The ISY-994i Home Automation Cookbook

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1 Disclaimer

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2 Introduction

I have been interested in home automation for several years. I started my journey looking into the X10 line of products, and now have moved into the INSTEON line.

There are basic controllers available such as the INSTEON and X10 hubs. These hubs are simple devices that let you control devices such as light bulbs, wall switches, outlets, and thermostats.

However, they did not offer me the degree of control I desired to automate my home. I would like to control devices programmatically, as well as other devices which are not INSTEON, X10, or other similar device, such as serial I/O devices.

Universal Devices produces an extensive line of ISY Series home automation controllers, which have these capabilities.

There is a lot of good information available on working with the ISY994 series of devices. You can find this information online in the Universal Devices Wiki[1], the Universal Devices Forum[2], and in the Comprehensive User Guide[3]. There are also many program samples, created by talented programmers available.

[1] (Universal Devices)
[2] (Universal Devices)
[3] (Universal Devices)

These sources provide a lot of great information. However, I have found that sometimes it is very difficult to find the information needed. Dependent on the search terms you enter, and where you look, you may, or may not find the information required.

That is why I have created this manual. I have tried to consolidate a lot of the information from these sources, into a single source. I have tried to give credit for this work to the appropriate authors/sources. Please see the footnotes and the Bibliography. I have also incorporated a lot of additional information which I have learned in setting up my system.

While I do have this book copyrighted, the freely available content is not. This content is listed in the bibliography. What I do consider copyrighted to myself is any of my personal work, which I have included, as well as the organization, structure, and formatting of this document.

This manual will help you install and configure your ISY and will provide links to additional resources that you may find helpful. It is not my intent for you to read this manual in its entirety before you can start working with your ISY. Instead, use it as you would a cookbook, looking for what you need at the time. If you have any issues working with your ISY, you should be able to quickly find the section in the index relating to the issue you may be having.

If you are interested in using the ISY and the built-in programming capabilities then this is the book for you. However, if you desire to extend the capabilities of the ISY by creating logic outside of the ISY, specifically using Polyglot, etc., then refer to the **ISY994i Developer's Cookbook**.

The instructions contained in this document should apply to firmware versions 4.2.18 and above, in the ISY. When the instructions do not apply to all versions of the ISY, the minimum firmware version will be noted.

3 ISY Overview

The ISY provides central control of home automation devices in a residence and is designed to play the role of home automation device controller in any domestic UPnP network. They are available in several different configurations. Choose the one that best fits your needs.

When properly accessorized, automation devices controlled by the ISY include: INSTEON lighting devices, ZigBee devices, Z-Wave devices, X10 lighting and power devices, relays, fans, curtain sweeps, thermostats, motion sensors, intruder alarms, power consumption monitors and many others. ISY interfaces securely to both wireless and wire line local area networks and the internet. Controlled systems can be managed via a browser interface from any smartphone or other internet browser from any location with internet access. This manual concentrates on INSTEON functionality in its examples. Depending on your device's options INSTEON may or may not be installed, however examples are interchangeable with other devices and protocols.

With the ISY, you can:

- Program, configure and manage your INSTEON, Z-Wave and X10 devices
- Automate your home using sophisticated timers, triggers, and macros
- Conserve energy in your home
- Remotely control your home using the ISY's web interface
- And, MUCH more!

3.1 Lighting and Power Overview

In order to make the most of the capabilities of the ISY, the user will find that a basic understanding of the devices to be controlled is helpful. This section contains a review of the salient characteristics of the types of device that the ISY can control.

When lights or power outlets are automated, the devices involved will almost always use Z-Wave, INSTEON, or X10 protocols. Such devices include light switches, power sockets, wired and remote controllers and IR receivers. Although INSTEON or X10 protocols can coexist in the same device (often referred to as dual-band), the way each of the protocols operates is quite different. The ISY controls both together so they can form a managed lighting solution that is simple to operate and easy to enhance.

3.2 The ISY Front Panel

The ISY's front panel has several elements with which you should become familiar:

Figure 1: ISY Front Panel

- The **LEDs** on the front of your unit show the current status of your ISY. They can also assist with troubleshooting any issues you may be having. For information on these LEDs see **23.1 Front and Rear Panel LEDs**

- A **Reset** button is located on the front of your ISY. To simply reboot your ISY, use a sharp object to briefly press the ISY's recessed **Reset** Button. To factory reset your ISY, please see **23.10 Factory Reset**

- Certain ISYs include an integrated **IR receiver** located on the front of the unit. This IR receiver can be used to control your home using an RC-5-capable universal remote control. See section **16 The Integrated IR Receiver**

- Your ISY may also include an externally accessible **SD card slot**. Please DO NOT remove the SD card while the ISY is running. ISY's without an external SD slot must be opened in order to replace the SD card. For instructions on replacing your SD card, please see **23.11 Upgrading Your SD Card**

3.3 The ISY Rear Panel

The rear panel of the ISY features the following:

The **Power port** is used to provide power to the ISY with an AC adapter. This may not be necessary if using a 2412S PLM but is required when using a 2413S PLM. Please use an AC adapter that provides 5V DC, a minimum of 300mA, and is center terminal positive.

Even if using a 2412S PLM, there are several reasons why you may want to use a separate AC adapter instead of power provided by the PLM:

- An AC adapter can be plugged into a UPS to help protect the ISY from power outages and power surges. The PLM cannot be plugged into a UPS.
- Powering the ISY using a separate AC adapter may help improve (by a small amount) the signal strength of the INSTEON PLM.

Port A is an RJ-45 connector used to attach your INSTEON PLM to the ISY. This allows the ISY to communicate with your INSTEON devices. Please use a standard Category 5e network patch cable (included) to connect your ISY to the PLM. WARNING: DO NOT use this port to connect to an Ethernet router or switch.

The **Monitor port** is a micro USB port used for initial configuration for users without a DCHP-enabled network, or for advanced troubleshooting. Please use a standard micro USB cable to connect your ISY to an available USB port on your PC.

The **Network jack** is used to attach the ISY to your Ethernet network. Use a standard Category 5e network patch cable (included) to plug your ISY into an available network jack on your router or switch. If connecting directly to a PC for programming, please use an Ethernet cross-over cable (not included). WARNING: DO NOT use this port to connect to an INSTEON PLM.

4 Installation

Installation of the ISY is completed in several easy steps. The following instructions assume that you are installing the ISY on a DHCP-enabled network (true in the vast majority of cases) and are using a Windows-based PC to connect to the ISY.

4.1 Hardware Installation

Installation of the ISY hardware is completed in three easy steps:

1. Connect your ISY into your home network. Plug one end of an included Ethernet cable into the ISY Network jack. Plug the other end of the cable into your router or network switch/hub.

2. Connect your ISY with the INSTEON PLM. Plug one end of an included Ethernet cable into ISY Port A. Plug the other end of the cable into your PLM.

3. Apply power to the PLM and ISY by plugging it into a standard power outlet. Do not plug the PLM into a UPS or surge protector of any kind. If possible, avoid plugging the PLM into an outlet on the same circuit as other electronic devices to ensure optimal communications with your INSTEON devices. For information on troubleshooting INSTEON communication issues, and tips on creating a reliable INSTEON network, se**e 23.7.1 Cannot determine Insteon Engine**

Once power is supplied to your ISY, it automatically boots up. The RX, TX, and Memory LEDs may flash briefly, and the POWER LED should be on steady. The two small green LEDs on the ISY's Network Jack should be on (indicating a good network connection) and may flash (indicating network activity).

for further details on the front panel.

4.2 Connecting to the ISY from a Local PC

There are several requirements for connecting to your ISY from a PC on your network:

- **Web Browser:** Please ensure your PC is running a Java-enabled web browser, such as Internet Explorer or FireFox.

- **Java:** Please ensure that the latest edition of Java is installed on your computer. The latest Java downloads may be found at: http://www.java.com/getjava

As shipped from the factory, the ISY is configured to obtain an IP address via DHCP. There are a few easy ways to connect to your ISY and find its local URL:

Option1: In most cases, the quickest and easiest way to connect to the ISY for the first time on a Windows PC is to open a web browser and type in the following URL: http://isy. If you have a MAC, please use Option 2 or 3 (below).

Option 2: If the above options are not working for you, or if you are on a non-Windows platform, please visit the following URL: http://isy.universal...com/994i/4.2.30 . (This link may not work with Chrome) If you have a MAC 10.6, please use Option 3 (below).

This launches a UDI-hosted version of the ISY's Administrative Console and attempt to locate the ISY on your network.

Option 3: To install the ISY's Java application on your PC and create an icon on your desktop, visit the following URL: http://isy.universal-devices.com/994i/admin.jnlp . If you have a MAC 10.6, please use http://isy.universal-devices.com/994i/admin16.jnlp . The icon allows you to get to the Admin Console without the need for a browser. - If you have MAC Yosemite and Java 1.8.40, please do make sure to follow the instructions here.

Option 4: You can also double-click the My Lighting icon that you'll find in your PC's My Network Places (in Windows XP) or Network (in Windows 7 or Vista).

The My Lighting icon requires that Windows is configured to discover UPnP devices on your network. If you do not see a My Lighting icon, look for an option on the left-hand pane called "Show icons for networked UPnP devices". Please click this option to allow Windows to automatically find the ISY on your network. In Windows 7 and Vista, please be sure Network Discovery is turned on.

Once you launch the Administrative Console, you will be presented with a login window asking you to authenticate your ISY. The default login information is:

Username: **admin**
Password: **admin**

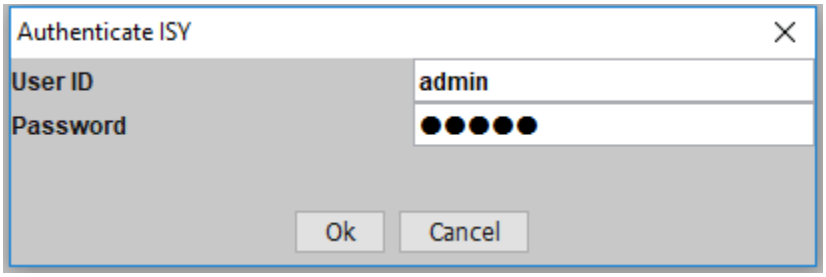


Figure 2: Login Window

Please refer to **5.1.1 Setting the User ID and Password** to change these values.

To find your ISY's login URL, click the HELP -> ABOUT pull-down menu:

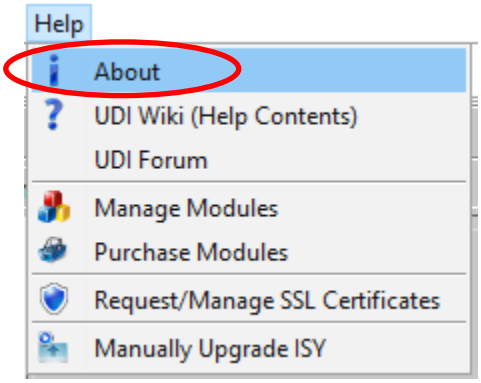


Figure 3: Help/About Menu

Then look for the address listed after "My URL."

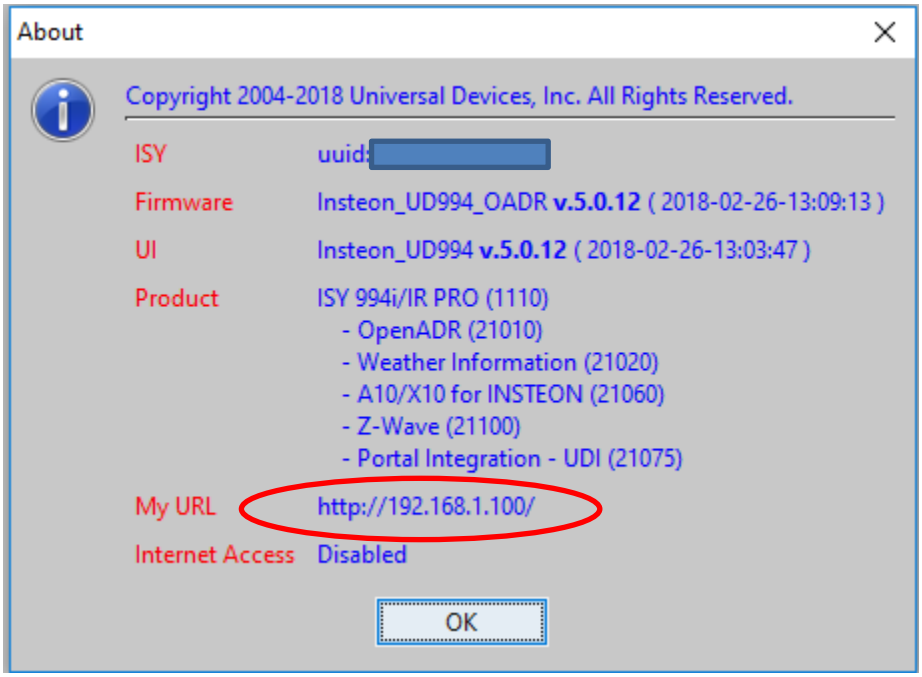


Figure 4: My URL

Type this into your web browser to quickly connect to your ISY in the future. Feel free to add this URL to your web browser's Favorites.

When using DHCP, in some cases your ISY may receive a new IP address from your router (or other DHCP server). If this happens, you may not be able to use the old address to connect to your ISY. To find your ISY's new address, simply double-click your My Lighting

icon or visit the following URL to automatically find the ISY (and its new address) on your network: http://isy.universal...com/994i/4.2.30

If you wish to assign your ISY a static IP address, please see **21.2 Assigning a Static IP Address to the ISY**

Once you find your URL, you are ready to start using the ISY. To connect to the ISY, launch your web browser and type the URL into the address bar. You will then be asked to authenticate. Again, the default login information is:

Username: **admin**
Password: **admin**

Once you login you will be presented with the ISY's HTML interface.

4.3 The HTML Interface

The ISY's HTML interface provides an easy way to interact with your ISY. The HTML interface does not require Java and is accessible from just about any web browser – including mobile phones and other devices!

Figure 5: ISY's Home Tab

You won't be able to do much until you start configuring your ISY, but here is a summary of what you can do with the HTML Interface:

Home Tab:

My Devices & Scenes – This is where you will find a list of all INSTEON devices and scenes you have on your ISY. You can control your devices and scenes as well as check their current state. Use this page to turn lights and other devices on or off, adjust your thermostats, and much more.

My Devices – Same as **My Devices and Scenes**, but this shows only your devices.

My Scenes – Same as **My Devices & Scenes**, but this shows only your scenes. You will learn more about Scenes in the section **7 Scenes.**

My Weather (only available if the optional Climate Module has been installed on your ISY) – This item is where you can see weather information available to your ISY. More information is available in the section entitled **6.5 Climate Module**

My Programs – By clicking this item you can view the status of any Programs you have stored on your ISY and also control them. You will learn more about Programs in the section entitled **5.3.2 Programs Tabs**

Networking Resources (only available if the optional Network Resources Module has been installed on your ISY) – This section is where you can view and control any network resources you may have configured on your ISY. More information is available in the section entitled **6.3 Network Module**

Networking WOL (only available if the optional Network Resources Module has been installed on your ISY) – This section is where you can view and control any Wake-On-LAN entries you may have configured on your ISY. More information is available in the section entitled **6.3 Network Module**

Cameras– This section is where you can add and view network bases IP cameras.

Elk (only available if the optional ELK Security Module has been installed on your ISY) – This section is where you can view and control any resources available from your ELK security system. More information is available in the section entitled **6.11 ELK Integration Module.**

Variables – This section is where you can view and control any Variables you have configured on your ISY. More information is available in the section entitled 8 Variables

Settings tab:

SubDevices – This option allows you to show or hide SubDevices. SubDevices are typically secondary buttons, such as non-load controlling buttons on KeypadLincs, etc.

Controllers – This option allows you to show or hide Controller-only devices, such as RemoteLincs and ControLincs.

Disabled – This option allows you to show or hide disabled devices. Devices can be disabled through the Admin Console.

Max Width – This option sets the width of the HTML interface.

Local Caching – Enabling this option tells the HTML interface to cache the node list to your system, potentially improving performance. If this option is enabled, however, you will need to periodically hit **Clear Cache** (see below) to refresh the interface and see changes to your node list.

Clear Cache – This button clears the disk and memory cache of the HTML interface allowing you to see the latest changes to your node list.

Install Admin Console – This button installs a local copy of the Admin Console applet to your system, creating a desktop icon so you can launch the Admin Console quickly and easily.

Admin Console tab:

Launches the ISY's Administrative Console (requires Java). The Administrative Console is where you will configure your ISY - adding devices, creating Programs, configuring the optional IR interface, and MUCH more.

There may be other items available in the HTML interface depending on how your ISY is configured, and what optional modules you have purchased.

4.4 Brower Based Interface (Supported on all Mobile Devices)[4]

4.4.1 UDAjax, ISY Default Web Interface FAQ's

4.4.1.1How do I access UDAjax?

- On Windows, click on http://isy
- On MAC/Linux or if http://isy does not work, go to Admin Console | Help | About and type the value for My URL into a browser

4.4.1.2What is UDAjax?

- UDAjax is the name of the default web interface for ISY.
- UDAjax is based on the IsyAjax custom web interface but with an updated layout and look.

[4] (Universal Devices)

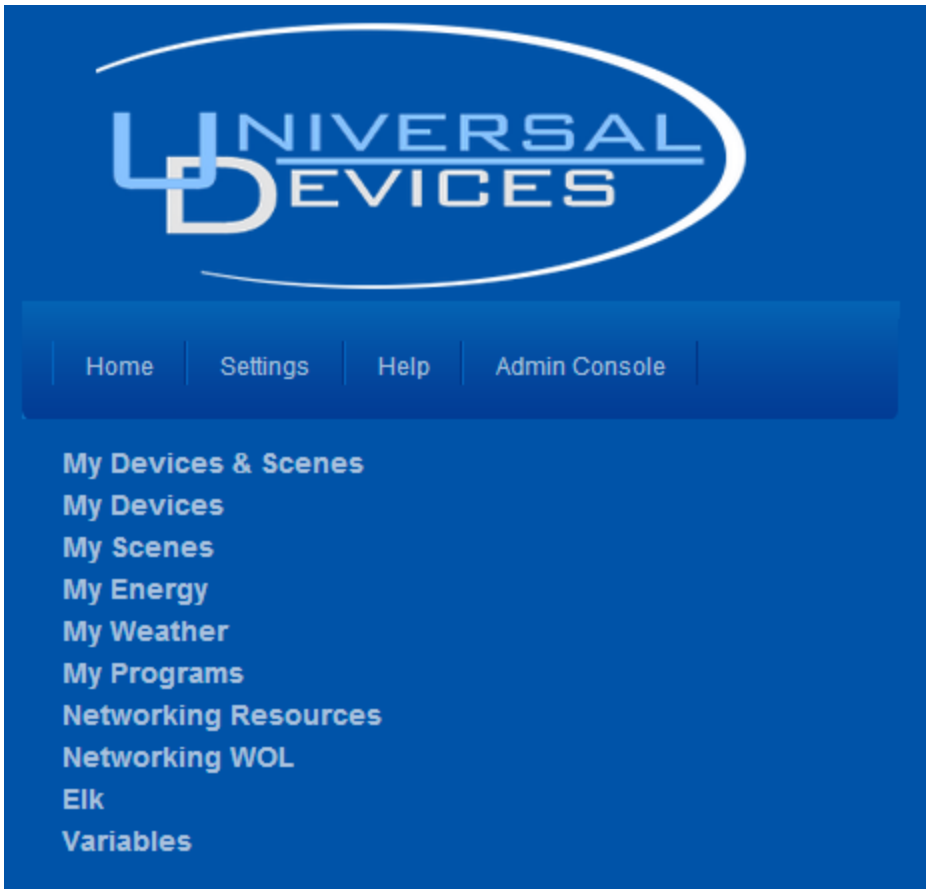


Figure 6: UDAjax Main Screen

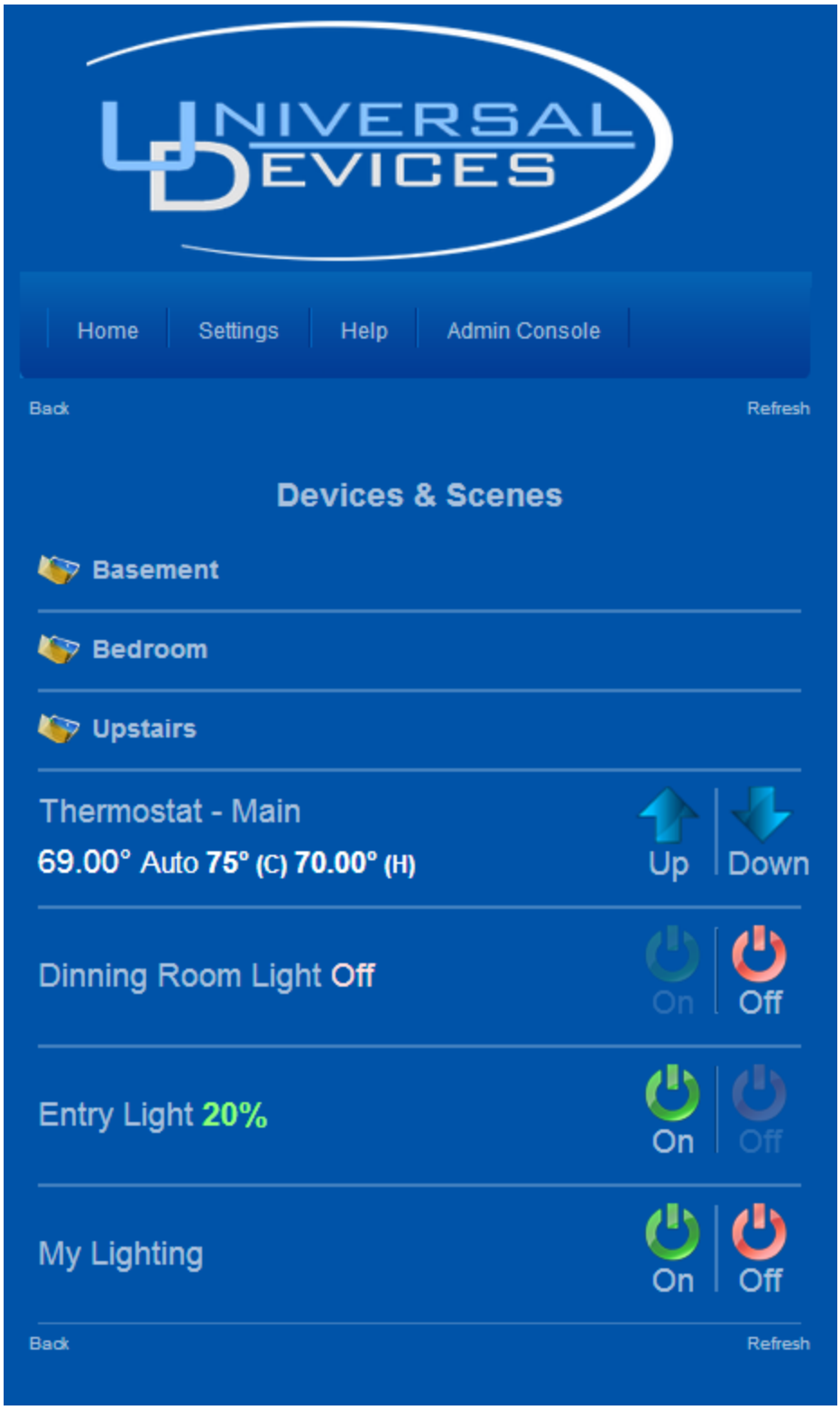


Figure 7: UDAjax Devices & Scenes Screen

4.4.1.3Can I hide a device or scene?

- Yes, by adding a ~ in front of the name of the device or scene in the admin console.

4.4.1.4Can I hide the logo and the top menu bar?

- Yes, by adding main panel=false to end of hash in the browser address (add an & in front if there is other data, just a # if there isn't)

4.4.1.5What settings can I change?

Figure 8: UDAjax Settings Screen

4.4.1.6Sub Devices, Hide/Show:

- Hide/Show the extra buttons on Keypads, Remotes etc.; An older option left in, using my Devices & Scenes and Grouping devices is usually a better option.

4.4.1.7Controllers, Hide/Show:

- Hide/Show control only devices such as RemoteLincs and ControLincs, based on their Insteon categories.

4.4.1.8Disabled, Hide/Show:

- Hide/Show disabled devices.

4.4.1.9Labels, Hide/Show:

- Hide/Show labels on controls on devices and/or scenes pages.

4.4.1.10Max Width:

- Changes how wide the interface is allowed to display.

4.4.1.11Local Caching:

- UDAjax will save a copy of the devices and/or scenes in the browser local cache in-between browser sessions.
- Use care enabling this feature as you will have to manually clear this cache on the settings page whenever you add, remove or change a device or scene and want to see the changes.
- Even with local caching disable the web interface will save a copy of the device and or scene list in memory, reloading/leaving the interface in the browser, or the Clear Cache button on the settings page will clear it.

4.4.1.12Camera Support (Requires 4.0.1 and above):

- Most Foscam's, Axis, and Panasonic Camera's are supported for easy config; Just select the brand and enter the ip and port.
- Any other camera that supports jpg snapshots can be added if you know the http url to get a jpg snapshot.

4.4.1.13Unsupported Camera's:

- Foscam FI9802W and probably most Foscam H.264 cameras, along with some other brands, do not support jpg snapshots needed to view the camera's in most browsers without upgrading their firmware to the latest version.
- Please note you can still use this model or other unsupported (but compatible) models by choosing "Other" as camera brand/model, and specifying the jpg/snapshot url.

4.4.1.14Password/Usernames:

- If the cameras don't support including the username and password in the later part of the url (axis cameras for example), the web page will include it right after the http:// as http://user:password unfortunately this isn't supported on all browsers but it is the best that can be done.

4.4.1.15Trouble Shooting

I am getting a parsing error loading ...

- Please make sure you don't have any un-allowed special characters in the names.
- Also check browser cache by clearing it in browser settings, using another browser/device or using private browsing.

A device or scene is missing:

- If you enabled local Caching on the settings page, please clear cache there.
- If not please check browser cache by clearing it in browser settings, using another browser/device or using private browsing

4.5 Launching the Administrative Console

The Administrative Console is where you will spend most of your time configuring and tuning the ISY, programming your devices, etc.

The best way to launch the Admin Console is from the following URL (requires internet access): http://isy.universal...com/994i/4.2.30

You can also install a copy of the Admin Console's applet on your local PC (icon created on desktop) by launching the following URL: http://isy.universal-devices.com/994i/admin.jnlp

Finally, you can also launch the Admin Console by clicking the link located on the ISY's HTML Interface.

Once launched, you will again be asked to authenticate to your ISY. The default login information is:

Username: **admin**
Password: **admin**

In the future you may go directly to the ISY's Administrative Console by appending */admin* to the URL. For example: http://192.168.0.101/admin

5 The ISY Administrative Console

The Administrative Console is divided into several tabs, each used to configure different aspects of your ISY. This section provides information to help you take advantage of the powerful features of the ISY Administrative Console.

The ISY's Administrative Console automatically checks for the latest firmware release. When a new release is detected, the ISY provides a notification message and instructions on how to perform the update. In some cases, however, you may want to manually download and install a different firmware release. For example, some beta releases may contain important features or device support that you may want to utilize. The Administrative Console will not notify you of beta firmware releases. Please refer to **23.12 Manually Upgrading Your Firmware** for instructions on how to manually install a release**.**

5.1 Basic Configuration

Before getting started, it's important to configure a few basic items on the ISY.

5.1.1 Setting the User ID and Password

For security reasons, please change the default User ID and Password used to connect to your ISY. Choose the **Set Userid/Password** option with the Administrative Console's **File** pull-down menu as shown below.

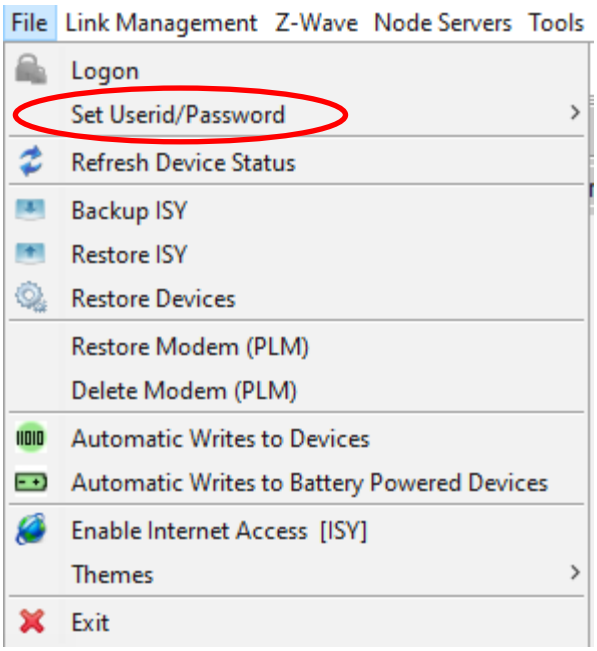


Figure 9: File Menu/ Set User ID/Password

When choosing your new User ID and Password, please consider the following:

- Both the User ID and Password must be entered
- Both the User ID and Password are case sensitive
- Both the User ID and Password must be between 3 and 10 characters
- The following characters are NOT allowed: < > / ; &

5.1.2 Setting the Time and Location

Click the ISY's **Configuration** tab, then the **System** sub-tab, to set your time (used for Program schedules) and location (used to calculate sunrise/sunset times).

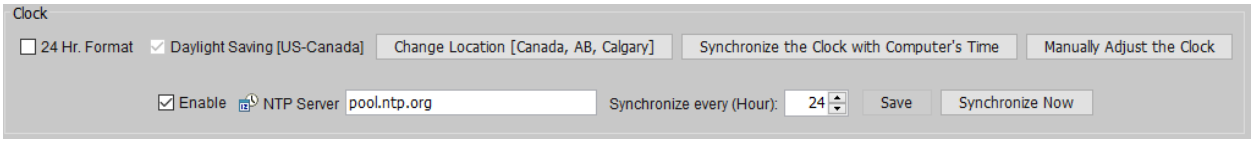


Figure 10: Setting the Clock

Please be sure to check the Daylight-Saving option if applicable in your area.

Also feel free to check and configure the NTP Server option if your ISY is able to access the internet. The ISY periodically syncs its clock with the specified NTP server to ensure accurate time. We recommend syncing every 24 hours, as too frequent connection attempts can result in the NTP server refusing the ISY's request.

After adjusting your settings, please be sure to hit the **Save** button.

5.1.3 Keyboard Navigation

Please note that pull-down menus are accessible via keyboard shortcuts as follows:

- **Alt-F** to access the **5.2.1 File Menu**
- **Alt-L** to access the **5.2.2 Link Management Menu**
- **Alt-Z** to access the **5.2.3 Z-Wave Menu**
- **Alt-N** to access the **0**

- NodeServers Menu
- **Alt-T** to access the **5.2.5 Tools Menu**
- **Alt-H** to access the **Help** menu

Once a pull-down menu is opened, use your **Arrow** keys to navigate and the **Enter** key to select a menu item. You can also enter letter keys to access many menu items quickly – look for menu items that contain underlined letters. For example, within the File pull-down menu, enter "b" to open the Backup ISY dialog box.

5.2 The Menu Structure[5]

5.2.1 File Menu

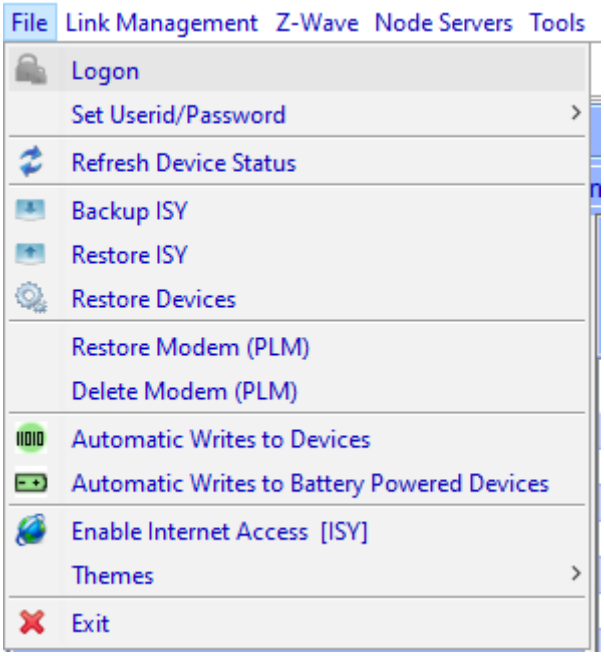


Figure 11: File Menu

5.2.1.1Logon

The Logon option will be enabled if you are not connected to the ISY. The system will prompt you that you have lost the connection and you must login. Once you select this option you will be required to enter your user name and password.

5.2.1.2Set Userid/Password

Once this menu option is selected the user can change the user name and password. The new user name and password should be typed in the appropriate fields. Please make sure

[5] (Universal Devices)

you remember the new user name and password as the default account of user name/password admin/admin will no longer work in future logins.

Firmware versions 5.0+ allow up to ten users, one of which is the administrator.

- Both User ID and password must be entered.
- User ID and passwords are case sensitive.
- The ID and password are limited to 10 characters maximum.
- The ID and password have a minimum of 3 characters.
- These characters are not allowed: < > / ; &

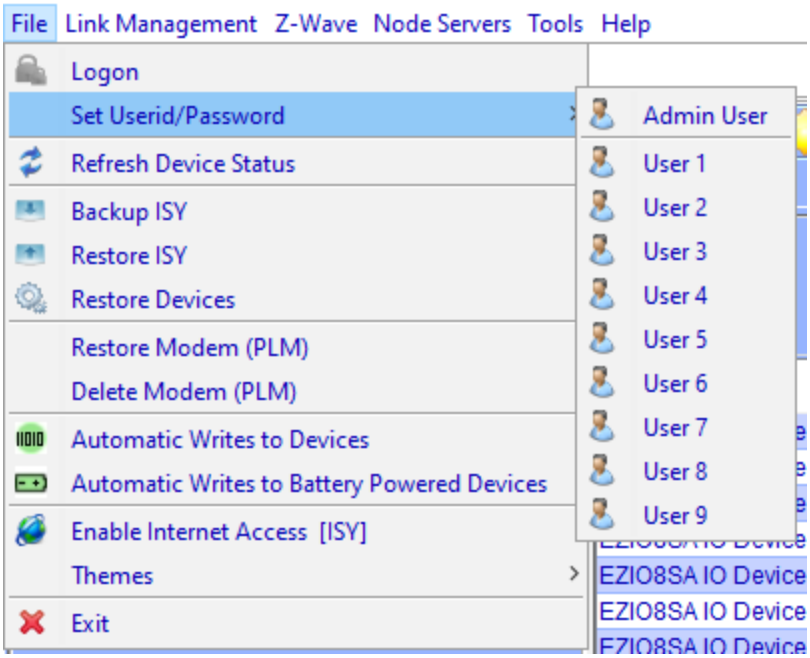


Figure 12: File -> Set Userid/Password Menu

5.2.1.3Refresh Device Status

This option refreshes the device status. Firmware v5+

5.2.1.4Backup ISY

Selecting this menu saves the entire ISY configuration in a file. The user will be prompted to select or type the storage location and name the configuration file. Note the location and file name for future use. The following system information will be saved to this file:

- Time Zone, Latitude, and Longitude
- Notification recipients
- Programs
- INSTEON devices information and scene memberships

- INSTEON devices links
- Scenes information

5.2.1.5Restore ISY

Selecting this menu option allows the user to locate and select the ISY's backup configuration file. Upon completion, this operation reboots ISY and closes your browser.

This option only restores the settings and has no impact on the underlying INSTEON devices and their configurations. If you wish to restore INSTEON device configurations, links, and settings please follow up this operation with Restore Devices menu option upon ISY reboot.

5.2.1.6Restore Devices

Selecting this menu option starts the ISY to use the current configurations settings stored within ISY and reprograms all the INSTEON devices based on them. Upon completion, this operation reboots ISY and closes Admin Console. This operation is most useful when a PLM is replaced or if INSTEON devices and their logical representations on ISY are out of synch. This scenario might happen if INSTEON devices are manually linked without using ISY's GUI. Please follow the instructions below:

- If you are replacing a PLM:
    - Please make sure you **reboot ISY with the new PLM before** doing anything else
    - Click on **File | Restore ISY** and restore a good backup. If you are replacing a defective PLM, choose a backup from right before the PLM died. This is a **very important step**
    - Once ISY reboots, wait for the query to complete
- If you have PRO series, click on the **Battery** icon on the top right corner of the tool bar. This prevents ISY from trying to restore battery operated devices since they are sleeping and will not respond
- Please make sure ISY is in **Ready** state
- Click on **File | Restore Devices** - this will take a long while
- In case ISY cannot communicate (or decides not to if an RF device/PRO Series) during the process, you will have a series of nodes with green 1011 icons in the device tree. For each one of those nodes:
    - If an RF device, ensure that the device is in Programming mode
    - Right mouse click | **Write pending updates** or **Write updates to device**...
    - For some newer INSTEON devices, you might have to repeat this step a couple of times since some devices may not go into linking mode

- If you have PRO series, click on the battery icon on the toolbar so that ISY goes back to normal mode

5.2.1.7Restore Modem (PLM)

This operation is most useful when you need to replace a defective PLM and the ISY is rebooted with a new PLM. When the communication links were established via the Link Management Menu, the PLM and INSTEON devices adds each device addresses it is linked to, in its own link table.

The ISY also reads and stores the PLM's address at boot up. The ISY stores all the configurations settings of the lighting network. If you are replacing a PLM the ISY will have the old PLM address link stored in it.

Warning: *Never replace your PLM while the ISY is running because it will assume it is still connected with the old PLM. The ISY will appear to work, but it will be writing the address of the old PLM into the device links, thus you will not see devices updates etc.*

If this menu option is selected, the ISY goes through all INSTEON devices looking for old and new PLM address links. If an old PLM address link is found, it replaces them with the address of the new PLM and adds the corresponding device link to the new PLM.

To replace a PLM:

- Unplug ISY from the power outlet
- Unplug the PLM from ISY and power outlet
- Connect ISY's port A to the new PLM
- Plug the new PLM into a power outlet
- Plug ISY into a power outlet
- Go to Admin Console and wait for system initialization to complete
    - If you have **PRO Series**, click on the Battery icon at the top. This will prevent ISY from trying to update programming on your RF devices which are probably in sleep mode
- Click on the **Restore Modem (PLM)** menu option
    - In case ISY cannot communicate (or decides not to if an RF device/PRO Series) during the process, you will have a series of nodes with green 1011 icons in the device tree. For each one of those nodes:
        - If an RF device, ensure that the device is in Programming mode
        - Right mouse click | Write pending updates ...

If the above procedure fails on many of your devices, it's highly recommended that you follow the instructions for *Restore Devices.*

5.2.1.8Delete Modem (PLM)

Before selecting this function, create a backup ISY file.

The modem (PLM) is the communication bridge between the ISY and the INSTEON devices. Without the modem and the links, you cannot control or get status from the INSTEON devices. When the communication links were established via the Link Management Menu, the PLM and INSTEON devices adds each device addresses it is linked to, in its own link table. The ISY also stores the PLM's address.

If you need to remove a modem from your lighting network, select this function. It will disconnect the ISY from the PLM and the PLM from all INSTEON devices in the network, removing all the links between them. This ensures orphaned links do not exist in the INSTEON devices when the PLM is removed from the lighting network. Also, it ensures the ISY is not looking for the removed PLM.

Orphaned links are links between two devices where one is no longer in the network. Orphaned links will affect the lighting network performance. A device with an orphaned link to a missing PLM will create unnecessary network traffic by trying to communicate with the PLM multiple times. This in effect will slow down the network response.

All ISY programs, Triggers or Schedules, will not work when you remove the modem from the lighting network. Also, the actual status of all INSTEON devices will not be synchronized with the status reported on the screen.

5.2.1.9Automatic Writes to Devices (ISY99i Pro)

By default, the ISY is set to automatically write updates to devices as you make changes in the Admin Console. In some cases, you might prefer to queue your changes and write all changes to devices at a more convenient time. Therefore, the PRO Series provides the option to either write automatically or manually.

When this option is on, changes are written automatically to devices. Toggle this option off to disable automatic writes. When toggled back on, all pending changes will be sent to devices.

- If *Automatic Writes to Battery Powered Devices* is disabled those devices will not be updated.
- At any time, you may write changes to a single device by selecting *Write Updates to Device* from the device context menu.
- The ISY keeps track of all your changes, this determines when they will be written.

Devices that have pending changes waiting to be written are marked with a green icon in the device tree as pictured here:

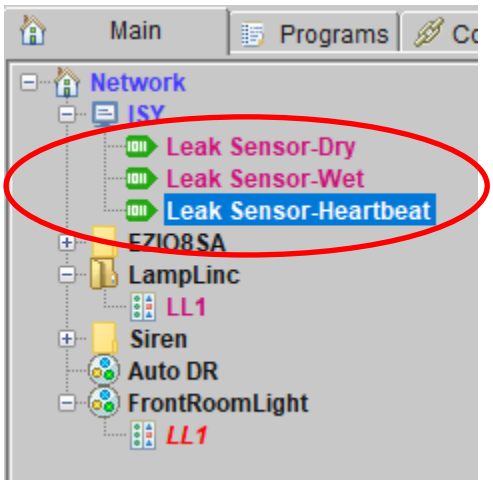


Figure 13: Devices with Pending Changes

To write all pending changes for a single device (without turning Automatic Writes back on), simply right-click the device and choose **Write Updates to Device**:

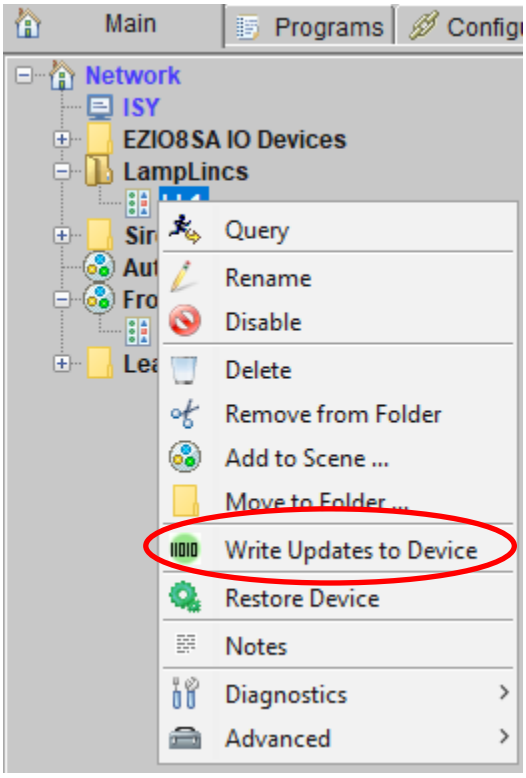


Figure 14: Write Updates to Device Screen

5.2.1.10Automatic Writes to Battery Powered Devices (ISY99i Pro)

By default, the ISY is set to automatically write updates to devices as you make changes in the Admin Console. In some cases, you might prefer to queue your changes and write all changes to devices at a more convenient time. Therefore, the PRO Series provides the option to either write automatically or manually.

This option toggles automatic writes only for battery powered devices. Most battery powered devices need to be manually set to linking mode to accept changes, so utilizing this option to queue up multiple changes can help save time.

- At any time, you may write changes to a single device by selecting *Write Updates to Device* from the device context menu.
- The ISY keeps track of all your changes, this determines when they will be written.

Devices that have pending changes waiting to be written are marked with a green icon in the device tree as pictured here:

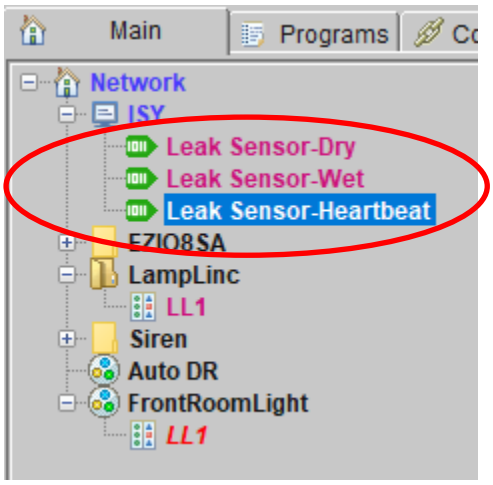


Figure 15: Devices with Pending Changes

To write all pending changes for a single device (without turning Automatic Writes back on), simply right-click the device and choose **Write Updates to Device**:

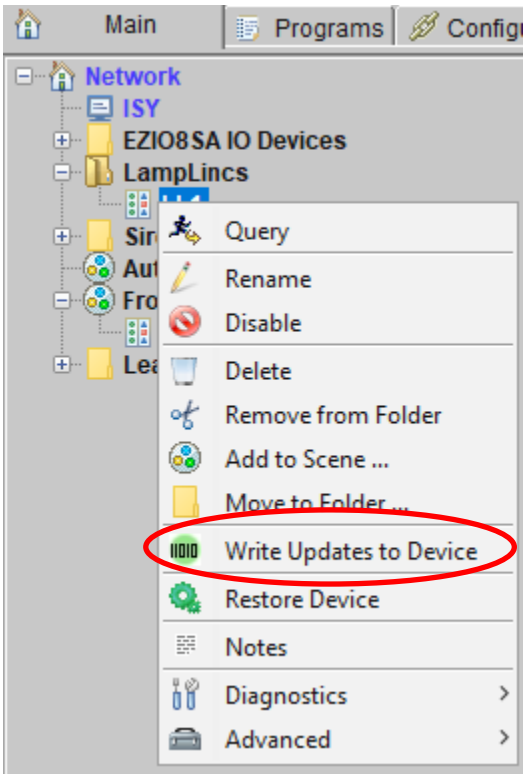


Figure 16: Write Updates to Device Screen

5.2.1.11Enable Internet Access (ISY)

In order to achieve remote/internet access, you will need to setup your router for port forwarding. Port forwarding allows the ISY's port to be seen over the internet.

The controller default setting is with internet access disabled. If you would like to enable internet access to the controller select this option. It is reversible and you will be presented with the Disable Internet Access menu option.

You may have to set up your port forwarding in your router.

5.2.1.12Themes

This option will allow you to change the look of your ISY console.

You can choose among several predefined color schemes to suit your preference. To select a different theme, click the **File** pull-down menu, then **Themes**, then **Theme Color** and

choose your scheme. Please note that the Administrative Console must be closed and re-opened for your Theme change to take effect.

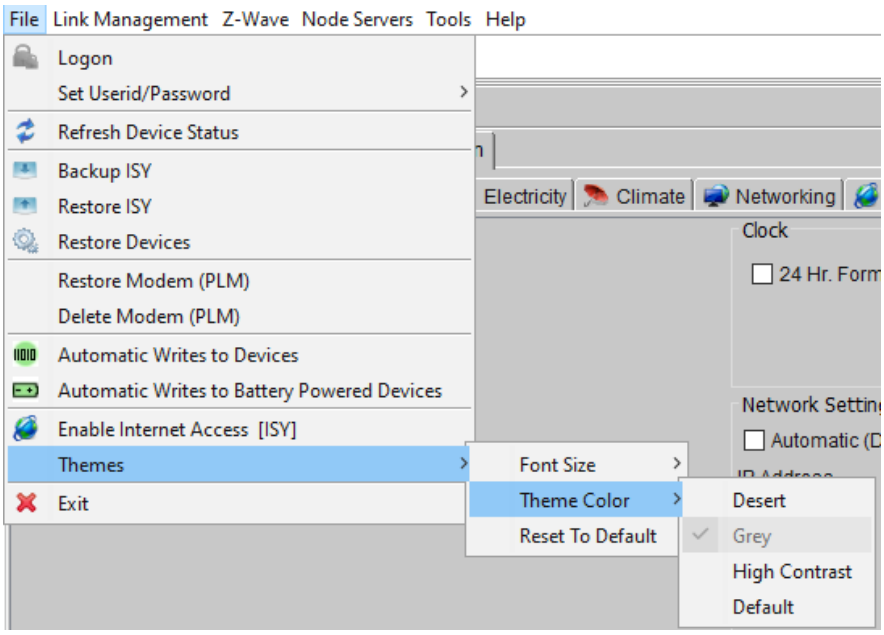


Figure 17: File -> Themes -> Theme Color Menu

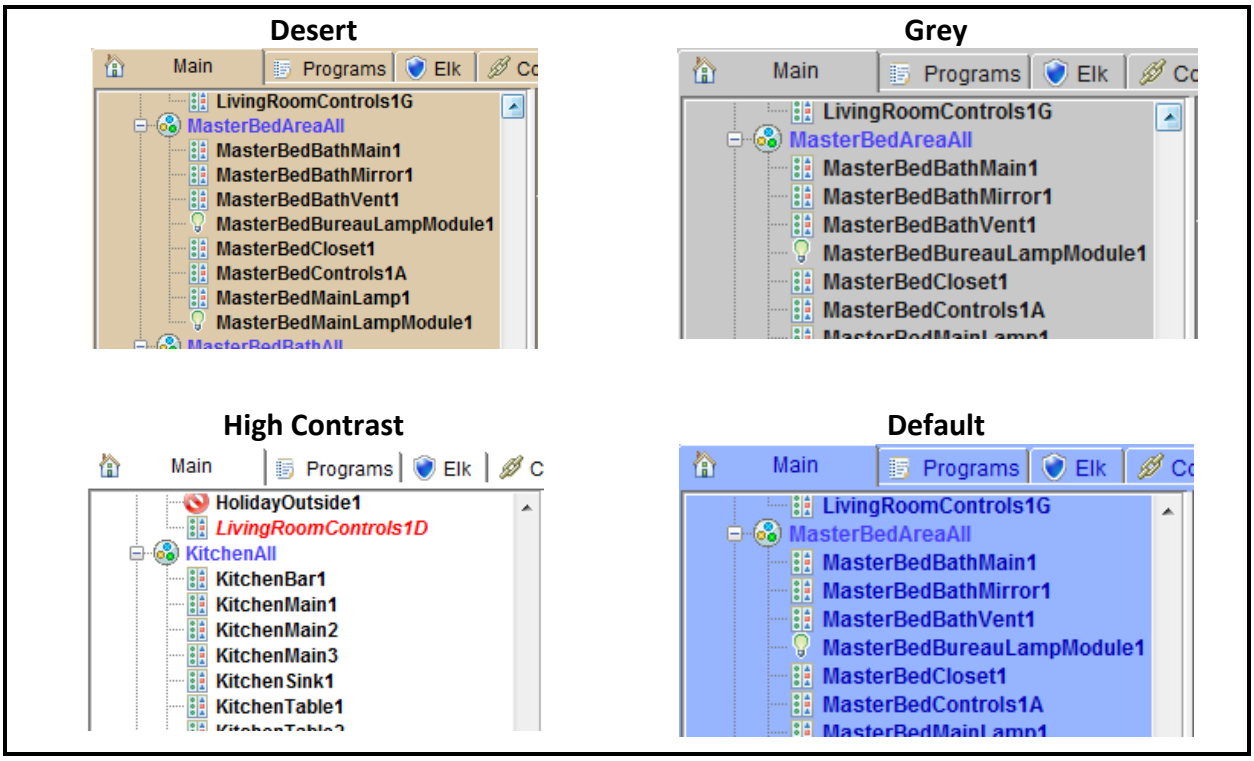


Figure 18: Theme Samples

You can choose font sizes from 12 thru 20 points.

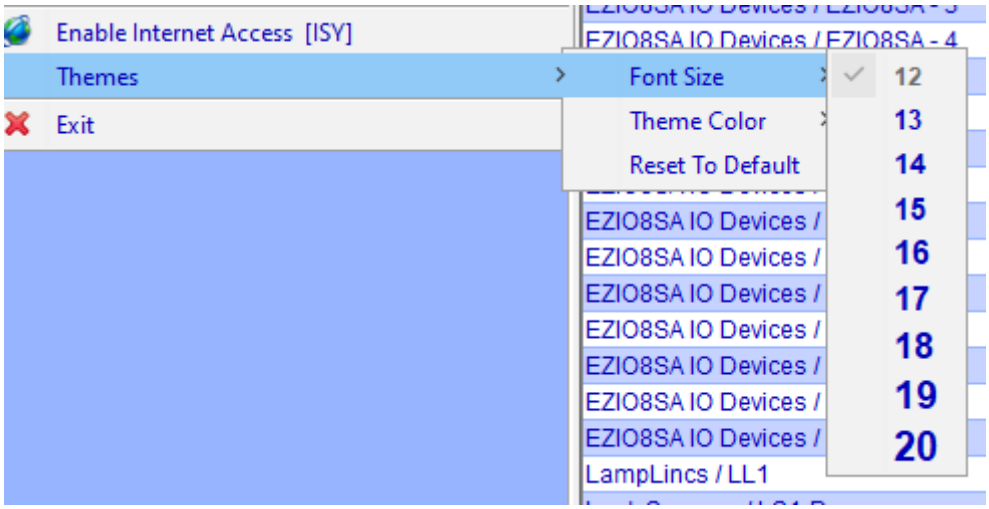


Figure 19: File -> Themes -> Font Size Menu

You can also restore the theme to the original configuration.

5.2.1.13Exit

Once this menu option is selected this application will end and the browser window will close.

5.2.2 Link Management Menu[6]

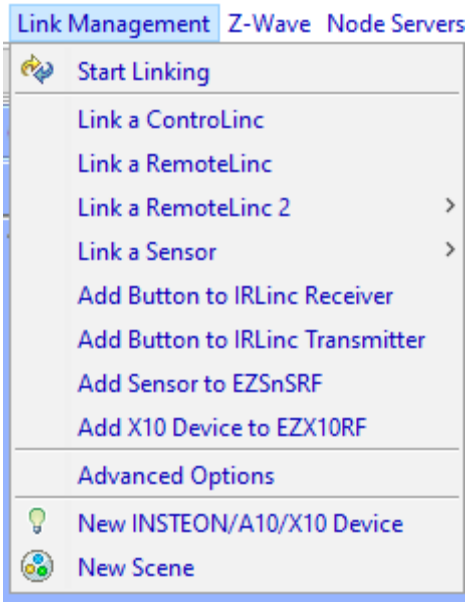


Figure 20: Link Management Menu

5.2.2.1Start Linking

The majority of INSTEON devices can be added using this method. Once this option is selected, simply go to each INSTEON device to be controlled and hold the **Set** button for 3-5 seconds. The ISY will then see each device and add it to the device list. When you hold the **Set** button on each device, the device is added to the left-hand pane. Adding devices to the ISY can take anywhere from a few seconds to minutes per device, depending on how many existing links are contained within each device. Please be patient.

Once you are finished adding devices, hit the **Finish** button which completes the process. Before adding devices to the ISY, it's important to understand the 3 different options presented:

[6] (Universal Devices)

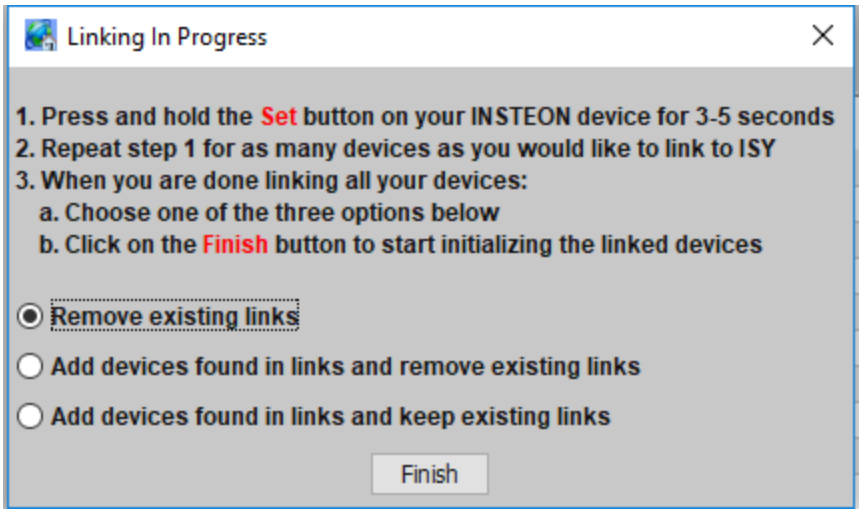


Figure 21: Linking Options

- **Remove existing links.** This option adds the device to the ISY, and also removes any existing links in the device. This is the default and the best option to choose if you would like a clean start, or if it is a brand-new device.

- **Add devices found in links and remove existing links.** This option not only adds the device, but also adds any devices that the device is linked to. Once complete, it removes any links contained within the devices. This helps save some time if you have a device you have already linked with other devices, but still clears out all links to give you a fresh start.

- **Add devices found in links and keep existing links.** This option not only adds the device, but also adds any devices that device is linked to. It also keeps any pre-existing links between devices and builds ISY scenes out of those links. This is the best option to choose if you'd like to preserve all existing links between devices.

5.2.2.2Link a ControLinc

Choose this menu to link a ControLinc.

- **The Insteon address is on the back of the ControLinc, usually under the table-top stand.**

Enter the Insteon address in the requester. Then click on the "Ok" button.

Note: You cannot discover or find other devices linked to the ControLinc using this option.

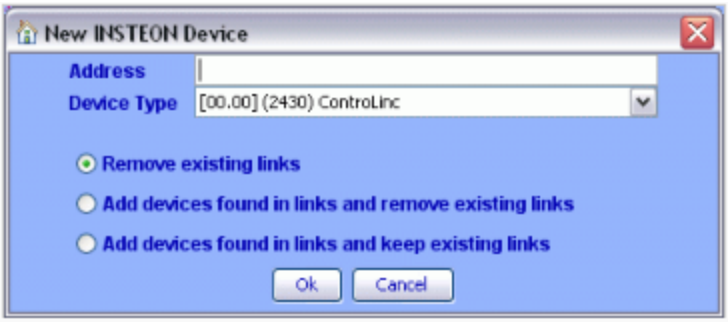


Figure 22: Link a ControLinc

5.2.2.3Link a RemoteLinc

Choose this menu item to link a RemoteLinc.

- **The Insteon address is on a sticker inside the battery compartment.**

When the “Link a RemoteLinc” dialog appears, press and hold the “Bright" and "Dim” buttons for 10 seconds or until the RemoteLinc’s light starts flashing. Then click on the “Ok” button.

Figure 23: Link a RemoteLinc Confirm

Enter the Insteon address of the RemoteLinc and press okay.

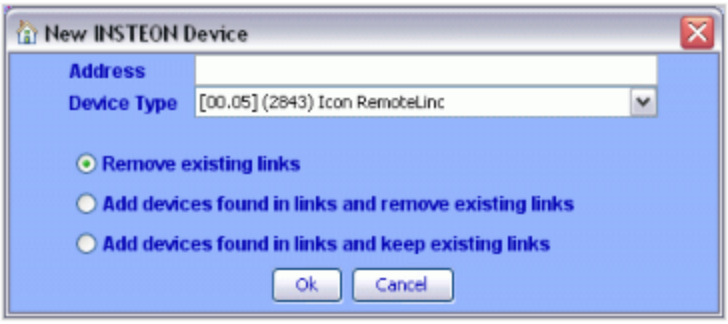


Figure 24: Link a RemoteLinc

When done linking communication mode can be quit by pressing the All Off button.

- Buttons can be added to scenes the same as any other controller.

5.2.2.3.1RemoteLinc FAQs

If one of the numeric buttons is pressed to exit linking mode that button will no longer send the On and/or Off commands.

A simple factory reset (without removing the RemoteLinc from the ISY) followed by a Restore - ensuring that you press the All Off button to exit linking mode

A full recovery procedure would be to:

- Remove the RemoteLinc from the ISY.
- Factory reset the RemoteLinc.
- Re-link the RemoteLinc to the ISY - ensuring that you press the All Off button to exit linking mode when done.
- Re-establish your button scenes.

5.2.2.4Link a RemoteLinc 2

Firmware 3.1.17+

Choose this menu item to link a RemoteLinc2. Select the proper device from the sub-menu; Switch, 4-Scene Keypad, or 8-Scene Keypad.

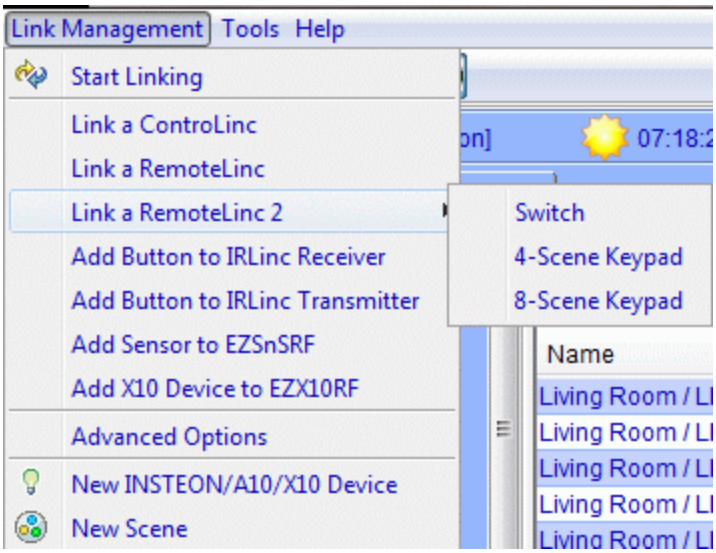


Figure 25: Link a RemoteLinc 2

- Put RemoteLinc2 in **Programming Mode**:
    - Ensure the on/off switch is in the On position
    - Press and hold the **Set** Button at the base of the RemoteLinc2 until the LED starts flashing green (takes about 3 seconds)
- **The Insteon address is on a sticker on the back of the RemoteLinc2.**

After the nodes are added to the ISY press the set button on the RL2 twice to quit linking mode.

- To maintain compatibility with the 4-Scene Keypad an 8-Scene Keypad uses groups 1, 3, 5, 7 for the buttons on the right side of the RemoteLinc2 (B, D, F, H) and groups 2, 4, 6, 8 for buttons on the left of the RemoteLinc2 (A, C, E, G).

5.2.2.5Link a Sensor

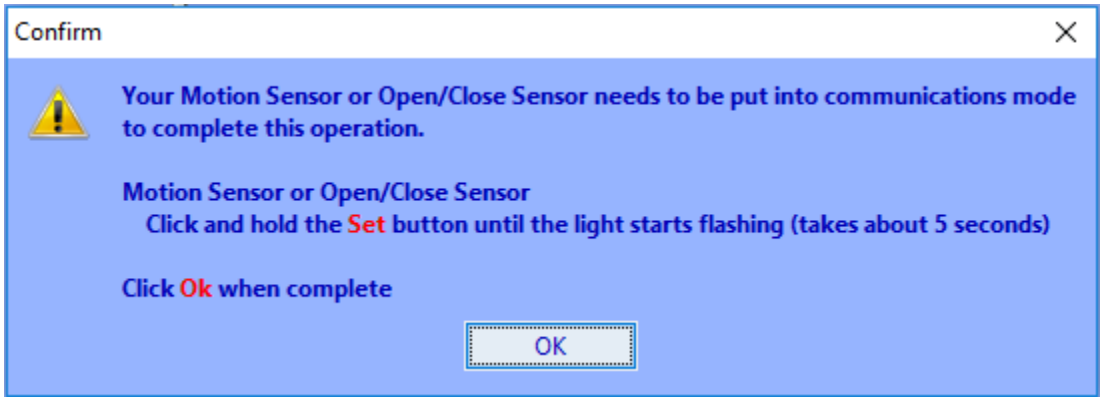


Figure 26: All Link Sensors have this type of popup

5.2.2.5.1Link an Open/Close Sensor

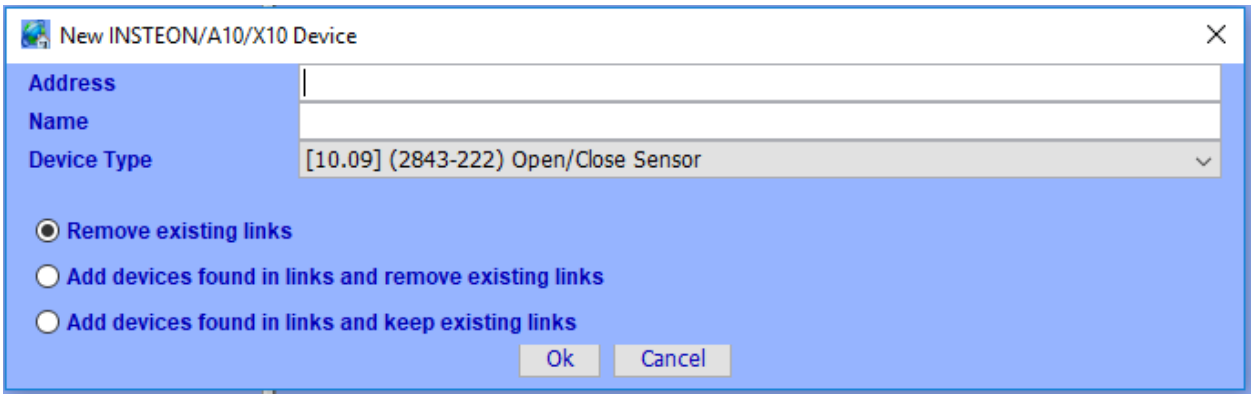


Figure 27: Link an Open/Close Sensor

5.2.2.5.2Link a Door Sensor

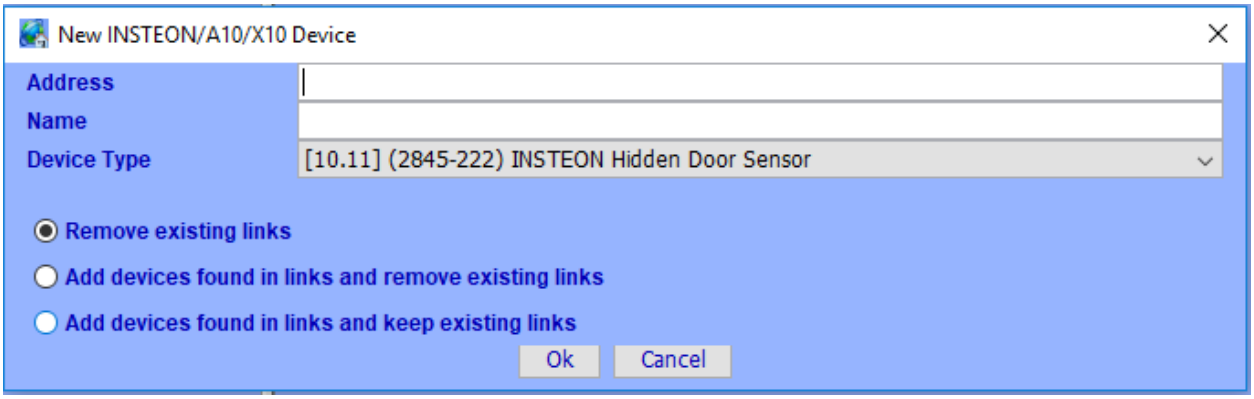


Figure 28: Link a Door Sensor

5.2.2.5.3Link a Motion Sensor

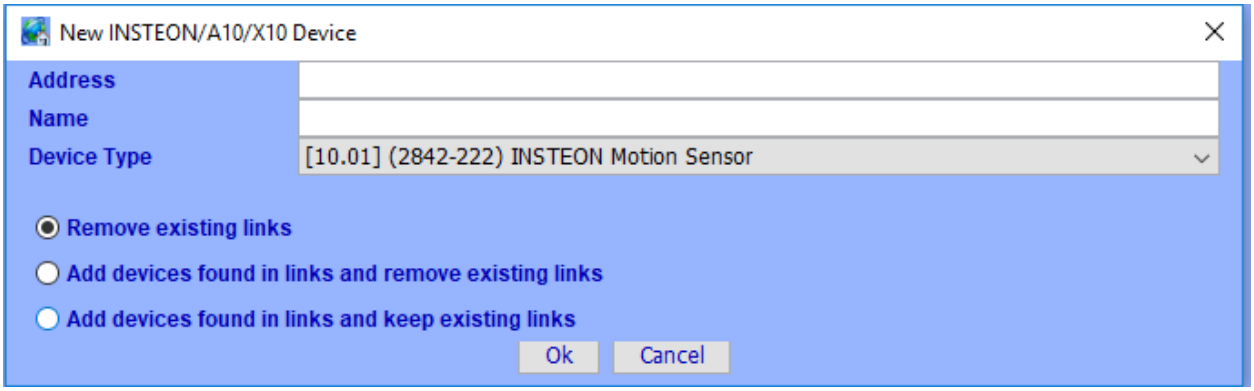


Figure 29: Link a Motion Sensor

5.2.2.6Add Button to IRLinc Receiver

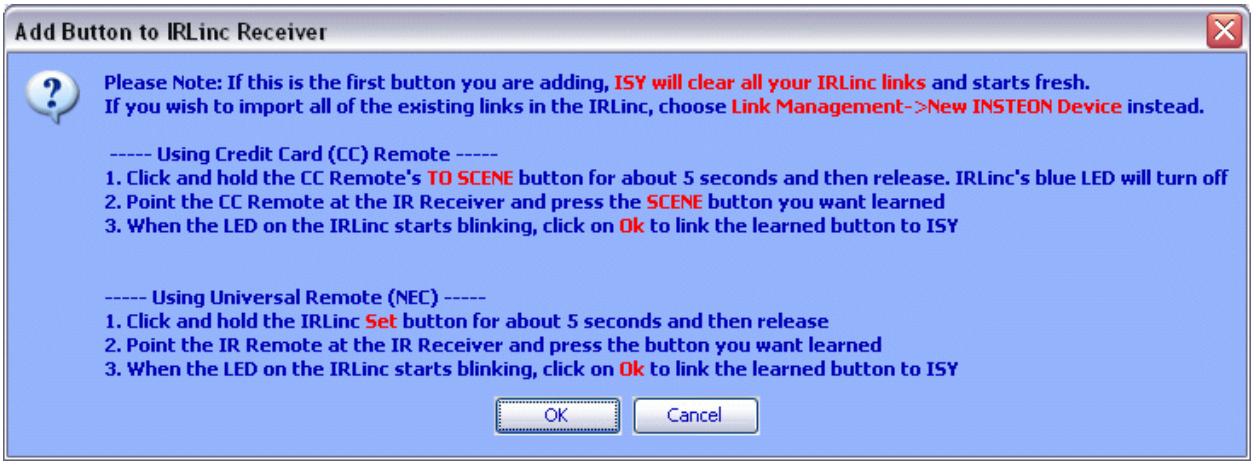


Figure 30: Add Button to IRLinc Receiver

Note: The Scene Control buttons (A-H) are On/Bright, Off/Dim buttons and control only one scene. Once either the On or Off button is linked to the ISY the other button is automatically linked.

Create Non-Toggle Links - (Always sends only on/off commands)

This can be handy if you want to create a button that is “All Off” or “Movie Time” (or other situations where you want the button to do the same thing every time you press it). This is also sometimes referred to as “non-toggle” mode.

- Select the "Add Button to IRLinc Receiver in the ISY Link Management pulldown menu
- Press & hold the IRLinc Set button for about 5 seconds, then release
    - Blue LED will turn Off
- Point your IR remote at IR Receiver, and press the button to be learned
    - Blue LED will begin blinking
- Tap IRLinc’s Set button once (to always send an on), or twice (to always send an off)
    - Blue LED will continue blinking
- On the ISY, click on Ok to link the learned button to ISY
    - Blue LED will return to on as normal after ISY completes linking

Optional: Factory Resetting your IRLinc

If you remove all the links to the IRLinc from the ISY it should clean up everything, but just in case you need to you can factory reset the IRLinc before linking it to the ISY.

- Unlink all the links in you ISY to the IRLinc
- Unplug the IRLinc, wait 10 seconds
- Press and continue to hold the Set button for 5 seconds while plugging the unit back in, then release
    - About 20 seconds after releasing the Set button, blue LED will flash twice to indicate a successful reset
    - Note: Blue LED may or may not be on during reset

5.2.2.7Add Button to IRLinc Transmitter

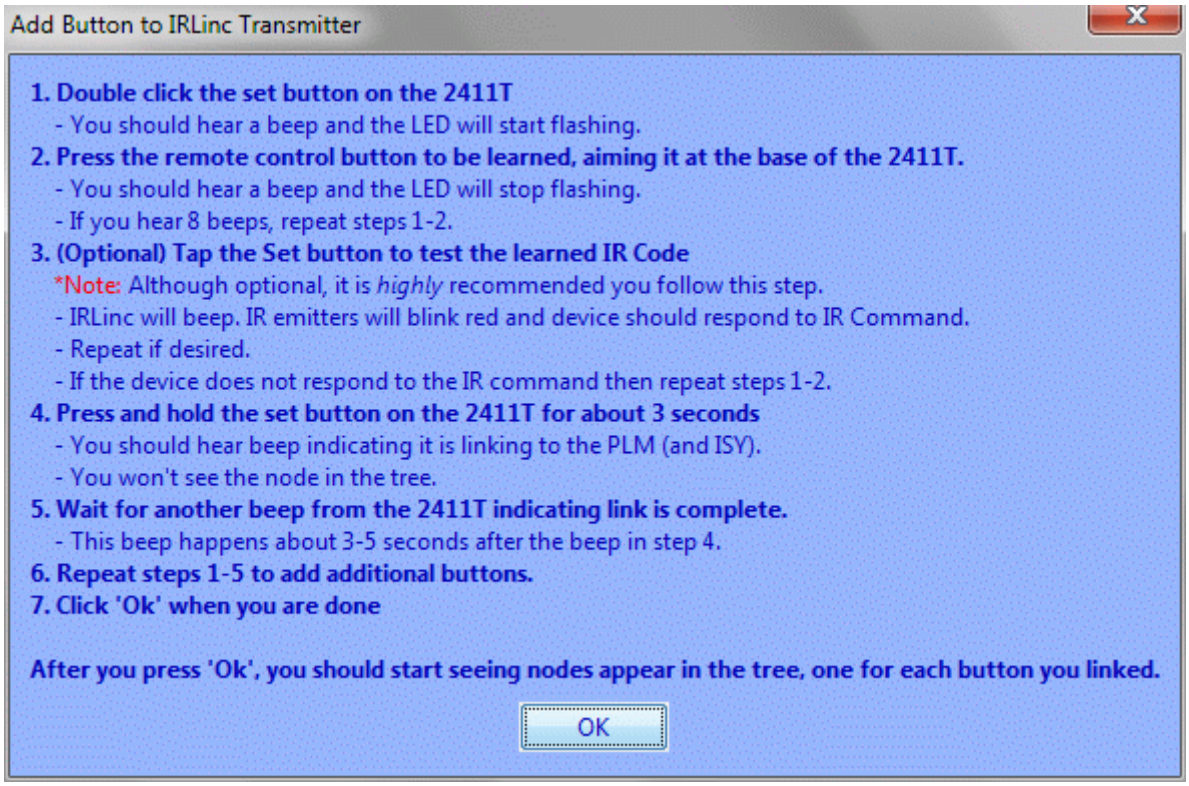


Figure 31: Add Button to IRLinc Transmitter

5.2.2.8Add Sensor to EZSnSRF

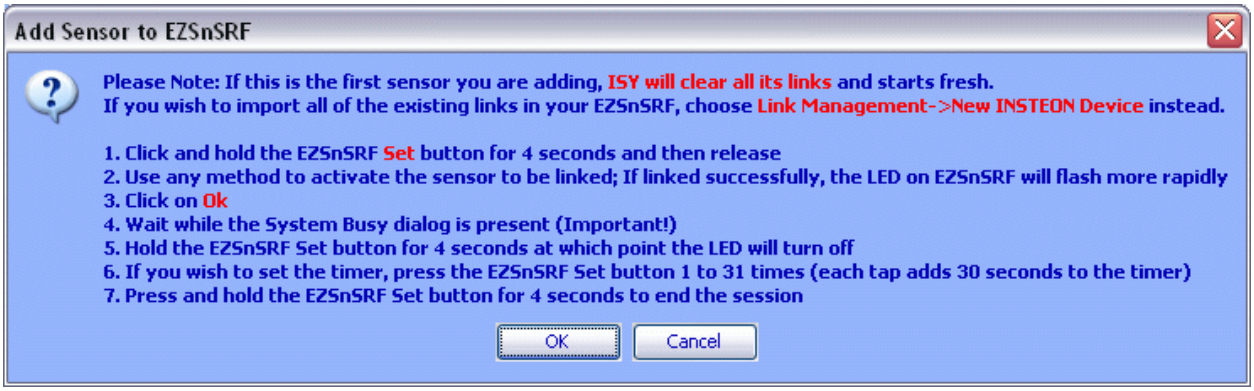


Figure 32: Add Sensor to EZSnSRF

5.2.2.9Add X10 Device to EZX10RF

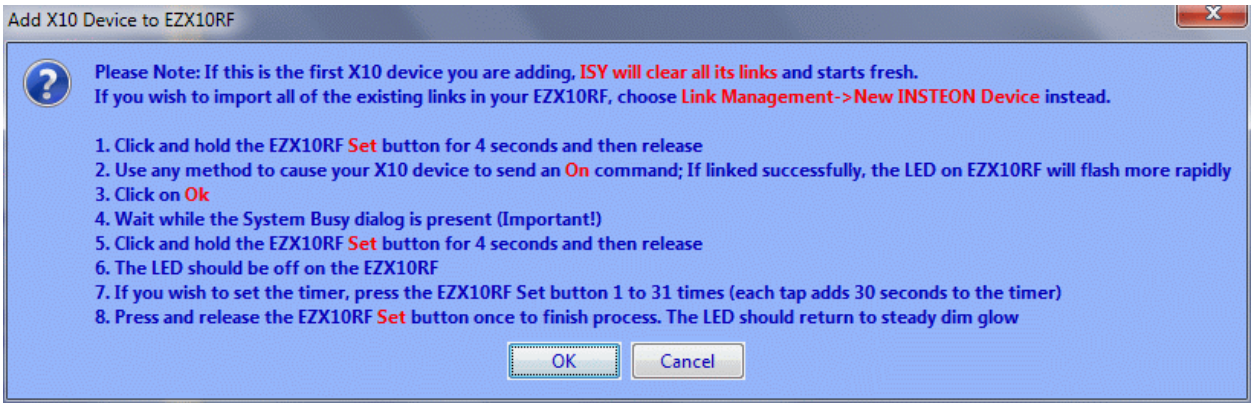


Figure 33: Add X10 Device to EZX10RF

5.2.2.10Advanced Options

Only available in firmware version 2.6.13+

This option adjusts the method used when the ISY is programming your devices. Please do not use this option unless instructed by UDI support staff.

Smarthome has introduced a new protocol which uses extended messaging called i2. This is intended to make communication faster and more reliable. Some devices introduced during the changeover have both protocols enabled and can sometimes report as i2 although the protocol is not fully implemented. Universal Devices has added, for firmware version 2.6.13, an option to select the original Insteon communication protocol, termed i1, in case the Automatic option fails.

- This option should normally be left on Automatic which uses a query into the device database to determine the best way of communicating.

Figure 34: Configure INSTEON Message Confirm

5.2.2.11New INSTEON/A10/X10 Device

NOTE: This option is entitled **New INSTEON/X10/A10 Device** if the optional X10 Module is installed. Please see **6.4 A10/X10 Experimental Support** for more information.

Choose this menu if you already know the INSTEON address of a device and if you do not wish to use the regular linking method of pressing the "Set" button.

After selecting this menu option, the "New Insteon Device" dialog appears as shown below:

- Enter the INSTEON address of the device using the following format where A, B, and C are the address parts as depicted on the INSTEON device itself
  - A B C or
  - A.B.C
- Optionally you can select the Device Type from the drop-down list
- Click on "Ok"

This operation performs the same action as the New INSTEON Device button on the tool bar ( ).

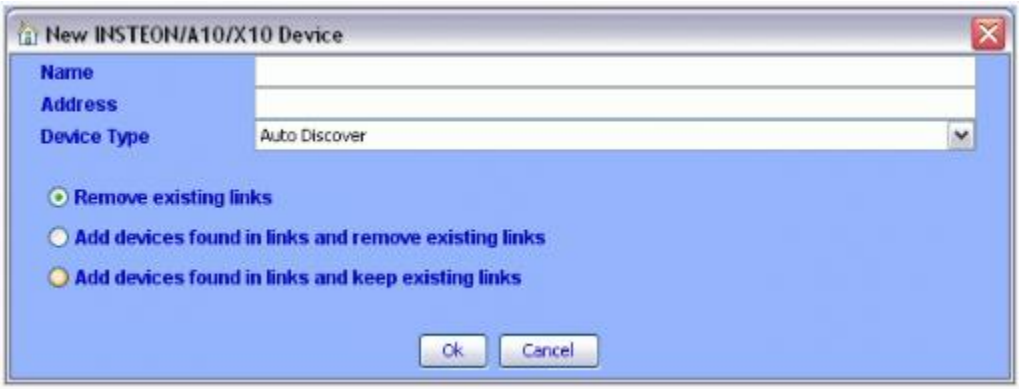


Figure 35: New INSTEON/A10/X10 Screen

5.2.2.12New Scene

Creating Scenes in ISY allows the user to set ramp rates, set on level, link or group devices without physically going to each device(s) to manually set, link or group them. Let's say you want to link a device in a bedroom to a device in the kitchen. When manually linking these devices, you will have to physically go to the bedroom device set it to linking mode then go to the kitchen device set it to linking mode. This process can be done via the ISY by creating a scene, naming it, then placing the bedroom and kitchen devices into the scene. The system will automatically link and program the devices.

Once you select this menu you will be presented with the "New Scene" dialog requesting a name for the new Scene. Enter the name you prefer (the name can be changed at a later time) and click on "Ok". The new scene will be added to the tree view on the left pane.

This operation performs the same action as the New Scene button on the tool bar ( ).

Figure 36: New Scene Dialog

You can drag and drop any one of the devices already linked to the system into any scene. If you click and drag correctly you will see a plus sign next to the device you are dragging. Dragging devices to scenes will not remove it from the master list of devices (ISY Node) or from other scene(s) they already belong to. As such, each device may belong to many scenes. You can select multiple devices by holding down CNTRL key and selecting the devices with the mouse pointer. Drag the selected devices and drop them into the scene folder. A prompt screen to set which device is the controller or responder will be presented. Select the device then click on the "Controller/Responder" button to set the device. This button toggles between responder and controller.

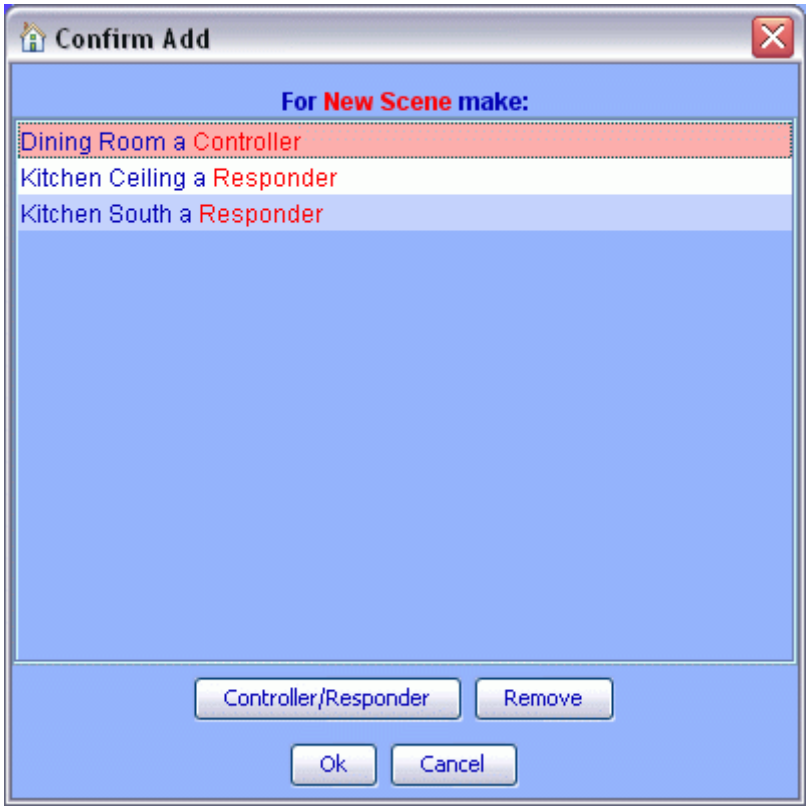


Figure 37: Confirm Add dialog or prompt

A device assigned as the controller of the scene is the device that initiates the scene. This device will control the responders according to the level and ramp rate settings.

It may take roughly 10 seconds to a few minutes to reprogram the device(s) to become part of a scene depending on the complexity and the number of other devices, and especially controllers/masters, for that scene.

This operation performs the same action as the New Scene button on the tool bar.

5.2.3 Z-Wave Menu

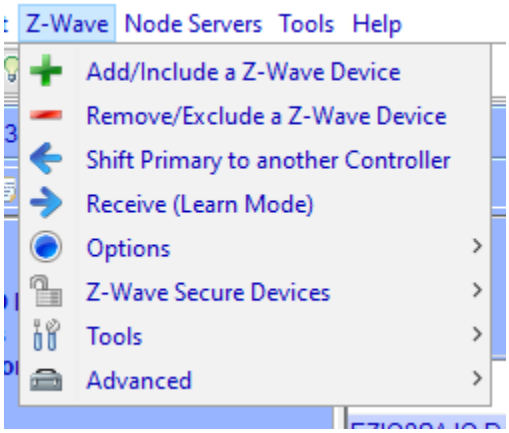


Figure 38: Z-Wave Menu

5.2.3.1Add/Include a Z-Wave Device

This option will scan your network for Z-Wave devices, which you can add to the network.

See section **15.1.2 Add/Include a Z-Wave device**

5.2.3.2Remove/Exclude a Z-Wave Device

This option will scan your network for Z-Wave devices, which you can remove from your network.

See section **15.1.3 Remove/Exclude a Z-Wave device**

5.2.3.3Shift Primary to another Controller

See section **15.1.4 Shift Primary to another Controller (Controller Shift)**

This option will scan your network for Z-Wave devices, which you can then shift to another network.

See section **15.1.4 Shift Primary to another Controller (Controller Shift)**

5.2.3.4Receive (Learn Mode)

See section **15.1.5 Receive (Learn Mode)**

5.2.3.5Options

This menu item has the following options available:

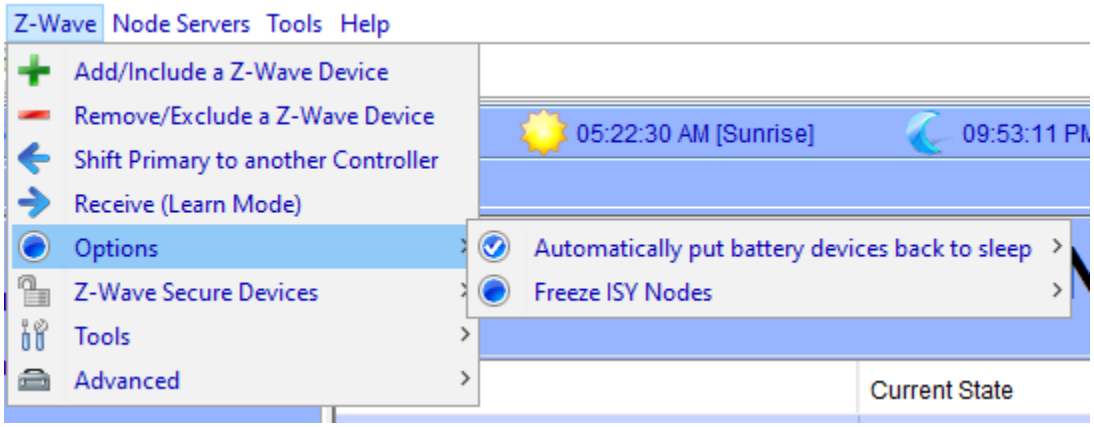


Figure 39: Z-Wave -> Options Menu

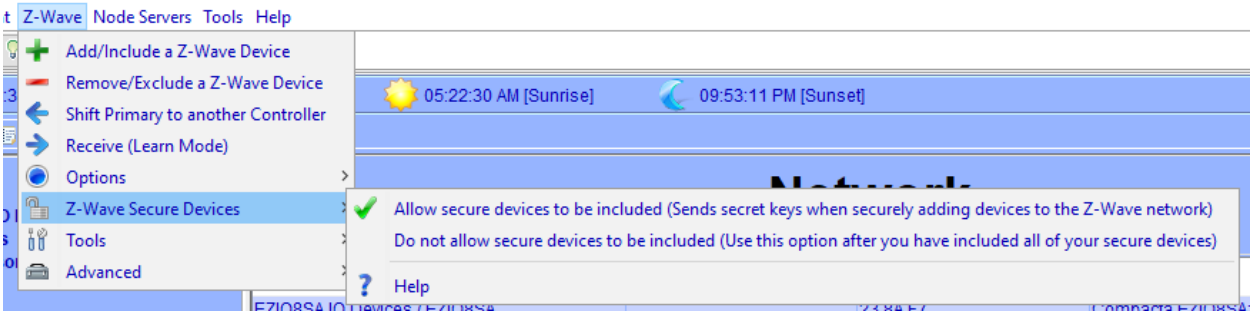


Figure 40: Z-Wave -> Z-Wave Scene Devices Menu

5.2.3.6Z-Wave Secure Devices

See section **15.1.6 Z-Wave Secure Devices**

5.2.3.7Tools

The tools menu has options allowing you to synchronize node, as well as do backup and restores.

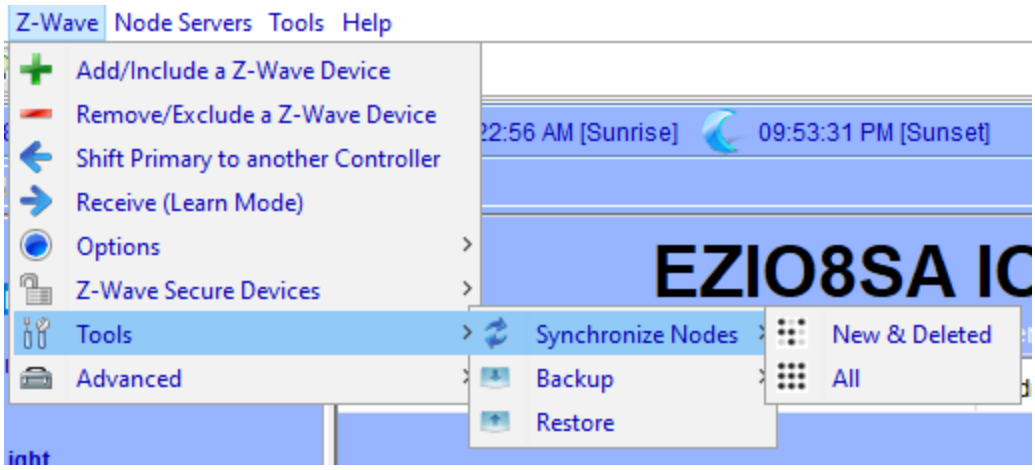


Figure 41: Z-Wave -> Z-Wave Tools Menu

5.2.3.8Advanced

The advanced menu has the following options:

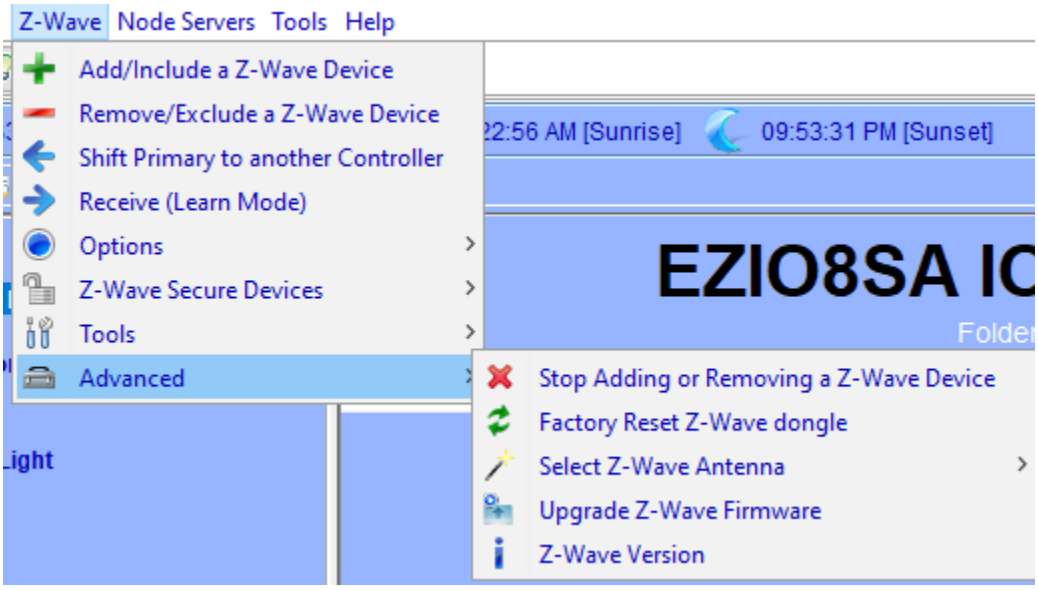


Figure 42: Z-Wave -> Z-Wave Scene Advanced Menu

5.2.4 NodeServers Menu

For information on how to configure NodeServers see **22 NodeServer Notes**.

This menu allows you to configure up to twenty-five NodeServers.

Figure 43: NodeServers Menu

Figure 44: NodeServer Configuration popup

5.2.5 Tools Menu

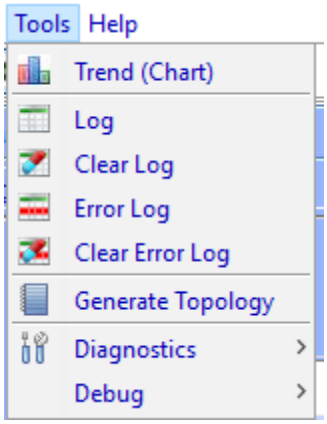
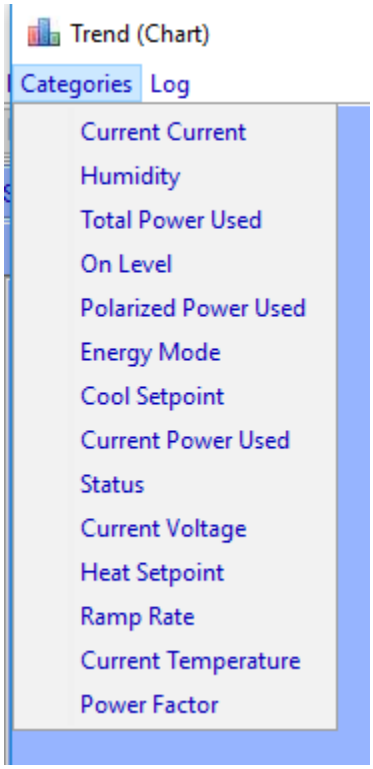


Figure 45: Tools Menu

5.2.5.1Trend (Chart)

This option will display a trend from one of the following categories:



5.2.5.2Log

This option will export the ISY log to an Excel file.

5.2.5.3Clear Log

This option will clear the ISY log.

5.2.5.4Error Log

This option will export the ISY error log to an Excel file.

5.2.5.5Clear Error Log

This option will clear the ISY error log.

5.2.5.6Generate Topology

This option will generate a topology report.

5.2.5.7Diagnostics

This menu option gives access to the diagnostic items in the ISY.

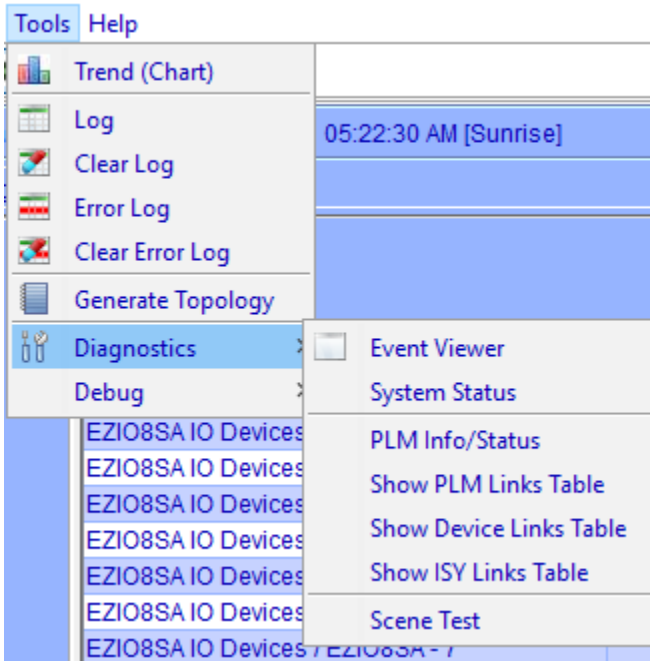


Figure 46: Tools -> Diagnostics Menu

5.2.5.7.1Diagnostics -> Event Viewer

This option displays data from the ISY event viewer.

5.2.5.7.2Diagnostics -> System Status

This option displays the ISY system status.

5.2.5.7.3Diagnostics -> PLM Info/Status

This option will show you the PLM status.

5.2.5.7.4Diagnostics -> Show PLM Links Table

This option will generate a table with all of your PLM links.

5.2.5.7.5Diagnostics -> Show Device Links Table

This option will generate a table with all of the device links from a selected device.

5.2.5.7.6Diagnostics -> Show ISY Links Table

This option will generate a table with all of the ISY links from a selected device.

5.2.5.7.7Diagnostics -> Scene Test

This option will perform a test for all devices in a scene, turning the device on and off properly.

5.2.5.8Debug

This option will allow you to set debug options.

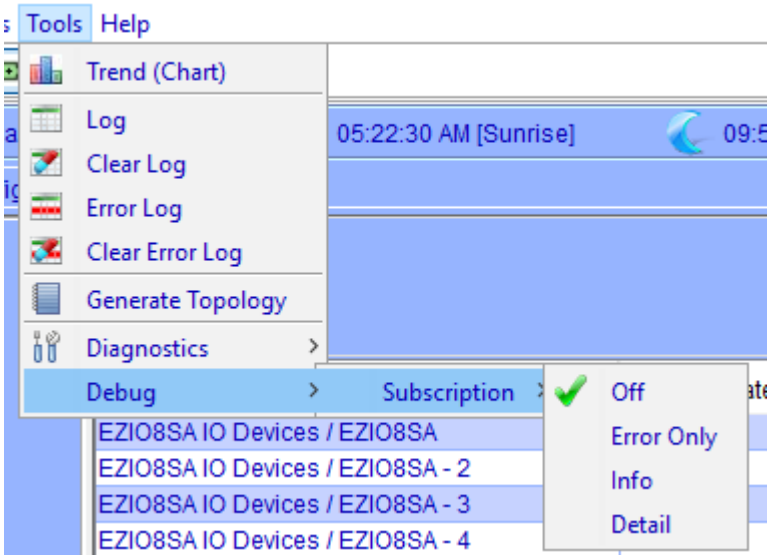


Figure 47: Tools -> Debug Menu

5.2.6 Help Menu

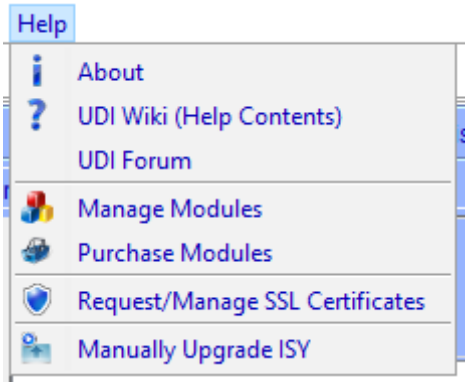


Figure 48: Help Menu

5.2.6.1About

This option will display a popup showing information regarding your ISY, from firmware to products installed.

Figure 49: Help -> About Menu

5.2.6.2UDI Wiki (Help Contents)

This option will take you to the Universal Devices Wiki, which is the ISY online help and manual.

5.2.6.3UDI Forum

This option will take you to the Universal Devices Forums.

5.2.6.4Manage Modules

Use this option to manage any purchased modules.

5.2.6.5Purchase Modules

This option will take you to the Universal Devices website, were you can purchase additional modules for your ISY>

5.2.6.6Request/Manage SSL Certificates

This option will take you to the **Network Security Configuration Guide** which contains information on SSL Certificates. You can access this document here: **21.6.1 Network Security Configuration Guide**

5.2.6.7Manually Upgrade ISY

Use this option to manually upgrade your ISY. For instance, you may want to install a beta version of the firmware. You would need to use this option to do that.

5.3 The Program Tabs Structure

5.3.1 Main Tab

The **Main** tab is where you can add, configure, and manage your INSTEON devices.

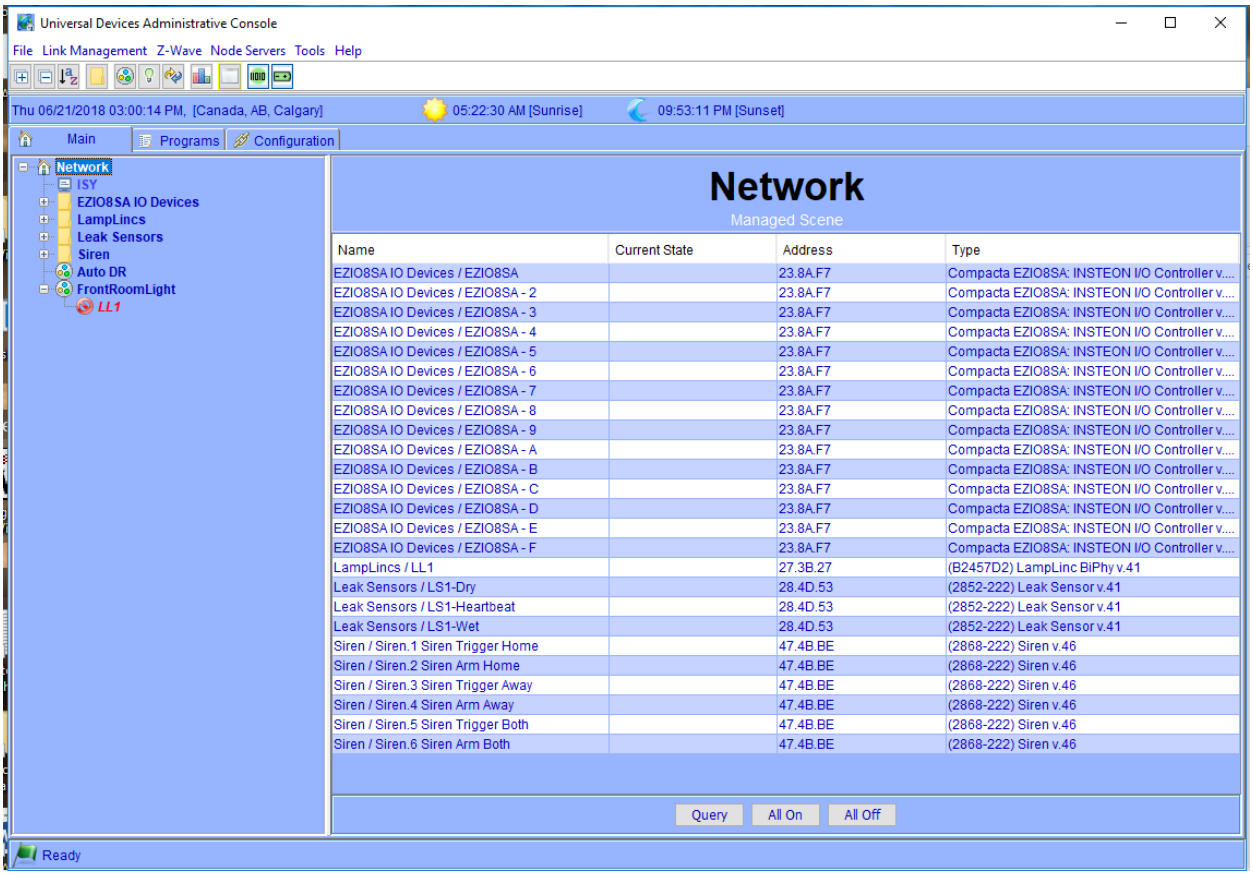


Figure 50: Main Tab

The left-hand pane displays a hierarchy of folders, devices, and scenes contained within your ISY. The right-hand pane displays detailed information on the item you have selected.

5.3.2 Programs Tabs

5.3.2.1Programs -> Summary Tab

The Programs/Summary page displays a list of all your Programs and Folders, and information about each. To open this tab, first click the **Programs** tab, then the **Summary** sub-tab.

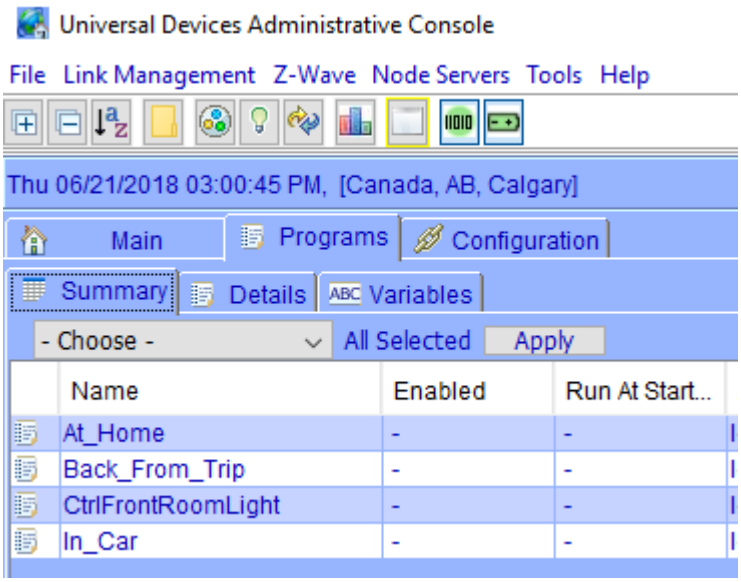


Figure 51: Programs -> Summary Tab

Here are the columns of information available:

- **Name**: the Program or Folder's name.
- **Enabled**: shows whether the Program is currently enabled or disabled.
- **Run At Startup**: shows whether the Program is set to run at startup.
- **Activity**: shows if the Program is currently running or is idle.
- **Status**: shows if the Program's IF statements are currently true or false.
- **Path**: the Folder that the program is located in.
- **Last Run Time**: the last time the Program's IF statements were evaluated.
- **Last Finish Time**: the last time the Program completed.
- **Next Scheduled Run**: the next time the Program is scheduled to run, if applicable.

Each column can be sorted by clicking its column heading.

There is a toolbar on the top portion of the screen that you can use to interact with ISY programs in a variety of ways.

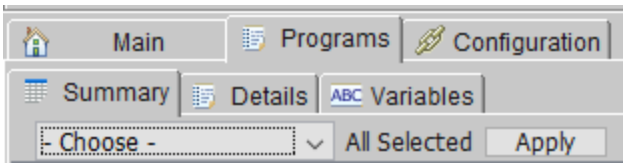


Figure 52: ISY Toolbar

To perform an action on a program, simply selecting it by clicking on it, click the left-most pull-down menu labeled “Choose” to select an action, and click the Apply button.

Available actions are:

Enable – enable a program that has been disabled

Disable – disable a program so that it will not run

Run (If) – force the evaluation of the IF statement and run the program

Run Then – force the run of the THEN portion of a program

Run Else – force the run of the ELSE portion of a program

Stop – stop a currently running program

Enable Run At Startup – set a program so that it automatically starts running when the ISY reboots

Disable Run At Startup – set a program so that it will not automatically run when the ISY reboots

On the right-most side of the tool bar is the **Edit** button which brings you to the Program Details tab and allows you to edit the currently highlighted program. The **Refresh** button forces a refresh of the screen.

5.3.2.2Programs -> Detail Tab

The **Programs/Details** tab is where you can create ISY Programs. ISY Programs are the true power of the ISY, where you can extend the capabilities of INSTEON and other devices using timers, triggers, macros, etc. Programs also allow you to utilize the ISY’s optional IR receiver, optional modules, and more.

To open this tab, first click the **Programs** tab, then click the **Details** sub-tab. The **Programs/Details** screen is divided into several sections. The left-pane is used to show your program hierarchy. As you create ISY programs and folders, they display here. The

bottom-left **"Manage Programs"** section holds several buttons used to create and manage your Programs.

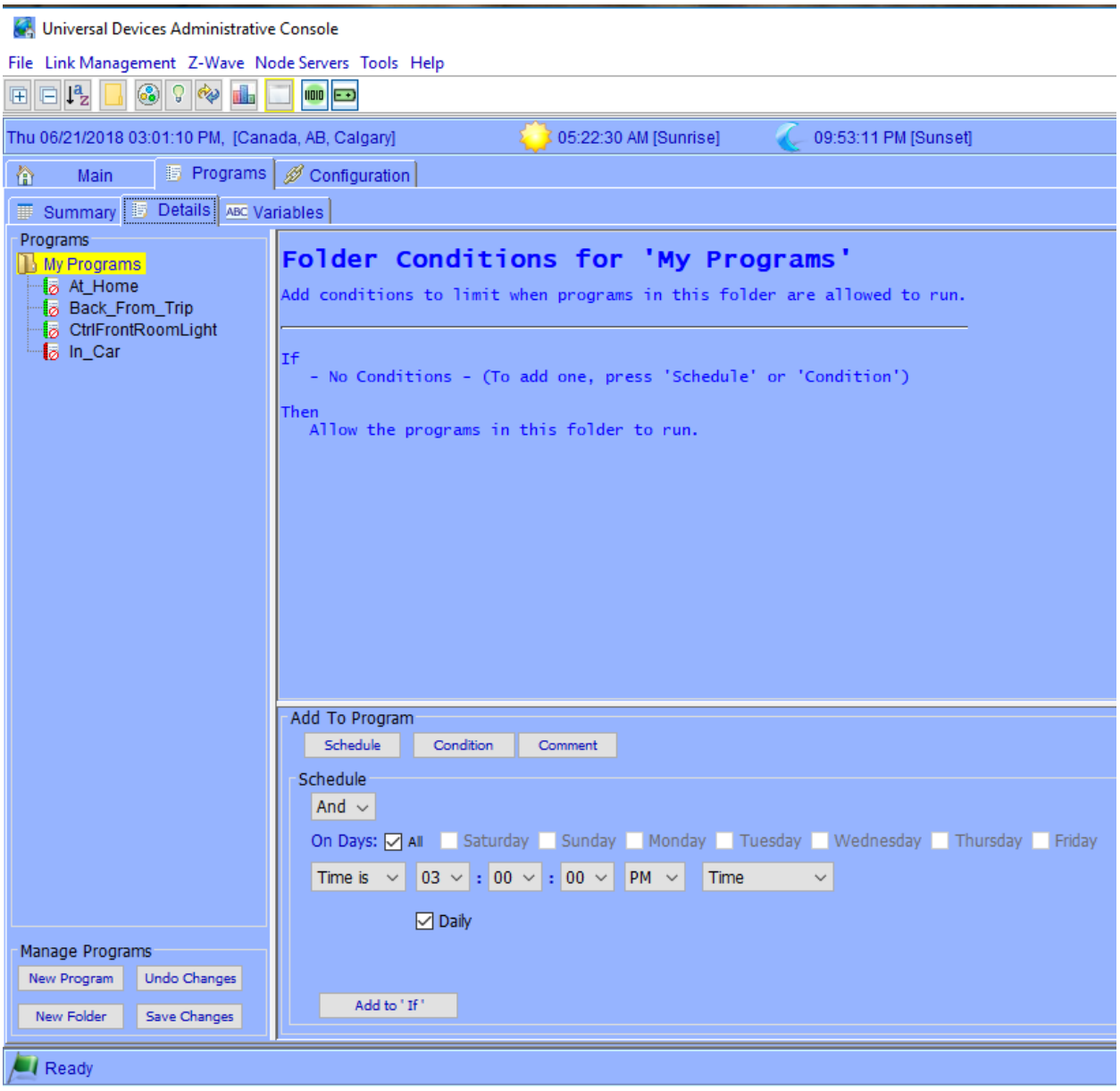


Figure 53: Programs -> Detail Tab

The top-right portion of the screen shows the details of a highlighted folder or program. The bottom right is where you create and edit your Program.

Right-clicking on a folder displays the following menu:

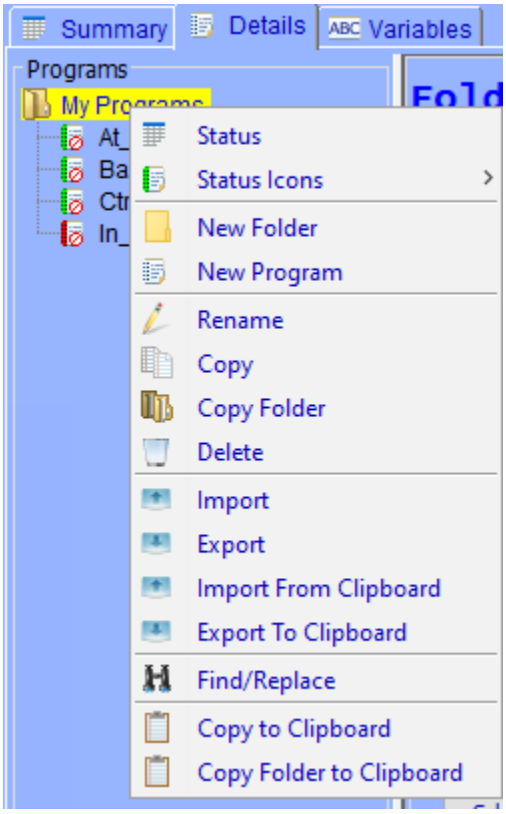


Figure 54: My Programs Popup Menu

5.3.2.2.1Status

This option will display the current status of all the Programs,

5.3.2.2.2Status Icons

This option will permit you to change how the status icons are displayed.

5.3.2.2.3New Folder

This option will create a new folder.

5.3.2.2.4New Program

This option will create a new program.

5.3.2.2.5Rename

This option will allow you to rename your program.

5.3.2.2.6Copy

This option will copy the currently selected item.

5.3.2.2.7Copy Folder

This option will currently selected folder.

5.3.2.2.8Delete

This option will delete the currently selected item.

5.3.2.2.9Import

This option will allow you to import programs and folders that have been previously backed up or obtained into your ISY.

5.3.2.2.10Export

This option will you to export programs and folders as a backup.

5.3.2.2.11Import from Clipboard

This option will import XML data from your clipboard.

5.3.2.2.12Export To Clipboard

This option will export XML data to your clipboard.

5.3.2.2.13Find/Replace

This option will allow you to find and replace data.

5.3.2.2.14Copy to Clipboard

This option will copy the current program to your clipboard.

5.3.2.2.15Copy Folder to Clipboard

This option will copy all programs in the currently selected folder to your clipboard.

Right-clicking on a program displays the following menu:

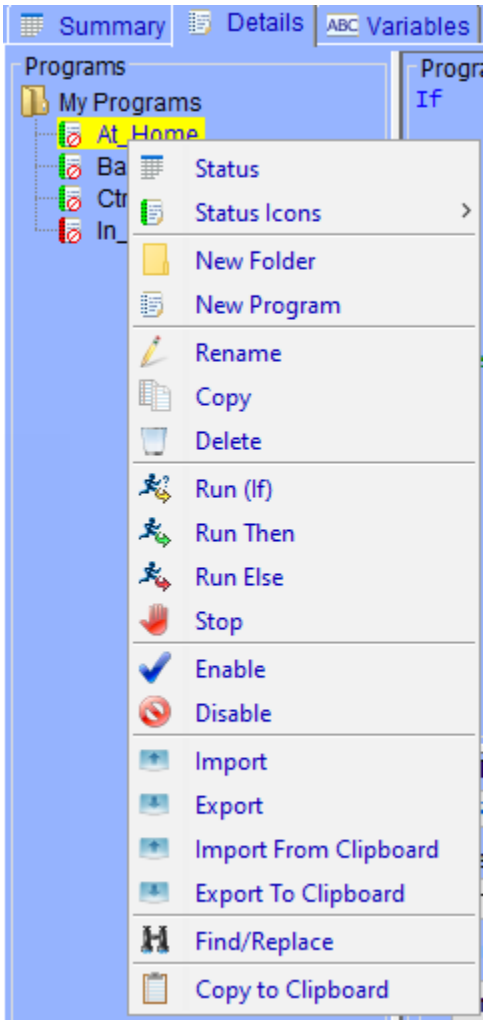


Figure 55: My Programs Popup Menu

5.3.2.2.16Status

This option will display the current status of the Program,

5.3.2.2.17Status Icons

This option will permit you to change how the status icons are displayed.

5.3.2.2.18New Folder

This option will create a new folder.

5.3.2.2.19New Program

This option will create a new program.

5.3.2.2.20Rename

This option will allow you to rename your program.

5.3.2.2.21Copy

This option will copy the currently selected program.

5.3.2.2.22Delete

This option will currently selected program.

5.3.2.2.23Fun (If)

This option will run the [**If]** portion of the program.

5.3.2.2.24Run Then

This option will run the [**Then**] portion of the program.

5.3.2.2.25Run Else

This option run the [**Else**] portion of the program.

5.3.2.2.26Stop

This option will stop the currently selected program.

5.3.2.2.27Enable

This option will enable the currently selected program.

5.3.2.2.28Disable

This option will disable the currently selected program.

5.3.2.2.29Import

This option will allow you to import programs and folders that have been previously backed up or obtained into your ISY.

5.3.2.2.30Export

This option will you to export the current program as a backup.

5.3.2.2.31Import from Clipboard

This option will import XML data from your clipboard.

5.3.2.2.32Export To Clipboard

This option will export XML data to your clipboard.

5.3.2.2.33Find/Replace

This option will allow you to find and replace data.

5.3.2.2.34Copy to Clipboard

This option will copy the current program to your clipboard.

For additional information on creating and working with programs, see section: **9 Programming**

5.3.2.3Programs -> Variables -> Integers Tab

This page displays all of your integer variables. This is also where you create or delete them.

The important thing to note regarding integer variables is that they cannot be used to trigger actions ins any of your programs. If you need to do this then use state variables instead.

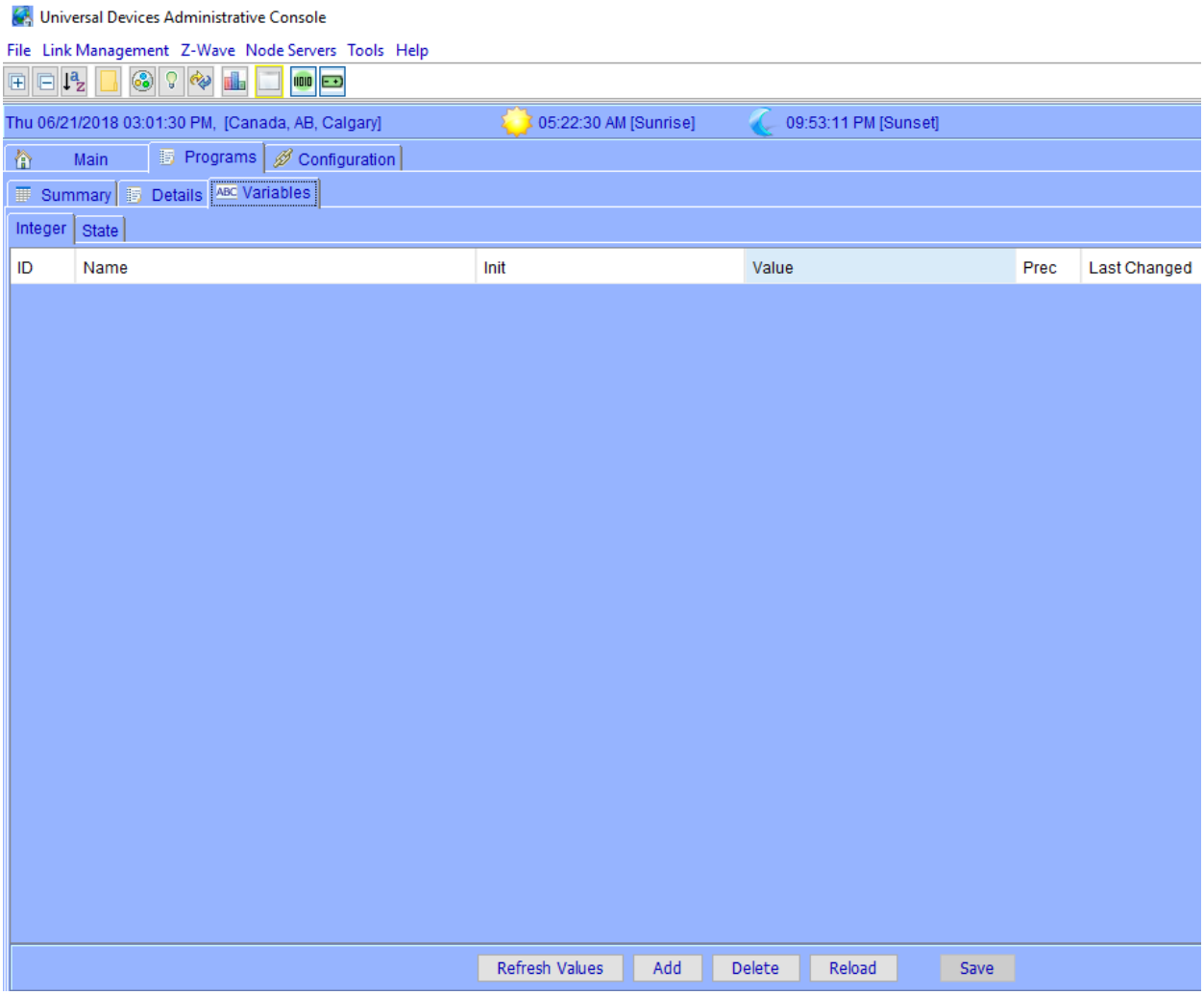


Figure 56: Programs -> Variables -> Integer Tab

5.3.2.4Programs -> Variables -> State Tab

This page displays all of your state variables. This is also where you create or delete them.

State and integer variables are the same in every respect, with one exception.

Integer variables cannot be used to trigger actions in any of your programs. However, state variables do trigger actions. If you need to do this then use state variables instead of integer.

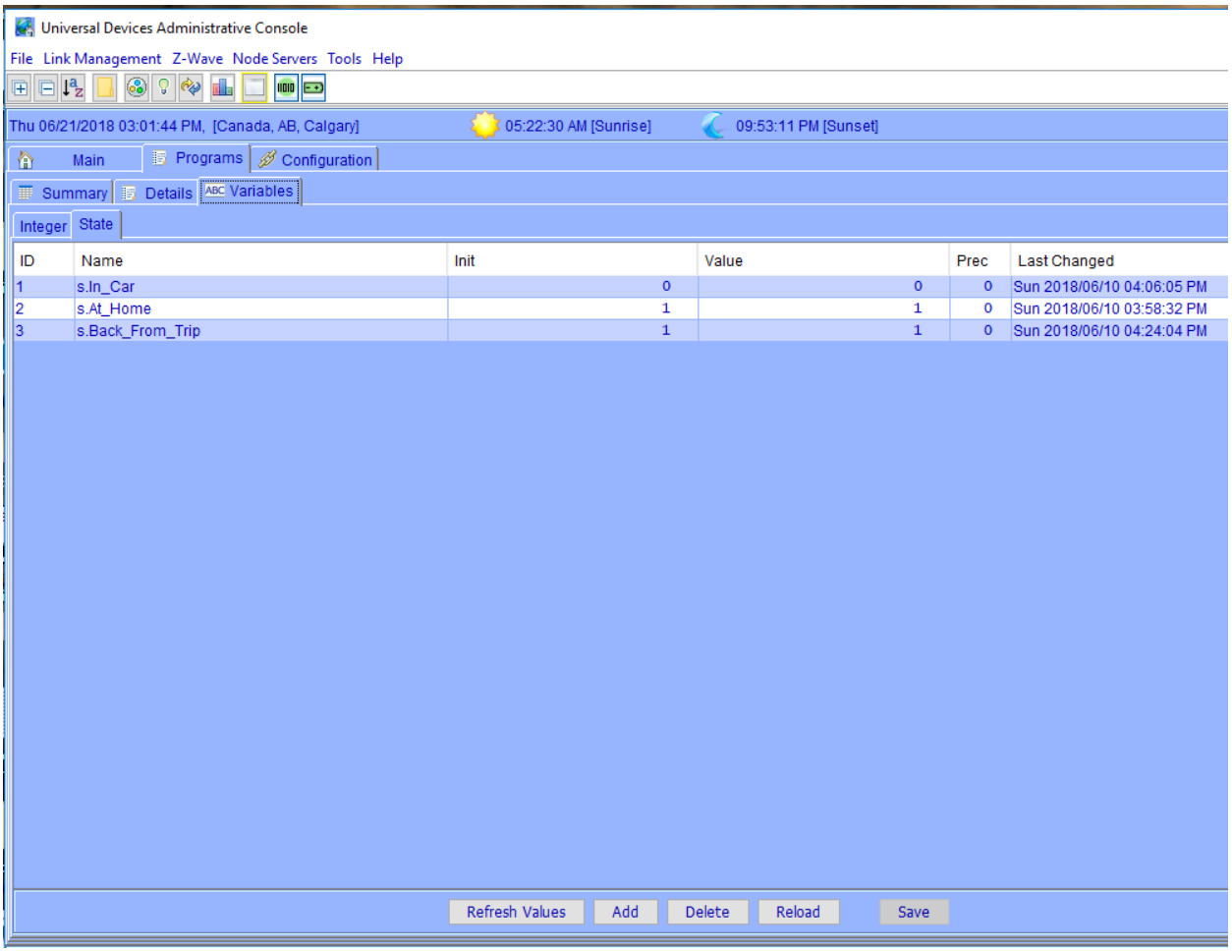


Figure 57: Programs -> Variables -> State Tab

5.3.3 Configuration Tabs

5.3.3.1Configuration -> System Tab

This page is used to configure the following:

- Clock time settings
- Network settings
- System settings
- ELK M1XEP interface settings

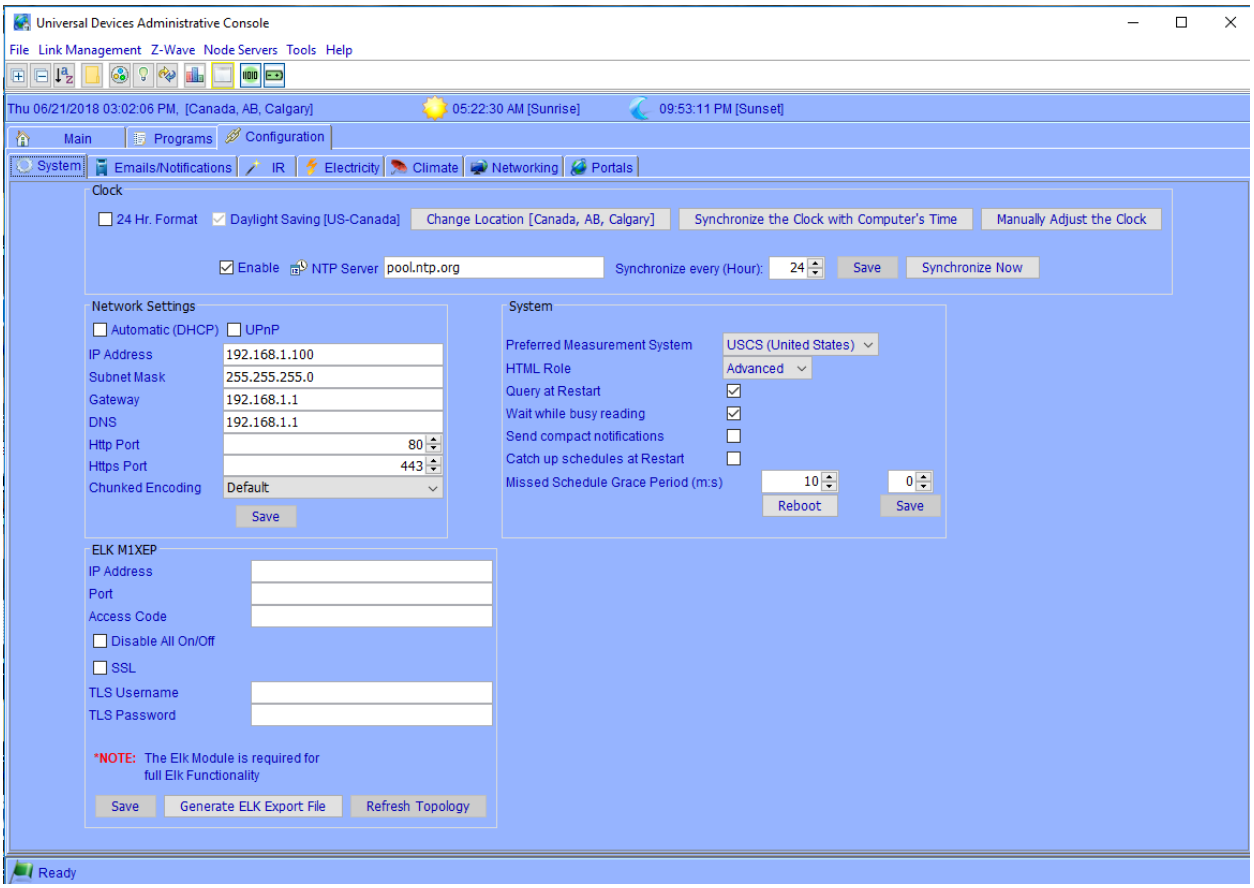


Figure 58: Configuration -> System Tab

5.3.3.2Configuration -> Emails/Notification -> Settings/Groups Tab

This page gives you the options to setup your email notification settings.

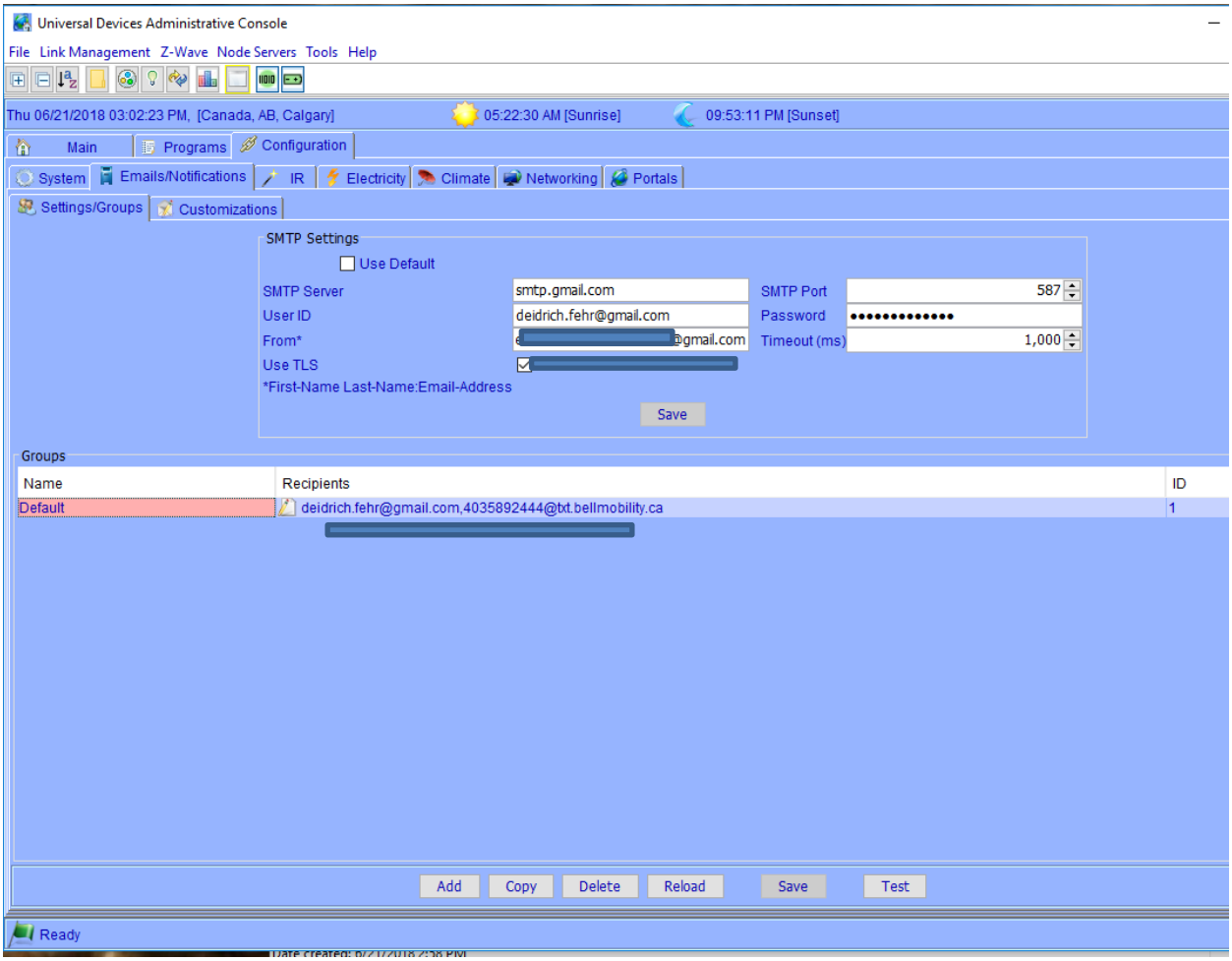


Figure 59: Configuration -> Emails/Notification -> Settings/Group Tab

Refer to section **21.8 Mail Server Settings** for more information.

Configuration -> Emails/Notification -> Customizations Tab

This page gives you options to create custom notifications to be used in your programs.

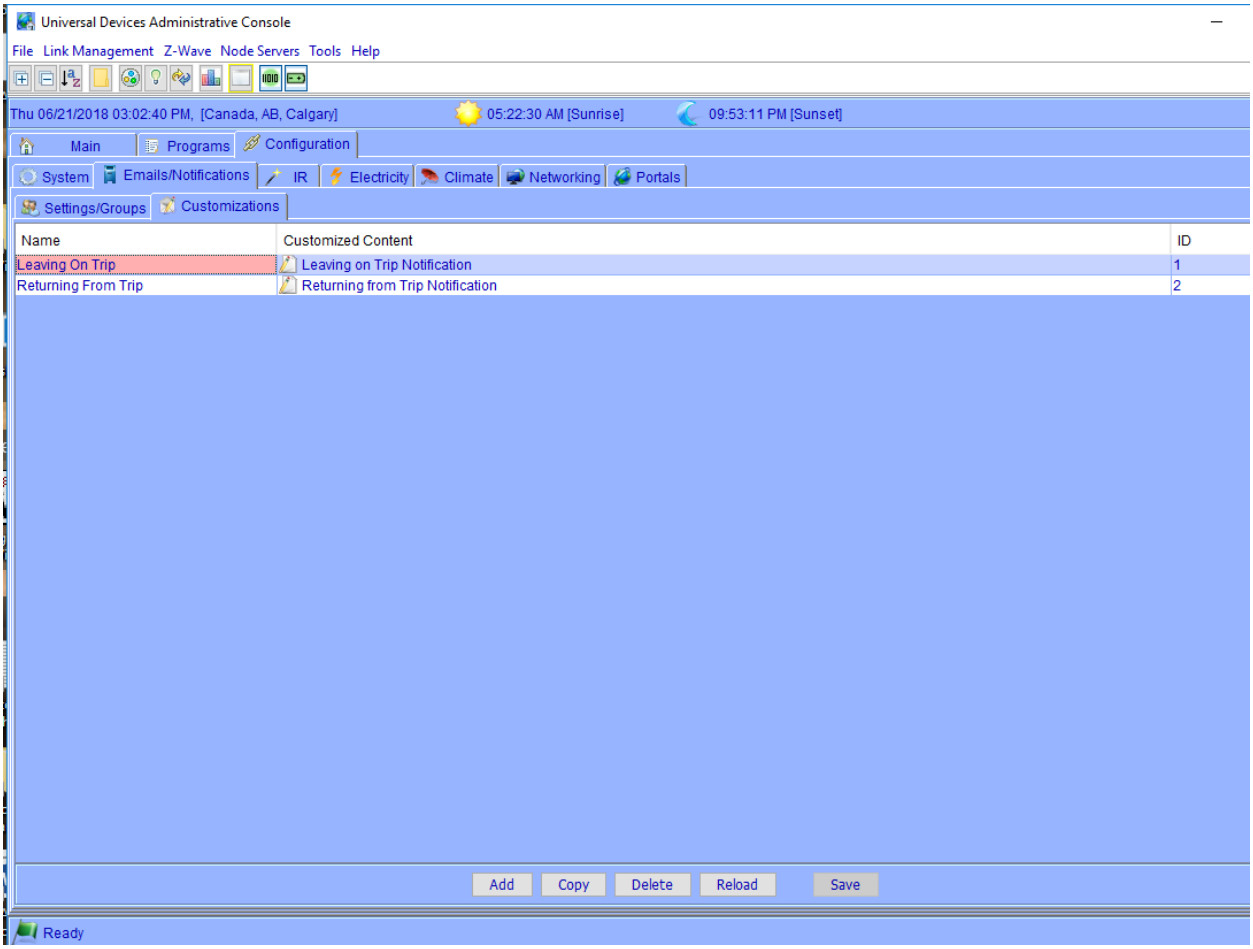


Figure 60: Configuration -> Emails/Notification -> Customizations Tab

Refer to section **21.8 Mail Server Settings** for more information.

5.3.3.3Configuration -> IR Tab

Use this page to import or learn IR codes to be used in your ISY, with your IR controller.

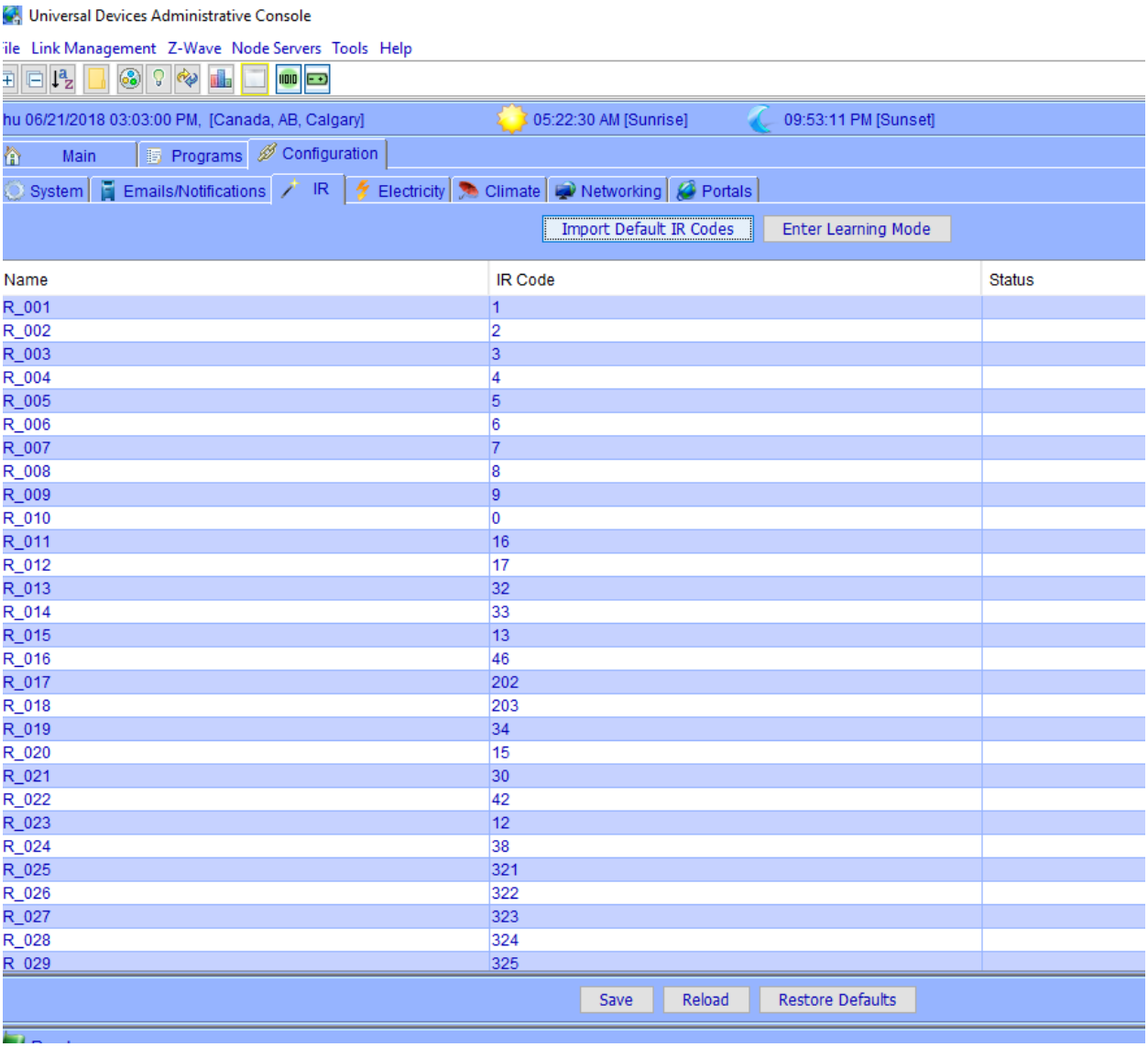


Figure 61: Configuration -> IR Tab

Refer to section **16 The Integrated IR Receiver Notes** for more information.

5.3.3.4Configuration -> Electricity Tab

This page is used for configuration of the electricity module.

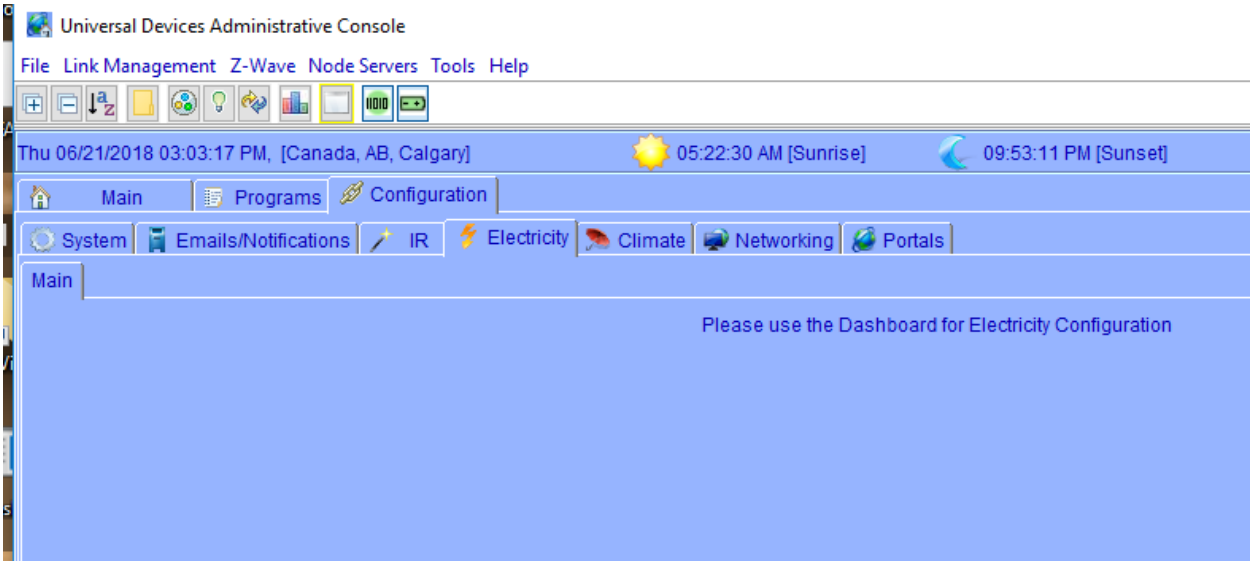


Figure 62: Configuration -> Electricity Tab

Refer to section **6.9 Electricity Module** for more information.

5.3.3.5Configuration -> Climate Tab

This page is used to configure your climate module.

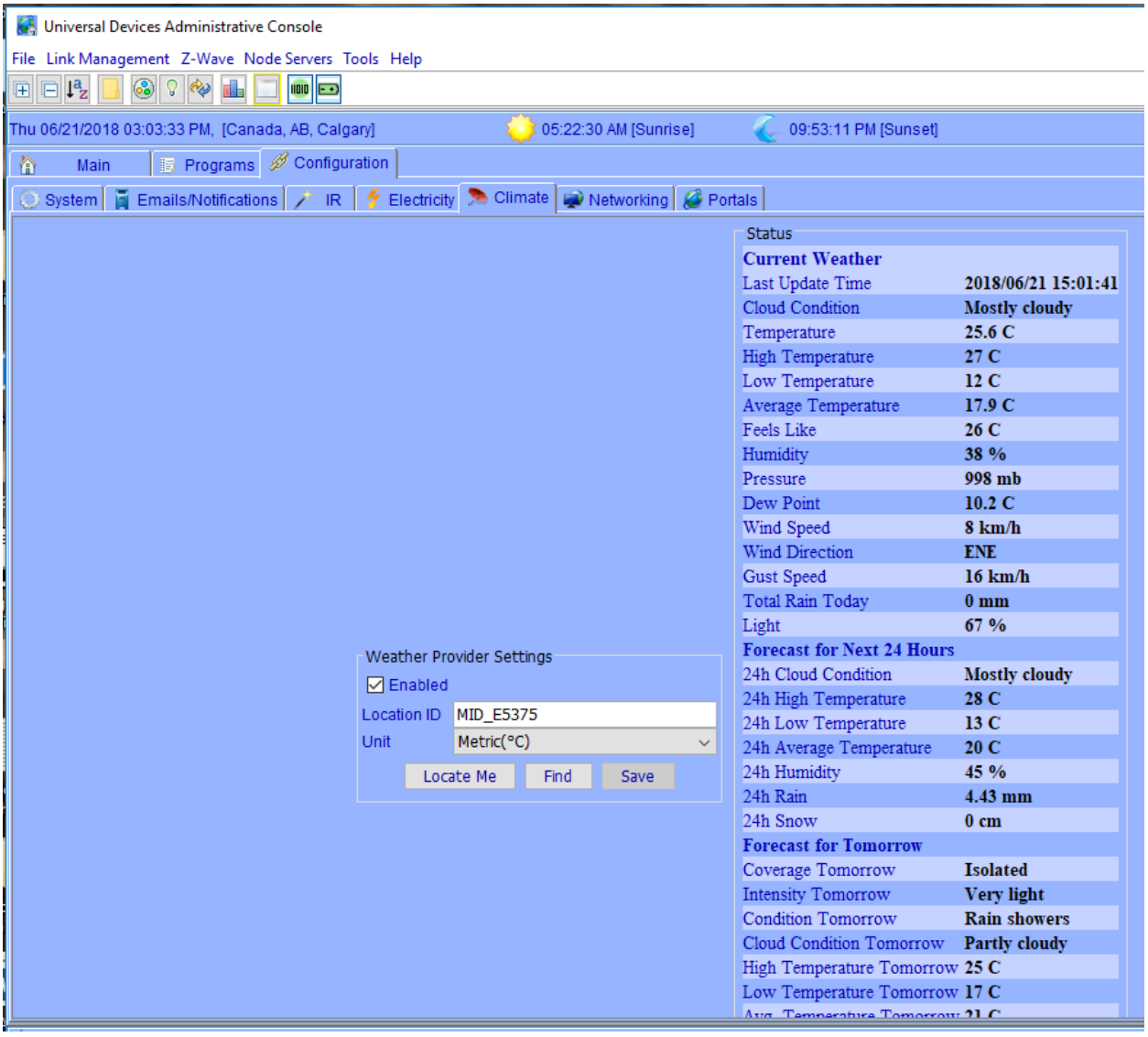


Figure 63: Configuration -> Climate Tab

Refer to section **6.5 Climate Module** for more information.

5.3.3.6Configuration -> Networking -> Wake On LAN Tab

This page is used to configure the Wake On Lan options for the networking module.

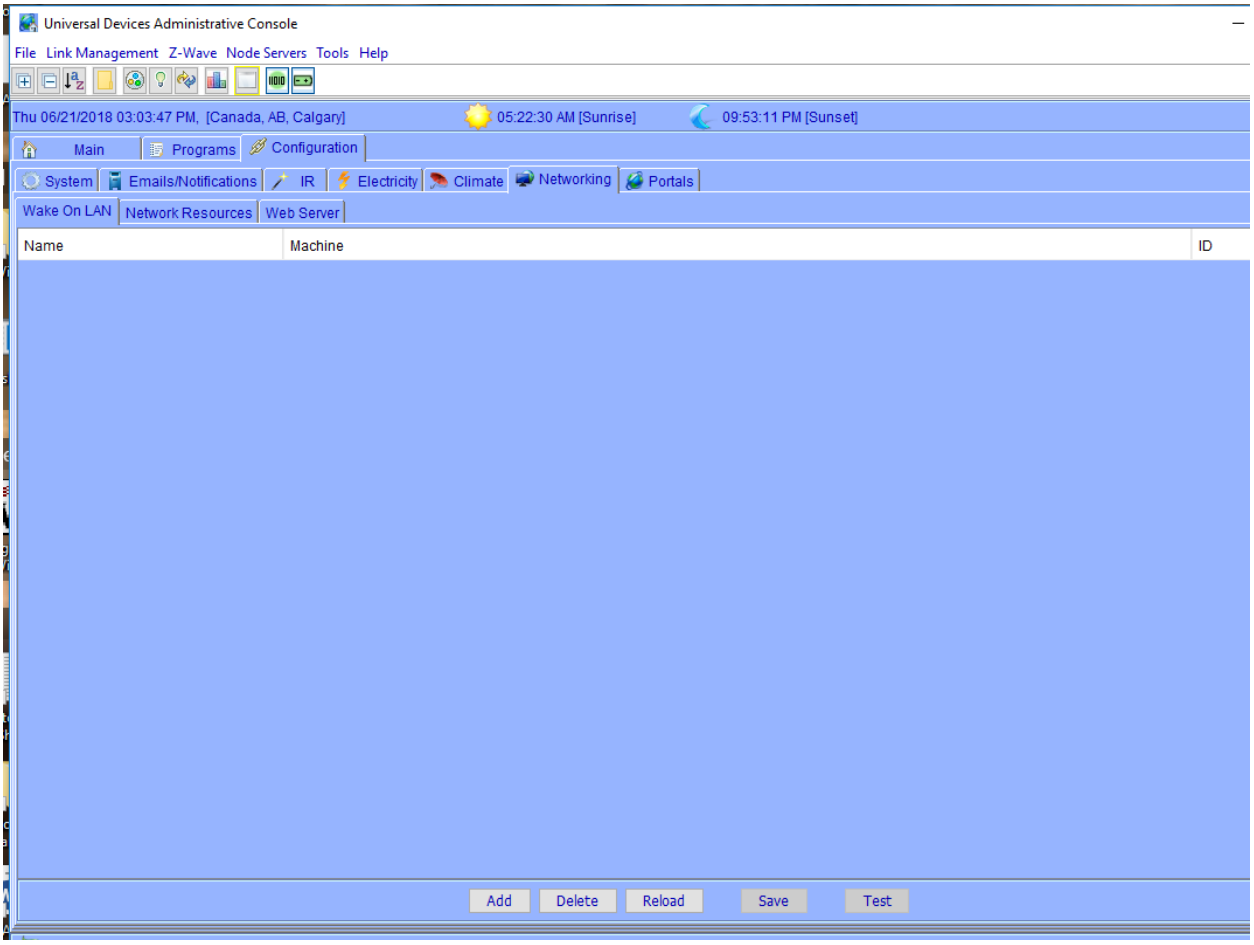


Figure 64: Configuration -> Networking -> Wake On LAN Tab

Refer to section **6.3 Network Module** for more information.

Configuration -> Networking -> Network Resources Tab

This page is used to configure the network resource options for the networking module.

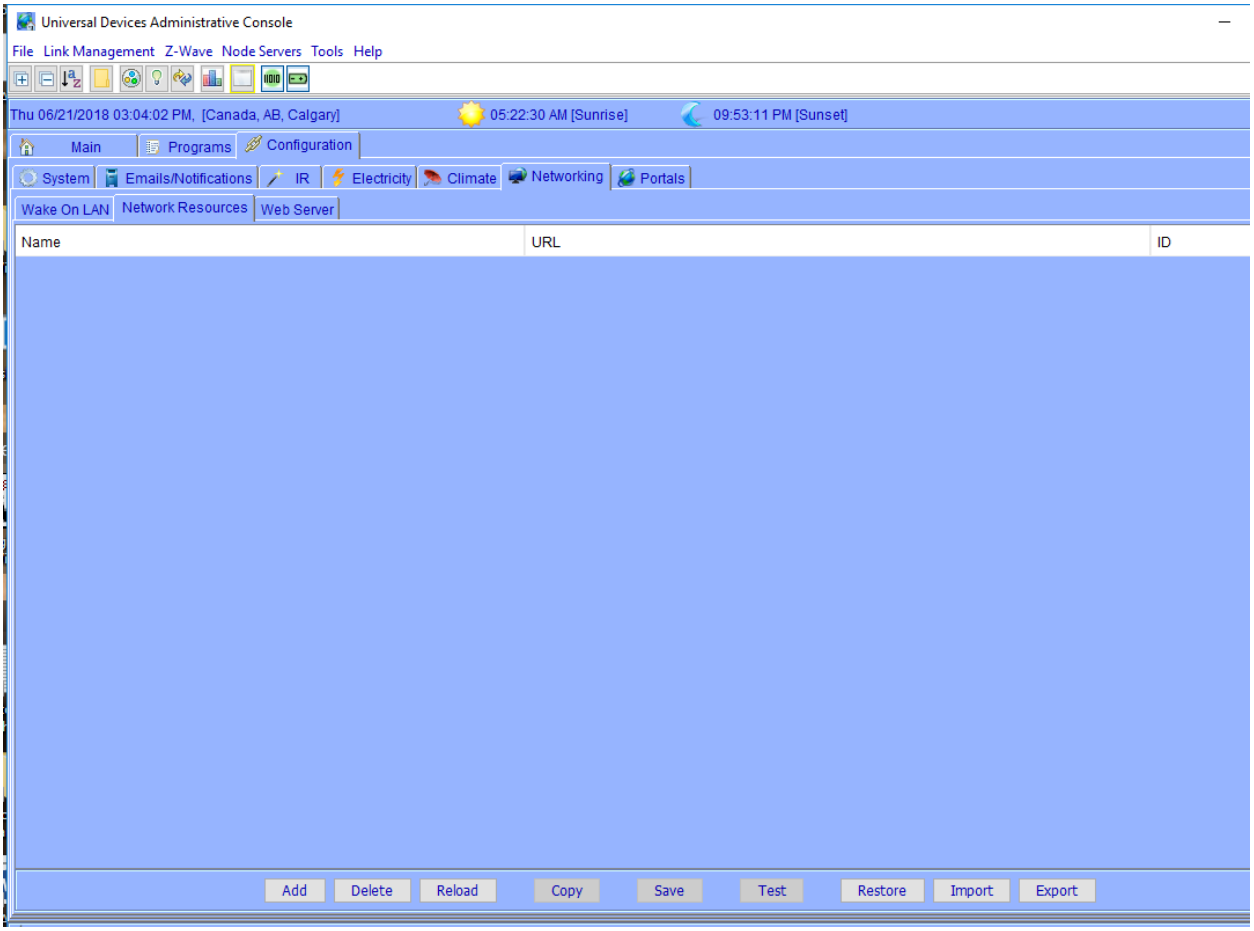


Figure 65: Configuration -> Networking -> Networking Resources Tab

Refer to section **6.3 Network Module** for more information.

5.3.3.7Configuration -> Networking -> Web Server Tab

This page is used when you configure your ISY web server.

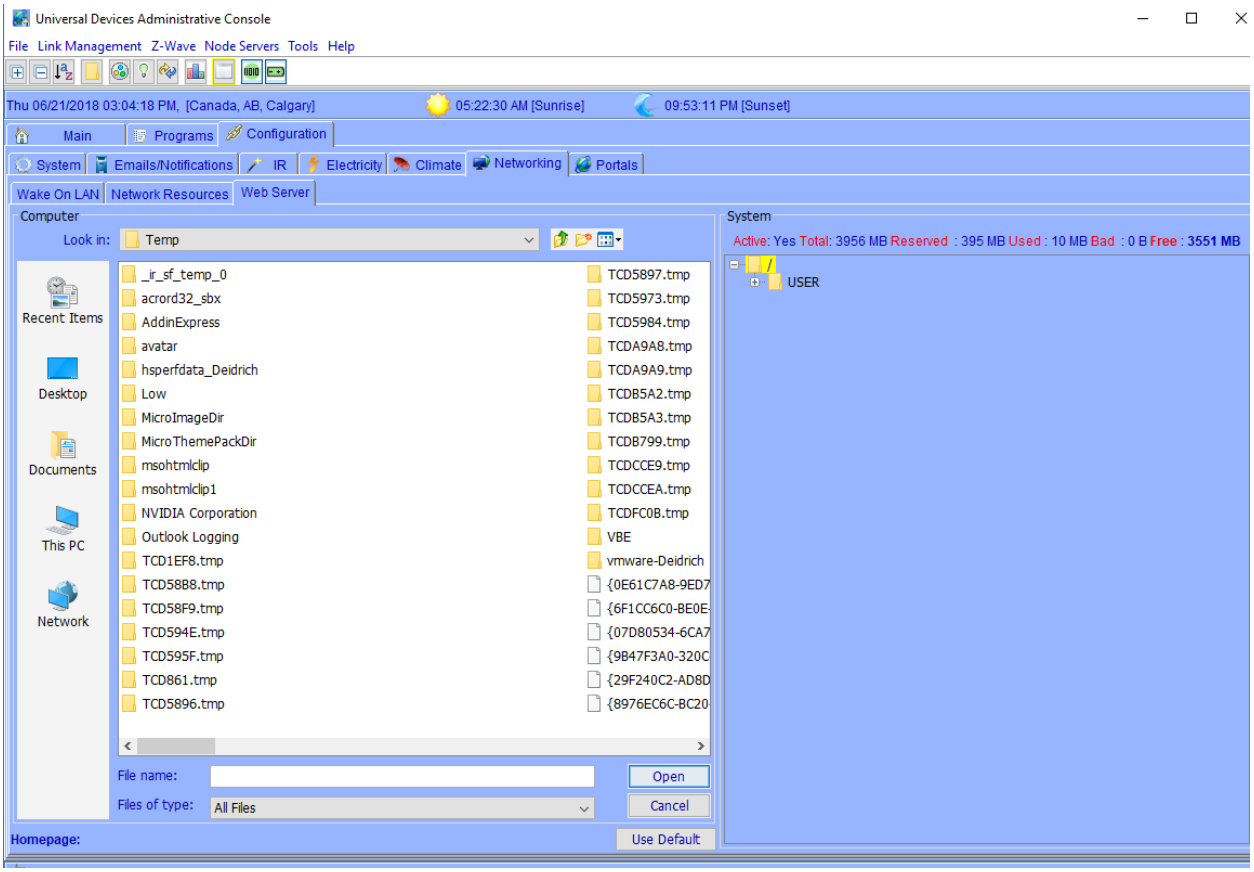


Figure 66: Configuration -> Networking -> Web Server Tab

Refer to section **6.3 Network Module** for more information.

5.3.3.8Configuration -> Portals Tab

This page is used to configure your Portals module.

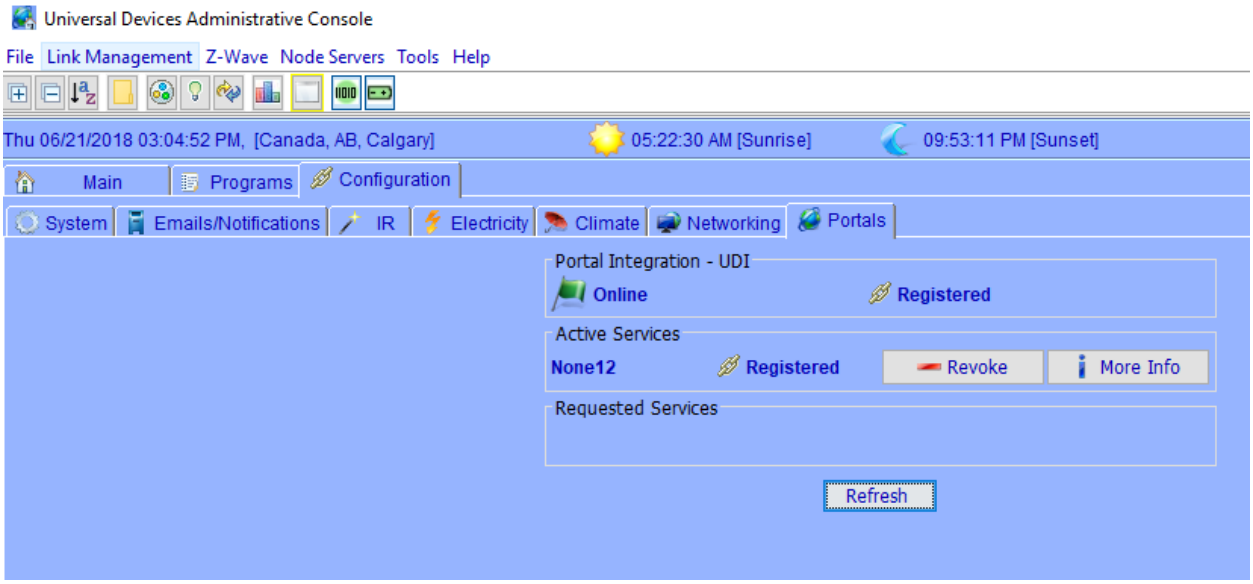


Figure 67: Figure 68: Configuration -> Portals Tab

Refer to section **6.1 ISY Portal Module** for more information.

6 ISY Optional Modules

Universal-Devices offers a variety of optional modules that enhance the capabilities of your ISY in a variety of ways.

To purchase a module, click the HELP pull-down menu in the ISY's Administrative Console, choose the "Purchase Modules" option, and follow the on-screen instructions.

6.1 ISY Portal Module

The preferred method to connect to your ISY is to use **Cloud** Services. The ISY Portal enables you to do this and remotely connect to your ISY device without the need to do any port forwarding. Your connection is not affected by changes to your external IP address. The ISY Portal uses cloud services hosted by Universal Devices. For setup see section **18.1 Configuring ISY Portal Integration**

6.2 Portal Integration – MobiLinc Connect Module

This module allows connection to the MobiLinc application. With MobiLinc and an iPad/iPhone/iPod touch or Android powered device, you can control the lights, thermostats, and other devices that are configured in your ISY device

6.3 Network Module

The ISY's Network Module enhances the ISY with several key features:

Web Server – using the Network Module, the ISY can be used as a web server to server up your own applications, pictures and files.

Network Resources – with the Network Module, the ISY allows you to call any network resource (TCP, UDP, HTTP, HTTPS) using ISY Programs. You can also control serial devices using Ethernet to RS-232 adapters.

Wake On LAN – this feature allows you to turn on PCs and other compatible network devices using their Wake On LAN feature.

Web Server

Once installed, click on the **Configuration** tab in the ISY's Administrative Console, then the **Networking** sub-tab, then the **Web Server** tab to copy files and folders to your ISY's internal web server.

The left side of the screen allows you to browse your local PC's files and folders. The right side of the screen displays the file/folder structure within your ISY. Simply drag-and-drop files and folders from the left side of the screen to your ISY's /USER/WEB folder on the right-side of your screen.

Right-click a file or folder stored on your ISY to rename, remove, or set it as your ISY Web Interface's default page. To restore the ISY Web Interface to its default home page, click the **Use Default** button on the bottom of the screen.

Network Resources

Once installed, click on the **Configuration** tab in the ISY's Administrative Console, then the **Networking** sub-tab, then the **Network Resources** tab to configure your resources.

Once devices have been added, they will be available in ISY Programs as Actions under the Networking category:

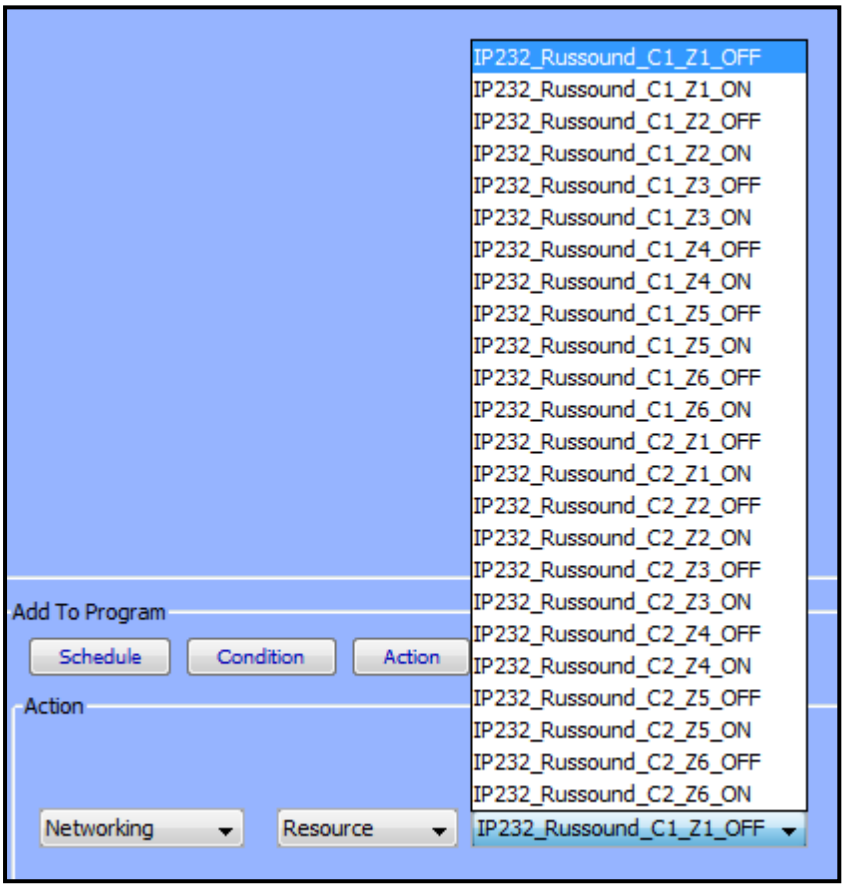


Figure 69: Networking Actions

More information on known-compatible 3rd party devices and how to control them is available in this section: **20 Networking Resources**

Wake On LAN

Once installed, click on the **Configuration** tab in the ISY's Administrative Console, then the **Networking** sub-tab, then the **Wake On LAN** tab to configure.

Once Wake On LAN devices have been added to your ISY, they will be available in ISY Programs as Actions under the Networking category.

6.4 A10/X10 Experimental Support

This optional module provides cleaner management and better control over A10/X10 devices, allowing you to add them to the Admin Console's device tree just like INSTEON devices.

Please note the following limitations:

This module uses simulated INSTEON addresses internally. Though unlikely, it could potentially conflict with existing INSTEON devices in your ISY, stopping you from using those particular INSTEON modules.

This module only allows for ON/OFF commands in the device tree. No support for bright/dim.

Note that X10 devices cannot be added to INSTEON Scenes.

To add an A10/X10 device to your tree, click the Link Management pull-down menu and choose New INSTEON/A10/X10 Device.

Type the A10/X10 device's address, name the device, then choose the appropriate device type:

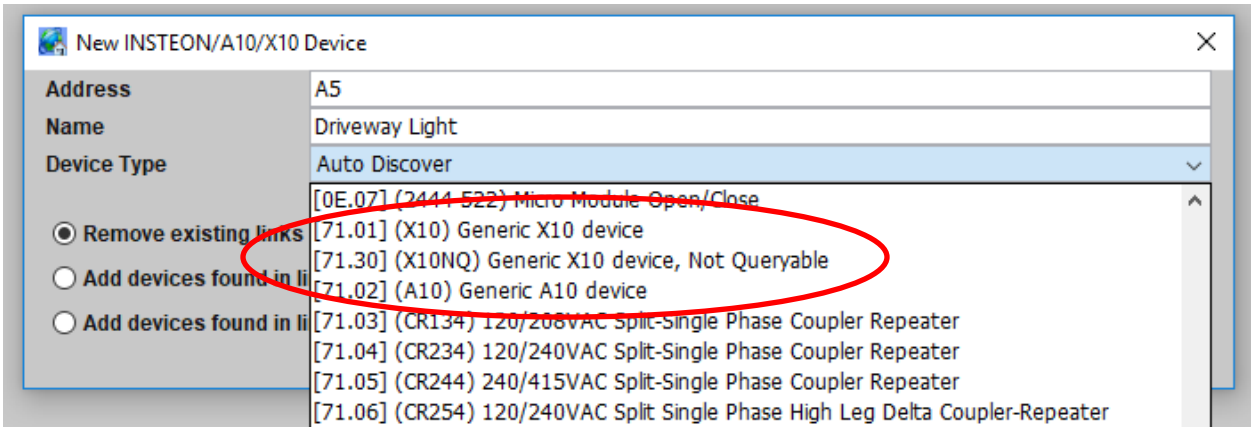


Figure 70: Adding an X10 Device

Once added the A10/X10 device appears in your Admin Console's device tree and can be organized or used in ISY Programs just like any other INSTEON device.

6.5 Climate Module

Using the Climate Module, you can create ISY Programs using local weather information as conditions. This module gathers information from HAM Weather, which provides a huge number of weather stations to pull data from.

To view and configure your Climate Module, click the **Configuration** tab in the ISY's Administrative Console then the **Climate** sub-tab. To choose your local weather station, click the FIND button and type your local City name. Double-click your Area to see a list of weather stations within your area.

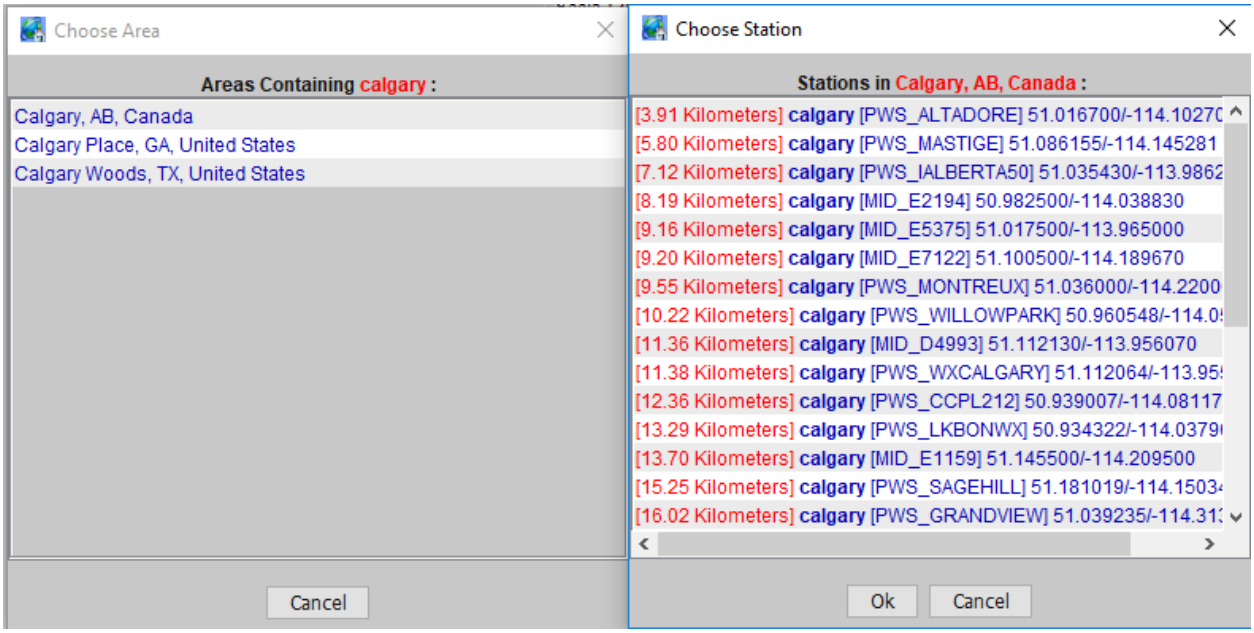


Figure 71: Weather Stations

Double-click a station to utilize it with your ISY. For best results, choose a station as close to your location as possible.

Once selected, choose how you would like the information displayed (English or Metric). Also feel free to adjust the Polling Interface, which is how often your ISY connects to WeatherBug for updated weather information. Hit the **Save** button to save your configuration.

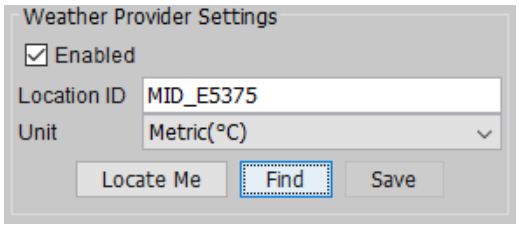


Figure 72: HAM Weather Configuration

You should now see local weather information as shown below:

Status

Current Weather	
Last Update Time	**2018/06/07 14:31:31**
Cloud Condition	**Mostly cloudy**
Temperature	**25.6 C**
High Temperature	**26 C**
Low Temperature	**9 C**
Average Temperature	**16.4 C**
Feels Like	**26 C**
Humidity	**20 %**
Pressure	**998 mb**
Dew Point	**0.9 C**
Wind Speed	**5 km/h**
Wind Direction	**NNE**
Gust Speed	**16 km/h**
Total Rain Today	**0 mm**
Light	**69 %**
Forecast for Next 24 Hours	
24h Cloud Condition	**Mostly cloudy**
24h High Temperature	**26 C**
24h Low Temperature	**11 C**
24h Average Temperature	**19 C**
24h Humidity	**27 %**
24h Rain	**0 mm**
24h Snow	**0 cm**
Forecast for Tomorrow	
Cloud Condition Tomorrow	**Clear**
High Temperature Tomorrow	**28 C**
Low Temperature Tomorrow	**12 C**
Avg. Temperature Tomorrow	**20 C**
Humidity Tomorrow	**27 %**
Wind Speed Tomorrow	**12 km/h**
Gust Speed Tomorrow	**20 km/h**
Rain Tomorrow	**0 mm**
Snow Tomorrow	**0 cm**

View All

Figure 73: Local Weather Information

Now that your Climate Module has been configured, you can use this information as Conditions in ISY Programs. When choosing a condition, choose Module and Climate to see all available conditions:

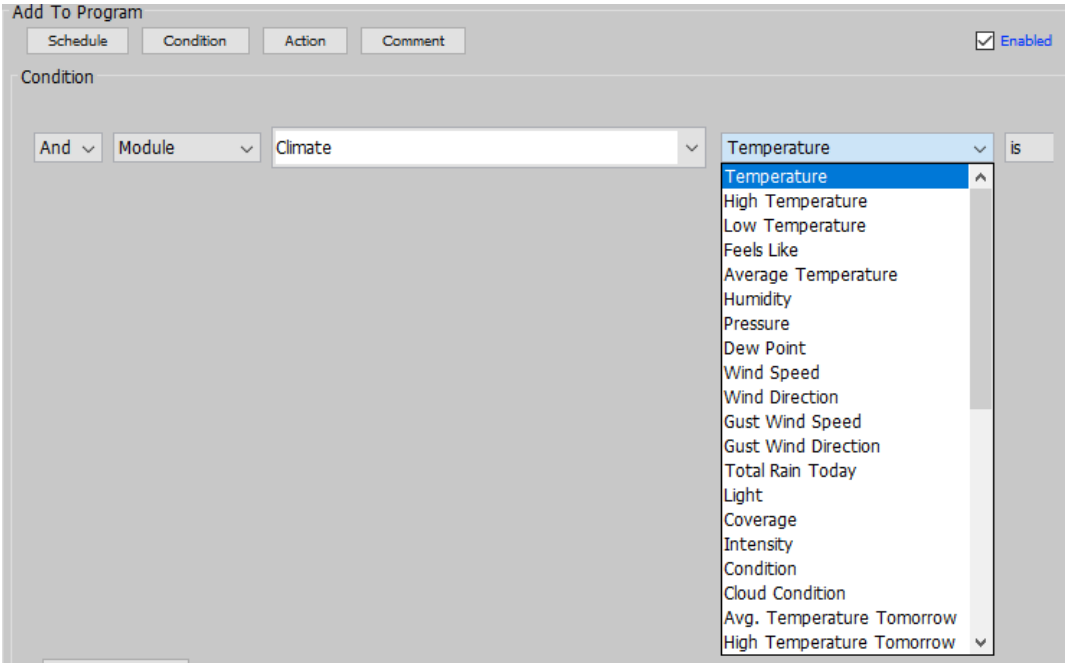


Figure 74: Using Climate Conditions

6.6 Open Auto Demand / Response Module

***Requires firmware 4.1.3+**

6.6.1 ISY Installation

- Connect one of the included Cat5e cable to ISY's Network Port and to your network hub. Note: the network must initially be DHCP enabled.
- The following depends on the model:
  - [ISY994 Series] If you have a Relay Board, connect the second included Cat5e cable to ISY's Port A and the other end to the RJ45 connector on the Relay Board. Power supply gets plugged into the barrel connector on the Relay Board (not ISY)
  - [ISY994i Series] If you have an INSTEON PLM, connect the second included Cat53 cable to ISY's Port A and the other end to the PLM. Power supply gets plugged into the Power jack on the back of ISY

- If you do not have Java installed, please install the latest for your platform. You may find the latest Java downloads at http://www.java.com/getjava. Please choose the latest JRE for your platform
- If you have ISY994i Series, go to http://isy.universal-devices.com/994i/zs/dashboard.jnlp; when prompted to authenticate, enter admin for both user-id and password
- If you have ISY994 Series, go to http://isy.universal-devices.com/994/zs/dashboard.jnlp; when prompted to authenticate, enter admin for both user-id and password

6.6.2 Connectivity requirements

- The network must initially be DHCP enabled. You can change these settings to static once you access ISY for the first time. In all cases, ISY must be able to use DNS to resolve domain names to IP addresses
- No inbound ports or port forwarding rules are necessary
- The following outbound protocol/ports/URLs
    - TCP [HTTPS] to the Utility VTN URL/Port (please see section 3c)
    - Network Time Server [UDP] port 123 (if and only if not internal)
- The following outbound rule is necessary if and only if ISY Portal is used for remote access
    - TCP [HTTPS] to https://my.isy.io port 443

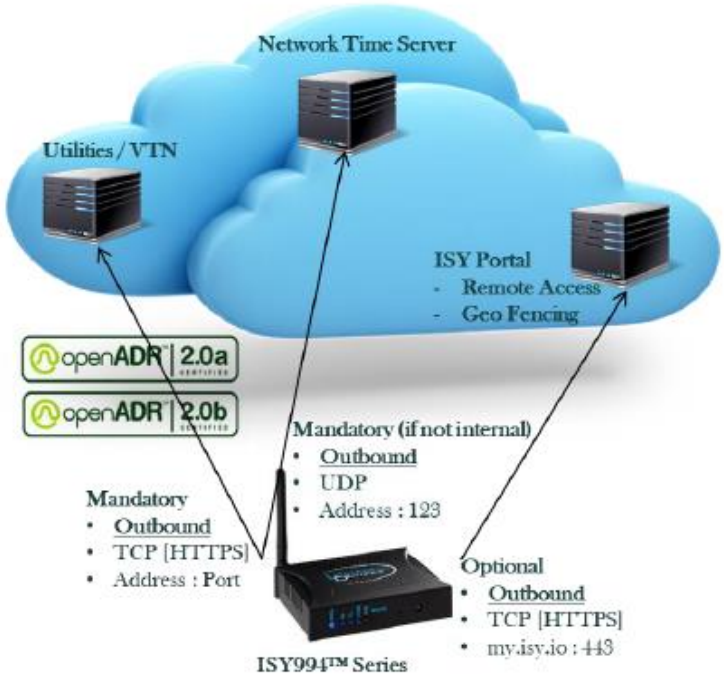


Figure 75: OpenADR Communication

6.6.3 Configure OpenADR

6.6.3.1Configure Devices

OpenADR operations, including reporting and opts, are only applied to devices that are in the Auto DR Group.

To include devices in the OpenADR Group, click on the Device Manager and drag and drop devices into the Auto DR Group.

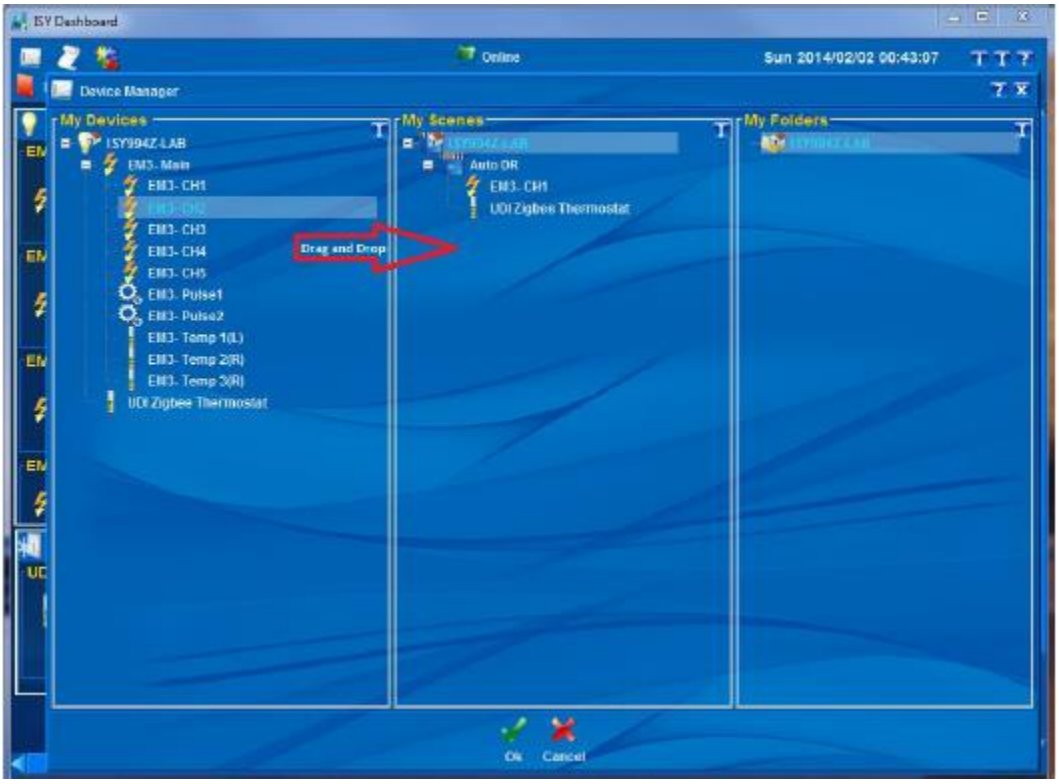


Figure 76: OpenADR Device Manager

6.6.3.2Activate My OpenADR Portlet

Figure 77: OpenADR My OpenADR Menu Option

6.6.3.3Configure OpenADR Settings

Figure 78: OpenADR Settings Menu Option

Figure 79: OpenADR Settings Display

6.6.3.4Configure OpenADR Registration (2.0b)

Figure 80: OpenADR Registration Menu Option

Auto Registration – if this option is checked, ISY will automatically try to register with the VTN at boot up or when there is no longer any registration.

6.6.3.5Configure OpenADR Reports (2.0b)

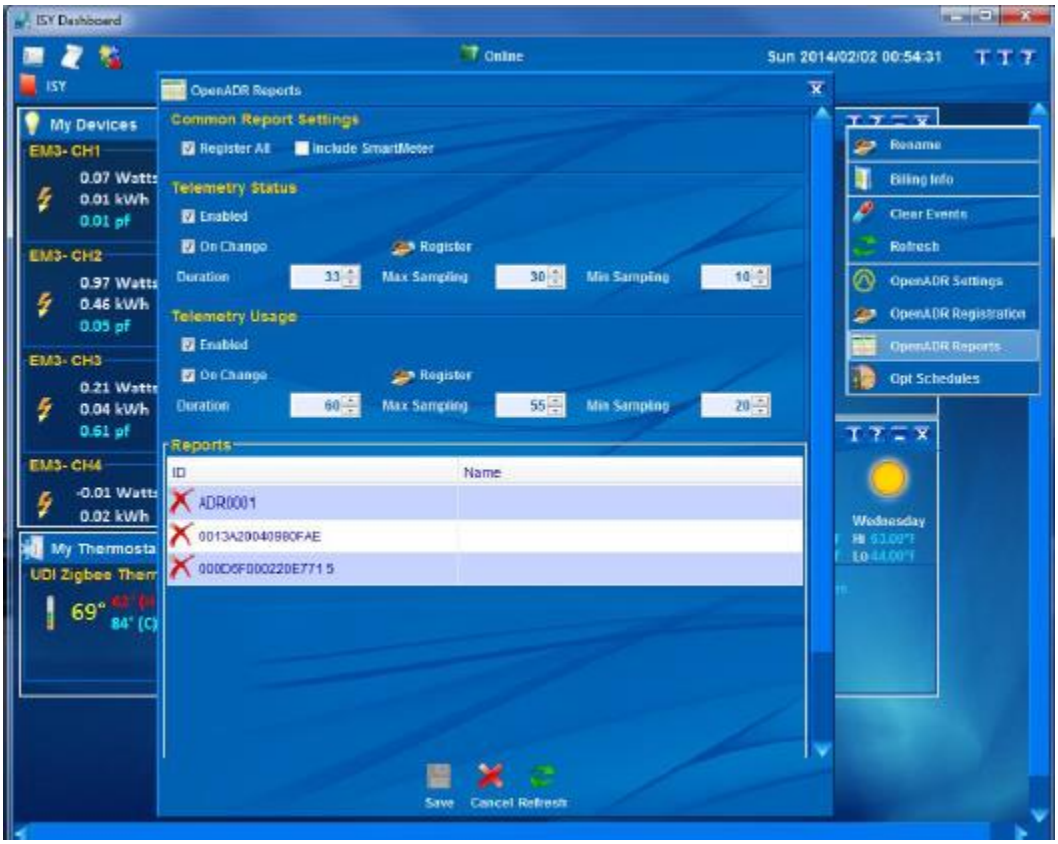


Figure 81: OpenADR Reports Menu Option

Register All – This option must always be checked since OpenADR 2.0b requires all reports (status/usage) to be registered at the same time.

Register – if Register All is checked, all report types (status/usage) are registered at the same time. Otherwise, only that specific report (usage OR status) is registered.

Report registrations are cannot be canceled. So, if there are any changes to any reports, register button must be clicked again to re-register all reports (replaces the old metadata information).

ISY will automatically decide what needs to be registered based on the device classes of devices that are in Auto DR group. For instance, energy monitoring channels or Smart Meters, only register Telemetry Usage whereas thermostats and load controllers register Telemetry Status. Some devices may report both.

6.6.3.6Configure OpenADR Opt Schedules (2.0b)

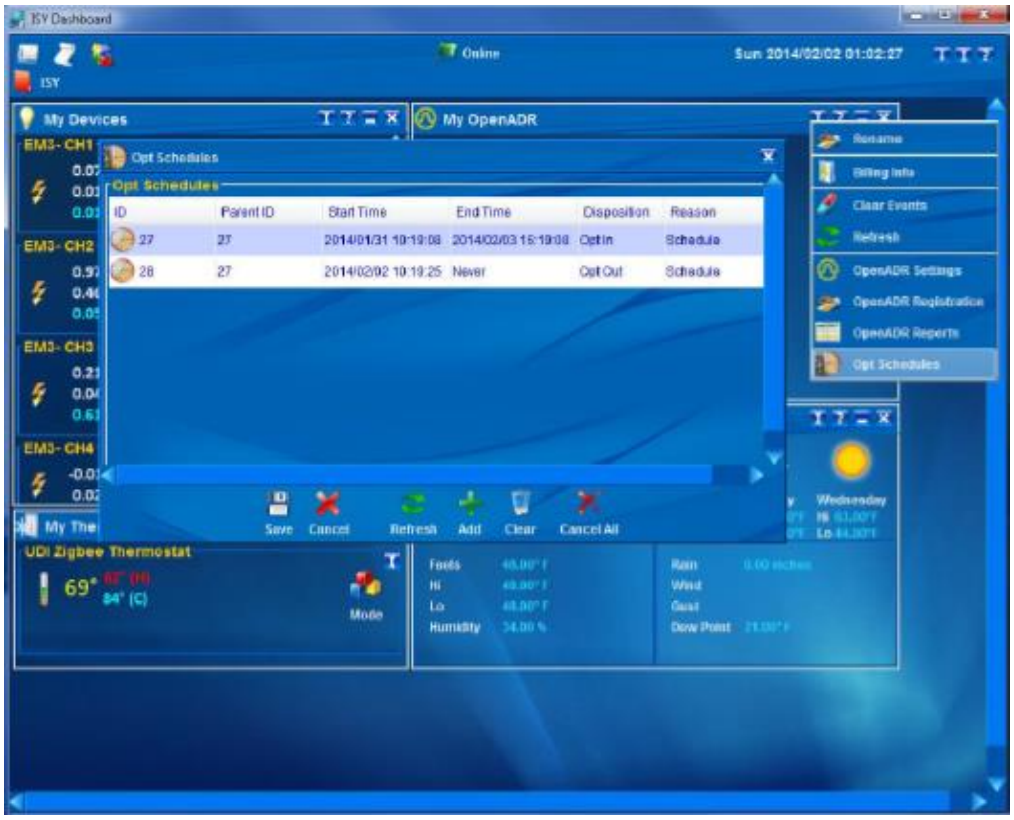


Figure 82: OpenADR Opt Schedules Menu Option

Opt Schedules inform ISY of what disposition must be reported during certain times. Clicking on the Add button or any of the schedules brings up the Opt Editor dialog which enables editing each schedule.

Figure 83: OpenADR Opt Schedule Popup

6.6.3.7Issue an Event

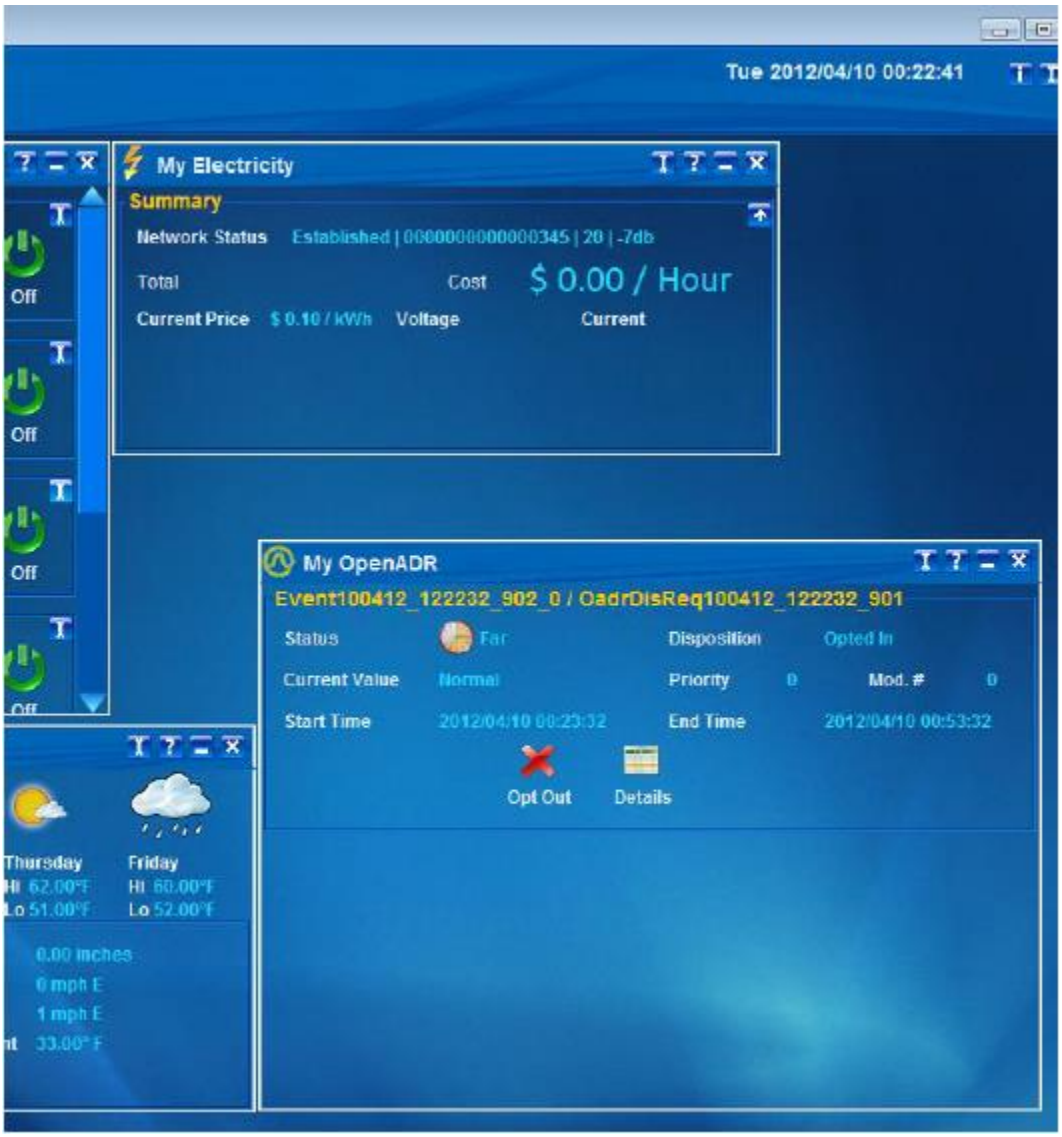


Figure 84: OpenADR Issue and Event

Figure 85: OpenADR Events

You can use the Event Viewer to see the operational status of ISY and OpenADR events:

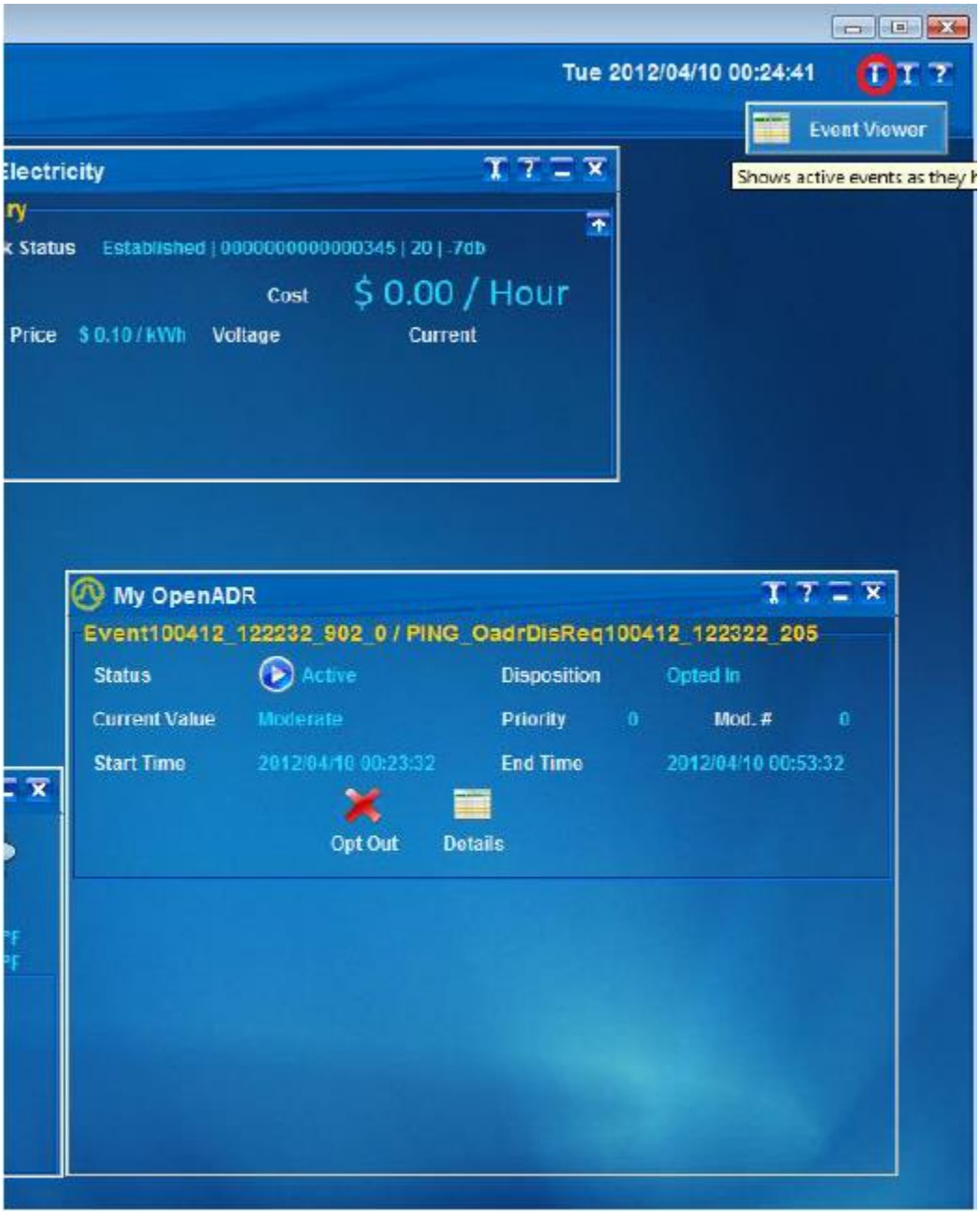


Figure 86: OpenADR Event Viewer

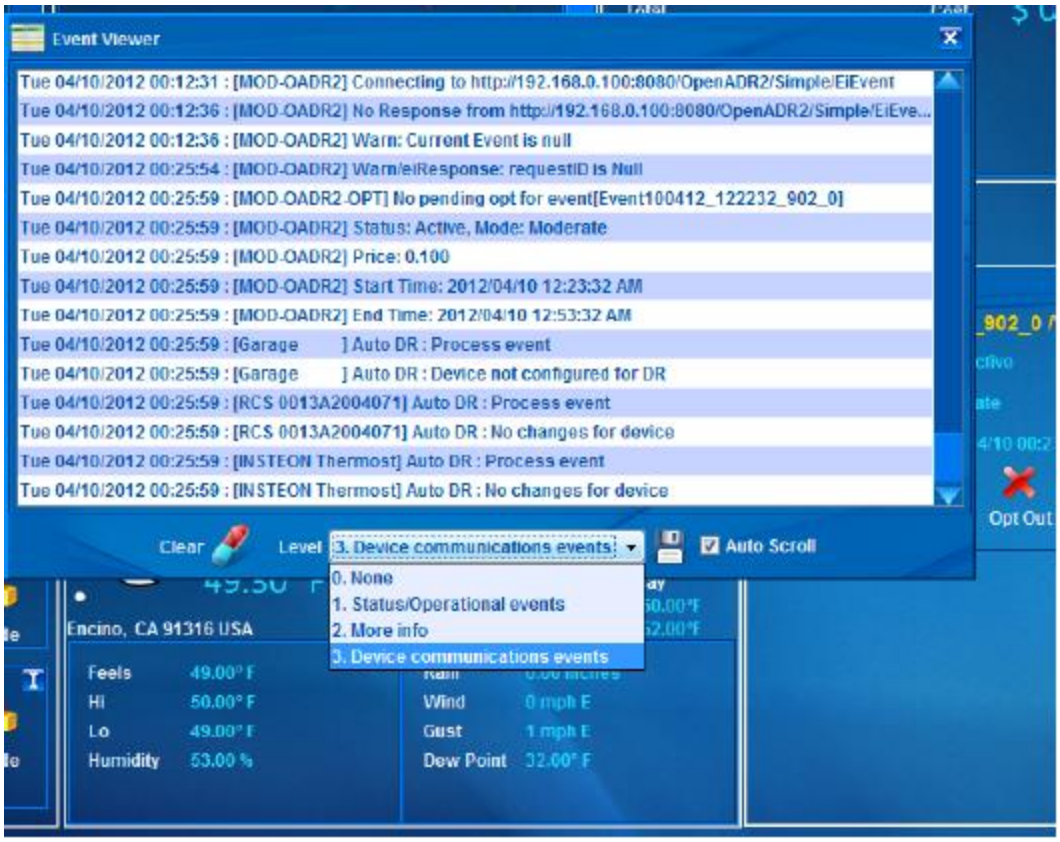


Figure 87: OpenADR Event Viewer – Event Level Pick List

6.7 Z-Wave Module[7]

This module provides ISY support for Z-Wave in a way that integrates with other protocols running on the same ISY. For example, you may add a Z-Wave lamp into a scene with Insteon devices.

Supported devices

- Thermostats
- Lamp dimmers
- Appliance module (on/off)
- Schlage locks
- Kwikset locks
- Yale locks

See section **0**

[7] (Universal Devices)

Z-Wave Notes for more information.

6.8 Brutech Electricity Module

Brultech Electricity Meters can be utilized to monitor electricity consumption. This information can be used as conditions within ISY Programs.

6.9 Electricity Module

Brultech Electricity Meters can be utilized to monitor electricity consumption. This information can be used as conditions within ISY Programs.

To configure the ISY to pull information from your Brultech meter, click the Configuration tab in the ISY's Administrative Console and choose the Electricity sub-tab. Check the "Enabled" box, enter your Brultech meter's URL, and choose the preferred polling interval in seconds. Hit SAVE to save your settings to the ISY.

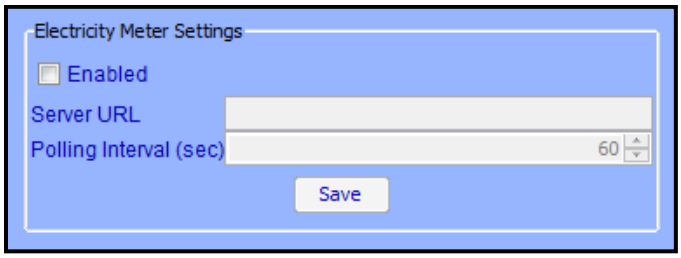


Figure 88: Electricity Meter Settings Screen

Once your Brultech meter is configured, you can use this information as Conditions in ISY Programs. When choosing a condition, choose Module and Electricity to see all available conditions:

Figure 89: Electricity Conditions

NOTE: Check out our ISY-994iZ Series device which contains Zigbee support for communicating with the Brultech Electricity Meters (and more!)

6.10 Irrigation/ETo Module

This module is designed to calculate the amount of water that is lost from the soil and plants and replace it with a close approximation of what was lost. Today in a world of "Green is good" every consumable resource such as water can be better conserved with such a tool.

The module takes the local HAM Weather data, the user settings, and calculates each day the average water that has been lost. The user then can have programs that respond to these calculations and apply the appropriate amount of water to replace that loss. When those programs complete they trigger a command that lets the module know that the water has been applied and can be subtracted from the module's tally. Each day this is done completing the cycle of tracking the data and applying the water. During cooler times of the year the watering day's frequency slow down, and during the warmer parts of the year the watering frequency ramps up to daily.

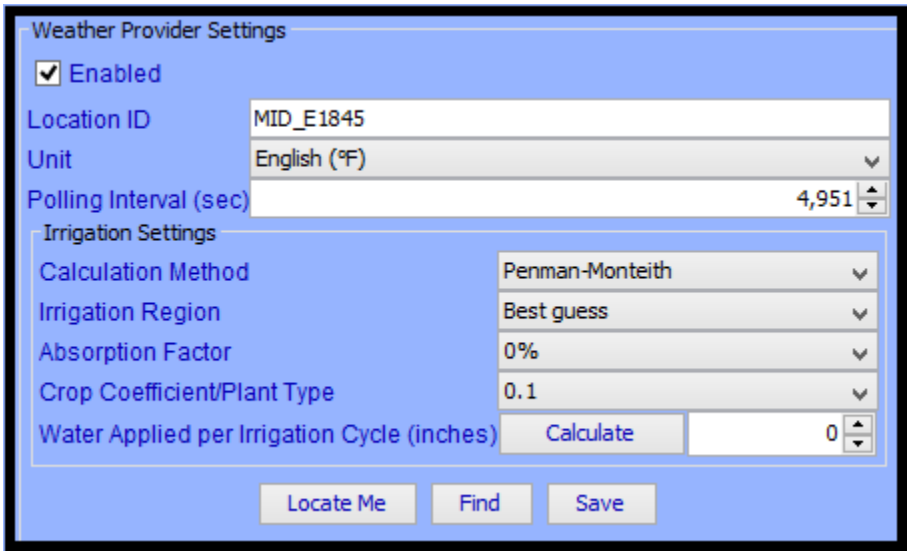


Figure 90: Ham Weather Settings

See section **17.2 Using the HAM Weather Irrigation Module**

6.11 ELK Integration Module[8]

While the ISY does include some ELK integration built-in, it is fairly limited in that most of the integration must come from the ELK side. For example, you can write a program on the ELK to turn a light on through the ISY, but you cannot write an ISY program that turns a light on based on the state of an ELK resource.

[8] (Universal Devices)

The ELK Security Module changes that, fully integrating the ELK with the ISY allowing you to use the ELK's available resources in your ISY programs.

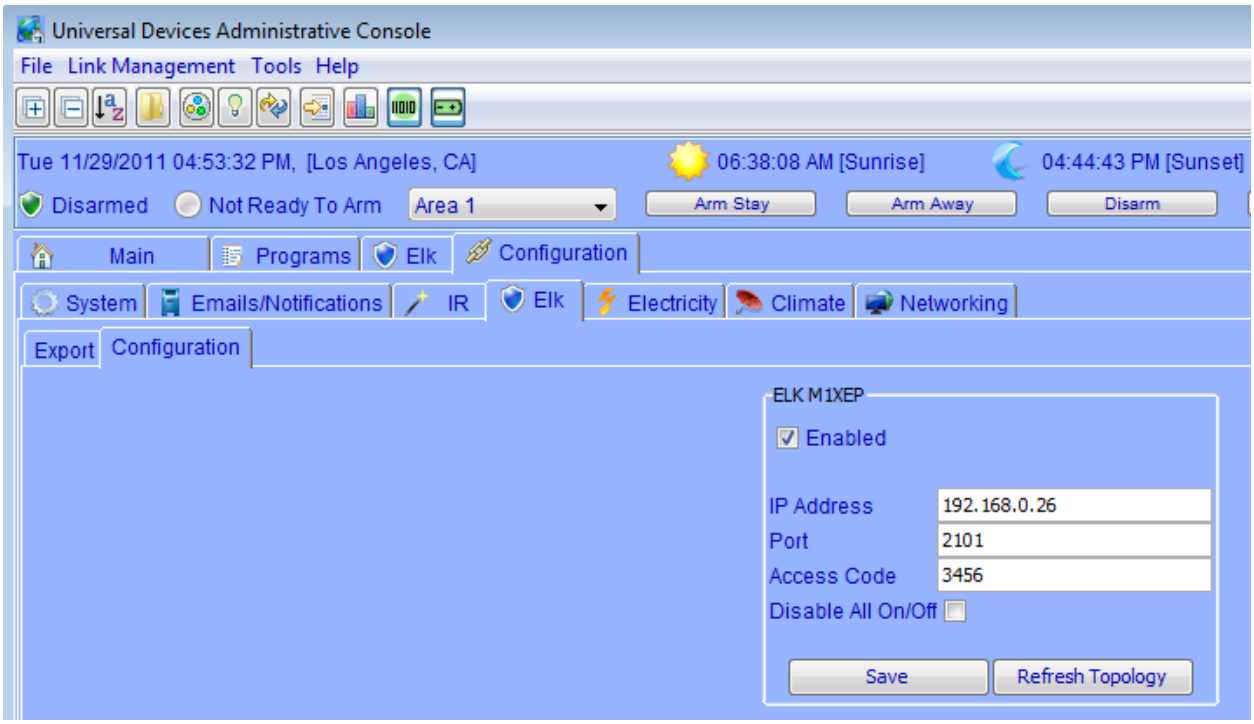


Figure 91: ISY Configuration

6.11.1 The Basic Idea of this Module

This module is designed to expose ELK Security commands and events to ISY's Programming environment.

Please note that since ISY uses the unsecure port for M1XEP, you must ensure that your Wi-Fi network uses encryption

6.11.2 Requirements

- ELK M1 Gold (4) with firmware 4.6.4 or above
- ELK M1 Gold (5) with firmware 5.2.4 or above
- ELK M1XEP with firmware 1.3.28 or above
- ISY99/994 Series with firmware 3.1.13 or above

6.11.3 Configuring Elk

6.11.3.1Overview

- You need an Elk M1 user configured with a 4 or 6 digit access code that is allowed to Arm, Disarm and Bypass the alarm
- You need to enable non-secure communications on the Elk so that the ISY can communicate with it

6.11.3.2Configuring an Elk User with an access code to use from the ISY

- Go to Users
    - Select the user that you want to use for the ISY connection
    - Ensure the user has a 4 or 6 digit access code defined
    - Select the following checkboxes:
        - Arm
        - Disarm
        - Bypass
    - Make sure the following are not selected:
        - Access
    - Click the [Send To Control] Button
- Go to Globals
    - Select the G29-G42 tab
    - Select all six Serial Port 0 checkboxes
    - Click [Send to Control] button (you may need to connect first)
- Select Save (under the main menu bar)

6.11.3.3Enabling Non-Secure Communications on the Elk

Launch the Elk RP2 application and do the following

- Enable the non-secure port for M1XEP
    - Go to Account Details, click the [M1XEP setup] button

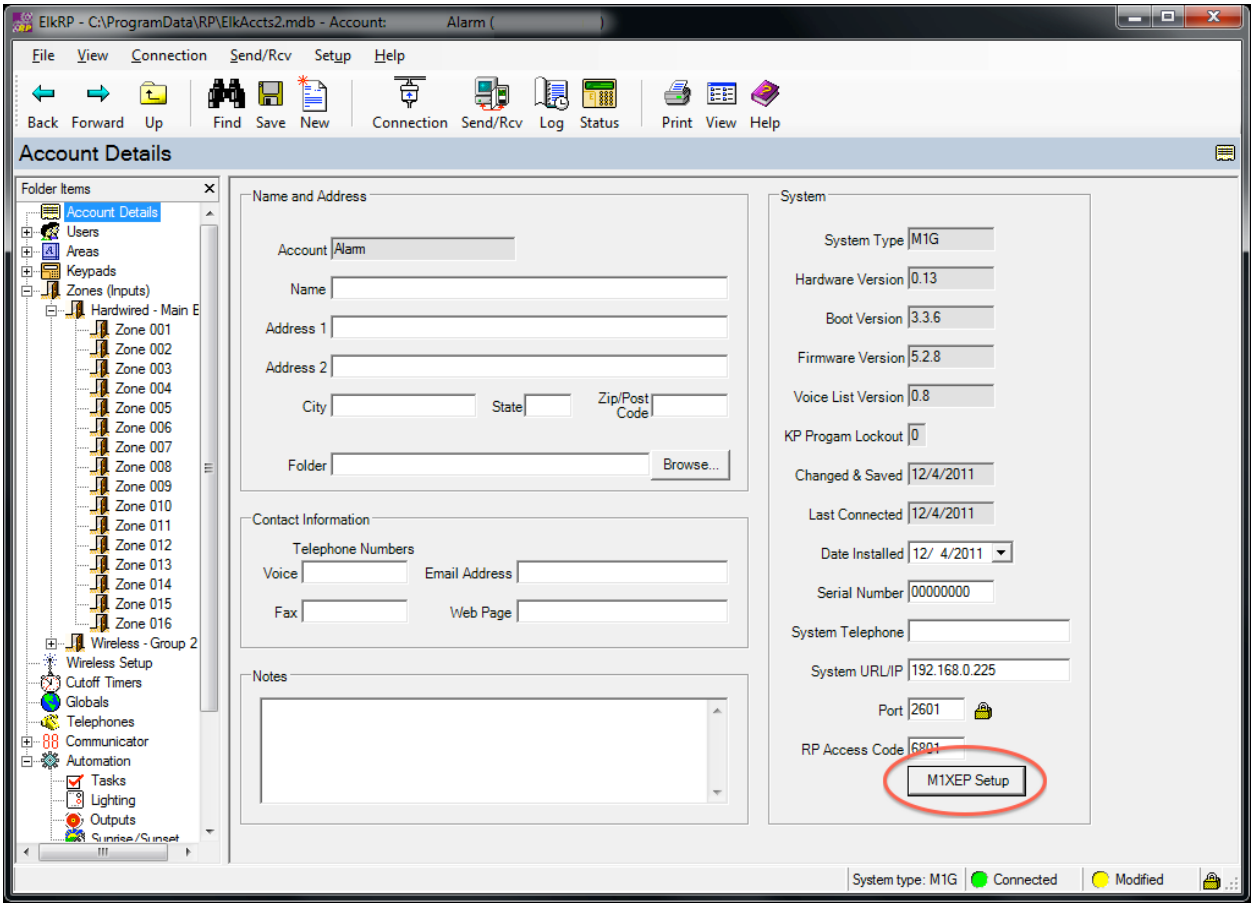


Figure 92: ElkRP2 Account Details – M1XEP Setup Button

- In the M1XEP Setup Window...

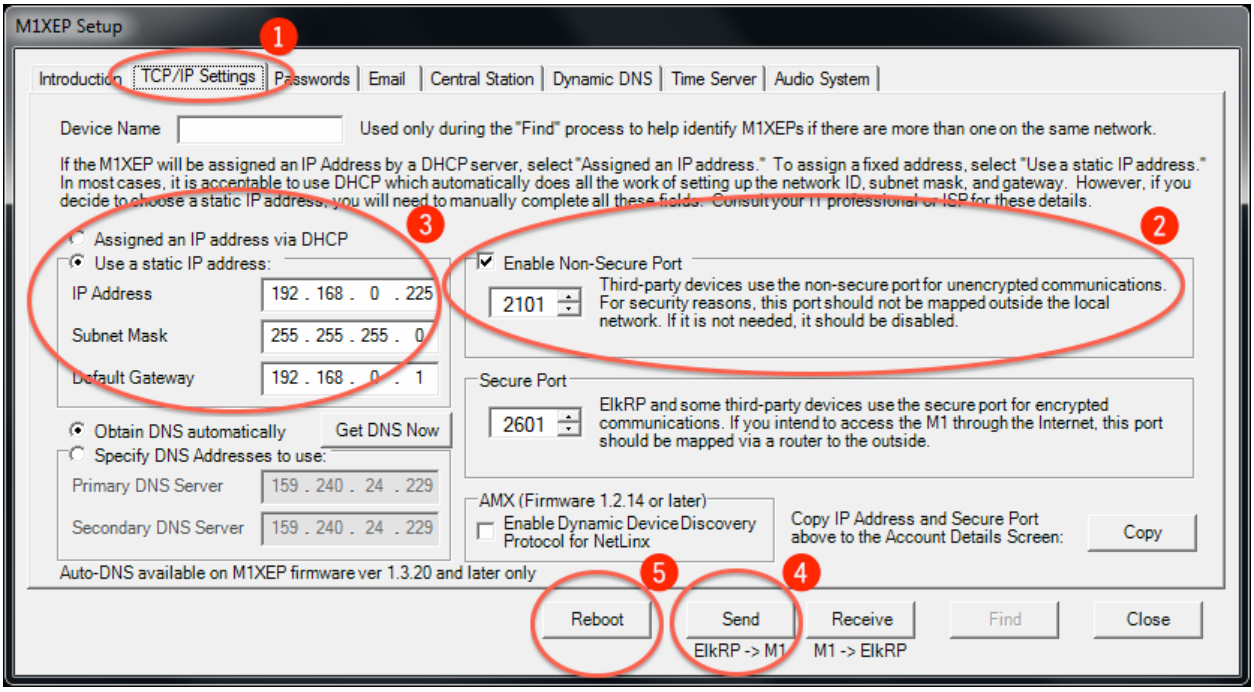


Figure 93: ElkRP2 – M1XEP TCP/IP Settings

- Perform the following steps:
  - (1) choose the TCP/IP Settings tab
  - (2) Select the Enable non-secure port Checkbox
  - (3) If you are using a static IP address for the M1XEP (this is recommended) then verify that the IP settings are still correct
  - (4) Click the [Send] button to update the M1XEP with your changes
  - (5) If you have changed your IP address config, you may need to reboot the M1XEP--Click the [Reboot] button to reboot the M1XEP
  - Close the M1XEP setup window

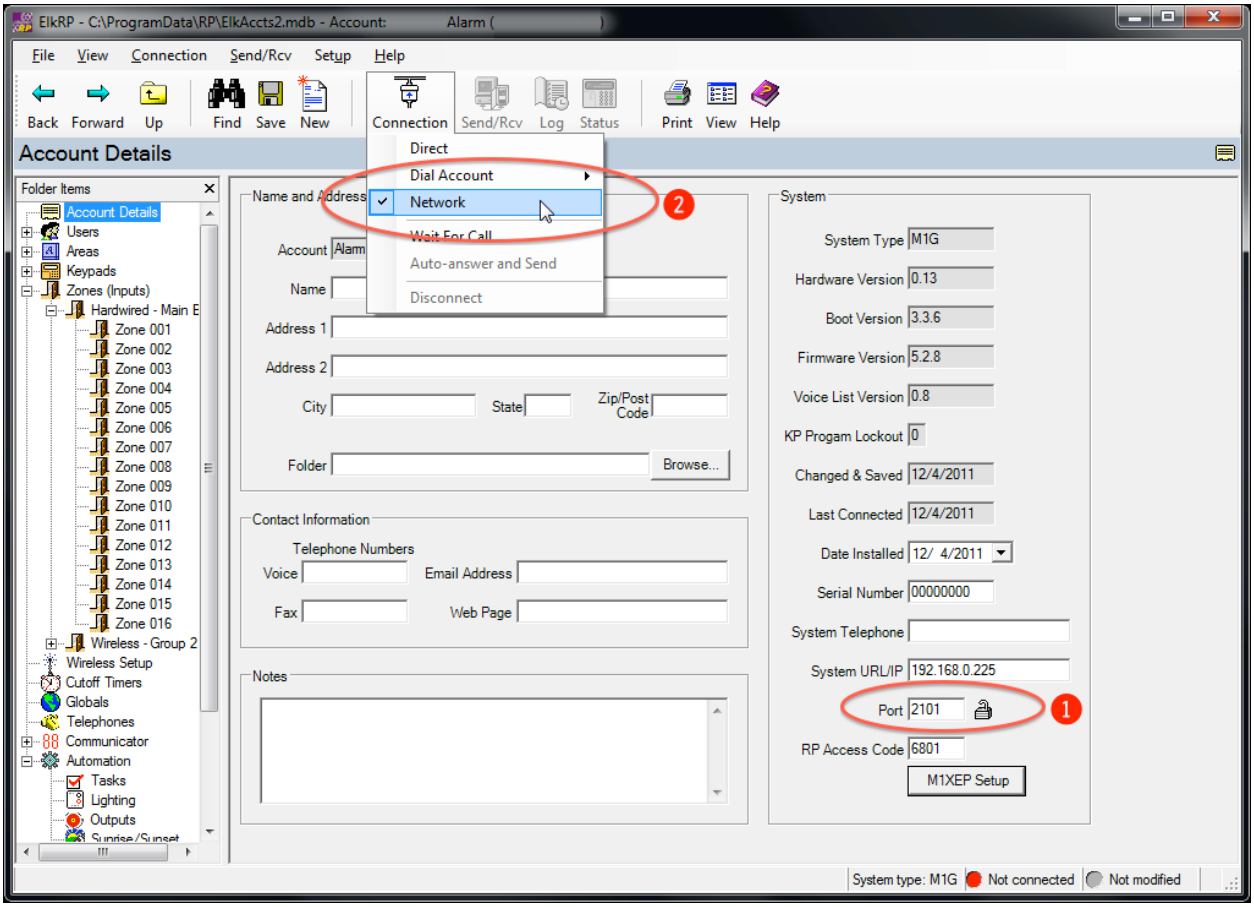


Figure 94: ElkRP2 – Account – Details Connect

- Test the connection to M1XEP via a non-secure socket (This is how the ISY will talk to the Elk, so let's make sure it is working correctly)
  - (1) In Account Details, change the port to the non-secure port (e.g. 101)
  - W(2) Try to connect to the Elk (Connection -> Network)
- If that works, you should see the indicator in the lower left corner of the ElkRP2 window change from Red to Green, and indicated that the M1g is "Connected"

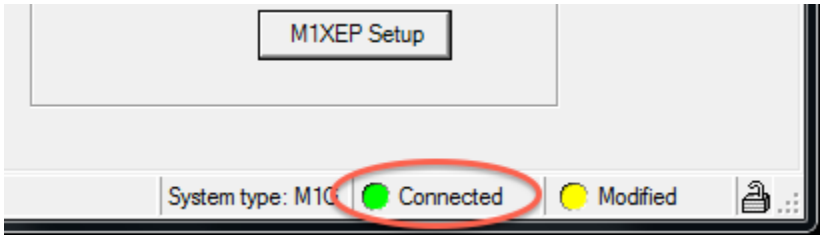


Figure 95: ElkRP2 – Connected

- Now go back to the 'Account Details' in the ElkRP2 software and change the port back to the secure port for Elk RP2 (2601 by default)
    - Go to M1XEP TCP/IP Settings page if you forgot the secure port number

6.11.3.4Configuring ISY to Communicate with ELK

Bring up the admin console for the ISY-99i and do the following

- Click on the Configuration tab
- Click on the Elk sub tab
- Enter the IP address of the M1XEP
- Set the port:
    - 99 and 994-Non-PRO: The Non-Secure port number that you configured for the M1XEP (default 2101)
    - 994 PRO Series v3.3.5+: The Secure port number that you configured for the M1XEP (default 2601). Please consult **21.6.1 Network Security Configuration Guide** to configure HTTPS Client Settings to:
        - Protocol: TLS 1.0 (or below)
        - Strength: Medium (or above)
- Enter the access code you have for the user in ELK RP2 (either 4 or 6 digits)
- Enable the ISY connection to the ELK M1XEP by clicking the "Enabled" checkbox
- Click the [Save] button
- Click the [Refresh Topology] button to load the topology (e.g. areas, zones, etc. from Elk)
    - After you make any changes to Elk, for example renaming a zone, you must refresh the topology for the ISY to see these changes.

6.11.3.5Export Lighting Devices to Elk

From the ISY Admin Console

- Click on the Configuration tab
- Click on the Elk sub tab
- Click on the Export sub tab
    - Add devices to be to exported to Elk by selecting them from the Available column and pressing the [Add to Export List] button
        - An ID is automatically assigned to each entry, but you may customize it by double clicking the value and entering any valid, unused X10 id. (e.g. B12)
- Click the [Save] button
- Click the [Export] button
    - This will save an export file on your computer, please note the location.

From Elk RP2

- Go to Automation, right+click on Lighting, and select Import Lighting Data ...
- Enter the name of the export file.
- Select Universal Devices ISY export for an Insteon network
- Click the [Import] button
- Click [Send to Control] button (you may need to connect first)
- Click the Save icon below the main menu bar

6.11.3.6Troubleshooting

Symptom

- If the Elk is configured, the ISY-99i Admin Console is slow and unresponsive
- The ElkRP software does not connect/transfer data reliably
- The data about the ELK is not loaded into the ISY-99i (you don't see the zone and area topology)

Solution

- You most likely have the ELK Module in the ISY-99i configured with the secure port on the ELK M1XEP (e.g. 2601), and the result is that the ISY-99i apparently floods the network trying repeatedly to connect to the secure socket, even though it requires a non-secure socket.

Symptom

- Not receiving updates from Elk although ISY is connect to Elk

Solution

- You most likely do not have the Serial Checkboxes in Elk Globals G29-42 selected (see Configuring Elk above for details)

Symptom

- Arm/Disarm does not work from the Admin Console

Solution

- The RP Access Code is strictly the code that will allow a connection to be made between ELK-RP and the ELK-M1. It can't be used to arm/disarm the M1. And please note that a User Code and the RP Access Code should not be programmed with a matching code
- Please confirm that your ELK system doesn't have the "Access" attribute (box) checked for the User Code that is associated with the ISY system. The "Access"

attribute is intended to be used as a special flag for the ELK Rules. For example, you may want a rule to trigger an output (magnetic door strike) when a certain user code has been entered. If the Arm, Disarm, and the Access attributes are enabled, then the first use of the user code will set the access flag. In this circumstance, an additional pressing of the exit key or entry of the code is required to arm the system

- Reset power to both systems (ELK and ISY) including the M1XEP after changes (especially #2) is made
- Make sure Globals -> Serial Port 0 Transmit Options boxes is checked? Typically all but the Event Log need to be checked.
- Make sure ELK-RP is disconnected from the ELK-M1 control? If not, please disconnect. The 3rd party commands will conflict with RP commands

6.11.3.7Program Examples

- Video: ELK Module Integration/Examples: http://www.youtube.com/watch?v=8csU9qc7oo4&feature=youtu.be
- Trigger when the system is armed away AFTER the exit delay ends

The Elk system itself sends events Armed Away, Armed Fully, Armed with Exit Timer, and Armed Fully in that order. We are uncertain as to why ELK sends the first Armed Fully. The workaround is to put a 2 or 3 second wait at the start of your program e.g.

```
If

    Elk Area 'Apt 1102' 'Arm Up State' is Armed Fully

  And Elk Area 'Apt 1102' 'Armed State' is Armed Away

Then

    Wait  3 seconds

    Send Notification to 'Default'

Else

  - No Actions - (To add one, press 'Action')
```

Send notification if either Zone 1,2, or 3 is violated while the Lobby is Armed Fully

```
If
      Elk Area 'Lobby' 'Arm Up State' is Armed Fully
   And (
         Elk Zone 'Zone 001' is Violated
       Or Elk Zone 'Zone 002' is Violated
       Or Elk Zone 'Zone 003' is Violated
      )
Then
      Send Notification to 'me' content 'Zone Status'
Else
  - No Actions - (To add one, press 'Action')
```

Variables for Notifications/ELK, see **8.4.5 Elk Variables**

7 Scenes

7.1 Scene Basics

Scenes are collections of INSTEON devices that react to and with one another in various ways. Scenes are comprised of both Responders and Controllers.

For additional information on creating and working with scenes, see section: **7 Scenes**

Responders are devices contained within scenes that only respond to commands issued to the scene. For example, a lamp module with a table lamp attached would likely be a Responder to the scene. When the scene is turned on, the lamp module would turn on. When the scene is turned off, the map module would turn off. Responders are colored blue within a scene.

Controllers not only respond to commands issued to the scene, they also control the scene. An example of a Controller might be a button located on a Keypad – when that Keypad button is pressed, all members of the scene will respond as configured. Controllers are colored red within a scene.

7.1.1 Creating a Scene[9]

The following steps show how to create a scene.

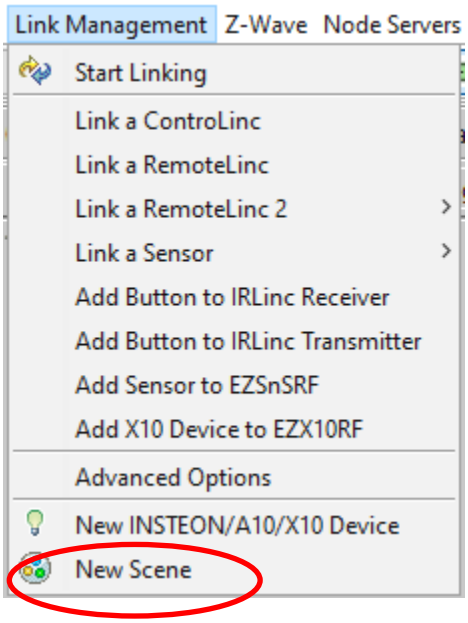


Figure 96: The Link Management Menu

- Select New Scene from the Link Management menu or the Tool Bar Icon.
- Name the scene you wish to create and enter this in the Name field of the Scene dialog.
- Once you created the scene, this will be added to the Tree View having its own scene node.
- Add the devices to the scene. You can select one or more devices then drag and drop them to the scene. To select multiple devices, select the first device, hold down CTRL key then select the next device or devices. Once all the devices are selected, drag and drop this to the scene.
- You will be presented with a Confirm Add dialog with a list of all the devices you selected. Assign the controller and responders by highlighting the device and select controller/responder button. From this dialog you can also remove devices.

[9] (Universal Devices)

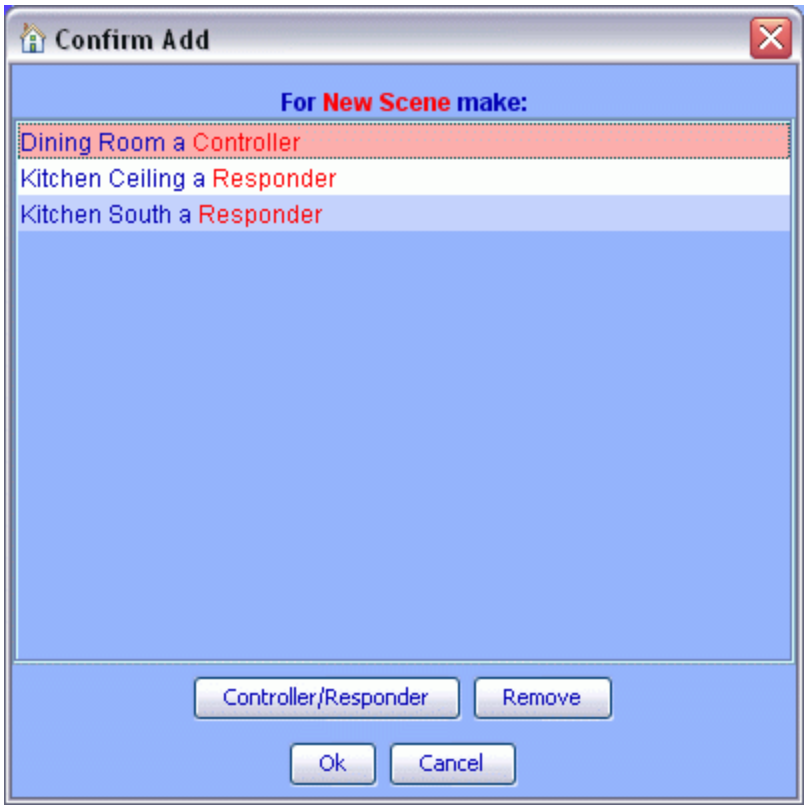


Figure 97: Confirm Add dialog

- Select OK.
- The system will add these devices to the scene. A System Busy dialog will be with a progress bar will be shown. Depending on the complexity and the number of other devices, especially with controllers/masters, it may take roughly 10 seconds to a few minutes to program the device(s) in becoming part of a scene. Heed the note within the dialog box. **Figure 98: System Busy Dialog**

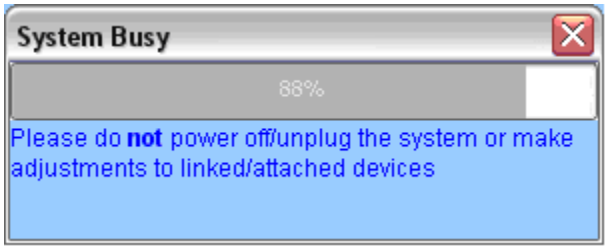


Figure 98: System Busy Dialog

- Set the scene attributes by adjusting the sliders for each device.

7.1.2 Scene Menu

By selecting any of the scenes you created and clicking on the right mouse button you will be presented with the Scene Menu.

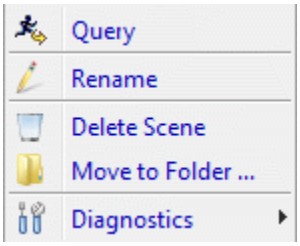


Figure 99: Scene menu on a right mouse button click

7.1.2.1Query

When you select the Query option on the menu, the ISY will query every device in the scene. Any new status retrieved is presented in the scene view.

7.1.2.2Rename

The Rename menu option allows you to rename the selected scene.

7.1.2.3Remove Scene

The Remove Scene menu option will completely remove the scene from ISY and delete the links in all the scene devices.

7.1.2.4Move to Folder...

Opens a requester with a drop-down of available folders.

7.1.2.5Diagnostics

7.1.3 Scenes[10]

Scenes are groups with members comprising of INSTEON devices. Each of which may have certain pertinent and permissible attributes for that specific Scene. For instance, a SwitchLinc may become a Controller for a scene and all the other devices assigned to the scene would respond to it based on its On Level and Ramp rate attributes (if applicable) for that scene. Attributes for all devices are stored in the devices itself. These attributes are invoked in three levels of your lighting network, the ISY, Controller and Local.

[10] (Universal Devices)

The ISY as the controller of the scene relies on a trigger(s) or schedule(s) defined in the program detail tab to invoke these attributes. Meaning, if the conditions set in the program are met and the action defined is to start the scene, the ISY will use the scene attributes at this level to create the lighting scene. The attribute setting for this scene is found at the scene folder level.

A device controller, SwitchLinc or KeypadLinc, relies on the physical actuation of the switch to invoke the scene attributes. If the controller switch is pressed, the controller will set the lighting scene based on the scene attributes assigned at this level. The settings can be found at the device level of the scene. These attributes are completely independent of the ISY scene attributes.

Local control or noted as “Applied Locally” is when a device within a scene is locally controlling its own load. This is true for SwitchLinc and KeypadLinc’s load key.

When the Scene folder is selected the” Apply Changes to All Devices” checkbox is available. See **Figure 100: Apply Changes and Copy Attributes**. This feature will allow the user to copy the attributes (On level and ramp rate) of the last device that was set to all devices within the scene. These attributes are stored in each device and are invoked only by the ISY.

A controller device within the Scene folder is noted in RED italicized text. When selected, the same sets of sliders in the Scene folder are presented on the screen. The difference is “Copy Scene Attributes from …” button is now made available so that you can copy the same ON level and ramp rates from the Scene folder. Note that these settings are invoked by the controller and not the ISY. Therefore, attributes set in this level are completely independent of the attributes found in the Scene folder.

Figure 100: Apply Changes and Copy Attributes

A scene can help create the right ambiance for a certain event by a simple click. For example, in **Figure 101: Screen Node expanded** we have created a movie scene. The lights in the Living Room were set to be turned on at the desired light intensity while viewing a movie. To populate a scene, simply drag and drop INSTEON devices into the scene.

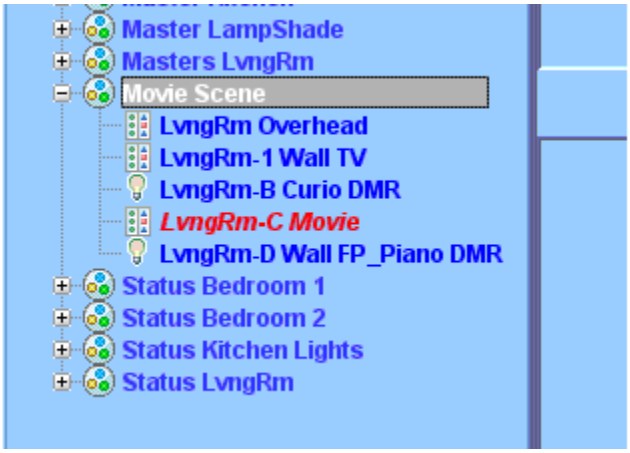


Figure 101: Screen Node expanded

In **Figure 102: Living Room – Movie Scene** you will find the detail screen of the devices assigned to the scene. You can control or set all the devices of the scene using this screen. Every time the scene is triggered the controller will use these settings to set all the responders.

Figure 102: Living Room – Movie Scene

7.2 Creating a Scene

7.2.1 What is a Scene

Scenes are simply a group of devices. A scene is equal to a group in INSTEON vernacular. Also, a scene is as small as two devices linked together and the more links you add the bigger the scene gets. I think there is a desire to think that linking two devices together is just a link and this is correct, but also, it's a scene. So, if you want to create a link between two devices you will have to create a scene to do it. Furthermore, to answer some concerns about a two-device scene; creating a scene in the ISY is no less efficient simply because the devices are linked as if they were linked manually.

7.2.2 Create a New Scene

- Log into your ISY.
- Create a new scene from the pull-down menu go to "Link Management --> New Scene"

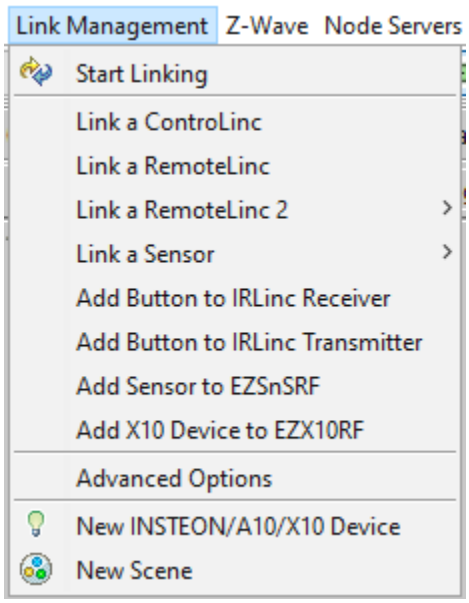


Figure 103: The Link Management Menu

- Name the new scene with something descriptive of what it controls

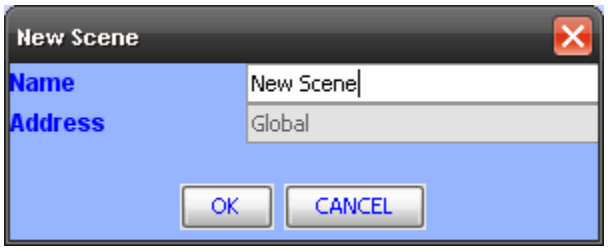


Figure 104: New Scene Window

- After clicking ok you should now see the new scene in the tree

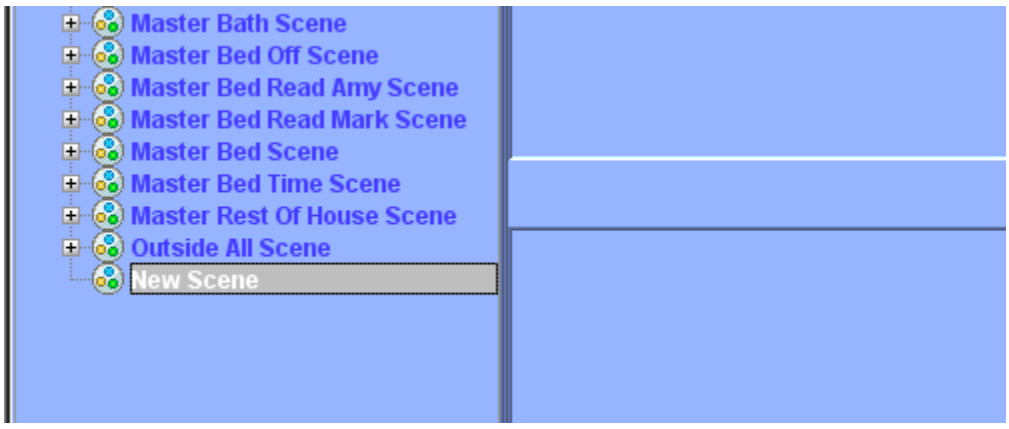


Figure 105: New Scene in Tree

7.2.3 Add Devices to a Scene

Here are some useful terms from the glossary that pertain to adding devices a scene. A controller is a transmitting device that sends out a message to cause an action in a receiving device. A responder is a receiving device that takes action based on a message from a transmitting device.

- Control+ Click all the devices you want to add to your new scene, and drag and drop the selected devices on to the new scene
- Confirm the scene to be created
    - If there are any devices that can be a controller the window will wait for you to set any controller devices, click ok when done
    - If there are not any devices that can be a controller the window will automatically start creating the scene

You will see the busy window popup with progress. It may disappear and re-popup several times this is ok. Be patient it may take some time to create your new scene. The more devices the more it has to do. It is creating all the links for your scene. These links are local to each device and will function with or without the ISY when it's done.

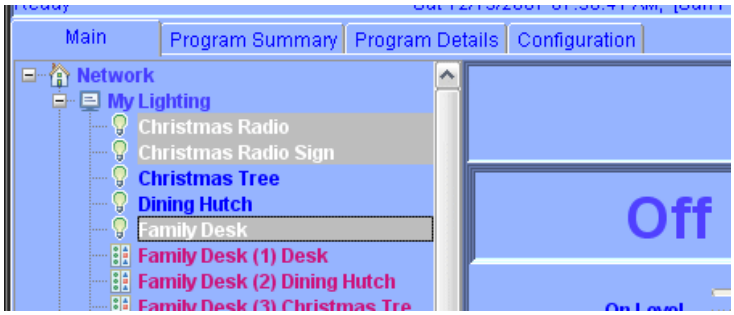


Figure 106: New Scene Devices to Add

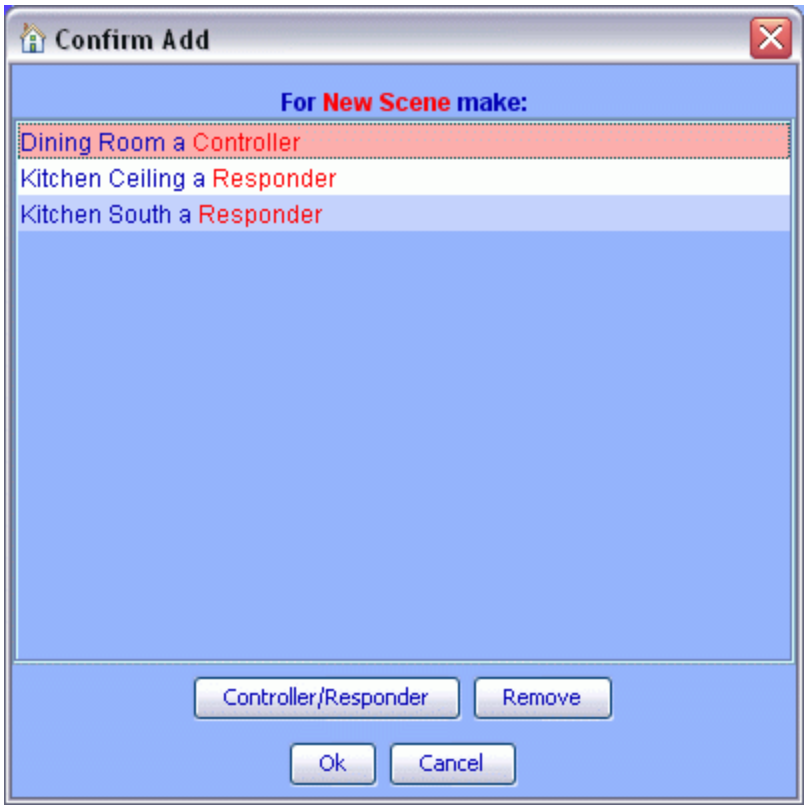


Figure 107: New Scene Confirm Window

7.3 Organizing INSTEON Devices and Scenes

Once added to your ISY, you can manage and organize your INSTEON Devices and Scenes in a variety of ways:

Rename. When added to the ISY, devices are named their INSTEON address by default. If you right-click a device or scene, a **Rename** option is available to help make your devices more identifiable. You can also rename by left-clicking to highlight, then hitting the F2 key. A dialog box pops up giving you several rename options if you'd like to rename associated devices as well.

Folders. Feel free to create folders to help organize your Devices and Scenes. Folders can be created by either right-clicking on the Network node (located on the left-hand pane) and choosing New Folder or using the New Folder icon located on the Administrative Console's top toolbar. Devices and Scenes can be dragged and dropped onto folders, or simply right-click a Device or Scene and choose Move To Folder and select the appropriate folder to move it to. Folders can also be moved within other Folders to create a nested hierarchy.

Delete. By deleting a Device or Scene you remove it completely from the ISY. The ISY also removes any links associated with any other Device or Scene.

NOTE: In order to delete a Device or Scene entirely from the node list, it must be located in the parent "My Lighting" folder. So, to delete a node, be sure to move it out to "My Lighting" first.

My Lighting. Clicking the My Lighting node on the left-hand pane displays a summary of all your devices, their current states, their INSTEON addresses, their device types and their firmware versions. You can sort by any field simply by clicking the appropriate column header (Name, Current State, Address, or Type).

7.4 Controlling INSTEON Devices and Scenes

The Admin Console also allows you to control your INSTEON devices and scenes. Simply click on a device or scene, and appropriate controls display on the bottom of the Console as follows:

Figure 108: Scene Controls

On. Clicking this button turns the INSTEON device or scene on to its programmed On Level using its programmed Ramp Rate.

Off. Clicking this button turns the INSTEON device or scene off using it's programmed Ramp Rate.

Fast On. Clicking this button turns the INSTEON device or scene on to its maximum (100%) level instantly (ignoring its programmed On Level and Ramp Rate).

Fast Off. Clicking this button turns the INSTEON device or scene off instantly (ignoring its programmed Ramp Rate).

Brighten. Pressing and holding this button starts ramping up the brightness level of a dimmable INSTEON device. Release the button to stop the ramp up.

Dim. Pressing and holding this button starts ramping down the brightness level of a dimmable INSTEON device. Release the button to stop the ramp down.

LED Brightness. Some INSTEON devices allow you to adjust the brightness of their LEDs by changing this value.

Some devices may have other controls or options available. To find out more information for a particular device, please see **13 INSTEON Device Notes**

7.5 Other Functions (Restore, Disable, Query, etc.)

There are several other functions available when working with INSTEON devices in the Administrative Console's **Main** tab. These functions are available by right-clicking the device or Scene.

Restore Device. If an INSTEON device has lost all or some of its configuration, you can try using this function. This will attempt to re-write all links in a device, recreating all scenes to match the ISY's internal database. Because a device restore can be a very lengthy process the ISY provides a confirmation window to avoid accidental restores as shown below:

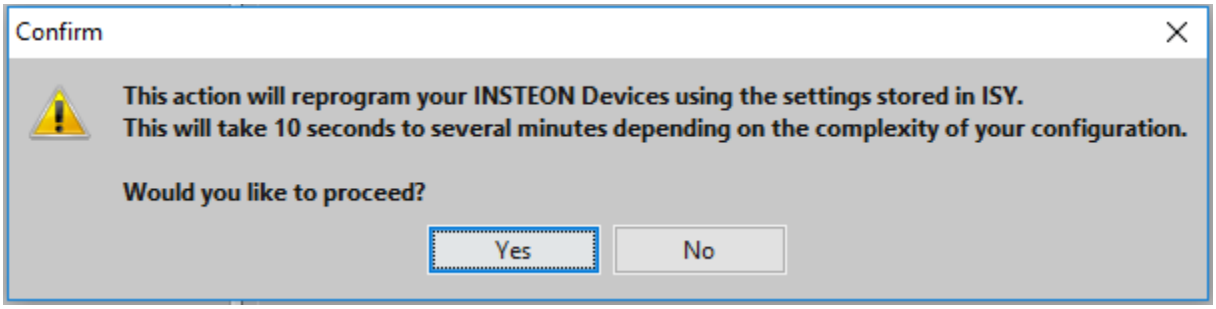


Figure 109: Restore Confirmation Window

Disable. If an INSTEON device will be taken offline for an extended period of time, it might be desirable to use this function to stop the ISY from trying to access it.

Query. This function causes the ISY to communicate with the highlighted Device or Devices to determine their current states.

Group Devices. Some INSTEON devices create multiple entries within the ISY. For example, KeypadLincs have 6 or 8 nodes in the ISY (one for each button). You can choose to group these nodes together by right-clicking the primary node and using this function.

Write Updates to Device. If you have turned off "Automatic Writes to Devices" or "Automatic Writes to Battery Powered Devices" you can manually update a Device with any pending changes using this function.

7.6 Working with Scenes In-Depth Tutorial[11]

7.6.1 INSTEON Devices and Local Settings

Every INSTEON device managed by ISY is listed under My Lighting in the tree view (the left pane) of the Main tab. Selecting My Lighting in the tree view will display in the right pane, a list of all INSTEON devices managed by ISY, along with their current status.

Selecting a device under My Lighting will display its current status and its local settings in the right pane. A relay device, such as a SwitchLinc Relay or an Icon On/Off switch, will have only two possible states: On or Off. A dimmer device will have an on-level which may vary between zero and 100 percent, and a ramp-rate which may vary between .1 seconds and 9 minutes. The on-level and ramp-rate may be adjusted by use of the sliders in the right pane.

These local settings are the settings which will be used by the device when it is manually switched On or Off at the switch itself, or when it receives an ON or OFF command from ISY either in response to clicking the On or Off buttons in the right pane when the device is selected in the tree view, or when an ISY program sends an ON or OFF command to the device. When a FAST ON or FAST OFF command is received, the device will turn full on or full off, respectively, at the fastest possible rate.

[11] (Universal Devices)

7.6.2 What Is A Group?

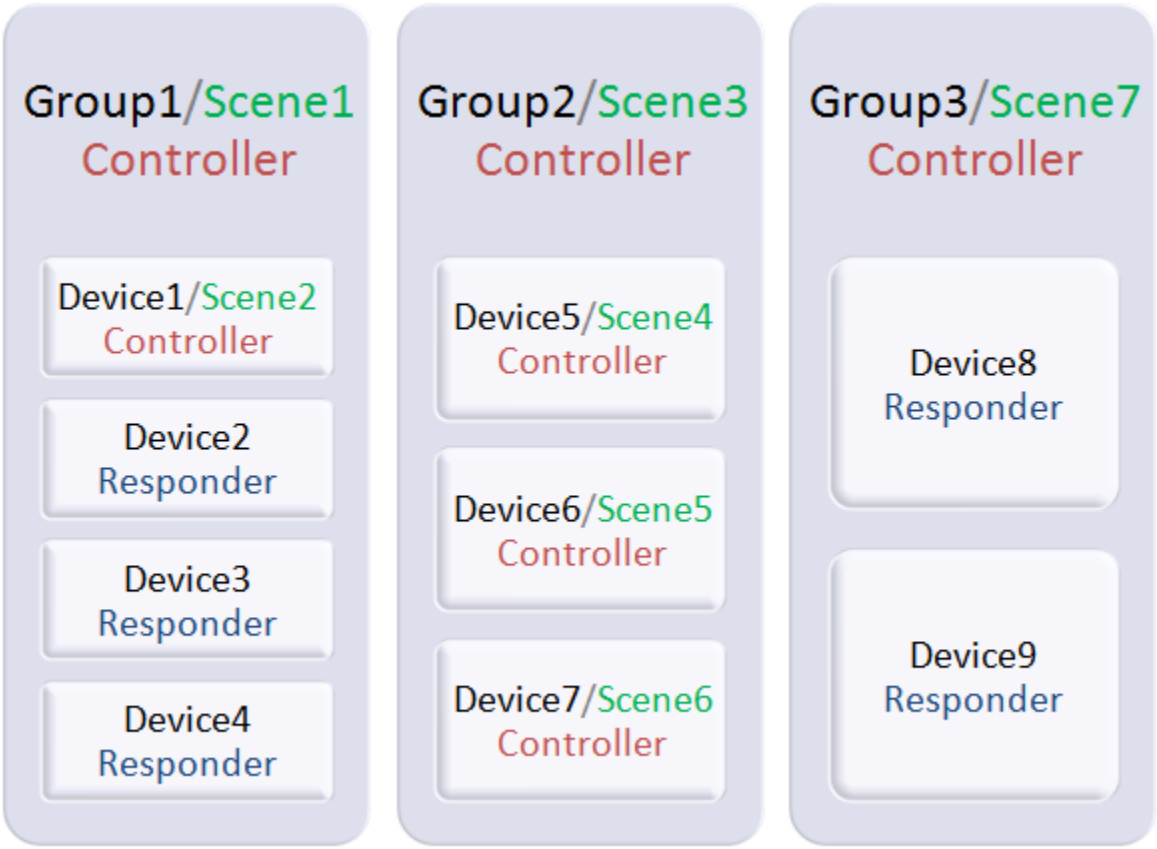


Figure 110: Device/Group/Scene Chart

In INSTEON terminology, a group is a unidirectional link between a single controller device, and one or more responder devices. All INSTEON devices employ bidirectional communication, and all are theoretically capable of acting as either a controller or a responder. In practice, a few types of devices (InlineLincs, most plug-in modules such as LampLincs and ApplianceLincs) do not act as controllers since they either have no local control, or do not send notifications when controlled locally. Similarly, a few devices such as ControLincs and RemoteLincs, do not act as responders, but only as controllers. Finally, some devices (SignaLinc, Access Point) are neither controllers nor responders, and do not participate in groups.

Many devices such as Icon, SwitchLinc, and ToggleLinc dimmers and relays, are able to act as a controller of only one group. KeypadLincs may be controllers of as many as five or eight groups, depending on whether configured for six-button or eight-button operation [in six-button mode, the top and bottom buttons act as On and Off buttons respectively for the local load, while the remaining four buttons toggle between On and Off]. ControLincs may

be controllers of up to five groups, and RemoteLincs controllers of up to six groups. In general, a device may be controller of a number of groups equal to its number of buttons/paddles. Finally, the PLM may be a controller of up to 255 groups.

All responder devices may be responders in multiple groups. Responder devices may be added to and removed from an established group. Each responder device maintains its own on-level and ramp-rate settings for every group in which it participates. When a device receives an ON command for a group in which it is a responder, it changes to its predefined on-level at its predefined ramp-rate. When it receives a FAST ON command, it ignores those settings and turns full on at the fastest possible rate. It may also respond to other commands sent to the group, including OFF, FAST OFF, BRIGHTEN and DIM. An OFF command will use the preset ramp-rate, while a FAST OFF will turn the device off at the fastest possible rate.

The controller of a group is usually also a responder of the group. For a single-button controller such as a SwitchLinc, or for the primary button(s) of a KeypadLinc, it is a responder by default, since operating the paddle/button(s) simultaneously operates the local load as well as any group of which it is the controller. In this case, the local load operates according to the local settings. However, in the case of a KeypadLinc secondary button, the KeypadLinc's local load is not a responder of a group programmed on that button unless it is specifically included in the group.

7.6.3 What Is A Scene?

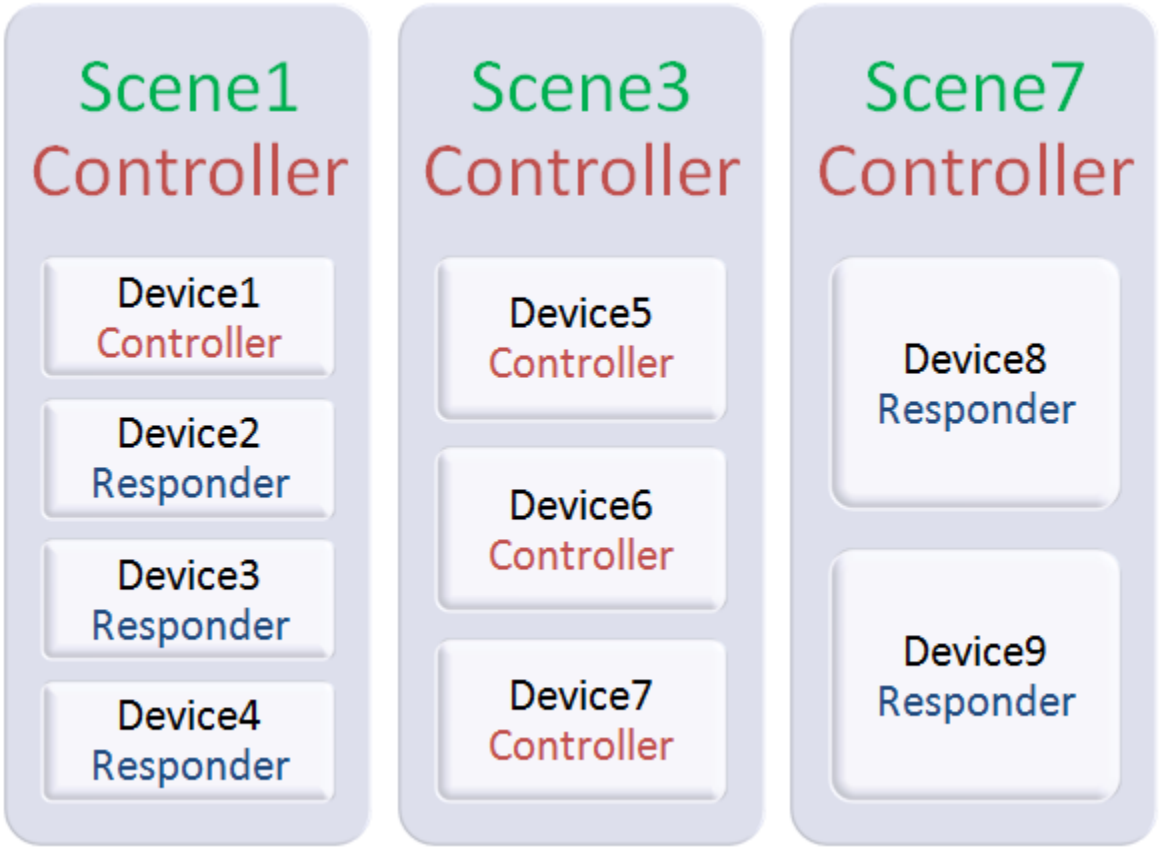


Figure 111: Device/Scene Chart

Scenes are closely related to groups. In ISY terminology, a scene is a named collection of devices, and is displayed in the tree view of the Main tab. When a scene is created by the user, it will initially be empty. The user may add and remove devices from a scene at any time.

An ISY scene is a super-set of an INSTEON group. Like a group, a scene may contain multiple responder devices, but unlike a group, a scene may also contain multiple controller devices. To be useful, a scene must have at least one controller device, and at least one responder device. The ISY/PLM is considered a controller of every scene managed by ISY, so a scene may be useful even without additional controllers.

Because an INSTEON device maintains separate on-level and ramp-rate settings for each group to which it responds, it follows that in a scene with more than one controller, the on-level and ramp-rate settings of the responders may be set separately for each controller.

When a scene contains more than one controller, ISY automatically creates the required cross-links so that each of the controllers' status indications, such as a SwitchLinc's level-

indicating LEDs or a KeypadLinc's button LED, will be updated when the scene is controlled from any other controller in the scene. In this sense, an ISY scene is a multi-directional group. If a scene were created manually without ISY, all of the required unidirectional INSTEON group links and cross-links would need to be manually created.

It should be noted that all links created by ISY are standard INSTEON links and are stored in the INSTEON devices. Therefore, after the required scenes are created, the ISY/PLM could be removed from the network, and the scenes would continue to function as programmed.

7.6.4 Working with Scenes

Selecting a scene in the Main tab's tree view will display in the top portion of the right pane, a list of all devices which are responders in that scene together with their current status, similar to the list of all managed device displayed when My Lighting is selected. The bottom portion of the right pane will display the ISY scene settings on-level and ramp-rate sliders for each of the scene's responder devices. These are the settings which will be used when the scene is controlled by ISY, either in response to user actions in the GUI, or in response to ISY programs or schedules.

When the scene is expanded in the tree view, it opens a list of all devices in the scene, with controllers displayed in red typeface, and responders in blue typeface. Selecting a controller within a scene displays in the right pane a list of the scene's responder devices with status on top, and a list of their on-level and ramp-rate settings on the bottom, similar to that displayed when the scene is selected. But in this case, the settings displayed are the controller-specific scene settings which will take effect when that particular controller is used to control the scene. When these settings are changed, the changes take effect immediately.

Selecting a responder device within a scene displays in the right pane the device's status and local settings, and is the same display as shown when the device is selected in My Lighting. Changing these settings in either location will have the identical effect.

7.6.5 Adding a New Scene

To add a new scene, open the Link Management menu and choose New Scene. A New Scene window will be displayed, allowing the new scene to be given a name.

7.6.6 Removing a Scene

In the tree view of the Main tab, right-click on the scene and from the context menu choose Remove Scene. A Confirm window is displayed, and if OK is chosen the scene is removed.

7.6.7 Adding Devices to a Scene

Devices may be added to a scene one at a time, or an entire group of devices may be added at once. To add a device or group of devices to a scene:

- Select the devices to be added:
  - In the tree view of the Main tab, click on the device to be added, or hold down the <Control> key and click one at a time on a group of devices to be added and then release the <Control> key. You may click on device names anywhere they appear within the tree, such as under My Lighting or under other scenes. To select a contiguous group of devices, click on the first device of the group, press and hold the <Shift> key, click on the last device of the group, and release the <Shift> key. In this case, the devices must all be within the same branch of the tree, such as My Lighting or another scene.
- Add the devices to the scene in either of the following ways:
  - Drag the selected devices onto the scene name in the tree, or
  - Right-click and from the context menu choose Add to Scene .... A Choose Scene window will open, allowing you to select the desired scene.
- Set the devices as controllers or responders:
  - A Confirm Add window will open, listing the devices to be added to the scene. For each device in the list, select the device and choose whether it should be added to the scene as a controller or a responder. The default is responder for all devices except those which are controller-only devices. When all devices are correctly set, click the OK button and the devices will be added to the scene.
  - Note: If none of the devices being added are capable of acting as both controller and responder (each device being added is either a responder-only or a controller-only device), then clicking the OK button will not be required; the devices will be added automatically.

7.6.8 Removing a Device from a Scene

In the tree view of the Main tab, right-click on the device within the scene, and from the context menu choose Remove from Scene. The device is removed from the scene immediately; no confirmation window is displayed.

7.7 Multi-Way Circuit[12]

7.7.1 Creating the Multi Way

In the ISY the multi way circuit is much easier than most other hardware/software controller setups. When it was done in the past with other INSTEON control systems you made a separate scene for each controlling device that linked to all the other devices. With the ISY there is only one scene to get the job done. Here are the steps to create a multi way circuit.

- Log into your ISY.
- Create a new scene for the "Three Way Scene" (we are using three way for this example you can have any number you like)
- In the confirm popup window set all three as controllers, then click ok (this step will only work if all the devices are controllers, and all the devices are not already controlling something else)
- Click on the "Three Way Scene" set all the scene levels so they are what you want.
- Click on each switch entry and click "Copy Scene Attributes From Three Way Scene" so all buttons do the same levels.

Your 3-way is ready and should look something like this below.

Three Way Scene

Switch 1

Switch 2

Switch 3

7.8 Organization with Scenes[13]

Scenes can be used to organize your home automation control as well as simplify logic.

For example:

ALL my lights fall into one of three global scenes: interior, exterior, or guest. I find these global scenes useful for multiple purposes such as end-of-day shutdown (both automated and manual), morning shutdown, troubleshooting, and away buttons. These scenes are generally used to turn the house OFF, rather than on. I also find that including all devices in one of these three global scenes makes introduction of new devices into my system easier

[12] (Universal Devices)
[13] (posted by: oberkc)

in that new devices affect very few programs. None of these scenes have a controller defined...all are responders and triggered only by programs.

In addition to the global scenes above, I use whole-house scenes for various scenarios: evening (occupied), evening (away), morning, weekends, holidays, visitors, etc... These are the scenes I use to turn on the house, and may (or may not) have a controller device included.

I then take advantage of folders, such as "at home", "away", "winter", "summer", etc, to control programs that should fire only under certain constraints.

Given this, activating (turning on) my "away" button results in a couple of things:

- "on" status enables my folder that includes programs that control how I want my house to behave when I am gone and disables my folder that includes programs that control how I want my house to behave when I am in my normal routines. For this, I use the "away" scene, mentioned above.
- "fast on" control triggers a program trigger which causes a whole-house off (using the global scenes), after a time period of a few minutes. I use this when I am leaving for vacations or other periods away of more than a couple of days.

Of course, if I forget to toggle the away button when leaving the house, I can do so via several internet devices, including a smartphone.

7.9 How to setup FanLinc, KeypadLinc and RemoteLinc2 properly using scenes[14]

Define an ISY Scene A. Using a 6 button KPL and 4 Scene RL2 for this example. Add the FanLinc Motor as a Responder, KeypadLinc Secondary button A as a Controller, KPL Secondary button B as Responder, KPL Secondary button C as Responder, KPL Secondary button D as Responder, RemoteLinc2 button A as Controller.

Click the ISY Scene A name, set the FanLinc Motor to High, KPL Secondary button A to 100% On Level, KPL Secondary button B to 0% On Level, KPL Secondary button C to 0% On Level, KPL Secondary button D to 0% On Level.

Click the KPL Secondary button A node name below Scene A name. Set FanLinc Motor to High, Secondary KPL button B to 0% On Level, Secondary KPL button C to 0% On Level, Secondary button D to 0% On Level.

[14] (posted by: LeeG)

Click RemoteLinc2 button A node name below Scene A name. Set FanLinc Motor to High, Secondary button A to 100% On Level, Secondary KPL button B to 0% On Level, Secondary KPL button C to 0% On Level, Secondary button D to 0% On Level.

Define an ISY Scene B. Add the FanLinc Motor as a Responder, KeypadLinc Secondary button A as a Responder, KPL Secondary button B as Controller, KPL Secondary button C as Responder, KPL Secondary button D as Responder, RemoteLinc2 button B as Controller.

Click the ISY Scene B name, set the FanLinc Motor to Med, KPL Secondary button A to 0% On Level, KPL Secondary button B to 1000% On Level, KPL Secondary button C to 0% On Level, KPL Secondary button D to 0% On Level.

Click the KPL Secondary button B node name below Scene B name. Set FanLinc Motor to Med, Secondary KPL button A to 0% On Level, Secondary KPL button C to 0% On Level, Secondary button D to 0% On Level.

Click RemoteLinc2 button B node name below Scene B name. Set FanLinc Motor to Med, Secondary button A to 0% On Level, Secondary KPL button B to 100% On Level, Secondary KPL button C to 0% On Level, Secondary button D to 0% On Level.

Define an ISY Scene C. Add the FanLinc Motor as a Responder, KeypadLinc Secondary button A as a Responder, KPL Secondary button B as Responder, KPL Secondary button C as Controller, KPL Secondary button D as Responder, RemoteLinc2 button C as Controller.

Click the ISY Scene C name, set the FanLinc Motor to Low, KPL Secondary button A to 0% On Level, KPL Secondary button B to 0% On Level, KPL Secondary button C to 100% On Level, KPL Secondary button D to 0% On Level.

Click the KPL Secondary button C node name below Scene C name. Set FanLinc Motor to Low, Secondary KPL button A to 0% On Level, Secondary KPL button B to 0% On Level, Secondary button D to 0% On Level.

Click RemoteLinc2 button C node name below Scene C name. Set FanLinc Motor to Low, Secondary button A to 0% On Level, Secondary KPL button B to 0% On Level, Secondary KPL button C to 100% On Level, Secondary button D to 0% On Level.

Define an ISY Scene D. Add the FanLinc Motor as a Responder, KeypadLinc Secondary button D as a Responder, KPL Secondary button B as Responder, KPL Secondary button C as Responder, KPL Secondary button D as Controller, RemoteLinc2 button D as Controller.

Click the ISY Scene D name, set the FanLinc Motor to Off, KPL Secondary button A to 0% On Level, KPL Secondary button B to 0% On Level, KPL Secondary button C to 0% On Level, KPL Secondary button D to 100% On Level.

Click the KPL Secondary button D node name below Scene D name. Set FanLinc Motor to Off, Secondary KPL button A to 0% On Level, Secondary KPL button B to 0% On Level, Secondary button C to 0% On Level.

Click RemoteLinc2 button D node name below Scene D name. Set FanLinc Motor to Off, Secondary button A to 0% On Level, Secondary KPL button B to 0% On Level, Secondary KPL button C to 0% On Level, Secondary button D to 100% On Level.

If an 8 Scene RL2 is used it is not a good candidate for this situation because individual RL2 buttons cannot be set to non-toggle On mode. The entire RL2 has to be set to non-toggle On mode OR the RL2 buttons have to be pressed twice to turn On a particular speed because the buttons Toggle On/Off

8 Variables

8.1 Variable Basics

Variables can be incredibly useful when creating programs on the ISY. Variables can be stored, modified using arithmetic operations, and compared. You can use variables to provide information, trigger programs, etc.

To view your variables, click on the **Programs** tab then the **Variables** sub-tab.

There are two different types of variables (Integer and State), each divided into a separate sub-tab. The only difference between the two is that State variables create ISY events when modified, so they can be used to trigger ISY Programs.

For example, if you'd like to create an ISY Program that runs only when a variable is or reaches a certain value, use a State variable. Otherwise, if the variable's value will not be used to trigger a program, feel free to use the simpler Integer variable.

8.1.1 Creating Variables

To create a new variable, click the Add button on the bottom of the screen. Here is a list of each column and a quick definition:

Name – This is the user-defined name of the variable. Choose a name that's descriptive so that you'll be able to quickly identify the variable you want to use in ISY Programs.

Init – This is the initial value of the variable, the value it has if the ISY is rebooted. This can be defined here and also updated using ISY Programs so that a variable value can persist even if the ISY loses power.

Value – This is the current value of the variable. Again, this can be defined here and also modified via arithmetic operations using ISY Programs.

Last Changed – This displays the date and time that the variable was last modified.

It is a good idea to use a standard prefix format for naming variables. This helps to identify the variable type when you are using them for programming:

8.1.1.1Suggested Prefixes

- **i.** - Integer type - example i.Counter
- **s.** - State type - example s.Switch_Status
- **c.** - Integer type (used as a constant) - example: c:TRUE_STATE

8.2 Variable Details[15]

8.2.1 Integer Variables

- A signed integer (32 bit)
- Arithmetic operations available in Actions
- Comparison operations available in conditions
- Initialized at startup
- Changes to the value do not cause an event to be sent

8.2.2 State Variables

- Identical to an Integer variable except that changes to the value do cause an event to be sent, causing programs to run

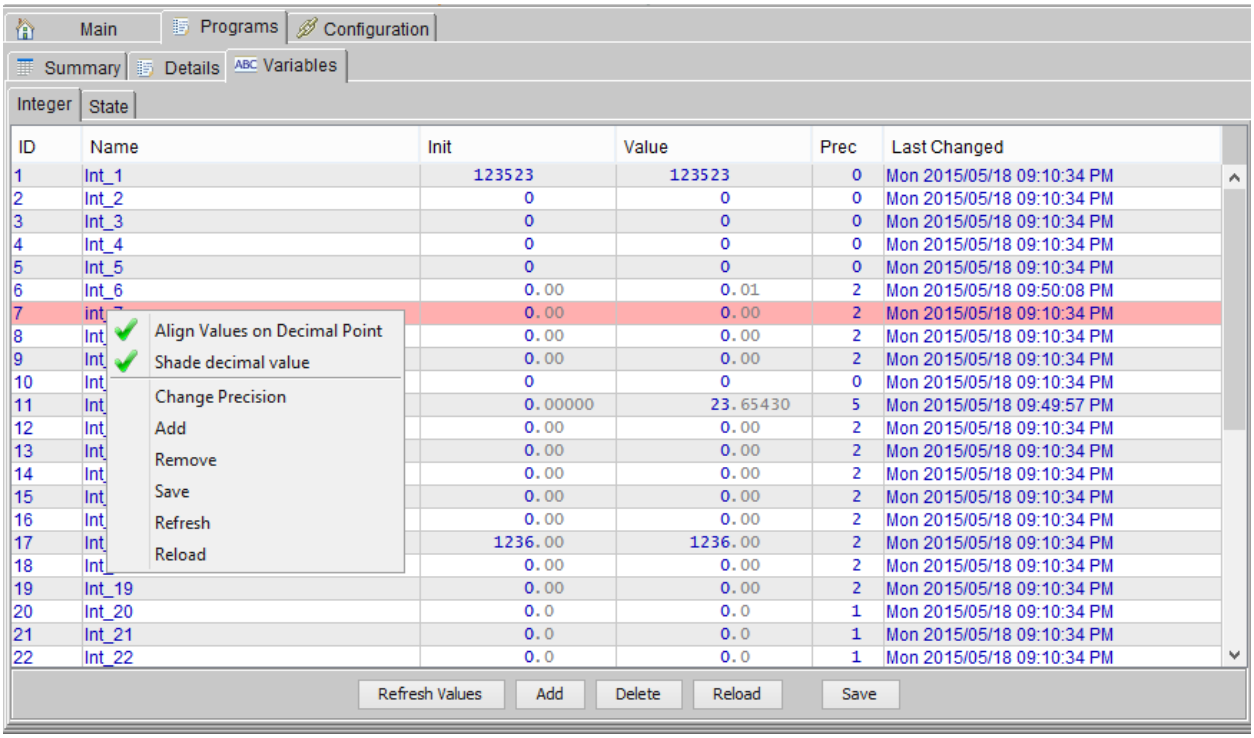
8.2.3 Variables Tab

- The definitions for all the variables is under the Variables tab in Programs.
- When you add/remove/rename a variable you must save your changes before they will take effect.
- When you modify either the init value or the current value the change takes place immediately and you do not have to hit save.
- The timestamp column shows the last time the current value of the variable was changed.

8.2.4 Changing the Precision of variables

(This applies to firmware v5 and above)

[15] (Universal Devices)



ID	Name	Init	Value	Prec	Last Changed
1	Int_1	123523	123523	0	Mon 2015/05/18 09:10:34 PM
2	Int_2	0	0	0	Mon 2015/05/18 09:10:34 PM
3	Int_3	0	0	0	Mon 2015/05/18 09:10:34 PM
4	Int_4	0	0	0	Mon 2015/05/18 09:10:34 PM
5	Int_5	0	0	0	Mon 2015/05/18 09:10:34 PM
6	Int_6	0.00	0.01	2	Mon 2015/05/18 09:50:08 PM
7	int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
8	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
9	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
10	Int_	0	0	0	Mon 2015/05/18 09:10:34 PM
11	Int_	0.00000	23.65430	5	Mon 2015/05/18 09:49:57 PM
12	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
13	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
14	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
15	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
16	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
17	Int_	1236.00	1236.00	2	Mon 2015/05/18 09:10:34 PM
18	Int_	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
19	Int_19	0.00	0.00	2	Mon 2015/05/18 09:10:34 PM
20	Int_20	0.0	0.0	1	Mon 2015/05/18 09:10:34 PM
21	Int_21	0.0	0.0	1	Mon 2015/05/18 09:10:34 PM
22	Int_22	0.0	0.0	1	Mon 2015/05/18 09:10:34 PM

Figure 112: Changing Precision of Variables

To change the precision of a set of variables

- Select the variables
- right click to bring up the menu and select *Change Precision*
- Select a precision for the variables
- Press the *Save* button at the bottom of the screen

All variables are still stored as 4-byte signed integers. Therefore, increasing the precision of a variable reduces its maximum value.

8.2.5 In Programs

- For both actions and conditions, variables are shown with just their name prefixed by $.
    - For example, if you define a variable named counter it will show up as $counter in your programs.

8.2.6 Initialization

- At start-up, all variables are initialized to their predefined init value, or zero, if no init value has been specified. The init value may be set by editing the init value in the table containing the variable definitions.
- The init value may also be set in programs, thus providing a means of persisting values across restarts.

x : A variable a : Either a variable or an integer constant

Initialize $x Init To a

This sets the init value for this variable, it does not modify the current value of the variable.

You may of course set the init value to the current value of the variable by doing this:

$x Init To $x

8.2.7 Persistence

It may be desirable to maintain the value of some variables across restarts of the ISY. This must be done explicitly by changing the init value of the variable (as described above).

One of the reasons we don't automatically persist all of the variables is that the value of a variable would have to written to persistent storage (a file on the SD Card) each time it changes.

8.2.8 Operators

All operations are in the form $variable op <value or variable>.

8.2.9 Calculations

Most operations do both a calculation and assignment, for example:

$counter += 1

is equivalent to the more familiar

$counter = $counter + 1

x : A variable

a : Either a variable or an integer constant

Assign $x = a

Add $x += a

Subract $x -= a

Multiply $x *= a

Divide $x /= a

Remainder $x %= a

And (binary) $x &= a

Or (binary) $x |= a

Xor (binary) $x ^= a

8.2.10 Functions

8.2.10.1Random

$x = Random a (Assigns $x a random value between 1..a inclusive, or 1 if a <= 1)

$x = Random 3 // Assigns $x either 1, 2, or 3

$y = 500

$x = Random $y // Assigns $x a random value between 1 and the value of $y (e.g. 1..500)

$x = Random -50 // Assigns $x a value of 1

8.2.10.2Comparison

Equal $x is a

Not Equal $x is not a

Less Than $x < a

Less Than or Equal $x <= a

Greater Than $x > a

Greater Than or Equal $x >= a

Example

A loop that could be used to implement an off timer that increases in 5-minutes intervals. For example, another program could be written to increase $BathRoomLightCount by 1 each time an On button is pressed.

$BathRoomLightCount is an Integer Variable

```
If
    $BathRoomLightCount > 0
Then
    Wait  5 minutes
    $BathRoomLightCount -= 1
    Run Program 'Bathroom Timer' (If)
Else
  - No Actions - (To add one, press 'Action')
```

8.2.11 Using the Status of Variables in Programs

You can use the If portion of an ISY Program to check the state of a variable. To do those, choose Variable when defining your If statement, then choose your Variable, then choose what you'd like to check for.

For example, you can check to see if a Variable is a certain value, if it's NOT a certain value, if it's greater than a certain value, etc. You can also compare one variable to another.

In this screenshot we are checking to see if a Variable called Counter is greater than 3:

(This applies to firmware v5 and above)

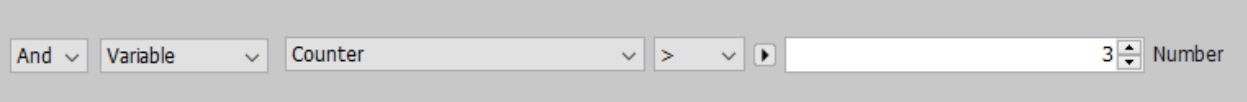


Figure 113: Counter Variable

8.2.12 Program Status Conditions

(This applies to firmware v5 and above)

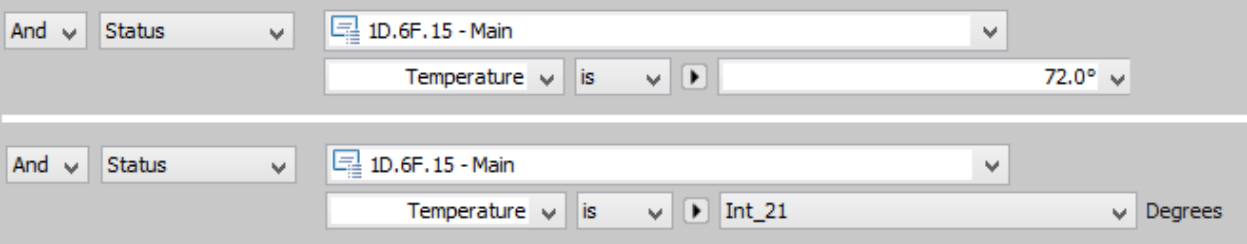


Figure 114: Program Status Conditions

Status conditions support either literal values or variables.

8.2.13 Program Device Actions

(This applies to firmware v5 and above)

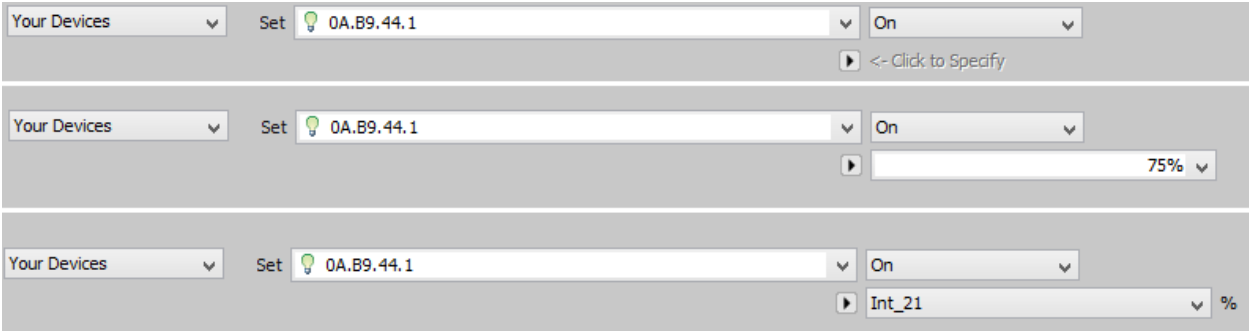


Figure 115: Program Device Actions

Device actions support either literal values or variables.

8.2.14 Using 'If Control' versus 'If Status' in Programs[16]

The reason to use control condition is that a control will trigger a program evaluation upon EACH receipt of the anticipated command. Unlike control, a "status" condition will trigger an evaluation only after a CHANGE in status. If a device status is off, and you turn it off again, the status has not changed and no program evaluation will take place.

8.2.15 Program Variable Actions

(This applies to firmware v5 and above)

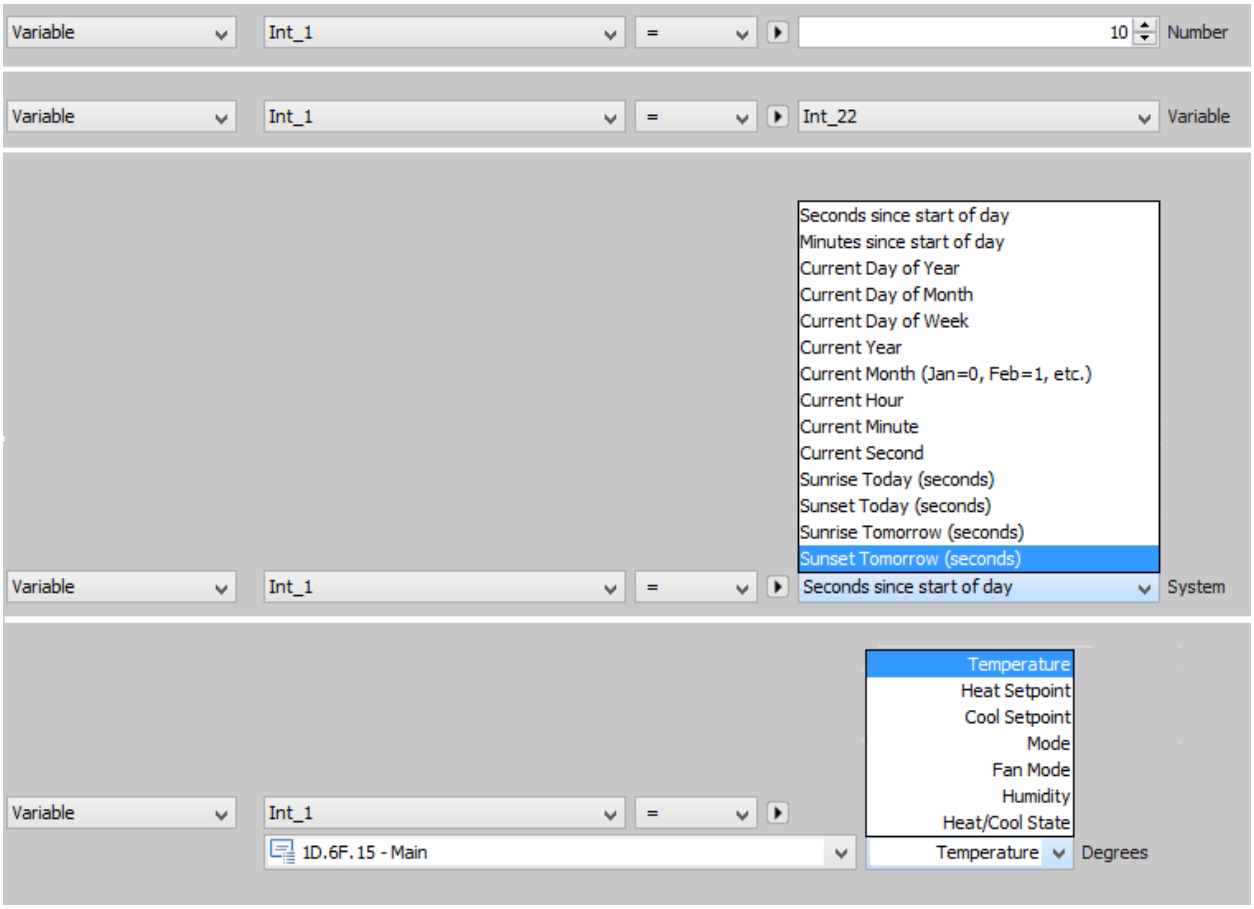


Figure 116: Program Variable Actions

Variables can now be assigned a variety of values.

[16] (posted by: oberkc)

8.2.16 Modifying Variables in Programs

You can also use ISY Programs to modify variables. You can perform standard arithmetic functions on a variable, change a variable to a specific value, or modify a variable's Init state.

The following functions can be performed on a variable:

Command	Function Performed
=	Sets the variable to a specified value.
+=	Adds to the variable
-=	Subtracts from the variable
*=	Multiples the variable
/=	Divides the variable
%=	Performs a remainder function on the variable
&=	Performs an AND (binary) function on the variable
|=	Performs an OR (binary) function on the variable
=Random	Sets the variable to a number between 1 and the specified number
Init To	Sets the variable's initial value

For example, the following screenshot increases a variable by 1:

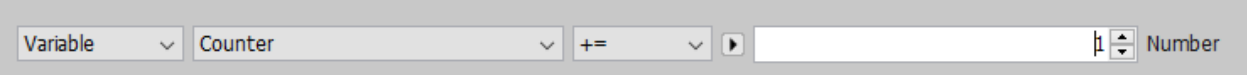


Figure 117: Increment a Variable by 1

This example sets the Init value of a variable to the current value of another variable:

(This applies to firmware v5 and above)

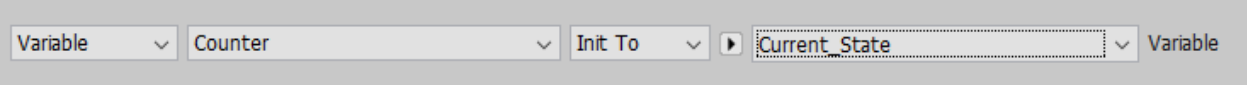


Figure 118: Set a Variable's Initial Value

8.2.17 Using Variables in Notifications

Variables can also be useful when sending notifications. Say you have a variable that you use to count the number of times a motion sensor is trigged overnight. You could send yourself an email in the morning telling you how many times it was triggered.

Your notification might look like this:

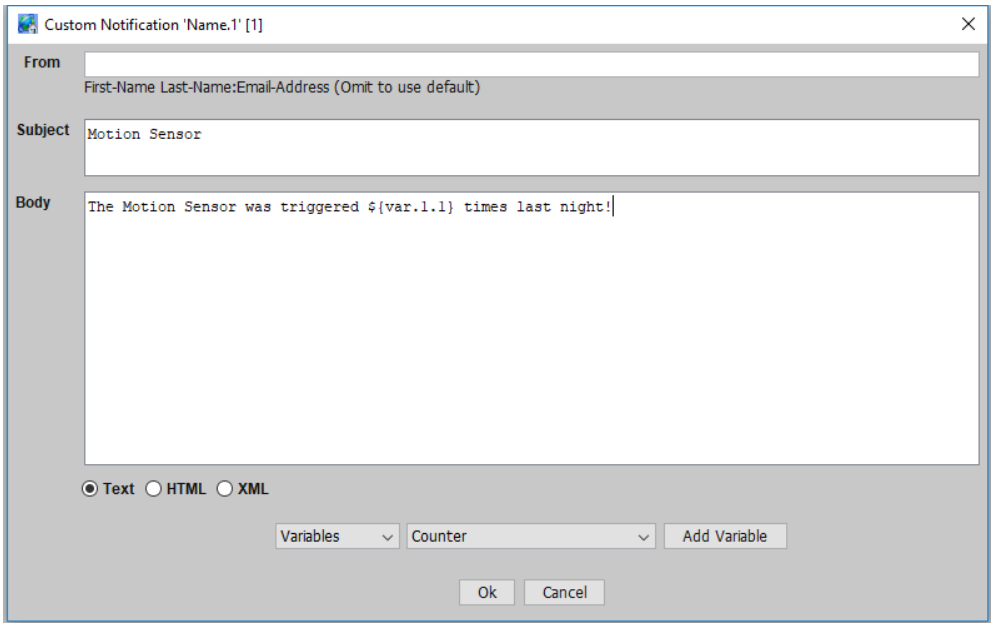


Figure 119: Email Based on Motion Sensor Trigger

8.3 Notifications

Using Programs, you can configure the ISY to send you notifications via text message or email. For example, the ISY could notify you if your thermostat drops below or above a pre-defined temperature, when motion is detected in an area of your home, or when your garage door opens unexpectedly.

8.3.1 Adding Recipients & Changing Server Settings

To configure recipients of these notifications, click on the Administrative Console's Configuration tab, choose the Emails/Notifications sub-tab, then the Settings/Groups tap below that.

On the bottom portion of the screen, labeled Groups, hit the Add button to create a Group and add recipient information. Simply name your group, then hit the field under the Recipient column to edit the recipients. A group can contain one or more recipients that you would like to notify.

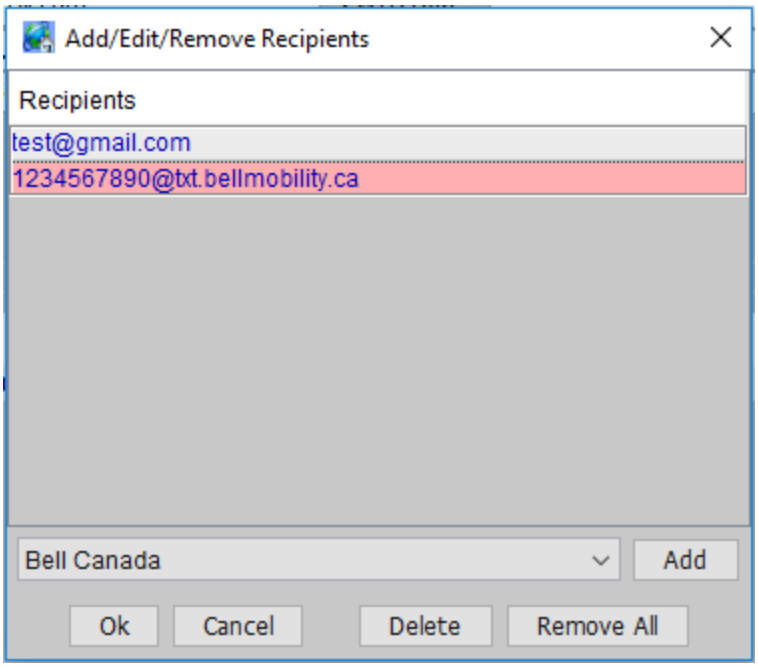


Figure 120: Email Recipients Screen

Choose the type of recipient you'd like to add (Regular Email, text notification, etc.), hit the Add button, then type the recipients corresponding address as instructed. When done, hit OK to finish editing the group.

Always remember to hit the Save button on the bottom of the Admin Console to save your settings to the ISY.

To send a test message to one of your recipient groups, highlight the group and hit the Test button on the bottom of your screen.

On the top of the screen you'll also find the "SMTP Settings" window where you can specify the email server used to deliver notifications. If "Use Default" is checked, the ISY utilizes the Universal-Devices server to send out notifications.

For advanced users, or if your ISP is blocking access to outside email servers, you can uncheck this box and specify a custom SMTP server to use.

8.3.2 Custom Notifications

To configure custom notifications, click the Customizations sub-tab and hit the Add button. Simply name your customization and type the message click the Customized Content field to edit the content you want to send with your notification.

Use the drop-down boxes to add real time information to your notification, such as current time/date, variable values, security system information, weather conditions, etc.

Once created, these custom notifications can be triggered and sent using your ISY Programs.

Note that Custom Notifications supports plain text, HTML and XML.

For example, you could set up a variable used to count how many times your motion sensor triggered every night. In the morning, the ISY could email this information using the following notification:

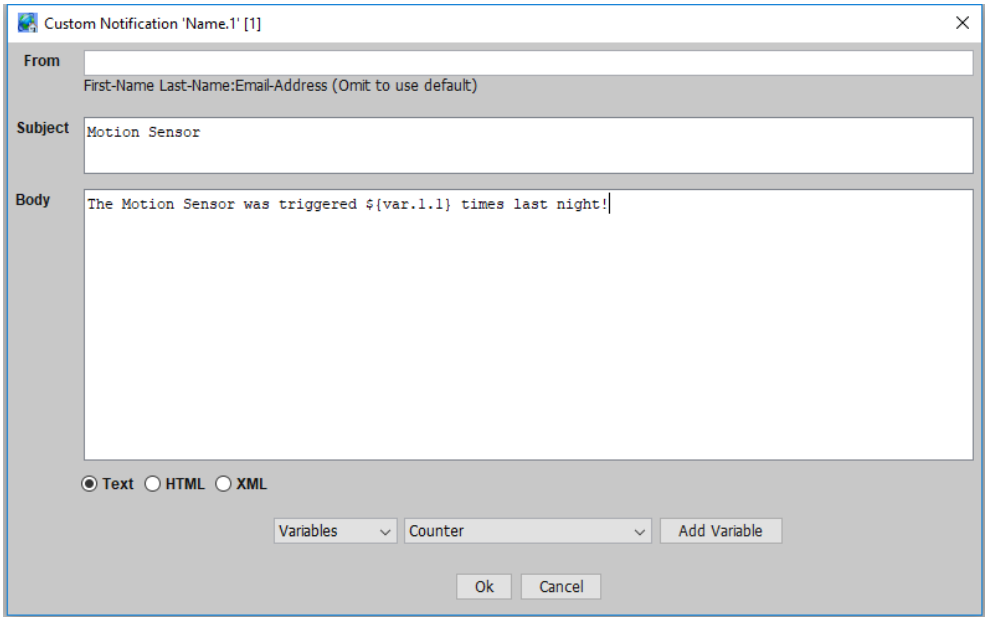


Figure 121: Motion Sensor Email

This program would send this notification to you every morning at 6am, then reset the variable back to 0:

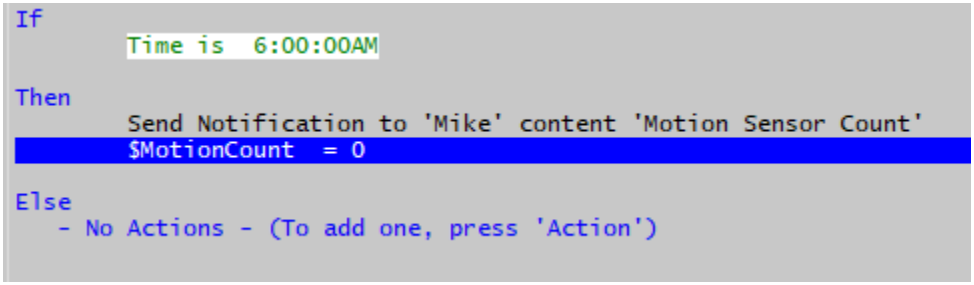


Figure 122: Scheduling an Email

8.4 Email Substitution Variables[17]

Note: In case of email customized content, both the Subject and the Body must be non-empty otherwise, emails shall not be sent!

8.4.1 Substitution Variables

- Custom Email definitions are available in the Admin Console by going to the **Configuration** / **Emails/Notifications** / **Customizations** tab
- Substitution variables are available inside custom email definitions in the form **${*<variable name>*}**.
- Substitutions can be manually made in the body, URL or header of Network Resources from version 4.3.26. If you included them in the URL then you cannot use the 'Encode URL' option
- In most cases, these variables use the ID of the element being referenced
  - For example **${sys.node.11 22 AA 1.name}** would use the name of the device node whose address is *11 22 AA 1*
  - Instead of specifying a fixed address, the special character # may be used to reference the element in the event that caused the program to run. (Does not work in network resources)
    - For example, if a status event for node *11 22 AA 1* caused a program to run, then **${sys.node.#.name}** would use *11 22 AA 1* as the address.
    - If a variable has more than one ID then any combination of fixed addresses and # is valid. For example, the following are all valid
      - ${elk.keypad.1.key.1.led} -- Show LED status of F1 Key on Keypad 1
      - ${elk.keypad.#.key.#.led} -- Show LED status of event Key on event Keypad
      - ${elk.keypad.#.key.3.led} -- Show LED status of F3 Key on event Keypad
      - ${elk.keypad.1.key.#.led} -- Show LED status of event Key on Keypad 1
  - User defined Integer and State variables are referenced with their type (1-Integer, 2-State) and ID Number for example: ${var.2.3} for the state variable with ID # 3

[17] (Universal Devices)

8.4.2 System Variables

Value Name	Description
${sys.date}	Date
${sys.time}	Time
${sys.time12}	Time (am/pm)
${sys.time24}	Time (24 hour)
${sys.sunrise}	Sunrise
${sys.sunrise12}	Sunrise (am/pm)
${sys.sunrise24}	Sunrise (24 hour)
${sys.sunset}	Sunset
${sys.sunset12}	Sunset (am/pm)
${sys.sunset24}	Sunset (24 hour)

8.4.3 User Variables

Value Name	Description
${var.<valueType>.<valueID>}	Type 1 = Integer, Type 2 = State

8.4.4 Device Variables and Properties

Many properties are subject to device capability You can obtain all available properties for a specific node via the REST API at /rest/nodes/<address>

Variable	Example	Description
sys.node.<address>.name	sys.node.11 22 AA 1.name	Name of the device node
sys.node.<address>.addr	sys.node.#.addr	Address of the device node
sys.node.<address>.<valueName>.ST	sys.node.11 22 AA 1.ST	The formatted specified value
sys.node.<address>.<valueName>.raw	sys.node.11 22 AA 1.ST.raw	The unformated specified value
sys.node.<address>.<valueName>.OL	sys.node.11 22 AA 1.OL	On Level
sys.node.<address>.<valueName>.RR	sys.node.11 22 AA 1.RR	Ramp Rate
sys.node.<address>.<valueName>.ERR	sys.node.11 22 AA 1.ERR	Error
sys.node.<address>.<valueName>.CLISPH	sys.node.11 22 AA 1.CLISPH	Heat Setpoint
sys.node.<address>.<valueName>.CLISPC	sys.node.11 22 AA 1.CLISPC	Cool Setpoint
sys.node.<address>.<valueName>.CLIFS	sys.node.11 22 AA 1.CLIFS	Fan State
sys.node.<address>.<valueName>.CLIMD	sys.node.11 22 AA 1.CLIMD	Thermostat Mode
sys.node.<address>.<valueName>.CLIHUM	sys.node.11 22 AA 1.CLIHUM	Humidity
sys.node.<address>.<valueName>.CLIHCS	sys.node.11 22 AA 1.CLIHCS	Heat/Cool State
sys.node.<address>.<valueName>.UOM	sys.node.11 22 AA 1.UOM	Unit
sys.node.<address>.<valueName>.CV	sys.node.11 22 AA 1.CV	Current Voltage
sys.node.<address>.<valueName>.CC	sys.node.11 22 AA 1.CC	Current Current
sys.node.<address>.<valueName>.PPW	sys.node.11 22 AA 1.PPW	Polarized Power Used

sys.node.<address>.<valueName>.TPW	sys.node.11 22 AA 1.TPW	Total Energy Used
sys.node.<address>.<valueName>.PF	sys.node.11 22 AA 1.PF	Power Factor

8.4.5 Elk Variables

Variable	Example	Description
elk.area.<areaNumber>.name	elk.area.1.name	Name of the Area
elk.area.<areaNumber>.armUpState	elk.area.1.armUpState	Area Arm Up State
elk.area.<areaNumber>.alarmStatus	elk.area.1.alarmStatus	Area Alarm Status
elk.area.<areaNumber>.bypassState	elk.area.1.bypassState	Area Bypass State
elk.zone.<zoneNumber>.name	elk.zone.1.name	Name of the zone
elk.zone.<zoneNumber>.alarmDef	elk.zone.1.alarmDef	Zone Alarm definition
elk.zone.<zoneNumber>.voltage	elk.zone.1.voltage	Zone voltage
elk.zone.<zoneNumber>.status	elk.zone.1.status	Zone status
elk.zone.<zoneNumber>.pstatus	elk.zone.1.pstatus	Zone physical status
elk.zone.<zoneNumber>.bypassState	elk.zone.1.bypassState	Zone bypass state
elk.zone.<zoneNumber>.temp	elk.zone.1.temp	Zone temperature
elk.output.<outputNumber>.name	elk.output.1.name	Output name
elk.output.<outputNumber>.status	elk.output.1.status	Output status
elk.tstat.<thermostatNumber>.name	elk.tstat.1.name	Thermostat name
elk.tstat.<thermostatNumber>.ST	elk.tstat.1.ST	Thermostat temperature
elk.tstat.<thermostatNumber>.CLIMD	elk.tstat.1.CLIMD	Thermostat mode
elk.tstat.<thermostatNumber>.CLIFS	elk.tstat.1.CLIFS	Thermostat fan state
elk.tstat.<thermostatNumber>.CLISPH	elk.tstat.1.CLISPH	Thermostat heat setpoint
elk.tstat.<thermostatNumber>.CLISPC	elk.tstat.1.CLISPC	Thermostat cool setpoint
elk.tstat.<thermostatNumber>.CLIHOLD	elk.tstat.1.CLIHOLD	Thermostat temperature hold
elk.keypad.<keypadNumber>.name	elk.keypad.1.name	Keypad name
elk.keypad.<keypadNumber>.temp	elk.keypad.1.temp	Keypad temperature
elk.keypad.<keypadNumber>.key.<keyNumber>.led	elk.keypad.1.key.2.led	Key LED state

8.4.6 Weather Variables

Variable	Example	Comments
Temperature:	${mod.weather.temp.current}	Current Temperature
High Temperature:	${mod.weather.temp.high}	Highest reached today
Low Temperature:	${mod.weather.temp.low}	Lowest reached today

Feels Like:	${mod.weather.temp.feelslike}	Current temperature but factors in wind chill and humidity.
Average Temperature:	${mod.weather.temp.avg}	Avg temp from Midnight till now
Humidity:	${mod.weather.humidity}	Current Humidity
Pressure:	${mod.weather.pressure}	Current Pressure
Dew Point:	${mod.weather.dewpoint}	Current Dew Point
Wind Speed:	${mod.weather.wind.speed}	Current Wind Speed
Wind Direction:	${mod.weather.wind.direction}	Current Wind Direction
Wind Gust Speed:	${mod.weather.gust.speed}	Current Wind Gust Speed
Gust Wind Direction:	${mod.weather.gust.direction}	Current Gust Direction
Light:	${mod.weather.light.level}	Current Light Level
Total Rain Today:	${mod.weather.rain.today}	Rain so far today.
Elevation:	${mod.weather.elevation}	Elevation at Weather Station
Coverage:	${mod.weather.coverage}	Defines things such as areas, chances, etc. **See key below.**
Intensity:	${mod.weather.intensity}	Defines things such as light, heavy, etc **See key below.**
Condition:	${mod.weather.condition}	Defines things such as Hail, rain, showers, etc. **See key below.**
Cloud Condition:	${mod.weather.cloud.condition}	Defines things such as clear, sunny, cloudy, etc. **See key below.**
24Hr High Temperature:	${mod.weather.temp.hi.24h}	Forecast high temperature next 24 hours.
24Hr Low Temperature:	${mod.weather.temp.low.24h}	Forecast low temperature next 24 hours.
24Hr Average Temperature:	${mod.weather.temp.avg.24h}	Forecast average temperature next 24 hours.
24Hr Humidity:	${mod.weather.humidity.24h}	Forecast humidity next 24 hours.
24Hr Rain:	${mod.weather.rain.24h}	Forecast rainfall next 24 hours.
24Hr Snow:	${mod.weather.snow.24h}	Forecast snowfall next 24 hours.
24 Hr Coverage:	${mod.weather.coverage.24h}	Forecast coverage next 24 hours. **See key below.**
24Hr Intensity:	${mod.weather.intensity.24h}	Forecast intensity next 24 hours. **See key below.**
24Hr Condition:	${mod.weather.condition.24h}	Forecast condition next 24 hours. **See key below.**
24Hr Cloud Condition:	${mod.weather.cloud.condition.24h}	Forecast cloud cover next 24 hours. **See key below.**

Avg Temperature Tomorrow:	${mod.weather.temp.avg.tomorrow}	Forecast average temperature tomorrow.
High Temperature Tomorrow:	${mod.weather.temp.hi.tomorrow}	Forecast high temperature tomorrow.
Low Temperature Tomorrow:	${mod.weather.temp.low.tomorrow}	Forecast low temperature tomorrow.
Humidity Tomorrow:	${mod.weather.humidity.tomorrow}	Forecast humidity tomorrow.
Wind Speed Tomorrow:	${mod.weather.wind.speed.tomorrow}	Forecast wind speed tomorrow.
Wind Gust Speed Tomorrow:	${mod.weather.gust.speed.tomorrow}	Forecast wind gust tomorrow.
Rain Tomorrow:	${mod.weather.rain.tomorrow}	Forecast rainfall tomorrow.
Snow Tomorrow:	${mod.weather.snow.tomorrow}	Forecast snowfall tomorrow.
Coverage Tomorrow:	${mod.weather.coverage.tomorrow}	Forecast coverage tomorrow. **See key below.**
Intensity Tomorrow:	${mod.weather.intensity.tomorrow}	Forecast intensity tomorrow. **See key below.**
Condition Tomorrow:	${mod.weather.condition.tomorrow}	Forecast condition tomorrow. **See key below.**
Cloud Condition Tomorrow:	${mod.weather.cloud.condition.tomorrow}	Forecast cloud cover tomorrow. **See key below.**

Climate Coverage defines things such as areas, chances, etc.

- Value 1 - Areas of
- Value 2 - Brief
- Value 3 - Chance of
- Value 4 - Definite
- Value 5 - Frequent
- Value 6 - Intermittent
- Value 7 - Isolated
- Value 8 - Likely
- Value 9 - Numerous
- Value 10 - Occasional
- Value 11 - Patchy
- Value 12 - Periods of
- Value 13 - Slight chance
- Value 14 - Scattered

- Value 15 - In the vicinity / Nearby
- Value 16 - Widespread

Climate Intensity defines things such as light, heavy, etc.

- Value 1 - Very light
- Value 2 - Light
- Value 3 - Heavy
- Value 4 - Very heavy

Climate Weather Condition defines things such as Hail, rain, showers, etc.

- Value 1 - Hail
- Value 2 - Blowing dust
- Value 3 - Blowing sand
- Value 4 - Mist
- Value 5 - Blowing snow
- Value 6 - Fog
- Value 7 - Frost
- Value 8 - Haze
- Value 9 - Ice Crystals
- Value 10 - Ice fog
- Value 11 - Ice pellets / sleet
- Value 12 - Smoke
- Value 13 - Drizzle
- Value 14 - Rain
- Value 15 - Rain showers
- Value 16 - Rain/snow mix
- Value 17 - Snow/sleet mix
- Value 18 - Wintry mix
- Value 19 - Snow
- Value 20 - Snow showers
- Value 21 - Thunderstorms

- Value 22 - Unknown Precipitation (May Occur in an automated observation station, which cannot determine the precip type falling.)
- Value 23 - Volcanic ash
- Value 24 - Water spouts
- Value 25 - Freezing fog
- Value 26 - Freezing drizzle
- Value 27 - Freezing rain
- Value 28 - Freezing spray

Climate Cloud Condition defines things such as clear, sunny, cloudy, etc.

- Value 1 - Clear - Cloud coverage is 0-7% of the sky.
- Value 2 - Fair/mostly sunny - Cloud coverage is 7-32% of the sky.
- Value 3 - Partly cloudy - Cloud coverage is 32-70% of the sky.
- Value 4 - Mostly cloudy - Cloud coverage is 70-95% of the sky.
- Value 5 – Cloudy

9 Programming

9.1 The Basics of ISY Programs

ISY Programs are created using simple buttons and pull-down menus. The ISY allows you to easily create simple programs yet is flexible and sophisticated enough to allow powerful and complex programming.

NOTE: Unlike Scenes, Programs require that the ISY is online in order to function.

There are several buttons available on the bottom-left of the Administrative Console used to create and manage your Programs:

New Program. This button creates a new ISY Program. Once a Program is created, it can be edited and modified as needed.

New Folder. This button creates a new folder in your Program hierarchy.

Save Changes. The ISY requires that you save your changes before they become active. Please be sure to save periodically as you create and edit your ISY Programs.

Undo Changes. If you have made changes to your ISY Programs that you would like to discard, click this button that causes the ISY to revert to the last time your changes were saved.

9.2 Program Detail Panel[18]

The GUI is divided into four areas; Tree View, Manage Program, Program Content, Add to Program. Refer to **Figure 123: Program Detail Screen**.

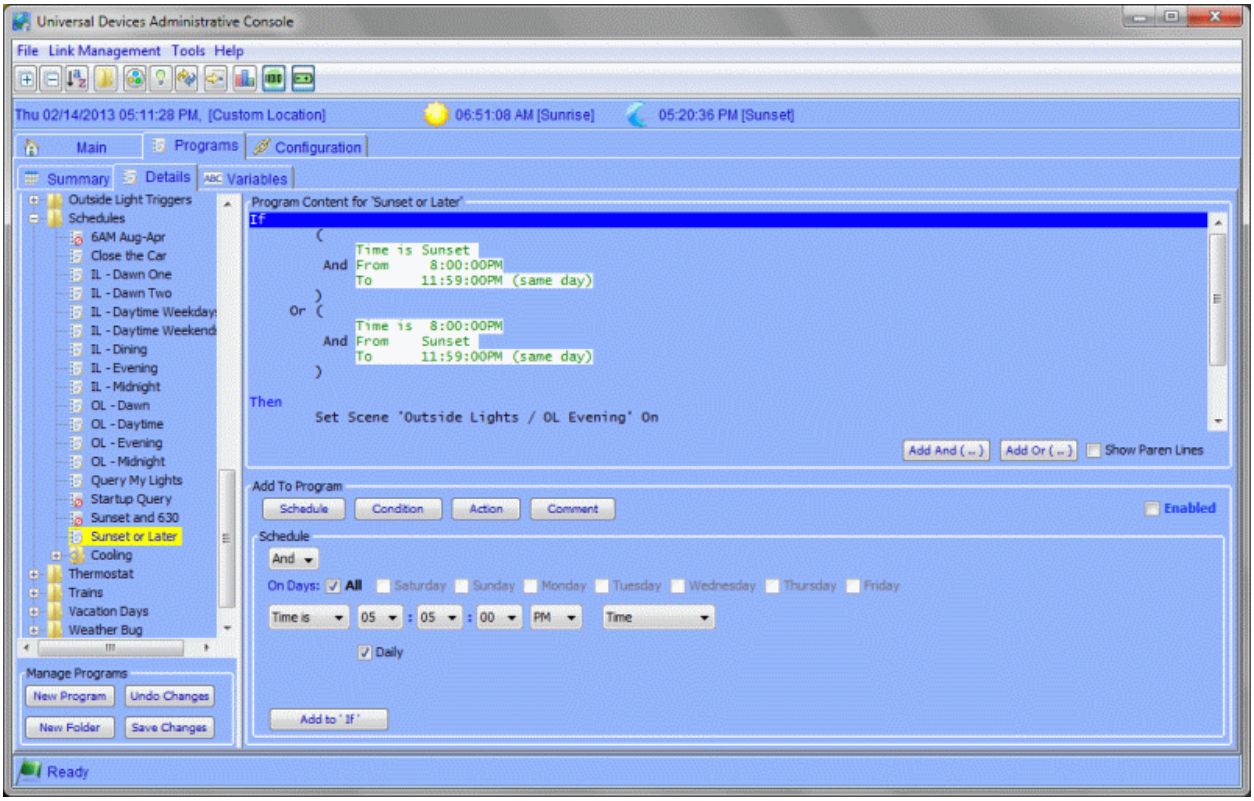


Figure 123: Program Detail Screen

9.2.1 Tree View[19]

This area shows the tree containing all of your programs and folders. When a new program is created, it is added to this tree. The tree has three levels; the root (My programs), program folders, and programs.

9.2.1.1Folders

Program Folder Icon Program Folders can be used to organize your programs.

[18] (Universal Devices)
[19] (Universal Devices)

Program Folder Conditions Icon Program folders can have conditions. These conditions must be met before any programs within the folder will run.

- Folders can be nested and thus Folder Conditions can be cascaded.

When changes have been made to a folder it will be flagged. Use the Manage Programs | Save Changes button.

9.2.1.2Programs

Program Icon Programs are displayed with this icon.

When a program has been modified it will be flagged. Use the Manage Programs | Save Changes button.

A disabled program will have a red circle overlaid on it.

You may rename, move, change or delete your old schedules and triggers anytime you wish. You may organize your programs in folders using drag and drop.

- If you Delete a program you must Manage Programs | Save Changes.

9.2.1.3Menus

A right mouse button press on different levels of the tree will show a menu pertinent to the folder chosen.

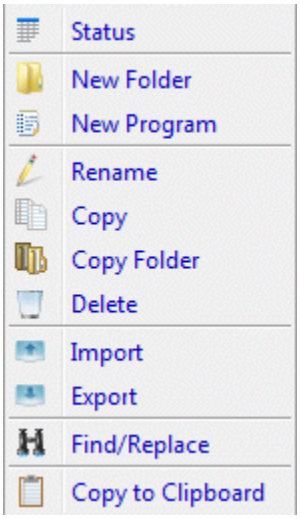


Figure 124: Program Folder Context Menu

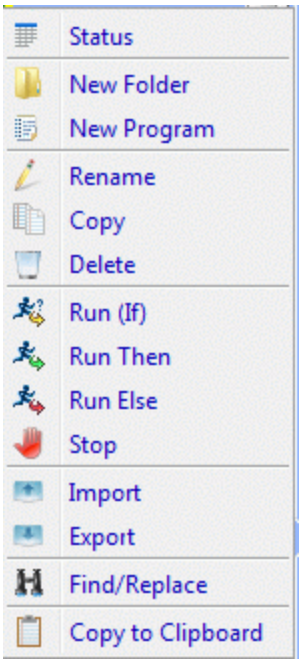


Figure 125: Program Context Menu

9.2.1.4Status

This will switch to the Program Summary screen with the selected program or folder highlighted.

9.2.1.5New Folder

Select this option to create a new folder. This option always creates a new folder at the next lower level of the tree.

Folders can be dragged in and out of other folders.

9.2.1.6New Program

This option creates a new program. To create a program in a specific folder, select a folder the program will be located. Select New Program option from the menu; name the program in the highlighted field. If you did not rename the field, the program name will be entered as New Program. The green arrow indicates that the program has not been saved. This arrow disappears after the Save Changes button is selected.

Selecting a program then the New Program option will create a new program at the same level as the selected program.

Programs can be dragged between folders.

9.2.1.7Rename

Select this option to rename a folder or program.

9.2.1.8Copy

Select this option to copy a folder or a program. The copied folder or program will be added at the same level of the tree. It will have the same name as the copied folder or program with the word COPY appended to it. It will be highlighted giving you the opportunity to rename the folder or program.

9.2.1.9Copy Folder

This option is only shown at the root level containing folders or folders containing the programs. When selected a dialog box will ask you to if you want to copy the folder and all its contents. Select Yes if you want a copy of the folder and its contents. Selecting No will abort the process.

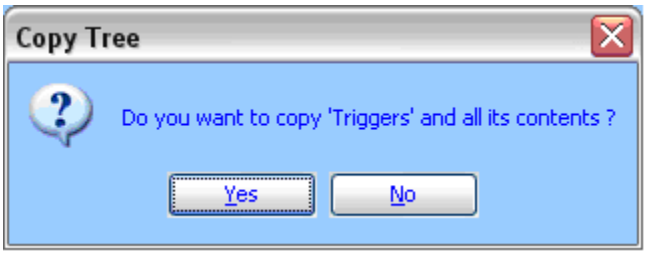


Figure 126: Copy Folder dialog

9.2.1.10Delete

Select this option if you want to delete a folder or a program. If you try to delete any programs or a folder, you will be prompted with a dialog box to confirm the deletion.

- You must select Manage Programs | Save Changes to Save the Deletion.

9.2.1.11Programs Only

These functions are available only for programs.

- Run (If)
  - This will run the program using all the conditions.
- Run Then
  - Run the Then actions and set the program True.
- Run Else
  - Run any Else actions and set the program False.
- Stop
  - Quits a running program.

9.2.1.12Import

Use this option if you are importing a folder or a program file. It will import all programs in the file into the selected folder.

9.2.1.13Export

Use this option if you are exporting a folder or a program file. If you selected a folder for export, it exports the folder and its contents. If you selected a program, it will only export the program.

9.2.1.14Find/Replace

This will allow you to search through your programs for Raw Text, Insteon Devices, Insteon Scenes, X10 commands, and Program references.

9.2.1.15Find/Replace

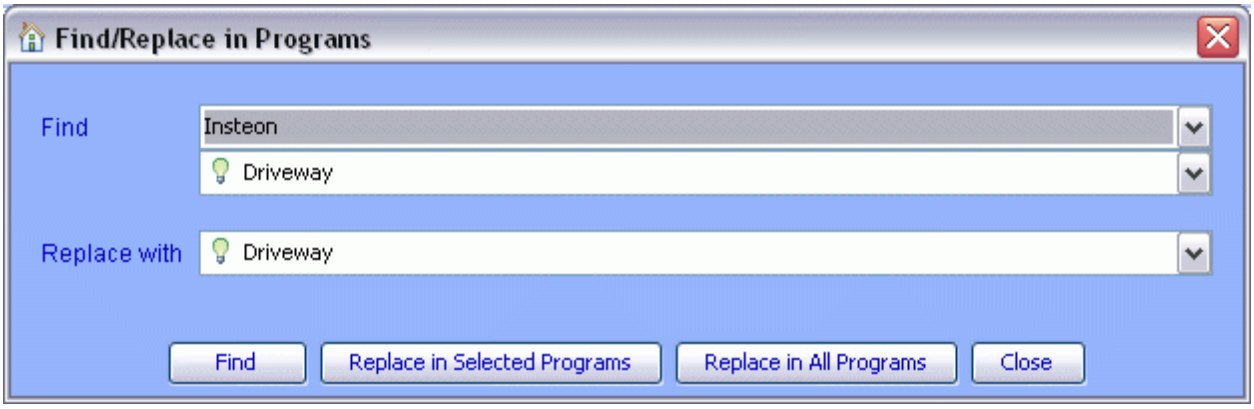


Figure 127: Find/Replace dialog

9.2.1.16Copy to Clipboard

This option copies folder conditions or a program in text format and places it in the clipboard for pasting to text editing programs.

9.2.2 Manage Program[20]

The manage program have four select buttons; New Program, New Folder, Undo Changes and Save Changes. New program and New folder buttons function the same as the menu option accessed via a right mouse button press.

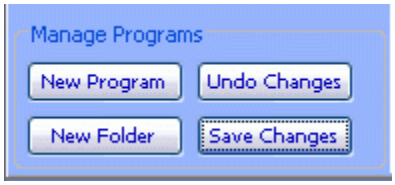


Figure 128: Mange Programs

New Program creates a new program and prompts you to name it.

New Folder creates a new folder and prompts you to name it.

Undo Changes button cancels the revisions or edits done to the program. It removes the changes since the last save. This can undo changes to many programs and folders.

Save Changes button stores the revisions or edits done to the program. You cannot undo the revisions after the Save changes button is selected.

9.2.3 Program Content[21]

This area is where the conditions and actions selected in Add to Program are placed.

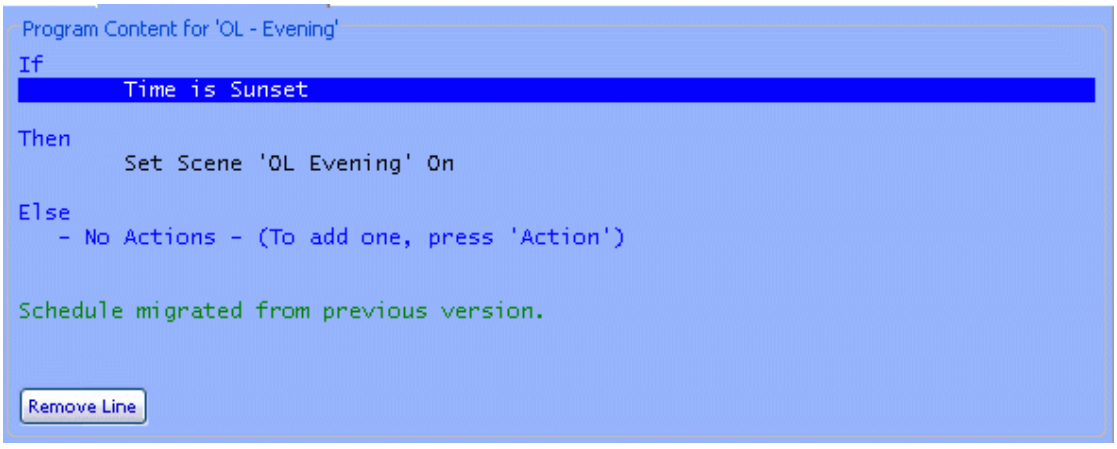


Figure 129: Program Details

[20] (Universal Devices)
[21] (Universal Devices)

Schedules and Conditions are placed in the If section of the program.

Actions are placed in the Then and Else sections.

Comments are noted at the bottom of the Program Details section.

9.2.4 Add to Program[22]

This area facilitates the user in building the program. It simplifies the program building process by providing the user a preformatted edit space filled in using Schedule, Condition and Action buttons. It even provides you with a button to add comments in the program.

- **IF** – has the condition that must be met to for the program to run. This condition is the trigger for the program to take action.
- **THEN** – is the primary action when the condition is met. The program here stays running as long as the condition is met or True.
- **ELSE** – is the secondary action when the condition is no longer met or False and only after the primary action was taken.

Your program is not limited to one condition and action. You can have multiple condition and actions defined in the program. Multiple conditions are created using the And/Or pull down menu field. Buttons labeled Add And (...) or Add Or (...) will be available only after a second condition is added. The use of this button allows adding a parenthesis to your program condition. An example of a program with multiple condition and action is shown below.

[22] (Universal Devices)

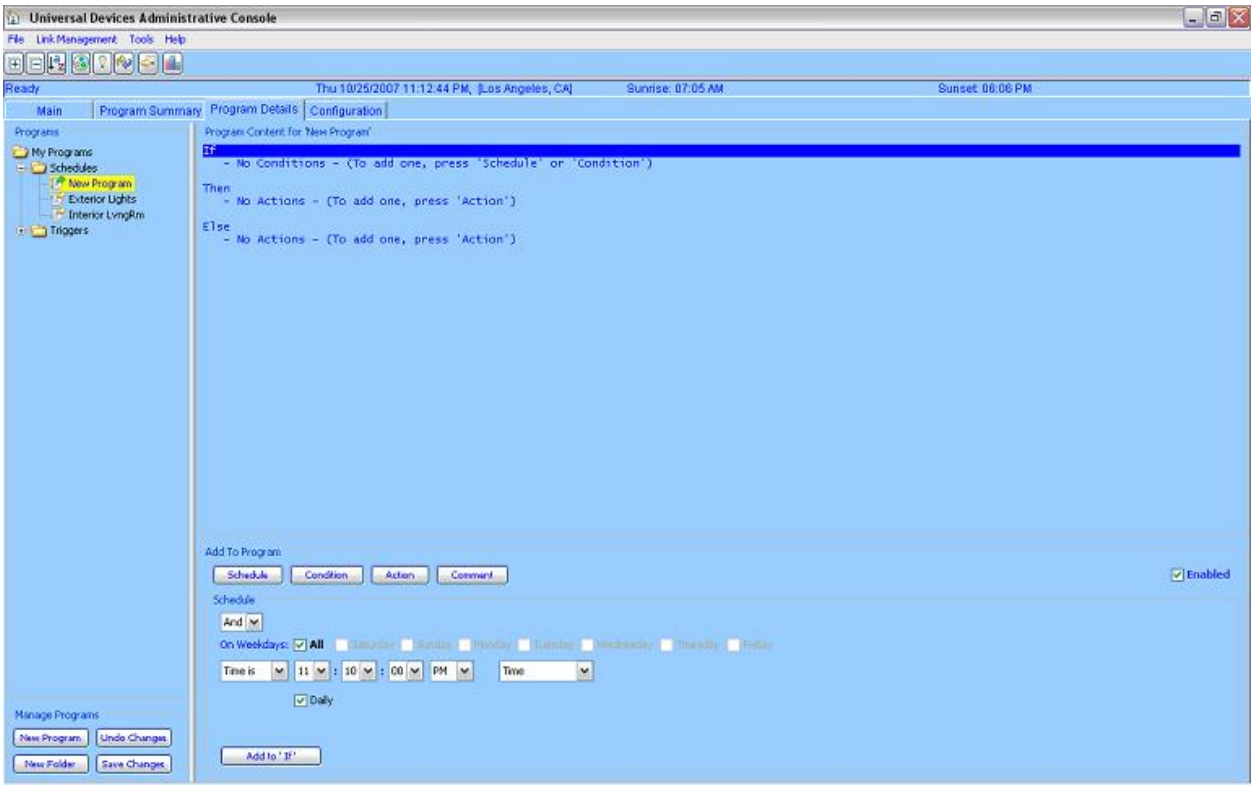


Figure 130: New Program Screen

The enabled check box allows the system to run the program. Unchecking this box disables the program.

9.2.4.1Schedule

The schedule button is used to enter time events into the IF section as a condition. When selected the lower portion of the Add to Programs area changes its selection fields.

A check box for each day of the week and All (for all days) is available. This set the days of the week the timer event will occur.

There are six pull down menu fields beneath the weekday checkbox. The first 5 fields define the occurrence and the sixth field defines if the occurrence is based on Time, Sunrise, Sunset or Last Run. Depending on the selection on the sixth field, the time set field (fields 2 to 5) setting will change. Refer to **Figure 133: Sunrise/Sunset field set** and **Figure 134: Last Run field set**.

A schedule can be set to occur at a specific or between the specified times. Selecting Time Is (refer to **Figure 131: Schedule Time Is condition fields**) is for setting a specific time and From/To (refer to **Figure 132: Schedule From/To condition fields**) is setting for between specified times.

The To field can be changed to For, defining the duration of the event based on time the start time. If you assigned a timer event to start at a time in a specific day of the week, and the For duration puts the end time to the next day, the ISY will complete the event timer on the next day. The timer event will always start at the set time of the selected weekday. For example, the start time (From) was set at 1:00PM on Monday and would last For 23Hrs. In this example the event will end on Tuesday at 12:00 noon. It will always start on Monday and end on Tuesday. This is a valid setting.

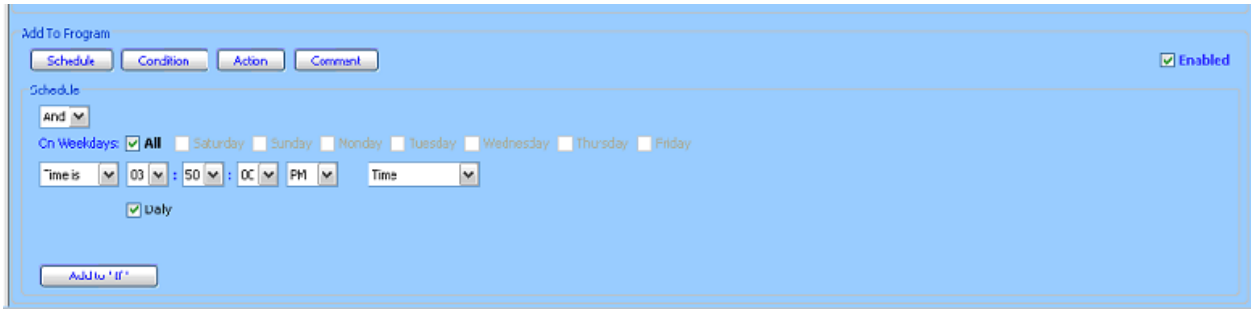


Figure 131: Schedule Time Is condition fields

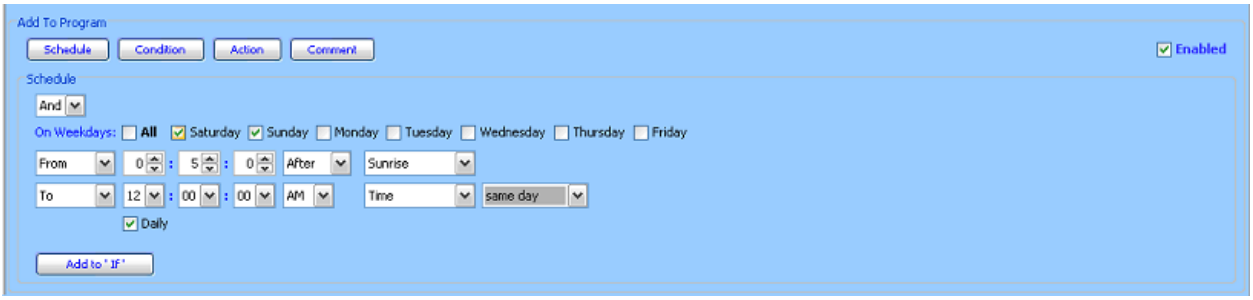


Figure 132: Schedule From/To condition fields

Longer daylight and shorter night time in summer. Shorter daylight and longer night time in winter. The change in sunrise and sunset time throughout the year from winter to summer meant that a fixed predetermined turn on or off time of lights meant you may either be turning on or off the lights too early or too late. Timer event based on Sunrise or Sunset instead of a specific time should solve this. You have the option to advance or delay the event to occur by setting the time and before/after fields.

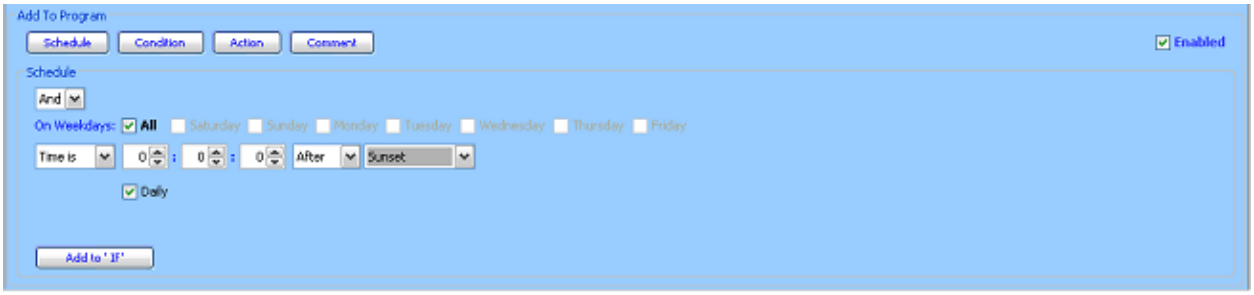


Figure 133: Sunrise/Sunset field set

The Last Run option is an event timer based on the last runtime of the selected program. Refer to **Figure 134: Last Run field set**.

Figure 134: Last Run field set

To add a timer event to a program, select or create a new program. Set the time conditions for the timer event. Click on 'Add to IF' button to place the timer condition in the program.

9.2.4.2Condition

Unlike the Schedule button that that uses the time as a trigger, the condition button uses the devices or a program to trigger the action. Conditions defined are added to the IF section.

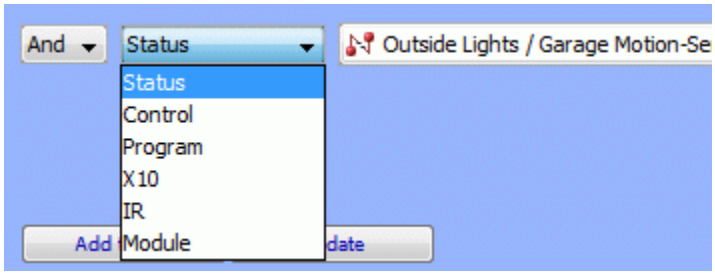


Figure 135: Device and Program condition select

To add a condition to a program, first select or create a program, and then press the Condition button. When you have finished entering the condition information, press the [Add to 'If'] button to add it to the 'If' section of the program.

A condition is based on:

Status

- The status of an Insteon Device (eg. its current on-level)

Control

- An Insteon control (eg. a button pressed 'Fast On')

Program

- The true/false status of another program.

X10

- Receiving an X10 command.
- NOTE: X10 messages are usually sent in pairs, the first identifying the devices, the second containing the command. This is automatically handled for you, thus you simply enter the house code/unit code/command code.

IR

- If the ISY has the optional Infra-Red receiver this will trigger the program upon reception of an IR signal.

Module

- The Electricity and add-on modules can also be used to trigger programs.

The program state is set to True when the program enters the Then path and False when it enters the Else path. Folder conditions can be set based on the program state. This state is also reported in the Status column in the program summary table.

9.2.4.3Action

The "Action" button adds the action information in the 'Then' and 'Else' section of the program. It is defining the action taken after the condition is met or the trigger occurs.

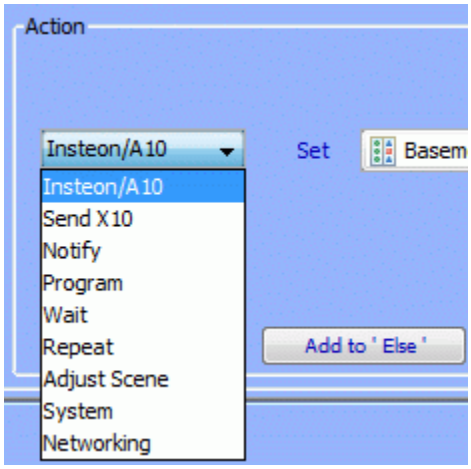


Figure 136: Action drop-down

An Action can be setting a device to a defined state that is ON/OFF or set level. The type of Action is dependent on the device type. The two types of device Actions that are supported are **INSTEON** or **Send X10**.

Insteon

- Set an Insteon device or scene (eg. set the On-Level of a lamp)
- Optionally (with the add-on A10/X10 module) A10/X10 devices that have been added to the Device tree can be controlled.

Send X10

Figure 137: Adding an X10 action to a program

Sends this as a complete X10 command.

- This X10 command will be sent as a pair of messages, the first identifying the X10 devices, the second containing the command.

Notify

Figure 138: Adding a Notify action to a program

Sends an e-mail notification to the addresses entered in the system configuration.

Program

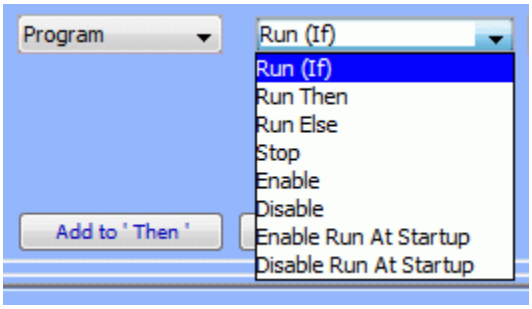


Figure 139: Selecting an action to a program

- Run (If)
  - Runs the Conditions of the specified program.
- Run Then
  - Runs the Then section of the specified program disregarding any Conditions.
- Run Else
  - Runs the Else section of the specified program disregarding any Conditions.
- Stop
  - Stops the specified program.
- Enable
  - Enables the specified program.
- Disable
  - Disables the specified program.
- Enable Run At Startup
  - Sets the specified program to run when the ISY is restarted.
- Disable Run At Startup
  - Sets the specified program to not run when the ISY is restarted.

Wait

Figure 140: Adding a Wait action to a program

Waits for the specified amount of time. If the Random checkbox is checked, then a random value from 0 to the specified time is used.

- A wait stops when the conditions change.

Repeat

Repeats all of the actions following it, to the end of the list, or to the next Repeat entry.

Figure 141: Adding a For - Repeat action to a program

Repeats the number of times specified. If the Random checkbox is checked, then a random value from 0 to the number of times specified is used.

Figure 142: Adding an Every - Repeat action to a program

Continuously repeats at this interval, as follows:

- A repeat stops when the conditions change.
- To break a Repeat sequence, add a "Repeat 1 times". Actions after this Repeat will only run once (that is to say, they won't repeat at all).

This is useful when you want some Actions repeated, but then want to continue on with more Actions that should not be repeated.

The Repeat and Wait actions have a "Random" option. This is set by selecting the Random check box. A Random value from 1 to the entered value will be randomly chosen each time the action is run.

Adjust Scene

This command will write new values to scene responders.

Select a Scene Controller from the In Scene drop-down.

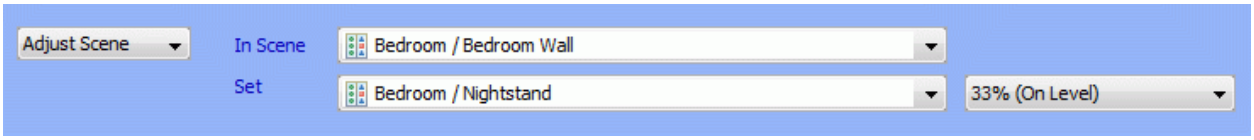


Figure 143: Adjust a Controller Scene

Or select an ISY scene.

Figure 144: Adjust an ISY Scene

- Select a device in the Set drop-down.
- Choose an On Level or Ramp Rate for the device.

System

Energy

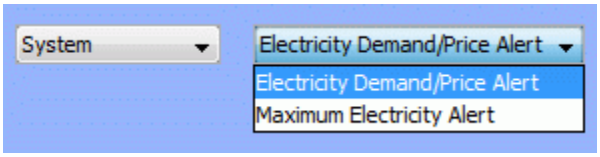


Figure 145: System Options

Electricity Demand/Price Alert

Maximum Electricity Alert

Networking

Calls a Network Resource if the Networking Module has been installed.

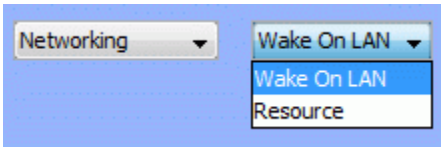


Figure 146: Networking Options

Wake on LAN: Sends a WOL command to a specified device.

Resource: Sends a prescribed command over the network.

Comment

To add a comment to a program, first select or create a program, and then press the Comment button. When you have finished entering the comment, press the Update button to add it to the program.

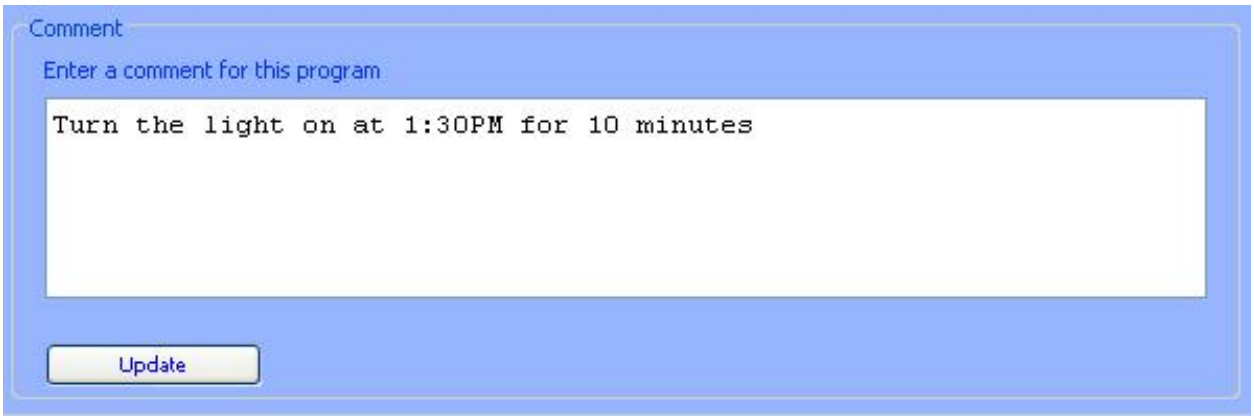


Figure 147: Networking Options

9.3 Create a Program[23]

In the ISY you can create many powerful programs in order to automate your setup. It helps to know the process to create a program which once you have created a simple program you can move on to more complex ideas. This how to is to help you create your first program. See the Program Commands reference for more info on syntax.

9.3.1 Basic Program Instructions

- If: Programs all rely on a Condition, or trigger, to be met that cause them to run.
- Then: A program will perform the defined Action.
    - Log into your ISY.
    - Click on the "Program Details" tab to get started.

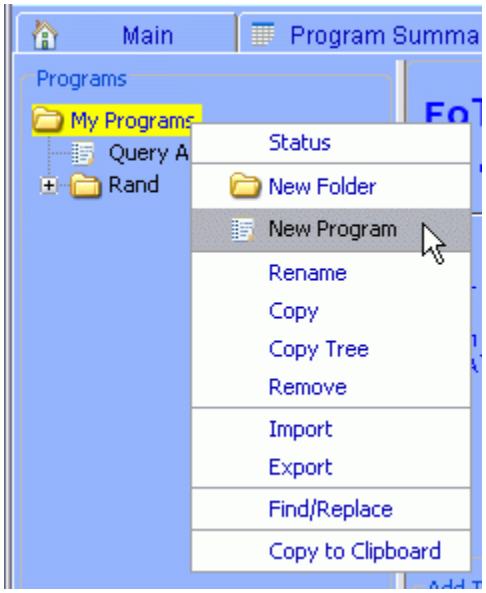


Figure 148: Program Menu

    - Right click on one of the folders and select "New Program", rename it to something that pertains to your program.

[23] (Universal Devices)

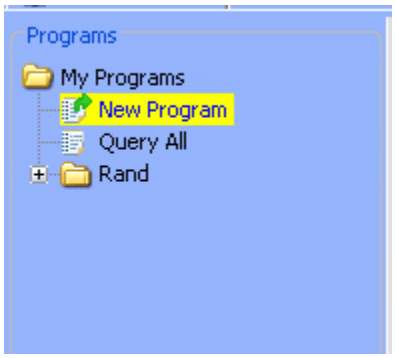


Figure 149: New Program

- Use the interface to define a Condition which will cause the program to run.
- Define a response to the Condition.
- Finally click on the "Save Changes" button to save your program to the database.

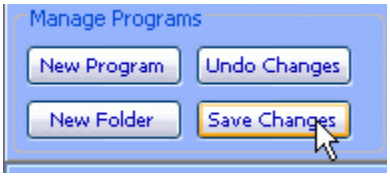


Figure 150: Save Changes

- The icon for the program should change from a "page green arrow icon" to a "page icon".
- Your program is enabled and ready to run.

9.3.2 Create a Schedule Program

- Create a program to turn on the lights when you wake up on weekdays.
  - Click on the Schedule button and define the time and day(s) you want the program to run.
  - Add to If.
  - Next click on the Action button.
  - Select a Scene to control.
  - Define the desired Action, On.
  - Add to Then.
  - Save Changes.

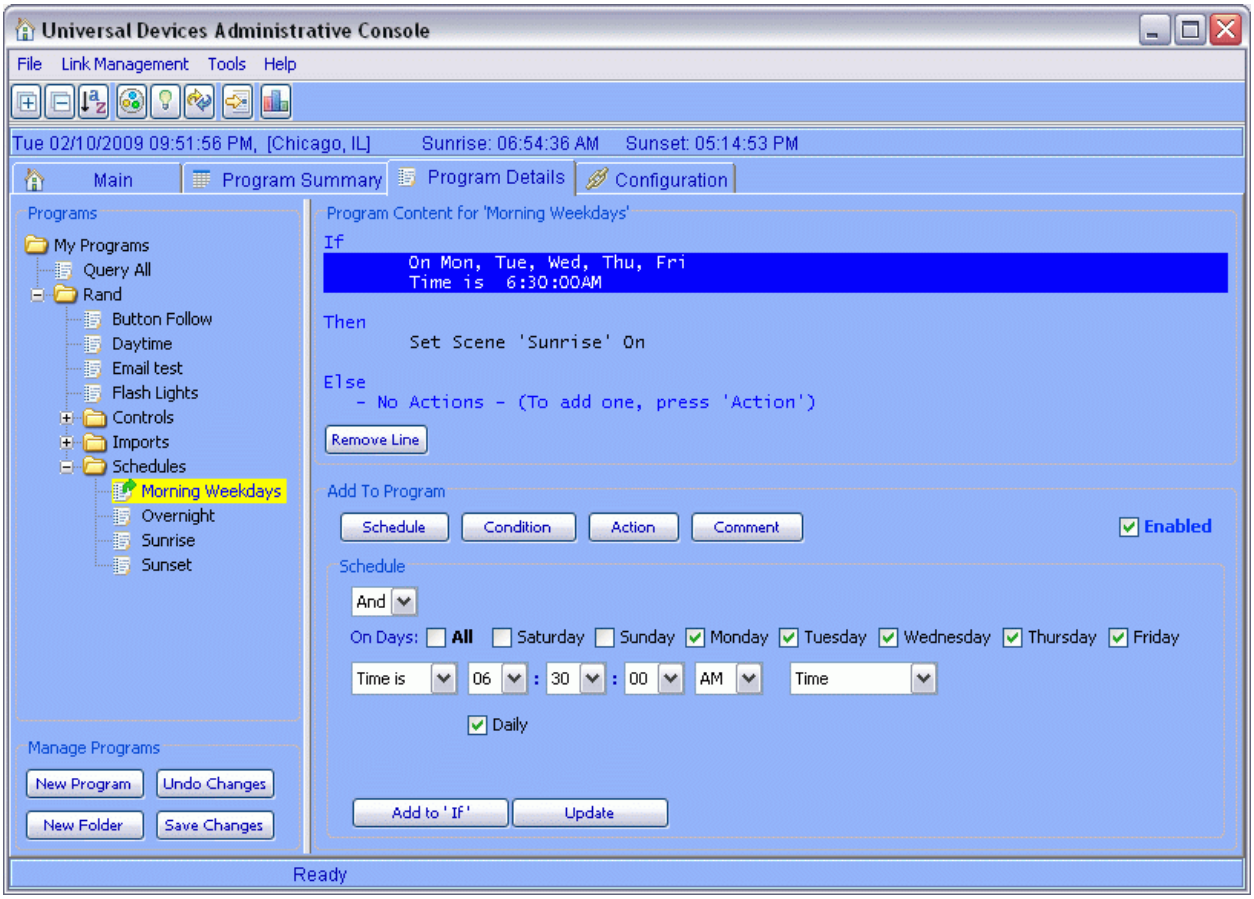


Figure 151: Schedule Window

9.3.3 Create a Conditional Program

- This example uses a button press to set a scene that lights the way to the bedroom and after 10 minutes turns off most of the house lights.

  - Click on Condition.
  - The first box should be set to And.
  - Select Control from the second box.
  - Select a Device to monitor in the third box.
  - In the fourth box select Is.
  - Select the Condition On from the last box.
  - Add to If.

- Click on Action to define a response to the Condition.
- Select Insteon in the first box.
- Select the Scene to control in the second box.
- Select the desired action On in the third box.
- Add to Then.

- Select Wait in the first box.
- Define the time to wait.
- Add to Then.

- Select Insteon in the first box.
- Select the desired Scene in the second input box.
- Define the Action On to be applied to the Scene in the last box.
- Add to Then.

- Save Changes.

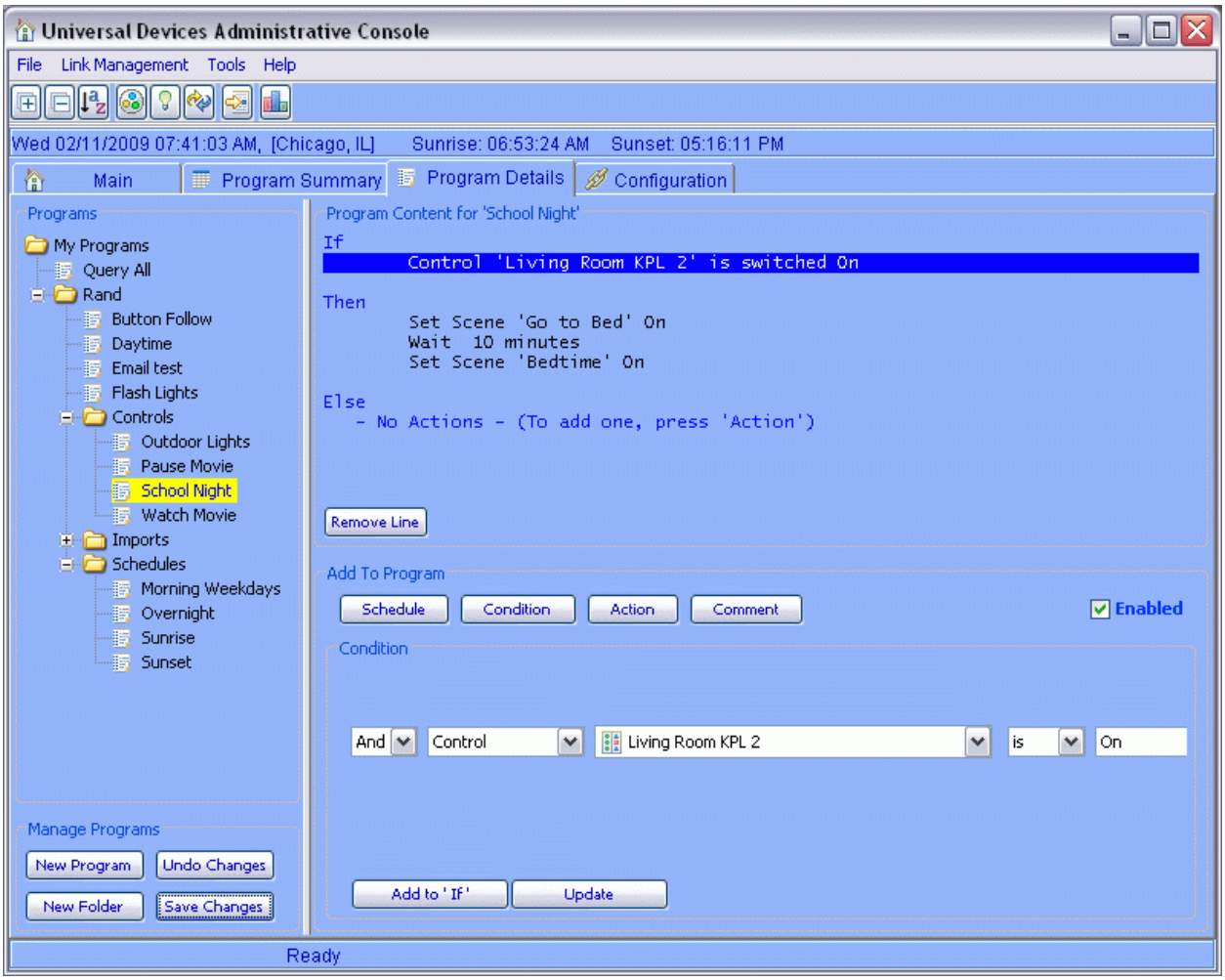


Figure 152: Conditional Program

9.3.4 Stop a Program

- When a Program is Waiting or Repeating it can be stopped. Here is an example that will cancel the above program.
- The 'Go To Bed' scene will remain on but the 'Bedtime' scene will not be called if the keypad button is turned off before the end of the 10 minute wait.
- Press the KPL 2 button On again to begin the 10 minute countdown again.
    - Begin with the above program example.
    - Click on the existing Condition to display it in the edit box.
    - Change the Is condition to Is Not.
    - Change the Action On to Off.
    - Select Add to If.
    - Save Changes.

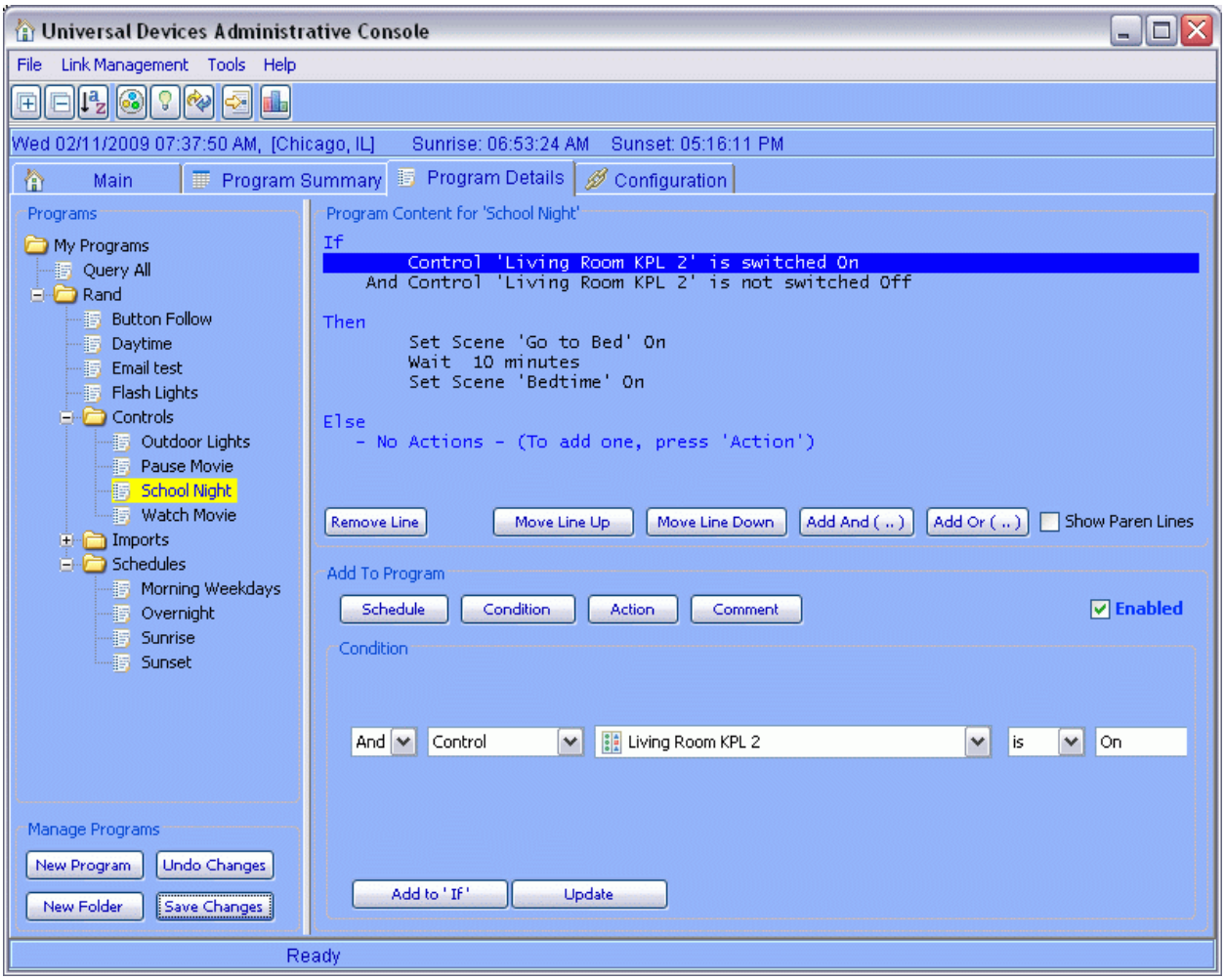


Figure 153: Stop Program

9.3.5 Creating Your First Program

To create a Program click the **New Program** button and a new program appears.

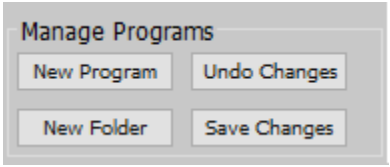


Figure 154: Creating a Program

The ISY prompts you to name your program – type in something descriptive so you can easily identify it in the future.

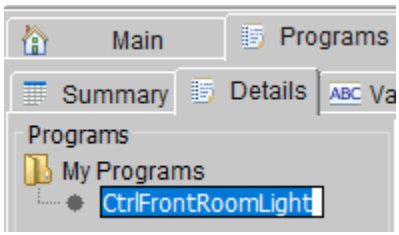


Figure 155: Naming a Program

Once you name your program click the If statement to set your conditions.

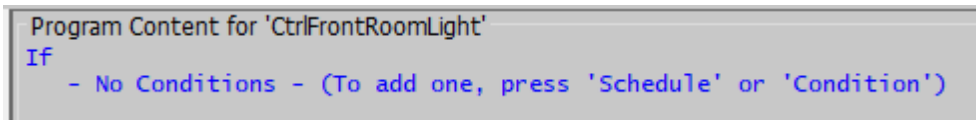


Figure 156: If Statement

Once highlighted, the bottom portion of the screen allows you to set your conditions using simple buttons and pull-down menus. For this example, we will create a program to turn your front door lights on at sunset.

To set your sunset condition, click the **Schedule** button and change the right-most drop-down menu to **Sunset** as shown below.

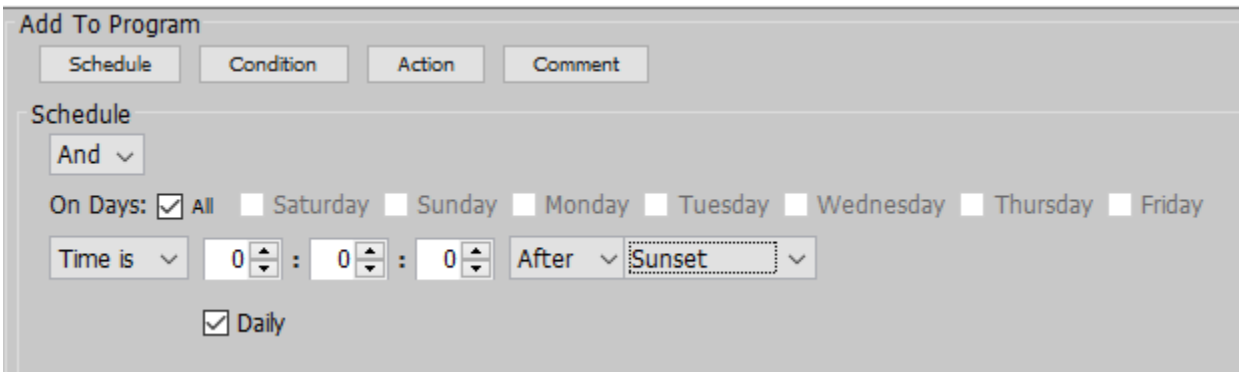


Figure 157: Schedule at Sunset

Once your Sunset condition is set, click **Add to 'If'** and you will see the If statement added to the top portion of the screen, which shows the actual program you are creating.

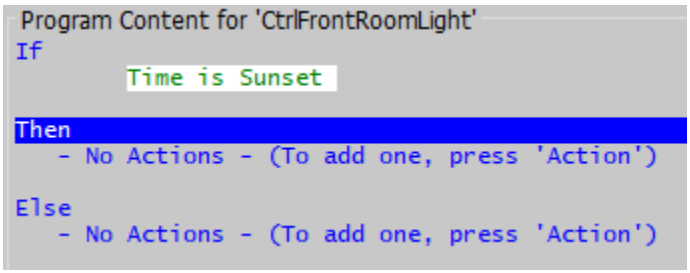


Figure 158: Adding to the If Statement

Next, click on the **Then** statement to highlight it. The Then portion of a program runs once the If portion of a program is true. At the bottom of the screen choose the device or scene that you want to turn on at sunset.

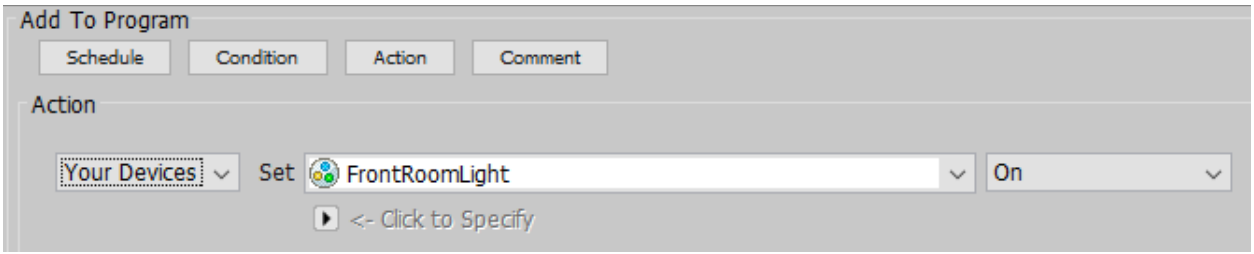


Figure 159: Adding a Then Statement

This time hit the **Add to 'Then'** button to add the Then statement to your program.

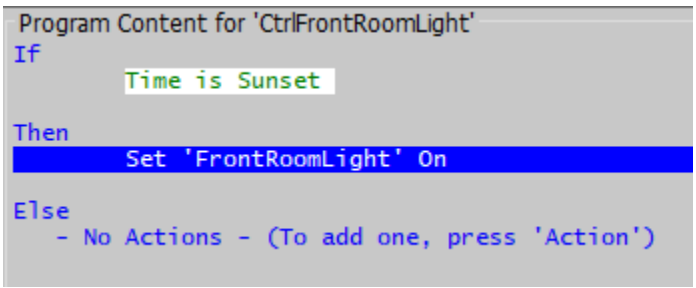


Figure 160: Entering a Then Statement

Hit the **Save Changes** button to save your program, and you're done! In just a few steps we've created a simple program to turn on your front door lights at sunset.

But, let's say we wanted something slightly more sophisticated. Say we want to turn the lights on 30 minutes AFTER sunset and turn them off at 10pm. To do that, we'll make a couple of quick adjustments to the program.

First, we'll click the "Time is Sunset" IF statement to highlight it.

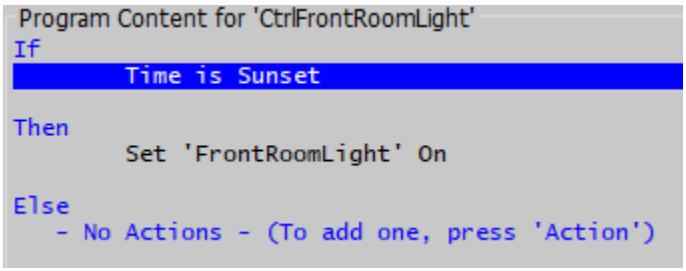


Figure 161: Changing the If Statement

Once the statement is highlighted we can edit it on the bottom of the screen. Change the **Time Is** pull-down menu to a **From** and change the middle numeric value to 30. Then change the **For** pull-down menu to **To** and change the values to 10pm as shown below:

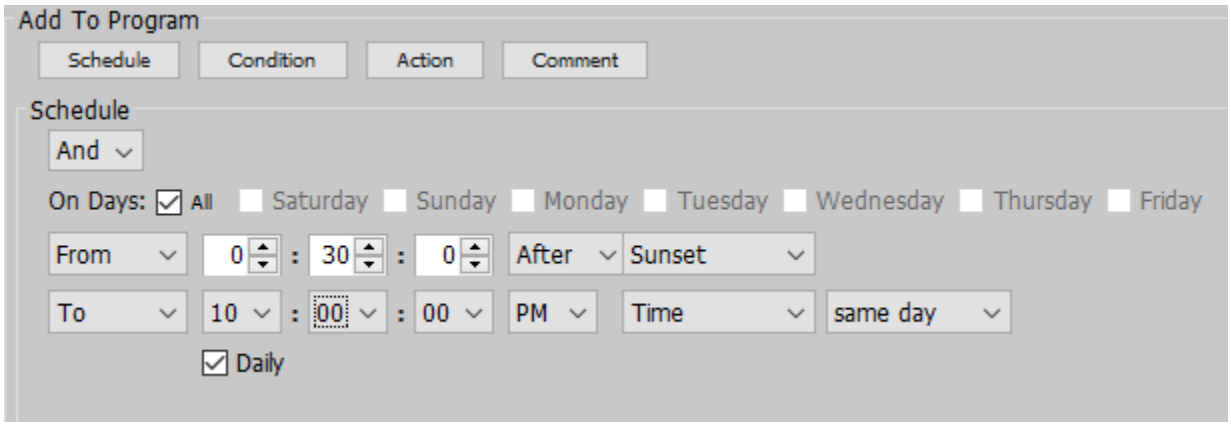


Figure 162: Updating the Schedule

Click the **Update** button to change the highlighted statement. Clicking the **Add to 'If'** button would add an additional IF statement, which is not what we want to do in this case.

The ELSE portion of a program runs once the IF statement is no longer true. After 10pm the IF statement is no longer true, so the ELSE statement runs. Next click the ELSE statement on the top portion of the screen to highlight it, and on the bottom portion set your Front Door lights to turn off.

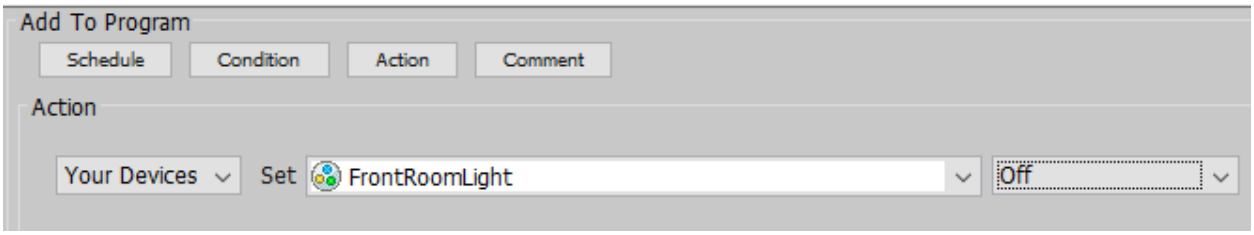


Figure 163: Adding an Else Statement

Click **Add to 'Else'** and your final program should look like this:

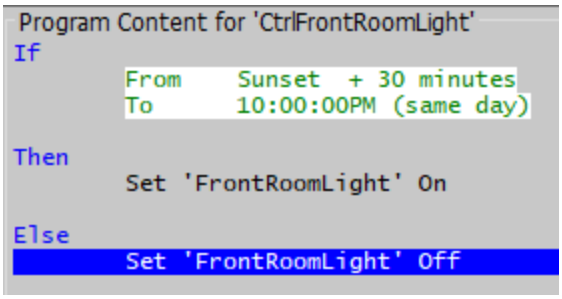


Figure 164: Enhanced Sample Program

Hit the **Save Changes** button in the bottom left, and your enhanced program is complete!

NOTE: Always remember to hit the **Save Changes** button when finished creating or editing your programs! Changes are not saved to the ISY until this button is pressed.

There is virtually an unlimited number of functions you can perform using ISY programs. For more examples, see **11 Example ISY Programs**

9.3.6 Building Your Programs

There are a variety of on-screen buttons to help build your Programs to suit your needs. Programs are not limited to one condition or action – you can add multiple IF, THEN, and ELSE statements to your program. When adding multiple lines, be sure to choose AND or OR as appropriate.

When working with Programs containing multiple lines, additional buttons appear to help arrange your lines and group them together with parentheses.

Figure 165: Additional Program Buttons

To remove a line, simply highlight it and click **Remove Line**. To rearrange your lines, highlight them and click **Move Line Up** or **Move Line Down**.

To group conditions together, use the **Add And (..)** and **Add Or (..)** buttons as shown below:

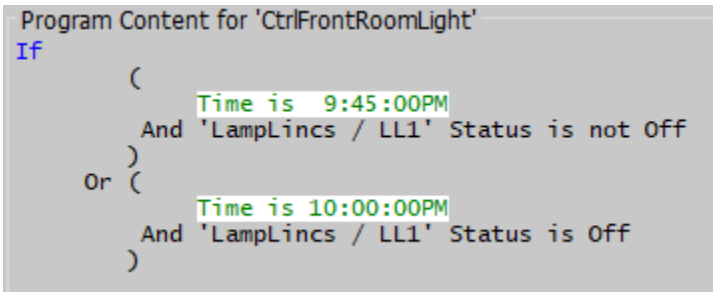


Figure 166: Grouping Conditions

This program executes only if the time is 9:45pm and the LampLincs/LL1 device is not Off (which means On, anywhere from 1-100% on) or if the time is 10:00pm and the LampLincs/LL1 device is Off.

Click the **Comment** button to add comments to your program as needed. Click the **Update** button to save your comment.

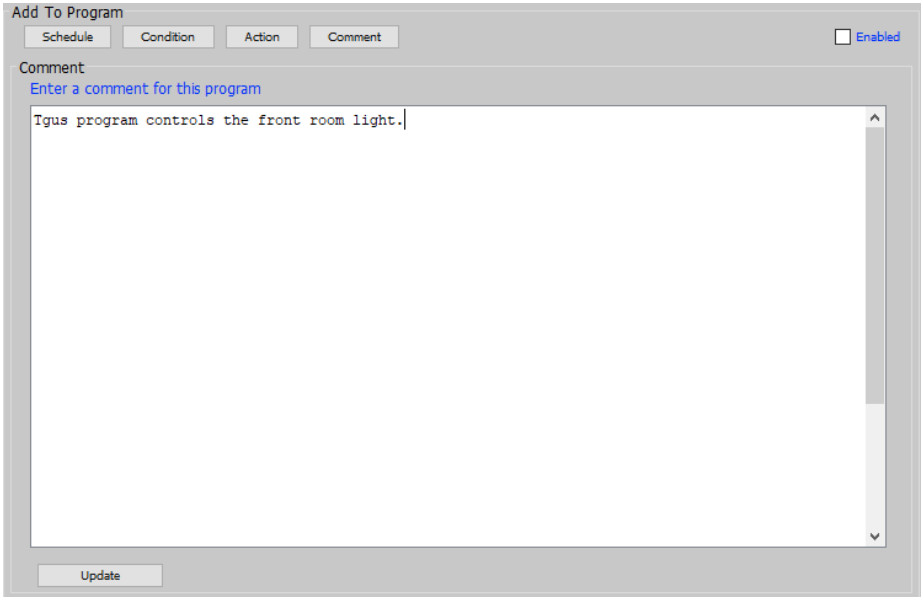


Figure 167: Adding Program Comments

To temporarily disable a program, un-check the **Enabled** box on the right-hand side of the screen and hit the **Save Changes** button. Alternatively, simply right-click a program and choose **Disable**.

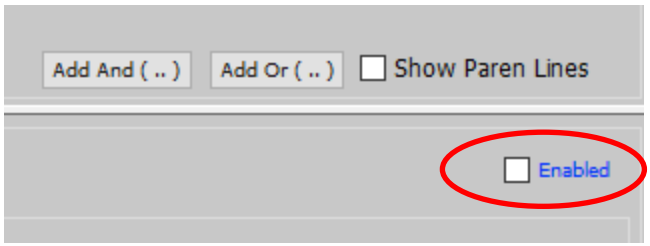


Figure 168: Temporarily Disable a Program

Disabled programs are displayed with a red crossed out circle in the Program list as shown below:

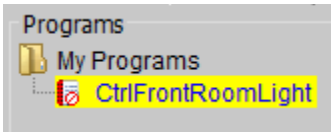


Figure 169: Disabled Programs

Enabled programs do have a red crossed out circle in the Program list as shown below:

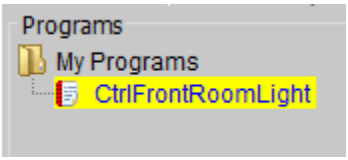


Figure 170: Enabled Programs

Programs that have changes and need to be saved are displayed in the program list with a green arrow:

Figure 171: Unsaved Programs with Changes

9.3.7 Program Schedules

In the **Add To Program** button section, click **Schedule** to add a Schedule to your Program.

Schedules allow you to add IF statements based on time of day, ranges of times, sunrise/sunset, days of the week, etc.

For example, a program that would run from 6am to 12pm:

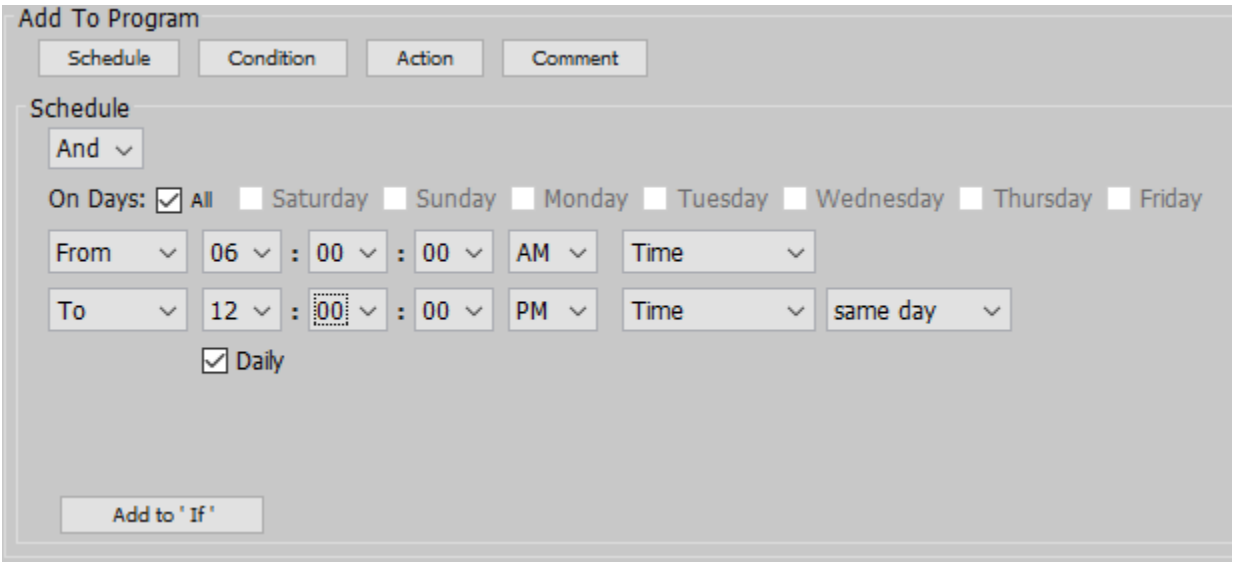


Figure 172: Schedule Screen – Time Range

Or a program that would run at 10pm on weekdays:

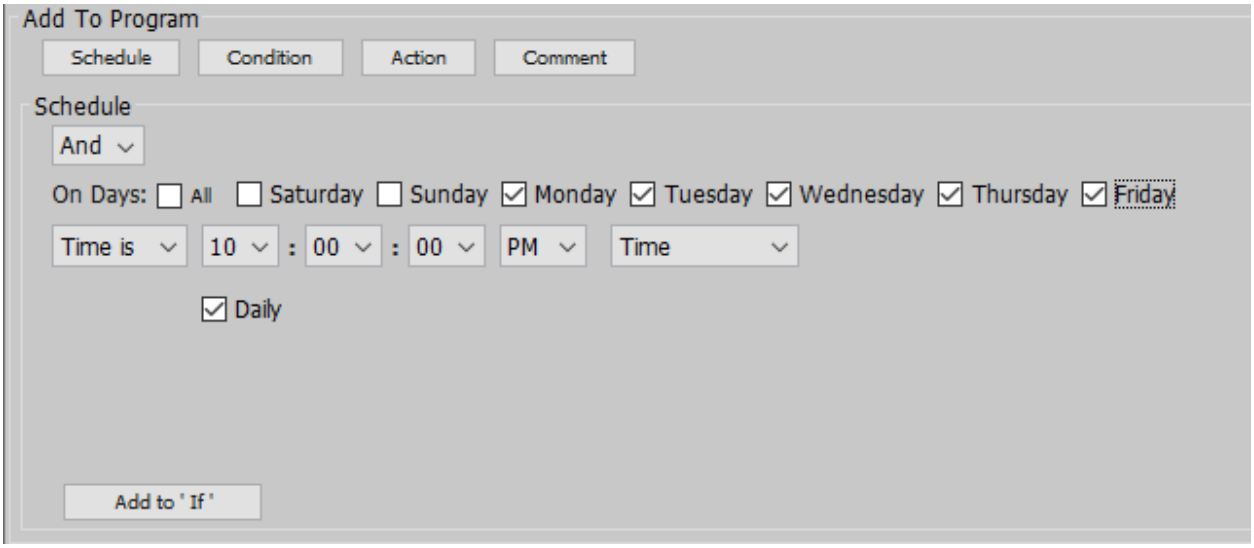


Figure 173: Schedule Screen – Time & Day

Once your Schedule statement is complete, click the **Add to 'If'** button to add it to your program.

9.3.8 Program Conditions

In the **Add To Program** button section, click **Condition** to add a Condition to your Program.

Conditions add other criteria to your IF statement. When adding a Condition to your Program, be sure to choose if you would like it to be added as an AND or OR.

Types of Conditions are:

Status conditions are true if a selected INSTEON device is at the state you specify. You can check to see if a device is On, Off, is Not On, is Not Off; if a dimmable device is at a specific level, if it's greater than a specific level, etc.

On means a device is at 100% brightness. So, if your program is checking to see if a dimmable device is on at ANY level, select **Not Off** instead.

For example, to see if your light is at 100% brightness you could do the following:

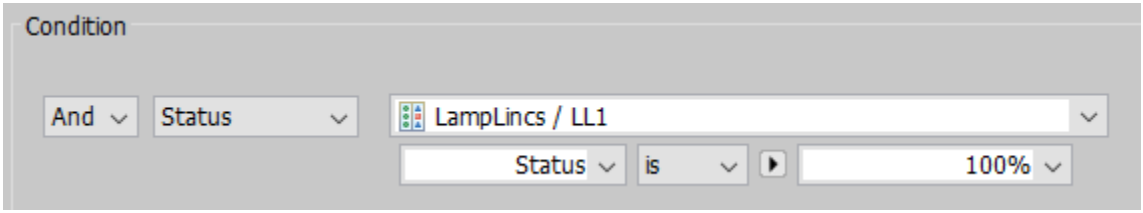


Figure 174: Status Condition – 100% Bright

But, to see if the same light is on at ANY brightness you might do this instead:

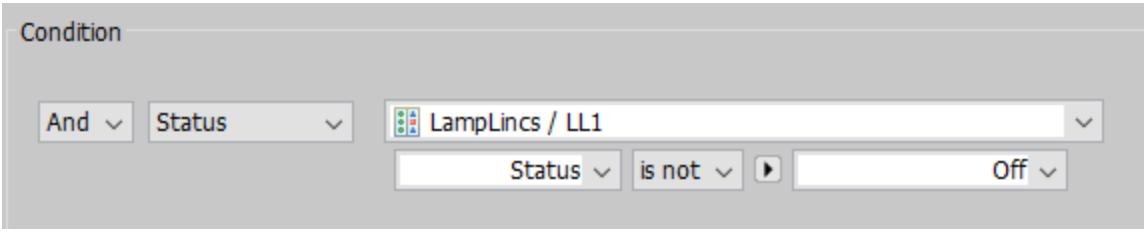


Figure 175: Status Condition – Any Brightness

Control conditions trigger only if a specified switch is pressed. The following types of conditions are available (not all options are available for all devices):

On

Off

Fast On (double-tap ON)

Fast Off (double-tap OFF)

Fade Up (press and hold ON)

Fade Down (press and hold OFF)

Fade Stop (release of a press and hold)

Bright (bright button pressed)

Dim (dim button pressed)

For example, if you want to trigger a program if your switch is double-tapped ON (Fast On) you could do the following:

Figure 176: Fast On Condition

Program Conditions check to see whether or not other ISY Programs are currently True or False.

X10 Conditions trigger programs when X10 commands are received by the ISY. For example, to run a program if an X10 M1 ON command is received:

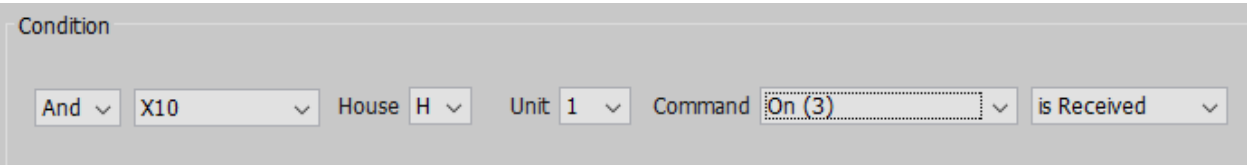


Figure 177: X10 Condition

Variable Conditions trigger programs based on the value of a defined variable. You can read more about Variables in 8 Variables

IR Conditions trigger programs when IR commands are received from a remote control. See **16 The Integrated IR Receiver** for more information.

Module Conditions trigger programs based on optional ISY modules, such as the Electricity meter module or the Climate module.

ELK conditions trigger programs based on the state of available ELK resources, assuming you have an ELK security system installed and communicating with your ISY, and have the optional ELK Security System module installed. See **6.11 ELK Integration Module** for more information.

9.3.9 Program Actions

In the **Add To Program** button section, click **Action** to add an Action to your Program.

Program Actions are commands that are run when the IF statement is true (a THEN action) or if the IF statement is no longer true (an ELSE action). When adding an Action to your program, be sure to click the **Add to 'Then'** or **Add to 'Else'** button depending on your intended result.

Insteon (Insteon/X10 with the optional X10 option): Sends INSTEON commands to devices or scenes to turn them ON, OFF, etc. Not all options are available for all devices:

ON (send a standard ON command)

OFF (send a standard OFF command)

FAST ON (turn device full on ignoring programmed on level or ramp rate)

FAST OFF (turn device full off ignoring programmed ramp rate)

FADE UP (start the ramp up of a dimmable device

FADE DOWN (start the ramp down of a dimmable device)

FADE TOP (stop the ramping up or down of a dimmable device)

BRIGHT (small increase in brightness of a dimmable device)

DIM (small decrease in brightness of a dimmable device)

QUERY (query the current state of a device)

BEEP DURATION (causes a supported device or scene to emit a beep)

BACKLIGHT LEVEL (sets the backlight level on a supported device)

Send X10: Sends X10 commands to X10-compatible devices. Using this feature, ISY programs can control a wide range of X10-compatible devices.

Notify: Sends an email or SMS text message to recipients. Please see **8.3 Notifications** for more information.

Program: Runs or modifies other ISY programs. The following options are available:

Run (If) (runs the IF portion of a program)

Run Then (runs the THEN portion of a program)

Run Else (runs the ELSE portion of a program)

Stop (stops a currently running program)

Enable (enables a disabled program)

Disable (disables and enabled program)

Enable Run at Startup (sets a program to run at startup)

Disable Run at Startup (sets a program to NOT run at startup)

Wait: Creates a pause in a running program. For example, to turn your front room light off 5 minutes after your LL1 switch is turned off, you could do the following:

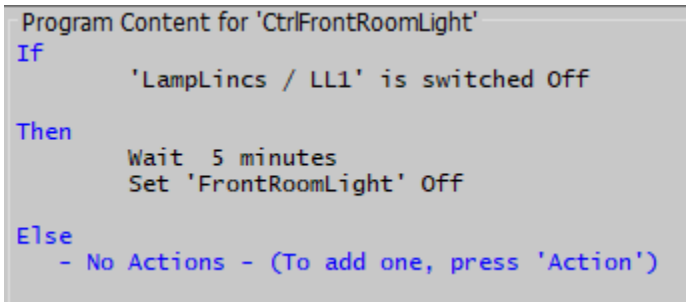


Figure 178: Wait Action

If the **Random** checkbox is checked, a random time between 0 and the specified time is used. For example, this program would wait between 0 and 5 minutes:

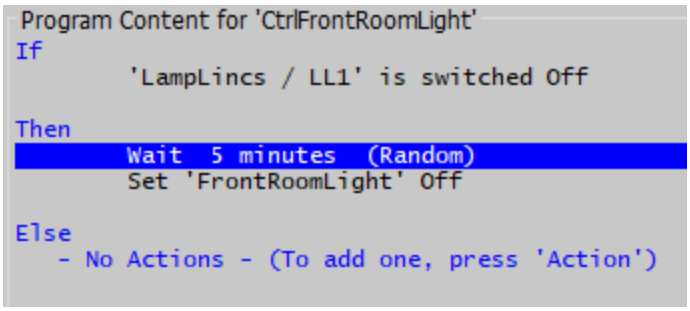


Figure 179: Random Action

Repeat: Repeats an action or group of actions multiple times. If the **Random** button is checked, a random number of repeats between 0 and the specified value is used.

For example, to flash your light on and off 5 times, every 2 seconds, you could:

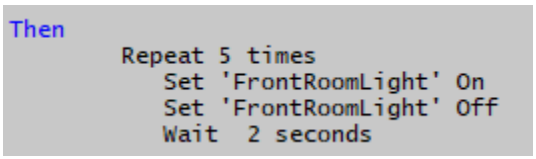


Figure 180: Flash Lights ON and OFF

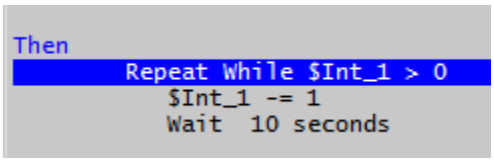


Figure 181: Repeat While

Repeat: *Repeat While* allows you to use variables in a loop. (This applies to firmware v5 and above)

Variable: Allows you to adjust the value of a defined variable within program. Please see 8 Variables for more information.

Adjust Scene: Adjusts the On Levels and Ramp Rates of devices or scenes. For example, use this function to adjust scenes so that they turn on at brighter levels during the day and perhaps at dimmer levels during the evening. Please keep in mind that many devices require a reboot before On Level or Ramp Rate changes take effect, so this function may not be useful in all cases.

System: Notifies compatible clients of energy related alerts.

Other Actions may be available depending on what optional modules you may have installed.

9.3.10 Program Folders

To create a new folder, simply click the **New Folder** button on the bottom-left corner of the screen. You can also create new folders by right-clicking on the program hierarchy (left-hand side of the screen) and choosing **New Folder**.

Folders can be used to store Programs to help organize them by type, category, etc.

Folders can also have conditions set on them to aid in program functionality. For example, you could create a Vacation Programs folder that contains only programs that should run when you are on vacation. In the following example, the user turns a keypad button called "GarageControls2E" on if they are going away on vacation. The folder is set with the following conditions so that the contained programs run only if that vacation keypad button is on:

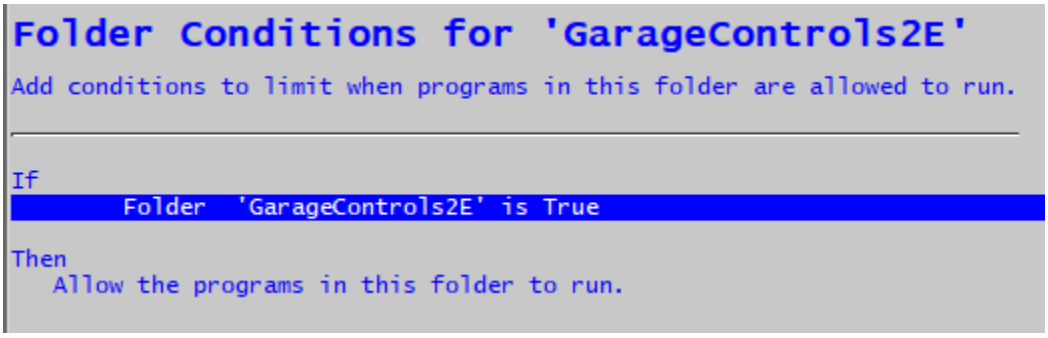


Figure 182: Folder Conditions

To set conditions on a folder, simply click the folder to select it and adjust conditions as you would any ISY Program.

9.4 Advanced Programming

9.4.1 Combining Conditions using And

- Using multiple Conditions can make Programs more convenient.
- This program watches for a switch to be turned Off and if it was already Off turns the lights on at a low level.
- It could be used for the lights in a nursery or a bathroom in the middle of the night.

    - Create a Scene and include all the lights you wish to control. Be sure to adjust the light levels and ramp rates.

    - Click on Condition.
    - Choose And Control.
    - Select the switch and is Off.
    - Add to If

    - Choose And Status.
    - The switch should still be selected with the is Off condition.
    - Add to If.

    - Click on Action.
    - Select Insteon and the scene you created.
    - Select On from the Action drop down.
    - Add to Then.

    - Save Changes.

- It doesn't matter what order the lines are in the Condition.
- The program will be triggered whenever the switch is pressed Off.

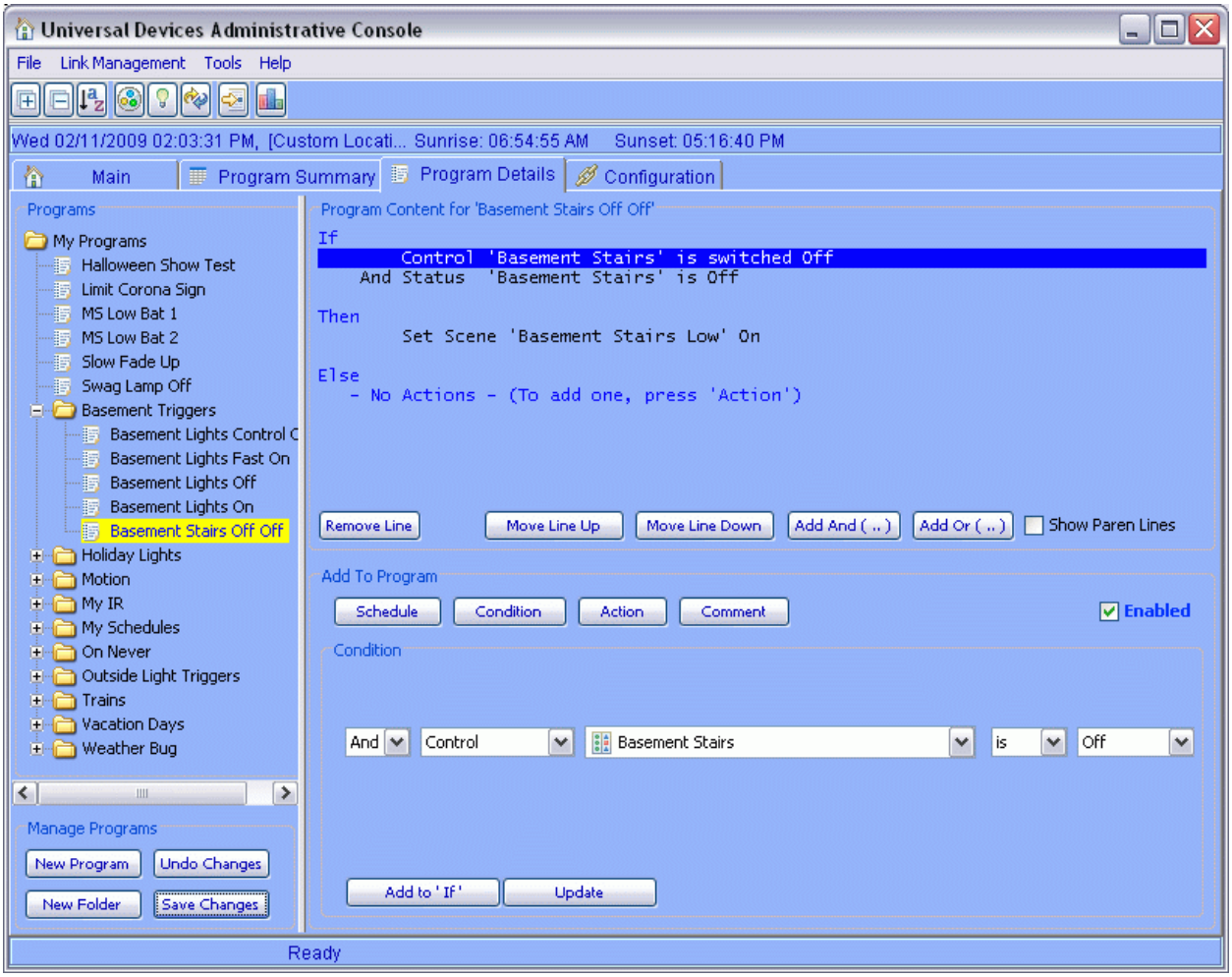


Figure 183: Program Off-Off

9.4.2 Combining Conditions using Or

- This program checks for any of three conditions become true.
- I use this to turn off all the basement lights when the basement stairs are turned off.
- I check for the Status in case someone holds the switch to dim the lights off.

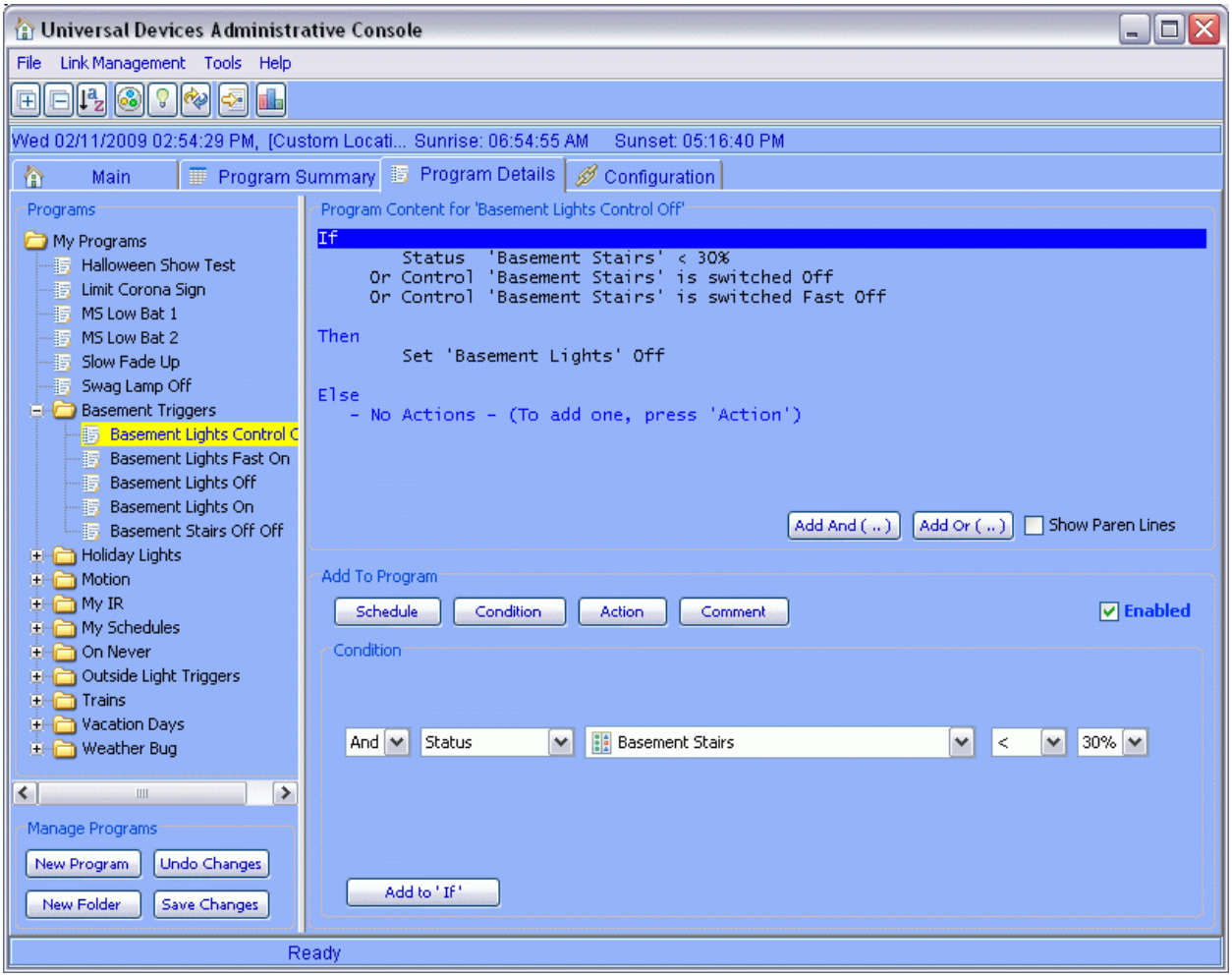


Figure 184: Program Off or Dim

9.4.3 Using Else

- ELSE will run when something in the IF statement is specifically not true.
- This program will be triggered when Button + is either Held or Released.
- The THEN statement will run when the program is TRUE.
- The ELSE statement will run when the program becomes FALSE.

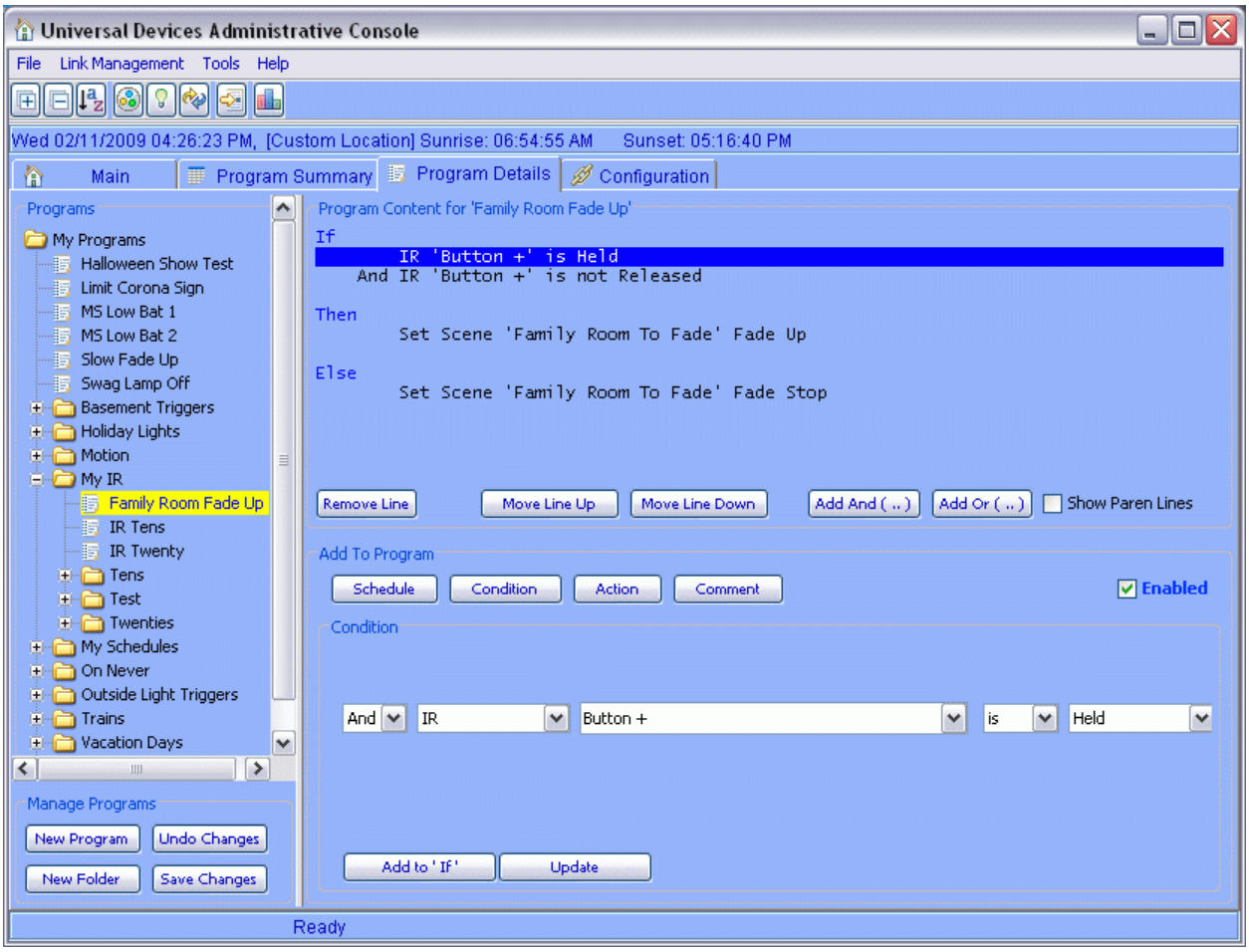


Figure 185: Program Fade Until Else

9.5 Scope, Precedence and Execution Order[24]

9.5.1 Scope

All programs and folders have global scope, i.e. they are visible to all other programs and folders.

[24] (Universal Devices)

9.5.2 Operator Precedence

A program's If clause may contain more than one condition. Every condition (including schedule conditions) begins with an operator, which is one of And or Or. The precedence of these operators is:

- And
- Or

Therefore, an expression such as If A or B or C and D would be evaluated as If A or B or (C and D).

The order of evaluation may be modified by use of And (..) and Or (..) parenthesis. Any number of conditions may be placed between the parenthesis and will be evaluated in precedence order. The entire parenthesized group then becomes a single And or Or condition, to be evaluated in precedence order with other same-level conditions (including other parenthesized groups). To change the above example to If (A or B or C) and D, use an And (..) parenthesis around A, B, and C, with D outside the parenthesis.

In the following example code of the above example:

```
If
      Status  'Light 1' is On
   Or Status  'Light 2' is On
   Or Status  'Light 3' is On
  And Control 'Switch 1' is switched On
Then
      Set 'Light 4' On
Else
  - No Actions - (To add one, press 'Action')
```

Light 4 will be turned on whenever Light 1 is on, or Light 2 is on, or Switch 1 is switched on while Light 3 is on, which is likely not the intended result. To have Light 4 turn on whenever Switch 1 is switched on and either Light 1 or Light 2 or Light 3 is on, add an And (..) parenthesis:

```
If
    (
        Status  'Light 1' is On
      Or Status  'Light 2' is On
      Or Status  'Light 3' is On
    )
  And Control 'Switch 1' is switched On
Then
    Set 'Light 4' On
Else
  - No Actions - (To add one, press 'Action')
```

The Or (..) parenthesis are less frequently used. Consider the expression If A or (..). If the expression within the Or (..) parenthesis consists only of single operands connected by And and/or Or operators, then the Or (..) parenthesis do not alter the order of evaluation, and are not required. In order for them to be required, they must be part of a compound expression as, for example, If A or (B and C or D) and E.

That example might have the requirement to turn Light 4 on if Switch 1 is turned on, or if either Switch 2 is on and Light 2 is on or Light 3 is on and Switch 3 is turned on:

```
If
      Control 'Switch 1' is switched On
   Or (
         Status  'Switch 2' is On
       And Status  'Light 2' is On
        Or Status  'Light 3' is On
      )
   And Control 'Switch 3' is switched On
Then
      Set 'Light 4' On
Else
  - No Actions - (To add one, press 'Action')
```

As a final example, the requirement is to have Light 3 turn on if Light 1 is on and Switch 1 is switched on, or Light 2 is on and Switch 2 is switched on: If (A and B) or (C and D). Since And has higher precedence than Or, the expression If A and B or C and D will bind as required, and therefore the following code needs no parenthesis:

If

Status 'Light 1' is On

And Control 'Switch 1' is switched On

Or Status 'Light 2' is On

And Control 'Switch 2' is switched On

Then

Set 'Light 3' On

Else

- No Actions - (To add one, press 'Action')

If this appears confusing, Or (..) parenthesis may be used to clarify, without changing the order of evaluation:

```
If
      (
         Status  'Light 1' is On
       And Control 'Switch 1' is switched On
      )
    Or (
         Status  'Light 2' is On
       And Control 'Switch 2' is switched On
      )
Then
      Set 'Light 3' On
Else
  - No Actions - (To add one, press 'Action')
```

Note that no operator (And or Or) is displayed for the first condition in the If clause. This is because a single-condition clause has no conjunction, while in a multi-condition clause, the operation performed on the first condition is wholly dependent upon and determined by the operator of the second condition. The operator of the first condition, though ignored, is still maintained in the drop-down setting box in the lower portion of the window, in case the condition line should be moved down and no longer be the first condition.

9.5.3 Evaluation Order

Within the If clause of a program, expressions are evaluated from left-to-right, meaning the individual expressions are evaluated from top to bottom as viewed on the screen. Evaluation does not stop as soon as the outcome is known; rather all expressions within the clause are evaluated each time the If is invoked.

9.5.4 Statement Execution Order

Within the Then or Else clause of a program, statements are executed from top to bottom in the order in which they occur. When a statement calls another program, the called program begins executing, and the calling program immediately continues execution with the next statement in sequence--it does not wait for the called program to complete before continuing.

A series of statements within a Then clause (or within an Else clause), up to the next Wait or Repeat statement, are atomic. In other words, all such statements are executed before the conditions of the program are retested. The program's conditions are reevaluated each time a Wait or Repeat statement is encountered, and at the end of each iteration of a Repeat loop.

What this means is that if a program's Then clause changes a condition which causes the program's overall condition to become false (or if the program's Else clause changes a condition which causes the program's overall condition to become true), the current atomic statement group will complete, and at that point execution will transfer from the Then clause (or the Else clause) to the Else clause (or the Then clause).

Therefore, if a Then clause (or an Else clause) contains no Wait or Repeat statements, the entire clause is atomic, and will complete before the program's conditions are reevaluated.

9.5.5 Boot/Startup Sequence and Program Execution Order

When the ISY boots, the True/False state of all schedule programs is determined, and any schedules which require catching up, are set to run following initialization. If Catch up schedules at Restart is enabled, schedules are set to run from the beginning of the day; otherwise schedules are set to run only for the specified Missed Schedule Grace Period. Note that prior to firmware 2.6.4, the Missed Schedule Grace Period applied only to Time is schedules, not From/To or From/For schedules; as of firmware 2.6.4 it applies to all schedules.

Next, ISY queries all devices and determines their status. During this process, the True/False state is determined for programs and folders which have conditions, and any programs which require running are set to run following initialization. Folders with no conditions are set to True so as not to prevent programs within them from running, since without conditions a folder's state will never be changed. Programs which have no conditions are initialized to False, just as a variable would be, since programs, which are often used as flags, may have their state changed by other programs or directly from the Program Summary tab, even though they have no conditions.

Finally, programs which are set to Run at Startup are set to run following initialization. Note that prior to firmware 2.6.6, a program which was set to Run at Startup would

actually execute at startup only if its Enabled box was checked; as of firmware 2.6.6 it will run at startup when set to do so, regardless of the state of the Enabled box.

At this point initialization is complete, and event processing begins. All programs which were set during initialization to run, whether schedules, triggers, or Run at Startup, now begin running, and programs initiated by new events will also begin running. In all cases, the order in which the programs run is determined by ISY's internal algorithms, and is not user predictable; specifically, schedules do not necessarily run in chronological order.

9.5.6 Program Enabled Checkbox

Each program has an Enabled checkbox. When this box is checked and provided any folder conditions in the program's hierarchy are True, the program will run normally whenever triggered by an event, when called from another program, when invoked directly from the Program Summary tab, and at startup if it is set to Run at Startup.

When the Enabled box is not checked, the program will not run in response to an event, but will still run normally when called from another program and when invoked directly from the Program Summary tab, provided any folder conditions in the program's hierarchy are True.

In firmware versions prior to 2.6.6, a program set to Run at Startup would not actually execute at startup when its Enabled box was not checked. In firmware 2.6.6 and above, a program set to Run at Startup will do so regardless of the state of its Enabled checkbox, provided any folder conditions in the program's hierarchy are True.

9.5.7 Folder Conditions

Folders may be created with or without conditions and may be nested. Folders with no conditions are an effective organizational tool, and programs within them run as described above.

When a folder is given conditions, then programs within that folder or any of its sub-folders run only when the folder's conditions are met (the folder's status is True). Whether invoked by a trigger or schedule, by another program, by Run at Startup, or directly from the Program Summary tab, a program will run only when the conditions are True for each folder within the program's hierarchy. Therefore, folder conditions may be considered to have the highest level of precedence.

When a folder's conditions become True, programs within that folder or its sub-folders do not automatically run, unless the event which caused the folder to become True is also a condition of one or more programs within that folder, in which case those programs will run either the Then or Else path, depending on whether the program's conditions are True or False. Except for that special case, programs within conditional folders do not run until an event which is a condition of the program occurs after the folder becomes True. When

the event occurs, the program's conditions are re-evaluated, and since the folder is now True, the program runs either the Then or Else path, depending on whether the program's conditions are True or False. Note that this does not require that the program's conditions change from False to True or vice versa, only that an event occurs which causes the program's conditions to be re-evaluated. As of firmware version 2.6.6, the True/False state of a folder may be tested within the If conditions of a program or another folder. This allows a program's If conditions to be automatically re-evaluated when a folder becomes True, by placing the test of the folder condition within the program's If conditions.

9.6 Procedural Programs using Run If[25]

Beginning with beta 2.6.4 of firmware version 2.7 for ISY-26 and ISY-99i series, a new Run (If) command has been added. The former Run command is now Run Then; the Run Else command is unchanged. Instances of the new command within programs will appear as Run 'Program Name' (If). All former instances of Run 'Program Name' within programs will now appear as Run 'Program Name' (Then Path); instances of Run 'Program Name' (Else Path) will remain unchanged.

The Run (If) command will evaluate the If condition of the specified program and run either the Then clause or the Else clause depending as the condition is True or False. When the If clause contains no condition, the Then clause will be run. In the new firmware, a program which is set to run at startup will likewise evaluate the If condition to determine which path to take, defaulting to the Then clause in the absence of a condition.

Why do we need Run (If), doesn't the ISY automatically run programs based on the If conditions?

Yes, the ISY automatically runs programs when an event occurs that changes an If condition for an enabled program. The difference is that Run (If) always runs the program based on the conditions without needing an event to occur. In Addition, the program can be disabled such that it runs only when Run If/Then/Else are used, and never runs due to an event.

What happens if an event occurs that changes the If condition while the program is currently running?

- If the program is not enabled then nothing happens, the program continues running as it currently is.
- If the program is enabled then either the Then or Else will run (business as usual).

This new command provides the ability to run programs in a procedural manner without the awkward workarounds required previously. Simply uncheck the Enabled box so that the program does not run independently, and it becomes a callable procedure, complete with conditions. These procedure programs may be nested just as other programs. A main

[25] (Universal Devices)

program may call several of these procedure programs consecutively in order to evaluate multiple conditional paths.

It should be noted that when a program is not enabled, its conditions are not automatically evaluated. Therefore, its Then and Else clauses may contain statements which alter the program's conditions, without causing the program to stop running the current path, as happens when the program is enabled.

As an example, consider a simple Welcome Home keypad button which turns on a group of lights, and optionally turns on an additional set of lights if the time is between sunset and sunrise:

9.6.1 Program: Welcome Home - Enabled

```
If

    Control 'Welcome Home KPL non-toggle button' is switched Off

  Or Control 'Welcome Home KPL non-toggle button' is switched Fast Off

Then

    Set Scene 'Welcome Home Scene' On

    Run Program 'Welcome Home Dark' (If)

Else

  - No Actions - (To add one, press 'Action')
```

9.6.2 Program: Welcome Home Dark - Not Enabled

```
If

    From   Sunset

    To     Sunrise (next day)

Then

    Set Scene 'Welcome Home Dark Scene' On

Else

  - No Actions - (To add one, press 'Action')
```

9.7 Comparative Study using Run If[26]

As a comparative study of a system with and without the use of the Run (If) command, consider a Movie Time KPL non-toggle-off button with the following function: the first time the button is pressed, the system goes to the Movie Prep stage, which turns on the kitchen lights (to make popcorn), and turns on the theatre lights. The next press of the button shifts the system to the Movie Start stage, which turns the kitchen lights off, and fades the theatre lights down. A press of the button while in this state, shifts the system to the Movie Stop state, which fades up the theatre lights, turns on the bathroom light (for refreshing pause), and turns on the kitchen light (to fetch more beverage). Additional presses of the button alternate between Movie Start and Movie Stop. The system does not turn the bathroom light back off, simply because it may still be in use; that step could be added at the discretion of the user.

Using the Run (If) command, the required functionality could be obtained by use of a group of programs such as the following:

9.7.1 Program: 'Movie Time Macro' - Enabled

```
If

    Control 'Movie Time KPL non-toggle button' is switched Off

  Or Control 'Movie Time KPL non-toggle button' is switched Fast Off

Then

    Run Program 'Movie Time Prep' (If)

Else

  - No Actions - (To add one, press 'Action')
```

[26] (Universal Devices)

9.7.2 Program: 'Movie Time Flag' - Not Enabled

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

- No Actions - (To add one, press 'Action')

Else

- No Actions - (To add one, press 'Action')

9.7.3 Program: 'Movie Time Prep' - Not Enabled

If

Program 'Movie Time Flag' is False

Then

Set 'Kitchen Movie Scene Fade' On

Set 'Living Room Movie Scene Fade' On

Run Program 'Movie Time Start/Stop' (Else Path)

Stop Program 'Movie Time Start/Stop'

Run Program 'Movie Time Flag' (Then Path)

Else

Run Program 'Movie Time Start/Stop' (If)

9.7.4 Program: 'Movie Time Start/Stop' - Not Enabled

```
If

    Program 'Movie Time Start/Stop' is False

Then

    Set 'Kitchen Movie Scene Fade' Off

    Set 'Living Room Movie Scene Fade' Off

Else

    Set 'Kitchen Movie Scene Fade' On

    Set 'Living Room Movie Scene Fade' On

    Set 'Main Bath' On
```

In this group of programs, only the Movie Time Macro program is enabled, so that Movie Time button presses will activate it. The other programs are not enabled, in order that they not run independently, but only when called from another program.

The Movie Time Flag program has no conditions or actions. It simply serves as a status flag. When the Then path is run, the program's status becomes True, and when the Else path is run, the program's status becomes False.

The Movie Time Macro program receives a button press and calls the Movie Time Prep Program's If clause. On the first button press, Movie Time Flag will be False, and so Movie Time Prep will run its Then path, which executes the preparation statements. It also calls the Else path of Movie Time Start/Stop in order to initialize that program's status to False, and immediately calls Stop to prevent the statements in the Else clause from executing. Finally, it calls the Then path of Movie Time Flag, setting it to True. Successive button presses will therefore cause Movie Time Prep to run its Else path, which calls Movie Time Start/Stop.

On the first call to Movie Time Start/Stop, its status is False which means that its condition is True. It therefore runs its Then path, executing the movie start statements, and setting its status to True. Therefore, on the next call its condition will be False, and it will run its Else path, executing the movie stop statements, and setting its status back to False. Successive calls will cycle between Movie Start and Movie Stop.

Without the use of the Run (If) command, the required functionality can still be obtained, though with significantly greater complexity, by use of a group of programs such as the following:

9.7.5 Program: 'Movie Time Flag'

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

9.7.6 Program: 'Movie Playing Flag'

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

9.7.7 Program: 'Movie Time Macro'

```
If
      Control 'Movie Time KPL non-toggle button' is switched Off
   Or Control 'Movie Time KPL non-toggle button' is switched Fast Off
Then
  - No Actions - (To add one, press 'Action')
Else
  - No Actions - (To add one, press 'Action')
```

9.7.8 Program: 'Movie Time Prep'

```
If
      Program 'Movie Time Macro' is True
  And Program 'Movie Time Flag' is False
Then
      Set 'Kitchen Movie Scene Fade' On
      Set 'Living Room Movie Scene Fade' On
      Run Program 'Movie Playing Flag' (Else Path)
      Run Program 'Movie Time Prep Action' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.7.9 Program: 'Movie Time Prep Action'

If

- No Actions - (To add one, press 'Action')

Then

Run Program 'Movie Time Macro' (Else Path)

Run Program 'Movie Time Flag' (Then Path)

Else

- No Actions - (To add one, press 'Action')

9.7.10 Program: 'Movie Time Start'

If

Program 'Movie Time Macro' is True

And Program 'Movie Time Flag' is True

And Program 'Movie Playing Flag' is False

Then

Set 'Kitchen Movie Scene Fade' Off

Set 'Living Room Movie Scene Fade' Off

Run Program 'Movie Time Start Action' (Then Path)

Else

- No Actions - (To add one, press 'Action')

9.7.11 Program: 'Movie Time Start Action'

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

Run Program 'Movie Time Macro' (Else Path)

Run Program 'Movie Playing Flag' (Then Path)

Else

- No Actions - (To add one, press 'Action')

9.7.12 Program: 'Movie Time Stop'

If

Program 'Movie Time Macro' is True

And Program 'Movie Time Flag' is True

And Program 'Movie Playing Flag' is True

Then

Set 'Kitchen Movie Scene Fade' On

Set 'Living Room Movie Scene Fade' On

Set 'Main Bath' On

Run Program 'Movie Time Stop Action' (Then Path)

Else

- No Actions - (To add one, press 'Action')

9.7.13 Program: 'Movie Time Stop Action'

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

     Run Program 'Movie Time Macro' (Else Path)

     Run Program 'Movie Playing Flag' (Else Path)

Else

  - No Actions - (To add one, press 'Action')
```

The programs Movie Time Flag and Movie Playing Flag have no conditions or actions. They simply serve as status flags. When the Then path is run, the program's status becomes True, and when the Else path is run, the program's status becomes False. Since these Flag programs have no conditions, it does not matter whether their Enabled box is checked or unchecked. The remainder of the programs must have the Enabled box checked, in order that their conditions be automatically evaluated.

When the Movie Time button is pressed (or double-pressed), the Movie Time Macro program runs its Then path, and the program's status becomes True. The Then clause contains no actions, but the program's status is used in the conditions of the following programs.

When Movie Time Macro becomes True and Movie Time Flag is False, program Movie Time Prep runs. It turns on the kitchen and theatre lights initializes the Movie Playing Flag to False, and then runs the Movie Time Prep Action program. That program then runs the Movie Time Macro Program's Else path to set that program's status back to False, and then sets the Movie Time Flag to True. The reason that these two steps must be placed in a separate program rather than in the Movie Time Prep program, is because each of these two steps changes one of the conditions of the Movie Time Prep program, and as soon as the first of these conditions is changed, that program immediately stops running, so the second step would never be executed if these steps were in that program.

The next time the Movie Time button is pressed and Movie Time Macro becomes True, Movie Time Prep will not run because Movie Time Flag is now True. Instead Movie Time Start will run, since its conditions are met. This program turns off the kitchen and theatre lights, and then runs the Movie Time Start Action program. That program then runs the Movie Time Macro Program's Else path to set that program's status back to False, and then sets the Movie Playing Flag to True. These two steps are in a separate program for the same reason as above.

The third time the Movie Time button is pressed, neither Movie Time Prep nor Movie Time Start will run because both Movie Time Flag and Movie Playing Flag are True. Instead, Movie Time Stop will run, since its conditions are met. This program turns on the kitchen, theatre and bathroom lights, and then runs the Move Time Stop Action program. That program then runs the Movie Time Macro Program's Else path to set that program's status back to False, and then sets the Movie Playing Flag back to False. These two steps are in a separate program for the same reason as above.

It should be noted that the order of the statements in each of the ... Action programs is very important. If Movie Time Prep Action set Movie Time Flag to True before setting Movie Time Macro to False, then Movie Time Start would immediately run. Similarly, if Movie Time Start Action set Movie Playing Flag to True before setting Movie Time Macro to False, Movie Time Stop would immediately run. And if Movie Time Stop Action set Movie Playing Flag to False before setting Movie Time Macro to False, then Movie Time Start would immediately run.

It can be seen that the use of the Run (If) command reduces the number of required programs, removes the requirement for special ordering of statements, simplifies the conditions within the If clause of the programs, and provides a more clear and understandable system.

9.8 Programs as Flags/Variables

9.8.1 Programs as Flags: Understanding and Using Program Status (True/False)[27]

By default, all programs and folders are False. Programs and folders will only change state when it's conditions are evaluated or, in the case of a program, when called using Run (Then) or Run (Else).

The State of a program or folder can be used as a Condition.

9.8.2 Programs as Variables: SwitchLink Emulates Countdown Timer[28]

The time increases each time the on paddle is pressed from 15, 30, 60, and 90 minutes. It maxes out at 90 minutes. You can add time after timer has been running by pressing the on paddle again.

If the timer has not already been set, a local fast on at the switch will simply turn the fan on without a timer. If a timer has been set and is running, a local fast on will not change the timer. One could program the operation of the local fast on differently if desired.

[27] (Universal Devices)
[28] (posted by user rob9)

I use two programs (Flag 1 and Flag 2) to keep track of the state of the timer.

One thing that I could not do is have the LED lights indicate the amount of time left on the timer. The SwitchLinc Relay by design will only display all LEDs on or all off.

Here are the programs.

First there are 4 programs for the 4 different timer states:

9.8.2.1Program: Fan Timer on 15 Min

```
If
        Control 'Utility Room Fan' is switched On
    And (
            Program 'Flag 1' is False
         And Program 'Flag 2' is False
        )
Then
        Run Program 'Run 15 min' (Then Path)
Else
   - No Actions - (To add one, press 'Action')
```

9.8.2.2Program: Fan Timer on 30 Min

```
If
      Control 'Utility Room Fan' is switched On
   And (
         Program 'Flag 1' is False
       And Program 'Flag 2' is True
      )
Then
      Stop program 'Run 15 min'
      Run Program 'Run 30 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.8.2.3Program: Fan Timer on 60 Min

```
If
      Control 'Utility Room Fan' is switched On
   And (
         Program 'Flag 1' is True
       And Program 'Flag 2' is False
      )
Then
      Stop program 'Run 30 min'
      Run Program 'Run 60 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.8.2.4Program: Fan Timer on 90 Min.

```
If
      Control 'Utility Room Fan' is switched On
   And (
         Program 'Flag 1' is True
       And Program 'Flag 2' is True
      )
Then
      Stop program 'Run 60 min'
      Run Program 'Run 90 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

The Flag 1 and Flag 2 programs are completely empty. Calling the Then path sets it to True and calling the Else path sets it to False. I used the flags as follows:

Flag 1	**Flag 2**	**Timer State**
False	False	Off
False	True	15 min
True	False	30 min
True	True	90 min

9.8.2.5Program: Flag 1

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

- No Actions - (To add one, press 'Action')

Else

- No Actions - (To add one, press 'Action')

9.8.2.6Program: Flag 2

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

- No Actions - (To add one, press 'Action')

Else

- No Actions - (To add one, press 'Action')

I next have the four program timers that the previous programs call:

9.8.2.7Program: Run 15 min

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Run Program 'Flag 1' (Else Path)
    Run Program 'Flag 2' (Then Path)
    Wait  15 minutes
    Run Program 'Fan Off' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.8.2.8Program: Run 30 min

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Run Program 'Flag 1' (Then Path)
    Run Program 'Flag 2' (Else Path)
    Wait  15 minutes
    Run Program 'Run 15 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.8.2.9Program: Run 60 Min

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Run Program 'Flag 1' (Then Path)
    Run Program 'Flag 2' (Then Path)
    Wait  30 minutes
    Run Program 'Run 30 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

9.8.2.10Program: Run 90 Min

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Run Program 'Flag 1' (Then Path)
    Run Program 'Flag 2' (Then Path)
    Wait  30 minutes
    Run Program 'Run 60 min' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

Lastly, I have the program that turns the fan off. This will terminate any timer if the switch is turned off locally or will turn off at end of timer countdown.

9.8.2.11Program: Fan Off

```
If
        Control 'Utility Room Fan' is switched Off
     Or Control 'Utility Room Fan' is switched Fast Off
Then
        Stop program 'Run 15 min'
        Stop program 'Run 30 min'
        Stop program 'Run 60 min'
        Stop program 'Run 90 min'
        Run Program 'Flag 1' (Else Path)
        Run Program 'Flag 2' (Else Path)
        Set 'Utility Room Fan' Off
Else
   - No Actions - (To add one, press 'Action')
```

9.8.3 Programs as Variables: ISY Restores KPL State After Power Loss[29]

This set of programs demonstrates how to 'memorize' the state of a keypad button and restore it after a power loss.

Keypad buttons can only be controlled when they are a member of a scene.

```
Scene:  sbGreen
   KPLg  as responder
```

This program will run whenever the keypad button changes state:

[29] (posted by Darrell Peters)

9.8.3.1Program: Green Status

```
If

    Status  'KPLg' is not Off

Then

    Set Program 'Green Startup On' To Run At Startup

    Set Program 'Green Startup Off' To Not Run At Startup

Else

    Set Program 'Green Startup Off' To Run At Startup

    Set Program 'Green Startup On' To Not Run At Startup
```

Since these programs have no Conditions they will only be run when called from Run At Startup or from another program.

9.8.3.2Program: Green Startup On

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    Set Scene 'sbGreen' On

Else

  - No Actions - (To add one, press 'Action')
```

Program: Green Startup Off

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

     Set Scene 'sbGreen' Off

Else

  - No Actions - (To add one, press 'Action')
```

9.9 Troubleshooting Programs

Sometimes it seems that a program does not Run when you expect it should. For testing add a Wait 2 minutes to the program in both the Then and Else sections before or during the Actions. A Wait will not execute if an Action does not follow it. Then you can check the Activity column of the Program Summary panel and it should appear as Running in red letters.

10 ISY Programming Commands Guide[30]

10.1 What are ISY Commands

The command set for the ISY is simple. It has only the commands needed to automate your INSTEON setup. Creating the code is done with the built-in editor in the ISY Administrative Console. It is not a freeform type of language, but rather a very structured language which is enforced by the editor itself. Everything is written by selecting your Commands and Arguments from GUI pull-downs, which make programming the ISY a snap. Please take time to review the command table below to further understand the syntax of this system.

- **expr** - is an expression is a combination of operators, variables, and grouping symbols (such as parentheses) arranged in a meaningful way which can be evaluated.
- **body** - is a group of commands and arguments arranged in a meaningful way which can be executed.
- **arg** - is one or more input variables to a sub-command or sub-program which are used to modify its functional behavior.
- **node** - is to be consider either a device or a scene in home automation terms.
- **provider** - is one or more of the notification message providers.

[30] (Universal Devices)

10.2 Expression Operators

- **is** - compares status
- **is not** - compares inverse status
- **>** - compares greater than status
- **<** - compares less than status

10.3 Control vs Status

- Control 'node' is switched On
  - When you use 'Control' you are testing for how it was turned on, eg. On, Fast On, Off, Fast Off etc. You see the word 'switched' to emphasize that.
  - If the action listened for occurs (eg. Fast On) then this condition activates the program (causes program to run either then or else path).

- Status 'node' is On
  - When you use 'Status' you are testing for its current brightness level.
  - If the status changes then this condition activates the program (causes program to run either then or else path).

This chart shows the difference between when the user presses a device button On vs when a scene is triggered On by a device or controller on the INSTEON network.

- Scene
  - node a (controller)
  - node b (controller)
  - node c (responder)

	Button Press (node a)	Button Press (node c)	Scene Change from (node a)	Scene Change from (node b)
Control 'node a' is switched On	true	false	true	false
Status 'node a' is On	true	false	true	true

Figure 186: Button Press Status Table

10.4 Device Intensity Level Arguments

With a device you have several options on what can be performed with them. Depending on if the device is a relay or a dimmer the ISY will provide the proper arguments for it. Here is a list of what each argument equates to.

- On/Off
  - On - sends the INSTEON "Single Tap ON" command
    - On means 100% for dimmer devices, select a Level (1-99%) if this is not the desired result.
    - On will set a Scene to it's selected levels using the ramp rates set in the scene.
  - Off - sends the INSTEON "Single Tap OFF" command
  - Fast On - sends the INSTEON "Double Tap ON" command
  - Fast Off - sends the INSTEON "Double Tap OFF" command
- Level
  - Brighten - sends the INSTEON "Hold Press BRIGHTEN" command
  - Dim - sends the INSTEON "Hold Press DIM" command
  - Fade Up - sends a INSTEON "Manual Change Level UP" command, that says active until an ISY "Fade Stop" command
  - Fade Down - sends a INSTEON "Manual Change Level DOWN" command, that says active until an ISY "Fade Stop" command
  - Fade Stop - sends a INSTEON "Manual Change Level STOP" command, which ends an active ISY "Fade Up" or ISY "Fade Down" command
- Status
  - Query - triggers the ISY to check an "ISY node" for status

10.5 ISY Commands

10.5.1 If *expr* … Then *body1* … Else *body2*

Description: The 'If' command evaluates its expression. The 'Then' and 'Else' arguments are key words to make the command easier to read. When the 'If' is true it will execute the 'Then' part of the program and when the 'If' is false it will execute the 'Else' part of the program.

Category	Arguments
Content	na

Sample Code:

```
If
    Time is  6:00:00AM
Then
    Set  Scene 'Outside Lights' Off
Else
  - No Actions - (To add one, press 'Action')
```

10.5.2 And *expr* … Or *expr*

Description: These words are expression key words that logically group together expressions. The 'And' requires both expressions to be a true result. The 'Or' requires only one expression to be a true result. The two can be used more than one time to check many different expressions.

Category	Arguments
Content	na

Sample Code:

```
If

    Status  'Closet' is On

  And Control 'Closet' is not switched Off
```

Sample Code:

```
If

    Status  'Pantry' is On

  Or  Control 'Pantry' is not switched Off
```

10.5.3 Time Is *arg*

Description: This command word is to specify an exact time for an event to occur. It has a small timeout window in which it makes sure that the event took place.

Category	Arguments
Schedule	Sunset, Sunrise, Last Run, Time

Sample Code:

```
If

    Time is  3:00:00AM
```

10.5.4 From *arg* … To *arg*

Description: The 'From' and 'To' words which are only used in pairs are for expressing a length of time.

Category	Arguments
Schedule	Sunset, Sunrise, Last Run, Time, Date, Before, After, Same Day, Next Day, (2,3,4,5,6 Days Later)

Sample Code:

```
If

    From    Sunset

    To      Sunrise (next day)
```

Sample Code:

```
If

    From    12:00:00AM on 2007/12/25

    To      12:00:00AM on 2007/12/26
```

10.5.5 From *arg* … For *arg*

Description: The 'From' and 'For' words which are only used in pairs are for expressing a length of time. The From time is the starting point and the For is the length of time it will be true.

Category	Arguments
Schedule	Sunset, Sunrise, Last Run, Time, Date, Before, After

Sample Code:

```
If

    From    Sunrise

    For     30 minutes
```

Sample Code:

```
If

    From    Last Run Time for 'New Years'

    For     1 hour and 30 minutes
```

10.5.6 On *arg*

Description: The optional 'On' word is for specifying certain days of the week. It requires that a 'From', 'To' combo or 'Time is' command to be specified. The 'Never' argument prevents the program from being evaluated, effectively commenting it out. To set 'On Never' deselect the 'All' option and deselect all seven of the days options.

Category	Arguments
Schedule	Mon, Tue, Wed, Thu, Fri, Sat, Sun, Never

Sample Code:

```
If

    On Mon, Tue, Wed, Thu, Fri

    From   Sunset

    To     Sunrise (next day)
```

Sample Code:

```
If

    On Never

    Time is  12:00:00AM
```

10.5.7 Status *'node' arg*

Description: The status command checks the current status of a node. It is true if the node meets the specified condition.

Category	Arguments
Condition	Is, Is Not, <, >, On, Off, 1% - 99%

Sample Code:

```
If

    Status  'Family Room' is On
```

10.5.8 Control *'node' arg*

Description: The control command checks for a current event of a node. It is watching for a node to be activated by the user. It becomes true when the event matches the specified condition. It has a small timeout window in which it makes sure that the event took place.

Category	Arguments
Condition	Is, Is Not, On, Off, Fast On, Fast Off, Fade Up, Fade Down, Fade Stop

Sample Code:

```
If

    Control 'Garage' is not switched Off
```

10.5.9 Program *'node' arg*

Description: The program command evaluates another program for its status.

Category	Arguments
Condition	Is, True, False

Sample Code:

```
If

    Program 'Christmas Day' is True
```

10.5.10 X-10 *'node/arg' arg*

Description: The X-10 command listens for X-10 events.

Category	Arguments
Condition	Is, Is Not, Received, X-10 Commands

Sample Code:

```
If

    X-10 'A1/On (3)' is Received
```

10.5.11 IR *'node' arg*

Description: The IR command listens for IR events.

Category	Arguments
Condition	Is, Is Not, Pressed, Double Pressed, Held, Released

Sample Code:

```
If

    IR 'Movie Time' is Pressed
```

10.5.12 Set *'node' arg*

Description: The 'Set' command sends INSTEON commands to the provided node. It also is used for setting the Query table with the latest status of a node.

Category	Arguments
Action	On, Off, Fast On, Fast Off, Brighten, Dim, Fade Up, Fade Down, Fade Stop, 1% - 99%, Query

Sample Code:

```
Then

    Set 'Bath Light' On
```

10.5.13 Set Scene *'node' arg*

Description: The 'Set Scene' is the same as the 'Set' command but sends INSTEON commands to a scene, it is an automatically displayed command when a scene node is selected.

Category	Arguments
Action	On, Off, Fast On, Fast Off, Brighten, Dim, Fade Up, Fade Down, Fade Stop, 1% - 99%, Query

Sample Code:

```
Then

    Set Scene 'All Lights' On
```

Sample Code:

```
Then

    Set Scene 'My Lighting' Query
```

10.5.14 Send X-10 *'node/arg' arg*

Description: Action The 'X-10' command executes X-10 Commands for the provided X-10 node address.

Category	Arguments
Action	X-10 Commands

Sample Code:

```
Then

    Send X-10 'A1/On (3)'
```

10.5.15 Send Notification *'provider'*

Description: The 'Send Notification' command triggers the ISY to brodcast a notice via the configured providers.

Category	Arguments
Action	To All

Sample Code:

```
Then

    Send Notification to All
```

10.5.16 Run program *'node' arg*

Description: The 'Run program' command causes the specified program to begin execution. The target program's state will become True or False as the program's Then or Else clause is executed. All normal conditions and restrictions apply; i.e. the target program will begin execution regardless of the state of its Enabled checkbox, and the target program will not begin execution if it resides within a folder tree any of whose folder's conditions are false.

Run program 'node' (If) will cause the target program's conditions to be evaluated, and the Then or Else clause to begin execution as the conditions are true or false. If the target program has no conditions, its Then clause begins execution.

Run program 'node' (Then Path) will cause the target program's Then clause to begin execution, regardless of its conditions.

Run program 'node' (Else Path) will cause the target program's Else clause to begin execution, regardless of its conditions.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Then

    Run Program 'Porch Timer' (If)

Else

    Run Program 'Porch Timer' (Then path)

Then

    Run Program 'Porch Timer' (Else path)
```

10.5.17 Stop program *'node' arg*

Description: The Stop program 'node' will cause the target program to immediately cease execution.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Else

    Stop Program 'Porch Timer'
```

10.5.18 Enable program *'node' arg*

Description: Enable program 'node' will cause the target program to become enabled.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Then

    Enable Program 'Porch Timer'
```

10.5.19 Disable program *'node' arg*

Description: Disable program 'node' will cause the target program to become disabled.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Then

    Disable Program 'Porch Timer'
```

10.5.20 Set program *'node' arg* To Run At Startup

Description: Set program 'node' To Run At Startup will cause the target program to be set to run at startup.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Else

    Set Program 'Porch Timer' To Run At Startup
```

10.5.21 Set program *'node' arg* To Not Run At Startup

Description: Set program 'node' To Not Run At Startup will cause the target program to be set to not run at startup.

Category	Arguments
Action	If, Then Path, Else Path, Stop, Enable, Disable, Set To Run At Startup, Set To Not Run At Startup

Sample Code:

```
Else

    Set Program 'Porch Timer' To Not Run At Startup
```

10.5.22 Wait *arg random*

Description: The 'Wait' command causes the program to pause for the specified amount of time (hours, minutes, seconds) before executing the next statement within the program. If the Random box is checked, the delay will be randomly chosen between zero and the specified amount of time, inclusive.

The 'Wait' command, when encountered during program execution, will cause the program's conditions to be reevaluated (see **9.5.4 Statement Execution Order**).

Category	Arguments
Action	Time, Random

Sample Code:

```
Then

    Wait 5 seconds
```

10.5.23 Repeat Every *arg*

10.5.24 Repeat For *arg* Random

10.5.25 Repeat While

Description: The 'Repeat' command causes the following statements to be repeated, up to the next Repeat command or the end of the If or Else clause. The statements to be repeated, are indented to show the extent of the Repeat loop.

Repeat Every Time causes the Repeat block to repeat every specified amount of time (hours, minutes, seconds). This form has no Random option.

Repeat For Times Random causes the Repeat block to repeat the specified number of times. If the Random box is checked, the number of repeats will be randomly chosen between zero and the specified number, inclusive.

Repeat While allows you to use variable in a loop (This applies to firmware v5 and above)

An argument of 0 times prevents the statements within the Repeat block from executing, effectively commenting them out.

The 'Repeat' command, when encountered during program execution, will cause the program's conditions to be reevaluated (see **9.5.4 Statement Execution Order**).

Category	Arguments
Action	Every, For, Time, Random

Sample Code:

```
Then
    Wait 5 seconds
```

Sample Code:

```
Else
    Repeat Every 24 hours
      Send Notification to All
```

Sample Code:

```
Then
    Repeat 3 times Random
      Set 'Overhead Light' On
      Wait 2 seconds
      Set 'Overhead Light' Off
```

Sample Code:

```
Then
    Repeat 0 times Comment out block
      Set 'Holiday Lights' On
```

Sample Code:

```
Then

    Repeat While $Int_1 > 0

     $Int_1 -= 1

      Wait 10 seconds
```

10.5.26 Comment

Description: The 'Comment' box creates a single note for the complete program. It is shown below the program in the same Program Content window pane.

Category	Arguments
Comment	na

Sample Code:

```
This is a comment for remembering some

details about a program.
```

10.6 X-10 Commands

These are the X-10 commands has been included into the ISY. They are utilized through two different ISY program commands 'X-10' and 'Send X-10'.

- All Lights Off (1)
- Status=off (2)
- On (3)
- Preset Dim (4) - Preset dimmer levels 0% to 48%. See level chart below for corresponding letter code for the desired dim level.
- All Lights On (5)
- Hail Acknowledge (6)
- Bright (7)
- Status=on (8)
- Extended Code (9)
- Status Request (10)
- Off (11)

- Preset Dim (12) - Preset dimmer levels 52% to 100%. See level chart below for corresponding letter code for the desired dim level.
- All Units Off (13)
- Hail Request (14)
- Dim (15)
- Extended Data (16)

Letter Code	Preset Dim (4)	Preset Dim (12)	Output Level (4)	Output Level (12)
M	0	16	0.00%	51.61%
N	1	17	3.23%	54.84%
O	2	18	6.45%	58.06%
P	3	19	9.68%	61.29%
C	4	20	12.90%	64.52%
D	5	21	16.13%	67.74%
A	6	22	19.35%	70.97%
B	7	23	22.58%	74.19%
E	8	24	25.81%	77.42%
F	9	25	29.03%	80.65%
G	10	26	32.26%	83.87%
H	11	27	35.48%	87.10%
K	12	28	38.71%	90.32%
L	13	29	41.94%	93.55%
I	14	30	45.16%	96.77%
J	15	31	48.39%	100.00%

Figure 187: X-10 Commands Included in ISY

11 Example ISY Programs

11.1 Calendar Date Programs

11.1.1 Generic Calendar Using Programs and Variables[31]

11.1.1.1 The Basic Idea of this Series of Programs

ISY's date function is a bit limited. As the firmware currently supports, there is no direct way to use it for recurring events except related to day of the week. For example, you can have something happen every Monday, or every Monday and Tuesday, but you can't set up something to run on the third Tuesday of every month, or every 3 rd day, or on even days of the month, or every July 4th, I think you get the idea.

Working outside the built-in firmware, a series of programs using the variable function can solve this problem. The following series of programs starts off with a single program that triggers at midnight and then cascades through a series of additional programs using "run if", "run then", and "run else" commands. These programs update a set of variables each day

[31] (Universal Devices)

including the current day, day of month, day of year, month, year, and week of month. In addition, there are counters which follow an every other, every third, every fourth, and every fifth day schedule. Also, there is a program that sets a variable according to whether it is an even day or an odd day. Finally, a series of programs sets a variable to 1 on several US holidays. Some of these programs can be expanded upon including the holiday series or every x number of days or weeks programs to suit your needs.

As an aside here, you may wonder why these programs don't all just run with their own triggers rather than start with a single program and cascade off of that as they do. The main reason is that the order of calculation is critical for many of these variables. When one variable is calculated from the updated value of another variable, that first variable must obviously be calculated first. The only way to be certain that one operation occurs, in order, prior to another, is to have them run, in order, in a single "then" or "else" clause. A single "then" or "else" clause always runs from top to bottom in order. If it is impossible to put everything in a single clause, then you must have the first program send you to a second program using a "run xxx" statement. Because of the way ISY operates, there is no guarantee that two programs which trigger on their own will actually run in any particular order to completion. If one program triggers at 1:00:00 and another triggers at 1:00:01, the program that runs at 1:00:01 may catch up to or pass the 1:00:00 program. But if a line of one program includes a "run if" of another program, you know that the second program will not do anything until every statement in the first program preceding the "run if" has completed.

11.1.1.2The Variables

There are a number of variables that need to be created by the user. By convention, variables that have an “i” to start the name are integer variables and an “s” indicates a state variable. This is only for ease of identification when writing and editing programs.

- **iDay.of.Year** starts with 1 on Jan 1 and counts to 365 (or 366 on leap year). This variable is a less used variable that is mostly included for completeness as it is rare that someone needs to know what day of the year it is.
- **iDay.of.Month** is how many days into the month we are (i.e. the 5th of the month).
- **iYear** is simply the current year.
- **iLeap.Year** counts 0,1,2,3,0,1,2,3, etc. where 0 means that we are in a leap year. This is primarily a variable used to keep the other variables in check since rarely do people have cause to include this directly in a program.
- **iDay.of.Week** starts with 1 on Monday and counts through to 7 on Sunday. This variable is used to cross check the status of the variables against ISY’s internal day of week function so as to alert you if it gets out of sync. You do not need this variable since ISY has this function built-in but you can choose to use it instead of the ISY’s built-in day function and get the same result.
- **iMonth** is simply the current month starting with 1 for Jan.
- **iDay.Counter** gets one number higher every day without regard to the start of a new month or year. The primary purpose of this variable is to serve as a basis for

every x number of days/weeks variables since those programs require a reference that always increases by one each day. I have arbitrarily used MS Excel's system of setting Jan 1, 1900 equal to day one and then counting from there. This offered an opportunity to test these programs well into the future and have a reference to check the values against.

- **iEver.xxx.Counter** starts with 0 and counts up to x-1. For example, **iEvery.Fourth.Day.Counter** cycles through 0,1,2,3,0,1,2,3,etc. If today the variable was equal to 1 and you wanted to start watering your lawn tomorrow continuing every 4th day after that, set your program to water when the variable is 2.
- **iWeek.of.Month** starts with 1 on the first day of the month and increases by 1 every 7 days until the next month starts. So if you wanted something to happen on the second Tuesday of each month, set it to occur on Tuesdays when **iWeek.of.Month** is equal to 2.
- **iWeek.Counter** counts the number of weeks since Jan 1, 1900. The purpose of this variable is to calculate every x weeks programs as there is likely no value in knowing how many weeks have passed since Jan 1, 1900. This value is produced by dividing **iDay.Counter** by 7.
- **i.Every.xxx.Week** programs start at 0 and count to x-1. This works the same as the **iEvery.xxx.Day.Counter** programs except it is for weeks.
- **iOdd.Even.Day** sets to 0 on even days and 1 on odd days of the month. This is useful in communities with watering restrictions limiting certain addresses to water on even or odd days of the month.
- **iHoliday** sets to 1 on the listed holidays and 0 on all other days. Feel free to add your own holidays. I use this value to shut down wake-up alarms.
- **iSync** is a variable whose purpose is to test the status of this set of programs against the ISY's internal day of week function. An email is triggered if the two are out of sync. If this variable is correct, it is quite safe to assume all of the variables are correct.
- The **sVariables** are simply the same value of the corresponding **iVariables** copied over to the state variable side. The purpose of this is so that you can use them as program "triggers". You can certainly add more to the list as you see fit.

11.1.1.3Setting Up The Programs

- The first step is to setup the variables. The variables do not load automatically with the programs. There is at present no way to import variable setups so you must do it manually. The screen captures at the bottom of this page show you all of the locations for the variables. Please note that there are a number of variables in that screen capture that are not part of this series of programs. Please just skip over those id locations or use them for other applications. You must enter the listed variables into ISY AT THE SAME ID LOCATION AS SHOWN. ISY programs reference the id location NUMBER, not the name. The name you enter in the name column is shown in the program for convenience only. Because I wrote these programs and then worked on some other programs, and then came back to these programs, there are some intervening variables which you need not concern yourself with, except to

know that they must be skipped over until you get back to the correct ID number location. If you have already used some of the variable locations for other programs, you must either redirect your current program to another ID location or redirect the appropriate variables from these programs to new ID locations. You are free to change the names if you like so long as you understand what it represents.

- Import the programs or undertake the task of manually entering the programs. Please observe the screen captures to see how I set up the folder architecture. You are certainly free to do it differently, but keeping the programs organized this way is helpful. Here is a link to a zipped version of the file. Please unzip the file first and then import it. http://www.universal-devices.com/programs/calendar/mmddyyyy.zip
- Set the start values. You must set the current date including day of month, day of year, month, day of week, year, and leap year and leap year (0 for leap year, 1 for the year after a leap year, etc.) variables to the correct values. If you would like to stay true to the day counter starting with 1 on Jan 1, 1900 then you need to cross reference that number to MS Excel. This is an arbitrary decision on your part as any number would actually work. All of the other variables are calculated from those values and will settle in when the programs run at midnight. The "init" values need not be set as they will automatically populate at the midnight run time (unless you reboot your ISY prior to that time in which case all of the values will be lost).
- Go to the Configuration Tab, System sub tab, System box and Uncheck the box next to "Catch up Schedules at Restart". Not doing so will cause your ISY to run these programs every time the ISY is rebooted pushing it one day into the future which in most cases will be an error. Missed schedule grace period should be left at 15 minutes.
- Setup the email at ID location number 1 to whom you want the email sent and what you would like the content to be in the event that the ISY's day of week becomes out of sync with the day of week calculated by these programs. It is assumed that if this variable is accurate, all of the others will be as well. Furthermore, it is the only thing that is possible for ISY to test on its own.

11.1.1.4Potential Pitfalls

The primary reason for a fault is a power failure or otherwise taking the ISY offline. If the ISY is continuously not operating between 12 midnight and 12:15 am the programs will fall one day behind. To manually push the programs one day forward, right click on "Advance Day" program and click "run then". You can do this repeatedly to advance several days forward. The ISY was tested by me to function properly through the year 2015. I did not actually run the program any further out than that but I have no reason to believe it should fail. It is designed to run correctly for several hundred years before the leap year issue no longer is accurate. I trust that will not cause you any inconvenience. At the time of this writing, these programs have been up and running real time for about 4 months without error. Based on this and my tests running these programs through to 2015 in "fake time" I suspect there are no errors.

11.1.1.5The Programs

Advance Day: This program is the "trigger". Meaning that the "if" clause contains the only trigger event starting the entire cascade of programs. If you manually initiate a "run then" of this program, all of the programs will run and it will push the entire series of programs one day into the future.

```
If

    Time is 12:00:00AM

Then

    Run Program 'Day of Month Advance' (If)

Else

  -No Actions - (To add one, press 'Action')
```

Day of Month Advance: This program advances the day of month forward one day making sure to move back to "1" at the start of a new month. It also is the main trigger for many of the other programs.

```
If

   (

      $iDay.of.Month < 31

    And (

         $iMonth is 1

       Or $iMonth is 3

       Or $iMonth is 5

       Or $iMonth is 7

       Or $iMonth is 8

       Or $iMonth is 10

       Or $iMonth is 12

      )
```

```
    )
  Or (
      $iDay.of.Month < 30
    And (
        $iMonth is 4
      Or $iMonth is 6
      Or $iMonth is 9
      Or $iMonth is 11
      )
    )
  Or (
      $iDay.of.Month < 29
    And $iMonth is 2
    And $iLeap.Year is 0
    )
  Or (
      $iDay.of.Month < 28
    And $iMonth is 2
    And $iLeap.Year > 0
    )
Then
  $iDay.of.Month += 1
  $iDay.of.Month Init To $iDay.of.Month
```

```
    $sDay.of.Month Init To $iDay.of.Month
    $sDay.of.Month  = $iDay.of.Month
    Run Program 'Day of Week' (If)
    Run Program 'Month Advance' (If)
    Run Program 'Month Reset' (If)
    Run Program 'Week of Month' (Then Path)
    Run Program 'Ever X Weeks' (Then Path)
    Run Program 'Odd Even Day' (Then Path)
    Run Program 'Holiday reset' (Then Path)
Else
    $iDay.of.Month  = 1
    $iDay.of.Month Init To 1
    $sDay.of.Month Init To $iDay.of.Month
    $sDay.of.Month  = $iDay.of.Month
    Run Program 'Day of Week' (If)
    Run Program 'Month Advance' (If)
    Run Program 'Month Reset' (If)
    Run Program 'Week of Month' (Then Path)
    Run Program 'Ever X Weeks' (Then Path)
    Run Program 'Odd Even Day' (Then Path)
    Run Program 'Holiday reset' (Then Path)
```

Odd Even Day: This program sets a variable to 0 or 1 based on the odd or even nature of the current day of month.

```
If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    $iOdd.Even.Day  = $iDay.of.Month

    $iOdd.Even.Day %= 2

    $iOdd.Even.Day Init To $iOdd.Even.Day

Else

- No Actions - (To add one, press 'Action')
```

Day of Week

```
If
   $iDay.of.Week < 7
Then
   $iDay.of.Week += 1
   $iDay.of.Week Init To $iDay.of.Week
   $sDay.of.Week Init To $iDay.of.Week
   $sDay.of.Week  = $iDay.of.Week
   Run Program 'Day of year Advance' (If)
Else
   $iDay.of.Week  = 1
   $iDay.of.Week Init To 1
   $sDay.of.Week Init To $iDay.of.Week
   $sDay.of.Week  = $iDay.of.Week
   Run Program 'Day of year Advance' (If)
```

Day of Year Advance: This program counts from 1 to 365 (or 366) as the year progresses.

```
If
   (
      $iDay.of.Year < 365
    And $iLeap.Year > 0
   )
 Or (
      $iDay.of.Year < 366
```

```
      And $iLeap.Year is 0
    )
Then
    $iDay.of.Year += 1
    $iDay.of.Year Init To $iDay.of.Year
    $sDay.of.Year Init To $iDay.of.Year
    $sDay.of.Year  = $iDay.of.Year
    Run Program 'Every x Day Counter' (Then Path)
    Run Program 'Year' (If)
Else
    $iDay.of.Year  = 1
    $iDay.of.Year Init To 1
    $sDay.of.Year  = $iDay.of.Year
    $sDay.of.Year Init To $iDay.of.Year
    Run Program 'Every x Day Counter' (Then Path)
    Run Program 'Year' (If)
```

Every X Day Counter: This program divides the day counter value (this value increases by one every day without ever resetting) by either 2,3,4, or 5 and then sets the remainder as the value of the variable. You could easily add additional lines to this program for any other count of repeating days.

```
If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

   $iDay.Counter += 1

   $iEvery.Other.Day.Counter  = $iDay.Counter

   $iEvery.Thrid.Day.Counter  = $iDay.Counter

   $iEvery.Fourth.Day.Counter  = $iDay.Counter

   $iEvery.Fifth.Day.Counter  = $iDay.Counter

   $iEvery.Other.Day.Counter %= 2

   $iEvery.Thrid.Day.Counter %= 3

   $iEvery.Fourth.Day.Counter %= 4

   $iEvery.Fifth.Day.Counter %= 5

   $iDay.Counter Init To $iDay.Counter

   $iEvery.Other.Day.Counter Init To  $iEvery.Other.Day.Counter

   $iEvery.Thrid.Day.Counter Init To $iEvery.Thrid.Day.Counter

   $iEvery.Fourth.Day.Counter Init To $iEvery.Fourth.Day.Counter

   $iEvery.Fifth.Day.Counter Init To $iEvery.Fifth.Day.Counter

Else

- No Actions - (To add one, press 'Action')
```

Christmas: This and the following holiday programs set a variable to 1 on the given holiday and back to zero for any other day. New programs should be added by the user for other holidays that they may want to include. Or you could write additional programs that are structured the same but set a different variable depending on the type of holiday. These are national holidays that most people have off of work which would have a very direct impact on how you would want your programs to function. Other holidays might be different. Or, you may live in Canada.

```
If
   $iMonth is 12
 And $iDay.of.Month is 25
Then
   $iHoliday  = 1
Else
- No Actions - (To add one, press 'Action')
```

Holiday Reset: This sets the holiday variable to 0, then triggers the programs that would set it to 1 on a holiday. Make sure to add any new holiday programs you write to the "then" section.

```
If
- No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
   $iHoliday  = 0
   Run Program 'Christmas' (If)
   Run Program 'Labor Day' (If)
   Run Program 'Memorial Day' (If)
   Run Program 'New Years Day' (If)
   Run Program 'Thanksgiving' (If)
Else
```

```
- No Actions - (To add one, press 'Action')
```

Labor Day

```
If
    $iDay.of.Week is 1
 And $iWeek.of.Month is 1
 And $iMonth is 9
Then
    $iHoliday  = 1
Else
- No Actions - (To add one, press 'Action')
```

Memorial Day

```
If
    $iDay.of.Week is 1
 And $iMonth is 5
 And (
        (
            $iWeek.of.Month is 4
         And $iDay.of.Month > 24
        )
       Or (
            $iWeek.of.Month is 5
         And $iDay.of.Month > 24
        )
```

```
    )
Then
    $iHoliday  = 1
Else
- No Actions - (To add one, press 'Action')
```

New Years Day

```
If
    $iDay.of.Month is 1
 And $iMonth is 1
Then
    $iHoliday  = 1
Else
- No Actions - (To add one, press 'Action')
```

Thanksgiving

```
If
    (
        $iDay.of.Week is 4
      Or $iDay.of.Week is 5
    )
 And $iWeek.of.Month is 4
 And $iMonth is 11
Then
    $iHoliday  = 1
```

```
Else

- No Actions - (To add one, press 'Action')
```

Leap Year Calculator: This rolls a variable from 0 through 3 depending on where we are in the leap year cycle. 3 is a leap year. The year 2100 is a special year in that it is not a leap year despite being at that point in the 4 year cycle. The next year like this isn't for several hundred years.

```
If

    $iDay.of.Year is 1

 And $iYear is not 2100

Then

    $iLeap.Year  = $iYear

    $iLeap.Year %= 4

    $iLeap.Year Init To $iLeap.Year

Else

- No Actions - (To add one, press 'Action')
```

Month Advance

```
If

    $iDay.of.Month is 1

 And $iMonth < 12

Then

    $iMonth += 1

    $iMonth Init To $iMonth

    $sMonth Init To $iMonth

    $sMonth  = $iMonth
```

```
Else

- No Actions - (To add one, press 'Action')
```

Month Reset

```
If

    $iDay.of.Month is 1

 And $iMonth is 12

Then

    $iMonth  = 1

    $iMonth Init To 1

    $sMonth  = 1

    $sMonth Init To 1

Else

- No Actions - (To add one, press 'Action')
```

Friday: This and the following day programs check the current day of week as calculated by these programs against the day of week by ISY's internal calendar and reports any issues.

```
If

    On Fri

    Time is  1:00:00AM

Then

    $iSync  = 5

    Run Program 'Sync email alert' (If)

Else

- No Actions - (To add one, press 'Action')
```

Monday

```
If
   On Mon
   Time is  1:00:00AM
Then
   $iSync  = 1
   Run Program 'Sync email alert' (If)
Else
- No Actions - (To add one, press 'Action')
```

Saturday

```
If
   On Sat
   Time is  1:00:00AM
Then
   $iSync  = 6
   Run Program 'Sync email alert' (If)
Else
- No Actions - (To add one, press 'Action')
```

Sunday

```
If

   On Sun

   Time is  1:00:00AM

Then

   $iSync  = 7

   Run Program 'Sync email alert' (If)

Else

- No Actions - (To add one, press 'Action')
```

Sync email alert

```
If

   $iSync is not $iDay.of.Week

Then

   Send Notification to 'dr-apo' content 'Out of Sync'

Else

- No Actions - (To add one, press 'Action')
```

Thursday

```
If
   On Thu
   Time is  1:00:00AM
Then
   $iSync  = 4
   Run Program 'Sync email alert' (If)
Else
- No Actions - (To add one, press 'Action')
```

Tuesday

```
If
   On Tue
   Time is  1:00:00AM
Then
   $iSync  = 2
   Run Program 'Sync email alert' (If)
Else
- No Actions - (To add one, press 'Action')
```

Wednesday

```
If

   On Wed

   Time is  1:00:00AM

Then

   $iSync  = 3

   Run Program 'Sync email alert' (If)

Else

- No Actions - (To add one, press 'Action')
```

Ever X Weeks: This works the same as the every x days programs but counts weeks instead of days.

```
If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

   $iWeek.Counter  = $iDay.Counter

   $iWeek.Counter /= 7

   $iEvery.Other.Week  = $iWeek.Counter

   $iEvery.Other.Week %= 2

   $iEvery.Thrid.Week  = $iWeek.Counter

   $iEvery.Thrid.Week %= 3

   $iEvery.Fourth.Week  = $iWeek.Counter

   $iEvery.Fourth.Week %= 4

   $iEvery.Fourth.Week Init To $iEvery.Fourth.Week
```

```
    $iEvery.Thrid.Week Init To $iEvery.Thrid.Week
    $iEvery.Other.Week Init To $iEvery.Other.Week
    $iWeek.Counter Init To $iWeek.Counter
Else
- No Actions - (To add one, press 'Action')
```

Week of Month

```
If
- No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    $iWeek.of.Month  = $iDay.of.Month
    $iWeek.of.Month -= 1
    $iWeek.of.Month /= 7
    $iWeek.of.Month += 1
    $sWeek.of.Month  = $iWeek.of.Month
    $sWeek.of.Month Init To $iWeek.of.Month
    $iWeek.of.Month Init To $iWeek.of.Month
Else
- No Actions - (To add one, press 'Action')
```

Year

```
If
    $iDay.of.Year is 1
Then
    $iYear += 1
    $iYear Init To $iYear
    $sYear  = $iYear
    $sYear Init To $iYear
    Run Program 'Leap year calculator' (If)
Else
- No Actions - (To add one, press 'Action')
```

11.1.1.6Screen Captures to Help You Get The Variables Setup at The Proper ID Location

Figure 188: Integer Variables

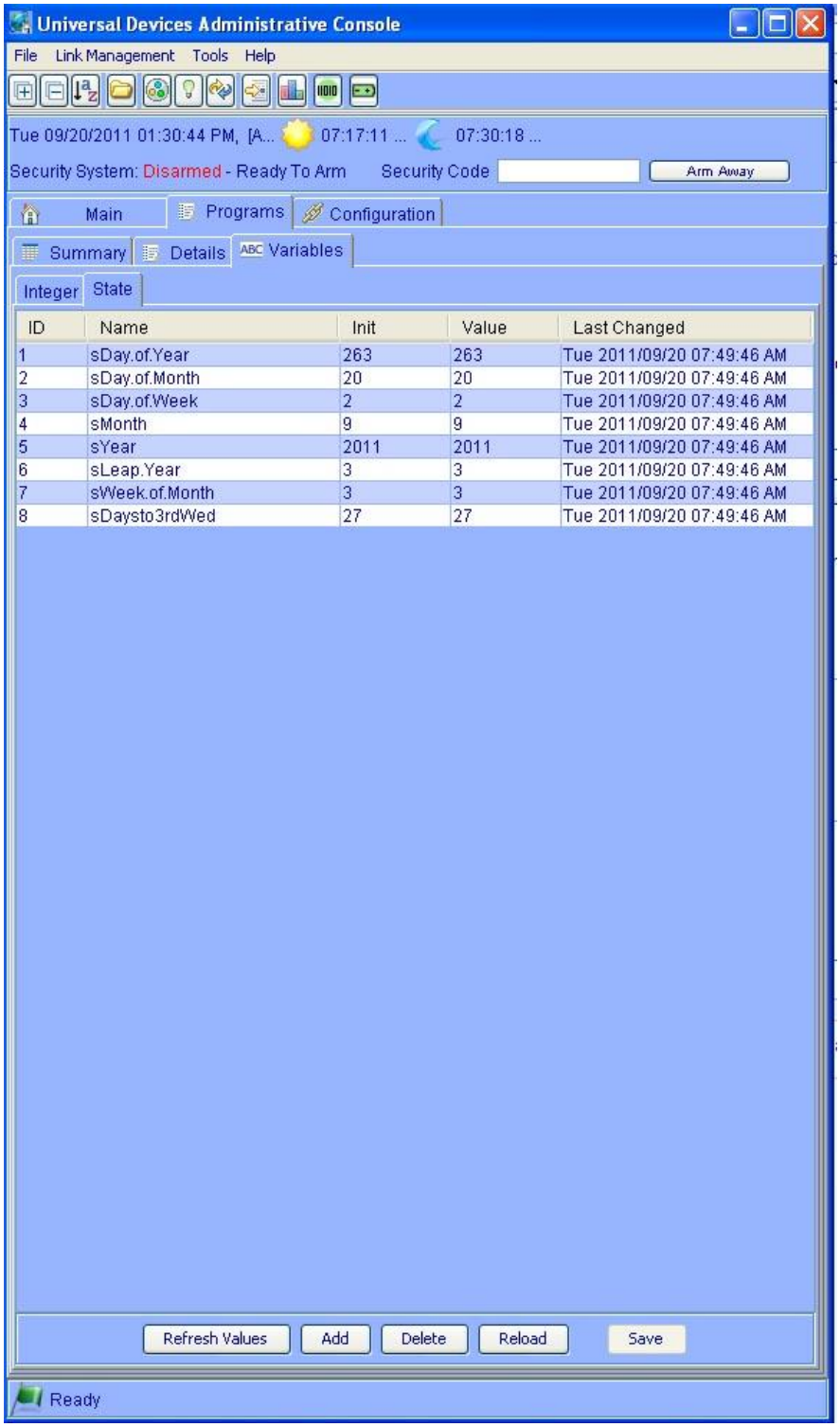


Figure 189: State Variables

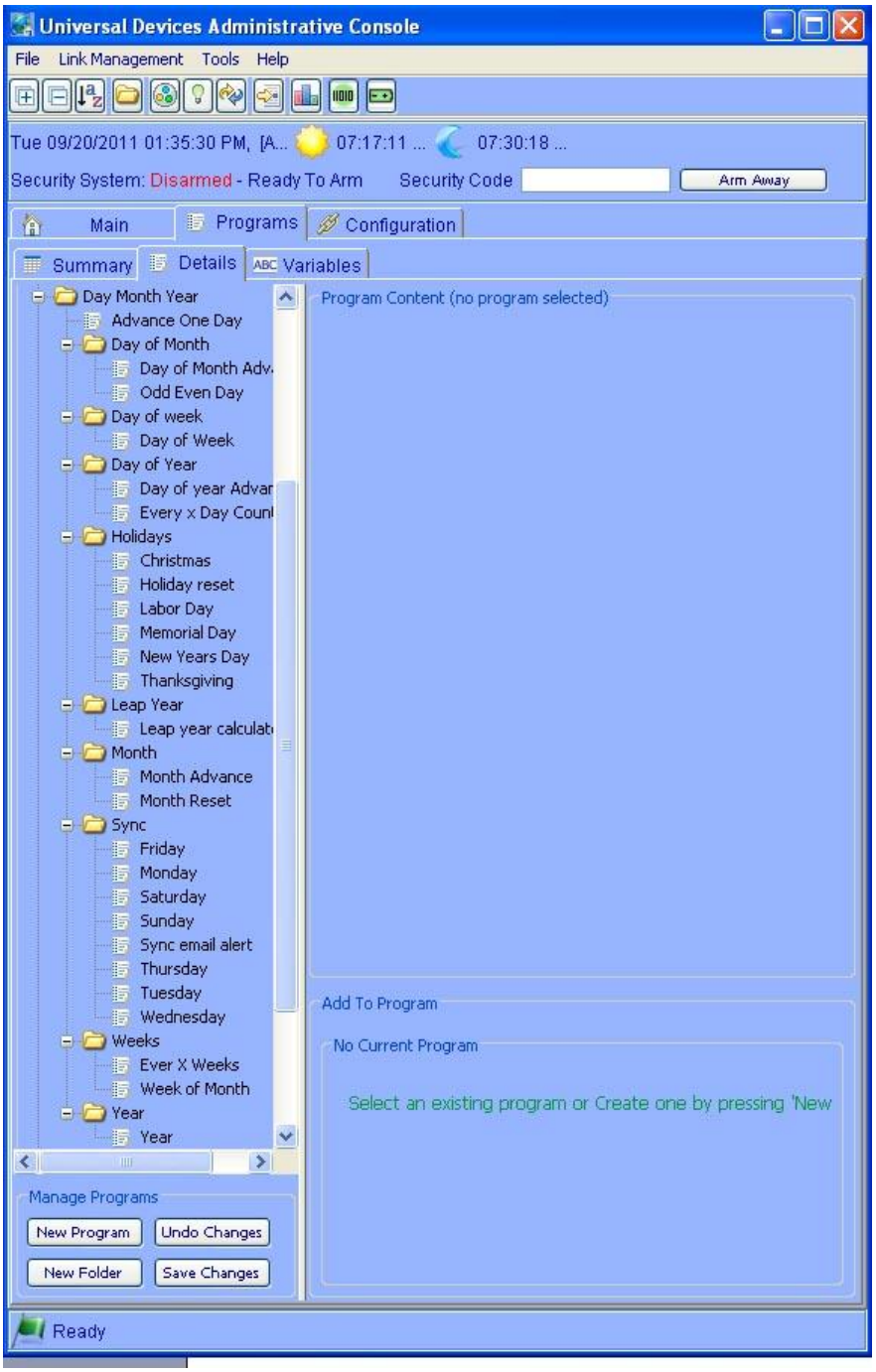


Figure 190: Programs and Folders

11.1.2 Canadian Calendar Programs

Following is a series of programs to be used for dates. You will need to modify them for the years desired. You may also add any **Then** or **Else** functionality required.

11.1.2.1New Year's Day

```
If
    From 12:00:00AM on 2018/01/01
    For 24 hours
Then
    - No Actions - (To add one, press 'Action' )
Else
    - No Actions - (To add one, press 'Action' )
```

11.1.2.2Family Day (British Columbia)

Replace **From** statement in sample code with the following text:

```
    From 12:00:00AM on 2018/02/12
```

11.1.2.3Family Day (Alberta, New Brunswick, Ontario, Saskatchewan)

Replace **From** statement in sample code with the following text:

```
    From 12:00:00AM on 2018/02/19
```

11.1.2.4Nova Scotia Heritage Day (Nova Scotia)

Replace **From** statement in sample code with the following text:

```
    From 12:00:00AM on 2018/02/19
```

11.1.2.5Louis Riel Day (Manitoba)

Replace **From** statement in sample code with the following text:

```
    From 12:00:00AM on 2018/03/19
```

11.1.2.6St. Patrick's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/03/19
```

11.1.2.7Good Friday

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/03/30
```

11.1.2.8Easter Monday

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/04/02
```

11.1.2.9St. George's Day (Newfoundland, Labrador)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/04/23
```

11.1.2.10Mother's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/05/13
```

11.1.2.11National Patriot's Day (Quebec)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/05/21
```

11.1.2.12Victoria Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/05/21
```

11.1.2.13Father's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/06/17
```

11.1.2.14National Aboriginal Day (Northwest Territories, Yukon)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/06/21
```

11.1.2.15Discovery Day (Newfoundland, Labrador)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/06/25
```

11.1.2.16The National Holiday of Quebec (Quebec)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/06/25
```

11.1.2.17Canada Day (Nova Scotia)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/07/01
```

11.1.2.18Canada Day (observed – all provinces except Nova Scotia)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/07/02
```

11.1.2.19Nunavut Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/07/09
```

11.1.2.20Orangeman's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/07/09
```

11.1.2.21Civic Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/08/06
```

11.1.2.22Civic Holiday (Ontario)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/08/06
```

11.1.2.23Heritage Day (Alberta)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/08/06
```

11.1.2.24Discovery Day (Yukon)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/08/20
```

11.1.2.25Labour Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/09/03
```

11.1.2.26Thanksgiving

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/10/08
```

11.1.2.27Remembrance Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/11/11
```

11.1.2.28Remembrance Day (observed)

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/11/12
```

11.1.2.29Christmas Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/12/25
```

11.1.2.30Boxing Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/12/26
```

11.1.3 United States Calendar Programs

Following is a series of programs to be used for dates. You will need to modify them for the years desired. You may also add any **Then** or **Else** functionality required.

11.1.3.1New Year's Day

```
If
    From 12:00:00AM on 2018/01/01
    For 24 hours
Then
    - No Actions - (To add one, press 'Action' )
Else
    - No Actions - (To add one, press 'Action' )
```

11.1.3.2Martin Luther King Jr. Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/01/15
```

11.1.3.3Presidents' Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/02/19
```

11.1.3.4St. Patrick's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/03/19
```

11.1.3.5Good Friday

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/03/30
```

11.1.3.6Easter Monday

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/04/02
```

11.1.3.7Emancipation Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/04/16
```

11.1.3.8Mother's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/05/13
```

11.1.3.9Memorial Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/05/28
```

11.1.3.10Father's Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/06/17
```

11.1.3.11Independence Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/07/04
```

11.1.3.12Labor Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/09/03
```

11.1.3.13Columbus Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/10/08
```

11.1.3.14Veterans Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/11/12
```

11.1.3.15Thanksgiving

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/11/22
```

11.1.3.16Day after Thanksgiving

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/11/23
```

11.1.3.17Christmas Day

Replace **From** statement in sample code with the following text:

```
From 12:00:00AM on 2018/12/25
```

11.2 Fan Timer Programs

11.2.1 Bathroom Fan Control Solution example #1[32]

Here is a simple setup to put a flexible timer system on your bathroom exhaust fan.

The objective is to let the fan run for a period of time after use, but to ensure that it shuts off in in a reasonable amount of time regardless.

The bathroom (in this case our man bathroom) has a fan and a light. They are separately switched with Insteon devices.

[32] (posted by: jrainey)

The light switch is pressed into the job of 'occupancy detector' i.e. if the light is on it is assumed that the bathroom is occupied.

Goals of the program as as follows:

- provide a single place to set the timeout value
- start the timer when the fan is turned off
- keep the fan running if the light is on
- shut off the fan after the initial time out (with no light on) OR the full time ot time after the light has been switched off

Four programs combine to implement this:

1. MBFanSwON - Executes the timer. Is initiated when the fa is switched on - passes control to a check program when te timeout is reached
2. MBFanCheck - Checks the status of the light and either keeps the fan running or shuts the system down
3. MBLightSwOFF - Resets the timer to allow full run time before shut down
4. MBFanSwOFF - Shuts down the fan and stops the timer.

11.2.1.1Program: MBFanSwON

Main Bathroom Fan Switch On

```
If

    Control 'BedAndbath / ~Devices / Main Bathroom Fan SW' is switched On

Then

    Wait  10 minutes

    Run Program 'MBFanCheck' (If)

Else

  - No Actions - (To add one, press 'Action')
```

A timer is started when the fan is turned on. When it times out control is passed to s check program to determine the next action.

This program is the central location to change the length of the fan run time - in this case it is set to 10 minutes

11.2.1.2Program: MBFanCheck

Main Bathroom Fan Check - Please take note of the comment that the program must be disabled

```
If

    Status  'BedAndbath / ~Devices / Main Bathroom Light SW' < 20%

Then

    Run Program 'MBFanSwOFF' (Then Path)

Else

    Run Program 'MBFanSwON' (Then Path)
```

Note that this program must be set to DISABLED. if it isn't it will shut down the fan immediately when the light is turned off.

When called by the timer program, the status of the light is checked.

if the light is OFF the shut down program is called.

If the light is ON the timer program is called again.

11.2.1.3Program: MBLightSwOFF

Main Bathroom Light Switch Off

```
If
      Control 'BedAndbath / ~Devices / Main Bathroom Light SW' is switched Off
   And Status  'BedAndbath / ~Devices / Main Bathroom Fan SW' is On
Then
      Stop program 'MBFanSwON'
      Run Program 'MBFanSwON' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

Resets the timer if it is running. Only runs if the light is switched off while the fan is running

This avoids starting the timer program if the fan is not running

11.2.1.4Program: MBFanSwOFF

Main Bathroom Fan Switch Off

```
If
      Status  'BedAndbath / ~Devices / Main Bathroom Fan SW' is Off
 Then
      Stop program 'MBFanSwON'
      Set 'BedAndbath / ~Devices / Main Bathroom Fan SW' Off
 Else
  - No Actions - (To add one, press 'Action')
```

The then action is to stop the timer program and shut down the fan.

this action is called by turning the switch off or after a time out when the light is either not turned on or turned off when the fan is running.

The goal of this is to ensure that the timer program is stopped whenever the fan is stopped.

11.2.2 Bathroom Fan Control Solution example #2[33]

For my bathroom fan I set up three programs that provide a simple timer that will run the fan for 10 minutes for each time the ON switch is pressed.

First I created a STATE variable: sMasterBathFan with an initial value of 0.

The first program adds 1 to the state variable each time the on button is pressed:

11.2.2.1Program: MBA Fan - On

```
If

    Control 'MBA Exhaust Fan' is switched On

Then

    $sMasterBathFan += 1

Else

  - No Actions - (To add one, press 'Action')
```

[33] (posted by: jaysmc)

Then a program to zero the variable if the off button is pressed:

11.2.2.2Program: MBA Fan - Off

```
If

    Control 'MBA Exhaust Fan' is switched Off

Then

    $sMasterBathFan  = 0

Else

  - No Actions - (To add one, press 'Action')
```

And a control program that will decrement the variable by 1 every 10 minutes and turn the fan off when the variable is 0:

11.2.2.3Program: MBA Fan - Control

```
If

    $sMasterBathFan > 0

Then

    Wait  10 minutes

    $sMasterBathFan -= 1

Else

    Set 'MBA Exhaust Fan' Off
```

11.3 Garage Door Programs

11.3.1 Garage Door Notification Program[34]

I use a few programs. One to do each job. My control is not connected but lines could be inserted very easily.

Here is the 4 hour allowance for a garage door left open calling the one below.

11.3.1.1Program: Garage Door Open.carHome

```
If
      'Garage / Garage Door.closed' Status is Off
   And $sTag1.outOfRange is $cFALSE
Then
      Wait  4 hours
      Run Program 'Garage Door Open.carGone' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

[34] (posted by: larryllix)

Here is one for when I first get home or the above program calls to notify us.

11.3.1.2Program: Garage Door Open.carGone

```
If
    'Garage / Garage Door.closed' Status is Off
  And $sTag1.outOfRange is $cTRUE
  And $sHouse.occupied is $cFALSE
Then
    Wait  5 minutes
    Enable Program 'Garage Door Closed.notify'
    Send Notification to 'Text  Larry' content 'Garage Door Open'
    Send Notification to 'Text Jackie' content 'Garage Door Open'
    Wait  20 seconds
    Send Notification to 'eMail Larry' content 'Garage Door Open'
    Send Notification to 'eMail Jackie' content 'Garage Door Open'
Else
  - No Actions - (To add one, press 'Action')
```

Happens when first arriving home so 5 minutes are allowed to trigger an MS to cancel notifications.

Here is another that notifies us inside the house when the door is open.

It saves the existing lamp brightness (takes v5) flashes the bulb (red) and then restores it to previous levels once closed again.

11.3.1.3Program: Garage Door Open.home

```
If
    'Garage / Garage Door.closed' Status is not On
  And $sHouse.occupied is $cTRUE
Then
    Wait  20 seconds
    $BufCornerLamp.level  = 'Gathering Room / ML2 / BufCornerLamp' Status %
    $BufCornerLamp.colour  = 'Gathering Room / ML2 / BufCornerLamp' Color
    Set 'Gathering Room / ML2 / BufCornerLamp' to 100%, color '$cZ.RED.ML Index'
    Repeat 400 times
      Set 'Gathering Room / ML2 / BufCornerLamp' On
      Wait  2 seconds
      Set 'Gathering Room / ML2 / BufCornerLamp' Off
      Wait  8 seconds
    Repeat 1 times
      Run Program 'Garage Door Open.home' (Else Path)
Else
    Wait  10 seconds
    Set 'Gathering Room / ML2 / BufCornerLamp' to '$BufCornerLamp.level %', color
'$BufCornerLamp.colour Index'
    $GathRm_Mode.scratchpad  = $sGathRm.colours
    $sGathRm.colours  = -1
    $sGathRm.colours  = $GathRm_Mode.scratchpad
```

Wait time must excede Just.Home lighting in GathRm using same light.

Here is one that indicates the door position on the Mudroom KPL LED.

11.3.1.4Program: Garage Door Open.LED

```
If
    'Garage / Garage Door.closed' Status is Off
Then
    Wait  1 second
    Set Scene 'Mudroom / MudRm kpl.LED.A' On
Else
    Wait  1 second
    Set Scene 'Mudroom / MudRm kpl.LED.A' Off
```

I have discovered that I can let ISY do a lot of the work with it's trigger based engine. Insteon protocols are the slowdown with HA not the ISY CPU.

11.4 Irrigation Timer Programs

11.4.1 Auto Irrigation Program[35]

This runs irrigation based on the WeatherBug's Rain Today information.

[35] (Universal Devices)

11.4.1.1Program: Var_RainInPast36Hours

This is an empty flag program. It is set and managed by two programs Weather_RainCountdown and Weather_RainFall.

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

11.4.1.2Program: Weather_RainCountdown

When triggered, it sets the Var_RainInPast36Hours program to true, waits for 36 hours, then sets the same to false. The countdown program is broken out into another program because the first program was stopping during the Wait portion whenever WeatherBug reported Rain Today as zero inches (because the conditions were being re-evaluated). This way the countdown should run uninterrupted for 36 hours.

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    Run Program 'Var_RainInPast36Hours' (Then Path)

    Wait 36 hours

    Run Program 'Var_RainInPast36Hours' (Else Path)

Else

  - No Actions - (To add one, press 'Action')
```

11.4.1.3Program: Weather_RainFall

It restarts the countdown each time WeatherBug reports that Rain Today is greater than zero inches:

```
If

    Module 'Climate' Rain Today is not 0 "

Then

    Stop program 'Weather_RainCountdown'

    Run Program 'Weather_RainCountdown' (Then Path)

Else

  - No Actions - (To add one, press 'Action')
```

11.4.1.4Program: Var_TempBelow40

This is an empty flag program. It is set and managed by one program Weather_TempBelow40Check.

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

11.4.1.5Program: Weather_TempBelow40Check

Checks the temp and updates the flag program. This program is updated each time the WeatherBug module updates.

```
If

    Module 'Climate' Temperature < 40 °F

Then

    Run Program 'Var_TempBelow40' (Then Path)

Else

    Run Program 'Var_TempBelow40' (Else Path)
```

11.4.1.6Program: Var_TempAbove90

This is an empty flag program. It is set and managed by one program Weather_TempAbove90Check.

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

11.4.1.7Program: Weather_TempAbove90Check

Checks the temp and updates the flag program. This program is updated each time the WeatherBug module updates at 3 pm when it is usually the hottest part of the day. This temp will be the previous day so there is some margin of error.

```
If
    Module 'Climate' Temperature > 90 °F
  And Time is  3:00:00PM
Then
    Run Program 'Var_TempAbove90' (Then Path)
Else
    Run Program 'Var_TempAbove90' (Else Path)
```

11.4.1.8Program: Run_IrrigationSchedule

The Var_RainInPast36Hours program is used as a condition for my irrigation program as follows:

```
If
    On Mon, Wed, Fri
    Time is Sunrise - 1 hour and 30 minutes
  And Program 'Var_RainInPast36Hours' is False
  And Program 'Var_TempBelow40' is False
Then
    Run Program 'Run_IrrigationStations' (If)
Else
  - No Actions - (To add one, press 'Action')
```

11.4.1.9Program: Run_IrrigationStations

The Var_TempAbove90 program is used as a condition for my irrigation program as follows:

```
If
    Program 'Var_TempAbove90' is False
Then
    Set 'Station1 Front Lawn1' On
    Wait  8 minutes
    Set 'Station2 Front Lawn2' On
    Wait  8 minutes
    Set 'Station3 Back Lawn1' On
    Wait  60 minutes
    Set 'Station4 Back Lawn2' On
    Wait  60 minutes
    Set 'Station5 Front Drip1' On
    Wait  60 minutes
    Set 'Station6 Front Drip2' On
    Wait  60 minutes
    Set 'Station7 Back Drip1' On
    Wait  60 minutes
    Set 'Station8 Back Drip2' On
    Wait  60 minutes
    Set 'Station8 Back Drip2' Off
Else
```

Set 'Station1 Front Lawn1' On

Wait 10 minutes

Set 'Station2 Front Lawn2' On

Wait 10 minutes

Set 'Station3 Back Lawn1' On

Wait 90 minutes

Set 'Station4 Back Lawn2' On

Wait 90 minutes

Set 'Station5 Front Drip1' On

Wait 90 minutes

Set 'Station6 Front Drip2' On

Wait 90 minutes

Set 'Station7 Back Drip1' On

Wait 90 minutes

Set 'Station8 Back Drip2' On

Wait 90 minutes

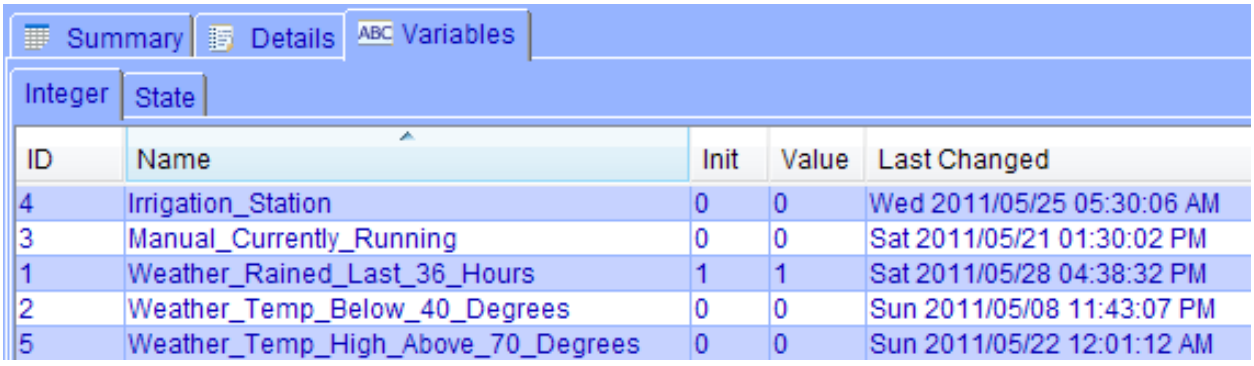
Set 'Station8 Back Drip2' Off

11.4.2 Auto Irrigation Program – Based on Temperature and Rain[36]

11.4.2.1Functionality Highlights

- Automatically runs 7 days a week with scaling back based on the weather ie. rain and temperature (WeatherBug).
    - Rain above zero inches pushes out the schedule
    - Temperature below a set-point prevents running that day
    - Temperature high above a set-point promotes daily runs
- Manual control is integrated with the Automatic mode ie. auto mode is user interruptable from an INSTEON device.
- Manual control to run irrigation and advance forward stations from an INSTEON device.
- Each "Station Timer" program also acts as a time-stamp for each station.
- Sends a start and finish notification for user tracking purposes.

11.4.2.2Variables



ID	Name	Init	Value	Last Changed
4	Irrigation_Station	0	0	Wed 2011/05/25 05:30:06 AM
3	Manual_Currently_Running	0	0	Sat 2011/05/21 01:30:02 PM
1	Weather_Rained_Last_36_Hours	1	1	Sat 2011/05/28 04:38:32 PM
2	Weather_Temp_Below_40_Degrees	0	0	Sun 2011/05/08 11:43:07 PM
5	Weather_Temp_High_Above_70_Degrees	0	0	Sun 2011/05/22 12:01:12 AM

Figure 191: Irrigation Variables

- Irrigation_Station - tracks which station is currently running, is used for tracking next valve to run.
- Manual_Currently_Running - tracks if the irrigation is being run manually, used to prevent an auto run from interrupting a manual run.
- Weather_Rained_Last_36_Hours - has rained in the lat 36 hours, used to hold off runs if it has rained.
- Weather_Temp_Below_40_Degrees - checks if its below 40 degrees at set start time (11pm), holds off runs if its too cold.
- Weather_Temp_High_Above_70_Degrees - checks if the high temp for the day is above 70 degrees, for adding 7 day a week runs if its hot weather.

[36] (Universal Devices)

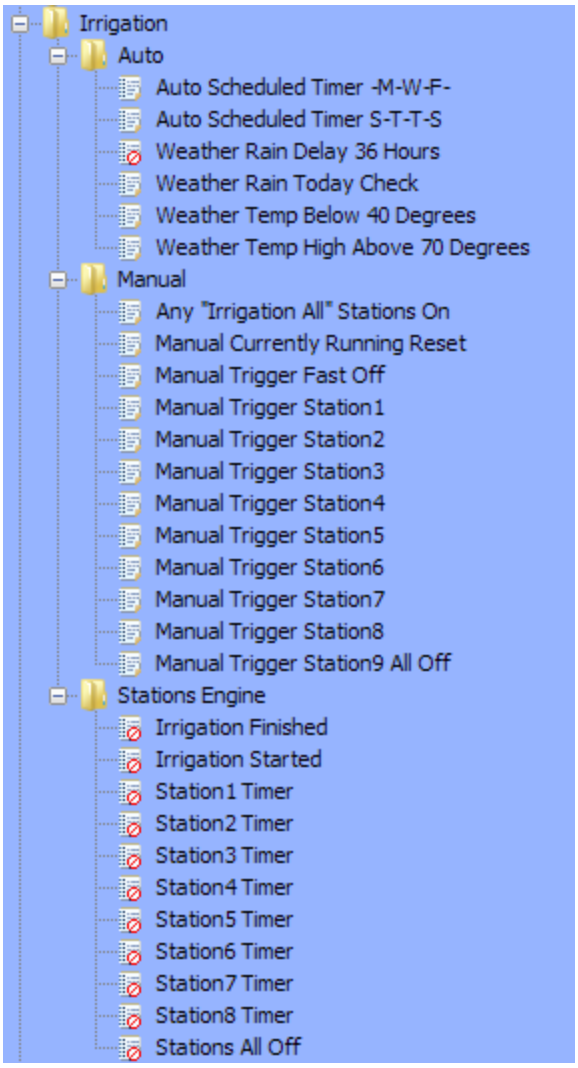


Figure 192: Irrigation Folders

Figure 193: Irrigation Devices

11.4.2.3ISY Programs File

AutoIrrig.zip - http://www.universal-devices.com/programs/AutoIrrig.zip

This file needs unzipping first then loaded from the programs tab. See the Wiki section on the programs tree view for more info on importing programs.

11.4.2.4Folder: Auto

11.4.2.4.1Auto Scheduled Timer -M-W-F-

```
If
    On Mon, Wed, Fri
    Time is 11:00:00PM
  And $Manual_Currently_Running is 0
  And $Weather_Rained_Last_36_Hours is 0
  And $Weather_Temp_Below_40_Degrees is 0
  And $Weather_Temp_High_Above_70_Degrees is 1
Then
    Run Program 'Station1 Timer' (Then Path)
```

11.4.2.4.2Auto Scheduled Timer S-T-T-S

```
If
    On Sat, Sun, Tue, Thu
    Time is 11:00:00PM
  And $Manual_Currently_Running is 0
  And $Weather_Rained_Last_36_Hours is 0
  And $Weather_Temp_Below_40_Degrees is 0
Then
    Run Program 'Station1 Timer' (Then Path)
```

11.4.2.4.3Weather Rain Delay 36 Hours

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    $Weather_Rained_Last_36_Hours  = 1

    Wait  36 hours

    $Weather_Rained_Last_36_Hours  = 0
```

Keep the rain status for 36 hours then reset it.

11.4.2.4.4Weather Rain Today Check

```
If

    Module 'Climate' Rain Today is not 0 "

Then

    Stop program 'Weather Rain Delay 36 Hours'

    Run Program 'Weather Rain Delay 36 Hours' (Then Path)
```

11.4.2.4.5Weather Temp Below 40 Degrees

```
If

    Module 'Climate' Temperature < 40 °F

Then

    $Weather_Temp_Below_40_Degrees  = 1

Else

    $Weather_Temp_Below_40_Degrees  = 0
```

This is in a separate program to avoid having the temperature event trigger a false start of the irrigation system.

11.4.2.4.6Weather Temp High Above 70 Degrees

```
If
    Module 'Climate' Temperature High > 70 °F
Then
    $Weather_Temp_High_Above_70_Degrees  = 1
Else
    $Weather_Temp_High_Above_70_Degrees  = 0
```

This is in a separate program to avoid having the temperature event trigger a false start of the irrigation system.

11.4.2.5Folder: Manual

11.4.2.5.1Any "Irrigation All" Stations On

```
If
    Status  'Irrigation / Irrigation1 Front Plants' is not Off
  Or Status  'Irrigation / Irrigation2 Empty' is not Off
  Or Status  'Irrigation / Irrigation3 Back Daylilies' is not Off
  Or Status  'Irrigation / Irrigation4 Back Fruit Trees' is not Off
  Or Status  'Irrigation / Irrigation5 Back Maple Trees' is not Off
  Or Status  'Irrigation / Irrigation6 Back Lawn1' is not Off
  Or Status  'Irrigation / Irrigation7 Back Lawn2' is not Off
  Or Status  'Irrigation / Irrigation8 Back Lawn3' is not Off
```

11.4.2.5.2Manual Currently Running Reset

```
If
    Program 'Any "Irrigation All" Stations On' is False
Then
    $Manual_Currently_Running  = 0
```

This is a safety to make sure manual mode does not get left on.

11.4.2.5.3Manual Trigger Fast Off

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast Off
Then
    Run Program 'Stations All Off' (Then Path)
```

Listens for manual remote control to turn the irrigation system off.

11.4.2.5.4Manual Trigger Station1

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 0
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station1 Timer' (Then Path)
```

11.4.2.5.5Manual Trigger Station2

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 1
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station2 Timer' (Then Path)
```

11.4.2.5.6Manual Trigger Station3

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 2
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station3 Timer' (Then Path)
```

11.4.2.5.7Manual Trigger Station4

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 3
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station4 Timer' (Then Path)
```

11.4.2.5.8Manual Trigger Station5

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 4
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station5 Timer' (Then Path)
```

11.4.2.5.9Manual Trigger Station6

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 5
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station6 Timer' (Then Path)
```

11.4.2.5.10Manual Trigger Station7

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 6
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station7 Timer' (Then Path)
```

11.4.2.5.11Manual Trigger Station8

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 7
Then
    $Manual_Currently_Running  = 1
    Run Program 'Station8 Timer' (Then Path)
```

11.4.2.5.12Manual Trigger Station9 All Off

```
If
    Control 'Inside / Inside RL4 Irrigation On' is switched Fast On
  And $Irrigation_Station is 8
Then
    Run Program 'Stations All Off' (Then Path)
```

11.4.2.6Folder: Station Engine

11.4.2.6.1Irrigation Finished

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Send Notification to 'Mark's Email'
```

11.4.2.6.2Irrigation Started

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Send Notification to 'Mark's Email'
```

11.4.2.6.3Station1 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Run Program 'Irrigation Started' (Then Path)
    Set 'Irrigation / Irrigation1 Front Plants' On
    $Irrigation_Station  = 1
    Wait  90 minutes
    Run Program 'Station2 Timer' (Then Path)
```

11.4.2.6.4Station2 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation2 Empty' On
    $Irrigation_Station  = 2
    Wait  5 seconds
    Run Program 'Station3 Timer' (Then Path)
```

11.4.2.6.5Station3 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation3 Back Daylilies' On
    $Irrigation_Station  = 3
    Wait  90 minutes
    Run Program 'Station4 Timer' (Then Path)
```

11.4.2.6.6Station4 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation4 Back Fruit Trees' On
    $Irrigation_Station  = 4
    Wait  90 minutes
    Run Program 'Station5 Timer' (Then Path)
```

11.4.2.6.7Station5 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation5 Back Maple Trees' On
    $Irrigation_Station  = 5
    Wait  90 minutes
    Run Program 'Station6 Timer' (Then Path)
```

11.4.2.6.8Station6 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation6 Back Lawn1' On
    $Irrigation_Station  = 6
    Wait  10 minutes
    Run Program 'Station7 Timer' (Then Path)
```

11.4.2.6.9Station7 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation7 Back Lawn2' On
    $Irrigation_Station  = 7
    Wait  10 minutes
    Run Program 'Station8 Timer' (Then Path)
```

11.4.2.6.10Station8 Timer

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    Set 'Irrigation / Irrigation8 Back Lawn3' On
    $Irrigation_Station  = 8
    Wait  10 minutes
    Run Program 'Stations All Off' (Then Path)
```

11.4.2.6.11Stations All Off

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
    $Manual_Currently_Running  = 0
    Stop program 'Station1 Timer'
    Stop program 'Station2 Timer'
```

```
        Stop program 'Station3 Timer'
        Stop program 'Station4 Timer'
        Stop program 'Station5 Timer'
        Stop program 'Station6 Timer'
        Stop program 'Station7 Timer'
        Stop program 'Station8 Timer'
        Set 'Irrigation / Irrigation1 Front Plants' Off
        Set 'Irrigation / Irrigation2 Empty' Off
        Set 'Irrigation / Irrigation3 Back Daylilies' Off
        Set 'Irrigation / Irrigation4 Back Fruit Trees' Off
        Set 'Irrigation / Irrigation5 Back Maple Trees' Off
        Set 'Irrigation / Irrigation6 Back Lawn1' Off
        Set 'Irrigation / Irrigation7 Back Lawn2' Off
        Set 'Irrigation / Irrigation8 Back Lawn3' Off
        $Irrigation_Station  = 0
        Run Program 'Irrigation Finished' (Then Path)
```

Let's cover everything just to make sure its reliable.

11.5 KeypadLinc Programs

11.5.1 Creating a KeypadLinc LED Follow Program[37]

If you want to have a KeypadLinc button LED be lit whenever one or more devices is on in the associated scene this is how you do it. And if you want to do it with more than one KeypadLinc button you can create the same set of programs for each button the KeypadLinc.

11.5.1.1KeypadLinc Button Toggle Mode

For this type of KeypadLinc LED follow setup the KeypadLinc will need the Button Toggle Mode option set to "toggle" for each button that will be used.

11.5.1.2Scenes

This is the scene that we are going to use for this example that will be setup with the KeypadLinc button. To keep it simple the controllers are in red and the responders are in blue just as they are seen in the ISY Admin Console.

- Family Evening Scene
  - Dining / Dining Hutch
  - Family / Family Desk Spot
  - Family / Family Main (A) Evening (KeypadLinc button)
  - Family / Family Main (load)
  - Family / Family Screen
  - Kitchen / Kitchen Island
  - Kitchen / Kitchen Main
  - Kitchen / Kitchen Main (slave)
  - Kitchen / Kitchen Pantry
  - Kitchen / Kitchen Sink

We need to add the KeypadLinc button to a separate Scene as a responder so you can control the LED.

- Family Evening Scene LED
  - Family / Family Main (A) Evening (KeypadLinc button)

11.5.1.3Main Programs

These three programs are needed to complete the design. Program 1 is "watching" for the button to be pressed on the KeypadLinc. Program 2a is to decide if the LED should be on or off then set it accordingly. Program 2b is the Scene check that checks for any light being on

[37] (Universal Devices)

in the Scene. This Scene check program is separate so it can be used in other programs as well.

11.5.1.3.1Program #1: Family Main (A) Evening is Switched

This is an optional program for if you have the KPL buttons in non-toggle mode so it may be better to just run with them in toggle mode and not use this.

```
If
        Control 'Family / Family Main (A) Evening' is switched On
    Or Control 'Family / Family Main (A) Evening' is switched Off
    Or Control 'Family / Family Main (A) Evening' is switched Fast On
    Or Control 'Family / Family Main (A) Evening' is switched Fast Off
Then
        Run Program 'Family Evening Scene Update LED' (If)
```

11.5.1.3.2Program #2a: Family Evening Scene Update LED

```
If
        Program 'Any "Family Evening Scene" Devices On' is True
Then
        Wait 2 seconds
        Set Scene 'KeypadLinc LEDs / Family Evening Scene LED' On
Else
        Wait 2 seconds
        Set Scene 'KeypadLinc LEDs / Family Evening Scene LED' Off
```

11.5.1.3.3Program #2b: Any "Family Evening Scene" Devices On

```
If
        Status 'Dining / Dining Hutch' is not Off
    Or Status 'Family / Family Desk Spot' is not Off
    Or Status 'Family / Family Main (load)' is not Off
    Or Status 'Family / Family Screen' is not Off
    Or Status 'Kitchen / Kitchen Island' is not Off
    Or Status 'Kitchen / Kitchen Main' is not Off
    Or Status 'Kitchen / Kitchen Main (slave)' is not Off
    Or Status 'Kitchen / Kitchen Pantry' is not Off
    Or Status 'Kitchen / Kitchen Sink' is not Off
```

11.5.1.4Optional Timer Program

This timer program is an example of another program that can share the "Any Scene Devices On" program. It is a sunset timer that only turns the lights on if there is no lights on in the scene. The idea is that someone already has on a light or two we should not change them.

11.5.1.4.1Program: Family Evening On Timer

```
If
        Time is Sunset
    And Program 'Any "Family Evening Scene" Devices On' is False
Then
        Set Scene 'Family / Family Evening Scene' On
```

11.5.2 How to Make Timed Button Press Program[38]

This will give you a starting point. Integer variable PressCount is required. Program TimedPress counts the number of times KeypadLinc button B is pressed with less than 5 seconds between each button press. KeypadLinc button B is set for non-toggle On mode so each press generates an On command. When button B pressed 3 times with less than 5 seconds between each press Program TimedPress3 is invoked. Scene TimedPressTooLong has KeypadLinc button B as a Responder. If more than 5 seconds passes the Integer variable PressCount is reset to 0 so count starts again and button B is turned Off.

11.5.2.1Program: TimedPress

```
If
    Control 'KeypadLinc 8 Dim V40 / KeypadLinc 8 Dim V40 - B' is switched On
  And $PressCount < 2
Then
    $PressCount += 1
    Wait  5 seconds
    $PressCount  = 0
    Set Scene 'SceneTimedPressTooLong' Off
Else
    $PressCount  = 0
    Run Program 'TimedPress3' (If)
```

[38] (posted by: LeeG)

11.5.2.2Program: TimedPress3

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

     Send X10 'H5/On (3)'

Else

  - No Actions - (To add one, press 'Action')
```

11.5.3 KeypadLinc Combination Lock[39]

Lighting controls are supposed to make life a bit EASIER, but for kids sometimes a bit tougher is more fun. Kids seem to enjoy things that THEY know how to do, but not others.

I setup a KeypadLinc that, using my ISY, will turn on different lamps based on the combination of different buttons that are lit. So, turn buttons C and H on, and Lamp1 goes on. Turn one or both buttons off, and Lamp1 turns off. Turn buttons B and G on, and Lamp2 goes on. Turn one or both buttons off, and Lamp2 turns off.

Here's a video demonstrating what I did: https://www.youtube.com/watch?v=7L2-PBxfvc4

Maybe not very useful in most areas of the home, but fun for the kids room.

There is a second or so delay before the lamps typically react because these are not direct links between the KeypadLinc and lamp modules - there is a program on my ISY that watches for these conditions and turns on/off the lamps.

[39] (posted by Michael D. Boulanger)

Though this can be done with other automation controllers/software I'm sure, I'm doing it on my ISY. Below are the 2 programs I'm using:

11.5.3.1Program: LAMP1

```
If
        Status  'KeypadC' is On
    And Status  'KeypadH' is On
    And Status  'KeypadC' is not Off
    And Status  'KeypadH' is not Off
  Then
        Set 'Lamp1' On
  Else
    Set 'Lamp1' Off
```

11.5.3.2Program: LAMP2

```
If
        Status  'KeypadB' is On
    And Status  'KeypadG' is On
    And Status  'KeypadB' is not Off
    And Status  'KeypadG' is not Off
  Then
        Set 'Lamp2' On
  Else
    Set 'Lamp2' Off
```

11.5.4 Using KPL KeyPad Triggers for Multiple Combination Locks

The forum has a great article on setting up a KeypadLinc as a combination lock. The URL of this document is: https://forum.universal-devices.com/topic/16135-using-kpl-keypad-triggers-for-a-multiple-combination-locks/

I have included this document below:

I use this series of programs as a combination keypad to turn on and off my armed/away mode. This determines the course of action of motion detected, low and high temperatures detected in several places, even the when clothes dryer is done, and many other functions.

On this project I decided to let ISY's even trigger processing do the work instead of calling subroutines. It makes a much cleaner project but event triggering can be a little confusing as it is not obvious what happens when your twiddle with a variable.

The first set of programs converts the keypad presses into a numerical value and shifts it into a state variable $sKeypress_sequence. One program will need to be defined for each button that you want to involve. I have posted only the first and fourth button programs for demonstration purposes, here. If you have an eight-button keypad, eight separate programs will need to be written.

Keypad buttons must be programmed to be "toggle 0ff - ON" mode so that each keypress will generate an On event trigger.

The result of several keypresses is a string of digits that can be analyzed for acceptance of our combination lock program(s). eg: Keypress sequence 'B", 'A', 'A', 'D', would result in state variable $sKeypress_sequence containing the number '2114'.

If this is used where people may be watching it is recommended that you use all the keys as the keypad likes to flash only the operated keys giving away the keys used, but not the sequence.

11.5.4.1Program: Key.A

```
If

    Control 'Mudroom / MudRm Button.A' is switched On

 Or  Control 'Mudroom / MudRm Button.A' is switched Off

Then

    $sKeypress_sequence *= 10

    $sKeypress_sequence += 1     <-----This number represents the key 'A'

    Wait  1 second

    Run Program 'Key.A' (Else Path)  <-----only for debugging via color changes

Else

  - No Actions - (To add one, press 'Action' )
```

(Key.B and Key.C programs not shown for clarity.)

11.5.4.2Program: Key.D

```
If

    Control 'Mudroom / MudRm Button.D' is switched On

 Or  Control 'Mudroom / MudRm Button.D' is switched Off

Then

    $sKeypress_sequence *= 10

    $sKeypress_sequence += 4   <----- unique number for each key

    Wait  1 second

    Run Program 'Key.D' (Else Path)

Else

  - No Actions - (To add one, press 'Action')
```

The second set of program(s) is triggered by the state variable $sKeypress_sequence. Each combination result requires a separate program that is enabled and a desired combination variable. This same technique can be used to operate many devices from the same keypad with only one extra program per combination desired.

My program uses one Integer variable called $cARM.COMBO (Note I use the 'c' prefix to denote a variable used as a constant value.) This number needs to be manually set into the variable as well as it's 'init to' value.

Your key combinations have no length restrictions other than the signed 32 bit value itself so 9 digit combinations should not be a problem. Mixing 3 digit and 5 digit combinations should also not be a problem except that longer combination sequences cannot start with the same key sequence as a shorter combination sequence.

Any time a pause in entry, more than 4 seconds, is encountered after the last keypress the internal sequence recording is reset and you will have to start over.

11.5.4.3Program: Arm Keypad Combo

```
If
        $sKeypress_sequence is $cARM.COMBO  <----- predefined numeric sequence
Then
        Run Program 'Armed Mode Toggle' (If)  <----Replace with your program
        Wait  1 second
        $sKeypress_sequence  = 0
Else
        Wait  4 seconds
        $sKeypress_sequence  = 0   <----- 4 second pause causes a reset/start over
```

11.6 Leak Sensor Programs

11.6.1 Program for Multiple Sensors

I have 6 leak sensors that I have spent the past few months integrating in with the ISY. It took a while to get them to perform as I wanted, and I figured this might be helpful to others trying to figure out the same thing. Here goes...

11.6.1.1Functionality

A notification is sent twice a day for any problem with a leak sensor (i.e. missed heartbeat) at 9:00am and 6:00pm. This avoids the inevitable single email that I ignore and the problem goes uncorrected for weeks...

A notification is sent immediately when a leak sensor is activated (and also again twice daily as above). This email is not sent repeatedly even if the sensor is "fluttering" at first activation, which it commonly does.

The email notification shows the status of EVERY leak sensor (heartbeat received as expected, heartbeat missed, sensor activation, etc.)

If the program monitoring heartbeat signals somehow fails or is shut down, a problem notification is sent.

All functionality should survive an ISY reboot without user intervention.

11.6.1.2Setup – First Leak Sensor

Add the leak sensor device to the ISY, for this example we'll call it Kitchen Sink

Create a state variable called sLeakKitchenSink; set Init = 1 and Value = 1

Create a program called KitchenSink - Variable Control 1:

```
If
        Status 'Leak Sensors / Kitchen Sink-Wet' is On
Then
        $sLeakKitchenSink = 9
Else
Wait 10 seconds
        $sLeakKitchenSink = 1
```

Create a program called KitchenSink - Variable Control 2:

```
If
        Control 'Leak Sensors / Kitchen Sink-Heartbeat' is switched On
    Or Control 'Leak Sensors / Kitchen Sink-Heartbeat' is switched Off
Then
$sLeakKitchenSink = 1
        Wait 25 hours
        $sLeakKitchenSink = 2
Else
        - No Actions - (To add one, press 'Action')
```

Create a program called KitchenSink - Variable Control 3:

```
If
        $sLeakKitchenSink is 1
    And Time is Last Run Time for 'KitchenSink - Variable Control 2' + 26 hours
Then
        Wait 5 seconds
        $sLeakKitchenSink = 3
Else
        - No Actions - (To add one, press 'Action')
```

Note: For ease of explanation, assume a second leak sensor named "Storage Room" has also been added using the steps above.

11.6.1.3Setup - Core Components

These only have to be set-up once, regardless of the number of leak sensors.

Create an integer variable called iStartUp; set Init = 0 and Value = 1.

Create a custom notification called "Leak Sensor Activation". This is the content I use:

```
A water leak has been detected at the location below with a status value of "9":

Kitchen Sink: (((Use "add variable" to add your sLeakKitchenSink variable here)))

Storage Room: (((Use "add variable" to add your sLeakStorageRoom variable here)))

---Status Key---

1 = Heartbeat OK (normal status)

2 = Heartbeat missed

3 = Heartbeat check program not running

9 = Leak detected
```

Create a custom notification called "Leak Sensor Problem". This is the content I use:

> A problem has been detected with a leak sensor. Details below:
>
> Kitchen Sink: (((Use "add variable" to add your sLeakKitchenSink variable here)))
>
> Storage Room: (((Use "add variable" to add your sLeakStorageRoom variable here)))
>
> ---Status Key---
>
> 1 = Heartbeat OK (normal status)
>
> 2 = Heartbeat missed
>
> 3 = Heartbeat check program not running
>
> 9 = Leak detected

Note 1: It may take up to 36 hours for a "heartbeat missed" signal to clear.

Note 2: Status Code 3 indicates the "Variable Control 2" program is not running for some reason.

Create a program called Leak Startup and ENABLE RUN AT START-UP

```
If
        $iStartUp is 0
Then
        Run Program 'KitchenSink - Variable Control 2' (Then Path)
        Run Program 'StorageRoom - Variable Control 2' (Then Path)
        Wait 5 seconds
        $iStartUp = 1
Else
        - No Actions - (To add one, press 'Action')
```

** Set to run at start-up **

Create a program called Leak Sensor Activation

```
If
        $sLeakKitchenSink is 9
    Or $sLeakStorageRoom is 9
Then
        Send Notification to 'Brian' content 'Leak Sensor Activation'
Else
        - No Actions - (To add one, press 'Action')
```

Create a program called Leak Sensor Problem

```
If
        (
                Time is 9:00:00AM
            Or Time is 6:00:00PM
        )
    And (
                $sLeakKitchenSink is not 1
            Or $sLeakStorageRoom is not 1
        )
Then
        Send Notification to 'Brian' content 'Leak Sensor Problem'
Else
        - No Actions - (To add one, press 'Action')
```

Test leak sensor in "wet" mode and ensure a notification is sent

11.6.1.4Brief Explanation

The 10 second wait in Variable Control 1 serves to stop multiple emails from being generated if the sensor "flutters" when it first activates.

The Variable Control 2 program should always be in a "Running Then" state, looking for the heartbeat signal. If it's missed then it changes the variable to status = 2 which triggers a notification email.

The Variable Control 3 program serves as a "watch-dog" for Variable Control 2. If it's stopped (manually, ISY issue, etc.), then it changes the variable to status = 3 which triggers a notification email.

The iStartUp variable is initialized to 0 on start-up and this triggers the "Leak Startup" program to run. Without this program, the potential exists for a "dead" leak sensor to go undetected after the ISY starts up.

11.6.1.5Procedure for Adding a New Leak Sensor

- Add device
- Add state variable (sLeakSensorName)
- Add programs: Variable Control 1, Variable Control 2, Variable Control 3
- Modify Leak Startup program
- Modify Leak Sensor Activation program and Leak Sensor Activation notification
- Modify Leak Sensor Problem program and Leak Sensor Problem notification
- Test leak sensor in "wet" mode and ensure notification is sent

11.7 Light Control Programs

11.7.1 Light Data Program[40]

11.7.1.1Folder: Everyday

Folder Conditions for 'Everyday'' Add conditions to limit when programs in this folder are allowed to run.

If

From Sunrise

To Sunset (same day)

Then

Allow the programs in this folder to run.

If it becomes dark during the day this program will turn the lights on.

[40] (Universal Devices)

11.7.1.2Program: Stormy Day

```
If
    Module 'Climate' Light < 5
  And Program 'Wait to Change Outside Lights' is True
Then
    Run Program 'Wait to Change Outside Lights' (Else Path)
Else
  - No Actions - (To add one, press 'Action')
```

When the sky turns dark

Only runs if sky was light during last check

This program will turn the lights off when it becomes bright again.

11.7.1.3Program: Clear Day

```
If
    Module 'Climate' Light >= 5
  And Program 'Wait to Change Outside Lights' is False
Then
    Run Program 'Wait to Change Outside Lights' (Then Path)
Else
  - No Actions - (To add one, press 'Action')
```

When the sky brightens

Only runs if sky was dark during last check

This program waits for 5 minutes so unusual Light levels are ignored. It also serves as a Flag for the previous two programs so the Wait command is not restarted every time the Light data changes. Only when the Light data crosses the threshold (5 in this example) is this program restarted. This program can be in the same folder.

11.7.1.4Wait to Change Outside Lights

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

Wait 5 minutes

Set Scene 'Outside Lights - Stormy Day' Off

Else

Wait 5 minutes

Set Scene 'Outside Lights - Stormy Day' On

Bright Day = True

Dark Day = False

Each morning to turn the lights Off you should use the Wait to Change Outside Lights program.

11.7.1.5Outside Lights Daytime

If

Time is Sunrise + 15 minutes

Then

Run Program 'Wait to Change Outside Lights' (Else Path)

Else

- No Actions - (To add one, press 'Action')

11.8 Motion Sensor Programs

11.8.1 Using Motion Sensors in Bathrooms[41]

Some may prefer not to use motion sensors as occupancy sensors in bathrooms, on the grounds that in such a location one certainly doesn't want the lights going off unexpectedly--a valid concern.

However, I find the bathroom to be a location which gains a high level of convenience through automation, as long as the sensors provide complete coverage and the programming is made sufficiently solid as to avoid the above scenario. Here I will attempt to present examples of such programming.

These programs will be based on INSTEON motion sensors and door contacts (TriggerLinc) but could be easily modified for X-10 sensors and contacts (DS10A).

To have the light simply turn on when motion is sensed, and turn off when the motion sensor times out:

11.8.1.1Program #1 - Motion 1 – Enabled

```
If
        Control 'Main Bath Motion.1-Sensor' is switched On
    And Control 'Main Bath Motion.1-Sensor' is not switched Off
Then
        Set 'Main Bath Lights' On
Else
        Set 'Main Bath Lights' Off
```

This is less than satisfactory for several reasons. First, rather than having the on time controlled entirely by the motion sensor, one may wish to allow ISY to determine the timeout, thereby allowing the on time to be changed programmatically:

[41] (Universal Devices)

11.8.1.2Program #2 - Motion 2 – Enabled

```
If
        Control 'Main Bath Motion.1-Sensor' is switched On
    And Control 'Main Bath Motion.1-Sensor' is not switched Off
Then
        Set 'Main Bath Lights' On
Else
        Wait 4 minutes
        Set 'Main Bath Lights' Off
```

Here the Wait time occurs after the motion sensor has timed out and sent the Off command, so if the motion sensor's timer is set to the default of one minute, then the total timeout period of this program will be five minutes.

Another improvement is to separate the on portion and the timer portion of the program, in order to allow having the INSTEON On command sent to the light switch only when the light is currently off, thereby reducing INSTEON traffic by not sending redundant On commands when the light is already on:

11.8.1.3Program #3 - Main Bath Motion On – Enabled

```
If
        Control 'Main Bath Motion.1-Sensor' is switched On
    And Status 'Main Bath Lights' is not On
Then
        Set Scene 'sMain Bath Lights' On
Else
        - No Actions - (To add one, press 'Action')
```

11.8.1.4Program #4 - Main Bath Motion Timer – Enabled

```
If

        Status 'Main Bath Motion.1-Sensor' is Off

Then

        Wait 4 minutes

        Set 'Main Bath Lights' Off

Else

        - No Actions - (To add one, press 'Action')
```

Here program 3 turns the lights on in response to motion, if they are not already on. When the motion sensor stops sensing motion, times out, and sends the Off command, its status becomes False and program 4 begins the countdown to turning the lights off. If during this period motion is once again detected, the motion sensor sends another On command, the sensor's status becomes True, and program 4 halts.

The motion sensor control of the lights may be programmatically enabled and disabled by use of a flag:

11.8.1.5Program #5 - Main Bath Motion On – Enabled

```
If

        Control 'Main Bath Motion.1-Sensor' is switched On

    And Program 'Main Bath Motion Timer Enable' is True

    And Status 'Main Bath Lights' is not On

Then

        Set Scene 'sMain Bath Lights' On

Else

        - No Actions - (To add one, press 'Action')
```

11.8.1.6Program #6 - Main Bath Motion Timer – Enabled

```
If
        Status 'Main Bath Motion.1-Sensor' is Off
    And Program 'Main Bath Motion Timer Enable' is True
Then
        Wait 4 minutes
        Set 'Main Bath Lights' Off
Else
    - No Actions - (To add one, press 'Action')
```

11.8.1.7Program #7 - Main Bath Motion Timer Enable – NOT Enabled

```
If
        - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
        Set Program 'Main Bath Motion Timer Enable' To Run At Startup
Else
        Set Program 'Main Bath Motion Timer Enable' To Not Run At Startup
```

Here we use a program (Main Bath Motion Timer Enable) as a flag to determine whether the motion sensor should turn the light on (program 5) and whether the timer should be allowed to turn the light off (program 6). To allow the motion sensor to turn the light on, but prevent the timer from turning the light off, add the And Program 'Main Bath Motion Timer Enable' is True line only to program 6 and not to program 5.

Notice first that the flag program is not enabled (the Enabled box at the right side of the window is not checked). This means that the program will never run automatically in response to changing conditions in the If; it will run only when told to do so either by another program, or by manually running it from the Program Summary tab. [There is one other condition under which it will run, and that condition will be explained in the next paragraph.] In this case, since the program has no conditions, it will not run automatically in any case. But clearing the Enabled box for programs which shouldn't run automatically is a good habit to get in to.

Notice also that when the flag is made True (the Then is executed), the flag program sets itself to run at startup, and when the flag is made False (the Else is executed), the program sets itself to not run at startup. This is the other time (mentioned in the previous paragraph) when a program may run even though the Enabled box is not checked.

When ISY reboots, each program which is not set to run at startup has its status set to False. Programs set to run at startup will evaluate the If conditions and run either the Then path or the Else path (thus making the program's status either True for False respectively) depending on whether the conditions evaluate to True or False. When a program which has no conditions is run at startup, the Then path is executed.

As a result, when the Main Bath Motion Timer Enable program is set to True, it configures itself to run at startup so that after an ISY reboot (for example after a power failure) it will once again have a True status. Likewise, when the program is set to False it configures itself to not run at startup and therefore will again have a False status after reboot. The effect is that ISY remembers the state of this program even across reboots.

With this code in place, the motion sensor control may be enabled and disabled by any desired action or schedule. For example, turning the Main Bath Lights switch Fast On to disable sensor control, and Fast Off to reactivate control:

11.8.1.8Program #8 - Main Bath Motion Timer Enable/Disable – Enabled

```
If

Control 'Main Bath Lights' is switched Fast On

And Control 'Main Bath Lights' is not switched Fast Off

Then

Run Program 'Main Bath Motion Timer Enable' (Else Path)

Else

Run Program 'Main Bath Motion Timer Enable' (Then Path)
```

Notice that if the timer is currently counting down to shutoff (program 6) when the Main Bath Motion Timer Enable flag is set to False, the countdown will be halted.

Now we approach the question of how long the timer should be set for. In light of the concern mentioned at the beginning of this article, the timeout must not be made too short. On the other hand, making the timeout longer than necessary results in wasted electricity and reduced effectiveness and convenience.

Earlier I mentioned changing the timeout programmatically, and in fact a two-level timing paradigm is one answer to the previous question.

For example, I have an interior (no windows) main bathroom which is completely covered by the motion sensor, except for the bath/shower, because the bath/shower has doors which the sensor cannot see through.

Consider that if the bathroom is occupied (as indicated by the motion sensor) but the bathroom door is open, then it is likely that the occupant won't be too long (perhaps washing hands, etc.). If the door is closed, on the other hand (but please don't close the door on either of your hands), the occupant might be expected to be somewhat longer, especially if bathing/showering, the exact conditions under which the sensor cannot see.

The solution: a two-level timer. When the door is open, time out and shut off the lights (and fan) five minutes after motion ceases. When the door is closed, increase that time to 45 minutes, to allow for a nice hot bath or a leisurely 20 minute shower. It could be set even longer for that matter. After all, if the door is closed and there is no motion for an hour, there is a more serious problem than the lights being left on!

The open/closed status of the door may be determined using either an INSTEON TriggerLinc, or an X-10 DS10A.

To implement the two-level timer, the triggering portion and the timing portion of the timer program are separated to allow for a conditional timing interval:

11.8.1.9Program #9 - Main Bath Re-Trigger – Enabled

```
If
        Status 'Main Bath Motion.1-Sensor' is Off
    And Program 'Main Bath Motion Timer Enable' is True
Then
    Run Program 'Main Bath Motion Timer' (If)
Else
        Stop program 'Main Bath Motion Timer'
```

11.8.1.10Program #10 - Main Bath Motion Timer – NOT Enabled

```
If

        Status 'Main Bath Contact.1' is Off

Then

        Wait 40 minutes

        Run Program 'Main Bath Motion Timer' (Else Path)

Else

        Wait 5 minutes

        Set Scene 'sMain Bath All Slow' Off
```

When the motion sensor status becomes False, the re-trigger program (program 9) starts the timer program (program 10). Should new motion occur during the countdown (or the Main Bath Motion Timer Enable flag become False), the re-trigger program halts the timer program.

When the timer program is started, it will run Then if the door is closed; if the door is open it will run Else. The Else provides the five-minute interval, while the Then provides a 40-minute interval before calling the Else for the final five minutes, prior to turning the scene (lights and fan) off.

Notice that program 10 is not enabled, and this fact is important since we don't want the program to run automatically, but only when called.

Another modification made in this program is to turn the lights and fan off using a sMain Bath All Slow scene, which has the fan switch (relay) ramp-rate set to .1 seconds (fastest possible), but the light switch set to a 30 second or one-minute ramp rate. This rate of change in light level is fast enough for the occupant to notice it, and to make some motion to retrigger the light, and is slow enough to give him plenty of time.

This means we have two separate scenes for the lights; one with a quick ramp rate for turning the light on, and the other with the slow ramp rate for turning the light off. Alternately, you could use a single scene with a slow ramp rate for turning the light off, and then use Fast On with the same scene to turn it quickly on.

My preference is to use two scenes, because using Fast On will cause the lights to come on to 100% with the fastest possible ramp rate (.1 seconds or nearly instantaneous). I usually set my lights to come on to 90% with a .5 second ramp rate. This slower ramp rate and reduced level reportedly should increase the life of the bulb significantly.

This slow-dim-to-off is a technique I use widely where there are motion sensors/timers turning lights off. In my master bedroom and ensuite I don't use motion sensors. Rather, there is a KeypadLinc in a pedestal on either side of the bed. Each has a button which causes both the lamp on the corresponding side of the bed, and the ensuite lights to do a slow fade up which is easy on the eyes in a dark room, to a low level sufficient for the purpose at hand but not bright enough to wake someone.

Next, we should give some thought to what occurs following a power interruption. Since ISY cannot poll the status of RF devices (motion sensor, door contact), should it default to assuming the door is open or closed?

In the case of an interior bathroom, if the power fails while the bathroom is occupied and the door is closed, the occupant will likely open the door since there will be no light. During a power failure, should someone enter the bathroom it is unlikely he would shut the door, as there would be no light. So, either way, when the power returns it is quite likely the door will be open.

However, once power is restored and ISY reboots, it can take ISY five minutes to query the INSTEON network in a modest installation and much longer in a large installation. During that time someone may very well enter and close the door. Clearly it is safer to assume the door is closed, since that will provide the longer timeout period before shutting off the light. The downside is that if someone enters, thereby triggering the motion sensor, and then leaves without having ever shut the door and then opened it, the lights/fan will take much longer to time out than is necessary. This condition will persist until the door is closed and opened.

As it turns out, when a device status is unknown, as in the case of RF devices following reboot, ISY defaults the status to Off with regards to programs. So, in program 10 the door status will default to closed.

There is a third possibility, and that is to remember the door status just as we remember the enable flag:

11.8.1.11Program #11 - Main Bath Door Status Closed – NOT Enabled

```
If

        - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

        Set Program 'Main Bath Door Status Closed' To Run At Startup

Else

        Set Program 'Main Bath Door Status Closed' To Not Run At Startup
```

Next, we need a program to set or clear the flag when the door closes or opens:

11.8.1.12Program #12 - Main Bath Door Status Change – Enabled

```
If

        Control 'Main Bath Contact.1' is switched Off

    And Control 'Main Bath Contact.1' is not switched On

Then

        Run Program 'Main Bath Door Status Closed' (Then Path)

Else

        Run Program 'Main Bath Door Status Closed' (Else Path)
```

The reason for two separate programs is because the flag program which we wish to remember across reboots, should not have any conditions in the If clause to ensure that it assumes the proper state after power up. Were we to place the above conditions in the flag program, the flag would always be False (door open) after a reboot.

Finally, we modify program 10 to test the flag:

11.8.1.13Program #13 - Main Bath Motion Timer – NOT Enabled

```
If
        Program 'Main Bath Door Status Closed' is True
Then
        Wait 40 minutes
        Run Program 'Main Bath Motion Timer' (Else Path)
Else
        Wait 5 minutes
        Set Scene 'sMain Bath All' Off
```

One question we have not addressed to this point is what should happen if the door opens or closes during the countdown period? In the above programs, the timer will continue with whichever time period it is currently running. We can modify the Main Bath Door Status Change program (program 12) to restart (or stop) the timer when the door opens or closes:

11.8.1.14Program #14 - Main Bath Door Status Change – Enabled

```
If
        Control 'Main Bath Contact.1' is switched Off
    And Control 'Main Bath Contact.1' is not switched On
Then
        Run Program 'Main Bath Door Status Closed' (Then Path)
        Run Program 'Main Bath Motion Re-Trigger' (If)
Else
        Run Program 'Main Bath Door Status Closed' (Else Path)
        Run Program 'Main Bath Motion Re-Trigger' (If)
```

Here, each time the door status changes, the re-trigger program (program 9) is called. If the motion status is On, or the enable flag is False, the timer will be stopped. Otherwise, the timer program (program 13) will be called again, will reevaluate the door status, and initiate the appropriate time interval.

Another feature we could add is to have the fan turn on if the door is closed and the light is on:

11.8.1.15Program #15 - Main Bath Door Status Closed Fan On Timer – Enabled

```
If

        Program 'Main Bath Door Status Closed' is True

    And Status 'Main Bath Lights' is not Off

Then

        Wait 5 minutes

        Set 'Main Bath Fan' On

Else

        - No Actions - (To add one, press 'Action')
```

If you wish to have the fan turn on immediately, simply remove the Wait.

Finally, as with any INSTEON motion sensor application, we can take note of a low battery indication:

11.8.1.16Program #16 - Main Bath Door Motion Low Battery – Enabled

```
If

        Status 'Main Bath Motion.3-LowBattery' is On

Then

        Repeat Every 24 hours

        Send Notification to All

Else

        - No Actions - (To add one, press 'Action')
```

Putting it all together, a complete program group (contained within a f_Main Bath Door/Motion folder for organizational purposes) may look like this:

11.8.1.17Program Main Bath Door Status Change – Enabled

```
If
        Control 'Main Bath Contact.1' is switched Off
    And Control 'Main Bath Contact.1' is not switched On
Then
        Run Program 'Main Bath Door Status Closed' (Then Path)
        Run Program 'Main Bath Motion Re-Trigger' (If)
Else
        Run Program 'Main Bath Door Status Closed' (Else Path)
        Run Program 'Main Bath Motion Re-Trigger' (If)
```

11.8.1.18Program Main Bath Door Status Closed – NOT Enabled

```
If
        - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
        Set Program 'Main Bath Door Status Closed' To Run At Startup
Else
        Set Program 'Main Bath Door Status Closed' To Not Run At Startup
```

11.8.1.19Program Main Bath Door Status Closed Fan On Timer – Enabled

```
If
        Program 'Main Bath Door Status Closed' is True
    And Status 'Main Bath Lights' is not Off
Then
        Wait 5 minutes
        Set 'Main Bath Fan' On
Else
        - No Actions - (To add one, press 'Action')
```

11.8.1.20Program Main Bath Motion Low Battery – Enabled

```
If
        Status 'Main Bath Motion.3-LowBattery' is On
Then
        Repeat Every 24 hours
        Send Notification to All
Else
        - No Actions - (To add one, press 'Action')
```

11.8.1.21Program Main Bath Motion On – Enabled

```
If
        Control 'Main Bath Motion.1-Sensor' is switched On
    And Status 'Main Bath Lights' is not On
Then
        Set Scene 'sMain Bath Lights' On
Else
        - No Actions - (To add one, press 'Action')
```

11.8.1.22Program Main Bath Motion Re-Trigger – Enabled

```
If
        Status 'Main Bath Motion.1-Sensor' is Off
    And Program 'Main Bath Motion Timer Enable' is True
    And (
            Status 'Main Bath Lights' is not Off
        Or Status 'Main Bath Fan' is not Off
        )
Then
        Run Program 'Main Bath Motion Timer' (If)
Else
        Stop program 'Main Bath Motion Timer'
```

11.8.1.23Program Main Bath Timer – NOT Enabled

If

Program 'Main Bath Door Status Closed' is True

Then

Wait 40 minutes

Run Program 'Main Bath Motion Timer' (Else Path)

Else

Wait 5 minutes

Set Scene 'sMain Bath All Slow' Off

11.8.1.24Program Main Bath Motion Timer Enable – NOT Enabled

If

- No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

Set Program 'Main Bath Motion Timer Enable' To Run At Startup

Else

Set Program 'Main Bath Motion Timer Enable' To Not Run At Startup

11.8.1.25Program Main Bath Motion Timer Enable/Disable – Enabled

```
If

        Control 'Main Bath Lights' is switched Fast On

    And Control 'Main Bath Lights' is not switched Fast Off

Then

        Run Program 'Main Bath Motion Timer Enable' (Else Path)

Else

        Run Program 'Main Bath Motion Timer Enable' (Then Path)
```

This is just one of many possible approaches to automating bathroom lights and fans.

11.9 Thermostat Programs

11.9.1 Create a Thermostat Program

To start, I wrote a few programs to get the overall status of my office. The first simply checks to see if the current day/time is within my normal work schedule. If it is, the program is true:

11.9.1.1Program: Office Work Hours

```
If

        On Mon, Tue, Wed, Thu, Fri

        From 9:00:00AM

        To 5:00:00PM (same day)

Then

        - No Actions - (To add one, press 'Action')

Else

        - No Actions - (To add one, press 'Action')
```

Unfortunately, I often need to put in late nights. To account for times I might be in the office outside of normal work hours, I also added this program to check the status of lights. If any of the lights in my office are on, this program is true:

11.9.1.2Program: Office Light Status

```
If
        Status 'OfficeLight1' is not Off
    Or Status 'OfficeLight2' is not Off
    Or Status 'OfficeLight3' is not Off
Then
        - No Actions - (To add one, press 'Action')
Else
        - No Actions - (To add one, press 'Action')
```

Finally, I wrote a notification program to let me know if there are any extreme temperature situations that might indicate a heating/AC equipment failure. This will both email me and send a text message to my phone if either of the conditions is true.

11.9.1.3Program: Office Safety Check

```
If
        Status 'OfficeThermostat' > 90° (Temperature)
    Or Status 'OfficeThermostat' < 60° (Temperature)
Then
        Send Notification to All
Else
        - No Actions - (To add one, press 'Action')
```

I'm up here in New England, so my thermostat controls both a furnace (for the cooler moths) and a whole house AC (for the warmer months). My ideal goal is to simply leave the thermostat in COOL mode in the summer, and manually switch it to HEAT mode when I want to start using the heater, then manually back to COOL mode when I want to start

using the AC again. I prefer to make that switch manually but would like to automate the rest as much as possible. All programs check to see if the thermostat is in COOL or HEAT mode, so if I'd like I can switch the thermostat to OFF or one of the PROGRAM modes to avoid the automation I've setup on the ISY.

The next program checks to see if the office lights are off and if the thermostat is in COOL mode. If they are, and it's outside of normal work hours, the program will increase the setpoint of the thermostat to save energy. I don't base vacancy only on status of lights, because there are times during the day that we might run out for a quick bite to eat or simply not need the lights on. But if the lights are ON, even after hours, I don't adjust the setpoint because we're clearly in the office working.

I also include a 2-minute wait before adjusting the thermostat in case I'm working late and simply turned off the lights briefly for some reason.

11.9.1.4Program: Office Cool Vacant

```
If
        Status 'OfficeThermostat' is Mode Cool
    And Program 'Office Work Hours' is False
    And Program 'Office Light Status' is False
    And Status 'OfficeThermostat' < 85° (Setpoint)
Then
        Wait 2 minutes
        Set 'OfficeThermostat' 85° (Cool Setpoint)
Else
        - No Actions - (To add one, press 'Action')
```

For the cooler months when the thermostat is in HEAT mode, I have the following program:

11.9.1.5Program: Office Heat Vacant

```
If
        Status 'OfficeThermostat' is Mode Heat
    And Program 'Office Work Hours' is False
    And Program 'Office Light Status' is False
    And Status 'OfficeThermostat' > 65° (Setpoint)
Then
        Wait 2 minutes
        Set 'OfficeThermostat' 65° (Heat Setpoint)
Else
        - No Actions - (To add one, press 'Action')
```

For times I am IN the office, I want to make it a bit more comfortable. Notice that I'm only checking to see if the setpoint is at LEAST a certain value, so that in the winter I can manually set it a bit warmer if I want and, in the summer, maybe set it a bit cooler. But, these programs ensure that the temperature is at least reasonable:

11.9.1.6Program: Office Cool Occupied

```
If
        Status 'OfficeThermostat' is Mode Cool
    And (
            Program 'Office Work Hours' is True
        Or Program 'Office Light Status' is True
        )
    And Status 'OfficeThermostat' > 76° (Temperature)
    And Status 'OfficeThermostat' > 76° (Setpoint)
```

```
Then
        Wait 2 minutes
        Set 'OfficeThermostat' 76° (Cool Setpoint)
Else
        - No Actions - (To add one, press 'Action')
```

Here is the HEAT version for cooler months:

11.9.1.7Program: Office Heat Occupied

```
If
        Status 'OfficeThermostat' is Mode Heat
    And (
                Program 'Office Work Hours' is True
            Or Program 'Office Light Status' is True
        )
    And Status 'OfficeThermostat' < 68° (Temperature)
    And Status 'OfficeThermostat' < 68° (Setpoint)
Then
        Wait 2 minutes
        Set 'OfficeThermostat' 68° (Heat Setpoint)
Else
        - No Actions - (To add one, press 'Action')
```

11.10 Utility Programs

11.10.1 Averaging Using Only the Best Values

This is a program I created to stabilize inputs from more than one source. Any "wild" sensor inputs get cut out of the calculation.

11.10.1.1Operation

- the last known working average is kept for comparison purposes during the next iteration.
- a constant $cAVERAGE.DEV.MAX variable is set to the allowable deviation limits for a sensor to be considered "bad". I have set mine to 2.0 degrees for this purpose
- each input is compared to the last known average and the absolute value compared to the allowable deviation factor.
- good sensor readings are tallied and used to calculate the new average
- if all values are outside the maximum deviation then a completely new average is created from all sensors.

11.10.1.2 Benefits

- gives a more stable resultant
- detects and isolates any sensors gone bad or "out-of-range of the crowd" readings.
- gives a contributor count that can be used for other purposes. eg: Temperature variance detection for circulation. fan operation from indoor temperature sensors
- I have a temperature sensor mounted up under a PV array and the oven effect gets disallowed every late morning with this program.
- this can use as many sensors as available to further stabilize the resultant output. Just add more lines of program code.
- ISY is fast. No delays can be noticed and lots of repeats allows other processing to occur during the calculations.

11.10.1.3 Negatives

- based on slow changing sensor values like temperature readings from thermostats and probes. Sudden value jumps may disrupt the process.
- all three sensors outside the past average results in including all three sensors to start. This may not be the best algorithm for some cases.

This is my latest using NodeLink input from the Ecobee current weather reporting.

11.10.1.4Program: Sync.Temp.out.average

```
If
    $sTag3.temp < 45
  Or 'Dining Room / GathRm Stat / Current Weather' Temperature <= 45.0°
  Or $sWC8.outTemp.raw < 450
Then
    $TempAvg.sum  = 0
    $TempAvg.contrib.cnt  = 0
    // sum inputs within dev.max of past average and keep count
    // start with sensor 1, if within deviation allowed
    $TempAvg.deviation  = $sWC8.outTemp.raw
    $TempAvg.deviation /= 10
    $TempAvg.deviation -= $sHouse.outTemp
    Repeat While $TempAvg.deviation < 0
      $TempAvg.deviation *= -1
    Repeat While $TempAvg.deviation <= $cTEMPAVG.DEV.ALLOWED
      $TempAvg.sum += $sWC8.outTemp.raw
      $TempAvg.sum /= 10
      $TempAvg.contrib.cnt += 1
      $TempAvg.deviation  = 999
    Repeat 1 times
    // add in sensor 2, if within deviation allowed
```

```
        $TempAvg.deviation  = 'Dining Room / GathRm Stat / Current Weather'
Temperature °

        $TempAvg.deviation -= $sHouse.outTemp

      Repeat While $TempAvg.deviation < 0

        $TempAvg.deviation *= -1

      Repeat While $TempAvg.deviation <= $cTEMPAVG.DEV.ALLOWED

        $TempAvg.sum += 'Dining Room / GathRm Stat / Current Weather' Temperature
°

        $TempAvg.contrib.cnt += 1

        $TempAvg.deviation  = 999

      Repeat 1 times

      // add in sensor 3, if wihin deviation allowed

        $TempAvg.deviation  = $sTag3.temp

        $TempAvg.deviation -= $sHouse.outTemp

      Repeat While $TempAvg.deviation < 0

        $TempAvg.deviation *= -1

      Repeat While $TempAvg.deviation <= $cTEMPAVG.DEV.ALLOWED

        $TempAvg.sum += $sTag3.temp

        $TempAvg.contrib.cnt += 1

        $TempAvg.deviation  = 999

      Repeat 1 times

      // none worked, get all new

      Repeat While $TempAvg.contrib.cnt is 0

        $TempAvg.sum  = $sWC8.outTemp.raw
```

```
        $TempAvg.sum /= 10

        $TempAvg.sum += $sTag3.temp

        $TempAvg.sum += 'Dining Room / GathRm Stat / Current Weather' Temperature
°

        $TempAvg.contrib.cnt  = 3

      Repeat 1 times

      // finish calcs with what we got

        $TempAvg.sum /= $TempAvg.contrib.cnt

        $sHouse.outTemp  = $TempAvg.sum

        $sHouse.outTemp Init To $TempAvg.sum

Else

  - No Actions - (To add one, press 'Action')
```

11.10.2 Using the ISY Trigger Engine - an alarm handler system[42]

I created this alarm system with five different levels to make other ISY programs easier to use it. I hope this gives other ISY users the feel for the power of the ISY event trigger handling engine. It can make programming so much easier once you set up a system to handle your user created events with STATE variables

It is based on a variable, making the ISY engine do most of the work. The state variable triggers the select program to alert the owners with different severities.

To use I just use one line of program code.

- Set $sAlarm.level = 5

Remember, that my sensing programs using this alarm system, each send their own specific notifications about the devices being monitored. These notifications are only to follow, or not, with a status indication that something is being done in regards to the detected problem.

[42] (posted by: larryllix)

This is Alarm.level = 0. The "no alarm" state and resting position all levels will reset to when done their "thing".

11.10.2.1Program: Alarm level 0

```
If
      $sAlarm.level is 0
Then
      Set 'Mudroom / MudRm Beeper' Off
      Set 'Utility Room / Util Beeper' Off
      Wait  1 second
      Run Program 'Alarm level 0.1' (If)
Else
  - No Actions - (To add one, press 'Action')
```

11.10.2.2Program: Alarm level 0.1

```
If
      $sHouse.armed is $cFALSE
   And $sAlarm.level >= 4
Then
      Set 'Alarm scene flasher' Off
Else
  - No Actions - (To add one, press 'Action')
```

We don't want normal house lighting turned off for low level alarms like Low Batteries etc.

$sALarm.Level = 1 gives a short beep on a few buzzlincs to alert the homeowner there is something to be looked at, and a notification should have been sent from the monitoring program.

11.10.2.3Program: Alarm level 1

```
If
      $sAlarm.level is 1
Then
      Set 'Mudroom / MudRm Beeper' On
      Set 'Utility Room / Util Beeper' On
      Wait  1 second
      Set 'Mudroom / MudRm Beeper' Off
      Set 'Utility Room / Util Beeper' Off
      $sAlarm.level  = 0
Else
  - No Actions - (To add one, press 'Action')
```

Level 1, beep, in-house only, for Low batteries, etc.

$Alarm.level = 2, longer beeper sounds to alert of more serious problems, and that notifications were sent from sensing devices.

11.10.2.4Program: Alarm level 2

```
If
      $sAlarm.level is 2
Then
      Set 'Mudroom / MudRm Beeper' On
      Set 'Utility Room / Util Beeper' On
```

```
        Wait  30 seconds
        Set 'Mudroom / MudRm Beeper' Off
        Set 'Utility Room / Util Beeper' Off
        $sAlarm.level  = 0
    Else
      - No Actions - (To add one, press 'Action')
```

Level 2, longer in-house notifications only

$Alarm.level = 3. Same as level 2 but with remote notifications that beepers are going in the house.

11.10.2.5Program: Alarm level 3

```
If

    $sAlarm.level is 3

Then

    Set 'Mudroom / MudRm Beeper' On

    Set 'Utility Room / Util Beeper' On

    Send Notification to 'Text  Larry' content 'House Beeping'

    Wait  1 second

    Send Notification to 'eMail Larry' content 'House Beeping'

    Wait  30 seconds

    Set 'Mudroom / MudRm Beeper' Off

    Set 'Utility Room / Util Beeper' Off

    $sAlarm.level  = 0

Else

  - No Actions - (To add one, press 'Action')
```

Level 3, In-house, and remote notifications,

$Alarm.level = 4. Medium duration, beepers, flashes all inside and outside lights, noise makers, and send notifications that house lights are flashing

11.10.2.6Program: Alarm level 4

```
If
    $sAlarm.level is 4
Then
    Set 'Mudroom / MudRm Beeper' On
    Set 'Utility Room / Util Beeper' On
    Send Notification to 'Text  Larry' content 'House Alarming '
    Send Notification to 'Text Jackie' content 'House Alarming '
    Wait  1 second
    Send Notification to 'eMail Larry' content 'House Alarming '
    Send Notification to 'eMail Jackie' content 'House Alarming '
    Repeat 5 times
      Set 'Alarm scene flasher' Fast On
      Wait  2 seconds
      Set 'Alarm scene flasher' Fast Off
      Wait  2 seconds
    Repeat 1 times
      Set 'Mudroom / MudRm Beeper' Off
      Set 'Utility Room / Util Beeper' Off
      Wait  1 second
      $sAlarm.level  = 0
Else
  - No Actions - (To add one, press 'Action')
```

Level 4, short duration, neighbourhood, and remote notifications,

$Alarm.level = 5. Long duration, beepers, flash all inside and outside lights with noise maker, send notifications that lights are flashing

11.10.2.7Program: Alarm level 5

```
If
    $sAlarm.level is 5
Then
    Set 'Mudroom / MudRm Beeper' On
    Set 'Utility Room / Util Beeper' On
    Send Notification to 'Text  Larry' content 'House Alarming '
    Send Notification to 'Text Jackie' content 'House Alarming '
    Wait  1 second
    Send Notification to 'eMail Larry' content 'House Alarming '
    Send Notification to 'eMail Jackie' content 'House Alarming '
    Repeat 100 times
      Set 'Alarm scene flasher' Fast On
      Wait  2 seconds
      Set 'Alarm scene flasher' Fast Off
      Wait  2 seconds
    Repeat 1 times
      Set 'Mudroom / MudRm Beeper' Off
      Set 'Utility Room / Util Beeper' Off
      $sAlarm.level  = 0
```

Else

- No Actions - (To add one, press 'Action')

Level 5, Long duration, neighbourhood, and remote notifications.

$Alarm.level = 4 or 5 notification text sample

SUBJECT: HOUSE ALARMING! ${sys.date} ${sys.time12}

Lights flashing and noise makers going in house!

11.10.3 Countdown Timer

When it's hot, I like to go to sleep with the whole house fan on. But there are nights I want it to stay on for a long time, and others when I want it on for just a bit.

My need is to control a whole-house fan.

Here's what a user can do;

- Turn a responder on, off or dim as usual using any KeyPadLinc or SwitchLinc button.
- Put the responder in timer mode by double-tapping the button.
- Increase the remaining time by double-tapping multiple times.

You will see below that the minutes remaining has been hard coded as 30 (in [Fan Increment], Then section). However, this could be replaced with a variable so it could be altered via the web or MobiLinc interface.

In my example, I'm watching two switches, one upstairs and one downstairs. Whether the fan is currently on or off, a double tap (from either location) turns it on and starts the timer decrementing. When the decrementing code times out, the fan is turned off.

Note that to detect button presses, individual devices must be checked. But for proper display status (if you have multiple controls linked), a scene must be used to ensure that all responders display the correct status.

A single variable, "Fan_Minutes" describes the remaining time on the counter.

Three program entry points are simple to follow;

11.10.3.1Program: Fan Increment

```
If   ;When either button is double-tapped
       Control 'Upstairs   / HouseFan' is switched Fast On
   Or  Control 'Upstairs   / HouseFan' is switched Fast Off
   Or  Control 'Downstairs / HouseFan' is switched Fast On
   Or  Control 'Downstairs / HouseFan' is switched Fast Off
Then
   Set Scene 'House Fan' On
   $Fan_Minutes += 30
   Run Program 'Fan Decrement' (If)
Else
   - No Actions - (To add one, press 'Action')
```

11.10.3.2Program: Fan Decrement

```
If
   $Fan_Minutes > 0
 Then
   Wait   1 minute
   $Fan_Minutes -= 1
   Run Program 'Fan Decrement' (If)
Else
   Set Scene 'House Fan' Off
```

11.10.3.3Program: Fan Stop Now

```
If
    Control  'Upstairs   / HouseFan' is switched Off
  Or Control  'Downstairs / HouseFan' is switched Off
 Then
  $Fan_Minutes = 0
  Set Scene 'House Fan' Off
  Stop program 'Fan Decrement'
Else
  - No Actions - (To add one, press 'Action')
```

12 INSTEON Notes

12.1 INSTEON Basics[43][44]

12.1.1 What is a Device?

Devices are the basic building blocks of your home automation system. These are the things you want to control, like switches, lamp modules, fan modules, water sensor modules, etc.

Normal control of devices in a home is done with mechanical switches, that the user has to turn on or off, or adjust ramp rates.

Devices in a home automation system need to have a different method to turn on and off devices, or adjust ramp rates, etc., which does not require human intervention, such as manually turning on a switch. This is done by the devices receiving commands from other devices and acting on these commands.

Devices can be setup to receive commands and act on them, or they can be setup to send commands for something to happen. Not all devices can do both, receive and send. For instance, a lamp module would receive commands only. It does not have a switch to initiate commands. Switches may send only can commands, as they have nothing to control.

12.1.2 What is a Controller?

Controllers are devices which send commands to devices which receive commands (responders).

Controllers not only respond to commands issued to the scene, they also control the scene.

An example of a Controller might be a button located on a Keypad – when that Keypad button is pressed, all members of the scene will respond as configured. Controllers are colored red within a scene.

12.1.3 What is a Responder?

Responders receive commands from controllers.

Responders are devices contained within scenes that only respond to commands issued to the scene.

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[43] (INSTEON)
[44] (INSTEON)

For example, a lamp module with a table lamp attached would likely be a Responder to the scene. When the scene is turned on, the lamp module would turn on. When the scene is turned off, the map module would turn off. Responders are colored blue within a scene.

12.1.4 What is a Link?

Links defines relationships between controllers and responders.

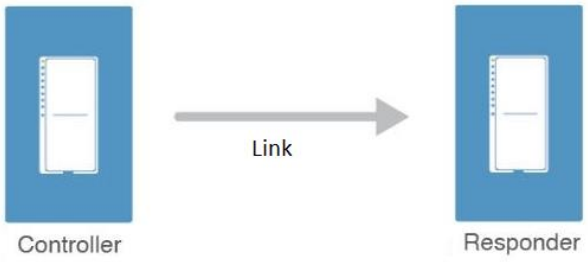


Figure 194: Link example

Links are in a single direction. If you wish two-way control, you will need to repeat the link setup process from the responder to the controller.

These are one-to-one relationships. Links can include additional information such as on-level and ramp-rates. Links are setup between controllers and responders.

The following depicts a very simple link where device A is the controller and Device C is the responder. In this instance, when Device A is turned on, it sends a command to Device C causing Device C to turn on. In this case, Device B is simply acting as a repeater, re-broadcasting the message but not acting on it.

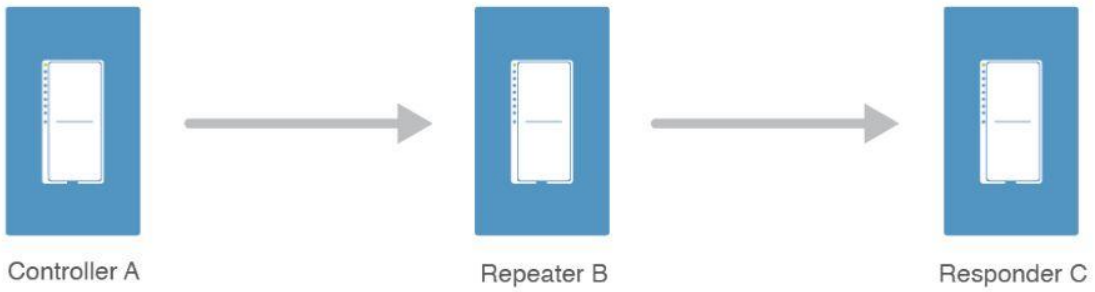


Figure 195: Link Relationship example

Every Insteon device has a record of all of the Controller/Responder relationships that affect that device. Controllers know which Responders they are linked to, and Responders know which Controllers they are linked to.

12.1.5 What is a Scene?

Scenes are simply a collection of links from a controller to one or more responders. For example. in the following diagram, Device 1 controls devices 2, 3, & 4:

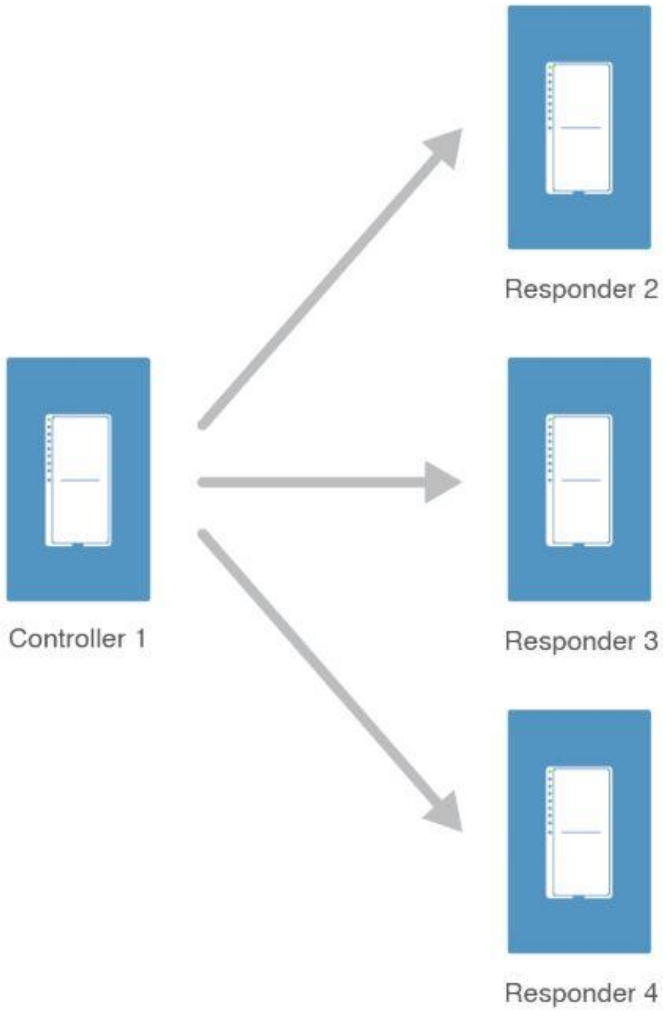


Figure 196: Scene example

We would call this the "Device 1 Scene." A Responder can be the member of numerous scenes, so Responder 4 may also be turned on by the Device 5 Scene.

The Terms Links and Scenes are Interchangeable.

In reality, there is no such thing as a link without a scene. In the first example above, even though Device A only controls Device C, Device A does so using Scene commands. As a result, many documents use the terms links and scenes interchangeably.

12.1.6 What is a Group?

A Group is a set of logical Links between INSTEON devices. A Link is an association between a Controller and a Responder or Responders. Controllers originate Groups, and Responders join Groups.

Devices in a group share all the same settings, for example on-level, ramp rates, etc. This keeps all group members synchronized. Every device in a group is both a controller of and responder to all other devices. The most common example of a group is a 3-way lighting circuit with 2 switches, such as switches at either end of a hallway.

Internally, in a Link Database maintained by INSTEON devices. A Group can have one or many members, limited only by the memory available for the Link Database. Examples of Groups

A device configured as a wall switch with a paddle could be designed to support one, two, or three Groups, as shown in the following examples.

One Group

Controller Event	Group	Action of Group Responders
Tap Top	1	Turn On
Tap Bottom	1	Turn Off
Hold Top	1	Brighten
Hold Bottom	1	Dim

Figure 197: One Group example

Two Groups

Controller Event	Group	Action of Group Responders
Tap Top	1	Turn On
Tap Top Again	1	Turn Off
Tap Bottom	2	Turn On
Tap Bottom Again	2	Turn Off

Figure 198: Two Group example

Three Groups

Controller Event	Group	Action of Group Responders
Tap Top	1	Turn On
Tap Bottom	1	Turn Off
Double Tap Top	2	Turn On
Double Tap Bottom	2	Turn Off
Triple Tap Top	3	Turn On
Triple Tap Bottom	3	Turn Off

Figure 199: Three Group example

12.2 Helpful Information on INSTEON and ISY[45]

First off, some nomenclature. Every Insteon device has an address - in the format aa.bb.cc where the letters correspond to Hex number 0-F. This system allows for over 16 million different addresses and I doubt Smarthome has sold that many devices but at some point they will repeat. It is important, though, that every device in your home have a unique address.

Next - Insteon deals in 'groups'. Every kind of command in Insteon is a group command. As such the words related to Insteon are heavily flavored with the word group. Insteon also deals with 'controllers' - devices that send group commands such as on or off and 'responders' - devices that receive these group commands and act accordingly. Some devices are both controllers AND responders - such as KeypadLincs or SwitchLincs. Some are just controllers - like Motion Sensors - and some are just responders - like InlineLincs. Regardless the terminology is the same.

In the context of a device as a controller the buttons on that device are not referred to as buttons. They are referred to as groups. A SwitchLinc has, therefore, 1 group - its paddle. We'll call this group 1. KeypadLincs can have either 8 groups or 5 (the on/off on a KPL6 is group 1). When they have 8 groups they're simply referred to as groups 1-8. When there are 5 groups they are referred to as groups 1,3,4,5,6

In the context of a device as a responder the buttons are referred to as buttons - and the numbering is the same as the groups are for controllers.

If it helps, you can think of the part that clicks when pressed as the groups and the LED's that light up on them as the buttons.

[45] (posted by: MarkJames)

The basic Insteon command set that concerns us - outside of the bright and dim commands are on, fast on, off, and fast off. Fast on and Fast off are simply double-presses of an on or off. Insteon gives you some extra flexibility in the way it handles them. On turns the device on to the set dim level at the set ramp rate. Off turns the device off at the set ramp rate. Fast on turns the device full on instantly and Fast off turns the device full off instantly.

OK... so let's examine how Insteon works and how ISY ties it together.

When you first install an Insteon device like a SwitchLinc it will just control its load - no different than a regular switch. On will turn on, off will turn off, hold the button will dim/bright. I'm going to skip over the parts about setting the ramp rate and bright level on an individual switch in isolation for the moment as the internal method is different than 'regular' Insteon. That's because there is no powerline transmission - it's all done internally. So let's go on to the next logical step - linking two devices.

Every Insteon device has a controller link table and a responder link table. The controller table keeps track of what that device controls - it's the 'who do I control?' table. The responder table keeps track of what devices control it - the 'who controls me?' table. A typical controller record will keep the address of the device to be controlled, the group on the controller itself responsible for the control, and the button # on the controlled device that will be controlled. So in a SwitchLinc with address aa.bb.cc that will be controlling SwitchLinc device dd.ee.ff there will be a controller record in aa.bb.cc that says dd.ee.ff, group 1, button 1. The group and button numbers must be 1 as a SwitchLinc only has 1 group to send and one button to respond (they are physically the same thing - only the name changes)

If aa.bb.cc was a KeyPadLinc the controller record group # could range from 1-8 as appropriate but the SwitchLinc would always be button 1. If it was a KeyPadLinc instead of a SwitchLinc at dd.ee.ff then the button being controlled could be 1-8 (unless it’s a kpl6 as above)

So, what happens when you press the ON button on a controller with this controller record? A group command to address dd.ee.ff. will be sent from group 1 to turn button 1 on (and it's load if applicable). But in this case absolutely nothing will happen! Why? Because you haven't yet created the responder link in the dd.ee.ff device.

This is an important difference between X-10 and Insteon and one worth mention. In X-10 a miscreant could plug a controller into an X-10 enabled house's outdoor outlet and start turning lights on or off. Clearly you wouldn't want to control your security system via a B-3 off! With Insteon this is not possible - you are protected - as no device in your house would have a matching responder record to the intruder's device! For additional security an Insteon device is designed to NEVER reveal its address except when placed into linking mode - which requires physical access to the switch. So, your neighbors can NEVER control your Insteon devices! Insteon devices can even encrypt their data using a feature called

'extended messages' - this makes Insteon suitable for high-security applications such as door locks or security systems.

So, when you link devices you create the controller link in the controller link table and then you go to the responder and create the responder link to complete the linkage. I should mention that one of the benefits of ISY is that it takes care of creating both sides of the link for you - the controller record in the controller and the responder record in the responder. The responder link table looks a little different than the controller link table. It keeps the address of the device that will control it, the group of the device on the controller that will control it, the button on itself that will be controlled, the ramp rate for it to respond and the dim level for it to respond to. So... when a responder sees a group command arrive with its address as the destination it looks in its responder table for a record that matches the controlling address and controlling group and if they match it reacts by doing what it's supposed to do in that record according to the group command it receives.

So how does it react to these commands?

When a responder receives a fast OFF - it turns completely off instantly. When it receives a fast ON - it turns completely on to full brightness instantly. Off will turn the device off but will do so at the ramp rate specified in the responder table for that command. On will turn the device on - again at the ramp rate specified but will turn it on to the level specified in the dim level setting in the responder table. What's important here is that the controller is only sending on, fast on, off, fast off. The 'scene' type settings - the dim level and ramp rate - are stored in the responder table for the matching group command.

The next important thing to understand is how Insteon sends it's commands through the network. Insteon doesn't do what X-10 did - flooding the powerline with a varying, time sensitive voltage signal. Insteon controllers send their command to the devices they know of as a binary message with specific data in it. The command is set to a 'max hops' of 3. If the destination device receives the command then it responds, acknowledges, and it's over. If not then that device will relay the command to the devices that it knows of and decrement max hops. When max hops reaches 0 that device will no longer forward the command. This is so that if you sent a command to a device that doesn't exist it would bounce infinitely around inside the network, never stopping. That would effectively ruin your network. Max hops prevents this internal reflection. You can see clearly by this 'mesh' model how having more devices and more links between them strengthens the network as there are more paths to get to each device and a greater likelihood of finding it quickly.

A significant part of this communication is that when the responder finally receives the command it acknowledges it. This is something that X-10 never did. With X-10 you sent your command and prayed. Later devices let you do status checks but they were expensive and didn't work well. The controller relies on this ACK coming back. Commands that are not acknowledged cause a great deal of network performance degradation. The controller will lag and flash if it doesn't receive a prompt ACK - this signifies to you that something is wrong - and that something is usually a missing responder or responder link.

Let's look at the links a little more 'visually'.

Essentially in each device there are two tables that look like below. There is actually a lot more info than this but what's here will suffice for 99% of what we need to do. Note that when you see the Ramp Lvl - it's a number from 0 to 31 for a range of instantaneous to about 9 minutes. For those of you who speak binary you'll spot the 0-31 range as representing the least significant 5 bits of an 8 bit byte. The dim level is a number from 0 to 255 where 255 is full bright, 0 is full dim - again, for binary users this is an 8 bit byte.

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

So in a typical situation - say SwitchLinc A - device address AA.AA.AA that is linked to SwitchLinc B - device address BB.BB.BB you would see tables that look like this

EXAMPLE 1

Device AA.AA.AA

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

1.....1.....BB.BB.BB.....1

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

Device BB.BB.BB

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

1.....1.....AA.AA.AA.....1.....31.....255

To complete the '3-way' control the links tables change and look like this:

EXAMPLE 2

Device AA.AA.AA

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

1.....1.....BB.BB.BB.....1

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

1.....1.....BB.BB.BB.....1.....31.....255

Device BB.BB.BB

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

1.....1.....AA.AA.AA.....1

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

1.....1.....AA.AA.AA.....1.....31.....255

So here we have the simplest sort of Insteon scenario. Of course many of us use KPL's to control other devices. With a KPL you start to get into the whole 'group' vs 'button' scenario. So let's see what happens when a KPL8 is used to control a switchlinc. In this scenario we'll have button C on the KPL crosslinked with a Switchlinc. The KPL will be device AA.AA.AA and the switchlinc device BB.BB.BB. Note that the controller group # for the KPL is 3 - that corresponds to button C

EXAMPLE 3

Device AA.AA.AA (kpl)

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

1.....3.....BB.BB.BB.....1

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

1.....3.....BB.BB.BB.....1.....31.....255

Device BB.BB.BB (switchlinc)

Controller links table (what I control)

Link#.... My grp #..... Resp address..... Resp button #

1.....1.....AA.AA.AA.....3

Responder links table (what controls me)

Link#.... My btn #..... Ctrlr address..... Ctrlr Grp#.....Ramp Lvl.... Dim Lvl

1.....1.....AA.AA.AA.....3.....31.....255

In KPL's there is an additional kind of link many of us use - the link WITHIN the KPL - for example using button H as an 'all off' turning off everything on the same KPL. This functionality DOES NOT look the same and DOES NOT use the controller/responder link tables. A moment thought will understand why not as NO powerline communication is necessary in this case - the device is simply talking to itself.

OK... so now we have the tables - what about the command? In the above KPL example you would see a command issued when button C was pressed that contained

Cntrlr Address.....Cntrlr Group #.....Destination Address..... Destination Button #

AA.AA.AA.....3.....BB.BB.BB.....1

The command would get relayed through the network until a responder with a matching destination address received it. When the responder with the matching address sees the command, it refers to its responder table and if it finds a match for the controller address and group # it processes the command according to the dim level and ramp rate in the matching record.

Simple, right?

OK - so we have the basics of Insteon communication and link tables. So, what, then, is a scene?

Well - a scene is merely a bunch of devices that all have responder records with matching controller addresses and controller groups. This means that they are all prepared to respond to the same group command from the same controller address.

The power of the scene is that because the dim level and ramp rate are set in the responder link table a single controller can turn multiple devices on to varying levels of brightness at varying rates. Very cool! But you have to remember that the devices are still simply responding to on, off, fast on, fast off. So ALL the devices in the scene will either turn on or all the devices will turn off. You don't get to mix ons and offs in one group command. This is kind of restrictive in that for most of the scenes I've ever created I've wanted some lights to turn off while others turn on and others dim. The solution to this problem is the dim level setting. Recent Insteon devices have overcome the problem of a scene ON command needing to turn things OFF by allowing a dim level near 0. When the Insteon device receives an ON and its dim level is set close to zero it will turn the device so low that it appears off. Magic! Scenes can now do whatever you want! Further - because scenes respond to dim/bright commands as well you can get creative and make all the lights in a scene move up and down in unison - very cool.

It's important to note, though, that you CANNOT turn off a KPL button using an ON command. Even if you set it to a low dim setting it will not work.

So, what is it that ISY is doing for you?

Well the first thing ISY does is have you add your devices. This is a very significant part of the process and bears some analysis. When ISY adds your device, you tell it the address (or put the device in linking mode). This is in keeping with what I mentioned earlier about security - ISY can't find it unless you tell it where it is or make it visible manually. You can either tell ISY what kind of device it is or let it figger it out itself by device ID and version information kept within the device. This is so that later on ISY can offer you the choices and functions relevant to your device specifically. You hit OK and ISY goes off and does some stuff.

So, what's it doing? Well - it's recording the info about your device into its own table. It's also creating a controller-responder link between your device and the PLM. This is of great importance as the PLM is the hub of a scene controller like ISY. So, let’s examine a PLM for the moment.

A PLM is basically like a KPL without the ability to control anything and without any buttons. It has groups that number into the hundreds and each group has its own responder and controller link tables. Why does ISY link your device to the PLM? There are two reasons. First - a controller with no links at all sends no signals on the network. If you connect a SwitchLinc to your light and do not link it as a controller to another device then when you press the button on the SwitchLinc the light turns on and off but NO Insteon signal is sent. The device is effectively invisible to the ISY or anything else on the network. Programs based on status and control states couldn't work without being able to detect the

signals. Why does it send nothing? Well - what would it send? There are no records in its controller link table! It has nothing to send to anyone so it just sits there quietly. So ISY linking your device to the PLM makes it visible on the network.

Secondly - one of the key features of the ISY is to be able to know - at a glance - what devices are on or off or at what dim level. By linking each device to the PLM your ISY can be informed when the devices change by looking at only one device - the PLM. The PLM is connected to the ISY by cat5 cable so it's fast - no powerline messaging required. When the PLM link is controlled the ISY is notified and makes entries into its tables so that it 'knows' what's on, off, dim, etc. and can tell you without having to go look first

Understanding this is key to understanding why you do NOT want to create links outside of ISY in your home network. Doing so will render the PLM records inaccurate and therefore your ISY info inaccurate. So always link your devices through ISY. I would wager that 99% of comments about lights turning on or off when they shouldn't are related to links created inadvertently outside of the ISY. Insteon is NOT like X-10. A device cannot respond arbitrarily. If it doesn't receive the RIGHT command from the RIGHT controller it will NOT respond. As you saw earlier the matching records have to exist. X-10 was subject to stray signals, line interference, and who knows what else. It was common to have lights turning on or off mysteriously. Not in Insteon.

The other purpose of the PLM is to keep all the group responder and controller link tables as a sort of library. This allows you to create way more scenes than you have controllers and use a scene controller like ISY to manage them. What I mean by that is this. Let's say you have 20 InlineLincs and one KPL6. The most scenes you could have would be 5 - one for each button on the KPL (again, remember that the off on a KPL6 is group 1). The responder link table in all the InlineLincs would have the controller address of the kpl, and a line for each group (1,3,4,5,6) and the associated ramp/dim. Now let's say you have a PLM in the system whose device address is pp.ll.mm (yes, I know that's not hex). You could start creating responder links in your InlineLincs (using a scene controller like ISY) that respond to device pp.ll.mm group 1, 2, 113, 224..... all the way into the hundreds! Now that's flexibility!

Of course, you could never SEND those group commands with only a PLM as a PLM doesn't have the ability to do that. That's what a scene controller like ISY does - it CAN send the group command specifying the PLM address and group # in the controller command. So, using your ISY you can now create hundreds of scenes where once you could create tens. Your scene flexibility is not limited to the number of controllers you have and that's great because who wants every switch in their house to be a KPL8? Now you can have scenes launched based on programmatic control - fast on, fast off, on during a certain time, two switches on at once, switches turned on or off in sequence - whatever you can imagine!

So why does ISY treat everything as a scene? That's a common question and with the information we have now the reasons are obvious. The scene corresponds to a PLM record and the ISY only knows the status of your devices because it is informed when a PLM group

changes. When it sees the change, it matches the PLM change against its internal tables and you will instantly know the status of your devices. Without using the PLM linkage ISY would have no way of knowing what the status of your system was. Because Insteon commands only hop until they find their destination ISY would not be privy to every command issued on the network. Furthermore, in order to determine the status of any device without the PLM links the ISY would have to query the device each time you needed or wanted to know. This is dreadfully time consuming! Adding the PLM link causes zero degradation in your network performance and makes ISY very powerful indeed.

Some other things ISY does:

- It takes care of writing both sides of the controller-responder linkage for you so all you have to do is specify a controller and a responder. It also makes it a snap to 3-way the linkage by specifying both (or n) devices as controllers so their states reflect in each other.

- ISY maintains all the links in its database it makes it a snap to restore a device to its appropriate link tables should you reset it for whatever reason.

- ISY will do all the work of changing all the controller and responder records in all the linked devices should you change out a device. This can be a HUGE time saving for you in a heavily linked system as every single responder and controller record must be changed to reflect the address of the new device!

- ISY will also take care of removing all the responder links in devices should you choose to 'break the link' - again, this is a huge time saver vs the manual method of putting your devices into unlinking mode one by one.

- ISY will configure button toggle modes (which I didn't go into as this is an internal memory addressing procedure) as well as button grouping and backlighting. It keeps you from having to remember how to set each little aspect of each firmware version of each device. The way Smarthome keeps churning these things out you end up with quite a library of 'how-to's by the time you have a house full of Insteon.

-ISY also makes it a snap to bring up a scene and adjust all the responder links related to a specific controller simultaneously on ONE page!

and, of course, there's the programming language which allow complex device management based on multiple conditions!

12.3 Spidering Your INSTEON Network[46]

12.3.1 Spidering While Keeping Your Existing Links

If you are new to the ISY and want to keep your existing network links, then spidering your network is what you are looking for. It will bring in any existing links in your devices so you will have less to do manually. It is suggested you pick devices to start with that are part of large scenes (like an "all lights" scene), because the spidering depends on following the links around your network to get as many devices as possible.

- Log into your ISY.
- Open the linking utility from the pull-down menu: go to "Link Management --> Start Linking"
- Select "Add devices found in links and keep existing links" which puts it into spider mode
- OK the popup window which warns of the lengthy time it might take
- Go to one of your devices with a big scene linked to it, and hold the button down until it goes into linking mode
- On the screen that shows the popup window titled 'Linking In Progress', click the FINISH button to begin finding your Insteon devices.

The ISY will start spidering the network collecting all the links it can find. If it misses some of your devices you can go to one of the missed devices that has a large scene and repeat the same process. Keep working your way through your network until all your devices are added to the ISY.

[46] (Universal Devices)

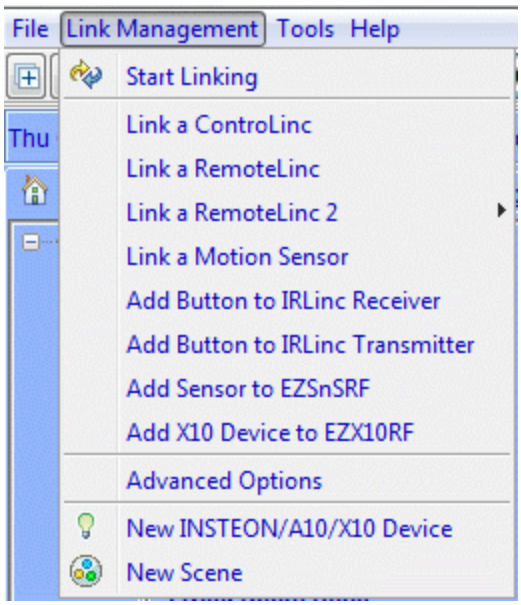


Figure 200: Launching the Linking Command

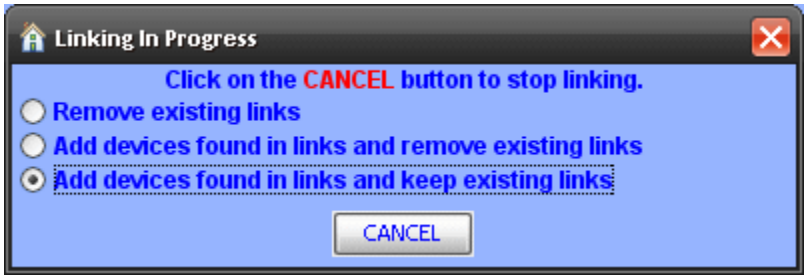


Figure 201: Select the Linking Mode

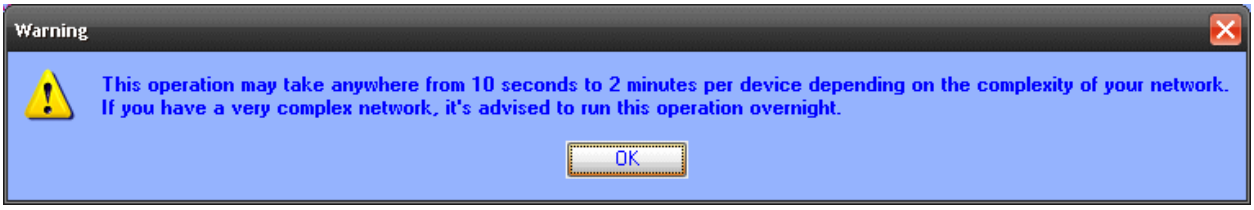


Figure 202: Answer the Warning

12.3.2 Spidering While Removing Your Existing Links

If you are new to the ISY and want to keep your existing devices but clear out your existing links, then spidering your network with removing your links is what you're looking for.

- Log into your ISY.
- Open the linking utility from the pull-down menu: go to "Link Management --> Start Linking"

- Select "Add devices found in links and remove existing links" which puts it into spider mode
- OK the popup window which warns of the lengthy time it might take
- Go to one of your devices with a big scene linked to it, and hold the button down until it goes into linking mode
- On the screen that shows the popup window titled 'Linking In Progress', click the FINISH button.

The ISY will start spidering the network collecting all the links it can find, then will clean up the links after its done. If it misses some of your devices you can go to one of the missed devices that has a large scene and repeat the same process. Keep working your way through your network until all your devices are added to the ISY.

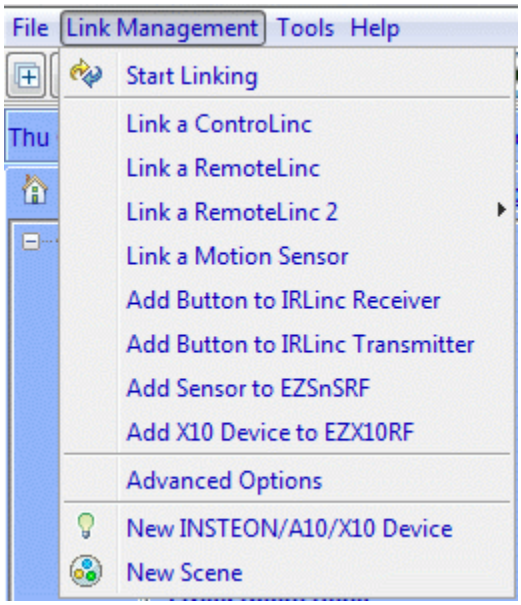


Figure 203: Launching the Linking Command

Figure 204: Select the Linking Mode

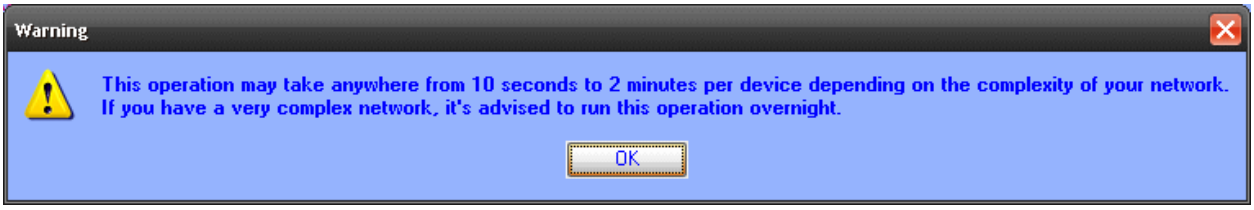


Figure 205: Answer the Warning

12.4 Generating a Network Topology Table[47]

12.4.1 Adding Data

The table you can generate has some columns that you can add personal data to help you better understand your setup. If your wanting to add to the table these entries (ie. Is Load, Location, Notes) you have to enter them in the device properties.

- Log into your ISY.
- To get to each device properties go to the Main tab
- Expand the tree to your 'My Lighting'
- Right click on a device and select properties
- In this window you can add details to each device for the spreadsheet.

Figure 206: Select Properties

[47] (Universal Devices)

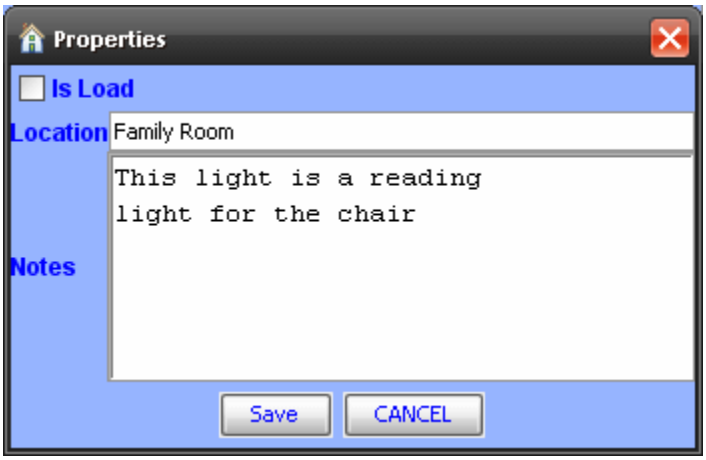


Figure 207: Device Properties

12.4.2 Outputting the Table

The ISY can save a html file with your INSTEON network topology then automatically launch it in the web browser.

- Log into your ISY.
- Click on the pulldown "Tools --> Generate Topology"
- Pick a location to save the file
- Wait for the ISY to generate the file and launch your default web browser

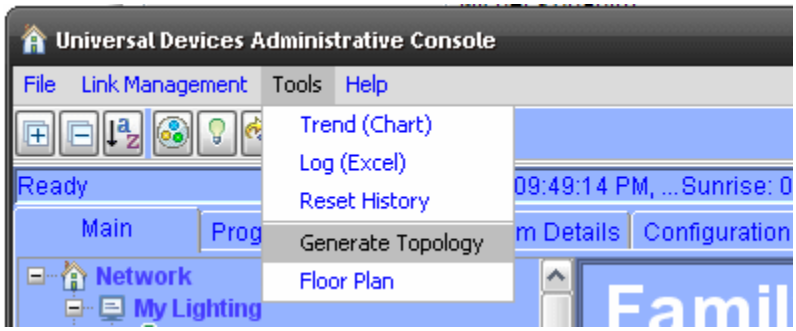


Figure 208: Select Generate Topology

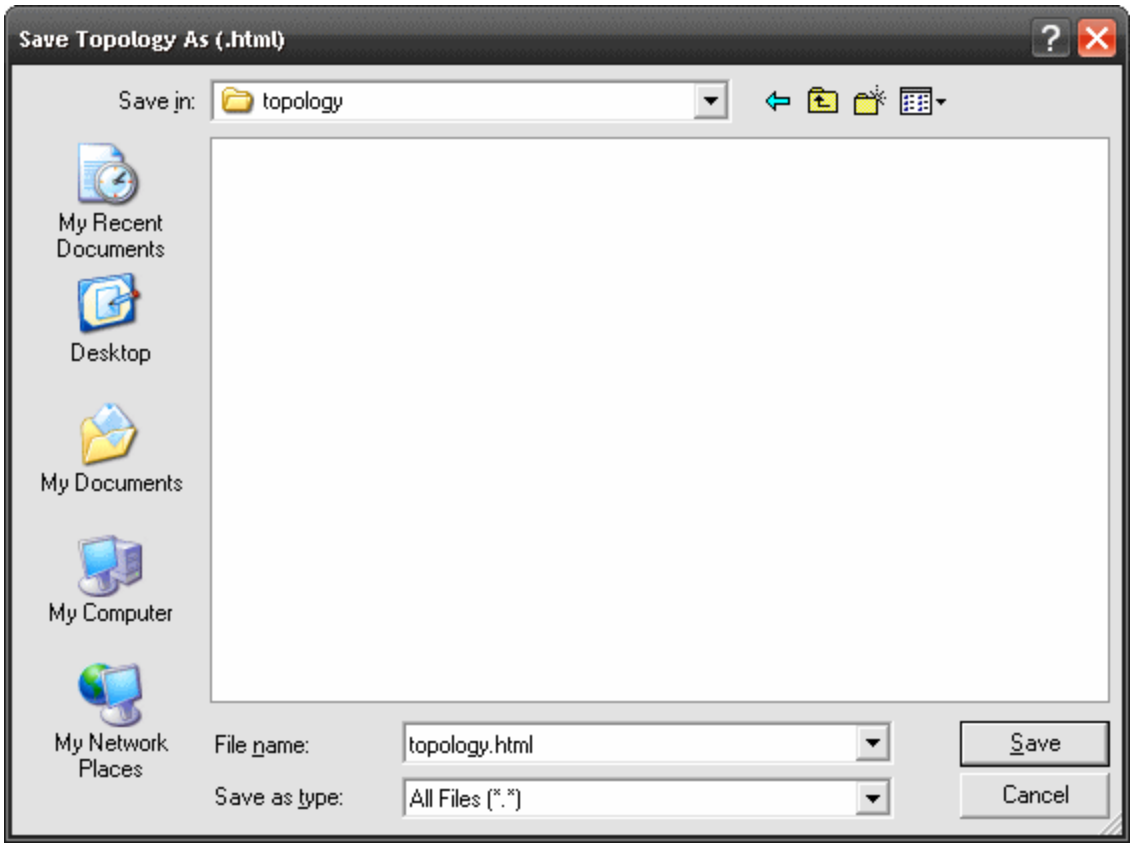


Figure 209: Save Topology File

My Lighting

Name	Address	Location	Is Load	Relationships	Type	Notes
Christmas Radio	07.D3.2B.1	-	No	Christmas Radio Scene:Responder	(245683)ApplianceLinc v.28	-
Christmas Radio Sign	04.C9.B3.1	-	No	Christmas Radio Scene:Responder	(2456D3)LampLinc v.28	-
Christmas Tree	01.44.E8.1	Family Room	Yes	Christmas Tree Scene:Responder Family Movie Time Scene:Responder Family Evening Time Scene:Responder	(2456D3)LampLinc v.28	-
Dining Hutch	06.14.EA.1	Dining Room	Yes	Dining Hutch Scene:Responder Master Rest Of House Scene:Responder Family Evening Off Scene:Responder Family Movie Time Scene:Responder Family Evening Time Scene:Responder Inside All Scene:Responder	(2456D3)LampLinc v.28	-
Family Desk	01.41.D5.1	Family Room	Yes	Master Rest Of House Scene:Responder Family Evening Off Scene:Responder Family Movie Time Scene:Responder Family Desk Scene:Responder Family Evening Time Scene:Responder Inside All Scene:Responder	(2456D3)LampLinc v.28	-
Family Desk (1)Desk	01.7E.88.1	Family Room	No	Family Desk Scene:Controller	(2430)ControLinc v.00	This light is a reading light for the chair
Family Desk (2)Dining Hutch	01.7E.88.2	Family Room	No	Dining Hutch Scene:Controller	(2430)ControLinc v.00	-
Family Desk (3)Christmas Tr	01.7E.88.3	Family Room	No	Christmas Tree Scene:Controller	(2430)ControLinc v.00	-
Family Desk (4)Movie Time	01.7E.88.4	Family Room	No	Family Movie Time Scene:Controller	(2430)ControLinc v.00	-
Family Desk (5)Inside All	01.7E.88.5	Family Room	No	Inside All Scene:Controller	(2430)ControLinc v.00	-
Family Main (A)Evening Tim	06.1C.2C.3	Family Room	No	Family Evening Time Scene:Controller Inside On LEDs Scene:Responder	(2486D)KeypadLinc Dimmer v.29	-
Family Main (B)Movie Time	06.1C.2C.4	Family Room	No	Family Movie Time Scene:Responder Inside On LEDs Scene:Responder	(2486D)KeypadLinc Dimmer v.29	-
Family Main (C)Night Off	06.1C.2C.5	Family Room	No	Inside Off LEDs Scene:Responder Family Evening Off Scene:Controller	(2486D)KeypadLinc Dimmer v.29	-
Family Main (D)Inside All	06.1C.2C.6	Family Room	No	Inside All LEDs Scene:Responder Inside All Scene:Controller	(2486D)KeypadLinc Dimmer v.29	-
Family Main (load)	06.1C.2C.1	Family Room	Yes	Inside Security Scene:Responder Master Rest Of House Scene:Responder Family Evening Off Scene:Responder Family Movie Time Scene:Responder Family Evening Time Scene:Responder Inside All Scene:Responder	(2486D)KeypadLinc Dimmer v.29	-
Family Screen	03.D8.A6.1	Family Room	Yes	Master Rest Of House Scene:Responder Family Evening Off Scene:Responder Family Movie Time Scene:Responder Family Evening Time Scene:Responder Inside All Scene:Responder	(2876D3)Icon Switch Dimmer v.27	-
Guest Bath Main	03.BA.A4.1	Guest Bathroom	Yes	Master Rest Of House Scene:Responder Guest Bath Scene:Controller Inside All Scene:Responder	(2876D3)Icon Switch Dimmer v.27	-
				Master Rest Of House Scene:Responder		

Figure 210: Topology Table

12.4.3 Viewing your Network XML File in Excel (Workaround)

All the attributes of your network for the ISY are stored in an xml file on your ISY. You can access this XML file by pointing your web browser to the file. You can take this one step further and open it with Excel's built in reader.

- In your web browser open http://your.isy.ip:port/web/nodescnf.xml
- Use the "File --> Save As" and save it to your computer (if your using IE7 hit the Alt key one time to display the command bar to find File)
- Launch Excel and open the XML file

12.5 Troubleshooting INSTEON Communication Errors[48]

12.5.1 **Communication** Problems with INSTEON Devices

The INSTEON protocol is a much more robust communication protocol than the older X10 protocol that it replaces. However, INSTEON users will sometimes find that while their INSTEON devices seem to communicate reliably between themselves, the ISY-26 will report "Communication Errors" on their power line network. There are multiple reasons for this:

- The ISY-26 communicates to the INSTEON devices on a power line network via the SmartHome PLM (PowerLinc Modem). The PLM can be less tolerant of weak INSTEON signals and power line "noise" (interference) than the actual INSTEON switch devices themselves.
- The PLM and ISY-26 require reliable "acknowledgements" of their "requests" to the INSTEON devices. When these are not properly received for any reason, the ISY-26 will display an error. Sometimes this will prevent the completion of an ISY-26 function.

Due to these characteristics, a power line network must be as free as possible from substantial interference or signal loss, in order for the ISY-26 to provide error-free INSTEON device monitoring and control.

The following tips may be helpful if communication problems are encountered:

- **Use two SmartHome AccessPoints to improve network communications. Place these on opposite legs (sometimes called "phases") of the power line mains.** The AccessPoints provide their own internal utility (as described in their enclosed instructions) to determine if they are on opposite legs of the power line mains. (The older SignaLincs can also be used for the same purpose.)
- **Place the two AccessPoints as close to the power line mains breaker or fuse box as possible.** This will give most signals the best chance of being propagated back throughout the entire power line network. This can provide a dramatic improvement in some cases. Again, be certain that the AccessPoints are placed on opposite legs of the power line mains.
- **Stack or "piggy-back" an additional AccessPoint on top of the PLM to improve network communications.** The use of a stacked AccessPoint can improve Insteon signal strength to enable the PLM to better receive and send signals. Many users have reported that this is an effective solution. It may help to add this as an

[48] (Universal Devices)

additional (third) AccessPoint in addition to the previously mentioned two AccessPoints.

- **Do not plug a PLM into a power strip that has any type of surge-suppression incorporated**, as this can weaken the INSTEON signals. Likewise, certain models of GFCI outlets have also been reported to degrade INSTEON signals (this, however, is not true for all GFCIs). To provide for surge protection for the PLM, ISY, and all of your INSTEON devices, consider using a "whole house" surge suppressor. This can often be supplied and installed by your electric power utility for a minimal charge.

The next points are probably some of the most important:

- **Use power line filtering devices (such as the SmartHome Filterlinc) on all potential signal "sinks" and noise generating devices in your home.** Devices such as computer power supplies, televisions, home theater systems, etc., can all act as "signal sinks" that degrade the INSTEON signals on your power line network. Conversely, devices such as low voltage halogen lighting, CFLs (compact fluorescent light bulbs), etc., can generate interference patterns on your power line network that can cause the PLM or even other INSTEON devices to miss INSTEON control signals, which get lost in the background noise on the power line. Even if you have previously installed some power line filters on your system, you may find that more may be required if problems still persist. Also, remember that the bottom outlet on the Filterlinc is the "filtered" outlet.
- **For hard-wired halogen or fluorescent lighting, in-line noise suppressors can be used (such as the Levition Noise Block model 6287).**
- **Some CFLs are prone to producing much higher levels of power line noise than others.** CFLs that are producing excessive line noise can be replaced with those that produce less interference.

12.6 INSTEON Signal / Noise Troubleshooting[49]

Our support department gets a fair amount of calls with question on INSTEON signal troubleshooting. The problems that the customers are experiencing are related to noise on the powerline and not an issue with the ISY. I wanted to provide a few points that you may find helpful in troubleshooting communication issues to your INSTEON devices from the ISY.

We tend to look to noise at the culprit when things start to become intermittent with device communication.

[49] (Universal Devices)

Example: Today 3 or my 5 devices turned on in a scene but yesterday everything worked fine.

Tools to look for noise.

- Place an INSTEON keypad in link mode and watch the flashing cadence. It should flash on and off about every second. When noise is present the flash cadence will be all over the place. It might flicker instead of flash and it might stay off to 5 or 10 seconds at a time then flash fast. (to put a keypad in link mode you just press and hold the set button in for 5 seconds)
- Some INSTEON devices actually have a function called flash on traffic. This will cause the LED on the device to flash when it see powerline traffic and in some cases it can show noise also.
- Query a device in the ISY and it should query very fast. If it takes 20 seconds (it should take a second or two) then you may have noise of phase bridging issues.

What to do to identify Noise.

- I find the easiest way to get to the bottom of the cause is to look for the identifier like the flashing on the keypad then go to the breaker panel and turn off the first breaker. Look to see if the flashing goes back to normal. If not then turn that breaker on and turn off the next. Keep doing it until the keypad flashes at a normal cadence. Note: Try not to switch the breaker that controls the keypad you are watching. If you go through all of the breakers and you have found the cause then it may be the circuit the keypad is on. In this case you unplug any device plugged into that circuit and see if one of the plug-in loads is the cause. Once you find it you can simply buy a plug-in filter and filter that device.

In closing, there doesn't have to be a device that you just added that causes the problem. It could be a device you have had for years and one day it starts to throw noise on the powerline. I had a customer that had a Sonic Care tooth brush and then the brush was in the charger it destroyed communication to 120 switches in his house. This is just one example and there are other stories like this with simple plugin loads that start to produce noise on their own.

12.7 INSTEON No Status Feedback from Devices[50]

ISY programs which are based on Status or Control depend on the status of devices being communicated back to ISY from the device and through the PLM. Therefore, if you do not see immediate status updates on the Admin Console when a device is manually controlled (at the device), then - and in all likelihood - the issue is PLM related and specifically link records for that device does not exist in the PLM. Since PLMs have limited capacity for link records (about 2000 but they stop sending change of state after about 900), it's always best

[50] (Universal Devices)

to plan your installation ahead of time and **estimate the number of links** your PLM is going to have.

If this issue has surfaced only after replacing a PLM, please follow the instructions here: http://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:File_Menu#Replace_Modem_.28PLM.29

If you have ever clicked on File | Delete Modem, then you must have a good backup from prior to this operation, do a File | Restore ISY, and then followed by File | Restore Modem (PLM).

The first step is to get the PLM Link count:

- Login to the Admin Console
- Go to **Tools | Diagnostics | Show PLM Link Table**
- click on the **Start** button, wait for completion
- Once complete, click on the **Count** button

How many links do you have? You should have:

- At least twice as many links in the PLM as the number of nodes in your device tree (Admin Console/Left Pane)
- At most 900 for 2413S PLMs

If Link count is 0:

- Go to **file | Restore Modem (PLM)** ... this will attempt to recreate all the links in the PLM
- Once Restore Modem (PLM) is completed, count the number of links in the PLM again using the procedure outlined above
- If the link count is still 0, then in all likelihood the PLM is dead and has to be replaced

If Link count is more than 900?

- When you have too many large scenes, PLM link records are used up pretty quickly
- It would be best to merge all most of the scenes with common members into one
- If you have very large installation, consider using programs for some of the scenes

12.8 INSTEON Random All On Events[51]

Random All On events are related to INSTEON commands being sent to the PLM from ISY and, on the other hand, one (or more) INSTEON devices sending events to the PLM **at the same time** and thus causing packet collision. **RF/dual band devices** increase the likelihood of this event since they send two packets for each signal.

The combination of the following technique will dramatically reduce the likelihood of All On events:

You don't have any programs that use **Control** for a device and then send a **Scene** command to a scene which includes the same physical device. So different buttons from the same KPL are considered one device

Don't Use a **Control** for a device which is already a **Controller** for some **Scene** and then have the program send other INSTEON commands to other devices/scenes. This basically causes two or more events arrive at the PLM at the same time

In addition, motion sensors with low battery, sometimes go crazy and start sending sequences of on/off every second or so. As such:

- Check Tools | Log for sequences of motion sensor on/off every few seconds and in succession
- If you do have those, change the motion sensor battery

12.9 INSTEON Safe Mode Dialog[52]

If you see **Safe Mode Dialog** as soon as you login to the Admin Console then, and in all likelihood, the PLM is defective. **If you have a good backup**, you might want to try the following:

- Unplug the PLM, wait for 30 seconds
- Press and hold the set button on the PLM while unplugged for 10 seconds … continue holding the set button on the PLM and then plug the PLM back in and while continuing to hold the set button on the PLM wait for another 10 seconds
- Reboot ISY and login to the Admin Console
- If you still get the Safe Mode dialog, then try pushing up the pins inside the RJ45 on the PLM (perhaps they are not making good contact), plug the cable back, reboot ISY, and then login to the Admin Console

[51] (Universal Devices)
[52] (Universal Devices)

- If you no longer see the Safe Mode dialog, then click on **File | Restore Modem (PLM)**

If neither of the above works OR the LED on the PLM is not lit, then, unfortunately you have a defective PLM. If your PLM is less than 2 years old, you might be able to get a replacement from SmartHome. Once you get a new PLM, please follow the instructions here: http://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:File_Menu#Replace_Modem_.28PLM.29

13 INSTEON Device Notes

Some INSTEON devices require special care when used with the ISY. Some need to be added to the system in a specific way, and some have unique options available when configuring with the ISY. This section details some of this information and more.

As always, please refer to the manufacturer's documentation first. Please consider the following notes as a secondary source of information.

The following notes are sorted alphabetically by device name.

13.1 PowerLineModem (PLM)[53]

The ISY uses the PowerLineModem (PLM) to interface with Insteon and X-10 signals. The PLM sends Insteon and X-10 commands initiated by the ISY and receives Insteon and X-10 commands placed on the power-line by Insteon and X-10 devices.

Every Insteon device in your system must be linked to the PLM for the ISY to be able to communicate with it. In this manner Insteon signals are secure. Insteon devices are linked as a controller, a responder, or as both a controller and a responder. In addition, every scene created with the ISY creates links in the PLM to each device in each scene. It is through these links that the ISY can control scenes and track the status of devices.

X-10 devices do not require any links in the PLM. X-10 signals can be sent and received freely, there is no security.

- The 2412S PLM provides a link database of 2016 and provides power for the ISY-99i.
- The 2413S PLM (Dual Band) has a database for 1023 links. There is no power output provided, a separate power supply is necessary for the ISY. This PLM interfaces signals on the power-line as well as radio frequency.

The PLM is connected to the ISY-99i using a CAT5 ethernet cable. The ISY-26 is connected with an RJ-45 to Serial cable.

[53] (Universal Devices)

There are options on the Administrative Console File menu for the PLM.

- Restore|Replace Modem
- Remove Modem

13.2 ApplianceLinc

Current ApplianceLincs will not act as Controllers – they will not notify the ISY or control other linked devices if turned on or off locally (via the SET button or using load sensing).

13.3 ControLinc

13.3.1 Link a ControLinc - 2340[54]

Choose this menu to link a ControLinc.

- The Insteon address is on the back of the ControLinc, usually under the table-top stand.

Enter the Insteon address in the requester. Then click on the "Ok" button.

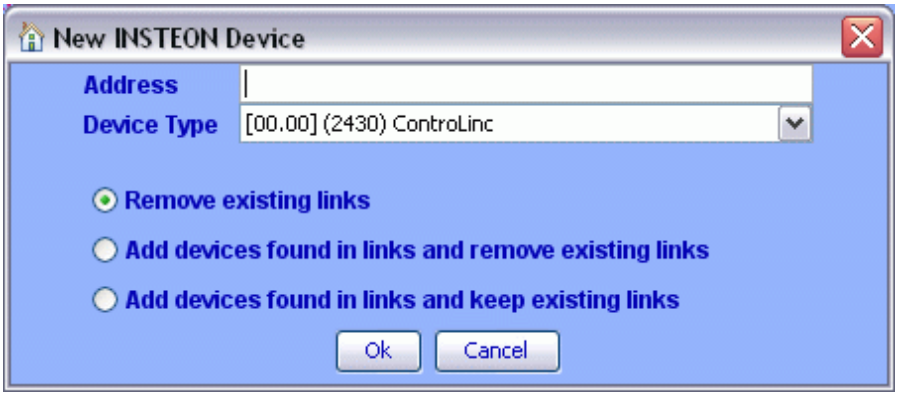


Figure 211: Link a ControLinc Dialog

Note: You cannot discover or find other devices linked to the ControLinc using this option.

13.4 EZI/O Devices (SimpleHomeNet)

Due to variations in firmware on SimpleHomeNet devices, some units (especially older firmware) may not work well with the ISY. Symptoms include the ISY not being notified of sensor state changes.

[54] (Universal Devices)

If you're having an issue with the ISY receiving status updates from an EZIO device, try the following steps:

- remove the device from the ISY
- factory reset the device
- add the device back to the ISY by using "New INSTEON Device" and typing in the address

13.5 EZFlora (EZRain)

13.6 Linking an EZFlora[55]

Linking a EZFlora is the same as for most other Insteon devices.

13.6.1 EZFlora Options

The timeout value is the underlying safety feature that prevents a zone from running forever should automation forget to turn it Off. You have to set the timeout value at least as large as the longest time you plan to have that particular zone on. Otherwise the timeout value will turn off the zone before you want it to.

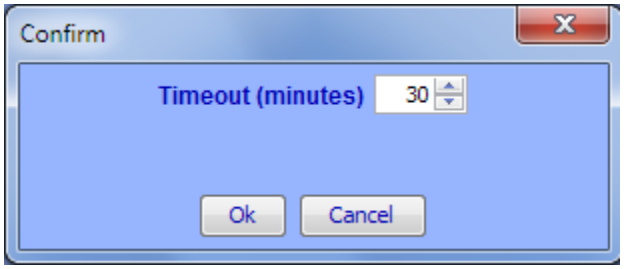


Figure 212: EZFlora ISY Options

[55] (Universal Devices)
(footnote continued)

13.7 EZSnSRF

13.7.1 EZSnSRF[56]

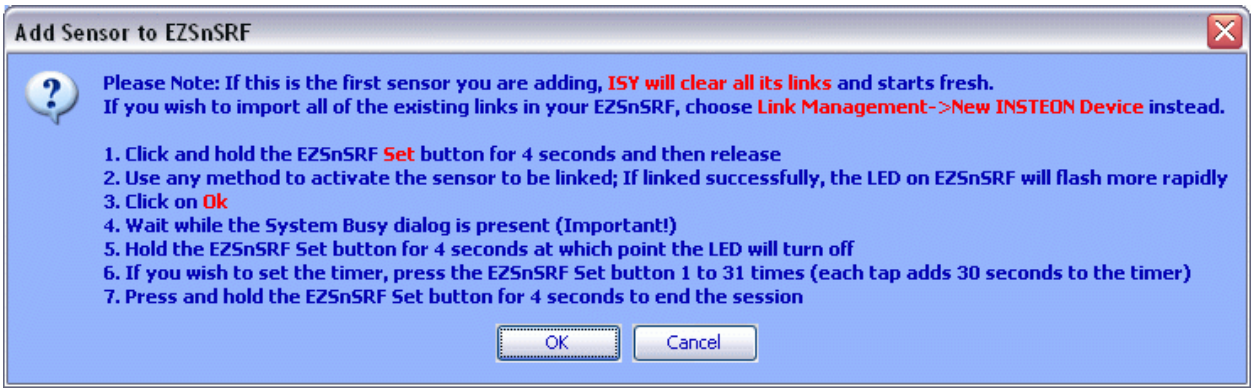


Figure 213: Add Sensor to SnSRF

13.8 EZX10SRF

13.8.1 EZX10SRF[57]

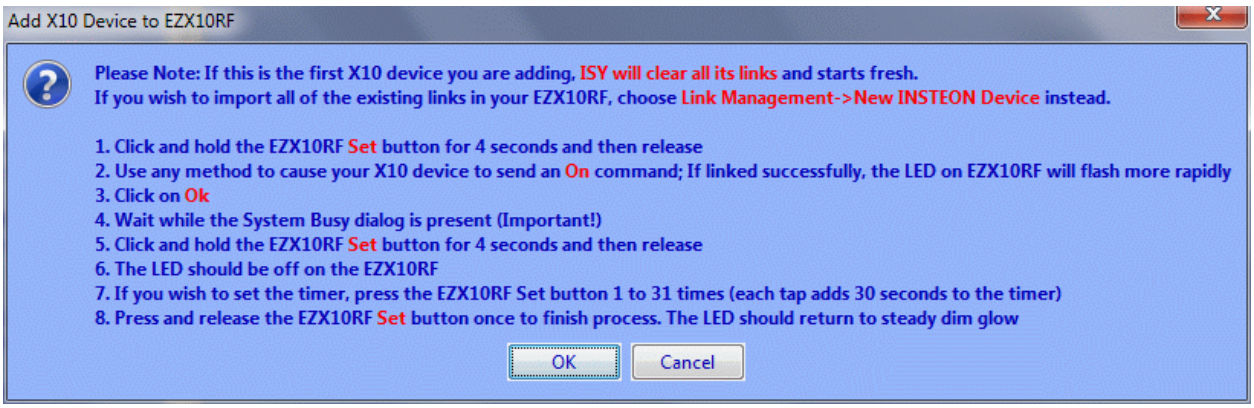


Figure 214: Add X10 Device to EZX10RF

Step 8 should read:

- 8. Click and hold the EZX10RF Set button for 4 seconds to finish the process. The led should return to a steady dim glow.

[56] (Universal Devices)
[57] (Universal Devices)
(footnote continued)

13.9 FanLinc

13.10 FanLinc & KeypadLinc Configuration[58]

Setting up a Fanlinc(FL) and 6 button Keypadlinc(KPL) to control a fan

- Add the FL and KPL to your Network
- Remove any existing FL/KPL related scenes
- Select the KPL in the network tree
- Click Button Toggle Mode and make all buttons **Non Toggle On**
- Click Button Grouping
    - Click Reset button
    - 'Do **not** ever go back to Button Grouping dialog again. Ever!
- Create 4 Scenes Labeled
    - Name the A button “High”
    - Name the B button “Medium”
    - Name the C button “Low”
    - Name the D button “Off”
- Add the FL - motor device and all 4 KPL buttons to each scene as Follows
    - **Off** Scene
        - Set the OFF button as Controller
        - Set all other buttons as Responders
        - The FL - Motor will be automatically set as a Responder
    - **High** Scene
        - Set the High button as Controller
        - Set all other buttons as Responders
        - The FL - Motor will be automatically set as a Responder
    - **Medium** Scene
        - Set the Medium button as Controller
        - Set all other buttons as Responders
        - The FL - Motor will be automatically set as a Responder
    - **Low** Scene
        - Set the Low button as Controller
        - Set all other buttons as Responders
        - The FL - Motor will be automatically set as a Responder
- Configure the 4 scenes as follows

[58] (Universal Devices)

- **High** Scene
  - Select the High Scene in the network tree
  - Using the sliders in the panel, set the levels for each button and the FL - Motor for this scene
    - High Button – 100
    - Fanlinc - High
    - All other buttons – 0
  - Select the Scene Controller button in the High scene. This entry will be red.
    - Click on Copy Scene Attributes from High
- **Medium** Scene
  - Select the Medium Scene in the network tree
  - Using the sliders in the panel, set the levels for each button and the FL - Motor for this scene
    - Medium Button – 100
    - Fanlinc - Med
    - All other buttons – 0
  - Select the Scene Controller button in the Medium scene. This entry will be red.
    - Click on Copy Scene Attributes from Medium
- **Low** Scene
  - Select the Low Scene in the network tree
  - Using the sliders in the panel, set the levels for each button and the FL - Motor for this scene
    - Low Button – 100
    - Fanlinc - Low
    - All other buttons – 0
  - Select the Scene Controller button in the Low scene. This entry will be red.
    - Click on Copy Scene Attributes from Low
- **Off** Scene
  - Select the Off Scene in the network tree
  - Using the sliders in the panel, set the levels for each button and the FL - Motor for this scene
    - Off Button – 100

        - Fanlinc - Off
        - All other buttons - 0
    - Select the Scene Controller button in the Off scene. This entry will be red.
        - Click on Copy Scene Attributes from Off

13.11 I/OLinc

Several options are available when configuring an I/OLinc on the ISY. These include:

- Timeout (seconds) - Sets the length of time the relay will close when Momentary is selected.
- Program Lock - Disables Set Button programming.
- Relay Follows Input - Sets Relay On when Sensor is On and Off when sensor if Off.
- Send X10 Send On (or Off) - Send X10 when the sensor changes.
- Trigger Off - If the TrigOff bit is set, Close Switch sends an OFF and Open Switch sends an ON. If the TrigOff bit is clear, Close Switch sends an ON and Open Switch sends an OFF.
- LED on TX - The LED flashes when the device sends INSTEON commands.
- Momentary: A - The relay will close momentary. If it is Linked while On it will respond to On. If it is Linked while Off it will respond to Off.
- Momentary: Look at Sensor - If the sensor is On the relay will close momentarily when an On command is received. If the sensor is Off the relay will close momentarily when an Off command is received.
- Momentary: Both - On and Off both cause the relay to close momentary.

13.11.1 Linking an I/OLinc - 2450[59]

Linking an I/OLinc is the same as for most other Insteon devices.

[59] (Universal Devices)

13.11.1.1I/OLinc Options

Figure 215: I/OLink Options

- Momentary hold time (10th of seconds) - Sets the length of time the relay will close when Momentary is selected. The Save button must be pressed to write the change to the I/OLinc.
- Local programming lockout - Disables Set Button programming.
- LED on TX - The LED will flash when the device sends Insteon commands.
- Relay Follows Input - Sets Relay On when Sensor is On and Off when sensor if Off.
- Send X10 Send On (or Off) - Send X10 when the sensor changes.
- Trigger Reverse - If the TrigOff bit is set, Close Switch sends an OFF and Open Switch sends an ON. If the TrigOff bit is clear, Close Switch sends an ON and Open Switch sends an OFF.

-- Momentary Options --

- Latching: The relay will remain open or closed until another command is received. Momentary hold time is ignored.
- Momentary A: The relay will close momentarily. If it is Linked while On it will respond to On. If it is Linked while Off it will respond to Off.
- Momentary B: Both - On and Off both cause the relay to close momentarily.
- Momentary C: Look at Sensor - If the sensor is On the relay will close momentarily when an On command is received. If the sensor is Off the relay will close momentarily when an Off command is received.

13.11.1.2IOLinc FAQs

- If you find the Relay is turning Off when your the ISY sends an On
  - Highlight the scene in the Administrative Console
  - Slide the relay level to 100%

13.11.2 Linking an I/OLinc – Garage Door Control & Status Kit[60]

13.11.2.1How to add the SmartHome I/O Linc - INSTEON Garage Door Control & Status Kit (74551)

In this tutorial I will be demonstrating how to control and monitor a Garage Door using keypad buttons on two separate KeypadLinc controllers. You can open or close the garage door using either keypad, with the button providing positive feedback that the command is being sent by flashing a few times. After this, the real-world status of the garage door will be indicated by the light on the button. When the door is open, the keypad light will be on.

You must update your ISY-99i to firmware 2.7.4 or greater. This firmware addresses an issue with the I/OLinc not showing the correct status after a Query and other issues related to the I/OLinc.

- Create a scene called Garage Door Relay. Add the KeypadLinc buttons as controllers and I/OLinc Relay as the responder. You can add as many controllers as you like.
- Create another scene called Garage Door Sensor. Add the KeypadLinc buttons as responders (you won't have a choice if you did step 1 correctly) and the I/O Linc Sensor as the controller. This will allow the sensor to control whether the button is lit or not, giving positive feedback as to the status of the garage door.

Figure 216: Scenes

Since you are controlling a relay, you need to set the On Level for each button and the scene to 100%. You will also need to change the toggle mode of the KeypadLinc button to Non-Toggle [On] so that it only sends the ON command when pressed.

- In the Garage Door Relay scene select each controller and be sure the On Level in the view pane is set to 100%. Also, set the On Level for the scene itself to 100%.

[60] (Universal Devices)

Figure 217: On Level

- In the Garage Door Sensor scene select each KeypadLinc controller and click the Button Toggle Mode option in the view pane. Set the toggle mode for only the button used in the scene to Non-Toggle On. Repeat for all of the controllers.

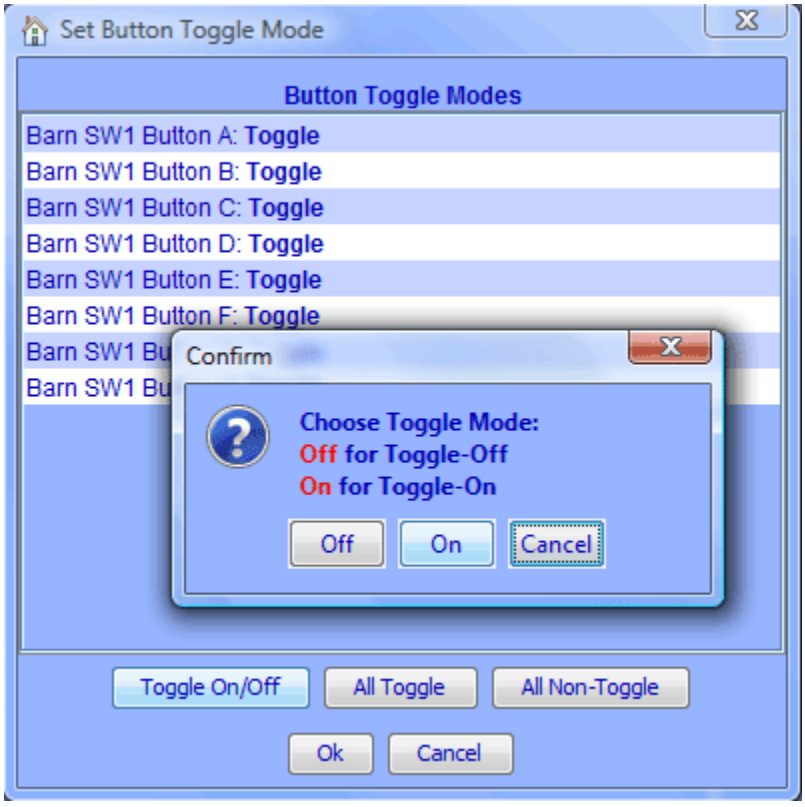


Figure 218: Confirm Toggle Mode

If you wired the sensor according to the directions provided with the kit, you used the black and green wires from the reed switch. These are the normally open leads from the sensor. If you sensor is normally open then you need to enable the Trigger Off option in the I/O Linc options dialog to make it behave as if it was a normally closed sensor. Be sure the Relay is set to Momentary: A as this allows the relay to return to the off state after it triggers the garage door opener (after the Timeout). Without this, you may lose the ability to control the door locally since the garage door button is essentially being held down by the relay.

- Select the I/OLinc Relay in the tree view and click the Set Options button in the view pane. Enable Trigger Off if you are using a normally open sensor. Be sure Momentary: A is enabled and all other Momentary options are disabled.

NOTE: If the I/OLinc loses power for any reason, the Trigger Off gets reset back to off (unchecked). This causes the keypad button light to be inverted and give a false indication

of the garage door status until you reprogram the I/OLinc. As this can happen often, I would highly recommend that you use the RED and BLACK wires from the reed switch and NOT the Green wire (NC or Normally Closed reed switch operation).

Figure 219: Confirm Timeout

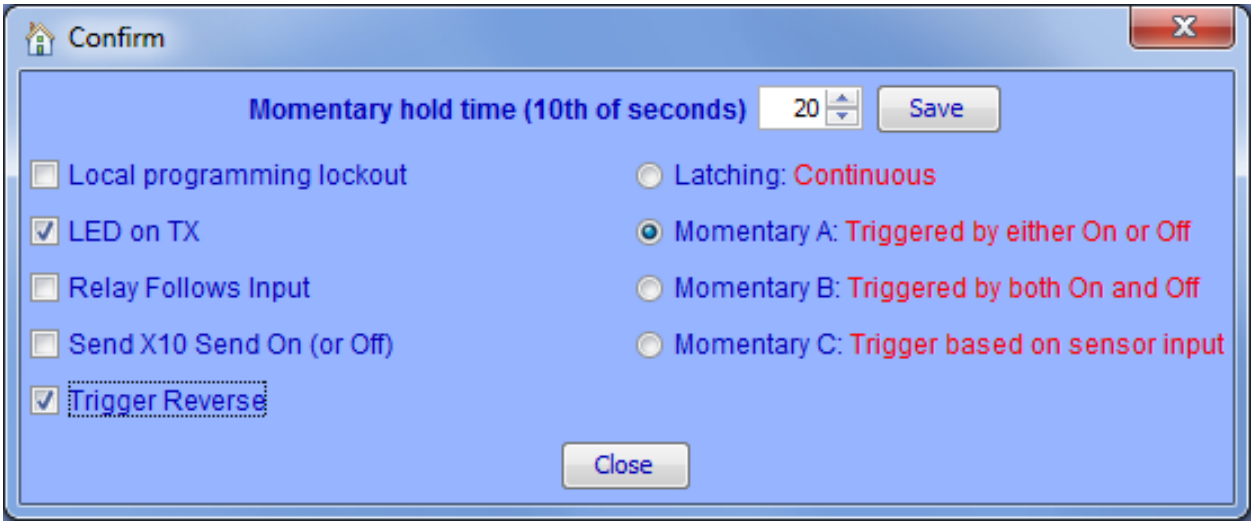


Figure 220: Confirm Momentary Hold Time

See Linking an I/O Linc for more information about these options.

13.12 IRLinc Receiver

13.12.1 Add Button to IRLinc Receiver – 2411R[61]

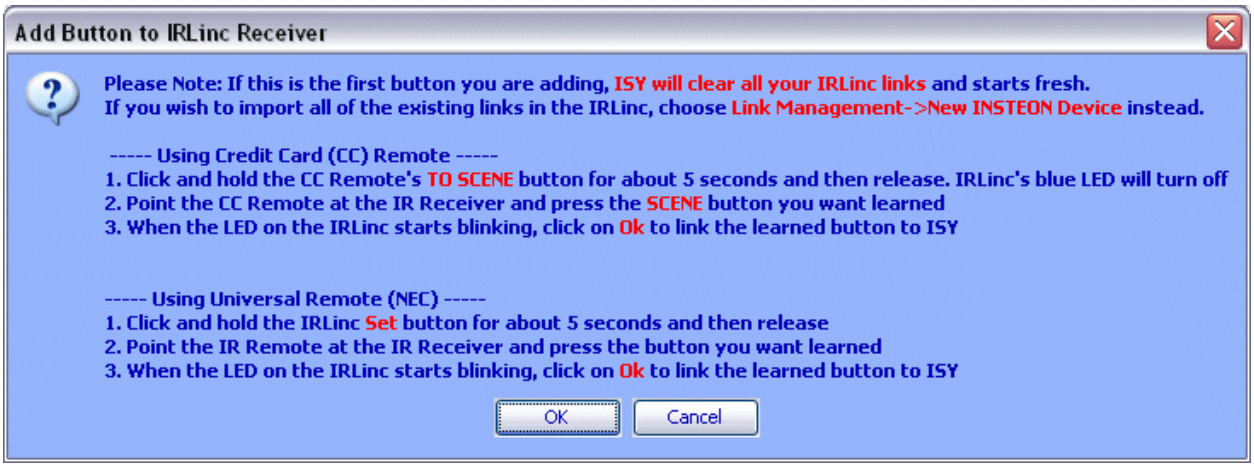


Figure 221: Add Button to IRLinc Receiver

Note: The Scene Control buttons (A-H) are On/Bright, Off/Dim buttons and control only one scene. Once either the On or Off button is linked to the ISY the other button is automatically linked.

13.12.1.1Create Non-Toggle Links - (Always sends only on/off commands)

This can be handy if you want to create a button that is “All Off” or “Movie Time” (or other situations where you want the button to do the same thing every time you press it). This is also sometimes referred to as “non-toggle” mode.

- Select the "Add Button to IRLinc Receiver in the ISY Link Management pulldown menu
- Press & hold the IRLinc Set button for about 5 seconds, then release
  - Blue LED will turn Off
- Point your IR remote at IR Receiver, and press the button to be learned
  - Blue LED will begin blinking
- Tap IRLinc Set button once (to always send an on), or twice (to always send an off)
  - Blue LED will continue blinking
- On the ISY, click on Ok to link the learned button to ISY
  - Blue LED will return to on as normal after ISY completes linking

[61] (Universal Devices)

13.12.1.2Optional: Factory Resetting your IRLinc

If you remove all the links to the IRLinc from the ISY it should clean up everything, but just in case you need to you can factory reset the IRLinc before linking it to the ISY.

- Unlink all the links in you ISY to the IRLinc
- Unplug the IRLinc, wait 10 seconds
- Press and continue to hold the Set button for 5 seconds while plugging the unit back in, then release
    - About 20 seconds after releasing the Set button, blue LED will flash twice to indicate a successful reset
    - Note: Blue LED may or may not be on during reset

13.13 IRLinc Transmitter

13.13.1 Add Button to IRLinc Transmitter – 2411T[62]

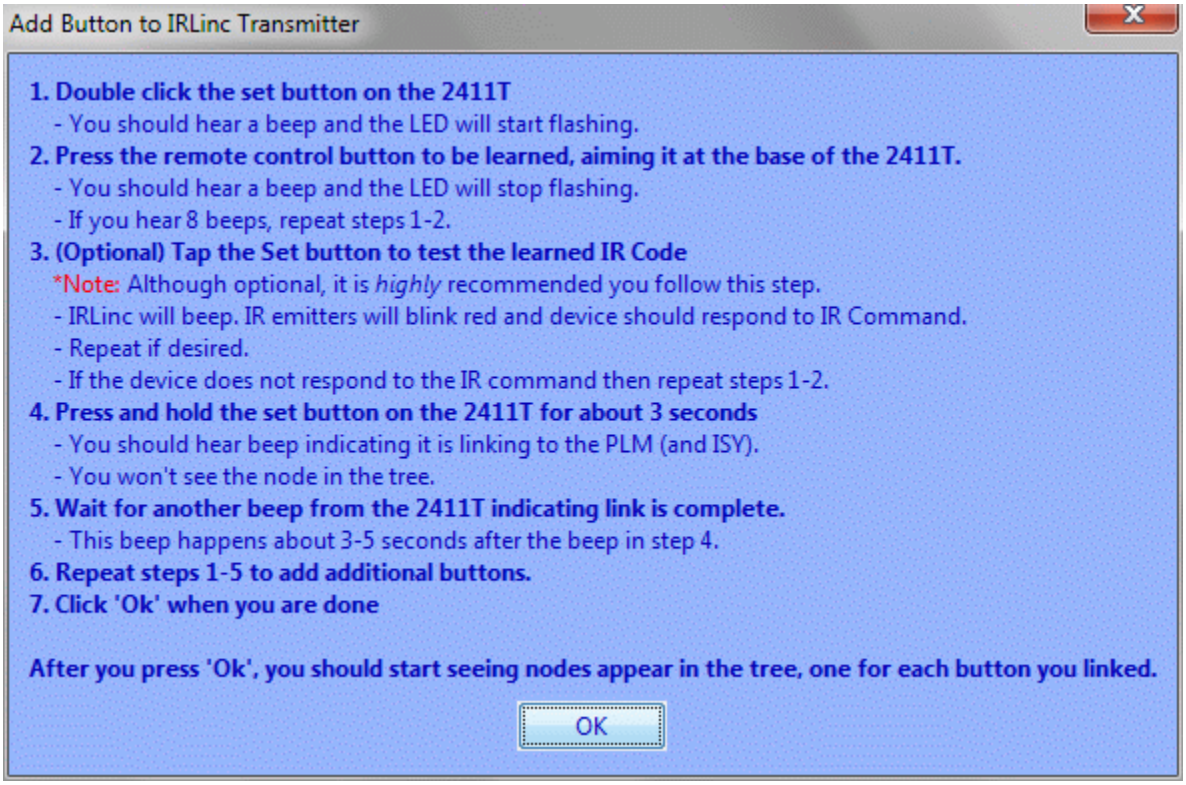


Figure 222: Add Button to IRLinc Transmitter

[62] (Universal Devices)

13.14 KeypadLinc

KeypadLincs show up as multiple nodes on the ISY (6 button or 8 button, depending on which model KeypadLinc). When switching between 6 and 8 button modes on the KeypadLinc, the device must be removed and re-added to the ISY.

Only the KeypadLinc's primary load button can be controlled directly by the ISY (through the Admin Console and ISY Programs). To control secondary buttons, create a Scene containing the button and control the scene.

KeypadLincs support several unique options, such as:

- Manually Exclusive Buttons – groupings of buttons so that one and only one button in the group can be ON at any one time.
- Toggle Mode – toggle a button to always stay ON or OFF (and only send the respective command when pressed)
- LED Brightness – adjust the KeypadLinc button LED brightness

Due to variations in KeypadLinc firmware, some configuration options may or may not be available.

13.14.1 Linking a KeypadLinc - 2486[63]

Linking a KeypadLinc is the same as for most other Insteon devices.

13.14.1.1KeypadLinc Options

13.14.1.1.1What are Mutually Exclusive Buttons

Mutually Exclusive Buttons, as the name implies are "grouping" of buttons such that one and only one button can be "ON" at any one time. This grouping is very useful for cases where you have the same set of devices controlled by multiple KeyPadLinc buttons, from the same KeyPadLinc, each one of which impacts the scene differently. Here are some examples of what this feature might be used for.

- Low, Medium, High, and Off Fan Speed Buttons
- Party, Romantic, Dinner, Lunch, and Breakfast Buttons

13.14.1.1.2Opening Mutually Exclusive Groupings Window

To make two or more buttons Mutually Exclusive, simply drag and drop them into a Mutually Exclusive Button Group.

- Log into your ISY.

[63] (Universal Devices)

- Under the Main Tab expand the Tree "Network --> My Lighting -->" and select any one of your KeypadLinc's button nodes
- Along the bottom select the "Mutually Exclusive Buttons" GUI button

Figure 223: Network Tree Open to KeypadLinc

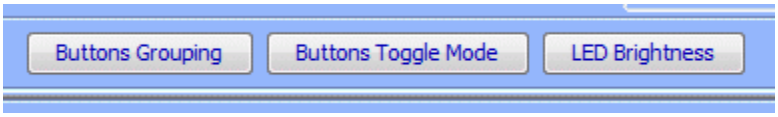


Figure 224: Mutually Exclusive Buttons GUI Button

13.14.1.1.3Configuring Mutually Exclusive Groupings

- In this window there is a new tree, drag and drop the buttons that are to be grouped on to any of the "Mutually Exclusive Buttons" groups.
- When done adding all the buttons you want grouped press the "OK" button to apply the changes

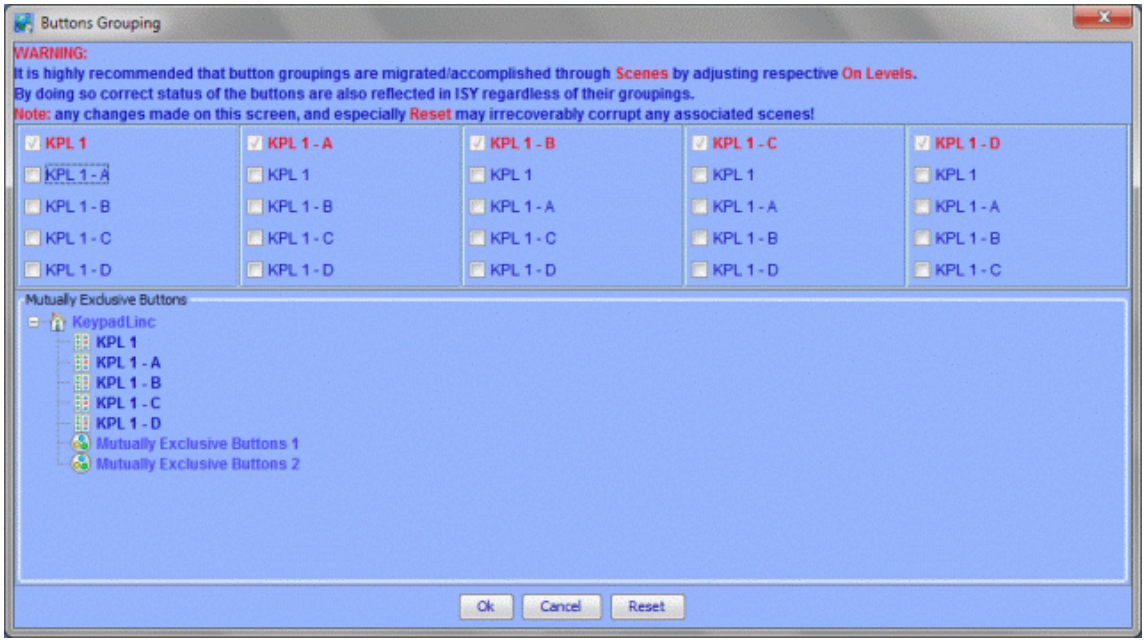


Figure 225: Before Grouping

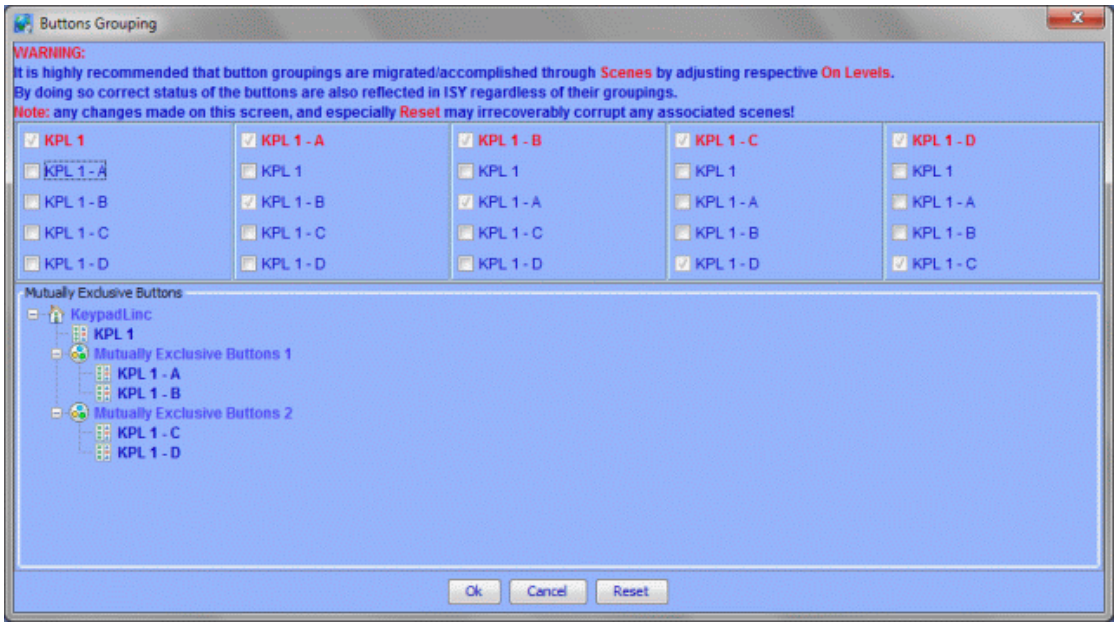


Figure 226: After Grouping

13.14.1.1.4Resetting Mutually Exclusive Groupings

When you need to remove Mutually Exclusive Groupings there is a handy "Reset" button on the bottom of the GUI which saves you the effort of dragging all the devices out of the group. Because the ISY does not track the KeyPadLinc groupings you can use the "Reset" to remove any stale groupings.

- In the Mutually Exclusive Groupings Window click on the Reset button to clear any groupings, the window will exit and clear the device of any groupings

13.14.1.1.5Button Toggle Mode

Button Toggle Mode sets the button state to toggle from ON to OFF and vice versa, or stay always ON, or always OFF. Assigning a button for toggle OFF sets it to either always ON or always OFF mode setting.

Figure 227: KeypadLinc Toggle Buttons

The ISY will open a requester to set the button to ON or OFF (key status LED ON or OFF) in the process.

Figure 228: KeypadLinc Toggle Buttons Select

Refer to the KeypadLinc User's Manual Toggle Mode section for more information.

Note: Older Keypads must be set to Off or On at the KPL.

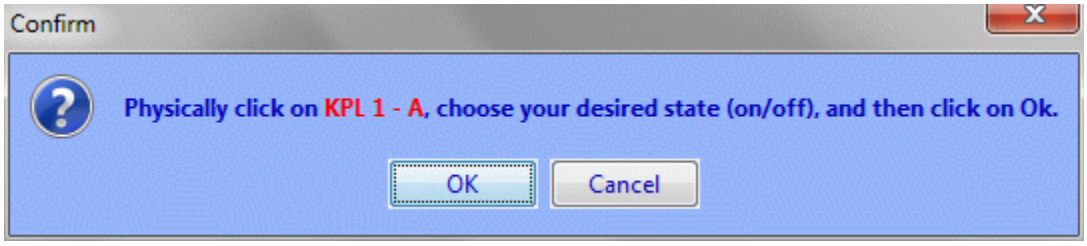


Figure 229: Button Toggle Old

13.14.1.1.6Button Brightness

Figure 230: KeyPadLinc LED Brightness

13.15 Leak Sensor

13.15.1 Linking a Leak Sensor - 2852[64]

- Menu - Link Management/New INSTEON device
- Enter the address.
- Select the Leak Sensor from the drop-down list labeled "Device Type".
  - Device Type = 10.08 (2852)
- Click Ok.
- Press and hold the set button on the Leak Sensor till the light starts blinking rapidly. Once the light blinks rapidly, then quickly click and release the set button one more time
  - You have to be close (within 10 to 20 ft) of a dual band or RF device
- Click OK.

[64] (Universal Devices)

- Wait while the ISY initializes communications with the Leak Sensor.

13.16 LampLinc

Most LampLincs will not act as Controllers – they will not notify the ISY or control other linked devices if turned on or off locally (via the SET button or using load sensing). LampLincs labeled v4.2 or higher (firmware v33+) should act as Controllers.

13.17 MorningLinc

13.17.1 MorningLinc – 2458A1[65]

ISY firmware 2.8.2+

- Manually link the MorningLinc to the Locks(s)
- See Link Management Menu to tell the ISY to Start Linking.
- Select the third option 'Add devices found in links and keep existing links'.
    - If you select 'Remove existing links' it removes all links from the MorningLinc and due to the security measures on the MorningLinc the PLM can no longer send commands to it.
- Link the MorningLinc to the ISY by pressing the Set button on the MorningLinc for 3-5 seconds.
    - If the MorningLinc does not appear on the ISY console press the set button once again and press and hold again.
- Click on the Finish button on the Linking in Progress dialogue requester.
- Some dialogue will take place between the ISY and the MorningLinc to create the links necessary to view and control the device state.
- The MorningLinc should now be available as a device in the Console and in Programs.

13.18 Motion Sensor

Motion Sensors are RF devices, thus require the installation of an INSTEON RF receiver (such as an INSTEON AccessPoint).

The Motion Sensor cannot be linked using Auto Discover. To link a Motion Sensor to the ISY, please choose the LINK MANAGEMENT pulldown, then NEW INSTEON DEVICE. Enter the device address manually (found inside the battery compartment), then select the "2420M INSTEON Motion Sensor" from the Device Type list.

Since the Motion Sensor is a battery-saving RF device, you must put the device into linking mode to add it to the ISY (and make any changes to the device, such as adding/removing

[65] (Universal Devices)

from scenes). Please follow the on-screen instructions to put the Motion Sensor into linking mode when prompted (hold SET button for 5 seconds).

Once added to the ISY, the Motion Sensor will show up as 3 nodes. The primary node is the motion sensing portion of the device, which updates according to sensed motion (or lack of motion).

There is also a DUSK/DAWN node that will show ON when the device senses darkness and show OFF when the device senses light. The Motion Sensor will not update this node until approximately 3.5 minutes after a state change has persisted.

Finally, a Low Battery node will show as ON when the Motion Sensor senses a low battery condition and notifies the ISY.

Motion Sensors support several unique options, such as:

- Timeout (minutes) - Defines the period of inactivity before the Motion Sensor sends an Off. Default = 1 minute. Range = 0.5 - 8.5 minutes in 30 second increments.
- LED Brightness - Default = 100. Range is 0 - 255.
- Darkness Sensitivity - The higher the value, the darker it needs to be for the unit to see night. Default = 35. Range = 0 - 255.

13.18.1 Link a Motion Sensor – 2420M[66]

13.18.1.1 Motion Sensor Linking

- Menu - Link Management/Link a Motion Sensor

[66] (Universal Devices)

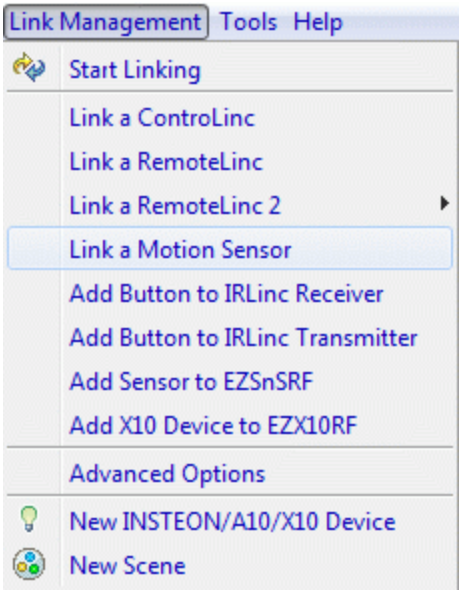


Figure 231: Motion Sensor Linking

- Press and Hold the Set button for 5 seconds to put the Motion Sensor in linking mode as per the requester.
- Enter the address in the next requester.
    - The Motion Sensor address is on a sticker inside the battery compartment.

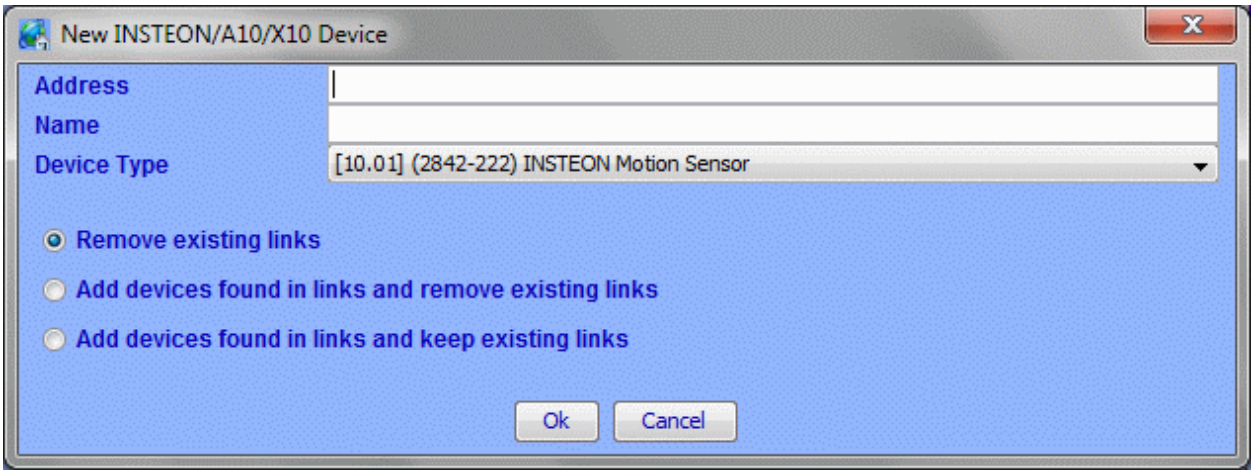


Figure 232: Motion Sensor Input

- Click Ok.
- Wait while the ISY initializes communications with the Motion Sensor.
- The Motion Sensor will create three new nodes in the ISY:
    - Motion Sensor-Sensor: Will switch to On when Motion is detected and switch to Off after no motion + timeout.

- Motion Sensor-Dusk/Dawn: On when the light on the sensor falls below the threshold.
- Motion Sensor-Low Bat: Sends an On when the battery voltage falls below a specific level.

- Any of these can be used as a Condition in a program.

13.18.1.2Motion Sensor Options

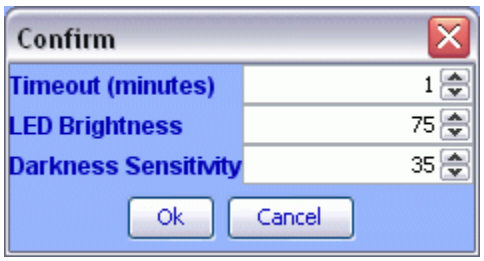


Figure 233: Motion Sensor Options

- Timeout (minutes) - Defines the period of inactivity before the Motion Sensor will send an Off. Default = 1 minute. Range = 0.5 - 120 minutes in 30 second increments.
- LED Brightness - Default = 100. Range is 0 - 255.
- Darkness Sensitivity - The lower the value, the darker it needs to be for the unit to see night. Default = 35. Range = 0 - 255.

As of ISY firmware 2.8.3+ more options are available.

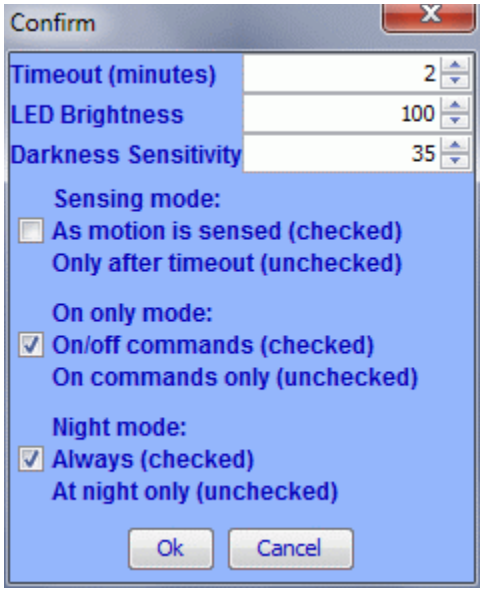


Figure 234: Motion Sensor Options 2

- Sensing mode (Occupancy): when checked an On command is sent for every motion detected. When unchecked an On command is sent only after the Timeout interval has expired.
- On only mode: when checked an Off command is sent when the Timeout value expires. When unchecked only On commands are sent.
- Night mode: when checked MS signals motion all the time. When unchecked MS signals motion only when Dark.

Motion Sensor v.2 must have the jumper set on pin 5 to use the software settings.

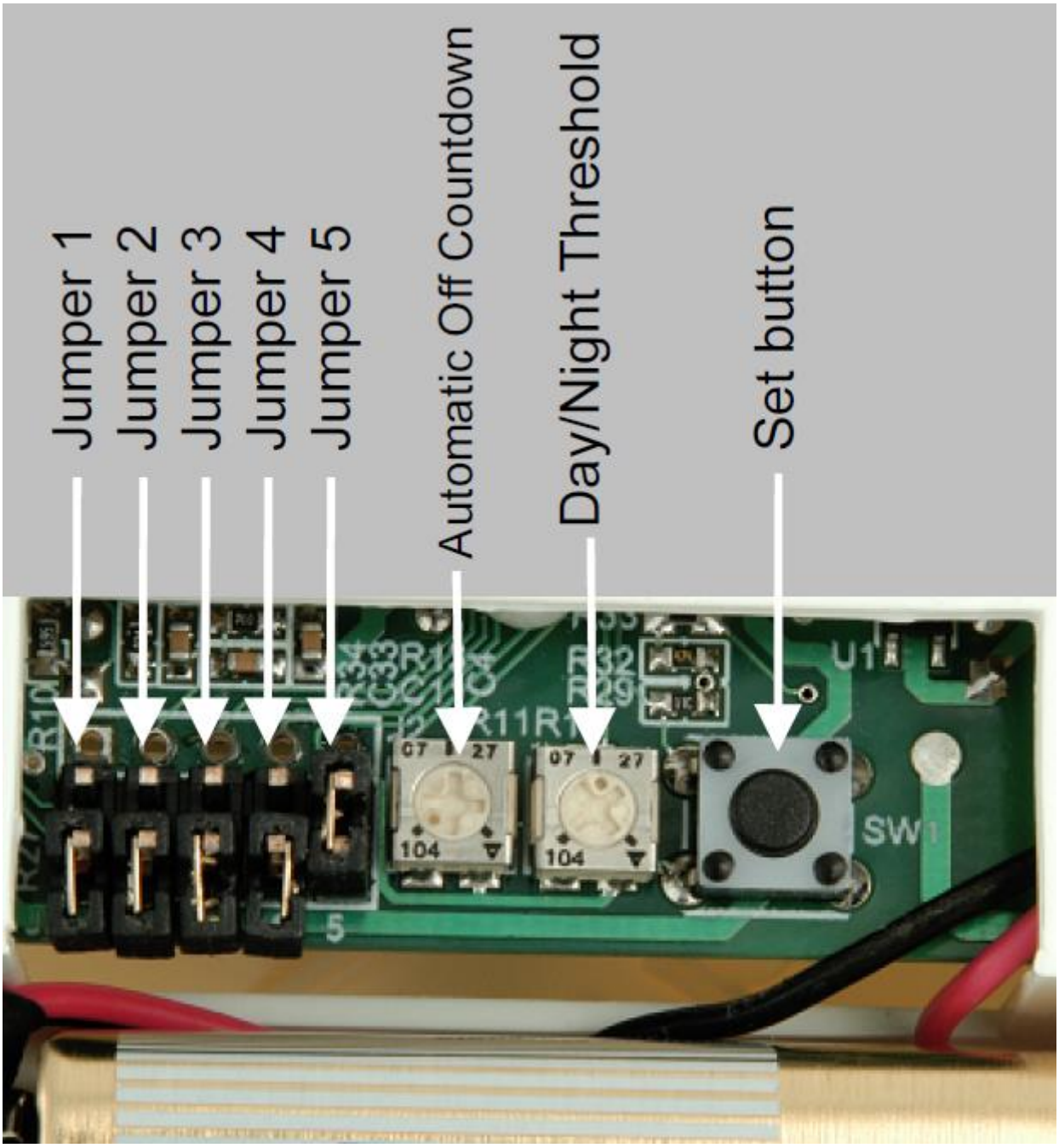


Figure 235: Motion Sensor Jumpers

- Jumper 1 - Sensitivity (33% range reduction)
- Jumper 2 - Disable LED (no red blinky blinky)
- Jumper 3 - Night Only Mode (only functions when dark)
- Jumper 4 - On-Only Mode (does not send Off commands)
- Jumper 5 - Remote Software Management (allows ISY to set all these things)

When Jumper 5 is installed the dials are disabled.

- Left Dial - Automatic Off Countdown Delay (delay control until sending Off command)
- Right Dial - Day/Night Threshold (brightness sensitivity control)

- Set Button

13.18.1.3Motion Sensor FAQs

- To access the Motion Sensor, one or more Access Points must be installed.
    - Tip: Plug an Access Point into the PLM for positive results.
- After a new battery is inserted or a factory reset is performed the motion sensor needs 5 minutes to stabilize the circuitry.
- The Set button toggles between Motion Off and On.
- The Motion Sensor must be “awake” to hear messages.
    - Tip: Put the Motion Sensor into linking mode to keep it awake for 4 minutes.
    - The Motion Sensor can be taken out of linking mode by pressing the Set button twice.
- A command is only sent when there is a change.
    - Do not expect to see a status for Motion until there has been a change.
    - Do not expect to see a status for Dawn/Dusk until there has been a change.
    - Do not expect to see a status for the battery until the battery becomes depleted.
- Dusk/Dawn requires a change to persist for 3.5 minutes before transmitting a command.
    - Dusk (dark) is represented by On.
- When the On-Only Mode jumper is set the motion sensor will send an On when there is new activity only after there is no activity for the duration of the timeout period plus ~ 2-4 seconds.
    - This is the same behavior as when the motion sensor sends an Off.
- To clear the status of the Low Battery sensor after it is initiated you have to replace your battery and then issue a Query on the low bat node in the Admin Console.

13.18.1.4Motion Sensor Trick

To activate the Motion Sensor for reads and writes without pressing the Set button:

- If you have a helper you can use the On command.
- If you are alone you will probably have to key with the Off command.
    - Select the Motion Sensor from the device tree.
    - Open the ISY dialogue concerning the MS Options.
    - The Communications Mode dialogue will open asking you to put the MS in linking mode.
    - Active the MS with motion.
    - Immediately after seeing the state change (this could be to On or Off) click the Ok on the Communications Mode requester.
    - ISY will read the options from the MS.
    - By the time you change any options the MS will be sleeping again.
    - If the MS is still On wait for it to change to Off. Otherwise activate the MS again.
    - Immediately after seeing the state change (this could be to On or Off) click the OK in the Options Settings requester.
    - ISY will write the changes to the MS.
    - If you miss the window you will see Request Failed and have to start over.

13.19 RemoteLinc

RemoteLincs are RF devices, thus require the installation of an INSTEON RF receiver (such as an INSTEON AccessPoint).

RemoteLincs link differently than other INSTEON devices, this require a separate linking routine. To link a RemoteLinc to your ISY, click the LINK MANAGEMENT pulldown and choose LINK A REMOTELINC and follow the on-screen instructions. Since the RemoteLinc is a battery-saving RF device, it must be put into linking mode whenever adding to the ISY or making changes (such as adding or removing from a scene). To put the device in linking mode, hold Button 1 down for 10 seconds, or until the light starts flashing.

To EXIT linking mode, either wait for the RemoteLinc to time out and the LED to stop flashing (4 minutes), or simply hit the BRIGHT or DIM button. DO NOT hit one of the 6 rocker buttons.

RemoteLincs show up as a multiple nodes on the ISY (one node per button).

13.19.1 Link a RemoteLinc - 2440[67]

Choose this menu item to link a RemoteLinc.

- The Insteon address is on a sticker inside the battery compartment.

When the “Link a RemoteLinc” dialog appears, press and hold the “Bright" and "Dim” buttons for 10 seconds or until the RemoteLinc’s light starts flashing. Then click on the “Ok” button.

Figure 236: Link a RemoteLinc dialog

Enter the Insteon address of the RemoteLinc and press okay.

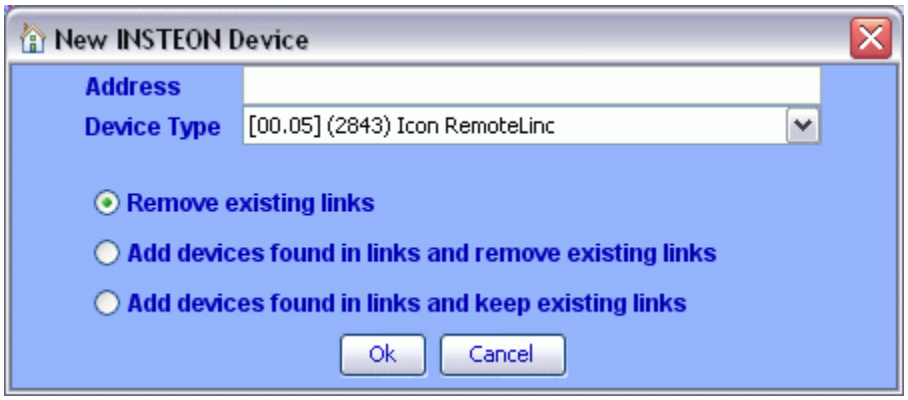


Figure 237: New Insteon Device dialog

[67] (Universal Devices)

When done linking communication mode can be quit by pressing the All Off button.

Buttons can be added to scenes the same as any other controller.

13.19.1.1RemoteLinc FAQs

If one of the numeric buttons is pressed to exit linking mode that button will no longer send the On and/or Off commands.

A simple factory reset (without removing the RemoteLinc from the ISY) followed by a Restore - ensuring that you press the All Off button to exit linking mode

A full recovery procedure would be to:

- Remove the RemoteLinc from the ISY.
- Factory reset the RemoteLinc.
- Re-link the RemoteLinc to the ISY - ensuring that you press the All Off button to exit linking mode when done.
- Re-establish your button scenes.

13.19.2 Link a RemoteLinc2 – 2444A2[68]

Firmware 3.1.17+

Choose this menu item to link a RemoteLinc2. Select the proper device from the sub-menu; Switch, 4-Scene Keypad, or 8-Scene Keypad.

[68] (Universal Devices)

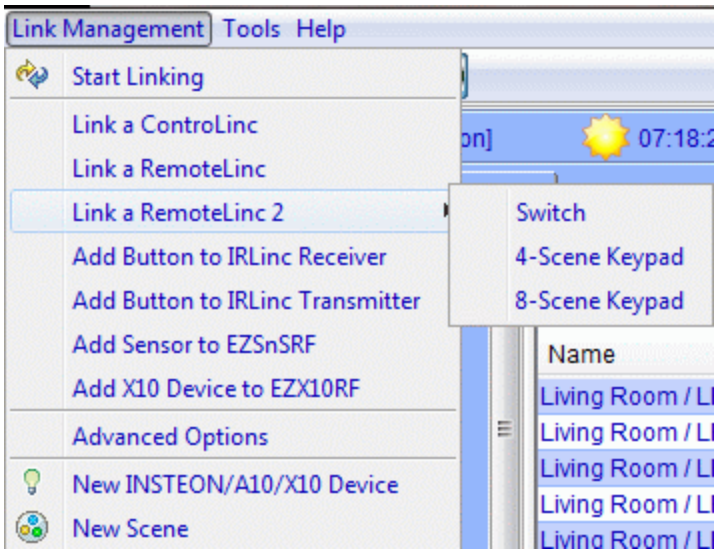


Figure 238: Link a RemoteLinc 2 Menu

- Put RemoteLinc2 in Programming Mode:
  - Ensure the on/off switch is in the On position
  - Press and hold the Set Button at the base of the RemoteLinc2 until the LED starts flashing green (takes about 3 seconds)
- The Insteon address is on a sticker on the back of the RemoteLinc2.

After the nodes are added to the ISY press the set button on the RL2 twice to quit linking mode.

- To maintain compatibility with the 4-Scene Keypad an 8-Scene Keypad uses groups 1, 3, 5, 7 for the buttons on the right side of the RemoteLinc2 (B, D, F, H) and groups 2, 4, 6, 8 for buttons on the left of the RemoteLinc2 (A, C, E, G).

13.20 Thermostat & Wireless Thermostat (2441TH / 2441ZTH)

There is a Program Action available to synchronize the Thermostat time with that of the ISY.

13.20.1 Thermostat Adapter

Older INSTEON Thermostat Adapters cannot act as Controllers, thus they do not notify the ISY of any state changes. To get the most current information from your thermostat, we recommend using an ISY Program to poll the device periodically. See **11.9 Thermostat**

Newer Thermostat Adapters (V2) do notify the ISY of state changes, so a poll Program will not be necessary.

13.20.2 Link a Thermostat – 2441V[69]

13.20.2.1Linking a Thermostat V1

Linking a Thermostat is the same as for most other Insteon devices.

13.20.2.2Linking a Thermostat V2

ISY firmware version 2.7.9

- If you have already installed a thermostat adapter in an earlier firmware version it must be removed from ISY
    - Ensure the thermostat is in the OFF mode before linking to the ISY
    - Use Link Management | Start Linking
    - Press and hold the Set button on the thermostat for 3-5 seconds
- You can safely remove your thermostat queries
- Changing the Fan status (on the thermostat itself) too quickly causes the updates not be sent to ISY. This is NOT a bug but limitations on the thermostat adapter interface.

13.20.2.3The thermostats are represented by 4 nodes

- The main node - this is the main thermostat node
- Cool Control - indicates when the thermostat is calling for Cool
- Heat Control- indicates when the thermostat is calling for Heat
- Fan Control - indicates when the fan is on/off

The main node can be used as a responder in any scenes and thus you can impact changes to the thermostat settings based on other INSTEON devices/ISY scene.

The other nodes can be used as controllers in any of your scenes. So, for instance, adding the Cool Control in a scene as controller would cause all responders in the scene to turn on when the thermostat is calling for Cool and turn off when the thermostat is calling for Heat.

13.20.2.4Thermostat Options

- Temperature
- Mode - Off/Auto/Heat/Cool
- Program - Auto/Heat/Cool
- Fan - On/ Auto
- Setpoint
- Heat Setpoint
- Cool Setpoint

[69] (Universal Devices)

- Humidity

13.20.2.5Example Programs (V1)

To run a Query on the Thermostat every 15 minutes:

```
If

    From    12:00:00AM

    For     24 hours

Then

    Repeat Every  15 minutes

      Set 'OfficeThermostat' Query

Else

  - No Actions - (To add one, press 'Action')
```

13.20.2.6Thermostat FAQs

If you are having trouble linking a Thermostat please check the following:

- Signal related … too far away from the closest Access Point
- Defective dongle
- Wrong address

The version 1 Insteon thermostat does not automatically inform the ISY of its current status. For the ISY to have a reasonable idea of the thermostat's current temp, setpoint, mode, etc. it will need to be polled periodically.

13.21 TriggerLinc

TriggerLincs are RF devices, thus require the installation of an INSTEON RF receiver (such as an INSTEON AccessPoint).

The TriggerLinc cannot be linked using Auto Discover. To link a TriggerLinc to the ISY, please choose the LINK MANAGEMENT pulldown, then NEW INSTEON DEVICE. Enter the device address manually (found inside the battery compartment), then select the “2421 TriggerLinc” from the Device Type list.

Since the TriggerLinc is a battery-saving RF device, you must put the device into linking mode to add it to the ISY (and make any changes to the device, such as adding/removing from scenes). Please follow the on-screen instructions to put the TriggerLinc into linking mode when prompted (hold SET button for 5 seconds).

Once added to the ISY, the TriggerLinc will show up as 2 nodes. The secondary node is only used when the TriggerLinc is in "Multi-Scene" mode.

When in Normal mode, the TriggerLinc sends an ON command to the primary node when the sensor is open (magnet pulled away) and an OFF command when the sensor is closed (magnet close to sensor).

When in Multi-Scene mode, the TriggerLinc sends an ON command to the first node when the sensor is open, and an ON command to the second node when the sensor is closed. It will NOT send an OFF command to either node when in Multi-Scene mode.

13.21.1 Linking a TriggerLinc – 2421[70]

- The Insteon TriggerLinc cannot be linked using Auto Discover.
- Menu - Link Management/New INSTEON device
- Enter the address.
    - The TriggerLinc address is on a sticker inside the battery compartment.
- Select the TriggerLinc [10.02] from the drop down list.
- Click Ok.
- Press and Hold the Set button for 5 seconds to put the TriggerLinc in linking mode as per the requester.

[70] (Universal Devices)

Figure 239: Press and Hold the Set button for 5 seconds

- Click OK.
- Wait while the ISY initializes communications with the TriggerLinc.

13.21.1.1TriggerLinc FAQs

- To access the TriggerLinc, one or more Access Points must be installed.
  - Tip: Plug an Access Point into the PLM for positive results.
- The Set button toggles between Off and On.
- The TriggerLinc must be "awake" to hear messages.
  - Tip: Put the TriggerLinc into linking mode to keep it awake for 4 minutes.
  - The TriggerLinc can be taken out of linking mode by pressing the Set button twice.

14 X-10 Device Notes

14.1 Tracking X-10 Device Status[71]

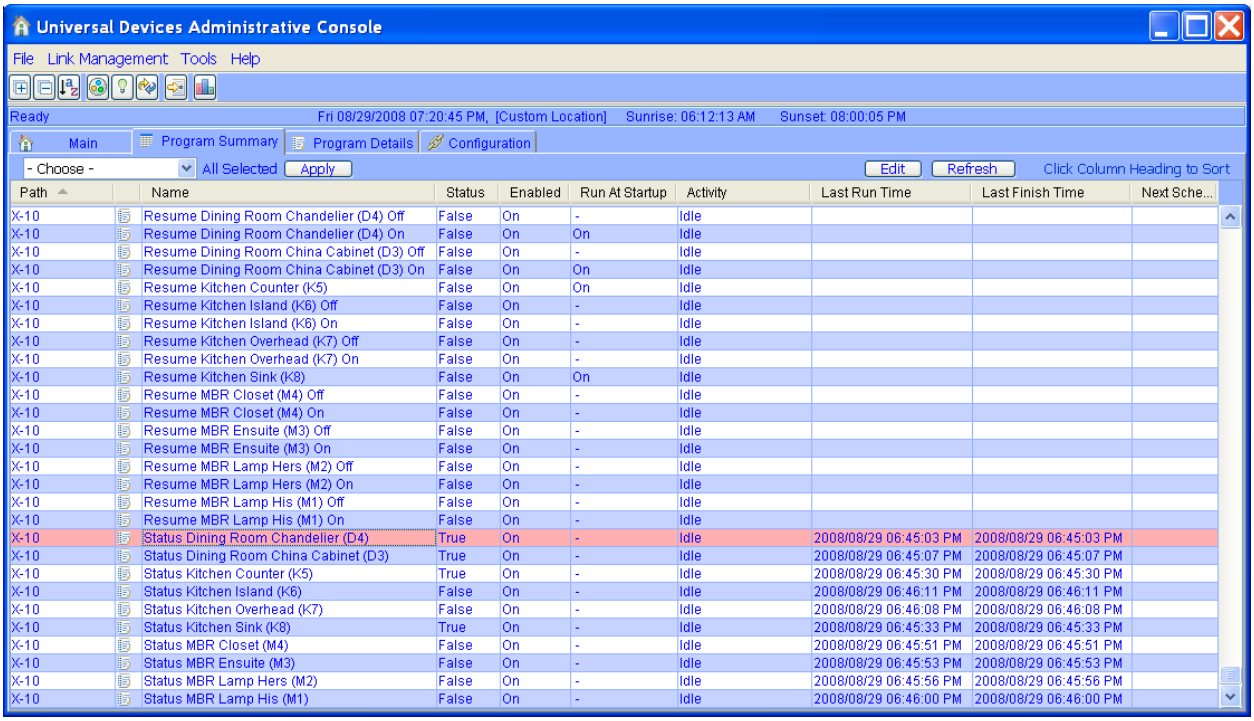
As of firmware 2.7, ISY does not maintain the status of X-10 devices, as it does for INSTEON devices. Furthermore, unlike INSTEON devices, most X-10 devices are not two-way devices, and therefore cannot be queried for status. However, the user may maintain the status of individual X-10 devices using a program triggered by commands which turn the device on and off. [Note: As of firmware 2.6.4, X-10 commands sent from ISY are treated as events and will therefore update the program status appropriately.] The simplest such program might look like this:

14.1.1 Program X-10 D4 Status

```
If

      X10 'D4/On (3)' is Received

   And X10 'D4/Off (11)' is not Received

Then

  - No Actions - (To add one, press 'Action')

Else

  - No Actions - (To add one, press 'Action')
```

[71] (Universal Devices)

The status of this program will be True when the X-10 D4/On command is received, and False when the D4/Off command is received. The program's status may be tested by other programs, and may also be viewed on the Program Summary tab.



Path	Name	Status	Enabled	Run At Startup	Activity	Last Run Time	Last Finish Time	Next Sche...
X-10	Resume Dining Room Chandelier (D4) Off	False	On	-	Idle			
X-10	Resume Dining Room Chandelier (D4) On	False	On	On	Idle			
X-10	Resume Dining Room China Cabinet (D3) Off	False	On	-	Idle			
X-10	Resume Dining Room China Cabinet (D3) On	False	On	On	Idle			
X-10	Resume Kitchen Counter (K5)	False	On	On	Idle			
X-10	Resume Kitchen Island (K6) Off	False	On	-	Idle			
X-10	Resume Kitchen Island (K6) On	False	On	-	Idle			
X-10	Resume Kitchen Overhead (K7) Off	False	On	-	Idle			
X-10	Resume Kitchen Overhead (K7) On	False	On	-	Idle			
X-10	Resume Kitchen Sink (K8)	False	On	On	Idle			
X-10	Resume MBR Closet (M4) Off	False	On	-	Idle			
X-10	Resume MBR Closet (M4) On	False	On	-	Idle			
X-10	Resume MBR Ensuite (M3) Off	False	On	-	Idle			
X-10	Resume MBR Ensuite (M3) On	False	On	-	Idle			
X-10	Resume MBR Lamp Hers (M2) Off	False	On	-	Idle			
X-10	Resume MBR Lamp Hers (M2) On	False	On	-	Idle			
X-10	Resume MBR Lamp His (M1) Off	False	On	-	Idle			
X-10	Resume MBR Lamp His (M1) On	False	On	-	Idle			
X-10	Status Dining Room Chandelier (D4)	True	On	-	Idle	2008/08/29 06:45:03 PM	2008/08/29 06:45:03 PM	
X-10	Status Dining Room China Cabinet (D3)	True	On	-	Idle	2008/08/29 06:45:07 PM	2008/08/29 06:45:07 PM	
X-10	Status Kitchen Counter (K5)	True	On	-	Idle	2008/08/29 06:45:30 PM	2008/08/29 06:45:30 PM	
X-10	Status Kitchen Island (K6)	False	On	-	Idle	2008/08/29 06:46:11 PM	2008/08/29 06:46:11 PM	
X-10	Status Kitchen Overhead (K7)	False	On	-	Idle	2008/08/29 06:46:08 PM	2008/08/29 06:46:08 PM	
X-10	Status Kitchen Sink (K8)	True	On	-	Idle	2008/08/29 06:45:33 PM	2008/08/29 06:45:33 PM	
X-10	Status MBR Closet (M4)	False	On	-	Idle	2008/08/29 06:45:51 PM	2008/08/29 06:45:51 PM	
X-10	Status MBR Ensuite (M3)	False	On	-	Idle	2008/08/29 06:45:53 PM	2008/08/29 06:45:53 PM	
X-10	Status MBR Lamp Hers (M2)	False	On	-	Idle	2008/08/29 06:45:56 PM	2008/08/29 06:45:56 PM	
X-10	Status MBR Lamp His (M1)	False	On	-	Idle	2008/08/29 06:46:00 PM	2008/08/29 06:46:00 PM	

Figure 240: Program Summary

If using several such programs for individual X-10 devices, placing them together in an X-10 folder will cause them to appear together near the bottom of the Program Summary page if it is sorted primarily by path, making it easy to observe the status of the X-10 devices. If the programs are given names related to the devices they control, other programs which test the status programs may reference the status programs almost as if referencing the devices by name.

There are many other X-10 commands which can cause the tracked device to change status, such as All Lights On, All Lights Off, All Units Off, Bright, Dim, and Preset Dim or scene commands for some devices. Some of these may also be monitored in the program:

14.1.2 Program Status Dining Room Chandelier (D4)

```
If
      (
         X10 'D4/On (3)' is Received
       Or X10 'D/All Lights On (5)' is Received
      )
   And X10 'D4/Off (11)' is not Received
   And X10 'D/All Lights Off (1)' is not Received
   And X10 'D/All Units Off (13)' is not Received
Then
  - No Actions - (To add one, press 'Action')
Else
  - No Actions - (To add one, press 'Action')
```

The All Lights On and All Lights Off commands would of course only be monitored for appropriate devices (in-wall dimmers, lamp modules, etc.).

Some dimmer type X-10 devices allow the Bright command to dim up from off, while most simply turn the device full on if it is off. In either case, the device is no longer off, so the Bright command can be monitored as well:

14.1.3 Program Status Dining Room China Cabinet (D3)

```
If
    (
      X10 'D3/On (3)' is Received
    Or X10 'D/All Lights On (5)' is Received
    Or X10 'D/Bright (7)' is Received
    )
  And X10 'D3/Off (11)' is not Received
  And X10 'D/All Lights Off (1)' is not Received
  And X10 'D/All Units Off (13)' is not Received
Then
  - No Actions - (To add one, press 'Action')
Else
  - No Actions - (To add one, press 'Action')
```

Unfortunately, there is no such simple relationship for the Dim command. The Preset Dim commands and scene commands are device specific, and experimentation will show which are appropriate to monitor for a particular device.

Many X-10 relay devices (in-wall relay switch, appliance module, etc.) return to the former state after a power failure, so if the X-10 device being tracked is such a device, an additional program can be used to have the status program resume its pre-power-fail state as well:

14.1.4 Program Status Kitchen Counter (K5)

```
If

    X10 'K5/On (3)' is Received

  And X10 'K5/Off (11)' is not Received

  And X10 'K/All Units Off (13)' is not Received

Then

    Set Program 'Resume Kitchen Counter (K5)' To Run At Startup

Else

    Set Program 'Resume Kitchen Counter (K5)' To Not Run At Startup
```

14.1.5 Program Resume Kitchen Counter (K5)

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    Run Program 'Status Kitchen Counter (K5)' (Then Path)

Else

  - No Actions - (To add one, press 'Action')
```

When the Status program is True, the Resume program is set to run at startup, and will set the Status program back to True. When the Status program is False, the Resume program does not run at startup, and the Status program therefore remains in its initial startup state of False (see the section **9.5 Scope, Precedence and Execution Order**).

Most X-10 dimmer devices, on the other hand, do not necessarily return to the former state after a power failure, and may in fact power up to an unknown state. Such devices may be reset to the pre-power-fail on/off state by the use of three programs per device:

14.1.6 Program Status Kitchen Island (K6)

```
If
    (
      X10 'K6/On (3)' is Received
    Or X10 'K/All Lights On (5)' is Received
    Or X10 'K/Bright (7)' is Received
    )
  And X10 'K6/Off (11)' is not Received
  And X10 'K/All Lights Off (1)' is not Received
  And X10 'K/All Units Off (13)' is not Received
Then
    Set Program 'Resume Kitchen Island (K6) On' To Run At Startup
    Set Program 'Resume Kitchen Island (K6) Off' To Not Run At Startup
Else
    Set Program 'Resume Kitchen Island (K6) On' To Not Run At Startup
    Set Program 'Resume Kitchen Island (K6) Off' To Run At Startup
```

14.1.7 Program Resume Kitchen Island (K6) On

```
If
  - No Conditions - (To add one, press 'Schedule' or 'Condition')
Then
   Send X10 'K6/On (3)'
Else
  - No Actions - (To add one, press 'Action')
```

14.1.8 Program Resume Kitchen Island (K6) Off

```
If

  - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

     Send X10 'K6/Off (11)'

Else

  - No Actions - (To add one, press 'Action')
```

The transmitted X-10 On or Off command will cause the Status program to resume its correct state.

Finally, to have some devices always go to a predetermined state at startup, rather than resuming a pre-fail state, a single program set to run at startup can be used to send a list of X-10 commands to set the requisite devices on or off.

14.2 Using X-10 Motion Sensors[72]

Small, inexpensive motion sensors have long been a popular part of the X-10 world. You can put them to good use in conjunction with ISY for control of INSTEON lighting. This article discusses the use of X-10 motion sensors with ISY and provides examples of ISY programming for X-10.

[72] (Universal Devices)

The simplest such program would simply have ISY turn on an INSTEON light when an X-10 motion sensor's On command is received, and turn the light back off when the sensor's Off command is received (in this example, the X-10 motion sensor is set to House/Unit code M1):

```
If
        X10 'M1/On (3)' is Received
    And X10 'M1/Off (11)' is not Received
Then
        Set 'Hall Light' On
Else
        Set 'Hall Light' Off
```

The program could alternatively turn on/off an X-10 light in response to the motion commands (in this example, the X-10 light has House/Unit code L1):

```
If
        X10 'M1/On (3)' is Received
    And X10 'M1/Off (11)' is not Received
Then
        Send X10 'L1/On (3)'
Else
        Send X10 'L1/Off (11)'
```

One problem with this simple approach is that the On time (the time the light remains on after the last motion is detected) is determined entirely by the motion sensor itself. X-10 motion sensors do not provide particularly fine control of the On time, which ISY can handle with much more flexibility. But of greater concern is the fact that many X-10 motion sensors do not properly re-trigger, i.e. they do not properly restart the internal timer when additional motion is detected. The result is that the sensor sends On when the first motion is detected, and after its preset delay (e.g. 3 minutes) it sends Off, no matter how many times additional motion was detected during that period. The motion sensor does properly send an On command for each additional detection, but it does not restart its timer. This

leaves the user in the dark until additional motion is detected, which causes the sensor to once again send On.

The solution is to listen only for the motion sensor's On command, and completely ignore its Off command, allowing ISY to do the timing and re-triggering:

```
If

    X10 'M1/On (3)' is Received

Then

    Set 'Hall Light' On

    Wait  3 minutes

    Set 'Hall Light' Off

Else

  - No Actions - (To add one, press 'Action')
```

Each time motion is detected, the program will restart, so the light will not be turned off until the programmed amount of time has elapsed after the last motion was detected.

An additional benefit of allowing ISY to do the timing, is that should the On time need to be changed for a number of sensors, it becomes simply a matter of altering the program lines, rather than going around to each sensor and physically changing its programmed On time.

It should be noted that the motion sensor itself will continue to send an Off command each time its timer expires (every three minutes in the above example), causing unnecessary RF and power-line traffic, with the attendant possibility of collisions. Therefore, when allowing ISY to do the timing, the motion sensor's timer should be set to its longest possible value. For many X-10 motion sensors this is 256 minutes, or approximately four and a quarter hours.

Speaking of unnecessary power-line traffic, the previous example will send the INSTEON On command every time motion is detected, which is very undesirable. This can be avoided by the use of two small programs:

14.2.1 Program: Motion Detect

```
If
    X10 'M1/On (3)' is Received
Then
    Run Program 'Motion Turn On' (If)
    Wait  3 minutes
    Set 'Hall Light' Off
Else
  - No Actions - (To add one, press 'Action')
```

14.2.2 Program: Motion Turn On

```
If
    Status  'Hall Light' is Off
Then
    Set 'Hall Light' On
Else
  - No Actions - (To add one, press 'Action')
```

Each time motion is detected, program Motion Detect is restarted, retriggering the timer and calling program Motion Turn On. The latter program turns on the light, but only if it is off.

The same functionality can be achieved with the two programs reconfigured this way:

14.2.3 Program: Motion Turn On

```
If
     X10 'M1/On (3)' is Received
  And Status  'Hall Light' is Off
Then
     Set 'Hall Light' On
Else
  - No Actions - (To add one, press 'Action')
```

14.2.4 Program: Motion Timer

```
If
     X10 'M1/On (3)' is Received
Then
     Wait  3 minutes
     Set 'Hall Light' Off
Else
  - No Actions - (To add one, press 'Action')
```

Each time motion is detected, both programs run. The first turns the light on, but only if it is off. The second starts or restarts the timer. This example executes slightly faster than the previous one, because in the previous example an additional program call is made, which adds a slight latency, before the light is turned on. This delay is small (subjectively, somewhere in the neighborhood of one-half to one second) but is nevertheless observable. For motion sensing applications, obviously quicker is better.

Many times, it is desirable to limit the period during which the motion sensor controls the light. The simplest example of this might be to have the sensor control the light only between sunset and sunrise:

14.2.5 Program: Motion Turn On

```
If
    From  Sunset
    To    Sunrise (next day)
  And X10 'M1/On (3)' is Received
  And Status  'Rear Floods' is Off
Then
    Set 'Rear Floods' On
Else
  - No Actions - (To add one, press 'Action')
```

14.2.6 Program: Motion Timer

```
If
    From  Sunset
    To    Sunrise (next day)
  And X10 'M1/On (3)' is Received
Then
    Wait  3 minutes
    Set 'Rear Floods' Off
Else
  - No Actions - (To add one, press 'Action')
```

Another common example would be to disable the motion control when the light is manually turned on:

14.2.7 Program: Motion Turn On

```
If
    Program 'Motion Disable' is False
  And X10 'M1/On (3)' is Received
  And Status  'Rear Floods' is Off
Then
    Set 'Rear Floods' On
Else
  - No Actions - (To add one, press 'Action')
```

14.2.8 Program: Motion Timer

```
If
    Program 'Motion Disable' is False
  And X10 'M1/On (3)' is Received
Then
    Wait  3 minutes
    Set 'Rear Floods' Off
Else
  - No Actions - (To add one, press 'Action')
```

14.2.9 Program: Motion Disable

```
If
      Control 'Rear Floods' is switched On
   And Control 'Rear Floods' is not switched Off
Then
  - No Actions - (To add one, press 'Action')
Else
  - No Actions - (To add one, press 'Action')
```

When the light is manually switched on, the program Motion Disable becomes True, and as a result the other two programs will not turn the light on or off. When the light is manually switched off, Motion Disable becomes False, and the other two programs resume operation.

Note that if the light is switched Fast On rather than On, the motion sensing will not be disabled, which may be a desirable feature. This can be changed to have Fast On disable motion sensing and regular On not disable it, by changing the Motion Disable program to sense Fast On and Fast Off rather than On and Off. Or, Motion Disable can be configured to sense both the regular and the Fast presses of On and Off to disable motion control when either manual control is used. Furthermore, multiple conditions can be used so, for example the schedule condition of the previous example can be combined with the manual disable example, so motion control is in effect from sunset to sunrise, but disabled by manual control:

14.2.10 Program: Motion Turn On

```
If
      From    Sunset
      To      Sunrise (next day)
   And Program 'Motion Disable' is False
   And X10 'M1/On (3)' is Received
   And Status  'Rear Floods' is Off
Then
      Set 'Rear Floods' On
Else
  - No Actions - (To add one, press 'Action')
```

14.2.11 Program: Motion Timer

```
If
      From    Sunset
      To      Sunrise (next day)
   And Program 'Motion Disable' is False
   And X10 'M1/On (3)' is Received
Then
      Wait  3 minutes
      Set 'Rear Floods' Off
Else
  - No Actions - (To add one, press 'Action')
```

14.2.12 Program: Motion Disable

```
If
      (
         Control 'Rear Floods' is switched On
       Or Control 'Rear Floods' is switched Fast On
      )
   And Control 'Rear Floods' is not switched Off
   And Control 'Rear Floods' is not switched Fast Off
Then
  - No Actions - (To add one, press 'Action')
Else
  - No Actions - (To add one, press 'Action')
```

As a final example, a set of conditions may be monitored which when active will prevent the motion timer from turning the light off, but not prevent motion detection from turning it on:

14.2.13 Program: Stairway Motion Turn On

```
If
      (
         X10 'M1/On (3)' is Received
       Or X10 'M3/On (3)' is Received
      )
   And Status  'Stairway Light (Load)' is not On
Then
      Set Scene 'sStairway Light' On
```

```
Else
  - No Actions - (To add one, press 'Action')
```

14.2.14 Program: Stairway Motion Timer

```
If
      Program 'Stairway Motion Enable' is True
   And (
         X10 'M1/On (3)' is Received
       Or X10 'M3/On (3)' is Received
      )
Then
      Wait  3 minutes
      Set Scene 'sStairway Light' Off
Else
  - No Actions - (To add one, press 'Action')
```

14.2.15 Program: Stairway Motion Enable

```
If
      Status  List...
   And Status  of...
   And Status  basement...
   And Status  'Lights' is Off
Then
  - No Actions - (To add one, press 'Action')
Else
```

Stop program 'Stairway Motion Timer'

In this example, motion at either the top (X-10 M1) or the bottom (X-10 M3) of the stairs will turn the stairway light on. When the timer expires, the stairway light will be turned off, but only if all basement lights are off. If any basement lights are on, the stairway light will not be turned off, though it will still turn on in response to motion (for example, if someone starts down the stairs).

This example shows several additional things. First, the load may be a scene rather than just an individual light in order, for example, to keep all the controllers in sync, such as switches at the top and the bottom of the stairs. It also shows how the enabling/disabling of motion control can be affected by other than just manual control; in the above example all of the basement lights are automatically monitored by ISY to determine whether or not to allow the motion timer to turn the stairway scene off. And one more very important feature is shown: when the motion control becomes disabled, the timer program is stopped, just in case it was already running. For example, someone starts down the stairs and the motion turns the scene on and starts the timer. The occupant reaches the lower level and turns on some basement lights, which disables further motion control. But the timer is already running and would turn the stairway scene off if it were not stopped.

All of these features may be combined with any of the previous examples, and this just scratches the surface. The possibilities are practically endless, if a little imagination is used.

14.3 Optional A10/X10 Firmware Module[73]

14.3.1 Overview

If you would like to do programmatic control such as when “x happens then send X10”, then all you have to do is to use the Send X10 statement under Actions section in Programs. You can also sense X10 signals by using X10 Received statement in conditions. These are all out of the box functionality and do not require this module. The only caveat is that PLM does not support Extended X10 commands such as variations of preset dim.

If you want to be able to name your X10 devices so that they show up on the device tree, and then you can reference them by name, then you would need this module (A10/X10 Module) which you can purchase by going through the Admin Console. Please note that the function of this module is purely cosmetic and does not add any additional functionality. Furthermore, this module does not support Dim/Bright.

14.3.2 Instructions

To purchase, please go to Admin Console | Help | Purchase Modules.

[73] (Universal Devices)

Using the A10/X10 module A10 and X10 devices can be added to the node tree.

Select from the **Link Mangement Menu | New Insteon/A10/X10 Device**. A requester will open allowing you to enter a name and the A10/X10 address the format for which is HouseCodeUnitCode such as F1. For X10 devices select a Device Type of **[71.01] {X10) Generic X10 device**.

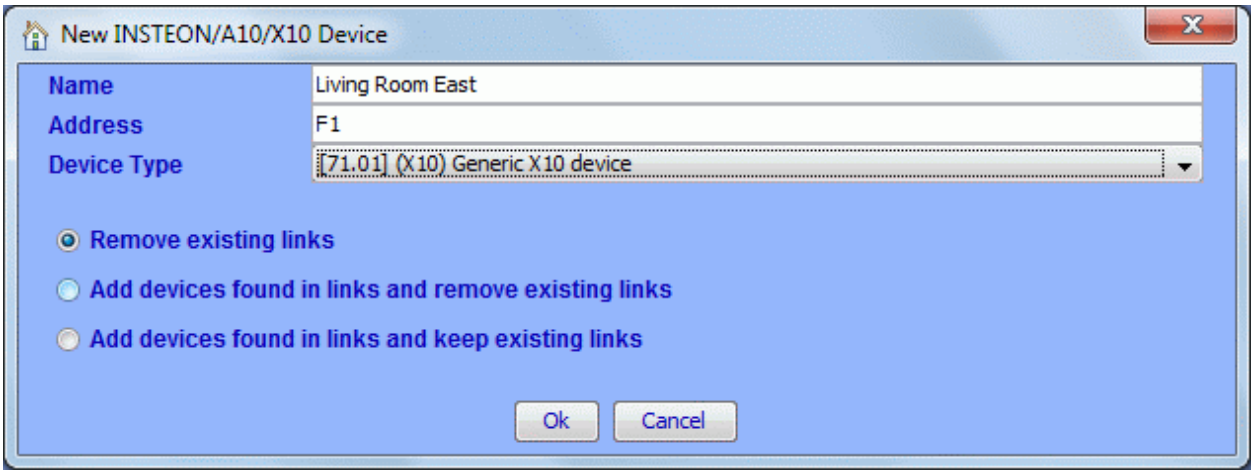


Figure 241: Add Device

Click on Ok and the device will be added to the node tree with an X10 icon. 

After the X10 device is added to the tree it will be available to use in programs as an Insteon/A10 device.

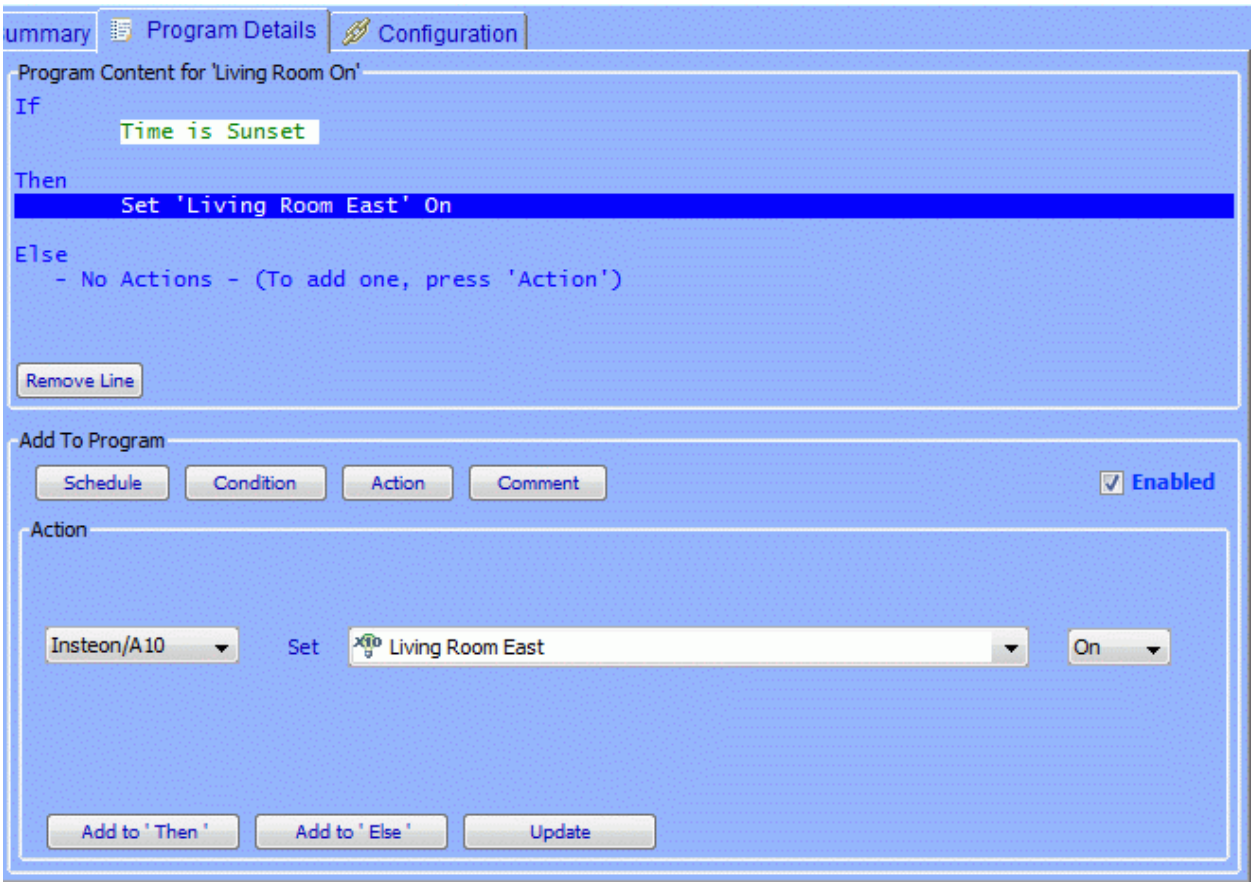


Figure 242: X-10 recognized as 'Living Room East' Device

15 Z-Wave Notes

15.1 Z-Wave Instructions

15.1.1 Requirements & Installation

- ISY-994 Series with firmware version 4.1.1 or above (Help | About)
- Z-Wave Module - 21100 (Help | About). If you do not have the Z-Wave Module, please do make sure you have firmware 4.1.1 installed first and then use Admin Console | Help | Purchase Modules ($1.00) to have it purchased/activated
- Z-Wave Dongle, see Ordering/Assembly Instructions
- INSTEON PLM plugged into Port A

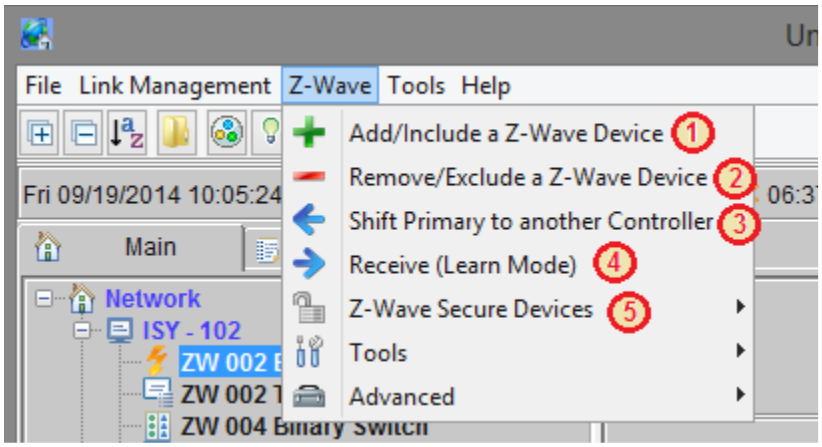


Figure 243: Z-Wave Menu

15.1.2 Add/Include a Z-Wave device

- Select **(1) Add/Include a Z-Wave Device**
  - If the popup window does not appear, select **15.1.12 Stop Adding or Removing a Z-Wave device** and the try again.

- Put the Z-Wave device in learn Mode. Refer to the user guide for your product on how to do this. In many cases this just requires you to press a button on the device.

- The ISY will begin adding the device (this may occur a few seconds after you put the device into learn mode).
  - The popup window will go away and you will see your device added to the tree.

Note: *To add a device, it must not already be included in a Z-Wave network. Therefore, if you are having trouble including a device try excluding it first.*

15.1.3 Remove/Exclude a Z-Wave device

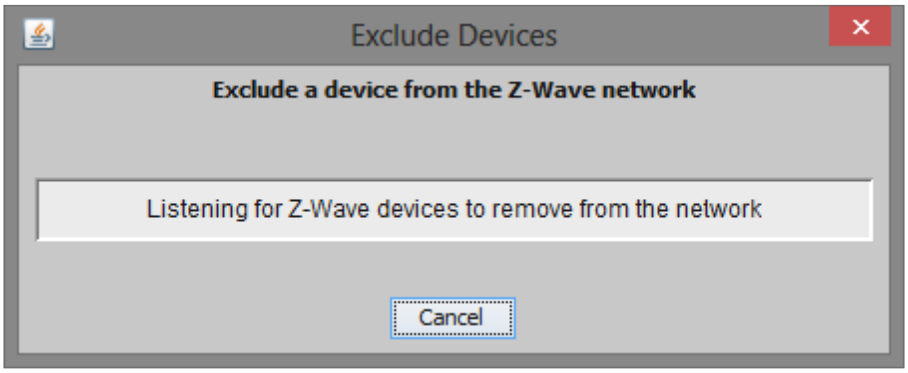


Figure 244: Exclude Devices Popup

- Select **(2) Remove/Exclude a Z-Wave Device**
  - If the popup window does not appear, select **15.1.12 Stop Adding or Removing a Z-Wave device** and the try again.

- Put the Z-Wave device in learn Mode. Refer to the user guide for your product on how to do this. In many cases this just requires you to press a button on the device.

- The ISY will exclude the device (this may occur a few seconds after you put the device into learn mode).
  - The popup window will go away and the nodes for the device will be removed from the tree.

15.1.4 Shift Primary to another Controller (Controller Shift)

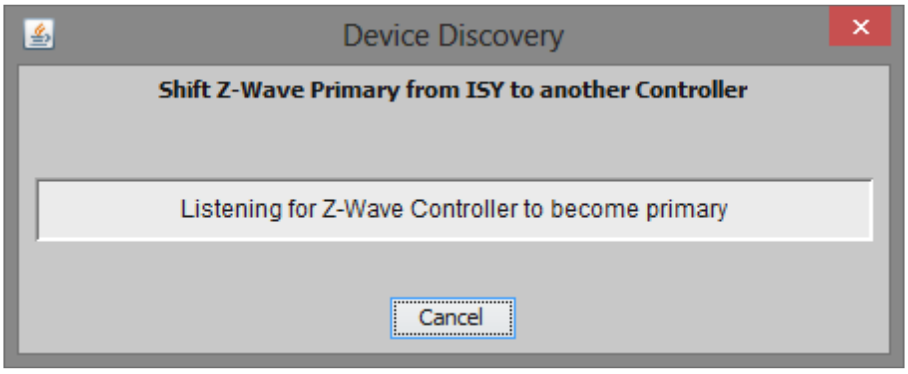


Figure 245: Device Discovery Popup

- Select **(3) Shift Primary to another Controller**
  - If the popup window does not appear, select **15.1.12 Stop Adding or Removing a Z-Wave device** and the try again.

- Put the other Z-Wave controller in learn Mode. Refer to the user guide for your product on how to do this.

- The ISY will begin making the device the new Primary Controller.
    - The popup window will go away and you will see your new Primary Controller added to the tree.

      Note: *If you are having trouble shifting primary to another controller, exclude it and try again.*

15.1.5 Receive (Learn Mode)

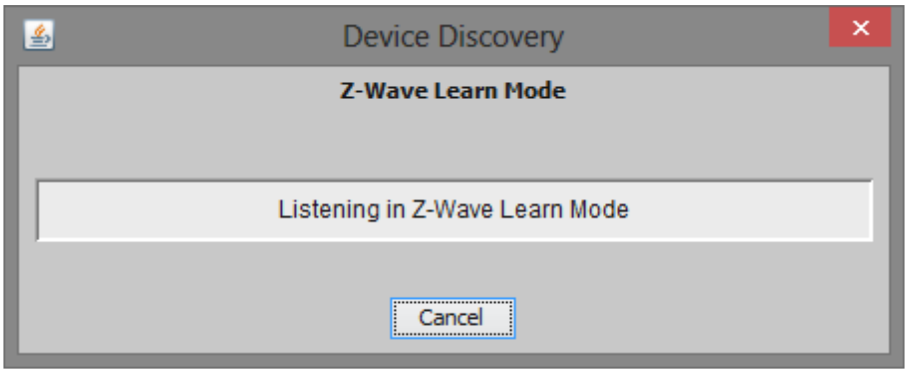


Figure 246: Device Discovery Popup

- Select **(4) Receive (Learn Mode)**
    - If the popup window does not appear, select **15.1.12 Stop Adding or Removing a Z-Wave device** and the try again.

- The ISY will now wait to receive information from another Z-Wave device performing an action such as Add/Include, Remove/Exclude, Controller Shift etc.
    - The popup window will go away when the operation is complete.

15.1.6 Z-Wave Secure Devices

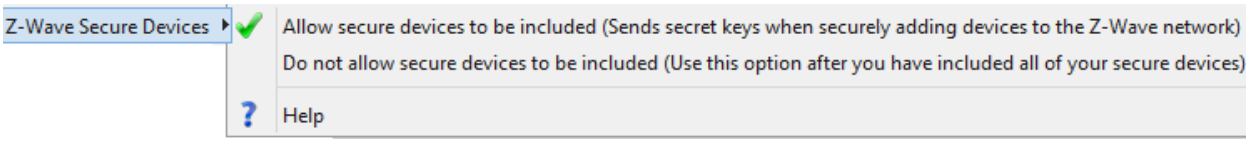


Figure 247: Z-Wave Secure Devices Menu

Sets the option for allowing devices to be securely added to the network. Once a secure device is added, the ISY will securely communicate with that device regardless of the

setting for this option. This prevents accidentally including a neighbor's device and sending it your secret keys.

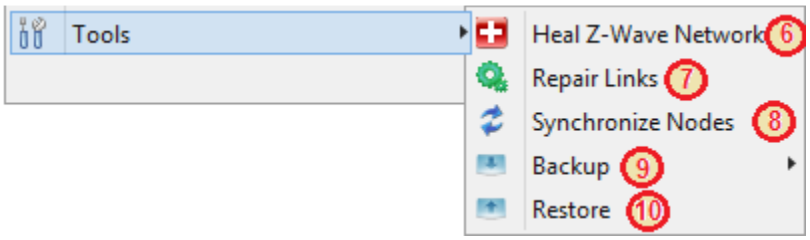


Figure 248: Z-Wave Tools Menu

15.1.7 Heal Z-Wave Network

Z-Wave devices maintain information for routing messages throughout the Z-Wave network. As devices are added, removed, and/or moved, this information becomes less optimal. Healing the network repairs this information by going through the whole Z-Wave network and finding the best routes between devices.

- Select **(6) Heal Z-Wave Network**
- Healing will begin and will run in the background. To see its progress, open the ISY event viewer.

15.1.8 Repair Links

For devices that support links (associations), this action makes sure associations to the ISY exist in all the devices and removes all of the links to devices that are no longer in your Z-Wave network (i.e. removes dead links).

- Select **(7) Repair Links**
- Repairing Links will begin and will run in the background. To see its progress, open the ISY event viewer.

15.1.9 Synchronize Nodes

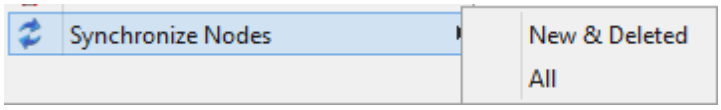


Figure 249: Synchronize Menu

The Z-Wave network maintains the list of devices that are members of the network. This command ensures that those devices appear as ISY nodes in the tree. For example, if you

delete the ISY nodes for a device, they will automatically reappear when using **Synchronize Nodes** because the device is still part of the Z-Wave network.

- Select **(8) Synchronize Nodes → New & Deleted**
  - Adds ISY nodes for devices that do not yet appear in ISY and removes ISY nodes for devices no longer in the Z-Wave network.

- Select **(8) Synchronize Nodes → All**
  - Adds ISY nodes for devices that do not yet appear in ISY, adds any missing ISY nodes for devices already appearing in the ISY, and removes ISY nodes for devices no longer in the Z-Wave network. This operation may take significantly longer than just processing the **New & Deleted** devices.

15.1.10 Backup

Takes a backup of all of your network information stored in the Z-Wave dongle. The backup file is created on the ISY.

- Select **(9) Backup**

- After a confirmation popup window, the backup will begin and will take anywhere from 8 to 40 minutes to complete (depending on the size of your network).

15.1.11 Restore

This action factory resets the Z-Wave dongle and then restores it with data from the backup file stored on the ISY. If no backup file exists then a restore is not attempted and the dongle is not factory reset.

If you have added or removed devices since your last backup, you may have to add or remove them again after the restore completes. In general, you never want to restore a backup that does not match your actual Z-Wave network configuration.

- Select **(10) Restore**

- After a confirmation popup window, the restore will begin.

15.1.12 Stop Adding or Removing a Z-Wave device

- Select **(11) Stop Adding or Removing a Z-Wave device** to force the ISY to get out of either include or exclude mode.

15.1.13 Factory Reset Z-Wave dongle

- Select **(12) Factory Reset Z-Wave Dongle**
- All network information will be removed from the dongle, and it will be reset to factory settings. In normal usage, factory reset should only be done if the dongle has been removed from the Z-Wave network.

15.1.14 Select Z-Wave Antenna

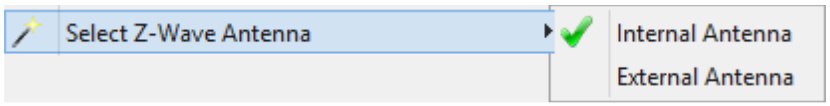


Figure 250: Select Z-Wave Antenna Menu

- Select **(13) Select Z-Wave Antenna**
  - The green arrow indicates the antenna currently being used.

15.1.15 Upgrade Z-Wave firmware

- Select **(14) Upgrade Z-Wave firmware**
  - Upgrades the Z-Wave library on the dongle to the most currently supported version.

15.1.16 Z-Wave Version

Select **(15) Z-Wave Version**	The Z-Wave library installed on the Z-Wave dongle
Library	
Z-Wave Version	The version of the Z-Wave library installed on the Z-Wave dongle
Bootloader Version	The version of the bootloader on the Z-Wave dongle

15.1.17 Importing an Existing Z-Wave Network

If you have the Primary Controller for your existing Z-Wave network, do the following to import the network into ISY.

- From the Admin Console, **Select Z-Wave -> Replicate (Learn Mode)** and wait for a popup window to appear.
    - If the popup window does not appear, select 'Stop Adding or Removing a Z-Wave Device' from the advanced menu then try again.
- Use the instructions for your Primary Controller to add a new Z-Wave device (the ISY) to the network, and optionally shift Primary control to the ISY.
- Wait until the transfer is complete; the instructions for your Primary Controller should tell you what to look for (e.g. LEDs stop flashing, it beeps, etc.)
    - The popup window will go away, and you will see the new Z-Wave devices appear in the ISY device tree

Adding Devices directly from ISY

- Make sure the ISY is the Primary Controller
- Select **Add a Z-Wave Device** from the menu and wait for a popup window to appear.
    - If the popup window does not appear, select 'Stop Adding or Removing a Z-Wave Device' from the advanced menu then try again.
- Put the Z-Wave device in link mode. Refer to the user guide for your product on how to do this. In many cases, this just requires you to press a button on the device.
- The ISY will begin adding the device (this may occur a few seconds after you put the device in link mode)
    - The popup window will go away, and you will see your device added to the tree.

Note

- All Secure devices such as door locks must be added to the ISY directly

15.1.18 Adding/Removing Devices Using Another Controller

- Shift Primary Control to the controller you want to use for including new Z-Wave devices into the network
- Add/Remove devices using the controller
- Either Shift Primary Control back to the ISY, or update the information in ISY

15.1.19 Shift Primary Control to ISY

- From the Admin Console, **Select Z-Wave -> Replicate (Learn Mode)**
- Use the instructions for your Primary Controller to start Replication that shifts Primary Control to another device.
- Wait until the transfer is complete; the instructions for your Primary Controller should tell you what to look for (e.g. LEDs stop flashing, it beeps, etc.)
- You should start seeing the Z-Wave devices appear in the ISY device tree

15.1.20 Update the ISY with Network changes

- From the Admin Console, Select **Z-Wave -> Replicate (Learn Mode)** and wait for a popup window to appear
- Use the instructions for your Primary Controller to include a device into the network
- Wait until the transfer is complete; the instructions for your Primary Controller should tell you what to look for (e.g. LEDs stop flashing, it beeps, etc.)
- You should start seeing the Z-Wave devices appear in the ISY device tree

15.1.21 Remove Devices

- Select **Remove/Exclude a Z-Wave Device** from the menu and wait for a popup window to appear.
    - If the popup window does not appear, Select **Stop Adding or Removing a Z-Wave Device** from the advanced menu then try again.
- Put the Z-Wave device in link mode. Refer to the user guide for your product on how to do this. In many cases, this just requires you to press a button on the device.
- The ISY will remove the device (this may occur a few seconds after you put the device in link mode)
    - The popup window will go away, but you will NOT see your device removed from the tree.

Notes

- Deleting a node from the ISY does not delete it from the Z-Wave dongle.
- When nodes are removed with a different controller, the ISY nodes are disabled instead of deleted. This is done in case the user accidentally removes ISY from the Z-Wave network, which essentially tells ISY that all nodes are deleted. We may change this behavior based on Alpha feedback.

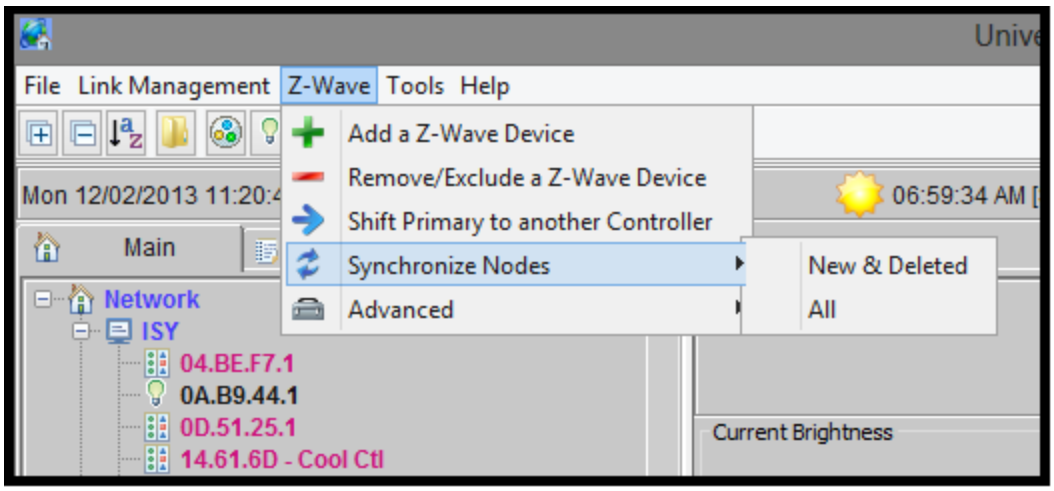


Figure 251: Synchronize Z-Wave Nodes

- Select **New & Deleted** to synchronize only those nodes have likely changed.
- Select **All** to synchronize all nodes whether they have changed or not.

Synchronizing ensures that the ISY and the Z-Wave network have the same device information for a node.

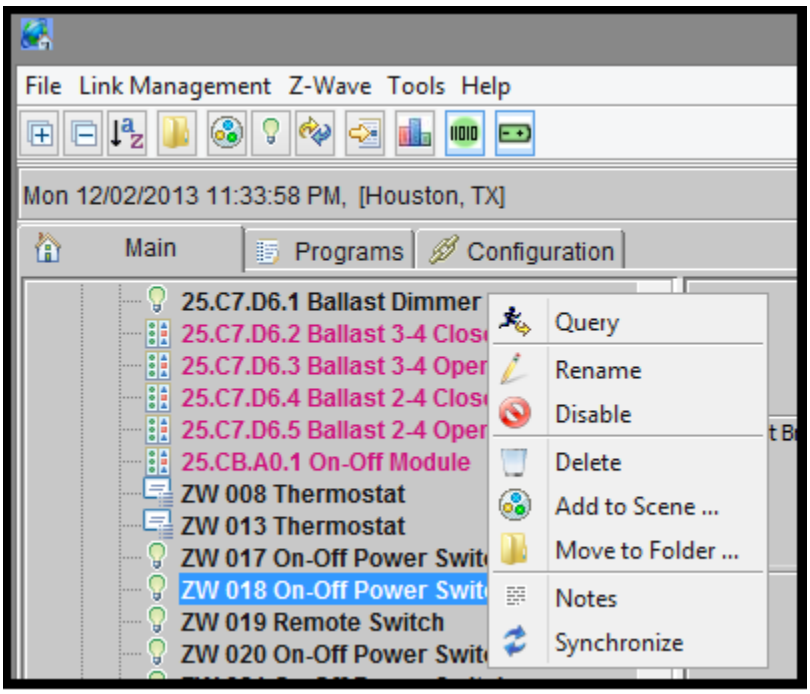


Figure 252: Synchronize one Z-Wave Node

- Select **Synchronize** to synchronize this node only.

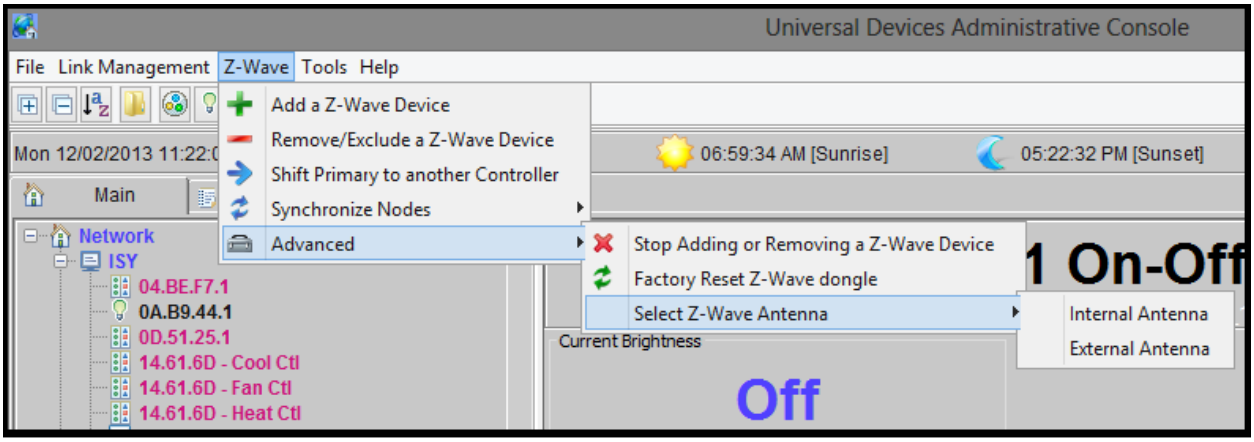


Figure 253: Antenna

Choose the antenna the Z-Wave dongle should use (Internal or External). **You must unplug ISY and then plug it back in for the settings to take effect**.

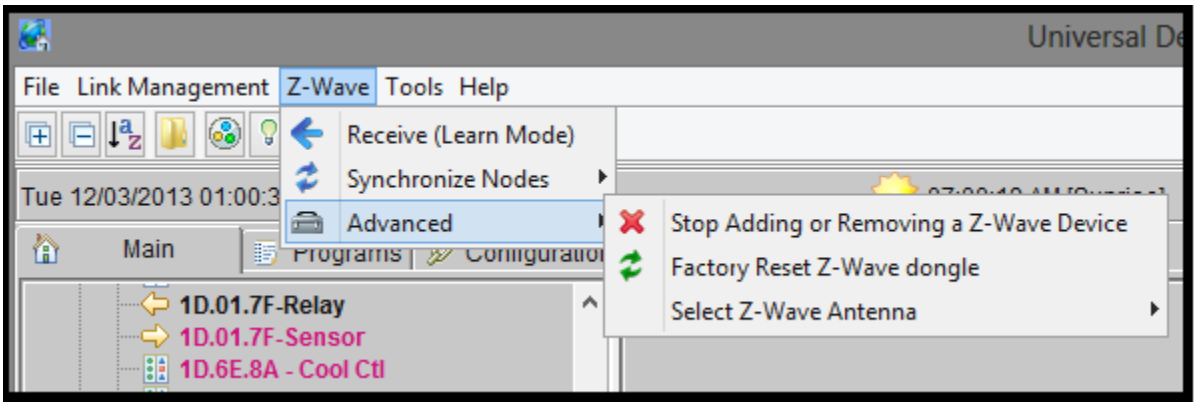


Figure 254: Factory Reset

You may Factory Reset the Z-Wave dongle if it is not a member of a Z-Wave network. This erases all network information from the dongle, making it the Primary for an empty Z-Wave network.

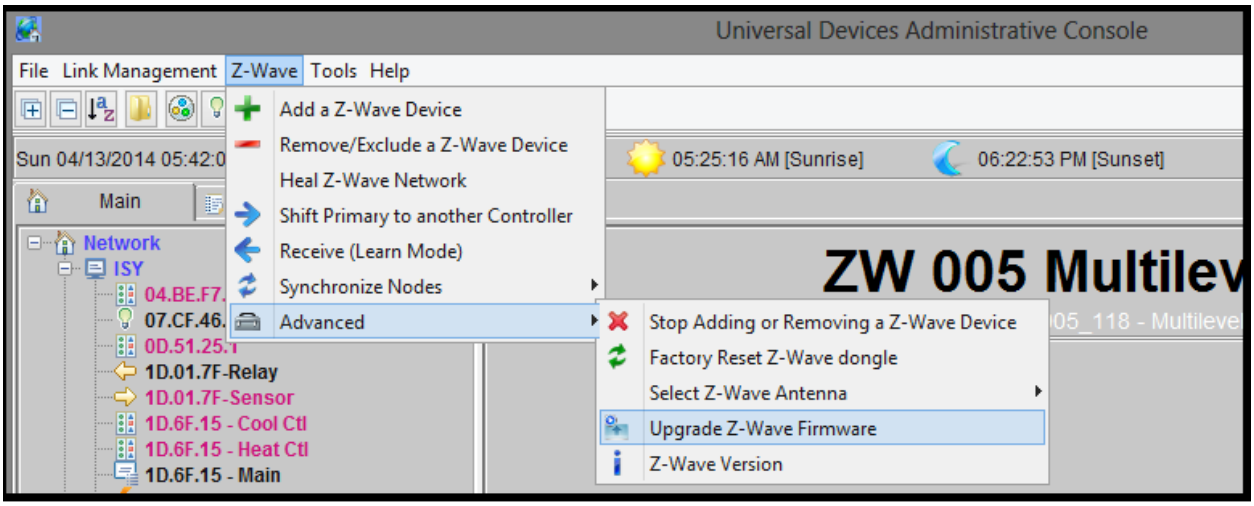


Figure 255: Firmware Upgrade

You must have Z-Wave Firmware version 4.55 (Z-Wave -> Advanced -> Z-Wave Version). If you don't, you may upgrade the firmware in the Z-Wave dongle if it is not a member of a Z-Wave network. This erases all network information from the dongle, making it the Primary for an empty Z-Wave network. You may also force it to upgrade even if you have an existing Z-Wave network.

Open the event viewer to see the progress of the firmware upgrade.

- If you want to preserve your existing Z-Wave network
  - Shift primary control to a secondary controller (such as an Aeon minimote).
  - Exclude ISY from the Z-Wave network
  - Upgrade the Z-Wave firmware (Z-Wave -> Advanced -> Upgrade Z-Wave Firmware)
  - Include ISY back into Z-Wave network
  - Shift primary control back to the ISY
  - NOTE: Even with this procedure, you may have to exclude your door locks and add them back in
- To do a fresh Z-Wave install or Overwrite your existing Z-Wave network
  - Upgrade the Z-Wave firmware (Z-Wave -> Advanced -> Upgrade Z-Wave Firmware)
  - Add all of your Z-Wave devices

15.2 Troubleshooting Z-Wave Communication Errors[74]

In most cases, communication errors can be solved by either Healing the Network (Z-Wave | Tools | Heal Z-Wave Network) or adding additional range extenders.

Please note that once you change the location of any Z-Wave device, you must Heal the Network so that the routing tables are updated by the underlying Z-Wave algorithms. The link below provides more details as far as healing the network and range extenders specifically for door locks and other RF devices.

15.3 Configuring Aeon Labs Range Extenders and Door Locks[75]

This repeater will work with door locks (encrypted traffic), though specific steps must be used to configure the network properly.

Here are some requirements for the repeaters to work for the door lock:

- The Door lock must have FLiRs enabled (repeater allows beaming which allows the repeater to wake up the door lock)
- The door lock and repeater must see each other as neighbors
- The repeater must support security mode and included in the network as a secure device. (See your extender or repeater documentation for specifics)
- Examples:
  - Aeon Labs Extender Gen 5, double tap inclusion button within 1 second when including, if you single tap you include as non-secure.
  - Aeon Labs RGB Bulb Gen 5, Triple "toggle" the on/off switch within 2 seconds to include in secure mode.

[74] (Universal Devices)
[75] (Universal Devices)

To force the door lock and repeater to see each other as neighbors, please:

- Re-include the door lock after the repeater has been included into the network to force the door lock to see the repeater as a potential neighbor. (This method may require you to move the ISY closer since the repeater does not support NWI).
- Open Tools | Diagnostics | Event Viewer and change the Level to 3
- Wake up the door lock, and run Z-Wave | Tools | Heal Network
    - Watch the Event Viewer and make sure that Heal completes without failure for each of your Z-Wave devices
    - Repeat as necessary

15.4 Configuring Aeon Labs DSB09104-ZWUS Energy Monitor[76]

Just as any Z-Wave device, DSB09104-ZWUS has some parameters that can be configured. The most important of which are voltage, units, and reporting interval.

- Right-mouse click on the associated node | Z-Wave | Set Configuration Parameter:
    - Choose Parameter 1 from the Parameter Number drop down, for Parameter Value enter your voltage (i.e. 120), then click the Set button
    - Choose Parameter 101 from the Parameter Number drop down, for Parameter Value enter 14 for auto reporting, then click the Set button
    - Choose Parameter 111 from the Parameter Number drop down, for Parameter Value enter the report interval (i.e. 10), then click the Set button

15.5 Configuring AeoTec Dry Contact Closure Gen 5[77]

This specific device reports sensor events as basic report by default. In 4.5.x firmware versions, ISY is expecting a binary sensor report and, as such, the node associated with binary sensor is not updated. To change the behavior of this device to report events as binary sensor report, change the configuration parameter as follows:

Parameter 121 [4 byte] = 16

15.6 Aeon Labs MultiSensor 6 Configuration Parameters

https://www.universal-devices.com/docs/Aeotech-MS6-Config-Params.pdf - Manual

15.7 Aeon Labs DSB28-ZWUS Configuration Parameters

https://www.universal-devices.com/docs/27_Home_Energy_Meter_G2.pdf - Manual

[76] (Universal Devices)
[77] (Universal Devices)

15.8 All AeoTec Parameters

https://aeotec.freshdesk.com/support/solutions/folders/6000209471

15.9 AeoTec Siren Configuration Parameters

https://www.vesternet.com/mwdownloads/download/link/id/426/z_wave_aeon_labs_siren_engineering_specification.pdf - Manual

15.10 RemoTec ZXT-120 Configuration[78]

ZXT-120 User Manual - http://www.universal-devices.com/docs/ZXT-120xx_User_Manual.pdf

- To configure ZXT-120 for IR:
- Configure parameter 27 to set up code 0
    - Configure parameter 25 and value from 0-22 to learn specific IR code data from your original remote control
    - After the IR code is learned, then go back to thermostat control page
    - For the details, please refer to page 9-12 of user manual.

16 The Integrated IR Receiver Notes

If your ISY came equipped with an integrated IR receiver (model numbers that contain "/IR"), Programs can be triggered using an RC5-compatible remote control. To program IR codes into the ISY, click the Configuration tab, then the IR sub-tab.

The IR configuration page lists all IR codes currently recognized by the ISY. The first column titled "Name" allows you to customize the name of a stored IR code. Simply double-click the IR code you'd like to change and type the desired name. This is how the IR code will be listed under ISY Program Conditions.

The "IR Code" is an internal number used to identify the IR code. It cannot be change and for the most part should be ignored.

The "Status" column contains the last Condition received from a particular IR code. The following conditions are available:

Pressed – indicates the remote-control button was pressed and released normally.

[78] (Universal Devices)

Double-Pressed – indicates the remote-control button was pressed twice quickly (similar to a mouse double-click).

Held – indicates the remote-control button was pressed and held (not yet released).

Released – indicates the remote-control button was pressed and held, then released.

The above Conditions are available in ISY Programs, allowing you to control your home in a wide variety of ways from a simple remote control.

There are also 3 buttons on the bottom of the IR Configuration Page:

Save – this button saves the currently displayed IR codes to the ISY.

Reload – this button aborts any IR codes learned since the last Save, and "reloads" the last saved IR database from the ISY.

Restore Defaults – this button restores the ISY to its default, blank IR database.

16.1 Using the 40 Default IR Codes

The ISY is able to download 40 pre-configured IR codes. These 40 pre-configured codes make it easier to configure remote controls that contain the ISY in their database (such as the Logitech Harmony), or remote controls that can import CCF files.

To import these 40 pre-configured IR codes into your ISY, simply click the "Import Default IR Codes" button at the top of the screen. This auto-populates the IR Configuration page with 40 codes labeled "IR_001, IR_002, etc." This overwrites any IR codes you may already have stored on your ISY.

With Logitech Harmony remote controls, you can simply choose the Universal Devices ISY from the Harmony software's built-in database. The Harmony software allows you to drag and drop the ISY's 40 default IR codes onto buttons on your remote control.

If you're using a Pronto or other CCF-compatible remote control, we have a CCF file available for download here: http://www.universal-devices.com/ir/99/isy-99.ccf.

If you're using a Universal Remote Control (URC) brand remote, we have a MXJ file available for download here: http://www.universal-devices.com/ir/99/isy-99.mxj.

Once your remote control is configured, create Programs to have your ISY perform actions or a series of actions based on your remote's button press. IR codes stored on the ISY will be available as Conditions when creating ISY Programs.

16.2 Using the IR Learning Mode

If more than 40 IR codes are needed, or if you prefer to "teach" your own IR codes, the ISY features a learning mode that is capable of reading most codes sent from RC5 compatible remote controls. For best results, try using codes compatible with Philips-brand devices, which are typically RC-5 compatible.

To use the ISY's learning mode, hit the button titled **Enter Learning Mode**. The ISY now waits for IR codes, and once received they will be entered into the ISY's IR database. Simply point your remote control at the front of the ISY and press the button you'd like the ISY to learn.

If a button press is not recognized, or a button is not recognized as expected, please try a different button/code.

Some symptoms of an incompatible IR code are:

Multiple entries created from a single button press

Inaccurate Status values (eg. you PRESS a button but the ISY shows it as HELD)

We highly recommend testing an IR code well to ensure it is 100% reliable with the ISY before saving. Make sure the ISY consistently displays the code correctly when the button is Pressed, Held, Released, etc.

When done teaching IR codes to your ISY, hit the "Leave Learning Mode" button on the top of the screen and be sure to "Save" your changes. If you wish to revert to the last saved IR codes stored on your ISY, hit the "Reload" button located on the bottom of your screen.

16.3 Quick IR Tutorial[79]

16.3.1 Using IR in the ISY-99i

Starting with firmware 2.7.1, the ISY now has a set of 40 default IR codes for you to use. You can import these codes into the ISY using the IMPORT DEFAULT IR CODES button. In the ISY's Admin Console, click the CONFIGURATION tab then the IR sub-tab and you will find the IMPORT button.

These 40 default IR codes are available pre-learned within CCF (for Pronto and other remotes) and MX-J (Universal Remote Control) files available for download here:

- Current CCF file: http://www.universal-devices.com/ir/99/isy-99_ccf.zip
- Older CCF file: http://www.universal-devices.com/ir/99/isy-99_ccf_old.zip

[79] (Universal Devices)

- MX-J file: http://www.universal-devices.com/ir/99/isy-99_mxj.zip

Please note that if these 40 default IR codes are not working for you, or if you need more than 40 IR codes, you can "teach" the ISY RC5-compatible IR codes in place of, or in addition to, these default 40 codes.

16.3.2 Teaching IR Codes To the ISY-99.9i (in place of or in addition to the 40 default IR codes)

If you're not using the 40 default IR codes, or need additional codes, the first step to using IR with your new ISY-99i is to find a remote or remote code that will work. The ISY-99i is compatible with any RC5 compatible remote control. If you have a universal remote control, try setting it to a Philips television. Just about any Philips device should be RC5 compatible. For this example, I'm using an old Philips television remote.

In the ISY-99i interface, click on the CONFIGURATION tab. Within there, click on the IR sub-tab. This will bring you to the IR configuration page. Simply click on the ENTER LEARNING MODE button, point your remote at the front of the ISY-99i, and push a button. If a compatible key is pressed, the ISY-99i will add the IR code to its list.

This is also a good time to test the remote. If you simply press the button and release, the status should show as PRESS. If you press and hold the button, the status will show as HOLD. If you press/hold the button then release the status will show as RELEASE.

Once you are done adding codes to the ISY-99i, go ahead and press the LEAVE LEARNING MODE button. If at any time you want to cancel the codes you have just added, simply click the RELOAD button at the bottom of the screen to return to the last saved configuration. If you'd like to wipe all saved IR codes and start from scratch, press the RESTORE DEFAULTS button. If you're happy with your currently displayed IR codes, press the SAVE button to save them to the ISY-99i.

16.3.3 Using IR In the ISY-99i

Now that you've learned your IR codes, it's time to use them! Received IR commands can be used in any ISY-99i program, which opens up tons of possibilities. For this tutorial, we'll create a simple program that uses IR to turn a light ON or OFF, depending on its current state. I'll also show you how to use that same IR button to brighten or dim that light.

First, some quick definitions

- **Pressed** - a normal press and release of a remote-control button
- **Double Pressed** - two quick presses and releases of a remote-control button
- **Held** - a press and hold of a remote-control button
- **Released** - the release of a held remote-control button

16.3.4 Sample ON/OFF Code

This code will turn a light on when pressing the IR code TV:1, assuming the light is currently off:

```
If

    IR 'TV : 1' is Pressed

  And Status  'Light1' is Off

Then

    Set 'Light1' On

Else

 - No Actions - (To add one, press 'Action')
```

This code will turn a light off when pressing the same IR code TV:1, assuming the light is currently NOT off:

```
If

    IR 'TV : 1' is Pressed

  And Status  'Light1' is not Off

Then

    Set 'Light1' Off

Else

 - No Actions - (To add one, press 'Action')
```

Now, suppose you want a bit more control. With the ISY-99i's IR capabilities, you can also trigger based on when a button is HELD, and then RELEASED. By implementing these commands in a program, you can cause the ISY-99i to dim or brighten a light.

16.3.5 Sample BRIGHTEN/DIM Code

This code will brighten a light when holding the same IR code TV:1, assuming the light is currently off:

```
If

    IR 'TV : 1' is Held

  And Status  'Light1' is Off

Then

    Set 'Light1' Fade Up

Else

 - No Actions - (To add one, press 'Action')
```

This code will dim a light when holding the same IR code TV:1, assuming the light is currently NOT off:

```
If

    IR 'TV : 1' is Held

  And Status  'Light1' is not Off

Then

    Set 'Light1' Fade Down

Else

 - No Actions - (To add one, press 'Action')
```

The above programs will START a fade up or fade down, but you also need the code below so the ISY-99i knows when to STOP the fade:

```
If

    IR 'TV : 1' is Released

Then

    Set 'Light1' Fade Stop

Else

 - No Actions - (To add one, press 'Action')
```

16.3.6 Summary

The above code examples show how to setup a single remote-control button to turn on, turn off, brighten, and dim a light from the ISY-99i. You could also configure separate buttons to turn on and off the light, and even use a volume +/- button to fade the light up or down!

16.4 Adding IR Commands[80]

16.4.1 What are ISY IR Commands

On the front of the ISY there is a IR receiver which can see remote control IR signals. These signals can then control devices and scenes linked to the ISY thru ISY Programs.

16.4.2 Default IR Commands

Starting with firmware version 2.7.1, we now have a default set of 40 IR codes that can be downloaded to your ISY through the Admin Console ("Import Default IR Codes" button). Please note that this will REPLACE any existing IR codes you may have already taught to your ISY.

The ISY is now listed on Harmony's device database, making setup much easier for Harmony owners. We also have a Pronto CCF file containing these 40 codes available for download here: http://www.universal-devices.com/ir/99/isy-99.ccf

[80] (Universal Devices)

Please note that this does not REPLACE any of the ISY's existing IR functionality - you are still free to teach codes to the ISY, either in place of or in addition to these 40 default IR codes.

16.4.3 Finding a Supported Remote Code

The ISY-99i does not come with its own remote but rather utilizes already existing Philips remote commands. Because the ISY-99i supports only the Philips RC5 Protocol, you will need to either use one of your old retired Philips remotes and teach the ISY or use a "Universal Remote" Philips device code. These remote codes should work fine, but there have been some cases where some codes work better than others.

Remote Brand	Device Code
Logitech Harmony Remote	Light Controller->Universal Devices->ISY99i/IR (case sensitive)
One for All	http://www.ofausa.com/advanced_search.php
Philips Pronto	http://www.pronto.philips.com/
Universal Remote Control	0330, 0430, 0036, 0136, 0738, 0439, 0939, 0247, 0230, 0830

Compatible / incompatible remotes (Forum Thread): http://forum.universal-devices.com/viewtopic.php?t=668

The article Philips RC-5 Codes for ISY has available for download, a .zip file which contains the 1024 RC-5 codes recognized by ISY in hex and Pronto .ccf format, for use with computer-programmable remote controls and other IR devices.

16.4.4 Adding an IR Command

- Log into your ISY.
- In the ISY-99i interface, click on the "Configuration" tab
- Click on the IR sub-tab. This will bring you to the IR configuration page
- Click on the "Enter Learning Mode" button, point your remote at the front of the ISY-99i, and push a button
- If a compatible key is pressed, the ISY-99i will add the IR code to its list
- Repeat the above steps until all desired codes are stored
- Once you are done adding codes to the ISY-99i, go ahead and press the "Leave Learning Mode" button
- Click the "Save" button to store them in the ISY-99i database

Please Note - If after a button is learned and you see lots of garbage when pressed, the IR command you are using is most likely not being understood by the ISY, which may need to be relearned or substituted by another button and or all together another device code.

16.4.5 Testing an IR Command

It is good to test your commands to see if they all work correctly. There is several states a command can have, here is a list below. These states can all be used by the user in ISY programs.

- **Press** - a normal press and release of a remote-control button
- **Double Press** - two quick presses and releases of a remote-control button
- **Held** - a press and hold of a remote-control button
- **Release** - the release of a held remote-control button

- Press the button and release, the status should show as PRESS.
- Press and hold the button, the status will show as HOLD.
- From a press and hold state, release the button and the status will show as RELEASE.

16.4.6 Controlling Devices With IR

After you have completed adding the IR commands to the ISY you will need to head on over to the Creating an IR Program How-To to create the programs that will control your devices with the newly stored IR commands.

16.5 Philips RC-5 IR Codes for ISY[81]

The infrared (IR) receive capability of the /IR series of ISY controllers is based on the Philips RC-5 IR protocol, a de facto standard. The RC-5 protocol defines 32 devices of 64 commands each, for a total of 2048 unique codes. The ISY/IR series controllers can receive up to 1024 unique codes, and will roll over the second group of 1024 codes (devices 16 to 31) to the first group (devices 0 to 15).

While the database in almost any so-called universal remote control will contain many codesets which use the RC-5 protocol, making use of these codes requires searching the particular remote control's database for one or more appropriate codesets. The article Adding IR Commands lists some appropriate codes for a few of the most common remote controls.

- https://wiki.universal-devices.com/images/c/c9/ISY_RC5.zip

Many of the more advanced universal remote controls, as well as other IR devices, allow for programming from a computer. IR codes may be entered into the programming application either as hex strings, or in standard Pronto .ccf format, depending on the application

[81] (Universal Devices)

software. For use with such applications, the first 1024 RC-5 codes (devices 0 to 15) have been generated as both hex strings and .ccf files, and placed in the .zip file linked above. This will make it easy for the user of such a device to simply select the required number of codes and import them. The .zip file contains a readme file.

16.6 Adjusting IR Press/Release Delays[82]

You can change the default settings for detecting when a hold, Release, or double press has occurred.

16.6.1 Hold Detect

The number of milliseconds the button must be pressed before it is considered a HOLD. If the button is released before Hold Detect milliseconds elapse, it is considered a PRESS.

The default value is 800, you can lower this value if you want HOLD to be detected quicker.

16.6.2 Hold Maintain

The number of milliseconds to wait for the next code sent by the remote.

While the remote button is being held down (HOLD), it continually sends out codes. When the button is released, it stops sending those codes, and thus the RELEASE action is detected.

The default value is 300, you can lower this value if you want RELEASE to be detected sooner. Ideally, this value should be as low as possible.

Note: DOUBLE PRESS also uses the Hold Maintain value. If a button is pressed, and then pressed again within the Hold Maintain time then it is considered a DOUBLE PRESS.

16.6.3 Change These Values

These values take effect the moment they are changed.

- Get your ISY IP address for your ISY.
- Telnet to your ISY and login with your username and password
- Use the CI command, it will prompt you for new values for Hold Detect and Hold Maintain

[82] (Universal Devices)

16.7 Creating an IR Program[83]

16.7.1 Create an IR Program

In the ISY you can create many powerful programs in order to automate your setup. It helps to know the process to create a program which once you have created a simple program you can move on to more complex ideas. This how to is to help you create an IR program. See the Program Commands reference for more info on syntax.

- Log into your ISY.
- Click on the "Program Details" tab to get started
- Right click on one of the folders and select "New Program", rename it to something that pertains to your program
- Click on the "Condition" button, and adjust the settings
- Next click on the "Action" button, and adjust the settings
- Finally click on the "Save Changes" button to save your program to the database
    - The icon for the program should change from a "page green arrow icon" to a "page icon".
- Your program is enabled and ready to run

[83] (Universal Devices)

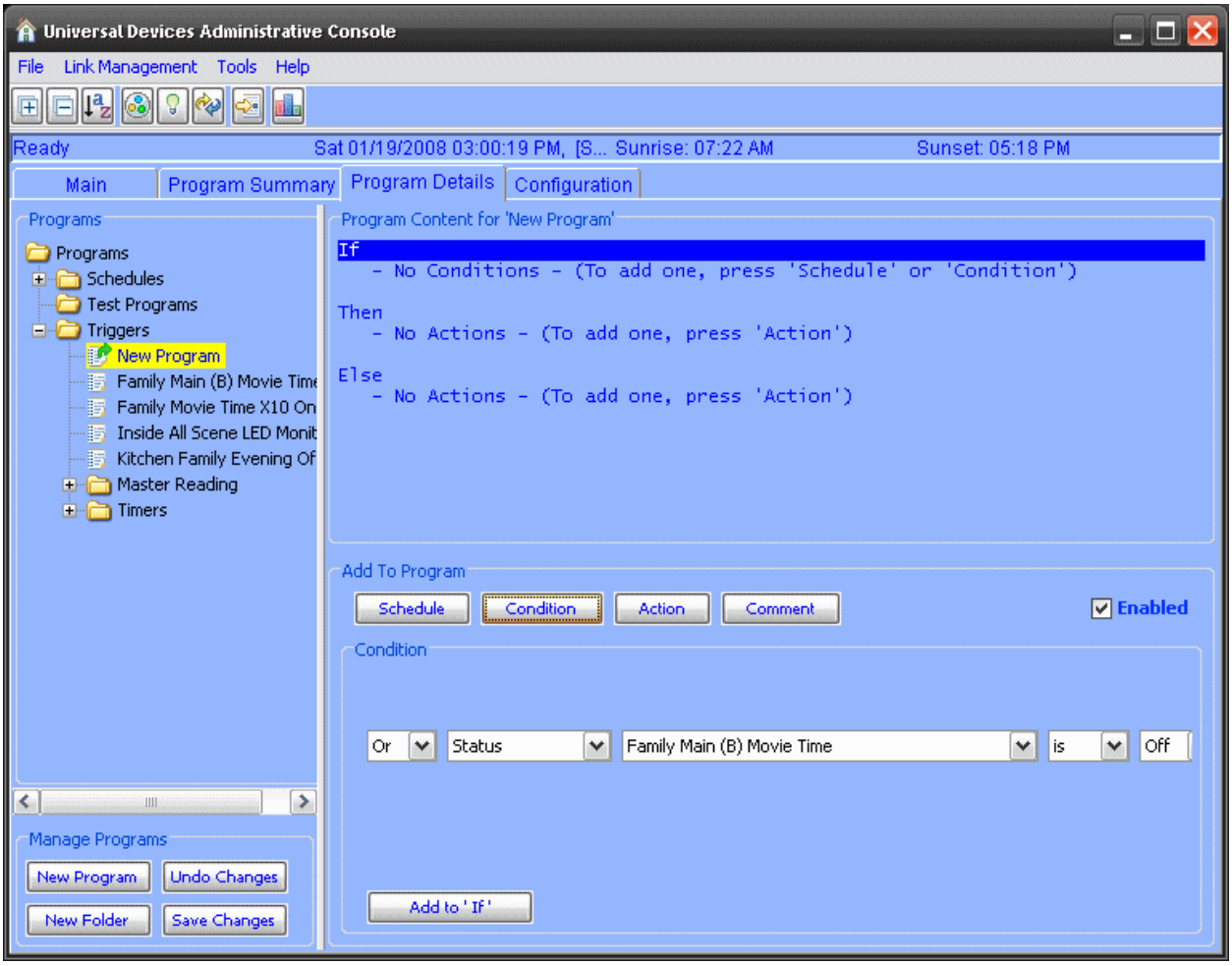


Figure 256: Program Condition Window

17 Irrigation Notes

Example programs can be found in section: 11.4 Irrigation Timer Programs

17.1 Evaporation and Irrigation[84]

17.1.1 What is Evapotranspiration

- ET is an approximation of the amount of water leaving the soil via a combination of evaporation and transpiration (a fancy word for plants drinking it up).
- The goal of an ET-aware irrigation system is to approximately (despite all the appearance of precision, we have to remember this) replace this water.
- It does this by tracking the water used/lost from the soil until a threshold is reached (where the plants would starve for water if much more left without replacement).

[84] (Universal Devices)

- In most climates, this will result in watering every few days.
- Rain may offset some of the water use/loss, resulting in less frequent watering.
- Calculations performed once every 24 hours are sufficient for this tracking.

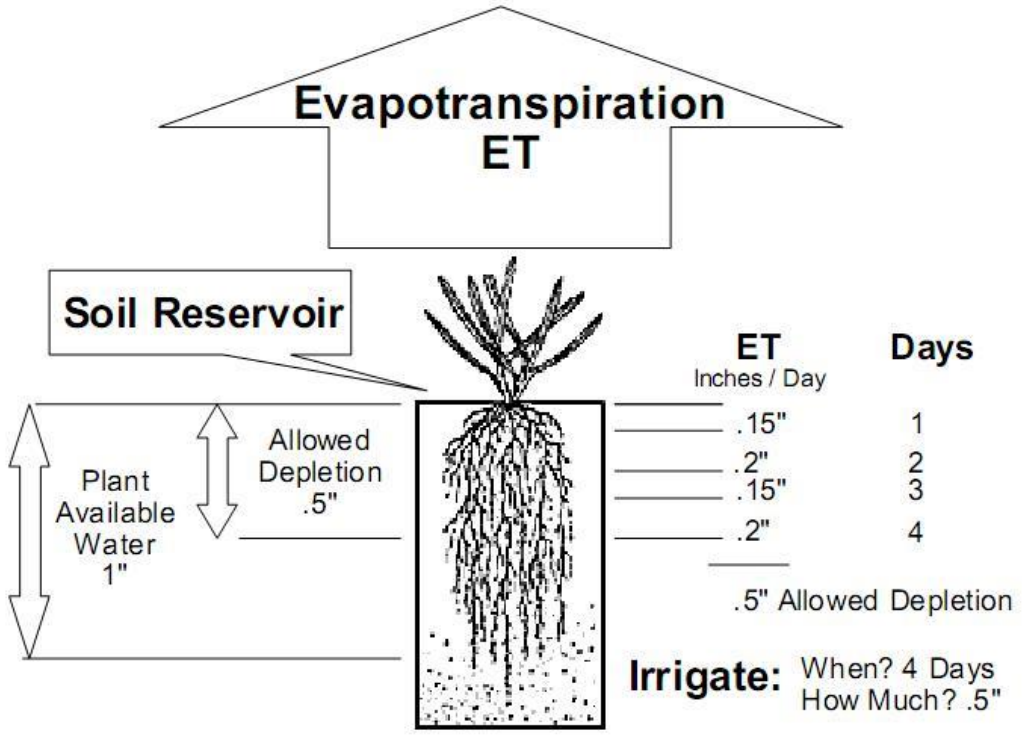


Figure 257: Irrigation based on ET

- There's some amount of allowed depletion (based on the plant types, root lengths, etc.).
- This depletion will not typically happen in a single day.
- What is varied is when to water, not how much.

17.1.2 Irrigation with Evapotranspiration

The irrigation requirement is computed and added to the balance. Once the irrigation requirement reaches the allowed moisture depletion level it is time to irrigate. The following example uses a .5" allowable depletion level before allowing irrigation.

Date	ETc	Effective Rain	Irrigate	Irrigation Requirement Balance
4/1/2003	0.28	0.13		0.15
4/2/2003	0.27			0.42
4/3/2003	0.21		0.50	0.13
4/4/2003	0.16	0.04		0.25
4/5/2003	0.19			0.44
4/6/2003	0.14		0.50	0.08
4/7/2003	0.15			0.23
4/8/2003	0.18			0.41
4/9/2003	0.18		0.50	0.09
4/10/2003	0.19			0.27
4/11/2003	0.20			0.47
4/12/2003	0.22		0.50	0.19
4/13/2003	0.23			0.42
4/14/2003	0.21		0.50	0.14
4/15/2003	0.17	0.20		0.11
4/16/2003	0.16	0.11		0.16
4/17/2003	0.18			0.34
4/18/2003	0.21		0.50	0.04
4/19/2003	0.11	0.01		0.14
4/20/2003	0.19			0.33
4/21/2003	0.17			0.50
4/22/2003	0.21		0.50	0.21
4/23/2003	0.13			0.34
4/24/2003	0.17		0.50	0.01
4/25/2003	0.23			0.24
4/26/2003	0.27		0.50	0.01
4/27/2003	0.24			0.25
4/28/2003	0.26		0.50	0.01
4/29/2003	0.27			0.28
4/30/2003	0.24		0.50	0.02

Figure 258: Irrigation Requirement Balance Example

- A running balance is used to decide when to irrigate.
- It's not necessary to exactly replace all the water which has left the soil (i.e. zero-out the balance).

17.2 Using the HAM Weather Irrigation Module[85]

17.2.1 The Basic Idea of this Module

For more in depth discussion of Evapotranspiration, please check out the section: **17.1 Evaporation and Irrigation**

This module is designed to calculate the amount of water that is lost from the soil and plants and replace it with a close approximation of what was lost. Today in a world of "Green is good" every consumable resource such as water can be better conserved with such a tool.

The module takes the local WeatherBug data, the user settings, and calculates each day the average water that has been lost. The user then can have programs that respond to these calculations and apply the appropriate amount of water to replace that loss. When those programs complete they trigger a command that lets the module know that the water has been applied and can be subtracted from the module's tally. Each day this is done completing the cycle of tracking the data and applying the water. During cooler times of the year the watering days frequency will slow down, and during the warmer parts of the year the watering frequency will ramp up to daily.

[85] (Universal Devices)

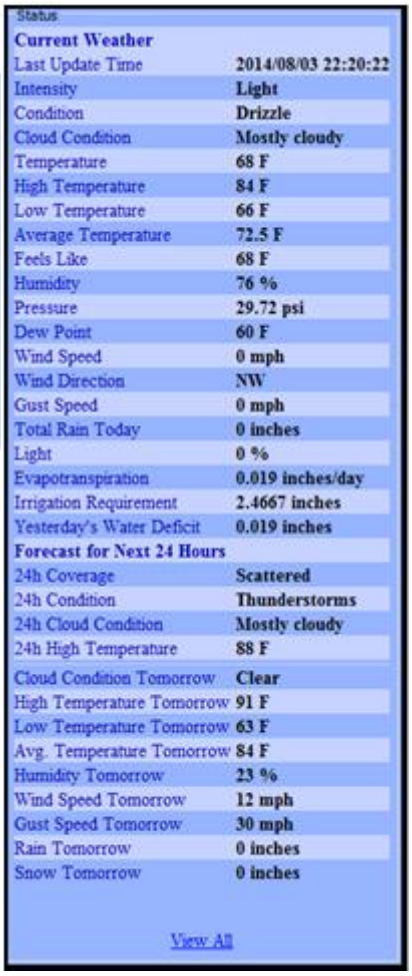


Figure 259: HAM Weather Data

17.2.2 Irrigation Module's Settings

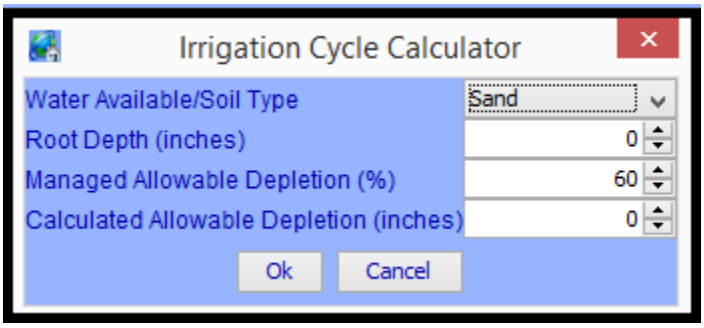


Figure 260: Irrigation Cycle Calculator

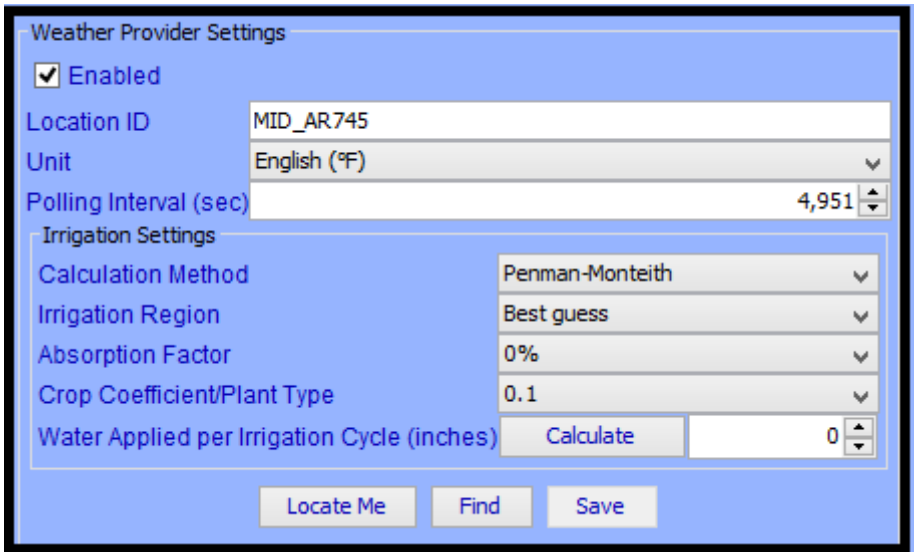


Figure 261: Weather Provider Settings

There are several variables that are adjustable by the user.

- Calculation Method - The method used to calculate ETo
  - Penman-Monteith: Accurate, but relies on averages of Temperature, Wind speed, and Dewpoint throughout the day. Some users had reported problems with communication to the HAM Weather servers which can cause errors in the averages.
  - Hargreaves-Samani: Less accurate, but relies on Min/Max temperatures alone. These can be acquired during one snapshot at the end of the day. As a result, the calculation is far more robust in the presence of HAM Weather access issues.
- Irrigation Region - adjusts for the differing ET in inland vs coastal areas.
  - coastal region, interior plains region
- Absorption Factor/Soil Type - adjusts for the relative efficiency of soil absorption.
  - 80% absorption is recommended for level ground. This is a generally accepted industry % absorption for rainfall. Users with steep slopes can apply lower percentages to compensate for runoff.
  - Absorption is applied to both rainfall and irrigation:
    - Rainfall .5 inches: Effective rain = 0.8 * .5 = .4 inches
    - Irrigation 0.5 inches: Effective irrifation = 0.8 * 0.5 = .4 inches
- Crop Coefficient/Plant Type - Plant needs are species dependent and defined as ETc = ETo * Kc (Kc = crop coefficient).
  - Cool season grasses (Bluegrass, Rye, Fescue) use Kc of 0.8
  - Warm season greasses (Bermuda, Saint Augustine, Zoisya, and Centipede) use a Kc of 0.6.
  - Additional values are provided to encompass a range of plants/trees/gardens.
  - Note: the current Evapotranspiration variable is actually ETc (=ETo * Kc)

- Water Applied per Irrigation Cycle - amount of water the user's irrigation program applies to the soil during each run.
- Allowable Depletion - how much water is allowed to leave (be depleted from) the soil before the next irrigation cycle.

17.2.3 Irrigation Module's Status Output

These variables are calculated from the WeatherBug data. They can be used in the program module for customizing the irrigation system.

- Evapotranspiration - approximation of the total amount of water leaving via a combination of soil evaporation and plant transpiration.
- Irrigation Requirement - amount of water to be applied based on the accumulation of previous day(s) water deficits.
- Yesterday's Water Deficit - total amount of water that has evapotranspired during a twenty four hour window from the day before.

17.2.4 Irrigation Module's Commands

These are commands that can be used in ISY programs.

- Irrigation - Cycle Complete - triggers the module's calculations for after water has been applied.
- Irrigation - Reset Variables - triggers a reset of the module's Irrigation Requirement variable.

17.2.5 Program Example: Irrigate If Needed

The IF condition decides whether to water by comparing the Irrigation Requirement balance to a constant. The user is responsible for setting this constant equal to Water Applied per Irrigation Cycle, and updating it if they change the value of water that they apply per irrigation in their own programs.

```
If

    Time is 11:00:00PM

  And Module 'Climate' Irrigation Requirement >= 0.50

Then

    Set 'Front Yard' On

    Wait  10 minutes

    Set 'Back Yard' On

    Wait  5 minutes

    Set 'Back Yard' Off

    Irrigation - Cycle Complete
```

Please note: If you are using an EZFlora device you only have to turn off the last station. When you turn on the next station the EZFlora first turns off the current station then turns on the next one. If you use an EZio device you will have to turn off each station before turning on the next one.

17.2.6 Calculating the Station Run Time

In order to replace the water that is lost from the soil your station run times will need to be properly calculated. Each type of emitter/sprinkler has a different amount of water that is being delivered per minute/hour.

17.2.7 Initialize the Module

After you have installed the Irrigation Module the Irrigation Requirement variable will most likely display zero. You will have to trigger a reset of the module variables to get things going correctly. Below is a walk-thru of the steps to perform this reset. Please note: If its the rainy season it may be difficult to tell if Irrigation Requirement is having an issue, so its recommended this be performed anyways just after the first install of the module.

- In the ISY Admin Console go to the Programs tab.
- Create the temporary program shown in the example below.
- Right click on the program in the folder tree and select "Run Then" to reset the module.
- Go back to the Weatherbug tab.
- Check again Irrigation Requirement and you should now see a number instead of a zero.
- Once you have done this initialization process you can delete the temporary program.

```
If

    - No Conditions - (To add one, press 'Schedule' or 'Condition')

Then

    Irrigation - Reset Variables
```

18 ISY Portal Notes

18.1 Configuring ISY Portal Integration

You can access your ISY device outside of your internal network. You do this by enabling the **File->Enable Internet Access (ISY)** option and setting up port forwarding within your ISY.

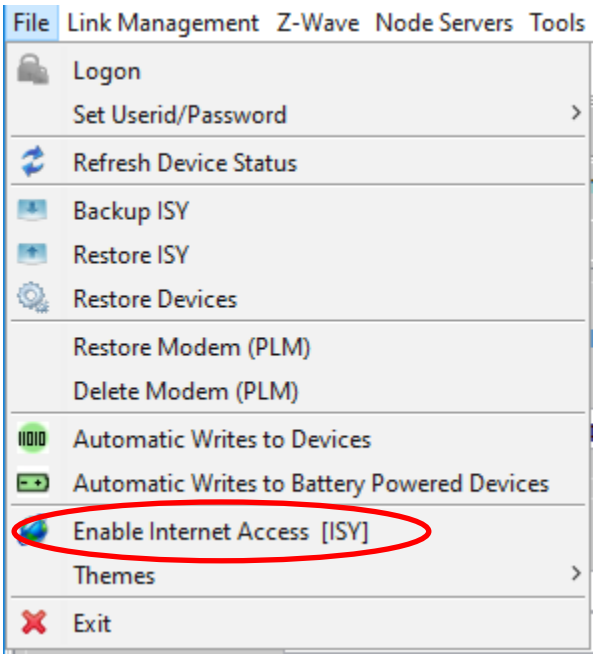


Figure 262: Networking Actions

However, there may be issues with your internet service provider. In most cases the service provider issues your home with an IP address which changes. This would cause you to lose connection to your ISY, often without your knowledge. You would need to reconfigure your remote access in ISY whenever this address changes.
The preferred method to connect to your ISY is to use **Cloud** Services. The ISY Portal enables you to do this and remotely connect to your ISY device without the need to do any port forwarding. Your connection is not affected by changes to your external IP address. The ISY Portal uses cloud services hosted by Universal Devices.
Instructions on setting up the ISY Portal can be found online at the following address:
Following is a step-by-step procedure for setting up the ISY Portal:

18.1.1 Verify Module Installation

The ISY Portal requires that you purchase the **Portal Integration** module. Check the ISY **Help->About** menu to verify the module installation.

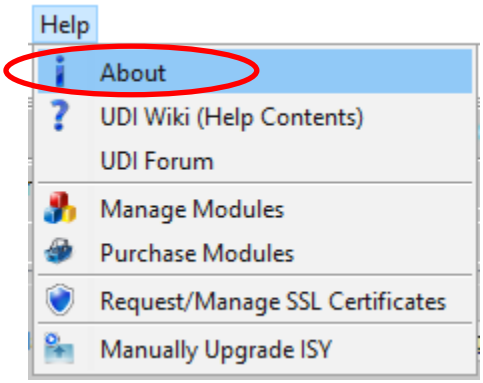


Figure 263: Help->About Menu Item

Selecting the **Help->About** menu option will display the following information.

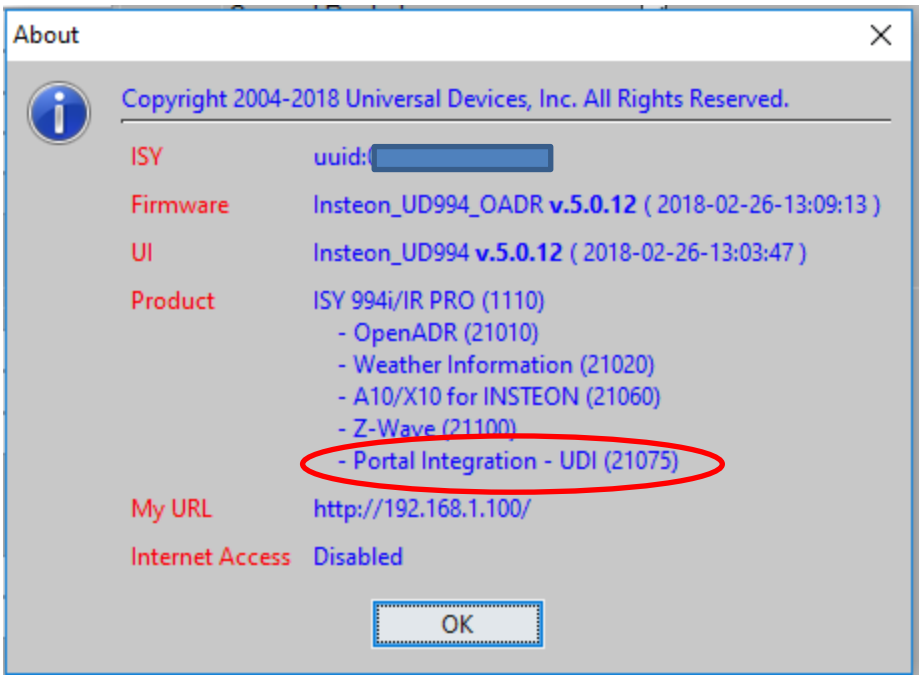


Figure 264: Help->About Display

Take a look at the **Product** section. If you do not see **Portal Integration** listed, you will need to purchase this prior to continuing. Select the **Help->Purchase Modules** option to purchase the **Portal Integration** moduel. You will be directed to the ISY website in order to complete the purchase.

18.1.2 Portal Registration

The next step once you have verified that you have the **Portal Integration** module installed is to register the service.
Verify that the service is not registered by selecting the **Configuration->Portals.** If you see **Not Registered** listed in the **Portal Integration – UDI** section, this indicates that you need to register this portal.

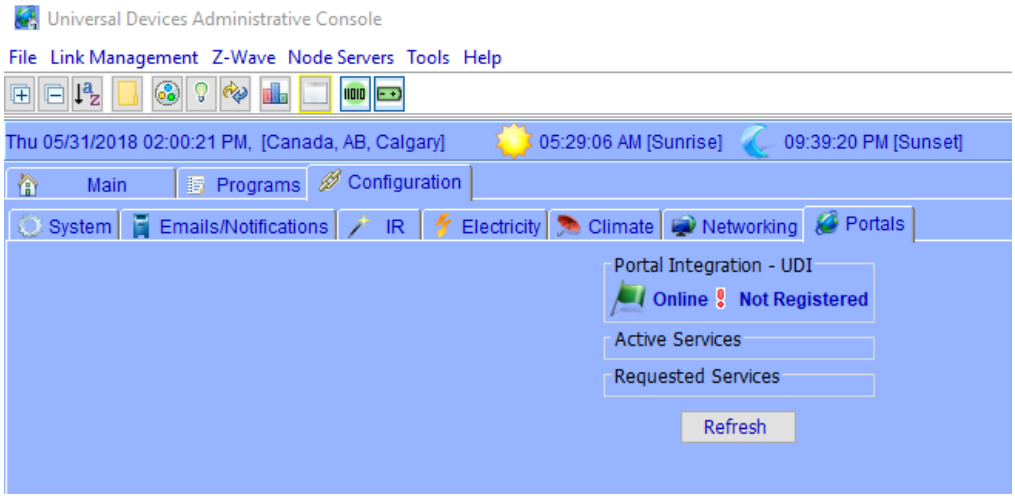


Figure 265: Configuration->Portals Tab

Register the **Portal Integration** service by going to the URL: https://my.isy.io/index.htm
You will see the following displayed:

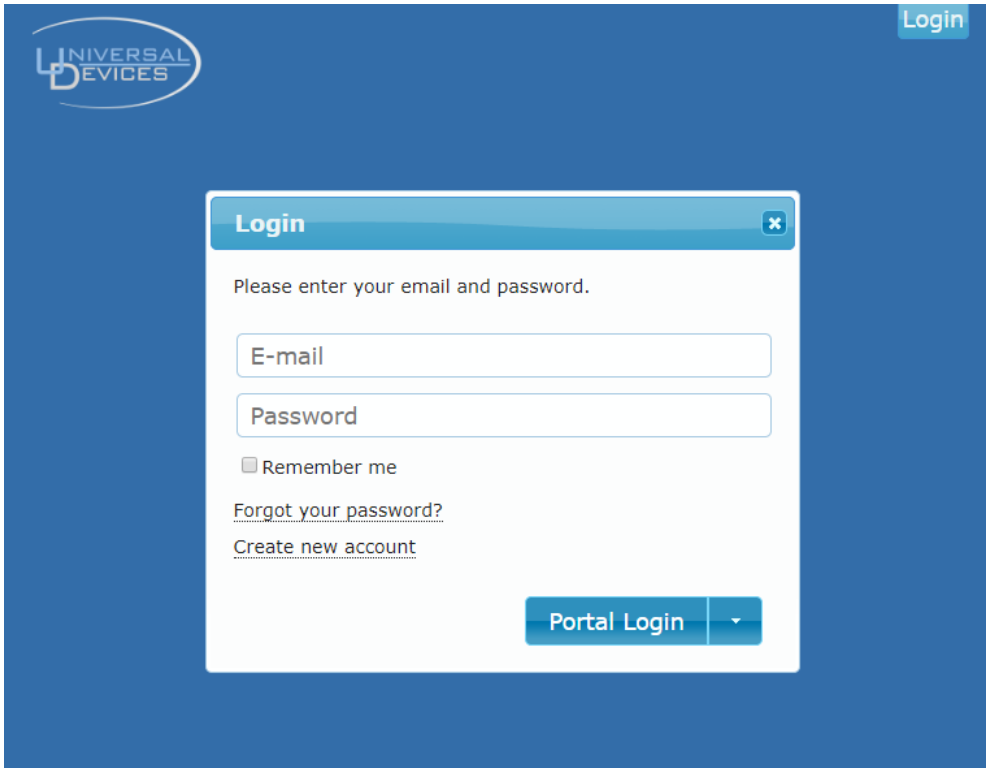


Figure 266: Portal Login

Select the **Create new account** option to create the account. Once you create your account you will see the following display:

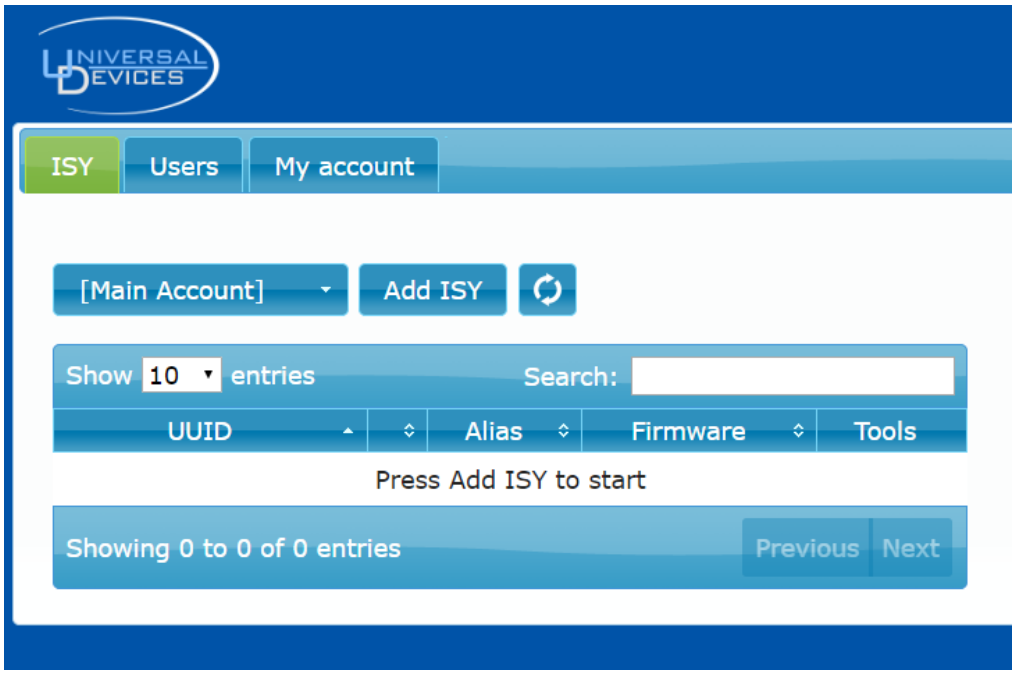


Figure 267: Portal ISY Configuration Screen

Press the **Add ISY** button to add your ISY to the Portal. You will see the following display:

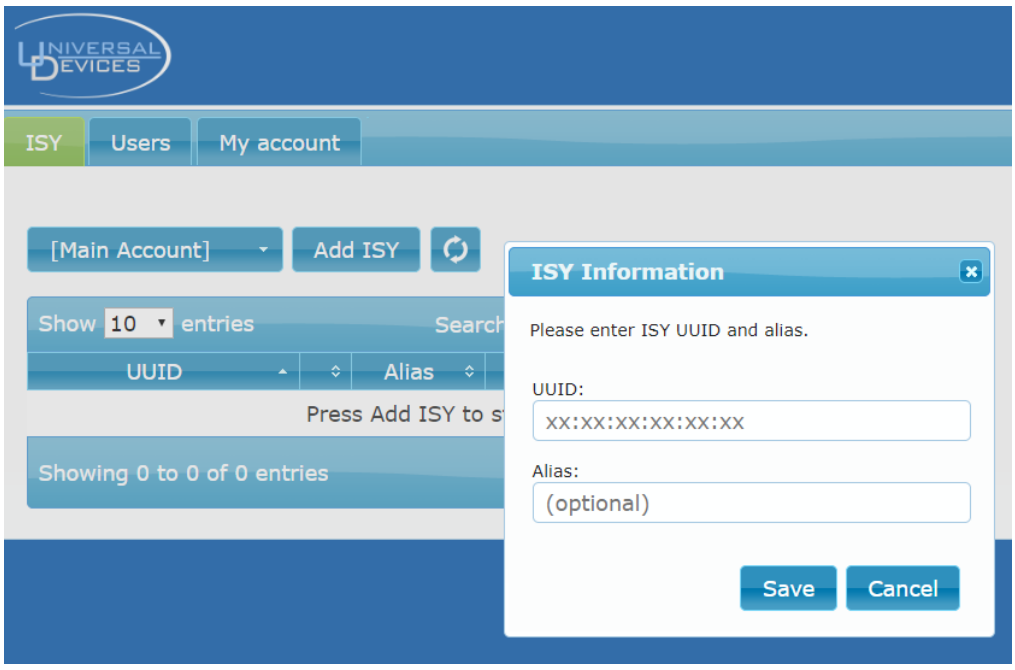


Figure 268: Portal ISY Add Popup

Enter the **UUID** for your ISY device. You can find the UUID listed in the **Help->About** menu option, see section: Verify Module Installation

You may also enter an **Alias**.
Once you have saved the configuration you will see the following screen:

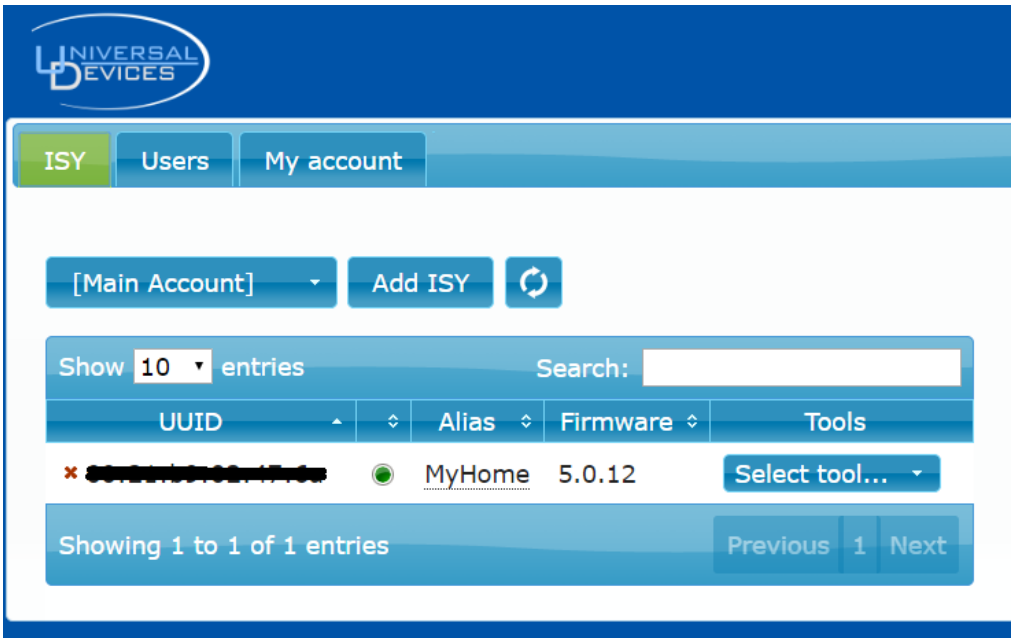


Figure 269: Portal ISY Added Display

You will see the UUID for your ISY listed, the Alias you created, as well as the firmware version of your ISY.
The next thing you will need to do is to add a **User**. Select the **Users** tab. You will see the following screen:

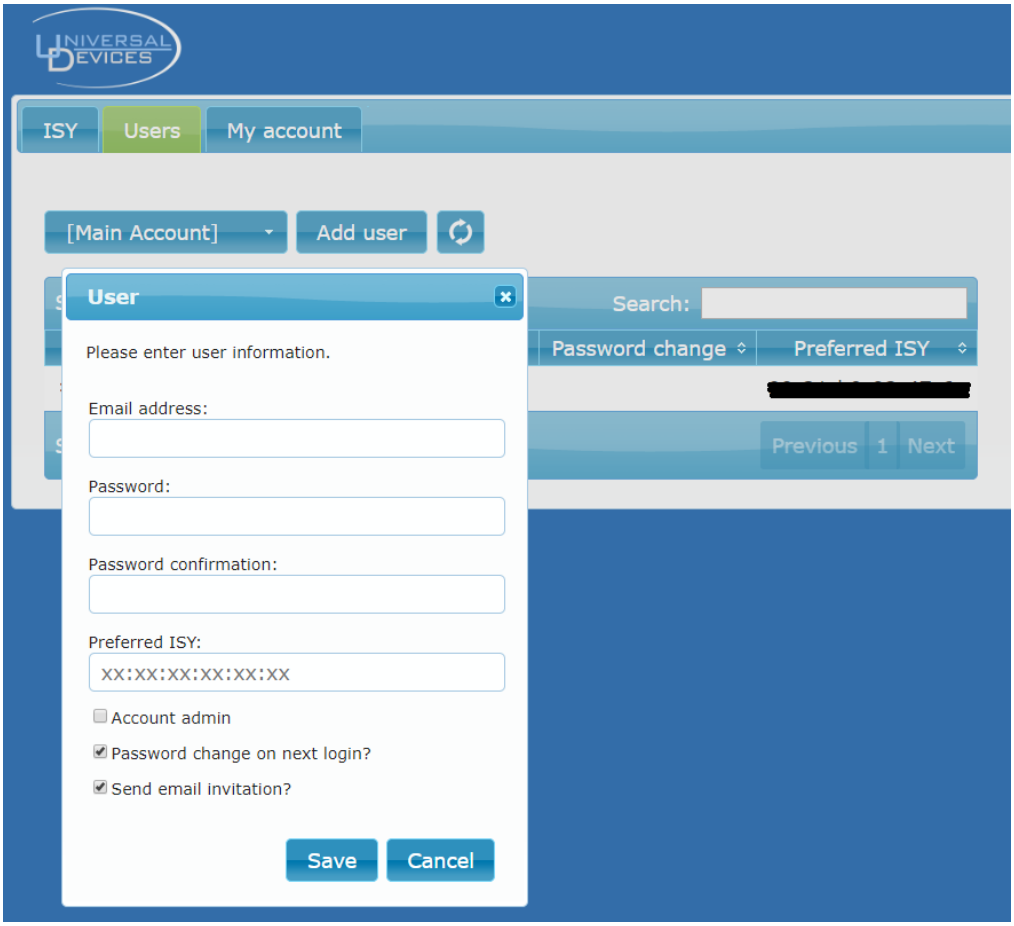


Figure 270: Portal ISY New User Popup

Enter information for the user. Initially create one as an **Administrator**. Use the same ISY UUID that you entered above. Check the **Account Admin** option for the Administrator. Once you save you will see the following screen:

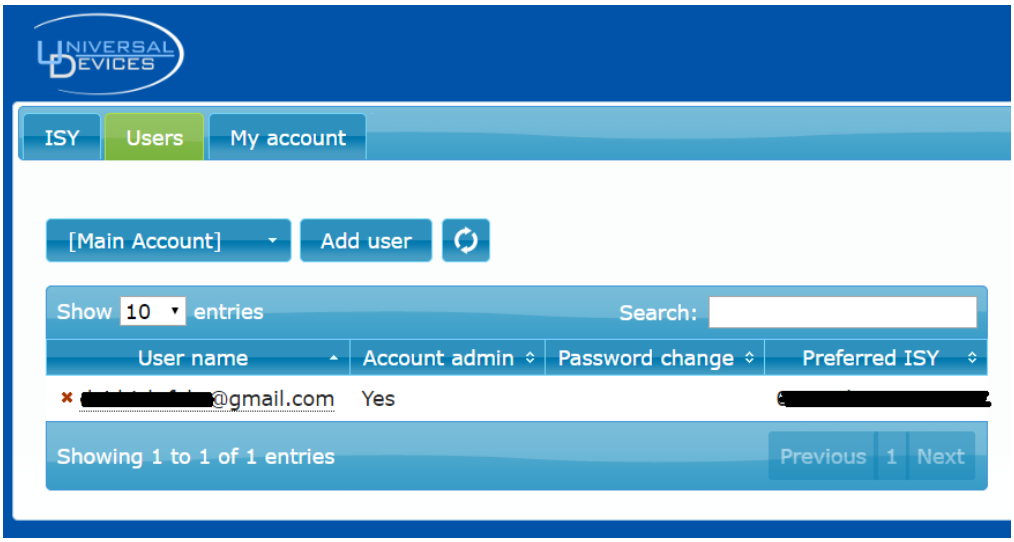


Figure 271: Portal ISY New User Added Display

You will see the user you created, whether this user is an administrator, and the preferred ISY.
Once the above has been completed, **Refresh** the display in the ISY **Configuration->Portals** section. This will indicate that the ISY Portal is now in full operation.

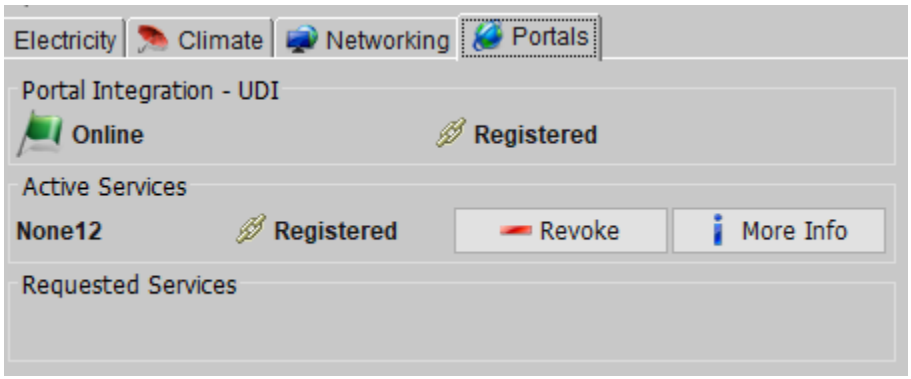


Figure 272: Configuration->Portals Tab ISY Registered Display

To access your Portal use the URL: https://my.isy.io/index.htm

18.2 ISY Portal Amazon Echo Integration (V3)[86]

Please follow the instructions here to setup Echo to work with your ISY:

18.2.1 Changes in ISY Optimized for Smart Home V3

- Proactive state update; this will allow to see the state of your devices on the echo mobile app in real-time.
- A/V Support through State Variables and Network Resources
- Color bulb support (Aeotec, Fibaro) - REQUIRES FIRMWARE 5.0.11+
- Slow devices like lock will no longer return an error, unless it's very long.
- Locks will tell you if the lock is Jammed, or if the battery is low.
- NOTES:
    - Thermostat behavior in Auto mode is completely different (see below)
    - You may no longer be able to use multiple ISYs with one Echo Account

18.2.1.1 Proactive State Update

- This will require the live update to be active. When you go to your Amazon Echo device list, make sure to enable the Live Update -- NOTE: This may not be working properly at this time

18.2.1.2 Thermostat Auto mode behavior

- When in Auto mode and requesting a specific temp, the V2 skill attempted to change the appropriate setpoint. Now, the V3 skill will change BOTH setpoints, one below the requested temp, one above the requested temp.
- If in Fahrenheit, the dead band is 5 degrees, with heat being -2 and cool +3 from the requested setpoint (Amazon's recommended numbers).
- Asking Alexa to increase or decrease temp by [##] degrees will increase or decrease both setpoints (just like in V2).

18.2.2 Instructions for Accessing ISY Portal

Please make sure you have ISY Portal Installed and Configured first.

18.2.3 Instructions for New Users

- Make sure you have followed all the steps in ISY Portal Installed and Configured first.
- Configure your Echo devices using the Instruction to configure Alexa devices in ISY Portal below

[86] (Universal Devices)

- Enable the ISY Smart Home Skill using the Instructions to enable the V3 skill in the echo app

18.2.3.1 Instructions for Existing Users

- ISY Smart Home skill is now on V3 and V2 will eventually be removed. If you are still on V2, please follow Instructions for Migrating to V3 below
- If you are using "Alexa, Ask izzy to …", you are currently using an outdated ISY Skill which is obsolete. Please consider disabling it and follow the Instructions to Enable the V3 Skill in the Echo App below

18.2.4 Instructions to configure Alexa devices in ISY Portal

- Make sure you have followed all the steps in ISY Portal Installed and Configured first.
- Log into ISY Portal
- Click on My Profile at the top right corner, choose your ISY from Preferred ISY drop down
- Under Select Tool, choose Connectivity | Amazon Echo
- Click on Add Device, Scene, Program, Variable or A/V to add a new Alexa device
- Choose your ISY device/scene/program/state variable
- Enter a Spoken (This is the name Alexa will use to recognize this device), then save. NOTE: Rooms are optional and useful only for categorization in ISY Portal
- Using Color bulbs:
    - When choosing your ISY device, please use the Z-Wave device ending with _186
    - The skill has been tested with Aeotec and Fibaro color bulbs
- Using A/V Devices:
    - Those are virtual devices for which you can map as many functions as you need to network resources, state variables or programs
    - Create as many virtual A/V devices as you have physical A/V devices. Example; one for the TV, one for the Home theater, etc.
    - All fields are optional
    - Under Basic, use either Set Channel To, or Channel Up/Channel Down, not both.
    - Under Volume, you can use Set Volume To, Volume Up/Volume Down, or both. If you use both, use the same State Variable.
    - When entering a State Variable value, you can specify an absolute value, or a delta by entering + or - before the number. This can be especially useful for the Volume Up/Volume Down
    - When you hover on a field label, you get an example of how to use it
- If the Smart Home Skill is already enabled on your Echo, you can send your devices to your Echo by saying: “Alexa, discover my devices”.
- If the Smart Home Skill has not been enabled on your Echo yet, please continue with the instructions below.

18.2.5 Instructions for Migrating to V3

- Review the ISY Optimized for Smart Home V3 Changes
- To use V3, you first need to uninstall V2:
    - Login to the Echo App
    - Click on the Smart Home menu item on the left navigation bar
    - Click on Smart Home Skills
    - On « ISY Optimized for Smart Home», click on Disable, then « Disable skill ».
    - On « ISY Optimized for Smart Home V2 », click on Disable, then « Disable skill ».
- Then you need to forget your existing devices:
    - In the echo app, click on the Smart Home menu item on the left navigation bar
    - Click on Devices
    - Scroll to the bottom and click Forget All, then Forget. NOTES
        - The "Forget all" option is not available on the mobile app. You need to use the browser-based Echo app
        - Your devices will be rediscovered by the V3 skill
        - If you use Echo Groups, they will be lost, so you will have to recreate them. A good alternative to Echo groups is to use ISY scenes or programs. If you ever need to forget devices again, they will always be recreated by the discovery process.
        - If you use Echo Routines, they will be lost. You will have to recreate them.
        - Using Forget All is mandatory, otherwise you will end up with duplicated devices once V3 is enabled.
- Continue with Instructions to Enable the V3 skill in the echo app below

18.2.6 Instructions to Enable the V3 Skill in the Echo App

- Make sure you have followed all the steps in Instructions for Accessing ISY Portal
- Login to the Echo App
- Click on Skills menu item on the left navigation bar
- Search for ISY
- Click on ISY Optimized for Smart Home V3 and then Enable
- On the ISY Portal Authorization page, enter your ISY Portal user name and password
- Then click Discover Devices
- The devices you have configured in ISY Portal will be imported in the Alexa App. Click on Smart Home then Devices to see them

NOTE: Please note that the ISY Optimized for Smart Home V3 skill is presently restricted to US and Canada.

18.2.7 Supported Commands

Devices

- Turn On: “Alexa, turn on the kitchen light”
- Turn Off: “Alexa, turn off the kitchen light”
- Brighten: “Alexa, brighten the kitchen light”
- Dim: “Alexa, dim the kitchen light”
- Set: “Alexa, set the kitchen light to 50%”

Thermostats

- Set [device] temperature to [##] degrees: "Alexa, set bedroom to 75 degrees"
- Increase the [device] temperature: "Alexa, increase the bedroom temperature"
- Decrease the [device] temperature: "Alexa, decrease the family room temperature"
- Turn off [device]: "Alexa, turn off kitchen"
- What is
    - "Alexa, what is the temperature of kitchen thermostat?"
    - "Alexa, what is the kitchen thermostat set to?"

Door locks

- Is Locked: "Alexa, is front door locked?"
- Is Unlocked: "Alexa, is front door unlocked?"
- Lock: "Alexa, lock the front door"
- Please note that, for security reasons, unlock is not supported

Scenes

- Turn On: “Alexa, turn on the kitchen light”
- Turn Off: “Alexa, turn off the kitchen light”
- Brighten: “Alexa, brighten the kitchen light” -- will issue brighten command 3 times
- Dim: “Alexa, dim the kitchen light” -- will issue dim command 3 times

Programs

- Turn On: “Alexa, turn on the kitchen light” - runs Then
- Turn Off: “Alexa, turn off the kitchen light” - runs Else

State Variables

- Turn On: “Alexa, turn on X” - Sets the variable X to the <turn on> value (defined in the portal)
- Turn On: “Alexa, turn on X to Y percent” - Sets the variable X to Y

- Turn Off: “Alexa, turn off X” - Sets the variable X to the <turn off> value (defined in the portal)
- Brighten: “Alexa, brighten X” - Increments variable X by 1
- Brighten: “Alexa, brighten X by Y percent” - Increments variable X by Y
- Dim: “Alexa, dim X” - Decrements variable X by 1
- Dim: “Alexa, dim X by Y percent” - Decrements variable X by Y
- Contrary to regular devices, you can use the same state variables multiple times. This allows you to have 2 different spoken for the same var, but with different turn on values
- The word "percent" is optional but recommended. Depending on your spoken and how well you pronounce, the word "percent" may be skipped. But it does facilitate proper recognition if you use it
- You can use "increase" and "decrease" instead of brighten and dim. But depending on your spoken and how well you pronounce, increase is often misunderstood as a volume adjustment
- You can assign turn on / turn off values with very high values. However, when you set it to a percentage, or use brighten/dim, the value can only be 0-100. For Alexa, it's a percentage after all

Color Devices

- Set Color: "Alexa, set <device> to <color>" e.g:
- Alexa, set living room to green
- Alexa, set kitchen to warm white
- Set Color Temperature : "Alexa, make <device> cooler"

A/V Devices

- Turn on|off : "Alexa turn <on|off> <device>"
- Set channel : "Alexa, set channel to <number> on <device>"
- Change channel : "Alexa, channel <up|down> on <device>"
- Set volume : "Alexa, set volume to <number> on <device>"
- Change volume : "Alexa, volume <up|down> on <device>"
- Mute : "Alexa, <mute|unmute> on <device>"
- Playback : "Alexa, <play|pause|stop|fast forward|rewind|next|previous|start over> on <device>"

18.2.8 Instructions for using Multiple ISYs with one Echo Account

- This may no longer work with V3 since proactive state updates may prevent Alexa from talking to devices that are offline

18.2.9 Instructions for using Multiple Echos Smart Home

To support multiple Echos with different Smart Home devices, you need multiple ISY Portal sub-accounts with each their own user profile.

- Have your Echos tied to different amazon accounts
- In ISY Portal, configure a sub-account and user profile per echo:
    - Login to your main ISY Portal account
    - Create a sub-account
    - Add your ISY to this sub-account, and approve access to it in the admin console
    - Create a new user profile In that sub-account
    - Logout of your main account
    - Login using the newly created user-profile
    - Click on My Profile and set My Preferred ISY to your ISY.
    - Enter your spokens

You can update your spokens by using your main account. But before doing so, please make sure to switch to the correct sub-account first.

If your account selector is set to [All], you will see all of your ISYs, no matter which account/sub-account they belong to. When an ISY is in several account/sub-accounts, you will see it only once. When you edit your spokens, without explicitly choosing the account, you can't be sure of the context of which account you are working on. You should switch to the intended account first.

NOTE: It is perfectly ok to use the main account for one of your Echos.

18.3 ISY Portal Google Home Integration[87]

18.3.1 Prerequisites

The user must be subscribed to the UDI Portal service and approve the portal in ISY's Admin console.

18.3.2 ISY Portal Google Home Integration

- Note: The user must configure the ISY Portal prior to linking the Google Home mobile application to UDI in order for the system to work.
    - Log into the ISY Portal using valid login credentials at "https://my.isy.io/".
    - Select the “Select Tool” for the ISY you wish to add Google Home to.

[87] (Universal Devices)

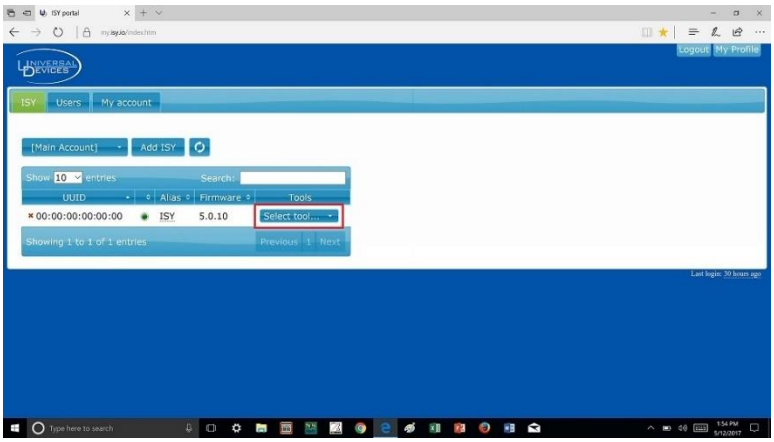


Figure 273: ISY Portal - Select Tool

- Select “Amazon Echo/Google Home” under “Connectivity”.

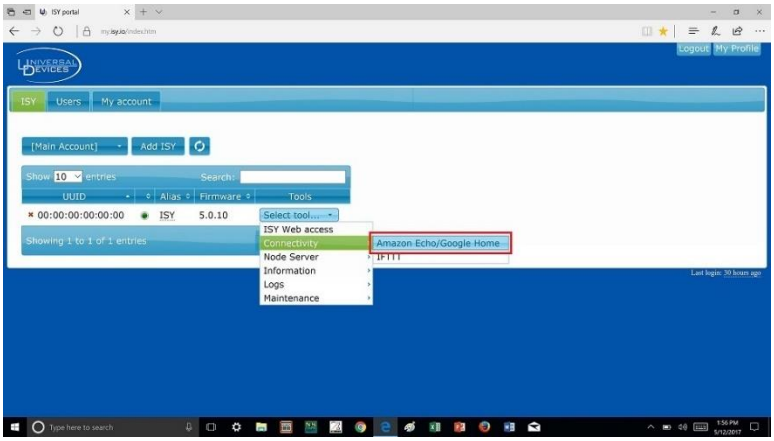


Figure 274: ISY Portal - Connectivity

- Select “Device” from the “Spoken device list”.

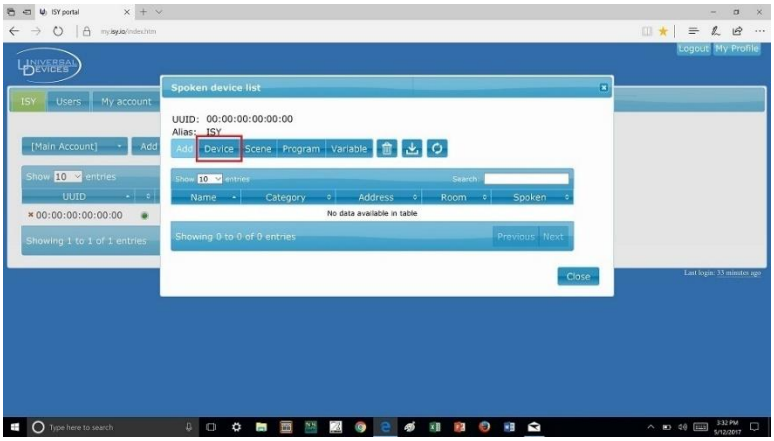


Figure 275: ISY Portal – Spoken device list

- Select the dropdown arrow to reveal devices.

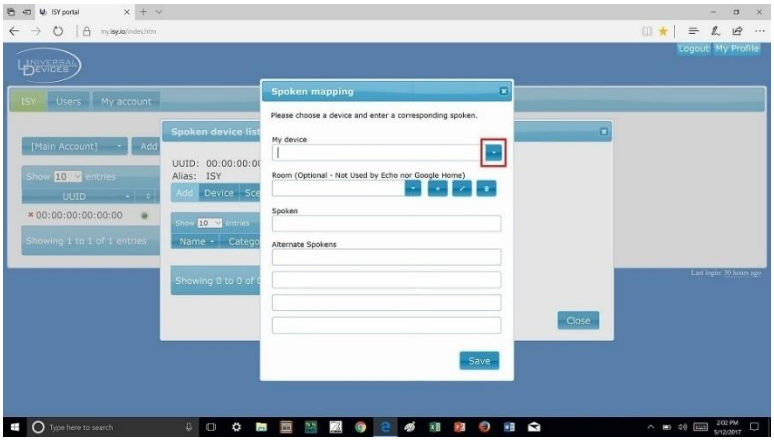


Figure 276: ISY Portal – reveal devices drop down

- Select a device to be added.

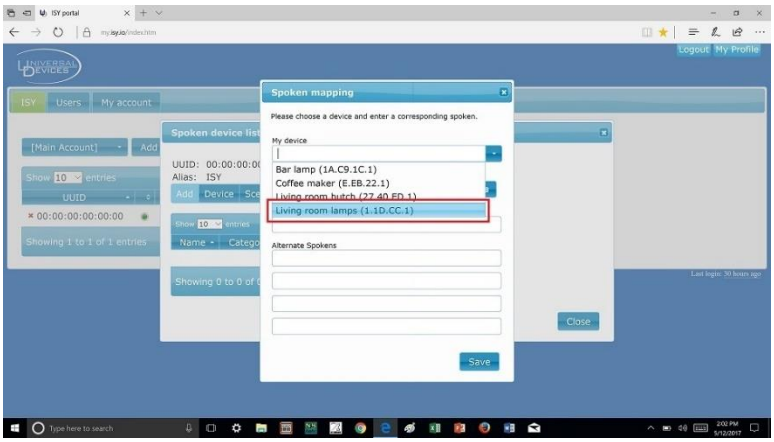


Figure 277: ISY Portal – select device to be added

- Enter a “Spoken” name for each device, and “Alternate Spokens” and select “Save”.
  - Note: The text in “Spoken” will be announced by Google Home as the device name. The text in “Spoken” will also be the name that the Google Home mobile application uses as the device name.

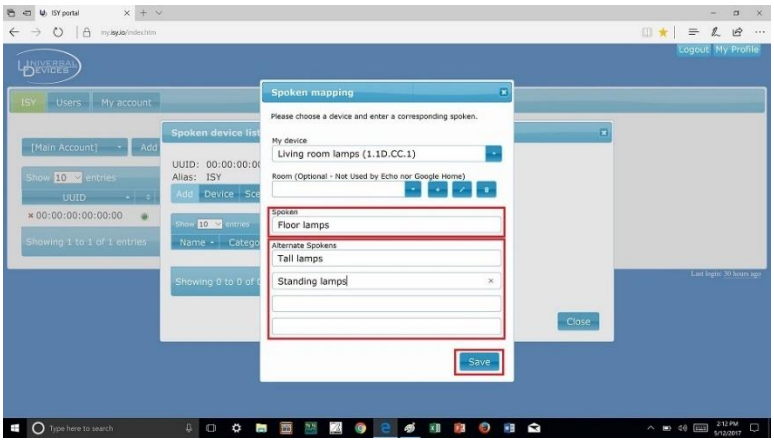


Figure 278: ISY Portal – Enter spoken name

- When a device "Spokens" have been added, they will appear in red in the "Spoken mapping" dropdown.

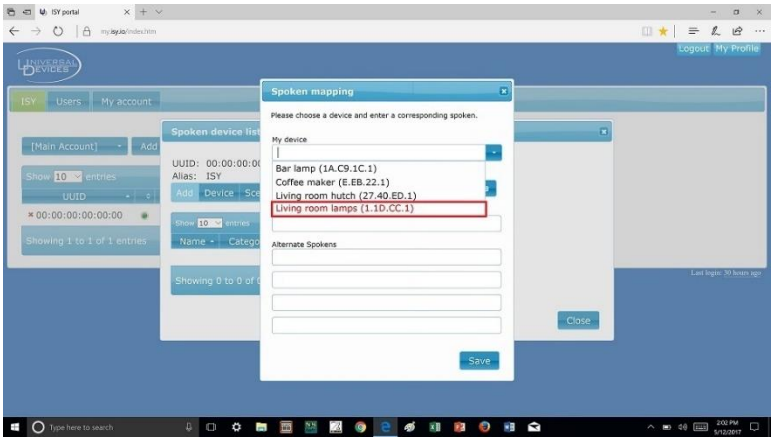


Figure 279: ISY Portal – Spoken mapping

- When a "Device" has been added successfully it will appear in the "Spoken device list".

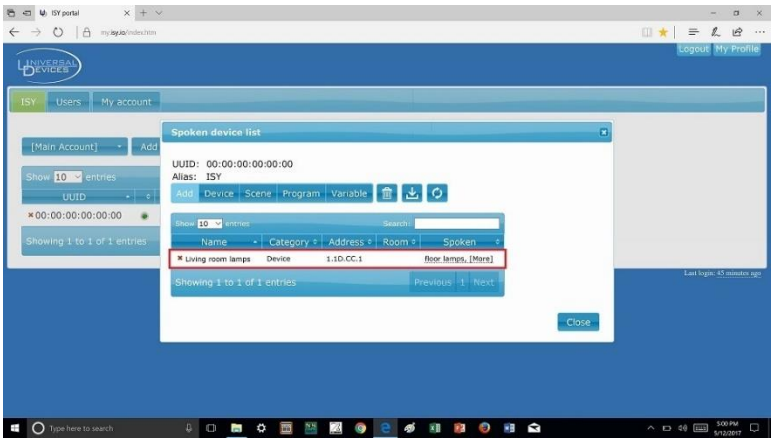


Figure 280: ISY Portal – Spoken device list

- Once all devices have been added they will appear in the “Spoken device list”. The setup required in ISY Portal is now complete.
  - Note: Scenes and Programs may be added in this same way. Programs will run the “Then” when commanded “On” verbally. Programs will run “Else” when commanded “off” verbally.

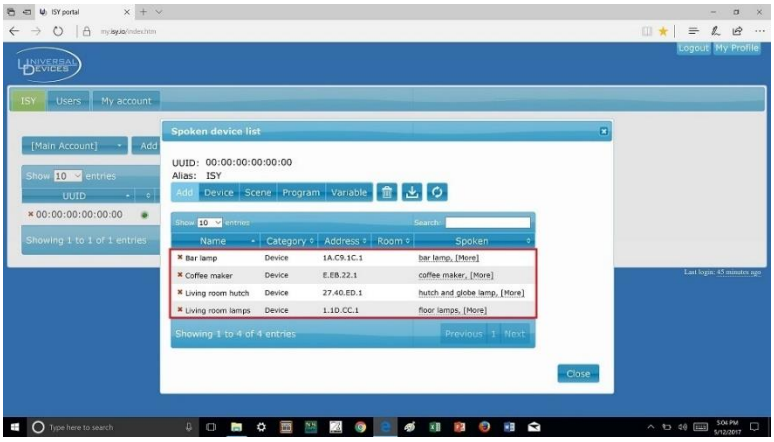


Figure 281: ISY Portal – Spoken device list

18.3.2.1Google Home Application

- Download the Application “Google Home” by Google

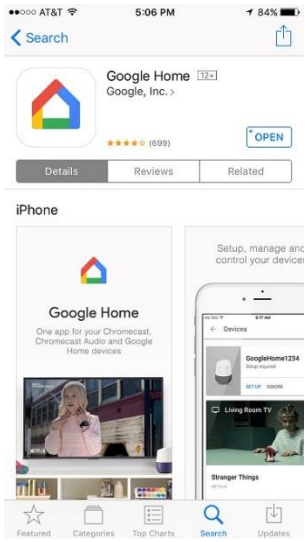


Figure 282: Google Home - App

- Launch “Google Home” and select “main menu”.

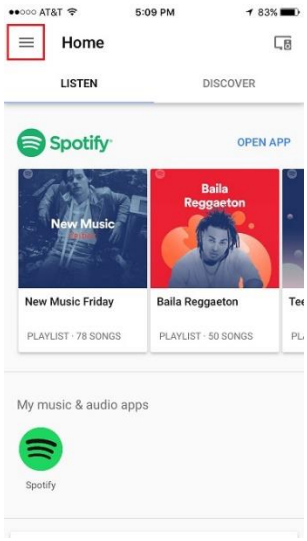


Figure 283: Google Home – Main Menu

- Select “Sign In” to sign in to “Google Home” mobile application.

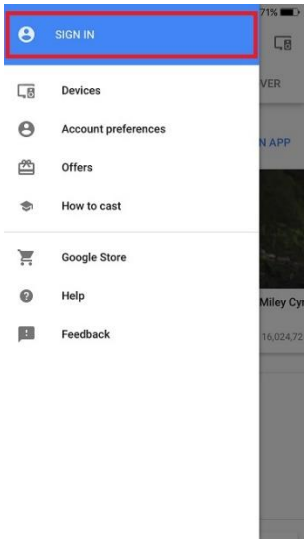


Figure 284: Google Home – Sign In

- Enter valid login credentials and select “Next”.

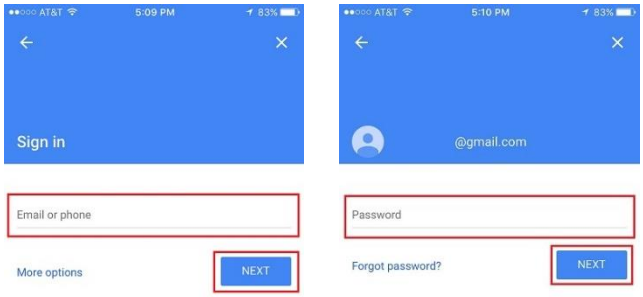


Figure 285: Google Home – Enter valid login credentials

- Select “main menu”.

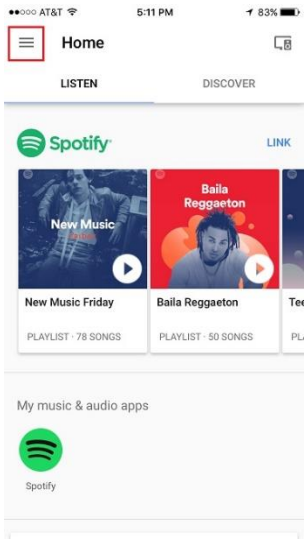


Figure 286: Google Home – Select main menu

- The "main menu" should now look like the image below once the user is logged into the "Google Home" mobile application.

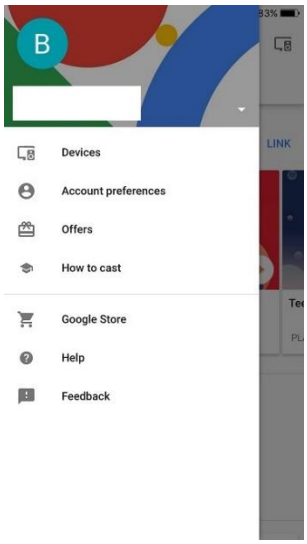


Figure 287: Google Home – Logged in

- Select "Devices" to setup the "Google Home" device.

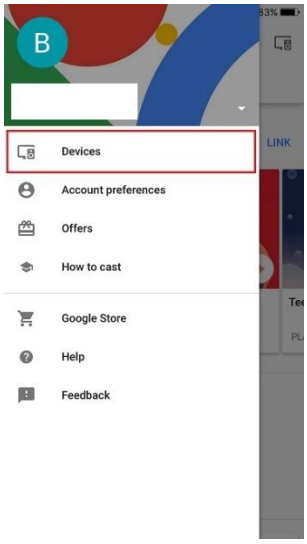


Figure 288: Google Home - Devices

- Select the “add new device” button. “Google Home” mobile application will look for any “Google Home” devices that are available.
  - Note: Make sure that the Google Home device is powered on, and that WiFi and Bluetooth are enabled on the mobile device being used.

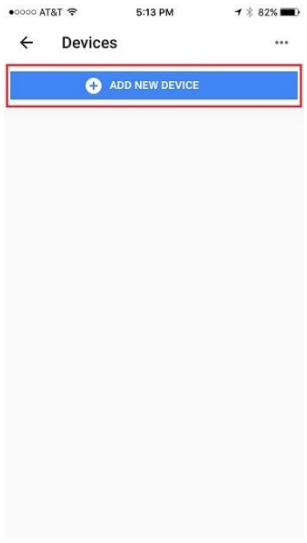


Figure 289: Google Home – Add new device

- Select the “Sign in” button once the “Google Home” mobile application has discovered the “Google Home” device you wish to add.
  - Note: The user MUST use the SAME Google login credentials for the “Google Home” device and the “Google Home” mobile application for the system to work. Use the credentials used in step 4.

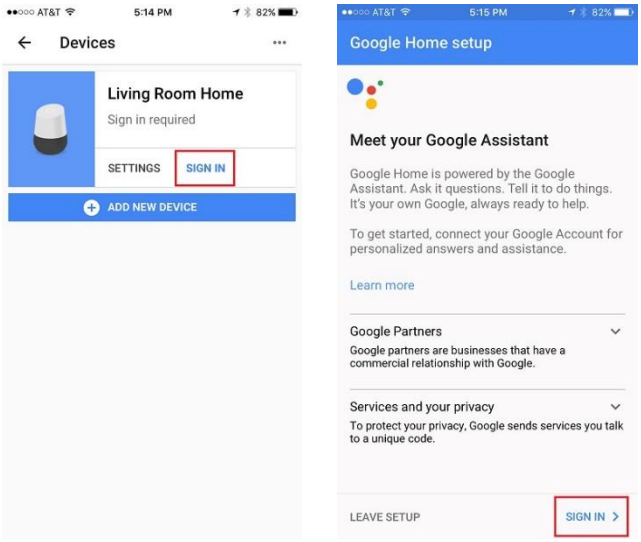


Figure 290: Google Home – Sign in

- Select the "Continue as …" button.

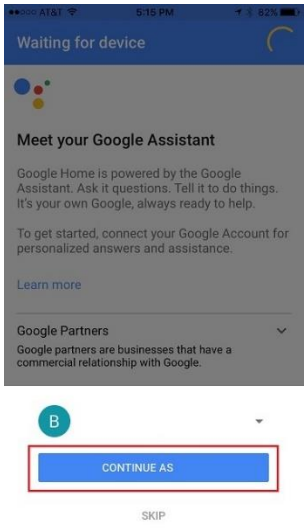


Figure 291: Google Home – Continue as …

- The user may set the location of the "Google Home" device.

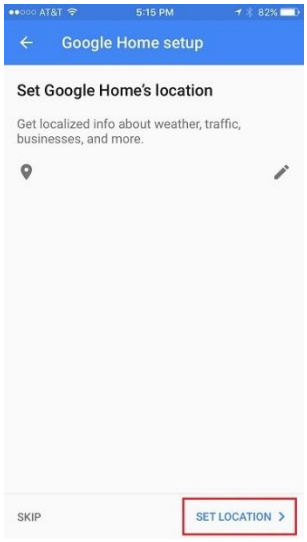


Figure 292: Google Home – Set Google Home's Locations

- The user may add music services to the "Google Home" device, and select continue.
  - Note: Free 2 week "Google Music" preview for purchasing "Google Home" device.

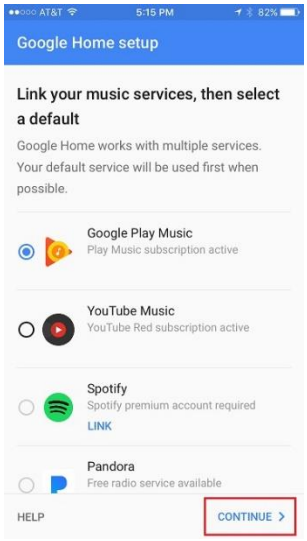


Figure 293: Google Home – Add music services

- The "Google Home" device setup is now complete. Select "Continue".

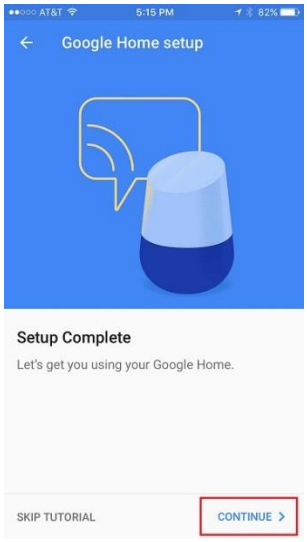


Figure 294: Google Home – Setup complete

- Your "Google Home Devices" window should now look like the image below. Select the "Back arrow" to return to the main menu.

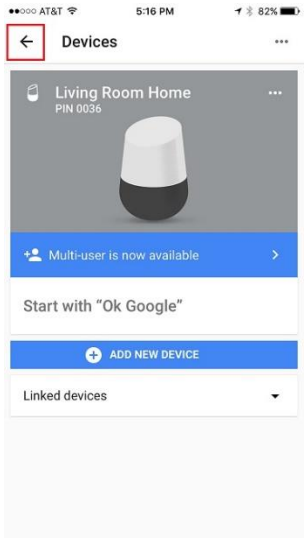


Figure 295: Google Home – Google Home Devices

- Select "Home Control" from the main menu.

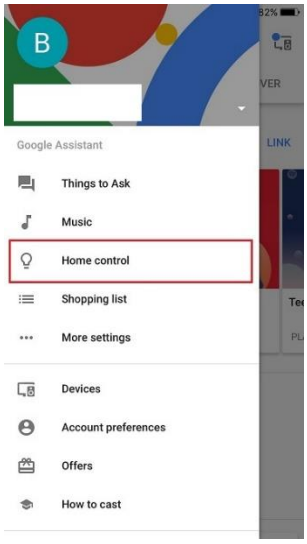


Figure 296: Google Home – Home Control

- Select the "+" button to add devices, scenes, and programs ("Spokens") from the UDI Portal.

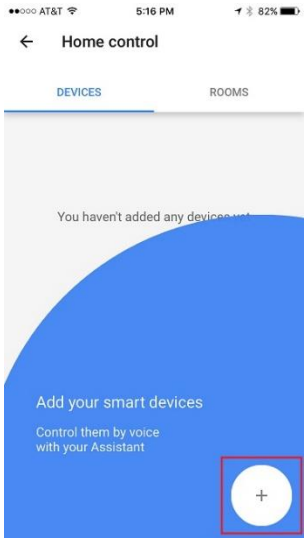


Figure 297: Google Home – Add spokens

- Select "Universal Devices" from the list of accounts that can be added.

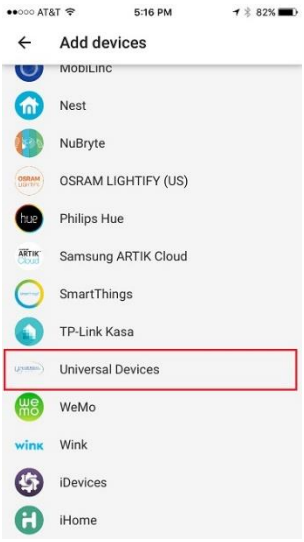


Figure 298: Google Home – Select Universal Devices

- Login to the UDI Portal using valid UDI portal credentials and select “Submit”.

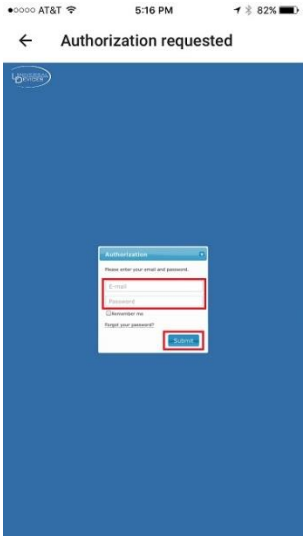


Figure 299: Google Home – Log into the UDI Portal

- The ”Google Home” mobile application will import “Spokens” from the UDI Portal. Once complete, the created “Spokens” will appear under the “Device” tab of “Google Home” mobile application. The setup of the Google Home mobile application is now complete, and ready to use.
  - Note: The screen of the application may be blank white momentarily while “Spokens” are imported. Devices, scenes, and programs may be added to rooms within the “Google Home” mobile application.

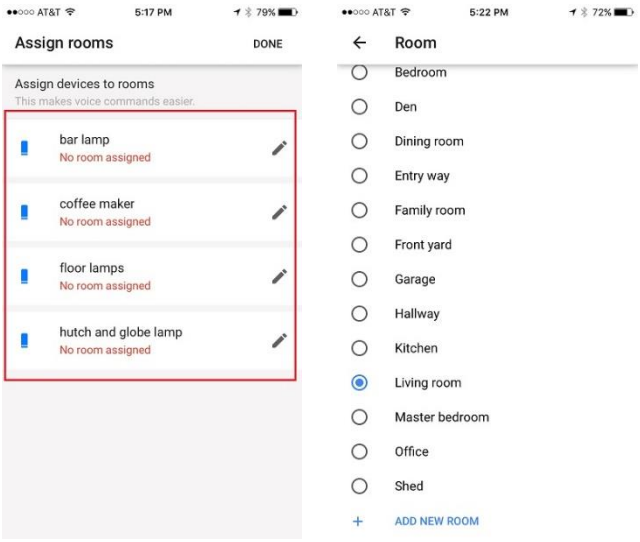


Figure 300: Google Home – Spokens imported

18.3.3 Supported Commands

- For Devices:
  - Turn On: “Ok Google, turn on the kitchen light”
  - Turn Off: “Ok Google, turn off the kitchen light”
  - Brighten: “Ok Google, brighten the kitchen light”
  - Dim: “Ok Google, dim the kitchen light”
  - Set: “Ok Google, set the kitchen light to 50%”
  - Turn On lights: "OK Google, turn on the lights"
  - Turn On all lights: "Ok Google, turn on all the lights"
  - Turn On room lights: "Ok Google turn on the lights in the <room name>"
  - Turn On room lights: "Ok Google turn on the <room name> lights"
- For Scenes:
  - Turn On: “Ok Google, turn on the kitchen light”
  - Turn Off: “Ok Google, turn off the kitchen light”
- For Programs:
  - Turn On: “Ok Google, turn on the kitchen light” - runs Then
  - Turn Off: “Ok Google, turn off the kitchen light” - runs Else
- For State Variables:
  - Turn On: “Ok Google, turn on X” - Sets the variable X to the <turn on> value (defined in the portal)
  - Turn On: “Ok Google, turn on X to Y percent” - Sets the variable X to Y
  - Turn Off: “Ok Google, turn off X” - Sets the variable X to the <turn off> value (defined in the portal)
- For Thermostats:
  - Change mode: “Set <device> mode to <off|heat|cool|auto|on>”
  - Change mode: “Turn off <device>”
  - Change mode: “Turn on <device>”

- Change temperature: “Set <device> to <temp>”
- Change temperature: “Increase <device> by <tempDelta>”
- Multiple thermostat commands: “What is the inside temperature”
- Multiple thermostat commands: “Set heating to <temp>”
- Multiple thermostat commands: “Set cooling to <temp>”
- Multiple thermostat commands: “Set the thermostat modes to <mode>”

18.3.4 Supported Queries/Questions

- For Devices:
  - Status "Ok Goggle is the <name> on?"
  - Status "Ok Google is the <name> off?"
- For Thermostats:
  - Query thermostat: “what is <device> set to”
  - Query thermostat: “what is <device> inside temperature”
  - Query thermostat: “what is <device> humidity (If your thermostat supports it)”

18.3.5 Troubleshooting

- Once a device has been added to a room it can only be moved to another room, it cannot be “un-roomed” without “Un-Linking UDI Portal account.
- Adding “Spokens” to the UDI Portal after linking the UDI Portal to the "Google Home" Mobile application requires “unlinking” the UDI Portal from the “Google Home” mobile application and then “relinking” the UDI Portal -- in order for “Google Home” to see the new “Spokens”. To do this, select “main menu" then "Home control" then select the ellipsis in the upper right corner. Select “Manage accounts”, select "Universal Devices" under "Linked", then select “Unlink account”. Once the account has been "unlinked", quit the application out of multitasking (iOS) or recent apps (Android). The user may now add "Spokens in the ISY Portal, then "relink" the ISY Portal and "Google home" mobile application to see the new "Spokens".
- Google Home will automatically group devices, scenes and programs with similar names containing the same word. It makes no distinction between a program and a device at this time. Example: If the user names a device “Hue bloom 1”, names a scene “Hue lights”, and names a program “Hue Color cycle” then speaking “Turn hue on” will result in device, scene, and program being toggled in some cases. This may change as time goes on.

18.4 ISY Portal NodeServer Instructions[88]

18.4.1 Prerequisites

- The user must be subscribed to the UDI Portal service and approve the portal in ISY's Admin console.

18.4.2 ISY Portal NodeServer Instructions

- Log into the ISY Portal using valid login credentials at "https://my.isy.io/".
- Choose "Configuration" by selecting "Select tool..." then "NodeServer" then "Configuration".

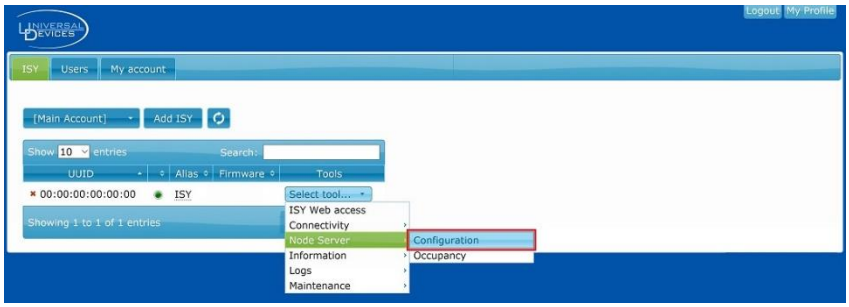


Figure 301: ISY Portal - Configuration

- Select "Configure connection".

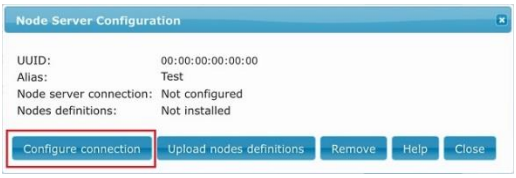


Figure 302: ISY Portal – Configure connections

- Select "Yes".

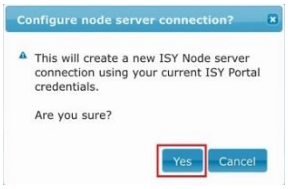


Figure 303: ISY Portal – Configure connection prompt

[88] (Universal Devices)

- Select "Upload nodes definitions".

Figure 304: ISY Portal – Upload nodes definitions

- Select "Yes".

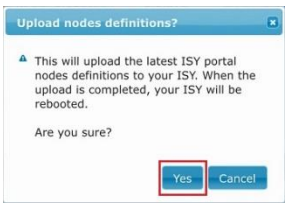


Figure 305: ISY Portal – Upload nodes definitions prompt

- The user is presented a dialog box: "Upload completed successfully. ISY is currently rebooting." Select "Ok".

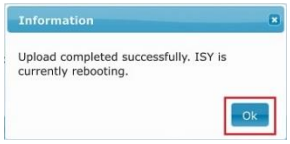


Figure 306: ISY Portal – Uploads completed successfully prompt

- Note: ISY Will reboot and The Portal NodeServer is now present in the Admin Console UI under "NodeServers" although no nodes have been added yet.

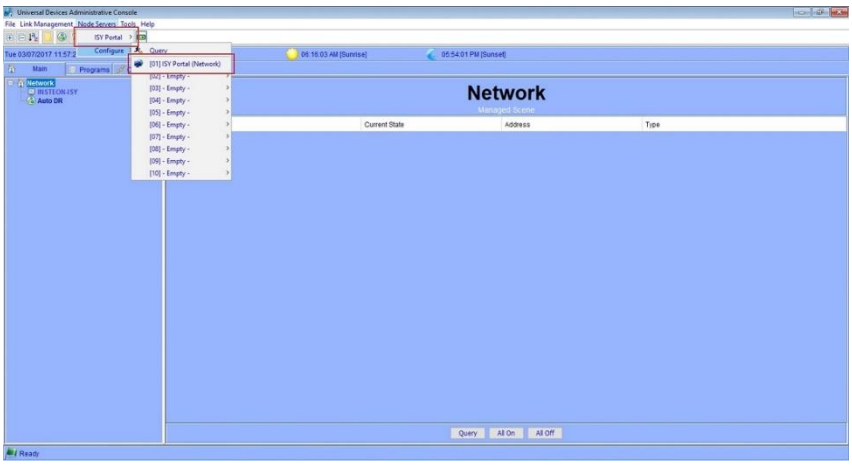


Figure 307: ISY - NodeServers

18.5 ISY Portal NodeServer Occupancy & Locative App Instructions[89]

18.5.1 Prerequisites

- The user must be subscribed to the UDI Portal service and approve the portal in ISY's Admin console.
- The user must have configured the NodeServer in the UDI Portal.

18.5.2 ISY Portal NodeServer Occupancy Instructions

- Log into the ISY Portal using valid login credentials at "https://my.isy.io/".
- Select "Occupancy" by selecting "Select tool..." then "NodeServer" then "Occupancy".

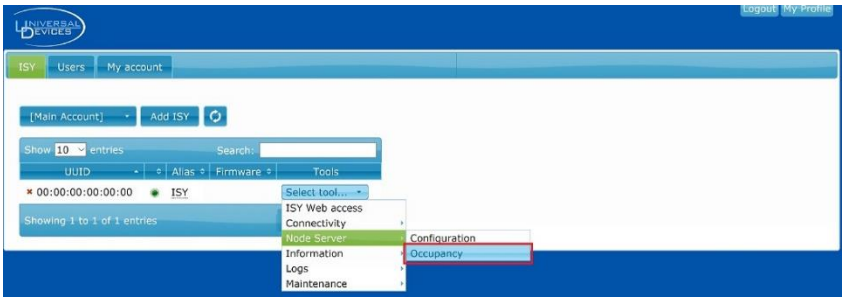


Figure 308: ISY Portal – Select Tool

- Select "Add a geofence", please enter a name for this geofence, such as "iPhone" and select "Save".

[89] (Universal Devices)

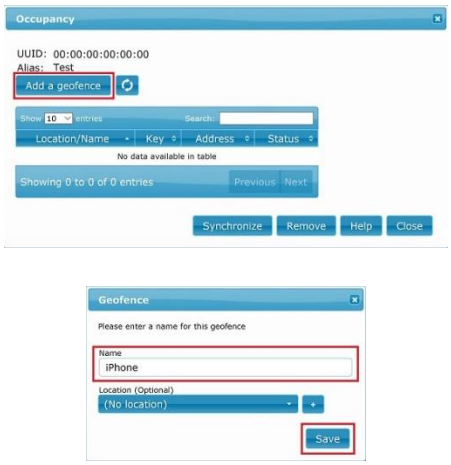


Figure 309: ISY Portal – Add a geofence

- The user may also enter a location or locations if the user so desires. To add a location, select the "+" button to the right of the "Location" dropdown. Please enter a location name, such as "Home" and select "Save". A location represents the global status, which means that the location is considered occupied (true) if any of the location members are occupied (true).
    - Note: if the user plans on only having one location for geofences you may skip this step. Locations may be added later, and devices may be assigned or reassigned to locations anytime.

Figure 310: ISY Portal - Location

- Once locations and geofences are saved, your "Occupancy" window should look like this:

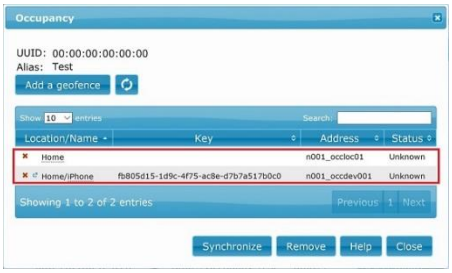


Figure 311: ISY Portal – Occupancy window

- Location nodes and geofence nodes should now be present in the admin console UI for consumption in programs.

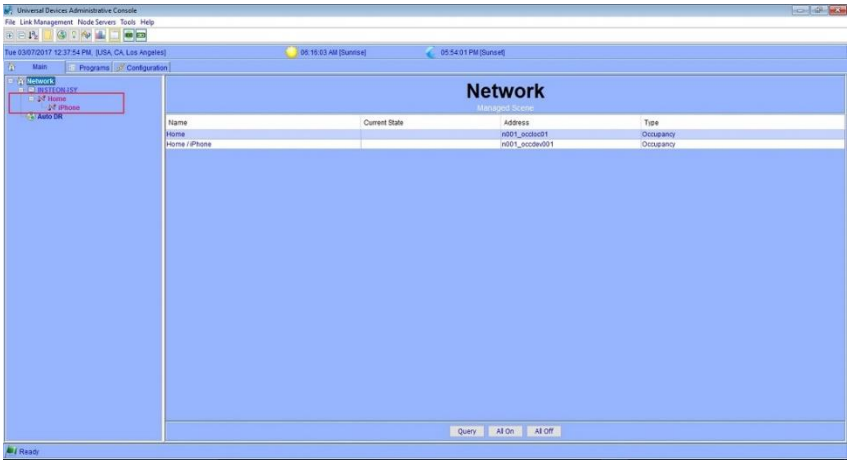


Figure 312: ISY – Location and geofence nodes

- In order to change the status of these nodes, the user must implement a mechanism for sending "GET" requests. The Mobile application "Locative" supports this functionality. Before Locative is configured, the user must obtain two unique URLs from the portal for each device/geofence they wish to change the status of. (one URL for IN, and one URL for OUT) These URLs can be obtained by selecting the blue arrow to the left of the device name in the "Occupancy" window.

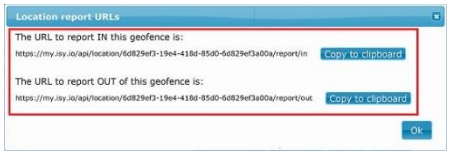


Figure 313: ISY Portal – Locative URLs

18.5.3 Troubleshooting

- If a geofence has accidentally been deleted in the admin console, or if there is an extra geofence that does not exist on the portal (such as restoring ISY to a backup that has more geofences) the user may select "Synchronize", then "Yes" to the dialog box, then "OK" to the dialog box to synchronize geofences between ISY and the portal.

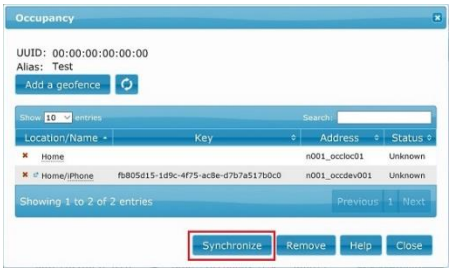


Figure 314: ISY Portal – Synchronize geofences

18.5.4 Locative Application Instructions

- Download and install "Locative" by Marcus Kida

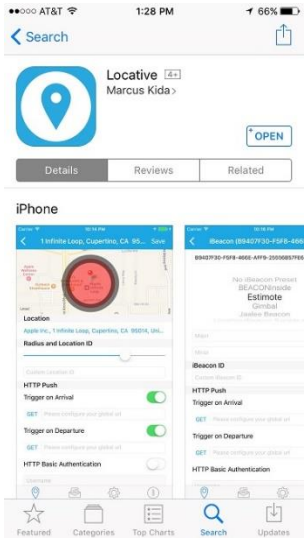


Figure 315: Locative - App

- Launch the application and select "+" to add a geofence.
- Enter in a location, set the radius to the maximum, and select "POST / GET" to "GET". "Trigger on Arrival" and "Trigger on Departure" should be enabled. The User may enter a custom location ID such as "Home".
    - Note: setting geofence to maximum avoids issues with Locative trying to send GET requests over weak but connected Wi-Fi.

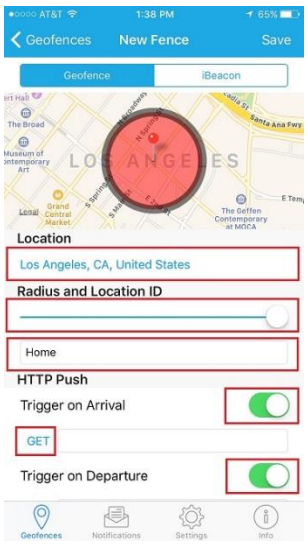


Figure 316: Locative – Add geofence

- Log into the portal on the mobile device's browser, navigate to the "Occupancy" window by selecting "Select tool..." then "NodeServer" then "Occupancy". Select the blue arrow to the left of the device name and copy both URLs presented in the dialog box one at a time. (one URL for IN, one URL for out)
    - Note: For this step, it is recommended that user access the portal via the mobile device they are setting up, so the user may copy and paste the URLs into Locative.

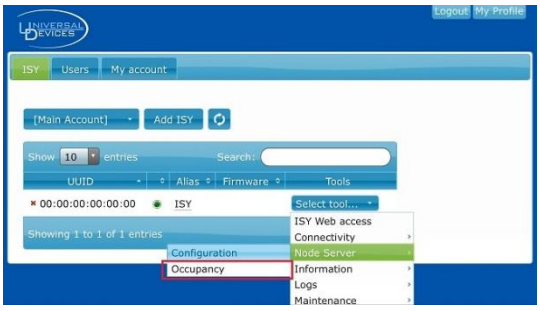


Figure 317: ISY Portal – Select Occupancy

- Paste the "IN" URL obtained in the previous step into the field "Trigger on Arrival".

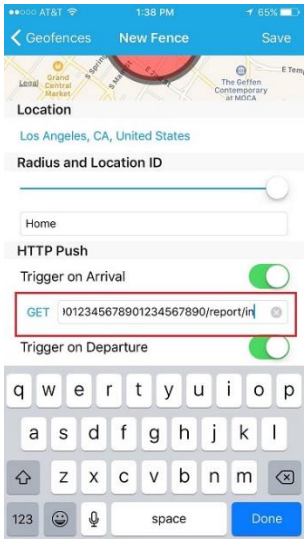


Figure 318: Locative – Trigger on Arrival

- Paste the "OUT" URL into the field "Trigger on Departure"

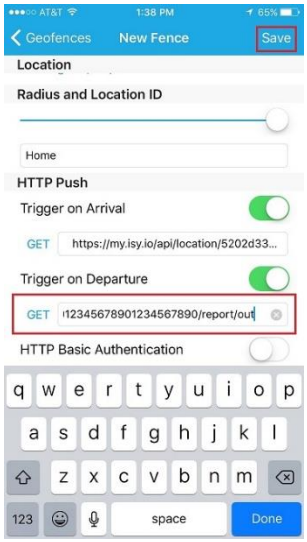


Figure 319: Locative – Trigger on Departure

- Locative is now configured with a geofence and able to send GET requests which change the status of device nodes in ISY.
    - Note: the user can test this functionality by leaving the geofence or by sending a test request in Locative's settings page.

18.6 ISY Portal NodeServer Occupancy V2 & UDI Mobile App Instructions[90]

18.6.1 Prerequisites

- The user must be subscribed to the UDI Portal service and approve the portal in ISY's Admin console.
- The user must have configured the NodeServer in the UDI Portal.

18.6.2 ISY Portal Occupancy V2 With UDI Mobile Instructions

- Download UDI Mobile by One Click to Control.

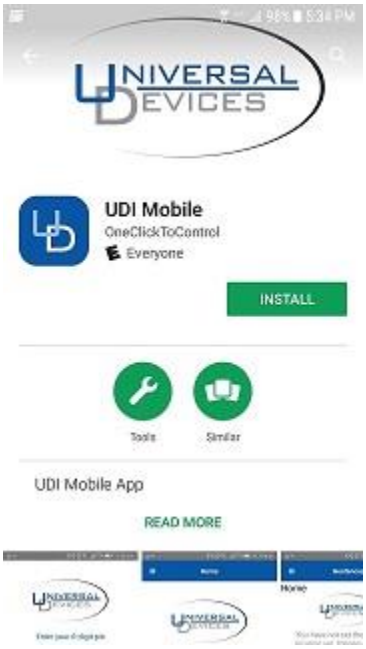


Figure 320: UDI Mobile - App

- Log into the ISY Portal at "https://my.isy.io".
- Select "NodeServer" from the "Select tool..." dropdown and then select "Occupancy V2 (with UDI Mobile)". Note: for this example, we will configure one device to trigger one geofence, multiple geofences and devices are supported as well.

[90] (Universal Devices)

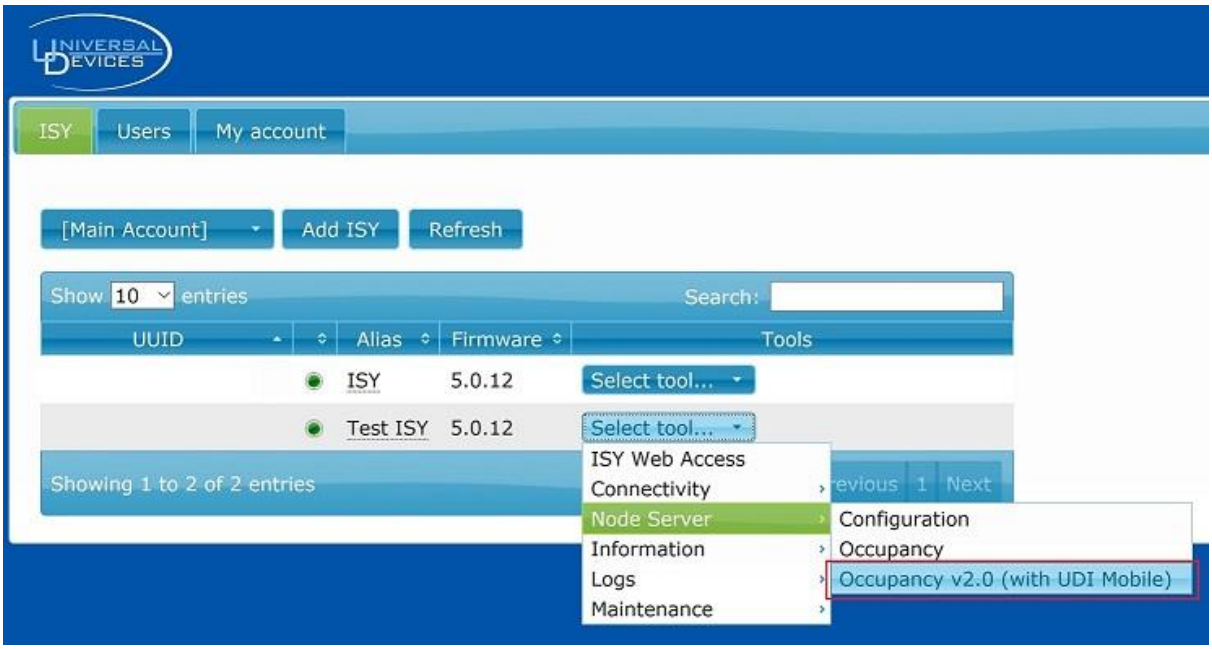


Figure 321: ISY Portal – Select NodeServer Occupancy v2.0

- Under the "Geofences" tab select "Add Geofence", name it and select "Save".

Figure 322: UDI Mobile – Add geofence

- Under the "Mobile Devices" tab select "Add Mobile Device", name it and select "Save".

Figure 323: UDI Mobile – Add mobile device

- Note: “Profile for UDI Mobile” can be toggled between "Editor" and "User". Selecting "Editor" grants the mobile device user permissions to unlink the mobile device.

- Under the "Geofences" tab select "Assign Mobile Device".

Figure 324: UDI Mobile – Assign mobile device

- Under the “Geofences” tab, select the desired geofence, select the device you want to use to trigger that geofence, and select “Save”.

Figure 325: UDI Mobile – Assign mobile device to geofence

- Under the "Mobile Device" tab, select the blue arrow under the "Linked" column.

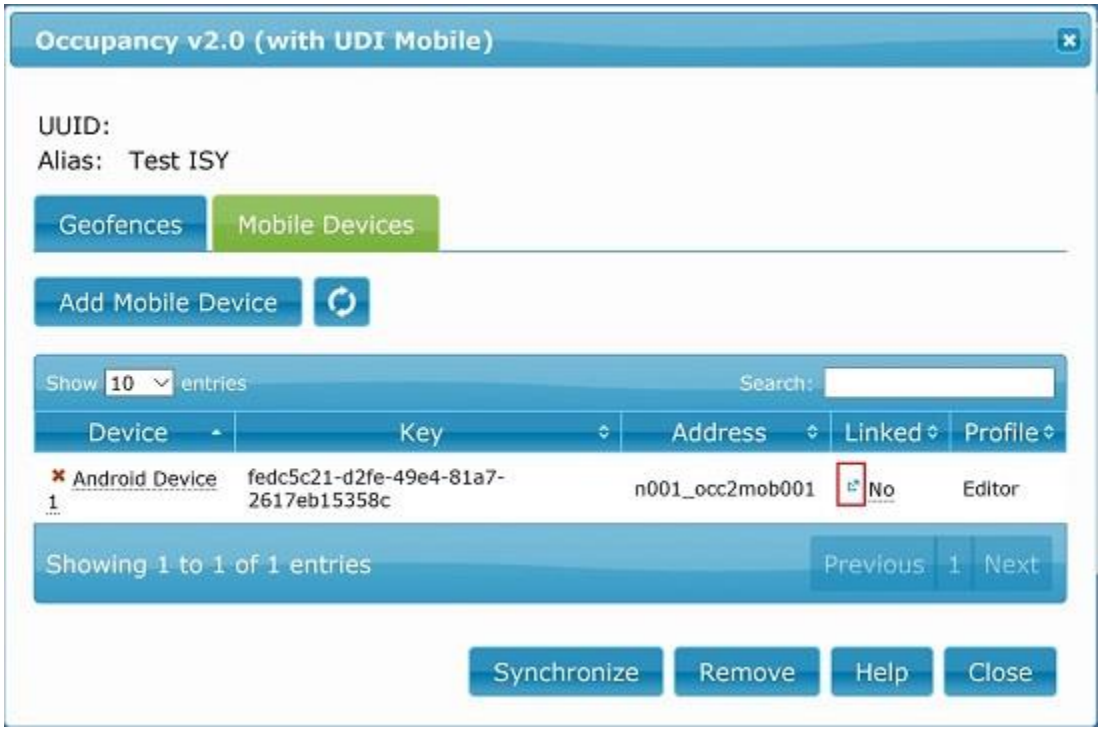


Figure 326: UDI Mobile – Select mobile device

- Select "Generate" and select "Confirm" to generate a six-digit pin for linking the UDI Mobile application downloaded in step 1.

Figure 327: UDI Mobile – General pin code

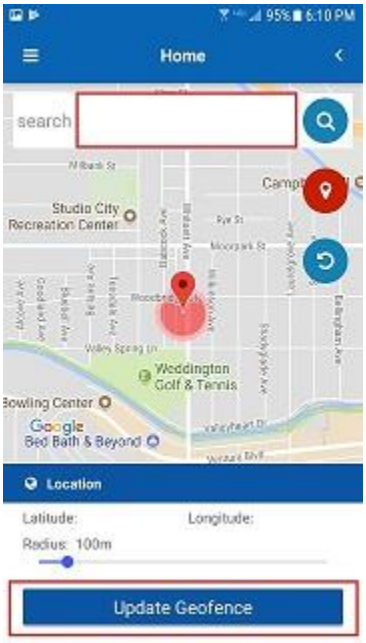
- Launch UDI Mobile and enter the six-digit code you received from the previous step and select "Confirm".

Figure 328: UDI Mobile – Confirm pin code

- Select "Allow" to the location services prompt of the mobile device. (Location is critical to the functionality of this application)
- Select "Set Geofences Location" and select "OK".

Figure 329: UDI Mobile – Set geofences location

- The application will locate your current location and set the fence to 100M by default. To save this setting select "Update Geofence". To select another location, enter the address in the search field and then select "Update Geofence" and "OK" to confirm.



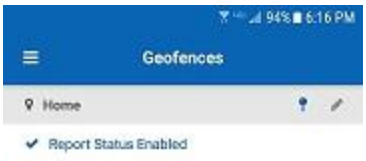


Figure 330: UDI Mobile – Update geofence

- Your application is now configured to report your location and does not need to be running to do so. The device will now report its status automatically. To test the geofence feature you may use the "Report Device Status" button within the settings of the application. This will manually change the device occupancy node that was created in ISY during the above process from False to True if your device is inside the geofence.

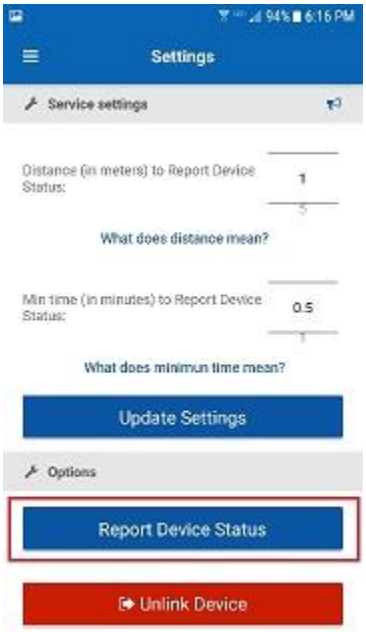


Figure 331: UDI Mobile – Report device status

- Note: the application will notify the user it has reported the status with a system notification, you may disable this feature in the "Notifications" settings of your mobile device.

18.7 ISY Portal IFTTT Integration[91]

With ISY Portal, you can integrate with IFTTT Maker Channel and therefore have programs, variables, devices, and scenes be triggered by IFTTT events (**inbound**). Furthermore, you can use the Network Module to send outbound triggers to IFTTT. Starting with firmware version 4.3.3 and above, Network Module will be included in the ISY Portal.

For more information on IFTTT, please consult their website: http://ifttt.com.

Please make sure you have ISY Portal Installed and Configured first.

18.7.1 Creating Inbound Triggers

This integration is possible using the IFTTT Maker Channel (https://ifttt.com/maker_webhooks) in the THAT portion of your IFTTT recipe. The Maker channel in turn communicates with ISY Portal to control your devices, scenes, programs or state variables.

18.7.2 Setup Instructions - ISY Portal

- On portal, IFTTT configuration is in **Select Tool | Connectivity | IFTTT**
- First, you will need to click on "Set Key" to create an IFTTT **Key** that will be used to authenticate your IFTTT requests
- Then, you need to create the events that the IFTTT Maker Channel will use:
    - Just click Add Device/Scene/Programs or State Variable, and choose the action that you want, and **save** it
    - It is now ready to be used on IFTTT and referenced by **Event Name**

18.7.3 Setup Instructions - IFTTT

- Start a recipe and choose whatever you want in the **THIS** section. For Amazon Echo users, you can try "Amazon Alexa"
- In the **THAT**, look for Maker/Make a web request
- To configure your Maker channel, you need to use the following URL: **https://my.isy.io/api/ifttt/<Event Name>/key/<Your IFTTT key>** where:
    - **Event Name**: This is the event name you created in ISY Portal
    - **IFTTT key**: This is the key you created in ISY Portal
    - For your convenience, in your list of events in portal, there is a small icon beside the red X, which will give you the full URL you can cut & paste here

[91] (Universal Devices)

- The Method should be **POST**
- Click on **Create Action**. You are ready to test!

18.7.4 Passing values from IFTTT event

In addition, you can pass values from IFTTT events to a state variable or a dimmable device. To do so, set your portal event with the action **IFTTT Value**. Then in the maker channel, you can pass the value in the Body field. Just make sure to set the Content Type to **text/plain**.

18.7.5 Using relative or absolute values

Values can be an absolute, or relative. To send a relative value, just precede the value with a **+** or **-** .

- Examples (Device)
  - Device values are always set as a percentage
  - Use 0, to turn off the device
  - Use +25, to increase the device level by 25%
- Examples (Variables)
  - To increase a state variable by 10, just enter +10
  - To set your state variable to 10, then just enter 10

18.7.6 Creating Outbound Triggers

You can use the Network Module to send outbound triggers to IFTTT.

18.7.7 Setup Instructions - IFTTT

- Go to https://ifttt.com and login
- Create a recipe
- In the **THIS** section, choose **maker**, and give it an **Event Name** (you will need this in ISY)
- Complete your recipe with a **THAT** of your choice

18.7.8 Setup Instructions - Maker

- Go to https://ifttt.com/maker and login
- Take note of your maker channel IFTTT **Key** (you will need this in ISY)

18.7.9 Setup Instructions - ISY

- Go to Admin Console | Configuration | Networking | Network Resources tab
- Click on the Add button and give your resource a **Name** (you will need this in ISY Programs)

- Click on the second column where it says **Select to Edit Content**. This will bring up Resource Editor
    - Choose **https** from the first drop down
    - Choose **POST** from the second drop down
    - For **Host**, type **maker.ifttt.com**
    - For **Port**, choose **443**
    - For **Timeout**, use at least 1000 (if you get TCP response failures, increase the timeout)
    - For **Path**, construct **/trigger/<Event Name>/with/key/<Key>** ... you need to replace <Event Name> and <Key> with the values you retrieved in the last two sections above.
        - Example, if the Event Name is **isyRules** and the key is **ABCDEF01234**, then the path would be **/trigger/isyRules/with/key/ABCDEF01234**
    - If you wish to send optional parameters:
        - Change the **Content Type** header to: **application/json**
        - Change **Encoding** to either **Raw Text** or **C-Escaped**
        - In the **Body** type: { "value1" : "<your value 1>", "value2" : "<your value 2>", "value3" : "<your value 3>" }
        - Where <your value 1>, <your value 2>, and <your value 3> must be replaced with whatever parameter you wish to send to IFTTT
        - You can also use ISY Substitution Variables that will be replaced by ISY at run time before submission to IFTTT
    - Click on the **Save** e button on Resource Editor
- Click on the **Save** button to save all your resources to ISY
- Click on the **Test** button to test your resource
- Once satisfied, you can use the resource referenced by **Name** in your ISY Programs

18.7.10 ISY Portal/IFTTT/Ring Doorbell

You can use ISY Portal/IFTTT to integrate with Ring Doorbell! For instance, you can have the ISY do any function for example, flash the lights in the house.

- Create a State Variable for use in the ISY. This Variable will show up in ISY Portal in the dropdown (e.g. RingDoor)
- Set up ISY portal for IFTTT use and create a ISY key for use

- You will then have a link to use on IFTTT for
  example: https://my.isy.io/ap.../RingDoor/key/<YourKEYFROMisyPORTAL>
- You will need to copy this key for later use)
- Use the variable you created in your ISY and create a action to run it in ISY Portal.
  For example:

Event Name	Category	Resource	Address	Action
RingDoor	Variable	RingDoorbellActive	8	Set value 10 1

Showing 1 to 1 of 1 entries

- Log on to IFTTT and create a recipe using Ring Doorbell and Maker
- Create a Recipe
- If this then that and pick THIS
- Choose trigger channel and search for Ring doorbell
- When picked you have to log into Ring and follow the prompts. When done....
- Choose a Trigger
- New Ding Detected

This Trigger fires every time somebody rings your Ring Doorbell

OR

- New Motion Detected
- Set up a trigger for what you want (ie New Ring detected)
- Complete Trigger Fields
- New Ding Detected
- Which doorbell?

Please select (e.g.) Front Door

- Now pick THAT
- Choose Action Channel
- Search/pick MAKER
- In MAKER, Choose an Action
- Make a web request
- Pick the web request
    - URL: https://my.isy.io/ap.../RingDoor/key/<YourKEYFROMisyPORTAL>

Use the KEY from the ISY portal, plug in in the URL field. Use the copy feature from ISY Portal works best!

- Method: POST
- Content Type: json+application
- Body: Leave blank
- Now select action

Now you can write any program you wish that will do an action and then reset the variable to 0 again.

18.7.11 ISY Portal/IFTTT/ISY Nest Camera Integration

- Very much like Ring (see above) but instead use the Nest Camera Maker channel instead

18.7.12 ISY Portal/IFTTT/SimpliSafe Alarm System

18.7.12.1 SimpliSafe Setup

- Configure SimpliSafe's email alerts to send to gmail.
- The enhanced 24/7 Interactive Alarm Monitoring + Alerts service is **required**

18.7.12.2 ISY and ISY Portal Setup

- Create the program you want to run
- Login into the ISY Portal, setup IFTTT under Select Tool / Connectivity / IFTTT
- Create an event and assign your program to it. For clarity, keep the name the same as the gmail label you'll create below

18.7.12.3 Gmail Setup

- Login to Gmail
- Use the search function to specify: •messages from no-reply@simplisafe.com
- Subject lines from SimpliSafe for the message type you want to control in the ISY Example: SimpliSafe System Disarmed. List of SimpliSafe Email subject lines:
    - SimpliSafe Secret Alert - for any activity with a sensor set to Secret Alert only
    - SimpliSafe System Armed - the system is armed in Home or Away Mode
    - SimpliSafe System Disarmed - the system is disarmed

    - SimpliSafe Error Alert: Power Outage - the Base Station has lost its connection to external power and is not operating on back-up battery
    - SimpliSafe Power Restored - the Base Station has gained it connection to external power
    - SimpliSafe Sensor Restored - a sensor that was previously not connecting to the Base Station has restored its connection.
    - Alarm Alert! Your SimpliSafe Security System was triggered - an alarm has been triggered
    - SimpliSafe Alarm Cancelled - you have disarmed the system within the alarm duration time.
- Create a filter for it and create a unique label for the filter. I suggest naming it the same as the ISY event you created above (Create filter with this search at the bottom of the gmail search window)

18.7.13 IFTTT Setup

- Create a recipe
    - For the IF, use the gmail channel and the "New email in inbox from Search" option. •In the text box, enter label:disarmed
        - (Substitute "disarmed" with whatever label name you created and want to act on)
        - This ties the subject line to the discrete action on the ISY
    - For THEN, pick the Maker channel. Follow the directions in the wiki for creating an inbound trigger •You'll need the key provided by the ISY portal under IFTTT
        - You'll need the event name you created under IFTTT on the ISY portal
        - Example:

https://my.isy.io/api/ifttt/Disarmed/key/xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxx

18.7.14 Notes

- It’s a one-way relationship from SimpliSafe to the ISY. There are lot of requests on their forum to support IFTTT, maybe one day....
- It can take between 15 seconds and a few minutes for the ISY Program to execute. It’s to be expected given email integration
- Maybe this would work with the SMS channel. SimpliSafe can send to text.
- The above is a template that can work for anything that generates consistent email content

18.8 Geo Fencing and Push Notifications using ISY Portal[92]

18.8.1 Push/Mobile Notifications[93]

18.8.1.1Mobile Notification

With the Networking module, you can send push notifications to both Android and IOS without using SMS messages (so works with non-phone devices, like tablets and media players).

All of these products utilize the respective push notification infrastructures - and use very similar APIs. You must first setup an account for respective API and install appropriate third-party product from the respective market/store. To configure in the ISY, follow these steps:

18.8.1.1.1MobiLinc Connect

MobiLinc on IOS (not Android - yet) offers notification within its subscription to the connect service. See http://mobilinc.com/features/push/

18.8.1.1.2Prowl

Apps

- IOS - http://itunes.apple.com/us/app/prowl-growl-client/id320876271

Instructions

- Sign up at https://www.prowlapp.com
- Enter credentials into Prowl on your IOS device
- Send a test notification from https://www.prowlapp.com/add_notification.php to verify installation
- Create an API key at https://www.prowlapp.com/api_settings.php
- For each message you wish to send, create a network resource as follows
    - 'https' 'post'
    - host is 'api.prowlapp.com'
    - port is 443
    - path is '/publicapi/add'
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - body to 'apikey=#API Key#&application=ISY&event=TEST ONLY&description=Test Notification\n'

[92] (Universal Devices)
[93] (Universal Devices)

        - (obviously - replace #API Key# with your API key

18.8.1.1.3Notify My Android

Apps

- Android - https://market.android.com/details?id=com.usk.app.notifymyandroid

Instructions

- Sign up at https://www.notifymyandroid.com
- Enter credentials into 'Notify My Android' on device
- Send a test message from https://www.notifymyandroid.com/notify.php to verify installation
- Create an API key at https://www.notifymyandroid.com/account.php
- For each message you wish to send, create a network resource as follows
    - 'https' 'post'
    - host is 'www.notifymyandroid.com'
    - port is 443
    - path is '/publicapi/notify'
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - body to 'apikey=#API Key#&application=ISY&event=TEST ONLY&description=Test Notification\n'
        - (obviously - replace #API Key# with your API key

18.8.1.1.4Pushover

Apps

- IOS - https://itunes.apple.com/us/app/pushover-notifications/id506088175
- Android - https://play.google.com/store/apps/details?id=net.superblock.pushover

Instructions

- Sign up at https://pushover.net/login
- Make a note of your user key
- Create an application at https://pushover.net/apps
- Make a note of your application key
- Enter same credentials into 'Pushover' app on device
- For each message you wish to send, create a network resource as follows
    - 'https' 'post'
    - host is 'api.pushover.net'
    - port is 443

    - path is '/1/messages.json'
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - body to 'token=#Application Token#&user=#User Key#&message=Test Notification'
        - full API documentation is at https://pushover.net/api

Pushbullet

Requires at least version 4.6.2. Currently does not work on 5.x (as of 5.0.10) because it does not support SNI in network resources. This is arriving shortly.

Apps

- IOS - https://itunes.apple.com/us/app/pushbullet/id810352052
- Android - https://play.google.com/store/apps/details?id=com.pushbullet.android
- Chrome - https://chrome.google.com/webstore/detail/pushbullet/chlffgpmiacpedhhbkiomidkjlcfhogd
- Firefox - https://addons.mozilla.org/en-US/firefox/addon/pushbullet/
- Others - https://www.pushbullet.com/apps

Instructions

- After signing up, visit https://www.pushbullet.com/account and get your access token.
- For each message you wish to send, create a network resource as follows
    - 'https' 'post'
    - host is 'api.pushbullet.com'
    - port is 443
    - path is '/v2/pushes'
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - In Headers, change 'Content type' to application/json
    - Add an 'Authorization' header - put your access token in the username - leave the password blank
    - Place: '{"type": "note", "title": "Note Title", "body": "Note Body"}' in the Body
    - Ensure 'SNI' is checked
    - Update - and test.
        - Documentation is at https://docs.pushbullet.com/v2/devices/ and https://docs.pushbullet.com/v2/pushes/

18.8.1.1.5AutoRemote (MUST HAVE if you are a Tasker User)

Apps

- Android - https://play.google.com/store/apps/details?id=com.joaomgcd.AutoRemote&hl=en

Instructions

- Please see **19.1.10 Mobile Notification**

18.8.1.1.6Pushsafer

Apps

- iOS - https://itunes.apple.com/app/pushsafer/id1096581405
- Android - https://play.google.com/store/apps/details?id=de.appzer.Pushsafer
- Win10 - https://www.microsoft.com/store/apps/9NBLGGH51ZV6
- Chrome, Firefox Webpush: https://www.pushsafer.com/en/apps

Instructions

- Sign up at https://www.pushsafer.com
- Make a note of your private or alias key
- For each message you wish to send, create a network resource as follows
    - 'https' 'post'
    - host is 'pushsafer.com'
    - port is 443
    - path is '/api'
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - body to 'k=#Private or Alias Key#&d=#device id#&m=Test Notification&t=Test Notification Title'
    - full API documentation is at https://www.pushsafer.com/en/pushapi

18.8.1.1.7Additional Info

- Many APIs have other optional parameters you can send as well - details are on the sites in the API documentation.
- On the ISY - there are potentially some issues with SSL negotiation depending on if you have the PRO version or not. Go into the dashboard and in the network settings make sure 'HTTPS Client Settings' is set to 'TLS 1.2' and 'All' is set for strength. Uncheck 'Verify'.

- Other settings may work - this is just what works for me - and it's a security best practice now to avoid SSL3.
- Before 4.3.1 - a separate network resource needs to be created for each potential action. So - one for 'Light On' and another for 'Light Off'. This makes it difficult to send, for instance, the current temperature. 4.3.1 introduced substations in network resources, with a couple of restrictions. You cannot use # to refer to the triggering device, and he network resource must NOT be 'URL Encoded'.

18.8.2 Geo Fencing

If you have used Geo Fencing using MobiLinc, you do need to migrate it either to IFTTT, Locative (IOS) or Tasker (Android):

- On your ISY, create a state variable that will be used to identify if you are Home or Away
- On portal, for your ISY, go to Select Tools/Communication/IFTTT
- Click on Set Key, then Create Key. Close.
- Click Add Variable
    - Choose the variable you just created
    - Name it "Home"
    - Set Value to 0
- Click Add Variable
    - Choose the variable you just created
    - Name it "Away"
    - Set Value to 1
- Next to those 2 IFTTT events, click on the small blue arrow. This will give you the URL to trigger each of those.
- Use an app to trigger those URLs based on location
    - On IOS, Locative is a good choice
    - On Android, Tasker is a good choice. For detailed configuration, please see **19.1 Tasker**

18.9 Using Admin Console through ISY Portal[94]

You can use ISY Portal for remote access through the Admin Console without the need for any port forwarding. Here are the instructions:

18.9.1 Configure ISY Finder

- Go to your portal account, click on Select Tools (next to your ISY) and then choose ISY Information
- Copy the URL next to **Admin Console URL**

[94] (Universal Devices)

- Make sure you use http://isy.universal-devices.com/994i/admin.jnlp ... this puts an icon on your desktop upon the clicking of which you will get a dialog called ISY Finder
- When ISY Finder comes up, if it finds your ISY on the network, it'll immediately bring up the Admin Console ... cancel out of the login dialog
- Go back to ISY Finder (behind the Admin Console), click on the Add button, and then paste what you copied in the second step
- Close the Admin Console

18.9.2 Restart Admin Console

- Click on the ISY994 Administrative Console icon on your desktop
- When ISY Finder comes up, double click on the line which points to the ISY Portal URL
- **IMPORTANT** when prompted to login, use the credentials for your **ISY Portal Account**

18.10 ISY Portal MobiLinc Configuration[95]

MobiLinc can be easily configured to use ISY Portal. This said, however, push notifications are not yet working. For push notifications, you may want to consider **18.8 Geo Fencing and Push Notifications using ISY Portal**.

Here are the instructions to setup MobiLinc:

- Login to https://my.isy.io, click on My Profile (top right) and make sure My Preferred ISY points to your ISY
- Open MobiLinc and go to My Settings->Lighting Controller Settings
    - Set Host Type to ISY
    - Set Username and Password to the email address and password with which you are registered in ISY Portal
    - Set Local - http:// to blank
    - Set Local port Leave as is
    - Set Secure - https:// my.isy.io
    - Set Secure Port to 443

If you have an Android Phone and still having trouble communicating:

- Uninstall MobiLinc PRO (Force Stop Services)
- Reboot your phone
- Install MobiLinc PRO
- Follow the same instructions as above

[95] (Universal Devices)

- You may want to clear Http port

19 Third Party Integration Notes

19.1 Tasker

The Android Tasker is an automation app. It is an application for Android which performs tasks based which can then be executed according to a variety of contexts.

Integration of the Tasker with an ISY lets you to add a lot of powerful functionality to your home automation system.

For example: You can configure Tasker, in conjunction with the ISY, to setup a geofencing system. Geofencing is the use of GPS and/or other technology to create a virtual geographic boundary, enabling software to trigger a response when a mobile device enters or leaves a particular area. This lets you do things like “turning the lights off when you leave and on when you get home".

If you are using the **ISY Portal** you will need to gather the required information prior to doing the work below.

19.1.1 ISY Portal Information

You will need some information from your ISY configuration. In your browser go to the URL: https://my.isy.io and log into the portal.

Select the **Select Tool…->Information->ISY Information** menu item.

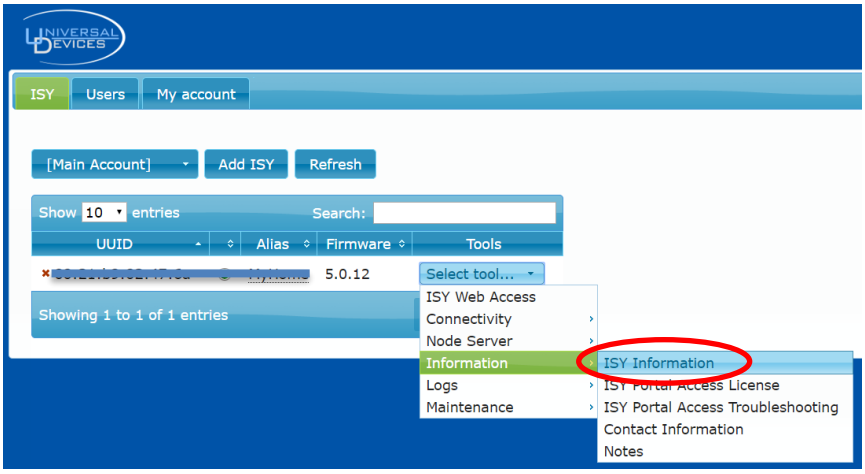


Figure 332: ISY Information Menu

You will see a popup containing information for your ISY Portal.

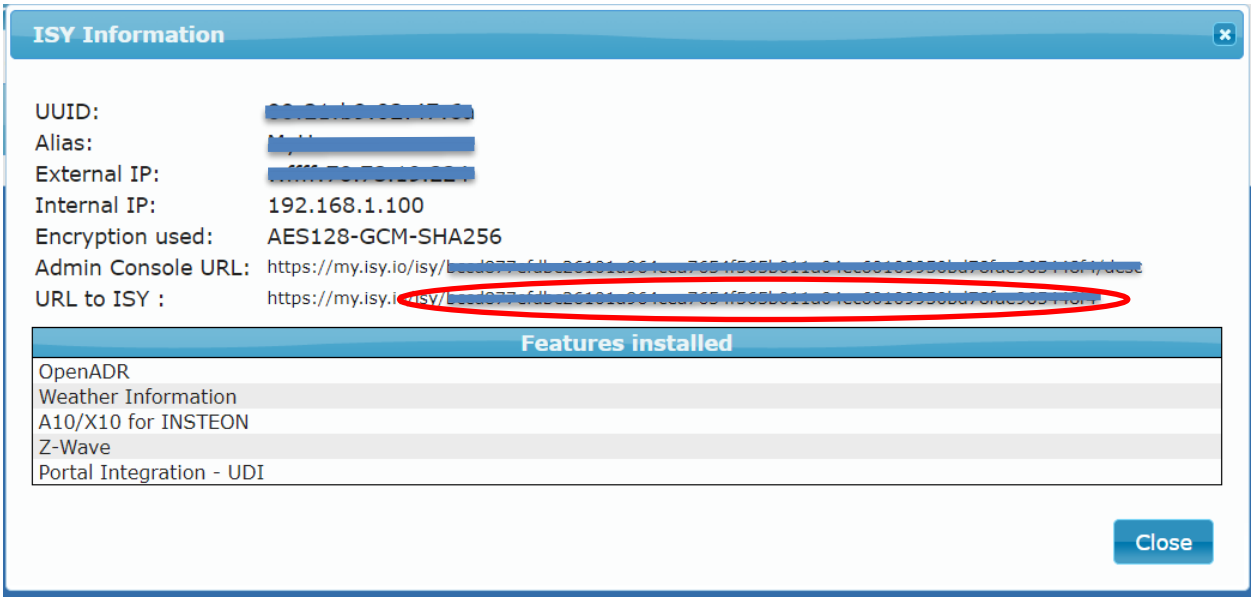


Figure 333: ISY Information Popup

Copy the cryptic text string in the **URL to ISY** section, following the **/ISY/** text. You will need this text in Tasker.

19.1.2 Network Awareness

First, it is helpful if Tasker can use the HTTP interface when on the same network, and HTTPS when not. This should probably not be used for geofencing your home - as Android devices will sleep and disconnect sometimes. This set of tasks and profile is simply so that Tasker has a reliable way to call the ISY API...

Once you have installed Tasker, perform the following steps:

- Click the three dots top-right - and select 'Preferences'
- Uncheck 'Beginner Mode'
- Set the 'Theme' to 'Dark' (saves battery!)
- Hit 'Back' (gear icon in the top-left of screen)

Now, let's create the first task, step by step: (CaSe is important)

- Click the 'Tasks' tab (top of screen)
- Click + (bottom right of screen)
- Set the task name to 'Home-On-Net' and touch the check-mark
- Click the + bottom center of screen
- In the 'Filter', type 'variable. Scroll and select 'Variable Set'
- In the 'Name' box, type '%IsyUrl'
- In to 'To' box, type '%IsyUrlInternal'

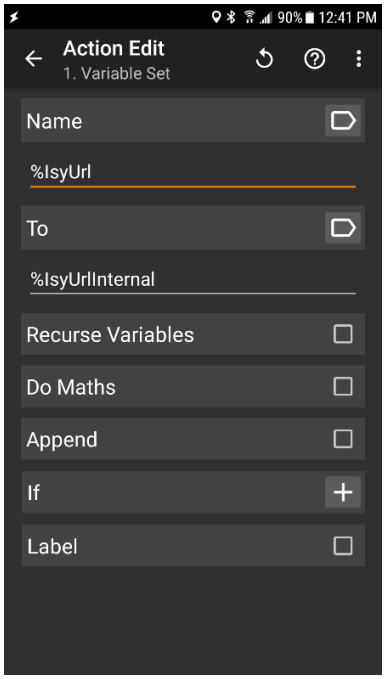


Figure 334: Network Awareness #1

- Hit 'Back' (gear icon in the top-left of screen)
- Click the + bottom center of screen
- In the 'Filter', type 'variable. Scroll and select 'Variable Set'
- In the 'Name' box, type '%URLPrefix'
- In to 'To' box, type '/'

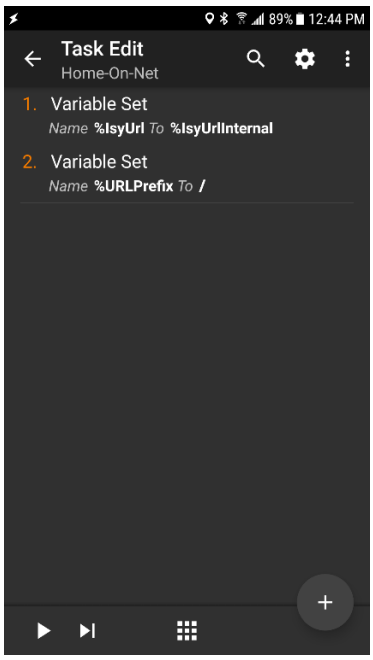


Figure 335: Network Awareness #2

- Hit 'Back' (gear icon in the top-left of screen)
- Hit 'Back' again (gear icon in the top-left of screen) to return to the list of tasks..

Now, let's create the second task, step by step: (CaSe is important)

- From the 'Tasks' tab...
- Click + (bottom right of screen)
- Set the task name to 'Home-Off-Net' and touch the check-mark
- Click the + bottom center of screen
- In the 'Filter', type 'variable. Scroll and select 'Variable Set'
- In the 'Name' box, type '%IsyUrl'
- In to 'To' box, type '%IsyUrlExternal'

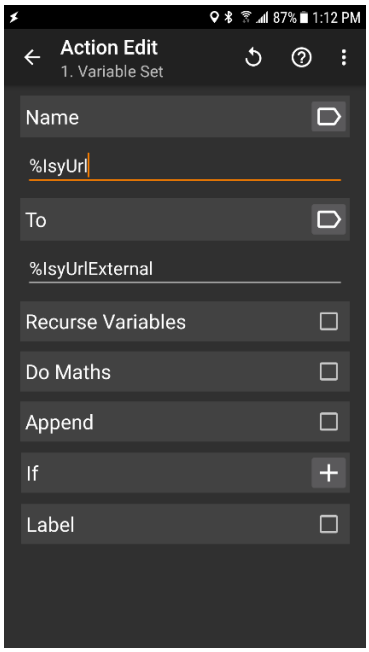


Figure 336: Tasker Network Awareness #3

- Hit 'Back' (gear icon in the top-left of screen)
- Click the + bottom center of screen
- In the 'Filter', type 'variable. Scroll and select 'Variable Set'
- In the 'Name' box, type '%URLPrefix'
- If NOT using ISY Portal:
- In to 'To' box, type '/'

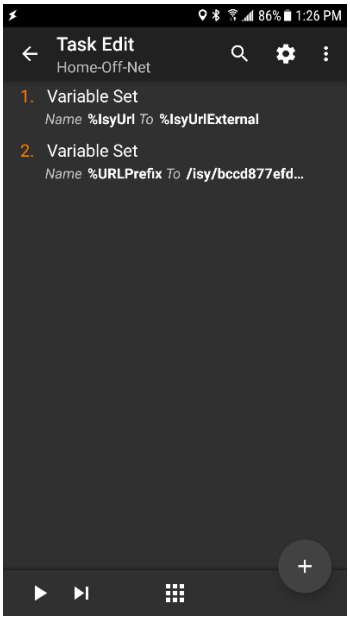


Figure 337: Tasker Network Awareness #4

- If you ARE using ISY Portal:
- In to 'To' box, type '/isy/<secure_isy_id>' (the <secure_isy_id> is the cryptic data string you found in your ISY Portal section above: **19.1.1 ISY Portal Information**)
- Hit 'Back' (gear icon in the top-left of screen)
- Hit 'Back' again (gear icon in the top-left of screen) to return to the list of tasks..

After creating the tasks above, the Tasks tab should look like this:

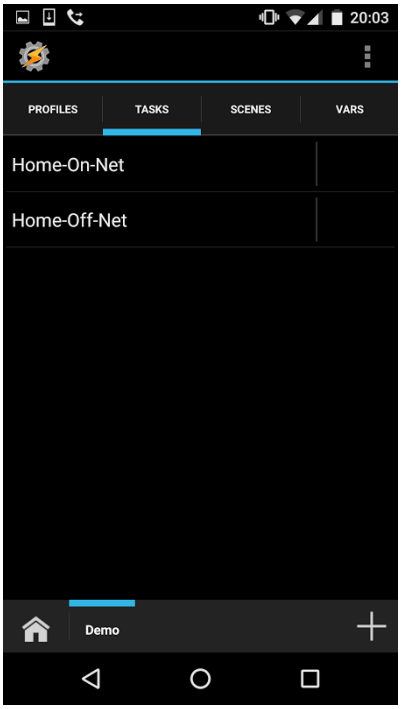


Figure 338: Tasker Network Awareness #5

Now, let's set a couple of variables...

- Click the 'VARS' tab (top of screen)
- Near the bottom of the screen - if you don't see buttons labeled 'Indexed' and 'Empty', click the ^ in the far bottom-right.
- Ensure 'Empty' is lit up... if not, click the 'Empty' button to display empty variables
- You should see the '%IsyUrl' '%IsyUrlExternal' and '%IsyUrlInternal' variables
- Touch '%IsyUrlInternal' and enter the internal URL (in the format 'http://user:password@192.168.1.3'). Touch the check to save
- Touch '%IsyUrlExternal' and enter the external URL for your ISY (or Portal URL) and save it.
- Internal: http://user:password@192.168.1.3
- External direct to ISY: https://username:password@myisy.dyndns.org
- External Via Portal: https://username:password@my.isy.io

If you use the ISY Portal - you might have to URL encode the username (since it has a @ in it). @ encodes to %40. Test without encoding first.

Leave '%IsyUrl' blank.

At this point, your variables should look like this (Except of course the correct IP address, external URL, username and password entries are used!

The following image is if you are connecting directly:

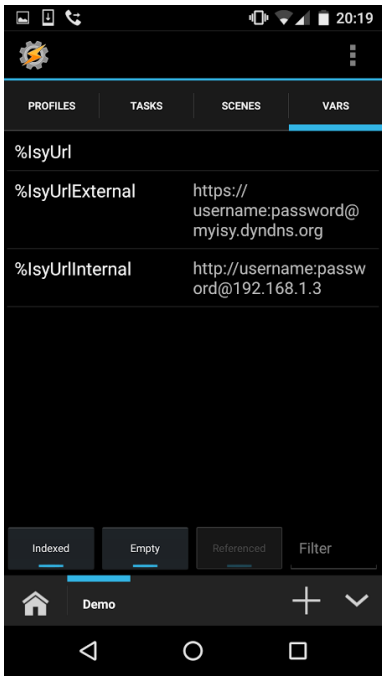


Figure 339: Tasker Network Awareness #6

The following image is if you are connecting via ISY Portal:

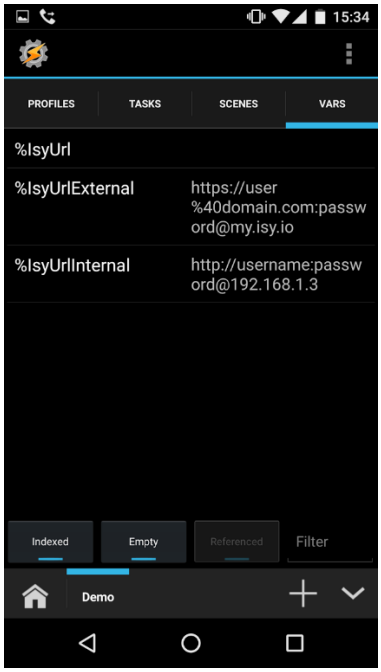


Figure 340: Tasker Network Awareness #7

Exit Tasker and re-launch (This is to save the tasks - so we can create profiles that refer to them)

Now, let's create the first profile:

- Click the 'Profile' tab
- Click the + bottom-right
- Click on 'State'
- In the 'Filter' - type 'wifi'
- Touch 'Wifi Connected'
- Next to 'SSID' - touch the magnifier.
- Select the SSID of your home network - where the ISY is. If you have more than one SSID - select each in turn until they are all added
- Next to 'MAC' - touch the magnifier.
- Select the Mac of your home network - where the ISY is. If you have more than one - select each in turn until they are all added
- (It's important to use the MAC as well as the SSID - so your device does not treat a spoofed SSID as your home network - and switch to no SSL..)
- Hit 'Back' (gear icon in the top-left of screen)
- You are prompted to select the entry task... touch 'Home-On-Net'
- In the list - touch and hold 'Home-On-Net'. From the popup menu, touch 'Add Exit Task'
- Touch 'Home-Off-Net'
- Touch and hold the profile name. Click the 'A' icon at the top of the screen
- Set the name to 'On Home Network', and hit the check.
- Hit the Android back button - Tasker should exit.

The profile tab should look like this when done:

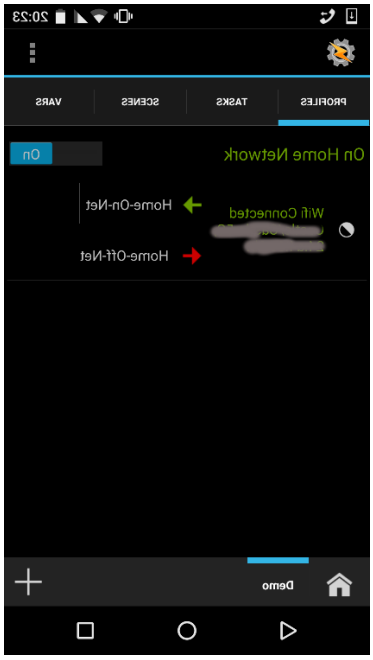


Figure 341: Network Awareness #8

The profile name is green when it's active...

At this point - if you drop the Android notifier, you should see a Tasker notification proclaiming 'On Home Network'. Click it - Tasker will open. Click the 'Vars' tab, you should see that %IsyUrl has been set to the internal URL..

19.1.3 Base Task Dependencies

Before you complete this step - please complete the steps outlined in **19.1.2 Network Awareness** section.

Let's create the first 'meta' task... These tasks are called by other processes to utilize the ISY API.

- From the 'Tasks' tab...
- Click + (bottom right of screen)
- Set the task name to 'ISY-SetVarState' and touch the check-mark

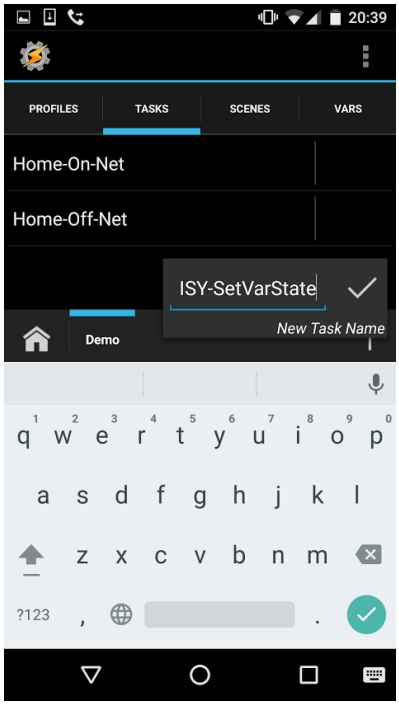


Figure 342: Base Task Dependencies #1

- Click the + bottom center of screen
- In the 'Filter', type 'http'
- Touch 'HTTP Get'

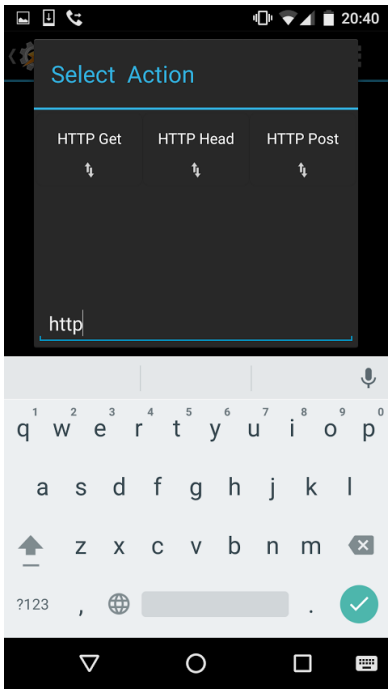


Figure 343: Base Task Dependencies #2

- In the 'Server:Port' box, touch the 'Tag' and select '%IsyUrl'
- In to 'Path' box, type '%URLPrefix/rest/vars/set/2/%par1/%par2'

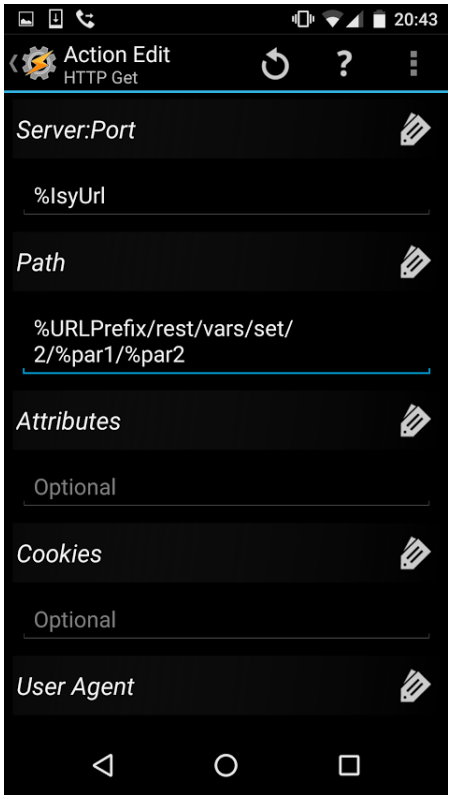


Figure 344: Base Task Dependencies #3

- If you are using a self-signed certificate on your ISY (and not the portal) - scroll down and check 'Trust Any Certificate'
- Hit 'Back' (gear icon in the top-left of screen)
- Hit 'Back' again (gear icon in the top-left of screen) to return to the list of tasks.

Figure 345: Base Task Dependencies #4

Now - use the above process to create these additional 'meta-tasks':

- ISY-SetVarInteger 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/vars/set/1/%par1/%par2'
- ISY-RunIf 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/programs/%par1/run'
- ISY-RunThen 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/programs/%par1/runThen'
- ISY-RunElse 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/programs/%par1/runElse'
- ISY-SceneOn 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/nodes/%par1/cmd/DON'
- ISY-SceneOff 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/nodes/%par1/cmd/DOF'
- ISY-ExecNet 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/networking/resources/%par1'
- ISY-WOL 'Net' 'HTTP Get' / Server:Port = '%IsyUrl' / Path = '%URLPrefix/rest/networking/wol/%par1'

19.1.4 In-Car Detection

First - the steps outlined in **19.1.2 Network Awareness** and **19.1.3 Base Task Dependencies** must be completed.

I've found the most reliable way to do in-car detection is Bluetooth. Either to your cars built-in Bluetooth, or a Bluetooth device plugged into the accessory outlet.

First, create a 'State Variable' on the ISY called '**In_Car**'. Set it's 'init' value to 2. Make a note of its ID number. For purposes of example, I'm going to say mine is 23. (I use a **s.** in front of any state variable name. This helps me identify state variables easily when I program the ISY)

Create two tasks (follow the steps in the **19.1.2 Network Awareness** section) using data in this table:

- ISY-Set-Car-Enter Perform Task / ISY-SetVarState**%par1=23 %par2=1**

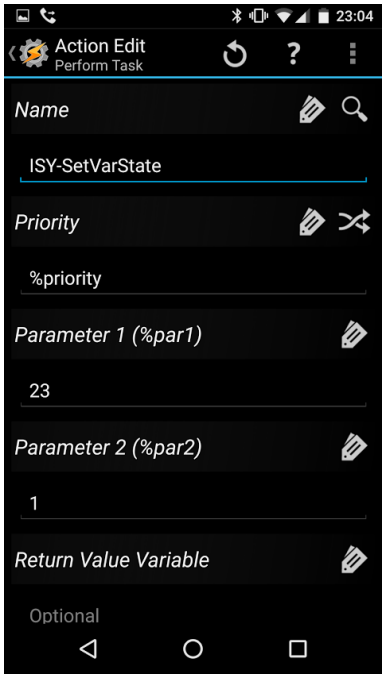


Figure 346: In-Car Detection #2

- ISY-Set-Car-Exit Perform Task / ISY-SetVarState**%par1=23 %par2=0**

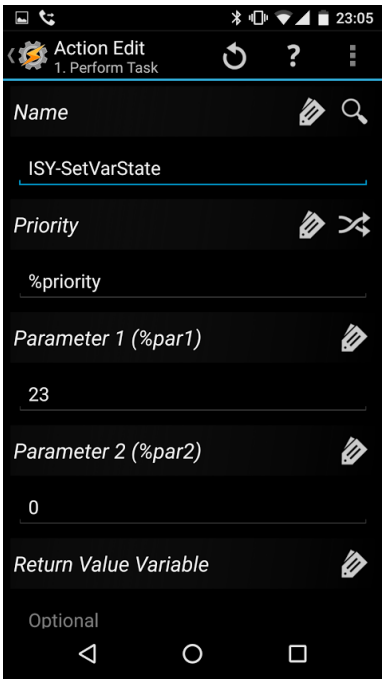


Figure 347: In-Car Detection #3

- Now, pair your phone with the Bluetooth device. This is necessary to cause your phone to automatically connect when the device powers up (in your car).
- In Tasker, add a 'State' profile.

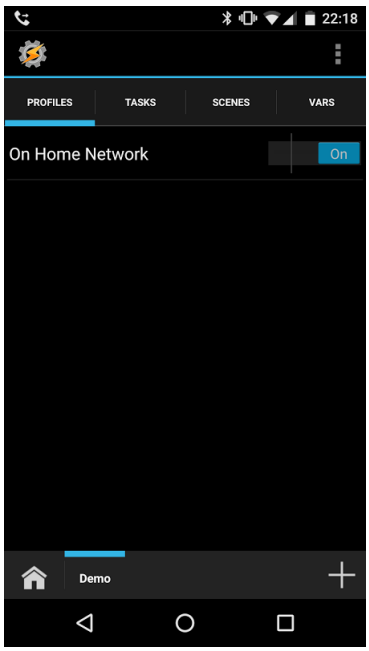


Figure 348: In-Car Detection #4

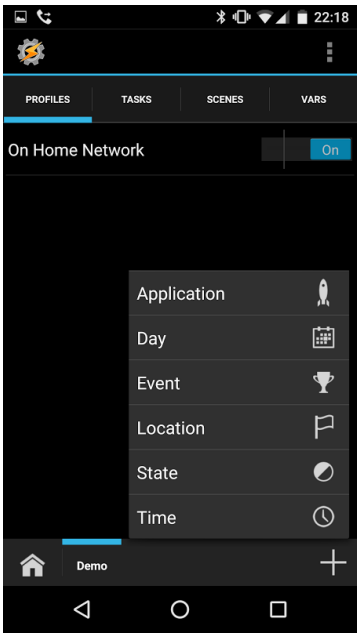


Figure 349: In-Car Detection #5

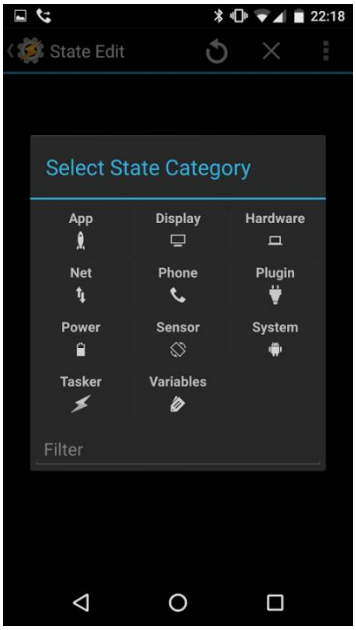


Figure 350: In-Car Detection #6

- In the filter, type 'BT' and then select 'BT Connected

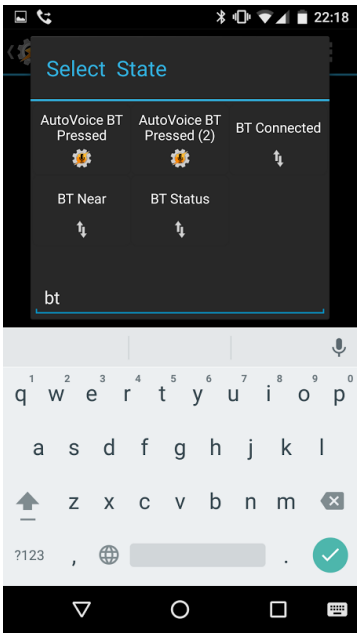


Figure 351: In-Car Detection #7

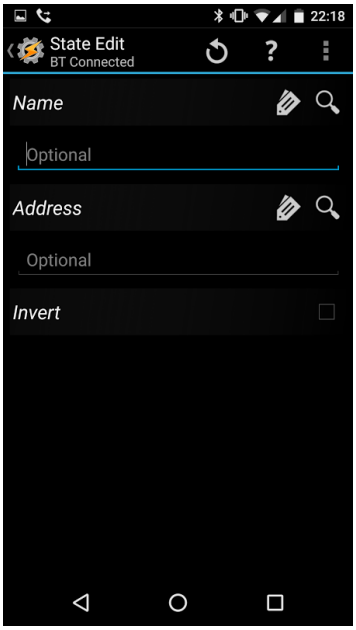


Figure 352: In-Car Detection #8

- For the 'Name', click the magnifying glass and select your Bluetooth device.

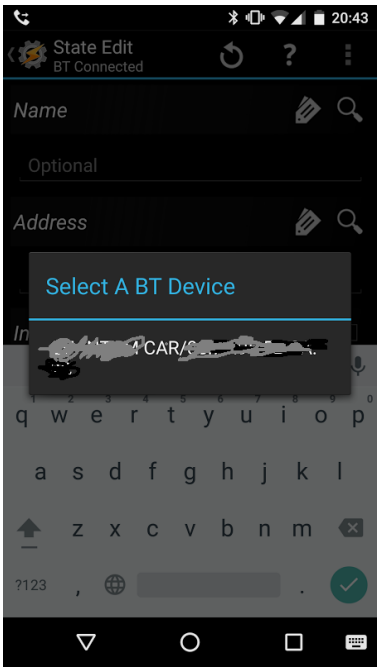


Figure 353: In-Car Detection #9

- For the 'Address', click the magnifying glass and select the same Bluetooth device as for the name.

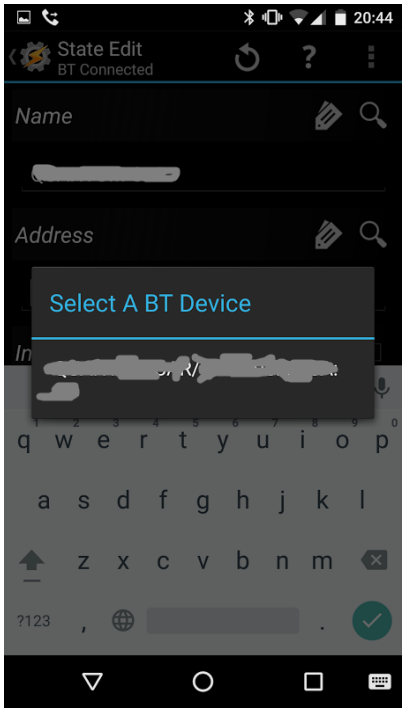


Figure 354: In-Car Detection #10

- Hit 'Back' and select 'ISY-Set-Car-Enter' as the task to run.

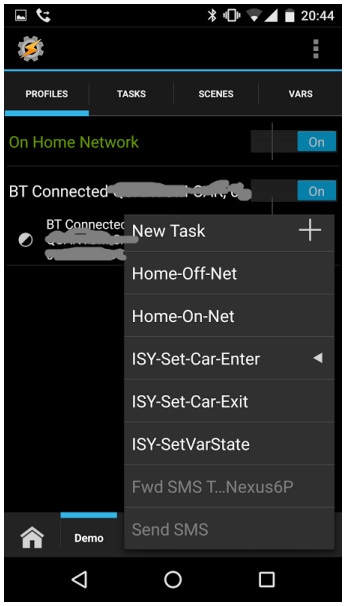


Figure 355: In-Car Detection #10

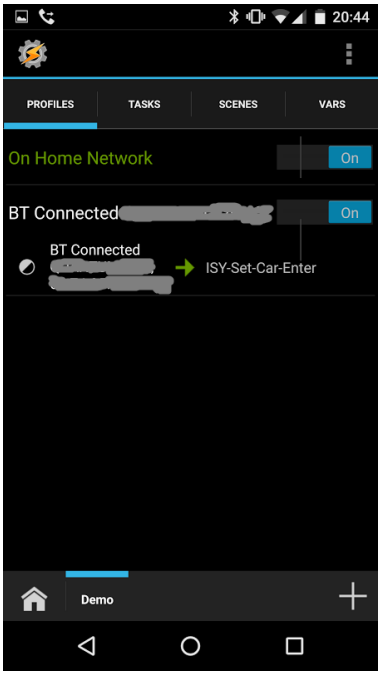


Figure 356: In-Car Detection #11

- In the profile list, long-press the 'ISY-Set-Car-Enter' task and select 'Add Exit Task' select 'ISY-Set-Car-Exit' as the task to run when exiting the car.

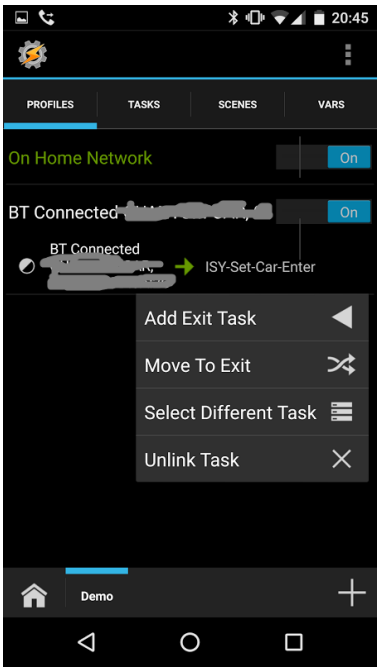


Figure 357: In-Car Detection #12

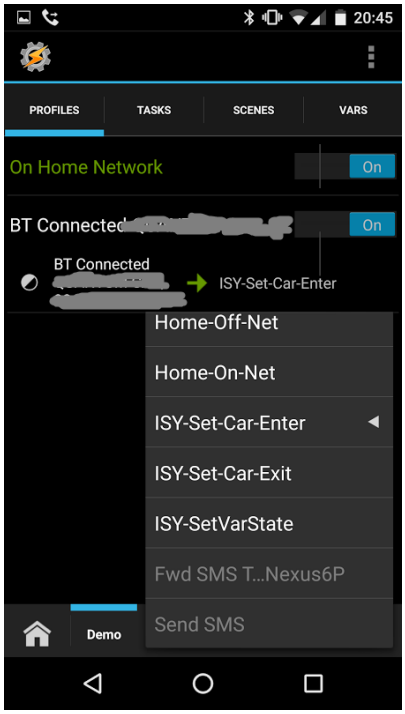


Figure 358: In-Car Detection #13

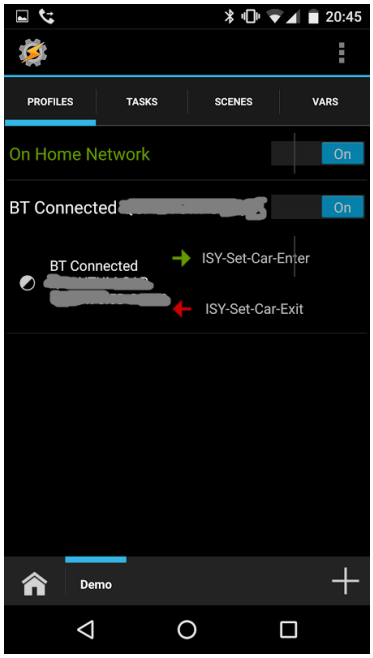


Figure 359: In-Car Detection #14

- Manually run the 'ISY-Set-Car-Exit' task the first time (while not in the car!) and verify the 'In Car' variable changes from '2' to '0'.

19.1.5 Geofencing

For effective geo-fencing on Android - add the AutoLocation module to Tasker (https://play.google.com/store/apps/details?id=com.joaomgcd.autolocation). After 7 days, you'll have to buy the unlock key (https://play.google.com/store/apps/details?id=com.joaomgcd.autolocation.unlock). If your phone supports it - this hooks into the hardware based geofencing that newer Android devices have.

Again - the steps outlined in **19.1.2 Network Awareness** and **19.1.3 Base Task Dependencies** must be completed before this section. They not only setup prerequisites - but they also serve as a tutorial on adding 'Tasks' and 'Profiles' to ISY.

First - ensure the AutoLocation Geofence monitor is set to run on boot:

- Create a 'task' called 'Start Geofence'
- In the filter, type 'autolocation' and select 'AutoLocation Geofences'
- Click the 'Configuration'
- Click 'Geofence Monitor'
- Select 'Start'
- Click the 'Check' to accept.

- click 'Back' to return to the list, and then back again.
- Create a 'Profile' by clicking +
- Select 'Event'
- In the filter, type 'device' and select 'Device Boot'
- There are no options to configure for this event, so hit 'Back'
- Select the 'Start Geofence' task you just created.

This will cause the geofence monitor to start when the Android device starts.

Now, create a 'State Variable' on the ISY called '**At_Work'**. Set it's 'init' value to 2. Make a note of its ID number. For purposes of example, I'm going to say mine is 28.

Create two tasks:

- ISY-Set-Work-Arrive Perform Task / ISY-SetVarState%par1=28 %par2=1
- ISY-Set-Work-Leave Perform Task / ISY-SetVarState%par1=28 %par2=0

Configure a geofence in AutoLocation

- Open 'AutoLocation' and click 'Manage Geofences'
- Click + to add a new Geofence
- In the map, select the center of the location you wish to fence.
- Adjust the size of the fenced area with the slider, and then click 'Accept Geofence'.
- Give it a name - 'Work'.
- Back on the list - Autolocation will tack on 'Inside' or 'Outside' as appropriate.
- Click 'Start Monitor' under the 'GEOFENCES' section.

Finally, create the Tasker profile that ties it all together:

- Create a new profile:
- 'State' 'Autolocation Geofences'
- For 'Configuration', select the 'Geofence Name' 'Work'.
- For 'Status' - select 'Inside'
- Click the 'Check' then hit 'Back'
- select 'ISY-Set-Work-Arrive' as the task to run on entering the geofence.
- In the profile list, long-press the 'ISY-Set-Work-Arrive' task, and select 'Add Exit Task'
- select 'ISY-Set-Work-Leave' as the task to run when exiting the geofence.

19.1.6 Device Toggles

The steps outlined in **19.1.2 Network Awareness** and **19.1.3 Base Task Dependencies** must be completed before this section. They not only setup prerequisites - but they also serve as a tutorial on adding 'Tasks' and 'Profiles' to ISY.

On my ISY - I have a device (a Switchlinc) called 'Dining Room Overhead' - and it's in a folder 'Main / Dining /' I also have a scene 'SC - Dining Room Overhead' in folder 'Main / '. The Switchlinc is a controller of the scene - and is also the switchlinc attached to the load. There are other Switchlincs in the scene.

The goal is to have a task on Tasker that simply toggles the state of the light - without having to know the current state. I do this with a DISABLED program on ISY (so it does not trigger on any element of the IF clause) and have the IF branch based on the current state..

On ISY, create a DISABLED program like the following:

If

Status 'Main / Dining / Dining Room Overhead' is not Off

Then

Set Scene 'Main / SC - Dining Room Overhead' Off

Else

Set Scene 'Main / SC - Dining Room Overhead' On

Test the program by manually performing a 'RunIF' - and abserving the light toggle - with all scene controllers and responders staying in sync.

Over on the program summary tab, make a note of the Program ID (in my case - 01D0).

On Tasker, create the following task:

- ISY-DiningRoom-Toggle Perform Task / ISY-RunIf %par1=01D0

...and test. Each run of the task toggles the light on and off.

19.1.7 Retrieving ISY Variables into a Tasker variable

This is how to get the content of an ISY variable with Tasker - and store the results in Tasker Global Variables.

First, setup the **19.1.2 Network Awareness** section. This is so you get nice, fast API access on the same LAN as your ISY - but secure remote access (either directly, or via the ISY Portal) while away from home.

19.1.8 Master Variable Retrieval Task

First - a master task that will be called by others... I called mine 'ISY-GetStatus-Var'.

- 'Anchor' - 'start_request'
- 'HTTP Get' - Server:Port='%IsyUrl' - Path='%URLPrefix/rest/vars/get/%par1/%par2' - Continue Task After Error='Checked' (If direct and self signed cert, check 'Trust Any Certificate')
- 'Wait' - 'Seconds'=2 - If %HTTPR eq -1
- 'Goto' - Type='Action Label' - Label='start_request' - If %HTTPR eq -1
- 'JavaScriptlet' - Paste the 'Code' from the next box...
- 'Return' - Value='%varLastVal' - Stop=Checked

The content of the JavaScriptlet is:

- var parser = new DOMParser();
- var xmlDoc = parser.parseFromString(global('HTTPD'),"text/xml");
- var varHeader = xmlDoc.getElementsByTagName("var")[0];
- setGlobal("varLastType",varHeader.getAttribute("type"));
- setGlobal("varLastID",varHeader.getAttribute("id"));
- setGlobal("varLastSet",xmlDoc.getElementsByTagName("ts")[0].childNodes[0].nodeValue);
- setGlobal("varLastVal",xmlDoc.getElementsByTagName("val")[0].childNodes[0].nodeValue);
- setGlobal("varLastInit",xmlDoc.getElementsByTagName("init")[0].childNodes[0].nodeValue);

19.1.9 Retrieve value using master variable retrieval task

I have a variable I wish to retrieve... 'FR-Temp'. It is a 'State' variable with ID 124.

This is the task you create to get this variable:

- 'Perform Task' Name='ISY-GetStatus-Var' - Parameter 1='2' - Parameter 2='124' - Return Value Variable='%var_val'

- 'Action Popup' Text='%var_val' Timeout='5'

Run the task - you'll get a popup with the current variable.

The Javascript sets variables (global in scope) for the properties of the variable.

- %varLastVal - Last returned variable value
- %varLastInit - Last returned variable Init value
- %varLastSet - Date and time the variable was last set
- %varLastID - ID of last returned variable
- %varLastType - Type of last var (1=Integer, 2=State)

In any other task - you can 'Perform Task' 'ISY-GetStatus-Var' with %par1 being the type, and %par2 being the ID of the variable you need the value of. Then read the values of the call from variables...

19.1.10 Mobile Notification[96]

We are going to use 'AutoRemote' to send device status to Tasker as a variable. This can then be used on Tasker to update widgets or trigger events.

AutoRemote

- Install from https://play.google.com/store/apps/details?id=com.joaomgcd.AutoRemote&hl=en
- After installing the app on your phone, make a note of the URL presented in app
- On a desktop - visit the goog.gl URL in order to determine the long URL. You'll need the long URL when setting up the resource.
- For each message you wish to send, create a network resource as follows
    - 'https' 'get'
    - host is 'AutoRemotejoaomgcd.appspot.com'
    - port is 443
    - path is '/sendmessage?key=[key-from-url]&message=[message]
    - timeout at least 2000ms (SSL takes a while to become established - can be lower if you change method to 'http' though
    - mode is 'C Escaped'
    - Make sure 'Encode URL' is checked - so that special characters or spaces in your message get encoded
        - Documentation can be found at http://joaoapps.com/AutoRemote/

In this example, I'm going to send the status of a door (from an Elk zone) to a Tasker variable (0=closed, 1=open).

[96] (Universal Devices)

First, create two network resources for AutoRemote. The two messages to send are:

Message 1

```
'AR - Door - Side Door - Closed'

SETVAR ISYFrontDoor=:=0
```

Message 2

```
'AR - Door - Side Door - Opened'

SETVAR ISYFrontDoor=:=1
```

The ISY program to send the message looks like this:

```
If
    Elk Zone 'Front Door' is Violated
Then
    Resource 'AR - Door - Side Door - Opened'
Else
    Resource 'AR - Door - Side Door - Closed'
```

In Tasker, create a new 'Task' called 'AR-SetVar'

```
Step 1: 'Variable Set'
 Name: %%arpar2
 To: %arcomm
```

Now, create a new profile:

Event

Plugin

AutoRemote

Edit the configuration:

Event Behaviour is checked

Message Filter is set to 'SETVAR'

Select 'AR-SetVar' as the 'Entry' task

Exit Tasker to save the profiles.

Done.

A message like 'SETVAR ISYFrontDoor=:=0' will create a variable in Tasker of ISYFrontDoor and assign the value '0' to it. Test the resource (or open and close the door) to call the network resource - and create the variable the first time. Go back into Tasker - and you will see a new variable 'ISYFrontDoor'. Watch the screen as you open and close the door - the value updates within a few moments.

You can then write Tasker events to trigger on variable changes if you want...

Like generic network resources - ISY does not currently support variable substitution - so you cannot, for example, send the dim status of a light. This should be addressed in 5.x.

20 Networking Resources[97]

Network Resources is a powerful feature of the ISY-99, allowing you to interface with a virtually unlimited number of network-enabled devices! Use an ethernet to serial converter to open up an even larger world of RS-232 compatible devices. This page provides information on known compatible hardware and software capable of being controlled by the ISY.

You'll also find export files which you can download and import into your ISY, saving you from doing all the dirty work. To use, simply download the linked .ZIP file and IMPORT into your ISY from the Network Resources tab. Always be sure to have a full backup of your ISY.

[97] (Universal Devices)

20.1 Utilities

20.1.1 Hex to Network Resource Binary

Hex to Binary Converter - http://www.universal-devices.com/networkresources/HexToNRDecimal.zip

This link contains a Java utility that converts Hex text to binary decimal representation that can be pasted into a Network Resource. For instance all Russound commands are in Hex. Using this utility, you can seamlessly convert them to the binary version that Network Resources understands.

20.2 External Interfaces

20.2.1 Elk IP-232

We have tested the Elk IP-232, which provides 1 serial port accessible over your ethernet network.

- By default, the IP-232 uses TCP port 2401

20.2.2 Elk Relay Control

Many commands are possible, such as turning on/off/Toggling outputs, triggering Tasks in Elk, simulating function Key presses on a keypad, arming and disarming, sending test to keypads, speaking words (if you have the M1 Gold). This said, for best bi-directional integration, please consider ELK Module: http://wiki.universal-devices.com/index.php?title=ISY-994i_Series_INSTEON:ELK_Security_Module

20.2.3 Global Cache GC-100

We have tested the Global Cache GC-100-12, which provides 2 serial ports, 3 relays, and 6 IR outputs in a single box connected to an ethernet network. We have tested the serial, relay, and IR outputs successfully.

- The GC-100-12 uses TCP port 4998 for the relay and IR outputs
- The GC-100-12 uses TCP port 4999 for serial port 1, and port 5000 for serial port 2
- Please use "C Escaped" mode when creating Network Resources on the ISY for control of relays and IR, and append all commands with "\r\n"
- Global Cache - http://www.globalcache.com/products/gc-100/

Export Files

http://www.universal-devices.com/networkresources/external_interfaces/gc100_relays.zip

This file contains commands used to turn on/off the three relays on a GC-100-12. Simply change the IP address to match your GC-100.

20.2.4 Global Cache iTach

A user has written a very complete article in our forum on using a WF2IR: The Global Cache WF2IR works.

http://forum.universal-devices.com/topic/4810-the-global-cache-wf2ir-works/?hl=%2Bwf2ir+%2Bworks

20.2.5 Stargate / Commstar

An ISY user has posted about his ability to communicate to and from the Startgate / Commstar by using the ISY's Network Resources and REST interface. Please see this post in our forum: http://forum.universal-devices.com/topic/13156-control-stargate-with-network-resources

20.2.6 Pentair Easy Touch pool control system

How to send commands to the RS485 interface. Pentair Easy Touch - http://forum.universal-devices.com/topic/5970-how-to-pentair-easytouchintellitouch-poolspa-controller

20.2.7 GE Concord 4 Alarm Panel using Autelis I/F

GE Concord 4 Alarm Panel - http://forum.universal-devices.com/topic/11322-now-supporting-ge-concord-advent-security-alarm-panels

20.3 Audio

20.3.1 Denon AVR Series

Communicate with AVR-991 and AVR-4308 (With many thanks to RussD).

S Series RS232/IP Protocol

Denon-S-Series-RS232-Protocol.xlsx - http://www.universal-devices.com/networkresources/audio/Denon-S-Series-RS232-Protocol.xlsx

This spreadsheet contains RS232/IP commands. For integration purposes only: You can NOT import this file into ISY.

Export Files

http://www.universal-devices.com/networkresources/audio/Denon-AVR-991.zip - This file contains commands to communicate with AVR-991.

http://www.universal-devices.com/networkresources/audio/Denon-AVR-4308.zip - This file contains commands to communicate with AVR-4308.

20.3.2 Logitech Squeezebox

An ISY user has posted about successfully controlling his Logitech Squeezebox using Networking Resources. Please see this post in our forum:

http://forum.universal-devices.com/topic/2563-what-are-you-controlling-share-your-experience

http://forum.universal-devices.com/topic/7722-squeezebox-support

20.3.3 Russound CAV6.6

We have tested the Russound CAV6.6, connected to an ethernet network using a Global Cache GC-100-12's serial port as well as with an Elk IP-232. With this combination, you can utilize ISY programs to control your Russound wholehouse audio system using serial commands sent over a TCP connection.

- Russound's protocol documentation specifies hex commands sent over serial
- Hex commands must be converted to binary and sent using the ISY Network Resource's "Binary" mode
- Russound's DocumentCenter contains full protocol information.

Export Files

http://www.universal-devices.com/networkresources/audio/gc100-cav66.zip - This file contains commands used to turn on/off up to 12 zones on a Russound CAV6.6 system (2 controllers, 6 zones per controller) using a Global Cache GC-100-12. Simply change the IP address to match your GC-100.

http://www.universal-devices.com/networkresources/audio/ip232-cav66.zip - This file contains commands used to turn on/off up to 12 zones on a Russound CAV6.6 system (2 controllers, 6 zones per controller) using an Elk IP-232. Simply change the IP address to match your IP-232.

20.3.4 Russound MCA Series

The Russound MCA-C5 controller was tested using the RIO (Russound Input/Output) protocol. The RIO command set is available as ASCII text via IP (using port 9621) and RS-232 interfaces. RIO commands are made up of ASCII characters except for the terminating

characters. All RIO commands must be terminated with a <CR> (0x0D hex). For more information about RIO, download the Third-Party Development Toolkit from Russound's Document Center. It contains all the protocol document and details about how to use RIO to integrate data features with third-party system hardware.

Export Files

http://www.universal-devices.com/networkresources/audio/Russound-MCA-Series-Zones-ON-OFF.zip - This file contains commands used to turn on/off up to 8 zones individually on a Russound MCA-C5 system (6 zones on the MCA-C3) and to turn on/off all zones simultaneously. Simply change the IP address listed to the one your MCA controller is assigned.

http://www.universal-devices.com/networkresources/audio/Russound-MCA-Series-Source-Selection.zip - This file allows you to select any of the MCA-C5 8 sources for any of the 8 zones. On the MCA-C3, the number of zones and sources is limited to 6. Here again, simply change the IP address listed to the one your MCA controller is assigned.

http://www.universal-devices.com/networkresources/audio/Russound-MCA-Series-Common-Functions.zip - This file contains an extended set of commands for each zone and source: mute, pause, play, stop, volume up, volume down.

http://www.universal-devices.com/networkresources/audio/Russound-Volume-Source-Selection.zip - This file contains almost a complete set of commands including source selection and volume

20.3.5 Onkyo / Integra

Network enabled Onkyo and Integra receiver models can be controlled via commands sent over a TCP connection. The Integra Serial Control Protocol over ethernet (eISCP) defines command messages in hex format; however, the ISY Network Resources module requires these messages to be in binary format and sent using the ISY Network Resource's "Binary" mode. A (near) complete list of the binary command strings to use has be prepared: https://wiki.universal-devices.com/index.php?title=File:EiscpMessages_binary.txt so you don't have to convert anything or stitch the message packet together!

Once you create the Network Resource commands, you can use them in programs.

20.3.5.1 Details of the protocol message

(if you want to create the packets yourself)

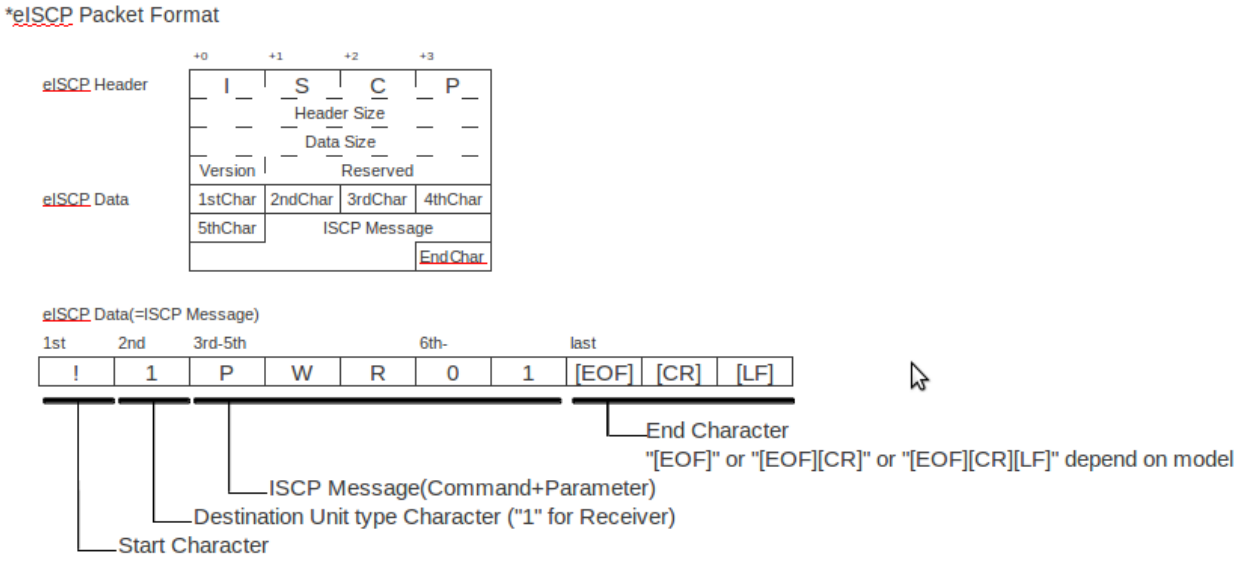


Figure 360: eISCP Packet

- commands are documented in the Onkyo-Integra-Netrules.zip
- Every ISCP command must be preceded with a header. The header is static except for byte 11, which specifies the command length (typically 7)
- Consult an ASCII table to convert hex commands to binary format. For example, the ISCP command "PWR01" (power on) is represented as "80;87;82;48;49" in the Network Resource editor ("P" is ASCII code 80, "W" is ASCII code 87, etc.)
- ISCP commands are always terminated with a carriage return (ASCII 13)

20.3.5.2Sample Binary eISCP Message Strings

- POWER_OFF: 73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;80;87;82;48;48;13
- POWER_ON: 73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;80;87;82;48;49;13
- POWER_QUERY: 73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;80;87;82;81;83;84;78;13
- MUTE: 73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;65;77;84;48;49;13
- UNMUTE: 73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;65;77;84;48;48;13
- MUTE_QUERY: 73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;65;77;84;81;83;84;78;13
- VOLUME_DOWN: 73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;77;86;76;68;79;87;78;13
- VOLUME_DOWN1: 73;83;67;80;0;0;0;16;0;0;0;27;1;0;0;0;33;49;77;86;76;68;79;87;78;49;13
- VOLUME_QUERY: 73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;77;86;76;81;83;84;78;13
- VOLUME_SET: 73;83;67;80;0;0;0;16;0;0;0;22;1;0;0;0;33;49;77;86;76;50;48;13
- VOLUME_UP: 73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;77;86;76;85;80;13
- VOLUME_UP1: 73;83;67;80;0;0;0;16;0;0;0;25;1;0;0;0;33;49;77;86;76;85;80;49;13

- AUDIO_INFO_QUERY:
  73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;73;70;65;81;83;84;78;13
- LISTEN_MODE_ALCHANSTEREO:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;48;67;13
- LISTEN_MODE_AUDYSSEY_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;49;54;13
- LISTEN_MODE_NEO_CINEMA_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;51;13
- LISTEN_MODE_NEO_MUSIC_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;52;13
- LISTEN_MODE_NEURAL_DIGITAL_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;54;13
- LISTEN_MODE_NEURAL_SURROUND_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;53;13
- LISTEN_MODE_PLII_GAME_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;50;13
- LISTEN_MODE_PLII_MOVIE_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;48;13
- LISTEN_MODE_PLII_MUSIC_DSX:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;65;49;13
- LISTEN_MODE_QUERY:
  73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;76;77;68;81;83;84;78;13
- LISTEN_MODE_STEREO:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;48;48;13
- LISTEN_MODE_THEATER_DIMENSIONAL:
  73;83;67;80;0;0;0;16;0;0;0;24;1;0;0;0;33;49;76;77;68;48;68;13
- .... more in the file: https://wiki.universal-devices.com/index.php?title=File:EiscpMessages_binary.txt

These binary strings were created using an open source Java implementation of eISCP protocol https://sites.google.com/a/webarts.ca/toms-blog/Blog/new-blog-items/javaeiscp-integraserialcontrolprotocolpart2 (eiscp.jar) that not only sends commands for you, it prepares the FULL encoded eISCP message and dumps it to the commandline in HEX and binary.

- For Example> java -jar eiscp.jar 10.0.0.203 VOLUME_QUERY
  - will dump out the binary version of the message you can use in the ISY Network Resources.
- > java -jar eiscp.jar
  - will list all the available commands
- The VOLUME_QUERY eISCP message to copy into the ISY Network Resources message box looks like:
  - 73;83;67;80;0;0;0;16;0;0;0;26;1;0;0;0;33;49;77;86;76;81;83;84;78;13
- A text file with a (near) complete list of the binary command strings to use has be prepared:

- File: https://wiki.universal-devices.com/index.php?title=File:EiscpMessages_binary.txt
- just copy the string of binary numbers (for the message to send) into the ISY Network Resources body

- If multiple commands are to be sent by an ISY program, include a one second delay between commands

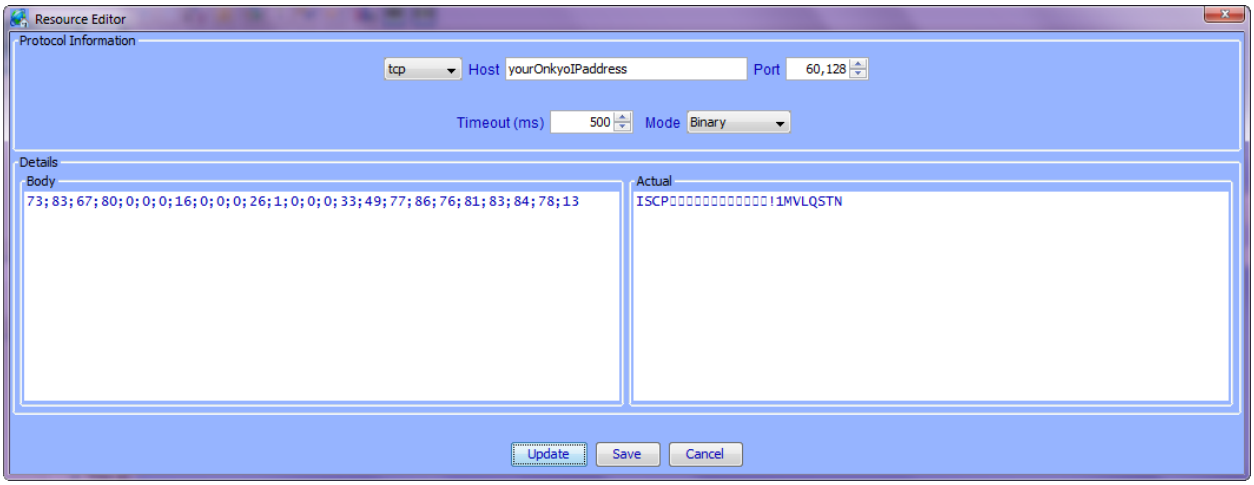


Figure 361: Net Resources EISCP messages

Export Files

https://wiki.universal-devices.com/index.php?title=File:EiscpMessages_binary.txt - A text file with a (near) complete list of the binary message strings to use in the ISY Network Resources body

http://www.universal-devices.com/networkresources/audio/Onkyo-Integra-Netrules.zip - This file contains commands used to control Onkyo/Integra. With many thanks to RatRanch.

http://www.universal-devices.com/networkresources/audio/ISCP_AVR_132.zip - With many thanks to rizast Onkyo Setup through network module: http://forum.universal-devices.com/topic/8941-help-with-audio-onkyo-setup-through-network-module

20.3.6 Pioneer

Pioneer IP/RS232 Commands: http://www.universal-devices.com/networkresources/audio/Pioneer-IP-RS232-Commands.pdf - Although not a resource, this file can be used to create network resources.

20.3.7 Home Theater Direct (HTD)

Thank you pikach for providing these instructions!

- Find out the IP address and port (should be 10006) of your GW1. (you should know that if you set up correctly the HTD app)
- In the ISY go to Configuration, Networking, Network Resources and click Add
- By protocol Information, select TCP, Host is your IP address, port is port, and by mode select Binary
- The converted HEX codes go into Body box, for example all zones on you type 2;0;0;4;85;91 click on save
    - You can find converted Hex Codes for HTD Here and for MC66 Here
    - And Here's the link to the discussion on the forum: http://forum.universal-devices.com/topic/12947-htd-home-theater-direct-integration/

20.3.8 Sonos

Communicate with your Sonos through ISY network resources.

Export Files

http://www.universal-devices.com/networkresources/audio/Sonos.zip - This file contains commands used to control Sonos.

http://forum.universal-devices.com/topic/14127-more-sonos-integration/ - Comprehensive guide for Sonos Integration.

Forum - Discussion forum for Sonos integration: http://forum.universal-devices.com/topic/11716-insteon-and-sonos-with-isy-994i

With many thanks to dstanley.

20.3.9 Sonos by jonathanud

Export Files

http://www.universal-devices.com/networkresources/audio/Sonos-NR.zip - This file contains commands used to control Sonos.

Forum - Discussion forum for Sonos integration: http://forum.universal-devices.com/topic/11716-insteon-and-sonos-with-isy-994i

20.3.10 Grace Audio

Forum - Discussion forum for Grace Audio integration: http://forum.universal-devices.com/topic/13449-non-stop-pandora/?hl=%2Bgrace+%2Baudio

20.3.11 Yamaha Receiver 1030

Forum - Discussion and PDF for Integration with Yamaha Receivers: https://forum.universal-devices.com/topic/22362-yamaha-network-resource-tcp-ip-codes

20.4 Video

20.4.1 DirecTV

Setting Up DirecTV: https://forum.universal-devices.com/topic/23212-setting-up-directtv-control-with-alexa-using-network-resources

20.4.2 TIVO

Interfacing the ISY-99i with a Tivo: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Network_Resources:Tivo

20.4.3 Axix IP Camera

Interfacing the ISY-99i with Axis IP Camera: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Network_Resources:Axis_IP_Camera

Using your ISY to control recording on a Axis IP Camera: http://www.alix.com/ and/or sending motion detection events from a Axis IP Camera to an ISY.

20.4.4 Foscam IP Camera

Integrating Foscam Webcams: http://forum.universal-devices.com/topic/13137-integrating-foscam-webcams-into-isy-and-its-web-server/?hl=%2Bcamera+%2Bnetwork+%2Bresource

20.4.5 Ring Door Bell

Ring Door Bell using ISY Portal/IFTTT: https://wiki.universal-devices.com/index.php?title=ISY_Portal_IFTTT_Integration#ISY_Portal.2FIFTTT.2FRing_Doorbell

20.4.6 Nest Camera

Nest Camera using ISY Portal/IFTTT: https://wiki.universal-devices.com/index.php?title=ISY_Portal_IFTTT_Integration#ISY_Nest_Camera_Integration

20.4.7 Blue Iris v4.x

Many thanks to Mr. Daniel Rich for providing these resources/instructions!

- Download Template Resources for Blue Iris: http://www.universal-devices.com/networkresources/ISY-BlueIris-NetworkResources.zip
- Change the Host and Port to the one configured for your Blue Iris (currently blueiris.example.com port 80 in the resource as a placeholder)
- Add your username and password to each resource
- The two camera triggers are also examples, the "cam1" and "cam2" names in the URLs will need to be changed to the appropriate short name configured for the cameras. This resource can then be copied for additional cameras.

Also, as of version 4.x of BlueIris this will only work if "Secure only" is disabled under "Web Server" -> "Advanced" in the settings. With that enabled the login process requires a multi-step HTTP process with session keys and md5-hashed login credentials.

20.5 Energy

Step by step instructions for charting energy information: http://www.universal-devices.com/networkresources/EnergyChart.pdf

20.6 Lights

20.6.1 Phillips Hue

Control your Phillips Hue from ISY: http://forum.universal-devices.com/topic/19565-isy-and-phillips-hue-integration-step-by-step-for-dummieslike-me/#entry184094

20.6.2 RGB Lighting Strip

Control Of RGB LED Lighting Strips by Ben Forta: http://forum.universal-devices.com/topic/19565-isy-and-phillips-hue-integration-step-by-step-for-dummieslike-me/#entry184094

20.7 Shades

20.7.1 Lutron Shades

Lutron uses telnet. The resource is pretty simple (default username/password is Lutron / integration):

- Protocol: tcp
- Port: 23
- Mode: C-Escaped
- Body/RAISE: <userid>\r\n<password>\r\n#OUTPUT,<zone id>,2\r\n
- Body/LOWER: <userid>\r\n<password>\r\n#OUTPUT,<zone id>,3\r\n
- Example/Raise: hello\r\nworld\r\n#OUTPUT,10,2\r\n

Network Resource Export File: http://www.universal-devices.com/networkresources/Lutron-NR.zip - Import and replace the following: Host (point to your Lutron IP address), <userid>, <password>, <zone-id>

20.7.2 Hunter Douglas Shades

Instructions by huddadudda: http://forum.universal-devices.com/topic/16351-hunter-douglas-motorized-shade-control

http://www.universal-devices.com/networkresources/HD-Shades.zip - This file contains sample network resources for Hunter Douglas Shades

http://www.universal-devices.com/networkresources/HD-Support-files.zip - This file contains sample supporting documentation for Hunger Douglas Shades

20.7.3 Somfy

ITach IP2SL to Somfy Universal RTS Interface by dpfrez: http://forum.universal-devices.com/topic/19136-itach-ip2sl-serial-to-ip-with-somfy-universal-rts-interface-ii

20.8 Fan

20.8.1 Airspace 1.7 WHF

Airspace Gen2 API Whole House Fan Network Resources courtesy of Mr. D. Rich (thank you!).

Instructions

Download the Zip file: http://www.universal-devices.com/networkresources/airscape-networkresource.zip

Since this device doesn't use any authentication, all that needs to be done is to import the resources and change the "whf.example.com" hostname with your fan hostname or IP.

20.9 Miscellaneous

20.9.1 Twitter

ISY can Tweet: https://wiki.universal-devices.com/index.php?title=ISY-994i_Series_INSTEON:Networking:Network_Resources:Twitter

ISY cannot perform the required oAuth - so this couples IFTTT and it's Maker channel to allow ISY to tweet

20.9.2 Nabaztag

Interfacing the ISY-99i with a Nabaztag: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Network_Resources:Nabaztag

Thanks to Jim (RatRanch) for our Wiki article on interfacing with the Nabaztag.

- More information is available on the Nabaztag here: Wikipedia-Nabaztag

20.9.3 Asterisk

Asterisk is software that turns an ordinary computer into a voice communications server. Asterisk is the world's most powerful and popular telephony development tool-kit.: http://www.asterisk.org/

- Forum topic: https://forum.universal-devices.com/topic/3748-networking-module-asterisk/

20.9.4 Push notification to Android and IOS

Mobile Notification: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Mobile_Notification

20.9.5 Tasker on Android

- Tasker Controlling ISY: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Tasker

- Pushing data from ISY to Tasker: https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Mobile_Notification:Tasker

20.9.6 NSLU

- Introductions: http://forum.universal-devices.com/topic/7868-howto-nslu-scrolling-led-sign-sports-scores-news-etc
- Web Server: http://forum.universal-devices.com/topic/7593-howto-nslu-2-adding-a-web-server
- Audio Alerts: http://forum.universal-devices.com/topic/7597-howto-nslu-3-audio-alerts
- 1 Wire Sensors: http://forum.universal-devices.com/topic/7604-howto-nslu-4-1-wire-sensors-temp-humidity-etc
- Weather Update/Audio: http://forum.universal-devices.com/topic/7605-howto-nslu-5-weather-update-audio
- Russound Monitor / Video Switching: http://forum.universal-devices.com/topic/7670-howto-nslu-6-russound-monitor-video-switching

20.9.7 MAC Audio

- ISY Has a Voice! http://forum.universal-devices.com/topic/7717-isy-has-a-voice

20.9.8 Function Exporter

- Function Exporter (not maintained): https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Function_Exporter

21 IP Network

21.1 Telnet to Your ISY[98]

21.1.1 Enable Telnet (Vista and Windows 7)

By default, Vista doesn't include the Telnet client, which is a text-based application for communicating with remote systems. You can install it by following these steps.

- Open the Programs and Features Control Panel applet (Start, Control Panel, Programs and Features).
- Select "Turn Windows Features On or Off."

[98] (Universal Devices)

- Select the "Telnet Client" option and click OK.

A dialog box appears, confirming the installation of new features. After installation is complete, close the main Programs and Features Control Panel applet. The telnet command should now be available.

21.1.2 Telnet To Your ISY (Windows)

If you have your ISY on your network then you can telnet directly into it. ISY uses the following ports for telnet depending on the firmware version:

2.6.3 and below, port 126

2.6.4 and above, default port (you do not need to enter a port#)

- Get your ISY IP address
- Launch a "command prompt" window
- Enter telnet your.isy.ip.address port (if any)
- Enter your user name and password

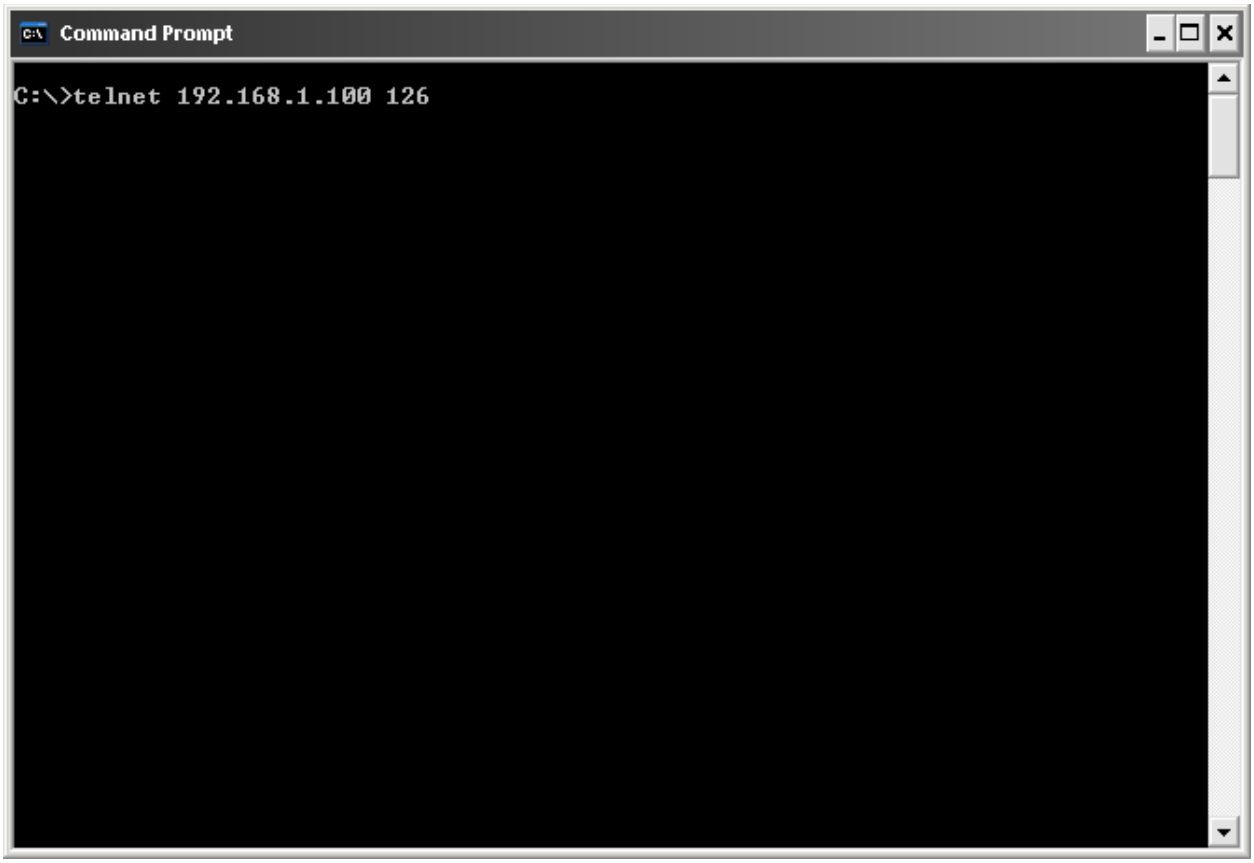


Figure 362: Telnet Command

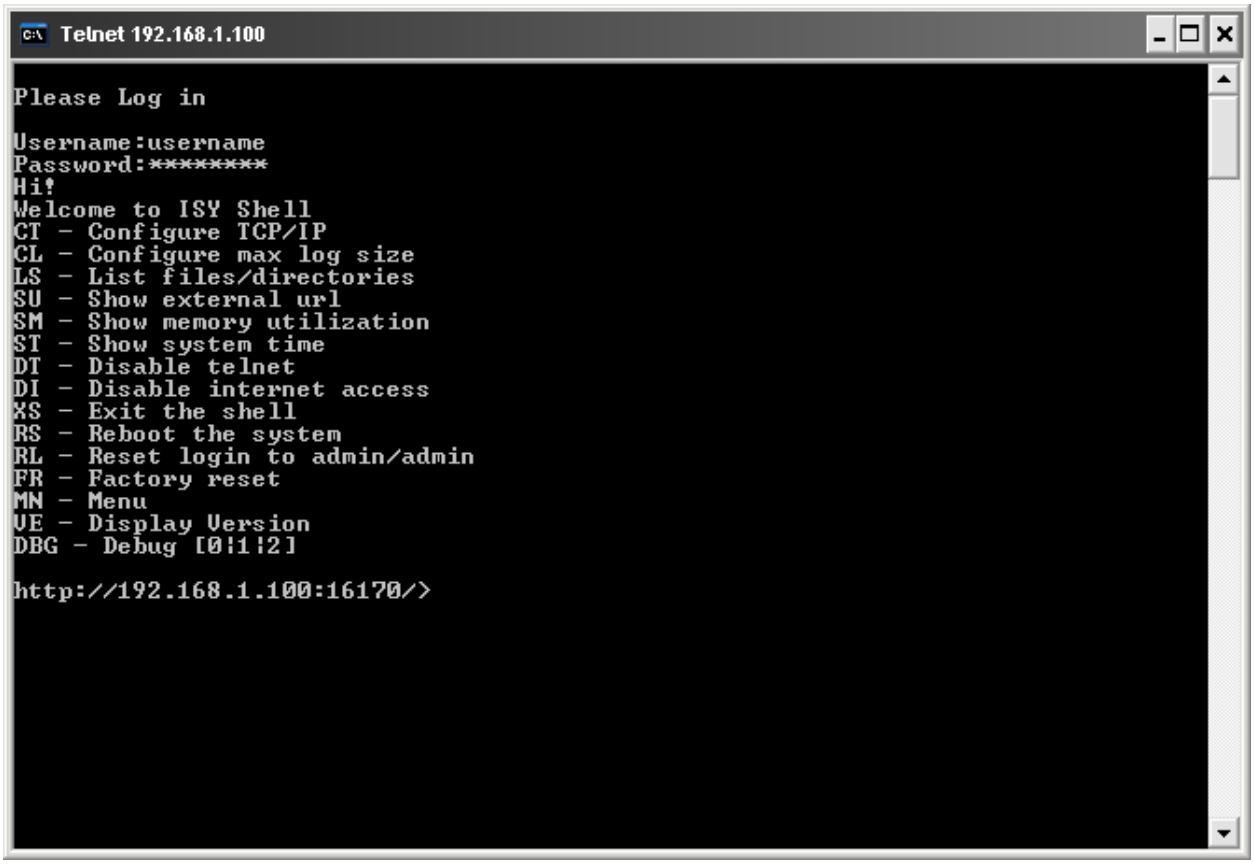


Figure 363: Telnet Login

21.1.3 Telnet To Your ISY (MAC)

- Get your ISY IP address
- Launch a "Terminal" window
- Enter telnet your.isy.ip.address
- Enter your user name and password

Figure 364: Mac Telnet

21.2 Assigning a Static IP Address to the ISY

If you wish to assign a static IP address to your ISY, please open the Configuration tab, then the System sub-tab. Uncheck the "Automatic (DHCP)" box and fill out the fields in the Network Settings section:

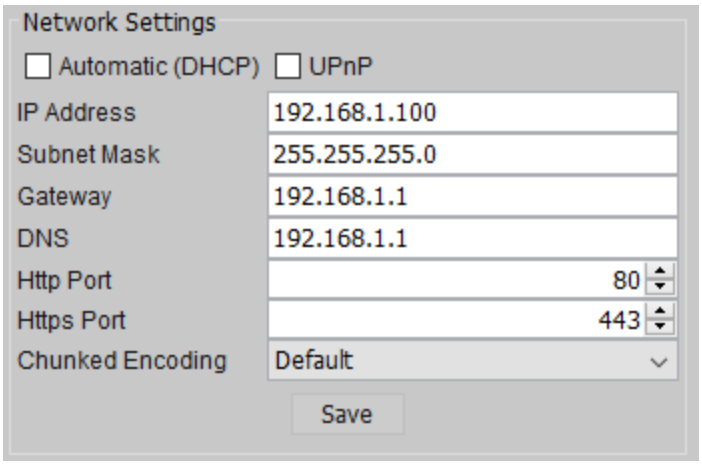


Figure 365: Assigning a Static IP Address

To avoid IP address conflicts, be sure to choose an address outside of the DHCP range set on your router. Also be sure to type the correct Gateway and DNS addresses (typically your router IP address), otherwise the ISY will not have access to the internet.

You can also configure custom HTTP and HTTPS ports on this screen.

If you check the **Automatic (DHCP)** option, the ISY will not use a static IP address but instead get an IP address automatically from a DHCP server on your network.

21.3 Remotely Connect to Your ISY[99]

21.3.1 Configuring ISY Remote Access

In order to access and control your ISY unit from the Internet (away from home) you will need to enable Internet access on your ISY and make sure your router configured to forward the ISY port. This process allows the ISY to get a real IP address from your Cable/DLS modem which is seen across the Internet. Many routers can auto-configure directly with the UPnP protocol and others will need to have it done manually. If you need to configure your router manually.

Please Note: If you're using a Portal enabled service to connect to your ISY remotely, in most cases you do not need to port-forward your ISY. Some products that have NOT been setup with the Portal service still however do need port forwarded and in that case please follow the steps below. Also note the Portal is a safe automatic connection that bypasses your router's standard NAT firewall.

[99] (Universal Devices)

21.3.1.1Configuring a UPnP Router

- Check the auto-configure Supported Remote Access Routers list, if not see On a Non-UPnP Router below
- Make sure you have enabled UPnP within your router so the ISY can auto-configure your router
- In your ISY click on File --> Enable Internet Access to enable the ISY internet access. This will negotiate the port through the router and out to the Internet
- Verify your ISY IP address in the popup window, it should NOT be from your local network (a local IP would look like: 192.168.1.101)
    - https://your.isp.add.ress - an example might be https://10.88.24.15
- Using the address assigned by your ISP or a domain name from a dynamic DNS service you are now ready to access your ISY software from the Internet!

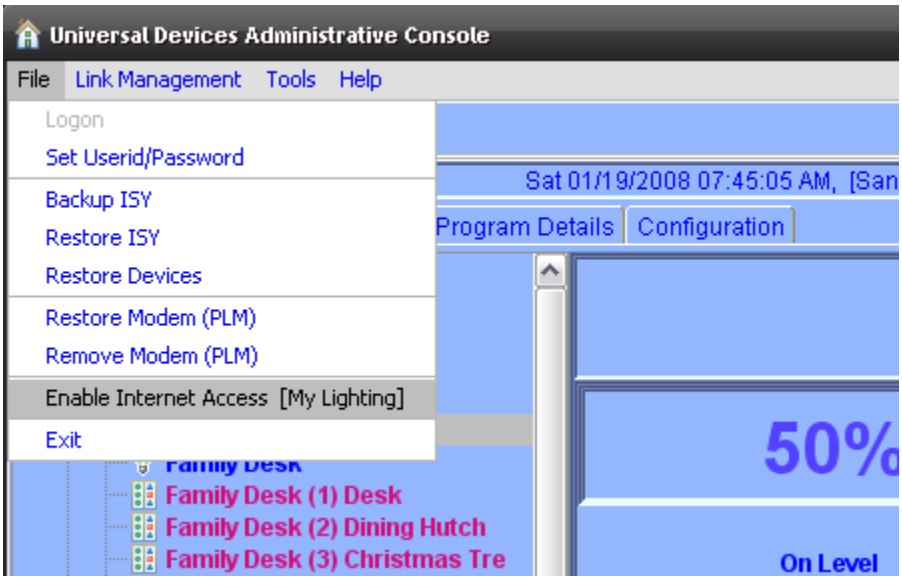


Figure 366: Enabling Internet Access

Figure 367: Enabled Access Message

21.3.1.2Configuring a Non-UPnP Router

Instructional Video for Port Forwarding:
https://www.youtube.com/watch?v=VV7u771uX7E

If you do not have a UPnP router, or if File->Enable Internet Access returns null or fails, then:

- Make sure you do NOT use File | Enable Internet Access. It's an either/or scenario
- Get your ISY IP address, and write it down. Here is an example of what you might have:
    - My URL: http://192.168.1.105
- If your ISY is on a DHCP (default behavior for most routers) then ISY's IP address may change. As such, if you plan to use remote access:
    - See **21.2 Assigning a Static IP Address to the ISY**
- Follow the information on Portforward.com to configure your specific router for port forwarding.
    - Find and select your router on the initial page
    - On the advertisement page locate the "Click here to skip this advertisement..." link and click it to continue.
    - Select the program HTTPS on the following page for instructions specific to your router
- Using the address assigned by your ISP or a domain name from a dynamic DNS service you are now ready to access your ISY software from the Internet!
    - If you are using port 443 (the default) you can access your ISY using HTTPS which will automatically forward port 443 to the ISY.
    - An example might be https://10.88.24.15
- Once port forwarding is configured in the router you DO NOT need to use the ISY Enable Internet Access option

21.3.1.3Verifying your IP Address

- Your ISP address can be found:
- by opening a browser page to Portforward.com, or
- by opening a browser page to WhatIsMyIPaddress.com, or
- by logging into your router and viewing the Status page
    - Menu item Help | About will display the external IP address
    - Note the address is preceded with HTTPS as you will be using a secure port.

Figure 368: External IP Address

21.3.2 Setup Dynamic DNS services

Most Internet Service Providers (ISP) use dynamic ISP addresses, this means that your ISP address can change at any time. It is suggested you use a dynamic DNS service that will give you a static web address to reach your ISY at all times. In order to keep the address static these services either use your router to auto update or have a small program that runs on your local computer which will update the DNS servers that your IP has changed. It's a good solution when you don't want to obtain a costly static address from your internet provider. There is many providers out there but here is a couple recommendations: DynDNS or tzoDNS.

21.3.3 Creating an ISY Self Signed Certificate

To eliminate the problem of being warned all the time about the default certificate the first thing that is suggested is to creating a Self-Signed Certificate. Other details can be found in the section **21.6.1.8Certificate Management**

- You must be on the same local network as the ISY.
- See **21.7 Internet Explorer SSL Certificate Install** for more details about accepting it when using we browsers.

21.3.4 Changing HTTPS Port Number

If your router is complaining about port 443 already being used, it means that you already have another network device (in your LAN) which uses 443 and thus the router will only forward the requests to that device. For reference here is a List of TCP and UDP port numbers http://en.wikipedia.org/wiki/List_of_TCP_and_UDP_port_numbers from the Wikipedia.

21.3.4.1Change Port via ISY Admin

ISY firmware v2.7.9+

Log into your ISY.

- Click on the Configuration tab, then System tab
- Under the Network Settings area change the HTTPS port, example 1443
- After selecting a new port click the Save button to save the changes, then your ISY will reboot
- Optional reboot your router (Some routers may need reconfiguring if they don't pick up the new IP address)
    - Your remote access URL will be https://your.ext.ip.add:new_port

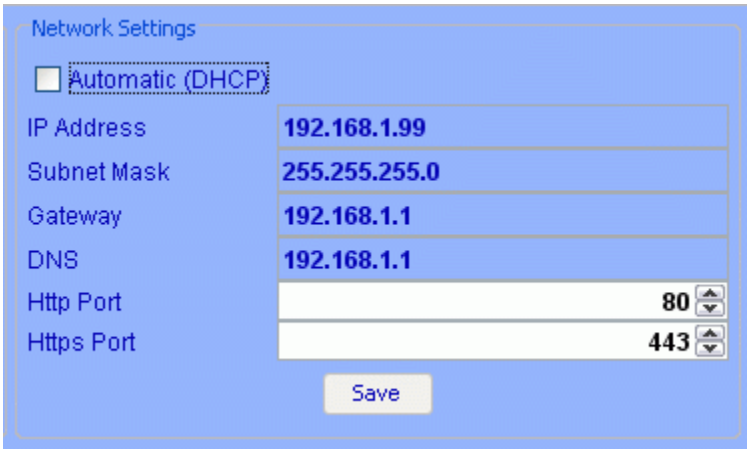


Figure 369: Configure the Network Settings

21.3.4.2Change Port via Telnet Interface

- Telnet To Your ISY
- Issue the CWP command: CWP - Configure Webserver Ports, see **23.5.7 CWP - Configure Webserver Ports**
- Change the HTTPS port to some other number, example 1443. This will reboot the ISY
- Optional reboot your router (Some routers may need reconfiguring if they don't pick up the new IP address)
    - Your remote access URL will be https://your.ext.ip.add:new_port

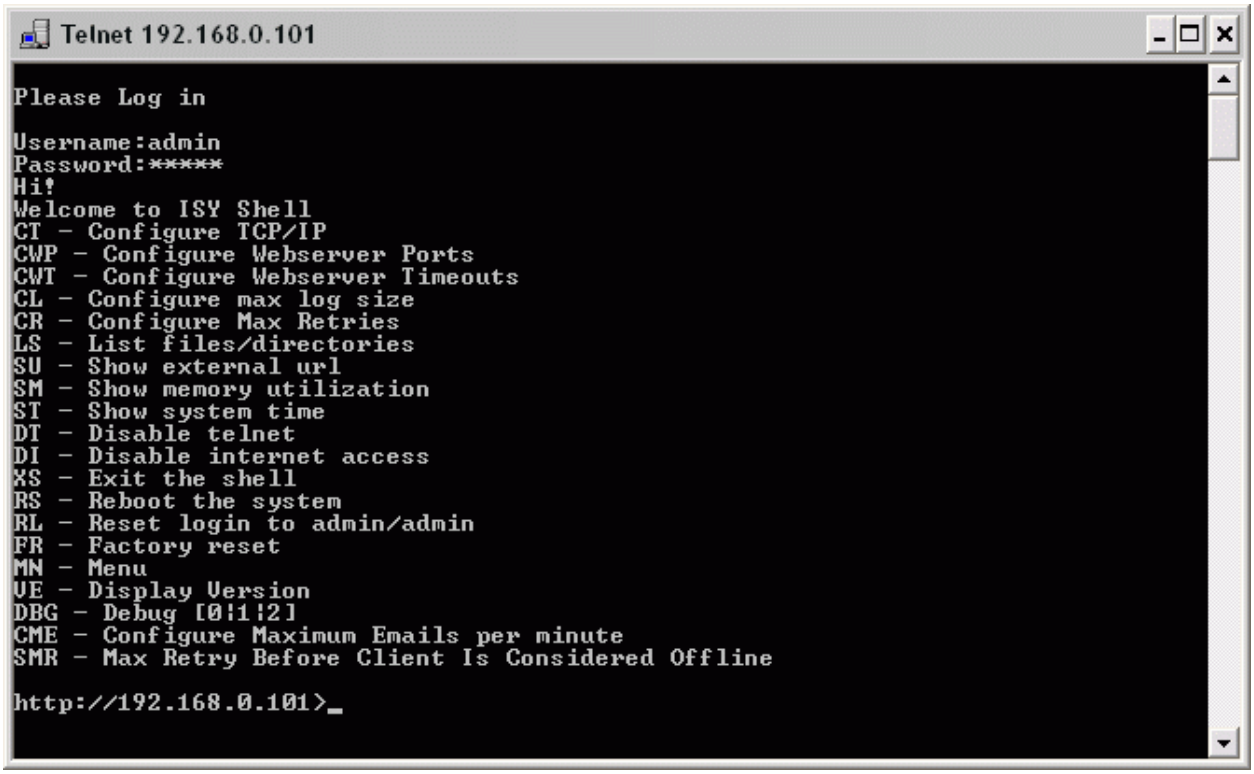


Figure 370: Telnet ISY Interface

21.3.4.3Verify the new HTTPS Port Number

- Login to the ISY Admin Console
- Verify the external IP address, menu item Help | About
    - Note the address is preceded with HTTPS as you will be using a secure port. In the image the Port has been changed to 1443.

Figure 371: Port = 1443

21.4 Home Automation Dashboard (HAD)[100]

21.4.1 What is HAD?

HAD is a replacement to the default UDAjax web interface. It features an enhanced user interface, easy to use and fully customizable web interface for your home automation.

This current release features;

- Devices and Scenes, including several Z-Wave devices like door locks and Thermostats.
- Programs.
- Variables.
- Weather.
- Camera support.
- Theming capabilities.
- Customizations capabilities.

HAD is still under development. The current version lacks some of the functions that UDAjax provides.

21.4.2 How can I try HAD?

HAD is built-in the firmware as of 4.2.0. You can try it easily by going to the settings page and change the default UI to "Home automation dashboard"

[100] (Universal Devices)

Figure 1

In order to switch back from HAD to UDAjax, go to the admin tab, and click "Default UI UDAjax".

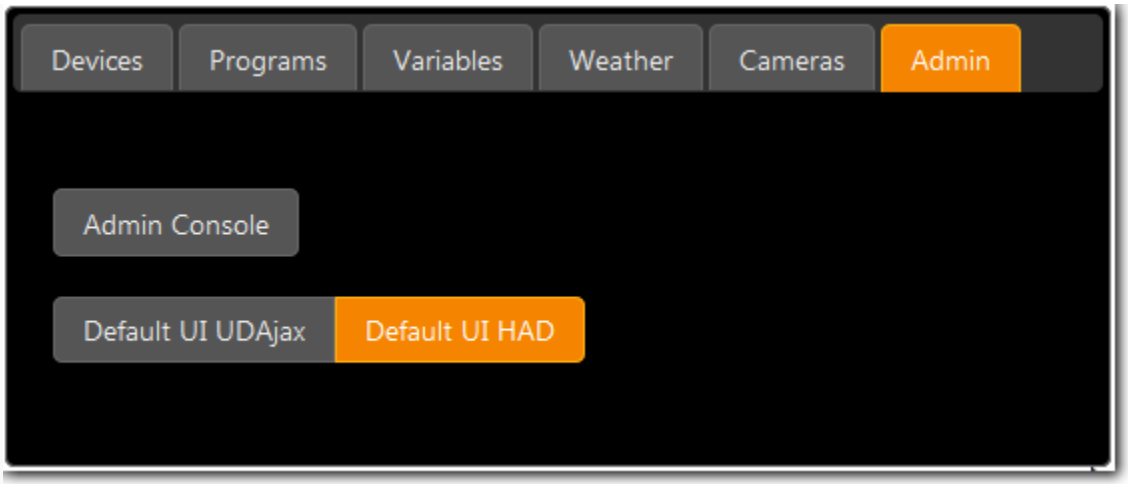


Figure 2

21.4.3 HAD installation and customization

In order to customize HAD, you need to download and install it.

The latest HAD release can be downloaded here: Link to be supplied soon.

You will also need a web page editor, and some basic web development skills.

You have the choice of installing your customized HAD on your own web server, or on ISY, provided that you own the ISY networking module. The easiest option for a first try is to install it on your ISY. However, it is difficult to constantly make changes to your web page and send it to ISY each time. For development purposes, having your own web server makes the process much easier. However, you will need to setup what is called a transparent proxy. The basic principle is that http calls to /rest/* needs to be redirected to http://your_isy/rest

Using a proxy also has the added benefit that you can skip the ISY authentication by providing the user and password to ISY automatically.

You can use the following Transparent ISY proxy from nstein: http://sites.google.com/site/isyajax/other-tools-php-code

Here's more information on HAD Customization;

21.4.3.1 HAD Customization: Theming[101]

21.4.3.1.1 Build a new theme

HAD is based on jQuery and jQueryUI. This allows you to build and replace the default theme that HAD uses. You can build a custom theme using the jQueryUI themeroller: http://jqueryui.com/themeroller/

In order to build your custom theme, you can start from scratch, or start from an existing theme. To start from an existing theme, choose "Gallery", choose one of the predefined themes, and use "Edit". Then, you can tweak your theme, below "Roll your own".

When it is to your taste, click "Download theme".

You have to choose a few options:

- Take the latest release (1.10.4) at the time of writing
- Then you can leave everything checked, or check only what is required;
    - Core
    - Widget
    - Mouse
    - Accordion
    - Button
    - Slider
    - Spinner
    - Tabs

Leave the rest as is and proceed with the Download.

[101] (Universal Devices)

Tip: If you want later on to modify your theme, just make a copy of the URL before proceeding with the download. That will allow you to continue your modifications.

21.4.3.1.2Install a new theme

Extract the zip file, and copy the following files over to replace the existing HAD files:

- Copy js\jquery-ui-9.9.9.custom.min.js over jqueryui.js
- Copy js\jquery-9.9.9.js over jquery.js (Optionnal: That will upgrade your jQuery version)
- Copy css\custom-theme\jquery-ui-9.9.9.custom.min.css over jqueryui.css

21.4.3.1.3Note about the jQueryUI images

The image file names are long names and are therefore not supported on ISY. ISY file names are limited to 8 characters, with an extension of 3 characters. However, you could use jQueryUI images if you host your web application on another web server. By default, had.css overrides jQueryUI classes so that the jQueryUI images are not loaded.

If you want to use jQueryUI images, you need to:

- Copy the files over from css\custom-theme\images* to images*
- Modify had.css to allow jQueryui to access the images. The override is located at the end of the file.

21.4.3.2HAD Customization: Custom device table[102]

21.4.3.2.1What is a custom device table?

One of the powerful customization option is to use a custom device table. In its simplest form, it is simply a way to group together the devices that you want together. As an example, you could group some devices based on their location. But it can do a lot more than that.

Common uses are:

- Show a device, but control it using a scene
- Control a program
- Control a variable using a "slider*
- Show a variable, controlled by a program

The power comes from grouping them as makes sense for you. An example would be to have a section for your living room which would include lights control along with program

[102] (Universal Devices)

to start music in that room. Another example could be sprinkler controls, where one option is to run your sprinkler cycle (a program), and below offer individual sprinkler controls.

21.4.3.2.2How to use a custom device table?

You need to do the following:

- Create a device list definition containing the data that specifies what to include in the custom device table (in index.htm)
- Create a placeholder to display the device table
- Adjust UDFdevLoaded to process and display the template when /rest/node is loaded (in custom.js).
- Optional: Adjust UDFvarsLoaded if your device table refers to variables by name (in custom.js).
- Optional: Adjust UDFpgmLoaded if your device table refers to programs by name (in custom.js).

21.4.3.2.3Create device list definitions

This determines what will be displayed, and what are the controls. A simple example of 5 devices in 2 sections would look like this. HAD knows what time of device it is and will react accordingly.

```
var deviceList =

[

 { location: "A section with two device2",

  list : [

    { name : "Device1" }

    { name : "Device2" }

    ]},

 { location: "A section with three devices",

  list : [

    { name : "Device1" }

    { name : "Device2" }

    { name : "Device3" }
```

```
    ]}

];
```

In this example, all devices whose name is "name" will be displayed, and controls show will be based on the device type. A dimmer will be show with a slider. A thermostat will be shown with thermostat controls.

For more information, see **21.4.3.3HAD Customization: Advanced customization table**

21.4.3.2.4Create a placeholder to display the device table

You need a div like this somewhere in your html. When the template is processed, the content will be pushed inside this div.

```
<div id="deviceListPlaceholder"></div>
```

21.4.3.2.5Adjust UDFdevLoaded to process and display the template

You need to adjust UDFdevLoaded and use tableInitCustomTable to initialize your custom table with the data coming from /rest/nodes. That's the purpose of tableInitCustomTable.

Then, use processTemplate to display your deviceList table, at the placeholder deviceListPlaceholder, using the template deviceListTemplate.

```
function UDFdevLoaded(devdata)

{

  ...

  tableInitCustomTable(devdata, deviceList)

  ...

  processTemplate("#deviceListPlaceholder", deviceList,
"deviceListTemplate");

}
```

21.4.3.2.6Optional: Adjust UDFvarsLoaded

If your device table refers to variables by name, you need this additional step.

First, make sure that you have loadVar1Defs, loadVar2Defs or both set to 1 (in custom.js).

```
var loadVar1Defs = 1; // Set to 1 if some integer variable names are used in a custom table, or if using generic var table. Set to 0 for better performance.

var loadVar2Defs = 1; // Set to 1 if some state variable names are used in a custom table, or if using generic var table. Set to 0 for better performance.
```

Then, you have to use processVarButtons in UDFvarsDefLoaded in order to create buttons to control the variable.

```
function UDFvarsDefLoaded(vars1def, vars2def, devdata)

{

    ...

    // For each typeControl=Var: when a variable name was specified instead of type+id, updates the buttons with appropriate names to id's

    processVarButtons(vars1def, vars2def);

    ...

}
```

21.4.3.2.7Optional: Adjust UDFpgmLoaded

If your device table refers to programs by name, you need this additional step.

First, make sure that you have loadPgms set to 1 (in custom.js).

```
var loadPgms = 1; // Set to 1 if some program names are used in a custom table, or if using generic pgm table. Set to 0 for better performance. (Will not run UDFpgmLoaded)
```

Then, you have to use processPgmButtons in UDFpgmLoaded in order to create buttons to control the variable.

```
function UDFpgmLoaded(pgmdata, vars1def, vars2def, devdata)

{

    ...

    // For each typeControl=Program: Updates the buttons when needed

    processPgmButtons(pgmdata, vars1def, vars2def);

    ...

}
```

The logic behind this is that it takes too long to wait for all rest calls to complete. So the page gets rendered as soon as /rest/nodes is finished with dummy buttons (in UDFdevLoaded). Then, when programs and vars definitions are loaded, the buttons are created in the background with the appropriate onclick.

21.4.3.3HAD Customization: Advanced customization table[103]

21.4.3.3.1Custom device table options

- location: Name for a group of devices. (It does not have any relationship with ISY folders)
- List:
    - name: Name of the device. Has to match an ISY device name. (Required, unless refreshOpt=="Pgm" or "Var")
    - displayname: Use to override the device name displayed. (Default: name)
    - control: Use to override the device to control. Can be a scene or another device. (Default: name).
    - refreshOpt: Use to control the refresh after a change.
        - "Yes": Update only current item. (Default for devices)
        - "All": Refresh all devices. (Default for scenes)
        - "Pgm": If typeControl=="Pgm", you can use refreshOpt to display the Status of the pgm instead of a device. (Default for programs)
        - "Var": If typeControl=="Pgm", you can have a variable be displayed instead
        - "No": Do not refresh.
    - typeControl: Can be "Dev", "Pgm" or "Var".
    - if typeControl=="Dev", this means this is a device or Scene.

[103] (Universal Devices)

- if typeControl=="Pgm"
  - program: program name
  - OR programId: ID of the program (If ID is specified, page can load faster)
  - NOTE: The On button will trigger "Then", Off will trigger "Else".
- if typeControl=="Pgm" and refreshOpt=="Var"
  - variable: Name of variable to display
  - OR
  - varType: 1 for integer, 2 for state
  - varId: Id of the variable (If Type and ID are specified, page can load faster)
- if typeControl=="Var"
  - variable: Name of variable to control (and display if refreshOpt does not specify otherwise)
  - OR
  - varType: 1 for integer, 2 for state
  - varId: Id of the variable (If Type and ID are specified, page can load faster)
  - varMax: Maximum value allowed for the variable. Default=100
  - varInc: Increment used for the buttons. Default=1
  - varControl: Variable additional control. 0=Disable, 1=Slider, 2=Edit (Future)
  - varSliderSnap: Value set for slider will be a multiple of varSliderSnap, Default=1.
- hideControls: "Yes", Useful if you want to hide buttons and dimmers.
- labelOn: Use to override the "On" label with something else
- labelOff: Use to override the "Off" label with something else

21.4.3.3.2Custom device table examples

```
var deviceList =

[

 {  location: "Standard devices & scenes",

    list : [

     { name : "Device1" },

     { name : "Device2" },

     { name : "Device3" },

     { name : "Thermostat1" },

     { name : "Thermostat2" },

     { name : "Scene1" },

     { name : "Scene2" }

    ]},

 {  location: "Devices & scenes examples",

    list : [

     { name : "DeviceControlledByScene1", control:"Scene1" }, // Controls via scene, display a specific device (All the table will be refreshed)

     { name : "DeviceControlledByScene2", control:"Scene1", refreshOpt:"Yes" }, // Same, but just this device will be refreshed

     { name : "Device", displayname:"DeviceRenamed" }, // Standard device control and display, but change the displayed name

     { name : "DeviceStatusOnly", hideControls:"Yes" } // Displays the device status only, but hide buttons and sliders

    ]},

 {  location: "Programs and Vars examples",
```

```
        list : [

        { name : "Pgm with status", typeControl:"Pgm", program:"testPgm",
    refreshOpt:"Pgm" }, // Controls "program". Status is the program's status

        { name : "Pgm custom labels", labelOn:"-1", labelOff:"+1", typeControl:"Pgm",
    program:"testPgm"  }, // Same, but button labels are changed

        { name : "Pgm Controls Var", typeControl:"Pgm", program:"testVarPgm",
    refreshOpt:"Var", variable:"testVar"  }, // Controls "program", but testVar will be
    displayed

                // Direct variable control example, with slider

        { name : "DirectVar", labelOn:"-10", labelOff:"+10", typeControl:"Var",
    refreshOpt:"Var", varType:"1", varId:"2", varInc:"10", varMax:"500",
    varSliderSnap:"10" }

        ]}

    ];
```

21.4.3.4HAD Customization: Guidelines[104]

Customizations should be as much as possible be done in index.htm or custom.js.

21.4.3.4.1index.htm

This is HAD's home page.

This is where your custom device table should be located. You can create as many tables as you like. Feel free to customize everything. In normal circumstances, you can easily upgrade HAD as it should not touch much index.htm.

21.4.3.4.2custom.js

This is where you should put your custom JavaScript options.

There are several options at the top that you can set to your taste.

[104] (Universal Devices)

If possible, disable as many of the following options as possible. This will help reduce the time required to load a page.

```
var loadVar1Defs = 1; // Set to 1 if some integer variable names are used in a custom table, or if using generic var table. Set to 0 for better performance.

var loadVar2Defs = 1; // Set to 1 if some state variable names are used in a custom table, or if using generic var table. Set to 0 for better performance.

var loadVar1Data = 1; // Set to 1 to load integer variable data and run UDFvarDataLoaded.

var loadVar2Data = 1; // Set to 1 to load state variable data and run UDFvarDataLoaded.

var loadPgms = 1; // Set to 1 if some program names are used in a custom table, or if using generic pgm table. Set to 0 for better performance. (Will not run UDFpgmLoaded)
```

21.4.3.4.3Note on HAD edition

Please note that HAD has 2 editions. The first one is called the firmware edition, and as it's name suggests, it is the one supplied in the ISY firmware. It comes with UDAjax and a redirector which allows the user to switch between these 2 UI's. In that version, index.htm is actually a redirector that points to had.htm, or udajax.htm, based on a cookie. The developer edition, which is available for download, does not come with UDAjax and the home page is index.htm.

21.5 Configure the Firewall for the ISY[105]

21.5.1 Description

ISY framework is based on publish/subscribe and, therefore, for the Admin Console subscribes to ISY's events and ISY publishes events, in real-time, to the Admin Console. This process requires the computer on which the Admin Console is running to allow traffic from known ISYs. Some firewall software might consider this a threat and thus stop ISY from publishing events to the Admin Console. In such cases:

- Admin Console might consider ISY offline and thus prompt for credentials in perpetuity
- Status updates are not published to the Admin Console in real-time

[105] (Universal Devices, John Miller)

21.5.2 Using HTTPS

Most firewall software are more lenient with HTTPS/secure traffic. Before configuring any firewall settings, you might want to try connecting to ISY using HTTPS:

- Bring up the ISY Finder by using the ISY994 icon on your desktop (installed by this link http://isy.universal-devices.com/994i/admin.jnlp)
- Login to your ISY
- Bring ISY Finder to the foreground (it's behind the Admin Console)
- Click on the add button
- Enter the IP address:Port of your ISY but, instead, prefix with https. For instance, if your ISY's IP address is 192.168.0.26 and HTTPS Port for your ISY is 8226 (Admin Console | Configuration | Network), then enter https://192.168.0.26:8226
- Close the Admin Console
- Restart the Admin Console using the icon on your desktop, in ISY Finder, double click the https address

21.5.3 Configuring Firewalls

In most cases, if you add ISY to the Trusted Zone or Exclusion List, all should be fine. Alas, there are certain firewall software which may require a little more configuration:

21.5.4 AVAST

- Open Avast and select -- Settings
- Select -- Active Protection
- Select -- Web Shield "cog wheel"
- Under enable Web Scanning select the check box -- "Scan traffic from well-known browser processes only"

(Thanks to Mr. John Miller)

21.5.5 Kaspersky

To add a website to the Trusted URLs list:

- Open Kaspersky.
- Click on 'Settings'.
- Click on 'Protection' on the left.
- Click on 'Web Ant-Virus' on the right.
- Click on 'Advanced Settings'.
- Click on 'Configure trusted web pages'.
- Click on the 'Add' button.
- Enter the web address in the same format as shown: http://*.example.com/*

- Select 'Active'.
- Click on the 'Add' button.
- If needed, repeat the process for additional sites.
- Close the 'Trusted web pages' window.
- Click the Back arrow in the upper left three times to return to the main window.
- Retry the web site. If it does not work, close all open web browsers and reopen the site.

21.5.6 Zone Alarm

It is suggested that you set the IP address that you used above as a static IP address on your DHCP server for your "My Lighting". Otherwise, you may find yourself chasing after an allusive IP address.

- Disable Zone Alarm
- Get your ISY IP address
    - If you opened your ISY for this step close it when your done
- Add the ISY to your Zone Alarm Trusted Zone
    - Open the Zone Alarm Security Suite Control Center
    - Select "Firewall" from the left-hand column, open the "Zones" tab
    - Select "Add >>" to add a new device (My Lighting) to your Trusted Zone
    - Type in the name of the device, "My Lighting" and it's IP address
        - An example such as 192.168.0.102 which is the address of my "My Lighting" on my network
- Re-enable Zone Alarm

21.5.7 Other Firewalls

See the forum topic Router, Firewall and Anti-virus Issues: http://forum.universal-devices.com/viewforum.php?f=3

21.6 Network Security[106]

21.6.1 Network Security Configuration Guide

**** Requires firmware version 4.5.4+*

**** requires Java 1.8+*

[106] (Universal Devices)

21.6.1.1Introduction

Universal Devices, Inc. takes ISY security extremely seriously. As such, all ISY994 Series are equipped with network security features.

	ISY994 PRO Series
TLS/SSL Level	*User selectable:* TLS 1.0 TLS 1.1 TLS 1.2 (default)
Cipher Suites	*User selectable*: Ciphers are offered in the order listed below. **Low Strength:** TLS_RSA_WITH_AES_128_SHA, **Medium Strength:** TLS_RSA_WITH_AES_128_SHA, TLS_RSA_WITH_AES_256_SHA, **High Strength:** TLS_RSA_WITH_AES_128_SHA2 TLS_RSA_WITH_AES_256_SHA2 TLS_RSA_WITH_AES_GCM_128_SHA2 **All (default):** TLS_RSA_WITH_AES_GCM_128_SHA2 TLS_RSA_WITH_AES_256_SHA2 TLS_RSA_WITH_AES_256_SHA TLS_RSA_WITH_AES_128_SHA2 TLS_RSA_WITH_AES_128_SHA
Server Certificates	✓ Self Signed ✓ Signed by a CA ✓ PKCS12 (.pfx) Import (can be used for wildcard certificates)
Client Certificates	✓ Self Signed ✓ Signed by a CA ✓ PKCS12 (.pfx) Import (can be used for wildcard certificates)
Client Authentication	Yes: *User selectable*
Server Authentication	Yes: *User selectable*
Import CA Certs for Authentication	Yes

Table 1. Features

21.6.1.2Logging into ISY dashboard

- If you do not have Java installed, please install the latest for your platform. You may find the latest Java downloads at http://www.java.com/getjava. Please choose the latest JRE for your platform.
    - Note: you need Java 1.8 and above
- If you have ISY994i Series, go to http://isy.universal-devices.com/994i/dashboard.jnlp
- If your model number does not have i after 994, please go to http://isy.universal-devices.com/994/dashboard.jnlp

21.6.1.3Configure Network Security

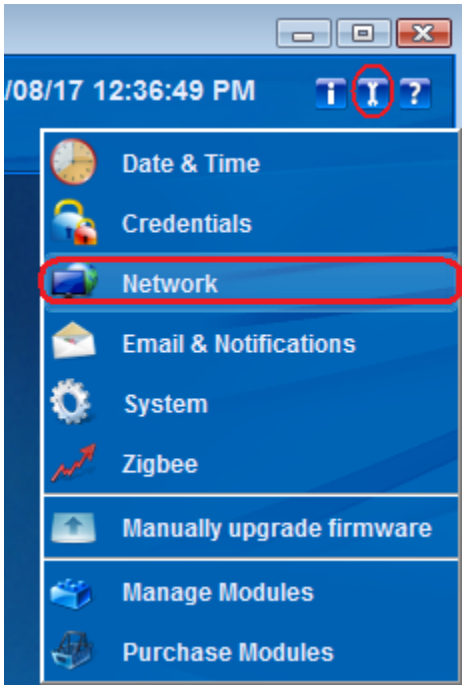


Figure 372: ISY Dashboard - Network

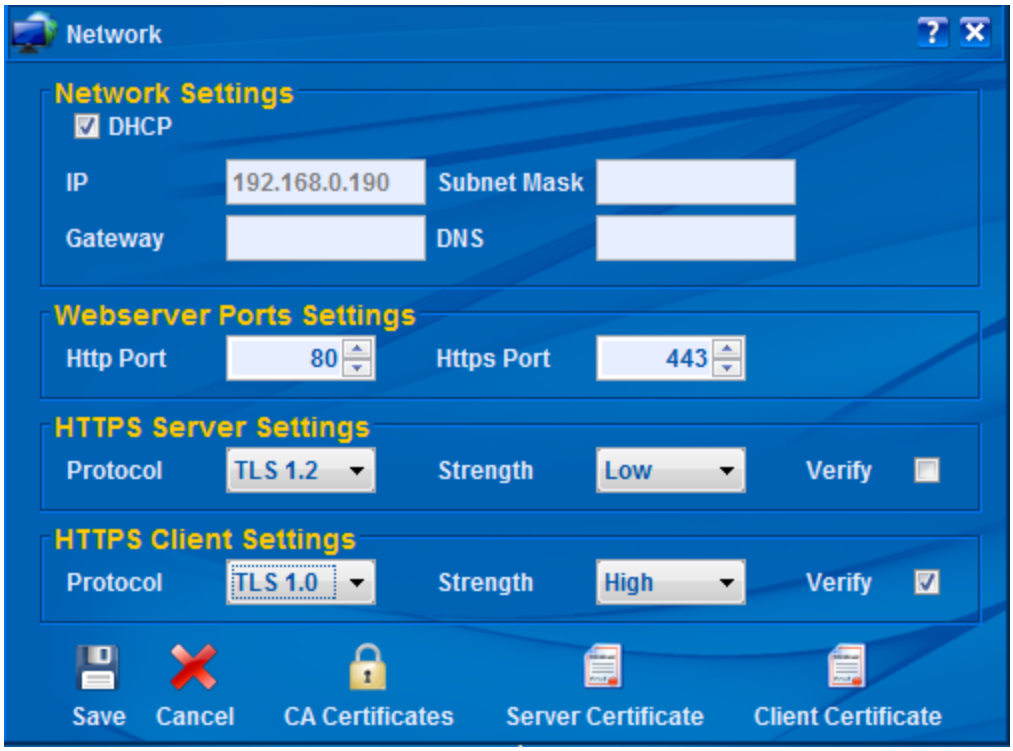


Figure 373: ISY Dashboard – Network settings

21.6.1.4Protocol

A maximum protocol level supported by client or server. Please note that if you use TLS 1.2 and if the peer is requesting TLS 1.0, then ISY will downgrade to TLS 1.0.

21.6.1.5Strength

The symmetric key strengths. Each cipher suites strength has an ordered/priority list of cipher suites that ISY will use to determine its operations. The priority is from high to low (top to bottom):

- High:
  - TLS_RSA_WITH_AES_128_SHA2
  - TLS_RSA_WITH_AES_256_SHA2
  - TLS_RSA_WITH_AES_GCM_128_SHA2
- Medium:
  - TLS_RSA_WITH_AES_128_SHA,
  - TLS_RSA_WITH_AES_256_SHA,
- Low:
  - TLS_RSA_WITH_AES_128_SHA,
- All:
  - TLS_RSA_WITH_AES_GCM_128_SHA2,
  - TLS_RSA_WITH_AES_256_SHA2,

- TLS_RSA_WITH_AES_256_SHA,
- TLS_RSA_WITH_AES_128_SHA2,
- TLS_RSA_WITH_AES_128_SHA,

21.6.1.6Verify

Whether or not client/server authentication should be performed on the peer:

- The certificate must be valid
- The certificate must be signed by a CA (see #d. CA Certificates), through a certificate path, which is known to ISY

Care should be taken when Verify is checked for Server Settings. In this case, all clients (including browsers and mobile devices) must provide ISY with a valid certificate. This might not be optimal in normal operations since most browsers/mobile devices do not offer any certificates and thus ISY may not be reachable over HTTPS.

Care should also be taken when Verify is checked for Client Settings. In this case all communications initiated from ISY to external HTTPS resources shall be validated. This might cause problems with Portals (such as MobiLinc) and Network resources which communicate with devices that do not have valid certificates. This may also interfere with SMTP operations that require TLS.

In short – and unless you have explicit requirements, such as OpenADR – then it's best to keep Verify unchecked.

21.6.1.7CA Certificates

In order for Verify (Client/Server Authentication) to work, you will need to import Certificate Authority signing certificates into ISY.

Please note that if you would like to support a certificate that goes through a chain to reach the root signing certificate, then you must import all the certificates in the chain and all the way up to the root.

To import CA Certificates, click on the CA Certificates button and then click on Import to import CA certificates (see below).

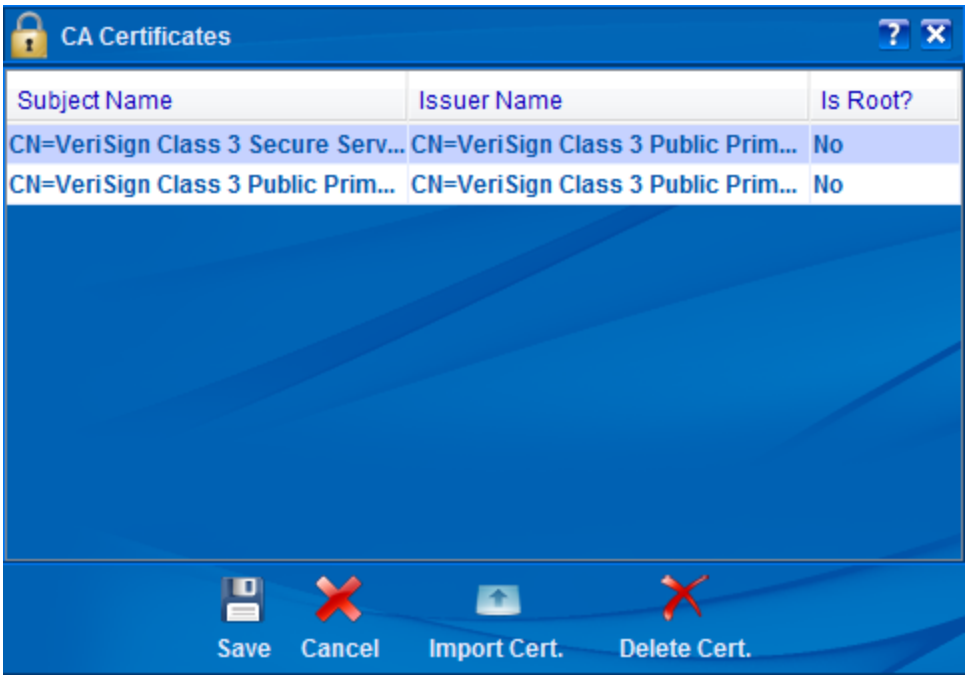


Figure 374: ISY Dashboard – CA Certificates

You can always use the trusted certificates in your browser to export (in PEM format) and then import into ISY.

21.6.1.8Certificate Management

The operations for Server Certificates and Clients Certificates are identical. As such, in this section only Server Certificates are discussed.

In the Network Dialog, click on the Server Certificate. You will be prompted by:

Figure 375: ISY Dashboard – Replace certificate prompt

Yes: This will load the certificate store from ISY for which you must have a valid password that you had setup before.

No: This will recreate a new certificate store and overwrites any previous certificate information. The requested password is the password you would like to use to access the store in the future (see Yes).

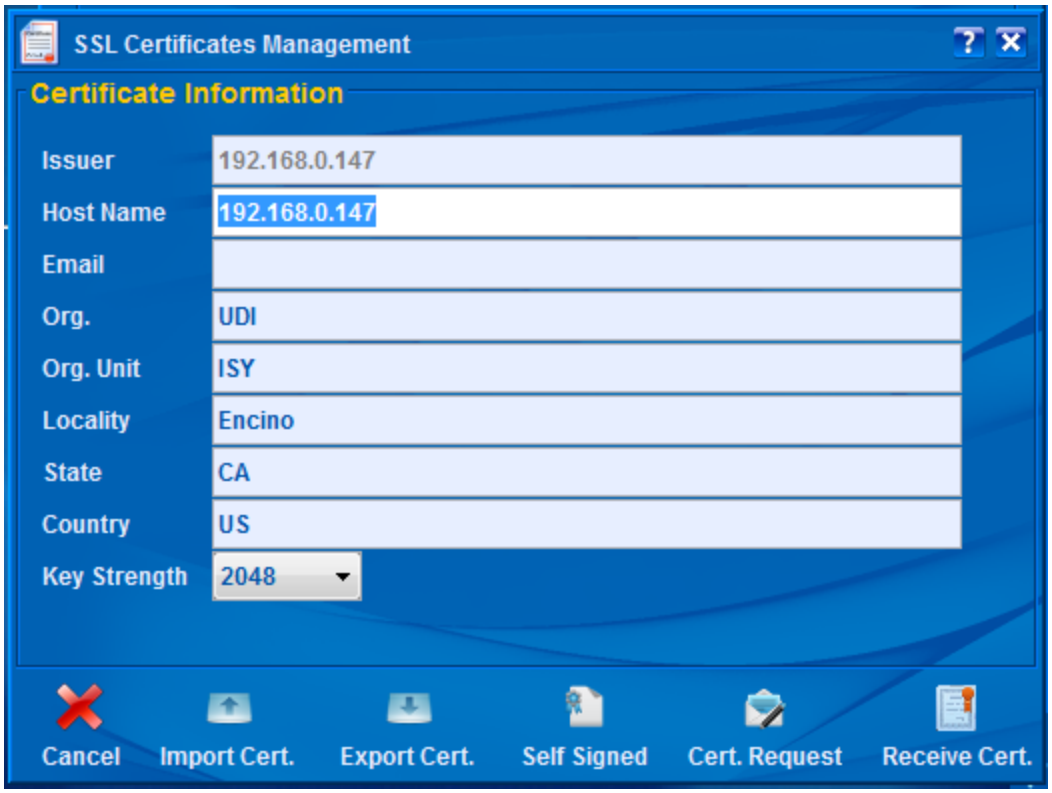


Figure 376: ISY Dashboard – Certificate information

a. Key Strength

Key Strength is the initial RSA Key Strength which may be 512, 1024, and 2048 bits. The higher the strength, the slower the initial connection with ISY (up to 10 seconds for 2048 bits). Please note that once the initial connection has been established, then this parameter no longer plays a role and communication and cryptographic methods are then based on the strength of the chosen cipher suite's symmetric key.

Note: Although ISY supports 512, 1024, and 2048 bits for self-signed certificates, however – and in case of certificate requests – the strength is subject to the approval of the certificate authority. In most cases, the lowest key strength approved by certificate authorities is 2048.

b. Import Cert.

If you have a PKCS12 (pfx) format file which includes both the Certificate as well as the Private Key, then choose this option to import your certificate/key combination into ISY. You will need to use this feature if you intend to use a preexisting certificate (including wildcard certificates).

Once imported successfully, ISY will reboot for the changes to take effect.

c. Export Cert.

Use this button to export an existing certificate in PEM format. You may want to use this option to import ISY's certificate into a browser's (or other clients') certificate store.

d. Self-Signed

If you wish to create a self signed certificate, make sure to enter and/or update (in case you are working on an existing certificate) all the necessary information in the fields and then click on the Self Signed button.

Once done, ISY will be rebooted for the changes to take effect.

e. Cert. Request

If you wish to have your certificate signed by a CA, you need to create a CSR. To create a CSR, make sure to enter and/or update (in case you are working on an existing certificate) all the necessary information in the fields and then click on the Cert. Request button.

You will be presented with a dialog containing the Certificate Request (see below). Simply right mouse click to copy the contents and then send it to the Certificate Authority.

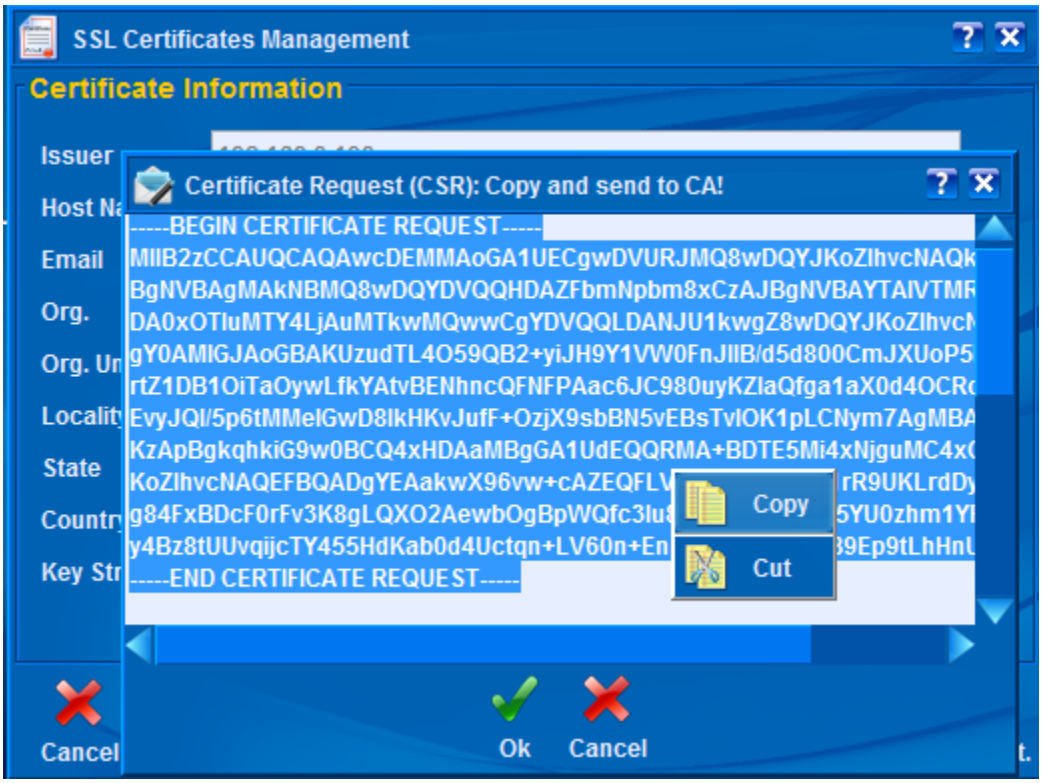


Figure 377: ISY Dashboard – Certificate request

Make sure to click the Save button on SSL Certificate Management dialog once done. You may also want to keep a copy of your CSR in case you need to recreate it. This is because ISY creates a new Private Key for every CSR request and thus you will have to start the whole process from scratch in case the original CSR is lost/misplaced.

f. Receive Cert.

If you have already made a Cert Request (#d) and have now been given an actual certificate based on your Cert Request (CSR), then click on the Receive Cert button to import the Certificate into ISY. You will be presented with a dialog to paste the certificate into (see below).

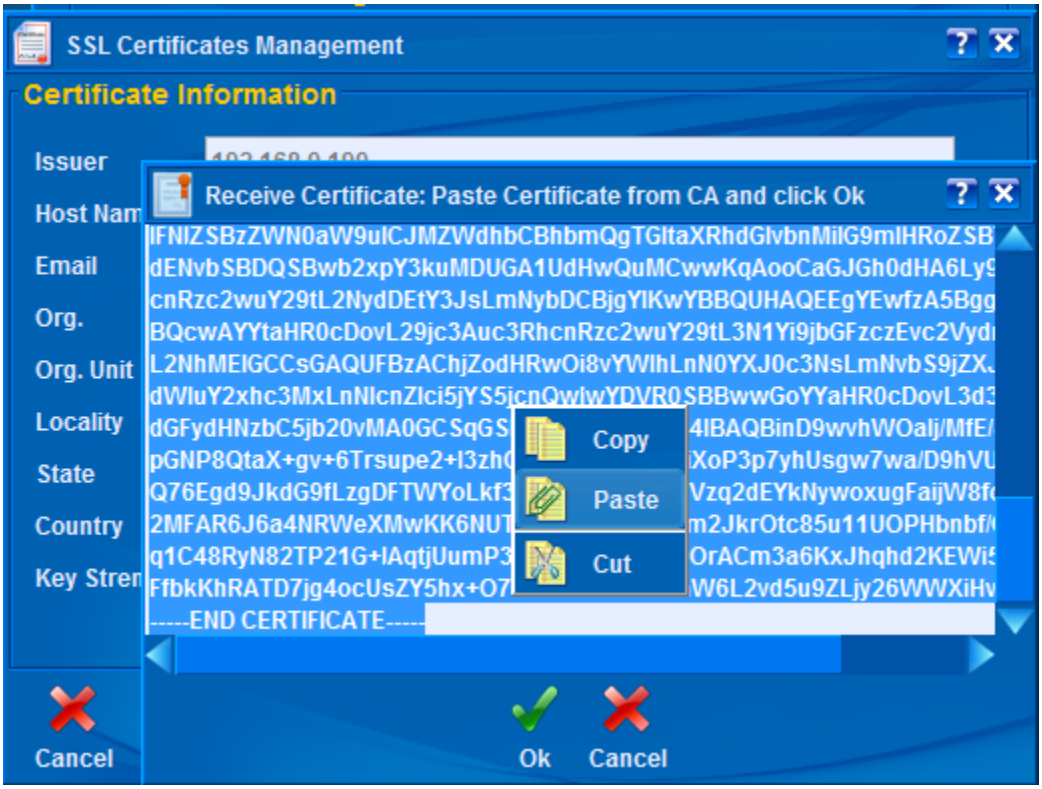


Figure 378: ISY Dashboard – Receive certificate information

Once imported successfully, ISY will reboot for the changes to take effect.

21.6.1.9Certificat4e Authorities (Root)

http://www.universal-devices.com/docs/cacerts/CACerts.zip

21.7 Internet Explorer SSL Certificate Install[107]

When you use Internet Explorer to remotely connect to your ISY it will open a warning about the self-signed certificate. You will have to click the Continue link to open the page. This will happen every time you use IE to access your ISY unless you Install the certificate in IE.

Vista users will have to disable Protected Mode from Internet Options or there will not be an “Install Certificate” button.

On the top of the page there should be a red shield that says Certificate Error. Click that, then View Certificates. In there you will find an Install Certificate button. Click that, then follow the instructions, and place the certificate in the Trusted Root Certification Authorities store.

Once installed, close the browser, reopen, browse to the ISY and IE should not give any more warnings.

The procedure should be the same for IE7 and IE8.

21.8 Mail Server Settings[108]

21.8.1 Configure Mail Server Settings

- Go to Admin Console | Configuration tab | Emails/Notifications
- Under SMTP Settings ensure Use Default is checked and then click on the Save button

IMPORTANT Using Default settings will cause ISY to use our mail servers which may have some limitations depending on the load. Furthermore, it's not a secure system

21.8.2 Configure Your own Mail Server Settings

- Go to Admin Console | Configuration tab | Emails/Notifications
- Under SMTP Settings ensure Use Default is Not checked
- For SMTP Server enter the SMTP host for your service (e.g. smtp.gmail.com)
- For SMTP Port enter the SMTP port for your service (e.g. 587)
- For User ID enter the username associated with your SMTP account (e.g. abc@gmail.com)
- For Password enter the password associated with your Account
- For From you can leave it blank. If your service allows it, you can add a display name ensuring the format follows First-Name Last-Name:Email-Address"

[107] (Universal Devices)
[108] (Universal Devices)

- If your service supports TLS, make sure this box is checked
- For timeout, use 1000 at the minimum. If you are using TLS increase it to 5000 (or more)
- Click on the Save button
- Test

21.8.3 Adding Recipients and Groups

- Go to Admin Console | Configuration tab | Emails/Notifications
- Under Groups click on the Add button at the bottom
- Enter a descriptive Name for this group which you can refer to in Programs and then hit Enter button on your keyboard
- Click on the column under Recipients for this group
- In the ensuing dialog, click on the Add button and enter an email addresses followed by hitting the Enter button on your keyboard
- Repeat the previous step for as many email addresses as you wish to be included in this group
- Once done, click on the Ok button and then click on the Save button at the bottom
- Test

21.8.4 Testing the Settings

- Go to Admin Console | Configuration tab | Emails/Notifications
- Under Groups click on the Name and highlight the desired row/group to be tested
- At the bottom, click on the Test button
- Configuring gmail Account
- Login to your gmail account
- Go to Settings | Forwarding and POP/IMAP. Under POP Download, make sure POP is enabled
- Go to Settings | Filters and Blocked Addresses and make you are not blocking yourself
- Go to Accounts and Import | Other Google Account settings:
- Click on Change Account Settings | Other Google Account settings
- Click on Security Checkup
- Click on the highlighted buttons till you reach Disable access for less secure apps
- Click on Turn on
- Click on the Done button
- Test

21.8.5 Configuring for Use with gmail

- Make sure you have configured your gmail Account (see above)
- Go to Admin Console | Configuration tab | Emails/Notifications

- Under SMTP Settings ensure Use Default is Not checked
- For SMTP Server enter smtp.gmail.com
- For SMTP Port enter 587
- For User ID enter the username associated with your gmail account (e.g. abc@gmail.com)
- For Password enter the password associated with your Account
- For From you can leave it blank. If your service allows it, you can add a display name ensuring the format follows First-Name Last-Name:Email-Address"
- Make sure TLS is checked
- For timeout, 5000 (or more)
- Click on the Save button
- Test

21.8.6 SMTP Errors

For errors, see: **23.9.5 SMTP Errors**

21.8.7 Email/Customized Content Substitution Variables

Use substitution variables in emails and network resources, see: **8.4 Email Substitution Variables**

22 NodeServer Notes

22.1 Introduction

Universal Devices has created an ingenious system to extend the capabilities of the ISY devices. NodeServers are software packages or extensions which run on the Polyglot platform. There are several types of NodeServers available. NodeServers have been created using NodeLink, as well as using Raspberry PI devices with Polyglot. The examples below use the Raspberry PI and Polyglot. For information on NodeLink see **http://automationshack.com/wp/nodelink/**

If you desire to control equipment that the ISY does not natively support, and you would like to use a NodeServer that has been developed to control this equipment, then follow the instructions below.

Currently, there are over thirty-seven (37) NodeServers available for download. These are:

AVRemote	Universal A/V remote control. Supported: nVidia Shield, LG TV, Tivo, Denon AVR, Onkyo AVR, ESP8266 IR, Chromecast
AVServer	Generic A/V Node Server. Supports Pioneer VSX-1021, Sony Bravia XBR-65X810C
AmbientPoly	Ambient Weather Station
Autelis-Jandy	Accesses the Austelis Pool Control module for Jandy/Zodiac Aqualink to allow ISY 994i to control pool functions.
BlueIris	Blue Iris UDI ISY Polyglot v2 Node Server
Camera	Camera Server
Dyson	Dyson Fan Control
Ecobee	Ecobee NodeServer
ElectrIQ	Add ElectrIQ System control to the ISY994
EnvisaLink-DSC	Accesses DSC PowerSeries alarm panels via EnvisaLink EVL-3/4 for ISY access to alarm functions and events
Flair	Flair system to the ISY994
GPIO	Raspberry Pi GPIO pins control
HarmonyHub	Connect Harmony Hub's to the ISY994
Holidays	aintains list of holidays and vacations
Hue	Connect Phillips Hue Personal Wireless Lighting system to the ISY994
HueEmulator	Hue Emulator Node Server
LiFX	Add LIFX control to the ISY994
MQTT	MQTT NodeServer
MagicHome	MagicHome LED NodeServer for UDI's Polyglot Platform
MiLight	Connect Milight V6 Protocol Lighting system to the ISY994
MyQ	Accesses the MyQ Web Service to allow ISY 994i to control LiftMaster/Chamberlain MyQ compatible garage door openers
NanoLeaf	Connect Nanoleaf Aurora to the ISY994

Nest2	Nest products (Thermostats, Cameras, Smoke/CO detectors) control
OneWire	OneWire NodeServer
Presence-Poly	A Polyglot Nodeserver to monitor proximity of devices for indoor positioning/presence
PythonTemplate	My Node Server
Rachio	Rachio NodeServer for UDI ISY994i Polyglot v2
Roomba	Roomba node server for UDI ISY994i Polyglot v2
SenseMonitoring	Connect Sense Energy Monitor to UDI ISY 994i
SensiboSky	Add Sensibo Control to the ISY994
SimpleControl	SimpleControl integration for ISY
SolarEdge	Solar Edge Cloud Integration
Somfy	Somfy URTSii Node Server
Sonos	Add Sonos control to the ISY994
Sun	Sun and Moon tracker
WeatherFlowPoly	Add WeatherFlow weather data to the ISY994
WirelessTag	Node Server for CAO Gadgets Wireless Sensor Tags www.wirelesstag.net

22.2 Polyglot Quick Install Notes[109]

Use these quick instructions to install Raspberry PI, Polyglot and some NodeServers. If you need additional information, see following sections.

RASBERRY PI INSTALL (note: ignore windows warnings about needing formatting or whatever)

- run etcher (www.etcher.io) and follow instructions pointing to .img file downloaded/unzipped from raspberrypi.org website (raspbian lite) and install image on a microsd card.
- create file called "ssh" in root directory, delete the file extension, just "ssh". This enables ssh session from putty/other telnet app.
- for wifi access create file called: **wpa_supplicant.conf**
- open in a text editor and enter the following to configure wifi into the wpa_supplicant file:

```
country=US

ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev

update_config=1

network={

    ssid="MyWiFiNetwork"

    psk="aVeryStrongPassword"

    key_mgmt=WPA-PSK

}
```

- put sd card into pi and boot
- find pi ip address on network
- run ssh session in putty using above ip address and default port
- username: pi, password: raspberry
- change password by enering the following at prompt: **passwd**
- other config can be done by entering: **sudo raspi-config**

[109] (apostolakisl)

POLYGLOT INSTRUCTION:

Instructions and file located at https://github.com/UniversalDevicesInc/polyglot-v2

- run polyglot install script (note, to paste into putty, just right click) (also note, this may take 5 or more minutes):

  wget -qO - https://raw.githubusercontent.com/UniversalDevicesInc/polyglot-v2/master/scripts/install.sh | bash -e

- Enter the following to check if polyglot is running:

  sudo systemctl status polyglot-v2

- To open polyglot admin console enter the following into a web browser of computer on same network:

  https://rasberrypiipaddress:3000

- skip over warnings about security
- Defulat user/pass is admin/admin
- Under Settings tab, enter your ISY username/password
- Check that it now says it is connected at the bottom of page

TO INSTALL NODES:

- Go to Node Servers/Node Store tab and "install" the one(s) you want
- Go to Node Servers/Install Node Server to complete the installation
- Go to ISY admin console and the nodes should be there

22.3 Installing Raspberry PI[110]

The following instructions are based on an excellent video produced by James Milne. For more detailed instructions see **https://www.youtube.com/watch?v=w9I_bip6Vbo**

- The first thing that you will need to do is to purchase a Raspberry PI. You can find this on Amazon.com. You will need to get the Raspberry Pi 3 Model B+. You can buy this with an included SSD memory card. You can also purchase it without this card, but if you did that you would also need to get an SSD card.
- You will need to get the operating system for the Raspberry PI. You can find it on the **https://raspberry.pi.org/downloads/raspbian** web site. You can get both the desktop and the lite versions. For these instructions we will be using the lite version, as we will be running "headless". In other words, we will not need be plugging in a HDMI cable, mouse, or keyboard. We will be running with a "command line" and we won't be using the "desktop". These instructions are also based on a hard-wire network connection, not Wi-fi.

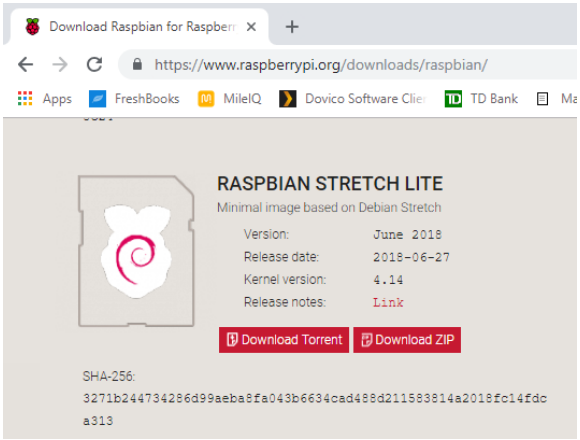


Figure 379: Raspian Stretch Lite Download

- Extract the zip file so that you have the **.img** file to work with.
- Plug the SSD card into your computer. You will see a prompt to format the card. Cancel these dialogs. Since this card will not be using a Windows operating system, it does not require formatting. It will be running a form of Linux. The file systems are not compatible.
- Download the **Etcher** software program to "flash" an image to the SSD card. You can find this file on the **https://etcher.io** web site. Select the **.img** file you extracted, select the SSD card, and then select "flash"

[110] (James Milne)

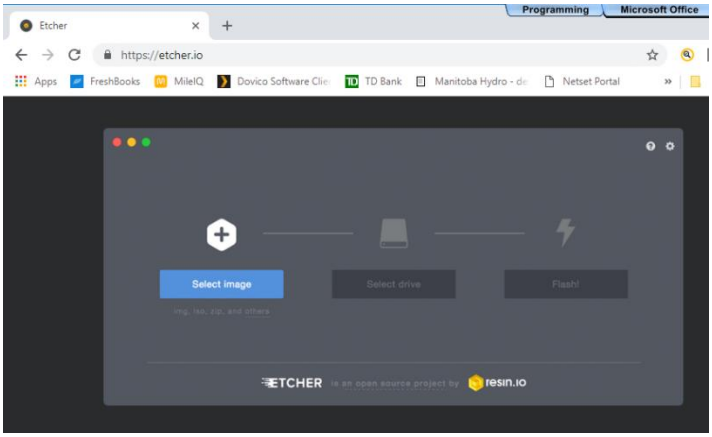


Figure 380: Etcher Program

- Cancel any “format disk” dialogs that may appear.
- You will be presented with the “boot” drive. If you do not see it use the file explorer, find it, and open it.
- You will need to create a “blank” file on this boot drive. Create a text file, call it **SSH**, and remove any extensions. It should not be called **ssh.txt**. Instead it should be called **ssh**. This enables ssh on the Raspberry PI.

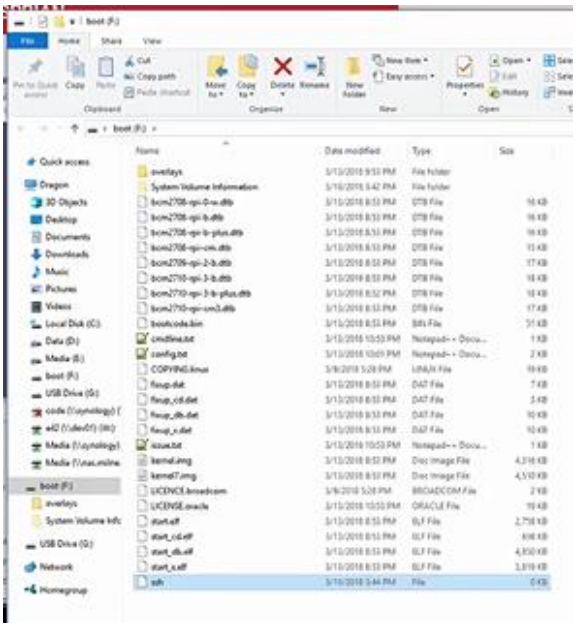


Figure 381: BOOT Drive with SSH File Added

- for wifi access create file called: **wpa_supplicant.conf**
- open in a text editor and enter the following to configure wifi into the wpa_supplicant file:

```
country=US

ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev

update_config=1

network={

    ssid="MyWiFiNetwork"

    psk="aVeryStrongPassword"

    key_mgmt=WPA-PSK

}
```

- Eject the SSD card from your computer and put it into your Raspberry PI. You should have the ethernet connected, as well as having the SSD card inserted before connecting power to your Raspberry PI. Power up the Raspberry PI.
- You will need to find the IP address of the Raspberry PI. You can use the your router login to determine the IP address of the Raspberry PI, and then do an “address reservation” in order to keep the address from shifting.
- Connect to your Raspberry Pi using SSH. You can use several different ssh client programs to access using SSH. I will be using **SecureCRT** for these instructions. You can get this file from the **https://www.vandyke.com/prodducts/securecrt/** web site. Enter the host name, which is the IP address of the Raspberry PI. You will need to accept and save the “host” key. Enter the username and password, which initially for PI is: **username: pi**, and **password: raspberry**. Change the password using the **passwd** command.

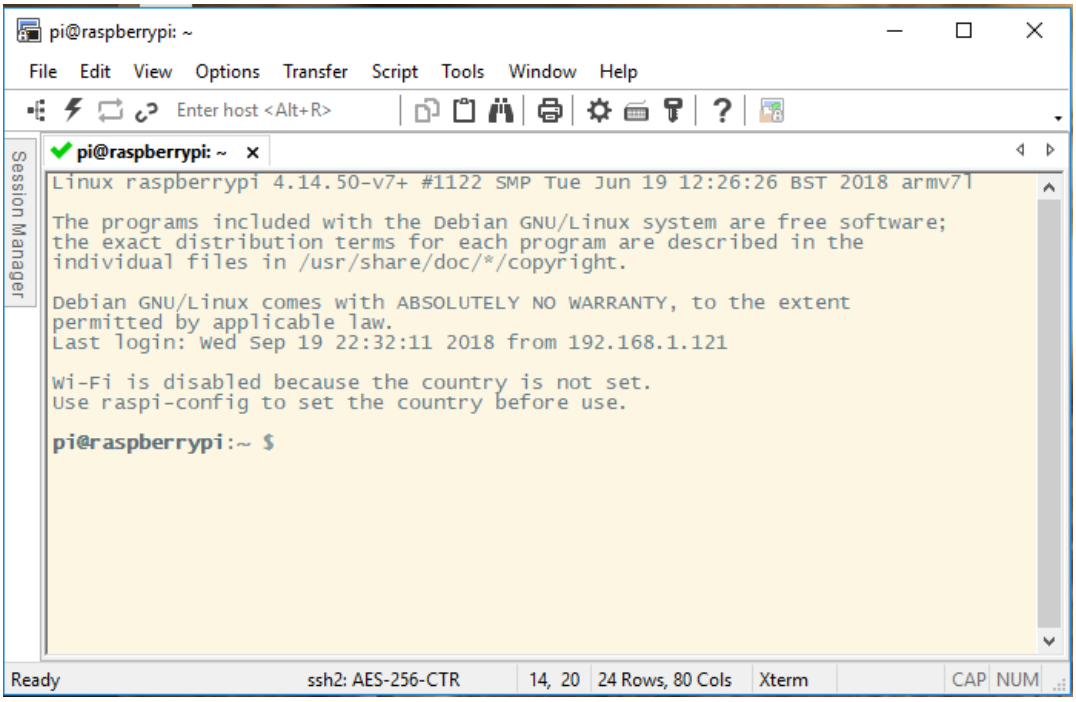


Figure 382: SecureCRT SSH Raspberry PI Session

22.4 Installing Polyglot[111]

The following instructions are based on an excellent video produced by James Milne. For more detailed instruction see **https://www.youtube.com/watch?v=lWqAq4Xf-9c&index=3&t=0s&list=PL418LHgc2F6uttVUW4cSDlpuX4BewQk8Y**

- To install Polyglot start by getting the script at: https://github.com/UniversalDevicesInc/polyglot-v2

```
wget -qO - https://raw.githubusercontent.com/UniversalDevicesInc/polyglot-v2/master/scripts/install.sh | bash -e
```

- Copy this script and paste into your SSH client. This will update the Raspberry PI with all the latest patches and files required, all the pre-requisite files.

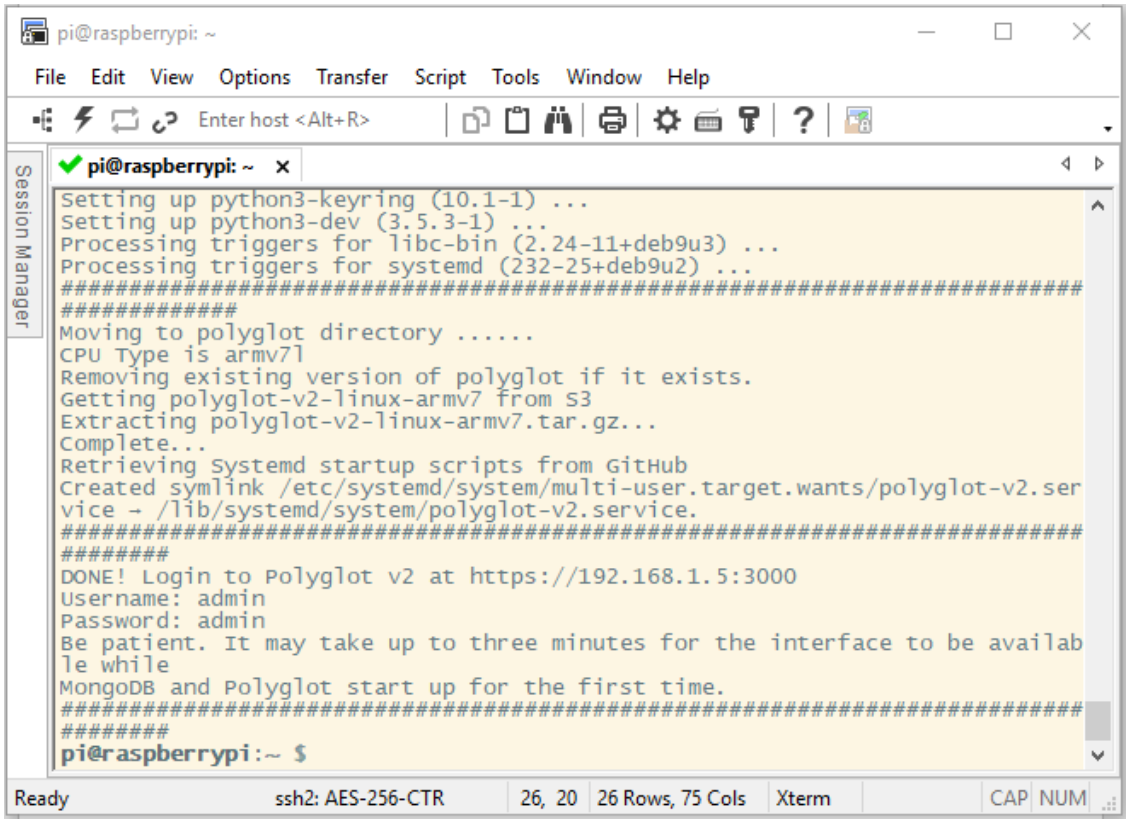


Figure 383: Polyglot Script Completion

[111] (James Milne)

- To verify that Polyglot was successfully installed type the following:

  sudo systemctl status polyglog-v2

  You will see the status that Polyglot is active and running, such as follows:

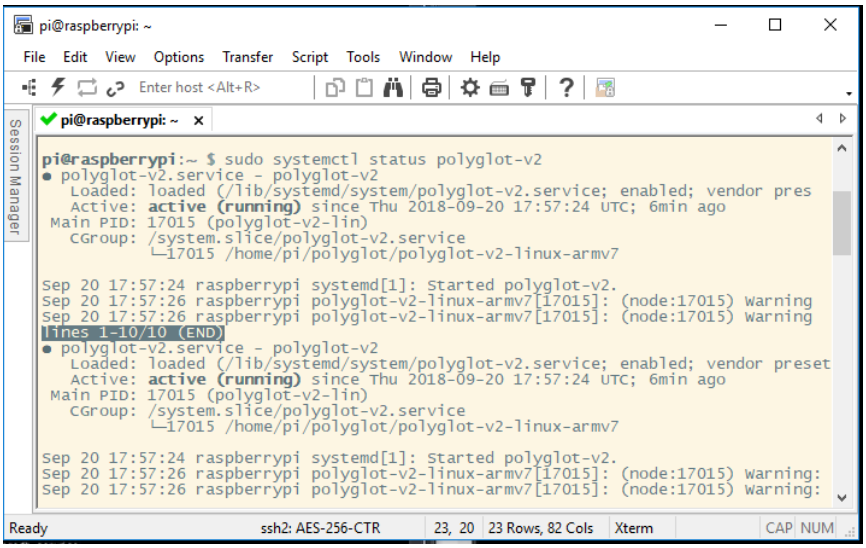


Figure 384: Polyglot Installation Status

- Copy the address Polyglot is using, such as **https://192.168.1.5:3000**
- Open your browser and paste this address into the URL bar. You can ignore any connection not private messages that come up.
- Go to the "ADVANCED" option on the screen
- Select "Proceed to … (unsafe) option.
- You should see the following display:

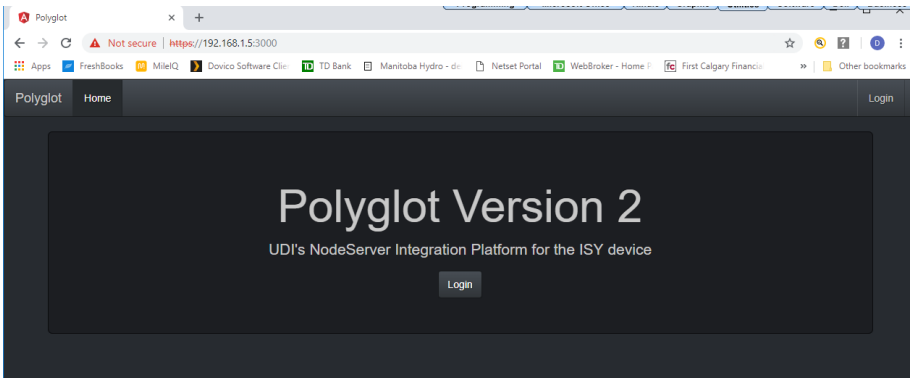


Figure 385: Polyglot Login Screen

22.5 Installing NodeServers[112]

The following instructions are based on an excellent video produced by James Milne. For more detailed instructions see https://www.youtube.com/watch?v=EnlqOl_46A&t=19s

- Login using username: **admin**, and password: **admin**. These are the initial values.
- You will notice that the ISY was automatically discovered. However, you will need to change the username and password to what you use in your ISY. Go to the **Settings** tab. Change these values and save them here. You will see the following screen:

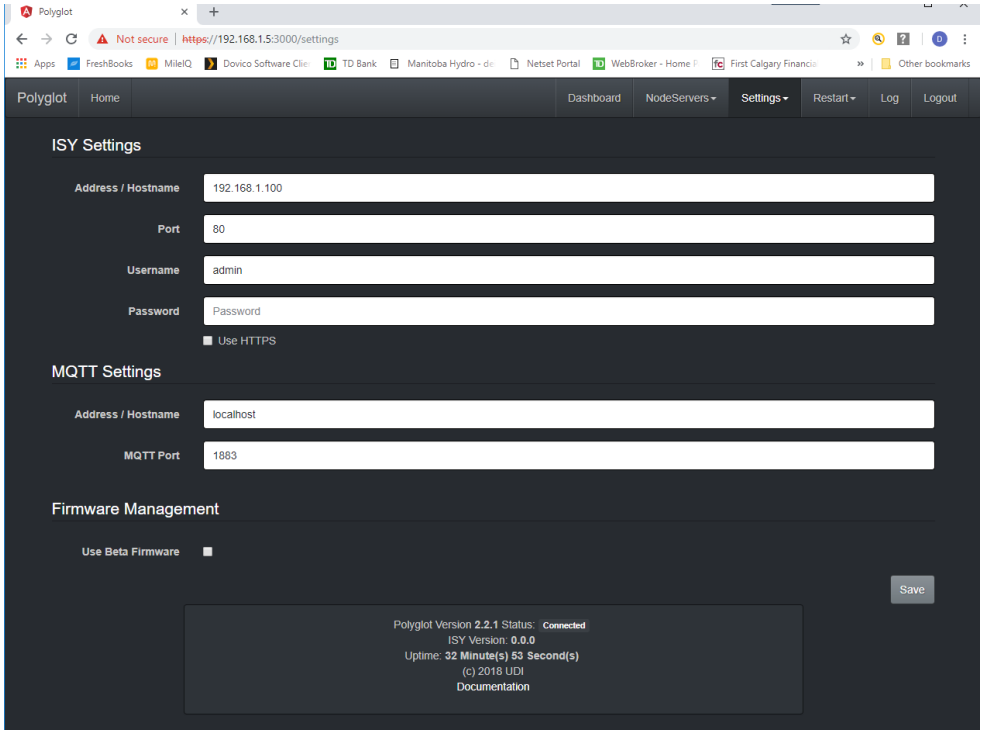


Figure 386: Polyglot Settings Status

- You will see on the bottom of the screen that the ISY was found, and the version number is shown.
- To change the password for Polyglot itself, to the **Settings->Profile** screen and change it t there.

[112] (James Milne)

- If you go to the **Dashboard** screen you will see that you currently do not have any NodeServers installed.

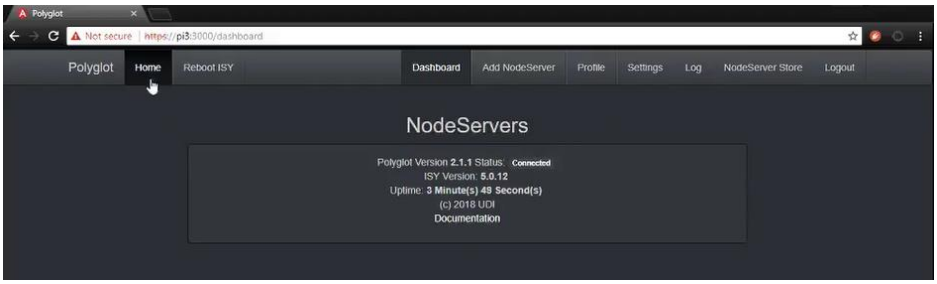


Figure 387: Dashboard Screen – No NodeServers

- Once every couple of minutes, Polyglot will communicate with the ISY to see if there are any unmanaged NodeServers installed there, and if so that information will be brought in, such as NodeLink and ISY Portal. For example this next screen shows that Polyglot found that the ISY Portal was on the ISY and has installed that. It also shows that the ISY Portal NodeServer was installed in slot number 1.

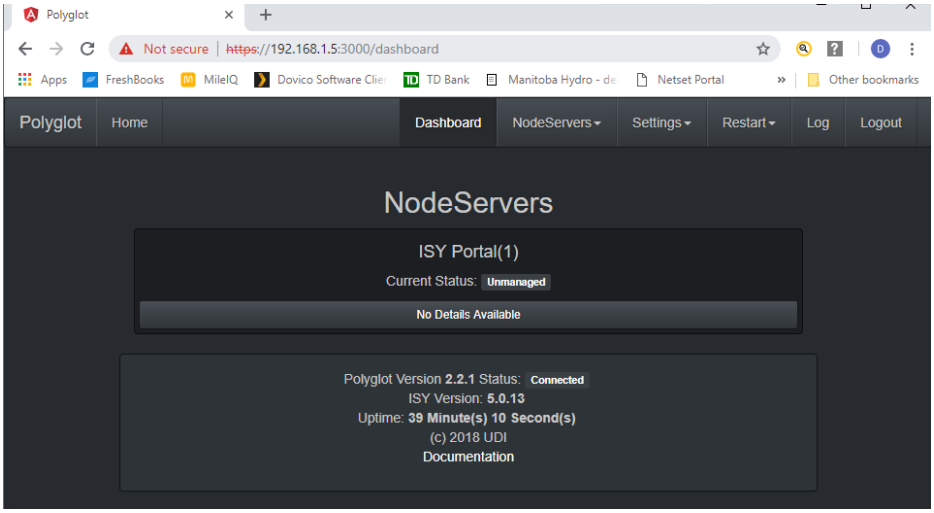


Figure 388: Dashboard Screen – With ISY Portal NodeServer

- To add a NodeServer go to the **NodeServer->NodeServer Store** screen. The example below shows that currently there are thirty-seven (37) NodeServers available for download. This number will change as developers create new ones.

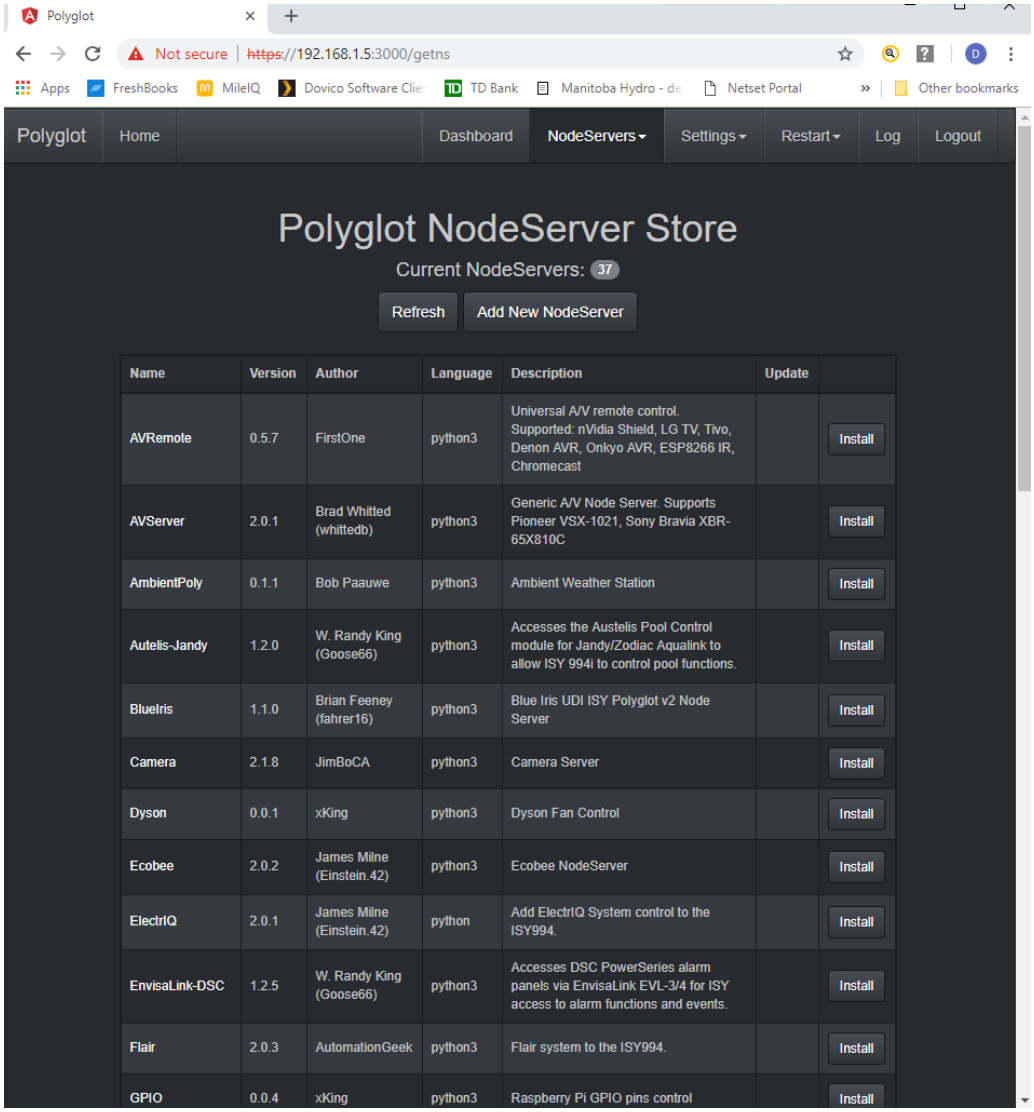


Figure 389: NodeServer Store Screen

- Select the desired NodeServer and press the **Install** button. This will clone the repository from github with the files you need.

- You will then need to add the NodeServer you just downloaded. Go to the **NodeServer->Add NodeServer** screen. You will see the NodeServer you downloaded in the **Available Node Servers** section of the screen, as well as the **Available Node Server Slot**.

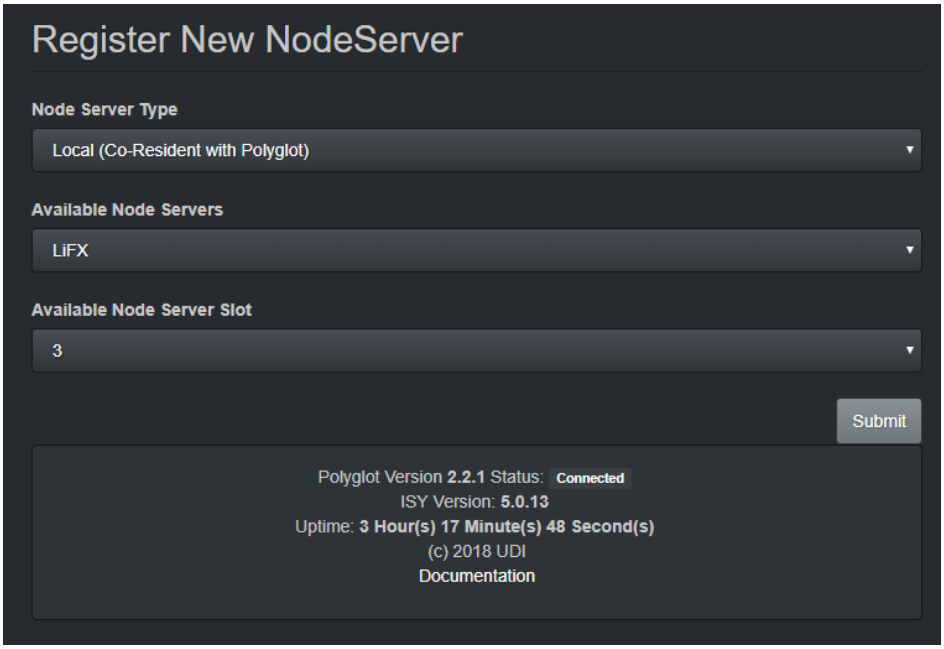


Figure 390: Register New NodeServer Screen

- Press the **Submit** button.

- If you check the **Dashboard** you will see the NodeServer.

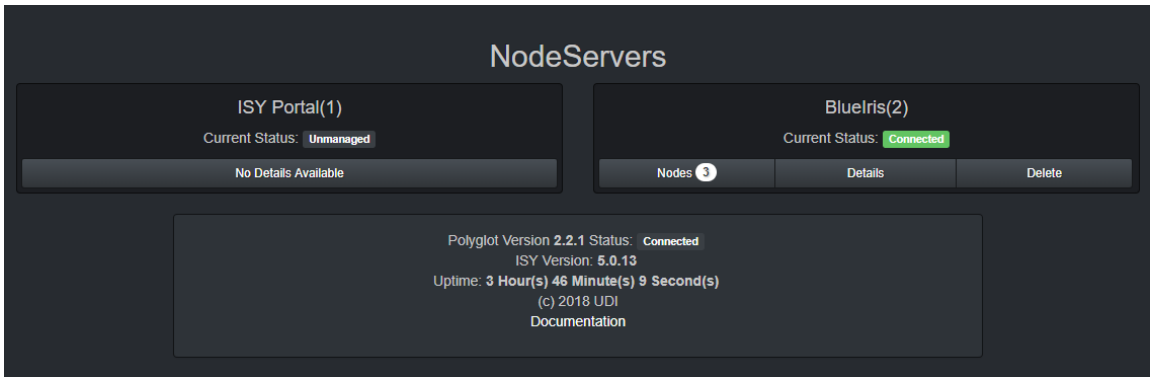
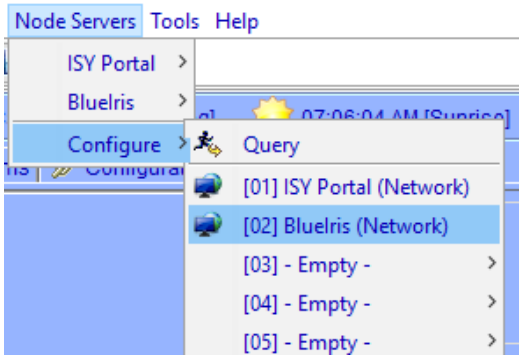


Figure 391: NodeServer Status

- If you check in the ISY you will see the NodeServer listed under the Network.

Figure 392: NodeServer Shown in ISY Network Tree

- If you check the **Node Servers** menu will see the NodeServer listed there.



22.6 NodeServer Development

If you would like to develop NodeServers please refer to **The ISY994 Developer's Cookbook**.

23 Issues & Troubleshooting

23.1 Front and Rear Panel LEDs

Front Panel LEDs: Understanding the ISY's front panel (see below) LEDs can be helpful when troubleshooting problems.

Figure 393: ISY Front Panel

Here is a table that helps explain each LED and LED combinations:

LED or Combination	Indicated Status
Power on steady	The PWR LED indicates that the ISY has power, either through the PLM or via a separate AC adapter. If the PWR LED is not lit, the ISY does not have power.
RX, **TX** and **Memory** off	If all three of these LEDs are off, the ISY is idle.
RX blinking	The RX LED blinks when the ISY is receiving INSTEON traffic.
TX blinking	The TX LED blinks when the ISY is sending INSTEON traffic.
Memory blinking	The MEM LED blinks when the ISY is accessing its internal memory.
RX on steady	If the RX LED is on steady, the ISY is having a problem communicating with the PLM. Unplug the PLM for 10 seconds, then plug it back in to reboot. If the problem continues, either the PLM or cable is most likely defective.
Error blinking	A blinking ERR LED indicates a file system error. Please power off the ISY and try to re-seat the SD card. If that does not help, the SD card may be defective. Please see **23.11 Upgrading Your SD Card**
Memory and **Error** blinking	If both the MEM and ERR LEDs are blinking, the ISY is unable to communicate with your Ethernet network. Please check all cable connections, try rebooting your router or switch, and ensure that you have a DHCP server available.

Rear Panel LEDs: There are also 2 LEDs on the rear of the ISY where the Ethernet cable attaches. One LED indicates a good network connection (should be on solid) while the other should flash with network activity.

23.2 Troubleshooting Flowchart[113]

This is a drop-thru flowchart so after you complete each line-item drop down to the next item until you have resolution of your issues at which point you do not need to continue further down the flow.

Step 1: Programming not acting as expected?

1. ❑ Check PLM is powered up
2. ❑ Check ISY is powered up
3. ❑ Check for locked up INSTEON devices
4. ❑ Check ISY error lights
    a. Flashing "Error" LED = file system issue
    b. Flashing "Error + Memory" LEDs = IP network issue
    c. Steady On "Rx" LED = ISY-to-PLM communication issue

Step 2: Can you access the ISY main screen?

1. ❑ Check local network issues
    a. ❑ Power down the ISY, local router, and internet modem
    b. ❑ Power up the internet modem, wait until connected to web
    c. ❑ Power up the local router, wait until startup routine is complete
    d. ❑ Power up the ISY, wait until startup routine is complete
    e. ❑ Login to your router, check for IP conflicts
2. ❑ Check remote access (if it's part of your current issue)
    a. ❑ Check your dynamic forwarding is correct
    b. ❑ If using UPnP, consider switching to manual port forwarding
    c. ❑ If using a portal service (http://www.check-it.ca/), check/test that it's working
3. ❑ Try different login methods
    a. ❑ Network places ISY icon
    b. ❑ Local ISY IP (ie. 192.168.1.105)
    c. ❑ UDI web link (http://www.universal-devices.com/99i/)
    d. ❑ Your personal ISY web address
4. ❑ Try different ISY shell login methods
    a. ❑ Telnet to the ISY, run configure TCP/IP, check for network issues
    b. ❑ Connect with a null modem cable, see **23.4.2 Connecting to the ISY Shell Using the Serial Port**
        i. ❑ Login with HyperTerminal, 115200, 8, none, 1, none
        ii. ❑ Power cycle ISY, analyze startup output for issues

[113] (Universal Devices)

5. ❑ Check for PLM issues
    a. ❑ Check PLM cable and RJ45 jack pins
    b. ❑ Power cycle ISY and PLM
    c. ❑ Watch ISY TX/RX LEDs and PLM LED
    d. ❑ First bootup flashing, then slow query blinks, then steady when done
6. ❑ Failed result may mean one or more of these possible issues...
    a. ❑ ISY-to-PLM cable is bad, replace with standard network cable
    b. ❑ PLM is bad, work with supplier (ie. Smarthome, etc.) on replacement
    c. ❑ ISY circuitry is damaged, work with UDI on replacement
    d. ❑ Router is configured wrong or damaged, check configuration or replace router

Step 3: From the ISY main screen, can you login to the Admin?

1. ❑ Clear Java cache, see **23.6 Clearing Java Cache**
2.
3. ❑ Install latest version of Java: http://www.java.com/
4. ❑ Check for firewall issues

Step 4: In the Admin, is there any device communication errors?

1. ❑ Check offending INSTEON device(s)
    a. ❑ ISY "Query Device" – **Right click on device, Query on popup menu**
    b. ❑ Power cycle offending INSTEON device, ISY query again
2. ❑ Check ISY links and scenes
    a. ❑ Check ISY logs
    b. ❑ Run the ISY "Show PLM Links Table", compare output with the ISY - **Diagnostics Menu->Show PLM Links Table**
    c. ❑ Run the ISY "Scene Test", analyze for issues - **Diagnostics Menu->Scene Test**
    d. ❑ Run the ISY "Event Viewer" over time, analyze for issues, see **23.8 Using the Event Viewer**
3. ❑ Troubleshoot INSTEON communication issues, fix signal suckers
    a. ❑ Test AccessPoints, relocate if necessary
    b. ❑ Disconnect electronics and computers
        i. ❑ Optional: utility fans, low voltage puck lights, some ballast lighting types
    c. ❑ Reconnect one at a time and test communication issues
    d. ❑ Pick different location or use noise filter for offending signal sucker
4. ❑ Reprogram offending device(s)
    a. ❑ Test device, does it work, status LED off
    b. ❑ Factory reset INSTEON device
    c. ❑ Test device, does it work, status LED still off, possible malfunctioning device
    d. ❑ If device now works, ISY "Restore Device"
5. ❑ Failed result may mean malfunctioning INSTEON device(s)
    a. ❑ Work with supplier (ie. Smarthome, etc.) on replacement

Step 5: In the Admin, can you get to the programs?

1. ❑ Check for PLM lockup or corruption issues
    a. ❑ Power cycle PLM
    b. ❑ Run ISY PLM info/status check - **Diagnostics Menu->PLM Info/Status**
    c. ❑ If the status is "Not connected", Factory reset PLM
    d. ❑ ISY Restore Modem - **File Menu->Restore Modem**
2. ❑ Check ISY for file system issues
    a. ❑ Check ISY for flashing "error" LED
    b. ❑ Restore ISY from backup (1st attempt) - **File Menu->Restore ISY**
3. ❑ Failed result may mean SD card formatting issues
    a. ❑ Format the SD card from the ISY shell, see **23.5.13 FS – Format SD Card**
        i. ❑ If unable to access through ISY shell then FAT format it on a Mac/PC
    b. ❑ Restore ISY from backup (2nd attempt) – **File Menu->Restore ISY**
4. ❑ Failed result may mean bad SD card
    a. ❑ Replace SD card, work with UDI on replacement

Step 6: In the Admin, do timestamps exist for program execution?

1. ❑ Are the programs enabled
2. ❑ Check ISY logs for signs of execution
3. ❑ Is the program code broken (ie. <Not Specified> devices)
4. ❑ Program syntax/logic issues

Step 7: No Status updates and/or multiple login prompts?

1. ❑ Configure Firewall Software
2. ❑ Try accessing ISY using https instead of http

Notes

In order to do a factory reset on INSTEON devices, most types of them require a 10 second removal of power, then holding the set button for 5 to 10 seconds as power is restored.

If you have Windows7 HyperTerminal can be downloaded here:
http://brianshowto.com/?p=35

23.3 ISY Diagnostics Menu

The ISY includes built-in tools to help troubleshoot problems that might occur, such as Programs that do not behave as expected or communication issues to or from INSTEON devices.

23.3.1 The Event Viewer

The Administrative Console's Event Viewer can be an invaluable tool in helping to diagnose problems. To access the Event Viewer, click on the **Tools** pull-down menu, then **Diagnostics**, then **Event Viewer**.

The Event Viewer window displays information on what is happening on your ISY, such as commands sent to devices, information received from devices, programs that are executing, and much more. There are several levels of detail available using the **Change Level** button (level 3 being the most detailed). Use the **Save Log To** button to save the current Event Viewer output to a text file.

Refer to **23.8 Using the Event Viewer** for details relating to the various logs generated by the Event Viewer.

23.3.2 System Status

The System Status screen shows you basic information about the ISY, such as the date and time it was last started, the size of the installed SD card, and how much free space is available.

To access the System Status screen, click on the **Tools** pull-down menu, then **Diagnostics**, then **System Status**.

23.3.3 PLM Info/Status

This screen tells you if the ISY is communicating with an attached PLM, and also displays the INSTEON address and firmware version of an attached PLM.

To view this information, click on the **Tools** pull-down menu, then **Diagnostics**, then **PLM Info/Status**.

23.3.4 PLM Links Table

To see the link table in your attached PLM, click the **Tools** pull-down menu, then **Diagnostics**, then **PLM Links Table**. Hitting **Start** begins reading the Link Table from your attached PLM.

Once complete, you can hit the **Count** button to see the total number of links read from your PLM. This can be useful as PLMs have limits to how many links they can store. Unfortunately, this limit does vary depending on which version PLM you have.

There is a **Stop** button available on this screen which, if pressed, aborts the reading of your PLM's Links Table. **Save** and **Load** buttons are also available to export or import the Links Table to an XML file.

23.3.5 Show Device Links Table

To view the links table of an INSTEON Device, click the **Tools** pull-down menu, then **Diagnostics**, then **Show Device Links Table**. Choose your device; adjust the starting and ending addresses (only if needed) and hit **OK**. This will start reading the selected Device's Links Table.

Once complete, you can hit the **Count** button to view your Device's total link count. This can be useful as Devices do have limits to how many links they can store. Unfortunately, the limits do vary depending on the device.

You can also hit the **Compare** button to compare the links read in from the Device to the list of links the ISY believes the Device should have. If there is a discrepancy, you may want to run a Restore on the device to correct the links table.

There is a **Stop** button available on this screen which, if pressed, aborts the reading of your Device's Links Table. **Save** and **Load** buttons are also available to export or import the Links Table to an XML file.

23.3.6 Show ISY Links Table

To view the list of links that the ISY believes a device should have, click the **Tools** pull-down menu, then **Diagnostics**, then **Show Device Links Table**. Choose your device and hit **OK** and the links table displays.

You can hit the **Count** button to view your Device's total link count. This can be useful as Devices do have limits to how many links they can store. The limits vary depending on the device.

There are also **Save** and **Load** buttons available to export or import the links table to an XML file.

23.3.7 Scene Test

The Scene test function can be very helpful in troubleshooting INSTEON communication issues. To open this tool, click the **Tools** pull-down menu, then **Diagnostics**, then **Scene Test**. Choose the Scene you would like to test then hit **OK**.

The Event Viewer pops up and an ON and OFF command are sent to the specified scene. The results of the test will be displayed in the Event Viewer window, indicating whether the test succeeded or failed for each member of the scene.

23.3.8 Query INSTEON Engine

If a device is not behaving as expected (for example, On Level or Ramp Rate is not working properly) the ISY may not have proper information about the device's capabilities. To refresh this information simply right-click the Device in the node list and choose **Query INSTEON Engine**. This will update the ISY's stored information and may correct the issue you are having.

23.4 Connecting to the ISY Shell[114]

23.4.1 Connecting to the ISY Shell Using Telnet

Note: In order to telnet to ISY, ISY's current IP address must be known. This can be found in the ISY, in the Help->About menu. You can also find it if you log into your router. There should be a DHCP client table, which contains an ISY entry with the IP address.

[114] (Universal Devices)

If using the Windows telnet command (Note: The Windows telnet command is installed by default on Windows XP, but not on Vista. On Vista, you will need to install the telnet command from Windows Components.):

- Go to the Start menu and choose Run.
- In the Run dialog, enter cmd and click OK.
- At the command prompt, type the following command, replacing isy.current.ip.address with your ISY's current IP address:
    - telnet isy.current.ip.address <ENTER>

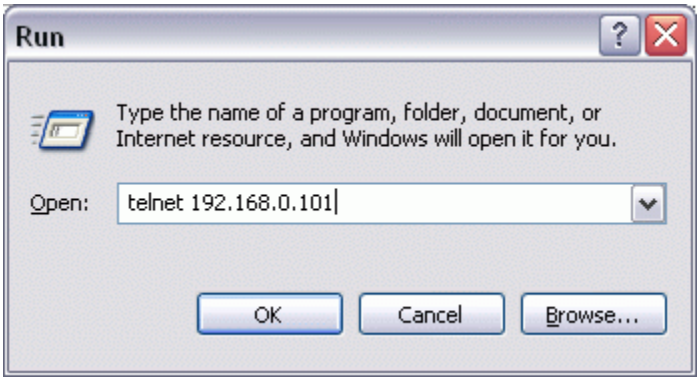


Figure 394:Run Command

If using another telnet client, connect to ISY's current IP address.

When prompted for Username: enter admin (lower case) followed by <ENTER> When prompted for Password: enter admin (lower case) followed by <ENTER>.

Figure 395:Telnet Login

The ISY Shell is displayed. All input to the ISY shell must be in UPPER CASE.

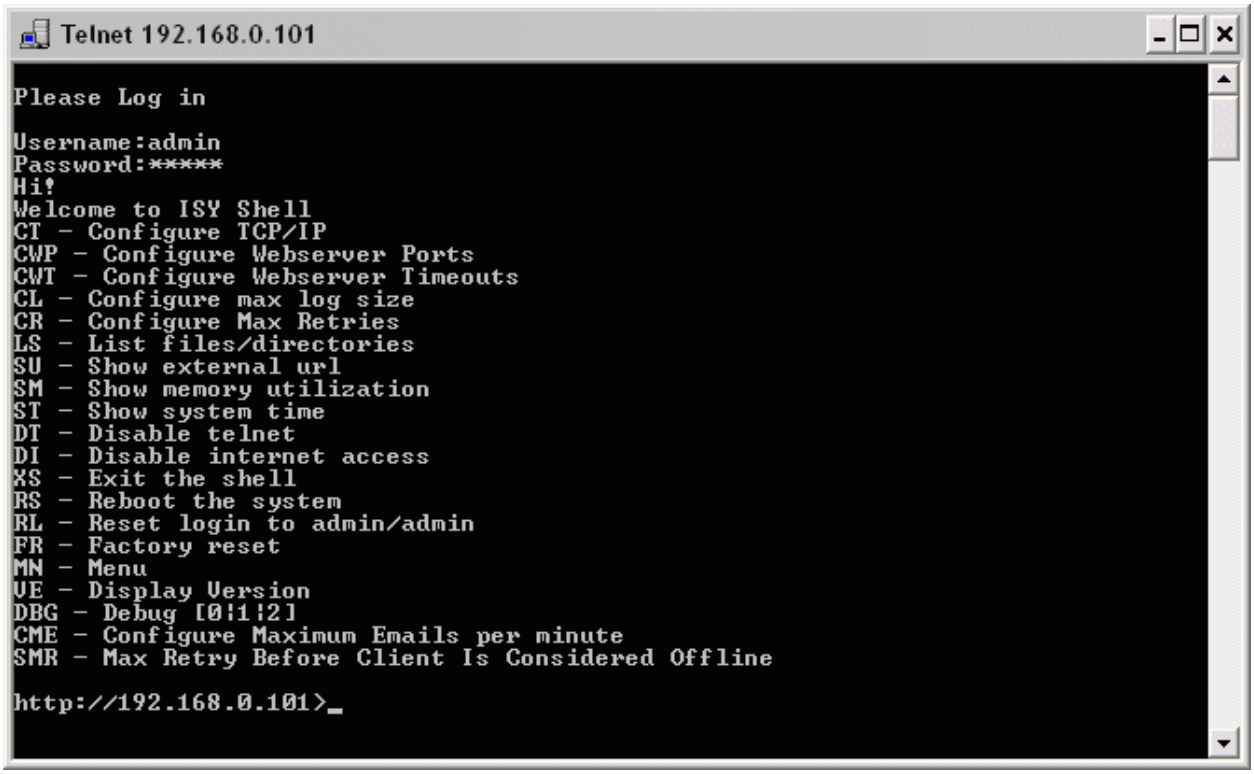


Figure 396:ISY Shell

23.4.2 Connecting to the ISY Shell Using the Serial Port

Connect one end of a serial null-modem cable (included with PRO version) to ISY's Port B, and connect the other end to the serial connector (or USB-to-serial adapter) on the computer.

Start a terminal program (such as Windows HyperTerminal) and configure for 115200bps, 8N1, Xon/Xoff, and for the appropriate COM port.

Type a few characters until prompted for Username: and enter admin (lower case) followed by <ENTER>. When prompted for Password: enter admin (lower case) followed by <ENTER>.

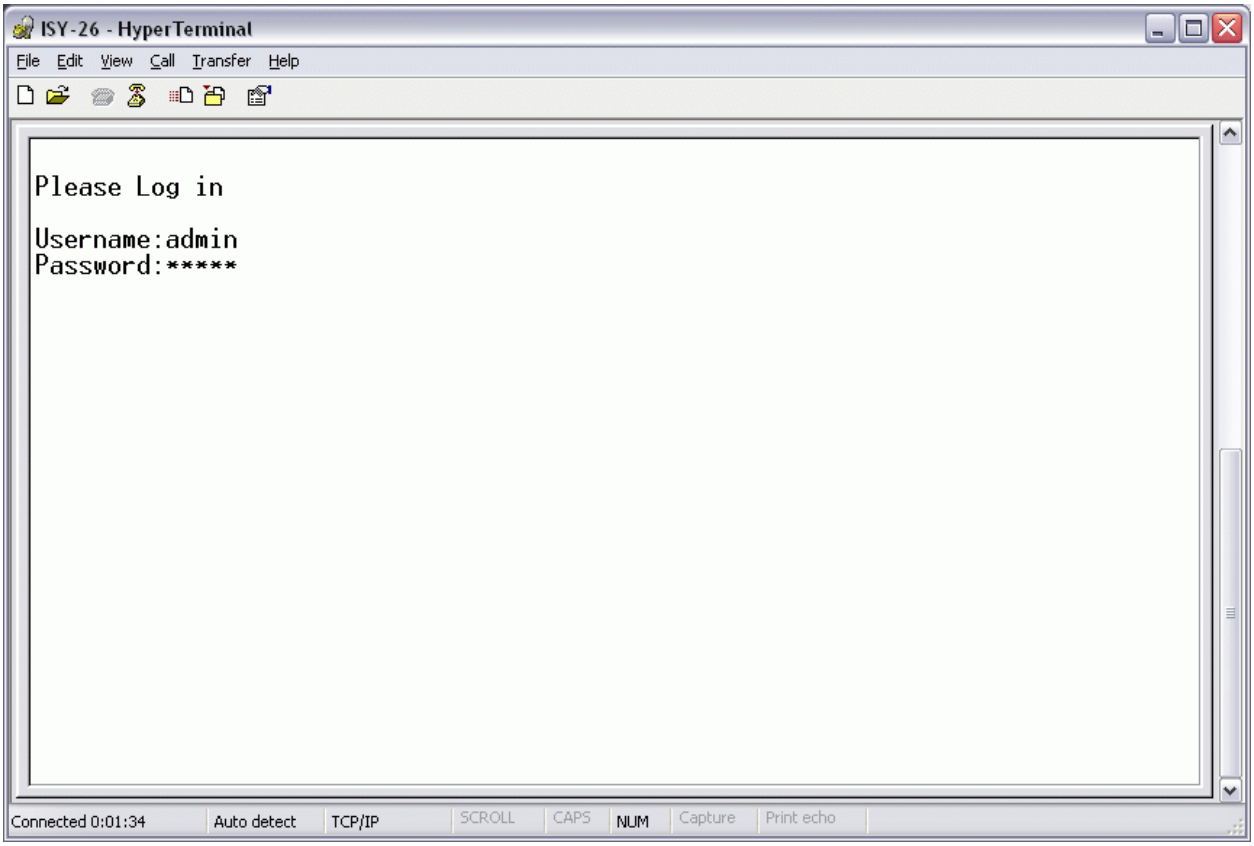


Figure 397:HyperTerminal Login

The ISY Shell is displayed. All input to the ISY shell must be in UPPER CASE.

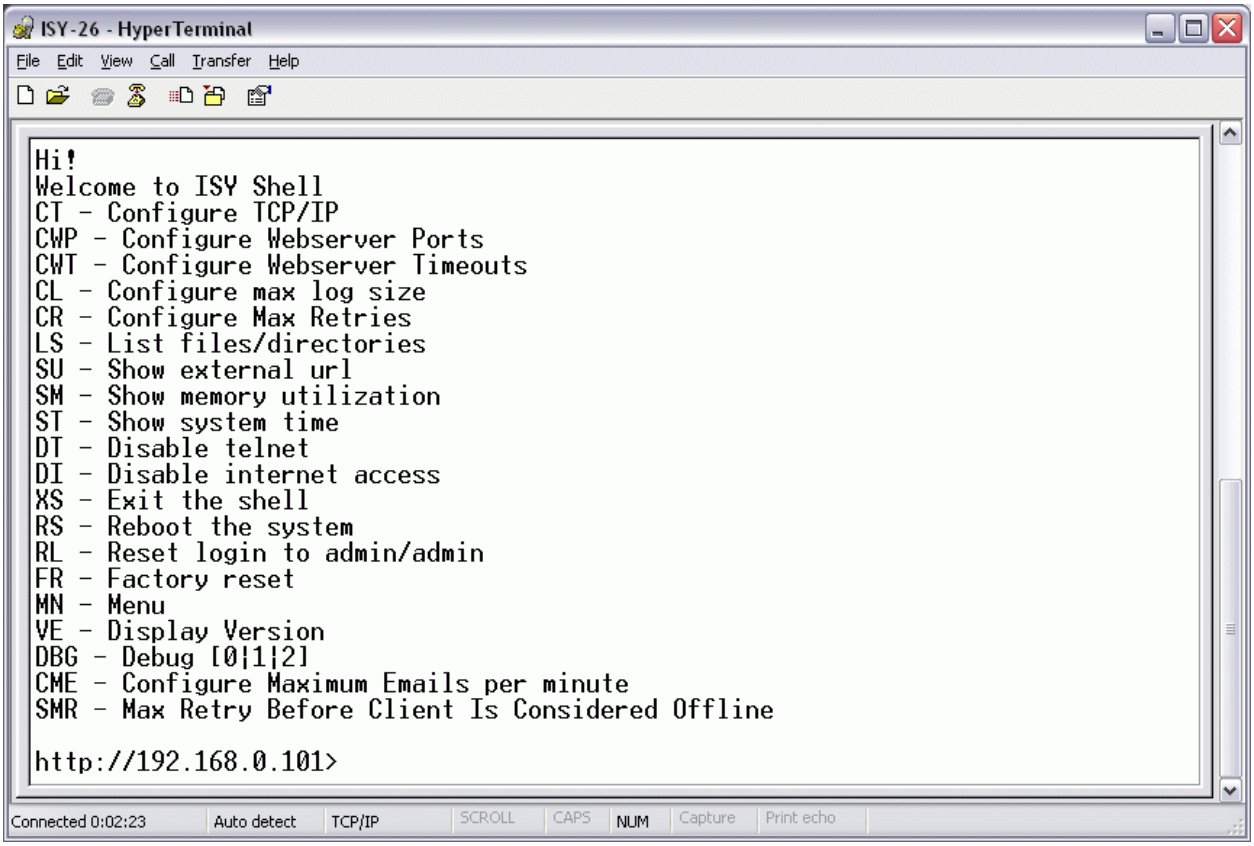


Figure 398:HyperTerminal Menu

Note: For more information on connecting to and using the ISY Shell, see **23.5 Advanced Configuration Guide**

23.5 Advanced Configuration Guide[115]

Please refer to **21.1 Telnet to Your ISY** to begin a Telnet or HyperTerminal session.

All commands are case sensitive and must be entered in upper case.

23.5.1 CI - Configure Infra-Red

To modify the settings for Infra-red use (only available on ISY-99i/IR)

- IR Hold detection [Default = 600 MilliSec](range 50-3000 MilliSec)
- IR Hold maintain [Default = 300 MilliSec](range 50-3000 MilliSec)

[115] (Universal Devices)

23.5.2 CL – Configure Maximum Log Size

To change the amount of log space allowed, type CL at the shell prompt.

- Default = 3 MB
- Range = 1-16 MB

23.5.3 CME - Configure Maximum Emails per minute

- Default = 60
- Range 1-3600

23.5.4 CR - Max Device Command Retries

- Default = 2
- Range 1-16

23.5.5 CT – Configure TCP/IP

TCP/IP configuration command enables you to either assign static IP address information or instruct the ISY to use DHCP. The default is DHCP. To perform TCP/IP configuration, type CT at the shell prompt.

Assigning a Static IP Address

- When prompted for IP Address, enter the desired static IP address
- When prompted for NetMask, enter the desired subnet mask
- When prompted for Gateway, enter the IP address for the gateway
- When prompted for DNS Server, enter the IP address for the DNS server

When prompted with Save Changes, enter Y. The system will reboot using the provided information for TCP/IP configuration. Note: If you enter the wrong Gateway and/or DNS server, some of the notifications and time functions will become inoperable.

23.5.6 Requesting a DHCP Assigned IP Address

- When prompted for IP Address, enter 0.0.0.0
- When prompted for NetMask, ignore
- When prompted for Gateway, ignore
- When prompted for DNS Server, ignore

When prompted with Save Changes, enter Y. The system will reboot and attempt to get DHCP assigned TCP/IP information upon system start.

23.5.7 CWP - Configure Webserver Ports

This command allows you to configure the Webserver ports.

- HTTP Port [Default = 80] (range 1-65536)
- HTTPS Port [Default = 443] (range 1-65536)

23.5.8 CWT - Configure Webserver Timeouts

- HTTPS Timeout [Default = 20000 MilliSec](range 5000-50000 MillisSec)
- HTTP Timeout [Default = 10000 MilliSec](range 5000-50000 MillisSec)

23.5.9 DBG - Debug [0|1|2|3]

To log key messages received to the java console, do the following

- DBG 0: this tells the box to not send messages to the GUI
- DBG 1: this tells the box to send basic messages to the GUI
- DBG 2: this tells the box to send more specific messages to the GUI
- DBG 3: this tells the box to send even more specific messages to the GUI

Open the Java console to see the messages. A line surrounded by square brackets is written to the Java console whenever a button is pressed, an X10 message is received, or a status change occurs. This is useful for determining whether or not the PLM has seen a button press or X10 message and sent it to the ISY.

23.5.10 EI|DI – Enable/Disable Internet Access

To enable access to this device from the internet, type EI at the shell prompt. By default internet access is disabled.

To disable access to this device from the internet, type DI at the shell prompt.

23.5.11 ET|DT – Enable/Disable Telnet Access

To enable telnet access, type ET at the shell prompt. By default, Telnet Access is enabled.

To disable telnet access, type DT at the shell prompt.

Note: If there's already a telnet session open, the session will continue to function until the user exits the shell.

23.5.12 FR – Factory Reset

To reset the ISY to factory settings, type FR at the shell prompt. Note: By performing a factory reset, the following information shall be lost (irrecoverable) and the Username and Password shall revert back to admin/admin.

- All the schedules
- All the notifications settings
- All the alarm settings
- Time zone
- All the discovered devices, their names, their groups
- The network name

23.5.13 FS – Format SD Card

To format the SD Card, type FS at the shell prompt. Answer the "Are you sure question" with an upper case "Y"

Please note: the ISY works with both FAT 16/32, but FS function formats it specifically for use with ISY with some performance improvements so its preferred you use this method.

23.5.14 LS – List All Files & Directories

To view the listing of files and directories on the memory card, type LS at the shell prompt.

23.5.15 MN – Menu

To show the menu, type MN on the shell prompt. You may also enter any unrecognized command to get the menu to be shown.

23.5.16 RL – Reset Login Credentials

To reset the login credentials back to the initial state of admin/admin, type RL at the shell prompt.

Note: If you have forgotten your Username and Password and are thus unable to login to the shell, please see this page: Resetting Your Userid/Password

23.5.17 RS – Reboot the System

To reboot the system, type RS on the shell prompt.

23.5.18 SM – Show Memory Utilization

To view the ISY's memory utilization, type SM at the shell prompt.

23.5.19 SMR - Maximum Retries Before Client Is Considered Offline

- Default = 3
- Range 1-255

23.5.20 ST – Show System Time

To view the ISY's system time, type ST at the shell prompt.

23.5.21 SU – Show External URL

If this device has been configured for internet access, you may use the SU command – at the shell prompt – to view the external URL through which this device is accessible on the internet.

23.5.22 VE - Display Version

Displays the version information of the ISY. This information includes the following:

- Product
- App
- Platform
- Version
- Build Date
- Other Services

23.5.23 XS – Exit the Shell

To exit the shell, type XS on the shell prompt.

23.6 Clearing Java Cache

Follow these instructions to clear the Java Cache:

Select the Configure Java option in your Windows program menu. This will open the **Java Control** Panel.

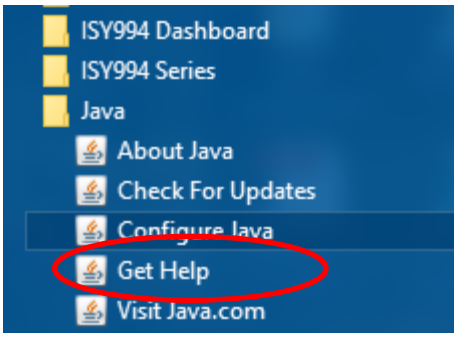


Figure 399: Configure Java Menu Option

Select the **Settings** button in the **General** tab.

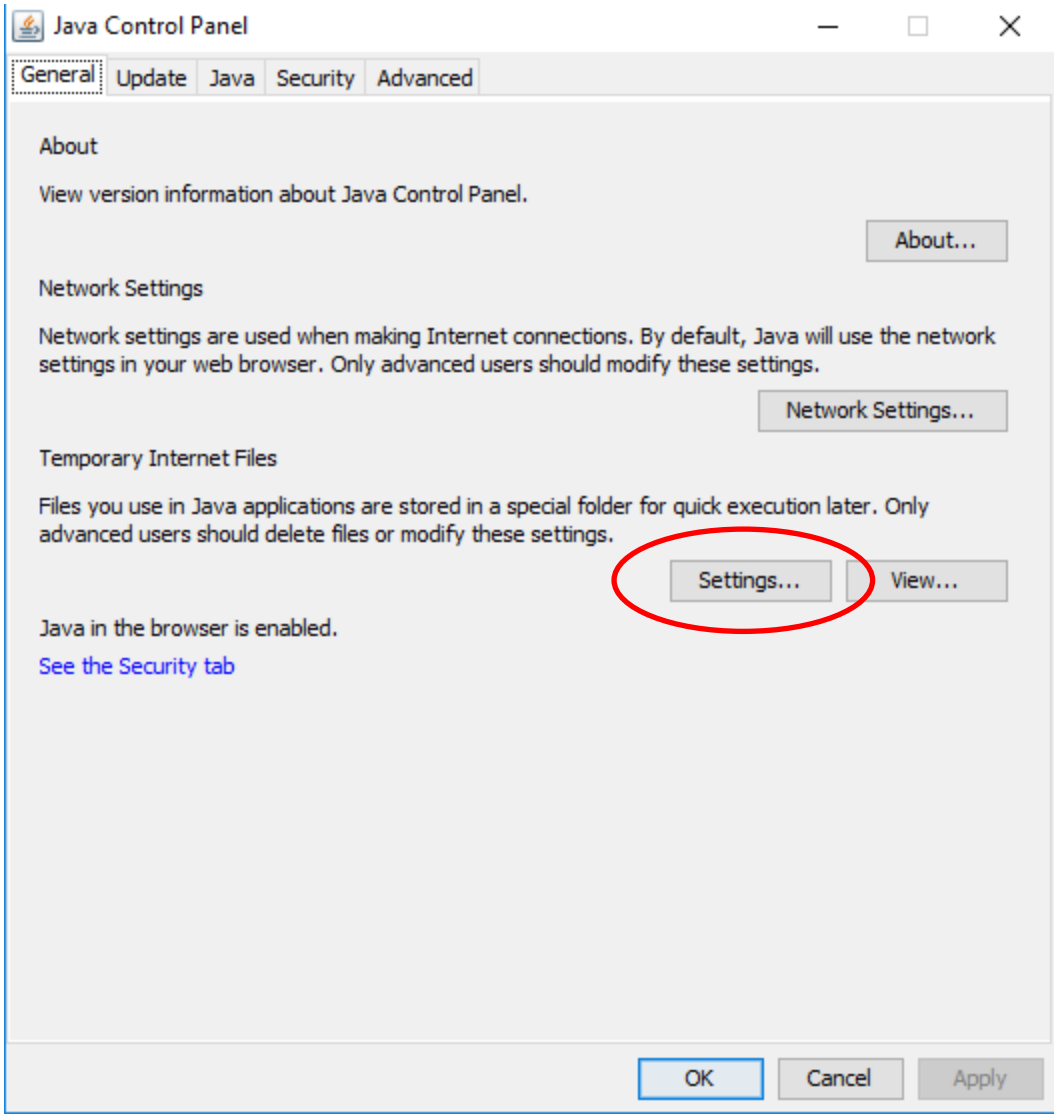


Figure 400: Java Control Panel – General Tab

Select the Delete Files… button in the Temporary **Files Setting** popup.

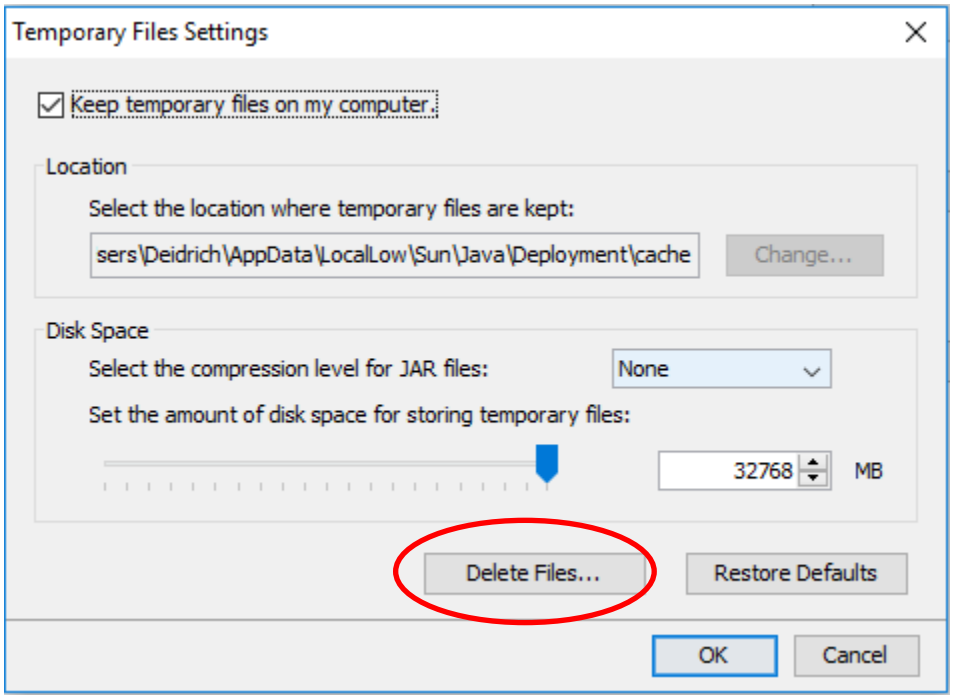


Figure 401: Temporary Files Settings Popup

Select the OK button in the **Delete Files and Applications** popup.

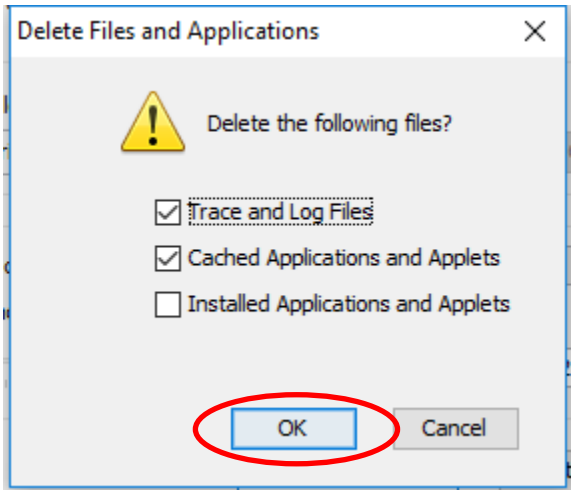


Figure 402: Delete Files and Applications Popup

23.7 INSTEON Communication Issues

It is important to have a pair of INSTEON AccessPoints or other INSTEON RF devices (or an INSTEON-compatible hardwired coupler) installed to ensure good communications between both legs of power in your home. See Smarthome's documentation for ensuring your AccessPoints are installed on opposite legs of power. We recommend placing them as close to your electrical panel as possible.

An AccessPoint (or other INSTEON RF receiver, such as their 2413S Dual-Band PLM) is also required to communicate with INSTEON RF devices.

Most INSTEON devices use powerline technology to communicate with one another. Some devices on in your home may interfere with device communications. Some known offenders are:

- Low voltage lighting
- Fluorescent lighting
- CFLs
- Desktop computers and notebooks
- Surge protectors
- UPSs

In many cases these devices can exist on your powerline with no problem. But, if you are experiencing communication issues, we highly recommend unplugging any devices you have on the above list. Once you establish reliable communications, add the devices back in one at a time to find the cause. Most troublesome plug-in devices can be filtered using FilterLincs from Smarthome.

Because the ISY sends and receives all INSTEON signals through the PLM, we highly recommend plugging it in to an outlet away from potentially noisy electrical devices, such as PCs and UPSs, and as close to your electrical panel as possible. DO NOT plug your PLM into a surge protector or UPS. We also highly recommend installing an AccessPoint as close to your PLM as possible.

23.7.1 Cannot determine Insteon Engine

One of the most common problems which occur is when you are trying to add a new device. The message displayed says **Cannot determine Insteon Engine**. This actual meaning of this cryptic message is that the ISY cannot communicate with the desired device.

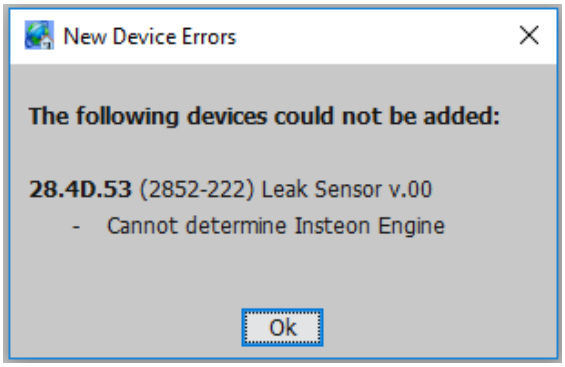


Figure 403: Cannot determine Insteon Engine Message

I will step thru the sequence of events in order for you to understand what is going on:

Open the **Event Viewer** found in the **Tools->Diagnostics** menu or select the **Event Viewer** button in the tool bar.

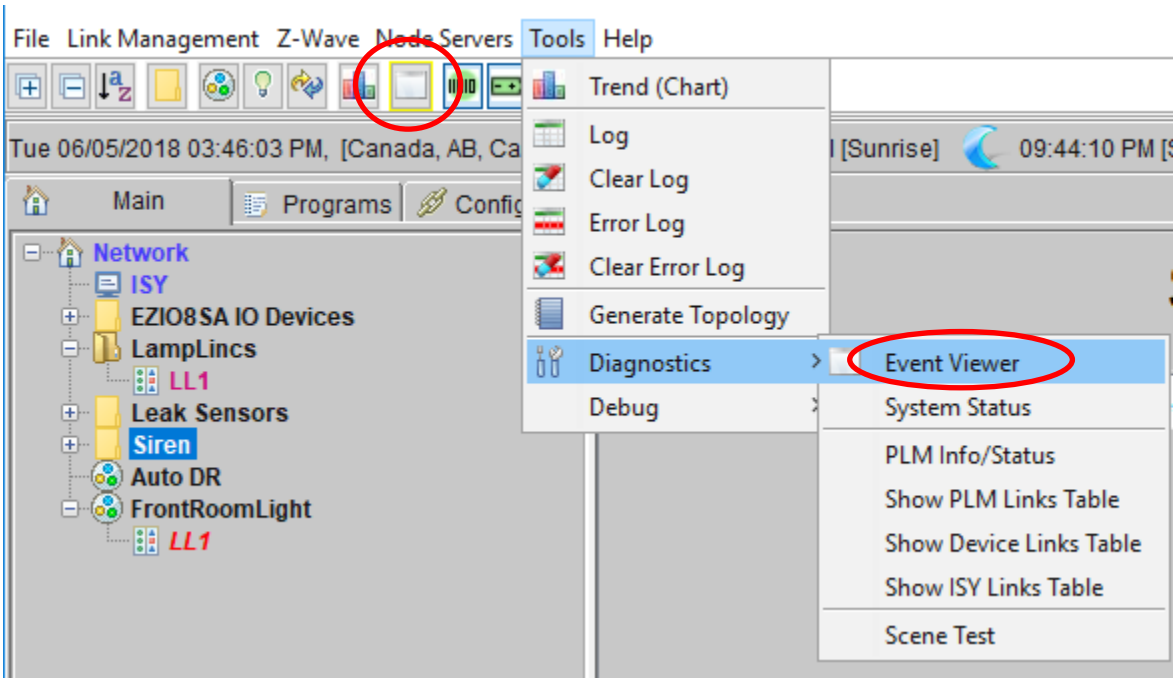


Figure 404: Tools->Diagnostics->Event Viewer Menu Item

Set the level to **3. Device communications events**, and then press the **Clear** button.

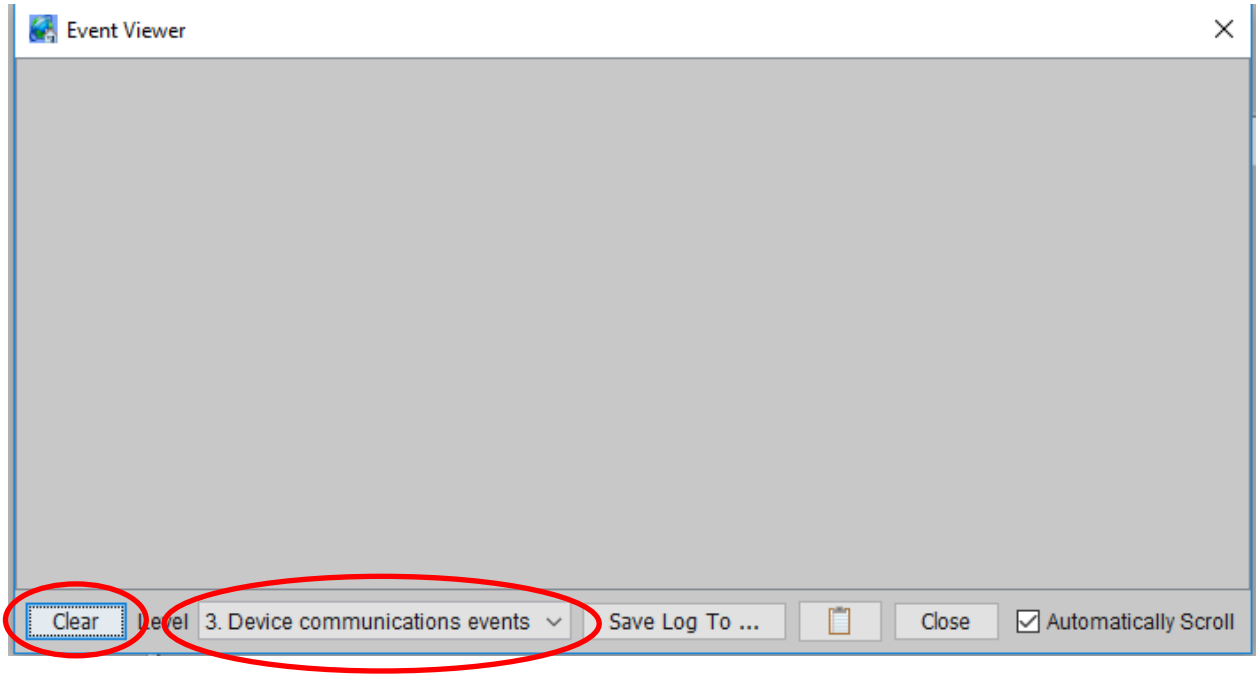


Figure 405: Event Viewer Popup

Try adding your device again.

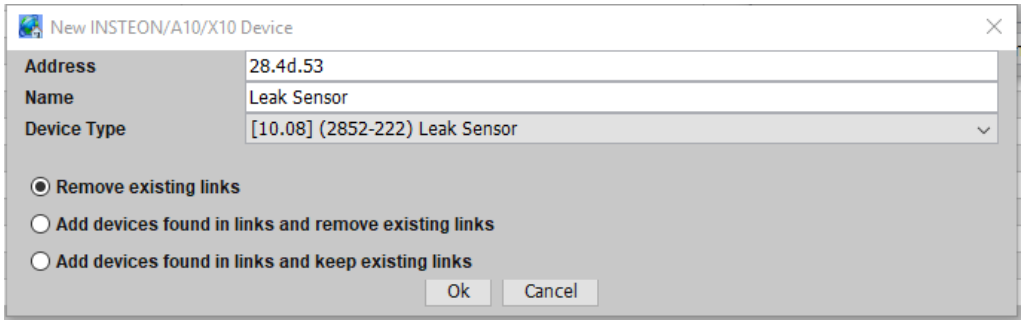


Figure 406: INSTEON/A10/X10 Device Popup

You will see the information showing that an attempt is being made to add the device.

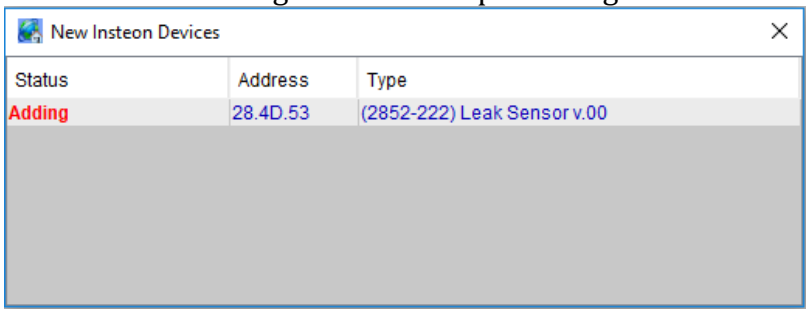


Figure 407: New Insteon Devices Status Popup

Upon failure when trying to add the device, the following popup will be displayed.

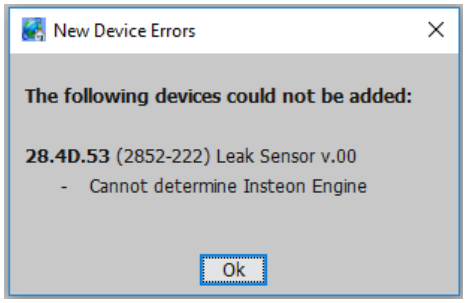


Figure 408: Cannot determine Insteon Engine Message

Examine the **Event Viewer** log.

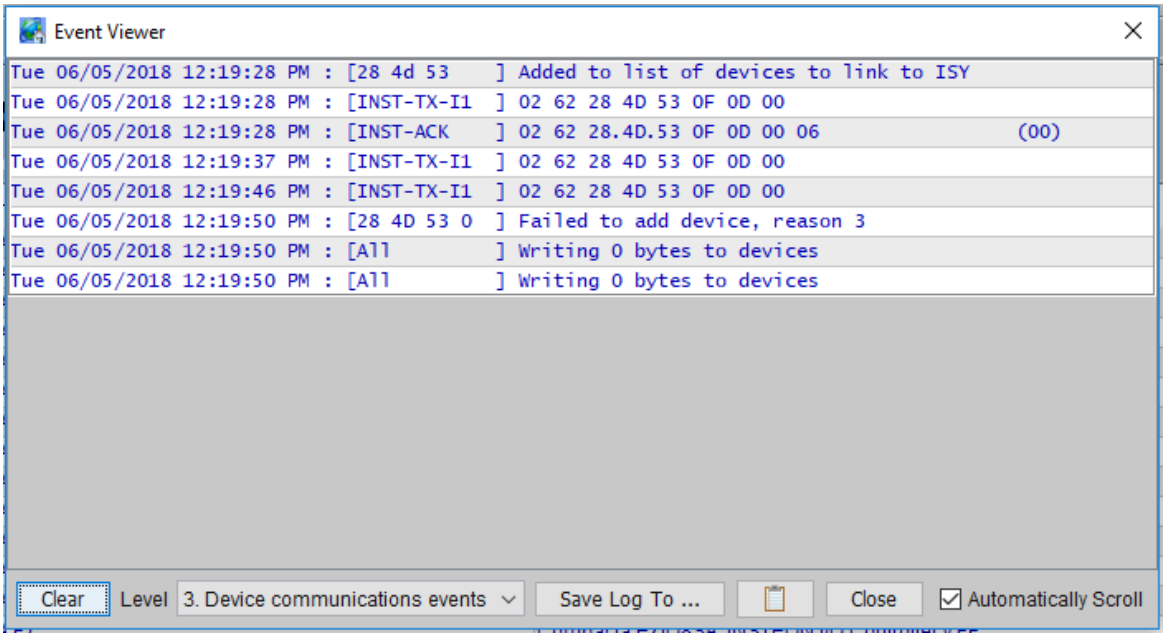


Figure 409: Event Viewer with events following failure

You will see a series of **INST-TX-T1** and **INST-ACK** lines. What is missing are lines that show **INST-SRX**. These are the acknowledgement lines from the device. If these are not being displayed then the ISY cannot communicate with the desired device.

Disconnect all devices from your network, such as spare routers. Once you have done that, and you should see the **INST-SRX** lines shown, as indicated below, and the device should add successfully. Reconnect your devices, one at a time, retesting the communications as above until you find the device causing the issue.

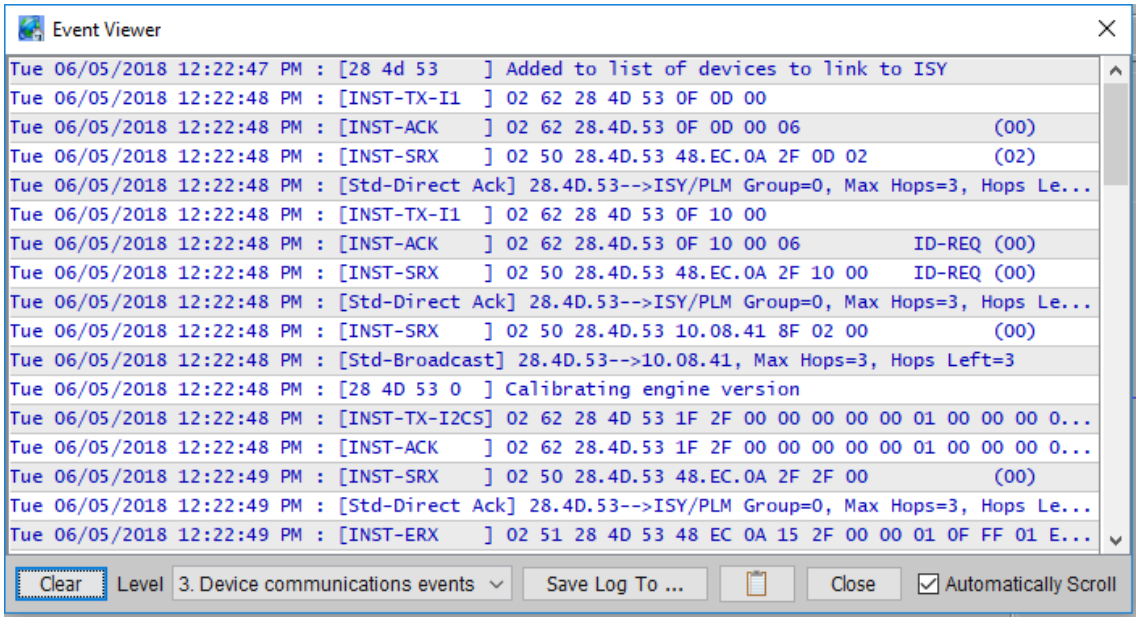


Figure 410: Event Viewer showing successful communication

If this does not work then the issue is most likely a defective PLM module.

23.8 Using the Event Viewer[116]

The Event Viewer provides a real-time display of traffic occurring on the INSTEON network, which may be saved to a log file.

To open the Event Viewer, open the Tools menu Diagnostics sub-menu, and choose Event Viewer.

[116] (Universal Devices)

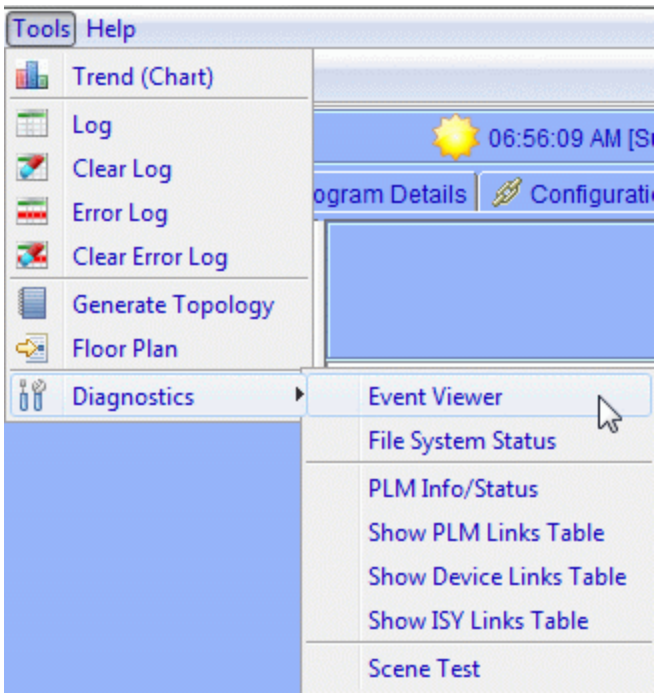


Figure 411: Event Viewer Menu

The Event Viewer window may be sized. At the bottom of the window are buttons to Clear the window, Save Log To ... a file, and Close the window. The Level drop-down allows setting the display level to None, Status/Operational events, More Info, or Device communications events. The default (when the window is opened) is Status/Operational events.

Display Levels

- 0 – None - No progress information.
- 1 - Status/Operational events - Normal events.
- 2 - More Info - Normal events and scheduler/trigger firing events.
- 3 - Device communications events - Hop count, group, and debugging information added.

The display level corresponds to the Debug level in the ISY Shell. The Event Viewer window displays the same information as is found in the Java Console, but without the necessity of telnetting to ISY and using the DBG command in order to set the Debug level.

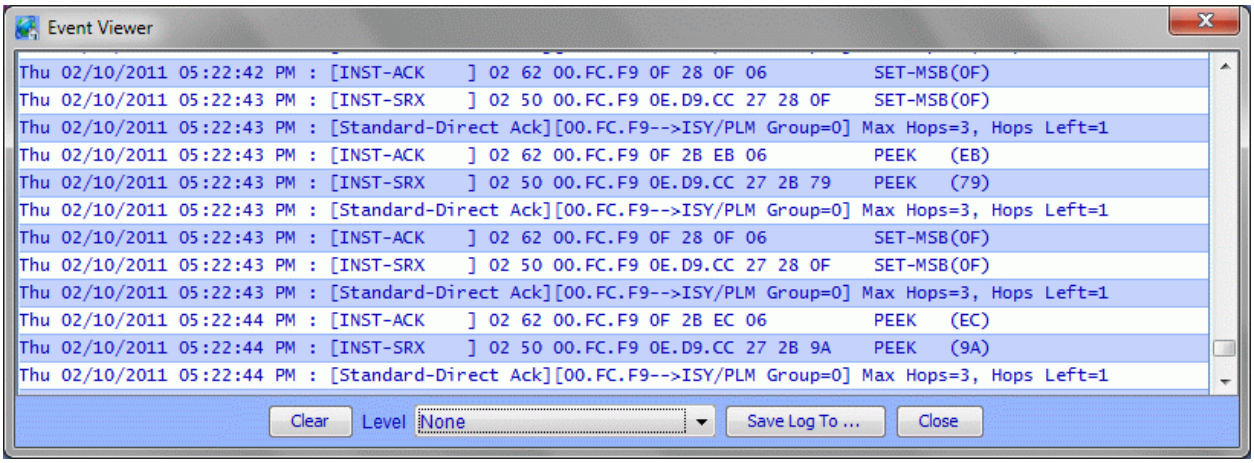


Figure 412: Event Viewer - None

In this image the ISY was reading (PEEKing) the link database on a device at level Device communications events.

None Stops events from being shown in the Event Viewer. Useful when you have captured a series of events and wish to view them without the informavtion scrolling.

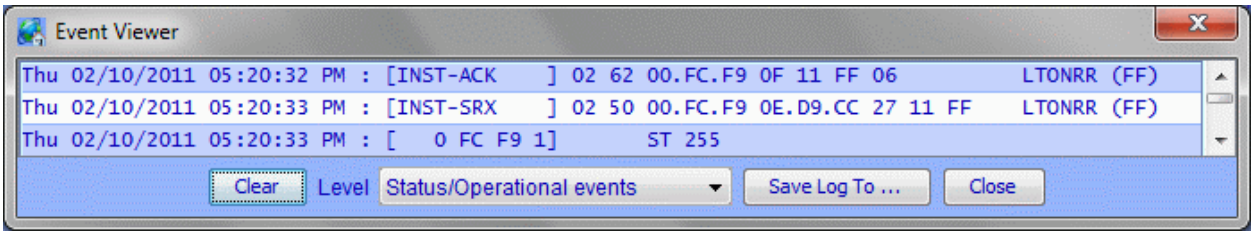


Figure 413: Event Viewer – Status/Operational events

In this image a device was sent an On command.

With Status/Operational events, each event is presented on one line in the Event Viewer window. Each event line displays the following columns: the date, the time, a colon, a bracketed column containing the device's INSTEON address or the term X10, the action code, and a parameter value.

For X-10 devices, the action code may be the device's X-10 address, or the X-10 command. A complete X-10 command sequence consists of two parts: the House/Unit code of the device being addressed, followed by the House/Command code of the command. Since each of these two parts is actually a separate command, each is displayed as an individual event. Some X-10 commands, such as All Off, don't require a separate House/Unit code, and are therefore a single event. The number in parenthesis is the actual X-10 command code. A complete list of X-10 command codes may be found on the Program Commands page.

For INSTEON devices, the action code may be one of:

INSTEON Action Codes

- DON Device On
- DOF Device Off
- DFON Device Fast On
- DFOF Device Fast Off
- BMAN Begin Manual Change
- SMAN Stop Manual Change
- OL On-Level
- RR Ramp-Rate
- ST Status

For the On-Level and Ramp-Rate commands, the parameter is the on-level or ramp-rate being set, respectively. For the Begin Manual Change command, the parameter is '1' for a Fade Up, and '0' for a Fade Down. The parameter for the Status command, is the value returned by that command; usually the current on-level.

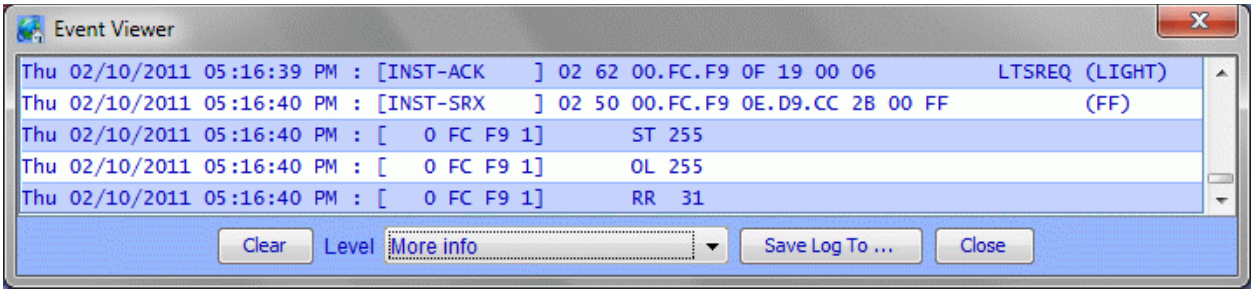


Figure 414: Event Viewer – More Info

In this image a device was Querried.

With More Info, in addition to the information displayed by Status/Operational events, the Event Viewer displays more detailed informational lines, the most important of which are:

INSTEON Level 2 Codes

- INST-ACK The PLM responded to a command sent by ISY (usually an echo). i2 ACKs are longer (23 bytes).
- INST-SRX The receiving device has either responded to a command from ISY or is sending an event. This is the standard length message (i1).
- INST-ERX Like INST-SRX, but extended length and returned by i2 devices.

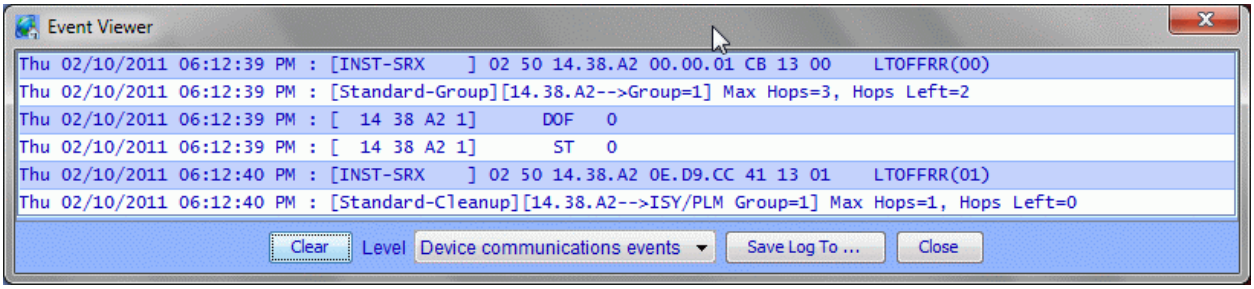


Figure 415: Event Viewer – Device communication events

In this image a device was turned Off and it sends a command to the ISY.

Device communications events adds to the information displayed by More Info. It adds Group numbers, hop counts and debugging information.

In general, things work like this:

INSTEON Communications

- Sending a request from ISY (i1) ---->Send Request---->Receive INST-ACK-(Wait for Response)---->Receive INST-SRX. Timeout means that either INST-ACK or ISNT-SRX did not come within allotted time (4 seconds).
- Sending a request from ISY (i2) ---->Send Request---->Receive INST-ACK-(Wait for Response)---->Receive INST-SRX---->Receive INST-ERX.
- Receiving events from devices ---->Receive INST-SRX

23.8.1 Decoding the Information

- Once the Event Viewer is begun during a session at the Administrative Console it can be closed and will retain the information it has.
- Use the Clear button to start a new test.
- Set to a higher level the window will fill faster but will display more complete diagnoses.
- Set the Level to None when your test is done to stop scrolling the window.
- The Events can be saved Using the Save Log... button.

23.9 Event Viewer Log Details[117]

23.9.1 Viewing the Log File:

From the ISY Administrative Console select the **Tools/Log** menu item. A window opens asking if you wish to view the Log in Excel. Selecting **Yes** produces a file and opens Excel.

[117] (Universal Devices)

Selecting **No** opens a window allowing you to save the file to a location of your choice. Start your database program and open the saved log file. Sorting can be applied as your database program allows.

When opening the log in Excel you will be requested to allow macros to run. You must select **OK** for the macro to run and to have access to the log file.

The log file contains the date and category intersections for all the devices linked to ISY. The columns provided are INSTEON Device, Control, Value, Time, User, and Log Type. Below is a sample Log file viewed in Excel.

INSTEON	Control	Value	Time	User	Log Type
0	null		Fri 2013/04/05 14:58:09	System	Start
Scene:ISY	Status	Query	Fri 2013/04/05 14:58:11	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:50	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:51	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:51	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:51	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:52	System	Log
X10	F	Bright (7)	Fri 2013/04/05 18:09:52	System	Log
X10	F5		Fri 2013/04/05 18:19:38	System	Log
X10	F5	Off (11)	Fri 2013/04/05 18:19:39	System	Log

Figure 416: Sample Log File

The log can be cleared using the menu item **Tools/Clear Log**.

23.9.2 Error Messages[118]

23.9.2.1Viewing the Log file

Viewing the log file from the ISY is best done using a database program. By default the ISY produces a file for use in Excel. However, any database program that can read comma separated values (.csv) files can be used to view the log.

From the ISY Administrative Console select the Menu item Tools | Log. A requester will open asking if you wish to view the log in Excel. Selecting Yes will produce a file and open Excel. Selecting No will open a file requester allowing you to save the file to a location of your choice. Start your database program and open the saved log file.

[118] (Universal Devices)

- When opening the log in Excel you will be requested to allow macros to run. You must select OK for the macro to run and to have access to the log file. The log file contains the date and category intersections for all the devices linked to ISY.
- If your log file is empty you probably don't have macros enabled. To enable macros:
    - Click on the Tools menu
    - Select Macros
    - Select Security and choose Medium for level

The 6 columns provided are INSTEON Device: The name of the device

- Control: The property on the device that changed
- Value: The value of the property
- Time: The time of the event
- User: The initiating party (Web, Program, ELK, System)
- Log Type: The type of entry (Start, Log, Error Code in case of error)

The error codes are contained in column 6, Log Type.

Sorting can be applied as your database program allows.

Log size can be configured using the ISY shell.

The log can be cleared using the menu item Tools | Clear Log.

23.9.2.2Outputting the Errors

The ISY error messages are output in the java console, but the output is not enabled by default. You will need to enable them using the ISY Telnet interface.

- Use the "Logon to My INSTEON ISY Now!" weblink: http://www.universal-devices.com/MyInsteonISY/, enter your user name and password when prompted to log in.
- At the bottom right, in System tray, on your computer screen right mouse click the Java icon and "Show Console" or "Open Console".

You should be able to see ISY messages in the Java Console.

23.9.3 System Errors

System Errors		
Number	**Error**	**Message**
-1	REQUEST_FAILED_ERROR	
-2	DEVICE COMMUNICATION ERROR	timed out waiting for the device to respond or got a NACK
-3	DEVICE RETURNED INVALID NODE	an address that we don't have in our nodemap
-4	DEVICE RETURNED INVALID ADDRESS	communication error
-10	UNEXPECTED DEVICE RESPONSE	
-20	MAIN LOCAL DEVICE BLANK	
-500	HAML DRIVER LISTENER NOT REGISTERED	the listener has not been registered
-1000	HAML PARSER UNDEFINED ELEMENT	
-1001	HAML PARSER ONDATA	
-5001	UPNP DRIVER NO DEVICES CONFIGURED	
-5002	UPNP DRIVER SERIAL READER FAILED	
-5003	UPNP DRIVER MAX DEVICES	
-5004	UPNP SERVICE TYPE SEARCH NS	we don't support service type search requests yet
-5005	UPNP SUBSCRIPTION NOT FOUND FOR RENEWAL	
-5006	UPNP SUBSCRIPTION NOT FOUND FOR CANCELATION	
-5007	UPNP INVALID SUBSCRIPTION URL	
-5008	UPNP INVALID SUBSCRIPTION CALLBACK	
-5009	UPNP MAX SUBSCRIBERS	
-5010	UPNP SUBSCRIBER TCP CONNECT FAILURE	tried to connect to the subscriber's ip/port but timed out
-5011	PROCESS DEVICE STATE CHANGE SID NOT FOUND	
-5012	UPNP SUBSCRIBER NOREPLY TO EVENT 1	subscriber didn't reply to the event:couldn't write header
-5013	UPNP SUBSCRIBER NOREPLY TO EVENT 2	subscriber didn't reply to the event:couldn't write body
-5014	UPNP SUBSCRIBER NOREPLY TO EVENT 3	subscriber didn't reply to the event:read time out
-5015	UPNP CONTROL MALFORMED SOAP REQUEST 1	missing body; we got a malformed control request
-5016	UPNP CONTROL MALFORMED SOAP REQUEST 2	chopped off URL
-5017	UPNP_CONTROL_MALFORMED_SOAP_REQUEST_3	missing node
-6000	OS DUPLICATE TASK PRIORITY	
-6001	OS OPEN SERIAL FAILED	
-7000	D2D SUBSCRIBE TCP CONNECT FAILURE	could not connect to the xternal device to subscribe to its events
-7001	D2D MAX REMOTE LISTENER THREADS	

System Errors		
Number	**Error**	**Message**
-7002	D2D FACTORY FILE NOT FOUND	tried to use a static d2d file but it doesn't exist
-7003	D2D MALFORMED RULE MISSING SENSE TAG	the <Sense> tag is missing
-7004	D2D MALFORMED RULE MISSING SENSE ID ATTR	missing the id attribute in the sense tag
-7005	D2D MALFORMED RULE UNDEFINED TAG	missing the condition tag
-7008	D2D MALFORMED RULE MISSING RESPOND TAG	missing the <Respond> tag
-7009	D2D EVENT MISSING SOAP BODY	missing soap body for the received event
-7010	D2D UNKNOWN CONDITION OPERATION	operations could be either of =<or>
-7011	D2D EVENT MISSING PROPERTY TAG	missing <e:property tag in the received event
-7012	D2D SUBSCRIPTION REMOTE DEVICE NOT FOUND	tried to subscribe to the remote device but couldn't find it
-7013	D2D SUBSCRIPTION FAILED NO REPLY	although made a connection but the device didn't reply back
-7014	D2D SUBSCRIPTION FAILED NO SID RETURNED	subscribed to the external device but it didn't return an sid
-7015	D2D DESCRIPTION MALFORMED URL	the url to the device is malformed
-7016	D2D UNSUBSCRIPTION FAILED NO REPLY	tried unsubscribing but no reply from the device
-7017	D2D REQUEST FAILED NO ACTION	a request was sent but it didn't have an action
-7018	D2D CONDITION CHECK FAILED NO ACTION	
-7019	D2D PARSER ERROR SENSE NOT FOUND	
-7020	D2D PARSER ERROR	
-7021	D2D FACTORY SUBSCRIBE URL FAILURE	couldn't open a socket connection to the d2d factory url
-7022	D2D FACTORY SUBSCRIBE NO REPLY	although subscribed to the factory default no reply was returned
-7023	D2D COMPRESSION FAILED	tried to compress the d2d rules but failed
-7024	D2D DECOMPRESS FAILED	tried to decompress the d2d rules but failed
-7025	D2D RETRIEVE INITIALIZE FAILED	after decompressing tried initializing the d2d but failed
-7026	NOTIFICATIONS DNS ERROR	
-7027	NOTIFICATIONS MAIL SERVER NOT SETUP	
-7029	NOTIFICATIONS MAIL TO ADDRESS REQUIRED	
-7030	NOTIFICATIONS SEND MAIL FAILED	
-7050	D2D EXPECTED D2D TAG	Expected D2D tag but got something different

System Errors		
Number	**Error**	**Message**
-7051	D2D UNEXPECTED TAG IN SENSE	Found an unexpected tag in the XML stream
-7052	D2D UNEXPECTED TAG IN CONDITION	Found an unexpected tag in the XML stream
-7053	D2D UNEXPECTED TAG IN RESPOND	Found an unexpected tag in the XML stream
-7501	DIAG PARSER ERROR	Error in UPBDiagParser
-7601	LINK PARSER ERROR	Error in UPBLinkDevices
-9000	SYSTEM NOT INITIALIZED POST FAILED	system is not intialized yet while trying to post
-9001	SYSTEM NOT INITIALIZED PUBSUB FAILED	
-10001	RANDOM GEN START ERROR	
-10002	RANDOM GEN READY ERROR	
-10003	RANDOM GEN ADD ENTROPY ERROR	
-10004	CTR START ERROR	
-10005	CTR ENCRYPT ERROR	
-10006	CTR SET IV ERROR	
-10007	CTR DECRYPT ERROR	
-10008	RSA KEY GENERATION FAILED	
-10009	RSA PUBLIC KEY IMPORT FAILED	
-10010	RSA PRIVATE KEY IMPORT FAILED	
-10011	RSA REIMPORT KEYS FAILED	
-10012	RSA EXPORT PUBLIC KEY FAILED	
-10013	RSA EXPORT PRIVATE KEY FAILED	
-10014	RSA MODULUS CONVERSION TO CHAR FAILED	
-10015	RSA EXPONENT CONVERSION TO CHAR FAILED	
-10016	RSA MODULUS ENCODING TO BASE 64 FAILED	
-10017	RSA EXPONENT ENCODING TO BASE 64 FAILED	
-10018	LIFETIME SEQUENCE ENCODING TO BASE 64 FAILED	
-10019	SET SESSION BASE64 DECODE FAILED	
-10020	SET SESSION RSA DECRYPT FAILED	
-10021	SET SESSION KEY PARSER FAILED	
-10022	SET SESSION KEY UNSUPPORTED BULK ALGORITHM	
-10023	BULK KEY INITIALIZATION FAILED WRONG KEY LENGTH	the vector sent to initialize a bulk key is too long
-10024	BULK KEY INITIALIZATION FAILED WRONG IV LENGTH	
-10025	BULK KEY INITIALIZATION FAILED WRONG KEY IV LENGTH	
-10028	SET SESSION INVALID BULK KEY	
-10029	SET SESSION AES INIT FAILED	
-10030	SET SESSION AES DECRYPT FAILED	
-10031	SET SESSION CIPHER TEXT BASE64 DECODE FAILED	
-10032	SET SESSION CIPHER TEXT PARSER FAILED	
-10033	SET SESSION KEY UNSUPPORTED BULK ENC ALGORITHM	

System Errors		
Number	**Error**	**Message**
-10034	SET SESSION KEY UNSUPPORTED SIGN ALGORITHM	
-10035	SET SESSION CIPHER TEXT ENC KEY TO DEVICE BASE64 DECODE FAILED	
-10036	SET SESSION CIPHER TEXT ENC KEY FROM DEVICE BASE64 DECODE FAILED	
-10037	SET SESSION CIPHER TEXT SIGN KEY TO DEVICE BASE64 DECODE FAILED	
-10038	SET SESSION CIPHER TEXT SIGN KEY FROM DEVICE BASE64 DECODE FAILED	
-10039	SET SESSION ENCRYPT KEY TO DEVICE ASSIGNMENT FAILED	
-10040	SET SESSION ENCRYPT KEY FROM DEVICE ASSIGNMENT FAILED	
-10041	SET SESSION SIGN KEY TO DEVICE ASSIGNMENT FAILED	
-10042	SET SESSION SIGN KEY FROM DEVICE ASSIGNMENT FAILED	
-10043	SET SESSION CIPHER TEXT BLANK ENC KEY TO DEVICE	
-10044	SET SESSION CIPHER TEXT BLANK ENC KEY FROM DEVICE	
-10045	SET SESSION CIPHER TEXT BLANK SIGN KEY TO DEVICE	
-10046	SET SESSION CIPHER TEXT BLANK SIGN KEY FROM DEVICE	
-10047	SET SESSION KEY MISSING CP RSA KEY	
-10048	SET SESSION CP RSA MOD BASE64 DECODE FAILED	
-10049	SET SESSION CP RSA EXP BASE64 DECODE FAILED	
-10050	SET SESSION CP RSA KEY INIT FAILED	
-10051	SET SESSION CP RSA MOD CREATION FAILED	
-10052	SET SESSION CP RSA EXP CREATION FAILED	
-10053	SET SESSION MISSING SIGNATURE	
-10054	SET SESSION SIGNATURE HASH FAILED	
-10055	SET SESSION MISSING SIGNATURE VALUE	
-10056	SET SESSION SIGNATURE VALUE BASE64 DECODE FAILED	
-10057	SET SESSION SIGNATURE VERIFICATION FAILED	
-10058	MISSING SEQUENCE BASE	
-10059	INVALID SEQUENCE BASE	
-10060	EXPIRE SESSION PARSE ERROR	
-10061	EXPIRE SESSION SESSION NOT FOUND	
-10062	VERIFY HMAC SIGNATURE VALUE BASE64 DECODE FAILED	
-10063	VERIFY HMAC MISSING SIGNATURE	
-10064	VERIFY HMAC PROCESS FAILED	
-10065	VERIFY HMAC SIGNATURE FAILED	
-10066	VERIFY UPNP SECURITY INFO INVALID SEQUENCE NUMBER	
-10067	DECRYPT AND EXECUTE SESSION DOES NOT EXIST	
-10068	DECRYPT AND EXECUTE MISSING REQUEST TAG	
-10069	DECRYPT AND EXECUTE MISSING IN IV	
-10070	DECRYPT AND EXECUTE BASE64 DECODE FAILED	

System Errors		
Number	**Error**	**Message**
-10071	DECRYPT AND EXECUTE EXPIRED SESSION	
-10072	DECRYPT AND EXECUTE SET IV FAILED	
-10073	DECRYPT AND EXECUTE DECRYPTION FAILED	
-10074	DECRYPT AND EXECUTE IV BASE 64 DECODE FAILED	
-10001	SSL DECODING LENGTHS FAILED	
-10002	SSL DECODING PMOD FAILED	
-10003	SSL DECODING PEXP FAILED	
-10004	SSL DECODING PRI EXP FAILED	
-10005	SSL DECODING PRI P FAILED	
-10006	SSL DECODING PRI Q FAILED	
-10007	SSL DECODING PRI X1 FAILED	
-10008	SSL DECODING PRI X2 FAILED	
-10009	SSL DECODING PRI COEFF FAILED	
-10010	SSL DECODING CERT FAILED	
-10011	SSL REQUEST NOT AUTHENTICATED	
-10012	SSL NO SUCH SERVICE	A call was made to a service end point that does not exist
-10026	SECURE SESSION DOES NOT EXIST	a secure session was requested that does not exist
-10027	SECURE SESSIONS EXHAUSTED	no more secure sessions available
-10100	AUTHENTICATION UPNP SECURITY NOT VERIFIED	
-10101	AUTHENTICATION UNSUPPORTED UID LEN	
-10102	AUTHENTICATION UNSUPPORTED PWD LEN	
-10103	AUTHENTICATION USER ID DOES NOT EXIST	
-10104	AUTHENTICATION USER ID PWD NOT PRESENT	
-10105	AUTHENTICATION WRONG PASSWORD	
-10106	AUTHENTICATION FAILED	
-10107	COULD NOT DECODE THE AUTHETICATION HEADER	
-11000	SECURITY INITIALIZATION FAILED	
-12000	TIMED OUT WAITING FOR CRITICAL SECION	
-12001	ERROR LEAVING CRITICAL SECTION NOT OWNED	
-12002	BULK KEY ENCRYPTION FAILED CFB START	
-12003	BULK KEY ENCRYPTION FAILED ENCRYPT	
-13000	CONTENT LEN NOT EQUAL TO HEADER CONTENT LEN	
-14001	XML MALFORMED TAG	@05
-14002	XML MALFORMED END TAG	@05
-14003	XML NO START TAG	@05
-14004	XML NO TAG NAME	@05
-14005	XML START END NAME MISMATCH	@05
-14101	UD_JSON_ERR_MAX_STRINGS_EXCEEDED	JSON Parsing Error (4.2.3+)
-14102	UD_JSON_ERR_MAX_NESTING_DEPTH_EXCEEDED	JSON Parsing Error (4.2.3+)
-14103	UD_JSON_ERR_UNEXPECTED_CLOSE_BRACKET	JSON Parsing Error (4.2.3+)
-14104	UD_JSON_MAX_TAG_AND_DATA_LENGTH_EXCEEDED	JSON Parsing Error (4.2.3+)

System Errors		
Number	**Error**	**Message**
-14105	UD_JSON_ERR_UNEXPECTED_HEX4_LENGTH	JSON Parsing Error (4.2.3+)
-14106	UD_JSON_SUPPLIED_MAXLEN_TOO_LOW	JSON Parsing Error (4.2.3+)
-14107	UD_JSON_ERR_OBJECT_UNEXPECTED_CHAR	JSON Parsing Error (4.2.3+)
-14108	UD_JSON_ERR_OBJECT_NAME_UNEXPECTED_CHAR	JSON Parsing Error (4.2.3+)
-14109	UD_JSON_ERR_OBJECT_SEP_UNEXPECTED_CHAR	JSON Parsing Error (4.2.3+)
-20000	MALFORMED UPNP HEADERS	
-30000	COMPRESSION INIT FAILED	
-40000	SCHEDULE SAVE NODE INDEX NOT FOUND	
-40001	DECOMPRESS GLOBAL SCHEDULE FAILED	
-40003	DECOMPRESS NOTIFICATIONS CONFIGURATION FAILED	
-50000	MAIL SERVER CONNECT ERROR	
-50001	SMTP SERVER FAILURE	
-50005	MAIL SERVER CONNECT ERROR	
-50006	MAIL SERVER CONNECT ERROR	
-50007	MAIL SERVER NO HOST PARAM	
-50008	MAIL SERVER NO PORT PARAM	
-50009	MAIL SERVER NO PATH	*/
-50010	MAIL SERVER DNS ERROR	
-50011	MAIL MAX FROM LEN	
-50012	MAIL MAX SUBJECT LEN	
-50013	MAIL MAX TO LEN	
-60000	NTP CONFIG SERVER NO HOST PARAM	
-60001	NTP CONFIG SERVER ADDRESS RESOLUTION FAILED	
-60002	NTP CONFIG SERVER NO INTERVAL PARAM	
-60004	NTP SERVER ADDRESS RESOLUTION FAILED	
-60006	NTP SERVER NOT RESPONDING	
-60007	NTP SERVER CONNECT ERROR	
-70000	OUT OF MEMORY	
-70001	VECTOR MAX CAPCITY	
-80000	IGD FAILED PARSING DESCRIPTION URL	
-80001	IGD FAILED RETRIEVING DESCRIPTION FILE	
-80002	IGD FAILED RETRIEVING URL BASE	
-80003	IGD FAILED PARSING URL BASE	
-80004	IGD FAILED RETRIEVING WAN CONNECTION DEVICE	
-80005	IGD FAILED RETRIEVING CONTROL URL	
-80006	IGD FAILED PARSING CONTROL URL	
-80007	IGD FAILED RETRIEVING EXTERNAL IP	
-80008	IGD NO RESPONSE FROM GATEWAY	
-80009	IGD FAILED STRIPPING HTTP HEADERS	
-80010	IGD FAILED DELETING PORT FORWARD MAP	
-80011	IGD FAILED ADDING PORT FORWARD MAP	
-80012	IGD FAILED GETTING SPECIFIC ENTRY	
-90001	CRC INVALID ORDER	

System Errors		
Number	**Error**	**Message**
-90002	CRC INVALID POLYNOM	
-90003	CRC INVALID CRC INIT	
-90004	CRC INVALID CRC XOR	
-100000	LOGGER DIRECTORY CREATION FAILED	
-100001	LOGGER SD IS NOT INSTALLED	
-100002	LOGGER LOG FILE OPEN FAILED	
-100003	LOGGER TEMP LOG FILE OPEN FAILED	
-100004	LOGGER MAKE ROOM LOG FILE OPEN FAILED	
-100005	LOGGER SEEK FREE LOG SIZE FAILED	
-100006	LOGGER SEEK END OF LINE FAILED	
-100007	LOGGER TEMP LOG FILE READ FAILED	
-100008	LOGGER TEMP LOG FILE WRITE FAILED	
-110000	FILE TO STRING OPEN FAILED	
-110001	FILE TO STRING MEM ALLOC FAILED	
-110002	SD DRIVE FORMAT FAILED 1	format failed
-110003	SD DRIVE FORMAT FAILED 2	couldn't write the config.ud file
-110004	SD DRIVE MOUNT FAILED 1	mount after format failed
-110005	SD DRIVE MOUNT FAILED 2	initial mount failed
-110006	SEND FILE OPEN FAILED	
-110007	SEND FILE READ FAILED	
-110008	RECEIVE FILE WRITE FAILED	
-110009	RECEIVE FILE OPEN FAILED	
-110010	SD DRIVE DIRECTORY CREATION FAILED	
-110011	SD DRIVE CONFIG FILE OPEN WRITE FAILED	
-110012	SD DRIVE CONFIG FILE OPEN READ FAILED	
-110013	SD DRIVE CONFIG WRITE FAILED	
-110014	SD DRIVE CONFIG READ FAILED	
-110015	STRING TO FILE OPEN FAILED	
-110016	STRING TO FILE WRITE FAILED	
-110017	FILE TO STRING READ FAILED	
-110018	REMOVE FILE FAILED	
-110019	REMOVE DIR FAILED	
-110020	FLUSH FILE FAILED	
-110021	CLOSE FILE FAILED	
-110022	OPEN FILE FAILED	
-110023	FLUSH FILE SYSTEM FAILED	
-110024	FILESYSTEM_INIT_FAILED	
-120000	FIRMWARE UPDATE OPEN FILE FAILED	
-120001	FIRMWARE UPDATE HEADER READ FAILED	
-120002	FIRMWARE UPDATE CHECKSUM FAILED	
-120003	FIRMWARE UPDATE MALLOC FAILED	
-120004	FIRMWARE UPDATE DATA READ FAILED	
-130000	ELK CONFIG PARSER ERROR	

System Errors		
Number	**Error**	**Message**
-140000	HTTP_CLIENT_DNS_ERROR	
-140001	HTTP_CLIENT_BASE64_ENCRYPTION_FAILED	
-140002	HTTP_CLIENT_CONNECTION_TIMED_OUT	
-140003	HTTP_CLIENT_WRITE_HEADER_FAILED	
-140004	HTTP_CLIENT_WRITE_BODY_FAILED	
-140005	HTTP_CLIENT_READ_RESPONSE_FAILED	
-140006	HTTP_CLIENT_HEADER_NO_STATUS	
-140007	HTTP_CLIENT_RESOURCE_MOVED	
-140008	HTTP_CLIENT_REQUEST_FAILED	
-150000	TCP_CLIENT_WRITE_FAILED	
-150100	UDP CLIENT DNS ERROR	
-160000	PROTOCOL_READER_READ_ERROR	
-160001	PROTOCOL_READER_BUFFER_OVERFLOW	
-160002	PROTOCOL_READER_REOPEN_ERROR	
-170000	WEB_MODULE_NO_FREE_SPACE	
-200000	DRIVER	
-251001	UZW_MSGCODE_COMM_RXU_IGNORED	Z-Wave: Unsupported unsolicited response message ignored
-251002	UZW_DATABASE_NOT_FOUND	Z-Wave: Database for device not found. Ignored
-251003	UZW_NOT_ACTIVE_ZWAVE_NODE	Z-Wave: Not an active Z-Wave node. Ignored
-251004	UZW_USER_SCHEDULE_NOT_ENABLED	Z-Wave: Schedule to wake up not enabled
-251005	UZW_USER_SCHEDULE_NOT_DISABLED	Z-Wave: Schedule to wake up not disabled
-251006	UZW_COMMAND_FAILED	Z-Wave: Command failed
-251007	UZW_CORRUPT_RX_MSG	Z-Wave: Corrupted message received
-251008	UZW_ATTEMPTED_TO_DELETE_DEFAULT_DB	Z-Wave: Debug info
-271001	PORTAL_SECURITY_INVALID_UUID_ERROR	Tried to register an ISY with the portal but invalid UUID was provided
-271002	PORTAL_SECURITY_INVALID_ACCOUNT_ID_ERROR	Tried to register an ISY with the portal but invalid portal account was provided
-271003	PORTAL_SECURITY_INVALID_KEY_ERROR	Tried to register an ISY with the portal but invalid portal key was provided
-271004	PORTAL_SECURITY_GENERATE_KEY_FAILED_ERROR	Failed generating a random portal key
-271005	PORTAL_SECURITY_INVALID_COMMAND_ERROR	Invalid portal command was provided

System Errors		
Number	**Error**	**Message**
-271006	PORTAL_SECURITY_KEY_EXPIRED_ERROR	Portal authorization failed since the key expired
-271007	PORTAL_SECURITY_INVALID_KEY_LENGTH_ERROR	Tried to register an ISY with the portal but invalid key length was received
-271008	PORTAL_SECURITY_KEY_VALIDATION_FAILED_ERROR	Tried to register an ISY with the portal but validation failed
-281001	RTC_READ_ERROR	Failed reading the RTC
-281002	RTC_READ_ERROR_ADJUST_DST	Failed reading the RTC to adjust DST
-281003	RTC_READ_ERROR_INVALID_TIME	Read the RTC but got invalid time
-281004	RTC_READ_ERROR_NO_CRIT	Failed reading RTC due to not being able to get a crit
-281005	RTC_WRITE_ERROR	Failed writing/updating the time in RTC
-281006	RTC_WRITE_ERROR_NO_CRIT	Failed writing/updating the time in RTC due to not being able to get a crit
-281007	RTC_WRITE_ERROR_REFRESH	Failed writing/updating the time in RTC during refreshing system clock
-281008	RTC_SYNCH_ERROR	Failed synching system clock with RTC

23.9.4 Web Services/SOAP Errors

Web Services/SOAP Errors		
Number	**Error**	**Message**
200	SOAP OK	Request Succeeded
401	Invalid Action	The HTTP Action header (SOAPAction) is invalid
402	Invalid Arguments	
403	Forbidden	
500	Internal Error	
501	SOAP Action Failed	Could not process the request SOAP message
600	Invalid Argument Value	Was expecting a different value for the given argument
601	Argument Value Out of Range	
602	Not Implemented	Returned when given SOAP Request is not implemented
603	Out of Memory	ISY is out of memory and might require reboot
604	Human Intervention Required	
605	String Argument Is Too Long	
609	Not Encrypted	Not used in 2.6.1 and above

Web Services/SOAP Errors		
Number	**Error**	**Message**
612	Invalid Session	Not used in 2.6.1 and above
701	Not Authorized	Credentials are either wrong or not provided
711	Signature Failed	Not used in 2.6.1 and above
712	Signature Missing	Not used in 2.6.1 and above
714	Invalid Sequence	Not used in 2.6.1 and above
715	Invalid Control URL	Control URL is the location where SOAP messages are Posted to
721	Algorithm Not Supported	Not used in 2.6.1 and above
781	No Such Session	The requested session does not exist
801	Exhausted Secure Sessions	No more sessions are available. In some cases, this may require reboot
802	Device Error	Could not communicate with a device
803	Is In Linking Mode	When ISY is in Linking mode, most other operations fail returning this code
810	Subscription: Incompatible Headers	Subscriptions require headers as defined in the developers guide
811	Subscription: Missing Callback	Need CALLBACK: URL in the HTTP Header. <URL> could be <REUSE_SOCKET>
812	Invalid NT	Not used in 2.6.1 and above
813	Subscription: SID Not Found	The Subscription for the given SID does not exist
814	Subscription: Invalid Callback URL	If <REUSE_SOCKET> is not used, the URL is pointing to a destination that is not reachable
815	Subscription: MAX Subscribers Reached	You can no longer subscribe
816	Disclaimer not available	You may ignore this error
817	Subscription: Already subscribed	You are already subscribed and there's no need to subscribe again

23.9.5 SMTP Errors

The following email errors are enumerated in the Control field (column 2) and are related to Error -50001 (SMTP_SERVER_FAILURE).

SMTP Errors	
Number	**Error**
-2	NETWORK_ERROR
-5	SMTP_CONNECT_FAILED
-6	SMTP_SERVER_NOT_RESPONDING
-7	SMTP_EHLO_TIMEOUT
-10	SMTP_FROM_TIMEOUT
-11	SMTP_TO_TIMEOUT
-12	SMTP_DATA_TIMEOUT
-13	SMTP_BODY_TIMEOUT
-14	SMTP_AUTH_LOGIN_NOT_ACCEPTED
-15	SMTP_USERID_NOT_ACCEPTED
-16	SMTP_PASSWORD_NOT_ACCEPTED
-17	SMTP_STARTTLS_NOT_ACCEPTED
-18	SMTP_TLS_NEGOTIATIONS_FAILED
-19	SMTP_WRITE_FAILED
-20	SMTP_UNSUPPORTED_AUTH_METHOD

23.9.6 Driver Errors

The following sub errors are enumerated in the **Control** field (column 2) and are related to errors -200xxx.

Driver Errors	
Number	**Error**
-1	Failed writing the highwater mark
-2	Failed writing PLM slave link
-3	Failed writing PLM master link
-4	Failed reading device memory
-41	Failed writing device memory
-5	Failed reading device link
-51	Failed writing device link
-6	Failed restoring device from file
-7	Failed initializing node - continuing
-8	Node not added - failed reading links
-9	Node not added - failed removing links
-10	Node not added - failed restoring device
-11	Replace device incomplete
-12	Add device incomplete
-13	Remove device incomplete
-14	Add scene incomplete
-15	Remove scene incomplete
-16	Failed removing PLM master link
-17	Failed removing PLM slave link
-18	Failed removing group link
-19	Failed adding device to scene
-20	Adding device to scene incomplete
-21	Removing device from scene incomplete
-22	Replace failed: failed renaming file
-23	Replace failed: address is null
-24	Restore failed: internal error
-25	Failed removing remaining links
-26	Node already exists
-27	Node does not exist
-28	Incompatible device/firmware types
-29	Failed to fully replace device
-30	Failed resetting the PLM
-31	Failed to fully restore device

23.10 Factory Reset

There are only a few reasons why you might want to factory reset your ISY. In most cases, a factory reset will not help any problems you might be having.

Please be sure to thoroughly investigate your problem before trying a factory reset. If possible, be sure to have a known good backup of your ISY's configuration before factory resetting.

NOTE: A factory reset of the ISY will not erase any programming stored on INSTEON devices.

To factory reset your ISY:

- Use a sharp object (for example an straightened paperclip) to push in the recessed Reset button and watch for the RX, TX, MEM, and ERR LEDs to start flashing (once per second).
- Hold the Reset button for approximately 30 seconds more, until the above LEDs turn off and the MEM LED flashes quickly.

Release the Reset button and wait for the ISY to reboot (when the MEM LED stops flashing).

23.11 Upgrading Your SD Card

In some instances, you may want to replace your SD card. For example:

- You are experiencing a blinking ERR light which could indicated a bad SD card.

The ISY supports up to a 16GB SD card.

Once your SD card is replaced, you will need to re-load the firmware onto your ISY as well as restore your configuration from a backup. Please be sure to have a good backup before attempting an SD card upgrade.

With you ISY you have an externally accessible SD card. Simply unplug all cables from your ISY, pull out the old SD card, and insert the new SD card. You will also need to reload the firmware onto your ISY. Proceed to the paragraph labeled "Reloading The ISY Firmware and Restoring From Backup."

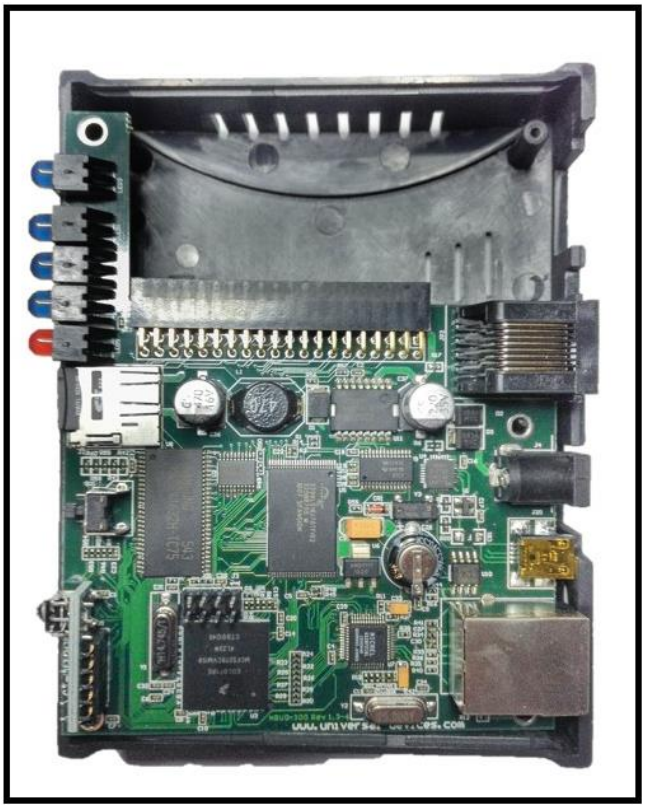


Figure 417: ISY with Cover Removed

Once you screw the ISY back together, you will need to reload the firmware. Proceed to the paragraph labeled “Reloading The ISY Firmware and Restoring From Backup”.

Reloading the ISY Firmware and Restoring From Backup

Once you’ve replaced your ISY’s SD card, you will need to re-load the firmware as well as restore your configuration from a backup.

- Boot your ISY with the new SD card installed

From a PC on your LAN, visit the following URL to launch the Administrative Console and locate your ISY (This link may not work with Chrome):
http://isy.universal...com/994i/4.2.30

- Login to the Administrative Console (default username and password are both “admin”)
- Click on the HELP pull-down menu, then MANUALLY UPGRADE MY LIGHTING.
- Browse to the firmware file you wish to install. If you do not have a copy of the ISY firmware, please visit our forum for the download link:

http://forum.universal-devices.com/viewforum.php?f=25

- After the firmware is installed your ISY reboots. Please re-launch the Administrative Console and login: http://www.universal-devices.com/994i
- Click on the FILE pull-down menu, then RESTORE ISY and choose your last backup.

23.12 Manually Upgrading Your Firmware

To manually download and install a firmware release, please see the following forum where both final and beta releases are regularly posted along with specific upgrade instructions: http://forum.universal-devices.com/forum/15-current-release-betas-and-bug-reports/

In general, please note the following before performing a firmware update:

- The downloaded firmware MUST remain zipped. DO NOT unzip the downloaded file.
- Please ensure you have a good backup before attempting a firmware update.
- Disable all anti-virus and firewall software before attempting a firmware update.
- Be sure to run firmware updates from a stable and, if possible, hardwired network connection. Avoid running firmware upgrades from marginal wifi connections or off-site locations if possible.
- Once downloaded, click the HELP pull-down menu, then MANUALLY UPGRADE MY LIGHTING, and browse to the firmware file you have downloaded.
- After upgrading your firmware, please close all browser windows and clear your Java cache as outlined in section **23.6 Clearing Java Cache**

23.13 Resetting Your Userid / Password[119]

23.13.1 Information common to all models

- The default (case sensitive) UserID = admin
- The default (case sensitive) Password = admin

23.13.2 ISY-994i Series

- Make sure the ISY has been powered on for at least a minute.

[119] (Universal Devices)

- Use a sharp non-conductive object like a toothpick to press and hold in the Reset Button.
- Continue holding for approximately 4 seconds until all four (Rx, Tx, Mem, & Error) lights blin**k** on/off in unison (Once per second).
- Continue holding for approximately an additional 7 seconds until the same lights turn on successively/consecutively (Rx, then Tx, then Mem, then Error) and then off in the same order.
- Release the Reset Button.
- The Rx, Tx, Mem, Error lights will continue to turn on/off sequentially/consecutively for a couple seconds.
- Wait about one minute for the ISY to fully reboot.
- Log in using the user name 'admin' and the password 'admin'.

23.13.3 ISY-99i Series

- Use a sharp non-conductive object like a toothpick to press and hold in the Reset Button.
- Continue holding until all four (Rx, Tx, Mem, & Error) lights blink on/off in unison (Once per second).
- Continue holding for 5 seconds until the same lights turn on successively/consecutively (Rx, then Tx, then Mem, then Error) and then off in the same order.
- Release the Reset Button.
- Log in using the user name 'admin' and the password 'admin'.

23.13.4 ISY-26

Before you proceed with the procedure below, you will need to retrieve the MAC address of your ISY device (see below)

To reset your userid and password please follow the steps as outlined below:

- Disconnect PLM from the ISY.
- Telnet to ISY
- Enter MAC address as both the userid and password at login prompt
- Wait 45 seconds (or until you see "Please connect PLM message")
- Plug PLM back in
- Log in again using admin/admin

Note: There is a time-out of 5 minutes for the PLM to get plugged back in. If timed out, the userid and password are not reset.

23.13.5 Retrieving ISY's MAC Address

- Versions 2.6.1 and above: Go to http://your.isy.ip.address/desc
- Versions 2.6 and below: Go to http://your.isy.ip.address:port/0/d
- Look for <UDN> (e.g. <UDN>uuid:00:03:f4:02:af:74</UDN>)
- The MAC Address is the what follows "uuid:" and before the </UDN> (e.g. 00:03:f4:02:af:74)

- Early ISY's will have a MAC address which begins with the segments 00:03; these MAC addresses are from NetBurner.
- Newer ISY's will have a MAC address which begins with the segments 00:21:B9, which is the Universal Devices, Inc. ID.

23.14 Resetting Your ISY[120]

23.14.1 Reboot

- If ISY is online, you can use Admin Console | Configuration | System and click on the Reboot button
- If ISY is not online:
  - Press the reset button inside the little hole on the front of the unit
  - Or, unplug power and plug back in

23.14.2 Reset Username and Password to Defaults

- Use a sharp object to push and hold in the Reset Button till the RX, TX, Mem, Error lights start blinking (every second)
- Continue holding for another 5 seconds till the RX, TX, Mem, Error lights turn on/off consecutively (RX -> Tx -> Mem -> Error)
- Release

23.14.3 Factory Reset

There are only a very few reasons for performing a Factory Reset:

- Corrupted File system (blinking ERR light)
  - Also instead of a factory reset another option for corrupt file systems issues is in section **23.15 Replacing/Reformatting a SD Card**
- To start fresh ... i.e. if you are going to restore your old backup on the same ISY, then in all likelihood factory reset is NOT going to fix anything

[120] (Universal Devices)

- Reuse one ISY for more than one location
- You have configured your ISY with a static IP address, changed router/network, and can no longer access ISY

IMPORTANT: You must reconfigure ISY again or restore your backup after the factory reset.

- Use a sharp object to push in the Reset Button till the RX, TX, Mem, Error lights start blinking (every second)
- Hold for at least 30 seconds until all of the the RX, TX, Mem, Error lights turn off and Mem light starts flashing quickly
- Release and wait for system reboot (reboot is complete when Mem light stops flashing)

You may wish to also reset the PLM at this time.

23.15 Replacing/Reformatting a SD Card[121]

In the ISY has two different memory storage locations. First is the base memory where the ISY has some of the basic code like its boot loader, SD file system, and networking facilities. The other memory is the SD card which is where upgraded admin firmware and user files are stored. Sometimes the SD card gets corrupted and/or damaged and needs to be reformatted or physically replaced. In either event here is the basic steps to complete in order to get your system back up and running smoothly.

These are some of the main symptoms to look for to know if your SD Card is acting up. In order to further ascertain if your SD card has issues please feel free to ask many of the helpful users on the UDI Forum before taking these steps below. This process is a safe process to perform but may be unnecessary if there is other issues going on with your ISY system.

- Flashing "Error" LED indicates file system problem ("Error" + "Memory" LED flashing indicates network error which this process will not fix)
- Unable to complete restoring a backup from the admin, usually quitting at the same percentage with each attempt

IMPORTANT - Formatting your SD card should only be done after consulting with support!!

It is best to complete this process from a local LAN connection and make sure that all Firewall and Anti-virus software is disabled during it.

[121] (Universal Devices)

23.15.1 Change the SD Card (skip this step if you're only formatting the SD card)

- Remove the screws that attach the lid to the ISY.

Figure 418: Inside View of ISY

- Remove the four screws that secure the circuit board inside the case (ISY-99i only)
    - Please note: newer ISYs now have access to the SD Card from the outside of the unit so no disassembly is required
- Remove the old SD Card and replace with the new card
- Please note: ISY supports up to a 16GB SD card with 4.2.18 firmware and above, any firmware before this only supports a 512MB SD card
- Reassemble the ISY in the reverse order

23.15.2 Format the SD Card - you do NOT have to format the SD Card if it's new

- Telnet To Your ISY, see section **21.1 Telnet to Your ISY**
- Login with the admin password
- Issue "FS" to format the SD Card, answer the "Are you sure question" with an upper case "Y"

    - Please note: the ISY works with both FAT 16/32, but FS function formats it specifically for use with ISY with some performance improvements so its preferred you use this method.
- You will see the Goodbye prompt confirming that the format is complete and that the has ISY rebooted

23.15.3 Install the latest firmware

- Download the latest firmware which can be found from the Current Release and Betas section of the Forum.
- Go to http://isy.universal-devices.com/994i/admin.jnlp to launch the ISY
    - Please note: using the UDI link supplies the admin code to launch your ISY in its clean state, trying to connect with any other methods will not work until you have reinstalled the latest firmware
- Login with the admin password
- Choose Help | Manually Upgrade My Lighting
- Choose the latest firmware (or beta if you wish) from the location you have downloaded it to
- The ISY will reboot after the install is complete

23.15.4 Restore your latest good backup

- Login with the admin password
- Choose File | Restore ISY
- Choose your latest good backup
    - Please note: If your performing this whole process because of a corrupted SD card, a good backup is considered one that was completed successfully before the SD card got corrupted
- The ISY will reboot after the restore is complete

23.15.5 Check that all is well

- Login with your password
- Devices and programs should be restored and back to normal.

23.16 Update the ISY Firmware[122]

The ISY unit comes with the capability (firmware 2.6 or greater) to automatically update your firmware. You no longer need a special username and password to automatically

[122] (Universal Devices)

update your firmware. You do need to ensure that you have enabled Internet access for your ISY unit.

23.16.1 Manual Update the Firmware

If your ISY does not have an internet connection you can still update your ISY manually.

- Obtain a copy of the updated Firmware from UDI - Download the Firmware from: http://forum.universal-devices.com/viewforum.php?f=25 or contact us for a copy
- Log into your ISY.
- Start the upgrade from the pull-down menu go to "Link Management --> Manually Upgrade My Lighting"

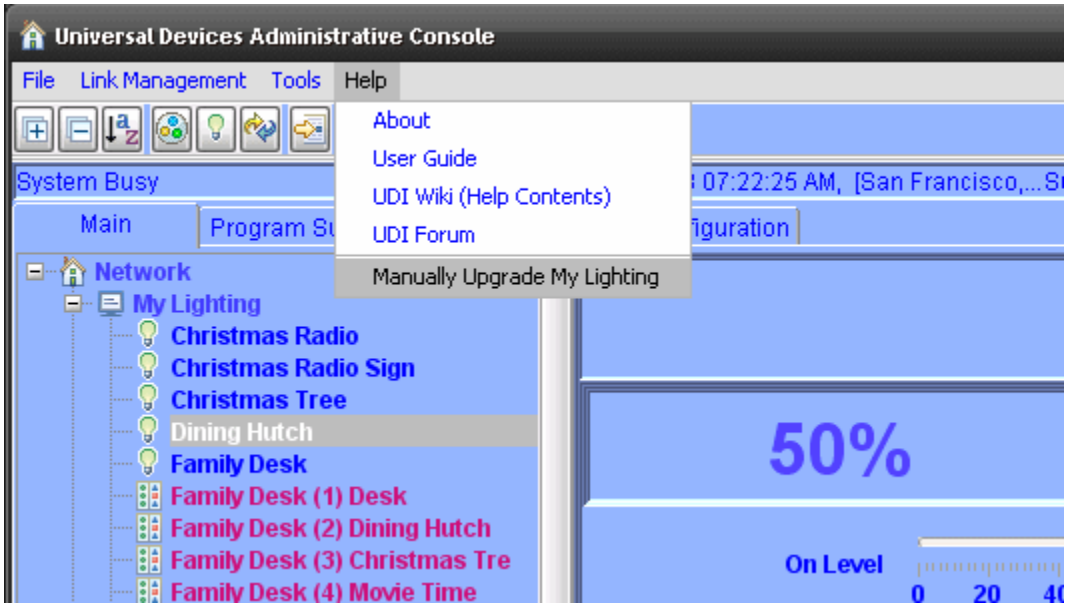


Figure 419: ISY – Manually upgrade my lighting men option

- Find the saved file, select it, and OK the selection

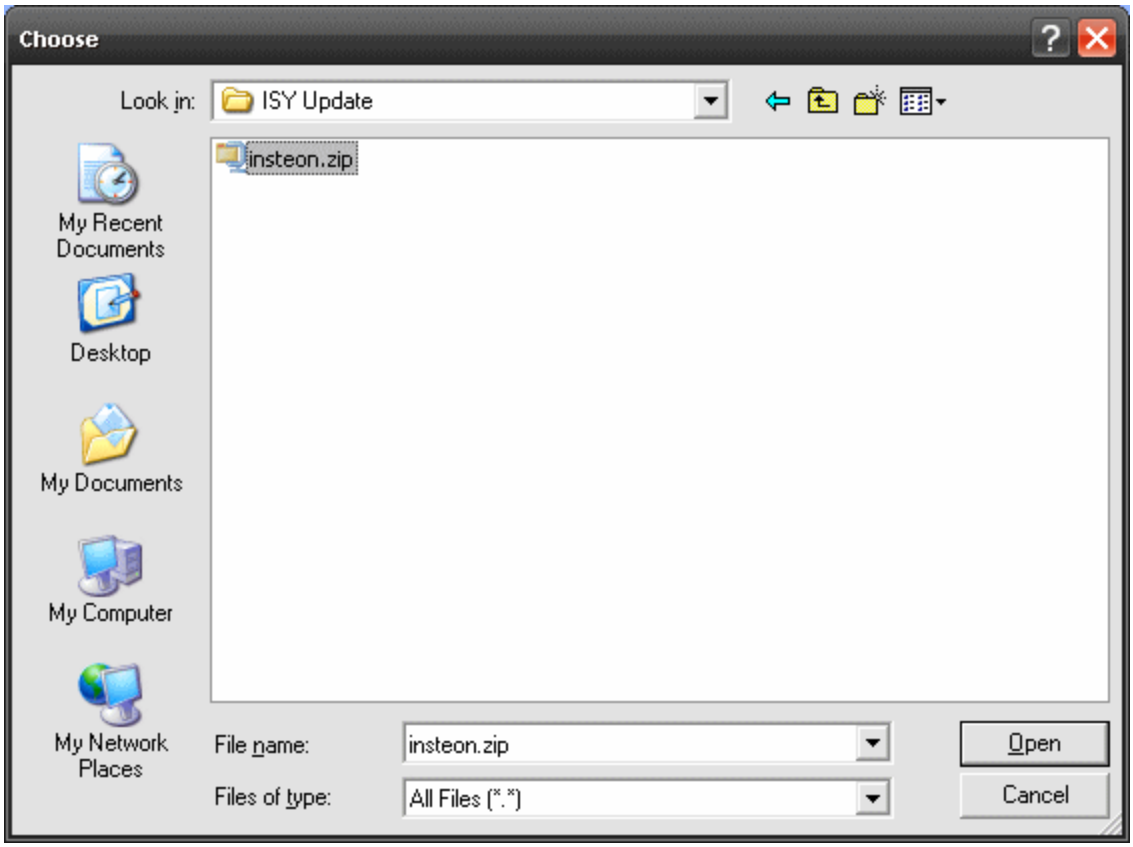


Figure 420: ISY – Select file

Your ISY will now update the firmware and reboot when it is finished.

24 Frequently Asked Questions (FAQs)[123]

24.1 Operational

24.1.1 Is there a way to find all my INSTEON devices?

- There is an option to add existing links from each device you add. The "Add devices found in links" option does crawl (spider) the network. It adds all the devices it finds in those links. Therefore, if you link a light that is linked to a keypad, which is linked to another light etc., then all those devices will be added to ISY. So if you start with one of your devices that has lots of links like a KeypadLinc you will get most of your devices just with that one device add, especially if you have an "all lights" scene.

24.1.2 On an existing INSTEON setup do I need to start over when I first get my ISY?

- There is an option to add your scenes.

24.1.3 So, I just got an ISY and know I will have to start over the programming for my existing INSTEON setup. When I start over do I need to reset all my devices first to clear everything?

- ***This is a bit outdated as ISY now has the ability to read your current scenes***
- It is still not a bad idea to use Restore on your devices after the ISY has read through them. This will rid the devices of any bad links.
- You do not need to reset your devices first, in fact if you do, you won't be able to crawl (spider) the network because there will be no links to find devices with. Having said that, if you don't reset your devices, they will operate (or partially operate) until the links get overwritten by linking devices in ISY. Therefore, when you first get your ISY, I would suggest the following:
    - Start Linking, with "Add Devices in links"
    - When all of your devices have been added to ISY, run "Restore Devices".
    - As you know, this reprograms the devices to match the settings in ISY. If you have no groups in ISY, basically all but the PLM links will be deleted in the devices, essentially resetting them.
    - Do a "Backup ISY" so you have the option of starting fresh again at some point in the future without having to re-link all your devices.
    - You can now start reprogramming your network using ISY
    - You can run "Restore Devices" at any time, but it is faster to run it right after you have initially linked your devices because it only has to delete links, which is much faster than writing out whole links.

[123] (Universal Devices)

24.1.4 I wish I had thought of the saving my clean slate before I got all mine reprogrammed. What steps should I take if I want to redo everything?

- It's not really necessary, there is some time/risk involved to do this and is an alternative to deleting all of your scenes (especially if you have a lot of scenes), but if you're one of those guys that just has to have it all here are the steps to go thru it all over again.
    - First create a fresh backup original of your latest ISY data, with "Backup ISY"
    - Do a "Factory Reset" from the ISY command shell. See Advanced Configuration Guide for details and risks
    - Start Linking, with "Add Devices in links"
    - When all of your devices have been added to ISY, run "Restore Devices".
    - As you know, this reprograms the devices to match the settings in ISY. If you have no groups in ISY, basically all but the PLM links will be deleted in the devices, essentially resetting them.
    - Do a "Backup ISY" so you have the backup clean option of starting fresh again at some point in the future without having to re-link all your devices.
    - Bring back the backup original with all your ISY programming, with "Restore ISY"
    - Finally, to relink all your devices, do a "Restore Devices"

24.1.5 I already have the ISY programmed but some of my devices have lost their way; how can I fix them?

- You will need to crawl (spider) your INSTEON network with the all the ISY data which can take some time. Launching the "Restore Devices" within the ISY will cause it go thru all your devices and update all the scene links. This is useful to make sure all the links are correct. Here is where you will find it: File (pull-down) --> Restore Devices (menu selection)

24.1.6 What do I do if the ISY locks up?

- All though it does not happen often but when it does, unplug the ISY and let it sit for a few minutes then plug it back in. On a typical startup the lights do a bunch of different blinking and then the INSTEON Power Line Modem will flash a bunch as the ISY updates the status of all the linked devices. See Note Below

24.1.7 Should any of the LED indicators be illuminated solid?

- The ISY-99i has a power indicator. If this is not illuminated the cable between the ISY and the PLM may be faulty or disconnected or the PLM has lost power. The ISY-26 does not have a power LED.

- None of the other 4 LEDs should be constantly illuminated. LEDs are only illuminated if; Transmitting to PLM (TX), Receiving from PLM (RX), Writing to Memory (MEM), System error (Error)! If all 4 LEDs are illuminated solid then the ISY is most likely locked up and will need to be power cycled according to the directions in the previous question.

24.1.8 How do I mount my ISY in my structured media panel?

- I found that two 3 inch long strips double sided Velcro work just fine. I usually stick the soft fuzzy side to the device, and the rough hook side to the mounting spot that way if you remove the device to work with it the fuzzy Velcro does not scratch anything.

24.1.9 What is an ISY scene?

- Scenes are simply a group of devices. A scene is equal to a group in INSTEON vernacular. Also, a scene is as small as two devices linked together and the more links you add the bigger the scene gets. I think there is a desire to think that just linking two devices is just a link and this is correct but it is still a scene. So, if you want to create a link between two devices you will have to create a scene to do it.

24.1.10 What is the best way to create a scene?

- Start with adding all your responding devices first. Then add your controlling devices last. This consolidates the longest busy times to just the last few devices you add to the scene.

24.1.11 What can I do when not all my devices are responding correctly?

- The INSTEON Power Line Modem is the main connection between your ISY and INSTEON network. If you're having issues that not all devices responding you may need to try connecting PLM to another location or try relocating your SignaLincs. Also, it may help not to connect the Wall-wart (power transformer) to the PLM pass-thru plug. The ISY has very little to do with the quality of communication on the INSTEON network.

24.1.12 Is there an offset for sunrise or sunset timers; how do I use it?

- There is support for offset time (in minutes) for Sunrise and Sunset. If you want a schedule for 1.5 hours before Sunrise, make the offset -90. For any positive offset, leave out the sign. In the Schedule Configuration there is a Spin Box that if you click the little up and down arrows you will see the numbers change to positive and negative numbers.

24.1.13 Is there a way I can control the lights on a KeypadLinc with INSTEON commands?

- If the KeypadLinc button is part of a scene, the lights will turn on/off either from the GUI (when issuing a scene/group command) or by other controllers linked to it. ISY does not work as a pass through for INSTEON commands; you can either use our GUI to perform what you need or our SDKs. In short, no longer do you have to care about the details of INSTEON commands; we take care of all of it in ISY. And, finally, you can even group KeypadLinc buttons (mutual exclusivity) using our GUI.

24.1.14 Is the ISY compatible with J2ME; what do I need to access my ISY?

- As a matter of fact, our UDMobile client is based on J2ME (IBM Websphere Micro Environment Runtime = WEME). The only reason that we do not actively advertise our UDMobile client is that we have had a hard time figuring out where our clients can buy the license for WEME. The price for the license is $5.99 and we were told that users can buy it directly from Handango but it is not listed.
- If you, or anyone else for that matter, is willing to take the responsibility for acquiring a license for WEME, you can download our UDMobile client: UDMobile-SD.zip. Installation is pretty straight forward:
    - Copy the contents of the zip file into an SD card
    - Insert the SD card into your Pocket PC
    - Use File Explorer and go to your /SD Card/UDClient or /Storage Card/UDClient directory
    - If your SD directory is called SD Card, then click on UDMSD
    - If your SD directory is called Storage Card, then click on UDMStorage

24.1.15 I registered my ISY on your website but did not get a confirmation email; what shall I do?

- Registration is immediate and you should receive a confirmation immediately. If you do not receive an email with-in let's say 15 minutes just send us an email to tech@universal-devices.com and we can check in our "dead letter" queue.

24.1.16 I do have a question regarding the EZRain unit. After linking, I see groups 1-8, representing the valves 1-8, but do not see any groups for the four EZRain Zone groups (1-4). I had to set up 6 schedules to turn on each of the valves, with each start time following 30 min later and then a final schedule to turn off the last valve 30 min later. It works, but it would be a lot better if you were able to just set up a start schedule for one of the

EZRain Zone programs. Did I mess up the linking or is there a way to do this?

- As far as EZRain, you have not messed anything up. We are still a bit ambivalent as to what should be done with "not purely" INSTEON features such as Sprinkler Zones, number of zones, programming zones, etc. On the one hand, that would make ISY a great companion for EZRain but on the other it would make ISY manufacturer dependent. So, please do bear with us till we figure out what's the best way to go. And, thanks so very much for the feedback since it's only the feedbacks which prod us to one direction vs. the other.

24.2 Networking

24.2.1 Can I use my ISY behind a NAT firewall; how do I connect remotely?

- Yes, you can by enabling the internet access for the ISY and using the correct external URL. You should use: https://external.ip.address. If you change the ISY https port from 443 you will have to append to port number to the external address: https://external.ip.address:port
- The address and port can usually be found using the menu item Help|About.

24.2.2 I understand some routers can be auto configured by the ISY; which ones are they?

- DLink DI-604, DI-614, DI-624, DIR-625, DIR-655
- NetGear WPN824v2
- Linksys WRT-54GS
- Buffalo AirStation

24.2.3 Can the ISY setup to be on my wireless network?

- As far as wireless-ness, ISY is Ethernet based and, thus, if you connect it to a wireless hub/router/switch then all the computers on the "same" network as your hub/router/switch can communicate with it regardless of the medium (wired vs. wireless).

24.2.4 Do you have to enable the UPnP in the router?

- As far as making your router UPnP enabled: If you have a DLink Router of model DI-6xx, they are automatically UPnP enabled out of the box. You only need to UPnP enable your router if you want ISY to automatically configure it. Unfortunately, at the moment, we have tested and support only DLink routers for automatic

configuration. We are working on enabling Linksys as well but, to date, we have gotten a little support.

- Any plans in the works to let the ISY act as a server to HA software on the PC? (This might be a good option so you can leave the PC on for ease if use/graphical interface/additional features, but if you shut off, it syncs and most if not all of the functionality is saved on the ISY.)
- Yes, you can use our MCE client (on the CD or download from our website under Resources) with is much easier to use (but does not allow you to configure ISY) and does exactly as you suggest. With respect to other HA software, we do offer JSDK (Java SDK) which can be used to build HA software for ISY. We are also in the middle of publishing our Web Services SDK (which has been put on hold to address functionality improvements such as crawling an INSTEON network)

24.2.5 What does it mean on your website, "access from anywhere in the world." How is this done?

- You can access ISY from anywhere in the world if: a. You have a DLink router of model DI-6xx ... ISY can automatically configure it so that you can access ISY using the IP as assigned by your ISP b. If don't have a DLink router, unfortunately, you have to configure your router manually I am almost certain that, rightly so, we'll be criticized for not supporting other routers or making it easier to access ISY remotely. Though not a 100% good reason, we had to make a decision in the early stages of design: to use a dedicated proxy server with a secure tunnel (or VPN) to ISY in which case we would have to charge for the service (third party) anywhere between $5 to $20 per month (depending on the license fees or hosting costs) or to try and reuse existing UPnP IGD functionality and slowly add support for other routers and not charge anything. We chose the latter since we do not believe you should not have to pay for remote access.

24.3 Product Comparison

24.3.1 What is the difference between ISY and HouseLinc?

- The only points of commonality between ISY and HouseLinc are the fact that they both allow you to link with devices using your computer and from there things diverge: With ISY, everything you do takes effect immediately (the links are written real-time). Links are created by dragging and dropping devices into scenes.

24.3.2 What is the difference between ISY and EZBridge IP?

- The difference between ISY and EZBridge IP is the statement you will find at the bottom of Details & Specifications for EZBridge IP under "Software": While the free configuration utility (Windows-only) can be used to set-up and operate the device, the EZBridge realizes its full potential working in "conjunction" with home

automation programs. Planned support for the EZBridge include "HouseLinc" from Smarthome, "mControl" from Embedded Automation or "Indigo" from Perceptive Automation.

- In short, with EZBridge IP, you still need to either install their free "utility" or buy another home automation software (HouseLinc, mControl, or Indigo) to be installed on your computer (stationary). ISY is fully self-contained: you do not need to install any software on any computer. If you have Java (jre 1.5+) installed, you can access the system, the GUI, and all the functionalities from any computer on the network or from the internet using the ISP's IP address.

24.3.3 What is the difference between ISY and the ADI Ocelot?

- There is a discussion on this topic in another thread (UDI Forum).

24.4 Development

24.4.1 What is the latest firmware version?

- You can find the firmware version history on the forum: http://forum.universal-devices.com/viewforum.php?f=25&sid=23fca4d0f38d1dc9ecfe6b12c9b160f5
- See below for older version history

24.4.2 What device does the ISY use to communicate with the INSTEON network?

- The ISY does not use the INSTEON Programmable Logic Controller (PLC), it uses INSTEON Programmable Logic Modem (PLM). The PLC has APIs that are not necessary for ISY network communication. The ISY has been designed to work with the INSTEON protocol directly.

24.4.3 So, am I going to have to pay for the SDK?

- Our goal and motto is to make home automation affordable for everyone. Initial release of the SDKs will be free for development use (you would still need to buy one of the ISY units) with email/forum support.
- Forum support can be found here: http://forum.universal-devices.com/viewforum.php?f=2

24.4.4 With the ISY what will the SDK and API provide?

- With ISY, 3rd party software developers can use our SDK to communicate with ISY and perform all the functions that can be performed from our GUI. In short, our Web Services and APIs mask the user from having to know "any" INSTEON oriented

protocol specs. So, if you were implying that 3rd parties could use ISY to issue INSTEON commands (such as PEEK , POKE, etc.) then the answer is NO. ISY is not a pass through bridge.

24.4.5 What OS does this device run on; can I get the source code?

- The operating system is a derivate of uCOS. We are not releasing our source code for the ISY but we have two SDKs: A Java Library which enables you to communicate with ISY with any Java Client on the network. All the functionality of our GUI is exposed as APIs in this library. A Web Services Development Kit which enables you to communicate with ISY using Web Services (in a language of your choice)

24.4.6 What connection protocol does the ISY use to connect to the PLC?

- Serial. It doesn't really matter to whether or not ISY's communication with the PLM is USB, Serial, XYZ, or WKM. Client communications with ISY is over the Network/Ethernet (HTTP)

24.4.7 What is the number of events?

- Currently, we have configured the system for the average install (80%)

24.4.8 What is the total number of triggers?

- It's configurable. Unlike other software, ISY triggers are conditionals with up to 6 conditions (using conjunctive, disjunctive) and 6 responses per trigger. 20 has been chosen as a baseline and nothing prevents us from increasing it except INSTEON limitations especially when the responses are issued sequentially to more than 10 devices/groups at a time. Same goes for schedules.

24.4.9 Can I get more triggers?

- It would be rather impractical, but not impossible, to support 1000s of triggers; could you please let me know the scenario where one with 100s of devices would need 1000s of triggers?

24.4.10 Can the ISY display other languages?

- ISY has been designed with following the National Language Support (NLS) specs, which means that a translation to any other language is a matter of translating 3 files.

24.4.11 Have you thought about an open source project around the ISY?

- We actually thought about doing precisely that but the OS is licensed and, as such, can never truly become free. Thus, we decided to go for the next best alternative: provide free SDKs to whomever wants to write network applications for ISY. We might start working on a Linux based solution (when we get some free time) which would give us more flexibility for making ISY a little more open source.

24.4.12 Can the second serial port be used for control/status of INSTEON devices via the ISY, from an outboard device such as a PC or a micro-controller based device?

- The second serial port is used to Administer ISY for functions which we do not allow from the GUI to be performed (for security reasons) such as reset userid/pwd, factory reset, etc. And, thus, you cannot use it to write programs which communicate to INSTEON network through ISY. This said, however, we do have a Java SDK which allows you to write "network" programs which enable you to do exactly what you want to do (through the serial port) using TCP/IP and a network connection.

24.4.13 I just "love" having my computer on all the time; is there any way ISY could be a standalone product?

- ISY is completely standalone: you use your computer to set it up the first time and you never need a computer after that unless you want to control it remotely or configure triggers/schedules make scenes etc. And, most importantly, you do not have to write programs nor do you have to install anything on your computer (except JRE).

24.4.14 Is the ISY a multitasking based device?

- Yes. The ISY is running in a continuous loop(s) (multitask) doing a variety of things such as sensing user input, a button press somewhere, a web service request, and also sensing all the "state" changes on the network. Triggers are notified when there are changes in the state of the devices on the network and, based on the defined conditions, they perform tasks such as sending an sms/text/page, turning on/off a device/scene etc.

24.5 Compatibility

24.5.1 Is the ISY compatible with SimpleHomeNet products?

ISY works with most SimpleHomeNet products. As a matter of fact, with ISY, you can link an EZRain Sprinkler valve to a button on a controller (KeypadLinc, ControLinc, etc.). We are currently working on supporting EZIO such that you could either link the dry contacts (inputs) to another (linkable) INSTEON device or use Triggers to do a series of actions (up to 6) based on EZIOs inputs. In any case, since the firmware is upgradable over the network, you should rest assured that all enhancements will be notified to registered users and thus you can upgrade your product for every new supported product/feature.

24.5.2 Is this unit compatible for Europe? Even if it is not CE certified, will it work?

- ISY's processor board is CE certified. The ISY is a 5/6 volt, 300 milliamps, DC device so you could use a power transformer that would match the needed voltage and current requirements. On the other hand, the INSTEON products would need voltage/phase/frequency converters. So yes, it could work but would require some serious workarounds. See Note Below

24.5.3 Are X-10 single phase 110V/120V or two phase 220V/230V devices compatible?

- The ISY does now support X-10. X-10 single phase 110V/120V is compatible.

24.6 Specifications

24.6.1 Hardware

Freescale 5270 running at 100Mhz

512K flash

2MB RAM

2 Serial Ports: one for communications with PLM and one with a Shell which allows administrative functions

SD Card Module: Up to 16GB holds a regular FAT file system

QSPI, I2C, PWM, and GPIO input outputs available

Real Time Clock on board

24.6.1.1 Why do you have so little flash and RAM?

- Because we do not need more. We have a multi-tasked web server with an SD based file-system on board. With the current configuration, we still have around 75K of free space left on the flash and 300K on the RAM.

24.6.2 OS

- A derivative of uCOS runs in less than 170K. I shall not discuss the benefits of uCOS (vs. ThreadX) simply because performing a copy/paste does not benefit this discussion.

24.6.3 Firmware

HTTP Stack + Web Server

SOAP 1.1/1.2 Stack

UPnP Stack driven by Publish/Subscribe (DPWS to be available by end of 2007)

D2D Stack (triggering events on local/remote devices)

INSTEON driver - low level driver for communications with INSTEON

X10 driver

SMS/Pager/Email drivers

Scheduler with sunrise/sunset

Cryptography (3 levels: none, 1. Digital Signatures Only, 2. Digital Signatures with Encryption, and 3. RSA). Default is 2

NTP client is available but disabled

24.6.4 Software

- Java client based on subscriptions. No polling is ever done from the client to ISY. Upon "any" state change, the clients are notified.
- JSDK: our Java SDK to develop an ISY client in a matter of days. One can even upload files to ISY and have it served up.
- MCE Client for Microsoft Media Center which allows you to control ISY using MCE remote control
- UDMobile client for Windows Mobile 5.0 platforms based on IBM J9

- Web Services (SOAP 1.2) ... a little behind on the documentation

25 Glossary

Action: Commands that are run when an IF statement is true (a THEN Action) or when an IF statement is no longer true (an ELSE Action). Examples are On, Off, Fast On, Query, etc.

Controller: A device that not only responds to commands issued to a scene, it also controls the scene. An example of a Controller might be a button located on a Keypad – when that Keypad button is pressed, all members of the scene respond as programmed. Controllers are colored red within a scene.

Cross-Linking: A configuration where two items control the same device. For example, you might have two switches in your kitchen that you'd like to control your kitchen table light. One switch is physically attached to the kitchen table light, but you'd like the other switch to control it as well. In this case you would add each device to a Scene as a Controller (shown in red).

Device Group: An INSTEON device that creates multiple entries within the ISY. For example, a KeypadLinc can have 6 or 8 nodes in the ISY (one for each button). You can choose to group these nodes together in a scene by right-clicking the primary node and choosing "Group Devices."

INSTEON: An integrated network protocol that combines wireless radio frequency (RF) with the home's existing electrical wiring. This dual-mesh network approach means INSTEON is faster and more reliable than X10. INSTEON is a peer-to-peer network. Its devices do not require network supervision and for straightforward applications an INSTEON network can operate effectively without a central controller.

Each INSTEON device has a unique factory-assigned address. Like X10, each INSTEON device constantly listens for any command broadcast by other INSTEON devices, but unlike X10, each INSTEON device broadcasts each command it generates and can re-broadcast each command it receives.

When an INSTEON device is broadcasting a command it is acting as a Controller; when responding to a command received from an INSTEON device it is acting as a Responder.

Each INSTEON device can be "taught" to respond to commands issued by any INSTEON device in that network. INSTEON devices can be taught to respond collectively and thereby create Scenes. In a Scene, one from a number of INSTEON devices can broadcast a signal that causes one or several INSTEON

devices (possibly including itself) to turn on or off or to change state in some more subtle way.

INSTEON scenes offer practical solutions to many domestic lighting problems: tap one key and so set each of the lights in the family room to that state for which the home theatre is most effective, tap another to ensure all basement lights are switched off once at the top of the stairs, or a third to ensure the staircase and upstairs landing lights are both on before a guest is dispatched to find the upstairs bathroom.

INSTEON scenes are easy to set up initially but as more scenes are added changing and maintaining them can become burdensome. While leaving existing scenes unchanged, ISY can discover them and bring them under the control of the ISY. There they can be easily managed, enhanced and coordinated with other scenes and X10 devices.

Infrared (IR): Relating to the invisible part of the electromagnetic spectrum with wavelengths longer than those of visible red light but shorter than those of microwaves.

Notification: Using Programs, you can configure the ISY to send you notifications via text message or email. For example, the ISY could notify you if your thermostat drops below or above a pre-defined temperature.

On Level: The brightness level at which a device is turned on when pressed (25%, 75%, etc.).

PowerLinc Modem (PLM): A family of products sold by Smarthome. It consists of the 2412S (now discontinued) and the 2413S which are sold separately. The PLM is required to interface with INSTEON devices.

Program: the true power of the ISY allowing you to extend the capabilities of INSTEON and other devices using timers, triggers, macros, etc. Programs also allow you to utilize the ISY's optional IR receiver, optional modules, and more. ISY Programs are created using simple buttons and pull-down menus. Programs require that the ISY is online in order to function.

Ramp Rate: The speed at which a device is turned on when activated. For example, a slow Ramp Rate causes a light to turn on slowly when a button is pressed.

Responder: A device contained within scenes that only responds to commands issued to the scene. For example, a lamp module with a table lamp attached would likely be a Responder to the scene. When the scene is turned on, the lamp module might turn on. When the scene is turned off, the lamp module might turn off. Responders are colored blue within a scene.

Scene: A collection of INSTEON devices that react to and with one another in various ways. Scenes are comprised of both Responders and Controllers. Scenes may be initiated by an INSTEON event or by a Program.

Theme: Several pre-defined ISY Administrative Console color schemes to available from the **File** menu. **T**he Administrative Console must be closed and re-opened for the Theme change to take effect.

Universal Plug and Play (UPnP): A set of standards intended primarily for residential networks to enable users to link their local and remote personal computers, printers, Internet gateways, Wi-Fi access points and mobile devices to seamlessly discover each other's presence on the network and establish functional network services for data sharing, communications, and entertainment.

Variable: Program parameters that can be stored, modified using arithmetic operations, and compared. You can use Variables to provide information, trigger programs, etc. There are two different types of Variables: Integer and State. A State Variable creates an event when it is modified, so it can be used to trigger ISY Programs when it is currently or reaches a certain value. An Integer Variable is not used to trigger a Program.

X10: A protocol for communication among electronic devices used for home automation. Developed in 1975, X10 was the first general purpose network technology to allow remote control of home devices and appliances for residences. With new components still available and millions of units in use worldwide, it remains today's most widely deployed home automation protocol.

X10 primarily uses power line wiring for signaling and control. Each X10 switch has a user-assigned address. The way X10 addresses are applied to switches depends on type and manufacturer. X10 switches operate by responding to the physical control (switch) on the device itself or by responding to a X10 control signal addressed to that switch from an X10 signal source elsewhere in the residence's electrical system.

Typically, X10 devices are either controllers that generate X10 signals or light switches or electrical sockets that respond to X10 signals. Controllers that are only capable of generating X10 signals tend to have a somewhat utilitarian appearance, so X10 signals are now often generated by Dual-Band devices such as the KeypadLink controller, by a PDA via an IR/X10 protocol converter, or better yet, by a program in the ISY.

Although, as a protocol, X10 lacks the capabilities and operational reliability of INSTEON, X10 switches remain the preferred way to control devices that may

create surges at power on such as traditional fluorescent lights and general purpose electrical sockets.

26 Table of Figures

27 Bibliography

apostolakisl https://forum.universal-devices.com/topic/24828-polyglot-quick-start-guide/ [Online] // https://forum.universal-devices.com.

INSTEON INSTEON Whitepaper: The Details, Version 2.0 [Report]. - [s.l.] : INSTEON.

INSTEON SwichLink On/Off (Dual-Band) 2477s Owner's Manual [Report].

James Milne https://www.youtube.com/watch?v=EnlqOl__46A [Online] // https://www.youtube.com.

James Milne https://www.youtube.com/watch?v=lWqAq4Xf-9c&index=3&t=0s&list=PL418LHgc2F6uttVUW4cSDlpuX4BewQk8Y [Online] // https://www.youtube.com.

James Milne https://www.youtube.com/watch?v=w9I_bip6Vbo [Online] // https://www.youtube.com.

posted by Darrell Peters ISY-99i/ISY-26 INSTEON:Programs as Variables: ISY Restores KPL State After Power Loss [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Programs_as_Variables:_ISY_Restores_KPL_State_After_Power_Loss.

posted by Michael D. Boulanger ISY-99i/ISY-26 INSTEON:KeypadLinc Combination Lock [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:KeypadLinc_Combination_Lock.

posted by user rob9 ISY-99i/ISY-26 INSTEON:Programs as Variables: SwitchLinc Emulates Countdown Timer [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Programs_as_Variables:_SwitchLinc_Emulates_Countdown_Timer.

posted by: jaysmc https://forum.universal-devices.com/topic/21727-bathroom-fan-control-solution/ [Online] // https://forum.universal-devices.com.

posted by: jrainey https://forum.universal-devices.com/topic/21727-bathroom-fan-control-solution/ [Online] // https://forum.universal-devices.com.

posted by: larryllix https://forum.universal-devices.com/topic/19558-garage-door-check-close-if-open/ [Online] // https://forum.universal-devices.com.

posted by: larryllix https://forum.universal-devices.com/topic/20882-using-the-isy-trigger-engine-an-alarm-handler-system/ [Online] // https://forum.universal-devices.com.

posted by: LeeG https://forum.universal-devices.com/topic/8562-how-to-make-timed-button-press-program/ [Online] // https://forum.universal-devices.com.

posted by: LeeG https://forum.universal-devices.com/topic/9574-how-to-setup-fanlin-keypadlinc-and-remotelinc-2-properly/ [Online] // https://forum.universal-devices.com.

posted by: MarkJames Some helpful info on Insteon and ISY [Online] // https://forum.universal-devices.com. - https://forum.universal-devices.com/topic/3784-some-helpful-info-on-insteon-and-isy/.

posted by: oberkc https://forum.universal-devices.com/topic/10272-question-about-a-scene/ [Online] // https://forum.universal-devices.com.

posted by: oberkc https://forum.universal-devices.com/topic/9886-using-keypadlinc-for-all-lights-off-but-then-prm-help/ [Online] // https://forum.universal-devices.com.

Universal Devices [Online] // https://www.universal-devices.com. - https://www.universal-devices.com/docs/production/zw.pdf.

Universal Devices Forums [Online] // Universal Devices Forum. - https://forum.universal-devices.com/.

Universal Devices HAD Customization: Advanced customization table [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=HAD_Customization:_Advanced_customization_table.

Universal Devices HAD Customization: Custom device table [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=HAD_Customization:_Custom_device_table.
Universal Devices HAD Customization: Guidelines [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=HAD_Customization:_Guidelines.
Universal Devices HAD Customization: Theming [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=HAD_Customization:_Theming.
Universal Devices Home Automation Dashboard [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Home_Automation_Dashboard.
Universal Devices INSTEON No Status Feedback From Devices [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON_No_Status_Feedback_From_Devices.
Universal Devices INSTEON Random All On Events [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON_Random_All_On_Events.
Universal Devices INSTEON Safe Mode Dialog [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON_Safe_Mode_Dialog.
Universal Devices INSTEON Signal / Noise Troubleshooting [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON_Signal_/_Noise_Troubleshooting.
Universal Devices INSTEON: Troubleshooting Communications Errors [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON:_Troubleshooting_Communications_Errors.
Universal Devices INSTEON: Troubleshooting Z-Wave Communications Errors [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=INSTEON:_Troubleshooting_Z-Wave_Communications_Errors.
Universal Devices ISY Portal Admin Console [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Admin_Console.
Universal Devices ISY Portal Amazon Echo Integration V3 [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Amazon_Echo_Integration_V3.
Universal Devices ISY Portal Geo Fencing [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Geo_Fencing.
Universal Devices ISY Portal Google Home Integration [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Google_Home_Integration.
Universal Devices ISY Portal IFTTT Integration [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_IFTTT_Integration.
Universal Devices ISY Portal MobiLinc Configuration [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_MobiLinc_Configuration.
Universal Devices ISY Portal Node Server Instructions [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Node_Server_Instructions.
Universal Devices ISY Portal Node Server Occupancy & Locative app Instructions [Online] // https://wiki.universal-devices.com. - https://wiki.universal-

devices.com/index.php?title=ISY_Portal_Node_Server_Occupancy_%26_Locative_app_Instructions.
Universal Devices ISY Portal Node Server Occupancy V2 & UDI Mobile app Instructions [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY_Portal_Node_Server_Occupancy_V2_%26_UDI_Mobile_app_Instructions.
Universal Devices ISY994:Configure Mail Server Settings [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY994:Configure_Mail_Server_Settings.
Universal Devices ISY-994i Initial Browser Screen [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-994i_Initial_Browser_Screen.
Universal Devices ISY-994i Series INSTEON:ELK Security Module [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-994i_Series_INSTEON:ELK_Security_Module.
Universal Devices ISY-994i Series INSTEON:Enhanced A10/X10 [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-994i_Series_INSTEON:Enhanced_A10/X10.
Universal Devices ISY-994i Series INSTEON:Networking:Network Resources [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-994i_Series_INSTEON:Networking:Network_Resources.
Universal Devices ISY-994i Series:EMail and Networking Substitution Variables [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-994i_Series:EMail_and_Networking_Substitution_Variables&redirect=no.
Universal Devices ISY994i:INSTEON Device:FanLinc-KPL FanLinc KeypadLinc Configuration [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY994i:INSTEON_Device:FanLinc-KPL_FanLinc_KeypadLinc_Configuration.
Universal Devices ISY-99i & 994i Series User Guide [Book]. - [s.l.] : Universal Devices. - Vols. https://www.universal-devices.com/docs/production/ISY%20User%20Guide%20v3.3.10%20a2.pdf.
Universal Devices ISY-99i Generic Calendar Using Programs and Variables [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Generic_Calendar_Using_Programs_and_Variables.
Universal Devices ISY-99i Series INSTEON:Adding IR Commands [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Adding_IR_Commands.
Universal Devices ISY-99i Series INSTEON:Adjusting IR Press/Release Delays [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Adjusting_IR_Press/Release_Delays.
Universal Devices ISY-99i Series INSTEON:Creating an IR Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Creating_an_IR_Program.
Universal Devices ISY-99i Series INSTEON:Light Data Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Light_Data_Program.
Universal Devices ISY-99i Series INSTEON:Networking:Mobile Notification [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Mobile_Notification.
Universal Devices ISY-99i Series INSTEON:Networking:Mobile Notification:Tasker [Online] // https://wiki.universal-devices.com. - https://wiki.universal-

devices.com/index.php?title=ISY-99i_Series_INSTEON:Networking:Mobile_Notification:Tasker.
Universal Devices ISY-99i Series INSTEON:Philips RC-5 IR Codes for ISY [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Philips_RC-5_IR_Codes_for_ISY.
Universal Devices ISY-99i Series INSTEON:Quick IR Tutorial [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i_Series_INSTEON:Quick_IR_Tutorial.
Universal Devices ISY-99i/ISY-26 INSTEON:Add to Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Add_to_Program.
Universal Devices ISY-99i/ISY-26 INSTEON:Advanced Configuration Guide [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Advanced_Configuration_Guide.
Universal Devices ISY-99i/ISY-26 INSTEON:Auto Irrigation Program v1 [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Auto_Irrigation_Program_v1.
Universal Devices ISY-99i/ISY-26 INSTEON:Auto Irrigation Program v2 [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Auto_Irrigation_Program_v2.
Universal Devices ISY-99i/ISY-26 INSTEON:Comparative Study using Run If [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Comparative_Study_using_Run_If.
Universal Devices ISY-99i/ISY-26 INSTEON:Create a Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Create_a_Program.
Universal Devices ISY-99i/ISY-26 INSTEON:Creating a KeypadLinc LED Follow Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Creating_a_KeypadLinc_LED_Follow_Program.
Universal Devices ISY-99i/ISY-26 INSTEON:Errors And Error Messages [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Errors_And_Error_Messages.
Universal Devices ISY-99i/ISY-26 INSTEON:Errors And Error Messages [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Errors_And_Error_Messages#Viewing_the_Log_file.
Universal Devices ISY-99i/ISY-26 INSTEON:Evapotranspiration and Irrigation [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Evapotranspiration_and_Irrigation.
Universal Devices ISY-99i/ISY-26 INSTEON:File Menu [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:File_Menu#Restore_Devices.
Universal Devices ISY-99i/ISY-26 INSTEON:Frequently Asked Questions [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Frequently_Asked_Questions.
Universal Devices ISY-99i/ISY-26 INSTEON:Garage Door Kit [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Garage_Door_Kit.
Universal Devices ISY-99i/ISY-26 INSTEON:Generate Topology [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Generate_Topology.

Universal Devices ISY-99i/ISY-26 INSTEON:Internet Explorer SSL Certificate Install [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Internet_Explorer_SSL_Certificate_Install.
Universal Devices ISY-99i/ISY-26 INSTEON:Link Management Menu [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Link_Management_Menu.
Universal Devices ISY-99i/ISY-26 INSTEON:Link Management Menu [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Link_Management_Menu&redirect=no.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking a Leak Sensor [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_a_Leak_Sensor.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking a MorningLinc [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_a_MorningLinc.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking a Motion Sensor [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_a_Motion_Sensor.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking a Thermostat [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_a_Thermostat.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking a Trigger Link [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_a_Trigger_Link.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking an EZFlora [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_an_EZFlora.
Universal Devices ISY-99i/ISY-26 INSTEON:Linking an I/O Linc [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Linking_an_I/O_Linc.
Universal Devices ISY-99i/ISY-26 INSTEON:Manage Program [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Manage_Program.
Universal Devices ISY-99i/ISY-26 INSTEON:Multi-Way Circuit [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Multi-Way_Circuit.
Universal Devices ISY-99i/ISY-26 INSTEON:PLM [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:PLM.
Universal Devices ISY-99i/ISY-26 INSTEON:Procedural Programs using Run If [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Procedural_Programs_using_Run_If.
Universal Devices ISY-99i/ISY-26 INSTEON:Program Commands [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Program_Commands.
Universal Devices ISY-99i/ISY-26 INSTEON:Program Content [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Program_Content.
Universal Devices ISY-99i/ISY-26 INSTEON:Program Detail [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Program_Detail.

Universal Devices ISY-99i/ISY-26 INSTEON:Programs as Flags: Understanding and Using Program Status (True/False) [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Programs_as_Flags:_Understanding_and_Using_Program_Status_(True/False).
Universal Devices ISY-99i/ISY-26 INSTEON:Quick Start Guide [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Quick_Start_Guide#Connecting_to_the_ISY_Shell_Using_the_Serial_Port.
Universal Devices ISY-99i/ISY-26 INSTEON:Remotely Connect to Your ISY [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Remotely_Connect_to_Your_ISY.
Universal Devices ISY-99i/ISY-26 INSTEON:Replacing/Formatting an SD Card [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Replacing/Formatting_an_SD_Card.
Universal Devices ISY-99i/ISY-26 INSTEON:Resetting Your Userid/Password [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Resetting_Your_Userid/Password.
Universal Devices ISY-99i/ISY-26 INSTEON:Scene [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Scene.
Universal Devices ISY-99i/ISY-26 INSTEON:Scope, Precedence and Execution Order [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Scope,_Precedence_and_Execution_Order.
Universal Devices ISY-99i/ISY-26 INSTEON:Spidering My Network [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Spidering_My_Network.
Universal Devices ISY-99i/ISY-26 INSTEON:Telnet To Your ISY [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Telnet_To_Your_ISY.
Universal Devices ISY-99i/ISY-26 INSTEON:Tracking X-10 Device Status [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Tracking_X-10_Device_Status.
Universal Devices ISY-99i/ISY-26 INSTEON:Tree View [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Tree_View.
Universal Devices ISY-99i/ISY-26 INSTEON:Troubleshooting Flowchart [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Troubleshooting_Flowchart.
Universal Devices ISY-99i/ISY-26 INSTEON:Update Your Firmware [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Update_Your_Firmware.
Universal Devices ISY-99i/ISY-26 INSTEON:Using Motion Sensors in Bathrooms [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Using_Motion_Sensors_in_Bathrooms.
Universal Devices ISY-99i/ISY-26 INSTEON:Using the Event Viewer [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Using_the_Event_Viewer.
Universal Devices ISY-99i/ISY-26 INSTEON:Using X-10 Motion Sensors [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Using_X-10_Motion_Sensors.

Universal Devices ISY-99i/ISY-26 INSTEON:Variable Details [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Variable_Details.
Universal Devices ISY-99i/ISY-26 INSTEON:Working With Scenes - in-depth tutorial [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=ISY-99i/ISY-26_INSTEON:Working_With_Scenes_-_in-depth_tutorial.
Universal Devices Main Page [Online] // Universal Devices Forum. - https://wiki.universal-devices.com/index.php?title=Main_Page.
Universal Devices Main Page -> Network Security [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Main_Page#Network_Security.
Universal Devices RemoTec ZXT-120 Configuration [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=RemoTec_ZXT-120_Configuration.
Universal Devices Resetting Your ISY [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Resetting_Your_ISY.
Universal Devices Using the HAM Weather Irrigation Module [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Using_the_HAM_Weather_Irrigation_Module&redirect=no.
Universal Devices Z-Wave: Configuring AeoTec Dry Contact [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Z-Wave:_Configuring_AeoTec_Dry_Contact.
Universal Devices Z-Wave: Configuring DSB09104 ZWUS Energy Monitor [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Z-Wave:_Configuring_DSB09104_ZWUS_Energy_Monitor.
Universal Devices Z-Wave: Configuring Range Extenders and Door Locks [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Z-Wave:_Configuring_Range_Extenders_and_Door_Locks.
Universal Devices, John Miller Configure Firewall Software [Online] // https://wiki.universal-devices.com. - https://wiki.universal-devices.com/index.php?title=Configure_Firewall_Software.