Hardware Reference Guide

NI-x100 Series

NetLinx® Integrated Controllers
(NI-2100, NI-3100, NI-4100)

AMX Limited Warranty and Disclaimer

AMX warrants its products to be free of defects in material and workmanship under normal use for three (3) years from the date of purchase from AMX, with the following exceptions:

- Electroluminescent and LCD Control Panels are warranted for three (3) years, except for the display and touch overlay components that are warranted for a period of one (1) year.
- Disk drive mechanisms, pan/tilt heads, power supplies, and MX Series products are warranted for a period of one (1) year.
- AMX Lighting products are guaranteed to switch on and off any load that is properly connected to our lighting products, as long as the AMX Lighting products are under warranty. AMX does guarantee the control of dimmable loads that are properly connected to our lighting products. The dimming performance or quality cannot be guaranteed due to the random combinations of dimmers, lamps and ballasts or transformers.
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Introduction

The X100-Series of NetLinx Integrated Master Controllers can both be programmed to control RS-232/422/485, Relay, IR/Serial, and Input/Output devices through the use of both the NetLinx programming language and the NetLinx Studio application version 2.x. Another key feature of this products is the ability to easily access the configuration switches without having to remove a cover plate.

NetLinx Integrated Master Controller Features	
NI-2100 (FG2105-04)	• 1 RS-232 Program port • 3 RS-232/RS-422/RS-485 ports • 4 IR/Serial Output ports • 4 Digital Input/Output ports • 4 Relays
NI-2100 Kit (FG2105-14)	• In addition to the options listed above, this Kit includes a pre-installed ICSNet daughter card (**FG2105-10**)
NI-3100 (FG2105-05)	• 1 RS-232 Program port • 7 RS-232/RS-422/RS-485 ports • 8 IR/Serial Output ports • 8 Digital Input/Output ports • 8 Relays
NI-3100 Kit (FG2105-15)	• In addition to the options listed above, this Kit includes a pre-installed ICSNet daughter card (**FG2105-10**)
NI-4100 (FG2105-06)	• Support for up to 4 NetLinx control cards (such as NXC-COM2, NXC-IRS4, etc.) • 1 ICSNet Hub port (part of the included pre-installed ICSNet card) • 1 RS-232 Program port • 2 ICSNet ports (part of the included pre-installed ICSNet card) • 7 RS-232/RS-422/RS-485 ports • 8 IR/Serial Output ports • 8 Digital Input/Output ports • 8 Relays

References within this manual to NI X100-Series Controllers are used to describe the NI-2100/3100/4100 Integrated Controllers. When there is an overlap of information with other related NI Controllers, an X will be used to refer to both sets of units.
As an example, if a feature is shared by both the NI-4000 and the NI-4100 Controller, the term NI-4x00 Series is used.

These NI Controllers are shipped with Duet firmware and can not be downgraded to earlier Non-Duet firmware (< build 300).

These NI Controllers are Duet-compatible and can be upgraded via firmware. Duet is a dual-interpreter firmware platform from AMX which combines the proven reliability and power of NetLinx with the extensive capabilities of the *Java®2 MicroEdition* (J2ME) platform. Duet simplifies the programming of a system that includes the NI-900 and other third party devices by standardizing device and function definitions, defaulting touch panel button assignments, and controlling feedback methods. Dynamic Device Discovery makes integration even easier by automatically identifying and communicating with devices which support this new beaconing technology.

These NI Controllers use a combination lithium battery and clock crystal package called a *Timekeeper*. Only one *Timekeeper* unit is installed within a given NI controller. The battery can be expected to have up to 3 years of usable life under very adverse conditions. Actual life is appreciably longer under normal operating conditions.

- This calculation is based on storing the unit without power in 50° C (120° F) temperature until battery levels are no longer acceptable.

- The part number for a replacement battery is *57-0032*.

NI-2100 Specifications

The NI-2100 (FIG. 1) provides support for **3** RS-232/RS-422/RS-485 Ports, **4** IR/Serial Output ports, **4** Digital Input/Output ports, and **4** Relays. The NI-2100 can be upgraded to provide **1** ICSHub and **2** ICSNet ports by either installing the optional ICSNet daughter card (**FG2105-10**) or purchasing this upgrade as an included feature of the NI-2100 Kit (**FG2105-14**).

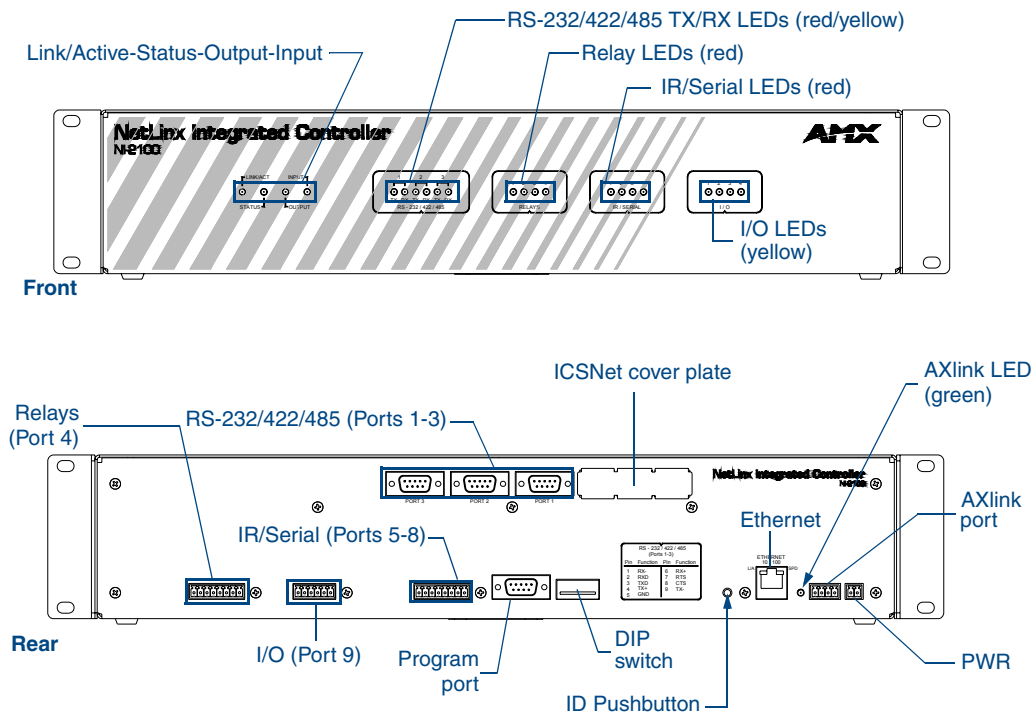**FIG. 1** NI-2100 NetLinx Integrated Controller (front view)

FIG. 2 NI-2100 front and rear panel connectors and components

NI-2100 Specifications	
Dimensions (HWD):	• 3.47" x 17.00" x 3.47" (8.81 cm x 43.18 cm x 8.82 cm) • 2 rack units high
Power Requirement:	700 mA @ 12 VDC
Memory:	• 64 MB SDRAM • 1 MB Non-volatile (NV) SRAM
Compact Flash:	128 MB or more - Upgradeable (see *Other AMX Equipment*) ***Note***: *AMX may increase Flash size at any time in response to market availability (refer to product's online catalog page for current Compact Flash size provided).*
Weight:	4.50 lbs (2.04 kg)
Enclosure:	Metal with black matte finish
Certifications:	FCC Part 15 Class B, CE, and IEC 60950
Front Panel LEDs:	
• LINK/ACT:	Green LED blinks when the Ethernet cables are connected and terminated correctly. Also blinks when receiving Ethernet data packets.
• Status:	Green LED blinks to indicate that the system is programmed and communicating properly.
• Output:	Red LED blinks when the Controller transmits data, sets channels On and Off, sends data strings, etc.
• Input:	Yellow LED blinks when the Controller receives data from button pushes, strings, commands, channel levels, etc.
• RS-232/422/485:	3 sets of red and yellow LEDs light to indicate that DB9 Ports 1 - 3 are transmitting or receiving RS-232, 422, or 485 data.
• Relay:	4 red LEDs light to indicate the relay channels 1 - 4 are active (closed). These LEDs reflect the state of the relay on Port 4.
• IR/Serial:	4 red LEDs light to indicate the IR/Serial channels 1 - 4 are transmitting control data on Ports 5 - 8. LED indictor for each IR port remains lit for the length of time that IR/Serial data is being generated.
• I/O:	4 yellow LEDs light when the I/O channels 1 - 4 are active. The LED for each I/O port reflects the state of that particular port.
Rear Panel Components:	
• RS-232/422/485 (Ports 1 - 3):	3 RS-232/422/485 control ports using DB9 (male) connectors with XON/XOFF (transmit on/transmit off), CTS/RTS (clear to send/ready to send), and 300-115,200 baud.
• ICSNet:	2 RJ-45 connectors for ICSNet interface (provided by optional ICSNet daughter card).
• ICSHub Out:	RJ-45 connector provides data to a Hub connected to the Controller (provided by optional ICSNet daughter card).
• Relay (Port 4):	• Four-channel single-pole single-throw relay ports • Each relay is independently controlled. • Supports up to 4 independent external relay devices • Channel range = 1-4 • Each relay can switch up to 24 VDC or 28 VAC @ 1 A 8-pin 3.5 mm mini-Phoenix (female) connector provides relay termination
• Digital I/O (Port 9):	4-channel binary I/O port for contact closure with each input being capable of voltage sensing. Input format is software selectable with interactive power sensing for IR ports.

NI-2100 Specifications (Cont.)	
Rear Panel Components (Cont.):	
• IR/Serial (Ports 5 - 8):	4 IR/Serial control ports support high-frequency carriers of up to 1.142 MHz with each output being capable of two electrical formats: IR or Serial.
	• 4 IR/Serial data signals can be generated simultaneously.
	• IR ports support data mode (at limited baud rates and wiring distances).
• Program Port:	RS-232 DB9 connector (male) can be connected to a DB9 port on a PC. This connector can be used with serial and NetLinx programming commands, as well as other DB9 capable devices, to both upload/download information from the NetLinx Studio program.
• Configuration DIPSwitch:	Sets the communication parameters for the Program port (see *Baud Rate Settings*).
• ID Pushbutton:	Sets the NetLinx ID (Device only) assignment for the device.
• Ethernet Port:	RJ-45 connector provides TCP/IP communication. This is an Auto MDI/MDI-X enabled port, which allows you to use either straight-through or crossover Ethernet cables.
	The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information:
	• *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps.
	• *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.
• AxLink Port:	4-pin 3.5 mm mini-Phoenix (male) connector that provides data and power to external control devices. Green AXlink LED indicates the state of the AXlink port.
• Power Port:	2-pin 3.5 mm mini-Phoenix (male) connector.
Included Accessories:	• 2-pin 3.5 mm mini-Phoenix (female) PWR connector (41-5025)
	• 4-pin 3.5 mm mini-Phoenix (female) AXlink connector (41-5047)
	• 6-pin 3.5 mm mini-Phoenix female I/O connector (41-5063)
	• 8-pin 3.5 mm mini-Phoenix female Relay connector (41-5083)
	• Installation Kit (KA2105-01):
	- 8-pin Relay Common Strip
	- 4 rack mount screws
	- 4 washers
	• 2 CC-NIRC NetLinx IR Emitter Cables (FG10-000-11)
	• 2 removable rack ears (62-2105-07)
Other AMX Equipment:	• 2-pin 3.5 mm mini-Phoenix male connector (41-5026)
	• CSB Cable Support Bracket (FG517)
	• CC-COM Programming Port Cable (FG10-727)
	• CC-NSER IR/Serial cable (FG10-007-10)
	• ICSNet daughter card (FG2105-10)
	• NCK, NetLinx Connector Kit (FG2902)
	• STS, Serial To Screw Terminal (FG959)
	• Upgrade Compact Flash (factory programmed with firmware):
	NXA-CF2NI256M - 256 MB compact flash card (FG2116-47)
	NXA-CF2NI512M - 512 MB compact flash card (FG2116-48)
	NXA-CF2NI1G - 1 GB compact flash card (FG2116-49)

NI-3100 Specifications

The NI-3100 (FIG. 3) provides support for **7** RS-232/RS-422/RS-485 Ports, **8** IR/Serial Output ports, **8** Digital Input/Output ports, and **8** Relays.

The NI-3100 can be upgraded to provide one ICSHub and two ICSNet ports by either installing the optional ICSNet daughter card (**FG2105-10**) or purchasing this upgrade as an included feature of the NI-3100 Kit (**FG2105-15**).

FIG. 3 NI-3100 NetLinx Integrated Controller (front view)
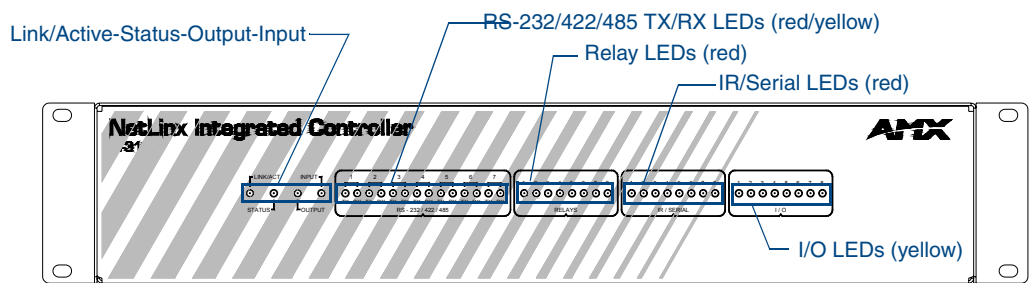
FIG. 4 NI-3100 front and rear panel connectors and components

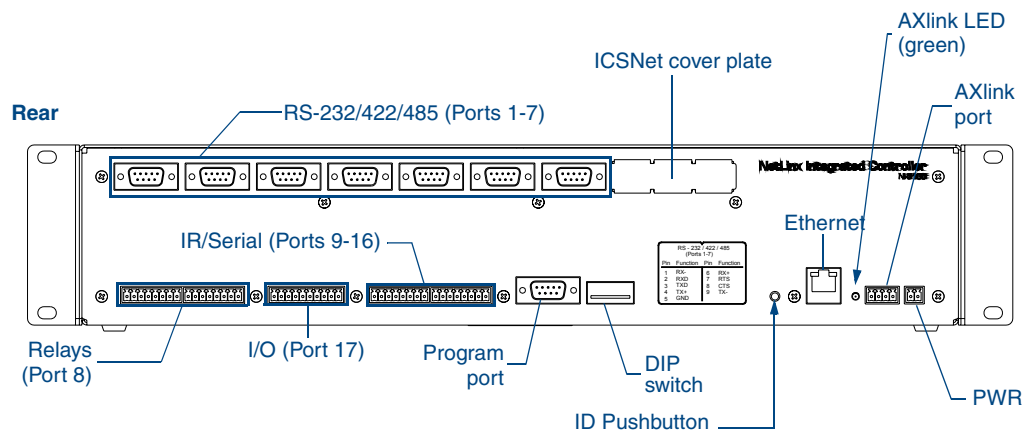| NI-3100 Specifications	
Dimensions (HWD):	• 3.47" x 17.00" x 3.47" (8.81 cm x 43.18 cm x 8.82 cm) • 2 rack units high
Power Requirement:	900 mA @ 12 VDC
Memory:	• 64 MB SDRAM • 1 MB Non-volatile (NV) SRAM
Compact Flash:	128 MB or more • AMX may increase Flash size at any time in response to market availability • Upgradeable - see *Other AMX Equipment*
Weight:	4.55 lbs (2.06 kg)
Enclosure:	Metal with black matte finish
Certifications:	FCC Part 15 Class B, CE, and IEC 60950
Front Panel LEDs:	
• LINK/ACT:	Green LED blinks when the Ethernet cables are connected and terminated correctly. Also blinks when receiving Ethernet data packets.
• Status:	Green LED blinks to indicate that the system is programmed and communicating properly.
• Output:	Red LED blinks when the Controller transmits data, sets channels On and Off, sends data strings, etc.
• Input:	Yellow LED blinks when the Controller receives data from button pushes, strings, commands, channel levels, etc.
• RS-232/422/485:	7 sets of red and yellow LEDs light to indicate that DB9 Ports 1 - 7 are transmitting or receiving RS-232, 422, or 485 data.
• Relay:	• Eight-channel single-pole single-throw relay ports • Each relay is independently controlled. • Supports up to 8 independent external relay devices • Channel range = 1-8 • Each relay can switch up to 24 VDC or 28 VAC @ 1 A Two 8-pin 3.5 mm mini-Phoenix (female) connectors provide relay termination
• IR/Serial:	8 red LEDs light to indicate the IR/Serial channels 1 - 8 are transmitting control data on Ports 9 - 16. LED indictor for each IR port remains lit for the length of time that IR/Serial data is being generated.
• I/O:	8 yellow LEDs light when the rear I/O channels 1 - 8 are active. The LED for each I/O port reflects the state of that particular port.
Rear Panel Components:	
• RS-232/422/485 (Ports 1 - 7):	7 RS-232/422/485 control ports using DB9 (male) connectors with XON/XOFF (transmit on/transmit off), CTS/RTS (clear to send/ready to send), and 300-115,200 baud.
• ICSNet:	2 RJ-45 connectors for ICSNet interface (provided by optional ICSNet daughter card).
• ICSHub Out:	RJ-45 connector provides data to a Hub connected to the Controller (provided by optional ICSNet daughter card).
• Relay (Port 8):	8-channel single-pole single throw relay ports with each relay being independently controlled and supporting up to 8 independent external relay devices.
• Digital I/O (Port 17):	8-channel binary I/O port for contact closure with each input being capable of voltage sensing. Input format is software selectable with interactive power sensing for IR ports.

NI-3100 Specifications (Cont.)	
Rear Panel Components (Cont.):	
• IR/Serial (Ports 9 - 16):	8 IR/Serial control ports support high-frequency carriers of up to 1.142 MHz with each output being capable of two electrical formats: IR or Serial. • 8 IR/Serial data signals can be generated simultaneously. • IR ports support data mode (at limited baud rates and wiring distances).
• Program Port:	RS-232 DB9 connector (male) can be connected to a DB9 port on a PC. This connector can be used with serial and NetLinx programming commands, as well as other DB9 capable devices, to both upload/download information from the NetLinx Studio program.
• Configuration DIP Switch:	Sets the communication parameters for the Program port (see *Baud Rate Settings*).
• ID Pushbutton:	Sets the NetLinx ID (Device only) assignment for the device.
• Ethernet Port:	RJ-45 connector provides TCP/IP communication. This is an Auto MDI/MDI-X enabled port, which allows you to use either straight-through or crossover Ethernet cables. The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information: • *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps. • *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.
• AxLink Port:	4-pin 3.5 mm mini-Phoenix (male) connector that provides data and power to external control devices. Green AXlink LED indicates the state of the AXlink port.
• Power Port:	2-pin 3.5 mm mini-Phoenix (male) connector.

Included Accessories:	• 2-pin 3.5 mm mini-Phoenix (female) PWR connector (41-5025)
	• 4-pin 3.5 mm mini-Phoenix (female) AXlink connector (41-5047)
	• 10-pin 3.5 mm mini-Phoenix (female) I/O connector (41-5107)
	• Installation Kit (KA2105-01):
	  - 8-pin Relay Common Strip
	  - 4 rack mount screws
	  - 4 washers
	• 2 8-pin 3.5 mm mini-Phoenix female Relay connectors (41-5083)
	• 2 CC-NIRC NetLinx IR Emitter Cables (FG10-000-11)
	• 2 removable rack ears (62-2105-07)

Other AMX Equipment:	• 2-pin 3.5 mm mini-Phoenix male connector (41-5026)
	• CSB Cable Support Bracket (FG517)
	• CC-NSER IR/Serial cables (FG10-007-10)
	• ICSNet daughter card (FG2105-10)
	• NCK, NetLinx Connector Kit (FG2902)
	• STS, Serial To Screw Terminal (FG959)
	• Upgrade Compact Flash (factory programmed with firmware):
	  NXA-CF2NI256M - 256 MB compact flash card (FG2116-47)
	  NXA-CF2NI512M - 512 MB compact flash card (FG2116-48)
	  NXA-CF2NI1G - 1 GB compact flash card (FG2116-49)

NI-4100 Specifications

The NI-4100 (FIG. 5) is geared toward those advanced control and automation requirements associated with most complex commercial and residential installations. The NI-4100 provides support for up to **4** NetLinx control cards (such as NXC-COM2, NXC-IRS4, etc.), **7** RS-232/RS-422/RS-485 Ports, **8** IR/Serial Output ports, 8 Digital Input/Output ports, and **8** Relays.

The NI-4100's on-board Master also provides the ability to update installed control card firmware.

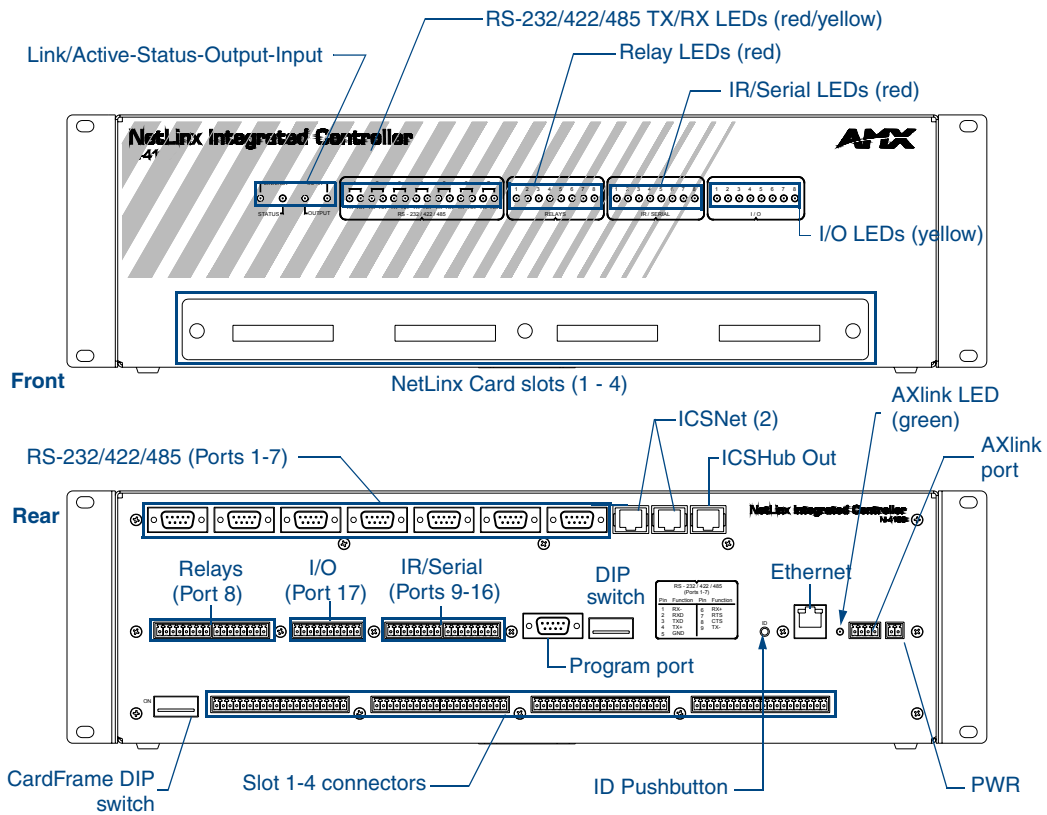**FIG. 5** NI-4100 NetLinx Integrated Controller (front view)

FIG. 6 NI-4100 front and rear panel connectors and components

NI-4100 Specifications	
Dimensions (HWD):	• 5.21" x 17.00" x 9.60" (13.23 cm x 43.18 cm x 24.27 cm)
	• 3 rack units high
Power Requirement:	• 900 mA @ 12 VDC
Memory:	• 64 MB SDRAM
	• 1 MB Non-volatile (NV) SRAM
Compact Flash:	128 MB or more
	• AMX may increase Flash size at any time in response to market availability
	• Upgradeable - see *Other AMX Equipment*
Weight:	9.15 lbs (4.15 kg)
Enclosure:	Metal with black matte finish
Certifications:	FCC Part 15 Class B, CE, and IEC 60950
Front Panel LEDs/Slots:	
• LINK/ACT:	Green LED blinks when the Ethernet cables are connected and terminated correctly. Also blinks when receiving Ethernet data packets.
• Status:	Green LED blinks to indicate that the system is programmed and communicating properly.
• Output:	Red LED blinks when the Controller transmits data, sets channels On and Off, sends data strings, etc.
• Input:	Yellow LED blinks when the Controller receives data from button pushes, strings, commands, channel levels, etc.
• RS-232/422/485:	7 sets of red and yellow LEDs light to indicate that DB9 Ports 1 - 7 are transmitting or receiving RS-232, 422, or 485 data.
• Relay:	8 red LEDs light to indicate the relay channels 1 - 8 are active (closed). These LEDs reflect the state of the relay on Port 8.
• IR/Serial:	8 red LEDs light to indicate the IR/Serial channels 1 - 8 are transmitting control data on Ports 9 - 16. LED indictor for each IR port remains lit for the length of time that IR/Serial data is being generated.
• I/O:	8 yellow LEDs light when the rear I/O channels 1 - 8 are active. The LED for each I/O port reflects the state of that particular port.
• NetLinx Control Card Slots 1 - 4:	Accepts up to 4 compatible NetLinx Cards: such as the NXC-COM2, NXC-I/O10, etc.
Rear Panel Components:	
• RS-232/422/485 (Ports 1 - 7):	7 RS-232/422/485 control ports using DB9 (male) connectors with XON/XOFF (transmit on/transmit off), CTS/RTS (clear to send/ready to send), and 300-115,200 baud.
• ICSNet:	2 RJ-45 connectors for ICSNet interface (provided by optional ICSNet daughter card).
• ICSHub Out:	RJ-45 connector provides data to a Hub connected to the Controller (provided by optional ICSNet daughter card).
• Relay (Port 8):	• Eight-channel single-pole single throw relay ports
	• Each relay is independently controlled.
	• Supports up to 8 independent external relay devices
	• Channel range = 1-8
	• Each relay can switch up to 24 VDC or 28 VAC @ 1 A
	Two 8-pin 3.5 mm mini-Phoenix (female) connectors provide relay termination
• Digital I/O (Port 17):	8-channel binary I/O port for contact closure with each input being capable of voltage sensing. Input format is software selectable with interactive power sensing for IR ports.
• IR/Serial (Ports 9 - 16):	8 IR/Serial control ports support high-frequency carriers of up to 1.142 MHz with each output being capable of two electrical formats: IR or Serial.
	• 8 IR/Serial data signals can be generated simultaneously.
	• IR ports support data mode (at limited baud rates and wiring distances).

NI-4100 Specifications (Cont.)	
Rear Panel Components (Cont.):	
• Program Port:	RS-232 DB9 connector (male) can be connected to a DB9 port on a PC. This connector can be used with serial and NetLinx programming commands, as well as other DB9 capable devices, to both upload/download information from the NetLinx Studio program.
• Configuration DIPSwitch:	Sets the communication parameters for the Program port (see *Baud Rate Settings*).
• ID Pushbutton:	Sets the NetLinx ID (Device only) assignment for the device.
• Ethernet Port:	RJ-45 connector provides TCP/IP communication. This is an Auto MDI/MDI-X enabled port, which allows you to use either straight-through or crossover Ethernet cables.
	The Ethernet Port LEDs show communication activity, connection status, speeds, and mode information:
	• *SPD (speed)* - Yellow LED lights On when the connection speed is 100 Mbps and turns Off when the speed is 10 Mbps.
	• *L/A (link/activity)* - Green LED lights On when the Ethernet cables are connected and terminated correctly, and blinks when receiving Ethernet data packets.
• AxLink Port:	4-pin 3.5 mm mini-Phoenix (male) connector that provides data and power to external control devices. Green AXlink LED indicates the state of the AXlink port.
• Power Port:	2-pin 3.5 mm mini-Phoenix (male) connector.
• CardFrame #DIP Switch:	Sets the starting address for the Control Cards in the CardFrame. *(Factory default CardFrame DIP switch value = 0). The Control Card address range is 1-3064.*
• Control Card Connectors (1-4):	20-pin (male) connectors that connect the Control Cards and external equipment to the CardFrame.
Included Accessories:	• 2-pin 3.5 mm mini-Phoenix (female) PWR connector (41-5025)
	• 4-pin 3.5 mm mini-Phoenix (female) AXlink connector (41-5047)
	• 10-pin 3.5 mm mini-Phoenix (female) I/O connector (41-5107)
	• Installation Kit (KA2105-01):
	- 8-pin Relay Common Strip
	- 4 rack mount screws
	- 4 washers
	• 2 8-pin 3.5 mm mini-Phoenix (female) Relay connectors (41-5083)
	• 2 CC-NIRC NetLinx IR Emitter Cables (FG10-000-11)
	• 2 removable rack ears (62-2105-07)
Other AMX Equipment:	• 2-pin 3.5 mm mini-Phoenix male connector (41-5026)
	• CSB Cable Support Bracket (FG517)
	• CC-NSER IR/Serial cables (FG10-007-10)
	• NCK, NetLinx Connector Kit (FG2902)
	• STS, Serial To Screw Terminal (FG959)
	• Upgrade Compact Flash (factory programmed with firmware):
	NXA-CF2NI256M - 256 MB compact flash card (FG2116-47)
	NXA-CF2NI512M - 512 MB compact flash card (FG2116-48)
	NXA-CF2NI1G - 1 GB compact flash card (FG2116-49)

Related Documents

For information on using the on-board Web Console, as well as NetLinx send commands and terminal communications to configure the NI Controllers, refer to the *NetLinx Integrated Controller WebConsole & Programming Guide*.

*All product documentation is available to view or download from **www.amx.com**.*

Installation and Upgrading

Installing NetLinx Control Cards (NI-4100 Only)

NetLinx Cards can be installed into the front card slots. The cards mount horizontally through the card slot openings on the front of the enclosure.

1. Discharge the static electricity from your body, by touching a grounded object.

2. Remove the three screws by turning them in a counter-clockwise direction and then remove the faceplate (FIG. 7).
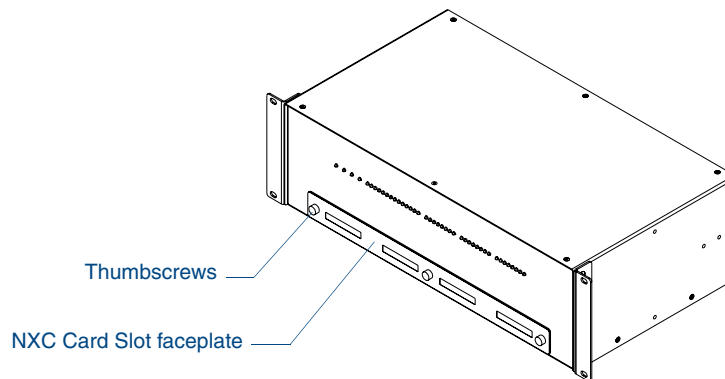
FIG. 7 NI-4100 front faceplate

3. Align the edges of the card with the internal guide slots and gently slide the card all the way into the slot (FIG. 8).
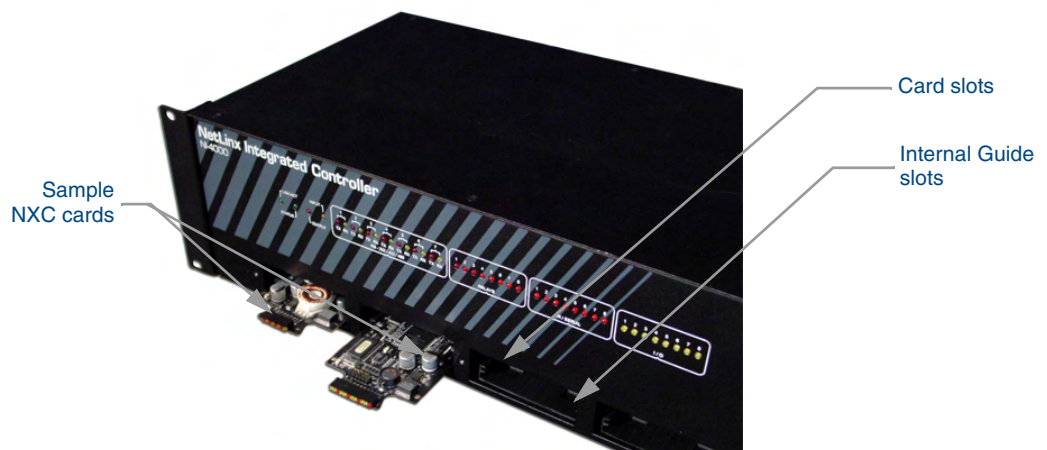
FIG. 8 Sample NXC cards inserted into an NI-4100 unit

4. Carefully apply a small amount of force to insert the cards into their respective connectors. If the cards have LEDs on them, those LEDs will initiate a lighting sequence to indicate they are receiving power and are communicating with the Controller.

5. Re-align the faceplate and secure it to the chassis by inserting the three screws by turning them in a clockwise direction and securing the front plate to the Integrated Controller.

6. Install all rear connectors and apply power.

If the cards do not appear in the NetLinx Studio's Workspace window for the selected Master System number: give the system time to detect the inserted cards (and refresh the system) and/or cycle power to the unit.

Setting the NetLinx Control Card Addresses (NI-4100 Only)

- The 8-position CardFrame Number DIP switch (located on the rear of the NI-4100) sets the starting address (the device number in the D:P:S specification) for the Control Cards installed in the CardFrame. The address range is 1-3064.
- The factory default CardFrame DIP switch value = **0** (all CardFrame DIP switches in the OFF position).
- The formula for setting the starting address is:

(DIP switch address x 12) + Card slot Number (1-12) = Card address

For example:

- DIP switch setting, 00010101: (0 + 0 + 0 + 96 + 0 + 384 + 1536) + SLOT #(ex:1) = 2017.
- A card in slot number 1 would be device address 2017.

1. Set the CardFrame Number DIP switch based on the information listed in the table below.

Position	1	2	3	4	5	6	7	8	
Value	12	24	48	96	192	384	768	1536	**ON position**

2. Cycle power to the unit for approximately 5 seconds. This allows the unit to read the new device number settings.

Device:Port:System (D:P:S)

A device is any hardware component that can be connected to an AXlink or ICSNet bus. Each device must be assigned a unique number to locate that device on the bus. The NetLinx programming language allows numbers in the range 1-32,767 for ICSNet (255 for AXlink).
Only the Device value can be set through the DIP switch settings mentioned above.

NetLinx requires a Device:Port:System (D:P:S) specification. This D:P:S triplet can be expressed as a series of constants, variables separated by colons, or a DEV structure. For example:

```
STRUCTURE DEV
{
INTEGER Number  // Device number
INTEGER Port    // Port on device
INTEGER System  // System the device belongs to
}
```

The D:P:S notation is used to explicitly represent a device number, port and system.
For example, 128:1:0 represents the first port on device 128 on this system.

If a device is declared in a NetLinx program with just the Device number (**System and Port are omitted**), the NetLinx Compiler assumes it has a **Port number of 1 and a System number of 0**. However, you should convert all existing device declarations using the D:P:S (Device:Port:System) notation. This enables certain NetLinx specific debugging features and can help pinpoint other possibly obscure errors.

Here's the syntax:

```
NUMBER:PORT:SYSTEM
```

where:

NUMBER:	16-bit integer represents the device number
PORT:	16-bit integer represents the port number (in the range 1 through the number of ports on the Controller or device)
SYSTEM:	16-bit integer represents the system number (0 = this system)

Removing NetLinx Control Cards (NI-4100 Only)

To install NetLinx Control Card:

1. Discharge any static electricity from your body, by touching a grounded object and unplug all connectors (if any) from the unit.

2. Remove the three faceplate screws by turning them in a counter-clockwise direction.

3. Remove the faceplate from the front plate (FIG. 7 on page 13).

4. Gently grasp the rear edge of the control card and gently pull it out from the unit (along the internal guide slots).

5. Re-secure the faceplate by inserting the three faceplate screws by turning them in a clockwise direction and securing the front plate to the Integrated Controller.

6. Re-apply power and other connections as necessary.

Compact Flash Upgrades

The NetLinx Integrated Controllers are shipped with a default 32 MB Compact Flash module.

*It is recommended that **ANY MEMORY UPGRADE should be done prior to any installation**. Refer to the following accessing and installation sections for more information.*

The Compact Flash card is factory programmed with specific Controller firmware. These cards can be ordered from AMX in several different upgrade sizes (see the following table):

Optional Compact Flash Upgrades	
Product Name	**Description**
NXA-CFNI64M	64 MB compact flash card (**FG2116-31**)
NXA-CFNI128M	128 MB compact flash card (**FG2116-32**)
NXA-CFNI256M	256 MB compact flash card (**FG2116-33**)
NXA-CFNI512M	512 MB compact flash card (**FG2116-34**)
NXA-CFNI1G	1 GB compact flash card (**FG2116-35**)

Accessing The Internal Components On An Integrated Controller

1. Carefully detach all connectors from the rear of the unit.

2. Remove the chassis housing screws from both the sides and top of the Controller, as shown in FIG. 9 by using a grounded screwdriver turning in a counter-clockwise rotation.

   - The NI-2100 and NI-3100 have six screws on top and three on each side.

   - *The NI-4100 has six screws on top and four on each side.*
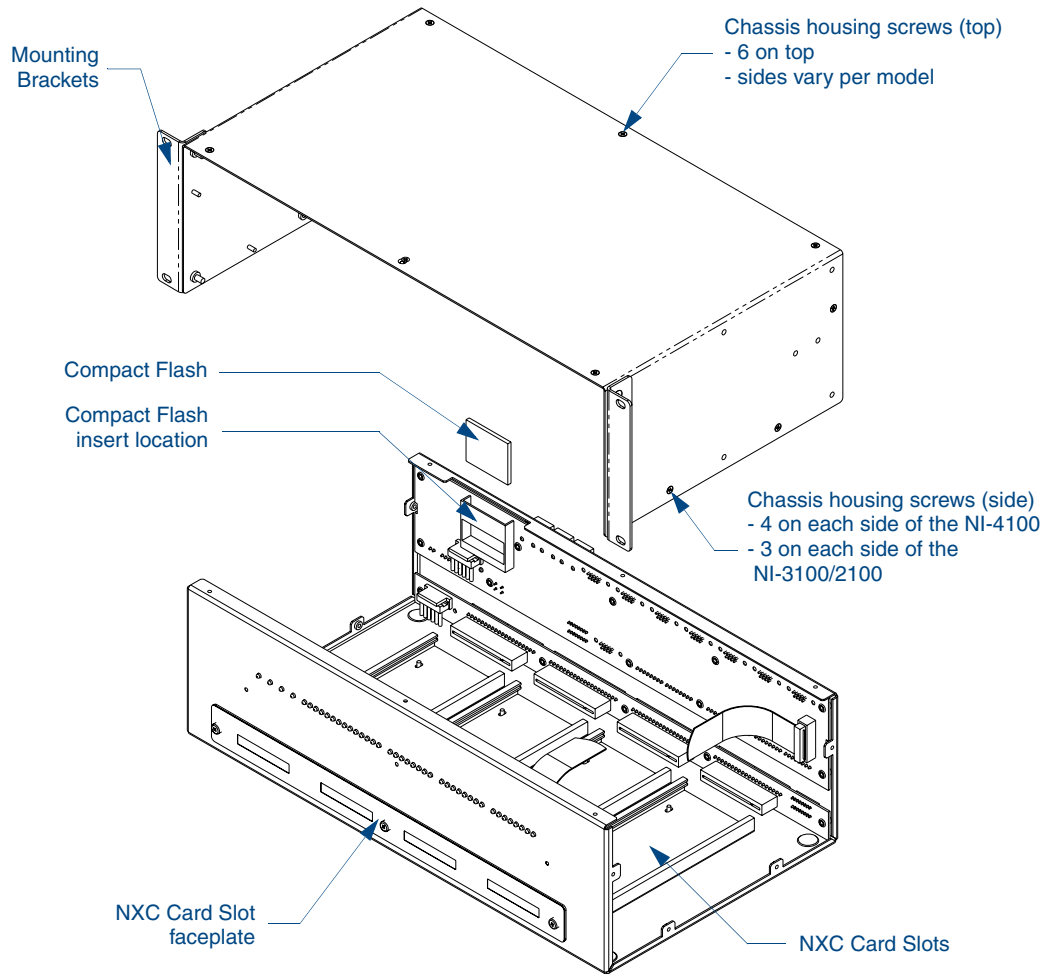
FIG. 9 Location of the Compact Flash within a sample Integrated Controller

3. Carefully pull-up and remove the housing up and away from the Controller to expose the internal circuit board (FIG. 9).

4. Refer to the following*Installation of Compact Flash Upgrades*for detailed replacement information.

Installation of Compact Flash Upgrades

1. Discharge any static electricity from your body by touching a grounded metal object.

2. Locate the 32 MB Compact Flash card on the main board. For more detailed information on component locations, refer to FIG. 9.

3. Insert the tip of a grounded flathead screwdriver into one of the Card Removal Grooves (located on either side of the card), and gently pry the card out of the slot. Repeat this process on the opposite card removal groove. This alternating action causes the card to "wiggle" away from the on-board connector pins.

4. Slip your finger into the opening between the connector pins and the card, and push the card out to remove it.

5. Remove the upgrade card from it's anti-static bag.

6. Insert the upgrade card into the connector opening with the arrow facing towards the pins, then push it in firmly until the contact pins are completely inside the flash card and securely attached to the connector (FIG. 10).

Under-side groove located below

Card Removal Grooves

Insert with arrow facing towards the connector pins
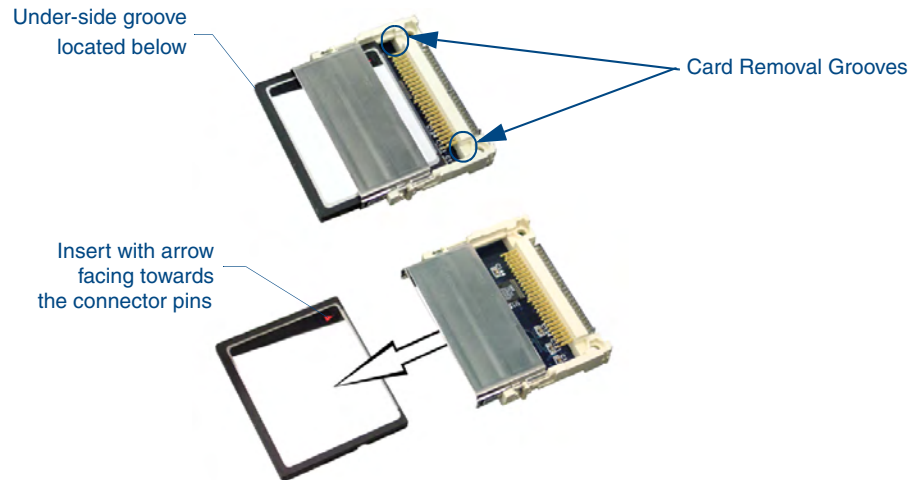
FIG. 10 Removing the Compact Flash card

7. To complete the upgrade process, close and re-secure the Integrated Controller enclosure using the procedures outlined in the following section.

> *Any new internal card upgrade is detected by the Controller only after power is cycled.*

Closing and Securing the Outer Housing

Once the card has been replaced, close and re-secure the outer housing:

1. Align the cover back over the unit and gently slide-down the chassis until the openings are aligned over their respective openings along both the sides and top of the unit.

2. Insert and secure the chassis housing screws back into their respective locations, as shown in FIG. 9 by using a grounded screwdriver.

3. Re-install all connectors and apply power to the unit.

Installing Into An Equipment Rack

Use the rack-mounting brackets (supplied) for equipment rack installations.

Remove the mounting brackets for flat surface installations.

> *Before completing the install process, it is recommended that you complete any firmware upgrade of the NetLinx Control Cards. This upgrade involves physically cycling power to the unit and can become cumbersome if the unit is already installed into a rack. Refer to the NI Series NetLinx Integrated Controllers WebConsole & Programming Guide (available online at www.amx.com) for detailed instructions.*

1. Discharge the static electricity from your body by touching a grounded object.

2. Position and install the mounting brackets, as shown in FIG. 11, using the screws supplied with the unit. The mounting brackets can be rotated to accommodate your mounting needs.
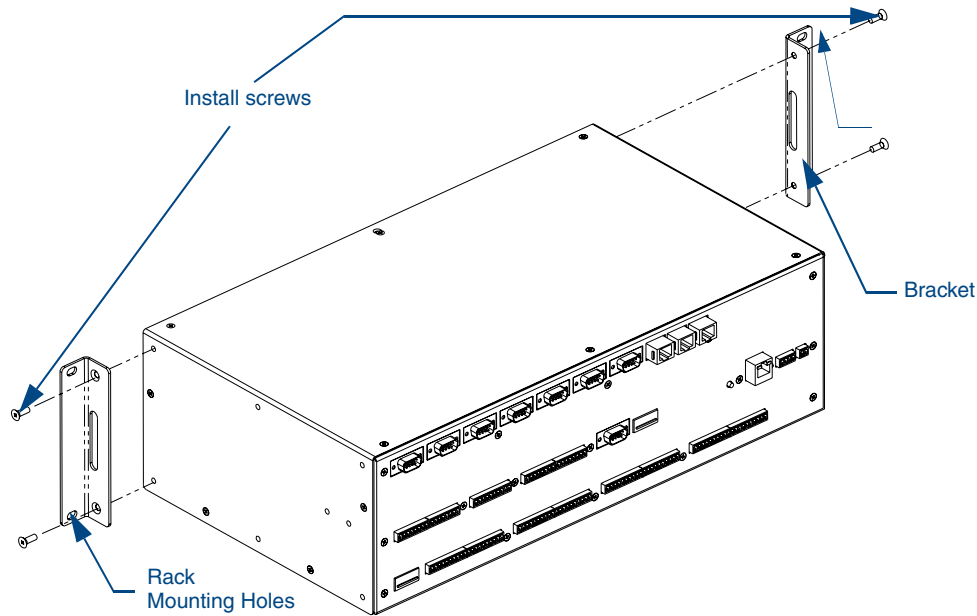
FIG. 11 Mounting Integrated Controller into an equipment rack

3. Thread the cables through the opening in the equipment rack. Allow for enough slack in the cables to accommodate for movement during the installation process.

4. Reconnect all cables to their appropriate source/terminal locations. Refer to the *Connections and Wiring* section on page 19 for more detailed wiring and connection information.

   ● Verify that the terminal end of the power cable is not connected to the a power supply before plugging in the 2-pin power connector.

To prevent repetition of the installation, test the incoming wiring by connecting the Controller's connectors to their terminal locations and applying power. Verify that the unit is receiving power and functioning properly. Disconnect the terminal end of the power cable from the connected 12 VDC-compliant power supply.

5. Slide the unit into the rack until the attachment holes, along both sides, align to their corresponding locations on the mounting brackets, as shown in FIG. 11.

6. Secure the AC-RK to the rack by using the four #10-32 screws (80-0186) and four #10 washers (80-0342) supplied in the kit.

7. Apply power to the unit to complete the installation.

Connections and Wiring

Setting the Configuration DIP Switch (for the Program Port)

Prior to installing the Controller, use the Configuration DIP switch to set the baud rate used by the Program port for communication. The Configuration DIP switch is located on the front of the Integrated Controllers.

Baud Rate Settings

Before programming the on-board Master, make sure the baud rate you set matches the communication parameters set on both your PC's COM port and those set through your NetLinx Studio v 2.4.

By default, the baud rate is set to **38,400** (bps).

Baud Rate Settings on the Configuration DIP Switch					
Baud Rate	**Position 5**	**Position 6**	**Position 7**	**Position 8**	
9600 bps	OFF	ON	OFF	ON	
38,400 bps (**default**)	OFF	ON	ON	ON	
57,600 bps	ON	OFF	OFF	OFF	
115,200 bps	ON	ON	ON	ON	

Note the orientation of the Configuration DIP Switch and the ON position label.
DIP switches 2,3, and 4 must remain in the OFF position at all times.

Program Run Disable (PRD) Mode

You can also use the Program port's Configuration DIP switch to set the on-board Master to Program Run Disable (**PRD**) mode according to the settings listed in the table below.

PRD Mode Settings		
PRD Mode	**Position 1**	
Normal mode (default)	OFF	
PRD Mode	ON	

The **PRD** mode prevents the NetLinx program stored in the on-board Master from running when you power up the Integrated Controller. This mode should only be used when you suspect the resident NetLinx program is causing inadvertent communication and/or control problems.

If necessary, place the on-board Master in PRD mode and use the NetLinx Studio v 2.4 program to resolve the communication and/or control problems with the resident NetLinx program. Then download the new NetLinx program and try again.

Think of the PRD Mode (On) equating to a PC's SAFE Mode setting. This mode allows a user to continue powering a unit, update the firmware, and download a new program while circumventing any problems with a currently downloaded program. Power must be cycled to the unit after activating/deactivating this mode on the Program Port DIP switch #1.

Working With the Configuration DIP Switch

1. Disconnect the power supply from the 2-pin PWR (green) connector on the rear of the NetLinx Integrated Controller.

2. Set DIP switch positions according to the information listed in the *Baud Rate Settings on the Configuration DIP Switch* and *PRD Mode Settings* tables.

3. Reconnect the 12 VDC-compliant power supply to the 2-pin 3.5 mm mini-Phoenix PWR connector.

Setting the CardFrame DIP Switch (NI-4100 Only)

Refer to the *Setting the NetLinx Control Card Addresses (NI-4100 Only)* section on page 14 for a detailed explanation on this process.

Program Port Connections and Wiring

The Integrated Controllers are equipped with a Program port located on the front of the unit. Use an RS232 programming cable to establish a connection between this Program port to your PC's COM port. This connection provides communication with the NetLinx Integrated Controller. Then you can download NetLinx programs to this on-board Master using the NetLinx Studio v 2.4 software program. Refer to the *NetLinx Studio* instruction manual for programming instructions. The following table shows the rear panel Program Port connector (male), pinouts, and signals.

Program Port, Pinouts, and Signals		
Program Port Connector	**Pin**	**Signal**
	2	RX
	3	TX
	5	GND
	7	RTS
	8	CTS
Male		

*When wiring the 422/485 connections, do **NOT** use pre-made 9-wire cable or connect the wire in the cable to any connection that will not be used by the DB9 serial port. Only use wiring that connects the needed pins.*

Modes and Front Panel LED Blink Patterns

The following table lists the modes and blink patterns for the front panel LEDs associated with each mode. These patterns are not evident until after the unit is powered.

Modes and LED Blink Patterns				
		LEDs and Blink Patterns		
Mode	**Description**	**STATUS (green)**	**OUTPUT (red)**	**INPUT (yellow)**
OS Start	Starting the operating system (OS).	On	On	On
Boot	On-board Master is booting.	On	Off	On
Contacting DHCP server	On-board Master is contacting a DHCP server for IP configuration information.	On	Off	Fast Blink
Unknown DHCP server	On-board Master could not find the DHCP server.	Fast Blink	Off	Off
Downloading Boot firmware	Downloading Boot firmware to the Master's on-board flash memory. Do not cycle power during this process!	Fast Blink	Fast Blink	Fast Blink
No program running	There is no program loaded, or the program is disabled.	On	Normal	Normal
Normal	On-board Master is functioning normally.	1 blink per second	Indicates activity	Indicates activity

Port Assignments and Functionality

The Port Assignments are as follows:

NI-2100 Port Assignments	
Port	**ICSP Port #**
Serial Port #1	1
Serial Port #2	2
Serial Port #3	3
Relays Ports (1-4)	4
IR/Serial Port #1	5
IR/Serial Port #2	6
IR/Serial Port #3	7
IR/Serial Port #4	8
I/O Port	9

NI-3100/4100 Port Assignments	
Port	**ICSP Port #**
Serial Port #1	1
Serial Port #2	2
Serial Port #3	3
Serial Port #4	4
Serial Port #5	5
Serial Port #6	6
Serial Port #7	7
Relays Ports (1-8)	8
IR Serial Port #1	9
IR Serial Port #2	10
IR Serial Port #3	11
IR Serial Port #4	12
IR Serial Port #5	13
IR Serial Port #6	14
IR Serial Port #7	15
IR Serial Port #8	16
I/O Port	17

AXlink Port and LED

All NI units have an AXlink port and adjacent status LED (FIG. 12). This port allows the NI to support AMX Legacy AXlink devices such as G3 touch panels (*ex: CP4/A*) and PosiTrack Pilot devices. A green LED shows AXlink data activity. When the AXlink port is operating normally, blink patterns include:

- **Off** - No power, or the controller is not functioning properly
- **1 blink per second** - Normal operation.
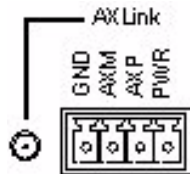- **3 blinks per second** - AXlink bus error. Check all AXlink bus connections.

FIG. 12 AXlink connector and LED

The AXlink port can be used to supply power to downstream AXlink-compatible devices as long as both the power required is LESS THAN 2 Amps total and the external power supply feeding the NI unit has the necessary power capability.

Wiring Guidelines

The Integrated Controllers use a 12 VDC-compliant power supply to provide power through the rear 2-pin 3.5 mm mini-Phoenix PWR connector. Use the power requirements referenced in the product's Specifications table to determine the power draw.

The incoming PWR and GND cable from the power supply must be connected to the corresponding locations within the PWR connector.

This unit should only have one source of incoming power.
Using more than one source of power to the Controller can result in damage to the internal components and a possible burn out.
Apply power to the unit only after installation is complete.

Wiring length guidelines

Refer to the following tables for the wiring length information used with the different types of NetLinx Integrated Controllers:

Wiring Guidelines - NI-2100 (@ 700 mA)	
Wire size	**Maximum wiring length**
18 AWG	154.83 feet (47.19 meters)
20 AWG	98.30 feet (29.96 meters)
22 AWG	63.40 feet (19.32 meters)
24 AWG	38.68 feet (11.79 meters)

Wiring Guidelines - NI-3100 & NI-4100 (@ 900) mA	
Wire size	**Maximum wiring length**
18 AWG	120.41 feet (39.70 meters)
20 AWG	76.45 feet (23.30 meters)
22 AWG	49.36 feet (15.04meters)
24 AWG	30.08 feet (9.17 meters)

Preparing Captive Wires

You will need a wire stripper and flat-blade screwdriver to prepare and connect the captive wires.

WARNING

Never pre-tin wires for compression-type connections.

1. Strip 0.25 inch (6.35 mm) of insulation off all wires.

2. Insert each wire into the appropriate opening on the connector (according to the wiring diagrams and connector types described in this section).

3. Tighten the screws to secure the wire in the connector. Do not tighten the screws excessively doing so may strip the threads and damage the connector.

Wiring a Power Connection

To use the 2-pin 3.5 mm mini-Phoenix connector with a 12 VDC-compliant power supply, the incoming PWR and GND cables from the external source must be connected to their corresponding locations on connector (FIG. 13).

1. Insert the PWR and GND wires on the terminal end of the 2-pin 3.5 mm mini-Phoenix cable. *Match the wiring locations of the +/- on both the power supply and the terminal connector.*

2. Tighten the clamp to secure the two wires. *Do not tighten the screws excessively; doing so may strip the threads and damage the connector.*

3. Verify the connection of the 2-pin 3.5 mm mini-Phoenix to the external 12 VDC-compliant power supply.

PWR +

GND -

Power Supply
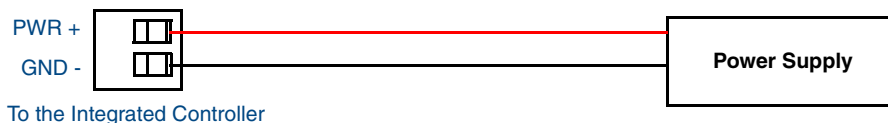
To the Integrated Controller

FIG. 13 2-pin mini-Phoenix connector wiring diagram (direct power)

Using the 4-Pin Mini-Phoenix Connector For Data and Power

Connect the 4-pin 3.5 mm mini-Phoenix (female) captive-wire connector to an external NetLinx device as shown in FIG. 14.

To the Integrated Controller's
AXlink/PWR connector

To the external AXlink device

Top view

Top view

GND -   AXP/TX   AXM/RX   PWR +

GND -   AXP/TX   AXM/RX   PWR +
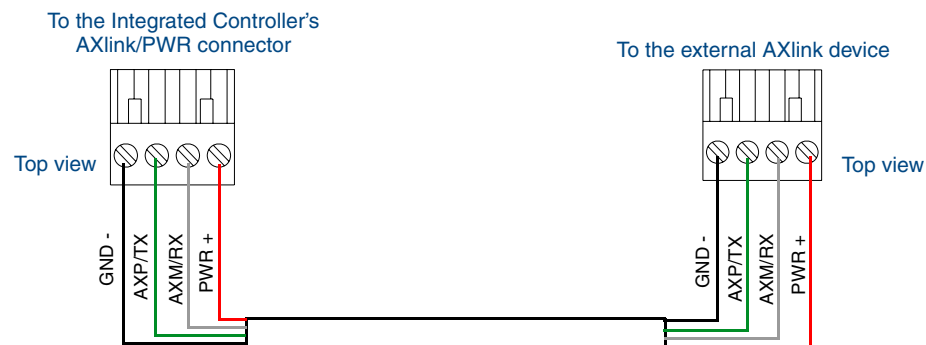
FIG. 14 Mini-Phoenix connector wiring diagram (direct data and power)

Using the 4-pin Mini-Phoenix Connector For Data With External Power

To use the 4-pin 3.5 mm mini-Phoenix (female) captive-wire connector for data communication and power transfer, the incoming PWR and GND cable from the 12 VDC-compliant power supply must be connected to the AXlink cable connector going to the Integrated Controller. FIG. 15 shows the wiring diagram. Always use a local power supply to power the Integrated Controller unit.
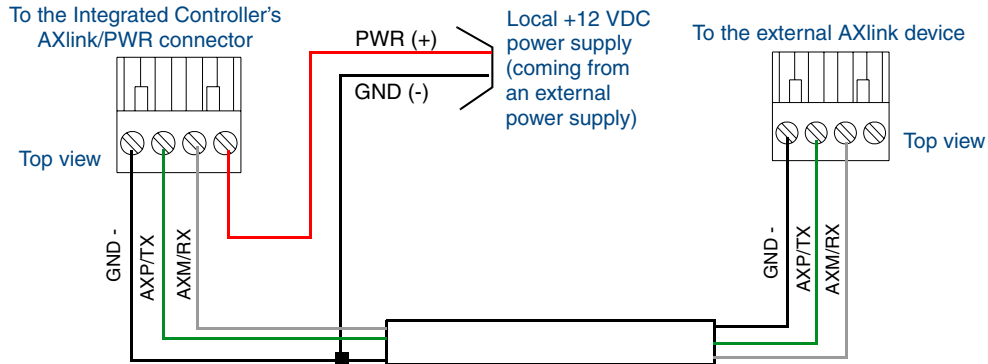

FIG. 15 4-pin mini-Phoenix connector wiring diagram (using external power source)

*When you connect an external power supply, do not connect the wire from the PWR terminal (coming from the external device) to the PWR terminal on the Phoenix connector attached to the Controller unit. Make sure to connect **only** the AXM, AXP, and GND wires to the Controller's Phoenix connector when using an external power supply.*

Make sure to connect only the GND wire on the AXlink/PWR connector when using a separate 12 VDC power supply. Do not connect the PWR wire to the AXlink connector's PWR (+) opening.

DB9 Device Port: Connections and Wiring

FIG. 16 shows the connector pinouts for the rear RS-232/RS-422/RS-485 (DB9) Device Ports.

These ports support most standard RS-232 communication protocols for data transmission. This figure gives a visual representation of the wiring specifications for the RS-232/422/485 Device connectors. Refer to the rear of the unit for more detailed connector pinout information.
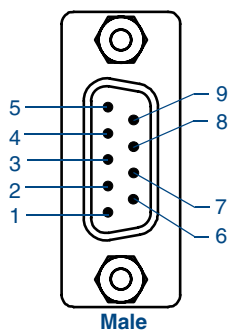
DB9 Serial Port pinouts (male connector)

RS-232	RS-422	RS-485
Pin 2: RX signal	Pin 1: RX -	Pin 1: A (strap to 9)
Pin 3: TX signal	Pin 4: TX +	Pin 4: B (strap to 6)
Pin 5: GND	Pin 5: GND	Pin 5: GND
Pin 7: RTS	Pin 6: RX +	Pin 6: B (strap to 4)
Pin 8: CTS	Pin 9: TX -	Pin 9: A (strap to 1)

FIG. 16 RS-232/422/485 DB9 (male) connector pinouts for the rear Device Ports

The table below provides information about the connector pins, signal types, and signal functions. This table's wiring specifications are applicable to the rear RS-232/422/485 Device Port connectors on the:

- NI-2100 (Ports 1-3)
- NI-4100/NI-3100 (Ports 1-7)

RS-232/422/485 Device Port Wiring Specifications					
Pin	**Signal**	**Function**	**RS-232**	**RS-422**	**RS-485**
1	RX-	Receive data		X	X (strap to pin 9)
2	RXD	Receive data	X		
3	TXD	Transmit data	X		
4	TX+	Transmit data		X	X (strap to pin 6)
5	GND	Signal ground	X	X	
6	RX+	Receive data		X	X (strap to pin 4)
7	RTS	Request to send	X		
8	CTS	Clear to send	X		
9	TX-	Transmit data		X	X (strap to pin 1)

ICSNet Port: Connections and Wiring

The NI Controller must be equipped with the available ICSNet connectors for this functionality to be active. The following tables show the signal and pinouts/pairing information:

ICSNet RJ-45 Signals		
Pin	**Signal-Master**	**Signal-Device**
1	TX +	RX +
2	TX -	RX -
3	N/A	N/A
4	GND	GND
5	N/A	N/A
6	N/A	N/A
7	RX +	TX +
8	RX -	TX -

RJ-45 Pinout Information (EIA/TIA 568 B)				
Pin	**Wire Color**	**Polarity**	**Function**	
1	Orange/White	+	Transmit	
2	Orange	-	Transmit	
3	Green/White	-	Mic	
4	Blue	-	Ground	
5	White/Blue	+	12 VDC	
6	Green	+	Mic	
7	White/Brown	+	Receive	
8	Brown	-	Receive	

TIA 568B

(female)   (male)

RJ-45 connector - pin configurations

Unlike the ICSNet ports, the ICSHub connections require a specific polarity. The IN/OUT configuration, on the hub ports, was implemented to use the same cables as ICSNet, but these ports need TX and RX crossed. You must connect an OUT to an IN, or an IN to an OUT port.
This is done simply to keep the polarity straight. The Hub bus is still a bus. All Hub connections are bi-directional.
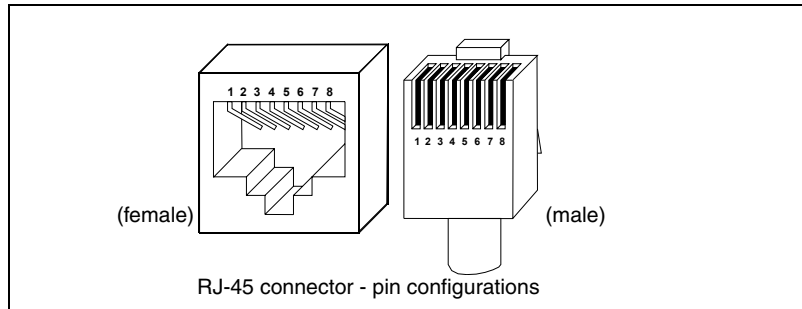
ICSHub OUT Port: Connections and Wiring

The NI Controller must be equipped with the available ICSNet connectors for this functionality to be active. The following table describes the pinout/signal information for the ICSHub OUT port located on the rear panel of the Integrated Controller.

ICSHub OUT Pinouts and Signals		
Pin	Signal	Color
1	RX +	orange-white
2	RX -	orange
3	------	------
4	------	------
5	------	------
6	------	------
7	TX +	brown-white
8	TX -	brown

Relay Port: Connections and Wiring

You can connect up to 8 independent external relay devices on both the NI-4100 and NI-3100 units (**4** on the NI-2100) to the Relay connectors on the Integrated Controller.

- Connectors labeled A are for common; B are for output.

- Each relay is isolated and normally open.

- A metal commoning strip is supplied with each Integrated Controller to connect multiple relays.

Relay Connections

Use A for common and B for output (FIG. 17). Each relay is isolated and normally open. A metal connector strip is also provided to common multiple relays.
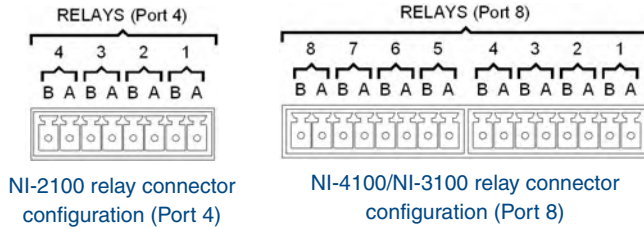
NI-2100 relay connector
configuration (Port 4)

NI-4100/NI-3100 relay connector
configuration (Port 8)

FIG. 17 RELAY connector (male)

Input/Output (I/O) Port: Connections and Wiring

The I/O port responds to either switch closures, voltage level (high/low) changes, or it can be used for logic-level outputs.
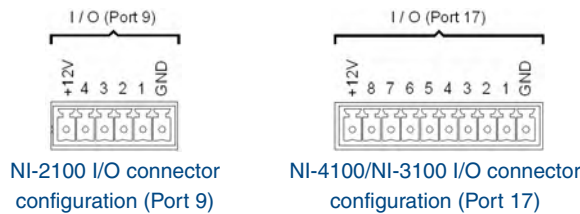

NI-2100 I/O connector
configuration (Port 9)

NI-4100/NI-3100 I/O connector
configuration (Port 17)

FIG. 18 INPUT/OUTPUT (I/O) connector (male)

- A contact closure between the GND and an I/O port is detected as a Push.

- When used for voltage inputs, the I/O port detects a low signal (0 - 1.5 VDC) as a Push, and a high signal (3.5 - 5 VDC) as a Release (*this IO port uses 5V logic but can handle up to 12V without harm*).

- When used for outputs, the I/O port acts as a switch to GND and is rated for 200mA @ 12 VDC.

  - The NI-2100 can use up to 4 I/O ports
  - The NI-3100 and NI-4100 can use up to 8 I/O ports

- The PWR pin provides +12 VDC @ 200 mA and is designed as a power output for the PCS Power Current Sensors, VSS2 Video Sync Sensors (or equivalent).

- The GND connector is a common ground and is shared by all I/O ports. A common ground is shared with I/O ports 1 - 8 (NI-3100/NI-4100) or with I/O ports 1 - 3 (NI-2100).

Pin	Signal	Function
**I/O Port Wiring Specifications NI-4100 and NI-3100**
1	GND	Signal GND
2	I/O 1	Input/Output
3	I/O 2	Input/Output
4	I/O 3	Input/Output
5	I/O 4	Input/Output
6	I/O 5	Input/Output
7	I/O 6	Input/Output
8	I/O 7	Input/Output
9	I/O 8	Input/Output
10	12 VDC	PWR

Pin	Signal	Function
**I/O Port Wiring Specifications NI-2100**
1	GND	Signal GND
2	I/O 1	Input/Output
3	I/O 2	Input/Output
4	I/O 3	Input/Output
5	I/O 4	Input/Output
6	12 VDC	PWR

IR/Serial Port: Connections and Wiring

You can connect up to **eight** IR- or Serial-controllable devices to the IR/Serial connectors on the rear of the NI-4100 and NI-3100 and up to **four** on the NI-2100 (FIG. 19).

These connectors accept an IR Emitter (CC-NIRC) that mounts onto the device's IR window, or a mini-plug (CC-NSER) that connects to the device's control jack. You can also connect a data 0 - 5 VDC device.

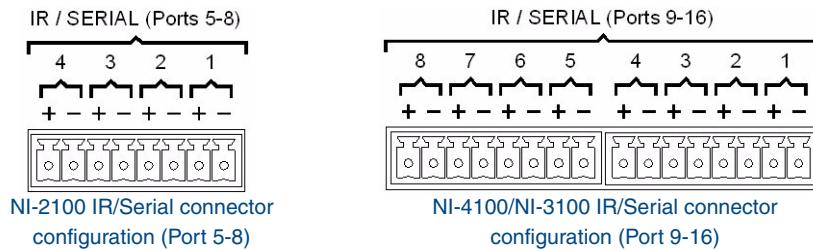These units come with two CC-NIRC IR Emitters (**FG10-000-11**).

NI-2100 IR/Serial connector configuration (Port 5-8)

NI-4100/NI-3100 IR/Serial connector configuration (Port 9-16)

FIG. 19 IR/SERIAL (male)

The IR/Serial connector wiring specifications are listed in the following table.

IR/Serial Connector Wiring Specifications (per Port)					
Number of IR connections	NI-4100/3100 Port #	NI-2100 Port #	Signal	Function	
1	9	5	GND (-)	Signal GND	
			Signal 1 (+)	IR/Serial data	
2	10	6	GND (-)	Signal GND	
			Signal 2 (+)	IR/Serial data	
3	11	7	GND (-)	Signal GND	
			Signal 3 (+)	IR/Serial data	
4	12	8	GND (-)	Signal GND	
			Signal 4 (+)	IR/Serial data	
5	13	N/A	GND (-)	Signal GND	
			Signal 5 (+)	IR/Serial data	
6	14	N/A	GND (-)	Signal GND	
			Signal 6 (+)	IR/Serial data	
7	15	N/A	GND (-)	Signal GND	
			Signal 7 (+)	IR/Serial data	
8	16	N/A	GND (-)	Signal GND	
			Signal 8 (+)	IR/Serial data	

NetLinx Control Card Slot Connector (NI-4100 only)

FIG. 20 shows the 20-pin (male) connector that provides connection to the NetLinx Control Cards.
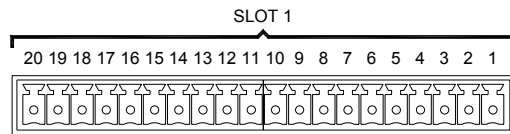

FIG. 20 NetLinx Control Card 20-pin connector

Ethernet/RJ-45 Port: Connections and Wiring

NI-x100 Controllers feature an Auto MDI/MDI-X Ethernet port. This provides the option of using either a standard (straight through), or a crossover Ethernet cable to communicate with a PC - both cable types will work.

The following table lists the pinouts, signals, and pairing for the Ethernet connector.

Ethernet RJ-45 Pinouts and Signals			
Pin	Signals	Connections	Pairing	Color
1	TX +	1 --------- 1	1 --------- 2	Orange-White
2	TX -	2 --------- 2		Orange
3	RX +	3 --------- 3	3 --------- 6	Green-White
4	no connection	4 --------- 4		Blue
5	no connection	5 --------- 5		Blue-White
6	RX -	6 --------- 6		Green
7	no connection	7 --------- 7		Brown-White
8	no connection	8 --------- 8		Brown

FIG. 21 diagrams the RJ-45 pinouts and signals for the Ethernet RJ-45 connector and cable.
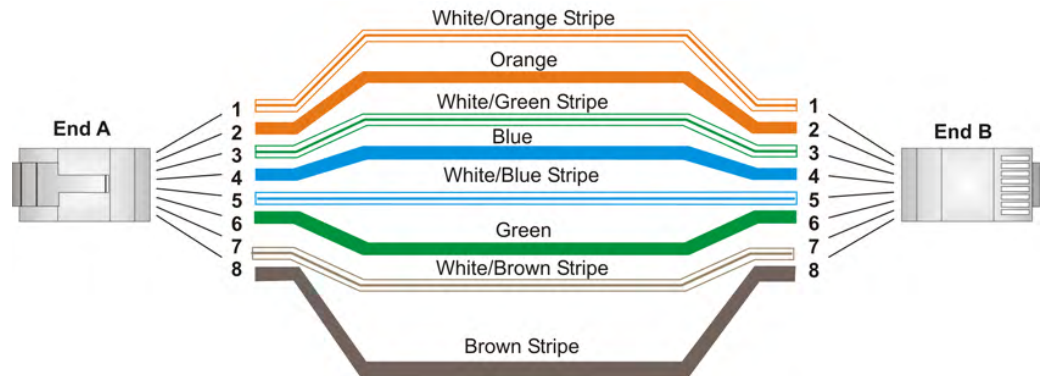

FIG. 21 RJ-45 wiring diagram

Ethernet LEDs

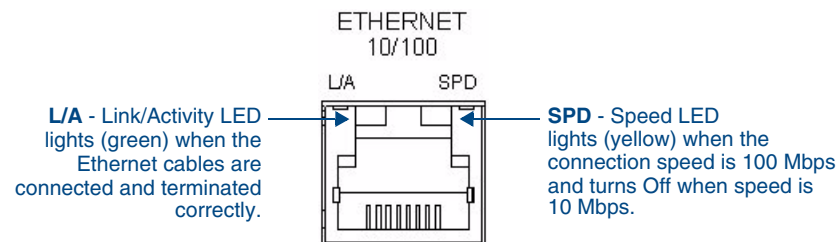**L/A** - Link/Activity LED lights (green) when the Ethernet cables are connected and terminated correctly.

SPD - Speed LED lights (yellow) when the connection speed is 100 Mbps and turns Off when speed is 10 Mbps.

FIG. 22 Ethernet LEDs

Ethernet Ports Used By the Integrated Controller

Ethernet Port Descriptions		
Port type	**Description**	**Standard Port #**
FTP	The on-board Master has a built-in FTP server.	21/20 (TCP)
SSH	The SSH port functions using the same interface as Telnet but over a secure shell where it uses SSL as a mechanism to configure and diagnose a NetLinx system. This port value is used for secure Telnet communication. Note: SSH version 2 is only supported.	22 (TCP)
Telnet	The NetLinx Telnet server provides a mechanism to configure and diagnose a NetLinx system. For maximum flexibility, the Master can be configured to utilize a different port than 23, or disable Telnet completely from either Telnet or the Program Port located on the rear of the Master itself. Once disabled, the only way to enable Telnet again is from the Master's Program port.	23 (TCP)
HTTP	The Master has a built-in web server that complies with the HTTP 1.0 specification and supports all of the required features of HTTP v1.1. This port is used for unsecure HTTP Internet communication between the web browser's UI and the target Master.	80 (TCP)
HTTPS/SSL	This port is used by a web browser to securely communicate between the web server UI and the target Master. This port is also used to simultaneously encrypt this data using the SSL certificate information on the Master as a key.	443 (TCP)
ICSP	Peer-to-peer protocol used for both Master-to-Master and Master-to-device communications. For maximum flexibility, the Master can be configured to utilize a different port than 1319, or disable ICSP over Ethernet completely from either Telnet or the Program Port located on the rear of the Master itself. This type of communication is used by the various AMX product for communication amongst themselves.	1319 (UDP/TCP)
integration! Solutions	This feature on the Master uses, by default, port 10500 for the XML based communication protocol. This port is connected to by the client web browser's JVM when integration! Solutions control pages are retrieved from the on-board Master's web server. For maximum flexibility, the on-board Master can be configured to utilize a different port than 10500 or to disable integration! Solutions completely.	10500 (TCP)

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