MOSAIC ENERGY FIREFLY®
USER TRAINING GUIDE
1.0.38.4

(Includes up to RR CX v3.26.4; FIREFLY D4200; D4300 CXMI 1.3)

MOSAIC™ regulations and Warranty information

The MOSAIC System is intended to be operated to manufacturer's specifications. As such, Customer understands that electronic communication between Datamatic and your MOSAIC System is required to provide software updates, to conduct support activities and to validate proper configuration and operation. Any blocking or prevention of such access may prevent the System from operating as intended and may void coverage under your Maintenance Agreement and/or your Warranty.

Any change to RF settings, other than by a Datamatic Administrator, may void your MOSIAC FIREFLY Warranty. Do not change RF communication settings without consulting Datamatic first.

FCC Regulations

FCC Part 15 requires that the Manual include the following statement:

"Caution: Changes or modifications not expressly approved by the manufacture could void the user's authority to operate the equipment."

"NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

To comply with FCC RF exposure requirements, the device and the antenna for this device must be installed to ensure a minimum separation distance of 20 cm or more from a person's body. Other operating configurations should be avoided.

FCC ID: ODYD4200 and ODYD4300

Datamatic, Ltd.

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions:
1) This device may not cause harmful interference, and
2) This device must accept any interference received, including interference that may cause undesired operation.

WARNING: These devices operate under Part 15 of the FCC rules. Modifications to these devices not expressly authorized by Datamatic, Ltd. may affect your ability to legally operate these devices.

Electrostatic Discharge (ESD) Warning

Electrostatic Discharge (ESD) is the enemy of electronic devices. You should always take precautions to eliminate any electrostatic charge from your body and clothing before touching any semiconductor device or card by using an electrostatic wrist strap and/or rubber mat.

Static electricity can harm system boards. Perform installation at an ESD workstation and follow proper ESD precautions to reduce the risk of damage to devices. Datamatic strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):
o   When unpacking a static-sensitive device from its shipping carton, do not remove the device's anti-static packaging material until you are ready to install the device. Just before unwrapping the anti-static packaging, be sure you are at an ESD workstation or grounded.
o   When transporting a sensitive device, first place it in an antistatic container or packaging.
o   Handle all sensitive devices at an ESD workstation. If possible, use anti-static floor pads and workbench pads.
Handle devices and boards with care. Don't touch the devices or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

Introduction

The Datamatic MOSAIC Mesh System is an automatic meter reading system designed for reading meter data remotely and wirelessly. This is accomplished using the Datamatic MOSAIC Mesh system that forms a mesh network with neighboring MOSAIC FIREFLYs and reports data to the MOSAIC Software Interface through strategically placed MOSAIC Gateway devices.

MOSAIC FIREFLYs can be deployed using walk-by, mobile, and MOSAIC Mesh collection platforms.

The main benefits of using The Datamatic MOSAIC Mesh system are:

- Real time access to meter reading data
- Built in logging of up to 240 days of hourly consumption data WATER?
- Meter lids do not have to be removed for reads WATER?
- Meter pits do not have to be dug out or pumped out for reads WATER?
- Safer meter reading procedure
- Visiting the site is not necessary for data collection

Please consult the MOSAIC Software Guide for user instructions regarding data access, configuring or upgrading the MOSAIC Mesh FIREFLY System. After reviewing this guide you should be able to successfully deploy the MOSAIC FIREFLYs for your system.

MOSAIC Software ⟷ MOSAIC Database ⟷ MOSAIC Gateway ⟷ MOSAIC FIREFLYs
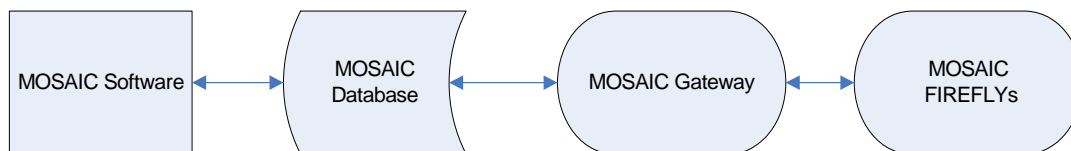
Equipment

MOSAIC FIREFLY

The MOSAIC FIREFLY tracks and transmits meter reading data. Each MOSAIC FIREFLY records up to 240 days of hourly consumption readings, thereby enabling the resolution of billing disputes. The MOSAIC FIREFLY signal includes the meter reading, leak indicators and trouble codes upon detection. (Refer to the troubleshooting section)

- **Batteries:** Dual 3.6-volt lithium-thionyl chloride D-cell
- **Material:** Polycarbonate
- **Construction:** silicon-lubricated gasket sealed tourqued to 12' lbs
- **Operating Temperature Range**: -40 F to 185 F
- **Radio Communication Frequency:** 902-928 MHz frequency hopping spread spectrum

Unique Features

- Use existing meters
- Maintain the freedom to choose meters without the constraints of a proprietary AMR system
- Internally potted, gasket sealed and designed to withstand constant submersion
- Supports direct-read, pulse and encoded registers
- Leak Detection
- Tamper Detection
- Battery Status Indicator
- Above ground or through the lid installation

FIREFLY Meter Interface Unit (MIU) – Electric

The FIREFLY Meter Interface Unit (MIU) tracks and transmits meter reading data. Each FIREFLY can be configured to record 169+ days of quarter-hourly consumption, thereby enabling the resolution of billing disputes. The FIREFLY signal includes the meter number, meter reading, battery voltage, and tamper flag.

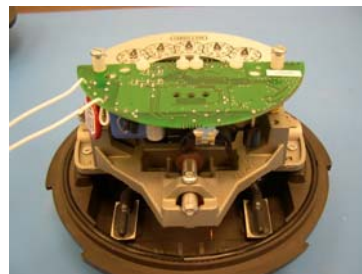Backup Power Supply: Two 3V CR2032 batteries
Operating Temperature Range: -40°F to 185°F
Radio Communication Frequency: 916.5 MHz

Electric FIREFLY   Electric FIREFLY mounted on meter

FIREFLY Meter Interface Unit (MIU) – MOSAIC Gas

The Gas FIREFLY can be configured to record 330 days of hourly consumption, and its signal transmits the same data as the Electric FIREFLY. Three models are designed for three specific groups of meters:

- American, Canadian, & Singer

Power Supply: 3.6V replaceable lithium chloride D-cell battery
Operating Temperature Range: -40°F to 185°F
Radio Communication Frequency: 916.5 MHz

American Meter with
 Gas FIREFLY

ROADRUNNER Handheld Computer

The ROADRUNNER Radio Frequency Receiving Unit (RFRU) receives and buffers radio readings, then downloads them to the ROADRUNNER handheld unit when interrogated (using the "I" key).

The ROADRUNNER RFRU is an integrated, internal unit, powered by a rechargeable NiCd battery pack.

X7 (left) and CX (right) ROADRUNNERs

Installation Considerations

- Complete field installation of a MOSAIC FIREFLY takes five to ten minutes, depending on the meter location and mounting application.

- Some meters may be located in such a manner that they require the addition of repeaters to reach the mesh.

- Some areas of your service territory may not have the density to warrant the use of the mesh - your project manager will alert you to these areas where units can be placed into a drive-by mode.

- Profile data uses more mesh bandwidth and as such can require the use of additional repeaters and/or Gateways.

- The system requires ongoing maintenance - make sure to have the proper equipment and training to maintain the system after your installation contractor leaves.

- Do not attempt to repair or trouble-shoot equipment without the proper equipment and training.

Installation Supplies

Electric FIREFLY Installation Equipment

- 2-way RF ROADRUNNER.

- Phillips Screwdriver, #2 head, with 3-4" shaft. *Used for attaching FIREFLY to meter.*

- Flat Head Screwdriver, with $^3/_{16}$" wide head. *Used for attaching FIREFLY power supply wire clips to meter's utility side power bus.*

- Static grounding mat with wrist strap and grounding plug. *Used whenever handling the electric FIREFLY by hand, except when attached to meter.*

Electric FIREFLY Installation Consumables

- Install packet including screws and nylon spacers.

- FIREFLY CR 2032 batteries.

- Disc marking template.

- Datamatic Ltd.'s Part #D2311 paint marker. *Used for painting meter disc. The warranty on the Electric FIREFLY will NOT be honored if the Datamatic D2311 paint marker is not used on the meter disc.*

Electric Meter Install Kits

ABB
2 - .25 nylon spacers

Westinghouse
2 - .25 nylon spacers
2 – 6-40 X ½" screws

Landis & Gyr
2 – 6-32 X ½" screws
2 – Post Meter spacers
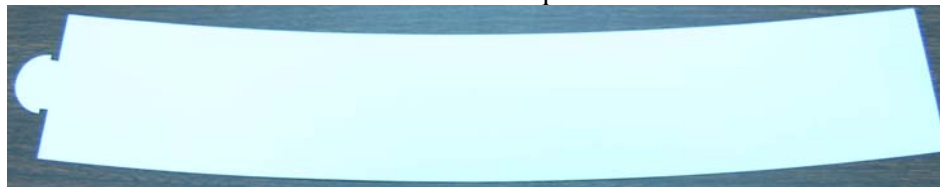2 - .25 nylon spacers

GE
2 - .25 nylon spacers
2 - 4-48X1/2" pan head screws

Sangamo
1 - .25 nylon spacer
1 - 5-40X ½" screw

Each Electromechanical FIREFLY will require a sun shade to be installed.

Gas FIREFLY Installation Equipment

- 2-way RF ROADRUNNER

- Cordless drill, reversible, variable speed, adjustable clutch. *Used to remove register screws and attaching FIREFLYS to meters.*

- Flat head screwdriver, with standard $^1/_8$" wide head. *Used to remove index screws.*

- Flat head screwdriver, with standard $^3/_{16}$" wide head. *Used to remove index screws.*

- Flat head screwdriver, with standard $^5/_{16}$" wide head. *Used to remove large screws from meters.*

- Phillips Screwdriver, #2 head, with 3-4" shaft. *Used for attaching FIREFLY to meter.*

- Phillips Screwdriver, #1 head [smaller], with 3-4" shaft. *Used for small register screw removal.*

- 1" wide putty knife. *Used to remove old register cover gaskets from meter.*

- WD40. *Used for removing difficult screws.*

- Small pruning shears. *Used to prune bushes away from gas meters.*

- Pliers with approximately 6" long handles. *Used to extract rusted register screws from meter with broken off heads.*

- Phillips #2 bit for drill, 3-6" long. *Used in cordless drill for register screw removal and FIREFLY installation.*

- Phillips #1 bit for drill, reduced $^3/_{16}$" diameter shaft, 3-6" long. *Used in cordless drill American/Singer meter's register screw attachment.*

- Flat head $^3/_{16}$" wide bit for drill, 3-6" long. *Used in cordless drill for small register screw removal.*

- Telescoping magnet. *Used to activate the FIREFLY.*

Gas FIREFLY Installation Consumables

- Cloth rags.

- Install packet including screws, tamper seals and necessary hardware.

Reading an Electric or Gas Meter

Following are some basic rules on how to read "clock style" electric or gas meter indexes. Each of the four or five dials on the meter represents one digit of the present reading. The dials move both clockwise and counter-clockwise. When the hand of one of the dials is between numbers, always take the smaller number. For example:

Residential Electric meter example
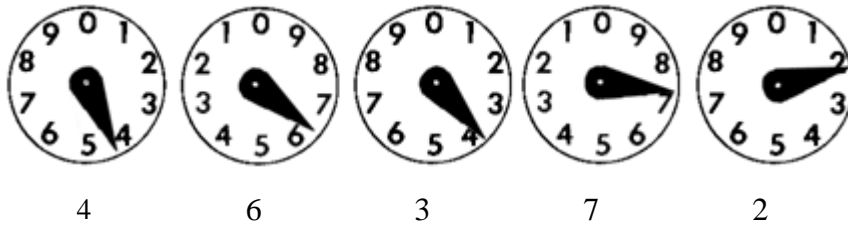
| 4 | 6 | 3 | 7 | 2 |

This reading would be 46372. To tell if a hand is past a number or not, look at the dial to the right. If the dial to the right has passed zero, then the hand is pointing to the correct number. If the dial to the right has not passed zero, then use the next smaller number.

Residential Gas Meter example
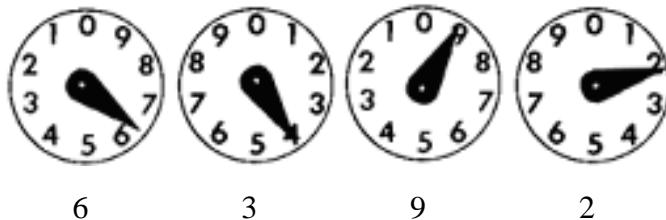
| 6 | 3 | 9 | 2 |

This reading would be 6392. The second digit is a three because the digit to the right has not yet passed zero. If the second dial from the right was between zero and one (or past the zero), then the third digit would have been a four.

To practice, go outside a home or business and record the readings for several days in a row. By subtracting yesterday's reading from today's reading, you can get a feel for how much energy (kilowatt hours for electric) or gas is used each day.

When a power or gas company representative reads a meter, they do not set it back to zero. Therefore, the dials keep turning until the next time the meter is read. By subtracting two consecutive readings, the amount of consumption is determined for the month. Utilities check to confirm that the readings each month fall within an expected range. If a reading is significantly lower or higher than expected, the meter reader can be alerted and confirm the reading is correct. This helps ensure bills are accurate each month.

This reading is 00000. Cyclometer (or odometer) style indexes are easier to read and can be found on both electric and gas meters.

Installation Procedures

Installing and Programming MOSAIC Gas FIREFLYs in Mesh Mode

Installing the MOSAIC Gas FIREFLY

Pre-installation Setup

- Access the FIREFLY Template from the FIREFLY Menu.
- Select the type of service for the FIREFLY you are installing.
- Then you will select a prompt type for each parameter of either Normal or Default.
    - ➢ <u>NORMAL</u> - this means you are going to *enter this value each time*.
    - ➢ <u>DEFAULT</u> - this means you are *setting it to a preset value that **does not change***. When selecting Default, an actual value must then be entered for that parameter.

#2 Set the Reading Mode

- Set the FIREFLY reading mode to **Verify Read Mode**.

#3 Check the Options Screen

Check the options screen from the FIREFLY Menu for the following:
1. Capture Data = Enabled
2. APD Register Number = Enabled
3. Clear Prof. Data = Enabled
4. Delta Warning = 2
5. Show Constants =Disabled
6. Comm. Method = Wireless RF
7. Zero Setting = 60
8. Read Truncation = Enabled
9. Quick Set = Disabled
A. Profile Default = 0
B. Encoder Zero Thr = 24
C. Trickle Duration = 48
D. Ovrflw Alert Days = 25
E. Rev Alert Days = 35
F. UnderSz Mtr Alert Day = 45
G. 0112 Support = Disabled
H. 0212 Support = Disabled

Gas FIREFLY Parts Identification

American Gas FIREFLY Kit
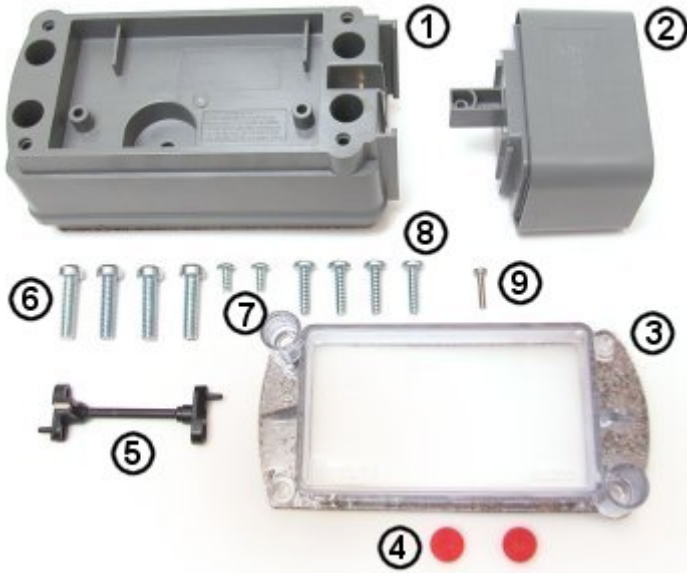
1. American Gas FIREFLY
2. Gas FIREFLY battery
3. Index cover
4. Tamper caps (2)
5. American FIREFLY drive
6. FIREFLY to meter screws (4)
7. Index to FIREFLY screws (2)
8. Index cover screws (4)
9. Battery screw

Installing the Gas FIREFLY

Optional: Pre-assemble FIREFLY, battery and drive kit prior to beginning field installations.

1. Remove tamper caps and/or lead wire seal from the gas meter, if equipped.

2. Remove the screws from the plastic index cover on the meter using a screwdriver (or cordless drill) and remove the register index and screws.

3. Remove any remaining gasket material from behind the plastic cover. Use gasket scraper if necessary.

4. Prepare the Gas FIREFLY by inserting the drive shaft into the FIREFLY, making sure magnet is included. On Rockwell meters, match the gear drive to the proper drive shaft kit (11, 18 or 24 tooth gear).
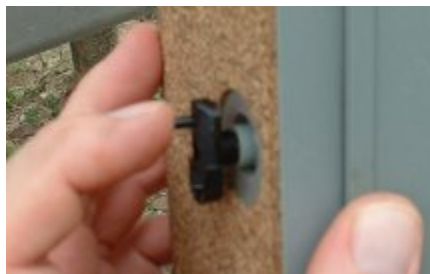
5. Take meter index and align index drive with hole (or over gear) in FIREFLY drive shaft assembly.

6. Using new self-tapping screws from the install packet, tighten the index to the FIREFLY with a screwdriver.


7. Once the index is attached to the FIREFLY, rotate the drive shaft to confirm the dials move easily.

8. Insert the four (large) meter to FIREFLY screws from the install packet into the FIREFLY housing.

9. Align meter drive with FIREFLY/index assembly. On Rockwell meters, ensure the FIREFLY has the proper gear drive installed matching the number of teeth on the meter output gear.

a. Place bottom right of the FIREFLY, over the screw hole and insert mounting screw. Rotate the FIREFLY counter clockwise to fully seat onto the meter.
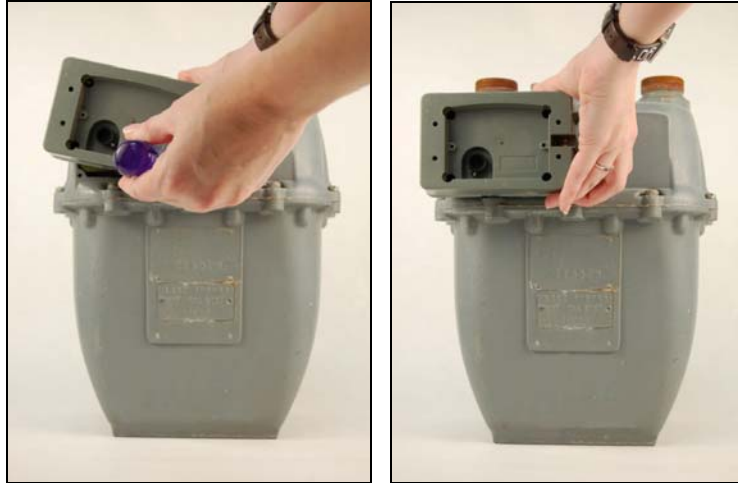
12. After checking drive alignment, attach FIREFLY to meter by tightening screws. Torque screws in a crossing pattern.

Note: When attaching the FIREFLY to the gas meter, the rear of the FIREFLY **drive shaft needs to be properly engaged** to the meter gear or drive.   Limit torque when installing meter screws. Failure to do so could damage the FIREFLY and negatively impact the FIREFLY's performance.

13. Tighten the four screws that attach the new index cover to the FIREFLY. Check "Datamatic" lettering for proper orientation. Make sure the gasket is tight against the meter, without over-tightening screws.

Note: Limit torque when installing screws. Failure to do so could damage the FIREFLY and negatively impact the FIREFLY's performance.

14. Program the FIREFLY then insert tamper plugs into new index cover (see programming section below).

Programming FIREFLYs in Mesh Mode

Mesh FF Config Utility (CXMI)

The Mesh FF Config Utility (CXMI) is used to program MOSAIC FIREFLYs in mesh mode. To access the CXMI software from the standard ROADRUNNER program screen, press F3 to bring up the Begin Comm menu, and then press 3 to exit the program. A shortcut to the CXMI program is located on the Desktop. If you do not have the CXMI software, please contact Datamatic Customer Support.

Application Setup
From the ROADRUNNER Desktop, select the shortcut for the MeshFFConfigUtility.
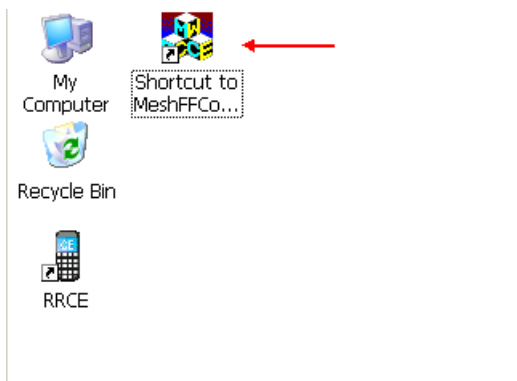
When the application first loads, it will connect to the radio installed in the ROADRUNNER. The following screen will be displayed while the connection process is active:
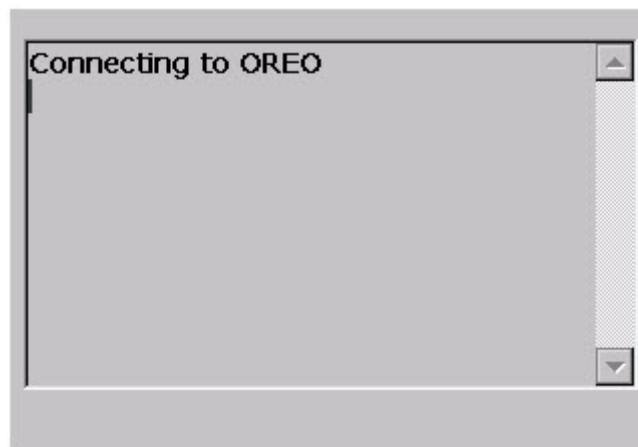
Once connected, the Main Menu will be displayed:

The following selections are available from this menu:

1 – MIU Settings	Select this option when programming or troubleshooting FIREFLYs
2 – Load Firmware	This option allows users to load firmware images to both the OREO and the FIREFLY
3 – Edit Terminal Commands	This option allows users to add or edit a terminal command
4 – Terminal Interface	This feature allows the user to send pre-defined or ad hoc commands to the FIREFLY
5 – Edit Export Definition	Defines the order of the fields in the export file as well as the fields to export
6 – Export Data	Places defined Export data in the CXMIData folder to be removed from the RR and analyzed using another program
X – Exit	Exit the application and return to the Desktop

At the bottom of these menus the following information is displayed:

OREO Phy Fram: B4D2B4D2

The Phy Fram is the setting the radio inside the ROADRUNNER uses to communicate with the FIREFLY. The radio and FIREFLY must be on the same setting to communicate. The default Phy Fram for all FIREFLYs is B4D2B4D2. If this value is not correct for your setup, your Project Manager will give you instructions on how to change this value.

MIU Settings

From the MESH FIREFLY Config Utility Menu, select 1 – MIU Settings.
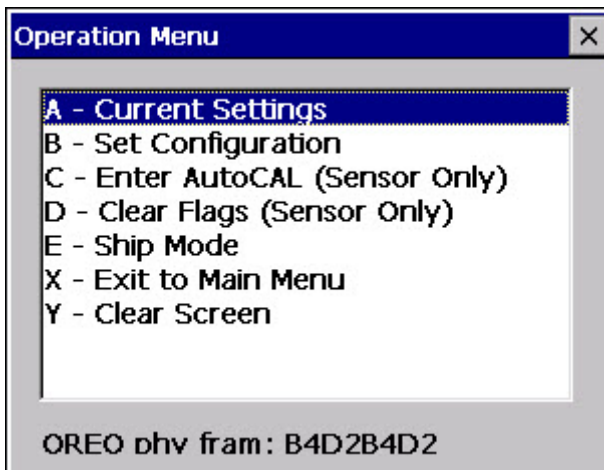
The following selections are available from this menu:

A – Current Settings	View the current configuration of the FIREFLY
B – Set Configuration	Set the configuration parameters of FIREFLY
C – Enter AutoCAL (Sensor Only)	Manually enters AutoCAL mode for a Sensor-end FIREFLY
D – Clear Flags (Sensor Only)	Clears all flags in the Sensor-end FIREFLY
E – Ship Mode	Sets the FIREFLY to Ship Mode
X – Exit to Main Menu	Returns to the Main Menu
Y – Clear Screen	Clears the Configuration Screen

Software Version
To view the current software version press the FNCTN key then the V key from the main menu.
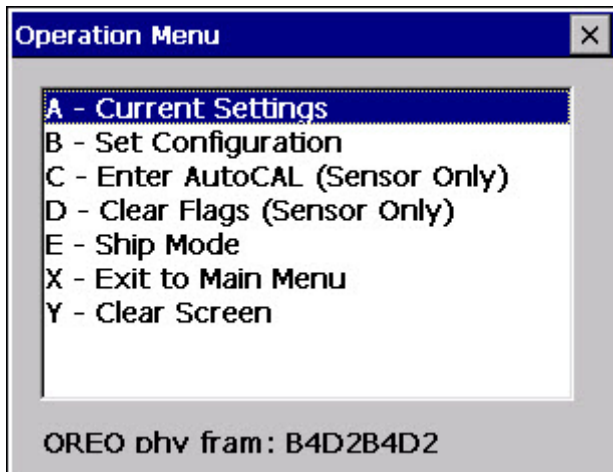
Change Phy Fram
To change the OREO Phy Fram, press the CNTRL key then the P key. Use caution when performing this function as it could prevent your ROADRUNNER from communicating with your FIREFLYs.

NOTE: To perform menu items A, B C, D and E, the FIREFLY must be awake before it will respond. To wake up the FIREFLY, magnet swipe the FIREFLY then perform the function.

Current Settings
To examine the current configuration of a FIREFLY, select A – Current Settings.

```
Operation Menu                          ✕

  A - Current Settings
  B - Set Configuration
  C - Enter AutoCAL (Sensor Only)
  D - Clear Flags (Sensor Only)
  E - Ship Mode
  X - Exit to Main Menu
  Y - Clear Screen


  OREO phy fram: B4D2B4D2
```
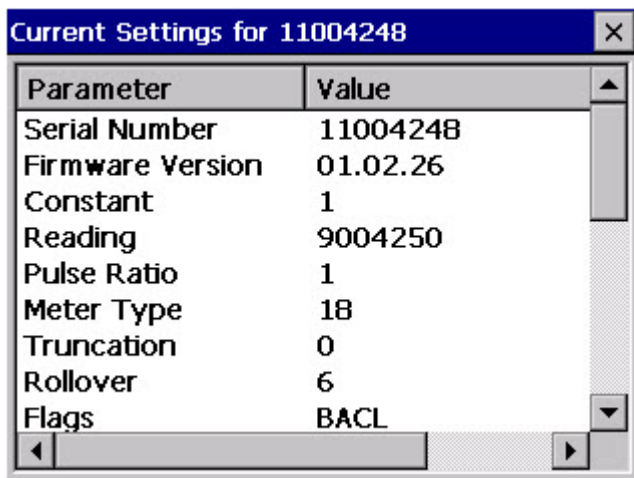
Enter the FIREFLY Serial Number and press Enter.

```
Get Device ID                      ✕


  Device  10030715


  ID      Serial Number  ▼
```
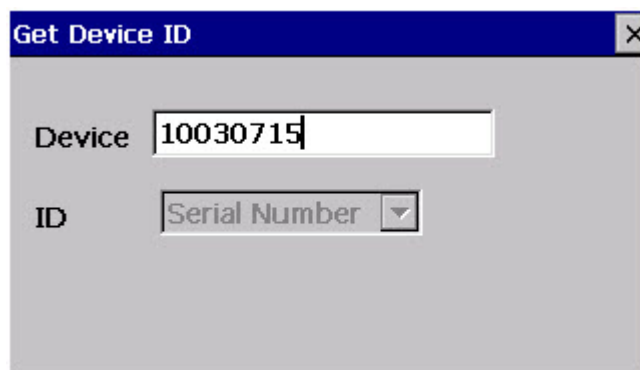
The application will now read the information from the FIREFLY.

```
Connect To Device                    ×
Connecting to device...




    [                              ]
```
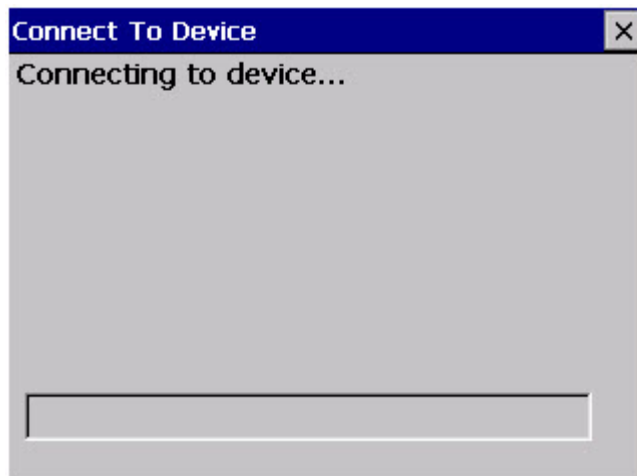
The following information is returned from the FIREFLY:

```
Current Settings for 11004248        ×

 Parameter          Value           ▲
 Serial Number      11004248
 Firmware Version   01.02.26
 Constant           1
 Reading            9004250
 Pulse Ratio        1
 Meter Type         18
 Truncation         0
 Rollover           6
 Flags              BACL            ▼
◄                         ►
```
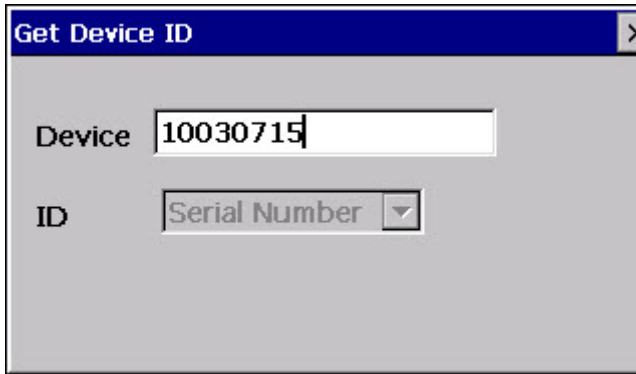
Set Configuration
See section below titled "Programming the Wire-end MOSAIC FIREFLY"

Enter AutoCAL (Sensor Only)
See the section below titled "Programming the Sensor-end MOSAIC FIREFLY".

Clear Flags (Sensor Only)
To clear any FIRELY flags select D – Clear Flags.
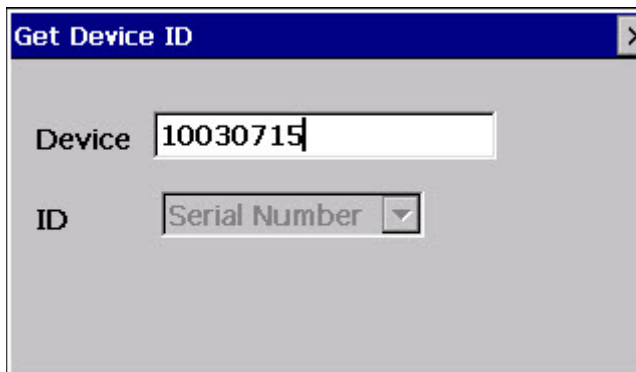
Enter the FIREFLY Serial Number. The application will clear all FIREFLY flags and return to the FIREFLY Sensor menu.

Ship Mode
Ship Mode is when the processor on the FIREFLY is in dormant state and will only respond to an interrupt caused by the closure of the reed switch using a magnet. Ship Mode will reset all parameters except Phy Fram back to defaults.

To put the FIREFLY back into Ship Mode select E – Ship Mode.

Enter the FIREFLY Serial Number. The application will set the FIREFLY to Ship Mode and return to the FIREFLY Sensor menu.

```
Preparing to issue 'ship mode'
command to FIREFLY '11004248'

Verifying FIREFLY is awake
Issuing 'ship mode' command...
```
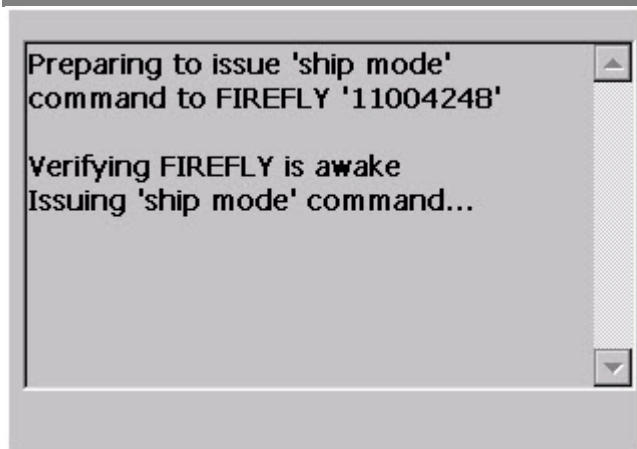
Installing and Programming MOSAIC Electric FIREFLYs in Mesh Mode

Installing MOSAIC Electric FIREFLYs

Pre-installation Setup

- Access the FIREFLY Template from the FIREFLY Menu.
- Select the type of service for the FIREFLY you are installing such as electric.
- Then you will select a prompt type for each parameter of either Normal or Default.
  - ➢ NORMAL - this means you are going to *enter this value each time*.
  - ➢ DEFAULT - this means you are *setting it to a preset value that **does not change***. When selecting Default, an actual value must then be entered for that parameter.

#1 Set your FIREFLY Template: (See appendix A)

#2 Set the Reading Mode

- Set the FIREFLY reading mode to **Verify Read Mode**.

#3 Check the Options Screen

Check the options screen from the FIREFLY Menu for the following:

1. Capture Data = Enabled
2. APD Register Number = Enabled
3. Clear Prof. Data = Enabled
4. Delta Warning = 2
5. Show Constants =Disabled
6. Comm. Method = Wireless RF
7. Zero Setting = 60
8. Read Truncation = Enabled
9. Quick Set = Disabled
A. Profile Default = 0
B. Encoder Zero Thr = 24
C. Trickle Duration = 48
D. Ovrflw Alert Days = 25
E. Rev Alert Days = 35
F. UnderSz Mtr Alert Day = 45
G. 0112 Support = Disabled
H. 0212 Support = Disabled

Installing the MOSAIC Electric FIREFLY

Note: All work on Electric FIREFLYs needs to be done taking static grounding precautions. Failure to use a grounded static mat and wrist strap when handling or retrofitting the FIREFLY to an electric meter could result in static discharge damage to the electronics. Units found to be damaged in this manner will not be covered by Datamatic warranty. See picture of static mat below:

1. Remove the break-away brass tamper seal, if equipped. Remove the glass cover from the electric meter.
2. Remove the screws from the utility faceplate.
3. Remove the utility faceplate from the meter. Clean the disc on old meters, if necessary.
4. Place marking template over meter disc, being sure to include one calibration hole and any black painted stripe in the marking area, as illustrated below:
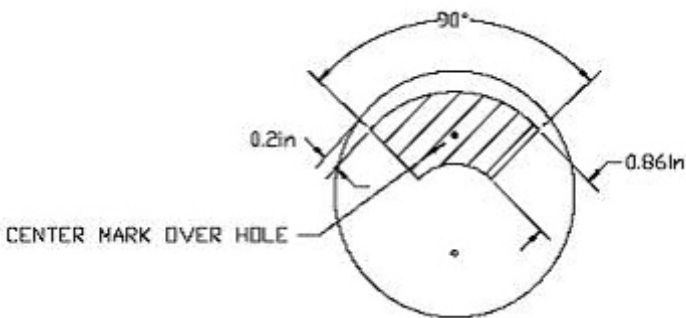
Note: When painting the disc, make sure calibration holes that do not fall within the painted area will not be positioned over the FIREFLY optics at the same time as the painted area.

5. Using the Datamatic D2311 paint marker, paint in the entire area of the template. Leave no empty spots within the template area.
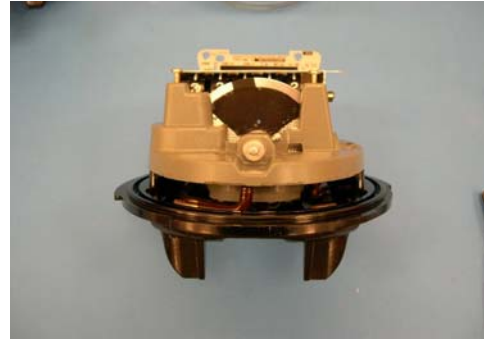
Note: If the meter disc is already painted, still place template over disc to ensure the entire area is covered. If not, paint in additional area within template not already covered with paint.

6. If required for this meter type, add metal extensions to the meter.
7. Position the FIREFLY on top of the nameplate posts.
8. Mount the unit flush on top of the nameplate posts with the spacer and nameplate above it.
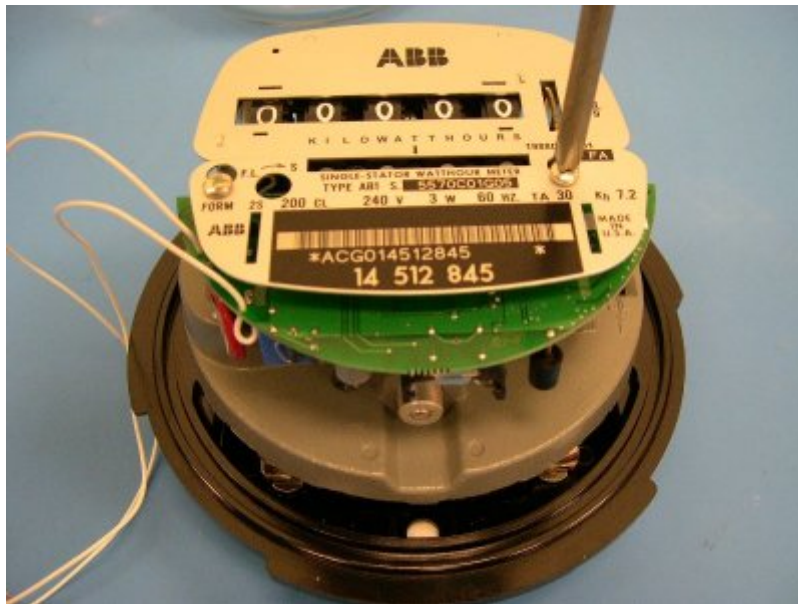9. Thread the mounting screw through the faceplate, the nylon spacer and FIREFLY into the faceplate post-holes.
10. While applying pressure perpendicular to the disc plane, tighten down screws into faceplate post-holes.

11. Make sure the FIREFLY is parallel with the meter disc; adjust if needed. Ensure the meter disc moves freely.
12. Attach fuse clips on FIREFLY wire ends to the meter 240 VAC terminal posts on the top of the meter. This is the city's side of the meter. Avoid placing clips next to lightning arrestors.

Note: Do not attach the fuse clips to any painted area on the meter posts.

13. Insert two CR2032 batteries into the two battery slots on the FIREFLY a maximum of 1 day before the meter is to be used in the field (to maximize battery life).
14. Copy the FIREFLY serial number (located on the round component near the FIREFLY wires) onto the outside of the sunshade and install it inside the meter cover as shown:

Note: The CR2032 batteries have a limited life. Installing the FIREFLYs soon after battery installation ensures the longest possible backup life.

15. Replace the glass cover on the meter, making sure the FIREFLY wires do not get pinched between the meter and the cover.

16. *Optional:* Test meter and calibrate on a test bench.

17. Install the meter into the 240V socket on a house or business, being careful not to jar the meter to prevent loosening the FIREFLY batteries.

Programming the MOSAIC Electric FIREFLY

Read and Verify (RV) Procedure

Another visit to all electric and gas meters should occur no less than 72 hours after new FIREFLYs have been installed. This allows for consumption to go through the meter to check accuracy. Any FIREFLY that needs adjustment or troubleshooting due to inaccuracy requires another RV visit until the FIREFLY passes inspection and accuracy is assured.

The RV mode is an installation tool used to verify the accuracy of FIREFLY readings with respect to the meter register reading. This method of interrogation is similar to Manual interrogation in that it allows only one meter to be read at a time. In contrast to manual interrogation, this routine will post the manually entered visual reading in the standard meter record. These readings can be billed through the billing system.

The RV process should also be used as a periodic auditing tool.

The RV function will begin by initializing the RF receiver unit. Once initialized, the application will scan RF messages for the current meter record. When a valid RF meter reading is received, the user will be prompted to manually enter the visual reading for that meter.

Before Leaving the Office

The following steps need to be checked before entering the field:

1. Set the ROADRUNNER reading mode to RV Mode.
2. Check the FIREFLY Options screen to verify the Delta setting.
3. Check the FIREFLY template.

Read and Verify Field Procedure

All FIREFLYs in the route are to be visited during an RV procedure. Utilize the following steps for each FIREFLY on the route:

1. Verify the correct street address and meter number on the ROADRUNNER account screen.
2. Check the FIREFLY for visible damage.
3. Be sure the FIREFLY battery is making a good connection.
4. Interrogate the FIREFLY by pressing the "I" key.
5. The "Enter Visual Reading" screen appears.
6. Enter the visual reading of the meter into the ROADRUNNER.
7. If the reading is within the specified Delta range, the ROADRUNNER will advance to the next account.
8. If the visual reading is outside of the specified Delta range, press [ENTER] and re-enter visual reading again. If the visual reading is still outside of Delta, press [NO] and proceed to next meter. This meter may need to be addressed during the troubleshooting phase.

Entering a Trouble or Skip Code

If the user aborts the RV Interrogation, (meaning they have pressed "I" to interrogate, but then pressed 'FNCTN' then 'ESC' keys on X7 or 'ESC' only on the CX to stop interrogation) they have the option to enter a trouble code, skip code, or exit without saving any information. This function will create a record that is returned with the FIREFLY configuration data. Standard trouble and skip codes should be utilized.

Some examples:

- No Access to Meter – If unable to view the visual reading on the register, enter Skip Code 130 and advance to the next meter.
- No RF Signal from FIREFLY – enter Skip Code 150 and advance to the next meter.

Using a FIREFLY as a Repeate

You will need a repeater in situations where there is excess distance between installed units. Repeaters help 'lighten the load' in passing data to the MOSAIC Gateway in dense installation areas and areas with excessive RF obstructions.

- Wire red & blue together and swipe with the magnet to activate the MOSAIC FIREFLY as a repeater.

Repeaters are ideally placed above ground with the antenna in a vertical position. When using FIREFLYs as repeaters, they can be placed in pits, but a resulting loss of RF performance should be anticipated. For best results and maximum coverage mount the repeater similar to the picture above.

Load Firmware

Load Firmware Image to OREO

After the user selects the 'Load Firmware' option, the following dialog is displayed:

The first option allows the user to load the firmware image to the OREO. The second option allows the user to send a firmware image that has been loaded into an OREO to a FIREFLY. In order to load a new firmware image to a FIREFLY through the OREO, it must first be loaded into the secondary image location in the OREO.

If the option to load an image to the OREO is selected, the following dialog is displayed:
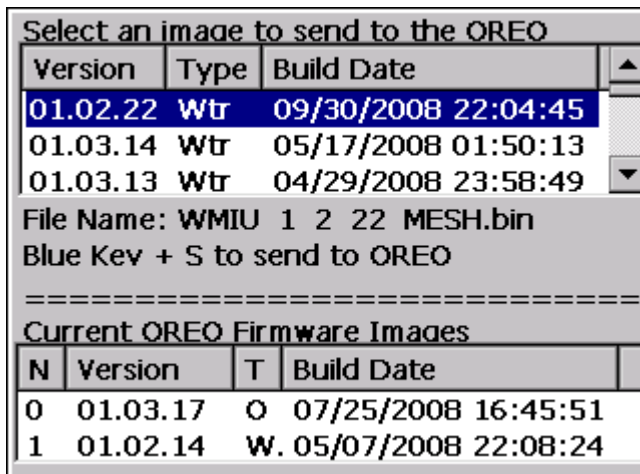
The dialog contains two list controls. The top list control lists all of the firmware images loaded on the handheld that are available to send to the OREO. The list control has 3 columns. These columns are:
  ▪ Firmware version number
  ▪ Type of firmware image (Water, Electric, Gateway, OREO, etc.).
  ▪ Build Date

When a firmware image item is highlighted in the list control, the name of the file associated with the image is displayed below the list control.

All firmware images stored on the handheld are expected to be stored in a folder designated as \FirmwareImages

The second list control shows the list of firmware images that are currently in the OREO. The second list control has 4 columns. These are:
- Image Number (0-Primary or 1-Secondary)
- Firmware version
- Firmware type (W-Water, E-Electric, G-Gas, O-OREO, etc.)
- Build Date

To send a firmware image to the OREO, highlight the image that will be needed on the OREO and press the Blue (FNCTN) key and the 'S' key. After doing this, the following dialog will be displayed to show the progress of the file transfer to the OREO:
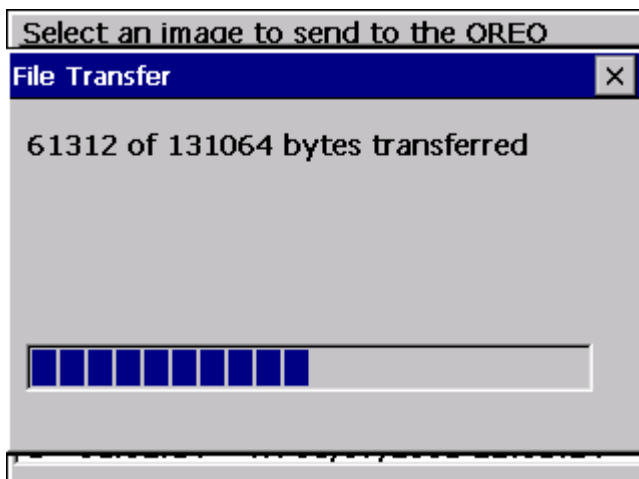
The dialog will show the progress of the transfer until it has completed.
Once the transfer has completed, the user will be returned to the list of available firmware images dialog box. The firmware image was transferred to the secondary image on the OREO. If the image loaded is to replace the existing OREO image, a boot swap command must be done to move the image to the primary location.

Load Image to FIREFLY
To load a firmware image to the FIREFLY the user will select option 2 from the Load Firmware dialog:
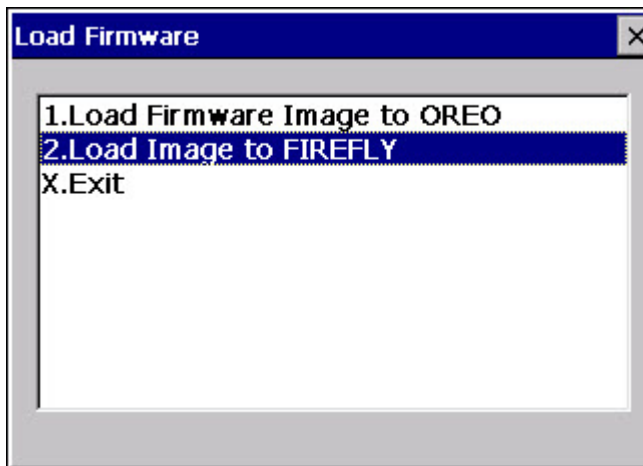
The firmware image that will be sent to the FIREFLY is the image that is stored in the secondary image location within the OREO. So in order to send a firmware image to a FIREFLY, the image must first be loaded into the OREO.

After selecting option 2, the user will be prompted for the serial number of the FIREFLY:
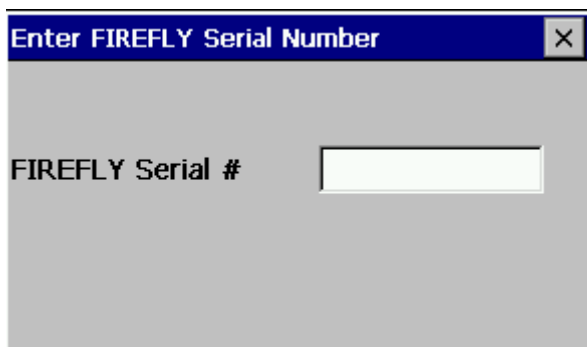
After entering the serial number, the 'Send Firmware Image to FIREFLY' dialog is displayed:

NOTE: Choosing "Destination: Both" will only work when upgrading firmware in the same mode (i.e. mesh to mesh or non-mesh to non-mesh).

Immediately the application begins requesting a list of the current firmware images stored in the FIREFLY. After a few seconds, these images are displayed in the list control at the bottom of the screen:

```
Send Firmware Image to FIREFLY                    ×

Serial Num: 11010404
Press Blue Key + S to send OREO
secondary image to FIREFLY:
Ver: 01.05.09        Type: Water
Build Date: 04/08/2009 15:41:06


Destination      Primary         ▼
Current FIREFLY Firmware Images
 N  Version      T  Build Date
 0   01.02.22    W. 09/30/2008 22:04:45
 1   00.00.00    U  02/06/2106 06:28:15
```
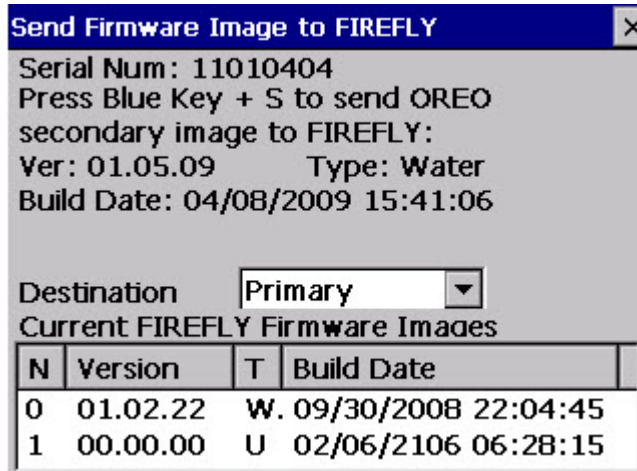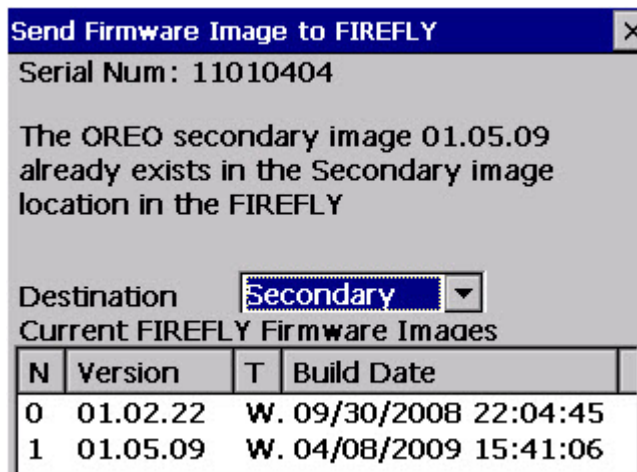
Once the application has a list of firmware images from the FIREFLY, it displays the current image that is available in the OREO for sending to the FIREFLY.

If the firmware image that will be sent to the FIREFLY from the OREO already exists in the secondary image location in the FIREFLY, it will be indicated as in the following screen shot:

```
Send Firmware Image to FIREFLY                    ×

Serial Num: 11010404

The OREO secondary image 01.05.09
already exists in the Secondary image
location in the FIREFLY


Destination      Secondary       ▼
Current FIREFLY Firmware Images
 N  Version      T  Build Date
 0   01.02.22    W. 09/30/2008 22:04:45
 1   01.05.09    W. 04/08/2009 15:41:06
```

It determines that the images are the same by examining the version, firmware type and build date. If all three of these are the same, the message is displayed.

If the image does not already exist in the FIREFLY, the user will be required to press the Blue (FNCTN) key and the S key to start the transfer from the OREO to the FIREFLY.

When sending the image the software will display the progress of the transfer as shown in the following dialog:
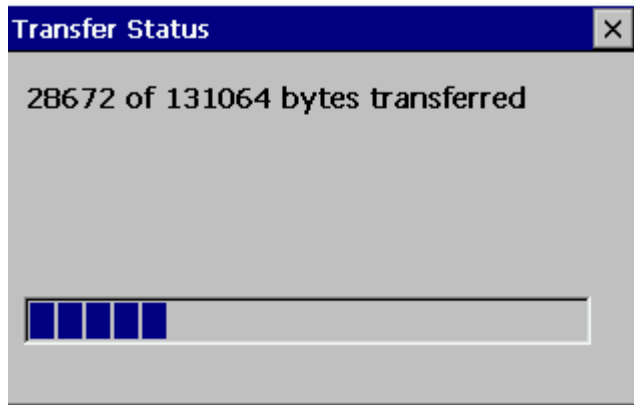
Transfer Status   ×

28672 of 131064 bytes transferred

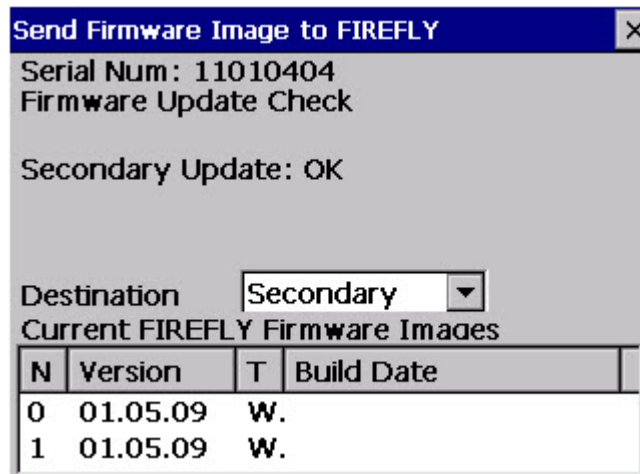After the transfer has completed, a message is displayed on the screen indicating that the transfer is almost done (re-activate the FIREFLY if needed):
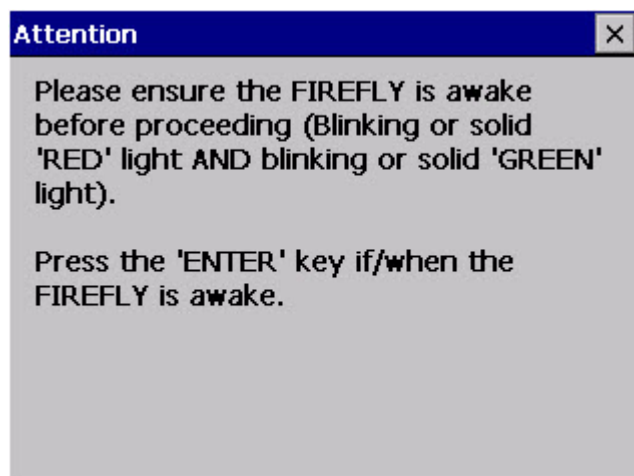
Attention   ×

Please ensure the FIREFLY is awake before proceeding (Blinking or solid 'RED' light AND blinking or solid 'GREEN' light).

Press the 'ENTER' key if/when the FIREFLY is awake.

After the transfer has completed, a message is displayed on the screen indicating that the transfer is done:

Send Firmware Image to FIREFLY   ×

Serial Num: 11010404
Firmware Update Check

Secondary Update: OK

Destination   Secondary   ▼
Current FIREFLY Firmware Images

N	Version	T	Build Date
0	01.05.09	W.	
1	01.05.09	W.	

It should be noted that the FIREFLY goes inactive after the transfer has completed. In order to swap the image into secondary location on the FIREFLY, the boot swap command must be issued to the FIREFLY from the command line.

Edit Terminal Commands

```
MESH FIREFLY Config Utility          OK  ×

 1 - MIU Settings
 2 - Load Firmware
 3 - Edit Terminal Commands
 4 - Terminal Interface
 5 - Edit Export Definition
 6 - Export Data
 X - Exit


 OREO phy fram: B4D2B4D2
```
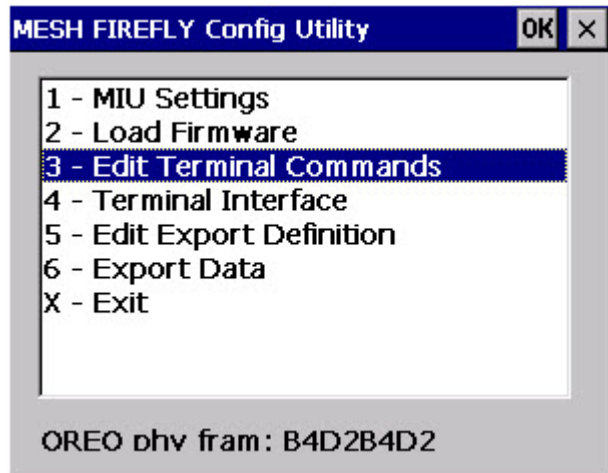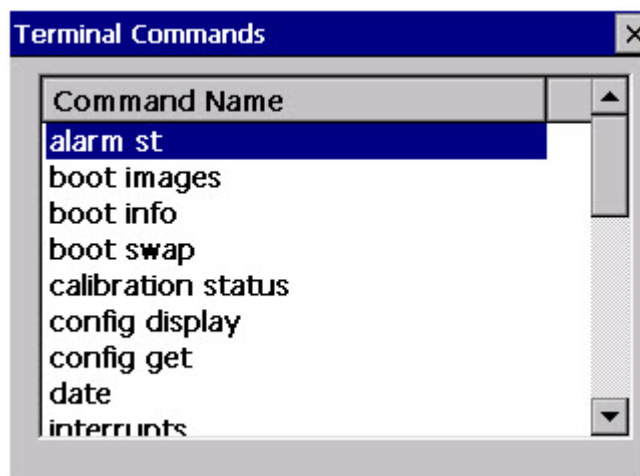
Adding a new terminal command
To add or edit a terminal command, from the main selection menu, select the 'Edit Terminal Commands' menu item:

After selecting this option, the following dialog is displayed:

```
Terminal Commands                    ×

 Command Name                 ▲
 alarm st
 boot images
 boot info
 boot swap
 calibration status
 config display
 config get
 date
 interrupts                   ▼
```

This dialog displays all of the commands that have been added to the command list. The commands are sorted in alphabetical order. All of the commands are stored in a file called TerminalCommands.dat. The file is expected to be in the same location as the CXMI application itself. If you do not have this file, please contact Datamatic Customer Support.

To add a new command, press the Blue Key and the 'A' key to display the following dialog:
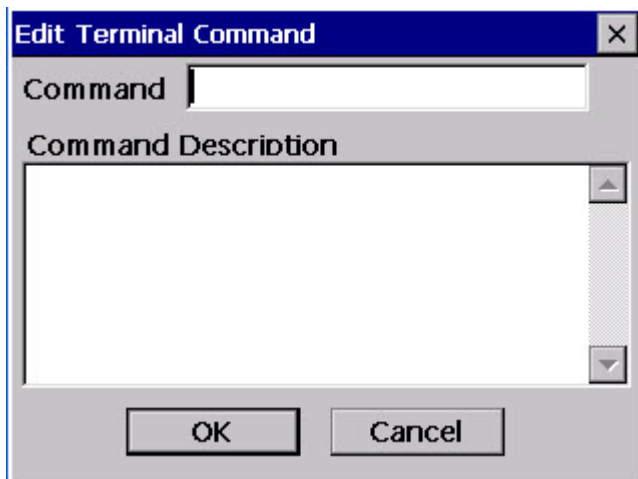
The command edit control is where the terminal command is entered. The command description is not required.

When entering a description, the 'ENTER' key can be used to add line feeds to the description as needed.

To dismiss the dialog box and accept the changes, press the 'OK' button. To discard the changes, press the 'CANCEL' button or press the 'ESC' key.

Terminal Interface

To edit an existing terminal command, select the command by highlighting it and then press the 'ENTER' key. The command along with its description will be displayed in the dialog box:
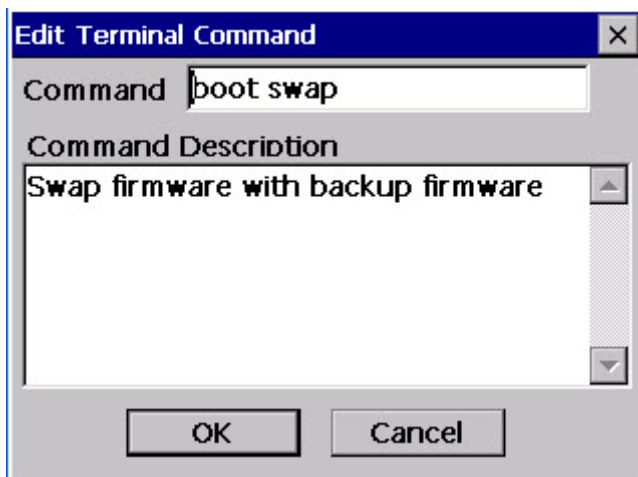
The dialog behaves the same as when adding a new command. The 'ENTER' key can be used to add line feeds. To accept the changes and dismiss the dialog, press the 'OK' button. To discard the changes press the 'CANCEL' button or hit the 'ESC' key.

To execute a terminal command, select option 4. Terminal Interface from the main selection menu. After selecting the terminal interface menu item, the following dialog is displayed:
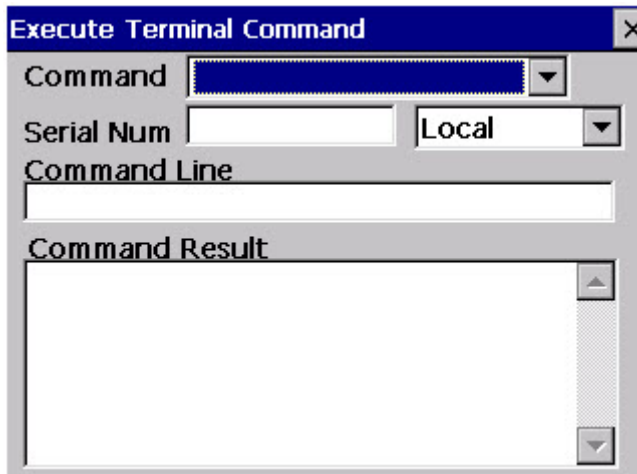

This dialog has 5 controls.

The Command drop down list contains the list of available commands that can be executed on the command line.

The Serial Num edit box is where the serial number for a remote device is supplied.

The drop down list following the serial number edit control indicates whether a command will be local or remote. A local command will be directed to the OREO. A remote command will be directed to the device indicated by the serial number.

The Command Line edit box shows the formatted command that will be executed on the target device. When the user selects a command from the drop down list box, the command is automatically formatted and added to the command line edit box. If the user is executing a command on a remote device (for example, a FIREFLY), the 'rexec' command is automatically added to the command line as shown in the following dialog:
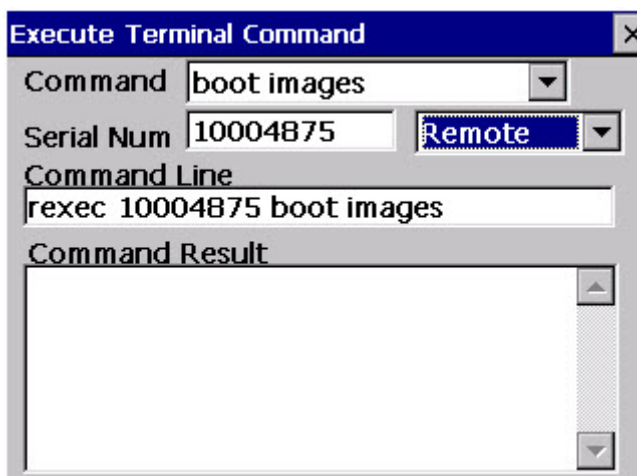
It should be noted that when a serial number is supplied, the command is automatically configured for remote execution.

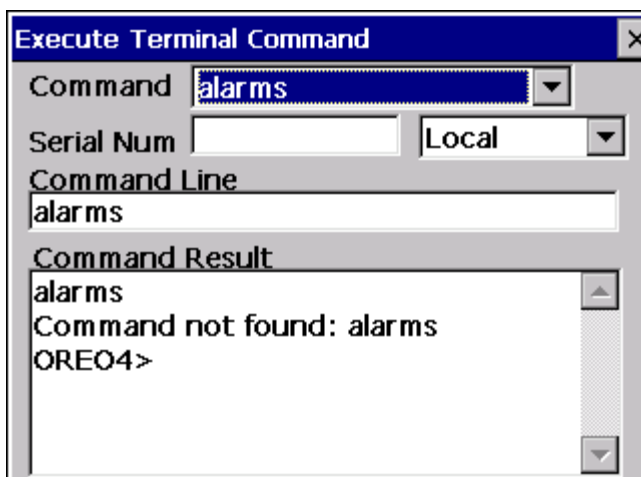After the command is entered, press the Blue Key and the 'E' key to execute the command. For the remote execution of the boot images command, after the command is executed, the 'Command Result' edit window will show the results of the command as shown in the following dialog:

```
Execute Terminal Command                    ×
Command  boot images              ▼
Serial Num 10014875      Remote   ▼
Command Line
rexec 10014875 boot images
Command Result
rexec 10014875 boot images        ▲
OREO4>[10014875] Img 0 @
0x00008000:   VALID(AP):04
01.02.16 06/26/2008 11:42:56 GMT
CRC=0xef254307                    ▼
```
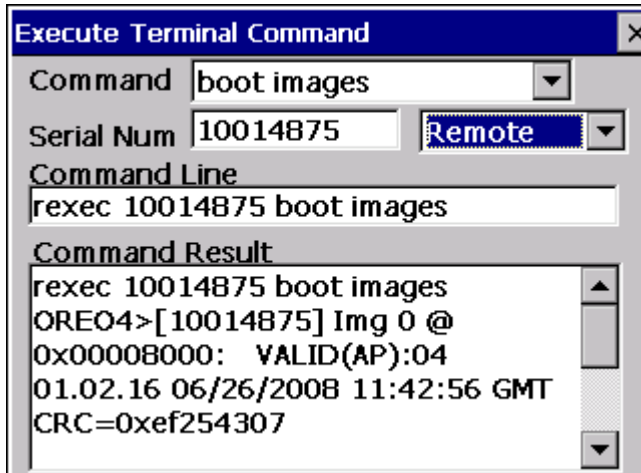
If the device does not support a command that is executed, the typical response from the device is 'Command not found: (command)'. The following is an example:

```
Execute Terminal Command                    ×
Command  alarms                   ▼
Serial Num          Local         ▼
Command Line
alarms
Command Result
alarms                            ▲
Command not found: alarms
OREO4>
                                  ▼
```

Also, if a terminal command that is needed has not been set up in the list, it can be entered directly in the Command Line edit control and executed just as if it were in the list.

It should be noted that only a single command can be executed at a time.

Edit Export Definition
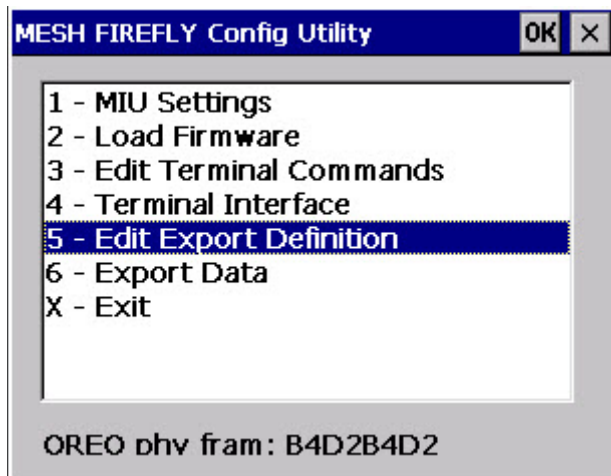

The data export feature will allow exporting most of the data items captured during the FIREFLY configuration process. In order to export data that has been captured, a definition that defines the order of the fields in the export file as well as the fields to be export must be created. To create a new export definition or to edit an existing export definition, the user will select option '5' from the main menu. This option is the Edit Export Definition option.

After selecting option 5, the following dialog is displayed:
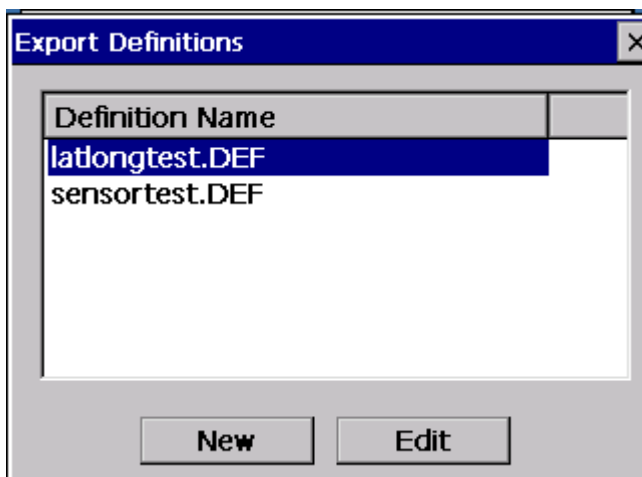
The list in the dialog shows the existing definitions that have been set up previously. To edit an existing definition, the user will highlight the definition that requires modification and press the 'Edit' button. To create a new definition, the user will press the 'New' button.
If the user selects either the new button or selects to edit an existing definition, the following dialog is displayed:
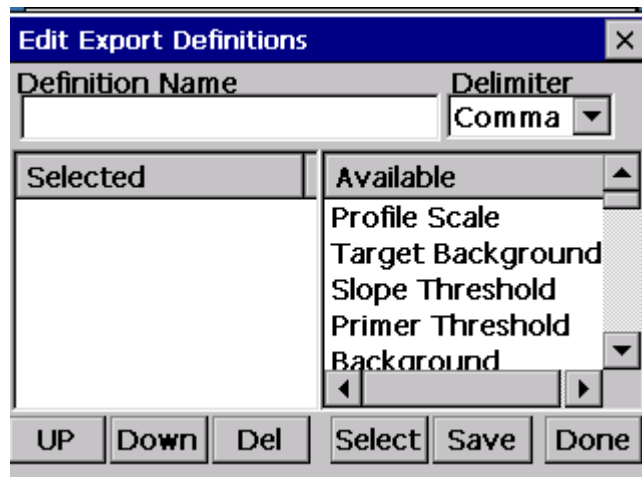
When setting up a new definition, the user will be required to enter a definition name. The delimiter option allows the user to specify how the fields will be separated in the export file. There are three available separators the user can choose from: Comma, Semicolon, and Tab.

The default selection is to separate the fields in the exported file by commas.

There are two list views on the dialog. The list control on the left shows the data items that are selected to be exported. The list control on the right shows the available data items that can be exported. In order to select an available item, the user must highlight the item to be included in the export and press the 'Select' button. This action will move the item from the 'Available' list control to the 'Selected' list control. The following dialog is an example of moving the 'Target Background' field to the 'Selected' list.
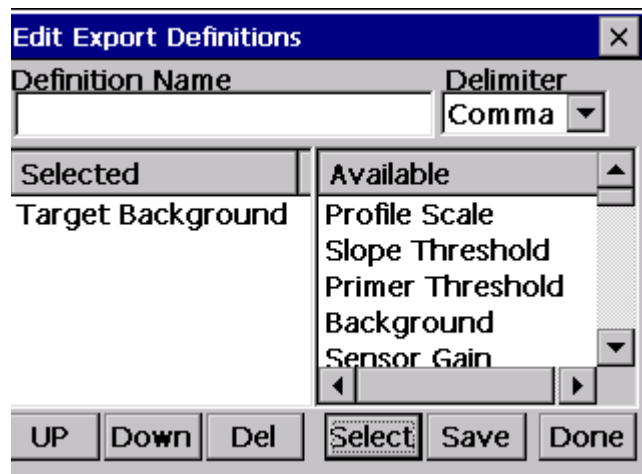
Only one item can be selected at a time. This process can be used to move several items to the 'Selected' list until the 'Selected' list contains all of the items of interest to be exported.
The items will be exported in the order that they appear in the 'Selected' list. The following screen shot is an example of setting up a definition to export lat/long data.
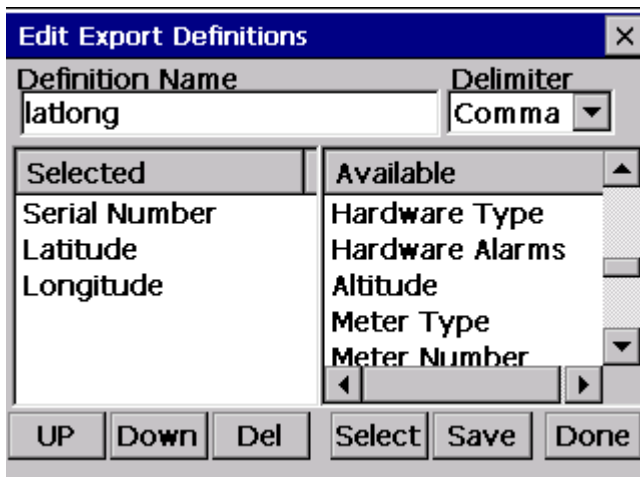
The fields will be exported in the order that they appear in the 'Selected' list. To arrange the order of the fields, highlight the field and press the 'Up' button to move the item up in the list or the 'Down' button to move it down in the list. To remove an item from the selection, press the 'Del' button. Removing an item will move the item back to the Available fields list.

When the export definition is finished, the user can select the 'Save' button to save the definition. The location where the export definitions are saved to will be the \CXMIExportDef folder.

To exit the dialog, the user will select the 'Done' button or press the 'ENTER' key. To exit the dialog without saving changes to the dialog, the user will be required to press the 'ESC' key. A warning indicating that the definition has not been saved will be displayed to verify that the user wants to exit the dialog without saving any changes to the definition.

In the example above, when the lat/long data is exported, on each row of data, the serial number will appear first followed by the latitude and then followed by the longitude. Each row will contain these 3 items. Also, the first row in each exported file will contain the names of the fields represented in the file. The following is an example of the exported data:

Serial Number, Latitude, Longitude
13000082, 11954973, -35195374
13000184, 11955067, -35195540

Once exported, this file can be imported into excel or some other application to view or process the data (after the file has been retrieved from the ROADRUNNER). A common software program used for retrieving data from a handheld or mobile device is ActiveSync. If you do not have this software on your PC, please contact a member of your IT staff.

Export Data

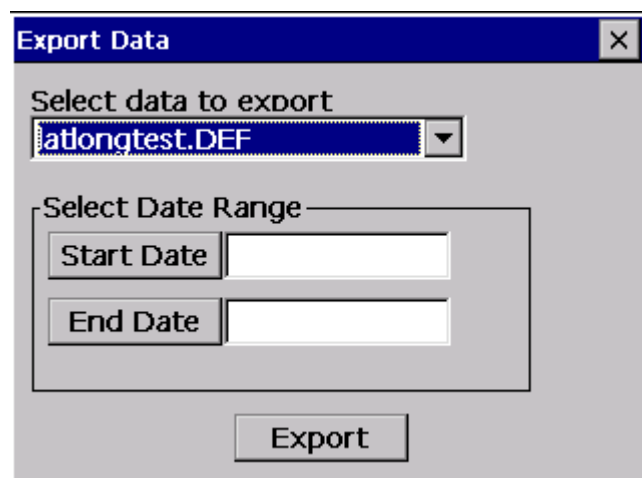In order to export data using a definition, the user will select option '6' from the main menu. The following screen shot is an example of the main menu.
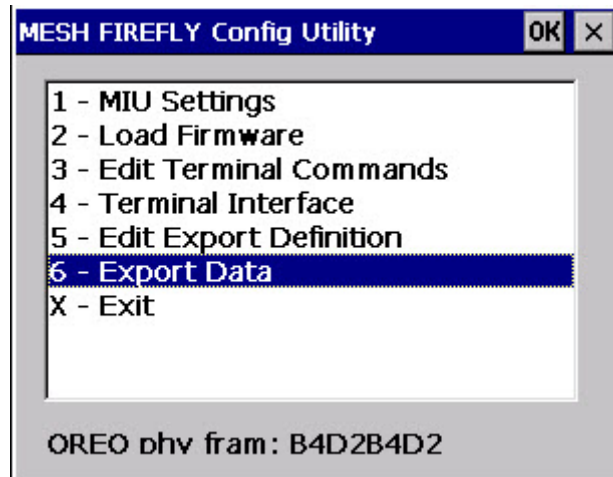
Selecting option 6 will show the following dialog:

There will be a drop down list that contains all of the definitions that have been set up for exporting data. After selecting a definition, the user will then have the option for entering a start date and an end date. Each of the records captured from a FIREFLY is time stamped with the date and time at the extraction. This will allow exporting data for a specific range of dates. Leaving the start and end date fields blank will export all records that are available for export.

If the user decides to enter a start date and end date, the user can enter the date manually in the edit control in the format MM/DD/YYYY or the user can simply press the 'Start Date' button or the 'End Date' buttons to select a date from a calendar. Selecting the start or end date buttons will bring up the following dialog:

To select a date, the user can use either the arrow keys to move between dates and months or use the stylus to select a date. The left/right arrow keys will scroll through the dates backward/forward through the month. The up/down arrow keys will cause the date selection to scroll from week to week.

After selecting a date, the user will need to either press either the 'OK' button on the screen or press the 'ENTER' key on the keyboard. After the user dismisses the dialog used to select a date, the date will be displayed in the Export Data dialog edit control. The following screen shot is an example:
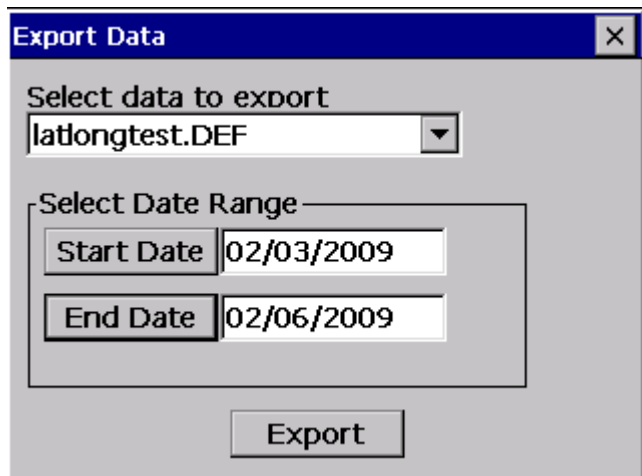
Once the user has selected the start and end date, the user can begin the export by pressing the 'Export' button. The following is an example of the exported data:
Serial Number, Latitude, Longitude
13000082, 11954973, -35195374
13000184, 11955067, -35195540

The location where the exported data is stored will be in the \CXMIData folder. The file name will be the same name as the definition file with the '.DEF' extension removed and an '.EXP' extension will be added. Also, the date will be added to the name of the file. For example, using the above definition name, the output file would be 'latlongtest_20090209.EXP'. The exported data will be stored for up to 90 days before being automatically deleted.

MOSAIC FIREFLYs as Repeaters (Mesh Mode)

When wired as a repeater, after a successful initial swipe, the RED LED will go solid and the GREEN LED will flash slowly as the MOSAIC FIREFLY searches for the mesh. When communication has been established with a node already connected to the mesh (MOSAIC Gateway, Repeater or another MOSAIC FIREFLY) the GREEN LED will go solid.

Troubleshooting Electric and Gas FIREFLYs

Reports are generated from installation and RV data that has been sent to Datamatic using the DAZE program. These reports are processed and e-mailed back to the customers for review. These reports are used to identify which FIREFLYs need troubleshooting. Examples of FIREFLYs in need of troubleshooting include no RF signal and Delta values outside of specified range.

Before Leaving Office

The following steps need to be checked before entering the field:

1. Check the Template parameters from the FIREFLY Menu.
2. Set the ROADRUNNER reading mode to RV Mode.
3. Check the FIREFLY Options screen to verify the correct parameters.

Troubleshooting Field Procedure

The following steps should be taken to troubleshoot FIREFLY issues while in the field:

- Perform a Walk-Up RV (see Read and Verify Procedure section of this manual).
- If walk-up RV is accurate, proceed to the next meter on the Troubleshooting Report.
- If the FIREFLY is inaccurate or has any trouble codes then proceed with troubleshooting.

Troubleshooting Details

Check the following before troubleshooting the FIREFLY:

- The dials are not stuck or malfunctioning.
- Make sure the FIREFLY has no visible damage.

Receiving no RF signal from a FIREFLY

When interrogating a FIREFLY from a ROADRUNNER and no radio read can be made, check the following:

- Check Current Settings by serial number to verify the register # on the meter, ROADRUNNER, and FIREFLY match.
- Verify that in Current Settings of the FIREFLY, the Mode is showing to be 'Active'.

Inaccurate Undercounting FIREFLY

Gas FIREFLY:

- Ensure the drive shaft is engaged properly and turns freely.

- Look at index speed; excessive index speed can cause under-counting. Continually undercounting deltas usually means the account has an undersized meter, making both the meter and FIREFLY miss counts.

Electric FIREFLY:

- Check connection of FIREFLY to power posts. Reconnect using the proper technique if needed.

- Confirm there are no reflective unpainted areas within the painted area of the disc.

- Check meter disc speed; excessive disc spend can cause under-counting. Continually undercounting deltas usually means the account has an undersized meter, making both the meter and FIREFLY miss counts.

Tightening Gas FIREFLY onto register

- Do not over-tighten screws on the Gas FIREFLY.

- Breakage due to negligence may not be covered under warranty.

Troubleshooting Procedures

MOSAIC FIREFLY Codes

Code	Description	Meaning	Onsite visit Y or N?	Steps To Resolve
BA10	Battery	Battery is low	Yes	RMA for battery replacement
Ta40	Tamper	System recorded En70 48 times	Yes	Perform *Connection Troubleshooting** below
Le60	Leak	25 hours of continual consumption	Yes	Check for leak
EN70	Encoder Not Read	Did not receive reading	Yes	Perform *Connection Troubleshooting** below
EN80	Encoder Invalid	"Other" message. System received "garbled" data from meter	No	Should get a reading at next scheduled reading time. Check register if the message is being transmitted frequently.
MESH	Mesh Alarm	Hardware Alarm	Yes	Remove & Replace immediately
Pr11	Primary Image	Loading primary image	No	Should not affect reading
Se13	Secondary Image	Loading secondary image	No	Should not affect reading

Connection Troubleshooting

1. Check for physical damage to the MOSAIC FIREFLY wire.
2. Check for physical damage to the Register.
3. If possible, test the register head.
4. If there is no physical damage detected resplice and reswipe the MOSAIC FIREFLY.
   a. Repeat step several times if necessary.
   b. If the red light goes solid, repot the MOSAIC FIREFLY and continue to monitor.
   c. Request an RMA if the issue persists.

Refer to LED Status *Figure 1* for verification of functional status.

Unread Meters Troubleshooting

1. Research in the MOSAIC Software Interface to determine when the last read was and check for possible patterns.
2. If the MOSAIC FIREFLY is unable to join the network:
    a. Verify that the MOSAIC FIREFLY is installed and mounted properly in the meter pit
    b. Swipe the meter & refer to the LED Operational States for verification of functional status Mesh (light will slow blink green). Go to the nearest neighboring MOSAIC FIREFLY and swipe.
    c. Check the unread MOSAIC FIREFLY for solid green light (this process can take several attempts). Before swiping both units must be "asleep" (no LED lights) before attempting to swipe again.
3. Continue monitoring in MOSAIC Software & replace unread MOSAIC FIREFLY if the issue persists.
4. If after all troubleshooting is complete & you are unable to achieve a solid green light the MOSAIC FIREFLY should be replaced.
    a. If there is no LED response within 5 seconds of magnet swipe retry several times. If the unit in question continues to be unresponsive it should be replaced.

FIREFLY File Emailing Instructions

The program most commonly used to zip files is called WinZip. If you do not have this program, find out if you can have it downloaded to your computer from www.Winzip.com. It is around $29 for the software. These instructions below are written for users using the WinZip program.

Use the following instructions to Zip and E-mail the FFConfiguration (F1) and FFReadVertification (F2) file.

Customers that are installing their own FIREFLYs will use only the Customername_Customername_MMDDYY in the file name. Example: PlanoTX_PlanoTX_020705.

Installers (contractors) that are installing for a customer will use Customername_Installername_MMDDYY. Example: PlanoTX_ABCMeters_020705.

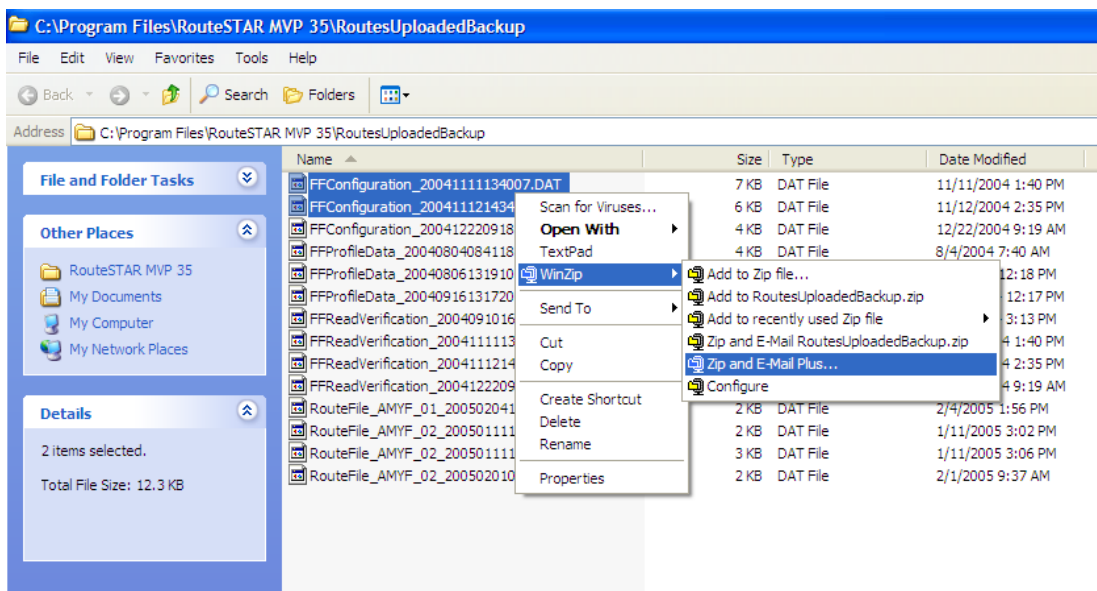Set up a shortcut to the Desktop for RoutesUploadedBackup folder. This has to be done only once.

Steps to Zip and E-mail a file using Winzip:

RoutesUploadedBackup folder
Open RoutesUploadedBackup folder
Select the FFConfiguration.dat and FFReadVertification.dat files that need to be zipped.
Right-click on the selected files and select Zip and E-Mail Plus.

Once at the Zip and E-Mail plus window, select "Use this name:" and enter the proper naming convention as discussed above. Then click OK.
Example: PlanoTX_PlanoTX_020705

This will bring up your email and attach the zipped file into the email for you automatically.
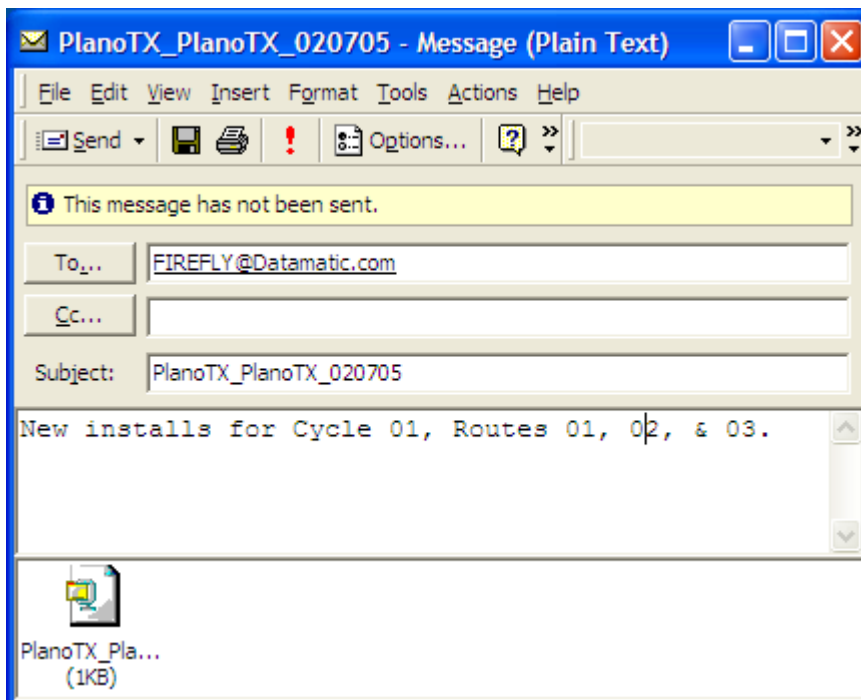
At the Email Window:

Enter the following information into the email window. The below example is if you are using Microsoft Outlook as your email program.

To: **FIREFLY@Datamatic.com**
Subject: **CustomerName_InstallerName_MMDDYY**
Body: List the cycle/routes loaded in the file. Also, state whether this file was created from a new install or a Read and Verify.
Click SEND

After receiving confirmation of arrival of the zip e-mailed files and receiving your reports back from Datamatic, you may delete the FF.dat files in the **RoutesUploadedBackup** folder.

FAQ's

Can I use all three MOSAIC Gateway backhaul types in a single installation?
Yes.

Will I see a difference as far as data collection between the three MOSAIC Gateway backhaul configurations?
No, you will not see a difference.

Why would I need to use GPRS in an installation?
GPRS works well in areas where other types of backhaul coverage are not available.

Is the Wi-Fi product 802.11 compliant?
Yes, our Wi-Fi product is 802.11B compliant.

How many MOSAIC FIREFLYs can mesh together?
Typically 1-24 MOSAIC FIREFLYs can communicate directly with each other. The minimum number of MOSAIC FIREFLY connections needed to continue the mesh is 1. The total number of MOSAIC FIREFLYs per MOSAIC Gateway should not exceed 1,500.

What is the output power of a MOSAIC FIREFLY?
Transmissions are rated at 250mW.

What is the range of a MOSAIC FIREFLY?
Above ground = approximately ¾ mile (line of sight). Pit mounted (through lid) = 600' – 1000' (depending on lid material). Many variables affect range, including topography, meter lid material and height of the MOSAIC Gateway.

Are the new MOSAIC FIREFLYs compatible with previous legacy FIREFLYs?
No, the transmission frequencies and messages scheme are different; thus a new radio is needed for handheld, mobile and mesh readings.

Do the MOSAIC FIREFLYs read via the ROADRUNNER MOBILE product?
Yes, a mobile reading mode is available with the same hardware used for Mesh reading.

Will I need different MOSAIC FIREFLYS for Mesh and Mobile functionality?
No, the same hardware used for mobile mode will work with both.

How do I program an MOSAIC FIREFLY?
MOSAIC FIREFLYs used on encoded water meters are automatically set-up. MOSAIC FIREFLYs for other meters are programmed via 2-way radio communications from a handheld programmer. New schedules, profile requests and firmware are also loaded via the Mesh.

What does your handheld programming tool look like?
The handheld programmer is a Datamatic, LTD ROADRUNNER CX unit with a MOSAIC 2-way radio.

What is the battery life for the MOSAIC FIREFLY?

When run at a 20 minute mesh interval, 10 plus years.

Is the battery pack replaceable?
Yes, the battery pack can be replaced at Datamatic.

What frequency does the MOSAIC product use?
We use a Frequency Hopping Spread Spectrum (FHSS) over the 902-928 MHz band. 50 separate frequencies are utilized.

Do you use a licensed frequency?
The radio frequency that Datamatic, LTD uses operates on the ISM band, which is unlicensed.

Does your product provide profiling?
Yes the battery operated MOSAIC FIREFLYS have 240 days of hourly profile data on board.

How do you get the profiling?
Profile data is extracted in two ways, the MOSAIC FIREFLY can be programmed via the mesh to send an hourly profile packet along with its midnight read, or you can use the RR programmer to extract the profile data on demand (in development). Keep in mind that requesting profile data over the Mesh in large quantities will take time and network resources.

How often do I get reads via the Mesh?
Once daily is recommended, but this is user definable. Battery powered MOSAIC FIREFLYs send in daily readings by default, with the ability to send in up to hourly intervals on selected basis. A sampling of all meters can be configured to send in higher resolution profile data for statistical analysis, but can have a negative impact on the mesh network performance.

Is the system 2-way?
Yes, the MOSAIC FIREFLYS can send data and receive commands from the MOSAIC Gateway, which in turn communicates with the back office utility. MOSAIC FIREFLYs can also communicate 2-way with a handheld programmer.

What can I do with the 2-way functionality?
Update schedules, configurations, extract profile or other data, and more. Communications can be broadcast to an entire Mesh or directed to an individual MOSAIC FIREFLY.

Does the MOSAIC system have repeaters?
Yes, low cost repeaters are utilized to bridge the gap between distant MOSAIC FIREFLYs to reduce network congestion at unavoidable Mesh network bottlenecks or to reduce latency.

How do the MOSAIC FIREFLY repeaters work?
Each MOSAIC FIREFLY already acts as a repeater. Units wired and dedicated as a MOSAIC FIREFLY repeater utilize the same firmware but do not read a meter and therefore only repeat readings upstream that they receive.

What is the MOSAIC FIREFLY repeater battery life?

It works similar to that of a MOSAIC FIREFLY.

Do you support cellular backhaul from the MOSAIC Gateway?
Yes, via GPRS only at this time.

Do you support Wi-Fi backhaul at the MOSAIC Gateway?
Yes, 802.11 b.

Appendix A

ROADRUNNER CX with
MOSAIC Gas FIREFLY

FIREFLY Template for_____

Parameter	Prompt Type	Value	Suggested Value
1. Reading	Normal	Normal	Depends on meter/billing units
2. Register #	Normal	Normal	Normal
3. Constant	Default		Depends on meter/billing units
4. Optic Threshold	Default		10
5. Rollover	Default		Depends on meter/billing units
6. Read Truncation	Default		Depends on meter/billing units
7. Target Background	Default		100
8. Optic Read Delay	Default		5
9. Trickle Threshold	Default		24 (hours)
A. No Dip Expiration	Default		30 (days)
B. Drive-by Schedule	Default		Default Schedule Defined*
X. Save and Exit	**Save**	**Your**	Template

*The schedule defined as the default value in the Template will be used

#1 Set your FIREFLY Template (See Appendix A):

Parameter	Prompt Type	Value (Recommended Value)
1. Reading	Normal	Normal
2. Register Number	Normal	Normal
3. Mode (makes the FIREFLY active)	Default	(Active)
4. System Number (area code for FIREFLYs)	Default	(100)
5. Profile Interval (how often usage is saved)	Default	(60)
6. Transmit Interval (how often a FIREFLY sends its signal into the air)	Default	(3)
7. Index Size	Normal	1,2,5,10 (whole # size from index)
8. Rollover (# of dials you read + 2)	Default	Residential = (6)
9. Profile Scale (usually same as constant)	Default	(1)
A. Encoder Interval	Default	(0)
B. Pulse Ratio	Default	(1)
C. Pressure Compensation Ratio	Normal	(Indicated by a red index face)
X. Save & Exit		*To Save your Template*

ROADRUNNER CX with
MOSAIC Electric FIREFLY

FIREFLY Template for_____

Parameter	Prompt Type	Value	Suggested Value
1. Reading	Normal	Normal	Depends on meter/billing units
2. Register #	Normal	Normal	Normal
3. Constant	Default		Depends on meter/billing units
4. Optic Threshold	Default		10
5. Rollover	Default		Depends on meter/billing units
6. Read Truncation	Default		Depends on meter/billing units
7. Target Background	Default		100
8. Optic Read Delay	Default		5
9. Trickle Threshold	Default		24 (hours)
A. No Dip Expiration	Default		30 (days)
B. Drive-by Schedule	Default		Default Schedule Defined*
X. Save and Exit	**Save**	**Your**	Template

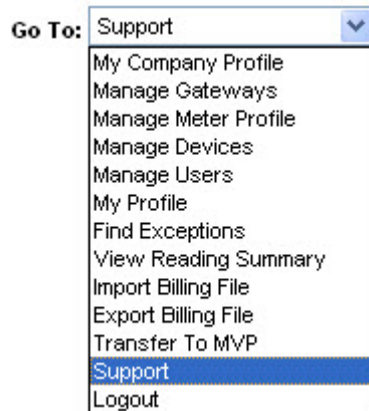*The schedule defined as the default value in the Template will be used

Parameter	Prompt Type	Value (Recommended Value)
1. Reading	Normal	Normal
2. Register Number	Normal	Normal
3. Mode (makes the FIREFLY active)	Default	(Active)
4. Centron Mode (60Hz - America, 50Hz - International) *ROADRUNNER CX only*	Default	(60 Hz)
5. System Number (area code for	Default	(100)

FIREFLYs)		
6. Profile Interval (how often usage is saved)	Default	(15)
7. Transmit Interval (how often a FIREFLY sends its RF signal)	Default	(2)
8. Constant (dependent upon the meter)	Normal or Default	(7.2, 12, 14.4)
9. Rollover (# Of Dials FIREFLY sends)	Default	(5)
10. Profile Scale	Default	(1)
X. Save & Exit		*To Save your Template*

Contacting Datamatic

Use the **Go To:** master navigation menu to access the '**Support**' page.

The Support page consists of the following:

Document Revisions

Team Members:	Deena Martin
Date:	June 9, 2009 – June 16, 2009
Revision:	A
Revision Log:	Created MOSAIC Energy FF Guide; updates for FCC certification per Ken D.