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Manual

Landis+Gyr
Series IV Gridstream RF
Router User and
Installation Guide

Publication: 98-1021 Rev 01

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Landis+Gyr Series IV Gridstream RF Router User and Installation Guide

Publication: 98-1021 Rev 01

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Gridstream Series IV Router

Overview

The Landis+Gyr Gridstream Router is designed for outdoor mounting. The Gridstream Router supports RS-232/485 serial interface for Transparent Packet Protocol (TPP) and RS-232 serial interface for LAN Packet Protocol (LPP). The LAN Packet Protocol line is used to communicate to devices which use LPP, such as a PC with configuration or diagnostic software, or an end device which has implemented LPP. The TPP provides a general data port and is used to transport byte-oriented data, such as that generated by industry standard protocols.

In an AMI system, Gridstream Routers are used to create a robust communications path to a collector or for Smart Grid applications.

In a Distribution Automation application it is commonly interfaced with such devices as Remote Terminal Units (RTUs), Programmable Logic Controllers (PLCs), and other Intelligent End Devices (IEDs) and communicates via RS-232/485 TPP to end devices.

The Gridstream Router Radio (see Figure 1 - 1) is provided in a 120/240 Volt AC/DC version. An optional RF filter has been included for reducing interference. The filter can be enabled or disabled in the field by qualified personnel using RadioShop.

The Gridstream Router when used internationally, will have to be programmed via a Device Control Word (DCW) to meet the specific country RF (Frequencies and output power) requirements. These country specific requirements may reduce the RF power or number of operational frequencies available.

The Gridstream Router radios are approved for operation in Australia (915-928 MHz) and New Zealand(921-928 MHz). For current specific RF requirements for your country, contact Landis+Gyr customer service.

Figure 1 - 1. Gridstream Router Radio

The Gridstream Router radio is provided in a white, die-cast aluminum enclosure. It has two connectors—one for AC power and one for RS-232/485 signal and 12/24 DC power. The Gridstream Router will operate between 120VAC (+/-20%) and 277 VAC (+/-15%) without having to change any settings. 12/24 VDC can be applied through the same port that provides the RS-232 lines. RS-232 lines are provided for both LPP and TPP communication. The radio is provide with a standard N-Female antenna connector and mounting hardware.

If programming before installation, an optional programming cable should be ordered with Gridstream Routers radios for initial configuration (see P/N 105617-000 and 105616-000). If you are connecting the Gridstream Router to an RS-232 end device, you will also need to order a signal cable (see P/N 105554-000 and P/N 105552-000).

A battery version is available for backup during a power outage. The battery is factory-installed into the radio enclosure.

Disconnecting the power cable at the radio will also disconnect the battery.

A filter version is available for attenuation of out-of-band interference. The filter is factory-installed into the radio enclosure.

This band pass filter attenuates out-of-band signals and is used to reject interference from sources such as paging and cellular phone. Only sites that exhibit interference from out-of-band sources require this filter. Gridstream Routers are designed to be in-band interference tolerant. In-band interference has rarely ever been a problem.

Series I Gridstream Router cables are not compatible with Series III (current version) Gridstream Router radios.

Notes on International version

- The radio must be programmed to meet the specific RF requirements of the country it is to be used in. These requirements may reduce the RF power or number of channels available.
- The Gridstream Router radios, when used in Australia and New Zealand, operate from 915 MHz to 928 MHz. The filter is not recommended for these radios.
- At present, there is only one power cable available, P/N 19-1224. The cable uses a VDE/SEV/UL approved connector. The wire harness uses the international coloring scheme of brown for active, blue for return and yellow/green for earth ground.

2

Gridstream Router Configuration

Direct Connect Configuration

The Gridstream Router, when shipped to the customer, may require configuration prior to network deployment. Occasionally it may be necessary to update the configuration before the Gridstream Router is installed. See “Gridstream Router Parts and Materials” on page 28 for a list of optional programming cables.

Pre-Installation Configuration Steps

Before the router can be configured, it must be connected to a computer using the optional programming cable labeled LAN Packet Protocol.

1. Remove the cover from the router communications port and connect the optional programming cable to the router and PC.
2. Connect the AC power cable to the router, and plug the AC power cable into the AC supply.

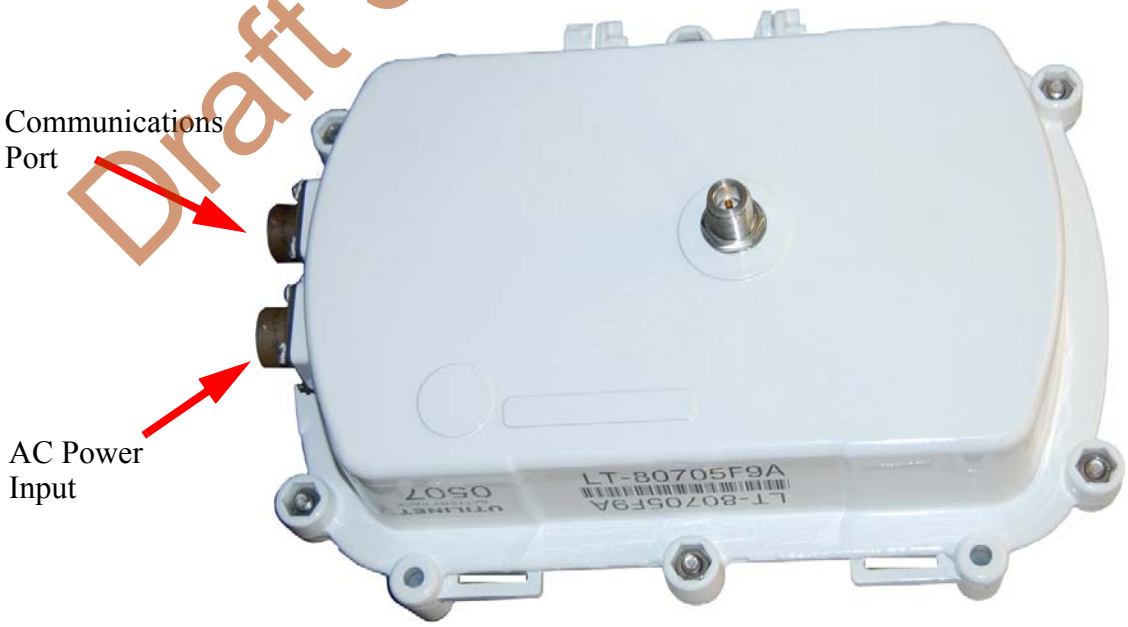


Figure 2 - 1. Router Connections

3. Open RadioShop 4.0 or later. For complete information on using RadioShop, please see *Publication 98-1008: Gridstream RadioShop® 4.1 Getting Started Guide*.

4. From RadioShop home select the **Head-End Mgmt** tab.
5. Click the drop-down arrow to the right of the Discover button and then select **Force Scan** and **Discover Entry Ports** or click **Start**.
6. Select which available COM Port RadioShop should use to check for attached radios, uncheck those Comm ports not being used. Click **OK.**

Configure WAN Address

1. On the RadioShop home screen, the Radio Name for the Gridstream Router appears in the Nodes pane.

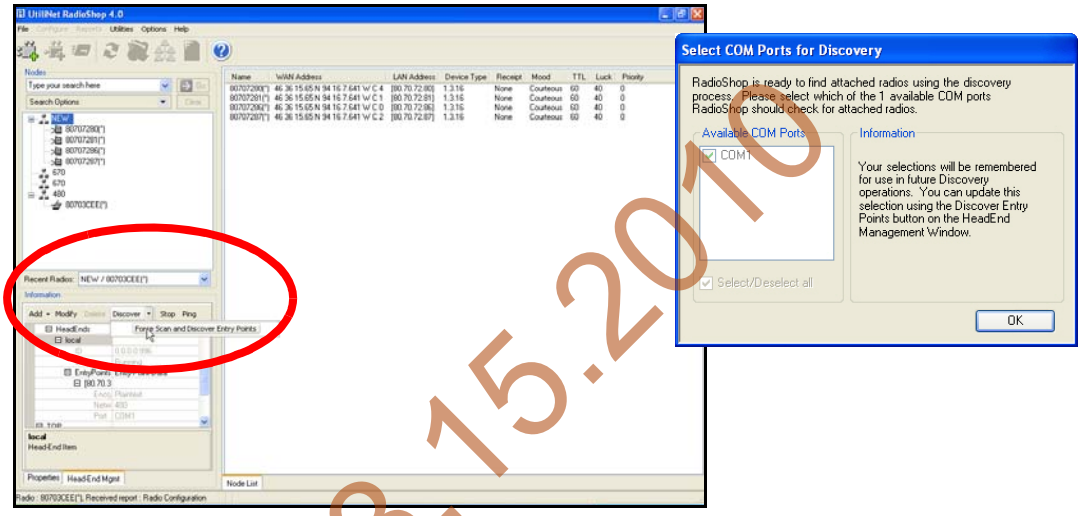


Figure 2 - 2. Discover>Force Scan and Discover Entry Points

2. Make sure the Gridstream Router is highlighted in the Nodes pane. Select **Configure > WAN Address...**

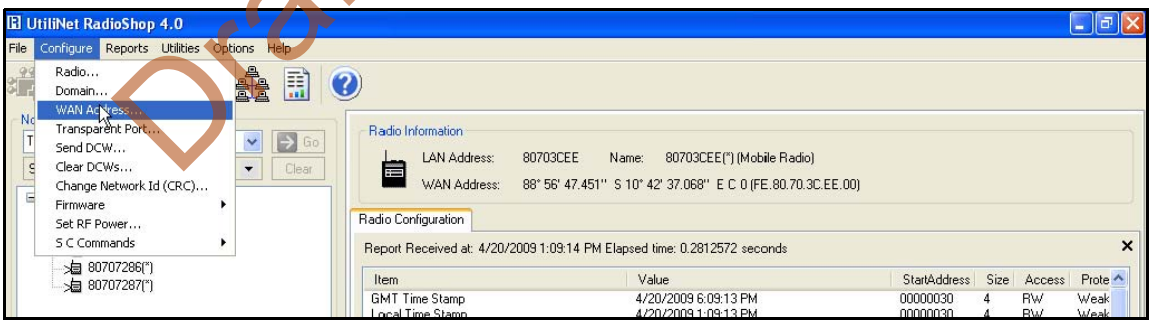


Figure 2 - 3. Select WAN Address

3. The Configure WAN Address window will open. Select either **Latitude/Longitude** or **Decimal Degrees** and enter the **WAN Address** and **Encoded value**. Click the **OK** button.

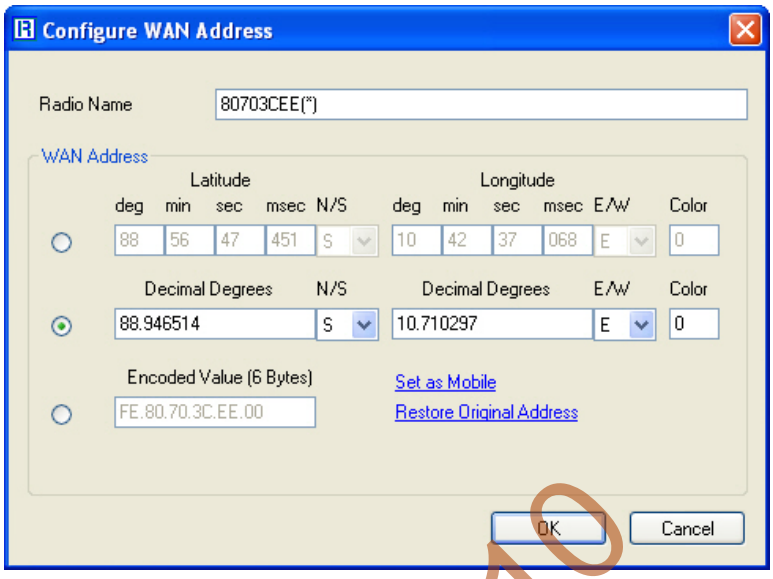


Figure 2 - 4. Configure WAN Address Window

After clicking the OK button, the WAN Address Change confirmation dialog box will appear.

4. Click both boxes to check-mark **Clear Current Reports** and **Run Radio Configuration Report**. Click the **OK** button.

Figure 2 - 5. WAN Address Change Window

The WAN Address will be displayed in the Radio Information window.

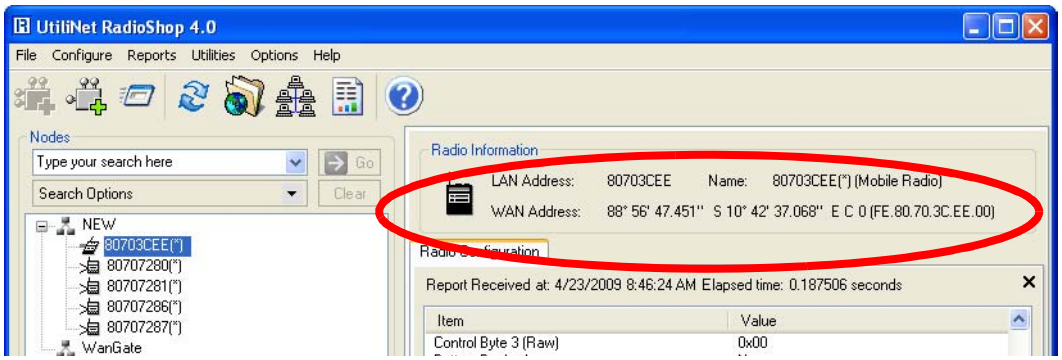


Figure 2 - 6. WAN Address

Setting the Network ID

To assign the Network ID to the Gridstream Router, perform the following steps.

All Landis+Gyr Gridstream radios, including the Gridstream Router, ship with a default network ID, or CRC, of 670.

1. Select **Configure > Change Network Id (CRC)...**, the Network ID Wizard is displayed.
2. Select **Use an Existing Network**. Click **Next**.

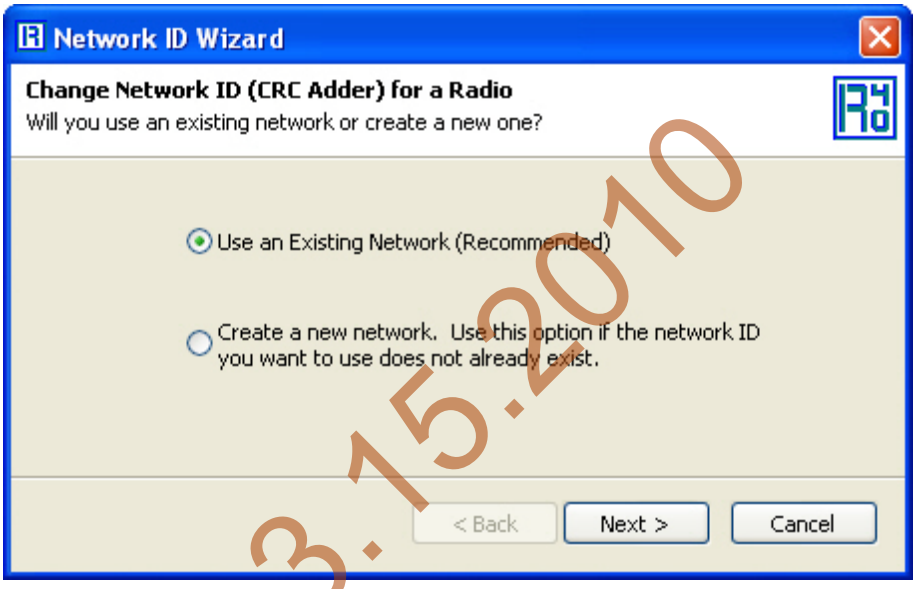


Figure 2 - 7. Network ID Wizard Window

3. On the Choose an Existing Network dialog box, click the drop-down menu arrow next to the Available Networks data field to display available networks. Highlight the desired choice to enter it into the data field and click **Next** to continue.

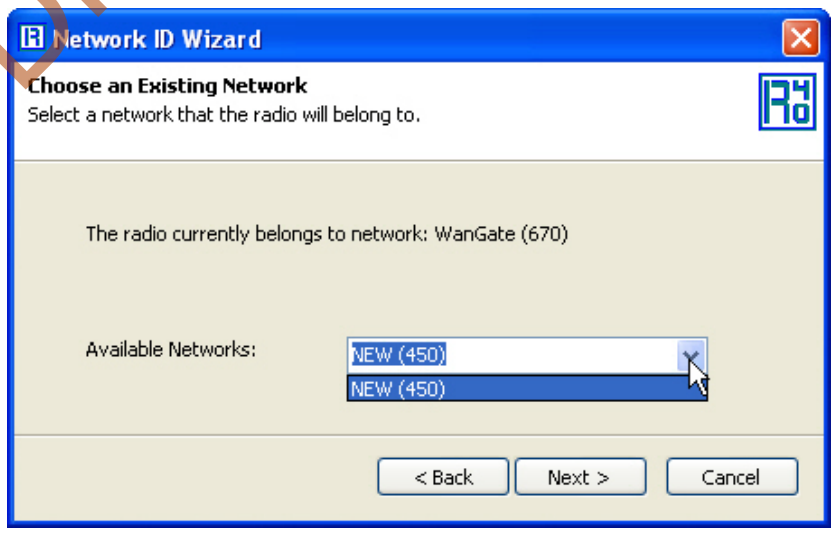


Figure 2 - 8. Choose Desired Network

If you have not been assigned a Network ID, contact Landis+Gyr customer service.

4. The Final Confirmation window will open. Click **Next**.

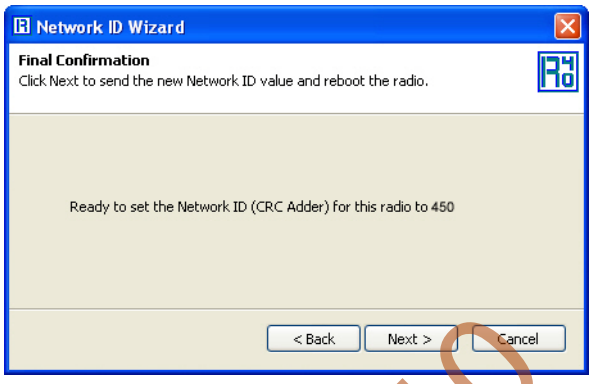


Figure 2 - 9. Final Confirmation Window

A confirmation message verifies that the new Network ID has been assigned to the radio. Click **Finish** to return to RadioShop.

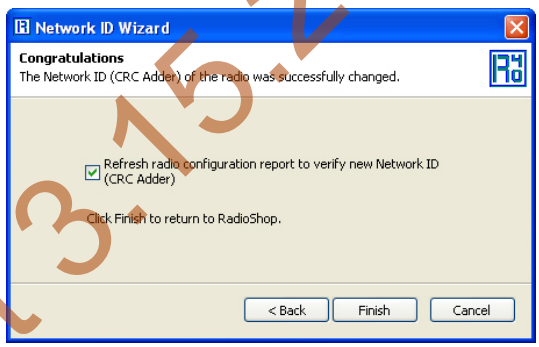


Figure 2 - 10. Click Finish to Finalize Configuration

5. RadioShop will reboot your Local Radio and run another Radio Configuration Report.
6. Make sure the Network ID of your Gridstream Router has changed. If the Radio Configuration Report times out, run another one.

Enabling the Routing Bit

The routing bit must be enabled in the Gridstream Router so it can route packets to other radios.

1. Make sure the Gridstream Router is highlighted on the Nodes Pane.
2. In the Radio Configuration window, scroll down to **Use for Routing**. Note whether or not the routing bit is enabled. “N” indicates that the routing bit is NOT enabled.
3. Right-Click on the Gridstream Router radio listed in the Nodes pane. The auxiliary menu opens, select Enable Routing.

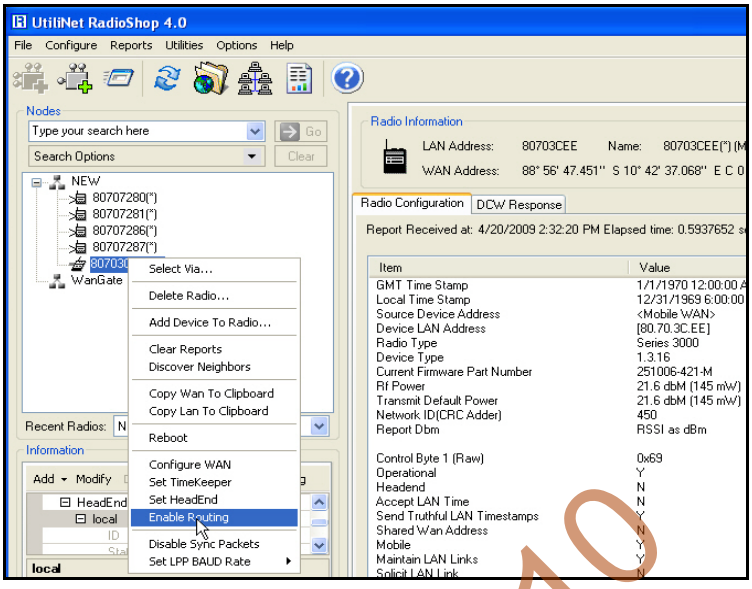


Figure 2 - 11. Enable Routing

4. RadioShop will reboot the Gridstream Router and a new Radio Configuration Report will be generated. Scroll down through the new report and confirm that the routing bit is enabled. “Y” indicates that the routing bit IS enabled.

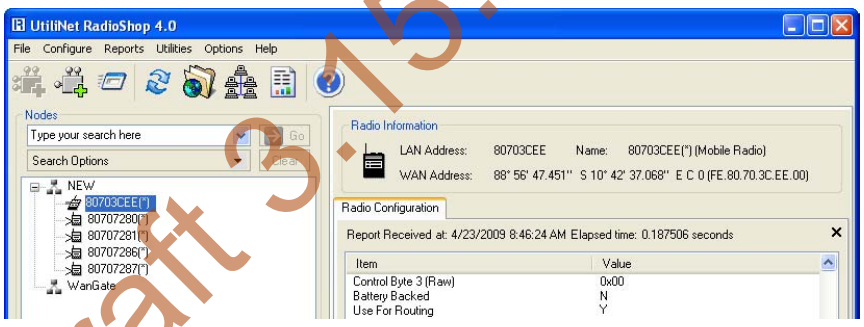


Figure 2 - 12. Routing Enabled

Download New Firmware

Firware upgrades can be accomplished by several different methods.

- On the bench, see “Direct Connect Configuration” on page 7.
- Over the air radio-to-radio, see “Wireless Configuration” on page 14.
- Over the Gridstream network using RadioShop connected to a collector.

To increase speed in downloading new firmware, set the Gridstream Router Baud Rate to 38,400.

1. Right-Click on the Gridstream Router radio listed in the Nodes pane. The auxiliary menu opens, select **Set LPP Baud Rate > 38,400 BAUD**.

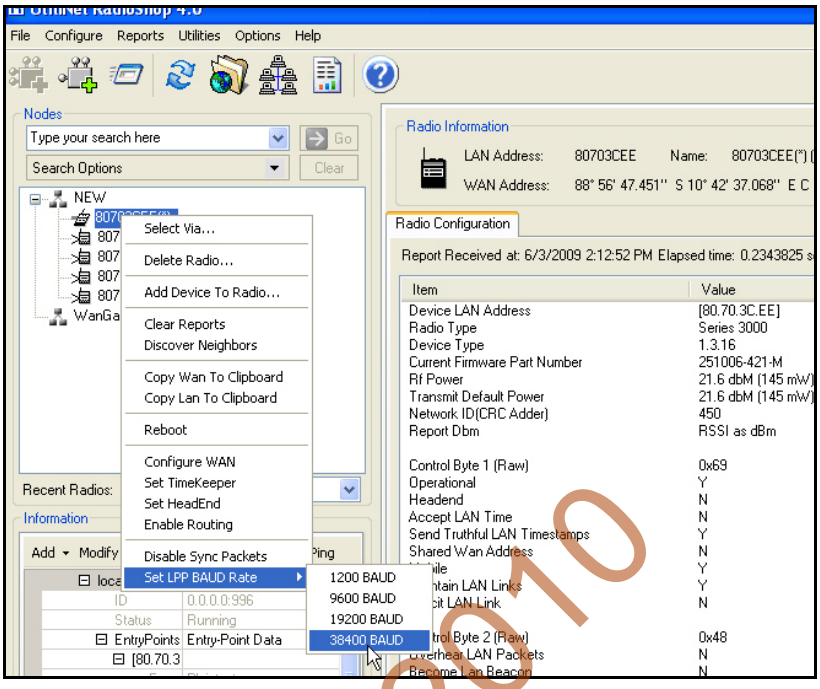


Figure 2 - 13. Select Baud Rate

Direct Connection Firmware Download

1. Make sure the Gridstream Router is selected in the Nodes pane.
2. Select **Configure > Firmware > Download New Firmware...**. The NMP Configuration window will open.

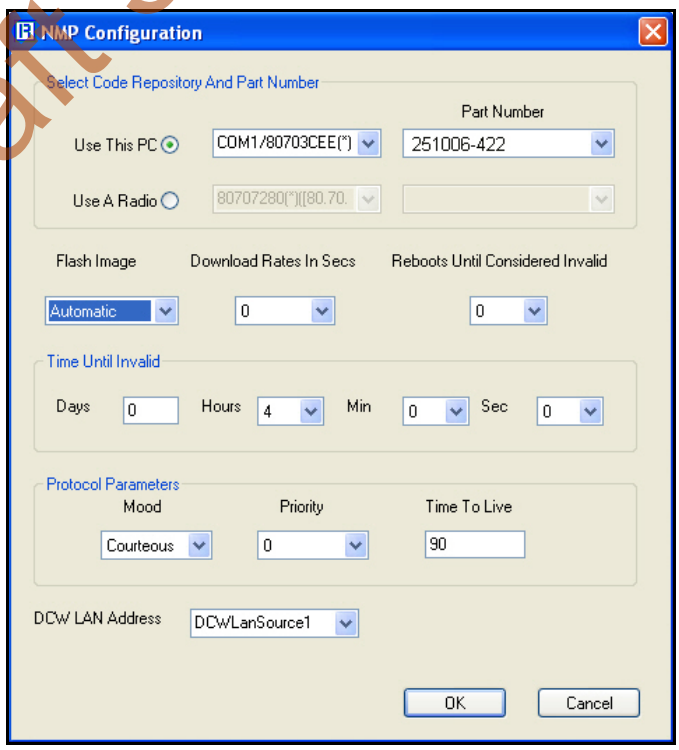


Figure 2 - 14. NMP Configuration Window

3. Select the **Use This PC** radio button. Choose the firmware version to download under the **Part Number** drop-down menu arrow.
4. After selecting the firmware version, click the **OK** button. After the firmware download begins, the Get Download Information dialog box opens. Click the **No** button.
5. The Get Download Information dialog closes and the Download Progress window displays a progress bar. When the action concludes, close RadioShop.
6. Disconnect the PLL and the AC Power cables from the Gridstream Router.
7. Re-install the protective cap onto the Gridstream Router's communications connector.

Wireless Configuration

RadioShop 4.0 (or later), is required for network configuration of the Gridstream Router.

After the Gridstream Router has been installed, you may use a computer to connect to a local head-end radio (IWR), which will then be used to communicate with the Gridstream Router over the air.

For further assistance on how to connect to your local head-end radio, please refer to the latest RadioShop user's manual.

Connect to Your Local Radio using RadioShop 4.0

Connect the LAN Packet Protocol port of your IWR to your computer's serial port using a serial cable. Once the radio is powered up, you can launch RadioShop 4.0 on your computer. RadioShop will now connect to your local head-end radio (IWR).

1. Open RadioShop 4.0 or later.
2. From RadioShop home select the Head-End Mgmt tab.
3. Click **Discover > Force Scan > Discover Entry Ports**, or click **Start**.

When the Select COM Ports for Discovery window opens, select the COM port on your computer that is connected to the radio, and then click OK.

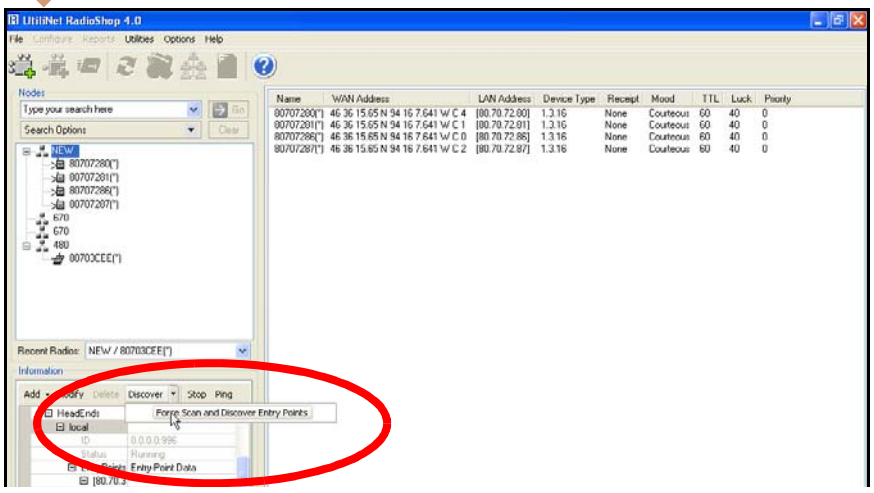


Figure 2 - 15. Connecting to Head-End Radio

4. Once connected, the local radio's LAN address will appear on the list at the top left-hand side of the screen, and a radio configuration report will be displayed in the main window.

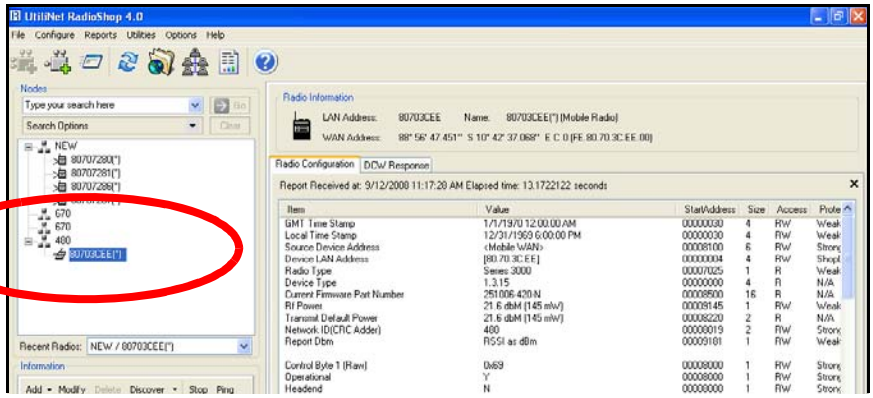


Figure 2 - 16. Local Radio LAN Address

5. If your Gridstream Router is new, you must make sure your Local Radio is on Network ID 670.

In the example above, the Network Id of the Local Radio is 450. It must be changed to 670 to be able to communicate with a new Gridstream Router. If the Gridstream Router already has been assigned a network ID, the radio must be changed to match.

Configure Local Radio to Match the Gridstream Router Network ID

To change the Network ID of the Local Radio, perform the following steps.

All Landis+Gyr Gridstream radios, including the Gridstream Router, ship with a default network ID, or CRC, of 670. In order to communicate with the new Gridstream Router, your local radio will have to be reconfigured to match the network ID (670) of the Gridstream Router. After reconfiguring the Gridstream Router to match the customer's unique network ID, the local radio will need to be reset to its original network ID.

---

1. Select **Configure > Change Network Id (CRC)...**, the Network ID Wizard is displayed.

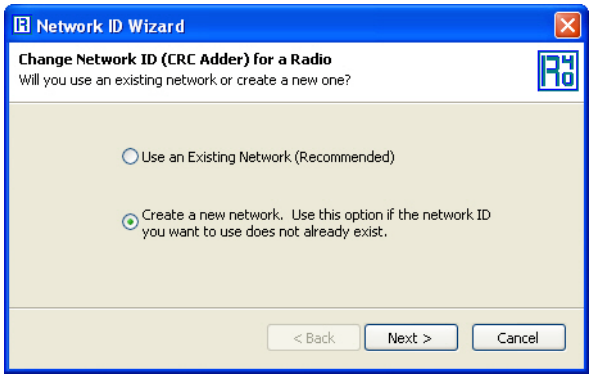


Figure 2 - 17. Specify New Network

2. Click **Next**.

3. Specify **670** or **Gridstream Router's ID** for both the **Network ID** and **Name** of the new network, and click **Next** to continue.

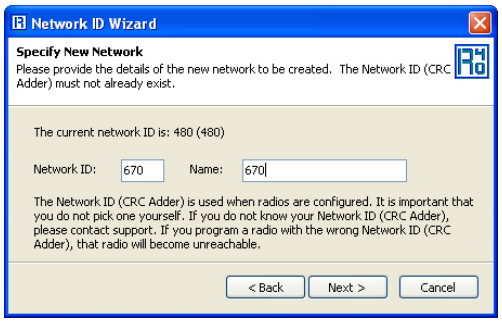


Figure 2 - 18. Network ID 670

4. The Final Confirmation window will open. Click **Next**.

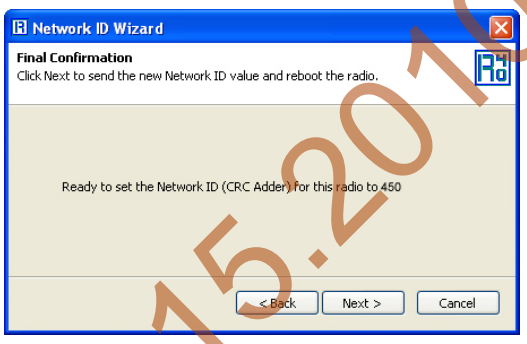


Figure 2 - 19. Final Confirmation Window

5. A confirmation message verifies that the new Network ID has been assigned to the radio. Click **Finish** to return to RadioShop.

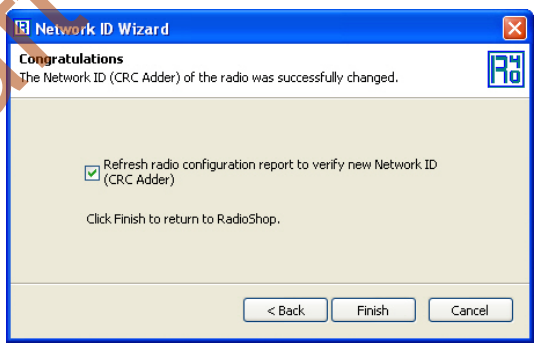


Figure 2 - 20. Click Finish to Finalize Configuration

6. RadioShop will reboot your Local Radio and run another Radio Configuration Report.
7. Make sure the Network ID of your Local Radio has changed. If the Radio Configuration Report times out, run another one.

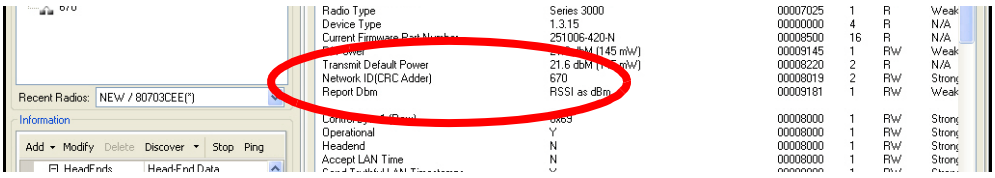


Figure 2 - 21. Network ID is Now 670

Adding New Radios to RadioShop

You can now add the Gridstream Router to the RadioShop database.

1. Make sure your local radio is highlighted on the Nodes Pane.
2. Click **Generate WAN Nodes Report**.
3. From RadioShop home click **Utilities > Radio > Discover Neighbors**.

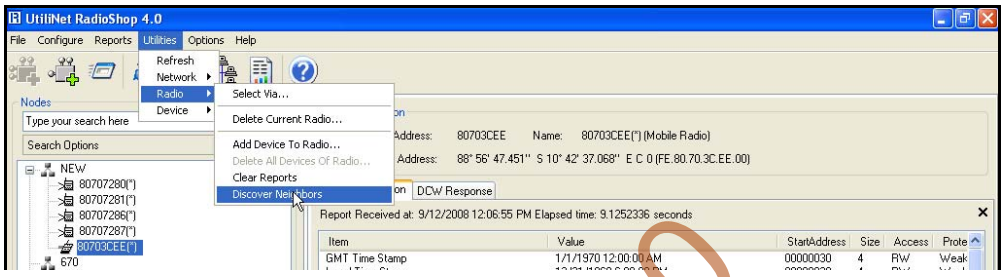


Figure 2 - 22. Discovering Neighbors

4. Once discovered, the Gridstream Router's LAN Address will show up on the Nodes pane.

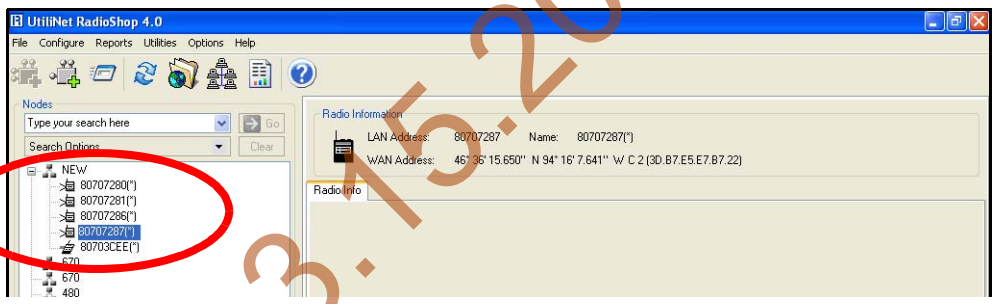


Figure 2 - 23. Gridstream Router Added to Nodes Pane

5. Highlight the new Gridstream Router, and click **Reports > Configuration > Radio** to verify that you can communicate with the Gridstream Router.

Locate your Gridstream Router using RadioShop 4.0

The Gridstream Router must be connected to power for configuration.

1. Click Generate WAN Nodes Report on the toolbar.
2. Right-Click your Local Radio and click **Discover Neighbors**.
3. Click your Gridstream Router's LAN ID.
4. Generate a Radio Configuration Report to make sure that you can communicate with your Gridstream Router.

3

Series IV Routers in Command Center

Importing Routers into Command Center

The following section describes the process of manually importing Routers into Command Center. The minimum data set required to successfully import the Router into Command Center includes: Wan ID, User ID, Installation Date, Installation Time, Installed Meter No, Installed Endpoint SN, and Service Time Zone.

Generating the Import Installation File (IIF)

The IIF is always required, even if using Router Auto Registration. When a Router has been physically installed in the field, certain data must be reported back to the Command Center staff in order to generate the IIF.

Create a CSV File for the IIF Information

Command Center can generate a template IIF (in CSV format).

1. From Command Center home, select **Operations > Import > Import Installation File**.

   The Import Installation File window will open.

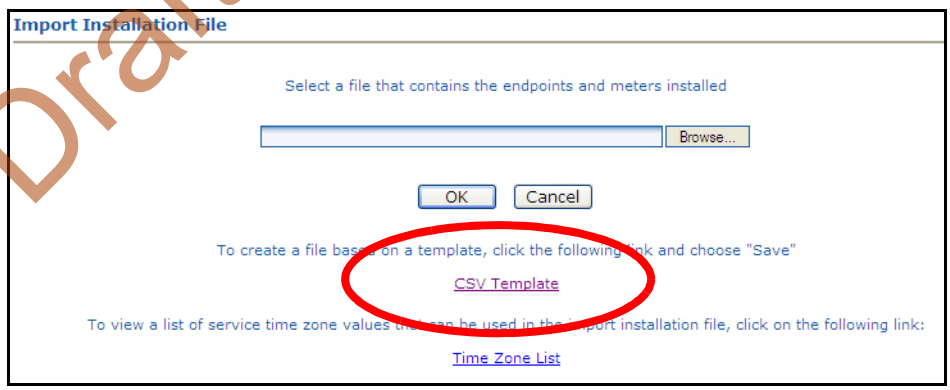


Figure 3 - 1. Import Installation Window

2. Click the **CSV Template** link.
3. Select **Save** and designate the file location.
4. Open up the saved .CSV file with Microsoft Excel.
5. Fill in the columns with the appropriate data. Each row in the document represents one router (or Endpoint) and should only contain data related to that specific unit.

CSV File Fields

- **UserID**: 1 (Router default)
- **InstallationDate**: Local Date (preferably collected by installer when operation performed).
- **InstallationTime**: Local Time (preferably collected by installer when operation performed).
- **ChangeOutMeterNo**: N/A
- **ChangeOutMeterkWh**: N/A
- **InstalledMeterNo**: ID assigned by the Network Engineers.
- **InstalledEndpointSN**: Serial number of the Router in decimal. (equivalent to LanID converted to decimal)
- **InstalledMeterkWh**: N/A
- **ServiceLatitude**: LAT
- **ServiceLongtitude**: LONG
- **ServiceLocation**: Same as InstalledMeterNo
- **ServiceTimeZone**: See “Time Zone” on page 21.

Importing the IIF

After the IIF has been created and saved, it must be imported into Command Center.

1. From Command Center home, select **Operations > Import > Import Installation File**.

   The Import Installation File window will open.

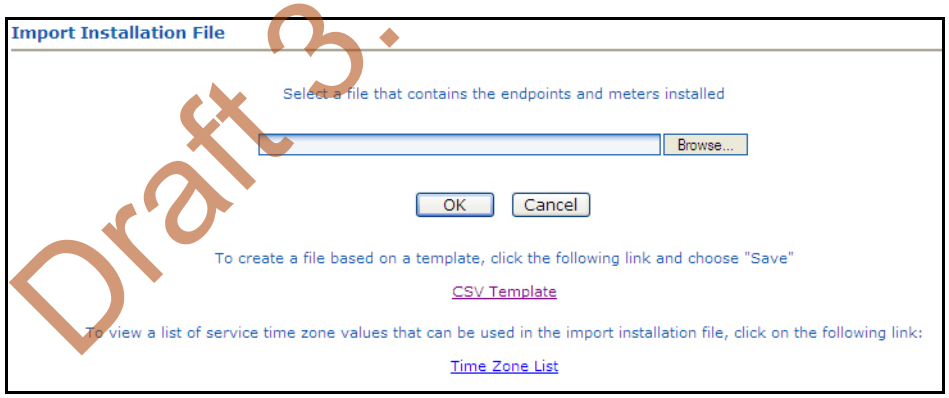


Figure 3 - 2. Import Installation File Window

2. Enter the path to the location of the **Import Installation File** created earlier.

...or...

3. Click the **Browse** button to navigate to the location of the desired file.
4. Click **Save** to upload the file.
5. The router described in the IIF should now appear in Command Center. The router should display the data entered for it and have the status 'Installed'.

Time Zone

In order to report readings time correctly, the router must be programmed with the appropriate time zone. This is achieved by sending commands to the router that indicates the time zone in which the endpoint is installed and whether Daylight Savings Time (DST) is observed in the given time zone.

The meter installer should include the endpoint time zone in the Installation File. To make it easy for installers to specify a time zone, the Time Zone List link will open a document that displays a list of valid time zone designations by country.

1. From Command Center home, select **Operations > Import > Import Installation File**.

   The Import Installation File window will open.

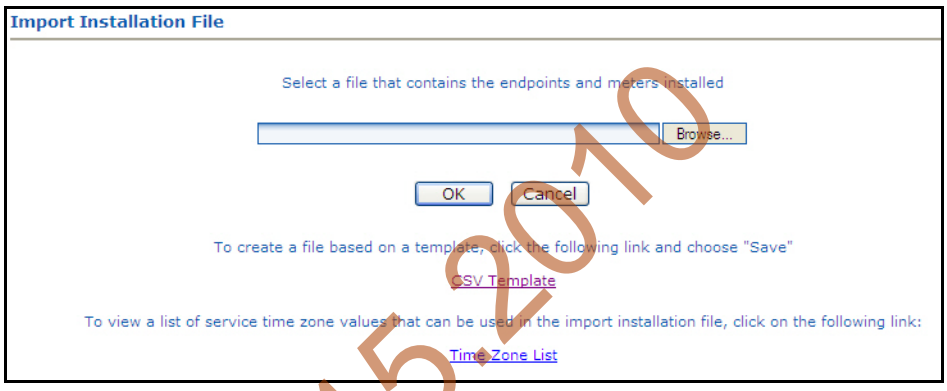


Figure 3 - 3. Import Installation File Window

2. Click on the **Time Zone List Link**. The TimeZonesForInstallation window will open.

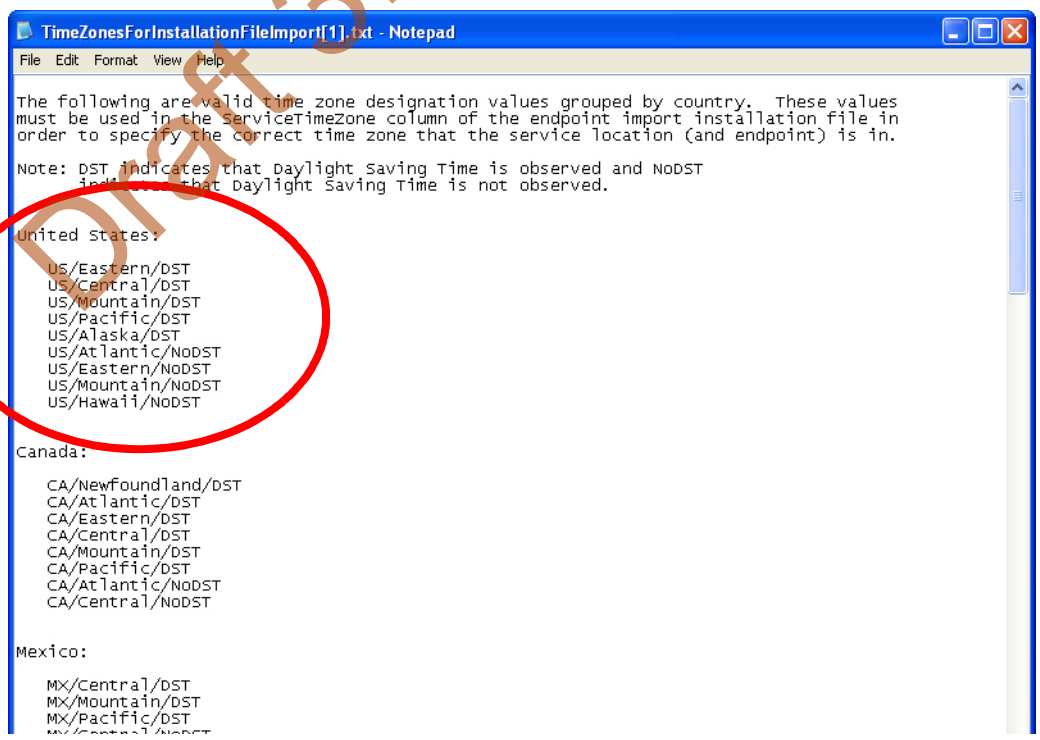


Figure 3 - 4. Time Zone List

3. Note the correct **Time Zone Value** for your IIF.

RF Network Settings

The RF Network Settings establish organization level settings for outage wait values, time synchronization, etc. The RF Network Settings are a part of the endpoint configuration and may only be changed by Landis+Gyr technical support.

Command Center Operation

Router

This function allows the user to remove a deployed router from service. The removed router can either be put back into inventory or archived.

1. From Command Center, select **Operations > Endpoints**. The Endpoint/Meter Selection window will open.
2. Enter the **Meter Number** of the existing meter.
3. Click **GO**. The Available Tasks list will appear. This list will vary based on model of the meter. Figure 3 - 5 displays a typical Available Tasks list.

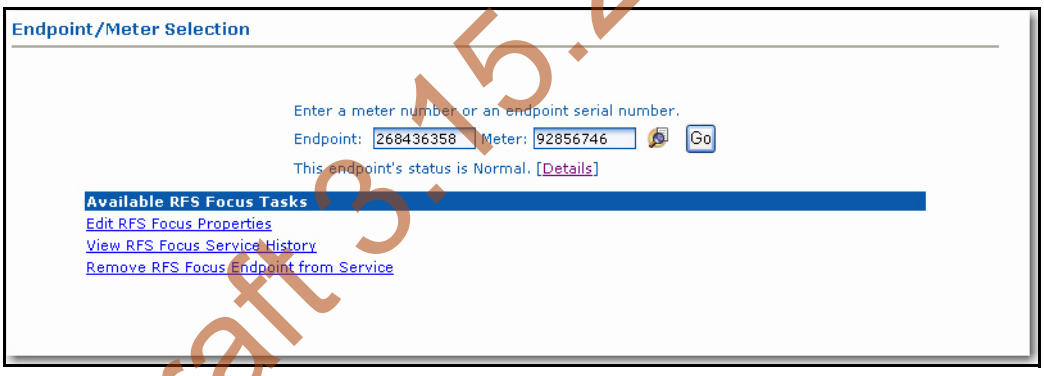


Figure 3 - 5.

Figure 3 - 6. Endpoint Meter/Selection Available Tasks

4. From the Available Tasks, select the **Remove Endpoint from Service** link. The Remove Endpoint From Service window will open, shown in Figure 3 - 7.

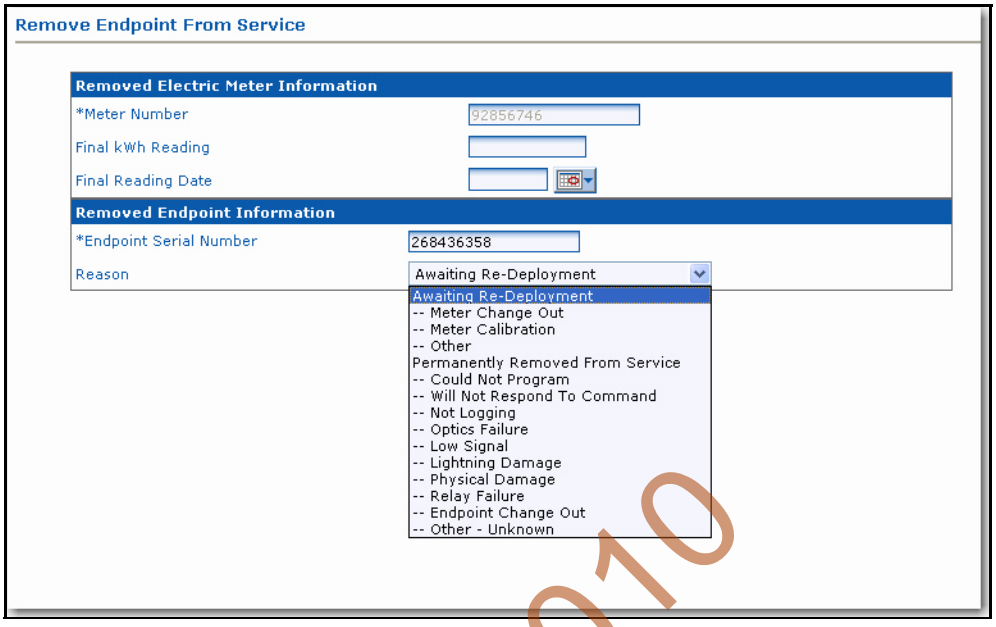


Figure 3 - 7. Remove Endpoint From Service

5. Enter Removed Electric Meter Information:
   - **A.** Enter the **Final kWh Reading** (Optional)
   - **B.** Enter the **Final Reading Date** (Optional)
   - **C.** Enter **Removed Endpoint Information**. Select a reason for the removal from the drop down list box.
   - **D.** **Awaiting Redeployment**. This option will transition the endpoint to Inventory status.
   - **E.** **Permanently Remove From Service**. This option will archive the endpoint. An endpoint in archived status will not be included in any Command Center reports.
6. Click **Save** to save changes. A message indicating the success or failure of the removal will be displayed.

4

Installation Best Practices

Gridstream Router Installation

The final guidelines provided by the utility or municipality determine where the Gridstream Router can be installed. It is the installer's responsibility to know and follow the utility or municipality guidelines before installing the Gridstream Router.

The utility provides installation information for every Gridstream Router to be installed, such as:

- Street address or Latitude/Longitude of site location
- Type of mounting (wood pole, streetlight pole, building, etc.)
- Access method (bucket truck or pole-climb)

Safety Precautions

Each individual utility will have its own interpretation of local codes and regulations governing the installation and placement of equipment on a power distribution pole. The utility or municipality determines the final guidelines of where to install the Gridstream Router. Know and follow the utility or municipality guidelines before installing the Router.

Follow all local safety precautions for working around high voltage lines.

Power Requirements

Verify that the power source is between 120 VAC and 240 VAC. The power source must have a constant supply of voltage.

Poles selected for Gridstream Router installation must have a constant supply of voltage. Many streetlights are fed by a switched source that is controlled by a master switch, elsewhere. A pole that is powered only half a day, everyday will produce a failure condition.

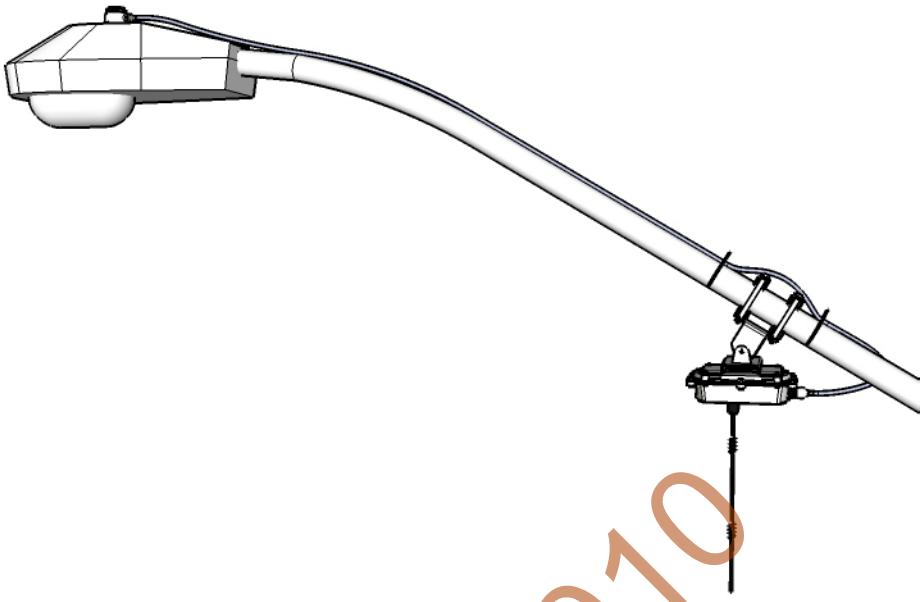


Figure 4 - 1. Gridstream Router Installed on a Swivel Bracket

Gridstream Router Parts and Materials

When receiving system components, carefully inspect the packaging and contents for any damage, and file any necessary damage claims with the shipper. The table below lists Gridstream Router-related installation parts. (However, not all parts will necessarily be needed in every installation.)

Table 4-1. Gridstream Router Parts and Materials

Description	Part Number	Qty
Gridstream Router Radios		
Gridstream Router Radio	26-1047	1
Gridstream Router Radio with Battery	26-1057	1
Gridstream Router Radio with Internal RF Filter	26-1058	1
Gridstream Router Radio Battery Backed, Internal RF Filter, AMI FW	26-1059	1
Gridstream Router Radio, Series 3, Battery Backed Internal RTU	26-1060	1
Gridstream Router Radio, Series 3, Battery Backed, Internal RTU, RF Filter	26-1082	1
Gridstream Router Radio, Series 3 w/o Brackets	26-1166	1
Gridstream Router Radio International Version	26-1229	1
Gridstream Router Radio International Version Battery Backed	26-1235	1
Gridstream Router Radio Battery Backed, Internal RF Filter, Command Center	26-1290	1
*North America Version Only **International Version Only † Included with Gridstream Router.		

Table 4-1. Gridstream Router Parts and Materials

Description		Part Number	Qty
Gridstream Router Radio with Mounting Kits			
Gridstream Router Kit, Radio and Streetlight Accessories		45-1102	1
45-1102 Components	Gridstream Router Radio Battery Backed, Internal RF Filter, AMI FW	26-1290	1
	Gridstream Router Swivel Brackets Kit	45-1101	1
Gridstream Router Kit, Radio and Streetlight Brackets with 18 ft Power Cable		45-1106	1
45-1106 Components	Gridstream Router Radio Battery Backed, Internal RF Filter, AMI FW	26-1290	1
	Gridstream Router Swivel Brackets Kit and 18 ft Power Cable	45-1105	1
AC Power Cables			
Unterminated, two wire - #16 SJO*		105704-00X	1
10' Unterminated, two wire - #10 SJO*		105627-000	1
20’ Unterminated, two wire - #10 SJO*		105627-001	1
6' Terminated with 110/120 VAC Plug (In shop use)*		105628-000	1
Streetlight Photo Cell Adapter, 4' Terminated #16*		103826-000	1
2 meter Unterminated, International Input Power, three-wire**		19-1224	1
DC Power/Programming Cables			
RS-232 (LPP & Transparent) & DC Power Cable 10' Unterminated		105552-000	1
RS-232 (LPP & Transparent) Cable, 40', Unterminated		105554-000	1
RS-232 (LPP & Transparent) & DC Power Cable 10' Terminated (w/car plug)		105616-000	1
RS-232 (LPP & Transparent) 6' Terminated w/DB9 connectors		105617-000	1
Mounting Kits			
Gridstream Router Mounting Kit		45-1018	1
45-1018 Components	Mounting Bracket, 3 to 5 inch Pole	28-1061	2
	Washers	22-0421	4
	Carriage Bolts	101887-350	4
	Lock Nuts	101983-025	4

*North America Version Only
**International Version Only
† Included with Gridstream Router.

Table 4-1. Gridstream Router Parts and Materials

Description		Part Number	Qty
Gridstream Router Mounting Kit		45-1081	1
45-1081 Components	Washer,1/4 Flat,1/16 Thk, SS	22-0421	4
	Washer,1/4 Slit Lock,1/ 16 Thk,SS	22-0422	4
	Washer,Flat,3/8IDx.81ODx1/16,SS	22-0452	6
	Bolt, Hex Head, 3/8-16x6.0 inch, Fully Threaded, SS	22-1116	4
	Bolt, Hex Head, 3/8-16x1.0 inch, SS	22-1117	2
	Bolt, Hex Head, 1/4-20x2.0 inch, SS	22-1137	4
	Bracket, Pole	28-1256	4
	Bracket, Base	28-1278	1
	Bracket, Adjustable, w/o Ground Plane	28-1288	1
Gridstream Router Swivel Brackets Kit		45-1101	1
45-1101 Components	Cable, Assy, Street Light, 4 ft	103826-000	1
	Gridstream Router Mounting Kit	45-1081	1
Gridstream Router Mounting Kit, Swivel Brackets, 18 ft Power Cable		45-1105	1
45-1105 Components	Power Cable 18′	105704-003	1
	Gridstream Router Mounting Kit	45-1081	1
Accessories/Replacement			
Antenna †		106119-000	1
Battery Replacement Kit		45-1027	1
Mounting Bracket, Wood Pole (Optional) †		28-1299	1
*North America Version Only **International Version Only † Included with Gridstream Router.			

Gridstream Router Installation Location

The following is general information regarding below-conductor router installation.

1. Ensure that required parts, tools, and materials are on hand and available.
2. Decide on the location at which the Gridstream Router will be installed.
3. Landis+Gyr suggests installing the Gridstream Router at least 30 inches below a transformer, 40 inches from any primary service conductor, and at least 30 inches above or below any communication lines (if present) while staying as high as possible. Figure 4 - 2

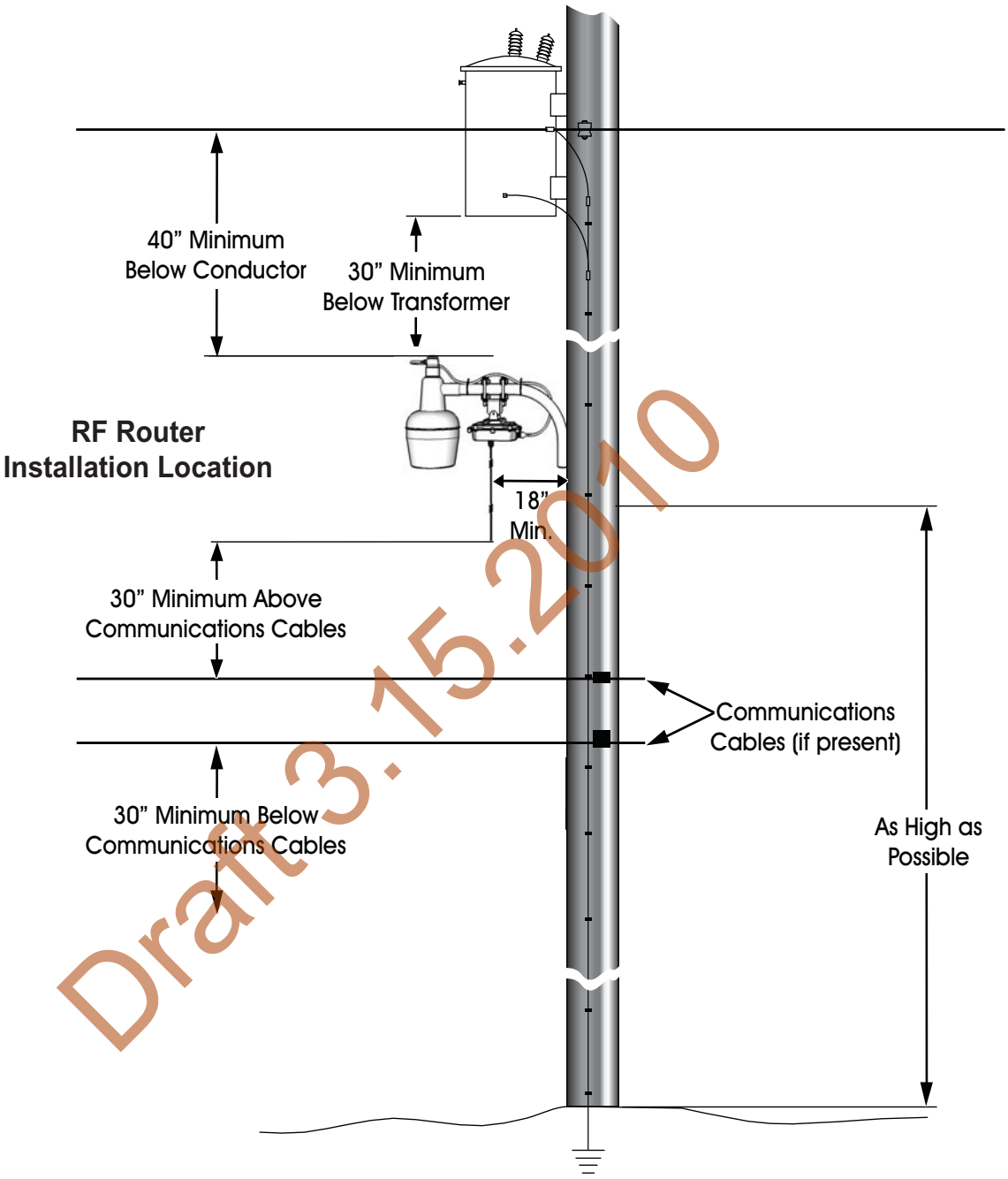


Figure 4 - 2. Gridstream Router Mounting Overview

Above-Conductor Gridstream Router Installation

Above conductor router installation components and minimum distances.

1. Gridstream Router.
2. Power Cable, 10’, #10 AWG.
3. Bracket Arm 6’.

4. UGuard, 1”, length as required.

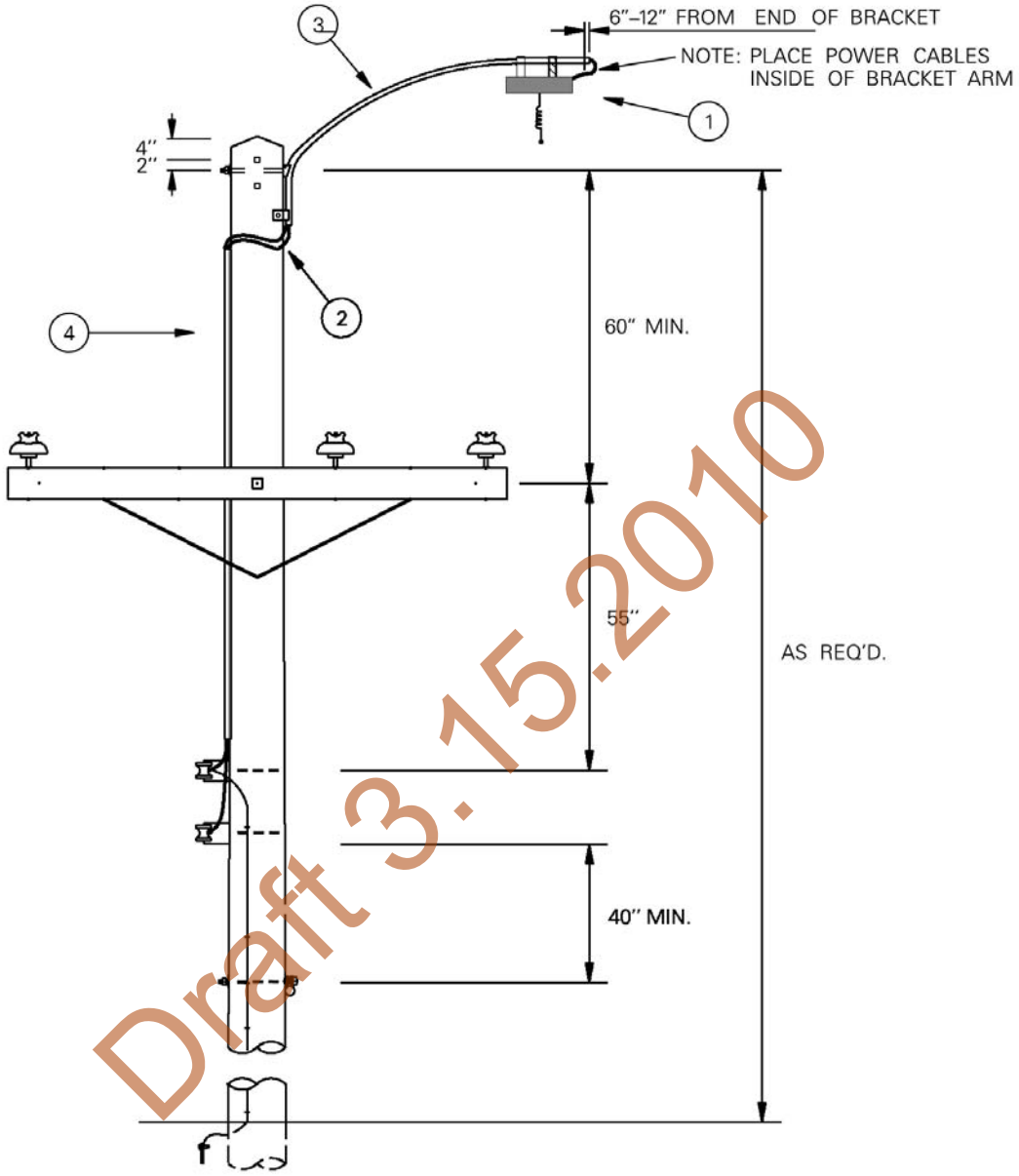


Figure 4 - 3. Above-Conductor Gridstream Router Installation

Tools Required

Open End Wrenches	Wire Stripper
Bubble Level	Screwdrivers
Vinyl and Mastic Tape	UV-Rated Cable Ties

Installation Overview

1. The Gridstream Router mounting kit may be preassembled for ease of installation on a streetlight mast.
2. Slide a lock washer and a flat washer onto each of the two 3/8-16 bolts, attach the swivel bracket to the mounting plate by threading bolt into press nut on mounting plate.
3. Slide a lock washer and a flat washer onto each of the four 1116 3/8-16 bolts, you are now ready to thread the bolts through the clamps that will go around the streetlight mast.

To install the swivel bracket to the mast, open one side of the bracket to permit mast entry.

4. Hang the Gridstream Router mount assembly off the mast and re-install the mast clamp bolts, taking care to keep the flat washer and lock washer on the mast clamp bolts with the lock washer closer to the head of the bolt.
5. Install the antenna and connect the power supply cable assembly to the Gridstream Router.

If using the 105704-000, 105704-001, 105704-002, 105704-003, or 19-1224 cables, the end of the cable opposite the connector (the unterminated end) must be installed in a junction box or other suitable enclosure.

Leaving the end of the cable exposed may allow water to migrate into the cable and into the Gridstream Router.

See Appendix B for power cable installation procedures and details.

6. As the mast clamps are tightened, align the Gridstream Router so that the antenna does not exceed 5^{o} off perpendicular to the ground.

The antenna should never be more than 5° off in any direction from being perpendicular to the ground.

7. Route the power cable and connect the cable photo-eye adapter to the streetlight for power to the Gridstream Router.

The mounting bracket can be adjusted to compensate for the angle of the streetlight arm. This allows the Gridstream Router to be perpendicular to the ground plane. A small bubble level is useful to ensure that the antenna is correctly positioned.

8. Verify that the antenna is perpendicular within tolerance and tighten all bolts per specifications.
9. Secure the power cable to the light arm using UV-resistant cable ties. Trim the waste ends from the ties for a clean installation.
10. Use short lengths of Rubber Mastic Tape to wrap around the antenna connector and the power supply cable assembly connector joints. Wrap two layers of mastic tape around the joints.
11. Finish with a layer of vinyl tape around the Mastic Tape.

VERIFY this street light has power 24/7 and is NOT remotely switched

Gridstream Router Mounting Kit 45-1018

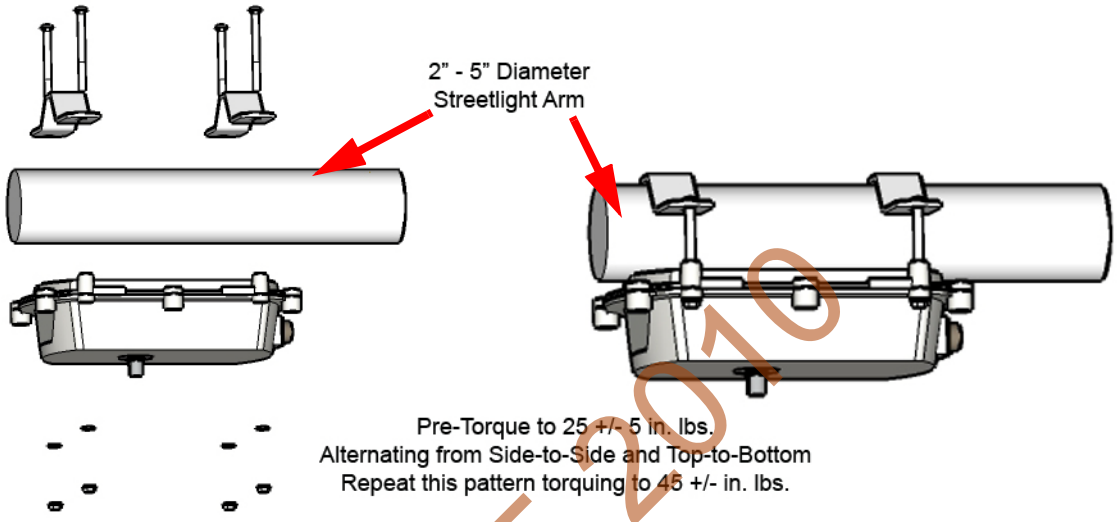


Figure 4 - 4. Gridstream Router Mounting Kit Installation on Street Light Arm

Gridstream Router Mounting Kit 45-1081

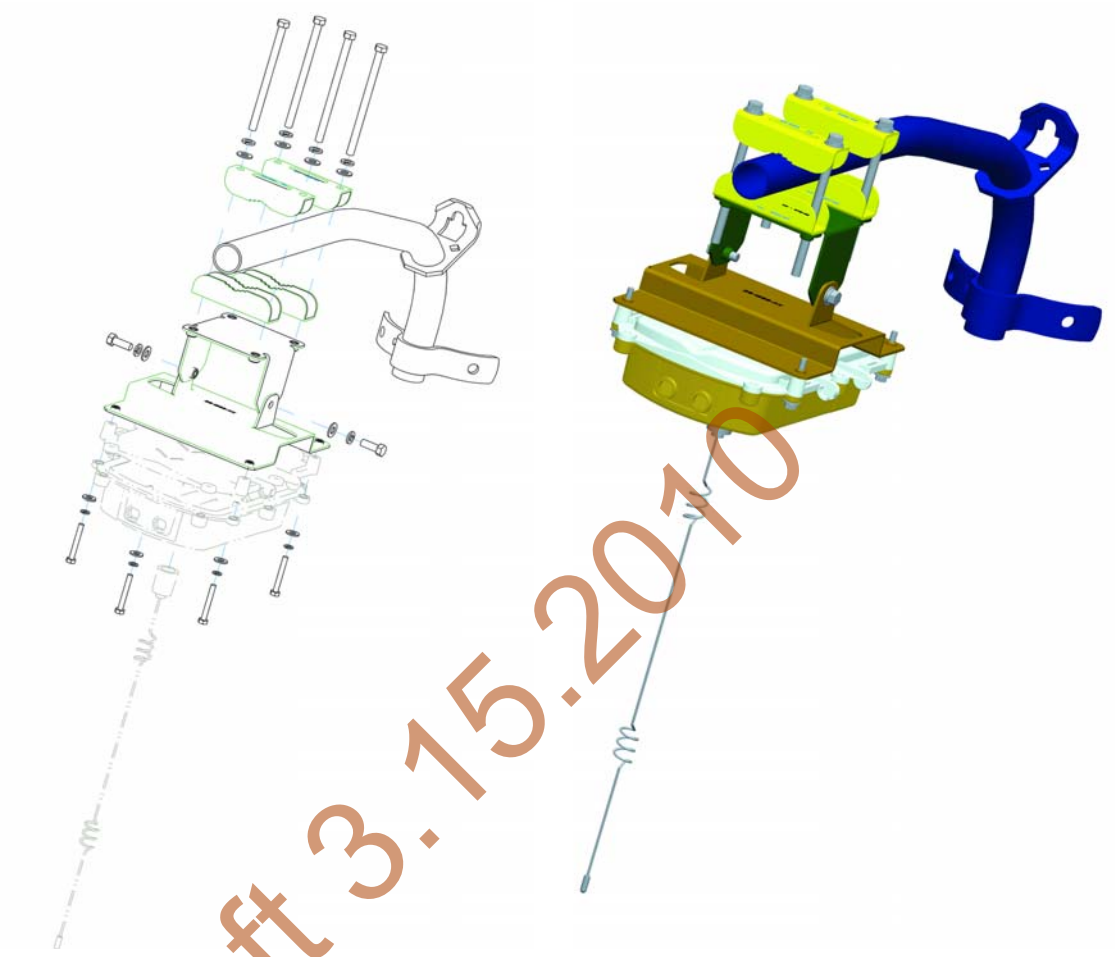


Figure 4 - 5. Gridstream Router Mounting Kit Installation With Optional Wood Pole Bracket

5

Gridstream Router and Component Specifications

Gridstream Router Component Details

AC Power Cables

If using the 105704-000, 105704-001, 105704-002, 105704-003, or 19-1224 cables, the end of the cable opposite the connector (the unterminated end) must be installed in a junction box or other suitable enclosure.

Leaving the end of the cable exposed may allow water to migrate into the cable and into the Gridstream Router.

See Appendix B for power cable installation procedures and details.

Unterminated #16 SJO (P/N 105704-00X)

This Gridstream Router AC power cable (see Figure 5 - 1) has #16 wires within an SJO cable.

Disconnecting the power cable at the radio will also disconnect the battery in a battery-backed Gridstream Router radio.

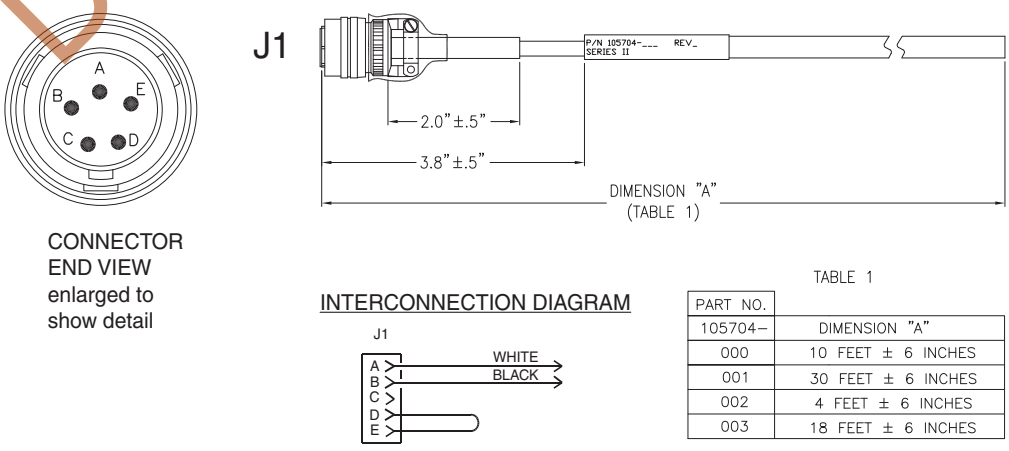


Figure 5 - 1. AC Power Cable #16 SJO

10’ Unterminated #10 SJO Two Wires (P/N 105627-000)

This Gridstream Router AC power cable (see Figure 5 - 2) is 10 feet long and is split into two #10 wires.

Disconnecting the power cable at the radio will also disconnect the battery in a battery backed Gridstream Router radio.

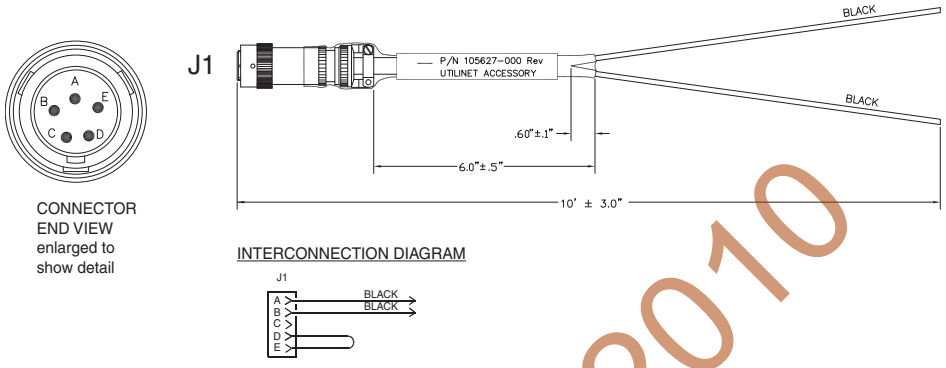


Figure 5 - 2. AC Power Cable #10 SJO

4' Terminated #16 Streetlight Photo Cell Adapter (P/N 103826-000)

This Gridstream Router AC power cable (see Figure 5 - 3) is 4 feet long with a streetlight photo cell adapter.

Disconnecting the power cable at the radio will also disconnect the battery in a battery-backed Gridstream Router radio.

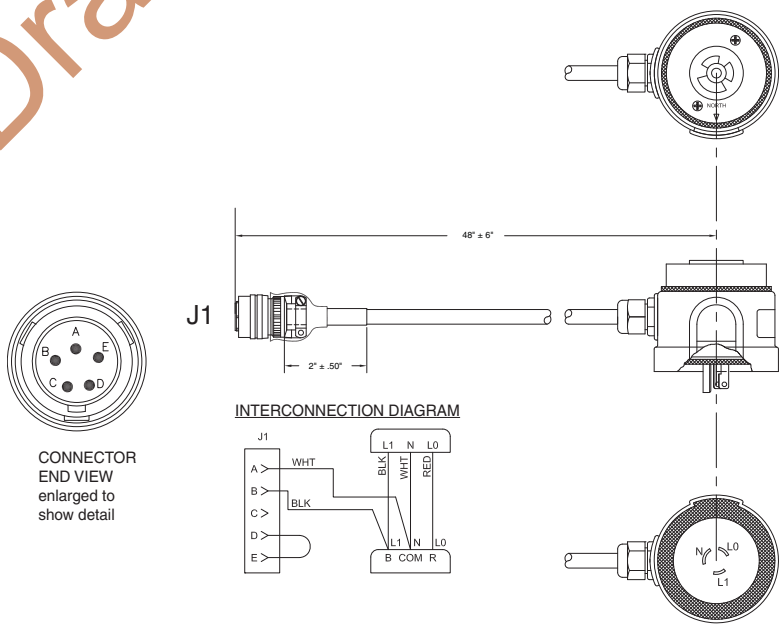


Figure 5 - 3. Streetlight Photo Cell Adapter

6’ Terminated AC Plug (P/N 105628-000)

This Gridstream Router AC power cable (see Figure 5 - 4) is 6 feet long and terminates in an AC plug. It is used to plug into an AC outlet. Since the Gridstream Router is usually wired directly to AC with one of the unterminated cables (see P/N 105704-00X and P/N 105627-000) in a final installation, this cable is typically only used for demonstration and test purposes.

Disconnecting the power cable at the radio will also disconnect the battery in a battery-backed Gridstream Router radio.

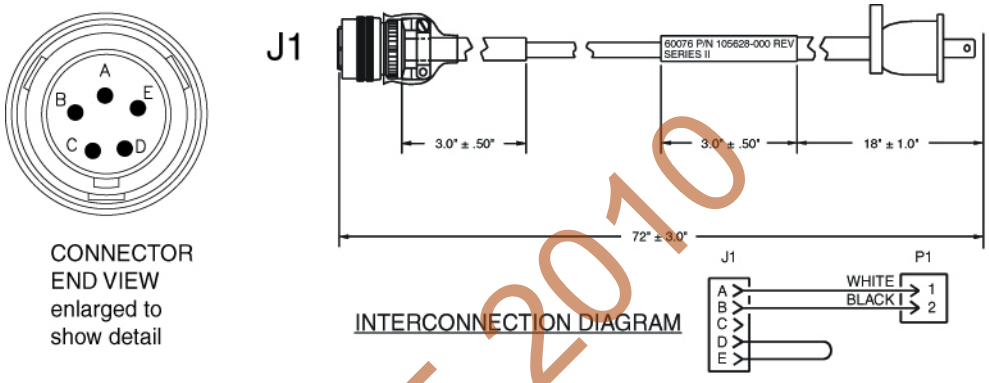


Figure 5 - 4. AC Power Cable 6’

AC Power Cable for Gridstream Router International (P/N 19-1224)

The power cable for the Gridstream Router International consists of a VDE/SEV/UL approved connector. It is a 2 meter long cable. The wire harness uses the international coloring scheme of brown for active, blue for return and yellow/green for earth ground.

Disconnecting the power cable at the radio will also disconnect the battery in a battery-backed Gridstream Router radio.

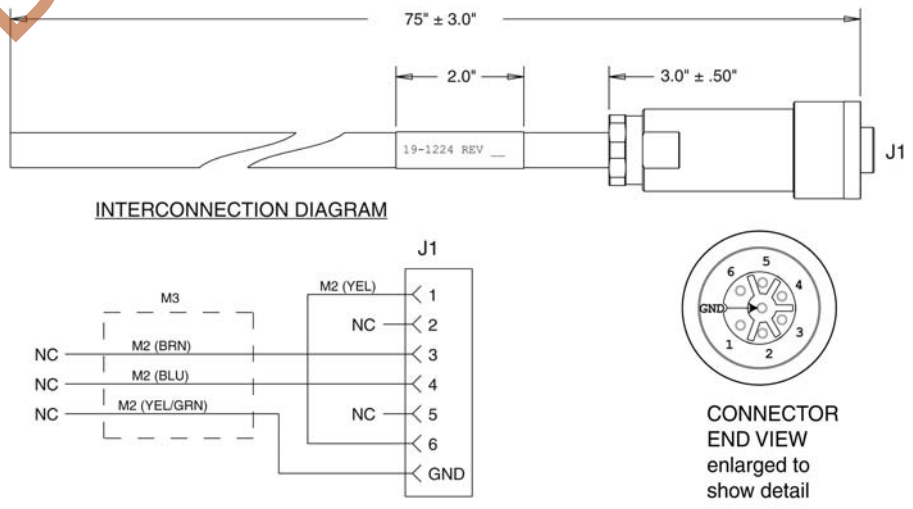


Figure 5 - 5. Gridstream Router International Power Cable

DC Power/Programming Cables

RS-232 Signal & DC Power Cable, 10’ Unterminated (P/N 105552-000)

This Gridstream Router cable (see Figure 5 - 6) connects to the RS-232 port of the radio and provides access to the RS-232 lines for both Gridstream LAN Packet Protocol communication and transparent port data. In addition, it also furnishes the lines to power the Gridstream Router with 12/24 VDC. It is 10 feet long and unterminated.

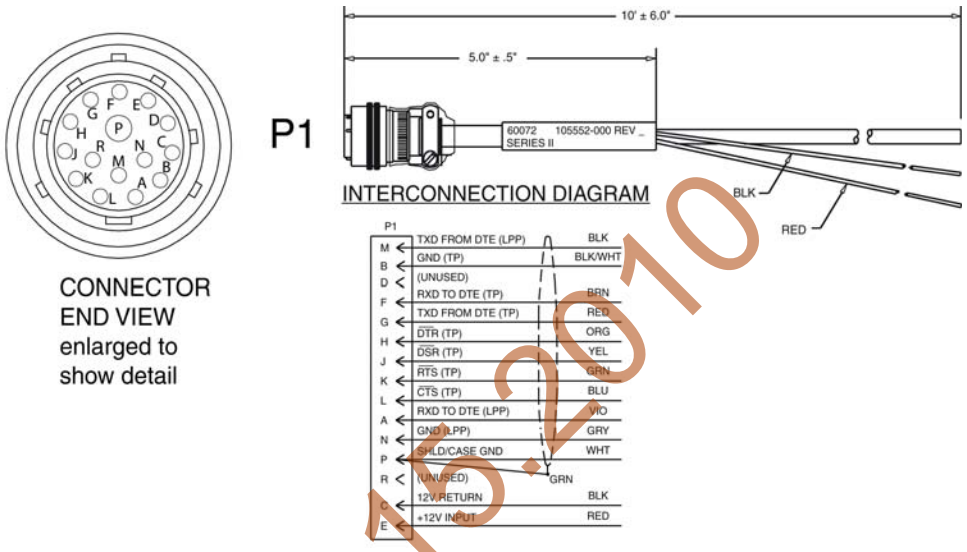


Figure 5 - 6. RS-232 Signal and Power Cable

RS-232 Signal, 40’ Unterminated (P/N 105554-000)

This Gridstream Router cable (see Figure 5 - 7) connects to the RS-232 port of the radio and provides access to the RS-232 lines for both Gridstream LAN Packet Protocol communication and transparent port data. It is 40 feet long and unterminated.

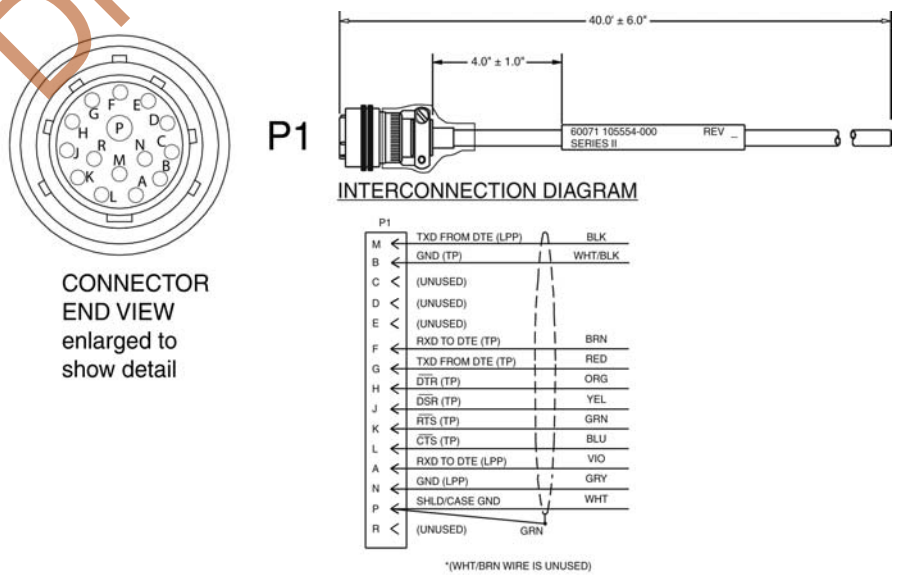


Figure 5 - 7. RS-232 Signal

RS-232 Programming Cable

10’ Terminated w/12V vehicle adapter plug (105616-000)

This Gridstream Router cable (see Figure 5 - 8) connects to the RS-232 port of the radio and provides access to the RS-232 line, the Gridstream LAN Packet Protocol Port and the RS-232/485 Transparent Port. It is 10 feet long and terminated in two Female DB-9 connectors for easy programming connection and a 12 volt vehicle adapter plug for power.

It is typically used to connect the Gridstream Router radio to a computer for the initial configuration and can also be used for test purposes. At least one programming cable should be ordered with Gridstream Router radios for initial configuration of the radios.

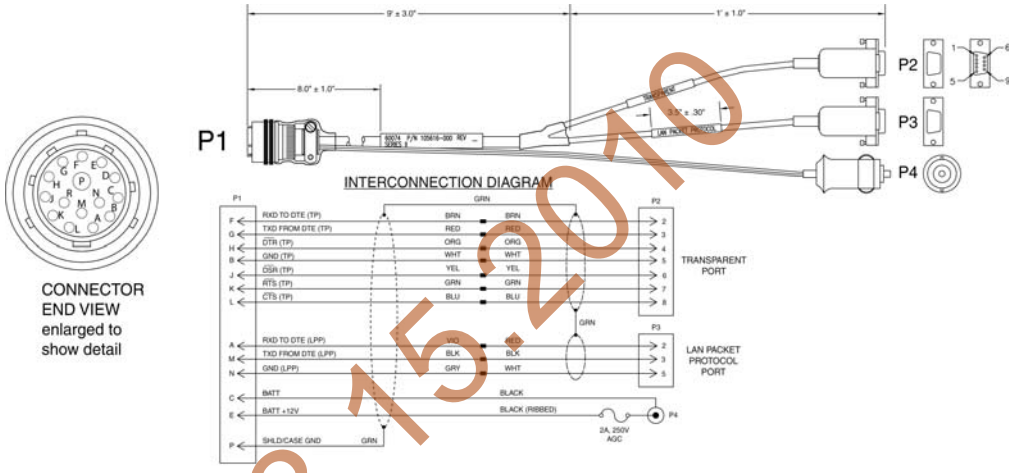


Figure 5 - 8. RS-232 Programming Cable

6’ Terminated Two DB-9 (105617-000)

This Gridstream Router cable (see Figure 5 - 9) connects to the RS-232 port of the radio and provides access to the RS-232 line, the Gridstream LAN Packet Protocol Port and the RS-232/485 Transparent Port. It is 6 feet long and terminated in two Female DB-9 connectors for easy connection.

It is typically used to connect the Gridstream Router radio to a computer for the initial configuration and can also be used for test purposes. At least one programming cable should be ordered with Gridstream Router radios for initial configuration of the radios.

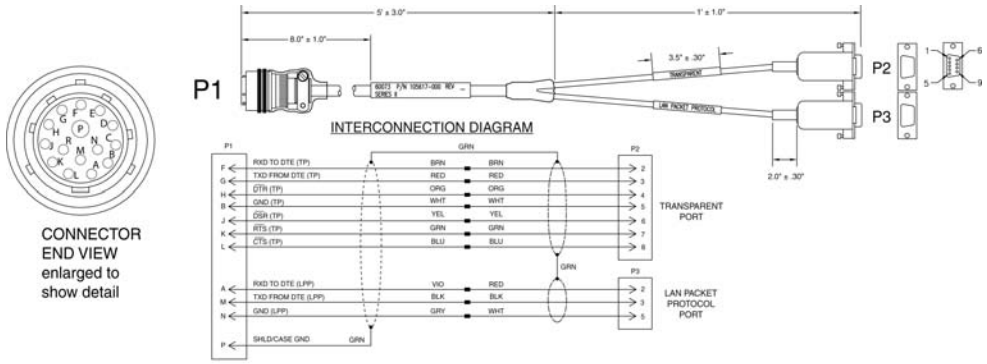


Figure 5 - 9. RS-232 Programming Cable

Battery Replacement Kit (P/N 45-1027)

A battery (see Figure 5 - 10) is provided for backup during a power outage. If a Gridstream Router radio is initially ordered without a battery, a battery kit can be ordered later. The battery kit can also be ordered when the battery has to be replaced.

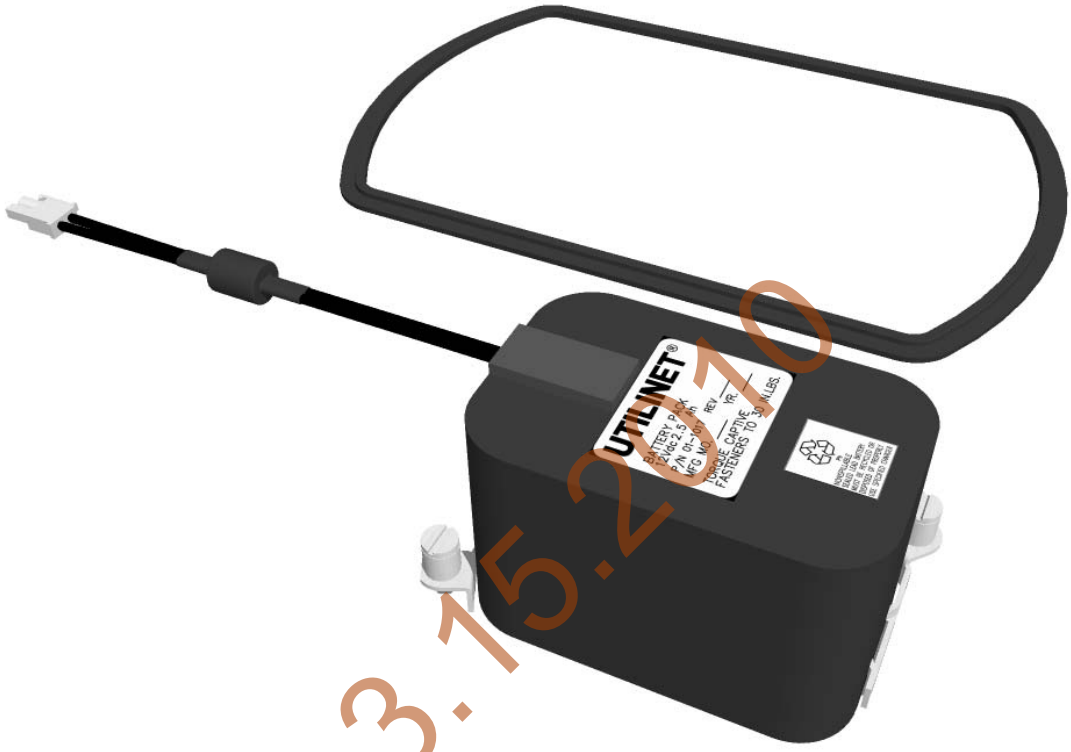


Figure 5 - 10. Battery Replacement Kit

The battery replacement kit is P/N 45-1027 and contains the battery, the gasket used to seal the two sections of the radio enclosure and a tie wrap used to hold the battery leads.

When the enclosure is opened, it is recommended that the gasket between the two sections of the enclosure be replaced at the same time. Over time the gasket takes a set, and failure to replace the gasket will result in a radio that is not properly sealed.

This is a sealed lead acid battery. Because it is sealed, it is safe to ship the radio and the radio can be mounted in any desired position.

Only use an approved battery. There is a risk of damage or explosion if the battery is replaced with an incorrect type.

The waste battery must be recycled in according with local laws and regulations. Contact Landis+Gyr if more information is required.

Gridstream Router Radio Specifications

Gridstream Router Dimensions

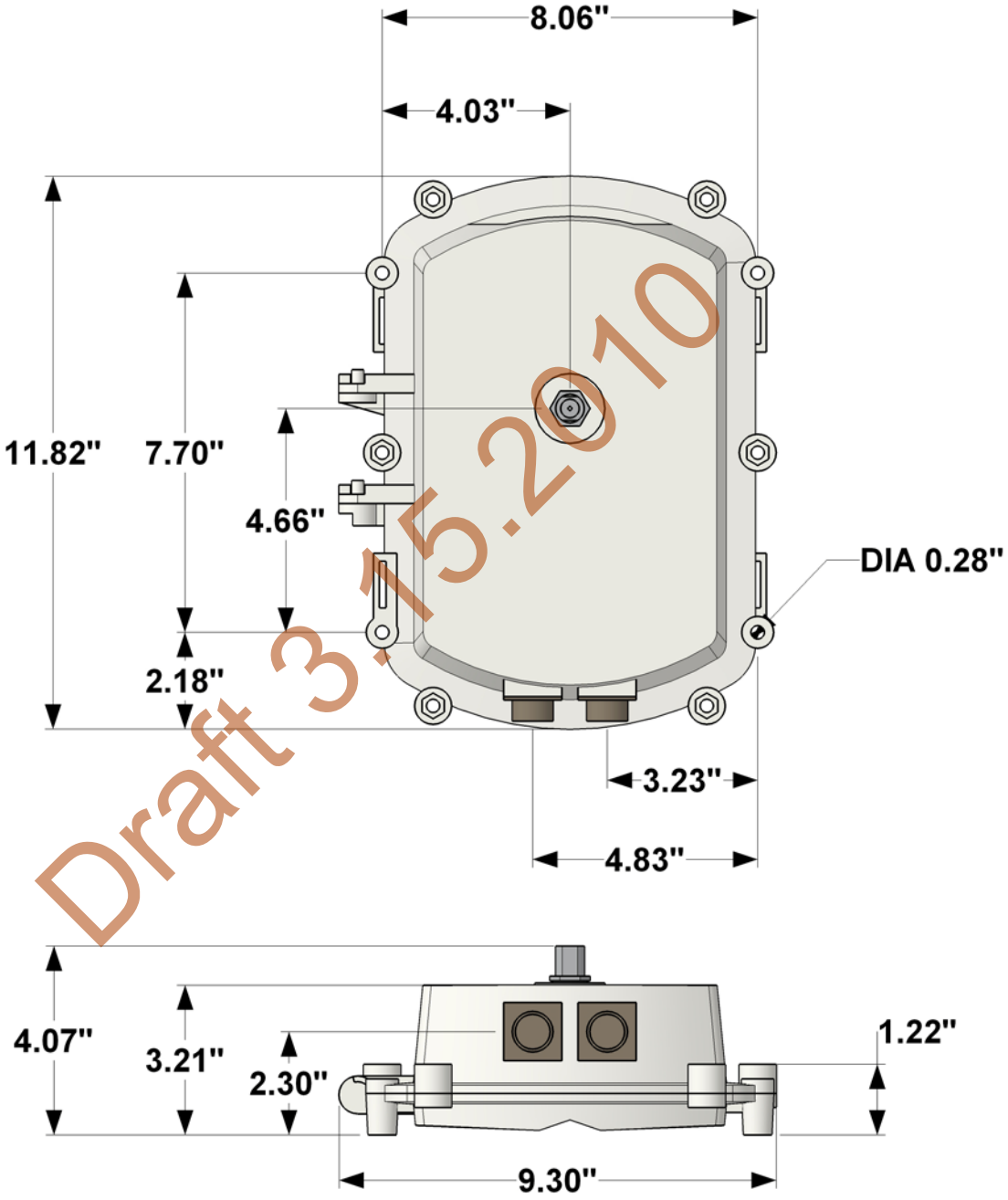
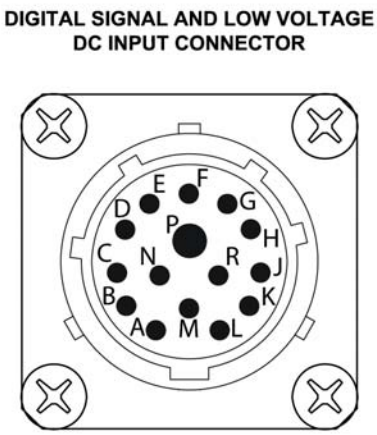


Figure 5 - 11. Gridstream Router Radio

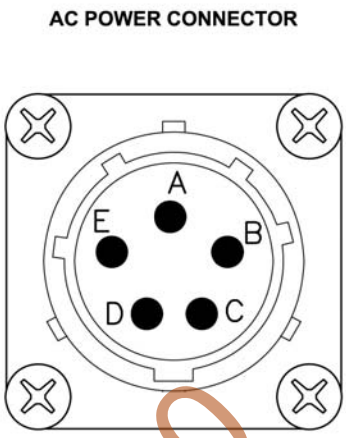
Gridstream Router Pinout



PIN	INPUT/OUTPUT (DCE)
A	RXD TO DTE (LPP)
B	GND (TP)
C	+12V RETURN
D	N/C
E	+12V INPUT
F	RXD TO DTE (TF)
G	TXD FROM DTE (TP)
H	DTR (TP)
J	DSR (TP)
K	RTS (TP)
L	CTS (TP)
M	TXD FRP, DTE (LPP)
N	GMD (LPP)
P	SHIELD/CASE GND
R	N/C

TP - TRANSPARENT PORT

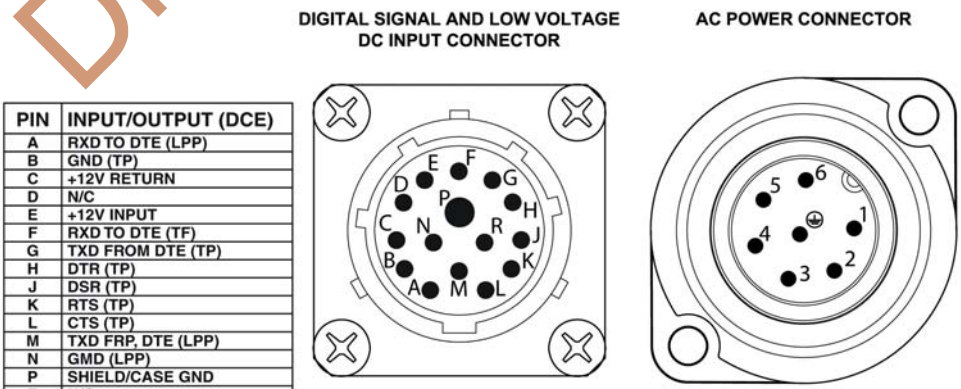
LPP - LAN PACKET PORT



PIN	INPUT/OUTPUT
A	AC
B	AC
C	N/C
D	CHARGER
E	+12VDC INT BATT

Figure 5 - 12. Gridstream Router Pinout

Gridstream Router International Pinout



PIN	INPUT/OUTPUT (DCE)
A	RXD TO DTE (LPP)
B	GND (TP)
C	+12V RETURN
D	N/C
E	+12V INPUT
F	RXD TO DTE (TF)
G	TXD FROM DTE (TP)
H	DTR (TP)
J	DSR (TP)
K	RTS (TP)
L	CTS (TP)
M	TXD FRP, DTE (LPP)
N	GMD (LPP)
P	SHIELD/CASE GND
R	N/C

TP - TRANSPARENT PORT

LPP - LAN PACKET PORT

PIN	INPUT/OUTPUT
1	LV RTN
2	N/C
3	AC ACTIVE
4	AC RTN
5	N/C
6	LV VBATT_GND
Center	Safety GND

Figure 5 - 13. Gridstream Router International Pinout

Specifications Tables

Table 5-1. Gridstream RF Router Specifications

Electrical	
Power Supply	
Input AC Voltage	96-317 VAC
Input Current, Receive mode, 120 VAC Operation	15 mA (max)
Input Current, Transmit mode, 120 VAC Operation	95 mA peak, 25 mA average
Input Current, Battery charging, 120 VAC operation	30 mA (max)
Radio, General	
RF Frequency Range	902-928 MHz (U.S.), 915-92 (International)
Channel Spacing	100 kHz, 300 kHz (depending on mode)
RF Baud Rates	9.6-38.4 kbps (100 kHz channels), 9.6-115.2 kbps (300 kHz channels)
Frequency Stability	+/- 3 ppm over temperature
Radio, Receiver	
Sensitivity (at 10% packet error rate)	-112 dBm (9.6 kbps), -102 dBm (115.2 kbps) typical
Co-channel rejection	10 dB typical
Adjacent Channel Rejection	30 dB typical
Alternate Channel Rejection	45 dB typical
Radio, Transmitter	
Output Power	20, 24, 29 dBm (user selectable)
Modulation Type	2-FSK, GFSK
Modulation Index	1
Out-of-band Spurlous Emissions	<-70 dBc
Processing	
CPU	M16C/65
Clock Speed	14.7456 MHz
SRAM	47 KB (in processor) + 512 KB (additional)
Flash	768 KB (in processor) + 1 MB (additional)
LAN Packet Port	
Serial Interface	RS-232C
Protocol	Gridstream LAN packet protocol
Parity	None

Table 5-1. Gridstream RF Router Specifications

Data Bits	8
Stop Bits	1
Duplex	Full
Transparent Port	
Serial Interface	RS-232C/RS-485
Protocol	Any asynchronous byte-oriented protocol
Parity	None
Data Bits	7 or 8
Stop Bits	1 or 2
Duplex	Full
Environmental	
Operating Temperature Range	-40 to 85 C (internal ambient of enclosure)
Storage Temperature Range	-40 to 85 C
Operating Vibration	ANSI C12.1
Operating Shock	ANSI C12.1
Relative Humidity	5%-85%, non-condensing
IP Rating (International Version)	IP65
Salt Spray	ANSI C12.1
Rain Tightness	4” per hour rainfall at 70 mph, per MIL Std 810E, method 506.3, procedure I, Blowing Rain
EMI & Power/Control Susceptibility	
Electromagnetic Radiated Emissions	ANSI C12.1
Electromagnetic Susceptibility	ANSI C12.1
Surge Withstanding Capability	ANSI C12.1
Electrostatic Discharge	ANSI C12.1
International Version	AS/NZS CISPR 22:2006, EN 55022:2006
Agency Approvals	
FCC Certified	Part 15.247
Gridstream Router International	ACMA Radio communications (Short Range Devices) Standard 2004; AS/NZS 4268:2003

A
Regulatory Compliance

FCC (Part 15.247)

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.

Changes or modifications not expressly approved by Landis+Gyr for compliance could void the user's authority to operate the equipment.

FCC Class B

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 to 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

RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 22cm between the radiator and your body. This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

B

Power Cable Installation

Power Connection and Termination

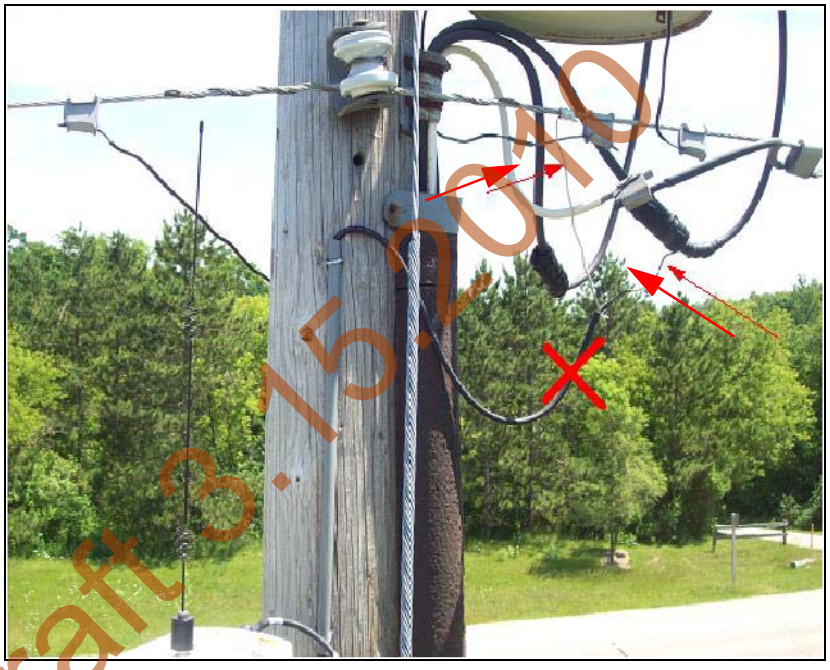


Figure B - 1. Improper Power Termination

If using the 105704-000, 105704-001, 105704-002, 105704-003, or 19-1224 cables, the end of the cable opposite the connector (the unterminated end) must be installed in a junction box or other suitable enclosure.

Leaving the end of the cable exposed may allow water to migrate into the cable and into the Gridstream Router.

See below for power cable installation procedures and details.

If power connections of this type are to be made, the 105627-000 and 105627-001 must be used. Note that a drip loop at both ends of the cable is needed.

Recommendations

When existing 105704-XXX cables are used, they must be terminated inside a junction or disconnect box. The inner wires cannot be exposed until after the 105704-XXX cable enters the enclosure. Once inside the box, connect the power leads to wires going to the mains per local practice. Connections to the mains must use UV-stable wiring. As long as the wire is UV-stable and rated for outdoor use, the wire model and manufacturer may be selected by the programs. Part number 18-1033 wire is acceptable and recommended.

In published examples, collector cables are shown going through conduit. Conduit is not required for Routers, but the entrance to the junction box should be through a clamp at the bottom of the junction box. Junction boxes do not have a part number and are available through local vendors. As always, electrical connections need to meet the requirements of the local utility and local ordinances.

The following diagram shows an installation using a junction box with a Router. If the 105704-XXX cable is used, this is a required installation procedure.

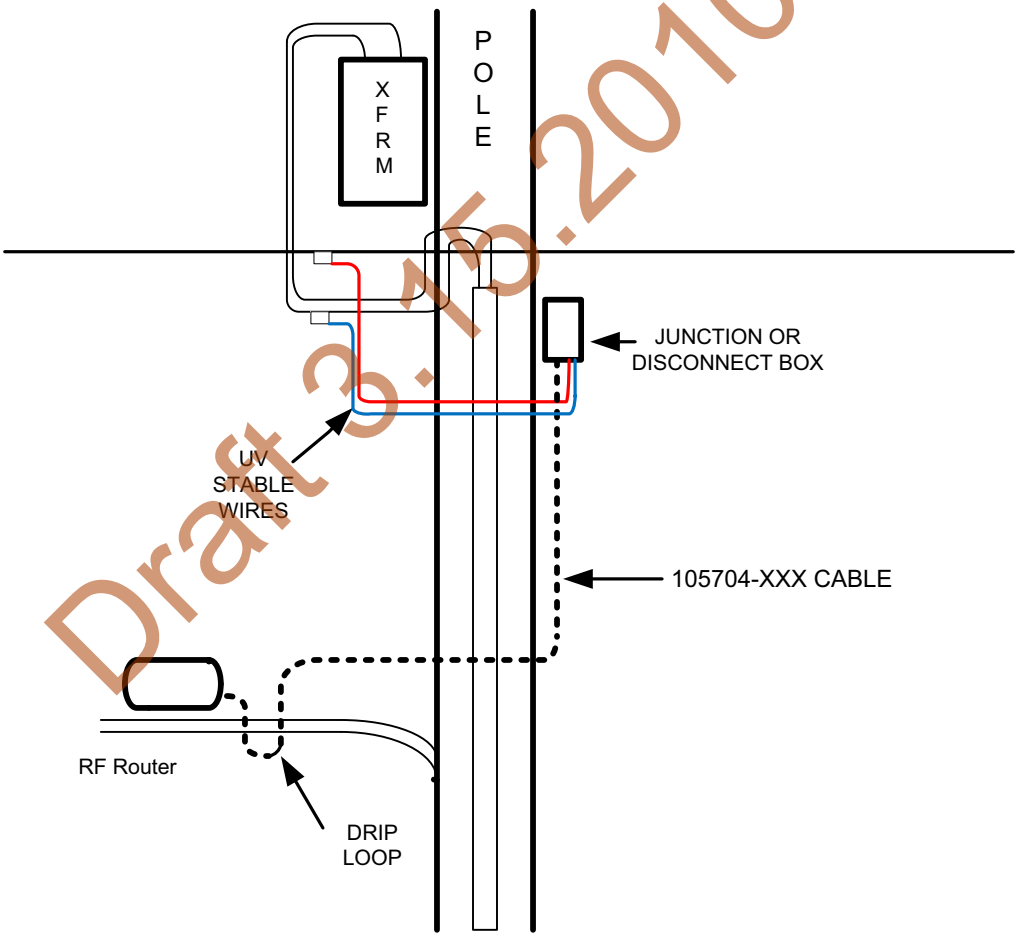


Figure B - 2. Suggested Power Termination

If the 105627-XXX cable is used, then the cable can go directly to the mains, provided drip loops are made at the point of contact with the mains and at the Router. The drip loop at the point of attachment to the mains should rise above the level of the point of attachment.

C
Troubleshooting

Troubleshooting Gridstream Routers

The following are general guidelines for troubleshooting a router once it has been successfully installed and configured for communications to the Command Center head-end system.

A router's main purpose is to facilitate routing of packets and provide communications paths. If a router fails, the network will self adjust and use alternative communications paths. However, if a router is used as a communications bridge for meters in a rural environment or a meter bank, a router outage should be handled with a higher priority and replaced in a timely fashion to prevent falling behind on meter reads.

1. When an outage event is received in Command Center from a router, go to the History tab in the Stat + Utilinet Endpoint Information screen and establish when the outage occurred.

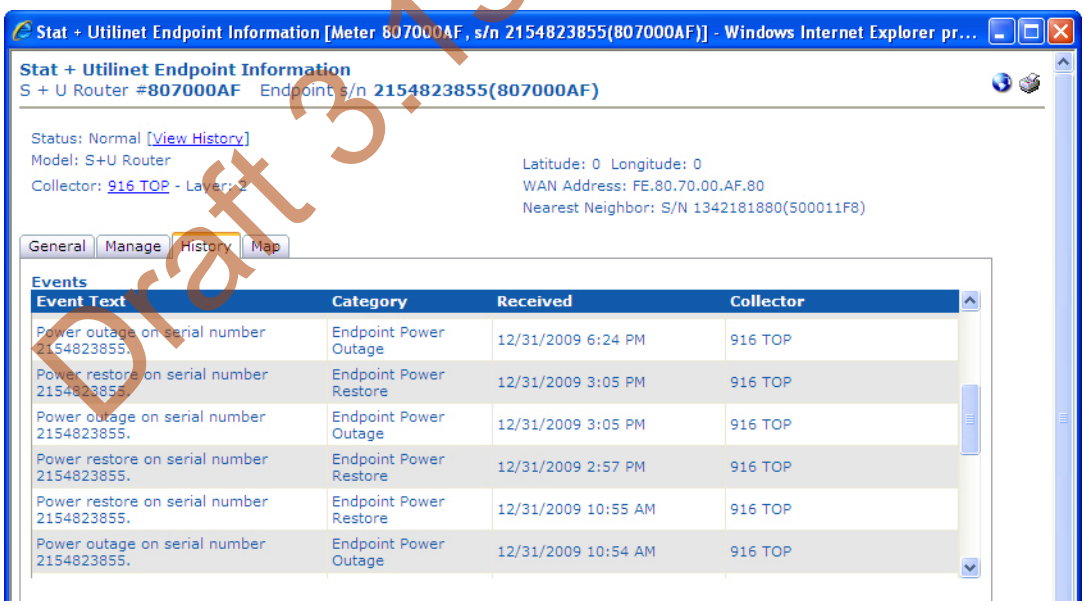


Figure C - 1.

2. Look at other outage events and establish if the outage is restricted to the router in question. This may be an indication of a bigger outage.
3. Issue a Ping command and see if a positive response comes back, as shown in Figure C - 2.

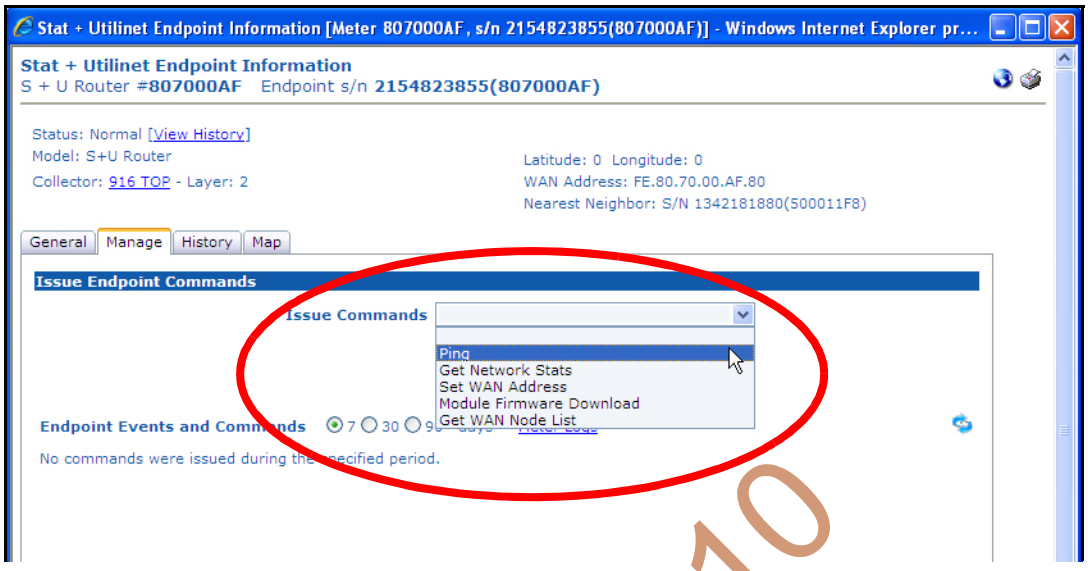


Figure C - 2. Ping Command

4. If Command Center fails to establish communications with the router, validate that the pole top or the street light that the router is mounted on has power.
5. Use RadioShop to try to establish communications with the router through a neighboring collector and/or a meter.
6. If the problem persists, contact Landis+Gyr field services for further investigation and replace the faulty router with a new one.

The History tab may also contain other event packets sent to Command Center.

Table C-1. Router Events

Event Name	Description	Default Reporting State
Router Low Battery Event	Event generated by the router informing the host a detected battery level lower than the configured threshold has occurred.	Alarm
Router Power Fail Event	Sent when the power moves from A/C power to battery power (plus any time the battery level changes by about 0.1V while in this state).	Alarm
Router Power Restore Event	Sent when the power changes from battery power to A/C power (plus any time the battery level changes by about 0.1V while in this state).	Alarm