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Gridstream Network Concentrator User and Installation Guide

Publication: 98-1013 Rev AF



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Landis+Gyr Gridstream Network Concentrator User and Installation Guide

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Landis+Gyr
30000 Mill Creek Avenue
Suite 100
Alpharetta, GA 30022
Website: www.landisgyr.com
E-mail: solutionsupport.na@landisgyr.com
Technical Support: 1-888-390-5733

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Preface

This guide describes the installation process for Gridstream Network Concentrators (concentrators). Any training provided directly to installers by the utility or by the Gridstream project management team takes precedence over this guide.

About the Landis+Gyr Gridstream Network

The Gridstream Automated Metering Infrastructure (AMI) network transfers information from a number of endpoints distributed over a large geographical area. The most common endpoints are from electrical, gas and water endpoints. The network includes a Radio Frequency (RF) Wide Area Network (WAN) and an RF Local Area Network (LAN). The WAN includes Take Out Points (TOP) and concentrators. The LAN is the RF link between the concentrator and endpoints with UtiliNet modules installed. Endpoint data transmits via radio frequency (RF) to the concentrator where it is stored and processed. The concentrator transmits the data via RF to the TOP and then to the utility. This chapter details the concentrator installation process.

About the Concentrator

The Concentrator is a device that receives one-way endpoint data from the Gridstream network, processes that data, and sends it to a Collector (Take Out Point, or TOP). It also receives and passes, but does not process, 2-way data. The concentrator contains:

- a LAN radio (BLT 3 or BLT 5)
- a WAN radio (UtiliNet IWR)
- a power supply
- a processor board (CPU)
- a battery pack in case of an AC power outage.

About This Guide

This edition of the *Landis+Gyr Gridstream Concentrator User and Installation Guide* provides:

- Basic installation procedure for concentrators.
- A task-based overview of detailed instructions for using concentrators.

Who Should Use This Guide

This guide is intended for use by utility employees or the Landis+Gyr project team responsible for installing concentrators. It does not assume an expert level of industry or computer knowledge. This guide assumes that you are familiar with basic:

- Utility operations.
- Terminology of your industry.
- Procedures for performing basic laptop computer operations.

Typographical Conventions

This section describes the conventions used in this guide to make finding and understanding information easier. Text formatting identifies special information.

<u>Convention</u>	<u>Description</u>
All Bold , initial capital letters	Refers to field names, buttons, menus, menu options, and keys. Examples: Device field, Open button, File menu, or Ctrl key.
All bold lower-case letters	Refers to the exact keystrokes you enter. What you type is always shown in lowercase letters. Example: Type local in the Device field.
Lower-case <i>italicized</i> word between less-than (<) and greater-than signs (>)	Refers to variables that occur in item names. Example: Add Sub Network To <network name> dialog, where <network name> refers to the name of a network.
<menu> <option> <option>...	Refers to the sequence of choices you should make to access a specific dialog or menu option. Examples: choose Start Settings Control Panel or choose File Open .
Plus sign (+) between keys	Refers to pressing the keys at the same time. Example: Alt+B .
Comma (,) between keys	Refers to keys which are pressed sequentially. Example: Alt,F .



Note boxes provide essential information about concentrator Installation.



Cautions provide information that must read to avoid making relatively moderate errors during concentrator Installation.



Warnings provide special must-read information. If you ignore a warning, you may omit essential data or make a critical error. Warnings are in the same format as notes, except they are shown in bold text.

Contacting Technical Support

Within the United States, Landis+Gyr technical support is available by telephone or email. When you contact technical support, be prepared to give exact descriptions of:

- The problem you encountered
- What happened and what you were doing when the problem occurred
- How you tried to solve the problem
- The exact text of any error messages

Telephone Access

Technical support is available Monday through Friday from 8:00 a.m. to 5:00 p.m. (EST) by calling 1-888-390-5733. If all support technicians are helping other customers, your call will be routed to the Landis+Gyr Support voice mail system.

Leave a brief message that includes the following information:

- Your name
- Your company's name
- Your telephone number

A support technician will return your call as soon as possible within normal business hours. Technicians return all calls in the order that they are received.

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If you prefer, you may email a description of your problem to:

solutionsupport.na@landisgyr.com

A support technician will return your email as soon as possible within normal business hours. Technicians return all emails in the order that they are received.

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- Telephone: 678-258-1500
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Be sure to include the following information along with your comment:

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- Page number or topic related to your comment

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2

Pre-Installation

Proper planning and thorough preparation are critical to successful Concentrator installation. This chapter outlines basic requirements for the pre-installation phase of the concentrator deployment process.

Safety Overview

Prior to starting the installation process, you must develop and launch an installer safety training plan for initial, refresher, and ongoing safety training. Ensure that installers receive appropriate initial and refresher training to meet their specific safety-related responsibilities. You must provide safety training when:

- an existing installer assumes new duties for which they have not previously received training.
- new processes and methodologies representing new risks are introduced into the installation environment.
- previously unidentified risks are reported.

The installation supervisory team assumes responsibility for ensuring that installers are properly trained, authorized, and continually qualified to perform their work. The team must also take responsibility for the safety of their installers and to assure safe work methodologies. Installers must understand that their supervisor's responsibility does not relieve them from their individual responsibility to perform the work safely and to follow all safety rules and procedures applicable to their work.

Pre-Installation Checklist

Be prepared before you go onsite. The following list includes most pre-install items.

Table 2-1. Pre-Install Checklist

Item	Description
Site Survey	The utility has surveyed the area to determine optimal locations for concentrator installation. Landis+Gyr offers this professional service as a contract option.
Obtain Necessary Permits	When the concentrator is to be installed on utility or municipal property such as utility poles, there is a general agreement to install on these poles. There may be a requirement for the utility or municipality to approve individual sites. It is the installer's responsibility to ensure that approval has been given for each installation.
Network Installation Timeline	The Network Installation Plan specifies and formalizes the entire concentrator installation plan. Perform all surveys in advance to ensure ample time for make-ready work as well as addressing any unforeseen installation issues. All concentrators will be installed, quality-checked, and online prior to any endpoint installation in a scheduled route.
Tools and Equipment	The latter part of this chapter has detailed tool and equipment information.
Bucket Truck	Procure all necessary barricade and traffic permits for the bucket truck as required, unless covered by prior
Supervision	Your organization has rules regarding supervision in the field. If you note any deviation from the specified installation criteria, contact your supervisor immediately.
ID Badges	Your identification badge should be clearly visible at all times. If you lose or damage your ID, notify your Field Supervisor immediately to get a replacement. You are not allowed to work in the field without one.

Getting Organized

Concentrator Installation Tool List

- Gas or hydraulic-powered drill, 3/4 inch augur bit
- Two adjustable-end wrenches
- Squeeze-on crimpers and crimps
- Standard socket wrench set
- Laptop computer with two serial ports
- Concentrator and applicable install kit
- Concentrator programming cable
- Network Configuration Manager application
- Concentrator power cable with standard 120VAC outlet
- Survey sheet
- Hyperterminal application
- Personal Protection Equipment
- Voltmeter
- Cell phone or 2-way communication device

Additional Tools Required for Street Light or Traffic Signal Pole Installs

- Steel banding tool
- Tin snips
- Hammer

Additional Tools Required for Building and Structure Installs

- Steel banding tool
- Hammer drill
- Bits

Install Material

The installation process consists of using predetermined route information identifying concentrators that need to be installed and methods for recording data to document the installation.

From the Cross-Dock, obtain concentrators and installation kits to install.

3

Field Configuration

Configure the concentrator prior to installation. Steps include:

1. Configure the IWR radio (using Network Configuration Manager).
2. Program the concentrator.
3. Write network settings to the concentrator.

Required Tools

To perform field configuration, you need the following:

- PC with two serial ports or USB-to-serial adapter.
- Concentrator programming Kit 45-1046 (see *About Programming and Diagnostic Cables* for more information).
- Network Configuration Manager.
- Hyperterminal (a communications accessory that comes bundled with the Windows Operating System prior to the Vista release, and available free on-line).

Concentrator Programming Kit

The Programming Kit includes all the parts you need to configure the concentrator.

Table 3-1. Concentrator Programming Kit 45-1046



Image	Part Number	Name	Quantity
	105628-000	CABLE ASSY, WANGATE, AC POWER, 120VAC PLUG	1
	19-1027	CBL ASM, EXTERNAL RF, S3 IWR	1
	19-1185	Cable Assy, RS-232 Prog, Infinet Concentrator, Phase 2	1
	19-1135	CBL ASSY, DB9M TO DB9F, SERIAL, 10FT	1
	26-1046	T/A, RADIO, S3, IWR	1

Table 3-1. Concentrator Programming Kit 45-1046 (continued)

	<p>26-1061</p>	<p>T/A, 120 VAC POWER ADAPTER CUBE, S3 IWR, 1000mA</p>	<p>1</p>
---	----------------	--	----------

Writing Utility Network Parameters to the Concentrator

After the concentrator is successfully powered up, you can restore (or) configure the concentrator to the utility network parameters.

Use the Network Configuration Manager application to complete this process. See the *Network Configuration Manager Users Guide* for information about using this application to preform the following:

1. Verify that the Network ID is setup for the utility Network and the default destination points to the appropriate Take Out Point.
2. Verify that the Concentrator “MCCTIME” Helper DCW is loaded correctly in the UtiliNet IWR Radio of this Concentrator.

Setting the Timekeeper Radio

If you can access network time over the air, then use network time. If you are in a location that cannot access network time, then set up the local test IWR radio as a timekeeper before beginning the configuration process. The concentrator does not start processing until it detects time.



Using a local test IWR radio as timekeeper can destroy network timekeeping capability if used within the network’s detection area.

1. Connect the radio to COM2 via serial cable (PN 19-1135).
2. Connect power to the radio via the power adapter (PN 26-1061).
3. Launch Network Configuration Manager on your PC.
4. Select the “Timekeeper” option.
5. Click the **Write Settings** button.

The radio remains powered and connected to the PC during the configuration process.

Concentrator Configuration

Follow the steps for configuring the Concentrator:

1. Plug the concentrator programming cable into the left-most barrel connector on the concentrator.



Figure 3 - 1. Concentrator with programming cable

2. Plug the serial cable labeled “Console” into the COM 1 port on the PC.



Figure 3 - 2. Serial Cable Plugged Into COM 1

3. Navigate to **Start | Accessories | Communications | Hyperterminal** to launch Hyperterminal on your PC. You must launch Hyperterminal before powering the concentrator.



Figure 3 - 3. Launch Hyperterminal

4. Connect power to the concentrator by inserting the power cable into the right barrel plug.



Figure 3 - 4. Concentrator with programming cable

5. Name the session in Hyperterminal.

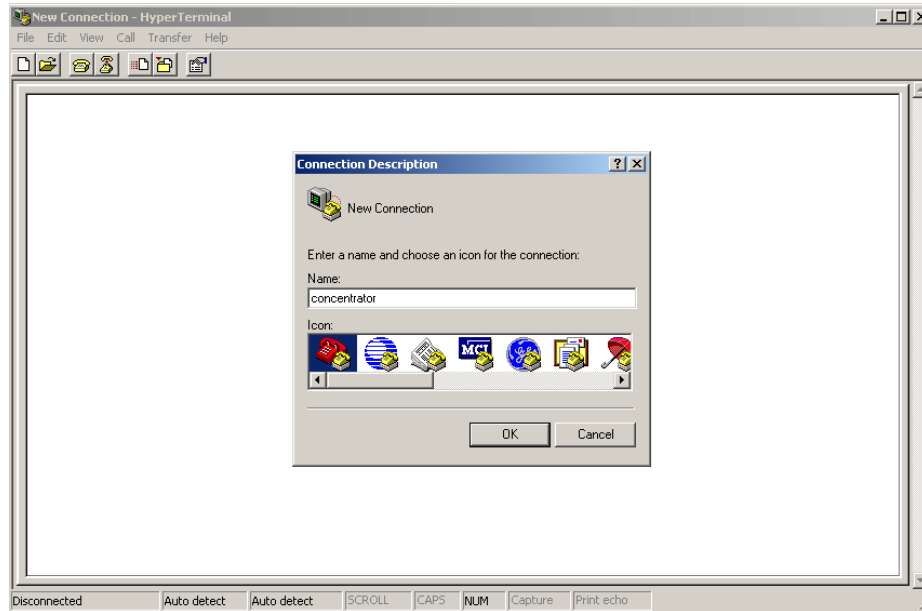


Figure 3 - 5. Hyperterminal name session

6. Click the **OK** button.
7. Verify port settings and click the **OK** button
 - Bits per second: **9600** baud
 - Data bits: **8**
 - Parity: **None**
 - Stop bits: **1**
 - Flow control: **None**.

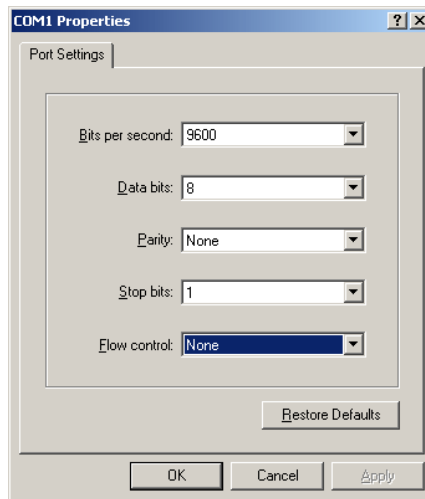


Figure 3 - 6. Set COM 1 Properties

8. Type ? to access the menu.

9. Type **c** for configuration.

```

d Debug menu...
l Lock Console
m Toggle Terse Mode

Select option (? for menu): c

MCC EEPROM Configuration Menu

d Display all configuration items a page at a time
x Display all configuration items with no paging
D Display only new items
s Set specific items (choose from paged list)
n Set specific items by name or id number
a Interactively set all items (prompt for each one)
A Interactively set new items
e Interactively set all out-of-range items
E Interactively set out-of-range new items
r Set all items to defaults (no prompting)
R Set new items to defaults
f Set all out-of-range items to defaults
F Set out-of-range new items to defaults
q Quit

Select option (? for menu): _

```

Figure 3 - 7. Type "c" For Configuration

10. Type **s** for set specific items.

```

x Display all configuration items with no paging
D Display only new items
s Set specific items (choose from paged list)
n Set specific items by name or id number
a Interactively set all items (prompt for each one)
A Interactively set new items
e Interactively set all out-of-range items
E Interactively set out-of-range new items
r Set all items to defaults (no prompting)
R Set new items to defaults
f Set all out-of-range items to defaults
F Set out-of-range new items to defaults
q Quit

Select option (? for menu): s

Gateway MCC EEPROM Configuration
[Note '*' indicates change requires Warm Boot; '+' requires Hot Boot]
[a] Gateway MCC ID (up to 15 characters): 14.02-01,ljjacob@cell-test3-at1-CYGVIN
_NT-5.1-phase21.Thu Jun 22 15:32:48 EDT 2006
[b] Gateway MCC serial number (up to 16 characters): @cell-test3-at1-CYGVIN_NT-5
.1-phase21.Thu Jun 22 15:32:48 EDT 2006
[c] MCC WAN Stack Type (0=radio, 1=serial DMS, 2=s_

```

Figure 3 - 8. Type "s" to Set Specific Items

11. Reset values by typing the letter in Hyperterminal corresponding to the item, then updating the value. For more information, see Sample Survey Sheet. Update the following items:

- A. [d]*Gateway MCC DMS Net Address [1..4294967039;default=4294967038]: **100051**
Input the assigned Concentrator ID here.
- B. [e]*Gateway MCC DMS node address (normally 1)
- C. [1..65534;default=65534]: **1**
This value is always 1.
- D. [f]+Log manager's (and CTS's) DMS Net Address [1..4294967039;default=4294967039]:
20
Input the assigned Net ID.

- E. [g]+Log manager's (and CTS's) DMS node address [1..65534;default=65534]: **152**
Input the assigned Node ID.
 - F. [h]+Event manager's DMS Net Address [1..4294967039;default=4294967039]: **20**
Input the assigned Net ID again.
 - G. [i]+Event manager's DMS node address [1..65534;default=65534]: **152**
Input the assigned Node ID again.
 - H. [m]*Minutes from GMT (0=GMT, 480=PST) [positive increments of 60] [-720..720;default=480]: **420**
Input the minutes from GMT.
 - I. [n]*Daylight savings type (0=none, 1=USA, 7=UK) [0..7;default=1]: 1
This value is always **1**.
12. After you change the value, press the **TAB** key to refresh the page.
 13. Press the **Enter** key to go to the next page.
 14. Update the following field:
 - A. [e]+Lan Tx address for this MCC (0 = no Tx) [default=0]: **0**
Always start with the number 400 (unless the concentrator address is 5 digits, then start with 4000), then append the concentrator ID.
For example, if the concentrator ID is 100016, then the Lan Tx address is 400100016.
 15. Press the **Enter** key until you see a list of Network Filter configuration items.

```
[c]-SRA summary update rate (seconds) [60..3024000;default=900]: 900
[d]-SRA create timeout (seconds) (0=dsbl) [0..3024000;default=129600]: 129600
[e]-SRA confirm timeout (seconds) (0=dsbl) [0..3024000;default=14400]: 14400
[f]-SRA discover timeout (seconds) (0=dsbl) [0..3024000;default=14400]: 14400
[g]-SRA acknowledge timeout (seconds) (0=dsbl) [0..3024000;default=561600]: 561600
[h]-SRA Loss of Communications Timer (minutes) [1..65535;default=45]: 45
[i] MCC Bltr Asap Message Frequency (0=Disable, upto 24 hours) [0..255;default=24]: 24
[j]-Network Filter: Disable/Enable (0:Disable, 1:Enable) [0..1;default=0]: 1
[k]-Network Filter: Default Behavior (0:Ignore, 1:Pass) [0..1;default=0]: 0
[l]-Network Filter: Pass Thru PID - No Filtering [0..255;default=4]: 4
[m]-Network Filter: Exception Utility#01 (3 alphanumeric chrs) [default=***]: ***
[n]-Network Filter: Exception Utility#02 (3 alphanumeric chrs) [default=***]: ***
[o]-Network Filter: Exception Utility#03 (3 alphanumeric chrs) [default=***]: ***
[p]-Network Filter: Exception Utility#04 (3 alphanumeric chrs) [default=***]: ***
[r]-Network Filter: Exception Utility#05 (3 alphanumeric chrs) [default=***]: ***
[s]-Network Filter: Exception Utility#06 (3 alphanumeric chrs) [default=***]: ***
[t]-Network Filter: Exception Utility#07 (3 alphanumeric chrs) [default=***]: ***
[u]-Network Filter: Exception Utility#08 (3 alphanumeric chrs) [default=***]: ***
Select item to change, RETURN for next page, ESC to quit, TAB to redisplay: j
Network Filter: Disable/Enable (0:Disable, 1:Enable) [0..1;default=0]: 1
Enter new value, RETURN to skip, ESC to quit: 0_
```

Figure 3 - 9. Type "0" For Disable

16. Type the letter **J** for Network Filter: Disable/Enable option.
17. Type **0** to disable network filtering, and then press [**Enter**]
18. Press the **Escape** key.

19. Type **q** for quit.

```
Enter new value, RETURN to skip, ESC to quit: 0
Select item to change, RETURN for next page, ESC to quit, TAB to redisplay:
MCC EEPROM Configuration Menu
d Display all configuration items a page at a time
x Display all configuration items with no paging
D Display only new items
s Set specific items (choose from paged list)
n Set specific items by name or id number
a Interactively set all items (prompt for each one)
A Interactively set new items
e Interactively set all out-of-range items
E Interactively set out-of-range new items
r Set all items to defaults (no prompting)
R Set new items to defaults
f Set all out-of-range items to defaults
F Set out-of-range new items to defaults
q Quit
Select option (? for menu): q
You have changed parameters which require an MCC Warm Boot (loss of database).
Are you ready to reset? (y/n):
```

Figure 3 - 10. Type “q” For Quit

20. Type **y** for yes.

```
MCC EEPROM Configuration Menu
d Display all configuration items a page at a time
x Display all configuration items with no paging
D Display only new items
s Set specific items (choose from paged list)
n Set specific items by name or id number
a Interactively set all items (prompt for each one)
A Interactively set new items
e Interactively set all out-of-range items
E Interactively set out-of-range new items
r Set all items to defaults (no prompting)
R Set new items to defaults
f Set all out-of-range items to defaults
F Set out-of-range new items to defaults
q Quit
Select option (? for menu): q
You have changed parameters which require an MCC Warm Boot (loss of database).
Are you ready to reset? (y/n): y
Saving Configuration changes ...
Resetting the system in 5 seconds ...
```

Figure 3 - 11. Rebooting the concentrator via Hyperterminal

- 21. After the concentrator resets, close Hyperterminal.
- 22. Unplug the cable marked “Console” from COM 1.
- 23. Plug the Lan Protocol cable into COM 1.



If you disconnect the power cables before the programming cable, the unit uses battery backup. This depletes the battery and can affect routing.

Disabling Network Filtering

With network filtering, you can configure the concentrator to accept all Cellnet packets, block certain packets, or allow only certain packets. When another Cellnet customer is nearby, set your network not to pick up the other utility's one-way reads.

1. Connect to the host via Putty or a similar telnet client.

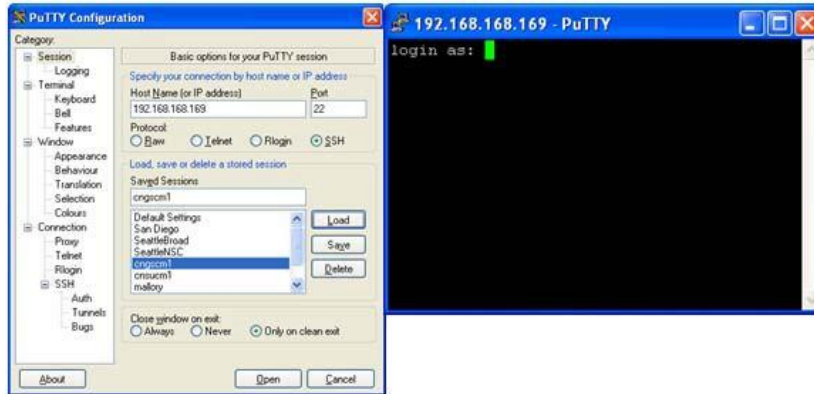


Figure 3 - 12. Login using telnet client

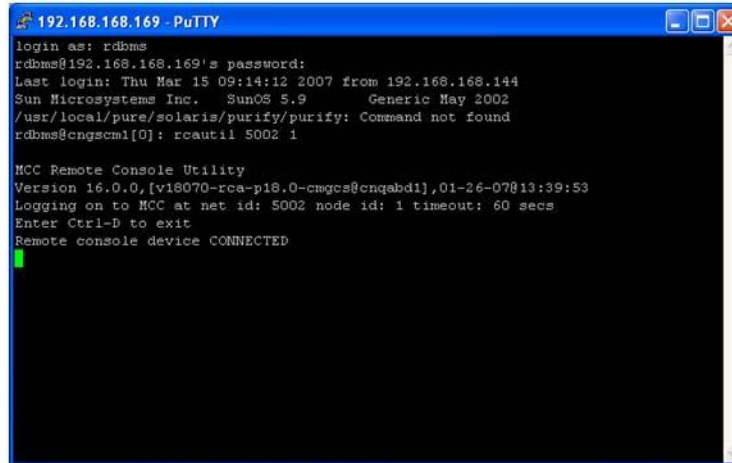
2. Login as *rdbms* using password *cellnet*.



Figure 3 - 13. Login as rdbms user

- Use the command **rcautil xxxx 1** to log into the concentrator with **id xxxx**.

Example: `rcautil 5002 1`



```

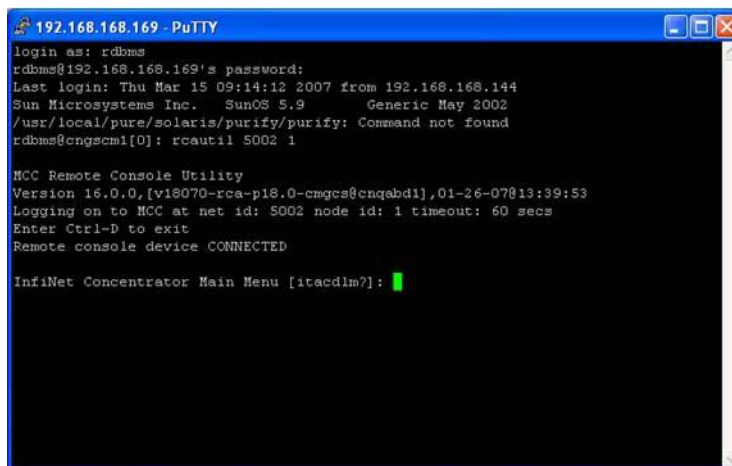
192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:14:12 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscml[0]: rcautil 5002 1

MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

```

Figure 3 - 14. Login to concentrator

- After the screen displays “Remote console device CONNECTED”, press [Enter].



```

192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:14:12 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscml[0]: rcautil 5002 1

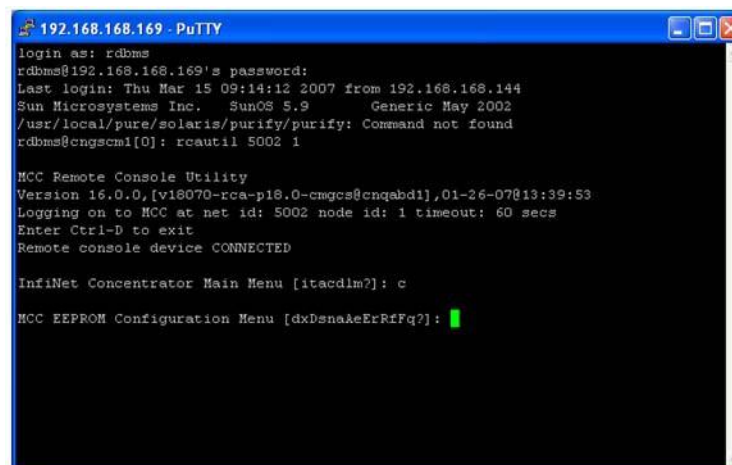
MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

InfiNet Concentrator Main Menu [itaacdlm?]:

```

Figure 3 - 15. Open console menu remotely

- Type the letter **c**. The EEPROM configuration menu displays.



```

192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:14:12 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscml[0]: rcautil 5002 1

MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

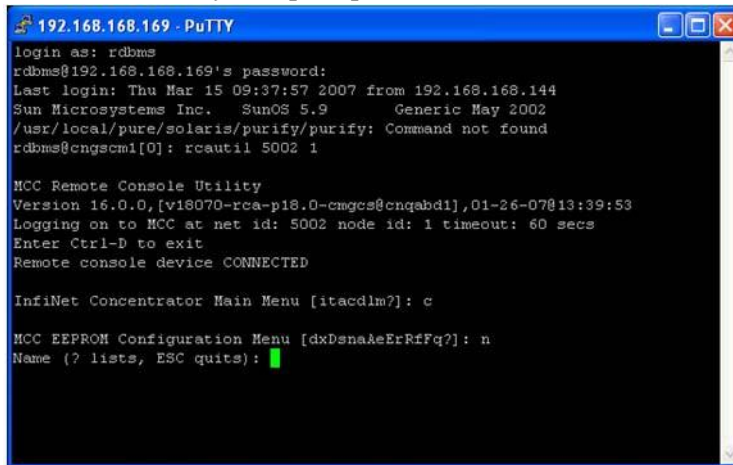
InfiNet Concentrator Main Menu [itaacdlm?]: c

MCC EEPROM Configuration Menu [dxDsnaAeErRffq?]:

```

Figure 3 - 16. EEPROM Menu

6. Type the letter **n**. The system prompts for a name.



```

192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:37:57 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscm1[0]: rcautil 5002 1

MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

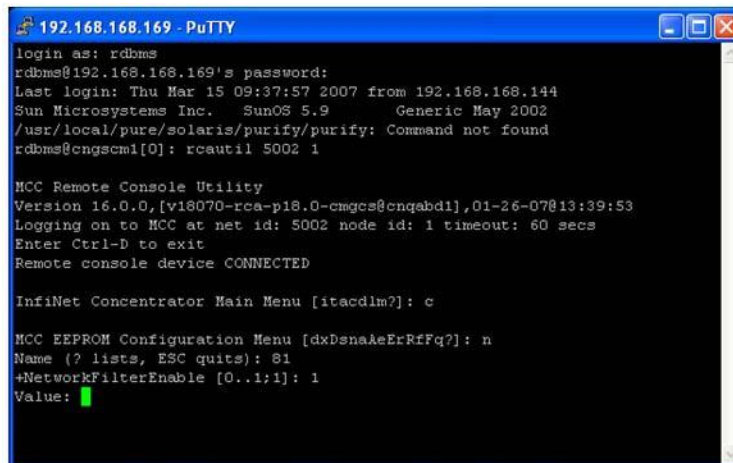
InfiNet Concentrator Main Menu [itacdln?]: c

MCC EEPROM Configuration Menu [dxDsnakEeRrFq?]: n
Name (? lists, ESC quits): █

```

Figure 3 - 17. Name prompt

7. Type **81** to access the network filtering menu and press [Enter].



```

192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:37:57 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscm1[0]: rcautil 5002 1

MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

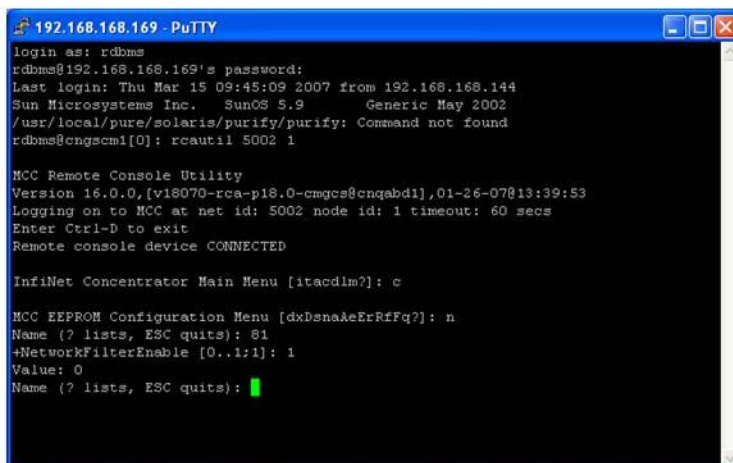
InfiNet Concentrator Main Menu [itacdln?]: c

MCC EEPROM Configuration Menu [dxDsnakEeRrFq?]: n
Name (? lists, ESC quits): 81
+NetworkFilterEnable [0..1;1]: 1
Value: █

```

Figure 3 - 18. Type 81

8. The default network filtering value is 1. To disable network filtering, type **0** and press [Enter]



```

192.168.168.169 - PuTTY
login as: rdbms
rdbms@192.168.168.169's password:
Last login: Thu Mar 15 09:45:09 2007 from 192.168.168.144
Sun Microsystems Inc. SunOS 5.9 Generic May 2002
/usr/local/pure/solaris/purify/purify: Command not found
rdbms@cnqscm1[0]: rcautil 5002 1

MCC Remote Console Utility
Version 16.0.0,[v18070-rca-p18.0-cmgcs@cnqabd1],01-26-07@13:39:53
Logging on to MCC at net id: 5002 node id: 1 timeout: 60 secs
Enter Ctrl-D to exit
Remote console device CONNECTED

InfiNet Concentrator Main Menu [itacdln?]: c

MCC EEPROM Configuration Menu [dxDsnakEeRrFq?]: n
Name (? lists, ESC quits): 81
+NetworkFilterEnable [0..1;1]: 1
Value: 0
Name (? lists, ESC quits): █

```

Figure 3 - 19. Network Filtering value

- 9. Type [Esc]. The EEPROM configuration menu re-displays.

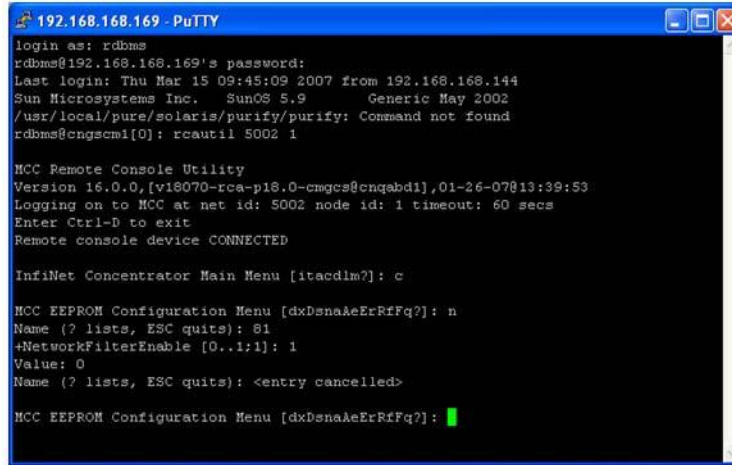


Figure 3 - 20. Return to EEPROM menu

- 10. Type the letter q. The system prompts you to hot boot the concentrator.

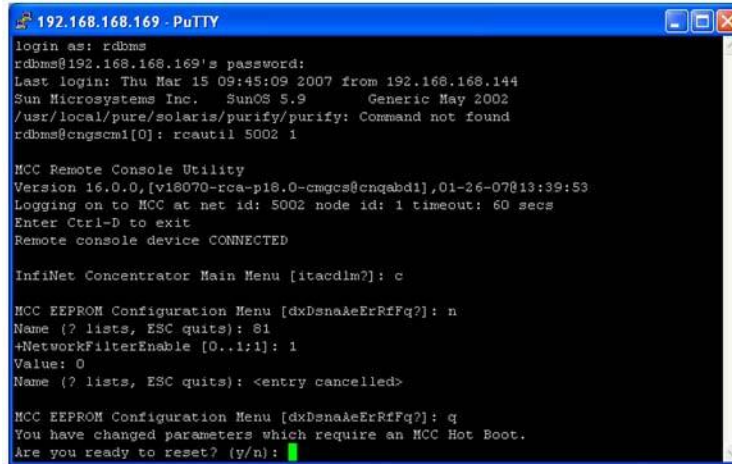


Figure 3 - 21. Hot boot prompt

- 11. To save changes, type y. The hot boot begins.

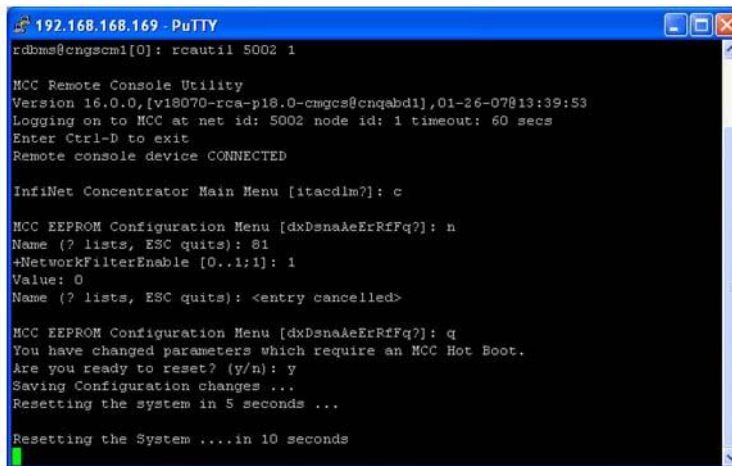


Figure 3 - 22. Hot boot

You have now successfully disabled network filtering in this concentrator. Repeat the steps for every concentrator in your network.

4

Concentrator Installation

Antenna Mounting Options

The concentrator requires three antennas to communicate with the endpoints and to relay information from the endpoint to the host application:

- Two LAN antennas
- One WAN antenna

The LAN antennas mount on the side of the antenna bracket. The WAN communications antenna mounts on top of the enclosure or on the antenna bracket, or you can mount all three antennas remotely from the concentrator such as at the top of a utility pole or a building parapet. If all three antennas are mounted above the enclosure, coaxial cable connects the enclosure and the remote antennas.



Use only Cellnet-approved antennas.

For All Installations

Concentrator Installation Sheet

The utility provides a concentrator Installation Sheet for every concentrator to be installed. The sheet contains:

- Street address
- Type of mounting (wood pole, streetlight pole, building, etc.)
- Access method (bucket truck or climbed manually).

Power Requirements

Power requirements are listed in Performance. Verify that the power source is either 120 VAC or 240 VAC single phase.

Power Cable Preparation

You can use the following AC power cable options with any Cellnet mounting kits. Cable part numbers are:

Table 4-1. AC Power Cable Options

Part Number	Part Description
19-2271	Cable, Power, 10 foot, Utilinet, Water Block
19-2272	Cable, Power, 30 foot, Utilinet, Water Block
19-2273	Cable, Power, 4 foot, Utilinet, Water Block
19-2274	Cable, Power, 18 foot, Utilinet, Water Block
19-1192	Cable Assy, Street Light, Utilinet, 18 ft
103826-000	Cable, Assy, Street Light, UtiliNet, 4 ft
105627-000	POWER CABLE, 2 WIRE, 10 FT, 10 AWG
105627-001	POWER CABLE, 2 WIRE, 30 FT, 10 AWG

Depending on the utility requirements, physical connections to the secondary may carry additional requirements.

Use the unterminated wires from the end of the power cable and securely attach them to the AC power feed. Sometimes, a secondary circuit from an adjacent pole is necessary to provide concentrator power.



Consult Appendix H for critical power connection details.

Adding Drip Loops to Cables

For any cables in an assembly, allow some slack to rest below metal parts. The slack is called a “drip loop” and isolates rain and condensation water from the cable connections to avoid damaging associated mechanical equipment.



Figure 4 - 1. Cable with drip loop

Kit Part Numbers

Different kinds of installs may require different mounting and install kits. The following table contains a list of part numbers (PN) by install type. This document details each kit in the appropriate install description.

Table 4-2. Mounting and Programming Kits

Kit Number	Wood Pole Install	Light Pole Horizontal Mount Install	Metal Pole Vertical Mount Install
Mounting Kit PN 45-1048	x		
Mounting Kit PN 45-1050, 8" rod			x
Mounting Kit PN: 45-1049		x	
Mounting Kit PN: 45-1055, 12" rod			x
Programming Kit PN 45-1046	x	x	x

For information about installation types not listed here, contact Landis+Gyr Customer Operations at CustomerOperations@landisgyr.com.

Concentrator Assembly

Unless otherwise noted, all kits in this book are for the UtiliNet Phase II concentrator.

Table 4-3. Concentrator 26-1139 / 26-1315

Image	Part Number	Name	Quantity
	26-1139 or 26-1315	Concentrator: Series III IWR or Concentrator: Series IV IWR	1
	01-1239	LAN Antennas (comes with concentrator);	2
	106119-000	WAN Antenna (comes with concentrator);	1
	28-1012	Antenna Ground Plane (comes with concentrator);	2

Optional Parts

Landis+Gyr can accommodate specialized needs such as remote antenna installation and RF filters pre- or post-installation. An RF filter limits the device to a certain number of channels it can jump (leaving frequencies for cell phones and pagers).

Built-In RF Filter Kit

If you would like to install a concentrator with the RF Filter kit already built in, the product number is 26-1162. Parts are the same as the regular concentrator, but this concentrator has an RF filter installed during manufacturing. 26-1315 Concentrators contain Series IV IWRs, and these units have the RF filter integrated into the IWR.


Additional RF Filter for Post-Installation

If you would like to add an RF Filter to a concentrator that has already been installed, use RF filter installation kit PN 01-1018.

Remote Antenna Cable

If you need to install antennas remotely from the concentrator, there is a cable designed specifically for this purpose

Table 4-4. Remote Antenna Cable

Image	Part Number	Description	Qty
	19-2200	CBL ASSY,REMOTE ANT,5 FT,N	0 Ref only

Wood Pole Mount Installation

The utility or municipality determines the final guidelines of where to install the concentrator. Know and follow the utility or municipality guidelines before installing the concentrator and antennas.

Wood Pole Mounting Kit

In addition to your chosen concentrator assembly kit, you need a mounting kit.

Table 4-5. 45-1048 KIT, MOUNTING,WOOD POLE, CONCENTRATOR

Image	Part Number	Name	Quantity
	101983-025	NUT, HEX, FLANGE 1/4-20UNC, SS	4
	19-1013 1 foot	CBL ASSY, REMOTE ANTENNA	2
	22-0421	WASHER, 1/4 FLAT, 1/16 THK, SS	4
	22-1071	BOLT, CARR., 1/4-20 UNC-2A X 4.00, SS	4
	28-1299	Bracket, Wood Pole, Alum, concentrator, Enhanced Processor	1

Wood Pole Installation Procedure

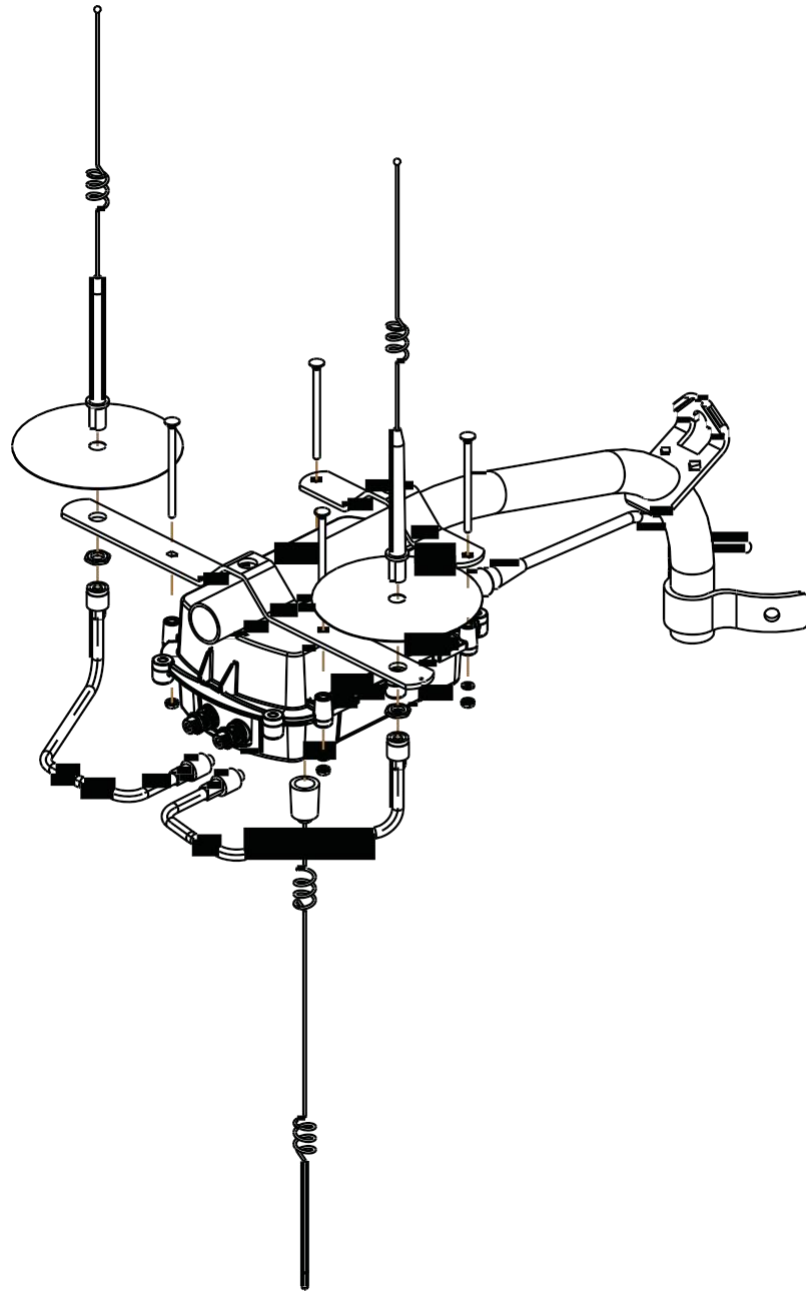


Figure 4 - 2. Built-out wood mounted concentrator assembly illustration, side and front views

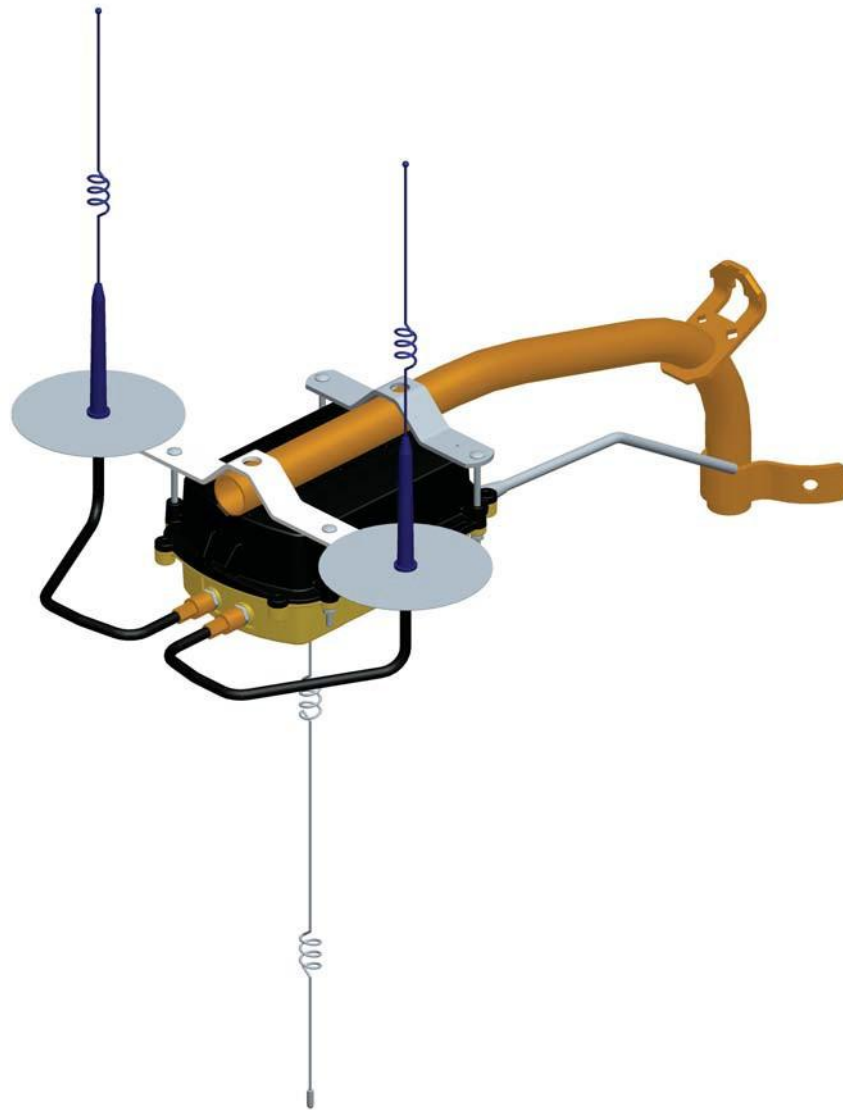


Figure 4 - 3. Built-out wood mounted concentrator assembly illustration, view from top

1. Affix the mounting bracket (PN 28-1147) to the wood pole using two mounting bolts (D/A Bolts) with washer and nut or steel bands. (Hardware parts not included in kit.)
2. Attach the concentrator to the bracket, being aware to face the military connectors toward the pole. Using the four (4) carriage bolts, secure it with nuts and washers included in the kit.
3. Connect the LAN antennas to the bracket.



Ground planes are built into bracket PN 28-1147. Do not install additional ground planes to a mounting that uses this bracket.

4. Using the RF cables, connect the LAN antennas to the concentrator.
5. Attach the WAN antenna to the concentrator directly.

- 6. Attach the AC power cable to the concentrator. Use any of the approved power cable options.

Metal Pole vertical Mount Installation

The utility or municipality determines the final guidelines of where to install the concentrator. Know and follow the utility or municipality guidelines before installing the concentrator and antennas.

Concentrator Metal Pole Mounting Kit

In addition to your chosen concentrator assembly kit, you need a mounting kit

- Kit number 45-1050 includes 8” rods for poles 3.5” to 5”.
- Kit number 45-1055 includes 12” rods for poles 5” to 7.5”.

These kits are identical except for the rod length, so only kit number 45-1050 is described below.


Table 4-6. 45-1050 KIT, MOUNTING, LIGHT POLE, CONCENTRATOR

Image	Part Number	Name	Quantity
	101983-025	NUT, HEX, FLANGE 1/4-20UNC, SS	8
	16-0214	CONN, BULKHEAD, F/F, TYPE N	1
	19-2215	CBL ASSY,CYLINK MALE-MAL E B,B 5.5 feet	3
	22-0375	TIE WRAP, 28 INCH, NYLON, WHITE	5

Table 4-6. 45-1050 KIT, MOUNTING, LIGHT POLE, CONCENTRATOR (continued)

Image	Part Number	Name	Quantity
	22-0421	WASHER, 1/4 FLAT, 1/16 THK, SS	8
	22-0453	WASHER, 3/8 SPLIT LOCK, S S	2
	22-0587	WSHR FLT, 3/8 INCH 1 INCH OD.4381ID, 300 S S	2
	22-1062	ROD, THREADED, 1/4-20X8IN, S S	4
	22-2319	SCREW, 3/8-16X7/8, HEX CAP, SS	2
	28-1090	BRACKET, ANTENNA, LIGHT POLE, 16 INCH	1
	28-2315	BRACKET, POLE, STRAP MOUNT	1

Table 4-6. 45-1050 KIT, MOUNTING, LIGHT POLE, CONCENTRATOR (continued)

Image	Part Number	Name	Quantity
	28-1061	BRKT, MOUNTING, 3 TO 5 IN POLE, WANGATE S2 BLT3	2

Metal Pole Installation Procedure

This section describes the light pole installation procedure.



The photos in this section are for illustrative purposes only. In the field, mount brackets higher on the pole. Use the parts supplied in the kit.

1. Attach the strap mount pole bracket (PN 28-2315) to the pole using steel bands.



Figure 4 - 4. Strap mount pole bracket attached to pole

2. Attach the antenna light pole bracket (PN 28-1090) to the strap mount pole bracket. Torque to 200 in/lbs.



Figure 4 - 5. Antenna light pole bracket attached to mounting bracket

3. Install the bulkhead connector (PN 16-0214). Torque to 100 in/lbs.



Figure 4 - 6. Attaching bulkhead connector

4. Connect the WAN antenna.



Figure 4 - 7. Connecting the WAN antenna

5. Put the ground plane on the LAN antennas.



Figure 4 - 8. Putting ground plane on antennas

6. Connect the LAN antennas to the antenna light pole bracket. Torque to 90 in/lbs.



Figure 4 - 9. Connecting a LAN antenna

7. Attach the RF cables to the WAN antenna.



Figure 4 - 10. Attaching RF cable

- 8. Attach the right-angle end of the cable to the top of the LAN antennas.



Figure 4 - 11. Attaching right-angle end of cable

- 9. With the mounting kit, affix the concentrator and two brackets sandwiched on the pole down from the light arm using the supplied hardware.



Figure 4 - 12. Concentrator mounted

- 10. Attach the AC power cable to the concentrator using one of the power cable options. Leave slack in the cable to form a drip loop.



If using the 105704-000, 105704-001, 105704-002, or 105704-003 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 Concentrator.

See Appendix H for power cable installation procedures and details.

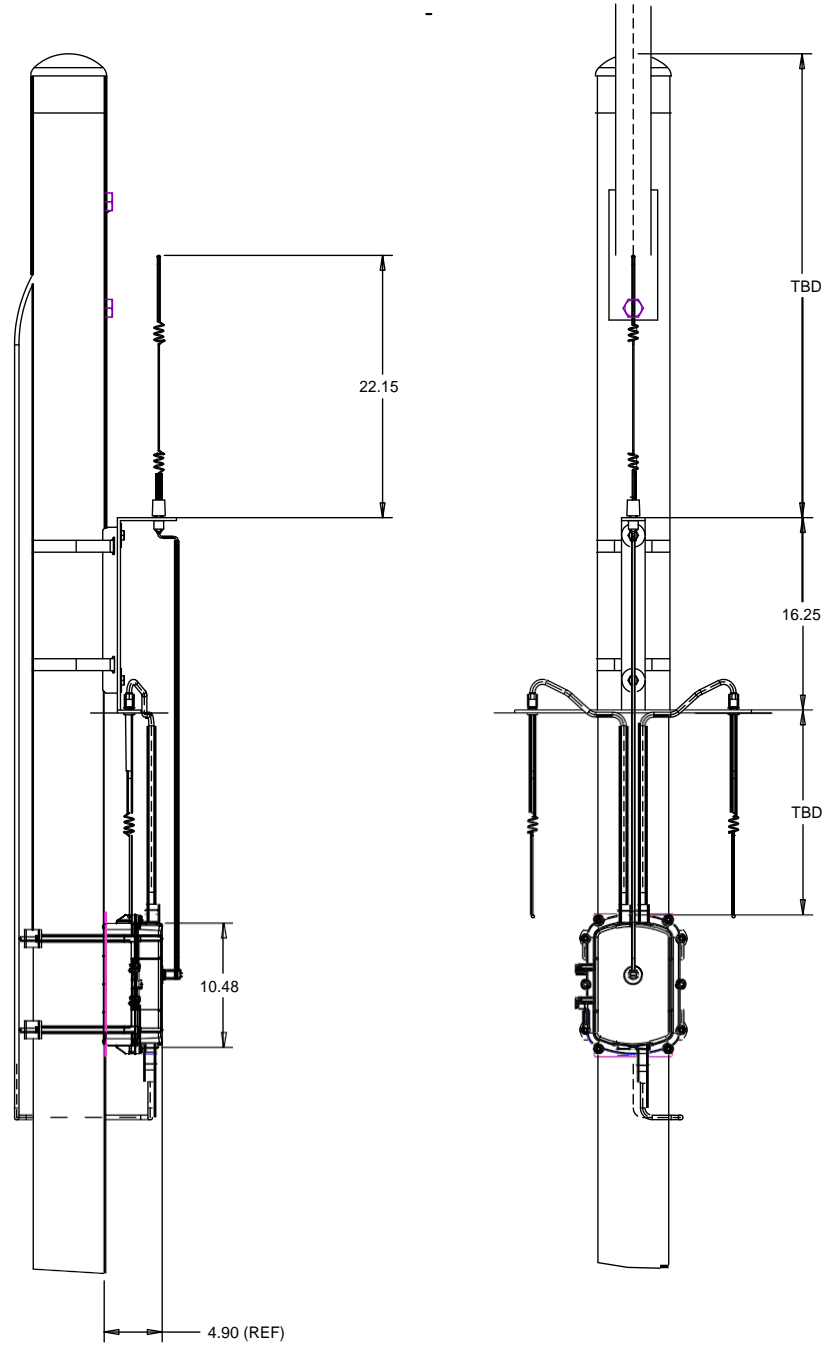


Figure 4 - 13. Complete pole mount assembly

Streetlight Arm Horizontal Mount Installation

The utility or municipality determines the final guidelines of where to install the concentrator. Know and follow the utility or municipality guidelines before installing the concentrator and antennas.

Concentrator Streetlight Arm Mounting Kit

In addition to your chosen concentrator assembly kit, you need a mounting kit.

Table 4-7. 45-1049 KIT, HORIZONTAL MOUNTING,METAL POLE, CONCENTRATOR

Image	Part Number	Name	Quantity
	103826-000	CBL, ASSY, STREET LIGHT, UTILINET, 4FT	0, ref only
	19-2200	CBL ASSY,REMOTE ANT,5 FT,N	0 Ref only
	19-1013 1 foot	CBL, ASSY, Remote Antenna	2
	22-0375	TIE WRAP, 28inch, NYLON, WHITE	3

Table 4-7. 45-1049 KIT, HORIZONTAL MOUNTING, METAL POLE, CONCENTRATOR (continued)

Image	Part Number	Name	Quantity
	28-1061:AC	BRKT, MOUNTING, 3 TO 5 IN POLE, WANGATE S2 BLT3	1
	28-1031	BRKT, ANTENNA MOUNT, 3 & 5 IN POLE, RADIO	1
	22-0421	WASHER, 1/4 FLAT, 1/16 THK, SS	4
	22-1072	BOLT, CARR, 1/4-20 UNC-2A X 6 SS	4
	101983-025	NUT, HEX, FLANGE, 1/4-2 OUNC, SS	4

Streetlight Arm Installation Procedure

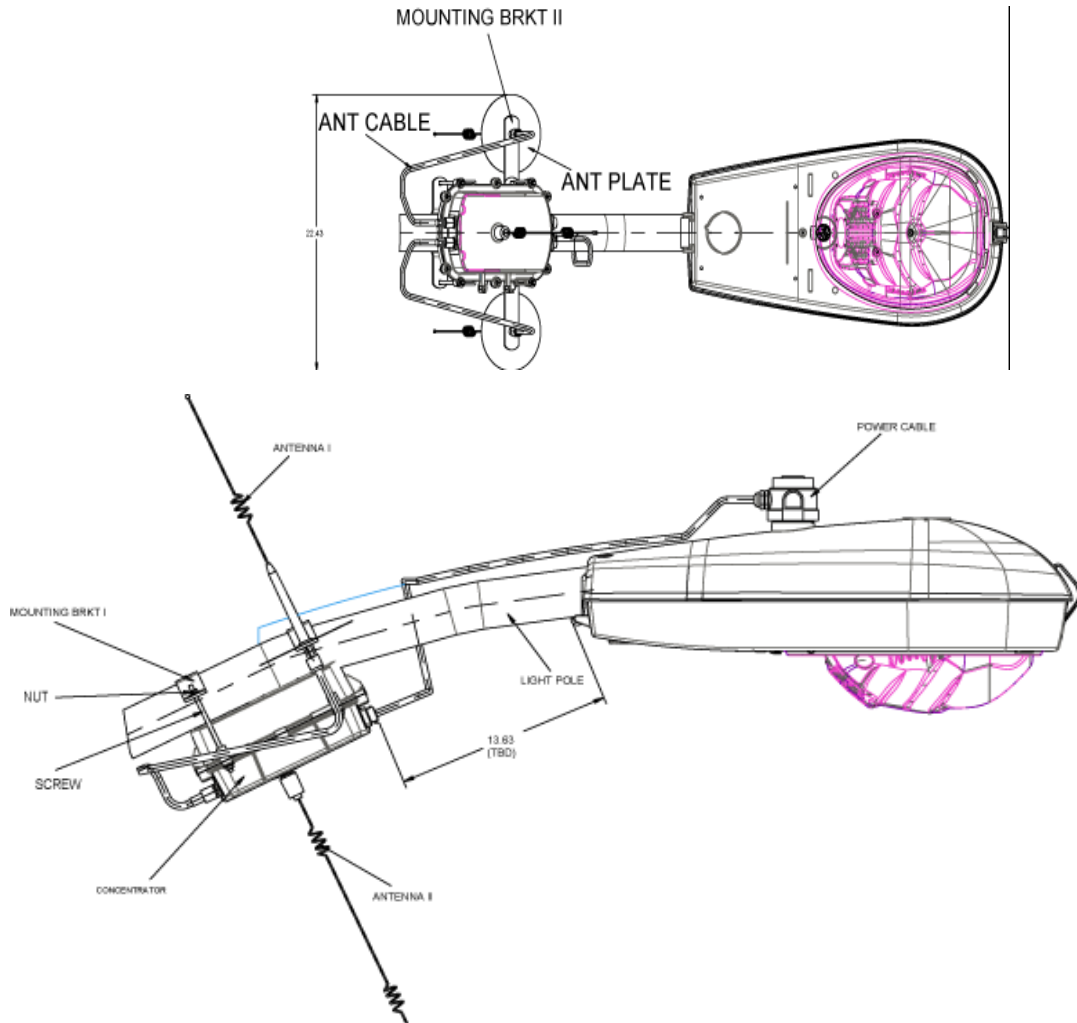


Figure 4 - 14. Pole mounted concentrator assembly illustration

Install the concentrator approximately 18" below the lowest portion on the light head arm.

1. Thread the four rods through the two included metal brackets.
2. Hold the concentrator on the front of the pole while threading the rods through the enclosure from the back of the pole.
3. Place nuts and washers on the four threaded rods and tighten until secure.
4. Assemble the antennas, ground planes, and RF cables. Leave slack in the cables to form a drip loop.
5. To connect the adapter, remove the photocell on the existing light head.
6. Install the adapter.

7. Lock it into place by turning clockwise.
8. Re-install the photocell in the same manner.
9. Run the cable between the brackets and the concentrator enclosure.
10. Using the supplied UV rated tie wraps, secure the cable to the light head.
11. Connect the power plug to the bottom of the concentrator.



If you need a longer cable, you can build one using one of the approved AC power cables and a photocell power adapter.

5

RF Filter and Battery Replacement Kits

You can retrofit a concentrator with an RF Filter anytime. This chapter outlines the parts and procedure to perform this task. It also outlines the battery replacement kit and procedure.

Enable/Disable RF Filter

When 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 4.1.

1. Verify that the Router is highlighted on the Nodes Pane.
2. Right-click the Router ID.
3. Select **Enable RF Filter** from the pop-up menu.

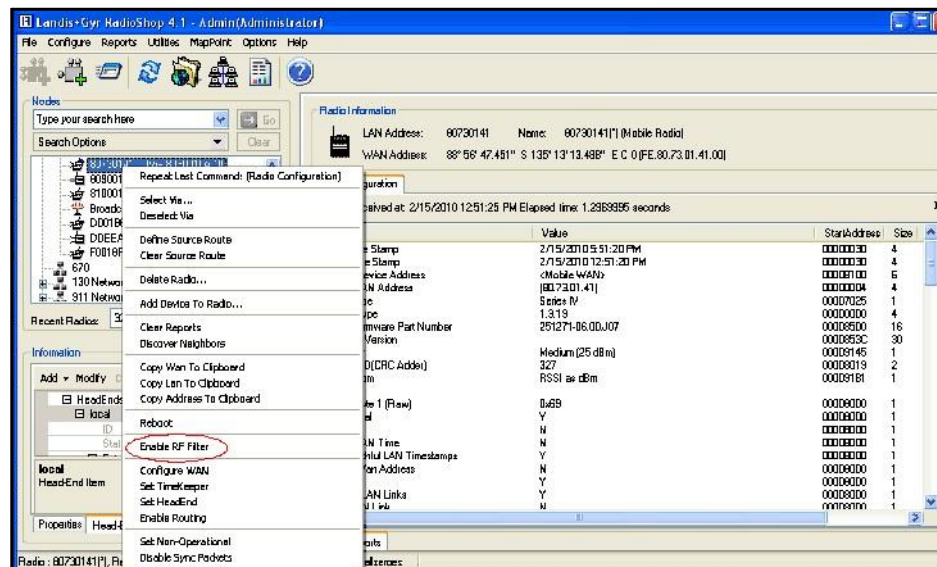


Figure 5 - 1. Enable (or Disable) the RF Filter


To Disable the RF Filter

4. Right-click the Router ID.
5. Select **Disable RF Filter** from the pop-up menu.

Retrofitting a Series III Concentrator with an RF Filter

You can add an RF filter to a concentrator after you have installed it in the field. Use kit number 45-1053.

Table 5-1. RF Filter Retrofit Kit 45-1053

Image	Part Number	Part Name	Quantity
	01-1018	FILTER, EXTERNAL RF, S3 IWR	1
	19-1070	CBL ASSY, RF TO FILTER, WANGATE S3	1
	22-1049	SEMS,2-56x3/16inch,INT,PNH,P HH,SS	4
	23-1098	Label, FCC, InfiNet Concentrator, Phase 2, RF Filter	1
	106555-000	GASKET UTILINET	1

Performing an RF Filter Retrofit

1. Unbolt the base from the lid.



Figure 5 - 2. RF Filter retrofit unbolt lid and base

2. Disconnect the battery cable from the power supply board.



Figure 5 - 3. RF Filter retrofit remove gasket and battery cables

3. Disconnect the lid from the base by the hinges.
4. Remove and discard the gasket.
5. Disconnect the BLT power cable from the Motherboard PCBA.
6. Disconnect BLT/ConnectCore Communication Cable connection 'BLT J2' from the 'J2' connection on BLT Transceiver PCBA.
7. Disconnect both RF Cables from 'J3' and 'J4' connectors on BLT Transceiver PCBA.

8. Remove the BLT/S3 Bracket from the base.

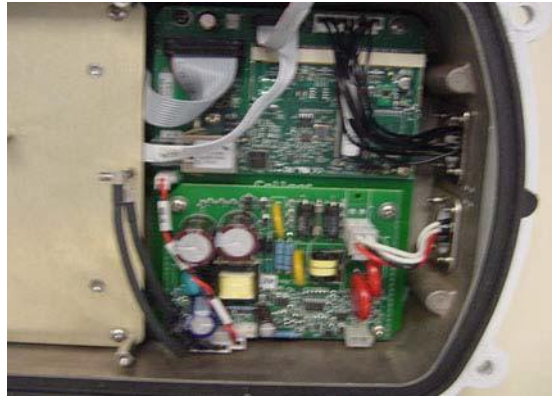


Figure 5 - 4. RF Filter retrofit remove BLT bracket

9. Disconnect RF Cable to 'J5' connection from UtiliNet S3 PCBA.
10. Disconnect power supply/S3 Cable from 'J6' connector on UtiliNet S3 PCBA.



Figure 5 - 5. RF Filter retrofit remove UtiliNet S3 PCBA

11. Remove UtiliNet S3 PCBA from BLT/S3 Bracket.



Figure 5 - 6. RF Filter Retrofit

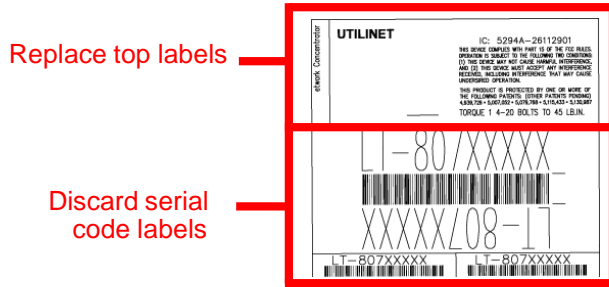
12. Secure the RF Filter (PN 01-1018) to the BLT/S3 Bracket (PN 28-1084), using screws (PN 22-1083). Torque screws to $5 \pm .5$ in-lbs.
13. Attach the RF Filter Cable Assembly (PN 19-1070) to the RF Filter (PN 01-1018). Torque to $7 \pm .5$ in-lbs. Orient filter as shown below.



Figure 5 - 7. Installing RF Filter

14. Put the concentrator back together in reverse order of the way you took it apart.
 - You must use a fresh gasket (PN 106555-000, supplied with kit).
 - Torque all SEM screws to $10 \pm .5$ in-lbs.
 - Torque all SMA connector to $7 \pm .5$ in-lbs.
 - Torque all exterior bolts to $45 \pm .5$ in-lbs.

15. Replace the labels as shown:



About Battery Storage

The ideal storage environment is normal room temperature or slightly below. Excess temperature shortens the battery life and accelerates self discharge. Charge batteries at least once per year or sooner if needed. The battery open circuit voltage should not be allowed to drop below 12V.



Recycle or dispose of batteries properly.



Do not mutilate or dispose of batteries in fire to avoid risk of releasing toxic materials. Short-circuiting batteries may cause burns.

Battery Test

You must use a copy of RadioShop 3.4 or higher to run the battery test. See the applicable *RadioShop Getting Started Guide* for information on using the application to test the concentrator battery.

The new Autoranging power supply (25-1008 or 25-1025) can be software-enabled into battery test mode. Disconnect the battery charger from the battery to place a load across the battery. Measure the battery voltage before, during, and at the end of this test to discover bad or weak batteries. This test is more effective than measuring the battery voltage without a load on the battery.

All Series III radios will have this capability. The Series II and IIb may have this capability if retrofitted with kit, P/N 45-1029 (other kits may be available).

Replacement materials

All parts required for battery replacement should already be present at the assembly site. To replace the battery, procure a battery pack replacement kit (PN 45-1058).

Concentrator Battery Pack Replacement Kit

Table 5-2. Battery Pack Replacement Kit t45-1058

Image	Part Number	Part Name	
Items pictured below	96-1070	Battery pack replacement kit, Concentrator	1
	01-1039	Battery pack 12V 4.5AH	1
	106555-000	Gasket UtiliNet	1

Replacing the Battery Pack

1. Remove all six bolts and hardware that hold the enclosure base to the enclosure lid.
2. Open the unit.

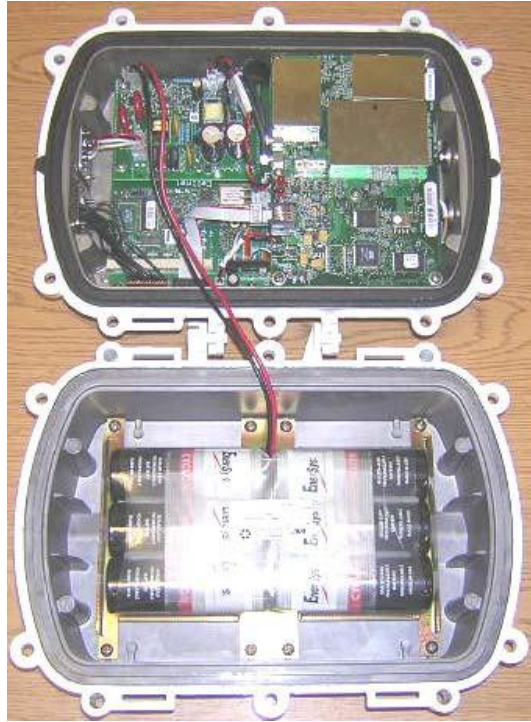


Figure 5 - 8. Open unit

3. Disconnect the battery cable from the power supply board.

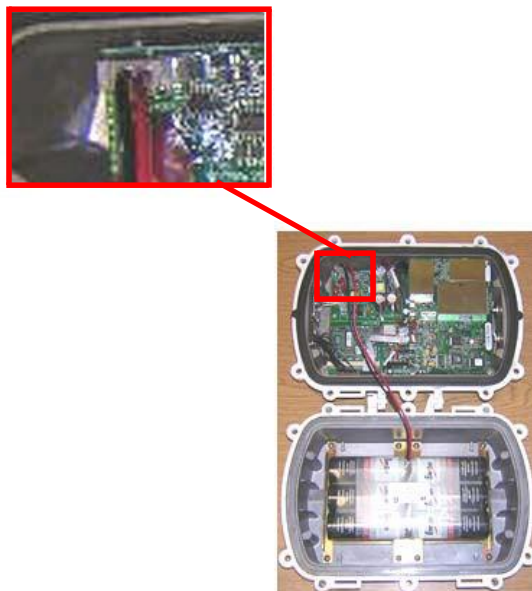


Figure 5 - 9. Battery cable closeup

4. Remove all eight pan head screws and the battery pack.

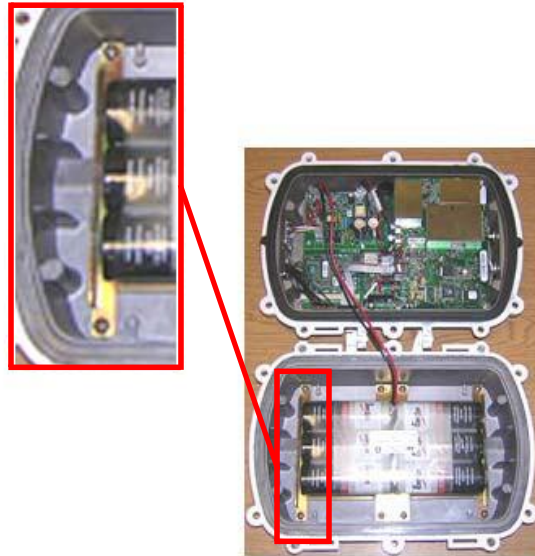


Figure 5 - 10. Sample Pan Head Screw Location

5. Place the new battery pack in the enclosure base and secure it with all eight pan head screws.
6. Torque the screws to $8 \pm .5$ in-lbs.
7. Connect the battery cable.
8. Replace enclosure gasket (PN 106555-000) with a new gasket. Do not re-use the old gasket.
9. Attach the enclosure lid to the enclosure base.



Take care to not pinch the battery cable between the base and the lid. Pinching the cable can short the battery and result in a hazardous condition.

10. Secure with all six bolts, nuts, washer-flats, and washers.
11. Torque bolts to $45 \pm .5$ in-lbs.
12. Affix the new battery date label to the outside of the enclosure.



Figure 5 - 11. New battery date label affixed to concentrator enclosure

6

Performing System Upgrades

What Are System Upgrades?

There are three kinds of upgrades you can perform on a concentrator:

- The concentrator firmware
- The IWR radio firmware
- The IWR radio DCW.

Accessing a Concentrator for Programming

There are two ways to access a concentrator for upgrading:

- Over the air
- Directly via cable (About Programming and Diagnostic Cables, for more information).

Upgrading a Concentrator Over the Air (OTA)

You can remotely download firmware to the concentrator via a command window from your PC. You must have control-level user access to the host to perform this procedure.

About the Image File

Landis+Gyr Customer Operations manages upgrades to firmware. Landis+Gyr notifies you when there is a new release of firmware and makes the file available. To upgrade firmware, load the concentrator with a new “image.bin” file. Contact Customer Operations at CustomerOperations@landisgyr.com for more information or to obtain the latest version of the firmware.

The download application utility runs on the host backend via a process called Live System update (LSU). The host connects over the air (OTA) to the concentrator. The host automatically:

1. Sends the new firmware information to the concentrator.
2. Polls the concentrator to verify that the download is complete.
3. Disconnects when the download is complete.

Verifying the Concentrator and the Host

Before sending large amounts of data over the network, verify communication with the concentrator. Also verify that the Cellnet host is up and running. Ping the concentrator via command line `rtrping`.



Concentrator addresses used in the following instructions are samples only. Obtain your utility's concentrator addresses from Customer Operations at cellnet@landisgyr.com.

Pinging from the Command Line

You need to know the concentrator's network ID before performing this task.

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.
3. Type `rtrping [concentrator ID]`.



Figure 6 - 1. rtrping screen shot

If the ping is successful, the system returns the length of time it took to receive a response. If the ping is unsuccessful, the system indicates a time out condition.

Verifying Host Operations

Verify that the Cellnet system is running.

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.

3. Type `iscellnet`.

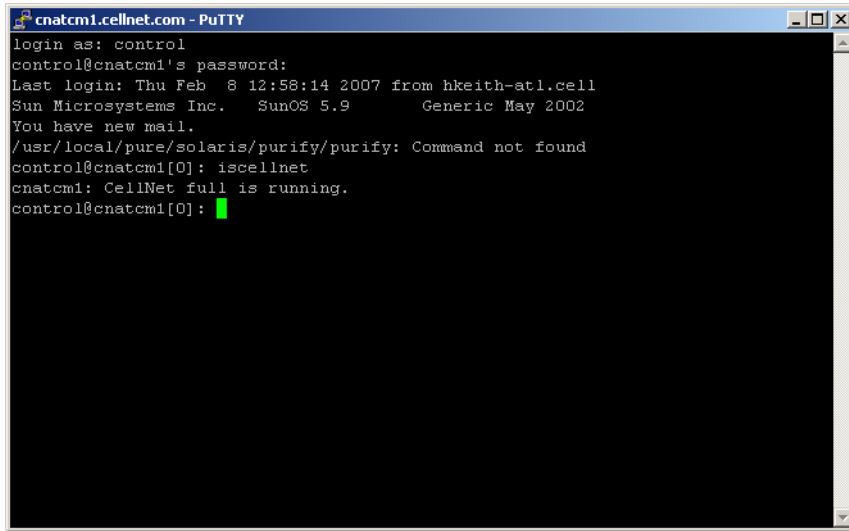


Figure 6 - 2. iscellnet screen shot

If the ping is successful, the system returns the length of time it took to receive a response. If the ping is unsuccessful, the system indicates a time out condition.

Hot-Booting a Concentrator

Always perform a disconnect, followed by a hot boot, before any download operations. For a firmware upgrade to be successful, it must load on top of system variables set to their default values. If you always perform a hot reboot, you always start with default values.

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.
3. Type `mcc_cmd 30000.1 -resethot`.

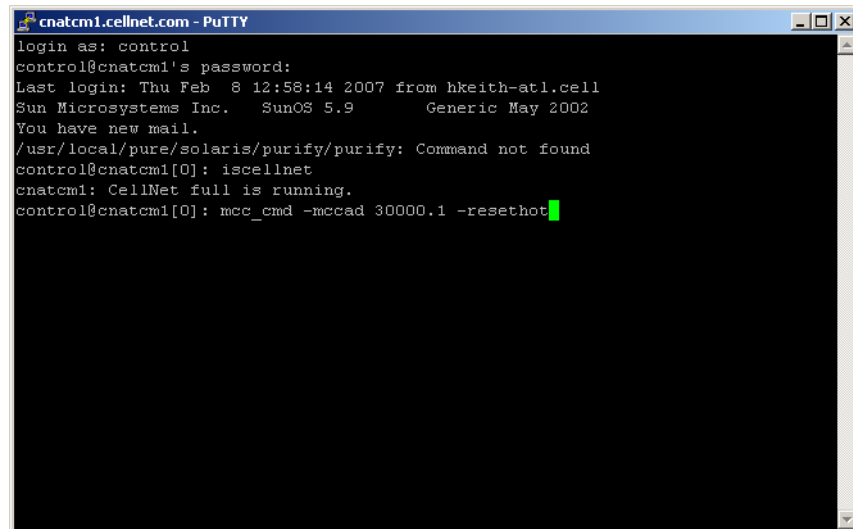


Figure 6 - 3. Hot boot concentrator

Downloading Firmware OTA

The download client program offers several command line options you can use to manage the upgrade process. These options are listed in Table 6-1 on page 65. Mandatory download options include: -mccadd, -session, and -s (image file location).

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.
3. Browse to /usr/cellnet/bin.

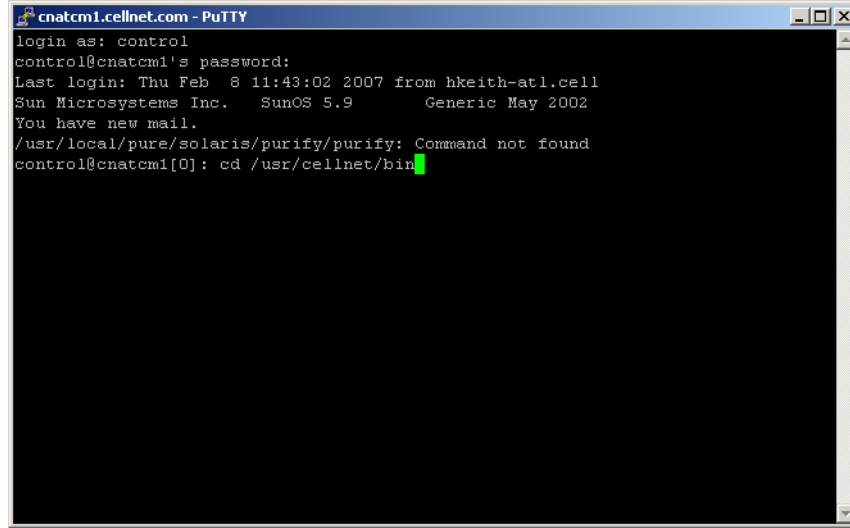


Figure 6 - 4. cd usr/cellnet/bin

4. Launch the download program by typing utlICDownload, then indicate options. For example, type:
utlICDownload -mccad 30000.1 -session 2 -s /home/download/image.bin

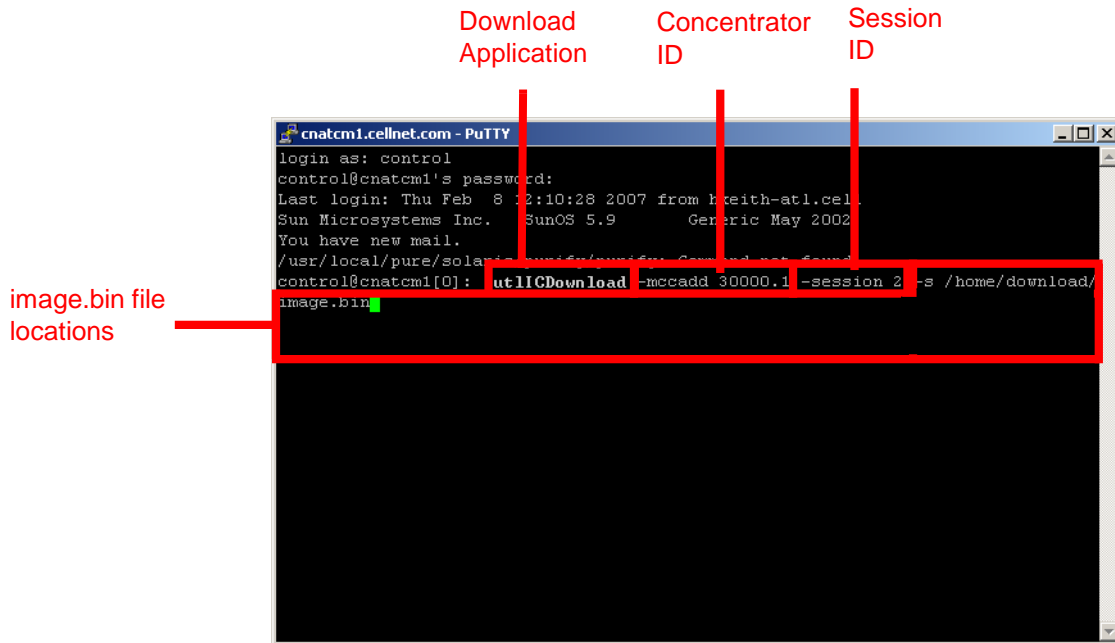


Figure 6 - 5. Launch OTA download program

The following table lists all the options in the download program:

Table 6-1. Download Command Line Switches

Switch	Description
Mccad	Mccad is the concentrator address <net>.<node> which requires a firmware upgrade. Example: utlICDownload -mccad 30000.1 [Args Reqd: 1 defaults: 0.0 format: %lu]
Session	Session is a number between 0 - 255. This is the session ID of the download task for the concentrator. All operations for the download have the same session number. Example: utlICDownload -session 5 [Args Reqd: 1 defaults: 2 format: %lu]
-s CIF file	The code image file (CIF) of the new version to be downloaded on the concentrator is usually present in the /home/download/MCC_Cnctr/ directory. If the directory does not exist, create one and place the image.bin file in that directory. Verify that it is the correct version. Downloading an older or incorrect version can cause loss of communication with the concentrator. Example: utlICDownload -s /home/download/MCCCTR/image.bin [Args Reqd: 1 defaults: 2 format: %s]

Table 6-1. Download Command Line Switches (continued)

Switch	Description
-disconnect	You need the disconnect session ID if the earlier download was terminated before completion. In this case, you must enter all the options of the download command and include the disconnect session ID. That should be the same session number that was terminated earlier. Example: <code>utilCDownload -disconnect 5</code>
-nohotboot	Override automatic disconnect and hotboot to avoid hot booting the MC before the session. In this case, you must start run disconnect and hotboot. Example: <code>utilCDownload -nohotboot -session 5 -mccad 30000.1 -s <filename></code>
-waittime	Time to wait (in seconds) before sending the next packet. The download firmware process sends a total of nine packets. The waittime option allows for a delay between packets sent. Example: <code>utilCDownload -waittime 4 /MCCCTR/image.bin</code> [Args Reqd: 1 defaults: 2 format: %s]
-bankcopy	Copy Concentrator image from B to A. The Concentrator must be running the image from B. This option applies to versions 14.02.06 and greater. Example: <code>utilCDownload -mccad 30000.1 -bankcopy</code>
-debugprint	Dump raw hex. Example: <code>utilCDownload -debugprint</code> [Args Reqd: 1 defaults: 2 format: %s]
-help	Print help information. Example: <code>utilCDownload -help</code>
-query	Get status of concentrator. Example: <code>utilCDownload -query</code>
-switchover	Switchover concentrator. Example: <code>utilCDownload -switchover</code>

Switchover Concentrator

After the download is complete, login to the concentrator to instruct it to switchover.

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.
3. Type
`./utilCDownload -mccad 30000.1 -session 2 -switchover`



The concentrator hot boots after this step.

Concentrator Verification

Verify that the concentrator has booted up with the latest firmware.

1. Open a command window on your PC.
2. Use your administrative credentials to login as control user.
3. Type

```
oms -op getattr -class mcc -mccad 30000.1 -attrnm FWRevision -remote
```

Bankcopy MCC

The Concentrator can send image data from B to memory location A. The Concentrator must be running from location B to ensure the operation is successful.

Copy the image by typing

```
./utlICDownload - mccad 3000.1 -session 2 -bankcopy
```

Restarting a Download

You can interrupt a download to substitute a newer file than the one currently being downloaded.

1. Suspend the client program by typing
`Control + C`
2. Send a disconnect command. At the prompt type

```
utlICDownload -mccad 30000.1 -session 2 -disconnect
```
3. Hot boot the concentrator.

Upgrading Concentrator Firmware Directly via Cable

You can connect a cable to the concentrator and upgrade interior components via direct cable connection or through a wired intranet or hub. Following are direct upgrade procedures. To perform these tasks you need:

- a concentrator
- a serial cable
- an AC power cable
- an intranet connection
- a hub (optional)
- an upgrade CD or link that includes rom.bin and image.bin files
- Hyperterminal
- a command prompt
- Network Configuration Manager

Connecting to the Concentrator Via Cables Using a Router

If you would like to be able to access the intranet from your PC while programming the concentrator, then set up the cables using a router.



Use a router to perform this procedure. This procedure is not designed to work with a switch.

It enables you to share one intranet connection with your PC and your concentrator simultaneously.

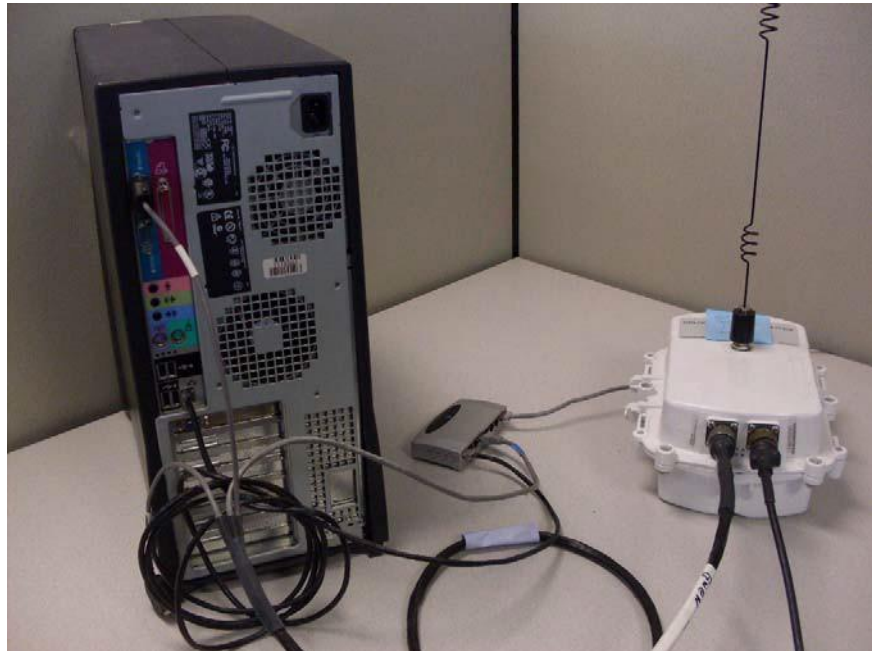


Figure 6 - 6. Diagram of router cable setup

1. Connect the programming cable branch (labeled “Console”) to the concentrator.
2. Connect the ethernet branch (labeled “Ethernet”) to the router.
3. Plug your network cable into the router.
4. Connect the router to the network port on the PC via network cable.
5. Connect the other end of the programming cable to the COM port on the PC.



Do not plug the LPP branch into the PC.

6. Launch Hyperterminal on the PC.



Launch Hyperterminal before supplying power to the concentrator.

7. “Boot Up in Dialog”, type **y** for yes.

8. Connect the AC power cable to the concentrator, and plug the other end into an outlet.

Loading the Concentrator Firmware Via Cables Using a Router

Hyperterminal automatically detects the concentrator. If it does not, close the Hyperterminal session, unplug the concentrator, and start again.

1. Assign the concentrator an IP address.
 - In Hyperterminal, specify the COM 1 port and properties as follows:
 - Bits per second: **9600** baud
 - Data bits: **8**
 - Parity: **None**
 - Stop bits: **1**
 - Flow control: **None**.

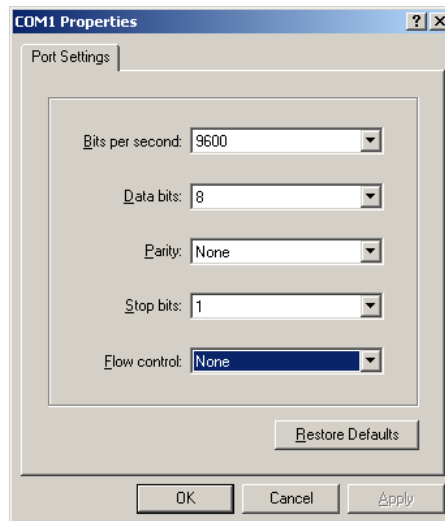


Figure 6 - 7. Hyperterminal COM port and properties

- A. When the Diagnostic Mode menu displays, type **n** to configure network parameters.

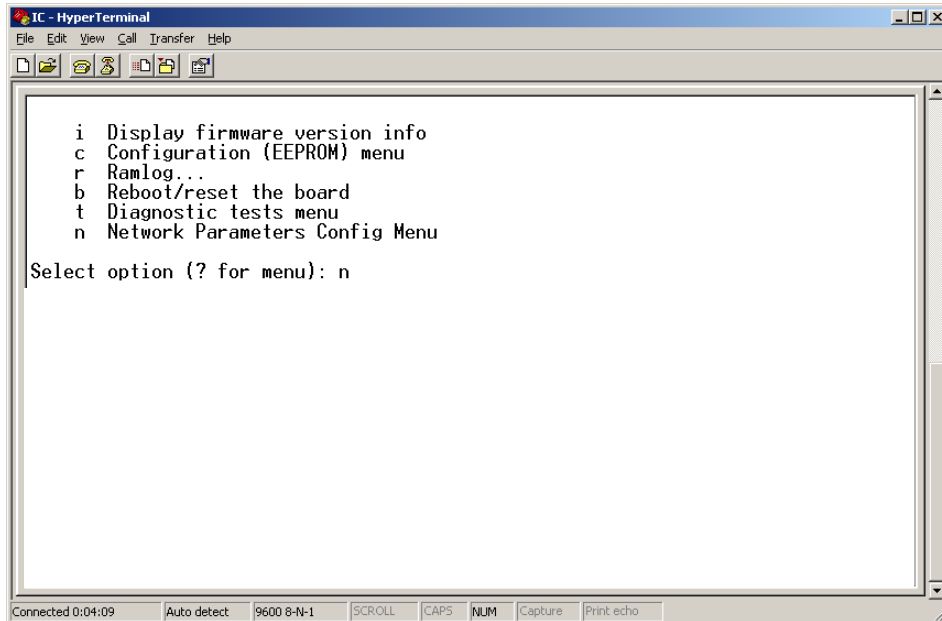


Figure 6 - 8. Hyperterminal configure network parameters

- B. Type **c** for Change Network Parameters.

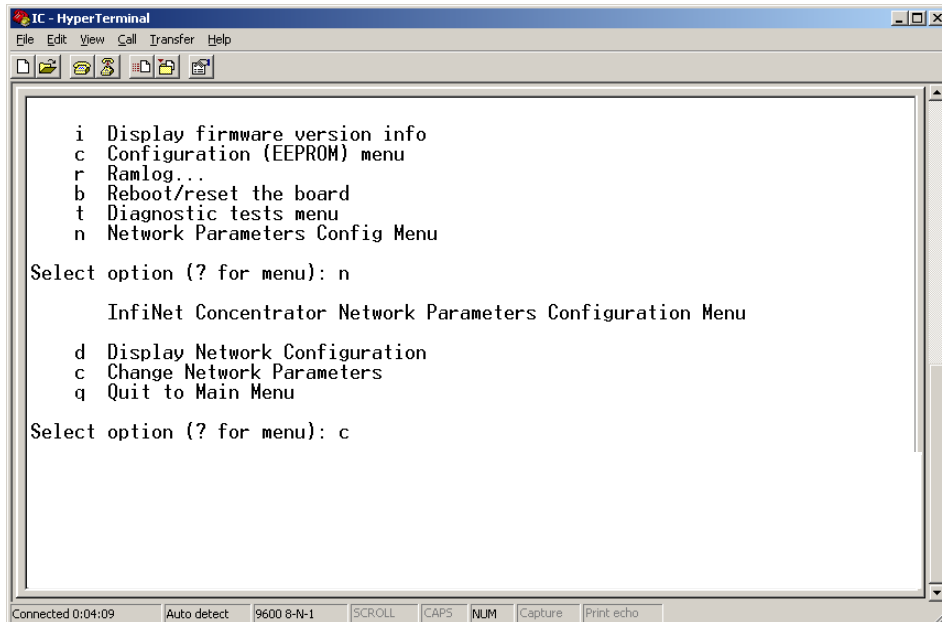


Figure 6 - 9. Hyperterminal change network parameters

C. Type **y** for Yes to go to the network to dynamically obtain an IP address.

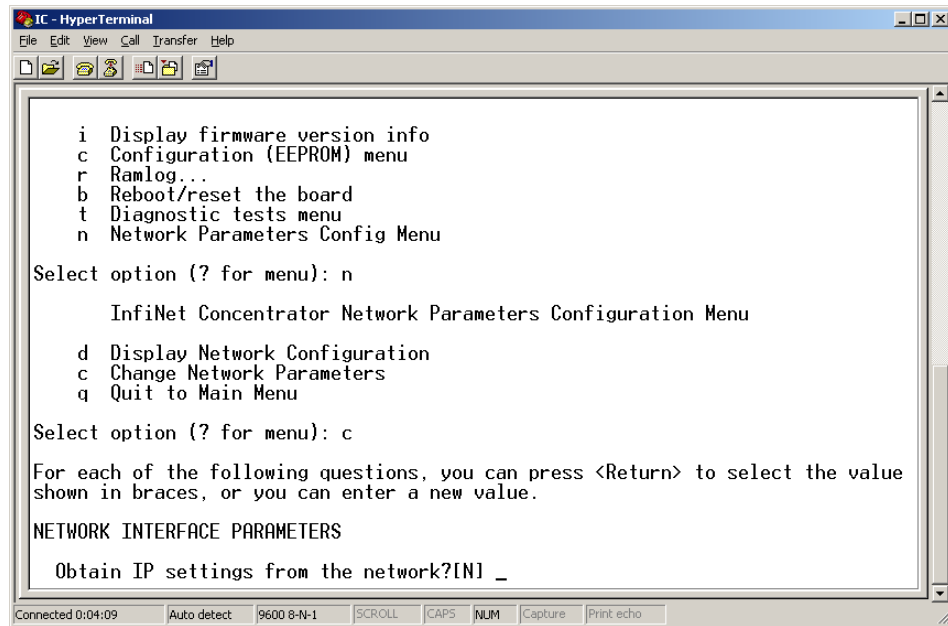


Figure 6 - 10. Hyperterminal obtain IP from network

D. Press the **Enter** key to keep the default options:

- Set IP Address?
- Set Subnet.Mask?
- Set Gateway IP Address?
- Set NAC Address?
- Set Ethernet Duplex Setting?

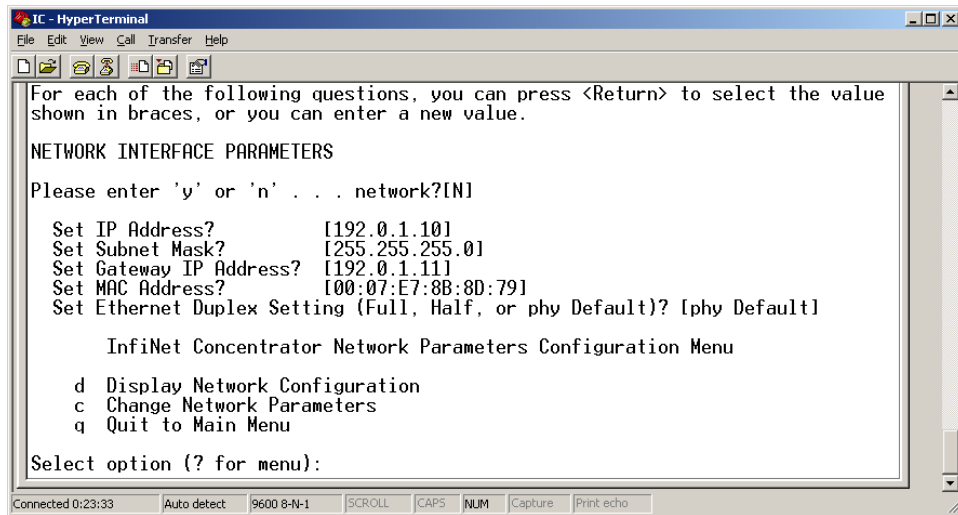


Figure 6 - 11. Hyperterminal keep default settings

- E. Type **q** for Quit. Hyperterminal displays a message to let you know it is saving changes in memory.

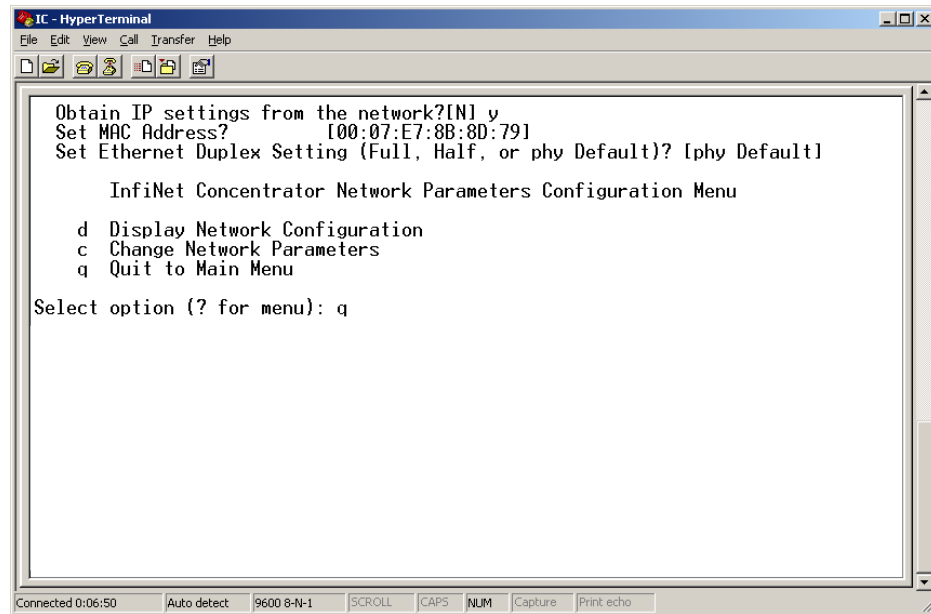


Figure 6 - 12. Hyperterminal quit Diagnostics

- F. Type **b** to Boot the concentrator.
- G. Type **y** for Yes to reset the system. Wait for the reset to complete. When Hyperterminal restarts, it displays new IP address. Note the IP address; you will need it for subsequent steps.
2. Copy the rom.bin and image.bin files to your c:\ drive before starting the update Flash memory process.
 3. Update the rom.bin file.
 - A. Open a command prompt window, usually under **Start | Programs | Accessories**. Keep Hyperterminal open.



Try to position the c:\ prompt and Hyperterminal windows so that you can see both of them at once.

- B. Type ftp, space, and then the IP address just assigned to your concentrator, in this example ftp 172.25.113.82. The command window connects to the CPU to update the rom.bin.

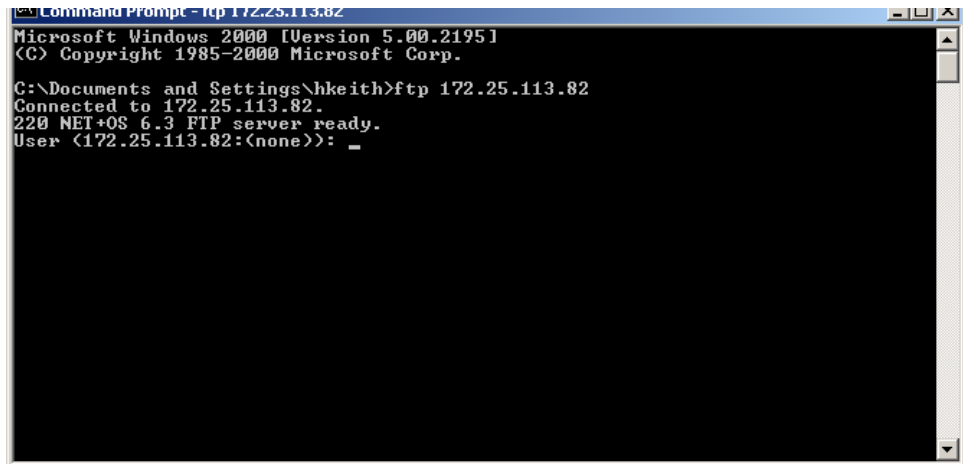


Figure 6 - 13. C:\ prompt

- C. Type the user root then the **Enter** key. The user is case-sensitive.

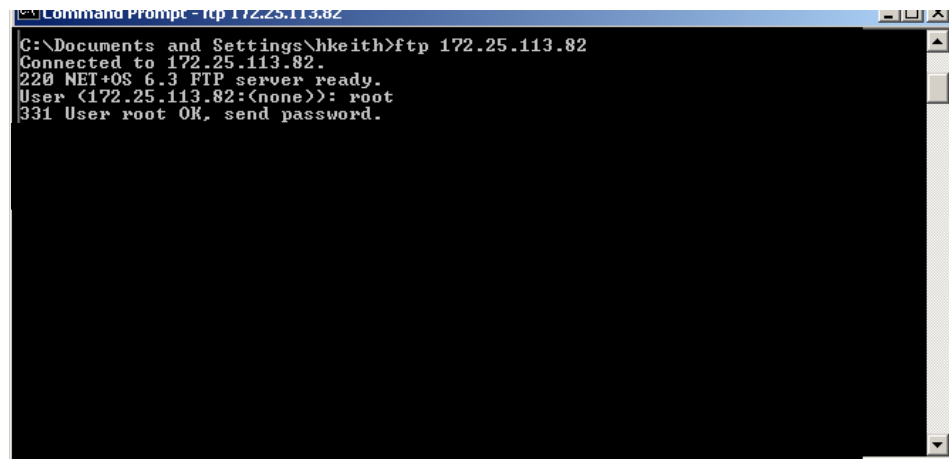


Figure 6 - 14. C:\ root

- D. Type password Netsilicon or password, then the **Enter** key. This password is case-sensitive.
- E. Type bin, then the **Enter** key.



Skipping this critical step corrupts the image on your concentrator.

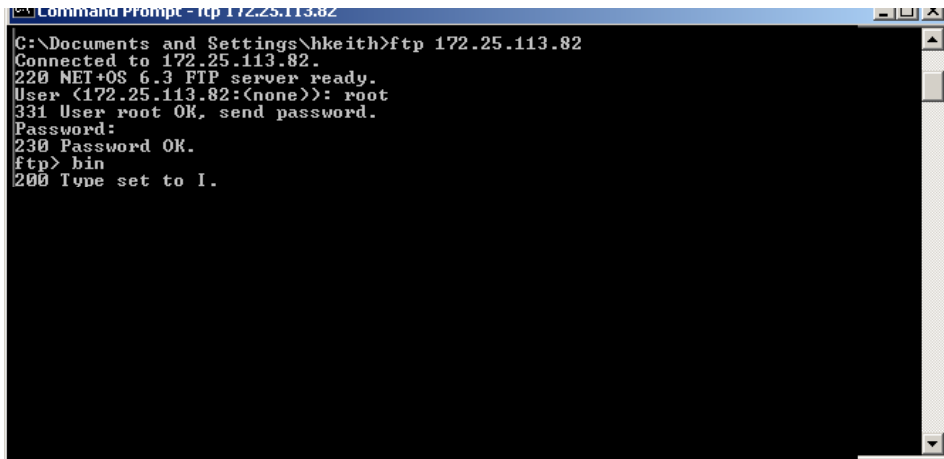


Figure 6 - 15. c:\password

F. Type `put c:\rom.bin`, then the **Enter** key

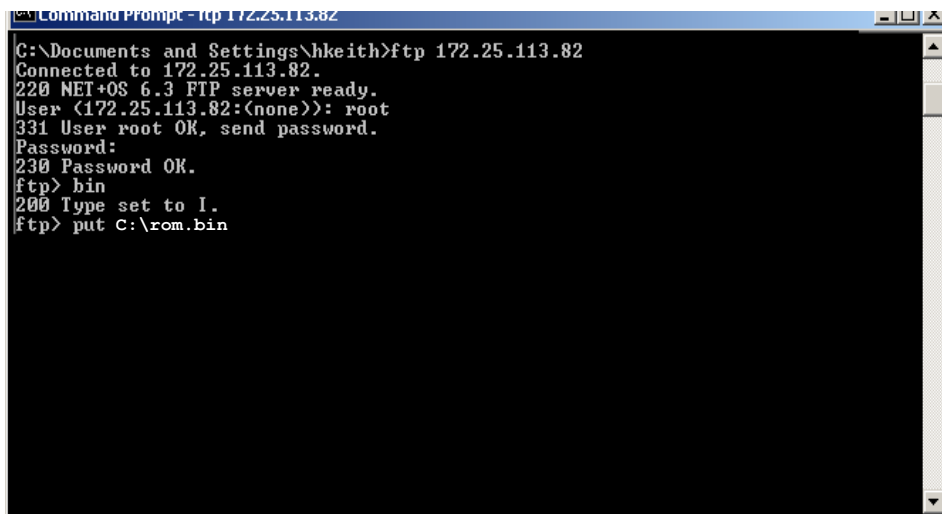


Figure 6 - 16. .put C:\rom.bin



If the bin files are located somewhere other than the C:\ drive, type the correct file path in this step.

G. Type `bye`.

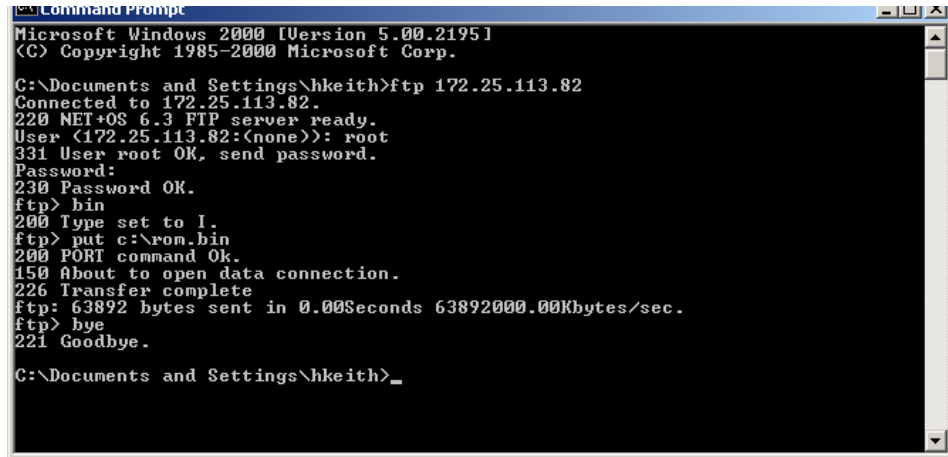


Figure 6 - 17. `C:\bye`



After a few seconds, Hyperterminal displays messages to confirm a successful restart. When you see the message “Ramlog Read Successful,” you can continue with the programming process.

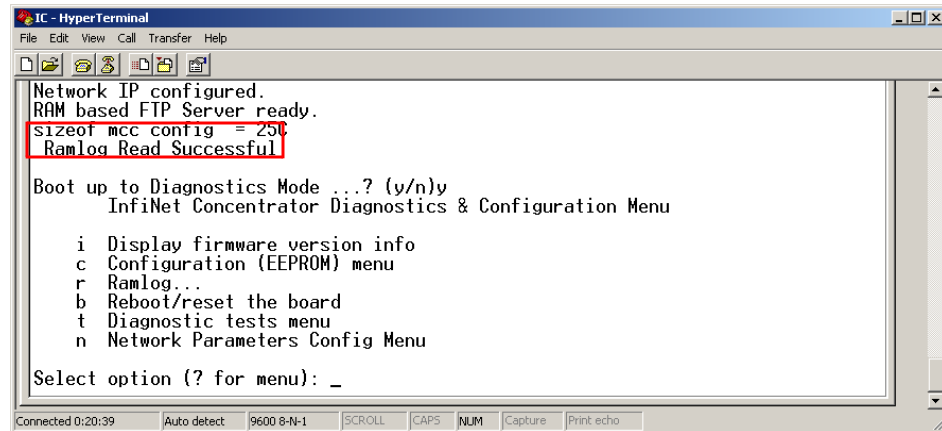


Figure 6 - 18. Ramlog read successful message

4. Boot to Diagnostics Mode by typing `y` for yes in the Hyperterminal window.
5. Update the image.bin file.
 - A. Open a command prompt window, usually under **Start | Programs | Accessories**.

- B. Type ftp, space, and then the IP address just assigned to your concentrator, for example ftp 192.0.1.10. The command window connects to the CPU board to update the image.bin.

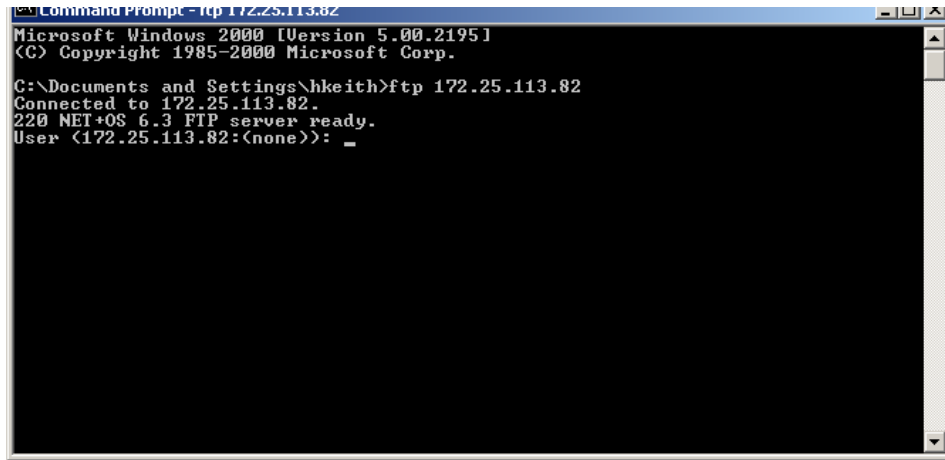


Figure 6 - 19. C:\ prompt

- C. Type user root, then the **Enter** key. The user is case-sensitive.

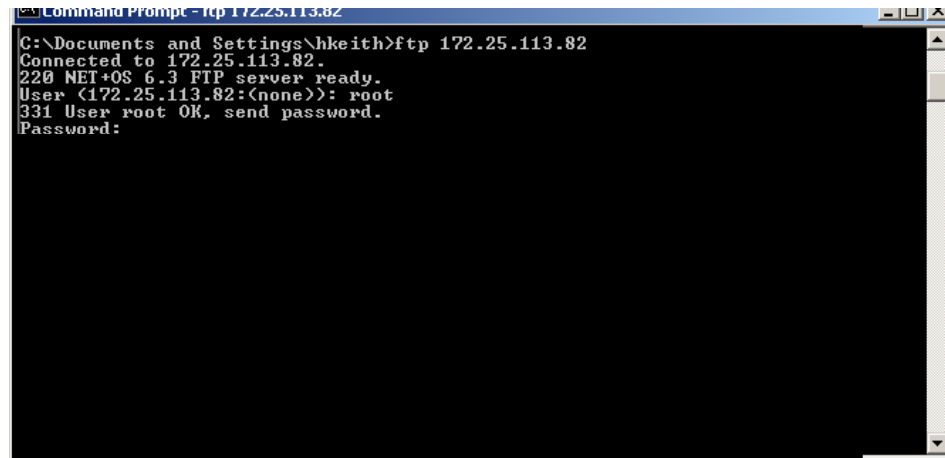
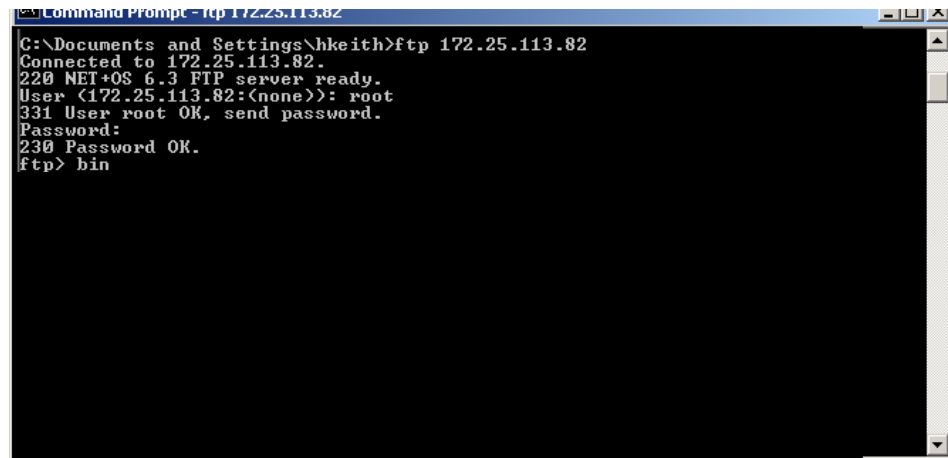


Figure 6 - 20. C:\root

- D. Type password Netsilicon or password, then the **Enter** key. This password is case-sensitive.
- E. Type bin, then the Enter key.



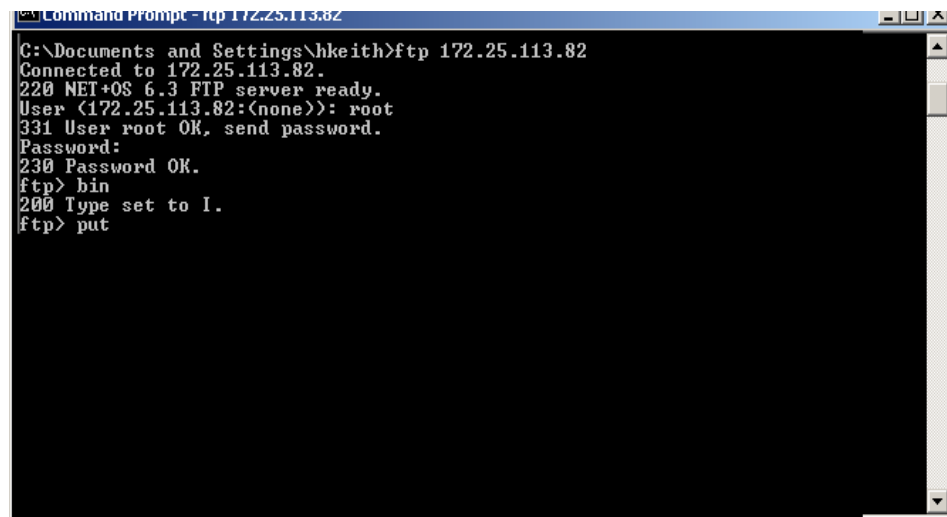
Skipping this critical step corrupts the image on your concentrator.



```
Command Prompt - ftp 172.25.113.82
C:\Documents and Settings\hkeith>ftp 172.25.113.82
Connected to 172.25.113.82.
220 NET+OS 6.3 FTP server ready.
User (172.25.113.82:(none)): root
331 User root OK, send password.
Password:
230 Password OK.
ftp> bin
```

Figure 6 - 21. C:\Netsilicon

F. Type `put c:\image.bin`, then the **Enter** key.



```
Command Prompt - ftp 172.25.113.82
C:\Documents and Settings\hkeith>ftp 172.25.113.82
Connected to 172.25.113.82.
220 NET+OS 6.3 FTP server ready.
User (172.25.113.82:(none)): root
331 User root OK, send password.
Password:
230 Password OK.
ftp> bin
200 Type set to I.
ftp> put
```

Figure 6 - 22. put C:\image.bin.



If you saved the bin files somewhere other than the C:\ drive, then type the correct file path in this step.

G. Type `bye`.

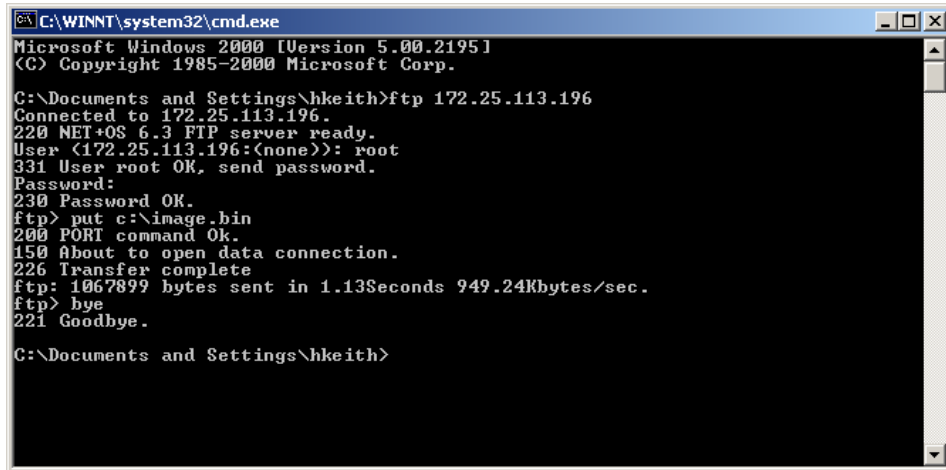


Figure 6 - 23. C:\bye



After a few seconds, Hyperterminal displays messages to confirm a successful restart. When you see the message “Ramlog Read Successful,” you can continue with the programming process.

- 6. Boot to Diagnostics Mode by typing `y` for yes in the Hyperterminal window.
- 7. When the command prompt displays a message to say the transfer is complete, type `bye` to reset the board.
- 8. Return to Hyperterminal. Type `y` for Yes to return to the Diagnostics menu.



Return to Diagnostics quickly, or Hyperterminal tries to obtain another new IP address.

- 9. Confirm the subnet mask address.

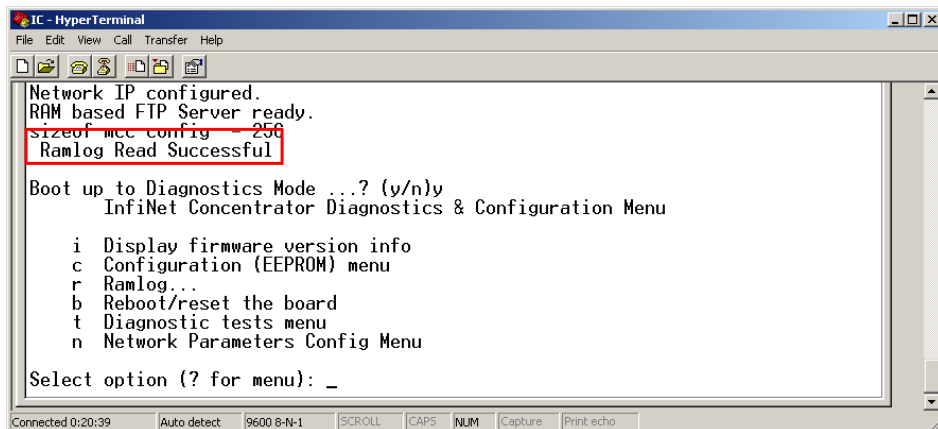


Figure 6 - 24. Ramlog read successful message

H. In the Diagnostics Menu, type **n** for Network Parameters Config Menu.

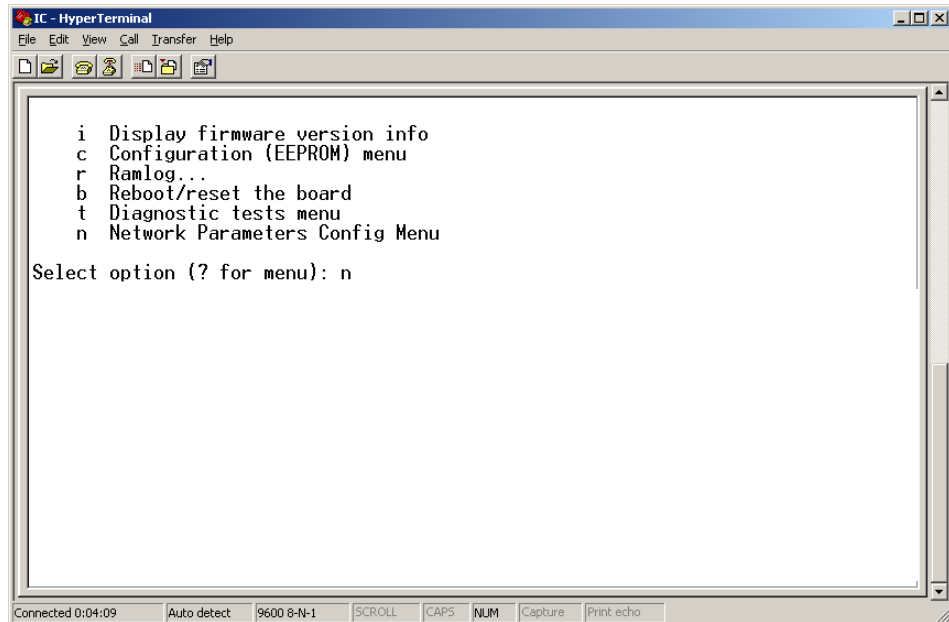


Figure 6 - 25. Hyperterminal network configuration

I. Type **c** for Change Network Parameters.

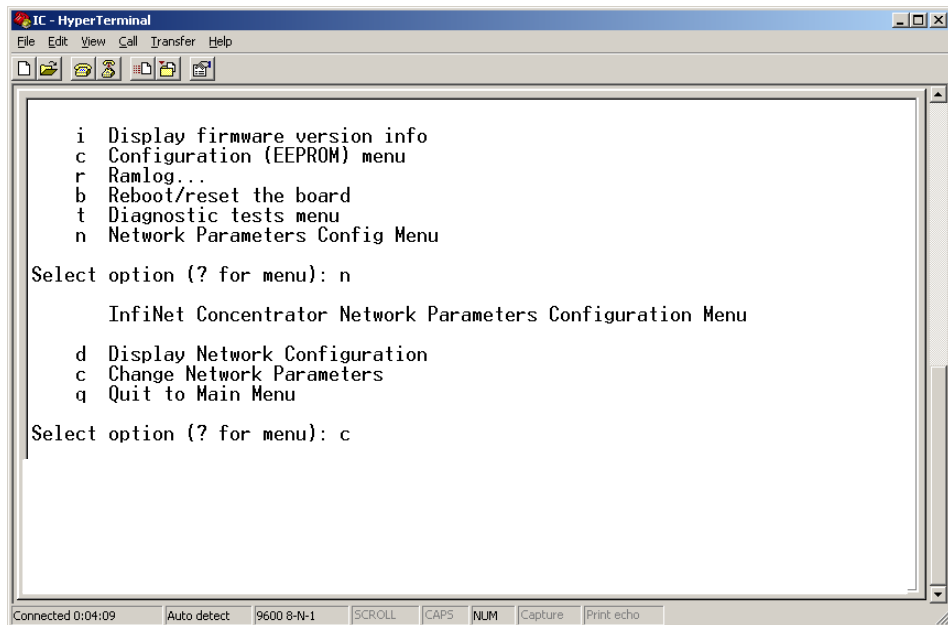


Figure 6 - 26. Hyperterminal change

J. Press the Enter key at **N** to specify a static IP.

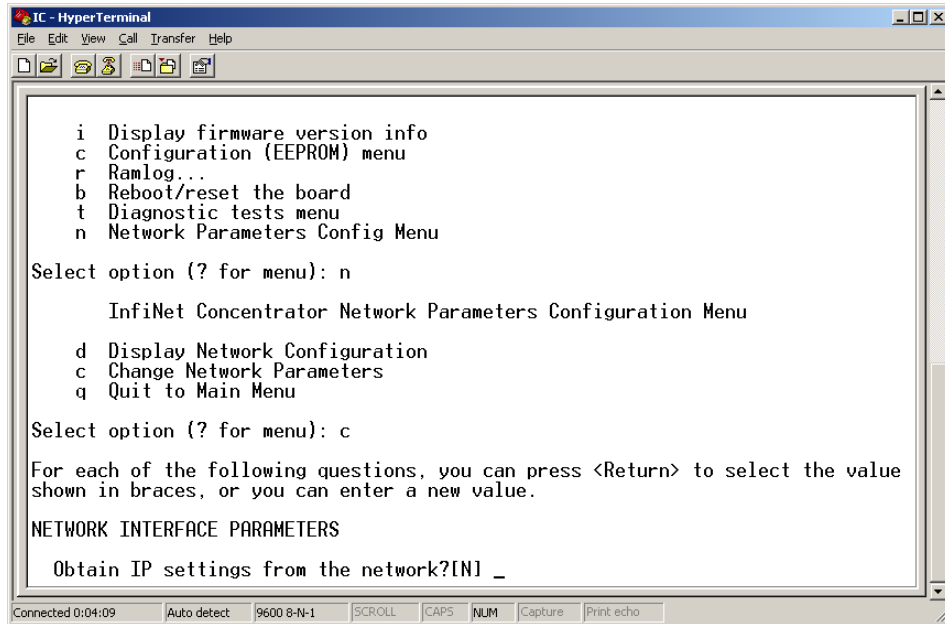


Figure 6 - 27. Hyperterminal no

K. At the Subnet mask prompt, re-type the subnet indicated by Hyperterminal.

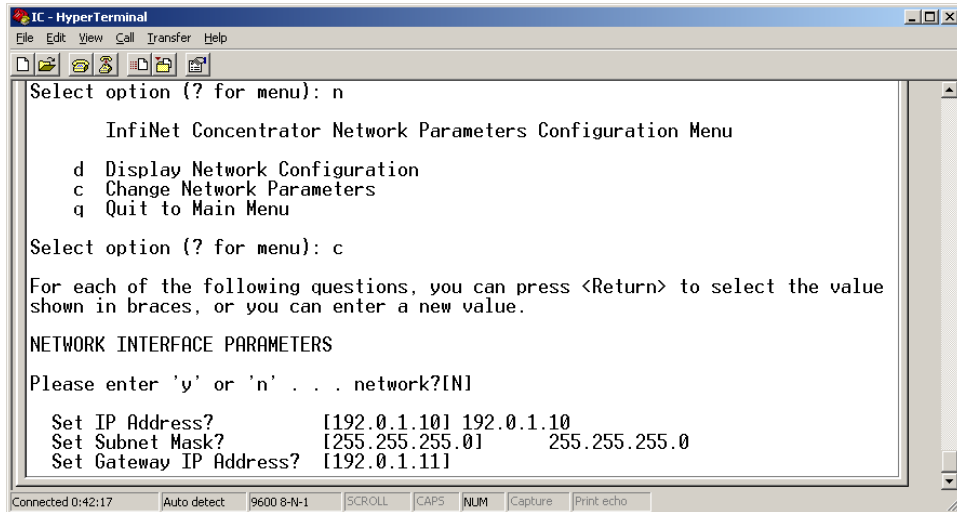


Figure 6 - 28. Hyperterminal re-type subnet mask

L. Press the **Enter** key for the rest of the default options:

- Set IP Address?
- Set Subnet.Mask?
- Set Gateway IP Address?
- Set NAC Address?

M. Set Ethernet Duplex Setting?

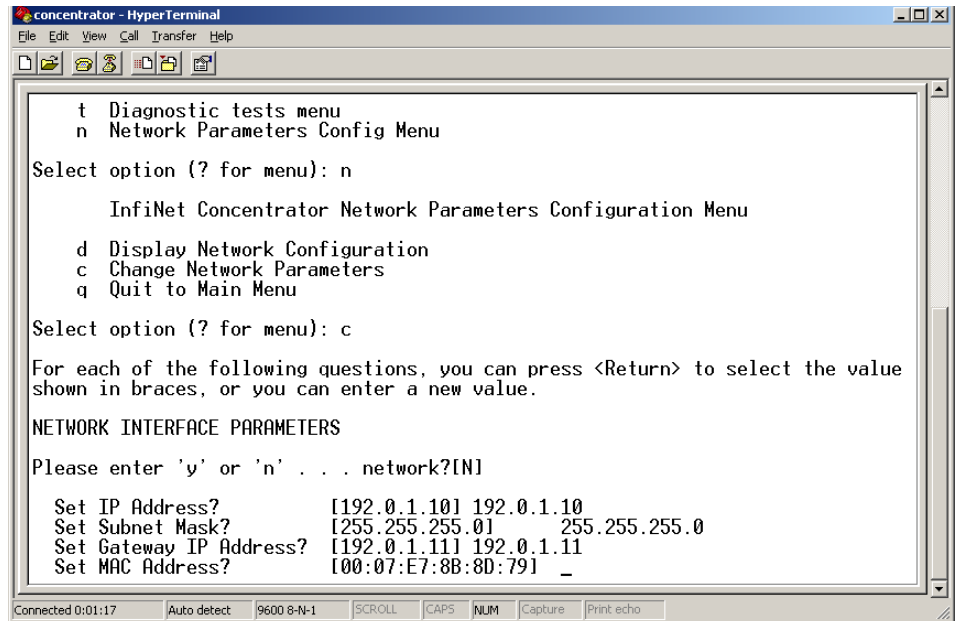


Figure 6 - 29. Hyperterminal accept default network options

N. Type q for Quit.

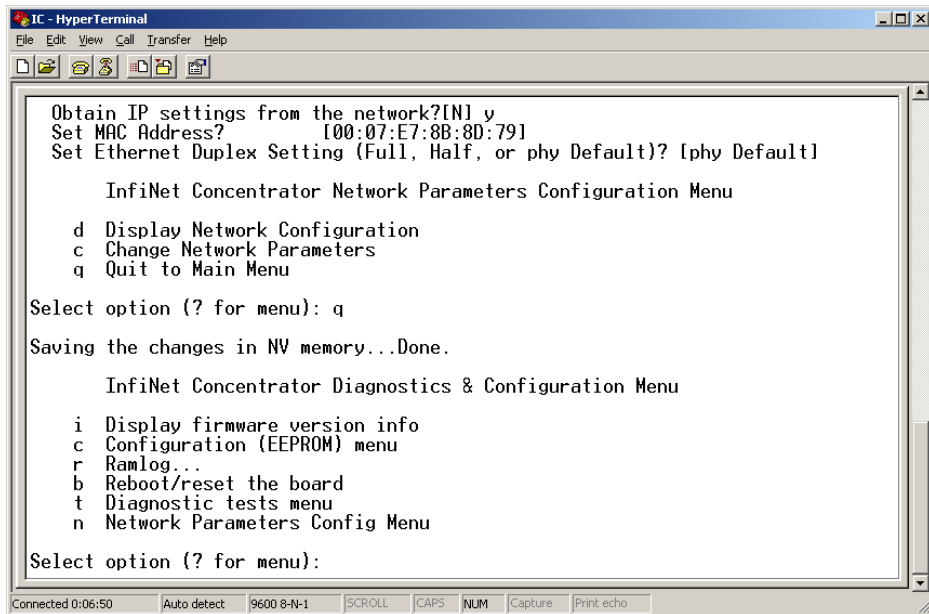


Figure 6 - 30. Hyperterminal quit

Testing the Concentrator

Test the concentrator to verify that it has been programmed correctly.

1. Unplug the ethernet cable from the router.
2. In the Diagnostics menu, type **b** to reboot the concentrator system.

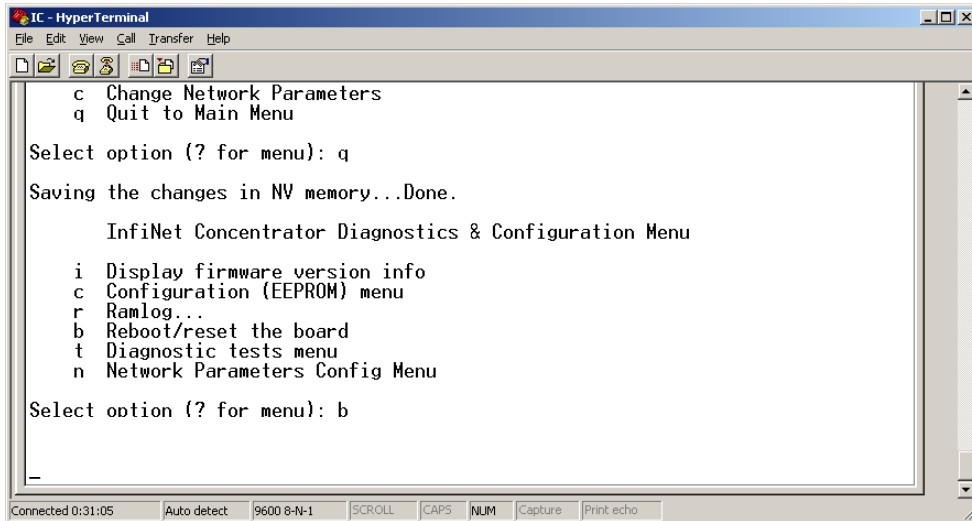


Figure 6 - 31. Diagnostic Menu

3. Hyperterminal reboot



If the Diagnostics Menu does not display, then start over again from the first step in this section.

4. Type **y** to Yes, reset the system. Wait for the system to boot into normal operation.

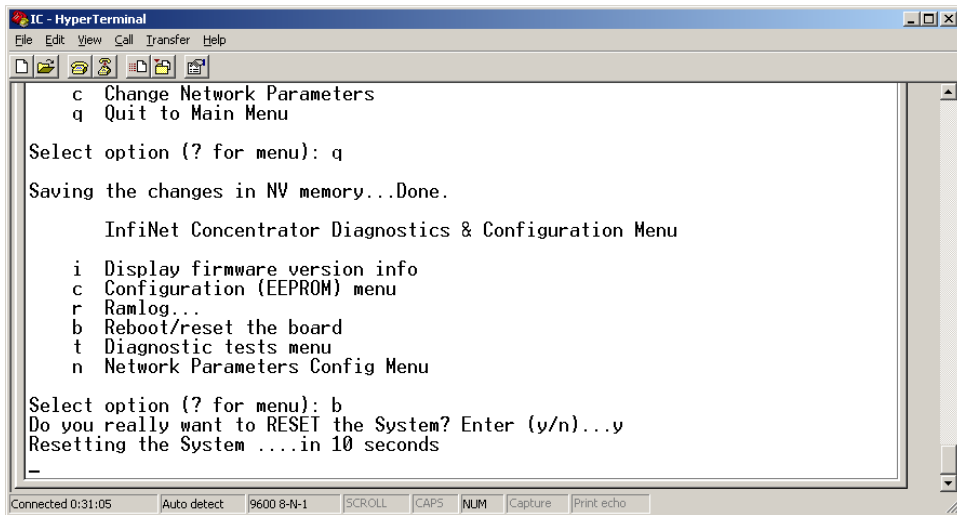


Figure 6 - 32. Hyperterminal rebooting message

5. Type **i** to display firmware version information.

6. Verify the version number.

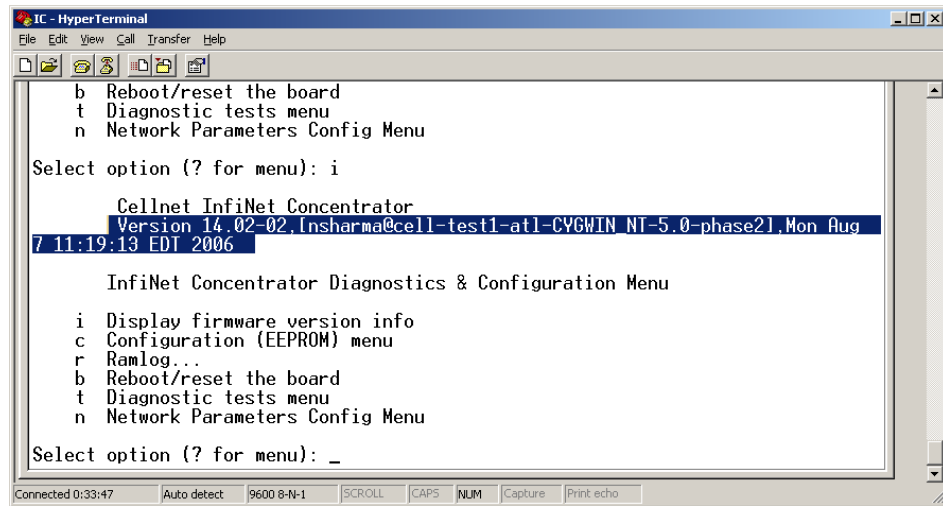


Figure 6 - 33. Hyperterminal reboot

7. Unhook all the cables.

Upgrading IWR Radio Firmware

To perform these tasks you need:

- Direct or OTA concentrator connection
- RadioShop

Specific instructions for updating the IWR firmware using RadioShop are in the *RadioShop Getting Started Guide*.

Upgrading the Radio's DCW

A Device Control Word (DCW) is a program written in the UtiliNet programming language. DCWs execute within UtiliNet devices and provide the ability to control the device. The DCW interacts with firmware and directs the radio to do things such as reboot or perform advanced functions.



For instance, the MCCTIME.hex DCW contains the current version of MCC Helper. MCC Helper queries the radio to get its ID, and begins sending discovery packets to the assigned Take Out Point.



If you are upgrading to DCW version 1.16F, see “Field Upgrade to DCW 1.16F” on page 117.

Upgrade the concentrator's DCW with Network Configuration Manager tool, via direct or OTA connection.

1. Open the Network Configuration Manager tool.
2. Connect to the concentrator's radio.
3. Click the **Load DCW** button.
4. Select the DCW from the file list.
5. Click the **Open** button.
6. The DCW loads and a series of messages display along the status bar of the Network Configuration Manager window.
7. Network Configuration Manager displays a message when the DCW loads successfully.



The MCC Helper DCW displays in the DCW section of the window. Verify with customer support at CustomerSupport@landisgyr.com that you have the most current version.

For more information about working with DCWs, see the *Network Configuration Manager Users Guide*.

7

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 7 - 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
- **ServiceLongitude:** LONG
- **ServiceLocation:** Same as InstalledMeterNo
- **ServiceTimeZone:** See “Time Zone” on page 87.

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.

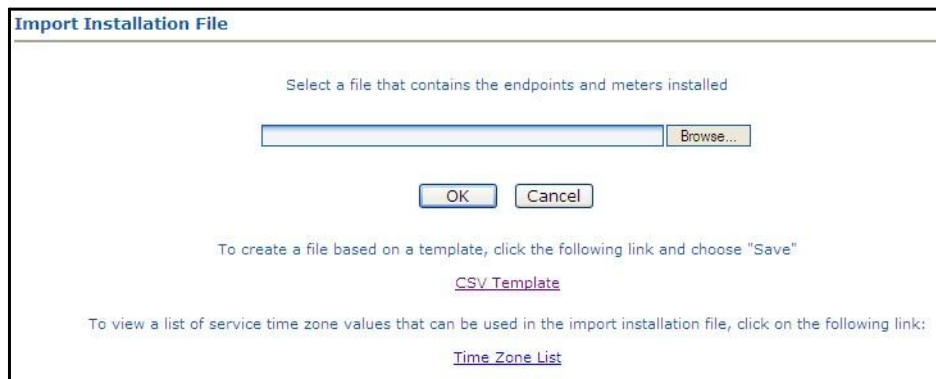


Figure 7 - 2. Import Installation File Window

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.

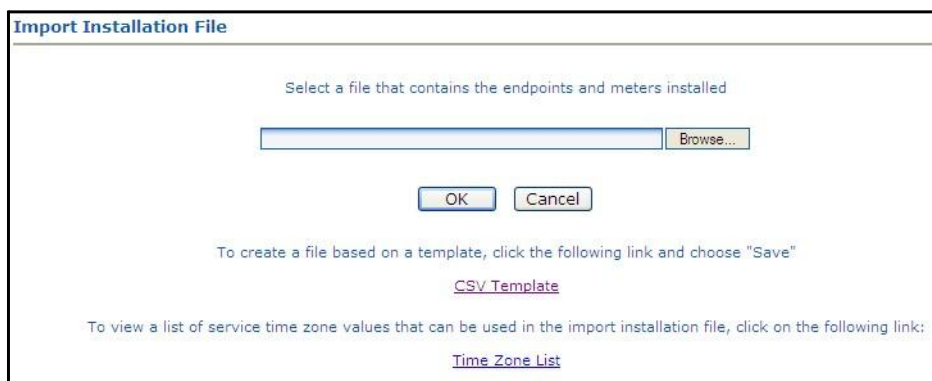


Figure 7 - 3. Import Installation File Window

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

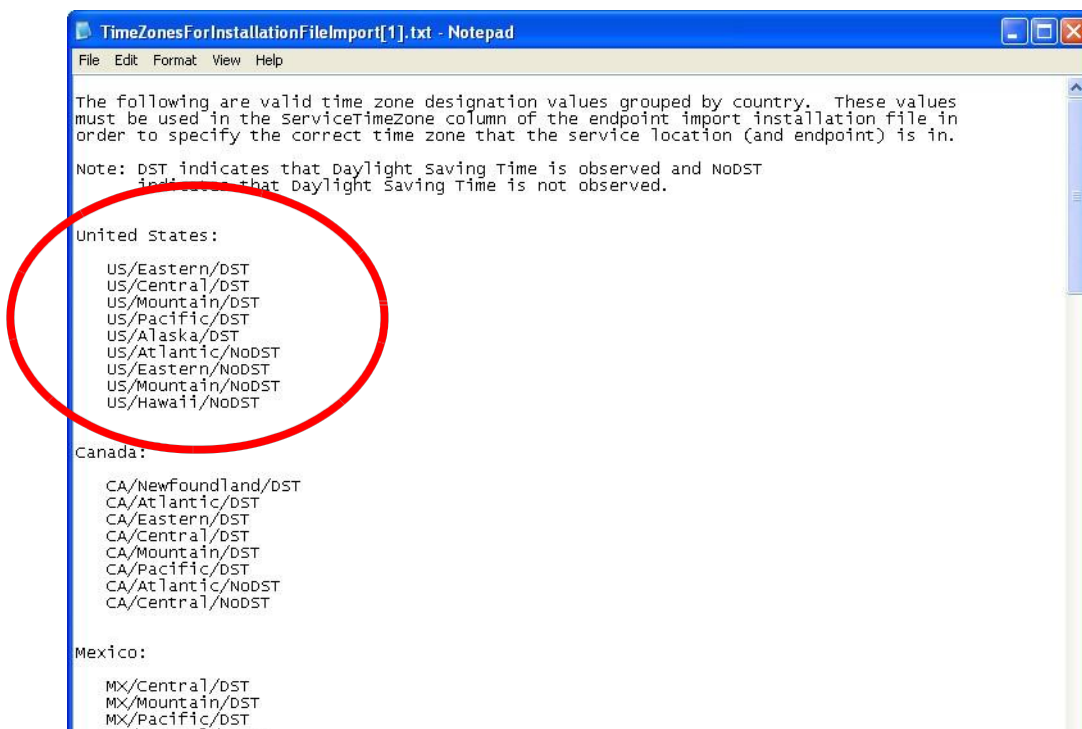


Figure 7 - 4. Time Zone List

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.

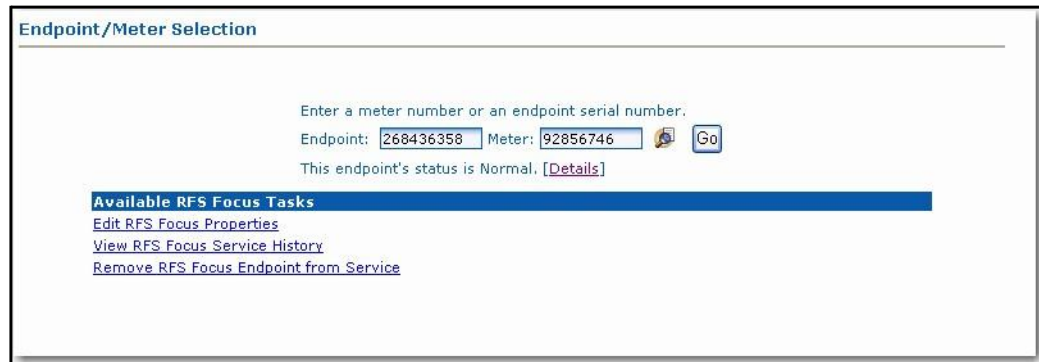


Figure 7 - 5. Endpoint/Meter Selection Available RFS Focus Tasks

4. From the **Available Tasks**, select the **Remove Endpoint from Service** link. The **Remove Endpoint From Service** window will open, shown in Figure 7 - 6.

Figure 7 - 6. 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.

8

Troubleshooting

This chapter lists common issues and steps to take to solve related problems. Contact Landis+Gyr Customer Operations at help@landisgyr.com with questions.

Verifying Configuration

If the network does not discover a concentrator, verify that the correct Network ID and destination are programmed into the radio. If so, then verify that the radio can communicate with the TOP.



The Network Configuration Manager application is required to perform these steps.

To verify communications with the TOP, use the ping command in the Network Configuration Manager application. This sends a message to the TOP and back to verify the TOP exists. Ping while plugged directly into the concentrator via a cable or over the air via another radio from the ground that is connected to the concentrator.

- If the ping is not successful, double-check the destination or choose another TOP.
- If the ping is successful, ensure that the radio is able to read the MCCID in the CPU.

To check the CPU, connect to the radio, and then locate the MCCID (in format MCC Helper v1.16a (130603) from the DCW list on the Network Configuration Manager main screen, as shown in Figure 8 - 1.

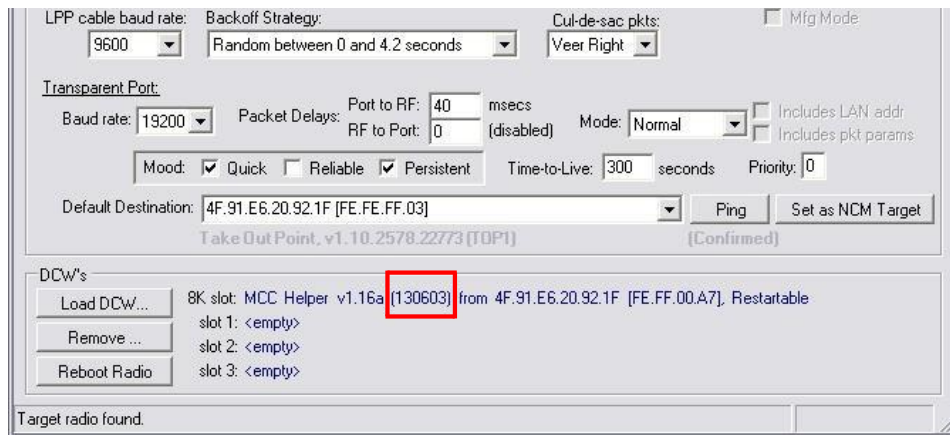


Figure 8 - 1. MCCID

If the MCCID is zero (in format MCC Helper v1.16a (0) from 4F.91.E6.20.92.1F [FE.FF.00.A7]), a CPU configuration failure occurred and the DCW was unable to

communicate with the CPU. To configure the CPU so it can communicate with the DCW, complete the following steps:

1. Connect to the CPU using Hyperterm, and then select **Y** in the Boot screen to boot the unit into diagnostic mode.
2. Type **C**.

The EEPROM Configuration menu is displayed for you to verify information.

3. Verify or edit the programmed values for:

- MccNetAddress
- MccNodeAddress
- LogMgrNetAddress
- LogMgrNodeAddress
- AlarmNetAddress
- AlarmNodeAddress
- MinutesFromGMT
- DayLightSavingsType

Follow the instructions and exit the EPROM menu, booting only if requested by the unit.

A

Performance

Product Specifications

Table A-1. Product Specifications

Element	Description
Concentrator Dimensions (excludes antennas)	H x W x D 4.9"x11.82"x9.30"
Antennas	Three (3), one on top and two on the bottom. Typical antenna length is 17.5".
Weight	12.5 Lbs.
Operating Frequency Band	902-928 MHz
Transmit Output Power	21, 25, 30 dBm (user selectable)
Standards Compliance	FCC Part 15, Class B
Operating AC Voltage	Autoranging 120-277
Operating Temperature	-40°C to 85°C
Storage Temperature	-40°C to 85°C
Color	White
Enclosure Material/Type	Aluminum/NEMA-4
Battery Backup Time	8 hrs, typical
Data Storage	3 days, typical
Backup Battery	Sealed lead-acid 12V 4.5 Amp/hr battery
Mounting Options	Utility pole and streetlights
Communication Technology	Direct Sequence Spread Spectrum - LAN, Asynchronous Frequency Hopping Spread Spectrum - WAN
Modulation Scheme	On/Off Keying (OOK) - LAN Frequency Shift Keying (FSK) - WAN
Number of Network Elements Under Control	<ul style="list-style-type: none">• 1500 max. Communication modules, max• 500-1,000 modules, typical
Regulatory Devices Supported	Electric (kWh, Kvar), Gas, Water

Table A-1. Product Specifications(Continued)

Element	Description
Types of Data Available	Consumption, TOU, Peak Demand, Interval Load Profile, Power Quality
Critical Alarms	Power Outage, Communication Loss

Power Statistics

Table A-2. Power Statistics

Voltage In (Vac)	Current In (Amps)	Load	Power In (W)
120	0.151	Battery charged/transmitting	12.75
240	0.086	Battery charged/transmitting	12.15
120	0.085	Battery charged/receive only	6.35
240	0.050	Battery charged/receive only	6.35
120	0.200	Battery charging/transmitting	17.13
240	0.120	Battery charging/transmitting	16.00

WAN Statistics

Table A-3. WAN Stats: General

Element	Description
Frequency Range	License-free, 902-928 MHz
Channels	240
Channel Spacing	100 kHz
Raw RF Data Rate	9600/19,200 bps
Spreading Technique	Frequency Hopping
Hopping Technique	Pseudo Random, Asynchronous
Hopping Patterns	65,536 (Unique per Network)
Network Address	Latitude/Longitude Coordinates
Frequency Stability	2.5 ppm

Table A-4. WAN Stats: EMI & Power/Control Susceptibility

Element	Description
Electromagnetic Radiation	FCC Class B, Part 15.247
Electromagnetic Susceptibility	ANSI C37.90.2 Modified
Surge Withstanding Capability	ANSI C37.90.1 and ANSI C62.41
Electrostatic Discharge	IEC 801.2

Table A-5. WAN Stats: Agency Approvals

Element	Description
FCC Certified	Part 15.247

B

Compliance

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.



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

RF Exposure

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

C

Bench Testing

The Concentrator Test Bench verifies the following critical functionality before deployment to the field.

- WAN connectivity (DCW and UtiliNet radio configuration).
- CPU configuration.
- LAN transceiver status.

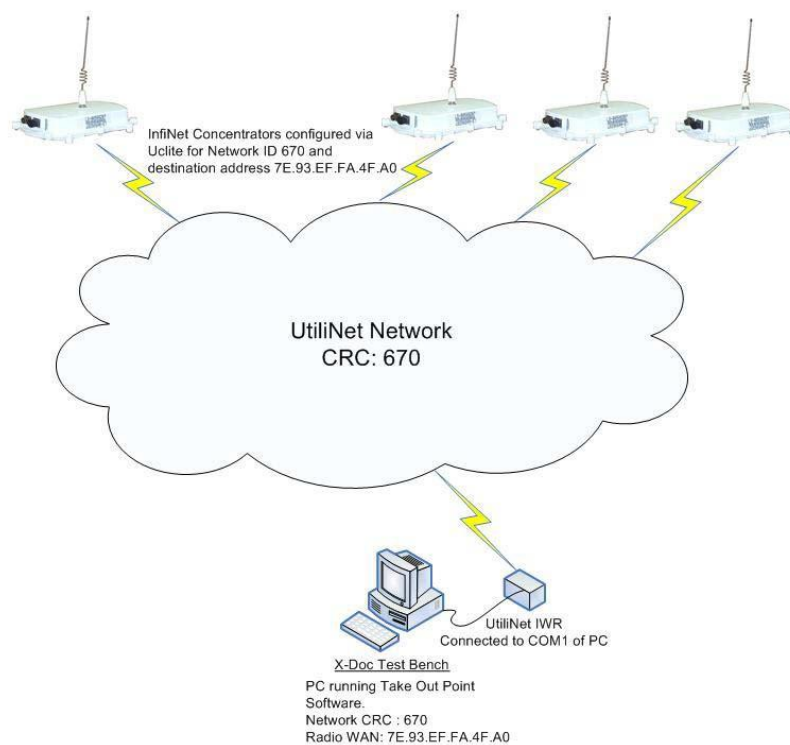


Figure C.1 Cross Dock Test Setup

The test setup consists of about 10 to 15 concentrators configured to work with the UtiliNet test network (Network ID 670).

Testing Concentrators

The steps involved in the test process are explained below.

1. Configuration.

Configure the concentrators in the test bench 24 hours before starting the test.

2. Verification.

Perform the actual test verification procedure at least 24 hours (up to 48 hours) prior to the deployment.

3. Reconfiguration.

Before the final deployment, reconfigure concentrators for the utility Network ID. Modify the default destination address to one of the utility TOPs.

Configuration

Both the Console/LAN Packet Protocol cable (PN 19-1126) and the Network Configuration Manager application are required to configure the WAN radio in the concentrator. The test Network ID and the Default Destination address of the test TOP are highlighted in Figure C.2.

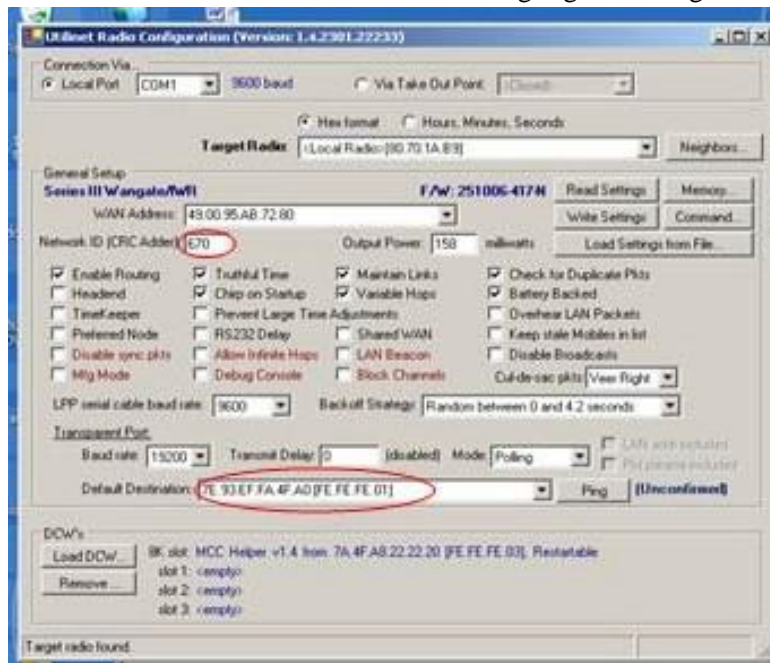


Figure C.2 Sample Network Configuration Manager Settings for Concentrators

Verification

To verify the operational condition of the concentrator:

1. Connect the Console port DB9 connector of the Console/LAN Packet Protocol cable (PN 19-1126) to the COM port of a laptop or a PC.
2. Configure the port for the following:
 - 9600 baud
 - 8 bits

- No parity
- 1 Stop bit
- No flow control

Check the concentrator via the console menu interface. There are three components:

- WAN Health Check
- CPU and Configuration Check
- LAN Health Check

WAN Health Check

The WAN health is determined based on the TIME exchange between the CPU and the UtiliNet WAN Radio. WAN conditions and their interpretation are provided below.

Ideal WAN

Figure C.3 shows output under ideal conditions. This scenario indicates that the CPU to UtiliNet Radio serial communication and the UtiliNet network is operational.

```
Boot up to Diagnostics Mode ...? (y/n)

Waiting for TIME from UtiliNet Radio...

Press Any Key to continue without time...

Parsed Frame: 00 00 00 00 00 00 F1 44 63 C0 7E

Time = 0x4463C07E 1147388030

Got for TIME from UtiliNet Radio...

System Startup at Thu May 11 18:53:50 2006
```

Figure C.3 Boot up WAN

Inconsistent WAN

This condition indicates that the CPU is communicating with the UtiliNet Radio. However, the UtiliNet radio is not able to acquire time. If the time is not acquired in 2 to 3 minutes, the UtiliNet

network in the cross dock is not operational. Check the test TOP application, the UtiliNet Radio connected to the test Take Out Point, UtiliNet antennas, etc.

```

ACE: Have IP address on interface eth0: 192.168.0.6
Network IP configured.
RAM based FTP Server ready.
Size of mcc config = 228

Boot up to Diagnostics Mode ...? (y/n)
Waiting for TIME from UtiliNet Radio...
Press Any Key to continue without time...
Parsed Frame: 00 00 00 00 00 00 F1 00 00 00 00
Time = 0x0 0
Parsed Frame: 00 00 00 00 00 00 F1 00 00 00 00

```

Figure C.4 Broken WAN

Inoperable WAN

This condition indicates that the communication between the UtiliNet Radio and the CPU is inoperable (or) the UtiliNet radio is not configured correctly.

1. Configure the UtiliNet radio into the cross-dock test network as described above.
2. Make sure that the “MCCTIME” Helper DCW is loaded in the radio. A device control word (DCW) is a program written in the UtiliNet programming language. DCW programs execute within UtiliNet devices and provide the ability to control the device. The DCW sits on top of the firmware and directs the radio when it is time to reboot or perform advanced math functions.
3. Power cycle the concentrator and check for the time again.



If the concentrator still does not pick time, then the unit has a inoperable WAN.

```

Boot up to Diagnostics Mode ...? (y/n) DTT Read Successful

Waiting for TIME from UtiliNet Radio...
Press Any Key to continue without time...
.....

```

Figure C.5 Broken WAN

CPU Configuration Check

To perform a check on the CPU configuration:

1. From the Main Menu, go to the EEPROM configuration menu and verify the relevant EEPROM configuration parameters.
2. From the concentrator EEPROM Configuration Menu display the configuration. Scroll down the page that starts with "+Asap store&forward evt group size [0..65535;default=14]: 14".
3. Verify that the following highlighted parameters are set to 0.

```

+Asap store&forward evt group size [0..65535;default=14]: 14
Decaying average Time constant 1 [1..255;default=1]: 1
Decaying average Time constant 2 [0..255;default=2]: 2
Decaying average Time constant 3 [0..255;default=2]: 2
+Decaying average sampling time (in hours) [4..24;default=24]: 24
+Lan PFM stats poll rate (seconds) [0..3024000;default=900]: 900
OFT max total time to group requests (seconds)
[0..3600;default=300]: 300
OFT max interim time to group requests (seconds)
[0..300;default=30]: 30
+TOMM Power Outage Suppression Timer (minutes)
[1..65535;default=12]: 12
+MCC Tomm Power Up Event SieveOperation (0=Summarize, 1=Forward)
[0..255;default=0]: 0
Pfm Tx throttle time (in msec) [0..65535;default=0]: 0
Pfm Tx randomizer time (in msec) [0..65535;default=0]: 0
+Noise decay value (samples) [0..15;default=3]: 3
Boot From Bank (0=A, 1=B) [0..1;default=0]: 0
Force Download to Bank (0=A, 1=B) [0..1;default=0]: 0
Gateway MCC Firmware Version in Bank A [default=0]: 0
Gateway MCC Firmware Version in Bank B [default=0]: 0
Gateway MCC Ramlog Start Address in Flash [default=0]: 0
Gateway MCC DTT Start Address in Flash [default=0]: 0
Gateway MCC Num of Tomm objects stored in Flash [default=0]: 0
Gateway MCC Num of LP objects stored in Flash [default=0]: 0
ESC to quit or any other key for more:

```

Figure C.6 CPU Configuration Check

4. Scroll down to the page which starts with the configuration item "Gateway Concentrator Num of Cal objects stored in Flash [default=0]: 0".
5. Verify that the following highlighted parameters are set to the values as shown below.

```

Gateway MCC Num of Cal objects stored in Flash [default=0]: 0
Gateway MCC Num of Tou objects stored in Flash [default=0]: 0
Gateway MCC Num of Attrchange objects stored in Flash [default=0]: 0
Starting time of the current AC power outage) [0..;default=0]: 0
Ending time of the last AC power outage) [0..;default=0]: 0
Total length of the AC outages [0..;default=0]: 0
Count of number of AC power outages [0..;default=0]: 0
Total outage duration (seconds) [0..4294967295;default=0]: 0
+Enable/Disable CPU Watchdog (0: Disable, 1: Enable) [0..1;default=1]:
1

```

Figure C.7 Concentrator Parameters

LAN Health Check

The LAN health is determined from the concentrator's RAMLOG.

1. From the Concentrator Main Menu select option 'd'. The Concentrator Debug Menu appears.
2. Select option 'r', to get to Ramlog Menu.



Use option "d" to dump the ramlog.

3. Look into the ramlog contents for the message “Pfm: LAN transceiver is working.” This indicates that the LAN transceiver is functional and the CPU is able to configure the LAN transceiver.



If there are any messages like “Pfm: LAN transceiver is broken”, then the LAN transceiver on this unit is not functional. If there is more than one instance of the above messages, then the LAN transceiver is being reset very frequently.

```

Ram Log Contents (enter any key to abort):
000>1147388030,12 ----- Cellnet -----
---
001>1147388030,12 InfiNet Concentrator
002>1147388030,12 MCC Id [100023.1]
003>1147388030,12 System Booted from BANK A
004>1147388030,12 Reset flag UNKNOWN
005>1147388030,12 Initializing the Memory Pools...
006>1147388030,255 Initializing the STREAMS memory pools
007>1147388030,255 Launching the STREAMS Scheduler
008>1147388030,3900 DmsDAssignId: Q1 Assigned new DMS CIA <100023,1>
009>1147388030,1501 ODS: Coldstart in progress
010>1147388030,1501 ODS: CoinUnique token 1's comb fail. tok 0x0.
1's 0x0
011>1147388030,2100 * AGT: AgtInit OK!
012>1147388031,4800 BldStpStk: Building stack pcs7
013>1147388031,4800 RStpInit: <100023.1.0> ver=2 -- Sent Survey Pkt
014>1147388031,3000 ASP: SAF Window Size 20099
015>1147388031,125 PFMT: skipped 48 frames: expected 0, got 48
016>1147388031,125 PfmTossGmb: freeing 1 cmb(s) (not handled!)

```

Figure C.8 Ram Log

```

017>1147388033,125 Pfm: LAN transceiver is working.

```

Figure C.9 LAN confirmation

D

About Firmware

The concentrator is an integrated unit consisting of

- UtiliNet Series III Integrated WAN Radio (IWR)
- BLT LAN Radio
- ConnectCore 9C CPU module

The ConnectCore 9C (CC9C) module is built on NetSilicon 32-bit NET+ARM technology. This is a fully integrated system-on-chip, which provides embedded networking connectivity and additional main processor performance and bandwidth to handle sophisticated embedded applications.

The features of the CC9C module are below:

- 32-bit NS9360 processor, operating at 155MHz
- 8MB Flash and 32 MB
- 10/100 Mbit Ethernet interface with on-board RJ-45 connector
- Four, high-speed serial ports. (Three ports out of four ports are used by the concentrator, the fourth is for PC communications)
- Real Time Clock (Processor powered, no battery backup)

CC9C Serial Port Configuration

The CC9C provides a general purpose I/O (GPIO) interface. The GPIO lines corresponding to Serial port A, B and C are connected to the console, UtiliNet WAN Radio and BLT LAN Radio. The details of the ConnectCore module are described in “ConnectCore™ 9C Hardware Reference. Part number/version: 90000722_A Release date: June 2005.”

All the serial ports are configured in UART mode. Except for baud rate, serial port parameters on all the ports are configured for 8 Bits, No Stop Bits, 1 Parity Bit (8, N, 1) and handshake mode is 'none'.

The console port operates at 9600 baud, the WAN port operates at 19200 baud and the LAN port operates at 19200 baud.

Startup

Firmware Images

The concentrator firmware consists of two image files, “rom.bin” and “image.bin”. The file “rom.bin” is also referred to as the boot image. The file “image.bin” is also referred as the main/

application image. Both these images reside in the flash memory of the concentrator. The application image resides in a compressed form in the Flash memory.

During the boot-up, these image files are loaded from the Flash memory into the RAM and executed in the RAM. The following sections describe the concentrator boot-up.

Initialization and Boot Image Loading

The boot image consists of a ROM boot image that is executed directly from Flash, and a RAM boot image that is stored in a compressed form in flash, and executed from RAM. The ROM boot image executes at power up and it:

1. Executes the basic BSP initialization code to bring up the H/W.
2. Decompresses the RAM boot image from Flash to RAM.
3. Starts the RAM boot image.

Application Image Loading

The RAM boot image determines which application image to execute. This is based on the boot bank configuration stored in the NVRAM/EEPROM section of the Flash memory. The RAM boot image during its execution:

- Identifies the appropriate application image stored in flash.
- Decompresses the application image from Flash to RAM
- Starts the RAM application image.

Application Image Startup

The application image initializes all the necessary device drivers and brings up the NET+OS operating system. The NET+OS operating system after completing its initialization passes on the control to the Concentrator Application. There are two execution modes (Diagnostics and Application) in the concentrator. The following sections describe boot-up and provide details on the execution modes.

Concentrator Boot-Up

Normally, the NET+OS configuration option displays during the boot-up. During concentrator boot-up, the network parameters required for configuring the TCP/IP are combined into the diagnostics

and configuration mode. The details of this configuration are explained in Concentrator Diagnostics Mode. The following figure describes boot-up.

```
0002580
Boot State00000000

Loading RAM image from Bank A...

imageA size...001014bb
Executing RAM image...
ACE: Have IP address on interface eth0: 10.52.33.130
Network IP configured.
RAM based FTP Server ready.
```

Figure D.1 Boot Up

Diagnostics Mode

During the startup, the following question displays on the console:

```
Boot up to Diagnostics Mode ...? (y/n)y
```

If the input is 'y', the concentrator goes into diagnostics mode. The diagnostic mode has limited functionality. The WAN port and the LAN port are not activated in this mode. This mode helps the user to:

- Configure the concentrator;
- Browse and capture the Ramlog; and
- Perform diagnostics tests.

Diagnostics modes are described in the following sections.

Diagnostics Mode

The diagnostics mode provides more diagnostics. In addition, this mode provides option to configure the TCP/IP Network Parameters.

```
InfiNet Concentrator Diagnostics & Configuration Menu

i Display firmware version info
c Configuration (EEPROM) menu
r Ramlog...
b Reboot/reset the board
t Diagnostic tests menu
n Network Parameters Config Menu
```

Figure D.2 Diagnostics Mode

Network Parameters Configuration Menu

Option 'n' from the “Diagnostics and Configuration” menu displays the “Network Parameters Configuration” menu, described in [Figure D.3](#). In this menu, the TCP/IP network parameters are displayed by using option'd', and the network parameters are configured by using option 'c'.

```
InfiNet Concentrator Network Parameters Configuration Menu

d Display Network Configuration
c Change Network Parameters
q Quit to Main Menu

Select option (? for menu): d

NETWORK INTERFACE PARAMETERS

MAC Address      : 00:40:9D:43:35:97
IP Address       : 7.92.187.163
Subnet Mask      : 255.255.255.0
Gateway IP Address : 7.92.187.218
Ethernet Duplex Setting: phy Default
```

Figure D.3 Network Parameters Configuration Menu

While configuring, the MAC Address should be set to the MAC address on the Connectcore processor board. Appropriate values to the IP address, subnet mask, gateway IP address and the Ethernet settings should be provided, to match the TCP/IP network corresponding to the local IT environment.

Diagnostics Tests Menu

Option 't' from the “Diagnostics and Configuration” menu displays the “Diagnostics & Manufacturing Tests” menu. This menu provides several test options. The menu options are described in Figure 8: Diagnostics and Manufacturing Tests Menu.

```
InfiNet Concentrator Diagnostics & Manufacturing Tests Menu

m Manufacturing tests
f Flash test
s Serial test
c Cache RAM test
d AHB DMA test
r RTC test
t Timer test
l LAN-WAN test
q Quit to Main Menu

Select option (? for menu):
```

Figure D.4 Diagnostics and Manufacturing Tests Menu

The option 'm' runs all the tests. This option is provided for use during the manufacturing. At the end of this test, the EEPROM would be configured to default values (based on the user input). The details of the tests performed are described in [Figure D.4](#).

```

Flash test running ...
  Flash size test                FAILED (err: 5)
Flash test done.                FAILED

Serial test running ...
est (ch1):                       PASSED
  WAN port Test (ch2):          PASSED
Serial test done.                PASSED

Cache RAM test running ...
  Address pattern test          PASSED
  Inverted address pattern test PASSED
Cache RAM test done.            PASSED

RTC test running ...
  Real Time Clock Alarm Test    FAILED
  ERR: Timeout while accessing the clock (err: 1)
RTC test done.                  FAILED

AHB DMA test running ...
  DMA Port Access Test (Port 1) PASSED
  DMA Port Access Test (Port 2) PASSED
  DMA Data Integrity Test       PASSED
AHB DMA test done.              PASSED

Timer test running ...
  Timer 1                       PASSED
  Timer 2                       PASSED
  Timer 3                       PASSED
  Timer 4                       PASSED
  Timer 5                       PASSED
  Timer 6                       PASSED
  Timer 7                       PASSED
Timer test done.                PASSED

Do you want to set all EEPROM values to defaults?
OK to set all EEPROM values to defaults? (y/n): n

```

Figure D.5 Manufacturing tests in diagnostics mode

Application Mode

The application mode initializes the LAN, WAN and all the necessary device drivers for normal operation. After initializing LAN and WAN, before all the system tasks are started, the concentrator waits for time from the UtiliNet radio. The details of the time synchronization mechanism between the concentrator and the UtiliNet WAN are explained below. Upon acquiring the TIME from the UtiliNet radio, the concentrator gets into the normal application mode.

TIME from UtiliNet Network

The concentrator has a Real Time Clock (RTC). However, this clock is processor powered, and has no battery backup. Therefore, time is not remembered by the concentrator during resets. The concentrator waits for the time from the UtiliNet Radio. The RTC is programmed with the latest time from the concentrator.

Application Troubleshooting without TIME

In the field, there may be instances where there is no WAN connectivity and, it may be required to troubleshoot the concentrator. During boot-up, the following message is displayed on the console by the concentrator.

```
Waiting for TIME from UtiliNet Radio...
Press Any Key to continue without time...
```

If any key is pressed during this wait period, the concentrator goes into the troubleshooting mode. In this mode, the TIME is set a default hard coded time as shown below.

```
System Startup at Wed Oct 27 07:02:12 2004
```



A concentrator reboot/reset is required to get back from the troubleshooting mode to the normal application mode.

Persistent Data Storage

Data Storage

There are four persistent logical data storage in the concentrator. They are:

- EEPROM - This stores the system configuration information. The information stored in this is not affected by the concentrator resets. The configuration parameters stored in the EEPROM are captured in Appendix B - EEPROM Configuration Parameters;
- Device Tracking Table (DTT) - This is a persistent table. This table is used to store the endpoint address and their performance metrics.
- Endpoint Database (aka ODE database) - This is the main database in the concentrator. This is a object database. Every endpoint is represented in the form of an object.
- Ramlog - This is an in-memory file, which contains the system log. This file is preserved over the resets.

All these persistent elements are stored in the flash memory. The EEPROM is stored in the last 64K segment of the Flash memory. Rest of the data elements is stored in the Data Storage area of Flash memory.

Impact of Boot-up on Data Storage

The concentrator boot-up/reset impacts the data storage. The nature of the impact varies based on the type of the boot-up. There are three kinds of boot-up:

- Cold Boot - DTT is cleaned up. ODE is cleaned up. The concentrator will not remember any endpoints.
- Warm boot - DTT is intact. ODE is cleaned up. The concentrator remembers the endpoints it heard. However, there are no database objects corresponding to them.
- Hot Boot - DTT is intact; and ODE is intact.

Capacity

The following table describes the data storage capacity in concentrators.

Table D-1. Concentrator Capacity

Type	Concentrator
Meter Endpoints (Cellnet 1-way meter module)	5000
ASAP objects	300
Load Profile (LP) Objects	3000 Note: Only 1000 TOMMs can be set on Load Profile.
DTT entries	40000
Calendar objects	20
Time of Use (TOU) objects	20
Ramlog size	1024 x 80 bytes

Cycling Power

To immediately reboot the concentrator, perform the following steps:

1. Disconnect the AC cable from its connection on the concentrator.



Disconnect the cable from the concentrator end, not the AC power source end. Do not disconnect the battery cable. If you cannot reach the AC cable on the concentrator end, then unplug at the source. You must wait three days for the battery to completely drain before you reconnect this cable.

2. Wait five seconds.
3. Re-connect the AC power cable to the concentrator.

E

About Programming and Diagnostic Cables

Landis+Gyr offers multiple cable options for performing system upgrades and configuration. The following table outlines tasks each cable can perform.

Table E-1. Update Cables

Cable	LPP	Console	Ethernet
19-1185 Do not plug this cable into a Phase I Concentrator (26-1129 or 26-1163).	Upload DCWs, Upload new firmware, and configure the UtiliNet radio inside the concentrator.	Configure EEPROM settings in the concentrator CPU, which includes the Concentrator Net and Node ID (aka MCC Net and Node), Event Manager Net, and Node settings.	Can do a direct FTP download of concentrator CPU firmware via cable connection. Use a router, computer, and Ethernet cables.
19-1126	Upload DCWs, Upload new firmware, and configure the UtiliNet radio inside the concentrator.	Configure EEPROM settings in the concentrator CPU, which includes the Concentrator Net and Node ID (aka MCC Net and Node), Event Manager Net, and Node settings.	No Ethernet connectivity. Perform upgrades over the air. You must have a WAN network setup with a Take Out Point (TOP), and the Cellnet system running on the system controller.

F Sample Survey Sheet

A sample survey sheet appears below this paragraph. Your utility may use a different format. This illustration calls out fields to update via Hyperterminal during configuration.

The image shows a sample survey sheet form with several fields. Red boxes highlight the following fields: Con_ID (100016), Pole_ID (OHC60037), Minutes_From_GMT (420), Net_ID (20), and Node_ID (151). Labels on the left side of the form point to these fields with red lines.

Con_ID	100016	
Con_Address	10490-AMR Mountain Ave	
Pole_ID	OHC60037	
Directions	SW of HWY 24 off Green Mountain Falls Rd	
Pole_Type	Wood	
Notes		
Lat	Long	Destination_Hex
38 55 48.0	-105 0 51.804	
Lat_Dec	Long_Dec	
38.93	-105.01439	
Destination	Approved	
38 55 22.238 N 104 59 47.125 W	<input checked="" type="checkbox"/>	
CRC	Minutes_From_GMT	
32500	420	
Top	Net_ID	Node_ID
	20	151
Survey_Date	Approved_Date	
10/10/2005	01/28/06	
Make_Ready_Date	Install_Date	
2/27/06	2/25/06	

Figure F - 1. Sample survey sheet

Field Upgrade to DCW 1.16F

This appendix contains information about upgrading Concentrator Gridstream radios that are within the field to DCW version 1.16F. It covers the following sections:

- Changing 9QPR-based MCC to a Gridstream-based Concentrator
- Upgrading DCW and Losing Default Destination

Changing 9QPR-based MCC to a Gridstream-based Concentrator

When replacing a 9QPR-based MCC with a RF mesh-based Concentrator, communication between host and the new Concentrator is established as soon as the DCW begins sending Concentrator Registration Messages. Once the host receives a Concentrator Registration Message, through whichever Collector the DCW has chosen, the host will discover the device.

Upgrading DCW and Losing Default Destination

Before you get started upgrading, make sure you complete the following recommended steps to avoid protection errors as well as other upgrade errors.

1. Read the current DCW's default destination.



Verify that the number is identical to the current DCW. Failure to do so can cause major read problems.

2. Load 1.16F into the radio.
3. Restore the address to the new DCW.

Upgrade Issues

Default Destination

If you override or lose the default destination, the DCW waits for the installer to assign a destination. If a designation is not assigned, the DCW will query its neighbors and select the nearest collector. A Concentrator Registration Message is sent through the selected collector with the shortest response time. This will likely be the same Concentrator it was sending to before. If it is a new Concentrator that is attached to the same System Controller as the original one, things will still work. System controllers are randomly associated with Concentrators. There is no guarantee that a Collector within

the neighborhood will be associated with the same System Controller as the Collector next door. If a utility is large enough to have a lot of System Controllers in use, then it is likely the change to a different Collector will result in a change to the System Controller. However, if the DCW completes the neighbor-query process in a timely-manner, the host will straighten the reassignment once it sees the Concentrator Registration Message.



The Concentrator discovery process time can be between 15-30 minutes

If the host sends the Concentrator CPU a message before the new default destination is assigned, it will use the Collector within the database. The DCW automatically accepts the Collector WAN address as the default destination as long as the message is received before the default destination is assigned.

Self-Assigned Destination

The best way to prevent unprocessed messages from interfering with data reads, is to shut down the host registration processing code during scheduled reads. The DCW will continue to send Concentrator Registration Messages once every 15 minutes until the host responds. If the DCW successfully self assigns a destination, a query from the host to the Concentrator CPU is received to not automatically change the destination. To change the destination, you must manually change it. If the destination change fails while on a different System Controller, the meter read data that is going to an incorrect System Controller is still processed, and then put into the database. The meter discovery events from that Concentrator will not work.



To avoid non-working meter discovery events, L+G recommends using the normal Concentrator rejoin process to address the Concentrator to the correct System Controller.

H

Power Cable Installation

Power Connection and Termination

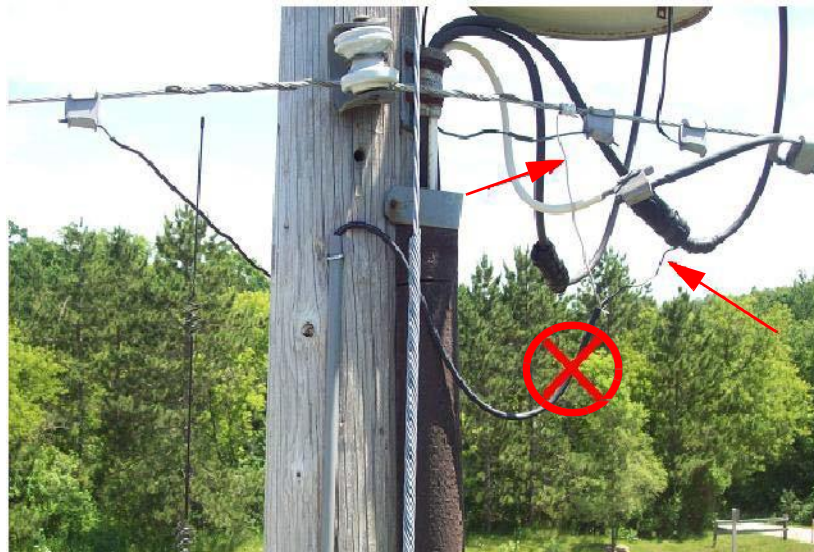


Figure H - 1. Improper Power Termination



If using the 105704-000, 105704-001, 105704-002, or 105704-003 cables, the end of the cable opposite the connector (the unterminated end) must be installed in a junction box or other suitable enclosure. These cables are not recommended for new installations. See Table 4-1 for suggested parts.



The older version decorative light pole kits use 105704-002 cables. Please observe standard precautions unless installing with the 19-2273 cables, which are in the current kits. Use standard procedures when installing 105604-XXX cables.



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

Recommendations

Water-Blocking Connections

When 19-227X or 105627-00X cables are used, they do not have to be terminated inside a junction or disconnect box. Protect the wire junction with mastic tape (or some other method).

In published examples, Collector cables are shown going through conduit. Conduit is not required for Concentrators. If a junction box is used, 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 figure below shows an installation of a Concentrator without using a junction box.



This installation diagram is for water blocking cable only. Do not install standard 105704-XXX “old style” cables as shown in the following figure.

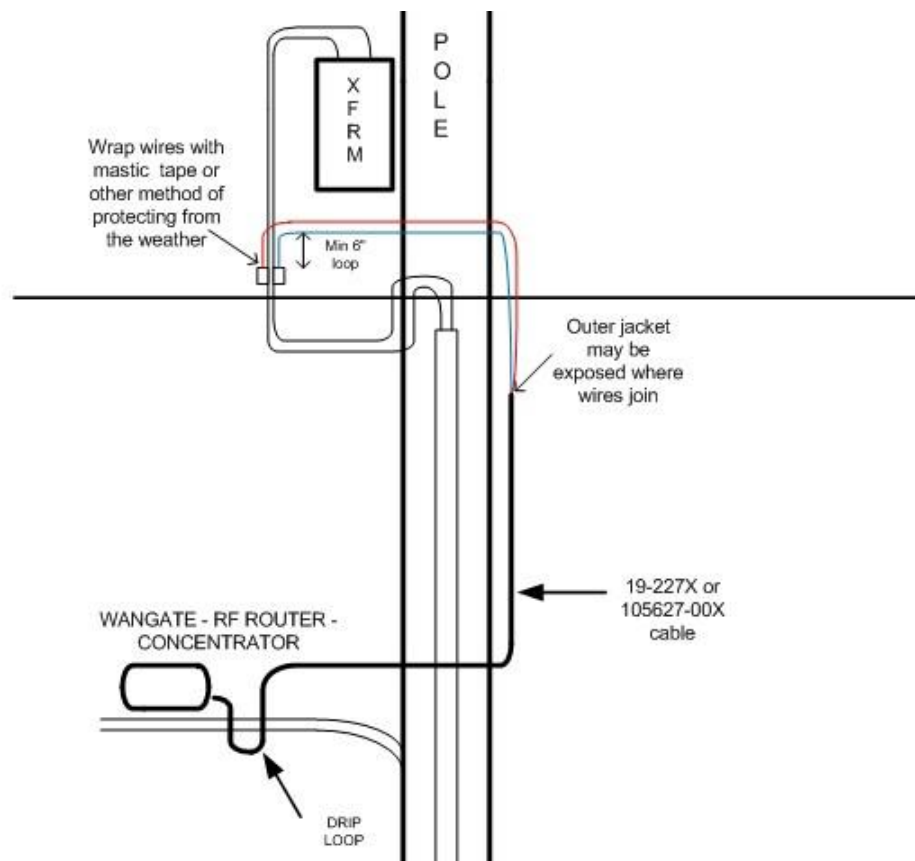


Figure H - 2. Suggested Power Termination for Water Blocking Lines

Non-Water-Blocking Connections

When existing 105704-XXX cables are used, they must be terminated inside a junction or disconnect box. The inner wires cannot be exposed until 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 Concentrators, 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 Concentrator. If 105704-XXX cable is used, then this installation procedure is required.

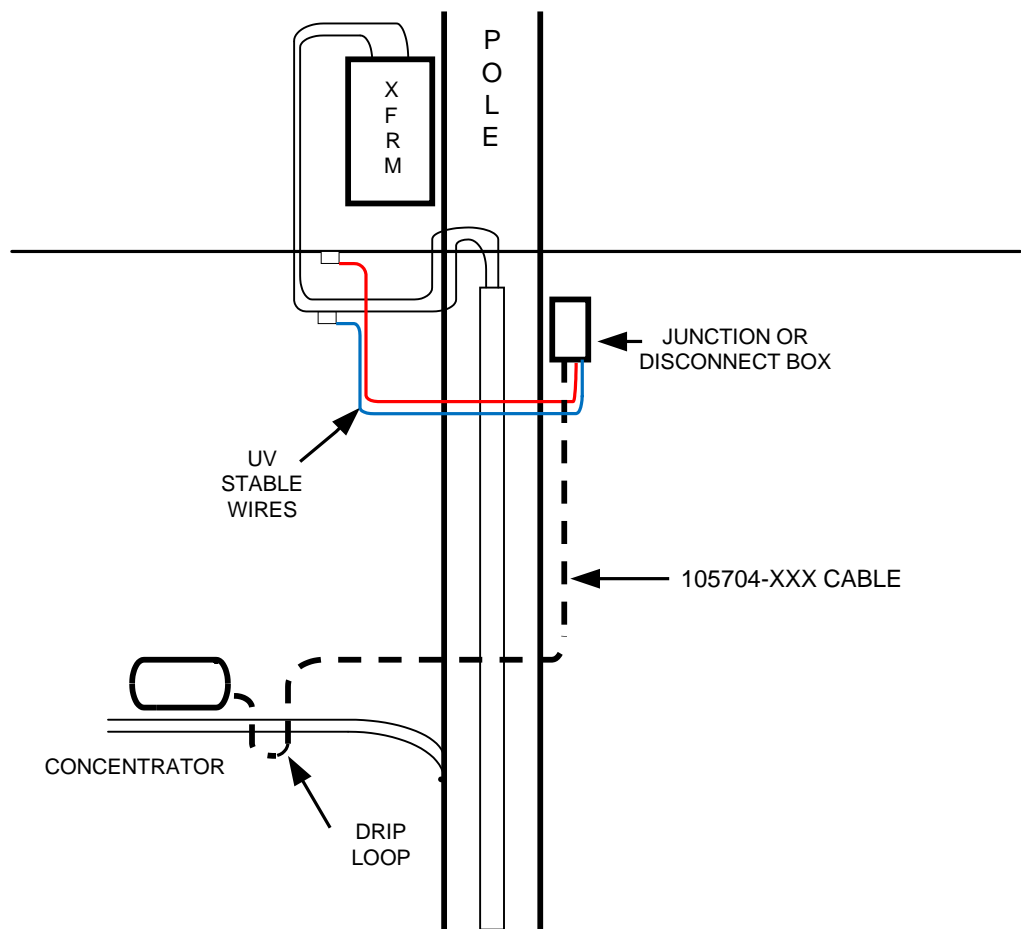


Figure H - 3. Suggested Power Termination for Non-Water Blocking Lines

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 Concentrator. The drip loop at the point of attachment to the mains should rise above the level of the point of attachment.

Glossary

BSP	Board Support Package
C&I	Commercial and Industrial meters; usually solid state meters with demand notes
Concentrator	Device that collects data and events from radio frequency local area network (RF LAN) devices for storage in the object database; communicates with the Collector (Take Out Point, or TOP) to forward the metering data.
DCW	A Device Control Word (DCW) is a not actually a word, but a program written in the UtiliNet programming language. DCWs execute within UtiliNet devices and provide the ability to control the device. The DCW sits on top of the firmware and directs the radio to perform tasks such as reboot or other, more advanced, functions.
Demand	Meter rate
DTT	Device Tracking Table: The table on the Concentrator that stores information about module discovery and health statistics.
EEPROM	Electrically Erasable Programmable Read-Only Memory
Gridstream IWR	Integrated WAN Radio. Used to communicate remotely to the network.
LAN	Local Area Network, consists of endpoints and RF link between endpoints and gathering devices such as Concentrators.
MAC	Media Access Controller used while configuring network parameters.
MapInfo	Software that maps devices and data regarding those devices in the network.
Network Concentrator	See Concentrator
NVRAM	Non-Volatile Random Access Memory
OCDB	Operations Center DataBase. Endpoint Management system that reports to network, exchanges information with the utility.
OTA	Over the Air, versus a direct or indirect (router) serial cable connection.
Personal Protection Equipment	also called Personal Protective Equipment, all necessary equipment used for worker safety while performing work on utility metering equipment as defined in this manual.
Ping	An “Echo” command travels to a specified device and then waits for a response. The result is a report that displays the success or failure, usually a report back of a timed response in seconds, of the intended action.

RAM	Random Access Memory
RIMS	Retrofit Information Management System, an Oracle program managing the shop floor assembly and programming of modules, also stands for myriad of data tables. Exchanges information with OCDB.
RPT	Revenue Protection Technician, utility employee responsible for identifying and taking corrective action on theft of service cases.
SNR	Signal to noise ratio: Comparison of the usable signal being transmitted to the undesired signal, usually expressed in decibels; a quality measure of a transmission.
TOP	Take Out Point; also called a Collector.
TOU	Time of Use. Specific meter rate where the usage is captured in intervals.
WAN	Wide Area Network, consists of data gathering devices like Concentrators and endpoints.
XD	Cross-Dock

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