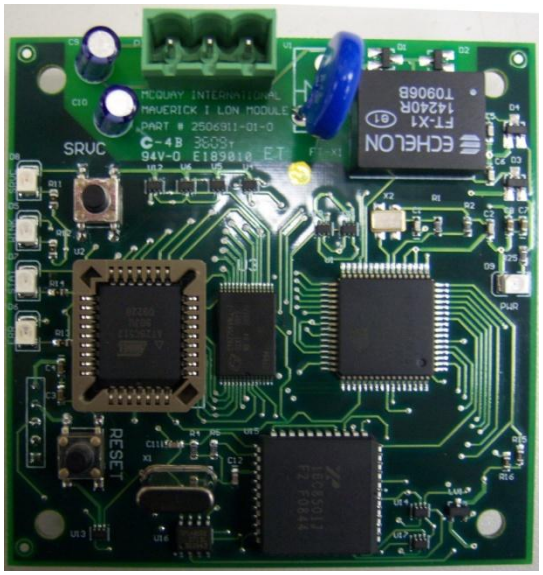
# INSTALLATION INSTRUCTIONS

## LonWorks Communication Card
## RXRX-AY02




**RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION!**

**WARNING**

**THESE INSTRUCTIONS ARE INTENDED AS AN AID TO QUALIFIED, LICENSED SERVICE PERSONNEL FOR PROPER INSTALLATION, ADJUSTMENT AND OPERATION OF THIS UNIT. READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING INSTALLATION OR OPERATION. FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN IMPROPER INSTALLATION, ADJUSTMENT, SERVICE OR MAINTENANCE POSSIBLY RESULTING IN FIRE, ELECTRICAL SHOCK, PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.**

**DO NOT DESTROY THIS MANUAL**

**PLEASE READ CAREFULLY AND KEEP IN A SAFE PLACE FOR FUTURE REFERENCE BY A SERVICEMAN**

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## *8.4 LONWORKS and Communication Module (RXRX-AY02)*

**NOTICE**

Use this section of the RTU-C installation and operation manual to physically connect the communication module to the RTU-C unit controller and connect the unit controller to your network. Connections and service to unit controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled. Use the appropriate Protocol Information document, to integrate the unit into your network. The Protocol Information document contains addressing details, LONWORKS® protocol information, and a list of the data points available to the network. See the Reference Documents section of the RTU-C installation and operation manual for Protocol Information document numbers.

### *8.4.1 Reference Documents*

| Number | Company | Title | Source |
|---|---|---|---|
| 078-0014-01E | LONMARK Interoperability Association | LONMARK Layers 1-6 Interoperability Guidelines, Version 3.0 | www.lonmark.org |
| 078-0120-01E | LONMARK Interoperability Association | LONMARK Application Layer Interoperability Guidelines, Version 3.4 | www.lonmark.org |
| 078-0156-01G | Echelon® Corporation | LONWORKS® FTT-10A Free Topology Transceiver Users Guide | www.echelon.com |
| 8500_20 | LONMARK Interoperability Association | Space Comfort Controller Functional Profile | www.lonmark.org |

### *8.4.2 Trademark Notices*

®™ The following are trademarks or registered trademarks of their respective companies. LonWorks, LonMark, LonTalk, and Neuron from Echelon Corporation; Windows from Microsoft Corporation; LONMARK and the LONMARK logo are managed, granted, and used by LONMARK International under a license granted by Echelon Corporation.

**NOTICE**

This equipment generates, uses, and can radiate radio frequency energy and; if not installed and used in accordance with this instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.

### *8.4.3 General Information*

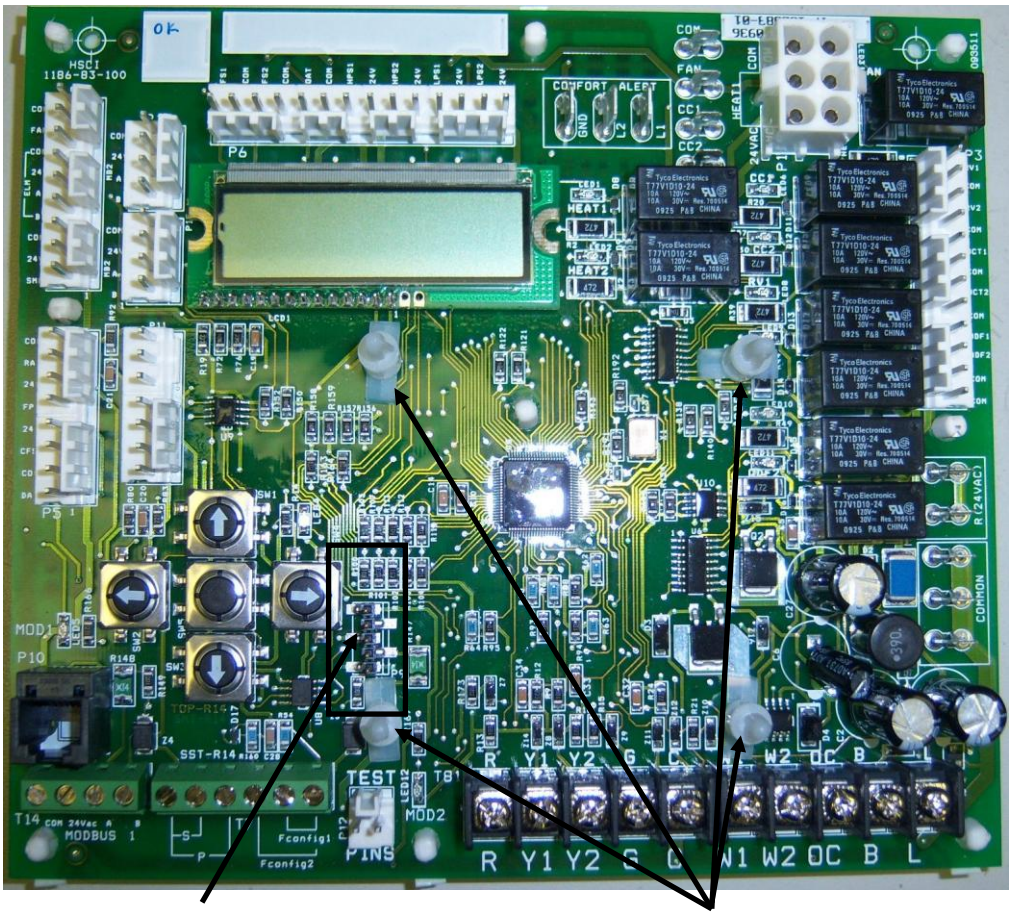
This section contains the information you need to install a LONWORKS Communication Module (RXRX-AY02) to the RTU-C Rooftop Unit Controller and integrate it into the network.

#### *8.4.3.1 Description*

A LONWORKS Communication Module provides the interface between The RTU-C Rooftop Unit Controller and a LONWORKS Local Operating Network (LON). It translates the LonTalk® variables used on the network to the variables used in the unit controller and vice versa. It translates in accordance with the LONMARK Functional Profile and is LonMark 3.4 certified. Profiles are interpreted in loaded programs (firmware).

The LONWORKS Communication Module is a printed circuit board that mounts directly on five pins on the top side of the RTU-C Rooftop Unit Controller (see Figure 8-10).

Figure 8-10. RTU-C Rooftop Unit Controller



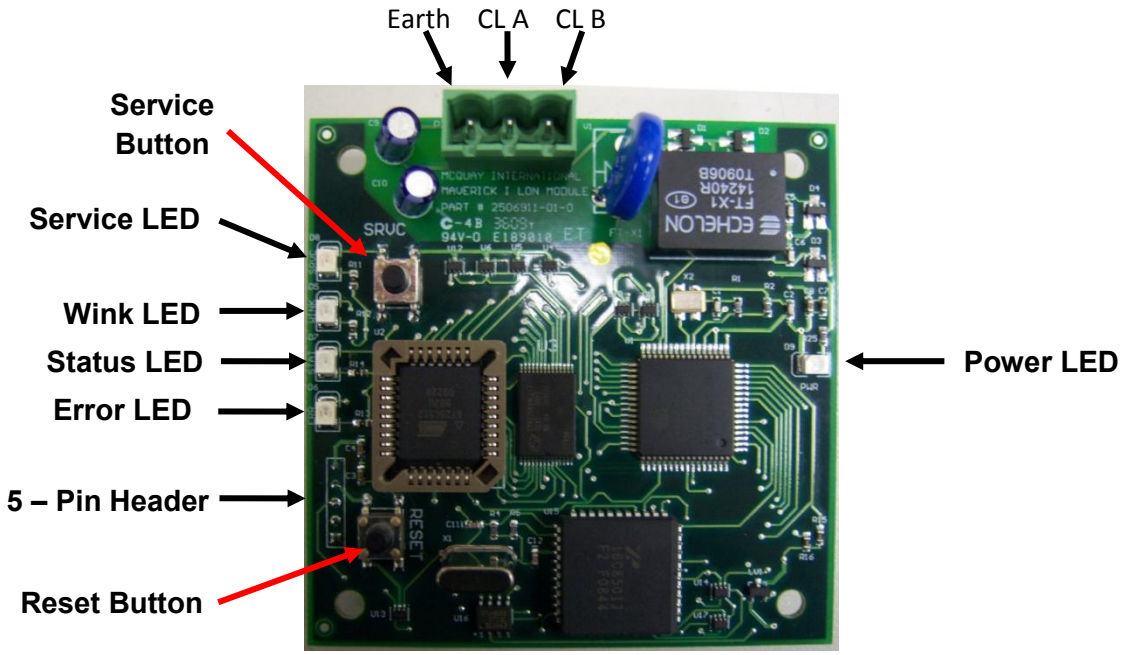
### 8.4.3.2 *Application*

A LONWORKS Communication Module connects the RTU-C Rooftop Unit Controller to the building automation system (BAS) on a LONWORKS network. It is the interface adapter for the exchange of LonTalk variables between the network and the unit controller. The LONWORKS Communication Module translates the LonTalk variables of the Space Comfort Control (SCC) profile into the native information of the unit controller.

### 8.4.3.3 *Component Data*

Figure 8-11 shows the location of the major components of the LONWORKS Communication Module.

Figure 8-11. LONWORKS Communication Module Major Components




### 8.4.3.4 *Service Pin*

The service pin generates a service-pin message that contains the Neuron® ID and the program code identification of the node. A service-pin message is a network message that is generated by a node and broadcast on the network. It can be used to commission the LONWORKS network (see Figure 8-11).

### 8.4.3.5 *Reset Pin*

Use the Reset button is to reset the LonWorks communication module application. Press the Reset button to revert all Network Variable (NV) parameters back to default values (see Figure 8-11).

Configuration variables do not change. See section 9.5 of the RTU-C I&O manual for a complete list of all network parameters.

The Reset button can also be used to clear network addressing parameters from a LonWorks communication module. For example, a module that has been previously installed on a network, and is then installed on a new network, can interfere with communications if the original LonWorks communication module has the same Subnet ID and/or Node Address as another module on the new network. To clear the network addressing data from the original module, press the Reset button and then immediately press and hold the Service Pin button for five seconds. When the Subnet ID and Node Address have been cleared, the green Service LED will flash on and off every two seconds.

#### *8.4.3.6 Light Emitting Diodes (LEDs)*

Five LEDs indicate communication activity and status of the LONWORKS Communication Module. These indicators can be seen when the LONWORKS Communication Module is connected to the RTU-C Rooftop Unit Controller (see Table 8-3).

Table 8-3. LED Activity Details

| LED Label | LED Color | Meaning |
|---|---|---|
| SRVC | Yellow | This LED flashes approximately once a second when device is not commissioned. This LED activates when the Service pin is pressed. Otherwise, this LED is off when the device is commissioned but the Service pin has not been pressed. |
| WINK | Green | Winking is used to identify control on the network. The Wink LED will flash 2 times/second for 5 seconds when control is winking. |
| STAT | Green | The Status LED flashes when the unit controller transmits a request. When communicating properly with the unit controller, it flashes 6 times/second or faster. If communication between the unit controller and communication module is not responding properly, it flashes slower (approximately once per second) and the error LED will flash. |
| ERR | Red | The Error LED flashes when there is a mis-communication between the unit controller and communication module. |
| PWR | Green | The LED remains steady on when power is applied to the communication module. |

#### *8.4.3.7 LONWORKS Network Connector*

The network connector connects the LONWORKS Communication Module to the LONWORKS FTT-10A bus (see Table 8-4).

Table 8-4. Network Connector Pin Descriptions

| Pin | Function |
|---|---|
| CLB | FTT-10B |
| CLA | FTT-10A |
| Earth | Earth Ground |

#### *8.4.3.8 LonMark Profile Software*

The LONWORKS Communication Module software translates the Standard Network Variable Types (SNVTs) and Standard Network Configuration Parameter Types (SCPTs) in accordance with the LONMARK

profiles used on the LONWORKS network into the variables and parameters used in the RTU-C Rooftop Unit Controller.

#### *8.4.3.9 Neuron ID*

The basis of the LONWORKS Communication Module is an Echelon Neuron integrated circuit. Each Neuron chip contains a globally (i.e., worldwide) unique, 48-bit serial number called the Neuron ID. The Neuron ID can be used to address the device on the LONWORKS network.

#### *8.4.3.10 Transceiver*

The Echelon Corporation Free Topology Transceiver (FTT-10A) is used to communicate on the LONWORKS network. The network topology may consist of a star, daisy-chain, or other topology. Data transmission rate on the network is 78 kbps (baud).

#### *8.4.3.11 Specifications*

Table 8-5 identifies the network specifications required for use with the LONWORKS Communication Module.

Table 8-5. LONWORKS Network Specifications

| **Characteristic** | **Description** |
|---|---|
| Network Topology | Flexible Free Topology |
| Neuron Chip Processor | 3150 |
| Free Topology Transceiver (FTT-10A) | 50051 |
| Cable Types | TIA Category 5 (recommended) |
| Maximum Bus Length | 1476 ft (450) meters per segment |
| Maximum Node Separation | 820 ft (250 meters) |
| Data Transmission | Two-wire, half duplex |
| Data Transmission Rate | 78 kbps (baud) |

### 8.4.4 *Installation*

The following section describes how to field install a new LONWORKS Communication Module or replace an existing LONWORKS Communication Module on the RTU-C Rooftop Unit Controller so that it can be incorporated into the LONWORKS network. The LONWORKS Communication Module is available for field installation only (see Specification Sheet for ordering information).

Recognize this symbol as an indication of Important Safety Information!

**CAUTION**

**Electrostatic discharge hazard.**

**Can cause equipment damage.**

This equipment contains sensitive electronic components that may be damaged by electrostatic discharge from your hands. Before you handle a communications module, you need to touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential in your body.

**WARNING**

**Electric shock hazard. Can cause personal injury or equipment damage.**

This equipment must be properly grounded. Only personnel knowledgeable in the operation of the equipment being controlled must perform connections and service to the RTU-C Rooftop Unit Controller.

**WARNING**

**BEFORE BEGINNING ANY MODIFICATION, BE SURE MAIN DISCONNECT SWITCH IS IN THE "OFF" POSITION. FAILURE TO DO SO CAN CAUSE ELECTRICAL SHOCK RESULTING IN PROPERTY DAMAGE, PERSONAL INJURY OR DEATH. TAG DISCONNECT WITH A SUITABLE WARNING LABEL.**

#### 8.4.4.1 *Contents of the LONWORKS Communication Module Kit (RXRX-AY02)*

The following is the list of items included in the field-installed kit:

The LONWORKS Communication Module
Four plastic stand-offs
3-pin network connector
Installation Manual

#### 8.4.4.2 *Installing a new LONWORKS Communication Module*

Follow these steps to install a new LONWORKS Communication Module RTU-C Rooftop Unit Controller:

1. Remove power from the unit controller.
2. Connect the LONWORKS Communication Module to the unit controller's 5-pin header and then further secure the module to the four plastic support stand offs (see Figure 8-10).
3. Connect the LONWORKS Communication Module to the network (see Figure 8-10 and Figure 8-12).
   a. Connect one wire of the network cable to the CLA Pin of the connector plug.

b. Connect the other wire to the CLB Pin of the connector plug.

4. Apply power to the unit controller.

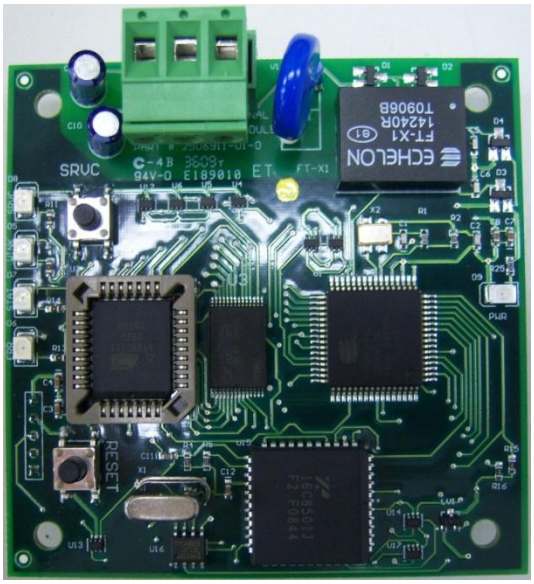
#### *8.4.4.3 Replacing an Existing LONWORKS Communication Module*

Follow these steps to remove an existing LONWORKS Communication Module from the unit controller and replace it with a new LONWORKS Communication Module:

1. Remove power from the unit controller.
2. Pull the network cable connector from the LONWORKS Communication Module.
3. Grasp the LONWORKS Communication Module and carefully pull it from unit controller. It may be necessary to also remove the plastic stand-offs if they have been installed (see Figure 8-10 and Figure 8-11).
4. Connect the LONWORKS Communication Module to the unit controller's 5-pin header and then further secure the module to the four plastic support stand offs (see Figure 8-10).
5. Connect the LONWORKS Communication Module to the network (see Figure 8-11 and Figure 8-12).
   a. Connect one wire of the network cable to the CLA Pin of the connector plug.
   b. Connect the other wire to the CLB Pin of the connector plug.
6. Apply power to the unit controller.

Figure 8-12 LONWORKS Communication Module Network Connection

**Network Connection (shown with 3-pin connector inserted)**



### *8.4.5 Integration*

Once the LONWORKS Communication Module has been properly installed on RTU-C Unit Controller, it is then necessary to configure the unit controller for integration into a Building Automation System (BAS) via the LONWORKS network. The configuration process is described in the following section.

#### *8.4.5.1 Connecting to the Network*

After you have connected the LONWORKS Communication Module to the RTU-C Rooftop Unit Controller, you must connect it into the LONWORKS network. Each LONWORKS Communication Module is equipped with an FTT-10A transceiver for network communications. This transceiver allows for (1) free topology network wiring schemes using twisted pair (unshielded) cable and (2) polarity insensitive connections at each node. Free topology segments require termination for proper transmission performance.

Refer to Echelon LONWORKS FTT-10A Transceiver User's Guide for details regarding acceptable configurations, cabling requirements, terminations, and other requirements for proper connection of the unit to the LONWORKS network**.**

#### *8.4.5.2 LONWORKS Network Addressing*

Every Neuron Chip has a unique 48-bit Neuron ID or physical address. This address is generally used only at initial installation or for diagnostic purposes. For normal network operation, a device address is used.

Device addresses are defined at the time of network configuration. All device addresses have three parts. The first part is the Domain ID, designating the domain. Devices must be in the same domain in order to communicate with each other. The second part is the Subnet ID that specifies a collection of up to 127 devices that are on a single channel or a set of channels connected by repeaters. There may be up to 255 subnets in a domain. The third part is the Node ID that identifies an individual device within the subnet.

A group is a logical collection of devices within a domain. Groups are assembled with regard for their physical location in the domain. There may be up to 256 groups in a domain. A group address is the address that identifies all devices of the group. There may be any number of devices in a group when unacknowledged messaging is used. Groups are limited to 64 devices if acknowledged messaging is used.

A broadcast address identifies all devices within a subnet or domain.

#### *8.4.5.3 Commissioning the Network*

- To commission the device (i.e. LONWORKS Communication Module), press the service pin (see Figure 8-12). Doing so generates a service-pin message, which is broadcast on the network and contains the Neuron ID and the program code identification of the node.
- Next, use a LONWORKS network configuration tool, such as LonMaker®, to map the device Neuron ID to the domain/subnet/node logical addressing scheme when it creates the network image, the logical network addresses and connection information.

#### *8.4.5.4 External Interface File (XIF) and NXE Files*

LONMARK guidelines specify exact documentation rules so that proprietary configuration tools are not required to commission and configure LONWORKS devices. The LONWORKS Communication Module is self-documenting so that any LONWORKS network management tool can obtain all the information needed over the network to connect it into the system and to configure and manage it.

An external interface file (a specially formatted PC text file with the extension .XIF) is required, along with LONWORKS network management tool, so that you can design and configure the device prior to installation.

The NXE file contains the application image that is downloaded into the LONWORKS Communication Module.

The XIF and NXE files are available at http://www.lonmark.org/

#### *8.4.5.5 Configuring the LONWORKS Communication Module*

The LONWORKS Communication Module typically does not require configuration. The unit ships ready to operate with default values which can then be changed via the network. Refer to section 9 of the RTU-C I&O manual for descriptions of the available LONWORKS variables.

#### *8.4.5.6 Resetting/Clearing the LonWorks Communication Module*

It is possible to reset or clear network parameters values from the LONWORKS communication module.

Use the Reset button is to reset the LONWORKS communication module application. Press the Reset button to revert all Network Variable (NV) parameters back to default values. Configuration variables do not change. See section 9.5 of the RTU-C I&O manual for a complete list of all network parameters.

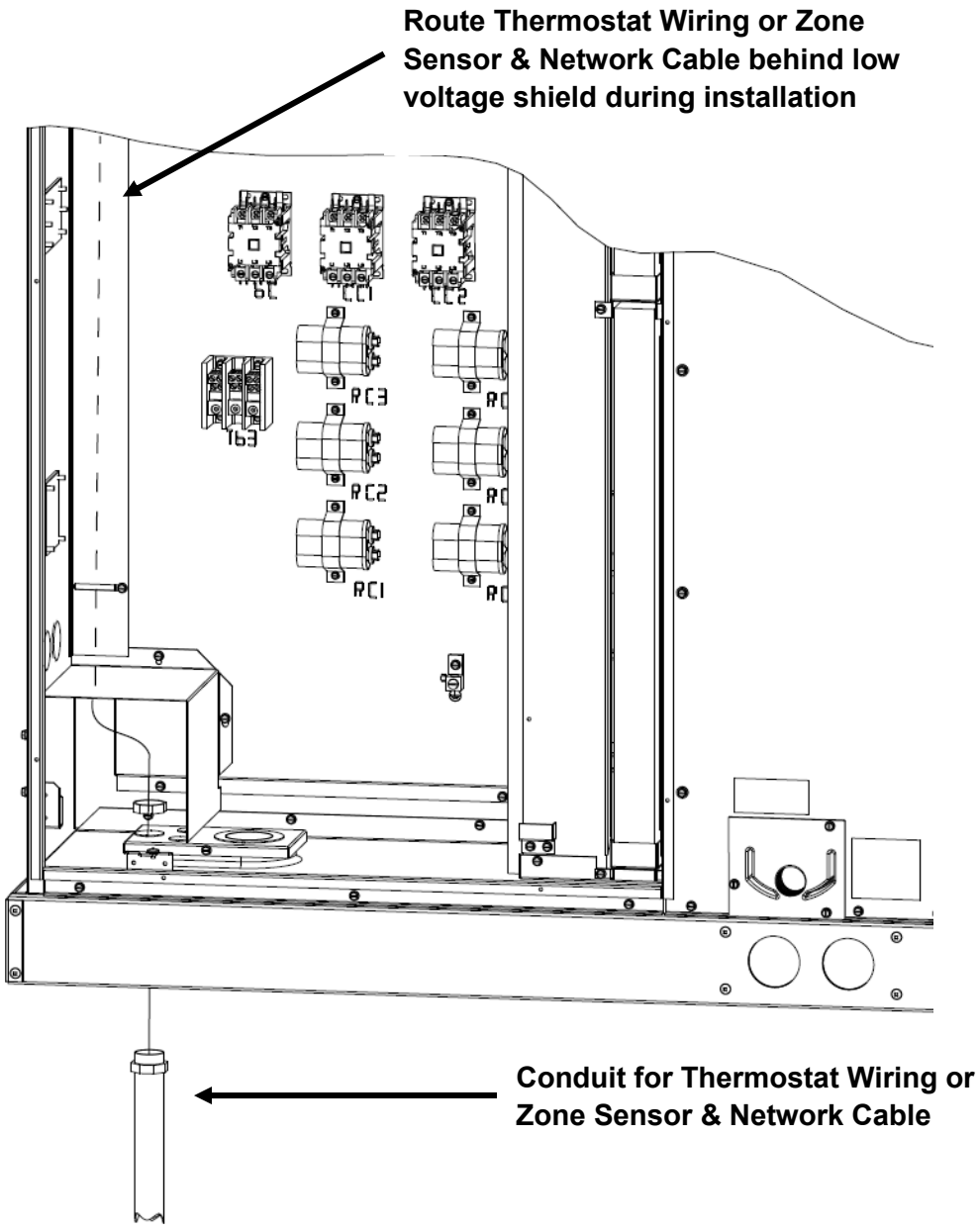
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### *8.4.6 Test Procedures*

If attempts to communicate with the RXRX-AY02 card are unsuccessful, cycle the unit main power once to reset communication between the RTU-C and the RXRX-AY02.

If you are unable to communicate to the LONWORKS Communication Module via the network:

- Check the network wiring.
- Check addressing.
    - Activate the Service Pin on the LONWORKS Communication Module to send the service message to the network. The service-pin message contains the Neuron ID and the program code identification of the node.


Route Thermostat Wiring or Zone Sensor & Network Cable behind low voltage shield during installation
RC3
RC2
RC1
Conduit for Thermostat Wiring or Zone Sensor & Network Cable