

Group: Controls

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## MicroTech<sup>®</sup> III Rooftop and Self Contained Unit Controller LONWORKS<sup>®</sup> Communication Module

**Applied Rooftop Models: RPE, RDE, RCE, RPS, RDT, RFS, RCS, RDS and RAH**  
**Self-Contained Models: SWP and SWT**  
**Maverick II<sup>™</sup> Model MPS**



### NOTICE

Use this manual to physically connect the McQuay MicroTech III Communication Module to the unit controller and connect the air handler unit controller to your network. Connections and service to the MicroTech III Air Handling Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled. Use the appropriate McQuay Engineering Data (ED), known as the Protocol Information document, to integrate the unit into your network. The Protocol Information document contains addressing details, LONWORKS<sup>®</sup> protocol information, and a list of the data points available to the network. See the Reference Documents section of this manual for Protocol Information document numbers. MicroTech III control integration literature is available from your local McQuay International sales representative and [www.mcquay.com](http://www.mcquay.com).

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## Revision History

IM 918	October 2008	Preliminary release.
IM 918-1	January 2009	Updated figure 3 & text for setting service pin with hex key.
IM 918-2	October 2009	Added Maverick II (MPS) model

## Reference Documents

Number	Company	Title	Source
078-0014-01E	LONMARK Interoperability Association	LONMARK Layers 1-6 Interoperability Guidelines, Version 3.4	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
8610_10	LONMARK Interoperability Association	Discharge Air Controller Functional Profile	www.lonmark.org
OM 920	McQuay International	MicroTech III Unit Controller Operation Manual for Applied Rooftop and Self-Contained Systems	www.mcquay.com
ED 15112	McQuay International	Protocol Information, BACnet and LonWorks	www.mcquay.com

## Limited Warranty

Consult your local McQuay Representative for warranty details. Refer to Form 933-43285Y. To find your local McQuay Representative, go to [www.mcquay.com](http://www.mcquay.com).

## Trademark Notices

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# General Information

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This manual contains the information you need to install a MicroTech III LONWORKS Communication Module and integrate it into the network.

## Hazard Identification Messages

### DANGER

Dangers indicate a hazardous situation which will result in death or serious injury if not avoided.

### WARNING

Warnings indicate potentially hazardous situations, which can result in property damage, severe personal injury, or death if not avoided.

### CAUTION

Cautions indicate potentially hazardous situations, which can result in personal injury or equipment damage if not avoided.

### WARNING

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

This equipment must be properly grounded. Connections and service to the Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

### CAUTION

**Static sensitive components. Can cause equipment damage.**

Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

### 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 his or her own expense. **McQuay International disclaims any liability resulting from any interference or for the correction thereof.**

## Description

A MicroTech III LONWORKS Communication Module provides the interface between a McQuay MicroTech III Rooftop or Self-Contained Unit Controller (i.e. Applied Rooftop, Self-Contained, or Maverick II™ Unit) 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. Profiles are interpreted in loaded programs (firmware).

The LONWORKS Communication Module is a printed circuit board with a plastic enclosure that connects onto the left side of the Unit Controller (see Figure 1).

*Figure 1. LONWORKS Communication Module Attached to the Unit Controller*



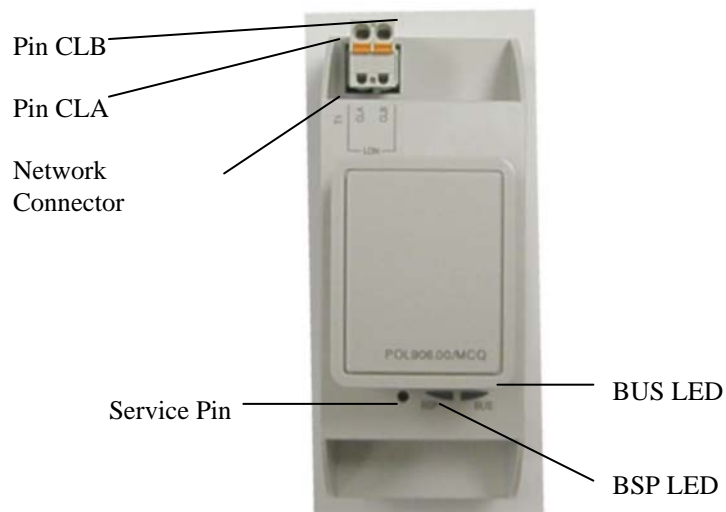
## Application

A LONWORKS Communication Module connects the 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 profile into the native information of the unit controller. Refer to the MicroTech III Air Handling Unit Controller Operation Manual, OM 920 for keypad details.

## Component Data

Figure 2 shows the location of the major components of the LONWORKS Communication Module.

Figure 2. LONWORKS Communication Module Major Components



### Service Pin

The service pin generates a service-pin message that contains the Neuron<sup>®</sup> 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.

The service pin button is located below the enclosure just left of the LEDs. To activate the service pin, insert the end of a 5/64 " (1.985 mm) Hex Key (Allen wrench), or other similar tool with a narrow end, approximately 1.5 inches (3.8 cm) into the small hole to the left of the LEDs (see Figure 3).

Figure 3. Service Pin: Before and After



## Light Emitting Diodes (LEDs)

Two 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 MicroTech III Air Handling Unit Controller.

### BSP LED

The BSP LED indicates the communication status between the LONWORKS Communication Module and the Unit Controller. The table below describes the status of the BSP LED.

BSP LED Color	Meaning
Flashing between Red & Green	Board Support Package (BSP) upgrade in progress
Green	Communication is established between the communication module and the unit controller.
Yellow	The communication module is capable of communicating to the unit controller. However, communication is not established.
Red flashing with 2Hz	Red flashing with 2Hz = Software error. <sup>1</sup>
Red	Hardware error. <sup>1</sup>

<sup>1</sup> In the event that this should occur, cycle power to the unit controller to attempt to clear the problem. Contact the McQuay Controls Customer Support Group at 866-4MCQUAY (866-462-7829) for additional assistance if necessary.

### BUS LEDs

The BUS LED indicates the communication status between the LONWORKS Communication Module and the network. The table below describes the status of the BUS LED.

BUS LED Color	Meaning
Green	The unit controller is capable of communicating to the network.
Red	The unit controller is not capable of communicating to the network.
Orange / Yellow	Communication module is initializing.
Orange / Yellow Flashing	Unit has not yet communicated with a LON network

## LonWorks Network Connector

The network connector connects the LONWORKS Communication Module to the LONWORKS FTT-10A bus.

Pin	Function
CLA	FTT-10A
CLB	FTT-10B

## Board-To-Board Connector

The board-to-board connector connects the unit controller to the LONWORKS Communication Module (see Figures 3 and 4).

## 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 Unit Controller.

## Neuron

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.

## 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).

## Specifications

<b>Characteristic</b>	<b>Description</b>
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)

# Installation

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The following section describes how to field install a new LONWORKS Communication Module or replace an existing LONWORKS Communication Module on the MicroTech III Rooftop, Self-Contained or Maverick II Unit Controller so that it can be incorporated into the LONWORKS network. The Communication Module can be factory or field installed. See Parts List for details.

## 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.

## Contents of the LONWORKS Communication Module Kit

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

- The LONWORKS Communication Module
- Board-to-board connector
- Network connector Installing a LONWORKS Communication Module

## Installing a LONWORKS Communication Module

Follow these steps to install a LONWORKS Communication Module on the Unit Controller to incorporate it into an existing LONWORKS network.

1. Remove power from the Unit Controller.

## WARNING

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

This equipment must be properly grounded. Connections and service to the Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

2. Remove the knockout on the far right side of the LONWORKS Communication Module (see Figure 4).

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**Note:** To prevent damage to the LONWORKS Communication Module, insert a small screwdriver or other tool to the tab on the bottom of the controller and pull the screwdriver or tool in the direction away from the unit controller.

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3. Insert the board-to-board connector into the LONWORKS Communication Module. It will only fit one way. Note that baffles must line up with corresponding slots in LONWORKS Communication Module and the unit controller (see Figures 4 and 5).
4. Connect the other end of the board-to-board connector to the far left of the unit controller.

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**Note:** If the knockout on the unit controller is still in place, remove it using the same procedure as with the LONWORKS Communication Module (see Figure 4).

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5. Connect the LONWORKS Communication Module to the network (see Figure 2 for locations of network connections).
  - a. Connect one wire of the network cable to Pin CLA of the connector plug.
  - b. Connect the other wire to Pin CLB of the connector plug.
6. Apply power to the Unit Controller.
7. The unit controller automatically resets approximately 20 seconds after it is powered up. This reset is necessary so that the LONWORKS Communication Module is synchronized with the unit controller.

Figure 4. LONWORKS Communication Module Knockout

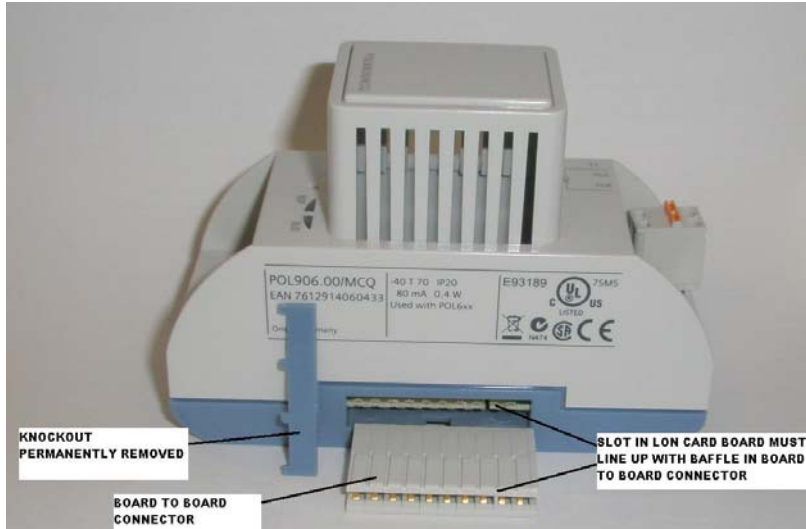
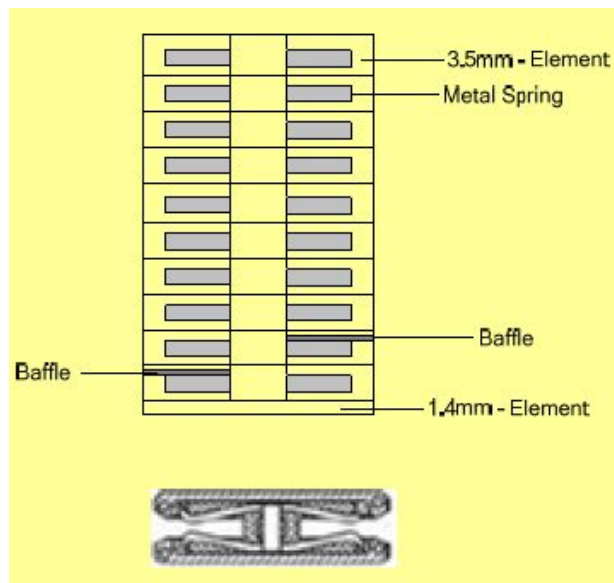


Figure 5. Diagram of Board-to-Board Connector



## 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.

### **WARNING**

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

This equipment must be properly grounded. Connections and service to the MicroTech III Air Handling Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

1. Remove power from the Unit Controller.
2. Locate the LONWORKS Communication Module. It is situated to the left of the Unit Controller (see Figure 1).
3. Pull the network cable connector from the LONWORKS Communication Module.
4. Grasp the LONWORKS Communication Module and carefully pull it from the Unit Controller.
5. Install the new LONWORKS Communication Module.
6. Insert the network cable connector into the LONWORKS Communication Module.
7. Apply power to the Unit Controller.
8. The unit controller automatically resets approximately 20 seconds after it is powered up. This reset is necessary so that the LONWORKS Communication Module is synchronized with the unit controller.

# Integration

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Integrating the LONWORKS Communication Module into a BAS involves three steps:

- Connecting the unit (node) to the network
- Addressing and establishing communications with the unit
- Configuring the unit to the building

## Connecting to the Network

After you have connected the LONWORKS Communication Module to the Maverick I 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.

## Addressing and Establishing Communications

### 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.

### Commissioning the Network

- To commission the device (i.e. LONWORKS Communication Module), press the service pin (see Figure 3). 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<sup>®</sup>, 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.

### 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 LONWORKS Communication Module uses a separate NXE file, depending on the whether the unit is configured for the DAC or SCC functional profile.

The XIF and NXE files are available at [www.mcquay.com](http://www.mcquay.com) or [www.lonmark.org](http://www.lonmark.org). Refer to ED MicroTech III Rooftop and Self Contained Controller Protocol Information, ED 15112 for additional details.

## Resource Files

Resource files contain definitions of functional profiles, network variables types, configuration property types, and enumerations. Resource files are required for 1) displaying McQuay-specific variables that are not included in the standard device profile or 2) switching from one device functional profile to another (SCC to DAC or vice versa). The LONWORKS Communication Module uses a separate set of resource files, depending on the whether the unit is configured for the DAC or SCC functional profile. These files are available at [www.mcquay.com](http://www.mcquay.com) or [www.lonmark.org](http://www.lonmark.org). Refer to ED 15112 for additional details.

## Configuring the Unit Controller

The LONWORKS Communication Module typically does not require configuration. Refer to the MicroTech III Applied Air Controller Operation Manual for additional information about using the unit controller keypad display to set unit parameters and modify unit setpoints. Refer to ED 15112 for descriptions of the available LONWORKS variables.

# Service Information

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## Test Procedures

If you can control the MicroTech III Air Handling Unit from the keypad, but you are unable to communicate with it 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.

Contact the McQuay Controls Customer Support group at 866-4MCQUAY (866-462-7829) for additional assistance if necessary.

## Parts List

### Kit

Description	Part Number
MicroTech III LONWORKS Communication Module Kit, Space Comfort Controller (SCC). Kit includes communication module, board-to-board connector, and Installation Manual.	090016711
MicroTech III LONWORKS Communication Module Kit, Discharge Air Controller (DAC). Kit includes communication module, board-to-board connector, and Installation Manual.	090016712

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