

Group: Controls

Part Number: IM 917

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MicroTech[®] III Rooftop and Self Contained Unit Controller BACnet[®] Communication Module (MS/TP)

Applied Rooftop Models: RPE, RDE, RCE, RPS, RDT, RFS, RCS, RDS and RAH
Self-Contained Models: SWP and SWT
Maverick II[™] Model MPS



NOTICE

Use this manual to physically install the McQuay MicroTech III Communication Module into the unit controller and connect the Applied Air Handling unit controller to your network. 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, BACnet[®] 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.

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Revision History

IM 917	October 2008	Initial release
IM 917-1	October 2009	Added Maverick II (MPS) model. Updated keypad display navigation menu per global standards.

Reference Documents

Number	Company	Title	Source
ANSI/ASHRAE 135-2001	American Society of Heating, Refrigerating and Air-Conditioning Engineers	BACnet® A Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org
OM 920	McQuay International	MicroTech III Applied Air Handling Unit Controller Operation and Maintenance Manual	www.mcquay.com
ED 15112	McQuay International	MicroTech III Rooftop and Self Contained Unit Controller Protocol Information, BACnet and LONWORKS Networks	www.mcquay.com
ED 15113	McQuay International	MicroTech III Rooftop and Self Contained Unit Controller Protocol Information, BACnet Protocol Implementation Conformance Statement (PICS)	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.

Notice

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® ™ The following are tradenames or registered trademarks of their respective companies: BACnet from the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; Windows from Microsoft Corporation; McQuay, Maverick II, and MicroTech III from McQuay International.

General Information

This manual contains the information you need to install the BACnet® Communication Module on a MicroTech III Rooftop or Self-Contained Unit Controller (i.e. Applied Rooftop, Self-Contained, or Maverick II™ Unit), incorporate it into the BACnet network, and maintain it.

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

The MicroTech III[®] BACnet Communication Module incorporates a MicroTech III Rooftop or Self-Contained Unit Controller (i.e. Applied Rooftop, Self-Contained, or Maverick II Unit) into a BACnet local area network (LAN). It supports the BACnet MS/TP (EIA 485) data link layer (physical layer.)

The BACnet Communication Module is a printed circuit board with a plastic enclosure that connects to the left side of the Unit Controller. The BACnet Communication Module provides access to the Unit Controller variables and parameters via BACnet (see Figure 1.)

Figure 1. BACnet MS/TP Communication Module Attached to the Unit Controller



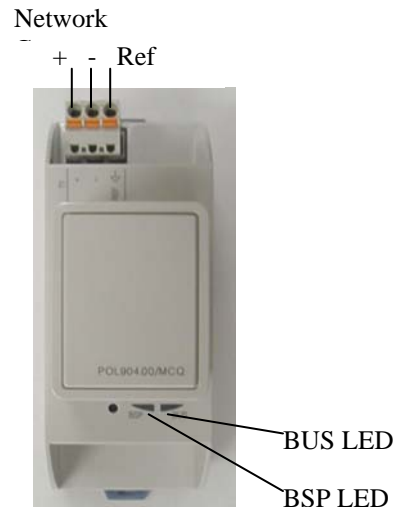
Application

The BACnet Communication Module connects the Unit Controller to a building automation system (BAS) on a BACnet local area network. It is the interface for the exchange of BACnet objects between the network and the unit controller. Refer to the McQuay 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 BACnet Communication Module.

Figure 2. BACnet Communication Module Components



Light Emitting Diodes (LEDs)

The BACnet Communication Module has a BSP LED and a BUS LED to indicate communication activity and status of the BACnet Communication Module. These indicators are visible when the communication module is connected to the Unit Controller and the unit is powered on (see Figure 2).

BSP LED

The BSP LED indicates the communication state between the BACnet 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 with the unit controller 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. ¹
Red	Hardware error. ¹

¹ 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 BACnet Communication Module and the BACnet MS/TP 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.

BACnet Network Connector

An RS485 connector connects the BACnet Communication Module to the MS/TP Network and has three pins: +, -, and ref (see Figure 2).

Board-To-Board Connector

The board-to-board connector connects the Unit Controller to the BACnet Communication Module (see Figures 3 and 4).

Figure 3. BACnet MS/TP Communication Module and Knockout

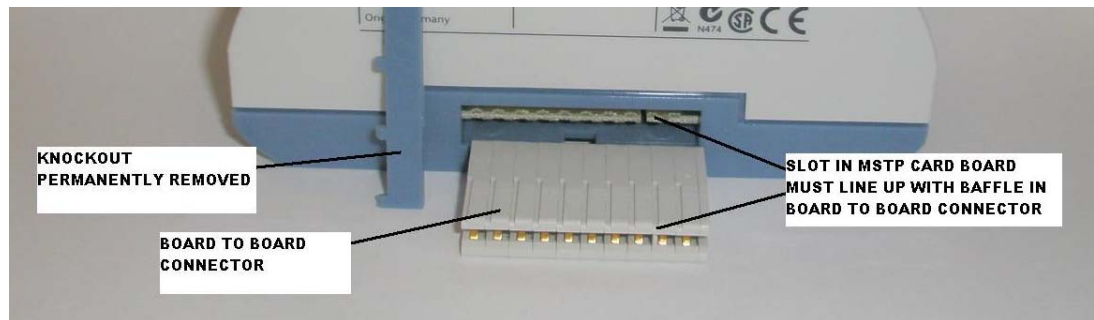


Figure 4. Diagram of Board-to-Board Connector

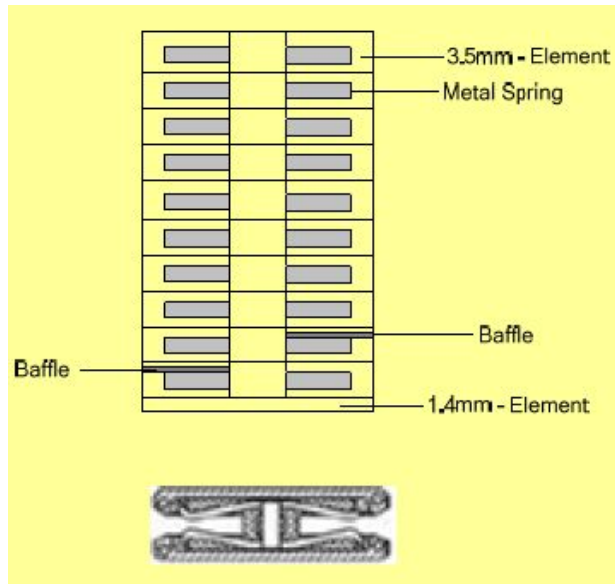


Figure 5. BACnet MSTP Communication Module with Board-to-Board Connector Inserted



Installation

The following section describes how to field install a new BACnet Communication Module or replace an existing BACnet Communication Module on the MicroTech III Rooftop, Self-Contained or Maverick II Unit Controller so that it can be incorporated into the BACnet 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 BACnet Communication Module Kit

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

- The BACnet Communication Module
- Board-to-board connector (separate)
- Network connector (attached)

Installing a new BACnet Communication Module

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

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 Unit Controller.

1. Remove power from the Unit Controller.
2. Remove the knockout on the far left end of the unit controller or BACnet Communication Module (see Figure 3.)

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

3. Remove the knockout on the far right side of the BACnet Communication Module.
4. Insert the board-to-board connector into the BACnet Communication Module (see Figures 3 and 4). Note that it only fits one way and that the baffles must line up with corresponding slots in BACnet Communication Module and the unit controller (see Figures 4 and 5).
5. Insert the other end of the board-to-board connector to the far left side of the unit controller or other communication module, if attached (see Figure 1 on page 5).
6. Connect the BACnet Communication Module to the network by inserting a network cable into the communication module's network connector (see Figure 2 on page 6).

Note: A crossover cable is required if connecting directly to the unit. A straight-through cable may be used if connecting through a network hub.

7. Power up the unit controller.
 8. The unit controller automatically resets itself approximately 20 seconds after it is powered up. This reset is necessary so that the BACnet Communication Module is synchronized with the unit controller.
-

Note: There is a limit of three devices that can be attached to the left side of the unit controller.

Replacing an Existing BACnet Communication Module

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

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 Unit Controller.

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

Integration

Once the BACnet Communication Module has been properly installed on the unit controller, it is then possible to integrate the unit controller into a building automation system (BAS) via the BACnet MS/TP network. The configuration process is described in the following section.

Configuring the BACnet Communication Module

The BACnet Communication Module can be configured using the keypad/display on the Unit Controller. The unit is ready to operate with the default parameter values in the unit controller after you change the default parameters for your particular network. Refer to the appropriate MicroTech III Applied Air Handling Unit Controller Operation Manual (OM 920) for default values and keypad operating instructions. Refer to McQuay Protocol Document ED 15112 for descriptions of the available BACnet objects

BACnet MS/TP Addressing

The BACnet MS/TP Media Access Control (MAC) address is a one-octet address that must be set during the BACnet Communication Module configuration. The MAC address must be unique to the MS/TP network and have a valid range of 0-127.

Additionally, there are certain parameters that must be set properly to verify communication between the Unit Controller and the MS/TP network. Table 1 provides details about these addressing parameters. See your system integrator for additional information regarding proper BACnet MS/TP addressing.

Note: Refer to Operation Manual OM 920 for details regarding the MicroTech III Applied Air Handling Unit Controller keypad/display.

To Configure the Module using the Keypad/Display:

1. Navigate to the Enter Password screen if you have not already entered a password. If you have entered a password, skip to step 3.
2. Enter Password: 6363.
3. Continue to navigate to BMS Communications\MSTP Setup.

Note: The MS/TP Setup menu only appears if a BACnet Communication Module installed correctly (see Installation section of this document for details.) If the BACnet Communication Module is installed correctly and this menu still does not appear, cycle power to the unit controller and repeat the procedure from Step 3 above.

4. Modify the parameters as necessary (see Table 1 for a complete list.)
5. Continue to navigate to BMS Communications\MSTP Setup and change “ApplyMSTPChgs” from No to Yes (see Figure 6).
6. On the MSTP Setup menu, verify the settings of all parameters. This procedure may take a minute while the BACnet Communication Module powers up.

Changing the MS/TP Data Transmission Rate

The options for baud rate (in bps) include: 9600, 19200, 38400, and 76800. The factory default baud rate is 38400 bps.

⚠ WARNING

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

This equipment has exposed electrical connections inside BACnet Communication Module. Only personnel that are knowledgeable in the operation of this equipment must perform connections and service to the BACnet Communication Module.

Changing the MS/TP Data Transmission Rate:

1. Navigate to the Enter Password screen if you have not already entered a password. If you have entered a password, skip to step 3.
2. Enter Password: 6363.
3. Navigate to the BMS Communications\MSTP Setup and change the baud rate to desired value (see Figure 7).
4. Continue to navigate to BMS Communications\MSTP Setup and change “ApplyMSTPChgs” from No to Yes (see Figure 6).

Figure 6. Unit Controller MSTP Setup Screen – Change “ApplyMSTPChgs”

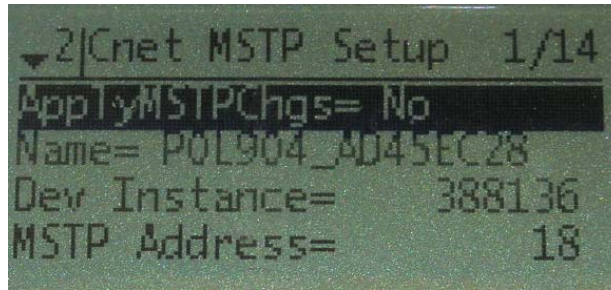
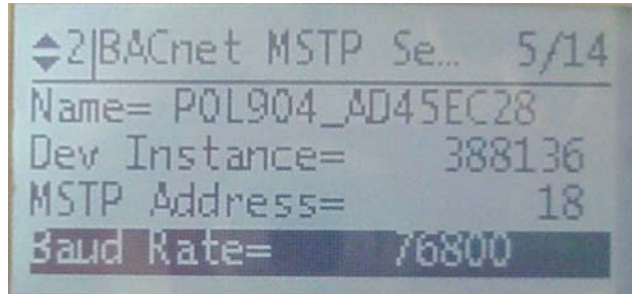


Figure 7. Unit Controller MSTP Setup Screen – Change Baud Rate



Configurable Parameters

Table 1 defines the network parameters of the BACnet Communication Module that must be set using the keypad/display in order to establish communication between the Unit Controller Unit and the BAS. Change parameters as required for your network.

Note: To save alteration of these parameters, select “ApplyMSTPChgs” under Advanced Menus/MSTP Setup (see Step 4 from previous section). For additional information on using the keypad/display, refer to OM 920.

Table 1. Network Configuration Menu

Parameter	Value (Range)/Definition	Initial Value/Note
ApplyMSTPChg	No-Yes/Apply MSTP Changes. Setting this to yes will cycle power to the controller to allow the network setup changes to take place.	No
Device Instance	0-4194303/Device Instance of the BACnet Communication Module.	368136/This must be unique throughout the entire BACnet network.
MS/TP Address ¹	0-127/ This is the MS/TP address of the BACnet Communication Module.	18/ Each device on the BACnet network must have a unique MS/TP address.
Name	Up to a 17-character Device Object Name. Change this value as needed to match installation parameters.	POL904_FF2BEE/This name must be unique throughout the entire BACnet network. The last 6 characters of the default are the last 6 digits of the MAC Address, which is printed on a label located on the left end of the module. "Apply MSTP Change" must be activated for changes to the Device Object Name to take effect.
Baud Rate ¹	9600-19200-38400-76800/ Data transfer speed.	38400
Max Master	0-127/ This variable specifies the highest possible address for master nodes and shall be less than or equal to 127.	127
Max Info Frames	0-255/ This variable specifies the maximum number of information frames the BACnet Communication Module may send before it must pass the token.	10
RcvHrtBt	0-6553.5/Receive Heartbeat	0 Seconds/Setting this value to 0 disables the receive heartbeat feature.
Unit Support	Off-On/Controls the type of units that are passed through BACnet (English or Metric).	On/To set the unit for Metric, set Unit Support to Off. If Unit Support is On, they type of units will be set to the same units as the keypad.
Term Resistor ¹	No-Yes	No
NC Dev 1	0-4194303/Alarm Recipient Device 1	0 (no device)/This is the device instance of the BACnet workstation or device that will receive the alarm notification. Use this in place of the Recipient List in the Notification Class.

Parameter	Value (Range)/Definition	Initial Value/Note
NC Dev2	0-4194303/Alarm Recipient Device 2	0 (no device)/This is the device instance of the BACnet workstation or device that will receive the alarm notification. Use this in place of the Recipient List in the Notification Class.
NC Dev3	0-4194303/Alarm Recipient Device 3	0 (no device)/This is the device instance of the BACnet workstation or device that will receive the alarm notification. Use this in place of the Recipient List in the Notification Class.
BACnetBSP	Basic Support Package Version	1.0.11

¹Parameter only available via the keypad/display; designates the location of the unit on the network.

Note: If unit controller application software requires uploading in the field, the network configuration parameters revert to their default values. Please contact the McQuay Applied Air Handling Customer Support Group at 763-553-5151 for assistance with upgrading unit controller application software.

Service Information

Test Procedures

If you can control the unit from its keypad, but you are not able to communicate with unit via the network, follows these steps:

- Check the network wiring
- Check the network parameters and verify that they are correct and that there are no duplicate devices on the network
- Check communications

If the BACnet Communication Module still does not respond, contact the McQuay Controls Customer Support Group at 866-4MCQUAY (866-462-7829).

Parts List

Installation Kit

Description	Part Number
MicroTech III BACnet Communication Module-MS/TP kit (kit includes communication module with attached network connector board-to-board connector, and Installation Manual)	090016710

This document contains the most current product information as of this printing. For the most current product information, please go to www.mcquay.com. All McQuay equipment is sold pursuant to McQuay's Standard Terms and Conditions of Sale and Limited Warranty.



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