

Group: Controls

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MicroTech[®] III McQuay Chiller Unit Controller BACnet[®] Communication Module (MS/TP)

Pathfinder[™] Chiller, Model AWS



NOTICE

Use this manual to physically install the McQuay MicroTech III Communication Module into the Chiller unit controller and connect the Chiller 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 967

October 2009

Initial release

Reference Documents

Number	Company	Title	Source
ANSI/ASHRAE 135-2004	American Society of Heating, Refrigerating and Air-Conditioning Engineers	BACnet® A Data Communication Protocol for Building Automation and Control Networks	www.ashrae.org
IM 1002 (50Hz) IM 997 (60Hz)	McQuay International	Pathfinder™ Air Cooled Chiller Installation Manual	www.mcquay.com
OM 998	McQuay International	Pathfinder Air Cooled Chiller Operation Manual	www.mcquay.com
ED 15120	McQuay International	MicroTech III Chiller Unit Controller Protocol Information, BACnet and LONWORKS Networks	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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General Information

This manual contains the information you need to install the BACnet® Communication Module on a MicroTech III Chiller Unit Controller, incorporate it into the BACnet network, and maintain it.

Hazard Identification Messages

DANGER

Dangers indicate a hazardous situation that 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 MicroTech III Chiller 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 Chiller Unit Controller 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 McQuay D-Net[™] Module as shown in Figure 1 or directly to the MicroTech III Chiller Unit Controller. The BACnet Communication Module provides access to the MicroTech III Chiller Unit Controller variables and parameters via BACnet.

Note: The D-Net module is an optional feature that provides remote monitoring and diagnostic capability for certain models of McQuay chillers. Please refer to supporting literature, available on www.mcquay.com, for additional details about D-Net.

Application

The BACnet Communication Module connects the MicroTech III Chiller 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 Chiller Operation Manual for keypad details.

Component Data

Figure 1 shows the BACnet Communication Module, located on the far left-hand side of the image below. It is connected to the AWM, which is mounted directly to the unit controller. Figure 2 shows the important features of the BACnet Communication Module.

Figure 1. BACnet MS/TP Communication Module Attached to MicroTech III Chiller Unit Controller

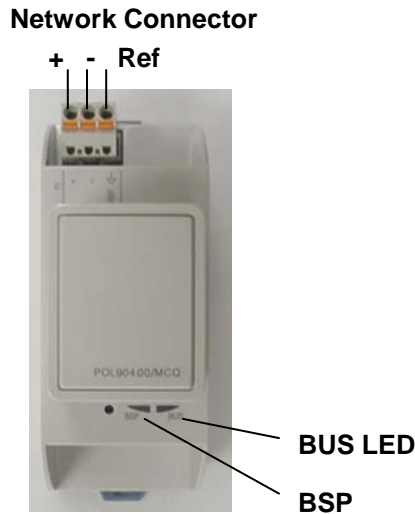


↑
BACnet MS/TP
Communication
Module

↑
D-Net Module attached to unit
controller

Figure 2 shows the location of the major components of the BACnet MS/TP Communication Module.

Figure 2. BACnet MS/TP 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 MicroTech III Chiller 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 MicroTech III Chiller 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 MicroTech III Chiller Unit Controller to the BACnet Communication Module (see Figures 3, 4 and 5).

Figure 3. BACnet MS/TP Communication Module and Knockout

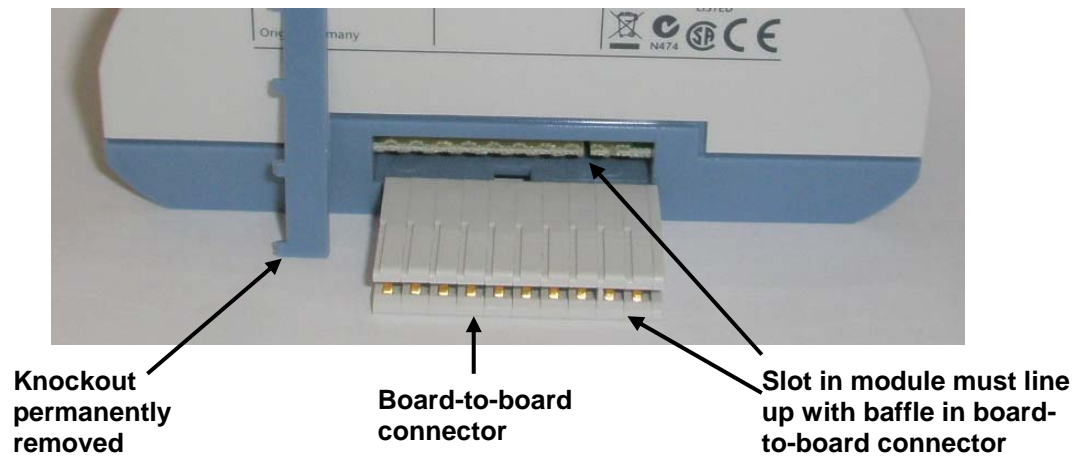


Figure 4. Diagram of Board-to-Board Connector

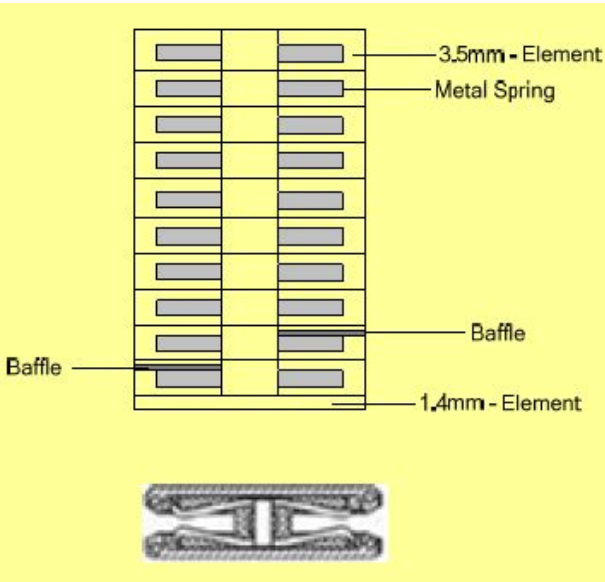


Figure 5. BACnet MSTP Communication Module with Board-to-Board Connector Inserted



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 Chiller Unit Controller so that it can be incorporated into the BACnet network.

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
- Network connector (attached to module)
- Installation Manual (IM 967)

Installing a new BACnet Communication Module

Follow these steps to install a BACnet Communication Module on the unit controller. The BACnet Communication Module can be connected directly to the unit controller itself or to an existing module, if one is attached.

To install a 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 MicroTech III Chiller Unit Controller.

1. Remove power from the unit controller.
2. Remove the knockout on the far left end of the unit controller itself (or additional module, if present). 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 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 device (i.e. module), if attached (see Figure 1).
6. Connect the BACnet Communication Module to the network by inserting a network cable into the communication module's network connector (see Figure 2).
7. Power up the unit controller.
8. The unit controller automatically resets itself approximately 30 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 unit controller and replace it with a new BACnet Communication Module.

To Replace a 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 MicroTech III Chiller 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 (or from an adjacent module, if it is attached to one.)
5. Install the new BACnet Communication Module (see steps 2-5 from previous section).
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 30 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 MicroTech III Chiller Unit Controller, it is then necessary to configure the unit controller for integration 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 is configured using the keypad/display on unit controller. Table 1 describes all of the available BACnet MS/TP network parameters used to establish communication between the unit controller and the BAS. The items shown in boldface are required for minimum network configuration. Table 1 also defines the factory defaults (as indicated by the Initial Value/Note column) for each network parameter.

See your system integrator for additional information regarding proper BACnet MS/TP addressing. Refer to the MicroTech III Chiller Unit Controller Operation Manual for additional information on using keypad/display to set unit parameters and factory defaults for unit setpoints. Refer to McQuay Protocol Document ED 15120 for descriptions of the available BACnet objects.

BACnet MS/TP Configuration using the Keypad/Display

1. If you have not already entered a password, select Enter Password from the Main Menu screen (i.e. turn the circular knob on the unit controller until the cursor is in the proper location) and press Enter (i.e. press down on the knob). See Figure 6.
 - a. If you are not at the Main Menu and need to enter a password, press the Back button from any other menu screen until you reach the Main Menu and follow step 1. See Figure 6 for the location of the Back button.
 - b. If you have already entered a password, skip to step 3. See Figure 6 if you are not certain whether or not a password has been entered.
2. Enter Password: 5321 and then press Enter.
3. Scroll down to View/Set Unit (i.e. turn the knob clockwise) and press Enter.
4. Scroll down to BACnet MSTP Setup and press Enter.

Note: The BACnet MSTP Setup menu only appears if a BACnet Communication Module is 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 above.

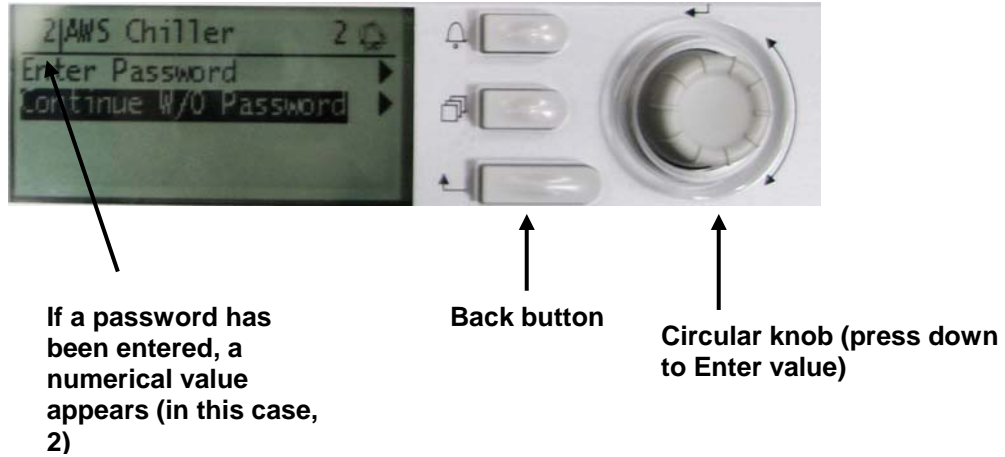
5. Scroll down to MSTP Address (MAC Address) and press Enter. Change this parameter to the value specified by the network administrator. Press Enter again to confirm selection.

Note: 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.

6. Change additional parameters as required for your network (see Table 1).
7. Set Apply Changes to Yes. This will save the changes and cycle power to unit controller.

8. Navigate back to the BACnet MSTP Setup menu (see steps 1-4) to verify the settings of all parameters. This procedure may take a minute while the BACnet Communication Module powers up.

Figure 6. MicroTech III Chiller Unit Controller Password Menu and Main Features



Changing the BACnet MS/TP Data Transmission Rate

The BACnet Communication Module is set with a factory default baud rate of 38400 bps. Additional baud rate options (in bps) include: 9600, 19200, 38400, and 76800. The following section describes how to change the BACnet MS/TP data transmission rate via the keypad display.

⚠ 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.

1. If you have not already entered a password, select Enter Password from the Main Menu screen (i.e. turn the circular knob on the unit controller until the cursor is in the proper location) and press Enter (i.e. press down on the knob). See Figure 6.
 - a. If you are not at the Main Menu and need to enter a password, press the Back button from any other menu screen until you reach the Main Menu and follow step 1. See Figure 6 for the location of the Back button.
 - b. If you have already entered a password, skip to step 3. See Figure 6 if you are not certain whether or not a password has been entered.
2. Enter Password: 5321 and then press Enter.
3. Scroll down to View/Set Unit (i.e. turn the knob clockwise) and press Enter.
4. Scroll down to BACnet MSTP Setup and press Enter.
5. Change the Baud Rate by scrolling to Baud Rate and press Enter to selected desired baud rate (see Figure 7 to view a baud rate that has been changed to 76800 bps).
6. Scroll to ApplyMSTPChgs and set to Yes. This will save the changes and cycle power to the unit controller (see Figure 8).

Figure 7. MicroTech III Chiller Unit Controller MSTP Setup Menu – Change Baud Rate

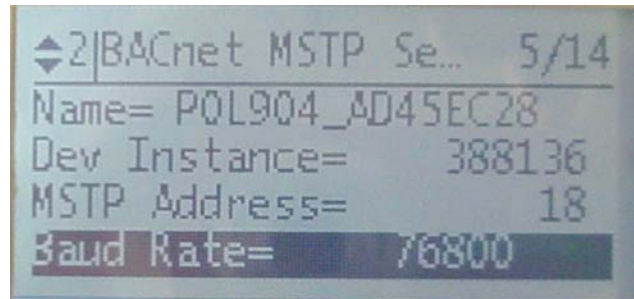


Figure 8. MicroTech III Chiller Unit Controller MSTP Setup Menu – Apply Change

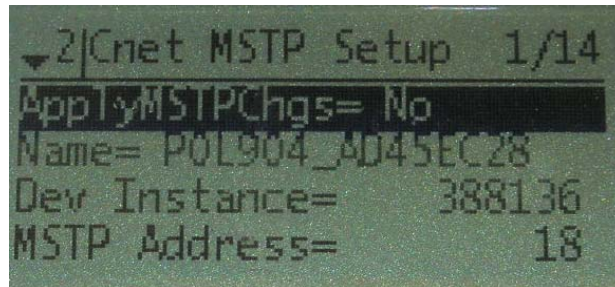


Table 1. BACnet MS/TP Network Configuration Parameters

Parameter	Value (Range)/Definition	Initial Value/Note
Apply Changes ¹	No-Yes/Setting this to yes will cycle power to the controller to allow the network setup changes to take place.	No
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.
Dev Instance	0-4194302/Device Instance of the BACnet Communication Module.	368136/This must be unique throughout the entire BACnet network.
MSTP 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.
Baud Rate ¹	9600-19200-38400-76800/ Data transfer speed (bps).	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 Frm	0-255/ This variable specifies the maximum number of information frames the BACnet Communication Module may send before it must pass the token.	10
Unit Support	Metric-English/Controls the type of units that are passed through BACnet (English or Metric).	English
Term Resistor ¹	No-Yes	No/Selecting Yes enables an internal resistor. Select No, if there is an external resistor or if this unit is not the first or last unit on the segment.
NC Dev 1 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.
NC Dev2 ¹	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.
BACnetBSP ¹	Basic Support Package Version	1.1.30s

¹ Parameter only available via the keypad/display.

² Items in boldface are required for minimum network configuration.

Note: If unit controller application software requires downloading in the field, the network configuration parameters revert to their default values. Please contact the Technical Response Center at 877-349-7782 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 the 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 Chiller Communication Module, BACnet MS/TP kit (kit includes communication module, board-to-board connector, and Installation Manual)	350147414

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.

