

Group: Controls

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MicroTech[®] III Chiller Unit Controller BACnet[®] IP Communication Module

Pathfinder[™] Chiller, Model AWS



NOTICE

Use this manual to physically install the McQuay MicroTech III Communication Module into the MicroTech III Chiller unit controller and connect the 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 966 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. Only personnel knowledgeable in the operation of the equipment being controlled must perform connections and service to the MicroTech III Air Handling Unit Controller.

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 IP 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 unit controller. The BACnet Communication Module provides access to the unit controller variables and parameters via BACnet.

Note: D-Net 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 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 MicroTech III Chiller Unit Controller 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 IP Communication Module Attached to MicroTech III Chiller Unit Controller

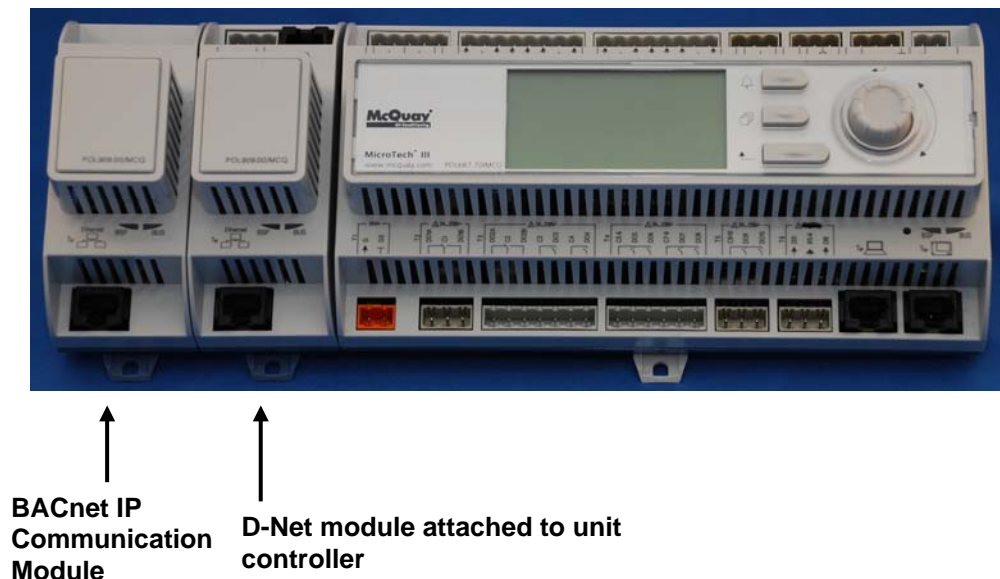
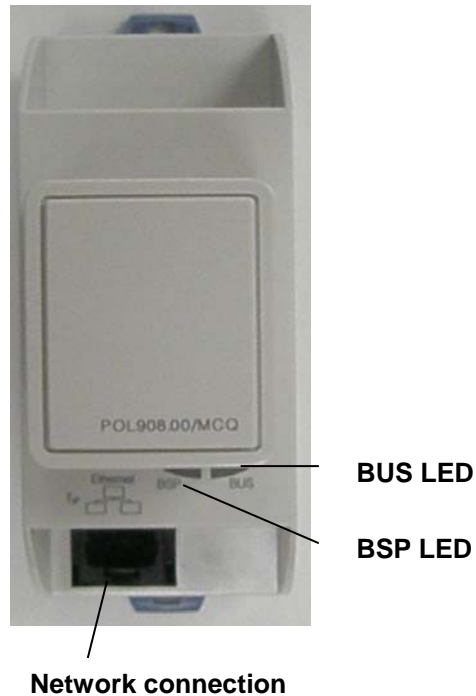


Figure 2 shows the location of the major components of the BACnet Communication Module.

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 MicroTech III Chiller Unit Controller and the unit is powered on (see Figure 2).

BSP LED

The BSP LED indicates the communication status 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 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 IP 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 RJ45 connector connects the BACnet Communication Module to the IP Network.

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 IP Communication Module and Knockout

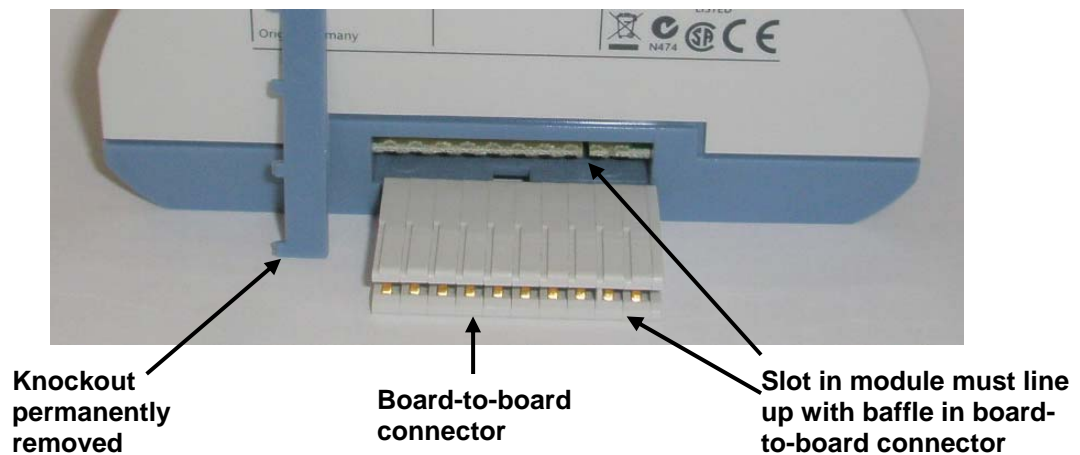


Figure 4. Diagram of Board-to-Board Connector

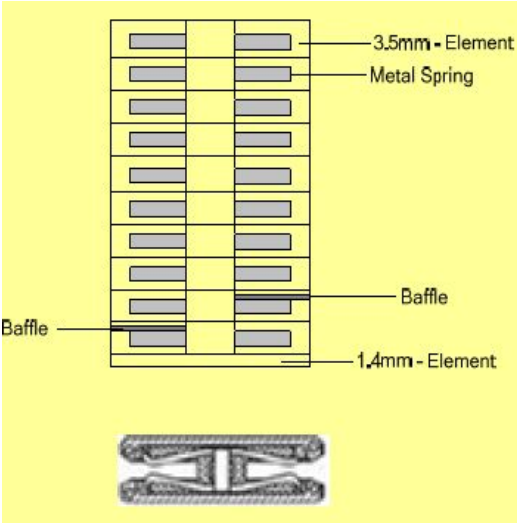


Figure 5. BACnet IP Communication Module with Board-to-Board Connector Inserted



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
- Installation Manual (IM 966)

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.

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. Insert the network cable connector into the BACnet Communication Module (see Figure 2 for location of network connection port).
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 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 MicroTech III Chiller Unit Controller.

1. Remove power from the unit controller.
2. Locate the BACnet Communication Module to the left of 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 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 connection port).
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 IP 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 IP 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.

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 IP 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 IP Setup and press Enter.

Note: The BACnet IP 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.

5. If the BACnet IP network does *not* require DHCP (Dynamic Host Configuration) to be enabled, go to step 6. If your BACnet IP network *does* require DHCP to be enabled, confirm DHCP is set to On and skip to step 8. See Table 1 for additional details about DHCP configuration.
6. If your BACnet IP network requires static IP Addressing for non-DHCP networks, follow steps a-b below:
 - a. Set DHCP to Off by following the two steps below:
 - i. From the BACnet IP Setup menu, turn the knob clockwise until DHCP is highlighted and then press Enter;
 - ii. Turn the knob counter-clockwise until DHCP = Off and then press Enter.
 - b. Modify the Given IP Address (Gvn IP), Given IP Mask (Gvn Msk), or Given IP Gateway (Gvn Gwy) as directed by the system integrator. Follow steps i-iii below:
 - i. *Fully change the three digits in each of the four octets of the desired field* (for example, 172.016.001.123 for Gvn IP or 255.255.000.000 for Gvn Msk.) If all three digits of all four octets are entered, skip to step 8 after entering the last digit. If all three digits are not entered (ie, 172.16.1.123 or 255.255.0.0) then continue with steps ii and iii below.

- ii. After entering the last octet, scroll by turning the knob until a blank space appears (i.e. the space character) and press Enter.
 - iii. Navigate to the BACnet IP Setup menu by pressing the Back button and then press Enter.
7. Change additional parameters as required for your network (see Table 1).
 8. Set Apply Changes to Yes. This will save the changes and cycle power to unit controller.
 9. Navigate back to the BACnet IP Setup menu (see steps 1-4) to verify that the Actual IP Address appears on the screen. This procedure may take a minute while the BACnet Communication Module powers up.

Note: The Actual IP Address displays 0.0.0.0 if the network cable is not attached.

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

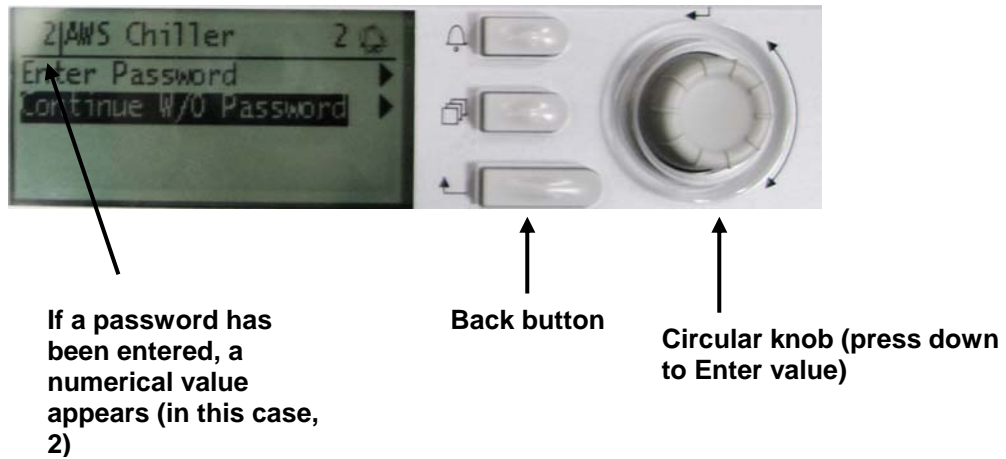


Table 1. BACnet IP Network Configuration Parameters

Parameter ²	Value (Range)/Definition	Initial Value/Note
Apply Changes	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.	POL908_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.	1579312/ This must be unique throughout the entire BACnet network.
UDP Port	(User Datagram Protocol) Identifies the application process in the destination unit.	47808
DHCP ¹	Off-On/Dynamic Host Configuration Protocol (DHCP) is a network protocol that enables a server to automatically assign an IP Address.	On/Set to Off if a static IP Address is needed.
Act IP	Actual IP Address of the BACnet Communication Module. This parameter is not changeable.	This item will display 0.0.0.0 if the network is not connected at power up. If DHCP is set to On, the network automatically assigns this address. If DHCP is set to Off, this address will be set equal to the Given IP Address (Gvn IP) provided the network is connected when Apply Changes is set to Yes.
Act Msk	Actual Subnet Mask of the BACnet Communication Module	This item will display 0.0.0.0 if the network is not connected at power up. If DHCP is set to On, the network automatically assigns this address. If DHCP is set to Off, this address will be set equal to the Given Subnet Mask (Gvn Msk) provided the network is connected when Apply Changes is set to Yes.
Act Gwy	Actual Gateway Address	This item will be blank if the network is not connected at power up. If DHCP is set to On, the network automatically assigns this address. If DHCP is set to Off, this address will be set equal to the Given Gateway Address (Gvn Gwy) provided the network is connected when Apply Changes is set to Yes.
Gvn IP	Given IP Address of the BACnet Communication Module	127.0.0.1/Use this to set a Static IP Address.
Gvn Msk	Given Subnet Mask of the BACnet Communication Module	255.255.255.0/Use this to set a Static Subnet Mask.
Gvn Gwy	Given Gateway Address	127.0.0.1/Use this to set a Static Gateway Address.
Unit Support	Metric-English/Controls the type of units that are passed through BACnet (English or Metric).	English/To set the unit for Metric, set Unit Support to Metric.
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.
NC Dev 2	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	Basic Support Package Version	1.1.30s

¹The BACnet Communication Module defaults to DHCP-enabled. See your system integrator for additional information regarding BACnet IP networks with DHCP functionality.

²The parameters shown in boldface text 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 MicroTech III Chiller Unit Controller from the keypad/display, but you are not able to communicate via the network, follow these steps:

- Check the network wiring
- Check communications
 - Use the standard TCP/IP suite of protocols to check your connectivity with other devices. For example, type “ping <IP address of the MicroTech III BACnet Communications Module>.” If you get a response from that IP address, you are connected to the BACnet Communication Module. If you do not get a response, verify the BACnet Communication Module and the PC network settings.

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

Parts List

Installation Kit

Description	Part Number
MicroTech III Chiller Communication Module, BACnet IP kit (kit includes communication module, board-to-board connector, and Installation Manual)	350147415

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.

