

Group: Controls

Part Number: IM 837

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Supersedes: New

MicroTech II[®] Chiller Unit Controller BACnet[®] Communication Module, Ethernet or IP

- WSC Water-Cooled Centrifugal, Single-Compressor
- WDC Water-Cooled Centrifugal, Dual-Compressor
- WCC Water-Cooled Centrifugal, Dual-Compressor, Series Counter-flow
- WPV Water-Cooled Centrifugal, Single-Compressor
- HSC Water-Cooled Single-Compressor Centrifugal, Heat Recovery
- HDC Water-Cooled Dual-Compressor Centrifugal, Heat Recovery
- TSC Water-Cooled Single-Compressor Centrifugal, Templifier™
- WMC Water-Cooled Centrifugal, Magnetic Bearing
- AGZ Air-Cooled Global Scroll
- ACZ Air-Cooled Scroll Condensing Unit
- WGZ Water-Cooled Global Scroll
- AGS Air-Cooled Global Screw
- WGS Water-Cooled Global Screw

NOTICE

Use this manual to physically install the McQuay MicroTech II Communication Module into the 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[®] and LONWORKS[®] 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 II control integration literature is available from your local McQuay International sales representative and www.mcquay.com.

Contents

Figures	2
Revision History	4
Reference Documents	4
Limited Warranty	5
General Information	6
Description	6
Application	7
Component Data	7
Light Emitting Diodes (LEDs)	8
BACnet Network Connector	8
8-Pin Header	8
Installation	9
Mounting	9
Mounting a BACnet Communication Module	9
Replacing an Existing BACnet Communication Module	12
Unit Setup for Network Control	12
Integration	13
Connecting to the Network	13
BACnet over Ethernet Addressing	13
BACnet IP Addressing	13
Configure the BACnet Communication Module	13
IP Address	14
Changing the Network Settings	15
Configuring the HTTP Interface	18
Configuring the Unit Controller	29
Service Information	30
Test Procedures	30
Replaceable Parts List	30
Replacement Kit	30
Appendix A: Hexadecimal Conversion Table	31

Figures

Figure 1. BACnet Communication Module (Component Side)	6
Figure 2. Building Automation System	7
Figure 3. BACnet Communication Card External Connectors (Top View)	7
Figure 4. Serial Card Slot Location on Unit Controller	10
Figure 5. Serial Card Slot Detail	10
Figure 6. Network Cable Routing and Connections	11
Figure 7. Network Connection Detail	11
Figure 8. BACnet Communication Module Main Page	14
Figure 9. Ping and Response	18
Figure 10: BACnet Properties Page	19
Figure 11: Verify Changes and Reboot System	21
Figure 12: Clock Setup Page	22
Figure 13: System Configuration-General Page	22
Figure 14: System Configuration-Network Page	23
Figure 15: System Configuration-Communications Page	24
Figure 16: System Configuration-Users Page	25
Figure 17: Select Password Window	25
Figure 18: Change Username and Password Window	25
Figure 19: System Configuration-Firmware Page	26
Figure 20: Test Page	26
Figure 21: Ping a Remote Host (Successful)	27

Figure 22: Ping a Remote Host (Unsuccessful) 27
Figure 23: Test Page-Read/Write 28
Figure 24: Variables Page 28
Figure 25: Info & Contact Page 29

Revision History

IM 837 June, 2006

Initial release

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
IMM AGS	McQuay International	MicroTech II Air-Cooled Screw Chiller Installation and Maintenance Manual	www.mcquay.com
IOMM ACZ/AGZ	McQuay International	MicroTech II Air-Cooled Condensing Unit Installation, Operation, and Maintenance Manual	www.mcquay.com
IOMM ACZ1	McQuay International	MicroTech II Air-Cooled Condensing Unit Installation, Operation, and Maintenance Manual	www.mcquay.com
IOMM AGZ1	McQuay International	MicroTech II Air-Cooled Scroll Chiller Installation, Operation, and Maintenance Manual	www.mcquay.com
IOMM AGZ	McQuay International	MicroTech II Air-Cooled Scroll Chiller Installation, Operation, and Maintenance Manual	www.mcquay.com
IOMM WGZ	McQuay International	MicroTech II Water-Cooled Scroll Chiller Installation Manual	www.mcquay.com
IOMM WPV	McQuay International	MicroTech II Centrifugal Chiller Installation, Operation, and Maintenance Manual	www.mcquay.com
IOMM WSCWDC	McQuay International	MicroTech II Chiller Unit Controller Installation, Operation, and Maintenance Manual	www.mcquay.com
OM AGS	McQuay International	MicroTech II Air-Cooled Screw Chiller Operating Manual	www.mcquay.com
OM CentrilMicro II	McQuay International	MicroTech II Unit Controller for Centrifugal Chillers and Templifiers Operating Manual	www.mcquay.com
ED 15100	McQuay International	MicroTech II Chiller Unit Controller Protocol Information, BACnet IP or BACnet Ethernet	www.mcquay.com
OM WGS	McQuay International	MicroTech II Water-Cooled Screw Chiller Operating Manual	www.mcquay.com
OM WMC	McQuay International	MicroTech II Magnetic Bearing Compressor Chiller	www.mcquay.com
IOMM TSC	McQuay International	MicroTech II Templifier Single Compressor Centrifugal Installation, Operation, and Maintenance Manual	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, incorporate it into the network, and maintain it.

⚠ WARNING

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

This equipment must be properly grounded. Only personnel that are knowledgeable in the operation of the equipment being controlled must perform connections and service to the MicroTech II Chiller 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

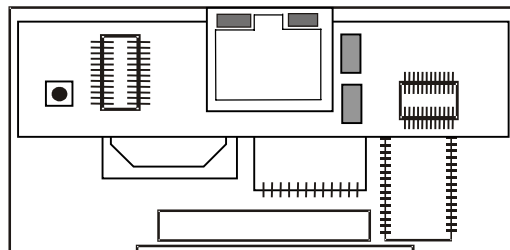
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of 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 BACnet Communication Module incorporates a MicroTech II Chiller Unit Controller into a BACnet Local Area Network (LAN). It supports BACnet over Ethernet (10Base-T) or BACnet/IP data link layers (physical layer).

The BACnet Communication Module mounts on the cover in the MicroTech II Chiller Unit Controller. This module gives you access to the MicroTech II Chiller variables and parameters by an Internet browser such as Internet Explorer[®] that is installed on a computer connected on the same LAN.

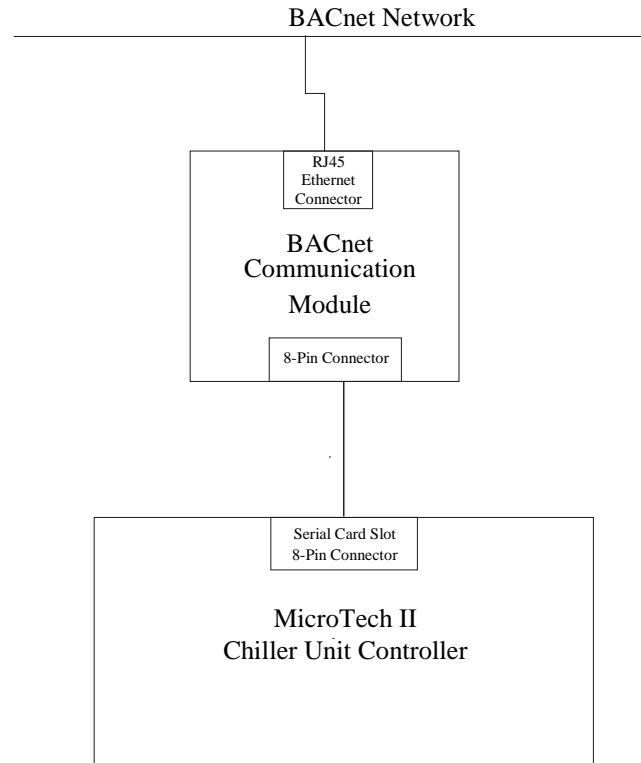
Figure 1. BACnet Communication Module (Component Side)



Application

The BACnet Communication Module connects the MicroTech II Chiller Unit Controller to the Building Automation System (BAS) on a BACnet Local Area Network. It is the interface adapter for the exchange of BACnet objects between the network and the unit controller. Figure 2 shows the BACnet Communication Module and unit controller integrated into a BAS.

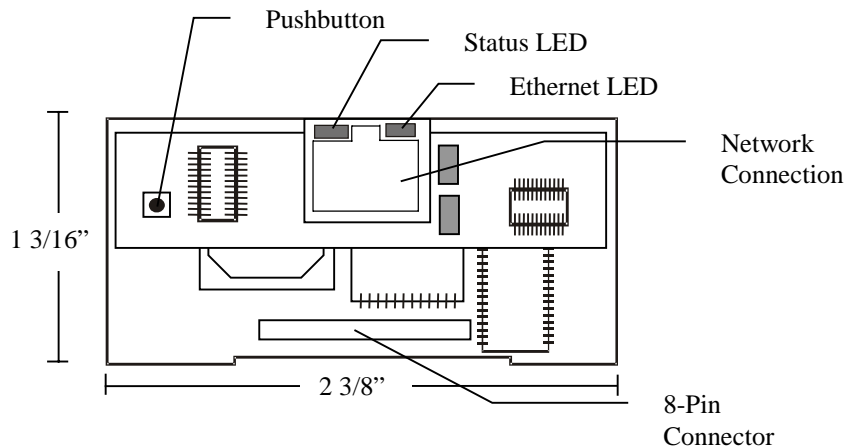
Figure 2. Building Automation System



Component Data

Figure 3 shows the external connectors of the BACnet Communication Module.

Figure 3. BACnet Communication Card External Connectors (Top View)



Light Emitting Diodes (LEDs)

The BACnet Communication Module has two LEDs (Status and Ethernet) to indicate communication activity and status of the BACnet Communication Module. These indicators are visible even when the module is installed in the MicroTech II Chiller Unit Controller.

Status LED

The status LED indicates the communication state between the BACnet Communication Module and the MicroTech II Chiller Unit Controller.

During power-up, the status LED will show the following sequence:

- Off
- 2 seconds after startup: quick flashing red-green
- 5 seconds after startup: steady green
- 62 seconds after startup: regularly flashing (see Communication State with the BACnet Communication Module section below for color descriptions)

Communication State with the BACnet Communication Module

After startup has completed, the Status LED will regularly blink to show the communication status between the BACnet Communication Module and the MicroTech II Chiller. The table below describes the different color and states.

Status LED Color	Meaning
Quick Flashing Green	Communication between the BACnet Communication Module and the MicroTech II Chiller is OK (i.e., Chiller is ON-LINE).
Slow Flashing Red	Communication between the BACnet Communication Module and the MicroTech II Chiller has not been established (i.e., Chiller is OFF-LINE).
Green/Red Flashing	BACnet Communication Module detects an error or a temporary answer fault from the MicroTech II Chiller.

Ethernet LED

The Ethernet LED shows the communication status between the BACnet Communication Module and the Ethernet network. The table below describes the status of the Ethernet LED.

Ethernet LED Color	Meaning
Red	Communication is not established. This can be due to several issues, including a cable defect, no power to the MicroTech II Chiller Unit Controller, or the cable is not connected to the network at the other end.
Green	Communication is established.

Note: The color of the Ethernet LED is based only on the electrical connection. The BACnet Communication Module checks for the right signals from the remote device in the Ethernet cable. There are no parameter settings in the BACnet Communication Module that affect this LED.

BACnet Network Connector

An RJ45 connector connects the BACnet Communication Module to the Ethernet Network.

8-Pin Header

The 8-pin header connects the MicroTech II Chiller Unit Controller to the BACnet Communication Module.

Installation

The BACnet Communication Module can be factory or field installed. Use the appropriate chiller selection software program in McQuayTools™ to include the BACnet Communication Module with the unit.

For field installation, the BACnet Communication Module may be ordered through McQuayTools as a separate line item or through McQuay Parts. See Replaceable Parts List for part number.

Mounting

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, touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential in your body.

Mounting a BACnet Communication Module

To mount a BACnet Communication Module:

1. Remove power from the MicroTech II Chiller Unit Controller.
2. Locate the Serial Card slot on the MicroTech II Chiller Unit Controller (see Figure 4).
3. Remove the cover from the Serial Card slot if it has not already been removed. Use a small screwdriver to pry the cover off from one end.
4. Grasp the BACnet Communication Module, with the network connector on the underside. The 8-pin receptacle must mate to the 8-pin plug in the MicroTech II Chiller Unit Controller. The plug has a guide on each end to direct it into the mating guide on the receptacle. Figure 5 details the Serial Card slot showing the 8-pin plug that mates to the receptacle on the BACnet Communication Module.

Note: This operation relies more on feeling the BACnet Communication Module into the connector than seeing the connectors mate.

5. Insert the BACnet Communication Module, pointing up, into the slot, rolling it into a level position as you move it into the slot.
6. Keeping the BACnet Communication Module *level*, move it in the slot until you feel the connectors line up.
7. When you feel the connectors align, press the BACnet Communication Module into the connector. Verify that the card is firmly seated in the connector.
8. Mount the plastic cover that was inside the delivery box.

Figure 4. Serial Card Slot Location on Unit Controller

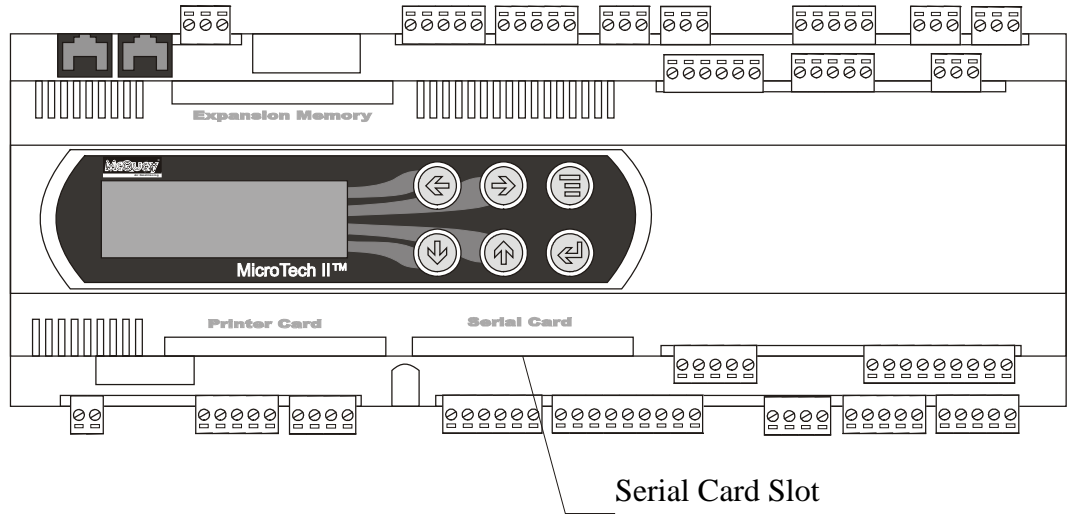


Figure 5. Serial Card Slot Detail

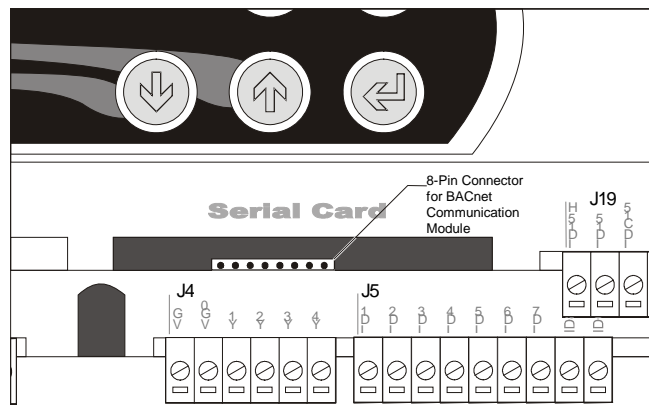


Figure 6. Network Cable Routing and Connections

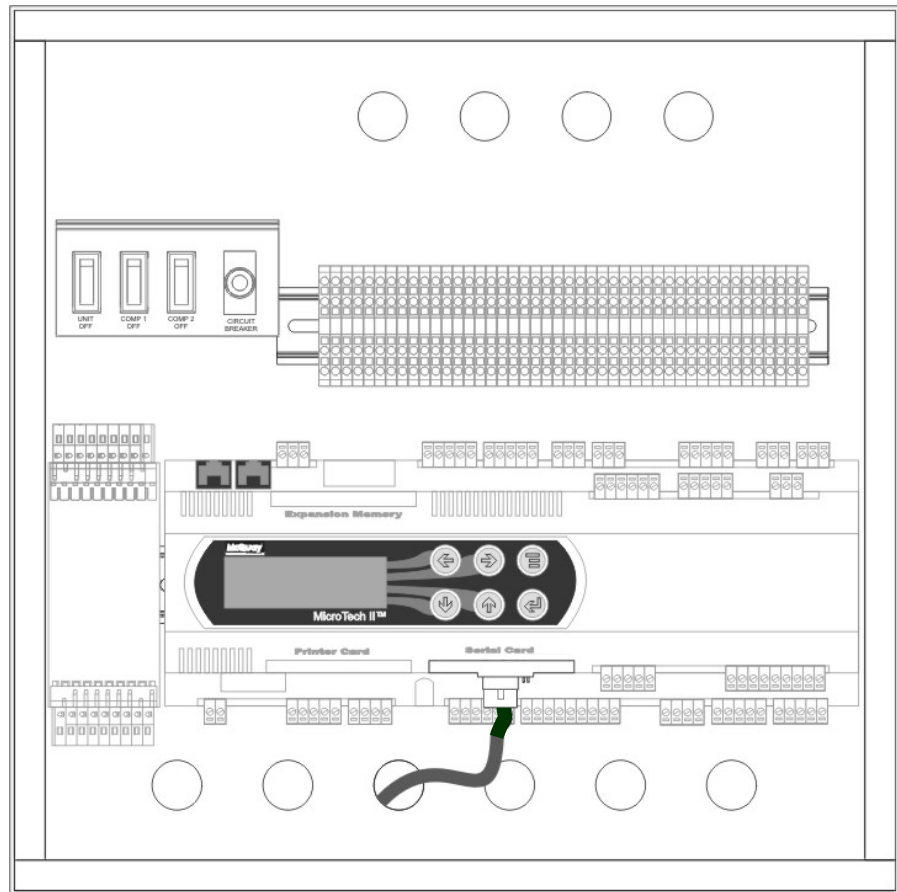
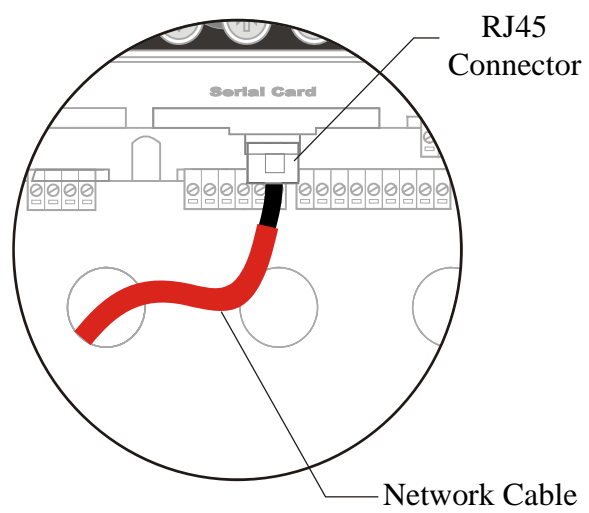


Figure 7. Network Connection Detail



Replacing an Existing BACnet Communication Module

To replace a BACnet Communication Module:

1. Remove power from the MicroTech II Chiller Unit Controller.
2. Locate the Serial Card slot on the MicroTech II Chiller Unit Controller (see Figure 4).
3. Pull the network cable connector from the BACnet Communication Module.
4. Remove the cover from the Serial Card slot. Use a small screwdriver to pry it off from one end.
5. Grasp the BACnet Communication Module and carefully pull it from the MicroTech II Chiller Unit Controller.
6. Grasp the BACnet Communication Module, with the network connector on the underside. The 8-pin receptacle must mate to the 8-pin plug in the MicroTech II Chiller Unit Controller. The plug has a guide on each end to direct the BACnet Communication Module into the mating guide on the receptacle. Figure 5 shows a detail of the Serial Card slot with the 8-pin plug that mates to the receptacle on the BACnet Communication Module.

Note: This operation relies more on feeling the BACnet Communication Module into the connector than seeing the connectors mate.

7. Insert the BACnet Communication Module, pointing up, into the slot, rolling it into a level position as you move it into the slot.
8. Keeping the BACnet Communication Module *level*, move it in the slot until you feel the connectors line up.
9. When you feel the connectors align, press the BACnet Communication Module into the connector. Verify that the BACnet Communication Module is firmly seated in the connector.
10. Replace the cover on the Serial Card slot. Slip the cover over the network connector plug.
11. Insert the network cable connector into the BACnet Communication Module.

Unit Setup for Network Control

Setup for MicroTech II Centrifugal Chiller Network Control:

1. Disable the MicroTech II Chiller Unit Controller. The chiller should not be operating while performing this setup.
2. At the MicroTech II Chiller touchscreen interface panel:
 - a. In the SETPOINTS MODE screen, set the #9 setpoint, BAS Protocol to BACnet. Use the Operator Password of “2001.”
 - b. In the SETPOINTS MODE screen, set the #3 setpoint, Control Source to Local.
3. Verify with the chiller/control company technician that the MicroTech II Chiller is operational on BAS.
4. In the SETPOINTS MODE screen, set the #3 setpoint, Control Source to BAS.

Setup for all Other MicroTech II Chillers Network Control:

1. Set the MicroTech II Chiller Unit Controller Set Unit Setpoint screen 1 initially to Source = Keypad.
2. Change the Protocol to BACnet in the applicable menu screen shown in the table below.
3. Verify with the chiller/control company technician that the MicroTech II Chiller is operational on a BAS.
4. Set the Set Unit Setpoint screen 1 to Source = Network.

Model	AGZ-A	ACZ-A	AGZ-B	ACZ-B	AGS-B	AGS-C	WGS	WGZ
Menu Screen	9	6	9	7	12	14	15	10
Password	2001	2001	2001	2001	8945	8453	8745	2001

NOTE: Models AGZ-A/B, ACZ-A/B, and WGZ have one Chiller Unit Controller, while models AGS-B/C and WGS have one Chiller Unit Controller and multiple circuit controllers. Unit settings for AGS-B/C and WGS models are adjusted on the Chiller Unit Controller.

Integration

Integrating the BACnet 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

BACnet over Ethernet Addressing

The Ethernet MAC address of the BACnet Communication Module is a six-octet address assigned when it was manufactured. It is fixed and cannot be changed. Use this address to access the MicroTech II Chiller on a BACnet Ethernet network.

BACnet IP Addressing

The BACnet IP address, IP subnet mask, and IP router address are variables that must be set during the BACnet Communication Module configuration. See your network administrator for an IP address, IP subnet mask, and IP router address. The BACnet IP address, IP subnet mask, and IP router address are available in the BACnet Configuration page (see the Configure the BACnet Communication Module section for details.)

Configure the BACnet Communication Module

The BACnet Communication Module is configured using HTML Interface pages in an HTTP server. In order to access these pages, your computer must be on the same subnet as the BACnet Communication Module, which is shipped set to a default IP subnet mask (255.255.0.0) and IP address (172.16.5.8). You must change the computer's network settings to match the subnet. The configuration process is the same regardless of the operating system on your computer. After you have configured the BACnet Communication Module, it is recommended that you restore the original network settings to your computer.

Figure 8 shows the BACnet Communication Module's main HTTP Interface page. This is a read-only screen that displays several setup parameters. To modify these and other parameters, press the Go to Configure/Test link at the bottom of the screen. The parameters that require setting depend on the data link layer of the BAS network. Device, Date/Time, and Alarms require settings for all BACnet networks. BACnet via Ethernet does not require network settings while BACnet via IP does require network settings.

Figure 8. BACnet Communication Module Main Page

Device Properties	
BACnet LAN Type	BIP
BACnetIP UDP Port	BAC0 hexadecimal
BCM Device Instance	3077
Description	McQuay Chiller - IT Rev 1.3
Location	McQuay
APDU Timeout	5000 milliseconds
Number of APDU Retries	4
Password for Restart	1234
Metric Units	no
Alarm Parameters	
Alarming Enabled	No
Alarm Destination Device Instance	0
Alarm Process Id	0
Alarm Problem Priority	255
Alarm Fault Priority	0
Alarm Warning Priority	255
Clock Parameters	
Daylight Saving Time	No
UTC offset	0 minutes
Interval to send WhoIs	1 minutes
BBMD Parameters	
IP Address for BBMD	None
Foreign Device Time-To-Live	0 seconds
Go to Configure/Test	

IP Address

The BACnet/IP (B/IP) address of the MicroTech II Chiller Unit Controller consists of the four-octet IP address followed by the two-octet UDP (User Datagram Protocol) port number. The BACnet/IP address is a six-octet value analogous to a MAC (Media Access Control) address. The IP address portion of the BACnet/IP address must be unique in the BACnet network segment. The default UDP port number in the MicroTech II Chiller Unit Controller is 47808 (BAC0 in hexadecimal). The BACnet Communication Module supports DHCP (Dynamic Host Configuration Protocol) IP addressing. By default, this feature is disabled. To configure the BACnet Communication Module to use the DHCP feature, write “DHCP” as the IP address. In a DHCP-based network, the BACnet Communication Module automatically receives the required parameters from the DHCP server. Consult with your network administrator for the information on your network settings.

If the IP address is lost or forgotten, the BACnet Communication Module can be reset to the default IP address and subnet mask. To reset these network settings to the factory default, follow one of the following procedures depending on whether or not the MicroTech II Chiller has power.

Resetting the IP Address and Subnet Mask when the Chiller is Powered Off:

1. Unplug network connections from the BACnet Communication Module.
2. Hold down the pushbutton on the BACnet Communication Module.
3. Apply power to the MicroTech II Chiller Unit Controller.
4. Keep the pushbutton pressed for at least 20 seconds.
5. Release the pushbutton once the Status LED starts to blink red.

6. After three slow red blinks, the LED will become green, and then to indicate the command has been successful, it will rapidly blink dark red three times.
7. Modify your computer settings to be on the same subnet as the BACnet Communication Module.
8. Log on to the default IP address (172.16.5.8) and modify network settings as necessary.

Resetting the IP Address and Subnet Mask when the Chiller is Powered On:

1. Unplug network connections from the BACnet Communication Module.
2. Press the pushbutton for more than five seconds and no more than ten seconds.
3. Release the pushbutton.
4. After another 5 seconds, press and hold the pushbutton again.
5. The Status LED will stop flashing and then it will flash red quickly.
6. Release the pushbutton when the Status LED starts flashing red slowly.
7. After three slow red blinks, the LED will become green, and then to indicate the command has been successful, it will rapidly blink dark red three times.
8. Modify your computer settings to be on the same subnet as the BACnet Communication Module.
9. Log on to the default IP address (172.16.5.8) and modify network settings as necessary.

Note: After successfully using the pushbutton, the BACnet Communication Module only retains the factory-specified default parameters until the next reboot is performed. The BACnet Communication Module will implement the latest user-specified parameters after a reboot has been performed without the pushbutton being pressed. See Changing User Name and Password section on page 24 for additional information.

Changing the Network Settings

The BACnet Communication Module is assigned a temporary IP address and Subnet Mask when it is manufactured. They are necessary so that you know where to access the BACnet Communication Module to change network parameters. The BACnet Communication Module is configured using an HTTP server that is accessed via Internet Explorer®.

Required Tools

You need the following tools to configure the BACnet Communication Module for network operation:

- Computer with Ethernet card and TCP/IP protocol.
- Internet Explorer browser.
- Ethernet cable (either an Ethernet crossover cable for direct connection or a standard Ethernet cable for connecting through a hub.)

Procedure

The procedure for changing the network settings varies depending upon your computer's operating system. You must access the HTTP Interface pages using the BACnet Communication Module's IP address. In order to access the configuration page, your computer must be on the same subnet as the BACnet Communication Module. The following sections detail the three steps required for changing network settings: 1) change the network settings on your computer and options in Internet Explorer, 2) access the HTTP Interface to change the BACnet Communication Module parameters, 3) change the network settings of your computer and Internet Explorer options back to the way they were before the configuration process.

To Change the IP address in the BACnet Communication Module:

1. Connect to the BACnet Communication Module via the Ethernet port.
2. Request the Subnet Mask of the network for the BACnet Communication Module from the network administrator.

3. Request an IP address for the BACnet Communication Module from the network administrator.
4. Change the network settings on your computer to access the BACnet Communication Module. See below for the appropriate procedure for your operating system.
5. Open the browser on your computer.
6. In the Internet Explorer, go to Tools/Internet Options/Connections/LAN Settings.
 - a. Note the selections for future reference.
 - b. Verify that Automatically Detect Settings, Use Automatic Configuration Script, and Use a Proxy Server for Your LAN are *not* selected.

Note: If these settings are not disabled, the changes you make to the BACnet Communication Module with the browser do not take effect.

7. Type <http://172.16.5.8/> in the Address box of the browser and press the Enter key to access the BACnet Communication Module.
8. Make changes to the configuration file in the BACnet Communication Module (see the Configure the HTTP Interface section.)
9. Change the BACnet Communication Module settings by pressing the Reboot button.
10. In the browser on your computer:
 - a. Go to Tools/Internet Options/Connections/LAN Settings.
 - b. Restore the settings as noted in Step 6a.
11. Restore the network settings on your computer (see following section for instructions based on your operating system.)

Network Settings for Microsoft Windows® 98

To change the network setting in Microsoft Windows 98 computer:

1. Open the Control Panel on your computer.
2. Open the Network Applet.
3. Select the TCP/IP-Ethernet card combination on your computer.
4. Select the Properties button.
5. Select the IP Address tab.
6. Note the IP address and Subnet mask if they have values or that Obtain IP address automatically is selected.
7. Select Specify an IP address.
8. Change the Subnet mask to 255.255.0.0.
9. Change the IP address to 172.16.X.X (where X.X is unique on the subnet but not 172.16.5.8).
10. Click the OK button.
11. Reboot your computer to change the Subnet Mask and IP address.

To restore the network setting in Microsoft Windows 98 computer:

1. Open the Control Panel on your computer.
2. Open the Network Applet.
3. Select the TCP/IP-Ethernet card combination on your computer.
4. Select the Properties button.
5. Select the IP Address tab.
6. Restore the settings noted as previously noted.
7. Click the OK button.
8. Reboot your computer to restore the original Subnet Mask and IP address.

Network Setting for Microsoft Windows NT

To change the network settings in a Microsoft Windows NT computer:

1. Open the Control Panel on your computer.
2. Open the Network Applet.

3. Select the Protocols tab.
4. Select the TCP/IP-Ethernet card combination on your computer.
5. Select the Properties button.
6. Select the appropriate adapter.
7. Note the IP address and Subnet mask if they have values or that Obtain IP address automatically is selected.
8. Select Specify an IP address.
9. Change the Subnet mask to 255.255.0.0.
10. Change the IP address to 172.16.X.X (where X.X is unique on the subnet but not 172.16.5.8).
11. Click on the Apply button.

To restore the network settings in a Microsoft Windows NT computer:

1. Open the Control Panel on your computer.
2. Open the Network Applet.
3. Select the Protocols tab.
4. Select the TCP/IP-Ethernet card combination on your computer.
5. Select the Properties button.
6. Select the appropriate adapter.
7. Restore the settings as previously noted.
8. Click the Apply button.

Network Setting for Microsoft Windows 2000

To change the network settings in a Microsoft Windows 2000 computer:

1. Select My Network Places on the desktop and right click.
2. Open Properties.
3. Select Local Area Connections and right click.
4. Open Properties.
5. Select TCP/IP.
6. Click on Properties button.
7. Note settings for future reference.
8. Select Use the following IP address.
9. Change the Subnet mask to 255.255.0.0.
10. Change the IP address to 172.16.X.X (where X.X is unique on the subnet but not 172.16.5.8).
11. Click OK.
12. Change the Subnet mask to 255.255.0.0.
13. Change the IP address to 172.16.X.X (where X.X is unique on the subnet but not 172.16.5.8).
14. Click OK.

To restore the network settings in a Microsoft Windows 2000 computer:

1. Select My Network Places on the desktop and right click.
2. Open Properties.
3. Select Local Area Connections and right click.
4. Open Properties.
5. Select TCP/IP.
6. Restore the network settings as previously noted.
7. Click OK.

Network Settings for Microsoft Windows XP

To change the network setting in Microsoft Windows XP computer:

1. Open the Control Panel on your computer.

2. Open the Network Connections Applet.
3. Right click on Local Area Network and Select Properties.
4. Select Internet Protocol (TCP/IP).
5. Select the Properties button.
6. Note the IP address and Subnet mask if they have values or that Obtain IP address automatically is selected.
7. Select Use the following IP address.
8. Change the Subnet mask to 255.255.0.0.
9. Change the IP address to 172.16.X.X (where X.X is unique on the subnet but not 172.16.5.8).
10. Click the OK button.
11. If prompted, reboot your computer to change the Subnet Mask and IP address.

To restore the network setting in Microsoft Windows XP computer:

1. Open the Control Panel on your computer.
2. Open the Network Connections Applet.
3. Right click on Local Area Network and Select Properties.
4. Select Internet Protocol (TCP/IP).
5. Select the Properties button.
6. Restore the settings noted as previously noted.
7. Click the OK button.
8. If prompted, reboot your computer to restore the original Subnet Mask and IP address.

Test Network Communications

You can determine whether your computer is properly configured to access the MicroTech II Chiller through the BACnet Communication Module.

To test whether your computer is properly addressed to communicate with the BACnet Communication Module:

1. Open a DOS window (go to Start button\Programs\Accessories\Command Prompt.)
2. Type “ping 172.16.5.8” at the DOS prompt.
3. Press Enter.
4. Observe response. See Figure 9 for a typical response.

Figure 9. Ping and Response

```
C:\>ping 172.16.5.8

Pinging 172.16.5.8 with 32 bytes of data:

Reply from 172.16.5.8: bytes=32 time=93ms TTL=63
Reply from 172.16.5.8: bytes=32 time=5ms TTL=63
Reply from 172.16.5.8: bytes=32 time=70ms TTL=63
Reply from 172.16.5.8: bytes=32 time=16ms TTL=63

Ping statistics for 172.16.5.8:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 5ms, Maximum = 93ms, Average = 46ms

C:\>
```

Configuring the HTTP Interface

To change the parameters in the HTTP Interface, select the Go to Configure/Test link at the bottom of the HTTP Interface home page. Figures 10-14 show the Configuration tabs in the HTTP Interface.

To Configure the HTTP Interface:

1. Connect to the BACnet Communication Module via the Ethernet port for configuration.
2. Browse to the HTTP Interface main page (see Figure 8.)
3. Select the Go to Configure/Test link. The HTTP Configuration page opens.
4. Enter the User Name: admin (Note that this is the default User Name and can be changed.)
5. Enter the Password: fadmin (Note that this is the default Password and can be changed.)
6. Press OK.
7. Adjust the parameters for your particular network. It may be necessary to navigate to other pages to find the information you need. For example, the IP Address can be changed on the System/Network page.
8. Select the Submit button to set the changes into the BACnet Communication Module. Only reboot for the parameters that indicate a reboot is necessary. If a reboot is required, a screen appears instructing you to reboot. To reboot, press the Reboot button.
9. Navigate to the screen where you made changes.
10. Verify that the changes were made. You may need to refresh the screen by pressing Internet Explorer's Refresh button or by navigating to View/Refresh at the top of the page. If the changes are not made, verify that the LAN Settings *are not* selected in Internet Explorer.
11. Close your browser.
12. Remove the connection to the Ethernet port you made in Step 1.

BACnet Properties

Table 1 defines the BACnet Communication Module's configurable parameters in the same order as they appear on the HTTP BACnet Properties page (see Figure 10). Change parameters as required for your network.

Figure 10: BACnet Properties Page

Device Properties	
BACnet LAN Type	<input checked="" type="radio"/> BACnetIP <input type="radio"/> BACnet Ethernet
BACnetIP UDP Port	<input type="text" value="BAC0"/> hexadecimal
BCM Device Instance	<input type="text" value="3077"/> 0 to 4194303
Description	McQuay Chiller - IT Rev 1.3
Location	<input type="text" value="McQuay"/>
APDU Timeout	<input type="text" value="5000"/> milliseconds
Number of APDU Retries	<input type="text" value="4"/>
Password for Restart	<input type="text" value="1234"/>
Metric Units	<input type="radio"/> Yes <input checked="" type="radio"/> No
Alarm Properties	
Alarming Enabled	<input type="radio"/> Yes <input checked="" type="radio"/> No
Alarm Destination Device Instance	<input type="text" value="0"/> 0 to 4194303
Alarm Process Id	<input type="text" value="0"/>
Alarm Problem Priority	<input type="text" value="255"/> 0 to 255
Alarm Fault Priority	<input type="text" value="0"/> 0 to 255
Alarm Warning Priority	<input type="text" value="255"/> 0 to 255
Clock Properties	
Daylight Saving Time	<input type="radio"/> Yes <input checked="" type="radio"/> No
UTC offset	<input type="text" value="0"/> minutes (-720 to +720)
Interval to send WhoIs	<input type="text" value="1"/> minutes (0=none)
BBMD Properties	
IP Address for BBMD*	<input type="text" value="None"/> (blank or none=none)
Foreign Device Time-To-Live*	<input type="text" value="0"/> seconds
*Required if BCM must register as a Foreign Device with a BBMD	
<input type="button" value="Save Changes"/>	

Table 1. Configurable Parameters

Section	Parameter	Value (Range)/Definition	Initial Value/Note
Device Properties	BACnet LAN Type	BACnet IP or BACnet Ethernet	BACnet IP
	BACnet IP/UDP Port	(User Datagram Protocol) Identifies the application process in the destination unit.	BAC0 (Hex) 47808 (Decimal)
	BCM Device Instance	0-4194303/Device Instance of the BACnet Communication Module.	3000/This must be unique throughout the entire BACnet network.
	Description	This property describes the application running in the BACnet device.	
	Location	This changeable property indicates the physical location of the MicroTech II Chiller.	
	APDU Timeout	The amount of time, in milliseconds, between retransmissions of an APDU requiring acknowledgment for which no acknowledgment has been received.	3000 Milliseconds
	Number of APDU Retries	The maximum number of times that an APDU shall be retransmitted.	3 Times
	Password for Restart	Password that allows the BACnet Communication Module to be reinitialized from the network.	1234/Blank indicates that no password is required. If a password is entered, a password is then required before a BACnet client can reinitialize this BACnet Communication Module.
	Metric Units	Yes or No/ Selecting Yes converts the Units and Relinquish Default properties to Metric units. Selecting No converts these properties to English units.	No/Changing this property does not affect the Present Value property read from the chiller. For Centrifugal Chillers, the units can be changed via the keypad.
Alarm Parameters	Alarming Enabled	Yes or No/Enabling this feature provides alarm annunciation from the BACnet Communication Module to a BACnet Client. BACnet Clients can also poll variables in a BACnet Communication Module for alarm information. See the Protocol Information document (ED 15100) for details.	No/Selecting Yes enables the BACnet Communication Module to send a ConfirmedEventNotification message to a single BACnet device whenever an alarm occurs in the MicroTech II Chiller. This message has an Event Type = Complex Event and has proprietary properties in its Event Values section. Not all BACnet devices can accept this message.
	Alarm Destination Device Instance	0-4194303/Device Object of the BACnet device that receives the alarm notification.	1
	Alarm Process ID	Process ID used at the receiving BACnet device to determine the response action to the alarm notification.	1/May be changed to suit the BAS preference.
	Alarm Problem Priority	Priority for Problem Alarms (0-255)	0
	Alarm Fault Priority	Priority for Fault Alarms (0-255)	0
	Alarm Warning Priority	Priority for Warning Alarms (0-255)	255
Clock Parameters	Daylight Saving Time	Yes or No	No/Must be set to No for a BACnet client to synchronize the time on the network.
	UCT Offset	Difference in minutes of the Universal Coordinated Time and local time (-720 to + 720)	0 Minutes
	Interval to send WhoIs	Frequency, in minutes, at which the BACnet Communication Module sends WhoIs Requests.	1 Minute
BBMD Parameters	IP Address for BBMD	IP Address for the BACnet Broadcast Management Device (BBMD) if used.	None
	Time-To-Live for Foreign Device Registration	The time, in seconds, within which the foreign device must re-register with the BBMD. If it does not re-register, the BBMD removes (purges) it from its Foreign Device Table (FDT) and discontinues forwarding messages to the foreign device.	0 Seconds

After changing the items on this page and pressing the Save Changes button, you are directed to a page to confirm your changes. If the changes are correct, you must press the Reboot System button to reboot the BACnet Communication Module for the changes take effect (see Figure 11).

Figure 11: Verify Changes and Reboot System

Important: You must click the Reboot System Button below in order for your changes to take effect.

Device Properties

BACnet LAN Type: BIP
BACnetIP UDP Port: BAC0 hexadecimal
BCM Device Inst: 3077
Description: McQuay Chiller - IT Rev 1.3
Location: McQuay
APDU Timeout: 5000 milliseconds
Number of APDU Retries: 4
Password for Restart: 1234

Alarm Parameters

Alarming Enabled: No
Alarm Destination Device Instance: 0
Alarm Process Id: 0

Clock Parameters

Daylight Saving Time: No
UTC offset: 0 minutes
Interval to send WhoIs: 1 minutes (0=none)

BBMD Parameters

IP Address for BBMD: None
Foreign Device Time-To-Live: 0 seconds

[Back to BACnet config page](#)

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Clock Setup

Table 2 defines the BACnet Communication Module's clock parameters in the same order as they appear on the HTTP Interface Clock Setup page (see Figure 12). Change parameters as required for your network. The clock is non-volatile, so if the clock is used, the Date and Time must be reset every time power is cycled to the MicroTech II Chiller Unit Controller or when the BACnet Communication Module is rebooted from the HTTP interface.

Question marks ("??") in any field represent an invalid value. If question marks appear, refresh the page, enter a valid date and time, and press the Set Clock button to reset the clock parameters.

Figure 12: Clock Setup Page

Clock Parameters

Local Date/Time

Year: Month: Day:

Hour: Minute: Second:

(?? indicates invalid value)

Table 2: Clock Parameters

Section	Parameter	Value (Range)/Definition	Initial Value/Note
Local Date/Time	Year	Current Year	4-digit year
	Month	Current Month (1-12)	
	Day	Current Day (0-X, where X is the number of days in the month)	
	Hour	Current Hour (0-23)	
	Minute	Current Minute (0-59)	
	Second	Current Second (0-59)	

System Configuration

System Configuration in the BACnet Communication Module is defined within 5 pages: General, Network, Communications, Users, and Firmware (see Figures 13-17). The information contained in each tab is described below. Change parameters as required for your network.

General

This page is used only to view system information. The information includes used/free disk space, factory bootswitch parameters, network configuration, and environment variables.

Figure 13: System Configuration-General Page

General
Network
Communications
Users
Firmware

System Information

- [View used/free disk space](#)
- [View factory bootswitch parameters](#)
- [View network configuration](#)
- [View environment variables](#)

Network

Use the Network page to change the IP address and Subnet Mask, along with other network variables (see Figure 14.) Table 3 defines the parameters available on this page.

Figure 14: System Configuration-Network Page

The screenshot shows a web-based configuration interface with five tabs: General, Network, Communications, Users, and Firmware. The 'Network' tab is active. Under 'Networking Configuration', there are sections for Eth0, Eth0:1, Eth0:2, and Eth0:3. Each section has input fields for IP Address and Subnet Mask. The Eth0 section has pre-filled values: IP Address main (172.16.5.4) and Subnet Mask main (255.255.0.0). Below this is 'Gateway Configuration' with a 'Gateway Address' field. Then 'Name Resolution' with 'DNS Server1' and 'DNS Server2' fields. A 'Save Changes' button is at the bottom left.

Table 3: Network Parameters

Section	Parameter	Value (Range)/Definition	Initial Value/Note
Networking Configuration	IP Address Main	IP Address of the BACnet Communication Module.	172.16.5.8
	Subnet Mask Main	Subnet Mask of the BACnet Communication Module.	255.255.0.0
	IP Alias 1	A second IP address (alias) that the BACnet Communication Module recognizes as it's own.	
	Subnet Mask 1	Subnet Mask for IP Alias 1.	
	IP Alias 2	A third IP address (alias) that the BACnet Communication Module recognizes as it's own.	
	Subnet Mask 2	Subnet Mask for IP Alias 2.	
	IP Alias 3	A fourth IP address (alias) that the BACnet Communication Module recognizes as it's own.	
	Subnet Mask 3	Subnet Mask for IP Alias 3.	
Gateway Configuration	Gateway Address		
Name Resolution	DNS Server 1		
	DNS Server 2		

Communications

Use this page to set the communication rate between the BACnet Communication Module and the MicroTech II Chiller (see Figure 15). Table 4 provides details regarding the serial communications parameter.

Figure 15: System Configuration-Communications Page

Table 4: Communications

Section	Parameter	Value (Range)/Definition	Initial Value/Note
Serial Communications	Baud Rate	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200/ Communications rate between the BACnet Communication Module and the MicroTech II Chiller Unit Controller.	19200/Modify carefully

Users

Use this page to modify the User Name and Password for access to the BACnet Communication Module HTTP Interface screens.

Changing User Name and Password

1. In the System/Users tab, click on Change Web Page Password (see Figure 16).
2. Then click on BCM Main (see Figure 17).
3. Enter a new Username and Password (see Figure 18).
4. Press Save Changes.
5. Close the Password Modification Result window.
6. Reboot the BACnet Communication Module by clicking the Reboot button on the left side of the screen.
7. Record the new Username and Password.
8. Use the new User Name and Password whenever you press the Go to Configure/Test link at the bottom of the home page.

If the User Name or Password are lost or forgotten, the BACnet Communication Module can be temporarily set back to factory bootswitch parameters:

- IP Address = 172.16.5.8
- Subnet Mask = 255.255.0.0
- User Name = admin
- Password = fadmin

These factory bootswitch parameters remain valid until the BACnet Communication Module or MicroTech II Chiller is rebooted.

Resetting User Name and Password if Lost or Forgotten

1. Set the unit to the factory bootswitch parameters (see IP Address section).
2. Change the network setting on your computer to the same Subnet as the BACnet Communication Module (see Changing the Network Settings section).
3. Log onto the BACnet Communication Module at the default IP address (172.16.5.8).
4. Change the User Name and Password (see Changing User Name and Password section above).
5. Reboot the BACnet Communication Module by pressing the Reboot button.
6. Change your computer settings back (see Changing the Network Settings section). All network parameters are now restored.

Figure 16: System Configuration-Users Page

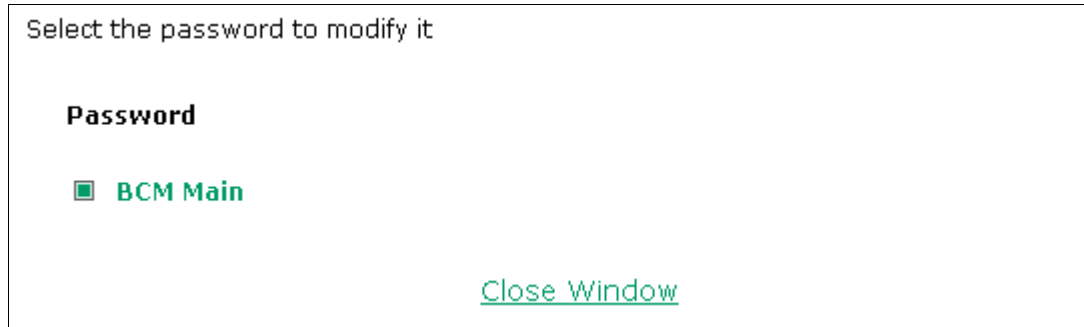


General Network Communications **Users** Firmware

User Passwords

Change Web Page Password

Figure 17: Select Password Window



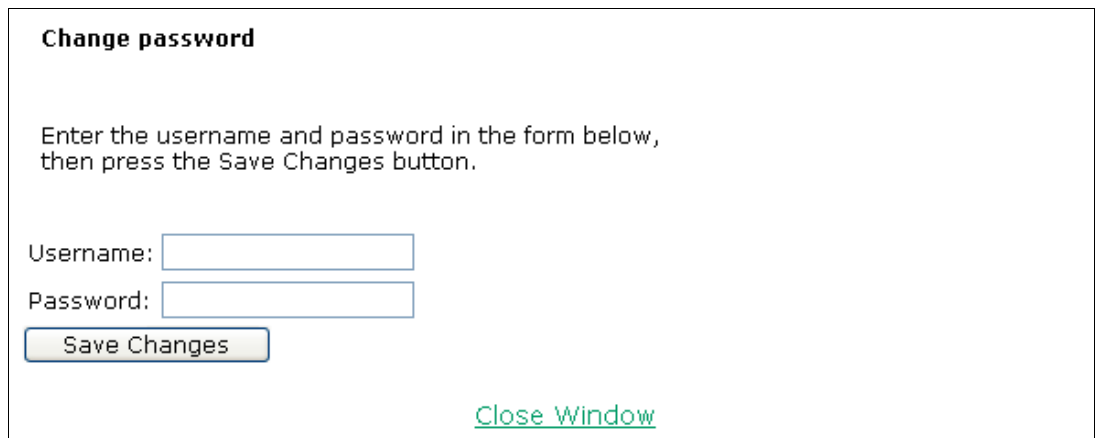
Select the password to modify it

Password

BCM Main

[Close Window](#)

Figure 18: Change Username and Password Window



Change password

Enter the username and password in the form below, then press the Save Changes button.

Username:

Password:

[Close Window](#)

Firmware

The Firmware page is used to upgrade firmware to the BACnet Communication Module (see Figure 19). The BACnet Communication Module contains two firmware files: Flash_sys.bin and Flash_apps.bin.

Flash_sys.bin contains the operating system software. This file does not change frequently and likely does not need to be downloaded. The second firmware file is Flash_apps.bin. This file contains the application software, including the BACnet management (BACnet Communication Module) software, the HTML screens, and software used to manage chiller communication. If an update is required or recommended, this file will require downloading. If you have any questions regarding the firmware, please contact McQuay Controls Customer Support at 866-4MCQUAY (866-462-7829).

CAUTION

Do not power down the BACnet Communication Module at any point during the firmware upgrade process. The BACnet Communication Module may become inoperable.

Figure 19: System Configuration-Firmware Page

Firmware upgrade

The BCM needs two files to upgrade the full firmware:

(A): FLASH_APPS_Axxx.BIN
(B): FLASH_SYS_Byyy.BIN

Normally, only (A) needs to be updated. (B) is usually only updated by McQuay at the factory.

CAUTION
Do not power down the BCM at any point during the firmware upgrade process.
The BCM may become inoperable.

Firmware File

Tests Parameters

Tests Parameters consists of two pages: Test and Variables (see Figures 20-24). Use these pages to read/write variables to the chiller or to ping a remote device on the network. Each page is defined below.

Test

From the Test page, click on Ping a Remote Host to open another window to enter the IP Address of the device you want to ping. Press Ping to complete the function. This is similar to typing ping followed by the IP address in DOS to locate a device on the network. Figure 21 indicates a successful ping while Figure 22 indicates an unsuccessful ping.

Figure 20: Test Page

Test **Variables**

Network test

- [Ping a remote Host](#)

Communication with MicroTech II® Chiller Unit Controller

- [Read/Write](#)

Figure 21: Ping a Remote Host (Successful)

Ping Result

```
PING 172.16.5.10 (172.16.5.10): 56 octets data
64 octets from 172.16.5.10: icmp_seq=0 ttl=63 time=13.5 ms
64 octets from 172.16.5.10: icmp_seq=1 ttl=63 time=5.9 ms

--- 172.16.5.10 ping statistics ---
3 packets transmitted, 2 packets received, 33% packet loss
round-trip min/avg/max = 5.9/9.7/13.5 ms
```

[Close Window](#)

Figure 22: Ping a Remote Host (Unsuccessful)

Ping Result

```
PING 172.16.5.97 (172.16.5.97): 56 octets data

--- 172.16.5.97 ping statistics ---
3 packets transmitted, 0 packets received, 100% packet loss
```

[Close Window](#)

Read/Write

Click on Read/Write in the Test page to read or write a specific variable (see Figure 23). The BACnet Communication Module uses variables of type Analog, Integer, or Digital. The following section defines how to perform a Read and Write. Refer to Protocol Information Document (ED 15100) for BACnet Communication Module HTTP Interface variable details.

To perform a Read

1. Go to the Tests/Test page on the HTTP Interface.
2. Select the Read/Write link.
3. Select the Variable Number.
4. Select the Variable Type (Digital, Analog, or Integer).
5. Press the Read button.

To perform a Write

1. Go to the Tests/Test page on the HTTP Interface.
2. Select the Read/Write link.
3. Select the Variable Number.
4. Select the Variable Type (Digital, Analog, or Integer).
5. Press the Read button.
6. In the New Value box, type the value you want to write. Consult Protocol Information Document (ED 15100) for valid ranges.
7. Press the Write button.

Figure 23: Test Page-Read/Write

Read variable from MicroTech II Chiller Unit Controller

Choose the variable

1 Digital

Current value: 0

Write variable to MicroTech II Chiller Unit Controller

Variable Digital 1 new value:

Operation result: **Undefined**

Operation result legend:

- U: Variable is Undefined in the MicroTech II Chiller Unit Controller
- Ok: MicroTech II Chiller Unit Controller sent back a value
- Timeout: MicroTech II Chiller Unit Controller didn't send back a value

[Close Window](#)

Variables

Use the Variables page (see Figure 24) to view the status of BACnet variables that are mapped from the MicroTech II Chiller. The only types supported by the BACnet Communication Module are Analog, Integer and Digital. Refer to Protocol Information Document (ED 15100) for details on how the points are mapped.

Figure 24: Variables Page

Test		Variables									
Chiller Variables											
Var Index	Analog Variables										
1-10	44.0	44.0	100.0	77.7	135.0	51.0	0.0	0.0	U	0.0	
11-20	U	U	U	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21-30	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	U
31-40	U	0.0	0.0	0.0	0.0	0.0	U	0.0	-327.6	U	
41-50	U	100.0	U	U	U	U	U	U	U	U	25.0
Var Index	Integer Variables										
1-10	1024	0	0	16	0	0	0	0	0	0	0
11-20	0	0	0	0	1	0	2	1	2	U	U
21-30	U	U	U	U	U	U	U	5	U	U	U
31-40	U	1	U	U	4	1	1	4	0	0	
41-48	0	0	0	U	0	0	0	0			
Var Index	Digital Variables										
1-10	0	1	1	U	1	0	0	0	U	U	
11-20	1	U	U	U	U	U	U	0	0	U	
21-30	U	U	U	0	U	U	U	U	0	U	
31	0										

All variables that are not applicable/undefined are marked with a U.

Information and Contact Information

The Info & Contact page provides general contact information for the Controls customer support group at McQuay International. It also contains a link to McQuay International's public web site, www.mcquay.com (see Figure 25).

Figure 25: Info & Contact Page

McQuay Controls Customer Support Group

866-4McQuay (866-462-7829)

Fax: 763-553-1667

McQuayControls@McQuay.com

For product literature and integration information please visit www.McQuay.com

Configuring the Unit Controller

The MicroTech II Chiller Unit Controller and BACnet Communication Module are designed, programmed, and configured at the factory. The unit is ready to operate with the default parameter values in the MicroTech II Chiller Unit Controller after you change the default parameter values in the HTTP Interface. If you need to change the default values in the MicroTech II Chiller Unit Controller, see the appropriate Operation Manual for default values and keypad operating instructions. Use the BACnet Communication Module Protocol Information Document (ED 15100) for HTTP Interface variable descriptions.

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:

- 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 II BACnet Communications Module>.” If you get a response from that IP address, you are connected to the BACnet Communication Module.

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

Replaceable Parts List

Replacement Kit

Description	Part Number
MicroTech II Communication Module Kit, BACnet IP or BACnet Ethernet (kit includes module and IM 837)	350147406

Appendix A: Hexadecimal Conversion Table

Dec	Hex
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	A
11	B
12	C
13	D
14	E
15	F
16	10
17	11
18	12
19	13
20	14
21	15
22	16
23	17
24	18
25	19
26	1A
27	1B
28	1C
29	1D
30	1E
31	1F

Dec	Hex
32	20
33	21
34	22
35	23
36	24
37	25
38	26
39	27
40	28
41	29
42	2A
43	2B
44	2C
45	2D
46	2E
47	2F
48	30
49	31
50	32
51	33
52	34
53	35
54	36
55	37
56	38
57	39
58	3A
59	3B
60	3C
61	3D
62	3E
63	3F

Dec	Hex
64	40
65	41
66	42
67	43
68	44
69	45
70	46
71	47
72	48
73	49
74	4A
75	4B
76	4C
77	4D
78	4E
79	4F
80	50
81	51
82	52
83	53
84	54
85	55
86	56
87	57
88	58
89	59
90	5A
91	5B
92	5C
93	5D
94	5E
95	5F

Dec	Hex
96	60
97	61
98	62
99	63
100	64
101	65
102	66
103	67
104	68
105	69
106	6A
107	6B
108	6C
109	6D
110	6E
111	6F
112	70
113	71
114	72
115	73
116	74
117	75
118	76
119	77
120	78
121	79
122	7A
123	7B
124	7C
125	7D
126	7E
127	7F

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