Daikin Magnitude® Chiller
BACnet® Networks (MS/TP, IP, Ethernet)
Communication Module

Model WME Magnetic Bearing Centrifugal Chiller, Single Compressor and Dual Compressor
## Table of Contents

**Introduction** ............................................. 3
- Revision History ........................................ 3
- Notice ................................................. 3
- Reference Documents .................................... 3
- Software Revision ....................................... 3
- Limited Warranty ....................................... 3
- Hazardous Information Messages ..................... 3
  - Recognize Safety Symbols, Words and Labels .... 3
- Features ............................................... 4
- Specifications ......................................... 4

**Application** ............................................. 5

**Component Data** ........................................ 5
- Light Emitting Diodes (LEDs) ......................... 5
- BACnet Network Connectors ......................... 6
- 16-Pin Header ......................................... 6
- J8 Jumper ............................................. 6

**Installation** ............................................ 7
- Installation and Mounting ............................ 7
  - Field Installation Kit .............................. 7
- Installing a new Communication Module .......... 7
  - BACnet MS/TP ...................................... 8
  - BACnet IP or Ethernet ............................ 8
- Replacing a Communication Module .............. 8

**Network Configuration** ................................. 9
- BACnet MS/TP Addressing ......................... 9
  - Set the BAS Network Protocol ................... 9
  - Configure BACnet MS/TP Parameters ............ 9
- BACnet IP Addressing ............................... 11
  - Set the BAS Network Protocol ................ 11
  - Configure BACnet IP Parameters ............... 11
- BACnet Ethernet Addressing ....................... 13
  - Set the BAS Network Protocol ................ 13
  - Configure BACnet Ethernet Parameters ...... 13

**Parts and Service** ..................................... 16
- Troubleshooting ...................................... 16
  - General ........................................... 16
  - BACnet MS/TP ...................................... 16
    - Communications and Network Wiring ........ 16
  - BACnet IP .......................................... 16
  - Parts ............................................... 17
This manual contains information regarding network integration for MicroTech® E control systems used on Daikin Magnitude® chillers. It describes how to install or replace a BACnet® communication module on a Magnitude Centrifugal Chiller unit controller. It also explains how to set network parameters and establish communication between the chiller and BACnet network.

**Revision History**

<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IM 963</td>
<td>Apr-10</td>
<td>Initial release</td>
</tr>
<tr>
<td>IM 963-1</td>
<td>Jul-10</td>
<td>Changed kit part number in Parts List. Updated Daikin Applied brand logo and associated references. Updated document part numbers.</td>
</tr>
<tr>
<td>IM 963-2</td>
<td>Mar-17</td>
<td>Formatting and branding refresh, updated Ref Docs table and parts list, added specifications, agency listings, Troubleshooting</td>
</tr>
</tbody>
</table>

**Reference Documents**

<table>
<thead>
<tr>
<th>Company</th>
<th>Number</th>
<th>Title</th>
<th>Source</th>
</tr>
</thead>
</table>

**Software Revision**

This edition documents all versions of the standard Magnitude Chiller Unit Controller software and all subsequent revisions until otherwise indicated. You can determine the revision of the application software from the display. The version is located on the Service screen. BACnet can also read the software revision by reading the Application_Software_Version property of the Device Object.

**Limited Warranty**


**Hazardous Information Messages**

**Recognize Safety Symbols, Words and Labels**

The following symbols and labels are used throughout this manual to indicate immediate or potential hazards. It is the owner and installer’s responsibility to read and comply with all safety information and instructions accompanying these symbols. Failure to heed safety information increases the risk of property damage and/or product damage, serious personal injury or death. Improper installation, operation and maintenance can void the warranty.

**CAUTION**

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

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.

**WARNING**

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

**DANGER**

Dangers indicate a hazardous situation which will result in death or serious injury if not avoided. Electric shock hazard. Can cause personal injury or equipment damage. This equipment must be properly grounded. Connections and service to the Magnitude Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

**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. Daikin disclaims any liability resulting from any interference or for the correction thereof.
The BACnet communication module connects the MicroTech III chiller unit controller to a building automation system (BAS). This interface enables the exchange of BACnet objects between the unit controller and the network. The BACnet communication module, together with the unit controller, support the BACnet MS/TP (EIA 485) data link layer, BACnet IP, or BACnet Ethernet (physical layer.)

**Features**

- Integration into a building automation and control system via BACnet MS/TP, BACnet IP, or BACnet Ethernet (B-AAC profile)
- Simple attachment to a Magnitude chiller unit controller
- LEDs that indicate communication status and network activity
- Network parameters configurable via the unit controller Operator Touch Screen Interface (OITS) display
- BACnet application pre-installed and ready for custom configuration

**Specifications**

The following section provides a summary of technical data and conformance to agency listings.

<table>
<thead>
<tr>
<th>General</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>W x H: 2.9 x 2.9 in (74 x 74 mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5 oz (98 g)</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>32 - 140°F (0 - 60°C)</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-4 - 158°F (-20 - 70°C)</td>
</tr>
</tbody>
</table>

**Electrical**

- Power: DC 5 V (+5% / –5%) power supplied by unit controller, max. 270 mA

**Network Communications - MS/TP**

- Network connection: RS-485 (EIA-485)
- Shielded, twisted pair wire
- Bus connection/Transceiver: Polarity sensitive
- Common, +, - (3 wires)
- Isolated transceiver with fail-safe circuitry
- ½ Unit load
- Network bias resistors: 510 Ω per wire (max. of two sets per segment)
- Characteristic impedance: 100-130 Ω
- Distributed capacitance: Less than 30 pF per ft (100 pF per m)
- Maximum length per segment: 4000 ft (1200 m), AWG 18 cable
- Bus termination: 120 Ω at the end of each segment

**Network Communications - IP/Ethernet**

- Network connection: Ethernet 10/100 over CAT 5 cable
- RJ-45 port, 3-pin connector

**BACnet Standard Compliance**

- BACnet Ethernet media access and physical layer: Class 1 LLC and Type 1 Unacknowledged Connectionless-Mode Data Link Protocol as described in ISO 8802-2.
Application

The BACnet communication module is the interface that provides the exchange of BACnet objects between the chiller unit controller and the network. Refer to the respective Magnitude Magnetic Bearing Centrifugal Chiller Operation and Maintenance Manual (Reference Documents) for unit controller details. For a complete list of available BACnet points, refer to the Magnitude Chiller Unit Controller - Protocol Document, ED 15117 (www.DaikinApplied.com).

Component Data

The following section describes the important features of the BACnet communication module.

Figure 3 shows the location of these components, which include the LEDs, network connections, and J8 jumper.

Figure 3: BACnet Communication Module Main Components

Light Emitting Diodes (LEDs)

The BACnet communication module has six LEDs to indicate communication activity and data transmission status. These indicators are visible when the communication module is connected to the unit I/O board and the unit is powered on. See Table 1 for descriptions of LED activity and Figure 3 for LED locations. The Ethernet LED is described separately in Table 2.

Table 1: Description of LED Activity

<table>
<thead>
<tr>
<th>LED</th>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D2</td>
<td>Green</td>
<td>Communication module supports a BACnet network. If present, this LED is always lit when 5 VDC power (supplied from the chiller unit controller) is present.</td>
</tr>
<tr>
<td>D4</td>
<td>Yellow</td>
<td>Indicates local 3.3 VDC power is present.</td>
</tr>
<tr>
<td>D5</td>
<td>Yellow</td>
<td>Flashes when the communication module transmits data to the chiller unit controller.</td>
</tr>
<tr>
<td>D7</td>
<td>Green</td>
<td>Flashes when the communication module receives data from the chiller unit controller.</td>
</tr>
<tr>
<td>D8</td>
<td>Green</td>
<td>Flashes when the communication module receives data from the BACnet network.</td>
</tr>
<tr>
<td>D9</td>
<td>Yellow</td>
<td>Flashes when the communication module transmits data to the BACnet network.</td>
</tr>
</tbody>
</table>
BACnet Network Connectors
The BACnet communication module can be used to connect to a BACnet MS/TP, BACnet IP, or BACnet Ethernet network. There are two separate network connectors available, depending on the type of network that is connected. See Table 2 for descriptions and Figure 3 for connector locations.

NOTE: The network connector hardware on newer communication modules may look slightly different than what is shown in Figure 3. See Parts for additional information.

Table 2: BACnet Network Connection Details

<table>
<thead>
<tr>
<th>Network</th>
<th>Connector Type</th>
</tr>
</thead>
</table>
| BACnet MS/TP         | An RS-485 connector links the communication module to the MS/TP network. The connector port has three pins: +, -, and Common.  
  - Pin 1 → COM → Common (not used)  
  - Pin 2 → Tx/Rc + → EIA 485 Transmit/Receive Positive  
  - Pin 3 → Tx/Rc - → EIA 485 Transmit/Receive Negative |
| BACnet IP or BACnet Ethernet | An RJ-45 connector links the communication module to the BACnet IP or BACnet Ethernet network. The LEDs for this connector function as follows:  
  - Green LED Flashes to indicate Ethernet activity. If configured for MS/TP, this LED does not flash green, even if it is connected to an active Ethernet port.  
  - Yellow LED Indicates the port speed. The communication module always operates in full-duplex mode. If the output is Off, the speed is 10 mbps. If the output is On, the speed is 100 mbps. |

16-Pin Header
The 16-pin header connects the communication module to the unit I/O board through the bottom of the communication module. The 16-pin header is located on the back side of the communication module (Figure 4) and mates to the I/O board 16-pin receptacle (Figure 5).

J8 Jumper
The communication module has an optional, built-in terminating resistor used for BACnet MS/TP networks. It is labeled “J8” on the circuit board. The communication module ships with the jumper installed, providing 120 ohms of end-of-line resistance to the network.

Typically, the J8 jumper is only required for termination if it is the first or last unit on the network. The J8 jumper is not used on intermediate units.

It is typically the responsibility of the system installer/integrator to recommend whether or not to terminate a device within the network. If the device does not require terminating resistance, or if an external terminating resistor is used, the jumper on J8 should be removed (Figure 3).

Figure 4: BACnet Communication Module - Reverse Side
Main Features

![Figure 4: BACnet Communication Module - Reverse Side](image)
Installation and Mounting

The following section describes how to field install a new BACnet communication module or replace an existing module on the Magnitude chiller unit controller.

**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 communication module, you need to touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential from your body.

**WARNING**

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

This equipment must be properly grounded. Only personnel knowledgeable in the operation of the equipment being controlled must perform connections and service to the unit controller.

**CAUTION**

Carefully align the holes on the communication module with the standoffs on the chiller unit I/O board.

Applying power to the unit controller with the communication module installed upside down can cause damage to the communication module.

Field Installation Kit

The BACnet communication module field-installed kit ships with the following items:

- The BACnet communication module circuit board
- BACnet MS/TP network connector (attached to module)
- J8 jumper (attached to module)
- Two screws
- This manual (IM 963)

Installing a new Communication Module

Follow these steps to install a new BACnet communication module on the unit controller.

1. Remove power from the unit controller.
2. Connect the communication module to the upper left corner of the unit I/O board, in the area labeled BAS Interface Board (Figure 1 and Figure 2). Carefully align the holes on the communication module with the two standoffs attached to the unit I/O board. 

   Figure 4 shows the back side of the communication module, oriented in the “up” position. When the module is positioned correctly as shown in Figure 5, the screw holes are located at the top of the module and fit into the standoffs on the I/O board. This allows the 16-pin receptacle to seat properly and secure the communication module into place.
Using the two screws included with the communication module kit, attach the communication module to the standoffs located on the unit I/O board.

As needed, remove the J8 jumper (Figure 3).

**NOTE:** The jumper is a built-in terminating resistor used with BACnet MS/TP networks. It is only required if it is the first or last unit on the network. The jumper is not used on intermediate units.

Connect the communication module to either the BACnet MS/TP or BACnet Ethernet network as described below. See Figure 3 for locations of the network connectors.

**BACnet MS/TP**

6. Insert the network cable into the three pin RS-485 connector plug on the communication module:
   a. Connect positive (+) wire of the network cable to Pin 2 of the connector plug.
   b. Connect the negative (-) wire to Pin 3 of the connector plug. Note that no wire is connected to Pin 1 (COM).

7. Apply power to the unit controller.

**BACnet IP or Ethernet**

6. Attach the network cable into the RJ-45 Ethernet connector port on the communication module.

7. Apply power to the unit controller.

---

### Replacing a Communication Module

Follow these steps to remove an existing BACnet communication module from unit controller and replace it with a new module.

1. Remove power from the unit controller.
2. Locate the communication module. It is situated at the upper left corner of the unit I/O board (Figure 2).
3. Remove the network cable connector from the communication module.
4. Remove the two screws holding the communication module in place.
5. Grasp the communication module and carefully pull it from the unit I/O board.
6. Connect the communication module to the upper left corner of the unit I/O board, in the area labeled BAS Interface Board (Figure 2). Carefully align the holes on the communication module with the two standoffs attached to the unit I/O board.

   **Figure 4** shows the back side of the communication module, oriented in the “up” position. When the module is positioned correctly as shown in **Figure 5**, the screw holes are located at the top of the module and fit into the standoffs on the I/O board. This allows the 16-pin receptacle to seat properly and secure the communication module into place.

7. Using the two screws included with the communication module kit, attach the communication module to the standoffs located on the unit I/O board.
8. Insert the network cable connector into the communication module.
9. Apply power to the unit controller.
Once the communication module has been properly installed, it is ready to be configured for BAS integration. The following sections describe the required BACnet parameters and addressing process to enable communications. Each protocol (BACnet MS/TP, BACnet IP, and BACnet Ethernet) is covered separately.

Use the chiller unit controller Operator Interface Touch Screen (OITS) display to set parameters. Figure 6 and Figure 7 show the two OITS display screens with the available network options. These screens are labeled BAS1 and BAS2. They are accessed by pressing the BAS button at the top of the column on the right-hand side of the main unit controller OITS display. Press the BAS button once for the BAS1 screen, and twice for the BAS2 screen.

Refer to the Magnitude Chiller Operation and Maintenance Manual (Reference Documents) for details regarding accessing and using the unit controller OITS display. The Magnitude Chiller Unit Controller Protocol Document, ED 15117 provide descriptions of all available BACnet points (www.DaikinApplied.com).

**BACnet MS/TP Addressing**

This section describes how to set the unit controller to the BACnet MS/TP protocol and then configure the MAC Address, baud rate (if necessary), Device Instance, and other BACnet parameters for your network.

**NOTE:** The BAS Network Protocol must first be set to BACnet MS/TP for network parameters to communicate properly.

**Set the BAS Network Protocol**

1. Open the unit controller OITS display screen.
2. Press the SET button, located at the bottom of the screen.
3. Press the BAS button from the top of the column on the right-hand side of the screen.
4. From the BAS1 screen, select item 1 BAS Network Protocol (Figure 6).
5. Press the Change button.
6. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
7. Press the Change button.
8. Select BACnet MSTP from the drop-down menu.
9. Press the Enter button.

**Configure BACnet MS/TP Parameters**

After the protocol has been established, network parameters can be addressed from the OITS display. At a minimum, the following parameters are required to establish network communication:

- MAC Address
- Baud rate (verify and change if necessary)
- Device Instance

Parameters are read from the unit controller during the communication module's initialization phase. With the exception of BAS Network Protocol and English/Metric parameters, any update made via the unit controller OITS display during run-time is automatically applied to the communication module as soon as the change is received.

**Table 3** defines all BACnet addressing parameters that are accessible from the unit controller OITS display. Additional parameters are also configurable from the BAS. Follow these steps to configure the MAC Address, baud rate, Device Instance, and other parameters as required for your network:

1. Press the BAS button to access the second BAS screen (BAS2).
2. Set the BACnet MS/TP – MAC Address within the valid range of 0-127.
3. Verify the baud rate of the BACnet communication module. Follow steps a-h to change from the default of 38400, if necessary.
   a. If you are at the BAS2 screen, proceed to Step 4 (Figure 7). If you are on the BAS1 screen, press the BAS button and proceed to Step 4.
   b. From any other screen, press the SET button once and then press the BAS button twice.
   c. From the BAS2 screen, select item 5 BACnet MS/TP - Baud Rate.
   d. Press the Change button.
   e. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
   f. Press the Change button.
   g. Select the desired baud rate from the drop-down menu.
   h. Press the Enter button. The new baud rate takes effect after approximately 60 seconds.
4. From the BAS1 screen, select item 3 BACnet (All) - Device Instance (Figure 6).
5. Change the value as required.
6. Press Enter on the Setpoint screen to enter the value.
7. Modify any remaining BACnet parameters as necessary (Table 3).
8. Cycle power to the unit controller.
### Table 3: BACnet MS/TP Configuration Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range/Default</th>
<th>Description/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC Offset</td>
<td>-780 to +780 minutes Default: 0</td>
<td>Sets the local time zone by specifying the zone’s offset from the Universal Time Coordinated (UTC) in minutes. For example, US Central Standard Time (CST) is -360.</td>
</tr>
<tr>
<td>Daylight Savings</td>
<td>0 or 1 Default: 0</td>
<td>0 (NO): Do not use daylight savings time 1 (YES): Use daylight savings time</td>
</tr>
<tr>
<td>APDU Retries</td>
<td>0-10 Default: 3</td>
<td>The maximum number of times an Application Protocol Data Unit (APDU) transmission is sent when there is no acknowledgement.</td>
</tr>
<tr>
<td>APDU Timeout</td>
<td>0-60,000 milliseconds Default: 3000 milliseconds</td>
<td>The retry timeout interval, in milliseconds, for APDU transmissions that require acknowledgement.</td>
</tr>
<tr>
<td>Description</td>
<td>Up to 31 characters Default: Daikin Applied</td>
<td>The user-defined BACnet description of the chiller.</td>
</tr>
<tr>
<td>Object Name</td>
<td>Up to 31 characters Default: Magnitude</td>
<td>The Device Object Name must be unique throughout the entire network. If an empty string is read from the unit controller, the communication module uses the following default: MTE Chiller UCA-Address Address = MAC Address. Changing the Device Object Name may affect the operation of other BACnet devices on the network that have previously discovered the device. The communication module may take up to 60 seconds before this change is recognized. A power cycle is not needed.</td>
</tr>
<tr>
<td>Device Instance(^1)</td>
<td>0-4194302 Default: 3000</td>
<td>Device Instance Number of the communication module. This value must be unique throughout the entire BACnet network. If a value greater than 4194302 is read from the unit controller, the following default value will be used: 3000 + Address Address = the last two octets of the MAC Address.</td>
</tr>
<tr>
<td>English / Metric</td>
<td>ENGLISH or METRIC Default: ENGLISH</td>
<td>ENGLISH: Use English units of measure (Deg F, PSI, GPM) METRIC: Use metric units of measure (Deg C, kPa, liter/sec) Cycle power to the unit controller after changing this parameter.</td>
</tr>
<tr>
<td>BAS Network Protocol(^1)</td>
<td>NONE, MODBUS, LONWORKS, BACNET IP, BACNET ETHERNET, BACNET MS/TP Default: NONE</td>
<td>Set the BAS Network Protocol to BACnet MS/TP. Cycle power to the unit controller after changing this parameter. NONE: No BAS network MODBUS: RTU - RS 485 LONWORKS: LonTalk FTT-10A BACET IP: IP over Ethernet BACNET Ethernet: Ethernet BACNET MS/TP: RS 485</td>
</tr>
<tr>
<td>Baud Rate(^1,2)</td>
<td>9600,19200,38400,76800 Default: 38400</td>
<td>Data transfer speed (bps) of the BACnet MS/TP network.</td>
</tr>
<tr>
<td>Max Info Frames</td>
<td>1-5 Default: 5</td>
<td>Maximum number of information frames the BACnet communication module may send before it must pass the token.</td>
</tr>
<tr>
<td>Max Masters</td>
<td>0-127 Default: 127</td>
<td>Specifies the highest possible address for the network master. Nodes must be less than or equal to 127.</td>
</tr>
<tr>
<td>MAC Address(^1,2)</td>
<td>0-127 Default: 1</td>
<td>MS/TP Address of the communication module. Each device on the BACnet network must have a unique MAC Address.</td>
</tr>
</tbody>
</table>

---

1. Parameter is required for minimum network configuration.
2. Parameter must be configured via the OITS display panel. It cannot be configured from the BAS.
BACnet IP Addressing

This section describes how to set the unit controller to the BACnet IP protocol and then configure BACnet parameters for your network.

The parameters listed below need to be configured before the unit controller can communicate to the BACnet network. They must be set from the chiller unit controller OITS display. The parameters are not accessible from the BACnet network or BAS:

- IP Address
- Subnet Mask
- UDP Port
- Default Gateway Address
- BBMD Address
- Foreign Device Time-To-Live

There are other parameters available from the OITS display (Device Instance and Device Name, for example) that are also configurable via the BACnet network or BAS. See Table 4 for details.

**NOTE:** The BAS Network Protocol must first be set to BACnet IP for network parameters to communicate properly.

Configure BACnet IP Parameters

After the protocol has been established, adjust network settings from the BAS1 screen. Refer to Table 4 for default values, ranges, and descriptions of BACnet IP parameters.

Parameters are read from the unit controller during the communication module’s initialization phase. With the exception of BAS Network Protocol and English/Metric parameters, any update made via the unit controller OITS display during run-time is automatically applied to the communication module as soon as the change is received.

Follow these steps to configure the IP Address and other parameters as required for your network:

1. From the BAS1 screen, select item 10 BACnet IP - Network Address.
2. Change the value as required.
3. Press Enter on the Setpoint screen to enter the value.
4. Modify any remaining BACnet parameters as necessary (Table 4).
5. Cycle power to the unit controller.

**NOTE:** Device Instance, IP Address and Object Name must all be unique throughout the network.

Set the BAS Network Protocol

1. Open the unit controller OITS display screen.
2. Press the SET button, located at the bottom of the screen.
3. Press the BAS button from the top of the column on the right-hand side of the screen.
4. From the BAS1 screen, select item 1 BAS Network Protocol (Figure 6).
5. Press the Change button.
6. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
7. Press the Change button.
8. Select BACnet IP from the drop-down menu.
9. Press the Enter button.
Table 4: BACnet/IP Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range/Default</th>
<th>Description/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foreign Device Time²</td>
<td>0 - 65535 seconds</td>
<td>The time, in seconds, within which the foreign device must re-register with the BBMD. If it does not re-register, the BBMD removes it from the Foreign Device Table (FDT) and discontinues forwarding messages to the foreign device. If the Foreign Device Time-To-Live (FDTTL) is changed, the update is automatically applied to the communication module as soon as the change is received. If the new value is different from the existing value, a Register-Foreign-Device message is sent to the BBMD address. A minimum TTL of 15 seconds is enforced to avoid excessive network traffic.</td>
</tr>
<tr>
<td></td>
<td>Default: 0</td>
<td></td>
</tr>
<tr>
<td>BBMD IP Address²</td>
<td>XXX.XXX.XXX.XXX XXX</td>
<td>IP Address for the BACnet Broadcast Management Device (BBMD), if used. If the BBMD IP Address is not 0, the communication module sends a Register-Foreign-Device message to the address. If the result code returned is X’0000’, the communication module renews the registration at the period defined by the Foreign Device Time-To-Live value. As soon as the BBMD IP Address is changed, the update is automatically applied to the communication module. If the new value is 0, the existing sign-up is no longer refreshed and will be allowed to expire. In other words, when a BBMD IP Address is defined using this parameter setting, a Register-Foreign-Device message is sent to register the unit controller’s IP Address with the BBMD. This message is continuously sent out before the Foreign Device Time expires. If the new value is non-zero, a Register-Foreign-Device message is sent to the BBMD IP Address that has been defined by this parameter. Changing the BBMD IP Address may affect the operation of other BACnet devices on the network if they are dependent on objects within the device.</td>
</tr>
<tr>
<td></td>
<td>where each XXX can be 0 to 255 Default: 0.0.0.0 = None</td>
<td></td>
</tr>
<tr>
<td>Default Gateway²</td>
<td>XXX.XXX.XXX.XXX XXX</td>
<td>Default Gateway Address. As soon as the default Gateway Address is changed, the update is automatically applied to the communication module. Modifying the Default Gateway may affect the operation of other BACnet devices on the network if they are dependent on objects within the device.</td>
</tr>
<tr>
<td></td>
<td>where each XXX can be 0 to 255 Default: 172.15.5.1</td>
<td></td>
</tr>
<tr>
<td>UDP Port²</td>
<td>0-65535 decimal</td>
<td>The User Datagram Protocol (UDP) identifies the application process in the destination unit. As soon as the UDP Port is changed, the update is automatically applied to the communication module. Modifying the UDP Port may affect the operation of other BACnet devices on the network if they are dependent on objects within the device.</td>
</tr>
<tr>
<td></td>
<td>Default: 47808 decimal (BACnet hexadecimal)</td>
<td></td>
</tr>
<tr>
<td>Subnet Mask²</td>
<td>XXX.XXX.XXX.XXX XXX</td>
<td>Subnet Mask of the communication module. As soon as the Subnet Mask is changed, the update is automatically applied to the communication module. The Subnet Mask is checked for validity against the IP address. If the Subnet Mask is modified but is not valid, the module does not enable BACnet/IP communication; the device does not initiate or respond to BACnet messages, the change is ignored, and the existing Subnet Mask remains in effect. Changing the Subnet Mask may affect the operation of other BACnet devices on the network that may be dependent on objects within the device.</td>
</tr>
<tr>
<td></td>
<td>where each XXX can be 0 to 255 Default: 255.255.255.0</td>
<td></td>
</tr>
<tr>
<td>Network Address²</td>
<td>XXX.XXX.XXX.XXX XXX</td>
<td>The four-octet (32-bit) Internet Protocol (IP) Address of the communication module. As soon as the IP Address is changed, the update is automatically applied to the communication module. The IP address is checked for validity as an IP Address and against the Subnet Mask. If the IP Address is modified but is not valid, the module does not enable BACnet/IP communication; the device does not initiate or respond to BACnet messages, the change is ignored, and the existing IP Address remains in effect. Changing the IP Address may affect the operation of other BACnet devices on the network that may be dependent on objects within the device.</td>
</tr>
<tr>
<td></td>
<td>where each XXX can be 0 to 255 Default: 172.16.5.8</td>
<td></td>
</tr>
<tr>
<td>UTC Offset</td>
<td>-780 to +780 minutes</td>
<td>Sets the local time zone by specifying the zone’s offset from the Universal Time Coordinated (UTC) in minutes. For example, US Central Standard Time (CST) is -360.</td>
</tr>
<tr>
<td></td>
<td>Default: 0</td>
<td></td>
</tr>
<tr>
<td>Daylight Savings</td>
<td>0 or 1</td>
<td>0 (NO): Do not use daylight savings time</td>
</tr>
<tr>
<td></td>
<td>Default: 0</td>
<td>1 (YES): Use daylight savings time</td>
</tr>
<tr>
<td>APDU Retries</td>
<td>0-10</td>
<td>The maximum number of times an Application Protocol Data Unit (APDU) transmission is sent when there is no acknowledgement.</td>
</tr>
<tr>
<td></td>
<td>Default: 3</td>
<td></td>
</tr>
<tr>
<td>APDU Timeout</td>
<td>0-60,000 milliseconds</td>
<td>The retry timeout interval, in milliseconds, for APDU transmissions that require acknowledgement.</td>
</tr>
<tr>
<td></td>
<td>Default: 3000 milliseconds</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>Up to 31 characters</td>
<td>The user-defined BACnet description of the chiller.</td>
</tr>
<tr>
<td></td>
<td>Default: Daikin Applied</td>
<td></td>
</tr>
<tr>
<td>Object Name</td>
<td>Up to 31 characters</td>
<td>The Device Object Name must be unique throughout the entire network. If an empty string is read from the unit controller, the communication module uses the following default: MTE Chiller UCA-Address Address = MAC Address. Changing the Device Object Name may affect the operation of other BACnet devices on the network that have previously discovered the device. The communication module may take up to 60 seconds before this change is recognized. A power cycle is not needed.</td>
</tr>
<tr>
<td></td>
<td>Default: Magnitude</td>
<td></td>
</tr>
<tr>
<td>Device Instance¹</td>
<td>0-4194302</td>
<td>Device Instance Number of the communication module. This value must be unique throughout the entire BACnet network. If a value greater than 4194302 is read from the unit controller, the following default value will be used: 3000 + Address Address = the last two octets of the MAC Address</td>
</tr>
<tr>
<td></td>
<td>Default: 3000</td>
<td></td>
</tr>
<tr>
<td>English / Metric</td>
<td>ENGLISH or METRIC</td>
<td>ENGLISH: Use English units of measure (Deg F, PSI, GPM) METRIC: Use metric units of measure (Deg C, kPa, liter/sec) Cycle power to the unit controller after changing this parameter.</td>
</tr>
<tr>
<td></td>
<td>Default: ENGLISH</td>
<td></td>
</tr>
<tr>
<td>BAS Network Protocol¹</td>
<td>NONE, MODBUS, LONWORKS, BACNET IP, BACNET ETHERNET, BACNET MS/TP Default: NONE</td>
<td>Set the BAS Network Protocol to BACnet IP. Cycle power to the unit controller after changing this parameter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NONE: No BAS network MODBUS: RTU - RS 485 LONWORKS: LonTalk FTT-10A BACNET IP: IP over Ethernet BACNET Ethernet: Ethernet BACNET MS/TP: RS 485</td>
</tr>
</tbody>
</table>

1. Parameter is required for minimum network configuration.  
2. Parameter must be configured via the OITS display panel. It cannot be configured from the BAS.
**BACnet Ethernet Addressing**

This section describes how to set the unit controller to the BACnet Ethernet protocol and then configure BACnet parameters for your network.

*Table 5* defines the network settings used to establish communication between the unit controller and the BACnet Ethernet network. These parameters must be set using the OITS display. The BACnet Ethernet MAC Address can also be read via the OITS display.

**Set the BAS Network Protocol**

1. Open the unit controller OITS display screen.
2. Press the SET button, located at the bottom of the screen.
3. Press the BAS button from the top of the column on the right-hand side of the screen.
4. From the BAS1 screen, select item 1 BAS Network Protocol (*Figure 6*).
5. Press the Change button.
6. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
7. Press the Change button.
8. Select BACnet Ethernet from the drop-down menu.
9. Press the Enter button.

**Configure BACnet Ethernet Parameters**

After the protocol has been established, adjust network settings from the BAS1 screen. Refer to *Table 5* for default values, ranges, and descriptions.

Parameters are read from the unit controller during the communication module’s initialization phase. With the exception of BAS Network Protocol and English/Metric parameters, any update made via the unit controller OITS display during run-time is automatically applied to the communication module as soon as the change is received.

Follow these steps to configure the Device Instance and other parameters as required for your network:

1. From the BAS1 screen, select item 3 BACnet (all) - Device Instance (*Figure 6*).
2. Change the value as required.
3. Press Enter on the Setpoint screen to enter the value.
4. Modify any remaining BACnet parameters as necessary (*Table 5*).
5. Cycle power to the unit controller.

**NOTE:** Device Instance and Object Name must be unique throughout the network.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Range/Default</th>
<th>Description/Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTC Offset</td>
<td>-780 to +780 minutes</td>
<td>Sets the local time zone by specifying the zone's offset from the Universal Time Coordinated (UTC) in minutes. For example, US Central Standard Time (CST) is -360.</td>
</tr>
<tr>
<td>Daylight Savings</td>
<td>0 or 1</td>
<td>0 (NO): Do not use daylight savings time</td>
</tr>
<tr>
<td></td>
<td>Default: 0</td>
<td>1 (YES): Use daylight savings time</td>
</tr>
<tr>
<td>APDU Retries</td>
<td>0-10</td>
<td>The maximum number of times an Application Protocol Data Unit (APDU) transmission is sent when there is no acknowledgement.</td>
</tr>
<tr>
<td>APDU Timeout</td>
<td>0-60,000 milliseconds Default: 3000 milliseconds</td>
<td>The retry timeout interval, in milliseconds, for APDU transmissions that require acknowledgement.</td>
</tr>
<tr>
<td>Description</td>
<td>Up to 31 characters Default: Daikin Applied</td>
<td>The user-defined BACnet description of the chiller.</td>
</tr>
<tr>
<td>Object Name²</td>
<td>Up to 31 characters Default: Magnitude</td>
<td>The Device Object Name must be unique throughout the entire network. If an empty string is read from the unit controller, the communication module uses the following default: MTE Chiller UCA-Address Address = MAC Address. Changing the Device Object Name may affect the operation of other BACnet devices on the network that have previously discovered the device. The communication module may take up to 60 seconds before this change is recognized. A power cycle is not needed.</td>
</tr>
<tr>
<td>Device Instance¹,²</td>
<td>0-4194302 Default: 3000</td>
<td>Device Instance Number of the communication module. This value must be unique throughout the entire BACnet network. If a value greater than 4194302 is read from the unit controller, the following default value will be used: 3000 + Address Address = the last two octets of the MAC Address</td>
</tr>
<tr>
<td>English / Metric</td>
<td>ENGLISH or METRIC Default: ENGLISH</td>
<td>ENGLISH: Use English units of measure (Deg F, PSI, GPM) METRIC: Use metric units of measure (Deg C, kPa, liter/sec) Cycle power to the unit controller after changing this parameter.</td>
</tr>
<tr>
<td>BAS Network Protocol¹,²</td>
<td>NONE, MODBUS, LONWORKS, BACNET IP, BACNET ETHERNET, BACNET MS/TP Default: NONE</td>
<td>Set the BAS Network Protocol to BACnet IP. Cycle power to the unit controller after changing this parameter. NONE No BAS network MODBUS: RTU - RS 485 LONWORKS: LonTalk FTT-10A BACET IP: IP over Ethernet BACNET Ethernet: Ethernet BACNET MS/TP: RS 485</td>
</tr>
<tr>
<td>MAC Address</td>
<td>XX-XX-XX-XX-XX-XX where each XX can be 00 through FF hexadecimal Default: 00-00-00-00-00-00</td>
<td>Unique MAC Address of the communication module. This parameter cannot be changed.</td>
</tr>
</tbody>
</table>

1. Parameter is required for minimum network configuration.
2. Parameter must be configured via the OITS display panel. It cannot be configured from the BAS.
NOTE: If the unit controller application software requires a field upgrade, the network configuration parameters revert to their default values. Please contact the Chiller Technical Response Center at 540-248-9239 (techresponse@daikinapplied.com) for assistance.
Troubleshooting

Follow these procedures if you can control the Magnitude chiller unit controller from the OITS panel, but are not able to communicate with the unit via the network.

General

→ Verify that network parameters are set correctly as shown in Table 3 (MS/TP), Table 4 (IP), or Table 5 (Ethernet).
→ Make sure there are no duplicate devices on the network.
→ Verify that other devices on the network are still communicating.
→ Verify that all appropriate configuration has been done to BAS server.
→ Reduce (isolate) the network to one single unit controller. Once this small network is working properly, continue to add more devices to the network.

BACnet MS/TP

Communications and Network Wiring

If performance is unsatisfactory or network is experiencing issues such as noise, loss of data packets, or collisions:

→ Verify that there are no duplicate MAC Addresses and/or Device-IDs on the network.
→ Confirm that the shield is landed at only one point in the trunk.
→ Be aware that network topology must be daisy-chain or line topology (no T-Taps or ring layout).
→ Verify that network wiring does not exceed 4000 ft total distance limit (without repeaters) at 76800 bps baud.
→ Check that there are end-of-line termination resistors at the first and last device on the trunk. Remove any invalid terminations, particularly in the middle of the bus.
→ Verify that the network trunk avoids strong sources of electromagnetic interference (EMI).
→ Verify that the network trunk is not located near a DC load switch (relay).
→ Verify that polarity is correct (a single node can disrupt the MS/TP network).
→ Check that there are no more than 32 devices installed in a single segment (using standard transceivers).

Follow the EIA-485 specification guidelines. Refer to www.ashrae.org.

BACnet IP

→ Check that the defined UDP port, (BAC0), is open in the firewall.
→ Use the standard TCP/IP suite of tools to check connectivity with other devices. Ping the unit controller using these steps if the communication module is not working:

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
</tr>
</thead>
</table>
| 1    | Select Start > Run on the Windows start bar  
→ The “Run” dialog box opens |
| 2    | Enter C:ping XX XX XX and press Enter  
→ The ping result is displayed (Figure 8) |

Figure 8: Successful Ping Result

Command Prompt

Microsoft Windows [Version 6.1.7601]
Copyright (C) 2009 Microsoft Corporation. All rights reserved.
C:\Users\broundy>ping 172.16.5.8

Ping 172.16.5.8 with 32 bytes of data:
Reply from 172.16.5.8: bytes=32 time=5ms TTL=128
Reply from 172.16.5.8: bytes=32 time=1ms TTL=128
Reply from 172.16.5.8: bytes=32 time=4ms TTL=128
Ping statistics for 172.16.5.8:
Packet Send = 4, Received = 4, Lost = 0 (0% loss).
Approximate round trip times in millisecond:
  Minimum = 1ms, Maximum = 4ms, Average = 2ms
C:\Users\broundy>

→ If you get a response from that IP address, you are connected to the BACnet communication module. If the ping fails and you do not get a response, then there is an issue with the network or the IP settings.

Verify the BACnet communication module and the PC network settings.
→ Verify if BBMDs are required. BBMD must be used if the BACnet client and BACnet server are located on different subnets. Use the command “tracert” to check this. Tracert shows all stations used to forward the signal to another segment. See Figure 9 for the result of a BBMD network as displayed by using the “tracert” command.

Figure 9: Example of Confirmed BBMD Network

C:\WINNT\System32\Tracert.exe

Microsoft Windows XP [Version 5.1.2600]
© Copyright 1985-2005 Microsoft Corp.
C:\Documents and Settings\schemasa\Desktop\tracert 10.169.8.193
Tracing route to 10.169.8.193 over a maximum of 30 hops
1 * 1ms * * 129.16.55.252
2 * 1ms * 129.16.29.252
3 * 1ms 129.16.55.252 10.169.8.193
Trace complete.

Contact the Daikin Applied Controls Customer Support group at 866-462-7829 for additional assistance, if necessary.
Parts

Table 6: Replacement Parts List

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude BACnet Communication Module kit Kit includes: BACnet communication module, network connector, screws, and IM 963</td>
<td>332356961</td>
</tr>
<tr>
<td>Network connector¹ (Wago, 231-303/026-000)</td>
<td>330803003</td>
</tr>
</tbody>
</table>

¹. The network connector shown in Figure 10 has replaced the previous connector that shipped with older communication modules. While the physical appearance of the hardware is different, the installation and function remain the same.

Figure 10: Wago Network Connector

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787).
**Daikin Applied Training and Development**

Now that you have made an investment in modern, efficient Daikin equipment, its care should be a high priority. For training information on all Daikin HVAC products, please visit us at www.DaikinApplied.com and click on Training, or call 540-248-9646 and ask for the Training Department.

**Warranty**

All Daikin equipment is sold pursuant to its standard terms and conditions of sale, including Limited Product Warranty. Consult your local Daikin Applied representative for warranty details. To find your local Daikin Applied representative, go to www.DaikinApplied.com.

**Aftermarket Services**

To find your local parts office, visit www.DaikinApplied.com or call 800-37PARTS (800-377-2787). To find your local service office, visit www.DaikinApplied.com or call 800-432-1342.

This document contains the most current product information as of this printing. For the most up-to-date product information, please go to www.DaikinApplied.com.

Products manufactured in an ISO Certified Facility.