



# Installation and Maintenance Manual

# IM 1013-1

Group: Controls  
Part Number: IM 1013  
Date: February 2016

## MicroTech® III Fan Coil

## BACnet® MS/TP Communication Module



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## Revision History

Literature Number	Release Date	Action
IM 1013-1	February 2016	Content Revision
IM 1013	November 2013	Initial release

## Reference Documents

Number	Company	Title	Source
ANSI/ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers	A Data Communication Protocol for Building Automation and Control Networks	<a href="http://www.ashrae.org">www.ashrae.org</a>
ED 15135	Daikin Applied	MicroTech III Fan Coil Unit Controller Protocol Information Manual	<a href="http://www.DaikinApplied.com">www.DaikinApplied.com</a>
OM 1111	Daikin Applied	MicroTech III Unit Controller for Fan Coil Unit Operation Manual	<a href="http://www.DaikinApplied.com">www.DaikinApplied.com</a>
OM 1095	Daikin Applied	MicroTech III Fan Coil Unit Controller Downloading Procedure	<a href="http://www.DaikinApplied.com">www.DaikinApplied.com</a>
OM 1092	Daikin Applied	System Manager Operation and Maintenance Manual	<a href="http://www.DaikinApplied.com">www.DaikinApplied.com</a>

## Notice

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## General Information

This manual contains the information you need to install and configure the MicroTech® III BACnet® Communication Module on the Fan Coil Unit Controller. For installation Technical Support, please contact the Daikin Applied Controls Support Group at (866) 462-7829.

## 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.

**NOTICE**

Use this manual when physically connecting the BACnet communication module to the MicroTech III fan coil unit controller for communication to a BACnet network. Connections and service to the unit controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled. Use the appropriate Engineering Data (ED) protocol document to integrate the unit into your network. The ED contains addressing details, BACnet protocol information, and also a list of the data points available to the network. See the Reference Documents section for details. MicroTech III control integration information is available from your local Daikin Applied sales representative and also at [www.DaikinApplied.com](http://www.DaikinApplied.com).

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 of 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 could cause harmful interference, in which case the user will be required to correct the interference at their expense. Daikin Applied disclaims any liability resulting from any interference or for the correction thereof.

## Overview

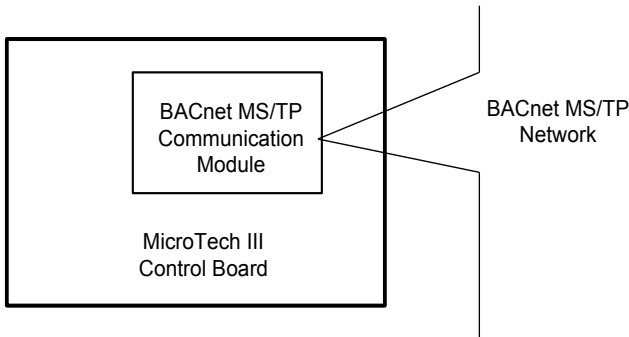
This manual provides the instructions for installing a BACnet Communication Module (communication module) to a MicroTech III Fan Coil Unit Controller (unit controller). It also explains the initial configuration steps required so that the fan coil unit can be integrated into a BACnet MS/TP network.

This document is intended for service technicians or other qualified personnel who need to replace or install a new communication module on the fan coil unit controller. Please read the Important Messages section before proceeding as they will be referenced throughout the process.

## Application

The communication module is the interface between the fan coil unit controller and the BACnet network. It allows for the exchange of BACnet objects between the unit controller and the network. It supports the BACnet MS/TP (EIA 485) data link layer physical layer. Figure 1 shows the communication module and fan coil unit controller integrated into a BAS. Refer to OM 1111, MicroTech III Fan Coil Unit Controller Operation and Maintenance manual ([www.DaikinApplied.com](http://www.DaikinApplied.com)).

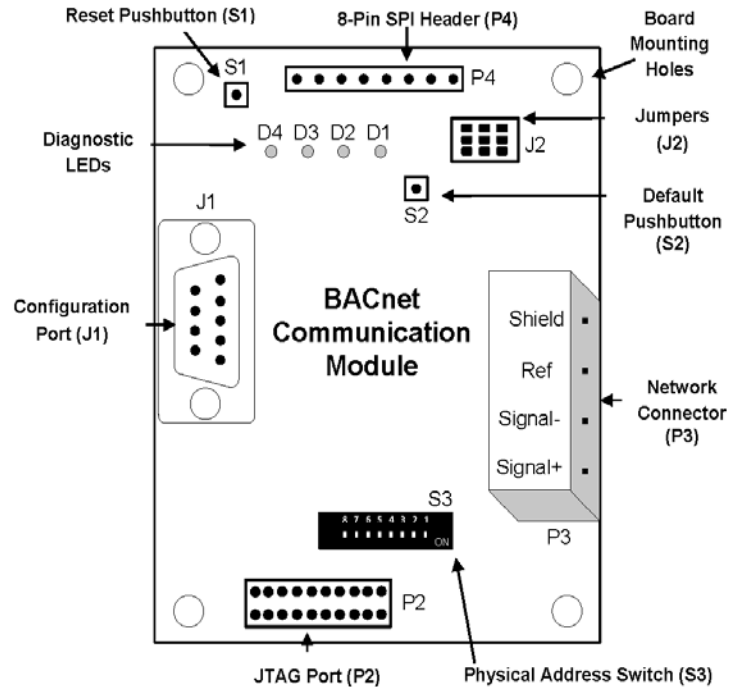
Figure 1: Building Automation System



## Components

The following section describes the key physical components of the communication module and their functions. The communication module is a rectangular printed circuit board that plugs on the top side of the unit controller baseboard. It has four LED indicators, a network connector, two pushbuttons, a physical address switch, SPI header, jumper header, network transceiver, and connection ports. Figure 2 shows the major components and their locations.

Figure 2: BACnet Communication Module



## Diagnostic Light Emitting Diodes (LEDs)

The communication module has four LEDs to indicate communication activity and status.

LED	Function	Description
D1	Program Running	Flashes with software application main loop activity
D2	SPI Message Transmit	Flashes with SPI communications with unit controller
D3	MS/TP Transmit	Flashes when transmitting an MS/TP message
D4	MS/TP Receive	Flashes when receiving an MS/TP message

## BACnet MS/TP Network Connector

The P3 connector is the 4-pin port that integrates the communication module to the BACnet network.

Pin	Designation	Function
1	+	Non-inverting signal input
2	-	Inverting signal input
3	GND	Reference used where isolated device requires a reference
4	Shield	Shield (isolated terminal for connection of shields)

## BACnet Pushbuttons

The S1 and S2 pushbuttons are used to restore the communication module to previous settings or to default parameters.

Switch	Designation	Function
S1	Reset	Resets the communication module
S2	Default	Resets the communication module to default parameters

## Connection Ports

The J1 and P2-P4 ports are used to configure, program, and connect the communication module to the fan coil unit controller.

Plugs	Function
J1	Configures the communication module
P2	Programs the communication module
P3	BACnet MS/TP network connection port
P4	8-pin header plug that connects the communication module to the unit controller

## Physical Address Switch

The physical Address Switch, S3, is used to determine the MAC address of the communication module. Valid physical switch values are 0-127 for manual addressing and 255 for auto-addressing ([Setting up Network Communications.](#))

## 8-Pin SPI Header

P4 is an 8-pin serial peripheral interface (SPI) connection port on the back side of the communication module. It matches up to the 8-pin header on the fan coil unit controller.

## Network Transceiver

The EIA-485 network transceiver has the following electrical specifications.

- Unit Loading: 68k  $\Omega$  receiver input impedance ( $\frac{1}{4}$  unit load) that allows up to 128 node connections.
- ESD Protection: 8kV ESD protection on driver outputs and receiver inputs.
- Safety: Fail-safe feature defaults to a high output state when the receiver inputs are open or shorted.

## Jumper J2

Jumper J2 is used for internal development and testing purposes. It can also be used to erase the programming logic in the microcontroller. Contact the Controls Customer Support Group at 866-462-7829 prior to accessing the J2 jumper.

## Overview

The communication module may already be attached to the unit controller or it can be installed and configured in the field. The following section describes how to install a new communication module or replace an existing module. It also describes how to connect the communication module to a BACnet network.

The communication module mounts on the fan coil unit controller with connector pins. It is held in place with four plastic locking standoffs. The communication module joins with the BACnet network at the network connector plug, P3 (Figure 2).

Field installation/replacement and network connection requires the following:

- A BACnet MS/TP communication module
- Four stand-offs
- Shielded, twisted pair pigtail wire and plug for network connection (see Figure 4 for wiring schematic)
- Installation Manual, IM 1013

To order a replacement communication module or a field installation kit (which includes the stand-offs and IM), visit [www.DaikinApplied.com](http://www.DaikinApplied.com) or call 800-37PARTS (800-377-2787). Note that the network wire is not included in the kit (Aftermarket Services).

## Installing a new Communication Module

**⚠ DANGER**

The terminals on the fan coil unit controller are high voltage. Disconnect power to avoid electrical shock potential, which will result in death or serious injury.

1. Disconnect power from the fan coil unit controller
2. Remove the network cable plug-in connector terminal block in P3 (Figure 2).
3. Locate the four standoffs on the communication module.
4. Install the four standoffs on the fan coil unit controller (Figure 3).
5. Orient the communication module so that the side with the components faces out and the connector socket can mate with the 8-pin header on the unit controller.
6. Push the communication module onto the connector pins and standoffs until you hear the faint click of the locking standoffs securing the communication module in place.
7. See Figure 4 for the network wiring schematic, if necessary.

## Replacing a Communication Module

**⚠ DANGER**

The terminals on the fan coil unit controller are high voltage. Disconnect power to avoid electrical shock potential, which will result in death or serious injury.

1. Disconnect power from the fan coil unit controller.
2. Record the MAC Address set in Address Switch S3.
3. Remove the network cable plug-in connector terminal block P3 (Figure 2).
4. Locate the four standoffs for the communication module from the unit controller (Figure 3).
5. Depress the barb on one standoff and gently pull the corner of the communication module over the barb. Do not bend the communication module or mis-align the connector pins.
6. Proceed to the other three corners, by carefully removing the communication module from each standoff, and pulling it over the standoffs.
7. Gently lift the communication module from the unit controller.
8. Locate the empty connector pins and four standoffs on the unit controller (Figure 3).
9. Orient the communication module so that the side with the components faces out and the connector socket can mate with the 8-pin header on the unit controller.
10. Push the communication module onto the connector pins and standoffs until you hear the faint click of the locking standoffs securing the communication module in place.
11. See Figure 4 for the network wiring schematic, if necessary.

**NOTE:** The 8-pin SPI header and P4 plug on the back of the communication module connect it to the unit controller.

Figure 3: BACnet Communication Module Mounted on the Fan Coil Unit Controller

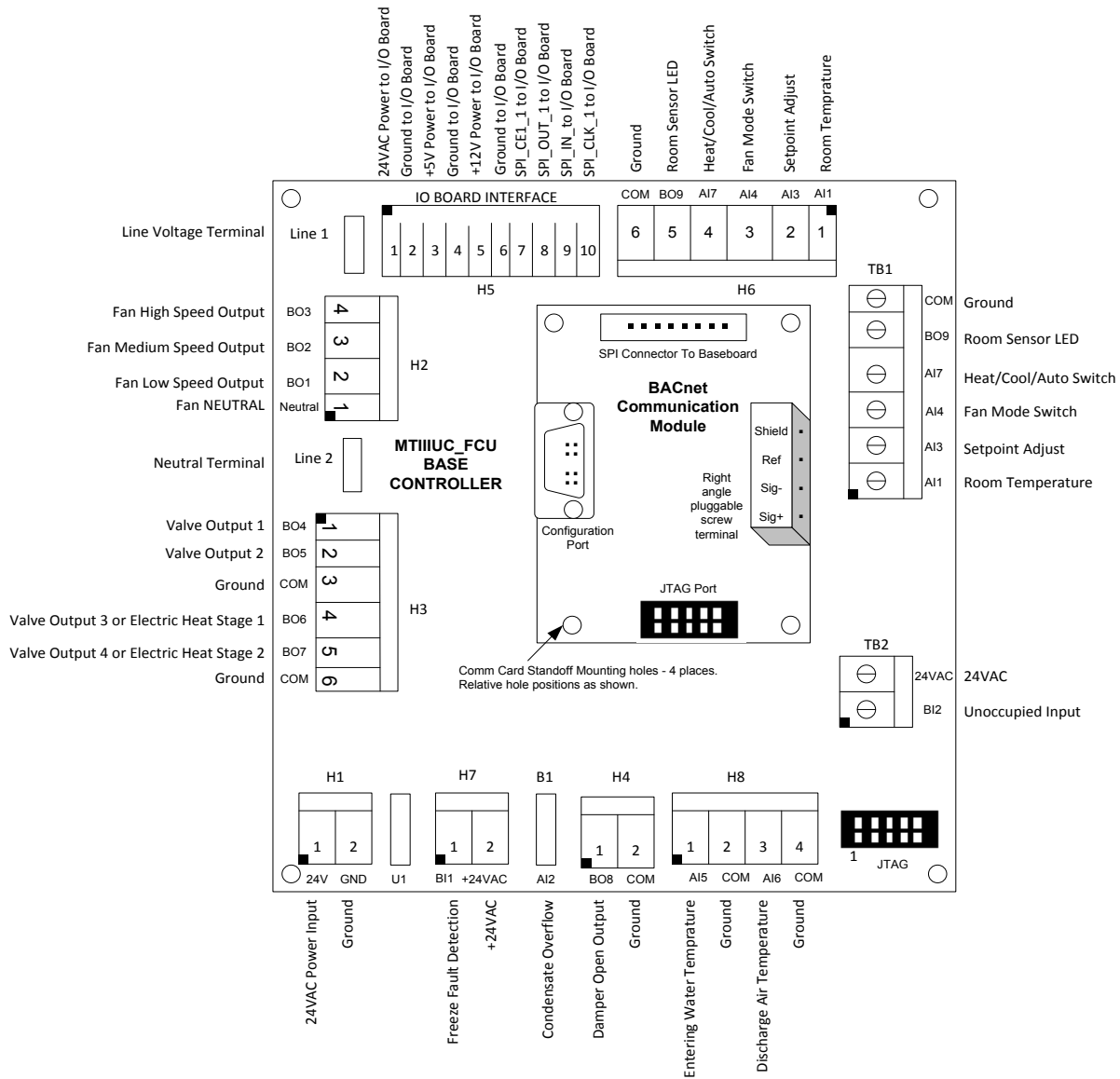
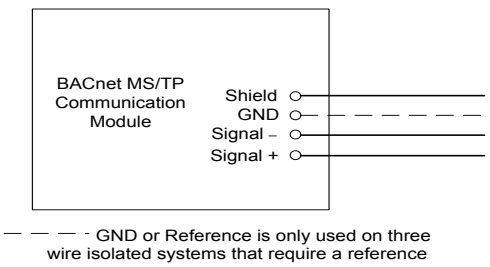


Figure 4: BACnet MS/TP Network Connection Schematic Diagram



**NOTE:** The communication module can function as either a 2-wire device (+ shield) or as a 3-wire device (+ shield). Use of the GND (or reference) terminal on the communication module is optional. The GND terminal can be used to terminate a reference conductor should one exist. Therefore, if a reference conductor does not exist, the GND terminal is not applicable. Additionally, the shield terminal is also optional. In all EIA-485 networks, the shield should be continuous throughout the entire MS/TP trunk. However, it does not need to be tied together using the shield terminal (for example, wire nuts are frequently used as an alternative). The optional shield terminal is provided for convenience when tying together the segments of the shield.

## Overview

Together, the fan coil unit controller and BACnet communication module are designed to communicate with a Building Automation System (BAS). The following section explains how to configure the essential parameters and establish network communication.

## Unit Controller Configuration

Follow these steps to set up the unit controller for addressing and BACnet network configuration:

1. Connect the unit controller to the network by replacing the network cable plug in P3 (Figure 2). The polarity of the signal must be maintained throughout the network. Always connect + to + and – to –.
2. Address the unit controller to establish the primary BACnet parameter settings. Set the physical S3 address switch settings on the communication module (Figure 2). The settings depend on which one of the four addressing methods, as described in the next section, is desired.
3. Configure the unit controller for the remaining network parameters. This step is done at the BAS or with the BACnet configuration menu (Appendix), and is typically the responsibility of the network integrator. Refer to the Protocol Document, ED 15135 ([www.DaikinApplied.com](http://www.DaikinApplied.com)) for a comprehensive list of the available BACnet objects and network integration details.
4. Apply power to the unit controller.

## Addressing and Commissioning

These BACnet parameters require configuration in order for each unit to communicate properly on the network:

- MAC Address (must be unique on the MS/TP trunk)
- Device Instance Number (must be unique on the network)
  - The Device Instance Number must not be set to 300. The Device Instance Number of 300 is reserved for the “unconfigured” state.
- Device Name (must be unique on the network)
- MS/TP Baud Rate (must be the same throughout the MS/TP trunk)
- MS/TP Max Masters (set to the value of the highest MAC address on the MS/TP trunk)

**There are four procedures that can be used to set the BACnet addressing parameters for each unit. Initial network setup requires the user to follow only one of these procedures.** However, it is possible to use another method at some point in the future, if desired (i.e. if a new unit(s) is added to the network and the user wishes to take advantage of auto-addressing.)

Below is a brief overview of the four methods, followed by detailed commissioning instructions. Table 2 provides default values and other important information for setting network parameters.

1. **Manual** – Physically adjust the 8 dip-switches on the communication module’s S3 address switch to set the MAC Address (0 to 127). The remaining parameters are then automatically determined based on the MAC Address value. Use this method only if it is not necessary to change the baud rate, Device Instance Number, and/or the Device Name default values (Table 2). If any one of these parameters requires configuration, use the Manual plus Serial Terminal Device method.
2. **Manual plus Serial Terminal Device** – Set the MAC Address via the 8 dip-switches, and then use a serial terminal device such as Windows HyperTerminal or PuTTY to adjust remaining parameters (Device Instance Number, Device Name, baud rate, Max Masters, etc.)
3. **Auto Addressing** – Confirm that the S3 address switch is set to the default value of 255. Press the Timed Override button on the room sensor for 11 or more seconds to activate the auto-assignment process for setting network parameters (see NOTE).
4. **Auto Addressing using Network Variables** - Confirm that the S3 address switch is set to the default value of 255. Set the analog value (AV412) via the BAS and then press the Timed Override button on the room sensor to activate the auto-assignment process. This method allows the desired System Minimum Device Instance number to be set at the BAS (see NOTE).

**NOTE:** The auto-addressing feature was designed for units communicating to a MicroTech Integrated System (MIS) controller. However, any BAS can configure a fan coil unit controller for auto-addressing. See the MicroTech System Manager Operation Manual, OM 1092 ([www.DaikinApplied.com](http://www.DaikinApplied.com)) for complete details on the MIS controller.



**Table 1: Summary of the Four Fan Coil Unit Controller BACnet Addressing Options**

Parameter	Network Addressing Methods			
	Manual	Manual plus Serial Terminal Device	Auto-Addressing	Auto-Addressing using Network Variables
Baud Rate	38400	9600, 19200, 38400 or 76800	38400	38400
MAC Address	Physical S3 switch setting	Physical S3 switch setting	First available (high to low) starting at 127	First available (high to low) starting at 127
Device Instance Number <sup>2</sup>	3101000 + MAC Address	3101000 + MAC Address or user-selected	3101000 + MAC Address	AV412 + MAC Address
Device Name	MTIIIUC_FCU_ + Device Instance <sup>T</sup>	MTIIIUC_FCU_ + Device Instance or user-selected <sup>1</sup>	MTIIIUC_FCU_ + Device Instance <sup>T</sup>	MTIIIUC_FCU_ + Device Instance <sup>T</sup>

<sup>1</sup>For example, if the Device Instance = 3101007, then the Device Name = MTIIIUC\_FCU\_3101007.

<sup>2</sup>Device instance number must not be set to 300. Device Instance number of 300 is reserved for the “unconfigured” state.

## Addressing Method #1 - Manual

Use this method only if the baud rate, Device Instance Number, and/or the Device Name default values do not need to be changed (Table 2). If any one of these parameters requires configuration, use the Addressing Method #2 - Manual plus Serial Terminal Device procedure.

### Required Equipment – N/A

### Procedure

1. Assign the MAC Address by setting the eight-position physical S3 address switch on the communication module (see Figure 1 for location). The allowable range is between 0 -127. Note that the communication module ships with a default MAC Address of 255. Bit 0 of the address/mode corresponds to switch position 1, and bit 7 of the address/mode corresponds to switch position 8. See S3 Address Switch for operation of the S3 dipswitch.
2. The default baud rate is 38400 bps as indicated in Table 2.
3. The Device Instance Number is set to 3101000 + MAC Address as determined by the S3 address switch.
4. The Device Name is set to MTIIIUC\_FCU\_ + Device Instance Number. For Example, if the Device Instance Number = 3101007, then the Device Name = MTIIIUC\_FCU\_3101007.

## Addressing Method #2 – Manual plus Serial Terminal Device

### Required Equipment

- Laptop with a serial port
- Serial terminal device application such as HyperTerminal or PuTTY (required for steps 2-4)
- Null modem serial cable for establishing communication between the laptop and the serial terminal device application

### Procedure

1. Assign the MAC Address by setting the eight-position S3 address switch on the communication module. See Figure 1 for location of the S3 dipswitch. See S3 Address Switch for operation instructions.
2. Change the baud rate, if necessary. The default is 38400 bps as indicated in Table 2. The baud rate can only be modified using a serial terminal device application such as HyperTerminal or PuTTY in conjunction with the BACnet Configuration Menu (Appendix).
3. The Default Device Instance Number is 3101000 + MAC Address as set by physical S3 address switch. If necessary, the Device Instance Number can be altered to any available valid value using a serial terminal device application such as HyperTerminal or PuTTY. The Default Device Name is MTIIIUC\_FCU\_ + Device Instance Number. If necessary, the Device Name can be modified to any available valid value using a serial terminal device application such as HyperTerminal or PuTTY (Appendix).

## Addressing Method #3 – Auto Addressing

### Required Equipment

- Room Sensor with Timed Override button

### Optional Equipment

The following items are required only if it is necessary to change the baud rate, Device Instance Number, and/or the Device Name from their default values as shown in [Table 2](#).

- Laptop with a serial port
- Serial terminal device application such as HyperTerminal or PuTTY
- Null modem serial cable for establishing communication between the laptop and the serial terminal device application

**NOTE:** In the unconfigured state (i.e. prior to activating the auto-addressing process as described below), the communication module is connected to the network and is “listening” to network traffic. It is not actively communicating. While in the unconfigured state, it is compiling a set of used MAC Addresses from other devices. The following procedures describe how a room sensor is used to commission the unit controller from an unconfigured state to an active, communicating state on the network.

### Procedure

1. Confirm the physical S3 address switches are set to the default value of 255. See [Figure 1](#) for physical location of the S3 dipswitch.
2. Apply power to the unit controller and verify other devices are available on the network.
3. Allow the communication module a minimum of two minutes to analyze the network traffic so that it can determine which MAC addresses are currently being used by other devices.
4. Press the Timed Override button on the room sensor for 11 or more seconds to activate the auto-assignment process.
5. The communication module is automatically assigned the highest available MAC Address. The assignment process begins at the highest value of 127. If 127 is already taken by another device, it uses the next lowest available address. For example, if 127 and 126 are taken but 125 is free, the communication module is assigned a MAC Address of 125.

6. The default baud rate is 38400 bps as indicated in [Table 2](#). The baud rate can only be changed using a serial terminal device application such as HyperTerminal or PuTTY ([Appendix](#)).
7. The Device Instance Number is assigned a value of 3101000 + MAC Address.
8. The Device Name is assigned a value of MTIIIUC\_FCU\_ + Device Instance Number.

## Addressing Method #4 – Auto Addressing using Network Variables

This method involves configuring BACnet Analog Value (AV) objects AV412 and AV411 from the BAS. These unique network variables were created for units communicating to a MicroTech Integrated System (MIS) controller, but they can also be used by a network integrator to commission any fan coil unit controller with a communication module.

### Required Equipment

- Room sensor with Timed Override button
- BAS – Required for setting network variables, AV412 and AV411

### Optional Equipment

The following items are required only if it is necessary to change the baud rate, Device Instance Number, and/or the Device Name from their default values as shown in [Table 2](#).

- Laptop with a serial port
- Serial terminal device application such as HyperTerminal or PuTTY
- Null modem serial cable for establishing communication between the laptop and the serial terminal device application

### Procedure

1. Confirm the S3 switch on the communication module is set to the default value of 255.
2. Apply power to the unit controller and verify other devices are available on the network.
3. The default baud rate is 38400 bps as indicated in [Table 2](#). The baud rate can only be changed using a Serial Terminal Device such as HyperTerminal or PuTTY ([Appendix](#)). From the BAS, set AV412 to the new desired System Minimum Device Instance Number (see above for details).

4. Allow the communication module a minimum of two minutes to analyze the network traffic so that it can determine which MAC addresses are currently being used by other devices.
5. Press the Timed Override button on the room sensor for 11 or more seconds to activate the auto-assignment process.
6. The assignment process begins at the highest value of 127. If 127 is already taken by another device, it uses the next lowest available address. For example, if 127 and 126 are taken but 125 is free, the communication module is assigned a MAC Address of 125.
7. The Device Instance Number is automatically configured to be the System Device Instance Number selected by the user at AV412 + MAC Address (see previous description for details.)
8. The Device Name Property is automatically configured to be MTIIIUC\_FCU\_ + Device Instance Number.

**NOTE:** If the Device Instance Number and/or Device Name have been changed from default values via the BAS system or a Serial Terminal Device application, it will no longer be automatically configured. However, restoring the communication module to default values allows auto-configuration to occur ([Restoring Default Values](#)).

### **Description of Network Variables AV412 and AV411**

During the automatic assignment process, AV412 (the System Minimum Instance number) is added to the MAC Address value to determine the Device Instance Number. After the communication module is commissioned, the MAC address is commandable, or writable, through the BAS using the AV411 object.

AV412 has an ObjectName of SystemMinInstance, the Present Value is writable, and it has a default value of 3101000. During the commissioning process, the present value of AV412 is added to the MAC Address to determine the Device Instance Number. In order to change the value of AV412 on the communication module in the unconfigured state, the BAS must broadcast a new present value to AV412 using the BACnet service (BIBB – BACnet Interface Building Block) called “Unconfirmed COV” with a ProcessID value of 1. This prevents unauthorized unconfirmed writes, or changes, to AV412. Note that this change affects the AV412 present value for every fan coil communication module on the trunk.

The following is an example of how AV412 can be used in a typical BACnet network with a traditional BAS:

*A network has two separate trunks. One trunk uses the default Minimum Instance Number of 3101000. The second trunk is set to a different Minimum Device Instance Number (Example 3102000) via AV412. In this way, the two trunks can each have unique Device Instance Numbers on the network.*

The AV411 object is the MAC Address/Address Switch. It is a multi-purpose variable, which means that the ObjectName changes based on the value of the physical S3 address switch on the communication module. When the address switch is set to 255, the AV411 ObjectName is MACAddress, the Present Value is commandable via the BAS, and represents the communication module’s MS/TP MAC Address. However, if the address switch is not set to 255, the AV411 ObjectName is MACAddressSwitch, Present Value is read-only, and represents the S3 physical address switch setting. Refer to the MicroTech III Fan Coil Unit Corotocol Document, ED 15135 ([www.DaikinApplied.com](http://www.DaikinApplied.com)).

## Configuration Settings for the BACnet Communication Module

Table 2 below describes the BACnet communication parameters required for successful network communication.

**Table 2: Network Communication Parameter Settings**

Parameter	Default Setting	Range/Valid Values	Important Notes
MS/TP Baud Rate	38400	9600, 19200, 38400, 76800	Manually adjustable only through the J1 configuration port connected to a laptop using a serial connector and terminal device application such as HyperTerminal or PuTTY (Appendix).
MS/TP Max Masters	127	1 to 127	Manually adjustable only through the J1 configuration port connected to a laptop using a serial connector and terminal device application such as HyperTerminal or PuTTY (Appendix).
MS/TP MAC Address	N/A	0 to 127, and 255 Note that 128 to 254 are not valid addresses.	When the physical S3 Address Switch is set to 255 (factory default), the MS/TP MAC Address is dynamically acquired during the commissioning process. Once commissioned, the MAC Address can be adjusted through the BAS using AV411 or through a terminal device application such as HyperTerminal or PuTTY (Appendix).
			When the physical S3 Address Switch is not set to 255, the static MS/TP MAC Address directly matches the S3 Address Switch value.
System Minimum Instance (AV412)	3101000	0 to 4194303	Writeable only through the network. "Present Value" is used during the commissioning process to determine the Device Instance and Name.
Device Instance Number	300	0 to 4194302 (300 Not Allowed).	The commissioning process initializes the Device Instance Number to "MAC Address + System Minimum Instance" (AV412) or is manually adjustable.
Device Object Name	MTIIIUC_FCU_0000300	Up to a 17-character Device Object Name	The commissioning process initializes the Device Object Name to: "MTIIIUC_FCU_" + Device Instance Number" or is manually adjustable.
Max APDU Length	480	N/A	Fixed value is 480.

### Important Notes

1. The address switch (S3) is factory defaulted to 255. The S3 address switch setting determines the mode that is used for establishing the MS/TP MAC Address.
2. The default setting is the value prior to the commissioning process completion (in other words, when the communication module is an unconfigured state). The unconfigured state implies that the S3 address switch is set to 255.
3. The Max APDU Length parameter should not be set higher than 480. This value is not user-adjustable.

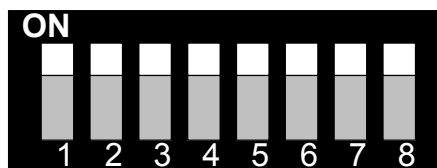
## S3 Address Switch

The S3 address switch setting determines the mode that is used for establishing the MS/TP MAC Address. The following section provides a description of the S3 address switch positions and their respective values (Table 4 and Table 4). Figure 6 gives an example of the dipswitch settings for a common network address.

**Table 3: Table 3. Explanation of Physical DIP Switch States (ON or OFF)**

Address Switch State	Description
ON	Closed = dipswitch in down position = 1
OFF	Open = dipswitch in up position = 0

**Figure 5: BACnet Communication Module Physical Address Switch (S3) – Default Settings to ON (Closed)**



**NOTE:** The switches on the actual communication module are numbered: 8, 7, 6, 5, 4, 3, 2, 1 from left to right when the communication module is attached on the unit controller baseboard (as shown in Figure 1 and Figure 3). This assumes the unit controller has not been rotated inside of the control enclosure.

**Table 4: Address Switch Values When Switch is ON (Closed)**

Switch #	Value	Value When Switch is ON (Closed)
1	2 to the zero power	1
2	2 to the 1 <sup>st</sup> power	2
3	2 to the 2 <sup>nd</sup> power	4
4	2 to the 3 <sup>rd</sup> power	8
5	2 to the 4 <sup>th</sup> power	16
6	2 to the 5 <sup>th</sup> power	32
7	2 to the 6 <sup>th</sup> power	64
8	2 to the 7 <sup>th</sup> power	128

**Figure 6: BACnet Communication Module Address Switch (S3) - Example of a Manual Network Address Setting**



$$0 + 0 + 4 + 8 + 0 + 0 + 64 + 0 = 76 \text{ (Decimal)}$$

The S3 address switch specifies a numeric value in binary format. Numeric values are always read from the highest significant digit first. Switch #8 is the most significant bit (MSB), and Switch #1 is the least significant bit (LSB) of the binary address switch. The switch positions in the example below result in a numeric value of (MSB) 01001100 (LSB) in binary, and the equivalent of 4C in hexadecimal. This provides an address of 76 decimal. In this example, the S3 address switch is set to 76, so the Device Instance Number is assigned to 3101076 (AV412 = 3101000) and the Device Name is assigned to MTIIIUC\_FCU\_3101076.

**NOTE:** The switches on the actual communication module are numbered: 8, 7, 6, 5, 4, 3, 2, 1 from left to right when the communication module is attached on the unit controller baseboard (as shown in Figure 1 and Figure 3).

## Verifying the Network Address Using the Wink Command

The communication module implements a unit identification mode command to the unit controller by using the BACnet “ReinitializeDevice” request, with a Cold or Warm Start request handle, and a password of “wink” (all lower case). The “wink” unit identification function allows verification of an individual unit network address without opening the unit access panels. The Wink command can be used during all operating and non-operating (ex. Alarm) modes except for the following conditions:

- Invalid Equipment Configuration Alarm
- Emergency Shutdown Alarm
- Actuator Calibration Process

Upon receiving a wink command from a network management node, the unit controller exhibits the following identification sequence (all occur simultaneously):

- Room Sensor LED: flashes ON 3 seconds, then OFF 3 seconds for 15 total seconds, unless an alarm condition exists.
- Fan: the fan turns off for 5 seconds then on 5 seconds, then off again for 5 seconds.

## Restoring Default Values

It is necessary to restore the communication module default settings under the following conditions:

- When new application software was loaded into the communication module.
- When the commissioning process does not work as expected.

Follow these steps to set the communication module back to default configuration settings:

1. Confirm that the communication module S3 address switch is set to the desired value. Use values 0 to 127 for manual addressing, and 255 for auto-addressing.
2. Press and hold the S2 Default pushbutton. See Figure 1 for location.
3. While holding the S2 switch, press and release the S1 Reset pushbutton. The LEDs should flash once, turn off and turn on one after another. See Figure 1 for location.
4. Release the S2 Default pushbutton (once all four LEDs are ON steady) to restore the communication module to default values.

## Troubleshooting

If you can control the unit from the room sensor, but not able to communicate with the unit via the MS/TP network:

- Verify the Program Running LED (D1) is flickering.
- Verify the SPI Message Transfer LED (D2) is flickering.
- Verify the MS/TP Transmit LED (D3) is flickering.
- Verify the network (bus) wiring.
- Check the network communication parameters in the BACnet communication module for proper settings.
- Verify the logical MAC Address is unique, and in the valid range of 0 to 127 (Master).
- Verify the Device Instance Number is unique, and in the valid range of 1 to 4194302. See note below.
- Verify the Device Object Name is configured, and is unique in the network.
- Verify the MS/TP baud rate matches the network communication data rate.
- Verify the MS/TP Max Masters matches the network setting, and in the valid range of 1 to 127.

Additional information can be found in the MicroTech III Fan Coil Unit Controller Downloading Procedure and Troubleshooting Guide, OM 1095 ([www.DaikinApplied.com](http://www.DaikinApplied.com)).

**NOTE:** Device instance number must not be set to 300. Device Instance number of 300 is reserved for the unconfigured state. For additional assistance if necessary, contact the Controls Customer Support group at 866-462-7829.

## Aftermarket Services

To find your local parts office, visit [www.DaikinApplied.com](http://www.DaikinApplied.com) or call 800-37PARTS (800-377-2787).

Description	Part Number
<b>MicroTech III Fan Coil Unit BACnet field installation kit</b> Includes: communication module, four stand-offs, 3-pin network connector, three temperature sensors (EWT, DAT, RAT) and IM 1013	910167258
<b>MicroTech III Fan Coil Unit BACnet replacement communication module</b> Includes: communication module and IM 1013	910160616

## BACnet Configuration Menu

This section describes how to set BACnet parameters using the BACnet configuration menu. The BACnet configuration menu is accessed using Microsoft Windows® HyperTerminal® or PuTTY. It is assumed that the user is familiar with such an application. Certain parameters are also configured via the BACnet network (BAS). Parameters that can only be accessed using the BACnet configuration menu are noted below.

The parameters listed below require configuration in order for the communication module to properly integrate to the BACnet network.

### BACnet Device Properties

- Device Instance - must be set to a unique value on the BACnet network
- Device Name - must be set to a unique value on the BACnet network
- Location
- Units
- Description
- Unit Controller Configuration Settings – must be set using the BACnet configuration ([Unit Controller Configuration Settings](#)).

### BACnet MS/TP Settings

- MS/TP Baud Rate - must be set to match the speed of the BACnet network. Valid values are 9600, 19200, 38400, or 76800. The baud rate must be set using the BACnet configuration menu.
- MaxMasters - set to the highest address of MS/TP master on the network segment to reduce the MS/TP token traffic and increase response time of the unit controller. MaxMasters can be set from the BAS or from the BACnet configuration menu.
- MAC Address / Address Switch - must be set according to the BACnet network requirements. The MS/TP MAC address can be set from the building automation system or from the BACnet configuration menu only when the physical address switch (S3) is set to 255.

## Accessing the BACnet Configuration Menu

The BACnet configuration menu is accessed through the DB-9 serial connector on the communication module (see J1 in [Figure 2](#)). Any serial terminal device or application (such as Microsoft Windows HyperTerminal or PuTTY) can be used to view the menu and change the configuration parameters.

Follow these steps to connect to the BACnet configuration menu ([Figure 7](#) and [Figure 8](#)):

1. Verify that the terminal application communication settings are set to: 19200 bps, 8-data bits, 1-stop bit, no parity, and no flow control.
2. Use a null modem serial cross over cable to connect the computer to the communication module.
3. Once connected, press the 'Enter' key to display the menu shown in [Figure 7](#).
4. Change the terminal EIA-232 baud rate, if desired. The baud rate must be set first using the BACnet configuration menu, and then the terminal device or application.
5. Change the following parameters, if desired: Instance, Name, Location, Description, and Units. Press 'S' to save the BACnet configuration settings.
6. Verify "Flash write – success" is shown for configuration pages 1 and 2. Otherwise, save the settings again ([Figure 9](#)).
7. Change any unit or equipment configuration settings as necessary. See the Equipment Configuration Settings section in the MicroTech III Fan Coil Unit Controller Protocol Document, ED 15135 ([www.DaikinApplied.com](http://www.DaikinApplied.com)).

Figure 7: BACnet Configuration Menu

```

===== Configuration Menu =====
Daikin Applied - MTIIIUC_FCU
BACnet FW FC0 v1.1      UnitApp FC0 vUC-1.1 IO-1.0
===== SW PN 2506908 =====
DEVICE
1) Instance ..... 3101127
2) Name ..... MTIIIUC_FCU_3101127
3) Location .....
4) Description .....
5) Units ..... English
6) Config Settings ... 7A CC 03 00

MS/TP
7) Baudrate ..... 38400
8) MaxMasters ..... 127
M) MAC Address ..... 127

TERMINAL
9) EIA-232 Baudrate ... 19200

B) Backup or R) Restore Configuration
S) Save Settings
-----
Enter Selection:
    
```

Figure 8: Terminal Emulator Serial Port Configuration

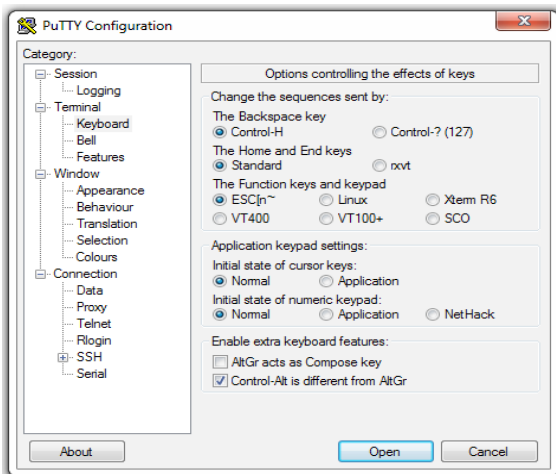
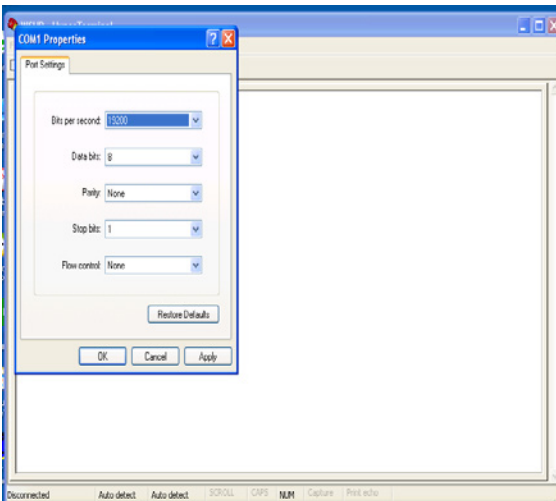


Figure 9: Verifying BACnet Configuration Saved Properly

Saving Configuration Page 1:  
StartAdr 0x13FC00, Size 0x40  
(64) Flash Write-SUCCESS

Saving Configuration Page 2:  
StartAdr 0x13FD00, Size 0x40  
(64) Flash Write-SUCCESS

## Unit Controller Configuration Settings

**CAUTION**

Before modifying the Unit Controller Equipment Configuration settings, please consult with the Controls Customer Support group at 866-462-7829.

**NOTE:** The fan coil equipment configuration settings must be set using the BACnet configuration menu, and are not writable through the BACnet building automation system. Four bytes of configuration data is entered using hexadecimal pairs. See ED 15135 ([www.DaikinApplied.com](http://www.DaikinApplied.com)) for additional equipment configuration settings information and bit level encoding of the options.

Follow these steps to set the Unit Controller Equipment Configuration:

1. Press the '6' key to be prompted for the equipment configuration settings.
2. Enter three hexadecimal pairs as determined by the desired equipment configuration options, and always set the fourth byte pair to "80" and then press Enter to set the values in the unit controller.
3. Press Enter again to display the BACnet configuration menu.
4. Verify the first three bytes have transmitted back correctly from the communication module in the "Config Settings" message display. The fourth byte is automatically cleared to zero.
5. Wait ten seconds to allow the unit controller to receive the new configuration settings and write the values to the serial EEPROM integrated circuit.
6. Restart the unit controller.
7. Verify that new equipment configuration options are being used by viewing the "Config Settings" diagnostic message.
8. Verify that "Invalid Equipment Configuration" alarm is not announced by the unit controller as indicated on the room sensor LED or building automation system.





### ***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](http://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](http://www.DaikinApplied.com).

### ***Aftermarket Services***

To find your local parts office, visit [www.DaikinApplied.com](http://www.DaikinApplied.com) or call 800-37PARTS (800-377-2787). To find your local service office, visit [www.DaikinApplied.com](http://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](http://www.DaikinApplied.com).

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