

Group: Controls

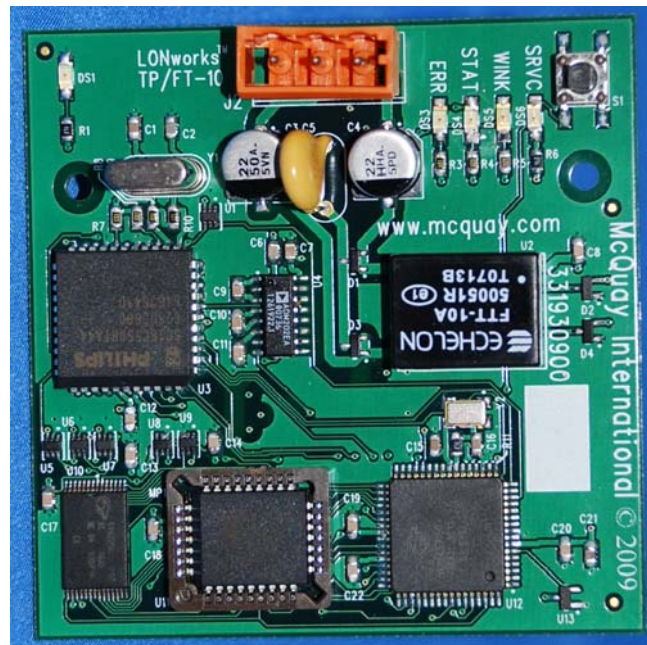
Part Number: IM 965

Date: July 2010

Supercedes: IM 965

Magnitude™ Chiller Unit Controller LONWORKS® Communication Module

Daikin McQuay Magnitude Frictionless Centrifugal Chiller, Single-Compressor Model WME



NOTICE

Use this manual to physically connect the communication module to the Daikin McQuay Magnitude Chiller unit controller and connect the unit controller to your network. Connections and service to unit controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled. 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, 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. Magnitude Chiller integration literature is available from your local McQuay International sales representative and www.mcquay.com.

Table of Contents

Table of Contents	2
Figures	2
Revision History	3
Reference Documents	3
Limited Warranty	3
Trademark Notices	3
General Information	4
Hazard Identification Messages	4
Description	5
Application	5
Component Data	5
Service Pin	6
Light Emitting Diodes (LEDs).....	6
LONWORKS Network Connector	6
Neuron ID	7
Transceiver.....	7
LONMARK Profile Software	7
Specifications	7
Installation	8
Contents of the LONWORKS Communication Module Kit.....	8
Installing a new LONWORKS Communication Module.....	8
Replacing an Existing LONWORKS Communication Module	9
Integration	10
Connecting to the Network	10
Addressing and Establishing Communications.....	10
LONWORKS Network Addressing	10
Commissioning the Network	10
External Interface File (XIF) and NXE Files	10
Resource Files	11
Configuring the LONWORKS Communication Module.....	11
Service Information	13
Test Procedures	13
Parts List	13

Figures

Figure 1.LONWORKS Communication Module Attached to the Magnitude Chiller I/O Backplane	5
Figure 2, LONWORKS Communication Module Major Components	6
Figure 3. OITS Display of Network Parameters – BAS1	12

Revision History

IM 965	April 2010	Preliminary release.
IM 965-1	July 2010	Updated kit part number in Parts List.

Reference Documents

Number	Company	Title	Source
078-0120-01G	LONMARK® Interoperability Association	LONMARK Layers 1-6 Interoperability Guidelines, Version 3.4	www.lonmark.org
078-0120-01G	LONMARK Interoperability Association	LONMARK Application Layer Interoperability Guidelines, Version 3.4	www.lonmark.org
078-0156-01G	Echelon® Corporation	LONWORKS® FTT-10A Free Topology Transceiver Users Guide	www.echelon.com
8040_10	LONMARK Interoperability Association	Chiller Profile	www.lonmark.org
OM 1034	McQuay International	Daikin McQuay Magnitude™ Frictionless Centrifugal Chiller Operation and Maintenance Manual	www.mcquay.com
ED 15117	McQuay International	Daikin McQuay Magnitude Chiller Unit Controller Protocol Information, BACnet® and LONWORKS	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.

Trademark Notices

Copyright © 2010 McQuay International, Minneapolis MN. All rights reserved throughout the world.

McQuay International reserves the right to change any information contained herein without prior notice. The user is responsible for determining whether this software is appropriate for his or her application.

®™ The following are trademarks or registered trademarks of their respective companies. LONWORKS, LONMARK, LonTalk, and Neuron from Echelon Corporation; Windows from Microsoft Corporation; Daikin McQuay, McQuay and Magnitude from McQuay International. LONMARK and the LONMARK logo are managed, granted, and used by LONMARK International under a license granted by Echelon Corporation.

General Information

This manual contains the information you need to install a LONWORKS Communication Module to the Daikin McQuay Magnitude™ Chiller Unit Controller and integrate it into the network.

Hazard Identification Messages

DANGER

Dangers indicate a hazardous situation which will result in death or serious injury if not avoided.

WARNING

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

CAUTION

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

WARNING

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

This equipment must be properly grounded. Connections and service to the Magnitude Chiller Unit Controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

CAUTION

Static sensitive components. Can cause equipment damage.

Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

NOTICE

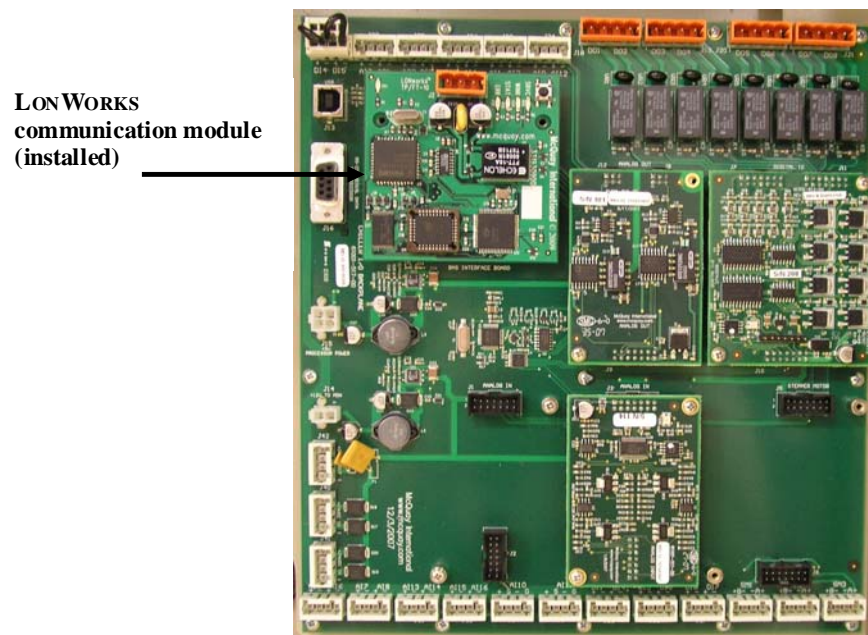
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense. **McQuay International disclaims any liability resulting from any interference or for the correction thereof.**

Description

A LONWORKS Communication Module provides the interface between the Daikin McQuay Magnitude® Chiller Unit Controller and a LONWORKS Local Operating Network (LON). It translates the LonTalk® variables used on the network to the variables used in the unit controller and vice versa. The firmware loaded on the LONWORKS Communication Module conforms to the LONMARK® Chiller Functional Profile and is LONMARK 3.4 certified.

The LONWORKS Communication Module is a printed circuit board attached to the upper left section of the Magnitude Chiller Unit Controller main circuit board (see Figure 1). This area is labeled “BAS Interface Board.” The main unit controller circuit board itself is labeled “Chiller I/O Backplane” and will be referred to as such for the remainder of this document.

Figure 1. LONWORKS Communication Module Attached to the Magnitude Chiller I/O Backplane



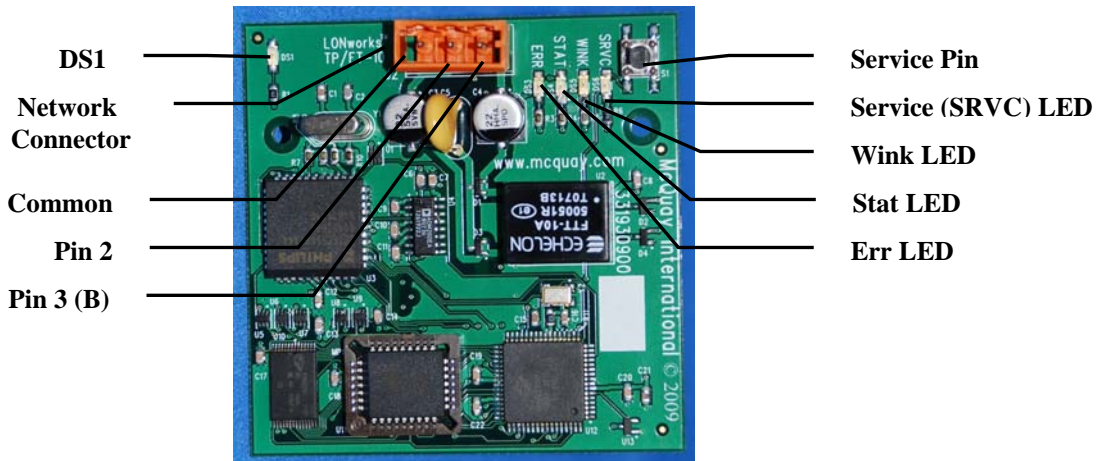
Application

A LONWORKS Communication Module connects the Magnitude Chiller Unit Controller to the building automation system (BAS) on a LONWORKS network. It is the interface adapter for the exchange of LonTalk variables between the network and the unit controller. The LONWORKS Communication Module translates the LonTalk variables of the profile into the native information of the unit controller. Refer to the Magnitude Chiller Operation Manual, OM 1034, for user interface details. For a complete list of available LONWORKS variables, refer to the Magnitude Chiller Unit Controller Protocol Document, ED15117 (all literature available on www.mcquay.com).

Component Data

The following section describes the important features of the LONWORKS Communication Module. Figure 2 shows the location of these components, which include the five LEDs, service pin, and network connection.

Figure 2, LONWORKS Communication Module Major Components



Service Pin

The service pin generates a service pin message that contains the Neuron[®] ID and the program code identification of the node. A service pin message is a network message that is generated by a node and broadcast on the network. It can be used to commission the LONWORKS network. The service pin button is located at the upper right hand corner of the communication module (see Figure 2).

Light Emitting Diodes (LEDs)

Five LEDs indicate communication activity and status of the LONWORKS Communication Module. These indicators are visible when the communication module is connected to the Magnitude Chiller I/O Backplane and the unit is powered on. See Figure 2 for LED locations and Table 1 for a description of LED activity.

Table 1. Description of LED Activity

LED	Color	Meaning
ERR	Red	The LONWORKS communication module is not receiving data from the unit controller.
STAT	Orange	The LONWORKS communication module is transmitting data to the unit controller.
WINK	Green	Blinks approximately every 5 seconds to report that the Neuron chip is alive and configured.
SRVC	Green	<ul style="list-style-type: none"> Blinks On & Off at 1/2Hz rate= This is normal behavior for an unconfigured device. Off = Configured Flashes at power-up, goes Off, then comes On solid= This is normal behavior for a device with no application.
DS1	Green	Power LED (supplied by the unit controller). This LED is always lit when power is detected.

LONWORKS Network Connector

The network connector connects the LONWORKS Communication Module to the LONWORKS FTT-10A bus and is comprised of three pins. See below for a description of each pin.

Pin	Function
1	Common (isolated from host controller)
2	A
3	B

16-Pin Header

The 16-pin header connects the unit controller to the LONWORKS Communication Module. The pin is located on the back side of the communication module.

Neuron ID

The basis of the LONWORKS Communication Module is an Echelon Neuron integrated circuit. Each Neuron chip contains a globally (i.e., worldwide) unique, 48-bit serial number called the Neuron ID. The Neuron ID can be used to address the device on the LONWORKS network.

Transceiver

The Echelon Corporation Free Topology Transceiver (FTT-10A) is used to communicate on the LONWORKS network. The network topology may consist of a star, daisy-chain, or other topology. Data transmission rate on the network is 78 kbps (baud). The transceiver allows for free topology network wiring schemes using twisted pair cable. Refer to www.echelon.com for additional details.

LONMARK Profile Software

The LONWORKS Communication Module software translates the Standard Network Variable Types (SNVTs) and Standard Network Configuration Parameter Types (SCPTs) to support the LONMARK guidelines. The Magnitude Chiller Unit Controller is LONMARK 3.4 certified in accordance with the LONMARK chiller profile. The corresponding LONWORKS Communication Module eXternal Interface File (XIF) for the Magnitude Chiller Unit Controller is available on www.mcquay.com or www.lonmark.org.

Specifications

Table 2 identifies the network specifications required for use with the LONWORKS Communication Module.

Table 2. LONWORKS Network Specifications

Characteristic	Description
Network Topology	Flexible Free Topology
Neuron Chip Processor	3150
Free Topology Transceiver (FTT-10A)	50051
Cable Types	TIA Category 5 (recommended)
Maximum Bus Length	1476 ft (450) meters per segment
Maximum Node Separation	820 ft (250 meters)
Data Transmission	Two-wire, half duplex
Data Transmission Rate	78 kbps (baud)

Installation

The following section describes how to field install a new LONWORKS Communication Module or replace an existing LONWORKS Communication Module on the Magnitude Chiller I/O backplane (i.e. unit controller main circuit board) that it can be incorporated into the LONWORKS network. The LONWORKS Communication Module can be factory or field installed. See Parts List section for replacement part numbers.

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 in your body.

Contents of the LONWORKS Communication Module Kit

The following is the list of items included in the field-installed kit:

- The LONWORKS Communication Module
- Two screws
- Network connector (attached to communication module)
- IM 965

Installing a new LONWORKS Communication Module

Follow these steps to install a new LONWORKS Communication Module on the Magnitude Chiller I/O backplane.

CAUTION

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.

1. Remove power from the Magnitude Chiller Unit Controller.
2. Connect the LONWORKS Communication Module to the upper left corner of the chiller I/O backplane, in the area labeled BAS Interface Board (see Figure 1). Carefully align the holes on the communication module with the two standoffs attached to the chiller I/O backplane.

CAUTION

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

Powering up the controller with the communication module installed upside down can cause damage to the communication module.

3. Using the screws that came with the communication module kit, attached the communication module to the standoffs located on the chiller I/O backplane.
4. Connect the LONWORKS Communication Module to the network (see Figure 2 for locations of network connection).
5. Apply power to the Magnitude Chiller Unit Controller.

Replacing an Existing LONWORKS Communication Module

Follow these steps to remove an existing LONWORKS Communication Module from the chiller I/O backplane and replace it with a new LONWORKS Communication Module.

WARNING

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

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

1. Remove power from the Magnitude Chiller Unit Controller.
2. Locate the LONWORKS Communication Module. It is situated at the upper left corner of the chiller I/O backplane (see Figure 1).
3. Remove the network cable connector from the LONWORKS Communication Module.
4. Remove the two screws holding the LONWORKS Communication Module in place.
5. Grasp the LONWORKS Communication Module and carefully pull it from the chiller I/O backplane.
6. Install the new LONWORKS Communication Module (see Steps 1-3 from previous section).
7. Re-attach the two screws to secure the communication module to the chiller I/O backplane.
8. Insert the network cable connector into the LONWORKS Communication Module.
9. Apply power to the Magnitude Chiller Unit Controller.

Integration

Once the LONWORKS Communication Module has been properly installed on the Magnitude Chiller Unit Controller, it is then necessary to configure the unit controller for integration into a Building Automation System (BAS) via the LONWORKS network. The configuration process is described in the following section.

Note: This document assumes that the user is familiar with common LONWORKS terminology, networking requirements, and software tools required for commissioning and configuring LONWORKS devices.

Connecting to the Network

Once the LONWORKS Communication Module has been connected to the Magnitude chiller I/O backplane, you must connect it into the LONWORKS network. Each LONWORKS Communication Module is equipped with an FTT-10A transceiver for network communications. This transceiver allows for (1) free topology network wiring schemes using twisted pair (unshielded) cable and (2) polarity insensitive connections at each node. Free topology segments require termination for proper transmission performance.

Refer to Echelon LONWORKS FTT-10A Transceiver User's Guide for details regarding acceptable configurations, cabling requirements, terminations, and other requirements for proper connection of the unit to the LONWORKS network.

Addressing and Establishing Communications

LONWORKS Network Addressing

Every Neuron Chip has a unique 48-bit Neuron ID or physical address. This address is generally used only at initial installation or for diagnostic purposes. For normal network operation, a device address is used. Device addresses are defined at the time of network configuration. All device addresses have three parts. The first part is the Domain ID, designating the domain. Devices must be in the same domain in order to communicate with each other. The second part is the Subnet ID that specifies a collection of up to 127 devices that are on a single channel or a set of channels connected by repeaters. There may be up to 255 subnets in a domain. The third part is the Node ID that identifies an individual device within the subnet.

A group is a logical collection of devices within a domain. Groups are assembled with regard for their physical location in the domain. There may be up to 256 groups in a domain. A group address is the address that identifies all devices of the group. There may be any number of devices in a group when unacknowledged messaging is used. Groups are limited to 64 devices if acknowledged messaging is used. A broadcast address identifies all devices within a subnet or domain.

Commissioning the Network

- To commission the LONWORKS Communication Module, press the service pin (see Figure 2). Doing so generates a service-pin message, which is broadcast on the network and contains the Neuron ID and the program code identification of the node.
- Next, use a LONWORKS network configuration tool, such as LonMaker[®], to map the device Neuron ID to the domain/subnet/node logical addressing scheme when it creates the network image, the logical network addresses and connection information.

External Interface File (XIF) and NXE Files

The LONWORKS Communication Module is self-documenting so that any LONWORKS network management tool can obtain all the information needed over the network to connect it into the system and to configure and manage it.

An external interface file (a specially formatted PC text file with the extension .XIF) is required, along with LONWORKS network management tool such as LonMaker, so that you can design and configure the device prior to installation.

The NXE is the executable file required for configuring the device. The LONWORKS Communication Module is based on the Chiller functional profile.

The XIF and NXE files are available at www.mcquay.com or www.lonmark.org. Refer to ED 15117, Magnitude Chiller Unit Controller Protocol Information, for additional details.

Resource Files

The Magnitude Chiller Unit Controller supports variables defined by the LONMARK Chiller functional profile as well as McQuay proprietary variables. The variable itself may not be a standard component of the profile, but the unit controller implements it and it is available to the network. The Resource Files define the format of how these McQuay-specific variables are displayed when using a tool such as Echelon® LonMaker® software. Refer to ED 15117 to determine if the variable is supported by the standard LONMARK Chiller functional profile or is a proprietary variable. ED 15117 includes a Profile description that indicates “Chiller” for standard network variables or “McQuayChiller” for proprietary variables. The Resource Files are available on www.mcquay.com or www.lonmark.org.

Configuring the LONWORKS Communication Module

The LONWORKS Communication Module is configured according to the LONMARK Chiller functional profile. The Magnitude Chiller Unit Controller must be configured for use with the LONWORKS Communication Module before communication from the unit controller to the network is established. Refer to ED 15117 for descriptions of the available LONWORKS variables. Follow the steps below to configure the unit controller protocol for a LONWORKS network.

Note: Refer to the Magnitude Chiller Operation and Maintenance Manual (OM 1034) for details regarding accessing and using the unit controller OITS display.

1. Open the Magnitude chiller unit controller OITS display screen.
2. Click on the SET button, located at the bottom of the screen.
3. Click on the BAS button from the top of the column on the right-hand side of the screen.
4. Click on the 1 button, located to the right of the BAS Network Protocol field. The BAS Network Protocol field should now be highlighted (see Figure 3).
5. Click on the Change button.
6. If prompted, enter the password 100 and press Enter. Otherwise, proceed to step 7.
7. Click on the Change button.
8. Select LONWORKS from the drop-down menu.
9. Click on the Enter button.
10. Click on the BAS button.
11. Cycle power to the unit controller.

Figure 3. OITS Display of Network Parameters – BAS1

Unit Status Chiller A
 COOL OFF - Manual Switch
 Compressor Status
 #1 OFF - Compressor Alarm

SETPOINTS °F - PSI

		BAS1		
			17	
			16	
			15	BAS
	BACnet IP-Foreign Device Time	0	14	
	BACnet IP - BBMD IP Address	0.0.0.0	13	ALARMS
	BACnet IP - Default Gateway	172.15.5.1	12	
	BACnet IP - UDP Port	47808	11	VALVE
	BACnet IP - Subnet Mask	255.255.255.0	10	
	BACnet IP - Network Address	172.15.5.8	9	TOWER
	BACnet (all) - UTC Offset	0	8	
	BACnet (all) - Daylight Savings	0	7	POWER
	BACnet (all) - APDU Retries	3	6	
	BACnet (all) - APDU Timeout	3000	5	STAGING
	BACnet (all) - Description		4	
	BACnet (all) - Object Name	Magnitude	3	UNIT
	BACnet (all) - Device Instance	3000	2	
	BACnet (all) - English / Metric	ENGLISH	1	WATER
	BAS Network Protocol	None		

Service Information

Test Procedures

If you are unable to communicate to the LONWORKS Communication Module via the network:

- Check the network wiring.
- Check addressing.
 - Activate the Service Pin on the LONWORKS Communication Module to send the service message to the network.
 - The service-pin message contains the Neuron ID and the program code identification of the node.

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

Parts List

Description	Part Number
LONWORKS Communication Module Kit. Kit includes communication module, network connector, screws, and Installation Manual.	332356902

This document contains the most current product information as of this printing. For the most current product information, please go to www.mcquay.com. All McQuay equipment is sold pursuant to McQuay's Standard Terms and Conditions of Sales and Limited Warranty



a member of **DAIKIN** group
www.mcquay.com • (800) 432-1342