

Group: Controls

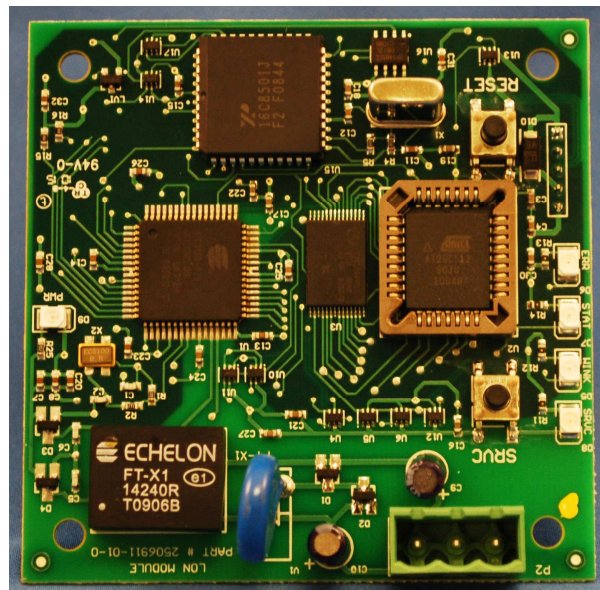
Part Number: IM 999

Date: June 2011

Supersedes: IM 999

## Maverick I™ Commercial Packaged Rooftop Systems LONWORKS® Communication Module

LONWORKS SCC (Space Comfort Control) Profile



### NOTICE

Use this manual to physically connect the communication module to the Daikin Maverick I 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 Daikin 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. Maverick I integration literature is available from your local Daikin International sales representative and [www.DaikinApplied.com](http://www.DaikinApplied.com).

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## Revision History

IM 999	April 2010	Preliminary release.
IM 999-1	June 2011	Corrected communication module kit number in Parts List.

## Reference Documents

Number	Company	Title	Source
078-0014-01E	LONMARK Interoperability Association	LONMARK Layers 1-6 Interoperability Guidelines, Version 3.4	www.lonmark.org
078-0120-01E	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
8500_20	LONMARK Interoperability Association	Space Comfort Controller Functional Profile	www.lonmark.org
OM 1047	Daikin	Unit Controller Operation Manual –Maverick I Commercial Rooftop Systems	www.DaikinApplied.com
ED 15125	Daikin	Maverick I Unit Controller Protocol Information, BACnet and LONWORKS Networks	www.DaikinApplied.com

## Limited Warranty

Consult your local Daikin Representative for warranty details. Refer to Form 933-43285Y. To find your local Daikin Representative, go to [www.DaikinApplied.com](http://www.DaikinApplied.com).

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# General Information

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This manual contains the information you need to install a LONWORKS Communication Module to the Maverick I™ Rooftop 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 Maverick I Rooftop 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

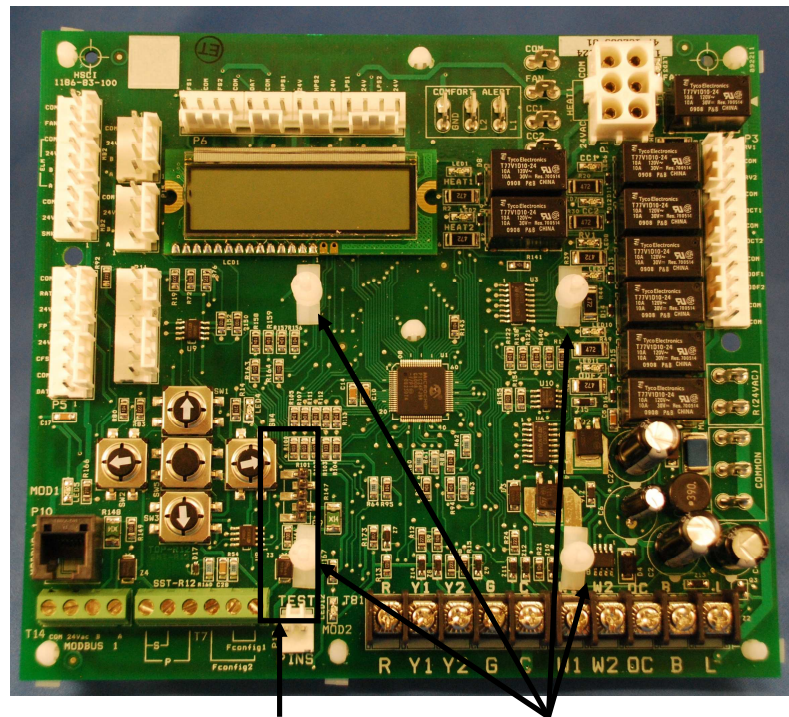
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of 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. **Daikin disclaims any liability resulting from any interference or for the correction thereof.**

## Description

A LONWORKS Communication Module provides the interface between a Daikin Maverick I Rooftop 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. It translates in accordance with the LONMARK Functional Profile and is LonMark 3.4 certified. Profiles are interpreted in loaded programs (firmware).

The LONWORKS Communication Module is a printed circuit board that mounts directly on five pins on the top side of the Maverick I Rooftop Unit Controller (see Figure 1).

*Figure 1. Maverick I Unit Controller*



**Five-pin header**

**Four supporting stand-offs**

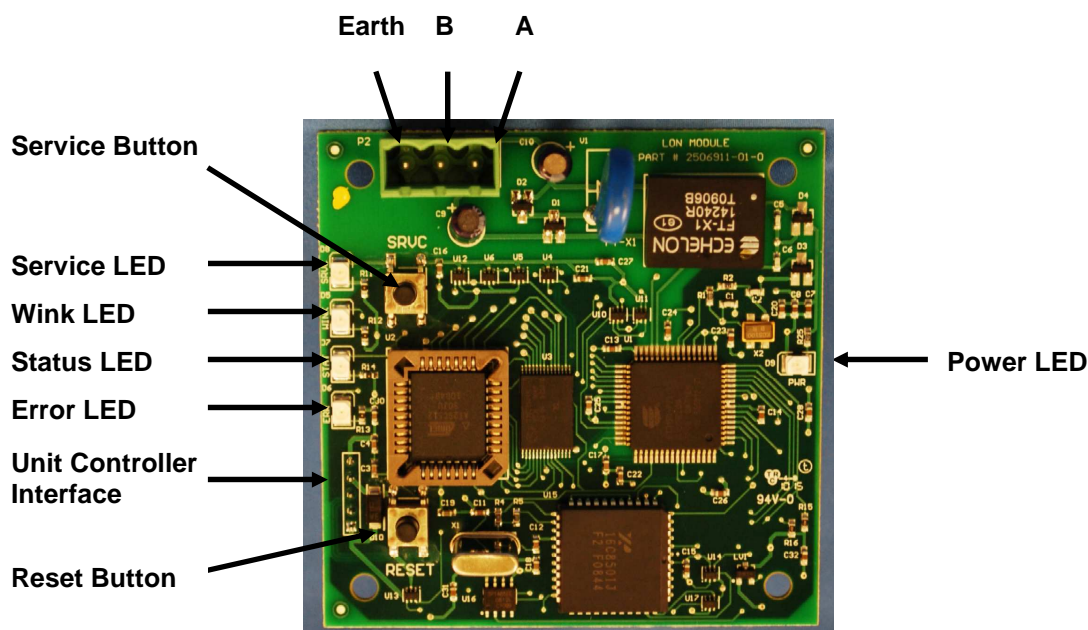
## Application

A LONWORKS Communication Module connects the Maverick I Rooftop 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 Space Comfort Control (SCC) profile into the native information of the unit controller.

## Component Data

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

Figure 2. LONWORKS Communication Module Major Components (Top View)



## Service Button

The service button generates a service-pin message that contains the Neuron<sup>®</sup> 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 (see Figure 2).

## Reset Button

Use the Reset button is to reset the LONWORKS communication module application. Press the Reset button to revert all Network Variable (NV) parameters back to default values. Configuration variables do not change. See the Maverick I Protocol Document, ED 15125 for a complete list of all network parameters.

The Reset button can also be used to clear network addressing parameters from a LONWORKS communication module. For example, a module that has been previously installed on a network, and is then installed on a new network, can interfere with communications if the original LONWORKS communication module has the same Subnet ID and/or Node Address as another module on the new network. To clear the network addressing data from the original module, press the Reset button and then immediately press and hold the Service Pin button for five seconds. When the Subnet ID and Node Address have been cleared, the green Service LED will flash on and off every two seconds.

## Unit Controller Interface

A 5-pin header provides the physical connection port from the LONWORKS Communication Module to the Maverick I Unit Controller. The unit controller interface on the LONWORKS Communication Module plugs into the matching 5-pin header on the Maverick I Unit Controller. Figure 2 shows the top (or front) side view of the communication module. Note that the actual connection port from the communication module to the unit controller is on the bottom (or back) side of the image shown.

## Light Emitting Diodes (LEDs)

Five LEDs indicate communication activity and status of the LONWORKS Communication Module. These indicators can be seen when the LONWORKS Communication Module is connected to the Maverick I Rooftop Unit Controller (see Table 1).

*Table 1. LED Activity Details*

LED Label	LED Color	Meaning
SRVC	Yellow	This LED flashes approximately once a second when device is not commissioned. This LED activates when the Service pin is pressed. Otherwise, this LED is off when the device is commissioned but the Service pin has not been pressed.
WINK	Green	Winking is used to identify control on the network. The Wink LED will flash 2 times/second for 5 seconds when control is winking. When not winking, the WINK LED flashes off for 0.1 second every five seconds. This indicates that the application is functioning properly.
STAT	Green	The Status LED flashes when the unit controller transmits a request. When communicating properly with the unit controller, it flashes 6 times/second or faster. If communication between the unit controller and communication module is not responding properly, it flashes slower (approximately once per second) and the error LED will flash.
ERR	Red	The Error LED flashes when there is a mis-communication between the unit controller and communication module.
PWR	Green	The LED remains steady on when power is applied to the communication module.

## LONWORKS Network Connector

The network connector connects the LONWORKS Communication Module to the LONWORKS FTT-10A bus (see Table 2).

*Table 2. Network Connector Pin Descriptions*

Pin	Function
A	Twisted Pair Network Signal
B	Twisted Pair Network Signal
Earth	Earth Ground

## LonMark Profile Software

The LONWORKS Communication Module software translates the Standard Network Variable Types (SNVTs) and Standard Network Configuration Parameter Types (SCPTs) in accordance with the LONMARK profiles used on the LONWORKS network into the variables and parameters used in the Maverick I Rooftop Unit Controller.

## 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 Echelon® Corporation's LONWORKS FTT-10A Free Topology Transceiver Users Guide for additional details.

# Specifications

Table 3 identifies the network specifications required for use with the LONWORKS Communication Module.

Table 3. 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

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The following section describes how to field install a new LONWORKS Communication Module or replace an existing LONWORKS Communication Module on the Maverick I Rooftop Unit Controller so that it can be incorporated into the LONWORKS network. The LONWORKS Communication Module is available for field installation only (see Parts List for ordering information).

## CAUTION

**Electrostatic discharge hazard.**

**Can cause equipment damage.**

This equipment contains sensitive electronic components that may be damaged by electrostatic discharge from your hands. Before you handle a communications module, you need to touch a grounded object, such as the metal enclosure, in order to discharge the electrostatic potential in your body.

## Contents of the LONWORKS Communication Module Kit

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

- The LONWORKS Communication Module
- Four plastic stand-offs
- 3-pin network connector
- IM 999

## Installing 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 Maverick I Rooftop Unit Controller.

Follow these steps to install a new LONWORKS Communication Module Maverick I Rooftop Unit Controller:

1. Remove power from the unit controller.
2. Connect the LONWORKS Communication Module to the unit controller. The unit controller interface on the LONWORKS Communication Module plugs directly into the 5-pin header on the unit controller (see Figures 1 and 2).
3. Further secure the LONWORKS Communication Module to the four plastic support stand offs (see Figure 1).
4. Connect the LONWORKS Communication Module to the network (see Figure 2 and 3).
  - a. Connect one wire of the network cable to the A Pin of the connector plug.
  - b. Connect the other wire to the B Pin of the connector plug.
5. Apply power to the unit controller.

# Replacing an Existing LONWORKS Communication Module

## **⚠ WARNING**

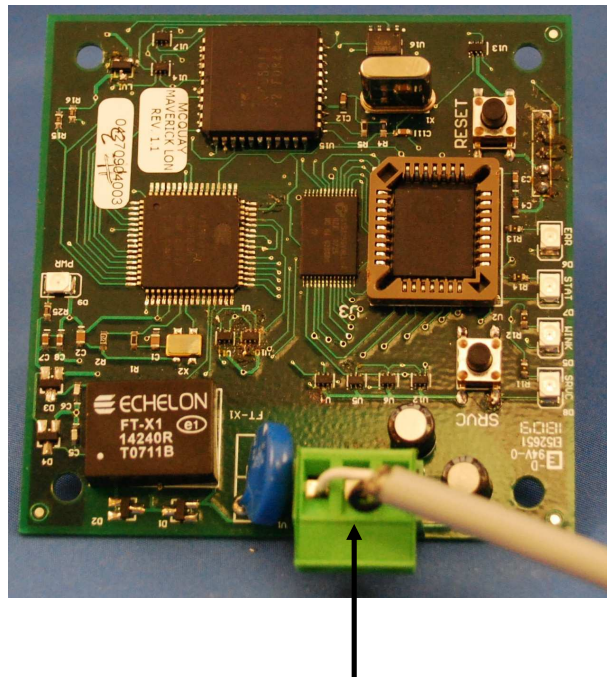
**Electric shock hazard. Can cause personal injury or equipment damage.**

This equipment must be properly grounded. Only personnel knowledgeable in the operation of the equipment being controlled must perform connections and service to the Maverick I Rooftop Unit Controller.

Follow these steps to remove an existing LONWORKS Communication Module from the unit controller and replace it with a new LONWORKS Communication Module:

1. Remove power from the unit controller.
2. Pull the network cable connector from the LONWORKS Communication Module.
3. Grasp the LONWORKS Communication Module and carefully pull it from unit controller. It may be necessary to also remove the plastic stand-offs if they have been installed (see Figure 1 and 2).
4. Connect the LONWORKS Communication Module to the unit controller. The unit controller interface on the LONWORKS Communication Module plugs directly into the 5-pin header on the unit controller (see Figures 1 and 2).
5. Further secure the LONWORKS Communication Module to the four plastic support stand offs (see Figure 1).
6. Connect the LONWORKS Communication Module to the network (see Figure 2 and 3).
  - c. Connect one wire of the network cable to the A Pin of the connector plug.
  - d. Connect the other wire to the B Pin of the connector plug.
7. Apply power to the unit controller.

*Figure 3. LONWORKS Communication Module Network Connection*



**Network Connection (shown with 3-pin connector inserted)**

# Integration

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Once the LONWORKS Communication Module has been properly installed on Maverick I 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.

## Connecting to the Network

After you have connected the LONWORKS Communication Module to the Maverick I Rooftop Unit Controller, 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 device (i.e. LONWORKS Communication Module), press the service pin (see Figure 3). 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.
- Refer to the Maverick I Protocol Document, ED 15125 for the complete list of LONWORKS variables.

### External Interface File (XIF) and NXE Files

LonMark guidelines specify exact documentation rules so that proprietary configuration tools are not required to commission and configure LONWORKS devices. The LONWORKS Communication Module is self-documenting so that any network management tool can obtain most of 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 an extension .XIF) is also available so that any network tool can design and configure it prior to installation. The NXE file contains the application image that is downloaded into the LONWORKS Communication Module. The corresponding XIF and NXE files are available at [www.DaikinApplied.com](http://www.DaikinApplied.com) or [www.lonmark.org](http://www.lonmark.org).

## Resource Files

Resource Files provide definitions of functional profiles, type definitions, enumerations, and formats that can be used by a LONWORKS network configuration tool. The Maverick I Rooftop Unit Controller supports the standard SCC functional profile. Additionally, certain Daikin-specific variables are used with the Maverick I Rooftop Unit Controller. The Resource Files define the format of how these Daikin-specific variables are displayed when using a LONWORKS network configuration tool. The Maverick I Resource Files are available on [www.DaikinApplied.com](http://www.DaikinApplied.com).

## Configuring the LONWORKS Communication Module

The LONWORKS Communication Module typically does not require configuration. The unit ships ready to operate with default values which can then be changed via the network. Refer to the Maverick I Protocol Document, ED 15125 for descriptions of the available LONWORKS variables.

## Resetting/Clearing the LONWORKS Communication Module

It is possible to reset or clear network parameters values from the LONWORKS communication module.

Use the Reset button to reset the LONWORKS communication module application. Press the Reset button to revert all Network Variable (NV) parameters back to default values. Configuration variables do not change.

The Reset button can also be used to clear network addressing parameters from a LONWORKS communication module. For example, a module that has been previously installed on a network, and is then installed on a new network, can interfere with communications if the original LONWORKS communication module has the same Subnet ID and/or Node Address as another module on the new network. To clear the network addressing data from the original module, press the Reset button and then immediately press and hold the Service Pin button for five seconds. When the Subnet ID and Node Address have been cleared, the green Service LED will flash on and off every two seconds.

# Service Information

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## 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 Daikin Controls Customer Support group at 866-462-7829 for additional assistance if necessary.

## Parts List

### Kit

Description	Part Number
Maverick I LONWORKS Communication Module Kit. Kit includes communication module, 4 plastic stand-offs, 3-pin network connector and Installation Manual 999.	910108214

This document contains the most current product information as of this printing. For the most current product information, please go to [www.DaikinApplied.com](http://www.DaikinApplied.com). All Daikin equipment is sold pursuant to Daikin's Standard Terms and Conditions of Sales and Limited Warranty.

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