

## LTM-10A Flash Control Module and Motherboard Models 65100-200, 65100R-200, 65120, and 65120R



### Description

The LTM-10A Flash Control Module provides a simple, cost-effective method of adding LONWORKS® technology to any control system. The module consists of a miniature circuit card containing a Neuron® 3150® Chip, re-programmable 64Kbyte flash memory, 32Kbyte RAM, 10MHz crystal oscillator, and connectors for power, application I/O or host interface, and a transceiver.

The LTM-10A module includes standard Neuron Chip firmware with extensions for automatic configuration of transceiver parameters, output of a packet transmitted signal, manual device recovery, and a Microprocessor Interface Program (MIP) that can be used to convert the LTM-10A to a LONWORKS network interface.

Models 65100R-200 and 65120R are compliant with the European Directive 2002/95/EC on the restriction of the use of certain hazardous substances (RoHS) in electrical and electronic equipment.

The LTM-10A firmware comes pre-configured with many common LONWORKS transceiver parameters. Five transceiver identification (ID) pins on the LTM-10A module select the appropriate transceiver type.

The packet send output uses an additional output pin provided by the LTM-10A hardware to provide an indication of LTM-10A network activity. This output is asserted low for approximately 40ms when a packet is sent from the network processor to the MAC processor on the LTM-10A module's Neuron Chip.

Logic on the LTM-10A module provides two additional bit outputs. One of these outputs is used as a packet send indicator by the LTM-10A firmware; the other can be used either as a

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- ▼ 64Kbyte flash memory provides non-volatile application memory that can be reprogrammed in the field
  - ▼ 32Kbyte RAM provides protocol buffer space for applications that receive large bursts of network traffic
  - ▼ Four memory maps allow the developer to maximize flash or RAM space, or to use RAM for debugging applications
  - ▼ Built-in Microprocessor Interface Program (MIP)
  - ▼ 10MHz input clock
  - ▼ Modular connectors allow modules to be exchanged without soldering
  - ▼ Supports most standard LONWORKS transceivers
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general purpose bit output or as an up-link data interrupt request when using the LTM-10A MIP.

The manual device recovery feature provides a means to recover a device that has been loaded with a defective application that renders it inoperable. The manual device recovery features allows such a device to be recovered by activating the service input prior to activating the reset input, then continuing to activate the service input after releasing the reset input. After approximately 10 seconds, the device will become application-less, allowing a network management tool to reload a new application.

The re-programmable flash memory makes the LTM-10A module ideal for controlling devices that may be upgraded or modified after installation, e.g., complex sensors, motor controllers, or user interfaces.

The integral MIP firmware allows the module to be used as an applications processor or as a network interface for another host processor. Any host with memory-mapped I/O or an 8-bit parallel data bus with 3 control lines and an optional up-link interrupt may be used. The MIP allows the host to receive asynchronous updates from up to 4096 network variable connections, each consisting of an unlimited number of network variables; as with any node, there are no limitations on the number of network variables that can be written or polled. The optional up-link interrupt eliminates the need for polling by the host for incoming data and thereby reduces delays.

Specifications for the network driver are included in the *Microprocessor Interface Program (MIP) User's Guide*.

A sample host application and source code for a network driver for DOS (or the basis for a network driver for any host) is available on Echelon's Web site at [www.echelon.com/downloads](http://www.echelon.com/downloads).

The LTM-10A module form factor is a superset of the 55000 series of LONWORKS control modules. This simplifies the use of control modules with integrated transceivers when the LTM-10A module's features are not required.

The LTM-10 motherboard allows a designer to rapidly develop a LONWORKS device. The motherboard accepts an LTM-10A module and any LONWORKS SMX™ transceiver. The LTM-10 motherboard also provides a service LED and switch, a reset LED and switch, and an LED and switch for use by the application. A connector is provided that enables the Neuron Chip's I/O pins to be interfaced to external I/O or a host processor. The motherboard requires either unregulated +9 to +12VDC power or +5VDC regulated power.

Using the LTM-10A module can save hundreds of hours of development time compared with designing custom modules. The LTM-10 module is designed to comply with both FCC and VDE Level B requirements, minimizing time-consuming and expensive laboratory testing, component selection, and layout redesign work.

Echelon offers a comprehensive range of development tools, network interfaces, routers, and network services tools to simplify the task of designing and commissioning products using the LTM-10A module.

## LTM-10A Module Specifications

Processor	Neuron 3150 Chip
Processor Input Clock	10 MHz
Operating Input Voltage	+5VDC ±5%
Operating Input Current	160mA max (see user's guide)
100mA typical	
Temperature	
Operating	0 to +70°C (standard) -40 to +85°C (contact Echelon)
Non-operating (12 hour)	-45 to +85°C
Humidity (non-condensing)	
Operating	10 to 95%RH @70°C (standard) 10 to 95%RH @85°C (contact Echelon)
Non-operating (12 hour)	95%RH max @85°C
Dimensions	61mm x 51mm x 13mm (2.4" x 2.0" x 0.5")
EMI Compliance	
FCC	Designed to comply with Part 15 Level B
VDE	Designed to comply with 0871 Level B
Network Interface Commands	Send Message Local Network Mgmt Command Reset Flush and Flush Cancel Online and Offline Source Quench and Resume
Network Interface Responses	Incoming Message Incoming Response Completion Event Reset Flush Complete
Network Driver Commands	Open Network Interface Read and Write Buffer I/O Control Register Callback Function Close Network Interface
Network Interface Library Functions	Initialize Network Interface Reset Network Interface Send LonTalk Message and Wait for Completion Get Next Response Receive LonTalk Message Send LonTalk Response Local Network Mgmt Command Handle Error

## LTM-10 Motherboard Specifications

Operating Input Voltage	+9 to 15VDC (+15VDC for PLT-30 transceiver)
Temperature	
Operating	0 to +70°C
Non-operating (12 hour)	-45 to +85°C
Humidity (non-condensing)	
Operating	10 to 95%RH @70°C
Non-operating (12 hour)	95%RH max @85°C
Dimensions	191mm x 109mm x 20mm (7.5" x 4.3" x 0.8")

## Motherboard Connector Suppliers

Connector	Supplier	Part Number
J3 Primary Power Plug: 2.1mm inside diameter 5.5mm outside diameter	LZR Electronics	HP-114A
J4 Alternate Primary Power Plug: 4-pin Molex	Molex	8981-4P
J5 I/O connector: 20-pin (2 x 10)	3M	3421-4620

## Module Socket Suppliers

Connector	Supplier	Part Number
P1: 26-pin (2 x 13)	Samtec	SSW-113-01-T-D
P2: 6-pin (1 x 6)	Samtec	SSW-106-01-T-S
	Augat	A010-006-YB-001
	Methode	9000-106-303

## Documentation

Documentation is not included with the LTM-10A module, but can be downloaded from [www.echelon.com/support](http://www.echelon.com/support). The *LTM-10A User's Guide* is included with the NodeBuilder® Development Tool.

Document	Echelon Part Number
<i>LONWORKS Host Application Programmer's Guide</i>	078-0016-01
<i>LTM-10A User's Guide</i>	078-0132-01

## Ordering Information

A power supply is required for the LTM-10 motherboard. Wall-mount power supplies suitable for use with twisted pair transceivers are available from Echelon.

Product	Echelon Model Number
LTM-10A Flash Control Module	65100-200, 65100R-200 (RoHS-compliant)
LTM-10 Motherboard	65120, 65120R (RoHS-compliant)
U.S. Power Supply	78010, 78010R (RoHS-compliant)
Continental Europe Power Supply	78020, 78020R (RoHS-compliant)
U.K. Power Supply	78030, 78030R (RoHS-compliant)
Japan Power Supply	78040, 78040R (RoHS-compliant)

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