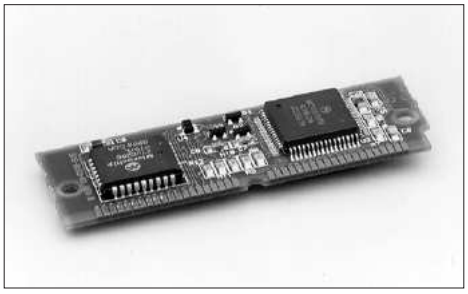
RTR-10 Router Core Module
Models 61000-100 and 61000R-100

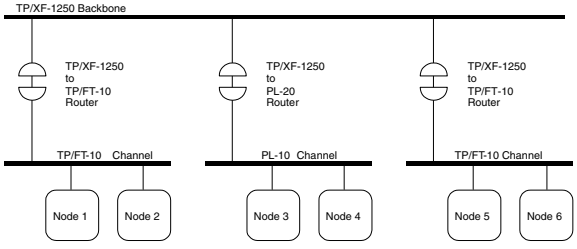


- Transparent multi-channel and multi-media support
- Compact single in-line module (SIM) form factor
- Transceiver-independent design
- Built-in transceiver parameters for standard transceiver types
- Messages forwarded between two channels of the same or different media type or bit rate
- Unlimited number of network variables forwarded
- Default 10MHz operation with a 2 to 2.5ms router delay maximizes system performance of multi-channel networks
- Status output indicates a forwarded packet
- One side of the router can be driven by an external clock and connected to a transceiver running at any LonWorks bit rate from 610bps to 1.25Mbps
- Choice of four routing algorithms allows optimizing tradeoffs between ease of installation and network performance
- Physical isolation between two channels improves system reliability by isolating failures between channels

Description

The RTR-10 Router Core Module is a compact module used by OEMs to build routers. Routers connect two communications channels and route LonTalk® messages between them. They support installation of networks with dozens to thousands of nodes.

The following figure illustrates a typical installation with free topology and power line channels connected to a 1.25Mbps backbone twisted pair channel using three routers. The applications on all six nodes in this example can communicate transparently as if they were installed on a common channel.



Model 61000R is 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 RTR-10 Module consists of the core electronics and firmware required to implement a router. Its compact single in-line module (SIM) form factor minimizes the board space required to implement a router. Vertical SIM sockets are available to minimize board space; right-angle SIM sockets are also available to minimize component height.

The RTR-10 router comes preconfigured with many common LonWorks® transceiver parameters. Two sets of five transceiver identification (XID) pins on the RTR-10 router select the appropriate transceiver type for each side. The transceiver ID inputs eliminate a manufacturing step by automatically configuring the RTR-10 router for most transceivers. A special transceiver ID is reserved for programming any custom type.

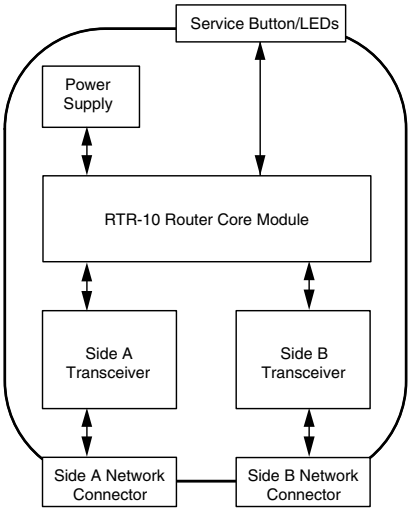
One side of the RTR-10 router has a fixed input clock rate of 10MHz. This side can be used with transceivers running at interface bit rates from 9.8kbps to 1.25Mbps. The second side of the RTR-10 router can be tied to the 10MHz output of the first side, requiring no external components for interface bit rates from 9.8kbps to 1.25Mbps. The 10MHz output can be divided to a lower frequency with external hardware and used as the input clock for the second side to support transceivers running at bit rates as low as 610bps.

Routers can use one of four routing algorithms: *configured router, learning router, bridge, or repeater.* These options allow system performance to be traded off for ease of installation. Configured and learning routers fall into a class of routers known as *intelligent routers,* which use routing tables to selectively forward messages based on the destination address. A bridge forwards all valid packets that match its domains. A repeater forwards all valid packets. Configured routers are easily installed using an installation tool that calculates network topology and layer 4 timing parameters, such as the LonMaker™ Integration Tool, the LonBuilder® development station, or an installation tool based on the LNS™.

Usage

A complete router, using an RTR-10 module, consists of the module, two transceivers, and a motherboard to connect the RTR-10 router to the two transceivers. Any pair of channel types may be connected by a router by selecting the appropriate pair of transceivers. The RTR-10 router is compatible with all LONWORKS transceivers including standard transceivers for free topology, link power, twisted pair, and power line. Using multiple communications media can minimize installation costs and increase system performance by allowing easily-installed media such as power line or link power to be combined with media such as TP/XF-1250 twisted pair.

A block diagram of a router based on an RTR-10 module is shown below.



The two channels connected to a router are physically isolated so a failure on one channel does not affect the other.

LONWORKS application programs do not have to be modified to work with routers. Only the network configuration of a node has to be modified when a node is moved to the far side of a router. The required modifications to the network configuration can be done automatically by an installation tool.

Routers are independent of the network variables and message tags in a system and can forward an unlimited number of them. This saves development cost since no code development is required to use routers in a system. It also saves installation and maintenance costs since router configuration is automatically managed by network server tools based on LNS. Monitoring and control applications such as those based on the LCA Object Server OCX do not require modifications to work with multi-channel networks when routers are used. All network configuration is performed over the installed network, further minimizing installation and maintenance costs since routers do not have to be physically accessed to change their configuration.

Suppliers

Connector	Supplier	Part Number
SIM Socket		
40-position vertical	Molex	15-82-0793 or 15-82-1175
40-position right angle	Molex	15-82-1390

Specifications

Processor	2 Neuron® 3150® Chips
Processor Input Clock	
A-side	10 MHz
B-side	External input of 10, 5, 2.5, 1.25, or .625MHz, may be driven by A-side output
Router Delay	2 to 2.5ms @10MHz input clock *Note: total latency is router delay plus packet time*
Router Throughput (packets/sec)	1 byte data, unidirectional 400 8 byte data, unidirectional 370 116 byte data, unidirectional 305 1 byte data, bi-directional 450 8 byte data, bi-directional 430 116 byte data, bi-directional 390

Note: Throughput was measured with a TP/XF-1250 transceiver on both sides, with both sides using a 10MHz input clock. Unidirectional measurements were made with packets originating on one side only. Bi-directional measurements used identical measurements on both sides. Measurement reported with 0 missed packets on both router sides.

Operating Input Voltage	+5VDC ±10%
Operating Input Current	200mA max
SIM Connector	40-position SIMM or SIMM II 0.050″ centerline single row connector, vertical or right angle
Temperature	
Operating	-40 to +85°C
Non-operating (12 hour)	-45 to +85°C
Humidity (non-condensing)	
Operating	10 to 95%RH @85°C
Non-operating (12 hour)	95%RH max @85°C
Dimensions	67mm x 23mm x 7mm (2.65″ x 0.9″ x 0.3″)
EMI Compliance	
FCC	Designed to comply with Part 15 Level B
VDE	Designed to comply with 0871 Level B

Documentation

The *LonWorks Router User's Guide* is not included with the RTR-10 module and must be ordered separately from Echelon's literature fulfillment department.

Document	Echelon Part Number
LONWORKS Router User's Guide	078-0018-01

Ordering Information

Product	Echelon Model Number
RTR-10 Router Core Module	61000-100, 61000R-100 (RoHS-compliant)

003-0331-01B