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i.LON® 600 LonWorks® / IP Server

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Mini Evaluation Kit

Product Catalog
2006 - 2007

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Product Catalog
2006 - 2007 Edition – Version A

For detailed information on Echelon's products, including the most up-to-date
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Echelon general policy prohibits the use of its components in life support applications wherein a failure or malfunction of the component may cause personal injury or death. Per Echelon's standard terms and conditions, the user of Echelon components assumes all risks of such use.

Echelon is presently converting most of its products to be RoHS-compliant, a process expected to be completed by 30 June 2006. The schedule for RoHS conversion of our products may be found on the RoHS section of Echelon's Web site at http://www.echelon.com/products/rohs_schedule.htm. RoHS-compliant products listed in this catalog can be identified by an "R" at the end of the product model number.

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Corporate Profile

Echelon is a control networking company - we develop, sell, and support networks that connect machines to other machines (referred to as control networks), to the sensors and actuators buried inside of machines (referred to as embedded control networks), and to the Internet. This catalog presents Echelon's family of solutions including a complete range of LONWORKS control networking tools and products, Pyxos FT embedded control networking products, LonSupport technical support services, and training courses. By allowing machines and devices to communicate with one another, locally and across the Internet, our solutions form the basis for building, industrial, utility, transportation, and home automation systems used the world over.

Original equipment manufacturers (OEMs), building owners, facility managers, and system integrators rely on Echelon solutions when designing, installing, and managing device networks of all kinds. Backed by a world-wide support and training organization, Echelon provides development assistance, product design reviews, and a full curriculum of training courses.

At the foundation of Echelon's control networking infrastructure is the open standard LONWORKS control networking platform. LONWORKS based devices utilize distributed peer-to-peer communications—each device in the network can receive, transmit, and process network information independently of other devices. LONWORKS devices can make decisions and process information without the need for a host processor, gateway, or controller. This peer-to-peer architecture increases reliability while reducing the life-cycle cost of a LONWORKS network.

The protocol, or language, used to communicate among LONWORKS devices is the open standard LonTalk protocol. Traditionally, control networks have used closed protocols and systems that locked the customer into a sole supplier for any changes, additions, or spare parts. In the open world of LONWORKS networks, there are multiple sources of products and services, and customers have the freedom to choose from whom they buy. The LonTalk protocol has been incorporated in many internationally recognized open standards including ANSI/CEA-709.1-B, IEEE 1473L, SEMI E54.6, and CEN EN14908.

The LonTalk protocol is integrated into Smart Transceiver products made by Echelon, Neuron® Chips (sold independently by Cypress Semiconductor and Toshiba), and third party processors to which the protocol has been ported. Echelon's Mini EVK and NodeBuilder tool suites are used to write, compile, and download code into Smart Transceivers and Neuron Chips.

The LONWORKS platform was designed from the ground up to operate on multiple communications media. Echelon specializes in the supply of twisted pair transceivers (for signaling on copper wires—also known as ANSI/CEA 709.3-1999), power line transceivers (for signaling over the power mains of a building or machine - also known as ANSI/CEA 709.2-1999), and IP-based communications (for signaling over Ethernet LANs, WANs, and the Internet—also known as ANSI/CEA 852). Other supported media include fiber optic, radio frequency, infrared, and coaxial cables. Supporting multiple media is essential for industrial, commercial, home, governmental, and institutional applications where media are often mixed to achieve low installation costs and satisfy requisite performance metrics.

Echelon offers a family of Smart Transceiver products in which the LonTalk protocol processor is integrated with a twisted pair or power line transceiver. Offering unmatched reliability and robustness, the Smart Transceivers offer a very economical way in which to add LONWORKS to any device. More than 60 million Neuron core devices have been shipped to date, making Echelon's LONWORKS platform the world's leading control networking platform.

The Pyxos Platform, Echelon's newest embedded control networking technology, extends the benefits of networking inside of machines down to every sensor and actuator. Designed to work standalone or in conjunction with a LONWORKS network, the Pyxos platform features high speed communication, ultra-miniature packaging, and a self-organizing architecture in which the network configures itself without human intervention.

Echelon offers a range of solutions for managing, configuring, and analyzing LONWORKS networks. LNS software is the gold standard for managing LONWORKS networks, and is used by OEMs worldwide as the platform on which they have built their own network management tool. Echelon's LonMaker Integration Tool is an LNS based design, installation, and maintenance tool that allows integrators and OEMs alike to manage their LONWORKS networks. The LonScanner Protocol Analyzer can be used with both LNS and non-LNS based networks to analyze network traffic, isolate faults, and identify opportunities for traffic optimization.

To connect LONWORKS devices to PCs and other host processors, Echelon offers a suite of USB, PCI, and serial adapters. The products interface with all popular LONWORKS media, and feature both high throughput and simple installation, making them idea for OEMs and integrators alike.

Recognizing that control networks may be located in disparate locations throughout a plant or city, or even in different countries, Echelon designed the LONWORKS platform to support wide-area networking, including dial-in/out modems and IP (Internet Protocol) networking. IP support is an integral component of many Echelon products. The *i*.LON product family provides LONWORKS connectivity as well as a Web services interface (XML/SOAP), a Web server, IP tunneling, wireless GSM/GPRS data modem support, interfaces for other protocols such as Modbus and M-Bus, and a range of powerful data logging, scheduling, e-mail, and alarming applications. By seamlessly integrating IP, SOAP/XML, and Web services into a LONWORKS network, Echelon makes available a range of high performance, cost-effective Internet connectivity solutions to meet industry needs.

To support remote service centers, Echelon offers the Panoramix Enterprise Software Platform. Panoramix middleware allows businesses with multiple remote sites to supervise those facilities via Web services based applications. Using the Panoramix platform, companies can gain deeper insights into the operation of their processes and facilities, allowing managers to make better business decisions, provide better and more profitable service, and realize new revenue opportunities.

To ensure that designers, installers, and users are properly trained and supported, Echelon offers a range of multi-lingual training courses, web-accessible computer training courses, as well as LonSupport services. LonSupport centers around the globe are staffed by trained professionals who can assist with almost any type of development, installation, or maintenance questions.

Development Tools

Echelon's development tools provide the foundation for quickly developing intelligent devices and applications.

Product	Models	Description
Mini EVK Evaluation Kit	10000-31	Evaluation and device development system in one inexpensive kit.
NodeBuilder Development Tool	10020	LONWORKS device development system for larger applications and faster development.
ShortStack Developer's Kit	23400	Software that enables existing microprocessor based products to be easily networked.
MIP/P20/P50 and MIP/DPS Developer's Kits	23200 23210	Transforms a Neuron Chip or Smart Transceiver into a communications co-processor for an attached host processor.
Echelon Software License Generator	34311	Software for distributing LonMaker and LNS Device Credits to end-users.
LNS Application Developer's Kit for Windows	34309	Package of tools for developing LNS-based network tools.
LNS Redistribution Kit for Windows	34312	Software for redistributing the LNS Server and Remote Client software.
LNS HMI Developer's Kit for the Java Platform		Software for designing Java-based applications, applets, and servlets that monitor and control LONWORKS devices through an LNS server
OpenLDV Developer's Kit		Software for building support for the OpenLDV interface into your network tools
LONWORKS Bundle Deployment Kit	34611	Software package for designing, installing, operating, and maintaining multi-vendor, open, interoperable LONWORKS networks connected to OSGi enabled service gateways.
LCA Field Compiler API	33300	Software for developing field compilation and debugging tools. Includes functions for compiling, linking, exporting, and debugging Neuron C applications.

MINI EVK EVALUATION KIT
MODEL 10000-31

The Mini EVK makes it affordable for anyone to understand and harness the power of the hugely popular LONWORKS platform, and to develop new devices for the rapidly growing, price-sensitive sensor/actuator mass market. The richly featured Mini EVK may be the only development platform many engineers ever require.
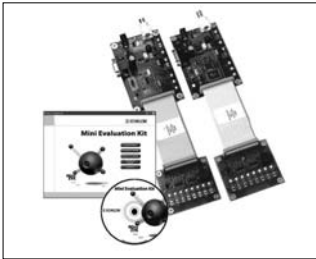
Features

- Introduces developers to LONWORKS control networking with a rich evaluation and programming environment
- Includes example applications for device networking and interfacing Windows applications
- Includes Interoperable Self-Installation (ISI) library for building self-organizing control networks that configure themselves without any tools
- Speeds development of control networks with the powerful Neuron C programming language and a compiler that supports up to 32 network variables and 32 Kbytes of generated code
- Downloads compiled Neuron C applications to target hardware over the control network
- Provides easy resource definition and editing with a built-in resource editor
- Includes two evaluation boards, I/O hardware, and USB interface for fast plug-and-play setup
- Provides easy migration to the powerful NodeBuilder® Development Tool
- Available in twisted pair and power line versions

Description

The Mini EVK is a powerful, low-cost tool for both evaluating and developing LONWORKS control networks. Designed for control system developers, integrators, specifying engineers, educators and students, the Mini EVK combines a flexible hardware platform with sample Neuron C applications and a Neuron C compiler. In just a matter of minutes, users can easily set-up and demonstrate twisted pair or power line control networking, as well as write, compile, and load new applications of their own design.

NODEBUILDER DEVELOPMENT TOOL MODEL 10020

Features

- LTM-10A platform supports initial application development and testing
- Gizmo 4 I/O Board provides prototype hardware for testing, including a 4x20 character LCD display
- Resource editor displays available functional profiles, network variable types, and configuration property types, and can be used to create new functional profiles and types
- Neuron C Version 2.1 compiler supports many new language features for LONMARK compliant applications
- Code wizard automatically generates Neuron C code to implement a LONMARK 3.4 standard device interface
- LNS development components support development of LNS device plug-ins

Description

The NodeBuilder Development Tool is a hardware and software platform that is used to develop applications for Neuron Chips and Echelon Smart Transceivers. The NodeBuilder tool includes a complete suite of device development software for Windows and a hardware platform that can be used for prototyping and testing.

The NodeBuilder tool includes a compiler and debugger for the Neuron C programming language. Neuron C is a high-level programming language based on ANSI C with extensions to simplify network communication, hardware I/O, and event-driven processing.

SHORTSTACK DEVELOPER'S KIT MODEL 23400

Features

- Enables existing microprocessor based products to be easily networked without discarding existing application code
- Extends the useful life of product designs by preserving your investment in software code
- Allows devices to be used with new Internet services
- No royalties when used with Echelon's Smart Transceivers, and power line, free topology, link power transceivers

Description

The ShortStack Micro Server enables any product that contains a microcontroller or microprocessor to quickly and inexpensively become a networked, Internet-accessible device.

By adding the tiny ShortStack API to the device's existing application, adding the appropriate calls to the ShortStack API, and then by adding a ShortStack Micro Server to the device hardware, any smart device can be network-enabled. The result is a communicating device that can communicate with other devices on a LONWORKS network, and can also interface with Internet-based services via LONWORKS Internet servers such as the *i*.LON Internet Servers.

The ShortStack Developer's Kit is available as a free download from www.echelon.com/shortstack.

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MIP/P20/P50 AND MIP/DPS DEVELOPER'S KITS MODELS 23200 AND 23210

Features

- Allows any host processor to attach to a LONWORKS network
- Network interfaces based on the MIP can be used with any host application
- High-speed dual-ported RAM interface sends and receives hundreds of packets per second with minimum host overhead (MIP/DPS)
- High-speed parallel interface sends and receives hundreds of packets per second (MIP/P20 and P50)
- Optional up-link interrupt for the MIP/P50 and MIP/DPS reduces latency to incoming network traffic by asynchronously informing the host of the availability of an up-link packet
- Supports host applications with up to 4096 network variables
- Supports the LONWORKS network interface protocol
- ANSI C source code for a network interface library and sample host application included
- ANSI C and PC assembly source code for a sample network driver included

Description

The Microprocessor Interface Program (MIP) is firmware that transforms a Neuron Chip into a communications co-processor for an attached host processor. The MIP enables the attached host to implement LONWORKS applications and to communicate with other devices using the ANSI/CEA-709.1 protocol.

Applications on the host can send and receive network variable updates and application messages, as well as poll network variables. The MIP opens the ANSI/CEA-709.1 protocol to a variety of hosts including PCs, workstations, embedded micro-processors, and microcontrollers. The MIP/P20 is optimized for the Neuron 3120 Chip, providing the lowest-cost network interface, while the MIP/P50 offers higher performance and is intended for use on a Neuron 3150 Chip. The MIP/DPS is the highest performance version and is designed for Neuron 3150 Chip applications using dual-ported RAM.

LNS APPLICATION DEVELOPER'S KIT / TURBO EDITION MODEL 34309

Features

- Allows users to develop interoperable applications that can install, maintain, connect, monitor, control, diagnose, and recover LONWORKS networks
- New Turbo Edition provides breakthrough performance, security, reliability, and scalability (see features box on next page)
- Enhanced support for the *i*.LON 10 Ethernet Adapter, *i*.LON 100 Internet Server, and the *i*.LON 600 LONWORKS/IP Server
- ANSI/CEA-709.1-B-2002 LonTalk protocol stack executing within LNS provides more than a 10x monitoring performance improvement over any tool using a traditional implementation of the 709.1 protocol
- Connects to ANSI/CEA-852 LONWORKS/IP channels with up to 256 members, and includes extensions which support connecting to these channels through firewalls that use Network Address Translation
- Distributed, cached monitor sets provide fault-tolerant, instant-on monitoring
- Language-independent standard Windows interface for high programmer productivity and high operating performance
- Client/server LNS network operating system runs natively on IP and LONWORKS channels
- Compatible with Windows XP, Windows 2000, and Windows Server 2003
- Remote data and service access via LONWORKS networks, modem dial-up, or IP networks
- Complete LONMARK® Version 3.4 support
- Example Microsoft Visual C++™ and Visual Basic® application source code

Description

The LNS Application Developer's Kit is a software development tool for designing and deploying high performance, scalable LNS network tools for LONWORKS control networks. The LNS operating system handles all the tasks associated with managing a sophisticated network, and is the foundation for the most capable, most popular tools for designing, installing, maintaining, and monitoring LONWORKS automation systems.

The LNS network operating system allows a high level of developer productivity through its fully-featured, object-oriented programming model. The LNS Object Hierarchy presents the LONWORKS network components such as application devices, network variables, LONMARK objects, configuration properties, routers, and channels as standard Windows objects. Each object has methods, properties, and events. LNS applications call methods to invoke operations on the object; they interrogate and configure the object by getting and setting its properties. And applications subscribe to events to stay current with object changes. Windows-based LNS client applications can extend the LNS Object Hierarchy by adding user-defined object extensions that are useful for storing application-specific data related to a particular object.

The LNS Server supports multiple simultaneous clients. Windows-based clients can run locally to the LNS Server, or remotely via the LONWORKS network, a modem, IP, or a LONWORKS/IP channel. In addition, Java™ clients can connect to the LNS Server via IP.

To optimize performance and minimize network traffic, remote Windows-based client applications automatically cache directory information received from the LNS Server. These applications can then perform monitoring and control functions directly, without interaction with the LNS Server. Client applications can read network variables using polled or event-driven updates, and can optionally filter redundant updates to minimize application overhead. Client applications can request that the LNS Server notify them of changes to the cached information, ensuring consistency between the database and the caches. In addition, monitoring and control applications can start-up or continue to function if the LNS Server is not available.

Network variable and configuration property values on devices are automatically converted to and from the most appropriate locale-specific formatted strings to simplify user interaction. This default string formatting can be overridden, and formatting can be based on standard resource files for standard network variable types and configuration property types, or manufacturer-specific resource files for user-defined network variable and configuration property types.

LNS includes comprehensive support for version 3.3 of the LONMARK Interoperability Guidelines. LNS is able to manage certified and prototype LONMARK devices as well as other LONWORKS devices.

To provide interoperability between LNS applications from different vendors, LNS defines and supports a standard plug-in architecture whereby an LNS application can invoke the services of other LNS applications on the same PC.

The LNS Plug-in standard allows a single user interface or installation tool application to navigate or manage all the devices in a network, and then invoke any of the LNS plug-ins for a particular device type on the network.

LNS Turbo Edition has new example applications to help you develop your own applications. The three example applications demonstrate best practice, and individually focus on network management, monitoring and control, and plug-in management.

ECHELON SOFTWARE LICENSE GENERATOR / TURBO EDITION MODEL 34311
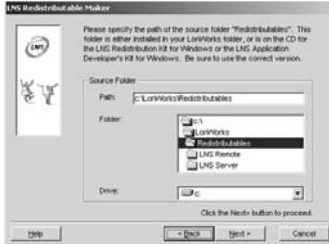

Features

- Simple wizard interface for processing end user orders for LNS Device Credits
- Enables LNS application developers to provide a complete, single point-of-service to end users
- Simple wizard interface for requesting new blocks of LNS Device Credits from Echelon
- Distributes LNS Device Credits to any LNS Server (Release 2 through Turbo Edition)

Description

The Echelon Software License Generator is an easy-to-use software package that enables an LNS application developer to distribute LNS Device Credits to end users. Each LNS Device Credit represents a pre-paid fee that allows an LNS application to commission or recover a LONWORKS device. The Echelon Software License Generator is available for purchase by companies that have also purchased both the Model 34309 LNS Application Developer's Kit and the Model 34312 LNS Redistribution Kit products.

When the end-user has consumed these LNS Device Credits, they use a software wizard included with the LNS Server to order more LNS Device Credits. The order is transmitted by e-mail, fax or telephone to the LNS Device Credit redistributor. The order is processed with the Echelon Software License Generator software and a software key is delivered back to the end-user by email, fax, or telephone. The key, when installed with the software wizard included with the LNS Server, adds the specified number of LNS Device Credits to the computer.

LNS REDISTRIBUTION KIT / TURBO EDITION MODEL 34312

Features

- Creates ready-to-use Turbo Edition LNS Server and LNS Remote Client redistribution packages for use with LNS applications
- Ready-to-use installation packages make distribution and deployment of the LNS network operating system with your LNS application simple and error-free
- LNS Server redistribution supports Windows-based clients on LONWORKS and IP networks as well as Java clients on IP
- LNS Remote Client redistribution enables LNS applications to connect to an LNS Server through LONWORKS and IP networks
- Compatible with Windows XP, Windows 2000, and Windows Server 2003

Description

The LNS Redistribution Kit is a software package that generates LNS Server and LNS Remote Client software redistribution packages. LNS application developers incorporate these packages into their LNS application distributions so that the LNS Server or LNS Remote Client is installed along with their LNS application. In this way, the LNS application does not require the prior installation of an LNS Server or LNS Remote Client redistribution in order to run. Once an LNS redistribution package is installed, any application that requires the LNS network operating system will run on that PC.

LNS HMI DEVELOPER'S KIT FOR THE JAVA PLATFORM

Features

- Rapid development of Java-based applications, applets, and servlets that monitor and control LONWORKS devices through an LNS server
- Build Internet-enabled HMI (human machine interface) applications on any Java platform—from mainframe computers to hand-held consumer devices.
- Familiar LNS object hierarchy speeds developer learning time
- Access to any LONWORKS device managed by LNS
- Read and write network variables (raw or formatted)
- Read and write LONMARK configuration properties (raw or formatted)
- Listeners for network variable changes take advantage of LNS's bandwidth-efficient push technology
- Retrieve Neuron ID, program ID, location string, device status
- Subscribe to LNS events (such as attachment, address change, and service pin)
- Access to LNS extensions collections

Description

The LNS HMI Developer's Kit for the Java Platform is a royalty-free LNS development kit for rapid creation of Internet-enabled HMI (human machine interface) applications on any Java platform. Applications built with the kit are compatible with the latest Java Developer's Kits and runtime environments. The applications connect to an LNS Server through IP sockets and require LNS 3, Turbo Edition or higher. Primarily intended for monitoring and control applications, you can also retrieve and set a number of device properties through the API, and can register for events thus making efficient use of network bandwidth between the application and the LNS Server.

This kit is available for download from www.echelon.com.

OPENLDV DEVELOPER'S KIT

Features

- Unified Windows driver interface for sending and receiving low-level LonTalk messages
- Works with all of Echelon's family of network interfaces, including the PCLTA-20 and PCLTA-21 PCI Network Interfaces, PCC-10 PC Card, U10/U20 USB Network Interfaces, *i*.LON 10 Ethernet Adapter, *i*.LON 100 Internet Server, *i*.LON 600 LONWORKS/IP Server, and the SLTA-10 Serial Network Interface
- Includes RC4 encryption, MD5 authentication when used with the *i*.LON 10, *i*.LON 100, and *i*.LON 600
- Automatic fault-tolerant session recovery over IP connections with the *i*.LON 10, *i*.LON 100 and *i*.LON 600
- Support for uplink connections initiated by the *i*.LON 10 or *i*.LON 100—commonly used in large remote access systems where hundreds or thousands of sites report back to a service center

Description

The OpenLDV driver interface provides a unified Windows driver interface for sending and receiving low-level LonTalk messages through Echelon's family of network interfaces. Network tool installer programs usually incorporate the OpenLDV Installer; however, if it's not included, you can download and install the OpenLDV Installer separately.

Most of our customers find that developing PC-based network tools is simpler and less time-consuming when using our LNS Network Operating System software. LNS based network tools also have higher performance levels than those that use OpenLDV. Your Echelon sales representative can help you decide whether you should develop your network tools with LNS or OpenLDV. The OpenLDV software is licensed for royalty-free when used with Echelon's family of network interface products.

Download the OpenLDV Installer and OpenLDV Developer's Kit from www.echelon.com.

LONWORKS BUNDLE DEPLOYMENT KIT / RELEASE 1.0 - MODEL 34611

Features

- Integrates everyday LONWORKS devices into a service gateway that uses an OSGi Framework
- Support for all types of LONWORKS devices on any media including power line communications and free topology communications
- Designed to work with any OSGi Framework
- Compatibility tested with these OSGi Frameworks: Sun Microsystems® Java Embedded Server™ (JES™), IBM® System Management Framework™ (SMF), and Gatespace™ Distributed Service Platform
- Browser-based administration of the LONWORKS Bundles using the OSGi Framework's built-in Web server
- Operator-grade solution including LNS based service center software that operates over broadband (cable modem or DSL) or dial-up networks
- Example device access bundle source code for several popular LONWORKS devices

Description

The LONWORKS Bundle Deployment Kit is a software package for designing, installing, operating, and maintaining multi-vendor, open, interoperable LONWORKS networks connected to Open Services Gateway Initiative (OSGi) enabled service gateways. The kit includes ready-to-use LONWORKS support bundles, example device service bundles, utilities, tools, and documentation.

The LONWORKS Bundle Deployment Kit provides a complete LONWORKS network service delivery solution for telcos, cable operators, utilities and other service gateway operators. Delivery platforms include set top boxes, multimedia gateways, DSL and cable modems, web pads, home appliances, and PCs.

LCA FIELD COMPILER API MODEL 33300

Features

- Neuron C Compiler API to create downloadable image files from Neuron C source files for writing and debugging LONWORKS applications
- Neuron C Debugger API provides a high-level interface for debugging Neuron C applications running on field devices
- Online help provides rapid access to detailed function references for all API functions

Description

The LCA Field Compiler API is a software library for Windows that is used to create graphical tools for writing and debugging LONWORKS applications. The API does not include a user interface; OEM field programming tools provide the user interface. End-users will interact with this OEM tool to program and optionally debug their applications. In turn, the OEM tool produces the required Neuron C code and then calls the Neuron C compiler API to produce the application code. The OEM software then loads the compiled application using either an off-the-shelf or custom-designed LNS network tool.

Embedded Control Networks

In 1990 Echelon pioneered the field of control networking with its LONWORKS platform. Unlike data networks that connect PCs and servers, LONWORKS control networks connect machines to other machines, forming the basis for home, building, and factory automation systems.

Echelon's new Pyxos platform extends the features and benefits of networking to every sensor, actuator, and display embedded *inside* of machines such as office equipment, building automation devices, vending machines, appliances, and industrial machines. The self-organizing Pyxos platform configures itself without special tools or skilled labor. Combining high speed, deterministic operation, and support for wired and wireless media, the Pyxos platform lowers product assembly, installation, and life-cycle costs. Best of all, it integrates seamlessly with LONWORKS control networks and the Internet.

PYXOS FT EMBEDDED CONTROL NETWORKS
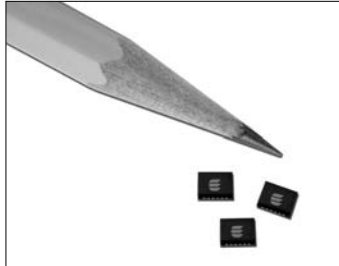
Features

- Low-cost embedded control network for use inside machines, devices, smart fabrics, and building materials
- Miniaturized form factor fits into almost every sensor and actuator
- Self-organizing feature configures the network without special tools or skilled labor
- High speed deterministic operation
- 25ms response time
- Free topology twisted pair sends both packets and power on two wires
- Extensible architecture for seamless integration with LONWORKS control networks and the Internet
- Robust performance ideal for industrial, consumer product, automotive, building, office machine, and transportation applications
- Optional transformer provides additional electrical immunity

Description

The Pyxos FT Embedded Control Network addresses the next frontier of networking by targeting the sensors and actuators embedded inside of machines. These ubiquitous sensors and actuators are very inexpensive, many are very small, and most are installed by technically unskilled labor. Accordingly, Pyxos FT networks are very low-cost, utilize a subminiature Pyxos FT integrated circuit, and are self-organizing—that is, they automatically configure themselves into fully functional control networks without the intervention of technically-skilled assembly personnel.

Pyxos embedded control networks reduce product, installation, warranty, and life-cycle costs. By replacing internal wiring bundles or proprietary networks with a

Pyxos self-organizing network, assembly time, material, and labor will be minimized. The remote diagnostics afforded by the Pyxos platform enables manufacturers to identify design issues, improve support logistics, and reduce warranty costs. The ability to access and disseminate status and control information enables the Pyxos platform to help optimize process efficiency, reduce energy consumption, and enable predictive failure analyses—all factors that influence life-cycle costs. Pyxos networks were designed to integrate synergistically with LONWORKS control networks. Pyxos networks embedded inside of machines interface with open standard LONWORKS networks that link machines to one another and to the Internet. Used together, Pyxos and LONWORKS networks provide a rich and comprehensive suite of features, and allow control information to be collected from every control-related device and disseminated wherever it may be needed.

Standalone Pyxos Network
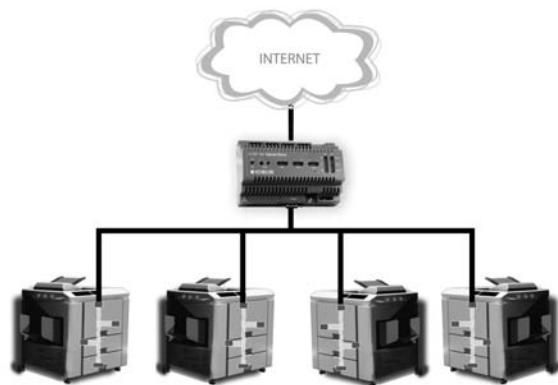

Integrated Pyxos and LONWORKS Networks

PRELIMINARY

Enterprise Software

When a company can tap into the information associated with its core operations, extract the data and forward it to a central site, and integrate it with planning, operating, and other business systems, that company will gain valuable insight into the heart of its business. Company management can better understand where costs are originating and how they can be reduced, identify inefficiencies and recommend how they can best be eliminated, and provide a consistent and high quality customer experience. Better still, a company can understand how its business is operating and make better informed, fact-based decisions that reduce costs and increase profitability.

Echelon's Panoramix platform is a highly scalable, enterprise-grade software application designed to reside in a corporate-owned or hosted data center and communicate across the Internet or a private IP network to as many as tens of thousands of remote sites containing networks of smart devices. Built around open standards, the Panoramix platform provides a powerful Web Services API to enable fast and easy integration into existing business systems. Seamless connectivity to the millions of installed LONWORKS networks via *i.*LON 100 e3 Internet Servers lets the Panoramix platform tap into networks of smart devices—thermostats, lighting devices, access control systems, HVAC devices, energy meters, refrigeration cases, and more. The Panoramix platform redefines enterprise-level visibility into operations by turning information trapped in far-flung sites into actionable business intelligence.

ECHELON®

PANORAMIX ENTERPRISE PLATFORM
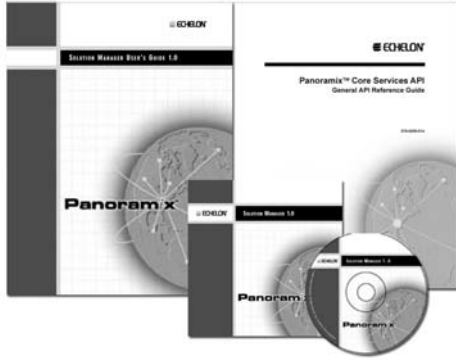
Overview

The Panoramix platform is a highly-scalable enterprise software platform that gathers data from distributed control networks, aggregates that data at a central site, converts the data to information, and makes that information available to external and internal applications. Solution developers and IT departments can lower their cost of development and improve time to market by using it as their device networking enterprise software platform.

Benefits

- Scalable. The Panoramix platform is designed to scale and handle millions of sites as well as small networks of buildings.
- Open. It supports industry standards such as SOAP and Web Services.
- Reliable. It has been designed and tested to exacting standards of performance.
- Easy to use. The Panoramix platform's Solution Manager, extensive documentation and training, and robust Web Services API make it easy to integrate the platform into your solution.
- Designed exclusively for control networks. Echelon knows control networking, and knows what's needed in an enterprise software platform for control networks.

Panoramix Core Services

Data Organization – Collecting several gigabytes of data from thousands of locations is a daunting task without the right management and data interpretation tools. The Panoramix platform tools drill down into the collected data – from a single site to a universe of sites – searching for information based on key criteria.

System Management – Tie together disparate sites, integrate thousands of device networks from every corner of the globe, and seamlessly tie them all together into one system.

Platform Infrastructure – Underlying these powerful features lays a scalable, robust infrastructure designed for maximum performance and system availability.
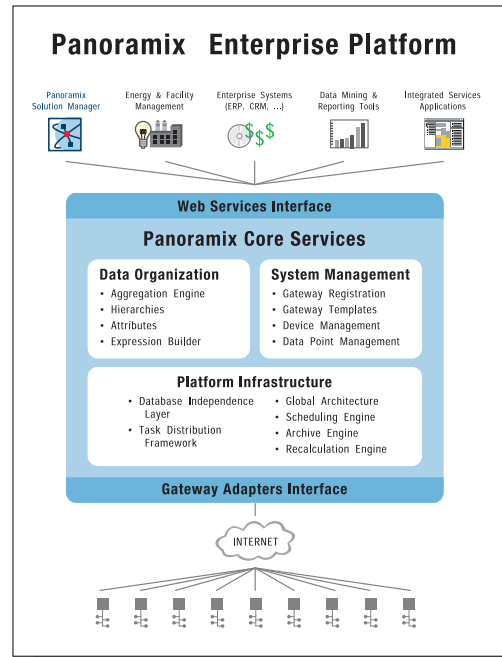
Internet Server and Router

LONWORKS networks are the worldwide standard for networking controls and machines in building, industrial, home, transportation, and utility automation applications. Internet Protocol (IP) based data networking is the worldwide standard for moving data over the Internet, local area networks (LANs), and wide area networks (WANs). Echelon's *i*.LON 100 e3 Internet Server seamlessly links together these control and data networking standards. The new *i*.LON 100 e3 server provides reliable, secure Internet access to everyday LONWORKS devices—lights, appliances, switches, thermostats, motors, meters, valves.

Product	Models	Description
i.LON 100 Internet Server	72101-300 72101-308 72102-300 72102-308 72103-300 72103-308 72104-300 72104-308 72110-300 72160	A high performance network interface that connects LONWORKS networks to corporate IP networks or the Internet.
i.LON 600 LONWORKS/IP Server	72601 72602 72603 72604	An ANSI/EIA-852 compliant, LonTalk-to-IP router that provides reliable and secure Internet access to everyday devices.

Internet Servers

i.LON 100 e3 INTERNET SERVER MODELS 72101-300, 72101-308, 72102-300, 72102-308, 72103-300, 72103-308, 72104-300, 72104-308, 72110-300, AND 72160

Features

- Web server and gateway with SOAP/XML Web services interface allows easy remote monitoring and control, and supports integration with enterprise systems
- *i*.LON Vision Web authoring tool—the simplest way to create custom Web pages for the *i*.LON 100 server (requires separate purchase of Macromedia Contribute)
- Bus devices, and legacy devices to the Internet, a LAN, or a WAN for commercial, industrial, and utility applications
- Scheduler for local control based on date, day, and time of day
- Astronomical clock for lighting applications
- Optional built-in IP-852 router for network expansion and for creating a high-speed backbone for large networks
- Web binding allows simplified interconnection between devices and applications using SOAP/XML
- Web connections can be used to span LONWORKS domains, expand the network address limits of LONWORKS devices, and to convert SNVTs, UNVTs, Modbus, and M-Bus types
- Alarm monitoring and notification with e-mail, data point, or network variable notification of alarm conditions
- Data logging with optional data log compression for monitoring system operation
- Compatible with NAT routers for operation behind firewalls, including firewall-compatible data log upload
- Remote network interface (RNI) provides seamless support for the LonMaker Integration Tool and other tools and LNS or OpenLDV based applications

- Supports the LonScanner™ Protocol Analyzer to ensure fast, successful LONWORKS network deployment
- 2 opto-isolated digital inputs
- 2 high-voltage, high-current relay outputs
- 2 S0 inputs for electric, gas, or water impulse meters
- Auto-polarity 10/100BaseT Ethernet interface
- Optional integral 56K V.90 analog modem for dial-up support
- Supports connection to an external wireless GSM or GPRS modem
- Supports LONWORKS twisted pair (TP/FT-10) and power line (PL-20) channels

Description

Whether you're using LONWORKS networks, Modbus, M-Bus, or local I/O, the *i*.LON 100 e3 server offers exceptional features, solid construction, and great value, plus the flexibility to monitor equipment from anywhere. No matter which interface you choose—built-in Web pages, custom Web pages, Web services (SOAP/XML), all via Ethernet, analog modem, or external GSM/GPRS modem—the *i*.LON 100 e3 will reach you.

The *i*.LON 100 e3 offers streamlined monitoring and control of all your control networks and devices. You can access devices from a local network, a virtual private network, or the Internet—and user authentication makes sure only authorized users can access your network.

The *i*.LON 100 e3 can serve as a gateway for a variety of devices types, including LONWORKS, Modbus, M-Bus, and digital I/O devices, and pulse meters. It provides universal connectivity for the devices attached to it, making their data available to corporate IP networks and the Internet, and providing local device monitoring and control via built-in scheduling, alarming, and data-logging applications. Appliances, meters, load controls, lights, security systems, pumps, valves—virtually any electrical device—can be connected remotely configured, monitored, and controlled from across the room, or across the globe.

i.LON 600 LONWORKS/IP SERVER MODELS 72601, 72602, 72603, AND 72604

Features

- Transforms the Internet (or any IP-based LAN or WAN) into a pathway for carrying LONWORKS control information locally, nationally, or around the world
- Provides highest performance Layer 3 routing of LONWORKS control packets
- Supports LONWORKS/IP channels up to 256 devices
- Supports multiple units behind NAT firewalls
- Remote network interface (RNI) provides seamless support for the LonMaker Integration Tool and other tools and LNS or OpenLDV based applications
- Supports the LonScanner Protocol Analyzer to ensure fast, successful LONWORKS network deployment
- EIA-852 & ANSI/CEA 709.1 compliant
- Security features include MD5 authentication for secure access
- 8T DIN packaging
- 24V AC or DC or 90V-240V AC or DC power input options
- CE Mark, U.L. Listed, cU.L. Listed, TÜV Certified

Description

The *i*.LON 600 LONWORKS/IP Server is an EIA 852 compliant, LonTalk-to-IP router that provides reliable, secure Internet access to everyday devices like pumps, motors, valves, sensors, actuators, and lights. Offering unparalleled packet throughput, rugged construction, and simple commissioning, *i*.LON 600 unit is ideal for demanding process control, building automation, utility, transportation, and telecommunications applications. U.L and cU.L. Listed, TÜV certified, and FCC and CE Mark compliant, the *i*.LON 600 server meets worldwide regulatory agency requirements.

The *i*.LON 600 LONWORKS/IP Server transforms the Internet – or any 10 or 100 BaseT IP-based LAN or WAN – into a pathway for carrying LONWORKS control information locally or remotely. Secure access is ensured by the use of MD5 authentication, while a 32-bit RISC processor and Echelon's LONWORKS /IP architecture provide best-of-class performance for high-speed control, display, and monitoring applications.

Up to 256 *i*.LON 600 servers may be used on the same channel, and multiple servers can operate behind a Network Address Translation (NAT) firewall. The *i*.LON 600 LONWORKS/IP Server is backward compatible with the *i*.LON 1000 and *i*.LON 100 Internet Servers. The *i*.LON 100 Internet Server and *i*.LON 1000 Internet Servers can co-exist in the same network. This feature ensures that existing applications can be fully supported while providing an expansion pathway to accommodate adds, moves, and changes.

Both TP/FT-10 and TP/XF-1250 LONWORKS channel options are available. The free topology TP/FT-10 channel provides the greatest wiring flexibility. The TP/XF-1250 channel is most commonly used for high performance industrial controls and high-speed back-bone channels, and provides high throughput for applications with a large number of devices.

I/O and Control Modules

Our modules are perfect for prototyping or for high-volume production. Ready to plug into your device design, they integrate a Neuron Chip, communication transceiver, memory, and clock oscillator in one compact module. Just add a power supply and the Neuron application on a customer-supplied ROM or flash part, and you've got a complete device.
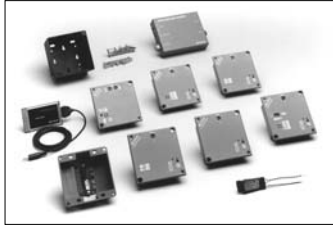
The LonPoint family of products is designed to integrate new and legacy sensors and actuators, as well as LONMARK devices, into cost effective, interoperable, control systems for building and industrial applications. In contrast to traditional control networks, which use an hierarchical architecture based on costly, proprietary controllers, LonPoint Modules offers a flat system architecture in which every point performs some control processing. Distributing the processing throughout the network lowers the overall installation and life cycle costs, increases reliability by minimizing single points of failure, and provides the flexibility to adapt the system to a wide variety of applications.

Product	Model	Description
Type 1 Base Plate	40111	Interface between a LonPoint Module and the network, power, and I/O wiring. Used with LonPoint Interface modules.
Type 2 Base Plate	40222	Interface between a LonPoint LPR Router Module and the network.
DI-10 Digital Input Interface Module	41100	Monitors four digital inputs.
DO-10 Digital Output Interface Module	41200	Controls four digital outputs.
AI-10 Analog Input Interface Module	41300	Monitors five analog inputs.
AO-10 Analog Output Interface Module	41400	Controls five analog outputs.
DIO-10 Digital Input Output Interface Module	41500	Monitors two digital inputs and controls two relay outputs.
Terminator	44100	Provides electrical termination for TP/FT-10 free topology channel.
Terminator	44101	Provides electrical termination for TP/FT-10 bus topology channel.
Terminator	44200	Provides electrical termination for TP/XF-78 and TP/XF-1250 bus topology channels.
Type 1D DIN Base Plate	48111	DIN interface between a LonPoint Module and the network, power, and I/O wiring. Used with LonPoint Interface, Scheduler, and Data Logger modules.
Type 2D DIN Base Plate	48222	DIN interface between a LonPoint LPR Router Module and the network.

Product	Model	Description
TP/FT-10 Free Topology Twisted Pair Control Module	55020-01	Includes FTT-10A transceiver; compatible with TP/FT-10 channels (free topology and link power).
TP/FT-10 Flash Free Topology Twisted Pair Control Module	55020-10	Includes FTT-10A transceiver and flash memory socket; compatible with TP/FT-10 channel (free topology and link power).
TP/XF-78 Twisted Pair Control Module	55010-00	Compatible with TP/XF-78 channels.
TP/XF-78F Flash Twisted Pair Control Module	55010-10	Includes flash memory socket; compatible with TP/XF-78 channels.
TP/XF-1250 Twisted Pair Control Module	55030-10	Compatible with TP/XF-1250 channels.
LTM-10A LonTalk Module	65100-100	Consists of a miniature circuit card containing a Neuron 3150 Chip, 32 Kbytes flash memory, 32 Kbytes RAM, and MIP firmware.

I/O and Control Modules

LONPOINT PRODUCTS OVERVIEW

The LonPoint family of products consists of the LonMaker Integration Tool, the LonPoint Configuration Plug-In, LonPoint Modules, and the *i*.LON 100 e3 Internet Server for scheduling and data logging. All modules include flash memory (to permit reconfiguration or download via the network), a powerful and highly-configurable application program, network access from a front panel jack (to simplify configuration and troubleshooting), and an innovative two piece design (to permit pre-wiring and simplify maintenance).

Features

- Seamlessly integrates sensors, actuators, and LONMARK devices into a low cost, distributed, interoperable control system
- LonMaker Integration Tool provides a graphical design, commissioning, operation, and maintenance environment
- LonPoint Routers extend networks quickly and reliably
- *i*.LON 100 e3 Internet Server provides an IP gateway and controller for a variety of devices, including LonPoint modules and other LONWORKS, Modbus, M-Bus, and local digital devices
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The LonPoint family of LONMARK products is designed to integrate new and legacy sensors and actuators, as well as LONWORKS devices, into cost-effective, interoperable control systems for building and industrial applications. In contrast to traditional control networks which use closed islands of control linked with proprietary gateways, the LonPoint products offer an open distributed system architecture in which every device performs some control processing and can be accessed from any location in the network. Distributed processing lowers overall installation and life cycle costs, increases reliability by minimizing single points of failure, and provides the flexibility to adapt the system to a wide variety of applications.

AI-10 ANALOG INPUT INTERFACE MODULE - MODEL 41300

Features

- Seamlessly integrates analog sensors into interoperable LONWORKS networks
- Two 16-bit analog inputs: 0-24mA, 0-10V, 100Ω-15kΩ
- Supports current loop or remotely powered devices
- LNS Plug-In
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The AI-10 Module is a LONMARK device that provides two 16-bit analog inputs that can monitor 0-24mA, 0-10V, and 100Ω to 15kΩ resistive inputs. 0-24mA devices may be powered by the module's current source or from a remote power supply. The module operates from 16 to 30VAC or VDC, allowing it to be powered from the same source as the sensors.

The module's application consists of LONMARK functional blocks that implement input and control functions. An LNS plug-in configures the LONMARK functional blocks.

AO-10 ANALOG OUTPUT INTERFACE MODULE - MODEL 41400

Features

- Seamlessly integrates analog actuators into interoperable LONWORKS networks
- Two 12 bit analog outputs: 0-20 mA, 0-10 V
- Two PID Controllers
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The AO-10 Module is a LONMARK device that provides two 12-bit analog outputs that can control 0-20mA or 0-10V actuators. The module operates from 16 to 30VAC or VDC, allowing it to be powered from the same source as the actuators.

The module's application consists of LONMARK functional blocks that implement output and control functions. An LNS plug-in configures the LONMARK functional blocks.

I/O and Control Modules

I/O and Control Modules

DI-10 DIGITAL INPUT INTERFACE MODULE - MODEL 41100

Features

- Seamlessly integrates digital sensors into interoperable LONWORKS networks
- 4 digital inputs: 0-32VDC or dry contact
- Separate status LEDs for each input
- LNS Plug-In
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The DI-10 Module is a LONMARK device that provides 4 digital inputs that can monitor dry contacts or 0-32VDC voltage inputs. Separate status LEDs are provided for each input. The module operates from 16 to 30VAC or VDC, allowing it to be powered from the same source as the sensors.

The module's application consists of LONMARK functional blocks that implement input and control functions. An LNS plug-in configures the LONMARK functional blocks.

DIO-10 DIGITAL INPUT OUTPUT INTERFACE MODULE - MODEL 41500

Features

- Seamlessly integrates legacy digital sensors and actuators into interoperable LONWORKS networks
- Two digital inputs support dry contact, 5V, 12V, 24V, 31V
- Two relay outputs rated at 2A continuous and 6A surge at 30VAC or 42VDC
- Status LEDs for each input and output
- Programmable input threshold levels on both digital inputs
- Hand/Off/Auto switches on the front panel for manual control of the two relay outputs
- Hardware support for high-speed (up to 20KHz) frequency measurement on both digital inputs
- LNS Plug-In
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark

Description

The DIO-10 Module is a LONMARK device that provides two digital inputs and two relay outputs. The digital inputs can monitor dry contacts or 31VDC voltage inputs. The two relay outputs are rated at 2A continuous and 6A surge at 30VAC or 42VDC.

Separate status LEDs are provided for each input and output. Separate Hand/Off/Auto switches are provided for each relay output. The module operates from 16 to 30 VAC or VDC, allowing it to be powered from the same source as the sensors.

The module's application consists of LONMARK functional blocks that implement input, output, and control functions. An LNS plug-in configures the LONMARK functional blocks.

DO-10 DIGITAL OUTPUT INTERFACE MODULE - MODEL 41200

Features

- Seamlessly integrates digital actuators into interoperable LONWORKS networks
- 4 digital outputs: 0-12VDC
- Separate Hand/Off/Auto switch and status LED for each output
- LNS Plug-In
- LONMARK, U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The DO-10 Module is a LONMARK device that provides 4 digital outputs of 0-12V; 100mA source/sink maximum on any one output; or 110mA source/ 400mA sink on all outputs combined. Separate Hand/Off/Auto front panel DIP switches and status LEDs are provided for each output. The module operates from 16 to 30VAC or VDC, allowing it to be powered from the same source as the actuators.

The module's application consists of LONMARK functional blocks that implement output and control functions. An LNS plug-in configures the LONMARK functional blocks.

TERMINATORS MODELS 44100, 44101, AND 44200

Features

- Model 44100 for free topology TP/FT-10 channel (one required)
- Model 44101 for bus topology TP/FT-10 channel (two required)
- Model 44200 for bus topology TP/XF-78 and TP/XF-1250 channels (two required)
- Flying wire leads with earth ground wire for electro-static discharge
- Small size fits easily in junction box or equipment enclosure
- U.L. Recognized, cU.L. Recognized, CE Mark

Description

The Terminator modules provide electrical termination for twisted pair channels. In a free topology TP/FT-10 segment, one Model 44100 Terminator is required and may be placed anywhere on the segment. In a bus topology TP/FT-10 channel, two Model 44101 Terminators are required—one at each end of the bus. Bus topology TP/XF-78 and TP/XF-1250 channels require two Model 44200 Terminators.

I/O and Control Modules

TYPE 1 AND TYPE 2 BASE PLATES MODELS 40111 AND 40222

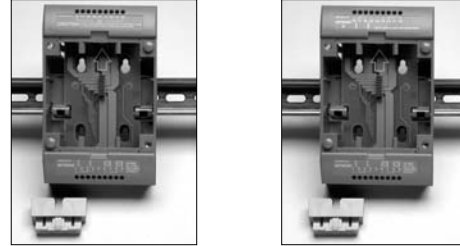### Features

- Base Plates for use with LonPoint Interface and LPR Routers
- Mounts to 4" square x 2" deep electrical boxes
- Allows pre-wiring and cable testing by an electrician prior to installing the electronics
- Color-coded, wire clamp style screw terminals accept 12-24AW (2 to 0.5mm) wire
- Power and network wiring are "looped" through each Base Plate, providing continuity during hot-plugging
- U.L. Listed, cU.L. Listed

Description

The Base Plates provide an interface between a LonPoint Module and the network, power, and I/O wiring. There are two types of Base Plates. The Type 1 Base Plate (Model 40111) is used with LonPoint Interface Modules. The Type 2 Base Plate (Model 40222) is used with LPR Router Modules. The Type 1 and Type 2 Base Plates are keyed to prevent accidental insertion of an incorrect module type.

TYPE 1D DIN AND TYPE 2D DIN BASE PLATES - MODELS 48111 AND 48222
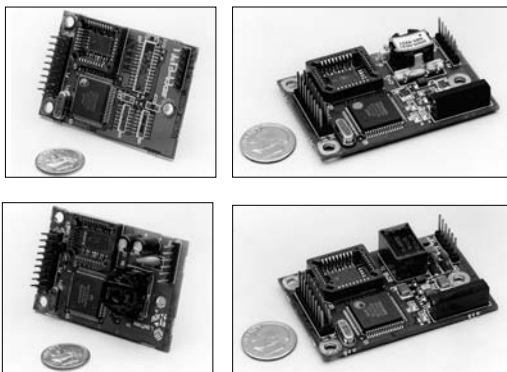

Features

- DIN Rail Base Plates for use with the LonPoint Interface, and LPR Routers
- Jumper Plug speeds connection of adjacent Base Plates
- Allows pre-wiring and cable testing by an electrician prior to installing the electronics
- Numbered wire clamp-style screw terminals accept 12-24 AW (2 to 0.5mm) wire
- Power and network wiring are looped through each Base Plate, providing continuity during hot-plugging
- U.L. Listed, cU.L. Listed, CE Mark

Description

The Type 1D DIN and Type 2D DIN Base Plates provide an interface between a LonPoint Module and the network, power, and I/O wiring. The DIN Rail Base Plates are designed to be installed on either 35mm x 7.5mm or 35mm x 15mm DIN rails or, using the integral keyhole slots, on a wall or panel.

There are two types of DIN Rail Base Plates. The Type 1D DIN Base Plate (Model 48111) is used with LonPoint Interface Modules, while the Type 2D DIN Base Plate (Model 48222) is used with LPR Routers.

I/O and Control Modules

TWISTED PAIR CONTROL MODULES
MODELS 55010-00, 55010-10, 55020-01, 55020-10, AND 55030-00

Features

- Neuron 3150 Chip
- Differential Manchester-encoded signaling and transformer-isolation for polarity-insensitive network wiring
- Distances up to 500 meters worst case in free topology (TP/FT-10, TP/FT-10F)
- Distances up to 2,700 meters worst case in doubly terminated bus topology (TP/FT-10, TP/FT-10F)
- Flash memory support on TP/FT-10F and TP/XF-78F
- Common form factor makes control modules interchangeable
- Low power consumption
- Designed to comply with FCC and VDE Level B requirements
- U.L., CSA, TÜV Recognized components

Description

Control modules provide a simple, cost-effective method of adding a LONWORKS processor and interface to any device A control module consists of a miniature circuit card containing a Neuron 3150 Chip, PROM, or flash (TP/FT-10F, TP/XF-78F) memory socket, a communication transceiver, and connectors for power, I/O, and the network. Three transceiver options are available for twisted pair control modules:

- Free topology, transformer-isolated, 78kbps, differential Manchester-encoded (TP/FT-10, TP/FT-10F)
- Transformer-isolated, 78kbps, differential Manchester-encoded (TP/XF-78, TP/XF-78F)
- Transformer-isolated, 1.25Mbps, differential Manchester-encoded (TP/XF-1250)

LTM-10A LONTALK MODULE
MODEL 65100-100

Features

- 32Kbytes flash memory provides non-volatile application memory that can be reprogrammed in the field
- 32Kbytes RAM provides protocol buffer space for applications that receive large bursts of network traffic
- 2 memory maps allow the developer to maximize flash or RAM space
- Built-in Microprocessor Interface Program (MIP)
- 10MHz input clock
- Modular connectors allow modules to be exchanged without soldering
- Supports most standard LONWORKS transceivers

Description

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

The LTM-10A module includes standard Neuron firmware with extensions for automatic configuration of transceiver parameters, output of a packet-transmitted signal, manual device recovery, and a Microprocessor Interface Program (MIP).

I/O and Control Modules

LONWORKS Routers

Transparent support for multiple media is a unique feature of the LONWORKS platform, allowing developers to choose whatever media best suits their needs. Multiple media support is made possible by routers, which adjust bit rate and other communication parameters to accommodate differences between multiple media. Routers can also be used to control network traffic and partition sections of the network from traffic in another section, increasing the total throughput and capacity of the network. LNS network tools automatically configure routers based on network topology, making the installation of routers easy for installers and transparent to the LONWORKS devices.

Product	Models	Description
MPR-50 Multi-Port Router	42150	Five-channel LONWORKS router (one TP/XF-1250 channel and four TP/FT-10 channels)
LPR Routers	42100 42101 42102 42103 42104 42105	Two-channel routers that can interface two different twisted pair channels (TP/FT-10, TP/XF-78, and TP/XF-1250)
RTR-10 Router Core Module	61000	Compact router in a single in-line module (SIM)

LPR ROUTERS
## MODELS 42100, 42101, 42102, 42103, 42104, AND 4205

Features
- Router for TP/FT-10, TP/XF-78, and TP/XF-1250 LONWORKS channels
- Screw terminal wiring connections
- 16-30VAC or VDC operation
- Network access from front panel jacks
- Two-piece design cuts installation time, cost
- U.L. Listed, cU.L. Listed, CE Mark, FCC

Description
The LPR Routers are two-channel LONWORKS routers that can interface two different twisted pair channels (e.g., a high-speed 1.25Mbps TP/XF-1250 backbone and a TP/FT-10 free topology channel) to manage network traffic, increase the total number of LONWORKS devices, or increase the amount of cabling in a system.

LPR Routers can be installed as repeaters, configured routers, or learning routers. Using the LonMaker Integration Tool, the user configures and commissions the LPR Routers and other LonPoint Modules, as well as third-party LONMARK and LONWORKS devices, to create an interoperable, distributed control system.

MPR-50 MULTI-PORT ROUTER
MODEL 42150
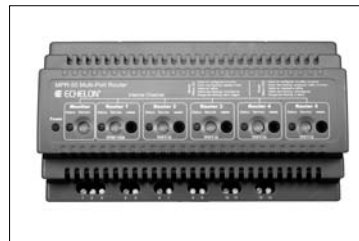
Features
- Low-cost 5 channel LONWORKS (ANSI/CEA-709.1) router (one TP/XF-1250 channel and four TP/FT-10 channels)
- Screw terminal wiring connections
- High network throughput and performance
- Rugged design
- DIN rail and wall mount compatible
- Flexible 9-28VAC 40-70Hz, 9-35VDC power input
- All five channels individually accessible from 3.5mm mono phone jacks on front panel
- Intelligent LONMARK certified monitor cuts installation time and cost
- CE, U.L., cU.L., and TÜV

Description
The MPR-50 Multi-Port Router provides ANSI/CEA-709.1 compliant routing among five channels: four TP/FT-10 Free Topology Twisted Pair (ANSI/CEA-709.3) channels and one LONMARK standard TP/XF-1250 channel. Each of the TP/FT-10 channel connections is fully compatible with link powered channels. The MPR-50 can be used to connect two, three, or four TP/FT-10 channels together, or it can be used to connect these TP/FT-10 channels to a high speed TP/XF-1250 backbone. Used in small- and large-scale Echelon control network installations, the MPR-50 substantially reduces the installation time and cost any time multiple channels are used.

The MPR-50 Multi-Port Router is compatible with all network management systems, including the LNS network operating system and end-users tools such as the LonMaker Integration Tool. In addition, the MPR-50 can be installed as an intelligent repeater—without any tools whatsoever

LONWORKS Routers

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RTR-10 ROUTER CORE MODULE
MODEL 61000
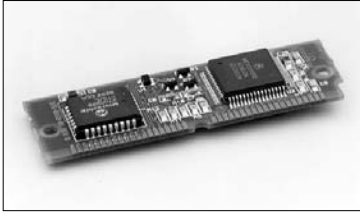
Features

- Compact router in a single in-line module (SIM) form factor
- Transparent multi-channel and multi-media support
- 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
- 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 LONWORKS routers. LONWORKS routers connect two communications channels and route LONWORKS messages between them. The RTR-10 Module consists of the core electronics and firmware on a compact single in-line module (SIM). The RTR-10 router comes pre-configured to support many common LONWORKS transceiver parameters. Pins on the RTR-10 router are used to automatically configure the RTR-10 router for standard and custom transceivers.

The RTR-10 can use one of four routing algorithms: configured and learning modes use routing tables to selectively forward messages based on the destination address; the bridge mode forwards all valid packets that match its domains; and the repeater mode forwards all valid packets

Network Interfaces

Echelon's network interfaces are the highest-performance, highest-quality, lowest-cost network interfaces available. Compatible with desktop and notebook PCs, and featuring a wide range of channel and interface options, there's a solution for every need.

All network interfaces are compatible with LNS and OpenLDV applications on Windows 2000, Windows XP, and Windows Server 2003. The PCLTA-20, PCLTA-21, PCC-10, and SLTA-10 also work with LNS and OpenLDV applications on Windows 98 and Windows NT. All network interfaces except the SLTA-10 and *i*.LON 10 adapter work with the LonScanner Protocol Analyzer.

Product	Models	Description
i.LON 10 Ethernet Adapter	72010 72011	A low-cost, high-performance interface that connects LONWORKS based everyday devices to the Internet, a LAN, or a WAN
LTS-20 LonTalk Serial Adapter Core Module	65202	Used to build serial LONWORKS adapters that require an LNS network interface or MIP-compatible network interface.
PCC-10 PC Card	73200	Provides both LNS network interface functionality and non-intelligent network interface functionality for use with legacy (non-LNS) tools.
PCLTA-20/SMX PCI Interface	74405	5V 32-bit half-length PCI for LONWORKS networks
PCLTA-21 PCI Interface	74501 74502 74503 74504	3.3V or 5V, PCI or PCI-X, half-length, MD1 compatible (standard and MD1 compatible brackets included) interface for LONWORKS networks.
PSG/3 Programmable Serial Gateway	73381 73382 73383 73384	Programmable gateway with an EIA-232C serial interface.
PSG-20 Serial Gateway Core Module	73390	Embedded, programmable serial gateway in a single in-line module (SIM) form factor.
SLTA-10 Serial LonTalk Adapter	73351 73352 73353	Serial EIA-232 interface connects host processors and Hayes-compatible modems to LONWORKS networks.
U10/U20 USB Network Interfaces	75010 75020-1 75020-2	Low-cost, high-performance LONWORKS interfaces for USB-enabled PCs.

## *i*.LON 10 ETHERNET ADAPTER MODELS 72010 AND 72011

Features

- Connects LONWORKS® networks to TCP/IP Ethernet networks for residential, commercial, and utility applications
- Power line (PL-20) or twisted pair (TP/XF-FT-10) LONWORKS channel support
- 10 BaseT Ethernet interface
- MD5 secured communications
- Supports PPP remote dial-up to local ISP or corporate terminal servers with optional external modem
- Compatible with NAT for operation behind firewalls
- Static or acquired (DHCP) IP address
- Uses less than 2% of available 10 BaseT bandwidth
- Local or remote configuration via built-in configuration Web page
- U.L., cU.L., CE, TÜV, C-Tick

Description

The *i*.LON 10 Ethernet Adapter is a low-cost interface that connects LONWORKS based everyday devices to the Internet, a LAN, or a WAN. Through the *i*.LON 10 Adapter, everyday devices like appliances, meters, load controls, lights, security systems, pumps, and valves can be connected to the Internet via a 10 BaseT broadband connection or PPP dial-up connection using an external modem. A local or remote service center running Echelon's LNS server can then configure, monitor and control the devices – from across the room or across the world.

The *i*.LON 10 Adapter is available with a power line (Model 72011) or free topology twisted pair (Model 72010) channel interface.

LTS-20 SERIAL ADAPTER CORE MODULE - MODEL 65202
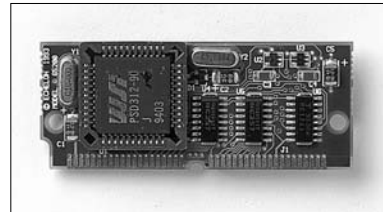
Features

- Compact single in-line module (SIM) form factor
- LNS network interface firmware supports LNS applications
- Supports any host with a standard EIA-232C serial interface
- Transceiver-independent design
- 1,200 to 115,200bps serial bit rate to the host
- Dial-in and dial-out support of compatible modems
- Optional password protection
- Direct replacement for LTS-10 core module
- CE, FCC

Description

The LTS-20 Serial Adapter Core Module is a compact module used by OEMs to build serial LONWORKS adapters that require an LNS network interface or Microprocessor Interface Program (MIP)-compatible network interface. Any host processor with an EIA-232C (formerly RS-232C) serial interface can implement LNS or LONWORKS applications and communicate with other LONWORKS devices. The host processor may be directly connected to the serial adapter or may be connected over a telephone line using a modem.

The module incorporates LNS network interface firmware that permits the module to be used as the network interface for LNS applications. A cutable jumper selects between the LNS mode (default) and MIP modes of operation.

Network Interfaces

PCC-10 PC CARD
MODEL 73200

Features

- Type II PC Card for LONWORKS networks
- Integral free topology transceiver supports both free topology and link power channels
- Single-ended and special-purpose mode ports, and current-limited 5VDC power, provided for external transceiver pods
- Downloadable LNS network interface and LNS fast network interface firmware for use with LNS applications
- Two versions: network adapter only and LonManager Protocol Analyzer with network adapter
- Downloadable firmware allows updates without accessing or changing hardware
- User-selectable languages for error messages
- E Mark, U.L., CSA, TÜV

Description

The PCC-10 Network Adapter is a high-performance interface that is ideal for portable installation, maintenance, monitoring, and control tools. Its compact form-factor and integral TP/FT-10-compatible free topology transceiver make it well suited for use by installation and service personnel of industrial automation, building controls, entertainment/lighting systems, and telecommunications systems.

The PCC-10 Network Adapter provides both LNS network interface functionality, for use with LNS tools such as the LonMaker Integration Tool, and non-intelligent network interface functionality for use with legacy (non-LNS) tools. The card can be used with any notebook, palmtop, or embedded PC with a Type II PC Card (formerly PCMCIA) slot and a compatible operating system. The PCC-10 functions under Windows XP, Windows 2000, and Windows 98 operating systems.

## PCLTA-20/SMX PCI NETWORK
INTERFACE
MODEL 74405
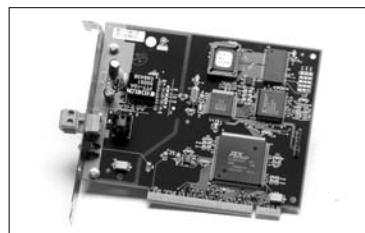
Features

- 32-bit PCI adapter card with SMX transceiver connector for LONWORKS networks
- Plug-and-play capability with Windows Server 2003, Windows XP, Windows 2000, and Windows 98
- Downloadable firmware allows updates without accessing or changing hardware
- Downloadable LNS network interface and LNS fast network interface firmware supports LNS applications
- CE Mark, U.L., cU.L.

Description

The PCLTA-20/SMX PCI Network Interface is a high-performance LONWORKS interface for personal computers equipped with a 32-bit Peripheral Component Interconnect (PCI) interface and a compatible operating system. Designed for use in LONWORKS networks that require a PC to monitor, manage, operate, or maintain the network, the PCLTA-20 adapter is ideal for industrial control, building automation, and process control applications. The PCLTA-20 adapter features an SMX transceiver interface, downloadable memory, and compatibility with Windows Server 2003, Windows XP, Windows 2000, and Windows 98.

Network Interfaces

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PCLTA-21 PCI NETWORK INTERFACE MODELS 74501, 74502, 74503, and 74504
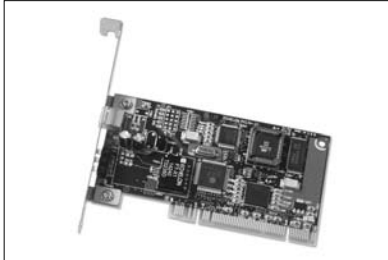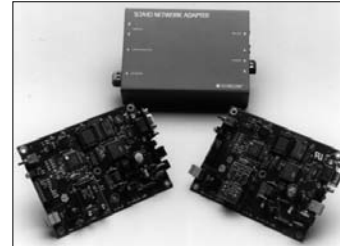

Features

- Universal 32-bit PCI adapter card for LONWORKS networks for PCs with 3.3V or 5V PCI
- Plug-and-play network driver compatible with Microsoft Windows 98/2000 and Windows XP
- Downloadable firmware allows updates without accessing or changing hardware
- Integral FT 3150 Free Topology Smart Transceiver, RS-485, TPT/XF-78, or TPT/XF-1250 transceiver
- LNS Network Services Interface (NSI) supports LNS applications
- Layer 5 MIP for use with OpenLDV driver
- CE Mark, U.L. Listed, cU.L. Listed

Description

The PCLTA-21 Network Adapter is a high-performance LONWORKS interface for personal computers equipped with a 3.3V or 5V 32-bit Peripheral Component Interconnect (PCI) interface and a compatible operating system. Designed for use in LONWORKS control networks that require a PC for monitoring, managing, or diagnosing the network, the PCLTA-21 adapter is ideal for industrial control, building automation, and process control applications. The PCLTA-21 adapter features an integral twisted pair transceiver, downloadable memory, a network management interface, and plug-and-play capability with Microsoft Windows 98/2000 and Windows XP.

The PCLTA-21 adapter provides both LNS network services interface (NSI) functionality for use with LNS tools, and Microprocessor Interface Program (MIP)-compatible network interface functionality for use with LonManager API-based tools or OpenLDV drivers.

## PSG/3 PROGRAMMABLE SERIAL GATEWAY - MODELS 73381, 73382, 73383, AND 73384

Features

- Programmable gateway with an EIA-232C interface
- 1,200 to 115,200bps serial bit rate
- Choice of TP/FT-10, TP/XF-78, and TP/ XF-1250 twisted pair channels
- Buffered 16550-compatible UART allows asynchronous processing between the external device and the Neuron Chip on the gateway using a 16-character FIFO in the UART
- 9-30VAC or DC power input via removable screw terminals or barrel connector
- Compatible with LonBuilder and NodeBuilder development tools
- CE Mark, U.L., cU.L., TÜV

Description

The PSG/3 Programmable Serial Gateway is a compact device used by OEMs to build gateways between LONWORKS networks and devices or systems with serial EIA-232C (formerly RS-232C) interfaces. Typical applications for the PSG/3 include LONWORKS gateways for programmable logic controllers, servo controllers, smart instruments, keypads, displays, and serial gateways to other networks. The PSG/3 includes a motherboard with high-speed UART and EIA-232 drivers, regulator, and a metal enclosure.

PSG-20 SERIAL GATEWAY CORE MODULE - MODEL 73390
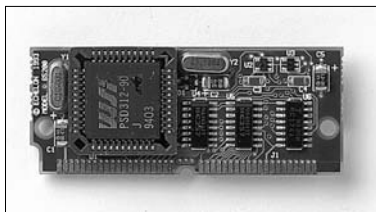
Features

• Embedded, programmable serial gateway in a single in-line module (SIM) form factor
• Transceiver-independent design connects to any LONWORKS channel with a transceiver interface rate from 9.8kbps to 1.25Mbps
• 1,200 to 115,200bps serial bit rate
• 4Kbytes RAM and up to 42Kbytes application PROM
• Buffered 16550-compatible UART allows asynchronous processing between the external device and the Neuron Chip on the gateway using a 16-character FIFO in the UART
• Compatible with the LonBuilder and NodeBuilder PSG access library
• CE Mark, FCC

Description

The PSG-20 Serial Gateway Core Module is a compact module used by OEMs to build gateways between LONWORKS networks and devices or systems with serial EIA-232C (formerly RS-232C) interfaces. Typical applications for the PSG-20 module include LONWORKS gateways for programmable logic controllers, servo controllers, smart sensors, keypads, displays, and serial gateways to other control networks.

SLTA-10 SERIAL LONTALK ADAPTER MODELS 73351, 73352, AND 73353
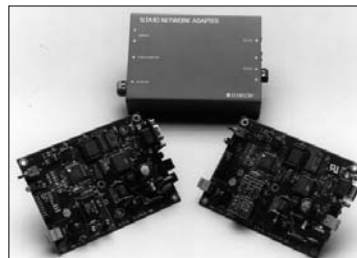
Features

• Serial EIA-232 interface connects host processors and Hayes-compatible modems to LONWORKS networks
• LNS network interface firmware supports LNS applications
• 1,200 to 115,200bps serial bit rate with autobaud detection
• Automatic dial-out with compatible modem
• DIP switch selectable LNS network interface and parallel MIP (SLTA/2 compatible) operating modes
• Integral TP/FT-10, TP/XF-78, or TP/XF-1250 transceiver
• Color-coded, removable screw terminals for network and power wiring
• Configuration DIP switches accessible without opening chassis
• 9-30VAC or DC power input via removable screw terminals or barrel connector
• Metal enclosure for desk or wall mounting
• CE Mark, U.L., cU.L., TÜV

Description

The SLTA-10 Serial LonTalk Adapter is a high-performance LONWORKS interface for use with Hayes-compatible modems, notebook, desktop, or embedded personal computers equipped with an EIA-232 serial interface and a compatible operating system. Designed for use in LONWORKS networks that require remote dial-in/dial-out network access or a host processor to monitor, manage, or diagnose the network, the SLTA-10 adapter is ideal for industrial control, building automation, and process control applications. Drivers are available for Windows XP, Windows 2000, and Windows 98. LinkManager software simplifies the task of communicating with multiple SLTA-10s from a central location.

Network Interfaces

U10/U20 USB NETWORK INTERFACES
MODELS 75010, 75020-1 AND 75020-2

U10 USB Network Interface – TP/FT-10 Channel

U20 USB Network Interface – PL-20 Channel

Features

- Low-cost USB to LONWORKS (ANSI/CEA-709.1) network interface
- Free topology twisted pair (TP/FT-10) and power line (PL-20 C-Band) LONWORKS channel support
- Highest possible network throughput and performance
- Rugged design, removable connectors
- Plug-and-play drivers for Windows XP, 2000, and Server 2003
- Functions as an LNS High Performance Network Interface when used with LNS 3 and LNS Turbo Edition
- Compatible with OpenLDV applications and the LonScanner Protocol Analyzer
- CE, U.L., cU.L., and TÜV

Description

The U10 and U20 USB Network Interfaces are low-cost, high-performance LONWORKS interfaces for USB-enabled PCs. The U10 USB Network Interface connects to a TP/FT-10 Free Topology Twisted Pair (ANSI/CEA-709.3) LONWORKS channel through a removable connector, and is fully compatible with link powered channels. The U20 USB Network Interface connects to a PL-20 Power Line (ANSI/CEA-709.2) LONWORKS channel through a wall plug coupling circuit/power supply (included). The U20 interface may also be connected directly to 10.8-18VDC power lines without a coupling circuit, or to virtually any powered line with a customer-supplied coupling circuit/power supply.

The U10 and U20 interfaces are certified USB 2.0 compatible by the USB Implementers Forum. In addition, the U10 and U20 interfaces carry the Designed for Windows XP logo compatibility certification.

A 60cm USB extension cable is included with both the U10 and U20 interfaces, to allow for easy connection in various laptop and desktop environments. An optional 3 meter cable accessory is available for the U10 interface; this cable accessory allows easy network connection between the U10 interface and LonPoint Routers, the MPR-50 Multi-Port Router, and the numerous third-party devices that implement the 3.5mm mono phone plug standard.

Network Tools

Network Tools

LONWORKS network tools are the premier toolset for building and maintaining LONWORKS control networks. These tools are made to speed network design, commissioning, and maintenance tasks.

Product	Models	Description
LonMaker Integration Tool	37000-32 37020-32	Software for designing, installing, operating, and maintaining multi-vendor, open, interoperable LONWORKS networks.
LonScanner Protocol Analyzer	33100-301 33100-302	Hardware and software network diagnostic tool for system integrators, end-users, and LONWORKS manufacturers.
LNS DDE Server	37200	DDE- and SuiteLink compatible interface to LONWORKS networks. Compatible with many HMI and SCADA tools.
DM-20 Device Manager	43201	Automatically manages up to 128 devices; configured with LonMaker Integration Tool; TP/FT-10 transceiver built-in. Embeddable PCB.
DM-21 Device Manager	43202	Automatically manages up to 128 devices; configured with the LonMaker Integration Tool; TP/FT-10 transceiver built-in. LonPoint module form-factor.

Network Interfaces

LONMAKER INTEGRATION TOOL / TURBO EDITIONS MODELS 37000-32 AND 37020-32
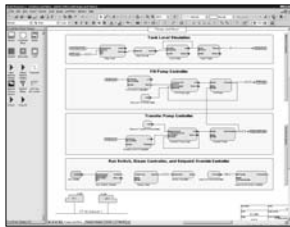
Features

- Provides graphical design, commissioning, operation, and maintenance for LONWORKS networks
- Includes the LNS Network Operating System Turbo Edition (new!) and Microsoft Visio 2003 (new!)
- Supports multiple users modifying devices in the network at the same time (new!)
- Provides automatic connection-type selection to reduce common errors when specifying connections (new!)
- Includes a streamlined interface to reduce engineering time (new!)
- Includes Visio SmartShape operator interface components (new!)
- Integrates easily with third-party tools and applications with an XML import/export capability (new!)
- Supports remote access via LONWORKS or IP networks
- Includes *i*.LON support for easy integration with the Internet and other IP networks
- Recovers a design from existing networks
- Merges independent networks into a single network
- Simplifies installation with integrated support for LNS plug-ins and LONMARK devices

Description

The LonMaker Integration Tool, Turbo Editions Release 3.2, is a software package for designing, installing, operating, and maintaining multi-vendor, open, interoperable LONWORKS networks. Based on Echelon's LNS network operating system, the LonMaker tool combines a powerful client-server architecture and a user-friendly Microsoft Visio interface. The result is a tool that is sophisticated enough to design and commission a control network, yet economical enough to be left behind as an operations and maintenance tool.

The LonMaker tool provides comprehensive support for LONMARK devices, *i*.LON Internet Servers, and other LONWORKS devices. The tool takes full advantage of LONMARK features such as standard functional profiles, configuration properties, resource files, network variable aliases, dynamic network variables, dynamic functional blocks, and changeable types. LONMARK functional profiles are exposed as graphical functional blocks within a LonMaker drawing, making it easy to visualize and document the logic of a control system. LNS plug-ins are supported for easy installation.

Users are provided with a familiar, CAD-like environment for designing a control system. Visio's smart shape drawing feature provides an intuitive, simple means for creating devices. The LonMaker tool includes a number of smart shapes for LONWORKS networks, and users can create new custom shapes. Custom shapes may be as simple as a single device, functional block, or connection, or as complex as a complete subsystem with nested subsystems and predefined devices, functional blocks, and connections between them. Using custom subsystem shapes, additional subsystems can be created by simply dragging a custom subsystem shape from a stencil to the drawing, a time-saving feature when designing complex systems.

Network installation time is minimized by the ability of the installer to commission multiple devices at the same time. Devices can be identified by service pin, bar code scanning, winking, manual entry, or automatic recovery. Network installation time is further reduced with a new automatic connection-type selection feature. When an integrator creates or modifies a connection, the LonMaker tool provides a smart default for the connection type based on the type of connection created. This new feature reduces common errors when specifying connections. Creating and managing connections is further simplified with a new drag-and-drop connector tool and a new capability to hide connections in a LonMaker drawing.

Network Tools

PRELIMINARY

LONSCANNER PROTOCOL ANALYZER MODELS 33100-301 AND 33100-302

Features

- Captures, analyzes, characterizes, and displays all ANSI/CEA-709.1 packets on a channel for detailed analysis of network activity and traffic patterns
- Supports the most popular 709.1 network interfaces including Echelon's U10 and U20 USB Network Interfaces, PCC-10 PC Card Network Adapter, PCLTA-21 PCI Network Adapter, *i*.LON 100 Internet Server, and *i*.LON 600 Internet Server
- Monitors IP-852 channels when used with an LNS Turbo runtime
- Monitors local or remote networks when using the *i*.LON 100 or 600 Internet Servers
- Runs on Windows XP, Windows Server 2003, and Windows 2000
- Supports sharing a network interface with LNS applications including the LonMaker Integration Tool
- Interprets packet contents without the need to interpret raw hex data
- Simplifies packet log interpretation with a sophisticated transaction analysis system that associates related packets
- Supports receive filters that reduce the amount of logged data to help isolate problems quickly
- Displays device and network variable names in addition to network addresses based on user definitions or based on names from any LNS network database including databases generated by the LonMaker Integration Tool
- Formats network variable values based on LONMARK resource files to simplify data interpretation
- Displays comprehensive network statistics data to provide a detailed analysis of the network's health
- Displays network loading and error rate data in long-term trend graphs, allowing easy identification of excessive network traffic or errors
- Monitors multiple channels and networks simultaneously

Description

The LonScanner Protocol Analyzer provides LONWORKS manufacturers, system integrators, and end-users with an easy-to-use Windows tool to allow users to observe, analyze, and diagnose the behavior of installed LONWORKS networks. The tool provides the advanced productivity features common in data network analyzers, adapted to the unique needs of control networks.

The protocol analyzer simplifies network maintenance by collecting, time-stamping, and saving all network communications into log files that can be later viewed and analyzed. Multiple logs and network interfaces can be active at the same time, making it simple to collect packets from multiple sources in a multi-channel network, or from multiple networks.

A sophisticated transaction analysis system examines each packet as it arrives and associates related packets to aid the user in understanding and interpreting traffic patterns in their network.

The protocol analyzer is compatible with a variety of network interfaces including Echelon's U10 and U20 USB Network Interfaces, PCC-10 PC Card Network Adapter, PCLTA-21 PCI Network Adapter, *i*.LON 100 Internet Server, and *i*.LON 600 Internet Server. Networks may be accessed locally or remotely via the Internet when using an *i*.LON 100 or *i*.LON 600 server. All network interfaces provide reliable diagnostics and accurate time-stamping—even if the network is saturated. The protocol analyzer can share any of these network interfaces with multiple LNS applications, including the LonMaker Integration Tool. This enables users to use a single network interface for all network monitoring, control, management, maintenance, and diagnostics operations.

Network Tools

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LNS DDE SERVER / RELEASE 2.1
MODEL 37200
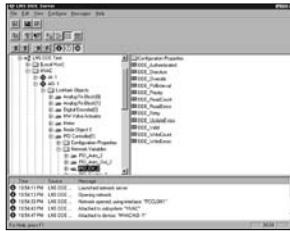
Features

- Interfaces HMI and visualization applications installed with LNS tools
- Reads and writes network variables, configuration properties, and application messages
- Supports LONMARK functional blocks
- Remote access via LNS or NetDDE
- Supports multiple clients and networks on the same computer or multiple computers
- Provides easy client set-up with a point browser and DDE copy/paste link support
- Used with hundreds of programs that support the Microsoft DDE and WonderWare SuiteLink protocols
- Supports Wonderware FastDDE protocol

Description

The LNS DDE Server is a software package that allows any DDE- or SuiteLink compatible Microsoft Windows application to monitor and control LONWORKS networks-without programming. Typical applications for the LNS DDE Server include interfaces with HMI applications, data logging and trending applications, and graphical process displays.

By linking LNS and Microsoft's DDE or Wonderware's SuiteLink protocol, DDE- and SuiteLink-compatible Windows applications can interact with LONWORKS devices using any of the following methods:

- Read, monitor, and modify the value of any network variable
- Supervise and change configuration properties
- Receive and send application messages
- Test, enable, disable, and override LONMARK functional blocks
- Test, wink, and control devices

DM-20 AND DM-21 DEVICE MANAGER
MODELS 43201 AND 43202
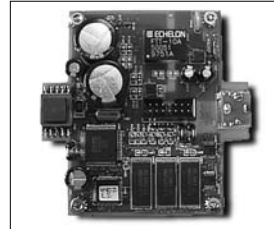
Features

- Provides automatic installation, fault detection, and device replacement of a LONWORKS network with up to 128 devices and one router
- Operates autonomously, without a PC, after commissioning
- Holds up to 16 databases
- Supports multiple networks via runtime database selection
- Stores database in flash memory—no batteries required
- Two-piece design cuts installation time, cost
- U.L. Listed, cU.L. Listed, CE Mark, FCC

Description

The DM-20 and DM-21 Device Manager Modules permit manufacturers and integrators to manage the operation and maintenance of a control network without an on-site PC. The DMs are ideal for networks with 128 or fewer devices in which automatic, highly reliable network management is required and a PC is impractical to use for this purpose. The DM-20 is supplied as a plug-in circuit card for use in embedded applications. The DM-21 is packaged in a LonPoint housing and is compatible with a Type 1 or 1D Base Plate.

Typical applications include machine tools, printing presses, water treatment systems, light rail vehicles, rail cars and propulsion systems, wayside control networks, airplanes, elevators, power substation systems, semiconductor manufacturing equipment, intelligent highway systems, and robotics equipment.

Network Tools

Transceivers and Smart Transceivers

Echelon's transceivers and smart transceivers make control networks easy to install and highly reliable, reducing both labor and equipment costs.

Echelon is presently converting most of its products to be RoHS-compliant, a process expected to be completed by 30 June 2006. The schedule for RoHS conversion of our products may be found on the RoHS section of Echelon's Web site at http://www.echelon.com/products/rohs_schedule.htm. RoHS-compliant products listed in this catalog can be identified by an "R" at the end of the product model number.

Product	Models	Description
FT 3120 and FT 3150 Free Topology Smart Transceivers	14212R-500 14222R-800 14230R-450	Integrated Neuron 3120 or Neuron 3150 processor core with a free topology twisted pair transceiver; high-performance external transformer.
FTT-10A Free Topology Transceiver	50051 50051R	Compatible with FTT-10 and LPT-11 transceivers.
LPI-10 Link Power Interface Module	56210-01	Couples power from a customer's 48VDC power supply to the link power twisted pair wire.
LPT-11 Link Power Twisted Pair Transceiver	50040-02 50040R-02	Combines power and data on a common twisted wire pair.
PLCA-22 Power Line Communications Analyzer	58022	Tool for assessing the performance and efficacious-ness of the PL 3120 and PL 3150 Power Line Smart Transceivers.
PL 3120 and PL 3150 Power Line Smart Transceivers	15311R-1000 15321R-960	Integrated Neuron 3120 or Neuron 3150 processor core with a power line transceiver.
Power Line Smart Transceiver Development Support Kit (PL DSK)	17050-20-271 17050-20-272 17060-20-272	Resource kit with reference designs for the external discrete interface circuitry that needs to be implemented with the Power Line Smart Transceiver IC.
TPM/XF-78 Modular Transceiver	77010	Compatible with TP/XF-78 channels.
TPM/XF-1250 Modular Transceiver	77030	Compatible with TP/XF-1250 channels.
FTM-10 Modular Transceiver	77040	Compatible with TP/FT-10 channels with or with-out link power.
TPM-RS485 Modular Transceiver	77050	Compatible with TP/RS485 channels.
PLM-22 Modular Transceiver	77162	Compatible with PL-20 channel.
TPT/XF-78 Twisted Pair Transceiver	50010-10	Features differential Manchester-encoded signaling. Compatible with TP/XF-78 channels.
TPT/XF-1250 Twisted Pair Transceiver	50020-10	Features differential Manchester-encoded signaling. Compatible with TP/XF-1250 channels.

Transceivers

FT 3120 / FT 3150 FREE TOPOLOGY SMART TRANSCEIVERS - MODELS 14212R-500, 14222R-800, 14230R-450

FT 3120 Free Topology Smart Transceiver in a 44-pin TQFP package

Features

- Combines an ANSI/CEA-709.3 compliant free topology twisted pair transceiver with a Neuron 3120 or Neuron 3150 network processor core
- Supports polarity insensitive free topology star, daisy chain, bus, loop, or mixed topology wiring
- 78 kilobits per second bit rate for distances up to 500 meters in free topology or 2700 meters in bus topology with double terminations
- High performance Neuron network processor core enables concurrent processing of application code and network packets (40MHz maximum for FT 3120 chip, 20MHz for FT 3150 chip)
- 4Kbytes of embedded EEPROM for application code and configuration data on the FT 3120 Smart Transceiver and 0.5Kbytes of embedded EEPROM for configuration data on the FT 3150 Free Topology Smart Transceiver
- Interface for external memory for nodes with larger memory requirements (FT 3150 Free Topology Smart Transceiver only)
- 2Kbytes of embedded RAM for buffering network data and network variables
- 11 I/O pins with 34 programmable standard I/O modes minimizing external interface circuitry
- Unique 48-bit ID in every device for network installation and management
- Compact external transformer with patent pending architecture providing exceptional immunity from magnetic interference and high frequency common mode noise
- Communications parameters preloaded for TP/FT-10 @ 10MHz
- U.L., CSA, TÜV Recognized component

Description

The FT 3120 and FT 3150 Free Topology Smart Transceivers integrate a Neuron 3120 or Neuron 3150 network processor core, respectively, with a free topology twisted pair transceiver to create a low cost, smart transceiver on a chip. Combined with Echelon's high performance FT-X1 (through-hole) or FT-X2 (surface-mount) Communication Transformer, the FT 3120 and FT 3150 transceivers set new benchmarks for performance, robustness, and low cost.

The free topology transceiver supports polarity insensitive cabling using a star, bus, daisy-chain, loop, or combination topology—freeing the installer from the need to adhere to a strict set of wiring rules. Free topology wiring reduces the time and expense of node installation by allowing the wiring to be installed in the most expeditious and cost-effective manner. It also simplifies network expansion by eliminating restrictions on wire routing, splicing, and node placement.

The FT 3120 Free Topology Smart Transceiver is a complete system-on-a-chip that is targeted at cost-sensitive and small form factor designs with a need for up to 4Kbytes of application code. The Neuron 3120 core operates at up to 40MHz, and includes 4Kbytes of EEPROM and 2Kbytes of RAM. The LONWORKS system firmware is pre-programmed in an on-chip ROM. The application code is stored in the embedded EEPROM memory and may be updated over the network. The FT 3120 chip is offered in a 32-lead SOIC package as well as a compact 44-lead TQFP package.

The FT 3150 Free Topology Smart Transceiver includes a 20MHz Neuron 3150 core, 0.5Kbytes of EEPROM and 2Kbytes of RAM. Through its external memory bus, the FT 3150 chip can address up to 58Kbytes of external memory, of which 16Kbytes of external non-volatile memory is dedicated to the LONWORKS system firmware. The FT 3150 chip is supplied in a 64-lead TQFP package.

## FTT-10A FREE TOPOLOGY TWISTED PAIR TRANSCEIVER MODELS 50051 AND 50051R
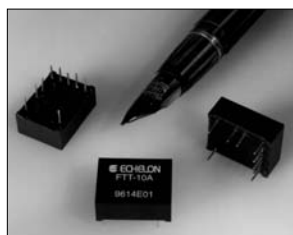
Features

- Complete LONWORKS transformer-isolated, free topology communication transceiver
- Compatible with the FTT-10 Free Topology Transceiver and LPT-10 Link Power Transceiver; all three transceivers can coexist on a twisted pair cable
- Differential Manchester coded signaling for polarity-insensitive network wiring
- 78 kilobits per second bit rate up to distances of 500 meters (free topology), or 2,700 meters (doubly terminated bus) worst case
- Supports free topology star, bus, and loop wiring
- Automatic clock detection at 5, 10, or 20MHz
- Designed to comply with FCC and EN55022 Level B EMI requirements
- U.L., CSA, TÜV Recognized component
- LONMARK certifiable for interoperability
- RoHS compatible

Description

The FTT-10A Free Topology Twisted Pair Transceiver provides a simple, cost-effective method of adding a LONWORKS transceiver to any Neuron Chip-based device. The FTT-10A transceiver supports polarity-insensitive free topology wiring, freeing the system installer from the need to wire using a bus topology. Star, bus, and loop wiring are all supported by this architecture. Free topology wiring reduces the time and expense of system installation by allowing the wiring to be installed in the most expeditious manner. It also simplifies network expansion by eliminating restrictions on wire routing, splicing, and device placement. Two FTT-10A transceivers may be used back-to-back as a digital repeater should it be necessary to support additional wiring or devices on a channel.

## LPI-10 LINK POWER INTERFACE MODULE - MODEL 56210-01
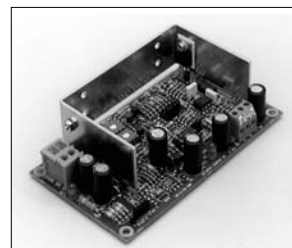
Features

- Couples power from a customer's 48VDC power supply to the link power twisted wire pair
- Prevents network voltage from exceeding 42.4VDC and protects the power supply from network faults
- Terminates the link power network
- Screw terminals for power supply and network wiring
- DIN rail, panel, or bulkhead mounting
- LED indicators for input and output power
- U.L., CSA, TÜV Recognized component
- LONMARK certifiable for interoperability

Description

Echelon's link power system sends power and data on a common twisted wire pair, and allows the user to wire link power devices with virtually no topology restrictions. Power is supplied by a customer-furnished nominal 48VDC power supply and flows through the LPI-10 Link Power Interface Module onto the twisted wire pair. The LPI-10 module couples power to the system wiring, terminates the twisted pair network, isolates the power supply from network wiring faults, and prevents the network voltage from exceeding 42.4VDC to comply with safety agency regulations' low voltage requirements.

Transceivers

LPT-11 LINK POWER TWISTED PAIR TRANSCEIVER MODELS 50040-02 AND 50040R-02
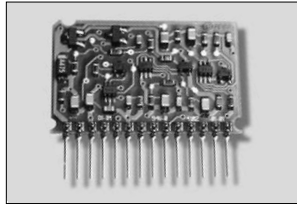
Features

- Complete LONWORKS free topology communication transceiver and power supply in a miniature SIP
- Receives both network data and power on a single twisted wire pair
- Provides unmatched electrical noise isolation
- Polarity insensitive network wiring
- 78 kilobits per second network bit rate for distances up to 500 meters (free topology) and up to 2,200 meters (doubly terminated bus topology)
- Supports free topology star, bus, and loop wiring
- Compatible with FTT-10A Free Topology Transceivers, as well as the FT 3120/FT 3150 Smart Transceivers
- Supplies 5VDC @ 100mA maximum for node power
- Meets the requirements of the LONMARK TP/FT-10 channel type
- U.L., cU.L. Recognized component

Description

The LPT-11 Link Power Twisted Pair Transceiver provides a simple, cost-effective method of adding a network-powered LONWORKS transceiver to any Neuron Chip-based control system. The link power system sends power and data on a common twisted wire pair, and allows the user to install LPT-11 transceivers with virtually no topology restrictions. Power is supplied by a customer-furnished nominal 48VDC power supply, flows through the LPI-10 Link Power Interface Module where it is regulated to 42.4VDC, and then passes onto the twisted wire pair. The LPT-11 transceiver eliminates the need to use a local power supply at each node since node power is sent from a central power supply over the same twisted wire pair that handles network communications.

PLCA-22 POWER LINE COMMUNICATIONS ANALYZER MODEL 58022

Features

- High performance, laboratory grade power line communication test tool
- Analyzes power line signaling performance and signal margin of the PL 3120 and PL 3150 Power Line Smart Transceivers
- Supports virtually any AC or DC mains voltage or unpowered wire
- Rugged, compact, portable instrument cases
- Dual LED bar graphs display noise levels and received signal strength
- Backlit LCD display shows analyzer status and packet error rate
- Identifies power circuit phase
- EIA-232 port for data logging
- Headphone/oscilloscope jack
- Operates from 100-240VAC or low voltage DC
- U.L., cU.L., TÜV Listed, CE Mark

Description

The PLCA-22 Power Line Communications Analyzer provides a simple means to test the operation and suitability of Echelon's PL-20 power line channel for any application. The user can select between operation in the frequency range of 110kHz to 140kHz (B/C-Band mode) or from 70kHz to 95kHz (A-Band mode). The first frequency range is the standard for most automation applications, while the second range is typically used for meter readings in Europe. By using the PLCA-22 in actual application environments (e.g., residences, commercial buildings, factories), users can quickly determine the performance of the associated power line transceiver as well as the need for routers, conditioning devices such as couplers, or booster amplifiers.

PL 3120 AND PL 3150 POWER LINE SMART TRANSCEIVERS MODELS 15311R-1000 AND 15321R-960

Features

- Combines an ANSI-709.2 compliant power line transceiver with an ANSI 709.1 compliant Neuron 3120 or Neuron 3150 processor core
- Designed to comply with FCC, Industry Canada, Japan MPT, and European CENELEC EN 50065-1 power line communications regulations
- Supports CENELEC A-band and C-band operation
- Dual carrier frequency mode and digital signal processing
- 4K Bytes of embedded EEPROM for application code and configuration data on the PL 3120 Smart Transceiver and 0.5K Bytes of embedded EEPROM for configuration data on the PL 3150 Smart Transceiver
- Interface for external memory for applications with larger memory requirements (PL 3150 Smart Transceiver only)
- 2K Bytes of embedded RAM for buffering network data and network variables
- Full duplex hardware UART and SPI serial interfaces
- 12 I/O pins with 38 programmable standard I/O modes to minimize external interface circuitry
- -40 to +85°C operating temperature range

Description

The PL 3120 and PL 3150 Power Line Smart Transceivers integrate a Neuron processor core with a power line transceiver, making them ideal for appliance, audio/video, lighting, heating/cooling, security, metering, and irrigation applications. Essentially a system-on-a-chip, the Power Line Smart Transceivers feature a highly reliable narrow-band power line transceiver,

an 8-bit Neuron processor core for running applications and managing network communications, a choice of on-board or external memory, and an extremely small form factor—all at a price that is compelling for even the most cost-sensitive consumer product applications.

Compliant with FCC, Industry Canada, Japan MPT, and European CENELEC EN50065-1 regulations, the PL 3120 and PL 3150 Smart Transceivers can be used in applications worldwide.

Intermittent noise sources, impedance changes, and attenuation make the power line a hostile signaling environment. The PL 3120 and PL 3150 Power Line Smart Transceivers incorporate a variety of technical innovations to insure reliable operation:

- Unique dual carrier frequency feature automatically selects an alternate secondary communication frequency should the primary frequency be blocked by noise;
- Highly efficient, patented, low-overhead forward error correction (FEC) algorithm to overcome errors induced by noise;
- Sophisticated digital signal processing, noise cancellation, and distortion correction algorithms. These features correct for a wide variety of signaling impediments, including impulsive noise, continuous tone noise, and phase distortion;
- High output, low distortion external amplifier design that can deliver 1Ap-p into low impedance loads, eliminating the need for expensive phase couplers in typical residential applications.

The combination of these special features enable the Power Line Smart Transceivers to operate reliably in the presence of consumer electronics, power line intercoms, motor noise, electronic ballasts, dimmers, and other typical sources of interference. The Power Line Smart Transceivers can communicate over virtually any AC or DC power mains, as well as unpowered twisted pair, by way of a low-cost, external coupling circuit.

POWER LINE SMART TRANSCEIVER DEVELOPMENT SUPPORT KIT (PL DSK) MODELS 17050-20-271, 17050-20-272, AND 17060-20-272
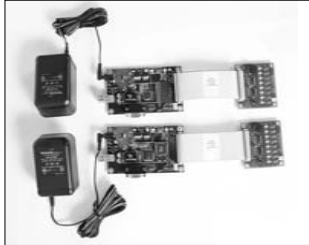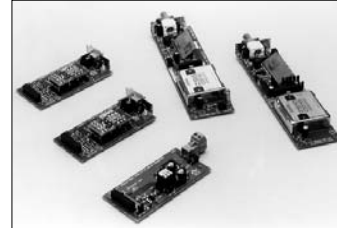

Features

- Reference designs with bill of materials, schematics, layout plots/Gerber files for 2-layer single-sided and 4-layer double-sided printed circuit boards
- Ten (10) PL 3120 Power Line Smart Transceivers
- Ten (10) PL 3150 Power Line Smart Transceivers
- One (1) PL 3120 based Evaluation Board
- One (1) PL 3150 based Evaluation Board
- Two (2) Mini Gizmo I/O Boards

Description

The Power Line Smart Transceiver Development Support Kit (PL DSK v2.0) provides reference designs for the external discrete interface circuitry that needs to be implemented with the Power Line Smart Transceiver IC. Additional key enhancements in this version of the PL DSK include:

- Two evaluation boards (one based on PL 3120 and the other based on PL 3150) that come with a simple-to-use, pre-loaded application. Plug in the test kit and you're ready to begin.
- Seven total reference designs including a PL3120 single in-line package (SIP) and a PL3150 2 Ampere output design. Now, designs engineers have the flexibility to pick a design that has been commonly used and tested for their application.
- Expanded layout tool support for the most commonly used layout tools around the world: P-CAD®, OrCAD®, and PADS®, and PowerPCB. This means you can port your reference designs faster and more accurately.

SMX TRANSCEIVERS MODELS 77010, 77030, 77040, 77050, AND 77162

Features

- Modular design provides simple means of changing transceiver types
- Built-in transceiver ID output supports automatic configuration of communications parameters
- Metal faceplate with network connector customized for each transceiver
- U.L., cU.L.

Description

The LONWORKS Standard Modular Transceiver (SMX) family provides a modular, flexible solution for interfacing a variety of LONWORKS devices to different LONWORKS communications media. LONWORKS devices such as the PCLTA-21 LonTalk Adapter and development tools comply with the SMX interface standard to support a wide variety of media types. OEMs may also use these transceivers with other products of their own design.

Channels supported by the SMX Transceivers:
- TP/XF-78
- TP/XF-10
- PL-20
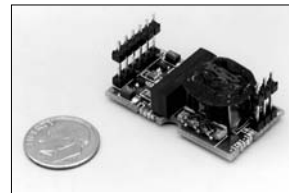
TPT/XF-78 TWISTED PAIR TRANSCEIVER MODEL 50010-10
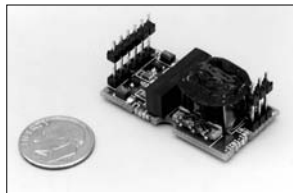
Features

- Complete LONWORKS communication transceiver
- Differential Manchester-encoded signaling for polarity-insensitive network wiring
- Transformer isolation for common mode rejection
- 78 kilobits per second bit rate at 1400 meters worst case
- +5VDC input voltage
- Designed to comply with FCC and VDE Level B requirements
- U.L., CSA, TÜV Recognized component
- LONMARK certifiable

Description

The TPT/XF-78 Twisted Pair Transceiver provides a simple, cost-effective method of adding a LONWORKS transceiver to any Neuron Chip-based device. The TPT/XF-78 transceiver consists of transformer-isolated differential Manchester-encoded communication transceiver and connectors for power, the Neuron Chip communications port (CP) lines, and the twisted pair network data bus. The small size of the transceiver permits it to be mounted almost anywhere on a printed circuit board assembly, either as a socketed or soldered component.

TPT/XF-1250 TWISTED PAIR TRANSCEIVER - MODEL 50020-10

Features

- Complete LONWORKS communication transceiver
- Differential Manchester-encoded signaling for polarity-insensitive network wiring
- Transformer isolation for common mode rejection
- 1.25 megabits per second bit rate at 130 meters worst case
- +5VDC input voltage
- Designed to comply with FCC and VDE Level B requirements
- U.L., CSA, TÜV Recognized component
- LONMARK certifiable

Description

The TPT/XF-1250 Twisted Pair Transceiver provides a simple, cost-effective method of adding a LONWORKS transceiver to any Neuron Chip-based device. The TPT/XF-1250 transceiver consists of transformer-isolated differential Manchester-encoded communication transceiver and connectors for power, the Neuron Chip communications port (CP) lines, and the twisted pair network data bus. The small size of the transceiver permits it to be mounted almost anywhere on a printed circuit board assembly, either as a socketed or soldered component. The TPT/XF-1250 transceiver can communicate with TP/XF-1250 control modules for those applications using both types of devices.

Transceivers

LonSupport Programs

Echelon's LonSupport Programs assist customers with the design, configuration, and application of Echelon's products. Comprised of professional applications engineers with years of experience with Echelon's products and technology, support teams are located in strategic locations worldwide to provide timely response, often in your local language. Whether a question relates to NES, the Pyxos platform, or Echelon's LONWORKS products, the LonSupport team stands ready to assist with both device development and integration questions.

Additionally, Echelon provides pre-production design reviews and consultation services associated with new product hardware designs and system architecture, respectively. A design review can expedite the release of new products and reduce the number of pre-production iterations by highlighting potential design issues before they make their way into a circuit board. Consultation services are generally used to review system architecture, and can help optimize network performance today and lay the groundwork for a flexible design that will accommodate future expansion and changes.

LonSupport services encompass annual support contracts, e-mail support, single incident support, and consultation services as follows:

Annual Developer Support Options
Device Development LonSupport Annual Service – Model 90790
Device Development LonSupport Annual Service provides device development support for one caller. Support is provided for the use and application of the following products: NodeBuilder; MIP; ShortStack; Mini EVK Evaluation Kit; the Pyxos platform; transceivers; router core and serial adapter module; smart transceivers, control module and PSG product families; design support kits (DSK); link power interfaces; and communication transformers.

LNS Development LonSupport Annual Service – Model 99000
LNS Development LonSupport Annual Service provides LNS device development support for one caller. Support is provided for the use and application of the following products: LNS Application Developer's Kit; LNS Redistribution Kit ; and OpenLDV Driver.

Annual Integrator Support Options
OSA Integration LonSupport Annual Service – Model 90690
Designed specifically for members of the Open Systems Alliance program, the OSA Integration LonSupport Annual Service provides integration services for two callers on the use and application of the following products: SLTA, PCLTA and PCC connectivity products; LonPoint product family; Device Manager product family; Protocol Analyzers; *i*.LON product families; LonMaker Integration Tools; and the LNS DDE Server.

Integration LonSupport Annual Service – Model 90695
Integration LonSupport Annual Services provides integration services for one caller on the use and application of the following products: SLTA, PCLTA and PCC connectivity products; LonPoint product family; Device Manager product family; Protocol Analyzers; *i*.LON product families; LonMaker Integration Tools; and the LNS DDE Server.

E-mail Support
E-mail Support is available to all Echelon customers by simply sending questions and suspected bug reports to LonSupport@echelon.com. E-mail Support requests are reviewed Monday through Friday 08:30AM - 4:30PM. E-mails from customers with a LonSupport contract receive a response within four hours or next business day. Customers without a LonSupport contract will receive a reply generally within one week, however, the response will be less detailed than a reply associated with a LonSupport contract.

Single Incident Support – Model 90900

LonSupport Single Incident support provides telephone access to Echelon's Applications Engineers for the purpose of resolving a single support incident. This fee-for-service provides technical assistance on the use and application of Echelon products, and requires a credit card payment upon initiation of the telephone call.

Consultation Services

Project Assistance – Model 90700

Whether held at a job-site, your office, or at one of Echelon's facilities, project assistance provides one eight-hour session with an Echelon application engineer to review system architecture, jumpstart a project, or help bring a project back on track.

Pre-production Design Review – Model 96100

A design review provides technical comments from an Echelon engineer on the use or application of an Echelon transceiver, smart transceiver, module, or Pyxos chip in a pre-production product. The review includes an analysis of the schematic, parts list, and printed circuit board (PCB) layout drawing with the goal of ensuring that Echelon's products provide the best possible performance in that application.

Echelon provides global support through Support Centers in San Jose (California), London (UK), and other locations. Questions may be addressed to an Echelon support center via telephone, fax or e-mail. Please refer to Echelon's Web site (http://www.echelon.com/support) for a detailed description on the LonSupport programs and the most current information on how to contact the Support Centers.

LonSupport Programs

LonWorks Training

Echelon's highly regarded training curriculum provides step-by-step, practical, and in-depth knowledge of product design, implementation, and maintenance for the LonWorks platform. Echelon offers both on-line computer based training courses and a comprehensive classroom training program for hardware and software developers, network integrators, facility owners, government agencies, trade associations, and standards bodies. Supported by professional trainers worldwide, Echelon's staff is prepared to deliver scheduled, on-site, and customized classes to fit every need.

Our curriculum includes:
• Designing and implementing a LonWorks network;
• Designing LonWorks devices that are interoperable and configurable;
• Developing LNS network tools;
• Effectively using the LonMaker Integration Tool in network design and implementation;
• Integrating LonWorks network with the Internet for remote monitoring and control applications.

These courses feature hands-on laboratory projects and comprehensive training materials for future reference, and are available at your facility or at training centers worldwide.

Visit www.echelon.com/training for the latest course offerings, schedule, and registration information.

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