LNS®Application Developer's Kit/Turbo Edition
Model 34309

Description

The LNS Application Developer's Kit is a software development tool that you use to design and deploy high performance, highly scalable LNS network tools for LONWORKS control networks.

LNS Network Operating System

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.

LONWORKS and Internet Clients

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.

Scalable Monitoring and Control

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

- ▼ New Turbo Edition provides breakthrough performance, security, reliability, and scalability (see features box on next page)
- ▼ Tools for developing interoperable LNS applications that can install, maintain, connect, monitor, control, diagnose, and recover LONWORKS® networks
- ▼ 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 LonTalk 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 3.3 support
- ▼ Example Microsoft Visual C++™ and Visual Basic® application source code

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.

Comprehensive LONMARK Support

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.

The LONMARK function blocks on LONMARK devices can be easily controlled, allowing LNS applications to override, enable, test, or disable individual function blocks on a device. Network variables can be accessed either by their device name or by their member name within a function block. LONMARK configuration properties are accessed as easily as network variables, even if the configuration properties are stored in the device's memory and accessed using the direct memory read/write method or the LONMARK file transfer protocol.

In addition, LNS provides simplified access to other LONMARK features such as standard functional profiles, resource files, and network variable aliases.

Plug-in Component Standard

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. Device manufacturers develop and distribute LNS plug-ins to simplify the installation, configuration, and operation of their devices.

The LNS Plug-in standard enables a plug-in to be invoked on any type of object in the LNS Object Hierarchy, allowing such plug-ins to be, for instance, system plug-ins, subsystem plug-ins, or channel plug-ins. Plug-ins can also be developed for general pur-pose applications such as device drivers for HMI or SCADA appli-cations.

A list of hundreds of currently available LNS plug-ins can be found at www.echelon.com/plugins.

Example Applications

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 man-agement, monitoring and control, and plug-in management.

License

The LNS Application Developer's Kit is licensed through a shrink-wrap license agreement. Applications developed with the LNS Application Developer's Kit run on an LNS Server or LNS Remote Client distribution of the LNS network operating system.

If you wish to include an LNS Server or LNS Remote Client

New LNS Turbo Edition Features

▼ Backward Compatibility: application, plug-in and database compatibility with prior LNS releases

▼ Performance Improvements: 20% overall improvement

▼ Enhanced Scalability: Installation and maintenance of large networks retain the high performance experienced with small networks

▼ LONMARK Support: Extensive LONMARK 3.3 support including support for passive tools

▼ Disaster Recovery: Full back-up of open LNS databases without shutting down LNS applications provides enterprise-grade 24/7 operation

▼ LONWORKS/IP Channels: Now ANSI/CEA-852 compatible (max 256 channel members)

▼ LONWORKS/IP Channel Firewall Compatibility: LONWORKS/IP Channels can be used in corporate and home automation applications with private IP addresses and NAT

▼ Enhanced Security: RC4 Encryption protects LonTalk authentication keys sent through *i*.LON 10 and *i*.LON 100 connections

▼ Communication Diagnostics: Verify communication ability with *i*.LON 10 and *i*.LON 100 network interfaces from the LONWORKS Interfaces item in the Control Panel

▼ Remote Client Support: Up to 9 LNS/IP remote clients, 9 LONWORKS/IP clients, or 9 LONWORKS NSI remote clients

▼ Multiple Database Support: Up to 100 databases open simultaneously for monitoring, and up to 50 databases open simultaneously for management and monitoring

▼ System Image Upgrade: Upgrades the Neuron® Chip System Image over the LONWORKS network

distribution with your application, you would also license the Model 34312 LNS Redistribution Kit. When the LNS Server distribution is installed onto an end-user's PC, from 64 to 512 LNS Device Credits are included as part of the installation.

You are not required to include an LNS Server or LNS Remote Client distribution with your application. Instead, you or your end user can purchase the Model 34500 LNS Server product, which is a shrink-wrap licensed copy of the LNS Server distribution.

Each LONWORKS device requires an LNS Device Credit in order to be commissioned or recovered. Additional LNS Device Credits for LNS applications deployed on end-user PCs may be ordered by using a software utility included with the LNS Server distribution.

If the LNS application developer also wishes to distribute more LNS Device Credits than are initially included with the LNS Server redistribution), the Model 34311 Echelon Software License

Generator may be licensed, however this is not required. By default, end users can purchase LNS Device Credits from Echelon. It is only when an LNS application developer has licensed the Echelon Software License Generator that LNS Device Credit requests will be directed to the developer.

Upgrades

Licensees of prior releases of the Model 34309 LNS Application Developer's Kit or Model 34319 LNS Application Developer's Kit Upgrade purchase the Model 34319 LNS Application Developer's Kit Upgrade/Turbo Edition. Licensees of LNS development kits not listed above should contact Echelon or your distributor for ordering details.

Specifications

Development PC Requirements	• Windows XP, Windows 2000 or Windows Server 2003
	• Pentium III 600 MHz or faster
	• 256 MB RAM (512 MB RAM recommended)
	• 50 MB or more of free disk space. For highest performance during development, Echelon recommends using a high-performance hard disk.
	• Any Windows application development tool that supports the use of COM components or ActiveX controls. In addition, Echelon has tested and offers technical assistance on the following development environments:
	  • Microsoft Visual Studio .NET 2003 (C++, used with ATL or MFC)
	  • Microsoft Visual Basic 6.0, Service Pack 6 or higher
	• CD-ROM drive
	• Mouse or compatible pointing device
	• Compatible LNS Network Interface (see below)
	• 800 x 600 minimum display size

Compatible LNS Network Interfaces	*i*.LON 10 Ethernet Adapter, *i*.LON 100 Internet Server, *i*.LON 600 LONWORKS/IP Server (connecting to a LONWORKS/IP channel), PCC-10 PC Card Adapter, PCLTA-21 PCI Adapter, SLTA-10 Serial LonTalk Adapter and LTS-20 SLTA Core Module. Discontinued network interfaces such as the PCLTA-10 ISA Adapter, PCLTA-20 PCI Adapter, PCNSI, and the PL-SLTA Power Line Serial LonTalk Adapter are also compatible, but may require a separate driver download from Echelon's Web site. LNS High Performance network interfaces include the PCC-10, PCLTA-10/20/21, *i*.LON 100 and *i*.LON 600.

The following general maximum limits apply:

Function	Description
Simultaneous active LNS clients per LNS Server	10 (any combination of local, LONWORKS remote, IP remote or dialup remote clients)
Simultaneous open networks per PC	50 (Full and complete LNS services) 100 (Independent mode–monitoring/control only)

The following maximum limits apply per device in a network

Function	Description
Network variables	4,096 per LNS Network Service Device; each network variable can be shared by all LNS applications; fan-in and fan-out connections support up to ANSI/CEA-709.1-B-2002 protocol limits. On PCs, monitor set monitoring does not consume host network variables. 4,096 per host-based device. 62 per Neuron® Chip-hosted device.
Address table entries	32,768 per LNS Network Service Device. These are shared for explicitly/implicitly bound network variables and for persistent monitor points. Typically one address table entry is used per monitored device, and per group in which the Network Service Device is a member. More may be used if different connection characteristics are used to force specific Layer 4 protocol timers to be used. 15 per non-PC host-based devices and Neuron Chip hosted devices.
Alias table entries	1024 per LNS Network Service Device, shared among explicit and implicit bindings.
Simultaneous outgoing transactions	250 (when using a LNS High Performance network interface) 1 (all other types of devices)
Simultaneous incoming transactions	250 (when using a LNS High Performance network interface) 16 (all other types of devices)

The following maximum limits apply per LNS network database:

Function	Description
Application devices	32,385 (2 addresses required per router and network service device)
Application device types	32,385
Routers	1,000
Channels	1,000
Domains per database	1
Network variable selectors	12,288 (The ANSI/CEA-709.1-B-2002 protocol limit) LNS re-uses network variable selectors and therefore the number of network variable connections in a network is not restricted by this protocol limit
Active points (single-point monitoring and temporary monitor points)	8,000 with intelligent point sharing if multiple applications are monitoring the same point. This limit does not pertain to permanent monitor point monitoring or ad hoc monitoring of host (local) network variables.
Permanent monitor sets	8,000; each monitor set may be used by any application
Permanent monitor points	65,535; monitoring a local host network variable does not consume a persistent monitor point.

Documentation

The following printed documentation is included with the Model 34309 LNS Application Developer's Kit and the Model 34319 LNS Application Developer's Kit Upgrade products. Comprehensive on-line help is also included.

Document	Echelon Part Number
LNS Programmer's Guide	078-0177-01

003-0313-01C

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