ECHELON®

LonManager® PCC-10 and ISA Protocol Analyzers
Models 33100-00 and 33100-10

▼ Captures all LONWORKS packets on a channel for detailed analysis of network activity and traffic patterns

▼ Interprets packet contents without the need to interpret raw hex data.

▼ Transaction analysis system simplifies packet log interpretation by associating related packets

▼ Receive filters reduce the amount of logged data to help isolate problems quickly

▼ Open interface for user-created receive filters

▼ Uses any network database from the LonMaker™ Integration Tool or any other LNS™ tool for naming information and eliminates the need to interpret network addresses

▼ Programmatic interface to the packet log permits custom user interfaces and analysis functions.

▼ Comprehensive network statistics and diagnostics provide a detailed analysis of the network's health

▼ DDE interface for statistical data for graphing, statistical analysis, trending, and data logging

▼ High-performance PC interface assures reliable capture of packets, even in overloaded networks

Description

The LonManager Protocol Analyzer provides LONWORKS® manufacturers, system integrators, and end-users with a rich set of Windows tools and a high performance PC interface card to allow users to observe, analyze, and diagnose the behavior of installed LONWORKS networks. The tool's open architecture allows manufacturers to customize it to their unique needs.

The LonManager Protocol Analyzer include three tools for network analysis and monitoring:

▼ Protocol analysis tool
▼ Network traffic statistics tool
▼ Network diagnostics tool

Each of these tools offers many of 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 (accurate to within 2ms), and saving all network communications into log files that can be later viewed and analyzed. Multiple copies of the tool can run at the same time, making it simple to collect packets from multiple channels in a multi-channel network.

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 tool uses a high-performance PC Card (formerly PCMCIA) or ISA bus PC card to ensure reliable diagnostics and accurate time-stamping—even if the network is saturated.

Logs can be displayed in summary form (one packet per line) for quick analysis, or in expanded form (one packet in a window) for more detailed analysis. Using a network database from the LonMaker Integration Tool, any other LNS tool, or from the LonBuilder® Developer's Kit, the protocol analyzer decodes and displays packet data using the device and network variable names assigned during installation. It also provides text descriptions of each message and a description of the LONWORKS protocol

services used to transmit it. The protocol analyzer eliminates the need for the user to manually interpret the ones and zeros of the LONWORKS protocol and reduces the time and effort needed to diagnose network problems.

The user can specify capture filters, including custom filters that they develop, to limit the packets collected. Standard filters are provided for packets to or from specific devices or network variables, and for packets using selected LONWORKS protocol services. Filtering further simplifies network analysis by limiting the packet log files to relevant packets only. To simplify interpretation and analysis, the user can specify match criteria when viewing logs. Matching can be used to display related packets in the same color, to extract packets, or to restrict the display to matching packets. Matching can be done based on device names, network variable names, message codes, or transactions.

Traffic Analysis

The traffic analysis tool provides access to detailed statistics related to the network's behavior. The statistics include total packet counts, error packet counts, and network loading. The statistics display provides the user with an easy-to-read summary of network activity.

All statistical data is available via Dynamic Data Exchange (DDE), simplifying the creation of custom analysis and display modules using off-the-shelf applications such as Microsoft Excel and Wonderware InTouch®.

Statistics can be tracked relative to the last time cleared or over a user-configurable time interval. Multiple copies of the tool can run at the same time, for example to collect cumulative and instantaneous traffic level data simultaneously.

When minimized, the tool displays either a bar graph summary of the bandwidth utilization and the error rate or a simple red light/green light view of current network activity. Bar graphs include user-configurable alarm thresholds—green for normal, yellow for warning, and red for alarm.

Network Diagnostics

The network diagnostic tool allows the user to perform network diagnostic and maintenance operations. The operations include:

▼ Ping and proxy ping—verifies that devices are alive
▼ Status and proxy status—gathers the internal error counts recorded by devices
▼ Wink—locates and identifies devices
▼ Clear status—resets the internal error counts recorded by devices
▼ Control (reset, offline, and online)—allows isolation and management of problem devices

Testing can be done on a one-time basis or repetitively at a user-configurable interval. A database navigator allows the user to quickly walk through the network and select the devices on which to operate.

Usage

Two PCC-10 protocol analyzer cards are included with the PCC-10 protocol analyzer. The LonManager ISA Protocol Analyzer interface card contains two LONWORKS network ports. Typically, one PC card or ISA network port is used by the protocol analysis and traffic analysis tools to collect networks data and the other is used by the network diagnostics tool to interact with devices in the network. If the network diagnostics tool is not used, the second card can be used by any LNS application, such as the LonMaker tool or LNS DDE Server. In a multi-channel network, both cards or ports can be used to collect network data for use with the protocol analysis and traffic analysis tools.

If available, the LonManager Protocol Analyzer uses an LNS network database to provide addressing and naming information. The network database can be generated by any of the following tools:

▼ The LonMaker Integration Tool
▼ Any tool based on LNS
▼ The LonBuilder Developer's Workbench

Specifications

Computer Requirements

Processor	Pentium 150 or better
Bus	
PCC-10	PC Card (PCMCIA)
ISA	16-bit ISA, full length (2 adjacent slots are required for the PLM-10, 20, and 30 transceivers)
Memory	32Mbytes minimum
Hard Disk (available)	5Mbytes minimum (9Mbytes recommended)
Disk Cache	512Kbytes minimum recommended
Graphics Adapter	Windows compatible
Mouse	Windows compatible
OS	Windows 95 or 98

Protocol Analyzer Tool

Packet Display Contents	Packet number
	Packet size
	Time stamp
	Packet attributes
	Service type
	Transaction number
	Source address (device name or address)
	Destination address (device name or address)
	Network variable (name or number)
	Message class
	Message code (name or number)

Packet Display Attributes	Priority
	Alternate path
	Authentication
	Idempotent response
Configurable Display Attributes	Visible packet fields
	Font name and size
	Column widths
Packet Log Options	Log size
	Fixed size or circular log
Packet Match Options	Device name
	Network variable name
	Message code
	Transactions
Packet Type Receive Filter Options	Acknowledgment
	Acknowledged
	Acknowledged/Reminder
	Challenge
	Repeated
	Reply
	Request
	Request/Reminder
	Response
	Unacknowledged
	Unknown
Packet Source Device Receive Filter Options	Device name
	Neuron® ID
	Subnet/node ID
Packet Destination Device Receive Filter Options	Device name
	Neuron ID
	Subnet/node ID
	Group ID
	Broadcast address
Packet Source or Destination Receive Filter Options	Network variable name
	Message code name
Detected Error Conditions	CRC error
	Timeout error
	Packet too short
	Packet too long
	Preamble too short
	Preamble too long
Traffic Analysis Tool	
Collection Options	Cumulative or snapshot
Summary Data	Start time
	Update time
	Elapsed time
	Total packets received
	Average packet size
	Average packets per second
	Maximum packets per second
	Bandwidth utilization
	Packet counts
	Network error counts
	Total errors
	Error rate
Network Error Count Categories	CRC error
	Timeout error
	Packet too long
	Preamble too short
	Preamble too long
	Packets lost

Network Diagnostics Tool

Commands	Ping
	Proxy ping
	Status (test)
	Proxy status
	Reset
	Offline
	Online
	Wink
	Clear error log, reset cause, and statistics
Command Options	Interval or number of operations
Test Data	Software version
	Most recent error
	Most recent reset cause
	Device statistics
Device Statistics	Transaction errors
	Transaction timeouts
	Receive transactions full
	Lost messages
	Missed messages
	Number of packets transmitted at layer 3
	Number of packets received at layer 3
	Number of packets received at layer 4
	Retries
	Backlog overflow
	Late acknowledgements
	Collisions

Interface Card

Processor	
PCC-10	One Neuron 3150® Chip
ISA	Two Neuron 3150 Chips
Processor Input Clock	
PCC-10	10MHz
ISA	10MHz, 5MHz, 2.5MHz, 1.25MHz, or 625kHz (software configurable)
Transceiver Connector Type	
PCC-10	15-position Hirose, NX30TA 15PAA plug
ISA	SMX-compatible 10x2 header
RAM Packet Buffer	32Kbytes
Operating Input Voltage	+5VDC±5%
PC Interface	
PCC-10	Type III PC card (PCMCIA)
ISA	16-bit ISA slot
PC I/O Ports	
PCC-10	4 contiguous I/O locations with a user selectable start address of 100 to 3FChe
ISA	8 contiguous I/O locations with a user selectable start address of 200 to 3FO hex; 320 hex default
PC Bus Interrupts	
PCC-10	One IRQ from 2 to 15
ISA	5, 9, 10, 11, 12, or 15 (software configurable)
Temperature	
Operating	0 to +55°C
Non-operating (12 hour)	20 to +65°C
Humidity (non-condensing)	5 to 95% RH
Dimensions	
PCC-10	54.0mm W x 85.6mm L x 5.0mm H (2.126" x 3.370" x 0.196")
ISA	334mm x 108mm x 18mm (13.13" x 4.25" x 0.69")
EMI Compliance	
PCC-10	FCC Part 15 Level A and EN55022 Level A
ISA	FCC Part 15 CA and EN55022 Class B

Documentation

The following printed documentation is included with Model 33100 LonManager Protocol Analyzer. Comprehensive on-line help is also included.

Document	Echelon Part Number
LonManager Protocol Analyzer User's Guide	078-0121-01
LONWORKS PCC-10 PC Card User's Guide*	078-0155-01

*PCC-10 version only

Ordering Information

A PCC-10 cable is required to use the PCC-10 protocol analyzer. Two LONWORKS SMX transceivers are required to use the ISA protocol analyzer.

Product	Echelon Model Number
LonManager ISA Protocol Analyzer	33100-00
LonManager PCC-10 Protocol Analyzer	33100-10
2-conductor cable assembly, XLR connector	78300
2-conductor cable assembly, flying leads	78302
14-conductor shielded cable assembly	78301