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Agilent
Distributed Network Analyzer

Data Sheet



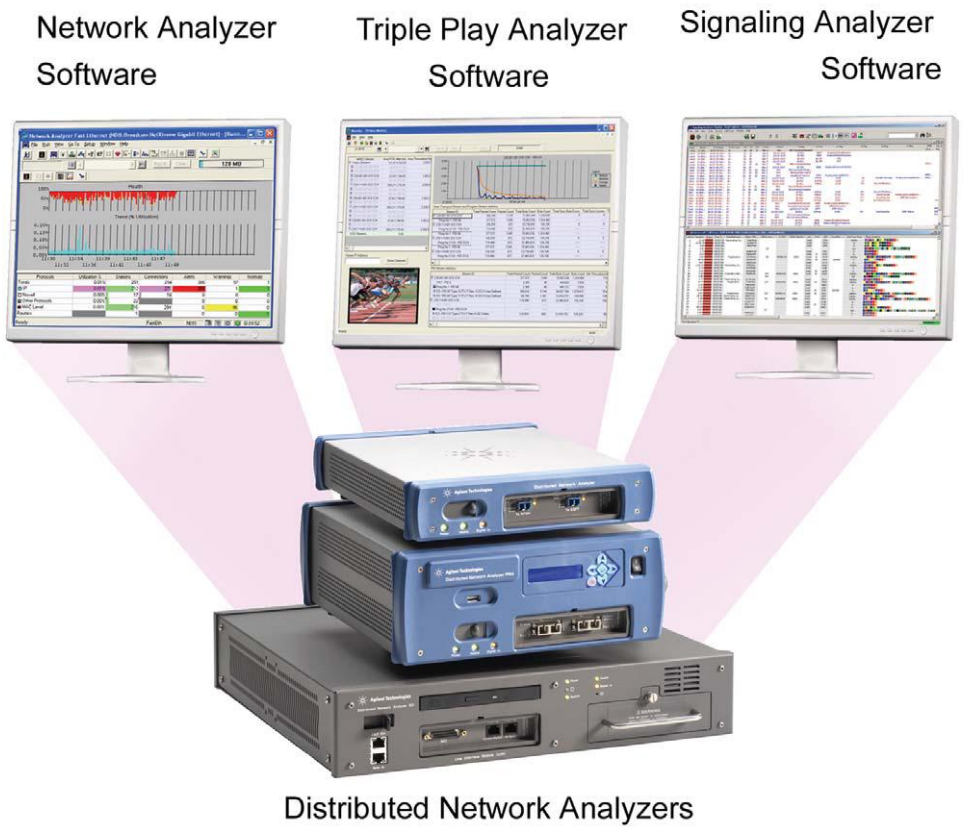
Technology to quickly solve problems in today's complex fixed and mobile networks

Agilent Technologies

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Network Analysis and Troubleshooting Solutions Overview

Agilent's scaleable Network Analysis and Troubleshooting Solutions provide the foundation of advanced protocol analysis. Take advantage of extensive diagnostic capabilities for troubleshooting and optimizing voice, video, data networks, as well as 2G, 2.5G and 3G mobile networks.



Combine your DNA platform hardware with Signaling Analyzer software for mobile network testing, with Network Analyzer software for fixed wireline network testing, and with Triple Play Analyzer software to test next generation services over IP

The DNA hardware platform brings greater power for collecting and analyzing real-time data over multiple technologies such as Ethernet, ATM, POS, Frame Relay, IPv6, MPLS, VoIP, IPTV, HSDPA, HSUPA, UMTS, CDMA 2000, GPRS, etc.

The scaleable DNA hardware platform provides the foundation of advanced protocol analysis architecture for fixed and mobile network application. Couple the hardware with the Network Analyzer software application and you have a powerful wireline solution for LAN and WAN networks; couple the DNA platform with the Triple Play Analyzer software for IPTV, VoD, VoIP QoE analysis. Similarly, use the hardware in conjunction with Signaling Analyzer software to create an advanced mobile network analysis solution for 2G, 2.5G and 3G technologies.

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DNA Components

Hardware		J6801B	DNA
		J6802B	DNA MX
		J6803B	DNA PRO
Applications	Mobile	J7830A	Signaling Analyzer Real-Time
		J7832A	Signaling Analyzer Offline
			Signaling Analyzer Free Decode Viewer
	Wireline	J6840A	Network Analyzer Software
		J6839A	Network Analyzer Software Professional Edition
			Network Analyzer Software Standard Edition
	Triple Play	J6900A	Triple Play Analyzer
Line Interface Modules (LIMs)		J6810B	STM-4/OC-12/STM-1o/OC3 LIM
		J6811A	STM-1o/OC-3 LIM
		J6813B	E3/T3 (DS3) LIM
		J6815B	T1/E1 (RJ45/48C & Bantam connectors) LIM
		J6816B	E1/T1 (RJ45/48C & DB9 connectors) LIM
		J6817B	E1 (75 Ohm BNC connectors) LIM
		J6818A	ATM25 LIM
		J6820B	V-Series LIM for the Agilent Network Analyzer Family.
		J6821A	Network Analyzer HSSI LIM
		J6824A	Network Analyzer Eight-port E1/T1 LIM
		J6830A	10BaseT and 10/100 BaseTX Ethernet LIM
		J6831A	10/100BaseFX Ethernet LIM
		J6832A	1000BaseX Ethernet LIM
		J6828A	4-Port OC-3/STM-1 LIM Multiplexor.
		J6756B	Network Analyzer HSSI Tap
		J6826A	Eight-port T1/E1 Balanced Monitor Tap
		J6827A	Eight-port E1 BNC Monitor Tap
Additional Utilities		J7833A	Call Manager Database
		J7831A	Multi-User
		J6848A	Report Center
		J5479A	Voice Quality Tester
		J6782A	Network Troubleshooting Center
			Instrument Manager
			Select Network Analyzer LIM
			Agent Config
		J6835A	NDIS Server
			NTP Time
			File Translator
			Time Sync Data File Merge Utility

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DNA Hardware Platforms

Acquisition System

DNAs accept any LAN or WAN LIM
LIMs can be hot-swapped
Operates on two ports per LIM
Operates with the following link-layer technologies:

- ATM
- CiscoSLE
- Ethernet
- Frame Relay
- HDLC/SDLC
- LAPB
- LAPD
- Packet over SONET/SDH (IETF RFC 2615/1662, 1619/1662, Cisco HDLC)
- PPP (RFC 1662, 1663)

Capture buffer:

- Capture rate: Full line rate per port on any installed LIM up to half-duplex rates up to 1 Gb/s and full-duplex rates up to 2 Gb/s
- Buffer memory size (used for user data and associated analyzer overhead):
- user adjustable up to 512MB for J6801B DNA and J6803B DNA PRO and 256 MB for J6802B DNA MX, shared equally between both ports
- Data time stamp resolution is 100 ns

Hardware real-time capture filters:

- 100% line rate filtering
- 32 filters

Auto-encapsulation discovery for LAN over WAN
Real time auto discovery and reassembly:

- ATM cell VPI:VCI for AAL5 and AAL2 to OC-12/STM-4

Traffic Generation:

- At 100% line rate for LAN and ATM (except for J6824A/J6828A)
- Scenario replay for LAN

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DNA Platform Time Synchronization

	GPS	Control & Sync	Network Time Protocol (NTP)
	Synchronize any number of DNAs worldwide for time-correlated measurements	Time-synchronize a daisy-chain of up to 10 DNAs in a 20 meter cable from a DNA PRO or DNA MX	Time-synchronize DNA MX and DNA PRO to an external NTP server
	Accuracy of ±1 µs for LAN and ±5 µs for WAN/ATM	Accuracy of ± 500 ns for LAN, and 5 µs for WAN/ATM	Accuracy of ± 20 ms
DNA	√	√	
DNA MX	√	√	√
DNA PRO	√	√	√

DNA Platform Telemetry

The DNA platform provides flexible options for telemetry.

	J6801B DNA	J6802B DNA MX	J6803B DNA PRO
10/100 Mbps Ethernet	Standard	Standard	Standard
Single-port 10/100/1000 Ethernet	NA	Option 001	Option 001
Combo 10/100 Ethernet / 56k Modem	NA	Option 002	Option 002
Dual-port 10/100/1000 Ethernet	NA	Option 003	Option 003
802.11 a/b/g WLAN	NA	NA	Option 202 for Europe Option 203 for Japan Option 204 for rest of the world

Run-Time Store to Media

The DNA platform allows you to collect and analyzer data over long periods of time by utilizing unique data streaming capabilities. In RTSM (run-time store to media) mode, the instruments export processed information in run time through external ports.

The J6801B DNA, J6802B DNA MX and J6803B utilize the control & sync port to stream data up to 55 Mbps.

The J6801B and J6803B, in addition, have an external gigabit Ethernet port with capabilities of streaming media up to 400 Mbps when using the Signaling Analyzer Multi-User software.

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J6801B DNA



J6801B Distributed Network Analyzer

The DNA consists of one acquisition system that supports any available LAN or WAN LIM, plus a built-in power supply. It has its own IP address and is controlled via TCP/IP over Ethernet from a standard PC running the Network Analyzer Software (included with the analyzer for use with the controlling PC), from Signaling Analyzer software, or directly from a DNA PRO or DNA MX.

DNAs are used for remote and distributed troubleshooting and can be used in standalone mode connected to a PC, or daisy-chained together to create multi-port with time-synchronization test systems. Distributed remote operation is possible, allowing one or more DNAs to be operated remotely over a LAN.

- Built-in power supply for with AC or DC options
- Rackmountable
- Network Analyzer Software CD with a single-use license
- Control: TCP/IP over 10/100Base-TX via RJ-45 Control & Sync In connector from:
    - Control & Sync Out connector of a DNA PRO, DNA MX or another DNA
    - A standard PC/laptop directly connected via Ethernet, or indirectly connected via a LAN or an Internet
- Time Synchronization:
    - Control & Sync: From an upstream a DNA PRO, DNA MX or DNA via the Control & Sync In interface. Up to 10 daisy-chained, time-synchronization DNAs can be connected to a DNA PRO or DNA MX.
    - GPS: via 10 MHz (75 Ohm), 1 pps (75 Ohm) & RS-232C from external GPS receiver
    - From external NTP server
- Run-Time Store to Media up to 400 Mbps

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J6802B DNA MX



J6802B Distributed Network Analyzer MX

The DNA MX is a rack-mountable analyzer with a built-in acquisition system that supports any available LAN or WAN LIM. It includes an embedded processor with removable hard disk drive storage, CD-RW drive and a built-in AC or 48 Volt DC power supply. Should testing with additional interfaces be necessary, the DNA MX supports multiple directly attached J6801B DNAs with full time synchronization between the test interfaces.

Network Analyzer Software running on the embedded processor is used to control the internal acquisition system and any directly attached DNAs. The DNA MX is accessed and controlled from an external PC via a web browser (requiring no other software), from Instrument Manager or from a PC that is running Network Troubleshooting Center software.

Included with each DNA MX is a choice of 10/100/1000 Mbps PC card or combo 56 kbps modem and 10/100 Mbps PC Card for telemetry purposes.

- Built-in controller:
    - 2.8 GHz Intel Pentium 4 CPU
    - 1 GB DDR 333MHz memory
- Removable 120 GB hard disk drive
- CD RW drive
- Telemetry/Auxiliary ports:
    - Single-port 10/100/1000 Ethernet (default)
    - Dual-port 10/100/1000 Ethernet
    - Combo 10/100 Ethernet/ 56kbps modem
- Two USB 2.0 ports
- Time Synchronization:
    - GPS: via 10 MHz (75 Ohm), 1 pps (75 Ohm) & RS-232C from external GPS receiver
    - NTP: Network Time Protocol via 10/100 Ethernet telemetry port
    - From external NTP server
- Network Analyzer Software pre-loaded on built-in controller
- Network Analyzer Instrument Manager (for downloading to controlling PC)
- System Recovery CD
- Run-Time Store to Media
- Optional –48 V DC Power Supply Available

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J6803B DNA PRO



J6803B Distributed Network Analyzer PRO

The DNA PRO is a portable analyzer with a built-in acquisition system that supports any available LAN or WAN LIM. It includes an embedded processor with removable hard disk drive storage and a built-in power supply. Should testing with additional interfaces be necessary, the DNA PRO also supports multiple directly attached DNAs with full time synchronization between the test interfaces.
Network Analyzer Software running on the embedded processor is used to control the internal acquisition system and attached DNAs. The DNA PRO is accessed and controlled from an external PC via a Windows-based Web browser, Instrument Manager or Network Troubleshooting Center software.

- Built-in controller:
  - 1.6 GHz Intel Pentium M CPU
  - 1 GB DDR 333MHz memory
- Removable 60 GB hard disk drive
- Telemetry ports:
  - Single-port 10/100/1000 Ethernet (default)
  - Combo 10/100 Ethernet/ 56kbps modem
  - Dual-port 10/100/1000 Ethernet
  - Optional 802.11a/b/g wireless LAN (region specific)
- Two USB 2.0 ports
- Time Synchronization:
  - GPS: via 10 MHz (75 Ohm), 1 pps (75 Ohm) & RS-232C from external GPS receiver
  - NTP: Network Time Protocol via 10/100 Ethernet telemetry port
  - From external NTP server
- Network Analyzer Software pre-loaded on built-in controller
- Network Analyzer Instrument Manager (for downloading to controlling PC)
- System Recovery CD
- Run-Time Store to Media

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DNA Software Applications

The DNA platform is capable of running software applications for mobile or cellular communications, as well as applications for wireline communication networks. For detail explanation of these software applications, please consult the Signaling analyzer Technical Overview and the Network Analyzer Technical Overview documents.

Signaling Analyzer Applications

J7830A Signaling Analyzer Real-Time

Signaling Analyzer Real-Time is a high-performance solution for 2, 2.5 and 3G system verification, troubleshooting, and RAN optimization. Its intelligent call trace-centric approach enables distributed call trace, performance measurements, and drill-down problem isolation for calls on UMTS, GSM, and CDMA RANs, as well as the mobile core, IMS, PSTN and Internet. Consult the signaling Analyzer Technical Overview document for a detail description of the capabilities of this products and configuration options.

J7832A Signaling Analyzer Offline

Signaling Analyzer Offline is a perfect companion of the Signaling Analyzer Real-Time. The Signaling Analyzer Offline allows you to do post capture analysis of 2, 2.5 and 3G networks. Its intelligent call trace-centric approach enables distributed call trace, performance measurements, and drill-down problem isolation for calls on UMTS, GSM, and CDMA RANs, as well as the mobile core, IMS, PSTN and Internet.

Signaling Analyzer Free Decode Viewer

Signaling Analyzer Free Decode Viewer is an application that allows to decode capture traces from Signaling analyzer Real-Time.
This application is free of charge and can be downloaded from www.agilent.com/find/sart.

Network Analyzer Applications

J6840A Network Analyzer Software

A single-use license key of the Network Analyzer Software is included with the Distributed Network Analyzer acquisition platform and is auto-licensed on the DNA MX and DNA PRO platforms. Network Analyzer Software can also be purchased separately as the J6840A product. This software performs the following functions:

- Control of the DNA hardware via TCP/IP and control of the DNA MX and DNA PRO acquisition hardware.
- Network measurement and analysis for LAN and WAN environments.
- Support for network traffic acquisition and analysis using an NDIS network interface card (NIC) for LAN technologies (10/100/1000 Ethernet, Token Ring, FDDI) on the local PC.
- Control of the Network Analyzer NDIS Server (J6835A).
- Off-line Analysis, providing users with full protocol analysis capabilities on saved capture data (display filtering, searching, decoding, etc.) without connecting to acquisition hardware (e.g. DNA). Data files captured on an Agilent Advisor can also be analyzed.

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J6839A Network Analyzer Software Professional Edition

Network Analyzer Software Professional Edition performs the following functions:

- Real-time network measurement and analysis for LAN and off-line analysis for LAN and WAN environments.
- Support for network traffic acquisition and analysis using an NDIS network interface card (NIC) for LAN technologies (10/100/1000 Ethernet, Token Ring, FDDI) on the local PC.
- Control of the Network Analyzer NDIS Server (J6835A).
- Off-line Analysis, providing users with full protocol analysis capabilities on saved capture data (display filtering, searching, decoding, etc.) without connecting to acquisition hardware (e.g. DNA). Data files captured on an Agilent Advisor can also be analyzed.

Network Analyzer Software Standard Edition

Network Analyzer Software Standard Edition is free of charge network analysis software suitable for evaluation purposes and for entry-level use.

- It can determine who is on your network, who is using bandwidth, and where errors may be occurring on the network, identifying problems before they become serious issues that impact productivity and performance.
- Expert analysis tools can be used to solve network problems quickly and effectively by reducing thousands of IP and Novell frames into a handful of significant events.
- It can capture and analyze network traffic in real-time using your PC's local NDIS Ethernet adapter.
- It can analyze LAN data offline and quickly pinpoint problems on your network.

Download the software and obtain a 6-month License Key at www.agilent.com/comms/freenetworkanalyzer.

J6835A Network Analyzer NDIS Server

Network Analyzer NDIS Server is a remote software agent process that is able to connect to an NDIS-based NIC and capture data in promiscuous mode, performing various analysis tasks. Measurements on 10/100/1000 Mbps Ethernet, Token Ring or FDDI NICs are supported. This server is accessed from the Network Analyzer Software client and does not, itself, contain an analysis GUI.

Triple Play Applications

J6900A Triple Play Analyzer

The Agilent J6900A Triple Play Analyzer is the most complete in-service analysis and troubleshooting tool in a single solution for network equipment manufacturers and communication service providers, who develop, install and troubleshoot voice, data and video applications. The analyzer provides accurate measurements of VoIP, IPTV and VoD Quality of Experience as well as channel zapping analysis. The analyzer helps customers realize faster time to market and decrease operational costs by passively testing any technology, over any interface, from anywhere and by anyone.

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Line Interface Module (LIM)- Specifications

General

Network Analyzer LIMs provide physical layer and link layer connectivity to the embedded data acquisition and real-time systems in these products:

- J6801B DNA
- J6802B DNA MX
- J6803B DNA PRO

They also gather physical and link layer statistics. For example, LIMs handling ATM provide real-time AAL-2 and AAL-5 reassembly on thousands of virtual channels simultaneously, and provide ATM and AAL error statistics. All LIMs have the hardware resources to generate traffic for their associated network technologies.

Connection Configurations

Depending on the type of LIM, they provide any of the following connection configurations:

- WAN Terminated Mode – uses one input and one output of WAN LIMs
- WAN Bridged Monitor Mode – uses both inputs and outputs of WAN LIMs for bi-directional monitoring at test access points; high input impedance should normally be selected.
- WAN Jack Monitor Mode – uses both inputs of WAN LIMs only for bi-directional monitoring at protected monitor points.
- WAN Through Monitor Mode – uses both inputs and outputs of WAN LIMs providing bi-directional repeater functionality plus bi-directional monitoring functionality. Each receiver input is terminated.
- LAN Node Mode – uses an interface port of LAN LIMs to transmit and receive
- LAN Monitor Mode – uses both interface ports of LAN LIMs to monitor traffic passively between two devices

The operation of the physical interface is often critical in determining the cause of network problems. Therefore, the acquisition system tracks errors at the physical layer. Signal events are recorded on the display for both the line (network) side as well as the equipment (user/subscriber) side. The time of the last occurrence of a particular event is recorded as well.

Advanced Statistics

LIMs provide advanced statistics for layer 1 and 2 measurements. Please refer to the Network Analyzer Technical Overview for a detailed description of the following statistics performed in LIMs:

- Physical Layer Status and Link Layer (VPI.VCI and DLCI) Statistics
- Common Statistics (cell mode ATM, frame mode ATM, and Frame Relay)
- ATM Statistics (cell mode)
- ATM Statistics (frame mode)
- Frame Relay Statistics
- Length Statistics (frame mode ATM, and Frame Relay)
- ATM Policing
- ATM Usage Expert (Traffic Contract Estimation)
- 1-Point CDV
- Traffic Generation

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J6810B STM-4/OC-12/STM-1o/OC-3 LIM (622.080/155.520 Mbps)



General

The dual-rate LIM handles ATM, Packet over SONET/SDH and Frame Relay at 622 Mbps and 155 Mbps, and performs ATM and WAN analysis on lower-rate sub-multiplexes/tributaries down to fractional E1/DS1 rates.

When analyzing ATM at any supported rate, real-time AAL-2 and AAL-5 reassembly is performed simultaneously on up to 5120 virtual channels and the resulting frames are passed from the LIM to the acquisition system for further analysis. Cell mode is also available. ATM Policing can be performed on up to 1024 virtual circuits in frame mode or cell mode simultaneously with other measurements.

The functionality of this LIM can be enhanced with the addition of the J6828A Dual 4-Port STM-1/OC-3 External LIM.

The LIM has dual-rate optical interfaces and can be used in single-mode or multi-mode environments; when used in multi-mode environments, 10 dB attenuators should be used on the optical outputs (a pair of suitable attenuators is supplied with the LIM).

Note: Both SDH and SONET framing are fully supported in this LIM; the SDH terminology is given first (that is, SDH/SONET); SONET terminology has recently changed and the newer terminology is used here with older terms shown in parentheses, where appropriate.

Common to Inputs and Outputs:

Framing:

SDH: STM-4, STM-4c and STM-1, ITU-T G.707

SONET: STS-12, STS-12c, STS-3 and STS-3c, GR-253

SDH / SONET Frame Scrambling (x7 + x6 + 1)

ATM Cell Scrambling: conforms to ITU-T I.432.1 (x43 + 1) and may be turned on (default) or off

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Inputs:

Two input ports (single-mode/multi-mode compatible)
Connectors: LC-PC
Monitor modes:

- Through monitor mode: uses both inputs and outputs; signal is terminated and regenerated
- Test access point monitor mode; uses inputs only

Sensitivity:

- Typ. –32 dBm
- Min. –28 dBm
- Max. –8 dBm (receiver overload limit)

Loss of Signal Detect Level: -34 dBm (typical)
Receiver wavelength range: 1310/1550 nm
Real-Time Optical Power measurement for each LIM port:

- Dynamic Range: +0.5 dBm to –32 dBm
- Accuracy @ 1310 nm:
    - ±1 dBm +0.5dBm down to –15dBm
    - ±3 dBm –15dBm down to –32dBm

Physical Layer line status indications for each LIM port (SDH / SONET):

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Loss of Pointer (LOP)
- Loss of Cell Delineation (LCD)
- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)

Physical Layer line vital counts for each LIM port (SDH / SONET):

- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)
- MS-REI / REI-L (Line FEBE)
- REI / REI-P (Path FEBE)
- B1 BIP errors
- Loss of Cell Delineation (LCD) –performed at selected level of demultiplexing

Physical Layer Demultiplexing: see SDH and SONET Tributary Analysis diagrams
Demux for one tributary of T1/E1 without demux and channelization license
ATM Layer at any supported rate for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)
- ATM policing, traffic contract estimation and 1-point CDV

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs at all rates up to 622 Mbps (corner case: reassembly of long sequences of shortest possible CPS packets at 622 Mbps is best effort)
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs (guaranteed at all rates up to 622 Mbps)
- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected on multiple VCs

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Packet over SONET/SDH analysis configurations supported:

- IETF PPP in HDLC: RFC 1662 and both current RFC 2615 (x43 + 1 scrambled
- SONET/SDH payload) and obsolete RFC 1619 (unscrambled SONET/SDH payload) versions with version auto-detect based on POH C2 byte value (default) and manual override for scrambling enable/disable
- Cisco HDLC over SONET/SDH
- FCS-16 and FCS-32 auto-detect and manual override

Frame Relay over SONET/SDH analysis configuration supported as per FRF.14

WAN analysis supported (at tributary rates shown in SDH and SONET Tributary Analysis diagrams):

- Frame Relay, HDLC/SDLC, sync PPP

WAN Statistics for the selected configuration on each LIM port:

- Total frames
- Bridged frames
- Bridged broadcast frames
- Bridged multicast frames
- Total octets
- Throughput (kbps)
- Aborted frames
- Short frames
- FCS errors

Frame Relay statistics per DLCI collected on 1024 VCs

Capture rate

Full rate, full duplex, at all supported configurations up to 622 Mbps

Outputs:

Two output ports

Connectors:

LC-PC

1310nm Class 1 laser (single mode, but multi-mode fiber compatible with 10 dB attenuator)

Output levels:

Min. –15 dBm

Max. –8 dBm

Clocking:

Recovered (loop)

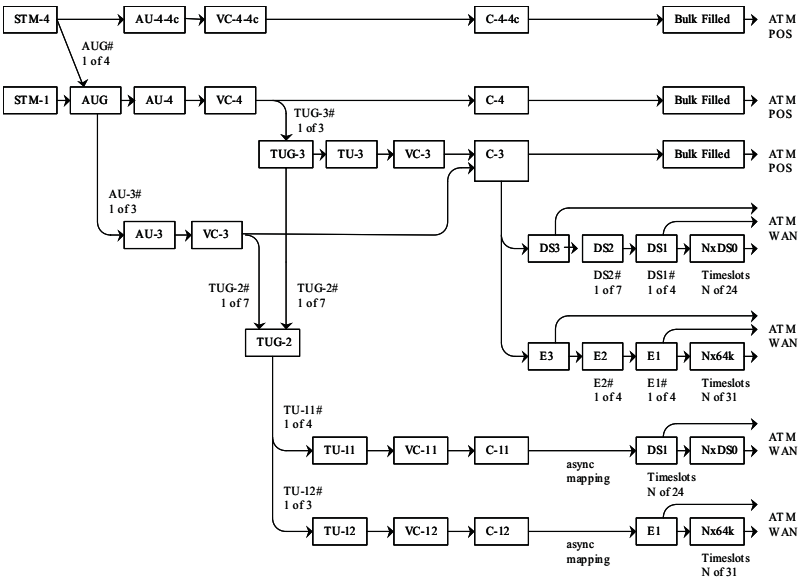
Traffic Generation:

Full rate ATM traffic generation at 155 Mbps (over STM-1/OC-3) and 622 Mbps (over STM-4/OC-12)

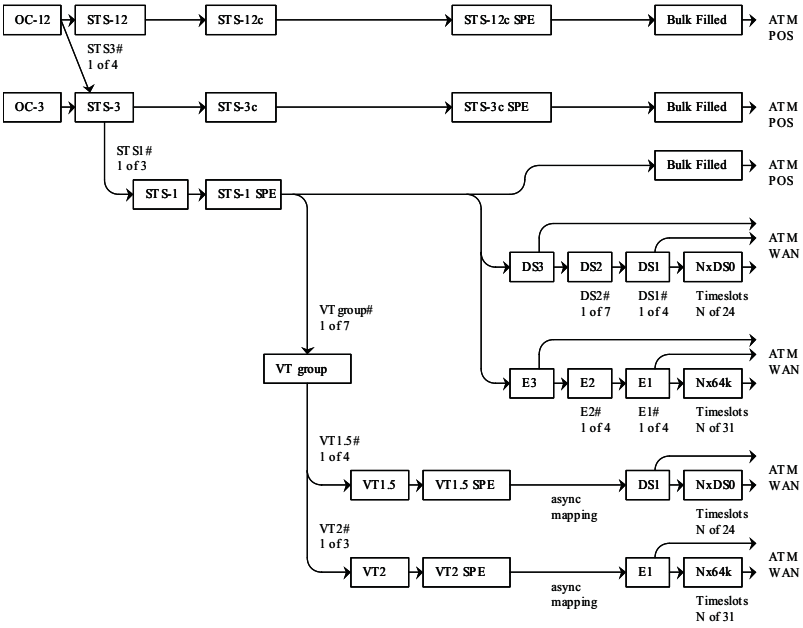
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Tributary Analysis

The following two diagrams depict the multiplexing functionality of the STM-4/OC-12/STM-1o/OC-3 LIMs. These interfaces allow connecting to a higher rate link, and internally demultiplexing the packets to get into a specific tributary for in-depth troubleshooting.



J6810B LIM SDH Configurations



J6810B LIM SONET Configurations

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J6811A STM-1o/OC-3 LIM (155.520 Mbps)



J6811A STM-1o/OC-3 LIM

General

This LIM handles ATM and Packet over SONET/SDH at 155 Mbps. When analyzing ATM, real-time (full rate) AAL-2 and AAL-5 reassembly is performed simultaneously on more than 5120 virtual channels and the resulting frames are passed from the LIM to the acquisition system for further analysis. Cell mode is also available. ATM Policing can be performed on up to 1024 virtual circuits in frame mode or cell mode simultaneously with other measurements.

The LIM has optical interfaces and can be used in single-mode or multi-mode environments; when used in multi-mode environments, 10 dB attenuators should be used on the optical outputs. Both SDH and SONET framing are fully supported in this LIM.

Common to Inputs and Outputs:

Framing:

- SDH: STM-1, ITU-T G.707
- SONET: STS-3c, GR-253

SDH / SONET Frame Scrambling (x7 + x6 + 1)

ATM Cell Scrambling: conforms to ITU-T I.432.1 (x43 + 1) and may be turned on (default) or off

Inputs:

Two input and output ports (single-mode/multi-mode compatible)

Connectors: SC-PC

Monitor modes:

- Through monitor mode: uses both inputs and outputs; signal is terminated and regenerated
- Test access point monitor mode; uses inputs only

Sensitivity:

- Typ. –32 dBm
- Min. –28 dBm

Loss of Signal Detect Level:

–34 dBm

Receiver wavelength range: 1310/1550 nm

Optical power measurement for each LIM port:

+3 dBm to –42 dBm dynamic range in steps of 0.1 dBm

±0.5 dBm absolute accuracy at 1310 nm

(can also be used to measure power at 622Mbps)

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Physical Layer line status indications for each LIM port (SDH / SONET):

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Loss of Pointer (LOP)
- Loss of Cell Delineation (LCD)
- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)

Physical Layer line vital counts for each LIM port (SDH / SONET):

- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)
- MS-REI / REI-L (Line FEBE)
- REI / REI-P (Path FEBE)
- B1 BIP errors
- Loss of Cell Delineation (LCD)

ATM Layer at any supported rate for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)
- ATM policing, traffic contract estimation and 1-point CDV

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs
- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors
- ATM and AAL statistics per VPI.VCI collected on multiple VCs

Packet over SONET/SDH analysis configurations supported:

- IETF PPP in HDLC: RFC 1662 and both current RFC 2615 (x43 + 1 scrambled
- SONET/SDH payload) and obsolete RFC 1619 (unscrambled SONET/SDH payload) versions with version auto-detect based on POH C2 byte value (default) and manual override for scrambling enable/disable
- Cisco HDLC over SONET/SDH
- FCS-16 and FCS-32 auto-detect and manual override

Capture rate: Full line rate (full duplex)

Outputs:

1310nm Class 1 laser (multi-mode fiber compatible with 10 dB attenuator, available separately as J2928A)

Output levels:

- Min. –12 dBm
- Max. –7 dBm

Clocking:

- Recovered (loop)

Traffic Generation: Full rate ATM traffic generation

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J6813B E3/T3 (DS3) LIM
(34.368 / 44.736 Mbps)



J6813B E3/T3 (DS3) LIM

General

The J6813B LIM supports ATM, Frame Relay, HDLC, SDLC and PPP. When analyzing ATM, real-time (full rate) AAL-2 and AAL-5 reassembly is performed simultaneously on more than 5120 virtual channels and the resulting frames are passed from the LIM to the acquisition system for further analysis. Cell mode is also available. ATM Policing can be performed on up to 1024 virtual circuits in frame mode or cell mode simultaneously with other measurements. The module can be configured for use as an E3 or T3 interface.

Common to Inputs and Outputs (E3 and T3):

Two input and output ports
Connectors: 75 Ohm BNC female

When E3 is selected:

Electrical: ITU-T G.703
Line Code: HDB3
Framing:
    Frame Relay: ITU-T G.751
    ATM: ITU-T G.832
ATM Cell Mapping:
    Direct (ITU-T G.804)
ATM Cell Scrambling:
    Conforms to ITU-T I.432.1 (x43 + 1) and may be turned on or off

When T3 is selected:

Electrical:
- ITU-T G.703

Line Code:
- B3ZS

Framing:
- C-bit and M13 (auto-select on input side)

Fractional DS3:
- any DS0 or combination of DS0s within any DS1 within DS3

ATM cell Mapping:
- Direct (normal mode, ITU-T G.804)
- PLCP (obsolescent mode, ITU-T G.804)

ATM Cell Scrambling:
- Conforms to ITU-T I.432.1 (x43 + 1) and may be turned on or off

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Inputs (E3 and T3):

Received pulse amplitude measurement (mVpeak) on each port
Monitor modes:

- Terminated/Repeater (75 Ohm unbalanced)
- Bridged (high impedance)

When E3 is selected:

Levels:

- Auto gain control for high, low and monitor jack; all unbalanced 1.2Vpeak to 36mVpeak, 34 dB dynamic range

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Defect Indication (RDI), formerly known as FERF
- Loss of Cell Delineation (LCD)

Physical Layer line vital counts for each LIM port:

- Code violations
- Out of frame (OOF) events
- Remote Defect Indication (RDI), formerly known as FERF
- Remote Error Indication (REI), formerly known as FEBE
- Bit Interleave Parity (BIP-8)
- Payload type mismatch
- Loss of Cell Delineation (LCD)

When T3 is selected:

Levels:

- Auto gain control for high, DSX-3, low, and monitor jack (min. = DSX –23 dB); all unbalanced 1.2 V peak to 36 mV, 34 dB dynamic range

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Defect Indication (RDI), formerly known as FERF
- Loss of Cell Delineation (LCD) – directly mapped ATM mode
- PLCP OOF (out of frame) – PLCP ATM mode
- PLCP RAI – PLCP ATM mode

Physical Layer line vital counts for each LIM port:

- Code violations
- Frame bit error
- P1/P2 parity errors
- C-bit parity errors
- Remote Error Indication (REI), formerly known as FEBE
- Loss of Cell Delineation (LCD) – directly mapped ATM mode
- PLCP OOF (out of frame) – PLCP ATM mode
- PLCP Frame Bit Error – PLCP ATM mode
- PLCP BIP Error – PLCP ATM mode
- PLCP REI (remote error indication, formerly FEBE) – PLCP ATM mode

When E3 or T3 is selected:

ATM Layer at any supported rate for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)
- ATM policing, traffic contract estimation and 1-point CDV

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5

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- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs
- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected on multiple VCs

Statistics for Frame Relay, HDLC/SDLC, sync PPP for each LIM port:

- Total frames
- Bridged frames
- Bridged broadcast frames
- Bridged multicast frames
- Total octets
- Throughput (kbps)
- Aborted frames
- Short frames
- FCS errors

HDLC FCS can be set to 16-bit (default) or 32-bit with two variants of each

Frame Relay statistics per DLCI collected on 1024 VCs

Capture rate: Full line rate (full duplex)

Outputs (E3 and T3):

Termination:

75 Ohm

Levels:

ITU-T G.703

Clocking:

Recovered (loop)

Traffic Generation

Full rate ATM traffic generation

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J6815B T1/E1 LIM,
J6816B E1/T1 LIM,
J6817B E1 LIM
(1.544 / 2.048 Mbps)



J6815B T1/E1 LIM



J6816B E1/T1 LIM



J6817B E1 LIM

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General

All three LIMs handle ATM, Frame Relay, HDLC, SDLC and PPP. When analyzing ATM, real-time (full rate) AAL-2 and AAL-5 reassembly is performed simultaneously on more than 5120 virtual channels and the resulting frames are passed from the LIM to the acquisition system for further analysis. Cell mode is also available.
ATM Policing can be performed on up to 1024 virtual circuits in frame mode or cell mode simultaneously with other measurements.

The J6815B LIM has four Bantam connectors and two 8-pin RJ connectors, which can be switched between RJ-48C and RJ-45 pin wiring via the configuration menu. This module can be configured as a T1 (100 Ohm, 1.544 Mbps, default) or E1 (120 Ohm 2.048 Mbps) interface.

The J6816B LIM has DB-9 and 8-pin RJ connectors which can be switched between RJ45 and RJ48C wiring via the configuration menu. Converter cables are available to connect the DB9 to 120 Ohm Siemens 3-pin connectors. This module can be configured as an E1 (120 Ohm, 2.048 Mbps, default) or T1 (100 Ohm, 1.544 Mbps) interface.

The J6817B LIM has 75 Ohm BNC connectors. This module can be configured only as an E1 (2.048 Mbps) interface. Third-party vendors make conversion cables from this ISO BNC connector to the 'small Siemens BNC (1.6/5.6 mm)', 'large Siemens BNC', 'British Telecom BNC', etc.

Common to Inputs and Outputs:

Two input and output ports

When E1 is selected:

Interface termination:
- 120 Ohm balanced (J6815B, J6816B); 75 Ohm unbalanced (J6817B)

Line Code:
- ATM: HDB3
- Other WAN: HDB3, AMI

Framing:
- ITU-T G.704 alternate framing with or without CRC-4
- Fractional (ATM and Frame Relay), any multiple of 64 kbps channel
- Unframed at 2.048 Mbps

ATM Cell Mapping:
- Direct (ITU-T G.804)

ATM Cell Scrambling:
- Conforms to ITU-T I.432.1 (x43 + 1) and may be turned on or off
-

When T1 is selected (not applicable with J6817B):

Interface termination:
- 100 Ohm balanced

Line Code:
- ATM: B8ZS
- Other WAN: B8ZS, AMI

Framing:
- Extended Super Frame (ESF) with CRC-6
- D4 (Super Frame)
- Fractional (ATM and Frame Relay), any multiple of 56 kbps or 64 kbps channels
- Unframed 1.544 Mbps

ATM Cell Mapping:
- Direct (ITU-T G.804)

ATM Cell Scrambling:
- Conforms to ITU-T I.432.1 (x43 + 1) and may be turned on or off

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Inputs:

Received pulse amplitude measurement (dBdsx)

When E1 is selected:

Monitor modes:

- Terminated (120 Ohm)
- Bridged (High Impedance)
- Monitor Jack: -20 dB and -30 dB

Physical Layer line vital counts for each LIM port:

- Code violations
- Loss of frame (LOF) events
- Frame bit error
- CRC-4 error
- Loss of Cell Delineation (LCD)

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Alarm Indication (RAI), formerly known as FERF
- Loss of Cell Delineation (LCD)

When T1 is selected:

Monitor modes:

- Terminated (100 Ohm)
- Bridged (High Impedance)
- Monitor Jack (20dB)

Interface types (and input sensitivities):

- DSX-1 (+6 dB to –10 dB)
- Network Interface (+6 dB to -36 dB)

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Alarm Indication (RAI), formerly known as FERF
- Loss of Cell Delineation (LCD)

Physical Layer line vital counts for each LIM port:

- Code violations
- Loss of frame (LOF) events
- Frame bit error
- ESF CRC-6 error
- 1s density
- Excess 0s
- Loss of Cell Delineation (LCD)

When E1 or T1 is selected:

ATM Layer at any supported rate for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)
- ATM policing, traffic contract estimation and 1-point CDV

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple
- AAL-5 SSCS PDUs

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- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected on multiple VCs
Statistics for Frame Relay, HDLC/SDLC, sync PPP for each LIM port:

- Utilization in percent
- Total frames
- Bridged frames
- Bridged broadcast frames
- Bridged multicast frames
- Total octets
- Throughput (kbps)
- Aborted frames
- Short frames
- FCS errors

HDLC FCS can be set to 16-bit (default) or 32-bit with two variants of each
Frame Relay statistics per DLCI collected on 1024 VCs (see details on page 15)
Capture rate: Full line rate (full duplex)

Outputs:

Termination:

- 120 Ohm when E1 is selected
- 100 Ohm when T1 is selected

Levels:

- ITU-T G.703

Clocking:

- Recovered (loop)

Traffic Generation:

- Full rate ATM, traffic generation

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J6818A ATM25 LIM
(25.6 Mbps)



J6818B ATM25 LIM

The J6818B LIM interface handle ATM at 25.6 Mbps. Real-time (full rate) AAL-2 and AAL-5 reassembly is performed simultaneously on more than 5120 virtual channels and the resulting frames are passed from the LIM to the acquisition system for further analysis. Cell mode is also available. Policing can be performed on up to 1024 virtual circuits in frame mode or cell mode simultaneously with other measurements.

Common to Inputs and Outputs:

Main Specifications: ATM Forum af-phy-0040.000, ITU-T I.432.5
Ports: Two bi-directional, one toward the equipment and the other toward the network: 100 Ohm (for UTP-3 cable) and 120 Ohm (for UTP-5 cable)
Test configuration modes:

- Terminal (toward network or equipment – available in a future software upgrade);
- Monitor (both directions for protocol analysis with repeater functionality in each direction)

Connectors: RJ-45 (UTP)
Line Code: NRZI
Symbol Coding: 4B5B
Line Symbol Rate: 32 Mbaud
Cell Mapping: Symbolic direct (i.e. no framing)
Cell Scrambling: Conforms to af-phy-0040.000 (x10 + x7 + 1)

Inputs:

Physical Layer Alarms and Statistics:

- Invalid symbol
- Short cell
- Loss of signal (LOS)
- Loss of Timing Synchronization
- Timing synchronization frequency

ATM Layer at any supported rate for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)
- ATM policing, traffic contract estimation and 1-point CDV

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5

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- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs
- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected on multiple VCs
Capture rate: Full line rate (full duplex)

Outputs:

Clocking:

- Recovered from line (loop), recovered from X8 8 kHz time synchronization source

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J6820B V-Series LIM (up to 10Mbps)



J6820B V-Series LIM

Connection to supported interfaces is by means of separately supplied external monitor/simulate cables, each specific to a particular V-series interface.

Monitor/Simulate Cables (J6757A)

- option #001: V.35
- option #002: RS-449/V.36
- option #003: V.10/V.11 (for X.21)
- option #004: RS-232C
- option #005: EIA-530

Detail:
Bit rates:

- 2400 b/s to 8.192 Mbps on V.35, Sync or Sync NRZI;
- 2400 b/s to 10 Mbps on V.36/RS-449/422/423/EIA-530 and X.21, Sync or Sync NRZI
- 300 b/s to 256 kbps on V.24/V.28/RS-232C

Lead status:

- RTS, CTS, DTR, DSR, and CD (V.24/V.28/RS-232C and V.35)
- CS, RS, RR, TR, and DM (V.10/V.11 and V.36/RS-449/422/423)

Statistics for Frame Relay, HDLC/SDLC, sync PPP for each LIM port:

- Utilization in percent
- Total frames
- Bridged frames
- Bridged broadcast frames
- Bridged multicast frames
- Total octets
- Throughput (kbps)
- Aborted frames
- Short frames
- FCS errors

HDLC FCS can be set to 16-bit (default) or 32-bit with two variants of each
Frame Relay statistics per DLCI collected on 1024 VCs
Capture rate: Full line rate (full duplex)

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J6821A HSSI LIM
(up to 52Mbps)



J6821A HSSI LIM

Connection to the ports DCE and DTE of this LIM is accomplished through a 25-twisted-pair cable with male HSSI connectors. Cable impedance is specified at 100 ohms (cable not supplied by Agilent). The LIM supports Frame Relay, HDLC, SDLC and Sync PPP.

J6821A HSSI LIM supports only monitor mode. Bridged and Transmit modes are not supported directly out of the LIM. Bridged mode provided by the J6756B HSSI Tap.

Bit Rates
- 56 kbps to 51.850 Mbps
- Example: DS3 (44.736 Mbps), SONET STS-1 (51.84 Mbps)

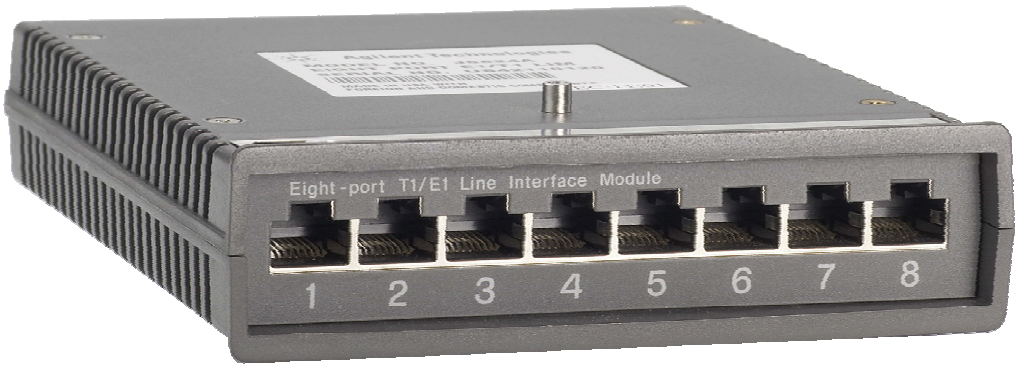
Lead Status
- Data: SD and RD
- Clock: ST, TT, and RT
- Control: CA and TA
- Test: LA, LB, LC, and TM

Statistics for Frame Relay, HDLC, SDLC, and Sync PPP for each LIM port
- Utilization in %
- Total Frames
- Bridged Frames
- Bridged Broadcast Frames
- Bridged Multicast Frames
- Total Octets
- Throughput (Kbps)
- Abort Frames
- Short Frames
- FCS Errors

HDLC FCS can be set to 16-bit (default) or 32-bit with two variants of each
Frame Relay statistics per DLCI collected on 1024 VCs
Capture Rate: Full Line Rate (full duplex)

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J6824A Multi-port E1/T1 LIM



J6824A Multi-port E1/T1 LIM

The Multi-port E1/T1 LIM has 8 ports, which are configurable for E1 or T1 framing. Each port on the LIM uses an 8-pin Modular connector (wired as RJ-48C), suitable for balanced 100 Ohm T1, or 120 Ohm E1 interfacing, or unbalanced 75 Ohm E1 interfacing. Three cable options are available, each providing a set of eight cables terminated with RJ-48C connectors at one end for plugging into the LIM and option-specific male connectors on the other end:

- option #001: RJ-48C to pairs of male Bantam connectors
- option #002: RJ-48C to pairs of 75 Ohm BNC connectors
- option #003: RJ-48C to RJ-45 wired 8-pin Modular connectors (swaps cable pairs between RJ-48C pins [1,2]/[4,5] to RJ45 pins [5,4]/[6,3], respectively).

This LIM can provide analysis of IMA (Inverse Multiplexing for ATM) traffic, multi-port ATM, Multi Link PPP, Multi-Link Frame Relay, Multi-Link HDLC, channelization with HDLC (SS7, Frame Relay and ISDN) or TRAU 16K framing for the Agilent Signaling Analyzer, and multi-port ISDN decodes. The IMA analysis requires, additionally, the presence of the J6825A Inverse Multiplexing for ATM (IMA) and Multi-Link WAN Technologies software product. Real-time (full rate) AAL 2 and AAL 5 reassembly is performed simultaneously on more than 5120 virtual channels on aggregated IMA traffic or on each port of multi-port ATM and the resulting frames passed from the LIM to the acquisition system for further analysis. Cell mode is also available.

Network Analyzer application:

- Multi-port ATM
- Inverse Multiplexing for ATM (IMA)
- Multi Link PPP,
- Multi-Link Frame Relay
- Multi-Link HDLC
- Multi-port ISDN PRI layer 2 statistics and layer 3 decodes

Signaling Analyzer Real-Time (SART) application:

- Multi-port ATM
- Inverse Multiplexing for ATM (IMA)
- Multi-port channelized with HDLC (SS7, Frame Relay, and ISDN) or TRAU 16 Kbps framing

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Common features of all 8 Ports:

Receiver Modes:

- Bridged (High Impedance), Terminated, Monitor Jack, and Thru/Bridged.
- Bridged, Terminated and Monitor Jack modes use two receivers per port connected to pins [1,2] and [4,5] of the 8-pin Modular connector providing full duplex 8 port monitoring (also see below for details on the J6826A and J6827A monitor taps)
- Thru/Bridged monitoring of signals uses pairs of ports (1&2, 3&4, 5&6, 7&8). Signals on port 1 and port 2 (pins [1,2] and [4,5]) are connected together to pass through the customer data which is monitored by two receivers set to Bridged (High Impedance) mode. Ports 3 and 4, ports 5 and 6, and ports 7 and 8 are similarly set to Thru/Bridged mode providing 4 port Thru/Bridged full duplex monitoring.

Received pulse amplitude measurement (dBdsx), displayed in 2.5 dB ranges

Hardware is compliant with the following standards (NOTE: some standards do not apply to current run modes or features, but apply to features added in the future):

- ANSI: T1.403-1995, T1.231-1993, T1.408
- AT&T: TR54016, TR62411
- ITU-T: G.703, G.704, G.706, G.736, G.775, G.823, G.932, I.431, I.432, O.151, O.161
- ETSI: ETS 300 011, ETS 300 166, ETS 300 233, CTR12, CTR4
- Japanese: JTG.703, JTI.431, JJ-20.11 (CMI Coding Only)

When E1 is selected:

Interface termination:

- 120 Ohms balanced
- 75 Ohms unbalanced

Line Code:

- HDB3, AMI

Framing:

- ITU-T G.704 alternate framing with or without CRC-4
- Fractional, any multiple of 64 kbps channel

Receiver Modes:

- Terminated (120 Ohm or 75 Ohm)
- Bridged (High Impedance)
- Monitor Jack (-20 dB, -26dB, and -32 dB)
- 4 Port Thru/Bridged

When T1 is selected:

Interface termination:

- 100 Ohms balanced (no converter cable required)

Line Code:

- B8ZS, AMI

Framing:

- Extended Super Frame (ESF) with CRC-6
- D4 (Super Frame)
- J1-ESF (calculates CDC-6 per JT-G.704)
- J1 D4 (uses Fs bit 12 as the RAI bit), WAN only
- Fractional, any multiple of 56 kbps or 64 kbps channels

Receiver Modes:

- Terminated (100 Ohm)
- Bridged (High Impedance)
- Monitor Jack (-20 dB)
- 4 Port Thru/Bridged

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Measurements and Statistics:

When E1 is selected:

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Alarm Indication (RAI), formerly known as FERF
- Loss of Cell Delineation (LCD)

Physical Layer line vital counts for each LIM port:

- Code violations
- Loss of frame (LOF) events
- Frame bit error
- CRC-4 error

When T1 is selected:

Interface types (and input sensitivities):

- DSX-1 (+6 dB to –10 dB)
- Network Interface (+6 dB to -36 dB)

Physical Layer line status indications for each LIM port:

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Alarm Indication Signal (AIS)
- Remote Alarm Indication (RAI), formerly known as FERF
- Loss of Cell Delineation (LCD)

Physical Layer line vital counts for each LIM port:

- Code violations
- Loss of frame (LOF) events
- Frame bit error
- ESF CRC-6 error
- 1s density

When E1 or T1 Eight-port ATM (including IMA) is selected:

Convergence Sub-Layer Vital counts for each LIM port:

- Single-bit HEC Error
- Multi-bit HEC Error
- Loss of Cell Delineation (LCD)

ATM policing (not available with IMA), traffic contract estimation and 1-point CDV

Inverse Multiplexing for ATM (IMA) – requires J6825A software:

IMA sub-layer:

- Conforms to ATM Forum af-phy-0086.001/ITU-T I.761
- Number of links in an IMA Group: 2 to 8
- Number of simultaneous IMA Groups: 1 (currently)
- Fractional E1/T1 links supported
- Auto-configuration of IMA Group with manual over-ride
- ICP (IMA Control Protocol) Cell decode (per link)
- Auto-detection of change in configuration (excluding link test mode byte 15, and test data bytes 16 and 17) with protocol analysis capture trigger
- Optional capture of all ICP cells or changing ICP cells in protocol capture (cell mode)

IMA Vital Counts for each LIM port:

- All ICP Cells
- Changed ICP Cells
- Filler Cells

ATM Vital Counts per IMA Group (frame mode)

- Utilization
- Idle Cells
- Busy Cells

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- Congestion Experienced
- CLP (low priority)
- Total Frames (frame mode)
- Bridged Frames (frame mode)
- Bridged Broadcast Frames (frame mode)
- Bridged Multicast Frames (frame mode)
- AALx Bad CRC-32 (frame mode)
- OAM F1 Cells (cell mode)
- OAM F3 Cells (cell mode)
- Resource Management Cells (cell mode)

ATM Layer for each direction (network or equipment) of the IMA Group:

- Full rate cell processing
- Auto-discovery and notification of up to 5120 virtual channels (VPI-VCI)

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120 AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs
- Count of total AAL-5 SSCS PDUs
- Reassembly of any mixture of up to 5120 AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected on multiple VCs

Channelization:

- Simultaneous 8-port receive for both Network and Equipment sides
- Up to 1024 channels and up to 512 timeslots supported, aggregated across all 8 ports per side
- 8, 16, 32, 56, 64, Nx56, and Nx64 Kbps data rates per channel supported
- HDLC, SS7 and standard 16 K TRAU framing formats supported
- WAN Multi-port ISDN Measurements:
- Simultaneous decoding of layer 3 Q.931 call activity on up to 8 ISDN PRI D-Channels
- Statistics for each port:
    - Utilization
    - Total Frames
    - Bridged Frames
    - Bridged Broadcast Frames
    - Bridged Multicast Frames
    - Total Octets
    - Throughput (Kbps)
    - Aborted Frames
    - Short Frames
    - FCS Errors

Transmitter Outputs (future emulation):

Termination:

- 100 Ohms (balanced) via LIM RJ-48C connectors
- 120 Ohms (balanced) via LIM RJ-48C connectors
- 75 Ohms (unbalanced) via LIM RJ-48C to BNC connectors with Cable Option 2

Levels:

- ITU-T G.703

Clocks:

- Recovered (loop), Internal, and External (input on one LIM port)
- Currently, only monitor modes are available with this LIM

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J6826A Eight-Port T1/E1 Balanced Monitor Tap (up to 2 Mbps)



J6826A Eight-Port T1/E1 Balanced Monitor Tap

General

Eight full-duplex T1/E1 links are passed through the Monitor Tap using pairs of Modular 8-pin (RJ45 type) connectors (all eight pins of each connector are passed through). The two data signals on connector pins [1,2] and [4,5] of each connector pair are wired to attenuator resistors to provide a 20 dB Monitor Jack circuit that can be directly connected to the J6824A Eight-Port T1/E1 LIM. Eight 3-foot RJ48C to RJ48C cables are supplied with the Monitor Tap for connection to the J6824A LIM.

Specifications

- Insertion Loss: <0.5 dB
- Attenuation: -20.7 dB nominal for T1
- Attenuation: -19.3 dB nominal for E1
- Maximum data rate: 2.048 Mbps

J6827A Eight-Port E1 BNC Monitor Tap (up to 2 Mbps)

General

Eight full-duplex E1 75 Ohm BNC ports are passed through the Monitor Tap using pairs of pass through BNC to BNC connections, and each of these links are wired to attenuator resistors to provide a 20 dB Monitor Jack circuit. The monitor tap contains impedance conversion transformers to change these signals from unbalanced 75 Ohm to balanced 120 Ohm outputs for direct connection to the J6824A Eight-Port T1/E1 LIM. Eight 3-foot RJ48C to RJ48C cables are supplied with the Monitor Tap for connection to the J6824A LIM.

Specifications

- Insertion Loss: <0.7 dB
- Attenuation: -22.4 dB nominal
- Maximum data rate: 2.048 Mbps

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J6828A Four-Port STM-1/OC-3 LIM Multiplexer



J6828A Four-Port STM-1/OC-3 LIM Multiplexer

General

This standalone multiplexer has four pairs of STM-1/OC-3 optical input ports. It is designed to be used with the J6810B STM-4/OC-12/STM-1/OC-3 LIM operating in a special mode to expand the latter's analysis capability to both directions of four STM-1/OC-3 ATM cell streams for use with the Agilent Signaling Analyzer Real-Time product. This external LIM is powered from a 5V DC supply with AC input (provided).

The J6828A LIM can monitor 4 ports of ATM clear channel as well as demux with the demux channelization license (J7836A) up to 336 T1/VT1.5/VC11 and 252 E1/VT2/VC12 ATM tributaries.

Inputs

Eight input ports grouped as four input port pairs

Connectors: SC-PC

Sensitivity:

- Min. -34 dBm

Loss of Signal Detect Level:

- Max. -36 dBm
- Min. –45 dBm

Framing:

- SDH: STM-1, ITU-T G.707
- SONET: STS-3c, GR-253

SDH / SONET Frame Scrambling (x7 + x6 + 1)

Receiver wavelength range: 1200/1600 nm

Optical power measurement for each LIM port:

- 0 dBm to -50 dBm dynamic range in steps of 0.1 dBm
- +/-0.5 dBm absolute accuracy at 1310 nm

Physical Layer line status indications for each LIM port (SDH / SONET):

- Loss of Signal (LOS)
- Loss of Frame (LOF)
- Loss of Pointer (LOP)
- Loss of Cell Delineation (LCD)
- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)

Physical Layer line vital counts for each LIM port (SDH / SONET):

- MS-RDI / RDI-L (Line FERF)
- RDI / RDI-P (Path FERF)

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- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)
- MS-REI / REI-L (Line FEBE)
- B1 BIP errors
- Loss of Cell Delineation (LCD)

Functionality Available with J6828A/J6810B Combination

When the multiplexer is connected to the J6810B STM-4/OC-12/STM-1/OC-3 LIM, the combined functionality available for each pair of STM-1/OC-3 ports (using the Signaling Analyzer Real-Time product) is as follows (note that this functionality is not supported with the J6810A LIM).

ATM Layer for each LIM port (network and equipment):

- Full rate cell processing
- Auto-discovery and notification of up to 5120* virtual channels (cell mode)

ATM Adaptation Layer (AAL) – frame mode:

- Auto-discovery and notification of up to 5120* AAL-2 Channels (VPI-VCI-CID) and/or AAL-5 virtual channels (VPI-VCI), any mix of AAL-2 and AAL-5
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-2 SSCS PDUs (corner case: reassembly of long sequences of shortest possible CPS packets is best effort)
- Count of total AAL-2 SSCS PDUs
- AAL-2 SSCS PDUs are reassembled to the SSSAR sub-layer
- Concurrent real-time reassembly of the first 4000 bytes of multiple AAL-5 SSCS PDUs
- Count of total AAL-5 SSCS PDUs
- Reassembly of any user defined mixture of up to 5120* AAL-2 and AAL-5 SSCS PDUs
- Reassembled AAL-5 SSCS PDUs with trailer CRC-32 errors

ATM and AAL statistics per VPI.VCI collected

Capture rate: Full rate, full duplex, on all ports

*aggregated over all four ports

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J6830A 10BaseT, 10/100BaseTX LIM,
J6831A 10/100BaseFX LIM,
J6832A 1000BaseX LIM



J6830A 10BaseT, 10/100BaseTX LIM



J6831A 10/100BaseFX LIM



J6832A 1000BaseX LIM

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General

The J6830A 10BaseT, 10/100BaseTX LIM handles Ethernet and Fast Ethernet over unshielded twisted pair (UTP) cable. The J6831A 10/100BaseFX LIM handles Fast Ethernet over multi-mode optical cable. The J6832 1000BaseX LIM accommodates a pair of GBIC interface adapters for handling Gigabit Ethernet over short reach (SX), long reach (LX) optical fiber, UTP-5 cable, or any combination of these; a pair of SX GBICs (Short range Gigabit Interface Connectors) is included with this LIM. All LIMs are capable of analysis and simulation. Other types of conforming GBIC may be supported (though not supplied by Agilent), such as CX.

J6830A 10BaseT, 10/100BaseTX specific:

Connectors: two RJ-45 (UTP)

Auto-sensing 10/100 Ethernet ports for 10BaseT and 100BaseTX

A second RJ-45 port allows testing of full duplex Ethernet between two network elements.

J6831A 10/100BaseFX specific:

Connectors: two duplex SC multi-mode 1300nm

J6832A 1000BaseX specific:

GBIC interfaces supported (any combination of the following):

J5491A SX GBICs (850 nm multi-mode) – included with the J6832A LIM

J5492A LX GBICs (1310 nm mono-mode)

J5495A T GBICs (UTP copper)

Other GBIC Interfaces supported:

Cisco WS-G5487 1000Base ZX GBIC (WS-G5487)

All LIMs:

Line and MAC statistics:

- bytes transmitted (total and per second)
- bytes received (total and per second)
- errors (total and per second)
- broadcasts (total and per second)
- multicasts (total and per second)
- frames transmitted (total and per second)
- frames received (total and per second)
- % transmitted
- % received
- local collisions
- remote collisions
- late collisions
- remote late collisions
- runts
- frames with bad FCS
- misaligned frames

Dribbles

Runts (good FCS)

Jabbers

Jabbers (good FCS)

Full rate, full duplex capture

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J6772A Rack Mount Kit for Agilent Distributed Network Analyzer and High Density Interfaces



J6772A Rack Mount Kit for Agilent Distributed Network Analyzer and High Density Interfaces. This graphic shows a J6801B DNA and a J6828A Four-Port STM-1/OC-3 LIM Multiplexer mounted in the J6772A Rack Mount Kit

General

The J6772A rack mount kit is a 19 inch, 1U platform that can hold:

- Single J6801A/B DNA
- Single J6801A/B DNA and a J6828A Four-Port STM-1/OC-3 LIM Multiplexer
- Single J6801A/B DNA, a J6824A Multi-port E1/T1 LIM and a J6826/7A monitor tap

DNA Mechanical Specifications

		J6801B DNA	J6802B DNA MX	J6803B DNA PRO
Physical Specifications	Size (depth x width x height):	307 x 259 x 61 mm (12.1 x 10.1 x 2.4 inches)	406 x 440 x 88 mm (14.6 x 17.3 x 3.5 inches)	311 x 300 x 114 mm (12.25 x 11.75 x 4.5 inches)
	Weight	2.3 kg (5.3 lb.)	7.3 kg (16.5 lb.)	4.5 kg (9.7 lb.)
Power Requirements	External	100 - 240 V ~, 50 - 60 Hz, 2.0A	Option 1AC 100 - 240 V ~, 50 - 60 Hz, 2.5A	100 - 240 V ~, 50 - 60 Hz, 2.5A
			Option 1DC –40 - –56 VDC, 1.4A Type (JA18)	
Temperature	Operating	+5° to +40° C (+41° to +104° F)	+5° to +40° C (+41° to +104° F)	+5° to +40° C (+41° to +104° F)
	Non-operating	-25° to +60° C (-13° to +140° F)	-25° to +60° C (-13° to +140° F)	-25° to +60° C (-13° to +140° F)
Humidity	Operating	20% to 80% Non-condensing	20% to 80% Non-condensing	20% to 80% Non-condensing
	Non-operating	10% to 90% Non-condensing	10% to 90% Non-condensing	10% to 90% Non-condensing
Altitude	Operating	4,570m (15,000 ft)	4,570m (15,000 ft)	4,570m (15,000 ft)
	Non-operating	12,200m (40,000 ft)	12,200m (40,000 ft)	12,200m (40,000 ft)
Regulatory Compliances for all DNAs	EMC	Europe: Low Voltage and EMC Directives (CE marked) IEC 61326-1 Canada: ICES-001 (marked) Australia/New Zealand: AS/NZS 2064.1 (C-Tick marked)		
	Safety	IEC 61010-1 (CE marked) UL 3111 CSA C22.2 No.1010.1 (CSA-C/US marked)		

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On-Line Information

For more information on DNA platform, please visit:
www.agilent.com/find/dna

For more information on Network Analyzer Software applications, please visit www.agilent.com/find/networkanalyzer

For more information on Triple Play Analyzer, please visit:
www.agilent.com/find/tpa

For more information on Signaling Analyzer Software applications, please visit:
www.agilent.com/find/sart

Related Literature

Network Analysis and Troubleshooting Solutions Distributed Network Analyzer Platform	5989-5455EN
Signaling Analyzer Technical Overview	5989-0347EN
Network Analyzer Technical Overview	5988-4231EN
Triple Play Analyzer Technical Overview	5989-5783EN
DNA Brochure	5989-3956EN
Signaling Analyzer Brochure	5989-4484EN
Mobile GSM GPRS UMTS R5 Poster	5989-4490EN
Protocol Communications Poster	5989-5245EN



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www.agilent.com/find/dna
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