

JDSU Distributed Network Analyzer



Key Features

- Supports 15 different physical interfaces: RS-232, V.35, RS-449/V.36, X.21, EIA-530, HSSI, T1, E1, DS-1, DS-3, OC-3/STM-1, OC-12STM-4, 10 Mbps Ethernet, 100 Mbps Ethernet (Fast Ethernet), and Gigabit Ethernet.
- Intelligent Packet Processing with hardware-based filtering, network stats and key performance metrics
- Specialized hardware to capture all the packets under any network load

Applications

- Network diagnostics and protocol test
- Quickly solve LAN, WAN and ATM network issues
 - Slow network response and poor application response times
 - quality of service problems
 - Physical layer anomalies
- Configuration issues
- Identify the root cause of VoIP, Data, Video, and wireless signaling and user plane problems
 - Is the problem the network service, the equipment, or the enterprise environment
- Access virtually any network, running any protocol, from anywhere with remote access, by anyone with intuitive test capability

Network Analysis and Troubleshooting Solutions Overview

JDSU's scalable 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, 3G and 4G mobile networks.

Distributed Network Analyzer (DNA)

- Ultra portable data acquisition and analysis system
- Requires a PC to control
- Used for remote and distributed troubleshooting and analysis
- One or more can be controlled and synchronized for multiport analysis

DNA-MX

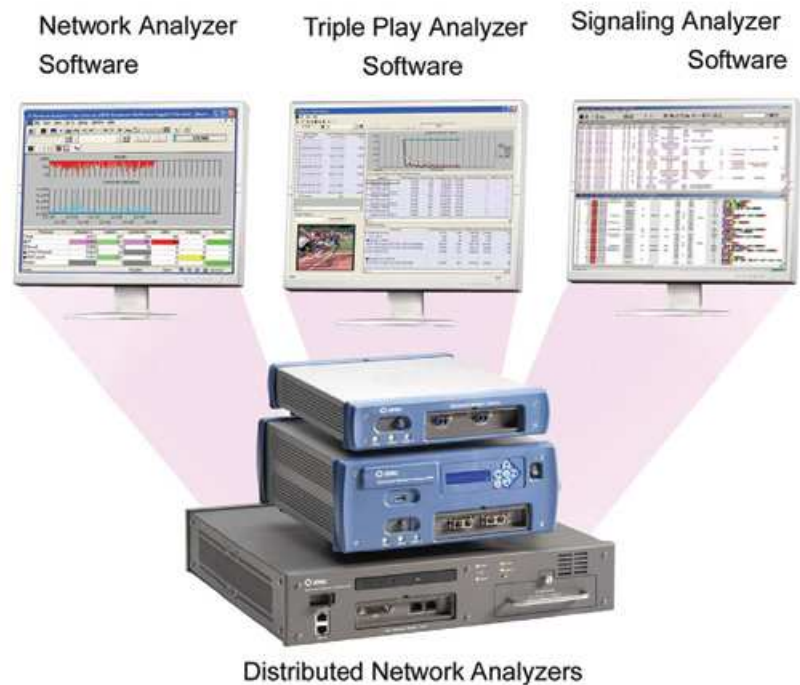
- Acquisition and analysis system with built-in controller
- Rack-mountable

DNA PRO

- Portable test system with built in acquisition system and controller
- Run-time store to media up to 400 Mbps
- Designed to be controlled remotely from a PC via a web browser or instrument manager

DNA HD

- High Density 16 Port Gigabit Ethernet acquisition and analysis system
- Supports both the SART and NgNAS applications
- Fully programmable FPGA hardware allows extensive analysis



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, LTE, HSDPA, HSUPA, UMTS, CDMA 2000, GPRS, and more.

The scalable DNA hardware platform provides the foundation of advanced protocol analysis architecture for fixed and mobile network applications. 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, MSTV, 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 3G and 4G technologies.

DNA Components

| | | | |
|----------------------------------|-------------|--------|---|
| Hardware | | J6801B | DNA |
| | | J6802B | DNA MX |
| | | J6803B | DNA PRO |
| | | J6804A | DNA HD |
| Applications | Mobile | J7830A | Signaling Analyzer Real-Time |
| | | J7832A | Signaling Analyzer Offline |
| | Wireline | J6840A | Network Analyzer Software |
| | | J6839A | Network Analyzer Software Professional 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 |
| | | J6820B | V-Series LIM for the JDSU 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 |
| | | J6850A | 8 Port Ethernet LIM for the J6804A |
| | | J6851A | 16 Port Ethernet LIM for the J6804A |

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 stand-alone 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 with AC or DC options
- Rackmountable
- Includes Network Analyzer software 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 DNA PRO, DNA MX or DNA via the Control & Sync In interface. Up to 8 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
- LIMs can be hot swapped
- Capture buffer 512MB
- Time stamp resolution 100 nsec
- 100% line rate filtering – supports up to 32 filters

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 160 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 disk
- Run-Time Store to Media
- Optional -48 V DC Power Supply Available
- LIMs can be hot swapped
- Capture buffer 256MB
- Time stamp resolution 100 nsec
- 100% line rate filtering – supports up to 32 filters

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 120 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
- LIMs can be hot swapped
- Capture buffer 512MB
- Time stamp resolution 100 nsec
- 100% line rate filtering – supports up to 32 filters

J6804A DNA HD

J6804A Distributed Network Analyzer HD

The JDSU Distributed Network Analyzer HD data acquisition probe provides high density advanced Ethernet packet processing capabilities for network monitoring and analysis. This versatile probe is designed to perform data acquisition and analysis for the JDSU NgN Analysis System, the JDSU Signaling Analyzer Real-Time, or the Triple Play Analyzer test applications. The probe is 1U in height and 19 inches in width and is rack mountable.

The DNA HD consists of an acquisition system that supports either a high density 8 port Ethernet (J6850A) or 16 port Ethernet (J6851A) LIM. It has its own IP address and is controlled via TCP/IP over Ethernet from a standard PC running the Signaling Analyzer software or TPA software.

DNA HDs are used for remote and distributed troubleshooting and can be used in standalone mode connected to a PC, or daisy-chained together to create 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 with AC or DC options
- Rack mountable
- 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, DNA HD 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 DNA PRO, DNA MX, or DNA HD or DNA via the Control & Sync In interface. Up to 8 daisy-chained, time-synchronization DNAs can be connected to a DNA PRO, DNA MX, or DNA HD.
 - 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
- Time stamp resolution 100 nsec
- 100% line rate filtering – supports up to 32 filters

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
- J6804A DNA HD (supports the J6850A and J6851A LIMs only)

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 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

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



J6810B STM-4/OC-12/STM-1o/OC-3 LIM

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

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

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:

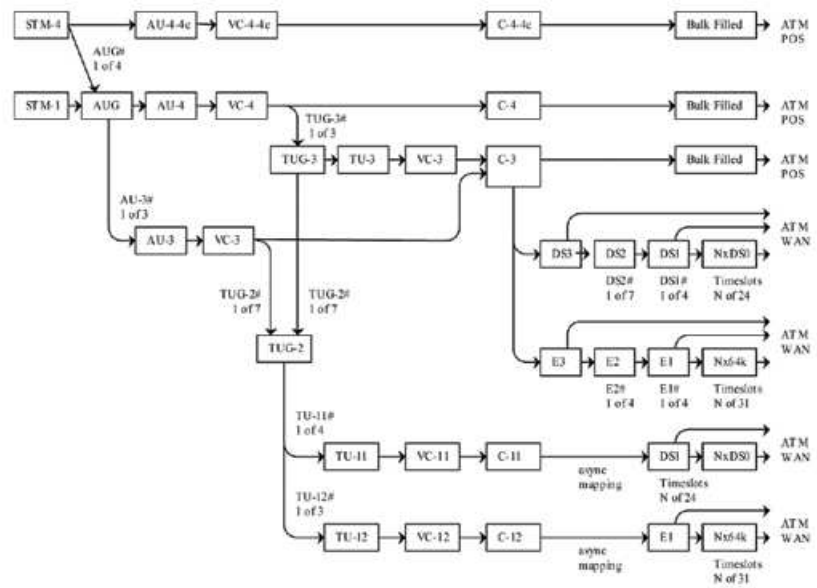
Recovered (loop)

Traffic Generation:

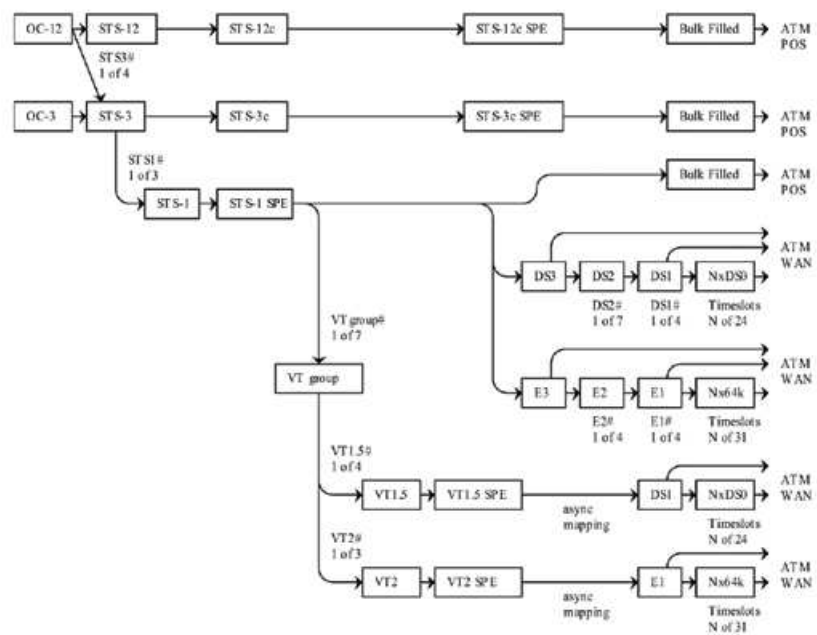
Full rate ATM traffic generation at 155 Mbps (over STM-1/OC-3) and 622 Mbps (over STM-4/OC-12)

Tributary Analysis

The following two diagrams depict the multiplexing functionality of the STM-4/OC-12/STM-10/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

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

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

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

Inputs (E3 and T3):

Received pulse amplitude measurement (mV_{peak}) 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 1.2V_{peak} to 36mV_{peak}, 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
- 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

**J6815BT1/E1 LIM,
J6816BE1/T1 LIM,
J6817BE1 LIM
(1.544 / 2.048 Mbps)**



J6815BT1/E1 LIM



J6816BE1/T1 LIM



J6817BE1 LIM

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

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 This should wrap with the sentence above and not be a separate bullet
- 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

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

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)

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 JDSU). 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)

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 JDSU 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

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

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
- 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

**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

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 JDSU 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)
- MS-AIS / AIS-L (Line AIS)
- AIS / AIS-P (Path AIS)
- MS-REI / REI-L (Line FEFE)
- 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

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



J6830A 10BaseT, 10/100BaseTX LIM



J6831A 10/100BaseFX LIM



J6832A 1000BaseX LIM

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 JDSU), 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)

J5492A LX GBICs (1310 nm mono-mode)

J5495A T GBICs (UTP copper)

Other GBIC Interfaces supported:

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

J6850A 8 Port Ethernet LIM



J6851A 16 Port Ethernet LIM



General

The J6850A and J6851A supports 10/100/1000Mbps Ethernet monitoring and troubleshooting data acquisition and analysis. The J6850A has 8 Ethernet ports and the J6851A supports 16 Ethernet ports. Select copper or optical SFP interfaces:

- Copper 1000BaseT, 100BaseT, and 10 BaseT (RJ-45)
- Gigabit Ethernet optical
 - › Short wavelength multimode SFP SX optical transceiver (850 nm) LC connectors
- Gigabit Ethernet Optical
 - › Long wavelength singlemode SFP LX optical transceiver (1310 nm) LC connectors

SFP Port Options:

| | |
|------------|--|
| J6758A-1SX | SX Multimode fiber optic Gigabit Ethernet LC SFP |
| J6758A-1LX | LX Multimode fiber optic Gigabit Ethernet LC SFP |
| J6758A-1TX | 1000Base-TX Gigabit Ethernet RJ-45 SFP |

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



J6772A Rack Mount Kit for JDSU 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 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 8 DNAs in a 10 meter cable from a DNA PRO, DNA MX or DNA HD | Time-synchronize DNA MX DNA PRO, or DNA HD to an external NTP server |
| | Accuracy of $\pm 1 \mu\text{s}$ for LAN | Accuracy of $\pm 1 \mu\text{s}$ for LAN | Accuracy of $\pm 20 \text{ ms}$ |
| DNA | ✓ | ✓ | |
| DNA MX | ✓ | ✓ | ✓ |
| DNA PRO | ✓ | ✓ | ✓ |
| DNA HD | ✓ | ✓ | ✓ |

DNA Platform Telemetry

The DNA platform provides flexible options for telemetry.

| | J6801B DNA J6804A DNA HD | 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 analyze 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, J6803B and J6804A, 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.

| | | 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 Input voltage +/- 10 % | 100 - 240 V ~, 50 - 60 Hz, 2.0A | Option 1AC 100 - 240 V ~, 50 - 60 Hz, 2.5A Option 1DC -40 - -56 VDC, 1.4A Type (JA18) | 100 - 240 V ~, 50 - 60 Hz, 2.5A |
| | | | | |
| 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 | 3,000m (9,842ft) | 3,000m (9,842ft) | 3,000m (9,842ft) |
| | Non-operating | 12,200m (40,000 ft) | 12,200m (40,000 ft) | 12,200m (40,000 ft) |
| Regulatory Compliances | EMC | Europe: Canada: Australia/New Zealand: | Low Voltage and EMC Directives (CE marked) IEC 61326-1 ICES-001 (marked) 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) | | |
| | | J6804A DNA HD | | |
| Physical Specifications | Size (depth x width x height): | 368 x 442 x 44 mm (14.5 x 17.4 x 1.75 inches) | | |
| | Weight | 5.3 kg (11.6 lb.) | | |
| Power Requirements | External Input voltage +/- 10 % | 100 - 240 V ~, 50 - 60 Hz, 2.0A 36 - 72 VDC 2.0A | | |
| | | | | |
| Temperature | Operating | +5° to +40° C (+41° to +104° F) | | |
| | Non-operating | -25° to +60° C (-13° to +140° F) | | |
| Humidity | Operating | 20% to 80% Non-condensing | | |
| | Non-operating | 10% to 90% Non-condensing | | |
| Altitude | Operating | 3,000m (9,842ft) | | |
| | Non-operating | 12,200m (40,000 ft) | | |
| Regulatory Compliances | | EMC Qualification: IEC 61326-1 ICES-001 AS/NZS 2064.1 | | |

JDSU Assistance

JDSU aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right JDSU products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Two concepts underlie JDSU's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

Our Promise means your JDSU test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you receive your new JDSU equipment, we can help verify that it works properly and help with initial product operation.

Your Advantage

Your Advantage means that JDSU offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced JDSU engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your JDSU instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Test & Measurement Regional Sales

| | | | | |
|---|--|---|---|--|
| NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216 | LATIN AMERICA TEL: +1 954 688 5660 FAX: +1 954 345 4668 | ASIA PACIFIC TEL: +852 2892 0990 FAX: +852 2892 0770 | EMEA TEL: +49 7121 86 2222 FAX: +49 7121 86 1222 | WEBSITE: www.jdsu.com/test |
|---|--|---|---|--|