Agilent N2X

OC-48/STM-16 multi-rate XM Test Card

J7244A and J7245A

Technical Data Sheet

Simultaneous and multi-channel SONET/SDH testing for OC-48/STM-16 multi-rate interfaces throughout development and deployment.

Agilent Technologies

Key Features

- OC-48, OC-12, OC-3
- STM-16, STM-4, STM-1
- Dual-port and single-port versions available
- Multi-channel BER, APS, J1 and J2 connectivity measurements
- Generation/measurement of mixed mapping structures
- Multi-channel test granularity to VT/TU level
- Full bandwidth simultaneous measurement of up to 1344 VT1.5 or 1008 TU-12 within an OC-48 or STM-16 signal.
- SONET/SDH Overhead access
- Error & alarm generation & measurements
- Transparent & intrusive thru mode testing

Product Overview

Agilent N2X is the industry's most comprehensive test solution for testing the development and deployment of network services for converging network infastructures. Service providers, network equipment manufacturers (NEMs), and component manufacturers can verify service attributes of entire networks end-to-end, while also isolating problems down to individual networking devices and subsystems.

Agilent N2X incorporates the strength of the OmniBER XM, RouterTester 900 and SANTester to offer unmatched service performance insight over transport networks.

The Agilent N2X OC-192/ STM-64 Multi-channel Test Card, in conjunction with the N2X Multi-Services Transport Application provides simultaneous multi-port and multi-channel SONET/SDH test capability to realistically characterize next generation SONET equipment. The J7244A and J7245A are OC-48/STM-16 multi-rate, multi-channel transceiver modules with optional dual-port and single-port versions available.

Both modules are dual SONET/SDH, providing 2.5 Gb/s, 622 Mb/s and 155 Mb/s optical interfaces. SONET support is for OC-48, OC-12 and OC-3. SDH support is for STM-16, STM-4 and STM-1. The J7244A has a 1550nm transmitter and the J7245A has a 1310nm transmitter. Both modules have wideband receivers covering both 1550nm and 1310nm.

The standard configuration of each module provides multi-channel payload granularity down to STS-1/AU-3. This enables multi-channel STS/High Order Path BER, STS/High Order Path APS switching times and (J1 byte based) path connectivity testing. This functionality enables both tributary and line side testing of MSSPs (Multi-Service Switching Platforms).

The optional multi-channel VT/TU capability adds multi-channel VT/Low Order Path BER, VT/Low Order Path APS switching times and J2 path connectivity testing for verification of MSPPs (Multi-Service Provisioning Platforms). Full bandwidth simultaneous measurement of up to 1344 VT1.5s or 1008 TU-12s is supported within each OC-48/STM-16. In addition, framed/unframed DS-3/DS-1/E1 mapped payloads are supported, as well as unframed E3 mapped payloads.

For information on the J7241A and J7242A OC-192/STM-64 transceiver modules, see publication number 5988-6665EN.

Technical specifications

Functional Specifications

Standard Functionality (multi-channel STS/AU Mode)

Multi-channel BER	Generates & measures BER simultaneously on all STS/High Order Path channels.
Multi-channel APS times	Measures service disruption times simultaneously on all or selected STS/High Order Path channels.
Multi-channel J1 auto-connectivity	Generates unique preset or user definable J1trace message for each High Order Path (64byte or 16byte including CRC7) with user initiated automatic measurement of J1 connectivity on all STS/ High Order Path channels.
Overhead Access	Set/monitor all defined/undefined overhead incl. the following: SOH/RSOH: A1A2, J0, Z0, E1, F1, D1-D3 LOH/MSOH: H1-H3, K1K2, D4-D12, S1, M0, M1, E2, Z1, Z2 POH: J1, C2, G1, F2, H4, F3, K3, N1 (STS/HP POH can be set uniquely for each channel)

Overhead Sequence Generation
(Up to 9 bytes can be selected Simultaneously)

SOH/TOH	J0, E1, F1, S1, D1-D3, K1, K2, K1-2, K2-2, D4-D12, M0, M1, E2 plus all undefined overhead bytes.
POH	J1, C2, G1, F2, H4, Z3/F3, Z4/K3, Z5/N1 in a single selected POH channel.

Available in Terminal Mode and Intrusive Thru-mode. Sequences can contain up to 255 elements. No of frames transmitted 1-65535.

J0 Section Trace	Preset or user definable trace message (64byte or 16byte including CRC7)
K1K2 Messages	Set/monitor K1K2 messages. Byte encode/decodes for both linear & ring topology messages are supported.
K1K2 Capture	Capture K1K2 pair or K1K2K2-2 triplets. Up to 256 different states with up to 65535 frames per value.
S1 Sync Status	Set/monitor S1 sync status byte. S1 byte encode/decodes are supported.
Mixed Payloads (SONET)	Full multi-channel mixed payloads generation & measurement STS-1, STS-3c, STS-6c, STS-9c, STS-12c, STS-24c & STS-48c
Mixed Payloads (SDH)	Full multi-channel mixed payloads generation & measurement AU-3, AU-4, AU-4-2c, AU-4-3c, AU-4-4c, AU-4-8c, AU-4-16c
Error Tx/Rx	B1, B2, REI-L/MS-REI B3, REI-P/HP-REI and Payload Bit (path error generation can be added to all or selected paths simultaneously, error rates can be different for each channel size, measurement is on all channels simultaneously)
Error Rates	Single or w.xy E-z (w.xy can be 1.00 to 9.99, z is 3 to 10)
Alarm Tx/Rx	LOS, LOF, SEF/OOF, AIS-L/MS-AIS, RDI-L/MS-RDI LOP-P/AU-LOP, AIS-P/AU-AIS, RDI-P/HP-RDI, UNEQ-P/HP-UNEQ, Pattern Sync Loss, PDI-P/HP-PDI (Path alarms can be added to all or selected paths simultaneously) Errors & Alarms can be added simultaneously.
Error/Alarm Timed Bursting	Bursts of ON for x seconds and OFF for y seconds, REPEAT z times (x, z =1 to 10,000; y =0 to 10,000)
Alarm Pulse Bursting	Off then burst ON for x frames then off (where x=1 to 64). Pulse bursting does not include support for LOS alarm.
Test Payload	Independent selection per channel of PRBS, inverted PRBS or user-defined 16bit word.
Pointer Adjustment	Inc, Dec, New Pointer Value (with/without NDF)
Pointer Measurements	Pointer Activity, Inc count, Dec Count (measurement is on all channels simultaneously)
Performance Analysis	ITU-T G.826 & G.828 (block based) and GR-253 (bit based) performance analysis
Thru-mode	Transparent or Intrusive modes **Error Tx/Rx:** B1, B2, REI-L/MS-REI, B3, REI-P/HP-REI **Alarm Tx/Rx:** LOS, LOF, LOP, AIS-L/MS-AIS, RDI-L/MS-RDI, AIS-P/AU-AIS, RDI-P/HP-RDI, UNEQ-P/HP-UNEQ **Overhead Delay** (up to 9 bytes can be selected simultaneously) Available in Intrusive Thru-mode only. SOH/TOH: J0, E1, F1, S1, D1-D3, K1, K2, K1-2, K2-2, D4-D12, M0, M1, E2 plus all undefined overhead bytes. The selected overhead channel is delayed by N frames where N can be between 1 and 512 (0.125ms to 64ms)
Signal auto-discovery	Receiver detects the signal structure and configures receiver channel settings appropriately.
Transmit Frequency offset	Up to +\- 100ppm.

Optional Functionality (multi-channel VT/TU mode - option 010)

Multi-channel BER	Generates & measures BER simultaneously on all STS/High Order and all VT/TU Low Order Path channels.
Multi-channel APS times	Measures service disruption times simultaneously on all STS/High Order and all VT/ TU Low Order Path channels.

Multi-channel J1 auto-connectivity	Generates unique preset or user definable J1trace message for each High Order Path (64byte or 16byte including CRC7) with user initiated automatic measurement of J1 connectivity on all STS/ High Order Path channels (also incl. J1 on Low Order TU-3).
Multi-channel J2 auto-connectivity	Generates unique preset or user definable J2 trace message for each Low Order Path (16byte including CRC7) with user initiated automatic measurement of J2 connectivity on all VT/TU Low Order Path channels.
Overhead Access	Set/monitor all defined/undefined overhead incl. the following: SOH/RSOH: A1A2, J0, Z0, E1, F1, D1-D3 LOH/MSOH: H1-H3, K1K2, D4-D12, S1, M0, M1, E2, Z1, Z2 POH: J1, C2, G1, F2, H4, F3, K3, N1 (STS/HP POH can be set uniquely for each channel) VT/TU POH: V5, J2, Z6, Z7 (VT/TU POH can be set uniquely for each channel)
J0 Section Trace	Preset or user definable trace message (64byte or 16byte including CRC7)
K1K2 Messages	Set/monitor K1K2 messages. Byte encode/decodes for both linear and ring topology messages are supported.
K1K2 Capture	Capture K1K2 pair or K1K2K2-2 triplets. Up to 256 different states with up to 65535 frames per value.
S1 Sync Status	Set/monitor S1 sync status byte. S1 byte encode/decodes are supported.
Mixed Payloads (SONET)	Mixed Low Order Payloads generation & measurement VT-1.5, VT-2 plus DS-3 mapped STS-1s
Mixed Payloads (SDH)	Mixed Low Order Payloads generation & measurement VC-11, VC-12, VC-3 (via AU-4 or via AU-3)
Mappings	Bulk filled, async (with PDH/DS-n payloads)
Error Tx/Rx	B1, B2, REI-L/MS-REI B3, REI-P/HP-REI BIP/TU BIP, REI-V/LP-REI and Payload Bit (path error generation can be added to all or selected paths simultaneously, error rates can be different for each channel size, measurement is on all channels simultaneously)
Error Rates	Single or w.xy E-z (w.xy can be 1.00 to 9.99, z is 3 to 10)
Alarm Tx/Rx	LOS, LOF, SEF/OOF, AIS-L/MS-AIS, RDI-L/MS-RDI LOP-P/AU-LOP, AIS-P/AU-AIS, RDI-P/HP-RDI, UNEQ-P/HP-UNEQ, PDI-P/HP-PDI, H4-LOM, AIS-V/TU-AIS, LOP-V/TU-LOP, RDI-V/LP-RDI, UNEQ-V/LP-UNEQ, RFI-V/LP-RFI, Pattern Sync Loss (Path alarms can be added to all or selected paths simultaneously) Errors & Alarms can be added simultaneously.
Error/Alarm Timed Bursting	Bursts of ON for x seconds and OFF for y seconds, REPEAT z times (x, z =1 to 10,000; y =0 to 10,000) - STS/HP only.
Alarm Pulse Bursting	Off then burst ON for x frames then off (where x=1 to 64). Pulse bursting does not include support for LOS alarm - STS/HP only.
DS-1 async mapped payloads	unframed, SF, ESF
E1 async mapped payloads	unframed, CRC ON, CRC OFF (ITU-T G.704)
DS-3 async mapped payloads	unframed, M23, C-bit
E3 async mapped payloads	unframed
PDH/DS-n alarm tx/rx	AIS, LOF
Test Payload	Independent selection per channel of PRBS, inverted PRBS or user-defined 16bit word.
Pointer Adjustment	Inc, Dec, New Pointer Value (with/without NDF)
Pointer Measurements	Pointer Activity (measurement is on all channels simultaneously)
Signal auto-discovery	Receiver detects the signal structure and configures receiver channel settings appropriately.
Transmit Frequency offset	Up to +\- 100ppm

Parametric Specifications

Fiber power output	1310nm: Min -5dBm, max 0dBm (single mode) 1550nm: Min -2dBm, max +3dBm (single mode)
Tx spectral width	<1nm at -20dB
Extinction Ratio (min)	8.2dB
Min sensitivity	-24dBm at 155/622Mb/s, -20dBm at 2.5Gb/s
Max input power	-3dBm, -2.5dBm
Max input power damage level	+2 dBm, +4 dBm
Optical pulse mask	Meets ITU-T G.957 (6/1999) and Telcordia GR-253-CORE Issue 3 (9/2000)
Tx clock sync	Tx clock can be synchronized to BITS, MTS or internal 10M through the XM chassis, or to recovered clock.
Tx clock performance	Frequency: +/- 0.2ppm Stability: +/-1.0ppm/year max

Mechanical	
Size	287mm L x 187mm W x 29mm H
Weight	1.44kg
Environmental	
Operating temperature range:	+5C to +40C

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Agilent N2X

Agilent's N2X multi-service tester combines leading-edge services with carrier grade infrastructure testing and emulation. The N2X solution set allows network equipment manufacturers and service providers to more comprehensively test new services end-to-end, resulting in higher quality of service and lower network operating costs.

Warranty and Support

Hardware Warranty

All N2X hardware is warranted against defects in materials and workmanship for a period of 1 year from the date of shipment.

Software Warranty

All N2X software is warranted for a period of 90 days. The applications are warranted to execute and install properly from the media provided.

This warranty only covers physical defects in the media, whereby the media is replaced at no charge during the warranty period.

Support

Technical support is available throughout the support life of the product. Support is available to verify that the equipment works properly, to help with product operation, and to provide basic measurement assistance for the use of the specified capabilities, at no extra cost, upon request.

Ordering Information

To order and configure the test system consult your local Agilent field engineer.

United States:

Agilent Technologies
Test and Measurement Call Center
P.O. Box 4026
Englewood, CO 80155-4026
1-800-452-4844

Canada:

Agilent Technologies Canada Inc.
5150 Spectrum Way
Mississauga, Ontario
L4W 5G1
1-877-894-4414

Europe:

Agilent Technologies
European Marketing Organisation
P.O. Box 999
1180 AZ Amstelveen
The Netherlands
(31 20) 547-2323

United Kingdom
07004 666666

Japan:

Agilent Technologies Japan Ltd.
Measurement Assistance Center
9-1, Takakura-Cho, Hachioji-Shi,
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