

Data Sheet

# VIAMI

## TestPoint OC-192/STM-64

This TestPoint single slot module provides OC-192/STM-64 SONET/SDH test functionality with channelization down to STS-1/VC-3(AU-3). It supports a hardware option for Digital Wrapper and Forward Error Correction (FEC) at G.709 OTU2 (10.709 Gbps).



### Key Features

- Channelized OC-192/STM-64
- OTN testing at OTU2 (10.709G)
- Clock rate variation injection
- PRBS traffic
- Injection of multiple errors/alarms simultaneously
- Full SONET/SDH byte diagram with two injection banks
- OTN full overhead capture and triggers with CE

### Applications

- SONET/SDH: OC-192/STM-64
- Digital Wrapper and FEC: OTU2
- (ITU-T G.709); OC-192/STM-64client

### Compliance

- CSA Certificate of Compliance to CAN/CSA C22.2 No 60950-1 (2003) and ANSI/UL 60950-1 (2003) with CSA Mark for Canada and USA
- CSA CB Certificate of Compliance to EN60950-1, IEC 60950-1 and National Deviations with CE Marking
- Class 1 Laser Product, with compliance to EN 60825, IEC 60825 and FDA/CDRH requirements

NOTE: The 10Gbps is available in either modules (TS-30/TS-170) or in configurations (TS-10). The term module is used in this document.

Interface Specifications		
<b>Optical Connector</b>	<b>SC</b>	<b>SC</b>
Wavelength	1310 nm	1550 nm
Optical Output Power (Rx power read)	-4 to +1 dBm	1 to +2 dBm
Optical Overload (min)	-1 dBm	1 dBm
Sensitivity (min)	-15 dBm	16 dBm
Clock Out	LVPECL signal, AC coupled on SMA connector	
LAN (Ethernet) Port	RJ-45 (10/100BASE-T)	
Operator Port	RJ-12 into RS-232 serial cable	

### Standard Offering

Equipped with one physical port providing: OC-192/STM-64: Channelized (HO)

### Options

Digital Wrapper and FEC	OTU2 (10.709 Gbps)
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### Line Rates

9.95328 Gbps (OC-192/STM-64)

10.709 Gbps (OTU2)

### Clocking

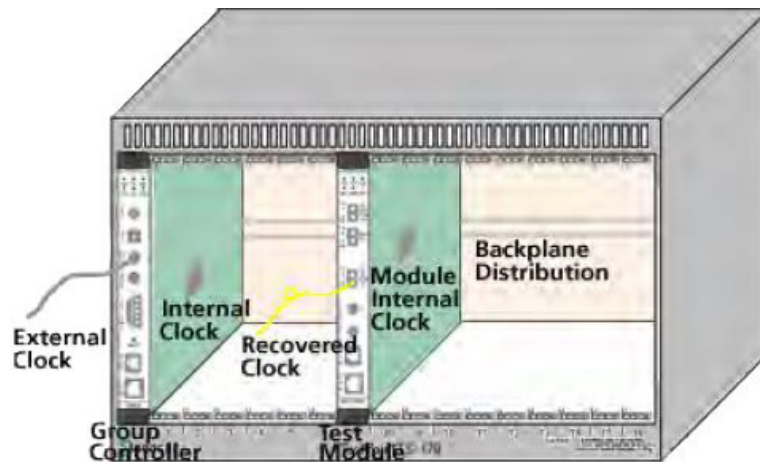
Internal (+/- 4.6 ppm accuracy)

Recovered

External via Group Controller (TS-30/170)

Clock rate variations +/-30 ppm: SONET/SDH, OTU2

Clock out (LVPECL, AC coupled on SMA)



### Connectivity

Terminal	Source and sink traffic (all rates)
Monitor	Transparently monitors signal and retransmits unaltered (all rates when equipped with Digital Wrapper and FEC)

## Applications

Descriptions of the following applications follow:

ONET/SDHS	OC-192/STM-64
Digital Wrapper and FEC:	OTU2 (ITU-T G.709); OC-192/STM-64 client

## SONET/SDH

### Channelization

OC-192	STS-192c / STS-48c / STS-12c / STS-3c / STS-1
STM-64	VC-4-64c / VC-4-16c / VC-4-4c / VC-4 / VC-3 (AU-3)

### Alarms

Monitoring is performed on all paths concurrently in the event log.

Sonet SDH

	Count	Ratio
LOS LOS	B1 0	0.0000E00 B1
LOF LOF	B2 0	0.0000E00 B2
OOF OOF	B3 0	0.0000E00 B3
AIS-L MS-AIS	REI-L 0	0.0000E00 MS-REI
RDI-L MS-RDI	REI-P 0	0.0000E00 HP-REI
AIS-P AU-AIS		
LOP-P AU-LOP		
RDI-P HP-RDI		
UNEQ-P HP-UNEQ		

LOS / LOF / 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

### Errors

Monitoring is performed on all paths concurrently in the event log.

Single / Rates for REI-L/MS-REI / REI-P/HP-REI / B1 / B2 / B3

### Overheads

Pointer adjustments	Increment/Decrement (single, rates) / NDF count / Pointer Value / SS Bits
Trace Messages	J0 / J1; 1, 16 or 64 bytes
Decoded Bytes	K1 / K2 / S1 / C2
Byte Diagram	User editable Overhead Fields (includes B1, B2, B3 xor masks) in two alternating overhead banks. Interleaving and Injection Counts in Frames / Continuous Injection support

### Traffic

PRBS 23 or 31 / 4-Byte Sequence

### Disruption time

Measurement	µsec Resolution
Triggers	LOS / LOF / PRBS Sync

## Digital wrapper and FEC

Supports OTU2.

### Alarm

The screenshot displays a configuration window for OTU and ODU alarms. The OTU section includes status indicators for LOS, AIS, LOF, LOM, OOF, OOM, BDI, IAE, and BIAE, all of which are green. It also shows numerical values for BIP8 (0), BIP8 Ratio (0.0000E00), BEI (0), and BEI Ratio (0.0000E00). The FEC Errors section shows Correctable Bytes (0), Correctable Bits (0), BER (0.0000E00), and Uncorrectable Subrows (0), with an unchecked Error Correction checkbox.

The ODU section is a table with columns for AIS, LCK, OCI, BIAE, BDI, BIP8, BIP8 Ratio, BEI, and BEI Ratio. The rows represent TCM 1 through TCM 6 and PM, with all status indicators green and numerical values set to 0.

ODU	AIS	LCK	OCI	BIAE	BDI	BIP8	BIP8 Ratio	BEI	BEI Ratio
TCM 1	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
TCM 2	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
TCM 3	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
TCM 4	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
TCM 5	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
TCM 6	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00
PM	Green	Green	Green	Green	Green	0	0.0000E00	0	0.0000E00

LOS / OOF / LOF / OOM / LOM / OTU-AIS (PN-11) / OTU-IAE / OTU-BDI / OTU-BIAE / ODU-AIS (PM/TCM1-6) / ODU-LCK (PM/TCM1-6) / ODU-OCI (PM/TCM1-6) / ODU-BDI (PM/TCM1-6) / ODU-BIAE (TCM1-6)

### Errors

Single / rates for OTU-BIP8 / OTU-BEI / ODU-BIP8 (PM/TCM1-6) / ODU-BEI (PM/TCM1-6)

### Overheads

Multi Frame Structures	OTU-TTI / ODU-TTI (PM/TCM1-6) / ODU-FTFL / PSI
Justification Events	Sync (line-client locked) on transmit. Reporting of justification event ratio and line-client ppm offset.
Byte Diagram	User editable Overhead Fields / MFAS invert. Injection Count in Frames / Continuous Injection
Overhead PRBS	3 independent PRBS 15 engines for GCC0-2 / RES (OTU, ODU, OPU) / TCM1-6 / TCM/ACT / EXP
Error Suppression	To optionally suppress incoming errors/alarms: FEC / TCM1-6 Errors / PM Errors / Client Errors

## Captures

FAS	MFAS	SM	GCC0	RES	RES	TCM/ACT	TCM6
F6 F6 F6 28 28 28	99	00 32 01	00 00	00 00	00 00 00	00	00 32 01
F6 F6 F6 28 28 28	9A	00 B5 01	00 00	00 00	00 00 00	00	00 B5 01
F6 F6 F6 28 28 28	9B	00 C5 01	FF FF	00 00	00 00 00	00	00 C5 01
F6 F6 F6 28 28 28	9C	00 43 01	00 00	00 00	00 00 00	00	00 43 01
F6 F6 F6 28 28 28	9D	00 4B 01	00 00	00 00	00 00 00	00	00 4B 01

Triggers	Manual / OOF / LOF / OOM / LOM / OTU-IAE / OTU-BDI / OTU-BIAE / OTU-BIP8 / OTU-BEI / ODU-AIS (PM/TCM1-6) / ODU-LCK (PM/TCM1-6) / ODU-OCI (PM/TCM1-6) / ODU-BDI (PM/TCM1-6) / ODU-BIP8 (PM/TCM1-6) / ODU-BEI (PM/TCM1-6) / ODU-BIAE (TCM1-6) / Positive Justification / Negative Justification / Overhead PRBS Bit Error / Pattern Match (equal, not equal) with Bit-Mask
Pattern Match Fields	FAS / MFAS / GCC0-2 / OTU RES / SM TTI / ODU RES1-3 / TCM/ACT / FTFL / EXP / APS/PCC / TCM1-6 TTI / PM TTI / OPU RES1-3
Trigger Point	Start / Middle / End
Display	Trigger Point / Hex values for all overhead fields
Size	Overhead of 256 frames
File Type	ASCII (csv)

### Client

OC-192/STM-64 signal

### FEC

Settings	Standard FEC / All-Zeroes FEC. Enable / Disable error correction
Injection	Single and rates. Control of Errored Sub-Row (including all) / Errored Bytes per Sub-Row / Errored Bits per Byte / Skipped Rows between Errors. Up to 16 symbol errors.
Detection	Number of Correctable Byte Errors / Number of Correctable Bit Errors / Bit Error Rate / Number of Uncorrectable Sub-Rows

## Ordering Information

N530-0120 OC-192/STM-64 Module Channelized OC-192 / STM-64

N550-0226 TS-10 with OC-192 /STM-64 Configuration

Module Options	OPT 0120-01 OC-192/STM-64 1310nm optics
	OPT 0120-02 OC-192/STM-64 1550nm optics
	OPT 0120-03 G.709 Digital Wrapper / FEC
TS-10 Configuration Options	OPT 0226-01 1310nm optics for TS-10 with OC-192/STM-64 Configuration
	OPT 0226-02 1550nm optics for TS-10 with OC-192/STM-64 Configuration
	OPT 0226-03 G.709 Digital Wrapper / FEC for TS-10 with OC-192/STM-64 Configuration



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