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ANDO

SDH/SONET ANALYZER

AP9942B

New Test Solution for
10Gbit/s DWDM Transmission System

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Development of DWDM 10G Transmission System/Cost Reduction of Manufacture!

High quality multi-port measurement system, which inspects the quality of transmission device for 10Gbit/s DWDM transmission system, ADM, OXC etc

■ Outline:

AP9942B SDH/SONET ANALYZER is the measurement instrument which is made for 10 G DWDM transmission line terminal used for DWDM transmission system, ADM, OXC, etc and research, development, manufacture of these system combined.
Because DWDM is the technology, which transmit multi-optical wavelength with one optical fiber, it is possible to evaluate the 10 Gbit/s or 2.5 Gbit/s of multi-optical interface port signals simultaneously. Combine measurement transmitter module with multi-port, it would be possible to carry out the multi-port simultaneous test and get the merit of reducing the evaluation time.

■ Feature:

- Multi-port lump sum test can be carried out
  Multi-port configuration for your use → scalable measurement system
  (1 transmitter module + 2 receiver modules configuration)
  (4 receivers module configuration)
  Possible to configure the measurement system with system up of existing VXI module configuration
  Possible to configure the measurement system relating function extension and other modules.

- 10 Gbit/s SDH/SONET frame test can be carried out with 1 system
  SDH/SONET frame test
  Alarm transmission test
  BERT test
  Mapping test: VC4-64c/STS-192c to VC3/STS1 (concatenation mapping)
  APS test
  Measurement function of service disruption time

- Drop /Insert function for 10 G bit/s signal (Option)
  Adding Drop/Insert module, following function can be operated.
  Optical interface signal of low-speed signal (156 Mbit/s to 2.5 G bit/s) can be mapped to 10 G bit/s SDH/SONET frame.
  (Detail test can be operated connecting to existing low-speed measurement device)
  (Expands the application width mapping the optical signal of various transmitters to 10 G bit/s SDH/SONET frame)
  Ex: High-speed router signal, etc
  Signal of less than 2.5 G bit/s mapped to 10 G bit/s SDH/SONET frame can be de-mapped to drop interface.
  (Monitoring the service signal and used it as drop function)
  (Connecting to existing low-speed measurement device, detail test can be operated)

- Reducing the development / manufacturing cost
  Using VXI plug & play, configure the transmitter automated evaluation flexibly.

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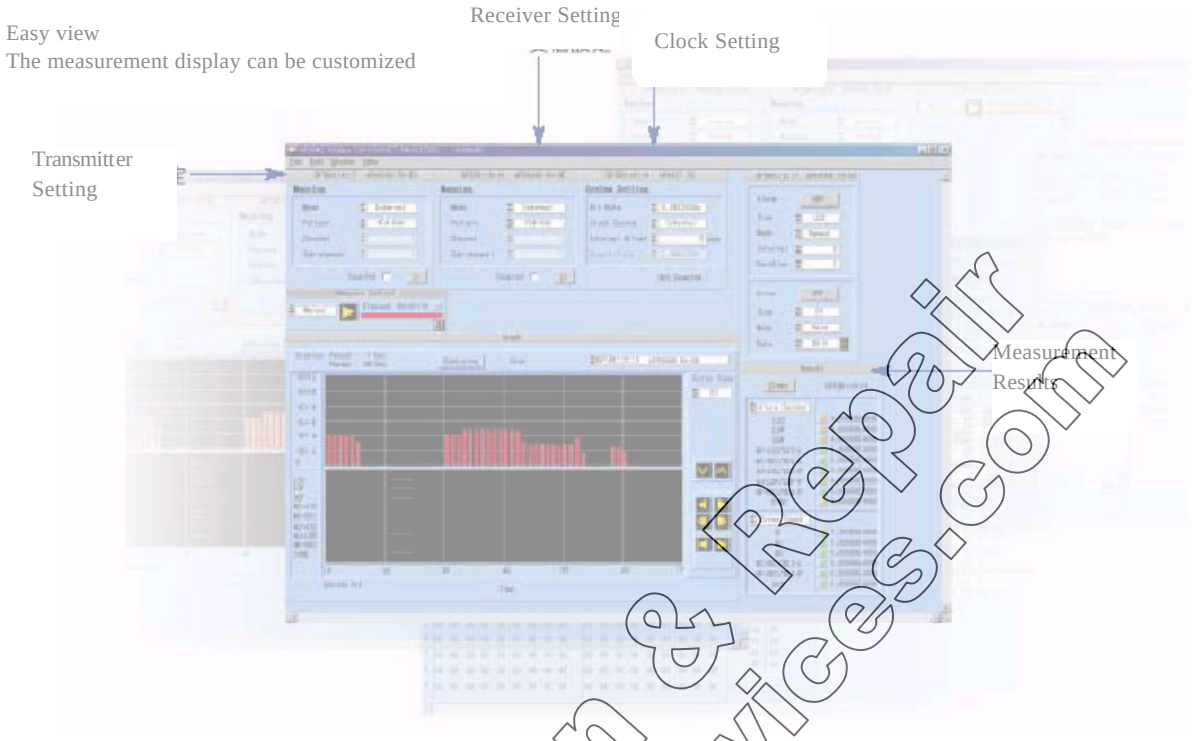
System evaluation by GUI!



Software environment to reduce development and manufacturing cost

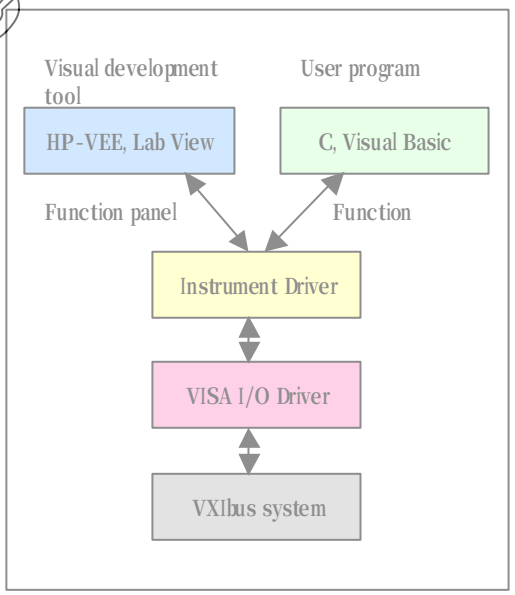
Operate Automated software to test function and performance

In the 10G SDH/SONET transmission system fields, enormous function and performance test like component test and system test will be required. In addition, when adding transmission system software and hardware, test will be repeated and if you can automate the regular function test, the productivity will be increased.

Software environment

*VXIplug&play Instrument Driver
*Function interface
*UID (Universal Instrument Driver) complied

for OS (Windows 95, 98, NT) each development environment (Visual C++, Visual Basic, LabWindows/CVI, LabView, HP-VEE) and various GPIB interface cards has been tested.



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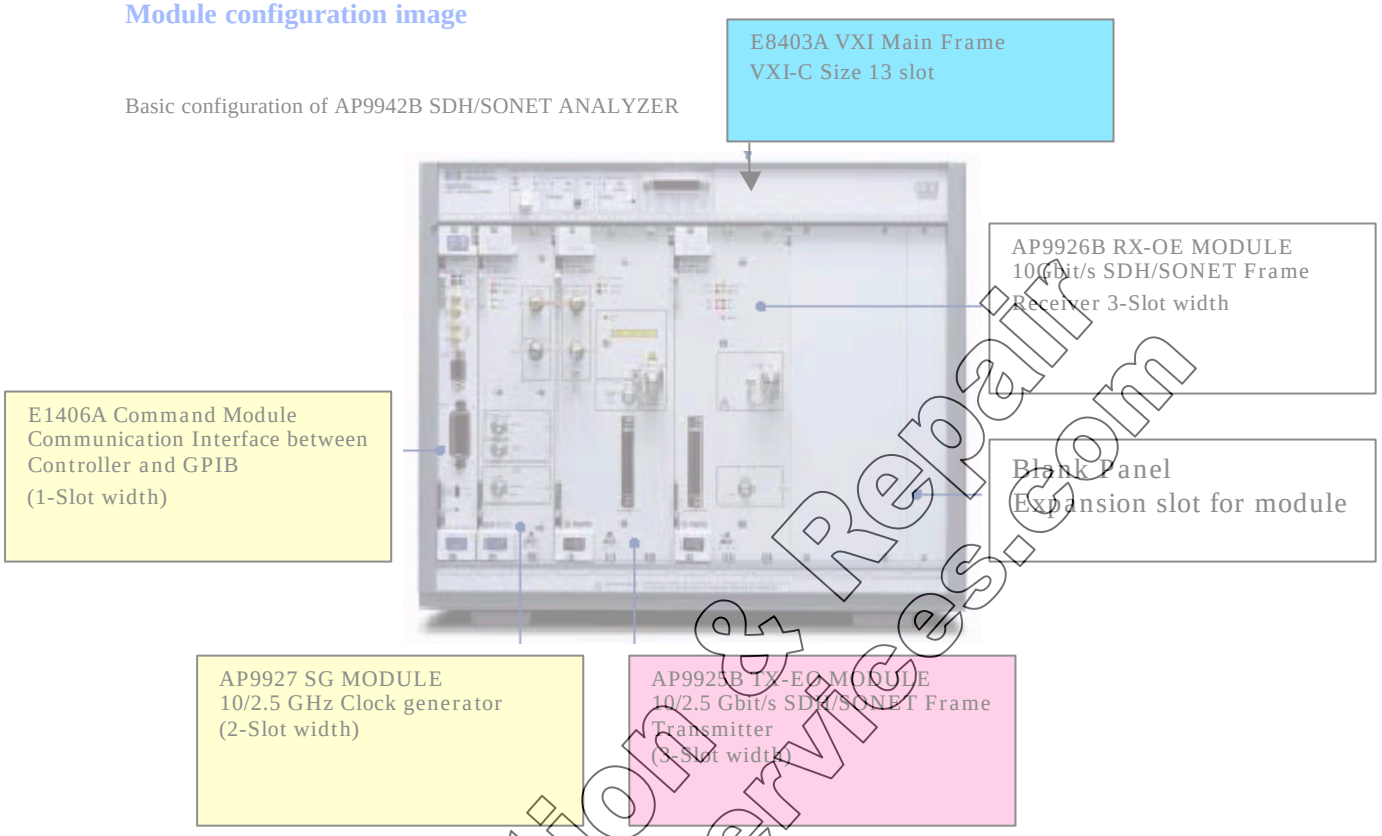
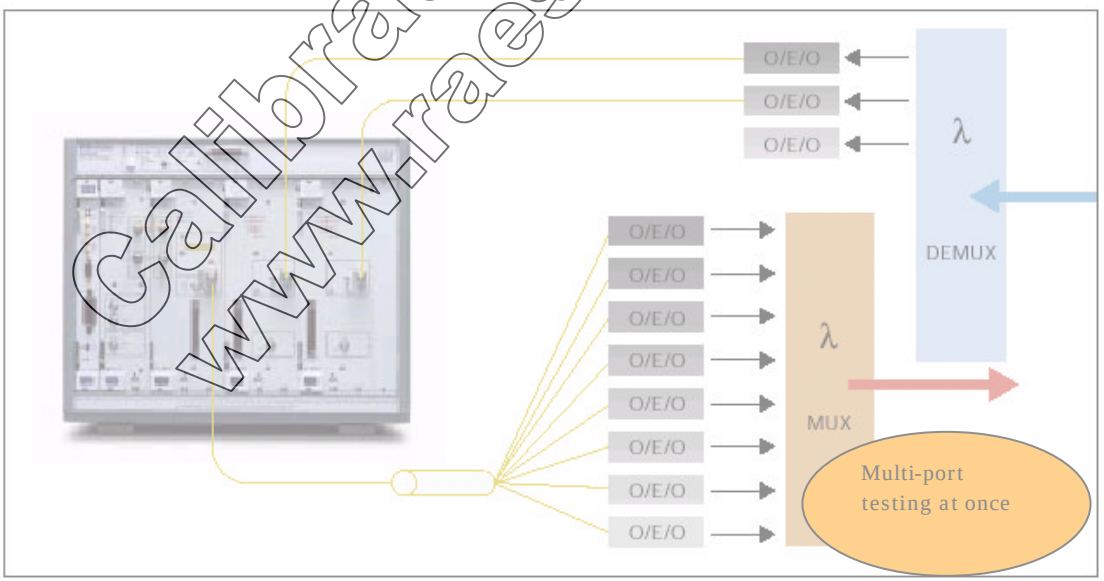
Scalable Plug-in Module configuration

Module configuration image

Basic configuration of AP9942B SDH/SONET ANALYZER



■ Image of Multiple module are installed into VXI Mainframe



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■ AP9942B SDH/SONET ANALYZER Basic Configuration

Product view	Model Type/Name	Outline	Notes
	AP9925B TX-EO MODULE	10/2.5 Gbit/s SDH/SONET frame transmitter Alarm Control: LOS, LOF, OOF, Line/MS-AIS, Line/MS-RDI Error injection: B1/B2/B3/BIT Mapping: VC4-64c/STS-192c – VC3/STS-1 Average output power:-1~+1dBm	High Power type: +2dBm or more (Option)
	AP9926B RX-OE MODULE	10Gbit/s SDH/SONET frame receiver Alarm detection: LOS, LOF, OOF, Line/MS-AIS, Line/MS-RDI Error measurements: B1/B2/B3/BIT Receiver sensitivity: <-12dBm (10Gbit/s)	2.5Gbit/s is Option
	AP9927 SG MODULE	Operating Mode: Internal/Insert/Slave/External Clock output: 9.95328Gbit/s, 2.48832Gbit/s	It uses as clock source of AP9925B.
	AP9942B SDH/SONET ANALYZER	Configuration AP9925B TX-EO MODULE AP9926B RX-OE MODULE AP9927 SG MODULE E1406A Command Module E8403A VXI Mainframe	Transmitter Receiver Clock source GPIB interface for PC VXI Module Mainframe

*Note: This product needs PC for GPIB control.

■ Option for AP9942B SDH/SONET ANALYZER

Option	Outline	Note
PC Controller	A PC controller equipped with GPIB interface (not supplied) is required to use this system.	Operating system Windows 95/98/NT CPU speed: Pentium more than 200MHZ Hard disc volume: Need more than 200MHZ RAM volume: More than 64 MB
GPIB Interface	PCMCIA type (National Instruments)	Tested by National Instrument & HP products. (VISA Complied)
2.5Gbit/s option for an AP9926B	2.5Gbit/s Optical receiver Interface	Factory option
AP9928 1.5M BITS MODULE	BITS input: 1.544Mhbit/s, Bantam 100Ω Clock output: 155.52MHz	Synchronization clock for BITS Operate with an AP9927
AP9929 2M MTS MODULE	MTS input: 2.048MHz, BNC 75Ω Clock output: 155.52MHz	Synchronization clock for MTS Operate with an AP9927
AP9932 DROP MODULE	De-mapped signal from AP9926B can be outputted to the external interface	Interface Optical 1.3μm, STM16/OC48 –STM1/OC3
AP9933 INSERT MODULE	Input interface to be mapped into AP9925B SDH/SONET transmit frame	Interface Optical 1.3/1.55μm, STM16/OC48 –STM1/OC3

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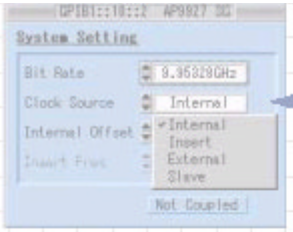
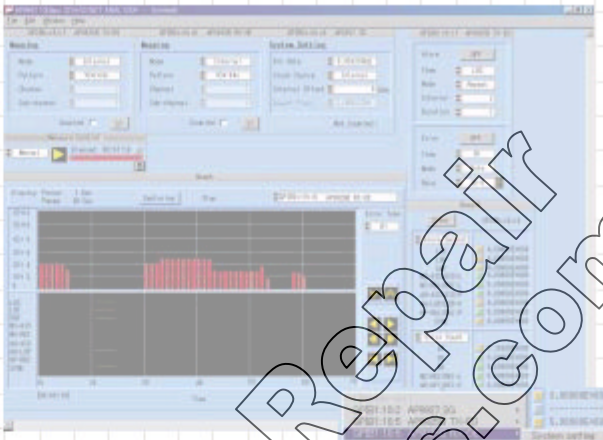
Measurement panel sight viewing! Easy operation and quick reporting

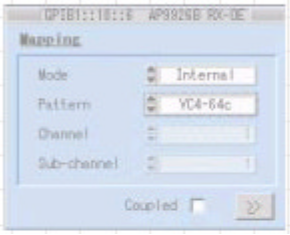
Basic panel
TX & RX setting and measurement results can be displayed

Bit rate selection
Set bit rate & Sync mode

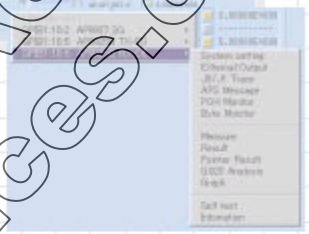




Set Mapping
Specify the test channel and mapping

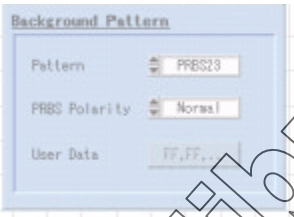


Set detail
More test menu can be displayed by right click



Graphic display
For long term measurement

Set Background Pattern
Set user pattern or Prbs

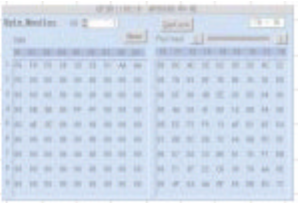


Enlargement
To enlarge measured results

Error performance function (G.828)

J0/J1 Trace message monitor

Receive frame byte monitor
SOH/POH and Payload can be monitored for detail testing



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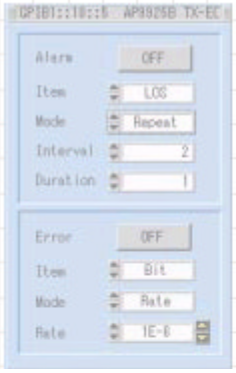
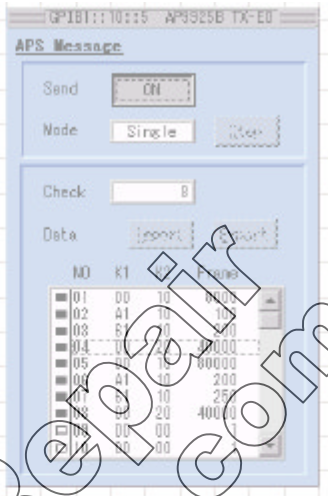
Set Alarm/Error
Alarm and Error can be transmitted at same time

Pointer setting
Set POS, NEG, Justification

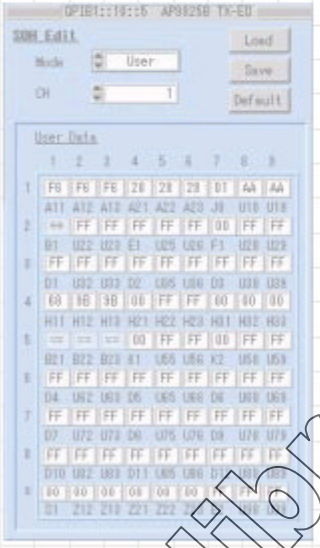
APS testing
APS sequence can be programmed and receive APS message by using capture function.

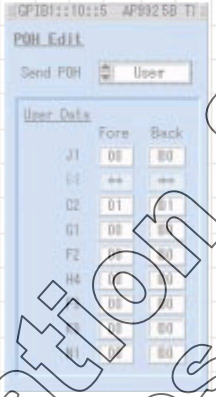


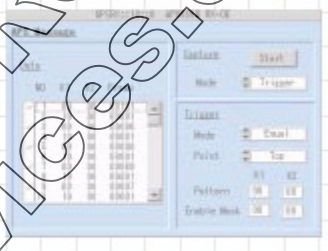


SOH EDIT
Overhead edit function

POH EDIT







Service disruption Test
Service disruption test measures error burst length for measurement of protection switching times.

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■ Specifications

AP9925B TX-EO MODULE

Environmental
Operating temprature：5 to +35 ° C
Storage temprature: -20 to +60 ° C
Humidity: 30 to 85%RH
EMC: Meets EN50082-1

Physical
Size: 3-slot, C-size VXI module
Weight: 4.5Kg
Power Dissipation: 105W typical

Operating Modes: SONET/SDH
OC-192/STM-64, OC-48/STM-16

Optical Output
Wavelength: 1528nm to 1563nm, 1557nm typical
Fiber output power: 0dBm±1dBm
Option: +2dBm or more
Connector:FC/PC(standard)
Option:SC,ST,DIN etc

Payload Mode
1. **R-SOH&M-SOHMode (AP9942)**
2. **R-SOH Mode(AP9940)**
3. **Mapping Mode**

SONET:STS-1,STS-Xc(X=3,12,48,192)
SDH:VC-3,VC-4,VC-4-Nc(N=4,16,64)

■ Payload pattern
2^{31}-1、2^{23}-1、2^{20}-1、2^{15}-1、2^{11}-1、2^{10}-1、2^{9}-1
Inverted or Non-inverted

■ Byte pattern
All ones, All zeros, User program pattern

■ External STS/STM input
Connect with AP9933 INSERT MODULE (STS-X/STM-X)

■ Mixed payload
Foreground and Background payload

CID Stressing
CIDstress: Consecutive 1's test to ITU-T G.958 Apppendix I.

TOH/SOH/POH Byte Access
Allows user-defined value in the range 00H to FFh to be programmed into any TOH/SOH/POH(except B1/B2/B3bytes).

SPE/AUPointer control
Mode: POS,NEG,New Pointer

Alarm Generation
LOS,LOF,OOF,Line/MS-AIS,Line/MS-RDI、AU-AIS,AU-LOP,HP-RDI
Mode: Off, Single,Repeat,All

Error Add
B1,B2,L-REI/MS-REI(M1),B3,HP-REI,BIT(INFO)
Single: Single error
Rate:m*10-^{n}（m=1～9,n=3～12）

J0/J1 message
16/64 repeating sequence

APS Sequencer
Mode: off, Step, Single, Repeat
Off: The static K1/K2 values are transmitted.
Single: K1/K2 sequencer is transmitted once only. (1 to 64 message)
Repeat: K1/K2 sequencer is transmitted repeatedly.

AP9926B RX-OE MODULE

Environmental
Operating temprature：5 to +35 ° C
Storage temprature: -20 to +60 ° C
Humidity: 30 to 85%RH
EMC: Meets EN50082-1

Physical
Size: 3-slot, C-size VXI module
Weight: 4.8Kg
Power Dissipation: 120W typical

Operating Modes: SONET/SDH
OC-192/STM-64, OC-48/STM-16 (Option)

Optical Input
Wavelength: 1500nm to 1600nm
Sensitivity: -12dBm for BER1*10^{-12}
-28dBm at 2.5Gbit/s
Max Input Power: -3dBm(10Gbit/s)
-10dBm(2.5Gbit/s)
Connector: FC/PC(Standard)
Option:SC,ST,DIN etc

Payload Mode
1. **R-SOH&M-SOHMode (AP9942)**
2. **R-SOH Mode(AP9940)**
3. **Mapping Mode**

SONET:STS-1,STS-Xc(X=3,12,48,192)
SDH:VC-3,VC-4,VC-4-Nc(N=4,16,64)

■ Payload pattern
2^{31}-1、2^{23}-1、2^{20}-1、2^{15}-1、2^{11}-1、2^{10}-1、2^{9}-1
Inverted or Non-inverted

■ Byte pattern
All ones, All zeros, User programmed

■ External STS/STM output
Connect with AP9932 DROP MODULE (STS-X/STM-X)

SDH/SONETFrame monitor
Allows the values of the TOH/SOH/POH and payload of the selected test channel can be monitored and displayed.

SPE/AU Pointer Analysis
Pointer value, POS/NEG/NDF, missing NDF can be measured.

Alarm detection
LOS,LOF,OOF,Line/MS-AIS,Line/MS-RDI、AU-AIS,AU-LOP,HP-RDI

Error Detection
B1, B2, L-REI/MS-REI(M1), B3, HP-REI, BIT(INFO) G.826/G.828

ServiceDisruption Test
Service disruption test measures error burst length for measurement of protection switching times.
Results: Longest burst length, Shortest burst length, last burst length
Accuracy: ±0.01%±30μs
Resolution: 1μs
Range: 2S

APS Capture
Mode: Manual, Trigeer
Capture data: K1/K2 byte
Capture sequence: Up to 64 conditions.

Measurements
Mode: Manual, Single, Repeat
Manual: Start/Stop
Single/Repeat：User-defined timed gating period from 1 to 999 seconds, 1to 999 minutes or 1 to 999 hours.

Data logging function

AP9927 OC MODULE

Environmental
Operating temprature：5 to +35 ° C
Storage temprature: -20 to +60 ° C
Humidity: 30 to 85%RH
EMC: Meets EN50082-1

Physical
Size: 2-slot, C-size VXI module
Weight: 3.5Kg
Power Dissipation: 57W typical

Operating Mode:
Interface rate:
2.48832GHz,9.95328GHz
Timing source:
Internal：
Frequency accuracy: ±4.6ppm
Frequency offset: ±20ppm
Insert：
155.52MHZ,622.08MHz,2.48832 GHz
Slave：155.52MHz
External：2.48832GHz,9.95328GHz

Clock output
Frequency: 2.48832GHz ,9.95328GHz
Level: +4dBm(Nominal)
Connector: APC-3.5

Trigger output
Waveform: 156MHz Square wave
Duty cycle: 50%±5% (Nominal)
Connector: SMA

HP E8403A VXI Mainframe

Detail specifications of E8403A VXI mainframe can be found on the Internet at:
http://www.tm.agilent.com

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Specifications are subject to change without notice.

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