TFN D240S 155M Digital Transmission Analyzer

Modular portable transmission test solution, supporting 155M full rate, overhead monitoring, and APS protection switching, facilitating precise operation and maintenance of optical transmission networks

Product Introduction

The D240S , a key component of the TFN FT100 intelligent network test platform, is a portable analyzer designed specifically for SDH/SONET and PDH/DSn transmission networks. Supporting multiple interfaces, including STM1/OC3 optical and electrical ports, E1/E3/E4, and DS1/DS3, it offers comprehensive bit error testing, overhead monitoring, pointer analysis, APS protection switching, and TCM cascade monitoring capabilities. It is ideal for transmission network installation, maintenance, and troubleshooting, making it an ideal test tool for carriers, private networks, and equipment manufacturers.

Core selling point (solving customer pain points)

1. Modular platform design: Based on the FT100 intelligent platform, it supports multi-module plug-in and pull-out, and one machine can achieve full-function testing such as SDH/PDH/Ethernet/synchronization, reducing overall procurement costs.

2. In-depth diagnosis of transmission networks: Supports overhead byte editing and capture, pointer event simulation, and TCM cascade monitoring to accurately locate soft faults at the transport layer.

3. Online monitoring without service interruption: Through-through mode and advanced through-through mode support real-time monitoring and error/alarm insertion, enabling seamless service testing.

4. Intelligent scanning and automatic configuration: Automatically identifies remote device configurations and matches test parameters, improving operation and maintenance efficiency.

5. Rugged, portable, and long-lasting: The 6.5-inch outdoor-enhanced touchscreen has a battery life of up to 12 hours, making it suitable for both field and equipment room environments.

Main functions

- SDH/SONET testing: STM1/OC3 optical/electrical ports, supporting overhead monitoring

and control, pointer adjustment, alarm/error insertion (B1/B2/B3, etc.)

- PDH/DSn test: E1/E2/E3/E4, DS1/DS3 interface, supports framing/unframing, HDB3/AMI/B8ZS and other line code types
- APS protection switching test: Automatically measures switching time with a resolution of 0.01 ms and supports K1/K2 byte analysis
- TCM cascade monitoring: complies with G.783/G.707 standards and supports multi-layer cascade connection monitoring
- Mapping and branch scanning: Supports full-path mapping scanning and service simulation from VC12/VT1.5 to VC4/STS3c
- Error performance analysis: G.821/G.826/G.828/M.2100/M.2110 standards, providing key indicators such as ES/SES/UAS
- Loopback delay test: resolution 1µs, maximum test time 60 seconds
- Data export and remote control: support USB result export and network port remote login, which is convenient for background analysis
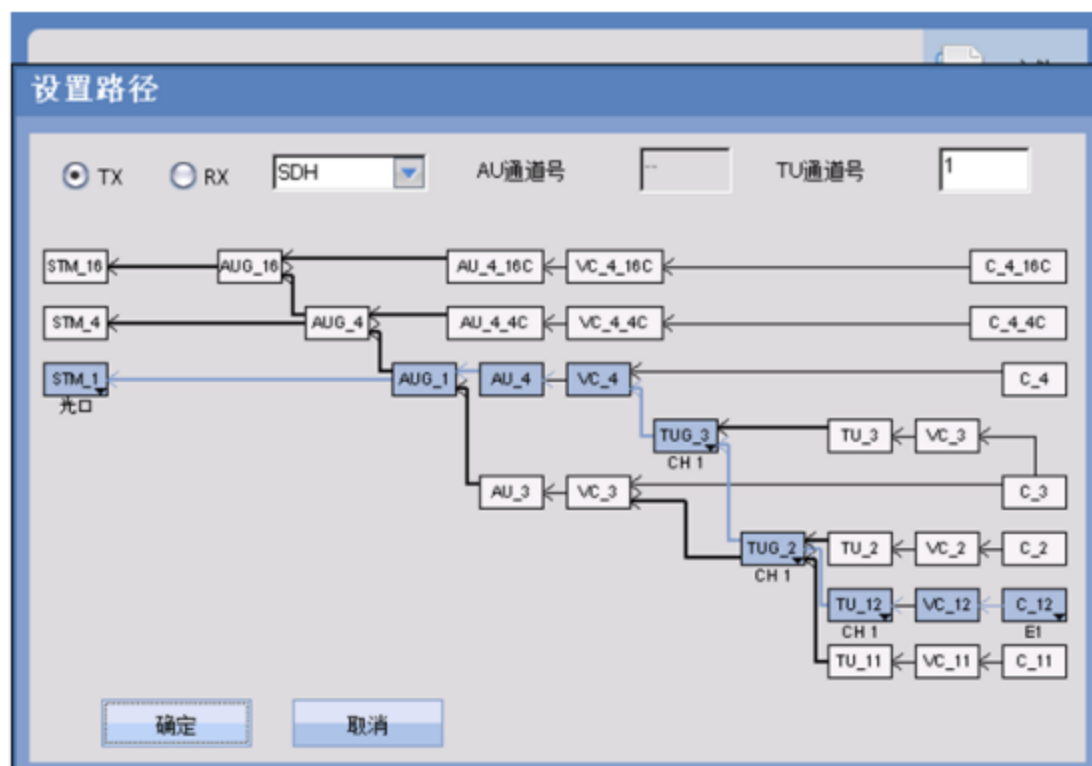
Product Parameters

General Features

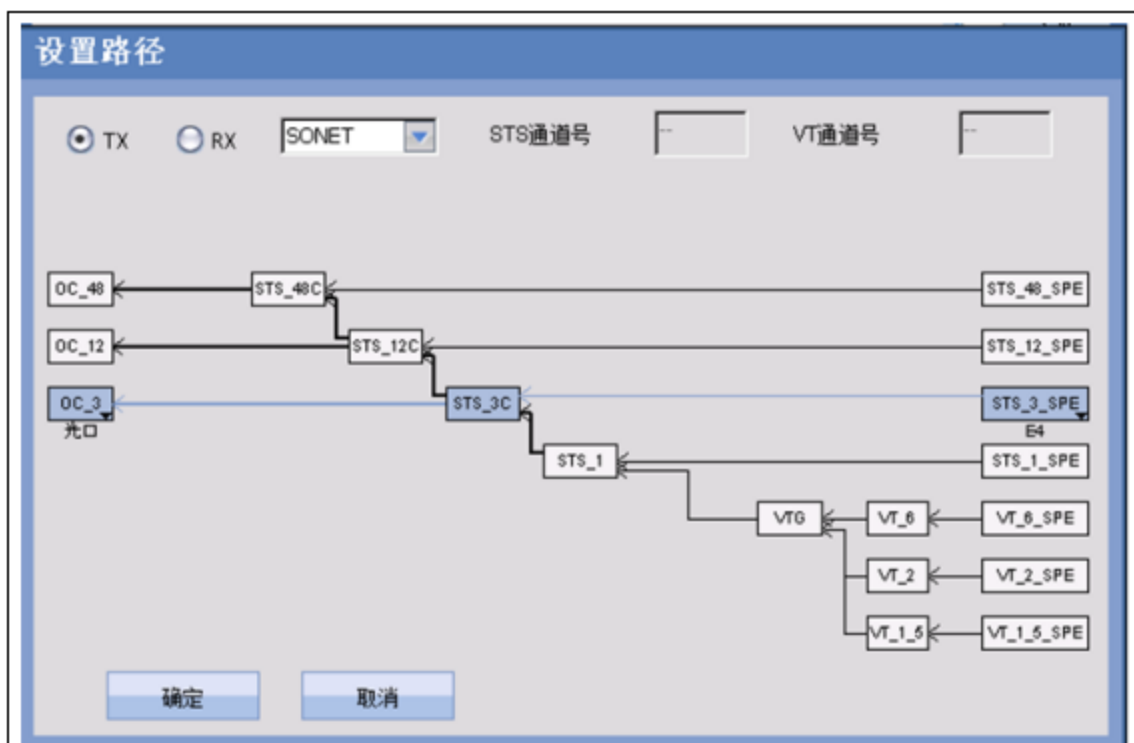| User Interface	
Display	6.5-inch TFT touch screen display (640×480 resolution)
Business Interface	
USB data port	USB2.0, Type A interface, 2; USB2.0 MiniB interface, 1
Ethernet port	Ethernet 10/100, interface: RJ45 (port)
Storage capacity	8G, optional 1 6G, 32G, 64G
Other interfaces	
Audio Interface	For connecting optional headphones, 3.5mm diameter jack
Other Features	
Size and weight	FT100: 319(H)x 202 (W) x 105(D) mm; 2.8kg D240S: 25(H) x 97 (W) x 259(D) mm; 0.4kg
temperature	Operating temperature: -10°C to 50°C; Storage temperature: -40°C to 70°C
relative humidity	0% to 95% (non-condensing)
vibration	<1.5g from 10Hz to 500Hz (on all three major axes)
Mechanical shock	<760 cm on six sides and eight main edges (according to GR-196-CORE standard)
EMC	EN55022/CIPSR22, EN61000-3-2, EN55024
Battery and power supply	
Battery	Rechargeable and replaceable lithium-ion battery Working time: 3 hours (typical) Charging time: 6 hours (typical) (25°C)
powered by	Input: 100 to 240V (AC), 50Hz/60Hz, 1.6A Output: 19V, 4A

Technical Specifications

SDH/SONET Testing	
Test port	STM-16/STM-4/STM-1, OC-48/OC-12/OC-3 optical interface : SFP, 1

	User-selectable optical modules: 1310nm, 1550nm
	STM-1e , STS-3 electrical port: BNC, 1 pair
Test Mode	Offline testing Online testing
Operation Mode	Point -to-point test mode Through mode Advanced pass-through mode: Ability to modify SOH/TOH overhead, insert bit errors and alarms
Frame structure	SDH : compliant with ITU-T G.707 SONET : Compliant with Telcordia GR-253
Line Coding	NRZ
Clock Reference	Internal clock accuracy: 4.6 ppm, optimal 2 ppm Frequency deviation: ±50 ppm (1 ppm step) Recovered clock TTL level external 2.048MHz clock · E1: 2.048Mbps, DS1: 1.544Mbps
Receive signal rate	±50 ppm Frequency deviation indication resolution: ± 1ppm
TCM frame format	I TU-T G.783, G.707 Annex D and Annex E, POH byte : HP-N1/LP-N1/LP-N2 for SDH, Z5/Z6 for SONET TCM Access Point ID (Apid): 15- byte ASCII sequence, CRC-7
Scrambling	SDH : compliant with ITU-T G.707 SONET : Compliant with Telcordia GR-253

SDH Mapping

SONET Mapping

Alarm	Alarm monitoring and generation
	· SDH: LOS, LOF, OOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-PLM, HP-UNEQ, HP-TIM, HP-RDI, TU-LOM, TU-AIS, TU-LOP, LP-PLM, LP-UNEQ, LP-TIM, LP-RDI, LP-RFI, LSS
	· SONET: LOS, LOF, OOF, AIS-L, RDI-L, AIS-P, LOP-P, TIM-P, PLM-P, UNEQ-P, RDI-P, LOM-V, AIS-V, LOP-V, PLM-V, UNEQ-V, RDI-V, TIM-V, LSS
	· TCM: TC-LTC, TC-TIM, TC-UNEQ, TC-AIS, TC-RDI, TC-ODI
	Alarm generation method:
	· continued
	· alternately
	· Sudden
Bit Error	Error insertion and monitoring
	· SDH: FAS, B1,B2,MS-REI,HP-B3, HP-REI, LP-B3,LP-BIP2,LP-REI, Bit Error
	· SONET: FAS, B1,B2,REI-L,B3, REI-P, B3-V,BIP2-V,REI-V, Bit Error
	·TCM: TC-IEC, TC-BIP2,TC-REI,TC-OEI
	Error insertion method:
	· continued
	· alternately
	· rate
	· single
	· Sudden
Bit test pattern	Generation and detection of bulk test patterns based on ITU-T O.181
	Test pattern support: PRBS9, PRBS11, PRBS15, PRBS20.PRBS23,

	PRBS31
	The test pattern can be reversed
	User-defined pattern (pattern length: 16-bit step)
Pointer	Display pointer values on the sending and receiving sides
	Support pointer event monitoring and generation
	Support all G.783 pointer test sequences
Expenses	Generates segment overhead/transmission overhead and path overhead bytes
	Displays the current segment overhead/transmission overhead and channel overhead bytes
	All overhead can be decoded, including decoded J0 , J1, J2 bytes
	Bit error test of all overhead or any specified overhead, such as DCC byte bit error test
	- frame overhead byte capture and decoding
SDH tributary scanning	Support DS1 signal embedding into VC-11
	Support E1 signal embedding into VC-12
	Support E2 signal embedding into VC -2
	Support E3/DS3 signal embedding into VC-3
	Support E4 signal embedding into VC-4
SONET tributary scan	Support DS1 signal embedded into VT1.5
	Support E1 signal embedding into VT2
	Support E3/DS3 signal embedding into STS-1
	Support E4 signal embedding into STS-3c
Smart Scan	Able to automatically scan remote SDH/SONET configuration information and automatically configure ports and mappings
SDH/SONET Test Results	
State	Current port information
	Monitor line alarms and errors
	Optical interface input level indication
	Input level indication of electrical interface
	Actual interface rate
	Frequency deviation
Statistics	Statistics: alarms (seconds and ratios), bit errors (count, number and ratio), pointer operations
Histogram	All alarms and errors can be displayed in graphic mode, allowing users to view all alarms and errors at a glance
Error performance	G.821/G.826/G.828/G.829 /M.2100/M.2110 analysis of received signals, based on detected bit errors and alarms: ES, SES, BBE, AS, UAS, EFS, etc.
APS	APS (Automatic Protection Switching) testing and analysis
	· Measure APS switching time. If it exceeds 50MS , it will be automatically judged as failure
	Trigger event()
	User can select all PDH/DSn, SDH/SONET alarms or errors, error

	thresholds, etc. Number of handovers indicated by the APS protocol K1/K2 byte setting and display APS switching time measurement resolution : 0.01ms
Round trip delay measurement	Resolution: 1us Maximum test time: 60.0s

PDH/DSN test	
Test port	PDH: E1, E3, E4 1pc DSn: DS1, DS3 1pc Interface: BNC, RJ48 (only applicable to E1 interface test)
Test Mode	Offline testing Online testing
Standard	E1 : compliant with ITU-T G.703 2.048Mbps DS1: compliant with ANSI T1.102 1.544Mbps E3 : compliant with ITU-T G.703 34.368Mbps DS3: Compliant with ANSI 44.736M bps E4 : compliant with ITU-T G.703 139.264Mbps
Impedance	E1 : 75 Ω (unbalanced), 120 Ω (balanced) DS1: 100 Ω E3 : 75 Ω DS3 : 75 Ω E4 : 75 Ω
Line Coding	E1 : HDB3, AMI DS1: B8ZS, AMI E3 : HDB3 DS3: B3ZS, E4: CMI
Frame structure	E1 : Unframed , PCM30, PCM31, PCM30CRC, PCM31CRC DS1: Extraordinary Frame , SF-D4, ESF E3: non-frame, framing DS3: non-frame, framing E4: non-frame, framing
Clock Reference	Internal clock accuracy: 4.6 ppm Frequency deviation: ±125 ppm (1 ppm step) Recovered clock TTL level external 2.048MHz clock E1: 2.048Mbps, DS1: 1.544Mbps
Receive signal rate	±150 ppm Frequency deviation display accuracy: ± 1ppm
Test method	E1 : Terminal, monitoring DS1 : terminal, monitoring E3 : Terminal, Monitoring DS3 : Terminal, monitoring

	E4 : Terminal
Alarm	Alarm generation and monitoring · E1 : LOS, LOF, OOF, RAI, AIS, CRCLOFM, MFASOOF, LOFMFAS, MFASRAI, LSS · DS1: LOS, LOF, OOF, RAI, AIS, LSS E3 : LOS, LOF, AIS, RDI · DS3 : LOS, LOF, AIS, RAI, LSS, IDLE · E4 : LOS, LOF, AIS, RAI, LSS Alarm generation method: · continued · alternately · Sudden
Bit Error	Error insertion and monitoring · E1: FAS, CRC4, E-BIT, C ode, Bit DS1: FAS, Code , Bit , CRC6 E3: FAS, Bit · DS3: FAS, C-BIT, P-BIT, FEBE, BIT E4: FAS, Bit Error insertion method: · continued · alternately · rate · single · Sudden
Bit pattern test	Generation and detection of bulk test patterns based on ITU-T O.181 Test pattern support: PRBS9, PRBS11, PRBS15, PRBS20.PRBS23, PRBS31 The test pattern can be reversed User-defined pattern (pattern length: 16-bit step)
PDH/DSN test results	
State	Current interface information Monitor line alarms and error display Input level display Actual interface rate Frequency deviation
Statistics	Statistics: alarm (seconds and ratio), bit errors (number, number and ratio), frequency deviation display
Histogram	All alarms and errors can be displayed in graphic mode, allowing users to view all alarms and errors at a glance
Error performance	M.2100 analysis of receiving models , based on detected errors and alarms: ES, SES, AS, UAS, EFS, etc.
APS	APS (Automatic Protection Switching) testing and analysis · Measure APS switching time. If it exceeds 50MS , it will be automatically judged as failure Trigger event()

	Users can select all PDH/DSn alarms or errors, error thresholds, etc. Number of handovers indicated by the APS protocol APS switching time measurement resolution: 0.01ms
Round trip delay measurement	Resolution: 1 us Maximum test time: 60.0s

Ordering Information

model	Product Name
Host	
FT100	Intelligent, modular test platform
D240S	155M transmission analyzer, supports DS1/DS3, E1/E3/E4/STM-1 /OC-3 electrical port and STM -1/OC-3 optical port testing
Standard accessories	
16080010	LC/PC full-duplex single-mode fiber optic test patch cord, 3 meters long, 1 piece
16060090	2M 75 ohm test cable, 1.5 meters long, 2 pieces
	RJ48 to BNC test patch cord, 1 pc
14020090	1.25G 1310nm 15km LC SFP optical module for D240S/OTM2516
14020350	2.5G 1310nm 15km LC SFP optical module for OTM2517
43170020	19V power adapter for FT100 platform .
16060010	2- meter power cable.
43160031	FT100 platform 2 parallel 4 series lithium-ion rechargeable battery
18080010	FT100 electronic CD-ROM.
19070010	FT100 instrument package.
	Three-year warranty for the main unit and one-year warranty for the adapter and battery
Software Options	
OPAP-OHSeqCapture	256 frames of SDH overhead
OPAP-TCM	TCM cascade test capability
Hardware options	
43160031	FT100 platform 2 parallel 4 series lithium-ion rechargeable battery
14020350	2.5G SFP optical module, 1310nm , 15km , LX
14020380	2.5G SFP optical module, 1550nm , 80km , ZX
14020160	1.25G SFP optical module, 850nm , 550m , SX
14020090	1.25G SFP optical module, 1310nm , 15km , LX
14020340	1.25G SFP optical module, 1550nm , 40km , ZX

Applicable Scenarios

1. Operator SDH/OTN network commissioning and inspection

2. Maintenance of private network transmission systems for power, railways, radio and television, etc.

3. Equipment manufacturers transmission equipment development and verification
4. Communication Engineering Company Line Acceptance and Fault Location
5. Data Center Interconnect Transmission Quality Assessment

Why choose D240S ?

The D240S not only offers the full functionality of a traditional transmission tester, but also integrates the advantages of modularity, intelligence, and portability. As networks evolve toward packet-based networks, the D240S allows users to smoothly upgrade to a packet-based test platform (FT100) while maintaining existing TDM networks. This enables "multiple uses in one device, multiple capabilities in one platform," significantly improving test efficiency and return on investment.