TFN D450S 10G Digital Transmission Analyzer

The industry's leading 10G multi-service transmission test platform supports full-function testing of SDH/PDH/Ethernet/PTN, providing a one-stop operation and maintenance solution for high-speed transmission networks.

Product Introduction

The D450S is a high-end transmission test module for the TFN FT100/FT6800 intelligent test platform, supporting full-rate SDH/SONET and PDH/DSn testing from 1.5 Mbps (DS1/E1) to 10 Gbps (STM64/OC192). It offers advanced features such as high-order and low-order path overhead operations, TCM cascade monitoring, APS protection switching, pointer sequence testing, and enhanced pass-through monitoring. Optional GE/10GE Ethernet and PTN testing capabilities make it a comprehensive testing tool for future multi-service transmission networks.

Core selling point (solving customer pain points)

1. 10G high-speed full coverage: Industry-leading STM64/OC192 testing capabilities meet the high-speed transmission testing needs of backbone networks and metropolitan area network core layers.
2. Multi-service convergence testing: A single module supports SDH/PDH/Ethernet/PTN testing, eliminating the need for stacking multiple devices and reducing procurement and operation and maintenance costs.
3. Intelligent operation and maintenance empowerment: Supports intelligent scanning, automatic channel discovery, and signal structure recognition, greatly improving test efficiency and accuracy.
4. Enhanced penetration monitoring: Supports overhead modification and error alarm insertion without interrupting services, enabling accurate fault simulation and location.
5. High-precision clock and measurement: Built-in clock accuracy is ±0.5ppm, loop delay resolution is at the microsecond level, and APS switching test resolution is 1ms.
6. Modular platform compatibility: supports FT100 and FT6800 platforms, and can flexibly expand test modules such as OTN, synchronization, and Ethernet.

Main Functions

- SDH/SONET testing: STM - 1/4/16/64 optical ports, STM - 1e electrical ports, supporting overhead editing/capture, pointer adjustment, alarm/error insertion
- PDH/DSn test: DS1/E1/E3/DS3/E4 interface, supports framing/unframing, multiple line code types and error performance analysis

- TCM cascade monitoring: complies with G.783/G.707 standards, supports multi-layer cascade connection monitoring and performance analysis
- APS protection switching test: multiple trigger conditions can be configured, 1ms resolution, automatic judgment of switching success/failure
- Pointer test sequence: supports G.783 standard sequence and can simulate complex pointer events
- Channel and smart scanning: Automatically scan channel status, identify mapping path and business type
- Loopback delay measurement: supports all interfaces and mappings, and provides maximum/minimum/average statistics
- Optional Ethernet/PTN testing: supports RFC2544, Y.1564, IEEE 1588v2, SyncE, OAM and other rich data network testing functions

Applicable Scenarios

1. Operator 10G backbone network and metropolitan area network opening and maintenance
2. Acceptance and inspection of transmission systems for large enterprise private line networks (such as power, transportation, and finance)
3. R&D verification and consistency testing for transmission equipment manufacturers
4. Data Center Interconnect (DCI) High-Speed Transmission Quality Assessment
5. Large-scale project delivery and fault location for a communications engineering company

Product Parameters

Specification		
Test interface		
XFP 10G Optical Interface (STM-64)		
SFP 155M/622M/2.5G optical interface (STM-1/4/16)		
BNC 155M electrical interface (STM-1e)		
BNC 1.5M/2M/34M/45M/140M PDH electrical interface (DS1/E1/E3/DS3/E4)		
RJ45 1.5M/2M electrical interface		
Test Features		
SDH/SONET		
Load	VC4-64c Bulk, VC4-16c Bulk, VC4-4c Bulk, VC4 Bulk,VC3 Bulk, VC12 Bulk,2M, VC11 Bulk	
Test Pattern	PBBS	2E23, 2E20, 2E15, 2E11
	User	User definable 8-bit length test pattern
Error Insertion	B1, B2,B3, MS-REI, HP/LP-REI, HP/LP-TC-IEC, HP/LP-TC-REI, HP/LP-TC-OEI, LP-BIP Burst: 1 to 100 Ratio: 1E-9 to 2E-3	

Alarm generation	RS: LOS, LOF, RS-TIM AU: AU-LOP, AU-AIS MS: MS-AIS, MS-RDI HP: HP-AIS, HP-UNEQ, HP-TIM, HP-RDI, HP-ERDI, HP-TC-AIS, HP-TC-RDI, HP-TC-ODI, HP-TC-LOM, HP-TC-TIM, HP-TC-UNEQ TU: TU-LOP, TU-AIS, TU-LOM LP: LP-UNEQ, LP-TIM, LP-RDI, LP-ERDI, LP-TC-AIS, LP-TC-RDI, LP-TC-ODI, LP-TC-LOM, LP-TC-TIM, LP-TC-UNEQ	
Test results	Bit Error	Bit,B1,B2,B3,BIP-2,MS REI,HP/LP REI, HP/LP-TC-IEC, HP/LP-TC-REI, HP/LP-TC-OEI
	Alarm	LOS, LOF, OOF, RS-TIM, MS-AIS, MS-RDI,AU-AIS, AU-LOP, HP-AIS, HP-PLM, HP-ERDI, HP-TIM, HP-UNEQ, HP-TC-AIS, HP-TC-RDI, HP-TC-ODI, HP-TC-LOM, HP-TC-TIM, HP-TC-UNEQ, TU-LOM, TU-AIS, TU-LOP, LP-PLM, LP-ERDI, LP-TIM, LP-UNEQ, LP-TC-AIS, LP-TC-RDI, LP-TC-ODI, LP-TC-LOM, LP-TC-TIM, LP-TC-UNEQ
	Performance	ITU-T G.821, G.826, G.828, G.829, M.2101, M2110, M2120
Expenditure characteristics	Expenditure monitoring	Display all bytes (RS, MS, HP, and LP) in hexadecimal Text decoding of all applicable bytes (K1/K2, S1, C2, etc.)
	ExpensesEdit	Hexadecimal input, excluding check bytes (B1/B2/B3), pointers (H1-H3, V1-V3) and undefined bytes Text decoding of all applicable bytes (K1/K2, S1, C2, etc.)
Trace Generation	J0 segment trace	1 byte, 16-byte E.164 ASCII sequence + CRC-7 or 64-byte E.164 ASCII sequence
	J1/J2 channel trace	16-byte E.164 ASCII sequence + CRC-7 or 64-byte E.164 ASCII sequence

Trace Generation	TC-APId traces	16-byte E.164 ASCII sequence + CRC-7	
	Options	Default, user, by	
Pointer monitoring	AU (H1, H2), TU (V1, V2) Real-time pointer value display Hands lost seconds Total Adjustment Count Positive adjustment count Negative adjustment count NDF seconds	Overhead sequence generation	Bytes: A1/A2, J0/J1/J2, D1-D3, D4-D12, K1/K2, or any single overhead byte can generate up to 16 elements, and each element (value) can be transmitted on a maximum of 65536 adjacent frames.
Pointer adjustment	Programmable pointer value, NDF and SS bits increase and decrease pointer value		Capture: A1/A2, J0/J1/J2, D1-D3, D4-D12, K1/K2, or any single overhead byte. Each new captured value is timestamped

Pointer test sequence	Specification: ITU-T G.783 Sequence: Single, Burst, Phase Instantaneous Burst, Periodic, 87-3, 26-1, Peer-to-Peer, Custom Actions: Increase, decrease, increase + decrease Exception: add, cancel, no Sequence Timing: Initialization, Cooldown, and Testing	Overhead sequence capture	(absolute time or elapsed time) and has a duration (ms or frames). Trigger: Manual or user-defined value Resolution: 125us (1 frame) Data Communication Channel DCC DCC BER test: PRBS can be analyzed in G.821 at D1-D3 or D4-D12 bytes (user selected) DCC insertion/advance
Automatic protection switching APS time measurement	Trigger conditions (can be combined in any way): LOS, LOF, MS-AIS, MS-RDI, MS-REI, AUAIS, HP-RDI, HP-REI, LP-RDI, LP-BIP, LPREI, TU-AIS, B1, B2, B3 Pass/fail indication with 1ms resolution		
Enhanced penetration test	Support through-mode, which supports overhead rewriting, alarm and error insertion of high-order channels and above in through-mode		
Round trip delay measurement	The Loopback Delay test tool measures the time it takes for a bit to travel from the transmitter, through the far-end loopback, and back to its receiver. This measurement is supported for all supported interfaces and mappings. Measurements: Last RTD time, minimum, maximum, average, number of measurements (number of successful RTD tests), number of failed measurements.		
Channel Scan	Automatically scan all channels of the specified signal structure to see if they are normal		
Smart Scan	Automatically identify and select the mapping path and service type of the interface		
High-precision internal clock	Built-in clock ±0.5ppm		

PDH		
Test code sample	PBBS	2E23, 2E20, 2E15, 2E11
	user	User definable 8-bit length test pattern
PDH/T-Bearer Error Insertion	1.5M: Code, Fas, CRC, Bit 2M: Code, Fas, CRC, Bit 34M:Fas, Bit 45M: F-bit (Fas), C-bit, P-bit, FEBE, Bit 140M： Fas, Bit Insertion mode: continuous, alternating, burst; Rate: 1×10-9 to 2×10-3 (depending on setting)	
Alarm generation	1.5M: LOS, LOF, AIS, RAI, PATTERN LOS 2M: LOS, LOF, LOFM, AIS, RAI, MFRAI, CRCLOFM, PATTERN LOS 34M: LOF, RAI, AIS, PATTERN LOS 45M: LOF, RAI, AIS, Idle, PATTERN LOS 140M： LOF, RAI, AIS, PATTERN LOS Insertion mode: continuous, alternating, burst	
	1.5M	LOS, LOF, AIS, RAI, PATTERN LOS, Code, Fas, CRC, Bit Error

Measurement	2M	LOS, LOF, LOFM, AIS, RAI, MFRAI, CRCLOFM, PATTERN LOS, Code, Fas, CRC, Bit Error
	34M	LOF, RAI, AIS, PATTERN LOS, Fas, Bit Error
	45M	LOF, RAI, AIS, Idle, PATTERN LOS, F-bit(Fas), C-bit, P-bit, FEBE, Bit Error
	140M	LOF, RAI, AIS, PATTERN LOS, Fas, Bit Error
	Error and alarm data	Total error count or alarm seconds Total bit error rate Current bit error rate (last second)
	ITU-T G.821 Analysis	Current bit error, Current BER, Total bit error, Total BER, ES, %ES, SES, %SES, EFS, %EFS, AS, %AS, UAS, %UAS
	ITU-T G.826 Analysis	Based on RAI. For distal and proximal analysis of BE, BBE, BBE rate, ES, %ES, SES, %SES, AS, %AS, UAS, %UAS

Physical Properties	
Temperature	Operating temperature: -10°C to 50°C; Storage temperature: -40°C to 70°C
Relative humidity	0% to 95% (non-condensing)
Dimensions (H×W×D)	50 mm x 97 mm x 259 mm (OTM2502); 25mm x 97mm x 259mm (OTM2515/2516/2517)

weight	0.7kg (OTM2502); 0.5kg (OTM2515/2516/2517)

Ordering Information		
Product Categories	Product Model	Product Description
Standard Configuration		
Test Module (Choose one of four)	D450S	Dual-slot SDH test module, supports 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, suitable for FT100 platform
	D240S	Single-slot SDH test module, supports 155M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, suitable for FT100 platform
	D280S	Single-slot SDH test module, supports 155M/622M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, suitable for FT100 platform
	D300S	Single-slot SDH test module, supports 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M

		PDH electrical interface, suitable for FT100 platform	
LCLC fiber optic patch cord	LCLC-0203	1 LC/LC interface, single mode, duplex fiber optic patch cord, 9/125, 3 meters.	
2.5G optical module	GA14022310	1 2.5G SFP optical module, 1310nm, 2km, LX.	
10G optical module	GA14021220	1 10G XFP optical module, 1310nm, 2km, LX. (This module is standard when configured with OTM2502)	
Optional Configuration			
SDH function option	F100-2517A100A	155M-2.5GSDH test function (applicable to OTM2502 module)	
	F100-2515A100A	1.5, 2, 34, 45, 140Mbps PDH test function (applicable to OTM2502 module)	
	F100-OHSeqCapture	SDH/OTN overhead sequence capture test function	
	F100-EnThrough	SDH/OTN enhanced penetration test function	
	F100-SDT	SDH/OTN service disruption testing	
	F100-ChannelScan	SDH channel scan test function	
	F100-AutoConfig	SDH signal intelligent scanning test function	
	F100-RTD	Loopback delay test function	
	F100-TCMTest	TCM test function	
	F100-12E1ATSDH	E1 multi-channel test option (applicable to OTM2515/16/17 modules)	
GE Ethernet/PTN test function Option (for D450S test module)	F100-BaseAGeEth	GE basic bit error, frame analysis and RFC2544 Ethernet test functions	
	F100-Y1564AGeEth	GE Y.1564 test function	
	F100-RFC3393AGeEth	GE RFC3393 packet jitter test function	
	F100-1588AGeEth	GE IEEE1588v2 test function	
	F100-SyncAGeEth	GE Sync-E Test Function	

Why choose D450S?

The D450S not only possesses all the functions of traditional SDH/PDH testing, but also achieves breakthroughs in speed, intelligence, and multi-functional integration. By supporting 10G high speeds, enhanced penetration monitoring, intelligent scanning, and optional Ethernet/PTN testing capabilities, the D450S helps users meet the complex challenges of high-speed transmission networks, packetization, and intelligent operation and maintenance, making it an ideal testing partner for future network evolution.