



Source Industrial Supply
Phone: +1-505-550-6501 and +1-505-565-5102 Fax: +1-505-814-5778
Email: info@sourceindustrialsupply.com
Web: <http://www.sourceindustrialsupply.com>

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OPWILL Technologies (Beijing) Co., Ltd.

Catalog of Telecom Testing Instruments

OPTIMIZE THE TEST AS YOUR WILL



SIS

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COMPANY PROFILE

OPWILL Technologies (Beijing) Co., Ltd. (hereinafter abbreviated as OPWILL) is a professional supplier of telecom testing instruments. The company, founded in October, 2007 in Beijing Zhongguancun National Demonstration Zone, boasts an entrepreneur team composed of world-famous suppliers of communication instruments or equipments, with its core members equipped with remarkable research and development ability and rich market experience.

OPWILL has always been committed to providing the users with accurate, reliable and low-cost solutions for communication tests. Our products, covering optical fiber, data and transmission fields, are widely applied in production, installation, maintenance and other links by manufacturers and operators of communication equipments and private network users, who in the meantime enjoy installation and maintenance services supplied by us.

With years of experience, OPWILL has grown into a top-level supplier of wire communication testing instruments in China. Our products like 43G OTN, 10G OTN/PTN, and 10GE have filled domestic void and reached an internationally advanced level. In the field of 10G+ communication test, OPWILL is the only

solution provider domestically. Numerous patents in the field of optical fiber possessed by OPWILL have greatly enhanced the international influence of Chinese original design.

OPWILL products are not only at the service of major operators, equipment manufacturers, private network users and contractors of communication services, they also command a ready market in over 10 countries and regions overseas. Our major clients include both world-famous equipment suppliers such as ERICSSON, ZTE and Fiber Home and also world-renowned operators such as VODAFONE and BT. In 2012, OPWILL became the exclusive supplier of 10G/2.5G rate transmission test and general OTDR for China Mobile, and enjoyed its largest share of PTN products, making itself the largest supplier of wire testing instruments for China Mobile.

OPWILL possesses complete proprietary intellectual property rights of all its products. It is one of Beijing's high- and new-tech enterprises, software enterprises and gazelle enterprises, holding 16 software copyrights, 6 patents and 1 registered trademark.



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1 OTP-60V Handheld Variable Optical Attenuator



Product Introduction

OTP-60V handheld variable optical attenuator is made according to optical communication technique to meet the actual practice requirement. OTP-60V is designed with flexible, lightweight, low power consumption, inexpensive and high performance. It is a perfect tool for the measurement of optical-electrical devices, optical passive devices, optical fiber, optical cable, optical fiber communication equipment and the development or maintenance of optical fiber communication system engineering.

Features

- Support single-step or continuous setting attenuation
- Automatic power off backlight without operation after 30 seconds and shut down system without operation after 10 minutes
- Automatic save REF, wavelength, attenuation before shutdown
- Support both battery and AC adapters
- RS232 serial communication and control functions, suitable for automatic test system

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS			
Wavelength range (nm)	1260~1650	Calibration wavelength (nm)	1310/1550(1490/1610)
Attenuation Range (dB)	>60	Insertion loss(dB)	<2.0
Return loss (dB)	≥40	Polarization dependent loss (dB)	TYP 0.05, MAX 0.15
Attenuation resolution (dB)	±0.5	Display resolution (dB)	0.01
Optical power (dBm)	+ 23	Step resolution (dB)	0.05
Repeatability (dB)	±0.2	Fiber Type	Single mode, SMF
Connector type	FC/PC	Computer interface	RS-232 / Mini USB 5PIN
Power supply	AC/DC adapter: input 100-240VAC, 50-60Hz, 0.2A max; ouput 5VDC, 1A max		
Batteries	1.5V AA batteries		
PHYSICAL SPECIFICATIONS			
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C		
Relative humidity	0% to 95%(non-condensing)		
Size(H×W×D)	45mm x 100mm x 210mm		
Weight	0. 5kg		

Ordering Information

Category	Model	Description
Standard Configuration		
Main Frame	OTP-60V	Handheld optical attenuator, wavelength: 1310/1550nm(1490/1610nm), dynamic range: 60dB.
Power Adapter	PSC0512-050	One AC/DC power adapter.
Battery	B15V01S01	Two 1.5V AA batteries.
Package	OBG60V	One OTP-60V package.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

2 OTP6122 Handheld Optical Multimeter



Product Introduction

OTP6122 handheld optical multimeter provides comprehensive optical test applications for metro, access, and LAN network. Also OTP6122 is designed for indoor or outdoor test with lightweight, flexible and rugged features. It is the best test set for service providers validating at installing phase or troubleshooting at running phase in optical network.

Features

- Lightweight, rugged, flexible for field testing
- Fast start-up, high resolution color touch display
- Friendly keystroke designed for easy, flexible input and select
- Covering comprehensive functions, up to six instruments combined in a single unit
- Performing professional power and loss measurement in field test
- Providing more integrated and lower cost solution

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS					
Optical Power Meter	Detector: Ge		Measurement range (dBm): +10 to -60		
	Uncertainty: $\pm 5\% \pm 0.1$ nW		Wavelength range (nm): 780 to 1800		
	Display resolution (dB): 0.01		Calibrated wavelengths: 6		
	Recommended recalibration period (years):3		Automatic offset nulling: Yes		
Sources		Standard	-12C (second port)	-12D (second port)	
	Wavelengths (nm)	1310 \pm 20/1490 \pm 20/1550 \pm 20	1625 \pm 5	650 \pm 25	
	1550 \pm 20	850 \pm 25/1300 \pm 25	650 \pm 25	LD	
	Emitter type	LD	LD	LD	
	Minimum output power (dBm)	-6	-10	-10	
	Spectral width (nm)	$\leq 5/\leq 5$	50/135	50/135	
Loss /ORL /Length	Wavelengths (nm)	1310/1490/1550	850/1300	650	
	Loss range (dB)	60	40	40	
	Loss precision (dB)	Side-by-side	0.15	0.15	0.15
		loopback	0.25	0.25	0.25
	Length measurement range (km)	200	3	3	
	Length measurement uncertainty	$\pm (10 \text{ m} + 1\% \times \text{length})$			
Dedicated ORL Wavelengths	ORL range(APC / UPC) (dB) : 65/55		ORL uncertainty (dB) : ± 0.5		
	Resolution (dB): 0.01				
PHYSICAL SPECIFICATIONS					
Temperature	Operating:-10°C to 50°C Storage: -40°C to 70°C		Size(H×W×D)	80 mm x 135 mm x 250 mm	
Relative Humidity	0% to 95%(non-condensing)		Weight	1.1kg	

Ordering Information

Category	Model	Description
Standard Configuration		
Main Frame	OTP6122	Handheld OMTS optical powermeter.
Battery	LB03V10S0103	One 1 parrallel 3 series Lithium polymer rechargeable battery for OTP6100, 10.8V.
Power Adapter	SA148A-15V	One 24V AC/DC, power adapter for OTP6100.
Power Cable	OA1611PWR_2M	One power cable, 2m.
Disc	OA1808_6122_CD	One OTP6122 disc.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

3 OTP6103 Series Handheld OTDR Test Set



Product Introduction

OTP6103 handheld OTDR test set has the characteristics of light and handy, flexible and durable, it can apply to the outdoor scene environment and it's the best testing tool for operators to verify and troubleshooting in the optical network construction phase or network operation phase.

Features

- Handiness and small, Solid Durable, flexible apply to the outdoor scene environment
- Start fast, high resolution and color touch screen
- Cover all the OTDR functions, wavelength support 1310/1550nm and meet the test requirements of different test scenarios
- Measuring distance up to 200km, meet MAN and optical test application of LAN

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS			
Wavelength(nm)	1310/1550	Dynamic Range (dB)	30/28
Pulse Width (ns)	3~20000	Event Dead Zone(m)	≤ 1.6
Attenuation Dead Zone (m)	≤ 10/10	Linearity (dB / dB)	±0.03
Loss Threshold (dB)	0.01	Loss Resolution (dB)	0.001
Sampling Resolution (m)	0.125~1	Sampling Points	256K
Distance Range (km)	≤ 200	Distance Uncertainty(m)	±(0.75+0.0010% × Distance + Sampling resolution)
Typical Real Time Refresh (Hz)	0.03	Memory Capacity	500 curves
Measuring Time	10s~180m, User Defined	VFL Output Power(dBm)	+10
PHYSICAL SPECIFICATIONS			
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C		
Relative Humidity	0% to 95%(Non - Condensing)		
Size(H×W×D)	80mm x 135mm x 250 mm		
Weight	1.1kg		
Battery	according to Bellcore TR-NWT-001138 standard, lithium battery sustainable running 4-6 hours		

Ordering Information

Category	Model	Description
Standard Configuration		
Main	OTP6103	Dual-wavelength 1310/1550nm OTDR Test Set, dynamic range is 30/28dB
VFL Function	OPAP-VFLatOTDR	OTDR red-light VFL test function
Battery	LB03V10S0103	One lithium polymer rechargeable battery apply to OTP6100, 10.8V
Power Adapter	SA148A-15V	One 24V AC/DC power adapter apply to OTP6100
Power Cable	OA1611PWR_2M	One 2 meters power cable
Electronic CD-ROM	OA1808_6103_CD	One OTP6103 Electronic CD-ROM
Instrument Bag	OBG6100	One OTP6100 Instrument bag

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

4 OTP6123 Series Handheld OTDR Test Set



Product Introduction

OTP6123 series provides comprehensive optical test for metro, access/FTTx, and LAN network. Also OTP6123 is designed for indoor and outdoor test with lightweight, flexible and rugged features. It is the best test set for service providers validating at installing phase or troubleshooting at running phase.

Features

- Lightweight, rugged, flexible for field testing
- Fast start-up, high resolution color touch display
- Friendly keystroke designed for easy, flexible input and select
- Covering all OTDR functions, dual-wavelength for different test demand
- More comprehensive test features with higher performance-to-price ratio
- 200km distance range satisfy metro and access optical network test application
- FTTx/MDU PON - network test
- (Optional) Support iOTA test feature

PRODUCT INTRODUCTION

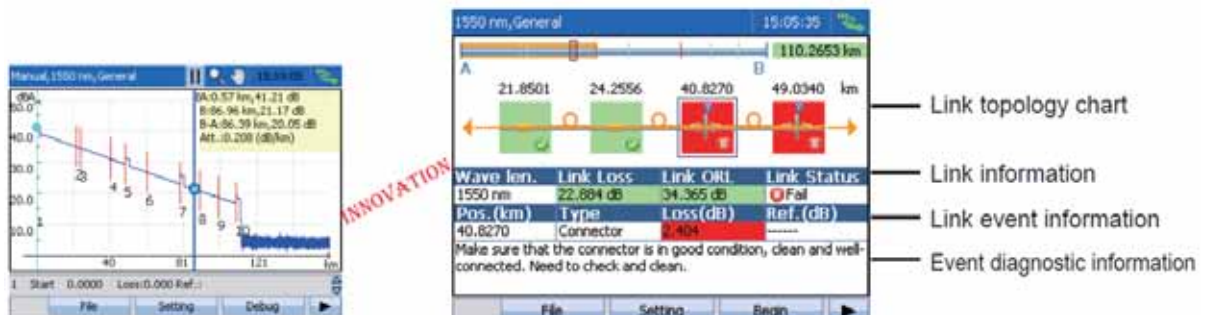
iOTA Introduction

Overview

Along with the large-scale deployment of the FTTH, the traditional OTDR isn't effective to face the new challenges for the efficiency and cost of testing in installation and maintenance. The intelligent optical link topology analysis (iOTA) and intelligent network test tool (iNET) which are developed by OPWILL cover all fiber optical applications of MAN, Access/FTTx and LAN network.

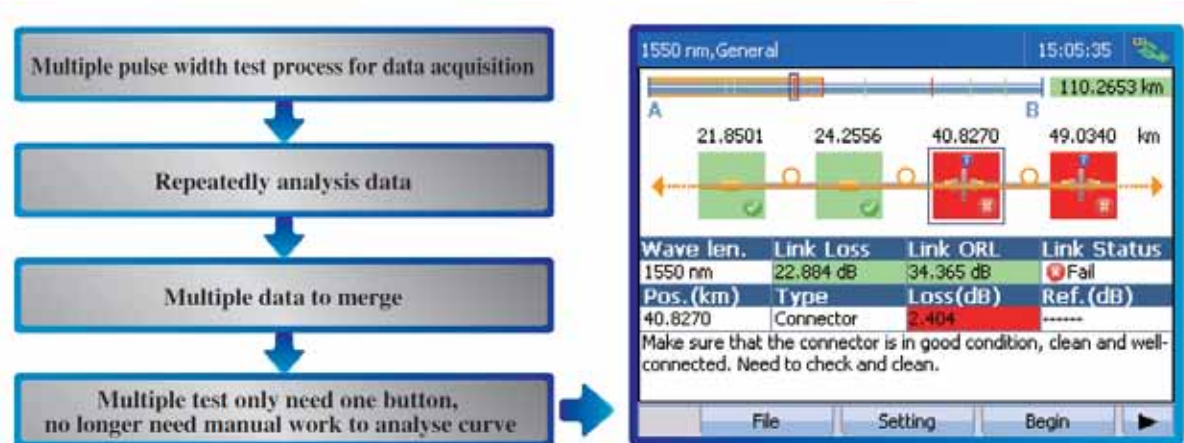
Intelligent optical link topology analysis---iOTA

The traditional OTDR only display fiber loss and event list of test fiber link, need manual to analysis event types and link topology. The artificial analysis workload has sharp increased with the rapid development of FTTH, so that is unable to safeguard the construction efficiency. Then the iOTA function which is developed by OPWILL provide a more comprehensive fiber test function and test data, assist network expert easily realize the turn up, operation and maintenance of optical fiber network.



iOTA Test Principle

Intelligent combination the different pulse width one time get loss and return loss of fiber and splitter. Multiple pulse acquisitions and algorithms to deliver detailed information of every element on the fiber link.



Specifications

SPECIFICATIONS			
Regular OTDR Specifications			
	OTP6123H	OTP6123N	OTP6123L
Wavelength (nm)	1310/1550	1310/1550	1310/1550
Dynamic Range (dB)	40/39	35/34	30/28
Pulse Width (ns)	3~20000	3~20000	3~20000
Event Dead Zone (m)	≤ 0.8/0.8	≤ 0.8/0.8	≤ 0.8/0.8
Attenuation Dead Zone (m)	≤ 7/7	≤ 7/7	≤ 7/7
Linearity (dB/dB)	±0.03	±0.03	±0.03
Loss Threshold (dB)	0.01	0.01	0.01
Loss Resolution (dB)	0.001	0.001	0.001
Sampling Resolution (m)	0.125 ~ 1	0.125 ~ 1	0.125 ~ 1
Sampling Points	256K	256K	256K
Distance Uncertainty(m)	±(0.75+0.0010%×distance + sampling resolution)		
Distance Range (km)	≤ 200	≤ 180	≤ 150
Typical Real-time Refresh(Hz)	2	2	2
Memory Capacity	500 traces	500 traces	500 traces
Measurement Time	10s~180m, user defined	10s~180m, user defined	10s~180m, user defined
VFL Output Power(dBm)	+10	+10	+10
Optical Power Meter	Output Power(dBm)	+10 to -60	+10 to -60
	Wavelength Range (nm)	±5%	±5%
PHYSICAL SPECIFICATIONS			
Temperature	Operating: -10°C to 50°C; storage: -40°C to 70°C		
Relative Humidity	0% to 95%(non-condensing)		
Size(H×W×D)	80mm x 135 mm x250 mm		
Weight	1.1kg		
Power	Li-Ion batteries 4-6 hours of continuous operation as per Bellcore TR-NWT-001138		

PRODUCT INTRODUCTION

SPECIFICATIONS					
PON OTDR Specifications					
	OTP6123P	OTP6123-a	OTP6123-b	OTP6123-c	OTP6123-d
Wavelength (nm)	1310/1550/1625	1310/1490/1550	1310/1550/1650	1310/1490/1550/1625	1310/1490/1550/1650
Dynamic Range (dB)	39/37/38	39/37/37	39/37/38	39/37/37/38	39/37/37/38
Pulse Width (ns)	3~20000	3~20000	3~20000	3~20000	3~20000
Event Dead Zone (m)	≤ 0.8	≤ 0.8	≤ 0.8	≤ 0.8	≤ 0.8
Attenuation Dead Zone (m)	≤ 7/7/7	≤ 7/7/7	≤ 7/7/7	≤ 7/7/7/7	≤ 7/7/7/7
Linearity (dB/dB)	±0.03	±0.03	±0.03	±0.03	±0.03
Loss Threshold (dB)	0.01	0.01	0.01	0.01	0.01
Loss Resolution (dB)	0.001	0.001	0.001	0.001	0.001
Sampling Resolution (m)	0.125~1	0.125~1	0.125~1	0.125~1	0.125~1
Sampling Points	256K	256K	256K	256K	256K
Distance Uncertainty(m)	±(0.75+0.0010%×distance + sampling resolution)				
Distance Range (km)	≤ 180	≤ 180	≤ 180	≤ 180	≤ 180
Typical Real-time Refresh(Hz)	0.03	0.03	0.03	0.03	0.03
Memory Capacity	500 traces	500 traces	500 traces	500 traces	500 traces
Measurement Time	10s~180m, user defined	10s~180m, user defined	10s~180m, user defined	10s~180m, user defined	10s~180m, user defined
VFL Output Power(dBm)	+3	+3	+3	+3	+3
PHYSICAL SPECIFICATIONS					
Temperature	Operating: -10°C to 50°C; storage: -40°C to 70°C				
Relative Humidity	0% to 95%(non-condensing)				
Size(H×W×D)	80mm x 135 mm x250 mm				
Weight	1.1kg				
Power	Li-Ion batteries 8 hours of continuous operation as per Bellcore TR-NWT-001138				

Ordering Information

Category	Model	Description
Standard Configuration		
Main Frame	OTP6123H	Dual-wavelength 1310/1550nm OTDR tester, dynamic range 40/39dB.
	OTP6123N	Dual-wavelength 1310/1550nm OTDR tester, dynamic range 35/34dB.
	OTP6123L	Dual-wavelength 1310/1550nm OTDR tester, dynamic range 30/28dB.
	OTP6123P	Tri-wavelength 1310/1550/1625nm PON OTDR tester, dynamic range 39/37/38dB.
	OTP6123-a	Tri-wavelength 1310/1490/1550nm PON OTDR tester, dynamic range 39/37/37dB.
	OTP6123-b	Tri-wavelength 1310/1550/1650nm PON OTDR tester, dynamic range 39/37/38dB.
	OTP6123-c	Qua-wavelength 1310/1490/1550/1625nm PON OTDR tester, dynamic range 39/37/37/38dB.
	OTP6123-d	Qua-wavelength 1310/1490/1550/1650nm PON OTDR tester, dynamic range 39/37/37/38dB.
Battery	LB03V10S0103	One 1 parrallel 3 series Lithium polymer rechargeable battery for OTP6100, 10.8V.
Power Adapter	SA148A-24V	One 24V AC/DC, power adapter for OTP6100.
Power Cabel	OA1611PWR_2M	One 2-mete-long power cable.
Disc	OA1808_6123_CD	One OTP6123 disc.
Package	OBG6100	One OTP6100 package.
Fiber Jumper	FCFC-0103	One FC/FC port, single-mode, simplex, 9/125, 3-meter-long.
VFL Function	OPAP-VFLatOTDR	OTDR red light VFL testing option.
Optional Configuration		
Functional Option	OPAP-PMatOTDR	OTDR optical power PM testing option.
	OPAP-LSatOTDR	OTDR single-mode optical source testing option.
	OPAP-iOTA	Intelligent fiber link topology analyzer option.
	OPAP-iNET	Intelligent network performance tool option.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

5 OTM2300 Series OTDR Test Module



Product Introduction

OTM2300 series OTDR test module offers comprehensive optical application for metro, access/FTTx and LAN network. OTM2300 also provides complete fiber test accurately, quickly and conveniently. It is the best test tool for service provider to validate during installation or troubleshooting at running phase.

Features

- Modular designed, flexibly applied to OPWILL's test platform OTP6200
- Covering all OTDR functions, offering singlemode/multimode fiber testing and supporting multi-wavelength to meet different test demands
- Powerful test features: maximum dynamic ranges: 40dB; event dead zones: 0.8m; attenuation dead zone: 7m
- Up to 256K sampling points, more accurate test results
- 260km maximum distance range satisfy metro and access fiber test application

Specifications

SPECIFICATIONS			
		OTM2302L	OTM2302N
Wavelength (nm)		1310/1550	1310/1550
Dynamic Range (dB)		35/33	40/38
Pulse Width (ns)		3~20000	3~20000
Event Dead Zone (m)		≤ 0.8/0.8	≤ 0.8/0.8
Attenuation Dead Zone (m)		≤ 7/7	≤ 7/7
Distance Range(km)		≤ 160	≤ 200
VFL	Output Power(dBm)	-4.5	-4.5
Power Meter	Output Power(dBm)	+10 to -60	+10 to -60
	Measurement Range(nm)	780 to 1800	780 to 1800
	Detector Type	Ge	Ge
	Uncertainty	± 5 % ± 0.1 nW	± 5 % ± 0.1 nW
	Calibration Wavelength(nm)	850,1300,1310,1490,1550,1625	850,1300,1310,1490,1550,1625
OTDR FEATURES			
Linearity (dB/dB)		±0.03	Loss Threshold(dB) 0.01
Loss Resolution (dB)		0.001	Sampling Resolution (m) 0.125~1
Typical Real-time Refresh (Hz)		1	Measurement Time 5s~180s
Distance Uncertainty (m)		±(0.75+0.0010%×distance+ sampling resolution)	Sampling Points 256K
PHYSICAL SPECIFICATIONS			
Temperature		Operating: -10°C to 50°C; Storing: -40°C to 70°C	Relative Humidity 0% to 95% (non-condensing)
Size (H×W×D)		25 mm x 97 mm x 259 mm	Weight 0.4kg

Ordering Information

Category	Model	Description
Standard Configuration		
Test module (one of two)	OTM2302L	Dual-wavelength 1310/1550nm OTDR module, dynamic range 35/33dB
	OTM2302N	Dual-wavelength 1310/1550nm OTDR module, dynamic range 40/38dB
Fiber jumper	FCFC-0103	One simplex fiber jumper with FC/FC interface, single mode, 9/125, 3m.
VFL function	OPAP-VFLatOTDR	OTDR red light VFL testing function.
Optional Configuration		
Functional option	OPAP-PMatOTDR	OTDR optical power PM testing option.
	OPAP-LSatOTDR	OTDR single mode light source testing option.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

6 OTC2300 Series Card OTDR



Product Introduction

OTC2300 series card OTDR is a card test product specially designed for fiber optic monitoring, and it's the ideal choice for monitoring optical fiber system. In recent years, fiber optic monitoring is widely applied in many fields, including communication network maintenance, safety sensing, disaster prevention system, etc. OTC2300 series module provides a compact and high-performance solution for optical fiber application.

Features

- Specially designed for optical fiber monitoring system.
- Wide working temperature range.
- High speed Ethernet data transmission interface.
- Short enough dead zone (event dead zone 0.8 m, attenuation dead zone 4 m), ensure accurate test on the whole fiber link.
- High-linearity index makes OTC2300 have more accurate event testing capabilities.
- 256000 sampling points and up to 10cm sampling resolution ensure more accurate event location.
- Controller (PC/server) rapidly configures operation OTC2300 through Ethernet port (compatible with 10M/100M Ethernet port, through RS232C configure IP address). OTC2300 series module has a complete set of control command, including configuration, measurement, data transmission, etc.

Specifications

SPECIFICATIONS					
Model	OTC2300N-a	OTC2300N-b	OTC2300N-c	OTC2300N-d	OTC2300N-e
Wavelength	1310 nm	1490nm	1550 nm	1625nm	1650nm
Fiberoptic Testing	10µm/125µm SMF(ITU-T G.652)				
Distance Range	0.5, 2.5, 5, 15, 40, 80, 120, 160, 200 km				
Pulse width	3, 5, 10, 30, 50, 100, 275, 500, 1000, 5000, 10000, 20000 ns				
Dynamic Range	40 dB	38 dB	38 dB	38 dB	38dB
Event Dead Zone	≤2m				
Attenuation Dead Zone	≤8m				
Sampling Points	256 000				
refractive index	1.30000 -1.80000				
distance accuracy	±(0.75+0.005%×distance + sampling resolution)				
Linearity	±0.03				
return loss Accuracy	±2dB				
Automatic measurement	Measurement items: total losses, every occurrence (type, location, loss, reflect) threshold: event threshold (0.01 - 9.99 dB), terminal threshold (1 -99 dB) automatic set-up: distance, pulse width, sampling time				
Manual Measurement	Two-point loss, Event loss, reflectivity				
laser safety	IEC 60825-1: 2007: CLASS 1 21 CFR 1040.10				
power	+12V±1V, 1.5A				
Interface	Ethernet port: 10M/100M self-adaption, 4 pin. RS-232C: 115.2kbps (through RS-232C set IP address).				
PHYSICAL SPECIFICATIONS					
Size (H*W*D)	16mm *110mm*160mm				
Weight	0.5kg				
Temperature	-10°C – +60°C				
Relative Humidity	0% to 95% (non-condensing)				
EMC	EN 61326-1,EN61000-3-2				

Ordering Information

Category	Model	Description
Standard Configuration		
Test module	OTC2300N-a	Single Wavelength (1310 nm)OTDR module, dynamic range 40dB
	OTC2300N-b	Single Wavelength (1490 nm)OTDR module, dynamic range 38dB
	OTC2300N-c	Single Wavelength (1550 nm)OTDR module, dynamic range 38dB
	OTC2300N-d	Single Wavelength (1625 nm)OTDR module, dynamic range 38dB
	OTC2300N-e	Single Wavelength (1650 nm)OTDR module, dynamic range 38dB

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

7 OTC2310 Smart OTDR



Product Introduction

OTC2310 Smart OTDR, our ultra-compact OTDR product controlled by Bluetooth and USB interfaces, which covers the entire application of optical fibers in WAN, Access/FTTx and LAN, is able to provide perfect test of optical fibers. Also, OTC2310 can be used cooperatively with the majority of intelligent devices running Windows8, IOS, and Android systems in indoor laboratories or outdoor environment. It is the operators' optimal test tool for verification in the network construction phase and troubleshooting in the network operation phase.

OTC2310 Smart OTDR is an ideal choice for optical fiber monitoring. In recent years, optical fiber monitoring has applied in many fields, including communication network maintenance, security sense, hazard prevention system, etc. OTC2310 provides an ultra-compact and super-intelligent solution for optical fiber application.

Features

- Ultra-compact design with Bluetooth and USB interfaces
- Applicable to monitoring system of optical fibers
- Available for 1310nm, 1490nm, 1550nm, 1625nm and 1650nm wave length tests
- 0.8m event dead zone, and 4m attenuation dead zone guaranteeing accurate test of OTC2310 Smart OTDR in the entire optical fiber link.
- 256,000 sampling points and a sampling resolution as high as 10cm guaranteeing more accurate positioning of events
- Smart OTDR is applicable to the most majority of tablet PCs and intelligent phones running Window 8, IOS, and Android as well as all PCs with Window system.
- Available for uploading and downloading of test reports transmitted via USB, Bluetooth, WIFI, 3G/4G and other channels.

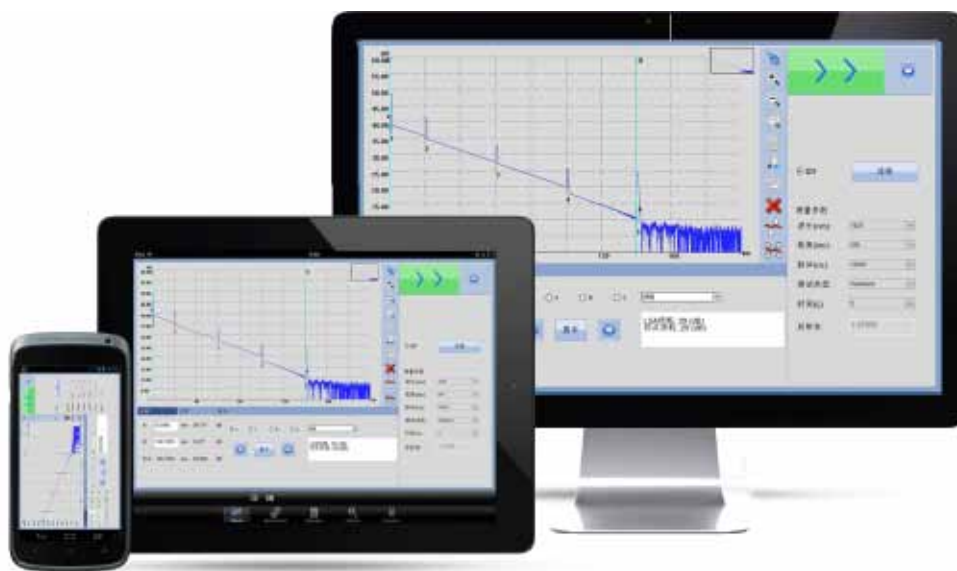
OTC2310 Smart OTDR Unit Description

OTC2310 Smart OTDR Unit Description	
Connection with PC/Table PC/Smartphone	USB, Bluetooth
Power Supply	Li-Ion Battery(8 hours)
Dimensions(H×W×D)	36mm×89mm×151mm
Weight	0.4kg
Temperature	Operating temperature: -10°C to 50°C ; Storage temperature: -40°C to 70°C
Relative humidity	0% to 95%(Non-condensable)



OTC2310 Smart OTDR Soft Description

OTC2310 Smart OTDR is specially designed to be used with the OPWILL OTDR Tools software. It can be controlled via USB or Bluetooth from all supported platforms (Windows, MacOS, Linux, iOS, Android).



PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS					
Model	OTC2310a	OTC2310b	OTC2310c	OTC2310d	OTC2310e
Wavelength	1310 nm	1490nm	1550 nm	1625nm	1650nm
Dynamic range	30dB	30dB	30dB	30dB	30dB
Model	OTC2310f	OTC2310g	OTC2310h	OTC2310i	
Wavelength	1310 nm	1490nm	1550 nm	1625nm	
Dynamic range	35dB	35dB	35dB	35dB	
Model	OTC2310j	OTC2310k	OTC2310l	OTC2310m	
Wavelength	1310 nm	1490nm	1550 nm	1625nm	
Dynamic range	40dB	40dB	40dB	40dB	
Model	OTC2310ac	OTC2310fh	OTC2310jl		
Wavelength	1310/1550 nm	1310/1550nm	1310/1550nm		
Dynamic range	30/30dB	35/35dB	40/40dB		
Optical fiber test	10µm/125µm single mode fiber(ITU-T G.652)				
Distance range	0.5, 2.5, 5, 15, 40, 80, 120, 160, 200 km				
Pulse width	3, 5, 10, 30, 50, 100, 275, 500, 1000, 5000, 10000, 20000 ns				
Event dead zone	≤0.8m				
Attenuation dead zone	≤4m				
Sampling point	256 000				
Refractive index	1.30000 – 1.80000				
Distance accuracy	±(0.75+0.005%×distance+ sampling resolution)				
Degree of linearity	±0.03				
Accuracy of return loss	±2dB				
Automatic measurement	Items measured: total loss, each event (type, position, loss and reflection) Threshold value: event threshold (0.01 – 9.99 dB), terminal threshold (1 -99 dB) Automatic setup: distance, pulse width, sampling time				
Manual measurement	Two-point loss, event loss, reflectivity				
Laser safety	IEC 60825-1 : 2007 : CLASS 121 CFR 1040.10				

Ordering Information

Category	Model	Description
Standard Configuration		
Smart OTDR	OTC2310	Intelligent OTDR, single or dual wavelength, dynamic range 30 to 40dB
Test terminals	5.5 Aterminal	Intelligent terminal with Android system and 5.5-inch screen
Optional operation screen	8 Aterminal	Intelligent terminal with Android system and 8-inch screen Android
	10.1 Aterminal	Intelligent terminal with Android system and 10.1-inch screen
	8 Wterminal	Intelligent terminal with Windows 8.1 system and 8-inch screen
	10.1 Wterminal	Intelligent terminal with Windows 8.1 system and 10.1-inch screen
	7.9 Iterminal	Apple 16G IPAD Mini2
	9.7 Iterminal	Apple 16G IPAD Air

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

8 PFS-103 Single Fiber Fusion Splicer



Product Introduction

PFS-103 is mainly used in optical communication, optical cable construction and maintenance. Mainly rely on release arc two optical fiber fusion, at the same time by using the principle of the collimating gently forward, so as to realize the coupling of optical fiber. Mainly applied to the operators, engineering companies, enterprises and institutions of the optical fiber cable line engineering construction, the line maintenance, emergency repair and production test of fiber optic devices and research teaching scientific research institutes.

Features

- Reversible monitor with control panel on each side
- Color LCD monitor 200 magnification
- Compact & Light weight
- Large capacity internal battery
- Max. wind velocity of 15m/s.
- 8 Sec. splice time, 30 Sec. tube-heat time
- Simultaneous X and Y views
- SYSTEM TEST ensures the best working condition
- User programmable
- Auto check fiber end face
- Auto calibrate parameters
- Store 8000 groups of splice results
- Multiple language options
- Core Alignment

Specifications

SPECIFICATIONS	
Applicable fibers	SM, MM, DS, NZ-DS(G655), EDF
Cladding diameter	100 to 150um
Coating diameter	100 to 1000um
Fiber cleaved length	8-22mm
Splicing mode	Auto & Manual
Average splice loss	0.02dB(SM), 0.01dB(MM), 0.04dB(DS)□, 0.04dB(NZDS)
Return loss	≥60dB
Tension test	2.0N(200gf)(Standard)
Protection sleeve length	20mm, 40mm, 60mm
Language	English, Chinese, Korean, Russian, Spanish, Portuguese, German, French
Interface	RS232 interface & video output AC adaptor:85~260V input voltage

Ordering Information

Category	Model	Quantity
Standard Configuration		
Fusion Splice	PFS-103	1
Fiber Cleaver	EC-101	1
Fiber Stripper	CLEAVER PFS-101	1
Spare Electrodes	FWS-101	1
Internal Battery and charge	SA148A-24V	1, 24V AC/DCpower adapter
AC Adaptor and AC Power Cord	LB03V10S0103	1, Lithium polymer rechargeable battery, 10.8V
Cooling Tray	BC-101	1
Carry Case	LRC-101	1
Manual Instruction	PFS-103	1
Optional Configuration		
Lithium Battery	LB03V10S0103	1
Optical Fiber Cutting Knife	CLEAVER PFS-101	1
Optical Fiber Wire Stripper	FWS-101	1
Electrode Bar	EC-101	1

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

PRODUCT INTRODUCTION

9 PFS-105 Digital Single Fiber Fusion Splicer



Product Introduction

PFS-105 Digital Single Fiber Fusion Splicer is mainly used in optical communication, optical cable construction and maintenance. Mainly rely on release arc two optical fiber fusion, at the same time by using the principle of the collimating gently forward, so as to realize the coupling of optical fiber. Mainly applied to the operators, engineering companies, enterprises and institutions of the optical fiber cable line engineering construction, the line maintenance, emergency repair and production test of fiber optic devices and research teaching scientific research institutes.

Features

- High definition LCD display
- PAS technology
- Core or cladding alignment
- Double heaters, 30 Sec. tube-heat time
- 3 magnification modes, max. 360 magnification
- 4 display modes, fiber core visible
- 8 Sec. splice time
- Lithium battery
- Max. wind velocity of 15m/s
- Splicing method: auto, manual
- Store 8000 groups of splice results
- USB interface

Specifications

SPECIFICATIONS	
Applicable fibers	SM, MM, NZ-DS(G655), EDF and others
Average splice loss	0.02dB(SM), 0.01dB(MM). 0.04dB(NZDS)
Return loss	≥60dB
Tension test	2.0N(200gf)(Standard)
Protection sleeve length	20mm, 40mm, 60mm and other series micro protection sleeves
Splicing program	80 groups
Language	English, Chinese, Korean, Russian, Spanish , French, German, Portuguese and others
Environment conditions	-25~+50℃ (operation temperature), 0~95%RH (humidity), 0~5000m (altitude)
Storage environment	-40~+80℃ (temperature) , 0~95%RH (humidity)
Power supply	AC adaptor: 85~260V input voltage Internal battery: 12V,8Ah, up to 180 times of continuous splice and heat
Dimensions/Weight	140(D)×150(W)×160(H)mm/2.8kg

Ordering Information

Category	Model	Quantity
Standard Configuration		
Fusion Splice	PFS-105	1
Fiber Cleaver	EC-101	1
Fiber Stripper	CLEAVER PFS-101	1
Spare Electrodes	FWS-101	1
Internal Battery and charge	SA148A-24V	1, 24V AC/DCpower adapter
AC Adaptor and AC Power Cord	LB03V10S0103	1, Lithium polymer rechargeable battery, 10.8V
Cooling Tray	BC-101	1
Carry Case	LRC-101	1
Manual Instruction	PFS-105	1
Optional Configuration		
Lithium Battery	LB03V10S0103	1
Optical Fiber Cutting Knife	CLEAVER PFS-101	1
Optical Fiber Wire Stripper	FWS-101	1
Electrode Bar	EC-101	1

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

PRODUCT INTRODUCTION

10 PFS-120 Optical Fiber Fusion Splicer



Product Introduction

PFS - 120 is a typical 6 motor fiber core on optical fiber fusion splitter released by OPWILL. PFS - 120 has the characteristics of small and light, strong and durable, long battery life. The color touch display brings more convenient and efficient work flow to users, and the fusion splitter is equipped with LED lights to be better used in dark environment. This fusion splitter adapts to all kinds of construction environment, and it can be used in optical transmission lines of low loss and long range, LAN, CATV, FTTx and all kinds of auxiliary work in the network construction.

Features

- Brand new 6 motor drive the fiber core alignment technology, high quality, low loss
- Handiness and small, solid durable, flexible apply to the outdoor scene environment
- 8 seconds rapid welding, 25 seconds heating, the world's fastest fusion splitter
- A 4.3 -inch touch color TFT with images automatically reversing function
- Shockproof, dustproof, waterproof, antifreeze, wind resistance, resistance to fall off, high altitude
- Automatic heat shrinkable tube heater; Automatic calibration
- Large capacity lithium polymer battery, 350 times to welding and heat shrinkable tube heating
- USB, RS232 interface, video output interface

Specifications

SPECIFICATIONS	
Alignment Way	6 motor fiber core alignment
Applicable Optical Fiber Type	SMF(ITU-T G.652)/MMF(ITU-T G.651)/DSF(ITU-T G.653)/NZDSF(ITU-T G.655)/EDF/EI980/ can welding of different type optical fiber(SM/MM)/ITU-T G.657
Fiber Diameter	Cladding layer:80μm-150μm, coating layer: 100μm-1000μm(single core)
Optical Fiber Peeling Length	250μm(coating layer):8-16mm, 900μm:16mm
Typical Coupling Loss	0.02dB(SMF), 0.01dB(MMF), 0.04dB(DSF), 0.04dB(NZDSF)
Return Loss	≥60dB
Welding Time	welding: Typical 8 seconds, heat-shrinkable T bush: 25 seconds(Typical)
Optional Procedure	Welding mode: 100, heating mode: 50
Fusion Results	4000 latest welding results(500 image results)
Working Elevation	Above 0-5000m
Working Environment	-10°C to 55°C, Humidity: 95%, Non - Condensing
Storage Condition	-40°C to 80°C, 0-95% Relative humidity
Protective Capability	Wind resistance, shockproof, waterproof, dustproof
Size	138W*160L*135H(Including the display and rubber parts)
Weight	2.3KG(Including batteries)
Port	USB, RCA, external power source
Power	Battery dc14.8V(7700mAh), 100-240V AC adapter
Other Power Supply	Dc 12V Mobile power supply
Welding/Heating Times	350 times, lithium polymer battery
Electrode Bar	Welding more than 3000 times, without replace of electrode
Display	Two CMOS cameras and a 4.3 -inch touch color LCD display screen
Optical Magnification Times	X/Y 300X, 170X

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Quantity
Standard Configuration		
Mainframe	PFS-120	1
Electrode Bar	EC-101	1
Optical Fiber Cutting Knife	CLEAVER PFS-101	1
Optical Fiber Wire Stripper	FWS-101	1
Power Adapter	SA148A-24V	1
Internal Battery	LB03V10S0103	1
Charger	BC-101	1
Carrying Case	LRC-101	1
Operation Instruction	PFS-120	1
Optional Configuration		
Lithium Battery	LB03V10S0103	1
Optical Fiber Cutting Knife	CLEAVER PFS-101	1
Optical Fiber Wire Stripper	FWS-101	1
Electrode Bar	EC-101	1

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

11 FTS-300 Fiber Analyzer



FTS-300 Platform



OTM2300



OTM2400

Product Introduction

FTS-300 fiber optical investigator is designed for cable identification. Locate the target cable under test or construction in a bundle of cable using the principle of interference. Combine with OPWILL's OTDR module OTM2302 for the fault location, can solve the problem of construction in pipeline rapidly and effectively.

Features

- Friendly interface, Simple operation, Rugged and Durable.
- Using audio technology, High sensitivity.
- Adapt to the complex environment.
- Through audio and video to accurate the locate cable.
- Covering all OTDR functions, Test singlemode/multimode fiber, Dual wavelength for different test demand.
- Max dynamic range 35dB, Event dead zone 0.8m, Attenuation dead zone 4m, ensure accurate test on the fiber link.
- Support VFL Function.

PRODUCT INTRODUCTION

Specifications

Platform Specifications				
Display	Color Touch Screen 640 x 480 TFT 6.5 inch			
Interface	USB A/B Ethernet Port			
Memory	1GB flash			
Battery	Rechargeable Li-Ion 4 hours continuously operation as per Bellcore TR-NWT-001138			
Power	AC/DC Adapter: Input: 100-240VAC, 50-60Hz, 1.6A Max; Output: 24VDC, 4A			
OTM2400 FCI Specifications				
	OTM2402	OTM2404	OTM2406	OTM2410
Fiber Interface	FC/APC	FC/APC	FC/APC	FC/APC
Test Distance(km)	20	40	60	100
Max Output Power (dBm)	-6	-3	0	0
Signal - Noise Ratio(dB)	30	30	40	40
Wave Length(nm)	1550nm	1550nm	1550nm	1550nm
Max Fiber loss dB(Loop)	50	50	50	50
Signal Processing	High sensitivity and low noise			
Output Mode	Video: Vibration Amplitude, LED Display Audio: Voice, corresponding disturbance intensity			
OTM2302L OTDR Specifications				
Wave Length(nm)	1310/1550	Dynamic Range(dB)	35/33	
Pulse Width(ns)	3~20000	Event Dead Zone(m)	≤ 0.8/0.8	
Attenuation Dead Zone(m)	≤ 4/4	Distance Range(km)	≤ 200	
Linearity(dB/dB)	±0.03	Loss Threshold(dB)	0.01	
Loss Resolution(dB)	0.001	S a m p l i n g Resolution(m)	0.125~1	
Sampling Points	256K	D i s t a n c e Uncertainty(m)	±(0.75+0.0025%×Distance + Sampling resolution)	
Typical Real-Time Refresh(Hz)	2	Memory	≥1000 Trace	
Measurement Time	5s~180s,User define	VFL Output Power (dBm)	+10	

PHYSICAL SPECIFICATIONS

Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C
Relative humidity	0% to 95%(Non - Condensing)
Size(H×W×D)	319 mm x 202 mm x 105 mm
Weight	3.6kg

Ordering Information

Category	Model	Description
Standard Configuration		
Platform	FTS300	Support 2 Slots, Modular Designed, Allow to use with FCI, OTDR, Ethernet, SDH/PDH/OTN/MSTP Test Modules
Fiber Analyzer Test Module	OTM2402	Support 1550nm Wavelength, 20km Testing Range.
	OTM2404	Support 1550nm Wavelength, 40km Testing Range.
	OTM2406	Support 1550nm Wavelength, 60km Testing Range.
	OTM2410	Support 1550nm Wavelength, 100km Testing Range.
OTDR Test Module	OTM2302L	Dual-wavelength 1310/1550nm OTDR Module, Dynamic Range 35/33dB.
Battery	LB08V14S0204	One 2 parallel four series lithium polymer rechargeable battery for OTP6200.
Power Adapter	SA190A-2440V-P	One 24V AC/DC Power Adapter for OTP6200.
Power Cable	OA1611PWR_2M	One 2 meters power cable.
Fiber Jumper	FCFC-0103	One FC/FC Port, Single Mode, Simplex, 9/125, 3 Meters.
Disc	OA1808_6200_CD	One OTP6200 Disc.
Package	OBG6200	One OTP6200 Package.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

PRODUCT INTRODUCTION

12 FTS-600 FTTA Analyzer



OTP6200 Platform



OTM2300 OTDR Module



OTM2950 Cable and Antenna Test Module

Product Introduction

The ever-increasing requirements on bandwidth impel the network operators to use FTTA and other new mobile infrastructures to improve the users' experience and lower the cost. Such 3G and 4G base stations constructed with FTTA technology are propelling the modernization of cellular architecture and help to realize wider coverage and higher single user capacity.

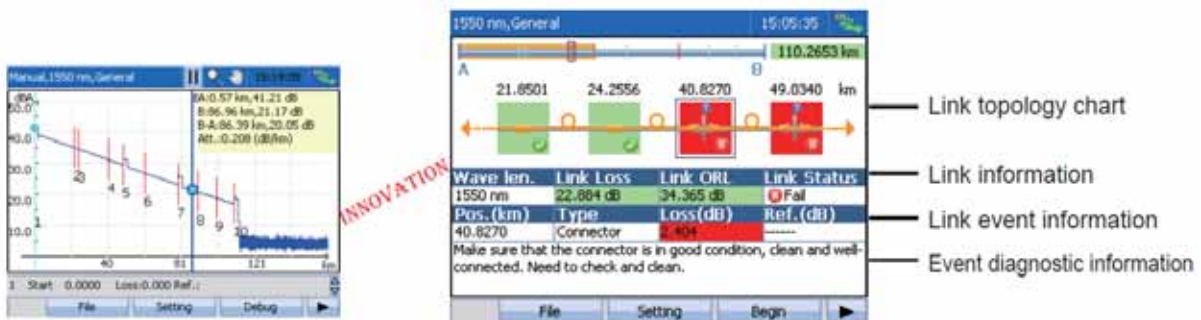
FTS-600 FTTA Analyzer is a complete solution launched by OPWILL which meets the demands for opening, activation, and fault diagnosis of RRH, DAS, small cell and C-RAN of 3G/4G base stations deployed with FTTA technology.

Features

- 6.5-inch TFT LCD enables users to easily read data under high brightness outdoors.
- Rechargeable lithium-ion battery enables the instrument to work for four continuous hours. (Five hours in standby mode).
- Convenient to store and read measured data via USB interface.
- (Option) Enabling remote control of the instrument to conduct tests via RJ45 management interface.
- Applicable to maintenance and test of radio frequency, radio-frequency cable, and optical fiber.
- Covering all functions of OTDR, available for test of single-mode/multi-mode fiber with multiple wave lengths, and able to satisfy test demands in different test scenarios.
- Supportive to 1310/1550nm, dynamic range of 35dB, event dead zone of 0.8m, and attenuation dead zone of 4m with 256000 sampling points guaranteeing highly accurate test on the entire short-distance optical fiber link.
- (Option) Support iOTA: intelligent combination the different pulse width: one time get loss and return loss of fiber and splitter. Multiple pulse acquisitions and algorithms to deliver detailed information of every element on the fiber link.
- Support return loss, cable loss, SWR, DTF test features with cable and antenna test module based on a frequency range of 25MHz to 4GHz.
- Support VFL
- (Option) Support optical power meter and light source function

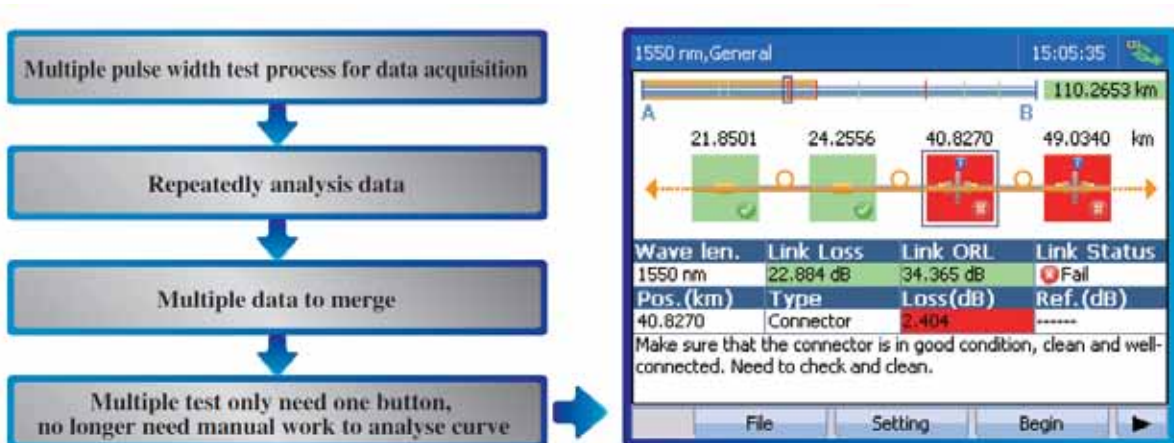
FTS-600 FTTA Analyser iOTA Introduction

The traditional OTDR only display fiber loss and event list of test fiber link, need manual to analysis event types and link topology. The artificial analysis workload has sharp increased with the rapid development of FTTH, so that is unable to safeguard the construction efficiency. Then the iOTA function which is developed by OPWILL provide a more comprehensive fiber test function and test data, assist network expert easily realize the turn up, operation and maintenance of optical fiber network.



iOTA Test Principle

Intelligent combination the different pulse width: one time get loss and return loss of fiber and splitter. Multiple pulse acquisitions and algorithms to deliver detailed information of every element on the fiber link.



PRODUCT INTRODUCTION

Specifications

OTM2302L OTDR Technical Specifications			
Wavelength(nm)	1310/1550	Dynamic range(dB)	35/33
Pulse width(ns)	3~20000	Event dead zone(m)	≤0.8
Attenuation dead zone (m)	≤4/4	Distance range(km)	≤140
D e g r e e o f linearity(dB/dB)	±0.03	Loss threshold(dB)	0.01
Loss resolution (dB)	0.001	S a m p l i n g resolution(m)	0.125~1
Typical real-time refresh (Hz)	2	Measuring time	5s~180s
D i s t a n c e uncertainty(m)	±(0.75+0.0025%×distance+sampling resolution)	Sampling point	256K
VFL output power (dBm)	+10		
Optical power meter (option)	Output power(dBm)	+10 to -60	
	Measurement range(nm)	780 to 1800	
	Detector type	Ge	
	Uncertainty	± 5 % ± 0.1 nW	
	Calibrated Wavelength (nm)	850,1300,1310,1490,1550,1625	
Light source (option)	Wavelength	1310nm, 1550nm	
	Output power(dBm)	-6~-7	
OTM2950 Cable and Antenna Analyser Technical Specifications			
Test function	SWR		
	Return loss		
	Cable loss		
	Distance-to-fault with SWR (DTF)		
	Distance-to-fault with return loss (DTF)		
Frequency	Frequency range	25MHz~4GHz	
	Frequency resolution	100kHz	
Output power	High	0 dBm, typically	
	Low	-20 dBm, typically	
Measurement speed	<2 sec/screen (full span, 521 data points)		
	<3 sec/data point, CW sweep mode, typically		
Number of data points	Maximum: 521, Selectalbel: 131,261,521		

OTM2950 Cable and Antenna Analyser Technical Specifications		
Return loss	Measurement range	0~60dB
	Accuracy	$A=20 \times \log_{10}(1.1+10^{-(D-RL)/20}+0.016 \times 10^{(-RL/20)}+10^{(-3+RL/20)})$
	D	Directivity of calibrator
	RL	Return loss value of DUT
	Resolution	0.01dB
SWR	Measurement range	1~65
	Accuracy	Same as RL
	Resolution	0.01
Cable loss	Measurement range	0~30dB
	Resolution	0.01dB
DTF	Measurement range of return loss	0~60dB
	Measurement range of SWR	1~65
	Fault resolution (meter)	$(1.5 \times 10^8 \times vp) / \Delta F$ (vp= the cable's relative propagation velocity, $\Delta F = F2-F1$, Hz as the unit) F2 is the stop frequency, and F1 is the start frequency
	Measurement distance	0~(data point-1)×fault resolution, 1500 m for maximum
Measurement accuracy	Calibrated directivity	>42dB corrected directivity after mechanical calibration
		>38dB corrected directivity after mechanical calibration
Interface	RF output	N-type, 50Ω
	USB interface	2 USB V2.0, 1 Mini USB
	LAN interface	RJ45 interface, 10/100M Base-T, for remote control of the testing instrument
	Headphone interface	2.5mm mini-headphone interface

PRODUCT INTRODUCTION

Platform Specifications	
Display screen	Color touch screen 640 x 480 TFT 6.5 inch
Interface	Two interfaces: USB A/B Ethernet interface
Memory space	1GB flash
Battery	Rechargeable lithium battery pack Continuous operation for 4 hours according to Bellcore TR-NWT-001138 standard
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, maximum current 1.6A; output: 19VDC, 4A
PHYSICAL SPECIFICATIONS	
Temperature	Working temperature: -10°C to 50°C; storage temperature: -40°C to 70°C
Relative humidity	0% to 95% (Non-condensable)
Size (H×W×D)	319 mm x 202 mm x 105 mm
Weight	3.6kg

Ordering Information

Category	Model	Description
Standard Configuration		
F T S - 6 0 0 testing instrument	OTP6200 platform	Equipped with 2 slot positions and modular design, can be cooperatively used with AFCID, OTDR, Ethernet, and SDH/PDH/OTN/MSTP.
	OTP2950	Cable and antenna test modules with a frequency range of 25MHz to 4GHz
	OTM2302L	OTDR module with a dual-wavelength of 1310/1550nm and dynamic range of 35/33dB
Battery	LB08V14S0204	1 rechargeable lithium ion battery pack with two in parallel and four in series for OTP6200
Power adapter	SA190A-2440V-P	One 19V power adapter, applicable to 6200
Power supply cable	OA1611PWR_2M	1 piece of 2-meter power supply cable
Optical fiber jumper	FCFC-0103	1 FC/FC interface, simple-mode simplex optical fiber jumper, 9/125, 3 meters.
Electronic CD	OA1808_6200_CD	1 OTP6200 electronic CD
Instrument bag	OBG6200	1 OTP6200 instrument bag
Optional configuration		
Function options	OPAP-PMatOTDR	OTDR optical power PM test
	OPAP-LSatOTDR	OTDR single-mode light source test
	OPAP-iOTA	Intelligent optical link topology analysis
	OPAP-RemoteAccess	Remote control of desktop

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

13 FTS-6129 Fiber Cable Investigator



Product Introduction

OTP6129 fiber cable investigator is designed for cable identification. The instrumentation is developed specific to fiber optic lines messy and difficult to troubleshoot problems in optical cable construction process. It is designed specifically for telecommunications engineers and technicians and it's applicable to fiber optic cable positioning in manholes, tunnels, pipes, overhead pole and other environments.

Features

- Friendly interface, Simple operation, Rugged and Durable.
- Using audio technology, High sensitivity.
- Adapt to the complex environment.
- Through audio and video to accurate the locate cable.
- Support up to 100km measuring distance.
- Support optical cable length and breakpoint position display.
- Support VFL Function.

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS				
	FTS-6129a	FTS-6129b	FTS-6129c	FTS-6129e
Fiber Interface	FC/APC	FC/APC	FC/APC	FC/APC
Test Distance(km)	20	40	60	100
Max Output Power (dBm)	-6	-3	0	0
Signal - Noise Ratio(dB)	30	30	40	40
Wave Length(nm)	1550nm	1550nm	1550nm	1550nm
Max Fiber loss dB(Loop)	50	50	50	50
Signal Processing	High sensitivity and low noise			
Output Mode	Video: Vibration Amplitude, LED Display Audio: Voice, corresponding disturbance intensity			
PHYSICAL SPECIFICATIONS				
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C			
Relative humidity	0% to 95%(Non - Condensing)			
Size(H×W×D)	80mm x 135 mm x250 mm			
Weight	1.1kg			

Ordering Information

Category	Model	Description
Standard Configuration		
Platform	OTP6129	Support 1550nm Wavelength, 20km to 10km testing range.
Battery	LB03V10S0103	One lithium polymer rechargeable battery apply to OTP6100, 10.8V
Power Adapter	SA148A-15V	One 15V AC/DC Power Adapter for OTP6100.
Power Cable	OA1611PWR_2M	One 2 meters power cable.
Disc	OA1808_6129_CD	One OTP6129 Disc.
Package	OBG6100	One OTP6100 Package.
Fiber Jumper	FCFC-0103	One FC/FC Port, Single Mode, Simplex, 9/125, 3 Meters.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

14 ETS-300-1 Mobile Backhaul Network Analyzer



Product Introduction

OPWILL ETS-300-1 Mobile Backhaul Network Analyser is the first full rate 1.5M to 10G PDH/SDH/MSTP/OTN and 10M to 10G Packet Ethernet test equipment of China. It is specifically for Mobile bearing mobile backhaul network test and cost-effective comprehensive testing equipment.

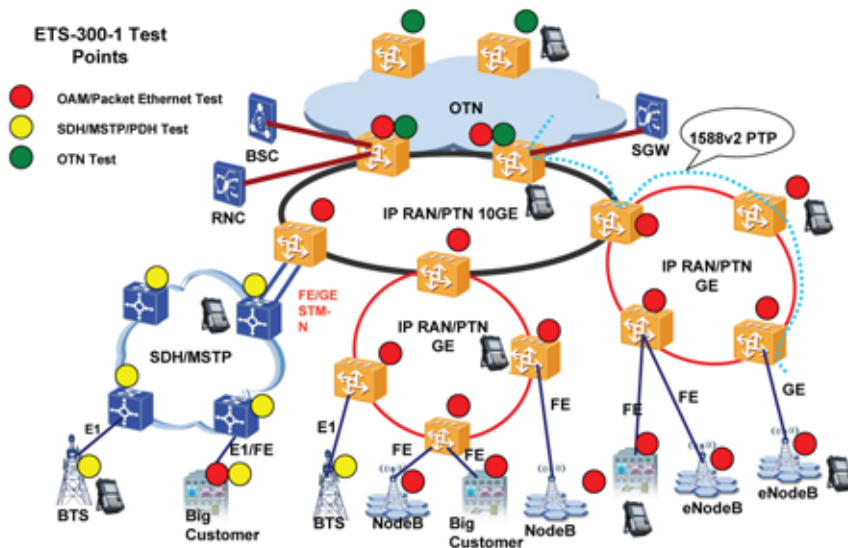
OPWILL ETS-300-1 Mobile Backhaul Network Analyser can cope with mobile backhaul network development challenges. It's characterized by a high level of integration, various interface, easy to carry, easy operation etc., and it's the most comprehensive test products and solutions for mobile bearing mobile backhaul network.

Test Features

- Whole OTN/SDH/MSTP/PDH test functions, covering different level rate from 1.5M to 10G, and can test from the access layer to the convergence layer.
- 100M to 10G rate IP RAN/PTN and Ethernet test function, support functions such as OAM, MPLS-TP, RFC2544, Y.1564, etc..
- The most valuable and the only domestic IP RAN/PTN comprehensive test solution provider.

PRODUCT INTRODUCTION

OPWILL ETS-300-1 Test Equipment Solution



The traditional solution is that users maintain mobile backhaul network need to purchase OTN instrument, SDH/MSTP instrument and 10GE/GE ethernet test instrument, but OPWILL's new ETS-300-1 test equipment is an integrative handheld testing tools. It can reduce the complexity of multiple test instruments operation, and more convenient for field use, and can ensure maximum efficiency and the highest cost performance during the development of IP RAN/PTN network. OPWILL ETS-300-1 Mobile Backhaul Network Analyser can provide OTN, SDH, MSTP, 10GE/GE, OAM all the required test functions in mobile backhaul network, and it can satisfy each link of the test requirements in mobile backhaul network.

ETS-300-1 test interface

PDH/DSn	SDH/SONET	OTN	Ethernet
E1/DS1	STM-1e/OC-3e	OTU1	10/100/1000M Base-T
E3/DS3	STM-1/OC-3	OTU2	100/1000M Base-X
E4	STM-4/OC-12	OTU1e/OTU2e	10G Base-X
	STM-16/OC-48		
	STM-64/OC-192		

ETS-300-1 Test Equipment IP RAN/PTN Test Function

- Support 10/100/1000M Base-T, 100/1000M Base-X and 10GE;
- Through the generation of MPLS-TP traffic and QoS analysis to support IP RAN/PTN test, and can also validate the operation of OAM label 13 or 14;
- Confirm the IPv4 and IPv6 a higher level Ethernet data application and services from 10Mbps to 10 Gbps;
- Multi-services bearer capability test (MPLS/PWE3) and abundant OAM function test, support IEEE802.3ah, IEEE802.1ag, ITU-T Y.1731 and ITU-T G.8113.1 standards;
- Support RFC2544 and Y.1564 test functions and RFC3393 jitter test function;
- Service interrupt test and service interrupt test.



ETS-300-1 Test Equipment OTN Test Function

- Provide to test OTU0, OTU1, OTU2, OTU1e, OTU2e optical port;
- Do the bit error and FEC performance analysis and testing to OTU0, OTU1, OTU2 optical signal according to the ITU-T G.709 frame structure
- Support OTU0 mapping with OTU1/OTU2, also support OTUFLEX mapping testing
- Generate and monitor OTN alarm;
- Insert and detect OTN errors;
- Edit and capture OTN overhead;
- Insert and detection FEC error;
- Automatic protection switching and business interruption time measurement.



PRODUCT INTRODUCTION

ETS-300-1 Test Equipment SDH/SONET/PDH Test Function

- Support multiple PDH/SDH/SONET test interface, 1.5M/2M/34M/45M/140M/155M electrical interface; and 155M/622M/2.5G/10G optical interface;
- Support generate and monitor of high order and low order pointer;
- Support segment / regeneration section, Line/multiplexing segment, operation and monitoring of high and low order channel overhead, warning/error generated and monitoring;
- Tandem connection monitoring; Performance monitoring: G.821/G.826/G.828/G.829/M.2100/M.2101;
- Automatic protection switching and and business interruption time measurement.

ETS-300-1 Test Equipment MSTP Test Function

- Generic framing procedure (GFP)
 - Conform to ITU-T G.7041 and ANSI T1.105-2001
 - GFP-F support
 - GFP header control, error injection and detection
 - GFP over LO VCAT/HO VCAT
- Virtual concatenation(VCAT)
 - Conform to ITU-T G.707, Telcordia GR253 and ANSIT1.105-2001
 - SDH error performance analysis per ITU-T G.821, G.828, G.829, M.2101, M.2110, M.2120 and Telcordia GR253
 - Virtual concatenation testing, VC-11, VC-12 , VC-3 and VC-4; synchronously test on 64 VC-11 & VC-12 members/48 VC-3 members/16 VC-4 members
 - Differential delay generation, measurement and payload reassembly up to 256ms
 - Path overhead bytes control and decode on eachmember
 - Error injection and alarm generation on each member
 - Independent control and monitoring on each path
- Link capacity adjustment scheme (LCAS)
 - Conform to ANSI T1.105, ITU-T G.7042, G.707, 783, 806
 - LCAS protocol emulation
 - Emulation of Source and Sink state machines per member
 - Generation and capture of member status information
 - All optical interfaces and electrical interfaces (SDH) support HO & LO VCAT
- Ethernet over SDH (EoS)
 - Support 10/100/1000 M Base-T Ethernet interface and gigabit optical interface
 - Ethernet payload add/drop in SDH line with GFP mapping
 - Flexible generation and statistics of Ethernet frame, including layer2 and layer3 testing with VLAN and MPLS label
 - Various Ethernet payload patterns (PRBS)

Specifications

IP RAN/PIN Test specifications		
Interface	One 10/100/1000M Base-T One 100/1000M Base-X One 10G Base-X	
RFC2544	Throughput, back to back, frame loss and latency test, support RFC2544 test on MAC layer and IP layer. Frame size : defined by RFC, or by user.	
Y.1564	Test of network service configuration and performance as per ITU-T Y.1564, verifying if they meet agreed SLA. Support CIR/EIR bandwidth ,packet loss rate, latency and jitter test.	
BERT	BEAT L1/L2/L3/L4, support random test of packet length.	
	Pattern(BERT)	PRBT 2E9-1, PRBS 2E11-1, PRBS 2E15-1, PRBS 2E20-1, PRBS 2E31-1,User-defined pattern and pattern reversion function.
	Error Insertion(BERT)	IP check error,UDP check error, FCS, BIT error,manually and automatically.
Deviation Measurement	LOS, link disconnection,symbol,FCS,jabber frame,ultra-long frame, ultra-short frame, collision, excessive collision,latency collision, UDP,TCP and IP checksum.	
Service Interruption Time Measurement (BERT)	Error mode, non-flow mode and packet loss rate mode. Interruption time statistics includes minimum, maximum, latest, average and total interruption time, and interruption amount.	
Multi-Stream	Transmit up to 8(gigabit interface) or 512(10 gigabit interface) data flow	
	Configuration Parameter	Packet size(46-16000),transmission mode (continuous, N-frame ,burst ,increment),MAC source/destination address(incrementally changeable), VLAN ID, VLAN priority, LLC, SNAP, MPLS, IP source/destination address, TOS segment ,DSCP segment, TTL, UDP source/destination port and payload.
	VLAN stacking	Generate data flow with maximum 3 VLAN layer□including VLAN with IEEE802.1ad Q-IN-Q mark),received information flow can be filtered according to VLAN ID or VLAN priority on any Stacking VLAN layer.
Information Flow Analysis	Analyze receiving information flow and provide statistics information according to a configurable filter group.	
Ethernet Statistics	Multi-cast, broadcast, uni-cast, frame size distribution, bandwidth, utilization, frame rate, bandwidth and utilization rate can be displayed by line graph.	
RFC339 Jittering Test	Minimum, maximum, current ,average value and sample amount	
Intelligent Loop-back	L1/I2/L3/L4 loop-back and statistics	
Double-end Test Mode	Achieve bi-directional test simultaneously by controlling remote facilities with local one.	
Online Business Scanning and Analysis	Support auto-scanning and auto-identification of several online business according to VLAN ID, IP address or PTN'S double-layer MPLS-TP tag.	
MPLS/PWE3 Protocol Analysis	Analyze if frame structure of SATOP meets RTC4553 Analyze if frame structure of CESOP meets RTC5086 and RFC4842.	
MPLS-TP Protocol Analysis	Analyze LSP in packet header of MPLS and Label in PW,EXP, TTL see G.8110,RFC3032	
Ethernet Link OAM Protocol Analysis	Analyze if OAM frame structure of Ethernet link meets IEEE 802.3ah Analyze packets including Information, Event Notification, Variable Request, Variable Response, Loop-back Control, Organization Specific.	

PRODUCT INTRODUCTION

IP RAN/PIN Test specifications	
Business OAM Protocol Simulation and Packet Analysis	Analyze if business OAM frame structure meets ITU-T Y.1731 protocol. Analyze packets including CCM, LBM, LBR, LTM, LTR, AIS, LCK, TST, APS, MCC, LMM, LMR, 1DM, DMM, DMR, EXM, EXR, VSM, VSR.
MPLS-TP LSP OAM Stimulation and Packet Analysis	Analyze if LSP OAM frame structure meets ITU-T Y.1731+GACH protocol. Analyze packets including Section CC, Section RDI/AIS, Section LB, Section LM, Section DM.
MPLS-TP PW Layer OAM Stimulation and Packet Analysis	Analyze if PW layer OAM frame structure meets ITU-T Y.1731+GACH protocol. Analyze packets including PW CC, PW AIS /RDI, PW LB, PW CSF, PW LCK, PW packet loss, PW latency.
MPLS-TP Section layer OAM Stimulation and Packet Analysis	Analyze if Section layer OAM frame structure meets ITU-T Y.1731+GACH protocol. Analyze packets including Section CC, Section RDI/AIS, Section LB, Section LM, Section DM.
Y.1731 OAM Protocol Analysis	Analyze OAM frame structure meets ITU-T Y.1731 protocol. Analyze packets including CV, FDI, LBR, LBM, LCK, TST, APS, SCC, MCC, LMR, LMM, 1DM, DMR, DMM, EXR, EXM, VSR, VSM, SSM, CSF

OTN Test Specifications	
Test Interfaces	
XFP 10G(10.7G/11.05G/11.1G)optical interface (STM-64/OC-192/OTU2/OTU1e/OTU2e)	
SFP 155M/622M/2.5G(2.7G)optical interface (STM-1/4/16, OC-3/12/48, OTU1)	
BNC 155M electrical interface (STM-1e/STS-3e)	
BNC 1.5M/2M/34M/45M/140M PDH electrical interface (DS1/E1/E3/DS3/E4)	
Test Features	
OTN	
Payloads	Support mapping/demapping of AU-3/AU-4/AU-4-4c/AU-4-16c to ODU1 Support mapping/demapping of AU-3/AU-4/AU-4-4c/AU-4-16c/AU-4-64c to ODU2 Support multiplexing/demultiplexing of 10G BASE-R to OTU2(packed by GFP-F)/ODU1e/ODU2e Support multiplexing/demultiplexing of ODU1 to ODU2, ODU0 to ODU1, ODU0 to ODU2 and ODUFlex to ODU2
Test patterns	PBBS 2E23,2E31
	User Allowing user define 8-byte test pattern
Error injection	FAS, BIP-8(SM, PM, TCM1-6), BEI(SM, PM, TCM1-6), Bit(CLIENT), FECcorrectable bit, FECcorrectable code word, FECuncorrectable code word, FECcorrectable symbol
Error injection mode	Single, rate, continuous, alternative, burst, frame operation
Alarm generation	OTU: LOF, OOF, LOM, OOM, OTU-AIS, SM-BDI, SM-IAE, SM-TIM, SM-BIAE ODU: ODTU-LOFLOM, ODU-AIS, ODU-OCI, ODU-LCK, ODU-BDI, ODU-TIM, ODU-FSF, ODU-BSF, ODU-FSD, ODU-BSD ODU-TCM1~6: TCM-BDI, TCM-IAE, TCM-BIAE, TCM-TIM, TCM-LTC OPU: OPU-PLM, OPU-CSF, OPU-MSIM, CLIENT-LSS
Alarm generation mode	Continuous, alternative, burst

OTN Test Specifications		
OTN		
Test result	Error	FAS, BIP-8(SM, PM, TCM1-6), BEI(SM, PM, TCM1-6), Bit(CLIENT), FECcorrectable bit, FECcorrectable code word, FECuncorrectable code word, FECcorrectable symbol
	Alarm	OTU: LOF, OOF, LOM, OOM, OTU-AIS, SM-BDI, SM-IAE, SM-TIM, SM-BIAE ODU: ODTU-LOFLOM, ODU-AIS, ODU-OCI, ODU-LCK, ODU-BDI, ODU-TIM, ODU-FSF, ODU-BSF, ODU-FSD, ODU-BSD ODU-TCM1~6: TCM-BDI, TCM-IAE, TCM-BIAE, TCM-TIM, TCM-LTC OPU: OPU-PLM, OPU-CSF, OPU-MSIM, CLIENT-LSS
Forward error correction(FEC)	Using RS(255,239) encoding	
Through mode	Support OTU1/OTU2 advanced through mode	
Other Test and Measurement Functions		
Overhead edition and capture	Overhead edition	All bytes can be edited except MFAS, SM BIP, PM BIP and TCM1-6 BIP
	Overhead capture	Capacity of continuous and variable capture
	Overhead display	Display complete overhead
Service disruption time measurement	Trigger condition	Alarm: LOS, LOM, OOM, SM-IAE, SM-BIAE, ODU-AIS, ODU-OCI, ODU-LCK, PM-BDI; Error: MFAS, PM-BIP, PM-BEI, payload errors.
	Measurement accuracy	0.1ms.
Round-trip delay measurement	Result	Latest RTD time, minimum, maximum, mean, measurement amount(successful RTD test amount), failed measurement amount.
	Measurement accuracy	0.1ms.
Power measurement	Support power measurement of optical interface Unit: dBm; accuracy: 0.1dBm; range: -24.5~+4dBm	
Frequency offset measurement	Support clock frequency and frequency offset(the difference between receiving frequency and rated frequency) measurement of optical interface Unit: bps and ppm; accuracy: 1 bps and 1ppm	
Frequency offset generation	Generate offset for clock of transmission signal in selected port to test clock recovery circuit of network elements. Generation range: ± 100 ppm	

SDH/PDH Test Specifications	
Test Interfaces	
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	

PRODUCT INTRODUCTION

SDH/PDH Test Specifications			
Test Features			
SDH/SONET			
Payloads	VC4-64c Bulk, VC4-16c Bulk, VC4-4c Bulk, VC4 Bulk, VC3Bulk, VC12 Bulk, 2M, VC11 Bulk		
Test patterns	PBBS	2E23, 2E20, 2E15, 2E11	
	User programmable	Allowing user define 8-byte test pattern	
Error injection	B1, B2, B3, MS-REI, HP-REI, LP-BIP, LP-REI Burst: 1-100 Rate: 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 result	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, M212	
Overhead features	Overhead monitoring	Display all bytes in hexadecimal (RS, MS, HP and LP) Text decode all applicable bytes (K1/K2, S1, C2 etc)	
	Overhead setting	Hexadecimal input, not including check bytes (B1/B2/B3), pointer (H1-H3, V1-V3) and non-defined bytes Text decode all applicable bytes (K1/K2, S1, C2 etc)	
Trace generation	J0 section trace	1 byte, 16 bytes E.164 ASCII sequence+CRC-7 or 64 bytes E.164 ASCII sequence	
	J1/J2 path trace	16 bytes E.164 ASCII sequence+CRC-7 or 64 bytes E.164 ASCII sequence	
	TC-APId trace	16 bytes E.164 ASCII sequence+CRC-7	
	Option	Default, user, pass	
Pointer monitoring	AU (H1, H2), TU (V1, V2) Real-time pointer value display Pointer loss second Total adjustment count Positive adjustment count Negative adjustment count NDF second	Overhead sequence generation	Byte: A1/A2, J0/J1/J2, D1-D3, D4-D12, K1/K2 or any single overhead byte, up to 16 elements, each element (value) can be transmitted on 65536 adjacent frames

SDH/PDH Test Specifications			
SDH/SONET			
Pointer adjustment	Programmable pointer value, NDF and SS byte Increment and decrement of pointer value	Overhead sequence capture	Capture: A1/A2, J0/J1/J2, D1-D3, D4-D12, K1/K2, any single overhead byte, each new captured value has a time label (absolute time or lapsed time) and continuous time (ms or frame) Trigger: Manual or user defined value Resolution: 125us(1 frame) Data communication channel: DCC DCC BER test: PRBS on D1-D3 or D4-D12 byte (user option) offer G.821 analysis DCC insertion/advance
Pointer test sequences	Index: ITU-T G.783 Sequence: single, burst, phase instant burst, periodic, 87-3, 26-1, equivalent, user customized Action: increment, decrement, increment+decrement Abnormity: plus, cancel, non Sequence timing: initialization, cooling and test		
Automatic protection switching APS time measurement	Transducer: LOS, LOF, MS-AIS, MS-RDI, MS-REI, AUAIS,HP-RDI, HPREI,LP-RDI, LP-BIP, LPREI,TU-AIS, B1, B2, B3 1ms resolution pass/failure indication		
Enhanced through test	Support through mode, in which overhead rewriting, alarm and bit error insertion of high-level channel are supported		
Round-trip latency measurement	Round-trip latency measurement tool measures time a bit costs from transmitter to receiver through remote round-trip. Applicable for all supported interfaces and mappings. Results: Latest RTD time, minimum, maximum, mean, measurement amount(successful RTD test amount), failed measurement amount.		
Channel scanning	Automatically scan all channels of specific signal structure to check if they're normal		
Intelligent scanning	Automatically identify mapping path and business type of selected interface		
High-precision internal clock	Internal clock ± 0.5 ppm		
PDH			
Test patterns	PBBS	2E23,2E20,2E15,2E11	
	User	Allowing user define 8-byte test patterns	
PDH/T-Carrier Bit error insertion	1.5M: Code, Fas, CRC, Bit 2M: Code, Fas, CRC, Bit 34M: Fas, Bi 45M: F-bit(Fas), C-bit, P-bit, FEBE, Bit 140M: Fas, Bit Insertion method: continuous, alternative, burst Ratio: 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 method: continuous, alternative, burst		

PRODUCT INTRODUCTION

SDH/PDH Test Specifications		
PDH		
Measurement	1.5M	LOS, LOF, AIS, RAI, PATTERN LOS, Code, Fas, CRC, Bit Error
	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 bit error count or alarm seconds Total bit error rate Current bit error rate (advanced 1 second)
	ITU-T G.821 analysis	Current bit error, current BER, total byte bit error, total BER, ES, %ES, SES, %SES, EFS, %EFS, AS, %AS, UAS, %UAS
	ITU-T G.826 analysis	RAI-based, remote end and near end analysis of BE, BBE, BBE rate, ES, %ES, SES, %SES, AS, %AS, UAS, %UAS

MSTP Test Specifications		
Test Interfaces		
XFP 10G optical interface (STM-64/OC-192)		
SFP 155M/622M/2.5G optical interface (STM-1/4/16, OC-3/12/48)		
BNC 155M electrical interface (STM-1e/STS-3e)		
BNC 1.5M/2M/34M/45M/140M PDH electrical interface (DS1/E1/E3/DS3/E4)		
RJ-45 10/100/1000M Base-T Ethernet electrical interface		
SFP 1000M BASE-X gigabit Ethernet optical interface		
Test Features		
MSTP		
Virtual concatenation (VCAT)	High-order path	VC-4-X-v, X=1-16
	Low-order path	VC-11-X-v, VC-12-X-v, X=1 – 64; VC-3-X-v, X=1-48 (from 16 different AU4)
	Differential delay test and generation (each-member based)	Individual and group test Test and generation range: 256ms VCAT regrouping range: up to 256ms
	Error (member-based)	Bit, B3, HP-REI, LP-BIP, LP-REI
	Alarm (member-based)	AU-AIS, AU-LOP, HP-AIS, HP-RDI, HPERDI, HP-UNEQ, HP-TIM, TU-LOM, TU-AIS, TU-LOP, LPRDI, LPERDI, LP-UNEQ, LP-TIM
	Error performance analysis (member-based)	Per ITU-T G.821, G.826, G.828, M.2101, M.2120

MSTP Test Specifications		
Test Features		
MSTP		
GFP-F	Conform to ITU-T G.7041, G.707 and ANSI T1.105.02-2001	
	Traffic generation	Ethernet frame
	Frame size	Maximum: 65535 bytes
	Bandwidth	Depend on virtual concatenation
	GFP payload type frame header control	PTI, PFI, EXI(linear and empty), CID(linear) and UPI
	GFP-F (Frame) generation	Test: idle frame, total frames, total bytes, client frame client frame with FCS, client management frame, extension header OK frame, type header OK frame, null-extension frame, linear frame, ring frame, Ethernet-mapping frame Error(GFP-F): correctable cHEC, uncorrectable cHEC, correctable tHEC, uncorrectable tHEC, correctable eHEC, uncorrectable eHEC, payload FCS, not available payload
	Alarm	GFP synchronization failure
Link capacity adjustment scheme (LCAS)	Conform to ITU-T G.7042, G.707 and ANSI T1.105.02-2001	
	LCAS mode	On, off
	H4, K4/Z7 monitoring	Control packet
LCAS protocol emulation	Transmit and receive emulation of status machines(member-based) Direct command -send: add/remove member, add/remove multiple members -receive: add/remove member, add/remove multiple members Adapt accepted member status(transmit): norm, fail, automated Adapt generated member status(receive): fail, automated Force re-sequence acknowledgement: RX RS-Ack (transmit), TX RS-Ack (receive) Force member status alarm (receive): MSU	
Generation and capture of member status message	Transmit (transmit end) and receive (receive end) sequence Receive (transmit end) and transmit (receive end) re-sequence acknowledgement Transmit equipment status decoding: idle, add, NORM, DNU(not using), remove Receive equipmentstatus decoding: idle, fail, NORM Send transmitted control byte: ADD, NORM, EOS, IDLE, DNU Receive end receive control byte: ADD, NORM(normal transmit) , EOS (sequence end indication and normal transmit), IDLE, DNU, FIXED(non-LCAS mode) Receive end receive alarm: LOS (sequence loss), MSU(member statusunavailable), FOP CRC(extra CRC error fail of protocol) Receive end receive error: extra CRC error fail of protocol (CRC fail)	
LCAS error generation and monitoring	Send end (Tx): LCAS-CRC member-based Error injection: single	
Ethernet over SDH (EoS)		
• 10/100/1000M Base-T Ethernet interface and gigabit optical interface		
• Add/drop of Ethernet payload in SDH line with GFP mapping		
• Ethernet frame generation and analysis, including layer2 and layer3 test with VLAN and MPLS label		

PRODUCT INTRODUCTION

Specifications	
Display	Color Touch Screen 640 x 480 TFT 6.5 inch
Interface	USB A/B two Port Ethernet Port
Battery	Rechargeable lithium-ion battery pack Can operate 4 hours continuously according to BellcoreTR-NWT-001138 standard
Power	AC/DC Adapter: Input: 100-240VAC, 50-60Hz, 1.6A Max; Output: 24VDC, 4A
PHYSICAL SPECIFICATIONS	
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C
Relative Humidity	0%~95%(Non - Condensing)
Size(H×W×D)	319 mm x 202 mm x 105 mm
Weight	3.3kg
Vibration	10Hz to 500Hz <1.5g(On the three main shaft)
Mechanical Shock	On six surfaces and eight main sides<760 cm (according to GR-196-CORE standard)

Ordering Information

Category	Model	Description
Standard Configuration		
Instrument	ETS-300-1	Support IP RAN/PTN,OTN/SDH/MSTP/PDH and simple IEEE1588 clock test
Battery	LB08V14S0204	ETS-300 platform and four string lithium ion rechargeable battery
Power Adapter	SA190A-2440V-P	ETS-300 platform 24V power adapter
Power Cable	OA1611PWR_2M	2 meters power cable
Disc	OA1808_6200_CD	ETS-300Disc
Package	OBG6200	ETS-300Package
Ethernet jumper	OA1611UTP53	5 classes UTP Twisted pair for Ethernet, 3m
LCLC fiber jumper	LCLC-0203	LC/LC interface single mode duplex fiber jumper, 9/125, 3m
GE electrical module	GA14020420	SFP-1000 Base-TX electrical module
GE optical module	GA14023230	1.25G 1310nm 10Km LC SFP optical module
2.5G optical module	GA14020050	2.5G1310nm10kmLC SFP optical module
10G optical module	GA14021220	10G 1310nm 2Km LC XFP optical module

Ordering Information

Category	Model	Description
Optional Configuration		
Accessories	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm, 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX
	GA14020040	2.5G SFP optical module, 850nm, 550m, SX
	GA14020050	2.5G SFP optical module, 1310nm, 10km, LX
	GA14020060	2.5G SFP optical module, 1550nm, 80km, ZX
	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020120	1.25G SFP optical module, 1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

PRODUCT INTRODUCTION

15 ETS-300-2 Synchronization Analyzer



Product Introduction

OPWILL ETS-300-2 Synchronization Analyzer, is the PTN/Packet Ethernet synchronization measurement and analysis instrument designed and developed by OPWILL.

ETS-300-2 support time testing, clock testing, BITS simulation, clock wander, GE PTN and E1/T1 BERT testing into one module. Lightweight, handheld, large touch-screen design style brings great convenience for field testing. It can perform high precision measurement and analysis on time/clock synchronization system basis of IEEE 1588v2 protocol.

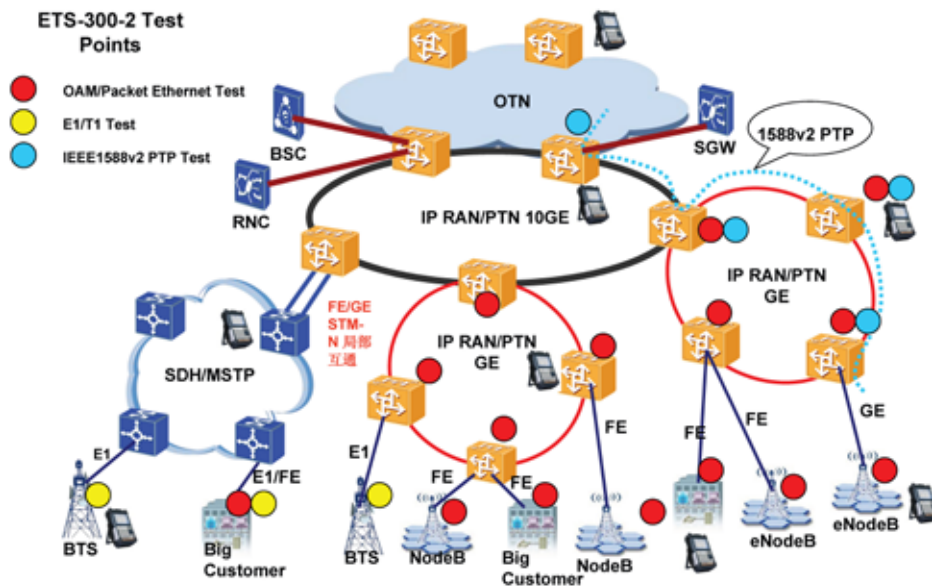
Features

- Support 1588v2 testing, 1PPS+ToD Testing, Sync-E testing, 1PPS/PP2S testing up to 1000M
- 10M to 1000M rate packet ethernet test functions, supports such as OAM, MPLS-TP, RFC2544, Y.1564 and so on
- E1/T1 Testing

ETS-300-2 Test Interface

PDH/DSn	Ethernet	Synchronization
E1/DS1	10/100/1000M Base-T	1PPS/PP2S
	100/1000M Base-X	1PPS+TOD
		TOD
		PTP V2 Electrical Port
		PTP V2 Optical Port
		SyncE
		2MHz/2Mbps/10MHz

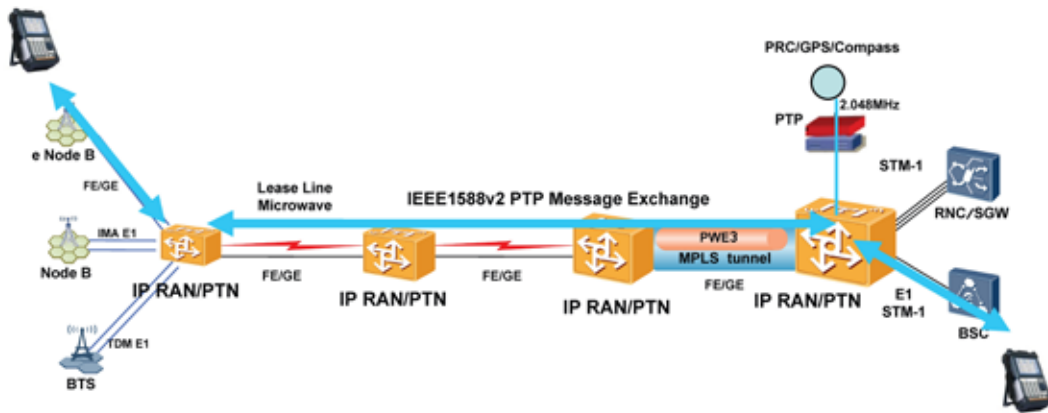
OPWILL ETS-300-2 Test Equipment Solution



ETS-300-2 Synchronization Test Features

- Adapted to lab and field environments with optional internal measurement references-GPS and internal rubidium
- Fully stress-test elements that deliver synchronisation over packet-based networks.
- Prove 1588v2 (PTP), Sync-E etc. implementations. to ITU-T G.8261, etc.
- Prove 1588v2 (PTP) to the ITU-T Telecom Profile G.8265.1
- Test 1588v2 Ordinary Clocks, Boundary Clocks and Transparent Clocks
- Support IEEE1588v2 PTP Master Clock and Slave Clock, also support one-step and two-step clock mode
- Support PTP message over Ethernet and PTP message over UDP over IPv4; PTP support Unicast and Multicast transmit method
- Support setup Sync, Announce and Delay_Req PTP Message frequency; Support PTP header setup, include clockClass, domain number and so on parameters setup
- Support PTP message statistics
- Support ITU-T G.8264 ESMC message transmit and analysis
- Measure recovered Time of Day (ToD) and Frequency (MTIE/TDEV) to specified limits (G.823, G.824, G.8261.1.)
- Support IEEE1588v2(PTP), 1PPS+ToD, 1PPS/PP2S and Sync-E up to 1000M
- Measure 2.048MHz/2.048bit/s and 10MHz recovered clock compliance to ITU-T G.823/G.824/G.8261.1 (MITE/TDEV)

PRODUCT INTRODUCTION



ETS-300-2PTN Test Features(OPTIONAL)

- Support one 10/100/1000M Base-T and one 100/1000M Base-X interface;
- Through the generation of MPLS-TP traffic and QoS analysis to support IP RAN/PTN test, and can also validate the operation of OAM label 13 or 14;
- Confirm the IPv4 and IPv6 a higher level Ethernet data application and services from 10Mbps to 10 Gbps;
- Multi-services bearer capability test (MPLS/PWE3) and abundant OAM function test support IEEE802.3ah, IEEE802.1ag, ITU-T Y.1731 and ITU-T G.8113.1 standards;
- Support RFC2544 and Y.1564 test functions and RFC3393 jitter test function;
- Service Disruption Test



ETS-300-2E1/T1 Test Features(OPTIONAL)

- Support E1/T2 BERT Testing
- Performance monitoring reference with G.821/G.826/M.2100
- Error Injection and Monitor; Alarm Generation and Monitor

Specifications

ETS-300-2 Synchronization Parts Test Specifications		
Internal GPS receiver	1PPS of accuracy	15ns(1 sigma)
	10MHz	1.16×10^{-12} /day
Rubidium Clock	PPS(Lock GPS)	30ns
	10MHz	1×10^{-12} /100 second $< 3 \times 10^{-11}$ /month
	PPS(losing lock GPS)	1×10^{-11} /4 hours
GPS - controlled atomichron accuracy	1×10^{-12} (Typical)	
Frequency measurement accuracy	± 1 ppb	
Time measurement input interfaces	1PPS+ToD;PP2S+ToD;ToD;1PPS/PP2S;IEEE1588v2 PTP(Slave)	
Clock measurement input interfaces	G.703, SYNC-E	
Supplementary output interfaces	1PPS+ToD;PP2S+ToD;ToD;1PPS/PP2S;G.703; IEEE1588v2 PTP(Master)	
Reference Time/Clock	GPS;1PPS;G.703	

PTN Test Specifications		
Ethernet Functions		
Interface	One10/100/1000M BASE-T interfaces One100/1000M BASE-X interfaces	
Stream Generation and Analysis	Support IEEE802.3 and Ethernet II frames; Support Pause Frame; 10M to 1000M rate generation and analysis; Support 64 to 16000 bytes frame transmit and receive, and the frame rate reach 1448000 packets/sec	
RFC2544	Throughput, back to back, frame loss and latency test, support RFC2544 test on MAC layer and IP layer. Frame size: defined by RFC, or by user.	
Y.1564	Test of network service configuration and performance as per ITU-T Y.1564, verifying if they meet agreed SLA. Support CIR/EIR bandwidth, packet loss rate, latency and jitter test.	
BERT	BERT L1/L2/L3/L4, support random test of packet length.	
	Pattern (BERT)	PRBS 2E9-1, PRBS 2E11-1, PRBS 2E15-1, PRBS 2E20-1, PRBS 2E23-1, PRBS 2E31-1, User-defined pattern and pattern reversion function
	Error Insertion(BERT)	IP check error, UDP check error, FCS, BIT error; manually or automatically
	Deviation Measurement	LOS, link disconnection, symbol, FCS, jabber frame, ultra-long frame, ultra-short frame, collision, excessive collision, latency collision. UDP, TCP and IP checksum
Service Disruption Testing	Error mode, non-flow mode and packet loss rate mode. Interruption time statistics includes minimum, maximum, latest, average and total interruption time, and interruption amount.	

PRODUCT INTRODUCTION

PTN Test Specifications		
Ethernet Functions		
Multi-Stream	Transmit up to 8(gigabit interface) data flow	
	Configuration Parameter	Packet size(46-16000), transmission mode(continuous, N-frame, burst, increment, N-burst and N-increment), MAC source/destination address(incrementally changeable), VLAN ID, VLAN priority, LLC, SNAP, MPLS, IP source/destination address, ToS segment, DSCP segment, TTL, UDP source/destination port, TCP source/destination port and payload
	VLAN Stacking	Generate data flow with maximum 3 VLAN layer(including VLAN with IEEE802.1ad Q-in-Q mark), received information flow can be filtered according to VLAN ID or VLAN priority on any Stacking VLAN layer.
	Information Flow Analysis	Analyze receiving information flow and provide statistics information according to a configurable filter group.
Ethernet Statistics	Multicast, broadcast, unicast, frame size distribution, bandwidth, utilization, frame rate, bandwidth and utilization can be displayed by line graph. Units support line rate percent, Kbps, Mbps, Gbps and so on; Support Tx frame count, Rx frame count, Rx frames/s, Tx Mbps, Rx Mbps, Rx lost frames, Rx lost percent, Min. latency, average latency, Max. latency, Rx Pause Frames ethernet statistics and also support FCS error frames, BER, Bit error count, IP Checksum error and so on errors statistics	
RFC3393 Jittering Test	Minimum, maximum, current, average value and sample amount.	
Intelligent Loopback	L1/L2/L3/L4 loopback and statistics.	
Double-end Test Mode	Achieve bi-directional test simultaneously by controlling remote facilities with local one.	
Other Ethernet Feature	Flow Control	Transmit, receive and respond to flow control frame.
	Auto-negotiation	Negotiate mutual maximum rate and duplex function with other Ethernet ports automatically.
	Advanced Auto-negotiation	Auto-negotiation parameters configurable, negotiate specified rate and duplex function with other Ethernet ports.
	Power Measurement	Support optical power measurement (Displaying unit: dBm).
	Frequency Measurement	Support clock frequency measurement. Accuracy: 1ppm.
	Frequency Offset Measurement	Resolution: 1ppm.
	ARP Test	ARP Test
	VCT Test	Detect link conditions including availability, rate, open circuit and short circuit of cable.
	PING	Achieve PING function flexibly configure destination address, packet size, packet amount and TTL.
	Trace Route	Support trace route function.
FTP/HTTP Download	Support FTP/HTTP download test.	

PTN Test Specifications	
PTN Function	
Online Business Scanning and Analysis	Support auto-scanning and auto-identification of several online business according to VLAN ID, IP address or PTN's double-layer MPLS-TP tag.
MPLS/PWE3 Protocol Analysis	Analyze if frame structure of SAToP meets RFC4553 Analyze if frame structure of CESoP meets RFC5086 and RFC4842
MPLS-TP Protocol Analysis	Analyze LSP in packet header of MPLS and Label in PW, EXP, TTL see G.8110, RFC3032
Ethernet Link OAM Function Test	Based on 802.3ah protocol, simulate 802.3ah client, support Ethernet link connectivity detection; support Ethernet link OAM remote loopback; monitor Ethernet OAM link monitor
Business OAM Protocol Simulation	Simulate PTN facilities generation and process multi-business OAM packet, protocol segment and transmission period flexibly configured, including CCM, LBM, LBR, LTM, LTR, AIS, LCK, TST, APS, MCC, LMM, LMR, 1DM, DMM, DMR, EXM, EXR, VSM, VSR, as per ITU-T Y.1731
MPLS-TP LSP OAM Protocol Simulation	Simulate PTN facilities generation and process multi-business LSP OAM packet, protocol segment and transmission period flexibly configured, including LSP CC, AIS/ RDI, LSP LB, LSP LCK, LSP TST, LSP LM, LSP DM as per ITU-T Y.1731+ RFC 5586(GACH)
MPLS-TP PW Layer OAM Protocol Simulation	Simulate PTN facilities generation and process multi-business PW layer OAM packet, protocol segment and transmission period flexibly configured, including PW CC, PW AIS / RDI, PW LB, PW CSF, PW Lck, PW, LM, PW, DM as per ITU-T Y.1731+ RFC 5586(GACH)
MPLS-TP Section Layer OAM Protocol Simulation	Simulate PTN facilities generation and process multi-business Section layer OAM packet, protocol segment and transmission period flexibly configured, including Section CC, Section RDI/AIS, Section LB, Section LM, Section DM as per ITU-T Y.1731+ RFC 5586(GACH)
ITU-T G.8114 OAM Protocol Simulation	Simulate PTN facilities generation and process multi-business ITU-T G.8114 OAM packet, protocol segment and transmission period flexibly configured, including CV, FDI, LBR, LBM, LCK, TST, APS, SCC, MCC, LMR, LMM, 1DM, DMR, DMM, EXR, EXM, VSR, VSM, SSM, CSF as per ITU-T G.8114
Ethernet Link OAM Protocol Simulation	Analyze if Ethernet link OAM frame structure meets IEEE 802.3ah protocol Support diversiform message analysis, including Information, Event Notification, Variable Request, Variable Response, Loopback Control, Organization Specific
LAG Load Sharing Business	Support MAC source/destination address switching streams, test LAG load sharing business
Protection Switching, Service Disruption Test	Support service interruption test in protection switching, support modes including non-information-flow mode, packet loss rate mode and etc.

PDH Test Specifications		
PDH		
Test patterns	PBBS	2E23,2E20,2E15,2E11
	User	Allowing user define 8-byte test patterns
PDH/T-Carrier Bit error insertion	1.5M: Code, Fas, CRC, Bit 2M: Code, Fas, CRC, Bit Insertion method: continuous, alternative, burst Ratio: 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 Insertion method: continuous, alternative, burst	

PRODUCT INTRODUCTION

PDH Test Specifications		
PDH		
Measurement	1.5M	LOS, LOF, AIS, RAI, PATTERN LOS, Code, Fas, CRC, Bit Error
	2M	LOS, LOF, LOFM, AIS, RAI, MFRAI, CRCLOFM, PATTERN LOS, Code, Fas, CRC, Bit Error
	Error and alarm data	Total bit error count or alarm seconds Total bit error rate Current bit error rate (advanced 1 second)
	ITU-T G.821 analysis	Current bit error, current BER, total byte bit error, total BER, ES, %ES, SES, %SES, EFS,%EFS, AS, %AS, UAS,%UAS
	ITU-T G.826 analysis	RAI-based, remote end and near end analysis of BE, BBE, BBE rate,ES, %ES, SES, %SES, AS, %AS, UAS,%UAS

Specifications					
Optical interface			1000Base-SX	1000Base-LX	1000Base-ZX
	Wavelength(nm)		850	1310	1550
	Tx level (dBm)		-9 to -3	-9.5 to -3	0 to +5
	Rx level sensitivity (dBm)		-20	-22	-22
	Maximum reach		550m	10 km	40 km
	Transmission bit rate (Gbit/s)		1.25	1.25	1.25
	Reception bit rate (Gbit/s)		1.25	1.25	1.25
	Tx operational wavelength range (nm)		830 to 860	1270 to 1360	1540 to 1570
	Measurement accuracy	Frequency (ppm)	<0.1	<0.1	<0.1
		Optical power (dB)	<0.5	<0.5	<0.5
Transceiver type		SFP	SFP	SFP	
Electrical interface	Duplex mode: full/half duplex			Compliance: 10/100/1000 BASE-T	
	Connector: RJ-45			Maximum reach: 100m	

Specifications	
Display	Color Touch Screen 640 x 480 TFT 6.5 inch
Interface	USB A/B two Port Ethernet Port
Battery	Rechargeable lithium-ion battery pack Can operate 4 hours continuously according to BellcoreTR-NWT-001138 standard
Power	AC/DC Adapter: Input: 100-240VAC, 50-60Hz, 1.6A Max; Output: 24VDC, 4A

PHYSICAL SPECIFICATIONS	
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C
Relative Humidity	0%~95%(Non - Condensing)
Size(H×W×D)	319 mm x 202 mm x 105 mm
Weight	3.3kg
Vibration	10Hz to 500Hz <1.5g(On the three main shaft)
Mechanical Shock	On six surfaces and eight main sides<760 cm (according to GR-196-CORE standard)

Ordering Information

Category	Model	Description
Standard Configuration		
Instrument	ETS-300-2	Support 1588v2 testing, 1PPS+ToD Testing, Sync-E testing, 1PPS/PP2S testing up to 1000M
Antenna	16120020	GPS receiving antenna
Cable	16120030	GPS receiving cable
Battery	LB08V14S0204	ETS-300 platform and four string lithium ion rechargeable battery
Power Adapter	SA190A-2440V-P	ETS-300 platform 19V power adapter
Power Cable	OA1611PWR_2M	2 meters power cable
Disc	OA1808_6200_CD	ETS-300Disc
Package	OBG6200	ETS-300-2Package
Cable	16060090	E1 75ΩBNC cable, 2m
Ethernet jumper	OA1611UTP53	5 classes UTP Twisted pair for Ethernet, 3m
LCLC fiber jumper	LCLC-0203	LC/LC interface single mode duplex fiber jumper, 9/125, 3m
GE optical module	GA14023230	1.25G 1310nm 15Km LC SFP optical module
Optional Configuration		
Software Optional	OPAP-BasicAGeEth	Basic Test featur(BERT, Frame Analysis and RFC2544) for Gigabit Ethernet
	OPAP-SyncAGeEth	ESMC message transmits and analysis reference ITU-T G.8264 for GE
	OPAP-Y1564AGeEth	SLA test features by Y.1564 for GE
	OPAP-RFC3393AGeEth	RFC3393 jitter testing for GE
	OPAP-8023ahAGeEth	IEEE802.3ah OAM testing for GE
	OPAP-Y1731AGeEth	Y.1731 OAM testing for GE
	OPAP-G81131AGeEth	Y.8113.1 OAM testing for GE
	OPAP-ScanAGeEth	Scanning testing in-service for GE
	OPAP-IPv6AGeEth	IPv6 testing for GE
	OPAP-E1Test	E1 testing
	OPAP-T1Test	T1 testing
Accessories	GA14020010	1.25G SFPoptical module, 850nm, 550m, SX
	GA14020020	1.25G SFPoptical module, 1310nm, 10km, LX
	GA14020120	1.25G SFPoptical module, 1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

16 OTM2602 Gigabit Ethernet Test Module



Product Introduction

OTM2602 gigabit Ethernet test module is designed for Ethernet network deployment and comprehensive test. OTM2601/2602 fully meets Ethernet standard, offering complete Ethernet test functionalities with reliable, simple and flexible qualities. It is an efficient test tool for verifying SLAs.

Features

- Throughput, frame loss, latency and back-to-back measurements as per RFC2544
- Comprehensive field tests for mobile backhaul and business services as per Y.1564
- Comprehensive PTN and OAM test functions(optional)
- Packet jitter measurement as per RFC3393 for assessing IP packet-delay variation
- Generate up to 8 streams configuring different parameters: MAC, VLAN ID, MPLS, IPV4/IPV6, payload and bandwidth; support Ethernet BERT test
- Rich filtering and packet capture functions

Specifications

SPECIFICATIONS					
Optical interface		1000Base-SX	1000Base-LX	1000Base-ZX	
	Wavelength (nm)	850	1310	1550	
	Tx level (dBm)	-9 to -3	-9.5 to -3	0 to +5	
	Rx level sensitivity (dBm)	-20	-22	-22	
	Maximum reach	550m	10 km	40 km	
	Transmission bit rate (Gbit/s)	1.25	1.25	1.25	
	Reception bit rate (Gbit/s)	1.25	1.25	1.25	
	Tx operational wavelength range (nm)	830 to 860	1270 to 1360	1540 to 1570	
	Measurement accuracy	Frequency (ppm)	<0.1	<0.1	<0.1
		Optical power (dB)	<0.5	<0.5	<0.5
	Transceiver type	SFP	SFP	SFP	
Electrical interface	Duplex mode: full/half duplex		Compliance: 10/100/1000 BASE-T		
	Connector: RJ-45		Maximum reach: 100m		
PHYSICAL SPECIFICATIONS					
Temperature	Operating: -10°C to 50°C; Storing: -40°C to 70°C				
Relative humidity	0% to 95%(non-condensing)				
Size(H×W×D)	25 mm x 97 mm x 259 mm				
Weight	0.4kg				

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Description
Standard Configuration		
Test Module (one of two)	OTM2602S	Ethernet test module, with one 10/100/1000Mbps Ethernet electrical interface and one 100/1000Mbps Ethernet optical interface.
	OTM2602	Ethernet test module, with two 10/100/1000Mbps Ethernet electrical interfaces and two 100/1000Mbps Ethernet optical interfaces.
Ethernet Jumper	OA1611UTP53	One Ethernet Category 5 UTP twisted pair, 3m.
LC/LC Fiber Jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single-mode, 9/125, 3m.
Optical Module	GA14023230	Two 1.25G 1310nm 10Km LC SFP optical modules
Optional Configuration		
Functional Option	OPAP-Y1564AGeEth	Gigabit Ethernet Y.1564 EthSAM testing option.
	OPAP-PoamAGeEth	Gigabit Ethernet PTN OAM testing option.
	OPAP-R3393AEth	RFC3393 jitter test option.
	OPAP-IPv6AEth	IPV6 testing option.
Accessories	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020120	1.25G SFP optical module, 1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

17 OTM2610 10Gigabit Ethernet Test Module



Product Introduction

OTM2610 10Gigabit Ethernet test module is designed for Ethernet network deployment and comprehensive test and fully meets Ethernet standard, offering 10Gigabit Ethernet WAN and LAN tests with reliable, simple and flexible qualities. It is an efficient test tool for verifying SLAs.

Features

- Throughput, frame loss, latency and back-to-back measurements as per RFC2544
- Comprehensive field tests for mobile backhaul and business services as per Y.1564(optional)
- Comprehensive PTN and OAM test functions(optional)
- Packet jitter measurement as per RFC3393 for assessing IP packet-delay variation(optional)
- Generate up to 512 streams configuring MAC, VLAN ID, MPLS, IP, payload and bandwidth by steady, random, progressive and degressive generation methods; support Ethernet BERT test
- Rich filtering and packet capture functions

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS						
	10GBASE-SW	10GBASE-SR	10GBASE-LW	10GBASE-LR	10GBASE-EW	10GBASE-ER
Wavelength(nm)	850	850	1310	1310	1550	1550
Tx Level(dBm)	-7.3 to -1	-7.3 to -1	-8.2 to +0.5	-8.2 to +0.5	-4.7 to +4.0	-4.7 to +4.0
Rx Level Sensitivity(dBm)	-9.9 to -1.0	-9.9 to -1.0	-14.4 to +0.5	-14.4 to +0.5	-15.8 to -1.0	-15.8 to -1.0
Maximum reach	550m	550m	10km	10km	80 km	80 km
Transmission bit rate	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm
Reception bit rate (Gbit/s)	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm
Tx operation wavelength range(nm)	840 to 860	840 to 860	1260 to 1355	1260 to 1355	1530 to 1565	1530 to 1565
Measurement accuracy	Frequency (ppm)	±4.6	±4.6	±4.6	±4.6	±4.6
	Optical power(dB)	<2	<2	<2	<2	<2
Transceiver type	XFP	XFP	XFP	XFP	XFP	XFP
PHYSICAL SPECIFICATIONS						
Temperature	Operating:-10°C to 50°C; Storage:-40°C to 70°C					
Relative humidity	0% to 95%(non-condensing)					
Size(H×W×D)	25 mm x 97 mm x 259 mm					
Weight	0.4 kg					

Ordering Information

Category	Model	Description
Standard Configuration		
Test Module	OTM2610	Ethernet test module, with one 10Gbps Ethernet optical interface.
LC/LC Fiber Jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single-mode, 9/125, 3m.
Optical Module	GA14021220	One 10G XFP optical module, 1310nm, 2km, LX.
Optional Configuration		
Functional Option	OPAP-Y1564ATGEth	10Gigabit Ethernet Y.1564 EthSAM testing option.
	OPAP-PoamATGEth	10Gigabit Ethernet PTN OAM testing option.
	OPAP-R3393AEth	RFC3393 jitter test option.
	OPAP-IPv6ATEth	IPV6 testing option.
Accessories	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm. 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

18 OTC1600 GE Loopback Responder



Product Introduction

The OTC1600 GE loopback responder provides loopback functionality in a lowcost box that is the perfect compaion to the OTP6126 and OTM2602 tester. It is able to provide L1/L2/L3/L4 loop-back for Gigabit (million bit/ kilomega) Ethernet and realize Ethernet OAM (802.3ah) protocol analysis and function of test.

When Ethernet and IP traffic passes through a switch or router, the source and destination addresses are checked,logged, and used for directing the traffic. A simple hard loop like those used for TDM networks are insufficient for testing. Instead, a smart loop device must swap the source and destination addresses in the MAC and IP headers.

Features

- Support loop-back function of Ethernet L1/L2/L3/L4.
- Support tests including RFC2544, Y.1564 and jittering
- Support testing equipments' OAM function by using OTC1600, support 802.3ah far-end loop-back.
- OTC1600 is able to provide three kinds of controlling methods as follows: IE (Internet Explorer), telnet or controlling by equipments' far-end, which can simply the administration .

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS					
		1000Base-SX	1000Base-LX	1000Base-ZX	
Optical interface	Wavelength(nm)	850	1310	1550	
	Tx Level(dBm)	-9 to -3	-9.5 to -3	0 to +5	
	Rx Level Sensitivity(dBm)	-20	-22	-22	
	Maximum reach	550m	10 km	40 km	
	Transmission bit rate	1.25	1.25	1.25	
	Reception bit rate (Gbit/s)	1.25	1.25	1.25	
	Tx operation wavelength range(nm)	830 to 860	1270 to 1360	1540 to 1570	
	Measurement accuracy	Frequency (ppm)	<0.1	<0.1	<0.1
		Optical power(dB)	<0.5	<0.5	<0.5
	Transceiver type	SFP	SFP	SFP	
Electrical port	Working manner: full duplex /half duplex	Criterion: 10/100/1000 BASE-T			
	Connector: RJ-45	Transmission distance: 100m			
Ports of network administration	Working manner: full duplex /half duplex	Criterion: 10/100/1000 BASE-T			
	Connector: RJ-45	Transmission distance: 100m			
PHYSICAL SPECIFICATIONS					
Temperature	Working temperature: -10°C to 50°C; storage temperature: -40°C to 70°C				
Relative humidity	0% to 95%(non-condensation)				
Size(H×W×D)	180 mm x 130 mm x 35 mm				
Weight	0.7kg				

Ordering Information

Category	Model	Description
Standard Configuration		
Test module	OTC1600	Gigabit Ethernet loop-back test equipment provide one Ethernet electrical port of 10/100/1000Mbps and one Ethernet optical port of 100/1000Mbps.
Ethernet jumper	OA1611UTP53	Using five kinds of UTP in one base of Ethernet, 3 meters.
LCLC optical fiber jumper	LCLC-0203	One LC/LC interface, single-mode, duplex optical fiber jumper, 9/125, 3 meters.
Optical mode	GA14023230	One optical module of 1.25G 1310nm 10Km LC SFP.
Optional Configuration		
Functional accessory	OPAP-Y1564AGeEth	Gigabit Ethernet ITU-T Y.1564 test accessory
	OPAP-IPv6AGeEth	Gigabit Ethernet IPV6 test accessory
Optional accessory	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020120	1.25G SFP optical module, 1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

19 OTP6126 Series Handheld Gigabit Ethernet Test Set



Product Introduction

OTP6126 handheld gigabit Ethernet test set is designed for Ethernet network deployment and comprehensive test. OTP6126 fully meets Ethernet standard, offering complete ethernet test functionalities with lightweighted, flexible and rugged qualities. It can be applied to indoor laboratory or outdoor field environment and provide carrier-class Ethernet test solution for network expert.

Features

- Lightweighted, compact, rugged, flexibly used in outdoor field environment
- Quick power on, high-resolution color touch screen
- Friendly key design for flexible scrolling and selecting
- More comprehensive test function, higher cost-effective
- Offer complete gigabit Ethernet solution from installation and commissioning to operation and maintenance

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS					
Optical interface		1000Base-SX	1000Base-LX	1000Base-ZX	
	Wavelength(nm)	850	1310	1550	
	Tx Level(dBm)	-9 to -3	-9.5 to -3	0 to +5	
	Rx Level Sensitivity(dBm)	-20	-22	-22	
	Maximum reach	550m	10 km	40 km	
	Transmission bit rate	1.25	1.25	1.25	
	Reception bit rate (Gbit/s)	1.25	1.25	1.25	
	Tx operation wavelength range(nm)	830 to 860	1270 to 1360	1540 to 1570	
	Measurement accuracy	Frequency (ppm)	<0.1	<0.1	<0.1
		O p t i c a l power(dB)	<0.5	<0.5	<0.5
	Transceiver type	SFP	SFP	SFP	
Electrical port	Working manner: full duplex /half duplex		Criterion: 10/100/1000 BASE-T		
	Connector: RJ-45		Transmission distance: 100m		
Screen	Color touch screen 320x 240 TFT 3.5 inch				
Interface	USB A/B interfaces Ethernet interface				
Storage	128M flash				
Battery	Rechargeable Li-Ion batteries 4-6 hours of continuous operation as per Bellcore TR-NWT-001138				
Power Source	AC/DC adapter, input: 100-240VAC, 50-60Hz, max current 2A; output: 24VDC, 2A				
PHYSICAL SPECIFICATIONS					
Temperature	Operating: -10°C to 50°C; Storing:-40°C to 70°C				
Relative humidity	0% to 95% (non-condensing)				
Size (H×W×D)	80mm x 135 mm x 250 mm				
Weight	1.1kg				

Ordering Information

Category	Model	Description
Standard Configuration		
Main Frame (one of two)	OTP6126S	Handheld Ethernet tester, one 10/100/1000Mbps Ethernet electrical interface and one 1000Mbps Ethernet optical interface.
	OTP6126	Handheld Ethernet tester, two 10/100/1000Mbps Ethernet electrical interfaces and two 1000Mbps Ethernet optical interfaces.
Battery	LB03V10S0103	One 1 parrallel 3 series Lithium polymer rechargeable battery for OTP6100, 10.8V.
Power Adapter	SA148A-24V	One 24V AC/DC, power adapter for OTP6100.
Power Cable	OA1611PWR_2M	One power cable, 2m.
Disc	OA1808_6126_CD	One OTP6126 disc.
Package	OBG6100	One OTP6100 package
E t h e r n e t Jumper	OA1611UTP53	One Ethernet Category 5 UTP twisted pair, 3m.
LC/LC Fiber Jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single-mode, 9/125, 3m.
Optical Module	GA14023230	Two 1.25G 1310nm 10Km LC SFP optical modules.
Standard Configuration		
F u n c t i o n a l Option	OPAP-Y1564AGeEth	Gigabit Ethernet Y.1564 EthSAM testing option.
	OPAP-BIDIRAGeEth	Bidirectional testing option.
	OPAP-SSAGeEth	Service scan testing option.
	OPAP-IPv6ATeEth	IPV6 testing option.
Accessories	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module1310nm, 10km, LX
	GA14020120	1.25G SFP optical module1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

20 OTP6128 Handheld Gigabit PTN Protocol Analyzer



Product Introduction

OTP6128 Handheld Gigabit PTN Protocol Analyzer is especially designed for mobile backhaul network deployment and comprehensive test characterized by portable, flexible and durable. It satisfies the standard of Ethernet and relevant technical standards of mobile backhaul network PTN/IP RAN, and can provide all-round Ethernet test functions and PTN/IP RAN network test functions.

Features

- Small in size, portable, and durable, flexibly used outdoors
- Quick start, high-resolution color touch screen
- User-friendly design of keys making it convenient to input and select
- Able to produce full duplex 10/100/1000 Mb/s Ethernet wire-speed data stream
- RFC2544 standard test, supportive to performance tests including throughput, packet loss, Latency, back to back
- RFC3393 jitter test
- Support Layer 1 to Layer 4 BERT test
- IPv6 test
- ITU-T Y.1564 Standard with Configuration Testing and Performance Testing for SLA
- PTN network OAM test, including IEEE 802.3ah, Y.1731 and G.8113.1 OAM tests
- PTN Network service disruption test
- Support to double-end test, automatic far-end discovery, and capable to test RFC2544 or Y.1564 indicators of up-link and down-link simultaneously and respectively
- Support to display mode involving IFG bandwidth
- Support to the scan of online services based on destination/source MAC, destination/source IP, 3-layer VLAN, 3-layer MPLS

Specifications

SPECIFICATIONS					
Optical interface		1000Base-SX	1000Base-LX	1000Base-ZX	
	Wavelength (nm)	850	1310	1550	
	Tx level (dBm)	-9 to -3	-9.5 to -3	0 to +5	
	Rx level sensitivity (dBm)	-20	-22	-22	
	Transmission distance	550m	10 km	40 km	
	Transmission bit rate(Gbit/s)	1.25	1.25	1.25	
	Reception bit rate (Gbit/s)	1.25	1.25	1.25	
	Wavelength range for Tx operation (nm)	830 to 860	1270 to 1360	1540 to 1570	
	Measurement accuracy	Frequency(ppm)	<0.1	<0.1	<0.1
		O p t i c a l power(dB)	<0.5	<0.5	<0.5
	Transceiver type	SFP	SFP	SFP	
Electrical interface	Working pattern: full duplex/half duplex		Standard satisfied: 10/100/1000 BASE-T		
	Connector: RJ-45		Transmission range: 100m		
Display screen	Color touch screen of 320x 240 TFT 3.5 inch				
Interface	Two interfaces: USB A/B Ethernet interface				
Memory space	128M flash				
Battery	Rechargeable lithium battery pack Continuous operation for 4-6 hours according to Bellcore TR-NWT-001138 standard				
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, maximum current 2A; output: 24VDC, 2A				
PHYSICAL SPECIFICATIONS					
Temperature	Working temperature: -10°C to 55°C; storage temperature: -40°C to 70°C				
Relative humidity	0% to 95% (non-condensable)				
Size (H×W×D)	80mm x 135 mm x 250 mm				
Weight	1.1kg				

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Description
Standard Configuration		
Host machine (either-or)	OTP6128S	Handheld gigabit PTN testing instrument providing one 10/100/1000Mbps Ethernet electrical interface and one 1000Mbps Ethernet optical interface.
	OTP6128	Handheld gigabit PTN testing instrument providing two 10/100/1000Mbps Ethernet electrical interface and two 1000Mbps Ethernet optical interface.
Battery	LB03V10S0103	1 li-polymer rechargeable battery pack with 1 in parallel and 3 in series for OTP6100, 10.8 V
Power adapter	SA148A-15V	One 15V AC/DC power adapter, applicable to OTP6100.
Power supply cable	OA1611PWR_2M	1 piece of 2-meter power supply cable.
Electronic CD	OA1808_6128_CD	1 OTP6128 electronic CD.
Instrument bag	OBG6100	1 OTP6100 instrument bag.
E t h e r n e t jumper	OA1611UTP53	1 piece of 3-meter Ethernet UTP-5.
LCLC optical fiber jumper	LCLC-0203	1 piece of single-mode and duplex optical fiber jumper with LC/LC interface, 9/125, 3 meters.
Optical module	GA14023230	A half of 1.25G 1310nm 10Km LC SFP optical module. (When equipped with OTP6128S, the standard configuration is 1 optical module; when equipped with OTP6128, the standard configuration is 2 optical modules)
Optional configuration		
F u n c t i o n a l options	OPAP-BIDIRAGeEth	Gigabit Ethernet double-end test.
	OPAP-IPv6AGeEth	Gigabit Ethernet IPV6 test.
	OPAP-ScanEth	Gigabit Ethernet online service scan.
Accessories	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020120	1.25G SFP optical module, 1550nm, 40km, ZX

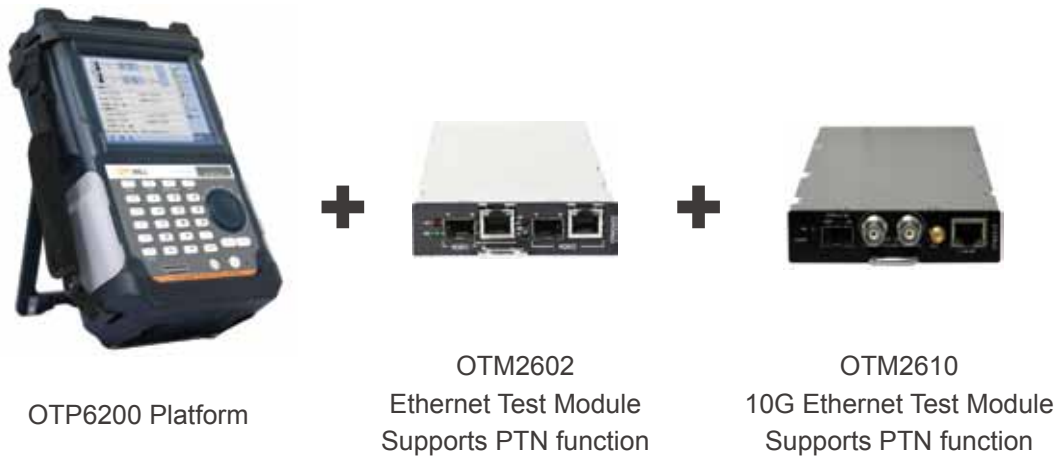
Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

21 10GE PTN Protocol Analyzer

Product Introduction

OPWILL PTN Integrated Testing Instrument is developed according to PTN related international standards (IEEE, ITU-T, RFC and etc.) and domestic norms, specifically serves for Packet Transport Network (PTN). The tester is designed with rich PTN test features with options 155M/622M/2.5G SDH/ PDH test functions, which meet the needs of every phase of the Ethernet network deployment.

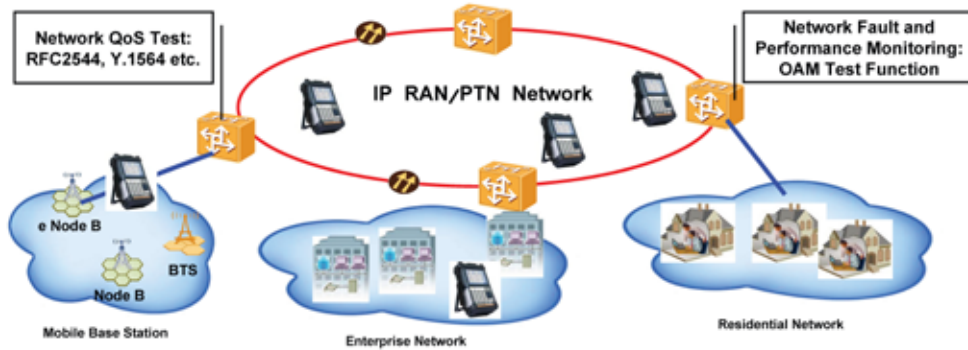
Configuration scheme



10GE PTN Protocol Analyzer Test Features

- FC2544 test function, multi-stream generation and BER Test which accelerate deployment and active Ethernet service
- MPLS-TP multi task payload test (MPLS/PWE3)
- Rich OAM feature test (3ah /Y.1731 / MPLS OAM)
- Protection switching feature test
- Ethernet SAM(Ethernet Service Activation Methodology) test method as per ITU-T Y.1564, verifying all SLA parameters through the test, ensuring QoS to its design goal
- Online business scanning and analysis
- Ethernet dual-port test mode

PRODUCT INTRODUCTION



Specifications

10GE PTN Protocol Analyzer Technical Specifications	
Ethernet Functions	
Interface	Two 10/100/1000 BASE-T electrical interfaces Two 100/1000M Base-X optical interfaces One 10GBase-X optical interfaces
RFC2544	Support throughput, back to back, frame loss and latency. Frame size: defined by RFC and also configured by users.
Y.1564	In accordance with ITU-T Y.1564 standard, conduct test on network service configuration and performance to verify if the network design can reach the agreed SLA. Supportive to performance tests including CIR/EIR bandwidth, FLR,FDV and so on
BERT	Support layer 1 to layer 4 BERT tests and random test of packet size.
	Graphic (BERT) PRBS 2E9-1, PRBS 2E11-1, PRBS 2E15-1, PRBS 2E20-1, PRBS 2E23-1, PRBS 2E31-1, graphic customization and reversal function.
	Error insert (BERT) IP check error, UDP check error, FCS, BIT error; two insert modes: manual and automatic
E r r o r measurement	LOS, link interruption, symbol, FCS, Jabber frame, Jumbo frame, Runt frame, conflict, excessive conflict, delayed conflict, UDP, TCP and IP checksum
Service Disruption Test	Fault mode, null-information flow mode, and packet loss probability mode. The statistics of interruption time includes: minimum break period, maximum break period, last break period, average break period, total break period and total times of break.
Multi-Stream	Capable of transmitting the data flow of 8 gigabit interface or 512 10G interfaces.
	Configuration parameters Data packet size (64-16000), transmission mode (continuous, N-frame, burst, incremental, N-burst and N-incremental, MAC source/destination address (incremental change), VLAN ID, VLAN priority level, LLC, SNAP, MPLS, IP source/destination address, ToS field, DSCP field, TTL, UDP source/destination port, TCP source/destination port and payload.
	VLAN stacking Capable of producing a minimum data flow of three VLAN layers (including VLAN marked with IEEE802.1ad Q-in-Q), and filter and receive information flow on any stacking layer of VLAN according to the priority level of VLAN ID or VLAN.
Analysis of information flow	Capable of analyzing the reception-side information flow and providing statistical information based on a set of configurable filters.
Ethernet statistics	Multicast, broadcast, unicast, frame size distribution, bandwidth, use ratio, frame rate. The bandwidth and use ratio therein can be presented with line graphs.

10GE PTN Protocol Analyzer Technical Specifications

Ethernet Functions		
RFC3393 jitter test	Minimum value, maximum value, current value, average value, number of samples.	
Loopback	Capable of 1-layer, 2-layer, 3-layer and 4-layer loopback and statistics.	
Double-end test mode	The far-end instrument is controlled by local instrument and bi-directional test is realized simultaneously.	
Other Ethernet characteristics	Flow control	Capable of transmitting flow control frame, and receiving and answering flow control frame.
	Auto-negotiation	Capable of negotiating the maximum mutual rate and duplex with other Ethernet ports.
	Advanced auto-negotiation	The parameters of automatic negotiation are open to configure, capable of negotiating the assigned rate and duplex with other Ethernet ports.
	Power measurement	Supportive to optical power measurement (displayed with dBm as the unit).
	Frequency measurement	Supportive to clock frequency measurement. Accuracy: 1ppm.
	Frequency deviation measurement	Resolution: 1ppm.
	VCT test	Capable of measuring the condition of connected lines, including availability, rate, open circuit and short circuit.
	PING	Capable of realizing PING function, which can flexibly configure the destination address, packet size, packet number and TTL.
	Trace route	Support trace route function.
FTP/HTTP	Support FTP/HTTP download test and FTP upload test	

PTN Function

PTN online scan and protocol analysis function

Scan and analyze online services	Supportive to automatic scan and identification of multiple online services according to their VLAN number, IP address or double-layer MPLS label of PTN.
MPLS/PWE3 protocol analysis	Analyze if the frame structure of SAToP conforms with RFC4553; Analyze if the frame structure of CESoP conforms with RFC5086 and RFC4842
MPLS-TP protocol analysis	Analyze LSP in MPLS message frame header and Lable, EXP and TTL of LSP and PW by referring to G.8110 and RFC3032 norms.
Ethernet link OAM protocol analysis	Analyze if the frame structure of Ethernet link OAM conforms with IEEE 802.3ah Supportive to diverse message analyses, including Information, Event Notification, Variable Request, Variable Response, Loopback Control, Organization Specific
Service OAM protocol simulation and message analysis	Analyze if the OAM frame structure of services conforms with ITU-T Y.1731 protocol Supportive to diverse message analyses, including CCM, LBM, LBR, LTM, LTR, AIS, LCK, TST, APS, MCC, LMM, LMR, 1DM, DMM, DMR, EXM, EXR, VSM, VSR
MPLS-TP LSP OAM simulation and message analysis	Analyze if LSP OAM frame structure conforms with ITU-TG.8113.1 protocol Supportive to diverse message analyses, including LSP CC, AIS/ RDI, LSP LB, LSP LT, LSP LCK, LSP LM, LSP DM
MPLS-TP PW layer OAM simulation and message analysis	Analyze if OAM frame structure of PW layer conforms with ITU-T G.8113.1 protocol Supportive to diverse message analyses, including PW CC, PW AIS / RDI, PW LB, PW CSF, PW Lck, PW packet loss, PW time delay
MPLS-TP Section layer OAM simulation and message analysis	Analyze if OAM frame structure of Section layer conforms with ITU-T G.8113.1 protocol Supportive to diverse message analyses, including Section CC, Section RDI/AIS, Section LB, Section LM, Section DM

PRODUCT INTRODUCTION

PTN Function	
PTN online scan and protocol analysis function	
IEEE1588 protocol analysis	Analyze if 1588 message conforms with IEEE 1588 v2 protocol Supportive to diverse message analyses, including Sync, Delay_Req, Pdelay_Req, Pdelay_Resp, Follow_Up, Delay_Resp, Pdelay_Resp_Follow_Up, Announce, Signaling, Management
OAM Service Test Function	
Ethernet link OAM function test	Based on 802.3ah protocol, simulate 802.3ah client, and support Ethernet link connectivity test; support Ethernet link OAM far-end loopback function and Ethernet OAM link supervision
Service OAM protocol simulation	Based on ITU-T Y.1731 standard, simulate PTN equipment to generate and handle OAM messages of multiple services, and the protocol fields and transmission period can be flexibly configured, including CCM, LBM, LBR, LTM, LTR, AIS, LCK, TST, APS, MCC, LMM, LMR, 1DM, DMM, DMR, EXM, EXR, VSM, VSR
MPLS-TP LSP OAM protocol simulation	Based on ITU-T G.8113.1 standard, simulate PTN equipment to generate and handle LSP OAM messages, and the protocol fields and transmission period can be flexibly configured, including LSP CC, AIS/ RDI, LSP LB, LSP LCK, LSP TST, LSP LM, LSP DM
M P L S - T P P W layer OAM protocol simulation	Based on ITU-T G.8113.1 standard, simulate PTN equipment to generate and handle OAM messages on PW layer of multiple services, and the protocol fields and transmission period can be flexibly configured, including PW CC, PW AIS / RDI, PW LB, PW CSF, PW Lck, PW, LM, PW, DM
MPLS-TP Section layer OAM protocol simulation	Based on ITU-T G.8113.1 standard, simulate PTN equipment to generate and handle OAM messages on Section layer of multiple services, and the protocol fields and transmission period can be flexibly configured, including Section CC, Section RDI/AIS, Section LB, Section LM, Section DM
Ethernet link OAM protocol analysis	Analyze if the OAM frame structure of Ethernet link conforms with IEEE 802.3ah Supportive to diverse message analyses, including Information, Event Notification, Variable Request, Variable Response, Loopback Control, Organization Specific
LAG load sharing service	Support data flow with variable source and destination MAC address, test LAG load sharing service
Protection switching, Service disruption test	Support service disruption test during protection switching and diverse modes, including null-information flow mode, packet loss probability mode, etc.

SPECIFICATIONS						
	10GBASE-SW	10GBASE-SR	10GBASE-LW	10GBASE-LR	10GBASE-EW	10GBASE-ER
Wavelength (nm)	850	850	1310	1310	1550	1550
Tx electrical level (dBm)	-7.3 to -1	-7.3 to -1	-8.2 to +0.5	-8.2 to +0.5	-4.7 to +4.0	-4.7 to +4.0
Rx level sensitivity (dBm)	-9.9 to -1.0	-9.9 to -1.0	-14.4 to +0.5	-14.4 to +0.5	-15.8 to -1.0	-15.8 to -1.0
Transmission distance	550m	550m	10km	10km	80 km	80 km
Transmission bit rate	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm	9.95328Gbps ±4.6ppm	10.3125Gbps ±4.6ppm
Reception bit rate	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm	9.95328Gbps ±150ppm	10.3125Gbps ±150ppm
Tx operation wavelength range (nm)	840 to 860	840 to 860	1260 to 1355	1260 to 1355	1530 to 1565	1530 to 1565
Measurement accuracy	Frequency (ppm)	±4.6	±4.6	±4.6	±4.6	±4.6
	Optical power (dB)	<2	<2	<2	<2	<2
Transceiver type	XFP	XFP	XFP	XFP	XFP	XFP

SPECIFICATIONS					
Optical interface		1000Base-SX	1000Base-LX	1000Base-ZX	
	Wavelength (nm)	850	1310	1550	
	Tx level (dBm)	-9 to -3	-9.5 to -3	0 to +5	
	Rx level sensitivity (dBm)	-20	-22	-22	
	Transmission distance	550m	10 km	40 km	
	Transmission bit rate(Gbit/s)	1.25	1.25	1.25	
	Reception bit rate (Gbit/s)	1.25	1.25	1.25	
	Wavelength range for Tx operation (nm)	830 to 860	1270 to 1360	1540 to 1570	
	Measurement accuracy	Frequency(ppm)	<0.1	<0.1	<0.1
		Optical power(dB)	<0.5	<0.5	<0.5
	Transceiver type	SFP	SFP	SFP	
Electrical interface	Working pattern: full duplex/half duplex		Standard satisfied: 10/100/1000 BASE-T		
	Connector: RJ-45		Transmission range: 100m		

SPECIFICATIONS	
Display screen	Color touch screen 640 x 480 TFT 6.5 inch
Interface	Two interfaces: USB A/B Ethernet interface
Battery	Rechargeable lithium battery pack Continuous operation for 4 hours according to Bellcore TR-NWT-001138 standard
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, maximum current 1.6 A; output: 19 VDC, 4A

PHYSICAL SPECIFICATIONS	
Temperature	Working temperature: -10°C to 50°C; storage temperature : -40°C to 70°C
Relative humidity	0% to 95% (non-condensable)
Size (H×W×D)	OTP6200: 319 mm x 202 mm x 105 mm OTM2602: 25 mm x 97 mm x 259 mm OTM2610: 25 mm x 97 mm x 259 mm
Weight	OTP6200: 2. 8kg OTM2602: 0.4kg OTM2610: 0.4kg
Jitter	<1.5g under 10Hz to 500Hz (on three principal axes)
Mechanical shock	<760 cm on six faces and eight major sides (according to GR-196-CORE standard)

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Description
Standard configuration		
Host machine	OTP6200	Intelligent test platform with two slot positions and modular design
	OTM2610	Single-port 10GE PTN test module
	OTM2602	Dual-port GE PTN test module
Optical fiber jumper	16080010	Instrument interface—LC/PC fiber test jumper with a length of 3 meters
Ethernet jumper	16060040	Ethernet electrical interface test jumper
10G optical module	14020100	10G 1310nm 10Km LC XFP optical module.
GE optical module	14020090	1.25G 1310nm 15 Km LC SFP optical module.
Power adapter	43170020	OTP6200 platform 19V power adapter.
Power line	16060010	2-meter power line.
Lithium battery	43160031	OTP6200 platform Li-ion rechargeable battery with 2 in parallel and 4 in series.
Electronic CD	18080010	OTP6200 electronic CD.
Instrument bag	19070010	OTP6200 instrument bag
Optional configuration		
Accessories	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm, 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX
	GA14020040	2.5G SFP optical module, 850nm, 550m, SX
	GA14020050	2.5G SFP optical module, 1310nm, 10km, LX
	GA14020060	2.5G SFP optical module, 1550nm, 80km, ZX
	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020120	1.25G SFP optical module, 1550nm, 40km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

22 OTM2500 Series SDH/SONET Transport Test Module



Product Introduction

OTM2500 SDH/SONET transport test module can be configured on OTP6200 test platforms to achieve complete PDH/DSn and SDH/SONET test functionalities and offer comprehensive test solutions for metro network. It is a high cost-effective network test product.

Features

- Offer test functions from PDH/DSn1.5M to 2.5G/10G SDH/SONET
- Automatic signal structure discovery in smartmode; automatically detect and monitor error paths
- Intuitionistic user interface, fast configuration of signal paths
- Customizable various forms of test report

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS		
Test Interfaces		
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		
Payloads	VC4-64c Bulk, VC4-16c Bulk, VC4-4c Bulk, VC4 Bulk, VC3 Bulk, VC12 Bulk, 2M, VC11 Bulk	
Test patterns	PBBS	2E23,2E20,2E15,2E11
	User programmable	Allowing user define 8-byte test pattern
Error injection	B1, B2, B3, MS-REI, HP-REI, LP-BIP, LP-REI Burst: 1-100 Rate: 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 result	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
Overhead features	Overhead monitoring	Display all bytes in hexadecimal (RS,MS,HP and LP) Text decode all applicable bytes (K1/K2,S1,C2 etc)
	Overhead setting	Hexadecimal input, not including check bytes (B1/B2/B3), pointer (H1-H3, V1-V3) and non-defined bytes Text decode all applicable bytes (K1/K2,S1,C2 etc)
Trace generation	J0 section trace	1 byte, 16 bytes E.164 ASCII sequence+/-CRC-7 or 64 bytes E.164 ASCII sequence
	J1/J2 path trace	16 bytes E.164 ASCII sequence+/-CRC-7 or 64 bytes E.164 ASCII sequence
	TC-APIId trace	16 bytes E.164 ASCII sequence+/-CRC-7
	Option	Default, user, pass

SPECIFICATIONS			
SDH/SONET			
Pointer monitoring	AU (H1, H2), TU (V1, V2) Real-time pointer value display Pointer loss second Total adjustment count Positive adjustment count Negative adjustment count NDF second	Overhead sequence generation	Byte: A1/A2, J0/J1/J2, D1-D3, D4-D12, K1/K2 or any single overhead byte, up to 16 elements, each element(value) can be transmitted on 65536 adjacent frames
Pointer adjustment	Programmable pointer value, NDF and SS byte Increment and decrement of pointer value	Overhead sequence capture	Capture: A1/A2, J0/J1/J2, D1-D3, D4- D12, K1/K2, any single overhead byte, each new captured value has a time label (absolute time or lapsed time) and continuous time (ms or frame) Trigger: Manual or user defined value Resolution: 125us(1 frame) Data communication channel: DCC DCC BER test: PRBS on D1-D3 or D4- D12 byte (user option) offer G.821 analysis DCC insertion/advance
Pointer test sequences	Index: ITU-T G.783 Sequence: single, burst, phase instant burst, periodic, 87-3, 26- 1, equivalent, user customized Action: increment, decrement, increment+decrement Abnormity: plus, cancel, non Sequence timing: initialization, cooling and test		
Automatic protection switching APS time measurement	Transducer: LOS, LOF, MS-AIS, MS-RDI, MS-REI, AUAIS,HP-RDI, HPREI,LP-RDI, LP- BIP, LPREI,TU-AIS, B1, B2, B3 1ms resolution pass/failure indication		
Enhanced through test	Support through mode, in which overhead rewriting, alarm and bit error insertion of high- level channel are supported		
Round-trip latency measurement	Round-trip latency measurement tool measures time a bit costs from transmitter to receiver through remote round-trip. Applicable for all supported interfaces and mappings. Results: Latest RTD time, minimum, maximum, mean, measurement amount(successful RTD test amount), failed measurement amount.		
Channel scanning	Automatically scan all channels of specific signal structure to check if they're norma		
Intelligent scanning	Automatically indentify mapping path and business type of selected interface		
High-precision internal clock	Internal clock ± 0.5 ppm		
PDH			
Test patterns	PBBS	2E23,2E20,2E15,2E11	
	User	Allowing user define 8-byte test patterns	
PDH/T-Carrier Bit error insertion	1.5M: Code, Fas, CRC, Bit 2M: Code, Fas, CRC, Bit 34M: Fas, Bi 45M: F-bit(Fas), C-bit, P-bit, FEBE, Bit 140M: Fas, Bit Insertion method: continuous, alternative, burst Ratio: 1×10^{-9} to 2×10^{-3} (depending on setting)		

PRODUCT INTRODUCTION

SPECIFICATIONS		
PDH		
Measurement	1.5M	LOS, LOF, AIS, RAI, PATTERN LOS, Code, Fas, CRC, Bit Error
	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 bit error count or alarm seconds Total bit error rate Current bit error rate (advanced 1 second)
	ITU-T G.821 analysis	Current bit error, current BER, total byte bit error, total BER, ES, %ES, SES, %SES, EFS, %EFS, AS, %AS, UAS,%UAS
	ITU-T G.826 analysis	RAI-based, remote end and near end analysis of BE, BBE, BBE rate, ES, %ES, SES, %SES, AS, %AS, UAS, %UAS
PHYSICAL SPECIFICATIONS		
Temperature	Operating: -10°C to 50°C; Storing: -40°C to 70°C	
Relative humidity	0% to 95% (non-condensing)	
Size (H×W×D)	50 mm x 97 mm x 259 mm(OTM2502); 25mm x 97 mm x 259 mm(OTM2515/2516/2517)	
Weight	0.7kg(OTM2502); 0.5kg(OTM2515/2516/2517/)	

Ordering Information

Category	Model	Description
Standard Configuration		
Test module (one of four)	OTM2502	Dual-slot SDH test module, support 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, compatible with OTP6200 platforms
	OTM2515	Single-slot SDH test module, support 155M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, compatible with OTP6200 platforms
	OTM2516	Single-slot SDH test module, support 155M/622M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, compatible with OTP6200 platforms
	OTM2517	Single-slot SDH test module, support 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, compatible with OTP6200 platforms
LC/LC fiber jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single-mode, 9/125, 3m.
2.5G optical module	GA14022310	One 2.5G SFP optical module, 1310nm, 2km, LX.
10G optical module	GA14021220	One 10G XFP optical module, 1310nm, 2km, LX(Standard configuration for OTM2502).

Ordering Information

Category	Model	Description
Optional Configuration		
Functional option	OPAP-12E1ATSDH	2M multi-channel testing option(for OTM2515/2516/2517)
	OPAP-2517A6200A	Software kit for 2.5G below SDH module test(for OTM2502)
Accessories	GA14020040	2.5G SFP optical module, 850nm, 550m, SX
	GA14020050	2.5G SFP optical module, 1310nm, 10km, LX
	GA14020060	2.5G SFP optical module, 1550nm, 80km, ZX
	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm, 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

PRODUCT INTRODUCTION

23 OTM2500 Series 2.7G/10.7G OTN Transport Test Module



Product Introduction

OTM2500 OTN transport test module can be configured on OTP6200 test platforms to achieve complete PDH/SDH/SONET/OTN test functionalities and offer comprehensive test solutions for metro network. It is a high cost-effective network test product.

Features

- Offer test functions from PDH/DSn1.5M to 2.5G/10G SDH/SONET/OTN
- Automatic signal structure discovery in smartmode; automatically detect and monitor error paths
- Intuitionistic user interface, fast configuration of signal paths
- Customizable various forms of test report

Specifications

SPECIFICATIONS		
Test Interfaces		
XFP 10G(10.7G/11.05G/11.1G) optical interface (STM-64/OC-192/OTU2/OTU1e/OTU2e)		
SFP 155M/622M/2.5G(2.7G) optical interface (STM-1/4/16, OC-3/12/48, OTU1)		
BNC 155M electrical interface (STM-1e/STS-3e)		
BNC 1.5M/2M/34M/45M/140M PDH electrical interface (DS1/E1/E3/DS3/E4)		
Test Features		
OTN		
Payloads	Support mapping/demapping of AU-3/AU-4/AU-4-4c/AU-4-16c to ODU1	
	Support mapping/demapping of AU-3/AU-4/AU-4-4c/AU-4-16c/AU-4-64c to ODU2	
Test patterns	PBBS	2E23,2E31
	User	Allowing user define 8-byte test pattern
Error injection	FAS, BIP-8(SM, PM, TCM1-6), BEI(SM, PM, TCM1-6), Bit(CLIENT), FECcorrectable bit, FECcorrectable code word, FECuncorrectable code word, FECcorrectable symbol	
Error injection mode	Single, rate, continuous, alternative, burst, frame operation	
Alarm generation	OTU: LOF, OOF, LOM, OOM, OTU-AIS, SM-BDI, SM-IAE, SM-TIM, SM-BIAE ODU: ODTU-LOFLOM, ODU-AIS, ODU-OCI, ODU-LCK, ODU-BDI, ODU-TIM, ODU-FSF, ODU-BSF, ODU-FSD, ODU-BSD ODU-TCM1~6: TCM-BDI, TCM-IAE, TCM-BIAE, TCM-TIM, TCM-LTC OPU: OPU-PLM, OPU-CSF, OPU-MSIM, CLIENT-LSS	
Alarm generation mode	Continuous, alternative, burst	
Test result	Error	FAS, BIP-8(SM, PM, TCM1-6), BEI(SM, PM, TCM1-6), Bit(CLIENT), FECcorrectable bit, FECcorrectable code word, FECuncorrectable code word, FECcorrectable symbol
	Alarm	OTU: LOF, OOF, LOM, OOM, OTU-AIS, SM-BDI, SM-IAE, SM-TIM, SM-BIAE ODU: ODTU-LOFLOM, ODU-AIS, ODU-OCI, ODU-LCK, ODU-BDI, ODU-TIM, ODU-FSF, ODU-BSF, ODU-FSD, ODU-BSD ODU-TCM1~6: TCM-BDI, TCM-IAE, TCM-BIAE, TCM-TIM, TCM-LTC OPU: OPU-PLM, OPU-CSF, OPU-MSIM, CLIENT-LSS
Forward error correction(FEC)	Using RS(255,239) encoding	
Through mode	Support OTU1/OTU2 advanced through mode	
Other Test and Measurement Functions		
Overhead edition and capture	Overhead edition	All bytes can be edited except MFAS, SM BIP, PM BIP and TCM1-6 BIP
	Overhead capture	Capacity of continuous and variable capture
	Overhead display	Display complete overhead
Service disruption time measurement	Trigger condition	Alarm: LOS, LOM, OOM, SM-IAE, SM-BIAE, ODU-AIS, ODU-OCI, ODU-LCK, PM-BDI; Error: MFAS, PM-BIP, PM-BEI, payload errors.
	Measurement accuracy	0.1ms.

PRODUCT INTRODUCTION

SPECIFICATIONS	
Other Test and Measurement Functions	
Power measurement	Support power measurement of optical interface Unit: dBm; accuracy: 0.1dBm; range: -24.5~+4dBm
Frequency offset measurement	Support clock frequency and frequency offset(the difference between receiving frequency and rated frequency) measurement of optical interface Unit: bps and ppm; accuracy: 1 bps and 1ppm
Frequency offset generation	Generate offset for clock of transmission signal in selected port to test clock recovery circuit of network elements. Generation range: ± 100 ppm
PHYSICAL SPECIFICATIONS	
Temperature	Operating: -10°C to 50°C; Storing: -40°C to 70°C
Relative humidity	0% to 95% (non-condensing)
Size (H×W×D)	50 mm x 97 mm x 259 mm
Weight	0.7kg

Ordering Information

Category	Model	Description
Standard Configuration		
Test Module	OTM2512	Dual-slot SDH/OTN test module, support 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, support OTN test with 2.7G/10.7G optical interface, compatible with OTP6200 and OTP6800 platforms
LC/LC fiber jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single-mode, 9/125, 3m.
2.5G optical module	GA14022310	One 2.5G SFP optical module, 1310nm, 2km, LX.
10G optical module	GA14021220	One 10G XFP optical module, 1310nm, 2km, LX(for OTM2512).
Optional Configuration		
Accessories	GA14020040	2.5G SFP optical module, 850nm, 550m, SX
	GA14020050	2.5G SFP optical module, 1310nm, 10km, LX
	GA14020060	2.5G SFP optical module, 1550nm, 80km, ZX
	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm, 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

24 OTM2500 Series MSTP Transport Test Module



Product Introduction

OTM2500 next-generation MSTP transport test module can be configured on OTP6200 test platforms to achieve complete next-generation MSTP test functionalities and offer comprehensive test solutions for metro network. It is a high cost-effective next-generation network test product.

Features

- Offer test functions from PDH/DSn1.5M to 2.5G/10G SDH/SONET/MSTP
- MSTP testing via GFP, VCAT and LCAS options
- Optional support 2.7G/10.7G OTN test
- Automatic signal structure discovery in smartmode, automatically detect and monitor error paths
- Intuitionistic user interface, fast configuration of signal paths
- Customizable various forms of test report

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS		
Test Interfaces		
XFP 10G optical interface (STM-64/OC-192)		
SFP 155M/622M/2.5G optical interface (STM-1/4/16, OC-3/12/48)		
BNC 155M electrical interface (STM-1e/STS-3e)		
BNC 1.5M/2M/34M/45M/140M PDH electrical interface (DS1/E1/E3/DS3/E4)		
RJ-45 10/100/1000M Base-T Ethernet electrical interface		
SFP 1000M BASE-X gigabit Ethernet optical interface		
Test Features		
MSTP		
Virtual concatenation (VCAT)	High-order path	VC-4-X-v, X=1-16
	Low-order path	VC-11-X-v, VC-12-X-v, X=1 – 64; VC-3-X-v, X=1-48 (from 16 different AU4)
	Differential delay test and generation(each-member based)	Individual and group test Test and generation range: 256ms VCAT regrouping range: up to 256ms
	Error(member-based)	Bit, B3, HP-REI, LP-BIP, LP-REI
	Alarm(member-based)	AU-AIS, AU-LOP, HP-AIS, HP-RDI, HPERDI, HP-UNEQ,HP-TIM, TU-LOM, TU-AIS, TU-LOP, LPRDI,LPERDI, LP-UNEQ,LP-TIM
	Error performance analysis(member-based)	Per ITU-T G.821, G.826, G.828, M.2101,M.2120
GFP-F	Conform to ITU-T G.7041, G.707 and ANSI T1.105.02-2001	
	Traffic generation	Ethernet frame
	Frame size	Maximum: 65535 bytes
	Bandwidth	Depend on virtual concatenation
	GFP payload type frame header control	PTI, PFI, EXI(linear and empty), CID(linear) and UPI
	GFP-F (Frame) generation	Test: idle frame, total frames, total bytes, client frame client frame with FCS, client management frame, extension header OK frame, type header OK frame, null-extension frame, linear frame, ring frame, Ethernet-mapping frame Error(GFP-F): correctable cHEC, uncorrectable cHEC, correctable tHEC, uncorrectable tHEC, correctable eHEC, uncorrectable eHEC, payload FCS, not available payload
	Alarm	GFP synchronization failure
Link capacity adjustment scheme (LCAS)	Conform to ITU-T G.7042, G.707 and ANSI T1.105.02-2001	
	LCAS mode	On, off
	H4, K4/Z7 monitoring	Control packet

SPECIFICATIONS	
MSTP	
LCAS protocol emulation	Transmit and receive emulation of status machines(member-based) Direct command -send: add/remove member, add/remove multiple members -receive: add/remove member, add/remove multiple members Adapt accepted member status(transmit): norm, fail, automated Adapt generated member status(receive): fail, automated Force re-sequence acknowledgement: RX RS-Ack (transmit), TX RS-Ack (receive) Force member status alarm (receive): MSU
Generation and capture of member status message	Transmit (transmit end) and receive (receive end) sequence Receive (transmit end) and transmit (receive end) re-sequence acknowledgement Transmit equipment status decoding: idle, add, NORM, DNU(not using), remove Receive equipment status decoding: idle, fail, NORM Send transmitted control byte: ADD, NORM, EOS, IDLE, DNU Receive end receive control byte: ADD, NORM(normal transmit) , EOS (sequence end indication and normal transmit), IDLE, DNU, FIXED(non-LCAS mode) Receive end receive alarm: LOS (sequence loss), MSU(member status unavailable), FOP CRC(extra CRC error fail of protocol) Receive end receive error: extra CRC error fail of protocol (CRC fail)
LCAS error generation and monitoring	Send end (Tx): LCAS-CRC member-based Error injection: single
Ethernet over SDH (EoS)	
10/100/1000M Base-T Ethernet interface and gigabit optical interface	
Add/drop of Ethernet payload in SDH line with GFP mapping	
Ethernet frame generation and analysis, including layer2 and layer3 test with VLAN and MPLS label	
Various Ethernet payload pattern (PRBS)	
PHYSICAL SPECIFICATIONS	
Temperature	Operating: -10°C to 50°C; Storing: -40°C to 70°C
Relative humidity	0% to 95% (non-condensing)
Size (H×W×D)	50 mm x 97 mm x 259 mm
Weight	0.7 kg

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Description
Standard Configuration		
Test Modules (one of four)	OTM2503	Dual-slot 2.5G SDH/MSTP test module, support 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, support MSTP, compatible with OTP6200 platforms
	OTM2504	Dual-slot 10G SDH/MSTP test module, support 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, support MSTP, compatible with OTP6200 platforms
	OTM2513	Dual-slot 2.5G SDH/OTN/MSTP test module, support 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, support MSTP, support OTN test with 2.7G optical interface, compatible with OTP6200 platforms
	OTM2514	Dual-slot 10G SDH/OTN/MSTP test module, support 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, support MSTP, support OTN test with 2.7G/10.7G optical interface, compatible with OTP6200 platforms
LC/LC fiber jumper	LCLC-0203	One duplex fiber jumper with LC/LC interface, single mode, 9/125, 3m.
1.25G optical module	GA14023230	One 1.25G SFP optical module, 130nm, 10km, LX.
2.5G optical module	GA14022310	One 2.5G SFP optical module, 1310nm, 2km, LX.
10G optical module	GA14021220	One 10G XFP optical module, 1310nm, 2km, LX.(standard configuration for OTM2504/2514)
Optional Configuration		
Accessories	GA14020010	1.25G SFP optical module, 850nm, 550m, SX
	GA14020020	1.25G SFP optical module, 1310nm, 10km, LX
	GA14020030	1.25G SFP optical module, 1550nm, 80km, ZX
	GA14020040	2.5G SFP optical module, 850nm, 550m, SX
	GA14020050	2.5G SFP optical module, 1310nm, 10km, LX
	GA14020060	2.5G SFP optical module, 1550nm, 80km, ZX
	GA14020070	10G XFP optical module, 850nm, 550m, SX
	GA14020080	10G XFP optical module, 1310nm, 10km, LX
	GA14020090	10G XFP optical module, 1550nm, 80km, ZX

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

25 OTM2900 Handheld RF Spectrum Analyzer



Product Introduction

OTM2900 Handheld RF Spectrum Analyzer is a handheld spectrum analyzer with multiple functions applicable for field test, including test for network installation and maintenance in complicated field environment, and test for network signal coverage thereby excluding complicated signal interference.

OTM2900 Handheld RF Spectrum Analyzer can be applied on OPWILL OTP6200v2 intelligent network test platform with a frequency coverage of 0KHz~3GHz, providing spectral analysis, interference removal and other tests of 2G/3G/4G, WiFi and other wireless networks.

Characteristics of Spectrum and Interference Analysis

- Test function: spectrum analysis, occupied bandwidth, channel power, field strength, Adjacent Channel Power Ratio (ACPR)
- Interference analysis: spectrogram, signal strength, RSSI
- Dynamic range: >95dB at 10Hz RBW.
- DANL: -140dBm at 10Hz RBW
- Phase noise: -100dBc/Hz maximum 1GHz@10kHz
- (Option) Tracking generator test

Features

- 6.5-inch TFT LCD enables users to easily read data under high brightness outdoors.
- Rechargeable lithium-ion battery enables the analyzer to work for four continuous hours. (Five hours in standby mode).
- Convenient to store and read measured data via USB interface.
- (Option) Enabling remote control of the instrument to conduct tests via RJ45 management interface.

PRODUCT INTRODUCTION

Specifications

OTM2900 RF Spectrum Analyser Technical Specifications	
Frequency range	0kHz~3000MHz
Frequency Reference	
Aging	$\pm 1 \times 10^{-6}$ /year
Stability	$\pm 2 \times 10^{-6}$
Temperature stability	$\pm 2 \times 10^{-6}$ (0 to +50) $^{\circ}$ C
Frequency resolution	10 Hz
Market Count Accuracy (SNR 25dB, RBW/span 0.01)	
Count accuracy	$\pm 2 \times 10^{-6}$
Count Resolution	1 Hz
Frequency span	
Range	0 Hz (zerospan), 0KHz to 3000 MHz
Sweep and Trigger	
Range	9ms~250s(Span \geq 1k Hz)
	300 μ s~250s(Span= 0 Hz)
Accuracy	< \pm 1%
Trigger Type	Free trigger mode, one-shot trigger mode, video trigger mode, line trigger mode
Resolution bandwidth	
Range	1KHz to 3 MHz in 1-3 sequence
Bandwidth accuracy	< \pm 10%
Selectivity	(60dB/3dB bandwidth ratio) : < 5:1
Video bandwidth	
Range	30Hz to 3MHz in 1-3 sequence
Stability	
Phase noise	Typically < -105 dBc/Hz @ 100kHz offset from CW signal
	Typically < -95 dBc/Hz @ 10 kHz offset from CW signal
	Typically < -85 dBc/Hz @ 10 kHz offset from CW signal
Amplitude	
Input Attenuator	
Range	0dB ~ 51dB
Step	1dB
Internal Preamplifier	
Gain	20dB (typically)
Noise factor	4dB (typically)
Maximum safe input level	+30dBm(peak power /input attenuation >15dB)100VDC
Third order intermodulation (TOI)	Typically > 15dBm

Specifications

SPECIFICATIONS	
Amplitude	
Display average noise level	
(No signal input, 0dB attenuator, 100HzRBW, 3Hz VBW, sample Detector)	
Pre-amplifier OFF (Typically)	≤ -130 dBm ≤ -126 dBm
	1MHz ~ 1GHz 1GHz ~ 3GHz
Pre-amplifier ON (Typically)	≤ -145 dBm ≤ -141 dBm
	1MHz ~ 1GHz 1GHz ~ 3GHz
Spurious Responses	
Second harmonic	< -70dBc for -20dBm signal at input mixer
TOI	< -66 dBc two -20dBm signals at input mixer with ≥1MHz separation and att=0
Residual response	(Input Terminal terminated and 0dB Attenuator) ≤ -85dBm 1MHz -3000MHz
Display range	
Log scale	0.1 -0.9 dB/marker, 0.1dB step; 1-40dB/mark, 1dB step
Linear scale	10 marker
Scale unit	dBm, dBmV, dBμV, mV
Marker Readout Resolution	0.03 dB, 0.03% of reference level for linear scale
Track	3 tracks
Trace Detector	Sampling value, positive peak, negative peak, general value, average value
Marker Functions	Peak, next peak, frequency marker to center, marker to reference, etc.
Marker display	General, difference value, fixed, and frequency counter
Reference level	-150 dBm ~ +40 dBm
Level accuracy	Typically ±1.0dB @ +25±5°C
Input/Output Indicators	
Radio frequency input	
Input interface:	N connector
Input impedance:	50Ω
Standing-wave ratio:	Typical value < 1.8 (10MHz~3000MHz, attenuator ≥ 10dB)
USB	2 USB2.0, 1 miniUSB
LAN interface	10M/100M RJ45
TG Out (option)	
Output interface	N connector
Output impedance	50Ω
VSWR	< 2.0
Frequency range	35MHz ~ 3000MHz
Frequency stability	±2ppm
Level range	-30dBm ~ 0dBm
Level resolution	1dB
Level accuracy	±1.5dB
Harmonic distortion	-20dBc
Non-Harmonic distortion	-30dBc

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS	
Display screen	Color touch screen visible under sunlight 640 x 480 TFT 6.5 inch
Interface	Two USB2.0, one miniUSB; one 10/100M RJ45 interface
Memory space	8GB flash
Battery	Rechargeable lithium battery pack Continuous operation for 4 hours according to Bellcore TR-NWT-001138 standard
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, maximum current 1.6A; ouotput:19VDC, 4A
PHYSICAL SPECIFICATIONS	
Temperature	Working temperature: -10°C to 50°C; storage temperature: -40°C to70°C
Relative humidity	0% to 95% (non-condensable)
Size (H×W×D)	OTP6200: 319 mm x 202 mm x 105 mm OTM2900: 50 mm x 97 mm x 259 mm
Weight	OTP6200: 2. 8kg OTM2900: 0.4kg
Jitter	<1.5g under10Hz to 500Hz (on three principal axes)
Mechanical shock	<760 cm on six faces and eight major sides (according to GR-196-CORE standard)

Ordering Information

Category	Model	Description
Standard Configuration		
Host machine	OTP6200	Intelligent test platform with 2 slot positions and modular design.
	OTM2900	0MHz to 3GHz spectrum analyzer test module
Ethernet jumper	16060040	Test jumper of Ethernet electrical interface.
Power adapter	43170020	OTP6200 platform19V power adapter.
Power line	16060010	2-meter power line.
Lithium battery	43160031	Rechargeable battery with 2 in parallel and 4 in series on OTP6200 platform.
Electronic CD	18080010	OTP6200 electronic CD.
Instrument bag	19070010	OTP6200 instrument bag.
Optional Configuration		
Software Option	OPAP-RemoteAccess	Desktop remote control

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

26 OTM2950 Handheld Cable and Antenna Analyzer



Product Introduction

OTM2950 Handheld Cable and Antenna Analyzer is a handheld cable and antenna analyzer with multiple functions applicable to tests involving network installation and maintenance in complicated fields of wireless communication construction, debugging and maintenance.

OTM2950 Handheld Cable and Antenna Analyzer can be applied on OPWILL OTP6200v2 intelligent network test platform with a frequency coverage of 25MHz~4GHz, providing return loss, cable loss, SWR, DTF tests of wireless communication base stations including installation, debugging, and maintenance of 2G, 3G and 4G base stations.

Characteristics of the Analyzer

- Test features: return loss, cable loss, SWR, distance-to-fault with SWR and distance-to-fault with return loss
- Measurement speed: 2msec/data point (typically)

Features

- 6.5-inch TFT LCD enables users to easily read data under high brightness outdoors.
- Rechargeable lithium-ion battery enables the analyzer to work for four continuous hours. (Five hours in standby mode).
- Convenient to store and read measured data via USB interface.
- (Option) Enabling remote control of the analyzer to conduct tests via RJ45 management interface.

PRODUCT INTRODUCTION

Specifications

SPECIFICATIONS		
Test function	SWR	
	Return loss	
	Cable loss	
	Distance-to-fault with SWR (DTF)	
	Distance-to-fault with return loss (DTF)	
Frequency	Frequency range	25MHz~4GHz
	Frequency resolution	100kHz
Output power	High	0 dBm, typical value
	Low	-20 dBm, typical value
Measurement speed	<2 sec/screen (full span, 521 data points)	
	<3 sec/data point, CW sweep mode, typically	
Number of data points	Maximum: 521, Selectalbel: 131,261,521	
Return loss	Measurement range	0~60dB
	Accuracy	$A=20 \times \log_{10}(1.1 + 10^{-(D-RL)/20} + 0.016 \times 10^{(-RL/20)}) + 10^{(-3+RL/20)}$
	D	Directivity of calibrator
	RL	Return loss value of DUT
	Resolution	0.01dB
SWR	Measurement range	1~65
	Accuracy	Same as RL
	Resolution	0.01
Cable loss	Measurement range	0~30dB
	Resolution	0.01dB
DTF	Measurement range of return loss	0~60dB
	Measurement range of SWR	1~65
	Fault resolution (meter)	$(1.5 \times 10^8 \times vp) / \Delta F$ (vp= the cable's relative propagation velocity, $\Delta F = F2 - F1$, Hz as the unit) F2 is the stop frequency, and F1 is the start frequency
	Measurement distance	0~(data point-1)×fault resolution, 1500 m for maximum
Measurement accuracy	Calibrated directivity	>42dB corrected directivity after mechanical calibration
		>38dB corrected directivity after mechanical calibration
Interface	RF output	N-type, 50Ω
	USB interface	2 USB V2.0, 1 Mini USB
	LAN interface	RJ45 interface, 10/100M Base-T, for remote control of the testing instrument
	Headphone interface	2.5mm mini-headphone interface

Specifications

SPECIFICATIONS	
Display screen	Color touch screen visible under sunlight 640 x 480 TFT 6.5 inch
Interface	Two USB2.0, one miniUSB; one 10/100M RJ45 interface
Memory space	8GB flash
Battery	Rechargeable lithium battery pack Continuous operation for 4 hours according to Bellcore TR-NWT-001138 standard
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, maximum current 1.6A; ouotput:19VDC, 4A
PHYSICAL SPECIFICATIONS	
Temperature	Working temperature: -10°C to 50°C; storage temperature: -40°C to70°C
Relative humidity	0% to 95% (non-condensable)
Size (H×W×D)	OTP6200: 319 mm x 202 mm x 105 mm OTM2950: 50 mm x 97 mm x 259 mm
Weight	OTP6200: 2. 8kg OTM2950: 0.4kg
Jitter	<1.5g under10Hz to 500Hz (on three principal axes)
Mechanical shock	<760 cm on six faces and eight major sides (according to GR-196-CORE standard)

Ordering Information

Category	Model	Description
Standard Configuration		
Host machine	OTP6200	Intelligent test platform with 2 slot positions and modular design.
	OTM2950	25MHz~4GHz cable and antenna test module.
Ethernet jumper	16060040	Test jumper of Ethernet electrical interface.
Power adapter	43170020	OTP6200 platform19V power adapter.
Power line	16060010	2-meter power line.
Lithium battery	43160031	Rechargeable battery with 2 in parallel and 4 in series on OTP6200 platform.
Electronic CD	18080010	OTP6200 electronic CD.
Instrument bag	19070010	OTP6200 instrument bag.
Optional Configuration		
Software Option	OPAP-RemoteAccess	Desktop remote control.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

27 OTP6200 Intelligent Network Test Platform



Product Introduction

OTP6200 intelligent network test platform is a modular test platform of OPWILL's test products. It combines powerful function, flexible, convenience, fast and high-efficient advantages. It is an excellent tool for network experts deploying and maintaining metro, access and FTTx multilayer networks.

Features

Network testing tool convenient and easy to use outdoors

- Compact and portable design, easy to carry
- Supportive to general TFT color touch LCD and color touch LCD especially enhanced for outdoor use
- The battery lasts for over 8 hours
- The structural strength conforms with GR-196-CORE standard

Fast and efficient analyzer of test results

- Needless to preheat before starting, short starting time
- Fast bus design, multitasking, minimized time for collection, treatment and analysis of measured data
- Supportive to USB and Ethernet interfaces
- Rich key design, supportive to rotary knob, numeric key and functional key, providing flexible input and diverse choices

Modular test platform with powerful functions

- Intelligent modular design, supportive to 2 testing slots, and easy to extend and upgrade even on the spot
- Supportive to OTDR, Ethernet and SDH/PDH/OTN protocol and other test modules
- Multilayer network test including physical layer, transport layer and data communication layer

Specifications

SPECIFICATIONS	
Display	Color touchscreen, 640 x 480 TFT 6.5 inch
Interfaces	USB A/B Ethernet port
Storage	1GB flash
Batteries	Rechargeable Li-Ion 4-h continuously operation as per Bellcore TR-NWT-001138
Power supply	AC/DC adapter, input: 100-240VAC, 50-60Hz, 1.6A max, output: 24VDC, 4A
PHYSICAL SPECIFICATIONS	
Temperature	Operating: -10°C to 50°C; Storage: -40°C to 70°C
Relative humidity	0% to 95% (non-condensing)
Size (H×W×D)	319 mm x 202 mm x 105 mm
Weight	2.8kg
Vibration	<1.5g at 10Hz to 500Hz (on three main axes)
Mechanical shock	<760 mm on six sides and eight main edges (according to GR-196-CORE)

PRODUCT INTRODUCTION

Ordering Information

Category	Model	Description
Standard Configuration		
Test Platform	OTP6200	Support 2 slots, modular designed, allow to use with OTDR, Ethernet, SDH/PDH/OTN/MSTP test modules.
Battery	LB08V14S0204	One two parallel four series lithium polymer rechargeable battery for OTP6200.
Power Adapter	SA190A-19V-P	One 19V power adapter for 6200.
Power Cable	OA1611PWR_2M	One power cable, 2m.
Disc	OA1808_6200_CD	One OTP6200 disc.
Package	OBG6200	One OTP6200 package.

Notes: Product ordering information may update along with the product upgrade, please refer to the final version provided by our sales.

Multi-service Test Product			
No.	Name	Mode	Description
1	Fiber Analyzer	FTS-300	Optical cable testing instrument
2	FTTA Analyzer	FTS-600	FTTA testing, support OTDR, Cable and antenna testing
3	Mobile backhaul network analyzer	ETS-300-1	Support IP RAN/PTN, OTN/SDH/MSTP/PDH and IEEE1588 protocol test
4	Synchronization Analyzer	ETS-300-2	All-round functions of IEEE1588v2, 1PPS/PP2S, 1PPS+ToD test, GE IP RAN/PTN and E1/T1 test
5	10GE PTN Protocol Analyzer	OTP6200+OTM2610+OTM2602	10M to 10G rates PTN test features

Product Platform			
No.	Name	Mode	Description
1	Intelligent testing platform	OTP6200	Equipped with 2 slot positions and modular design, and able to cooperatively used with OTDR, Ethernet and SDH/PDH/OTN/MSTP testing modules.

PRODUCT LOOKUP TABLES

Handheld Product			
No.	Name	Mode	Description
1	Handheld optical attenuator	OTP-60V	Handheld optical attenuator, wavelength 1310/1550nm (1490/1610nm), dynamic range 60dB.
2	Handheld OMTS optical multimeter	OTP6122	Handheld OMTS optical multimeter.
3	Handheld OTDR	OTP6103	Dual-wavelength 1310/1550nm OTDR testing instrument, dynamic range 30/28dB.
4	Handheld OTDR	OTP6123H	Dual-wavelength 1310/1550nm OTDR testing instrument, dynamic range 40/39dB.
5	Handheld OTDR	OTP6123N	Dual-wavelength 1310/1550nm OTDR testing instrument, dynamic range 35/34dB.
6	Handheld OTDR	OTP6123L	Dual-wavelength 1310/1550nm OTDR testing instrument, dynamic range 30/28dB.
7	Handheld PON OTDR	OTP6123P	Three-wavelength 1310/1550/1625nm PON OTDR testing instrument, dynamic range 39/37/38dB.
8	Handheld PON OTDR	OTP6123-a	Three-wavelength 1310/1490/1550nm PON OTDR testing instrument, dynamic range 39/37/37dB.
9	Handheld PON OTDR	OTP6123-b	Three-wavelength 1310/1550/1650nm PON OTDR testing instrument, dynamic range 39/37/38dB.
10	Handheld PON OTDR	OTP6123-c	Four-wavelength 1310/1490/1550/1625nm PON OTDR testing instrument, dynamic range 39/37/37/38dB.
11	Handheld PON OTDR	OTP6123-d	Four-wavelength 1310/1490/1550/1650nm PON OTDR testing instrument, dynamic range 39/37/37/38dB.
12	Handheld PON OTDR	OTP6123-e	Mono-wavelength 1625nm PON OTDR testing instrument, dynamic range 38dB.
13	Handheld PON OTDR	OTP6123-f	Mono-wavelength 1650nm PON OTDR testing instrument, dynamic range 38dB.
14	Handheld PON OTDR	OTP6123-g	Mono-wavelength 1310nm PON OTDR testing instrument, dynamic range 39dB.

Handheld Product			
No.	Name	Mode	Description
15	Handheld PON OTDR	OTP6123-h	Mono-wavelength1490nm PON OTDR testing instrument, dynamic range 37dB.
16	Handheld PON OTDR	OTP6123-i	Mono-wavelength1550nm PON OTDR testing instrument, dynamic range37dB.
17	Handheld AFCID	FTS-6129	Support 1550nm wavelength with a measuring range of 20km to100km.
18	Handheld Ethernet testing instrument	OTP6126S	Handheld Ethernet testing instrument, providing one 10/100/1000Mbps Ethernet electrical interface and one1000Mbps Ethernet optical interface
19	Handheld Ethernet testing instrument	OTP6126	Handheld Ethernet testing instrument, providing two 10/100/1000Mbps Ethernet electrical interfaces and two 1000Mbps Ethernet optical interfaces
20	Handheld PTN Protocol Analyzer	OTP6128S	Handheld gigabit PTN testing instrument, providing 10/100/1000Mbps Ethernet electrical interface and one 1000Mbps Ethernet optical interface
21	Handheld PTN Protocol Analyzer	OTP6128	Handheld gigabit PTN testing instrument, providing two 10/100/1000Mbps Ethernet electrical interfaces and two 1000Mbps Ethernet optical interfaces
22	Fiber fusion splicer	PFS-120	Touchable color LCD, two CMOS cameras; single heating slot; able to magnify by a maximum factor of 300; equipped with high-capacity a battery supportive to heating for 220 times continuously.
23	Single-core fiber fusion splicer	PFS-103	LED color screen, able to magnify by a maximum factor of 200; single heating slot; equipped with a high-capacity battery supportive to heating for 200 times continuously.
24	Digital fiber fusion splicer	PFS-105	LED color screen, able to magnify by a maximum factor of 360; two heating slots; equipped with a high-capacity battery supportive to heating for 200 times continuously.

Module Product			
No.	Name	Mode	Description
1	OTDR test module	OTM2302L	Dual-wavelength1310/1550nm OTDR module, dynamic range 35/33dB
2	OTDR test module	OTM2302N	Dual-wavelength1310/1550nm OTDR module, dynamic range 40/38dB
3	OTDR test module	OTC2300N-a	Mono-wavelength (1310 nm) OTDR module, dynamic range 38dB
4	OTDR test module	OTC2300N-b	Mono-wavelength (1490 nm) OTDR module, dynamic range 36dB
5	OTDR test module	OTC2300N-c	Mono-wavelength (1550 nm) OTDR module, dynamic range 36dB
6	OTDR test module	OTC2300N-d	Mono-wavelength (1625 nm) OTDR module, dynamic range38dB
7	OTDR test module	OTC2300N-e	Mono-wavelength (1650 nm)OTDR module, dynamic range 38dB
8	Smart OTDR	OTC2310	Smart OTDR, dynamic range 30dB to 40dB.
9	Gigabit Ethernet test module	OTM2602S	Ethernet test module, providing one 10/100/1000Mbps Ethernet electrical interface and one 100/1000Mbps Ethernet optical interface.

PRODUCT LOOKUP TABLES

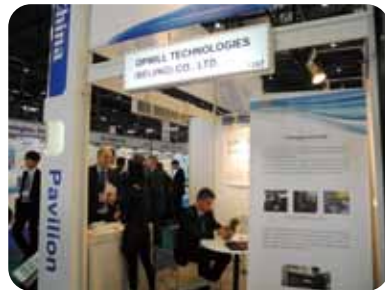
Module Product			
No.	Name	Mode	Description
10	Gigabit Ethernet test module	OTM2602	Ethernet test module, providing two 10/100/1000Mbps Ethernet electrical interfaces and two 100/1000Mbps Ethernet optical interfaces.
11	10-gigabit Ethernet test module	OTM2610	Ethernet test module, providing one 10Gbps Ethernet optical interface.
12	Gigabit Ethernet test module	OTC1600	Gigabit Ethernet loopback test module, providing one 10/100/1000Mbps Ethernet electrical interface and one 100/1000Mbps Ethernet optical interface.
13	SDH test module	OTM2502	Dual-slot SDH test module, supporting 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, applicable to OTP6200 platform
14	SDH test module	OTM2515	Mono-slot SDH test module, supporting 155M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, applicable to OTP6200 platform
15	SDH test module	OTM2516	Mono-slot SDH test module, supporting 155M/622M optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, applicable to OTP6200 platform
16	SDH test module	OTM2517	Mono-slot SDH test module, supporting 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, applicable to OTP6200 platform
17	MSTP test module	OTM2503	Dual-slot 2.5G SDH/MSTP test module, supporting 155M/622M/2.5G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, supporting MSTP function, applicable to OTP6200 platform
18	MSTP test module	OTM2504	Dual-slot 10G SDH/MSTP test module, supporting 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 1.5M/2M/34M/45M/140M PDH electrical interface, supporting MSTP function, applicable to OTP6200 platform
19	MSTP test module	OTM2513	Dual-slot 2.5G SDH/OTN/MSTP test, supporting 155M/622M/2.5G optical interface, 155M SDH electrical interface and 5M/2M/34M/45M/140M PDH electrical interface, supporting MSTP function, OTN test, supporting 2.7G optical interface, applicable to OTP6200 platform
20	MSTP test module	OTM2514	Dual-slot 10G SDH/OTN/MSTP test, supporting 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 5M/2M/34M/45M/140M PDH electrical interface, supporting MSTP function, OTN test, supporting 2.7G/10.7G optical interface, applicable to OTP6200 platform
21	OTN test module	OTM2512	Dual-slot SDH/OTN test module, supporting 155M/622M/2.5G/10G optical interface, 155M SDH electrical interface and 5M/2M/34M/45M/140M PDH electrical interface, OTN test, supporting 2.7G/10.7G/11.05G/11.1G optical interface, applicable to OTP6200 platform
22	RF Spectrum Analyzer	OTM2900	0MHz to 3GHz RF spectrum analyzer test module
23	Cable and Antenna Analyzer	OTM2950	25MHz to 4GHz Cable and Antenna test module

OPWILL has made expressive achievements on global market by virtue of its core technologies and products dominant nationwide with constant innovation:

- In 2009, SDH testing instrument was shortlisted in the annual procurement project of China Mobile Headquarters;
- In October, 2009, Fiber Home Technologies purchased SDH transmission analyzer in bulk;
- In 2010, gigabit Ethernet testing instrument was shortlisted in the annual procurement project of China Mobile Headquarters, and thereafter China Mobile branches in many provinces purchased it in bulk;
- In January, 2010, gigabit Ethernet testing instrument was exported to South Africa;
- In May, 2010, Accelink Technologies purchased 10G SDH transmission analyzer and Ethernet testing instrument;
- In July, 2010, gigabit Ethernet testing instrument was exported to South Africa and Italy;
- In August, 2010, OTDR testing instrument was exclusively shortlisted in the project of Chengdu Railway;
- In August 2010, Fiber Home Technologies purchased 2M testing instrument and production test platform in bulk ;
- In November, 2010, gigabit Ethernet testing instrument was exported to Singapore;
- In December, 2010, Chongqing Electric Power purchased OTDR testing instrument;
- In December, 2010, OTDR testing instrument was shortlisted in the project of Jiangsu Telecom;
- In January, 2011, 10G SDH transmission analyzer was exported to South Africa;
- In April, 2011, Fiber Home once again purchased gigabit Ethernet testing instrument in bulk;
- In June, 2011, OTDR testing instrument was shortlisted in the project of Shandong Mobile;
- In June, 2011, 10G SDH transmission analyzer was exported to America;
- In June, 2011, 10G SDH transmission analyzer, gigabit Ethernet testing instrument and optical multimeter were exported to South Africa;
- In July, 2011, gigabit Ethernet testing instrument was exported to Indonesia;
- In August, 2011, Wuhan Telecommunication Devices (WTD) purchased handheld optical attenuator;
- In September, 2011, Harbin Railway Administration purchased OTDR, light source optical power meter and other testing instruments;
- In September, 2011, gigabit Ethernet testing instrument was shortlisted in the project of Vodafone in bulk;
- In November, 2011, ZTE purchased 10G SDH transmission testing instrument and Ethernet testing instrument;
- In December, 2011, Zhejiang Telecom purchased 10.7G ONT transmission analyzer;

OPWILL CHRONICLE of EVENTS

- In February, 2012, 10.7G OTN transmission analyzer was shortlisted in the project of Shanghai Guangdian Electric Group;
- In April, 2012, China Comservice Nanjian Corporation purchased OTDR in bulk;
- In June, 2012, SDH transmission analyzer was shortlisted in the project of China Petroleum;
- In July, 2012, Beijing Unicom purchased PON OTDR in bulk;
- In August, 2012, whole series OPWILL products were once again shortlisted in the annual procurement project of China Mobile with 6 products in transmission and OTDR family exclusively shortlisted and PTN product ranking the first.
- In August, 2012, PON OTDR won the bidding of Jiangsu Unicom project;
- In September, 2012, OTDR was shortlisted in Hubei Electric Power;
- In September, 2012, Xinhua News Agency purchased OTP6126 Ethernet testing instrument for communication support during London Olympic Games period;
- In October, 2012, UTSTARCOM purchased gigabit and 10-gigabit Ethernet instruments;
- In November, 2012, general OTDR and PON OTDR were shortlisted in the project of Chongqing Electric Power;
- In December, 2012, OTDR and PON OTDR were shortlisted in the project of Hebei Unicom;
- In December, 2012, OTDR, PON OTDR and gigabit/10-gigabit Ethernet testing instruments were shortlisted in the project of Chongqing Electric Power;
- In June, 2013, Anhui Mobile purchased shortlisted OPWILL products in bulk;
- In July, 2013, Yunnan Mobile purchased shortlisted OPWILL products in bulk;
- In August, 2013, 5 OPWILL products ranked the first on the bid winner list of China Unicom's annual procurement project of testing instruments, including 10G transmission testing instrument (10G/2.5G OTN/SDH/MSTP) and 4 OTDR products;
- In October, 2013, 3 OPWILL products ranked the first on the bid winner list of China Telecom annual procurement project of instruments;
- In December, 2013, 10GE Ethernet testing instrument was shortlisted in the project of Guangdong Mobile;
- In December, 2013, fiber link testing instrument, and 2.5G/10G core network multiservice testing instrument won the bidding of the project of Shanghai Unicom;
- In July, 2014, 8 OPWILL products ranked the only on the bid winner list of China Mobile's annual procurement project for testing instruments, including 10G OTN/SDH/MSTP, 10G SDH/MSTP, 2.5G SDH/MSTP, 155M SDH, GE PTN Protocol Analyzer, GE tester, 45dB OTDR and PON OTDR.



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Source Industrial Supply
Phone: +1-505-550-6501 and +1-505-565-5102 Fax: +1-505-814-5778
Email: info@sourceindustrialsupply.com
Web: <http://www.sourceindustrialsupply.com>

