OTM2620

100G Ethernet/OTN Test Module

OTM2620 100G Test Module is a new modular product, which is released by OPWILL in 2015. This module is designed for satisfying the current increasingly test demand of Core Network and MAN 100GE/40GE and OTU4/OTU3E1/OTU3E2/OTU3 such high speed network performance and stability.

This module is compatible with OTP6200v2 (OPWILL Intelligent Network Test Platform).

- CFP interface for 100GE and OTU4 Applications;
- QSFP28 interface support with QSFP28 and CFP-to-QSFP28 Adapters;
- QSFP28/QSFP+ interface for 40GE and OTU3E1/OTU3E2/OTU3 Applications;
- External clock interface;
- 200ppm clock offset generation;
- Eye diagram reference clock output;
- Soft LED indicator.

OPWILL TECHNOLOGIES (BEIJING) CO., LTD.

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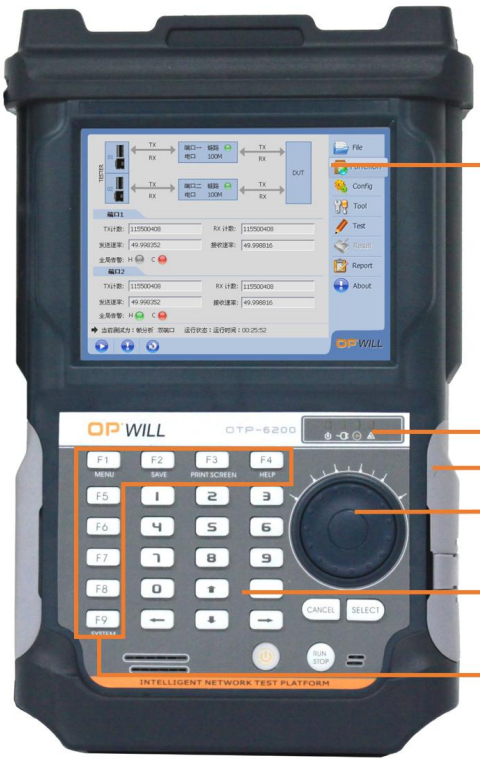
Platform Briefs: OTP6200



Colour Touchscreen

Advanced TFT transflective display provides prefect visibility in any sunlight conditions. Graphical menu makes your operation easier and faster.

LEDs

LEDs offer crucial test information

Interfaces

USB A/B and RJ45

Dial

Rugged and durable

Number Keys

Conveniently input number and IP address

Function Keys

Quickly achieve various configurations

- Compact and lightweight designed;
- Graphical user interface, easy to operate;
- 6.5 inches outdoor-enhanced LCD colour touch screen;
- Ultra-high capacity field-exchangeable Li-ion battery pack extends testing time;
- Powerful modular intelligent network test platform;
- Dial, number keys and function keys for flexible scrolling and selecting;
- Remote control by PC using 10/100M Base-T port.

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100G Ethernet/OTN Test Module

Key Feature:

Ethernet Test:

- Optical 100G/40G Ethernet testing;
- Optical Lane BERT and CAUI-4/XLAUI Lane BERT;
- PCS Layer Testing with Skew generation and monitoring;
- Multi-stream testing up to 512 independent streams;
- Q in Q, MPLS, MPLS-TP support;
- Error Injection and Alarm Generation.
- RFC2544 and Y.1564 SLA testing;
- Service Disruption Measurements;
- IPv4 and IPv6 traffic generations;
- BERT, loopback testing at Layer1 to Layer4;
- 100G/40G packet capture with OPWILL Capture Software decode;

OTN Test:

- OTN testing for OTU4/OTU3E1/OTU3E2/OTU3;
- Complete multi-stage Mapping/Multiplexing;
- Ethernet over OTN;
- Service Disruption Measurements;
- Overhead monitoring and byte decoding;
- Terminate and Through test modes;
- Per-lane optical power and wavelength measurements;
- External clock reference interface;
- Eye diagram reference interface;
- Error Injection and Alarm Generation.

Transceiver Test:

- Optical Lane BERT;
- PCS lager testing with skew generation and monitoring;
- Transmit and receive optical power measurement;
- Module status display.

Application

- OTN Core Network, MAN development, installation, and maintenance;
- Carrier Ethernet infrastructure manufacture, installation, and maintenance;
- Mobile Front haul and Backhaul Network installation, and test;
- BERT, RFC2544, and SLA verification;
- 100G/40G data stream generation and analysis.

General Specifications: OTP6200 + OTM2620

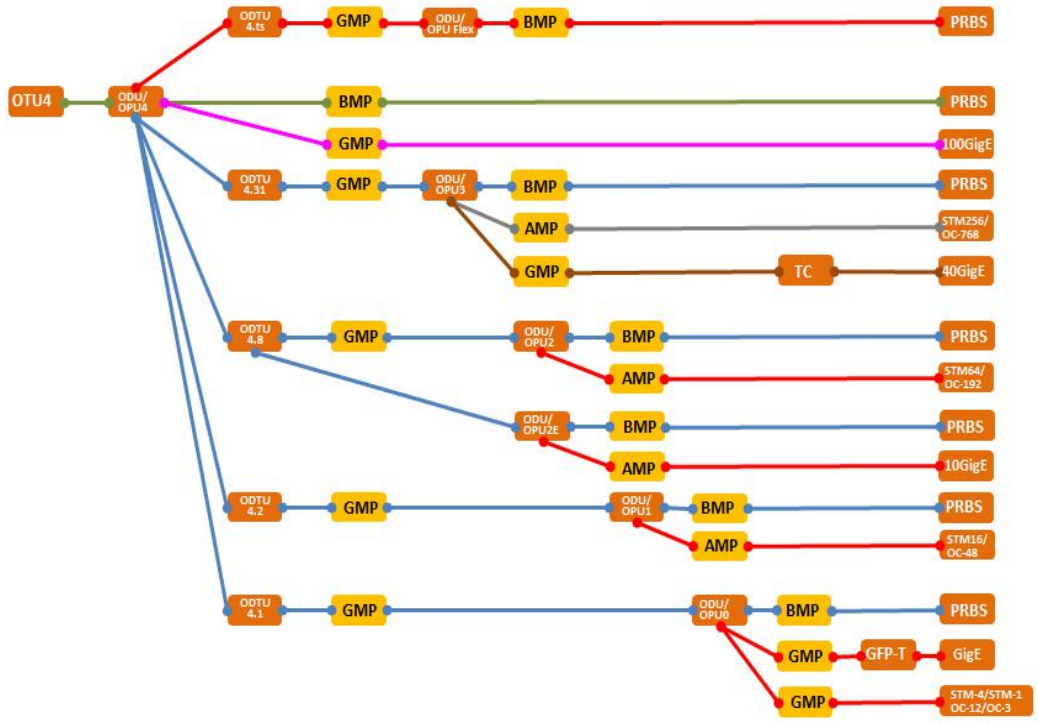
GENERAL SPECIFICATIONS	
User Interface	
Screen	6.5 Inch TFT Touch Screen (640 x 480);
Other Interface	
USB	• USB2.0, A type, 2; • USB2.0 Mini B type, 1;
Ethernet	Ethernet 10/100, RJ45;
Audio	3.5mm Audio Interface;
Storage	16G;
Physical Specifications	
Temperature	• Operating: -10°C to 50°C; • Storage: -40°C to 70°C;
Relative Humidity	0% to 95% (non-condensing);
Size(H×W×D)	• OTP6200: 319mm x 202mm x 105mm; • OTM2620: 50mm x 97mm x 259mm;
Weight	• OTP6200: 2.8kg; • OTM2620: 1.2kg;
Vibrancy	10Hz to 500Hz < 1.5g (on 3 main axes);
Mechanical Shock	6 sides, 8 edges < 760cm, according to GR-196-CORE;
EMC	• EN55022/CIPSR22; • EN61000-3-2; • EN55024;
Battery and Power Supply	
Battery	• Rechargeable Li-Ion batteries; • Working time: 1 hour (typical for 100G Ethernet test); • Charging time: 3 hours (typical: 25°C);
Power Source	• Input: 100-240VAC, 50-60Hz, 2A; • Output: 19VDC, 4A.

Technical Specifications: OTM2620

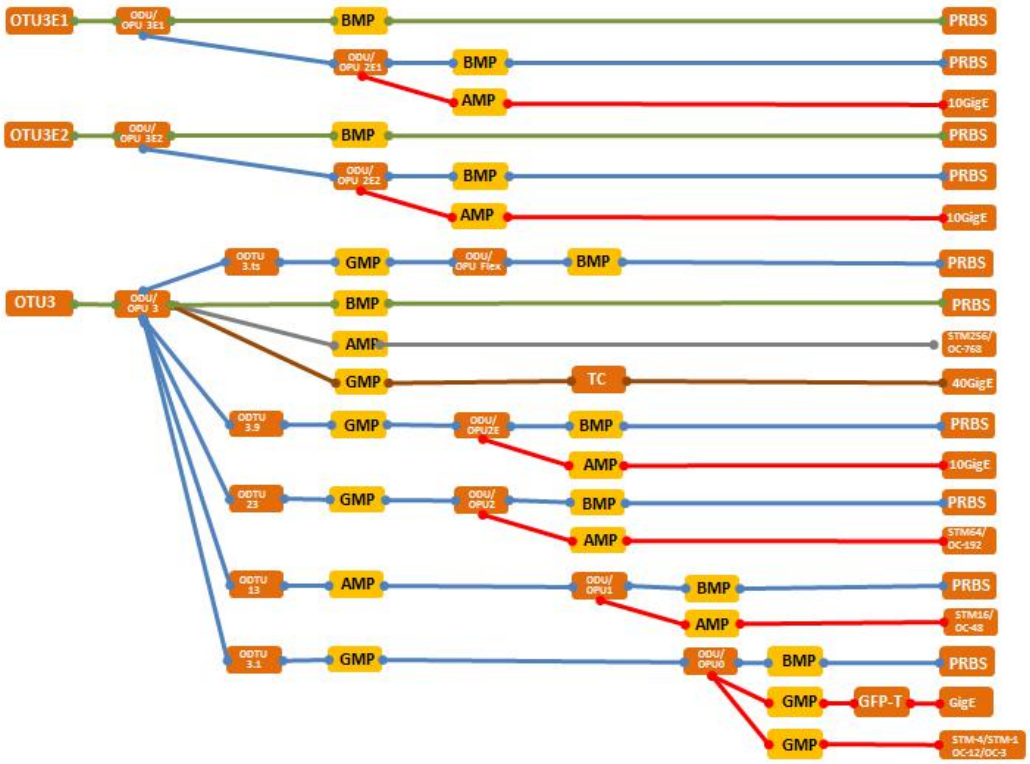
OTN

OTU4/OTU3/OTU3E1/OTU3E2	
Interface	OTU4 optical interface: CFP, 1 port.
Frame	• In accordance with ITU-T G.709; • FEC: In accordance with G.709, RS (255,239), enable to control.
Extern Clock	• Termination: 50Ω; • Connector: SMA.
Operator Mode	• Pointer-to-pointer mode; • Through mode.
Framing	ITU-T G.709.
Receive Single Rate	• ±200ppm; • Frequency deviation indication resolution: ±0.1ppm.
TCM Frame Format	• ITU-T G.783, G.707 Annex D and Annex E, POH bytes: • HP-N1 *(SDH)*, • LP-N1 *(SDH)*, • LP-N2 *(SDH)*, • Z5*(SONET)*, • Z6 *(SONET)*; • TCM access point identifier (Apid): 15 bytes ASCII sequence, CRC-7.
Transmitter Clock	• Internal clock: 4.6ppm ±200ppm (0.1ppm step); • Received signal clock; • External clock: 2.048MHz, 2.048Mbps, 1.544Mbp.
Scrambling	ITU-T G.709 and G.sup43

OTN Mapping:OTU4



OTN Mapping:OTU3/OTU3E1/OTU3E2



OTU4/OTU3/OTU3E1/OTU3E2 Test	
OTN Alarm	**Alarm can be detected:** • OUT: OTU-AIS, LOF, OOF, LOM, OOM, SM-TIM, SM-BIAE, SM-BDI, SM-IAE; • ODU: ODU-AIS, ODU-OCI, ODU-LCK, PM-TIM, PM-BDI; • ODU Multiplex: ODU-LOF, ODU-OOF, ODU-LOM, ODU-OOM; • OPU: PLM, OPU-MSIM,CSF, LSS; • TCM: TCMi-TIM, TCMi-BIAE, TCMi-BDI, TCMi-IAE (i=1-6); • OTL: LOF, OOF, OOR, LOR, OOM, LOM, ILA/OLA. **Alarm can be generated:** • OUT: OTU-AIS, LOF, OOF, LOM, OOM, SM-TIM, SM-BIAE, SM-BDI, SM-IAE; • ODU: ODU-AIS, ODU-OCI, ODU-LCK, PM-TIM, PM-BDI; • ODU multiplex: ODU-LOF, ODU-OOF, ODU-LOM, ODU-OOM; • OPU: LSS, CSF; • TCM: TCMi-TIM, TCMi-BIAE, TCMi-BDI, TCMi-IAE (i=1-6); • OTL: LOF, OOF, OOR, LOR.
OTN Error	**Error can be detected:** • OUT: FAS, MFAS, SM-BEI, SM-BIP8, FEC-Correctable, FEC-Uncorrectable; • ODU: PM-BIP8, PM-BEI; • OPU: BIT; • TCM: TCMi-BEI, TCMi-BIP8 (i=1-6); • OTL: FAS, MFAS, LLM. **Error can be generated:** • OUT: FAS, MFAS, SM-BEI, SM-BIP8; • ODU: PM-BIP8, PM-BEI, ODU-FAS; • OPU: BIT; • TCM: TCMi-BEI, TCMi-BIP8 (i=1-6); • OTL: FAS, MFAS, LLM.
Mapping Adjustment	• Adjustment: (each AMP) -1/+1/+2; • Cm (t) (each GMP): based on Cm (t) (ppm).
BERT Pattern	**Support to generate and detect:** • PRBS9, PRBS11, PRBS15, PRBS20, PRBS23, PRBS31. **Support reversed PRBS pattern:** • 16 bit user define pattern.
FEC	ITU-T O.182.
Overhead	**Overhead can be edited:** • OTU: FAS, SM-TTI, SM-BEI/BIDE, BDI, IAE,GCC0, RES; • ODU: PM-TTI, PM-BEI, BDI, IAE, FTFL, APS/PCC, GCC1, GCC2, RES, EXP, advanced TCMi-TTI (i=1-6), TCMi-BEI/BIAE, TCMi-BDI, TCMi-IAE, TCMi-RES (i=1-6); • OPU: PSI. **Decode:** • Advanced TTI (SM, PM, TCMi (i=1-6)), FTFL, PT. **Support to capture and display current overhead;** **Support to capture 256 continuous frames overhead bits.**
Through	• Though mode; • Overhead rewrite mode; • Enable/disable FEC encoding and decoding.
OTU4/OTU3/OTU3E1/OTU3E2 Result	
Situation	**Display information of current situation:** • Alarms and errors; • Input power of optical signal; • Frequency ; • Frequency deviation.
Statistics	Log: alarm (s), error (quantity/ratio).

OTU4/OTU3/OTU3E1/OTU3E2 Result	
APS	**APS(Automatic protection switching):** • APS time; • Independently select start and complete trigger; • Select trigger from advanced OUT to ODU; • Display and save APS time, frequency, pass/fail, min/max/avg value. **APS time resolution: 0.1ms.**
Loop delay	• Resolution: 0.1us; • Maximum: 10.0 s.

Ethernet

100G/40G Ethernet	
Interface	CFP to QSFP28,100GE, one; CFP to QSFP+,40GE, one
Configuration	Monitoring, generation, though mode
Encapsulation	Ethernet type II, IEEE802.3 with 802.2,IEEE802.3 with SNAP
Configuration, Monitoring, and Generation	
Stream Generation	**Stream quantity and speed:** • 512 stream generation and analysis in maximum; • Flexible data transmissions speed till reach the maximum line speed. **Stream sustained time mode:** • Continuous; • Burst; • Ramp; • N-frame; • N-burst; • N-ramp; **Frame size:** • Fixed; • Decreased; • From 64 to 16,000 bytes • Increased; • Random; **IP:** • Fixed IP identifier; • IPV4 and IVP6 address configuration for source and destination; • Address increment, Decrement and Random generation supported. **TCP/UDP address is able to be edited;** **Support PAUSE frame generation and response;** **User-defined traffic mix of unicast and broadcast frames.**
Stacked VLAN	**Support 3 layers VLAN, and VLAN tags parameters:** • Ethernet Type II 0x8100 (802.1Q), 0x88a8 (802.1ad), 0x9100, 0x9200, 0x9300; • User defined VLAN ID, CFI, and VLAN priority; • Address increment, Decrement and Random generation supported ***(Coming soon)***.
Clock	**Clock sources:** • Internal; • Received clock; • 2.048 MHz, 2.048 Mbps, 1.544 MHz, 1.544 Mbps; • Deviation: ±200 ppm (0.1-ppm steps); • The frequency deviation of received Ethernet signals can be measured against the internal clock.
Error	• FCS; • IP/UDP/TCP check sum; • CRC4 error; • Sequence error. **100Gbps:** • Invalid block type; • Invalid synchronisation code; • Invalid alignment flag; • BIP error.
Alarm	• No link; • Remote fault; • Local fault; • High BER.
PCS Deviation	• 100Gbp insert: 0-4096bits (TX channel); • Examine: relative deviation, marking mapping.
Status	• Link status; • Interface type; • Jabber detected; • Frames • MPLS/EoMPLS/VLAN; • Speed; • Signal; • Bit rate; • Speed of connecting port; • Indicators for utilisation, throughput and errored frames.

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Configuration, Monitoring, and Generation	
Performance Statistics	• Utilisation; • Throughput; • Frame rate.
Frame Statistics	• Total frames; • Total valid frames; • Unicast/Multicast/Broadcast frames; • Number of pause frames; • Number of VLAN frames; • Number of MPLS frames; • Total errored frames; • Number of oversized and undersized (runts) frames; • Number of FCS errored frames.
Frame Distribution Statistics	**Total valid/ frames:** • <64; • 64 to 127; • 128 to 255; • 256 to 511; • 512 to 1023; • 1024 to 1518; • >1518.
Stream Statistics	**Information for each stream:** • Frame loss count/rate; • Throughput; • Latency; • Packet jitter; • Frames and bytes received and transmitted.
Transmission Statistics	• Total frames; • Unicast/multicast/broadcast frames.
Filter	**Filter conditions:** • IP or MAC source address; • IP or MAC destination address; • Broadcast address; • Encapsulation type; • VLAN ID and VLAN tag priority; • MPLS; • TPC/UDP source and destination port.
BERT and Service Disruption Measurement	
BERT	**BERT:** • Generation and detection of test patterns; • Count of errors in received test pattern. **Pattern generation:** • Layer 1 to layer 4; **Frame loss count and frame loss ratio; Throughput measurement results display; Test patterns:** • PRBS 9; • PRBS 11; • PRBS 15; • PRBS 31; • HF test pattern; • CRPAT; • PRBS 20; • PRBS 23; • JTPAT; • SPAT; • User defined (32bits).
Error	• FCS; • IP/UDP/TCP check sum; • CRC4 error; • Sequence error.
Alarm	No link, and Remote fault.
Service Disruption	**Service disruption measurement activated as part of BER test:** • Max/avg service disruption time, resolution: 0.1 µs; • Number of service disruptions.
RFC2544	
RFC2544	**Switch/Router test and single ended network test modes:** • Throughput; • Frame loss; • Latency; • Back-to-back.
Service Activation Test	**ITU-T Y.1564 service activation test:** • Up to 512 services per port; • Colour-aware and non-colour-aware in combinations.
Y.1564 (Service Activation Test)	
Service Activation Test	**Test modes:** • One-way (uni- or bi-directional); • Round-trip. **Verification against service acceptance criteria:** • CIR; • EIR; • Frame transfer delay; • Frame delay variation; • Frame loss rate.

Y.1564 (Service Activation Test)	
Service Configuration Test	**Subtests for:** • CIR; • EIR; • Traffic policing. **Step duration:** • 1 s to 60 s (user programmable). **Results:** • Pass/fail indication; • FL (count/FLR); • FDV (min/avg/max (during measurement)). • IR (min/avg/max); • FTD;
Service Performance Test	**All services tested simultaneously at CIR;** **Duration:** • 15 min; • 2 h; • 24 h; • User defined. **Results:** • Pass/fail indication; • FL (count/FLR); • FDV (min/avg/max (during measurement)). • IR (min/avg/max); • FTD;
Advanced IP Test Tools IP	
PING	**For connectivity and configuration check:** • Round trip time (RTT); • Supports IPv4 address/TTL/URL.
Trace Route	**Trace IP route over IP network;** **Information per hop:** • Ping time; • Number of ping timeouts.
FTP Upload/ Download	**Simulation for FTP server and client test:** • IPV4; • User name and password; • File upload/download. **Result:** • Pass/fail; • Time display for upload/download.
HTTP	• IPV4; • WEB display or not.
Online Scan	• MAC; • VLAN ID; • IP; • MPLS label; • Port.
MPLS	
Number of MPLS Header	Up to 3 MPLS headers set by user.
Parameters	**User defined in each MPLS header:** • Label; • TTL fields; • Address increment, decrement and random generation *(Coming soon)*. • Exp;
Statistics	Number of MPLS-TP frames
Ethernet Frame Capture	
Capture Buffer Size	32Kbytes, When capture buffer full: stop.
Capture Frame Slicing	Can capture frame length by user defined.
Capture Data	CAP format for display in Wireshark.
Area to be edited	• B-label; • MAC source address; • I-label; • MAC destination address.

OTP6200 + OTM2620 Ordering Information

OTP6200+OTM2620 STANDARD CONFIGURAIOTN		
Module		Description
OTP6200		Test platform, support SDH, OTN, Ethernet, packet Ethernet, OTDR test modules;
OTM2620	100G Ethernet	100GE and OTU4 test module;
		One 100Gige Interface;
		Layer 1 to Layer 4 BERT test;
		Up to 16 streams generation and analysis with MAC/VLAN/IP/TCP/UDP;
		RFC2544 standard test with Throughput, Latency, Frame Loss, Back-to-Back and Jitter;
		Layer 1 to Layer 4 loopback and smart loopback test;
		Enable to drop data packet under loopback mode;
		Up to 100G streams generation with 3 Layer VLAN;
		Ping, Trace Route, FTP Download/Upload, and HTTP tools;
		Ethernet service disruption test;
		Packet capture and analysis to 100G rate;
		Bi-directional test
		CFP check and PCS test
		Layer 1 bandwidth statistics
		Remote control by PC
	OTN	One OTU4 test port;
		OTN overhead edit and monitoring;
		OTN Alarm generation and monitoring, error injection and monitoring;
		FEC test according with ITU-T O.182;
		APS and SDT test;
		100GE mapping over OTU4 test;
		Round trip delay test;
		CFP check and PCS test;
		Remote control by PC;
Accessories Code		Accessories Description
16080010		LC/PC to LC/PC full-duplex single-mode fibre, 3m, one;
16120080		SMA test cables, two;
14020560		1310nm-100G-10km SM-LC-QSFP28-LR4-DDM (with CFP to QSFP28 Adapter), one;
14020570		1310nm-40G-10km SM-LC-QSFP+ LR4 DDM (If select 40G Ethernet or OTN test function, this module will be selected), one;
16060010		3 pins adapter cable, one;
43170020		OTP6200 100-240V input and 19V output AC/DC power adapter, one;
18080010		OTP6200 disc include user manual and OPWILL remote control software, one;
19070060		OTP6200 package, one;
18010010		Factory test report, one;
18010020		Calibration certificate, one;
18040011		One year warranty service.

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OTM2620 OPTIONAL CONFIGURATION	
Optional Order Information	
Optional Ethernet Information	
OPAP-Y1564100GeEth	Y.1564 standard service configuration and performance test for SLA QoS with CIR/EIR/Traffic Dropped;
OPAP-IPv6100GeEth	IPv6 feature, the test interface can set IPv6 address and also can generate stream with IPv6;
OPAP-Scan100GeEth	Traffic scan according with destination MAC/IP, source MAC/IP, 3 Layer VLAN, 3 Layer MPLS in-service test;
OAPA-EPING100GeEth	Advance/Fast PING, PING segments of the IP one by one in one time;
OPAP-3MPLS100GeEth	Up to 100G rates generation with 3 Layer MPLS label;
OPAP-128Streams100GeEth	Up to 128 streams generation and analysis with MAC/VLAN/IP/TCP/UDP for 100G port;
OPAP-512Streams100GeEth	Up to 512 streams generation and analysis with MAC/VLAN/IP/TCP/UDP for 100G port;
OPAP-BaseA40GeEth	One 40Gige Interface (Open the 40G Ethernet test function)
Optional OTN Information	
OPAP-OHSeqCapture	SDH/OTN Overhead sequence capture
OPAP-EnhancedThrough	OTN enhanced through function
OPAP-ODU0Mapping	ODU0 function
OPAP-ODUFLEXMapping	ODUFLEX mapping function
OPAP-ODU1Mapping	ODU1 function
OPAP-ODU2Mapping	ODU2 and ODU2E function
OPAP-ODU3Mapping	ODU3 function (Option 2 is a default inclusion)
OPAP-RFC2544	RFC2544 (when the Payload is ETH，it is effective.)
OPAP-BaseA40GOTN	One OTU3 test port (Open the 40G OTN test function)
OPAP-OTU3E	OTU3E1/OTU3E2 test port (when select OTU3E, must select OTU3)
Optional Hardware	
43160031	OTP6200 lithium polymer rechargeable battery;
OPAP-Onewarranty	One year extended warranty service;
OPAP-Twowarranty	Two years extended warranty service.

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

Please visit our website for the further information: www. opwill.com

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