OTM2800

Synchronisation Anlysis Module

OTM2800 Synchronisation Analyser is specially designed for conducting clock synchronisation of PTN or Packet Ethernet.

It is developed in accordance with IEEE1588v2, SyncE, 1PPS+ToD, Ethernet, and E1 such standards, provides a complete clock, frequency, and time synchronisation test solution for operators.

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

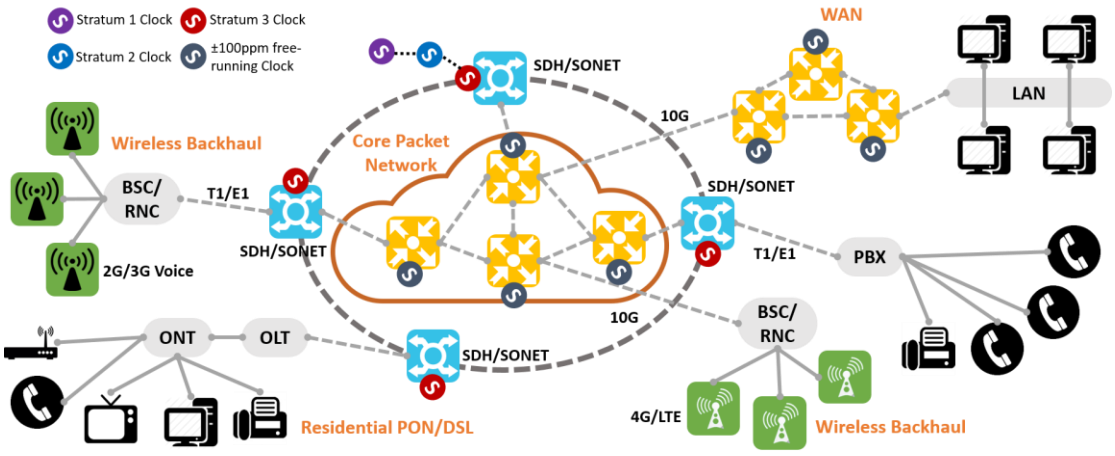
- Support 1588v2 testing, 1PPS+ToD testing, SyncE testing, 1PPS/PP2S testing up to 1000M;
- Support 10M to1000M rate packet Ethernet test functions, such as OAM, MPLS-TP, RFC2544, Y.1564 and so on;
- Support E1/T1 Testing.

OPWILL

OPWILL TECHNOLOGIES (BEIJING) CO., LTD.

OTM2800
Synchronisation Analysis Module

OTM2800 Synchronization Test Solution



FEATURES

- Support 1588v2, SYNC-E, 1PPS+ToD, and TDM;
- Integrated a rubidium or atomic GPS clock, which can keep GPS time signal for 2 hours, beneficial for some situation where is inconvenient for setting GPS antenna;
- Support to reproduce UTC time and clock with high precision;
- Support to test IEEE1588v2 time server, IP RAN/PTN/OTN/xPON infrastructures, and BS time synchronisation precision and performance;
- Support 1PPS+ToD, IEEE1588v2 PTP and SYNC-E mask and slave emulation testing;
- Support ESMC simulation and analysis, which is in accordance with ITU-T G.8264 standard;
- Support to conduct 7X24 continuous test to analyse drift performance in a long term situation for time and clock synchronisation;
- Support to calculate MTIE, TDEV;
- Support E1 BERT test;
- Support 1 Gbit/s data stream in maximum;
- Support RFC2544, includes Throughput, Frame Loss, Latency, and Back-to-Back;
- Support Y.1564 test.

OTM2800 Physical and Clock Specification

PHYSICAL SPECIFICATIONS			
Screen	6.4 inch TFT touch screen(640×480)		
Interfaces			
USB	USB, type A port,1; USB type B port, 1		
Ethernet	10/100M Base-T, RJ45（port）		
Other Parameters			
Storage	8G		
Size and Weight	319(H) x 202(W) x 105(D) mm; 2.8 kg		
Temperature	Operating: -10°C to 50°C; storage: -40°C to 70°C		
Relative Humidity	0% to 95% (non-condensing)		
EMC	EN55022/CIPSR22, EN61000-3-2, EN55024		
Battery and Power supply			
Battery	• Rechargeable Li-Lon battery; • Working time: 4 hour; • Charging time: <3 hours (typical: 25°C)		
Power supply	• Input: 100-240V AC, 50-60Hz, 2A; • Output: 15V DC, 2A		
CLOCK SPECIFICATIONS			
Internal Time Base			
	Rubidium Clock	Atomic Clock	
Stability	$5x10^{-11}$ (Typical 25℃)		
Warm up Stability	100s to < $3x10^{-12}$	100s to < $2x10^{-11}$	
Ageing Rate	24h: < $5x10^{-11}$ per month	24h: < $3x10^{-10}$ per month	
GPS Disciplining			
Internal GPS	12 channels, high sensitivity, 15ns		
Time Accuracy to UTC	±25ns		
Interfaces			
Time Input	• 1PPS+ToD; • 1PPS/PP2S; • IEEE 1588v2 PTP (Slave)		
Clock Input	• SyncE; • E1/2MHz; • 10MHz		
Output	• 1PPS+ToD; • E1/2MHz; • IEEE 1588v2 PTP (Master) • 1PPS/PP2S; • 10MHz;		
Reference Clock			
Standard	GPS		
Optional	• 1PPS+ToD; • 10MHz; • E1/2MHz; • SyncE		

OTM2800 Ethernet Functions (OPTIONAL) Specification

ETHERNET FUNCTIONS SPECIFICATIONS (OPTIONAL)		
Interfaces	• 10/100/1000M BASE-T Interface, one; • 100/1000M BASE-X Interface, one	
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 fame transmit and receive, and the frame rate reach 1448000 packets/s		
RFC2544		
• Throughput; • Back to back; • Frame loss; • Latency test;	• Support RFC2544 test on MAC layer and IP layer; • Frame size: defined by RFC, or by user	
Y.1564		
• CIR/EIR bandwidth; • Packet loss rate; • Latency; • Jitter;	• Test of network service configuration and performance as per ITU-T Y.1564, verifying if they meet agreed SLA	
BERT		
• BERT L1/L2/L3/L4, support random test of packet length		
Pattern	• PRBS 2E9-1; • PRBS 2E11-1; • PRBS 2E15-1; • PRBS 2E20-1;	• PRBS 2E23-1; • PRBS 2E31-1; • User-defined pattern; • Pattern reversion
Error Insertion	• IP check error; • UDP check error; • FCS;	• BIT error; • Insert 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; • IP checksum
Service Disruption Testing	• Error mode; • Non-flow mode; • Packet loss rate; mode;	Interruption time statistics includes • Minimum; • Maximum; • Latest; • Average; • Total interruption time; • Interruption amount

ETHERNET FUNCTIONS SPECIFICATIONS (OPTIONAL)		
Multi-Stream		
• Transmit up to 8(1G interface) data flow		

Configuration Parameter	• Packet size(46-16000);
	• Transmission mode:
	  • Continuous,
	  • N-frame,
	  • Burst,
	  • Increment,
	  • N-burst,
	  • 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;
		• 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		
• Analyse receiving information flow and provide statistics information according to a configurable filter group		
Ethernet Statistics		
Graph Display	• Multicast; • Broadcast; • Unicast; • Frame size distribution;	• Bandwidth; • Utilization; • Frame rate
Unit	• Rate percent; • Kbps; • Mbps;	• Gbps; • Other
Ethernet Statistic	• 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
Error Statistic	• FCS error frames; • BER; • Bit error count;	• IP Checksum error; • Other
RFC339 Jittering		
• Minimum, maximum, current, average value, and sample amount		
Intelligent Loopback		
• L1/L2/L3/L4 loopback and statistics		

ETHERNET FUNCTIONS SPECIFICATIONS (OPTIONAL)	
Double-end Test Mode	
• 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 (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	• Support FTP/HTTP download test
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	• Analyse if frame structure of SAToP meets RFC4553; • Analyse if frame structure of CESoPmeets RFC5086 and RFC4842
MPLS-TP Protocol Analysis	• Analyse 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
Business OAM Protocol Simulation	Simulate multi-business OAM packet, protocol segment, and transmission period flexibly configured, as per ITU-T Y.1731: • CCM, • LBM, • LBR, • LTM, • LTR, • LCK, • TST, • APS, • MCC, • LMM, • 1DM, • DMM, • DMR, • EXM, • EXR, • VSM, • VSR, • LMR, • AIS,

ETHERNET FUNCTIONS SPECIFICATIONS (OPTIONAL)	
PTN Function	
MPLS-TP LSP OAM Protocol Simulation	Simulate multi-business LSP OAM packet, protocol segment, and transmission period, as per ITU-T Y.1731+ RFC 5586(GACH)： • LSP CC, • LSP LB, • LSP TST, • LSP DM • AIS/ RDI, • LSP LCK, • LSP LM,
MPLS-TP PW Layer OAM Protocol Simulation	Simulate multi-business PW layer OAM packet, protocol segment, and transmission period, as per ITU-T Y.1731+ RFC 5586(GACH): • PW CC, • PW LB, • PW Lck, • LM, • PW AIS / RDI, • PW CSF, • PW, • DM
MPLS-TP Section Layer OAM Protocol Simulation	Simulate multi-business Section layer OAM packet, protocol segment, and transmission period, as per ITU-T Y.1731+ RFC 5586(GACH): • Section CC, • Section LB, • Section LM, • Section DM • Section RDI/AIS,
ITU-T G.8114 OAM Protocol Simulation	Simulate multi-business ITU-T G.8114 OAM packet, protocol segment, and transmission period, as per ITU-T G.8114: • CV, • LCK, • LMR, • EXM, • FDI, • TST, • LMM, • VSR, • LBR, • APS, • 1DM, • VSM, • LBM, • SCC, • DMR, • SSM, • EXR, • MCC, • DMM, • CSF
Ethernet Link OAM Protocol Simulation	• Analyse if Ethernet link OAM frame structure meets IEEE 802.3ah protocol; • Support diversiform message analysis: • Information, Event Notification, • Loopback Control, • Variable Request, • Organization Specific • Variable Response,
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.

OTM2800 PDH Test (OPTIONAL) Specification

PDH SPECIFICATION (OPTIONAL)				
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				
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	• 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: • BE; • BBE; • BBE rate; • ES;	• %ES; • SES; • %SES; • AS;	• %AS; • UAS; • %UAS	

OTM2800 Ordering Information

OTP6200+OTM2800 STANDARD CONFIGURAIOTN	
Module	Description
OTP6200	Test Platform, support SDH, OTN, Ethernet, Packet Ethernet, OTDR test modules
OTM2800	Synchronization Test Module
	Adapted to lab and field environments with optional internal measurement references—GPS and internal rubidium
	Fully stress-test elements that deliver synchronization 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;
	Support setup Sync, Announce and Delay_Req PTP Message frequency; Support PTP header setup, include clock Class, domain number and so on parameters setup
	Support PTP message statistics
	Measure recovered Time of Day (ToD) and Frequency (MTIE/TDEV) to specified limits (G.823, G.824, and G.8261.1.)
	Support IEEE1588v2(PTP),1PPS+ToD,1PPS/PP2S and Sync-E up to 1000M
	Measure2.048MHz/2.048bit/s and 10MHz recovered clock compliance to ITU-T G.823/G.824/G.8261.1 (MITE/TDEV)
Accessories Code	Accessories Description
43160031	OTP6200 2 Parallel Four Series Lithium Polymer Rechargeable Battery
43170020	OTP6200 19V AC/DC Power Adapter
16120020	GPS Receiving Antenna
16120030	GPS Receiving Feeder
16060010	2 Meters Power Cable
19070010	OTP6200 Package
16060090	2 Meter 75ΩBNC test line
16060040	5 types Ethernet UTP Twisted-pair, 3 Meter
16080010	Port—LC/PC, Single-mode, Simplex, 9/125, 3 Meter
14020090	1.25G 1310nm 15Km LC SFP Optical Module
18080010	OTP6200 Disc include user manual and OPWILL remote control software, one
19070010	OTP6200 Package, one
	Factory Test Report, one
	Calibration Certification, one
	One year warranty card, one

OTM2800
Synchronisation Analysis Module

OTM2800 OPTIONAL CONFIGURATION	
Synchronisation Optional Software	
OPAP-TimeReferASync	Use 1PPS+ToD and IEEE1588v2 PTP as reference time
OPAP-ClockReferASync	Use SyncE，2.048MHz,2.048Mbps,10MHz as reference clock
OPAP-PTP3MSASync	IEEE1588v2 PTP support Unicast and Multicast transmit method with IP layer
OPAP-SyncEwanderASync	SyncE Wander Test support
OPAP-FrequencyASync	Frequency test feature for SyncE，2.048MHz,2.048Mbps,10MHz
OPAP-EFrequencyASync	Advanced frequency sampling test function
OAPA-100FXASync	IEEE1588v2 PTP and SyncE test feature for 100M Base-X ports
OPAP-CaptureASync	IEEE1588v2 PTP,SyncE，1PPS+ToD massage capture and decode
PDH Optional Software	
OPAP-ESMCASync	SyncE ESMC test function
OPAP-E1Test	E1 BERT test function
Ethernet Optional Software	
OPAP-BaseAGeEth	One 10/100/1000M Base-T and one 1000M Base-X Gigabit Ethernet testing, include BER, Frame Analysis, RFC2544, RFC3393, Loopback, SDT, Packet capture and IP tools capability
OPAP-Y1564AGeEth	Y.1564 standard service configuration and performance test for SLA QoS with CIR/EIR/Traffic Dropped for GE
OPAP-IPv6AGeEth	IPv6 feature, the test interface can set IPv6 address and also can generator stream with IPv6 for GE
OPAP-ScanAGeEth	Traffic scan according with Destination MAC/IP, source MAC/IP, 3 layer VLAN, 3 layer MPLS in-service testing for GE
OPAP-EautoAGeEth	Advance Auto-Negotiation, Can set the remote equipment auto-negotiation the Speed & Duplex as you want for GE
OAPA-EPINGAGeEth	Advance/Fast PING, PING a segments of the IP one by one in one time for GE
OPAP-3MPLSAGeEth	Up to 1000M streams generation with 3 layer MPLS label for GE
OPAP-FXAGeEth	Dual 100M Base-X optical ports
Optional Hardware	
43160031	OTP6200 Lithium Polymer Rechargeable Battery
GA14020010	1.25G SFPOptical Module, 850nm, 550m, SX
GA14020020	1.25G SFPOptical Module, 1310nm, 10km, LX
GA14020120	1.25G SFPOptical Module, 1550nm, 40km, ZX

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

OPWILL TECHNOLOGIES (BEIJING) CO., LTD.

Add: Room 415, Digital Media Building, No.7 Shangdi Information Road, Haidian District, Beijing, PRC. 100085

Tel: +86(10)8277-1386/2866/3382

Fax: +86(10)8277-1782

Email: Sales@opwill.com