

100G Optical Transport Platform

A-1600 Series



- Flexible networking
- Super scalability
- Works with CWDM / DWDM / EDFA / OLPS / OTAP multi interface modules
- Supports multi data rates on SDH / SONET / POS / EPON / GPON / CPRI / SAN / ETHERNET
- MSA compliant
- Supports SNMP uniform network management platform, CLI, Web, NetRiver
- Supports 1+1 power back up, hot pluggable, AC or DC

A1600 series OTP products are new generation optical transmission platforms supporting high capacity, multi services connection. It bears advantages of high service integration, high terminal density, multi services, flexible configuration etc, it supports C/S graphic management interface based on SNMP protocol, showing clear bug position for maintenance team and saving maintenance cost.

A1600 platforms are widely used in Telcos, Broadcast & TV, Power grid, Education, Cloud computing, IT security. Catering for fully optical networks, they are applied in national/provincial/inter-city trunk lines.

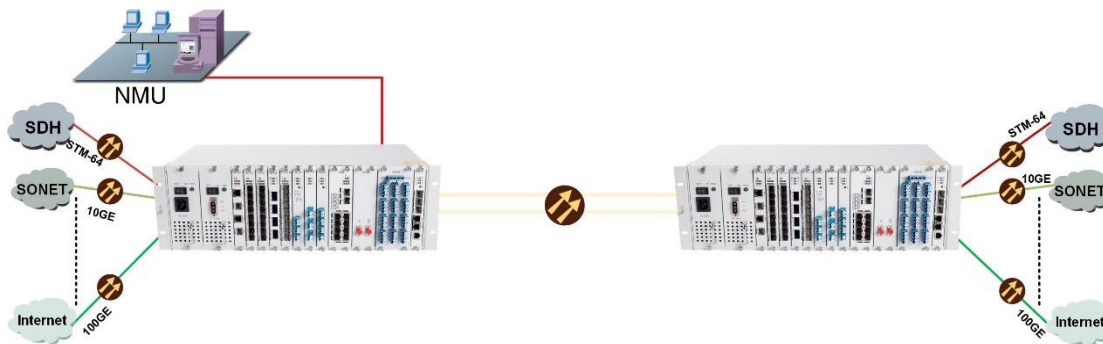
The platforms deliver independent & clear services, multiplex different channels, save fiber optic resources, are secure and reliable. They can facilitate customers to build optical transmission network featuring long haul, high reliability, flexibility, disaster proof. They are optimum solution for current shortage of fiber optic resources.

Typical Network Applications

The major advantages of multi services, high capacity and clear transmission cater for the telecom carrier's requirements of mega capacity and extra long haul, multi services operation and smooth future network expansion. Trunk core layer, intra-city core layer, intra-city convergence layer, point of presence, data centre interconnect etc.

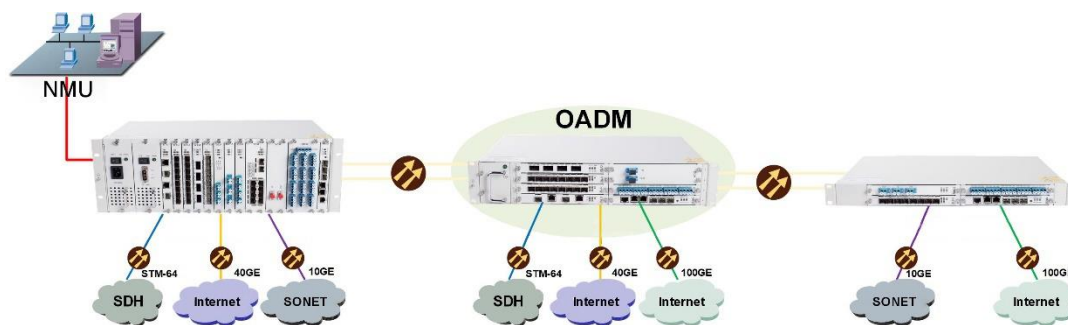
Point to point network

Multiplex single fiber or dual fiber to dozens of fiber channels, integrating multi services (SDH, SONET, Internet, SAN) in a single fiber or dual fiber.



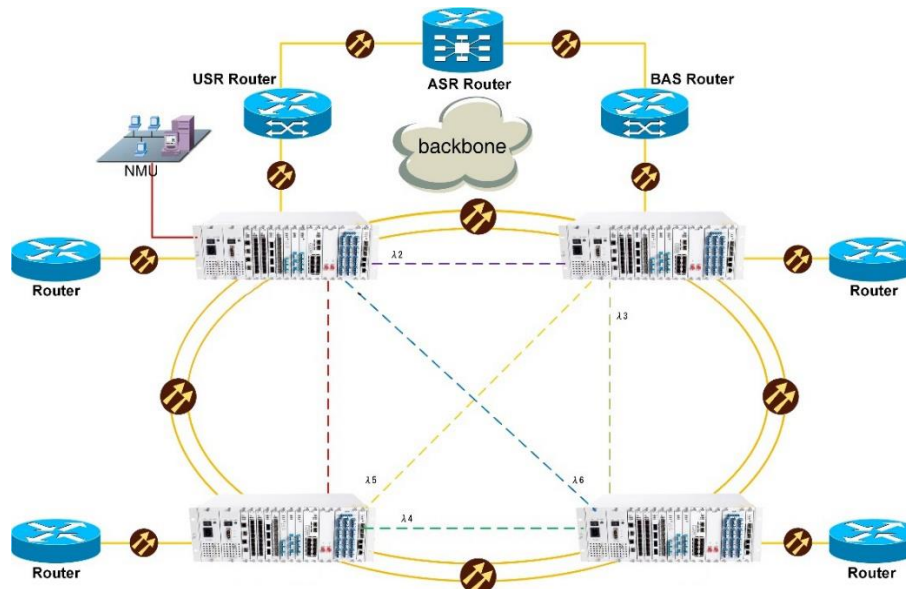
Daisy Chain network

Use WDM and OADM equipment, add/drop multi services in each node, interconnecting multi services (SDH, SONET, Internet, SAN) in a single fiber or dual fiber in intra-city network.



Ring network

Use WDM equipment, add/drop multi services in each node, interconnecting multi services (SDH, SONET, Internet, SAN) in a single fiber or dual fiber in intra-city ring network.



Network Management

Support SNMP unified network management platform

Comply with TMN, enabling comprehensive management from device level to network level

Supports Web network management graphic interface, interconnecting multi services (SDH, SONET, Internet, SAN) in a single fiber or dual fiber in intra-city ring network.



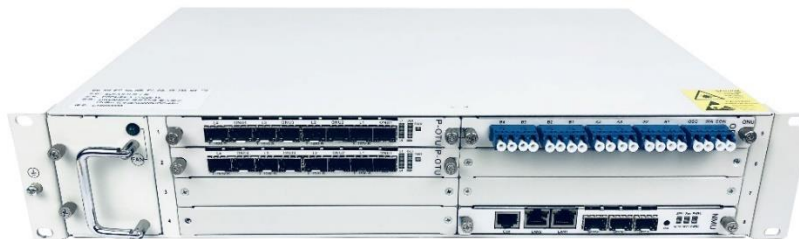
Optical Transmission Platform

A1600 1U, 2U and 4U platforms are highly integrated, compact in size. It features standard 19" 1U, 2U, 4U chassis, power supply (AC/DC optional), 1+1 backup, ready to install. 1U, 2U, and 4U transmission platforms support max 4, 8 and 16 services slots, mixed different interface modules (hot pluggable), in-band and out-of-band network management, flexible bandwidth per channel, remote update, easy maintenance.

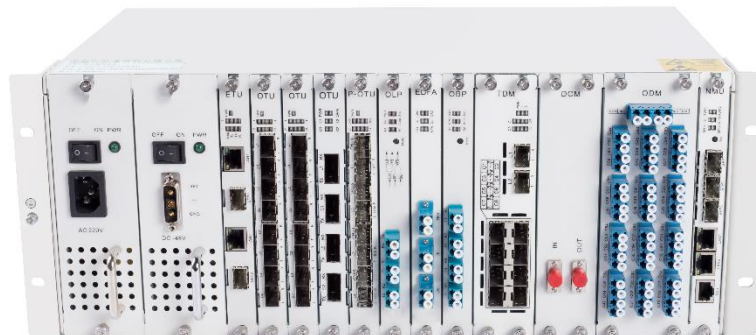
- Flexible networking, compact size, super scalability.
- Works with CWDM/DWDM/EDFA/OLPS/OTAP multi interface modules.
- Supports multi data rates on SDH/SONET/POS/EPON/GPON/CPRI/SAN/ETHERNET.
- Supports single fiber unilateral, single fiber bi-directional, dual fiber bi-directional chain/star/ring interconnection.
- MSA compliant, works with single-mode fiber (1310 nm/1550 nm), multi-mode fiber (850 nm/1310 nm), RJ45, OADM, add/drop wavelength en route.
- Supports SNMP unified network management platform, CLI, Web, NetRiver.
- Supports 1+1 power back up, hot pluggable, AC or DC.



1U transmission platform (A1604 series)



2U transmission platform (A1608 series)



4U transmission platform (A1616 series)

Item	Description
Max Capacity	1U: 4CH, 8CH, 16CH 2U: 4CH, 8CH, 16CH, 40CH 4U: 4CH, 8CH, 16CH, 40CH, 48CH, 80CH, 96CH
Wavelength	Compliant with ITU-T G.692, ITU-T G.695
Service Type	PDH, EPON, GPON SDH: STM-1/STM-4/STM-16/STM-64/STM-256 SONET: OC-3/OC-12/OC-48/OC-192/OC-768 FE, GE, 10GE, 40GE, 100GE, CPRI 1 to 7, POS FICON, ESCON, CATV
Optical Terminal Data Rates	2R transmission, each channel 32M to 111.81Gbit/s; 3R transmission, each channel 155Mbit/s, 622Mbit/s, 1.25Gbit/s, 2.488Gbit/s, 4GFC, 8GFC, 10GFC, 11.3Gbit/s, 40Gbis/s, 100Gbis/s;
Network Topology	Chain, Star, Ring
Fiber Cable Type	G.652, G.653 (not recommended), G.655
Network Management Type	CLI, NetRiver, Web
Dimension	1U: 482(W)× 44(H)× 285(D)(mm) 2U: 482(W)× 89(H)× 285(D)(mm) 4U: 482(W)× 177(H)× 285(D)(mm)
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Power Supply	220 V/AC, 50Hz; -48 V/DC (optional)
Safety & EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	1U: <120 W 2U: <200 W 4U: <300 W

Network Management Module (NMU)

NMU interface module is special module designed for A1600 series products; it can manage all devices under A1600 platform. NMU embeds high speed ARM processor with strong data processing, provides management interfaces NetRiver, Web, CLI. Both Server edition (C/S structure) and Standalone edition are available. Ideal network management solution to networks with different scale for telcos and enterprises.



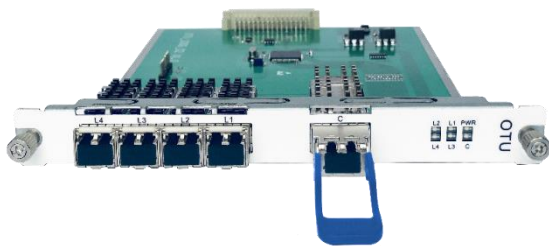
NMU interface module (A1600 series)

- hot pluggable, its failure will not affect other interface modules.
- Local/remote upgrade simultaneously, not affecting operation of other interface modules.
- Unified SNMP network management platform, CLI, Web, NetRiver.
- In-band and out-of-band network management, 3 SFP ports, 2 RJ45 ports, 1 Console serial port.
- Provides strong multi-layers network topology management, automatic recognition of network topology, generating intuitive graphics display for analysis.
- Complies with TMN, enabling comprehensive management from device level to network level: device management, monitoring and deployment, software upgrade, configuration, alarm and performance management.

Item	Description
Ports	Optical ports:3*SFP RJ45:2 Serial port:1 Console
Network Management	NetRiver, Web, CLI
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Dimension	177 (W)× 20(H)× 225(D)(mm)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	<15W

Multi Services Interface Module

A1600 multi services interface module can transform the input signals to standard CWDM or DWDM wavelength signals, ready for DWDM Mux/Demux to carry multiplexing transmission. Applicable to SDH, SAN, SONET, ETHERNET, OTN, DCI. It is the ideal solution to alleviate fiber optic shortages and mitigate dissipation en route.



100G OTU interface module



100G CFP2 OTU



100G CFP OTU



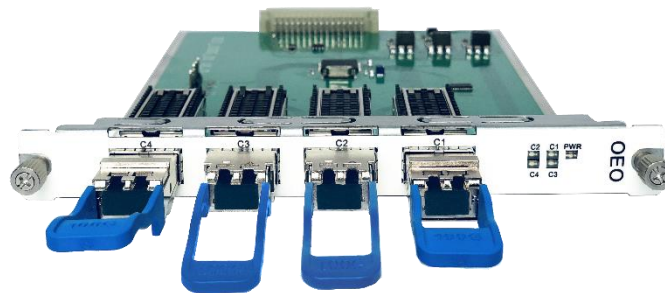
200G CFP OTU

- Supports CWDM/DWDM transmission, wavelength conversion.
- Multi services acceptable: 100G Base-SR4/CWDM4/LR4/PSM4/OTU4.
- Unified SNMP network management platform, CLI, Web, NetRiver.
- CDR, optimize output, DDM, Automatic switch off without signal.
- Shut down terminal by software.
- 100G OTU: Each board supports 1CH/2CH 103.125Gbit/s to 111.81Gbit/s unilateral or bilateral.
- 100G CFP2 OTU: Each board supports 2CH 100Gbit/s Bilateral or 4CH unilateral.
- 100G CFP2 OTU: Works with 100G CFP2 Coherent transceiver or 4*25G CFP2 non-coherent transceiver.
- 100G CFP OTU: Each board supports 1CH 100Gbit/s Bilateral or 2CH unilateral.
- 100G CFP OTU: Works with 100G CFP Coherent transceiver or 4*25G CFP non-coherent transceiver.
- 200G CFP OTU: Each board supports 2CH 100Gbit/s Bilateral or 1CH 200G Bilateral.

Item	Description
Max Capacity	100G OTU: 1*100G bilateral 1*100G unilateral 100G CFP2 OTU: 2*100G bilateral 4*100G unilateral 100G CFP OTU: 1*100G bilateral 2*100G unilateral 200G CFP OTU: 2*100G bilateral 1*200G bilateral
Wavelength Range	CWDM:1271 to 1611 nm DWDM:C-Band (100GHZ or 50GHZ)
Applicable Services	SDH, SAN, SONET, ETHERNET, OTN
3R Technology	3R: Re-amplifying, Re-timing, Re-shaping
OSNR Limit (200G CFP OTU)	±55000 ps/nm
Network Management	CDR (DDM), Automatic switch off without signal, setting bilateral or unilateral.
NMU Mode	CLI, NetRiver, Web
Dimension	100G OTU: 177(W)× 20(H)× 225(D)(mm) 100G CFP2 OTU: 177(W)× 40(H)× 225(D)(mm) 100G CFP OTU: 177(W)× 40(H)× 225(D)(mm) 200G CFP OTU:
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	100G OTU: <13 W 100G CFP2 OTU: <27 W 100G CFP OTU: <20 W 200G CFP OTU: <21 W

Amplification Board (100G OEO)

100G OEO amplification board reshape optical signals by optical-electrical-optical transforming, Re-amplifying, Re-shaping, Re-timing (3R), thus transform the input signals to standard CWDM or DWDM wavelength signals, ready for DWDM Mux/Demux to carry multiplexing transmission. Applicable to SDH, SAN, SONET, ETHERNET, OTN, DCI. Ideal solution to alleviate fiber optic shortage and mitigate dissipation en route.



100G OEO module (A1600 series)

- Applicable to SM/MM wavelength conversion, optical application.
- Supports unilateral relay amplification or bilateral relay amplification.
- Supports 2CH 100G bilateral or 4CH 100G unilateral input.
- Multi services acceptable: 100G Base-SR4/CWDM4/LR4/PSM4/OTU4.
- Unified SNMP network management platform, CLI, Web, NetRiver.
- CDR, optimize output, DDM, Automatic switch off without signal.
- Shut down terminal by software.

Item	Description
Max Capacity	2*100G bilateral 4*100G unilateral
Wavelength Range	CWDM:1271 to 1611 nm, MM:850 nm, 1310 nm DWDM:C-Band (100GHZ or 50GHZ)
Applicable Services	SDH, SAN, SONET, ETHERNET, OTN
3R Technology	3R (Re-amplifying, Re-timing, Re-shaping)
Network Management	CDR (DDM), Automatic switch off without signal, setting bilateral or unilateral.
NMU Mode	CLI, NetRiver, WEB
Dimension	177 (W)× 20(H)× 225(D)(mm)
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	<16W

Optical Amplifier (EDFA)

EDFA amplification module is designed to accompany with DCM for long-haul digital fiber optic transmission. Its core parts consist of reliable PUMP laser, unique APC (Automatic Power Control), ATC (Automatic Temperature Control), generating stable power output and great reliability. Sophisticated GFF (Gain Flat Filter) and advanced optical route design optimize the flatness and noise.



EDFA amplification module (A1600 series)

- Supports optical amplification of C-band DWDM system.
- Supports amplification of optional OSC signal input.
- Max saturated output +23 dB, Minimum input -35 dB.
- Booster amplification, Line amplification, Pre-amplification.
- Unified SNMP network management platform, CLI, Web, NetRiver.
- It can monitor: PUMP drive current, PUMP power output, PUMP switch, PUMP temperature, input power, output power, module temperature.
- It can configure PUMP switch, AGC mode and APC mode.
- Supports optical monitoring port (MON).

Item	Description
Wavelength Range	1528 nm to 1565 nm
Input Range	-35 dBm to +6 dBm
Saturated Output	+23 dBm
Max Gain	30 dB
Noise Index	4.5 dB to 6 dB
Gain Flatness	1.0 dB
Input/Output Isolation	30 dB
Input/Out Echo Loss	45 dB
Output Pump Leakage	-30 dBm
Polarization-Dependent Loss	0.5 dB
Polarization Mode Dispersion	0.5ps
Network Management	CLI, NetRiver, Web
Dimension	177 (W)× 20(H)× 225(D)(mm)
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	<30W

Semiconductor Optical Amplifier (SOA)

SOA amplification module is designed to amplify the O-band optical signals 1230 nm to 1360 nm, it works with 100G/40G/10G data traffic. Each module can amplify max 4 channels of service signals, it can be applied in information system or data transmission system.



SOA amplification module (A1600 series)

- Optical amplification of O-band signals.
- Applicable to 100G/40G/10G data rates.
- Max saturated output +10 dB, minimum input -20 dB.
- Unified SNMP network management platform, CLI, Web, NetRiver.
- It can monitor: PUMP drive current, PUMP power output, PUMP switch, PUMP temperature, input power, output power, module temperature.
- It can configure PUMP switch, APC mode.

Item	Description
Wavelength Range	1230 nm to 1360 nm
Input Range	-20 dBm to +3 dBm
Saturated Output	+10 dBm
Gain Per Channel	12 dB to 20 dB
Noise Index	7.5 dB to 8 dB
Gain Flatness	2.0 dB
Uniformity	1.0 dB
Stability	0.5 dB
Bias Current	300mA
Polarization-Dependent Gain	2.0 dB
Network Management	CLI, NetRiver, Web
Dimension	177 (W)× 20(H)× 225(D)(mm)
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	<24W

Fixed Dispersion Compensation Module (DCM)

DCM is widely used in long-haul high-speed communication systems to mitigate the optical dispersion, applicable to popular G.652&G.655 standard SM fiber cables. DCM Complies with slope compensation function, it can compensate wide wavelength dispersion in C-Band for G.652 SM fiber cables, optimize the residual dispersion of system.

Based on mature and reliable fiber optic technology, it can improve the performance of optical transmission system. The dispersion range at 1550 nm wavelength can reach -10 to -2100 ps/nm. We can customize DCM with special requirements for central wavelength and dispersion.



DCM fixed dispersion compensation module (A1600 series)

- Low insertion loss, low polarization mode dispersion.
- Wide wavelength dispersion compensation to DWDM system.
- G.652 fiber cable, C-band 100 % slope compensation (typical value).
- Performance compliant with Telcordia GR-2854-CORE.
- Reliability compliant with Telcordia GR-2854-CORE.
- Available in different package, connector and fiber length.
- Supports unified SNMP network management platform, CLI, Web, NetRiver.

Item	Unit	Specification				
Dispersion Compensation @ 1545 nm	Ps/nm	20 km	40 km	60 km	80 km	100 km
	Ps/nm	-340 ± 20	-670 ± 20	-1000 ± 20	-1340 ± 20	-1680 ± 20
Relative Dispersion @ 1545 nm	Nm-1	0.0036 % ± 20 % (general), 0.0036 % ± 10 % (advanced)				
Insertion Loss @ 1525 nm to 1565 nm	dB	≤3	≤4.8	≤6	≤7.6	≤8.8
Insertion Loss (Typ.) @1525 to 1565 nm	dB	≤2.8	≤4.4	≤5.8	≤7.2	≤8.4
Polarization Mode Dispersion	ps	≤0.7	≤0.8	≤0.9	≤1.0	≤1.1
Polarization Mode Dispersion (Typ.)	ps	0.2	0.3	0.4	0.5	0.6
Polarization-Dependent Loss	dB	≤0.1				
Brillouin Scattering Threshold	dBm	Minimum 6				
Nonlinear System	n ² /A _{eff}	Max 1.4*10 ⁻⁹				
Area Effective	A _{eff}	Minimum 20				
Network Management		CLI, NetRiver, Web				
Dimensions (W×H×D)	mm	177 × 20 × 225 (size varies based on the distance)				
Operating Case Temperature		-10 °C to 70 °C				
Storage Temperature		-40 °C to 80 °C				
Relative Humidity		5% to 95% (non-condensing)				
Safety And EMC		Compliant with FCC, UL, CE, TUV, CSA				
Power Consumption		<2W				

Tunable Dispersion Compensation Module (TDC)

TDC is based on temperature adjustment to compensate dispersion of fiber optic precisely, applicable to 10G/40G/100G long-haul optical transmission system and data center interconnect. Its main features are: long-haul compensation, high output accuracy, low insertion loss, low phase jitter, low group latency jitter, low PDL and PMD etc.



TDC tunable dispersion compensation module (A1600 series)

- low insertion loss, low polarization mode dispersion.
- High compensation to dispersion, compensation reach to 60km.
- Clear transmission, no alteration of optical signals.
- Wide wavelength dispersion compensation to DWDM system.
- Supports unified SNMP network management platform, CLI, Web, NetRiver.

Item	Description
Dispersion Compensation	± 700 nm or ± 1360 nm
Working Wavelength	C&C+ Band (1528.97 nm to 1567.13 nm)
Channel Spacing	50 GHz or 100 GHz
Absolute Dispersion Accuracy	± 25 Ps/ nm or ± 60 Ps/ nm
Insertion Loss	<4 dB
Echo Loss	50 dB
Polarization-Dependent Loss	0.1 dB
Max Output	27 dBm
Max Power Output	<4.5W
Network Management	CLI, NetRiver, Web
Dimension	177 (W)× 20(H)× 225(D)(mm)
Operating Case Temperature	-10 °C to 70 °C
Storage Temperature	-40 °C to 80 °C
Relative Humidity	5% to 95% (non-condensing)
Safety And EMC	Compliant with FCC, UL, CE, TUV, CSA
Power Consumption	<10W

Integrated WDM Equipment

Integrated WDM equipment is specially designed for DCI optical transmission network, its advantage is: clear transmission, low latency, high capacity, low consumption, easy operation, reliability and stability. Maximum service 1.2T is supported. Data rates 10G/100G/200G, applicable to SDH, SAN, SONET, ETHERNET, OT, DCI etc. It is innovative solution to tight fiber resource and high dissipation optical route.



- 10G *48CH or 100G*12CH converged fiber optic transmission.
- Ultra-high integration, front and rear ventilation, 1+1 protection, physical terminal isolation, clear transmission.
- Multi inputs:8GFC/10GE/100G Base-SR4/CWDM4/LR4/PSM4/OTU4
- SNMP unified network management platform, CLI, Web, NetRiver.
- CDR, optimize output, DDM, Automatic switch off without signal.
- Shut down terminal by software.

Item	Description
Max capacity	12*100G bilateral 48*10G bilateral
Wavelength	DWDM:C-Band (100GHZ or 50GHZ)
Service type	SDH, SAN, SONET, ETHERNET, OTN
Transmission reach	10km, 40km, 80km optional
Network protection	1+1 protection
Network management	CDR(DDM), Automatic switch off without signal, unilateral or bilateral service, in-band and out-of-band network management
network management type	CLI, NetRiver, Web
Dimension	482.6 (W)× 44(H)× 600(D)(mm)
Operating case temperature	-10 °C to +70 °C
Storage temperature	-40 °C to 80 °C
Relative humidity	5% to 95% non-frost
Safety and EMC	Compliant with FCC, UL, CE, TUV, CSA
Power supply	AC 90V to 264V 50/60HZ DC -36V to 60V
Power consumption	<200W

Ordering Information

Product Name	Variable	Options
A16XX-Y-Z	XX = Chassis	04: 1RU chassis 08: 2RU chassis 16: 4RU chassis
	Y = Wavelength	CWDM: CWDM DWDM: DWDM or Mixed
	Z = System Configuration	1: 1U 4slots & 1U 3slots 2: 2U 8slots 4: 4U 16slots
		I: Integrated case C: Compact case
A1600-NMU-X-Y-Z	X = System Type	OSC1: 1 OSC channel OSC2: 2 OSC channel NA: no OSC channel
	Y = Reach	S: <40 km M: 40 km to 80 km L: 80 km to 120 km
	Z = Enhance	E: Blackout alarm
	X = Form factor	OTU: 100G OTU CFP: CFP OTU CFP2: CFP2 OTU
A1600-X-Y	Y = Data Rates	1: 155M to 2.5G 2: 10G 3: 100G 4: 200G 5: 400G
	X = Amplification	P: Pre-amplifier L: Line amplifier B: Booster amplifier
		V: VOA
		M: Monitor
A1600-SOA-X	X = System	1: 1CH 2: 2CH
A1600-DCM-X	X = Reach to Compensate	XX: km
A1600-TDC-X	X = Connector	L: LC connector S: SC connector F: FC connector

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