

CC8800-Hybrid Introduction

Topvision DAA and R-OLT node CC8800-Hybrid is a high-performance and cost-effective cable/fiber network edge device, which is designed based on DOCSIS 3.0/ Euro-DOCSIS 3.0/ C-DOCSIS and GPON/ XG-PON/ XGS-PON.

Product Features

- Supports access to both CM and ONU terminals
- Supports DAA and R-OLT Node access architecture, supporting operation and management through remote distribute controller
- DOCSIS 3.0/ 2.0/ C-DOCSIS compatible, thus protecting existing investments
- Supports up to 32*DS and 8*US(DOCSIS3.0), supports 10Gbps+ throughput per fiber node
- Cable access provides maximum downstream rate of 1.6 Gbps and upstream rate of 200 Mbps
- Supports up to 1000 CM, no need to change optical node
- Supports DOCSIS, PacketCable/PCMM, EQAM and Optical receiver, which can satisfy applications including internet, voice, VoD and CATV application
- GPON/ XG-PON/ XGS-PON ONU compatible, with combo mode.
- Supports up to 2.5Gbps with GPON, 10Gbps with XG(S)-PON
- Supports up to 256 ONUs with XG(S)-PON combo ports
- Supports typical scenarios: DAA + GPON, DAA + XG(S)-PON
- Supports more installation methods: field installation, corridor installation, wall-mounted and hanging-cable installation
- Support a variety of technical management and maintenance modes: CLI/ Stand-alone Web/ EMS and other management modes



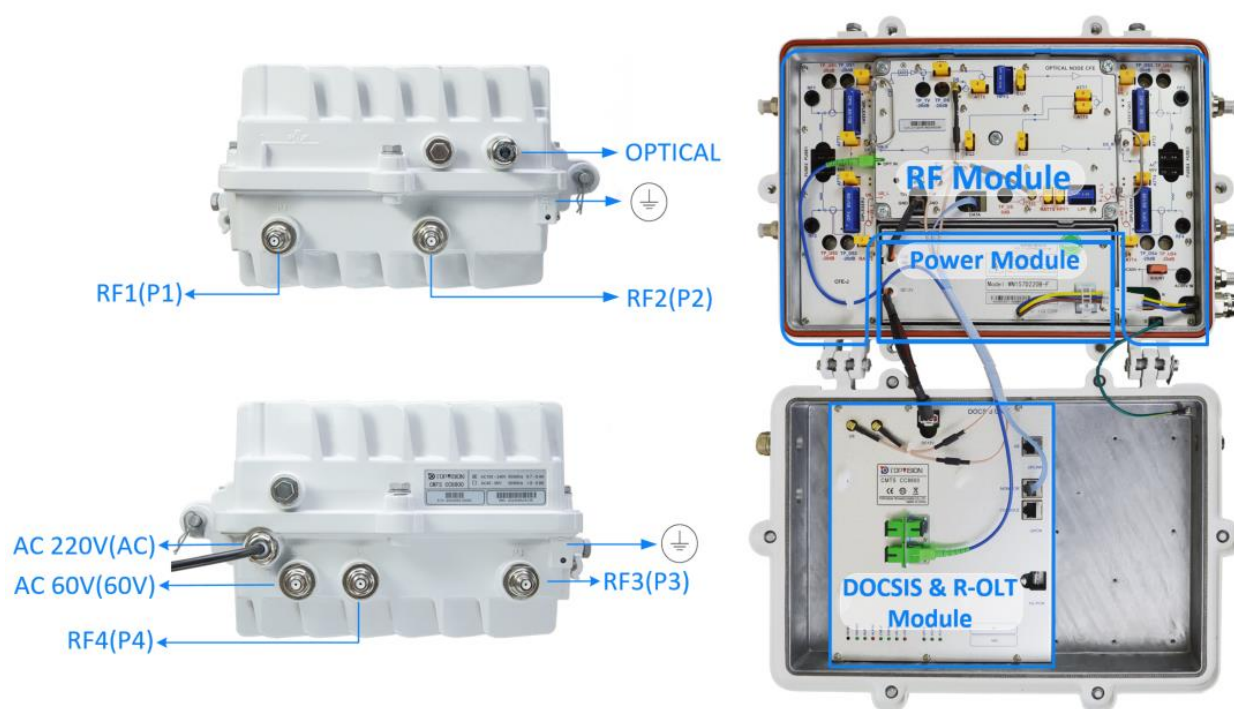
Performance and Specifications

CC8800-Hybrid Introduction

Dimensions: 168 mm (H) x 379 mm (W) x 256 mm (D)



CC8800-Hybrid is mainly composed of DOCSIS and R-OLT module, power module and RF module, and the external interface description is shown in the below.



- DOCSIS and R-OLT module:
 - provide 10G Combo SFP+ uplink Interface, support GE/EPON/GPON and 10G EPON/XG(S)-PON/10GE mode
 - DOCSIS: Support up to 32*DS and 8*US(DOCSIS3.0), and DOCSIS/ EQAM function
 - R-OLT: Support 1 GPON OLT port and 1 XG(S)-PON Combo OLT port, 1 port available simultaneously.
- RF module: provide optical receiver module of RF platform module, up to 1GHz.
- Power module: Local power supply (AC110/ AC220V) or cable-based power supply(AC60/ AC90V)
- (Optional) CWDM module
- (Optional) Industrial uplink grade SFP+ optical module
- (Optional) Industrial PON OLT SFP+ module

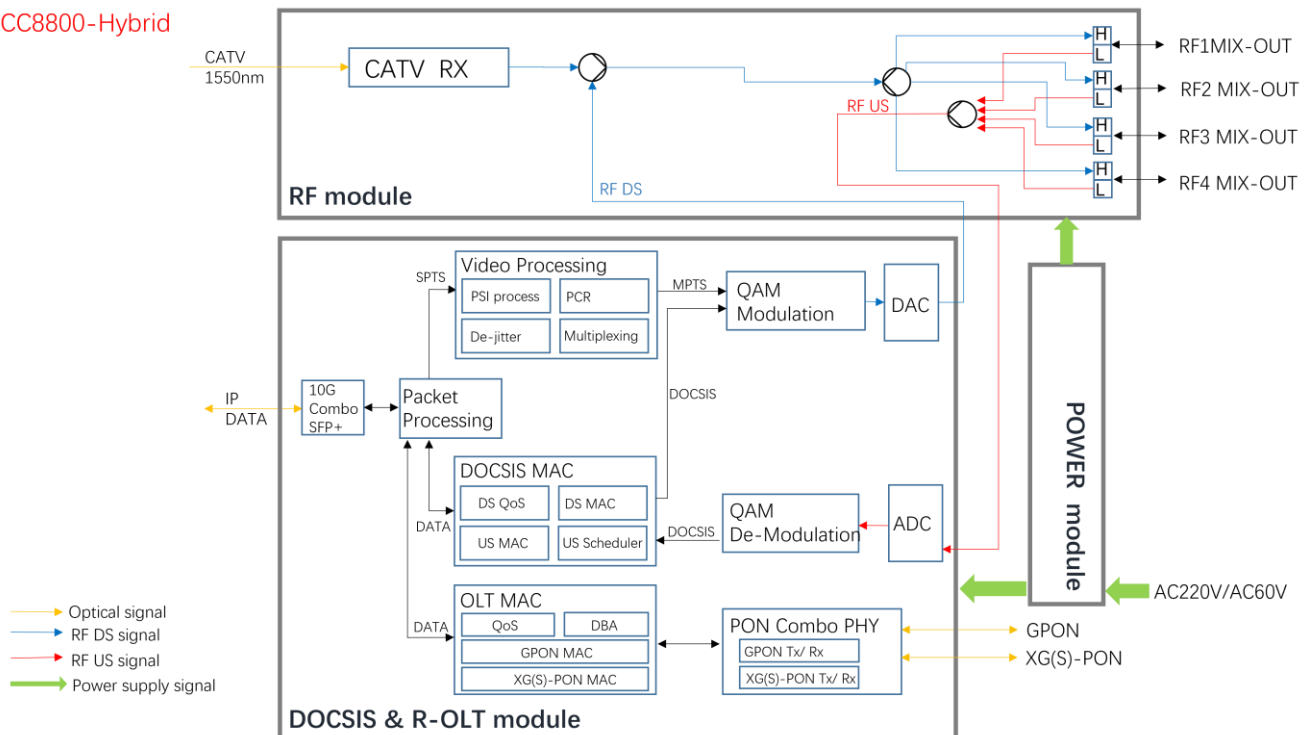
Overall characteristic

Parameter	Specification
Dimension	379mm×256mm×168mm
Product form	Field-type
Weight	<10kg (rough weight)
Ingress protection rating	IP67
Surge protection level	6 kV in both common and differentiated modes for the AC power port
Operating temperature	-40~+60°C(startup on -25°C)
Operating humidity	5%-95% (non-condensing)
Power supply	Local power supply/cable-based power supply
Power consumption	80W
Overcurrent protection	
Continuous overcurrent	≥15A
Burst overcurrent	≥25A
Device grounding	PGND
Optical receivers module local test point	Support
LED indicators	Support
Optional status monitoring and control	Support
Electronic attenuator for each port	
Forward path	Provide individual level control for each port
Reverse path	Provide individual level control for each port
Number of ports	

Power supply port or AC only port	1
RF out port	4
Frequency division	42/ 54MHz, 65/ 87MHz, 85/ 108MHz
Output impedance	75ohm
Default RF port type	F type

System functional diagram

CC8800-Hybrid



DOCSIS and R-OLT Module

DOCSIS and R-OLT module provide a 10G Combo SFP+ Interface for uplink, 1 GPON and 1 XG(S)-PON Combo port for OLT, and DOCSIS/EQAM function for cable. It supports centralized management through RMD Controller which can greatly simplify the installation and maintenance and unified network management.

CC8800-Hybrid DOCSIS & R-OLT module characteristic

Parameter	Specification
Standard	DOCSIS 3.0/ Euro-DOCSIS 3.0 DOCSIS 2.0/ Euro-DOCSIS 2.0 C-DOCSIS GPON/ XG-PON/ XGS-PON
SNI	1* SFP+ GE 10GE EPON 10G EPON GPON XG(S)-PON ¹
UNI	1* SC/APC CATV 1* SMA DS 1* SMA US 1* SFP+ GPON ¹ 1* SFP+ XG(S)-PON Combo ¹
Management interface	1*GE RJ45 management interface 1*RJ45 console interface 1*RJ45 monitor Interface (transponder interface)
CM Qty. supported	DOCSIS 3.0 & 2.0 CM ≤1000
ONU Qty. supported	≤512 total
GPON	≤128 per port
XG(S)-PON	≤256 per port
MAC address	4K
DOCSIS Working channel	DS US

Channel frequency range		
European standard	87 / 108 ~ 1006MHz	5 ~ 65 / 85MHz
American Standard	54 ~ 1002MHz	5 ~ 42MHz
Working channel		
DOCSIS 3.0	32	8
Channel width		
DOCSIS 3.0	6/ 8MHz	1.6/ 3.2/ 6.4MHz
Communication protocol	/	ATDMA
Modulation mode		
DOCSIS 3.0	64/256/1024 QAM	QPSK, 16/ 32/ 64/ 256 QAM
Reception level range	/	-7-+23dBmV@6.4MHz -10-+20dBmV@3.2MHz -13-+17dBmV@1.6MHz
Qty. of service flow	4K	4K
System function		
MTU	1532 Byte	
IP Stack	Support IPv4 and IPv6 dual-stack	
DHCP	Support DHCP relay/ snooping	
	Support DHCP bundle	
	Support DHCP lease query	
	Support according to Option 60 to identify equipment type	
DHCPv6	Support insert Remote-ID, Interface-ID, CMTS capabilities and CM MAC	
	Support DHCPv6 relay/ snooping	
	Support DHCPv6 bundle	
	Support DHCPv6 lease query	
	Support DHCPv6-PD	
	Support according to Option 60 to identify equipment type	
	Support insert Remote-ID, Interface-ID, CMTS capabilities and CM MAC	
VLAN&L2VPN	Support 802.1ad/ 802.1q/ subnet VLAN	
	Support service flow-based VLAN addition or deletion	
	Support VLAN addition according to device type	
	Support the L2VPN	
	Support VLAN conversion	
MAC domain management	Support MDD & MDF enable and disable	
	Support MTC & MRC enable and disable	
	Support UDC enable and disable	
	Support upstream automatic frequency hopping	
	Support piggyback, shared-secret, channel bonding	
Multicast	Support multicast authentication	
	Support static multicast	
	Support IGMP V2/ V3 Snooping	
	Support MLD V1/ V2 Snooping	
Load balance	Support RLBG/ GLBG	
	Support load balance priority	
QoS	Support static/ dynamic service flow	
	Support service class	
	Support best effort, UGS, UGS-AD, RTPS, NRTPS	
	Support the DOCSIS 3.0 USCB scheduling	
	Support PowerBoost	
Packetcable	Support Packetcable 1.5/2.0 & PCMM	
	Support DQoS	
Management & Monitor		
CM management	Support CM status review	
	Support CM steer	
	Support CM blacklist	
	Support remote query	
	Support flaplist	
	Support admission control	
CPE management	Support CPE query and clear	

Network management	Support SSH/telnet Support SNMP Support SYSLOG Support graphical standalone WEB management Support for integration into NMS (graphical EMS) Support RMD Controller centralized management
System diagnostic and monitor	Support system information acquisition and monitoring Support optical receiver information monitoring Support showtech Support ping, DOCSIS ping, tracer Support spectrum monitor Support PNM using Pre-equalization
IPDR	Support IPDR/SP over TCP Support DOCSIS IPDR Support based on the data IPDR/XDR encoding Support time interval/event-based/adhoc data acquisition method
Security guarantee	Support AAA (TACACS+, RADIUS) Support RA guard Support ACL Support BPI+ Support EAE Support source verify Support prevent DoS attack Support blacklist, white list, the firewall
Software upgrade	Support CLI/ WEB GUI/ RMD Controller/ EMS(NM3000) upgrade Support remote upgrade, version reversion when upgrade failure
EQAM functions	
Channel frequency range	DS: 87 / 108 ~ 1006MHz
European standard	US: 5 ~ 65 / 85MHz
American Standard	DS: 54 ~ 1002MHz
	US: 5 ~ 42MHz
Channel width	8MHz/ 6MHz
Symbol rate	6.875/ 6.900/ 6.952 Mband/s, 5.057/ 5.361 Mband/s
Modulation mode	64QAM/ 256QAM
Working channel	≤32 channel
Phase noise	
1KHz	<-75dBc/Hz
10KHz	<-85dBc/Hz
>100KHz	<-100dBc/Hz
Network delay jitter tolerance	1000ms
Transmission technology	Support UDP/ IP/ GE transmission
Control protocol	Compatible with NGOD specification, D6/R6 standard
Multiplexing capability	Support PMT PID, and other PSI/SI multiplexing capabilities
TS multiplexing	1)VOD service, single frequency supports 32 programs, with each program supporting 16 PIDs simultaneously by default 2)a single program can configure to transmit 50 PIDs 3)the whole device supports 1K UDP ports, and 16K PIDs 4)Support DATA stream of a single frequency multiplexing with other frequency
Stream parameters	1)Support the stream of a variety of signal source formats such as MPEG2, MPEG4, H.264, H.265, HEVC, AVS, DATA (including VBR and CBR formats) 2) In a single frequency, support unicast stream, multicast stream and DATA stream simultaneously 3) Each frequency support 32 business UDP port 4) the service port (UDP port) can be configured with PMT PID and service flow type information according to different frequencies 5) In data broadcasting service, support PID value offset in the transport stream (remapping)
Status monitoring	Support real-time traffic statistics Support concurrent traffic statistics
Regular ARP	Report EQAM business IP ARP packet every 2s
Network management	1) Support web-based graphic management interface, HTTP/ HTTPS

2) Support SSH, telnet and R232 serial port management

PON function	
GPON	Access 128 terminals for single fiber PON Each GPON port supports 4K GEM-PORT and 1K T-CONT Transmit rate: downstream 2.488Gbit/s, upstream 1.244Gbit/s ODN Optical link loss: 28dBm (Class B+), 32dBm (Class C+) Downstream wavelengths 1490nm Upstream wavelengths 1310nm Maximum 60KM PON transmission distance; Maximum transmission distance of 20KM Support Bi-directional FEC (Forward Error Correction) Uplink and downlink triple churning encrypted function with 128Bits Support NSR (Non Status Reporting) DBA and SR (Status Reporting) DBA ONU terminal legitimacy certification, report illegal ONU registration PON port optical power detection
XG(S)-PON	Reserved 4K VLAN entries Port-based QinQ and Selective QinQ (StackVLAN) Support PVLAN to realize port isolate and save common VLAN resources
VLAN & MAC	MAC Black Hole Port MAC Limit Port-based/MAC-based/IP subnet-based VLAN VLAN Swap and VLAN Remark and VLAN Translate Based on ONU service flow VLAN add, delete, replace
PPPoE+	Insert PPPoE discovery related messages into upstream data Removing PPPoE related messages from downstream data

Note:

1, Industrial-grade optical module has to be used when deployed in field.

UNI Cable & Fiber ports usage

This module provides 4 RF mixed out ports (DAA) and 2 PON ports (R-OLT), which can be used as listed in the table below.

Mode	Cable	Fiber
DAA + R-OLT		
DAA + GPON	4* RF Mixed out	1* GPON port
DAA + XG(S)-PON	4* RF Mixed out	1* XG(S)-PON port
R-OLT only		
GPON	-	1* GPON port
XG(S)-PON	-	1* XG(S)-PON port

UNI PON ports and mode list

The following table lists the modes, optical modules and terminal types supported.

Ports & Mode	Optical Module	ONU Type
GPON port		
GPON mode	GPON	GPON
XG(S)-PON port		
XG-PON mode	XG-PON	XG-PON
XGS-PON mode	XGS-PON	XG-PON
		XGS-PON
XG-PON combo mode	XG-PON combo	GPON
		XG-PON
XGS-PON combo mode	XGS-PON combo	GPON
		XG-PON
		XGS-PON

RF Module

CC8800-Hybrid provides optical receiver module of RF platform module. It can amplify both CATV optical receiver and DOCSIS RF signal.

CC8800-Hybrid optical receiver module characteristic

Parameter	Specification	
Forward receiver (RX) module		
Wavelength	1290~1600nm	
Optical connector types	SC/APC	
Number of optical receiver module	1	
Optical AGC options	-7~+2dBm	
Passband	47~1003MHz	
Flatness	±0.75dB	
Optical input test point (± 20 %)	1V/mW	
RF section specifications¹	Forward	Reverse
Amplifier type	PHD	/
Return loss	≥16db (~870MHz)	≥16db
	≥14db (870MHz~1003MHz)	
MER	≥39dB(Equalizer off)	
	≥43dB(Equalizer on)	
Internal RF test points (± 1 dB)	-20dB	-20dB
Port to port isolation	50dB	50dB
Maximum output level of DOCSIS	108dBuV@1GHz@32channels	
	112 dBuV@1GHz@16 channels	
Maximum output level of CATV	108 dBuV@1GHz	
Default output tilt (87~1002MHz)	8dB	
Tilt range (±1.0 dB)	20dB	
Flatness ³	±0.75dB	±0.75dB
Level stability (-40~+55°C)	±1.5dB	
99 PAL channels(CW)⁴		
CSO	>60dBc	
CTB	>65dBc	
C/N	>51dBc	
Accessories		
Fuses (15A)	4pcs	

Note:

1, All of RF section specifications are tested under default configuration.

2, Operational gain refers to the gain or loss of RF launch amplifier.

3, The RF launch amplifier performance.

4, Test conditions for C/N, CTB and CSO:

59 PAL-D analog signals (less than 550 MHz), 56 8 MHz QAM signals (550-1003 MHz), and QAM signals are 6 dB lower than the analog signal carrier. -1dBm optical power input, 8dB equalization, 108dBuV@1GHz output.

Power Module

Topvision CC8800-Hybrid supports local power supply and cable-based power supply. Different type of power supply plug can be suit for different power supply standard.

Power module characteristic

Parameter	Specification
Qty. of power module (whole device)	1pcs
Power supply	
Local power supply	AC110V/AC220V, 90V~265V, 50/60Hz
Cable-based power supply	AC60V/AC90V, 36V~110V, 50/60Hz
Max. output power	100W
Power efficiency	85%
Local power supply plug	
European standard plug	Type E (CEE 7/7 plug), Length 1000mm
American standard plug	Type B (NEMA 5–15 U.S. 3 pin), Length 1000mm
British standard plug	Type G (BS 1363 UK), Length 1000mm

(Optional) CWDM Component Specifications

Topvision CC8800 series DAA and R-OLT Node support CWDM components.

CWDM multiplexes the optical signals of different wavelengths to a single optical fiber for transmission by using optical multiplexer. At the receiving end, the optical de-multiplexer is used to decompose the hybrid signal in the optical fiber into signal of different wavelengths, and is connected to corresponding receiving devices. CWDM is a low-cost WDM transmission technology.

The CWDM scheme supported by CC8800-Hybrid includes the following:

Data signal		CATV signal	
Data transmission protocol	Central wavelength	Modulation mode	Central wavelength
IEEE 802.3av 10G EPON (Asymmetrical)	1310nm/1577nm	Amplitude modulation	1550nm
IEEE 802.3av 10G EPON (Symmetric)	1270nm/1577nm	Amplitude modulation	1550nm
ITU-T G.987 XG-PON	1270nm/1577nm	Amplitude modulation	1550nm
IEEE 802.3av 10G EPON (Asymmetrical)	1310nm/1577nm	Amplitude modulation	1550nm

CC8800-Hybrid CWDM components characteristic

Parameter	CWDM components 1 specification	CWDM components 2 specification
Support optical power	<300mW (24.77dBm)	<300mW (24.77dBm)
COM interface	1260 ~ 1620nm	1260 ~ 1560nm
PASS interface	1523.5 ~ 1565nm	1540 ~ 1560nm
REF interface	1260 ~ 1510nm	1260 ~ 1360nm
	1571.5 ~ 1620nm	1480 ~ 1500nm
Insertion loss		
PASS interface	<0.8dB	<0.8dB
REF interface	<0.6dB	<0.6dB
Isolation		
PASS interface	>30dB	>30dB
REF interface	>15dB	>15dB

(Optional) Industrial-grade Optical Module for Uplink

GE Industrial Optical Module

No.	1	2
Central Wavelength	TX: 1310nm RX: 1550nm	TX: 1550nm RX: 1310nm
Package	SFP	SFP
Rate (Gbps)	1.25	1.25
Connector	BIDI LC/UPC	BIDI LC/UPC
Fiber type	Single mode	Single mode
Transmission distance	20km	20km
Launched power range (dBm)	-9~-3	-9~-3
Receive power range (dBm)	-23~-3	-23~-3

10GE Industrial Optical Module

No.	1	2
Central Wavelength	TX: 1270nm RX: 1330nm	TX: 1330nm RX: 1270nm

Package	SFP+	SFP+
Rate (Gbps)	10	10
Connector	BIDI LC/UPC	BIDI LC/UPC
Fiber type	Single mode	Single mode
Transmission distance	20km	20km
Launched power range (dBm)	-3~3	-3~3
Receive power range (dBm)	-14.5~0.5	-14.5~0.5

GPON / EPON Industrial Optical Module

Type	Class B+
Central Wavelength	TX: 1310nm RX: 1490nm
Package	SFP
Rate(Gbps)	TX: 1.25; RX: 2.5
Connector	SC/UPC
Fiber type	Single mode
Launched power range (dBm)	0.5~5
Receive power range (dBm)	-28~-8

10G PON Industrial Optical Module

Type	PR30
Central Wavelength	TX: 1270nm RX: 1577nm
Package	SFP+
Rate (Gbps)	TX: 10; RX: 10
Connector	SC/UPC
Fiber type	Single mode
Launched power range (dBm)	4~9
Receive power range (dBm)	-28~-8

(Optional) Industrial-grade Optical Module for PON OLT

(reserved)



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