D-node

JH-DN3416B   DOCSIS3.

D-node
DVB Data Distributed

About D3-B Series

D3-B family is the upgrade version of D3 family, running DOCSIS 3.0 and C-DOCSIS protocol. The D3-B family includes the following forms of CMTS: compact rack-mountable type (1U), high-density type(3U) and D-node type(outdoor).

The benefits of D3-B family over D3 family are listed as follows:

► Upgrade from Dual core to Quad core processor for data forwarding;

► Upgrade from DDR2 to DDR3 RAM;

► Improved power management;

► Migrate to Linux operating system;

With these changes, the D3-B family provides faster forwarding capabilities and larger throughput for IP packet (especially smaller size packet or fragment packet are optimized).

All D3-B family products implement CMTS channel bonding technology, providing up to 16 QAM channels with total 1Gbps for DS (Down-Stream), and up to 4 QPSK/QAM channels with total 160 Mbps for US (Up-Stream). The DS can be easily configured to run as either data channel or IPQAM channel. It provides both electrical (RJ45) and optical (SFP, 1.25Gbps) connection for data forwarding. D3-B family also implements layer 3 routing function, QoS, DHCP/TFTP services, and DHCP relay. Users have 2 management methods, including CLI withTelnet and Web interface.

► Users can use CLI by login with Telnet (direct connection to the CMTS).

► Users can remote login to the CMTS embedded web interface through internet.

D3-B family is capable to run with DOCSIS 3.0/2.0 client cable modems, set-top boxes (built-in with modems) and eMTA.

Summary

JH-DN3416B is the latest version of D-Node, a multi-task outdoor node integrated with CMTS, CATV optical receiver, and ONU. D-Node has two fiber optical ports for upper link to the datacenter, one for CATV fiber, and the other is for IP traffic. D-Node has four RF ports for cable connection which connect to the access network. D-Node is responsible for CATV signal optical-to-electrical conversion, IP traffic optical-to-electrical conversion, as well as mixing the IP traffic with CATV signal. D-Node is also known as "Multi-task optical node" for this reason.

The CMTS module integrated inside the JH-DN3416B is from D3-B family, running DOCSIS 3.0. It contains SFP optical port and 1G RJ45 port.

ONU module is optional for D-Node, which is compatible with GE/EPON/GPON.

D-Node contains built-in 1GHz CATV optical receiver and amplifier. With programmable balance and fading control, and optional real-time spectrum analysis module, remote control can be achieved.

JH-DN3416B is a perfect replacement for existing optical node system, which simplifies the network topology and fulfills the Internet requirements for HFC network. With its outstanding network performance and safety features, JH-DN3416B provides the best solution for HFC triple play.

Function

► CATV signal optical-to-electrical conversion and amplify.

► IP traffic from GE/EPON/GPON optical-to-electrical conversion.

► IP traffic and CATV signal mixing, then transferring and forwarding on coax cables.

► Supported services: DVB, IP traffic, IPQAM, IPTV etc.

Feature

► Running DOCSIS 3.0 protocol which is very stable, lower the risk of investment.

► All investment one box design, simplifies network topology, lowers the cost.

► Clients can be Cable Modem or set top boxes, which are cheap and have lots of options.

► Pushes the CTMS more close to client side, dramatically lowers noise funneling effect.

► High utilization on spectrums.

► Remote controls, riches set of management features.

► Almost no limits on transmission range.

► Low cost per client, with certain scalability.

► Low power consumption, no cooling fans needed, designed for outdoor environment.

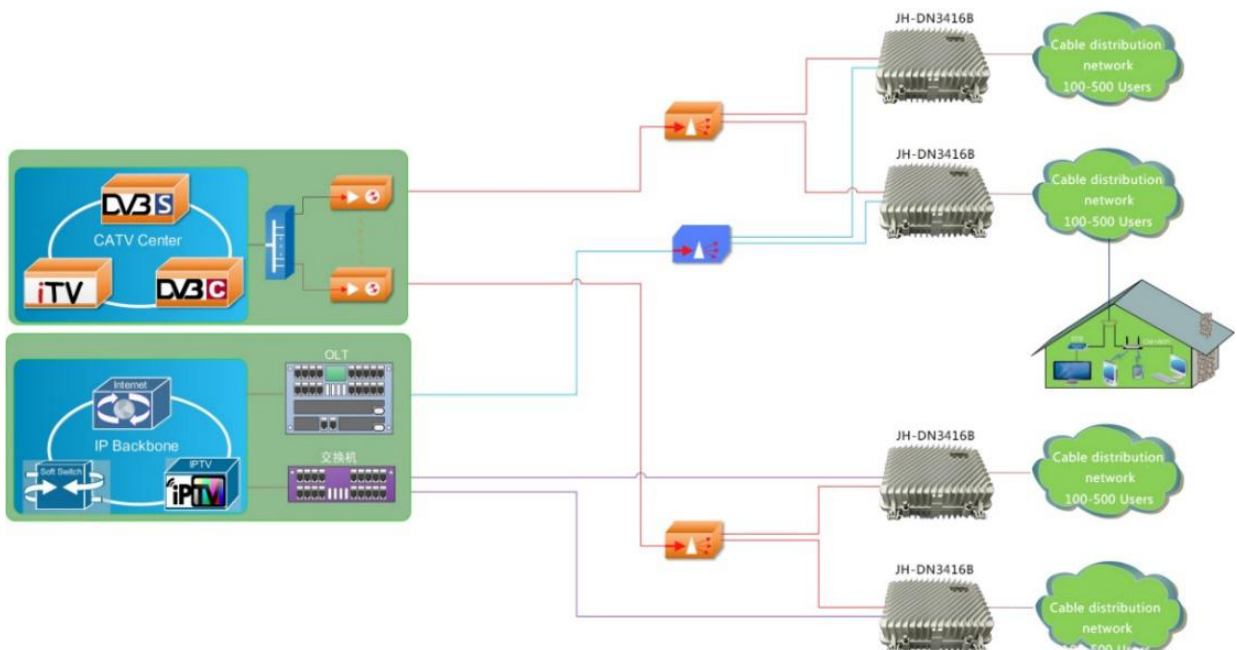► Can replace the existing optical node without additional equipment needed.

Block Diagram
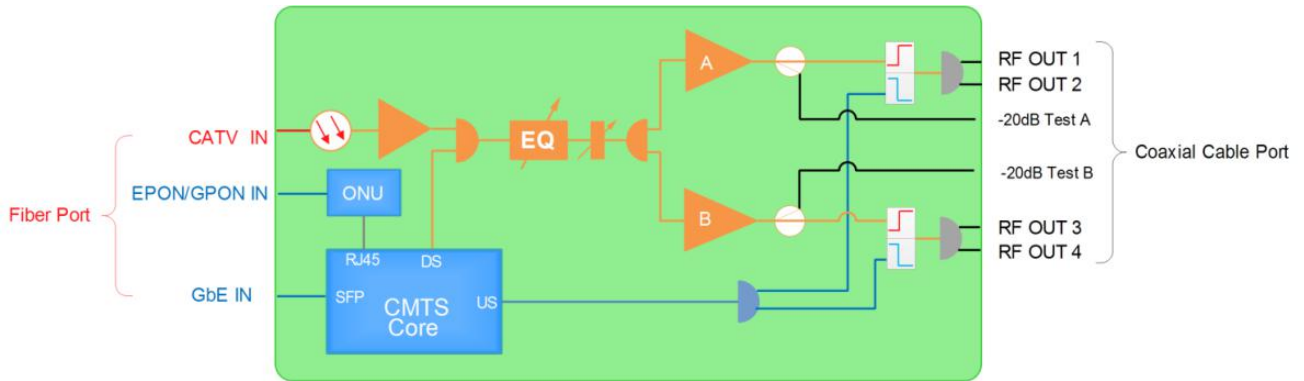
Appearance

Applications

Advantages

Lowers the investment risk by using standardized protocol

The multi-task optical node (D-Node) is based on fully developed industry standard and protocol, and takes the advantage of existing network topology and equipment. The solution can be co-existing with both Ethernet and EPON network. No matter which EOC the ISP chooses, D-Node will be there to provide the best solution

Simplifies the HFC network topology

Since the D-Node is usually deployed much closer to the client side, this means the IP traffic and CATV signal are mixed here in the D-Node which, not only simplifies the network topology but also
1. Improves the system stability;
2. Provides more bandwidth for clients;
3. Reduces the complexity of construction and maintenance.

Solves the dilemma between funneling noise and the amount of clients

In traditional DOCSIS solutions, CMTSs are usually deployed in the Headend datacenter due the high cost of CMTS equipment, which leads to a dilemma: the ISPs want each CMTS to cover as many clients as possible, however, with increased funneling noise. D-Node is the perfect solution for the dilemma.

Lowers Cost

Thanks to the highly integrated D-Node, no more optical node or optical receiver are needed in the system. With this simplified network topology and lowered cost, with reduced funneling noise and more clients, the performance of the network is improved. If the ISPs want to maintain the existing optical equipments in the system, D-Node with RJ (electrical) port can be used.

Advanced Management

The D-Node comes with Network Management Software, providing the most comfortable method for remote management of D-Node, and its clients.
1. D-Node management includes: Status monitoring such as supply voltage, electrical level, temperature and spectrum parameters; Working mode changing; Spectrum parameter setting;
2. Clients management includes: client information, rights and authorization, bandwidth limitation, billing, cable modem status monitoring;
3. Warning system includes: D-Node system failure warning; abnormal alarm on AC/DC supply voltage, temperature, and TTL level; Client cable modem spectrum parameter shifting, losing connection and large packet loss.

Specification

CMTS Module							
	Down Stream		**UP Stream**				
	Euro-DOCSIS	DOCSIS	ATDMA/S-CDMA				
Modulation Mode	64/256/1024QAM*		8~256QAM/QPSK				
Frequency Range(MHz)	88~1002	88~1002	5~65				
Channel Bandwidth(MHz)	8	6	Single Channel Bandwidth(MHz)	6.4	3.2	1.6	
Bonding Channel Quantity	16		4				
Max. Total Data Rate (Mbps)	1000	858	160				
Single Channel Data Rate (Mbps)	64QAM	41.7	30.3	Single Channel Data Rate (Mbps)	256QAM	40.96	20.48	10.24
	256QAM	55.6	42.9		128QAM	35.84	17.92	8.96
					64QAM	30.72	15.36	7.68
	1024QAM*	69.5	53.6		32QAM	25.60	12.80	6.40
					16QAM	20.48	10.24	5.12
					8QAM	15.36	7.68	3.84
Single Channel Symbol Rate (Msymps)	64QAM	6.952	5.056941		QPSK	10.24	5.12	2.56
	256QAM	6.952	5.360537	Single Channel Symbol Rate (Msymps)	5.12	2.56	1.28
	1024QAM*	6.952	5.360537				
Output Level (dBmV)	10~48 (1dB step)		Receive Level(dBmV)	-13~+23			
WAN Port	Fiber	1.25G SFP ×1	Uplink Data Rate	1.0Gbps			
	Electronic	1000/100/10Base-T	Console	RJ45×1			
Management Methods	CLI: after log in by telnet; NMS: based SNMP from third part; Embed Web: by remote log in						
Supported Protocols	Euro-DOCSIS/DOCSIS3.0/2.0, CDOCSIS, TCP/IP, ARP, L2VPN , ICMP, ACL, VLAN, Multicast, DHCP-rely, SNMP, etc.						
IPQAM Function Parameter							
Compressed Format	MPEG2/MPEG4/H.264/AVS		Package Length	188/204			
Stream Type	SPTS、MPTS、DATA		Network Anti- flapping	≥500			
Support Protocol	UDP,RTP,IGMPv3		PCR Anti-flapping	≤500			
PSI/SI Table Precessing	supported (Editable)		Symbole Rate (Msymps)	3.6~6.952			

CATV Part			
Received Optical Wave lengh	1200～1610 (nm)	Received Optical	-10~+2 (dBm)
Optical AGC Range	-8～+2 (dBm)	Optical Conector Type	SC/APC or FC/APC
DS Frequency Range	88～1002 (MHz)	US Frequency Range(MHz)	5-65
DS Output Level	54～58dB (dBmV)	Return Loss	>14 (dBc)
Flatness	±1.5 (dB)	Impedance	75 (Ω)
C/N	>51 (dBc)	CTB	>66 (dBc)
Attenuation Range	0～20 (dBc)	EQ Range (dB)	0～20 (dB)
CSO	>61 (dBc)	RF Part	power strip with five or eight outlets or F type socket
ONU Module			
Support Protocol	IEEE802.3ah,YD/T 1475-2006,IEEE 802.1D, Spanning Tree, IEEE 802.1Q, VLAN,IEEE 802.1w, RSTP/ Ethernet – II, Ethernet-SNAP, IEEE 802.3x,Ant- Head Of Line, IEEE p802.1p, CoS, WR,SP and FIFO Queue scheduling algorithm, UDLD, Dying-Gasp, CHAP, EAP,CLI,Web,SNMP, TELNET, TFTP,FTP	Tx Optical Wave Lenth	1310 (nm)
		Rx Optical Wave Lenth	1490 (nm)
		Tx Optical Power	-1～+4 (dBm)
		Rx Optical Power	-26.5～-3 (dBm)
		Fiber Connector Type	SC/PC
		Ethernet Port	10/100Base-T ×4
		Data Rate	1.0Gbps
Miscellaneous			
Input Votage	External	AC220/110V 50/60Hz	Protection Grade	IP65
	Internal	AC 60V by Cable		
Power Consumption		<75 (w)	Net Weight	7.5 (Kg)
Working Environment		Temp: -40～+60; Hum: <90%	Dimension	L380mm×W260mm×H140mm

*Requset CM support 1024QAM

Model Name

JH-DN3416B-x

w: AC220V external power supply

n: AC60V internal power supply
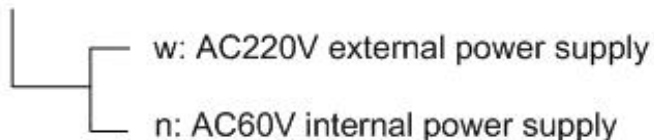
Order Information

Item		Model	Description
D-node		JH-DN3416B-w	Include CMTS Module, CATV Optical Receiver, RF Process. 4 RF output. AC220/110V External Supply
		JH-DN3416B-n	nclude CMTS Module, CATV Optical Receiver, RF Process. 4 RF output. AC60V Internal Supply
Option	OUN Module	GDOU1000M	10/100Base-T ×4
	SFP Module	FTCS-Bxx12-20DL	FTCS-B1312-20L/FTCS-B1512-20L, Each one becomes a pair

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