Corinex High Density Building controller

Introduction

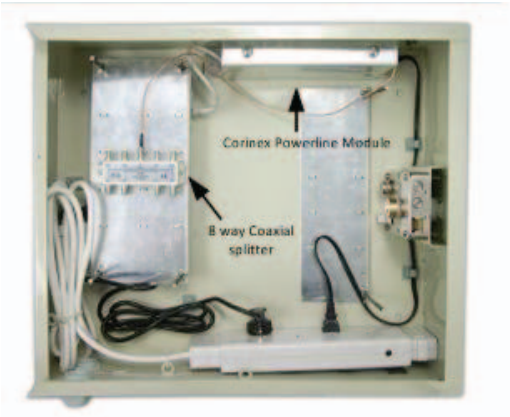
The Corinex High Density Building Controller (HDBC) is the latest evolution in Corinex's layer 2 bridging and switching technology. The Controller consists of 2 modules, which provides 3 different application services to Multi Dwelling Units (MDU) users.

The BPL Module - provides Broadband via the existing electrical or coaxial wires

The Switch Module - provides high speed broadband, IPTV[1] via a 10/100 Mbps Fast Ethernet network infrastructure

HDBC BPL Module

The Corinex High Density Building Controller consists of a Broadband over Powerline (BPL) module, which provides Broadband Internet services either through the existing Powerline or existing coaxial infrastructure of the building, thereby providing greater and faster time to the market for the Service Provider.
The Corinex BPL technology uses a Master/Slave paradigm, which allows each HDBC (Master) module to support up-to 64 CPE adapters and 1024 MAC addresses in its bridge table per network segment.



Corinex High Density Building Controller
(Lateral view)

HDBC : Ethernet Switch Module

The Corinex High Density Building Controller also provides Layer 2 Fast Ethernet (FE) managed switching capability.
The default configuration supports 7 (10/100Mbps) FE Twisted Pair (TP) ports, which are connected to end users, and 2 Gigabit Ethernet (GE) dual media ports with TP/SFP (Small Form-factor Pluggable)[2]modules, which connect multiple Corinex HDBC devices together. A total of 16 HDBCs can be cascaded together via the Gigabit Ethernet (CAT 6 or Fiber) ports throughout the MDU, thereby providing high speed broadband and IPTV services throughout a large MDU.

Applications

Both the BPL and Switch modules together provide 3 different types of application services to end users.

Application 1 - Broadband over Powerline or coaxial, which is provided by the BPL module

Application 2 - Broadband and/or VoD over coaxial, which is provided by the BPL module

Application 3 - High Speed Broadband and IPTV over Ethernet, which is provided by the Switch module

Below is a detailed description of the 3 different applications

Application 1 - Broadband over Powerline

The Corinex HDBC can provide broadband services (up to 10 Mbps) for up to 64 users via the electrical wires. This is achieved via connecting one of the coaxial ports of the HDBC to the coaxial port of the Corinex 11+1 coupler, and the electrical ports from the coupler to the 3 phases of the distribution panel.
Each end user then simply plugs in a Corinex HD200 Powerline adapter (sold separately) to their wall socket to receive the broadband connection.

Application 2 - Broadband and/or VoD over Coaxial

The Corinex HDBC can provide broadband and/or VoD services (up to 50 Mbps) for up to 64 users via the existing coaxial infrastructure. Each end user then simply connects in a Corinex HD200 Coaxial adapter to their coaxial outlet. Corinex also provides coaxial accessories (Signal Terminators and Diplexers) which can be used together to:

- Allow for the separation of Corinex's BPL signal and regular Cable TV signals at the end user's unit
- Physically segment the coaxial infrastructure into separate networks

Manageability of Option 1and 2

Both Applications 1 (Broadband over Powerline) and Application 2 (Broadband and/or VoD over coaxial) can be fully managed by Corinex's PowerNET(3) NDMS (Network Deployment and Management System) software.

PowerNET software allows for the management of an entire MDU, which can consist of up-to 16 HDBC BPL modules inside a single MDU, including all of the Corinex HD200 CPE adapters (upto 64 adapters per HDBC) located throughout the premises.
PowerNET can also manage the BPL network of multiple MDU's clustered together in a geographic region.

The Corinex PowerNET NDMS offers operators not only the ability to manage/monitor their network (as a traditional NMS), but it also aides the operator with network deployment, as it is able to auto detect a new BPL node/CPE, perform auto analysis of the current network, followed by the NDMS providing a set of suggested configuration(s) to the operator on how best to add the new BPL node/CPE to the network. As result it can greatly reduce deployment time and cost.

For more information on the PowerNET software is available on the corporate website at **http://www.corinex.com**

Application 3 - High Speed Broadband & IPTV over Ethernet

High Speed Broadband, IPTV and other streaming or bandwidth intensive applications are provided throughout the MDU via the HDBC's Ethernet switch module. In a cascaded network topology the HDBC's backbone infrastructure can be connected as follows:

INJECTION POINT – HDBC -1

- 1st Gigabit Ethernet port connects to the ISP / Service Provider's WAN equipment
- 2nd Gigabit Ethernet port connects up to HDBC #2, (this port is provisioned as a vlan trunk)
- All 7 of the 10/100 Mbps FE ports are connected to individual units (with each port assigned to its own vlan)

DISTRIBUTION POINT – HDBC -2

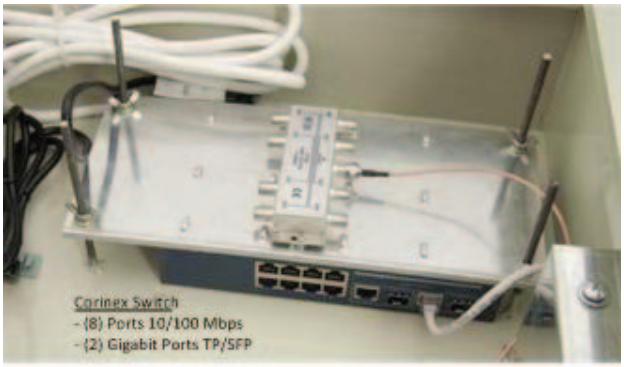
- 1st Gigabit Ethernet port connects back to the HDBC at the point of injection & this port is also provisioned as a vlan trunk
- 2nd Gigabit Ethernet port connects up to HDBC #3, and is also provisioned as a vlan trunk
- All 7 of the 10/100 Mbps FE ports are connected to
- individual units (with each port assigned to its own vlan)

For more information on the network topology, please see the network diagram on the following page

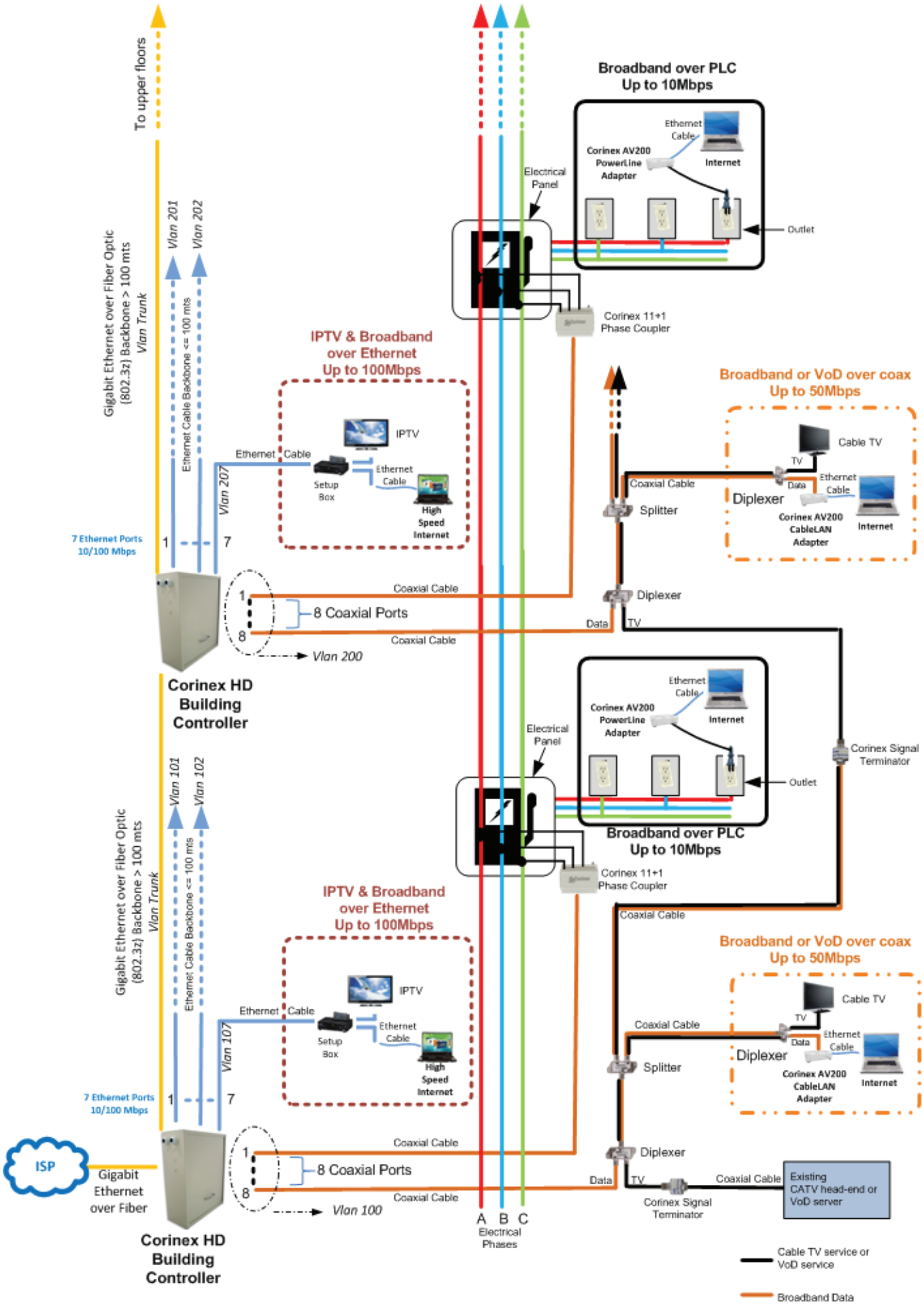
Manageability of option 3

The Corinex High Density Building Controller Ethernet Switch module can be managed and monitored via Telnet or a User friendly Web based UI. In addition to these options, the switch module also supports SNMP V1 and V2c. All 16 Corinex HDBC systems can be managed via a single IP address.

Notes
(1): IPTV content and IPTV equipment/accessories to be provided by your service provider.
(2) Gigabit Ethernet SFP is an optional module
(3) PowerNET is sold separately.



Corinex High Density Building Controller
(Frontal view)


To upper floors
Gigabit Ethernet over Fiber Optic (802.3z) Backbone > 100 mts
Vlan Trunk
Vlan 201
Vlan 202
Ethernet Cable Backbone <= 100 mts
Vlan 207
7 Ethernet Ports 10/100 Mbps
Broadband over PLC Up to 10Mbps
Ethernet Cable
Corinex AV200 PowerLine Adapter
Internet
Electrical Panel
Outlet
Corinex 11+1 Phase Coupler
IPTV & Broadband over Ethernet Up to 100Mbps
IPTV
Ethernet Cable
Setup Box
High Speed Internet
Broadband or VoD over coax Up to 50Mbps
Cable TV
TV
Data
Diplexer
Coaxial Cable
Splitter
Corinex AV200 CableLAN Adapter
8 Coaxial Ports
Vlan 200
Corinex HD Building Controller
Corinex Signal Terminator
Vlan 101
Vlan 102
Vlan 107
Vlan 100
ISP
Gigabit Ethernet over Fiber
A B C
Electrical Phases
Existing CATV head-end or VoD server
Cable TV service or VoD service
Broadband Data

HDBC Powerline Communications (PLC) Module Technical Specifications

Function	Detailed Description/Specification
Chipset	DS2 9002 Chipset
Standards Safety and EMI	IEEE 802.3u, 802.1P, 802.1Q, FCC Part 15, OPERA EN 50412, EN 55022, EN 55024, EN 60950
Backbone Speed	Up to 200 Mbps on physical layer (coax) 100 Mbps on Ethernet
Frequency Range	2 - 34 MHz
Transmitted Power Spectral density	-50 dBm/Hz
Interface	Ethernet 10/100 BaseT with RJ45 Plug
	Coaxial Port with F Connector Male
Power Input	85 - 265 VAC , 50/60 Hz, 23 W

HDBC PCL Features

Speed and Coaxial Network

- Physical data rates of up to 200 Mbps over distances of 1200 meters (coax)
- Coaxial network interface ports allowing an internet connection to be extended over existing cable infrastructure

VLAN/OVLAN

- 802.1Q VLAN & Optimized VLANs

Network Security

- Powerful DES/3DES/AES encryption

QoS

- 8-level priority queues, with programmable priority-classification Engine
- Priority classification according to 802.1P tags, IP coding (IPv4 or Ipv6) or TCP source/destination ports

STP

- Integrated 802.1D Ethernet Bridge With Optimized Spanning Tree Protocol

Bridge Forwarding Table

- Bridge Forwarding Table for 1024 MAC Addresses

OFDM

- OFDM technology and powerful error correction system allow robust performance under harsh conditions in the cable network

Broadcast Storm

- Optimized support for broadcast and multicast traffic

Configuration

- Configuration via web interface or Corinex PowerNET NDMS

HDBC Switch Module Specifications

Standard compliance

- IEEE 802.3 10Base-TEthernet (Twisted-pair
- Copper)
- IEEE 802.3u 100Base-TX Ethernet (Twisted-pair Copper)
- IEEE 802.3ab 1000Base-TX Ethernet (Twisted-pair Copper)
- IEEE 802.3z 1000Base-X Ethernet
- IEEE 802.3x Flow Control Capability
- ANSI/IEEE 802.3 Auto-negotiation
- IEEE 802.1q VLAN with GVRP/ GARP
- IEEE 802.1p Class of Service
- IEEE 802.1x Access Control
- IEEE 802.1d Spanning Tree
- IEEE 802.1w Rapid Spanning Tree
- IEEE 802.1s Multiple Spanning Tree
- IEEE 802.3ad Link Aggregation Control Protocol (LACP)

RoHS Compliance

Power Saving

- Auto detect client idle or cable length

Performace

Switching capacity

- Non-blocking switch fabric supports up to
- 8FE+2GbE ports
- 8K MAC addresses
- The maximum throughput is 5.6Gbps
- With 64 bytes packets throughput is
- 6.547Mpps

Rate Limit

Ingress rate limit:

- Port 1~8: 64K up to 100Mbps
- Port 9, 10: 64K up to 1000Mbps

Egress rate limit:

- Port 1~8: 64K up to 100Mbps
- Port 9, 10: 64K up to 1000Mbps

VLAN

- Port-base VLAN
- IEEE802.1q tag-base VLAN, 4094 max, up to 4k active VLANs including static plus dynamic entry
- Flooding unknown VLAN frame setting, can flood packet with some VLAN tag associated to an invalid/inactive VLAN
- In tag-base VLAN, supports egress/ingress packet filter
- Supports Multicast VLAN Registration (MVR) carrier to serve content provider using multicast for Video streaming application in the network
- Q-in-Q is an efficient method for enabling Subscriber Aggregation

QoS

- Port Based, 802.1p and Diffserv (IPv4/IPv6) QoS packet classification
- Supports four level priority queues to prioritize traffic
- Supports two scheduling, WRR and Strict
- Supports priority in a Q-in-Q tag

VSM (Virtual Stacking Management)

- Up to 16 switches can be managed via Single IP
- Virtual stacking, no extra stacking hardware is required
- Distributed stacking, no physical central wiring closet is needed

Broadcast Storm

- Broadcast/Multicast/Unknown-Unicast Storm suppression.

Port Mirroring

- Support 1: N RX port mirroring
- Supports port sniffer function with 3 modes: (TX Monitor Mode, RX Monitor Mode and TX-RX pair Monitor Mode)

Protocol

LACP

- 10Fast Ethernet +2 Gigabit Ethernet groups
- Per-group max 8 member
- Provides DA, SA and DA+SA Mac-based trunking with automatic link fail-over

Multicasting

- Supports IGMPv3 proxy including active and passive mode

STP/RSTP/MSTP

- 802.1d STP/ 802.1w RSTP/ 802.1s MSTP

Network Security

- IEEE 802.1x access control
- Isolated group allows certain ports to be
- designated as protected
- Management Access Policy Control
- Static MAC, to limit which MAC addresses can pass through or not
- Mac addresses learning limit, to set up the maximum amount of MAC that each port can learn
- Access control List
- IP-MAC-Port binding
- DHCP Snooping (Including DHCP Option 82)
- SSL/ SSH for management (prevision, upgrade via FW)
- TACACS+ for management authentication (prevision, upgrade via FW)

Network Interface

Configuration	Connector	Port
10/100Mbps TP Jack (RJ -45)	TP(RJ -45)	1 to 8
1000Mbps SFP Fiber Module Dual Media Auto Detection	SFP	9, 10
Powerline Module	Coaxial Splitter /11+1 Coupler Or Coaxial Splitter/Powerline converter	Coaxial (1 to 8)
Coaxial Module	Coaxial Splitter	Coaxial (1 to 8)

Electrical, Safety and Cabinet

Function	Detailed Description/Specification
Electro-Mechanic Features	
AC power switch	Current 10 Amp
Two Polar	Yes
AC sockets outlets	4
AC sockets outlets style	Universal – Receptacle
Splitter Configuration	One input and eight outputs
Splitter bandwidth	2 to 34MHz
Splitter Connectors	F-Connector
Splitter Input resistance	75 ohm
Splitter Insertion/Return loss	11db
Splitter Attenuation between two outputs	22db
Safety Features	
Filtering noise	EMI/RFI (10dB@1MHz-35MHz)
Surge protection	Yes (1800 Joules)
Overload protection	Yes(1000V Max)
Cabinet Specification	
Anti-vandal	Yes
Dimension	W380 X H450 X D170(mm)
Color	Grey with RoHS Compliance
Thickness	1.5mm
Lock	Yes

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