

# CG5315/CG5321/CG5331

## CG5300 SERIES - G.HN TRANSCEIVERS

### CG5315 - G.HN TRANSCEIVER FOR COAX

### CG5321 - G.HN TRANSCEIVER FOR POWERLINE MIMO AND SISO

### CG5331 - G.HN TRANSCEIVER FOR POWERLINE SISO

August 2019

## OVERVIEW

The CG5315, CG5321 and CG5331 (CG5300 G.hn series) transceivers implement the MAC and the PHY components of the ITU-T G.hn (G.9960/1/2/3/4) [1, 2, 3, 4, 5] stack protocols.

The modes and interfaces supported by the CG5300 series are summarized in the following table:

High-level summary of supported functionalities and features:

Feature	G.hn Chip		
	CG5315	CG5321	CG5331
G.hn Coax and Phone 100MHz	•	-	-
HPNA3.1 (ITU-T G.9954)	•	-	-
G.hn Powerline MIMO 50MHz (and SISO 50MHz)	-	•	-
G.hn Powerline SISO 100MHz	-	-	•
Coexistence with HPAV/2	-	•	•
External memory support	DDR3	DDR3	DDR3
Interface types	RGMI, MII, UART, SPI	RGMI, MII, UART, SPI	RGMI, MII, UART, SPI
Embedded Fast Ethernet	•	•	•
Embedded IP Stack, TR69	•	•	•

Lumissil Microsystems' CG5315, CG5321 and CG5331 ensure unprecedented levels of consistency and reliability, making it the ideal embedded solution for G.hn-enabled consumer electronics devices, gateways, and set-top boxes for whole-home networking of multiple HD and 3DTV video streams, etc. The CG5300 series supports 1 Gbps physical layer (PHY) bit rate for multimedia and data distribution.

The CG5300 transceivers support network level and device level QoS and are optimized to deliver multiple streams of 4K and HD video content, 3DTV video traffic, audio content, data, gaming, and Voice over Internet Protocol (VoIP).

The MIMO feature (supported by CG5321) uses all three wires in the power outlet (phase, neutral, and ground) to enable the best traffic delivery (e.g., IPTV traffic) over power lines, even in the presence of surge protectors, circuit breakers and across multiple phases. The MIMO capability achieves unprecedented coverage across power outlets, higher guaranteed throughput, and better immunity to noise, while maintaining compatibility with ITU-T G.hn recommendations.

## FEATURES

- Compliant with ITU-T G.hn Recommendation (G.9960/1/2/4) [1, 2, 3, 5] over all existing wires: power line, coax, and phone line.
- Compliant with ITU-T G.hn-MIMO Recommendation (G.9963) [4] over power line, extending coverage, improving the network's immunity to noise and delivering a higher throughput.
- Compliant with ITU-T G.9954 Recommendation (HomePNA™ 3.1)[6].

## CG5315/CG5321/CG5331

- The G.hn modem default transmission frequency bands can be modified by a customized firmware according to regulation, restrictions and customer requirements. For example, the default transmission bands can be limited to 2-30MHz
- PHY rate up to 1 Gbps.
- Plug & Play solution – Auto configuration. Self-installable over all three media.
- Smart power saving modes.
- Supports both G.hn master and G.hn endpoint applications.
- Supports coordination and coexistence with neighboring networks.
- Coexists with xDSL, terrestrial, and satellite TV.
- Implements OFDM multi-carrier modulation, advanced error correction codes, advanced channel adaptation, and noise mitigation schemes.
- Supports 4096/1024/512/256/128/64/32/16/ 8-QAM, QPSK, BPSK
- Robust modulation schemes employing diversity in time and frequency.
- MAC methods: CSMA/CA, TDMA, and CSMA.
- RGMII and MII host interfaces. Supports MAC and PHY modes.
- Embedded Fast Ethernet.
- Comprehensive traffic classification for QoS and flow definition, analysis of layers 2 to 4.
- Guaranteed Quality of Service (QoS), support for priority-based and parameter-based QoS.
- Device-level QoS.
- Supports IPv6 and IPv4. Manages multicast using IGMP v1-3 and MLD v1-2.
- AES 128-bit based encryption with key management for secure communication
- Instant Privacy. Also supports legacy pushbutton-based privacy mechanism.
- Support for Broadband Forum's TR69 and data model.
- Quick system troubleshooting using built-in diagnostic tools and APIs.
- Performance quality Light Emitting Diode (LED) indication.
- Remote management and diagnostics for faster installation. Field-upgradeable firmware.
- Fully configurable device able to integrate customized functionality.
- CG5315, CG5331: Green package, commercial package: -10°C ÷ 70°C.
- CG5321: Green package, industrial package: -40°C ÷ 85°C.

### APPLICATIONS

- Industrial IoT applications like Smart Grid (meters, gateways, monitor/management interface), Smart buildings (HVAC, Lighting, elevator, Safety, Security etc), smart cities (street lighting, parking meters etc) and Industry4.0
- Solar PV or wind turbine systems monitoring and diagnoses
- Data backhaul for VLC (Visible Light Communications)
- Networking in Train, Ships and other vehicles
- Video doorbell
- Data backhaul for 5G/4G LTE
- Home networks
- 4K, 3D, High Definition (HD) and Standard Definition (SD) in-home video distribution
- Multi-room DVR Video and audio streaming in Media Gateway (IPTV) applications
- Thin clients
- Voice Over IP (VoIP)
- Shared Broadband Internet Access
- PC file and application sharing
- Security and Surveillance (home monitoring)
- Home Health Care
- Gaming

### PRODUCTS

- Smart Meter GW
- Meter device

## CG5315/CG5321/CG5331

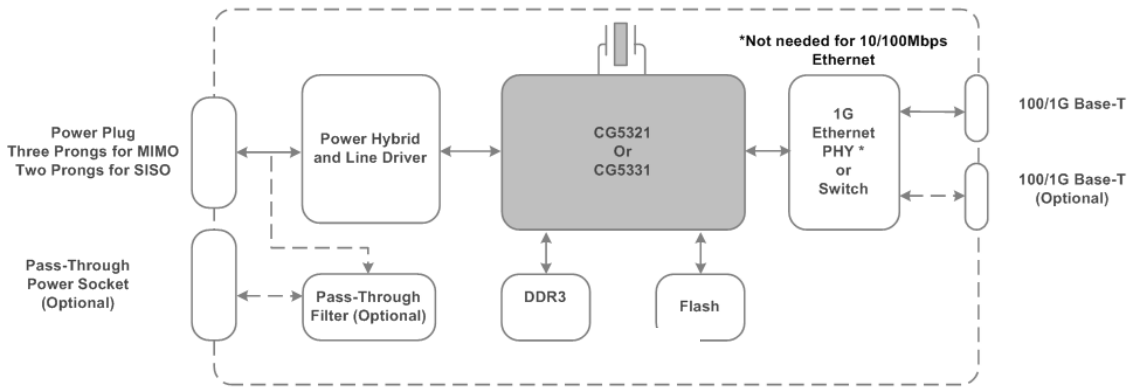
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- Repeater device
- Head End device
- Set-top boxes and Consumer Electronics products
- Residential Gateways (RG)
- Optical Network Terminals (ONTs)
- Home Audio and Home Theater Systems
- Network-Attached Storage devices (NAS)
- IP cameras
- Video game consoles
- VoIP adaptors
- Ethernet to G.hn bridges
- Backbone to WiFi, 3G/4G

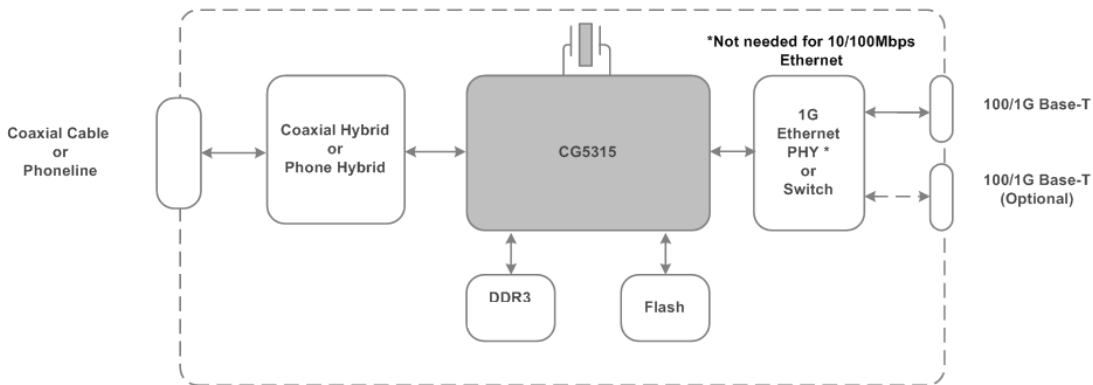
# CG5315/CG5321/CG5331

## SYSTEM IMPLEMENTATIONS

### Ethernet over Power Line Bridge



### Ethernet over Coaxial Cable or Phoneline Bridge



### Ethernet over Power Line, Coaxial Cable or Phoneline Bridge – Low End Configuration

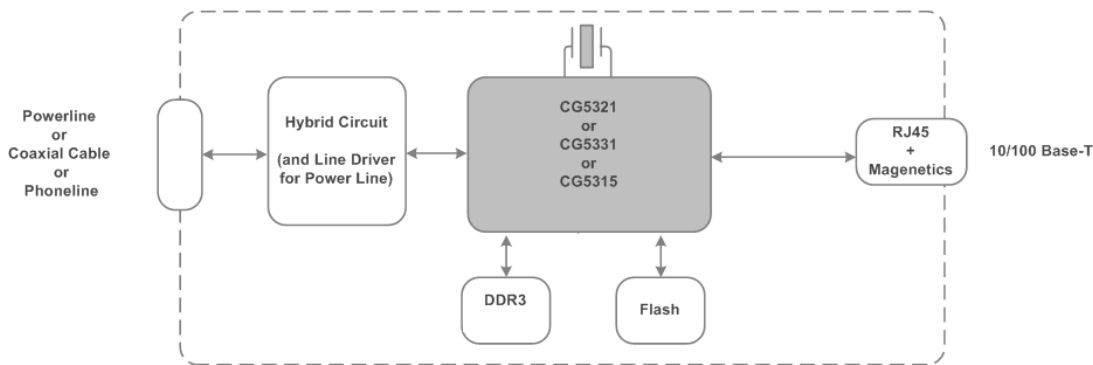


Figure 1: G.hn to Ethernet Bridges