



A SIMPLY
PERFECT
NETWORK.

G@Co
TAKES THE
UNUSUAL PATH



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THE GIGABIT @ COAX (G@Co) SOLUTION – SYMMETRIC 10GBPS OVERLAY ON EXISTING COAX INFRASTRUCTURE

The increasing market demand for more bandwidth is pushing new technologies to be used on existing cable infrastructure and in parallel to the DOCSIS broadband services.

Classically a fibre connection is used to realize 10Gbps IP services. However high construction cost, long rollout time and complex project management are the main obstacles, especially in urban environment.

Like a gecko our G@Co goes unusual paths.



The challenge in today's network infrastructure:

- || Access to high speed IP backbone network is not widely available
- || To roll out fibre to every place is too expensive and takes years
- || Often a coaxial CATV network is available in the field, however not reaching the required performance

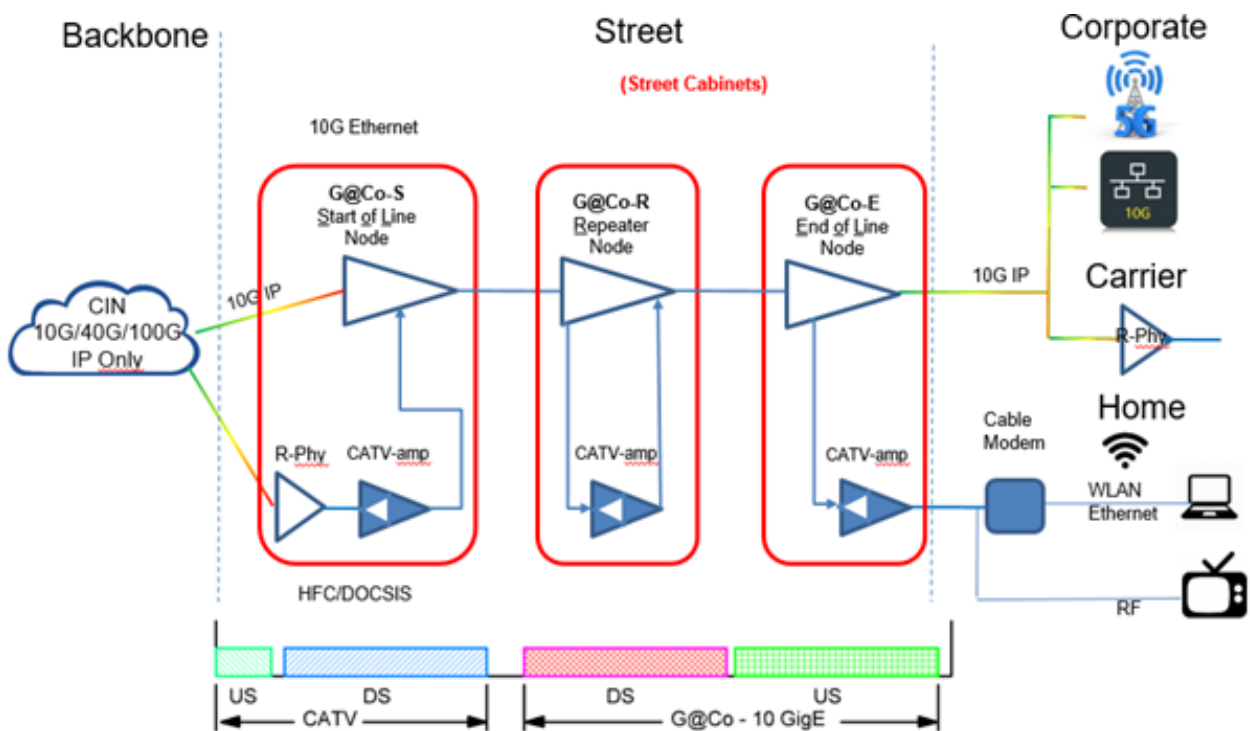
Main Applications of G@Co:

- || Remote PHY: Will be installed in many locations within the CATV network but needs a 10Gbps IP fibre connection
- || Corporate customers: are asking for symmetrical Gbit IP network connections, low latency for virtual reality applications
- || 4G/5G: Due to their smaller coverage area, the amount of 5G mobile base stations will increase, base stations expect a 10 Gbps fibre connection with ultra low latency and jitter

Key Benefits of G@Co:

- || Very fast IP-service implementation for the customer as no planning, approval, and construction is needed
- || Saves up to 80% of the costs due to the fact that there are no civil works
- || Universal service offering for cable operators through existing infrastructure

The G@Co-solution offers an easy, quick and cost effective way to extend the IP portfolio to serve the above mentioned applications. It therefore builds the ideal bridging technology for cable operators using the available infrastructure assets in parallel with their DOCSIS offering.



CIN: (Converged Interconnect Network)



The G@Co solution in combination with the CATV signals using DOCSIS 3.1 technology offer already today a total bandwidth of up to 20 Gbit/s in the downstream and up to 16 Gbit/s in the upstream.

RF-features

- Provision for DOCSIS 3.1 extension to 862, 1002, or 1218 MHz (configuration option)
- Flexible centre frequency and flexible occupied bandwidth per direction
- Close-to-optimum channel usage by means of fully automated adaptation to channel conditions (coding rate, modulation order, baud rate, centre frequency)
- Integrated Diplexer for FDD separation determining downstream/upstream bands
- Tx Predistortion, Rx Equalizer, cross talk optimization Rx / Tx
- Rendezvous-mode to determine FDD assignment Rx / Tx
- Basic operation mode for remote access over RF link
- Advanced operation modes for optimized channel usage
- The total attenuation budget to operate at the highest data rates is 55 dB. Dependant on the used coaxial cable is it possible to get over distances up to 600m

IP features

- Management functions as known from the Metro Ethernet Forum
- Support synchronous Ethernet (SyncE) and IEEE-1588v2 (clock and time synchronization) which is beside QoS and high data rates a mandatory requirement for the backhauling of mobile radio cells
- Clock transfer incoming/outgoing from any 10G interface
- PTP (Precision Time Protocol) IEEE-1588v2 (2008) in transparent mode
- Rx / Tx Flow-Control (802.3) over multiple G@Co links

Provisioning and Monitoring

- Management: SNMP v2, v3 (secure), CLI, GUI
- https:// (SSL) web access
- RF capabilities: via automated channel qualification and bitrate optimization

ordering number	name	description
57004172	G@Co-S-1.0G	Start-of-line node for 1 GHz CATV range
57004173	G@Co-S-1.2G	Start-of-line node for 1,2 GHz CATV range
57004176	G@Co-E-1.0G	End-of-line node for 1 GHz CATV range
57004177	G@Co-E-1.2G	End-of-line node for 1,2 GHz CATV range
57004174	G@Co-R-1.0G	Repeater node for 1 GHz CATV range
57004175	G@Co-R-1.2G	Repeater node for 1,2 GHz CATV range
57004178	G@Co-P-1.0G	Passive amplifier bypass for 1 GHz CATV range
57004179	G@Co-P-1.2G	Passive amplifier bypass for 1,2 GHz CATV range

RF Parameter		remarks	
Frequency range common input	MHz	5-4000	
G@Co max. downstream frequency range	MHz	800-2450	
G@Co max. upstream frequency range	MHz	2450-4000	
CATV frequency range	MHz	5 – 862 / 1006 / 1218	Depends on diplex filter
Insertion loss CATV range	dB	< 2,5	per diplex filter
Insertion loss G@Co range	dB	< 4,5	F < 4,0 GHz
Frequency response CATV	dB	< +/- 0,5	
Isolation between G@Co and CATV range	dB	> 35 for f < 2300 MHz > 50 for f < 2300 MHz	
HUM modulation@7A CATV-range	dB	< 70	

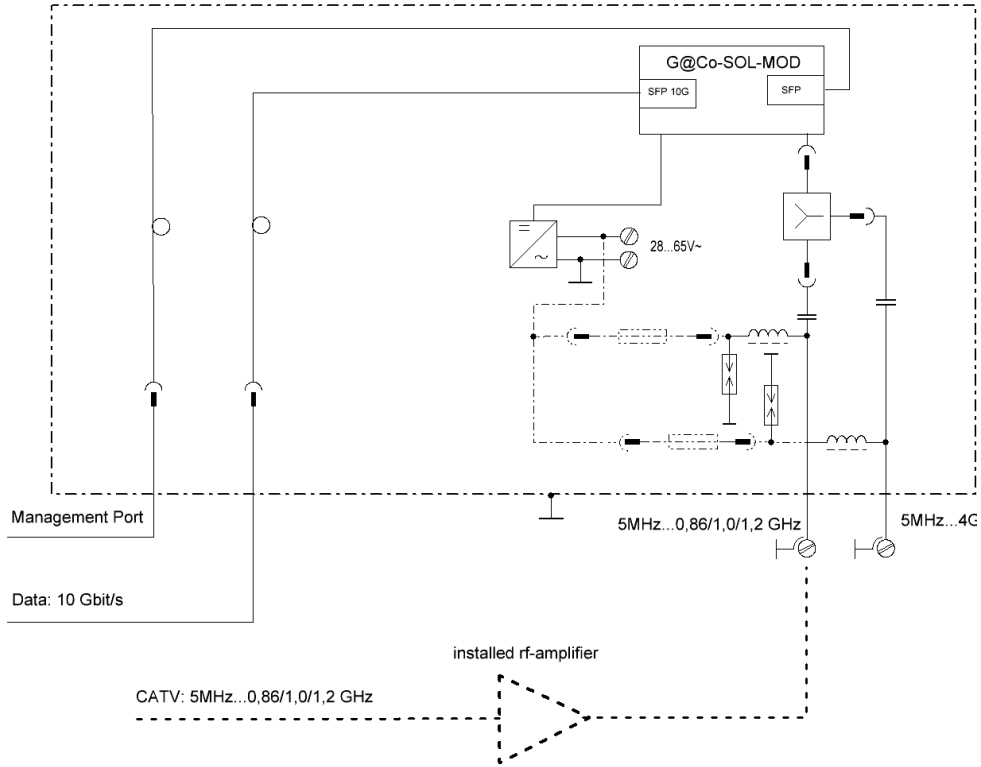
Electrical parameter	
Power supply	28 – 65 (90) VAC – remote powered
Operational voltage	24 VDC
Max. current	2 A (1 A per G@Co-module)
Protection class	IP 65
Overvoltage protection	6 kV (EN 60728-3)
EMC	EN 50083-2 up to 1 GHz EN 55032 for radiation > 1 GHz EN 55024 for immunity > 1 GHz
Safety	EN 60728-11, EN 62368-1
Conformity	CE
Temperature range	-20 to +55°C

Mechanical parameter	
Dimensions and weight G@Co-S, -E, -P	225 x 220 x 105 mm; 3.0 kG
Dimensions and weight G@Co-R	225 x 220 x 165 mm; 5.2 kG
RF Inputs	3,5/12
RF Outputs	3,5/12
Optical	10G SFP+ for the data port 100 Base-T or 100 Base-FX for the monitoring port

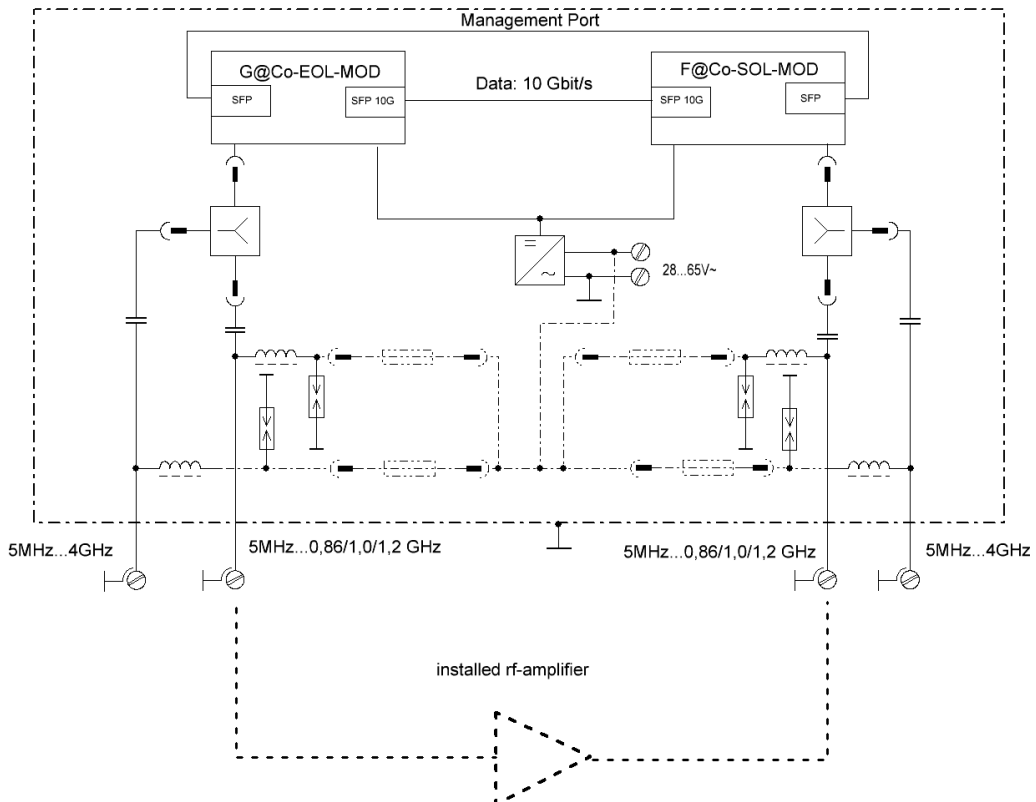


G@CO - BLOCK DIAGRAMS

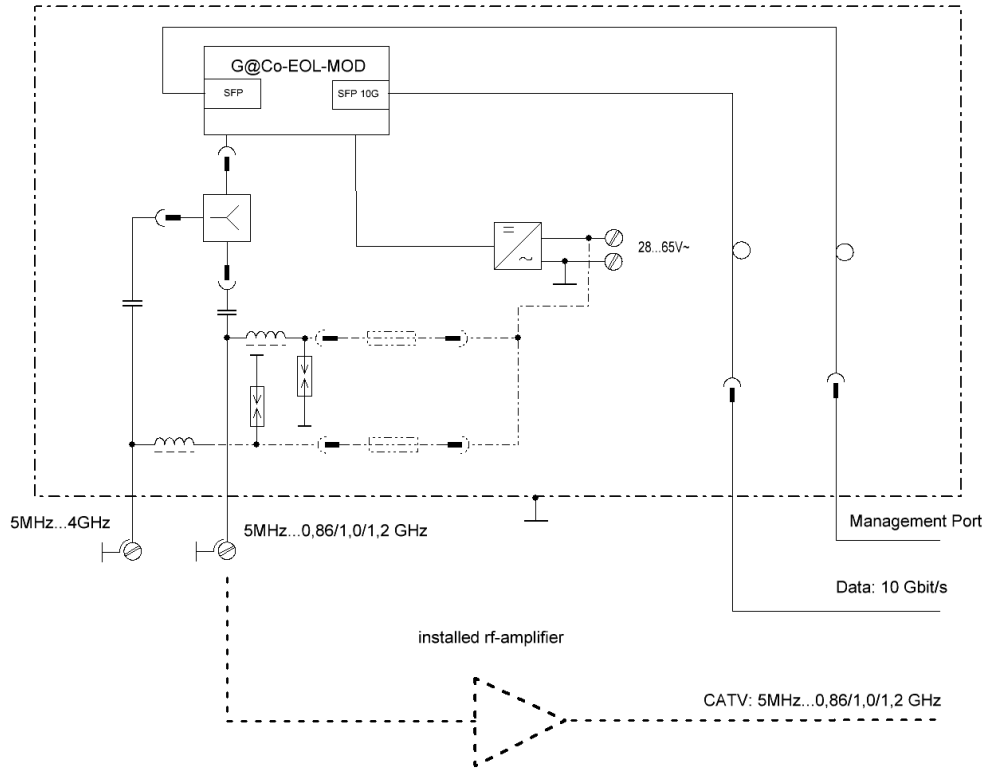
Start-of-Line Node (SoL)



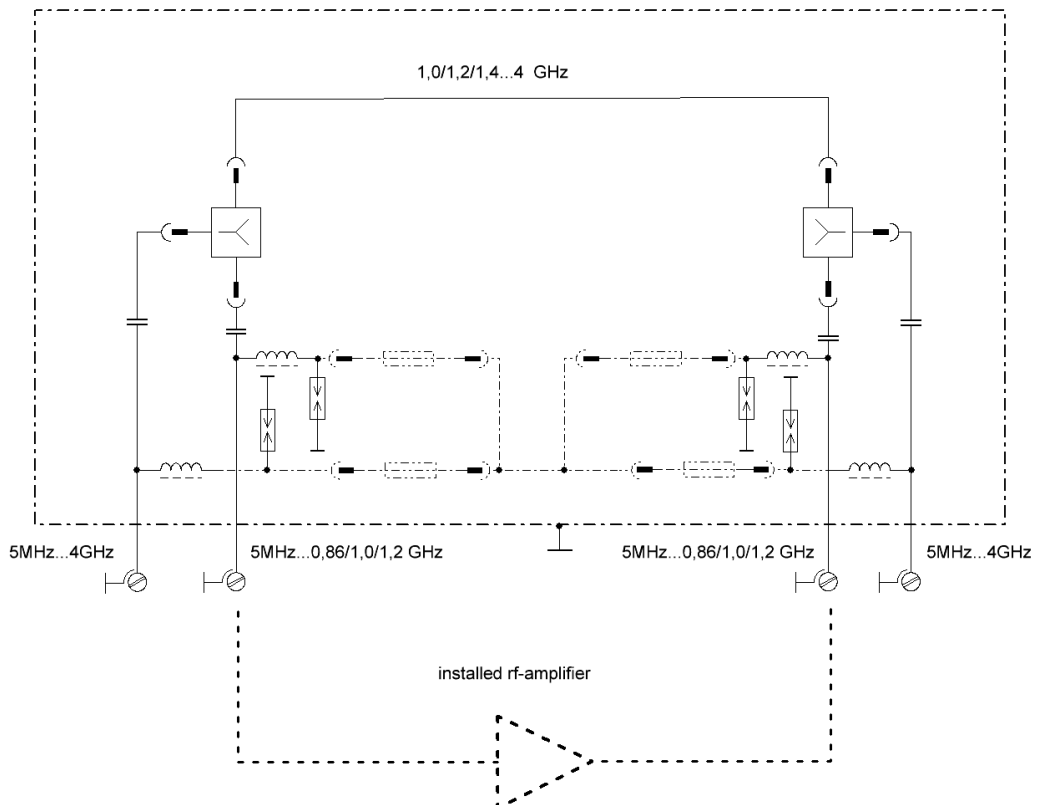
Repeater-Node

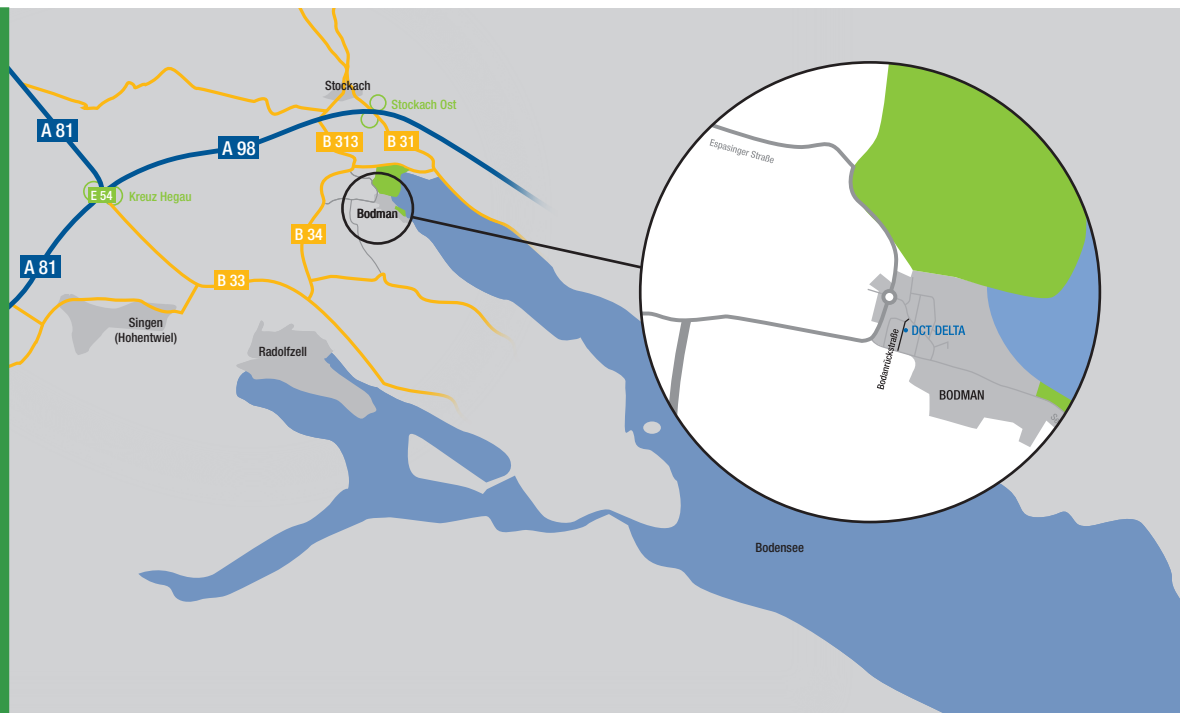


End-of-Line Node (EoL)



Passive Node





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