Cisco GainStar 1 GHz Line Extender with 65/87 MHz Split

The Cisco 1 GHz GainStar Line Extender (GSLE) is specifically designed for use in HFC networks. The GSLE provides excellent forward and reverse path performance combined with high reliability and a user-friendly layout. All new GainStar products share common plug-in accessories and perform to 1 GHz in the forward path. The GSLE provides a single high-level output port or two lower-level RF output ports in a strand or pedestal mount configuration.

The GSLE utilizes GaAsFET technology for superior distortion performance.

The GSLE can be field-upgradable from a forward only configuration to a forward and reverse path configuration. Standard plug-in attenuators can be used to adjust the gain and equalization.

Features

- Can be set up for 862 MHz or 1 GHz performance
- Selectable single or dual outputs with an onboard signal director
- Standard plug-in attenuators are used to adjust gain and equalization settings
- Surge-resistant circuitry ensures resistance to high voltage transients (6 kV)
- Thermal RF control minimizes gain movement over temperature
- 10 A current capacity (steady state) and 15 A surge survivability
- Outdoor housing is IP68 dustproof and watertight
- Strand and pedestal mount housing configurations are available
- All ports are PG11 or 5/8″ with included adapter
- RoHS 6 of 6

Figure 1. Cisco GainStar 1 GHz Line Extender Strand

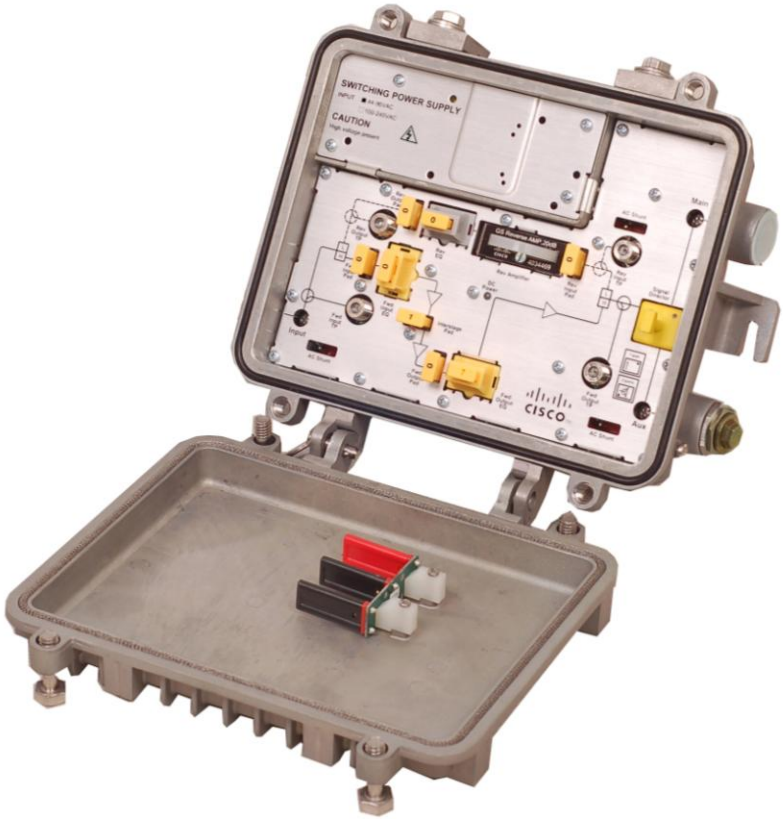


Figure 2. Cisco GainStar 1 GHz Line Extender Pedestal

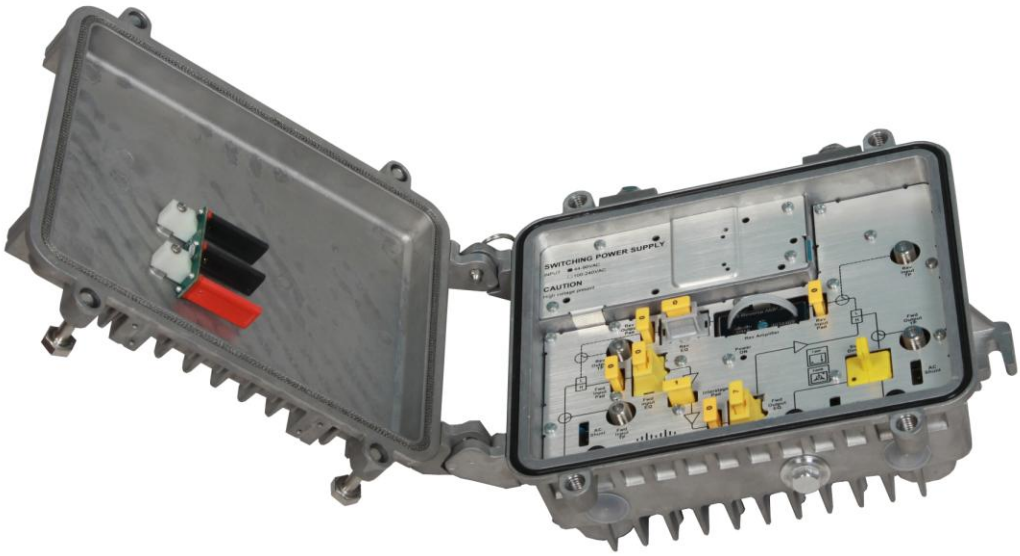
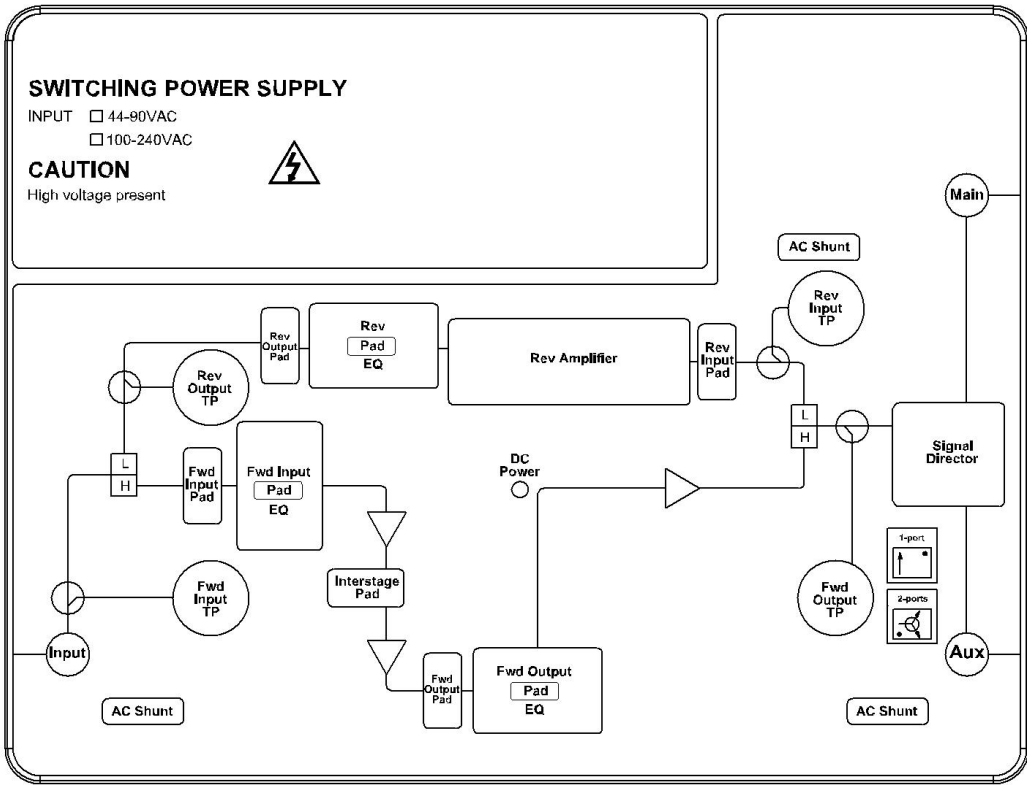


Figure 3. Block Diagram



Specifications

Table 1. Forward RF Section Specifications

Item	Value	
Forward RF		
Frequency Range	87 – 862 MHz	87 – 1000 MHz
Internal Tilt[1]	12 ±1 dB @ 862 MHz	14 ±1 dB @ 1 GHz
Frequency Response	±0.75 dB	
Gain[2,3]	39.5 dB, 1 port 36 dB, 2 ports	
Return Loss	≥ 16 dB	
RF Output Test Point	–20 ±1 dB, 1 port –16.5 ±1 dB, 2 ports	
Hum	65 dB @10 A	
Noise Figure[2,3]	< 8 dB	
Distortion @ 79 NTSC + Digital[3,4,5] CTB CSO XMOD	 68 dB 63 dB 60 dB	
Distortion @ 59 PAL D/K + Digital[3,4,5] CTB CSO	 66 dB 63 dB	
Distortion @ 42 CENELEC[3,4] CTB ≥ 60 dB CSO ≥ 60 dB	 114 dBµV 112 dBµV	

Notes: Unless otherwise noted, specifications reflect typical performance and are referenced to 20ºC.

1. Forward internal tilt specified is primarily due to an on-board equalizer 6 dB (862 MHz band) or 7 dB (1 GHz band) and a factory configured 6 dB (862 MHz band) or 7 dB (1 GHz band) linear output equalizer.
2. Forward Gain and Noise Figure measured with 0 dB input EQ and 0 dB input pad.
3. With 1 dB interstage Pad installed for 1 GHz, 0 dB interstage Pad installed for 862 MHz.
4. Tilt 12 dB @ 862 MHz and 14 dB @ 1 GHz.
5. Distortion performance reference output level is 50 dBmV (1 port). Digital refers to 550 MHz to 862 MHz or 1 GHz loading with QAM carriers at -6 dB relative to analog CW carrier levels.

Table 2. Reverse RF Section Specifications

Item	Value
Reverse RF	
Frequency Range	5 – 65 MHz
Frequency Response	±0.75 dB
Gain[1]	20 dB, 1 port 16.5 dB, 2 ports
Output Level IMD3 ≥ 60 dB IMD2 ≥ 60 dB	 99 dBµV 98 dBµV
Hum	65 dB @ 10 A
Return Loss	≥ 16 dB
Test Point	–20 dB, 1 port –23.5 dB, 2 ports
Noise Figure[1]	< 8 dB
Notes: Unless otherwise noted, specifications reflect typical performance and are referenced to 20ºC. 1. Reverse Gain and Noise Figure measured with 0 dB EQ, 0 dB input pad, and 0 dB output pad.	

Table 3. Station Delay Characteristics

Station Delay Characteristics			
Forward (Chrominance to Luminance)		**Reverse (Group Delay in 1.5 MHz BW)**	
Frequency (MHz)	Delay (ns)	Frequency (MHz)	Delay (ns)
112.25–116.68	4	5.0– 6.5	60
119.25–123.68	3	6.5–8.0	24
126.25–130.68	3	8.0–9.5	12
		60.5–62.0	11
		62.0–63.5	13
		63.5–65.0	19

Table 4. Electrical Specifications

Item	Value
Electrical	
Max. AC Through Current (continuous)	10 Amps
Max. AC Through Current (surge)	15 Amps

Table 5. Station Powering Data (40 - 90 V)

Station Powering Data												
I_{DC} *		AC Voltage										
		90	85	80	75	70	65	60	55	50	45	40
0.8	AC Current (A)	0.29	0.30	0.32	0.33	0.35	0.37	0.39	0.42	0.45	0.49	0.55
	Power (W)	15.1	15.1	15.1	15.0	15.0	15.0	15.0	15.0	15.1	15.2	15.3
*Data is based on stations configured for 2-way operation. AC currents specified are based on measurements made with typical CATV type ferroresonant AC power supply (quasi-square wave).												

Table 6. Station Powering Data (100 - 240 V)

Station Powering Data																
I_{DC} *		AC Voltage														
		240	230	220	210	200	190	180	170	160	150	140	130	120	110	100
0.8	AC Current (A)	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.18	0.19	0.20	0.22	0.23
	Power (W)	14.7	14.6	14.5	14.4	14.3	14.2	14.2	14.2	14.2	14.3	14.3	14.3	14.3	14.2	14.2

*Data is based on stations configured for 2-way operation. AC currents specified are based on measurements made with typical CATV type ferroresonant AC power supply (quasi-square wave).

Table 7. Mechanical and Environmental Specifications

Item	Value	
Mechanical		
Water/Dust Ingress Rating	IP68	
Dimensions (H x W x D)	Strand	Pedestal
	90 x 234 x 212 mm 3.5 x 9.2 x 8.4 in.	90 x 250 x 197 mm 3.5 x 9.9 x 7.8 in.
Weight	3.0 kg 6.6 lb	
Environmental		
Operating Temperature	–40 to +60 °C –40 to +140 °F	
Storage Temperature	–40 to +85 °C –40 to +185 °F	
Compliance	EU RoHS 6/6, IEC/EN 60728-11, IEC/EN 60065, EN 50083-2, FCC Part 76, Subpark K, CB Scheme Certification w/All National Deviation & CENELEC Common Mods	

Ordering Information

The GainStar Line Extender is available in a wide variety of configurations. This section contains ordering information for required and optional accessories. Consult your Customer Service Representative or Applications Engineer to determine the best configuration for your particular application.

Table 8. Required Accessories

Required Accessories for RF Module	Part Number
Plug-in Pads (attenuators) – Available in 1 dB steps from 0 to 20 dB • 1 required for forward input • 1 required for reverse input (Not required for forward only configuration) • 1 required for reverse output (Not required for forward only configuration)	4036021 (0 dB) sequentially through 4036041 (20 dB)
Plug-in Forward Equalizer – Available from 0 to 14 dB • 1 required for forward input; 1 Pad also required and plugged into EQ 862 MHz platform: GainStar Forward Cable Equalizer 0 to 4 dB GainStar Forward Cable Equalizer 5 to 9 dB GainStar Forward Cable Equalizer 10 to 14 dB 1000 MHz platform: GainStar Forward Cable Equalizer 0 to 4 dB GainStar Forward Cable Equalizer 5 to 9 dB GainStar Forward Cable Equalizer 10 to 14 dB	 4034450 4034451 4034452 4034453 4034454 4034455

Table 9. Optional Accessories

Optional Accessories	Part Number
Inverse Equalizer	
Plug-in Forward Inverse Equalizer—Available from 0 to 14 dB	
• 1 required for forward input; 1 Pad also required and plugged into EQ	
GainStar Forward Inverse Equalizer, 0 to 4dB 87 MHz Platform	4035732
GainStar Forward Inverse Equalizer, 5 to 9dB 87 MHz Platform	4035733
GainStar Forward Inverse Equalizer, 10 to 14dB 87 MHz Platform	4035734
Reverse Amplifier Module	
GainStar Reverse Amplifier Module, 20dB Gain	4034469
Reverse Equalizer	
Plug-in Reverse Equalizer—Available from 0 to 10 dB (Not required for forward only configuration) 0 to 5 dB EQ (4034462) and 0 dB Pad (4036021) are provided—Other values must be ordered.	
• 1 required for reverse input; 1 Pad also required and plugged into EQ	
65 MHz platform:	
GainStar Reverse Cable Equalizer 0 to 5 dB	4034462
GainStar Reverse Cable Equalizer 6 to 10 dB	4034463
Related Equipment	
RF Test Probe	1010409
Plug-in 75 ohm Pad	4036140

When upgrading from forward only to a forward and reverse, the Reverse Amplifier Module, Reverse Equalizer with PAD, Reverse input PAD, and Reverse output PAD accessories are required.

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