

## GainStar 1 GHz Line Extender with 42/54 MHz Split

The 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. GainStar 1 GHz Line Extender Strand

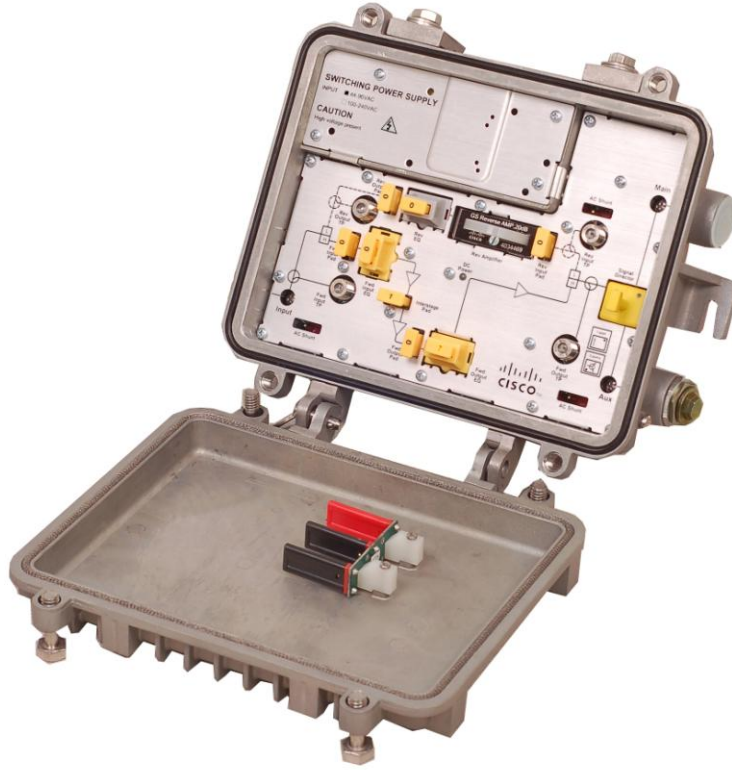


Figure 2. GainStar 1 GHz Line Extender Pedestal

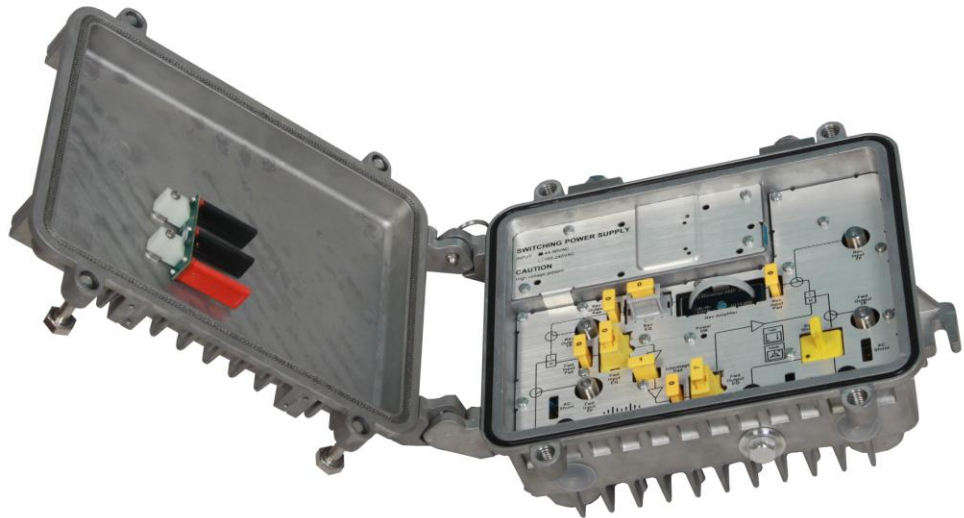
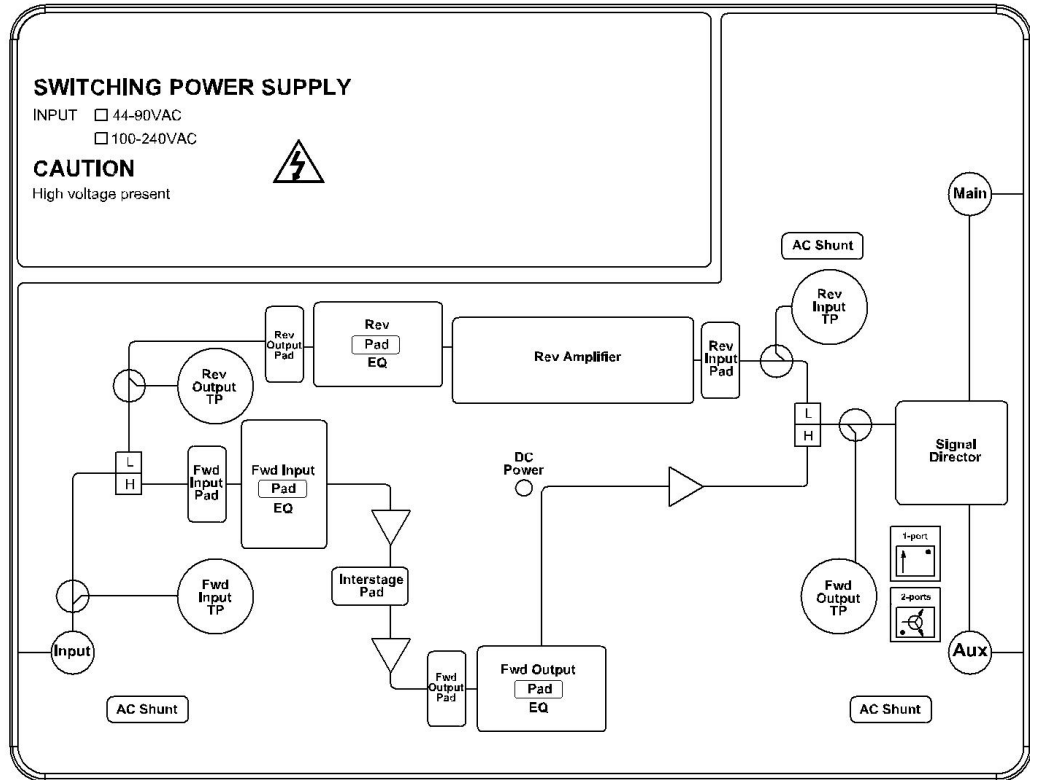


Figure 3. Block Diagram



## Specifications

**Table 1.** Forward RF Section Specifications

Item	Units	Value	
<b>Forward RF</b>			
Frequency Range	MHz	54 – 862	54 – 1000
Internal Tilt <sup>1</sup>	dB	12 ±1 @ 862 MHz	14 ±1 @ 1 GHz
Frequency Response	dB	±0.75	
Gain <sup>2,3</sup>	dB	39.5, 1 port 36, 2 ports	
Return Loss	dB	≥ 16	
RF Output Test Point	dB	-20 ±1, 1 port -16.5 ±1, 2 ports	
Hum	dB	65 @10 A	
Noise Figure <sup>2,3</sup>	dB	< 8	
Distortion @ 79 NTSC + Digital <sup>3,4,5</sup>			
CTB	dB	68	
CSO		63	
XMOD		60	
Distortion @ 64 PAL B/G + Digital <sup>3,4,5</sup>			
CTB	dB	74	
CSO		67	
Distortion @ 42 Cenelec <sup>3,4</sup>			
CTB ≥ 60 dB	dBµV	114	
CSO ≥ 60 dB		112	
<p>Notes: Unless otherwise noted, specifications reflect typical performance and are referenced to 20°C.</p> <ol style="list-style-type: none"> <li>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.</li> <li>Forward Gain and Noise Figure measured with 0 dB input EQ and 0 dB input pad.</li> <li>With 1 dB interstage Pad installed for 1 GHz, 0 dB interstage Pad installed for 862 MHz.</li> <li>Tilt 12 dB @ 862 MHz and 14 dB @ 1 GHz.</li> <li>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.</li> </ol>			

**Table 2.** Reverse RF Section Specifications

Item	Units	Value
<b>Reverse RF</b>		
Frequency Range	MHz	5 – 42
Frequency Response	dB	±0.75
Gain <sup>1</sup>	dB	20, 1 port 16.5, 2 ports
Output Level IMD3 ≥ 60 dB IMD2 ≥ 60 dB	dBμV	99 98
Hum	dB	65 @ 10 A
Return Loss	dB	≥ 16
Test Point	dB	-20, 1 port -23.5, 2 ports
Noise Figure <sup>1</sup>	dB	< 8
Notes: Unless otherwise noted, specifications reflect typical performance and are referenced to 20°C.		
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

<b>Station Delay Characteristics</b>			
<b>Forward (Chrominance to Luminance)</b>		<b>Reverse (Group Delay in 1.5 MHz BW)</b>	
Frequency (MHz)	Delay (ns)	Frequency (MHz)	Delay (ns)
55.25–58.83	37	5.0– 6.5	60
61.25–64.83	14	6.5–8.0	24
67.25–70.83	9	8.0–9.5	12
77.25–80.83	6	37.5–39.0	23
		39.0–40.5	30
		40.5–42.0	49

**Table 4.** Electrical Specifications

Item	Units	Value
<b>Electrical</b>		
Max. AC Through Current (continuous)	Amps	10
Max. AC Through Current (surge)	Amps	15

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

<b>Station Powering Data</b>												
I <sub>DC</sub> *		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 <sub>DC</sub> *		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	14.2	14.3	14.3	14.3	14.3	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	Units	Value
<b>Mechanical</b>		
Water/Dust Ingress Rating	–	IP68
Dimensions (H x W x D)	mm in.	Strand
		Pedestal
		90 x 234 x 212 3.5 x 9.2 x 8.4
		90 x 250 x 197 3.5 x 9.9 x 7.8
Weight	kg	3.0
	lb	6.6
<b>Environmental</b>		
Operating Temperature	°C	–40 to +60
	°F	–40 to +140
Storage Temperature	°C	–40 to +85
	°F	–40 to +185
Compliance	–	EU RoHS 6/6, IEC/EN 60728-11, IEC/EN 60065, EN 50083-2, FCC Part 76, Subpart 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 <ul style="list-style-type: none"> <li>• 1 required for forward input</li> <li>• 1 required for reverse input (Not required for forward only configuration)</li> <li>• 1 required for reverse output (Not required for forward only configuration)</li> </ul>	4036021 (0 dB) sequentially through 4036041 (20 dB)
Plug-in Forward Equalizer – Available from 0 to 14 dB <ul style="list-style-type: none"> <li>• 1 required for forward input; 1 Pad also required and plugged into EQ                             <ul style="list-style-type: none"> <li>862 MHz platform:                                     <ul style="list-style-type: none"> <li>GainStar Forward Cable Equalizer 0 to 4 dB</li> <li>GainStar Forward Cable Equalizer 5 to 9 dB</li> <li>GainStar Forward Cable Equalizer 10 to 14 dB</li> </ul> </li> <li>1000 MHz platform:                                     <ul style="list-style-type: none"> <li>GainStar Forward Cable Equalizer 0 to 4 dB</li> <li>GainStar Forward Cable Equalizer 5 to 9 dB</li> <li>GainStar Forward Cable Equalizer 10 to 14 dB</li> </ul> </li> </ul> </li> </ul>	4034450 4034451 4034452 4034453 4034454 4034455

**Table 9.** Optional Accessories

Optional Accessories	Part Number
<b>Inverse Equalizer</b>	
Plug-in Forward Inverse Equalizer—Available from 0 to 14 dB	
<ul style="list-style-type: none"> <li>1 required for forward input; 1 Pad also required and plugged into EQ</li> </ul>	
GainStar Forward Inverse Equalizer, 0 to 4 dB 54 MHz Platform	4035729
GainStar Forward Inverse Equalizer, 5 to 9 dB 54 MHz Platform	4035730
GainStar Forward Inverse Equalizer, 10 to 14 dB 54 MHz Platform	4035731
<b>Reverse Amplifier Module</b>	
GainStar Reverse Amplifier Module, 20dB Gain	4034469
<b>Reverse Equalizer</b>	
Plug-in Reverse Equalizer—Available from 0 to 10 dB (Not required for forward only configuration)	
0 to 5 dB EQ (4034465) and 0 dB Pad (4036021) are provided—Other values must be ordered.	
<ul style="list-style-type: none"> <li>1 required for reverse input; 1 Pad also required and plugged into EQ</li> </ul>	
42 MHz platform:	
GainStar Reverse Cable Equalizer 0 to 5 dB	4034465
GainStar Reverse Cable Equalizer 6 to 10 dB	4034466
<b>Related Equipment</b>	
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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