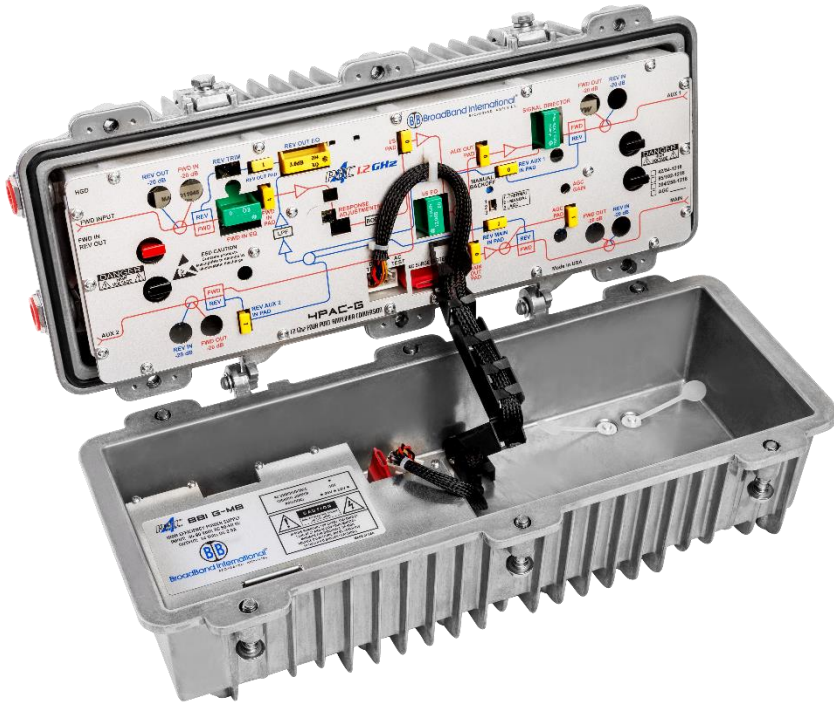


1.2 GHz System Amplifiers 4PAC-G High Gain Dual (HGD)

Replaces/Upgrades Cisco®/Scientific Atlanta®
750/870/1002/1218 MHz Systems



Product Overview

The 4PAC-G HGD High Gain GaN 1.2 GHz enhanced system amplifier module from Broadband International® is designed to drop into any existing Broadband International® or GainMaker® system amplifier housing. The forward bandwidth is up to 1.2 GHz and can be utilized for any bandwidth from 750 MHz to 1.2 GHz. Complete housing with module/power supply or module only is available.

The amplifier accepts any standard GainMaker® style equalizer and long 1.6" JXP style pads. The interstage pad and equalizer set the output gain and slope for maximum performance. The new 1.2 GHz amplifier is equipped with Gallium Nitride (GaN) technology with two RF outputs. A plug-in jumper allows AUX port 1 or 2 to be enabled/disabled as required for network designs. AUX Port 1 and 2 can also be enabled with the optional splitter or DC-8/12 directional coupler plug-ins.



Features:

- Specified bandwidth performance to 1.2 GHz
- Utilizes GainMaker® style plug-in equalizers and pads
- Multiple options for return path bandwidth with removable duplex filter
- Low/high pass filters can be changed in the field
- Field upgradable from 42/54 to 85/102 or 204/258 MHz
- All modules contain a built in thermal network for thermal mode operations when an AGC is not installed
- Advanced AGC circuitry with loss of pilot protection
- Housing available with Chromate Conversion



Performance Specifications - 5-42/54-1218		Unit	Forward	Reverse
Pass Band		MHz	54-1218	5-42
Frequency Response (Flatness)		dB	+/--.75	+/--.5
Return Loss (Min)		dB	16	16
Noise Figure		dB	8.5	10
Operating Gain Main		dB	48	27
Operating Gain AUX (with jumper)		dB	48	27
Bode Control Range		dB	+/-5	N/A
AC Hum Mod @ 12 Amperes (worst case)		dBc	>60	>60
AC Hum Mod @ 15 Amperes (worst case)		dBc	>60	>60
Maximum AC through current (continuous)		Amps	15	15
Reference Digital Output Level (1218/54 MHz)		dBmV	49/31	Varies
Output Slope (typical)		dB	18	Varies
Output Gain Block Technology		dB	GaN/Hybrid	GaAs/MMIC
Test Points		dB	-20	-20
Noise and Distortion Performance		Units	Forward	Reverse
Composite Triple Beat-(Analog 54-550/256 QAM 558-1218 MHz)		dB	70	N/A
Cross-Modulation		dB	65	N/A
Composite Second Order		dB	72	N/A
Carrier to Intermodulation Noise (CIN)		dB	52	N/A
NPR at 50 dB CNR at 42 MHz		dB	N/A	21
NPR at 40 dB CNR at 42 MHz		dB	N/A	33.5
Amplifier Delay Characteristics				
Forward Chrominance to Luminance Delay ns/3.58 MHz			Reverse Group Delay 1.5 MHz	
Frequency (MHz)	Delay (ns)		Frequency (MHz)	Delay (ns)
55.25 to 58.83	37		5.0 to 6.5	60
61.25 to 64.83	13		6.5 to 8.0	25
67.25 to 70.83	8		39.0 to 40.5	25
77.25 to 80.83	4		40.5 to 42.0	35
Powering Data		Units	Voltage/Current	
DC Voltage		VDC	24	
DC Power Consumption- Thermal – 24		Amps	1.65	
DC Power Consumption- with AGC – 24		Amps	1.70	
AC Input voltage range		VAC	38-90	

Notes

1. Forward operating gain and noise figure measured with 1 dB input pad and 0 dB equalizer.
2. Analog loading varies by band split for distortions and CIN.
3. X-Mod measured with 100 percent synchronous modulation.
4. Reverse gain and reverse noise figure measured with 1 dB output pad and 0 dB equalizer.
5. Manual backoff set to 4 dB at 1218 MHz at 75° F.
6. Output level is rated 49 dB at 1218 MHz with 18 dB tilt for 54-1218, 17.3 dB tilt for 102-1218, and 15 dB tilt for 258-1218 modules.
7. QAM loading is 256 QAM Annex B 6 MHz channels.
8. Hum modulation is measured with 15 and 12 amperes of AC passing through the port under test.
9. Specifications are listed as typical performance at 75° F and are subject to change without notice.



Performance Specifications -5-85/102-1218		Unit	Forward	Reverse
Pass Band		MHz	102-1218	5-85
Frequency Response (Flatness)		dB	+/-0.75	+/-0.5
Return Loss (Min)		dB	16	16
Noise Figure		dB	8.5	10
Operating Gain Main		dB	48	27
Operating Gain AUX (with jumper)		dB	48	27
Bode Control Range		dB	+/-5	N/A
AC Hum Mod @ 12 Amperes (worst case)		dBc	>60	>60
AC Hum Mod @ 15 Amperes (worst case)		dBc	>60	>60
Maximum AC through current (continuous)		Amps	15	15
Reference Digital Output Level (1218/109 MHz)		dBmV	49/31.7	Varies
Output Slope (typical)		dB	17.3	Varies
Output Gain Block Technology		dB	GaN/Hybrid	GaAs/MMIC
Test Points		dB	-20	-20
Noise and Distortion Performance		Units	Forward	Reverse
Composite Triple Beat-(Analog 109-550/256 QAM 558-1218 MHz)		dB	72	N/A
Cross-Modulation		dB	66	N/A
Composite Second Order		dB	75	N/A
Carrier to Intermodulation Noise (CIN)		dB	52	N/A
NPR at 50 dB CNR at 85 MHz		dB	N/A	15.5
NPR at 40 dB CNR at 85 MHz		dB	N/A	28.5
Amplifier Delay Characteristics				
Forward Chrominance to Luminance Delay ns/3.58 MHz			Reverse Group Delay 1.5 MHz	
Frequency (MHz)	Delay (ns)		Frequency (MHz)	Delay (ns)
109.275 to 112.855	26		5.0 to 6.5	60
115.275 to 118.855	22		6.5 to 8.0	24
121.2625 to 124.8425	17		82.0 to 83.5	18
127.2625 to 130.8425	9		83.5 to 85.0	22
Powering Data		Units	Voltage/Current	
DC Voltage		VDC	24	
DC Power Consumption- Thermal		Amps	1.65	
DC Power Consumption- with AGC		Amps	1.70	
AC Input voltage range		VAC	38-90	

Notes

1. Forward operating gain and noise figure measured with 1 dB input pad and 0 dB equalizer.
2. Analog loading varies by band split for distortions and CIN.
3. X-Mod measured with 100 percent synchronous modulation.
4. Reverse gain and reverse noise figure measured with 1 dB output pad and 0 dB equalizer.
5. Manual backoff set to 4 dB at 1218 MHz at 75° F.
6. Output level is rated 49 dB at 1218 MHz with 18 dB tilt for 54-1218, 17.3 dB tilt for 102-1218, and 15 dB tilt for 258-1218 modules.
7. QAM loading is 256 QAM Annex B 6 MHz channels.
8. Hum modulation is measured with 15 and 12 amperes of AC passing through the port under test.
9. Specifications are listed as typical performance at 75° F and are subject to change without notice.



Performance Specifications - 5-204/258-1218		Unit	Forward	Reverse
Pass Band		MHz	258-1218	5-204
Frequency Response (Flatness)		dB	+/-0.75	+/-0.5
Return Loss (Min)		dB	16	16
Noise Figure		dB	8.5	10
Operating Gain Main		dB	48	27
Operating Gain AUX (with jumper)		dB	48	27
Bode Control Range		dB	+/-5	N/A
AC Hum Mod @ 12 Amperes (worst case)		dBc	>60	>60
AC Hum Mod @ 15 Amperes (worst case)		dBc	>60	>60
Maximum AC through current (continuous)		Amps	15	15
Reference Digital Output Level (1218/258 MHz)		dBmV	49/34	Varies
Output Slope (typical)		dB	15	Varies
Output Gain Block Technology		dB	GaN/Hybrid	GaAs/MMIC
Test Points		dB	-20	-20
Noise and Distortion Performance		Units	Forward	Reverse
Composite Triple Beat-(Analog 258-550/256 QAM 558-1218 MHz)		dB	73	N/A
Cross-Modulation		dB	66	N/A
Composite Second Order		dB	76	N/A
Carrier to Intermodulation Noise (CIN)		dB	52	N/A
NPR at 50 dB CNR at 204 MHz		dB	N/A	11.5
NPR at 40 dB CNR at 204 MHz		dB	N/A	26
Amplifier Delay Characteristics				
Forward Chrominance to Luminance Delay ns/3.58 MHz		Reverse Group Delay 1.5 MHz		
Frequency (MHz)	Delay (ns)	Frequency (MHz)	Delay (ns)	
259.2625 – 262.8425	10	5.0 to 6.5	60	
265.2625 – 268.8425	8	6.5 to 8.0	24	
271.2625 to 274.8425	7	201.0 to 202.5	4	
277.2625 to 280.8425	5	202.5 to 204.0	7	
Powering Data		Units	Voltage/Current	
DC Voltage		VDC	24	
DC Power Consumption- Thermal		Amps	1.65	
DC Power Consumption- with AGC		Amps	1.70	
AC Input voltage range		VAC	38-90	

Notes

1. Forward operating gain and noise figure measured with 1 dB input pad and 0 dB equalizer.
2. Analog loading varies by band split for distortions and CIN.
3. X-Mod measured with 100 percent synchronous modulation.
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5. Manual backoff set to 4 dB at 1218 MHz at 75° F.
6. Output level is rated 49 dB at 1218 MHz with 18 dB tilt for 54-1218, 17.3 dB tilt for 102-1218, and 15 dB tilt for 258-1218 modules.
7. QAM loading is 256 QAM Annex B - 6 MHz channels.
8. Hum modulation is measured with 15 and 12 amperes of AC passing through the port under test.
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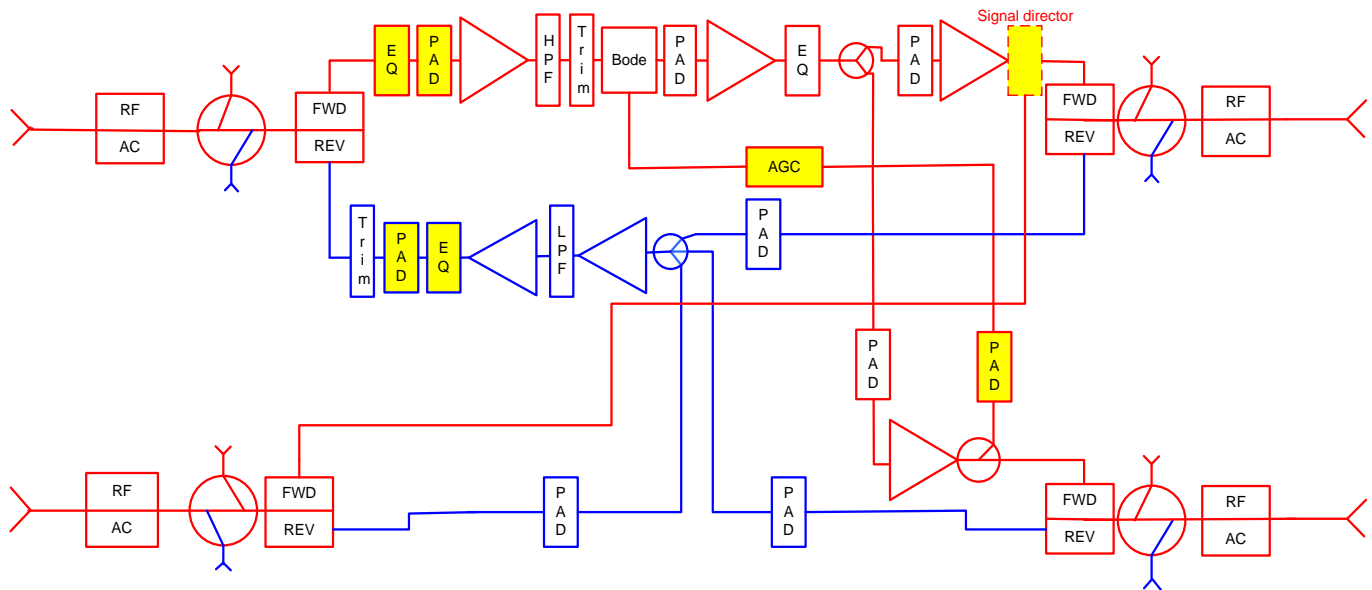


4PAC-G HGD		High Gain GaN	AC Voltage										
	I DC		90	85	80	75	70	65	60	55	50	45	40
Thermal	1.65	AC current draw	0.77	0.78	0.83	0.85	0.91	0.96	1.03	1.12	1.21	1.3	1.37
AGC	1.70	AC current draw	0.81	0.82	0.87	0.89	0.95	1.01	1.08	1.18	1.27	1.35	1.44

Physical Specifications	
Operating temperature range (degrees)	-40 to +140 F (-40 to +60 C)
Housing dimensions (inches)	17.4 in. L x 7 in. H x 7.8 in. D
Housing Weight with PS/LT/UC	13 lb. 10 oz.
Amplifier weight (lbs.)	6 lb. 6 oz.

4PAC-G HGD 1.2 GHz Diagram and Ordering Information

The following Required Accessories highlighted in yellow must be ordered separately (all other pads and equalizers are provided)



BROADBAND INTERNATIONAL 4PAC G 1.2 GHZ - Dual

The Broadband International® 4PAC-G amplifier can be configured in many different frequencies and options. Please consult your account representative for assistance with specific plug-in options.



Required Accessories

Plug-In 1.2 GHz Pads* (Attenuators) – available in 1 dB steps from 0 to 24 dB	Part Number
1 Pad required for Forward Input	5898XX
1 Pad required for Reverse Output	
**1 Pad required for AGC, if applicable	
Forward 1.2 GHz Equalizers for Forward Input	
1 Forward Cable Equalizer – available in 1.5 dB steps from 0 to 30 dB	2071XX
Or - 1 Forward Inverse Equalizer – available in 1.5 dB steps from 1 to 21 dB	2071XXI
Reverse Cable Equalizers for Reverse Output	Part Number
1 Reverse Equalizer - available in 1 dB steps from 0 to 12 dB (42 MHz)	2064XX
1 Reverse Equalizer - available in 1 dB steps from 0 to 12 dB (85 MHz)	2068XX
1 Reverse Equalizer - available in 1 dB steps from 0 to 16 dB (204 MHz)	2062XX
Signal Director	Part Number
Splitter activates 2 AUX ports	2041204
Jumper activates 1 AUX port	2051200
DC-8 activates 2 AUX ports	2031208
DC-12 activates 2 AUX ports	2031212

**To determine AGC pad value, subtract 35 dB from the design value main port RF output level at the AGC Pilot Frequency

Optional Accessories

Optional – Automatic Gain Control (AGC)	Part Number
423.00 MHz – QAM	225423
427.25 MHz – Analog	225427
445.25 MHz – Analog	225445
499.25 MHz – Analog	225499
527.25 MHz - Analog	225527
547.25 MHz – Analog	225547
609.00 MHz – QAM	225609
711.00 MHz – QAM	225711
Optional – Housing Accessories	Part Number
15 Amp Seizure Assembly (set of 4)	548775-BB
Housing for Gainmaker Style System Amplifiers with 15 amp seizure screws	41-3200
Housing for Gainmaker Style System Amplifiers with 15 amp seizure screws, 2.5-Amp power supply/UC/LT.	41-32PSLD
Housing Lid Cover Kit, for Gainmaker Style System Amplifiers -includes Lid Cover, 2.5-Amp power supply/UC/LT	21932PSLD
Umbilical Cord/Ladder Tray Only - for Gainmaker Style System Amplifiers	214222000
Power supply Only - For Gainmaker Style System Amplifiers and BBI 4PAC-MOT Mini Bridgers	219PS000



Ordering Information – 1.2 GHz 4PAC-G High Gain Dual (HGD)

