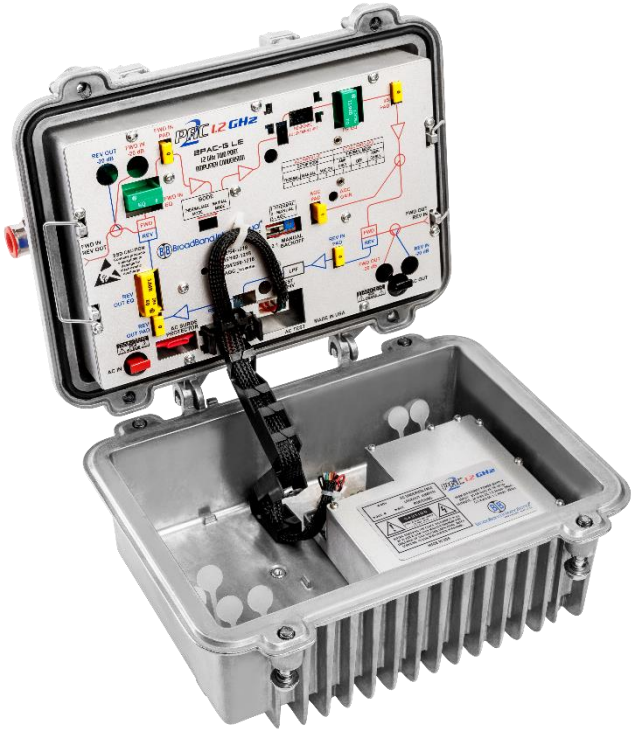
BroadBand International®
BROADBAND. AMPLIFIED.

1.2 GHz Line Extenders – 2PAC-G High Gain GaN

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



Product Overview

The 2PAC-G High Gain GaN 1.2 GHz enhanced line extender module from Broadband International® is designed to drop into any existing Broadband International® or GainMaker® Line Extender 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 a single output.

Features:

- **Specified bandwidth performance to 1.2 GHz**
- **Utilizes GainMaker® style plug-in equalizers and pads**
- **Multiple options for return path bandwidth with removable diplex 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 circuity 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	5.5
Operating Gain with AGC	dB	39	27
Operating Gain in Manual	dB	44	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	63	N/A
Composite Second Order	dB	69	N/A
Carrier to Intermodulation Noise (CIN)	dB	54	N/A
NPR at 50 dB CNR at 42 MHz	dB	N/A	27
NPR at 40 dB CNR at 42 MHz	dB	N/A	42

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	24/5.5
DC Power Consumption- Thermal – 24/5.5	Amps	.78/.91
DC Power Consumption- with AGC – 24/5.5	Amps	.85/.91
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% 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 degrees 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	+/-.75	+/-.5
Return Loss (Min)	dB	16	16
Noise Figure	dB	8.5	5.5
Operating Gain with AGC	dB	39	27
Operating Gain in Manual	dB	44	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 105-550/256 QAM 558-1218 MHz)	dB	71	N/A
Cross-Modulation	dB	65	N/A
Composite Second Order	dB	68	N/A
Carrier to Intermodulation Noise (CIN)	dB	54	N/A
NPR at 50 dB CNR at 85 MHz	dB	N/A	24.5
NPR at 40 dB CNR at 85 MHz	dB	N/A	38

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	24/5.5
DC Power Consumption- Thermal – 24/5.5	Amps	.78/.91
DC Power Consumption- with AGC – 24/5.5	Amps	.85/.91
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% 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	+/-.75	+/-.5
Return Loss (Min)	dB	16	16
Noise Figure	dB	8.5	5.5
Operating Gain with AGC	dB	39	27
Operating Gain in Manual	dB	44	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	71	N/A
Cross-Modulation	dB	65	N/A
Composite Second Order	dB	68	N/A
Carrier to Intermodulation Noise (CIN)	dB	54	N/A
NPR at 50 dB CNR at 204 MHz	dB	N/A	20
NPR at 40 dB CNR at 204 MHz	dB	N/A	33

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	24/5.5
DC Power Consumption- Thermal	Amps	.78/.91
DC Power Consumption- with AGC	Amps	.85/.91
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% synchronous modulation.
4. Reverse gain and reverse noise figure measured with 1 dB output pad and 0 dB equalizer.
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7. QAM loading is 256 QAM Annex B 6 MHz channels.
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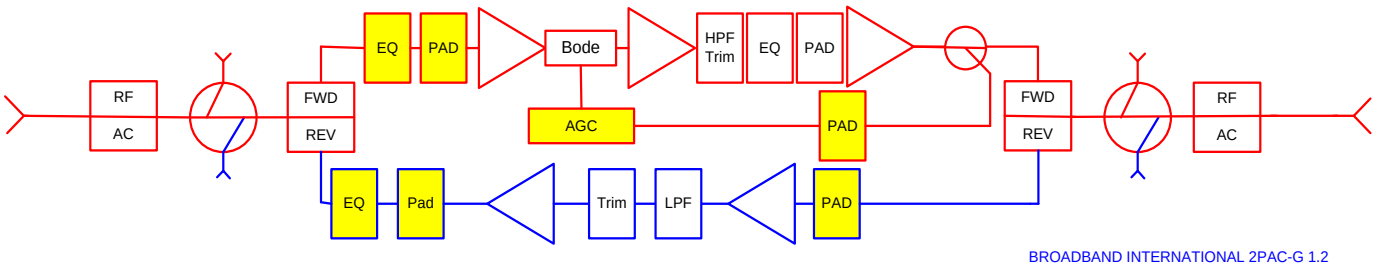
9. Specifications are listed as typical performance at 75° F and are subject to change without notice.

2PAC-G	I DC/Amps		2 PAC - GaN	AC Voltage										
	24V	5.5V		90	85	80	75	70	65	60	55	50	45	40
Thermal	.78	.91	AC current draw	0.49	0.51	0.54	0.56	0.59	0.63	0.67	0.71	0.79	0.85	0.89
AGC	.85	.91	AC current draw	0.56	0.58	0.60	0.63	0.67	0.71	0.76	0.82	0.88	0.97	0.99

Physical Specifications	
Operating temperature range (degrees)	-40 to +140 F (-40 to +60 C)
Housing weight dimensions with PS/UC LT (lbs.)	10 lbs. 3 oz.
Housing dimensions (inches- L x W x D)	11.45" X 9.76" X 6.36"
Amplifier Weight (lbs.)	3 lbs. 10 oz.

2PAC-G Line Extender 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)



The Broadband International® 2PAC-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	5898**XX**
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	2071**XX**
Or - 1 Forward Inverse Equalizer – available in 1.5 dB steps from 1 to 21 dB	2071**XX**I
Reverse Cable Equalizers for Reverse Output	**Part Number**
1 Reverse Equalizer - available in 1 dB steps from 0 to 12 dB (42 MHz)	2064**XX**
1 Reverse Equalizer - available in 1 dB steps from 0 to 12 dB (85 MHz)	2068**XX**
1 Reverse Equalizer - available in 1 dB steps from 0 to 16 dB (204 MHz)	2062**XX**

**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 2)	548774-BB
Housing for Gainmaker Style Line Extender with 15 ampere seizure screws	42-3000
Housing for Gainmaker Style Line Extender with 15 ampere seizure screws, 24/5.5 Volt PS/UC/LT	42-31PSLD
Gainmaker Style Line Extender Lid Cover Kit for 1.2 GHz BBI or OEM Line Extenders - Includes Lid Cover, 24/5.5 Volt PS/UC/LT (Upgrades SA II/III shallow lid cover housing)	2512PSLD
24/5.5 Volt PS/UC/LT for 1.2 GHz BBI or OEM amplifiers (Electronic kit only without housing lid cover for upgrading existing BBI or OEM GM style LE housing)	2512PS24G
Umbilical Cord/Ladder Tray Only - For OEM or BBI 1.2 GHz Gainmaker style line extenders	251224G000
24/5.5 Volt power supply - For OEM or BBI 1.2 GHz Gainmaker style line extenders	2512PS000

Ordering Information – 1.2 GHz GaN Line Extender

A-C	Product Family
24G	2PAC-G

E	Frequency Split
2	42/54
5	85/102
6	204/258

H	Frequency	Type
A	427.25	Analog
B	445.25	Analog
C	499.25	Analog
D	527.25	Analog
E	547.25	Analog
F	423	QAM
G	609	QAM
H	711	QAM
I	AGC Ready	
K	Thermal	

J	Housing
1	No Housing
2	Housing W/O PS
3	Housing W PS

K	Kit
0	No Kit

A-C	D	E	F	G	H	I	J	K	L	M-O
24G	2		1			3		0		Future 000

D	Bandwidth
2	1.2 GHz

F	Port Configuration
1	LE Single Output

G	Tilt	Split
K	15 dB	204/258
M	17 dB	85/102
N	18 dB	42/54

I	Gain Type
3	High Gain GaN

L	Power Supply
1	PS in Lid Cover
2	No PS