

## OVERVIEW

The Quantum12 HGBT (High Gain Balanced Triple) 1.2GHz System Amplifier is the latest solution to provide high-quality signal performance in CATV networks. Designed for both high gain dual and high gain balanced triple, these system amplifiers seamlessly integrate into your GainMaker SA Housings.

### High-performance Gallium Nitride (GaN) gain stage technology:

The technology uses the power of GaN for signal performance.

- Delivers unrivaled signal strength and quality.

**Drop into GainMaker SA Housing:** Designed for compatibility with existing GainMaker SA Housings

- Saves time and resources by eliminating the need for housing replacement.

**Accessible RF test points:** The design allows for direct access to RF test points without the need to open the amplifier housing.

- Enables easy and efficient signal testing.

**Spring-loaded seizure assemblies:** Mechanisms allows for the ease of installation or removal of the amplifier RF module.

- Offers a user-friendly experience during installations or maintenance, minimizing downtime.

**Robust Power Supply:** The power module is strategically located in the housing lid.

- Ensures efficient heat dispersion to optimize the product's lifespan.

**QAM pilot (711MHz) AGC:** An optional feature with thermal backup

- Provides better control and eliminates disruptive RF output variation during pilot loss.

**Surge-resistant circuitry:** Designed to protect the active devices that can lead to network outages.

- Enhances longevity and reliability of the amplifier by reducing the risk of damage from unexpected power fluctuations.

**Additional Features:** These include a 15A current capacity (steady state), 25A surge (2 hour) survivability, AGC with thermal backup, and reverse input pad and RF test point for each reverse input port.

- These collective enhancements solidify the amplifier's robustness, making it versatile and reliable in various networking contexts.



GENERAL STATION PERFORMANCE	UNITS	FORWARD	REVERSE	NOTES
Pass band	MHz	54-1218	5-204	
Amplifier type	-	GaN	GaAs	
Frequency response	dB	± 0.5	± 0.5	
Auto slope and gain range	dB	± 5.8	-	
Return loss	dB	16	16	4
Maximum AC through current (continuous)	Amps	15	-	
Maximum AC through current (surge)	Amps	25	-	
Hum modulation at 15A (over specified frequency range)	dB	60 (54-1002 MHz) 55 (1002-1218 MHz)	55 (5-10 MHz) 60 (10-204 MHz)	
Test points (± 0.75 dB)	dB	-20	-20	

Forward Station Performance	Units	Auto/Thermal with 12 dB I/S EQ	Notes
Operational gain (minimum)	dB	48	2
Internal tilt (± 0.5 dB) @ 54 – 1218 MHz	dB	19.0	6
Noise Figure	dB	8.5	2
BER	dB	<1E-6	
CCN	dB	49	5
MER	dB	49	5

Unless indicated differently, our specifications are established based on a standard performance of 68°F (20°C). The measurements employed in determining these specifications adhere to the globally recognized SCTE/ANSI standards, when relevant, utilizing standard frequency assignments.

Reverse Station Performance	Units	Notes	
Operational gain (minimum) @ 42 MHz	dB	3, 4	
@ 85 MHz			21.6
@ 204 MHz			23.8
Noise figure	dB	3, 4	
NPR at 50dB CNR at 42 MHz		22	
NPR at 50dB CNR at 85 MHz	dB	19	
NPR at 50dB CNR at 204 MHz		14.5	

Station Delay Characteristics (42/54 Split)			
Forward (Chrominance to Luminance Delay)		Reverse (Group Delay in 1.5 MHz bandwidth)	
Frequency (MHz)	Delay (ns)	Frequency (MHz)	Delay (ns)
55.25 to 58.83	39	5.0 to 6.5	60
61.25 to 64.83	15	6.5 to 8.0	22
67.25 to 70.83	17	8.0 to 9.5	12
77.25 to 80.83	10	37.5 to 39.0	20
		39.0 to 40.5	32
		40.5 to 42.0	50

Station Delay Characteristics (85/102 Split)			
Forward (Chrominance to Luminance Delay)		Reverse (Group Delay in 1.5 MHz bandwidth)	
Frequency (MHz)	Delay (ns)	Frequency (MHz)	Delay (ns)
109.275 - 112.855	15	5.0 to 6.5	60
115.275 - 118.855	10	6.5 to 8.0	22
121.2625 - 124.8425	8	8.0 to 9.5	12
127.2625 - 130.8425	5	80.5 – 82.0	10
		82.0 – 83.5	17
		83.5 – 85.0	21

Station Delay Characteristics (204/258 Split)			
Forward (Chrominance to Luminance Delay)		Reverse (Group Delay in 1.5 MHz bandwidth)	
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	22
271.2625 - 274.8425	7	8.0 to 9.5	12
277.2625 - 280.8425	5	199.5 -201.0	6
		201.0-202.5	5
		202.5-204.0	8

Station Powering Data														
Quantum12 System Amplifier	I DC (Amps)	AC Voltage												
		90	85	80	75	70	65	60	55	50	45	40	35	
Thermal	1.97	AC current	0.83	0.85	0.87	0.90	0.92	0.95	1.08	1.17	1.25	1.36	1.53	1.76
		Power (W)	53.5	53.3	53.1	53.0	52.8	52.7	52.7	52.6	52.6	52.7	52.8	53.2
AGC	2.03	AC current	0.84	0.88	0.90	0.93	0.95	0.98	1.12	1.22	1.30	1.42	1.59	1.82
		Power (W)	55.0	54.8	54.7	54.5	54.4	54.3	54.3	54.2	54.3	54.3	54.5	54.8

The data provided here is derived from stations set up for bidirectional operation. The specified AC currents are measured using a common CATV type ferroresonant AC power supply (quasi-square wave) and the Quantum12 High Output System Amplifier power supply (2.5A, 24 VDC).

The DC supply incorporates a customizable 30V, 40V, or 50 VAC under-voltage lockout circuit with the default setting being 30V, 40V, or 50 VAC. You can adjust the under-voltage lockout by modifying the position of the lockout jumper.

**Note:**

1. We specify the output tilt as "LINEAR" tilt (not "cable" tilt). These tilts were achieved using a 12 dB EQ in the interstage, while the remaining tilt comes from the input EQ and the input signal.
2. Forward gain and noise figures were measured with 0 dB input EQ, 1 dB input pad, Thermal, and AGC module.
3. Down tilt, an effect of cable, is denoted by a (-). Up tilt, an effect of equalization, is denoted by a (+).
4. The data reflects mixed loading of 79 analog channels (54 – 554MHz) and SC-QAMs (554- 1218MHz) with 6dB back-off.
5. Distortion performance at reference output levels and tilt. Corrected with source performance backed out.
6. All digital loading. 49dBmV QAM at 1218MHz, 18dB tilt (54 – 1218 MHz).

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Environmental	Value
Operating temperature range	-40 to 140°F (-40 to 60°C)

Mechanical	Value
Housing dimensions (L x H x D)	17.3 in. x 7.2 in. x 7.8 in. (439.4 mm x 182.9 mm x 198.1 mm)
Weight	
Housing with power supply Module	12 lb, 5 oz (5.6 kg) 5 lb, 5 oz (2.4 kg)