Datasheet

# Quantum12™ HGBT 1.2GHZ System Amplifiers

## 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 AGC:** An optional feature with thermal backup

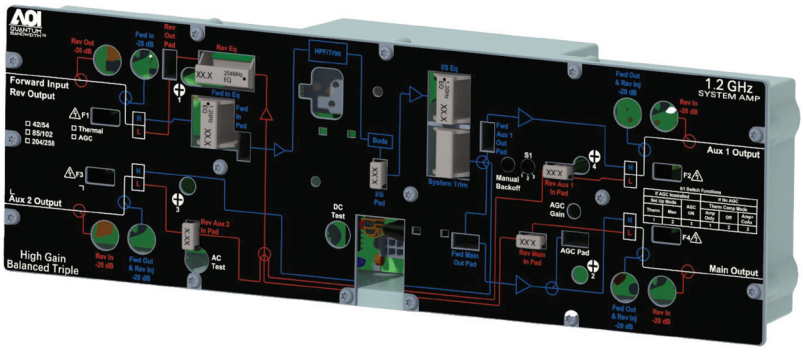
- Provides better control and eliminates disruptive RF output variation during pilot loss.

**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)<br>55 (1002-1218 MHz) | 55 (5-10 MHz)<br>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 | 21.6 | 3, 4 |
| @ 85 MHz | | 23.8 | |
| @ 204 MHz | | 27.2 | |
| Noise figure | dB | 12 | 3, 4 |
| NPR at 50dB CNR at 42 MHz | dB | 22 | |
| NPR at 50dB CNR at 85 MHz | | 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).*

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.

| 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.<br>(439.4 mm x 182.9 mm x 198.1 mm) |
| Weight | | |
| | Housing with power supply | 12 lb, 5 oz (5.6 kg) |
| | Module | 5 lb, 5 oz (2.4 kg) |