

# Compact Outdoor Gallium Nitride (GaN) Solid State Power Amplifiers

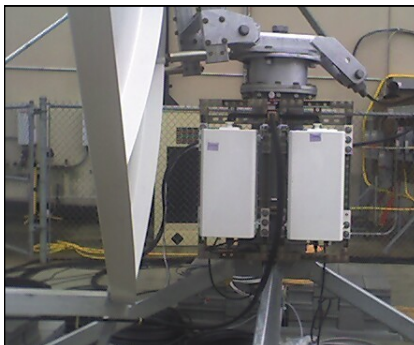


**400W C-Band GaN  
 Compact Outdoor SSPA**

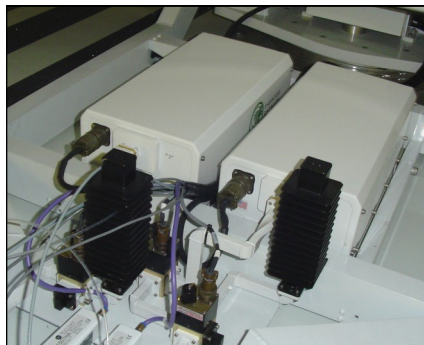
## Description

The Teledyne Paradise Datacom Compact Outdoor Solid State Power Amplifier (SSPA) is built for extreme environmental conditions and high reliability operation. Along with the robust construction exists the highest power density in the industry. This allows solid state technology to be used in applications that have long been reserved for TWTAs. Weighing 44 lbs. (20 kg) and being only slightly larger than a shoe box, these SSPAs are available in output power levels of:

- S-Band: 50W, 100W, 200W, 300W, 400W, 500W**
- C-Band: 300W, 400W, 500W**
- X-Band: 300W, 400W**
- Ku-Band: 100W, 150W, 200W, 250W, 300W**
- Ka-Band: 80W, 100W, 180W**



Antenna-mount 1:1 system w/ mounting frame



SNG-mount 1:1 system w/ side-mount AC input

## FEATURES

- Compact size and weight
- CE & MIL-461 Compliant
- Integrated forced-air cooling system
- 20 dB RF Gain Adjustment
- Extreme Environmental Testing
- RF Output Sample Port
- Maintenance Free Operation
- Universal, Power Factor Corrected Power Supply
- Built-in 1:1 Redundancy Control
- Built-in Maintenance Switch Controller
- True Output Power Detection

## OPTIONS

- Hand Held Controller
- Antenna Mounting Kit
- Remote Control Panel
- L-Band Input
- FSK monitor & control via IFL
- Phase Combined Systems
- Low line voltage operation
- Fiber Optic Input
- Optional side-mount AC input for SNG installations
- Receive Band Reject Filter
- Reflected Power Monitor
- -55 °C Operation

## SPECIFICATIONS

- Compact Outdoor housing  
 10.0 X 19.5 X 6.50 in  
 254 X 495 X 165 mm  
 44.0 lbs. / 20.0 kg
- White powder coat finish
- Operating temperature:  
 -40 to +60 °C

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## Specifications, S-Band SSPAs

| PARAMETER   | NOTES  | LIMITS   | UNITS  |
|---|--|--|--|
| Frequency Range   | Frequency selection "G"<br>Frequency selection "A"<br>Frequency selection "B"  | 1.750 to 2.120<br>2.020 to 2.120<br>2.200 to 2.300   | GHz<br>GHz<br>GHz  |
| Output Power<br>Typical, $P_{sat}$<br>Guaranteed minimum, $P_{Linear}$ <sup>1</sup> | <b>A Series</b><br>HPAS2050ACXXXXXG<br>HPAS2100ACXXXXXG<br>HPAS2200ACXXXXXG<br>HPAS2300ACXXXXXG<br>HPAS2400ACXXXXXG<br>HPAS2500ACXXXXXG<br><b>B Series</b><br>HPAS2050BCXXXXXG<br>HPAS2100BCXXXXXG<br>HPAS2200BCXXXXXG<br>HPAS2300BCXXXXXG<br>HPAS2400BCXXXXXG<br>HPAS2500BCXXXXXG | $P_{sat} / P_{Linear}$<br>47.5 (56) / 43.0 (20)<br>50.0 (100) / 47.0 (50)<br>53.0 (200) / 50.0 (100)<br>54.8 (300) / 51.8 (150)<br>56.0 (400) / 53.0 (200)<br>57.0 (500) / 54.0 (250)<br>47.5 (56) / 43.0 (20)<br>50.0 (100) / 47.0 (50)<br>53.0 (200) / 50.0 (100)<br>54.8 (300) / 51.8 (150)<br>56.0 (400) / 53.0 (200)<br>57.0 (500) / 54.0 (250) | dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W) |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC) | power factor<br><br>HPAS2050ACXXXXXG<br>HPAS2100ACXXXXXG<br>HPAS2200ACXXXXXG<br>HPAS2300ACXXXXXG<br>HPAS2400ACXXXXXG<br>HPAS2500ACXXXXXG   | .98<br>47 to 63<br>400 / 300 (90-265)<br>500 / 400 (90-265)<br>800 / 700 (90-265)<br>1300 / 1000 (180-265) <sup>2</sup><br>1600 / 1300 (180-265) <sup>2</sup><br>1800 / 1500 (180-265) <sup>2</sup>  | Hz<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)   |
| Receive Band Noise Power Density  | without optional filter<br>with optional filter  | - 95<br>- 155  | dBW / 4 KHz<br>dBW / 4 KHz   |

## Specifications, C-Band SSPAs

| PARAMETER   | NOTES   | LIMITS  | UNITS   |
|---|---|---|---|
| Frequency Range   | Frequency selection "L"<br>Frequency selection "H"<br>Frequency selection "C" <sup>3</sup><br>Frequency selection "A"<br>Frequency selection "B" <sup>3</sup><br>Frequency selection "E"<br>Frequency selection "F" | 4.400 to 5.000<br>5.715 to 5.790<br>5.750 to 6.670<br>5.850 to 6.425<br>5.850 to 6.725<br>6.425 to 6.725<br>6.725 to 7.025                                  | GHz<br>GHz<br>GHz<br>GHz<br>GHz<br>GHz<br>GHz |
| Output Power<br>Typical, $P_{sat}$<br>Guaranteed minimum, $P_{Linear}$ <sup>1</sup> | HPAC2300ACXXXXXG<br>HPAC2400ACXXXXXG<br>HPAC2500ACXXXXXG  | $P_{sat} / P_{Linear}$<br>54.8 (300) / 51.8 (150)<br>56.0 (400) / 53.0 (200)<br>57.0 (500) / 54.0 (250)   | dBm (W)<br>dBm (W)<br>dBm (W)                 |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC) | power factor<br><br>HPAC2300ACXXXXXG<br>HPAC2400ACXXXXXG<br>HPAC2500ACXXXXXG  | .98<br>47 to 63<br>$P_{sat} / P_{Linear}$<br>1500 / 1300 (180-265) <sup>2</sup><br>1800 / 1600 (180-265) <sup>2</sup><br>2300 / 1700 (180-265) <sup>2</sup> | Hz<br>W (VAC)<br>W (VAC)<br>W (VAC)           |
| Receive Band Noise Power Density  | without filter  | - 155   | dBW / 4 KHz                                   |

### Notes

- Note 1:**  $P_{Linear}$  = maximum output power at which third order intermodulation products < -25 dBc (for two tones separated by 5 MHz) or spectral regrowth on a single QPSK at 1.5 x symbol rate or OQPSK at 1.0 x symbol rate is < -30 dBc.
- Note 2:** Available with low line voltage option, 90 to 265 VAC. (Not available in S-Band units)
- Note 3:** Output power decreases over the extended portion of the frequency range. Both  $P_{sat}$  and  $P_{Linear}$  de-rate by 1 dB from 5.85 to 5.75 GHz and from 6.425 to 6.725 GHz.

**Specifications, X-Band SSPAs**

| PARAMETER   | NOTES   | LIMITS  | UNITS                        |
|---|---|---|------------------------------|
| Frequency Range   | Frequency selection "F"<br>Frequency selection "D"<br>Frequency selection "A" | 7.10 to 7.40<br>7.70 to 8.40<br>7.90 to 8.40  | GHz<br>GHz<br>GHz            |
| Output Power<br>Typical, P <sub>sat</sub><br>Guaranteed minimum, P <sub>Linear</sub> <sup>1</sup> | HPAX2300ACXXXXXG<br>HPAX2400ACXXXXXG  | P <sub>sat</sub> / P <sub>Linear</sub><br>54.8 (300) / 51.8 (150)<br>56.0 (400) / 53.0 (200)  | dBm (W)<br>dBm (W)           |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC)               | power factor<br><br>HPAX2300ACXXXXXG<br>HPAX2400ACXXXXXG                      | .98<br>47 to 63<br>P <sub>sat</sub> / P <sub>Linear</sub><br>1500 / 1300 (180-265) <sup>2</sup><br>2000 / 1700 (180-265) <sup>2</sup> | Hz<br><br>W (VAC)<br>W (VAC) |
| Receive Band Noise Power Density  | without optional filter<br>with optional filter                               | - 85<br>- 155   | dBW / 4 KHz<br>dBW / 4 KHz   |

**Specifications, Ku-Band SSPAs**

| PARAMETER   | NOTES   | LIMITS  | UNITS   |
|---|---|---|---|
| Frequency Range   | Frequency selection "F"<br>Frequency selection "B"<br>Frequency selection "A"<br>Frequency selection "C"<br>Frequency selection "D" | 12.75 to 13.25<br>13.75 to 14.50<br>14.00 to 14.50<br>14.50 to 14.70<br>15.10 to 15.40  | GHz<br>GHz<br>GHz<br>GHz<br>GHz                               |
| Output Power<br>Typical, P <sub>sat</sub><br>Guaranteed minimum, P <sub>Linear</sub> <sup>1</sup> | HPAK2100ACXXXXXG<br>HPAK2150ACXXXXXG<br>HPAK2200ACXXXXXG<br>HPAK2250ACXXXXXG<br>HPAK2300ACXXXXXG                                    | P <sub>sat</sub> / P <sub>Linear</sub><br>50.0 (100) / 47.0 (50)<br>51.8 (150) / 48.8 (75)<br>53.0 (200) / 50.0 (100)<br>54.0 (250) / 51.0 (125)<br>54.8 (300) / 51.8 (150)   | dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)<br>dBm (W)           |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC)               | power factor<br><br>HPAK2100ACXXXXXG<br>HPAK2150ACXXXXXG<br>HPAK2200ACXXXXXG<br>HPAK2250ACXXXXXG<br>HPAK2300ACXXXXXG                | .98<br>47 to 63<br>P <sub>sat</sub> / P <sub>Linear</sub><br>900 / 750 (90-265)<br>1000 / 850 (90-265)<br>1200 / 920 (180-265) <sup>2</sup><br>1500 / 1000 (180-265) <sup>2</sup><br>1600 / 1250 (180-265) <sup>2</sup> | Hz<br><br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC) |
| Receive Band Noise Power Density <sup>3</sup>   |   | - 155   | dBW / 4 KHz   |

**Specifications, Ka-Band SSPAs**

| PARAMETER   | NOTES  | LIMITS   | UNITS                                   |
|---|--|--|---|
| Frequency Range   | Frequency selection "H"<br>Frequency selection "C"<br>Frequency selection "B"<br>Frequency selection "A" | 27.50 to 30.00<br>29.00 to 29.30<br>29.00 to 30.00<br>30.00 to 31.00   | GHz<br>GHz<br>GHz<br>GHz                |
| Output Power<br>Typical, P <sub>sat</sub><br>Guaranteed minimum, P <sub>Linear</sub> <sup>1</sup> | HPAA2080ACXXXXXG<br>HPAA2100ACXXXXXG<br>HPAA2180ACXXXXXG   | P <sub>sat</sub> / P <sub>Linear</sub><br>49.0 (80) / 46.0 (40)<br>50.0 (100) / 47.0 (50)<br>52.5 (180) / 49.5 (90)            | dBm (W)<br>dBm (W)<br>dBm (W)           |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC)               | power factor<br><br>HPAA2080ACXXXXXG<br>HPAA2100ACXXXXXG<br>HPAA2180ACXXXXXG                             | .98<br>47 to 63<br>P <sub>sat</sub> / P <sub>Linear</sub><br>825 / 575 (90-265)<br>1100 / 700 (90-265)<br>2000 / 1270 (90-265) | Hz<br><br>W (VAC)<br>W (VAC)<br>W (VAC) |
| Receive Band Noise Power Density  |  | - 124  | dBW / 4 KHz                             |

**Notes**

**Note 1:** P<sub>Linear</sub> = maximum output power at which third order intermodulation products < -25 dBc (for two tones separated by 5 MHz) or spectral regrowth on a single QPSK at 1.5 x symbol rate or OQPSK at 1.0 x symbol rate is < -30 dBc.

**Note 2:** Available with low line voltage option, 90 to 265 VAC.

**Note 3:** All Ku-Band SSPAs are fitted with a receive band reject bulkhead filter, standard. An optional pressure window is available.

**Common Electrical Specifications**

| PARAMETER   | NOTES                                     | LIMITS                                    | UNITS               |
|---|---|---|---------------------|
| Gain  | range                                     | 55-75                                     | dB                  |
| Gain Flatness   | full band                                 | ± 1.0                                     | dB                  |
|   | full band (Extended C-Band)               | ± 1.5                                     | dB                  |
|   | full band (S-Band)                        | ± 0.75                                    | dB                  |
| Gain Slope  | per 40 MHz                                | ± 0.3                                     | dB/40 MHz           |
|   | per 10 MHz (S-Band)                       | ± 0.3                                     | dB/10 MHz           |
| Gain Variation vs. Temperature                          | -40 °C to +60 °C                          | ± 1.5                                     | dB                  |
| Gain Stability  | at constant temperature                   | ± 0.25                                    | dB/24 hours         |
| Gain Adjustment   | 0.1 dB resolution                         | 20  | dB                  |
| Intermodulation Distortion<br>(Two-tone, 5 MHz spacing) | At $P_{Linear}$ ( $P_{sat} - 3$ dB)       | -25                                       | dBc                 |
| AM/PM Conversion  | @ rated $P_{Linear}$                      | ≤ 1.0                                     | °/dB                |
| Spurious<br>Harmonics (SSPA only)                       | @ rated $P_{Linear}$                      | -65                                       | dBc                 |
|   | @ rated $P_{Linear}$                      | -50                                       | dBc                 |
|   | @ rated $P_{Linear}$ (S-Band)             | -30                                       | dBc                 |
| Input/Output VSWR                                       | Extended C-Band                           | 1.30:1                                    |                     |
|   | Output VSWR: Ku-Band with bulkhead filter | 1.50:1                                    |                     |
|   |   | 1.40:1                                    |                     |
| Noise Figure  | at maximum gain                           | 10  | dB                  |
|   | at maximum gain (S-Band)                  | 8   | dB                  |
| Group Delay<br>(per 40 MHz segment)                     | Linear                                    | 0.01                                      | ns/MHz              |
|   | Parabolic                                 | 0.003                                     | ns/MHz <sup>2</sup> |
|   | Ripple                                    | 1.0                                       | ns p-p              |
| Transmit Band Noise<br>Output Power Density             | TX Band                                   | -75                                       | dBW/4 KHz           |
| Residual AM Noise, typical                              | Offset frequency from carrier             |   |                     |
|   | 1 Hz                                      | -110                                      | dBc/Hz              |
|   | 10 Hz                                     | -120                                      | dBc/Hz              |
|   | 100 Hz                                    | -130                                      | dBc/Hz              |
|   | 1 KHz                                     | -135                                      | dBc/Hz              |
|   | 10 KHz                                    | -140                                      | dBc/Hz              |
|   | 100 KHz                                   | -140                                      | dBc/Hz              |
|   | 1 MHz                                     | -140                                      | dBc/Hz              |
| Residual Phase Noise, typical<br>(SSPA only)            | Offset frequency from carrier             |   |                     |
|   | 10 Hz                                     | -90                                       | dBc/Hz              |
|   | 100 Hz                                    | -100                                      | dBc/Hz              |
|   | 1 KHz                                     | -110                                      | dBc/Hz              |
|   | 10 KHz                                    | -120                                      | dBc/Hz              |
|   | 100 KHz                                   | -125                                      | dBc/Hz              |
|   | 1 MHz                                     | -130                                      | dBc/Hz              |
| True RF Power Detector                                  | Range<br>Accuracy                         | $P_{sat}$ to ( $P_{sat} - 20$ )<br>± 0.75 | dB<br>dBm           |

Specifications are subject to change without notice.

## L-Band Operation

Teledyne Paradise Datacom amplifiers are available with an integrated L-Band Block Up Converter. L-Band units utilize Teledyne Paradise Datacom's proprietary zBUC technology. Adding a zBUC<sup>®</sup> converter typically increases the gain by 2-4 dB. Advantages include:

- zBUC converter can detect and switch to an externally supplied reference.
- Optional internal high stability (10MHz) reference.
- zBUC converter can lock to an externally supplied reference of 10 or 50 MHz.
- zBUC converter can accept a wide range of external reference power (-10 to +5 dBm)
- zBUC converter can accept FSK monitor and control signal via the IFL for complete amplifier remote control.

## Available Frequency Plans

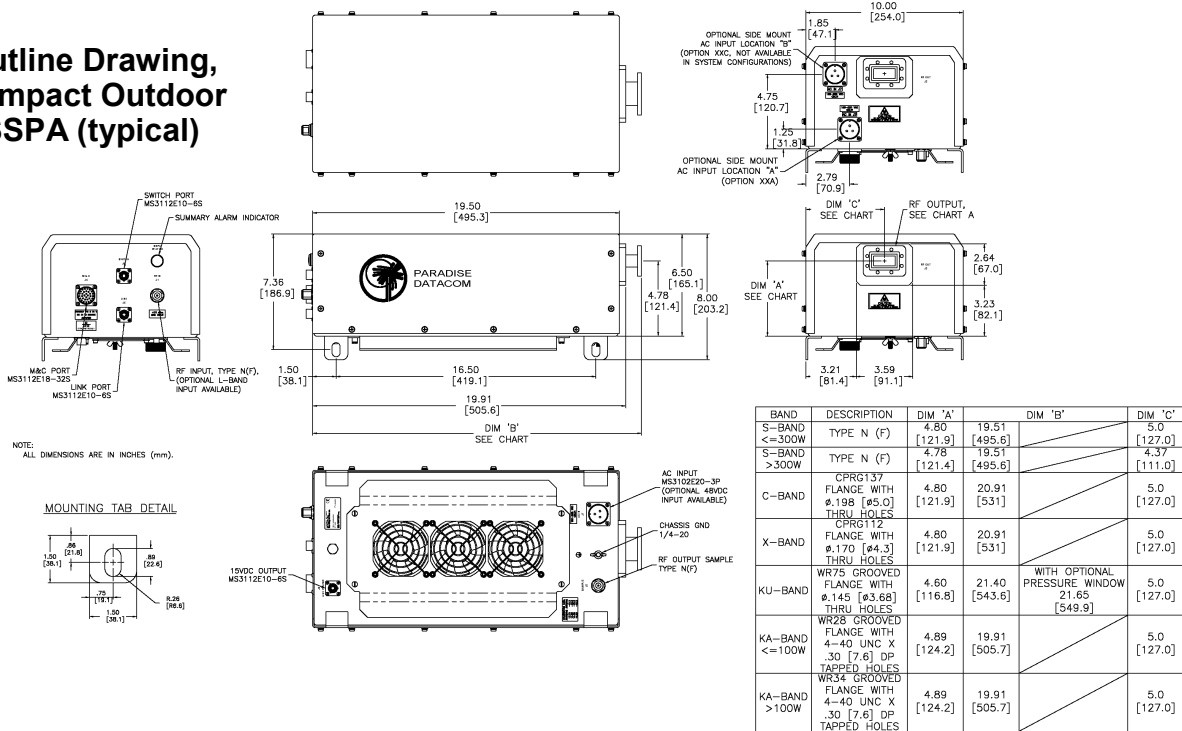
| Band | Frequency Plan | IF Input        | LO Frequency | RF Output         |
|------|----------------|-----------------|--------------|-------------------|
| C    | Sub-Band "A"   | 950 - 1525 MHz  | 4.900 GHz    | 5.850 - 6.425 GHz |
| C    | Sub-Band "B"   | 950 - 1825 MHz  | 4.900 GHz    | 5.850 - 6.725 GHz |
| C    | Sub-Band "C"   | 950 - 1870 MHz  | 4.800 GHz    | 5.750 - 6.670 GHz |
| C    | Sub-Band "E"   | 950 - 1250 MHz  | 5.475 GHz    | 6.425 - 6.725 GHz |
| C    | Sub-Band "F"   | 950 - 1250 MHz  | 5.775 GHz    | 6.725 - 7.025 GHz |
| C    | Sub-Band "L"   | 950 - 1550 MHz  | 3.450 GHz    | 4.400 - 5.000 GHz |
| X    | Sub-Band "A"   | 950 - 1450 MHz  | 6.950 GHz    | 7.900 - 8.400 GHz |
| Ku   | Sub-Band "A"   | 950 - 1450 MHz  | 13.050 GHz   | 14.00 - 14.50 GHz |
| Ku   | Sub-Band "B"   | 950 - 1700 MHz  | 12.800 GHz   | 13.75 - 14.50 GHz |
| Ku   | Sub-Band "D"   | 1350 - 1650 MHz | 13.750 GHz   | 15.10 - 15.40 GHz |
| Ku   | Sub-Band "F"   | 950 - 1450 MHz  | 11.800 GHz   | 12.75 - 13.25 GHz |
| Ka   | Sub-Band "A"   | 1000 - 2000 MHz | 29.000 GHz   | 30.00 - 31.00 GHz |
| Ka   | Sub-Band "B"   | 1000 - 2000 MHz | 28.0 GHz     | 29.00 - 30.00 GHz |

## Electrical Specifications for Compact Outdoor SSPA with ZBUC converter

| PARAMETER                                | NOTES   | LIMITS                 |                      |                      |                       |                       | UNITS     |
|--|---|------------------------|----------------------|----------------------|-----------------------|-----------------------|-----------|
| Gain                                     | Nominal setting   | 75                     |                      |                      |                       |                       | dB        |
| Gain Flatness                            | full band   | ± 2.0                  |                      |                      |                       |                       | dB        |
| Gain Slope                               | per 40 MHz  | ± 0.5                  |                      |                      |                       |                       | dB/40 MHz |
| Gain Adjusted Range                      |   | 20                     |                      |                      |                       |                       | dB        |
| Gain Stability                           | Typical C-Band Adj. Range                               | 60 - 80                |                      |                      |                       |                       | dB        |
|  | Typical Ku-Band Adj. Range<br>-40 to +60 °C             | 57 - 77<br>± 1.5       |                      |                      |                       |                       | dB        |
| Phase Noise                              | Offset frequency from carrier                           | <u>Absolute max.</u>   | <u>C-band (typ.)</u> | <u>X-band (typ.)</u> | <u>Ku-band (typ.)</u> | <u>Ka-band (typ.)</u> |           |
|  | 10 Hz   | -30                    | -60                  | -58                  | -56                   | -50                   | dBc/Hz    |
|  | 100 Hz  | -60                    | -74                  | -70                  | -67                   | -65                   | dBc/Hz    |
|  | 1 KHz   | -70                    | -84                  | -80                  | -78                   | -76                   | dBc/Hz    |
|  | 10 KHz  | -80                    | -100                 | -94                  | -91                   | -85                   | dBc/Hz    |
|  | 100 KHz   | -90                    | -105                 | -97                  | -94                   | -105                  | dBc/Hz    |
| 1 MHz                                    | -90   | -125                   | -122                 | -120                 | -120                  | dBc/Hz                |           |
| Spurious                                 | In-Band Signal Related<br>(Extended C-Band)             | -50                    |                      |                      |                       |                       | dBc       |
|  | Close to Carrier Spurious (≤ 20 MHz)                    | -40                    |                      |                      |                       |                       | dBc       |
|  | Local Oscillator  | -50                    |                      |                      |                       |                       | dBm       |
| Noise Figure                             | At Maximum gain   | -30                    |                      |                      |                       |                       | dB        |
| Transmit Band Noise Output Power Density | Tx Band at Maximum gain                                 | 20                     |                      |                      |                       |                       | dBW/4kHz  |
| Input VSWR                               | L-Band  | 1.5 : 1 (13.9)         |                      |                      |                       |                       | (dB)      |
| Internal Reference Option                | Reference Accuracy (initial)                            | ± 1 • 10 <sup>-8</sup> |                      |                      |                       |                       |           |
|  | Aging per day (after 30 days)                           | ± 1 • 10 <sup>-9</sup> |                      |                      |                       |                       |           |
|  | Aging per year (after 30 days)                          | ± 6 • 10 <sup>-8</sup> |                      |                      |                       |                       |           |
|  | Reference Stability over Temp. (-40 to +40 °C, ambient) | ± 1 • 10 <sup>-8</sup> |                      |                      |                       |                       |           |

# Compact Outdoor Gallium Nitride (GaN) Solid State Power Amplifiers

## Outline Drawing, Compact Outdoor SSPA (typical)



## Mechanical & Environmental Specifications

| PARAMETER                 | NOTES   | LIMITS   | UNITS  |
|---------------------------|---|--|--|
| Size                      | width X length X height   | 10.0 X 19.5 X 6.5<br>254 X 495 X 165   | inches<br>mm   |
| Weight                    | Base Unit<br>Base Unit (Ka-Band, <180W)<br>Base Unit (Ka-Band, 180W)<br>With Internal zBUC  | 44 (20.0) ± 3%<br>50 (22.7) ± 3%<br>53 (24.1) ± 3%<br>+1.7 (+0.8)  | lbs.(kg)<br>lbs.(kg)<br>lbs.(kg)<br>lbs.(kg)   |
| Finish                    |   | Paint  | White; powder coat   |
| Connectors                | RF/L-Band Input<br>RF Input (Ka-Band)<br>RF Output (S-Band)<br>RF Output (C-Band)<br>RF Output (X-Band)<br>RF Output (Ku-Band)<br>RF Output (Ka-Band, to 100W)<br>RF Output (Ka-Band, 180W)<br>RF Output Sample<br>RF Output Sample (Ka-Band)<br>Line Power<br>Monitor and Control<br>Link Port<br>Redundancy Switch<br>Auxiliary +15VDC LNB Power (500 mA) | Type N<br>2.92 mm<br>Type N<br>WR137 Waveguide<br>WR112 Waveguide<br>WR75 Waveguide<br>WR28 Waveguide<br>WR34 Waveguide<br>Type N<br>2.92 mm<br>3-pin MS-type<br>32-pin MS-type<br>6-pin MS type<br>6-pin MS-type<br>6-pin MS-type | Female<br>Female<br>Female<br>CPR137G flange (PDR-70)<br>CPR112G flange (PDR-84)<br>Grooved flange<br>Grooved flange<br>Grooved flange<br>Female<br>Female<br>Plug<br>Socket<br>Socket<br>Socket<br>Socket |
| Operating Temperature     | Ambient   | -40 to +60   | °C   |
| Relative Humidity         | Condensing  | 100  | %  |
| Cooling System            | Integrated, Forced air  | 103  | CFM  |
| Ingress Protection Rating | With connectors properly sealed   | IP 54  |  |
| Audible Noise             | Measured 1m from unit, at P <sub>sat</sub>  | 74.0   | dBA  |
| Altitude                  | No temperature de-rating up to 10,000 ft. (3,000 m)<br>De-rate maximum temperature by 2 °C per 1,000 ft (300 m) beyond 10,000 ft.   |  |  |
| Shock                     |   | 50 g p-p, 11 msec pulses   |  |
| Vibration                 |   | 3g rms 30 min. 5-2000 Hz   |  |

## Optional Accessories

### Remote Control Panel (RCP2-1000-CO)



The RCP2-1000-CO is a Remote Control Panel for the Compact Outdoor SSPA. It requires 1RU of cabinet space and provides a similar local interface as exists on Teledyne Paradise Datacom Indoor Rack Mount amplifiers. Reference specification sheet **209728**.

The controller communicates with the outdoor amplifier via a RS485 link. The controller then provides a wide range of interface capability including Ethernet communications. The following communication links are available at the Remote Control Panel:

- RS232 or Addressable RS485 Serial Data
- Discrete (Parallel) Interface - Form C contact outputs & Opto Isolated Inputs
- Ethernet Interface - A full compliment of Ethernet Communications including UDP, SNMP, and an internal web browser.
- Local (Manual) interface via front panel LCD display

### Universal Handheld Controller (RCH-1000)

The Universal Handheld Controller (RCH-1000) is a versatile device used to interface with a variety of Teledyne Paradise Datacom amplifiers, including Compact Outdoor SSPA, Mini Compact Outdoor SSPA, or H-Series High Power Outdoor SSPA. Reference specification sheet **211667**.

The device is housed in a ruggedized enclosure that is environmentally sealed to IP65 levels. This allows the Universal Handheld Controller (RCH-1000) to be used in most outdoor environments. The rugged construction of the device enclosure provides protection from impact and vibration.



This device allows the operator to adjust the attenuation of the connected unit, and control the mute/unmute selection, as well as monitor the status, conditions and settings of the connected unit via a serial RS-485 connection. Fault conditions and other events are tracked in the controller's internal log.

# Compact Outdoor Gallium Nitride (GaN) Solid State Power Amplifiers

## Part Number Configuration Matrix

HPA **C** **2** **4** **0** **0** **A** **C** **M** **X** **X** **X** **X** **G**

| Band    |          |
|---------|----------|
| S-Band  | <b>S</b> |
| C-Band  | <b>C</b> |
| X-Band  | <b>X</b> |
| Ku-Band | <b>K</b> |
| Ka-Band | <b>A</b> |

| Generation |          |
|------------|----------|
| Second     | <b>2</b> |

| Power Level (Watts) |                                     |
|---------------------|-------------------------------------|
| S-Band              | <b>050, 100, 200, 300, 400, 500</b> |
| C-Band              | <b>300, 400, 500</b>                |
| X-Band              | <b>300, 400</b>                     |
| Ku-Band             | <b>100, 150, 200, 250, 300</b>      |
| Ka-Band             | <b>080, 100, 180</b>                |

| Frequency Sub Band    |                    |
|-----------------------|--------------------|
| S-Band                |                    |
| <b>A</b>              | 2.02 to 2.12 GHz   |
| <b>B</b>              | 2.20 to 2.30 GHz   |
| <b>G</b>              | 1.75 to 2.12 GHz   |
| C-Band                |                    |
| <b>A</b> <sup>1</sup> | 5.850 to 6.425 GHz |
| <b>B</b> <sup>1</sup> | 5.850 to 6.725 GHz |
| <b>C</b> <sup>1</sup> | 5.750 to 6.670 GHz |
| <b>E</b> <sup>1</sup> | 6.425 to 6.725 GHz |
| <b>F</b> <sup>1</sup> | 6.725 to 7.025 GHz |
| <b>H</b> <sup>1</sup> | 5.715 to 5.790 GHz |
| <b>L</b> <sup>1</sup> | 4.400 to 5.000 GHz |
| X-Band                |                    |
| <b>A</b> <sup>1</sup> | 7.90 to 8.40 GHz   |
| <b>D</b>              | 7.70 to 8.40 GHz   |
| <b>F</b>              | 7.10 to 7.40 GHz   |
| Ku-Band               |                    |
| <b>A</b> <sup>1</sup> | 14.00 to 14.50 GHz |
| <b>B</b> <sup>1</sup> | 13.75 to 14.50 GHz |
| <b>C</b>              | 14.50 to 14.70 GHz |
| <b>D</b> <sup>1</sup> | 15.10 to 15.40 GHz |
| <b>F</b> <sup>1</sup> | 12.75 to 13.25 GHz |
| <b>G</b>              | 14.75 to 15.25 GHz |
| Ka-Band               |                    |
| <b>A</b> <sup>1</sup> | 30.00 to 31.00 GHz |
| <b>B</b> <sup>1</sup> | 29.00 to 30.00 GHz |
| <b>C</b>              | 29.00 to 29.30 GHz |
| <b>H</b>              | 27.50 to 30.00 GHz |

<sup>1</sup> Available with optional BUC

| GaN Device Designator |            |
|-----------------------|------------|
| <b>G</b>              | GaN Device |

| Configuration Modifier 3 |                                   |
|--------------------------|-----------------------------------|
| <b>X</b>                 | None (Standard)                   |
| <b>A</b>                 | Side-Mount AC Input, Location 'A' |
| <b>C</b> <sup>1</sup>    | Side-Mount AC Input, Location 'B' |

<sup>1</sup> Standalone units only

| Configuration Modifier 2 |                            |
|--------------------------|----------------------------|
| <b>X</b>                 | Standard                   |
| <b>M</b>                 | MS-Connector Covers        |
| <b>R</b> <sup>1</sup>    | Receive Band Reject Filter |
| <b>S</b> <sup>1</sup>    | M + R (see above)          |
| <b>W</b> <sup>2</sup>    | Waveguide Pressure Window  |
| <b>Y</b> <sup>2</sup>    | M + W (see above)          |

<sup>1</sup> S-Band and X-Band only

<sup>2</sup> Ku-Band standalone units only

| Configuration Modifier 1 |                     |
|--------------------------|---------------------|
| <b>X</b>                 | Standard            |
| <b>K</b> <sup>1</sup>    | 110 VAC Input Power |

<sup>1</sup> Available on all C-Band units, all X-Band units, Ku-Band units > 150W

| System Configuration |                      |
|----------------------|----------------------|
| <b>X</b>             | Standalone amplifier |

| Block Up Converter |                        |
|--------------------|------------------------|
| <b>M</b>           | Internal Reference BUC |
| <b>P</b>           | External Reference BUC |
| <b>X</b>           | No BUC                 |

| Package  |                      |
|----------|----------------------|
| <b>C</b> | Standalone amplifier |

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