

# Indoor Rack Mount GaN Solid State Power Amplifiers 2nd Generation, 3RU Rack Height



**800W C-Band Second Generation 3RU SSPA Chassis with 1RU N+1 Power Supply**

**Teledyne Paradise Datacom** has a rich history in the design and production of Gallium Nitride (GaN) based SSPAs. Our engineers utilize innovative linearization techniques that enable GaN amplifiers to produce linear output power with the same efficiency as tube based amplifier systems. A complete family of Satcom amplifiers has been developed that cover S-Band through Ku-Band.

GaN amplifiers have a superior set of mutually beneficial characteristics, including:

- Higher Output Power
- Greater Power-Added Efficiency
- High Reliability

These GaN amplifier modules are installed in the popular 3RU (5.25 inch high) Chassis, which features a front panel display and five fault condition LEDs that reflect some of the SSPA major fault states. Local/Remote and Mute/Unmute LEDs show the current control mode and mute state of the amplifier.

A full compliment of remote monitor and control of the amplifier is available at the rear panel, including: RS-232/RS-485; Ethernet, with UDP and SNMP control; Web Browser TCP/IP; and Discrete hardware (parallel port) signals.

## FEATURES

- Extremely High Power Density:
  - to 600 W S-Band
  - to 800 W X-Band
  - to 800 W C-Band
  - to 500 W Ku-Band
- Removable Fan Tray and M&C Card Assembly
- Remote Communication via RS232/485 or Ethernet
- RF Output Sample Port
- 20 dB RF Gain Adjustment
- True RF Output Power Measurement
- 1RU N+1 Power Supply
- Built-in Maintenance Switch Controller

## OPTIONS

- Removable RF Module
- L-Band Input operation
- Reflected Power Monitor
- Input Sample Port
- Exhaust Duct Adapters
- Front Panel Power Switch
- Remote Control Panel
- System Configurations

# Indoor Rack Mount

## GaN Solid State Power Amplifiers

### 2nd Generation, 3RU Rack Height

#### 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, $P_{Linear}^1$            | HPAS3050ARXXXXPG2<br>HPAS3100ARXXXXPG2<br>HPAS3200ARXXXXPG2<br>HPAS3300ARXXXXPG2<br>HPAS3400ARXXXXPG2<br>HPAS3500ARXXXXPG2<br>HPAS3600ARXXXXPG2                     | $P_{sat} / P_{Linear}$<br>47.0 (50) / 44.0 (25)<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>57.8 (600) / 54.8 (300)   | 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>HPAS3050ARXXXXPG2<br>HPAS3100ARXXXXPG2<br>HPAS3200ARXXXXPG2<br>HPAS3300ARXXXXPG2<br>HPAS3400ARXXXXPG2<br>HPAS3500ARXXXXPG2<br>HPAS3600ARXXXXPG2 | .98<br>47 to 63<br>$P_{sat} / P_{Linear}$<br>400 / 300 (90 to 265)<br>500 / 400 (90 to 265)<br>800 / 700 (90 to 265)<br>1300 / 1000 (180 to 265) <sup>2</sup><br>2000 / 1300 (180 to 265) <sup>2</sup><br>2100 / 1500 (180 to 265) <sup>2</sup><br>2200 / 1700 (180 to 265) <sup>2</sup> | Hz<br><br>W (VAC)<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  |

**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:** For 90 to 180 VAC operation, consult factory.

#### Specifications, C-Band SSPAs

| PARAMETER   | NOTES  | LIMITS   | UNITS  |
|---|--|--|--|
| Frequency Range   | Frequency selection "L"<br>Frequency selection "H"<br>Frequency selection "C" <sup>2</sup><br>Frequency selection "A"<br>Frequency selection "B" <sup>2</sup><br>Frequency selection "D" | 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 7.025   | GHz<br>GHz<br>GHz<br>GHz<br>GHz<br>GHz   |
| Output Power<br>Typical, $P_{sat}$<br>Guaranteed minimum, $P_{Linear}^1$            | HPAC3050ARXXXXPG2<br>HPAC3100ARXXXXPG2<br>HPAC3150ARXXXXPG2<br>HPAC3200ARXXXXPG2<br>HPAC3300ARXXXXPG2<br>HPAC3400ARXXXXPG2<br>HPAC3650ARXXXXPG2<br>HPAC3800ARXXXXPG2                     | $P_{sat} / P_{Linear}$<br>47.0 (50) / 44.0 (25)<br>50.0 (100) / 47.0 (50)<br>51.8 (150) / 48.8 (75)<br>53.0 (200) / 50.0 (100)<br>54.8 (300) / 51.8 (150)<br>56.0 (400) / 53.0 (200)<br>58.1 (650) / 55.1 (325)<br>59.0 (800) / 56.0 (400)   | 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>HPAC3050ARXXXXPG2<br>HPAC3100ARXXXXPG2<br>HPAC3150ARXXXXPG2<br>HPAC3200ARXXXXPG2<br>HPAC3300ARXXXXPG2<br>HPAC3400ARXXXXPG2<br>HPAC3650ARXXXXPG2<br>HPAC3800ARXXXXPG2 | .98<br>47 to 63<br>$P_{sat} / P_{Linear}$<br>500 / 400 (90 to 265)<br>600 / 500 (90 to 265)<br>1000 / 800 (90 to 265)<br>1100 / 880 (90 to 265)<br>1500 / 1300 (180 to 265) <sup>3</sup><br>1800 / 1600 (180 to 265) <sup>3</sup><br>3300 / 2800 (180 to 265) <sup>3</sup><br>4000 / 3500 (180 to 265) | Hz<br><br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC)<br>W (VAC) |
| Receive Band Noise Power Density  | without filter   | -155   | dBW / 4 kHz  |

**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:** 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.

**Note 3:** For 90 to 180 VAC operation, consult factory.

# Indoor Rack Mount

## GaN Solid State Power Amplifiers

### 2nd Generation, 3RU Rack Height

#### Specifications, X-Band SSPAs

| PARAMETER   | NOTES  | LIMITS  | UNITS                                 |         |
|---|--|---|---------------------------------------|---------|
| Frequency Range   | Frequency selection "F"  | 7.10 to 7.40  | GHz                                   |         |
|   | Frequency selection "D"  | 7.70 to 8.40  | GHz                                   |         |
|   | Frequency selection "A"  | 7.90 to 8.40  | GHz                                   |         |
| Output Power<br>Typical, P <sub>sat</sub><br>Guaranteed minimum, P <sub>Linear</sub> <sup>1</sup> | HPAX3300ARXXXXPG2  | P <sub>sat</sub> / P <sub>Linear</sub><br>54.8 (300) / 51.8 (150) | dBm (W)                               |         |
|   | HPAX3400ARXXXXPG2  | 56.0 (400) / 53.0 (200)   | dBm (W)                               |         |
|   | HPAX3650ARXXXXPG2  | 58.1 (650) / 55.1 (325)   | dBm (W)                               |         |
|   | HPAX3800ARXXXXPG2  | 59.0 (800) / 56.0 (400)   | dBm (W)                               |         |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC)               | power factor   | .98   |                                       |         |
|   | Line frequency   | 47 to 63  | Hz                                    |         |
|   | HPAX3300ARXXXXPG2<br>HPAX3400ARXXXXPG2<br>HPAX3650ARXXXXPG2<br>HPAX3800ARXXXXPG2 | P <sub>sat</sub> / P <sub>Linear</sub>                            | 1500 / 1300 (180 to 265) <sup>2</sup> | W (VAC) |
|   |  |   | 2000 / 1700 (180 to 265) <sup>2</sup> | W (VAC) |
|   |  |   | 3300 / 2800 (180 to 265) <sup>2</sup> | W (VAC) |
|   |  | 4000 / 3500 (180 to 265)  | W (VAC)                               |         |
| Receive Band Noise Power Density  | without optional filter  | -85   | dBW / 4 kHz                           |         |
|   | with optional filter   | -155  | dBW / 4 kHz                           |         |

**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:** For 90 to 180 VAC operation, consult factory.

#### Specifications, Ku-Band SSPAs

| PARAMETER   | NOTES  | LIMITS                                 | UNITS                                 |         |
|---|--|--|---------------------------------------|---------|
| Frequency Range   | Frequency selection "F"  | 12.75 to 13.25                         | GHz                                   |         |
|   | Frequency selection "B"  | 13.75 to 14.50                         | GHz                                   |         |
|   | Frequency selection "A"  | 14.00 to 14.50                         | GHz                                   |         |
|   | Frequency selection "C"  | 14.50 to 14.70                         | GHz                                   |         |
|   | Frequency selection "D"  | 15.10 to 15.40                         | GHz                                   |         |
| Output Power<br>Typical, P <sub>sat</sub><br>Guaranteed minimum, P <sub>Linear</sub> <sup>1</sup> | HPAK3040ARXXXXPG2<br>HPAK3050ARXXXXPG2<br>HPAK3080ARXXXXPG2<br>HPAK3100ARXXXXPG2<br>HPAK3150ARXXXXPG2<br>HPAK3200ARXXXXPG2<br>HPAK3250ARXXXXPG2<br>HPAK3300ARXXXXPG2<br>HPAK3400ARXXXXPG2<br>HPAK3500ARXXXXPG2 | P <sub>sat</sub> / P <sub>Linear</sub> |                                       |         |
|   |  | 46.0 (40) / 43.0 (20)                  | dBm (W)                               |         |
|   |  | 47.0 (50) / 44.0 (25)                  | dBm (W)                               |         |
|   |  | 49.0 (80) / 46.0 (40)                  | dBm (W)                               |         |
|   |  | 50.0 (100) / 47.0 (50)                 | dBm (W)                               |         |
|   |  | 51.8 (150) / 48.8 (75)                 | dBm (W)                               |         |
|   |  | 53.0 (200) / 50.0 (100)                | dBm (W)                               |         |
|   |  | 54.0 (250) / 51.0 (125)                | dBm (W)                               |         |
|   |  | 54.8 (300) / 51.8 (150)                | dBm (W)                               |         |
|   |  | 56.0 (400) / 53.0 (200)                | dBm (W)                               |         |
|   |  | 57.0 (500) / 54.0 (250)                | dBm (W)                               |         |
| Power Requirements<br>Line Frequency<br>Line Power (Voltage)<br>(typical @ 220 VAC)               | power factor   | .98                                    |                                       |         |
|   | Line frequency   | 47 to 63                               | Hz                                    |         |
|   | HPAK3040ARXXXXPG2<br>HPAK3050ARXXXXPG2<br>HPAK3080ARXXXXPG2<br>HPAK3100ARXXXXPG2<br>HPAK3150ARXXXXPG2<br>HPAK3200ARXXXXPG2<br>HPAK3250ARXXXXPG2<br>HPAK3300ARXXXXPG2<br>HPAK3400ARXXXXPG2<br>HPAK3500ARXXXXPG2 | P <sub>sat</sub> / P <sub>Linear</sub> | 500 / 400 (90 to 265)                 | W (VAC) |
|   |  |  | 600 / 500 (90 to 265)                 | W (VAC) |
|   |  |  | 730 / 585 (90 to 265)                 | W (VAC) |
|   |  |  | 900 / 750 (90 to 265)                 | W (VAC) |
|   |  |  | 1000 / 850 (90 to 265)                | W (VAC) |
|   |  |  | 1200 / 920 (90 to 265)                | W (VAC) |
|   |  |  | 1500 / 1000 (180 to 265) <sup>3</sup> | W (VAC) |
|   |  |  | 2000 / 1500 (180 to 265) <sup>3</sup> | W (VAC) |
|   |  | 2500 / 1700 (180 to 265) <sup>3</sup>  | W (VAC)                               |         |
|   | 3000 / 2000 (180 to 265) <sup>3</sup>  | W (VAC)                                |                                       |         |
| Receive Band Noise Power Density <sup>2</sup>   |  | -155                                   | dBW / 4 kHz                           |         |

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

**Note 3:** For 90 to 180 VAC operation, consult factory.

## 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                          | 0 °C to +50 °C                                   | ± 1.0   | 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 <sub>Linear</sub> (P <sub>sat</sub> - 3 dB) | -25   | dBc                 |
| AM/PM Conversion  | @ rated P <sub>Linear</sub>                      | ≤ 1.0   | °/dB                |
| Spurious  | @ rated P <sub>Linear</sub>                      | -65   | dBc                 |
| Harmonics (SSPA only)                                   | @ rated P <sub>Linear</sub>                      | -50   | dBc                 |
|   | @ rated P <sub>Linear</sub> (S-Band)             | -30   | dBc                 |
| Input/Output VSWR                                       | Extended C-Band                                  | 1.30:1  |                     |
|   | Output VSWR: Ku-Band with bulkhead filter        | 1.50:1<br>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 <sub>sat</sub> to (P <sub>sat</sub> - 20)<br>± 0.75 | dB<br>dBm           |

### 1RU N+1 Redundant Power Supply

The combination of a separate, fully redundant power supply is an excellent means of obtaining the ultimate in system reliability. The power supply is an N+1 redundant configuration, meaning that there is one more power supply module available than required to operate the SSPA. A failure of one power supply module will not take the amplifier off the air.





### 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. The addition of a zBUC<sup>®</sup> converter to the SSPA typically increases the gain by 2-4 dB. The advantages of zBUC technology 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).

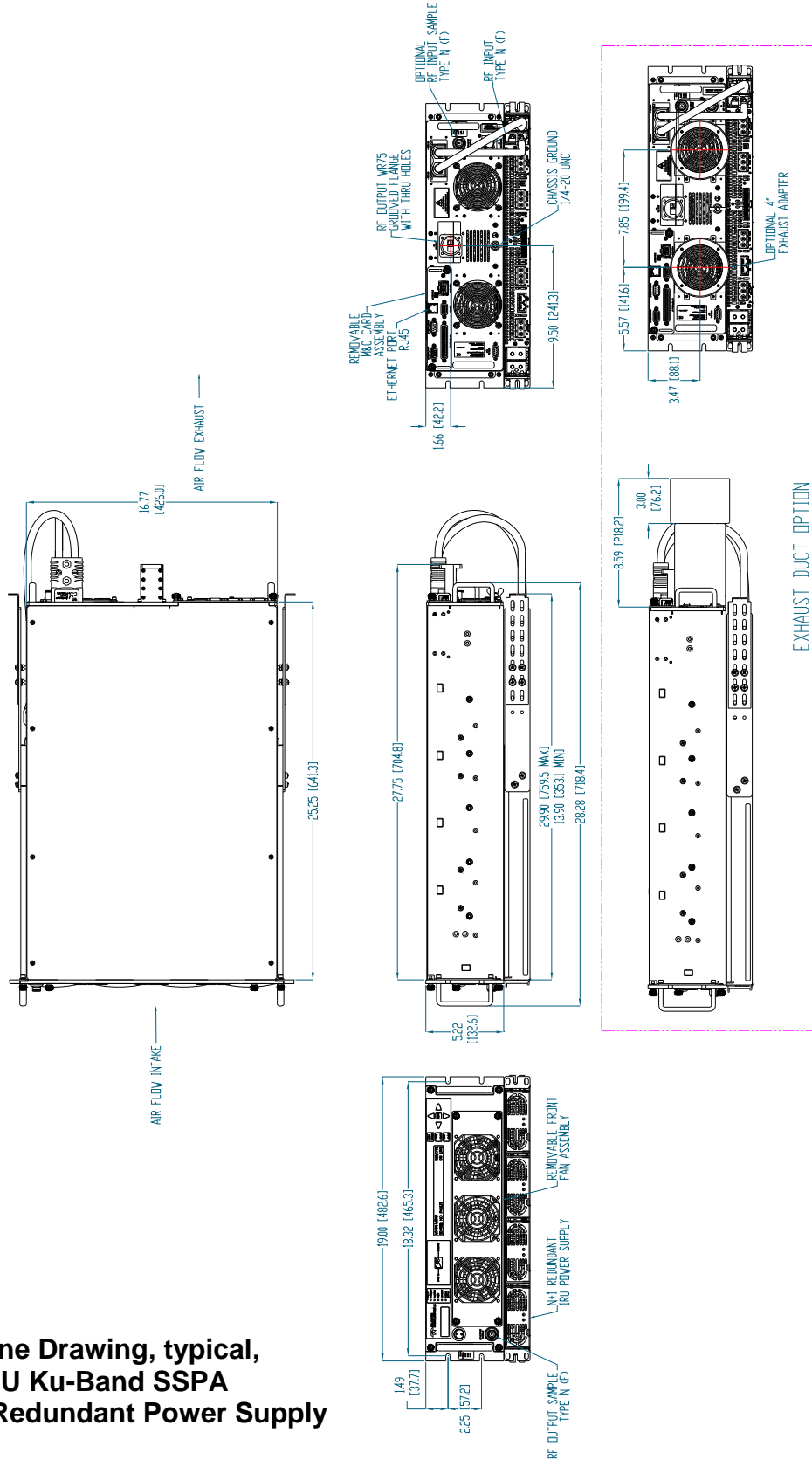
### Available Frequency Plans

| Band | Frequency Band    | IF Input       | LO Frequency | RF Output         | Gain Change |
|------|-------------------|----------------|--------------|-------------------|-------------|
| C    | Standard C-Band   | 950 - 1525 MHz | 4.900 GHz    | 5.850 - 6.425 GHz | 0-4 dB      |
| C    | Extended C-Band   | 950 - 1825 MHz | 4.900 GHz    | 5.850 - 6.725 GHz | 0-4 dB      |
| C    | Palapa Band       | 950 - 1250 MHz | 5.475 GHz    | 6.425 - 6.725 GHz | 0-4 dB      |
| C    | Insat Band        | 950 - 1250 MHz | 5.775 GHz    | 6.725 - 7.025 GHz | 0-4 dB      |
| C    | Extended C-Band 2 | 950 - 1675 MHz | 4.800 GHz    | 5.750 - 6.475 GHz | 0-4 dB      |
| C    | Low C-Band        | 840 - 1000 MHz | 4.250 GHz    | 5.090 - 5.250 GHz | 0-4 dB      |
| X    | Standard X-Band   | 950 - 1450 MHz | 6.950 GHz    | 7.900 - 8.400 GHz | 0-2 dB      |
| Ku   | Standard Ku-Band  | 950 - 1450 MHz | 13.050 GHz   | 14.00 - 14.50 GHz | 0-2 dB      |
| Ku   | Extended Ku-Band  | 950 - 1700 MHz | 12.800 GHz   | 13.75 - 14.50 GHz | 0-2 dB      |

### Electrical Specifications for 3RU RM SSPA with ZBUC converter

| PARAMETER                 | NOTES   | LIMITS                 |                      |                      |                       | UNITS     |
|---------------------------|---|------------------------|----------------------|----------------------|-----------------------|-----------|
| Gain                      | Nominal setting   | 75                     |                      |                      |                       | dB        |
| Gain Flatness             | full band (C-,X-,Ku-bands)                                    | ± 2.0                  |                      |                      |                       | dB        |
| Gain Slope                | per 40 MHz (C-,X-,Ku-bands)                                   | ± 0.5                  |                      |                      |                       | dB/40 MHz |
| Gain Adjusted Range       | Typical C-Band Adj. Range                                     | 20                     |                      |                      |                       | dB        |
|                           | Typical Ku-Band Adj. Range                                    | 60 - 80                |                      |                      |                       | dB        |
| Gain Stability            | -40 to +60 °C   | 57 - 77                |                      |                      |                       | dB        |
|                           |   | ± 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> |           |
|                           | 10 Hz   | -30                    | -60                  | -58                  | -56                   | dBc/Hz    |
|                           | 100 Hz  | -60                    | -74                  | -70                  | -67                   | dBc/Hz    |
|                           | 1 KHz   | -70                    | -84                  | -80                  | -78                   | dBc/Hz    |
|                           | 10 KHz  | -80                    | -100                 | -94                  | -91                   | dBc/Hz    |
|                           | 100 KHz   | -90                    | -105                 | -97                  | -94                   | dBc/Hz    |
|                           | 1 MHz   | -90                    | -125                 | -122                 | -120                  | dBc/Hz    |
| Spurious                  | In-Band Signal Related (C-/Ku-Band)<br>(Extended C-Band)      | -50                    |                      |                      |                       | dBc       |
|                           | Close to Carrier Spurious (≤ 20 MHz)                          | -40                    |                      |                      |                       | dBc       |
|                           | Local Oscillator  | -50                    |                      |                      |                       | dBc       |
|                           |   | -30                    |                      |                      |                       | dBm       |
| Noise Figure              | At 75 dB gain setting   | 20                     |                      |                      |                       | dB        |
| Input VSWR                | L-Band  | 1.5 : 1                |                      |                      |                       |           |
| 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 Temperature (-40 to +40 °C, ambient) | ± 1 • 10 <sup>-8</sup> |                      |                      |                       |           |

# Indoor Rack Mount GaN Solid State Power Amplifiers 2nd Generation, 3RU Rack Height



**Outline Drawing, typical,  
 3RU Ku-Band SSPA  
 with N+1 Redundant Power Supply**

### Mechanical Specifications

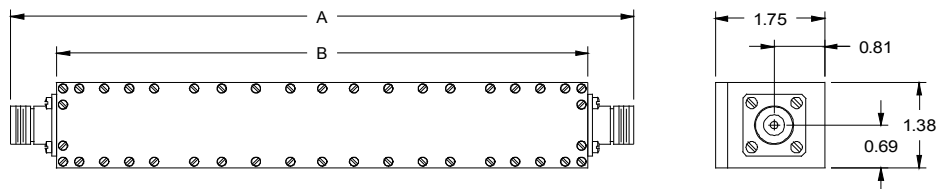
| PARAMETER             | NOTES   | LIMITS   | UNITS  |
|-----------------------|---|--|--|
| Size (SSPA)           | width X height X depth  | 19.0 x 5.22 x 24.13<br>483 x 133 x 613   | inches<br>mm   |
| Size (Power Supply)   | width X height X depth  | 19.0 x 1.75 x 15.97<br>483 x 45 x 406  | inches<br>mm   |
| Weight (SSPA)         | Typical ( $\pm 3\%$ )<br>With integrated zBUC converter   | 75 (34)<br>+1.7 (+0.8)   | lbs. (kg)<br>lbs. (kg)   |
| Weight (Power Supply) | with four (4) power supply modules  | 29 (13.2)  | lbs.(kg)   |
| Finish                |   | Paint  | Gray; powder coat  |
| Connectors            | RF Input<br>RF Output (S-Band)<br>RF Output (C-Band)<br>RF Output (X-Band)<br>RF Output (Ku-Band)<br>RF Output Sample | Type N<br>Type N<br>WR137 Waveguide<br>WR112 Waveguide<br>WR75 Waveguide<br>Type N | Female<br>Female<br>CPR137G Flange (PDR-70)<br>CPR112G Flange (PDR-84)<br>Grooved flange (PBR-120)<br>Female |

### Environmental Specifications

| PARAMETER                   | NOTES   | LIMITS                                       | UNITS              |
|-----------------------------|---|--|--------------------|
| Operating Temperature       | Ambient   | 0 to +50                                     | $^{\circ}\text{C}$ |
| Storage Temperature         |   | -20 to +75                                   | $^{\circ}\text{C}$ |
| Operating Relative Humidity | Non-condensing  | 95   | %                  |
| Cooling System              | Forced Convection Air Cooling   | Front Panel - Intake<br>Rear Panel - Exhaust |                    |
| Audible Noise               | Measured 1m from unit, at $P_{\text{sat}}$  | 71   | dBA                |
| Altitude                    | No temperature de-rating up to 10,000 ft, (3000 m)<br>De-rate maximum temperature by $2^{\circ}\text{C}$ per 1,000 ft (300 m) beyond 10,000 ft. |  |                    |

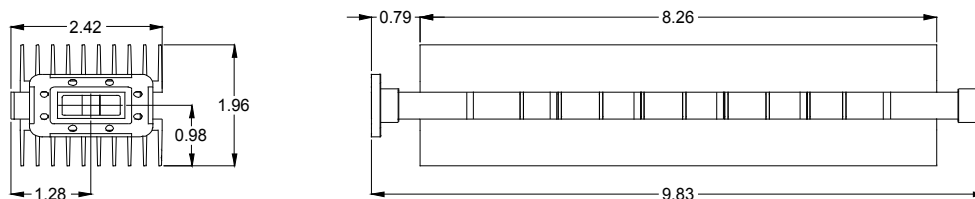
### Receive Band Filter Options

S-Band



- 2.020-2.120 GHz (Band A) : Filter L205250-S3-TX Dimensions: A=9.972 , B=8.500
- 2.200-2.300 GHz (Band B) : Filter L205250-S4-TX Dimensions: A=12.222 , B=10.750
- 1.750-2.120 GHz (Band G) : Filter L205250-S11-TX Dimensions: A=4.730 , B=3.250

X-Band



## Redundant and Phase Combined Systems

Teledyne Paradise Datacom's 3RU Rack Mount SSPAs can be configured in a variety of redundant and phase combined configurations.

- 1:1 Redundant System with Internal Redundancy Control
- 1:1 Redundant System with RCP2-1100 Redundant System Controller
- 1:1 Fixed Phase Combined System with FPRC-1100 Phase Combined System Controller
- 1:2 Redundant System with Internal Redundancy Control
- 1:2 Redundant System with RCP2-1200 Redundant System Controller
- 1:2 Fixed Phase Combined System with FPRC-1200 Phase Combined System Controller

## System Output Power Capacity

Due to residual losses inherent in redundant system configurations (waveguide bends; switch and coupler losses), reduce the typical output power specification of a single amplifier by approximately 0.2 dB for 1:1 and by 0.4 dB for 1:2 systems.

In phase combined systems, these same losses result in slightly less than the ideal addition of 3 dB to the output power of a single HPA unit. For 1:1 phase combined systems, the typical additive output power is approximately 2.70 dB above the output power of a single HPA. For 1:2 phase combined systems, the typical additive output power is approximately 2.50 dB above the output power of a single HPA.

Actual system losses will vary based on the system options.

## System Controllers

The RCP2/FPRC-1100/1200 system controller provides an extremely user friendly interface for complete monitor and control of the amplifier system.



**RCP2-1100 Redundant System Controller**

The front panel mimic display shows the on-line amplifiers and the switch positions. Fault lights are provided for easy identification of system status. All system monitor and control is available locally at the front panel LCD display, as well as remotely by the RS232, RS485, or Ethernet interface ports. Audible alarms and a full compliment of parallel I/O signal are available at the rear panel of the controller.



# Indoor Rack Mount GaN Solid State Power Amplifiers 2nd Generation, 3RU Rack Height

## Part Number Configuration Matrix

| Power Level (Watts) |  |
|---------------------|--|
| S-Band              | 050, 100, 200, 300, 400, 500, 600                |
| C-Band              | 050, 100, 150, 200, 300, 400, 650, 800           |
| X-Band              | 300, 400, 650, 800                               |
| Ku-Band             | 040, 050, 080, 100, 150, 200, 250, 300, 400, 500 |

| Rack Height |   |
|-------------|---|
| 3RU         | 3 |

| Band    |   |
|---------|---|
| S-Band  | S |
| C-Band  | C |
| X-Band  | X |
| Ku-Band | K |

| Standalone Unit or System Package |  |
|-----------------------------------|--|
| R                                 | Standalone amplifier                                     |
| S                                 | System with Cabinet, Top Mounted Waveguide Switching     |
| T                                 | System without Cabinet, Top Mounted Waveguide Switching  |
| Y                                 | System with Cabinet, Rear Mounted Waveguide Switching    |
| Z                                 | System without Cabinet, Rear Mounted Waveguide Switching |

| Block Up Converter |                        |
|--------------------|------------------------|
| M                  | Internal Reference BUC |
| P                  | External Reference BUC |
| X                  | No BUC                 |

| Configuration Modifier 3 |                                  |
|--------------------------|----------------------------------|
| P                        | Standard (N+1 Power Supply)      |
| L                        | N+1 P.S. + Rear Exhaust Adapters |

| GaN Device Designator |            |
|-----------------------|------------|
| G                     | GaN Device |

**MODEL: HPA** **C** **3** **3** **0** **0** **A** **R** **M** **X** **X** **X** **P** **G** **2**

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

| Configuration Modifier 2 |                          |
|--------------------------|--------------------------|
| X                        | Standard                 |
| P                        | Front Panel Power Switch |
| R <sup>1</sup>           | Rx Band Reject Filter    |
| V                        | Reflected Power Monitor  |
| A <sup>1</sup>           | P + R (see above)        |
| B                        | P + V (see above)        |
| C <sup>1</sup>           | V + R (see above)        |
| D <sup>1</sup>           | P + R + V (see above)    |

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

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

| Standalone Unit or System Configuration |   |
|---|---|
| X                                       | Standalone amplifier  |
| A <sup>1</sup>                          | 1:1 Redundant System, Input Switching, Internal Control           |
| B                                       | 1:1 Redundant System, Input Splitter, Internal Control            |
| C <sup>1</sup>                          | 1:2 Redundant System, Input Switching, RCP2-1200 <sup>2</sup>     |
| D <sup>1</sup>                          | 1:2 Redundant System, Input Switching, Internal Control           |
| E                                       | 1:2 Phase Combined System, Input Splitter, FPRC-1200 <sup>2</sup> |
| F                                       | 1:1 Redundant System, Input Splitter, RCP2-1100 <sup>2</sup>      |
| G                                       | 1:1 Phase Combined system, Input Splitter, FPRC-1100 <sup>2</sup> |
| H <sup>1</sup>                          | 1:1 Redundant System, Input Switching, RCP2-1100 <sup>2</sup>     |
| J                                       | 1:2 Phase Combined system, Input splitter, Internal Control       |

| Configuration Modifier 1 |                       |
|--------------------------|-----------------------|
| X                        | Standard              |
| K                        | 110 VAC Operation     |
| R                        | 90° Output W/G Flange |
| S                        | Input Sample Port     |
| C                        | K + S (see above)     |
| T                        | R + S (see above)     |
| U                        | K + R (see above)     |
| V                        | K + R + S (see above) |

### Use and Disclosure of Data

The information contained herein is classified as EAR99 under the U.S. Export Administration Regulations. Export, re-export or diversion contrary to U.S. law is prohibited. Specifications are subject to change without notice.

1 Switched input with external reference BUC requires reference distribution box.  
2 Standard location for controller is directly above HPA1.