



7RU Rack Mount SSPA  
with 3RU Power Supply

## DESCRIPTION

**Teledyne Paradise Datacom's Indoor, High Power Rack Mount** series of SSPAs represent the industry's highest power density and most reliable high power amplifier systems.

The High Power Rack Mount SSPA employs a modular design, which allows quick and easy replacement in the event of a catastrophic failure of one of the SSPA components. These modular assemblies include: hot-swap SSPA modules, front and rear fan trays; and a rear panel controller card. These amplifiers are powered via a separate power supply chassis.

The power supply is configured as a n+1 redundant, hot swappable, power supply comprised of three modules. Only two modules are required to operate the HPA, therefore one module is redundant. In the event of a power supply module failure, the amplifier system will not fail. The module can then be changed without ever taking the HPA out of service.

## FEATURES

- Extremely High Power Density:  
1.1 kW C-Band;  
to 1000W X-Band;  
to 500W Ku-Band.
- Hot Swap, n+1 Redundant Power Supply
- Power Factor Corrected Power Supply
- Modular (soft-fail) Architecture
- Removable fan assemblies
- Ethernet Port
- RF Output Sample Port (-40 dB)
- Built-in 1:1 Redundancy Control

## OPTIONS

- Extended Frequency Band
- Reflected Power Monitor
- Phase Combined Systems
- Remote Control Panel
- RF Input Sample Port (-10 dB)
- Rear Panel Air Intake and Exhaust

## SPECIFICATIONS

- SSPA Chassis housing:  
7 Rack Units (RU)  
19.0 X 12.22 X 30.0 in  
483 X 310 X 762 mm  
180 lbs / 82 kg
- 3RU Power Supply:  
19.0 X 5.25 X 15.44 in  
483 X 134 X 433 mm  
50 lbs / 23 kg
- Gray powder coat finish
- Operating temperature:  
0 to +50 °C

## Power Specifications

| BAND    | PARAMETER  | NOTES  | LIMITS  | UNITS               |
|---------|--|--|---|---------------------|
| C-BAND  | Frequency Range  | (see options for extended band)                              | 5.850 to 6.425  | GHz                 |
|         | Output Power @: Saturation/P <sub>1dB</sub><br>(Typical/Guaranteed minimum)        | HPAC7750ARXXXXX<br>HPAC711KARXXXXX                           | P <sub>sat</sub> / P <sub>1dB</sub><br>58.7 / 58.0 (750 / 630)<br>60.4 / 60.0 (1100 / 1000) | dBm (W)<br>dBm (W)  |
|         | Power Requirements<br>Line Voltage<br>Line Frequency<br>Power Factor<br>Line Power | HPAC7750ARXXXXX<br>HPAC711KARXXXXX                           | 180 to 265<br>47 to 63<br>.90<br>4150<br>6000   | VAC<br>Hz<br>W<br>W |
| X-BAND  | Frequency Range  |  | 7.9 to 8.4  | GHz                 |
|         | Output Power @: Saturation/P <sub>1dB</sub><br>(Typical/Guaranteed minimum)        | HPAX7700ARXXXXX<br>HPAX710KARXXXXX                           | P <sub>sat</sub> / P <sub>1dB</sub><br>58.5 / 58.1 (700 / 650)<br>60.0 / 59.5 (1000 / 900)  | dBm (W)<br>dBm (W)  |
|         | Power Requirements<br>Line Voltage<br>Line Frequency<br>Power Factor<br>Line Power | HPAX7700ARXXXXX<br>HPAX710KARXXXXX                           | 180 to 265<br>47 to 63<br>.90<br>5500<br>6000   | VAC<br>Hz<br>W<br>W |
| KU-BAND | Frequency Range  | (see options for extended band)                              | 14.0 to 14.5  | GHz                 |
|         | Output Power @: Saturation/P <sub>1dB</sub><br>(Typical/Guaranteed minimum)        | HPAK7400ARXXXXX<br>HPAK7500ARXXXXX                           | P <sub>sat</sub> / P <sub>1dB</sub><br>56.0 / 55.0 (400 / 300)<br>57.0 / 56.0 (500 / 400)   | dBm (W)<br>dBm (W)  |
|         | Power Requirements<br>Line Voltage<br>Line Frequency<br>Power Factor<br>Line Power | Power Factor Corrected<br>HPAK7400ARXXXXX<br>HPAK7500ARXXXXX | 180 to 265<br>47 to 63<br>.90<br>4600<br>5100   | VAC<br>Hz<br>W<br>W |

## Options

|   |  |                                    |
|---|--|------------------------------------|
| Extended C-Band<br>5.850 to 6.725 GHz<br>5.750 to 6.670 GHz | De-rate power by 1.0 dB linearly from 6.425 to 6.725 GHz<br>De-rate power by 1.0 dB linearly from 6.425 to 6.670 GHz and by 0.5 dB from 5.750 to 5.850 | HPAC7XXXBRXXXXX<br>HPAC7XXXCRXXXXX |
| Extended Ku-Band<br>13.75 to 14.5 GHz                       | De-rate power by 1.0 dB linearly from 13.75 to 14.0 GHz  | HPAK7XXXBRXXXXX                    |
| Reflected Power Monitor                                     |  | See Configuration Matrix           |
| RF Input Sample Port (-10 dB)                               |  | See Configuration Matrix           |

## General Specifications: 7RU RM Series

| PARAMETER                           | NOTES   | LIMITS                | UNITS               |
|-------------------------------------|---|-----------------------|---------------------|
| Gain                                | minimum   | 75                    | dB                  |
| Gain Flatness                       | full band   | ±1.0                  | dB                  |
|                                     | Extended C-Band units   | ±1.5                  | dB                  |
| Gain Slope                          | per 40 MHz  | ±0.3                  | dB/40 MHz           |
| Gain Variation vs. Temperature      | 0°C to +55°C  | ±1.0                  | dB                  |
| Gain Adjustment                     | 0.1 dB resolution<br>adjustable by either serial or analog<br>voltage input: 0.5 to 2.5 VDC | 20                    | dB                  |
| Intermodulation Distortion          | 3dB back off relative to P <sub>1dB</sub>   | -25                   | dBc                 |
| AM/PM Conversion                    | (@ rated P <sub>1dB</sub> )   | 3.5                   | °/dB                |
|                                     | (@P <sub>1dB</sub> -3dB)  | 0.5                   | °/dB                |
| Spurious Harmonics                  | (@ rated P <sub>1dB</sub> )   | -60                   | dBc                 |
|                                     | (@ rated P <sub>1dB</sub> -3dB)   | -50                   | dBc                 |
| Input/Output VSWR                   | All units except Extended C-Band<br>Extended C-Band units <sup>1</sup>                      | 1.30:1<br>1.50:1      |                     |
| Noise Figure                        | at maximum gain   | 12                    | 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              |
| Noise Output                        | TX Band (C-, X- or Ku-Band)   | -75                   | dBW/4 KHz           |
|                                     | RX Band (C- or Ku-Band)   | -150                  | dBW/4 KHz           |
|                                     | RX Band (X-Band)  | -100                  | dBW/4 KHz           |
| Residual AM Noise                   | 0 - 10 KHz  | -45                   | dBc                 |
|                                     | 10 KHz - 500 KHz  | -20 (1.25 + log F)    | dBc                 |
|                                     | 500 KHz - 1 MHz   | -80                   | dBc                 |
| Phase Noise                         |   | IESS -308/309 - 10 dB |                     |

## Mechanical

|                            |                        |  |              |
|----------------------------|------------------------|--|--------------|
| Size                       |                        |  |              |
| HPA Chassis                | width X height X depth | 19.0 X 10.47 X 30.0<br>483 X 266 X 762 | inches<br>mm |
| Power Supply Chassis       | width X height X depth | 19.0 X 5.25 X 15.44<br>483 X 134 X 433 | inches<br>mm |
| Weight                     |                        |  |              |
| HPA Chassis                |                        | 180 (82)                               | lbs.(kg)     |
| Power Supply Chassis (3RU) |                        | 50 (23)                                | lbs.(kg)     |
| Finish                     |                        | powder coat                            | Gray         |

## Environmental

|                       |            |            |    |
|-----------------------|------------|------------|----|
| Operating Temperature | Ambient    | 0 to +50   | °C |
| Relative Humidity     | Condensing | 95         | %  |
| Cooling System        | Integrated | Forced air |    |

<sup>1</sup> Extended C-Band units may meet 1.30:1 as a special option. Discuss with your sales representative.

## Interface Specifications; 7RU RM Series

| PORT                       | NOTES   | LIMITS   | PIN-OUT  |
|----------------------------|---|--|--|
| Monitor & Control (J7)     | Parallel Port Outputs   | Power Supply Fault<br>Auxiliary Fault<br>Mute<br>BUC Fault<br>Temperature Fault<br>Voltage Fault<br>DC Current Fault<br>Low RF Fault                               | Form C relay<br>Form C relay<br>Form C relay<br>Form C relay<br>Form C relay<br>Form C relay<br>Form C relay<br>Form C relay |
| Monitor & Control (J7)     | Parallel Port Inputs  | Mute Input<br>Local / Remote<br>Fault Clear<br>Standby Select<br>Auxiliary Fault<br>Ground   | Opto Isolator<br>Opto Isolator<br>Opto Isolator<br>Opto Isolator<br>Opto Isolator  |
| Main Serial Port (J4)      | RS232 / RS485<br>DB9 (F)  | RS232 Out, RS485 TX-<br>RS232 In, RS485 RX-<br>RS485 RX+<br>RS485 TX+<br>Service Request 1<br>Service Request 2<br>Service Request Common<br>Termination<br>Ground | Pin 2<br>Pin 3<br>Pin 4<br>Pin 1<br>Pin 6<br>Pin 8<br>Pin 7<br>Pin 9<br>Pin 5  |
| Auxiliary Serial Port (J5) | RS232 / RS485<br>DB9 (F)  | RS232 In, RS485 RX-<br>RS232 Out, RS485 TX-<br>RS232 DTR, RS485 TX+<br>RS485 RX+<br>Termination<br>Ground  | Pin 2<br>Pin 3<br>Pin 4<br>Pin 1<br>Pin 9<br>Pin 5   |
| Link Port (J8)             | 1:1 Redundant System Control Link<br>DB9 (F)  | RS485+<br>RS485-<br>Link Out<br>Link In<br>Ground  | Pin 1,4<br>Pin 2,3<br>Pin 6,7<br>Pin 8,9<br>Pin 5  |
| Switch Port (J3)           | Redundant Switch Control<br>Molex (43810-0002)  | +28 VDC<br>RF Switch 1, pos 1<br>RF Switch 1, pos 2<br>RF Switch 2, pos 1<br>RF Switch 2, pos 2  | Pin 1,4<br>Pin 3<br>Pin 2<br>Pin 6<br>Pin 5  |
| Program Port (J6)          | Flash Firmware Program Port   | DB25(F)  | -  |
| Ethernet Port (J9)         | RJ45  | TX+<br>TX-<br>RX-<br>RX+<br>Ground   | Pin 1<br>Pin 2<br>Pin 3<br>Pin 6<br>Pins 4,5,7,8   |
| Connectors                 | RF Input, Input & Output Sample<br>RF Output<br>HPAK7XXXR<br>HPAC7XXXR<br>HPAX7XXXR<br>Line Power | Type N<br><br>WR75 Waveguide<br>WR137 Waveguide<br>WR112 Waveguide<br>(3) IEC feeds  | Female<br><br>Grooved (PBR-120)<br>CPR137G flange<br>CPR112G (PDR-84)<br>Plug  |

## Power Supply Options

The 7RU Chassis may be fitted with a variety of power supply options. The dual 1RU power supply configuration provides redundancy with all power levels; or may be used as a non-redundant supply by utilizing fewer power supply modules. The stand-alone 1RU power supply can be used to power the 750W C-Band or 400W Ku-Band chassis. The standard 3RU, three-module power supply offers redundancy for all power levels. See the table below.

| 1RU NON-REDUNDANT<br>(750W C-Band & 400W KU-Band only) |     |     |     |     |
|--|-----|-----|-----|-----|
| PS1  | MOD | MOD | MOD | MOD |

| DUAL 1RU<br>(Redundant for 750W C-Band & 400W Ku-Band; Non-redundant for others) |     |       |       |     |
|--|-----|-------|-------|-----|
| PS1  | MOD | MOD   | MOD   | MOD |
| PS2  | MOD | BLANK | BLANK | MOD |

Note: Single pair of DC cables between PS2 and SSPA

| DUAL 1RU REDUNDANT<br>(All power levels) |     |     |     |     |
|--|-----|-----|-----|-----|
| PS1                                      | MOD | MOD | MOD | MOD |
| PS2                                      | MOD | MOD | MOD | MOD |

Note: Two pair of DC cables between PS2 and SSPA

| 3RU REDUNDANT<br>(All power levels) |     |     |     |  |
|-------------------------------------|-----|-----|-----|--|
| PS1                                 | MOD | MOD | MOD |  |

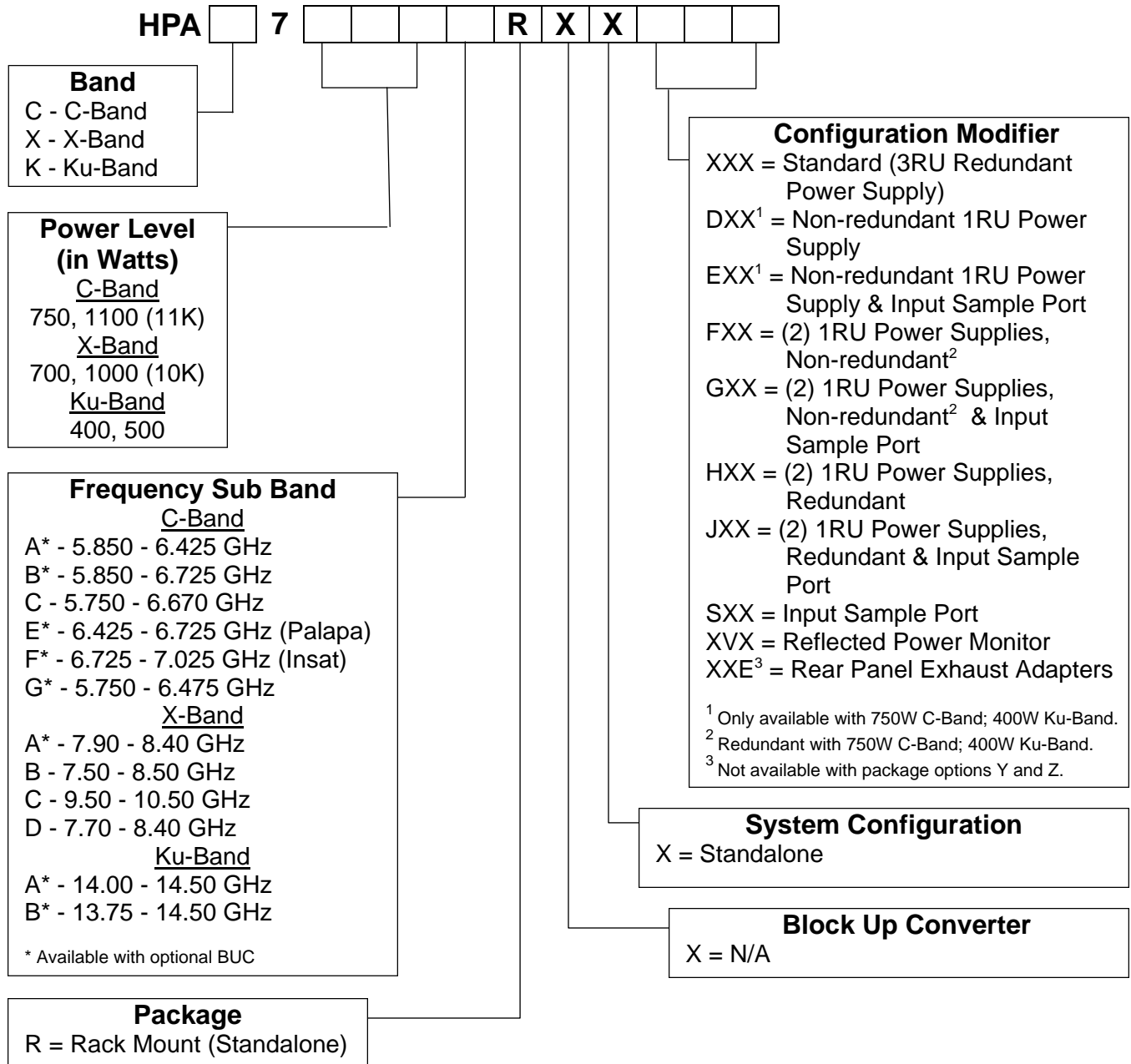
## Hot-Swap SSPA Modules

Four SSPA modules are phase combined inside the 7RU Rack Mountable SSPA to produce the amplifiers total output power. Each of the SSPA modules is hot-swappable, allowing the unit to remain in service while a failed SSPA module is replaced.

The chassis front panel is removable to access the SSPA modules, even while the unit is in operation.



## Part Number Configuration Matrix



**Example** - A standalone 750W C-Band high power rack mount SSPA with an optional input sample port is part number: **HPAC7750ARXXSXX**.

Specifications listed in this document are subject to change without notice.