



400W C-Band, 1:1 Redundant System in the 4RU chassis, with optional N+1 redundant power supplies



500W X-Band, 1:2 Redundant System in the 4RU chassis, with N+1 redundant power supplies



200W Ku-Band 1:1 Redundant System in the 3RU Chassis, with optional N+1 redundant power supplies

## DESCRIPTION

Teledyne Paradise Datacom's Indoor Rack Mount (-RM) series of redundant amplifier systems provide the highest degree of earth station redundancy and reliability.

These systems can be configured in either 1:1 or 1:2 redundant configurations using any of the Teledyne Paradise Datacom family of Indoor Rack Mount SSPAs.

The RCP2-1100/1200 System Controller front panel mimic display shows the current switch positions and the on-line amplifiers. Dedicated fault lights provide easy indication of system status.

All RCP2-1100/1200 monitor and control is available locally, at the front panel LCD display, as well as remotely by the RS-232 or RS-485 interface ports.

## FEATURES

- System Output Power to:
  - 1.1 kW C-Band
  - 1.0 kW X-Band
  - 500 W Ku Band
- Universal Input, Power Factor Corrected Power Supply
- Output Power Monitoring
- Separate 1 RU Redundant Controller for 1:2 systems
- Controller-less solutions for 1:1 systems

## OPTIONS

- Controller-less 1:2 System
- Reflected Power Alarm
- L-Band Input operation
- Cold Standby Amplifier Operation
- External Exhaust Air Ducting Kit
- Custom Configurations

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# Redundant Systems

## Indoor Packaged SSPAs

### 3RU, 4RU, 6RU & 7RU



#### 3RU SSPA Chassis Output Power Levels

C-Band: 25W - 300W  
X-Band: 60W - 200W  
Ku-Band: 10W - 125W

3 RU Chassis includes integrated AC-DC power supply or optional 1RU redundant power supply chassis



#### 4RU SSPA Chassis Output Power Levels

C-Band: 50W - 600W  
X-Band: 60W - 500W  
Ku-Band: 25W - 250W

4 RU Chassis includes integrated AC-DC power supply or optional 1RU redundant power supply chassis



#### 6RU & 7RU SSPA Chassis Output Power Levels

C-Band: 800W - 1.1 kW  
X-Band: 700W - 1.0 kW  
Ku-Band: 250W - 500W

6RU & 7RU Chassis use separate, 1RU power supply chassis.

Power Supply is a redundant, N+1, chassis.

Only 3 of 4 power supply modules required to operate the SSPA with 1 hot standby.

Power Supply modules are front panel hot swappable.



### Common System Specifications

PARAMETER	NOTES	LIMITS	UNITS
Gain	minimum	70	dB
Gain Flatness	full band (except Extended C-Band) Extended C-Band units	± 1.0 ± 1.5	dB dB
Gain Slope	per 40 MHz	± 0.3	dB/40 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	3 dB back off relative to P <sub>1dB</sub>	-25	dBc
AM/PM Conversion	(@ rated P <sub>1dB</sub> ) (@ P <sub>1dB</sub> - 3 dB)	3.5 0.5	°/dB °/dB
Spurious Harmonics	(@ rated P <sub>1dB</sub> ) (@ rated P <sub>1dB</sub> - 3 dB)	-65 -50	dBc dBc
Input / Output VSWR		1.50:1	
Noise Figure	at maximum gain	12	dB
Group Delay (per 40 MHz segment)	Linear Parabolic Ripple	0.01 0.003 1.0	ns/MHz ns/MHz <sup>2</sup> ns p-p
Noise Output	TX Band RX Band (C- or Ku-bands) RX Band (X-band)	-70 -155 -100	dBW/4 KHz dBW/4 KHz dBW/4 KHz
Residual AM Noise	0 - 10 KHz 10 KHz - 500 KHz 500 KHz - 1 MHz	-45 -20 (1.25 + log F) -80	dBc dBc dBc
Residual Phase Noise	Offset frequency from carrier 10 Hz 100 Hz 1 kHz 10 kHz 100 kHz 1 MHz	-90 -100 -110 -120 -125 -130	dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz dBc/Hz

### Mechanical

Size	width x height x depth		
3 RU SSPA Chassis		19.0 x 5.22 x 24.13 (483 x 133 x 613)	inches (mm)
4 RU SSPA Chassis		19.0 x 7.0 x 28.0 (483 x 178 x 711)	inches (mm)
6 RU SSPA Chassis		19.0 x 10.47 x 30.0 (483 x 266 x 762)	inches (mm)
7 RU SSPA Chassis		19.0 x 12.22 x 30.0 (483 x 310 x 762)	inches (mm)
1RU Power Supply Chassis		19.0 x 1.75 x 16.10 (483 x 44 x 409)	inches (mm)
Weight			
3RU SSPA Chassis		66 (30)	lbs. (kg)
4RU SSPA Chassis		75 (34)	lbs. (kg)
4RU SSPA Chassis	≤ 250W Chassis	100 (45)	lbs. (kg)
6RU SSPA Chassis	> 250W Chassis	180 (82)	lbs. (kg)
7RU SSPA Chassis		180 (82)	lbs. (kg)
1RU Power Supply Chassis		29 (13)	lbs. (kg)
Finish		powder coat	Gray

### Environmental

Operating Temperature	Ambient	0 to +50	°C
Relative Humidity	Condensing	95	%
Cooling System	Integrated	Forced 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 5, 10, 20, 25, or 50 MHz without modification.
- zBUC converter can accept a wide range of external reference power (-10 to +5 dBm).

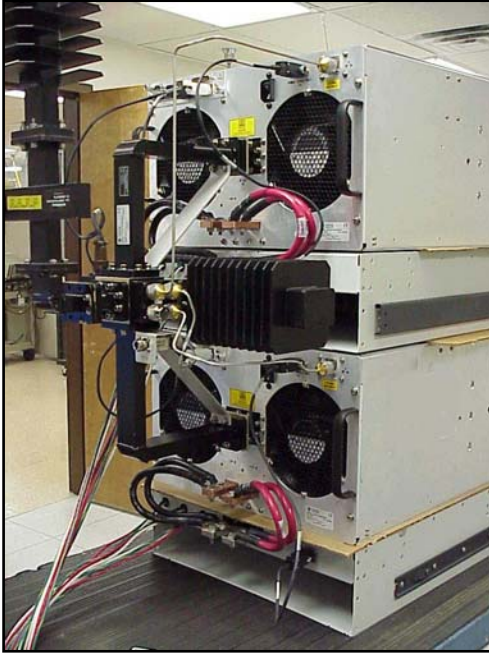
### Available Frequency Plans

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

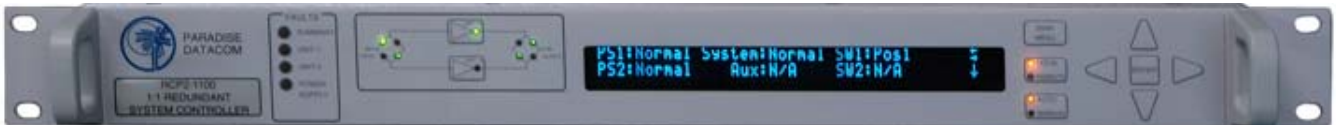
### Electrical Specifications for RM SSPA System with ZBUC<sup>™</sup> converter

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		20				dB	
	Typical C-Band Adj. Range	60 - 80				dB	
	Typical Ku-Band Adj. Range	57 - 77				dB	
Gain Stability	0 to +50 °C	± 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	-60	-50	dBc/Hz	
	100 Hz	-60	-80	-75	-65	dBc/Hz	
	1 KHz	-70	-80	-75	-72	dBc/Hz	
	10 KHz	-80	-85	-100	-90	dBc/Hz	
	100 KHz	-90	-120	-110	-110	dBc/Hz	
	1 MHz	-90	-125	-122	-120	dBc/Hz	
Spurious	In-Band Signal Related (C-/Ku-Band)					-50	dBc
	(Extended C-Band)					-40	dBc
	Close to Carrier Spurious (≤ 20 MHz)					-50	dBc
	Local Oscillator					-30	dBm
Noise Figure	At 75 dB gain setting					20	dB
Input VSWR	L-Band					1.5 : 1	
Internal Reference Option	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 (-20 to +85 °C)					± 3 • 10 <sup>-8</sup>	

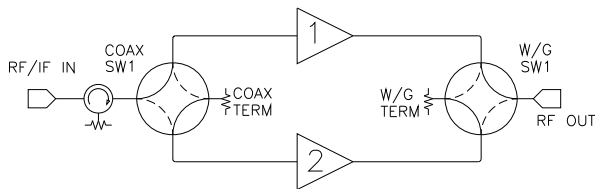
### Indoor Redundant System Physical Configurations



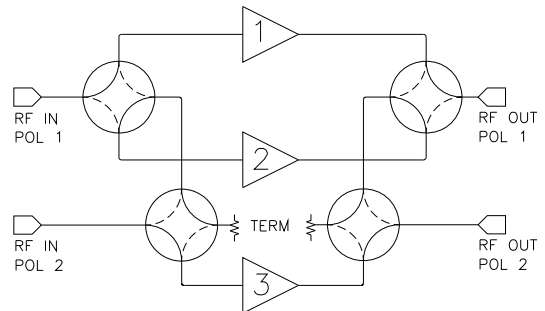
### Redundant Control Panels



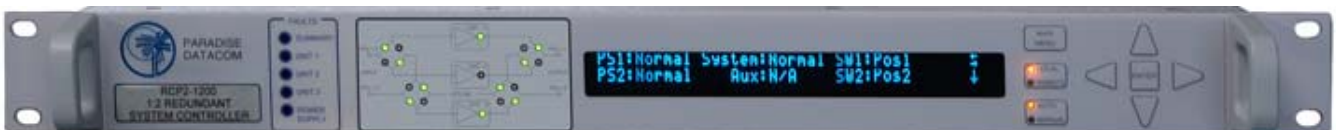
**RCP2-1100 1:1 Redundant Controller**



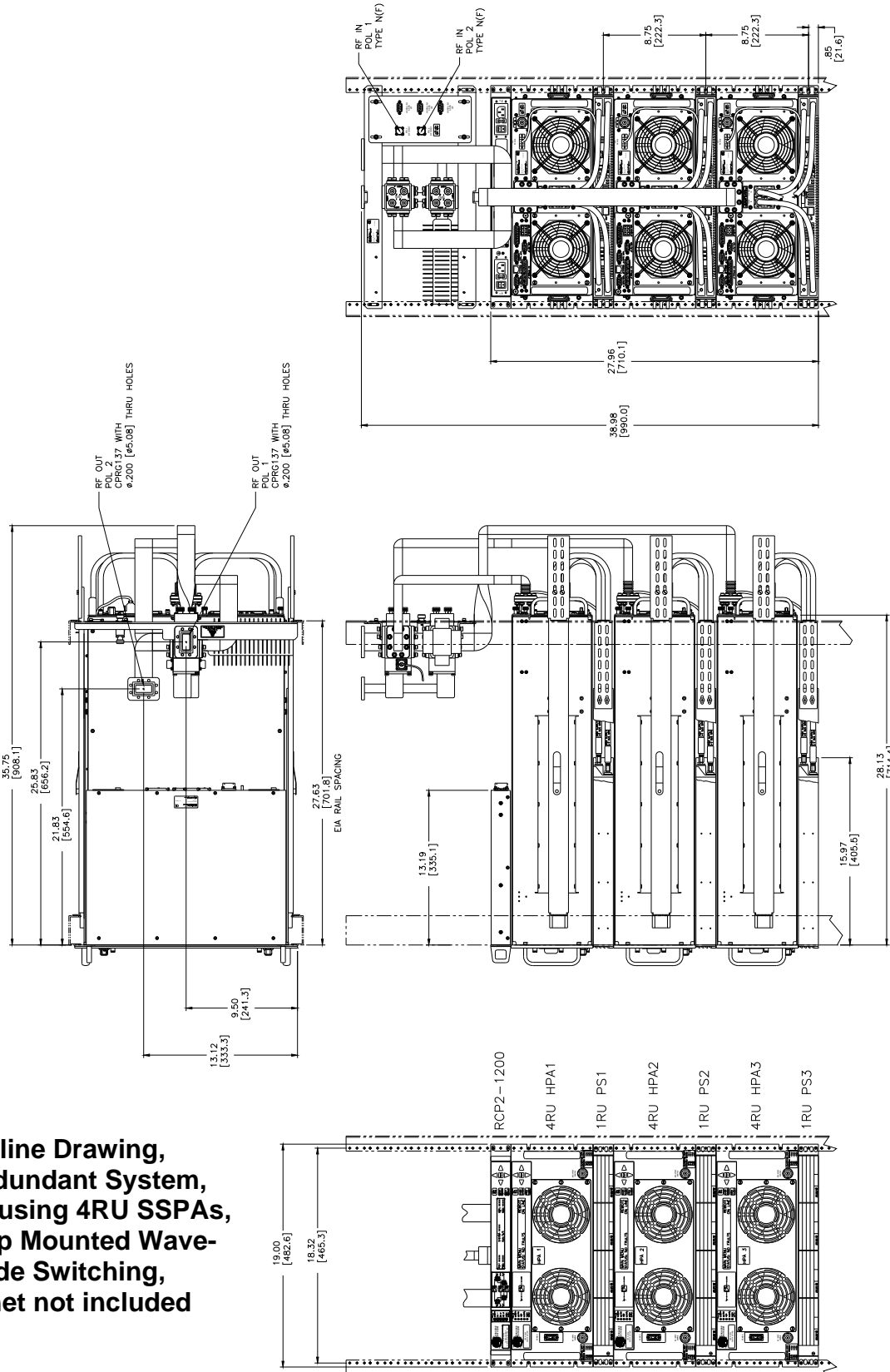
**Block Diagram, 1:1 Redundant System**



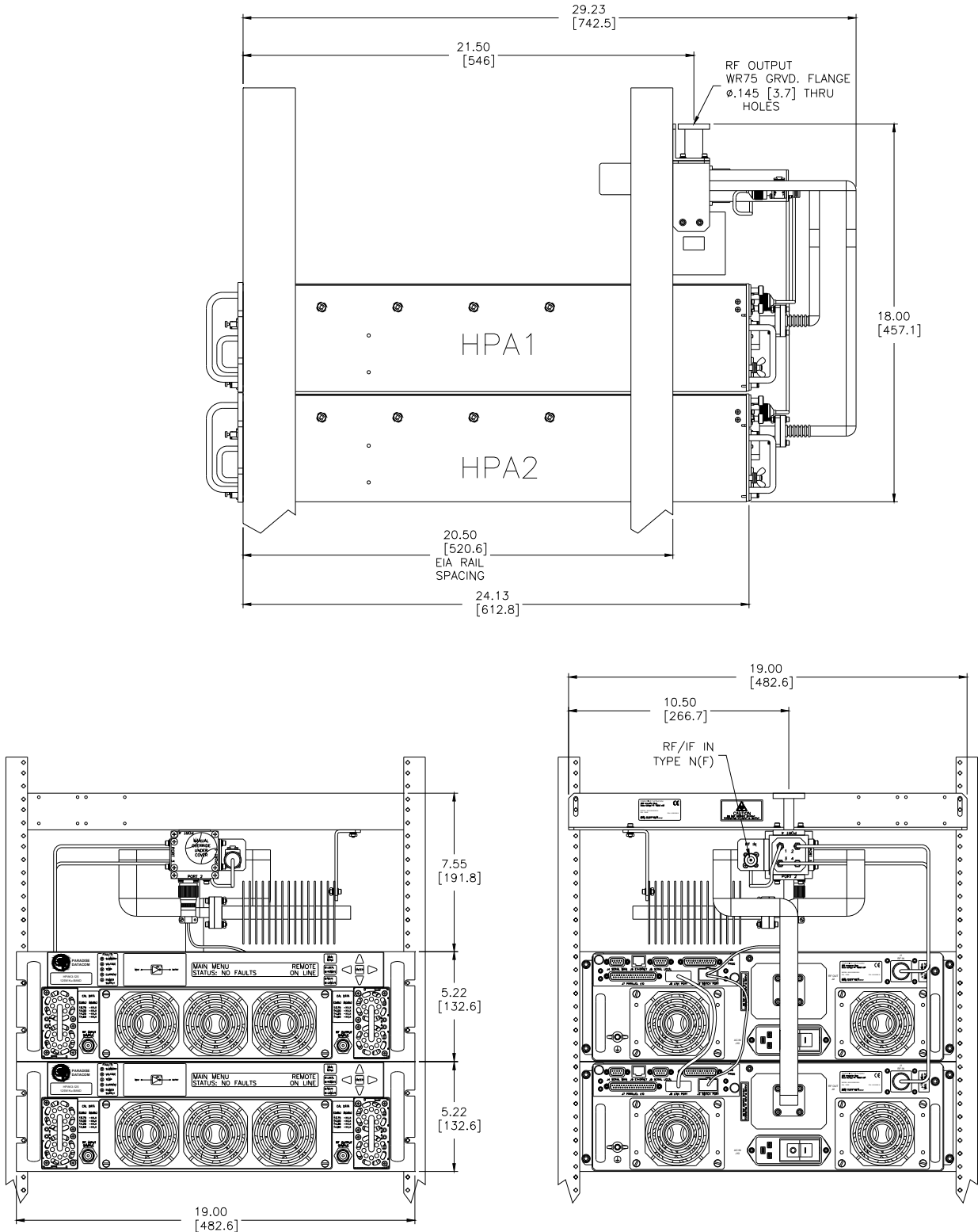
**Block Diagram, 1:2 Redundant System**



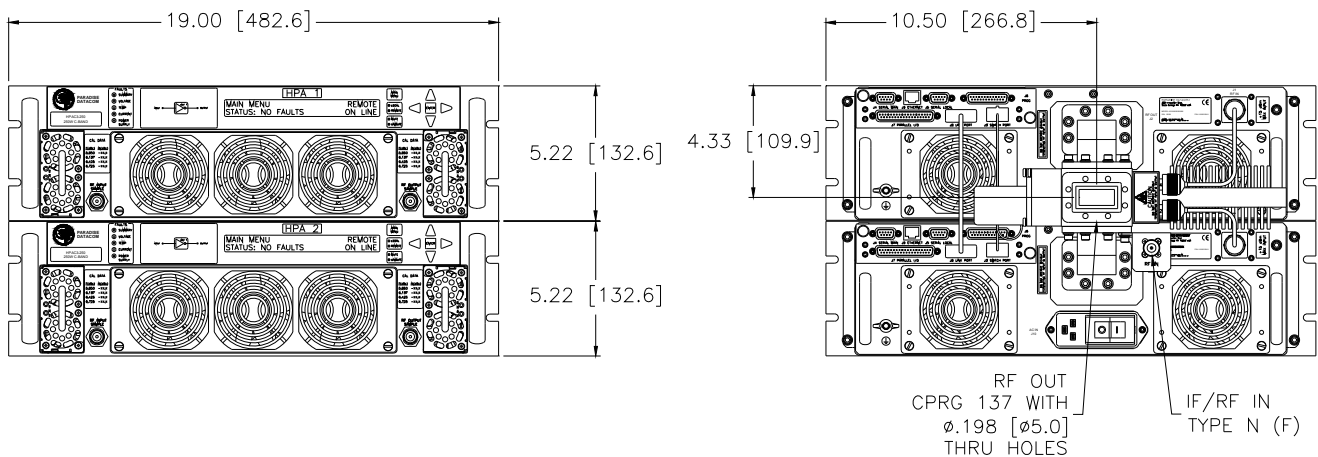
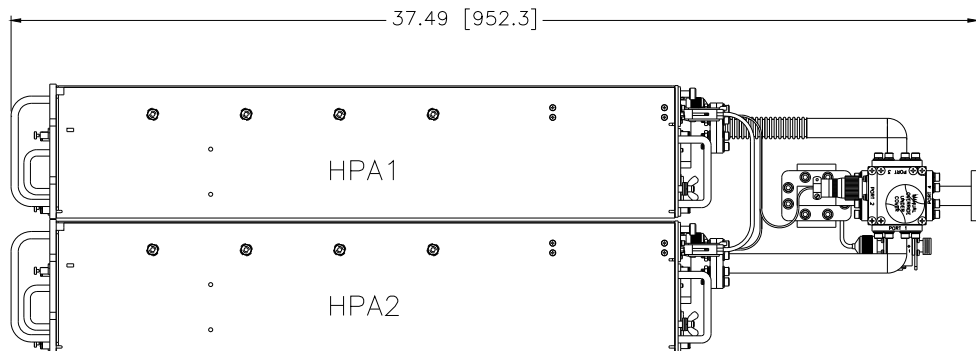
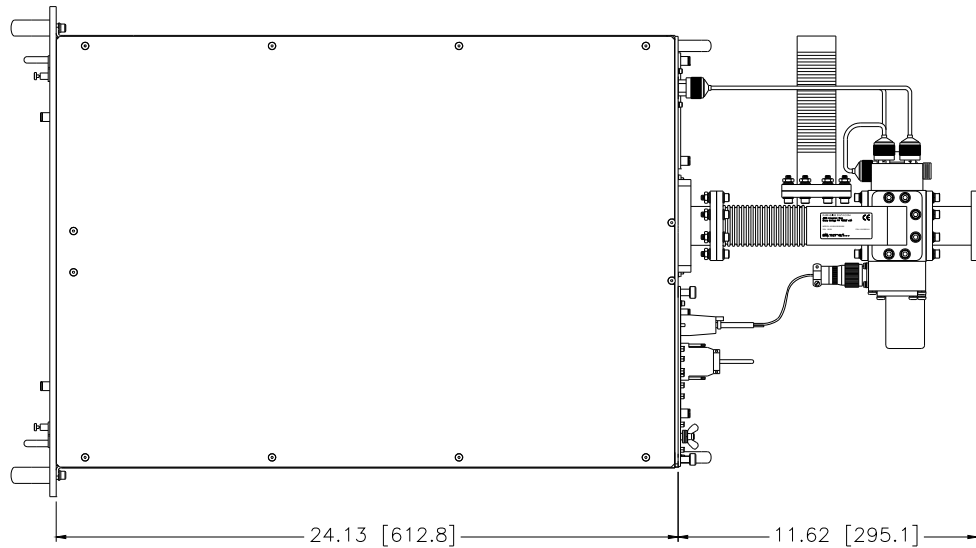
**RCP2-1200 1:2 Redundant Controller**



**Outline Drawing,  
 1:2 Redundant System,  
 C-Band, using 4RU SSPAs,  
 with Top Mounted Wave-  
 guide Switching,  
 Cabinet not included**



**Outline Drawing, 1:1 Redundant System, Ku-Band, using 3RU SSPAs, with Top Mounted Waveguide Switching, Cabinet not included**



**Outline Drawing, 1:1 Redundant System, C-Band, using 3RU SSPAs, with Rear Mounted Waveguide Switching, Cabinet not included**





**Part Number Configuration, 4 RU GaAs SSPA**

HPA  2

**Band**  
 C - C-Band  
 X - X-Band  
 K - Ku-Band

**Power Level (in Watts)**  
C-Band  
 025, 030, 040, 050, 075, 100, 140, 200, 250, 300, 400, 500, 600  
X-Band  
 060, 075, 100, 140, 200, 250, 350, 500  
Ku-Band  
 010, 020, 025, 035, 040, 050, 070, 100, 125, 200, 250

**Frequency Sub Band**  
C-Band  
 A<sup>1</sup> - 5.850 to 6.425 GHz  
 B<sup>1</sup> - 5.850 to 6.725 GHz  
 C - 5.750 to 6.670 GHz  
 E<sup>1</sup> - 6.425 to 6.725 GHz (Palapa)  
 F<sup>1</sup> - 6.725 to 7.025 GHz (Insat)  
 G<sup>1</sup> - 5.750 to 6.475 GHz  
 V<sup>1,2</sup> - 5.850 to 6.725 GHz  
X-Band  
 A<sup>1</sup> - 7.90 to 8.40 GHz  
 B - 7.50 to 8.50 GHz  
 C - 9.50 to 10.50 GHz  
 D - 7.70 to 8.40 GHz  
Ku-Band  
 A<sup>1</sup> - 14.00 to 14.50 GHz  
 B<sup>1</sup> - 13.75 to 14.50 GHz  
<sup>1</sup> Available with optional BUC.  
<sup>2</sup> With 1.3:1 VSWR.

**Package**  
 S = Rack Mount, Top Mounted Waveguide Switching, with Cabinet  
 T = Rack Mount, Top Mounted Waveguide Switching, without Cabinet  
 Y = Rack Mount, Rear Mounted Waveguide Switching, with Cabinet  
 Z = Rack Mount, Rear Mounted Waveguide Switching, without Cabinet

**Configuration Modifier 3**  
 X = Standard  
 D = 48V Input  
 E<sup>1</sup> = Rear Panel Exhaust Adapters  
 J<sup>1</sup> = 48V Input & Rear Panel Exhaust Adapters  
 L<sup>1</sup> = External 1RU N+1 Power Supply & Rear Panel Exhaust Adapters  
 P = External 1RU N+1 Power Supply  
<sup>1</sup> Not available with Package options Y and Z.

**Configuration Modifier 2**  
 X = Standard  
 V = Reflected Power Monitor

**Configuration Modifier 1**  
 X = Standard  
 S = Input Sample  
 C<sup>1</sup> = Input Sample & 110/220 VAC Operation  
 K<sup>1</sup> = 110/220 VAC Operation  
<sup>1</sup> 100-125W Ku- & 200-300W C-band only; Consult factory regarding other bands and power levels.

**System Configuration**  
 A<sup>1</sup> = 1:1 w/ Input Switching, Internal Control  
 B = 1:1 w/ Input Splitter, Internal Control  
 C<sup>1</sup> = 1:2 w/ Input Switching & RCP2-1200<sup>2</sup>  
 D<sup>1</sup> = 1:2 w/ Input Switching, Internal Control  
 F = 1:1 w/ Input Splitter & RCP2-1100<sup>2</sup>  
 H<sup>1</sup> = 1:1 w/ Input Switching & RCP2-1100<sup>2</sup>  
 S = Custom  
<sup>1</sup> Input switching with external reference BUC requires a reference distribution box.  
<sup>2</sup> Standard location for RCP is directly above HPA1

**Block Up Converter**  
 M = Internal Reference ZBUC  
 P = External Reference ZBUC  
 X = N/A



### Part Number Configuration, 7 RU GaAs SSPA

HPA  7

**Band**  
 C - C-Band  
 X - X-Band  
 K - Ku-Band

**Power Level (in Watts)**  
C-Band  
 800, 900, 1100 (11K)  
X-Band  
 700, 1000 (10K)  
Ku-Band  
 250, 400, 500

**Frequency Sub Band**  
C-Band  
 A<sup>1</sup> – 5.850 to 6.425 GHz  
 B<sup>1</sup> – 5.850 to 6.725 GHz  
 C – 5.750 to 6.670 GHz  
 E<sup>1</sup> – 6.425 to 6.725 GHz (Palapa)  
 F<sup>1</sup> – 6.725 to 7.025 GHz (Insat)  
 G<sup>1</sup> – 5.750 to 6.475 GHz  
 V<sup>1,2</sup> – 5.850 to 6.725 GHz  
X-Band  
 A<sup>1</sup> - 7.90 to 8.40 GHz  
 B - 7.50 to 8.50 GHz  
 C - 9.50 to 10.50 GHz  
 D - 7.70 to 8.40 GHz  
Ku-Band  
 A<sup>1</sup> – 14.00 to 14.50 GHz  
 B<sup>1</sup> – 13.75 to 14.50 GHz

<sup>1</sup> Available with optional BUC.  
<sup>2</sup> With 1.3:1 VSWR.

**Configuration Modifier 3**  
 X = Standard  
 E<sup>1</sup> = Rear Panel Exhaust Adapters  
<sup>1</sup> Not available with Package options Y or Z.

**Configuration Modifier 2**  
 X = Standard  
 V = Reflected Power Monitor

**Configuration Modifier 1**  
 D = Redundant 1RU Power Supply  
 E = Redundant 1RU Power Supply & Input Sample Port

**System Configuration**  
 S = Custom  
 A<sup>1</sup> = 1:1 System w/ Input Switching  
 B = 1:1 System w/ Input Splitter  
 C<sup>1</sup> = 1:2 System w/ Input Switching & RCP2-1200<sup>2</sup>  
 D<sup>1</sup> = 1:2 System w/ Input Switching, Internal Redundancy Control  
 F = 1:1 System w/ Input Splitter & RCP2-1100<sup>2</sup>  
 H<sup>1</sup> = 1:1 System w/ Input Switching & RCP2-1100<sup>2</sup>

<sup>1</sup> Input switching with external reference BUC requires a reference distribution box.  
<sup>2</sup> Standard location for RCP is directly above HPA1

**Block Up Converter**  
 M = Internal Reference zBUC  
 P = External Reference zBUC  
 X = N/A

**Package**  
 S = Rack Mount, Top Mounted Waveguide Switching, with Cabinet  
 T = Rack Mount, Top Mounted Waveguide Switching, without Cabinet  
 Y = Rack Mount, Rear Mounted Waveguide Switching, with Cabinet  
 Z = Rack Mount, Rear Mounted Waveguide Switching, without Cabinet

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