



600W C-Band, 1:1 Redundant System
in the 5RU chassis,
with N+1 redundant power supplies



125W Ku-Band 1:1 Redundant System
in the 3RU Chassis,
with 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.

Redundant systems may be configured without an optional 1RU system controller. However, the controller front panel mimic display shows the current switch positions and the on-line amplifiers. Dedicated fault indicators provide easy indication of system status.

All system controller monitor and control is available locally at the front panel touchscreen display, as well as remotely by the RS-232, RS-485 or Ethernet interface ports.

FEATURES

- Extremely High Power Density:
 - 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
- Arc Detection Kit
- L-Band Input Operation
- Cold Standby Amplifier Operation
- External Exhaust Air Ducting Kit
- Custom Configurations

Redundant Systems

Indoor Packaged GaAs SSPAs

3RU, 5RU, 6RU & 7RU



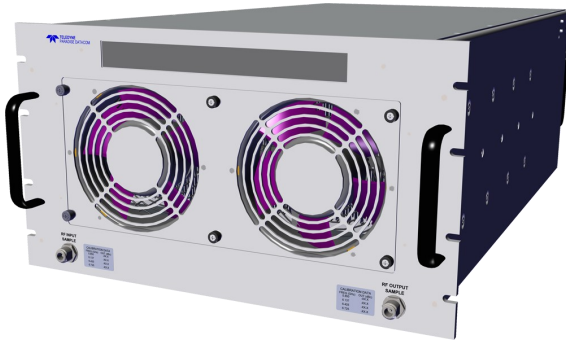
Single 3RU Chassis
Output Power Levels

C Band: 75W - 300W
X Band: 200W
Ku Band: 100W - 125W



Single 5RU Chassis
Output Power Levels

C Band: 400W - 600W
X Band: 250W - 350W
Ku Band: 200W - 250W



Single 6RU Chassis
Output Power Levels

C Band: 800W - 1.1 kW



Single 7RU Chassis
Output Power Levels

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

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.

For example, a single thread 200W Ku-Band 5RU SSPA has a typical saturated output power of 53.0 dB (200W). Placing two of the above amplifiers in a 1:1 redundant system configuration would reduce the typical system saturated output by 0.2 dB to 52.8 dB (191W).

Placing three of the above amplifiers in a 1:2 redundant system configuration would reduce the typical system saturated output by 0.4 dB to 52.6 dB (182W).

Actual system losses will vary based on the system options.

Common System Specifications

PARAMETER	NOTES	LIMITS	UNITS
Gain	minimum	70	dB
Gain Flatness	full band (except Extended C-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 +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 _{1dB}	-25	dBc
AM/PM Conversion	(@ rated P _{1dB})	3.5	°/dB
	(@ P _{1dB} - 3 dB)	0.5	°/dB
Spurious	(@ rated P _{1dB})	-65	dBc
Harmonics	(@ rated P _{1dB} - 3 dB)	-50	dBc
Input / Output VSWR		1.50:1	
Noise Figure	at maximum gain	12	dB
Group Delay	Linear	0.01	ns/MHz
(per 40 MHz segment)	Parabolic	0.003	ns/MHz ²
	Ripple	1.0	ns p-p
Noise Output	TX Band	-70	dBW/4 KHz
	RX Band (C- or Ku-bands)	-155	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
Residual Phase Noise	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

Mechanical

Size	width x height x depth		
3 RU SSPA Chassis		19.0 x 5.22 x 25.25 (483 x 133 x 641)	inches (mm)
5 RU SSPA Chassis		19.0 x 8.75 x 30.25 (483 x 222 x 768)	inches (mm)
6 RU SSPA Chassis		19.0 x 10.47 x 30.25 (483 x 266 x 768)	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, typical			
3RU SSPA Chassis		85 (38.5)	lbs. (kg)
5RU SSPA Chassis		150 (68)	lbs. (kg)
6RU SSPA Chassis		180 (82)	lbs. (kg)
7RU SSPA Chassis		160 (72.5)	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	

Supplying Power to Indoor Packaged SSPAs

The Indoor Packaged SSPAs use a separate 1RU power supply chassis in an N+1 redundant configuration, which means it has one additional power supply module than is necessary to operate the SSPA, with that module in hot standby. Power supply modules are hot swappable at the front panel.

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® converter to an SSPA typically increases the gain by 2-4 dB. In addition:

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

Available Frequency Plans

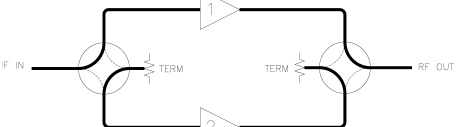
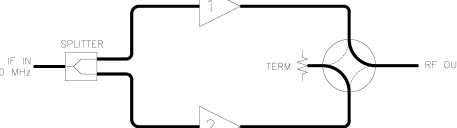
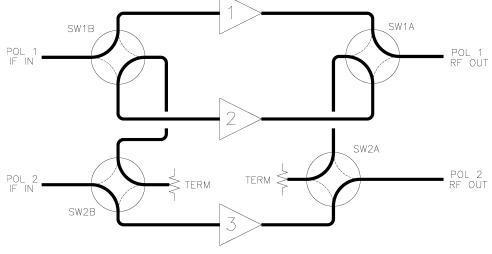
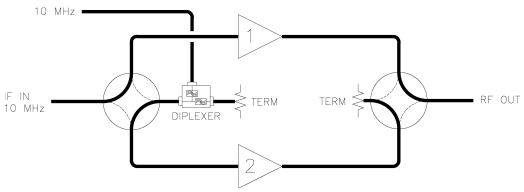
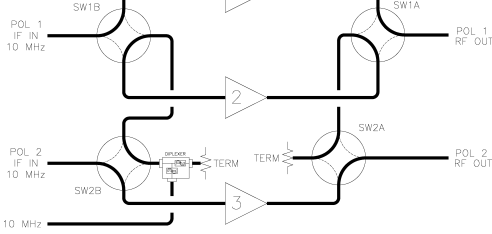
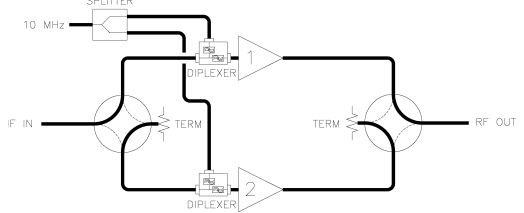
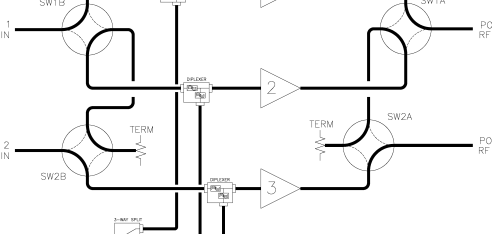
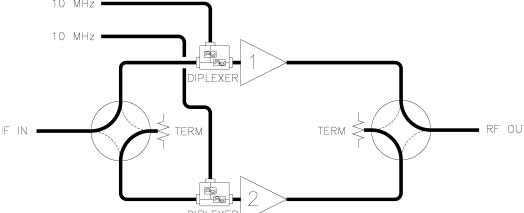
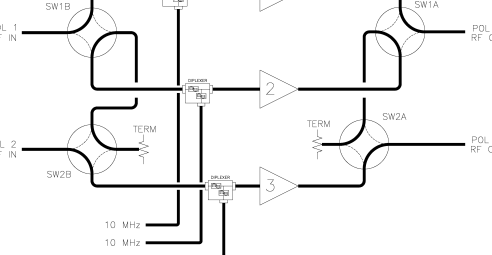
Band	Model Number	IF Input	LO Frequency	RF Output
C	Sub-Band "A"	950 - 1525 MHz	4.900 GHz	5.850 - 6.425 GHz
C	Sub-Band "B"	950 - 1825 MHz	4.900 GHz	5.850 - 6.725 GHz
C	Sub-Band "C"	950 - 1870 MHz	4.800 GHz	5.750 - 6.670 GHz
C	Sub-Band "E"	950 - 1250 MHz	5.475 GHz	6.425 - 6.725 GHz
C	Sub-Band "F"	950 - 1250 MHz	5.775 GHz	6.725 - 7.025 GHz
C	Sub-Band "G"	950 - 1675 MHz	4.800 GHz	5.750 - 6.475 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

Electrical Specifications for RM SSPA Systems with ZBUC converter

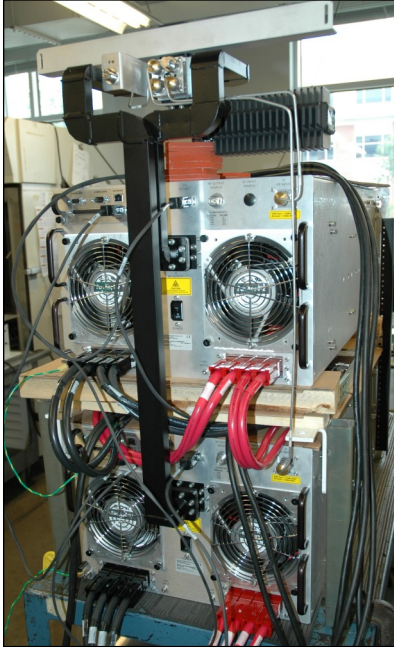
PARAMETER	NOTES	LIMITS				UNITS
Gain	Nominal setting	75				dB
Gain Flatness	full band (C-,X-,Ku-bands)	± 2.0				dB
Gain Slope	per 40 MHz (C-,X-,Ku-bands)	± 0.5				dB/40 MHz
Gain Adjusted Range		20				dB
	Typical C-Band Adj. Range	60 - 80				dB
	Typical Ku-Band Adj. Range	57 - 77				dB
Gain Stability	-40 to +60 °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	-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) (Extended C-Band)	-50				dBc
	Close to Carrier Spurious (≤ 20 MHz)	-40				dBc
	Local Oscillator	-50				dBc
		-30				dBm
Noise Figure	At Maximum gain	20				dB
Transmit Band Noise Output Power Density	Tx Band at Maximum gain	-65				dBW/4kHz
Input VSWR	L-Band	1.5 : 1				
Internal Reference Option	Reference Accuracy (initial)	± 1 • 10 ⁻⁸				
	Aging per day (after 30 days)	± 1 • 10 ⁻⁹				
	Aging per year (after 30 days)	± 6 • 10 ⁻⁸				
	Reference Stability over Temperature (-40 to +40 °C, ambient)	± 1 • 10 ⁻⁸				

Reference Options in Redundant Systems with L-Band Input

See below for BUC configurations in which the 10 MHz reference can be distributed to units in redundant systems. Converters with internal reference oscillators automatically switch to an externally applied reference.

1:1 Redundant Systems	Ref. Option	1:2 Redundant Systems
<p>Internal Reference Standard for BUC option 'M' with input switching</p>  <p>Internal/External Reference Standard for BUC option 'M' or 'P' with input splitting</p> 	<p>Option 1</p>	<p>Internal Reference Standard for BUC option 'M'</p> 
<p>External 10 MHz Diplexed to Standby Unit</p> 	<p>Option 2</p>	<p>External 10 MHz Diplexed to Standby Unit</p> 
<p>Single External 10 MHz Diplexed to Each Unit Standard for BUC option 'P' with input switching</p> 	<p>Option 3</p>	<p>Single External 10 MHz Diplexed to Each Unit Standard for BUC option 'P'</p> 
<p>Separate External 10 MHz Diplexed to Each Unit</p> 	<p>Option 4</p>	<p>Separate External 10 MHz Diplexed to Each Unit</p> 

Indoor Redundant System Physical Configurations



◀ 1:1 Redundant
7RU System,
Top Facing W/G,
Without Cabinet

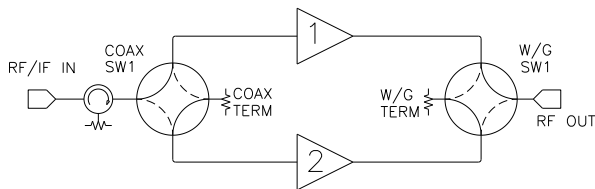
1:2 Redundant ▶
3RU System
With Cabinet



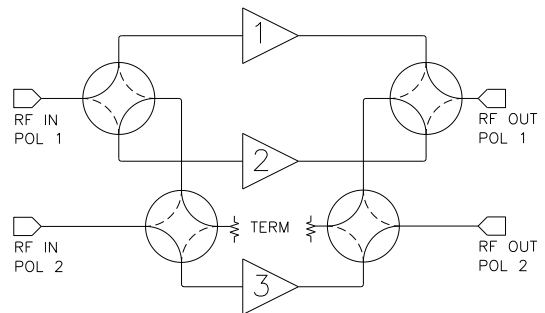
Redundant System Controllers



Redundant System Controller with Touchscreen (1:1 Mode Shown)

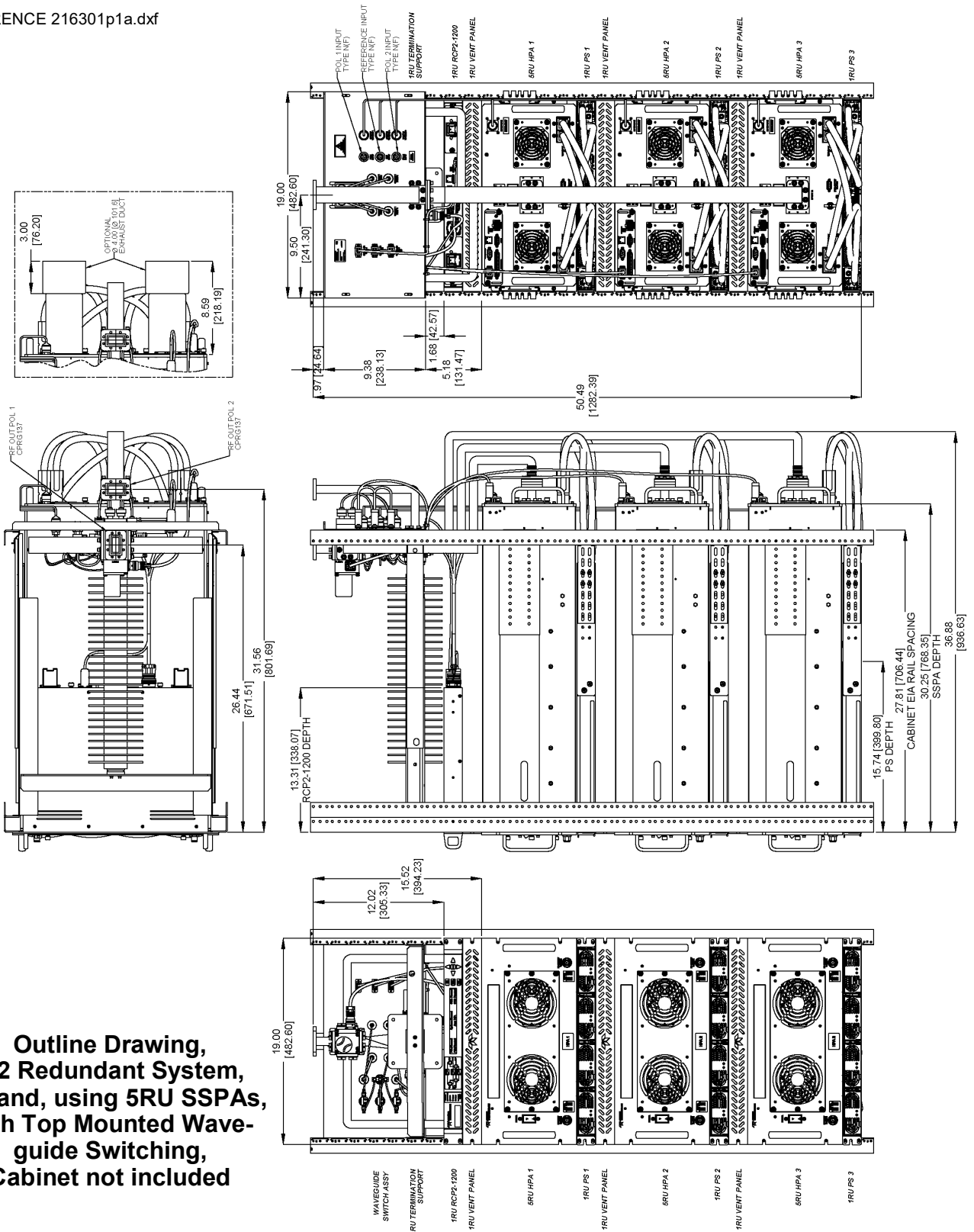


Block Diagram, 1:1 Redundant System



Block Diagram, 1:2 Redundant System

REFERENCE 216301p1a.dxf

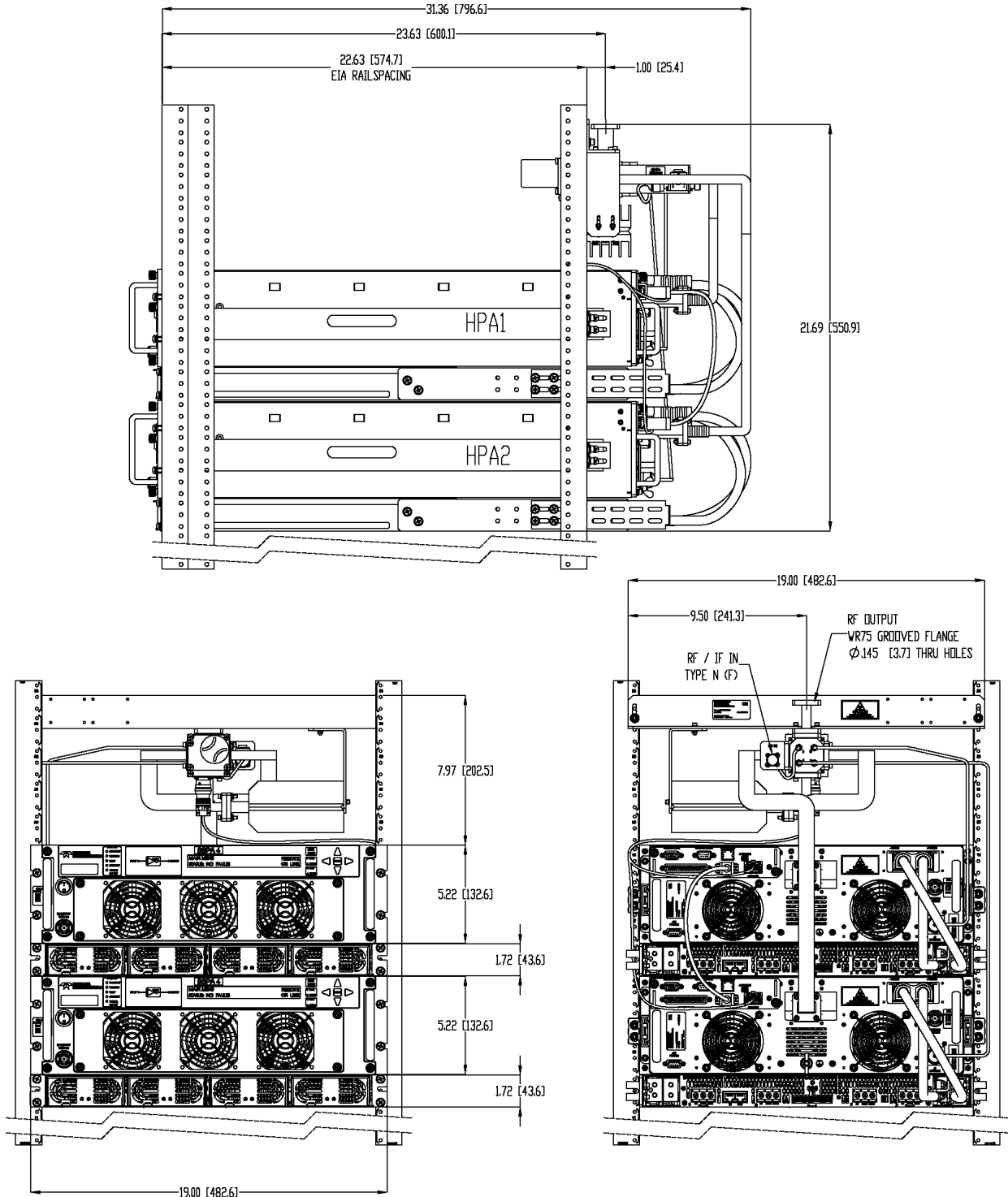


Redundant Systems

Indoor Packaged GaAs SSPAs

3RU, 5RU, 6RU & 7RU

REFERENCE 215172p1a.dxf



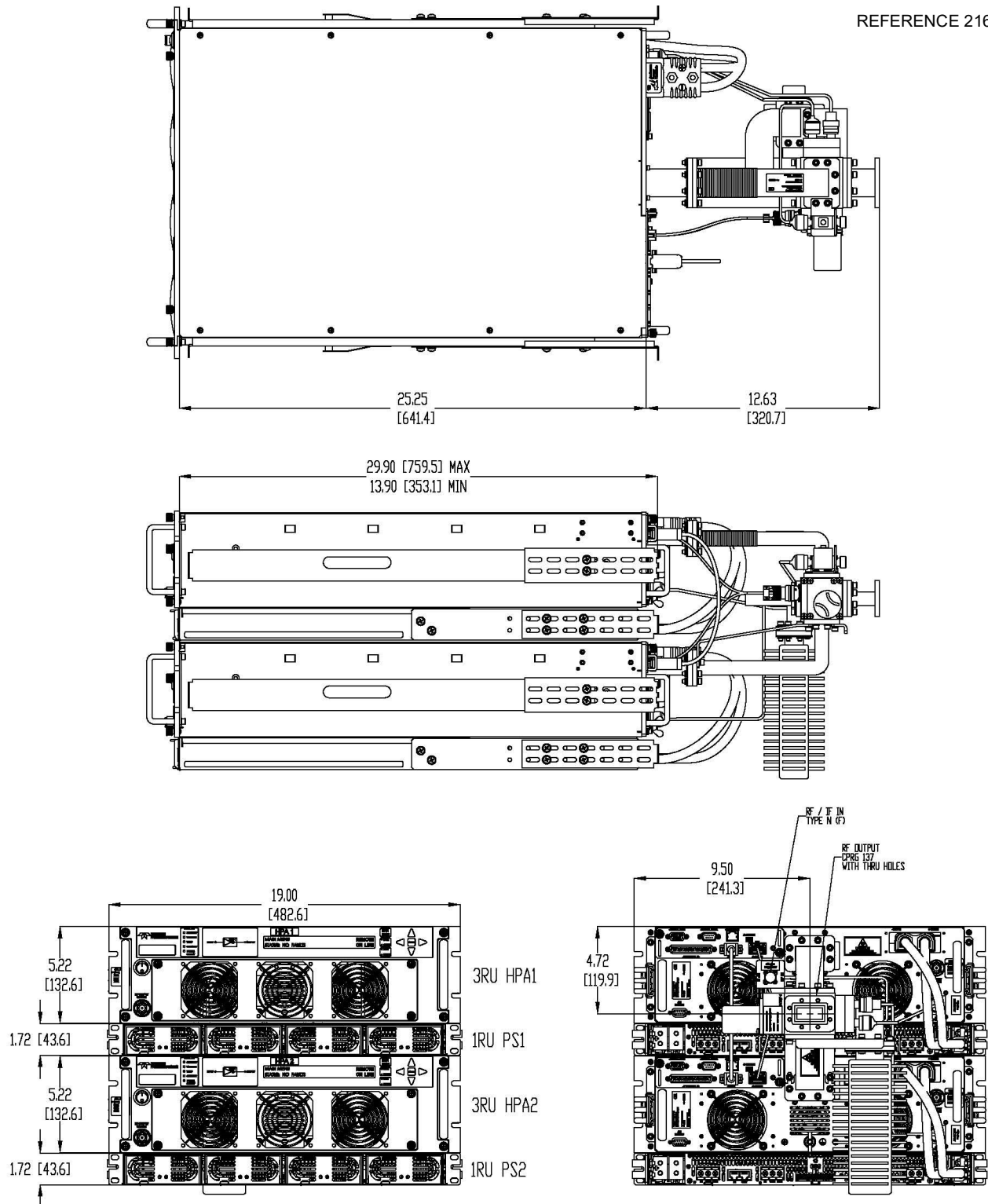
Outline Drawing, 1:1 Redundant System, Ku-Band, using 2nd Gen 3RU SSPAs, with Top Mounted Waveguide Switching, Cabinet not included

Redundant Systems

Indoor Packaged GaAs SSPAs

3RU, 5RU, 6RU & 7RU

REFERENCE 216135



Outline Drawing, 1:1 Redundant System, C-Band, using 2nd Gen 3RU SSPAs, with Rear Mounted Waveguide Switching, Cabinet not included

Part Number Configuration, 2nd Generation 3 RU GaAs SSPA

HPA **C 3 3 0 0 A S M B S X P 2** — 2nd Generation

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

Rack Height	
3RU	3

Power Level (Watts)	
C-Band	075, 100, 140, 200, 250, 300
X-Band	200
Ku-Band	100, 125

Frequency Sub Band	
C-Band	
A¹	5.850 to 6.425 GHz
B¹	5.850 to 6.725 GHz
C¹	5.750 to 6.670 GHz
E¹	6.425 to 6.725 GHz
F¹	6.725 to 7.025 GHz
G¹	5.750 to 6.475 GHz
X-Band	
A¹	7.90 to 8.40 GHz
Ku-Band	
A¹	14.00 to 14.50 GHz
B¹	13.75 to 14.50 GHz

¹ Available with optional BUC

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

COMMENTS:

Configuration Modifier 3	
P	1RU N+1 Power Supply
L¹	1RU N+1 Power Supply & Rear Exhaust Adapters

¹ Not available with Package options 'Y' or 'Z'

Configuration Modifier 2	
X	Standard
P	Front Panel Power Switch
R¹	Receive Band Reject Filter
V	Reflected Power Monitor
A¹	P + R (see above)
B	P + V (see above)
C¹	V + R (see above)
D¹	P + R + V (see above)

¹ X-Band only

Configuration Modifier 1	
X	Standard
K	110 VAC Input
S	Input Sample Port
C	K + S (see above)

System Configuration	
A	1:1 System, Input Switching, Internal control
B	1:1 System, Input Splitter, Internal control
C	1:2 System, Input Switching, RCP2-1200 ¹
D	1:2 System, Input Switching, Internal control
F	1:1 System, Input Splitter, RCP2-1100 ¹
H	1:1 System, Input Switching, RCP2-1100 ¹

¹ Standard location for RCP is directly above HPA1

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

See page 5 for BUC reference configuration options. **Option 1** is standard for all 1:1 and 1:2 systems using BUC option 'M' and for 1:1 systems with input splitting using BUC option 'P'.

Option 3 is standard for all 1:2 systems and 1:1 systems with input switching using BUC option 'P'.

Part Number Configuration, 5 RU GaAs SSPA

HPA **C** **5** **5** **0** **0** **A** **S** **M** **B** **S** **X** **P**

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

Rack Height	
5RU	5

Power Level (Watts)	
C-Band	400, 500, 600
X-Band	250, 350
Ku-Band	200, 250

Frequency Sub Band	
C-Band	
A ¹	5.850 to 6.425 GHz
B ¹	5.850 to 6.725 GHz
C ¹	5.750 to 6.670 GHz
E ¹	6.425 to 6.725 GHz
F ¹	6.725 to 7.025 GHz
H	5.715 to 5.790 GHz
L ¹	4.400 to 5.000 GHz
X-Band	
A ¹	7.90 to 8.40 GHz
F	7.10 to 7.40 GHz
Ku-Band	
A ¹	14.00 to 14.50 GHz
B ¹	13.75 to 14.50 GHz

¹ Available with optional BUC

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	
P	1RU N+1 Power Supply
L ¹	1RU N+1 Power Supply & Rear Exhaust Adapters

¹ Not available with Package options 'Y' or 'Z'

Configuration Modifier 2	
X	Standard
R ¹	Receive Band Reject Filter
V	Reflected Power Monitor
C ¹	V + R (see above)

¹ X-Band only

Configuration Modifier 1	
X	Standard
S	Input Sample Port

System Configuration	
A	1:1 System, Input Switching, Internal control
B	1:1 System, Input Splitter, Internal control
C	1:2 System, Input Switching, RCP2-1200 ¹
D	1:2 System, Input Switching, Internal control
F	1:1 System, Input Splitter, RCP2-1100 ¹
H	1:1 System, Input Switching, RCP2-1100 ¹

¹ Standard location for RCP is directly above HPA1

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

See page 5 for BUC reference configuration options. **Option 1** is standard for all 1:1 and 1:2 systems using BUC option 'M' and for 1:1 systems with input splitting using BUC option 'P'. **Option 3** is standard for all 1:2 systems and 1:1 systems with input switching using BUC option 'P'.

COMMENTS:

Part Number Configuration, 6 RU GaAs SSPA

HPA C 6 8 0 0 A S M B S X P

Band	
C-Band	C

Rack Height	
6RU	6

Power Level (Watts)	
C-Band	800, 900, 1100 (11K)

Frequency Sub Band	
C-Band	
A ¹	5.850 to 6.425 GHz
B ¹	5.850 to 6.725 GHz
C ¹	5.750 to 6.670 GHz
E ¹	6.425 to 6.725 GHz
F ¹	6.725 to 7.025 GHz
G	5.750 to 6.475 GHz

¹ Available with optional BUC

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	
P	1RU N+1 Power Supply
L ¹	1RU N+1 Power Supply & Rear Exhaust Adapters

¹ Not available with Package options 'Y' or 'Z'

Configuration Modifier 2	
X	Standard
V	Reflected Power Monitor

Configuration Modifier 1	
X	Standard
S	Input Sample Port

System Configuration	
A	1:1 System, Input Switching, Internal control
B	1:1 System, Input Splitter, Internal control
C	1:2 System, Input Switching, RCP2-1200 ¹
D	1:2 System, Input Switching, Internal control
F	1:1 System, Input Splitter, RCP2-1100 ¹
H	1:1 System, Input Switching, RCP2-1100 ¹

¹ Standard location for RCP is directly above HPA1

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

See page 5 for BUC reference configuration options.
Option 1 is standard for all 1:1 and 1:2 systems using BUC option 'M' and for 1:1 systems with input splitting using BUC option 'P'.
Option 3 is standard for all 1:2 systems and 1:1 systems with input switching using BUC option 'P'.

COMMENTS:

Part Number Configuration, 2nd Generation 7 RU GaAs SSPA

HPA **C** **7** **1** **1** **K** **A** **S** **M** **B** **S** **X** **P** **2** ——— 2nd Generation

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

Rack Height	
7RU	7

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

Frequency Sub Band	
C-Band	
A ¹	5.850 to 6.425 GHz
B ¹	5.850 to 6.725 GHz
C ¹	5.750 to 6.670 GHz
E ¹	6.425 to 6.725 GHz
F ¹	6.725 to 7.025 GHz
G ¹	5.750 to 6.475 GHz
X-Band	
A ¹	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 ¹	14.00 to 14.50 GHz
B ¹	13.75 to 14.50 GHz

¹ Available with optional BUC

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	
P	1RU N+1 Power Supply
L ¹	1RU N+1 Power Supply & Rear Exhaust Adapters

¹ Not available with Package options 'Y' or 'Z'

Configuration Modifier 2	
X	Standard
R ¹	Receive Band Reject Filter
V	Reflected Power Monitor
C ¹	V + R (see above)

¹ X-Band only

Configuration Modifier 1	
X	Standard
S	Input Sample Port

System Configuration	
A	1:1 System, Input Switching, Internal control
B	1:1 System, Input Splitter, Internal control
C	1:2 System, Input Switching, RCP2-1200 ¹
D	1:2 System, Input Switching, Internal control
F	1:1 System, Input Splitter, RCP2-1100 ¹
H	1:1 System, Input Switching, RCP2-1100 ¹

¹ Standard location for RCP is directly above HPA1

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

See page 5 for BUC reference configuration options. **Option 1** is standard for all 1:1 and 1:2 systems using BUC option 'M' and for 1:1 systems with input splitting using BUC option 'P'.

Option 3 is standard for all 1:2 systems and 1:1 systems with input switching using BUC option 'P'.

COMMENTS:

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Data Security: Teledyne Paradise Datacom amplifiers and controllers do not inherently provide encryption to transmitted data, and have limited security measures to protect it. If the unit will be accessible over the Internet, exercise appropriate data security protocols. Teledyne Paradise Datacom strongly recommends placing the equipment behind a protective Firewall or setting up a VPN link with dual authentication for remote access.

Specifications are subject to change without notice.