



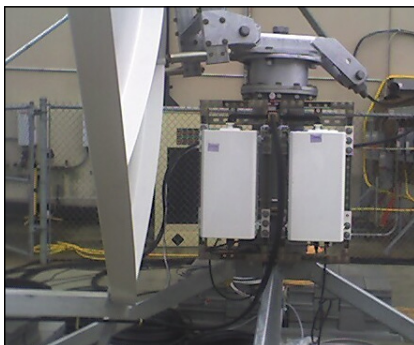
**125W Ku-Band Compact Outdoor SSPA**

## Description

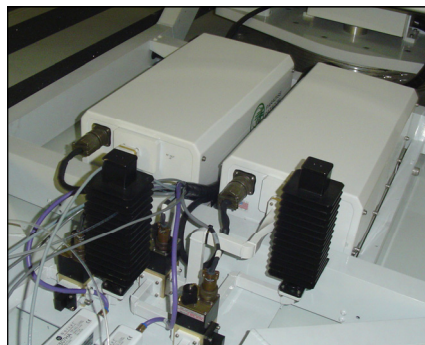
The Teledyne Paradise Datacom Compact Outdoor Solid State Power Amplifier (SSPA) is built for extreme environmental conditions and high reliability operation. Along with the robust construction exists the highest power density in the industry. This allows solid state technology to be used in applications that have long been reserved for TWTAs.

At less than 40 lbs. (18 kg), and only slightly larger than a shoe box, this family of SSPAs is available in output power levels in the following range:

**C-Band: 100W - 300W**  
**X-Band: 200W**



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-STD-461 Compliant
- Integrated forced-air cooling system
- Adjustable RF Gain, 55 dB to 75 dB
- 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
- Hot/Cold Standby operating modes for reduced power consumption

## OPTIONS

- Extended band operation
- Antenna Mounting Kit
- DC Operation (48VDC)
- Remote Control Panel
- L-Band Input
- Phase Combined Systems
- Reflected Power Monitor
- Low line voltage operation
- Optional side-mount AC input for SNG installations

## SPECIFICATIONS

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

## Specifications, C-Band SSPAs

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	Frequency selection "A" Frequency selection "B" <sup>2</sup> Frequency selection "C" <sup>3</sup>	5.850 to 6.425 5.850 to 6.725 5.750 to 6.670	GHz GHz GHz
Output Power @: Saturation/ $P_{1dB}$ (Typical/Guaranteed minimum)	HPAC2100ACXXXXX HPAC2140ACXXXXX HPAC2200ACXXXXX HPAC2250ACXXXXX HPAC2300ACXXXXX	$P_{sat} / P_{1dB}$ 50.0 (100) / 49.5 (89) 51.5 (141) / 51.0 (126) 53.0 (200) / 52.3 (170) 54.0 (250) / 53.0 (200) 54.7 (300) / 54.0 (251)	dBm (W) dBm (W) dBm (W) dBm (W) dBm (W)
Power Requirements Line Frequency Line Power (Voltage) (typical @ 220 VAC)	power factor corrected  HPAC2100ACXXXXX HPAC2140ACXXXXX HPAC2200ACXXXXX HPAC2250ACXXXXX HPAC2300ACXXXXX	47 to 63 750 (90-265) 875 (180-265) <sup>1</sup> 1300 (180-265) <sup>1</sup> 1500 (180-265) <sup>1</sup> 1675 (180-265) <sup>1</sup>	Hz W (VAC) W (VAC) W (VAC) W (VAC) W (VAC)
Receive Band Noise Power Density	without filter	- 155	dBW / 4 KHz

**Note 1:** Available with low line voltage option, 90 to 265 VAC.

**Note 2:** De-rate output power by 1.0 dB linearly from 6.425 to 6.725 GHz.

**Note 3:** De-rate output power by 1.0 dB linearly from 5.850 to 5.750 GHz and by 1.0 dB linearly from 6.425 to 6.670 GHz.

## Specifications, X-Band SSPAs

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range	(see options for extended band)	7.900 to 8.400	GHz
Output Power @: Saturation/ $P_{1dB}$ (Typical/Guaranteed minimum)	HPAX2200ACXXXXX	$P_{sat} / P_{1dB}$ 53.0 (200) / 51.8 (170)	dBm (W)
Power Requirements Line Frequency Line Power (Voltage) (typical @ 220 VAC)	power factor corrected  HPAX2200ACXXXXX	47 to 63 1425 (180-265) <sup>1</sup>	Hz W (VAC)
Receive Band Noise Power Density	without optional filter with optional filter	- 85 - 155	dBW / 4 KHz dBW / 4 KHz
Frequency Sub-Band Power De-rating 7.70 to 8.40 GHz	De-rate output power by 1.0 dB linearly from 7.90 to 7.70 GHz		

**Note 1:** Available with low line voltage option, 90 to 265 VAC.

Continuous operation at saturated power can negatively impact the life of the amplifier and will not be covered by warranty. Normal operating output should be limited to  $P_{1dB}$  (1dB backed off from the full rated power,  $P_{sat}$ ).

## 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
Gain Slope	per 40 MHz	± 0.3	dB/40 MHz
Gain Variation vs. Temperature	-30 °C to +50 °C	± 1.5	dB
Gain Stability	at constant temperature	± 0.25	dB/24 hours
Gain Adjustment	0.1 dB resolution	20	dB
Intermodulation Distortion	@ P <sub>1dB</sub> - 3 dB	-25	dBc
AM/PM Conversion	@ rated P <sub>1dB</sub>	3.5	°/dB
	@ P <sub>1dB</sub> - 1 dB	1.5	°/dB
	@ P <sub>1dB</sub> - 2 dB	1.0	°/dB
Spurious Harmonics (SSPA only)	@ rated P <sub>1dB</sub>	-65	dBc
	@ rated P <sub>1dB</sub> - 3 dB	-50	dBc
Input/Output VSWR		1.30:1	
	Extended C-Band	1.50:1	
Group Delay (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	TX Band	-75	dBW/4 KHz
Output Power Density	RX Band	-150	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 (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
RF Power Detector	P <sub>sat</sub> to (P <sub>sat</sub> - 20 dBm)	20 ± 1.0	dBm

## Environmental Specifications

PARAMETER	NOTES	LIMITS	UNITS
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	IP54	
Audible Noise	Measured 1m from unit, at P <sub>sat</sub>	74	dBA
Altitude	No temperature de-rating up to 10,000 ft. (3000 m) 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		

## 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:

- Autosensing zBUC includes an internal reference but will switch to an external reference if applied;
- Internal high stability (10 MHz) reference; will lock to externally supplied (10 or 50 MHz) reference;
- 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
X	Sub-Band "A"	950 - 1450 MHz	6.950 GHz	7.900 - 8.400 GHz

### Electrical Specifications for Compact Outdoor SSPA with ZBUC converter

PARAMETER	NOTES	LIMITS			UNITS
Gain	Nominal setting	75			dB
Gain Flatness	full band (C-,X-bands)	± 2.0			dB
Gain Slope	per 40 MHz (C-,X-bands)	± 0.5			dB/40 MHz
Gain Adjusted Range		20			dB
Gain Stability	Typical C-Band Adj. Range -40 to +60 °C	60 - 80			dB
		± 1.5			dB
Phase Noise	Offset frequency from carrier	<u>Absolute max.</u>	<u>C-band (typ.)</u>	<u>X-band (typ.)</u>	
	10 Hz	-30	-60	-58	dBc/Hz
	100 Hz	-60	-74	-70	dBc/Hz
	1 KHz	-70	-84	-80	dBc/Hz
	10 KHz	-80	-100	-94	dBc/Hz
	100 KHz	-90	-105	-97	dBc/Hz
	1 MHz	-90	-125	-122	dBc/Hz
Spurious	In-Band Signal Related (C-Band) (Extended C-Band)	-50			dBc
	Close to Carrier Spurious (≤ 20 MHz)	-40			dBc
	Local Oscillator	-50			dBc
		-30			dBm
Transmit Band Noise	Tx Band at Maximum gain	-65			dBW/4kHz
Output Power Density					
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>			

## 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.

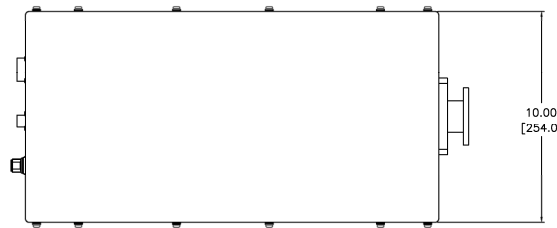


**Mechanical Specifications**

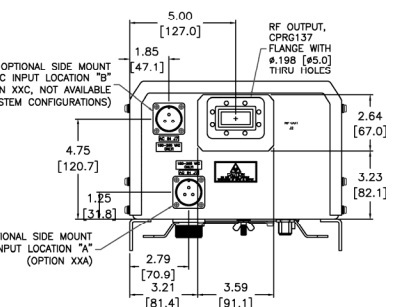
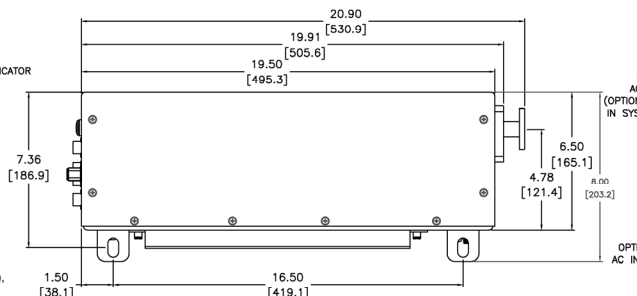
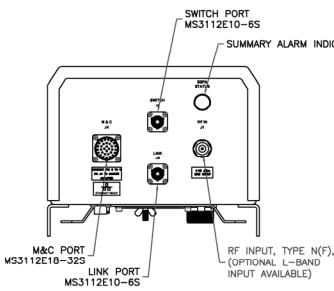
PARAMETER	NOTES	LIMITS	UNITS/DETAILS
Size	Width X Length X Height	10.0 X 19.5 X 6.50 254 X 495 X 165	inches mm
Weight	Base unit (< 200W C-Band) Base unit (≥ 200W C-Band) Base unit (≥ 200W X-Band) With Internal zBUC With 110 VAC Option With optional Tx Filter or Rx Reject Filter	36 (16.4) ± 3% 44 (20.0) ± 3% 54.9 (25.0) ± 3% +1.7 (0.8) + 1.2 (0.6) + 1.0 (0.5) ea.	lbs. (kg) lbs. (kg) lbs. (kg) lbs. (kg) lbs. (kg) lbs. (kg)
Finish		Paint	White; powder coat
Connectors	RF Input RF Output - C-Band RF Output - X-Band RF Output Sample Line Power Monitor and Control Link Port Redundancy Switch Auxiliary +15VDC LNB Power (500 mA)	Type N WR137 Waveguide WR112 Waveguide Type N 3-pin MS-type 32-pin MS-type 6-pin MS type 6-pin MS-type 6-pin MS-type	Female CPR137G flange (PDR-70) CPR112G flange (PDR-84) Female Plug Socket Socket Socket Socket

**Outline Drawing,  
 Compact Outdoor  
 SSPA (typical)**

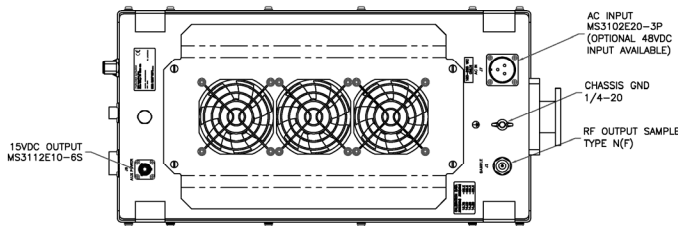
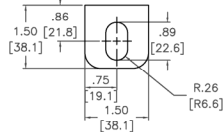
SUMMARY ALARM INDICATOR  
 OMITTED ON X-BAND UNITS



REFERENCE  
 L205509



**MOUNTING TAB DETAIL**



BAND	W/G OUTLINE	W/G DESCRIPTION
C		CPRG-137 FLANGE WITH Ø.198 [Ø5.0] THRU HOLES
X		CPRG-112 FLANGE WITH Ø.170 [Ø4.3] THRU HOLES

**Part Number Configuration Matrix**

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

Band	
C-Band	<b>C</b>
X-Band	<b>X</b>

Generation	
Second	<b>2</b>

Power Level (Watts)	
C-Band	<b>100, 140, 200, 250, or 300</b>
X-Band	<b>200</b>

Frequency Sub Band	
C-Band	
<b>A<sup>1</sup></b>	5.850 to 6.425 GHz
<b>B<sup>1</sup></b>	5.850 to 6.725 GHz
<b>C<sup>1</sup></b>	5.750 to 6.670 GHz
X-Band	
<b>A<sup>1</sup></b>	7.90 to 8.40 GHz

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

Package	
<b>C</b>	Standalone amplifier

Configuration Modifier 3	
<b>X</b>	None (Standard)
<b>A</b>	Side-Mount AC Input, Location 'A'
<b>C<sup>1</sup></b>	Side-Mount AC Input, Location 'B'
<b>D</b>	48 VDC Input
<b>F</b>	Side-mount 48V Input, Location 'A'
<b>G<sup>1</sup></b>	Side-mount 48V Input, Location 'B'

<sup>1</sup> Standalone units only

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

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

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

<sup>1</sup> Available on C- and X-Band units ≥ 140W

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

Refer to the following specification sheets:

- 203581 for Redundant Systems
- 203582 for Phase Combined Systems

Block Up Converter	
<b>M</b>	Autosensing BUC
<b>X</b>	No BUC

**Example** - A standalone 200W GaAs C-Band Compact Outdoor SSPA with an optional internal reference block up converter is part number: **HPAC2200ACMXXXX**.

**COMMENTS:**

---

## Global Sales Offices

### U.S., Canada, Latin America

Teledyne Paradise Datacom  
11361 Sunrise Park Drive  
Rancho Cordova, CA 95742  
Tel: +1 (814) 954-6163  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

### Eastern Regional Sales Office

(Eastern U.S. & Latin America)  
RF Inquiries: John O'Grady, (848) 220-6464  
Modem Inquiries: Mike Towner, (470) 509-9941  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

### Western Regional Sales Office

(Western U.S. & Canada)  
Bruce Grieser  
Cell: +1 (480) 444-9676  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

### U.K. Office

Europe, Middle East, Africa  
Teledyne Paradise Datacom  
106 Waterhouse Lane,  
Chelmsford, Essex, England, CM1 2QU  
Tel: +44(0)1245 847520  
Tel: +44(0)1376 515636  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

### Asia Pacific

Tavechai Mektavepong  
Teledyne Paradise Datacom Thailand Office  
333, 20 C1 Fl., Lao Peng Nguan Tower 1,  
Vibhavadi-Rangsit Rd.,  
Chomphol, Chatuchak,  
Bangkok 10900  
Thailand

Tel: +66 2-272-2996  
Fax: +66 2-272-2997  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

### Beijing, China

Teledyne Paradise Datacom Representative Office  
Room 204, No.1 Building,  
No.9 Jiuxianqiao East Road,  
Chaoyang District,  
Beijing, China 100016

Tel: +86 13601251528  
[sales@paradisedata.com](mailto:sales@paradisedata.com)

**Use and Disclosure of Data:** This product is classified as EAR99 and is subject to U.S. Department of Commerce regulations. Export, reexport or diversion contrary to U.S. law is prohibited.

**Proprietary and Confidential:** The information contained in this document is the sole property of Teledyne Paradise Datacom. Any reproduction in part or as a whole without the written permission of Teledyne Paradise Datacom is prohibited.

**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.