



**40W Ka-Band
Compact Outdoor SSPA
with AC Input Option 'B'**

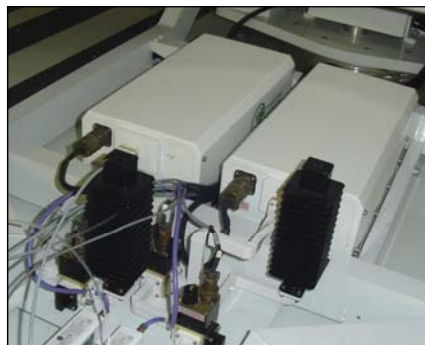
Description

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.

This Ka-Band SSPA weighs in at less than 44 lbs. (20.0 kg), and is only slightly larger than a shoe box.



Antenna-mount 1:1 system w/ mounting frame



SNG-mount 1:1 system w/ side-mount AC input

FEATURES

- Compact size and weight
- CE Compliance Tested
- Integrated forced-air cooling system
- Extreme Environmental Testing
- RF Output Sample Port
- Maintenance Free Operation
- Universal, Power Factor Corrected Power Supply
- Ethernet Interface
- RS-485
- Built-in 1:1 Redundancy Control
- Built-in Maintenance Switch Controller

OPTIONS

- Custom Frequency Sub-Bands
- Antenna Mounting Kit
- Remote Control Panel
- L-Band Input
- FSK monitor & control via IFL
- Phase Combined Systems
- 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
44.0 lbs. / 20.0 kg
- White powder coat finish
- Operating temperature:
-40 to +60 °C

Specifications, Ka-Band SSPAs

PARAMETER	NOTES	LIMITS	UNITS
Frequency Range		30.00 to 31.00	GHz
Output Power Typical @ P_{sat} Guaranteed min. @ P_{Linear}^1	HPAA2020ACXXXXX HPAA2040ACXXXXX	P_{sat} / P_{Linear} 43.0 (20) / 40.0 (10) 46.0 (40) / 43.0 (20)	dBm (W) dBm (W)
Power Requirements Line Frequency Line Power (Voltage) (typical @ 220 VAC)	power factor Line frequency HPAA2020ACXXXXX HPAA2040ACXXXXX	.91 47 to 63 @ $P_{sat} / @ P_{Linear}$ 425 / 350 (90 to 265) 850 / 700 (90 to 265)	Hz W (VAC) W (VAC)

Note 1: P_{Linear} is defined as the maximum output power at which third order intermodulation products are < -25 dBc (for two tones separated by 5 MHz) or where the spectral regrowth on a single QPSK at 1.5 x symbol rate or OQPSK at 1.0 x symbol rate is < -30 dBc.

Electrical Specifications

PARAMETER	NOTES	LIMITS	UNITS
Gain, with BUC without BUC	range range	50 - 70 50 - 60	dB dB
Gain Flatness	full band	± 2.0	dB
Gain Slope	per 40 MHz	± 0.3	dB/40 MHz
Gain Variation vs. Temperature	-40 °C to +55 °C	± 1.0	dB
Gain Stability	at constant temperature	± 0.25	dB/24 hours
Gain Adjustment, with BUC without BUC	0.1 dB resolution 0.1 dB resolution	20 10	dB dB
Single Carrier Spectral Regrowth for QPSK or OQPSK at 1.0x symbol rate	@ P_{Linear}	-30	dBc
AM/PM Conversion		2.0	°/dB
Spurious Harmonics (SSPA only)	(@ rated P_{sat}) (@ rated $P_{sat} - 3$ dB)	-60 -50	dBc dBc
Input/Output VSWR (Return Loss)	(30.0 - 31.0 GHz)	1.30:1 (17.7)	(dB)
Noise Figure	at maximum gain	20	dB
RX Band Noise Figure		-147	dBm/Hz
Group Delay (per 40 MHz segment)	Linear Parabolic Ripple	0.01 0.003 1.0	ns/MHz ns/MHz ² ns p-p
Residual AM Noise	0 - 10 KHz 10 KHz - 500 KHz 500 KHz - 1 MHz	-45 -20 (1.25 + log F) -80	dBc dBc dBc
Phase Noise (SSPA only)	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
RF Power Detector	P_{sat} to ($P_{sat} - 20$ dBm)	20 ± 1.0	dBm

Optional L-Band Operation

Teledyne Paradise Datacom offers Ka-Band amplifiers with an integrated L-Band Block Up Converter. The L-Band units utilize Paradise Datacom's proprietary zBUC[®] technology. The addition of a zBUC converter to a Compact Outdoor SSPA typically increases the gain by 2-4 dB. The advantages of zBUC technology include:

- zBUC converters can detect and switch to an externally supplied reference.
- Optional internal high stability (50 MHz) reference.
- zBUC converters can lock to an externally supplied reference of 10 or 50 MHz.
- zBUC converters can accept a wide range of external reference power (-10 to +5 dBm)
- zBUC converters can accept FSK monitor and control signal via the IFL for complete amplifier remote control.

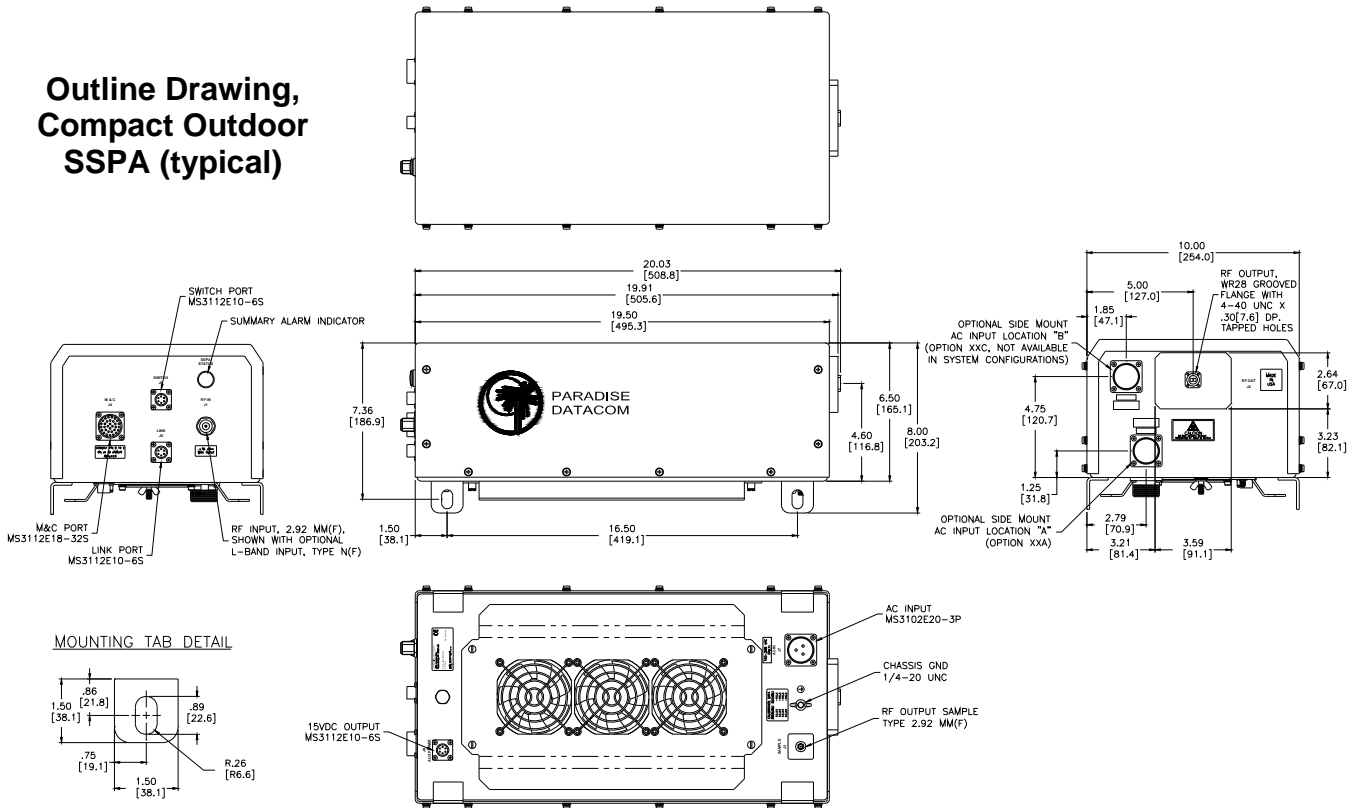
Available Frequency Plans

Band	Frequency Band	IF Input	LO Frequency	RF Output
Ka	Standard Ka-Band	1.0 - 2.0 GHz	29.0 GHz	30.00 - 31.00 GHz

Electrical Specifications for Compact Outdoor with zBUC converter

PARAMETER	NOTES	LIMITS		UNITS
Gain	Nominal setting	70		dB
Gain Flatness	Full band	± 2.0		dB
Gain Slope	per 40 MHz	± 0.75		dB/40 MHz
Gain Stability	-40 to +55 °C	± 2.5		dB
Phase Noise	Offset frequency from carrier	<u>Absolute max.</u>	<u>Ka-band (typ.)</u>	
	10 Hz	-30	-50	dBc/Hz
	100 Hz	-60	-65	dBc/Hz
	1 KHz	-70	-76	dBc/Hz
	10 KHz	-80	-85	dBc/Hz
	100 KHz	-90	-105	dBc/Hz
Spurious	In-Band Signal Related	-50		dBc
	Close to Carrier Spurious (≤ 20 MHz)	-50		dBc
	Local Oscillator	-30		dBm
Noise Figure	At 60 dB gain setting	20		dB
Input VSWR (Return Loss)	L-Band	1.5 : 1 (13.9)		(dB)
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		

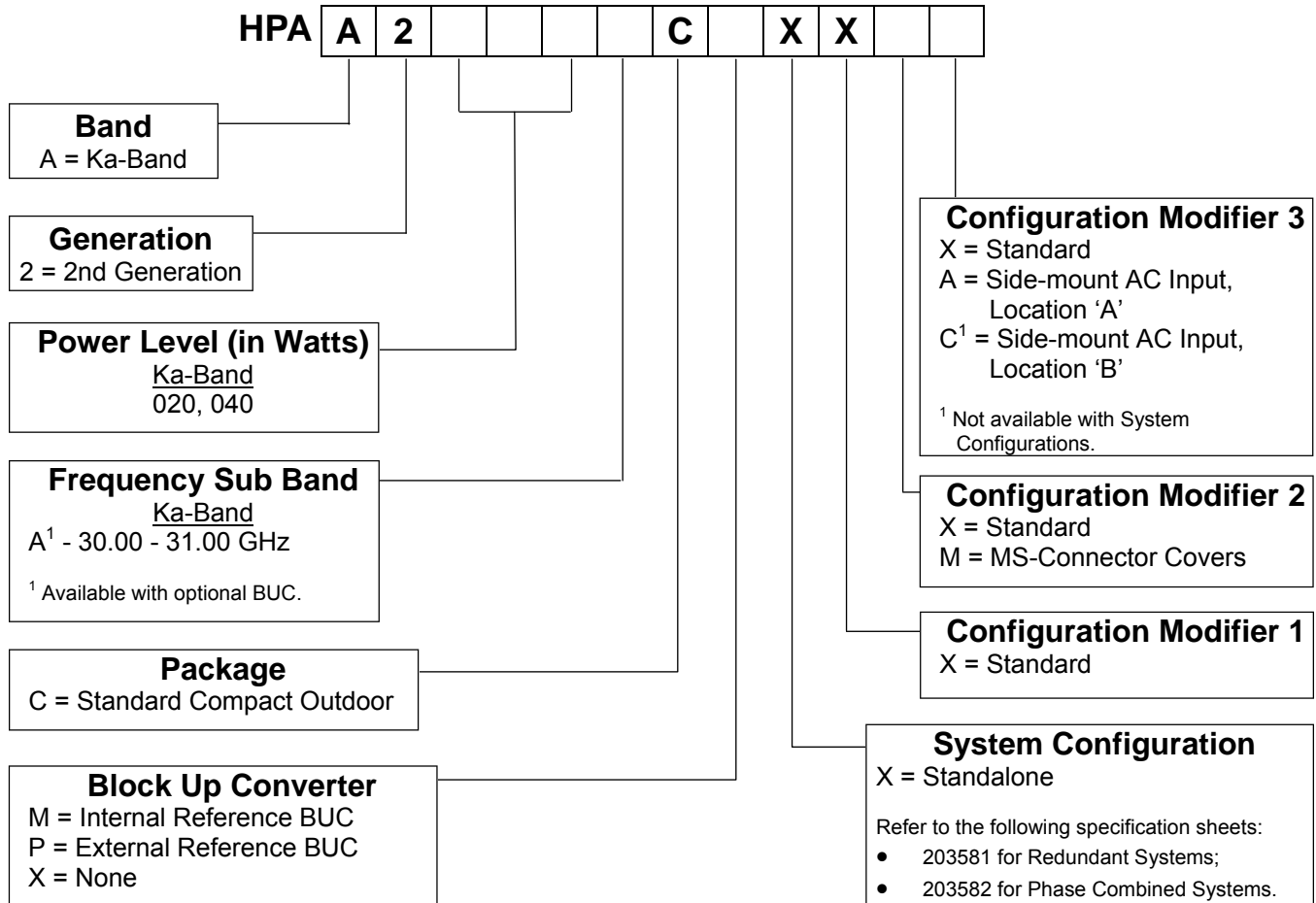
Outline Drawing, Compact Outdoor SSPA (typical)



Mechanical & Environmental Specifications

PARAMETER	NOTES	LIMITS	UNITS
Size	width X length X height	10.0 X 19.5 X 6.50 254 X 495 X 165	inches mm
Weight	With Internal zBUC	44 (20) ± 3% +1.7 (0.8)	lbs. (kg) lbs. (kg)
Finish		Paint	White; powder coat
Connectors	RF Input L-Band Input RF Output RF Output Sample Line Power Monitor and Control Link Port Redundancy Switch Auxiliary +15VDC LNB Power (500 mA)	2.92 mm Type N WR28 Waveguide 2.92 mm 3-pin MS-type 32-pin MS-type 6-pin MS type 6-pin MS-type 6-pin MS-type	Female Female Grooved Flange Female Plug Socket Socket Socket
Operating Temperature	Ambient	-40 to +60	°C
Storage Temperature	Ambient	-50 to +75	°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 _{sat}	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		

Part Number Configuration



Example: A standalone 40W Ka-Band (30.0-31.0 GHz) Compact Outdoor SSPA with optional MS-Connector covers is part number: **HPAA2040ACXXXM**.

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