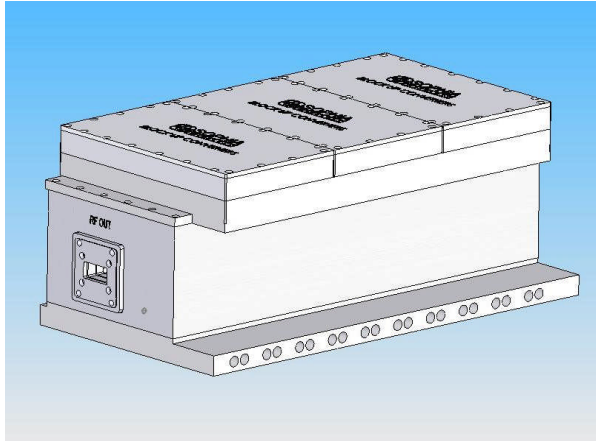


COMM-SSPA100 Ultra-compact 100 Watt (120 Watt Sat.) Ku band SSPA

13.0-18.0 GHz SSPA Outdoor and Component Unit



KEY FEATURES:

- Ideal for TWTA replacement
- Remarkably Small Size:
11.5"x6.0"x4.5", 10 lbs. (component configuration with power supply)
11.5 x 6.75 x 7.75" , 18 lbs. (outdoor configuration)
- Highest efficiency in 13.75-15.0 GHz band, but good power available over 13.0 to 18.0 GHz
- Ultra efficiency:
 - 480W consumption (@120W RF out) typical for component unit
- Forward/Reverse Power Monitor & Control processor
- Gain vs. Temp. compensation
- Integrated heat-pipe baseplate
- Fully environmentally sealed
- Internal DC/DC power supply accepts wide 18-55VDC input

Product Description:

Sophia Wireless' new 120W Ku band SSPA makes a huge leap forward in efficiency and size for high-powered Solid State Power Amplifiers. The typical saturated efficiency is 24%, including fans and power supply parasitic power drain. Minus the fans and power supply, the core SSPA approaches 30% peak efficiency at 120 Watts output.

This remarkable and unprecedented high-power efficiency allows the COMM-SSPA100 to produce large power outputs from a very small space, producing very little heat. This solves a wide array of problems, from heat build-up under radomes or in rack assemblies, excessive weight, and eliminates bulky, heavy SSPAs. At 10lbs. in component form and 18lbs. with cooling fins/fans, it greatly reduces system size.

Furthermore, the industry-leading efficiency greatly reduces heat generation and power consumption, greatly simplifying system integration challenges.

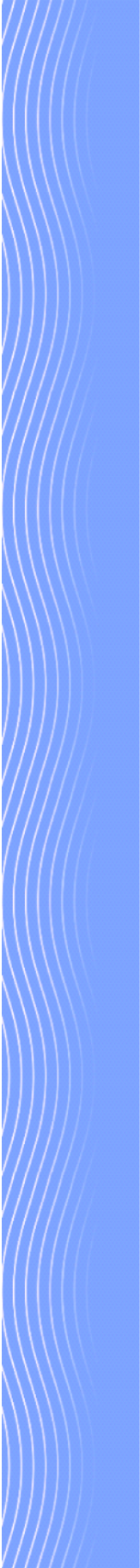
TWTA replacement

A key target application for the COMM-SSPA100 is replacement and retrofitting for TWTA (Traveling Wave Tube Amplifiers) applications. The compact size and high efficiency matches that of TWTAs, allowing a form-fit-function drop-in replacement. Please contact our factory about options for a custom cooling and enclosure/connector attachments which can be designed to exactly replicate the external interfaces of your current TWTA.

Conversion from TWTA to SSPA (while maintaining the same power output, efficiency and size) brings many benefits, including higher reliability, eliminating tube replacement and service. Also, greatly reduced noise floor (by 20 to 40 dB in many applications), elimination of warm-up time (SSPA turn-on is <200ms), and elimination of high-voltage power supply, and elimination of vibration sensitivity.

Most importantly, conversion to SSPA often brings large reduction in cost. A 40% cost reduction is typical in most applications due to the inherently lower cost of solid state.

Integrated Power Supply



The SSPA includes an integrated DC/DC power supply which accepts a wide range of input voltages from 18 to 55 VDC. This is co-located with the power amplifier section to eliminate losses in high-current power paths and reduce drain bias line inductance.

Fan cooling and options - perfectly flexible in application:

The base component-type configuration is a component-only configuration which has the power supply but requires external cooling. Option FA is an optional fan-cooling accessory; when combined with the component unit, this forms a complete, plug-and-play outdoor unit. In all cases this component unit is also fully environmentally sealed and ready for outdoor use.

Customized cooling, mounting, and interconnect accessories are available to give a customized rack mounted solution; please contact the factory. Rack units feature forced air cooling systems and may be configured for front-to-front recirculation of air, rear-to-rear, or flow-through with front to rear or rear to front.

Note that due to the extremely high efficiency, thermal dissipation under 400Watts is typical, so the cooling system design is much smaller and simpler than the typical power dissipation in a competitive 120Watt SSPA approaching a kilowatt or more.

For the component configuration, the bottom surface is the thermal interface for conductive cooling. This flat surface is an aluminum plate with 20 embedded heat pipes, giving excellent uniformity of temperature across the surface. This greatly simplifies thermal attachment and reduces the risk of hot spots causing larger rise-above-ambient than expected.

1 x 1 redundancy system

Because of the remarkably small size and low weight of the Sophia SSPA, it is perfect for redundant systems, where multiple units can be fit into the same space normally reserved for one conventional-sized unit.

This unit is available as a 1 x 1 redundancy system, please see the data sheet for the Sophia RDY-1100 rack mounted redundancy controller, which includes system diagrams and mounting instruction and dimensions. 2 x1 and more complex systems are available, please contact factory for details.

Features:

These units offer 50dB minimum gain with temperature compensation, output power monitor with RS422 (serial communication) readout, monitor & control processor, discrete transmit/mute control, fault protection and reporting for over-temperature, over-voltage or over-current. For component units, a thermal-data system is available for Windows computers to connect to the serial port which reports internal temperatures at thermistors located at a dozen locations throughout the amplifier, helping to assess the performance of cooling systems and identify any hotspots or problems due to poor thermal contact.

Performance Features:

The temperature compensation circuitry minimizes gain & linear power variations, and the output power monitor simplifies system power settings.

Safety controls include thermal & bias protection to ensure reliable performance from initial system integration to harsh field environments.

Monitor & Control Functions:

The monitor & control processor interfaces with a host computer over a serial communications link. All voltage, current, power, and temperature sensors are read through this interface, including output power monitoring. The transmit/mute control is opto-isolated for trouble-free system integration. The RS422 port communications run at 9600 baud, 8-bit word, no parity, and 1 stop bit, using a custom protocol (see ICD-COMM-SSPA100.pdf for specifics of the communications protocol)

The monitor & control also provides safety features such as over-temperature fault modes, automatically shutting down the SSPA and reporting these fault conditions over the serial link.

Simplifying Heat Management:

The industry-leading efficiency greatly reduces power dissipation, thereby reducing heat generation.

With the component base, an integrated heatpipe baseplate provides even distribution of the heat load over the entire baseplate surface, eliminating hotspots and greatly simplifying the system thermal management. The optional fan cooler accessory then evenly distributes this heat to the fins, giving extremely low temperature rise above ambient.

Environmental Sealing:

Unlike many component-style (“indoor”) amplifiers, the core component unit is fully o-ring sealed, providing a higher level of reliability and immunity to moisture and dust. The unit may be mounted outdoors or exposed outside a radome and is fully qualified for all-weather operation.

Electrical & Mechanical Specifications:

RF Parameters	Specification					
Frequency Band	13.0-13.75	13.75-14.5	14.5-15.0	15.0 - 16.0	16.0-16.5	16.5 – 17.5 GHz
Rated Power Output*						
P1dB	80W	100W	100W	80W	72W	40W
Psat	95W	120W	120W	95W	85W	48W
AM/PM Conversion @ 2dB below rated power	2.5°/dB					
F & R Power Monitor (15 dB Range) @CF	+/- 0.25 dB					
Gain (min.)	53dB	56dB	50dB	46dB	45 dB	40dB
Gain Variation over .5 GHz	8 dB max.	5 dB max.	6 dB max.	7 dB max.	7 dB max.	10 dB max.
Gain Variation over any 40MHz	2 dB max.	1.5 dB max.	1.5 dB max.	2 dB max.	3 dB max.	3 dB max.
Gain Variation over Temperature	3 dB max.					
Gain variation over Time	.5dB per day					
Noise Figure in-band	12dB	12dB	12dB	12dB	12dB	12dB
Input VSWR	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	2:1
Output VSWR: <i>with optional output isolator (derate power by 0.4dBm):</i>	2:1	2:1	2:1	2.3:1	2.3:1	2.3:1
	1.4:1	1.4:1	1.4:1	1.4:1	1.4:1	1.4:1
Spurious	-60dBc					
2 nd Harmonic @ 3dB below rated pwr.	-45dBc					
3 rd Order IMD @ 3dB max. backoff from rated pwr.	-25dBc					

Specifications subject to change without notice 3/14/07

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Monitor & Control Parameters	Specification
Discrete Mute Control Voltage ranges	mute:0-1.0V; enable:4.0-5.0V; has internal 10kohm pull-up to +5V
Thermal Shutdown Control threshold	+85 °C
Temperature Monitor Accuracy	+/- 3 °C
Summary Fault Monitor	
Input Power Parameters	Specification
Input voltage range	18-55 VDC
Total Power consumption (typ.), (including DC/DC power supply parasitic losses): At quiescent (small signal): At saturated output:	350 Watts 480 Watts
Additional power draw of fan cooler accessory:	48 Watts
Environmental/Physical Parameters	Specification
Operating Temperature	-40° C to +70° C in SSPA bottom surface
Humidity	100% condensing
Altitude	Component unit does not have altitude limit. Fan cooler 10000 feet for full ambient temp. range (for higher altitudes, operation at cooler temperatures is acceptable, please contact factory)
Storage Temperature	-54 to +105°C
RF input connector	Type N
RF output connector	WR-75 (WR-62 above 15.5GHz)
Power Connector	AMPHENOL 10-194922-22P, 4 pins.
Monitor/Control Connector	MIL-26482 Series 1 receptacle, Shell size 12, 10 pins
Dimensions	Component configuration: 11.5"x6.0"x4.5" Outdoor configuration, With Fan Cooling system: 11.5 x 6.75 x 7.75"
Weight	Component configuration: 10 lbs. Outdoor configuration, With Fan Cooling system: 18 lbs.

* at room temperature ambient

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