



## T-1000

1-kW Transmitter System

## T-500

500-W Transmitter System



Sunair provides the robust solution for mission-critical communications applications requiring reliable coverage. The transmitter system combines a solid-state radio (exciter or transceiver), RF power amplification, and control technology to produce a fail-safe high-power solution that operates in the 1.5 MHz to 30 MHz frequency range.

### 1-kW System

The Sunair 1-kW System is supplied as an integrated system consisting of the Sunair RT-9000E Software-Defined Next Generation HF SSB/ISB Transceiver or T-9000E Software-Defined Next Generation HF SSB/ISB Transmitter, the F-9810 Post-selector, and the LPA-9600 1-kW Power Amplifier. Maximum power output is 1 kW at 100% duty cycle to facilitate long-range communications when coupled with the appropriate antenna system. Output power is reducible to 500 W. Standard input voltage is 115 / 230 Vac  $\pm 15\%$ ; 50 / 60 Hz; single phase, with a modest power requirement of  $\leq 4.6$  kVA.

The amplifier architecture consists of four RF/PS modules producing over 300 W each, allowing the LPA-9600 to deliver conservative averages of 1000 or 500 W. The radio, whether a T-9000E or RT-9000E, actively monitors system balance and performance, providing power control and safety shutdown in the event of internal module failure, system failures, or external failures such as high antenna VSWR (as well as antenna short or open circuit)

Advanced built-in-test (BITE) capability reports the status of the Sunair 1-kW System down to the Lowest Replaceable Unit (LRU) level providing English messages on the display of the radio, whether T-9000E or RT-9000E, and then to a remote site when configured. Individual LRU fault indication and the system's intuitive modular design allows for ease of maintenance and upgrade throughout the equipment life cycle at minimal expense. These high-performing niche products are in daily service as integral components of critical strategic communications solutions for leading defense, peacekeeping, and aviation agencies around the world.

### 500-W System

The Sunair 500 W system includes all of the features of the 1-kW system above but uses an LPA-9500 in place of the LPA-9600. Maximum power output is 500 W at 100% duty cycle to facilitate long-range communications when coupled with the appropriate antenna system. Standard input voltage is 115 / 230 Vac  $\pm 15\%$ ; 50 / 60 Hz; single phase, with a modest power requirement of  $\leq 2.1$  kVA.

### Rack Mounting

Either Sunair system can be rack mounted into your existing racks using offered rackmount kits. Another option is for Sunair to provide a portable rack that is completely wired and set up to install the components at the destination site. Or, you can specify a rack and Sunair can prepare it for your system.

- High efficiency solid state design
- Full power into load VSWR up to 2:1
- Comprehensive BITE to LRU



## GENERAL

General performance:	Complies with the performance requirements in MIL-STD-188-141C, MIL-STD-203-1A and STANAGs 4203, 5031, 5511 and 5522
Frequency range:	1.5 MHz – 30 MHz
Frequency accuracy and stability:	Frequency accuracy is better than $\pm 3$ Hz. The stability of any selected carrier frequency is within $\pm 1$ parts in $10^{-7}$ after a warm up period of 30 minutes. It does not vary more than $\pm 1$ part in $10^{-6}$ after a warm up period of 2 hours. The stability does not degrade by more than $\pm 5$ parts in $10^{-6}$ for each 30-day period.
Duty cycle:	Continuous (100 %); designed for unattended continuous operation
Tuning steps:	1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, or 1 MHz
Transmit activation and frequency settling time	7 ms maximum for 90% output power
Modes of operation:	AME, NB-FM, USB, LSB, ISB, CW; data modes such as STANAGs 4285, 4529, 4259, 4481, 4539, 4415, and 4203, RATT, FSK WIDE SHIFT, FSK NARROW SHIFT, Link 11 / 22 and MIL-STD-188-110 A / B with optional internal modem or external modems
Keying:	Local or remote
Programmable channels:	250 channels on non-volatile memory; storing channel frequency (simplex and half duplex), modulation mode, output power level, and peripherals.
Remote control:	Through RCU-9310E or Pathfinder II
Post-selector operation:	Automatic with F-9810 bypass between 1.5 MHz and 1.6 MHz
Tuning control:	Initiated by T-9000E or RT-9000E and digitally controlled; no further operator intervention required
Input voltage:	115 / 230 Vac $\pm 15$ %; 50 / 60 Hz; single phase
Energy consumption:	$\leq 4.6$ kVA (T-1000) $\leq 2.1$ kVA (T-500)
Metering:	TFT display on T-9000E or RT-9000E; analog metering on LPA-9600 or LPA-9500 unit; via remote control
BITE:	Power up, surveillance, and operator-initiated; fault isolation to the module level; reporting and resetting through T-9000E, RT-9000E, and remote control
MTBF:	11,100 hours
MTTR:	60 minutes with spares at hand
Module dimensions:	RT-9000E or T-9000E: H: 5.96 in / 15.1 cm; W: 17.83 in / 45.3 cm; L: 17.66 in / 44.9 cm LPA-9500 or LPA: 9600: H: 15.75 in / 40.0 cm; W: 17.88 in / 45.4 cm; L: 19.0 in / 48.3 cm F-9810: H: 1.75 in / 4.4 cm; W: 19.0 in / 48.3 cm; L: 19.0 in / 48.3 cm Rack: To be determined by client requirements
Module weight:	RT-9000E or T-9000E: 49 lbs / 22.3 kg LPA-9500: 71 lbs / 32 kg LPA: 9600: 90 lbs / 40.9 kg F-9810: 12 lbs / 5.5 kg Rack: To be determined by client requirements
Construction:	Modular plug-in assemblies, field serviceable
Origin:	Designed and manufactured in the U.S.A.

## ACCESSORIES & PERIPHERALS

Spares kits:	Running spares, field modules, final tested sub-units
Tools:	Card Extractor, board extenders
Antenna coupler	CU-9150

## RECEIVER (if using the RT-9000E)

Selectivity	<ul style="list-style-type: none"> <li>SSB / ISB: 300 – 3300 Hz @ 6 dB</li> <li>CW: 500 Hz @ 3 dB, centered at 1 kHz</li> <li>AME: <math>\pm 3000</math> Hz @ 6 dB</li> <li>NB FM: <math>\pm 5000</math> Hz @ 6 dB</li> </ul>
Sensitivity	<ul style="list-style-type: none"> <li>SSB / ISB: 0.5 <math>\mu</math>V for 10 dB (S+N)/N</li> <li>CW: 0.3 <math>\mu</math>V for 10 dB (S+N)/N</li> <li>AME: 3.0 <math>\mu</math>V for 10 dB (S+N)/N</li> <li>NB FM: 1.0 <math>\mu</math>V for 10 dB (S+N)/N</li> </ul>
Audio output	<ul style="list-style-type: none"> <li>5 W into internal speaker, <math>&lt; 1</math> % THD</li> <li>600 <math>\Omega</math>, balanced @ -20 dBm to +10 dBm</li> <li>Headset: low impedance</li> </ul>
Audio response	$\pm 2$ dB from 300 Hz to 3300 Hz
Image & IF rejection	90 dB minimum
Spurious rejection	80 dB minimum
IMD (IP3)	$> 20$ dBm
Intermodulation suppression	Not less than 32 dB
AGC attack time	10 ms nominal
AGC release time	<ul style="list-style-type: none"> <li>Fast: 23 ms nominal</li> <li>Medium: 200 <math>\pm</math> 100 ms nominal</li> <li>Slow: 3 <math>\pm</math> 1 second nominal</li> </ul>
AGC range	100 dB
AGC control	No more than 6 dB change for signal inputs from -100 dBm to 0 dBm; 4 dB for signal inputs from -90 dBm to 0 dBm
BFO	$\pm 1.99$ kHz (1 Hz, 10 Hz, or 100 Hz tuning steps)
Scan	Manual or automatic
Squelch	Syllabic
Antenna input protection	100 V Peak to Peak (53 dBm), self-resetting
Internally generated spurious	99.5 % of available frequencies from 100 kHz to 30 MHz, at or below 0.5 $\mu$ V equivalent input at antenna terminal

## TRANSMITTER

Intermodulation Distortion	36 dB below PEP
Harmonic Distortion	60 dB below PEP
RF Output Impedance	50 ohms, nominal, unbalanced to ground
Output impedance:	50 ohms, nominal, unbalanced
Output connector:	Type N
Input VSWR	2:1 maximum
Power output and VSWR performance:	<ul style="list-style-type: none"> <li>1 kW or 500 W (selectable) PEP and average <math>\pm 1</math> dB for performance;</li> <li>Reduced power for VSWR <math>\leq 3:1</math>; self-protected from open / short circuits</li> </ul>
Indicators	Power on, Fault, metering, and LCD
Metering	Forward power, reflected power, PA voltages, and PA currents

## ENVIRONMENTAL

Temperature:	<ul style="list-style-type: none"> <li>Operating: -20 °C to 45 °C (-4 °F to 113 °F)</li> <li>Reduced duty cycle: 45 °C to 55 °C (113 °F to 131 °F)</li> <li>Storage: -40 °C to 85 °C (-40 °F to 185 °F)</li> </ul>
Humidity:	95% @ +55 °C, non-condensing
Altitude:	<ul style="list-style-type: none"> <li>Operating: up to 10,000 feet</li> <li>Storage: up to 40,000 feet</li> </ul>
Cooling:	Fan cooled (radio and amplifier)
Air Source and Volume:	Clean filtered air
Exhaust Air:	Through top or rear of cabinet; external exhaust recommended

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Specifications subject to change without notice or obligation. Rev. 1 (April 2023)

US export control laws may apply to some options