



RT-9000E

Next Generation
Software Defined
LF/MF/HF Transceiver



The Sunair RT-9000E is a proven solution in communications applications requiring rugged, reliable, and flexible equipment. This next generation transceiver operates continuously (100% duty cycle) with a 125 W PEP and average output in AME, NB-FM, USB, LSB, ISB, CW, Data, or MELPe-based Digital Voice modes. The RT-9000E uses software-defined digital signal processing (DSP) technology, which supports the latest developments in high-speed waveform processing. This technology enhances the functionality of the CPU as well as the Synthesizer, Audio, and IF stages. The radio offers Automatic Link Establishment (ALE) as an internal option in accordance with MIL-STD-188-141 A/B/C, FS1045A, and S4538 as well as remote control and programming via Ethernet or serial port. A serial port connector on the front panel allows for changes in the unit's configuration.

With a factory-installed option, the Sunair RT-9000E complies with MIL-STD-188-203-1A and STANAG 5511/5522 (TADIL-A/Link 11 and NILE/Link 22) for data link operation. The RT-9000E is also compatible with MIL-STD-188-110 A/B/C and STANAG HF modem waveforms. The radio can accommodate Type 1 encryption such as ANDVT, KY-99, KG-84(), and KG-40 as well as commercial privacy devices or optional internal MELPe digital voice F/W with DES 56, AES 128 & AES 256 encryption functions. The RT-9000E design allows it to accommodate single or split-site operation as transmitter-only or receiver-only (T-9000E or R-9000E). The audio interface supports analog or VoIP connections.

- **Analog or VoIP audio interface**
- **VoIP ATM ED-137B**
- **Software-Defined SSB and ISB configurations**
- **DSP-based syllabic squelch and tone squelch**
- **Remote control via RS-232/422/485 and Ethernet**
- **Comprehensive BITE to LRU**
- **Internal 115/230 Vac power supply**
- **Data Link - MIL-STD-188-203-1A TADIL A and Link 11/22 (factory installed option)**
- **HF Data - MIL-STD-188-110 A/B/C and STANAG**
- **ALE - 2G MIL-STD-188-141 A/B/C and 3G STANAG 4538**
- **Secure Digital Voice (MELPe S4591)**
- **500 W, 1 kW, 5 kW and 10 kW LPAs**
- **150 W and 1 kW antenna couplers**

A large TFT display with wide viewing angle (>45° from normal) shows the unit's operating status in English, while its advanced built-in-test (BITE) capability provides feedback to the lowest replaceable unit (LRU) level providing English messages on the display and internal LED indications. The RT-9000E can operate from both ac and dc voltage sources, while its internal power supply minimizes undesirable RFI and EMC effects.

The radio's intuitive modular design allows for ease of maintenance, expansion, and upgrade throughout the equipment life cycle at minimal expense. Thousands of these radios are in daily service as integral components of critical strategic communications solutions worldwide.

GENERAL

Frequency Range	RX: 10 kHz – 30 MHz TX: 1.5 MHz – 30 MHz
Frequency Stability	$\pm 1 \times 10^{-8}$ per day after a warm up period of 30 minutes
Programmable Channels	250, Simplex or Half-Duplex
Modes of Operation	CW, AM, SSB, ISB, FSK, Data Mode
Data Bandwidth	Up to 24 kHz
Key	Local or remote
Memory Retention	Non-volatile
Scan	Manual or automatic
Analog Audio Interface	Front panel MIC and PHONE jacks, 600-ohm line, and VoIP
BFO	± 1.99 kHz, 1 Hz resolution
Synthesizer Lock	10 ms maximum
Synthesizer Tuning Step	1 Hz
T/R Switching Time	10 ms
Remote Interface	Ethernet, RS-232, RS-422 (point-to-point and bus), RS-485, and optional internal FSK/PSK Tone modem (leased lines)
Encryption	Internal (AES 256) and external (ANDVT, KY-99, KG-84(), KG-40 and others) over audio or RS-232
RF Antenna Impedance:	50 ohms, nominal, unbalanced to ground
RF Antenna Connector:	Coaxial, female UHF connector
Power Supply	Internal (ac voltage), external (dc voltage), independent from LPA
Input Voltage	<ul style="list-style-type: none"> • 28 Vdc ± 15 % • 115/230 Vac ± 15 %, 50 Hz/60 Hz ± 10 % • Automatic ac/dc changeover
Energy Consumption	< 100 VA
BITE:	Fault isolated to module level (LRU); descriptive readout on front panel and individual module indication
MTBF	11,100 hours
MTTR	15 Minutes (with spares at hand)
Dimensions	Height: 5.95 in (15.1 cm) Width: 17.83 in (45.3 cm) Length: 17.66 in (44.9 cm)
Weight	49 lbs (22.3 kg), unpacked
Construction	Internal modular plug-in assemblies, field serviceable
Origin	Designed and manufactured in the U.S.A.

Product Specifications

RECEIVER

Selectivity	<ul style="list-style-type: none"> SSB / ISB: 300 – 3300 Hz @ 6 dB CW: 500 Hz @ 3 dB, centered at 1 kHz AM: ±3000 Hz @ 6 dB
Sensitivity	<ul style="list-style-type: none"> SSB / ISB: 0.5 µV for 10 dB (S+N)/N CW: 0.3 µV for 10 dB (S+N)/N AM: 3.0 µV for 10 dB (S+N)/N
Audio Output	<ul style="list-style-type: none"> 5 W into internal speaker, <1 % THD 600 Ω, balanced @ -20 dBm to +10 dBm Headset: low impedance
Audio Response	±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"> Fast: 23 ms nominal Medium: 200 ±100 ms nominal Slow: 3 ±1 second nominal
AGC Range	100 dB
AGC Control	No more than 6 dB change for signal inputs from -100 to 0 dBm; 4 dB for signal inputs from -90 to 0 dBm
Squelch	Syllabic, carrier, tone, and noise
Antenna Input Protection	100 V Peak to Peak (53 dBm), self-resetting
Internally Generated Spurious	99.5 % of available frequencies from 100 kHz – 30 MHz At or Below 0.5 µV equivalent input at antenna terminal

TRANSMITTER

Normal Output Power	<ul style="list-style-type: none"> SSB: 125 W PEP and average ISB: 100 W PEP CW: 125 W AME: 40 W Carrier
Medium Output Power	<ul style="list-style-type: none"> SSB: 65 W PEP and average ISB: 50 W PEP CW: 65 W Internal Adjustable
Harmonic Suppression	64 dB below PEP
Intermodulation Distortion	36 dB below PEP
IMD (IP3)	> 20 dBm
Carrier Suppression	70 dB below PEP (J3E, ISB); 6 dBm (H3E)
Undesired Sideband	70 dB below PEP @ 1 kHz
Hum and Noise Level	50 dB below PEP
Load VSWR	<ul style="list-style-type: none"> Rated power for VSWR ≤ 2:1 Graceful degradation for VSWR between 2:1 and 3:1 Protected cut off for VSWR > 3:1
Audio Input	Microphone and 600 Ω balanced at -20 to +20 dBm
Audio Bandwidth	±2 dB from 300 Hz to 3300 Hz
Audio Distortion	<2 % @ 1 kHz (0 dBm input signal)
Automatic Level Control	125 W ±1 dB
Audio Compression	10 dB nominal (internal disable)
RF Output Protection	Overload protection, antenna mismatch and open / short circuit

INTERNAL OPTIONS

Secure Voice	Embedded Option
ALE	<ul style="list-style-type: none"> MIL-STD-188-141 A and FS1045A MIL-STD-188-141 B and STANAG 453
Data Link	TADIL-A, Link 11/22
Bandwidth Filters	Custom bandwidth filters and center frequencies available
HF Modem Modes	FSK, MSK, PSK, and QAM
VoIP	SIP, RTP, and VoIP ATM (ED-137B)

PERIPHERAL EQUIPMENT OPTIONS

Mounting	<ul style="list-style-type: none"> Shroud and rack slides for EIA standard 19 inch rack Desktop Shock mount kit
Spares Kits	Running spares, field modules
Remote Control	RCU-9310E, Pathfinder II Software
Linear Power Amplifiers	LPA-9500 (500 W), LPA-9600 (1 kW), LPA-5000 (5 kW), LPA-10000 (10 kW)
Antenna Couplers	CU-9125 (150 W), CU-9150 (1 kW)
Pre-Postselector	F-9810
AC Power Control	Remote On/Off
Messaging	STANAG 5066 controller

CERTIFICATIONS

FCC Part 90, RT	FCC Identifier XVKRT-9000
European CE Standard (Optional)	<ul style="list-style-type: none"> EN 300 373-2 v1.2.1 EN 301 843-5 v1.1.1 EN 60950 Notified Body 1177

ENVIRONMENTAL

Temperature	<ul style="list-style-type: none"> Operating: -30 °C to +55 °C (-22 °F to 131 °F) Optional: +60 °C (140 °F) Storage: -40 °C to +85 °C (-40 °F to 185 °F)
Humidity	95 % at 55 °C (122 °F), non-condensing; splash-resistant front panel
Shock	MIL-STD 810F, Method 516.5, Procedure 1
Vibration	MIL-STD 810F, Method 514.5 & MIL-STD-167-1
Altitude	<ul style="list-style-type: none"> Operating: up to 10,000 feet Storage: up to 40,000 feet



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Specifications subject to change without notice or obligation. Rev. 3 (Dec 2018)

US export control laws may apply to some options