



## sunair RT-9000D Software Defined HF SSB/ISB Radio User Manual

[Home](#) » [Sunair](#) » sunair RT-9000D Software Defined HF SSB/ISB Radio User Manual 

### Contents

- [1 sunair RT-9000D Software Defined HF SSB/ISB Radio](#)
- [2 Documents / Resources](#)
  - [2.1 References](#)
- [3 Related Posts](#)



### sunair RT-9000D Software Defined HF SSB/ISB Radio



The Sunair RT-9000D is a proven solution in communications applications where rugged, reliable and flexible equipment is required. The next-generation radio operates continuous duty at 125W AVG and PEP with operating modes of AME, NB-FM, USB, LSB, ISB, CW, and Data (with external modems). The RT-9000D utilizes software-defined digital signal processing (DSP) technology to enhance functionality in the synthesizer, audio and IF, which is designed to support the latest developments in high-speed data waveform technology. The radio offers Automatic Link Establishment (ALE) as an internal option in accordance with MIL-STD-188-141A and FS1045A, and supports 141B and STANAG 4538 and 5066 through external controllers.

With a factory-installed option, the Sunair RT-9000D is compliant with MIL-STD-188-203-1A and STANAG 5511/5522 (TADIL-A/Link 11 and NILE/Link 22) for data link operation; and it is compatible with MIL-STD-188-110 A/B and STANAG HF modem waveforms. The radio can accommodate Type 1 encryption such as ANDVT, KY-99, KG-84(), KG-40, as well as commercial privacy devices or an optional voice privacy function. The RT-9000D is specially designed to accommodate single or split-site operation as transmitter-only or receiver-only (T-9000D or R-9000D).

Operating status is presented in English via a large TFT display, and advanced built-in-test (BITE) capability provides feedback to the lowest

- Software-Defined SSB and ISB Configurations
- DSP Based Syllabic Squelch
- Remote Control via Serial and Ethernet
- Comprehensive BITE to LRU
- Internal AC 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 and STANAG
- ALE – 2G MIL-STD-188-141 A/B and 3G STANAG 4538
- 500 W, 1 kW, 5 kW and 10 kW LPAs
- 150 W and 1 kW Antenna Couplers replaceable unit (LRU) level with both front panel English and internal LED indication. The RT-9000D accommodates operation on both AC and DC sources, and its internal power supply is optimized to minimize 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 are in daily service as integral components of critical strategic communications solutions worldwide.

Ethernet, VoIP, internal 3G ALE and internal Data Modem options are forthcoming.

GENERAL Frequency Range	*Tx:1.5 – 30 MHz  *Rx:10 kHz – 30 MHz
Frequency Stability	$\pm 1 \times 10^{-8}$ Per Day
Programmable Channels	128 Simplex or Half-Duplex

Modes of Operation	AME, NB-FM, USB, LSB, ISB, CW, and Data (With External Modems)
Key	Local or Remote
Memory Retention	Non-Volatile
Scan	Manual or Automatic
BFO	$\pm 1.99$ KHz, 1 Hz Resolution
Synthesizer Lock	10 ms
Synthesizer Tuning Step	1 Hz
T / R Switching Time	10 ms
Remote Interface	RS-232 / RS-422 (FSK Tone Internal Option, IP Internal Option Forthcoming)
RF Input / Output Impedance	50 $\Omega$ Nominal, Unbalanced
Input Power	*DC: 28 VDC $\pm 15\%$ *AC: 115 / 230 VAC $\pm 15\%$ , 47 – 400 Hz *AC / DC Automatic Changeover
BITE	Fault Isolated to Module Level (LRU); Descriptive Readout on Front Panel and Individual Module Indication
MTBF	6500 Hours

MTTR	15 Minutes
Dimensions	*5.96 H x 17.83 W x 17.66 L (in) *15.1 H x 45.3 W x 44.9 L (cm)
Weight	49 lbs (22.3 kg)
Construction	Modular Plug-In Assemblies, Field Serviceable
Origin	Designed and Manufactured in the U.S.A.

RECEIVER Selectivity	* SSB / ISB: 300 – 3300 Hz @ 6 dB * CW: 500 Hz @ 3 dB, Centered at 1 kHz * AM: $\pm 3000$ Hz @ 6 dB
Sensitivity	* SSB / ISB: 0.5 $\mu$ V for 10 dB (S+N)/N * CW: 0.3 $\mu$ V for 10 dB (S+N)/N * AM: 3.0 $\mu$ V for 10 dB (S+N)/N
Audio Output	* 5 W Into Internal Speaker, <1% THD * 600 $\Omega$ Balanced @ -20 dBm to +10 dBm * Headset: Low Impedance
Audio Response	$\pm 1$ dB From 300 – 3050 Hz
Image and IF Rejection	90 dB Minimum
Spurious Rejection	80 dB Minimum

AGC Attack Time	10 ms Nominal
AGC Release Time	<ul style="list-style-type: none"> <li>* Fast: 23 ms Nominal</li> <li>* Medium: 200 ±100 ms Nominal</li> <li>* Slow: 3 ±1 Second Nominal</li> </ul>
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
Manual RF Gain	Front Panel and Via Remote Control Forthcoming
Squelch	Syllabic
Antenna Input Protection	100 V RMS, Self-Resetting
Internal Generated Spurious	99.5% of Available Frequencies from 100 kHz – 30 MHz At or Below 0.5 µV Equivalent Input At Antenna Terminal

TRANSMITTER Output Power Normal	<ul style="list-style-type: none"> <li>* SSB: 125 W PEP and Average</li> <li>* ISB: 100 W PEP</li> <li>* CW: 125 W</li> <li>* AME: 40 W Carrier</li> </ul>
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Medium	<ul style="list-style-type: none"> <li>* SSB: 65 W PEP and Average</li> <li>* ISB: 50 W PEP</li> <li>* CW: 65 W</li> <li>* Internal Adjustable</li> </ul>
Harmonic Suppression	64 dB Below PEP
Intermodulation Distortion	36 dB Below PEP
Carrier Suppression	70 dB Below PEP
Undesired Sideband	70 dB Below PEP @ 1 kHz
Hum and Noise Level	50 dB Below PEP
Load VSWR	<ul style="list-style-type: none"> <li>* Rated Power <math>\leq 2:1</math></li> <li>* Graceful Degradation <math>\leq 3:1</math></li> <li>* Protected Cut Off Above 3:1</li> </ul>
Audio Input	Microphone and 600 $\Omega$ Balanced at -20 to +20 dBm
Automatic Level Control	125 W $\pm 1$ dB
Audio Compression	10 dB Nominal (Internal Disable)
RF Output Protection	Overload Protection, Antenna Mismatch and Open / Short Circuit

INTERNAL OPTIONS Voice Privacy	Embedded Option
ALE	* MIL-STD-188-141 A and FS1045A * MIL-STD-188-141 B and STANAG 4538 Forthcoming
Data Link	TADIL-A; Link 11 / 22
Filter Bandwidths	Custom Filter Bandwidths and Center Frequencies Available
Low Power	Third Power Setting

PERIPHERAL EQUIPMENT Mounting	NT OPTIONS * Shroud and Rack Slides For EIA Standard 19 Inch Rack * Desktop * Shockmount Kit
Spares Kits	Running Spares, Field Modules
Remote Control	RCU-9310D, PATHFINDER II
500 W / 1 kW / 5 kW / 10 kW Power Amplifiers	LPA-9500 / LPA-9600 / LPA-5000A / LPA-10000A
Voice Duty / 150 W / 1 kW Antenna Couplers	CU-2430 / CU-9125 / CU-9150
Pre-Selector / Post-Selector	F-9800
AC Power Control	Remote ON/OFF

ENVIRONMENTAL Temperature	* 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	* Operating: Up to 10,000 Feet * Storage: Up to 40,000 Feet

CERTIFICATIONS FCC Part 90, RT	FCC Identifier XVKRT-9000
European CE Standard,	* EN 300 373-2 v1.2.1
RT (Optional)	* EN 301 843-5 v1.1.1
	* EN 60950
	* Notified Body 1177


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Specifications are subject to change without notice or obligation. Revised: August 2011.

## Documents / Resources

	<a href="#">sunair RT-9000D Software Defined HF SSB/ISB Radio</a> [pdf] User Manual RT-9000D Software Defined HF SSB ISB Radio, RT-9000D, RT-9000D ISB Radio, Software Defined HF SSB ISB Radio, ISB Radio, Software Defined Radio, HF Radio, HF SSB Radio, Radio
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## References

- [Sunair – Sunair](#)
- [Sunair – Sunair](#)