



## RT-8500WB

Next Generation Software-Defined,  
Wideband, LF/MF/HF Transceiver



The Sunair RT-8500WB is a time proven solution in communications applications requiring rugged, reliable, and flexible equipment. This next generation transceiver operates continuously (100% duty cycle) in AME, NB-FM, USB, LSB, ISB, CW, Data, or MELPe-based Digital Voice modes. The RT-8500WB is the ideal exciter for the LPA-8200 1-kW amplifier with its 100 mW output, which automatically increases to 125 W for continued service if the LPA-8200 goes into Bypass mode.

The RT-8500WB uses software-defined digital signal processing (DSP) technology, which supports the latest developments in high-speed waveform processing, including 48-kHz wideband operation capability for faster, more secure data communications links. This technology enhances the functionality of the CPU as well as the Synthesizer, Digital Audio, and Digital IF stages.

The RT-8500WB 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 audio interface supports analog or VoIP connections, while the CPU allows for remote control and programming via Ethernet or serial port.

With a factory-installed module and the optional licenses, the Sunair RT-8500WB complies with MIL-STD-188-203-1A and STANAG 5511/5522 (TADIL-A/Link 11 and NILE/Link 22) for data link operation. This transceiver is also compatible with MIL-STD-188-110 A/B/C and STANAG HF modem waveforms.

The RT-8500WB transceiver offers Automatic Link Establishment (ALE) as an internal option in accordance with MIL-STD-188-141 A/B/C, FS1045A, and S4538. The RT-8500WB's design also allows it to accommodate single or split-site operation as transmitter-only or receiver-only.

A large, color touchscreen with wide viewing angle shows the unit's operating status in English. The radios' advanced built-in-test (BITE) capability provides feedback to the lowest replaceable module (LRM) level by means of test result messages in English on the display as well as LED indications.

The RT-8500WB can operate from both ac and dc voltage sources with automatic changeover if one of them fails. The radio's internal power supply provides energy to the internal modules as well as to external accessories.

The RT-8500WB's intuitive modular design allows for ease of maintenance, expansion, and upgrade throughout the equipment life cycle at minimal expense. Its construction minimizes undesirable RFI and EMC effects by using multiple layers of shielding as well as filtering and protection on the individual control lines.

Thousands of these radios are in daily service as integral components of critical strategic communications solutions worldwide.

- Analog or VoIP audio interface
- VoIP ATM ED-137B
- Software-Defined SSB and ISB configurations
- 48-kHz wideband operation
- DSP-based syllabic squelch and tone squelch
- Remote control via RS-232/422/485 and Ethernet
- Comprehensive BITE to LRM
- 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)
- 100 mW output for the 1-kW LPA-8200
- 125-W operation in Bypass mode
- 150-W and 1-kW antenna couplers



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# Product Specifications

## 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	$\pm 1.99$ 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, 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"> <li>28 Vdc <math>\pm 15\%</math></li> <li>115/230 Vac <math>\pm 15\%</math>, 50 Hz/60 Hz <math>\pm 10\%</math></li> <li>Automatic ac/dc changeover</li> </ul>
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.

## RECEIVER

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>AM: <math>\pm 3000</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>AM: 3.0 <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, &lt;1 % 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 to 0 dBm; 4 dB for signal inputs from -90 to 0 dBm
Squelch	Syllabic, carrier, tone, and noise
Antenna Input Protection	100 Vrms (53 dBm), self-resetting
Internally Generated Spurious	99.5 % of available frequencies from 100 kHz – 30 MHz at or below 0.5 $\mu$ V equivalent input at antenna terminal

## TRANSMITTER

Output power with LPA-8200 in operational mode	Modulation mode	Normal	Reduced
	SSB (PEP & Avg.)	100 mW	50 mW
	ISB	70 mW	35 mW
	CW	100 mW	50 mW
	AME (carrier)	40 mW	20 mW
Output power with LPA-8200 in Bypass mode	Modulation mode	Normal	Reduced
	SSB (PEP & Avg.)	125 W	65 W
	ISB	100 W	50 W
	CW	125 W	65 W
	AME (carrier)	40 W	20 W
Harmonic suppression	Modulation mode	Normal	Reduced
	SSB (PEP & Avg.)	125 W	65 W
	ISB	100 W	50 W
	CW	125 W	65 W
	AME (carrier)	40 W	20 W
Intermodulation distortion	64 dB below PEP		
IMD (IP3)	36 dB below PEP		
Carrier suppression	> 20 dBm		
Undesired sideband	70 dB below PEP (J3E, ISB); 6 dBm (H3E)		
Hum and noise level	70 dB below PEP @ 1 kHz		
Load VSWR	50 dB below PEP		
	<ul style="list-style-type: none"> <li>Rated power for VSWR <math>\leq</math> 2:1</li> <li>Graceful degradation for VSWR between 2:1 and 3:1</li> <li>Protected cut off for VSWR &gt; 3:1</li> </ul>		
	Audio input	Microphone and 600 $\Omega$ balanced at -20 to +20 dBm	
	Audio bandwidth	$\pm 2$ dB from 300 Hz to 3300 Hz	
Audio distortion	<2 % @ 1 kHz (0 dBm input signal)		
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

Secure voice	Embedded Option
ALE	<ul style="list-style-type: none"> <li>MIL-STD-188-141 A and FS1045A</li> <li>MIL-STD-188-141 B and STANAG 453</li> </ul>
Data link	TADIL-A, Link 11/22
Bandwidth filters	Narrow and wide band operation
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"> <li>Shroud and rack slides for EIA standard 19 inch rack</li> <li>Desktop</li> <li>Shock mount kit</li> </ul>
Spares Kits	Running spares, field modules
Remote Control	RCU-9310E, Pathfinder II Software, ARGUS MCC software
Linear Power Amplifiers	LPA-8200 (1 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"> <li>EN 300 373-2 v1.2.1</li> <li>EN 301 843-5 v1.1.1</li> <li>EN 60950</li> <li>Notified Body 1177</li> </ul>

## ENVIRONMENTAL

Temperature	<ul style="list-style-type: none"> <li>Operating: -30 °C to +55 °C (-22 °F to 131 °F)</li> <li>Optional: +60 °C (140 °F)</li> <li>Storage: -40 °C to +85 °C (-40 °F to 185 °F)</li> </ul>
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"> <li>Operating: up to 10,000 feet</li> <li>Storage: up to 40,000 feet</li> </ul>

Specifications subject to change without notice or obligation. Rev. 1 (Sept. 2024)

US export control laws may apply to some options