PHF-125

125 W portable HF system

The Sunair PHF-125 portable HF system provides the flexibility and performance of the RT-9000E Digital HF Transceiver, the efficiency of the CU-9125 Digital Antenna Coupler, and the practicality of the Chameleon MPAS 2.0 MIL antenna.

The concept was to be able to package the standard Sunair radio and 150 W coupler with a Chameleon military grade antenna that would allow quick response to a disaster site or for tactical military operations. This system allows the military to set up, transmit, tear down and leave the area in a very short amount of time. The setup of the system takes only 4 minutes for first time users including the antenna.

For disaster response, the two containers can be taken on a flight and loaded into a rental car at the destination.

The PHF-125 has been packaged in two Pelican cases, the MAC Rack™ 4U and the 1626 Air Case, which provide the ruggedness and portability required for field operations. Because of this, the PHF-125 can operate from land bases, whether deployed or sheltered, without requiring a permanent setup. Its portability and simple one-man setup make the PHF-125 a great tool for military and civil defense applications.

The PHF-125 can transmit over the frequency range from 2.00 MHz to 30 MHz at 125 W PEP and average. The reception frequency range covers from 100 kHz to 30 MHz.

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PHF-125 Specifications

General

Frequency range	RX: 10 kHz – 30 MHz TX: 1.80 MHz – 30 MHz
Frequency stability	±1 x 10^{-8} per day after a warm up period of 30 minutes
Programmable channels	250, Simplex or Half-Duplex
Modes of operation	CW, AMe, SSB, ISB, and NB FM
Keying	Local or remote
Memory retention	Non-volatile
Analog audio interface	Front panel MIC and PHONE jacks, 600-ohm balanced line
Synthesizer lock	10 ms maximum
Synthesizer tuning steps	1 Hz, 10 Hz, 100 Hz, 1 kHz, 10 kHz, 100 kHz, and 1 MHz
T/R switching time	10 ms
Remote control interface	RS-232, RS-422 (point-to-point and bus), RS-485, Ethernet, and optional internal FSK/PSK Tone modem (leased lines)
Encryption	Internal (DES 56, AES 128, and AES 256) as well as external (Type 1 or commercial)
Power supply	Internal (ac voltage), external (dc voltage), independent from LPA
Input voltage	• 28 Vdc ±15 % • 115 Vac or 230 Vac ±15 %,50 Hz/60 Hz ±10 % • Automatic ac/dc changeover (ac and dc sources connected)
BITE:	Fault isolated to module level (LRU); descriptive readout on front panel and individual module indication
MTBF	11,179 hours
MTTR	15 Minutes (with spares at hand)
Dimensions	MAC Rack case: Height: 11.40 in (29 cm), Width: 22.00 in (50.8 cm), Length: 33.60 in (86.3 cm) 1625 Air case: Height: 11.72 in (29.8 cm), Width: 14.10 in (35.8 cm), Length: 28.14 in (79.0 cm)
Weight	MAC Rack case w/RT-9000E: 100.0 lbs (45.3 kg) 1625 Air case w/Coupler: 51.0 lbs (23.1 kg)
Construction	Internal modular plug-in assemblies, field serviceable
Internal standard features	Lincompex, Frequency Hopping, VOX, and alarms
Origin	Designed and manufactured in the U.S.A.

RT-9000E reception

Selectivity	• SSB / ISB: 300 – 3300 Hz @ 6 dB • CW: 500 Hz @ 3 dB, centered at 1 kHz • AMe: ±3000 Hz @ 6 dB • NB FM: ± 5000 Hz @ 6 dB
Sensitivity	• SSB / ISB: 0.5 µV for 10 dB (S+N)/N • CW: 0.3 µV for 10 dB (S+N)/N • AMe: 3.0 µV for 10 dB (S+N)/N • NB FM: 1.0 µV for 10 dB (S+N)/N
Audio Output	• 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	• 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 dBm to 0 dBm; 4 dB for signal inputs from -90 dBm to 0 dBm
BFO	±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

RT-9000E transmission

Normal output power	• SSB and CW: 125 W PEP and average (continuous tone) • ISB: 100 W PEP (50 W PEP per sideband) • NB FM: 125 W • AMe: 40 W carrier
Medium output power	• SSB and CW: 65 W PEP and average (continuous tone) • ISB: 50 W PEP (25 W PEP per sideband) • Internally 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	• Rated power for VSWR ≤ 2:1 • Graceful degradation for VSWR between 2:1 and 3:1 • Protected cut off for VSWR > 3:1
Audio Inputs	Microphone (2.5 kΩ, unbalanced) and Line (600 Ω, balanced, -20 dBm to +10 dBm range
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, antenna mismatch, and open/short circuit

RT-9000E Internal options

Secure voice	Embedded option
ALE	• MIL-STD-188-141 A and FS1045A • MIL-STD-188-141 B and STANAG 4538
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)

CU-9125 antenna coupler

RF input power	150 W PEP and average
Duty cycle	Continuous (100%) for antennas > 23 ft.
Tuning time	• Typical: 1 s • Max.: 7 s • From memory: 10 ms
Tuning power	25 W
Input voltage	28 Vdc ±15 % from radio @ 1 A maximum
Tuning accuracy	1.5:1 VSWR or better

Chameleon MPAS 2.00 MIL antenna

Power rating	500 W (SSB voice, 250 W (CW). 100 W (digital)
Polarization	Vertical, horizontal, or sloper
Radiation pattern	Omnidirectional, horizontal, or NVIS
Wind rating	Up to 25 mph (no icing), recommend guy kit for stronger winds

Environmental

Temperature	• Operating: -30 °C to +55 °C (-22 °F to 131 °F) • Optional: Maximum oper. temperature up to+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

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PHF-125 Components

RT-9000E Transceiver

The RT-9000E is a time proven solution in communications applications that operates continuously (100% duty cycle) with a 125 W PEP and average output in USB, LSB, and CW (key down) as well as 50 W in AMe (AM equivalent), 125 W in NB FM, and 100 W in ISB (50 W per sideband). 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, Digital Audio, and Digital IF stages.

The RT-9000E's 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-9000E 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-9000E transceiver offers Automatic Link Establishment (ALE) as an internal option in accordance with MIL-STD-188-141 A/B/C, FS1045A, and S4538.

Among its standard system features, the RT-9000E F/W includes remote keying, frequency hopping, and Lincompex.

The RT-9000E 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.

CU-9125 Antenna Coupler

The CU-9125 Digital Antenna Coupler included in the PHF-125 Portable HF System provides the RT-9000E with the necessary impedance matching to use the Model 120-60 Field Vertical HF Antenna while keeping the VSWR as low as possible for maximum RF output.

The CU-9125 draws power from the RT-9000E, regardless of the radio's input voltage (115/230 Vac or 28 Vdc).

Chameleon MPAS 2.0 MIL Antenna

The flexibility of the MPAS 2.0 MIL antenna allows for multiple configurations, depending on the characteristic of the site where it is being deployed:

- Vertical Whip configuration using one or both whips
- Horizontal Whip configuration for NVIS operations
- Sloper wire configuration
- Inverted "V" wire configuration
- Inverted "L" wire configuration
- NVIS wire configuration

Setting up the antenna is a simple and quick one-man operation. The kit contains all the necessary parts for the installation: balun, antenna wire, coaxial cable, RFI choke, stainless steel center stake, universal clamp mount, and hardware.

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