RA1

SECURE VOICE & POSITION MODEM / WEARABLE
DATASHEET

RA
FAMILY

Handset / Headset

Radio

Actual Size

GPS / GLONASS

FEATURES & BENEFITS:

○ AES-256 Encryption: Voice & Position Transmissions

○ GPS & GLONASS Positioning Built-in

○ 600 – 2400 bps Automatic Digital Voice Rates

○ TWELP* Vocoder - High Voice Clarity

○ Dedicated AFFIRMATIVE and NEGATIVE Buttons

○ Automatic Clear Voice Reception (FM/SSB)

○ Best-in-class RapidM Voice Modem Performance

○ V/UHF & HF Transceiver Compatible (SSB & FM)

○ Cross-Vendor Radio Interoperability

○ Extended Range, including BLoS Links

○ Automatic Periodic Position Transfer

○ Over-the-Air compatible with RA2, RA3, RA5 & RA7

○ RA1 Handset / Headset / Speaker-Mic Variants

○ 4.5 – 18 V DC Input with Surge Protection

○ 2 Year Warranty

○ Zeroize Function

○ Blue Force Tracking via TRACKPOINT software

* TWELP voice coding by DSP Innovations Inc.(www.dspini.com)

SECURE VOICE & POSITION FOR ANY RADIO

The *RapidM RA1* is a high performance digital in-line secure voice modem with built-in GPS. The *RA1* is suitable for first responders, security agencies, governmental and paramilitary users. The *RA1* provides voice privacy and asset tracking. The *RA1* easily integrates with all VHF, UHF and HF radio transceivers via the audio or accessory interface. The unit is suitable for use with hand-held, man-pack and vehicular radio equipment.

INFORMATION SECURITY

All radio communications are vulnerable to eavesdropping. The *RA1*'s built-in AES encryption means that all communications are secured by a trusted algorithm. Switching between Secure Digital Voice (SDV) and analog voice (analogue SSB or FM) transmission is done by pressing the PLAIN / SECURE button (lock symbol).

POSITION TRACKING AND AFFIRMATIVE & NEGATIVE CODES

The *RA1* can be configured to send out periodic position reports. These can be received and displayed by *RapidM RA5* units and the *TRACKPOINT* PC software. The *TRACKPOINT* software can also pull positions from *RA1* units, if so configured.

The *RA1* provides dedicated buttons for broadcasting AFFIRMATIVE or NEGATIVE message codes. These message codes decoded to audible voice messages at receiving *RA1* devices and allow for basic robust, silent, asymmetric communications.

LOW RATE VOCODER & SUPERIOR MODEM PERFORMANCE

Long-range communication is prone to interference and noise. Both digital voice and data operation benefits from RapidM's superior technology and experience in HF modem design. The latest generation Vocoder-modem-combination dramatically improves voice quality in adverse channel conditions, extending the range of voice communications.

RA – SECURE COMMUNICATIONS FOR ANY RADIO

RapidM

ENCRYPTION & DIGITAL VOICE

KEY FILL	99 different user selectable cryptographic keys. New key sets can be generated via **KMS** and loaded via **CLS** software which runs on a MS Windows tablet/laptop. Key Fill and configuration happens via a Serial or Bluetooth interface.
SECURITY	Advanced Encryption Standard (AES), 256-bit key length. Key index selection via keypad.
MODEM	High performance serial tone HF and V/UHF modem (Beyond Line of Sight [BLoS] compatible) featuring adaptive equalization. Dedicated digital voice waveform HF-2T.
VOCODER	**TWELP:** Tri-Wave Excited Linear Prediction high performance vocoder. 600, 1200 & 2400bps Low-rate Vocoder.

TWELP DIGITAL VOICE PERFORMANCE	VOCODER RATE [bps]	END-TO-END LATENCY [s]	PESQ	CHANNEL USE	SPEECH QUALITY		UNDERSTAND-ABILITY LIMIT SNR [dB]	
					INTELLIGIBILITY	SPEAKER RECOGNITION	CCIR POOR	AWGN
	2 400	1.6	3.1	Ground Wave	Very Good	Good	6.5	0.5
	1 200	2.2	3.0	Sky Wave	Good	Acceptable	4.0	-0.5
	600	2.2	2.4	Sky Wave	Acceptable	Fair	0.5	-3.0

HARDWARE		ENVIRONMENTAL	
WEIGHT	170 g with mounting strap (excludes handset & cables)	**SAFETY**	IEC/EN 60950
SIZE	117 x 52 x 20 mm	**EMC/EMI**	MIL-STD-461
COLOUR	Jet Black (RAL9005)	**SHOCK**	MIL-STD-810F: 40G, 15 - 23 ms
MOUNTING	1" webbing strap. MOLLE / PADS compatible	**VIBRATION**	Composite wheeled vehicle 10Hz – 2000Hz, @2.5g
POWER INPUT	4.5 - 18 V DC	**TEMPERATURE**	-40°C to +65°C (operating), -40°C to +85°C (storage)
BLUETOOTH	Key Fill & Configuration interface (via **CLS**)	**HUMIDITY**	MIL-STD-810F: 0 to 90%, non-condensing
GPS / GLONASS	12 channel, -165 dBHz, active patch antenna	**INGRESS**	IP67, 1m for 30 min

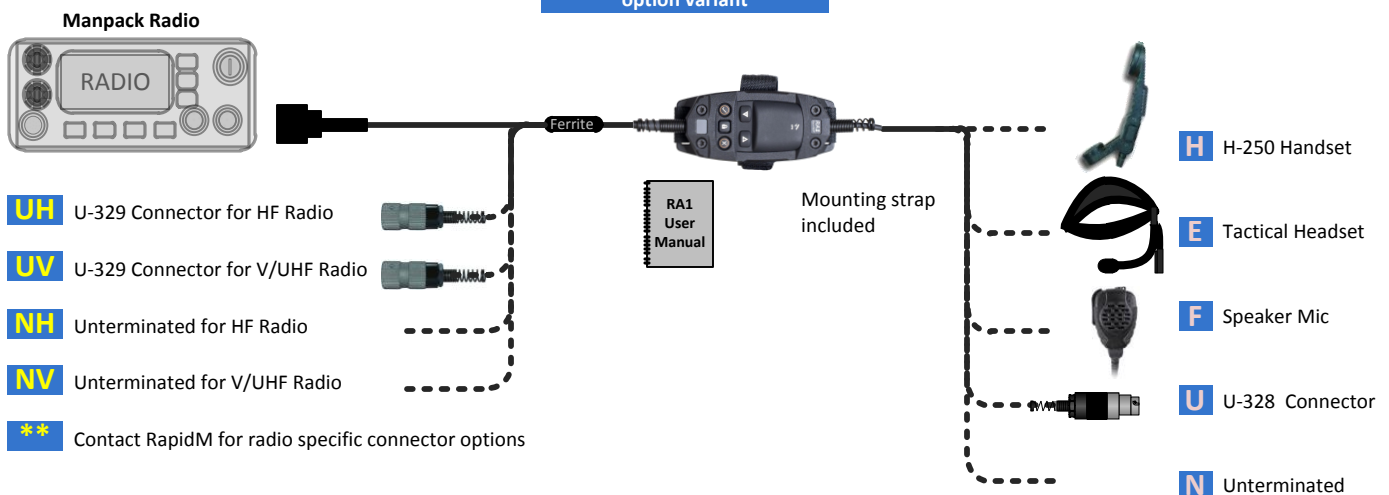| INTERFACES	DESCRIPTION
HANDSET / HEADSET	**Phones**: Hardware configurable Output: Unbalanced 25mW into 1000 Ω or Balanced 1.3W into 8 Ω. **Microphone:** Unbalanced Input, Mic Bias (configurable), PTT input.
BLUETOOTH	**Bluetooth Interface:** For Configuration and FILL connection to **Config Load Software (CLS)**
RADIO — SECURE AUDIO	**Baseband Audio In:** Balanced / Unbalanced (cable configurable), 7V$_{RMS}$ Maximum Level, 900 Ω to 1000 Ω Input Impedance. **Baseband Audio Out:** Balanced / Unbalanced (cable configurable), 3mV$_{RMS}$ to 1.77V$_{RMS}$, 320 Ω Output Impedance. **Keyline:** Open Collector (36 V, 250mW tolerant).
RADIO — POWER SUPPLY	4.5 – 18 VDC, 2000 mW max.
RADIO — SERIAL PORT	RS-232: Software update and Configuration and FILL connection to **Config Load Software (CLS)**
KEYPAD / UI	Individual keys: SECURE/PLAIN, Volume +, Volume -, AFFIRMATIVE (✓) and NEGATIVE (X) message codes broadcast. Via key combinations: Zeroize, Crypto Key selection, Bluetooth enable, Serial port enable. Clear voice warning side-tone, Audio voice-prompt alerts and indication side-tones.

ORDERING INFORMATION

RA1-R002rrh-AE4

Where **rr** must be substituted for one of the following radio interface option abbreviations:

And **h** must be substituted for one of the following audio side option abbreviations:

RA1 Stock number depends on option variant

Manpack Radio

UH	U-329 Connector for HF Radio
UV	U-329 Connector for V/UHF Radio
NH	Unterminated for HF Radio
NV	Unterminated for V/UHF Radio
✱✱	Contact RapidM for radio specific connector options

Ferrite

RA1 User Manual

Mounting strap included

H	H-250 Handset
E	Tactical Headset
F	Speaker Mic
U	U-328 Connector
N	Unterminated