

# RM2-HVM HF & V/UHF Modem

## HF & V/UHF Data Modem

The **RM2-HVM** is a compact HF and V/UHF data modem for governmental and NGO use. The unit is suitable for long distance data communications links. The maximum data rate is 9600 bps over a standard 3 kHz HF or V/UHF radio channel. The **RM2-HVM** is intended for installation in mobile and marine environments.



## Key Features & Benefits

- High Data Rate Modem
- Up to 9600 bps in 3 kHz
- HF Modem & ALE controller in one unit
- ALE function is optional
- Compatible with RapidM RC50 Government Communications Suite
- STANAG 4539 (high speed)
- STANAG 4415 (robust)
- MIL-STD-188-110A
- Icom, Kenwood & Vertex Standard radio compatibility
- Vehicle Surge Protected DC Power Input (MIL-STD-1275B)
- Mobile form factor
- PC configuration utility

The optional **ALE** function is built-in and can be activated with the appropriate *RapidM* license key. For more information on these functions, please see the **RM2 2G ALE** product brochure.

For easy system configuration a PC-based configuration application (GUI) is provided.

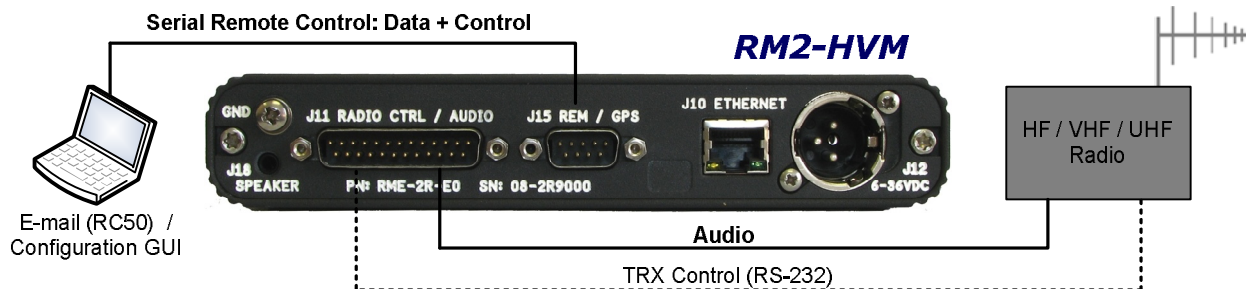


Figure 1: Typical system configuration.

## HF & V/UHF E-mail

The **RM2-HVM** is designed to operate in conjunction with an external **STANAG 5066** compliant automatic repeat request (ARQ) server, for example *RapidM's RC50* Government Communications Suite. For more information please refer to the **RC50** product brochure.

## Waveforms

STANAG 4539, 4415 and MIL-STD-188-110 A/B.

Adaptive equalization mitigates the effects of channel multi-path.

Convolutional encoding combined with soft-decision Viterbi decoding provides **forward error correction (FEC)**. Cancellation of narrowband co-channel interference is accomplished via adaptive **tone excision**.

## Interfaces

The **RM2-HVM** is fully remote controllable via a high speed **serial control interface**. The *RapidM* RIPC/RAP1 protocol is used for both control and data messages. Full documentation on the RIPC/RAP1 protocol is included with the unit (or available from *RapidM* upon request).

The **data interface** of the **RM2-HVM** is via RIPC/RAP1 messages over the remote control serial interface. The data interface offers FEC but no ARQ.

**Radio interfacing** is accomplished using industry standard 600 Ohm audio transmit and receive lines as well as a PTT line. . Optionally the radio can be controlled by the ALE radio control protocol embedded in the **RM4** (ALE brochure).

The **DC power supply** of the **RM2-HVM** is designed according to MIL-STD-1275B and caters for harsh mobile & marine power supply environments.

MODEM WAVEFORM	MODULATION	CODING	DATA RATES
STANAG 4539	PSK / QAM	C	75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps
STANAG 4415	PSK	C	NATO robust: 75 bps
MIL-STD-118-110A	PSK	C	75, 150, 300, 600, 1200, 2400 bps
GENERAL			
ALL WAVEFORMS	Carrier capture range $\pm 200$ Hz Frequency tracking of up to 75 Hz changing at 3.5 Hz per second (triangular sweep)		
BIT	Comprehensive BIT (Built-In-Test) and continuous error detection		
PRESETS	10 Factory Presets, 10 Custom Presets		
REMOTE CONTROL	Waveform settings are remote controllable via or Remote Control Port		
AUTOBAUD	All waveforms have Auto baud capability (automatic detection of bit rate)		
SYNC ON DATA	All waveforms are able to synchronise on a data stream (late entry)		
TONE EXCISION	Narrowband Interference cancellation		
SOFTWARE OPTION	CHARACTERISTICS		
ALE 2G MIL-STD-188-141B APPENDIX A, B & FED-STD 1045 FED-STD 1049	Automatic Link Establishment 2nd Generation (2G ALE) Occupancy Detection: MS 110A/B, S 4539, S 4285, S 4415, S 4529, S 4481, FSK, 8-FSK, SSB Voice Protocol: Calling, AMD, DTM, Excluding: DBM, AQC-ALE <ul style="list-style-type: none"> <li>Link Quality Analysis (LQA)</li> <li>Scanning (2 or 5 channels per second)</li> <li>Selective Calling</li> <li>Automatic Sounding</li> <li>Automatic Hand-Off to Internal Modem</li> </ul> The RM2-HVM unit may already support a particular radio protocol. If not, the radio control protocol must be made available to RapidM for integration & testing.		
INTERFACES			
REMOTE CONTROL/ RAW DATA PORT (DE9M)	<b>Remote Control (5 pins):</b> RS-485 Multi-drop, RS-422 balanced or RS-232 Data Rate: 1200 to 115200 bps, 1 or 2 stop bits, 8 bit character lengths Protocol: Control Protocol (RAP1 + RIPC)  <b>Raw Serial Data (4 pins) (optional):</b> RS-232 (nominally input) Data Rate: 300 to 19200 bps (nominally 19200 bps), 1 or 2 stop bits, 7/8 bit data, hardware flow control (CTS/RTS)		
ETHERNET CTRL & RAW DATA PORT (RJ45) (AVAILABLE Q4,2010)	<b>Remote Control:</b> 10 Base T (IEEE 802.3U compatible), half duplex Protocol: RapidM Control Protocol (RAP1 + RIPC) over TCP/IP  <b>Raw Data Port:</b> TCP Berkeley Socket interface for sending / receiving raw data <ul style="list-style-type: none"> <li>Flow control handled by TCP</li> <li>Forward Error Correction (FEC)</li> <li>No ARQ</li> </ul>		
FRONT PANEL	<b>8 bi-colour status LED indicators on front panel:</b> <ul style="list-style-type: none"> <li>Ethernet (Activity, Link)</li> <li>REM Ctrl (Activity, connected)</li> <li>RADIO Ctrl – not used</li> <li>SNR / INT (Bit Error Rate indication &gt; BER 4)</li> <li>Audio IN (Signal level indication)</li> <li>Data (Tx / Rx Data)</li> <li>Tune status</li> <li>Power indicator (Power on, Fault indication)</li> </ul>		
RADIO CONTROL & AUDIO PORTS (DB25M)	<b>Radio Control Pins:</b> RS-232, 4800 to 115200 bps, 1 or 2 stop bits, 7/8 bit data (no Hardware flow control), used by RC50 Software  <b>Radio Audio Pins:</b> Input Audio: 600 Ohm balanced, -20 to +10 dBm without adjustment Output Audio: Balanced, -40 to +5 dBm adjustable into 600 ohm load Keyline: Non-polarized contact closure (<45 V, 200 mA) PTT Sense Input: Pull to ground to indicate external PTT (used by RC50 to detect PTT override)		
RADIOS			
HF	ICOM	IC-F7000, IC-M700PRO, IC-M710RT, IC-M802, IC-78, IC-703, IC-706MKIIG, IC-718, IC-710, IC-746PRO, IC-756PROII, IC-7800	
	KENWOOD	TK-90, TK-80, TS-50, TS-480, TS-2000	
	VERTEX STANDARD	VX-1700	
	OTHER	Most HF radios with a 3 kHz audio bandwidth	
V/UHF	ICOM	IC-M422, IC-M504, IC-M506	
	OTHER	Most V/UHF radios with a 3 kHz audio bandwidth	
INSTALLATION		ENVIRONMENTAL	
WEIGHT	1.25 kg	TEMPERATURE	-30°C to +70°C (operating)
COLOUR	Black, powder coat	HUMIDITY	0 to 90%, non-condensing
SIZE	32.0 x 162.0 x 180.0 mm (h x w x d)	SHOCK	MIL-STD-810E Method 516.4, Procedure 1, Funct. (40G, 11 ms)
MOUNTING	Desktop or vehicle & marine installation using the supplied mounting bracket	EMC	MIL-STD-461E
		SAFETY	IEC/EN 60950
POWER	7-36 V DC (designed for MIL-STD-1275B) XLR3 plug (supplied) GND Screw: Lug + copper braid (supplied)	VIBRATION	MIL-STD-810E Meth. 514.4, Cat. 9, Shipboard
RELATED PRODUCTS	FEATURES*		
RM6	Rack Mount, Ethernet, DTE (Synchronous & Asynchronous), 2G ALE s/w Option, up to 9600 bps in 3kHz, up to 19200 bps in 2-1SB, Security Processor, Front Panel (Control & Configuration), Email (using RC66 Combat Communications Suite).		
RM4-HVM	Rack Mount, Ethernet, DTE (Async.), 2G ALE s/w Option, up to 9600 bps in 3kHz, E-mail (using RC50 Government Communications Suite)		
RM2-HVM	Mobile, up to 9600 bps in 3kHz, E-mail (using RC50 Government Communications Suite).		
RM2-ALE	Standalone 2G ALE unit, DTMF Microphone I/F, ALE voice calling		

Note: The names of actual companies and products mentioned herein are the trademarks of their respective owners.

Rapid Mobile Pty (Ltd)  
Tel: +27 (0) 12 349 0000  
Fax: +27 (0) 12 349 0010

e-mail: [info@rapidm.com](mailto:info@rapidm.com)  
web: [www.rapidm.com](http://www.rapidm.com)

Apex Corporate Park  
Quintin Brand Street, Persequor Park  
Pretoria, South Africa, 0020