

# RM6 HF Data Modem & ALE Controller

## HF Data Modem & 2G ALE

The **RM6** is a high data rate HF data modem & ALE controller for standards-based naval and military data communications. The **RM6** is suitable for long distance point to point data links. The maximum data rate is 9600 bps over a standard 3 kHz HF radio link and **19200 bps over an ISB link**. The **RM6** is intended for installation into 19" rack systems.



## Key Features & Benefits

- High Data Rate Modem
- Up to 9600 bps in 3 kHz
- Up to 19200 bps (ISB radio)
- HF Modem & ALE controller in one unit
- ALE function is optional
- MIL-STD-188-141B App. A
- MIL-STD-188-110 A/B
- STANAG 4539 (QAM)
- STANAG 4285 (PSK)
- STANAG 4529 (NB PSK)
- STANAG 4415 (robust)
- STANAG 4481 (P/FSK)
- STANAG 5065 (MSK)
- STANAG 5066 compliant interface
- Synchronous DTE port for interfacing with high grade cryptographic equipment
- Ethernet Interface

The **RM6** is designed to operate in conjunction with an external **STANAG 5066** compliant ARQ server, for example **RapidM's RC66** HF email suite. A PC Configuration utility is provided for remote control.

The additional software options **ALE** and **Signal Detection** and are built-in and can be activated with the appropriate **RapidM** license key. For more information on these functions, please approach **RapidM** for a brochure.

## Waveforms

MIL-STD-188-110B, STANAG 4539, 4285, 4529, 4415, 4481 and 5065.

Adaptive equalization mitigates the effects of HF channel multi-path.

Convolutional encoding combined with soft-decision Viterbi decoding provides **forward error correction**. Cancellation of narrowband co-channel interference is accomplished via adaptive **tone excision** capable of eliminating up to four signals.

## Modem Software Packs

The waveforms that are included in the **RM6** can be customised by choosing from two software packs. Please see the reverse page for more details.

## Secure System

In a secure system, data is routed through a crypto unit and into the **synchronous DTE port** of the **RM6**. The modem Tx and Rx audio signals are fed to the HF radio. The radio is keyed by the **RM6**, while the unit monitors independent PTT activity on the radio.

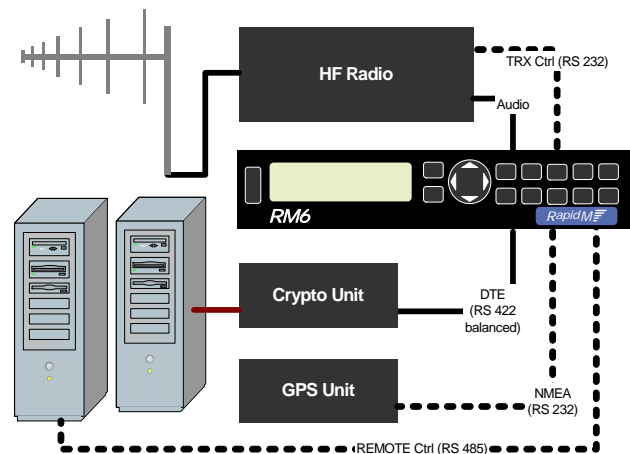


Fig 1: Secure System Configuration with **RM6** Unit

Optionally the radio can be controlled by the ALE radio control protocol embedded in the **RM6** (ALE brochure).

The unit supports split-site operation. Two radio control ports are available to support this option.

The **RM6** unit provides two independent audio ports to support the ISB mode.

The REM Ctrl, GPS and Ethernet ports are routed to a **Security processor**. 5V supply for fiber optic line drivers is provided on DTE & REM Ctrl ports.



Fig 2: Two **RM6** Units side-by-side in a 19-inch rack

STANDARD	CODING MODULATION		DATA RATES & CHARACTERISTICS	MODEM SOFTWARE PACK	
				M1	M2
MIL-STD-188-110B APPENDIX C	C	PSK/	3200, 4800, 6400, 8000, 9600 bps	•	•
	U	QAM	12800 bps	•	•
STANAG 4539	C	PSK/	75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps	•	•
	U	QAM	12800 bps	•	•
MIL-STD-188-110B	C	PSK/	75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, bps	•	•
MIL-STD-188-110B APPENDIX F	C	PSK/	ISB: 9600, 12800, 16000, 19200 bps	•	-
MIL-STD-188-110A § 5.3	C	PSK	75, 150, 300, 600, 1200, 2400 bps	•	•
	U		4800 bps	•	•
STANAG 4415	C	PSK	NATO robust: 75 bps	•	•
STANAG 4285	C	PSK	75, 150, 300, 600, 1200, 2400 bps	•	•
	U		1200, 2400, 3600 bps	•	•
STANAG 4529	C	PSK	75, 150, 300, 600, 1200 bps	•	•
	U		600, 1200, 1800 bps	•	•
STANAG 4481 PSK	C	PSK	300 bps	•	•
STANAG 5065	C	FSK MSK	75 bps (FSK) 300 bps (MSK)	•	-
STANAG 4481 FSK	U	FSK	Single channel: 75 bps	•	•
			Multi-channel: 75 bps selectable carrier	•	•
FSK VARIABLE	U	FSK	Data Rates: 50, 75, 100, 150, 200, 300, 400, 600, 1200 bps Mark & Space Frequency: 350 to 3000 Hz	•	•
<b>GENERAL</b>					
ALL WAVEFORMS	Carrier capture range ±200 Hz. Sync-on-Data				
BIT	Frequency tracking of up to 75 Hz changing at 3.5 Hz per second (triangular sweep)				
PRESETS	Comprehensive BIT (Built-In-Test), Continuous error detection				
AGC CONTROL	20 Factory Presets, 10 Custom Presets				
REMOTE CONTROL	Transceiver AGC control is necessary for optimum performance of QAM W/Fs				
AUTOBAUD	All W/Fs and 2G ALE settings are remote controllable via Remote Control Port				
-tone EXCISION	All PSK waveforms except for STANAG 4285 & 4529. Sync-on-Data capability.				
SOFTWARE OPTION	Narrowband Interference cancellation of up to 4 signals				
<b>SOFTWARE OPTION CHARACTERISTICS</b>					
ALE 2G MIL-STD-188-141B APPENDIX A, B & FED-STD 1045 FED-STD 1049	<p>Automatic Link Establishment 2<sup>nd</sup> 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</p> <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> <p>The unit may already support a particular radio protocol. If not, the radio control protocol must be made available to <i>RapidM</i> for integration &amp; testing.</p>				
<b>INTERFACES</b>					
DTE (DATA) PORT	RS-422 balanced, RS-423, RS-232 unbal., MIL-STD-188-114 compatible & EIA 530A compliant (DB25 female connector). Half & Full Duplex operation, Sync, Standard Async and High-Speed Async mode supported: <ul style="list-style-type: none"> <li><b>Synchronous:</b> Data Rate: 50, 75, 100, 150, 200, 300, 400, 600, 1200, 1800, 2400, 3200, 3600, 4800, 6400, 8000, 9600, 12800, 16000, 19200 bps, Clock: Internal / Ext., data polarity: norm / inv.</li> <li><b>Asynchronous:</b> 75 to 115200 bps, Full Duplex, 5/6/7/8 bit data, 1, 2 stop bits, Flow ctrl: CTS/RTS, XON/XOFF, data polarity: norm / inv.</li> </ul>				
REMOTE CTRL PORT	RS-485 Multi-drop, RS-232D (DE9 male connector): Data Rate: 1200 to 115200 bps, 1 or 2 stop bits, 8 bit character lengths Protocol: RM6 Control Protocol RAP1 (proprietary)				
GPS/AUX PORT	RS-232 (DE9 male connector): Data Rate: 300 to 19200 bps, 1 or 2 stop bits, 7/8 bit character lengths Protocol: NMEA or Proprietary (Aux port), PPS line (RS232 or TTL, under software control)				
ETHERNET	Data & Control, <b>10/100 Base T</b> , RJ 45 connector, embedded TCP/IP Stack, Protocol: RM6 Ctrl Protocol				
LOCAL CONTROL	Local control via 32x202 pixel <b>graphical LCD display</b> and 16-key keypad. 3 bi-colour LED indicators Alphanumeric and digit keypad for fast data entry, 4-way navigation button				
RADIO CTRL PORTS	RS-232 (DE9 male connectors): <b>2 channels</b> , 75 to 115200 bps, 1 or 2 stop bits, 7/8 bit character lengths. Supports for various radio control protocols are built-in. See the <i>RapidM</i> 2G ALE Product brochure for more details.				
RADIO AUDIO PORTS	<b>2 channels.</b> (DE9 female connectors) Input Audio: 600 Ohm balanced, -20 to +15 dBm without adjustment Output Audio: Balanced, -40 to +15 dBm (PMP) adjustable into 600 ohm load Keyline: Open collector to ground (<45 volts, 50 mA) & non-polarized contact closure (<45 V, 200 mA)				
<b>INSTALLATION</b>			<b>ENVIRONMENTAL</b>		
WEIGHT	2.5 kg		TEMPERATURE	-30°C to +70°C (operating) remote ctrl; -20°C to +70°C (operating) local ctrl	
COLOUR	Black, powder coat		HUMIDITY	0 to 90%, non-condensing	
SIZE	212.2 x 225.6 mm x 41.1 (w x d x h), Front panel height : 44.1 mm		SHOCK	MIL-STD-810E Method 516.4, Procedure 1, Funct. (40G, 11 ms)	
POWER	87 to 267 V AC, 47 to 440 Hz		VIBRATION	MIL-STD-810E Meth. 514.4, Cat. 9, Shipboard	
RACK MOUNTING	1 unit in ½ 19" Rack slot		EMC	MIL-STD 461-E	
	2 units side-by-side on shelf		SAFETY	IEC/EN 60950	

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