The **RM4** is a high data rate HF data modem & ALE controller for standards-based naval and military data communications. The **RM4** is suitable for long distance point to point data links. The maximum data rate is 9600 bps. The **RM4 HF Data Modem & ALE Controller** is intended for installation into 19” rack systems.

### 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
- 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 optional **ALE** function is built-in and can be activated with the appropriate RapidM license key. For more information on these features, please see the RM4 2G ALE product brochure.

**The RM4 is designed to operate in conjunction with an external STANAG 5066 compliant ARQ server, for example RapidM’s RC66 Combat Communications Suite. A PC Configuration utility is provided for remote control.**

### Waveforms
MIL-STD-188-110 A/B, 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 **RM4** can be customised by choosing from four 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 **RM4**. The modem Tx and Rx audio signals are fed to the HF radio. The radio is keyed by the **RM4**, while the unit monitors independent PTT activity on the radio.

![Secure System Configuration with RM4 Unit](image1.png)

**Fig1: Secure System Configuration with RM4 Unit**

Optionally the radio can be controlled by the ALE radio control protocol embedded in the **RM4** (ALE brochure). The unit supports split-site operation. Two radio control ports are available to support this option.

![RapidM Crypto Unit](image2.png)

**Fig2: RM4 Unit front panel**
### RACK MOUNTING

<table>
<thead>
<tr>
<th>Standard</th>
<th>Coding Modulation</th>
<th>Data Rates &amp; Characteristics</th>
<th>Military Modem Software Pack</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIL-STD-188-110B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appendix C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| C                 | PSK/QAM           | 3200, 4800, 6400, 8000, 9600 bps | M2  
| U                 | 12800 bps         |                              | M3  
| STANAG 4539       |                   |                              |                             |
| C                 | PSK/QAM           | 75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps | M4  
| U                 | 12800 bps         |                              |                             |
| MIL-STD-188-110B  |                   |                              |                             |
| § 5.3             |                   |                              |                             |
| C                 | PSK/QAM           | 75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps | M2  
| U                 | 4800 bps          |                              | M3  
| STANAG 4415       |                   |                              |                             |
| C                 | PSK               | NATO robust: 75 bps          | M2  
| U                 |                  |                              | M3  
| STANAG 4428       |                   |                              |                             |
| C                 | PSK               | 75, 150, 300, 600, 1200, 2400 bps | M2  
| U                 | 1200, 2400, 3600 bps |                              | M3  
| STANAG 4529       |                   |                              |                             |
| C                 | PSK               | 75, 150, 300, 600, 1200, 2400 bps | M2  
| U                 |                  |                              | M3  
| STANAG 4481 PSK   |                   | 600, 1200, 1800 bps          | M2  
| C                 | PSK               | 300 bps                      | M3  
| STANAG 4481 FSK   |                   | Single channel: 75 bps       | M2  
| U                 | FSK               | Multi-channel: 75 bps selectable carrier | M3  
| FSK Variable      |                   | Data Rates: 50, 75, 100, 150, 200, 300, 400, 600, 1200 bps | M2  

#### GENERAL

- **All Waveforms**
  - Carrier capture range ±200 Hz, Sync-on-Data
  - Frequency tracking of up to ±75 Hz changing at 3.5 Hz per second (triangular sweep)
  - Comprehensive BIT (Built-In-Test), Continuous error detection
- **Presets**
  - 20 Factory Presets, 10 Custom Presets
- **AGC Control**
  - Transceiver AGC control is necessary for optimum performance of QAM W/Fs
- **Remote Control**
  - All W/Fs and 2G ALE settings are remote controllable via Remote Control Port
- **Autobaud**
  - All PSK waveforms except for STANAG 4285 & 4529. Sync-on-Data capability.
- **Tone Excision**
  - Narrowband Interference cancellation of up to 4 signals

#### INTERFACES

- **DTE (Data) Port**
  - Half & Full Duplex operation, Sync, standard async and high-speed mode supported:
    - **Synchronous**: Data Rate: 50, 75, 100, 150, 200, 300, 400, 600, 1200, 1800, 2400, 3200, 3600, 4800, 6400, 8000, 9600 bps, Clock: Internal / Ext., data polarity: norm / inv.
    - **Asynchronous**: 75 to 115200 bps, Full Duplex, 5/6/7/8 bit data, 1, 2 stop bits, Flow ctrl: CTS/RTS, data polarity: norm / inv.
- **Remote Control Port**
  - RS-485 Multi-drop, RS-232D (DB25 connector, male):
    - Data Rate: 1200 to 115200 bps, 1 or 2 stop bits, 8 bit character lengths
- **Ethernet**
  - Data & Control, 10/100 Base T, RJ 45 connector, embedded TCP/IP Stack, Protocol: RM4 Ctrl Protocol
- **F/Panel**
  - 8 bi-colour status LED indicators on front panel:
    - DTE, REM Ctrl / LAN, RADIO Ctrl connection status
    - Mail (AMD), MODM & ALE, Voice (ALE voice call) activity status, Power indicator
- **Radio Control Port**
  - RS-232 (DE9 connector): 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 RapidM 2G ALE Product brochure for more details.
- **Radio Audio Port**
  - Input Audio: 600 Ohm balanced, −20 to +13 dBm without adjustment
  - Output Audio: Balanced, −40 to +10 dBm (PAM) adjustable into 600 ohm load
  - Keyline: Open collector to ground (<45 volts, 50 mA) & non-polarized contact closure (<45 V, 200 mA)

#### INSTALLATION

- **Weight**: 1.7 kg (approx.)
- **Colour**: Black powder coat
- **Size**: 41.1 x 212.7 x 159.0 mm (h x w x d), Front panel height : 44.1 mm
- **Power**: 87 to 267 V AC, 47 to 440 Hz
  - 6 to 36V DC
- **Rack Mounting**: 1 unit in 19" Rack slot, 2 units side-by-side on shelf

#### ENVIRONMENTAL

- **Temperature**: −30°C to +70°C (operating);
- **Humidity**: 0 to 99%, non-condensing
- **Shock**: MIL-STD-810E Method 516.4, Procedure 1, Funct. (40G, 11 ms)
- **Vibration**: MIL-STD-810E Meth. 514.4, Cat. 9, Shipboard
- **EMC**: MIL-STD-1810E Method 514.4, Cat. 9, Shipboard
- **Safety**: IEC/EN 60950

---

Apex Corporate Park
Pretoria, South Africa

Rapid Mobile Pty (Ltd)
Tel: +27 (0) 12 349 0000
Fax: +27 (0) 12 349 0010
e-mail: info@rapidm.com
web: www.rapidm.com

Copyright © 2008 RapidM