



### RM8 Product Overview

The *RM8 Software Defined Modem & ALE Controller* is a standalone unit building on the functionality of the RM6-A. The RM8 offers a comprehensive range of HF data modem waveforms and the latest 3G ALE (STANAG 4538 ARCS) protocols. The RM8 is aimed at both naval and government end-users who require high-performance flexible product for their long distance (BLOS) strategic and maritime data communications using HF transceiver equipment.

The basic RM8 platform comes with either the M1 or M2 HF modem software pack. Other software options can be activated with the appropriate *RapidM* activation key.

### Key Features

- **Standards compliance**
  - MIL-STD 110B, 141C and
  - STANAG 4539, 4538
- **High Data Rate HF & V/UHF Modems**
- **DTE port** – EIA 530A Synchronous/Asynchronous
- **Split-Site Operation** – Modem & ALE 2G & 3G
- **Remote control interfaces** – Serial and Ethernet
- **Local configuration & control** – Menu-driven
- **Power supply variants** – AC and AC + DC
- **GPS unit built-in & I/F** – for ALE time (Link Prot.)
- **2G ALE option** – datasheet available
- **3G ALE FLSU option** – datasheet available
- **3G Packet data option** – datasheet available
- **Works with RC8 ARQ** – datasheet available

### LF and HF Data Modem

The RM8 HF data modem offers a maximum data rate of 9600 bps over a standard 3 kHz (SSB) channel and 19200 bps over 2x3 kHz (ISB).

All QAM waveforms have AUTOBAUD and adaptive equalization to mitigate HF dispersive fading or multi-path induced Doppler spread – mobile V/UHF channels. Cancellation of narrowband co-channel interference is accomplished via adaptive tone excision.

In practice, the RM8 will operate well with older generation HF and V/UHF transceivers due to superior in-band equalization performance and dynamic range.

### Additional Data Modem Features

- **HF Data Modem Waveform Standards**
  - MIL-STD-188-110A
  - MIL-STD-188-110B & App. F
  - STANAG 4539 (QAM), incl. Annex D TDMA
  - STANAG 4285 (PSK)
  - STANAG 4529 (NB PSK)
  - STANAG 4415 (robust)
  - STANAG 4481 (shore-to-ship)
- **LF Data Modem Waveform Standards**
  - STANAG 5065 (MSK)
- **Configuration and Control Protocols**
  - RAP1/RIPC Protocol
  - STANAG 5066 (Annex E)
- **Waveform Performance**
  - Field hardened performance



Figure 1: Rear Panel connections on RM8 – Variant 2: AC + DC PSU ( *RapidM* RM-SC sync card also shown)

| MODEM SOFTWARE PACKS           |            |                                                                                                                                                       |            |    |
|--------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----|
| STANDARD                       | MODULATION | DATA RATES & CHARACTERISTICS                                                                                                                          | INTERFACES |    |
|                                |            |                                                                                                                                                       | M1         | M2 |
| MIL-STD-188-110B<br>APPENDIX C | PSK/QAM    | 3200, 4800, 6400, 8000, 9600 bps (Coded)                                                                                                              | •          | •  |
| STANAG 4539                    | PSK/QAM    | 75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, 9600 bps (Coded)<br><i>Includes STANAG 4539 Annex D TDMA Protocol &amp; WF1, WF2 &amp; WF3</i> | •          | •  |
| MIL-STD-188-110B               | PSK/QAM    | 75, 150, 300, 600, 1200, 2400, 3200, 4800, 6400, 8000, bps (Coded)                                                                                    | •          | •  |
| MIL-STD-188-110B<br>APPENDIX F | PSK/QAM    | ISB: 9600, 12800, 16000, 19200 bps (Coded)                                                                                                            | •          | -  |
| MIL-STD-188-110A               | PSK        | 75, 150, 300, 600, 1200, 2400 bps (Coded), 4800 bps                                                                                                   | •          | •  |
| STANAG 4415                    | PSK        | NATO robust: 75 bps (Coded)                                                                                                                           | •          | •  |
| STANAG 4285                    | PSK        | 75, 150, 300, 600, 1200, 2400 bps (Coded), 1200, 2400, 3600 bps                                                                                       | •          | •  |
| STANAG 4529                    | PSK        | 75, 150, 300, 600, 1200 bps (Coded), 600, 1200, 1800 bps                                                                                              | •          | •  |
| STANAG 4481 PSK                | PSK        | 300 bps (Coded)                                                                                                                                       | •          | •  |
| STANAG 5065 (LF)               | FSK MSK    | 75 bps (FSK) 300 bps (MSK) (Coded)                                                                                                                    | •          | -  |
| STANAG 4481 FSK                | FSK        | Single channel: 75 bps<br>Multi-channel: 75 bps selectable carrier                                                                                    | •          | •  |
| FSK VARIABLE                   | FSK        | Data Rates: 50, 75, 100, 150, 200, 300, 400, 600, 1200 bps<br>Mark & Space Frequency: 350 to 3000 Hz                                                  | •          | •  |

| PHYSICAL CHARACTERISTICS     |                                                                                                                                |                                                                                                                                                                             |                                                                                                                                                                                                        |                              |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| SIZE, WEIGHT & COLOR         | Width: 212.2 mm<br>Depth: 225.6 mm                                                                                             | Height: 41.1 mm (excl. front panel)<br>Height: 44.1 mm (incl. front panel)                                                                                                  | Weight: 2.2 kg                                                                                                                                                                                         | Color: Black Grey (RAL 7021) |
| ENVIRONMENTAL SPECIFICATIONS | Climatic                                                                                                                       | <ul style="list-style-type: none"><li>Storage/Operation: -30 °C to +70 °C (MIL-STD-810F)</li><li>Humidity: 90% non-condensing at 30 °C (MIL-STD-810F)</li></ul>             |                                                                                                                                                                                                        |                              |
|                              | Mechanical                                                                                                                     | <ul style="list-style-type: none"><li>Vibration: Surface Ship, Marine Vehicles, Aircraft, Min. Integrity (MIL-STD-810F)</li><li>Shock: 40 G, 11 ms (MIL-STD-810F)</li></ul> |                                                                                                                                                                                                        |                              |
|                              | EMC                                                                                                                            | <ul style="list-style-type: none"><li>MIL-STD-461E (RE101, RE102, CE102, CS101, CS114, RS101, RS103)</li></ul>                                                              |                                                                                                                                                                                                        |                              |
|                              | Safety/CE Marking                                                                                                              | <ul style="list-style-type: none"><li>CE Marking - Directives 2006/95/EC as amended</li><li>SANS 60950-1:2010 / IEC 60950-1:2012</li></ul>                                  | <ul style="list-style-type: none"><li>LVD - Low Voltage Directive 2014/35/UE</li><li>EMC - Electromagnetic Compatibility Directive 2014/30/UE</li><li>EDD – Eco-Design Directive 2009/125/EC</li></ul> |                              |
|                              | MTBF                                                                                                                           | <ul style="list-style-type: none"><li>&gt; 40,000 hours</li></ul>                                                                                                           |                                                                                                                                                                                                        |                              |
| INSTALLATION                 | Compact design: The unit occupies a width less than ½ of an 1U 19” rack slot, <i>RapidM</i> 19" rack-mountable tray available. |                                                                                                                                                                             |                                                                                                                                                                                                        |                              |
| PRESETS                      | Factory and Custom Presets                                                                                                     |                                                                                                                                                                             |                                                                                                                                                                                                        |                              |

| INTERFACES                             |                                                                                                                                                                                                                                                                                           |
|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DTE (DATA) PORT<br>(DB25F)             | RS-422 balanced, RS-423, RS-232 unbalanced., MIL-STD-188-114 (interoperable), EIA 530A compliant<br>Half & Full Duplex operation, Synchronous, Standard and High-speed Async modes                                                                                                        |
| REMOTE CONTROL/<br>GPS PORT (DE9M)     | Remote Control Pins: RS-422 balanced or RS-232<br>Protocol: Control Protocol (RAP1 + RIPC, ASCII S5066 Annex E)<br>External GPS Control Pins: RS-232 (nominally input)<br>Data Rate: 300 to 19200 bps, 1/2 stop bits, 7/8 bit data. PPS line: RS 232/422 (NMEA) or TTL                    |
| GPS                                    | Built-in GPS receiver: Time reference for 2G ALE Linking protection (AL-2).                                                                                                                                                                                                               |
| ETHERNET<br>CTRL PORT (RJ45)           | Remote Control: 10/100 Base T (IEEE 802.3U compatible), embedded TCP/IP Stack<br>Protocol: Control Protocol (RAP1 + RIPC)                                                                                                                                                                 |
| ETHERNET<br>DATA PORT (RJ45)           | IP Packet Data: 10/100 Base T (IEEE 802.3U compatible), embedded TCP/IP Stack<br>Protocol: Raw IP packet data, requires 3G ALE.                                                                                                                                                           |
| USER INTERFACE                         | Local control via 32x202 pixel graphical LCD display and 16-key keypad. 3 bi-colour LED indicators<br>Alphanumeric and digit keypad for fast data entry, 4-way navigation button                                                                                                          |
| RADIO CONTROL &<br>AUDIO PORTS (DB25M) | Radio Control Pins (2 channels): RS-232, up to 115200 bps, 1/2 stop bits, 7/8 bit data<br>Supports for various radio control protocols are built-in.                                                                                                                                      |
|                                        | Input Audio (2 channels): 600 Ohm balanced, -20 to +10 dBm without adjustment<br>Output Audio (2 channels): Balanced, -40 to +10 dBm adjustable into 600 ohm load<br>Keyline: Non-polarized contact closure (<45 V, 200 mA).<br>PTT Sense Input: Pull to ground to indicate external PTT. |
|                                        | Aux Audio Pins: Connection of microphone for ALE voice calling<br>Input Audio: 600 ohm balanced, -20 to +10 dBm without adjustment or MIC input (selectable)<br>Output Audio: Balanced, -40 to +10 dBm adjustable into 600 ohm load                                                       |
| SUPPLY                                 | <b>Variant 1, AC Supply:</b> 90-264 VAC, 40-440 Hz, 2A; 100-370 VDC<br><b>Variant 2, AC + DC:</b> 90-264 VAC, 40-440 Hz, 2A; 100-370 VDC & 6-36 VDC MIL-STD 1275B protection                                                                                                              |

| ORDERING INFORMATION    | STOCK NUMBER    | DESCRIPTION                                |
|-------------------------|-----------------|--------------------------------------------|
| RM8 (M1) AC SUPPLY      | RME-81-RA-M13.2 | SDM: RM8 M1 (110B, F ISB 2x9600) V3.2      |
| RM8 (M2) AC SUPPLY      | RME-81-RA-M23.2 | SDM: RM8 M2 (HF S4285, S4539 9600) V3.2    |
| RM8 (M1) AC & DC SUPPLY | RME-81-RY-M13.2 | SDM: RM8 A/DC M1 (110B, F ISB 2x9600) V3.2 |
| RM8 (M2) AC & DC SUPPLY | RME-81-RY-M23.2 | SDM: RM8 A/DC M2 (S4285, S4539) V3.2       |

| OTHER RM8 SOFTWARE OPTIONS*    | STOCK NUMBER    | DESCRIPTION                             |
|--------------------------------|-----------------|-----------------------------------------|
| 2G ALE (MIL-STD-188-141B)      | RM8-SW-O-2G-5.3 | SW MDL-2G ALE / MS 141B, App. A, B V5.3 |
| 3G ALE (STANAG 4538) FLSU, xDL | RM8-SW-O-3A-5.3 | SW MDL-3G ALE 4538 FLSU, xDL V5.3       |

\* Contact RapidM for datasheets.

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