RM12

Wideband SDM & ALE – 48 kHz

NAV DIVISION

DATASHEET

ALE 4G, 3G & 2G (48 kHz) | **WBHF MODEM (48 kHz)**

Functions and Applications

- **Streaming Modem:** MIL-STD-188-110D and STANAG 5069
- **Automatic Link Establishment Controller:** MIL-STD-188-141D and STANAG 4538 (FLSU)
- **Packet Modem:** STANAG 4538 (xDL)

Features and Benefits

- **Wideband HF Data Modem Waveforms**
  - MIL-STD-188-110D and STANAG 5069 (24, 48 kHz)
  - Constraint length 7 and 9 FEC
  - High-Speed BLOS HF Data Communications
    - Up to 144 kbps SKY-WAVE/BLOS
    - Up to 240 kbps GND-WAVE/LOS
- **Narrowband HF/LF Data Modem Waveforms**
  - MIL-STD-188-110A/B, including 2-ISB
  - STANAG 4539, 4415, 4481, 4529, 4285, 5065 (LF)
- **Automatic Link Establishment Controller**
  - MIL-STD-188-141D: WALE (Fast and Deep)
  - MIL-STD-188-141D: Linking Protection (HALFLOOP)
  - MIL-STD-188-141A/B/C: 2G ALE and 3G ALE
- **External Interfaces**
  - DTE Port: Synchronous (EIA-530A)
  - ETHERNET LAN Ports: Control, Data and VITA-49
  - Radio Audio and Control: 48 kHz Baseband, 2xRS-232
- **Deployment**
  - 19" Rack Mount for Strategic Use
  - Mobile Platform (Ship, Aircraft)
  - Shore Station (Split-Site Architecture)
- **High-Build Quality**
  - Excellent Environmental Specifications
  - Wide Operational Temperature Range
- **High Reliability:**
  - High MTBF: > 40 000 hours
- **Extended Product Life-Cycle:**
  - Product Availability: > 15 years
  - Availability of Spares: > 20 years
  - Long-Term Configuration Management
- **Front Panel:** Operator Interface

RM12 Product Overview

Navies and coast guards need relatively high speed beyond line-of-sight (BLOS) data communication, spanning long distances over water, without being reliant on satellite networks. High frequency (HF) backbone networks and other terrestrial HF radio networks provide strategic communications to government, disaster relief agencies and industries, without relying on vulnerable fixed-line network infrastructure.

Wideband HF Streaming Modem

Offering data rates of up to 240 kbps on a 48 kHz wide channel, the RM12 opens the door for HF to provide the same levels of data transmission speeds, quality and security of a narrowband SATCOM system. The RM12 offers standards-based HF data modem waveforms, in particular, the 48 kHz wideband HF modem as defined in MIL-STD-188-110D and STANAG 5069. Included with the wideband data mode, the suite of SSB and 2-ISB waveform, defined in HF MIL-STD-188-110A/B, STANAG 4539, 4415, 4481, 4285, 4529 and 5065 (LF) allows interoperability with legacy systems.

Wideband ALE

The RM12 also provides wideband automatic link establishment (4G ALE/WALE), based on MIL-STD-188-141D, up to 48 kHz bandwidth. The 4G ALE/WALE option includes 2G ALE and 3G ALE as per MIL-STD-188-141A/B and STANAG 4538 (FLSU only). Please refer to the RM12 “ALE 4G, 3G & 2G (48 kHz)” datasheet.

Deployment

The RM12 has a flexible and compact ½ of 1U 19-inch rack-mountable form factor and provides standard interfaces to radios (audio and control), data terminal and cryptographic equipment and management systems. The RM12 Wideband HF Data Modem and ALE connects to wideband HF radios via analogue or digital audio interfaces. The latter is based on the use of the VITA 49.2 standard.

Companion Product

The companion product of the RM12 is the RC12 Wideband ARQ and IP Controller which provides automatic repeat request (ARQ) services based on STANAG 5066 Edition 4. In addition, the RI12 IP-to-Sync Controller product can also be considered for split-site installations.

RapidM

REACHING BEYOND BOUNDARIES

The RM12 comes standard with MIL-STD-188-110D Block 1 (B1) to Block 4 (B4) capability. These data rates per modulation and bandwidth are shown in the table below. In addition, the RM12 comes standard with MIL-STD-188-141D Wideband ALE which includes 2G ALE, 3G ALE (FLSU) functions and linking protection modes as described in the standard.

Waveform Standards	Capability Blocks	#	0	1	2	3	4	5	6	7	8	9	10	11	12	13
		B/W (kHz)	Walsh	BPSK	BPSK	BPSK	BPSK	BPSK	Q-PSK	8-PSK	16-QAM	32-QAM	64-QAM	64-QAM	256-QAM	Q-PSK
MIL-STD-188-110D Appendix D	B1	3	75	150	300	600	1200	1600	3200	4800	6400	8000	9600	12000	16000	2400
	B2	6	150	300	600	1200	2400	3200	6400	9600	12800	16000	19200	24000	32000	
	B3	9	300	600	1200	2400	-	4800	9600	14400	19200	25600	28800	36000	48000	
	B3	12	300	600	1200	2400	4800	6400	12800	19200	25600	32000	38400	48000	64000	
	B3	15	300	600	1200	2400	4800	8000	16000	24000	32000	51200	48000	57600	76800	
	B4	18	600	1200	2400	4800	-	9600	19200	28800	38400	51200	57600	72000	90000	
	B4	21	300	600	1200	2400	4800	9600	19200	28800	38400	48000	57600	76800	115200	
	B4	24	600	1200	2400	4800	9600	12800	25600	38400	51200	64000	76800	96000	120000	
	B4	30	600	1200	2400	4800	9600	16000	32000	48000	64000	80000	96000	120000	160000	
	B4	36	1200	2400	4800	9600	12800	19200	38400	57600	76800	96000	115200	144000	1920000	
	B4	42	1200	2400	4800	9600	12800	19200	38400	57600	76800	96000	115200	160000	192000	
	B4	48	1200	2400	4800	9600	16000	24000	48000	72000	96000	120000	144000	192000	240000	
			Sky-Wave Channel											Ground-Wave Channel		

General Specifications and Interfaces

Physical Characteristics				
Size, Weight & Color	Width: 212.2 mm Depth: 225.6 mm	Height: 41.1 mm (excl. front panel) Height: 44.1 mm (incl. front panel)	Weight: 1.7 kg	Colour: Saddlewood Powder (VX 7517)
Environmental Specifications	Climatic	○ Storage: -30 ˚C and +70 ˚C (MIL-STD-810H, Methods 501.7 & 502.7) ○ Operation: -20 ˚C and +55 ˚C (MIL-STD-810H, Methods 501.7 & 502.7) ○ Humidity: 95% non-condensing at 30 ˚C to 60 ˚C cycles (MIL-STD-810H, Method 507.6)		
	Mechanical	○ Vibration: Mechanical Vibration of Shipboard Equipment (MIL-STD 810H, Method 528.1) ○ Shock: 20 G, 18 ms (MIL-STD-810H, Method 516.8)		
	EMC	○ MIL-STD-461G (CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS103)		
	Safety/CE Marking	○ CE Safety – EN62368-1 ○ CE-EMC – Emissions: EN 55032 ○ Immunity: EN 55035	○ LVD - Low Voltage Directive 2014/35/UE ○ EMC - Electromagnetic Compatibility Directive 2014/30/UE	
	MTBF	> 40 000 hours		
	Safety (other)	RoHS (2011/65/EU + 2015/863); REACH (EC No. 1907/2006); WEEE (2012/19/EU); Ozone (EU 2024/590); Greenhouse Gases (EU 2024/573)		
Installation	Compact design: The unit occupies a width less than ½ of an 1U 19” rack slot, *RapidM* 19" rack-mountable tray available.			

External Interfaces – Front & Rear Panels		
Rear J3 DTE (Data) Port (DB25F)	RS-422 balanced, RS-423, RS-232 unbalanced, MIL-STD-188-114 interoperable, EIA-530A compliant Half & Full Duplex operation, Synchronous, Standard and High-speed Async modes	
Rear J15 Remote Control / GPS Port (DE9M)	Remote Control Pins: RS-422 balanced or RS-232 Protocol: Control Protocol (RAP1 + RIPC, ASCII S5066 Annex E)	External GPS Control Pins: RS-232 (nominally input) Data Rate: 300 to 19200 bps, 1/2 stop bits, 7/8 bit data. PPS line: RS-232 or logic level
Rear J14 Ethernet CTRL Port (RJ45)	Remote Control: 10/100BASE-T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: Control Protocol (RAP1 + RIPC)	
Rear J13 Ethernet DATA Port (RJ45)	IP Packet Data: 10/100BASE-T (IEEE 802.3U compatible), embedded UDP/IP Stack Protocol: Narrowband or Wideband Packet Data over TCP/IP	
Rear J49 Ethernet RADIO Port (RJ45)	IP Packet Data: 10/100BASE-T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: ANSI/VITA 49.2-2017 VITA Radio Transport (VRT)	
Rear J11 Radio Control & Audio Ports (DB25M)	Radio Control Pins (2 channels): RS-232, up to 115200 bps, 1/2 stop bits, 7/8 bit data Supports for various radio control protocols are built-in.	
	Input Audio (2 channels): 600 Ohm balanced, –20 to +10 dBm without adjustment Output Audio (2 channels): Balanced, –40 to +10 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.	
	Aux Audio Pins: Connection of microphone for ALE voice calling Input Audio: 600 ohm balanced, –20 to +10 dBm without adjustment Output Audio: Balanced, –40 to +10 dBm adjustable into 600 ohm load	
Rear J38 Supply	AC Supply: 85-305 VAC, 47–440 Hz, 2A; 120-430 VDC, 4.5 Watt	
Front User Interface	Local control via 256x64 pixel graphical OLED display and 16-key keypad. Alphanumeric and digit keypad for fast data entry, 4-way navigation button.	

Ordering Information	Stock Number	Description
RM12 Hardware, Modem and ALE	RME-M2-RA-4SV06	SDM: RM12 (110ABCD 4G WALE 48kHz) V06

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