RC12
Wideband ARQ & IP Controller – 240 kbps

| S4591 MELP 1200/2400 | S4691 MARLIN – 48 kHz | S5066 Ed 4 WB-ARQ | PRODUCT OVERVIEW |

Features and Benefits

- **Available Embedded Functions**
  - STANAG 5066 Ed. 4*: WB-ARQ Stack & Clients (≤ 240 000 bps)
  - STANAG 4691*: MARLIN Controller (≤ 240 000 bps)
  - STANAG 4591*: MELPe Voice Coder (1200 & 2400 bps)
  - * refer to separate datasheets for technical specifications.

- **Product Interfaces**
  - DTE Data: Connects to COMSEC, Synchronous / Async, serial I/F
  - Serial Remote Control: Connects to Trusted Filter, serial I/F
  - Ethernet Remote Control: Connects to Management System, Eth. I/F
  - Ethernet Auxiliary Data: Connects to Data Applications, Eth. I/F
  - Ethernet Data: Alternative data connection to Modem, Eth. I/F
  - Serial Data: Connects to MMHS Terminal, serial I/F
  - Analog Audio: Connects to Audio Intercom, 2 channel audio I/F
  - GPS: Accurate time updates from external GPS

- **STANAG 5066 Wideband ARQ Features**
  - HF BLOS: STANAG 5066 data over HF BLOS (skywave) radio links
  - Data Rate Change: Dynamically adapts to BLOS radio link variability
  - ALE Control: Multi-channel support, 2G/3G/4G ALE with ALM
  - Collision Avoidance: For HF Networking, CSMA & WTRP
  - Deployment: Ship-Borne & Shore Station incl. Split-Site

- **STANAG 4691 MARLIN Controller Features**
  - HF ELOS: IPv4 data over HF ELOS (surface wave) radio links
  - Collision Avoidance: For HF Networking, TDMA slots
  - Deployment: Ship-Borne for C2 in Naval Task Force

- **STANAG 4591 MELPe Voice Coder Features**
  - Data Rates: 1200 and 2400 bps (600 bps is not included)

- **Product Features**
  - Factory Presets: Simplified configuration using pre-defined profiles
  - Radio Silence: Tx Inhibit support for S5066, S4691 & S4591
  - Split-Site Operation: Supports dedicated Tx and Rx modems
  - Environmental Spec: Tested to MIL-STD-810H and MIL-STD-461G
  - Product Availability: 15 years, then Form Fit Function replacement
  - Interoperability: NATO architecture support, proven interoperability
  - Network Time: Accurate time updates via NTP time server

RC12 Product Overview

The RC12 ARQ Server and IP Controller is a software defined OSI Layer 2 product for HF radio circuits, offering the following standards-conformant protocol and voice embedded functions in a 19" rack-mountable unit:

- STANAG 5066 Edition 4 Automatic Repeat Request (ARQ) protocol stack for HF Beyond-Line-Of-Sight (BLOS) data communication,
- STANAG 4691 Appendix A Mobile Ad-Hoc Relay Line of Sight Networking (MARLIN) controller for HF Extended Line-of-Sight (ELOS) data communication, and
- STANAG 4591 Enhanced Mixed Excitation Linear Prediction (MELPe) digital voice encoder and decoder.

These functions enable seamless end-to-end interoperability between strategic and tactical data and voice radio communication systems for NATO and Allied Forces. The RC12 embedded functions can be ordered separately and activated via software activation keys. Refer to the ordering information on the back page of this datasheet.

The STANAG 5066 Ed.4 ARQ Stack was designed for emerging wideband HF applications providing data communications over HF BLOS radio links. The RC12's wideband ARQ function supports automatic Data Rate Change (DRC), multi-frequency Automatic Link Establishment (ALE) and Automatic Link Maintenance (ALM) operation which combined, significantly increases geographic reach and availability of service – day and night.
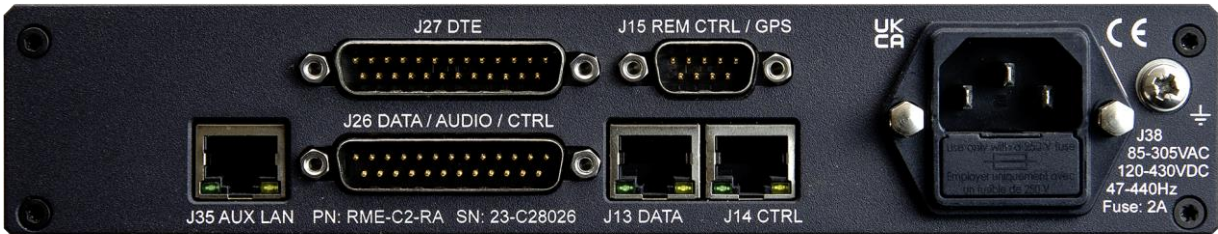
The STANAG 5066 Ed.3 Narrowband ARQ Stack for HF, including the Wireless Token Ring Protocol (WTRP), is available as an operating mode in the RC12. This can be used for backward compatibility with existing fielded equipment supporting STANAG 5066 Ed.3 only.

Even though the STANAG 4691 MARLIN standard was originally developed to provide connectivity amongst ships at sea and slow-moving aircraft using V/UHF LOS radio links, it has become a proven technology for ships using HF LOS radio links, i.e. using surface wave propagation. This use case enables task force based ship-to-ship command and control (C2) operation over HF ELOS, where direct UHF LOS (including multi-hop relay) communication is not possible due to distance.

The RC12 includes a standards-conformant STANAG 4591 MELPe digital voice coder, enabling seamless end-to-end digital voice interoperability among and between the strategic and tactical NATO and Allied radio communication systems.

The RC12 MELPe implementation is based on the Compandent Inc. MELPe library (Version 8.3MC) and provides the 1200 bps and 2400 bps voice coder rates.

General Specifications & 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	Color: Saddlewood Powder (VX 7517)
Environmental Specifications	Climatic	o Storage: -30 ˚C and +70 ˚C (MIL-STD-810H, Methods 501.7 & 502.7) o Operation: -20 ˚C and +55 ˚C (MIL-STD-810H, Methods 501.7 & 502.7) o Humidity: 95% non-condensing at 30 ˚C to 60 ˚C cycles (MIL-STD-810H, Method 507.6)		
	Mechanical	o Vibration: Mechanical Vibration of Shipboard Equipment (MIL-STD 810H, Method 528.1) o Shock: 20 G, 18 ms (MIL-STD-810H, Method 516.8)		
	EMC	o MIL-STD-461G (CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS103)		
	Safety/CE Marking	o CE Safety – EN62368-1 o CE-EMC – Emissions: EN 55032 o Immunity: EN 55035	o LVD - Low Voltage Directive 2014/35/UE o 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 J27 DTE (Data) Port (DB25M)	RS-422 balanced, RS-423, RS-232 unbalanced, MIL-STD-188-114 (interoperable), EIA-530A compliant. Half Duplex operation, DTE Synchronous and Asynchronous modes. Connects to serial cryptographic equipment for communication security.
Rear J13 Ethernet Data LAN (RJ45)	IP Packet Data: 10/100BASE-T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: TCP data for modem. Connects to *RM12 Wideband SDM & ALE* modem.
Rear J35 Ethernet Aux LAN (RJ45)	IP Packet Data: 10/100BASE-T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: IP - connects to application Router (Enclave or Federating); SIS S_Primitives over TCP/IP - connects to PCs & routers.
Rear J15 Remote Control/ GPS Port (DE9M)	Remote Control Pins: RS-422 balanced or RS-232 Protocol: Control Protocol (RAP1 + RIPC). Connects to *RM12 Wideband SDM & ALE* modem for real-time operational control for data rate change and ALE/ALM operation.
	External GPS Control Pins: RS-232 (nominally input). Data Rate: 300 to 19200 bps. PPS line: RS-232 or logic level. Connects to external GPS. Used for accurate system time (not position) from GPS.
Rear J26 Serial Data (2) & Audio Ports (2) (DB25M)	Asynchronous Data: RS-232, up to 115200 bps, 1/2 stop bits, 5/6/7/8 data bits, RTS/CTS supported. Support for: ITA-2, ITA-5 for ACP-127 support. Connects to ACP 127 terminal.
	Input Audio: 600 ohm balanced, –20 to +10 dBm without adjustment Output Audio: Balanced, –40 to +10 dBm adjustable into 600 ohm load. Connects to intercom.
Rear J14 Ethernet CTRL LAN (RJ45)	Remote Control: 10/100BASE-T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: Control Protocol (RAP1 + RIPC). Connects to external management / control system; connects to Modem as an alternative to J15.
Rear J38 Supply	AC Supply: 85-305 VAC, 47–440 Hz, 2A; 120-430 VDC, 3.1 Watt Powers the unit; suitable for use on military base stations, vessels and aircraft.
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.

RC12 Ordering Information

The RC12 product can be ordered in two software defined basic variants, i.e. STANAG 5066 Wideband ARQ for operation of HF BLOS radio links or STANAG 4691 MARLIN Controller for operation over HF ELOS radio links. For both basic variants, the other software functions can be ordered as software options. Both basic variants offer STANAG 4591 MELPe Voice Coder as software option.

RC12 Hardware + STANAG 5066 Wideband ARQ Software

RC12 Ordering Information	Stock Number	Description
RC12 Hardware, S5066 ARQ & IP Controller (CD)	RME-C2-RA-CDV06	SDC: RC12 CD (5066WB ARQ IP Client 240kbps) V06
Software Option: Email Gateway (SMTP/CFTP/HMTP) (CE)	C12-SW-O-CE-V06	SW MDL-CE (5066 Email G/way, SMTP) V06
Software Option: S4691 MARLIN Controller (CU)	C12-SW-O-CU-V06	SW MDL-CU (4691-A Ctrl 240kbps) V06
Software Option: S4591 MELPe Voice Coder (CN)	C12-SW-O-CN-V06	SW MDL-CN (DV MELPe 1200, 2400bps) V06

RC12 Hardware + STANAG S4691 MARLIN Controller Software

RC12 Ordering Information	Stock Number	Description
RC12 Hardware, S4691 MARLIN Controller (CU)	RME-C2-RA-CUV06	SDC: RC12 CU (4691-A Ctrl 240kbps) V06
Software Option: S5066 Wideband ARQ & IP Controller (CD)	C12-SW-O-CD-V06	SW MDL-CD (5066WB ARQ IP 240kps) V06
Software Option: Email Gateway (SMTP) (CE)	C12-SW-O-CE-V06	SW MDL-CE (5066 Email G/way, SMTP) V06
Software Option: S4591 MELPe Voice Coder (CN)	C12-SW-O-CN-V06	SW MDL-CN (DV MELPe 1200, 2400bps) V06

@ info@rapidm.com

☎ +27 12 349 0000

🌐 https://www.rapidm.com/

RapidM