



MARLIN Controller

Features and Benefits

- **Embedded Function**
 - STANAG 4691, Annex A: MARLIN Controller (≤ 1920 kbps)
- **STANAG 4691 MARLIN Controller Features**
 - STANAG 4691 (20, 25, 100, 300, 500 kHz) Data Rates: ≤ 1920 kbps
 - IPv4 Support: IPv4 Data Transfer over V/UHF LOS
 - Single-Hop Support: Point-to-Point Packet Delivery (No Relaying)
 - Multi-Hop Support: Packet Delivery via MANET Relaying
 - Reliable Data Transfer: Error-Free Data Transfer Using ARQ Protocol
 - Collision Avoidance: Synchronous Time-Division Multiple Access Slots
 - Adaptive Data Throughput Control: Dynamic Bandwidth Allocation
 - Automatic Neighbour Discovery: MANET Relay Controller
 - Radio Silence: Tx Inhibit
 - Proven Interoperability
- **External Control Interfaces**
 - Remote: Serial and Ethernet I/F
 - Local: Front Panel – Operator I/F
- **External Data Interfaces**
 - Serial Data: EIA 530, RS-232, RS-422 Sync./Async I/F
 - Ethernet Auxiliary Data: Alternative Data Connection to Modem, Eth. I/F
 - Ethernet Data: Connects to Data Applications, Eth. I/F
- **High-Build Quality**
 - Excellent Environmental Specifications
 - Wide Operational Temperature Range
- **High Reliability**
 - High MTBF: $> 40\,000$ hours
- **External Time Interfaces**
 - GPS: Accurate Time Updates from External GPS
 - Network Time: Accurate Time Updates via NTP Time Server
- **Deployment**
 - 19" Rack Mount for Strategic Use
 - Mobile Platform (Ship, Aircraft)
- **Extended Product Life-Cycle**
 - Availability of Spares: > 20 years
 - Product Availability: > 15 years

RC34 Product Overview

The RC34 is a software-defined OSI Layer 2 and Layer 3 product for V/UHF radio circuits, offering a STANAG 4691 Appendix A Mobile Ad-Hoc Relay Line of Sight Networking (MARLIN) controller for HF extended line-of-sight (ELOS) data communication in a 19-inch rack-mount unit.

This function enables seamless and proven end-to-end interoperability between strategic and tactical data systems for NATO and allied forces utilising ultra-wideband radio channels.

STANAG 4691 MARLIN

STANAG 4691, also known as Mobile Ad-Hoc Relay Line of Sight Networking (MARLIN), is a NATO specification designed to facilitate internet protocol (IP) data transfers in multi-node, multi-hop dynamic networks employing V/UHF line-of-sight (LOS) and HF extended line-of-sight (ELOS) radio circuit networks.

In environments where SATCOM availability is constrained due to equipment limitations, cost considerations or SATCOM-denied areas, MARLIN's utilisation of V/UHF LOS emerges as a practical alternative. Furthermore, the widespread availability of legacy tactical voice radios that support UHF bands could be utilised to transport IP data using STANAG 4691 (MARLIN).

MARLIN radio circuit networks offer interoperability of allied forces by allowing the exchange of tactical data with all sea-surface, sub-surface, airborne (mobile) and land (fixed) platforms.

MARLIN Network Controller

The RC34's MARLIN controller conforms to the STANAG 4691, Annex A, by providing functionalities, such as automatic network discovery, collision avoidance, error-free data delivery using the embedded ARQ protocol, multi-hop Mobile Ad-Hoc Networking (MANET) operation and slot merging for adaptive data throughput control.

The MARLIN controller utilises a synchronous Time Division Multiple Access (TDMA) scheme called Distributed Slot Reservation Media Access (DSRMA). Each MARLIN node, except during radio silence, maintains a fixed allocation of time slots in each frame. The number of allocated slots per node adjusts automatically based on data demands through a dynamic bandwidth allocation mechanism.

System Integration

For the STANAG 4691 MARLIN UHF solution, the RC34 is utilised in conjunction with the ultra-wideband V/UHF S4691 waveform provided by the RM34. A link encryption module may be connected between the controller and modem. Typically, an IP router connects to the RC34 controller, while a V/UHF radio interfaces with the RM34 modem.

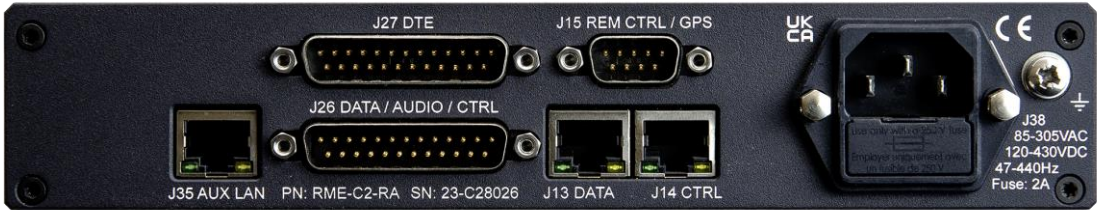
The RC34's utilises the following RM34 embedded waveforms during STANAG 4691-A (protocol) operations:

Deployment

The RC34 offers a compact ½ of 1U 19-inch rack-mountable form factor, ensuring flexibility in deployment across sea-surface vessels, sub-surface submarines, airborne (mobile) platforms, and land-based (fixed) installations. The standard interfaces offered by the RC34 seamlessly integrate cryptographic equipment, and management systems, facilitating convenient deployment in various operational environments.

V/UHF Modem Waveforms									
Waveform Standards	Annex	Bandwidth	Data Rates [kbps]						
			64-QAM	32-QAM	16-QAM	16-QAM	8-PSK	Q-PSK	B-PSK
STANAG 4691/AComP-4691	E	500 kHz	1920	1600	1280	960	720	360	180
	D	300 kHz	1152	960	768	600	450	225	112.5
	C	100 kHz	384	320	256	192	128	64	32
	B	25 kHz	96	80	64	48	32	16	-
STANAG 4691 (Scaled) *	B	20 kHz	76.8	64	51.2	38.4	25.6	12.8	-
Line of Sight VHF and UHF Radio Channel									
* Extension of standard implementation.									

General Specifications and Interfaces



Physical Characteristics				
Size, Weight and Color	Width: 212.2 mm	Height: 41.1 mm (Excluding Front Panel)	Weight: 1.7 kg	Color: Saddlewood
	Depth: 225.6 mm	Height: 44.1 mm (Including Front Panel)		
Environmental Specifications	Climatic	<ul style="list-style-type: none">Storage: -30 °C and +70 °C (MIL-STD-810H, Methods 501.7 & 502.7)Operation: -30 °C and +60 °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	<ul style="list-style-type: none">Vibration: Mechanical Vibration of Shipboard Equipment (MIL-STD 810H, Method 528.1)Shock: 20 G, 18 ms (MIL-STD-810H, Method 516.8)		
	EMC	<ul style="list-style-type: none">MIL-STD-461G (CE101, CE102, CS101, CS114, CS115, CS116, RE101, RE102, RS103)		
	Safety/CE Marking	<ul style="list-style-type: none">CE Safety – EN62368-1CE-EMC – Emissions: EN 55032CE-EMC – Immunity: EN 55035	<ul style="list-style-type: none">LVD - Low Voltage Directive 2014/35/EUEMC - Electromagnetic Compatibility Directive 2014/30/EU	
	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	The unit occupies less than half the width of a 1U 19-inch rack slot. A 19-inch rack-mount tray is available.		
External Interfaces - Front and Rear Panels				
Rear J27 DTE (Data) Port (DB25M)	RS-422 Balanced, RS-423, RS-232 Unbalanced, MIL-STD-188-114 (Interoperable), EIA-530-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 <i>RM34 Ultra-Wideband SDM/70 MHz – 500kHz</i>			
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 and Routers.			
Rear J15 Remote Control/ GPS Port (DE9M)	Remote Control Pins: RS-422 Balanced or RS-232 Protocol: Control Protocol (RAP1 + RIPC).			
Rear J26 Serial Data (2) and Audio Ports (2) (DB25M)	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.			
	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.			
Rear J14 Ethernet CTRL LAN (RJ45)	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 J38 Supply	Remote Control: 10/100BASE-T (IEEE 802.3U Compatible), Embedded TCP/IP Stack Protocol: Control Protocol (RAP1 + RIPC)			
Front User Interface	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.			
Ordering Information	Stock Number	Description		
RC34 Hardware, S4691 MARLIN Controller (CU)	RME-CC-RA-CUV06	SDC: RC34 CU (4691-A Ctrl 1.92Mbps) V06		

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Revision: RC34_UWB_ARQ_EN_05B