



RI10 Product Overview

The RI10 IP-to-Sync Controllers are a pair of 19" rack-mountable hardware for transferring Synchronous Serial Data over Ethernet (TCP/IP). By utilizing the RI10, the transfer of encrypted bulk Data-over-IP over extended distances is possible whilst leveraging on the already installed base of high performance COMSEC devices.

The RI10 DCE variant is positioned between the COMSEC device and the Wide Area Network (WAN). On the radio equipment side the RI10 DTE variant operates as a Data Terminal Equipment (DTE) device. If the RapidM RM10 HF Wideband Modem is used, RI10 DTE variant is not required as the RM10 provides an embedded DATA LAN/WAN Port.

The RI10 DCE and DTE units can be installed as both land and ship-borne 19" rack equipment occupying only a single 1U slot. The units are typically used at NAVAL SHORE & STRATEGIC GROUND stations where the encrypted bulk data must be transferred over an IP network.

IP-to-Sync Operation

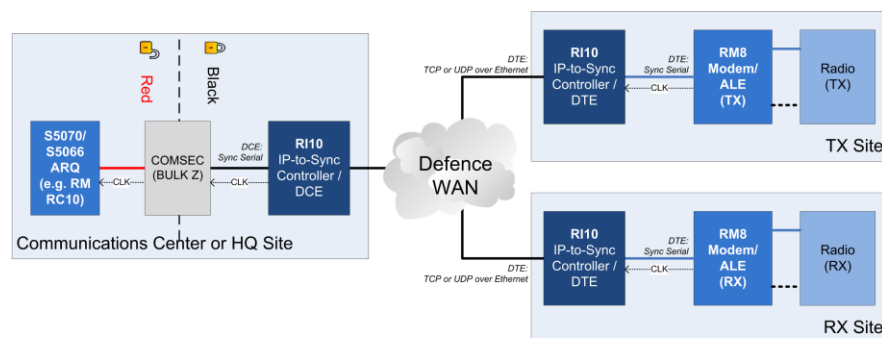
The RI10 product breaks continuous serial data stream into fixed size packets, adds the IP framing and sends the data over a packet switched Ethernet network, e.g. Defence LAN/WAN to a remote Tx or Rx Site. In the reverse direction, the IP Data received via the LAN is de-encapsulated and synchronously clocked into the data encryption equipment, e.g. KIV-7.

The RI10 provides for very low end-to-end latency. A synchronous balanced DTE port is built into the RI10 DCE variant to interface with the crypto unit. The serial interface is EIA-530 & EIA-530A compatible. The maximum synchronous serial data rate is 128 kbps. The RI10 can be used to supply the send-timing clock to the data encryption equipment. It can also be configured to accept an external send-timing clock.

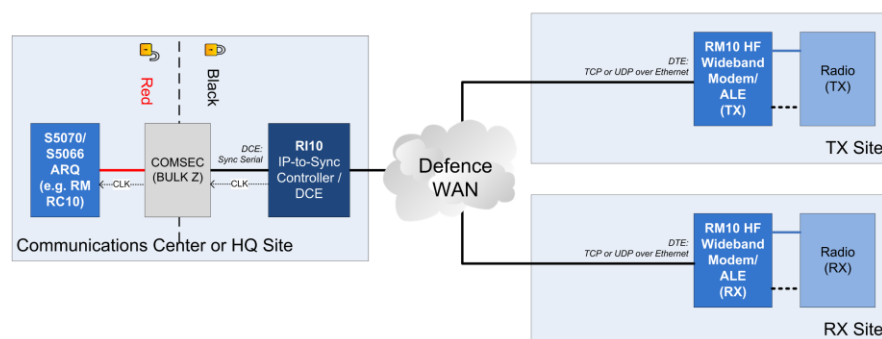
Front panel indications include serial port rate, packet generation rate, packet size, clocking status and Sync or Ethernet ports activity.

Key Features

- **Converts EIA-530 Serial to IP**
- **Interfaces**
 - DCE: Synchronous & Asynchronous Modes
 - EIA-530, EIA-530A
 - RS-232, RS-422
 - Internal/External Clocks
 - IP: TCP/IP via Ethernet
 - 10/100/1000 Electrical
 - IEEE 802.3
- **Deployment** – ship-borne & shore station/split-site
- **Companion Products** – RI10 DCE variant or RM10
- **Data Rate**
 - Sync: 50 bps to 128 kbps (Half Duplex)
 - Sync: 50 bps to 64 kbps (Full Duplex)
 - Async: 50 bps to 480k8 bps (Half/Full Duplex)
- **Menu-Driven control & configuration**
- **DTE port** – Synchronous / Asynchronous
- **Ethernet LAN interfaces** – for Control and IP-based Data services
- **Factory Presets** – lower integration effort



(a) RI10 DCE & DTE units used in combination with modems providing a EIA-530 based DTE port (e.g. RM8)



(b) RI10 DCE unit used in combination with modems providing an Ethernet LAN/WAN port (e.g. RM10)

Figure 1: RI10 Typical Use-Cases

IP-TO-SYNC CONTROLLER		
Modes	○ TCP/IP to Async (Built-in congestion control) ○ TCP/IP to Sync (Built-in congestion control)	○ UDP/IP to Async ○ UDP/IP to Sync
TIME SYNCHRONISATION	○ Support for NTP via CTRL LAN Ethernet Interface (≤ 10 ms accuracy) ○ External GPS via REM CTRL/GPS Interface (≤ 2 ms accuracy)	
DTE PORT ACTIVITY DETECTION	○ Disabled when flow control signalling lines (e.g. DTR/DSR, RTS/CTS and DCD) are available between the DTE/Crypto and the RI10. ○ Enabled when start and stop control of the data transferred between the DTE/Crypto and the RI10 are required in the absence of the flow control signalling lines.	
Tx & Rx SITE OPERATION	○ Normal Transceiver Site – User IP Data send and receive from modem at TRX site ○ Split Transit and Receive Sites – User IP Data send to modem at TX site, User IP Data received from modem at RX site	

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: 2.2 kg	Color: Black Grey (RAL 7021), Saddlewood Powder (VX 7517)
ENVIRONMENTAL SPECIFICATIONS	Climatic	○ Storage/Operation: -30 °C to +70 °C (MIL-STD-810F) ○ Humidity: 90% non-condensing at 30 °C (MIL-STD-810F)		
	Mechanical	○ Vibration: Surface Ship, Marine Vehicles, Aircraft, Min. Integrity (MIL-STD-810F) ○ Shock: 40 G, 11 ms (MIL-STD-810F)		
	EMC	○ MIL-STD-461E (RE101, RE102, CE102, CS101, CS114, RS101, RS103)		
	Safety/CE Marking	○ CE Marking - Directives 2006/95/EC as amended ○ SANS 60950-1:2010 / IEC 60950-1:2012	○ LVD - Low Voltage Directive 2014/35/UE ○ EMC - Electromagnetic Compatibility Directive 2014/30/UE ○ EDD – Eco-Design Directive 2009/125/EC	
	MTBF	○ > 40,000 hours		
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	
DCE (DATA) PORT (DB25M)	RS-422 balanced, RS-423, RS-232 unbal., MIL-STD-188-114 (interoperable), EIA 530A compliant. Half & Full Duplex operation, Sync, Std. and High-speed Async modes. Connects to COMSEC. Provision of Fiber Optical supply: 5 VDC
ETHERNET DATA PORT (RJ45)	IP Packet Data: 10/100 Base T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: RAW SIS IP packet data. Connects to application PCs / servers / laptops.
ETHERNET AUX LAN (RJ45)	IP Packet Data: 10/100 Base T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: TCP/IP, connects to application Router (Enclave or Federating Router)
REMOTE CONTROL/ GPS PORT (DE9M)	Remote Control Pins: RS-485 Multi-drop, RS-422 balanced or RS-232 Protocol: Control Protocol (RAP1 + RIPC, ASCII S5066 Annex E). Connects to <i>RM8 SDM</i> External GPS Control Pins: RS-232 (nominally input). Data Rate: 300 to 19200 bps. PPS line: RS 232/422 (NMEA) or TTL. Time reference, [position function]. Connects to external GPS.
GPS ANTENNA (MCX)	Optional Built-in GPS receiver: Time reference for time-based functions, [position function].
SERIAL DATA (2) & AUDIO PORTS (2) (DB25M)	Asynchronous Data (2 ports): RS-232, up to 115200 bps, 1/2 stop bits, 5/6/7/8 bit data 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 or MIC input Output Audio: Balanced, -40 to +10 dBm adjustable into 600 ohm load. Connects to intercom or hand / headset.
ETHERNET CTRL PORT (RJ45)	Remote Control: 10/100 Base T (IEEE 802.3U compatible), embedded TCP/IP Stack Protocol: Control Protocol (RAP1 + RIPC). Connects to external management / control system.
USER INTERFACE FOR UNIT CONTROL	Local control via 32x202 pixel graphical LCD display and 16-key keypad. 3 bi-colour LED indicators Alphanumeric and digit keypad for fast data entry, 4-way navigation button.
POWER SUPPLY	Wide-range supply input: 90-264 VAC, 40-440 Hz, 2A & 100-370 VAC. Makes the unit suitable for use on military base stations, vessels and aircraft.

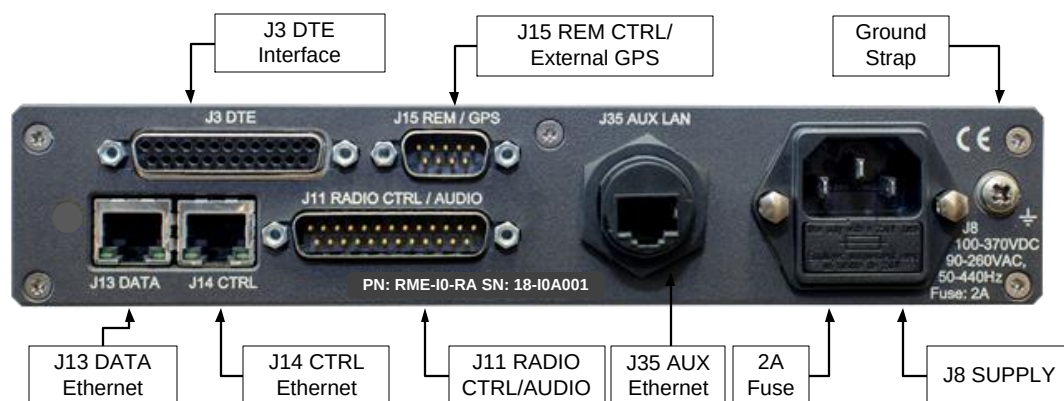


Figure 2: RI10 DCE Rear Panel Layout

RI10 ORDERING INFORMATION	STOCK NUMBER	DESCRIPTION
RI10 IP-to-Sync Controller / DCE	RME-I0-RA-CCV06	SDC: RI10 IP-to-Sync / DCE, 120 kbps V06
RI10 IP-to-Sync Controller / DTE	RME-I1-RA-CTV06	SDC: RI10 IP-to-Sync / DTE, 120 kbps V06

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