

# RAM<sup>®</sup> 9000 Industrial Cellular RTUs

Sixnet<sup>®</sup> Networking Series



## ▶▶▶ High-Density I/O RTUs with GPS and Local Control

Red Lion's Sixnet<sup>®</sup> series RAM<sup>®</sup> 9000 high-density I/O cellular RTUs with multi-carrier 4G LTE support provide advanced control and communication for monitoring and controlling remote assets and processes in extreme conditions.

RAM 9000 industrial cellular RTUs seamlessly connect Modbus and DNP3 enabled SCADA equipment via software selectable multi-carrier 4G LTE with fallback to 3G networks. Featuring a web-based event engine that can trigger built-in I/O or send SMS text messages based on real-time operational data, RAM cellular RTUs can perform advanced control at the edge and alert personnel of critical events. A built-in I/O concentrator allows the RAM to collect local sensor data from on-board I/O or external equipment and can optimize cellular bandwidth by optionally reporting only on an exception. With built-in Ethernet, serial, digital and analog I/O and GPS, RAM RTUs easily integrate with existing equipment enabling remote monitoring and control for M2M applications in industries including oil and gas, water/wastewater, utility, transportation and mining.



### APPLICATIONS

- > Mining
- > Oil & Gas
- > Transportation
- > Utility
- > Water/Wastewater

### PRODUCT HIGHLIGHTS

- > High-Performance Multi-Carrier 4G LTE Connectivity
- > Built-in I/O Lowers Total System Cost
- > Multiple Communication Ports
- > Powerful data logging for process analysis
- > Routing Capabilities Provide Secure, Reliable Communication
- > Event Engine that can Send SMS Messages or Control I/O Based on Operational Data

### FEATURES & BENEFITS

- > On-Board High-Density I/O
  - 2 digital inputs, 2 digital outputs, 3 analog inputs and 1 form c relay reduce the need for external I/O devices
  - Built-in I/O concentrator
- > Multiple Communication Ports
  - RS-232 and RS-485 provides seamless connectivity to remote devices
  - Native Modbus and DNP3 Support
- > Rugged, Industrial Design
  - Reliable operation in rugged environments
  - -40° to 75°C operating temperature\*
- > IEEE802.11b/g/n Wi-Fi Compliant - Access Point
  - Supports local access to communicate with network assets
  - Configure and update firmware without physically connecting to RAM
- > Secure Ethernet Connectivity
  - Routing capabilities for reliable communication
  - Stateful firewall, SSL, GRE and VPN services and deep packet inspection reduce the risk of unwanted access
- > Advanced RTU Functionality
  - Configurable control engine with drop-down menus
  - Powerful data logging of I/O registers to SD Card or internal storage

industrial  
networking



# RAM 9000 LTE Multi-Carrier Specifications

## WIRELESS INTERFACE

AT&T LTE with fallback to HSPA+  
 Generic LTE with fallback to HSPA+  
 Verizon LTE with fallback to EVDO  
 Verizon DMNR/NEMO compliance

## PROGRAMMABLE PLATFORM

Configurable Events: Up to 99 events can be triggered by I/O, Modbus registers, or over 200 system variable which in turn can send text messages or control I/O  
 Software Development Kit (SDK)  
 C/C++/Perl

## PROTOCOL GATEWAY

I/O controller  
 Modbus RTU/TCP/ASCII  
 DNP3 Slave

## SYSTEM PERFORMANCE

32-bit ARM9 400 MHz CPU  
 512 MB NAND Memory  
 128 MB RAM

## TUNNELING

IPsec, GRE, OpenVPN

## IP

NAT, port forwarding, dynamic DNS, DHCP  
 Stateful inspection firewall, IP transparency

## ROUTING PROTOCOLS

OSPF, BGP, RIP

## CLUSTERING

VRRP

## GPS

GNSS Supported: GPS L1, GLONASS L1, Galileo E1  
 high RF sensitivity plus jamming detection/removal

## CONNECTORS

Ethernet: One (1) or two (2) 10/100Base-T RJ-45 ports  
 WAN capability on ETH0  
 Serial: One (1) RS-232 (DB9) 115200bps  
 One (1) RS-485 (screw block) 115200bps  
 USB: One (1) USB 2.0 (mini)  
 Antennas: Three (3) SMA connectors (antenna, diversity, GPS)  
 One (1) RP-SMA connector (Wi-Fi optional)

## INPUTS & OUTPUTS\*

2 Digital Inputs  
 2 Digital Outputs  
 3 Analog Inputs  
 1 Form C Relay

## WI-FI INTERFACE (OPTIONAL)

Complies with IEEE802.11b/g/n  
 Wireless Operation: Access Point  
 Maximum output power up to 25dBm  
 Supports up to 150Mbps with 40MHz channel

## POWER INPUT

Range: 8-30 VDC (12 or 24 VDC nominal)  
 Power Consumption: (less DO power)  
 Standby: 4W (all models)  
 Transmitting:  
 -9711: 5.0W – 9.4W (cellular only)  
 -9731: 5.0W – 13.6W (cellular and Wi-Fi)  
 Power Consumption of DO: (max. each)  
 30 W (1A at 30 VDC)  
 Heat Dissipation: 46 BTU/hour max

## MECHANICAL

Dimensions: 132H x 127D x 70W mm (5.2" x 5.00" x 2.75")  
 Material: Steel with black zinc coating  
 Weight: 906 g (2 lbs)

## ENVIRONMENTAL

Operating Temperature: -40° to +75°C\*  
 Shock: IEC60068-2-27  
 Vibration: IEC60068-2-6  
 Humidity: 5 to 95% non-condensing  
 Ingress: IP30 protection

## CERTIFICATION

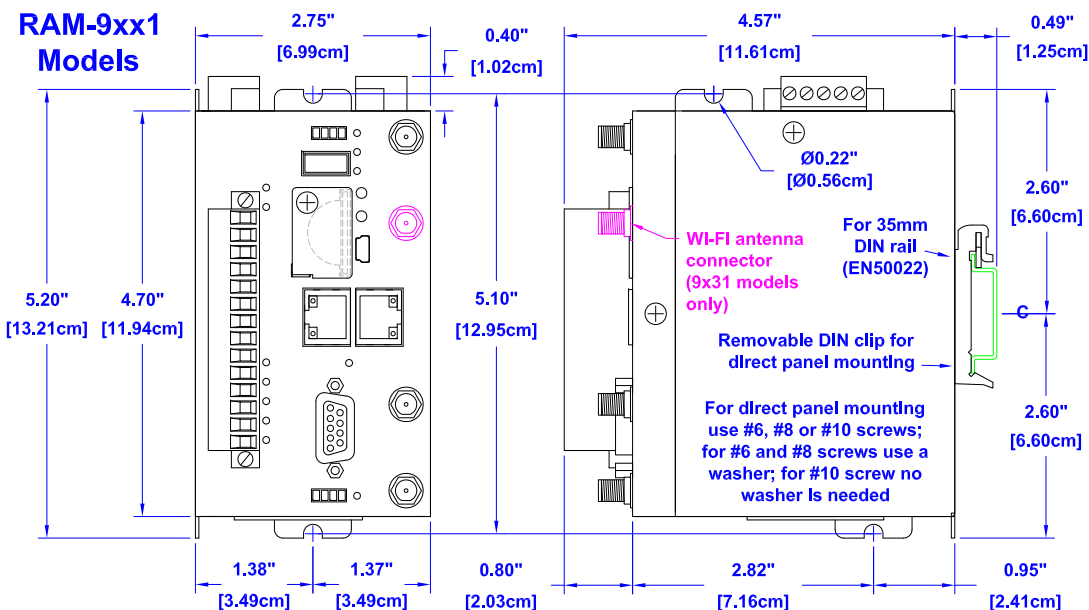
EMI/EMC:  
 Emissions: FCC, Part 15 and Industry Canada, ICES-003; Class A;  
 EN55022, IEC61000-6-4  
 Immunity: IEC61000-6-2 (EN61000-4-2,3,4,5,6,8)  
 Hazardous Locations: Class I, Div. 2, Groups A, B, C, D, ISA 12.12.01  
 ATEX – EN60079-0, -15 (Zone 2, Category 3) CE  
 Electrical Safety: UL508/CSA22.2/14 (CUL); IEC61010-1  
 Carrier Specific Approvals (Contact Red Lion for latest)  
 RoHS compliant

## WARRANTY

3 years on design and manufacturing defects

\* See Hardware Manual for thermal considerations.

## DIMENSIONS In inches (mm)



# RAM 9000 LTE Multi-Carrier Specifications

## ORDERING GUIDE

MODEL NUMBER	SERIES	SERIAL		ETHERNET	WI-FI	CELLULAR	POWER CONNECTOR	DEFAULT CARRIERS**
		RS-232	RS-485	10/100				
RAM-9911-(Carrier Code)	RAM	1	1	2 (WAN/LAN)	N	4G LTE	DC powered	AT (AT&T); VZ (Verizon); AM (Generic - Bell Mobility, TELUS and Rogers); EU (Europe and Asia Carrier Support); JP (Japan)
RAM-9931-(Carrier Code)	RAM	1	1	2 (WAN/LAN)	Y	4G LTE	DC powered	

\* See Band/Frequency table for compatibility

\*\* Carrier that is pre-configured on device. Carrier can be selected via software.

## FREQUENCY SPECIFICATIONS

North America Models (AT/VZ/AM)

TECHNOLOGY	BANDS	FREQUENCIES	ANTENNA CONFIGURATION
LTE	2, 4, 5, 13, 17, 25	700/850/1900 & 1700(AWS)/2100(AWS) MHz	MIMO Required
Fallback CDMA/EVDO	BC0, BC1, BC10	800/1900 MHz	Diversity Support
Fallback HSPA+	1, 2, 4, 5, 8	850/900/1900/2100 & 1700(AWS)/2100(AWS) MHz	Diversity Support
Fallback GSM/GPRS/EDGE	-	850/900/1800/1900 MHz	-

Rest of World Model (EU)

TECHNOLOGY	BANDS	FREQUENCIES	ANTENNA CONFIGURATION
LTE	1, 3, 7, 8, 20	800/900/1800/2100/2600 MHz	MIMO Required
Fallback HSPA+	1, 2, 5, 8	850/900/1900/2100 MHz	Diversity Support
Fallback GSM/GPRS/EDGE	-	850/900/1800/1900 MHz	-

Japanese Model (JP)

TECHNOLOGY	BANDS	FREQUENCIES	ANTENNA CONFIGURATION
LTE	1, 19, 21	850/1500/1900/2100 MHz	MIMO Required
Fallback HSPA+	1, 5, 6, 19	800/850/2100 MHz	Diversity Support
Fallback GSM/GPRS/EDGE	-	850/900/1800/1900 MHz	-

All specifications are subject to change. Consult the company website for more information.



[www.redlion.net](http://www.redlion.net)

**Connect. Monitor. Control.**

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As the global experts in communication, monitoring and control for industrial automation and networking, Red Lion has been delivering innovative solutions for over forty years. Our automation, Ethernet and cellular M2M technology enables companies worldwide to gain real-time data visibility that drives productivity. Product brands include Red Lion, N-Tron and Sixnet. With headquarters in York, Pennsylvania, the company has offices across the Americas, Asia-Pacific and Europe. Red Lion is part of Spectris plc, the productivity-enhancing instrumentation and controls company. For more information, please visit [www.redlion.net](http://www.redlion.net).

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