

IP VEHICULAR NETWORKING NODE MSR165E

ELECTRONICS DIVISION



 **LEONARDO**

The MSR165E is a vehicular IP node conceived to support mobile networking of modern battlefield systems. Within the MultiService Router family of products, the MSR165E is the Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) core component of the new-generation Military Internet Theatre. By integrating several C4ISR assets, it provides Size-Weight-and-Power optimisation in conjunction with increased capabilities in all the operational conditions.

The MSR165E establishes Self-Forming and Self-Healing IP Meshed Networks, inter-vehicles and aboard, through the integration of a wide set of heterogeneous radio technologies. It operates in tactical mobile networks and allows for optimized dynamic traffic routing even in the presence of unsteady and low bandwidth links. The MSR165E also embeds units' position dissemination functions to achieve full situational awareness in high-mobility military operations.

Although it is designed for a full integration with Leonardo's SWave® SDR Radio family, the MSR165E can seamlessly interoperate with radios and equipment from other manufacturers, thanks to a wide variety of network and management interfaces.

The MSR165E allows the planning and deployment of autonomous, self-adapting mobile networks with minimal configuration efforts, in favor of an increased responsiveness of the land forces.

The MSR165E routing algorithms dynamically select the best radio channels in the route to the final destination. The capability to achieve fast network topology convergence with a significant reduction of bandwidth consumption and the efficient handling of narrowband radio bearers makes these routing algorithms best-in-breed for Combat Net Radio (CNR) networks. Policy Based Routing (PBR) and Generic Routing Encapsulation (GRE) modes complete the routing features set.

KEY BENEFITS

- › Designed to comply with NATO Generic Vehicle Architecture requirements
- › Tactical Server capability for Vehicle/Mission specific applications
- › Integrates routing of new generation IP radios, satellite modems and former CNRs
- › CNR Voice Ear&Mouth (E&M) Audio Interfaces
- › Multi-bearer priority routing across heterogeneous radio technologies
- › Fast setup and rapid activation time for operations effectiveness
- › Embedded Radio Control Management Features
- › OMG DDS based Situational Awareness Data Distribution
- › SIP/H.323 Voice Over IP (VoIP) Call Management suite
- › Qualified for Wheeled and Tracked tactical Vehicles
- › Custom Link Encryption on unprotected links (upon request)

HIGH PERFORMANCE

The MSR165E combines market leading throughput performance with innovative services and protocols support, providing a dual stack IPv4-IPv6 networking solution.

A wide range of electrical and optical interfaces is available to establish network connections over Ethernet. 6-wires E&M analogue interfaces allow audio communications with different radio devices and INTCOM systems, thus enabling automatic relay of voice and data amongst different radio technologies. Serial data link interfaces support packet data services according to MIL-STD-188-220 and MIL-STD-188-184 specifications.

A communication management system enabling configuration and control of the connected communication means - like radio devices, satellite modems and sensors - is integrated in the equipment.

Embedded dissemination services along with the IP Calling Suite make the MSR165E a comprehensive IP solution to deliver voice and data services on vehicles. In addition to standard IP protocols, proprietary networking strategies are introduced for faster system topology convergence and graceful network performance degradation upon link failures or nodes disruption or rapid nodes mobility.

Advanced traffic management strategies inclusive of traffic control and resources optimisation mechanisms are implemented in support of mission critical applications, along with the conventional Differentiated Services (DS) policies, for an increased Quality of Service (QoS) level across the whole network.

INTEGRATION OF BEARERS AND SERVICES

The MSR165E embeds a LINUX-based WEB server; it includes a VoIP server, the PLI dissemination services and a radio management environment towards Leonardo's radio families. On customer's request, the server can host Element Management facilities to legacy or Third Parties communication assets, while keeping a homogeneous and intuitive MMI interface. Further, the system can host Communications Services (e.g. a DHCP server) and the GVA-compliant data models for integration of sensors and effectors.

The integrated IP Calling Suite implements VoIP services in accordance with H.323 and SIP standards. The suite provides adaptation services to CNR radios (CNRoIP) and to non-IP communication systems, thus delivering seamless digital voice services over multi technology systems and transparently to the physical network topology.

The availability of a wide set of interworking and transcoding functions and of an embedded service platform makes the MSR165E the ideal choice for the implementation of future-proof Battlefield Management Systems.

FEATURES

Integrated Service:

- › Embedded Call Management suite, supporting H.323 and SIPv2 with telephonic addressing formats according to standard and military numbering plans.
- › Embedded Radio control management functions through the Vehicular Element Management System (VEMS)
- › Embedded Processing Unit for Core Applications / Services (OMG DDS based)

Security: Firewalling

Network Services: IP Addresses Dynamic Assignment, IPv6 Stateless Address Auto-configuration, Proxy ARP

QoS: Differentiated Services, Enhanced traffic management strategies for mission critical applications

IP Unicast Routing/Internetworking : OSPFv2 and v3, BGPv4 and v4+

IP Multicast Routing/Internetworking: PIMv2 Sparse Mode, MLDv2

Advanced Routing: Multi-vector Priority Routing, Policy Based Routing, Wireless Routing algorithms (WSPF)

Radio Datalink Protocols: MIL-STD DataLink Access Protocol

Layer 2 Features: Transparent bridging, MAC learning, aging and switching by hardware, VLAN according to IEEE 802.1q, Rapid Spanning Tree Protocol according to IEEE 802.1d, InterVLAN routing

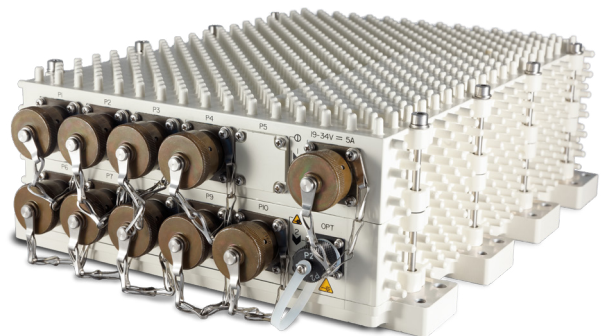


Management

- › Auto-diagnostic
 - Power-on self-test
 - General Alarm
- › Local Terminal
 - RS232 asynchronous serial line with ASCII protocol
- › NMS Control through an Ethernet 10/100
 - SNMPv3 protocol
 - Telnet protocol
 - Configuration files (XML)
 - TFTP saving and restoring configuration
 - Integrated Web Server

MAIN STANDARDS

- › IPv4, ICMP, GRE tunneling protocol for IPv4, IGMPv1 and v2 for IPv4, IP over Ethernet, ARP, Proxy ARP for IPv4
- › IPv6, ICMPv6, IPv4-IPv6 dual stack
- › Neighbor Discovery for IPv6
- › IPv6 Stateless Address Autoconfiguration
- › UDP, TCP, DHCPv4
- › OSPFv2, OSPFv3, BGPv4, BGPv4+
- › PIMv2 Sparse Mode for IPv4, MLDv2
- › MIL-STD-188-220C datalink protocol, MIL-STD-188-184 datalink protocol
- › NATO STANAG 4214, STANAG 4705, STANAG 5046
- › VLAN Tagging (IEEE 802.1q)
- › Rapid Spanning Tree Protocol (IEEE 802.1d)
- › Session Description Protocol (SDP), Session Initiation Protocol (SIP), The SIP INFO Method (RFC 2976)
- › Real-Time Transport Protocol (RTP), H.323, E.164
- › Telnet, TFTP
- › National Marine Electronics Association NMEA Protocols
- › OMG Data Distribution Service DDS
- › STANAG 5527 NATO Friendly Force Information (NFFI)
- › Simple Network Management Protocol (SNMP)
- › SNMP/SNMPv3 Applications
- › Management Information Base for Version 2 of the Simple Network Management Protocol (SNMPv2)



Installation

- › Wheeled or tracked combat and combat support vehicles, tactical logistics platforms and ships
- › Fixed in deployable area



TECHNICAL DESCRIPTION

INTERFACES

- › 8 Ethernet 10/100/1000 Base T LAN/WAN interfaces
- › 1 Ethernet 1000 Base Sx LAN/WAN interface
- › 12 Ethernet 10/100 Base T for radio/satellite WAN connectivity and management functions
- › 4 synchronous serial RS232/MIL-STD-118-114A for WAN connectivity via legacy UHF/VHF/HF radio devices supporting MIL-STD-188-220 and MIL-STD-188-184 datalink protocols
- › 8 asynchronous serial interfaces for management functions of legacy UHF/HF/VHF radio devices
- › 7 analogue 6 Wires E&M interface to perform voice communications through legacy UHF/VHF/HF radio devices and to interconnect analogue INTERCOM
- › 1 asynchronous serial interface towards an external GNSS Receiver interface configurable RS232/RS422 supporting NMEA protocol
- › 1 Ethernet 10/100 Base T local management interface
- › 1 RS232 asynchronous local management interface
- › 1 USB local management interface

POWER SUPPLY

- › DC source
 - 19VDC to 34VDC according to MIL-STD-1275E
 - Average consumption 60W

PHYSICAL

- › Size (H x W x D) 120mm x 266mm x 328mm
- › Weight 7 kg

ELECTRICAL SAFETY

- › According to CEI EN 60950-1

ENVIRONMENTAL

- › Operating Temperature -31°C to + 49°C
MIL-STD-810G Method 501.5 & 502.5, Procedure II
- › Storage Temperature -46°C to + 71°C
MIL-STD-810G Method 501.5 & 502.5, Procedure I
- › Temperature Shock MIL-STD-810G Method 503.5 Procedure IA
- › Humidity MIL-STD-810G Method 507.5 (Aggravated temperature-humidity cycle), operating & storage
- › Immersion MIL-STD-810G Method 512.5, Procedure I (0.5m water depth)
- › Vibration MIL-STD-810G Method 514.6, wheeled and tracked vehicle
- › Functional Shock MIL-STD-810G Method 516.6, Procedure I, sawtooth pulse at 40g/10ms
- › Altitude MIL-STD-810G Method 500.5, Procedure I (storage) & II (operating)
- › Salt Fog MIL-STD-810G Method 509.5
- › Fungus MIL-STD-810G Method 508.6
- › Dust and Sand MIL-STD-810G Method 510.5, Procedure I (Blowing Dust) e II (Blowing Sand)
- › EMI Emission MIL-STD-461F, RE101, RE102, CE102
- › EMI Susceptibility MIL-STD-461F, RS101, RS103, CS101, CS114, CS115, CS116

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