

NETernity™ RM921N

IPv6 Enabled, 6U VME 24-Port Fully Managed Layer 2/3+ Gigabit Ethernet Switch with Front Access I/O and OpenWare™ Switch Management Environment

Features

- 6U VMEbus form factor
- Available in 12 or 24 ports and multiple copper/fiber combinations
 - 12-port switch is single slot
 - 24-port switch is dual slot
- Front I/O
- Optional removeable Flash memory
- Hardware enabled IPv6 and IPv4 support
- 100BaseFX port option
- Fully managed solution
- L-2 and L-3 switching at wire-speed
- L-3 protocol support including OSPF, RIP and VRRP with IPv6 support
- OpenWare™ Switch Management Environment
- Allows up to 4096 VLANs
- Onboard management processor
- Industrial temperature version available
- Polyurethane and acrylic conformal coating available

Key Specifications

- IEEE 802.3-2005
 - IEEE 802.3ad (Link aggregation)
- IEEE 802.1p (Prioritization)
- IEEE 802.1Q (VLAN tagging)
- IEEE 802.1Q (Spanning Tree Protocol)

NETernity™ RM921N is a family of Layer 2/3+ fully managed Ethernet embedded switches offering full IPv6 wire speed switching and routing, and full management capabilities with 12 or 24 front I/O Gigabit Ethernet ports. Designed to meet the needs of a wide range of challenging networking and switching applications, the 6U VME form factor RM921N facilitates communications within a chassis as well as supporting the network outside the chassis.

The switch supports multiple combinations of 12 or 24 ports accessed on the switch front panel. The 12-port model is supported with the single slot baseboard. The addition of an expansion card to the baseboard allows support for 24 ports in dual slot. Both configurations support Gigabit Ethernet ports or a hybrid of Gigabit Ethernet and 100BaseFX ports.

All configuration information is stored on the NAND Flash memory. The optional removable NAND memory allows the switch to be used in applications in which it must be guaranteed that configuration information never leaves a secure environment.

RM921N delivers full wire-speed Gigabit Ethernet switching that can be fully managed and easily deployed. Proven, high-performance architecture and a multilayer switching fabric provides a rich feature set, broad functionality, scalability, and product life longevity. Based on a PowerPC® management processor and a leading high-performance switch fabric, the RM921N has integrated Layer 2/3 switching capabilities as well as the ability to support higher Layer 4-7 functionality when required.

IPv6 brings improved security, reliability and flexibility, enhanced support for mobile computing devices, and larger address space for global reach and scalability to applications.

In the near future, support for IPv6 will be required for Military and Defense customers, and because this switch also supports IPv4 it offers a path forward which protects existing investments.



NETernity™ RM921N IPv6 Enabled, 6U VME 24-Port Fully Managed Switch

Switch Fabric Features

- Supports both Layer 2 (L2) and Layer 3 (L3) packet switching. Packets are categorized by the MAC addresses for L2 switching and by IP addresses for L3 switching.
- QoS prioritization (IEEE 802.1p) permits classifying packet priorities which is beneficial in delay-sensitive applications.
- Packet filtering to prevent forwarding of certain packets; filtering capabilities are available in Layers 2 - 7.
- Link aggregation (IEEE 802.3ad) links a group of physical ports to create a single logical port that provides higher bandwidth and increases redundancy between switches. The fabric is capable of full wire speed switching, allowing a maximum aggregate throughput that is the sum of all aggregated ports.
- Virtual LANs (VLANs) (IEEE 802.1Q) defines a forwarding (switching) domain; supports up to 4096 VLANs.
- Multiple Spanning Tree Protocol (MSTP) (IEEE 802.1Q-2005) enables automatic and rapid determination of an optimal loop-free topology from an arbitrary network of enabled switches with duplicate and redundant connections; supports rapid reconfiguration in the event of a link or switch failure; backward compatible with RSTP and STP.
- Broadcast storm control screens excessive traffic and controls the rate limit for each port and prevents flooding in the network.
- IGMP snooping permits the switch to monitor IGMP interactions between hosts and routers and to adjust its forwarding tables accordingly resulting in more efficient bandwidth use. MLD snooping, the IPv6 equivalent of IGMP, is also supported.
- Port mirroring eases debug and packet pattern study. This is a method to observe on one port traffic that is flowing on another port.

L-3 IP Routing Protocols

- OSPF (Open Shortest Path First), a flexible link state protocol, tests the state of links and transmits that information throughout the system to establish the shortest path to the destination. This protocol also load balances by distributing traffic equally among routes. Messages may also be routed based on the type of service so that critical messages can traverse the most reliable routes.
- RIP (Routing Information Protocol), an easy-to-implement, dynamic routing protocol, allows routers to exchange information for computing routes through networks. Routing tables are used to store destination and metric pairs.
- VRRP (Virtual Router Redundancy Protocol) eliminates single points of failure on a network. Using an election protocol to provide failover for forwarding packets, VRRP provides a higher availability default path. VRRP is supported by both IPv6 and IPv4.

OpenWare Switch Management Environment

OpenWare™ is available exclusively on selected NETernity fully-managed Layer 2/3 Ethernet switches. Comprehensive and powerful, this switch management environment provides integrated management services including configuration, monitoring, switching control, addressing, routing and all supported protocols. Configuration and monitoring functions are accessible from a serial console or via a network. Supported access methods include Telnet, SSH and SNMP.

OpenWare features:

- IPv6 support for improved security, reliability and flexibility, enhanced support for mobile computing devices, and larger address space for global reach and scalability. IPv4 is also supported offering a path forward which protects existing investments.

- Easy deployment and management that results from the wide range of protocols supported. These protocols are defined by RFCs, and cover a range of operations: Switching, VLANs, Aggregation, Multicast, Filtering, Routing, QoS, and Management. NETernity switches with OpenWare offer broad functionality and support communications within the chassis as well as supporting the network outside of the chassis.
- MSTP, the latest version of the Spanning Tree protocol, support allowing use of the latest technology to create efficient, loop-free networks by combining multiple VLANs. In the event of link or switch failure, the network can be rapidly reconfigured minimizing down time. MSTP is backward compatible with RSTP and STP
- Highly efficient bandwidth utilization. Multicast with IGMP Snooping ensures that frames are only forwarded on those ports having nodes that have joined the group.
- Linux® based software allows faster implementation and easy updates to firmware as part of standard releases or when customization is required. Customizations may be leveraged across all NETernity/OpenWare platforms. Standard Linux commands may be used as well as open source protocol and routing capabilities.
- A familiar Linux command line interface and remote Telnet user interface support allows users to select how they interact with the switch.
- Using a combination of open source protocol software and OpenWare allows us in certain instances to provide full software source to customers. Additionally, full control over the software environments permits customization for specific requirements such as customer-specific handling of failover conditions.
- Portability across switch fabrics and processor environments.

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Why choose GE Fanuc Intelligent Platforms NETernity Ethernet Switches?

GE Fanuc Intelligent Platforms has a wealth of expertise in Military, Commercial and Telecommunications markets. This makes us unique in the embedded computing industry – we understand application requirements and we know communication protocols.

Our line of NETernity Ethernet Switches is unmatched. Not only is our product selection extensive, but the switches themselves provide maximum flexibility, performance, and density. NETernity Ethernet Switches are available in a variety of form factors, interfaces, levels of ruggedness, port configurations, media support, and types of management.

Fully managed switches are Layer 2/3+ switches with control and monitoring capabilities via local or remote access. Managed switches are Layer 2 switches with control and monitoring capabilities via local or remote access. Unmanaged switches are Layer 2 switches with no operator interfacing and are designed for quick deployment in well defined applications.

Call GE Fanuc Intelligent Platforms' knowledgeable sales team for help in selecting the switch that best meets your applications requirements.

Ordering Information

Base Part Number	# of Copper Ports AA	# of Fiber 1000SX Ports BB	# of Fiber 1000LX Ports CC	# of Fiber 100FX Ports DD	Faceplate Style E
RM921N- RM921ND- (with removable NAND Flash)					0 = 1101.01 with ejector handle 1 = flat VMEbus w/Scanbe handle
Example 1	8 (08)	4 (04)	0 (00)	0 (00)	0
Example 2	4 (04)	0 (00)	4 (04)	16 (16)	1

NOTE:

Only allowable combinations are all copper, all fiber, or mix of copper and fiber ports in increments of four. Exception: 10 copper and 2 fiber. RM921N supports either 12 ports (single slot) or 24 ports (dual slots).

Suffix	-CC to model number to indicate conformal coated boards
	-CA to model number to indicate acrylic conformal coated boards
	-I to model number to indicate Industrial Temperature Range
Example 1:	Order RM921N-080400000 : RM921N with 8 copper & 4 fiber 1000BaseSX ports and standard faceplate
Example 2:	Order RM921N-040004161-CC : RM921N with 4 copper, 4 1000BaseLX and 16 100BaseFX ports, flat VMEbus faceplate with Scanbe handle, and polyurethane conformal coating
Example 3:	Order RM921ND-040004161-CC-I : RM921ND with removable NAND Flash, 4 copper, 4 1000BaseLX and 16 100BaseFX ports, flat VMEbus faceplate with Scanbe handle, polyurethane conformal coating, and industrial temperature range.

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Specifications

Physical Interface

- All ports routed through front panel
- For copper media the Gigabit Ethernet ports support 10BaseT, 100BaseTX and 1000BaseT and have quad RJ-45 connectors with integrated LEDs
- Fiber Gigabit Ethernet ports support either 1000BaseLX or 1000BaseSX transceivers and have LC connectors
- 100BaseFX Ethernet ports have LC connectors
- Copper ports support automatic Media Dependent Interface (MDI) crossover eliminating the need for crossover cables or cross-wired (MDIX) ports

IPv6

- IPv6 addressing and specification (RFC 2460)
- Neighbor discovery for IPv6 (RFC2461)
- Stateless address auto configuration (RFC 2462)
- ICMPv6 (RFC 2463)
- IPv6 over Ethernet (RFC 2464)

Dimensions

- 6U (4HP) single slot VME Eurocard form factor
- Height: 9.2 in. (233.4mm)
- Depth: 6.3 in. (160mm)
- Thickness: 0.8 in. (20.3mm) single slot
1.6 in. (40.6mm) dual slot
- Weight: 1.47 lbs (0.67Kg) 24-port version

Power Requirements

- All copper ports
 - 31 watts (12 ports)
 - 46 watts (24 ports)
 - 5 V @ 9.2 A (max)
- All fiber ports
 - 26 watts (12 ports)
 - 37 watts (24 ports)
 - 5 V @ 7.2 A (max)

Environmental

- Temperature
 - Operating: 0° to +65 °C
 - Storage: -40° to +85 °C
- Industrial Temperature
 - Operating: -40° to +85 °C
 - Storage: -40° to +85 °C
- Relative Humidity
 - Operating: 5% to 95%, noncondensing
 - Storage: 5% to 95%, noncondensing

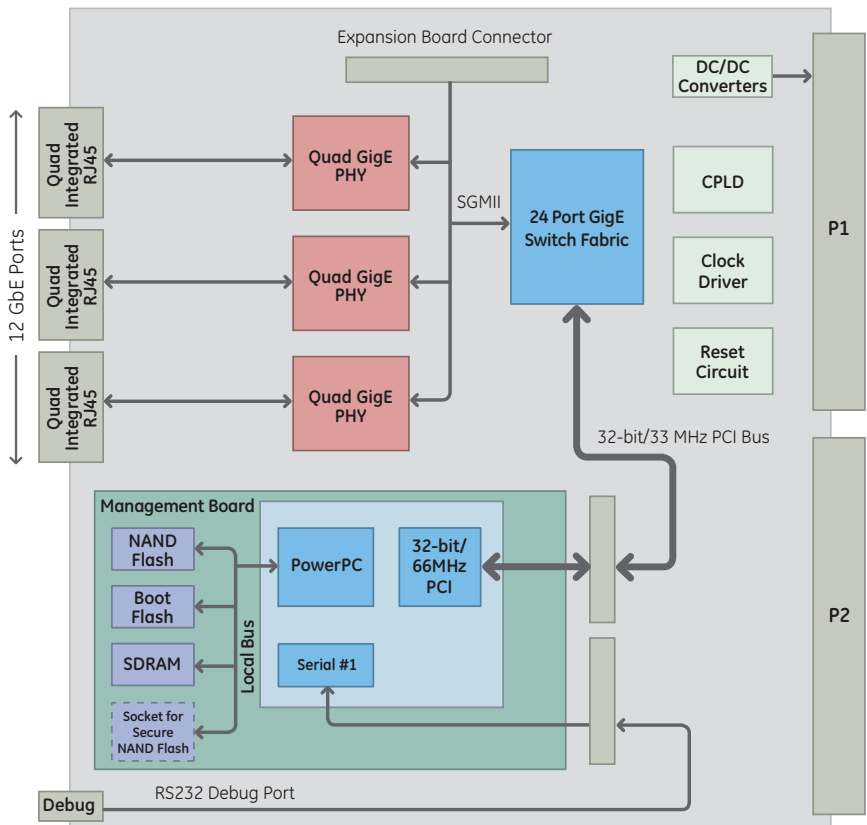
MTBF

- 260,829 hours (Telcordia Issue 1, Method 1 Case 3 at 40 °C) for 24-port version

Regulatory Compliance

- European Union (CE Mark)
 - EN55024
 - EN55022 Radiated Emissions Class A
 - EN55022 Conducted Emissions Class A
 - EN61000-4-2 (ESD)
 - EN61000-4-3 (Radiated Immunity)
 - EN61000-4-4 (EFT)
 - EN61000-4-5 (Surge)
 - EN61000-4-6 (Conducted RF)
 - EN61000-4-8 (Power Frequency Magnetic Fields)
- United States
 - FCC Part 15, Class A
- Canada
 - ICES-003, Class A
- Safety:
 - UL60950-1
 - CSA C22.2, No. 60950-1-03
 - EN60950-1 (Low Voltage)

Block Diagram



About GE Fanuc Intelligent Platforms

GE Fanuc Intelligent Platforms, a joint venture between General Electric Company (NYSE: GE) and FANUC LTD of Japan, is an experienced high-performance technology company and a global provider of hard-ware, software, services, and expertise in automation and embedded computing. We offer a unique foundation of agile, advanced and ultra-reliable technology that provides customers a sustainable advantage in the industries they serve, including energy, water, consumer packaged goods, government & defense, and telecommunications. GE Fanuc Intelligent Platforms is a worldwide company headquartered in Charlottesville, VA and is part of GE Enterprise Solutions. For more information, visit www.gefanuc.com.

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Additional Resources

For more information, please visit the GE Fanuc Intelligent Platforms web site at:

www.gefanuc.com

