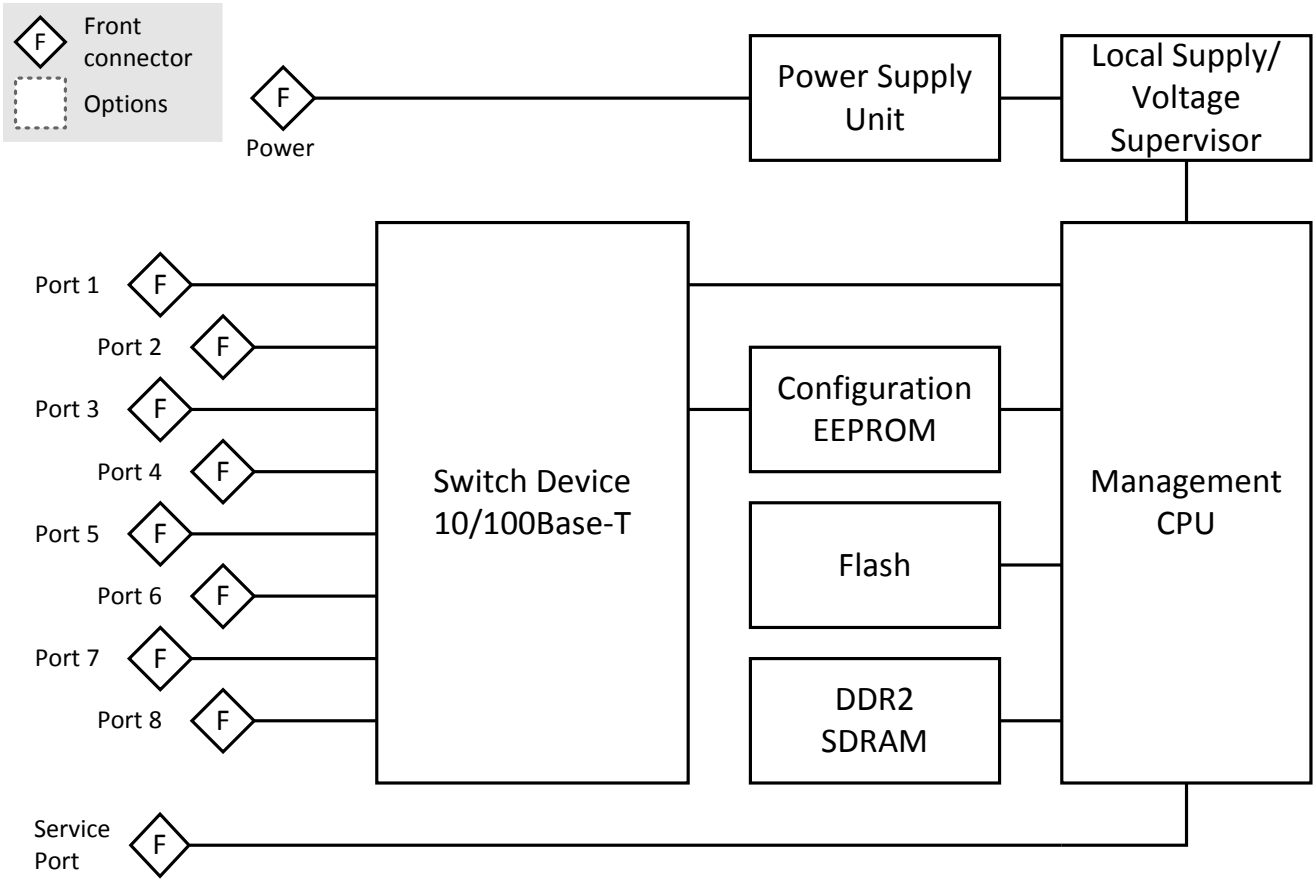
RS3 – IP67 Industrial Ethernet Switch

- **Managed 8-port rugged Ethernet switch**
- **Rugged aluminum enclosure (220 x 130 x 70 mm)**
- **Fanless and maintenance-free**
- **8 Fast Ethernet ports via M12 connectors**
- **Configuration via CLI (RS232, Telnet or SSH), SNMP ver. 3 or ext. dongle**
- **24 VDC nom. (9 to 36 V) power supply and service interface via M12 connectors**
- **Status LEDs for ports, power and more**
- **-40 to +70(+85)°C operating temperature**
- **EN 50155 class Tx (railways) and IP67 compliant**
- **Compliant to ISO 7637-2 (E-mark for automotive)**

The RS3 is an industrial, IP67 stand-alone Fast Ethernet switch. It is managed and provides eight Ethernet channels on M12 connectors.
The rugged switch supports full-duplex and half-duplex operation with auto-negotiation, high-speed non-blocking store-and-forward switching, Quality of Service (QoS) support with four traffic classes IEEE 802.1p and three-level 802.1x security as well as the logical segmentation of ports (802.1q VLANs). The switch is fault tolerant and restores itself on its own: If a link is temporarily unavailable, frames can be sent via backup/redundant links (spanning tree protocol / link aggregation) and no data loss occurs. Its built-in test mechanisms make the RS3 an even more reliable component in the communication system.
A service port is accessible at the front panel on an M12 connector, providing an easy way to configure the switch. A command line interface is available via the RS232 at the service port and over Ethernet via Telnet or Secure Shell (SSH). The switch can also be configured via SNMP (version 3). Additionally, the service connector can be used to attach an external dongle to store or update the switch configuration. This makes it easy to exchange the unit for service purposes.
The RS3 a member of the MIPIOS® family of extremely rugged IP67 compliant products designed for Ethernet connectivity and highly demanding applications, e.g., for redundancy systems.
The industrial-grade unit is fully compliant with EN 50155 railway standard. All components inside the enclosure are specified for -40 to +85°C operation, thus enabling the device for EN 50155 class Tx operation. Additionally, the device is is compliant with ISO 7637-2 (E-mark for automotive). Convection cooling is sufficient. There are no socketed components, hardening the box against shock and vibration. The internal electronics are prepared for conformal coating.
The Ethernet switch is prepared for wall or DIN-rail mounting.

Diagram


F
Front connector
Options
F
Power
Power Supply Unit
Local Supply/ Voltage Supervisor
Port 1
Port 2
Port 3
Port 4
Port 5
Port 6
Port 7
Port 8
Switch Device 10/100Base-T
Configuration EEPROM
Flash
DDR2 SDRAM
Management CPU
Service Port

Technical Data

Key Features	■ Simple Switch replacement: configuration can be done via external dongle without any tools ■ High-speed non-blocking, store-and-forward switching ■ Eight 10/100Base-T ports at front panel (Electrical isolation: 1500 Vrms) ■ Port configuration: copper, 10/100 Mbit/s ■ Auto-negotiation / Auto MDI/MDIX crossover on all ports / manual configuration possible ■ Layer2-based Policy Control List ■ 8K MAC address lookup table with automatic learning and aging ■ Up to 4096 VLANs ■ Rapid Spanning Tree Protocol and Multiple Spanning Tree Protocol to ensure loop free topology formation ■ Reducing multicast traffic in the network through multicast snooping - IGS (IPv4) and MLDS (IPv6)
Management Firmware System Features	■ Saving and restoring user configurations ■ Software upgrades through TFTP ■ System logs (syslog) and e-mail alerts for critical events ■ Remote monitoring (RMON) and alarm generation ■ Displaying the running configuration in the form of CLI commands ■ Management interfaces through □ CLI (RS232 console, Telnet, SSH) □ SNMP v3 ■ Switch configuration can be loaded from external dongle
Management Firmware Security Features	■ User authentication using 802.1x ■ Controlling management access through SNMP and CLI only from authorized managers ■ MAC based access list (ACL) for traffic filtering ■ Rate-limiting and storm control to prevent packet flooding from malicious peers
Supported Protocols and Standards	■ DHCP client / server / relay (IEEE 1394) ■ Ethernet flow control (IEEE 802.3x) ■ GARP (VLAN-aware bridging) ■ GVRP/GMRP support (IEEE 802.1D, 2004) ■ Hypertext Transport Protocol (HTTP) Server for Remote Management and Monitoring (RFC2626) ■ HTTP Secure (HTTPS) - HTTP-based Remote Management over encrypted data channel (RFC2818) ■ IGMP snooping / IGMP proxy / IGMP Querier / MLD Discovery (RFC 4541) ■ Link aggregation LACP / EtherChannel (IEEE 802.3ad, 2005) ■ Link Layer Discovery Protocol LLDP (IEEE 802.1ab, 2005) ■ Multiple Spanning Tree (MSTP) (IEEE 802.1s) ■ Path MTU Discovery Protocol (PMTUD) (RFC 1984) ■ Priority-based switching, Quality of Service/DiffServ, tagged frames, Layer2-based 801.1Q VLAN-ID packet routing (IEEE 802.1p) ■ Port-based authentication with EAP (IEEE 802.1x - REV2004/RFC3748) ■ Rapid Spanning Tree Protocol (RSTP IEEE 802.1w) ■ Remote Network Monitoring Information Base v1 (RFC2819) ■ Secure Shell (SSH) for Remote Configuration (CLI) over secure channel ■ Secure Sockets Layer - Encrypted Data Exchange (RFC5246) ■ SNMP v1, v2c, v3 management ■ Syslog (RFC 5424) ■ TCP/IP v4 and v6 ■ TFTP (RFC 1350) ■ VLAN/port-based VLANs GVRP/MVRP (IEEE 802.1Q Rev D5.0, 2005)
Service Interface	■ M12 connector at front ■ RS 232 / V24 ■ I2C interface for external dongle
Front I/O	■ Eight Ethernet ports via M12 connectors ■ One service interface via M12 connector ■ One power input via M12 connector ■ Link and activity Ethernet status LEDs (2 per channel) ■ Status LEDs for power, reset and error codes

Technical Data

Electrical Specifications	■ Power input □ Nominal input voltage 24 VDC (9 to 36 V) according to EN50155 ■ EN50155 power interruption class S2 ■ Isolation (according to EN50155) □ 1500 Vrms ■ Power consumption: 5 W
Mechanical Specifications	■ Dimensions: 220 mm x 130 mm x 70 mm (without connectors) ■ Prepared for wall or DIN-rail mounting with special mounting plates (available separately) ■ Weight: 1.9 kg
Environmental Specifications	■ Temperature range (operation): □ -40..+70°C (+85°C) with up to 85°C for 10 minutes according to class Tx (EN50155) □ Airflow: natural convection ■ Temperature range (storage): -40..+85°C ■ Relative humidity (operation): max. 95% non-condensing ■ Relative humidity (storage): max. 95% non-condensing ■ Altitude: -300 m to + 3000 m ■ Shock: 50 m/s², 30 ms (EN 61373) ■ Vibration (function): 1 m/s², 5 Hz - 150 Hz (EN 61373) ■ Vibration (lifetime): 7.9 m/s², 5 Hz - 150 Hz (EN 61373) ■ Conformal coating on request ■ Climatic tests according to EN50155 and EN68068 ■ Fully EN 50155-compliant (Power Interruption Class 2, Temperature Class Tx) ■ IP67 compliant
MTBF	■ 669 843 h @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ Flammability □ PCBs manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC	■ Tested according to the following railway standards: □ EN50121 (radio disturbance) □ EN61000-4-2 (ESD) □ EN61000-4-3 (radiated disturbances) □ EN61000-4-4 (burst) □ EN61000-4-5 (surge) ■ Conforming to E1 requirements of the German Federal Motor Transport Authority ■ Tested according to the following automotive standards: □ CISPR25/CISPR16 (radiated emission) □ ISO7637-2 (conducted emission - power line) □ ISO7637-2 (conductive immunity - power line) □ ISO7637-3 (capacitive immunity - signal line) □ ISO11452-2, ISO11452-5 (radiation immunity) □ EN50121 (radio disturbance)
Software Support	■ Firmware for configuration and management included

Configuration & Options

Standard Configurations

Article No.	Channels	Management	PSU
06RS03-00	8x 100Base-T	managed	24 VDC in
06RS04-00	8x 100Base-T	unmanaged	24 VDC in

Options

Ethernet Switch Functions / Mechanical Specifications	■ 4 Ethernet ports
Electrical Specifications	■ Other nominal input voltages: 36, 48, 72, 96 or 110 VDC □ Wide input range (according to EN50155): 0.7 x nominal voltage < nominal voltage < 1.25 x nominal voltage

Ordering Information

Standard RS3 Models	**06RS03-00**	Managed, 8x 100BaseT, PSU 24/48V, -40...+70°C screened, EN50155 class Tx compliant, IP67
Related Hardware	**06RS04-00**	Unmanaged, 8x 100BaseT, PSU 24/48V, -40..+70°C screened, EN50155 class Tx compliant, IP67
Miscellaneous Accessories	**05RS01-00**	DIN-Rail mounting plate for MIPIOS® family, -40..+85°C
	05RS01-01	Wall-mounting plate for MIPIOS® family, -40..+85°C
	05RS01-02	I2C Dongle for MIPIOS® Switch, 32Kb, M12, -40..+85°C
	05RS01-03	Cable set for G302, RSx and 19" rack-mountable SFx switches, consisting of: 4 Ethernet cables (M12 to RJ45), 1 service adapter (M12 to D-sub), 1 service cable, 1 dongle adapter (D-Sub to M12), 1 power cable (M12 to open end), -40..+85°C
Software: Firmware/BIOS	**14ETSW-00**	Ethernet Switch Firmware for managed RSx, SFx, F302 and G302 models

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart Industrial Ethernet switches for different platforms » Download	
	20RS03-00	RS3 User Manual
	21ETSW-ER	14ETSW-00 Managed Ethernet Switch Firmware Errata
	21ETSW-00	Managed Ethernet Switch Quick Start Guide
	21ETSW-01	Managed Ethernet Switch Command Line Interface User Manual - Command Reference

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