F302 – 3U CompactPCI® Industrial Ethernet Switch

- **Managed 8+1-Port rugged Ethernet switch**
- **12 or 16 HP 32-bit/33-MHz CompactPCI®**
- **8 Fast Ethernet ports (front) on RJ45 or M12 connectors**
- **Configuration via Telnet CLI, SNMP ver. 3 or external dongle**
- **Switch accessible via cPCI for router applications**
- **Service interface via D-Sub**
- **LEDs for port and board states**
- **-40 to +85°C with qualified components**
- **EN 50155 compliant (railways)**

The F302 is a managed 3U Fast Ethernet switch module with a maximum of eight channels at the front panel (8 RJ45 or M12 connectors) plus one additional Ethernet channel that is led to the CompactPCI® J1 connector at the rear.

The F302 is managed by its own PowerPC® CPU that integrates the configuration firmware. A service interface is accessible at the front panel, 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.
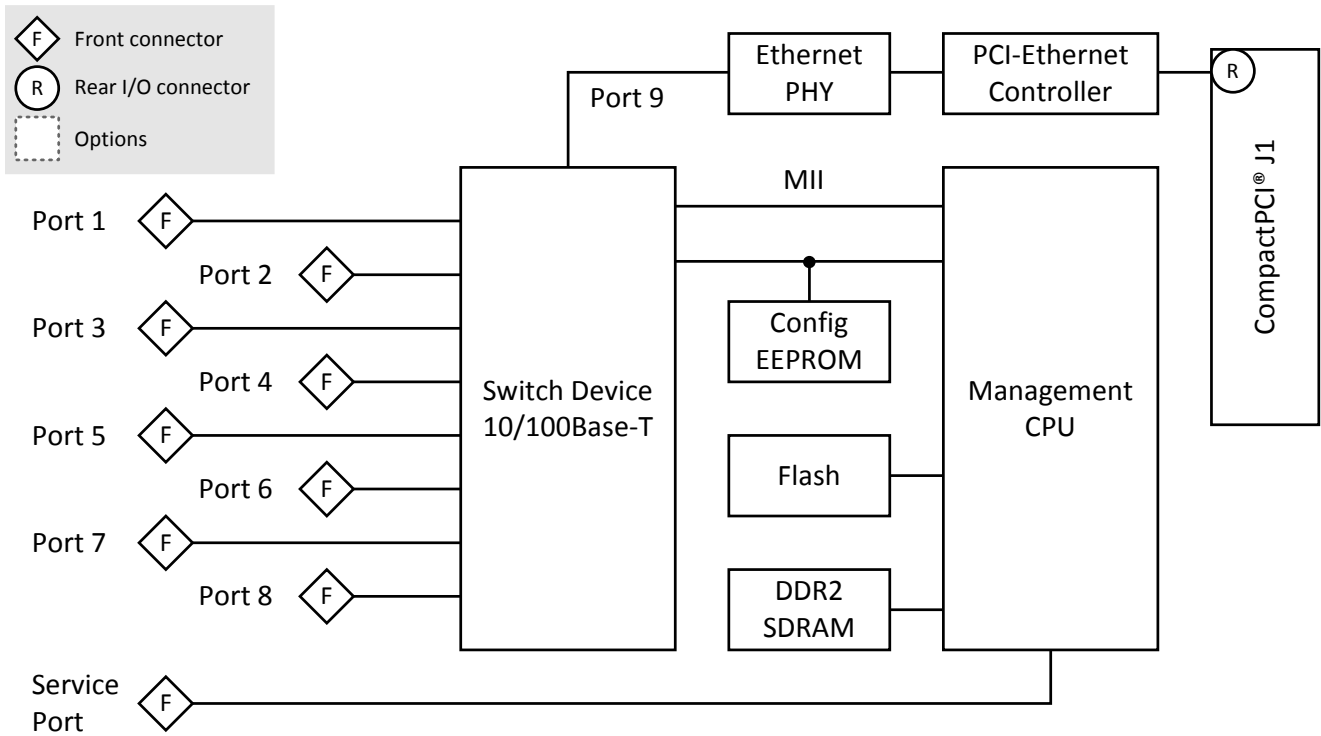
The F302 supports full-duplex and half-duplex operation with auto-negotiation, high-speed non-blocking store-and-forward-switching, Quality of Service (QoS) support with four traffic classes IEEE 802.1p and three-level 802.1x security as well as the logical segmentation of ports (802.1q VLANs). The switch 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 F302 an even more reliable component in the communication system.

The F302 was specifically designed for rugged mobile communication systems. It is thus for example fully compliant with the EN 50155 railway standard. All components on the board are specified for a -40 to +85°C operation temperature. There are no socketed components, hardening the card against shock and vibration. The board is ready for coating (standard with M12 connectors) and has a guaranteed minimum standard availability of 5 years.

Depending on the connector type, the F302 has a front-panel width of 12 HP (3 slots) with RJ45 or 16 HP (4 slots) with M12 connectors. In either case the card occupies only one CompactPCI® backplane slot.

Diagram

Front connector
Rear I/O connector
Options

Port 1
Port 2
Port 3
Port 4
Port 5
Port 6
Port 7
Port 8

Service
Port

Switch Device
10/100Base-T

Port 9

Ethernet
PHY

PCI-Ethernet
Controller

MII

Config
EEPROM

Flash

DDR2
SDRAM

Management
CPU

CompactPCI® J1

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 ■ Up to eight 10/100Base-T ports at front panel (Electrical isolation: 1500 Vrms) ■ One 10/100Base-T port at rear connector ■ 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 IEEE 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) ■ 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) ■ 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) ■ Secure Shell (SSH) for Remote Configuration (CLI) over secure channel ■ 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	■ 9-pin D-Sub connector at front ■ RS232 / V24 ■ I2C interface for external dongle
Front I/O	■ Eight Ethernet ports on RJ45 or M12 connectors ■ One service interface via 9-pin D-Sub connector ■ 16 link and activity Ethernet status LEDs (2 per channel) ■ Status LEDs for power, reset and error codes
Rear I/O	■ One 10/100Base-T port via CompactPCI® J1 (rear)

Technical Data

CompactPCI® Bus	■ Compliance with CompactPCI® Specification 2.0 R3.0 ■ Only one slot required on the 3U CompactPCI® bus ■ Peripheral slot ■ Compliance with PCI Specification 2.1 ■ V(I/O): +3.3 V ■ Ninth Fast Ethernet port via CompactPCI® J1
Electrical Specifications	■ Supply voltage/power consumption: □ +3.3 V (-3%/+5%), 5 W □ +5 V (-3%/+5%), 5 W
Mechanical Specifications	■ Dimensions: conforming to CompactPCI® specification for 3U boards ■ Weight: 316 g (16HP model with M12 connectors)
Environmental Specifications	■ Temperature range (operation): □ -40..+85°C (qualified components) □ Airflow: min. 10 m³/h ■ 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: according to EN 60068-2-27 ■ Bump: according to EN 60068-2-29 ■ Vibration (sinusoidal): according to EN 60068-2-6 ■ Conformal coating on request (standard with M12 connectors)
MTBF	■ 778 505 h (RJ45 model) or 752 506 h (M12 model) @ 40°C according to IEC/TR 62380 (RDF 2000)
Safety	■ Flammability □ PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers
EMC Conformity	■ EN 55022 (radio disturbance) ■ EN61000-4-2 (ESD Immunity) ■ IEC 61000-4-4 (burst)
Software Support	■ Firmware for configuration and management included

Configuration & Options

Standard Configurations

Article No.	Channels	Connector	Front Panel	Operation Temperature	Conformal coating
02F302-00	8	RJ45	12 HP	-40..+85°C	On request
02F302-02	8	M12	16 HP	-40..+85°C	Yes

Options

Front Connectors / Mechanical	■ RJ45 connectors
	  □ 12 HP (3-slot) front panel
	■ M12 D connectors
	  □ 16 HP (4-slot) front panel

Environmental specifications	■ Conformal coating for RJ45 models (standard with M12 connectors)
Cooling Concept	■ Also available with conduction cooling in MEN CCA frame

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

Ordering Information

Standard F302 Models	**02F302-00**	Managed Switch with 8 Fast Ethernet ports, 1 Fast Ethernet controller, RJ45 connectors, 12HP, -40..+85°C with qualified components
	02F302-02	Managed Switch with 8 Fast Ethernet ports, 1 Fast Ethernet controller, M12 connectors, 16HP, -40..+85°C with qualified components, conformal coating
Related Hardware	**05SF02-00**	I2C dongle for F302, G302 and managed SFxx switches, 512Kb, D-Sub, -40..+85°C
Software: Firmware/BIOS	**14ETSW-00**	Ethernet Switch Firmware for managed RSx, SFx and F302 models

For operating systems not mentioned here contact MEN sales.

Documentation	Compare Chart 3U CompactPCI® / PlusIO CPU cards » Download
	Compare Chart 3U CompactPCI® / PlusIO peripheral cards » Download
	Compare Chart Industrial Ethernet switches for different platforms » Download
	20F302-00 F302 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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