# *sat-nms* IO-FEP – I/O Front-End-Processor

The **sat-nms** IO-FEP MNC Front-End-Processor interfaces to any "low level" interface commonly used in satellite ground stations like equipment alarm contacts, waveguide- or coaxial-switches and other status signals. It provides opto-coupled in- and outputs and potential free relay output contacts. All these interfaces are monitored and controlled locally in the **sat-nms** IO-FEP. As additional feature, the **sat-nms** IO-FEP can also perform automatic RF-inhibit of high power amplifiers (HPA) during the switch-over time of waveguide switches. With this feature the selective RF inhibit in an n:1 redundant configuration of only affected HPA's is possible. If the waveguide switches used in the ground station do not provide the RF inhibit feature at all, the **sat-nms** IO-FEP takes care of the correct sequence in switching a waveguide switch if it is also connected to an HPA. The internal redundancy switching mode offers the possibility to use the **sat-nms** IO-FEP as stand-alone redundancy controller.
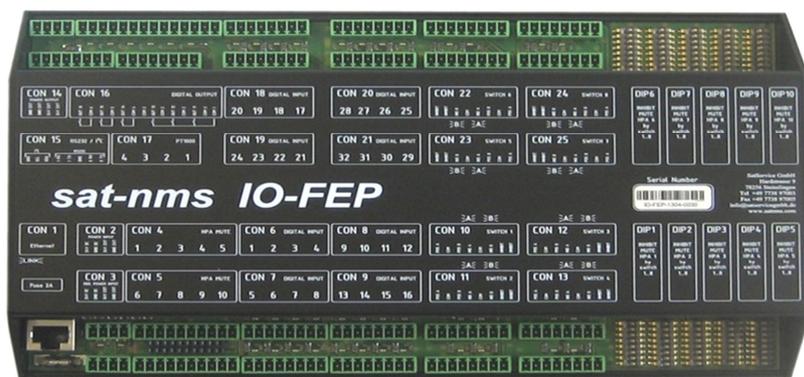
The **sat-nms** IO-FEP can be used as stand-alone equipment via its web-based user interface, but interfaces also smoothly with the **sat-nms** MNC and **sat-nms** NMS or any other Monitoring & Control and Network Management System either via Ethernet or serial interface for remote control. The web browser interface provides a user-friendly interface for local remote control.

The standard module provides 32 Opto-Coupler inputs, 16 digital outputs and 8 input/output interfaces to monitor and control waveguide switches including the selective management of inhibit contacts of up to 10 HPAs. 6 of the digital outputs have relays to operate up to 48V the other 10 are open collector outputs. Also available is an extended version: the **sat-nms** IO-FEP-E with additional 16 Opto-Coupler inputs and altogether 16 waveguide switch connectors.

Key Features

- Ethernet (SNMP and HTTP), Web Browser and RS232 Interface
- Integrated Redundancy Switching Capability
- 32 or 48 Digital Inputs
- 6 Relay Outputs & 10 Opto-Coupler Outputs
- Interfaces for 8 or 16 Waveguide Switches
- Supports RF Inhibit Contacts of Waveguide Switches and HPAs
- Temperature Measurement with external PT1000 Sensors
- Integrated Alarm/ Event Logging
- Interfaces to any higher Level MNC System
- NTP Server Interface also for redundant NTP Server Systems

Applications

- Monitoring of Alarm Contacts
- Redundancy Switching with RF Inhibit of HPA's
- Control of Waveguide and Coaxial Switches

Contact Information

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Technical Specification

General Interfaces	IO-FEP	IO-FEP-E	
System Interfaces			All Interfaces (except Ethernet-Interface) have to be connected via Mini Combicon MCV1,5/XX-G-3.5
External Temperature Measurement	4x	4x	External PT1000 Sensors; Accuracy +/-3°C; Range: -40 to +60°C, alarm threshold, digital outputs can be assigned to setup up to 4 temperature controllers (heater or cooling)
Internal Temperature Measurement	1x	1x	Internal On-Chip-Sensor; Accuracy +/-3°C; Alarm threshold
Internal Clock/ Calendar	1x	1x	Real-time Clock/Calendar. If Power Supply is missing, a Goldcap Capacitor keeps the Clock running for min. 7 days
Digital Input	32x	48x	Optocoupler, Indication Current: ~3mA @ 24V DC
Digital Output	6x	6x	Relay Contacts, max. continuous Current: 1A, max. continuous Voltage: 48V DC
Digital Output for HPA RF Inhibit	10x	10x	PhotoMOS Relays, Per Relay max. Continuous Current: 130mA, Max. Continuous Voltage: 48V, On-State-Resistance: ~25Ohm
HPA RF Inhibit Matrix	10x8	10x16	Software HPA-muting or DIP-Switches for Hardware-HPA-Muting
Waveguide Switches	8x	16x	
Position Control			Maximum Peak Switching Current: 5A
Position Indication			Opto-Coupler, Indication Current: ~3mA @ 24V DC
Inhibit Indication			Indication Current ~5mA @ 24V DC
Redundancy Switching 1:1 up to	8x	16x	1:1 and 2:1 can be used at the same time in any combination.
Redundancy Switching 2:1 up to	4x	8x	Maximum quantity is limited by quantity of Waveguide Switch Interfaces!
NTP Time Server Interface	2x	2x	Interface for master and redundant NTP server
Power Output	1x	1x	24V DC, max. 500mA
RS232	1x	1x	Serial Remote Monitoring & Control Interface
Ethernet	1x	1x	RJ45, 10/100-Base-T, Via HTTP GET Requests and SNMP

Electrical and Mechanical Specification, Environmental Conditions

	IO-FEP	IOFEP-E
Supply Voltage	24V DC	24V DC
Power Consumption 24V DC	Max. 150mA	Max. 200mA
Power Consumption 24V EXT	Max. 450mA (excluding power output at CON14 and the switching current of the waveguide switches)	Max. 650mA (excluding power output at CON14 and the switching current of the waveguide switches)
Temperature Range	5° to 50° C	5° to 50° C
Humidity	Up to 90% non-condensing	Up to 90% non-condensing
DIN Rail Module	264 x 165 x 60 mm	434 x 165 x 60 mm
Weight	1.5 kg	2.2 kg