User Manual
1 U MTCA Shelf

Product Number:

11850-016

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Schroff ®

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1 Safety

The intended audience of this User's Manual is system integrators and hardware/software engineers.

1.1 Safety Symbols used in this document

⚡	**Hazardous voltage!** *This is the electrical hazard symbol. It indicates that there are dangerous voltages inside the Shelf.*

⚠	**Caution!** *This is the user caution symbol. It indicates a condition where damage of the equipment or injury of the service personnel could occur. To reduce the risk of damage or injury, follow all steps or procedures as instructed.*

⚠	**Danger of electrostatic discharge!** *The Shelf contains static sensitive devices. To prevent static damage you must wear an ESD wrist strap.*

1.2 General Safety Precautions

⚡	**Warning!** *Voltages over 60 VDC can be present in this equipment. As defined in the PICMG 3.0 Specification, this equipment is intended to be accessed, to be installed and maintained by qualified and trained service personnel only.*

- Use of this product in a manner not specified by the manufacturer may impair the safety protection of this equipment.
- Service personnel must know the necessary electrical safety, wiring and connection practices for installing this equipment.
- Install this equipment only in compliance with local and national electrical codes.
- For additional information about this equipment, see the PICMG MicroTCA Specification (*www.picmg.com*).

1.3 References and Architecture Specifications

- PICMG® MTCA.0 Specification (*www.picmg.com*)
- PICMG® AMC® Base Specification (*www.picmg.com*)

2 Hardware Platform

The Schroff **11850-016** is an 1 U/2slot MicroTCA Shelf with **EMCH** (Embedded MicroTCA Carrier Hub) for AMC Single Full-size or Mid-size modules (with 2 HP filler panel).

Features:

- Shielded steel case
- 2 AMC single Full-size slots
- MicroTCA Backplane
- EMCH (Embedded MicroTCA Carrier Hub) with basic MicroTCA functionality for switching and managing two AMCs (Advanced Mezzanine Cards)
- Power management controller on the backplane
- Active cooling through:
  4 fans for cooling the AMC modules
  1 fan for cooling the power supply
- Easy removable air inlet filter
- Integrated 150 W AC Power Supply with wide range AC input and 12 V DC output.
- AC mains/line module with IEC 320-C14 connector, integrated mains/line fuses and line filter

2.1 Front and Rear View

Figure 1: Front and RearView
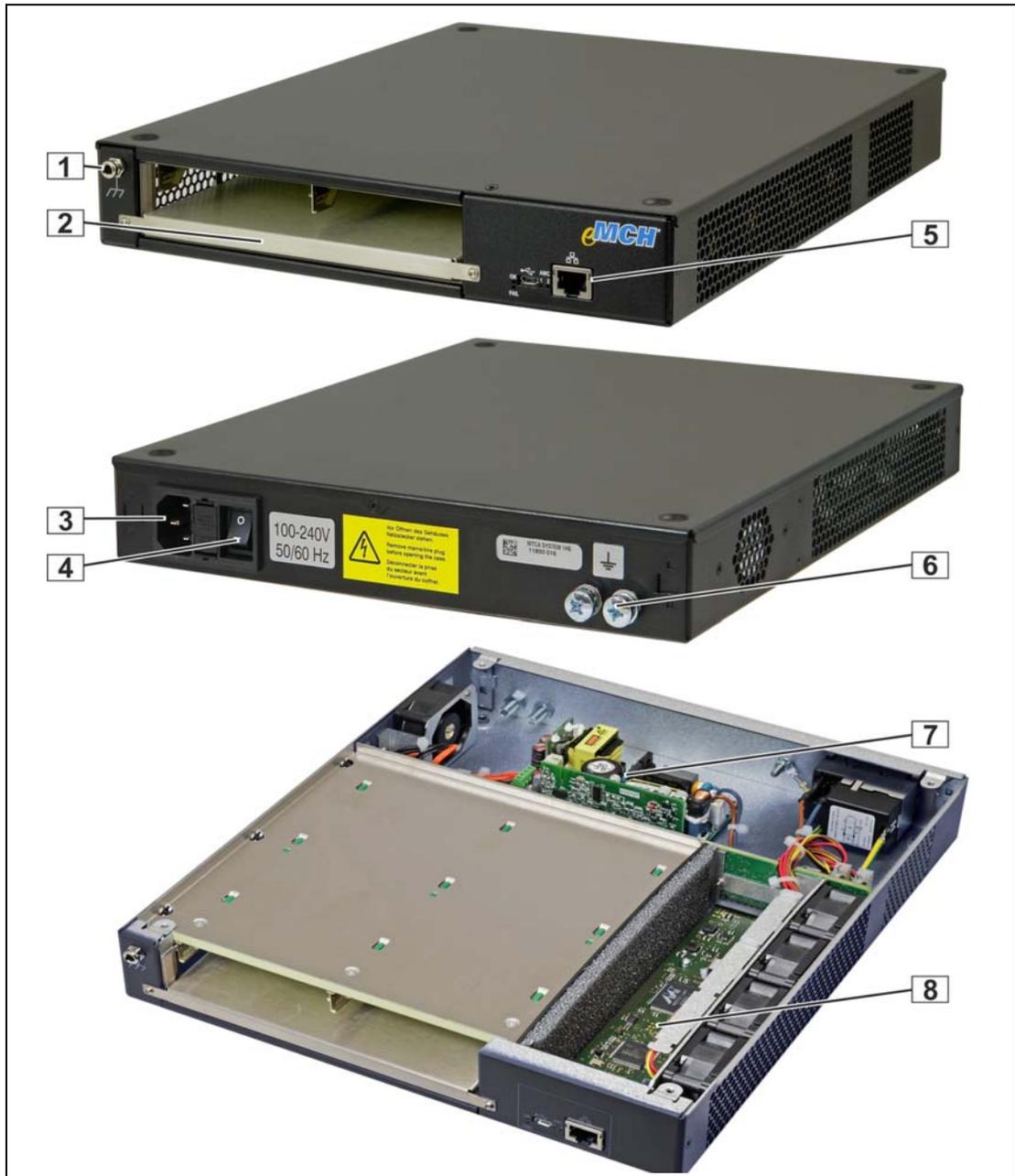
1	ESD Wrist Strap Terminal	5	EMCH interfaces
2	2 HP Filler panel	6	Ground Terminal (Equipotential bonding)
3	AC input	7	PSU
4	Mains/line switch	8	EMCH

2.2 ESD Wrist Strap Terminal

⚠	**Danger of electrostatic discharge!**
	The Shelf contains static sensitive devices. To prevent static damage you must wear an ESD wrist strap.

The ESD Wrist Strap Terminal (4 mm banana jack) is located left to the card cage.

3 Backplane

- 3.3 V management power generation on the backplane
- Hot-Swap circuitry for enabling the management power and payload power by the EMCH
- Fan connectors on the backplane (4-pin fan connectors)

3.1 Backplane Topology

Figure 2: Backplane Topology
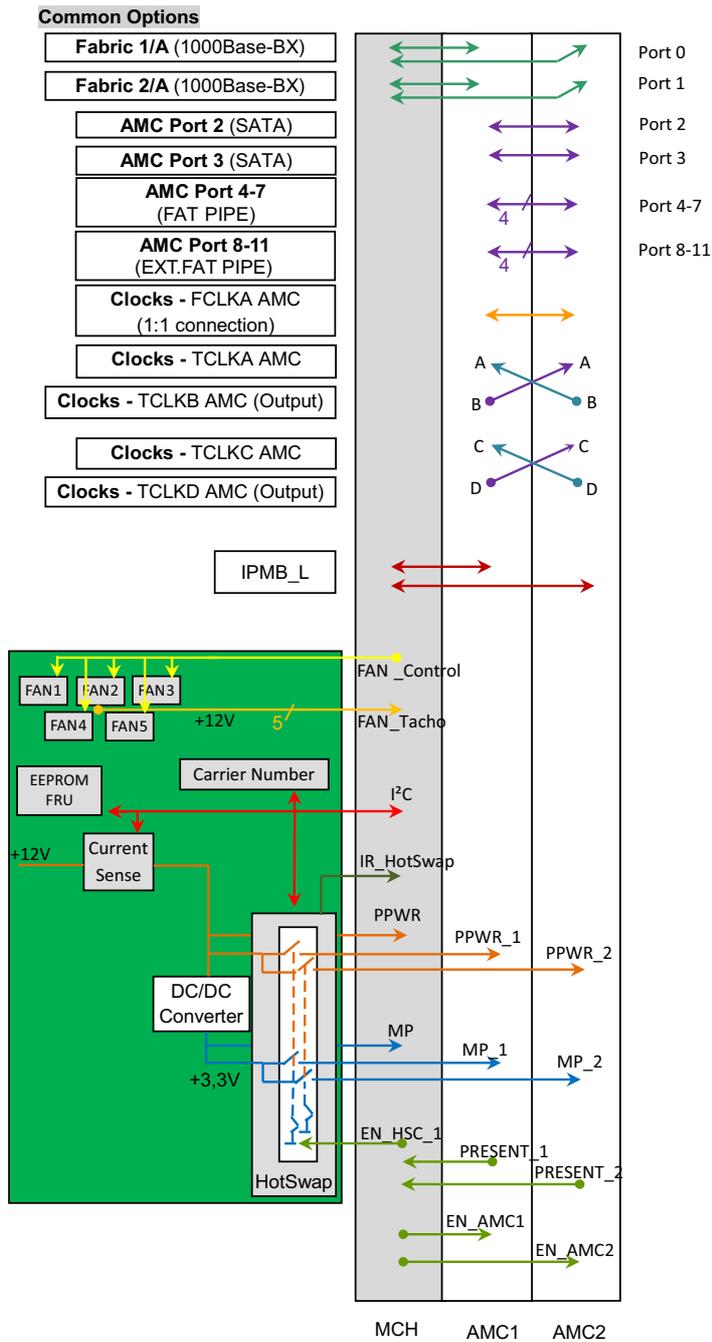
3.2 Fabric Interface

3.2.1 Common Options

MCH Fabric Port 1 is routed to AMC 1 Port 0.

MCH Fabric Port 2 is routed to AMC 2 Port 0.

MCH Fabric Port 3 is routed to AMC 1 Port 1.

MCH Fabric Port 4 is routed to AMC 2 Port 1.

AMC Ports 2 and 3 are direct slot to slot connections between both AMC slots.

3.2.2 Fat Pipe

AMC slots Port [4:7] are direct slot to slot connections between both AMC slots.

3.2.3 Extended Fat Pipe

AMC slots Port [8:11] are direct slot to slot connections between both AMC slots.

3.3 Intelligent Platform Management Bus (IPMB)

MicroTCA uses an Intelligent Platform Management Bus (IPMB) for management communications.

3.3.1 IPMB-L

Radial IPMB from MCH to both AMCs.

3.4 Power Management

The integrated power management circuitry on the backplane provides 12 V payload power distribution branches to the AMC Slots. It also generates the 3.3 V management power and distributes it to all slots.

The current to the AMC slots is limited to:
- 8 A (Payload Power)
- 250 mA (Management Power)

4 Cooling

4.1 Air Filter

Figure 3: Air Filter

1   Air Filter

4.2 Air filter swap

The system provides a replaceable air filter. The air filter can be pulled out after removing the top cover. The filter meets the requirements of the Telcordia Technologies Generic Requirements GR-78-CORE specification.

4.3 Cooling

Figure 4: Airflow
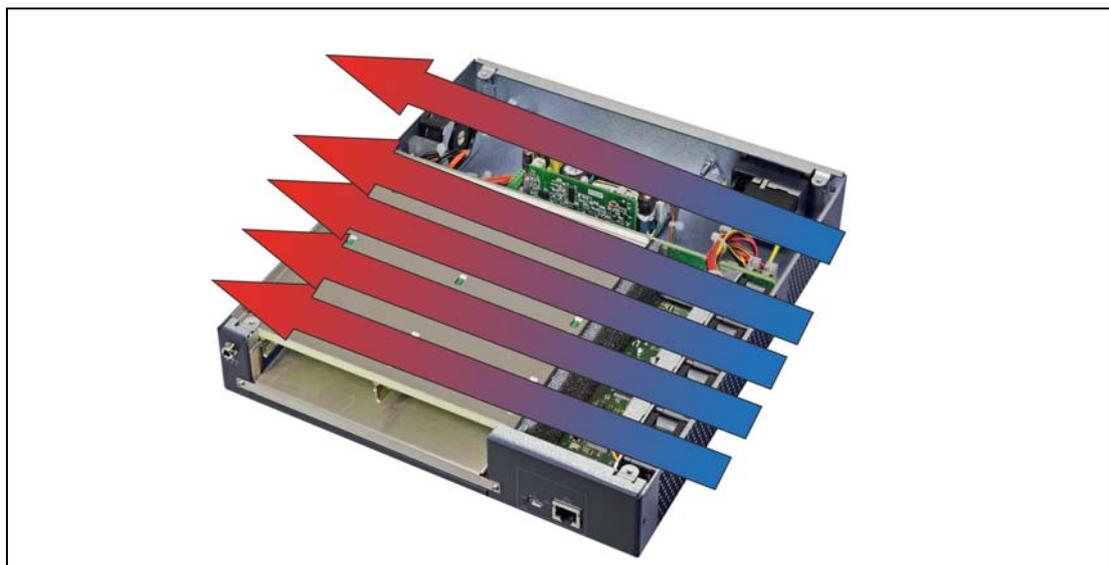
The MicroTCA Shelf is equipped with four 12 VDC fans for cooling the AMC modules and one 12 VDC fan for cooling the power supply. The fans are controlled as a group by the EMCH.

4.4 Power Supply

⚠	**Hazardous voltage!** *Parts of the power supply may be exposed with hazardous voltage.* *Always remove mains/line connector before carry out any assembly work.*

⚠	**Caution!** *The unit is designed in accordance with protection class 1! It must therefore be operated with protective earth/GND connection. Use only a three conductor AC power cable with a protective earth conductor that meets the IEC safety standards!*

⚠	**Caution!** *There is a ground terminal at the right side. This ground terminal is only for equipotential bonding. Grounding is achieved through the protective earth conductor of the power cable!*

The system has a 150 W open frame AC power supply with wide range AC input and 12 V DC output. The DC output is connected directly to the power management circuitry on the backplane.

The power input is provided by an AC mains/line module with IEC 320-C14 connector, integrated mains/line fuses, line filter and a mains/line switch.

Fuse value is T2AH250V.

Figure 5: AC Input

1	AC Input	3	Equipotential bonding
2	Mains switch	4	Fuse holder

Table 1: Data AC Power Supply

Input voltage	100 - 240 VAC
Mains Frequency	50 / 60 Hz
Output (max.)	150 W
Output voltage	12 V DC
Output voltage ripple and noise	120 mVpp
Operating Temperature	-5° C - +55° C

5 EMCH (Embedded MicroTCA Carrier Hub)

The EMCH (Embedded MicroTCA Carrier Hub) is intended to provide basic MicroTCA functionality for switching and managing two AMC (Advanced Mezzanine Card) modules. It delivers switching and hub functionality for the system fabric gigabit ethernet (GbE) as defined in the AMC.0 standard series.

Furthermore it supports the typical hot swap management and its transition state machine (M0 to M6) for each AMC module. In addition to that, the embedded MCH monitors and verifies local sensor data of the chassis and installed FRU devices and supplies MicroTCA power and cooling concepts by accessing the chassis integrated power supply and fan coolers.

Remote administration can be done locally over the CLI (Command Line Interface) served by the front USB port.

Figure 6: EMMC Block Diagram
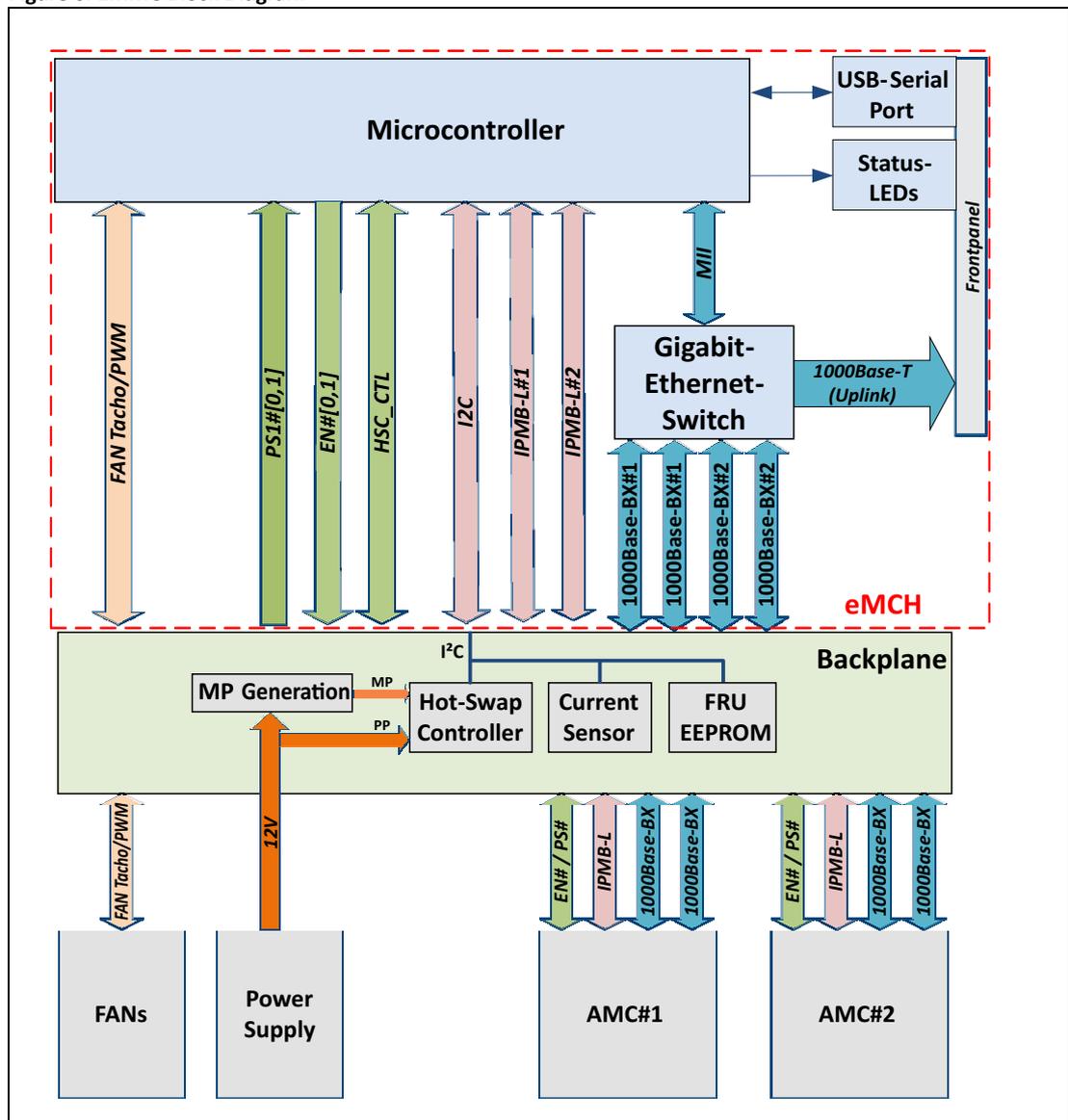
5.1 Front Panel and LEDs

The EMCH front panel consists of two status LEDs for the AMCs, and each one LED (OK, FAIL) for the system's operation status. In addition to the LEDs, you can find sockets for a RJ45 plug and a micro USB cable.

Figure 7: EMMC Front Panel
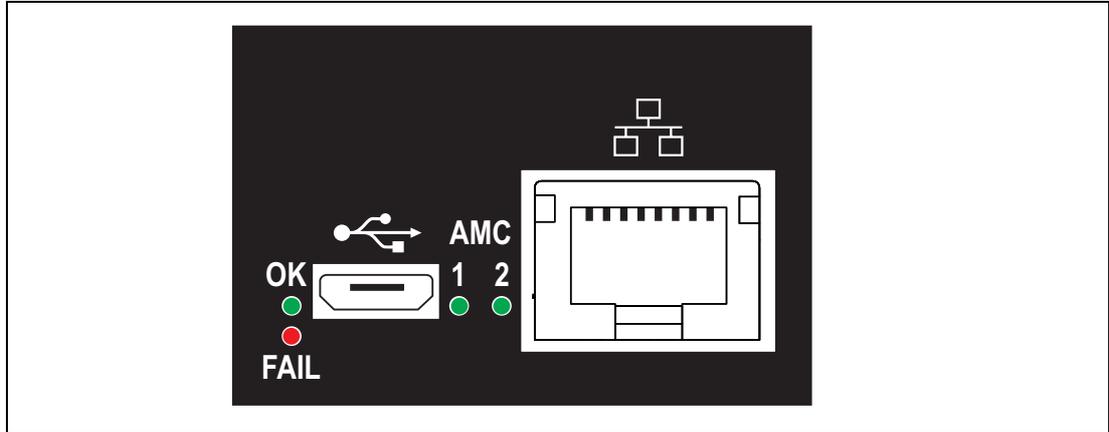
Table 2: EMCH front panel

Type	Function
LED AMC1	Blink Short: Reading FRU information (M1) Blink Slow: Waiting for HS-Handle being closed (M1) ON: FRU operating state (M4) OFF: No Module installed
LED AMC2	Blink Short: Reading FRU information (M1) Blink Slow: Waiting for HS-Handle being closed (M1) ON: FRU operating state (M4) OFF: No Module installed
LED OK	Blink Slow: - Blink Short: Test Mode ON: Normal operating status. No error OFF:-
LED FAIL	Blink Slow: - Blink Short: - ON: Hard fault OFF: -
Micro USB Type A	Used for virtual COM-Port. Direct connection to PC
RJ45 Gigabit-Ethernet	1000Base-T Uplink for remote control

- Note: When executing the bootloader, all LEDs will be put on.

5.2 Comand Line Interface (CLI)

The EMCH is providing a low level command line interface (CLI) which allows to set certain operational parameters and to display run time information from the MCH and the system.

5.2.1 COM-Settings

The CLI can be accessed over the front MicroUSB port. To establish a connection to a host PC, use a serial terminal program e.g. Terra-Term, HTerm, Putty, e.g.

Configure the COM port settings as followed:

Table 3: COM port settings

Baudrate	115200
Data	8 bit
Parity	None
Stop	1 bit
Flow control	None
COM	The devices COM address defined by host

If the terminal is opened, press enter to see if the connection is established successfully. You can now type "help" to see the list of available commands. Press enter to call the previous command again.

NOTE: Depending on your operating system, you need to download and install the FTDI-chip driver manually. Drivers can be downloaded at http://www.ftdichip.com/FTDrivers.htm. Installing the driver automatically by the windows update may take up to a few minutes.

Table 4: CLI Commands

Command	Parameter	Description
bi		**Board Information** Prints the vital product information record (i.e. Serial number, Hardware revision and release codes).
ip	<ip> <netmask> <gateway>	**IP configuration** Configures IP addresses, net mask, broadcast address and gateway. Parameters have to be in dotted representation <x.x.x.x>
ni		**Print network configuration**
ti		**Print task information**
bl		**Starts the bootloader**
show_localsensors		**Show local sensor information of the chassis**
show_fru		**Show all FRU's**
show_fruinfo	<fru_id>	**FRU contents** Shows the contents of a FRU device selected by <fru_id>. For valid FRU numbers please refer to MTCA R1.0 table 3-3
show_sensorinfo	<fru_id>	**Shows the sensor values of the selected FRU**
show_pm		**Power Module Status** Shows the actual power allocation status for all AMC modules
reboot		**Reboot the eMCH**
password	<old_password> <new_password>	**Changes the web password for accessing the update service**

5.3 Firmware Update

The EMCH serves a web based front end to easily upgrade the devices firmware in field. To use this utility, first establish an ethernet link over the EMCH uplink port. If not changed, the standard interface config is as followed:

Table 5: Standard interface configuration

IP address:	192.168.1.138
Netmask:	255.255.255.0
Gateway:	0.0.0.0

Type http://192.168.1.138/ in your web browser or type "bl" in the command line interface to call the bootloader. Your browser should show the index page with a button "call bootloader". By clicking on this button, a software reset will be triggered and the system will boot into the bootloader. Wait a few seconds and call http://192.168.1.138/ again. The page should have changed slightly and will prompt you to enter a password. By default, the password is "nat". To leave the bootloader without touching anything, just click on "Leave Bootloader".

By clicking on "submint" the upload page should open.

Now select a proper firmware image with the file extension ".srec". Click upload to flash the image into the device memory.

NOTE: The upload process will take a few seconds, please don't interrupt or close the browser while upgrading.

If succeed, the Message "File Upload Done" is shown. Click on "Reset MCU" to trigger a software reset. The device should now boot into the new firmware.

NOTE: If something went wrong during the firmware upgrade (e.g. lost of power or communication during file transfer), the device will boot into the bootloader again instead of loading the firmware. In this case you can easily repeat the firmware upgrade.

6 Technical Data

Table 6: Technical Data

Physical Dimensions	
Height	43.60 mm (1 U)
Width	265 mm
Depth	approx. 302 mm
Weight	
Weight completely assembled	approx. 2.7 Kg
Power Supply	
Input Voltage	100 VAC to 240 VAC
Mains Frequency	50 Hz to 60 Hz
Input Current	1,2 A at 100 VAC; 0,5 A at 240 VAC
Input Fuse (2x)	T2AH250V
Environmental	
Ambient temperature	-5°C…+45°C (long term)
Ambient temperature	-5°C…+55°C (short term)
Humidity	+5%...+85%, non-condensing