MicroTCA System

User's Manual

Product Number:

11850-011

Doc-No: 63972-232_R1.1

April 2014

Rev.	Date updated	Change
R1.0	August 08, 2008	Initial Release
R1.1	April 2014	Backplane Topology and fan specs updated

Impressum:

Schroff GmbH

D-75334 Straubenhardt, Germany

The details in this manual have been carefully compiled and checked.

The company cannot accept any liability for errors or misprints. The company reserves the right to amendments of technical specifications due to further development and improvement of products.

1 Safety 1
1.1 Safety Symbols used in this document 1
1.2 General Safety Precautions 1
1.3 References and Architecture Specifications 2
1.4 Product Definition 2
2 Hardware Platform 2
2.1 Front View 3
2.2 ESD Wrist Strap Terminal 3
3 Backplane 23005-423 4
3.1 Backplane Topology 4
3.2 Fabric Interface 5
3.2.1 Common Options 5
3.2.2 Fat Pipe 5
3.2.3 Extended Fat Pipe 5
3.3 Synchronization Clock Interface 5
3.4 Intelligent Platform Management Bus (IPMB) 5
3.4.1 IPMB-L 5
3.4.2 IPMB-0 5
3.5 JTAG 5
3.6 Cooling Unit Connectors 6
3.7 Carrier FRU SEEPROM 6
3.8 Carrier Number 6
3.8.1 Mechanical DIP Switch 7
3.8.2 Electronic DIP Switch (factory default) 7
4 Cooling Unit 8
4.1 Air Filter 8
4.2 Air Filter Replacement 8
4.3 Air Filter Presence Sensor 8
4.4 Fan Trays 9
4.5 Fan Tray Connectors and Indicators 10
4.6 Fan Tray IPMB Addresses 11
4.7 Smart Fan Controller Block Diagram 11
5 Technical Data 12
5.1 Shelf Dimensions 13

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. This equipment is intended to be accessed, to be installed and maintained by qualified and trained service personnel only.*

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

1.4 Product Definition

The Schroff 11850-011 is a 3 U MicroTCA Shelf, 10+2+2 slot for AMC modules.

2 Hardware Platform

- Compliant to PICMG MicroTCA Base specification
- Shielded steel case with 19” rack mounting brackets
- MicroTCA Backplane with radial IPMI-L from both MCH slots to all AMC slots and bused IPMB-0 among MCHs, PMs and CUs.
- The Shelf provides:
  - 10 AMC Single Full-size slots
  - 2 redundant MicroTCA Carrier Hub (MCH) slots (Single Full-size)
  - 2 Power Module (PM) slots (12 HP Single)

  Note: The 8 AMC Single Full-size slots in the right card cage can also be used as 4 Double Full-size slots by removing the splitting kits.
- Active cooling through two hot-swappable Cooling Units (CUs) providing each:
  - 1 temperature controlled 12 VDC fan.
  - Smart Fan Controller
  - Display Module
- Front accessible air inlet filter

2.1 Front View

Figure 1: Front View

12908809

1	ESD Wrist Strap Terminal	3	Air Filter
2	Coolung Unit 1	4	Cooling Unit 2

2.2 ESD Wrist Strap Terminal

	**Danger of electrostatic discharge!** *Static electricity can harm delicate components. You must wear an ESD wrist strap before exchanging any part or electric component!*

The ESD Wrist Strap Terminal (4 mm banana jack) is located at the left mounting bracket.

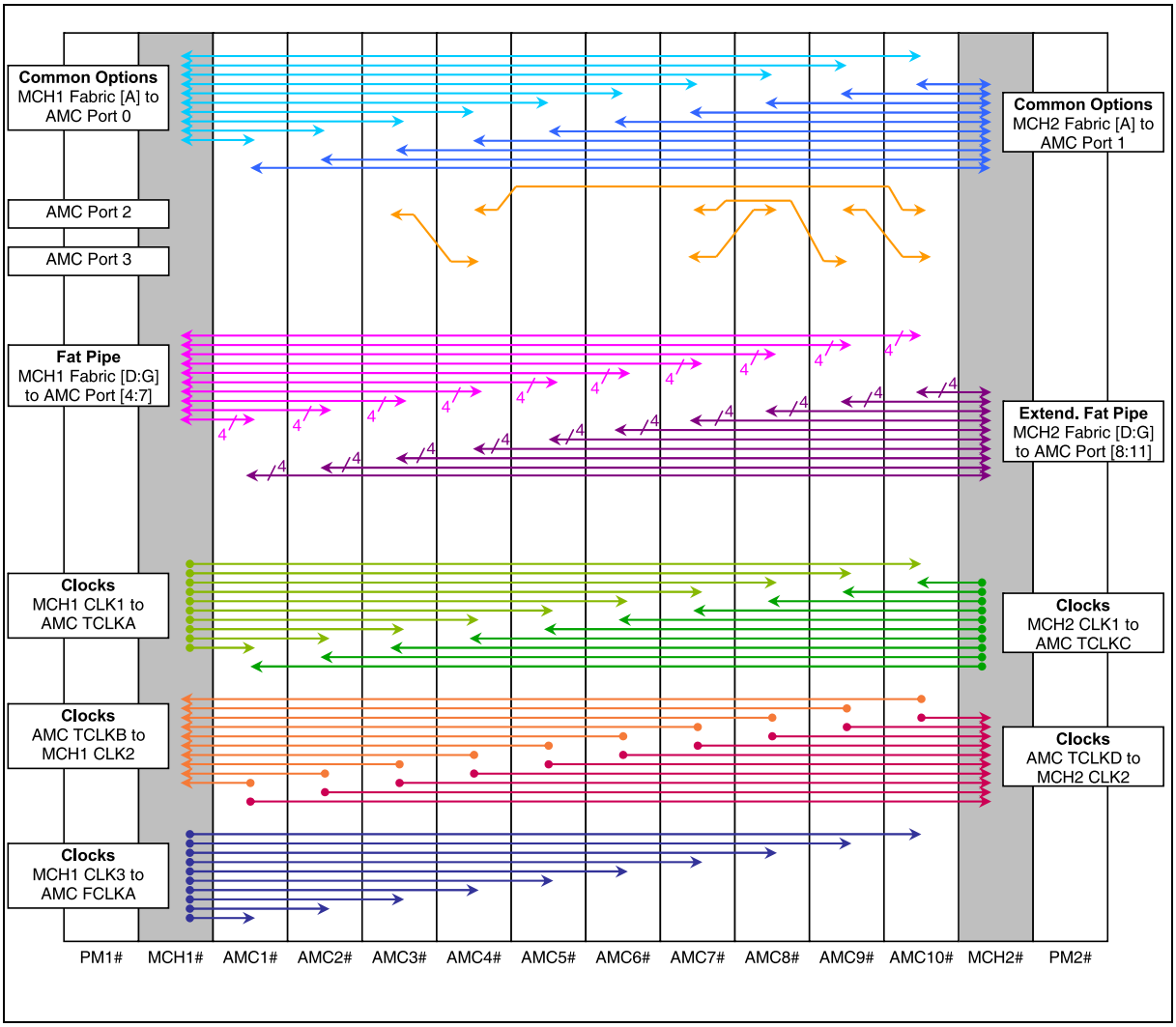
3 Backplane 23005-423

The 10+2+2 slot MicroTCA Backplane provides:

- 10 AMC Single Full-size slots (6 HP)
  or 4 Double Full-size slots and 2 Single Full-size slots
- 2 MicroTCA Carrier Hub (MCH) slots (6 HP)
- 2 Power Module (PM) slots (12 HP)
- 2 Connectors for Cooling Units

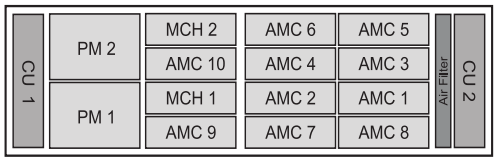
3.1 Backplane Topology

Figure 2: Backplane Topology



12908800

Figure 3: Slot Locations



12908808

3.2 Fabric Interface

3.2.1 Common Options

MCH1 Fabric Port A is routed to all AMC slots Port 0 in a radial configuration.

MCH2 Fabric Port A is routed to all AMC slots Port 1 in a radial configuration.

AMC Ports 2 and 3 are direct slot to slot connections to support CPU/HDD configurations.

3.2.2 Fat Pipe

MCH1 Ports [D:G] are routed to all AMC slots Port [4:7] in a radial configuration.

3.2.3 Extended Fat Pipe

MCH2 Ports [D:G] are routed to all AMC slots Port [8:11] in a radial configuration.

3.3 Synchronization Clock Interface

Synchronisation clock topology in accordance with AMC.0 R2.0, especially for the use of PCIe AMC modules in accordance with AMC0 R2.0 that expect the FabricCLK on FCLKA.

Fully redundant telecom clock architecture with TCLKA, TCLKB, TCLKC,TCLKD.

3.4 Intelligent Platform Management Bus (IPMB)

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

3.4.1 IPMB-L

The IPMB among AdvancedMCs and the MCHs is non-redundant and implemented in a radial topology. This IPMB called Local IPMB (IPMP-L)

3.4.2 IPMB-0

The IPMB among the MCH, the PM and the CU is called IPMB-0. The reliability of the IPMB-0 is improved by the addition of a second IPMB, with the two IPMBs referenced as IPMB-A and IPMB-B.

The IPMB-A and IPMB-B are routed in a bused configuration.

IPMB-A and IPMB-B are electrically and logically separate from the Local IPMB (IPMB-L)

3.5 JTAG

JTAG signals are not supported.

3.6 Cooling Unit Connectors

Two connectors for intelligent Cooling Units are located on the left and right side of the Backplane. For pin assignment see chapter cooling unit.

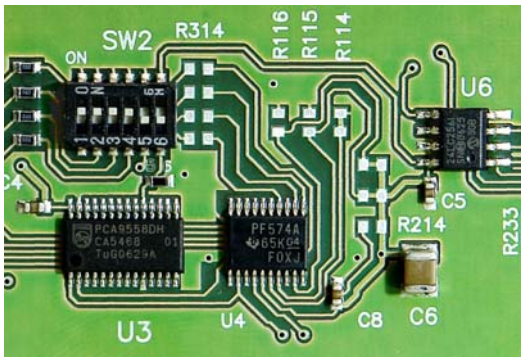
3.7 Carrier FRU SEEPROM

Two SEEPROMS are located at the backside of the Backplane. The SEEPROMS are connected to both MCHs through I²C-busses.

The I²C-addresses of the SEEPROMs is 0xa4.

3.8 Carrier Number

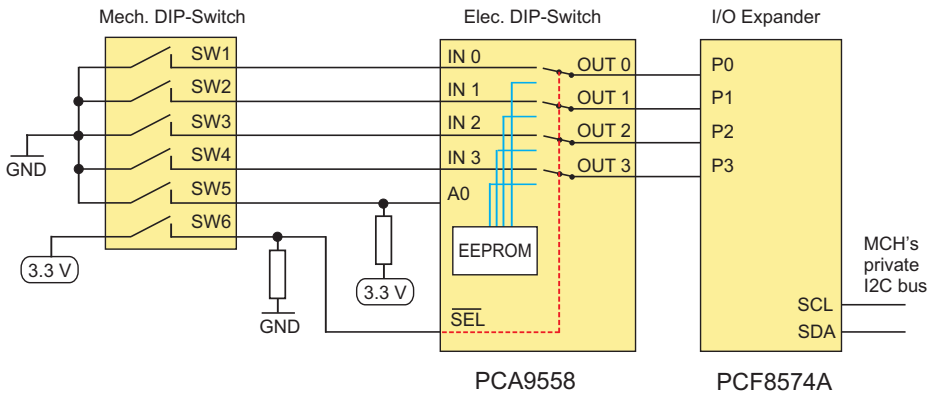
Figure 4: Electronic and mechanical DIP Switch



12908801

Each MicroTCA Carrier shall have a unique Carrier Number, ranging from 1 to 16 in its MicroTCA Shelf. To provide the Carrier Number, a mechanical and electronic (PCA9558) DIP switch and a PCF8574A I²C I/O expander is located on the Backplane.

Figure 5: Carrier Number Switches



12807826

The customer can use either the mechanical or the electronic DIP switch to set the carrier number.

3.8.1 Mechanical DIP Switch

The mechanical DIP switch is a 6-position switch.

- Switch 1 to 4 are used to set the carrier number (Switch 1 = Bit 0).
- Switch 5 is used to change the I2C-address of the electronic DIP switch.
  - Switch 5 ON: address = 9C
  - Switch 5 OFF: address = 9E
- With switch 6 you can select between mechanical or electronic DIP switch to set the carrier number.
  - Switch 6 ON: Mechanical DIP switch active
  - Switch 6 OFF: Electronic DIP switch active

Two DIP Switches (for redundancy) are located on the Backplane. They are user-accessible after removing the rear panel.

*When setting the carrier number with the **mechanical** DIP switch please note:*

Switch ON = logic 0
Switch OFF = logic 1

The mechanical DIP switch is connected to the input of the electronic DIP switch. When the SEL signal is a logic 0, the electronic DIP switch will select the data from the internal EEPROM to drive the output pins, when the SEL signal is a logic 1, the electronic DIP switch will select the signal from the mechanical DIP switch to drive on the output pins.

3.8.2 Electronic DIP Switch (factory default)

The electronic DIP switch is connected to the lower four bits of the I/O lines of the PCF8574A I²C I/O expander. The I/O expander connects to the MCMC's private I²C bus. The MCMC reads the DIP switch setting from the I/O expander, **adds one**, and uses the result as its Carrier Number.

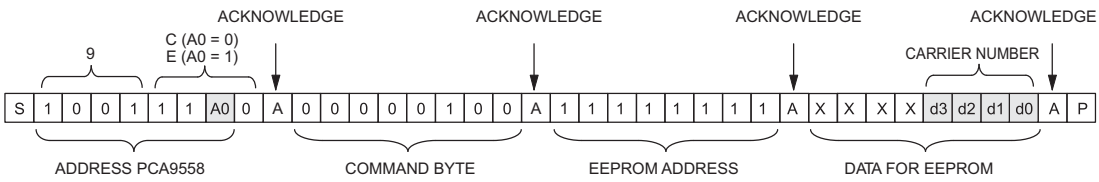
In the default factory setting the electronic DIP switch is active at the address 0x9E (SW5 and SW6 at the mechanical DIP switch = OFF)

Default carrier address = 1 (Data content EEPROM = 0000)

Table 1: I²C Addresses

PCA 9558 DIP switch	0x9e or 0x9c
PCF8574A I/O expander	0x3e

To change the carrier number with the electronic DIP switch you have to send the following I2C command to the electronic DIP switch's EEPROM:



4 Cooling Unit

4.1 Air Filter

Figure 6: Air Filter

12807801

The MicroTCA Shelf provides a front replaceable air filter.

The filter meets the requirements of the Telcordia Technologies Generic Requirements GR-78-CORE specification.

4.2 Air Filter Replacement

The air filter can be removed by pulling the air filter's handle. To re-install, push the air filter into the guide rails at each side of the shelf until the spring mounted ball lock engage.

4.3 Air Filter Presence Sensor

The air filter presence is detected by a reed switch located on the Backplane. The reed switch is activated by a magnet at the rear side of the air filter metal frame.
The signal of the Air Filter Presence Sensor is hosted by the Cooling Unit.

4.4 Fan Trays

The MicroTCA Shelf provides two front-pluggable Fan Trays.
Each Fan Tray contains a 12 VDC fan and a Schroff MicroTCA Smart FanTray Controller (SFC). The SFC has a Enhanced Module Management Controller (EMMC) onboard that communicate with the Carrier Manager over IPMB-0. The SFC controls the fan speed and provides hot-swap functionality.

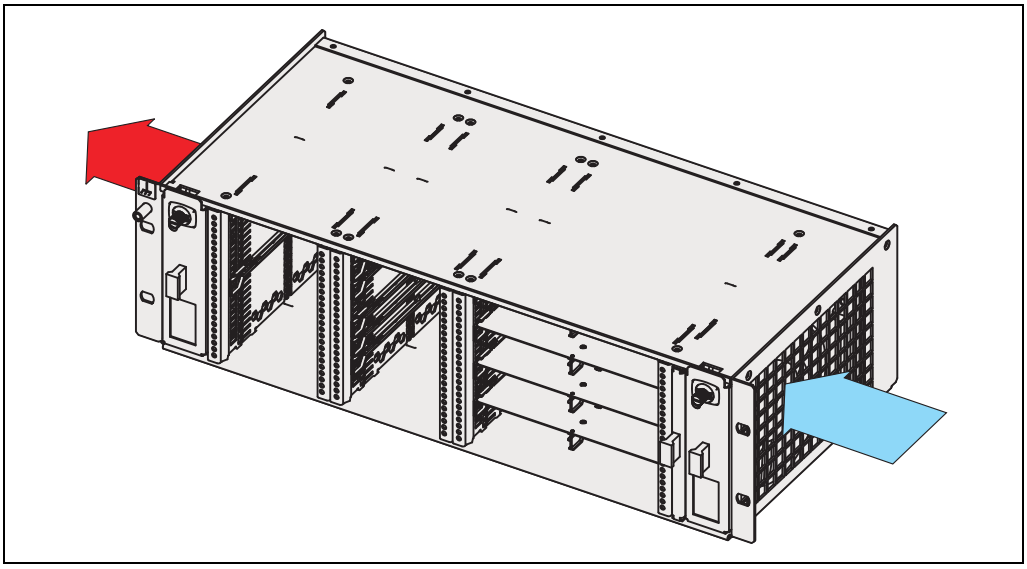
Figure 7: Cooling Unit

12908805

Table 2: Data Fan

Input voltage nominal	12 VDC
Airflow (free blow)	290 m³/h / 171 cfm
Fan Speed (max)	5100 rpm

Figure 8: Airflow



12908804

4.5 Fan Tray Connectors and Indicators

The display module on the front panel includes the following indicators:

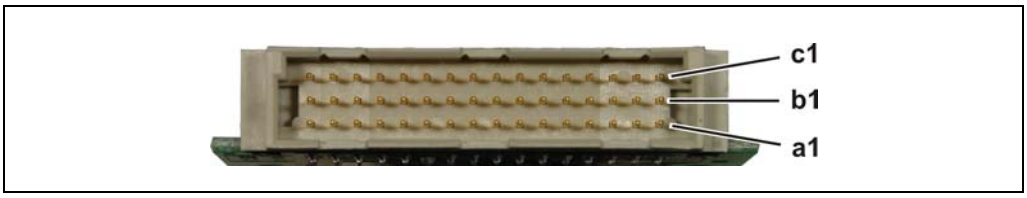
- Green LED – “In-Service”
- Red LED – “Out of Service”
- Blue LED – “Hot-Swap”
- Hot Swap Switch

The Hot-Swap switch indicates to the Shelf Managers that the Fan Tray is about to be removed. Once the operator pushes the Hot-Swap switch, the Shelf Manager is informed of the pending extraction.

Table 3: LEDs on Fan Tray front panel

Color	Description	Status	Condition
Green	In-Service LED	Off	No Power to the Fan Tray
		Solid green	Normal Operation
Red	Alarm LED	Solid red	Attention Status (error condition)
Blue	Hot Swap LED	Off	In use
		Long blink	Activation Request
		Short blink	Deactivation Request

Figure 9: Fan Tray Backplane Connector



12807804

Table 4: Fan Tray Connector Pin assignment

PIN	A	B	C
1	+12 V	+12 V	+12 V
2	+12 V	+12 V	+12 V
3	+12 V	+12 V	GND
4	GND	GND	GND
5	3.3 V MP	CU_ENABLE	CU_PRESENT
6	IPMB0_SCL_A	IPMB0_SDA_A	IPMB0_SCL_B
7	IPMB0_SDA_B	GA0	GA1
8	GA2	GND	GND
9	GND	GND	GND
10			
11			GND
12	GND	GND	GND
13	Air Filter Present	GND	GND
14			
15			
16			

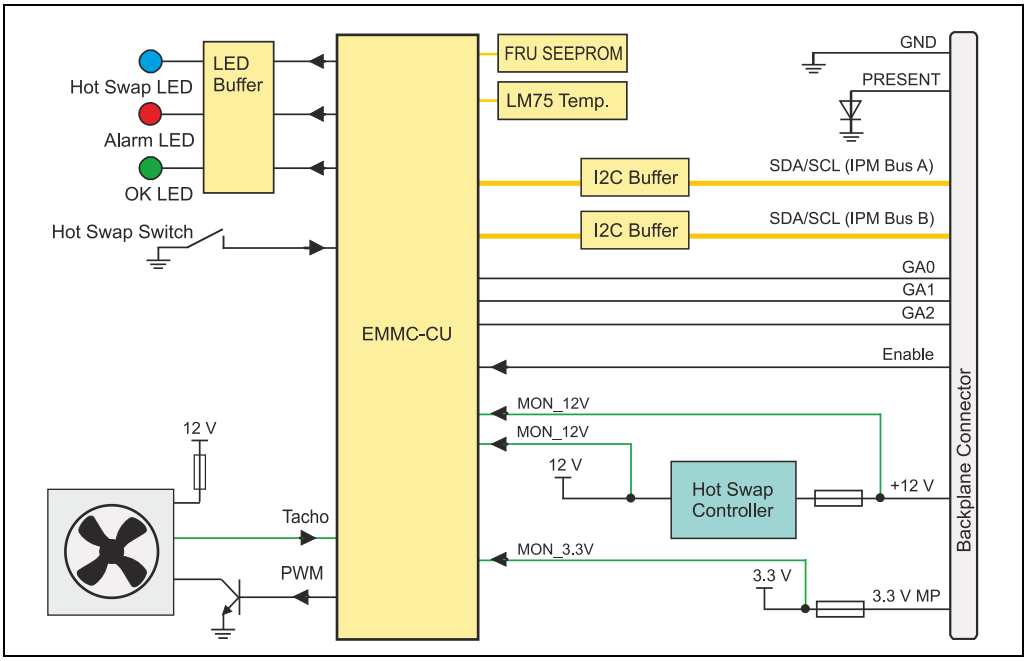
4.6 Fan Tray IPMB Addresses

Table 5: Fan Tray IPMB Addresses

Left Fan Tray	0xAA
Right Fan Tray	0xA8

4.7 Smart Fan Controller Block Diagram

Figure 10: Smart Fan Controller Block Diagram



12908807

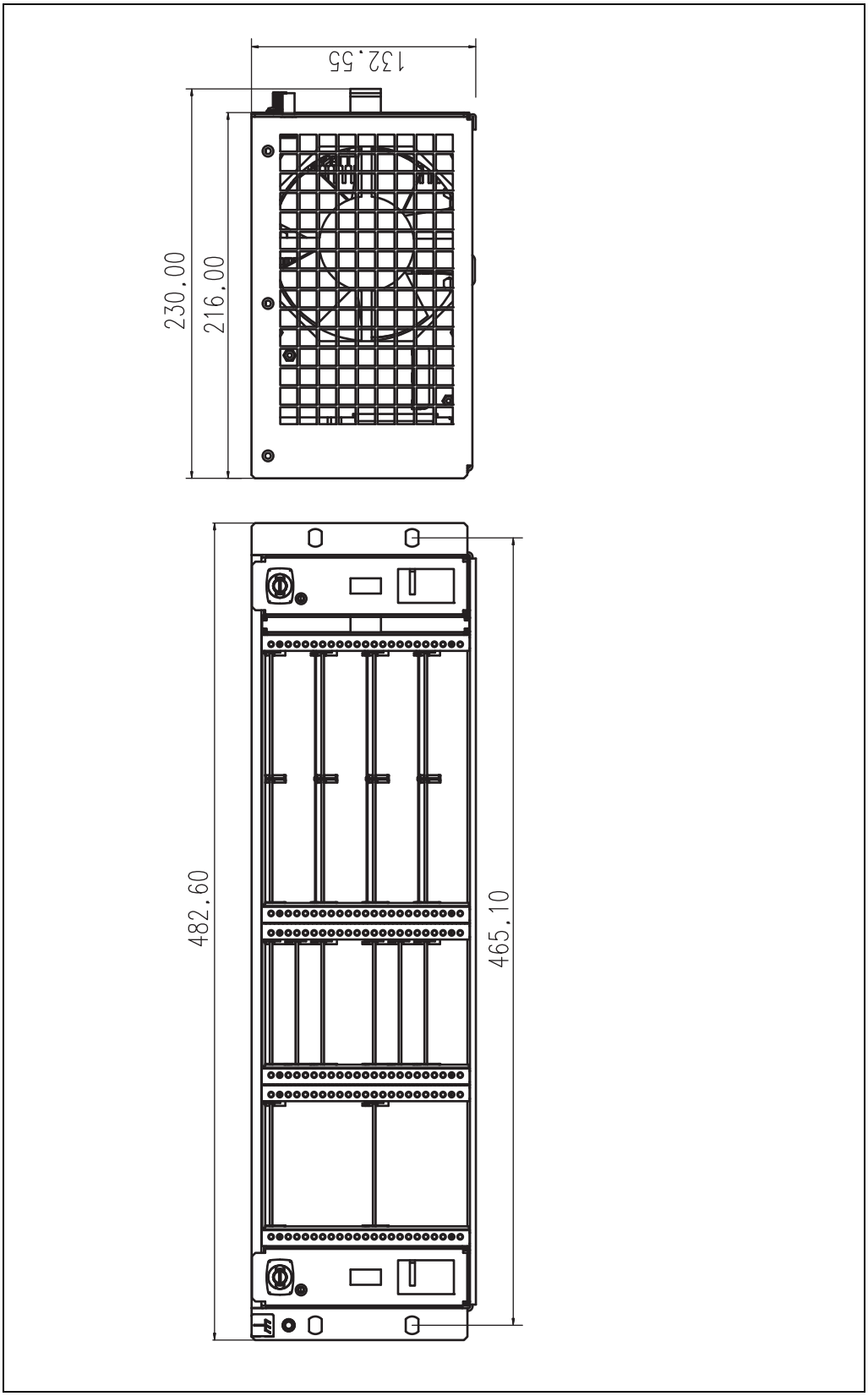
5 Technical Data

Table 6: Technical Data

Physical Dimensions	
Height	132.55 mm
Width (with mounting brackets)	482.60 mm
Depth (with handles)	230 mm
Weight	
Weight completely assembled	7 Kg
Environmental	
Ambient temperature	+5°C…+45°C
Humidity	+5%...+85%, no condensation
EMI	
Conducted Emissions	EN 55022 Class B
Radiated Emissions	EN 55022 Class B

5.1 Shelf Dimensions

Figure 11: Shelf Dimensions



12908803

SCHROFF GMBH **www.schroff.biz**

Langenalberstr. 96-100 **Tel.: + 49 (0) 7082 794-0** **Fax: +49 (0) 7082 794-200**
D-75334 Straubenhardt