Schroff®

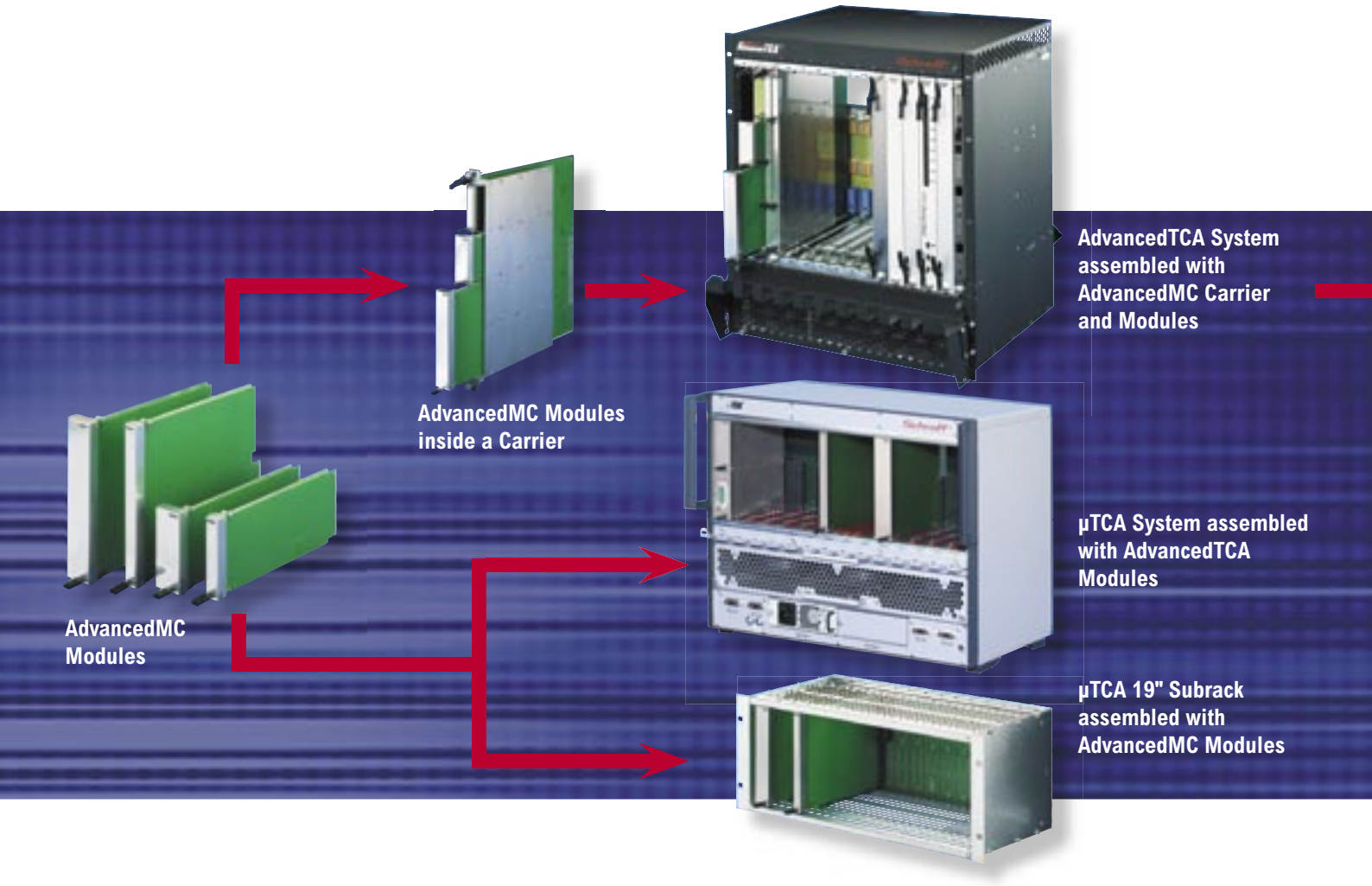
Edition 2007

AdvancedTCA® AdvancedMC™ µTCA™

Packaging Solutions

Pentair
Technical Products

New standards for high speed networks



New Demands

Increasing data traffic and new communication services demand flexible, reliable and scalable infrastructures.

Since 2001 PICMG has therefore investigated what the market expects from a new forward-looking standard for telecommunication applications.

The resulting AdvancedTCA standard demands an effective capacity for data transfers up to 2.5 Tbit/s, along with 99.999% availability of the system, meaning that such a system is only allowed to be inoperable for max. 5.3 minutes per year. Furthermore, different protocols, such as Ethernet, Infiniband, Star-Fabric, PCI-Express and Rapid I/O for fast interfaces have to be supported.

Competitive Advantages with a new Equipment Generation

The present situation in the telecommunication sector shows, that 99% of all systems are proprietary. Many telecommunication companies, however, cannot or do not want to develop or operate proprietary systems any longer, but are demanding a standardised infrastructure.

With the new AdvancedTCA equipment generation, hardware and software components from different manufacturers can be utilised and combined. This new technology offers a flexible, cost effective module, with low development costs and short product launch times.

Applications

The AdvancedTCA standard was originally defined for the applications in the telecommunications sector. The platform orientated concept is ideally suited for:

- Wireless
- Wireline
- Voiceover IP
- Video on Demand
- Media Gateways
- Broadband platform services

Switches, routers and other network applications profit through the extremely high data transfer rates of above 2.5 Tbit/s.

AdvancedTCA (or short ATCA) stands for **Advanced Telecom Computer Architecture**. ATCA is the third main group of standards issued by PICMG (PCI Industrial Computer Manufacturers Group) following the passive PCI Backplane and CompactPCI standards.

To read more, please turn to
Page 4 – Systems
Page 20 – Cabinets

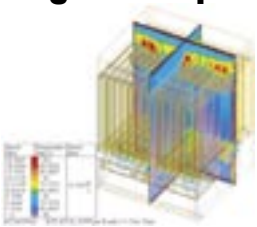
The AdvancedMC standard is an important part of the AdvancedTCA platform.
AdvancedMC modules contain additional boards, which extend the function of a Carrier Board considerably. Parallel to this are the AdvancedMC modules, which are used with the newly defined MicroTCA systems.

To read more,
please turn to Page 24

MicroTCA is a very modular standard with the aim, to assemble AdvancedMC modules directly on the backplane without the requirement for a Carrier Board in cost critical applications in the low end area.

To read more,
please turn to Page 36

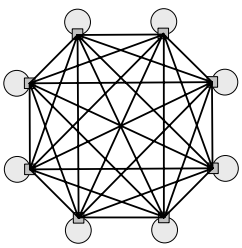
Cooling Concepts



Fast processors create high performance losses and require a carefully thought-out cooling concept – starting from the backplane and up to the cabinet.

To read more,
please turn to Page 44

Standards



The AdvancedTCA, AdvancedMC and µTCA standards have been influenced considerably by Schroff's experts. The focal points of the standards have been summarised for you.

To read more,
please turn to Page 46

Through further development of AdvancedMC and µTCA additional areas of application have been created. And these are not only usable in telecommunication, but universally:

- Communication
  - Base stations: WiMAX
- Picture processing
- Medical technology
- Automation
- Defence technology
- Automation

Advanced Telecom Computer Architecture

Following the initiative of board manufacturers, such as Intel and Motorola, PICMG (PCI Industrial Computer Manufacturers Group) started the development of an open standard for the so far proprietary platforms in the “Carrier Grade”.

In December 2002, after intensive work of more than 100 members, PICMG issued a new standard that embraces the future, the Advanced Telecom Computer Architecture – AdvancedTCA 3.0 (PICMG 3.0 Rev. 2.0).

PICMG®
Open Modular Computing Specifications

AdvancedTCA Specification
Know-how and Expert Knowledge from Schroff!

Foto: Interoperability Workshop 2004 USA

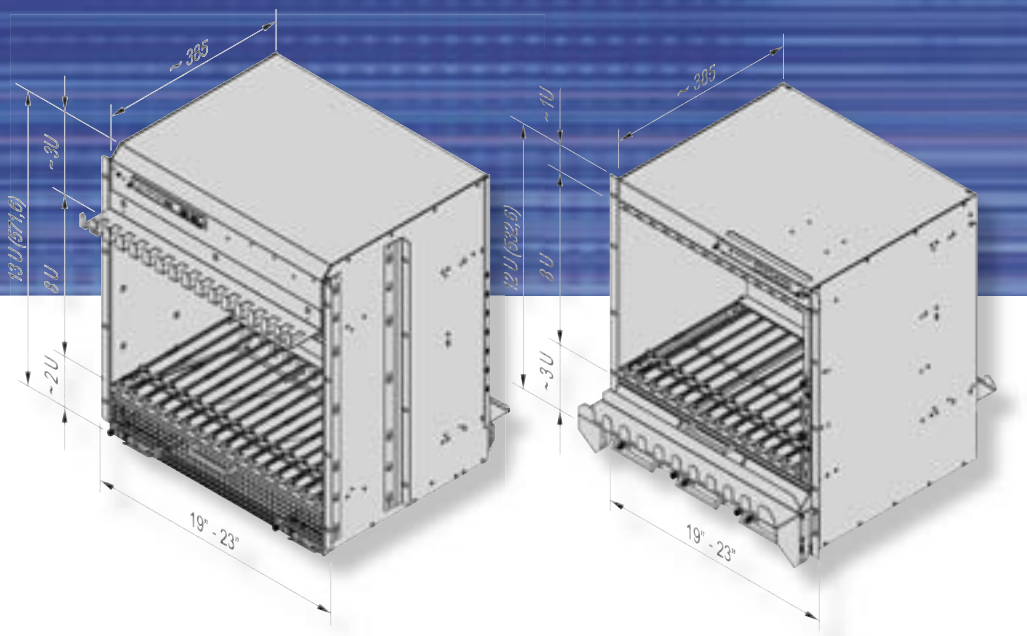
Always one step ahead

As an electronics packaging expert Schroff did not only actively participate in the development of the AdvancedTCA standard, but lead one complete part of it. Based on the experience and Know-how of their specialists, Schroff was involved with the structuring of the mechanical section. Even before the issue of the AdvancedTCA standard, Revision 2.0, Schroff had already supplied the first development systems. In the meantime leading board manufacturers use Schroff systems for their own tests and telecom equipment manufacturers worldwide are counted among Schroff's customers. At regular intervals the members of the AdvancedTCA Working Group meet at so-called Interoperability Workshops (AIW) in order to test the compatibility of their products such as boards, software, chassis and shelf management and gain new knowledge for the refining of the standards. Schroff hosted one of these workshops in the USA.

Complete Solutions from Experts!

Since the beginning of 2005 the first AdvancedTCA systems are in operation. Schroff now offers the third generation of AdvancedTCA systems in different designs, as well as a complete range of accessories, such as front panels, blank panels, shelf managers and backplanes.

AdvancedTCA
stands for high speed and high availability!



AdvancedTCA – Advantages at a Glance:

- System availability to min. 99.999%
- Redundant operation ensures highest reliability
- Hot-swap capability guarantees uninterrupted operation
- High speed transfers. Data transfers up to 2.5 Terabits/s
- Proven performance of data cables > 3.125 Gbits/s
- Support of different protocols for interfaces: Ethernet (PICMG 3.1), Infiniband (PICMG 3.2), Star Fabric (PICMG 3.3), PCI Express (PICMG 3.4), Radpid I/O (PICMG 3.5)
- Performance losses specified to 200 Watt per board
- Systems monitoring via Shelf Manager enables the management of the systems sources and offers perfect protection of the boards via electronic coding

Systems

- Systems available ex stock - from 2U to 13U
- Fully assembled and tested
- Fulfilment of all NEBS (Network Equipment Building Standard) demands

PICMG®
Open Modular Computing Specifications

Systems and Components available worldwide – ex stock

16 Slot

- Area of application:
  Central Office/Development Laboratory
- Optimum utilisation of space when assembled in ETSI or 23" frames
- Cooling up to 200 Watt per board
- The system contains:
  - Chassis with 3 hot-swappable cooling units including RTM cooling
  - Redundant power supply DC
  - Dual Star and Full Mesh backplane
  - Shelf Alarm Panel (SAP)
  - Cable management front and rear
  - Use of two redundant Shelf Managers based on Pigeon Point ShMC 500 possible (bussed or radial IPMI)

14 Slot

- Area of application:
  Central Office/Development Laboratory
- Optimum utilisation of space when assembled in 19" frames
- Cooling up to 200 Watt per board
- The system contains:
  - Chassis with 3 hot-swappable cooling units including RTM cooling
  - Redundant power supply DC
  - Dual Star and Full Mesh backplane
  - Shelf Alarm Panel (SAP)
  - Cable management front and rear
  - Use of two redundant Shelf Managers based on Pigeon Point ShMC 500 possible (bussed or radial IPMI)

5/2 Slot

- Area of application:
  Development Laboratory and Test Systems
- For the testing of AdvancedTCA boards, of software and systems design
- The system contains:
  - Chassis with a cooling unit including RTM cooling
  - Power supply AC or DC
  - Full Mesh Backplane
  - Use of two redundant Shelf Managers based on Pigeon Point ShMC 500 possible (bussed or radial IPMI)

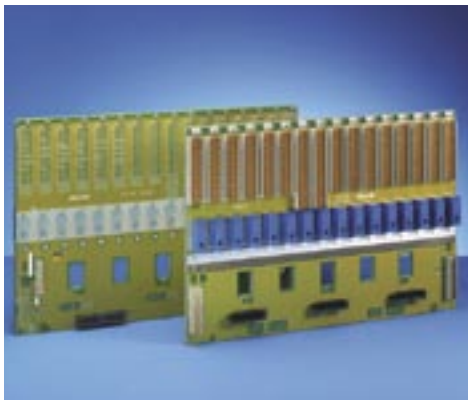
Service

- **Global Availability** – Schroff offers a large range of packaging products worldwide ex stock
- **Global Project Support** – Schroff's Project Engineers assist you in finding answers to your questions – worldwide
- **Unique Internet Platform:** www.a-tca.com

AdvancedTCA Packaging Solutions – stand for „Time to Market“ with Schroff!

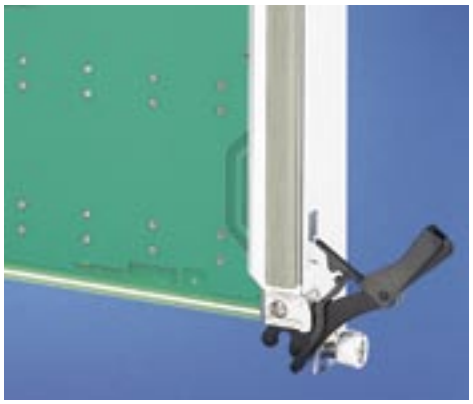
Shelf Manager

- Efficient flexible shelf management concept based on Pigeon Point technology (www.pigeonpoint.com)
- Available with integrated fan control
- With electronic coding for the protection of boards and system



Backplanes

- Point-to-point connection structure independent of protocol
- Dual Star up to Full Mesh configuration
- IPMI (Intelligent Platform Management Interface) bussed or radial
- Redundant power supply, divided into up to 4 independent segments

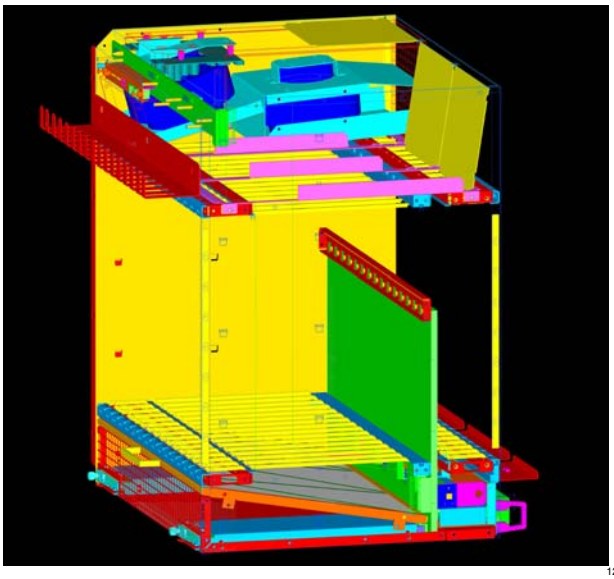


Front Panels

- Stainless Steel or Aluminium extrusion
- Mesh HF seal
- Innovative hot-swappable extractor handles with self-locking mechanism and micro-switch operation
- Customer specific finish, powder coating, screen printing or overlay possible

AdvancedTCA system, 16 slot

12705004



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Shelf Manager

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- 16 slot backplane with Dual Star or Full Mesh topology
- Assembly of 16 boards, 8 U, 6 HP (front) and 16 rear I/O boards, 8 U, 6 HP
- Two redundant Power Entry Modules (PEM) for supply voltage -48 V_{DC}/-60 V_{DC}, plugged in on the rear
- Three redundant hot-swap fan units for cooling of up to 200 W per board
- Provisions for two Shelf Managers with Pigeon Point ShMM 500 for bused or radial IPMI topology
- Shelf Alarm Panel (SAP)
- Shelf Alarm Display (SAD)
- Inclusive of mounting bracket for the installation in ETSI racks or 23" cabinets

Delivery comprises (Completely assembled and wired)

Item	Qty	Description
1	1	Subrack 13 U, 96 HP, 280 mm/70 mm deep
2	1	Backplane 16 slot
3	1	Fan unit, top, with 3 redundant fan trays with 390 m^3/h (230 cfm) each, with 2 radial fans each, for cooling of front and rear I/O boards
4	1	Filter mat, removable from front
5	2	Redundant -48 V_{DC}/-60 V_{DC} Power Entry Module (PEM), plugged in on the rear, with 4 pairs of lines each per input (8 fuses, 30 A)
6	1	Shelf Alarm Panel (SAP)
7	1	Shelf Alarm Display (SAD)
8	1	Cable ducting at the front and at the rear of the system

Order Information

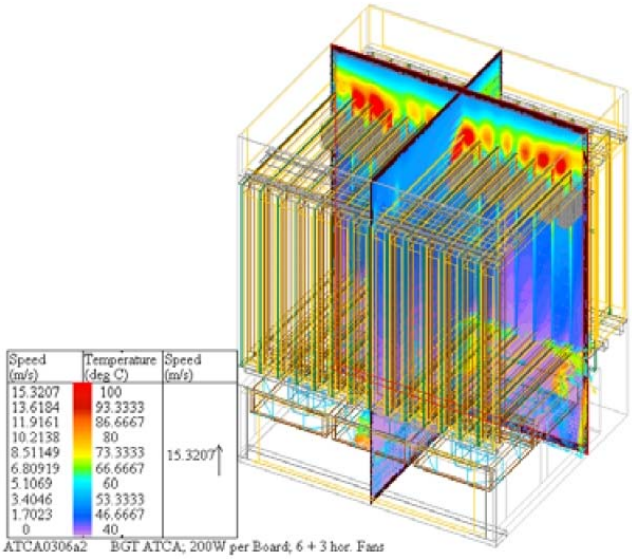
Height U	Width HP	Depth mm	Description	Order no.
13	96	383	AdvancedTCA system, black, Dual Star backplane, bused IPMI	**11592-500**
13	96	383	AdvancedTCA system, black, Dual Star backplane, radial IPMI	**11592-501**
13	96	383	AdvancedTCA system, black, Full Mesh backplane, bused IPMI	**11592-502**
13	96	383	AdvancedTCA system, black, Full Mesh backplane, radial IPMI	**11592-503**
Shelf Manager (bused) 1 piece				**21593-375**
Shelf Manager (radial) 1 piece				**21593-376**
Air filter for 16 slot AdvancedTCA system 1 piece				**21594-144**
Fuse 30 A/80 V for Power Entry Module, PU 10 pieces				**21191-207**

- 13 U system, 14 slot, ventilation top on request
- Service manual, spare parts, see on the Internet
- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system, 14 slot

12705005



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12705007

Shelf Manager

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- 14 slot backplane with Dual Star or Full Mesh topology
- Assembly of 14 boards, 8 U, 6 HP (front) and 14 rear I/O boards, 8 U, 6 HP
- Two redundant Power Entry Modules (PEM) for supply voltage -48 V_{DC}/-60 V_{DC}, plugged in on the rear
- Three redundant hot-swap front plug-in units for cooling of up to 200 W per board
- Provisions for two Shelf Managers with Pigeon Point ShMM 500 for bused or radial IPMI topology
- Shelf Alarm Panel (SAP)
- Inclusive of mounting bracket for the assembly in 19" cabinets

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 12 U, 84 HP, 280 mm/70 mm deep
2	1	Backplane 14 slot
3	1	Fan unit, bottom, with 3 redundant fan trays with 270 m^3/h (160 cfm) each, with 2 fans each, for cooling of front and rear I/O boards
4	1	Filter mat, removable from front
5	2	Redundant -48 V_{DC}/-60 V_{DC} Power Entry Module (PEM), plugged in on the rear, with 4 pairs of lines each per input (8 fuses, 30 A)
6	1	Shelf Alarm Panel (SAP)
7	1	Cable ducting at the front and at the rear of the system

Order Information

Height U	Width HP	Depth mm	Description	Order no.
12	84	383	AdvancedTCA system, black, Dual Star backplane 14 slot, bused IPMI	**11592-400**
12	84	383	AdvancedTCA system, black, Dual Star backplane 14 slot, radial IPMI	**11592-401**
12	84	383	AdvancedTCA system, black, Full Mesh backplane 14 slot, bused IPMI	**11592-402**
12	84	383	AdvancedTCA system, black, Full Mesh backplane 14 slot, radial IPMI	**11592-403**
Shelf Manager (bused) 1 piece				**21593-375**
Shelf Manager (radial) 1 piece				**21593-376**
Air filter for 14 slot AdvancedTCA system 1 piece				**21596-002**
Fuse 30 A/80 V for Power Entry Module, PU 10 pieces				**21191-207**

- 13 U AC version on request
- Service manual, spare parts, see on the Internet
- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system, 5 U, 5 slot, AC version

Shelf Manager

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- Bused IPMI
- 5 slot backplane with Triple Replicated Mesh topology
- Assembly of 5 boards, 8 U, 6 HP (front) and rear I/O boards
- Hot-swap fan tray with 490 m^3/h (290 cfm) for cooling of up to 200 W per board
- Provisions for one Shelf Manager with Pigeon Point ShMM 500 and one Shelf Alarm Panel (SAP)
- Voltage supply 1200 W, AC
- Easy access of board by removable cover plate

NEW

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 5 U, 84 HP, black, for 280 mm/70 mm deep boards
2	1	Backplane 5 slot, Triple Replicated Mesh
3	1	Fan unit with telescopic fan tray
4	1	Monitored air filter
5	1	Power supply 1200 W, input voltage 115 ... 230 V_{AC}

Order Information

Height U	Width HP	Depth mm	Order no.
5	84	399.3	**11596-012**
Shelf Manager (bused) 1 piece			**21593-375**
Shelf Alarm Panel 1 piece			**21596-077**
Air filter 1 piece			**21596-082**
Equipment cable, SCHUKO/UTE SCHUKO/UTE connector, IEC 320 female connector, 2.5 m, 1 piece			**62150-191**
Equipment cable, BS British standard connector, IEC 320 female connector, 2.5 m, 1 piece			**60103-137**
Equipment cable, USA USA connector, IEC 320 female connector, 2 m, 1 piece			**60103-141**

Note

- Other configurations available on request
- Service Manual, see on the Internet
- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system, 5 U, 5 slot, DC version


12706020


12705007

Shelf Manager

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- Bused IPMI
- 5 slot backplane with Triple Replicated Mesh topology
- Assembly of 5 boards, 8 U, 6 HP (front) and rear I/O boards
- Hot-swap fan tray with 490 m^3/h (290 cfm) for cooling of up to 200 W per board
- Provisions for two Shelf Managers with Pigeon Point ShMM 500 and one Shelf Alarm Panel (SAP)
- Voltage supply -48 V_{DC}/-60 V_{DC}, two redundant Power Entry Modules (PEM), plugged in on the rear, with 25 A fuses
- Easy access of board by removable cover plate

NEW

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 5 U, 84 HP, black, for 280 mm/70 mm deep boards
2	1	Backplane 5 slot, Triple Replicated Mesh
3	1	Fan unit with telescopic fan tray
4	1	Monitored air filter
5	2	Redundant -40 V_{DC}/-60 V_{DC} Power Entry Module (PEM), plugged in at the rear, with 25 A fuses

Order Information

Height U	Width HP	Depth mm	Order no.
5	84	411.3	**11596-010**
Shelf Manager (bused) 1 piece			**21593-375**
Shelf Alarm Panel 1 piece			**21596-077**
Air filter 1 piece			**21596-082**

Note

- Other configurations available on request
- Service manual, see on the Internet
- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system 3 U, 2 slot

Shelf Manager

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- 2 slot backplane, one Node slot and one Hub slot
- Designed to accept two boards 8 U, 6 HP
- Fan for cooling of up to 200 W per board
- Power supply AC
- Easy access of board by removable cover plate
- Optional Shelf Manager

NEW

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 3 U, 84 HP, depth 383 mm
2	1	Backplane 2 slot, Node-Node configuration
3	3	Fan
4	2	Power supply 115 ... 230 V_{AC}, 800 W

Order Information

Height U	Width HP	Depth mm	Order no.
3	84	383	**11596-007**
Shelf Manager (bused) 1 piece			**21593-375**
Shelf Alarm Panel 1 piece			**21596-077**
Air filter 1 piece			**21596-037**
Equipment cable, SCHUKO/UTE SCHUKO/UTE connector, IEC 320 female connector, 2.5 m, 1 piece			**62150-191**
Equipment cable, BS British standard connector, IEC 320 female connector, 2.5 m, 1 piece			**60103-137**
Equipment cable, USA USA connector, IEC 320 female connector, 2 m, 1 piece			**60103-141**

Note

- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system 2 U, 2 slot

12706017

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- Perfect configuration for the introduction to AdvancedTCA
- Backplane 2 slot, Node-Node configuration, all 15 fabric channels are connected directly
- Designed to accept 2 front boards, 8 U, 6 HP and rear I/O
- 2 hot-swap fan plug-in units for cooling of up to 200 W per board and 15 W per RTM board
- 2 Power Entry Modules (PEM) -48 V_{DC}
- Easy access of board by removable cover plate

NEW

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 2 U, 84 HP, 469 mm deep
2	1	Backplane 2 slot, Node-Node configuration
3	2	Fan tray
4	2	Power Entry Module (PEM) -48 V_{DC}

Order Information

Height U	Width HP	Depth mm	Order no.
2	84	469	**11596-004**
Air filter 1 piece			**21596-028**

Note

- Filler panel, air baffle, see page 19

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA system, 12 U, Ventus Shelf, 14 slot

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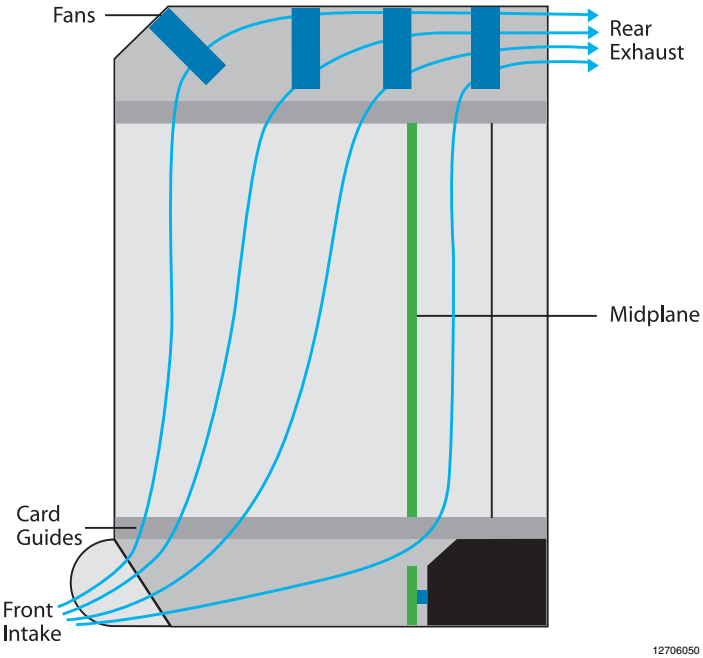

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- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- Distributed Intelligent Platform Management Interface (IPMI) through intelligent Field Replaceable Units (FRUs)
- 14 slot backplane with Dual Star topology
- Assembly of 14 boards, 8 U, 6 HP (front) and rear I/O boards
- Three hot-swap fan plug-in units for cooling of up to 200 W per board
- Provisions for two Shelf Managers with Pigeon Point ShMM 500 for bused IPMI topology
- Redundant voltage supply -40 V_{DC}/-60 V_{DC} by two Power Entry Modules (PEM), plugged in on the rear

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 12 U, 84 HP, black, 471 mm deep, for 280 mm/70 mm deep boards
2	1	Backplane 14 slot Dual Star
3	1	Fan unit with 3 redundant fan units with Intelligent Platform Management (IPM)
4	1	Intelligent Platform Management Interface (IPMI) monitored air filter
5	2	Redundant -48 V_{DC}/-60 V_{DC} Power Entry Modules (PEM) with IPM
6	1	Rear and front Cable Management Tray

Order Information

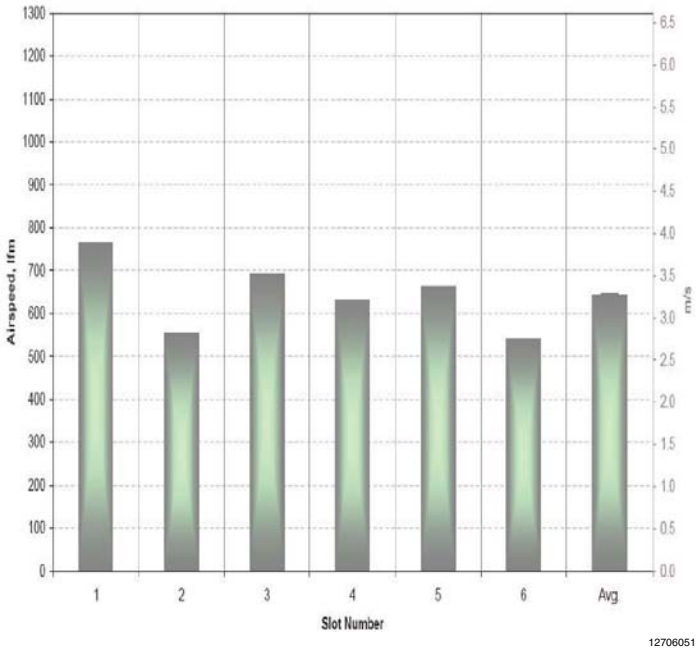
Height U	Width HP	Depth mm	Order no.
12	84	471	**VEN12ATCA14DSDCDFBR**
Shelf Manager (bused) 1 piece			**21593-375**
Shelf Alarm Panel 1 piece			**21596-077**
Intelligent Shelf Alarm Panel 1 Stück			**ISAP2**

Note

- Other configurations available on request

AdvancedTCA system, 5 U, Zephyr Shelf, 6 slot

12706013



12706051

- In accordance with AdvancedTCA standard PICMG 3.0 Rev. 2.0
- Distributed Intelligent Platform Management Interface (IPMI) Through intelligent Field Replaceable Units (FRUs)
- 6 slot backplane with Triple Replicated Mesh topology, bused IPMI
- Assembly of 6 boards, 8 U, 6 HP (front) and rear I/O boards
- Two hot-swap fan plug-in units for cooling of up to 200 W per board
- Provisions for two Shelf Managers with Pigeon Point ShMM 500
- Voltage supply -48 V_{DC}/-60 V_{DC}, two redundant Power Entry Modules (PEM), plugged in on the rear

Delivery comprises (completely assembled and wired)

Item	Qty	Description
1	1	Subrack 5 U, 84 HP, black, for 280 mm/70 mm deep boards
2	1	Backplane 6 slot, Triple Replicated Mesh
3	1	Fan unit with 2 telescopic fan trays with Intelligent Platform Management Control (IPMC)
4	1	Intelligent Platform Management Interface (IPMI) monitored air filter
5	2	Redundant -48 V_{DC}/-60 V_{DC} Power Entry Modules (PEM) with IPMC, plugged at the rear

Order Information

Height U	Width HP	Depth mm	Order no.
5	84	445	**ZR5ATC6TMDPEM2N**
Shelf Manager (bused) 1 piece			**21593-375**
Shelf Alarm Panel 1 piece			**21596-077**
Intelligent Shelf Alarm Panel 1 piece			**ISAP2**

Note

- Other configurations available on request

Shelf Manager

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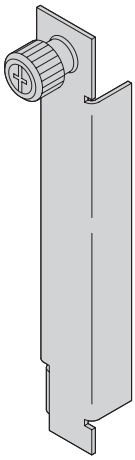
Cable



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Filler panel

- For use of up to two Shelf Managers per system
- Based on Pigeon Point Shelf Management technology ShMM 500
- Inclusive of stainless steel front panel and AdvancedTCA handle (black)

Order Information

Height U	Width mm	Depth mm	Description	Qty/PU	Order no.
2	20	280	Shelf Manager, bused version	1	**21593-375**
2	20	280	Shelf Manager, radial version	1	**21593-376**
Cable RJ 45 category 5 D-SUB plug 9-pin, length 2 m, 1 piece					**23204-187**
Filler panel from stainless steel To cover an unused Shelf Manger slot, width 15.22 mm, height 99.33 mm, incl. EMC gasketing, 1 piece					**21596-012**

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA front panel kit

12705008

Delivery exclusive of board

- Stainless steel or Al extrusion versions
- Including Schroff hot-swap handle
- Including special support to mount the board on the components side
- Including mesh EMC seal or Copper Beryllium (CuBe)

Delivery comprises (Kit)

Item	Qty	Description
1	1	Stainless steel or Al extrusion front panel incl. alignment pin and knurled screw M3
2	1	Bottom handle incl. bearing
3	1	Top handle incl. bearing
4	1	Mesh seal
5	1	Assembly kit (M2.5 screws incl. screw retention lacquer)

Order Information

Height U	Width HP	Description	Order no.
8	6	Front panel kit stainless steel with mesh seal	**21591-100**
8	6	Front panel kit Al extrusion with mesh seal	**21591-102**

Note

- Front panels with CuBe seal on request
- Front panels with board cover on request
- Schroff offers an extensive modifcation service via the Front Panel Fast Track, including customized cut-outs, foils and silk-screen printing, www.schroff.biz/fpe
- Drawings can be found on the Internet

FRONT PANEL FAST TRACK

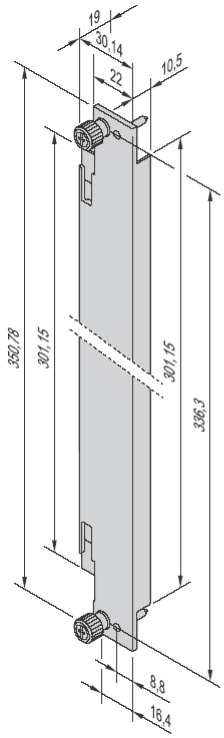
Front panel with integrated Side Two Cover

12706022

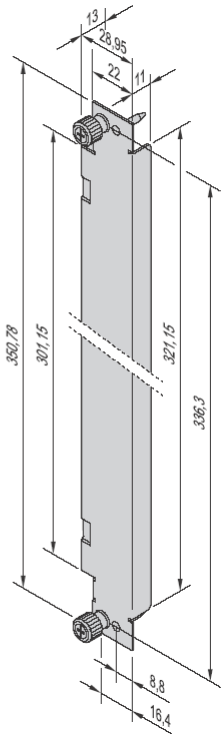
- For protection of components on solder side of printed board
- Customer specific versions on request

AdvancedTCA front panels

Al extrusion



Stainless steel profile



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- Stainless steel or Al extrusion
- Mesh seal

Order Information

Height U	Width HP	Description	Qty/PU	Order no.
8	6	Front panel, Al extrusion	1	**31591-454**
8	6	Front panel, stainless steel profile	1	**31591-422**
Mesh seal, self-adhesive, for AdvancedTCA front panels PU 10 pieces				**21591-092**

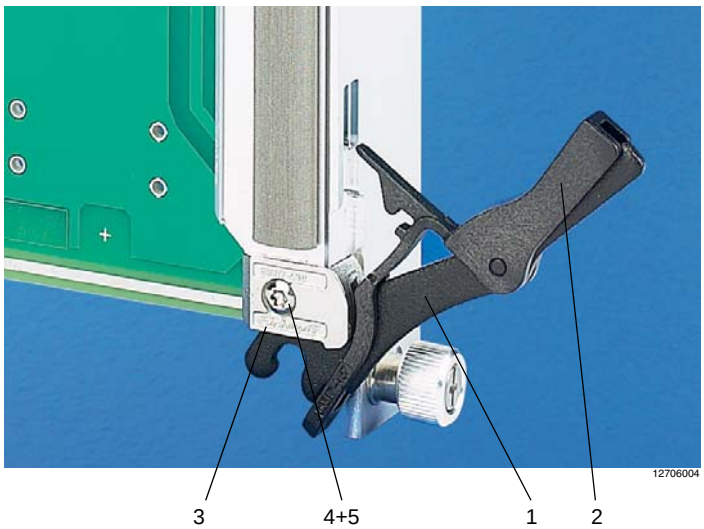
Note

- CuBe seal on request
- Schroff offers an extensive modifcation service via the Front Panel Fast Track, including customized cut-outs, foils and silk-screen printing, www.schroff.biz/fpe
- 3D drawings on the Internet

FRONT PANEL
FAST TRACK

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA handles



12706004

Delivery comprises (kit)

Item	Qty	Description
1	10	Lever, St, 2 mm, black
2	10	Plastic part, black
3	10	Die-cast bearing (top/bottom)
4	10	Screw M2.5 x 12, self-locking
5	10	Washer

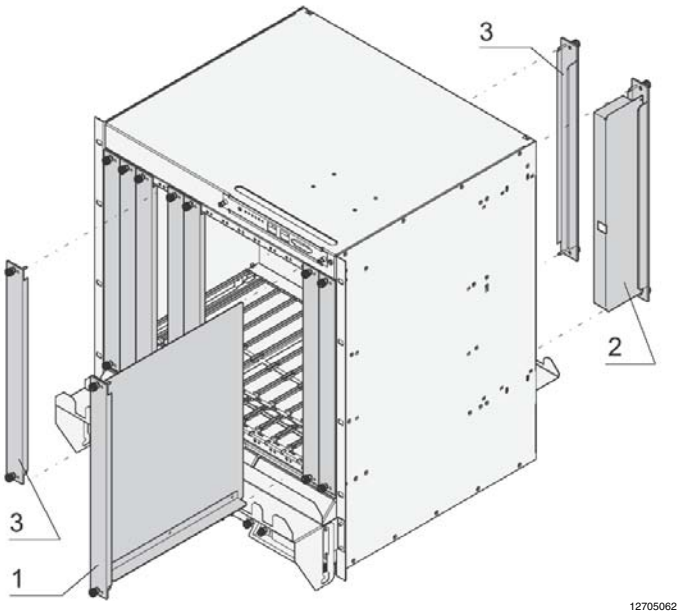
Order Information

Description	Order no.
Lower handle assembly kit	**20817-476**
Top handle assembly kit	**20817-477**
Micro switch Opener for soldering (SMD), PU 10 pieces	**20817-853**

- 3D drawings on the Internet

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedTCA filler panel



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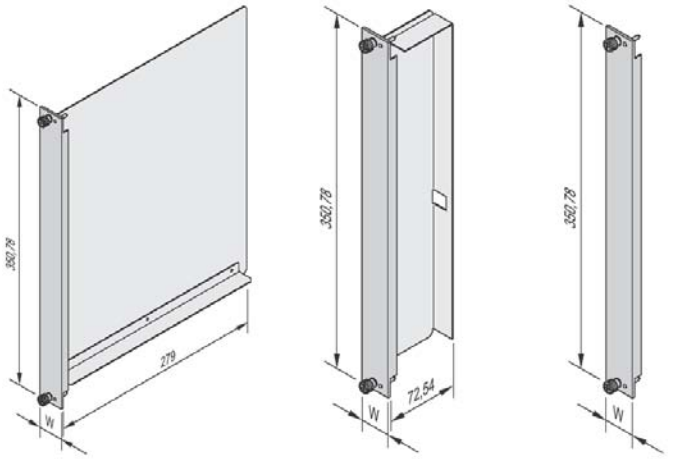
Item 1 Item 2 Item 3



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- Front panels from stainless steel or Al extrusion
- 6 HP filler panel in 3 versions
  - Front: Filler panel with air baffle (item 1, air baffle blocks the air from unused slots)
  - Rear: Filler panel with air baffle (item 2, air baffle blocks the air from unused slots
  - Only filler panel (item 3)

Delivery comprises (kit)

Item	Qty	Description
1	1	Filler panel
2	1	Separating panel (front or rear)

Order Information

Item	Height U	Width HP	Depth mm	W mm	Description	Order no.
1	8	6	280	30.14	Filler panel Al extrusion, incl. air baffle with mesh seal	**21596-008**
1	8	6	280	28.95	Filler panel stainless steel, incl. air baffle with mesh seal	**21591-079**
2	8	6	70	30.14	Filler panel Al extrusion for rear I/O area incl. air baffle with mesh seal	**21591-107**
2	8	6	70	28.95	Filler panel stainless steel for rear I/O area incl. air baffle with mesh seal	**21591-099**
3	8	6	–	30.14	Filler panel Al extrusion with mesh seal	**21591-104**
3	8	6	–	28.95	Filler panel stainless steel with mesh seal	**21591-097**

Note

- Version with CuBe seal available on request

For further information www.schroff.biz/oneclick
oneClick code = Order no.

High demands on Cooling

Processors and electronic components are becoming increasingly smaller and more efficient and through this, heat loss which is given off into the environment increases. Heat losses of more than 6 kW in a cabinet cannot effectively be dissipated by conventional air cooling alone. A far more efficient way to dissipate these higher requirements is to move to an air/water cooling concept, as water has a heat capacity which is higher by a factor of 4000 in relation to volume in comparison to air.

Schroff's complete Solution

Based on these demands Schroff has developed the VARISTAR LHX 20 with integrated air/water heat exchanger. Heat losses of 20 kW per cabinet can be dissipated safely and efficiently, without direct emission of heat into the environment.

Cool Times with the Complete Solution from Schroff

VARISTAR for AdvancedTCA Assembly

Air/water heat exchanger (LHX 20)

Applications

The VARISTAR LHX 20 was developed for the installation of AdvancedTCA systems.
The dimensions of the cabinet are aligned to the assembly space and air flow required for AdvancedTCA systems. The performance data of the air/water heat exchanger can be evaluated directly with the AdvancedTCA Shelf Manager. Furthermore the VARISTAR LHX 20 is especially suited for server cabinet (particularly blade servers) and other cabinets with high performance losses.

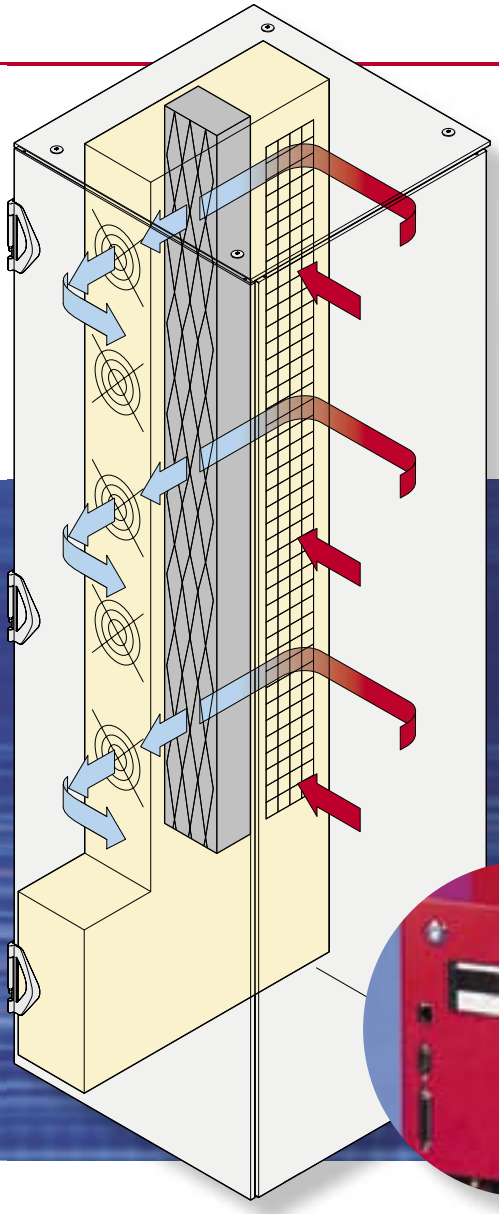
VARISTAR

The joint development of the cabinet platform VARISTAR and the air/water heat exchanger guarantees the optimum co-ordination of cabinet and cooling.

- Type of protection IP 55
- Static load-carrying capacity up to 1000 kg
- High flexibility with extensive range of assembly parts
- Intelligent cabling

Air/Water Heat Exchanger (LHX 20)

- Cooling performance up to 20 kW
- Air movement volume from 1000 to 3000 m^3/h
- Water flow temperatur 6 °C to 15 °C
- Ambient conditions:
  Temperature range 5 °C to 70 °C and relative humidity 5 % to 95 %
- Air expulsion adjustable from 18 °C to 30 °C
- Pressure loss ≤ 0.5 bar



Operating principle of the air/water heat exchanger

Electronic Monitoring Unit with Display and Interfaces

SERVICE ...
... the number one priority at Schroff

From the start our application engineers will be at your side worldwide. Components which are available ex stock provide short delivery times, which save time and money. In the after sales area too we offer extensive support. Our friendly, worldwide team of experts is at your disposal at all times.

Cooling capacity up to 20 kW per cabinet

Safety and Monitoring

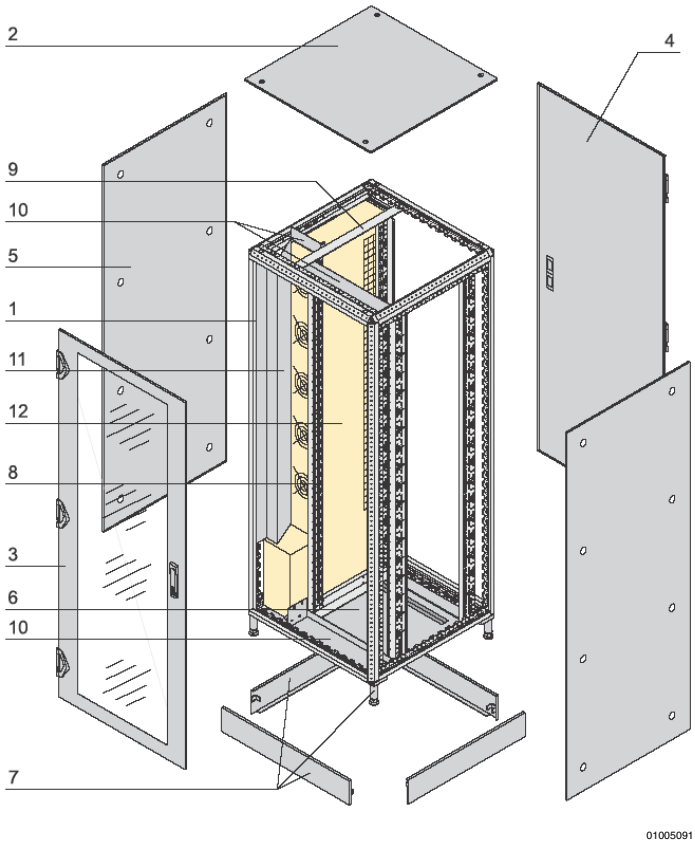
During the development of the LHX 20 particular importance was placed on safety and the monitoring functions:

- System monitoring through AdvancedTCA Shelf Management
- Interface RS 232 for external cabinet monitoring
- Redundant $48V_{DC}$ supply
- Condensation is controlled with an integrated droplet collector that avoids water in the air expulsion area
- The water and power supply is arranged from the bottom

VARISTAR LHX 20 – advantages at a glance

- Even cooling of all systems over the entire assembly height
- The entire heat loss is expelled via the cool water circulation
- Optimum system adjustment and safety through:
  - preventative control and regulation
  - integrated alarm and communication interfaces
- Noise level smaller than 55dB(A), even suitable for office environments

VARISTAR LHX 20 for Advanced TCA



- Cabinet IP 55, RAL 7021 with air/water heat exchanger
- Assembly dimensions coordinated for the assembly of AdvancedTCA subracks (cabinet depth 800 mm)
- Air/water heat exchanger 20 kW alternatively for voltage supply with 48 V_{DC} or 230 V_{AC}, assembled on the left (right side possible too)
- Max. static load-carrying of the 19" plane: 800 kg

Delivery comprises (completely assembled and GND/earthed)

Item	Qty	Description
1	1	Welded basic frame, St profile, RAL 7021, zinc-plated with all-round seal IP 55
2	1	Flat top cover, St, RAL 7021
3	1	Front door, glazed, RAL 7021, safety glass 6 mm, 180° hinge, 4 point locking, lever handle for optional DIN profile half cylinder
4	1	Rear door, St, RAL 7021, 180° hinge, 4 point locking, lever handle for optional DIN profile half cylinder
5	2	Side panel screw-fixed, St, RAL 7021
6	1	Base plate, St, RAL 7021, cable entry at rear, entry for water connection at front, connections can be sealed with sliding panels
7	1	Base/plinth 100 mm, St, RAL 7021, removable covers, adjustable feet integrated
8	4	19" panel/slide mount with EIA cut-outs, St, RAL 7021, 175 mm recessed at front, distance 500 mm between front and rear 19" plane
9	2	Support rail for the assembly of the air/water heat exchanger and 19" panel/slide mounts, St, RAL 7021
10	4	Air baffle, for optimal airflow, St, RAL 7021
11	1	Air/water heat exchanger, 20 kW, RAL 7021, assembled on the left
12	1	User Manual

Order Information

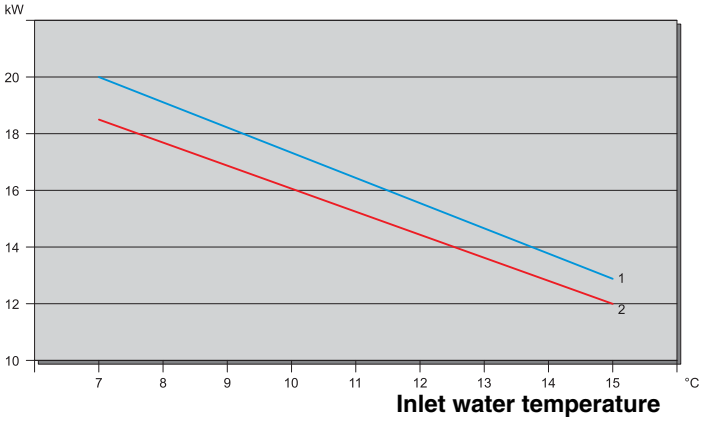
Height U	Height H mm	Width W mm	Depth D mm	Description	Order no.
42	2100	800	800	230 V_{AC}	**10130-010**
42	2100	800	800	48 V_{DC}	**10130-011**
DIN semi-profile cylinder, common locking (1 key fits into all locks) incl. 2 keys					**25127-995**
Lifting eye PU 4 pieces					**23130-072**

■ Technical data air/water heat exchanger, see page 23

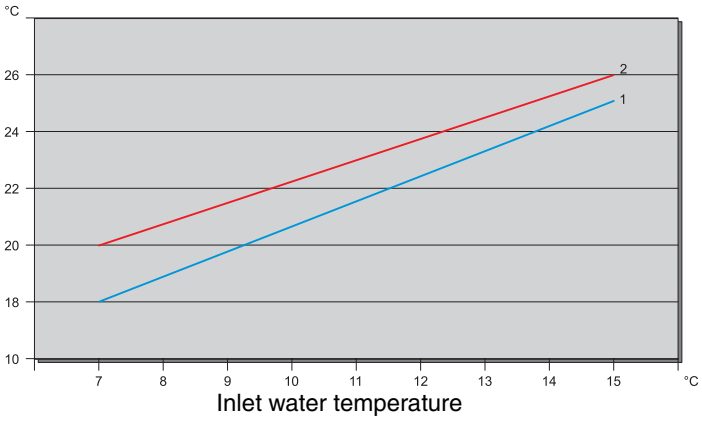
For further information www.schroff.biz/oneclick
oneClick code = Order no.

Technical data LHX20 (only air/water heat exchanger)

Usable cooling capacity*)



Air exit temperature*)



*) at constant incoming air temperature of 40 °C

1) at 2.8 m^3/h water

2) at 1.55 m^3/h water

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Technical data LHX 20

Cooling capacity	
Usable cooling capacity	up to 20 KW
Temperature adjustment range of exiting air	18 ... 30 °C (in 0.1 °C increments)
Max. offset	± 2 K
Water circuit	
Cooling medium 1)	Water
Temperature of incoming water 2)	6 ... 15 °C
Water flow volume	up to 2.8 m^3/h
Static pressure loss in device at 1.55 m^3/h	0.5 bar
Water conduit	Copper
Water connection in/out	Rp 1"
Condensat overflow connection	Rp 1/2"
Air circuit	
Airflow volume, controlled temperature dependently	1000 .... 3000 m^3/h
Exiting air LHX 20 (adjustable)	18 .... 30° C
Electrical Data AC	
Supply voltage, (single phase mains)	230 V_{AC}(50/60 Hz)
Max. current consumption	4.3 A
Max. power consumption	700 W
Apparent power at full load	990 VA
Protection fuse	10 A
Electrical Data DC	
Supply voltage	48 V_{DC}
Max. current consumption	13 A
Max. power consumption	624 W
Protection fuse	16 A
Interface	
ST-bus (RJ 45)	Connection possibility for external operation and digital display
RS 232 (SUB-D 9-pin)	ASCII protocol, all operational values and status reports, such as temperature, humidity levels, fan operation times
Digital input/output (SUB-D 25-pin)	External on/off, alarm outputs and warning signals
General Data	
Type of protection cabinet	IP 55
Ambient temperature at transport	–25 ... 70 °C
Ambient temperature outside of cabinet (during operation)	5 ... 70 °C
Noise level (closed cabinet) at 80 % fan capacity	50.7 dB(A)
Relative humidity level	5 ... 95 %
Weight	78.5 kg (82 kg with water)

1) For an optiuml operation of the air/water heat exchanger the water requirements have to be fulfilled (VDE 3803, please see User Manual)

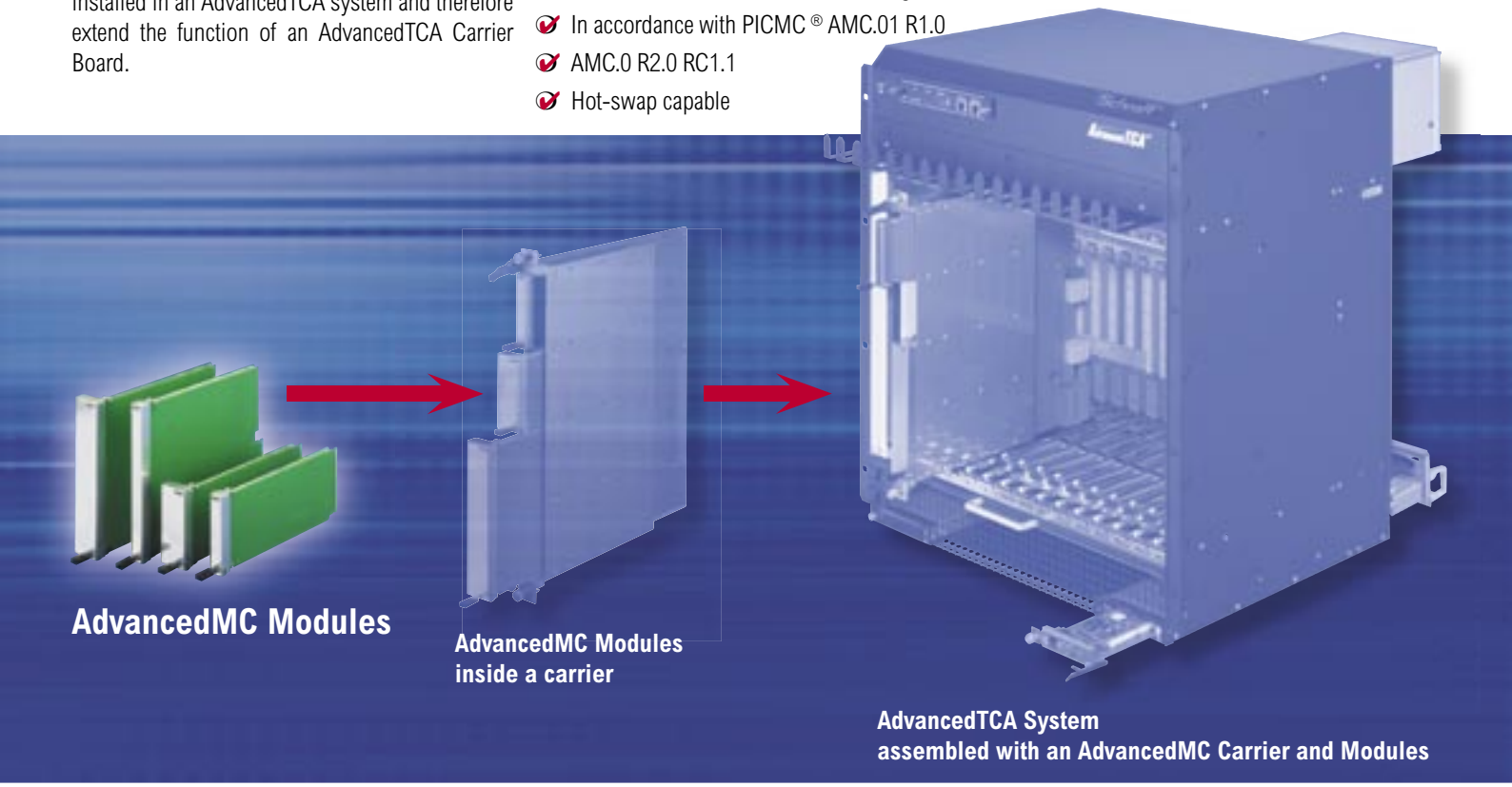
2) For water inlet temperature < 6 °C and > 15 °C the control accuracy is not guaranteed anymore, furthermore there is the risk of condensation if the water temperature is underrun

AdvancedMC Module

The AdvancedMC standard is an important part of the AdvancedTCA platform. AdvancedMC modules are Mezzanine modules, which with corresponding adaptors, the so-called AdvancedMC Carriers, are installed in an AdvancedTCA system and therefore extend the function of an AdvancedTCA Carrier Board.

The central components of AdvancedMC are the mechanics of the module and the Carrier

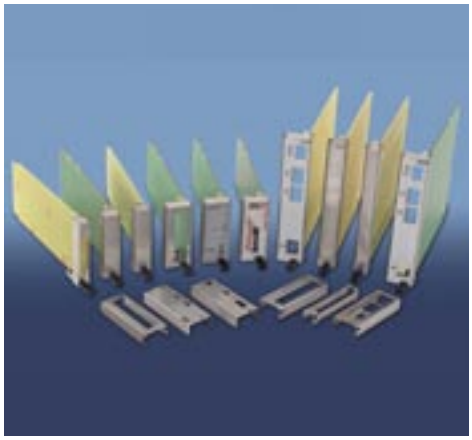
- Serial interface to the Carrier Board
- Software interface for the board management
- In accordance with PICMC ® AMC.01 R1.0
- AMC.0 R2.0 RC1.1
- Hot-swap capable



AdvancedMC Modules

AdvancedMC Modules inside a carrier

AdvancedTCA System assembled with an AdvancedMC Carrier and Modules

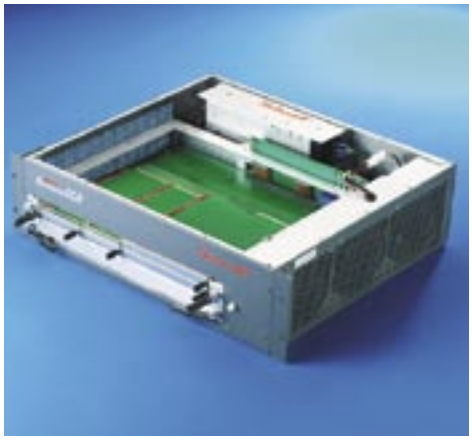


In the AdvancedMC.0 standard at present 6 module sizes have been determined

Single height: Single
Double height: Double

In widths:

Compact: 3 HP
Mid-size: 4 HP
Full-size: 6 HP

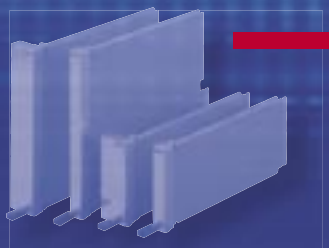


2 Slot Development System

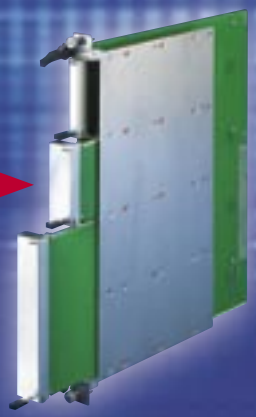
AdvancedMC Carrier

AdvancedMC carriers are frame-type plug-in units, which like plug-in units, are inserted into an AdvancedTCA system. The standard defines different versions of carriers.
The basic construction and the outside dimensions are always the same, the differences show themselves in the arrangement of the carrier backplane.

PICMG®
Open Modular Computing Specifications

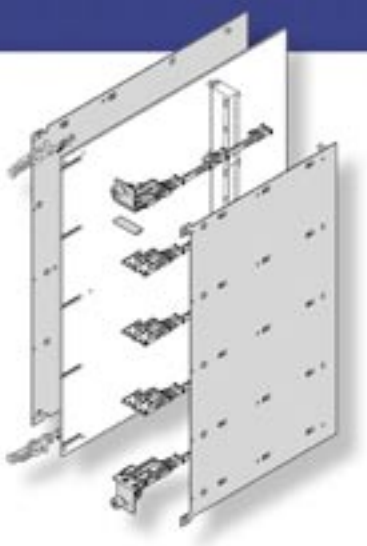


AdvancedMC Modules



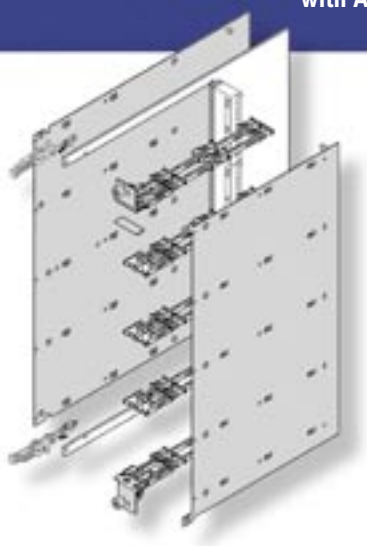
AdvancedMC Modules inside a Carrier

AdvancedTCA System assembled with AdvancedMC Carrier and Modules



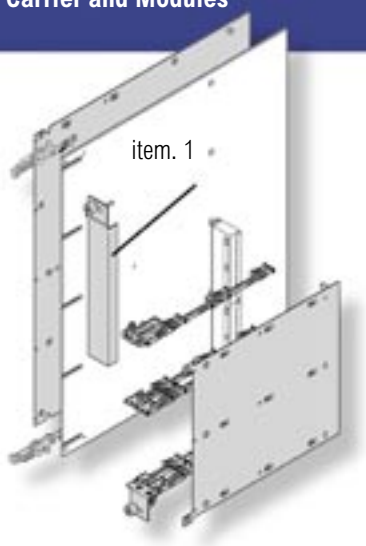
Conventional-Carrier

The carrier backplane is continuous and enables complete board assembly. Assembly with max. 4 Single Full-size AdvancedMC modules. Compact modules cannot be used.



Cutaway-Carrier

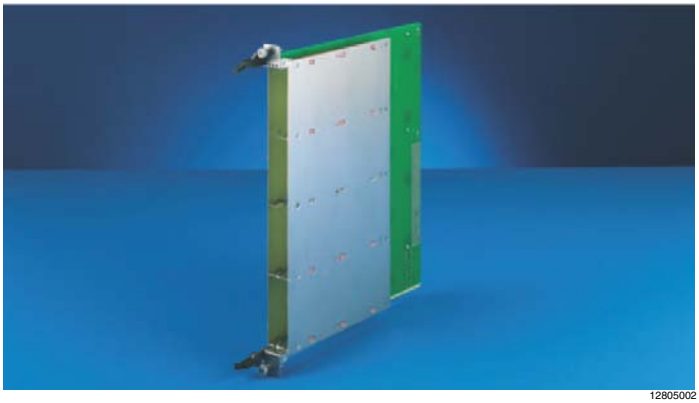
The carrier backplane has been cut away in the area of the modules. Assembly with max. 8 Single Compact-AdvancedMC modules, or a combination of Full-size and Compact modules.



Hybrid-Carrier

The carrier backplane can correspond to that of a Conventional-Carrier or it can be a combination of Conventional- and Cutaway-Carrier. The number of modules used depends on the size of the Carrier front panel (item 1).

AdvancedMC Carrier mechanics for Conventional/Cutaway printed boards



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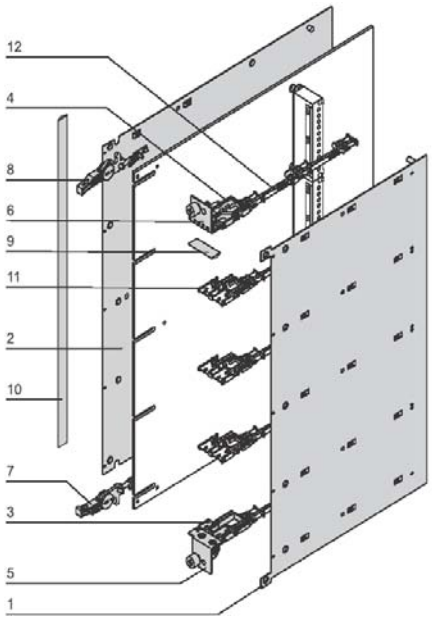
For Conventional printed circuit board/Full-size module



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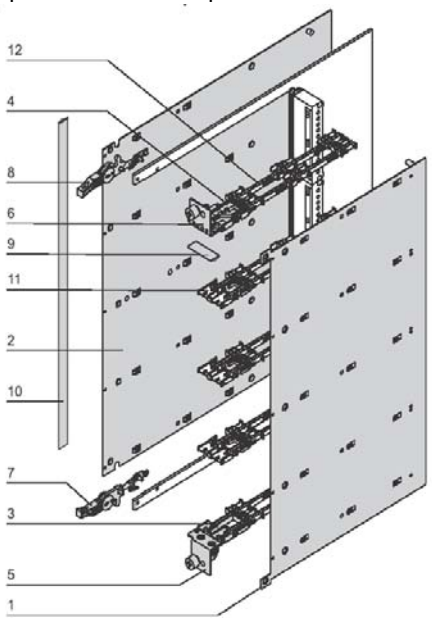
For Cutaway printed board/Compact module/Full-size module



12805053

- Carrier mechanics for Mezzanine modules, stainless steel (EMC shielded)
- 1slot AdvancedMC chassis in accordance with PICMG AdvancedTCA RC 1.1
- Insertion/extraction mechanics designed for micro switch operation (hot-swap)
- Height 8 U, width 6 HP, to accommodate up to 8 AdvancedMC modules (Compact)
- Identical mechanics for Conventional and Cutaway boards

Delivery comprises (kit)

Item	Qty	Description
1	1	Cover B (on the right), 0.6 mm, stainless steel, insulated interior, exterior with protection film
2	1	Cover A (left), 0.6 mm, stainless steel, insulated interior, exterior with protection film
3	1	Splitting extrusion (strut) at bottom, Zn die-cast, nickel-plated
4	1	Splitting extrusion (strut) at top, Zn die-cast, nickel-plated
5	1	Front panel at bottom, 1 mm, stainless steel, pressed in alignment pin and retention screws
6	1	Front panel at top, 1 mm, stainless steel, pressed in alignment pin and retention screws, with holes for LED
7	1	Standard insertion/extraction mechanics, with micro switch operation, plastic lever, black
8	1	Standard insertion/extraction mechanics, plastic lever, black
9	1	EMC profile seal, core: foam, sleeve: textile cladding with CuNi coating
10	1	EMC profile seal, core: foam, sleeve: textile cladding with CuNi coating
11	1	Assembly kit
12	1	Strut A-B (3 pieces), strut for cover A (3 pieces), strut for cover B (3 pieces), ESD clip (8 pieces)
13	10	AdvancedMC guide rail, PBT, UL 94 V-0, red

Order Information

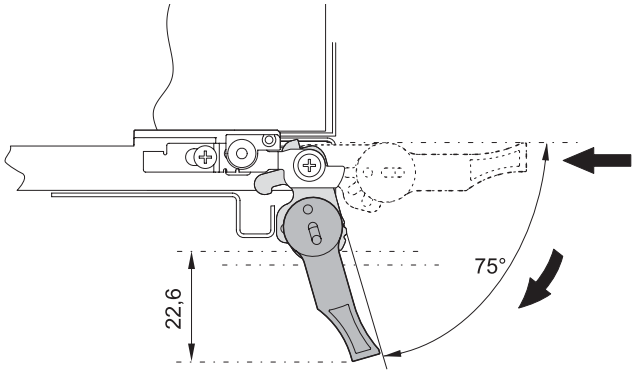
Description	Item	Order no.
AdvancedMC Carrier mechanics for Conventional/ Cutaway board with struts, ESD clip, guide rail	1 ... 13	**10849-001**
AdvancedMC Carrier mechanics for Conventional/ Cutaway printed boards	1 ... 11	**10849-002**
Micro switch for AdvancedMC Carrier module (opener) for soldering (SMD), PU 10 pieces		**20849-064**
Micro switch for AdvancedMC Carrier module (closer) for soldering (SMD), PU 10 pieces		**20849-020**

Note

- Hybrid Carrier, see page 29
- Carrier for Mid-size AdvancedMC modules, see page 30
- Please order strut (item 12), ESD clip and guide rails (item 13) separately, see page 28
- AdvancedMC module mechanics, see page 32
- Description micro switch, see page 35

Differences standard/MF handle for AdvancedMC Carrier

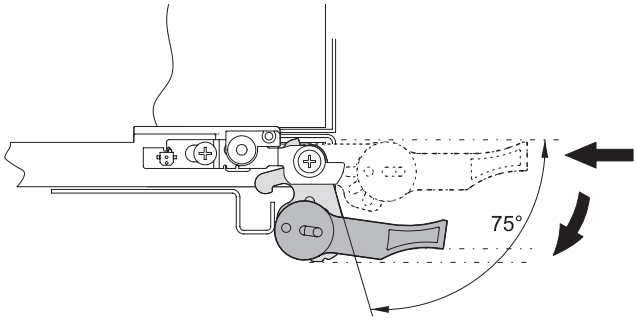
Delivery of Carrier module includes standard front handle



12806063

- Insertion/extraction mechanics: 75° opening angle
- Insertion/extraction in one step
- Swing range: 23 mm below and above the separation line
- Included in delivery of Carrier

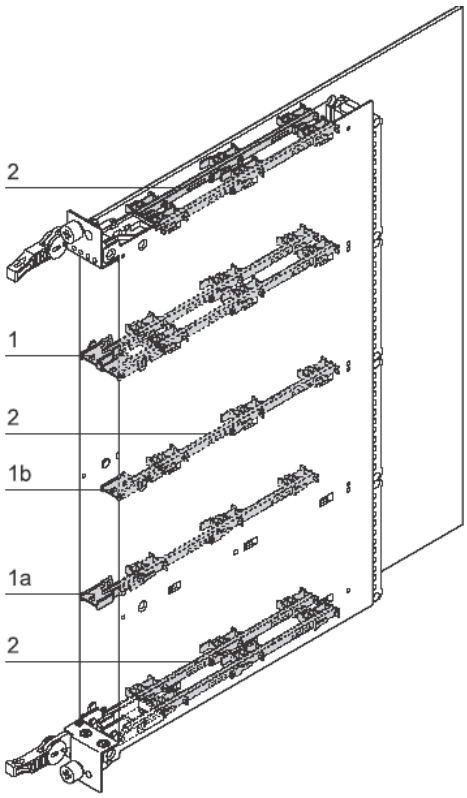
MF handle can be exchanged by a standard handle (if required)



12805072

- Insertion/extraction mechanics: 75° opening angle
- Insertion/extraction in 3 steps (2 operations)
- Small swing range (0 mm) below and above the pitch line. The lower or upper limit of the Carrier is not exceeded during the extraction.
- Available on request

Guide rails/struts for AdvancedMC module



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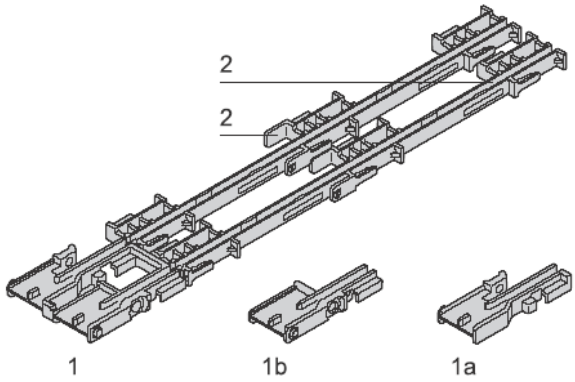

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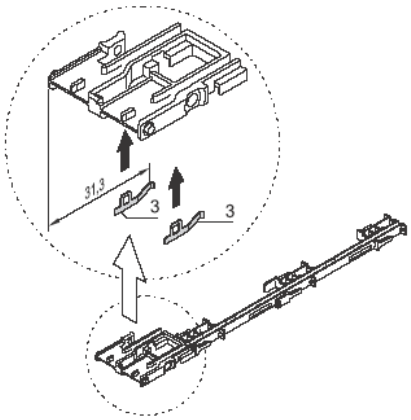
ESD clip



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- Specific combinations allow to assemble up to 8 AdvancedMC modules (8 x Single Compact) in a Carrier
  - Strut (splitting extrusion) is assembled between the cover plates (retainer for ESD clip)
  - Guide rails are clipped into the cover
  - Board guiding is always done with splitting extrusion (strut) and guide rail

Order Information

Item	Description	Qty/PU	Order no.
1	Strut between cover A (left) and B (right), Zn die-cast, nickel-plated	10	**20849-009**
1a	Splitting extrusion (strut) for cover A (left), Zn die-cast, nickel-plated	10	**20849-010**
1b	Splitting extrusion (strut) for cover B (right), Zn die-cast, nickel-plated	10	**20849-011**
2	AdvancedMC guide rails, PBT, UL 94 V-0, red	10	**20849-008**
3	ESD clip, spring steel, corrosion-free, for deflection of electrostatics	50	**20849-021**

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedMC Carrier mechanics for hybrid boards

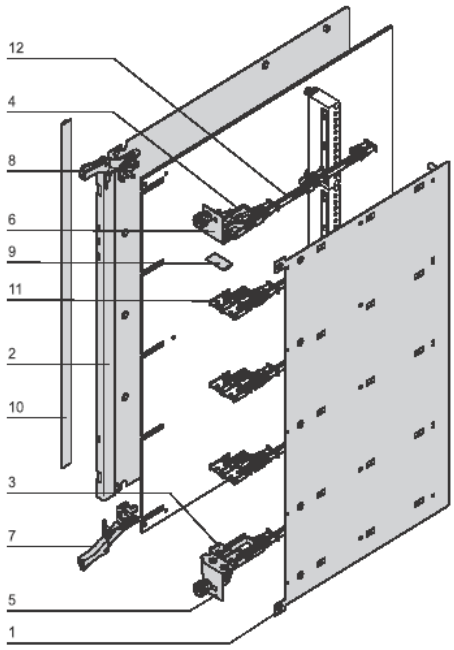
12806017

- The supporting board can correspond to a Conventional Carrier or be a combination from Conventional and Cutaway Carrier
- The number of usable modules depends on the size of the Carrier front panel (item 1)
- Available on request

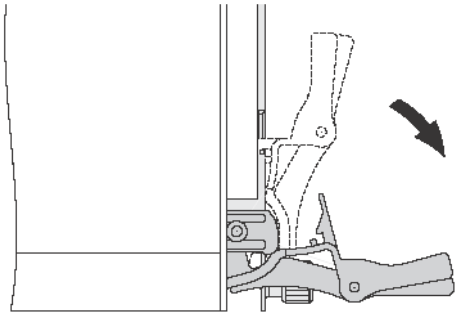
AdvancedMC Carrier mechanics for Mid-size AdvancedMC modules

12806010 12806012

For Conventional printed board/Mid-size module



12806054



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Handle

- Carrier mechanics for Mezzanine modules, stainless steel (EMC shielded)
- 1 slot AdvancedMC chassis in accordance with PICMG AdvancedTCA RC 1.1
- Insertion/extraction mechanics designed for micro switch operation (hot-swap)
- Height 8 U, width 6 HP, to accommodate up to 4 AdvancedMC Mid-size modules

NEW

Delivery comprises (kit)

Item	Qty	Description
1	1	Cover B (right), 0.6 mm, stainless steel, insulated interior, exterior with protection film
2	1	Cover A (left), 0.6 mm, stainless steel, insulated interior, exterior with protection film
3	1	Splitting extrusion (strut) at bottom, Zn die-cast, nickel-plated
4	1	Splitting extrusion (strut) at top, Zn die-cast, nickel-plated
5	1	Front panel, bottom, 1 mm, stainless steel, pressed in alignment pin and retention screws
6	1	Front panel, top, 1 mm, stainless steel, pressed in alignment pin and retention screw
7	1	AdvancedTCA insertion/extraction mechanics, with micro switch operation, plastic lever, black
8	1	AdvancedTCA insertion/extraction mechanics, with micro switch operation, plastic lever, black
9	1	EMC profile seal, core: foam, sleeve: textile cladding with CuNi coating
10	1	EMC profile seal, core: foam, sleeve: textile cladding with CuNi coating
11	3	Strut A-B, ESD clip (4 peases)
12	5	AdvancedMC guide rail, PBT, UL 94 V-0, red
13	1	Assembly kit

Order Information

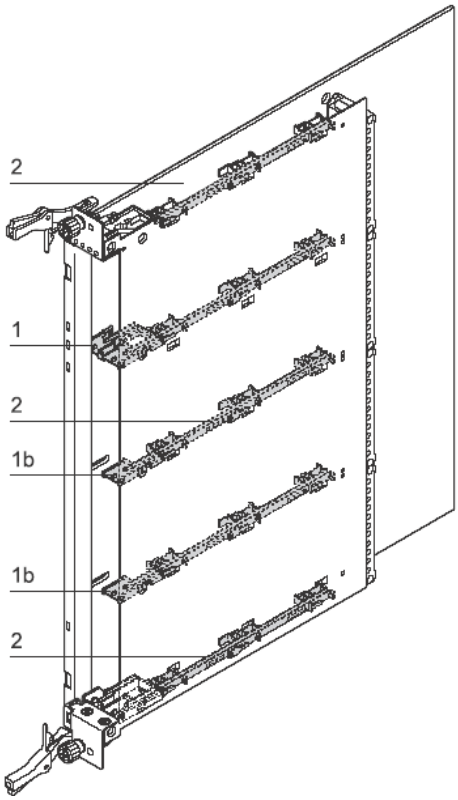
Description	Item	Order no.
AdvancedMC Carrier mechanics for Mid-size AdvancedMC modules with support member, ESD clip, guide rail	1 ... 13	**10849-003**
Micro switch Opener for soldering (SMD), PU 10 pieces		**20817-853**

Note

- Hybrid Carrier, see page 29
- AdvancedMC module mechanics, see page 32

For further information www.schroff.biz/oneclick
oneClick code = Order no.

Guide rails/struts for AdvancedMC Mid-size-modules



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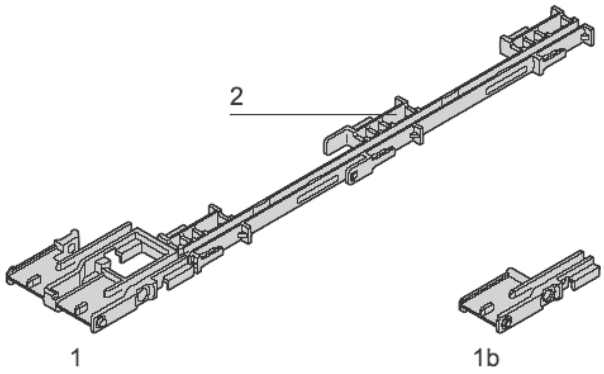

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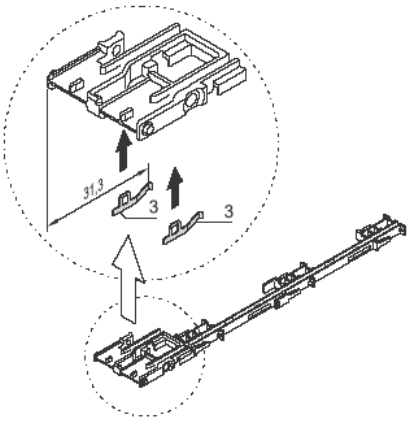
ESD clip



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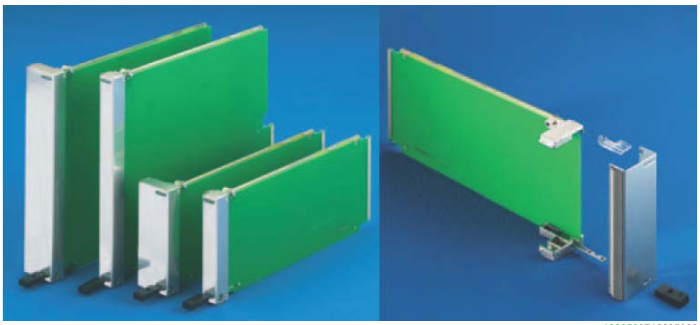
- Up to 4 AdvancedMC modules can be assembled in a Carrier:
  - Strut (support member) is assembled between the covers (reception of ESD clip), also serves as reception of ESD clip
  - Guide rails are clipped into the cover
  - Board guiding is always done with splitting extrusion (strut) and guide rail

Order Information

Item	Description	Qty/PU	Order no.
1	Strut between cover A (left) and B (right), Zn die-cast, nickel-plated	10	**20849-009**
1b	Splitting extrusion (strut) for cover B (right), Zn die-cast, nickel-plated	10	**20849-011**
2	AdvancedMC guide rails, PBT, UL 94 V-0, red	10	**20849-008**
3	ESD clip, spring steel, corrosion-free, for deflection of electrostatic charges	50	**20849-021**

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedMC module mechanics PIGMG® AMC.0 RC1.1



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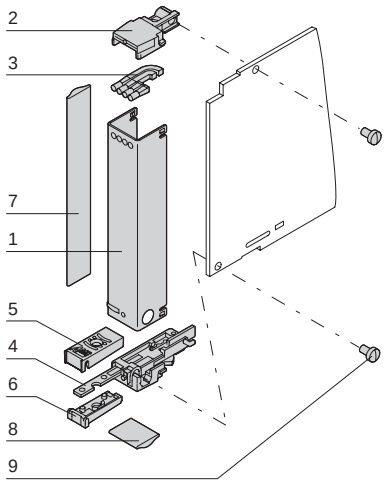
- Kit, shielded
- Locking of modules without screws
- For Conventional, Cutaway and Hybrid Carrier
- Insertion/extraction mechanics in accordance with AdvancedMC standard
- Insertion/extraction mechanics designed for micro switch operation (hot-swap)
- Inclusive of Light Pipe



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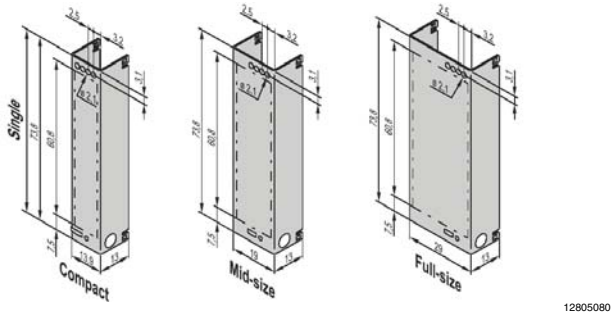
Delivery comprises (kit)

Item	Qty	Description
1	1	U-form front panel, stainless steel, 0.6 mm
2	1	Reception for Light Pipe and printed board bracket, Zn die-cast, nickel-plated
3	1	Light Pipe, PC, UL 94 V-0
4	1	Standard insertion/extraction mechanics, with micro switch operation and printed board brakket
5+6	1	Handle, PC, UL 94 V-0, black
7	1	Lateral EMC gasketing, core: foam, sleeve: textile cladding with CuNi coating
8	1	Bottom EMC gasketing, core: foam, sleeve: textile cladding with CuNi coating
9	1	Assembly kit

Single AdvancedMC module



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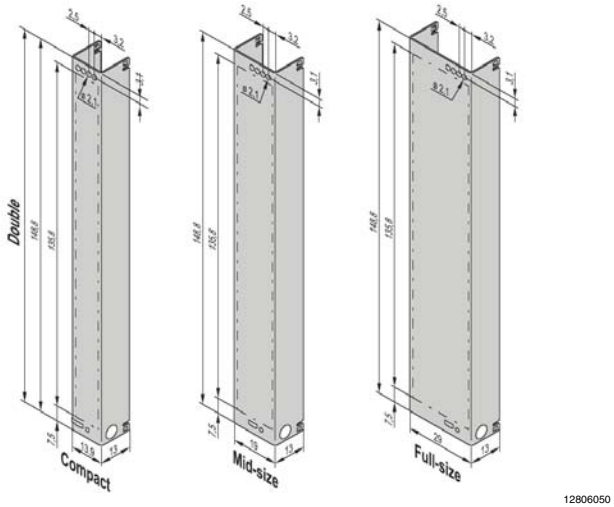
Double AdvancedMC module



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Order Information

Description	Order no.
AdvancedMC module mechanics Single Compact, 3 HP	**20849-002**
AdvancedMC module mechanics Single Mid-size, 4 HP	**20849-101**
AdvancedMC module mechanics Single Full-size, 6 HP	**20849-004**
AdvancedMC module mechanics Double Compact, 3 HP	**20849-003**
AdvancedMC module mechanics Double Mid-size, 4 HP	**20849-104**
AdvancedMC module mechanics Double Full-size, 6 HP	**20849-005**
Micro switch for AdvancedMC module (opener) for soldering (SMD), PU 10 pieces	**20849-065**
Micro switch for AdvancedMC module (closer) for soldering (SMD), PU 10 pieces	**20849-015**

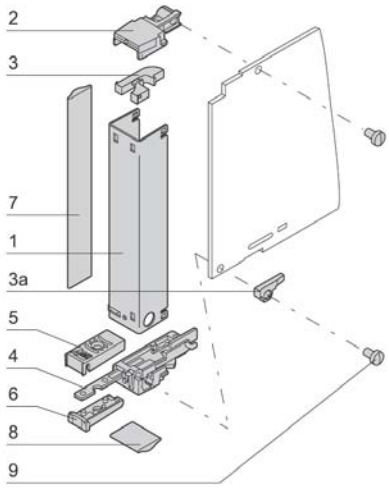
Note

- **In accordance with specification up to 01.07.2007, new version available, see page 33**
- Filler modules (filler panel), see page 34
- Description micro switch for AdvancedMC module, see page 35
- Schroff offers an extensive modifcation service via the Front Panel Fast Track, including customized cut-outs, foils and silk-screen printing, www.schroff.biz/fpe

FRONT PANEL
FAST TRACK

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedMC module mechanics
PIGMG® AMC.0 R2.0 RC1.1



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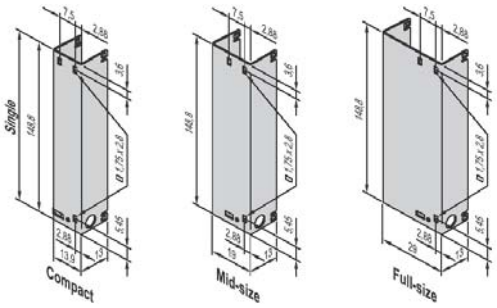
Single AdvancedMC module



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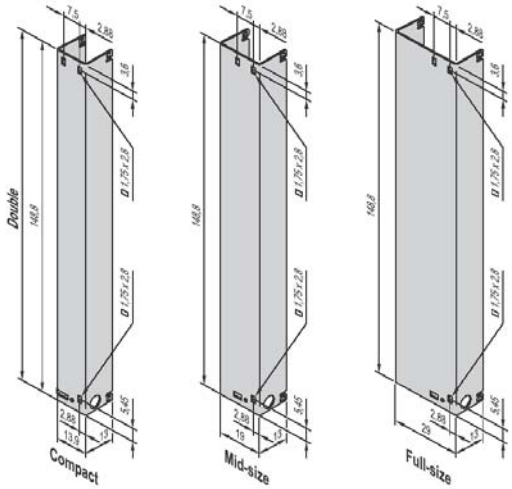
Double AdvancedMC module



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- Kit, shielded
- Locking of modules without screws
- For Conventional, Cutaway and Hybrid Carrier
- Insertion/extraction mechanics in accordance with AdvancedMC standard
- Insertion/extraction mechanics designed for micro switch operation (hot-swap)
- Inclusive of Light Pipes

NEW

Delivery comprises (Kit)

Item	Qty	Description
1	1	U-form front panel, stainless steel, 0.6 mm
2	1	Reception for Light Pipe and printed board bracket, Zn die-cast, nickel-plated
3	1	Light Pipe, top, PC, UL 94 V-0
3a	1	Light Pipe, bottom, PC, UL 94 V-0
4	1	Standard insertion/extraction mechanics, with micro switch operation and printed board brakket
5+6	1	Handle, PC, UL 94 V-0, black
7	1	Lateral EMC gasketing, core: foam, sleeve: textile cladding with CuNi coating
8	1	Bottom EMC gasketing, core: foam, sleeve: textile cladding with CuNi coating
9	1	Assembly kit

Order Information

Description	Order no.
AdvancedMC module mechanics Single Compact, 3 HP	**20849-127**
AdvancedMC module mechanics Single Mid-size, 4 HP	**20849-128**
AdvancedMC module mechanics Single Full-size, 6 HP	**20849-129**
AdvancedMC module mechanics Double Compact, 3 HP	**20849-130**
AdvancedMC Module mechanics Double Mid-size, 4 HP	**20849-131**
AdvancedMC module mechanics Double Full-size, 6 HP	**20849-132**
Micro switch for AdvancedMC module (opener) for soldering (SMD), PU 10 pieces	**20849-065**
Micro switch for AdvancedMC module (closer) for soldering (SMD), PU 10 pieces	**20849-015**

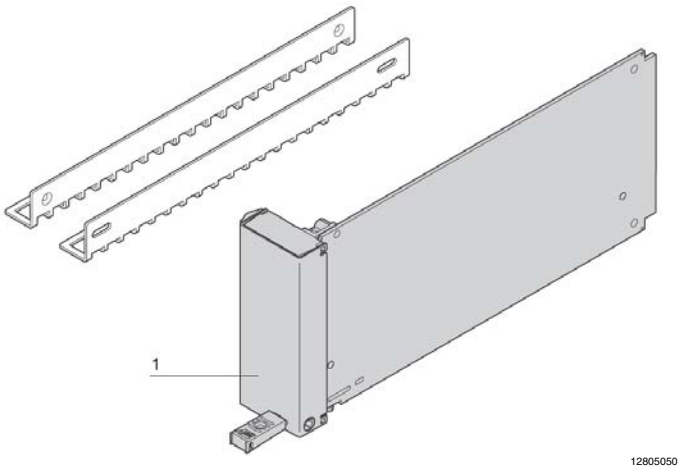
Note

- Filler module (filler panel) see page 34
- Description micro switch for AdvancedMC module, see page 35
- Schroff offers an extensive modifcation service via the Front Panel Service, including customized cut-outs, foils and silk-screen printing, www.schroff.biz/fpe

FRONT PANEL FAST TRACK

For further information www.schroff.biz/oneclick
oneClick code = Order no.

AdvancedMC filler modules (filler panel)



- For Conventional, Cutaway-Carrier and Hybrid Carrier
- Insertion/extraction mechanics in accordance with AdvancedMC standard
- Same design as AdvancedMC modules

Delivery comprises (assembled)

Item	Qty	Description
1	**1**	**AdvancedMC filler module, consisting of**
	1	U-form front panel, stainless steel, 0.6 mm
	1	Printed board bracket, Zn die-cast, nickel-plated
	1	Printed circuit board
	1	Insertion/extraction mechanics and printed board bracket
	1	Handle, plastic, PC, UL 94 V-0, black
	1	Lateral EMC profile gasketing, core: foam, sleeve: textile cladding with CuNi coating
	1	Bottom EMC profile gasketing, core: foam, sleeve: textile cladding with CuNi coating

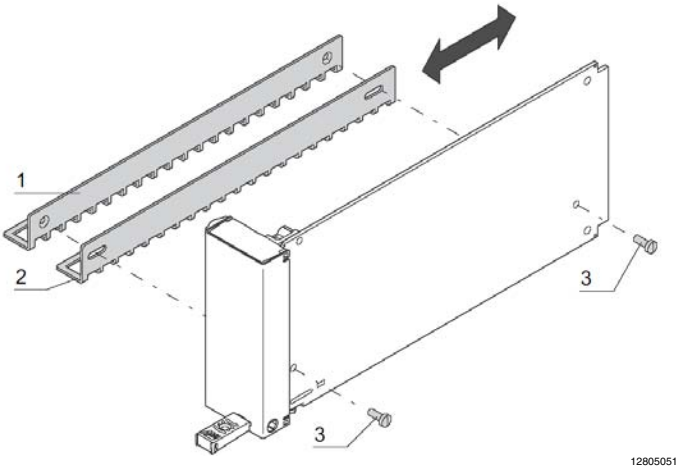
Order Information

Description	Order no.
AdvancedMC filler module Single Compact	**20849-022**
AdvancedMC filler module Single Mid-size	**20849-106**
AdvancedMC filler module Single Full-size	**20849-024**
AdvancedMC filler module Double Compact	**20849-023**
AdvancedMC filler module Double Mid-size	**20849-107**
AdvancedMC filler module Double Full-size	**20849-025**

Note

- Front panel dimensions, see page 32
- Please order air baffle separately, see page 34

Air baffle for filler module



- Air through-put adjustable between 60 and 80 %
- Can be retrofitted

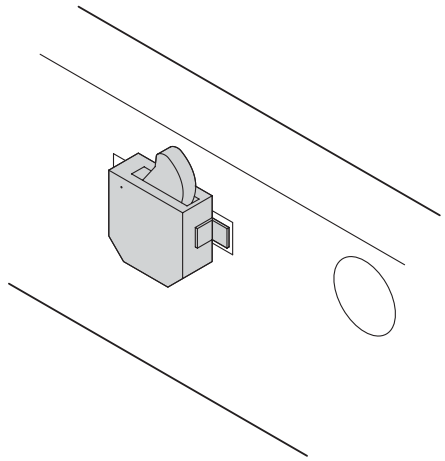
Delivery comprises

Item	Qty	Description
1	1	Metal sheet with perforation, Al
2	1	Sliding metal sheet with perforation, Al
3	1	Assembly kit

Order Information

Description	Qty/PU	Order no.
Air baffle for AdvancedMC filler module Compact	10	**20849-016**
Air baffle for AdvancedMC filler module Mid-size and Full-size	10	**20849-017**
Air baffle for AdvancedMC filler module Full-size, Cutaway printed boards	10	**20849-018**

Micro switch for AdvancedMC Carrier



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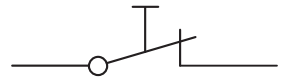
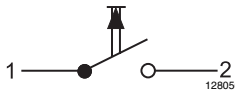


Opener



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Closer

■ Micro switch for soldering (SMD)

Order Information

Description	Qty/PU	Order no.
Micro switch for AdvancedMC Carrier module (opener)	10	**20849-064**
Micro switch for AdvancedMC Carrier module (closer)	10	**20849-020**

Technical data

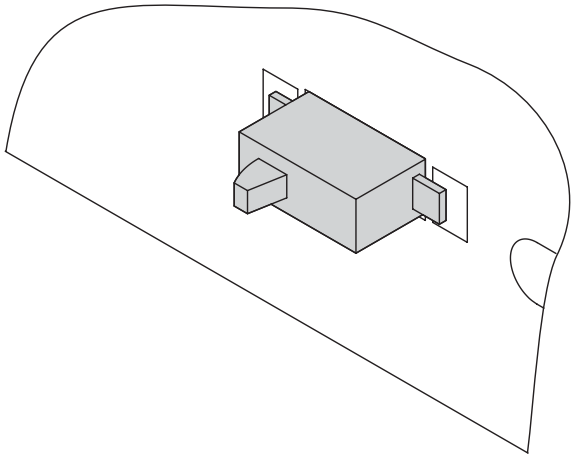
Max. switch current	10 mA
Operating temperature	-25 °C ... +80 °C
Electrical life	10^5

Note

■ **Not to be used anymore for new developments**
Availability until end 2007
Replacement on request

For further information www.schroff.biz/oneclick
oneClick code = Order no.

Micro switch for AdvancedMC modules



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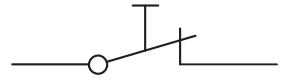
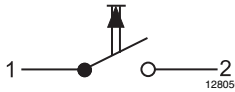


Opener



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18 Closer

■ Micro switch for soldering (SMD)

Order Information

Description	Qty/PU	Order no.
Micro switch for AdvancedMC module (opener)	10	**20849-065**
Micro switch for AdvancedMC module (closer)	10	**20849-015**

Technical data

Max. switch current	10 mA
Operating temperature	-25 °C ... +80 °C
Electrical life	10^5

Note

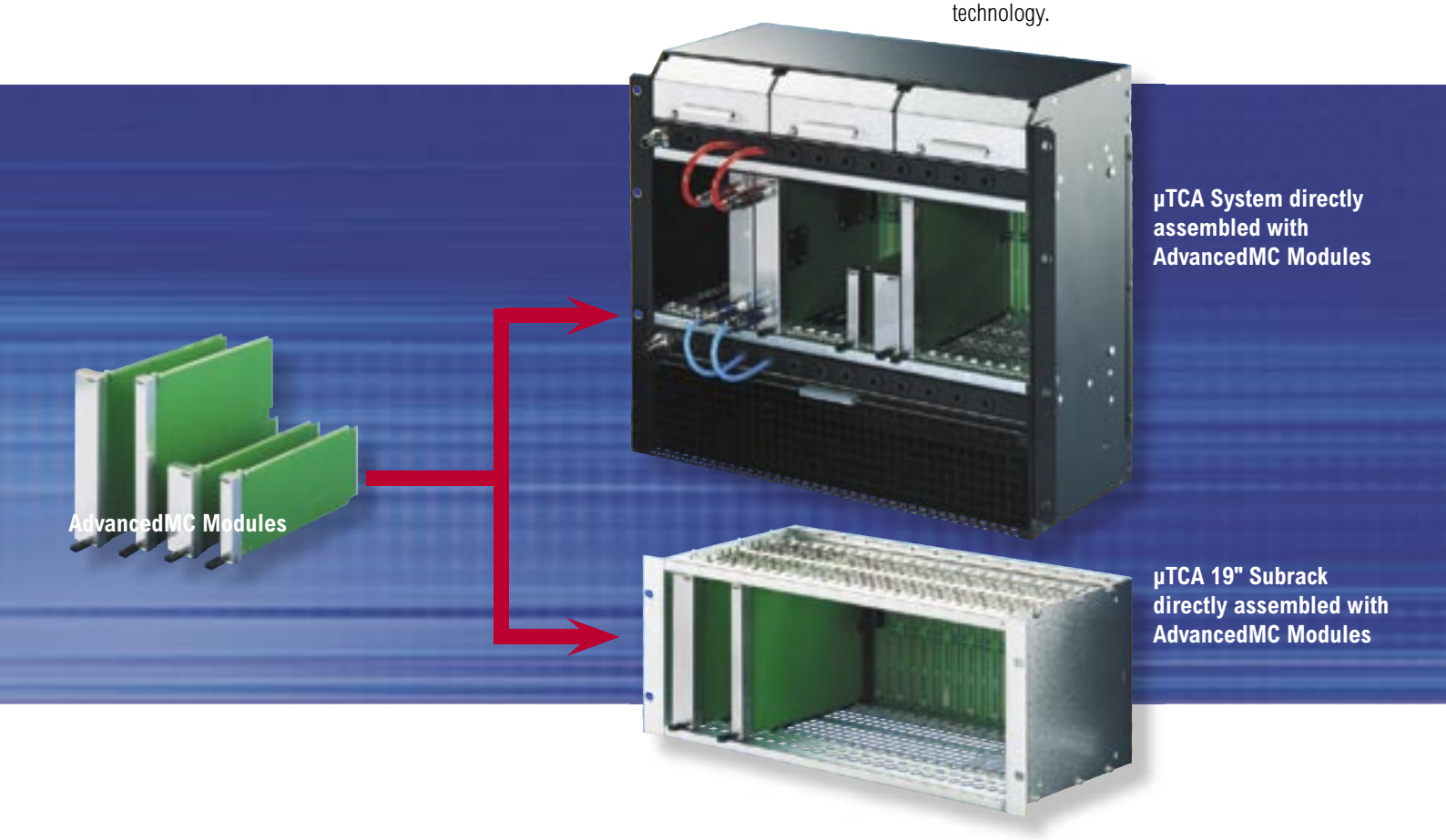
■ **Not to be used anymore for new developments**
Availability until end 2007
Replacement on request

For further information www.schroff.biz/oneclick
oneClick code = Order no.

Micro Telecom Computer Architecture

AdvancedTCA enhanced by AdvancedMC, which was specified by PICMG for the highest performance applications in the telecomuunication market, for instance WiNMAX. For application in the telecom sector that do not required these high performances the MicroTCA standard has been developed and through its high scalability it can easily be adapted to the relevant tasks, such as simple applications without reduncancy, Cube or Pico systems with two to four AdvancedMC modules up to fully redundant systems with maximum 12 AdvancedMC modules.

Parallel to this, development engineers from other markets were involved in the realisation of the MicroTCA standard, so that it conforms to requirements from these sectors, for instance enterprise solutions, industry applications, automation, defence technology or medical technology.



Dimensions

With a maximum depth of only 200 mm in comparison to AdvancedTCA more subracks can be housed in a smaller cabinet.
The adaptation into 300 mm deep ETSI racks is possible. The width and height of the subracks correspond to the well-known 19" dimension, whereby part width are planned (Cube, Pico).

Performance Loss

Apart from the applications with heat loss of approx. 20 W for the smallest AdvancedMC modules and approx. 80 W for the largest AdvancedMC modules, there are also applications, which manage without additional cooling.

Periphery

Suitable cooling and power supply units are made available separately and are not integrated as a rule. This leads to a considerable cost reduction, but the construction of a complete system similar to AdvancedTCA is possible and taken into account in the standard.

µTCA.0 R1.0 is a very modular standard with the aim to assemble AdvancedMC modules without carrier board directly on a backplane. This line of thought expands the user spectrum for AdvancedMC in the low end area of cost critical applications, such as base stations (Wireless), access units (Wireline) or elements of smaller networks.

The dimensions of the new µTCA subracks and systems which are required for this are aligned to modules described in the AdvancedMC RC1.1 standard and the current revision of the standard which is in progress.

PICMG®
Open Modular Computing Specifications

MicroTCA Carrier Hub

For the operation of an AdvancedMC module a so-called MicroTCA Carrier Hub (MCH) is required. In the original application of AdvancedTCA carriers the management, for instance the validation check of the modules during a hot-swap, is carried out by the AdvancedTCA carrier. As this carrier is now replaced by a backplane, the corresponding management has to be arranged on another board, which is the so-called MCH. The MCH takes over the management as well as the switching functions. Additionally the MCH can also carry out shelf and systems management functions.

Standards

The subracks will fulfil all required standards such as UL, NEBS etc. and be equipped with a backplane, on which the AdvancedMC modules make contact. Similar to AdvancedTCA it is also planned to standardise complete systems.

Roadmap

The µTCA standard µTCA.0 R1.0 issued in July 2006. Schroff is responsible for the mechanical part of the standard.

MicroTCA development systems

12806021

6 U system

12806020

8 U system

- In accordance with standards
  - PICMG MicroTCA.0 R1.0
  - PICMG AMC.0 RC1.1
- MicroTCA development system (in ratiopacPRO case), front handle (19" bracket optional), board section for AdvancedMC module
- MicroTCA backplane
- Active cooling (air flow from front to rear)
- Hot-swap fan modules with three temperature controlled 12 V_{DC} fans
- Air filter exchangeable from the front
- Accessories
  - Plug-in power supplies (12 V_{DC} or -48 V_{DC})
  - Power input module for +12 V from an external power supply or a plug-in power supply to the MicroTCA backplane

NEW

Delivery comprises

Case	19" ratiopacPRO case, 316 mm deep, 2 slots for power supplies, board section 200 mm deep, air filter exchangeable from the front
Cooling	Air flow from front to rear, fan modules hot-swappable, 3 fans with 170 m^3/h (100 cfm) temperature dependent fan speed control (NTC)

Order Information

Description	Backplane Slot positions	Qty/PU	Order no.
Development system with **Single** module board section	9 Full-Size, 2 x PM, 2 x MCH	1	**11850-005**
Development system with **Double** module board section	8 Full-Size, 4 Compact AMC, 2 x PM, 2 x MCH	1	**11850-001**
Power supply 300 Watt, AC-DC (12 V) Input 85 ... 264 V_{AC}, output 12 V_{DC}/25 A, 1 piece			**11098-287**
Power supply 300 Watt, AC-DC (-48 V_{DC}) Input 85 ... 264 V_{AC}, output 48 V_{DC}/6,25 A, 1 piece			**11098-288**
Connection cable Power supply, 12 V_{DC} output to power input module, length 260 mm, 1 piece			**23204-176**
Connection cable Power supply, 48 V_{DC} output to MicroTCA power module, length 260 mm, 1 piece			**23204-177**
Connection cable Power supply 12 V_{DC} output to power input module, length 550 mm, 1 piece			**23204-182**
MicroTCA power input module, Single module, Full-size 1 piece, see page 42			**23098-561**

■ Description MicroTCA backplane, see page 39

For further information www.schroff.biz/oneclick
oneClick code = Order no.

MicroTCA backplane for development systems

12606006

- In accordance with:
  - PICMG MicroTCA.0 R1.0
- Different topologies in Fat Pipe area

NEW

Delivery comprises

Item	Qty	Description
1	1	Backplane

Order Information

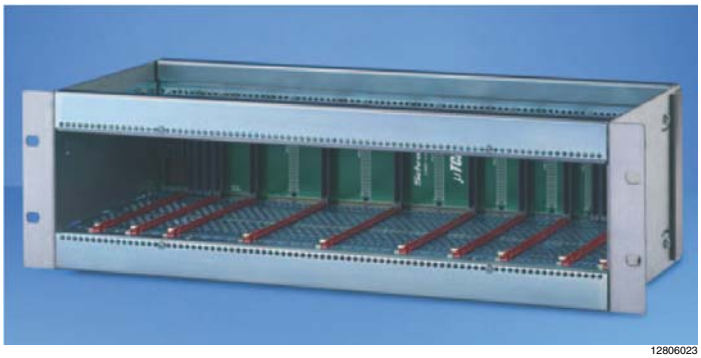
Slots AMC	Width mm	Height U	Description	Order no.
12	425.0	260.4	8 slots Full-size, 4 Compact slots, 2 MCH slots, 2 PM slots (6 HP)	**23005-408**
9	425.0	169.9	9 Full-size AMC slots, 2 MCH slots, 2 PM slots (9 HP)	**23005-419**

Technical data

	12 slot AMC	9 slot AMC
Slots	12 AdvancedMC slots, thereof 8 Single Full-size and 4 Single Compact, 2 redundant MicroTCA Carrier Hub (MCH) slots, 2 redundant Power Module (PM) slots 6 HP	9 AdvancedMC Single Full-size slots, 2 redundant MicroTCA Carrier Hub (MCH) slots, 2 redundant Power Module (PM) slots 9 HP
IPMI	Radial IPMI from both MCH slot positions, to all AdvancedMC, cooling unit (CU) and PM slot positions	Radial IPMI from both MCH slot positions, to all AdvancedMC, cooling unit (CU) and PM slot positions
Clock Connections	CLK1: radial from MCH2 to all AdvancedMC slots CLK2: radial from each AdvancedMC slot to both MCH slots, incl. serial termination CLK3: same topology as Fat Pipe connection (Port 4 ... 7)	CLK1: radial from MCH1 to all AdvancedMC slots CLK2: radial from each AdvancedMC slot to both MCH slots, incl. serial termination CLK3: radial from MCH2 to all AdvancedMC slots
Common Options	AdvancedMC Port 0 in star form to MCH1; AdvancedMC Port 1 in star form to MCH2	AdvancedMC Port 0 in star form to MCH1; AdvancedMC Port 1 in star form to MCH2
Fat Pipe	Port 4 ... 7 radial connection from MCH1 to AdvancedMC slots 2, 3, 5, 7, 10, 11, point-to-point connection between slots 1 and 4, 6 and 8, 9 and 12	Port 4 ... 7 radial connection from MCH1 to all AMC slots, Extended Fat Pipe ports 8 ... 11: radial connection from MCH2 to all AMC slots

For further information www.schroff.biz/oneclick
oneClick code = Order no.

MicroTCA 19" subrack, shielded



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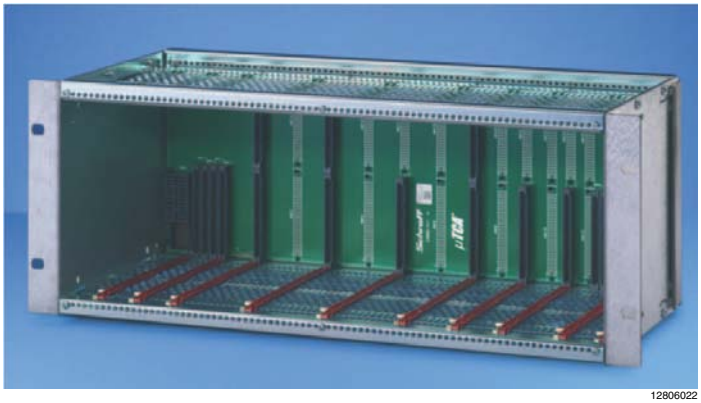
3 HE



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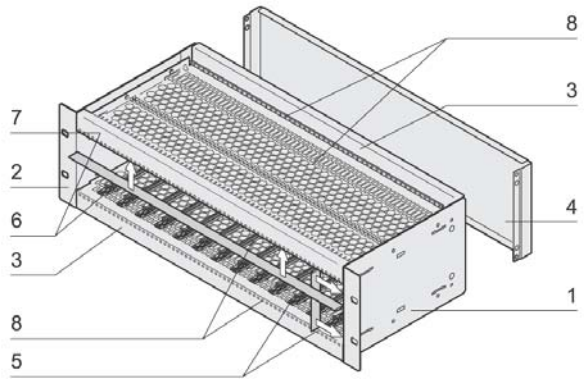
4 HE



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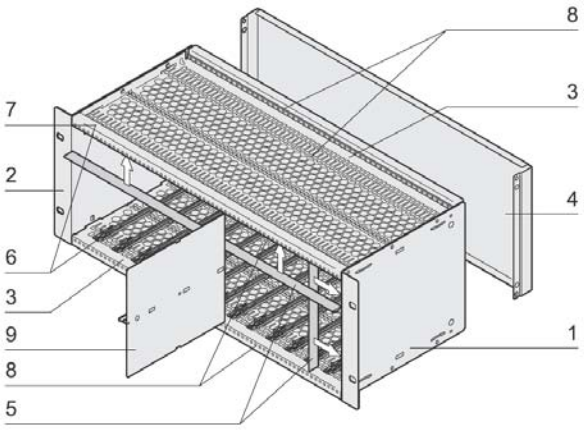
3 HE



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4 HE

- To accommodate AdvancedMC modules
  - 3 U subrack for Single modules
  - 4 U subrack for Single and Double modules with splitting kit
- Shielded
- Guide rails can be assembled in HP grid (5.08 mm)
- Integrated ESD clip

NEW

Delivery comprises (kit)

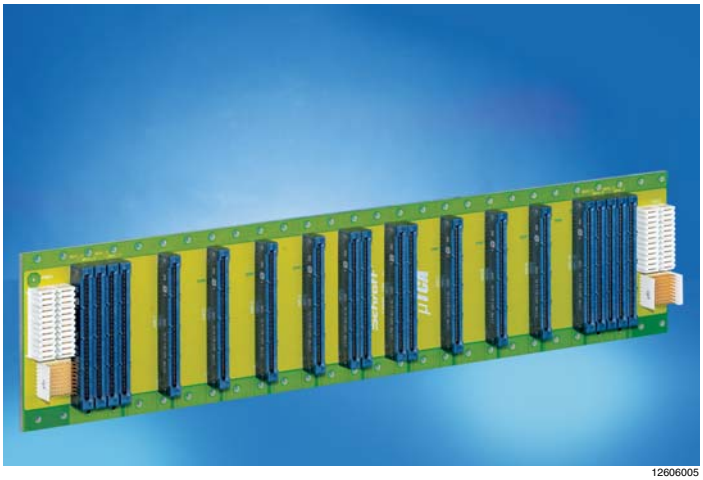
Item	Qty	Description
1	2	Right side panel, 1.5 mm, zinc-plated (AlZn)
2	1	Left side panel, 1.5 mm, zinc-plated (AlZn)
3	1	Top and base cover,1 mm, zinc-plated
4	1	EMC rear hood
5	2	EMC textile gasket, core: foam, sleeve: textile cladding with CuNi coating
6	32	Guide rail plastic, PBT UL 94 V-0
7	16	ESD clip, stainless steel, assembled in upper guide rail
8	4	Threaded insert M3, St, zinc-plated
9	5	Splitting kit incl. guide rail (only with 4 U version)
10	1	Assembly kit for subrack and MicroTCA backplane

Order Information

Height U	Width HP	Depth mm	Qty/PU	Order no.
3	84	197	1	**20849-114**
4	84	197	1	**20849-095**
Splitting kit PU 5 pieces				**20849-115**
MicroTCA backplane 4 U, 2 + 2 + 12 slot, 1 piece				**23005-415**
MicroTCA backplane 3 U, 2 + 2 + 12 slot, 1 piece				**23005-414**
Additional guide rail top, ESD clip assembled, PU 10 pieces				**20849-120**
Additional guide rail bottom, PU 10 pieces				**20849-122**

For further information www.schroff.biz/oneclick
oneClick code = Order no.

MicroTCA backplanes for subracks



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- In accordance with:
  – PICMG µTCA D0.9
- Special topologies for development purposes

NEW

Delivery comprises

Item	Qty	Description
1	1	Backplane

Order Information

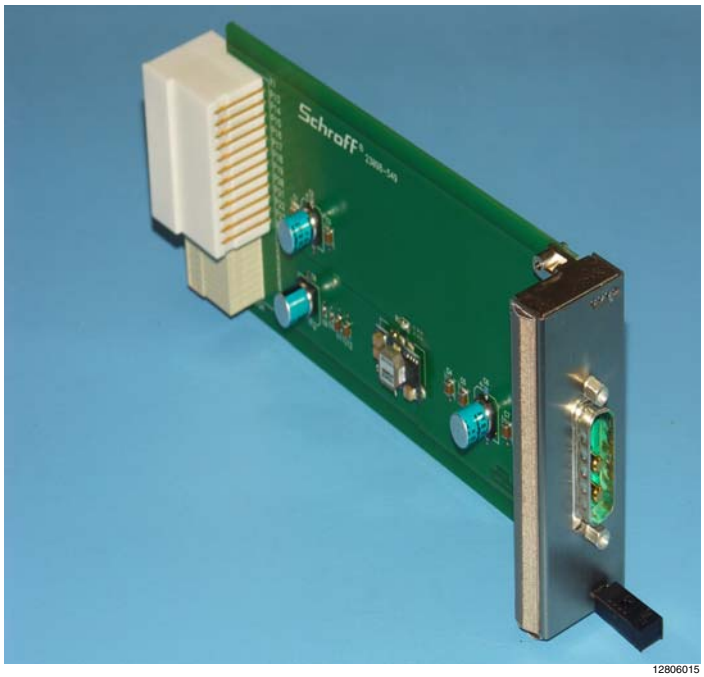
Slots AMC	Width mm	Height U	Description	Order no.
12	425.0	3	8 slots Full-size, 4 Compact slots, 2 hubs (MCH slots), 2 Power Module slots (PM)	**23005-414**
12	425.0	4	8 slots Full-size, 4 Compact slots, 2 hubs (MCH slots), 2 Power Module slots (PM)	**23005-415**

Technical data

	Backplane 2 + 2 + 12
Slots	12 AdvancedMC (8 Single Full-size, 4 Single Compact), 2 redundant MicroTCA Carrier Hubs (MCH) , 2 redundant Power Module (PM) slots 6 HP
IPMI	Radial IPMI from both MCH slots to all AdvancedMC, cooling unit (CU) and PM slots
Clock Connections	CLK1: radial from MCH 2 to all AdvancedMC slots CLK2: radial from each AdvancedMC slot to both MCH slots, incl. serial termination CLK3: same topology as Fat Pipe connections (Port 4 ... 7)
Common Options	AdvancedMC Port 0 in star form to MCH 1 AdvancedMC Port 1 in star form to MCH 2
Fat Pipe	Port 4 ... 7: radial connection from MCH1 to AdvancedMC slot positions 2, 3, 5, 7, 10, 11, point-to-point connections between slots 1 and 4, 6 and 8, 9 and 12

For further information www.schroff.biz/oneclick
oneClick code = Order no.

MicroTCA power input module, Single module, Full-size



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- Imput of +12 V_{DC} supply voltage from external source via D-Sub connector (front panel) to 16 x 12 V_{DC} outputs to MicroTCA backplane
- Generation of +3.3 V_{DC} management voltage, 5 A max. and distribution to 16 outputs
- Is inserted into the Power Module slot position instead of a MicroTCA power module (Single module, Full-size), connector and form factor compatible
- Hot-swap voltage cut-off of the individual outputs via Enable signal of AdvancedMC boards
- Protection against overvoltage and Verpolung of input voltage

NEW

Order Information

Description	Order no.
MicroTCA power input module, Single module, Full-size	**23098-561**
Connection cable Power supply, 12 V_{DC} output to power input module, length 260 mm, 1 piece	**23204-176**
Connection cable Power supply 12 V_{DC} output to power input module, length 550 mm, 1 piece	**23204-182**

Note

- Both connecting cables are especially for use in the development systems

For further information www.schroff.biz/oneclick
oneClick code = Order no.

Further information:
www.a-tca.com or AdvancedTCA E-mail hotline:
Europe, Asia: infoATCA@schroff.biz
America: infoATCA@pentair-ep.com

Responsible for contents and print
Schroff GmbH, Marketing Communication, D-75334 Straubenhardt, Germany
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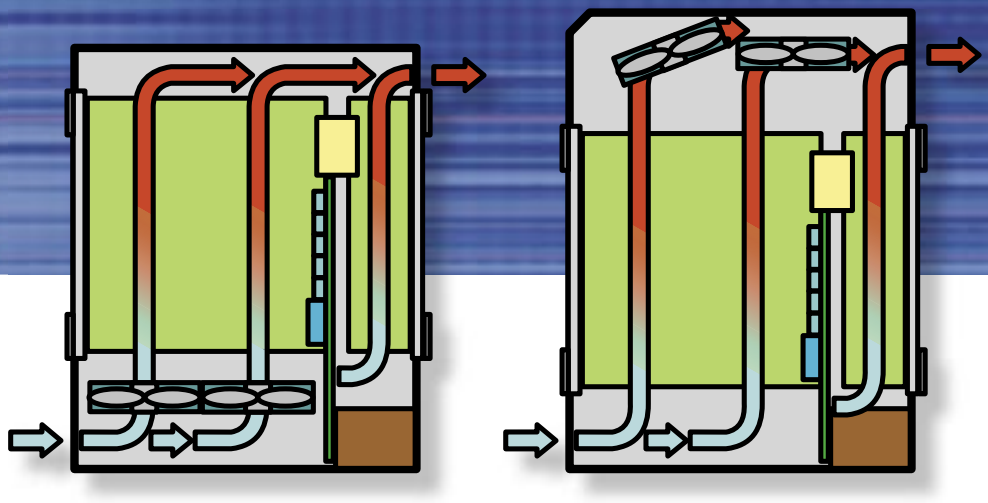
12705003

Air Cooling

The AdvancedTCA standard defines a 99.999% systems availability. This also applies to the cooling and demands a redundant cooling concept, so that the failure of a fan does not affect the operation of the system. Strict guide lines of the NEBS (America) and ETSI (Europe) determine the upper limits for the noise generation.

The compact structure of AdvancedTCA systems presents a further challenge. With systems a heat loss of up to 3.4 kW can be generated - with three systems in a cabinet it can therefore increase to more than 10 kW.



Cooling in Systems:
Push or Pull Cooling?

Basically there are several ways to cool systems. Even today liquid cooling is not yet accepted for telecom applications. Therefore, air cooling, which forces cool air at high speed past components that require cooling, is the only possibility. In general two different approaches are possible: Push Cooling or Pull Cooling.

Push Cooling

- Axial or diagonal fans push the air into the system
- Extended life of fans
- Reduced space requirement, system height: 12 U
- High pressure prevents dust accumulation on the components

Pull Cooling

- Radial fans pull hot air out of the system
- Performance losses of the fans are taken away with this systems
- Better air distribution inside the system
- High static pressure

Water Cooling

From today's view point cooling is the critical aspect of the AdvancedTCA systems. This situation will intensify even more, as signs point to further increasing performance losses of the components. Schroff has therefore put great emphasis on optimum cooling during the development of their AdvancedTCA systems.

The cooling of processors on µTCA boards often demands water cooling already.

For cabinets with 2 to 3 AdvancedTCA systems the limits for air cooling have been exceeded. A heat loss of 10 kW in cabinets demands an air/water heat exchanger.

Schroff has developed a solution based on the cabinet platform Varistar:

- Up to 20 kW cooling capacity
- Integrated compact heat exchanger
- Even cooling of all systems
- Optimum safety through:
  - Perfect system balance
  - Integrated communication interfaces
  - Redundant power supply

Overview PICMG 3.0 - AdvancedTCA

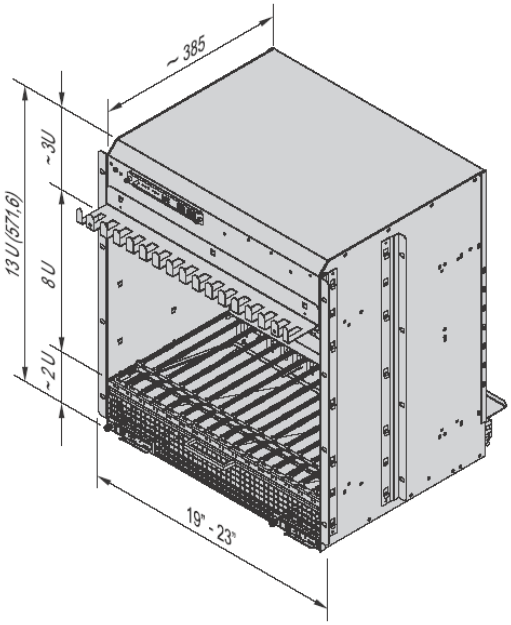
The **A**dvanced **T**elecom **C**omputing **A**rchitecture specification was at first only specified for the telecommunications market. For this market further overlapping standards have to be considered (NEBS, Belcore, Tecordia). On this platform also other products for high-performance networks can be built. AdvancedTCA also allows manufacturers of central office equipment to replace proprietary systems by standardized systems.
A new form factor was defined, with a board height of 8 U, a board depth of 280 mm and an I/O board depth (RTM) of 70 mm. The front panel width is 6 HP, whereas the board is offset 0.1". This offset allocates more space on the rear side of the boards for SMT components. The mounting of the EMC gasket on the left hand side of the front panel reduces the danger of the components of the EMC gasket being damaged during the extraction of the boards. The new handles were optimized in accordance with the withdrawal forces.
With AdvancedTCA the common parallel bus was replaced by a fast serial connection. If a Dual Star backplane is used, Switch/Hub boards and twelve Node boards can be used in an AdvancedTCA system intended for assembly in a 19" cabinet. With a Full Mesh backplane 14 AdvancedTCA blades (function boards) can be used. Other backplane architectures like e. g. Dual Dual Star and Replicated Mesh are possible too. The AdvancedTCA standard also allows to build a 16 slot system that fits in a 23" Telecom or 600 mm ETSI cabinet. AdvancedTCA systems are designed for a maximum energy loss of 200 W per board. A 14 slot AdvancedTCA system can generate up to 2.8 kW energy loss.

The total data throughput of the system depends on the selected fabric layer, the protocol and the fabric architecture and can reach more than 1 Tb/s. Until now, Ethernet (PICMG 3.1), Infiniband (PICMG 3.2) and StarFabric (PICMG 3.3) fabric layers were defined. The PCI Express (PICMG 3.4) standard is being designed at present.
The connectors in an AdvancedTCA system are divided in three different groups, zones 1 to 3.

- Connector zone 1 provides the current, the primary (IPMI) management system as well as the geographic address of the board.
- In connector zone 2 a 10/100/1000 BASE-T Base-Interface and a fabric interface are defined. The Base interface is used for the transmission of Flash Memory Images, the download of firmware as well as for high level management functions. The fabric interface is for high-speed transfer of large data volumes.
- Connector zone 3 is set by the individual applications. The 70 mm deep RTM (Rear Transition Module) is connected directly with the front board. Therefore, both electric as well as optic connectors can be inserted between front board and Rear Transition Module.

A high-capacity shelf management monitors the boards, the Field Replaceable Units (FRUs) as well as all other important parameter of the chassis.

AdvancedTCA Chassis



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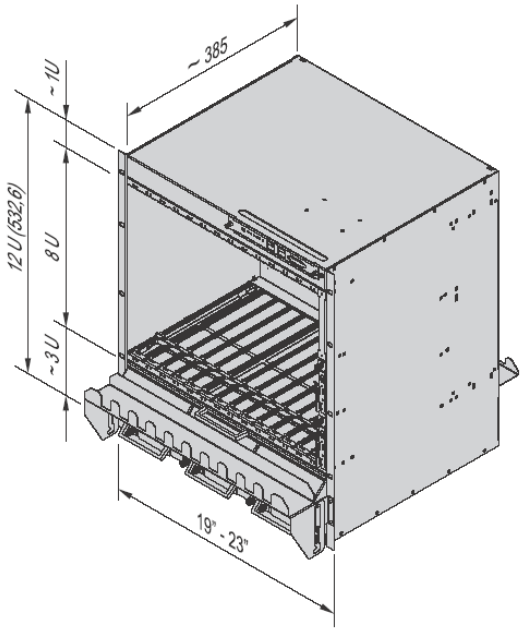

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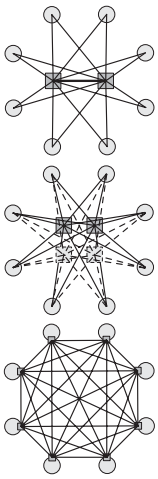
Full Mesh/Dual Dual Star/Dual Star

Schroff supports a range of AdvancedTCA backplane topologies.
The main goal of the development of the AdvancedTCA standards was a scalable architecture that allows the consideration of performance and costs. A further goal was an alternative for the parallel bus on the backplane, as this causes a hold-up of the data throughput and is a frequent breakdown reason.

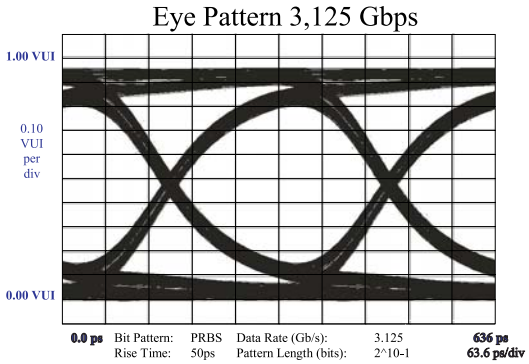
The AdvancedTCA backplane is the first backplane which is designed based on an open standard, which only supports package based architectures (switched fabrics). The scalability is granted because of several topology options which support one, two or four ports per channel (link between slots), and because of the Dual Star, Dual Dual Star or Full Mesh connection.

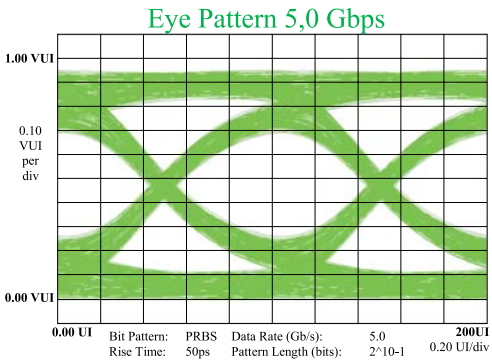


In a Dual Star topology all slots are connected with a Star, on which a fabric switch is placed. A second switch (dual) assures the redundancy which is important for the system availability. All slots communicate with switches in the Hub slot:

For a higher performance a second group with two redundant switches can be added and a Dual Dual Star configuration can be created.

The highest capacity is reached with a Full Mesh configuration in which every slot is directly connected with all other slots. Without the restrictive fabric switches, the data bandwidth can reach more than 2.5 Tbps.





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Radial and bused IPMI topology

Schroff backplanes support both bused as well as radial IPMI configurations.
IPMI, which runs on I^2C, with several AdvancedTCA specific extras, is used for the primary low level shelf management communication channel. There are two independent (redundant) IPMI interfaces in the chassis. Normally a bused IPMI solution is chosen: This means that all slots are connected with redundant, parallel I^2C busses.

There were concerns about AdvancedTCA boards and chassis that in a worst-case scenario both IPMI busses could be blocked and no shelf management would be available. To avoid this, IPMI interfaces can be routed in a Dual Star (radial) configuration, so that both interfaces of each slot are connected separately with each shelf manager.

Shelf Management

Schroff offers state-of-the-art shelf and thermal management products for AdvancedTCA systems.
The shelf manager adopts considerably more tasks in an AdvancedTCA environment than in a CompactPCI chassis. In the CompactPCI system the shelf manager monitors and controls fans, temperatures and power supplies. In an AdvancedTCA system the shelf manager also controls all boards, in addition to the chassis environment. To introduce the electronic coding was a main focus in the standardization work. Instead of few effective coding blocks, which were to prevent that a board were inserted in a wrong slot, the electronic coding enables the shelf manager to support only those fabric ports on an AdvancedTCA board which are compatible with the board on the other end of the fabric connection.

When an AdvancedTCA board is assembled in the shelf, the shelf manager compares the features of the board with those available in the system. It compares the current, the cooling and the fabric signalling levels (protocols) per channel, the available ports per channel and the backplane topology to what is connected at the other end of a fabric connection. The shelf manager assigns current to the board, allows 'power up' of the board and engages only those board features which are compatible with the remaining shelf. This deatailed shelf management prevents damage due to electric incompatibility to the boards and eliminates an unreliable system configuration. Furthermore, the shelf manager creates a list of the boards and components installed in the shelf. (Remote) Access to this list is possible via a network interface to the shelf manager.

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Pentair Technical Products Group and Representatives

www.schroff.biz

Schroff GmbH
Langenalber Straße 96-100
75334 Straubenhardt
Deutschland
Tel. +49 (0)7082 794-0
www.schroff.de

Schroff Scandinavia AB
Flygfältsgatan 11
12821 Skarpnäck
Sweden
Tel. +46 (0) 8 683 61 00
www.schroff.se

Schroff GmbH/
Sp.z.o.o./-oddzial w Polsce
ul. Marynarska 19A
PL-02-674 Warszawa
Poland
Tel. +48 (0) 22 607 06 16
www.schroff.pl

Pentair Electronic Packaging
170 Commerce Drive
Warwick RI 02817
USA
Tel. +1 (401) 732-3770
www.schroff.us

Schroff UK Ltd.
Maylands Avenue
Hemel Hempstead
Herts HP2 7DE
Great Britain
Tel. +44 (0)1442 240 471
www.schroff.co.uk

Schroff Scandinavia AB
Peräsimentie 8
FIN-03100 Nummela
Finland
Tel. +358 9 222 68 00
www.schroff.fi

Schroff K.K.
Nisso No.13 Bldg. 4F
2-5-1 Shinyokohama, Kohoku-ku
Yokohama-shi
Kanagawa 222-0033
Japan
Tel. +81 (0)45 476 02 81
www.schroff.co.jp

Pentair Technical Products China
Shuangyuan Rd. South, Liuting, Chengyang
District (Airport Ind. Zone)
Qingdao, PC 266108
PR China
Tel. +86 532-8771 6101
www.schroff.biz

Schroff SAS
Z.I, 4 rue du Marais
67660 Betschdorf
France
Tel. +33 (0)3 88 90 64 90
www.schroff.fr

Schroff s.r.l.
Via Brughiera 1
20010 Pregnana Milanese (MI)
Italy
Tel. +39 02 932 714-1
www.schroff-italia.it

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