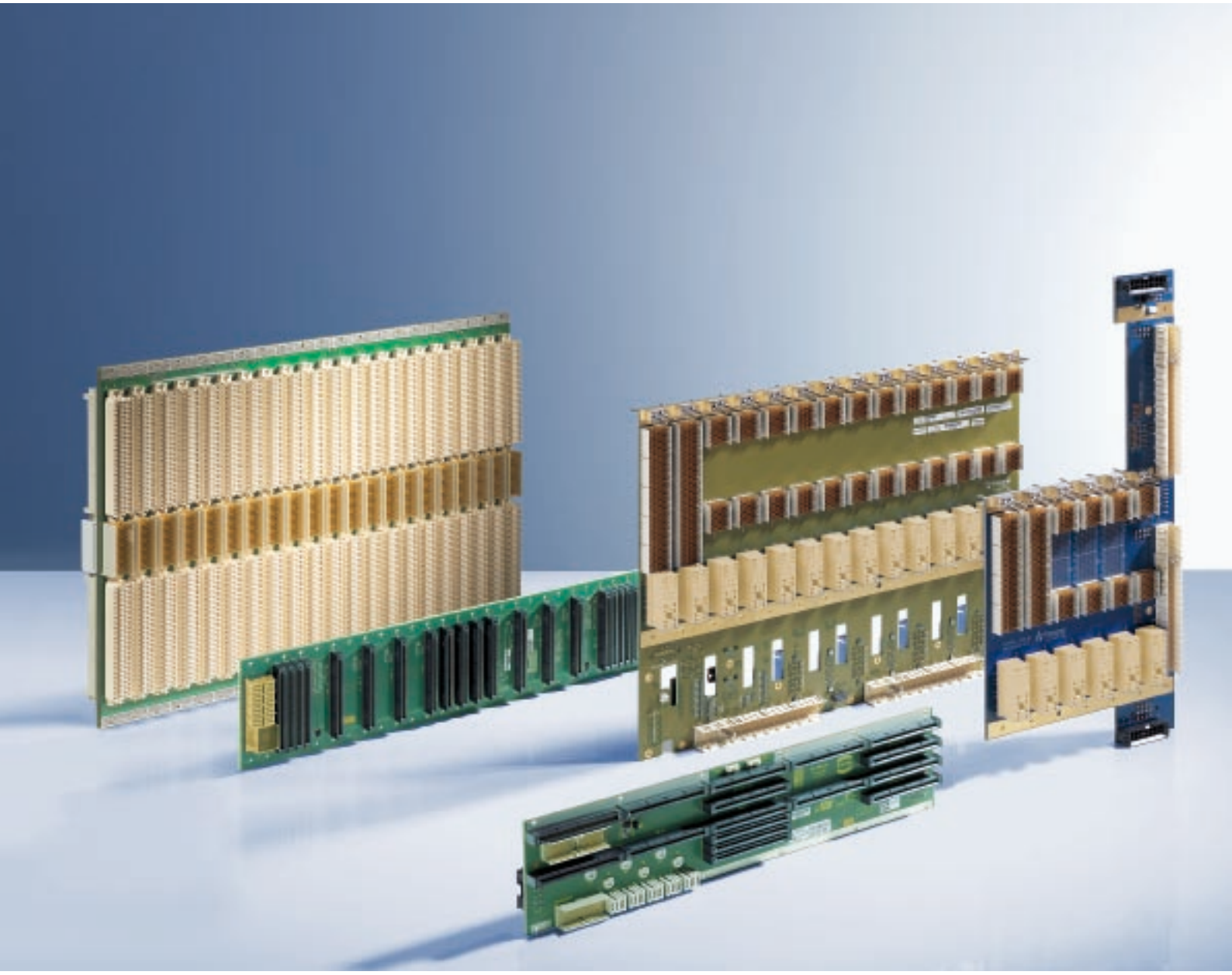
Rittal Electronic Systems

the complete know-how



High-speed backplanes

FRIEDHELM LOH GROUP

RITTAL®

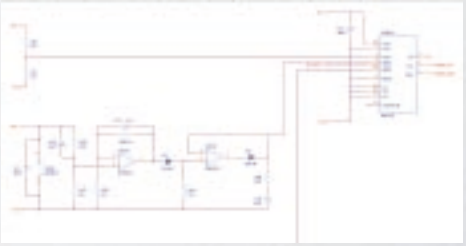
The complete backplanes know-how – Competence direct from the manufacturer

The Rittal Electronic Systems Division offers you the "complete know-how" for the field of electronics packaging – from the integration of innovative components through to full plug & play solutions. It goes without saying that the product portfolio also includes state-of-the-art high-speed backplanes. Our design and manufacturing specialists have developed a wealth of experience and expertise both within our Canadian subsidiary and through a highly competent supply chain.

The production centres accommodate the very latest in manufacturing equipment. Alongside market-specific demands and industry standards, attention is also paid to individual customer wishes. PCB designs and layouts are elaborated using professional CAE tools, and standardised procedures ensure full control over the whole manufacturing process. In the end, all this guarantees that you receive only backplanes of the highest possible quality from Rittal.

Definition of requirements

- Optimisation of product design through careful analysis and implementation of customer wishes
- Continuous support by experienced specialists
- Global purchasing ensures cost-optimised solutions



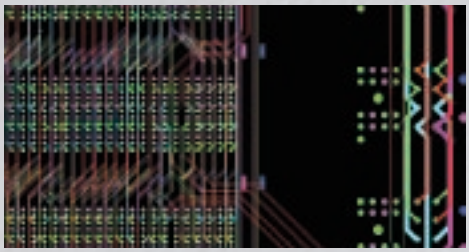
Design and circuit drawing input

- Reliable design process using Cadence Allegro software
- Standard and customer-specific designs
- Design consulting secures the best possible results
- Fast and reliable solutions
- Design and simulation service
- Component selection

Simulation

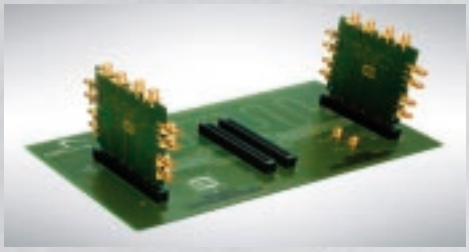
- Simulation of signal transmission response of the modules
- Design verification with regard to signal propagation time, impedance, crosstalk, reflection and attenuation
- Current carrying capacity and thermal response
- Determination of number and position of the layers (Signal, Ground, Power)
- Specification of materials

DEFINITION OF REQUIREMENTS → **DESIGN DEVELOPMENT** → **SIMULATION**



Layout

- Implementation in a layout
- Positioning of devices/components
- Optimised design taking into account thermal demands
- Routing
- Specification of the physical backplane parameters
- Determination of the impedance and signal propagation times of the connections



Prototyping

- Rapid realisation of the layout by way of prototyping
- Implementation according to previously defined specifications
- Development of test cards
- Measurements to verify signal transmission properties in accordance with the relevant standards, e.g. IEEE 802.3ap (10GBASE-KR)

Testing

- All backplanes are individually tested to applicable standards
- Intelligent TeroTest-B10 test system
- Modern backplane testing with RoBAT test system
  - AOI (Automated Optical Inspection) and complete electrical tests
  - Checking of pin alignment and height
  - Handling of backplanes with high packing densities
  - Simultaneous testing on both sides
  - Suitable for both small batches and large series

Production

- Global production facilities in Europe, America and Asia
- Fast SMD insertion on automatic insertion machines
- Automatic pressing-in of the pins
- Static-safe manufacturing
- ISO 9001: 2000 approved
- IPC 610 Class 3 (best) assembly standard
- Press-in and solder technology
- Manufacturing of backplanes with large form factors up to 1500 x 800 mm
- RoHS-compliant

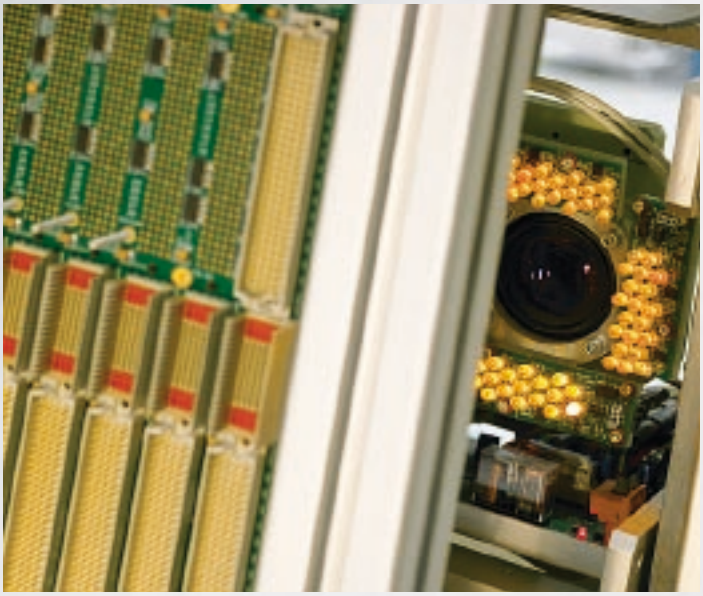
LAYOUT PROTOTYPING TEST PRODUCTION

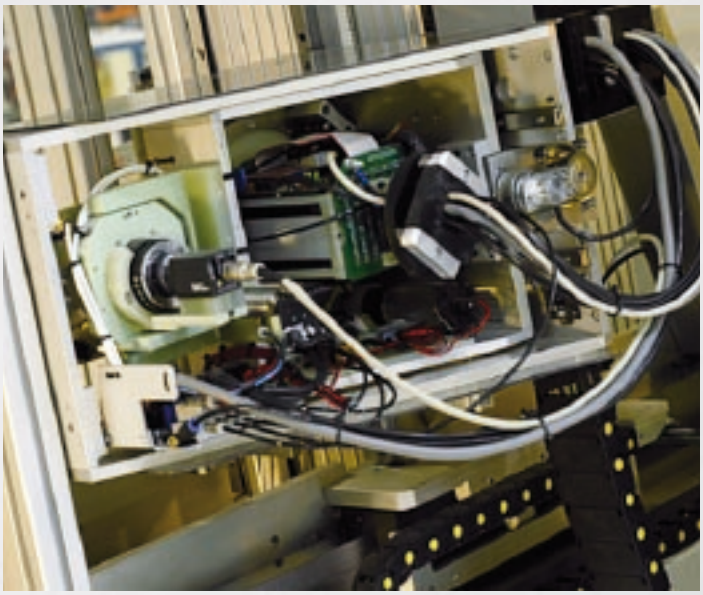
Tested quality for maximum confidence

Test programs ensure the precision and quality of our backplanes and are essential tools for manufacturing at the highest level.

This could mean customer-specific test routines, or sophisticated robot-assisted standard test programs processing up to 64,000 nodes. The RoBAT test system which is used in such cases offers the following benefits and possibilities:

- Cost-effective analysis of high-density backplanes
- Fast programming and low tooling costs
- Simultaneous testing on both sides
- Optical inspection for completeness
- Checking of pin alignment and height
- Electrical continuity test
- Insulation test





All Rittal Electronic Systems products are systematically and precision-tested in our own internationally accredited quality assurance laboratories. Another process element serving to ensure the ultimate quality level of all services and products.

The product portfolio:

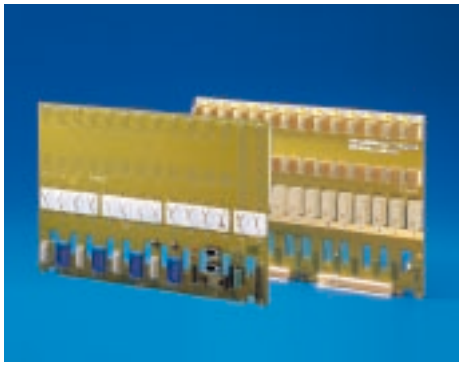
Backplanes AdvancedTCA®

ATCA – Advanced Telecom Computing Architecture
First cross-industry standard developed by PICMG (PCI Industrial Computer Manufacturers Group) to replace telecommunications applications previously developed on a proprietary basis.

ATCA is the ideal solution for exacting demands in terms of system availability and performance, in both telecommunications and industrial automation, traffic control technology and medical technology. Rittal's product spectrum includes a range of complete systems in various designs with the corresponding accessories.

AdvancedTCA backplane, 6 slots

- High-speed serial data transmission to PICMG 3.0 R 2.0 (3.125 Gbit/s per pair)
- System performance up to 1 Terabit/s
- Conforms to PICMG 3.0 Rev. 2
- Backplane topologies Dual Star, Dual-Dual Star or Full Mesh
- 6 front-side slots and 5 rear-side slots
- Bussed IPMI, radial IPMI optional



AdvancedTCA backplane, 14 slots

- High-speed serial data transmission up to 3.125 Gbit/s
- System performance up to 2 Terabit/s
- Conforms to PICMG 3.0 Rev. 2
- Backplane topologies Dual Star, Dual-Dual Star or Full Mesh
- 14 front-side slots and 14 rear-side slots
- Bussed IPMI, radial IPMI optional

MicroTCA – Compact design, extended range of applications

MTCA specification MTCA.0 R1.0 was ratified by PICMG in July 2006. Supplementary to the ATCA standard, MicroTCA (Micro Telecommunications Computing Architecture) was devised as a compact solution for cost-critical applications in the low-end range. AdvancedMC modules are connected directly onto the backplane without a carrier card. The modules may be installed either vertically or horizontally.

MicroTCA is distinguished by its very compact design as well as its high level of scalability and significantly reduced system costs. The compact design with a depth of just 200 mm facilitates installation in 300 mm deep enclosures, on the wall, or in cases. The benefits of MicroTCA extend the usage spectrum to other application areas outside telecommunications, such as medicine, safety technology or industrial automation. High-speed backplanes are an important component for this.

MicroTCA backplane

- High-speed serial data transmission up to 3.125 Gbit/s
- Conforms to MTCA.0 R1.0
- 2 MCH, 2 power module slots and 12 AMC slots
- AMC connector con:card+ from HARTING
- Customer-specific slot and topology configurations by request
- Standard and customer-specific system solutions

con:card+®

PicoTCA backplane

- Conforms to MTCA.0 R1.0
- 1 MCH, 1 management slot and 12 AMC slots
- AMC connector con:card+ from HARTING
- Customer-specific slot and topology configurations by request
- Standard and customer-specific system solutions

con:card+®

The product portfolio: Backplanes CPCI

Rittal offers an extensive range of powerful backplanes for CompactPCI.

- Modular construction facilitates expansion up to a maximum of 21 slots
- Connection between the individual segments via CPCI or H.110 bridge modules
- Power input via ATX-compatible connectors or screw terminal
- Additional 2 x 3 Mate-N-Lock connector for 48 V with H.110 backplane
- Optional development of customer-specific Monolithic backplanes
- 10 layer multi-layer
- System slot on right (left upon request)

Backplanes 3 U, 3.5 U

Backplanes 3 U

Slots	Design	Model No. RP 32-bit	Model No. RP 64-bit
2	S	**3689.300**	**3689.307**
3	SE	**3689.301**	**3689.308**
4	SBME	**3689.302**	**3689.309**
5	SBME	**3689.303**	**3689.310**
6	SBME	**3689.304**	**3689.311**
7	SBE	**3689.305**	**3689.312**
8	S	**3689.306**	**3689.313**

S = Stand alone B = Beginning segment
Extendible with low profile bridges

Backplanes 3.5 U

Slots	Design	Model No. RP 32-bit	Model No. RP 64-bit
2	SBE	**–**	**3687.864**
3	SE	**3687.865**	**3686.578**
4	SE	**3687.863**	**3686.576**
5	SE	**3687.862**	**3686.575**
6	SBME	**3687.861**	**3686.548**
7	SBE	**3687.860**	**3686.547**
8	S	**3687.859**	**3686.546**

M = Middle segment E = Ending segment
Extendible with CPCI/CPCI bridges

Backplanes 6 U, 6.5 U

Backplanes 6 U

Slots	Design	Model No. RP 32-bit	Model No. RP 64-bit
2	S	**3689.314**	**3689.321**
3	SE	**3689.315**	**3689.322**
4	SBME	**3689.316**	**3689.323**
5	SBME	**3689.317**	**3689.324**
6	SBME	**3689.318**	**3689.325**
7	SBE	**3689.319**	**3689.326**
8	S	**3689.320**	**3689.327**

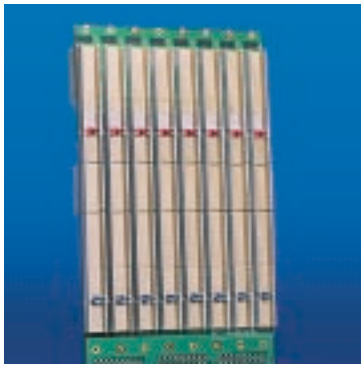
S = Stand alone B = Beginning segment
Extendible with low profile bridges

Backplanes 6.5 U

Slots	Design	Model No. RP 64-bit
3	SE	**3689.209**
4	SE	**3689.208**
5	SBE	**3689.207**
6	SBME	**3689.206**
7	SBE	**3689.205**

M = Middle segment E = Ending segment
Extendible with low profile bridges

Backplanes 7 U with H.110



H.110 connected to system slot

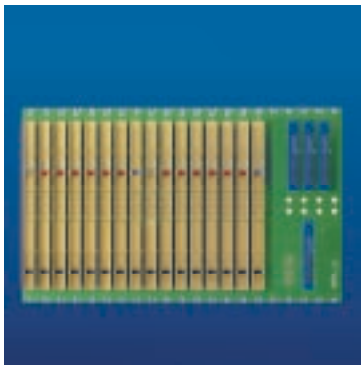
Slots	CPCI design	H.110 design	Model No. RP
3	SE	SE	**3688.508**
4	SE	SBME	**3688.507**
5	SE	SBME	**3687.875**
6	SBME	SBME	**3687.874**
7	SBE	SBME	**3687.873**
8	S	SBME	**3687.877**

H.110 not connected to system slot

Slots	CPCI design	H.110 design	Model No. RP
3	S	S	**3688.427**
4	S	SB	**3688.426**
5	S	SB	**3688.506**
6	SB	SB	**3688.505**
7	SBE	SB	**3688.504**
8	S	SB	**9805.494**

S = Stand alone B = Beginning segment M = Middle segment E = Ending segment
Extendible with low profile bridges

Backplanes 7 U, Switch Fabric to PICMG 2.16



Width	Number of slots	Description of slots	Model No. RP
32 HP	8	1 fabric slot 6 node slots with CPCI and H.110 1 host slot	**3689.188**
		see RP 3689.188, but without H.110	**3686.414**
64 HP	16	1 fabric slot 6 node slots with CPCI and H.110 1 host slot 1 fabric slot 6 node slots with CPCI and H.110 1 host slot 3 slots for power supplies	**3686.396**
		see RP 3686.396, but without H.110	**3689.186**
84 HP	21	7 node slots with CPCI and H.110 1 host slot 1 node slot with H.110 without CPCI 1 fabric slot 7 node slots with CPCI and H.110 1 host slot 1 node slot with H.110 without CPCI 1 fabric slot 1 alarm slot	**3686.397**
		see RP 3686.397, but without H.110	**3689.190**
		see RP 3686.397, but without CPCI	**3689.191**

Modular CPCI bridge

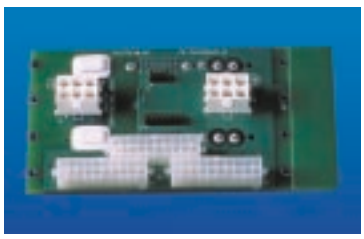
Description	Model No. RP
64-bit CPCI bridge	**3686.571**
Extended delivery times (For backplanes 3.5 U only)	

Modular low profile bridge

Design	Bit	Model No. RP
left-right	32	**3689.210**
right-left	32	**3689.211**
left-right	64	**9810.637**
right-left	64	**9812.625**
right-left	64	**3687.880**[1)]

[1)] For backplane H.110

Power supply board 3 U/3.5 U



Description	Model No. RP
3 U board for plug-in power supply with Positronic connector, 47-pin	**9905.105**
3.5 U board for 2 plug-in power supplies with Positronic connector, 47-pin	**3688.603**
ATX (12″) cable harness	**9810.337**
ATX (16″) cable harness	**3686.570**
ATX (20″) cable harness	**9810.338**

Backplanes CPCI, VME

Power supply board 6 U/6.5 U, 8 HP

Description	Model No. RP
Board for plug-in power supply with Positronic connector, 47-pin	**3688.607**
ATX (12″) cable harness	**9810.337**
ATX (16″) cable harness	**3686.570**
ATX (20″) cable harness	**9810.338**

Extended delivery times

Power supply board 6 U/6.5 U, 16 HP

Description	Model No. RP
Board for 2 x plug-in power supplies with Positronic connector, 47-pin	**3688.608**
ATX (12″) cable harness	**9810.337**
ATX (16″) cable harness	**3686.570**
ATX (20″) cable harness	**9810.338**

Extended delivery times

Backplanes 9 U Monolothic with power supply connector

Slots	Connector Positronic 47-pin	ATX	Model No. RP
2[1)]	1	**0**	**3689.329**
4	2	**1**	**3689.330**
6	3	**1**	**3689.331**
8	4	**1**	**3689.332**

Extended delivery times
System slot on right 64 bit with rear I/O, V I/O: +5.0 V. H.110 not connected to system slot
[1)] without H.110

The product portfolio: VMEbus

All Rittal VMEbus boards are of a HIGH SPEED DESIGN. Minimal reflections are achieved, due to even surge impedance of the signal track. The consistent shielding of every signal track ensures minimum coupling and hence guarantees interference-free operation even when extended to 64 bit mode with the 2e protocol (160 MByte/s).

VME J1 system bus

Slots	Dimensions Height mm	Dimensions Width mm	Model No. RP
3	128.4	59.5	**3686.555**
4	128.4	80	**3686.556**
5	128.4	100	**3686.557**
6	128.4	120.5	**3686.558**
7	128.4	141	**3686.559**
8	128.4	161.5	**3686.560**
9	128.4	181.5	**3686.561**
10	128.4	202	**3686.562**

Slots	Dimensions Height mm	Dimensions Width mm	Model No. RP
12	128.4	242.5	**3686.563**
13	128.4	263	**3686.564**
14	128.4	283	**3686.565**
15	128.4	303.5	**3686.566**
18	128.4	364.5	**3686.567**
20	128.4	405	**3686.568**
21	128.4	425.5	**3686.569**

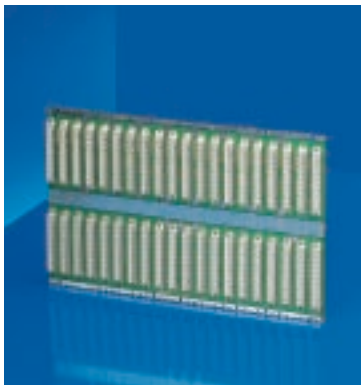
Backplanes VME/VME64x

VME J2 expansion bus

Slots	Dimensions Height mm	Width mm	Model No. RP
3	128.4	59.5	**3686.585**
4	128.4	80	**3686.586**
5	128.4	100	**3686.587**
6	128.4	120.5	**3686.588**
7	128.4	141	**3686.589**
8	128.4	161.5	**3686.590**
9	128.4	181.5	**3686.591**
10	128.4	202	**3686.592**

Slots	Dimensions Height mm	Width mm	Model No. RP
12	128.4	242.5	**3686.593**
13	128.4	263	**3686.594**
14	128.4	283	**3686.595**
15	128.4	303.5	**3686.596**
18	128.4	364.5	**3686.597**
20	128.4	405	**3686.598**
21	128.4	425.5	**3686.599**

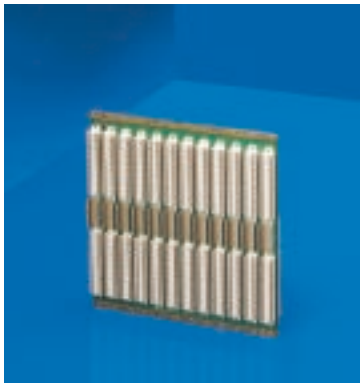
Backplanes VME J1/J2 Monolithic



Slots	Dimensions Height mm	Width mm	Model No. RP
2	261.7	39.5	**3686.495**
3	261.7	59.5	**3686.496**
4	261.7	80	**3686.497**
5	261.7	100	**3686.498**
6	261.7	120.5	**3686.499**
7	261.7	141	**3686.500**
8	261.7	161.5	**3686.501**
9	261.7	181.5	**3686.502**
10	261.7	202	**3686.503**
11	261.7	222.5	**3686.504**

Slots	Dimensions Height mm	Width mm	Model No. RP
12	261.7	242.5	**3686.505**
13	261.7	263	**3686.506**
14	261.7	283	**3686.507**
15	261.7	303.5	**3686.508**
16	261.7	324	**3686.509**
17	261.7	344	**3686.510**
18	261.7	364.5	**3686.511**
19	261.7	385	**3686.512**
20	261.7	405	**3686.513**
21	261.7	425.5	**3686.514**

VME64x backplane



VME64x 6 U

Slots	Dimensions Height mm	Width mm	Model No. RP Without P0 connector	With P0 connector
2	261.7	39.5	**9912.423**	**9912.410**
3	261.7	59.5	**9912.424**	**9912.411**
4	261.7	80	**9912.425**	**9912.362**
5	261.7	100	**3687.608**	**3687.609**
6	261.7	120.5	**9912.426**	**9912.412**
7	261.7	141	**3687.610**	**3687.611**
8	261.7	161.5	**9912.427**	**9912.413**
9	261.7	181.5	**9904.930**	**9904.932**
10	261.7	202	**9904.931**	**9904.933**
11	261.7	222.5	**9912.428**	**9912.414**

Slots	Dimensions Height mm	Width mm	Model No. RP Without P0 connector	With P0 connector
12	261.7	242.5	**3686.634**	**3686.473**
13	261.7	263	**9912.429**	**9912.415**
14	261.7	283	**9912.430**	**9912.416**
15	261.7	303.5	**9912.431**	**9912.417**
16	261.7	324	**9912.432**	**9912.418**
17	261.7	344	**9912.433**	**9912.419**
18	261.7	364.5	**9912.434**	**9912.420**
19	261.7	385	**9912.435**	**9912.421**
20	261.7	405	**9912.436**	**9912.422**
21	261.7	425.5	**3686.635**	**3686.474**

VME64x 6.5 U

Slots	Dimensions Height mm	Width mm	Model No. RP Without P0 connector	With P0 connector
5	283.7	100	**9910.012**	**9910.007**
7	283.7	141	**9910.013**	**9910.008**
9	283.7	181.5	**9910.014**	**9910.009**

Slots	Dimensions Height mm	Width mm	Model No. RP Without P0 connector	With P0 connector
10	283.7	202	**9904.928**	**9904.929**
12	283.7	242.5	**9910.015**	**9910.010**
21	283.7	425.5	**9910.016**	**9910.011**

Rittal's Electronics Division.

Reliable solutions depend on expertise in every detail, be it standard or customised. As one of the worldwide leading system suppliers, Rittal Electronic Systems caters for all requirements in the field of electronic packaging. For telecommunications, industrial automation, medicine, traffic guidance and security systems.

Rittal Electronic Systems utilises the worldwide Rittal distribution network with more than 150 distribution and logistics centres for a comprehensive service: Immediate availability, and an outstanding maintenance and spare parts service. In addition, the specialists at our centres of excellence provide tailor-made advice, customised to your needs.

Electronics centres of excellence

EUROPE:

1. Eckental/Nuremberg (Germany)
- The headquarters of Rittal Electronic Systems
- Specialising in: Mechatronics, the development and production of prototypes and small series
- Development of electronic packaging systems, preparation for mass production
- State-of-the-art logistics centre for rapid access to our full range of products

2. Ertop in Joigny (France)
- This subsidiary is our mass production centre

ASIA:

3. Shanghai (China)
- Production engineering, production of electronic packaging components
- Complete customised electronic systems are produced in a special integration and assembly centre
- Support and central logistics coordination for the entire Asia-Pacific market

AMERICA:

4. Waterloo/Toronto (Canada)
- Support for customers in the North American market
- Development of customised system solutions
- Mass production of systems, production of backplanes
- Design and layout of backplanes and PCBs

1


2


3


4

Total Benefit of Usership:
Global complete service up to Level 4.

Rather than individual components, there is a growing demand for fully integrated plug & play system solutions. In order to ensure individual, high-quality solutions, Rittal subjects every product to a defined service process. Particularly during the development phase, the result is optimised through continuous contact and exchange.

PROJECT PLANNING

Precise analysis of requirements according to relevant factors such as location, function and technical status – the basis for sound advice.

APPLICATION ENGINEERING

Our application consultants will guide you to the most efficient solution. All key questions relating to the system and components, as well as specific market conditions, are clarified. Simulations for the areas of climate control, mechanics and backplane help to highlight any problem areas and enable their solution.

PROTOTYPING

Once the electronic packaging concept has been agreed, a prototype is prepared. In intensive dialogue with you, the prototype is optimised to your precise requirements.

TESTS/ CHECKS

A comprehensive test and check programme is carried out at our accredited Rittal test laboratory. Mechanical load capacity, dust and humidity protection are exhaustively tested, as are other factors such as extreme climate conditions. Your advisor will notify you immediately of the outcome of all these tests and checks. Any optimisation requirements are defined, implemented and then subjected to retesting.

MASS PRODUCTION

Once a suitably high level of functional reliability has been achieved, serial production can begin. Prior to delivery, every system undergoes the full range of functional and safety checks. The test seal is a guarantee of Rittal quality.

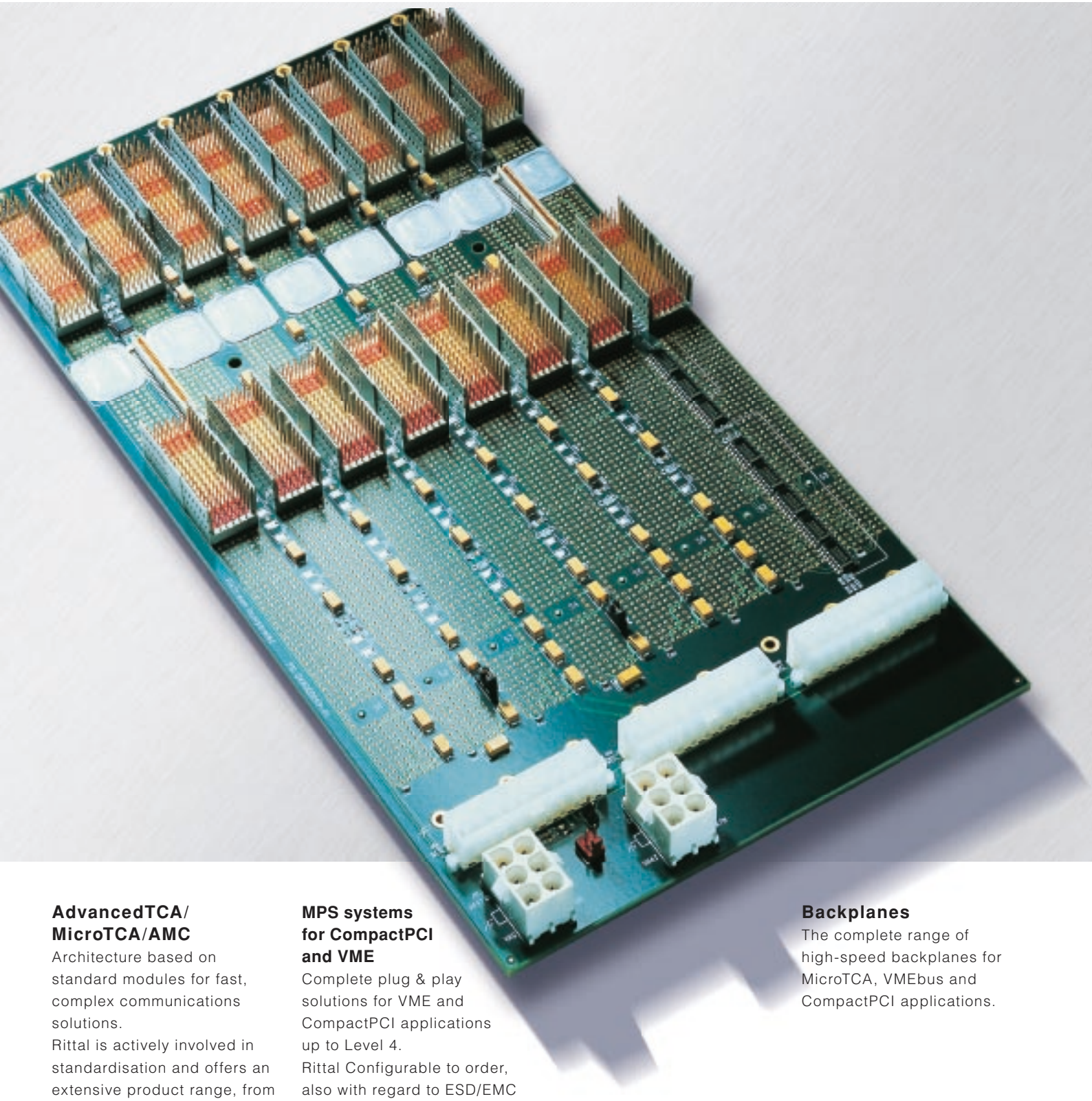
AFTER-SALES SERVICE

We continue to assist you with on-site advice and support. In this way, you can draw on our expertise, and we are happy to answer your questions at any time.

Rittal Electronic Systems integration services:

Level 1: Components (e.g. guide rails, connectors, etc.)
Level 2: Preconfiguration, population (e.g. backplane, subrack etc.)
Level 3: Integration (e.g. MPS systems including backplane, PSU), wiring of various components
Level 4: Level 3 with integral boards, tested
Level 5: Level 4 with I/O and application software, tested (in accordance with customer requirements)

Rittal Electronic Packaging – Top competence direct from the manufacturer, worldwide



AdvancedTCA/ MicroTCA/AMC
Architecture based on standard modules for fast, complex communications solutions.
Rittal is actively involved in standardisation and offers an extensive product range, from backplanes to a complete Shelf range, Shelf Management and Advanced Mezzanine Cards.

MPS systems for CompactPCI and VME
Complete plug & play solutions for VME and CompactPCI applications up to Level 4.
Rittal Configurable to order, also with regard to ESD/EMC protection, climate control and the keying of board-type plug-in units.

Backplanes
The complete range of high-speed backplanes for MicroTCA, VMEbus and CompactPCI applications.

Reliable components provide the basis for optimum configurations. For their production, Rittal Electronic Systems follows a tried-and-trusted principle: Everything from a single source. The products we use in our systems are manufactured by us. To this end, Rittal Electronic Systems also draws on Rittal's extensive expertise which sets standards in innovative manufacturing techniques, as verified by numerous internationally recognised certifications, such as ISO 9001. In this way, Rittal Electronic Systems provides two guarantees for its electronic packaging: A high standard of quality, and modularity. For all applications.

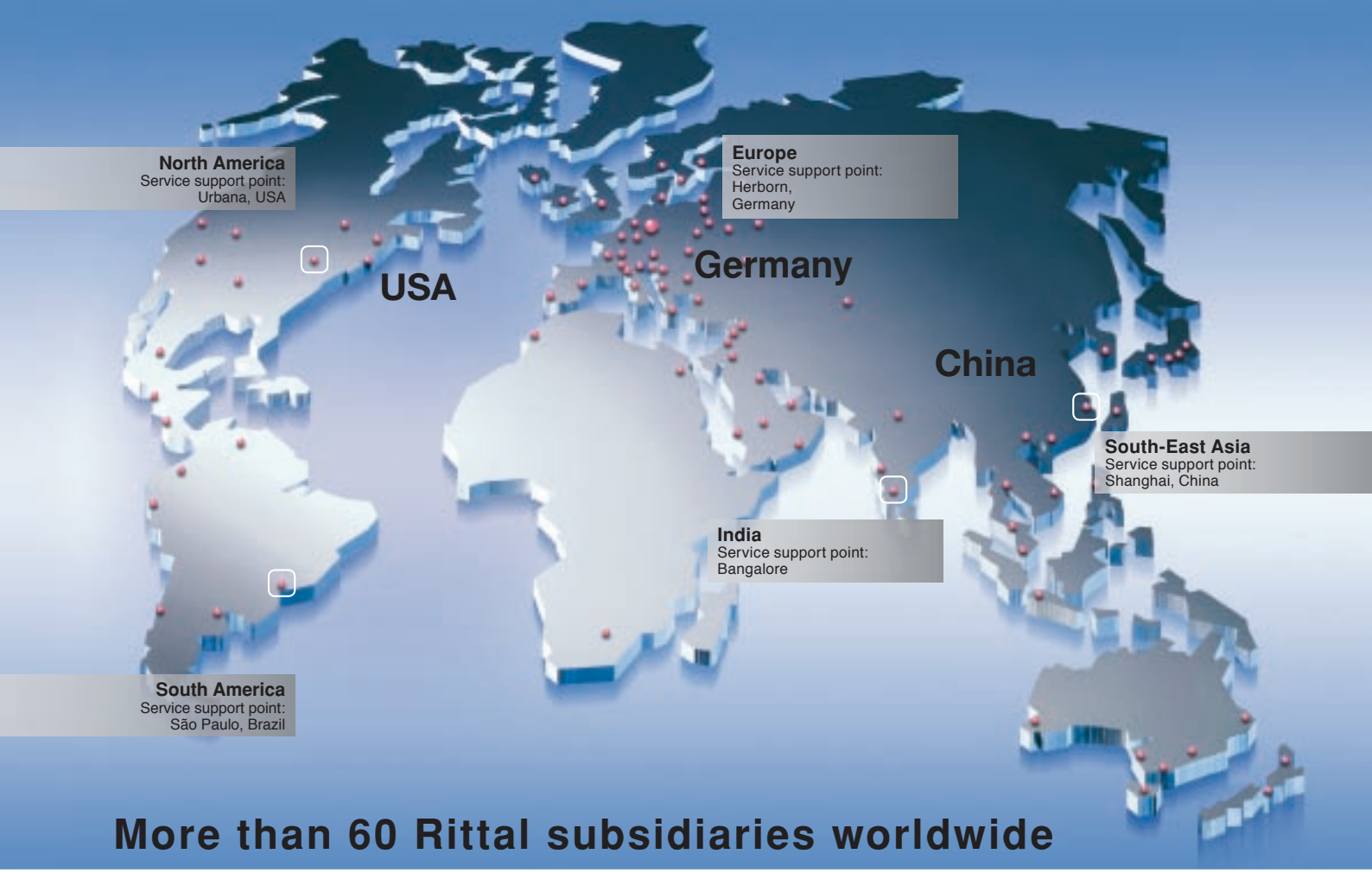
Climate control
Complex climate control solutions protect the sensitive electronics, even with high heat losses. We offer a comprehensive range, from liquid-based board cooling, to system cooling with RiCool blowers, through to system-led enclosure cooling.

Industrial PCs
Robust rack-mounted or desktop enclosure solutions, for AT or ATX applications, EMC-ready. Both self-assembly systems and preconfigured, pre-wired systems are available.

Subrack
Standardised subracks in 6 basic versions, fully fitted and wired on request. Individually configured, EMC-upgradable.

Instrument cases/ system enclosures
Comprehensive range of enclosures for measurement, medical, laboratory and safety technology through to EMC-upgradable enclosure solutions suitable for configuration as microcomputer systems which meet the most discerning requirements in terms of ergonomics and design.

Monitors, keyboards
482.6 mm (19″) TFTs and keyboards for ergonomic operation at the human/machine interface, for installation in cases or racks.



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