Power Supplies, Backplanes / Test Adapters and Microcomputer Packaging Systems

Schroff®

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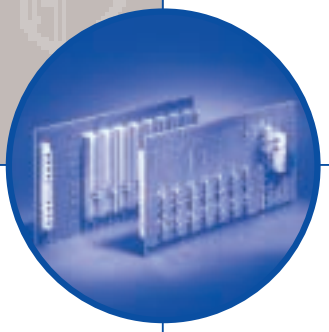

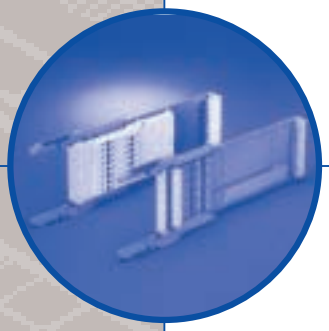

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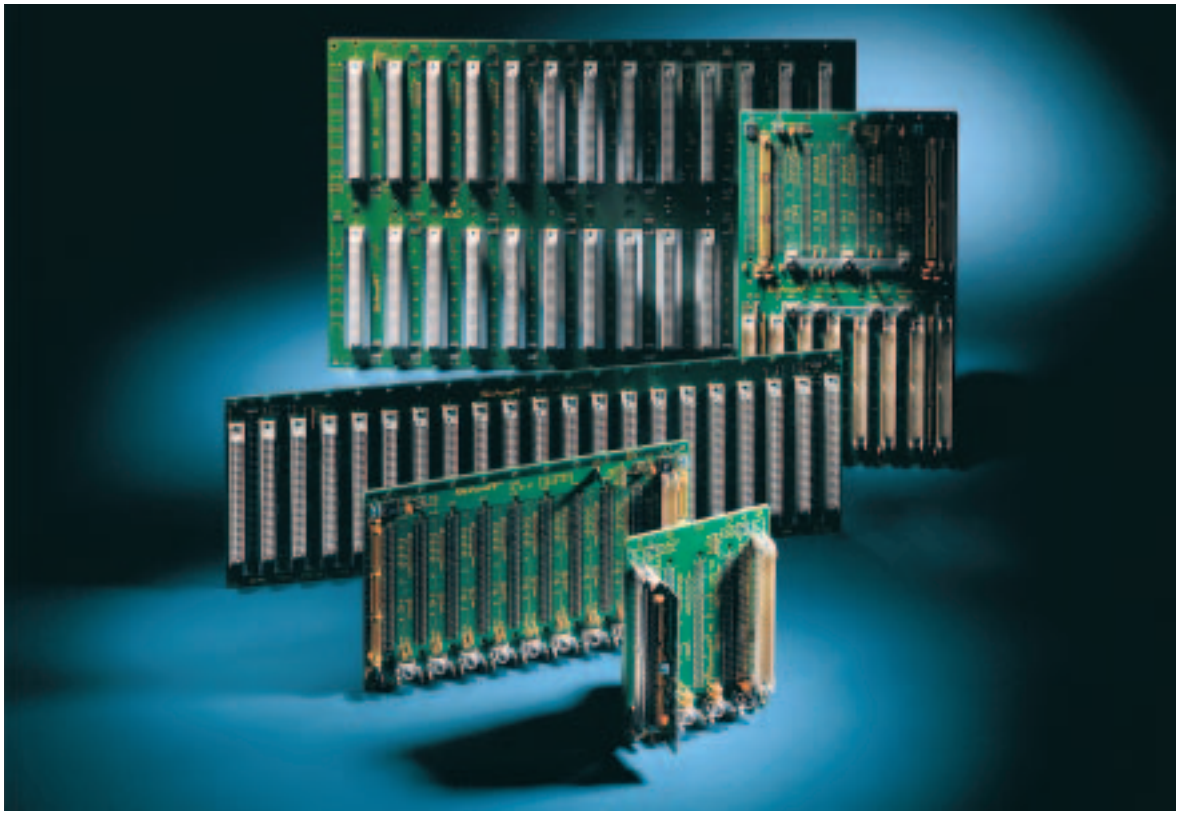
VMEbus backplanes overview



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Application

We supply a comprehensive range of backplanes for the VMEbus.

The range includes J1, J2 and J1/ J2 backplanes.

For the J2 I/O bus, there are supplements such as the VSB and ribbon cable buses.

Electrical

In the design of the multi-layer backplane and component placement, the utmost care has been taken to ensure uniform signal line impedance.

The termination resistors are either **ON-board** (outside the connector field), **IN-board** (inside the connector field) or **OFF-board** (external). The termination can be switched over via jumpers from active to passive.

The daisy chain signals can be routed either manually via jumpers (MDC manual daisy chaining) or automatically via a special switch connector (ADC automatic daisy chaining). For the advantages of ADC, refer to the Appendix "Explanation of backplane terminology".

Screw-type connections are used for the power supply while busbars are used for higher power requirements.

Mechanical design

Assembly holes (in compliance with ANSI/VITA 1-1994 and IEEE 1101) are provided for the purpose of fitting the backplanes to the subrack horizontal rail. The backplanes have through-plated holes with which the PE connection is achieved simply by means of screws.

The ON-board backplane is wider than the IN-/OFF-board back-planes because the termination is outside the connector field. For this reason, the ON-board backplanes only have a maximum of 20 slots compared with IN-/OFF-board backplanes with 21 slots. Due to their narrower design, IN-/OFF-board backplanes can be mounted side by side without the loss of slots.

The backplanes are multi-layer boards with optimized layout and shielded planes. The shielded planes reduce crosstalk between the signal paths and can provide for maximum shielding.

The power is supplied by means of screw-type and FASTON connections.

Standards

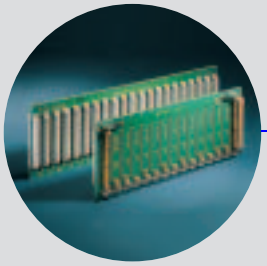
The backplanes comply with the VMEbus specification ANSI/VITA 1-1994. The VME64 Extended complies with the specification ANSI/VITA 1.1-1997.

The specifications are available from Vita (www.vita.com). Schroff has been a member of Vita for many years.

VMEbus backplanes overview

J1 system bus

- 3 U backplane
- Termination in ON-/IN-/OFF-board



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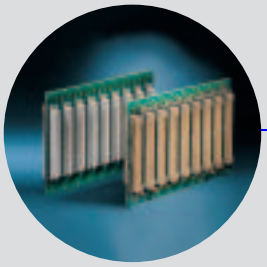
J2 I/O bus

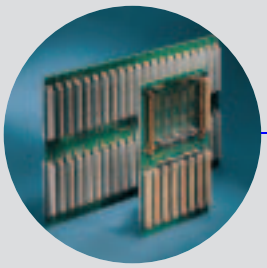
- 3 U backplane
- Expands the J1 system backplane to 32 bits
- Serves as input/output (I/O) bus
- Passive termination



10596010

J1/J2 monolithic

- 6 U backplane with 32-bit data bus width (combination of J1 and J2 planes)
- Termination in IN-/OFF-board
  64-bit data/address bus width
  with MBTL protocol



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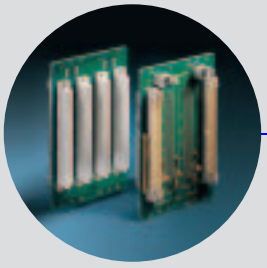
J2 VSB (VME Subsystem Bus)

- 3 U backplane, mountable side by side or pluggable on J2 backplanes
- Expands the J1 system backplane to 32 bits
- Serves as system bus expansion



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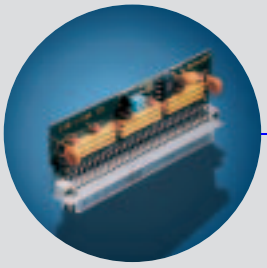
Accessories

- J1 terminator
- Ribbon cable bus
- Busbar
- Threaded pin
- Power jumpers
- Test adapters, see Test adapters for VMEbus



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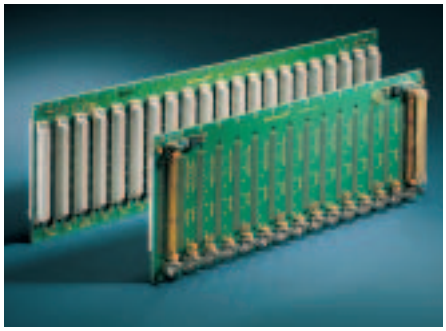
VMEbus backplanes J1 system bus



10596025

J1 system bus

- 3 U backplane with 16-bit data bus width
- Termination:
  Versions in IN-, ON- and OFF-board available
  Can be switched over, ON-/IN-board, active/passive
- Versions with (ADC) and without automatic daisy chaining (MDC) available
- Several IN-/OFF-board backplanes can be mounted next to each other without the loss of slots
- Particular features of IN-board backplane:
  – Through-connected PE mounting holes
  – Better shielding (on the backplane, shielded planes are on the outside, signal lines on the inside)

Delivery comprises

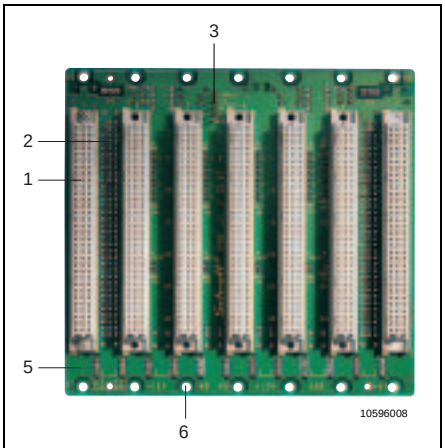
Qty	Description	Material
1	Backplane	Fully equipped
10	Daisy chain jumper	
4	Locking lever	For safe securing of external terminator board on OFF-board

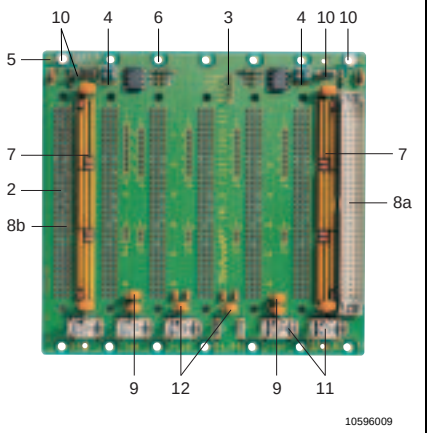
Slot	Width mm	Order No. ON-board [3] ADC [7]	ON-board [3] MDC	IN-board [3] ADC [7]	IN-board [3] MDC	OFF-board ADC	OFF-board MDC [5]	Slot	Width mm
1		–	–	–	–	–	**23000-101**[6]	1[1]	16.3
2		–	–	**23000-062**[4]	–	**23000-102**	**60800-369**[2]	2	38
3	71	**23000-003**	**23000-603**	**23000-063**[4]	–	**23000-103**	–	3	58
4		–	–	**23000-034**	**23000-634**	**23000-104**	–	4	78
5	112	**23000-005**	**23000-605**	**23000-035**	**23000-635**	**23000-105**	**23000-705**	5	98
6	133	–	**23000-606**	**23000-036**	**23000-636**	**23000-136**	**23000-706**	6	118
7	153	**23000-007**	**23000-607**	**23000-037**	**23000-637**	**23000-107**	**23000-707**	7	138
8		–	–	**23000-038**	**23000-638**	**23000-108**	**23000-708**	8	159
9	194	**23000-009**	**23000-609**	**23000-039**	**23000-639**	**23000-109**	**23000-709**	9	179
10	214	**23000-010**	**23000-610**	**23000-040**	**23000-640**	**23000-110**	**23000-710**	10	199
11		–	–	**23000-041**	**23000-641**	**23000-111**	**23000-711**	11	219
12	255	**23000-012**	**23000-612**	**23000-042**	**23000-642**	**23000-112**	**23000-712**	12	240
13		–	–	**23000-043**	**23000-643**	**23000-113**	**23000-713**	13	260
14		–	–	**23000-044**	**23000-644**	**23000-114**	**23000-714**	14	281
15	316	**23000-015**	**23000-615**	**23000-045**	**23000-645**	**23000-115**	**23000-715**	15	301
16	338	**23000-016**	**23000-616**	**23000-046**	**23000-646**	**23000-126**	**23000-726**	16	321
17		–	–	**23000-047**	**23000-647**	**23000-117**	**23000-717**	17	341
18		–	–	**23000-048**	**23000-648**	**23000-118**	**23000-718**	18	362
20	417	**23000-020**	**23000-620**	**23000-050**	**23000-650**	**23000-120**	**23000-720**	20	403
				23000-051	**23000-651**	**23000-121**	**23000-721**	21	423

[1] For power supply
[2] Connecting board for side-by-side mounting
[3] Termination can be switched over between active/passive
[4] Termination passive
[5] Cannot be mounted side by side
[6] 4-layer
[7] 1st slot, MDC connector
ADC = **A**utomatic **D**aisy **C**haining
MDC = **M**anual **D**aisy **C**haining

Note
Further dimensions available on request.

VMEbus backplanes J1 system bus





Technical data:

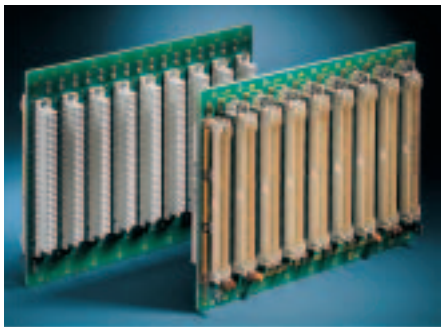
- "High-speed" VME system bus, ON-/IN-board backplanes – particularly suitable for data transmission with fast drivers (ABT, FCT)
- Complying with Specification ANSI/VITA 1-1994
- Uniform impedance of all signal lines
- Optimized layout for minimal crosstalk
- Current distribution via busbars and connections via screw/plug connectors
- Suppression capacitors for conducted interference
- Interference suppression to PE ground also possible with plated-through PE mounting holes
- Safe interference suppression of transient and dynamic currents

Item	Description
1	Connector either with or without switch connector
2	Wire-wrap pins for daisy chain jumper for manual daisy chain (MDC)
3	Utility connector (5 wire-wrap pins, accessible on both sides)
4	Termination changeover between active/passive for ≥ 4 slots
5	Multi-layer backplane
6	Assembly holes
7	Terminators (for ON-, IN-board)
8a	Connector slot 1, prepared for locking lever
b8	On OFF-board, even last slot equipped with connector
9	Suppression capacitors for filtering conducted interference on the power supply lines
10	PE connection (FASTON) and for IN-/OFF-board also through-plated mounting holes
11	Power connections
12	Decoupling capacitors between each slot

		ON-board	IN-board	OFF-board[1)]
Description		VME system bus, 16-bit, J1, 3 U		
Bit rate		20 Mbyte/s		
Base material		Epoxy resin fibreglass EP GC 02 as per DIN 40 802 (FR4), flame-resistant as per UL 94 V-0		
Design		4-layer: signal – V_{cc} – GND – signal	6-layer: GND – signal – GND – V_{cc} – signal – GND	
Characteristic impedance Z / Ohmic resistance R of all signal lines		Z = 60 ± 5 Ω / R <1.5 Ω	Z = 55 ± 5 Ω / R <1.5 Ω	
Termination location		ON-board	IN-board	OFF-board
Termination type		Can be switched over between active/passive	2 – 3 slot, passive, ≥ 4 slot, can be switched over between active/passive	External
Basic current consumption		< 0.5 A (active termination), < 1.5 A (passive termination)		External
Connections	Power supply	FASTON (2.8/6.3 mm × 0.8 mm), screw terminals (M4)		
	PE	FASTON 6.3 × 0.8 mm	FASTON 6.3 × 0.8 mm, through-plated mounting holes	
	ACFAIL	FASTON 6.3 × 0.8 mm	–	
	Utility signals	Wire-wrap pins (GND, + 5 V, ACFAIL*, SYSFAIL*, SYSRESET*)		
	Connectors	C 96, press-in version, quality class 2 (400 plug-in cycles), ADC and MDC; for ADC first and last slot MDC connector, 1st slot cannot be jumpered, MDC cannot be mounted side by side		
Temperature range	Operation	Termination active 0 °C ... 50 °C, termination passive -40 °C ... +85 °C		
	Storage	Termination active -40 °C ... +85 °C, termination passive -40 °C ... +85 °C		
Dimensions	Height	3 U, 130 mm; 2 slot connecting board 100 mm		
	PCB thickness	approx. 3.2 mm		
	Slot pitch	4 HP = 20.32 mm		

[1)] Suitable with limitations for fast drivers, * Low active

VMEbus backplanes J2 I/O bus



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J2 I/O bus

- 3 U backplane
- J2 input/output bus (I/O)
- Expands the J1 system bus to 32-bit data bus width
- Termination ON-/IN-board integrated, passive
- Versions:
  - Type 1 with rear-side connectors for VSB/ribbon cable bus
  - Type 2 for shielded ribbon cable

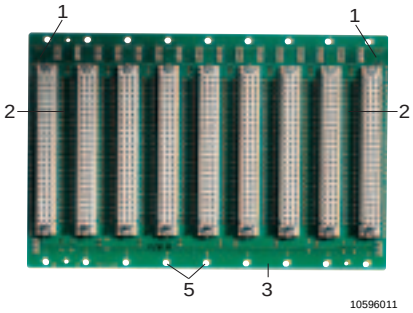
Delivery: Backplane, fully equipped

Slot	Width in mm	Order No.		
		ON-board	IN-board	
		Type 1 2 layers	Type 1 4 layers	Type 2 for shielded I/O ribbon cable 4 layers
1	16	**23000-301** [1]	–	–
2	35	**23000-202**	–	–
3	61	**23000-203**	–	–
4	81	**23000-204**	–	–
5	101	**23000-205**	**23000-265**	**23000-335**
7	142	**23000-207**	–	–
8	162	**23000-208**	–	–
9	182	**23000-209**	**23000-269**	**23000-339**
10	203	**23000-210**	–	–
11	223	**60800-421**	–	–
12	243	**23000-212**	**23000-272**	**23000-342**
13	264	**23000-213**	–	–
14	284	**23000-214**	–	–
16	325	**23000-216**	–	–
17	345	**23000-217**	–	–
20	406	**23000-220**	–	–
21	426	–	**23000-281**	**23000-351**

[1] For power supply

VMEbus backplanes J2 I/O bus

Type 1



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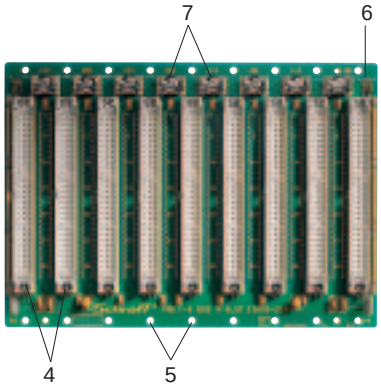

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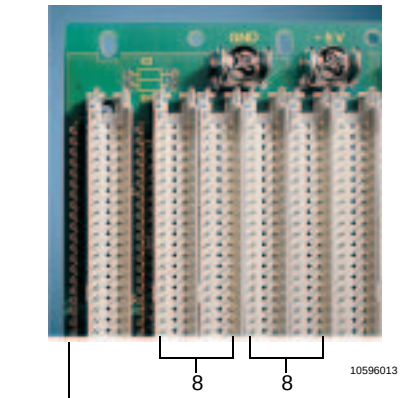
Type 2



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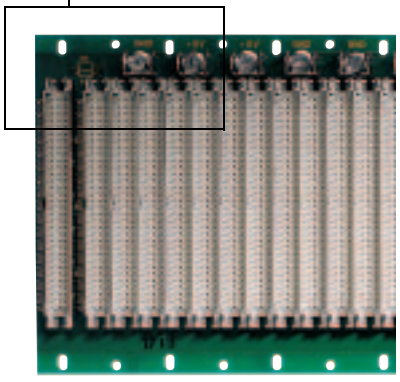


10596012

Technical data:

- "High-speed" VME system bus expansion to 32 bits
- Complying with Specification ANSI/VITA 1-1994
- Uniform impedance of all signal lines
- Termination integrated, passive
- Stable power supply
- I/O, V_{cc} and GND with wire-wrap pins

Type I

Long pins equipped with connector bodies on rear side, thus use of system bus expansion VSB or I/O ribbon cable is possible.

Type II

Except for slot 1, two connectors per slot, on rear side pin row b shortened, GND-a and c-GND, for use of shielded ribbon cables.

Item	Description
1	Terminators for Reserved or Retry ("b3")
2	Terminators (row "b")
3	Multi-layer backplane, 2-/4-layer
4	Connector prepared for locking lever
5	Assembly holes
6	PE connection
7	Power connections
8	GND pins (row "a" on left, row "c" on right) for shielded ribbon cable bus

Description		I/O bus J2 with system bus expansion to 32 bits
Bit rate		40 Mbyte/s (J1 + J2); 80 Mbyte/s (MBLT)
Base material		Epoxy resin fibreglass EP GC 02 as per DIN 40 802 (FR 4); flame-resistant as per UL 94 V-0
Design		Through-plated on both sides or 4-layer
Characteristic impedance Z of all signal lines		75 ± 7.5 Ω (2-layer version); 55 ± 5 Ω (4-layer version)
Ohmic impedance R of all signal lines		≤ 1 Ω/slot
Termination location		ON-board/IN-board
Termination type		passive
Basic current consumption		0.3 A
Connections	Power supply	FASTON (2.8/6.3 mm × 0.8 mm); screw terminals (M 4)
	Connectors	C 96, press-in version, quality class 2 (400 plug-in cycles), for type 2 double number
Temperature range	Operation	- 40 °C ... 85 °C
	Storage	- 40 °C ... 85 °C
Dimensions	Height	3 U, 130 mm
	PCB thickness	approx. 3.2 mm
	Number of slots	1 to 21
	Width:	= number of slots × 20.32 mm – 2.23 mm
	Slot	Pitch between 2 connectors = 4 HP = 20.32 mm

VMEbus backplanes J1/J2 monolithic

10595005

J1/J2 monolithic

- 6 U backplane with 32-bit data bus width (combination of J1 and J2 levels)
- Termination:
  Versions in IN- and ON-board available
  Can be switched over between active/passive
- Versions with and without automatic daisy chaining available
- Several backplanes can be mounted next to each other without the loss of slots

Delivery comprises

Qty	Description	Comments
1	Backplane	Fully equipped
10	Daisy chain jumper	
4	Locking lever	Also for safe securing of external terminator board on OFF-board

Slot	Width in mm	Order No.		
		IN-board		OFF-board
		ADC[1)]	MDC	ADC
3	57	**23000-463**	–	**23000-503**
4	77	**23000-464**	**23000-864**	**23000-504**
5	98	**23000-465**	**23000-865**	**23000-505**
6	118	**23000-466**	**23000-866**	**23000-506**
7	138	**23000-467**	**23000-867**	**23000-507**
8	159	**23000-468**	**23000-868**	**23000-508**
9	179	**23000-469**	**23000-869**	**23000-509**
10	199	**23000-470**	**23000-870**	**23000-510**
12	240	**23000-472**	**23000-872**	**23000-512**
13	260	**23000-473**	**23000-873**	**23000-513**
14	280	**23000-474**	**23000-874**	**23000-514**
15	301	**23000-475**	**23000-875**	**23000-515**
16	321	**23000-476**	**23000-876**	**23000-516**
20	403	**23000-480**	**23000-880**	**23000-520**
21	423	**23000-481**	**23000-881**	**23000-521**

[1)] 1st slot, MDC connector

ADC = **A**utomatic **D**aisy **C**haining

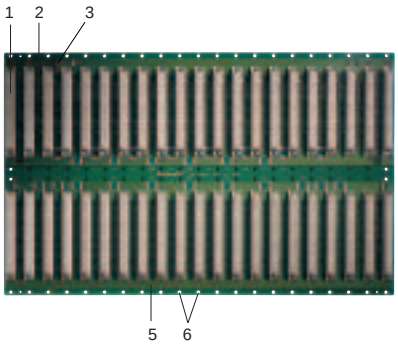
MDC = **M**anual **D**aisy **C**haining

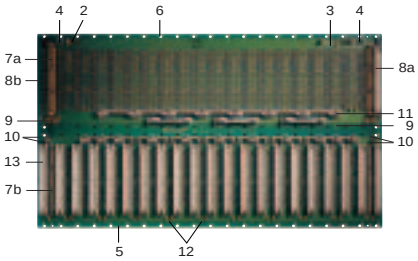
Note

Further dimensions available on request.

VMEbus backplanes J1/J2 monolithic

Example: IN-board





Technical data:

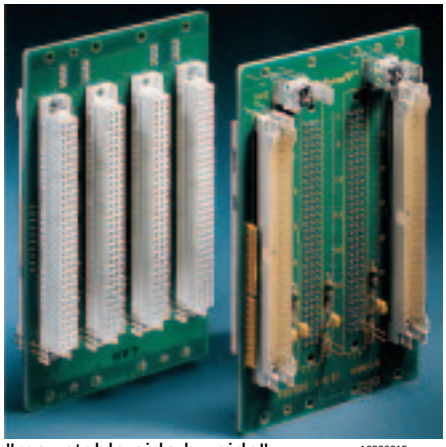
- "High-speed" VME system bus, particularly suitable for data transmission with fast drivers (ABT, FCT)
- Complying with specification ANSI/VITA 1-1994 and VME64
- Uniform impedance of all signal lines
- Optimized layout for minimal crosstalk
- Current distribution via busbars and connections via screw/plug connectors
- Suppression capacitors for conducted interference
- Interference suppression to PE ground also possible
- Safe interference suppression of transient and dynamic currents

Item	Description
1	Connector either with or without switch connector
2	Wire-wrap pins for daisy chain jumper for manual daisy chain (MDC)
3	Utility connector – (5 wire-wrap pins, accessible on both sides)
4	Termination changeover between active/passive (for IN-board)
5	Multi-layer backplane
6	Assembly holes
7a	Terminators (J1 for IN-board)
b7	Terminators (J2)
8a	Connector J1/slot 1, prepared for locking lever
b8	For OFF-board only: Connector J1, last slot, prepared for locking lever
9	Suppression capacitors for filtering conducted interference on the power supply lines
10	PE connection (FASTON 6.3 × 0.8 mm)
11	Power connections
12	Decoupling capacitors between each slot
13	Connector J2, connector body prepared for locking lever, row b partially equipped, voltage supply pins fitted

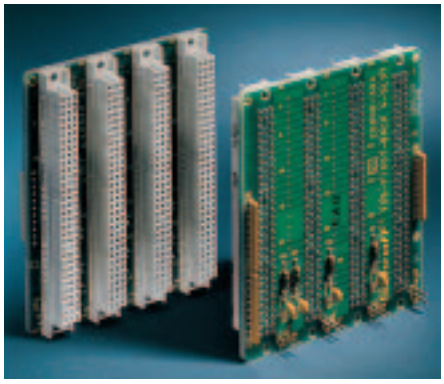
		IN-board	OFF-board[1)]
Description		6 U monolithic VME system bus, 32-bit, J1 + J2	
Bit rate		80 Mbyte/s with MBLT protocol	
Base material		Epoxy resin fibreglass EP GC 02 as per DIN 40 802 (FR 4); flame-resistant as per UL 94 V-0	
Design		6-layer multi-layer: signal – signal/V_{cc} – V_{cc} – GND – GND/signal – signal	
Characteristic impedance Z / Ohmic resistance R of all signal lines		Z = 55 ± 5 Ω / R ≤ 1.5 Ω	R ≤ 1.5 Ω
Termination location		IN-board	OFF-board[1)]
Termination type	J1	Can be switched over between active/ passive	External
	J2	passive	
Basic current consumption (termination)	J1	< 0.5 A (active)	External
	J1	< 1.5 A (passive)	
	J2	< 0.3 A (passive)	
Connections	Power supply	FASTON (2.8/6.3 mm × 0.8 mm); screw terminals (M 4)	
	Power supply	via special busbars e.g. at 5 V, max. 9 A per slot	
	PE	FASTON 6.3 × 0.8 mm	
	Utility signals	Wire-wrap pins (GND, +5 V, ACFAIL*, SYSFAIL*, SYSRESET*)	
	Connector	C 96, press-in version, quality class 2 (400 plug-in cycles)	
Temperature range	Operation	Termination active 0 °C ... 50 °C, Termination passive - 40 °C ... 85 °C	
	Storage	Termination active - 40 °C ... 85 °C, Termination passive - 40 °C ... 85 °C	
Dimensions	Height	6 U, 263.3 mm	
	PCB thickness	approx. 3.2 mm	
	Number of slots	3 to 21	
	Width:	= number of slots × 20.32 mm – 4.013 mm	
	Slot	Pitch between 2 connectors = 4 HP = 20.32 mm	

[1)] Termination with external J1 termination board, see J1 terminator, further boards can be mounted side by side, suitable with limitations for fast drivers

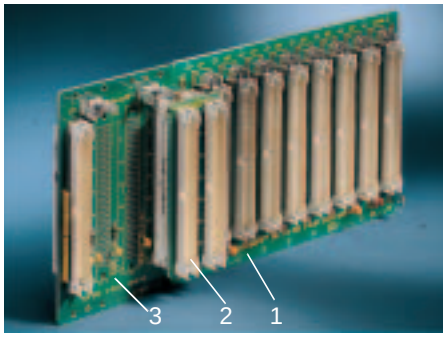
* Low active



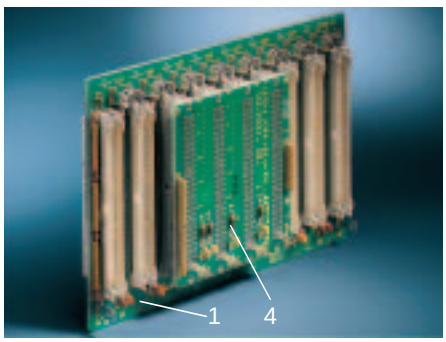
"mountable side by side" 10596015



"pluggable" 10596016



Example:
VSB butt-mounted
to J2 backplane 10596017



Example:
VSB plugged
to J2 backplane 10596018

J2 VSBbus

- 3 U backplane
- J2 VSBbus (**V**ME **S**ubsystem **B**us)
- Expands the J1 system bus to 32-bit data bus width
- Enables high-speed data interchange between the boards
- Termination ON-board, passive
- Versions:
  Mountable side by side to J2 I/O backplanes
  Pluggable on J2 I/O backplanes

Particular features:

"mountable side by side"

- Daisy chain jumper pluggable on connector side and on rear side
- Screw/plug connections for power supply
- Integrated termination

"pluggable"

- Daisy chain jumper pluggable on rear side
- Pin row "b" only with connector contacts for power supply:
  b1, b13, b32, (+5 V) and b2, b12, b22, b31 (GND) equipped
- Integrated termination

Example: VSB mountable side by side, pluggable

Item	Description	
1	J2 (I/O bus) backplane	10 slots
2	J2, connecting board	2 slots
3	J2, VSB, mountable side by side	4 Slot
4	J2, VSB, pluggable	6 slots

Delivery comprises

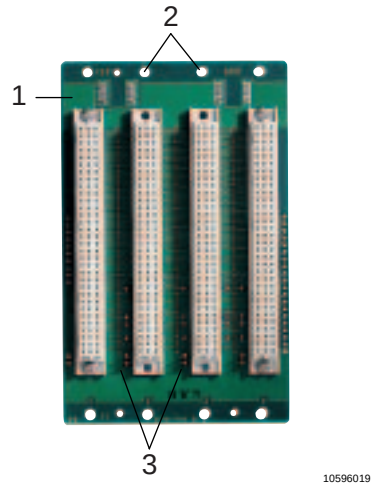
Qty	Description	Comments
1	Backplane	Fully equipped
10	Daisy chain jumper	

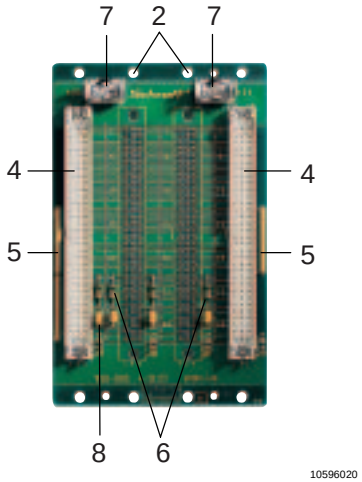
Slot	ON-board termination			
	"mountable side by side"		"pluggable"	
	Dimensions H × W × 3.2 mm mm	Order No.	Dimensions H × W × 3.2 mm mm	Order No.
2	100 × 35	**60800-436**[1)]	95 × 39	**20800-332**
3	–	**–**	95 × 60	**20800-333**
4	130 × 81	**60800-478**	95 × 80	**20800-334**
6	–	**–**	95 × 121	**20800-336**

[1)] Connecting board for side-by-side mounting

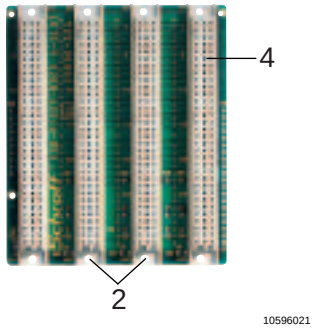
VMEbus backplanes J2 VSB

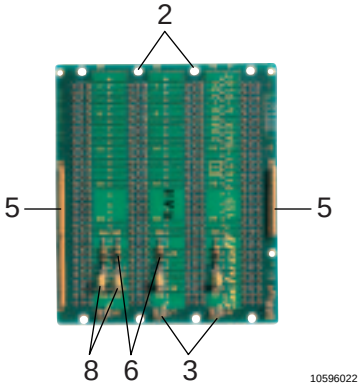
"mountable side by side"





"pluggable"





Technical data:

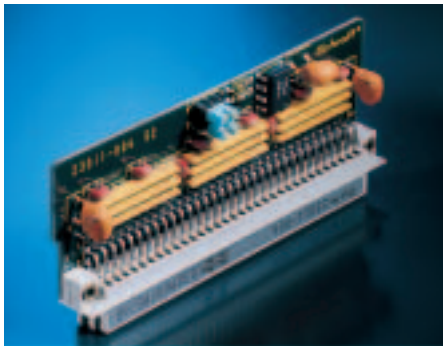
VSB backplanes comply with the VSB Specification Version C (mountable version B). The VME sub system bus (VSB) enables high-speed data interchange between the boards – without loading the system bus. The R/C combinations required for geographical addressing of the slots are already located on the backplanes.

- VSB with system-bus-independent, multiplexed address/data bus AD 32
- Uniform impedance of all signal lines
- Safe decoupling of all bus lines
- Stable power supply
- Termination, passive, integrated on the backplane
- 2 versions: mountable side by side with I/O backplanes and VSB or pluggable on I/O backplanes

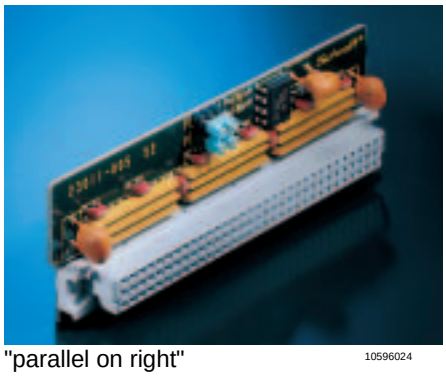
Item	Description
1	Multi-layer backplane, 4-layer
2	Assembly holes
3	Daisy chain jumper for BG IN-BG OUT
4	Connector prepared for locking lever
5	Terminators
6	Terminators for Reserved ("b3")
7	Power connections for power supply
8	Decoupling capacitors

Description		VSB backplane J2 with system bus expansion to 32 bits	
Version		Mountable side by side to J2	Pluggable on J2
Base material		Epoxy resin fibreglass EP GC 02 as per DIN 40 802 (FR 4); flame-resistant as per UL 94 V-0	
Design		4-layer multi-layer: signal – V_{cc} – GND – signal	
Characteristic impedance Z of all signal lines		60 ± 5 Ω	
Ohmic impedance R of all signal lines		≤ 1 Ω	
Termination location		ON-board	
Termination type		passive	
Basic current consumption		< 0.15 A	
Connections	Power supply	FASTON (2.8/ 6.3 mm × 0.8 mm), screw terminals (M4)	via I/O bus backplane
	Connectors	C 96, press-in version, quality class 2 (400 plug-in cycles)	
Temperature range	Operation	- 40 °C ... 85 °C	
	Storage	- 40 °C ... 85 °C	
Dimensions	Height	3 U, 130 mm, 2 slots 100 mm	95 mm
	PCB thickness	approx. 3.2 mm	
	Number of slots	2 to 4	2 to 6
	Width:	= number of slots × 20.32 mm – 0.23 mm	
	Slot	Pitch between 2 connectors = 4 HP = 20.32 mm	

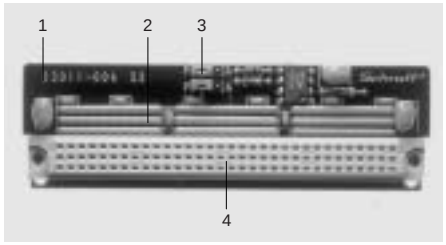
VMEbus backplane accessories



"at right angles" 10596023



"parallel on right" 10596024



10596026

J1 terminator

- For termination of OFF-board backplanes
- Termination can be switched over between active/passive
- Different mechanical versions (at right angles/parallel to backplane)
  - at right angles: 2 terminators required
  - parallel: One terminator required in each case on left and right

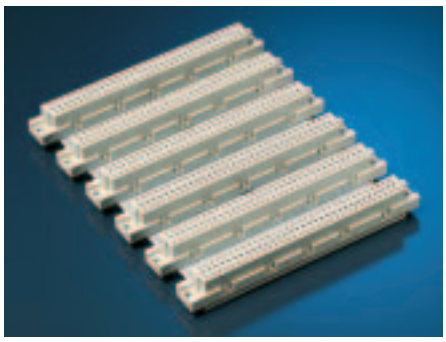
Item	Description
1	Backplane, 4-layer
2	Terminators
3	Termination changeover between active/passive
4	Connector C 96 / R 96

Technical data

Termination		can be switched over between active/passive
Basic current consumption		active: < 0.5 A passive: < 1.5 A
Temperature range	Operation	active: 0 °C ... + 50 °C passive: - 40 °C ... + 85 °C
	Storage	- 40 °C ... + 85 °C
Mechanical version, dimensions	at right angles	A = 38 mm, B = 10 mm, C = 98 mm
	parallel on left	A = 30 mm, B = 13 mm, C = 98 mm
	parallel on right	

Delivery: Terminator board, fully equipped

Qty	Description	Comments	Order No.
1	J1 terminator	at right angles to backplane	**23011-004**
		parallel to backplane on left	**23011-005**
		parallel to backplane on right	**23011-006**



05592007

Ribbon cable bus

- Fitted with 64-pin connectors of type C
  - Connection of the two outer rows a + c on the I/O backplane
- Application: In expanded VMEbus systems for data interchange, independent of the VME system bus
  - Plug on of the VMX ribbon cable bus on the wire-wrap connections of the I/O connector

Qty	Description	Slot (4 HP/20.32 mm per slot)	Dimensions mm	Order No.
1	Ribbon cable bus, row "a" and "c", C 64 as per DIN 41612	2	20.3 × 94	**20800-239**
		3	40.6 × 94	**20800-241**
		4	61,0 × 94	**20800-240**
		5	81,3 × 94	**20800-280**
		6	101.6 × 94	**20800-218**

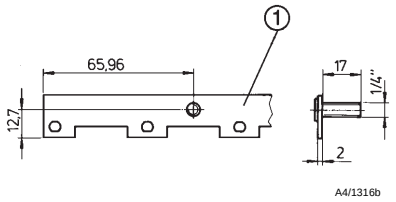


Table of dimensions

Length mm	Order No.
173	**20800-309**
254	**20800-311**
295	**20800-307**
335	**20800-308**
386	**20800-387**

Busbar

- Busbar with threaded studs for monolithic backplanes
- For a higher power supply, the busbar with threaded studs is replaced by the standard busbars fitted on the monolithic VMEbus backplanes
- The two threaded studs enable further cables with ring tags to be connected
  Two versions:
  – + 5 V
  – Ground (GND)

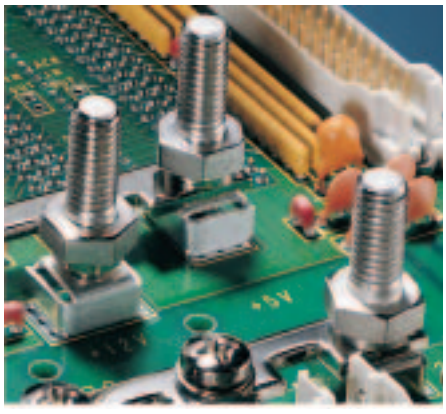
Delivery comprises

Item	Qty	Description	Material
1	1	Busbar with 2 threaded studs $^1/_4$"	Brass, nickel-plated, 2 mm thick, dependent on slot number
2	2	Washer	Steel, ∅ 7.4 mm DIN 125
3	2	Nut (hexagon)	Steel, $^1/_4$" – 20
4		Screw M4 × 8 with strain washer	

Delivery: In kit form

Slot	Order No. IN-board + 5 V	Order No. IN-board GND	Order No. OFF-board + 5 V	Order No. OFF-board GND	Slot[1)]
12	**20800-309**	–	–	–	12
13			**20800-309**	–	13
14					14
15					15
16	**20800-311**	–	**20800-311**	–	16
17					17
18					18
19					19
20	**20800-308**	**20800-387**	**20800-308**	**20800-387**	20
21	**20800-307**		**20800-307**		21

[1)] 1 slot = pitch = 4 HP = 20.32 mm



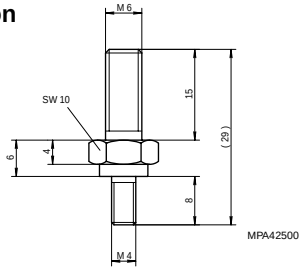
12296001

Threaded stud

For connecting supply lines of larger cable cross-section.
For replacing with the M 4 screws fitted as standard on the backplanes.

Qty	Description	Material	Order No.
1	Threaded stud	St, nickel-plated	**60800-553**

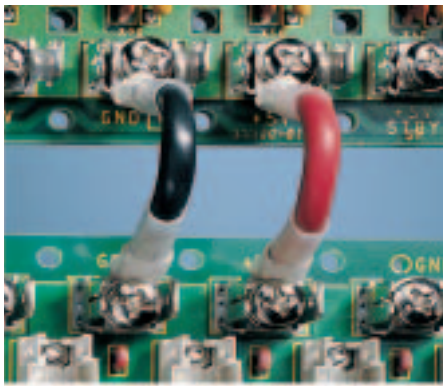
Dimension



Power jumpers

Serve to electrically connect VMEbus J1 to J2 backplane.

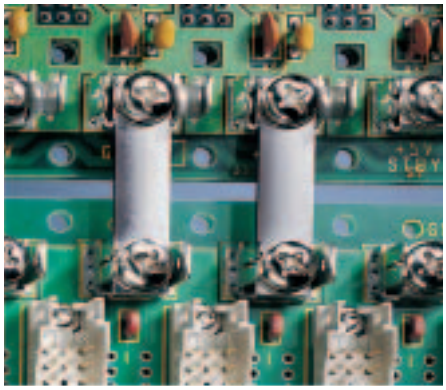
- Cable with screw connections at both ends
- Metal bracket for M4 screw connections (with same number of slots)



12296002

Cable

Qty	Description	Length mm	Order No.
2	Cable with screw connections at both ends (M4)	50	**20835-326**
		100	
		150	



12296003

Metal bracket

With matching number of slots for J1 and J2

Qty	Description	Order No.
10	Metal bracket for M 4 screw connections	**20800-232**