

IBS VME xH CB/I-T



Data Sheet

INTERBUS

Controller Board for VMEbus Systems

Data Sheet Revision A

08/1996

Product Description

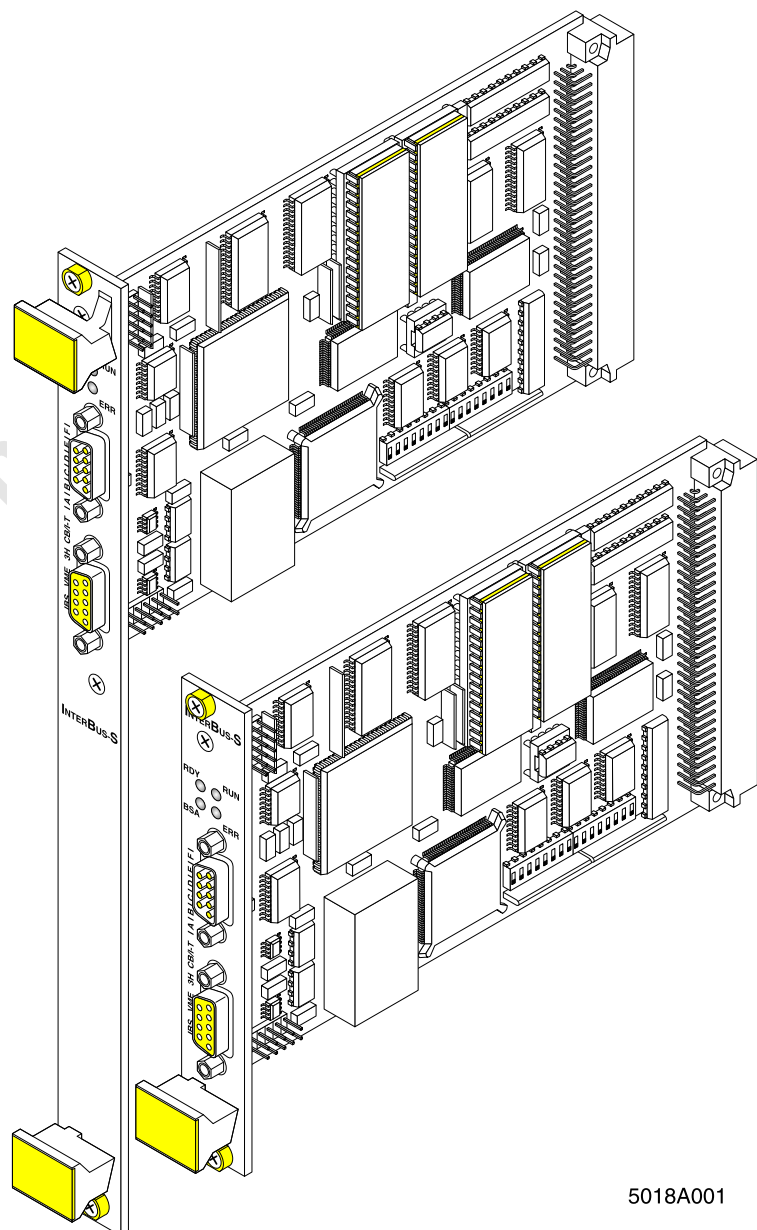
INTERBUS controller boards for VMEbus systems with two different front plates for 3U or 6U rack mounting.

Features

- INTERBUS protocol (DIN E 19258)
- 2-wire remote bus connection
- Serial diagnostic interface
- Networking of up to 4096 sensors and actuators
- Up to 512 INTERBUS devices
- Up to 256 remote bus devices
- Up to 64 PCP devices
- Logical addressing
- Group shutdown
- System diagnostics via user program
- LEDs on the front plate for basic diagnostics
- Electrical isolation between VMEbus system and remote bus connection

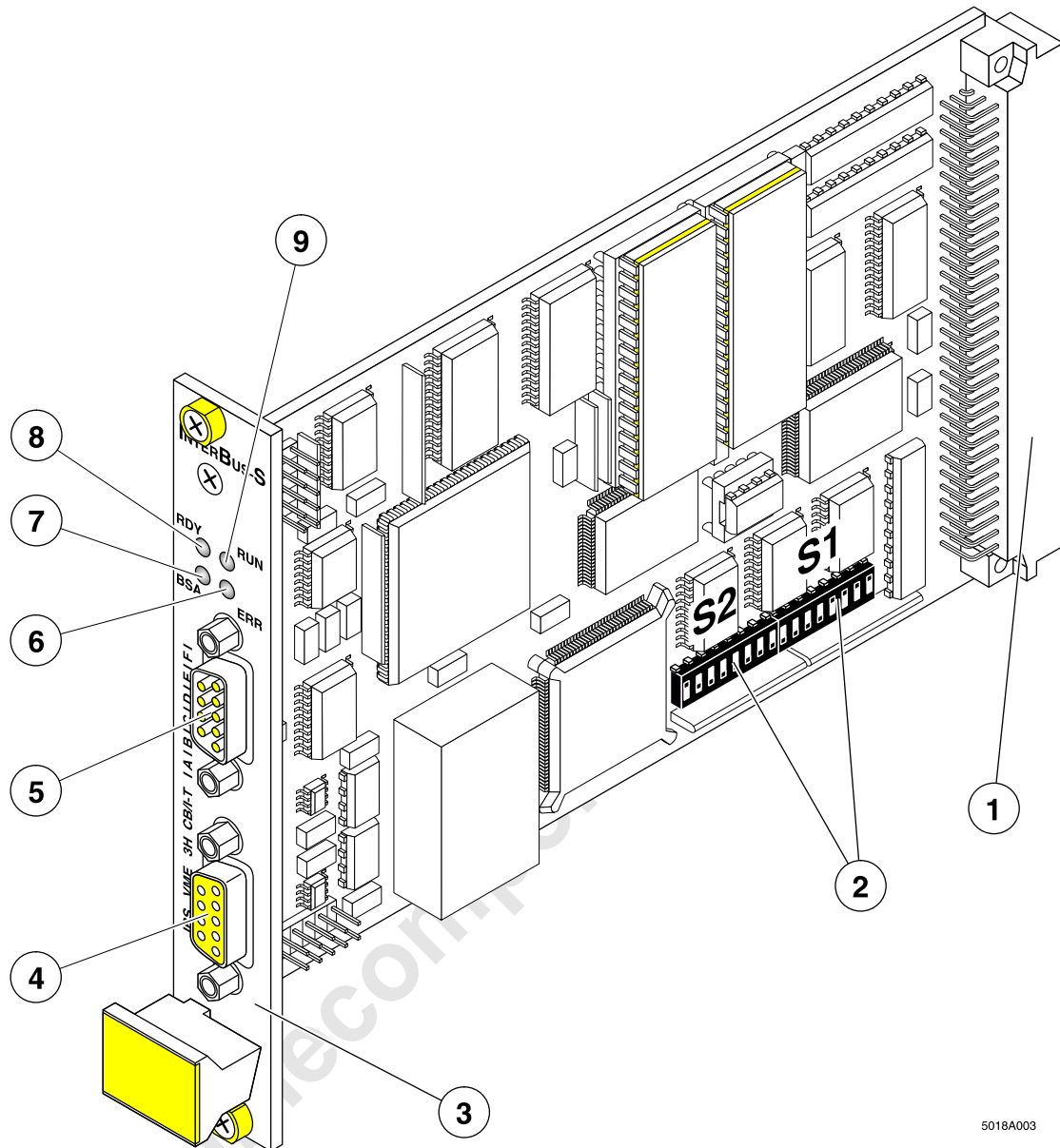
Applications

- Adapting INTERBUS to VMEbus systems



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Figure 1: IBS VME 6H CB/I-T and IBS VME 3H CB/I-T



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Figure 2: Design of IBS VME ..H CB/I-T controller board

The controller board has the following components:

- 1 VMEbus interface (P1 connector)
- 2 DIP switch
- 3 Front plate
- 4 INTERBUS remote bus interface (9-pos. D-SUB female connector)
- 5 Diagnostic interface (9-pos. D-SUB male connector)
- 6 *ERR* LED (red, error occurred)
- 7 *BSA* LED (yellow, bus segment disabled)
- 8 *RDY* LED (green, controller board ready)
- 9 *RUN* LED (green, INTERBUS data transmission active)

Function Units of the Controller Board

VMEbus Interface

The VMEbus interface of the controller board has been implemented with a 24-bit wide address bus and a 16-bit wide data bus. It has address and data lines as well as further control lines. Interrupt operation is possible.

The controller board is supplied with power via the P1 connector from the 5 V system voltage of the VMEbus system.

Watchdog

The controller board consists of an integrated watchdog circuit that monitors the functioning of the microprocessor (Motorola 68332). When the watchdog responds, a reset of the controller board is initiated. When the controller board starts again, it recognizes that a reset has been initiated by the watchdog before. The function of the watchdog cannot be controlled by the user.

Voltage Monitoring, Reset System

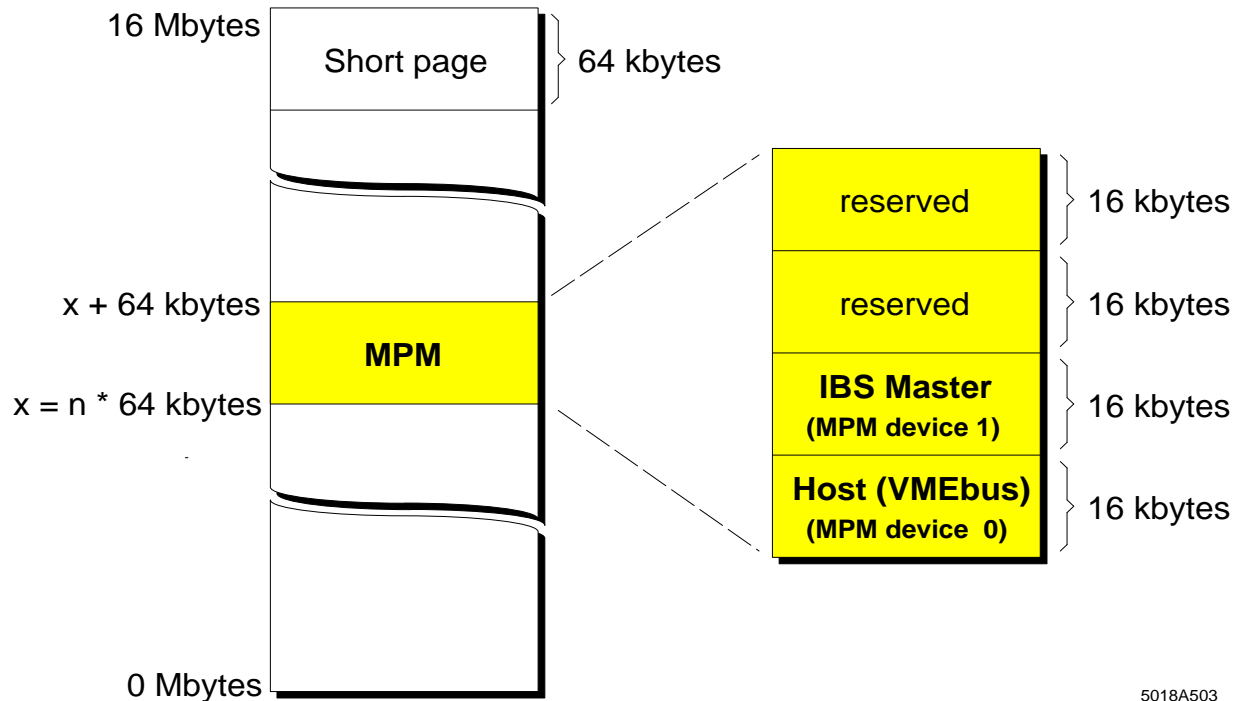
The reliable functioning of the controller board requires a sufficiently high operating supply voltage (5V) via the VMEbus. If the voltage falls below a minimum value, an integrated voltage monitoring circuitry initiates a reset of the controller board. Thus, the outputs of all INTERBUS devices are reset.

A reset of the controller board is activated under the following conditions:

- Response of the voltage monitoring circuitry
- Reset signal on the VMEbus
- Response of the watchdog

Multi-Port Memory

The 64 kbyte Multi-Port Memory (MPM) transfers data between the VMEbus system and the controller board.



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Figure 3: Location of the MPM in the 16 Mbyte address area

The 64 kbyte MPM is divided into four device areas of 16 kbytes each. Two device areas are assigned to the MPM devices Host (VMEbus CPU) and INTERBUS Master. The other two device areas are reserved.

The MPM consists of:

- the mailbox interface for exchanging commands and messages
- the data interface for exchanging process data
- several registers for exchanging status and handshake information

Diagnostic Register

The MPM has two diagnostic registers that indicate error states of the bus system:

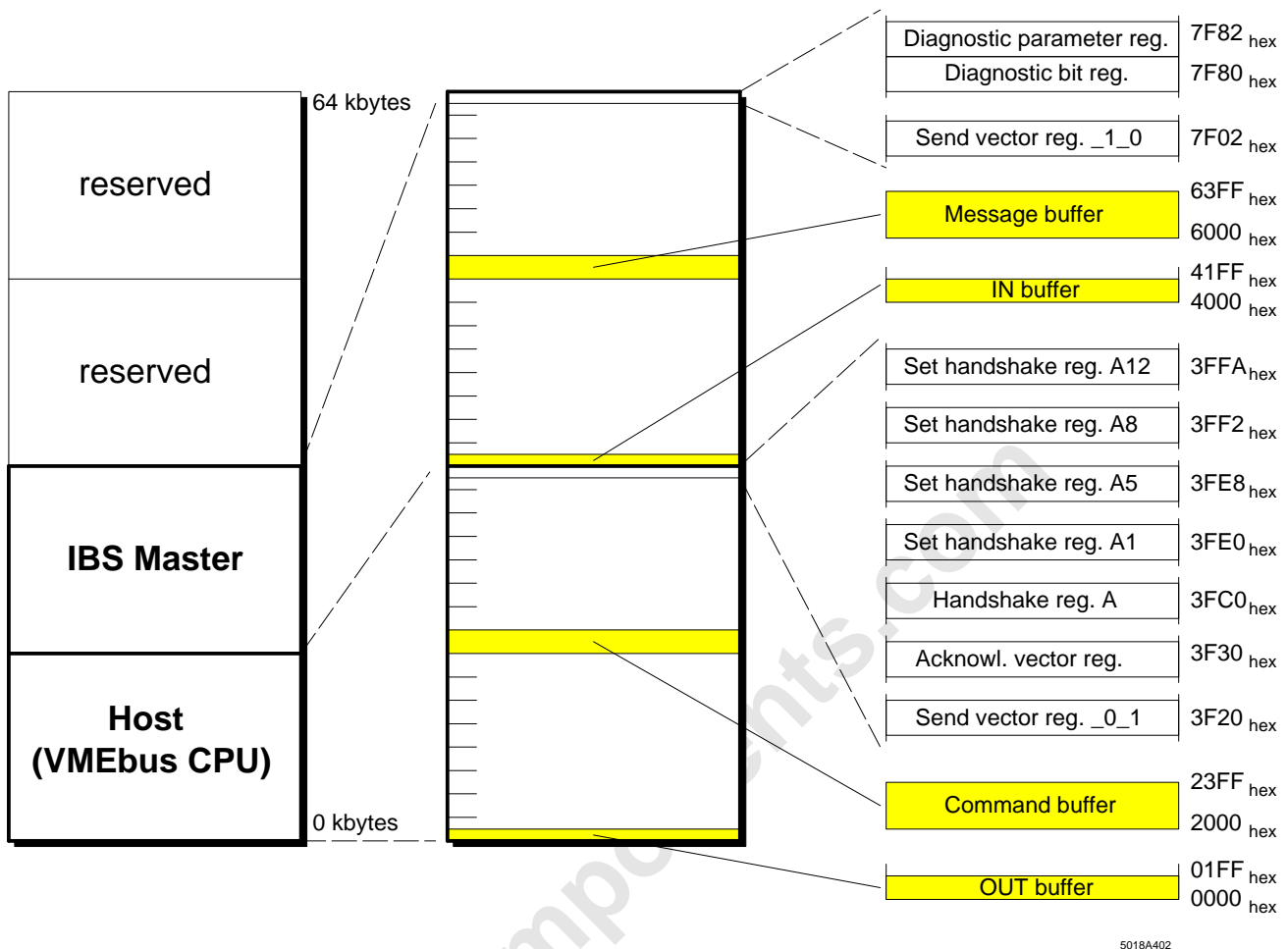
Diagnostic bit register (MPM offset address 7F80_{hex}):

Bit 0: Module error	Bit 4: Bus segment disabled (BSA)
Bit 1: Local bus error	Bit 5: INTERBUS data transmission active
Bit 2: Remote bus error	Bit 6: Host system stopped
Bit 3: Hardware error	Bit 7: Controller board is ready for operation

Diagnostic parameter register (MPM offset address 7F82_{hex}):

If the diagnostic bit register indicates an error, the diagnostic parameter register gives further information (e.g. the number of a bus segment with an error).

If errors occur, the INTERBUS system generates error messages that are available in the message buffer of the MPM. Thus, a more detailed diagnostic of the INTERBUS system can be performed by the user program.



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Figure 4: Areas and registers in the Multi-Port Memory

Register in the Short Page

The controller board uses two registers in the short page of the VMEbus system:

- The status/control register is used to set the base address of the 64 kbyte DPM, the access mode to the MPM (supervisor/user) and the interrupt level of the controller board. Furthermore this register contains additional bit information on the controller board status.
- The interrupt vector register contains the number of the interrupt vector which determines the jump address of the respective interrupt service routine.



The registers can be accessed with a byte-, word- or read-modify-write access. Long word access is not supported by the controller board.

The base address of these registers in the short page is set via DIP switches S1 and S2.

DIP switch S2 sets also the access right for the VMEbus CPU to the short page registers of the controller board.

The base address of the registers in the short page consists of the short page base address in the VMEbus address area as well as the address of the registers within the short page. The base address

of the short page is at $FFFF0000_{hex}$ (VMEbus specification). Thus, the short page uses 64 kbytes at the end of the 4 Gbyte VMEbus address area. Within these 64 kbytes the short page registers of the controller board can be shifted each two words. The address lines A2 to A15 are coded via DIP switches S1 and S2.

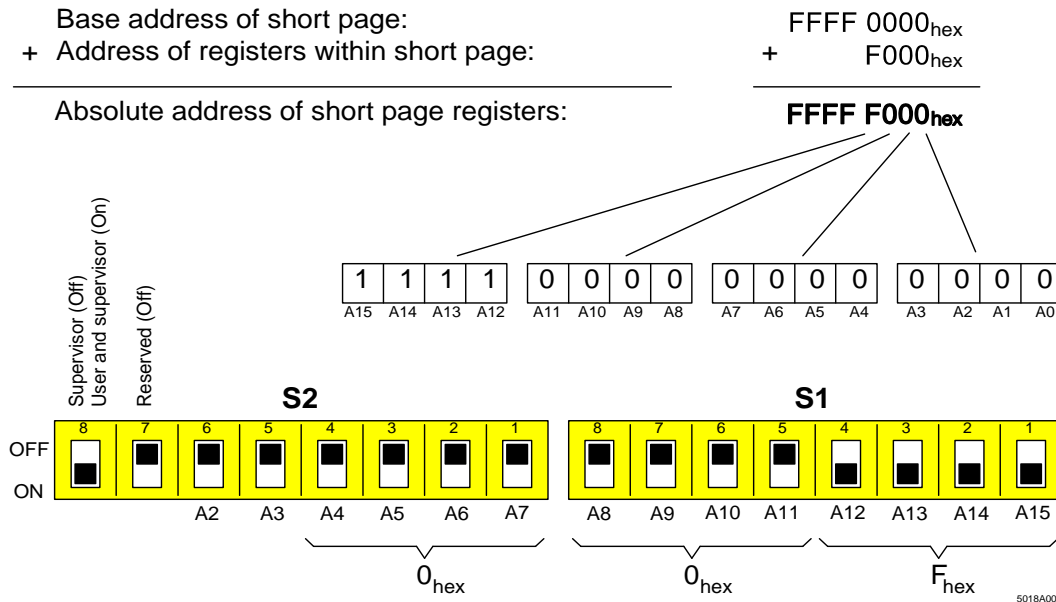


Figure 5: Example for setting a base address of the short page registers

Switch S2.8 is used to set the access mode to the controller board which is either *supervisor* access mode or *user and supervisor* access mode.

S2.8 = ON User and supervisor
S2.8 = Off Supervisor

Switch S2.7 is reserved and must always be in the OFF position.

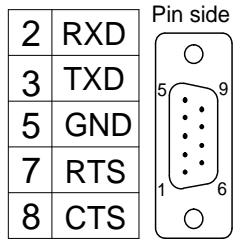
Interfaces

Diagnostic Interfaces (serial)

An IBM-compatible PC with the IBS SYS SWT or IBS CMD SWT software can be connected as a diagnostic device to the controller board via its diagnostic interface (RS232). The diagnostic interface on the front plate of the controller board is a 9-pos. SUB-D male connector.

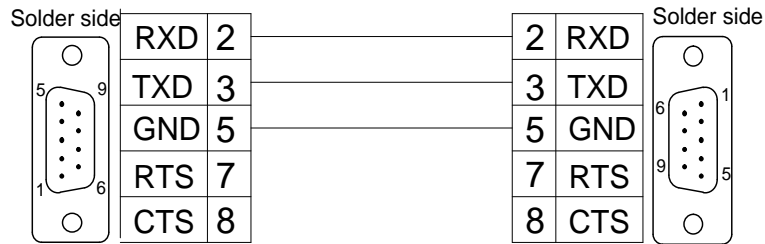
The IBM-compatible PC is connected to the diagnostic interface via the diagnostic cable *IBS PRG CAB* (Order no. 28 06 86 2) which is illustrated in the following figure.

Front plate



SUB-D 9-pos.
male connectors

Diagnostic cable



SUB-D 9-pos.
female connectors

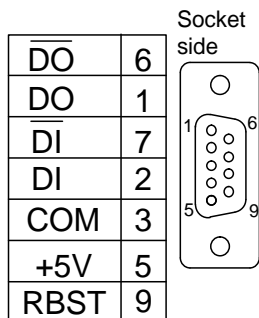
SUB-D 9-pos.
female connectors

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Figure 6: Diagnostic interface and diagnostic cable for connecting a PC

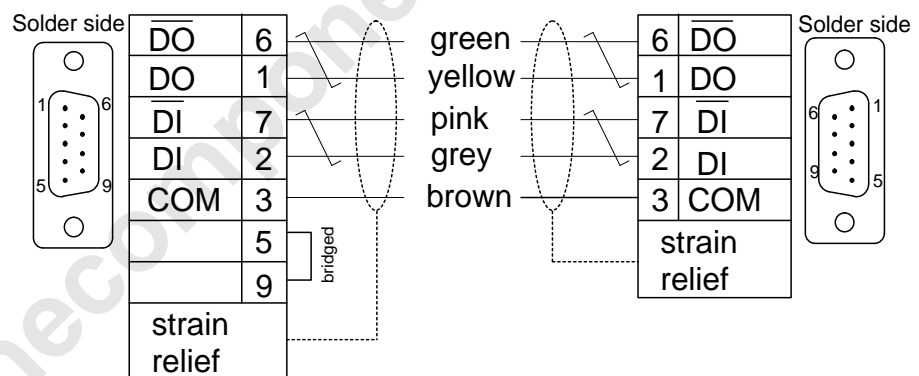
Remote Bus Interface

Front plate



SUB-D 9-pos.
female connectors

Remote bus cable (D9/D9)



SUB-D 9-pos.
male connectors

SUB-D 9-pos.
female connectors

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Figure 7: Remote bus interface and an example for a remote bus cable (cable type D9/D9)

Address Modifier

The controller board supports the following address modifiers:

Short User I/O Access	29 _{hex}
Short Supervisory I/O Access	2D _{hex}
User Data Access	39 _{hex}
User Block Transfer	3B _{hex}
Supervisory Data Access	3D _{hex}
Supervisory Block Transfer	3F _{hex}

Technical Data

Types	IBS VME 3H CB/I-T (single Eurocard with 3U front plate) IBS VME 6H CB/I-T (single Eurocard with 3U front plate)
Degree of protection	IP 20
Air and creepage distances	VDE 0110 part 1, 01/89, VDE 0160 05/88
Permissible operating temperature	From 0°C to +55°C
Permissible storage temperature	From -25°C to +75°C
Connectors:	- P1 connectors for VMEbus - Sub-D female connector (9-pos.) for remote bus, - Sub-D male connector (9-pos.) for diagnostic interface
Operating voltage:	+5 V ± 5 %
Current consumption:	Typically approx. 650 mA, maximum 1 A
Dielectric strength:	500 V between INTERBUS interface and VMEbus system
INTERBUS interface:	2-wire remote bus
Sensors and actuators	Up to 4096
INTERBUS devices	Up to 512
Remote bus devices	Up to 256
PCP devices	Up to 64

Table 1: Ordering data for the controller boards

Description	Type	Order No.
Controller board for 3U racks	IBS VME 3H CB/I-T	27 54 52 9
Controller board for 6U racks	IBS VME 6H CB/I-T	27 54 53 2
User manual for the controller boards	IBS VME CB UM E	27 54 77 8
Configuration manual for INTERBUS	IBS SYS PRO UM E	27 51 00 1
Installation manual for INTERBUS	IBS SYS INST UM E	27 54 80 4

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