ES1651.1-B Carrier Board

User's Guide

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Contents

1 Introduction

This User's Guide contains the description of the ES1651.1-B Carrier Board.

It consists of the following chapters:

- "Applications and Features" on page 6

  The introduction contains an overview of the characteristics of the ES1651.1-B Carrier Board and also includes a block diagram.

- "Hardware Features" on page 9

  This is where the properties of the ES1651.1-B Carrier Board are described in detail. These are:

  – "Carrier Board for Piggybacks" on page 9

  – "Inspection and Versioning Data" on page 9

- "Configuration" on page 11

  This section contains a description of the configuration possibilities of the ES1651.1-B Carrier Board and their presettings.

- "Installing I/O Modules" on page 17

  This section describes how to assemble I/O modules on the ES1651.1-B Carrier Board and any necessary preparatory steps:

  – "Assembling the Front Panel to the PB4350XXX Module" on page 17

  – "Mounting the I/O Modules" on page 20

- "Pin Assignments and Display Elements" on page 25

  This section contains a description of all connectors on the front panel and on the board as well as the meaning of the LED displays.

- "Technical Data" on page 29

  contains the technical data of the ES1651.1-B Carrier Board.

Note

Some components of the ES1651.1-B Carrier Board may be damaged or destroyed by electrostatic discharges. Please keep the board in its storage package until it is installed.
The ES1651.1-B Carrier Board should only be taken from its package, configured and installed at a working place that is protected against static discharge.

Note

The components, connectors and conductors of the ES1651.1-B Carrier Board may carry dangerous voltages.
These voltages may even exist when the board is not installed in the VMEbus system or the VMEbus system is powered off.
Make sure that the board is protected against contact during operation.
Disconnect all connections to the ES1651.1-B Carrier Board before removing the board from the VMEbus system.

1.1 Applications and Features

The ES1651.1-B Carrier Board acts as a carrier board for up to four I/O modules in VMEbus systems. All modules of types "PB4350XXX" and "PB1651XXX" can be used in any combination. An SPI control unit realized in the FPGA of the board converts the parallel data flow of the processor into a serial bit flow for the SPI interfaces of the I/O modules.

VMEbus Interface

The ES1651.1-B Carrier Board has a VMEbus slave interface and reacts to "A24 non privileged data access" accesses (VMEbus address modifier 39 hex).

The position of the 64-kByte VMEbus address space of the board can be set either dynamically or statically. Data is exchanged with VMEbus master boards via a 32-kByte DPRAM. The board can trigger interrupts at the VMEbus.

Inspection and Versioning Data

Inspection and versioning data of the board are stored in a serial non-volatile data memory.

Processor

The MPC555 processor of the board has a 448-kByte ROM memory which is large enough for program code and data; this is why the optional external ROM memory is not assembled.

Fig. 1-1 shows the front panel of the ES1651.1-B Carrier Board.

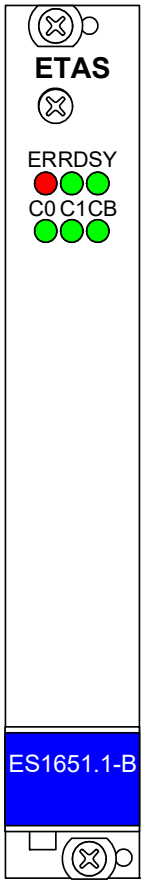


Fig. 1-1 Front Panel of the ES1651.1-B Carrier Board

1.2 Block Diagram

Fig. 1-2 shows a block diagram with all important functional units of the ES1651.1-B Carrier Board.

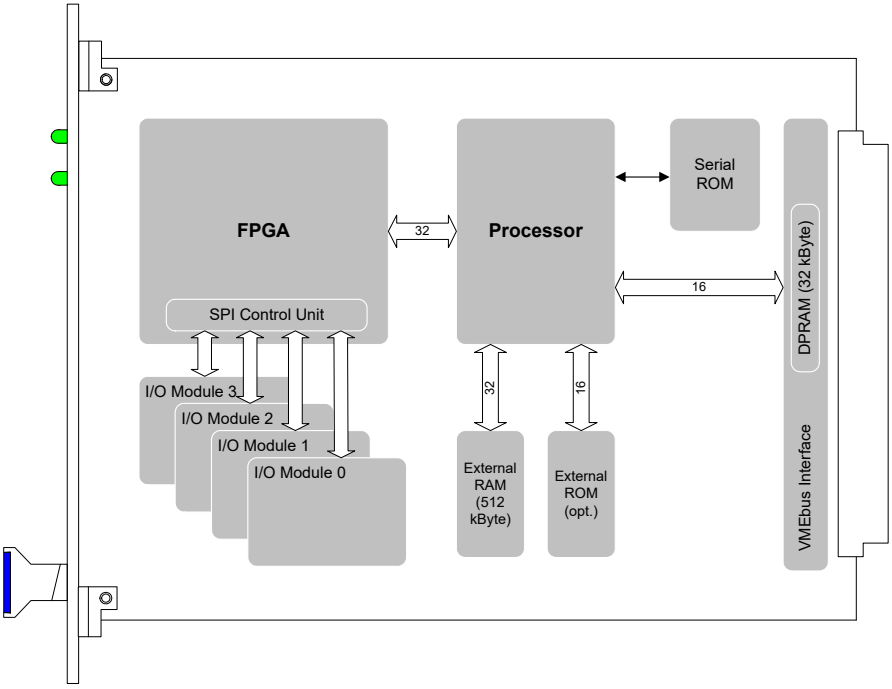


Fig. 1-2 Block Diagram of the ES1651.1-B Carrier Board

2 Hardware Features

This section contains a description of the different hardware features of the ES1651.1-B Carrier Board.

2.1 Carrier Board for Piggybacks

The ES1651.1-B Carrier Board is used as a carrier board for I/O modules in VMEbus systems. I/O modules are available for various tasks, such as the generation and measuring of ECU signals in real time.

All modules of types "PB4350XXX" and "PB1651XXX" can be used. This means that the LABCAR test system can be equipped both with the standard I/O modules for the ES1651.1-B Carrier Board (VME system) and with the highly precise I/O modules for the ES4350 Carrier Board. Up to four I/O modules of both types mentioned above can be used per ES1651.1-B Carrier Board.

The I/O modules are connected using ribbon cable. There are four connectors on the ES1651.1-B Carrier Board for this purpose. For more details on how to assemble I/O modules, please refer to section

2.2 Inspection and Versioning Data

Inspection and versioning data of the board are stored in a serial non-volatile data memory which is addressed via the processor's SPI (Serial Peripheral Interface). The data can be read out via the operating software LABCAR-OPERATOR.

3 Configuration

Fig. 3-1 shows the position of all connectors and switches for configuring the ES1651.1-B Carrier Board - in addition to important components and connectors for orientation purposes.

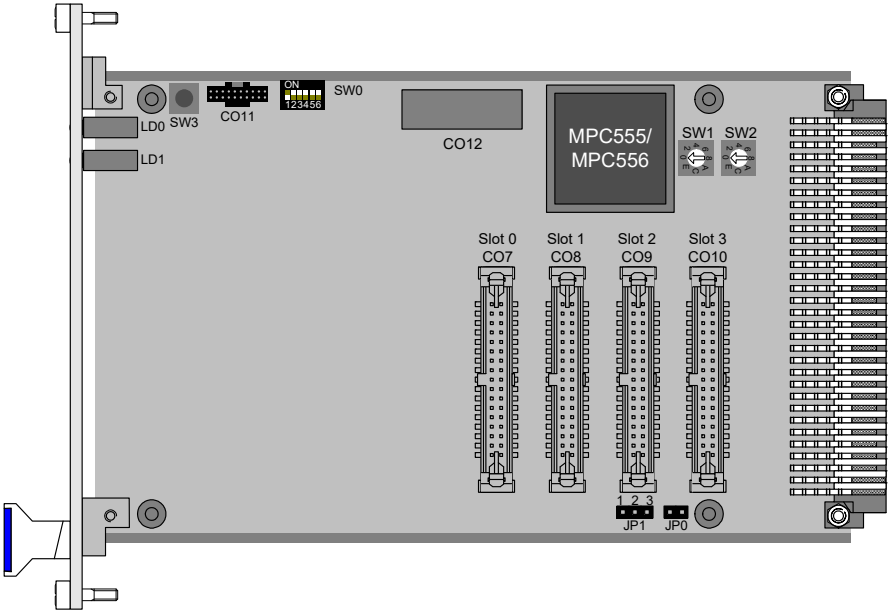


Fig. 3-1 Position of the Connectors, Jumpers and Switches (Component Side)

3.1 Configuration of the Debug Port Connections of the Processor (JP0)

JP0 Jumper	Meaning
set	Debug port connections
open	JTAG interface (preset)

Tab. 3-1 JP0 Jumper

3.2 JTAG Chain Configuration (JP1)

Use the JP1 jumper to set whether the I/O modules are included in the JTAG chain or not.

JP1 Jumper	Meaning
Pos. 1-2	JTAG chain bypasses I/O modules (preset)
Pos. 2-3	I/O modules are included in the JTAG chain

Tab. 3-2 JP1 Jumper

Note

The jumper at JP1 must be in one of the positions listed in Tab. 3-2. Otherwise the JTAG chain is open which leads to errors.

3.3 Boot Configuration (SW0)

The boot configuration is determined using the SW0 switch.

DIL switch	Meaning	Presetting
1	Flash enable – determines whether the MPC555 Flash memory is activated or deactivated after a reset. OFF: Flash disabled – the system is booted from the external memory ON: Flash enabled	ON
2	Determines the base address of the MPC555-internal memory space OFF: 0x0000 0000 ON: 0x0100 0000	OFF
3	Boot port size OFF: 32-bit port ON: 16-bit port	OFF
4	Hard reset configuration word OFF: Configuration word is read by external data bus ON: The internal configuration word is used	OFF
5,6	Source for boot code OFF, OFF: Internal flash memory OFF, ON: External SRAM ON, OFF: Dual-Ported RAM ON, ON: External Flash memory	OFF, OFF

Tab. 3-3 DIL Switch SW0 for Boot Configuration

3.4 Reset Switch (SW3)

Results in a reset of the ES1651.1-B Carrier Board, but not a VMebus reset.

3.5 Addressing the ES1651.1-B at the VMEbus (SW1 and SW2)

The ES1651.1-B Carrier Board can be operated both in (standard) VMEbus systems with 96-pin backplane connectors and in VME64x systems with geographical addressing.

Set the two HEX switches SW1 and SW2, (see Fig. 3-1 on page 11) to "0x00" to operate the board in "geographical addressing mode".

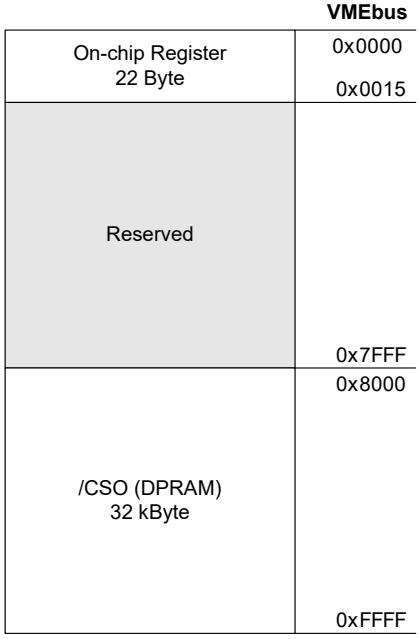


Fig. 3-2 Address Map

In the "0x00" setting, the ES1651.1-B Board maps 256 bytes into the A24 address space depending on the slot position. Depending on the available memory area, the 64 kB address space is then assigned dynamically by the system controller.

Slot Position	Address	VME Interface (Control Register)
1	E0E000 - E0E0FF	256 bytes
2	E0E100 - E0E1FF	256 bytes
3	E0E200 - E0E2FF	256 bytes
4	E0E300 - E0E3FF	256 bytes
5	E0E400 - E0E4FF	256 bytes
6	E0E500 - E0E5FF	256 bytes
7	E0E600 - E0E6FF	256 bytes
8	E0E700 - E0E7FF	256 bytes
9	E0E800 - E0E8FF	256 bytes
10	E0E900 - E0E9FF	256 bytes
11	E0EA00 - E0EAFF	256 bytes
12	E0EB00 - E0EBFF	256 bytes
13	E0EC00 - E0ECFF	256 bytes
14	E0ED00 - E0EDFF	256 bytes
15	E0EF00 - E0EFFF	256 bytes
16	E0F000 - E0F0FF	256 bytes
17	E0F100 - E0F1FF	256 bytes
18	E0F200 - E0F2FF	256 bytes
19	E0F300 - E0F3FF	256 bytes
20	E0F400 - E0F4FF	256 bytes
21	E0F500 - E0F5FF	256 bytes

Tab. 3-4 Slot Position and Address

Note

VMEbus backplanes can have a maximum of 21 slots.

The 64 kB address space is assigned statically with every other setting of the hex switches (≠ 0x00).

Switch Setting	Address Space
0x01	010000 - 01FFFF
0x02	020000 - 02FFFF
0x03	030000 - 03FFFF
..	.
0xFF	FF0000 - FFFFFF

Tab. 3-5 Setting the Address Spaces

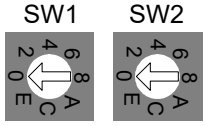


Fig. 3-3 Switch for Address Setting

SW1	SW2
0x**n**0	0x0**n**
Address A23 - A20	Address A16 - A19

Tab. 3-6 Meaning of the Switches SW1 and SW2

Note

The default setting is: SW1=0x0, SW2=0x0

4 Installing I/O Modules

This section describes how to install I/O modules.

Note

I/O modules of the type "PB1651XXX" are delivered with the front panel assembled; modules of the type "PB4350XXX" come with a front panel which is not assembled. If you want to mount a module of type "PB4350XXX" on the ES1651.1-B Carrier Board, you first have to assemble its front panel.

4.1 Assembling the Front Panel to the PB4350XXX Module

Proceed as follows to assemble the front panel on a module of the type "PB4350XX":

- Tighten the printed board brackets as shown in Fig. 4-1 with the Pozidrive flathead screws M2.5x10 provided on the module.

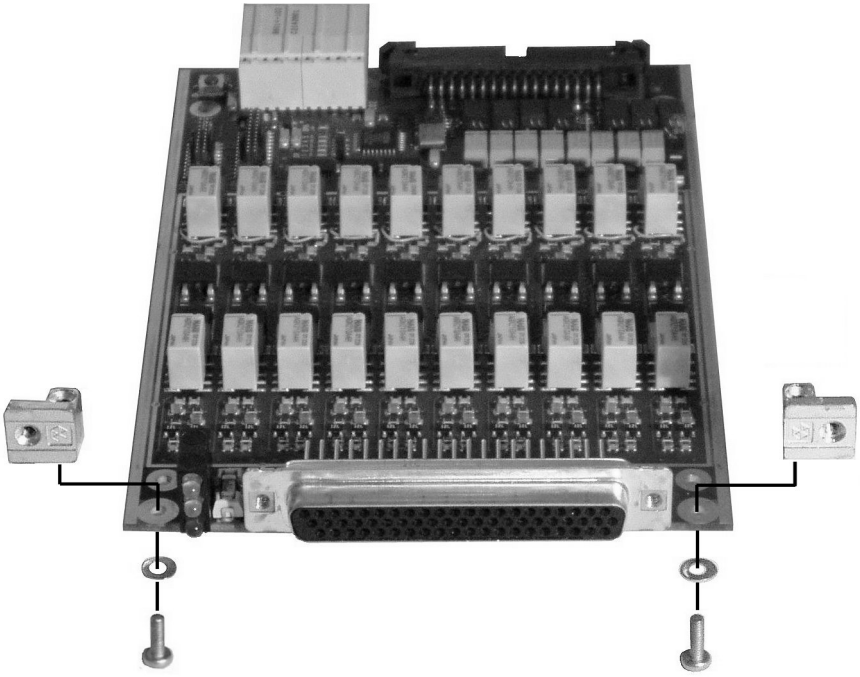


Fig. 4-1 Tightening the Printed Board Brackets

- Fasten the front panel with the hexagon head screws above and below the "OUTPUT 0-9" connector (Fig. 4-2).

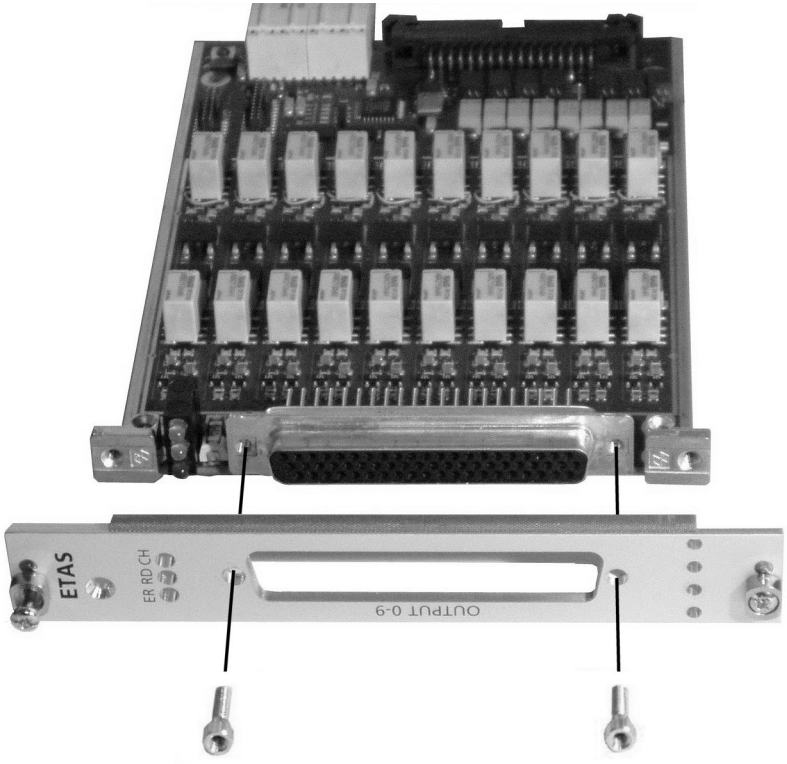


Fig. 4-2 Fastening the Front Panel at the Connector

- Fasten the front panel at the top with the raised countersunk head screw M2.5x8 to the bracket attached previously.
- Fasten the front panel at the bottom and the front panel handle to the bracket attached previously using the Pozidrive flathead screw M2.5x16 (Fig. 4-3).

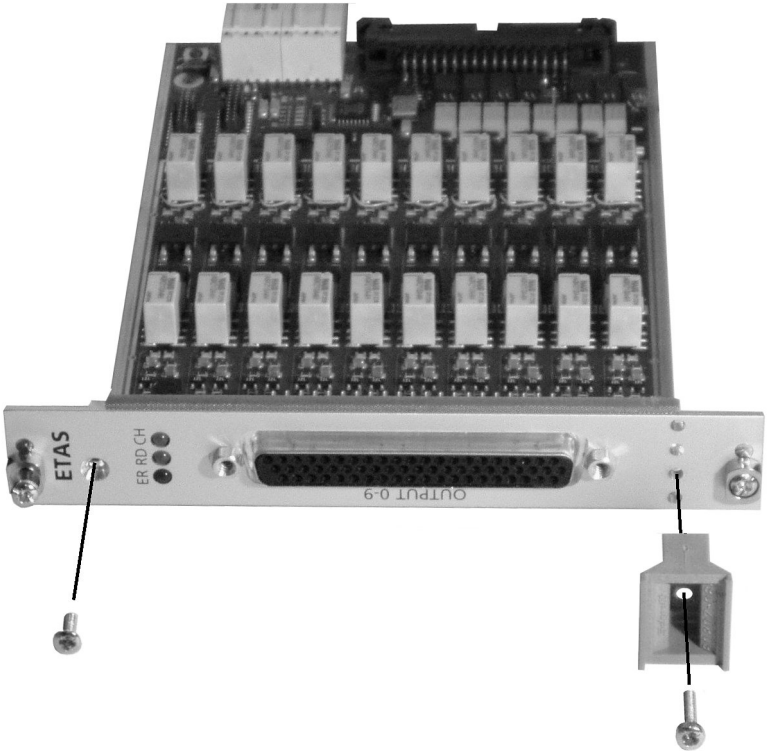


Fig. 4-3 Attaching the Upper and Lower Fastening Screws

- Finally press the identification plate into the extraction handle.

You have now mounted the front panel for a PB4350XXX module.

4.2 Mounting the I/O Modules

Proceed as follows to mount the I/O modules.

To mount distance pins on the ES1651.1-B Carrier Board

- Make sure you have four distance pins at hand which have an internal thread on both sides.
- Get out four screws.
- Screw all four distance pins onto the ES1651.1-B Carrier Board (distance pins on the component side, screws on the solder (dip) side, see Fig. 4-4)

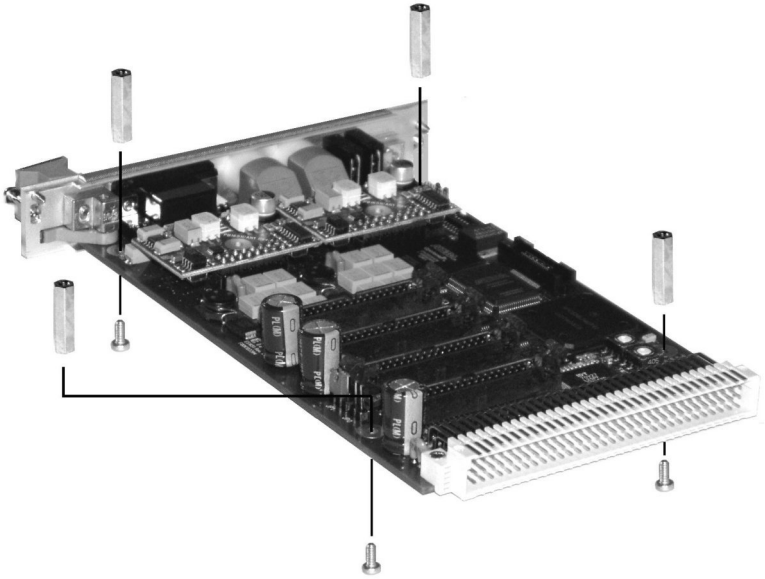


Fig. 4-4 Mounting Distance Pins on the ES1651.1-B Carrier Board

To insert ribbon cable in box headers on the ES1651.1-B Carrier Board

- Insert the ribbon cable delivered with the corresponding I/O module into Slot 0.
- If you want to mount further I/0 modules, insert the ribbon cable correspondingly into Slot 1, then Slot 2, Slot 3 etc.

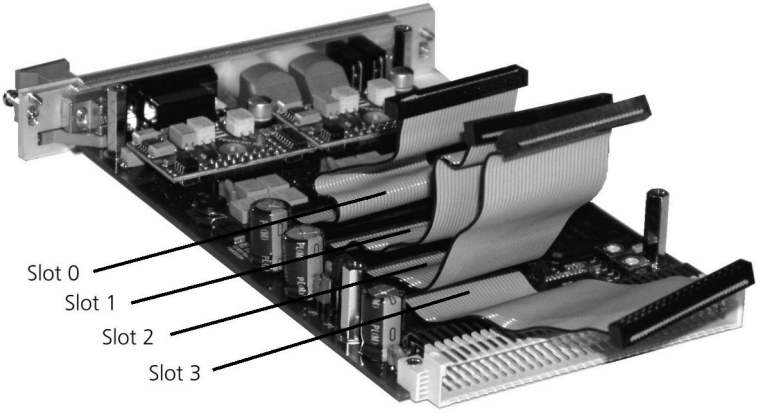


Fig. 4-5 Inserting the Ribbon Cable

To mount I/O modules

Note

If you only want to mount one I/0 module, continue with "To mount the last I/O module" on page 23.

- Make sure you have four distance pins at hand which have an external thread on one side.
- Lie the I/0 module on the distance pins you have just mounted on the Carrier Board.
- Tighten the I/O module with the distancepins (see Fig. 4-6 on page 22).
- Slot the connector of the relevant ribbon cable into the box header of the I/O module.

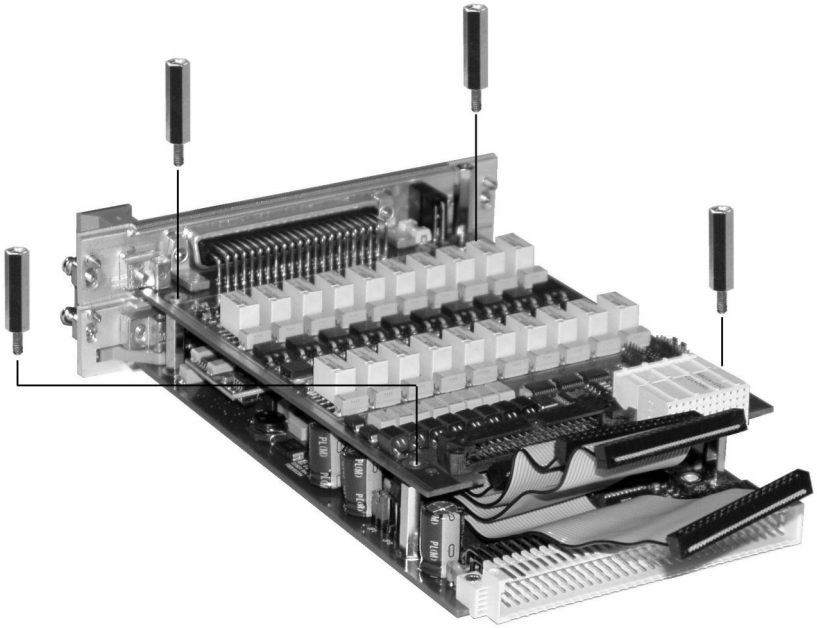


Fig. 4-6 Mounting the I/O Module

- Mount further I/O modules in the same way.

  The mounting of the last module is described in the following section.

To mount the last I/O module

- Mount the last I/O module as described above – it is tightened, however, with four screws (see Fig. 4-7 on page 23).

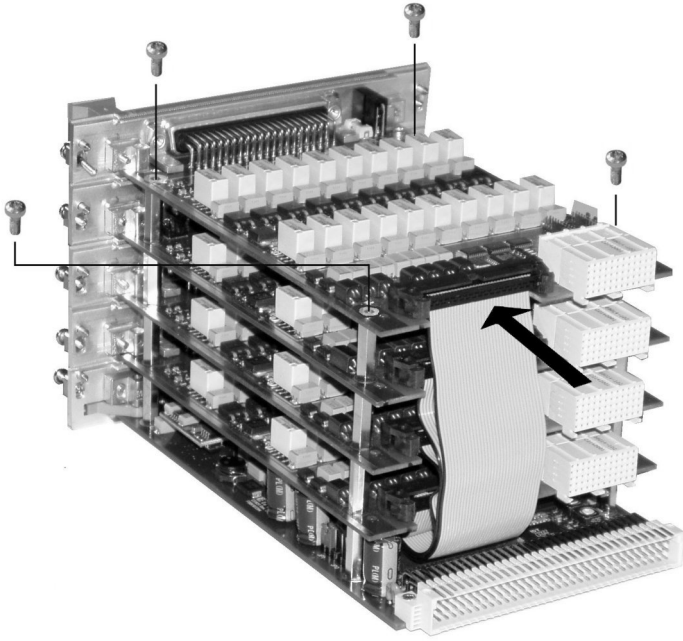


Fig. 4-7 Mounting the Last I/O Module

5 Pin Assignments and Display Elements

This section contains a description of connectors on the board and the meaning of the display elements on the front panel.

The position and name of the individual elements is shown in Fig. 3-1 on page 11.

5.1 Box Headers for I/O Modules (CO7 - CO10)

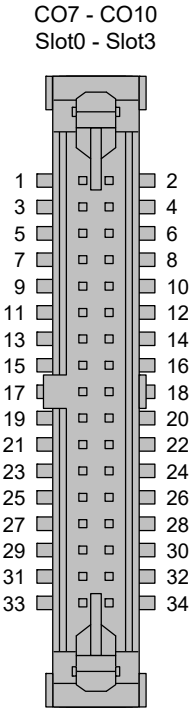


Fig. 5-1 Box Headers for Connecting I/O Modules

Pin	Assignment	Pin	Assignment
1	/RESET	2	SOUT
3	SDIN	4	SCLK
5	/SCS0	6	/SCS1
7	TDO	8	TDI
9	TMS	10	TCK
11	/IRQ	12	PROG_DONE
13	internal	14	internal
15	internal	16	internal
17	internal	18	internal
19	internal	20	PB_AV
21	GND	22	+5 V
23	+5 V	24	+3.3 V
25	+3.3 V	26	+2.5 V
27	GND	28	GND
29	AGND	30	AGND
31	+12 V	32	+12 V
33	-12 V	34	-12 V

Tab. 5-1 CO7 - CO10 Pin Assignment

5.2 ETAS-Internal Service Connection (CO11)

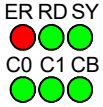
CO11 provides various access possibilities for ETAS-internal purposes such as e.g. RS232, Debug, JTAG, Boundary Scan.

5.3 Interface for Logic Analyser (CO12)

A further debug interface for ETAS-internal purposes.

5.4 LEDs

There are 6 LEDs on the front panel of the ES1651.1-B Carrier Board, the meaning of which is described below.



LED	Color	Meaning
ER	Red	Error
RD	Green	Ready
SY	Green	not used
C0	Green	not used
C1	Green	not used
CB	Green	not used

Tab. 5-2 Significance of the LEDs

6 Technical Data

This chapter contains the technical data of the ES1651.1-B Carrier Board.

Number of slots	4
Supported types of I/O modules	PB1651XXX and PB4350XXX
Configuration of the I/O modules	PB1651XXX and PB4350XXX, mixed

Power Supply

Current consumption	1 A @ +5 V DC 0.1 A @ +12 V DC 0.1 A @ -12 V DC

Environmental Conditions

Operating temperature	5 °C to 35 °C (5.00 °C to 35.00 °C)
Relative humidity	0 to 95% (non-condensing)

Physical Dimensions

Printed circuit board (L x W)	145 mm x 100 mm
Front panel	Height: 3 U Width: 4 HP

6.1 Fulfilled Standards and Norms

The module adheres to the following standards and norms:

Norm	Test
EN 61326	Electrical equipment for measurement, control and laboratory use – EMC requirements
EN 61000-6-2	Immunity (industrial environments)
EN 61000-6-4	Emission standard (industrial environments)

The module is designed only for use in industrial environments in accordance with EN 61000-6-4. When using the module outside of industrial environments avoid possible radio disturbances by additional shielding measures!

WARNING!

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

7 ETAS Contact Addresses

ETAS HQ

ETAS GmbH

Borsigstraße 24	Phone:	+49 711 3423-0
70469 Stuttgart	Fax:	+49 711 3423-2106
Germany	WWW:	www.etas.com

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