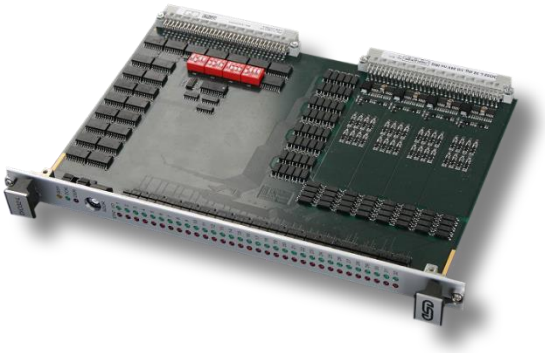
VME-DIO32-L

Digital IO VMEbus Board



Hardware Manual

to Product V.1607.05

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Notes

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This manual contains important information and instructions on safe and efficient handling of the VME-DIO32-L. Carefully read this manual before commencing any work and follow the instructions.
The manual is a product component, please retain it for future use.

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Document History

The changes in the document listed below affect changes in the hardware as well as changes in the description of the facts, only.

Rev.	Chapter	Changes versus previous version	Date
1.0	-	First English manual for VME-DIO32-L	2022-03-18
--	-	-	-

Technical details are subject to change without further notice.

Classification of Warning Messages and Safety Instructions

This manual contains noticeable descriptions, warning messages and safety instructions, which you must follow to avoid personal injuries or death and property damage.

This is the safety alert symbol.
It is used to alert you to potential personal injury hazards. Obey all safety messages and instructions that follow this symbol to avoid possible injury or death.

DANGER, WARNING, CAUTION

Depending on the hazard level the signal words DANGER, WARNING or CAUTION are used to highlight safety instructions and warning messages. These messages may also include a warning relating to property damage.

DANGER
Danger statements indicate a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING.
Warning statements indicate a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION
Caution statements indicate a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

Notice statements are used to notify people on hazards that could result in things other than personal injury, like property damage.

NOTICE
This NOTICE statement indicates that the device contains components sensitive to electrostatic discharge.

NOTICE
This NOTICE statement contains the general mandatory sign and gives information that must be heeded and complied with for a safe use.

INFORMATION

INFORMATION
Notes to point out something important or useful.

Safety Instructions

- When working with the VME-DIO32-L follow the instructions below and read the manual carefully to protect yourself from injury and the VME-DIO32-L from damage.
- The device is a built-in component. It is essential to ensure that the device is mounted in a way that cannot lead to endangering or injury of persons or damage to objects.
- Do not use damaged or defective cables to connect the VME-DIO32-L.
- In case of damages to the device, which might affect safety, appropriate and immediate measures must be taken, that exclude an endangerment of persons and domestic animals and property.
- Current circuits which are connected to the device must be sufficiently protected against hazardous voltage (SELV according to EN 60950-1).
- The VME-DIO32-L may only be driven by power supply current circuits, that are contact protected. A power supply, that provides a safety extra-low voltage (SELV) according to EN 60950-1, complies with these conditions.

- The device must be securely installed in the control cabinet before commissioning.
- Protect the VME-DIO32-L from dust, moisture, and steam.
- Protect the VME-DIO32-L from shocks and vibrations.
- The VME-DIO32-L may become warm during normal use. Always allow adequate ventilation around the VME-DIO32-L and use care when handling.
- Do not operate the VME-DIO32-L adjacent to heat sources and do not expose it to unnecessary thermal radiation. Ensure an ambient temperature as specified in the technical data.

DANGER
Hazardous Voltage - Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages inside of the system into which the VME-DIO32-L is to be integrated.
→ Disconnect all hazardous voltages (mains voltage) before opening the system.
→ Ensure the absence of voltage before starting any electrical work

NOTICE
Electrostatic discharges may cause damage to electronic components.
To avoid this, perform the steps described on page 15 before you touch the VME-DIO32-L, in order to discharge the static electricity from your body

Qualified Personnel

This documentation is directed exclusively towards personnel qualified in control and automation engineering. The installation and commissioning of the product may only be carried out by qualified personnel, which is authorized to put devices, systems, and electric circuits into operation according to the applicable national standards of safety engineering.

Conformity

The VME-DIO32-L is a sub-assembly intended for incorporation into an apparatus by a manufacturer and NOT by the end user. The manufacturer of the final system must decide whether additional EMC or EMI protection requirements are necessary.

Intended Use

The intended use of the VME-DIO32-L is the operation as VME board with digital I/Os.
The guarantee given by esd does not cover damages which result from improper use, usage not in accordance with regulations or disregard of safety instructions and warnings.

- The VME-DIO32-L is intended for installation in VMEbus systems only.
- The operation of the VME-DIO32-L in hazardous areas, or areas exposed to potentially explosive materials is not permitted.
- The operation of the VME-DIO32-L for medical purposes is prohibited.

Service Note

The VME-DIO32-L does not contain any parts that require maintenance by the user. The VME-DIO32-L does not require any manual configuration of the hardware except of the configuration of the dip switches and the rotary switch. Unauthorized intervention in the device voids warranty claims.

Disposal

Devices which have become defective in the long run have to be disposed in an appropriate way or must be returned to the manufacturer for proper disposal. Please, make a contribution to environmental protection.

Typographical Conventions

Throughout this manual the following typographical conventions are used to distinguish technical terms.

Convention	Example
File and path names	**`/dev/null`** or **`<stdio.h>`**
Function names	***open()***
Programming constants	`NULL`
Programming data types	`uint32_t`
Variable names	*Count*

Number Representation

All numbers in this document are base 10 unless designated otherwise. Hexadecimal numbers have a $_h$ appended. For example, 42 is represented as $2A_h$ in hexadecimal format.

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1 Overview

1.1 Description of VME-DIO32-L

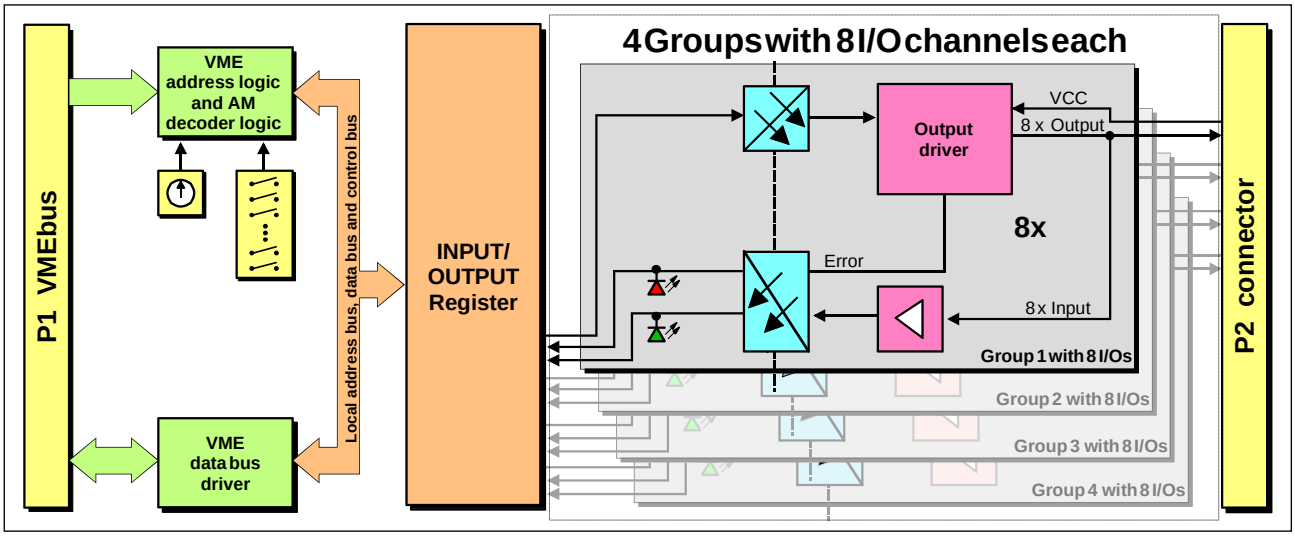


Figure 1: Block circuit diagram of VME-DIO32-L

The VME-DIO32-L offers a digital process interface containing 32 opto-isolated digital channels for IOs, which are transferred into a process. It includes all necessary components on a VMEbus 6U board and needs one slot.

The 32 digital I/O channels are programmable in 4 groups of 8 channels as inputs or outputs. The 4 groups are electrically isolated against the system and each other. An external voltage must be fed individually for each group. The 32 input/outputs and the external voltages are connected to the 64-pin connector P2.
The VMEbus interface is designed for addressing as A24 Slave and D16/D08(EO) transfer mode.

The digital output channels use a quad channel smart high-side power switch ITS4130Q and accept an operating voltage range of 18 VDC to 32 VDC (24 VDC nominal voltage) with a nominal current of 0.5 A per channel. The current of each channel is limited. Overvoltage and undervoltage protection functions are integrated in the power switch.

The VME-DIO32-L is developed as light successor for VME-DPIO32/63140 (V.1607.04). Compatibility in terms of design and interfaces is ensured, however the range of functions is reduced. The I/O-interface is pin-compatible. Transparent reading and writing of the IOs is possible. Counter, PWM operations, and generation of interrupts are not supported by the VMEDIO32-L.

The VME-DIO32-L comes with a green and a red LED in the front panel for each of the 32 I/O-channels. All LEDs are located on the front panel. The green LEDs indicate the input status, and the red LEDs indicate the output short-circuit of the individual channels.

To feed power supply for the output groups separately, the power adapter VME-DPIO32-P2VCC can be used for VME-DIO32-L.
If a separate wiring of the output groups is not necessary, the adapter VME-DPIO32-P2VCC-3X is an economic solution. It feeds power to three VME-DIO32-L installed side-by-side in three VMEbus slots.

1.2 Abbreviations

Abbreviation	Term
CPU	Central Processing Unit
HW	Hardware
I/O	Input/Output
LSB	Least Significant Bit
MSB	Most Significant Bit
n.a.	not applicable
OS	Operating System
SDK	Software Development Kit

2 Hardware

2.1 PCB View

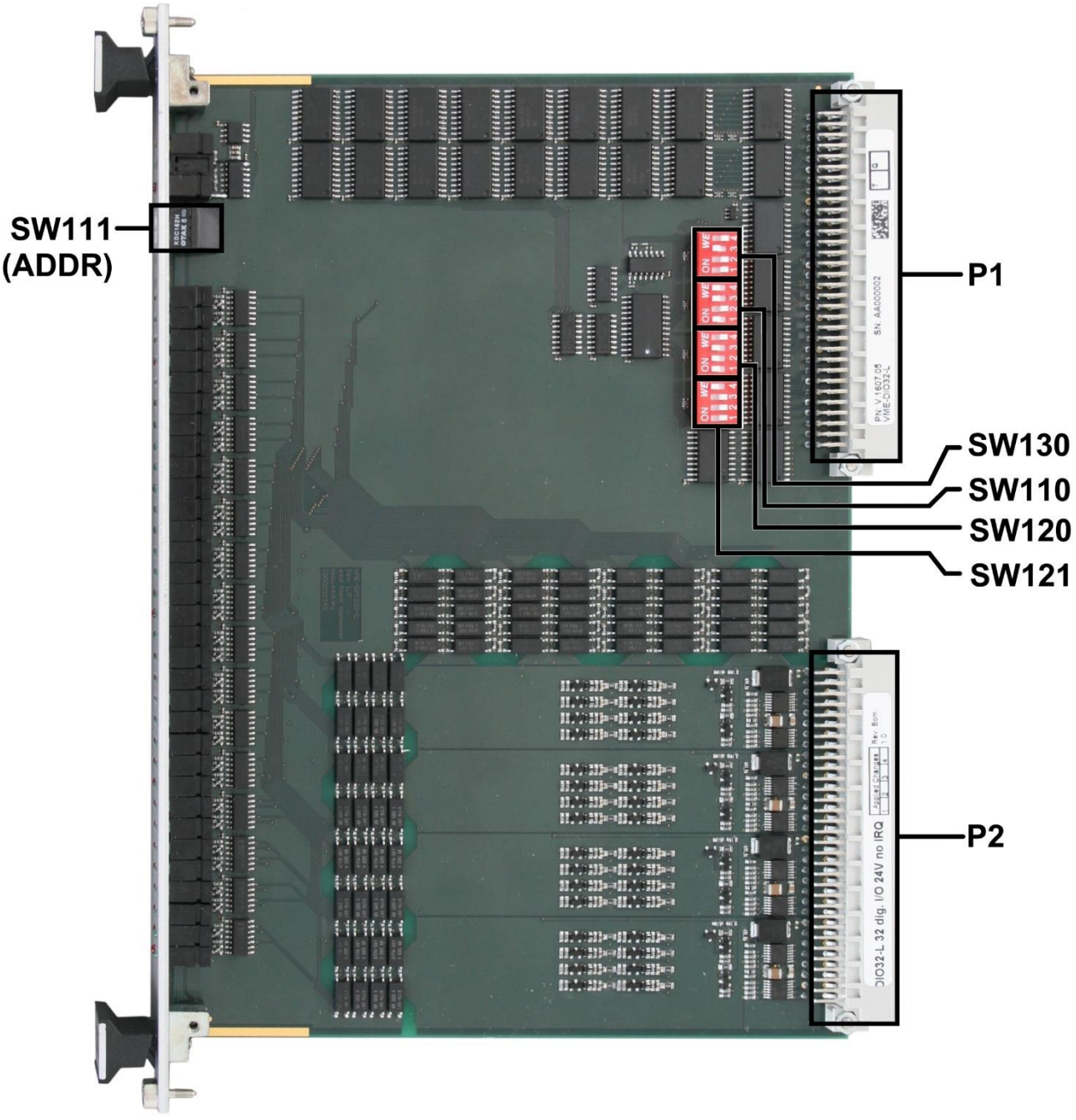
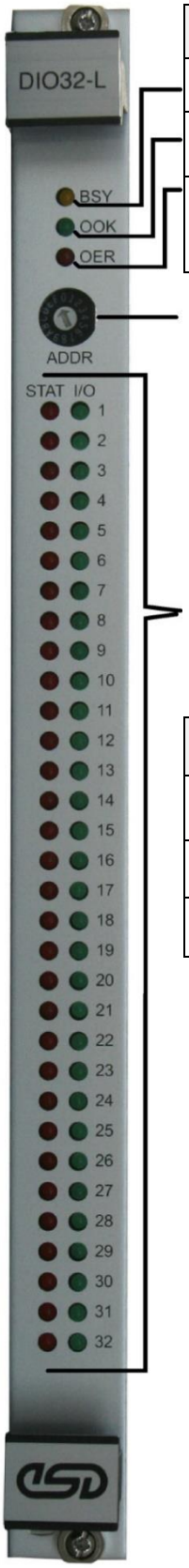


Figure 2: PCB top view of VME-DIO32-L

NOTICE
Read chapter “Hardware Installation” on page 15, before you start with the installation of the hardware!

2.2 LEDs

The VME-DIO32-L comes with 3 general LEDs (BSY, OOK, OER) and 2 LEDs for each I/O-channel (STAT1- STAT 32 and I/O1 -I/O32)



LED	Function	Colour	Description (LED on)
BSY	Busy	Yellow	Access to the board via VMEbus
OOK	Output OK	Green	All outputs are working properly, all Vcc_Y are OK. (Y =1 - 4)
OER	Output Error	Red	An error occurred on at least one of the outputs (DOUT1 – DOUT32) or any of Vcc_Y is not OK. (Y =1 - 4)

ADDR - Rotary Switch (SW112)
for the adjustment of the VMEbus address (lower base address).
For further information see chapter “Lower VMEbus Base Address via Rotary Switch ” (page 12).

STAT LEDs and I/O LEDs
For each channel of the VME-DIO32 there is a STAT LED and an I/O LED.
The LEDs indicate the status of the corresponding channel X:

LED Name	Colour	Description (LED on)
STAT X	Red	Input signal of channel X “OFF“, AND output signal of channel X “ON“ (short-circuit)
I/O X	Green	Input signal of channel X “ON” (active input)
X = 1 - 32		

Figure 3: Front panel with LEDs and ADDR switch

2.3 Coding Switches

The VME-DIO32-L comes with a rotary switch (SW111) and three DIP switches (SW110, SW120, SW121) for the adjustment of the VMEbus base address. The modifiers (AM0 - AM2 and AM2E) can be set via switch SW130.

2.3.1 Lower VMEbus Base Address via Rotary Switch (SW111)

The rotary switch (SW111) can be easily accessed via the front panel (see Figure 3, page 11).

SW111
Rotary switch

Switch	ADDR	
Position	0_h 1_h : : F_h	The address bits A11-A8 of the VMEbus base address can be adjusted from 0 – 15 (0_h - F_h).

Table 1: Description of the switches

2.3.2 Higher VMEbus Base Address and Modifiers via DIP-Switches

The DIP-switches are equipped on the board next to VMEbus connector P1 as described in Figure 2 page 10.

The VME base address (address bits A[23:12] can be configured via the DIP-switches SW110, SW120, SW121.
The address modifiers (AM2E, AM[2:0]) can be configured via the DIP-switch SW130.

Example:

SW121 SW120 SW110 SW130

DIP switches (as seen from P1)

Switch	**SW121**				**SW120**				**SW110**				**SW130**			
Position	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Address bit	A23	A22	A21	A20	A19	A18	A17	A16	A15	A14	A13	A12	AM 2E	AM2	AM1	AM0
ON	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OFF	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Description	VMEbus base address A[23:20]				VMEbus base address A[19:16]				VMEbus base address A[15:12]				Address Modifier AM2E, AM[2:0]			
Meaning	VMEbus base address, see chapter 2.3.3, page 13												See chapter 2.3.4, page 13			

Table 2: Description of the switches

2.3.3 VME Base Address

The VME base address can be set via the DIP-switches SW110, SW120, SW121 on the board and the rotary switch ADDR (SW111) in the front panel.

Switch	**SW121**				**SW120**				**SW110**				**SW111**			
Position	1	2	3	4	1	2	3	4	1	2	3	4	Via rotary switch ADDR			
Address bit	A23	A22	A21	A20	A19	A18	A17	A16	A15	A14	A13	A12	A11	A10	A09	A08
Descript-ion	VMEbus base address A[23:20]				VMEbus base address A[19:16]				VMEbus base address A[15:12]				VMEbus base address A[11:08]			
Example (Default setting on delivery):																
Adress bit:	1	1	1	0	0	0	0	1	0	1	0	0	0	0	0	0
	E_h				1_h				4_h				0_h			
Meaning	VMEbus base address A[23 :08]): $E140_h$ The address bits A[07:01] are local decoded: $xx_{h,}$ VMEbus base address: $E14000_h$															

Table 3: VME base address

2.3.4 Address-Modifier (SW130)

The VME-DIO32-L can be operated with access modes A24/D16 (standard).
At the default setting of the DIP-switch SW130 (see **Table 2**, page 12), A24/D16 accesses to the board are enabled.
AM2 will be ignored, so user mode as well as supervisory mode can be used for addressing.
Default setting: Standard supervisory or non-privileged data access (A24-Mode)

AM0, AM1 and AM4 are evaluated ‘individually’. AM2 and AM2E form a unit and are always evaluated together. AM3, AM4 and AM5 are always ‘1’.
AM0, AM1 and AM2 and AM2E are evaluated as follows:

Switch	**SW130**			
Position	1	2	3	4
Address bit Modifier	AM2E	AM2	AM1	AM0
ON	0	0	0	0
OFF	1	1	1	1

Permissible Positions of AM2 and AM2E

Switch	SW130		Meaning
Position	1	2	-
Address bit Modifier	**AM2E**	**AM2**	-
Address bit	**1**	**X**	**AM2 = Don't care**
Address bit	**0**	**1**	**AM2 = 1** (supervisory modes only)
Address bit	**0**	**0**	**AM2 = 0** (non-privileged modes only)

Table 4: VME permissible positions of AM2 and AM2E

Address Modifier Combinations for A24 Accesses are recommended as follows:

The modifiers AM3, AM4 and AM5 are always '1'.

Switch	Modifier AM3-AM5			SW130				Result [Hex]	Meaning
Position	-	-	-	1	2	3	4	-	-
Address bit Modifier	AM5	AM4	AM3	AM2E	AM2	AM1	AM0	-	-
Address bit	1	1	1	**1**	**1**	0	1	**$3D_h$**	Standard supervisory data access OR
					0	0	1	**39_h**	Standard non-privileged data access
Address bit	1	1	1	**0**	**1**	0	1	**$3D_h$**	Standard supervisory data access
					0	0	1	**39_h**	Standard non-privileged data access

Table 5: Recommended access modes for standard accesses (A24)

3 Hardware Installation

NOTICE
Read the safety instructions at the beginning of this document carefully before you start with the hardware installation!

WARNING
Hazardous Voltage - **Risk of electric shock** due to unintentional contact with uninsulated live parts with high voltages inside of the system into which the VME-DIO32-L is to be integrated.

→ Disconnect all hazardous voltages (mains voltage) before opening the system. Never carry out work while power supply voltage is switched on!
→ Ensure the absence of voltage before starting any electrical work.

NOTICE
Electrostatic discharges may cause damage to electronic components.

→ To avoid this, please discharge the static electricity from your body *before* you touch the VME-DIO32-L.
→ Furthermore, you should prevent your clothes from touching the VME-DIO32-L, because your clothes might be electrostatically charged as well.

Procedure:

1. Switch off your system and all connected peripheral devices (monitor, printer, etc.).
2. Discharge your body as described above.

   If necessary, configure the VMEbus address via the rotary switch and the DIP switches as described in chapter “Coding Switches” from page 12. The lower VMEbus address can also be easily set later via the rotary switch in the front panel.
3. Disconnect the VME system from the mains.
   Make sure that no risk arises from the system into which the VME-DIO32-L shall be inserted.

   WARNING
   Hazardous Voltage
   Risk of electric shock due to unintentional contact with uninsulated live parts with high voltages.

   → Disconnect all hazardous voltages (mains voltage) before opening the system.
   → If the system does not have a flexible mains cable, but is directly connected to mains, disconnect the power supply via the safety fuse and make sure that the fuse cannot switch on again unintentionally (e.g. with caution label).
   → Ensure the absence of voltage before starting any electrical work.
   → Cover or block off adjacent live parts.
4. Insert the VME-DIO32-L board into the selected slot.
   Carefully push the board into the slot until it snaps into place.
5. Fix the module.
6. Connect the system to mains again (mains connector or safety fuse).
7. Switch on the system and the peripheral devices. - End of hardware installation.

4 Technical Data

4.1 General Technical Data

Power supply voltage	4.85 V … 5.25V DC nominal current:	I_{OFF} = ca. 250 mA (all Inputs/Outputs OFF), I_{ON} = ca. 625 mA (all Inputs/Outputs ON) $I_{Typical}$ = ca. 650 mA
Power consumption	typical: P_{OFF} = 1.25 W (all Inputs/Outputs OFF) maximum: P_{MAX} = 3.25 W	
Temperature range	Operation: 0 °C ... +70 °C ambient temperature Storage: -20 °C ... +70 °C ambient temperature Transport: -20 °C ... +70 °C	
Humidity	Operation: max. 90%, non-condensing Storage: max. 90%, non-condensing	
Protection class	IP20 (mounted in VMEbus system)	
Electrical isolation of inputs and outputs	Pollution degree:	maximum permissible according to DIN EN 61131-2: Pollution degree 2
	Over voltage category:	II (acc. to DIN EN 61131-2)
	Electrical isolation:	functional isolation between I/O circuits and VMEbus, dimensioning of air and creepage distances: max. isolation working voltage U_e = 600 V AC/DC (acc. to. DIN EN 61131-2, pollution degree 2, over voltage category II) max. isolation voltage of optocouplers U_{rms} = 2500 V_{rms} for 1 minute
Form factor / Dimensions	Eurocard Double-height (6U), 1 slot width /160 mm x 233,35 mm x 20,1 mm (length, width, hight)	
Weight	Ca. 470 g	

Table 6: General data of the module

4.2 VME Interface

VME interface	IEEE 1014 / D
Addressing	A24 Slave
Transfer mode	D16 / D08(EO)
Base address	Adjustable by DIP-switches and rotary switch Address Bit A23 – A12 The higher part of the base address can be adjusted with 3 DIP-switches (SW121, SW120, SW110) A11 – A8 the lower base address can be adjusted via the rotary switch (ADDR, SW111) in the front panel
Interrupter	none

Table 7: VME interface

4.3 Connectors accessible from Outside

Name	Function, Interfaces	Type
P1	VMEbus	DIN41612, type C, 96-pin.
P2	Inputs/Outputs	DIN41612, type C, 64-pin.

Table 8: Connectors, accessible from outside

4.4 Digital Inputs/Outputs

Number of outputs	Arranged in 4 groups with 8 channels.
I/O-configuration	Ports are configurable as inputs or outputs, digital outputs, The status of the outputs (DERR) can be read.
Type of the outputs	Plus switching (High Side Driver)
Power supply	
External power supply	18 V ... 32 V Arranged in 4 groups, no reverse polarity protection maximum current per group: 6A
Protective circuits of the power supply	Safety fuse 6.3 A for each group of 8 channels, after activation of the fuse, the VME-DIO32-L has to be returned to esd for an expert repair. Transient protection from 39 V
Digital Inputs	
Input voltage range	-3 V ... 32 V (but maximum external power supply) Note that the maximum reachable voltage value results from the external power supply.
Input threshold	$U_{ON} \geq 12$ V $U_{OFF} \leq 3$ V
Input current at 24V	Minimum 4 mA, maximum 6 mA
Digital outputs	
Driver module	ITS4130
Output current	Typical: 0.50 A maximal: 0.75 A max. overcurrent-limit: 1.5 A
Electrical isolation	Isolation voltage: 5000 V_{rms} (1 minute)
Connector	See chapter 6.2 “I/O-Connector P2” page 21

Table 9: Digital inputs/outputs

5 Description of the Hardware Registers

The following registers are supported:
“Status Register”
“Transparent Input-Data”, 32-Bit, read_only
“Output-Data-Register”, 32-Bit, read/write
On read access to the other addresses, ‘1’ will be returned, a write access will be ignored.

5.1 INPUT-Register (read only)

Local Address	D15	D14	D13	D12	D11	D10	D9	D8	
$F8_h$	1	0	0	0	DERR2932	DERR2528	DERR2124	DERR1720	
FA_h	DIN24	DIN23	DIN22	DIN21	DIN20	DIN19	DIN18	DIN17	
FC_h	DIN32	DIN31	DIN30	DIN29	DIN28	DIN27	DIN26	DIN25	
FE_h	0	0	0	0	0	0	0	0	(CIO Status)

Local Address	D7	D6	D5	D4	D3	D2	D1	D0	
$F9_h$	1	0	0	0	DERR1316	DERR0912	DERR0508	DERR0104	
FB_h	DIN08	DIN07	DIN06	DIN05	DIN04	DIN03	DIN02	DIN01	
FD_h	DIN16	DIN15	DIN14	DIN13	DIN12	DIN11	DIN10	DIN09	
FF_h	0	0	0	0	0	0	0	0	(CIO Status)

Table 10: Input register VME-DIO32-L

5.2 OUTPUT-Register (read/ write)

Local Address	D15	D14	D13	D12	D11	D10	D9	D8
04_h	DOUT32	DOUT31	DOUT30	DOUT29	DOUT28	DOUT27	DOUT26	DOUT25
06_h	DOUT24	DOUT23	DOUT22	DOUT21	DOUT20	DOUT19	DOUT18	DOUT17

Local Address	D7	D6	D5	D4	D3	D2	D1	D0
05_h	DOUT16	DOUT15	DOUT14	DOUT13	DOUT12	DOUT11	DOUT10	DOUT09
07_h	DOUT08	DOUT07	DOUT06	DOUT05	DOUT04	DOUT03	DOUT02	DOUT01

Table 11: Output register VME-DIO32-L

The data directions of the digital outputs are stored in the local addresses 00_h, 02_h, 01_h, 03_h.
Write accesses will be ignored. On read access always ‘1’ will be returned.

6 Connector Assignments

6.1 VMEbus P1

Device connector: DIN41612, type C, 96-pin, Harting: 09033966921

pin	row a	row b	row c
1	DATA 0	-	DATA 8
2	DATA 1	-	DATA 9
3	DATA 2	-	DATA 10
4	DATA 3	BG0 IN* ⎤	DATA 11
5	DATA 4	BG0 OUT* ⎦	DATA 12
6	DATA 5	BG1 IN* ⎤	DATA 13
7	DATA 6	BG1 OUT* ⎦	DATA 14
8	DATA 7	BG2 IN* ⎤	DATA 15
9	GND	BG2 OUT* ⎦	GND
10	-	BG3 IN* ⎤	-
11	GND	BG3 OUT* ⎦	-
12	DS1*	-	SYSRESET*
13	DS0*	-	LWORD*
14	R/W*	-	AM5
15	GND	-	ADDR 23
16	DTACK*	AM0	ADDR 22
17	GND	AM1	ADDR 21
18	AS*	AM2	ADDR 20
19	GND	AM3	ADDR 19
20	IACK*	GND	ADDR 18
21	IACKIN* ⎤	-	ADDR 17
22	IACKOUT* ⎦	-	ADDR 16
23	AM4	GND	ADDR 15
24	ADDR 7	-	ADDR 14
25	ADDR 6	-	ADDR 13
26	ADDR 5	-	ADDR 12
27	ADDR 4	-	ADDR 11
28	ADDR 3	-	ADDR 10
29	ADDR 2	-	ADDR 9
30	ADDR 1	-	ADDR 8
31	-	-	-
32	+ 5V	+ 5V	+ 5V

P1 connector according to DIN 41 612-C 96 / a+b+c

Signal Description
Signals with * … active low
Current rating: max 1.0 A per pin

- .... pin is not connected on the PCB

⎤⎦ .... signals are connected on the PCB

6.2 I/O-Connector P2

Device connector: DIN41612, type C, 64-pin, Harting: 09033646921

pin	row a	row c
1	GND1	VCC1
2	I/O2	I/O1
3	GND1	VCC1
4	I/O4	I/O3
5	GND1	VCC1
6	I/O6	I/O5
7	GND1	VCC1
8	I/O8	I/O7
9	GND2	VCC2
10	I/O10	I/O9
11	GND2	VCC2
12	I/O12	I/O11
13	GND2	VCC2
14	I/O14	I/O13
15	GND2	VCC2
16	I/O16	I/O15
17	GND3	VCC3
18	I/O18	I/O17
19	GND3	VCC3
20	I/O20	I/O19
21	GND3	VCC3
22	I/O22	I/O21
23	GND3	VCC3
24	I/O24	I/O23
25	GND4	VCC4
26	I/O26	I/O25
27	GND4	VCC4
28	I/O28	I/O27
29	GND4	VCC4
30	I/O30	I/O29
31	GND4	VCC4
32	I/O32	I/O31

P1 connector according to DIN 41 612-C 96 / a+c

Signal Description

GNDy, VCCy … power supply (U_{vcc}) for the digital I/O circuits to be fed externally. Each 4 channels are locally connected to the same power supply (y = 1, 2, ..., 4)

I/Ox ... I/O channels of VME-DIO32-L (x = 1, 2, ..., 32)

7 Order Information

7.1 Hardware

Type	Properties	Order No.
VME-DIO32-L	32 digital input/outputs	V.1607.05
Accessories		
VME-DPIO32-P2VCC	24 V connection for P2	V.1607.90
VME-DPIO32-P2VCC-3X	24 V connection for P2 for 3 slots	V.1607.93

Table 12: Order information hardware

7.2 Software Support

Type	Properties	Order No.
VME-DPIO32-OS9	C driver for OS-9 as source code	P.1607.50
VME-DPIO32-VxW	C driver for VxWorks	P.1607.56
For detailed information about driver availability for your operating system please contact our sales team.		

Table 13: Order information software

7.3 Manuals

PDF Manuals
For the availability of the manuals see table below.
Please download the manuals as PDF documents from our esd website https://www.esd.eu for free.

Manuals		Order No.
VME-DIO32-L-ME	Hardware manual in English for VME-DIO32-L	M.1607.27

Table 14: Available manuals

Printed Manuals
If you need a printout of the manual additionally, please contact our sales team (sales@esd.eu) for a quotation. Printed manuals may be ordered for a fee.