OPTORE-16
STANDARD

EDV-Nr.: A-1222

16 Isolated Digital Inputs
16 Reedrelay Outputs

wasco®

user‘s guide

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Table of Contents

1. Description

OPTORE-16STANDARD provides 16 digital inputs and 16 digital outputs each of which are opto-isolated galvanically separated for each channel. Inputs are isolated by 16 high power optocouplers with integrated schmitt trigger function, outputs by 16 reedrelays.

Resistor arrays easily to change and to plug in can adjust two different input voltage ranges. Output reedrelays manage a maximum switching current of 500 mA.

The output relays are connected to a 37pin Sub-D female connector, which is mounted to the slot bracket of the board. The optocoupler inputs are applied to a 40pin male connector (box header) on the board. Optionally, a set of female connector, ribbon cable and 37pin female Sub-D-connector with slot bracket is available to relocate to a slot bracket.

Pin assignment and input voltage ranges are identical to PCI card OPTORE-PCI16STANDARD.

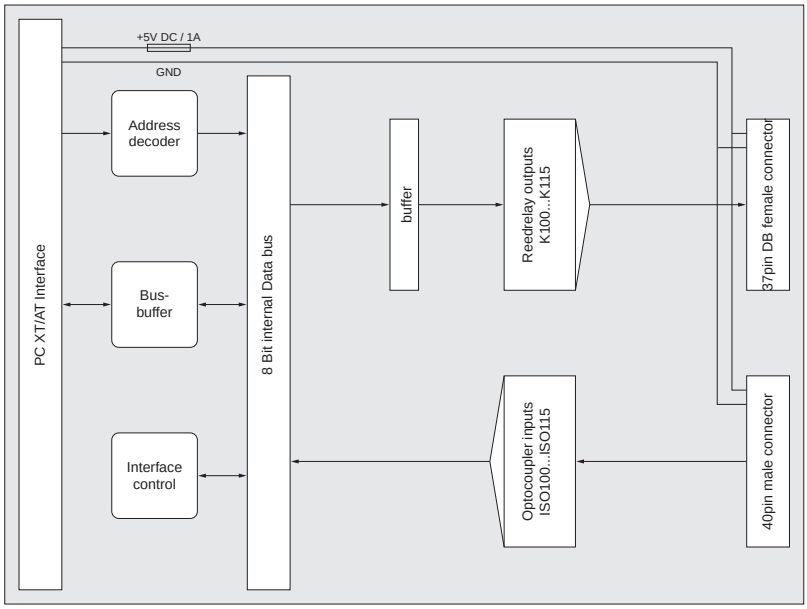
2. Installation of OPTORE-16STANDARD

Before you insert the OPTORE-16 to your computer make sure, that the computer is turned off or is disconnected from power source. Installing the interface card in an operating system may cause damages on OPTORE-16 and even other cards of your computer.

Select an empty ISA slot and plug in the card. Secure the slot bracket of the board to your computer chassis with a screw to avoid coming loose by effects of the connecting cables.

3. System components

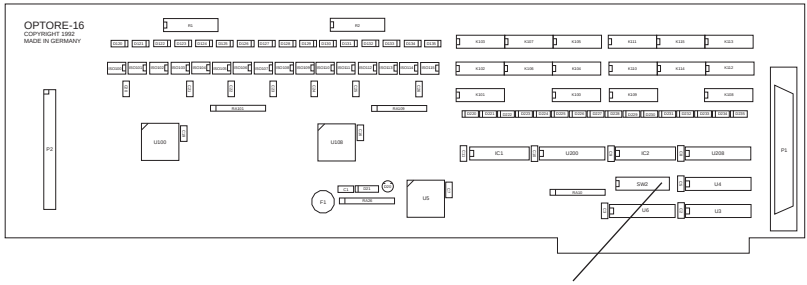
3.1 Block diagram



3.2 Configurating Addresses and access to the system components

OPTORE-PCI16 hardware components access by reading or writing to port addresses.

Port address areas wherein the devices can be accessed, are selectable by DIP switches on the board:



The Interface card OPTORE-16STANDARD decodes address lines A4 up to A11. Address lines A4 up to A9 are relevant for base port address, because the complete address range is not decoded in computers. The DIP switches of the address line A10 and A11 are always to be switched ON.

Make sure, that your selected port address is not used by any other peripheral card or computer itself. Default address of the interface card is 220h. In case the required port address is reserved already and you have to change this address please note, that you have to change the port addresses in the enclosed application examples as well.

The most important settings of port addresses you can see in following table:

Setting of port addresses:

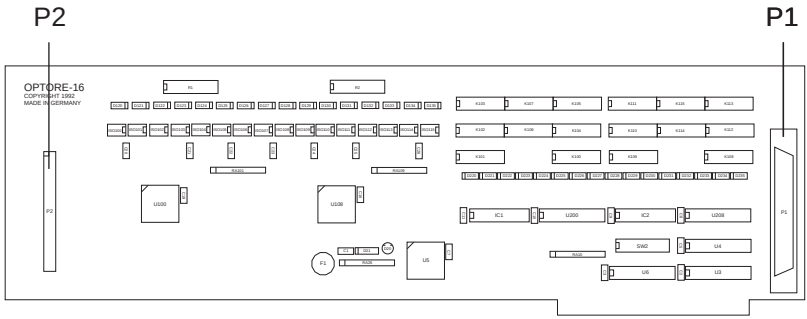
Switch SW2 Base address	1 A4	2 A5	3 A6	4 A7	5 A8	6 A9	7 A10	8 A11
200h	ON	ON	ON	ON	ON	OFF	ON	ON
210h	OFF	ON	ON	ON	ON	OFF	ON	ON
220h	ON	OFF	ON	ON	ON	OFF	ON	ON
230h	OFF	OFF	ON	ON	ON	OFF	ON	ON
240h	ON	ON	OFF	ON	ON	OFF	ON	ON
250h	OFF	ON	OFF	ON	ON	OFF	ON	ON
260h	ON	OFF	OFF	ON	ON	OFF	ON	ON
270h	OFF	OFF	OFF	ON	ON	OFF	ON	ON
280h	ON	ON	ON	OFF	ON	OFF	ON	ON
290h	OFF	ON	ON	OFF	ON	OFF	ON	ON
2A0h	ON	OFF	ON	OFF	ON	OFF	ON	ON
2B0h	OFF	OFF	ON	OFF	ON	OFF	ON	ON
2C0h	ON	ON	OFF	OFF	ON	OFF	ON	ON
2D0h	OFF	ON	OFF	OFF	ON	OFF	ON	ON
2E0h	ON	OFF	OFF	OFF	ON	OFF	ON	ON
2F0h	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
300h	ON	ON	ON	ON	OFF	OFF	ON	ON

Assignment of port addresses:

Port address	Function
000h .. 00Fh	DMA controller
020h .. 021h	Interrupt controller
040h .. 043h	Timer (8253)
060h .. 063h	System registry (8255)
080h .. 083h	DMA site registry
0AXh	NMI interrupt registry
0CXh	Reserved
0EXh	Reserved
100h .. 1FFh	Not used
200h .. 20Fh	Game Port
210h .. 217h	Expansion unit
220h .. 24Fh	Reserved
278h .. 27Fh	2nd parallel printer
2F8h .. 2FFh	2nd serial interface
300h .. 31Fh	Prototype card
320h .. 32Fh	Harddisk controller
378h .. 37Fh	Parallel printer
380h .. 38Fh	SDLC interface
3A0h .. 3AFh	Reserved
3B0h .. 3BFh	Monochrome adapter
3C0h .. 3CFh	Reserved
3D0h .. 3DFh	Colour graphic card
3E0h .. 3E7h	Reserved
3F0h .. 3F7h	Floppy controller
3F8h .. 3FFh	Serial interface

4. Connectors

4.1 Position of connectors

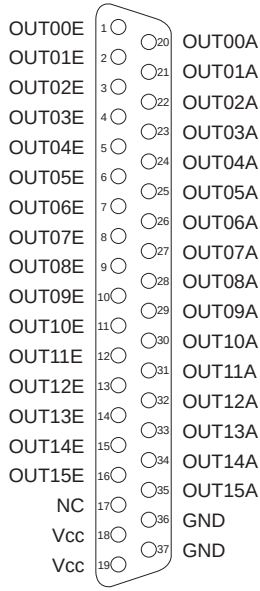


P1: Reedrelay outputs OUT00 - OUT15
P2: Optocoupler inputs IN00 - IN15

4.2 Pin assignment of P1

P1 is a 37pin Sub-D female connector mounted to the slot bracket of the board. It is identical to P1 of OPTORE-16EXTENDED, RELAIS-16STANDARD, RELAIS-16EXTENDED, RELAIS-32EXTENDED, OPTORE-PCI16STANDARD and OPTORE-PCI16EXTENDED

Reedrelay outputs are connected to this Sub-D connector P1



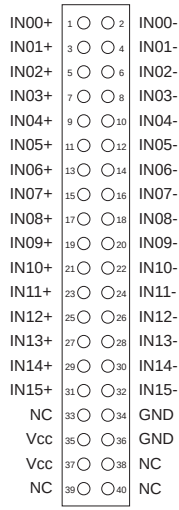
Vcc:
Internal Vcc (+ 5V) from the computer. **Never apply an external voltage across this pin!**

GND:
Ground

NC:
not connected

4.3 Pin assignment of P2

he box header male connector P2 is placed directly on the board, but you can relocate it with an optionally available set of female connector, ribbon cable and 37pin female sub-D-connector with slot bracket.
The 16 optocoupler inputs are connected to P2, identical to OPTORE-16EXTENDED, OPTOIO-16STANDARD, OPTOIO-16EXTENDED, OPTORE-PCI16STANDARD, OPTORE-PCI16EXTENDED, OPTOIO-PCI16STANDARD and OPTOIO-PCI16EXTENDED.
After relocation to a 37pin female connector, P2 of OPTORE-16STANDARD is compatible to P2 of OPTOIN-16STANDARD and OPTOIN-16EXTENDED.
Following figure shows the pin assignment:

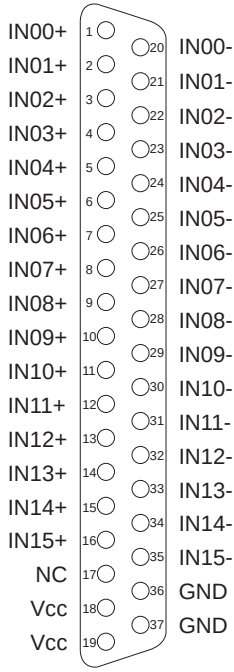


Vcc:
Internal Vcc (+ 5V) from the computer. **Never apply an external voltage across this pin!**

GND:
Ground

NC:
Pin not connected

4.4 Pin assignment of P2 on Sub-D 37 (connector cable set not included)



Vcc:
Internal Vcc (+ 5V) from the computer. **Never apply an external voltage across this pin!**

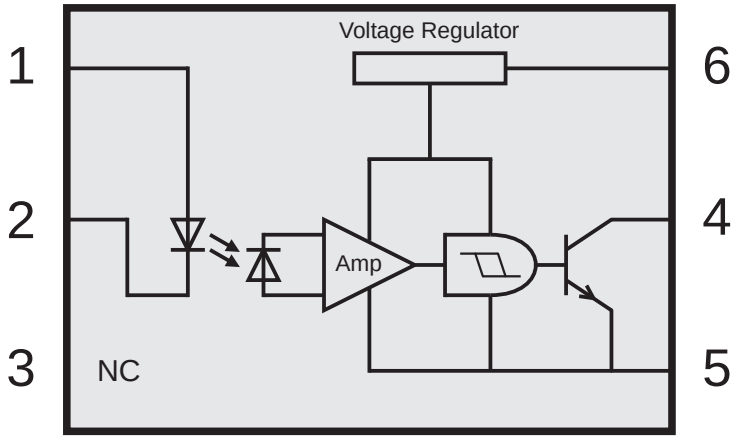
GND:
Ground

NC:
Pin not connected

5. Digital optocoupler inputs

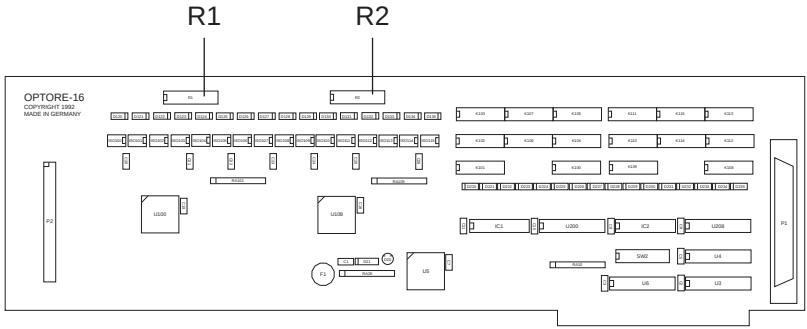
The OPTORE-16 provides 16 input channels, which are isolated by optocouplers. The isolation voltage between computer ground and optocoupler input is 500 V, while the isolation voltage within the input channels is limited to 100 V.

5.1 Pin assignment of the input optocouplers



5.2 Input voltage ranges

Two different input voltage ranges can be selected by interchanging resistor arrays R1 und R2



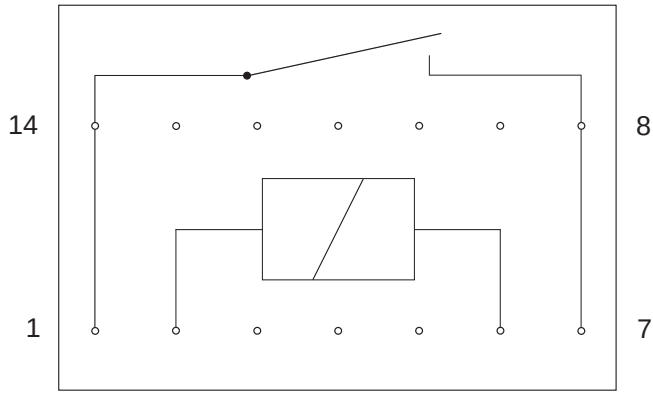
Following table shows the two input voltage ranges:

Resistor array R1, R2	identification	low	high
1,0 KOhm	102	0...1,5 V	2,2...15 V
4,7 KOhm	472	0...4,0 V	7,0...30 V

6. 16 reedrelay outputs

OPTORE-16STANDARD provides 16 output channels, which are galvanically isolated by reedrelays.
Isolation voltage between computer ground and relay output is 500 V.

6.1 Pin assignment of the reedrelays



6.2 Relays Specification

16 channels with galvanic isolation
Switching current: 500 mA
Switching voltage: 50 V DC
Switching rating: 10 W
Circuit time (typ): 0,5 ms
Release time: 0,2 ms
Coil voltage: 5 V
Coil resistance: 500 Ohm
Coil power: 10 mA

7. Programming

7.1 Programming instructions for OPTORE-16STANDARD

For easier programming of the wasco® interface card OPTORE-16STANDARD, we generated several pogramming examples in Basic, Turbo-C and Turbo-Pascal. Explanations joined with the programs help to retrace the addressing of the interface modules. Pogramming examples you can find in the source code in the according subdirectories on the enclosed CD.

Directory:

TP	- Programs in Turbo-Pascal
TC	- Programs in Turbo-C
GWBasic	- Programs in GW-Basic
PBasic	- Programs in Power-Basic
QBasic	- Programs in Quick-Basic
COM	- res. safe COM-File

You also can download latest software visiting http://www.wasco.de

Attention:
In order to avoid unnecessary computer crashes, you should read carefully the explanations of the respective programs before starting the program

7.2 Port addresses assignment

The port addresses of the single hardware components result from the I/O-base address (BA) and the according offset as follows:

Port/Registry	BA + Offset (hexadecimal)	command function
Optocoupler input port A	BA + 0	read
Optocoupler input port B	BA + 1	read
Reedrelay output port A	BA + 2	write
Reedrelay output port B	BA + 3	write

Following address area results at default base address 220h :

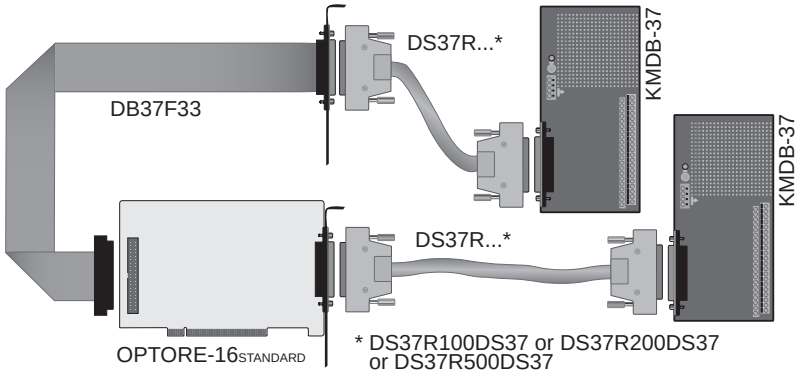
220h	input port A (inputs IN00 to IN07)
221h	input port B (inputs IN08 to IN15)
222h	output port A (outputs OUT00 to OUT07)
223h	output port B (outputs OUT08 to OUT15)

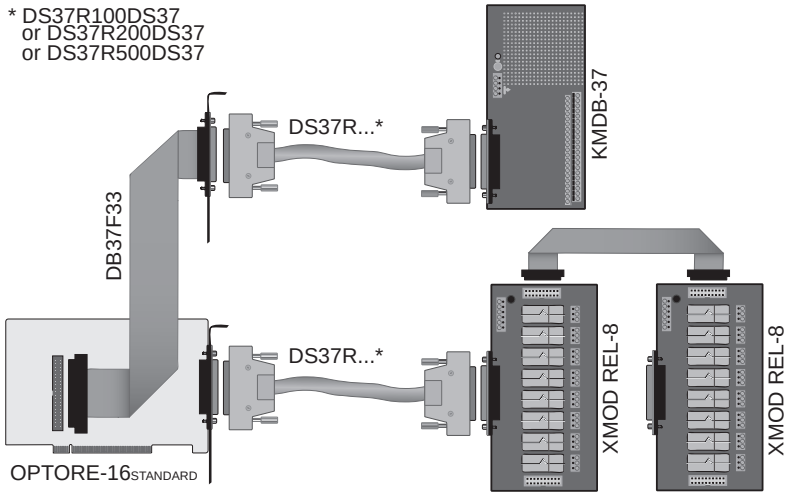
8. Accessories

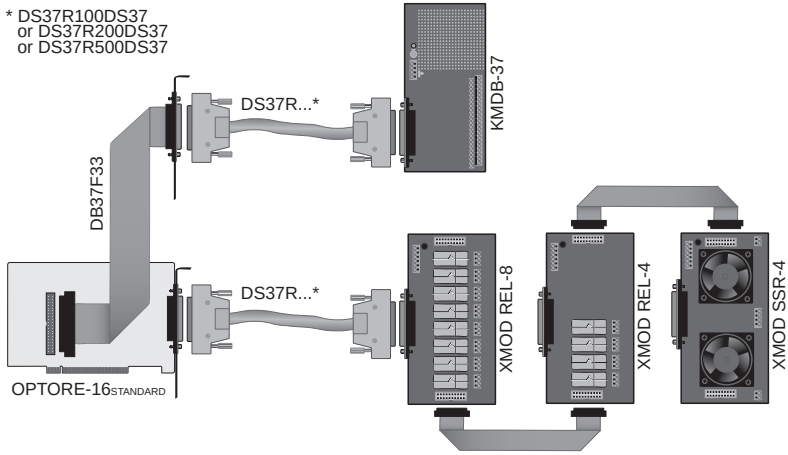
8.1 Fitting wasco®-accessories

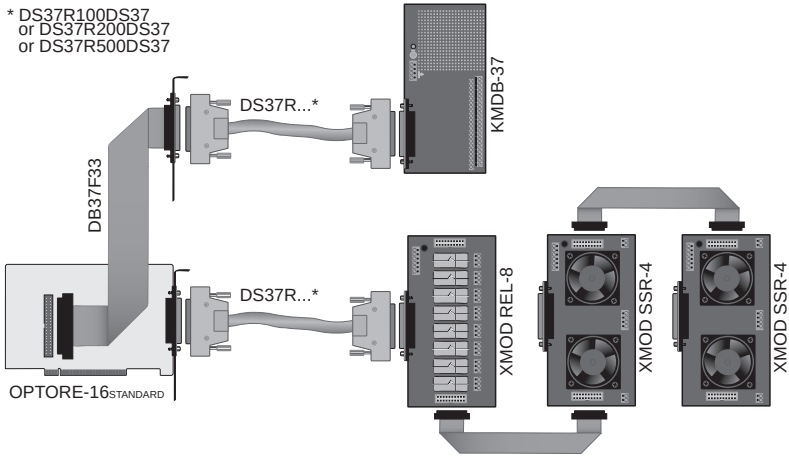
Connecting devices	EDV-Nr.
DB37F33 Ribbon cable	A-1976
DS37R100DS37 Connecting wire (1 meter)	A-202200
DS37R200DS37 Connecting wire (2 meter)	A-202400
DS37R500DS37 Connecting wire (5 meter)	A-202800
KMDB-37 Connecting board (screw terminal)	A-2046
XMOD REL-4 Relay modul	A-3264
XMOD REL-8 Relay modul	A-3268
XMOD SSR-2 Solid-State-Relay-Modul	A-3282
XMOD SSR-4 Solid-State-Relay-Modul	A-3284

8.2 Connection system (application samples)




* DS37R100DS37
or DS37R200DS37
or DS37R500DS37
DS37R...*
KMDB-37
DB37F33
DS37R...*
XMOD REL-8
XMOD REL-8
OPTORE-16STANDARD


* DS37R100DS37
or DS37R200DS37
or DS37R500DS37
DS37R...*
KMDB-37
DB37F33
DS37R...*
XMOD REL-8
XMOD REL-4
XMOD SSR-4
OPTORE-16STANDARD



8.3 Components for individual assembly

Components	EDV-Nr.
DSS37L Sub-D male connector 37pin with solder terminal	A-5506
DSH37L Sub-D hood for 37pin connector with solder terminal	A-5586
DSS37F Sub-D-connector 37pin for ribbon wire	A-5526
DSB37F Sub-D-female connector 37pin for ribbon wire	A-5566
DA37I slot bracket for a 37pin male/female connector	A-5754
PBZ40F female connector 40pin for ribbon wire	A-5642
FBL37 ribbon wire 37pin	A-5718
FBL40 ribbon wire 40pin	A-5720

9. Trouble Shooting

Following you find a short compilation of the most known error causes while starting or working with OPTORE-16.

Please firstly check the following points before contacting your supplier or distributor, we hope this will solve most of your problems:

1. Did you insert the OPTORE-16 to the connector properly?
2. Did you set correctly the base address of OPTORE-16?
3. Did you adjust the addresses in your software to the base address of your OPTORE-16?
4. Are there other interface cards at the same address area?
5. Is the fuse (F1) of the OPTORE-16 blown?
6. Are all cables in good order?
7. Did you install the latest version of **wasco**® driver?

   Updates you can download here: http://www.messcomp.com
   http://www.wasco.de

10. Specifications

Digital inputs by optocoupler

Optocoupler: 16 * PC900V
16 channels with galvanic isolation
galvanic isolation between each channel, two separate pins for each channel
Two input voltage ranges to select by included pluggable resistor arrays:

R = 4,7 kΩ:	high = 8..30 Volt
	low = 0..4 Volt
R = 1,0 kΩ:	high = 2,2..15 Volt
	low = 0..1,5 Volt

input frequency: max. 10 kHz

Digital outputs by reedrelay

16 channels with galvanic isolation
galvanic isolation between each channel, two separate pins for each channel
Switching current: 500 mA
Switching voltage: 50 V DC
Switching rating: 10 W
Operate time (typ): 0,5 ms
Release time: 0,2 ms
Coil voltage: 5 V
Coil resistance: 500 Ohm
Coil power: 10 mA

Connectors

1 * 37pin Sub-D female connector
1 * 40pin (male) connector

Fuse

+ 5 V 1 A Mini Fuse F1

Power consumption

+ 5 V typ. 450 mA

Other technical data

dimensions:	340 mm x 100 mm (l x h)
board design:	Multilayer board with 4 layers

11. Product Liability Act

Information for Product Liability

The Product Liability Act (Act on Liability for Defective Products - ProdHaftG) in Germany regulates the manufacturer‘s liability for damages caused by defective products.

The obligation to pay compensation can be given, if the product’s presentation could cause a misconception of safety to a non-commercial enduser and also if the end-user is expected not to observe the necessary safety instructions handling this product.

It must therefore always be shown, that the end-user was made familiar with the safety rules.

In the interest of safety, please always advise your non-commercial customer of the following safety instructions:

Safety instructions

The valid VDE-instructions must be observed, when handling products that come in contact with electrical voltage.

Especially the following instructions must be observed:
VDE100; VDE0550/0551; VDE0700; VDE0711; VDE0860.
The instructions are available from:
Vde-Verlag GmbH
Bismarckstr. 33
10625 Berlin

* unplug the mains cord before you open the unit or make sure, there is no current to/in the unit.

* You only may start up any components, boards or equipment, if they are installed inside a secure touch-protected casing before. During installation there must be no current to the equipment.

* Make sure that the device is disconnected from the power supply before using any tools on any components, boards or equipment. Any electric charges saved in components in the device are to be discharged prior.

* Live cables or wires, which are connected with the unit, the components or the boards, must be tested for insulation defects or breaks. In case of any defect the device must be immediately taken out of operation until the defective cables are replaced.

* When using components or boards you must strictly comply with the characteristic data for electrical sizes shown in the corresponding description

* As a non-commercial end-user, if it is not clear whether the electrical characteristic data given in the provided description are valid for a component you must consult a specialist.

Apart from that the compliance with building and safety instructions of every kind (VDE, TÜV, industrial injuries corporation, etc.) are subject to the user/customer.

12. CE Declaration of Conformity

This is to certify, that the product

OPTORE-16STANDARD
EDV-Number A-1222

comply with the requirements of the EC directives. This declaration will lose its validity, if the instructions given in this manual for the intended use of the products are not fully complied with.

EN 5502 Klasse B
IEC 801-2
IEC 801-3
IEC 801-4
EN 50082-1
EN 60555-2
EN 60555-3

The following manufacturer is responsible for this declaration:

Messcomp Datentechnik GmbH
Neudecker Str. 11
83512 Wasserburg

given by

Dipl.Ing.(FH) Hans Schnellhammer
(Execution Board)

Wasserburg, 06.06.2006

Reference system for intended use

The expansion card OPTORE-16STANDARD is not a stand-alone device. The CE-conformity only can be assessed when using additional computer components simultaneously. Thus the CE conformity only can be confirmed when using the following reference system for the intended use of the interface card:

Control Cabinet:	Vero IMRAK 3400	804-530061C 802-563424J 802-561589J
19“ Casing:	Vero PC-Casing	145-010108L
19“ Casing:	Addition Electronic	519-112111C
Motherboard:	GA-586HX	PIV 1.55
Floppy-Controller:	on Motherboard	
Floppy:	TEAC	FD-235HF
Grafic Card:	Advantech	PCA-6443
Interface card:	OPTORE-16STANDARD	A-1222