

Features

- 48 digital channels
- short PC-plug-in card (ISA)
- 25-pole Sub-D socket
- I/O port modules type 8255
- TTL-level

Applications

- digital controls
- signal acquisition/recording



The **PIO48II** is a digital I/O card with

... **48 digital channels** ...

for controlling and recording TTL-signals.

The card provides two 8255 port modules with

... **three 8 Bit ports each** ...

with programmable direction.

The port lines of the first PIO module (Bit 1..24) are brought out via a 25-pole Sub-D socket in the PC card cover. The port lines of the second port module (Bit 25..48) are also accessible by means of a PC card cover and a 25-pole Sub-D socket.

An extra-low voltage connector allows to tap the

... **5V voltage** ...

of the PC and is equipped with a miniature fuse.

Included as accessory is the hardware independent ActiveX control **LibadX** for programming under Windows® 2000/XP/Vista.

In addition the **PIO48II** can be used under Windows® 2000/XP/Vista together with our powerful software for acquisition and processing of measuring data

... **NextView® 4** ...

It is available as "Professional", "Lite" or "Client/Server" version. The free version **NextView® 4 Live!** is included with delivery.

With **NextView® 4 Live!** the entire functional range of the **PIO48II** can be tested.

For further information and software updates please visit our homepage at:

<http://www.bmcm.de>

1 Mounting the PIO48II

The first step is to fix the included cover to the **PIO48II** by means of the two hexagonal bolts. Then plug the ribbon cable with bracket, as shown above, onto the 26-pole pin connector P2, to make the digital lines of the second port module accessible from the outside at the 25-pole Sub-D socket of the additional bracket. Please note, that pin 1 of the Sub-D socket must be connected with pin 1 of the pin connector (square pad). After removing two adjacent blank brackets plug the **PIO48II** in a free slot of the standard ISA bus and fix the brackets to the PC with screws.

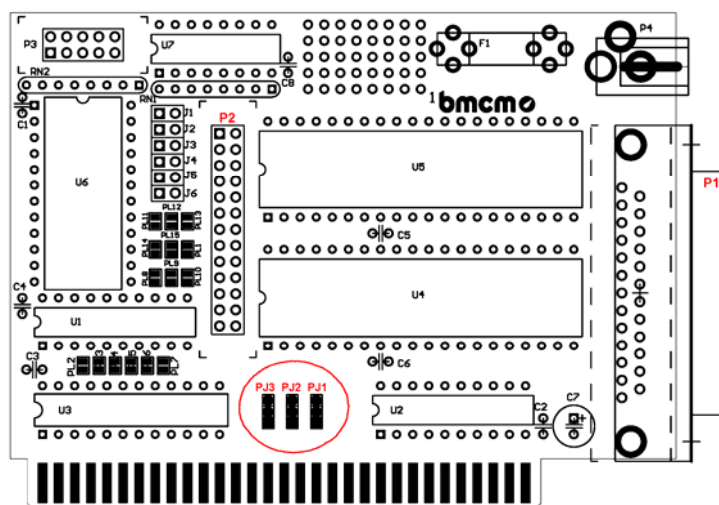


- **Turn off the PC before mounting the card to avoid damages at the card and the PC!**
- **Install the software before mounting the PIO48II (see chapter 5 "Software installation"), to be able to change the card settings if necessary.**

2 Set I/O address

The **PIO48II** uses the 8 Bit data bus and 16 addresses in the I/O-area of the 80x86/88 processor. By means of soldering bridges the basic address of the card (Default: \$210) can be set to one of the following values:

Basic address		PJ3	PJ2	PJ1
Hex	Decimal			
\$210	528			
disabled				
\$220	544			
\$230	560			
\$300	768			
\$310	784			
\$320	800			
\$330	816			



The address on the card and in the PC must be the same and must not be used by any other component in the PC (also see chapter 5.1.3), to allow for the communication between hardware and PC!

3 Connections

3.1 Auxiliary supply of the PC

The small connector at the bracket of the **PIO48II** leads out the 5V auxiliary supply of the PC. The figure on the right shows the pin assignment of the 5V voltage connector equipped with a miniature fuse.

Polarität des 5V
Klinensteckers
Polarity of the 5V
voltage connector



3.2 Digital lines

On the **PIO48II** board two port modules (type 8255) are integrated, both providing three 8 Bit digital ports A, B, C. The interfaces are bidirectional, which means that their in- and output direction is defined by software. The direction is always set for all lines of a digital port together, for the C port in groups of four.

The connections for the digital interfaces are accessible at the two 25-pole Sub-D sockets of the **PIO48II**. The lines of the first port module are available at the socket P1 of the board, the connection of the second port module at the additional bracket or at the 26-pole pin connector P2 (see figure above) on the board. Their pin assignment is illustrated in the following tables and figures.

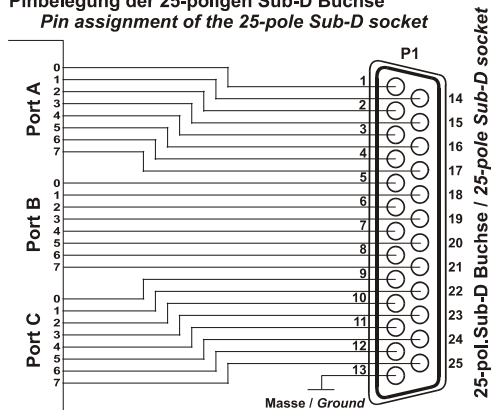
Port module 1:

Sub-D25 (P1)	Port / Bit	Sub-D25 (P1)	Port / Bit	Sub-D25 (P1)	Port / Bit	Sub-D25 (P1)	Assignment
1	A/0	5	B/0	9	C/0	13	digital ground (DGND)
14	A/1	18	B/1	22	C/1		
2	A/2	6	B/2	10	C/2		
15	A/3	19	B/3	23	C/3		
3	A/4	7	B/4	11	C/4		
16	A/5	20	B/5	24	C/5		
4	A/6	8	B/6	12	C/6		
17	A/7	21	B/7	25	C/7		

Portbaustein 1 (Leitung 1 .. 24)

Port (line 1 .. 24)

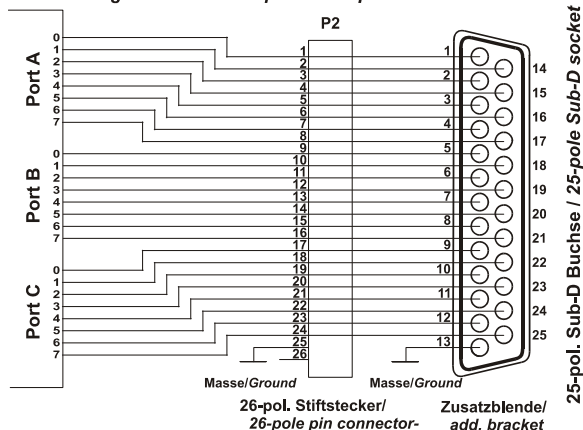
Pinbelegung der 25-poligen Sub-D Buchse
Pin assignment of the 25-pole Sub-D socket



Portbaustein 2 (Leitung 25 .. 48)

Port 2 (line 25 .. 48)

Pinbelegung der 26-pol. Stiftleiste bzw. 25-pol. Sub-D Buchse
Pin assignment of the 26-pole or 25-pole Sub-D socket



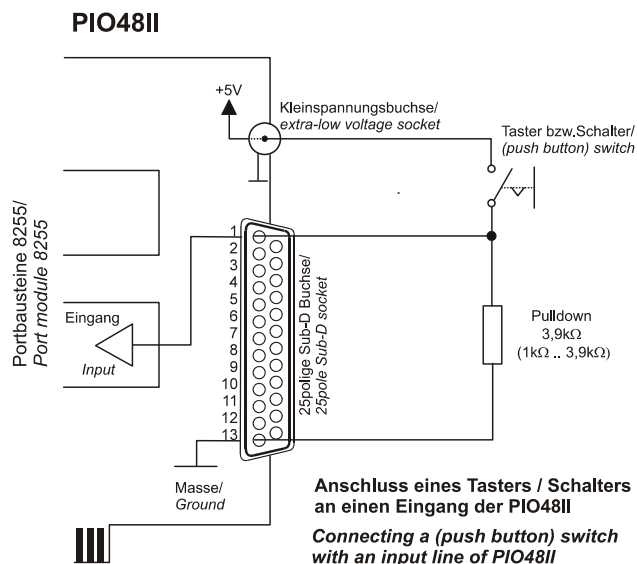
Port module 2:

Sub-D25	P2	Port / Bit	Sub-D25	P2	Port / Bit	Sub-D25	P2	Port / Bit	Sub-D25	P2	Assignment
1	1	A/0	5	9	B/0	9	17	C/0	13	25	digital ground (DGND)
14	2	A/1	18	10	B/1	22	18	C/1	-	26	-
2	3	A/2	6	11	B/2	10	19	C/2			
15	4	A/3	19	12	B/3	23	20	C/3			
3	5	A/4	7	13	B/4	11	21	C/4			
16	6	A/5	20	14	B/5	24	22	C/5			
4	7	A/6	8	15	B/6	12	23	C/6			
17	8	A/7	21	16	B/7	25	24	C/7			

4 Interfacing examples for the in- and outputs of the PIO48II

Inputs:

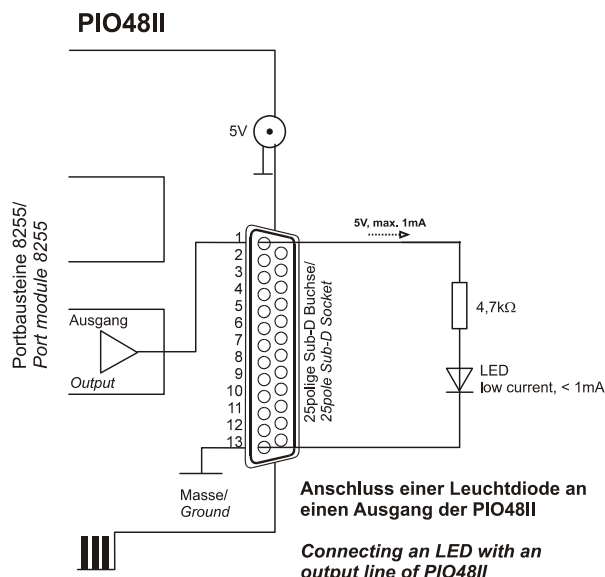
Using the extra-low voltage plug the input voltage is tapped from the PC. A 3.9kΩ pulldown resistor sets the input to *low* if the circuit is not closed.



Do not apply voltage to the ports without the relevant protective circuit. Two outputs connected with each other may get damaged by the high flow of current. The high-resistance CMOS-inputs can continuously switch between 0 and 1 without appropriate protective circuit (e.g. 10kΩ-Pulldown-resistor). The in-/ outputs of the PIO48II are applied to the 8255 port packages without protective circuit. For interfacing examples, please visit the FAQ section of our homepage.

Outputs:

The application on the right shows the connection of an output to an LED. The LED does not need an auxiliary voltage, but is directly provided by the output voltage. A current-limiting resistor prevents for the overload of the LED.



5 Software installation



All the software for Windows[®] 2000/XP/Vista and documentation available for the **PIO48II** is integrated on the "Software Collection"-CD included with delivery. When inserting the CD a CD starter opens automatically (otherwise: start **setup.exe**).



PIO48II

Change to the product page of the **PIO48II** by selecting the entry "Products" in the CD starter and then the hardware ("PIO48II") listed under the interface "ISA".



For detailed information about installing or operating the software please see the corresponding manuals. To open the documentation in PDF format the Adobe Acrobat Reader is required.



You can run any installation directly from CD. If your browser prevents this first save the setup program to hard disc before running it separately afterwards.

Software	Software product	Notes	Documentation
Device driver	BMCM-DR (driver package)	1. Installation of the driver package to hard disc 2. Installation by Windows [®] hardware wizard 3. Check installation and I/O address 4. Mount the card into the off-state PC	BMCM-DR-IG (driver installation manual)
Programming	STR-LIBADX	ActiveX control for hardware independent programming	STR-LIBADX-IG (installation / programming manual)
	STR-LIBADX-EX	example programs for LIBADX ActiveX control	-
	STR-PIO	easy-to-use ActiveX control for programming with Visual Basic [®] , Delphi [®] , Visual C++ [™]	STR-PIO-IG (installation / programming manual)
	STR-PIO-EX	example programs for STR-PIO ActiveX control	-
Operating program	NV4-LIVE	free online version of NextView [®] 4 for testing the functional range of the hardware	NV4-IG (installation Stand-alone version) IG-NV4-CS (inst. Client/Server version)
	NV4	measuring software NextView [®] 4 (requires license number, no freeware!)	NV4-UM (user manual)
	NV4-SERV	Client/Server version of NV4 consisting of NextView [®] 4 Server and NextView [®] 4 Workstation	"First steps" in the NextView [®] 4 demo project (displayed at first start of the software)
	NV4-WORK		

5.1 Driver installation



For the **PIO48II** a driver installation is always required. Only then additional software can be installed. To make sure that the installation is done correctly, please follow the instructions in the order as described below and mount the card after successful installation into the off-state PC.

5.1.1 Install driver package

The prior installation of the bmc driver package [BMCM-DR](#) to the hard disc makes the driver search for Windows® much easier. Especially when you update a driver only the new driver package must be installed, the hardware uses the new version automatically. The link to install the driver package is located on the **PIO48II** product page of the CD.

5.1.2 Manual installation with the Windows® hardware wizard

Open the control panel to manually install new hardware with the Windows® hardware wizard:

- **Windows® XP/Vista:** Start / Control Panel / Add New Hardware
- **Windows® 2000:** Start / Settings / Control Panel / Add New Hardware

If you are not familiar with the manual installation under Windows®, please follow the detailed instructions of the driver installation manual on CD.

5.1.3 Check installation and I/O address

In the Windows® Device Manager the entry "Data Acquisition (BMC Messsysteme GmbH)" is included after successful installation displaying the installed bmc hardware. To open the Device Manager proceed as follows:

- **Windows® Vista:** Start / Control Panel / System / "Device Manager"
- **Windows® XP:** Start / Control Panel / System / TAB "Hardware" / button "Device Manager"
- **Windows® 2000:** Start / Settings / Control Panel / System / TAB "Hardware" / button "Device Manager"

Double click the **PIO48II** to open its properties. For general information, any existing device conflicts and possible sources of error see TAB "General". Switch to TAB "Resources" to change the I/O address.

The I/O address assigned to the **PIO48II** by the system and set on the board by soldering jumpers enables Windows® to communicate with the card. Therefore the address settings on the hardware and in the system must correspond and not be used in the PC by any other hardware component. If necessary, the I/O address has to be adjusted by changing the settings on the card (see chapter 2 "Set I/O address") or in the Device Manager. For detailed help about how to change the I/O address, please see the driver installation manual on CD.

5.2 Programming

Programming the **PIO48II** under Windows® 2000/XP/Vista with Visual Basic®, Delphi®, Visual C++™ is possible with the hardware independent [STR-LIBADX](#). It is available on the **PIO48II** product page of the "Software Collection"-CD. After installation the ActiveX control must be loaded into the respective programming environment.



- **Visual Basic®:** menu "Project / Components", entry "LIBADX Object Library 4.0"
- **Delphi®:** menu "Components / Import ActiveX", entry "LIBADX Object Library 4.0"



The easy-to-use, product specific ActiveX control [STR-PIO](#) is located on the on the **PIO48II** product page of the "Software Collection"-CD. Checkmark "PIO II ActiveX Control module" to load the card into the programming environment.

If you select the entry [STR-LIBADX-EX](#) or [STR-PIO-EX](#), listed directly under the installation program of the corresponding ActiveX control, you can install example programs (incl. source code) demonstrating how to apply the ActiveX control.

The data sheet [STR-DPIO](#) contains instructions for DOS programming and can be downloaded as PDF from our website.

5.3 Using the PIO48II with NextView®4



Install the "Live!" version of the professional software NextView®4 for measurement data acquisition and processing to test the features and functions of the **PIO48II** directly. The setup program [NV4-LIVE](#) is available in the section "NextView® 4.x". Select your measuring system (**PIO48II**) by pressing the button "Add" in the dialog "Device Setup" of the installation program.

When you open the software you get first instructions about how to operate the program. For detailed information an online help is provided.



With NextView®4 Live! signals cannot be stored. The full version NextView®4 is no freeware and requires a license number!

6 Important notes for using the PIO48II

- The **PIO48II** is only suitable for extra-low voltages - please observe the relevant regulations!
- ESD voltages at open lines may cause malfunction during operation.
- All accessible pins are electrostatic sensitive devices. Provide for earthed conductive work place during installation.
- The **PIO48II** must only be used in closed PC housing (for reasons relating to EMC).
- The **PIO48II** is electrically connected to the chassis of the PC, which is usually also connected to ground.
- For cleaning use water and mild detergent only. The board is designed to maintenance free.
- The product must not be used for safety-relevant tasks. With the use of the product the customer becomes manufacturer by law and is therefore fully responsible for the proper installation and use of the product. In the case of improper use and/or unauthorized interference our warranty ceases and any warranty claim is excluded.



Do not dispose of the product in the domestic waste or at any waste collection places. It has to be either duly disposed according to the WEEE directive or can be returned to bmcm at your own expense.

7 Technical data PIO48II (typical at 20°C and 5V supply)

• Digital in- and outputs

Port inputs:	0 - 5V (TTL)
Surge protection:	max. 5.5V, max. ± 20 mA in total of all input channels!
Current pick-up per output pin:	1mA (with app. 4V level), max. 2.5mA (with app. 3V level)
Sampling rate:	under Windows® up to 500 values/second can be sampled (depending on software and PC)
Input resistance:	min. 1M Ω (with PC turned off: 1k Ω)

• General data

Supply:	+4.5V..+5.5V from PC/AT bus, max. 100mA
Digital connections:	all channels at a 25-pole Sub-D socket
Voltage output:	5V from PC; with 1A miniature fuse at 2.1mm extra-low voltage plug
CE standards:	EN61000-6-1, EN61000-6-3, EN61010-1; for decl. of conformity (PDF) visit www.bmcm.de
ElektroG // ear registration:	RoHS and WEEE compliant // WEEE Reg.-No. DE75472248
CE standards:	EN50081T1, EN50082T1, EN61010-1; for decl. of conformity (PDF) visit www.bmcm.de
Max. permissible potentials:	60V DC acc. to VDE , max. 1kV ESD on open lines
Temperature ranges:	operating temp. -25°C..+50°C, storage temp. -25°C..+70°C
Relative humidity:	0-90% (not condensing)
Dimensions:	105 * 82 * 15 mm ³
Delivery:	product, PC bracket, "Software Collection" CD with drivers, description
Available accessories:	Sub-D plug ZUST25, connecting cable ZUKA25, optocoupler board OI16
Guarantee:	2 years with effect from sales date, damages at product resulting from improper use excluded

• Software support

Software on CD (included):	ActiveX Controls LibadX (hardware independent) and STR-PIO for programming under Windows® 2000/XP/Vista; measuring program NextView®4 Live! to test and operate the hardware
NextView®4 (optional):	professional software (versions: Professional, Lite, Client/Server) for the acquisition and analysis of measurement data under Windows® 2000/XP/Vista