

iM-AD25a

TCP/IP-based intelligent Frontend Module (16 channels)

Features

- 25kHz overall sampling rate
- 16 analog input channels
- 1 digital output channel (4 bit)
- solid aluminum housing
- $\pm 10V$, 16 bit or $\pm 5V$, 15 bit
- TCP/IP Ethernet (Twisted Pair)
- synchronization
- external clock (TTL), 0..20kHz

Applications

- remote data acquisition
- quality monitoring and control
- substitute for recording instruments



The **iM-AD25a** is a remote measuring system for data acquisition with

... Client/Server technology ...

Via network it is connected to a server unit, which saves the transmitted measuring data, so that fast multi-channel measurements with almost unlimited storage requirements are possible.

The **iM-AD25a** uses TCP/IP which guarantees reliable data transmission and even makes transmission via internet possible.

The device has its own

... 32-bit CPU ...

for measuring data acquisition and a RISC-CPU as scanning sequencer.

It is provided with

... one digital output (4 bit) and 16 analog inputs ...

(single-ended) within the adjustable measuring range of $\pm 10V$ or $\pm 5V$ and a

... 16-bit A/D converter ... ,

(in the $\pm 5V$ measuring range 15 bit) transforming the incoming voltages via a multiplexer in digital values.

The **iM-AD25a** reaches a

... overall sampling rate of 25kHz ...

for each device. So when using several devices the overall sampling rate increases respectively.

Even when using the **iM-AD25a** as single device it has great advantages compared to the classical single measurement devices, like PC measuring cards. Via a network cable the external device can directly be connected to the PC, where the measuring data is transmitted to. That means that installation of hardware or drivers is not necessary. This makes the

iM-AD25a also interesting for users of laptops and

... perfect for mobile use ...

When using several **iM-AD25a** the

... number of measuring systems is basically not limited ...

and is only determined by the bandwidth of the TCP/IP network. This leads measuring data acquisition to completely new dimensions.

... Synchronization ...

of the individual devices to each other is possible. The devices are connected with each other via a 2-wire line.

If desired, the synchronization can be related to the absolute time, which is realized by the optional DCF synchronization module of the server unit. With synchronization a time accuracy of $\pm 2ms$ can be achieved.

For measurements not relating to time an external clock signal can be connected.

When using several **iM-AD25a** the devices can be fixed on top of each other to a stable unit.

Configuration of the device (e.g. assignment of the TCP/IP address) is done with the software *iM Admin*, which is on the bmcm "Soft-

ware Collection"-CD included with delivery.

The **iM-AD25a** offers superb performance together with the software for measuring data acquisition and analysis

... **NextView®4** ...

In addition we provide the programming interface and ActiveX Control **LibadX** for programming on Windows® 2000/XP/Vista.

Furthermore the **iM-AD25a** is directly supported by the operating systems

... **MAC OS X,**
FreeBSD and Linux ...

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

<http://www.bmcm.de>



1 iM-AD25a and NextView®4

The **iM-AD25a** perfectly goes together with the modern measuring data acquisition and analysis program **NextView®4** by BMC Messsysteme GmbH.

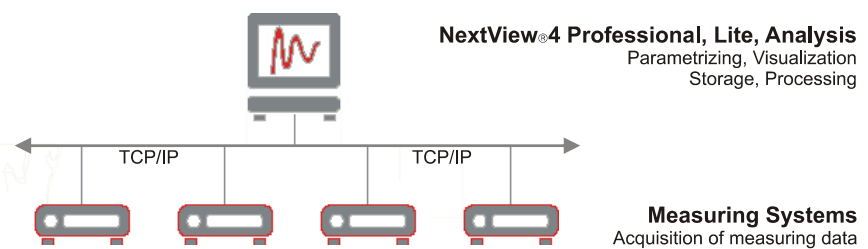
The software is available in different versions (Demo, Live!, Lite, Professional, Client/Server, Analysis).

The number of connected devices is not limited (exception: **NextView®4 Lite**). Of course, the **iM-AD25a** can be used together with other measuring systems within the same application.

The free version **NextView® 4 Live!** is included with delivery to test the features and functions of the **iM-AD25a**.

The measuring devices can be synchronized and communicate with the PC via a TCP/IP connection. On the PC the software **NextView®4** is installed under the operating system Windows® 2000/XP/Vista.

Changing the **iM-AD25a** measuring systems even during a scan is possible without any loss of data. This makes data security even higher. As soon as it is connected the new device is configured by the server and starts with the measurement.



The modern and intuitively operable program **NextView®4** is responsible for the configuration and visualization of the complete measuring system.

Here all channels can be set according to their physical quantity and the measuring process (duration, frequency, measurement file name) is defined.



The measuring data are visualized in different displays, like in an online display e.g. You can even scroll back and forth in the display

to see the signal run of the past or show the current values.

To reduce the high amount of data a different storage ratio can be defined for each channel separately. This must be in an integer ratio to the scan frequency (i.e. 1:1, 1:2, 1:3, ...).

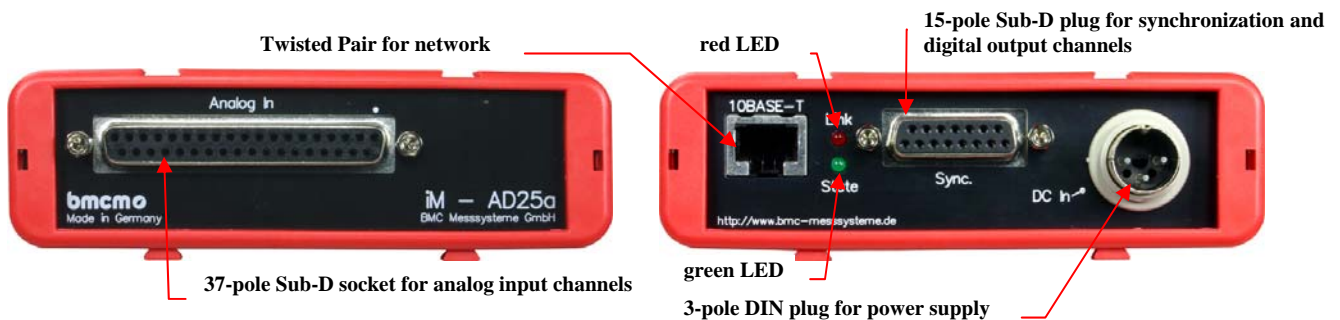
If the storage ratio is below the scan frequency it can also be chosen if the minimum, maximum or average of the scanned data is stored.

It is also possible to select more than one storage type for the same input channel, e.g. maximum and minimum or all three types as well.

Various functions for analysis and documentation are provided for a fundamental interpretation of the measuring data.

2 Connections

The connections for the analog inputs are located at the front of the **iM-AD25a**, the others are at the back of the device.



Two LEDs at the back of the device indicate the following status:

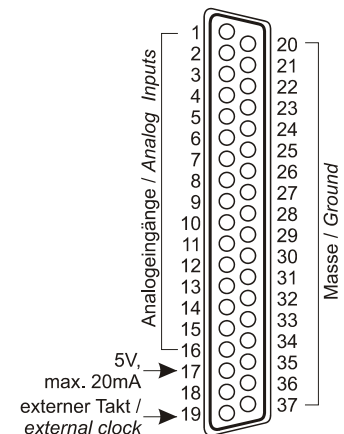
Status	green LED	red LED
flashing	device on, waiting for connection to software*	transmission of data
on	device on, connection to software*	connection to hub
off	device off	no connection to hub

* NextView®4 or Libad4; not: iM-Admin

2.1 Analog input channels

The 37-pole Sub-D socket provides for 16 analog voltage inputs with $\pm 10V$ or $\pm 5V$ measuring range (single-ended). The measuring range is set via software (e.g. in **NextView®4**). The pin assignment of the 37-pole Sub-D socket for the **iM-AD25a** is listed in the following table:

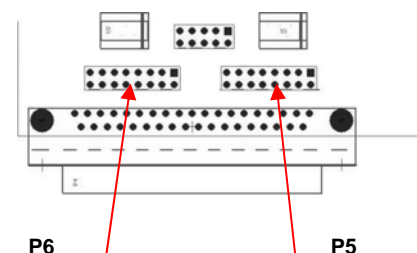
Pin	iM-AD25a
1..16	Analog In 1..16
17	Auxiliary voltage (5V, max. 20mA)
18	-
19	External clock (see below)
20..37	Analog Ground (AGND)



The max. potentials to ground must not exceed $\pm 12V$. Any channel overload may influence measurements of other channels and may lead to wrong values.

There are two 16-pole pin connectors (P5, P6) on the **iM-AD25a** board. These are the internal connections of the analog inputs, which for example can be used for connecting current shunts. See the table below for the pin assignment:

Pin (P5)	iM-AD25a	Pin (P6)	iM-AD25a
1	Analog In 1	1	Analog In 9
3	Analog In 2	3	Analog In 10
5	Analog In 3	5	Analog In 11
...
13	Analog In 7	13	Analog In 15
15	Analog In 8	15	Analog In 16
2, 4, ..., 14, 16	AGND	2, 4, ..., 14, 16	AGND



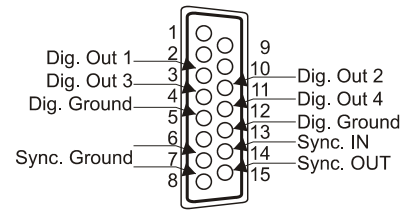
2.2 External clock

For scans that are not based on time (but e.g. on rotation angles) you can connect an external clock signal at pin 19 of the 37-pole Sub-D socket (s. 2.1 Analog input channels). This has to be a TTL signal with a maximum frequency of 20kHz. The clock signal must be high at rising edge for at least 10 μ s.

2.3 Digital output channels

The 4 output lines of the digital channel can be connected at the 15-pole Sub-D socket at the back of the device. For the pin assignment please see the table below.

Pin	iM-AD25a
3, 4, 11, 12	Digital Out 1..4
5, 13	Digital Ground (DGND)

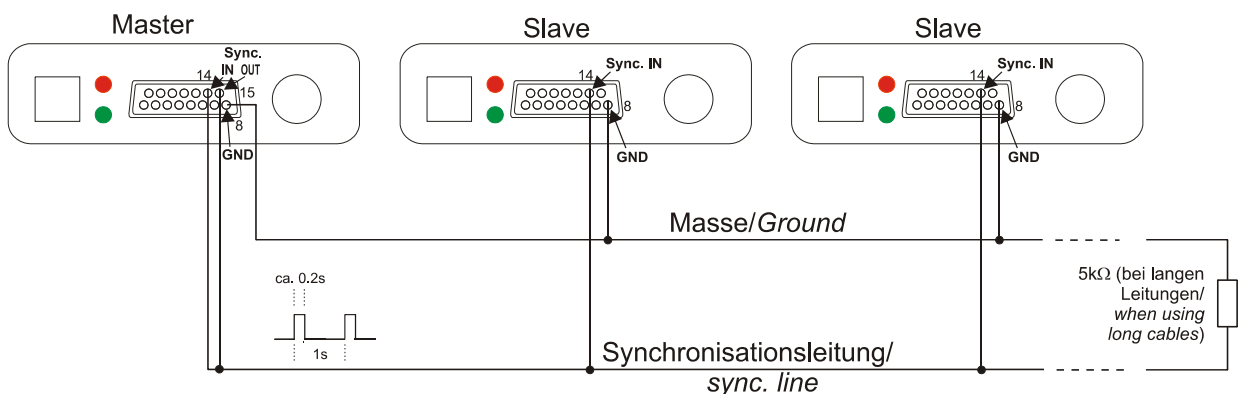


2.4 Synchronization

The **iM-AD25a** provides for a synchronization in- and output, which can be reached at the 15-pole Sub-D socket at the back of the device. The table below lists the pin assignment of the 15-pole Sub-D socket:

Pin	iM-AD25a
7, 8	Sync. GND
14	Sync. IN
15	Sync. OUT

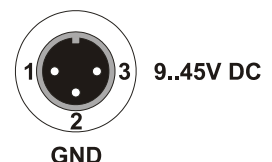
The following figure explains the connection of several **iM-AD25a** to a synchronization line. Always one device provides for the synchronization cycle (*Master*), that means the sync. line must also be connected to **Sync. OUT** (pin15), whereas the others (*Slaves*) are only connected with each other at **Sync. IN** (pin 14). In addition all devices need a connection to ground (pin 7,8).



- Only one device can be the master!
- When using long lines the last device should have a 5kΩ resistance at Sync. IN.
- Max. 30 devices can be connected at Sync. OUT of the master.

2.5 Network

The server and the **iM-AD25a** communicate via network, which is realized with by a Twisted Pair connection (10Mbit). When directly connecting the **iM-AD25a** to the server PC a crosslink cable must be used. Both cables are available as accessories (ZUKA10T or ZUKA-CL10T).



A firewall software installed on the PC might hinder the operation of the **iM3250T**. In this case please contact your network administrator.

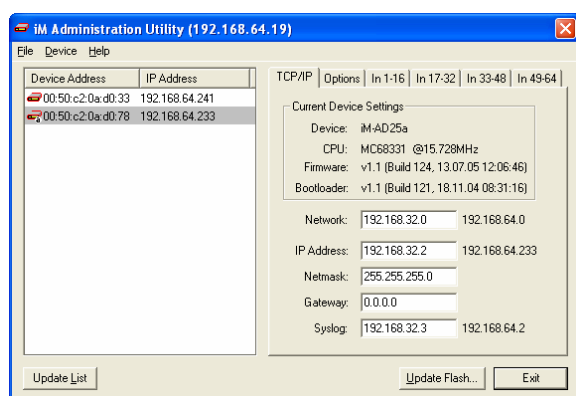
2.6 Power supply

The power supply of the device is led out via the 3-pole DIN plug at the back of the device. The input voltage must be in the range of 9..45V DC.

3 Configuration

Connect the **iM-AD25a** to the PC and start the software *iM Admin* which is required for the configuration of the device. First the program has to be installed on hard disk. You will find the installation program on our "Software Collection"-CD included with delivery. Under "Products" in the "Welcome"-Screen choose the interface "Ethernet (iM-AD25a/iM-AD25/iM3250T/iM3250)". To start the installation select "iM Admin" in the section "iM Administration Utility".

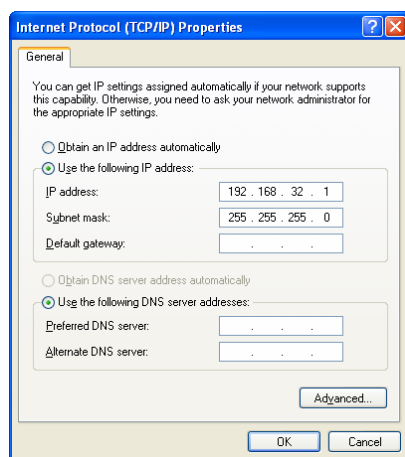
You will be prompted to choose the desired program group, from where *iM Admin* can be reached in the Windows® Start menu, and the directory path, where the software will be installed. After the successful installation please restart your computer if necessary and open the program *iM Admin*, which you will find in the respective program group in the Windows® Start menu (*Start / Programs / Program group*).



In the window on the left all measuring devices, which have a working network connection to the PC, are listed with their IP addresses. The IP address shown is the last set address of the device.

When you select an **iM-AD25a** all current parameters of this device are displayed in the TABs on the right. Please check the configuration of the device. Pressing the button *Update Flash...* conveys the new settings to the hardware.

Using the **iM-AD25a** together with **NextView®4** the correct assignment of the IP address and the netmask is of decisive importance. Please check these setting in the TAB *TCP/IP*.



Useful advices for correct settings:

Each participant of the network has his own IP address, which consists of four groups of numbers. To guarantee that a data package arrives at the correct address, this IP address must have been given out only once. Every IP address contains the network number identifying the net your PC belongs to. It must be guaranteed that the PC and the **iM-AD25a** are in the same net, that means that they have the same network number, so that they can communicate with each other. Please refer to your network administrator for an available IP address in your net and adjust the settings of the device in the *iM Admin* (TAB *TCP/IP*).

If there is only the PC and the measuring device in your network you can use the following configuration:

Netmask: 255.255.255.0
IP Address of the PC: 192.168.32.1
IP Address of the iM-AD25a: 192.168.32.2

Specify the IP address via the *Control Panel* (*Start / (Settings)*) of the PC:

- Windows® 2000: open dialogs *Network Connections / Local Area Connection*, press button *Properties...*, select entry *Internet Protocol (TCP/IP)*, click on button *Properties...*
 → set IP address and netmask number in the dialog *Internet Protocol (TCP/IP) Properties*
- Windows® XP: open dialogs *Network Connections / Local Area Connection*, press button *Properties...* (TAB *General*), select entry *Internet Protocol (TCP/IP)*, click on button *Properties...*
 → set IP address and netmask number in the dialog *Internet Protocol (TCP/IP) Properties*

4 Important notes for using the iM-AD25a

- The **iM-AD25a** is only suitable for extra-low voltages, please observe the relevant regulations!
- Only use an electrical isolated power supply unit (with CE).
- For reasons relating to CE use shielded cables. Connect the shield to ground at one end only. Close open inputs if possible. ESD voltages on lines may cause malfunction during operation.
- The Gain is adjusted to even values. Therefore only 64000 values of the full range of the converter are used. As a result, the measuring ranges are effectively slightly larger ($\pm 10.24V$) than the indicated measuring ranges, providing for the advantage that overranges can be recognized.
- The AD converter of the **iM-AD25a** has a code noise of up to ± 4 LSB. For a 16-bit accuracy you must average app. 10times in order to suppress the noise.
- For cleaning use water and mild detergent only. The device is designed to be maintenance-free.
- The device must not be used for safety-relevant jobs. 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 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.

5 Technical data iM-AD25a (typ. at 20°C, after 5min.)

• Analog input channels

Description:	16 input channels, single-ended			
Overvoltage protection:	$\pm 35V$ (when turned on), $\pm 20V$ (when turned off), max. $\pm 20mA$ in total of all input channels!			
Input resistance // input capacity:	1M Ω (when turned off: 1k Ω) // 5pF			
Zero shift // gain drop:	$\pm 50ppm/^{\circ}C$ // $\pm 50ppm/^{\circ}C$			
	measuring range	resolution	abs. accuracy	noise
	$\pm 10V$	16 bit (305 μV)	$\pm 2.5mV$	$\pm 1mV$
	$\pm 5V$	15 bit (305 μV)	$\pm 2.5mV$	$\pm 1mV$
Sampling rate:	25kHz overall sampling rate*			
Frequency accuracy // frequency drift:	max. $\pm 100ppm$ // max. $\pm 50ppm/^{\circ}C$			
External clock:	connect to pin 19 of the Sub-D37, TTL signal (low: 0..1V; high: 3..5V), max. 20kHz, rising edge, min. 10 μs			
Memory:	only depending on the size of the hard disk of the server PC			
Trigger // prehistory:	rising/falling edge, window trigger, logical trigger // 0.99% (with NextView [®] 4)			

* The overall sampling rate is the sum of the sampling rates of the individual used channels (e.g. from 5 channels scanned with 1kHz results a overall sampling rate of 5kHz).

The values for accuracy always relate to the respective measuring range. Errors might add at worst.

• Digital output channel

Description:	1 digital channel (TTL-level), 4 bit, connectable via a 15-pole Sub-D socket
Resistance R_i // Output current:	1k Ω // 0.5mA

• General data

Power supply:	+9..45V DC, typ. 3W, max. 5W (electrically isolated by DC/DC converter in the device)
Analog connections:	37-pole Sub-D socket
Connection for power supply:	3-pole DIN plug
Ethernet connection:	Twisted Pair RJ45 socket (10BASE-T), 10Mbit
Connection for synchronization bus and digital channel:	15-pole Sub-D socket, Sync OUT: 15V level, max. 30*Sync IN connectable at master with +5k Ω
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
Max. permissible potentials:	60V DC acc. to VDE , max. 1kV ESD on open lines
Temperature ranges:	operating temp. $-25^{\circ}C..+50^{\circ}C$, storage temp. $-25^{\circ}C..+70^{\circ}C$
Relative humidity:	0-90% (not condensing)
Housing // Protection type:	aluminum housing, size: 167x113x30mm ³ // IP50
Delivery:	device, Software Collection"-CD incl. drivers, <i>iM Admin</i> , and NextView [®] 4 Live!, documentation
Available accessories:	optocoupler board OI16, DIN rail set ZU-SCHI, Sub-D plugs ZUST37 and ZUST15, 3-pole DIN socket ZU3DIN, connecting cables ZUKA37SB, ZUKA37SS, ZUKA10T (Twisted Pair), ZUKA-CL10T (Crosslink), gender changer ZU37SS, connector boards ZU37BB/-CB/-CO, power supply ZU-PW10W
Guarantee:	2 years with effect from sales date, damages at product resulting from improper use excluded

• Software support

Software on CD (incl. with delivery):	programming interface and ActiveX Control LibadX for programming on 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

Manufacturer: BMC Messsysteme GmbH. Subject to change due to technical improvements. Errors and printing errors excepted. Rev. 4.2 11/28/2007