

iM-AD25

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

Features

- 25kHz cumulative sampling rate
- 16 analog input channels
- 1 digital output channel (4 Bit)
- solid aluminum housing
- 16 Bit converter
- TCP/IP Ethernet (Twisted Pair)
- synchronisation

Applications

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



The **iM-AD25** 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-AD25** uses TCP/IP which guarantees reliable data transmission and even makes transmission via internet possible.

The device has its own

... 32Bit-CPU ...

for measuring data acquisition and a RISC-CPU as scanning sequencer. It is provided with

... one digital output (4 Bit), 16 analog input channels...

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

... 16 Bit A/D converter ... ,

which transforms the incoming voltages via a multiplexer in digital values. The **iM-AD25** reaches a

... cumulative sampling rate of 25kHz ...

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

Even when using the **iM-AD25** 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-AD25** also interesting for users of laptops and

... perfect for mobile use ...

When using several **iM-AD25** 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.

... Synchronisation ...

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

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

When using several **iM-AD25** the devices can be fixed on top of each other to a stable unit.

The **iM-AD25** offers superb performance together with the measuring data acquisition and analyzing software

... NextView®/NT ...

In addition we provide the programmatic interface and ActiveX Control BMCSAD for the programming on Windows® 98/Me/NT4.0/2000/XP.

Please visit our homepage for further information and software updates: www.bmcm.de.

iM-AD25 and NextView®/NT

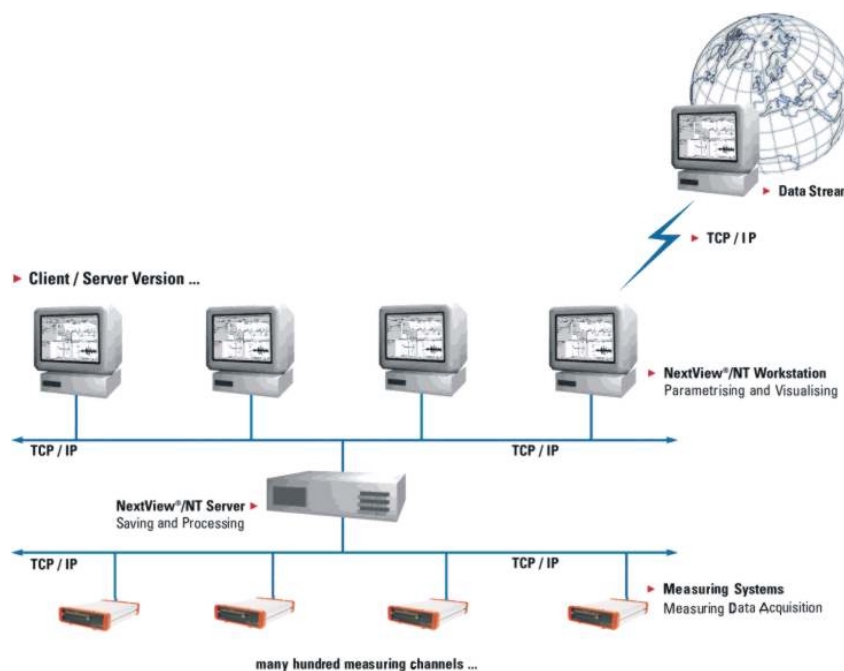
The **iM-AD25** perfectly goes together with the modern measuring data acquisition and analysis software **NextView®/NT** by BMC Messsysteme GmbH.

The software is available as Standalone (*Light* or *Professional*) as well as *Client/Server* version, depending on the number of required measuring systems. Of course the **iM-AD25** can be used together with other measuring systems within the same application.

The figure on the right shows the set-up when using the Client/Server version. A server unit functions as interface between two different networks: the measuring network and the office network. That implies fast data transmission and taking the load of the office network. In this case **NextView®/NT** is splitted in two software parts: **NextView®/NT Server** and **NextView®/NT Workstation**.

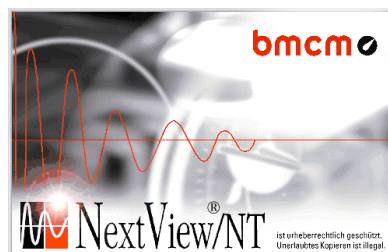
The measuring devices communicate with the server PC via the measuring net and send their measuring data to the server using the TCP/IP measuring data bus. The server runs with the software **NextView®/NT Server** on the operating system Windows® NT4.0/2000/XP, which guarantees highest data security. Additionally it can be equipped e.g. with mirrored hard disks or various backup media (DAT tape, CD writer etc.).

Changing the **iM-AD25** 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 second software part is the modern and intuitively operatable program **NextView®/NT Workstation** 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, file name of the measurement etc.) is defined.



The measuring data are visualized e.g. in an online display. You can

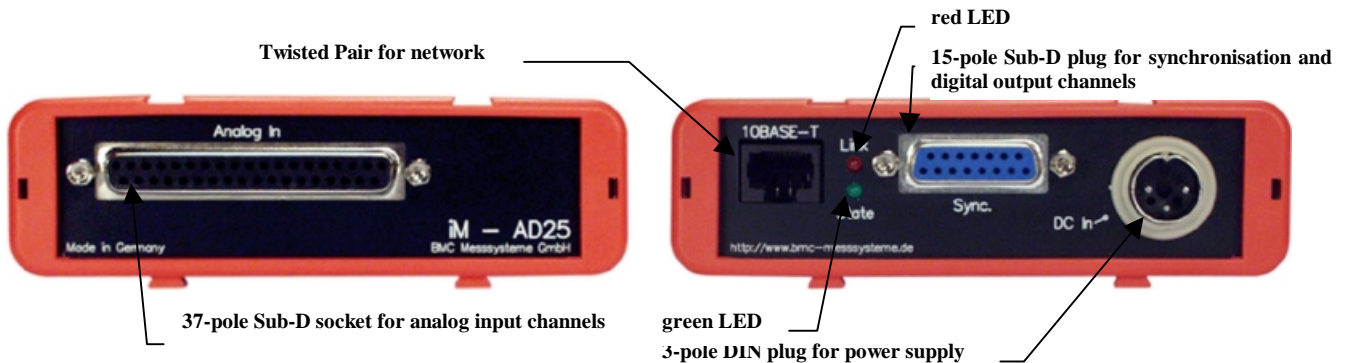
even scroll back and forth in the display to see the signal run of the past or show the current values.

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.

Connections

The connections for the analog input channels are located at the front of the **iM-AD25**, the others are at the back of the device.



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

status	green LED	red LED
on	device on	connection to hub
off	device off	no connection to hub
flashing	-	transmission of data

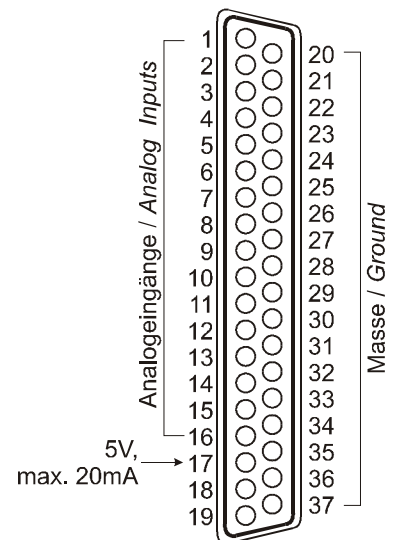
Analog Input Channels

The 37-pole Sub-D socket provides for 16 analog voltage inputs with a measuring range of $\pm 5V$ (single-ended). The pin assignment of the 37-pole Sub-D socket for the **iM-AD25** is listed in the following table:

Pin	iM-AD25
1..16	analog input channels 1..16
17	auxiliary voltage (5V, max. 20mA)
18, 19	-
20..37	GND



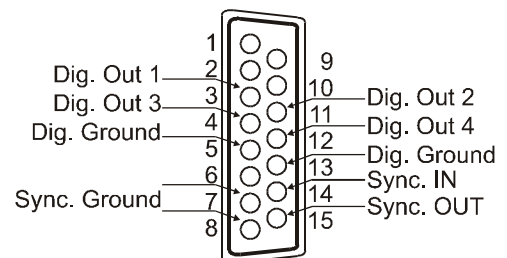
The max. potentials to ground must not exceed $\pm 7V$. Any channel overload may influence measurements of other channels and may lead to wrong values.



Digital Output Channel

The 4 lines of the digital output 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-AD25
3,4,11,12	digital lines 1-4
5	dig. GND

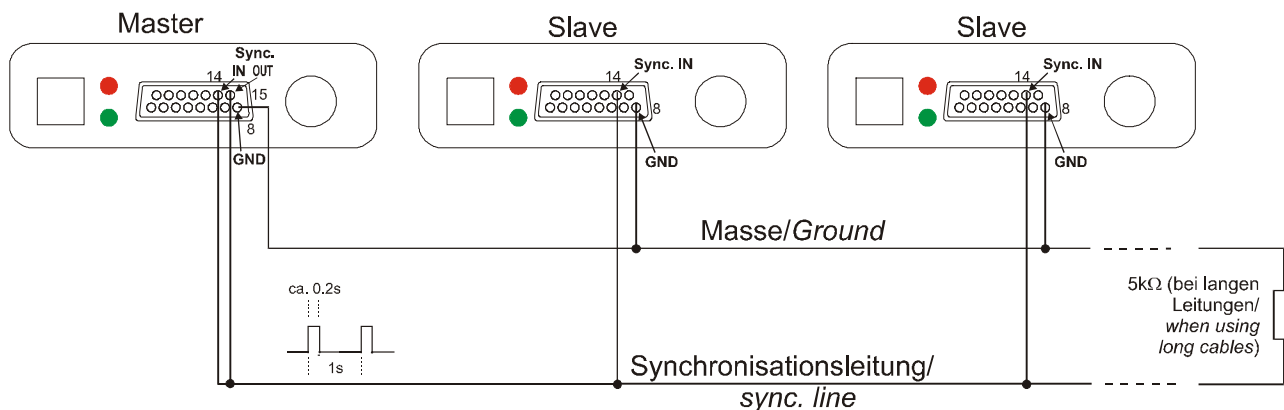


Synchronisation

The **iM-AD25** provides for a synchronisation 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-AD25
7,8	Sync. GND
14	Sync. IN
15	Sync. OUT

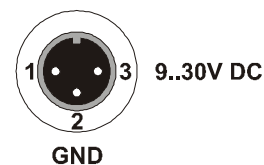
The following figure explains the connection of several **iM-AD25** to a synchronisation line. Always one device provides for the synchronisation cycle (*Master*), that means the sync. line must also be connected to **Sync. OUT** (pin 15), whereas the others (*Slaves*) are only connected with each other 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.

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..30V DC.



Network

The server and the **iM-AD25** communicate via network, which is realized with by a Twisted Pair connection (10MBit). When directly connecting the **iM-AD25** to the server PC a crosslink cable must be used. Both cables are available as accessories (ZU-KA10T or ZU-KACL10T).

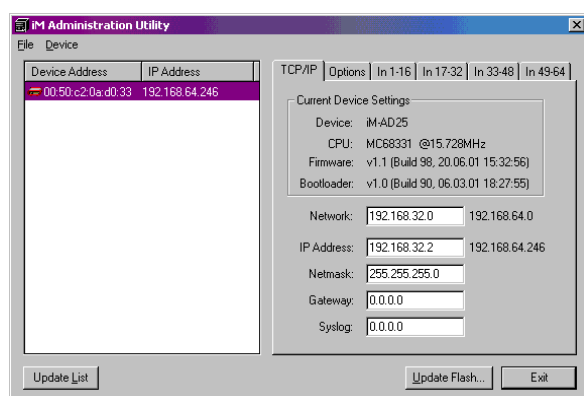


A firewall software installed on the PC might hinder the operation of the **iM-AD25**. In this case please contact your network administrator.

Configuration

Connect the **iM-AD25** to the PC and start the software *iM Admin* which is necessary 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. Choose the entry "Products" in the "Welcome"-Screen and the interface "Ethernet (iM-AD25/iM3250T/iM3250)". To start the installation select "iM Administration Utility".

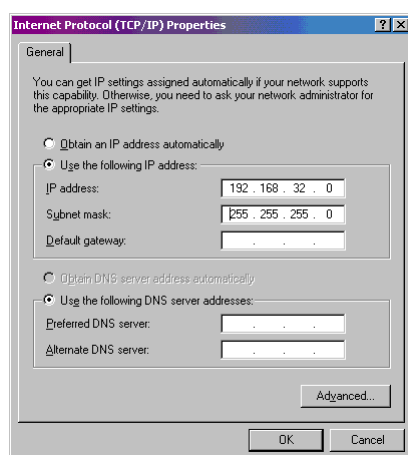
You will be prompted to choose the desired program group, from where *iM Admin* can be reached in the Windows® Start menu, and the directory path, where the software will be installed. After successful installation please restart your computer if necessary and open the program *iM Admin*, which you will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



In the white field 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-AD25** 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-AD25** together with **NextView®/NT** 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-AD25** 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-AD25: 192.168.32.2

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

- Windows® 98/Me: dialog *Network*, TAB *Configuration*, entry *TCP/IP*, click on button *Properties...*
→ set IP address and netmask number in the dialog *Microsoft TCP/IP Properties*
- Windows® NT 4.0: dialog *Network*, TAB *Protocols*, entry *TCP/IP Protocol*, click on button *Properties...*
→ set IP address and netmask number in the dialog *Microsoft TCP/IP Properties*
- Windows® 2000/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*

Important Notes for Using the iM-AD25

- The **iM-AD25** 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 ($\pm 5.12V$) than the indicated measuring ranges, providing for the advantage that overranges can be recognized.
- The AD converter of the **iM-AD25** has a code noise of up to ± 4 LSB. For a 16 Bit accuracy you must average approx. 10 times 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.

Technical Data iM-AD25 (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:	1M Ω (when turned off: 1k Ω)
Input capacity:	5pF
Zero shift:	$\pm 50ppm/^{\circ}C$
Gain drop:	$\pm 50ppm/^{\circ}C$
	measuring range resolution abs. accuracy noise
	$\pm 5V$ 16 Bit (156 μV) $\pm 2.5mV$ $\pm 1mV$
Sampling rate:	25kHz cumulative sampling rate*
Frequency accuracy:	max. $\pm 100ppm$
Frequency drift:	max. $\pm 50ppm/^{\circ}C$
Memory:	only depending on the size of the hard disk of the server PC
Trigger:	rising/falling edge, window trigger, logical trigger
Prehistory:	0..99% (with NextView [®] /NT)

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

The values for accuracy always relate to the respective measured value. 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 :	1k Ω
Output current:	0.5mA

General Data

Power supply:	+9..30V DC, typ. 5W, 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 synchronisation 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:	EN50081T1, EN50082T1, EN61010-1; for decl. of conformity (PDF) visit www.bmc.de
Max. permissible potentials:	60V DC acc. to VDE , max. 1kV ESD on open lines
Temperature range:	operation temp. -10°C..60°C, storage temp. -25..85°C
Relative humidity:	0-90% (not condensing)
Housing:	aluminum housing, size: 167x113x30mm ³
Protection type:	IP50
Delivery:	device, "Software Collection"-CD incl. drivers and <i>iM Admin</i> , documentation
Available accessories:	Hatrail set ZU-SCHI, Sub-D plugs ZUST37 and ZUST15, 3-pole DIN socket ZU3DIN, connecting cables ZUKA37SB, ZUKA37SS, connector box ZU37BNC, power supply ZU-PW6W, Twisted Pair cable ZUKA10T (3m), Crosslink cable ZUKACL10T
Guarantee:	2 years with effect from sales date, damages at product resulting from improper use excluded

Software Support

Software on CD (incl. with delivery):	programmatic interface and ActiveX Control BMCSAD for programming on Windows [®]
NextView [®] /NT (optional):	superb performance of the iM-AD25 together with the modern measuring and analysis software NextView [®] /NT
NextView [®] /NT Server (optional):	software for storing measuring data in the PC (requires Windows [®] NT4.0/2000/XP)
NextView [®] /NT Workstation (optional):	software for configuring the iM-AD25 measuring systems, visualisation of measuring data, analysis