NEW: PCI–Express version!

High-precision universal 16 bit multifunctional DAQ board   ME-FoXX ME-46xx

This **DAQ** board series for professional applications offers a high level of flexibility. You will be surprised about the versatile functions the board offers. Starting with lowcost allround starter models up to highend versions with complete opto-isolation and lots of extra features - you will find the right board for nearly every standard **DAQ** application!

- Up to 32 single-ended/16 differential **analog inputs**. Models "s": 8 inputs can also operate as single-ended channels with **simultaneous sampling** . Ranges ±10 V, ±2.5 V, 0...+10 V, 0...+2.5 V.
- **16 bit/max. 500 kHz A/D conversion**. External digital and analog trigger.
- Models "i" **A/D section opto-isolated**.
- Up to 4 analog output channels. Range ±10 V. Models with **FIFO** per channel.
- **16 bit/max. 500 kHz D/A conversion**. External digital trigger.
- Models "i" **D/A section opto-isolated**.
- **32 digital I/O channels**, grouped as 4x 8 bit ports: Models without "i" TTL level, each port programmable as inputs/outputs. Models "i" 8 opto inputs, 8 opto outputs and 2x 8 TTL inputs/outputs.
- Models with timer controlled bit pattern output with FIFO.
- 3x 16 bit counters. Models without "i" TTL level, models "i" opto-isolated. All lines available on connector.
- Plug'n'Play. Available for the bus platforms **StandardPCI** and **PXI/CompactPCI** (PCI Local Bus 2.1 compatible), **PCI-Express** and with ME-Synapse: **Ethernet/LAN, USB**.

Universal board!

All-round DAQ & control board for all platforms!

- - - Software included on CD: - - -
- ME-iDS and ME-iDC driver and configuration tool for **Windows XP, 2000, Vista and GNU Linux 2.6**.
- Supports **Visual C/C++**, **Visual Basic**, **VEE Pro** (Windows), **LabVIEW** (Windows, Linux), **Python**.
- Programming examples.

"Soft manuals" English and German for Acrobat Reader/PDF.

- - - Specifications - - -

Analog inputs	ME-LittleFoXX ME-4650	ME-RedFoXX ME-4660	ME-SlyFoXX ME-4670	ME-SylverFoXX ME-4680
Number	16 single-ended	16 single-ended	32 single-ended or 16 differential	
		Models "s": 8 of the single-ended channels also with simultaneous sampling (with Sample&Hold), rest: Standard single-ended channels		
Ranges	±10 V, ±2.5 V, 0...10 V, 0...2.5 V			
FIFO	1 k FIFO (1024 values) for conversion with channel list			
Isolation	-	Models "i": Up to 500 V (specification of the opto coupler chip)		
A/D converter	16 bit/max. 500 kHz (see the **"Information on A/D and D/A rates"**)			
Ext. trigger digital	External digital trigger (rising, falling, both edges); TTL or on models "i" with opto-isolation			
analog	-	-	Ext. analog trigger (rising, falling, both edges)	
Analog outputs	ME-4650	ME-4660	ME-4670	ME-4680
Number	-	2 channels	4 channels	
Ranges	-	±10 V		
Isolation	-	Models "i": Up to 500 V (specification of the opto coupler chip)		
D/A conversion	-	16 bit/500 kHz (see the **"Information on A/D and D/A rates"**)		
FIFO	-	-	-	4 k per channel
Trigger	-	External digital trigger (rising, falling edge)		
Digital I/O	ME-4650	ME-4660	ME-4670	ME-4680
Number	Models without "i" 4x 8 bit TTL I/O ports, each port programmable as inputs/outputs; 2 ports on D-sub, 2 ports on IDC			
	-	Models "i": 8 opto inputs, 8 opto ouputs on D-sub and 2x 8 bit TTL I/O ports, each port programmable as inputs/outputs, on IDC (on-board)		
Level	Models without "i": Standard TTL level			
	-	Models "i" opto-isolated ports: Standard 5 V level, optional up to 48 V. Outputs open collector		
Extras	-	-	-	Bitpattern generator, timer controlled via FIFO (uses D/A FIFO 3)
Counter	ME-4650	ME-4660	ME-4670	ME-4680
Number	-	3 independent 16 bit, 8254 compatible		
Level	-	Models without "i": TTL. Models "i" opto-isolated: Standard 5 V level, optional up to 48 V. Outputs open collector		
Lines	-	All lines (Clock, Gate, Out) of all countrs wired to connector		
General	ME-4650	ME-4660	ME-4670	ME-4680
Bus interface	StandardPCI or CompactPCI/PXI; 32 bit/33 MHz PCI Local Bus 2.1 compatible. PCI-Express x2			
Settings	Via Software; Windows Plug'n'Play			
Size (mm)	StandardPCI: 175 x 107 (without slot bracket/connector); CompactPCI/PXI: 160 x 100 (3 HE Europacard); PCI-Express: 111 x 168 (without slot bracket/connector)			
Connectors	78-pin D-sub female, on-board pin field (2x 8 bit TTL digital I/O ports C/D). A flat ribbon cable with 25-pin D-sub female and slot bracket (ME AK-D25F/S) is included; uses a second PC slot			

High-precision universal 16 bit multifunctional DAQ board   ME-FoXX ME-46xx

Ready for **ME-Synapse** — Version / CompactPCI
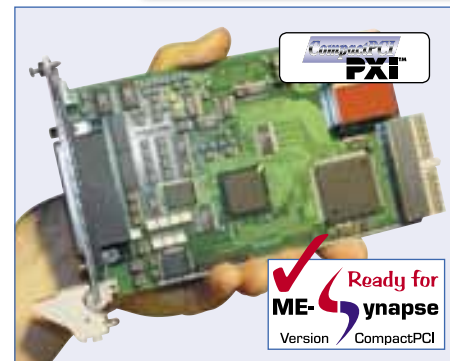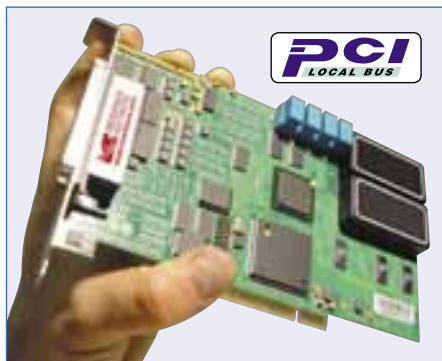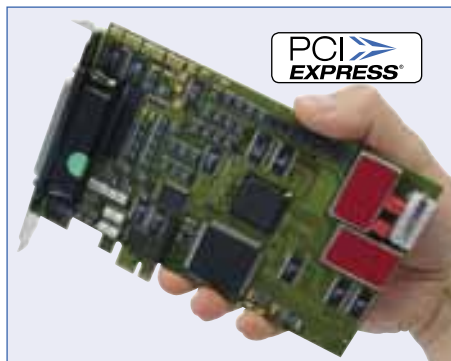
- - - Ordering codes and features — ME-FoXX ME-46xx family - - -

Model	16 bit/500 kHz analog inputs — Channels[1]	Isol.	ExATrig[2]	16 bit/500 kHz analog outputs — Channels	Isol.	FIFO	Digital I/O[3] — Chan.	Isol.	16 bit cnt. — No.	Isol.	Bus
ME-Jekyll ME-4610											
ME-4610 PCI	16	-	-	-	-	-	32	-	3	-	PCI
ME-LittleFoXX ME-4650											
ME-4650 PCI	16	-	-	-	-	-	32	-	-	-	PCI
ME-4650 cPCI	16	-	-	-	-	-	32	-	-	-	PXI/CompactPCI
ME-4650 PCIe	16	-	-	-	-	-	32	-	-	-	PCI-Express
ME-RedFoXX ME-4660											
ME-4660 PCI	16	-	-	2	-	-	32	-	3	-	PCI
ME-4660 cPCI	16	-	-	2	-	-	32	-	3	-	PXI/CompactPCI
ME-4660 PCIe	16	-	-	2	-	-	32	-	3	-	PCI-Express
ME-4660s PCI	16 - 8	-	-	2	-	-	32	-	3	-	PCI
ME-4660s cPCI	16 - 8	-	-	2	-	-	32	-	3		PXI/CompactPCI
ME-4660s PCIe	16 - 8	-	-	2	-	-	32	-	3		PCI-Express
ME-4660i PCI	16	-	√	2	√	-	32	➡ 16	3	√	PCI
ME-4660i cPCI	16	-	√	2	√	-	32	➡ 16	3	√	PXI/CompactPCI
ME-4660i PCIe	16	-	√	2	√	-	32	➡ 16	3	√	PCI-Express
ME-4660is PCI	16 - 8	√	-	2	√	-	32	➡ 16	3	√	PCI
ME-4660is cPCI	16 - 8	√	-	2	√	-	32	➡ 16	3	√	PXI/CompactPCI
ME-4660is PCIe	16 - 8	√	-	2	√	-	32	➡ 16	3	√	PCI-Express
ME-SlyFoXX ME-4670											
ME-4670 PCI	32 16	-	-	√	4	-	-	32	-	3	-	PCI
ME-4670 cPCI	32 16 -	-	√	4	-	-	32	-	3	-	PXI/CompactPCI
ME-4670 PCIe	32 16 -	-	√	4	-	-	32	-	3	-	PCI-Express
ME-4670s PCI	32 16 8	-	√	4	-	-	32	-	3	-	PCI
ME-4670s cPCI	32 16 8	-	√	4	-	-	32	-	3	-	PXI/CompactPCI
ME-4670s PCIe	32 16 8	-	√	4	-	-	32	-	3	-	PCI-Express
ME-4670i PCI	32 16 -	√	√	4	√	-	32	➡ 16	3	√	PCI
ME-4670i cPCI	32 16 -	√	√	4	√	-	32	➡ 16	3	√	PXI/CompactPCI
ME-4670i PCIe	32 16 -	√	√	4	√	-	32	➡ 16	3	√	PCI-Express
ME-4670is PCI	32 16 8	√	√	4	√	-	32	➡ 16	3	√	PCI
ME-4670is cPCI	32 16 8	√	√	4	√	-	32	➡ 16	3	√	PXI/CompactPCI
ME-4670is PCIe	32 16 8	√	√	4	√	-	32	➡ 16	3	√	PCI-Express
ME-SylverFoXX ME-4680											
ME-4680 PCI	32 16 -	-	√	4	-	√	32	-	3	-	PCI
ME-4680 cPCI	32 16 -	-	√	4	-	√	32	-	3	-	PXI/CompactPCI
ME-4680 PCIe	32 16 -	-	√	4	-	√	32	-	3	-	PCI-Express
ME-4680s PCI	32 16 8	-	√	4	-	√	32	-	3	-	PCI
ME-4680s cPCI	32 16 8	-	√	4	-	√	32	-	3	-	PXI/CompactPCI
ME-4680s PCIe	32 16 8	-	√	4	-	√	32	-	3	-	PCI-Express
ME-4680i PCI	32 16 -	√	√	4	√	√	32	➡ 16	3	√	PCI
ME-4680i cPCI	32 16 -	√	√	4	√	√	32	➡ 16	3	√	PXI/CompactPCI
ME-4680i PCIe	32 16 -	√	√	4	√	√	32	➡ 16	3	√	PCI-Express
ME-4680is PCI	32 16 8	√	√	4	√	√	32	➡ 16	3	√	PCI
ME-4680is cPCI	32 16 8	√	√	4	√	√	32	➡ 16	3	√	PXI/CompactPCI
ME-4680is PCIe	32 16 8	√	√	4	√	√	32	➡ 16	3	√	PCI-Express

Scope of delivery	Board, ME-Power-CD/software, ME AK-D25F/S, 78- and 25-pin mating plug

Attractive bundles:
Buy the ME board of your choice bundled with accessory of your choice and save money! For example:

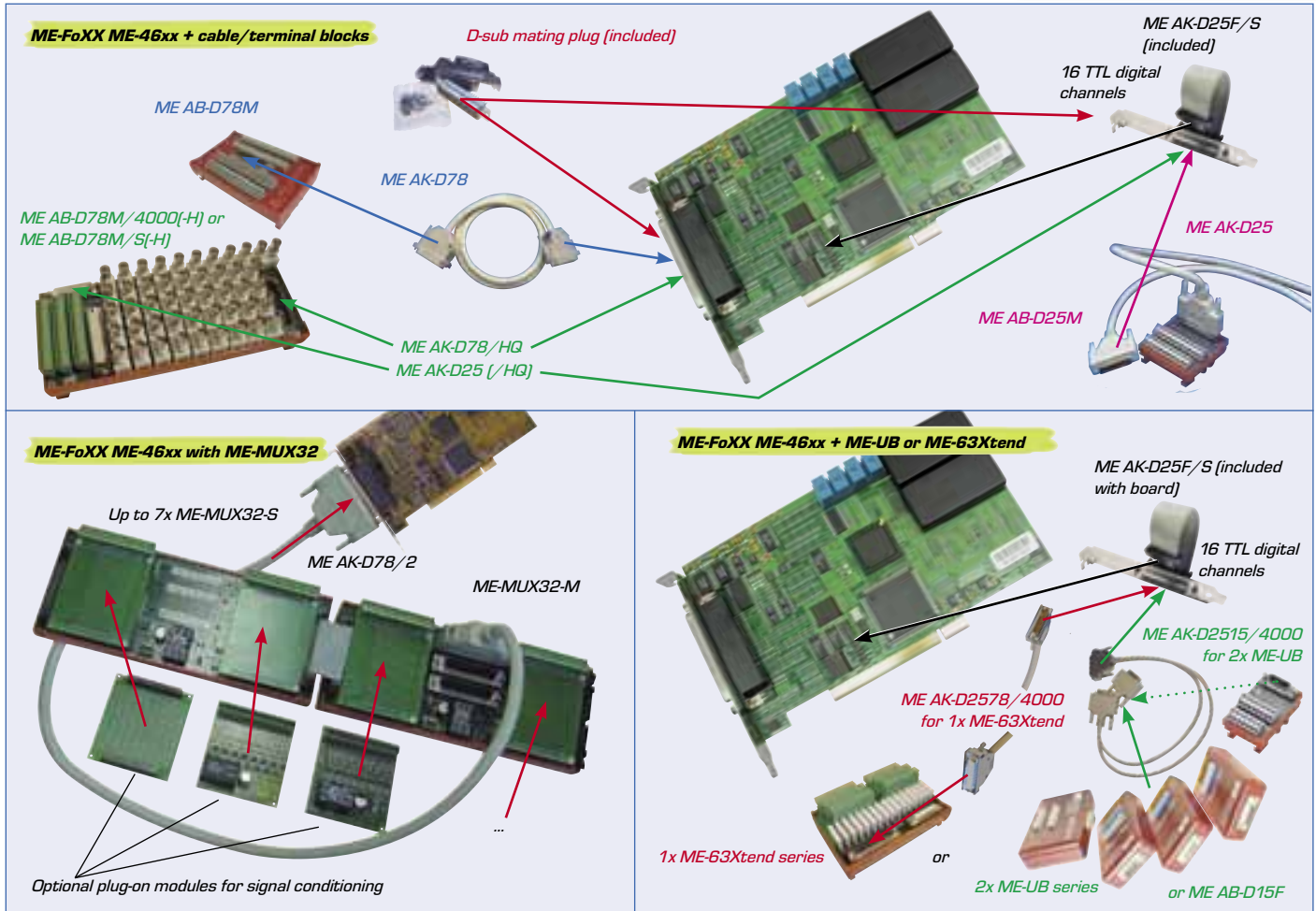|	
ME-SK ME-46_ _ _	**StartKit with:** ME-46xx of your choice + cable of your choice + terminal block of your choice.
ME-PP ME-46_ _ _	**PowerPack with:** ME-46xx of your choice + cable of your choice + terminal block of your choice + graphic software development environment VEE Pro in current full version.
ME-SK MUX ME-46_ _ _	**MUX StartKit with:** ME-46xx of your choice + cable of your choice + ME-MUX32-M.

1) Listed above, in this order: a) Number of **single-ended inputs**. b) Number of **differential inputs** (single-ended or differential software selectable). c) Number of single-ended inputs with **Sample&Hold/simultaneous sampling** (enabled with software, rest: Standard single-ended inputs).

2) In addition to the external digital trigger (rising, falling, both edges): **External analog trigger** (rising, falling, both edges).

3) Total: 4x 8 bit ports. On the models without "i" all ports are TTL level, each port is programmabel as inputs or outputs. On the models "i": 2x 8 bit ports with opto-isolation (defined as one 8 bit input port and one 8 bit output port) as well as 2x 8 bit non-isolated/TTL ports (each port programmable as inputs/outputs).

▪ Light green: Standard models, short delivery times. All other models: Special custom versions on request.

High-precision universal 16 bit multifunctional DAQ board   ME-FoXX ME-46xx

ME-FoXX ME-46xx + cable/terminal blocks

D-sub mating plug (included)

ME AK-D25F/S (included)

16 TTL digital channels

ME AB-D78M

ME AK-D78

ME AB-D78M/4000(-H) or ME AB-D78M/S(-H)

ME AK-D25

ME AB-D25M

ME AK-D78/HQ
ME AK-D25 (/HQ)

ME-FoXX ME-46xx with ME-MUX32

Up to 7x ME-MUX32-S

ME AK-D78/2

ME-MUX32-M

...

Optional plug-on modules for signal conditioning

ME-FoXX ME-46xx + ME-UB or ME-63Xtend

ME AK-D25F/S (included with board)

16 TTL digital channels

ME AK-D2515/4000 for 2x ME-UB

ME AK-D2578/4000 for 1x ME-63Xtend

1x ME-63Xtend series   *or*   *2x ME-UB series*   *or ME AB-D15F*

- - - Recommended accessory for the ME-FoXX ME-46xx... - - -

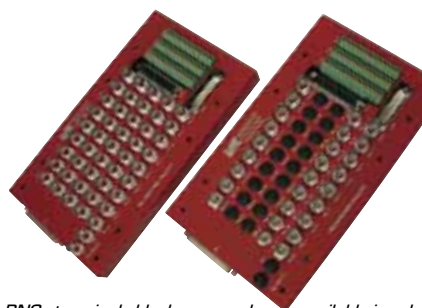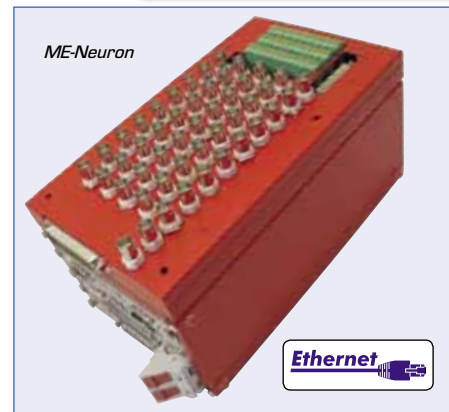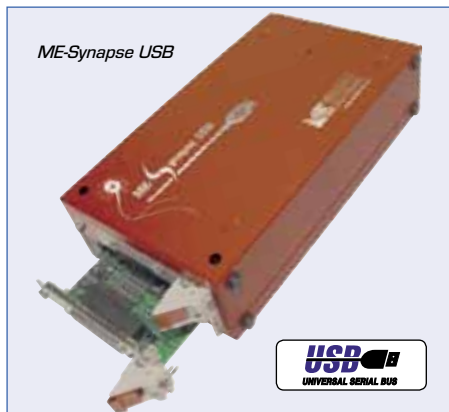|	
For applications with high precision and optimum noise immunity:	
ME AK-D78/HQ/x	x = 0.5 m, 1 m or 2 m **high quality cable**. 78-pin D-sub male to female, 1:1 contacted. Metal housing and 2 lines of cable.
ME AK-D25/HQ/1	1 m **high quality cable**. 25-pin D-sub male to female, 1:1 contacted. Metal housing.
ME AK-D25/2	2 m **Standard cable.** 25-pin D-sub male to female, 1:1 contacted. Standard cable.
ME AB-D78M/4660 (-H)	**Deluxe terminal block**. 78-pin D-sub male to BNC and pluggable spring terminals as well as 25-pin D-sub male to
ME AB-D78M/4000 (-H)	spring terminals. In a robust metal box or DIN rail mountable card carrier (-H). For ME-LittleFoxx and ME-RedFoXX (/4660) or ME-SlyFoXX and ME-SylverFoXX (/4000)
Alternative:	
ME AB-D78M/S	**Deluxe terminal block**. 78-pin D-sub male to pluggable spring terminals as well as 25-pin D-sub male to spring
ME AB-D78M/S-H	terminals. In a robust metal box or in a DIN rail mountable card carrier (-H).
ME AK-D78/HQ-OE/1	In cases you don't want to use a terminal block: 1 m **high quality cable**. 78-pin D-sub male and open ends.
For uncritical applications with higher signals:	
ME AK-D78/x	x = 0.6 m, 1 m or 2 m **standard cable**. 78-pin D-sub male to female, 1:1 contacted.
ME AK-D25/HQ/1	1 m **high quality cable**. 25-pin D-sub male to female, 1:1 contacted. Metal housing.
ME AK-D25/2	2 m **standard cable**. 25-pin D-sub male to female, 1:1 contacted.
ME AB-D78M	**Standard terminal block**. 78-pin D-sub male to spring terminals. In a DIN rail mountable card carrier.
ME AB-D25M	**Standard terminal block**. 25-pin D-sub male to spring terminals. For on-board digital ports.
Expand analog inputs or outputs with signal conditioning and analog multiplexers/demultiplexers:	
ME-SIG32	32 channel **analog signal conditioning** for plug-on modules, for RTDs, thermo couples, stran gauges etc.
ME-MUX32-M and -S	32-to-1 **analog multiplexer**, expandes the analog inputs up to 256 and more.
ME-DEMUX32	1-to-32 **analog demultiplexer**, expands one analog output.
Expanding the on-board digital ports:	
ME AK-D2578/4000	1 m **special cable.** 25-pin D-sub male to 78-pin D-sub female, use to connect 1x ME-63Xtend.
ME-63Xtend series	**External expansion boards**, DIN rail mountable, with relays or opto-isolation. 16 channels.
Alternative:	
ME AK-D2515/4000	1 m **cable**. 25-pin D-sub male to 2x 15-pin D-sub male, use to connect 2x ME-UB.
ME-UB series	**External expansion boxes**, with relays or opto-isolation. 8 channels. Use any combination of: ME-UB15, ME-UBRE, ME-UBOI, ME-UBOO. Alternative to ME-UB15: Terminal block ME AB-D15F.
ME AB-D15F	**Standard terminal block**. 15-pin D-sub female to spring terminals. Can be used as alternative to ME-UB15.
Further accessory:	
ME AB-D78M/P-H	**Deluxe terminal block**. 78-pin D-sub male to IDC and prototyping array for user signal conditioning. In a DIN rail mountable card carrier (-H).
ME-5	1-channel **power amplifier** for the analog outputs of the ME-FoXX ME-46xx series boards.
ME-Synapse LAN and USB	Adaptor from 3 U ME CompactPCI to USB or Ethernet/LAN.
ME-Neuron	Pre-configured, 3 U CompactPCI-based complete DAQ and control system.

High-precision universal 16 bit multifunctional DAQ board   ME-FoXX ME-46xx

ME-Synapse USB

ME-Synapse LAN

ME-Neuron

★★★★★

Safe and robust!

Terminal blocks in a metal housing!

BNC terminal blocks are also available in robust metal housings - suitable for ME-Synapse or ME-Neuron (picture: ME AB-D78M/4000 and ME AB-D78M/4660).

✓ **Ready for**
ME-**S**ynapse
Version   CompactPCI

Ready for ME-Synapse, that means: You can use the CompactPCI versions of the ME-FoXX ME-46xx together with the **ME-Synapse LAN in your ethernet** or with the **ME-Synapse USB at USB!**
And its quite simple: Just order a complete bundle with the ME-FoXX version of your choice and an ME-Synapse LAN or USB. Find all information you need to order here in this data sheet and on our web site (see ME-Synapse). Or would you like to use the ME-FoXX in a **complete, pre-configured DAQ system**? The ME-Neuron combines a stand-alone DAQ system and LAN DAQ station. It makes use og the same technology as the ME-Synapse LAN, but adds the power of a complete 3 U CompactPCI-based PC/CPU.

- - - Systems and system packages with the ME-FoXX ME-46xx[1] - - -

ME-FoXX as DAQ station at the ethernet/LAN or USB: ME-Synapse (ME-1)	
ME-Synapse USB xxxx	**USB "docking" station** and ME-FoXX model of your choice: You can leave out the "ME-". However, please quote the complete model name, eg. 4680is. **Example configurations:**
ME-Synapse USB 4660	**USB DAQ station:** ME-Synapse USB and 16 bit/500 kHz all-round DAQ board ME-RedFoXX ME-4660.
ME-Synapse LAN xxxx	**Ethernet "docking" station** and ME-FoXX model of your choice: You can leave out the "ME-". However, please quote the complete model name, eg. 4680is. **Example configurations:**
ME-Synapse LAN 4660	**Remote ethernet DAQ station:** ME-Synapse LAN and 16 bit/500 kHz all-round DAQ board ME-RedFoXX ME-4660.
ME-Synapse LAN PWR	Power supply for ME-Neuron and ME-Synapse LAN, with Phoenix terminals, DIN rail mountable.
ME-FoXX as pre-configured stand-alone DAQ system: ME-Neuron (ME-2)	
ME-Neuron (ME-2)[1]	**Base model.** Scope of delivery: ME-Neuron metal chassis with CPU module and 2 empty, active peripheral bus slots for 2 CompactPCI boards. Adaptor from DVI-I to VGA. Instructions for installation. Power supply not included!
ME-Neuron xxxx	**Complete system** with ME-FoXX model of yur choice: You can leave out the "ME-". However, please quote the complete model name, eg. 4680is. **Example configurations:**
ME-Neuron 4660	**Complete ethernet or stand-alone DAQ station:** ME-Neuron and 16 bit/500 kHz all-round DAQ board ME-RedFoXX ME-4660.
RPC-Licence	Required for the use as an ethernet station: Licence for ME-iDS for Windows ethernet networks. Control hardware supported by the ME-iDS which is installed on a computer connected via TCP/IP network.
ME-Synapse LAN PWR	Power supply for ME-Neuron and ME-Synapse LAN, with Phoenix terminals, DIN rail mountable.

1) Bundles/example configurations: The desired DAQ board is already pre-installed. ME-Neuron is also available as base version without DAQ board. ME-Synapse can only be used with the supported ME boards and is therefore only sold as a bundle with these ME boards. If you have an ME board alread, that you want to use in an ME-Synapse, please call/e-mail our technical sales team: **sales@meilhaus.com**.

- - - Information on A/D and D/A rates at ME-FoXX ME-46xx and ME-6x00 - - -

A/D and D/A conversion rates quoted in the technical specifications are **maximum values of the converter chips**, as specified by the chip manufacturers. These maximum rates are available, when data is converted directly into or from the FIFO of the boards. As soon as data is transmitted to the PC via a bus (PCI/CompactPCI, PCI-Express, USB, Ethernet) or sent from the PC to the board via the bus, rates depend on the system and maximum rates can only be reached under optimum conditions. **Examples:**

Conversion	Number of values	Configuration	Max. rate	Optimalum conditions, i.e.:
A/D conversion	≤ A/D FIFO size	ME-46xx in PCI/cPCI/PXI PC	500 kHz	• **Little load** on the PCI, CompactPCI, PXI, PCI-Express bus and/or
		ME-46xx in PCI-Express PC	500 kHz	• **little load** on the USB or LAN/ethernet, or direct connection without hubs/other network devices.
		ME-46xx in ME-Synapse USB	500 kHz	
		ME-46xx in ME-Synaspe LAN	500 kHz	
	> A/D FIFO size	ME-46xx in PCI/cPCI/PXI PC	500 kHz	• Onkly **one DAQ board** in use.
		ME-46xx in PCI-Express PC	250 kHz	• **DAQ board's FIFO buffering in optimal use** (FIFO is an option for the analog output boards depending on the model version). Buffering can compensate temporary bottelnecks. If the number of values is less or equal to the buffer size, the maximum rate can very certainly be reached independently from the system. If the number of values is larger than the buffer size the rate depends on the system.
		ME-46xx in ME-Synapse USB	min. 20 - 25 kHz	
		ME-46xx in ME-Synaspe LAN	500 kHz	
D/A conversion	≤ D/A FIFO size	ME-46xx, ME-6x00 in PCI/cPCI/PXI PC	500 kHz	
		ME-46xx in PCI-Express PC	500 kHz	
		ME-46xx, ME-6x00 in ME-Synapse USB	500 kHz	
		ME-46xx, ME-6x00 in ME-Synaspe LAN	500 kHz	
	> D/A FIFO size or models without D/A FIFO	ME-46xx, ME-6x00 in PCI/cPCI/PXI PC	depnd. on system	
		ME-46xx in PCI-Express PC	depnd. on system	
		ME-46xx, ME-6x00 in ME-Synapse USB	depnd. on system	
		ME-46xx, ME-6x00 in ME-Synaspe LAN	depnd. on system	