

Expand Digital-I/O-Channels with TTL Level Externaly

Relays to switch higher power and various signals. • Opto-couplers for galvanic isolation.



Digital-I/O - Principle and Applications



What are Digital Channels For?

- Controlling digital actuators, for example in process automation or in controlled systems.
- Controlling switching processes - switching on/off.
- Acquisition of digital states/ switching conditions.
- Generating or reading digital (bit) patterns/binary signals..

Discrete Digital I/O Line or Port?

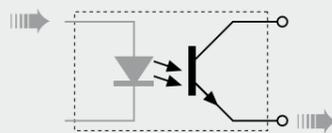
- A port is the grouping of a certain number of digital/bit lines: 8-bit port, 16-bit port, etc.
- This grouping simplifies configuration and use for bit pattern input/output.
- Bidirectional digital I/O lines are often configured port by port in their direction as inputs or outputs.

TTL or Opto-isolated?

- TTL/CMOS: Signals are fed directly (without galvanic isolation) with TTL (5V)/CMOS logic level from the components to the connector.
- Of course, other levels for the logic signals are also possible.
- Opto-isolation (opto-coupler) provides galvanic isolation for increased operational safety - even with potential differences.

Isolation or galvanic separation/decoupling **prevents an electrically conductive connection** between two circuits. In the case of galvanic isolation with opto-couplers, the signal transmission is accomplished with opto-electronic isolation, i.e. a short-time transmission of the signal "by light". An opto-coupler consists of a light-emitting diode or laser

diode as transmitter and a photodiode or phototransistor as receiver. The two logical states Hi and Lo are represented by "light on/off" (light or laser diode switches "light on/off", photodiode or phototransistor detects the state and converts it back into a digital signal).



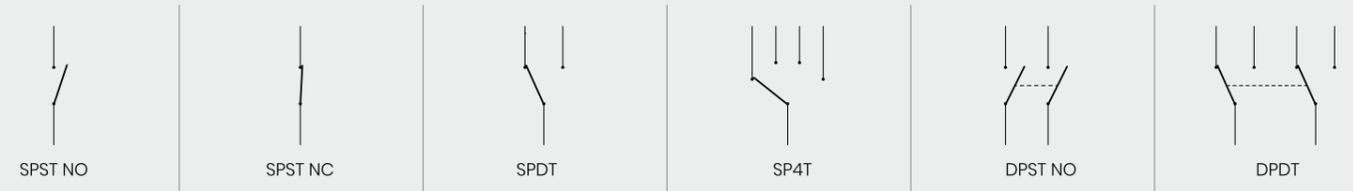
What do Relays do?

- Classical relays are mechanical switches controlled electromagnetically via current.
- Relays have at least two circuits: The "controlling" one to activate the switch by excitation coil and the circuit to be switched.
- Other relay types include reed relays and solid-state relays (SSR).

Advantages of mechanical relays: Low contact resistance, high in-rush power and overload capability, high insulation resistance, switching from DC to high frequency signals.

Disadvantages of mechanical relays: Limited lifetime (max. number of switching operations) due to wear; noise generation, sensitivity to vibration, higher drop-out and response times compared to solid state relays.

How to extend TTL channels of digital I/O PC plug-in cards with relays or galvanic isolation using opto-couplers

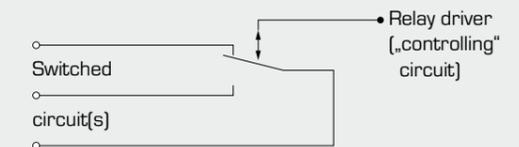


Solid state relays (SSR/Solid State Relays) do not operate mechanically but are electronic semiconductor devices based, for example, on transistors, thyristors or triacs. Advantages: Noiseless, low switching delay, no contact bounce, no mechanical closure, but no DC.

Relay versions

For the description of the contact configuration with relays the designation with the English terms „Pole“ (contacts) and „Throw“ (switching positions) is usually used. Often the „normal“ state (normally open/closed) is also specified.

- SP - Single-pole.
- DP - Double-pole.
- ST - Single-throw/switch on/off.
- DT - Double-throw/toggle switch.
- 4T or nT - 4-way/n-way throw (multiple changeover switch).
- NC - Normally closed, closed at rest/sleep contact.
- NO - Normally open, normally open/working contact.



Meilhaus Electronic Expansion Cards ME-63x EXT

- Expand 16 digital channels each with opto-couplers, mechanical or solid state relays.
- Optional cables: Easy connection to digital I/O boards from Meilhaus Electronic, but can also be used with other products.
- Card in mounting carrier for DIN rail mounting.
- Easy to open spring terminals for I/O cables.
- 1 status LED per channel.

Digital cards with TTL level are low in cost. But often you need other levels, potential separation, or want to switch higher currents. These additional modules are the ideal solution. They offer you high security, because the modules are not located in the PC, but are connected to the PC card with cables. Reliable, interference-proof, flexible, cost- and space-saving. The modules operate completely transparently - no need to adapt the software!



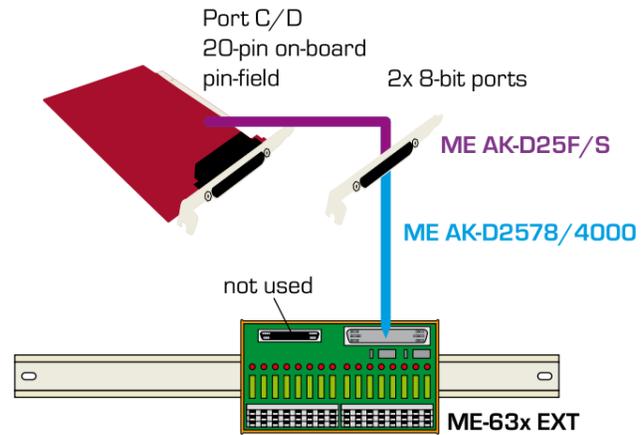
Model	ME-631 EXT	ME-632 EXT	ME-633 EXT	ME-634 EXT	ME-635 EXT
Function	16 relay type C, SPDT, 6 A/30 VDC/250 VAC, status LEDs	16 opto-inputs (2.5...60 V); status LEDs	16 opto-outputs (0.6...60 V); status LEDs	8 opto-outputs and 8 opto-inputs; status LEDs	16 solid state relays, SPST NO, 5 A/240 VAC, status LEDs
Design	Card in DIN-rail mountable card carrier				
Connector to DIO board	78-pin D-sub male				
Connector of DIO signals	Terminal strip (spring terminals)				
Further connectors	25-pin D-sub female for other channels connected through				
For use with PC board models...	ME-8200, ME-6x00, ME46x0, ME-5310, ME-1000, ME-5314A/B, ME-1400, ME-630 and others			ME-8200, ME-6x00, ME46x0, ME-5314A/B, ME-1400, ME-630 and others. Cannot be used with ME-5310, ME-1000	ME-8200, ME-6x00, ME46x0, ME-5310, ME-1000, ME-5314A/B, ME-1400, ME-630 and others

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Simply Connect...

Connecting to DIO ports C/D:

- The Meilhaus Electronic PC board series ME-8200, ME-630, ME-4610/ME-4600, and ME-6000/ME-6100 have two 8-bit wide TTL digital ports ("port C/D") which are connected to an on-board pin-field.
- With the ME AK-D25F/S, an adaptor from pin-field to 25-pin D-sub female (included with the PC board) both ports are easily accessible. The 25-pin D-sub is mounted on an additional slot bracket which can be mounted in the slot next to the PC board.
- The external modules of the ME-63x EXT series can be used to expand the ports C/D with opto-couplers or relays.



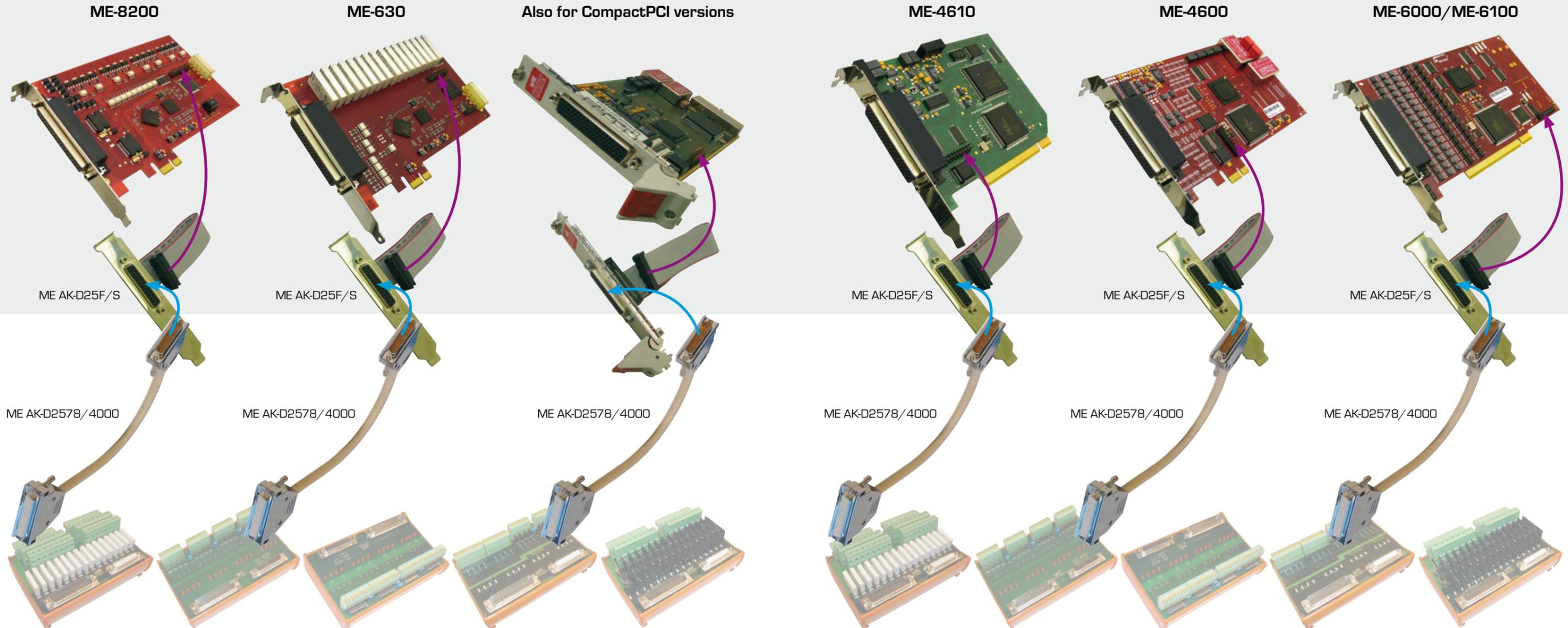
Expand Meilhaus Electronic PC plug-in boards with TTL-Digital-I/O - easily with the optimal adaptor cables

Configuration of the ports C/D for use with ME-63x EXT

Modell	Funktion	Port C	Port D
ME-631 EXT	16 relays type C, 6 A/30 VDC/250 VAC	Output port	Output port
ME-632 EXT	16 opto-inputs (2.5...60 V)	Input port	Input port
ME-633 EXT	16 opto-outputs (0.6...60 V)	Output port	Output port
ME-634 EXT	8 opto-outputs and 8 opto-inputs	Output port	Input port
ME-635 EXT	16 solid state relays, 5A/240 VAC	Output port	Output port

What is required?

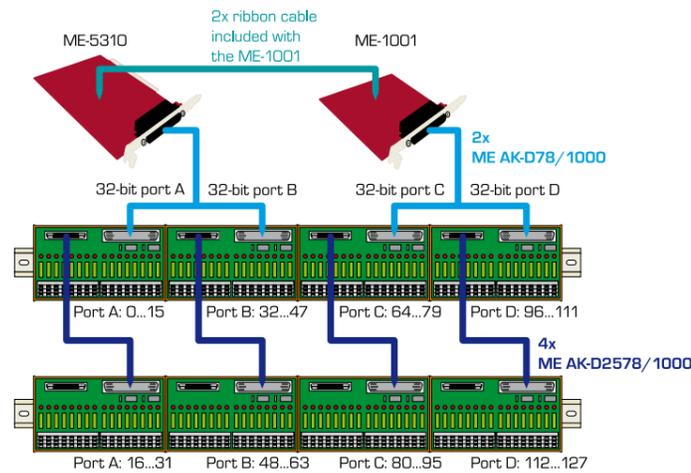
- DAQ/control PC board Meilhaus Electronic ME-8200, ME-630, ME-4610/ME-4600, or ME-6000/ME-6100 with adaptor ME AK-D25F/S connected (included with the boards).
- Depending on application: **External expansion module** ME-631 EXT, ME-632 EXT, ME-633 EXT, ME-634 EXT, or ME-635 EXT.
- A **tool to open** the spring terminals of the ME-63x EXT is included with the modules.
- Special cable ME AK-D2578/4000** (optional accessory).
- Possibly a standard **DIN rail** for the clear snap-on mounting of the modules.



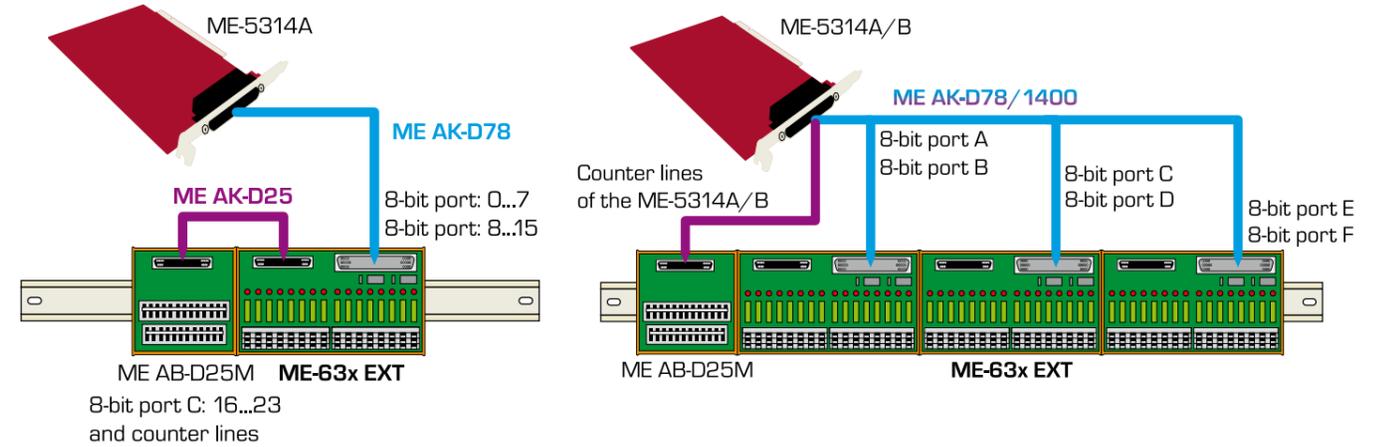
Up to 128 Relays or Opto-Channels

Direct connection with special cable:

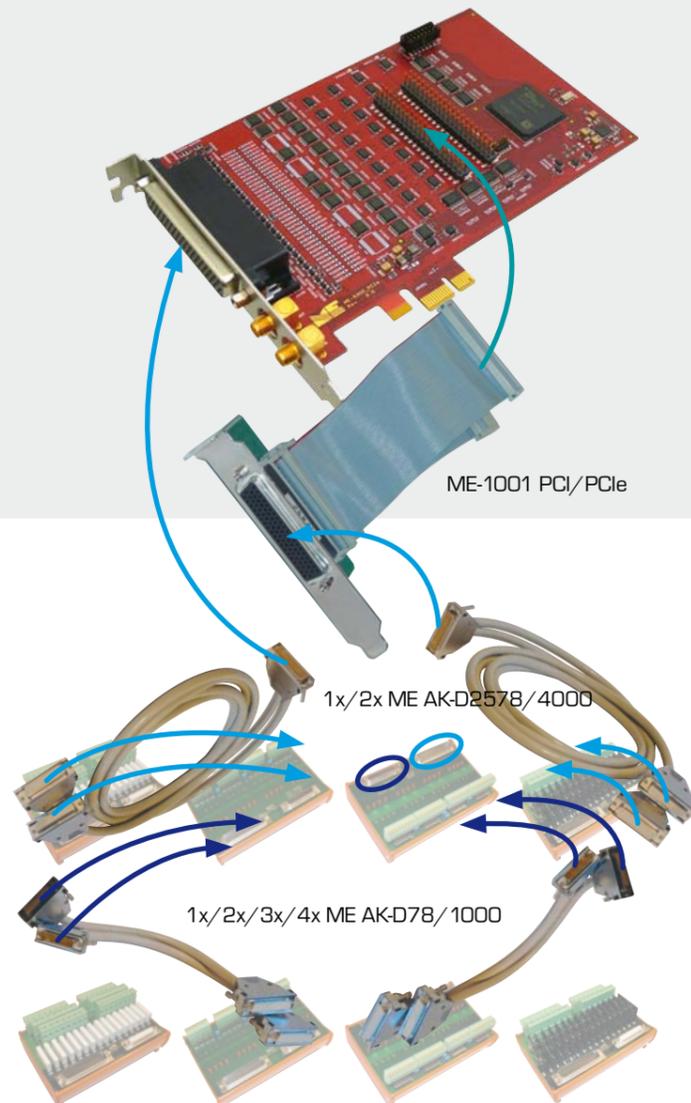
- The Meilhaus Electronic ME-5310 series digitalH/O channels (replacement/new design of the ME-1000) as well as the ME-5314A/B and ME-1400/ME-1400A/B can easily and directly be expanded with special cable.
- On the ME-5310, two of the external modules are connected in series for the lower and upper 16 bits of the 32-bit wide ports.
- On the ME-5314 and ME-1400 the counter channels are still accessible and usable.



Expand Meilhaus Electronic ME-5310 and ME-5314A/B - for multi-channel relay or opto-I/O systems. ME-5314A/B counters still accessible



ME-5310 (also for the previous model ME-1000)



Port configuration for use with ME-63x EXT

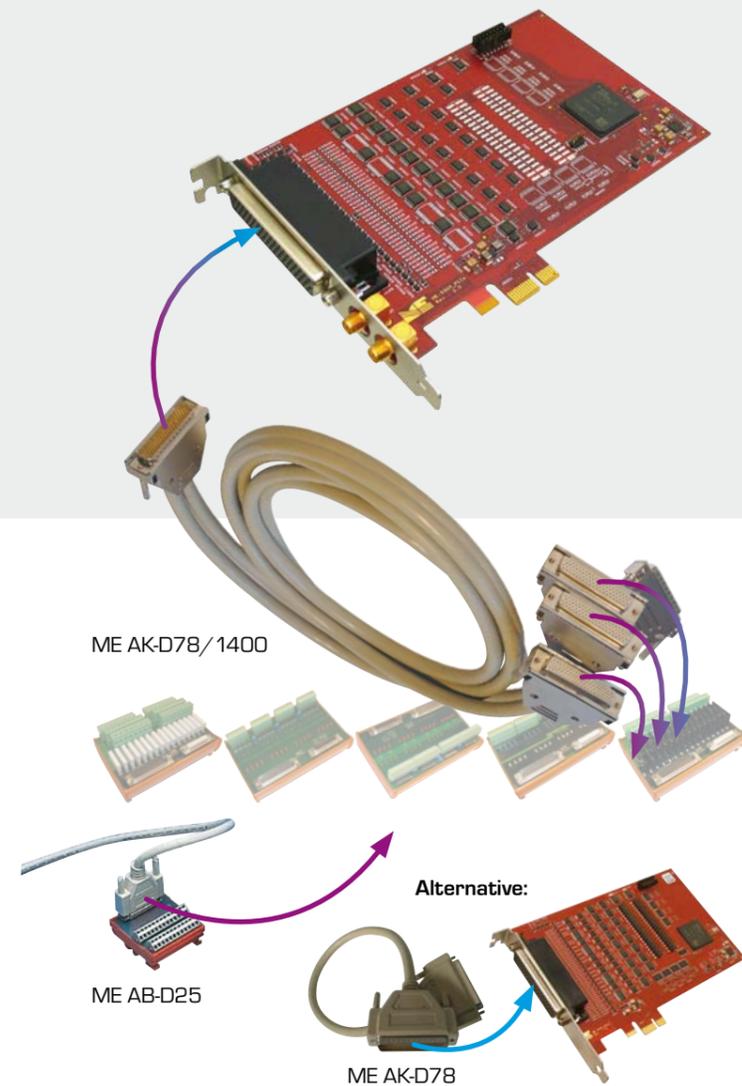
ME-5310 configuration		Connect 1x or 2x...
Port A	Input	ME-632 EXT
	Output	ME-631 EXT, ME-633 EXT, ME-635 EXT ¹⁾
Port B	Input	ME-632 EXT
	Output	ME-631 EXT, ME-633 EXT, ME-635 EXT ¹⁾
Port C	Input	ME-632 EXT
	Output	ME-631 EXT, ME-633 EXT, ME-635 EXT ¹⁾
Port D	Input	ME-632 EXT
	Output	ME-631 EXT, ME-633 EXT, ME-635 EXT ¹⁾

¹⁾ also mix

What is required?

- DigitalH/O board** Meilhaus Electronic ME-5310, and ME-1001 to access all 128 channels.
- Depending on application **external expansion module(s)** ME-631 EXT, ME-632 EXT, ME-633 EXT or ME-635 EXT (ME-634 EXT cannot be used due to the 32-bit wide ports of the ME-5310).
- A **tool to open** the spring terminals of the ME-63x EXT is included with the modules.
- Special cables (optional accessories, see picture above):** 1x (port A/B, for up to 64 channels) or 2x (port A/B/C/D, for up to 128 channels) **ME AK-D78/1000**. 1x to 4x **ME AK-D2578/1000** (for the upper 16 bits of the 32-bit wide ports).
- Various expansion stages** from 16 to 128 I/Os with relays or opto-couplers can be accomplished (i.e. from 1 to max 8 ME-63x EXT modules).
- Possibly a standard **DIN rail** for the clear snap-on mounting of the modules.

ME-5314A/B (also for previous models ME-1400A/B)



Port configuration for use with ME-63x EXT

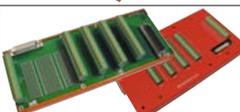
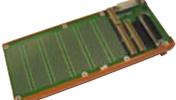
Ports	Configuration	Connect
ME-5314A A + B ²⁾	Out Out	ME-631 EXT, ME-633 EXT, ME-635 EXT
	In In	ME-632 EXT
	Out In	ME-634 EXT
ME-5314A C	Out equal	ME-631 EXT, ME-633 EXT, ME-634 EXT, ME-635 EXT
	In equal	ME-632 EXT
	Out In	ME-634 EXT
ME-5314B A + B	Out Out	ME-631 EXT, ME-633 EXT, ME-635 EXT
	In In	ME-632 EXT
	Out In	ME-634 EXT
	Out Out	ME-631 EXT, ME-633 EXT, ME-635 EXT
ME-5314B C + D	In In	ME-632 EXT
	Out In	ME-634 EXT
	Out In	ME-634 EXT
ME-5314B E + F	Out Out	ME-631 EXT, ME-633 EXT, ME-635 EXT
	In In	ME-632 EXT
	Out In	ME-634 EXT

²⁾ This configuration also when cable ME AK-D78 is used.

What is required?

- DigitalH/O board** Meilhaus Electronic ME-5314A or B.
- Depending on application **external expansion module** ME-63x EXT (all models can be used).
- A **tool to open** the spring terminals of the ME-63x EXT is included with the modules.
- Cable (optional accessories, see picture above):** 1x **ME AK-D78/1400** (for ME-5314A and B, all digitalH/O channels). Optional for ME-5314A, 2 ports only: **MEAK-D78**. Optional **MEAK-D25** and terminal block **MEAB-D25M** for counters.
- Possibly a standard **DIN rail** for the clear snap-on mounting of the modules.

Standard Connectivity Accessories

Model	D-sub	from	to	for use with	
Shielded cable - various length and combinations available					
	ME AK-D78	78-pin	Male	Female	ME-8100, ME-6x00, ME-5820, ME-5300, ME-46x0, ME-1600, ME-1400, ME-1000, ME-630 etc.
	ME AK-D37	37-pin	Male	Female	ME-8200, ME-5004
	ME AK-D25	25-pin	Male	Female	ME-8200, ME-6x00, ME-5001, ME-46x0, ME-630, ME-95, ME-94, ME-63x and others
	ME AK-D15	15-pin	Male	Female	ME-96 and others
DIN-rail mountable terminal blocks or in metal housing					
	ME AB-D78M	78-pin	Male	Spring terminal strip	same as for ME AK-D78
	ME AB-D37M	37-pin	Male	Spring terminal strip	same as for ME AK-D37
	ME AB-D25M	25-pin	Male	Spring terminal strip	same as for ME AK-D25
	ME AB-D15M	15-pin	Male	Spring terminal strip	same as for ME AK-D15
	ME AB-D78M/S(-H)¹	78-, 25-pin	Male	Spring terminal strip	same as for ME AK-D78 and/or ME AB-D78M
	ME-AB-D78M/P-H¹	78-, 25-pin	Male	Breadboard for own circuits and IDC	same as for ME AK-D78 and/or ME AB-D78M
	ME AB-D78M/4000(-H)¹	78-, 25-pin	Male	BNC and spring terminal strip	ME-4670, ME-4680 and/or ME-4610, ME-4660
	ME AB-D78M/4660(-H)¹	78-, 25-pin	Male	BNC and spring terminal strip	ME-4660
	ME AB-D78M/6000(-H)¹	78-, 25-pin	Male	BNC und spring terminal strip	ME-6x00 series

1) -H: Board in DIN-rail mountable card carrier (alternative: Models in metal housing, except ME-AB-D78M/P-H).



MEILHAUS ELECTRONIC GmbH
Am Sonnenlicht 2
82239 Alling/Germany

Fon +49 (0) 81 41 - 52 71-0
Fax +49 (0) 81 41 - 52 71-129
E-Mail sales@meilhaus.com

www.meilhaus.com