

## Product Datasheet - Technical Specifications



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# ME-6100 Isolated Analog Output Board with FIFOs

- Isolated analog output/control PC-board
- Depending on model: 4, 8, or 16 voltage outputs.
- Range  $\pm 10$  V (max.  $\pm 15$  mA per channel).
- All channels opto-isolated, available as:
  - \* Full opto-isolation with no common ground („p“). All individual channels opto-isolated from the PC and from each other.
  - \* Opto-isolated outputs with common ground („i“).
- Individual 16 bit/500 kHz high precision D/A converter per channel. Transparent output.
- Automatic adjustment, no potentiometers.
- 16 TTL digital I/O channels, organized as 2x 8 bit ports. Each port programmable as input or output.
- One 8 kByte FIFO each on channel 1 - 4 for extended operating modes (generation of waveforms): Continuous output or wrap-around/periodic output of data sets from the FIFO under timer control. Periodic signals up to 250 kHz (square signal).
- PC DAQ board for PCI or 3 U CompactPCI/PXI.

| Model           | Analog voltage outputs                    | Isolation             | D/A FIFO | Digital I/O | Bus platform    |
|-----------------|---|-----------------------|----------|-------------|-----------------|
| ME-6100i/4 PCI  | 4, 16 bit/max. 500 kHz, range $\pm 10$ V  | Standard (common GND) | yes      | 16, TTL     | StandardPCI     |
| ME-6100i/16 PCI | 16, 16 bit/max. 500 kHz, range $\pm 10$ V | Standard (common GND) | yes      | 16, TTL     | StandardPCI     |
| ME-6100p/8 PCI  | 8, 16 bit/max. 500 kHz, range $\pm 10$ V  | Complete floating     | yes      | 16, TTL     | StandardPCI     |
| ME-6100p/16 PCI | 16, 16 bit/max. 500 kHz, range $\pm 10$ V | Complete floating     | yes      | 16, TTL     | StandardPCI     |
| ME-6100i/4 cPCI | 4, 16 bit/max. 500 kHz, range $\pm 10$ V  | Standard (common GND) | yes      | 16, TTL     | 3 HE CompactPCI |

Note: The D/A rate of 500 kHz is the max. value of the D/A converter chip. The true rate depends on the system (see datasheet), except for the ME-6100/ME-6300 channels with FIFOs in the corresponding operating mode.

# Specification

(Ambient temperature 25 °)

## PC-Interface

|  |
|--|
| Standard-PCI- resp. CompactPCI-bus (32 bit, 33 MHz, 5 V) |
| PCI Local bus specification version 2.1 compliant;       |
| CompactPCI Specification PICMG 2.0 R3.0,                 |
| Resources assigned automatically (Plug&Play)             |

## Voltage Outputs

|   |  |                                    |
|---|--|------------------------------------|
| (Partly different specifications are valid for the „U-Plus“-channel – see separate section) |  |                                    |
| Number of channels  | 4, 8 or 16 (depends on model)  |                                    |
| D/A converter   | 1 serial converter (500 kHz) per channel   |                                    |
| Resolution  | 16 bit   |                                    |
| Output range  | $\pm 10$ V   |                                    |
| Output current  | Without external power supply: depends on the number of assembled resp. used channels:   |                                    |
|   | <b>channels</b>  | <b>I<sub>max</sub> per channel</b> |
|   | 4  | 15 mA                              |
|   | 8  | 15 mA                              |
|   | 12   | 10 mA                              |
|   | 16   | 3 mA                               |
|   | With external power supply ( $\pm 15$ V) only in connection with options „Island channels“ and „High Current“: max. $\pm 15$ mA per channel) |                                    |
| Ext. power supply   | $\pm 15$ V (optional); current per channel: 7 mA + load (max. $\pm 15$ mA)   |                                    |
| Settling time (DAC)   | max. 2 $\mu$ s at full-scale (-10 V $\rightarrow$ +10 V)   |                                    |

**Total accuracy**

|                             |   |
|-----------------------------|---|
| „With electrical isolation“ | max. $\pm 20$ mV  |
| „With island channels“      | max. $\pm 10$ mV  |
| Operation modes             | „Single“, „Streaming“   |
| Trigger modes               | software start, ext. digital trigger, synchronous start (software/external) |
| External trigger edges      | rising, falling, any  |

**Timer-Controlled Output (ME-6100/6300, channel 0...3)**

|             |  |
|-------------|--|
| Channels    | 0...3 (independent of one other)                             |
| D/A-FIFOs   | 8 k values per channel                                       |
| Sample-Rate | max. 500 kS/s  |
| D/A-Timer   | programmable from 2 $\mu$ s up to 130 s in steps of 30.30 ns |

**External Trigger (channel 0...3)**

|                     |                              |
|---------------------|------------------------------|
| Voltage level       | typ. 5 V                     |
| Input current $I_F$ | 7.5 mA $\leq I_F \leq$ 10 mA |
| Reference to ground | ground (GND_x)               |
| Delay time          | max. 80 ns                   |

**Electrical Isolation, Island Channels (optional)**

|                         |            |
|-------------------------|------------|
| Over-voltage protection | max. 500 V |
|-------------------------|------------|

**Output Buffer „U-Plus“ (channel number 8)**

|                |  |
|----------------|--|
| Output line l  | U <sub>OUT_8</sub>   |
| Voltage range  | 0...50 V   |
| Output current | max. 20 mA   |
| Offset error   | typ. $\pm 5$ mV; max. $\pm 20$ mV                                    |
| Gain error     | $\pm 0,16$ %   |
| Settling time  | max. 25 $\mu$ s at full-scale (0 $\rightarrow$ 50 V) with 20 mA load |

## Digital I/Os

|                     |               |                                      |
|---------------------|---------------|--------------------------------------|
| Ports               |               | 2 x 8 bit                            |
| Reference to ground |               | PC ground (PC_GND)                   |
| Port type           |               | bidirectional TTL ports              |
| Output level        | $U_{OL}$      | max. 0.5 V bei 24 mA                 |
|                     | $U_{OH}$      | min. 2.4 V bei -24 mA                |
| Input level         | $U_{IL}$      | max. 0.8 V bei $V_{CC} = 5\text{ V}$ |
|                     | $U_{IH}$      | min. 2 V bei $V_{CC} = 5\text{ V}$   |
|                     | Input current | $\pm 1\ \mu\text{A}$                 |

## General Information

|  |   |
|--|---|
| Power consumption at +5 V (16 D/A channels; without ext. load) |   |
| „With electrical isolation“                                    | max. 3.6 A  |
| „With island channels“   | max. 1.2 A  |
| Load for VCC_OUT   | max. 200 mA   |
| Physical size PCI  | 174 mm x 99 mm  |
|  | (without mounting bracket and connector)                          |
| Physical size CompactPCI                                       | 3 U CompactPCI board  |
| Connectors   | 78-pin D-Sub female connector (ST1)<br>20-pin IDC connector (ST2) |
| Operation temperature  | 0...70 C  |
| Storage temperature  | -40...100 C   |
| Relative humidity  | 20...55 % (non-condensing)  |
| Certification  | CE  |

# Pinout

## Legend for pinouts:

**Attention:** With the options “High Current” and “Island Channels” the pins  $-U_x$  and  $+U_x$  are inputs for the external  $\pm 15$  V power supply. In all other cases these pins output  $\pm 15$  V and it is not permitted to connect them. **The hardware will be irreversible damaged!**

| Pin-name  | Function   |
|-----------|--|
| Uout_x    | analog output channels   |
| +U_x      | +15 V power supply; <b>only</b> with the options „High Current“ (HC) and “Island Channels”   |
| -U_x      | -15 V power supply; <b>only</b> with the options „High Current“ (HC) and „Island Channels”   |
| AO_TRIG_x | digital trigger input for each D/A channels 0..3.  |
| DIO_Ax    | digital-I/O port A   |
| DIO_Bx    | digital-I/O port B   |
| GND_x     | Common ground for all D/A channels. Electrical isolated from PC ground. On models with the option “Island Channels” the grounds of the single D/A channels are additionally isolated from one another. |
| PC_GND    | PC ground for the digital-I/O section  |
| VCC_OUT   | $V_{CC}$ output (+5 V from PC) max. 200 mA load  |
| +U_EXT    | ME-6200/6300 optional: pins for the positive supply for the output buffer of the „U-Plus“-channel ( $U_{OUT\_8}$ )   |
| -U_EXT    | ME-6200/6300 optional: pins for the negative supply for the output buffer of the „U-Plus“-channel ( $U_{OUT\_8}$ )   |
| n.c.      | pin not connected  |

# D-Sub Connector (ST1)

## ME-6000/6100

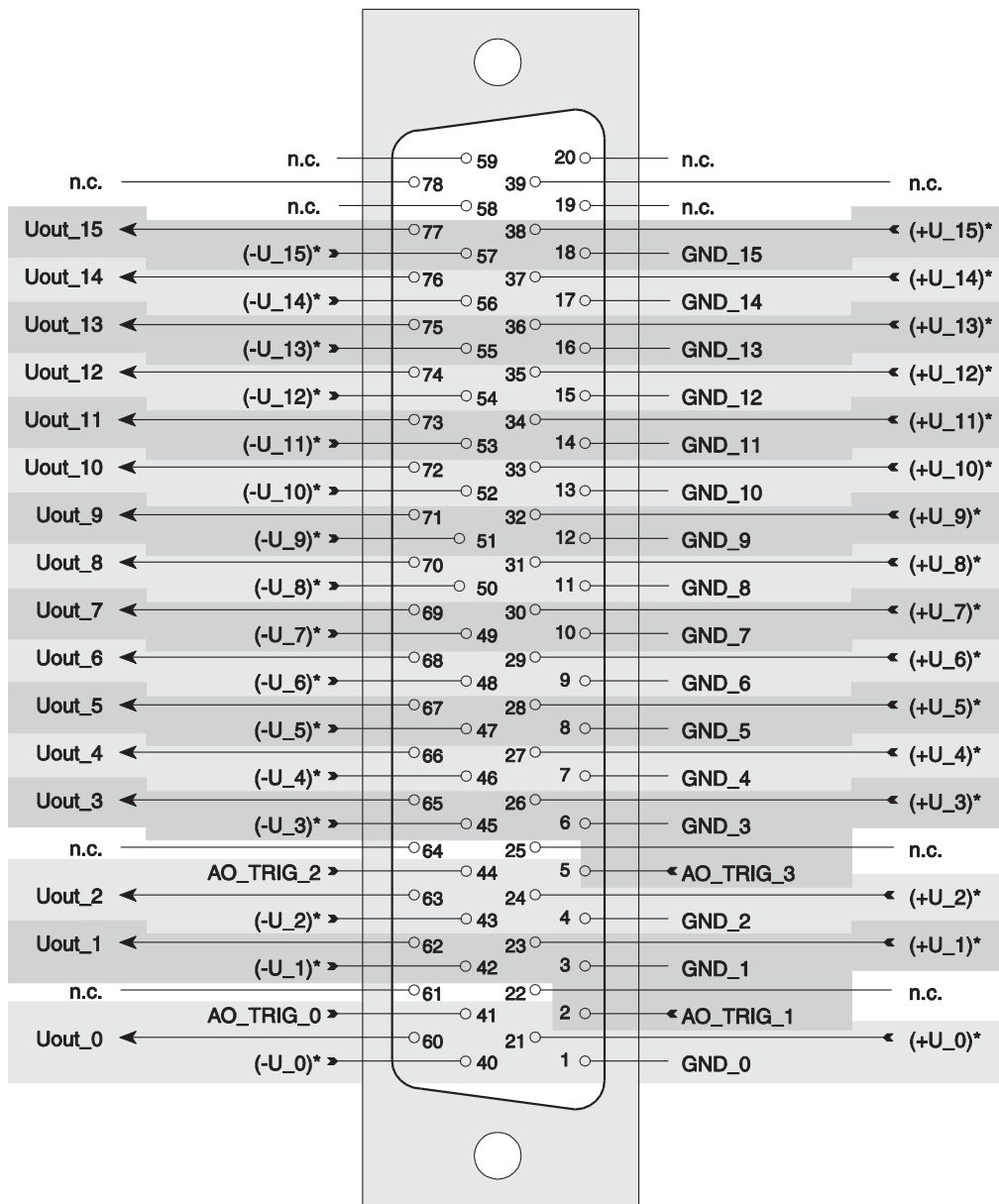


Diagram 11: Pinout of the 78-pin D-Sub female connector

# ME-6200/6300

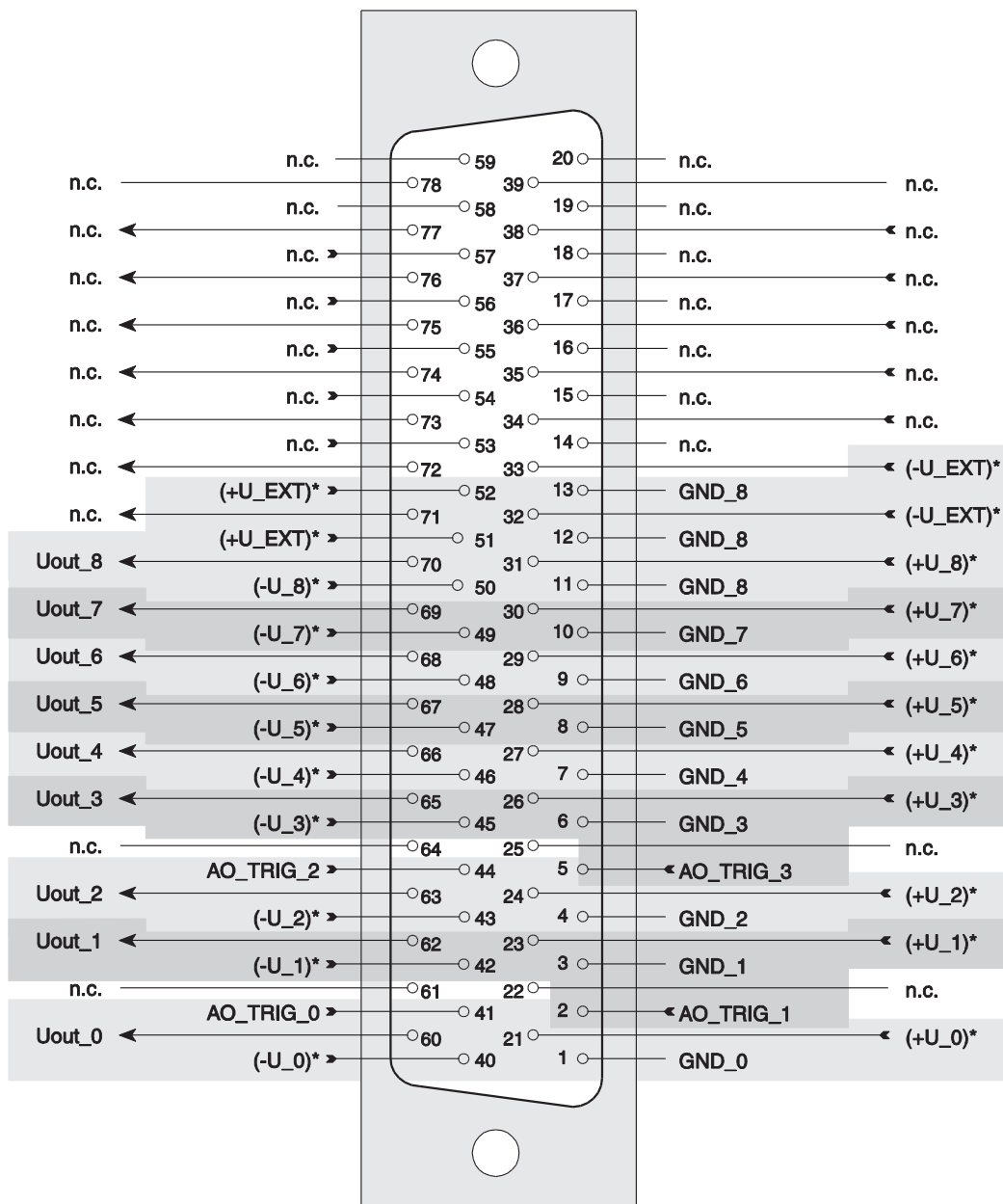


Diagram 12: Pinout of the 78-pin D-Sub female connector

**\*Note the warning on page 25.**



## Auxiliary Connector (ST2)

Adapter cable (ME-AK-D25F/S (cPCI)) from 20-pin IDC connector to mounting bracket with 25-pin D-Sub female connector (comes with the board).

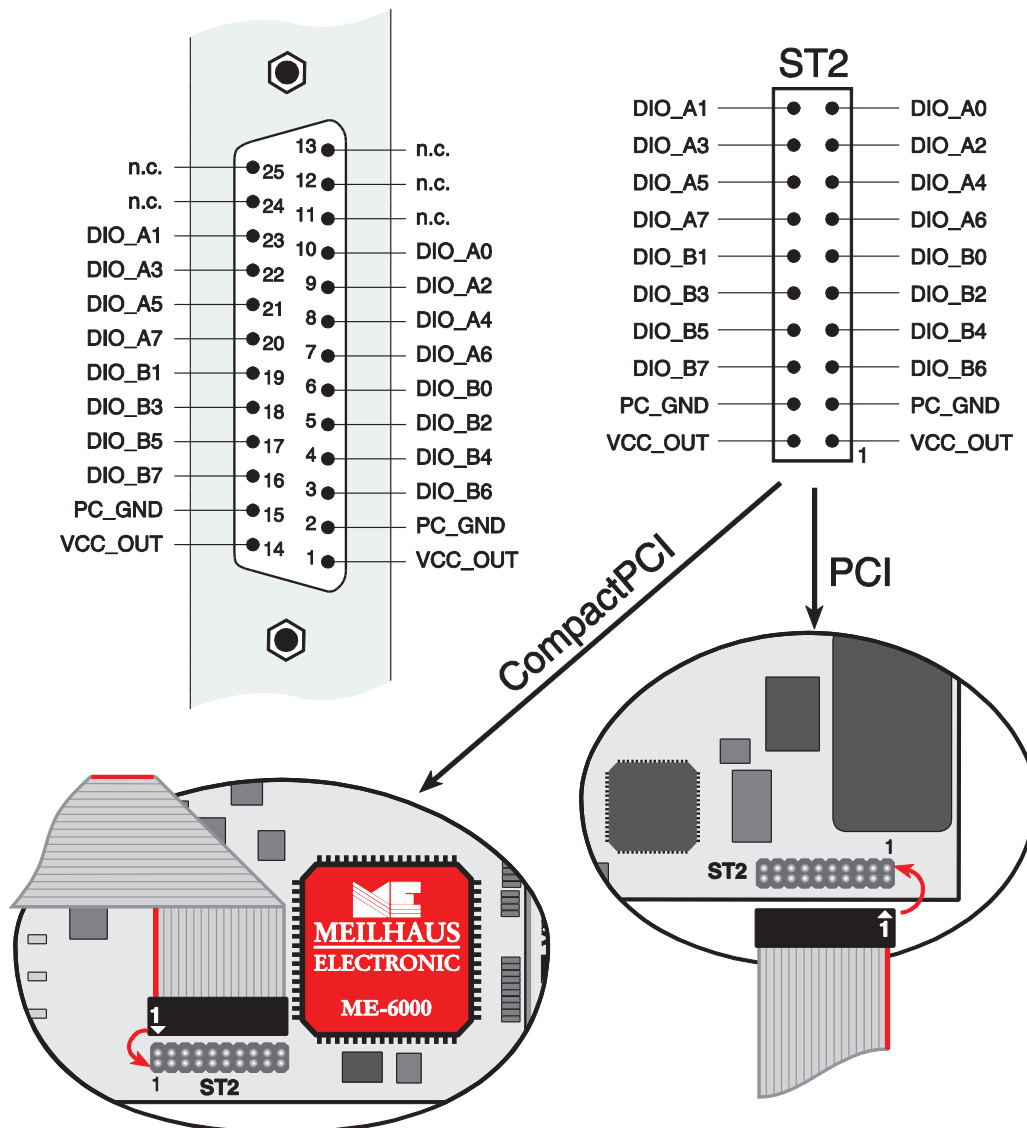


Diagram 13: Auxiliary connector ST2 for ME-6000 series (top view)

**Attention:** When connecting the mounting bracket make sure to plug in pin 1 of the flat ribbon cable (red marked line) as shown above to the IDC connector ST2.