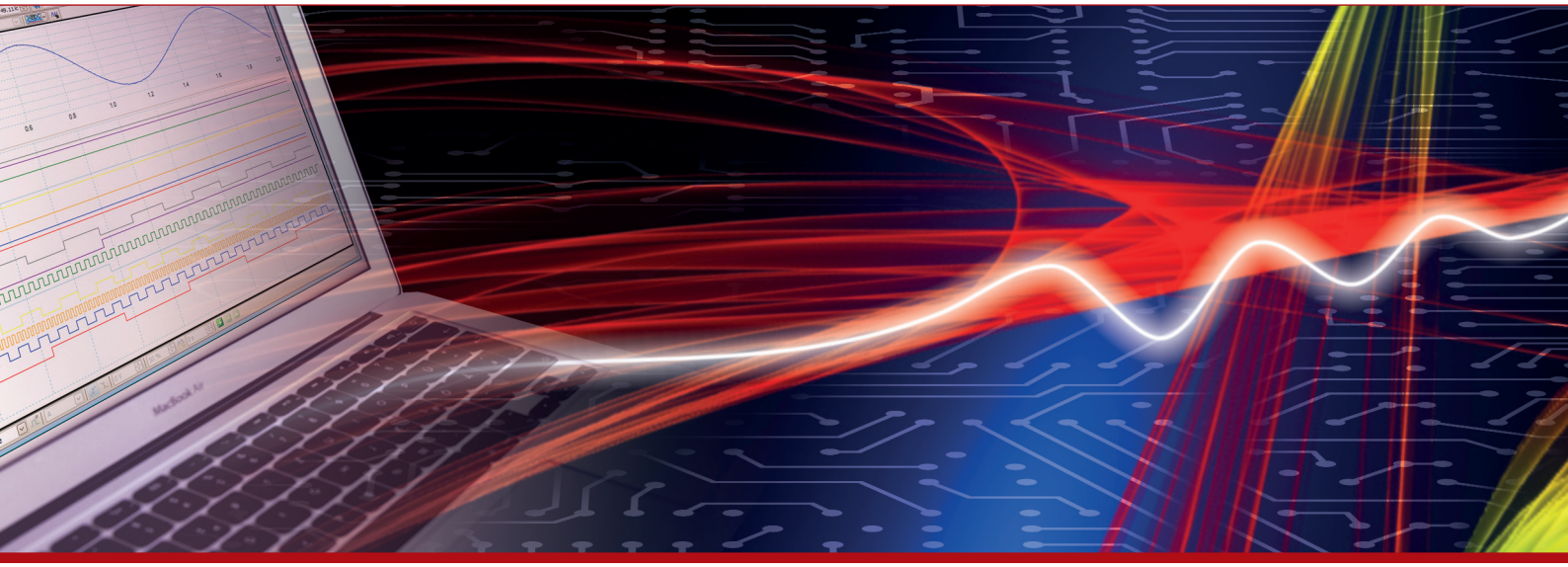
Product Datasheet - Technical Specifications



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ME-5261 Isolated 16 bit/250 kS/s DAQ Board

- Reliable, precise measurement data acquisition.
- Potential-free, isolated, full differential channels: Ideal solution for measurement of solar cells, batteries, rechargeable batteries, fuel cells, etc.
- For PCI-Express and 3 U CompactPCI/PXI.
- 4 or 8 analog measurement inputs:

  Differential, potential-free, isolated up to 500 V (for 1 s, no common GNDs).

  Range ±10.4 V. Two external digital triggers.Präzisions-A/D-Wandlung, 16 bit, 250 kS/s.
- High-precision A/D conversion, 16 bit, 250 kS/s.

  Individual SAR converter per channel
- MMCX connectors (optional terminal board with BNC). Connection of probes, for example for high voltage measurements.
- 8 digital-I/O channels with variable functions:

  Standard single-I/O or 4-channel frequency measurement, 4-channel frequency output.

  Bitchange detection with interrupt.

Model	Channels	Rate per channel	Resolution	Isolation	Digital-I/O	External trigger	Bus platform
ME-5261-8 PCIe	8 diff.	250 kS/s	16 bit	yes (separate grounds/no common ground), up to 500 V	1x 8 bit port, TTL level. standard firmware: Single digital-I/O, frequency measurement (4 of the channels, 5 MHz), frequency output (4 of the channels, 5 MHz)	2, TTL, isolated up to 42 V	PCI-Express
ME-5261-8 cPCI	8 diff.	250 kS/s	16 bit	yes (separate grounds/no common ground), up to 500 V	1x 8 bit port, TTL level. standard firmware: Single digital-I/O, frequency measurement (4 of the channels, 5 MHz), frequency output (4 of the channels, 5 MHz)	2, TTL, isolated up to 42 V	3 HE CompactPCI/PXI

Specification

PC Interface

PCI-Express-bus	32 bit, 33 MHz, 3.3 V, PCI-Express x 1 specification version 2.0
CompactPCI-bus	32 bit, 33 MHz, 5 V, PICMG 2.0 R3.0
Plug&Play	is fully supported

Analog Inputs

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Number of channels	subdevice 0 (streaming)	4 or 8 analog inputs
Operation modes	single	reading/writing triggered by software or externally
	stream timer	timer-controlled reading/writing of the values via FIFO
	stream trigger sample	trigger-controlled reading/writing of the values via FIFO
	interrupt	bit-pattern change, bit-pattern compare
FIFO size	FIFO_IN	8192 Values
Transfer rate in streaming mode	between the ME-5200 and PC	max. 25 MHz (cPCI) or 30 MHz (PCIe) (system-dependent)*
Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Timer (CHAN time)*	ME-5265 (2.0 MS/s)	500 ns...65 s (33..FFFFFFFFHex Ticks)
	ME-5284 (1.6 MS/s)	621 ns...65 s (41..FFFFFFFFHex Ticks)
	ME-5283, ME-5263 (1.0 MS/s)	1 µs...65 s (66..FFFFFFFFHex Ticks)

	ME-5282, ME-5262 (500 kS/s)	2 µs...65 s (132..FFFFFFFFHex Ticks)
	ME-5281, ME-5261 (250 kS/s)	4 µs...65 s (264..FFFFFFFFHex Ticks)
Timer resolution	programmable	15.$\overline{15}$ ns (1 Tick)
External trigger inputs	for the analog input section	TRIG_A1, TRIG_A2
External trigger edges		rising, falling, any
Sampling rate max.	ME-5284 (synchronous)	1.6 MS/s, 18 bit
	ME-5283 (synchronous)	1.0 MS/s, 18 bit
	ME-5282 (synchronous)	500 kS/s, 18 bit
	ME-5281 (synchronous)	250 kS/s, 18 bit
	ME-5265 (synchronous)	2.0 MS/s, 16 bit
	ME-5263 (synchronous)	1.0 MS/s, 16 bit
	ME-5262 (synchronous)	500 kS/s, 16 bit
	ME-5261 (synchronous)	250 kS/s, 16 bit
Resolution	ME-528x, option S, T, F	18 bit (79.3 µV)
	ME-528x, option E	18 bit (793 µV)
	ME-526x, option S, T	16 bit (317 µV)
	ME-526x, option E	16 bit (3174 µV)
Input voltage range	option S	±10.4 V
	option T	±10.4 V[2)]
	option E	±104 V
	option F	±10.4 V
Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Max. input voltage	option S	±20 V
	option T	±13 V
	option E	±160 V
	option F	±20 V
Input impedance	option S	R_i >100 MΩ, C_i=5 pF
	option T	R_i=1 MΩ, C_i=15 pF
	option E	R_i=200 kΩ, C_i=2 pF

	option F	R_i > 100 MΩ, C_i = 100 pF
Input current	option S	40 nA
	option T	10 µA
	option E	500 µA
	option F	40 nA
Bandwidth (3 dB)	option S (500kS/s. 2,0 MS/s)	920 kHz
	option T (500kS/s. 2,0 MS/s)	750 kHz [3)]
	option E (500kS/s. 2.0 MS/s)	750 kHz
	option F (500kS/s. 1.6 MS/s)	700 kHz
	option S, T, E (250 kS/s)	700 kHz
Bandwidth (0. 1 dB flatness)	option S (500 kS/s. 2.0MS/s)	130 kHz
	option T (500 kS/s. 2.0 MS/s)	100 kHz[3)]
	option E (500 kS/s. 2.0 MS/s)	100 kHz
	option F (500 kS/s. 1.6 MS/s)	80 kHz
	option S, T, E (250 kS/s)	80 kHz
SNR at 1 MS/s and 10 kS	option S, T, E (18 bit, 1.6MS/s)	103.6 $dB_{FS, RMS}$
	option F (18 bit, 1.6 MS/s)	105.5 $dB_{FS, RMS}$
	option S, T, E F (16 bit, 250 kS/s. 2.0 MS/s)	90 $dB_{FS, RMS}$
Coupling capacitance		23 nF
Isolation voltage	channel to channel, channel to PC ground	max. 300 VDC
Reference ground	fully differential channels	not required

[1)]Signal-to-noise ratio (SNR) indicates the ratio between the signal and noise levels of the individual channels. Measured with the 18-bit version, a sampling rate of 1 MS/s and using 10 kS.

[2)]The measuring range depends on the probe in use: „x1“: ±10.4 V, „x10“: ±104 V, „x100“: ±1040 V.

[3)]with „x10“-sampling probe.

Digital Trigger Inputs for the A/D Section

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Number		2 (TRIG_A1, TRIG_A2)
Max. trigger rate	applies to successive pulses of one of the two trigger inputs	max. sampling rate of the board
Max. input level		-0,5..+5.5 V
Input level U_{IL}		max. 0.8 V
U_{IH}		min. 2 V
Input current I_{IN}		±10 µA
Delay time		max. 30 ns
Isolation voltage	signal to GND_PC and GND_TRIG to GND_PC	max. 42 V
Reference ground		GND_TRIG

Digital Input/Output

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Port	subdevice 1	8-bit bidirectional
Operation modes	single	software triggered reading/writing
	interrupt	monitoring the digital ports for a change in the bit-pattern or for a bit-pattern comparison
Input/output rate	(depends on the system)	software controlled
Max. input level		-0.5..+7.0 V
Input level U_{IL}		max. 0.8 V
U_{IH}		min. 2 V
Input current I_{IN}		±10 µA
Output level U_{OL}	At I_{OUT} = 12 mA	max. 0.4 V
U_{OH}	At I_{OUT} = -12 mA	min. 2.8 V
Output current I_{OUT}	per pin	±12 mA
Reference ground		PC ground (GND_PC)

Frequency Input/Output

Availability	alternative subdevice configuration via ME-iDC
Signal form	rectangular

Frequency Measuring Channels

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Reference ground		PC ground (GND_PC)
Number of channels	(FI_0...3)	4 inputs (TTL)
Input level	see digital I/O	
Input current	see digital I/O	
Period (T)	$T_{min.} = T_{min.\ asym.} = T_{minsym.}$ $T_{max.\ asym.}$ $T_{max.\ sym}$	181.$\overline{81}$ ns (5.5 MHz) 32.5 s (0.03 Hz) 65 s (0.015 Hz)
Duty cycle	variable, depending on T	measurable in steps of 1 tick
Resolution	1 Tick	15.$\overline{15}$ ns
Accuracy		15.$\overline{15}$ ns
Operation modes		Single

Pulse Generator Channel

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Reference ground		PC ground (GND_PC)
Number of channels	(FO_0...3)	4 outputs (TTL)
Output level	see digital I/O	
Period (T)	$T_{min.} = T_{min.\ asym.} = T_{min.\ sym.}$ $T_{max.asym.}$ $T_{max.sym.}$	181.$\overline{81}$ ns (5.5 MHz) 32.5 s (0.03 Hz) 65 s (0.015 Hz)
Duty cycle	variable depending on T	adjustable in steps of 1 tick
Resolution	1 tick	15.$\overline{15}$ ns
Accuracy		±15.$\overline{15}$ ns
Operation modes		single

Interrupt

Measured Quantity/Criterion	**Condition/ Explanation**	**value**
Interrupt sources	passed directly to the PC	bit-pattern change, bit-pattern compare

General Data

Measured Quantity/Criterion	**Condition/ Explanation**	**Value**
Power supply	CompactPCI	+5 V (via PCI-bus)
	PCI-Express	+3.3 V (via PCIe-bus), +5 V (via Molex-plug from PC power-supply-unit)
Current consumption	CompactPCI (idling current)	3.3 V : 240 mA,5 V : 570 mA
	CompactPCI (8 AI, 8 DIO 1MS/s)	3.3 V : 650 mA,5 V : 1.8 A
	PCI-Express (idling current)	3,3 V : 370 mA,5 V : 570 mA
	PCI-Express (8 AI, 8 DIO, 1MS/s)	3,3 V : 770 mA,5 V : 1,8 A
Board dimensions	CompactPCI	3U CompactPCI boards
	PCI-Express	162 mm x 98 mm
Connections	ST1..4 or ST1..8	4 or 8 MMCX coaxial sockets
	ST9	HDMI connector, type HEC
Operating temperature		0...70 °C
Storage temperature		-40...100 °C
Air humidity		20...55 % (non-condensing)

Certification	CE

Pinout

Note: „ME-5200“ stands for all the models in the ME-5200 series.

Legend for pinouts:

Pin-name	Function
AI_0...7+	positive signal of the analog input channels (subdevice 0)
AI_0..7-	negative signal of the analog input channels (subdevice 0)
DIO_0..7	digital input/output (subdevice 1)
FI_0..3	frequency measurement inputs (subdevice 1, alternative configuration)
FO_0..3	pulse generator outputs (subdevice 1, alternative configuration)
TRIG_A1	first digital trigger input for AI section (referenced to GND_TRIG)
TRIG_A2	second digital trigger input for AI section (referenced to GND_TRIG)
GND_TRIG	isolated ground for TRIG_A1 and TRIG_A2
GND_PC	PC ground
„reserved“	pins reserved for extensions **These pins must not be connected, otherwise the board can be irreversibly damaged!**

Note: the level of the unused pins DIO_4..7 in the “Frequency measurement” (FI) and “Pulse generator” (FO) configurations. **These pins are connected to ground!**

HDMI Connector (Digital I/O)

HDMI connector type HEC for digital I/Os (opt. FI/FO) and digital trigger inputs.

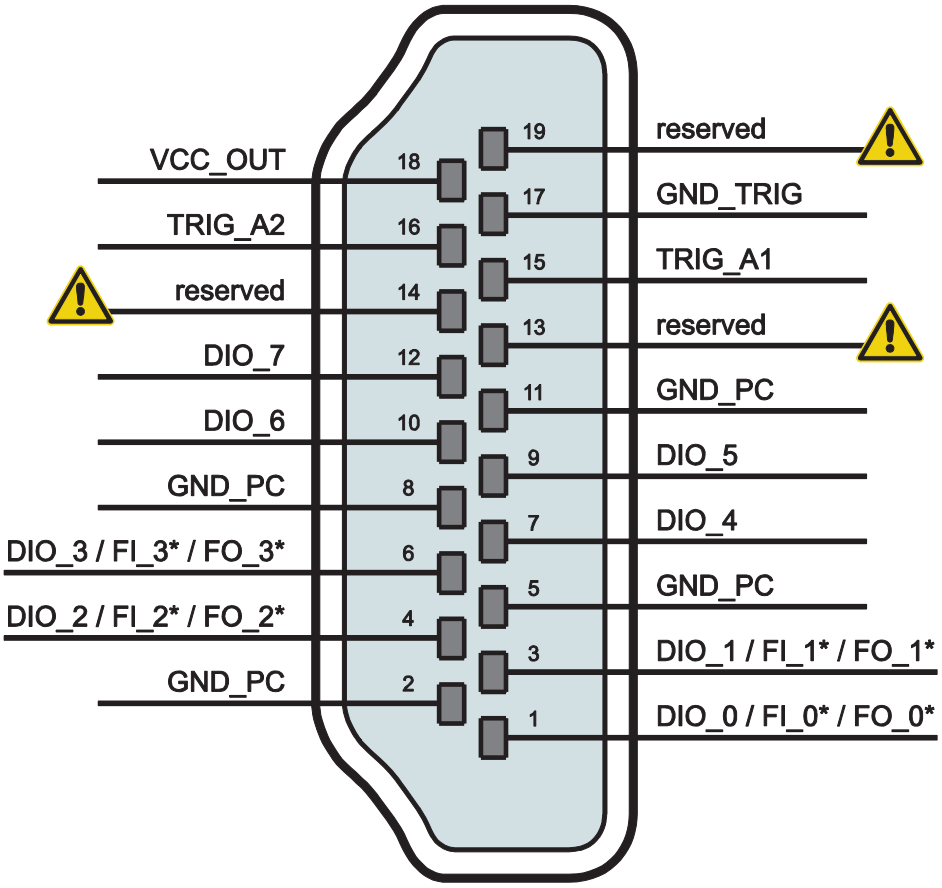

Diagram 23: HDMI connector of the ME-5200 series (ST9)

*It is only possible to use these pins as frequency measuring inputs (FI_x) or as pulse generator outputs (FO_x) after the relevant subdevice has been appropriately configured with the ME-iDC. The other pins of the relevant digital port can then no longer be used for digital input/output.

Reserved pins must not connected, otherwise the board may be irreversibly damaged.

Mounting bracket with analog inputs

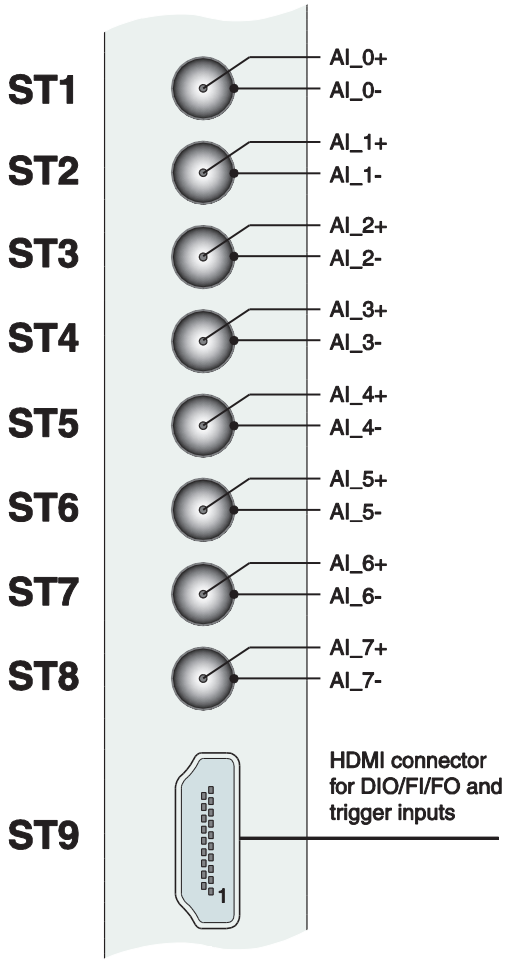

Diagram 24: Slot bracket of the ME-5200 series

Note: ST1..8 are MMCX coaxial-sockets. The number of analog inputs depends on the model.

Terminal block for the ME-5200

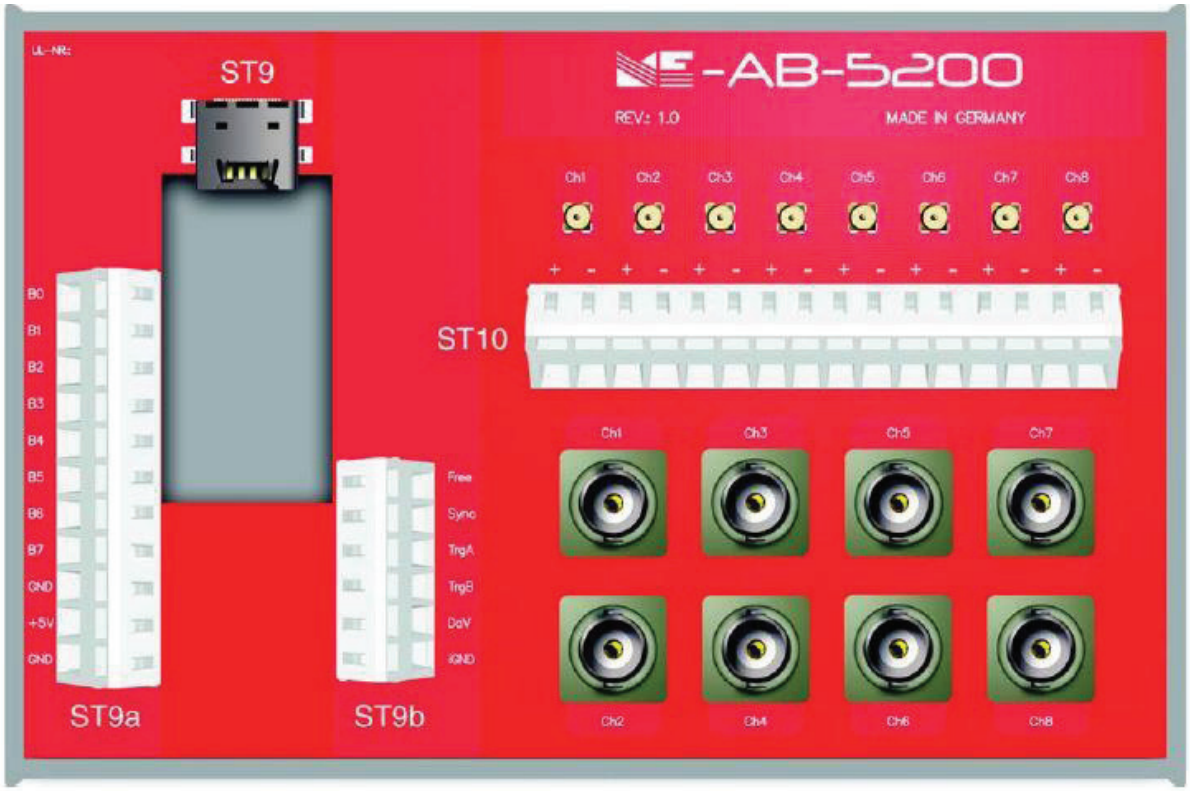

Diagram 25: ME-AB-5200

Signal assignments

Signal Name (manual)	Label on Terminal Block	Signal Name (manual)	Label on Terminal Block
AI_0+/-	Ch1	DIO_0..7	B0..7
AI_1+/-	Ch2	reserved*	Free
AI_2+/-	Ch3	reserved*	Sync
AI_3+/-	Ch4	TRIG_A1	TrgA
AI_4+/-	Ch5	TRIG_A2	TrgB
AI_5+/-	Ch6	reserved*	DaV
AI_6+/-	Ch7	GND_TRIG	iGND
AI_7+/-	Ch8	GND_PC	GND
	AI_0+/-	VCC_OUT	+5 V

Table 6: ME-AB-5200 signal assignments