

Product Datasheet - Technical Specifications



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ME-5820 Opto-isolated Digital-I/O PC DAQ and Output Board

- Fast, multifunctional opto-I/O and counter board with interrupt control.
- For PCI-Express and 3 U PXI-Express/PXIe (fully compatible).
- 16 or 32 digital inputs and 16 or 32 digital outputs, opto-isolated, and 3 isolated 16 bit counters.
- Inputs: 5...60 V variable, outputs: 15...30 V variable, isolation voltage up to 1 kV.
- Sink/source per port software-selectable, sink 50 mA/channel, source 180...370 mA/channel.
- Channels can have various functions, for example single digital-I/O, frequency measurement, frequency output.
- Operating modes: Simple read, bitpattern comparator (compare) with interrupt, bitchange with interrupt.
- New in comparison to ME-5810: No more piggyback technology! Version B is also completely built on the base board: More compact, more space-saving.

Model	Opto in	Opto out	Opto isolated counters	Standard firmware functions	Bus platform
ME-5820 PCIe	16	16	3, 16 bit, max. 300 kHz (external)	Single digital-I/O, frequency measurement (4 of the 16 inputs; 300 kHz), impulse generator output (4 of the 16 outputs; 3 kHz), bitpattern comparison with with interrupt, bit-change with interrupt, output source/sink selection	PCI-Express
ME-5820 PXIe*	16	16	3, 16 bit, max. 300 kHz (external)		3 U PXI-Express
ME-5821 PCIe	32	32	3, 16 bit, max. 300 kHz (external)	Single digital-I/O, frequency measurement (8 of the 32 inputs; 300 kHz), impulse generator output (8 of the 32 outputs; 3 kHz), bitpattern comparison with interrupt, bit-change with interrupt, output source/sink selection	PCI-Express
ME-5821 PXIe	32	32	3, 16 bit, max. 300 kHz (external)		3 U PXI-Express

* The models available in the shop are standard products. Other models are produced only, if ordered in higher numbers.

Specification

(Ambient temperature 25 °C)

PC Interface

PCI-Express Bus	PCI-Express x1, Version 2.0
PXI-Express Bus	PCI-Express x1, Version 2.0, PICMG 2.0 R3
Plug&Play	is fully supported

Digital Input/Output (general)

Measured Quantity/Criterion	Condition/Explanation	Value
Ports ME-582x	subdevice 0 (Single)	16-bit input port opto-isolated
	subdevice 1 (Single)	16-bit output port opto-isolated
Ports ME-5821 (only)	subdevice 5 (Single)	16-bit input port opto-isolated
	subdevice 6 (single)	16-bit output port opto-isolated
Operation modes	single	software triggered read/write
	interrupt	bit-pattern change, bit-pattern compare
Frequency input signal	symmetrical rectangular signal	max. 300 kHz
Frequency output signal	symmetrical rectangular signal	max. 3 kHz
	option „wraparound“	max. 3 kHz, without load for the Host PCs
Timer (CHAN-time)	input	30.30 ns...65 s (2..FFFFFFFFHex Ticks)
	output	0.15 ms...65 s (11000..FFFFFFFF-Hex Ticks)

Timer resolution	programmable	15.15 ns (1 Tick)
Input level	see the following tables	
Isolation voltage	U_{ISO} (f = 60 Hz, t = 60 s)	max. 1000 VAC _{rms}
Reference ground	isolated from PC ground	GND_EXT

Opto-Isolated Inputs

Static values

Conditions: $T_A=25\text{ °C}$

Measured Quantity	Test Criterion	MIN	Type	MAX	Unit
$U_{in,H}$		5		60	V
$U_{in,L}$		0		2.2	V
R_{in}	$U_{in}=24\text{ V}$		4.3		k Ω
I_{in}	$U_{in}=24\text{ V}$		5.5	6	mA

Limiting Values

Measured Quantity /Criterion	Condition/Explanation	Value
URWM over-voltage protection for inputs	max. 600 W pulse power at a pulse width of 1 ms	64.4 V

Opto-Isolated Outputs

Conditions: $T_A=25\text{ °C}$

Output-drivers	sink	2 x ULN2803 (ME-5820)
		+ 2 x ULN2803 (ME-5821)
	source	2 x ISO1H811G (ME-5820)
		+ 2 x ISO1H811G (ME-5821)
External supply	U_{ext}	15...30 V
	U_{Lmax}	U_{ext}

For further specifications see chapter sink driver resp. source driver

Sink Driver (UDN2803)

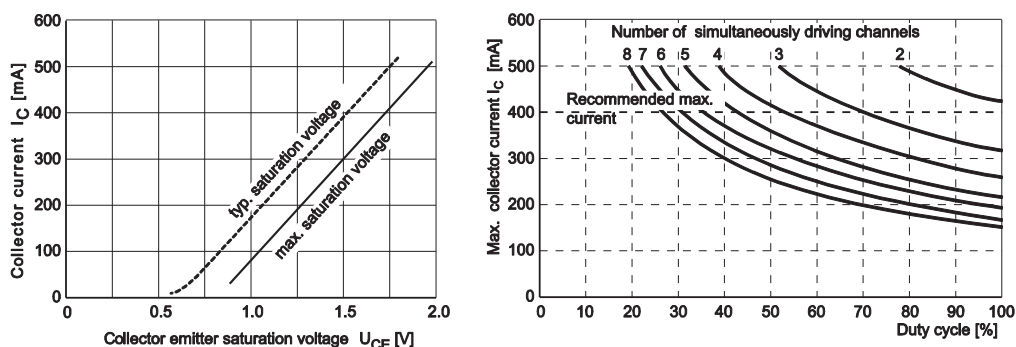
Measured Quantity	Test Criterion	MIN	Type	MAX	Unit
$I_{OUT}=I_C$ (output current)	per channel			50	mA
	See also characteristics curves in picture 18				

I_{CEX} (output leakage current)	$U_{CE}=50\text{ V}, T_A=25\text{ }^\circ\text{C}$ $U_{CE}=50\text{ V}, T_A=85\text{ }^\circ\text{C}$			50 100	μA
$U_{CE(SAT)}$ (collector emitter saturation voltage)	$I_{OUT}=350\text{ mA}$ $I_{OUT}=200\text{ mA}$ $I_{OUT}=100\text{ mA}$		1.3 1.1 0.9	1.6 1.3 1.1	V
I_R (clamp diode reverse current)	$U_R=50\text{ V}, T_A=25\text{ }^\circ\text{C}$ $U_R=50\text{ V}, T_A=85\text{ }^\circ\text{C}$			50 100	μA
U_F (clamp diode forward voltage)	$I_F=350\text{ mA}$			2.0	V
t_{on} (switch-on time)	$R_L=125\ \Omega,$ $U_{OUT}=50\text{ V},$ $C_L=15\text{ pF}$		0.1	1	μs
t_{off} (switch-off time)	$R_L=125\ \Omega, U_{OUT}=50\text{ V},$ $C_L=15\text{ pF}$		0.2	1	μs

Output current

The maximum current per output (I_C) depends of the saturation voltage U_{CE} and is limited by the power dissipation of the sum of the channels to $P_{tot}=1\text{ W}$ per chip:

$$P_{TOT}=P_0+\dots+P_7 \leq 1\text{ W (by } 70\text{ }^\circ\text{C)}$$



Picture 18: Characteristic curves UDN2803

Source Driver (ISO1H811G)

(short-circuit proof with current limiting and temperature monitoring)

Voltage supply

Conditions: $U_{ext}=15\dots 30\text{ V}, T_J=-25\dots +125\text{ }^\circ\text{C}$

Measured Quantity	Test Criterion	MIN	Type	MAX	Unit
U_{OUT}	$U_{ext}=24\text{ V}; 1\text{ channel with}$ $I_{out}=0,625\text{ A}$		23.8		V
$I_{OUT}/\text{channel}$	1 channel			625	mA

	16 channel			370	mA
	32 channel (with ME-5002)			180	mA
U_{USD} (undervoltage shutdown)		7		10.5	V
R_{ON} (resistance if output active)	$I_{OUT}=0.5\text{ A}$, $T_I=25\text{ °C}$ $I_{OUT}=0.5\text{ A}$, $T_J=125\text{ °C}$		150 270	200 320	m Ω m Ω
I_S (current consumption driver chip)	8 channels active per chip; without load		10	14	mA
$I_{L(off)}$ (output current in inactive state)	$U_{in}=U_{OUT}=0\text{ V}$,	0	5	30	μA

Switching Times

Measured Quantity	Test Criterion	MIN	Type	MAX	Unit
t_{on} (switch-on time)	$R_L=47\ \Omega$, to 90 % U_{out}		64	120	μs
t_{off} (switch-off time)	$R_L=47\ \Omega$, to 10 % U_{out}		89	120	μs
$dU_{out}/dt_{(on)}$ (slope on switch-on)	$R_L=47\ \Omega$, up 10...30 % U_{out} , $U_{ext}=15\text{ V}$		1	2	V/ μs
$dU_{out}/dt_{(off)}$ (slope on switch-off)	$R_L=47\ \Omega$, up 70...40 % U_{out} , $U_{ext}=15\text{ V}$		1	2	V/ μs

Limiting Values

Measured Quantity	Test Criterion	MIN	Type	MAX	Unit
T_{CSD} (housing switch-off temperature)		125	130	135	$^{\circ}\text{C}$
T_{CR} (housing reset temperature)		110			$^{\circ}\text{C}$
T_{TSD} (junction switch-off temperature)		150	175	200	$^{\circ}\text{C}$
T_R (junction reset temperature)		135	1		$^{\circ}\text{C}$
I_{lim} (DC-short-circuit current)	$U_{ext} = 24\text{ V}$, $R_L=10\text{ m}\Omega$		1.1		A

Frequency Input/Output

Availability	alternative subdevice configuration via ME-iDC
Signal-form	rectangular

Frequency Measuring Channels

Measured Quantity/Criterion	Condition/Explanation	Value
Reference ground	isolated from PC ground	GND_EXT
Number of channels	ME-5820 (FI_A0...3)	4 inputs (opto-isolated)
	ME-5821 (FI_A0...3) and (FI_C0...3)	8 inputs (opto-isolated)
Input-level		see digital I/O
Input-current		see digital I/O
Period (T)	$T_{\min.} = T_{\min.asym.} = T_{\min.sym.}$	3.3 μ s (300 kHz)
	$T_{\max.asym.}$	16.25 s (0.06 Hz)
	$T_{\max.sym.}$	32.5 s (0.03 Hz)
Duty-cycle	variable, depending on T	measurable in steps of 1 tick
Resolution	1 tick	15.15 ns
Accuracy		\pm 15.15 ns
Operating modes		single

Pulse Generator Channels

Measured Quantity/Criterion	Condition/Explanation	Value
Reference ground	isolated from PC ground	GND_EXT
Number of channels	ME-5820 (FI_A0...3)	4 outputs (opto-isolated)
	ME-5002 (FI_A0...3) and (FI_C0...3)	8 outputs (opto-isolated)
Output level	sink or source driver	see digital I/O
Period (T)	$T_{\min.} = T_{\min.asym.} = T_{\min.sym.}$	0.3 ms (300 kHz)
	$T_{\max.asym.}$	16.25 s (0.06 Hz)
	$T_{\max.sym.}$	32.5 s (0.03 Hz)
Duty-cycle	variable, depending on T	to be set in steps of 1 tick
Resolution	1 tick	15.15 ns
Accuracy		\pm 15.15 ns

Operating modes		single
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Counters

Number	3 x 16 bit (1 x 82C54)	
Opto-isolation	yes (dimensioning of the I/O level for 24 V)	
Counter-clock	up to 300 kHz by external source	

...with Opto-Isolation

Measured Quantity/Criterion	Condition/Explanation	Value
Reference ground	isolated from PC ground	GND_EXT
External supply for opto-couplers	U_{ext}	24...30 V
Level for Counter Outputs (OUT_x)		
Type		"Open Collector"
U_{Lmax}		U_{ext}
I_{Out}		max. 30 mA
Level for Counter Inputs CLK_x, Gate_x)		
Logic level	inverted by opto-couplers	low-active
I_F		$7.5 \text{ mA} \leq I_F \leq 10 \text{ mA}$
U_{IL}		max. 0.8 V
U_{IH}		24..30 V, max. U_{ext}

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	PXI-Express	+3,3 V (via PXIe-Bus)
	PCI-Express	+3.3 V (via PCIe-Bus)
	PXI-Epress	0.8...1.2 A (full-load)

Current consumption	PCI-Express	0.8...1.2 A (full-load)
Board dimensions (without slot bracket and connector)	PXI-Express	3 U PXI-Express board
	PCI-Express	162 mm x 98 mm
Connections	ST1	78-pin D-sub female socket
Operating temperature		0 °C...70 °C
Storage temperature		-40 °C...100 °C
Air humidity		20 %...55 % (non-condensing)
Certification	CE	

Pinout

Note: „ME-581x“ represents all models of the ME-5820 series.

Legend for pinouts:

Name	Function
DI_A0..15	digital inputs of ME-582x (subdevice 0)
DO_B0..15	digital outputs of ME-582x (subdevice 1)
DI_C0..15*	digital inputs of ME-5821 (subdevice 5)
DO_D0..15*-	digital inputs of ME-5821 (subdevice 6)
CLK_0..2	clock inputs for counters
GATE_0..2	gate inputs for counters (low-active)
OUT_0..2	Counter outputs (type "Open-Collector")
FI_A0..3	frequency measurement inputs of ME-582x (subdevice 0, alternative configuration)
FO_B0..3	pulse generator outputs of ME-582x (subdevice 1, alternative configuration)
FI_C0..3*	frequency measurement input of ME-582x (subdevice 5, alternative configuration)
FO_D0..3*	pulse generator output of ME-5821 (subdevice 6, alternative configuration)
VCC_EXT	VCC input for ext. power supply of isolated ports, U_{ext} typ. 24 VDC
GND_EXT	reference ground for isolated ports (isolated from PC ground)

Note: In the configuration “pulse generator” (FO) do not forget to take care of the unused pins DO_B4..15 (ME-582x) and DO_D4..15 (ME-5821). When used as sink drivers they are in high-impedance state, when used as source drivers they are connected to ground!

*These signals are only available on ME5821

