

# PRTM-PZDR4

## 4-Channel Piezo Driver for MTCA

PIEZOTECHNICS

### HIGHLIGHTS

- Supports 4 actuators and sensors
- Unipolar and bipolar operation
- Digital voltage and current readout
- Encapsulated in metal housing
- Internal high-voltage source with external high-voltage input option

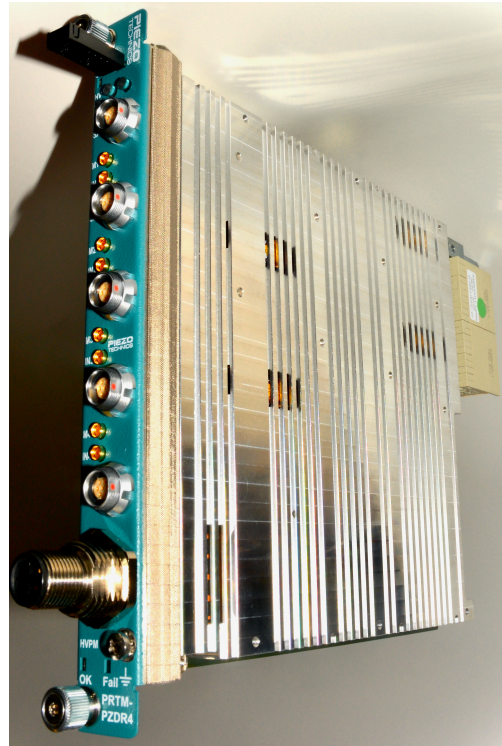
### APPLICATIONS

- Science: Particle and optical beam control
- Particle accelerator: RF Cavity frequency control
- Laser optics: Stretcher and switcher for optical fiber control, mirror steering, synchronization of pulsed lasers, fiber link stabilization etc.
- Industry: High-end piezo controller in production systems, laser control, precision object positioning

### FEATURES

#### MicroTCA.4 Rear-Transition Module (RTM)

- Typical bandwidth of 50 kHz with 0.1  $\mu$ F piezos
- Digital output sampling with 200 kSPS
- Switchable actuator and sensor functionality
- Unipolar: 0 ...+100 V and bipolar:  $\pm$ 100 V operation
- External high-voltage input for up to 120 V/ 500 mA
- Interlock signal support via Zone 3 or front panel
- Analog low-voltage monitor outputs on front panel



The 4-channel Piezo Driver is a general purpose Rear Transition Module (RTM) board compatible to the MTCA.4 standard.

The module supports simultaneous driving and sensing of four piezo elements. The small signal bandwidth of the piezo driver is in range of 50 kHz when driving pure capacitance loads of order of 0.1  $\mu$ F with an output voltage signal level of 5  $V_{pp}$ .

For driving and sensing circuits the PRTM-PZDR4 module allows a sampling rates of up to 200 kSPS on each channel. The most critical circuits are monitored using general purpose ADCs and temperature sensors.

The actuator and sensor functionality can be toggled remotely using relay-switches. The drivers are deactivated whenever an interlock signal is active.

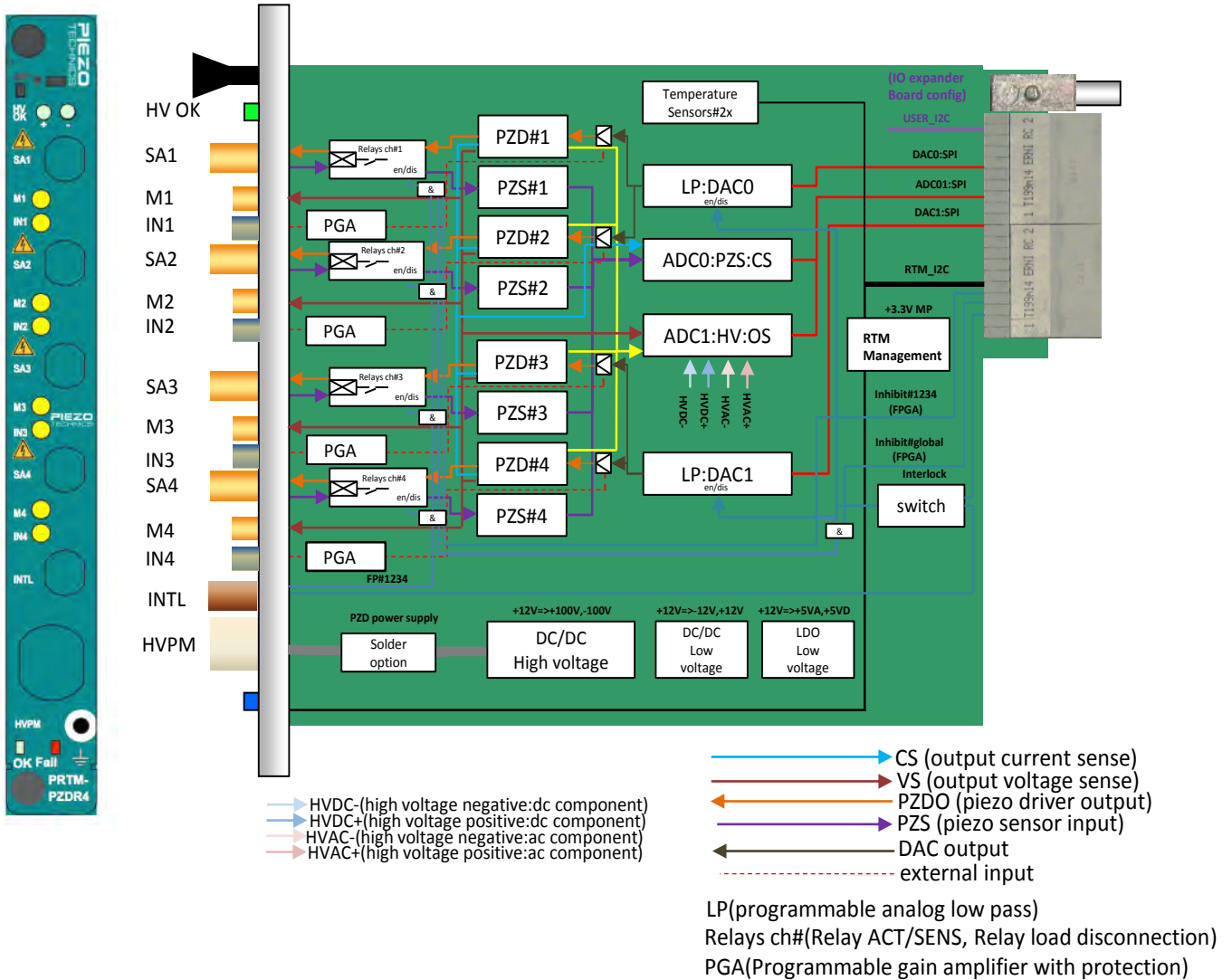
Piezoelectric elements can be powered using unipolar or bipolar power supply. Power can be provided internally via on-board generators or via an external power input.

Proven track record in large-scale physics experiments (DESY, CERN, KEK, Pohang ...).

## TECHNICAL SPECIFICATIONS

GENERAL DATA				
Function	4-channel piezo driver with 4 actuator Inputs			
Operation modes	unipolar, bipolar			
Driver type	DAC + high power amplifier			
High-voltage (HV) options	Internal DC-DC converter External front panel input			
Output levels	Internal HV:	0 - 80V / -80V - +80V		
	External HV (max.):	0 - 120V / -120V - +120V		
Output power	Internal HV:	100mA RMS / Number of active channels (=max. sum current)		
	External HV (max.):	500mA RMS / Number of active channels (=max. sum current)		
Power consumption	Internal HV:	30W max.		
ARCHITECTURE				
Physical dimensions	RTM	Double width, Mid-Size		
		Width: 148.5mm Depth: 180.6mm		
Compatibility	Zone 3	Class D1.0, D1.1, D1.2		
	Compatible AMCs	DAMC-FMC20, DAMC-FMC25, DAMC-TCK7		
CONNECTORS				
Piezo connectors	Piezo actuator outputs (A1...A4)	Connector type	Fisher connector (DBPC 102 A056-130/ 100704), 7-pin	
		Output load ( $R_{load}$ )	Capacitance: 30 nF - 6 $\mu$ F	
		Output bandwidth (3 dB)	DC - 300 Hz ( $V_o = 140$ Vpp @ 6 $\mu$ F): cavity tuner DC - 20 kHz ( $V_o = 0.5$ Vpp @ 1 $\mu$ F): laser DC - 50 kHz ( $V_o = 5$ Vpp @ 100 nF): link	
		DAC resolution	18-bit	
		Channel crosstalk	better -60 dB channel-to-channel	
		Overcurrent protection (HV shutdown)	$I_{max}=500$ mA for each channel	
	Piezo sensor inputs (S1...S4)	Input impedance	2.4 k $\Omega$	
		Input voltage range	2 Vpp	
		Input bandwidth (3dB)	DC - 20 kHz	
	Analog monitor Outputs	Piezo driver output or current feedback (M1...M4)	Channel crosstalk	better -60 dB channel-to-channel
Connector type			single-ended MMCX, 1-pin	
Piezo driver inputs	Multiplexed with internal DAC (IN1...IN4)	Output voltage range	$\pm 8$ V	
		Connector type	single-ended MMCX, 1-pin	
		Input voltage range	$\pm 1$ V	
		Input impedance	1 k $\Omega$	
Interlock input	Global interlock (1 channel) Single-channel interlocks (optional)	Channel crosstalk	better -60 dB channel-to-channel	
		Connector type	Fisher connector (DBPC 102 A056-230/ 100776 ), 7-pin	
High voltage input	HVPM	Signaling standard	EIA-422 or 3.3V-5V digital signal	
		Signaling standard	3.3V-5V digital signal	
PE terminal	HVPM	Connector type	M12 power connector (male type)	
		Contacts	3-pin + first finger PE	
PE terminal	HVPM	Connection type	M3 screw + PE cable	
		Connection type	M3 screw + PE cable	
OTHER FEATURES				
Environmental	In-crate operation	Operating temperature	0 - +50°C	
		Storage temperature	-40 - +90°C	
		Relative humidity	5 - 90%, non-condensing	
OTHER				
Compliance	RoHS			

FUNCTIONAL BLOCK DIAGRAM



OPTIONS

PRTM-PZDR4 - A-B-C-D

- A** Piezo connector type
- 7 = 7-pin Piezo connector
  - 4 = 4-pin (reserved)
- Interlock mask [S3: 1-4]
- D** 1111 = interlock to all channels
- Please contact manufacturer

- High voltage power supply option
- B** IB = Internal bipolar
- IU = Internal unipolar
- E = External bipolar or unipolar

- Interlock sources [S2: 1-4]
- C** 1000 = default: interlock off
- Please contact manufacturer