4-channel Fast Interface Bipolar Picoammeter with Integrated High-Voltage Source

TetrAMM

- **The TetrAMM ("Tetra AMMeter") is a 4-channel picoammeter designed for quad monitoring applications – e.g. photon Beam Position Monitors**
- **4-channel simultaneous sampling with a 24-bit Analog-to-Digital conversion resolution and 100 kHz sampling frequency**
- **Integrated High Voltage power supply with factory-selectable polarity source for detector biasing**

FEATURES

- **4-channel simultaneous sampling**
- **Up to 100 kHz sampling frequency**
- **24-bit ADC conversion**
- **Bipolar current ranges from ±120 nA to ±120 μA** - *different ranges available*
- **10/100/1000 Ethernet Connectivity**
- **Low-noise integrated HV source**
- **Firmware Remote Update**
- **External Trigger/Gate and Interlock**
- **Auto-ranging functionality**
- **On-board FPGA and soft-processor computations**
- **SFP Link**
- **Compact mechanical dimensions**
- **Oscilloscope software available**
- **Ready to be integrated into the BEST stabilization system**

APPLICATIONS

- **Beam Position Monitoring**
- **Ion Chambers Readout**
- **Ultra-low Current Measurements**
- **Diamond Detector Readout**
- **Radiation Monitoring**

TetrAMM. The TetrAMM ("Tetra AMMeter") is the new 4-channel picoammeter designed for quadrature monitoring applications – e.g. photon Beam Position Monitors – that expands CAEN ELS picoammeter family.

The device is composed by a carrier board and by two plugins: these are the Front-End board and the High Voltage source.

The Front End board performs the analog signal conditioning and the digital data conversion: input currents range from ±120 μA to ±120 nA full-scale range in the standard configuration and are simultaneously converted with a 24-bit resolution at a maximum 100 kHz frequency.

The High Voltage plugin board is rated at a standard +500 V or -500 V @ 1 mA output but it can be configured in its rating and polarity (up to 4 kV). This source, fed on a SHV connector - is perfectly suited to be used as the biasing voltage for a detector system.

The TetrAMM is housed in a light and extremely compact box that can be placed close to the detector – i.e. the signal source – in order to reduce cable lengths and to limit noise pick-up from external sources or from parasitic effects. Low-noise, high stability and excellent linearity enable users to perform very high precision current measurements.

A 10/100/1000 Mbit Ethernet connection allows for very fast data transmission and easy instrument control with several operating systems and programming languages.

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About Us

CAEN ELS is a leading company in the design of power supplies and state-of-the-art complete electronic systems for the Physics research world, having its main focus on dedicated solutions for the particle accelerator community and high-end industrial applications.

- Power Supply Systems
- Precision Current Measurements
- Beamline Electronics Instrumentation
- FMC and MicroTCA

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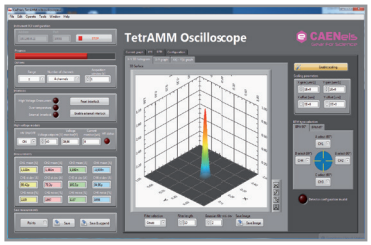
TetrAMM - Rear View



Oscilloscope Software

The TetrAMM has two different TRIGGER and GATE signals on a LEMO coaxial connector; additional passive interlock contacts are present on the 10-pin I/O connector on the rear panel.

An SFP link is also present and it will be used to integrated the device in a closed-system.

The internal firmware can be remotely updated, please check our website www.caenels.com in order to have the last available version installed on your TetrAMM.

Technical Specifications	**TetrAMM**
Input Channels	4
Current Polarity	Bipolar
Current Measuring Range	RNG0: ±120 µA RNG1: ±120 nA
Current Resolution	RNG0: 15 pA RNG1: 15 fA
Analog Bandwidth	5 kHz
Data rate	up to 100 ksamples/s
Equivalent Input Noise (@ 1 ksps)	RNG0: 1 ppm/FS RNG1: 6 ppm/FS
Equivalent Input Noise (@ 100 ksps)	RNG0: 6 ppm/FS RNG1: 25 ppm/FS
Communication Interface	Ethernet 10/100/1000 TCP-IP or UDP SFP - Small Form-factor Pluggable
Temperature Coefficient	RNG0: < 0.001 %/FS/K RNG1: < 0.002 %/FS/K
I/O Signals	Configurable Trigger/Gate - *input* Trigger - *output* External Interlock - *output*
Additional Features	Auto-Ranging Firmware Remote Upgrade Configurable Sampling Frequency High Voltage Output Current/Voltage Readback High Voltage Overcurrent Protection
Protections	External Interlock Internal Over-Temperature High Voltage Over-Current
High Voltage Output	High Voltage Source 500 V @ 1 mA - *standard* *configurable up to 4 kV with different ordering options*
Dimensions	174 x 175 x 44 mm
Connectors	BNC for current inputs SHV for High-Voltage output
Weight	850 g
Supply Voltage	+12 V
Status Indicators	5 LEDs

Ordering Code	Ranges	HV	BW	Description
WTETRAMMNOHV	±120 µA, ±120 nA	n.a.	5 kHz	*4-channel Fast Interface Bipolar Picoammeter without Integrated HV Source*
WTETRAMM05PX	±120 µA, ±120 nA	+500 V	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated +500V HV Source*
WTETRAMM05NX	±120 µA, ±120 nA	-500 V	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated -500V HV Source*
WTETRAMM20PX	±120 µA, ±120 nA	+2 kV	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated +2kV HV Source*
WTETRAMM20NX	±120 µA, ±120 nA	-2 kV	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated -2kV HV Source*
WTETRAMM40PX	±120 µA, ±120 nA	+4 kV	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated +4kV HV Source*
WTETRAMM40NX	±120 µA, ±120 nA	-4 kV	5 kHz	*4-channel Fast Interface Bipolar Picoammeter with Integrated -4kV HV Source*
WTETRAMMC001	±1.2 µA, ±1.2 nA	-500 V	100 Hz	*4-channel Picoammeter with Integrated -500V HV (RNG: ± 1.2 µA, ± 1.2 nA)*
WTETRAMMC002	± 1.2 mA, ± 1.2 µA	+500 V	5 kHz	*4-channel Picoammeter with Integrated +500V HV (RNG: ± 1.2 mA, ± 1.2 µA)*
WTETRAMMC003	± 25 µA, ± 250 nA	n.a.	5 kHz	*4-channel Picoammeter without Integrated HV (RNG: ± 25 µA, ± 250 nA)*
WTETRAMMC004	±120 µA, ±120 nA	+ 500V	20 kHz	*4-channel Picoammeter with Integrated + 500V HV (RNG: ± 120 µA, ± 120 nA)*
WTETRAMMC005	±10 µA, ±125 nA	- 500V	5 kHz	*4-channel Picoammeter with Integrated -500V HV (RNG: ± 10 µA, ± 125 nA)*
WTETRAMMC006	± 10 µA, ± 2 µA	n.a.	5 kHz	*4-channel Picoammeter without Integrated HV (RNG: ± 10 µA, ± 2 µA)*

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