# TR-22 Ultra Fast Transient Recorder

https://www.gigahertz-optik.com/en-us/product/tr-22-transient-recorder/

**Product tags:**

# Description

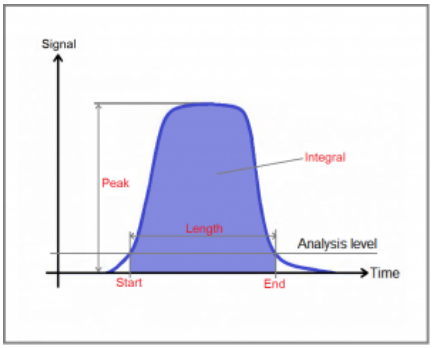
**Ultra fast Digital Data Sampler (Transient Recorder) for Light Pulse for Analysis**

The TR-22 optometers are designed for pulse analysis of frequency modulated and single pulse flashing light sources down to the ns regime. Especially this very short pulses are a challanging measurement due to limitations of rise time, amplification and noise. Standard signal amplifieres are usually not able to allow such measurements time resolved. With the TR-22 series and its accessories like the CA-22 amplifier this door is now open!

*TR-22*

**Complete Analysis of Pulse Shape and Pulse Parameters down to the ns Time Regime**

- pulse locus shape
- peak power in a radimetric quantity
- pulse width
- single pulse energy
- pulse repetition rate




*Pulse analysis of ns pulses with the TR-22*

**3 ns  Rise Time Voltage Amplifier**

The TR-22 voltage amplifier offers a rise time of 3 ns. The voltage amplifier combined with the CA-2x series accessory signal amplifiers, see specifications.

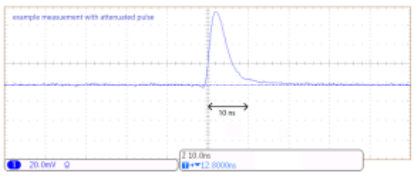
**250 MS/s and 14 bit ADC**

A high speed analog to digital converter (ADC) with 14 bit and 250 MSamples/s (MS/s), which are 4 ns sampling time digitizes the analog signal for ultra high time resolution measurements.

**Trigger and Remote Interface by USB-C, Ethernet or RS485**

The digital data is stored in a high-speed storage in the device which is designed as transient recorder. This allows pre-trigger and post-trigger evaluations since the ransient recorder enables measurement data to be stored before the triggered event and after. Different trigger possibilites like edge, level, etc. are available. 8MSamples can be stored in memory.

The TR-22 offers remote operation via USB-C, Ethernet or RS485. SMA connectors are available for trigger input and trigger output or for use with external devices with TTL signal capability.



*example meausurement of an attenuated pulse*

**S-TR22 Software**

A software is supplied with the TR-22 which provides all necessary functions to do remote control pulse-shape measurements and analysis.

# Specifications

| **Product** | |
|---|---|
| Sampling rate | max. 250 MSamples/s □4 ns |
| ADC | 14 bit |
| Rise time | TR-22 voltage amplifier: 3 ns |
| Signal input | SMA jack (50 Ohm), voltage 2.2 Vpp<br>*(e.g. signal amplifier from CA-2x series, see own specification)* |

| | |
|---|---|
| Trigger | Signal or trigger input (level, edge, pre/post trigger).<br><br>Trigger input: SMA jack (50 Ohms)<br><br>Trigger output: SMA jack (50 Ohms) |
| Logger memory | 8 MSamples<br>divisible into max. 1000 segments (enables the acquisition of pulses with large time intervals, each segment is triggered separately)<br><br>Dead time between segments:<br><br>• with timeout definition: 3 µs<br>• with abort by command: 15 µs |
| **Miscellaneous** | |
| Interface | USB 2.0 (full speed, USB-C-Buchse), Ethernet (100 Mbit), RS485 |
| Info | red LED: Error<br>green LED: Communication |
| Power Supply | 5.0V / 0.5 A, direct supply via USB possible<br>Power supply via Phoenix socket 3 pole |
| **Accessories** | |
| Signal amplifier | **CA-22-xx (Single-stage amplifier, user-specific configurable):**<br><br>• Power supply: 5.0 V / 100 mA<br>• Bias voltage of the photodiode: +4.2 V, other bias voltages possible on request<br>• Integrated calibration data in the amplifier<br><br>Example Setups: |

| Gain A/V | Rise Time (10-90)% | Noise (p-p ADC digits Detector 0pF) |
|---|---|---|
| $2.2 \cdot 10^{-3}$ | 10 ns (typ. depending on the photodiode capacity) | 17 |
| $1 \cdot 10^{-3}$ | 10 ns (typ. depending on the photodiode capacity) | 17 |
| $1 \cdot 10^{-4}$ | 10 ns (typ. depending on the photodiode capacity) | 18 |
| $4.55 \cdot 10^{-5}$ | 15 ns (typ. depending on the photodiode capacity) | 25 |
| $2.13 \cdot 10^{-5}$ | 35 ns (typ. depending on the photodiode capacity) | 30 |

*Example: ISD-xP-SP Series: Photodiode Rise Time 10 ns, Noise P-P (ADC TR-22) 18 Counts*

**CA-23 (Five-stage amplifier, wide range, slightly slower):**

- Power supply: 5.0 V / 100 mA
- Switchable bias voltage: +3.3 V / -3.3 V (or other external values using accessories)
- Integrated calibration data in the amplifier

| Gain A/V | Range # | Range max. |
|---|---|---|
| $1 \cdot 10^{-3}$ | 0 | ±2 mA |
| $3.33 \cdot 10^{-3}$ | 1 | ±600 µA |
| $1 \cdot 10^{-4}$ | 2 | ±200 µA |

| | | |
|---|---|---|
| $3.33 \cdot 10^{-4}$ | 3 | ±60 µA |
| $1 \cdot 10^{-5}$ | 4 | ±10 µA |

**CA-24 (two-stage amplifier, fast):**

- Power supply: 5.0 V / 100 mA
- Switchable bias voltage: +3.3V (or other external values using accessories)
- Integrated calibration data in the amplifier

| Gain A/V | Range # | Range max. |
|---|---|---|
| $1 \cdot 10^{-3}$ | 0 | ±2 mA |
| $1 \cdot 10^{-4}$ | 1 | ± 200uA |

## Configurable with

| Product Name | Product Image | Description | Go to product |
|---|---|---|---|
| VL-37xx Series |  | Detector series for measuring illuminance in lux | https://www.gigahertz-optik.com/en-us/product/vl-37xx/ |
| VL-3708 |  | Class L Detector head for the measurement of photopic illuminance in Lux | https://www.gigahertz-optik.com/en-us/product/vl-3708/ |

## Purchasing information

| Article-Nr | Modell | Description |
|---|---|---|
| **Product** | | |
| 15316776 | TR-22 | TR-22 Ultra Fast Transient Recorder |
| **Accessories** | | |

| Article-Nr | Modell | Description |
|---|---|---|
| 15316777 | CA-22-xx | CA-22-xx signal amplifier (specific article number will be created on request) |
| | CA-23 | CA-23 five-stage amplifier |
| | CA-24 | CA-24 two-stage amplifier |

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- Technical Consulting & Sales
- After-Sales Support
- Calibrations & Re-Calibrations (ISO/IEC 17025 Calibration Services, factory calibration, Calibration of Third-Party Products)
- Repairs & Updates
- OEM & Feasibility Consulting of Customized Solutions

Send us your inquiry or contact us by phone or e-mail. We would welcome your feedback too or review us on Google.


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