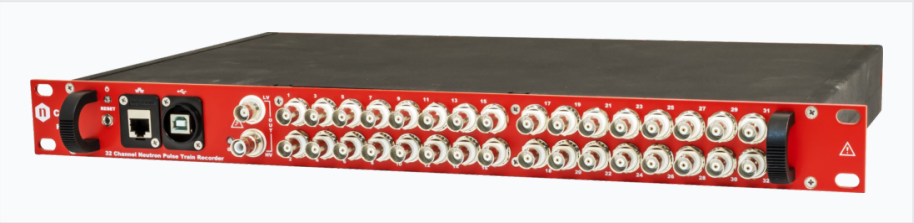
R7771B

Neutron Pulse Train Recording Device



R7771B is a 32-channel neutron pulse train recording device for multi-detector counting, Nuclear Safeguards and nuclear material process monitoring. It records timestamped TTL input pulses independently on 32 BNC channels (50 Ω), with 10 ns timestamp resolution, 10 ns plus pulse width pulse pair resolution and 10 ns minimum pulse width detection. It supports a total continuous input rate up to 3×106 cps, includes a +2000 V @ 1 mA HV output and +5 V @ 1.5 A, +12 V and -12 V LV outputs, and provides USB-2.0 and 10/100T Ethernet interfaces. The 19” rack device supports attended operation and stand-alone use.

Overview

Product Highlights

- Intended for neutron counting applications with multiple detectors
- Timestamp resolution of 10 ns
- Minimum pulse width detection of 10 ns
- Single high-power high-voltage supply output (+2000 V @ 1 mA)
- 10/100T Ethernet and USB-2.0 interfaces
- 19” rack form factor, suited for stand-alone use as well
- Dedicated to Nuclear Safeguards and nuclear material process monitoring in its life cycle
- Pulse pair resolution of 10 ns plus pulse width
- 32 inputs on BNC connectors (TTL, 50 Ω)
- Single high-power low-voltage supply outputs (5V @1.5 A and +-12V @ 500 mA)
- Provided with readout software and web interface

Product Description

The new **R7771B** module replaces the obsolete R7771 and previous R7771B versions. This is a device boxed in a mechanics compliant to 19” racks and designed for performing neutron pulse trains recording independently on 32 channels. The device works in attended mode, where time-stamped lists of input TTL pulses coming from a neutron detector are provided to an external computer to be recorded for further analysis.

The front panel HV output channel can provide the bias for the detector power supply, while a LV output channel (+5V on BNC connector) is also available to supply power for the preamplifier. On the rear panel, another LV output (+12V and -12V on 3-pin connector) has been added to interface with CAEN A1421x preamplifier family. The internal CPU manages the board settings, the acquisition for attended operations, and the data transfer of the pulse train from each of the board channels to an external host PC for further analysis. The computational resources and data throughput allow the acquisition of a high total continuous input rate (up to 3×106 cps).

The R7771B device can be controlled by a point-to-point direct connection through the USB-2.0 interface and by a remote network connection through the Ethernet 10/100T port. The acquisition, configuration, and data saving can be then controlled through the CAEN R7771 Control Software, which is available to the users.

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Technical Specifications

PHYSICAL

Form Factor

1.25U wide
Compatible with 19” rack

Weight

2650 g

CONNECTORS

Input [1:32]

- 32 signal inputs
- BNC jack receptacle
- Single ended TTL (Zin = 50 Ω)
- Minimum pulse width detected = 10 ns

High Voltage output (HV):

- SHV jack receptacle

Low voltage output (LV):

- BNC jack receptacle
- 3-pole male TINY xlr receptacle

USB

- USB2.0 port
- Type-B socket

ETHERNET

- 10/100 Mbps port
- RJ45 shielded jack

Power In

- AC power input

MIN. PULSE WIDTH

10 ns

PULSE PAIR RESOLUTION

Pulse width + 10 ns

HVPS OUTPUT

Single channel for the detector power supply:

- Output Bias Voltage (Vset) = 0 ÷ +2000 V DC
- Vset Resolution = 1 V
- Vmon Resolution = 1 V
- Ramp-Up/Ramp-Down = 1 ÷ 500 V/s in steps of 1V
- Maximum Output Bias Current (Iset) = 1 mA

LVPS OUTPUT

Preamplifier power supply channels:

- +5 V @ 1.5 A (on BNC front connector)
- +12 V @ 500 mA and -12V @ 500 mA (on 3-pole rear connector)

ON-BOARD CPU

SBC

- 1 ARM Cortex-A8 @ 1GHz
- SDRAM Memory 512MB DDR3L @ 800MHz
- Linux® on board

FPGA

Cyclone V GX

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Technical Specifications (continued)

OPERATING MODES

ATTENDED: The device works under full control of an external PC transmitting raw data for further analysis; time-stamped lists are saved to binary files compatible with PTR-32 format

PULSE TRAIN RECORDER

- Internal clock = 100MHz
- Timestamp resolution = 10ns
- Pulse pair resolution = pulse width + 10ns

BUTTONS AND INDICATORS

- Power LED (green)
- HV ON LED (red)
- Reset button

COMMUNICATION INTERFACES

Ethernet

- 10/100 Mbps Ethernet
- Configuration, operation, and data taking in attended mode

USB

- USB-2.0 version
- Configuration, operation and data taking in attended mode

FIRMWARE

Firmware can be upgraded via Web interface

SOFTWARE

- Windows® and Linux® support
- CAEN R7771 Control Software

POWER REQUIREMENTS

- Voltage = 100 - 240 V ~
- Frequency = 50/60 Hz
- Current = 0.5 A RMS (max.)
- FUSE = 2x T1A 6.3×32 250VAC

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Ordering Information

ORDERING CODE	DESCRIPTION
WR7771BXAAAA	R7771B – 32 Channel Neutron Pulse Train Recorder (5V @1.5 A and +-12V @ 500 mA)

1. Ordering codes and descriptions are reproduced from the product record. Availability is confirmed at order entry.

Related Products

A1421 — Preamplifier and Discriminator for 3He tubes

R7780 — CAEN Shift Register Multiplicity and Time Recorder

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