

# R7771B

## Neutron Pulse Train Recording Device



## Features

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

## 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  $3 \times 10^6$  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.

## 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 ( $Z_{in} = 50 \Omega$ )
- 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 ( $V_{set}$ ) = 0 ÷ +2000 V DC
- $V_{set}$  Resolution = 1 V
- $V_{mon}$  Resolution = 1 V
- Ramp-Up/Ramp-Down = 1 ÷ 500 V/s in steps of 1V
- Maximum Output Bias Current ( $I_{set}$ ) = 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

### 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

## Ordering Options

Code	Description
WR7771BXAAAA	R7771B - 32 Channel Neutron Pulse Train Recorder (5V @1.5 A and +-12V @ 500 mA) <span data-bbox="1394 250 1469 297">RoHS</span>

## Related Products

### A1421



Preamplifier and Discriminator for 3He tubes

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### R7780



CAEN Shift Register Multiplicity and Time Recorder

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### DT7790



Unattended Dual Current Monitor

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**CAEN S.p.A.**

Via Vetraia 11  
55049 - Viareggio  
Italy

**Phone +39.0584.388.398**

**Fax +39.0584.388.959**

**info@caen.it**

**www.caen.it**

**CAEN GmbH**

Brunnenweg 9  
64331 Weiterstadt, Germany

**Phone +49 (0)212.254.4077**

**Mobile +49 (0)151.16.548.484**

**info@caen-de.com**

**www.caen-de.com**

**CAEN Technologies, Inc.**

1 Edgewater Street - Suite 101  
Staten Island, NY 10305  
USA

**Phone +1.718.981.0401**

**Fax +1.718.556.9185**

**info@caentechnologies.com**

**www.caentechnologies.com**

**CAENspa India Private Limited**

B205, BLDG42, B Wing,  
Azad Nagar Sangam CHS,  
Mhada Layout, Azad Nagar, Andheri West  
Mumbai, Maharashtra 400053, India

**info@caen-india.in**

**www.caen-india.in**

