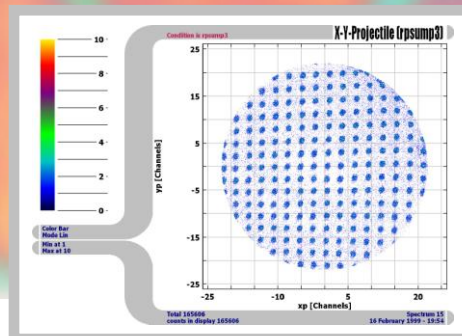
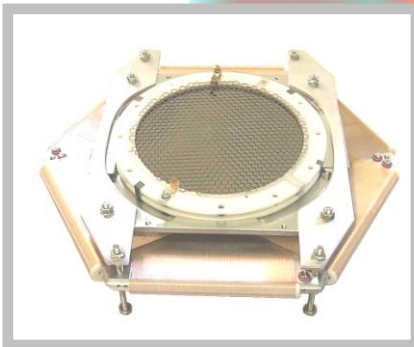


The ATR19-T add-on Manual

(Version 6.2.90.6)



Mail Addresses:

Headquarter

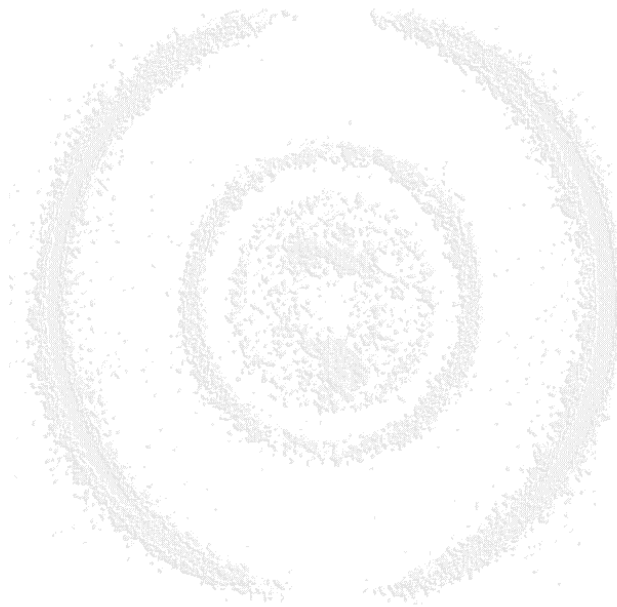
RoentDek Handels GmbH
Im Vogelshaag 8
D-65779 Kelkheim-Ruppertshain
Germany

Frankfurt subsidiary

RoentDek Handels GmbH
c/o Institut für Kernphysik
Max-von-Laue Str. 1
D-60438 Frankfurt am Main
Germany

Web-Site:

www.roentdek.com



Product names used in this publication are for identification purposes only and may be trademarks of their respective companies.

All rights reserved. Technical changes may be made without prior notice. The figures are not binding.

We make no representations or warranties with respect to the accuracy or completeness of the contents of this publication.

The ATR19-T Amplifier & CFD Module

With the **ATR19-T** you have received a special version of the **ATR19** module, featuring a special internal board (**CFD2**) for improved timing performance on channels 1 and 2 (typically used for MCP signal processing), replacing the standard **DLATR+** board in this slot. Please refer to the **ATR19** standard manual first. This add-on manual describes only the special feature of the **ATR19-T** module where it differs from the standard **ATR19** unit.

The **CFD2** board is a two-channel constant-fraction-discriminator circuit which allows an improved temporal resolution compared to the **DLATR+** board for (and only for) fast signals with rise time $< 3\text{ns}$, as obtained from an MCP stack or photomultiplier. Unlike the **DLATR+**, the **CFD2** board has no amplification stage and needs an additional amplifier like the **RoentDek FAMP1+** before the input: For **RoentDek** MCP detectors the product combination **ATR19-T** plus **FAMP1+** (one or two units) is equivalent in function to the **ATR19**, but usually yields better temporal resolution for the MCP signal.

The input signals to the **CFD2** (supplied via the corresponding “+” **ATR19-T** input) must have negative polarity and pulse heights between 30mV and 2V. For signals with less than 3ns rise time and $> 50\text{mV}$ pulse height, the temporal resolution is typically $< 250\text{ps}$ FWHM*. The pulse pair separation (“dead-time”) is $< 20\text{ns}$.

The output signals from the **ATR19-T** and the control elements on the front panel are the same as for the standard **ATR19**-units, only the “walk adjust” button does not act on the **CFD2** board. Instead there is a potentiometer on the **CFD2** board for each channel to adjusting the level. This *CFD walk* level is factory set and does not need to be changed.

The *CFD delay* is factory set but may be changed (see figure A1): The left jumper position is not in use, the other positions set the *CFD delay* to 1, 2, 3 or 4ns (left to right). The *CFD timing output* signal level can be changed by a jumper (see Figure 1). Other jumpers on the board should not be changed.

These on-board controls are per-set for your application and can only be accessed/modified if the **ATR19-T** unit is opened (see standard **ATR19** manual). If you want to change these settings please contact **RoentDek** for further information how these settings affect the performance. Please refer also to the **RoentDek CFD** manual. The operation principle of the **CFD2** board is very similar to the **RoentDek CFD1/4/8**, although there are less settings/options to be adjusted for proper operation.

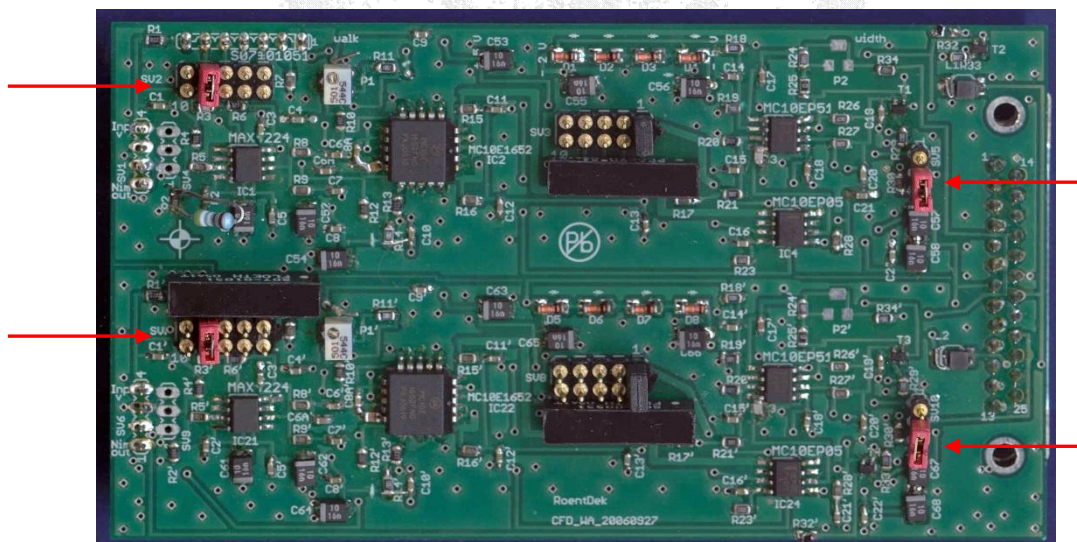


Figure 1: CFD2 board with indication of the settings which may be changed: the arrows on the left indicate the jumper settings for changing the CFD delay (here: 1ns) and, on the right, jumpers for changing the signal level of the CFD timing output (here: “NIM”)

* The temporal resolution also depends on the signal source. For MCP detectors < 15 micron pore diameter is recommended.

For the operation of the **ATR19-T** (plus **FAMP1+** or equivalent amplifier) with **RoentDek** detectors please refer to the standard **ATR19** manual. There are only minor deviations for the channels 1 and 2, i.e. those equipped with the **CFD2** board:

- The width of the *CFD timing output* signal (from the “NIM” or “ECL” output on the **ATR19-T** front panel) is factory-set to a value between 5 and 10ns. It is not recommended to change this setting, although it is possible via the width potentiometer on the front panel.
- The analog output (“Mon”) shows a bipolar signal (“analog monitor signal”) with a zero-crossing from a negative component to a (larger) positive component (see Figure 2). This signal can be used to determine a proper threshold setting as it is described in the standard **ATR19** manual or in the **RoentDek CFD** manual. However, if a **FAMP1+** is used (or another amp with two outputs) it is recommend utilizing this signal as reference for the *CFD threshold* setting.
- The *CFD threshold* can be adjusted between 0 and 0.8V, corresponding to voltage readings between 0.2V and 5V on the respective front panel control points. The correspondence is not strictly linear.

Figure A2 shows typical output signals obtained from the **CFD2** board in the **ATR19-T**. For the channels equipped with **DLATR+** boards please refer to the standard **ATR19** manual.

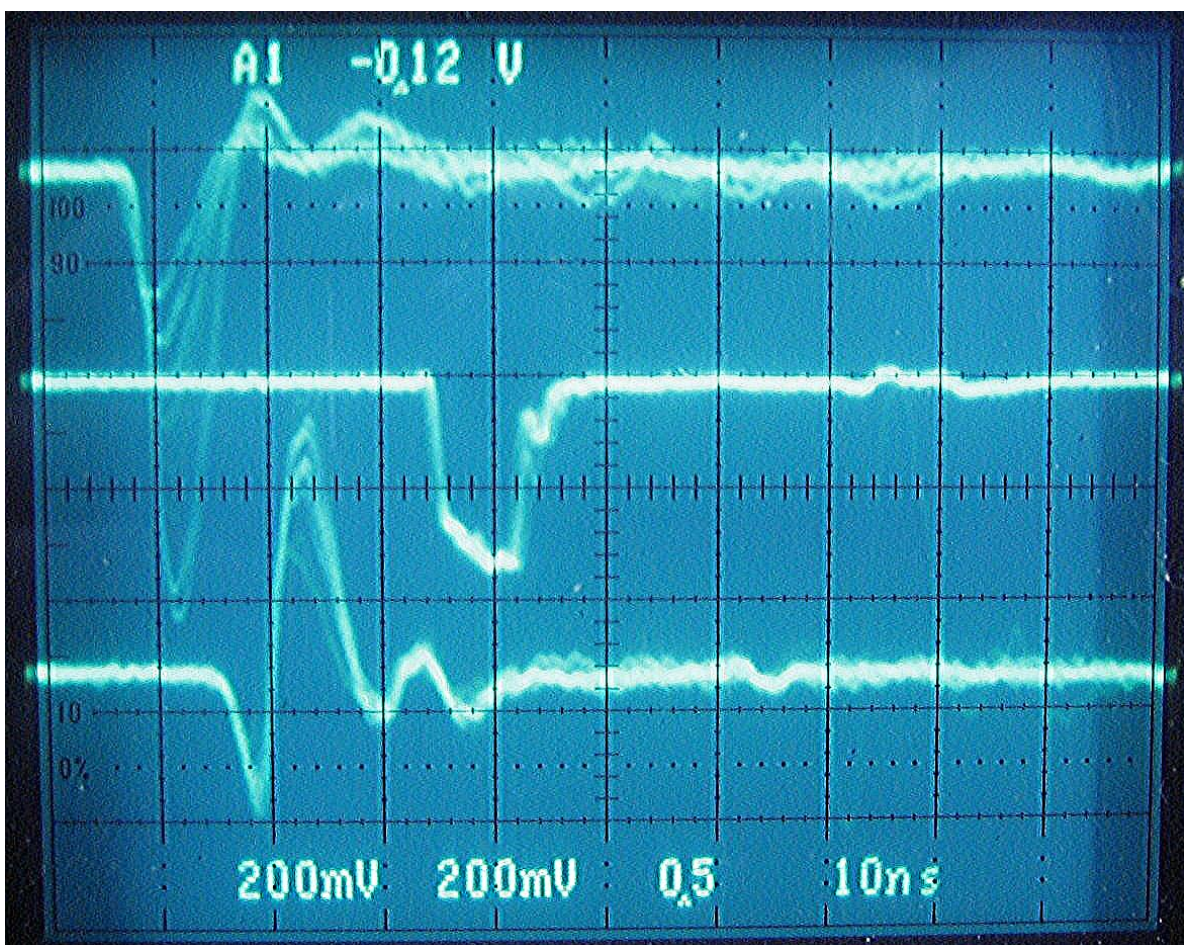


Figure 2: Oscilloscope traces of in- and output signals of the **ATR19-T/CFD2** board, traces 1-3 from top: input signal (which triggers all traces), *CFD timing output* and (analogue) monitor output. The signals were obtained with a 300MHz analogue oscilloscope (several signals with varying pulse heights are superimposed). Similar views can be obtained with a digital oscilloscope with adequate “persistence” setting.