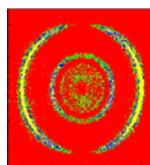


# The **RoentDek** CFD1c, CFD4c and CFD8c *Constant Fraction Discriminator* modules



**RoentDek**  
Handels GmbH

Supersonic Gas Jets  
Detection Techniques  
Data Acquisition Systems  
Multifragment Imaging Systems

The **RoentDek** CFD1c, CFD4c and CFD8c are single channel, 4-fold or 8-fold *Constant Fraction Discriminator* (CFD) modules for the timing of fast signals as obtained (after amplification) from microchannel plate detectors or other types of secondary electron amplifiers (photomultiplier, channeltron, etc.). An external veto input allows disabling/enabling individual channels as function of the level on the veto input. Although there is only one veto input per module internal jumper settings allow different settings (enable/disable or ignore) individually for each channel.

The advanced version **CFD1x** and **CFD7x** additionally feature an integrated pulse height to pulse width converter for one channel, please refer to the separate description sheet.

The **CFD4c** hosts one 4-channel CFD-circuit board in a standard 1/12 NIM case (W34mm/L280mm/H220mm, weight 1.2 kg) and requires a NIM-bin for operation (+/- 6 V, 0.2 A/-1.8 A).\*

The **CFD8c** is a standalone unit for 19" racks (one height unit) with two of the same 4-channel CFD-circuit boards and an external mains adapter for 100-250 V AC (50-60 Hz). The power consumption is max. 3.7 A at 12 V DC (<45 W). Size (approx.): 485 mm x 45 mm x 375 mm (width x height x depth incl. power connector). Weight: 2.5 kg (without 12 V/5 A power adapter).

The **CFD1c** has the same functions for one channel only. It comes as a standalone box (W61mm/L129mm/H232mm, weight 0.8 kg) with an external 12 V DC mains adapter for use with 100-250 V AC sockets. The power consumption is max. 0.5 A at 12 V DC (6 W).

Each CFD channel has specifications as follows:

- The bandwidth of the input is 300 MHz which allows processing signals with rise/fall time as low as 1 ns without shape alteration. The timing precision can be < 100 ps in case of short signals and for properly adjusted CFD parameters.
- The double hit dead-time for short signals is 10 ns, with a minimum output signal width of 4 ns (3xNim on front panel lemo socket and optionally 1xECL on rear panel). The maximum output signal width is 200 ns, adjustable by a potentiometer (W) on the front panel (or up to 2000 ns, when setting an internal jumper).
- The threshold for negative signal input (max. -3 V, linear -50 mV to -2 V via lemo socket "In" on front panel) can be adjusted from -20 mV to -1 V by a potentiometer (Th) with test point on the front panel.
- The CFD delay is selected by connecting a lemo coaxial cable of appropriate length between the corresponding sockets on the front panel (min. delay 0.75 ns).

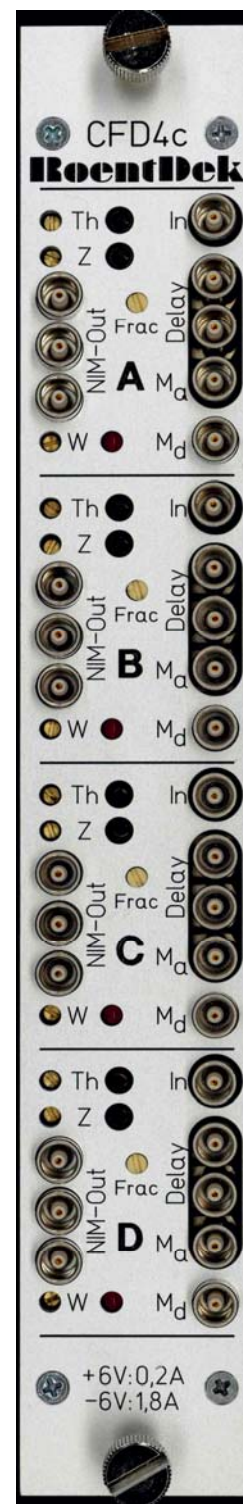


Figure 1: front panel of CFD4c

\* The **CFD4cX** version can be operated with an external mains power supply like the **RoentDek** SPS3.

- The fraction (default 0.35) can be adjusted between 0.15 and 1 by a potentiometer. It is also possible operating the CFD circuit as a leading edge discriminator.
- The CFD walk is adjusted by a potentiometer (Z) with test point on the front panel and can be monitored in two ways:
  - a) The analog monitor output ( $M_a$  lemo socket on the front panel) provides the bipolar analog signal after the mixing stage before it enters the zero-crossing comparator.
  - b) The digital monitor output ( $M_d$  lemo socket on the front panel) provides the output of the zero-crossing comparator.



Figure 2: CFD8b (similar as CFD8c)

All CFD8c/CFD4c/CFD1c units are well suited for the operation of **RoentDek** delay-line detectors (in combination with **RoentDek FAMP8**, **(D)FAMP6**, **FAMP3** or **FAMP1+** amplifiers or amplifiers with similar performance parameters). Such a module combination has a significant advantage over the **RoentDek ATR19** module in terms of the reduced multi-hit dead-time, which can now be as low as 10 ns for short analog signals (e.g. from the MCP) compared to 20 ns in case of the **ATR19** module. The **FAMP8/CFD8c** front-end electronics option is the recommended read-out concept for **RoentDek** Hexanode detectors

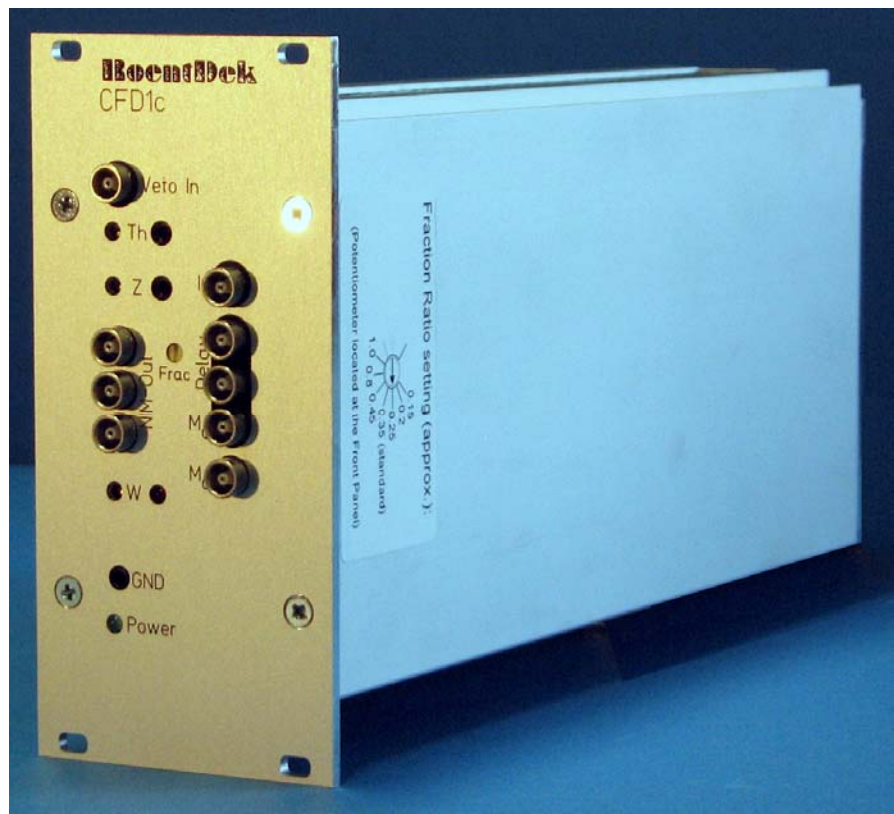


Figure 3: CFD1c