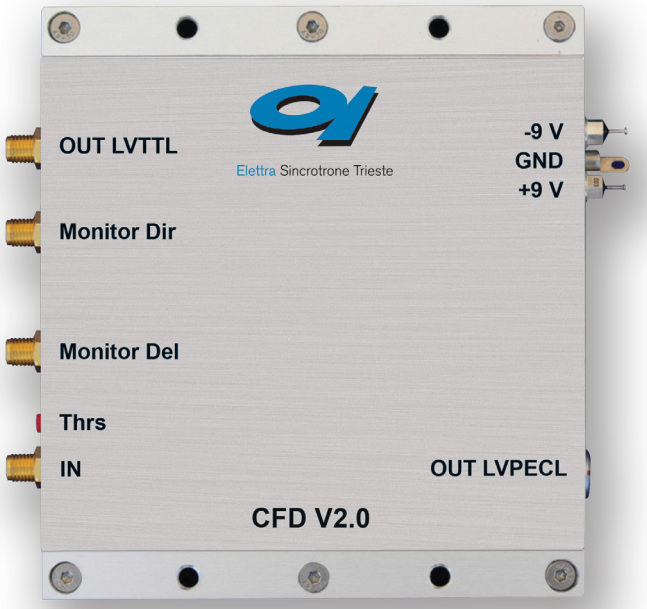
CFD V2.0

Constant Fraction Discriminator



HIGHLIGHTS

FEATURE	BENEFIT
Optimized for use with delay-line (1D) and cross delay-line (2D) detectors	
The threshold comparator	Prevents the CFD from being affected by the noise on the input signal
2 SMA connectors ("dir" & "del")	To control the right pulses cross
Fast crossover configuration	Robust against noise

HOW DOES IT WORK?

Constant Fraction Discriminator (CFD) is a perfectly suitable solution for the low-jitter digitization of analogue signals in systems that use microchannelplates or channeltrons as electron multiplier devices.
Elettra Sincrotrone Trieste's CFD exploits a fast crossover configuration, which is somehow sensitive to variations in the width of the pulses, but is more robust against noise if compared with other kinds of configurations (e.g. zero crossing CFDs).
The delay-line (usually equivalent to a 4ns time delay) is obtained with a transmission line of proper length.

The amplitude of the charge pulses produced by an MCP stack shows a wide dynamic range and there is evidence that pulse height distributions strongly depend on the voltage applied to the MCPs and on the effective rate of events. CFDs, rather than simple threshold discriminators, are required in timing measurements because the arrival time of a particle cannot be measured with accuracy if the process is influenced by signal amplitude variations. Signal width (FWHM), instead, is almost constant and mainly depends on the electron multiplying system.

The CFD are optimized by default for pulses with a nearly Gaussian shape, full width at half maximum (FWHM) of about 4 ns, amplitude between 0.5V and 2V, rise and fall times around 2.8 ns. In such conditions, a measured jitter lower than 20 ps and a walk error lower than 40 ps are achieved.

SPECIFICATIONS

Channels	1
Input	50 Ω impedance, pulse signal, max amplitude ±2 V
Input polarity	Positive or negative
Front output connector	SMA (LVTTL)
Rear output connector	Bipolar LEMO (LVPECL)
Power supply	Bipolar ±8V (not included)
Current	220 mA@+9V; 80 mA@-9V
CFD threshold	Adjustable with externally accessible trimmer
Threshold testpoint	On front panel
CFD internal delay	Typical 4 ns (customizable on request)

RELATED PRODUCTS

- Delay-Line (1D) and Cross Delay-Line (2D) Detectors
- RUD-RFLN-XLS, Pulse Amplifier
- PIT-RFLN, Wide Bandwidth Pulse Amplifier
- THR02-TDC, Advanced 4-Channel Time to Digital Converter
- **Coming soon:** THR02-TAC, Advanced 4-Channel Time to Analogue Converter

CFDs are part of the acquisition chain in the 3D (x, y, t) High Count Rate Detectors.

See the single product brochures for details.

Contact us!

Industrial Liaison Office
Elettra - Sincrotrone Trieste S.C.p.A.
S.S. 14 - km. 163.5 in Area Science Park, 34149 Basovizza - Trieste, Italy
Tel. +39 040 3758303 - Fax +39 040 3758623
ilo@elettra.eu - http://ilo.elettra.eu