Model 2128
Constant Fraction Discriminator

Features:

- **100 MHz Count Rate**
- **1000: 1 Dynamic Range**
- **Five Operating Modes**
- **Walk < 30 ps typically for 100: 1 Range**
- **Simultaneous Dual Positive and Negative Outputs**
- **Multicolor Count Rate Indicator**
- **DC coupling**

Description:

The Model 2128 is a fully dc-coupled constant fraction discriminator with a dynamic range of up to 1000: 1. Three operating modes provide optimum time resolution for many detector types and applications. For example:
CFT-Constant fraction mode for fast detectors
CFRR-Slow rise time reject mode for Ge detectors
LET-Leading edge mode for single photon counting

In addition, internallyselectable program modules provide for
1) User change of fraction from the standard 40%,
2) Operation of the unit as a Zero Crossing Discriminator for bipolar inputs, and
3) Operation of the unit as a Leading Edge Discriminator without termination of the delay ports.

The Model 2128 has a dc-coupled 50 ohm input which accepts negative pulses. The constant fraction composite signal is formed by the algebraic sum of a direct, attenuated signal path and a delayed. unattenuated path. The delay time is user selected by cable delay. Optimum selection of this external delay provides full compensation for timing distortions due to both amplitude- and rise time variations in the input signal.
Four simultaneous, independent output signals are provided. The two positive outputs are adjustable in width, the width duration sets the internal dead time required to suppress spurious outputs due to input signal anomalies. The two negative outputs are fixed-width pulses keyed to the start of the dead time period.
The front panel WALK ADJUST control and INSPECT OUTPUT permit the user to trim the time walk characteristics of the experimental setup for optimum timing resolution. A novel frontpanel LED indicates count rate by color change.

Specifications:

INPUTS
INPUT - Accepts - 5 mV to - 5 V linear pulses: width:≥ 1ns, Zin= 50 Ohms, dc coupled; front panel BNC connector.
DELAY - 2 front panel BNC connectors accept 50 Ohm delay cable to form the internal constant fraction signal.

OUTPUTS
WALK INSPECT - Displays signal of zero crossing discriminator for use in trimming time walk.

2128 Rev. 1 20072013

FAST ComTec GmbH
Grünwalder Weg 28A • 82041 Oberhaching • Germany
phone: 49-(0)89 665180 0 • fax: 49-(0)89 665180 40 • http://www.fastcomtec.com

LEADING EDGE - (With fraction module inserted) displays leading edge discriminator output.
OUTPUTS Two independent negative current outputs, each providing -32 mA into 50 ohms; rise time < 3 ns, pulse width 5 ns nominal, dc coupled.
OUTPUTS - (+)- Two independent positive voltage outputs providing 2 V (minimum) into 50 ohms, rise time< 10 ns, width adjustable by adjacent width trimming potentiometer, which also determines internal dead time.
CLIP CABLE (rear panel) - 2 BNC connectors accept 50 Ohm delay cable to adjust width of the negative output pulses: controlled by adjacent IN-EXT switch.

CONTROLS
THRESHOLD - Front panel 10-turn locking dial potentiometer to set acceptance threshold for input pulses: range - 5 mV to - 1V.
INSPECT WALK - Front panel trimpot to compensate walk of the internal zero crossing discriminator.
LEADING EDGE WIDTH - Frontpanel trimpot: With fractionmodule inserted sets leading edge width to input pulse duration: With zerocross module inserted sets leading edge width beyond Z/C point of the input signal.
CFRR-CFT-LET - Front panel three position rotary switch to select constant fraction with slow rise time reject (CFRR), basic constant fraction timing (CFT), or leading edge timing (LET) modes of operation.
OUTPUT WIDTH - Front panel 22-turn screwdriver adjustable potentiometer to set width of slow positive output pulse, which is equal to the internal dead time of the discriminator - max. setting: 1.5 micro sec.
IN—EXT (rear panel) - Toggle switch allows use of external cable to widen negative outputs.

PERFORMANCE
DYNAMIC RANGE - 1000 : 1
CF MODE WALK ≤±50ps (typically ±30ps) for-3OmV to -3V range with <2 nsec rise time.
COUNTING RATE - to 100 MHz, limited by dead time (OUTPUT WIDTH setting).
PULSE PAIR RESOLUTION - <10 ns, or as limited by dead time.
THRESHOLD STABILITY - Better than ±0.02 %/°C (± 200 ppm/°C)
TEMPERATURE RANGE - 0 to +50°C
THRESHOLD LINEARITY - ±0.25% Integral

TYPICAL CABLE LENGTHS (RG-58)
For Plastic, Nal and Si (S.B.) detectors- 0.5 to 1.0 m
For Planar Germanium detectors- 1.0 to 2.0 m
For Coaxial Ge- 2.0 to 4.0 m

TYPICAL POWER REQUIREMENTS
Standard version
+6 V - 150 mA, +12 V - 70 mA
- 6 V - 450 mA, -12 V - 100 mA

12V Version:
+12 V - 220 mA*
-12 V - 550 mA*

PHYSICAL
SIZE - Single width NIM module 3,43 X 22,12 cm (1.35 X 8.71 inches) per TID-20893 (rev.)
NET WEIGHT - 0.9 kg (2.0 lbs.)
SHIPPING WEIGHT - 2.2 kg (4.9 lbs.)
ACCESSORIES includeded:
Fraction module f = 0.4
Leading edge module
Zero cross module

Special version using ±12 V available on special request.
* This power exceeds the normal bin allotment of 167 mA for a singlewidth module for the 12V version

FAST ComTec GmbH
Grünwalder Weg 28A • 82041 Oberhaching • Germany
phone: 49-(0)89 665180 0 • fax: 49-(0)89 665180 40 • http://www.fastcomtec.com