NCB223 - QUAD CONSTANT FRACTION DISCRIMINATOR

The module NCB223 Quad Constant-Fraction Discriminator is a single-width NIM module. Each channel provide constat-fraction timing on fast, negative-polarity signals with pulse width more then 1 ns. Each channel provides two NIM standard timing outputs.
The Model 223 uses the constant fraction timing technique to select a timing point on each input pulse that is independent of pulse amplitude. The zero crossing discriminator detects this point and generates the corresponding timing output pulse.
The input pulse is delayed and sumed with inverted input fraction. The delay time is selected by an external delay cable to be equal to the time taken for the input pulse to rise from 20% of maximum amplitude.
"Walk" is the error in detecting the time for the 20% fraction as a function of input pulse amplitude. The results in a walk guarantee <±50 ps over a 100:1 dynamic range of input pulse amplitudes.
The discriminator thresholds are individually settable in a range from -1 mV to -1120 mV (4 mV step), via an 8-bit DAC and displayed by 4 digit led display. The minimum detectable signal is - 1 mV. Internal jumper permit change the range of threshold from up to -2 volts (10 mV step).
Walk range from +3 mV to - 44 mV with step 0,185 mV.
On the front panel there are OR_SUM, AND_SUM and SUM_I (sum input current) of all 4 channels.
The output pulse width is adjustable from front panel by 8 bits DAC from 25 ns to 400 ns.

PERFORMANCE

Input pulse	Accepts negative input pulses from 0 to 5 V
Threshold	Threshold dynamic range from 0 mV to 1120 mV (Optional version from 0-255 mV- note A, Optional version from 0-2 V- note D).
Walk	<±50 ps over a 100:1, with external delay 2 ns, input pulse rise time < 1 ns, input pulse width 10 ns, leading edge threshold -20mV, walk threshold -0,7 mV
Constant fraction	20%
Pulse-pair resolution	<15 ns in the updating mode (optional version 5 ns - Note B)
Input/output rate	Operates at burst rates >70 MHz (optional version 200 MHz - Note B)
Transmission delay	**Input-output:** <14 ns with 2-ns external delay; **Input- AND_S, OR_S outputs:** <15,6 ns with 2-ns external delay
Operating temperature	0 - 50°C
Threshold temperature sensitivity	<0,01%/°C, from 0 - 50°C
Transmission delay temperature sensitivity	<±10 ps/°C from 0 - 50°C
Threshold_1	control (T) on front-panel are individually settable in a range from -1 mV to -1120 mV (4 mV step), via an 8-bit DAC and displayed by 4 digit led display.
Walk_1	Control (T) on front panel adjustable from +3 mV to -44 mV range

Output width	Control (W) on front-panel the pulse output width is adjustable in a range from 25 ns to 400 ns (optional version from 5 ns to 100 ns - note C).
Veto	During VETO signal all channels are disabled
Input DL1-4	A front panel pair connectors to determine the constant shaping delay. Internal delay is 2 ns. For best triggering, the shaping delay time should be is equal 20% of rise time of input signal
Output M1-4	Analogue outputs that permits observation of the shaped signal. Output is DC coupled and can be terminated by 50 Ω. The monitor outputs are attenuated by factor 5 in relation to input signals
Output OR_S	Logical function OR of 4 output channels. NIM standard signal
Output AND_S	Logical function AND of 4 output channels. NIM standard signal
Output SUM_I	Fast analogue inverted sum signal of 4 input channels. Gain of each channels is 0,52 in relation to single input signal (without termination). Output resistance of is 100 Ω and can be terminated by 50 Ω. The rise time of this signal is less then 10 ns. Maximum output signal is 4 Volt.

Note of ordering:

A. NCB223TXX Threshold dynamic range 0-255 mV.

B. NCB223XFX Pulse-pair resolution 5 ns in the updating mode.
Operates at burst rates 200 MHz.

C. NCB223XXW The pulse output width is adjustable from 5 ns to 100 ns.

D. NCB223HXX Threshold dynamic range 0-2 V.

SET UP MODULE PARAMETERS

The module has 4 keys, 4 digits LED display and rotate switch to set all settable parameters of module.

CH select channel

T set threshold

W set width output pulse

R revers key

The last working value thresholds and output pulse widths always are saved in the module memory. These parameters will be installed after power on. On the LED appears: "**RUN**".

Select channel by **CH** key and press **T** key to install a threshold or **W** an output pulse width of selected channel. Press **T** key to increase or **R** key to decrease threshold by step one.
Press **W** key to change output pulse width and R key to decrease it.
The first value is actual installed threshold or pulse width. Escape without change press **CH** and **R**.
The rotated switch has used to increase or decrease settable value more then step 1 of selected channel. Select channel by **CH**, select T or W key. After moving the rotated switch press **T**, **R** or **W**, **R** key to increase/ decrease value by step 1. After press key **R** or **CH**; the rotated switch is disabled to avoid missing setup.

Threshold (T) SET table:

Channel 0 - INPUT 1 Walk discriminator threshold.
Channel 1 - INPUT 1 Normal leading edge discriminator threshold.
Channel 2 - INPUT 2 Walk discriminator threshold.
Channel 3 - INPUT 2 Normal leading edge discriminator threshold.
Channel 4 - INPUT 3 Walk discriminator threshold.
Channel 5 - INPUT 3 Normal leading edge discriminator threshold.
Channel 6 - INPUT 4 Walk discriminator threshold.
Channel 7 - INPUT 4 Normal leading edge discriminator threshold.

Pulse width (W) SET table:

Channel 0 - Channel 1 pulse width.
Channel 1 - disabled.
Channel 2 - Channel 2 pulse width.
Channel 3 - disabled.
Channel 4 - Channel 3 pulse width.
Channel 5 - disabled.
Channel 6 - Channel 4 pulse width.
Channel 7 - disabled.

POWER SUPPLY REQUIREMENTS

The module has NIM standard power supply.

P. Voltage (V)	Current/ch (mA)
+6	280
-6	1430
+12	21
-12	20

DIMENSIONS

dimensions	3,43x22,13 cm per DOE/ER-0457T
weight	0,92 kg