Quad constant-fraction discriminator

Model **NCB223.**

WARRANTY

NAICAM S.R.L. warrants this product to be free from defects in material and workmanship for a period of 1 year from date of shipment from headquarter in Italy.

NAICAM SRL warrants the following items for one year from the date of shipment: probes, cables, and documentation of specified equipment.

During the warranty period, we will, at our option, either repair or replace any product that proves to be defective.

To exercise this warranty, write or call your local NAICAM SRL representative, or contact NAICAM SRL headquarters in Italy. You will be given prompt assistance and return instructions. Send the product, transportation prepaid, to the indicated service facility. Repairs will be made and the product returned, transportation prepaid. Repaired or replaced products are warranted for the balance of the original warranty period.

LIMITATION OF WARRANTY

This warranty does not apply to defects resulting from product modification without NAICAM SRL express written consent, or misuse of any product or part.

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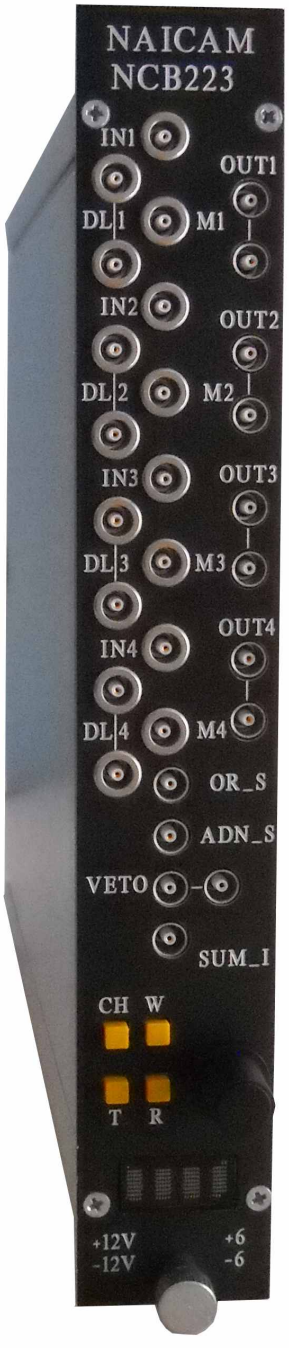
NAICAM
NCB223
IN1
OUT1
DL 1
M1
IN2
OUT2
DL 2
M2
IN3
OUT3
DL 3
M3
IN4
OUT4
DL 4
M4
OR_S
ADN_S
VETO
SUM_I
CH W
T R
+12V
-12V
+6
-6

1. GENERAL DESCRIPTION.

1.1 DESCRIPTION.

The module **NCB223** Quad Constant-Fraction Discriminator is a single-width NIM module. The each channel to provide constant-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 sum 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 guaranteed <±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.

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.

1.2 FUNCTIONAL BLOCK DIAGRAM

1.3 PERFORMANCE.

INPUT PULSE	Accepts negative input pulses from 0 to 5 Volt.
THRESHOLD	Threshold dynamic range from 0 mV to 1120 mV (Optional version from 0-255 mV- note A).
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 -0,7mV.
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 to 50°C.

THRESHOLD TEMPERATURE SENSITIVITY <0.01%/°C, from 0 to 50°C.

TRANSMISSION DELAY TEMPERATURE SENSITIVITY <±10 ps/°C from 0 to 50°C.

THRESHOLD 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 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 for 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 Ohms. The monitor outputs are attenuated by factor 5 respect input signals.

OUTPUT OR_S Logical function OR of 4 output channels. NIM standard signal.

OUTPUT AND_S Logical function ADN 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 respect single input signal (without termination). Output resistance of is 100 Ohm and can be terminated by 50 Ohm. The rise time of this signal less then 10 ns. Maximum output signal is 4 Volt.

Note of ordering:

A. NCB223TXX - Threshold dynamic range from 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 from 0-2 V.

2. TECHNICAL SPECIFICATIONS.

2.1 OPERATING INSTRUCTIONS

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 memory of module. These parameters will be installed after power on. On the LED display the text **Run** is appeared.

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 key press **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.

For example: Set threshold channel 1 equal 5 (equivalent value -20 mV) and threshold channel 0 equal 20 (equivalent walk value -0,7 mV).

2.2 INPUT/OUTPUT CONNECTIONS AND SIGNAL CHARACTERISTIC

2.3 INTERNAL HARDWARE SETTINGS

2.4 POWER REQUIREMENTS

The module has NIM standard power supply.

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

2.5 DIMENSION AND WEIGHT

Standard single-width NIM module.

Weight:

0,92 kg.

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