Electronic Instrumentation for Nuclear, Astroparticle Physics and Industrial Electronics.

Two channel spectrometric amplifier

Model **NCB239.**

Manual Revision V4.0 30/05/2025

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.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE. THE REMEDIES PROVIDED HEREIN ARE BUYER'S SOLE AND EXCLUSIVE REMEDIES.

NAICAM srl, NOR ANY OF ITS EMPLOYEES SHALL BE LIABLE FOR ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF ITS INSTRUMENTS AND SOFTWARE EVEN IF NAICAM SRL, HAS BEEN ADVISED IN ADVANCE OF THE POSSIBILITY OF SUCH DAMAGES. SUCH EXCLUDED DAM- AGES SHALL INCLUDE, BUT ARE NOT LIMITED TO: COSTS OF REMOVAL AND INSTALLATION, LOSSES SUSTAINED AS THE RESULT OF INJURY TO ANY PERSON, OR DAMAGE TO PROPERTY.


NAICAM
NCB239
IN1
GAIN
PLZ
BLR/Vo
Pos/Neg
FG
UNI 1
BI 1
IN2
GAIN
PLZ
BLR/Vo
Pos/Neg
FG
UNI 2
2
Spectrometric
Amplifier
+12V
-12V

1. GENERAL DESCRIPTION.

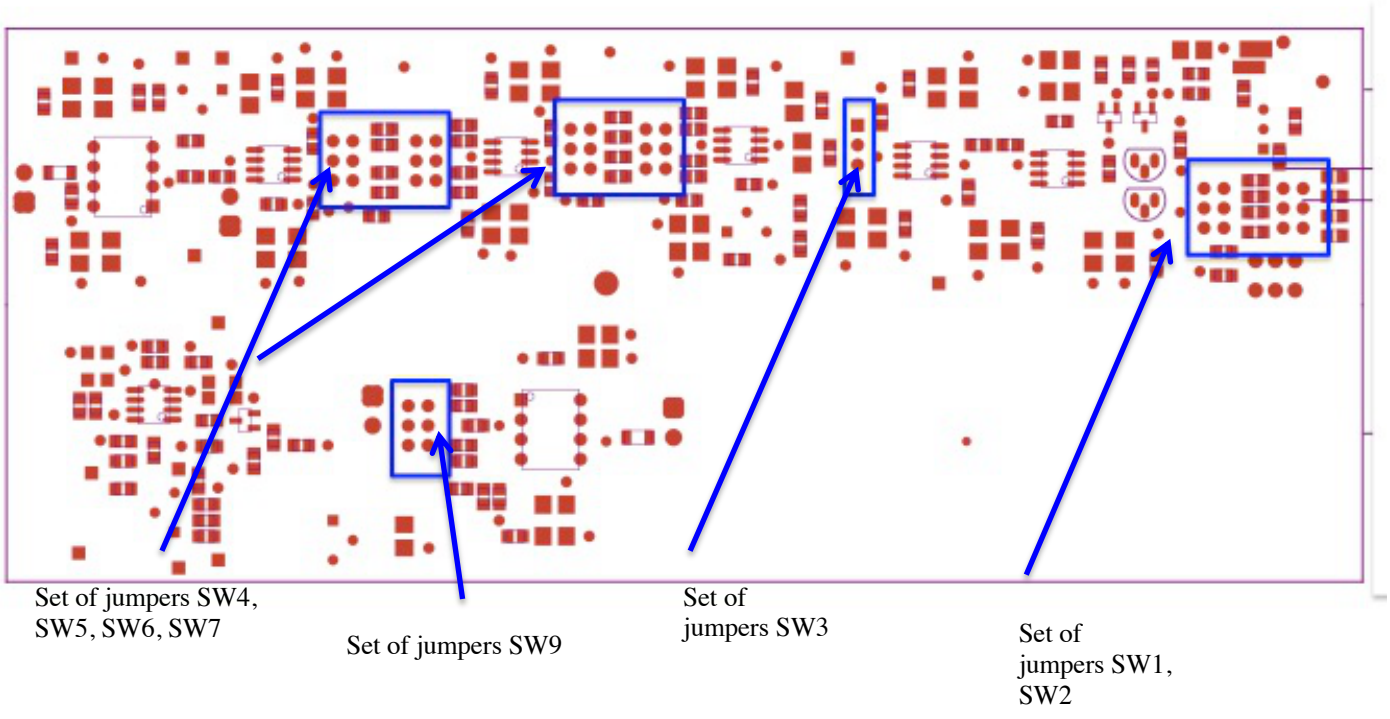
1.1 DESCRIPTION.

The single-width NIM module NCB239 has two separate spectrometric amplifiers. This design can provide optimum timing for up to two germanium detectors or also be used for timing with other solid-state detectors, or operate as a general-purpose wideband amplifier with selectable bandwidth.

Three-position printed wiring board (PWB) jumpers select either Pos or Neg input pulse polarity.

The Gain can be selected and is adjustable over the nominal range from 5 to 1500. The Gain is adjustable from 5 to 500 using a front-panel screwdriver potentiometer (FG) and Gain Switch (GAIN). Internal jumper selects a Coarse Gain of x1 or x5. Front-panel screwdriver adjustment to compensate for the preamplifier decay time constant from 25us to ∞ (B/L). Automatic Base line restorer. Front-panel screwdriver adjustment to compensate output offset in range +/- 20mV.

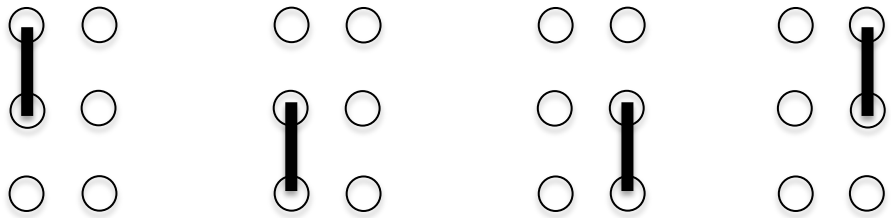
The module provide two independent outputs: unipolar and bipolar signals. Each output available on the front and back side panels. All input and outputs connectors are RADIAL BNC type connector. The connectors can be changed to LEMO 00 type connectors if this option will be specified in order.



Picture 1. The positions of set jumpers on the top view of the board.

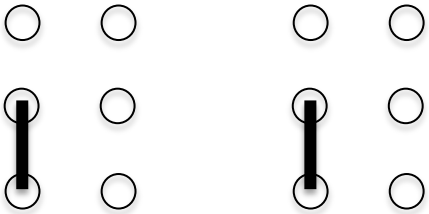
Common positions of 6 pins jumper:

A: **B:** **C:** **D:**



Note 1. Set jumpers SW1 and SW2.

Differential time constant select (default set - 1us time constant is selected).



SW1 positions of jumpers. SW2 positions of jumpers.

SW1 - A, SW2 - A - Differential time constant is **0,5 us.**
SW1 - B, SW2 - B - Differential time constant is **1 us.**
SW1 - C, SW2 - C - Differential time constant is **2 us.**
SW1 - D, SW2 - D - Differential time constant is **3 us.**

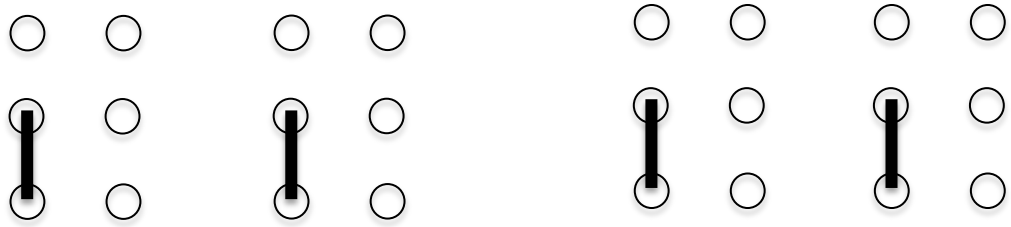
Note 2. Set jumpers SW 3.

INTERNAL COARSE GAIN selected x1.

INTERNAL COARSE GAIN selected x5.

Note 3. Set Jumpers SW4,SW5,SW6,SW7.

Integration time constant select (default set - 1us time constant is selected)..

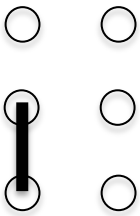


SW7 SW6 SW5 SW4

SW4- A, SW5 - A, SW6 - A, SW7- A - Integration time constant is **0,5 us.**
SW4 - B, SW5 - B, SW6 - B, SW7 - B - Integration time constant is **1 us.**
SW4 - C, SW5 - C, SW6 - C, SW7 - C - Integration time constant is **2 us.**
SW4 - D, SW5 - D, SW6 - D, SW7 - D - Integration time constant is **3 us.**

Note 4. Set jumpers SW9.

Bipolar time constant select.



SW9 - A - Bipolar time constant select is 0,5 us.
SW9 - B - Bipolar time constant select is 1 us.
SW9 - C - Bipolar time constant select is 2 us.
SW9 - D - Bipolar time constant select is 3 us

1.2 PERFORMANCE.

INPUT SIGNAL AMPLITUDE RANGE 0 to ±1.0 V AC signal; 0 to ±200m V DC offset; maximum input ±10 V.

OUTPUT AMPLITUDE RANGE 0 to ±10 V linear without load. Output DC-coupled with DC regulated offset <±1 mV.

PULSE SHAPE Semi-Gaussian on all ranges with peaking time equal to 2.2τ of shaping time.

RMS NOISE (maximum gain, Integration and Differentiation set to 1-µs) referred to the input RMS <7 µV for unipolar shaping, negative polarity; <5 µV using 2-µs shaping time;

INTEGRAL NONLINEARITY <±0.5% over ±10 V into a 1000-Ω load.

TEMPERATURE SENSITIVITY Dc level <±10 µV/C referred to the output.

CONTROLS each section of the Model NCB239 has separate controls for Coarse Gain, Fine Gain, P/Z, Differentiation, and Integration time constant.

INTERNAL COARSE GAIN jumpers selectable for nominally x1 or x5.

COARSE GAIN selectable by 10 positions switch for nominally x10, x15, x20, x30, x45, x60, x80, x120, x160, and x250.

FINE GAIN Front-panel potentiometer adjustable from 1 to 2.

BIPOLAR CROSSOVER WALK <5 ns at 0.5-µs shaping time for 50:1 dynamic

range,

P/L front-panel potentiometer used to adjust pole-zero cancellation for decay time constants from 25 μs to ∞.

INVERT/NONINVERT jumpers selectable to invert or Non-invert the Output signal relative to the Input signal.

DIFFERENTIATION Time constant jumper selectable as 0,5 us, 1 us, 2 us, 3us. A third position is available for custom modification. The Model NCB239 is shipped with this jumper in the 1 us position.

INTEGRATION Time constant jumper selectable as 0,5 us, 1 us, 2 us, 3us.. The Model NCB239 is shipped with this jumper in the 1 us position.

INPUT Positive or negative polarity selectable with a jumper; amplitude 0 to ±1 V ac signal; 0 to ±2 V dc offset; maximum input ±2 V signal plus offset. Input impedance is 1000 Ω, protected to ±12 V.

UNIPOLAR OUTPUT Front-panel LEMO connector, output impedance Zo = 100 **Ω** , active base line restorer adjustable +/- 20 mV.

BIPOLAR OUTPUT Front-panel LEMO connector, output impedance Zo = 100 **Ω**, full range scale 0-10V.

POWER SUPPLY REQUIREMENTS:

The module has NIM standard power supply and 202515-3 AMP connector on the backside of module.

Standard pin out of NIM connector.

PIN	Function	PIN	Function
1	+3 V	23	Reserved
2	- 3 V	24	Reserved
3	Spare bus	25	Reserved
4	Reserved bus	26	Spare
5	Coaxial	27	Spare
6	Coaxial	28	+24 V
7	Coaxial	29	- 24 V
8	200 V DC	30	Spare bus
9	Spare	31	Spare
10	+6 V	32	Spare
11	- 6 V	33	117 V AC
12	Reserved bus	34	Power return ground

13	Spare	35	Reset (Scaler)
14	Spare	36	Gate
15	Reserved	37	Reset (Auxiliary)
16	+12 V	38	Coaxial
17	- 12 V	39	Coaxial
18	Spare bus	40	Coaxial
19	Reserved bus	41	117 V AC (neutral)
20	Spare	42	High-quality ground
21	Spare	G	Ground guide pin
22	Reserved		

The module use +/-12 and +/-24 volts and power required:

P. Voltage (V)	Current (mA)
+12	225
-12	225
+24	Preamplifier supply
-24	Preamplifier supply

There are two DSUB 9 pins connectors on the rear panel standard power for two preamplifiers. Each connector has standard pin out and provide +/-24V, +/-12 V.

Power supply pin out:

Pin number	
7	+24 Volt
6	-24 Volt
4	+12 Volt
9	-12 Volt
1	Ground
2	Ground

.

DIMENSIONS NIM-standard single-width
module 3.43 X 22.13 cm for DOE/ER-0457T.

WEIGHT
Net 0,82 kg.

For More information on NAICAM products and applications contact your local NAICAM representative:

Europe: NAICAM s.r.l., Via Aosta 14, Padua, 35142, Italy.
Telephone: +39.049.2050437. Fax: +39.049.2050437
E-mail: info@naicam-tech.com.
Website:www.naicam-tech.com.