Spectrometric amplifier.

Model **DCB215(P).**

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 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
Spectrometric Amplifier
COARSE GAIN
Pos.
Neg.
0,5
1
2
3
6
10
20
50
100
200
500
1000
FINE GAIN
INT. SHAPING
TIME (us)
PLZ


OUT 1
OUT 2
INPUT
+/-12 VDC
Vo
BLZ

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1. GENERAL DESCRIPTION.

1.1 DESCRIPTION.

The desktop module **DCB215** is a general-purpose spectrometric amplifier for energy spectroscopy with all types of detectors. The module has 2 unipolar output, low noise, wide-gain range and front-panel selectable time constant.

The Module DCB215 is general-purpose spectrometric amplifier and has active filter networks of circuit that generate a very symmetrical unipolar output with optimal signal-to-noise ratio over a wide range of time constants. The module DCB215 has a good output DC stability.

The module DCB215P is precise spectrometric amplifier with the same circuit of DCB215 module but passive components are 0,1 % value and high temperature stability. The model DCB215P has gain up to 3000.

1.2 FUNCTIONAL BLOCK DIAGRAM

The module has 3 basic circuits low noise input amplifier with differentiation time constant control of the pulse circuit, amplification circuit and integration time constant to control circuit. The base line circuit is optional and can be integrated in DCB215 version (Fig.1). Pulse shape Semi-Gaussian on all ranges. Gain range continuously adjustable from 10 to 1500. (20 to 3000 DCB215P).

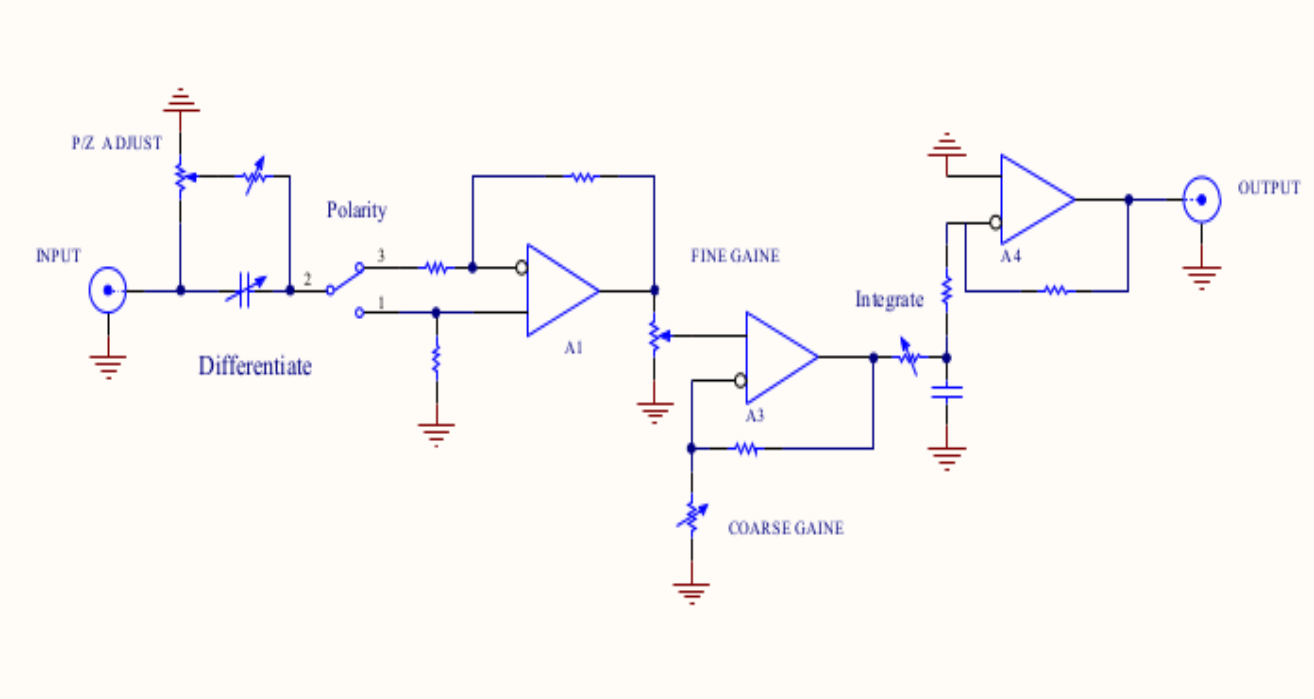


Figure. 1. Block Diagram of the DCB215 spectrometric amplifier.

1.3 PERFORMANCE.

INPUT AMPLITUDE RANGE	0 to ±1 V signal, 0 to ±5 V DC offset; maximum input ±12 V total.
OUTPUT AMPLITUDE RANGE	0 to ±10 V without termination. The output can be terminated to 50-**Ω** load.
NOISE RMS	≤ 6 µV. (2 us shaping time and maximum gain, positive polarity)
RISE TIME	x2.2 **τ** for shaping selections.
NONLINEARITY	≤±0.05% not over ±10 V range. Variation of nonlinearity in over range signal is less then 0,1%.
TEMPERATURE INSTABILITY	
DCB215	Gain ≤±0.01%/°C, 0 to 50°C. DC Level ≤±50 µV/C, 0 to 50°C.
DCB215P	Gain ≤±0.005%/°C, 0 to 50°C. DC Level ≤±20 µV/C, 0 to 50°C.
COARSE GAIN	Front-panel 6-position switch for selection of x10, x50, x100, x200, x500, or x1000.
GAIN STABILITY DCB215	less then 0,04 %/C in full range.
GAIN STABILITY DCB215P	less then 0,02 %/C in full range.
FINE GAIN	10-turn precision potentiometer variable gain factor of x0.5 to x1.5.
POLE ZERO ADJ (PLR)	Front-panel screwdriver adjustment to compensate for the preamplifier decay time constant from 25us to ∞.
TIME CONSTANT	Two 6-position switches on front panel: Integrate RC time constants: 0.5, 1, 2, 3, 6, and 10 us. Differentiate RC time constants: 0.5, 1, 2, 3, 6, and 10 us.

Pos./Neg.	Selects inversion or noninversion of the input signal.
INPUT	Positive or negative polarity selectable by back-panel switch; amplitude range 0 to ±12 V ; impedance 1k**Ω**, DC-coupled; back-panel LEMO connector. Accepts a ±12 V DC maximum input signal.
OUTPUT 1	Back-panel LEMO connector. Amplitude 0 to ±10 Volt (without termination); Output impedance Zo = 100 **Ω**. This output has possibility adjust output offset by trimmer V0, adjustment to compensate output offset in range +/- 100 mV.
OUTPUT 2	Back-panel LEMO connector. Amplitude 0 to ±10 Volt (without termination); Output impedance Zo = 100 **Ω**. Back panel screwdriver adjustment regulates automatic base line restorer threshold (BLZ).
SPECTRUM BROADENING	Typically <20% FWHM.
SPECTRUM SHIFT	Peak position shifts typically <0.03%.

2. TECHNICAL SPECIFICATIONS.

The module on the front panel fine gain trimmer, diff. and Int. switches,
Zero Pole trimmer and locking toggle switch pulse polarity.
On the rear panel there are 4 connectors (input Power, input LEMO connector,
2 output LEMO connectors) and trimmer of BLR and Vo offset.

2.1 OPERATING INSTRUCTIONS

Signal Polarity control.

Pos./Neg Selects inversion or non-inversion input signal.

Gain control.

COARSE GAIN on the front-panel is 6-position switch for selection of x10, x50, x100, x200, x500, or x1000.

FINE GAIN on the front-panel is 10-turn potentiometer, continuous from x0,5 to

x1,5

Time Constant control.

One 6-position switch on front panel control Integrate RC time constants: 0.5, 1, 2, 3, 6, and 10 us.

One 6-position switch on front panel control Differentiate RC time constants: 0.5, 1, 2, 3, 6, and 10 us.

Front-panel Pole zero control screwdriver adjustment to compensate for the preamplifier decay time constant from 25us to ∞ (PLR).

Output buffer DC level control.

This back panel screwdriver near to Output 1 (LEMO connector) permit adjustment output DC level by automatic base line restorer (BLR) in range +/- 20mV.

This back panel screwdriver near to Output 2 (LEMO connector) permit adjustment output DC level by trimmer in range +/- 100mV (Vo).

2.2 INPUT/OUTPUT CONNECTIONS AND SIGNAL CHARACTERISTIC.

INPUT: Back-panel LEMO connector accepts positive or negative pulses with rise times of 15 to 1000 ns and decay times of 30µs to ∞, Zin ≅ 1 K**Ω** dc-coupled; maximum +/-10 V; absolute maximum +/-12V DC.

OUTPUT 1: UNIPOLAR back-panel LEMO connector with Zo = 100 **Ω**, short-circuit proof; prompt with full scale linear range of +/-10 V; active filter shaped; dc-restored; dc-level adjustable to ±20 mV.

OUTPUT 2: UNIPOLAR back-panel LEMO connector with Zo = 100 **Ω**, short-circuit proof; prompt with full scale linear range of +/-10 V; active filter shaped; dc-offset level adjustable to ±100 mV.

2.3 INTERNAL HARDWARE SETTINGS.

No any internal settings.

2.4 POWER REQUIREMENTS.

The NAICAM Model DCB215 operates only with ±12 V power that must be furnished from a linear power supply or NAICAM poser supply such as the NSP100 series. The temperature of the equipment could not exceed the limit of 50°C.

PREAMP POWER: The module has not rear-panel standard DSUB9 power connector for connection one preamplifier like on module NCB215. The best solution use DSP100 module for alimentation DCB215 and several preamplifiers. The DSP100 has 4 outputs with standard DSUB connectors and provide +/-24Volt, +/-12 Volt.

DSUB9 connector pin out:

Pin number	Function
4	+12 Volt
9	-12 Volt
2	Ground
1	Ground

.

POWER SUPPLY REQUIREMENTS:

P. Voltage (V)	Current (mA)
+12	85
-12	85

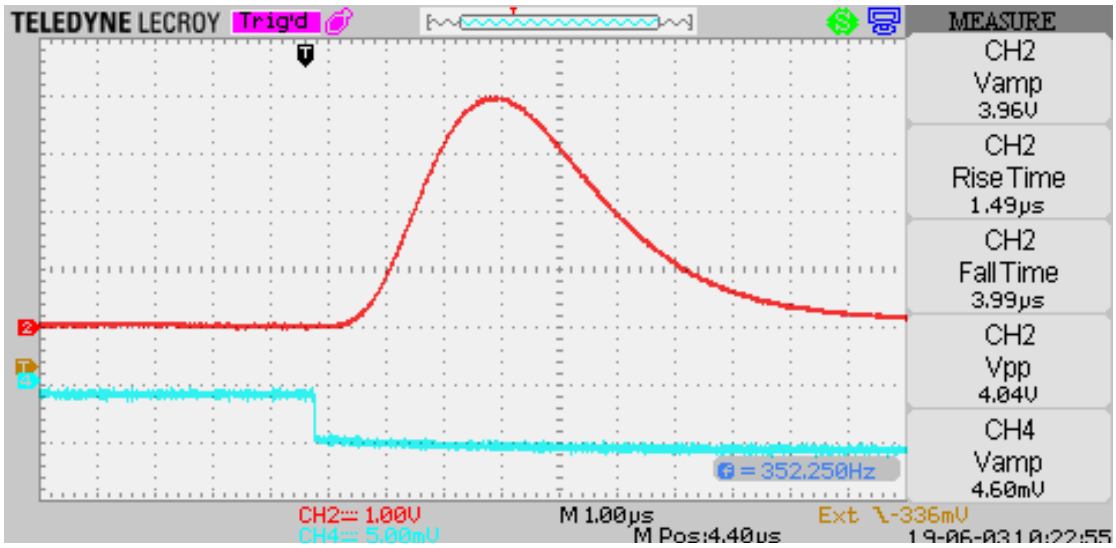
2.5 DIMENSION AND WEIGHT

WEIGHT:
Net 0.79 kg.

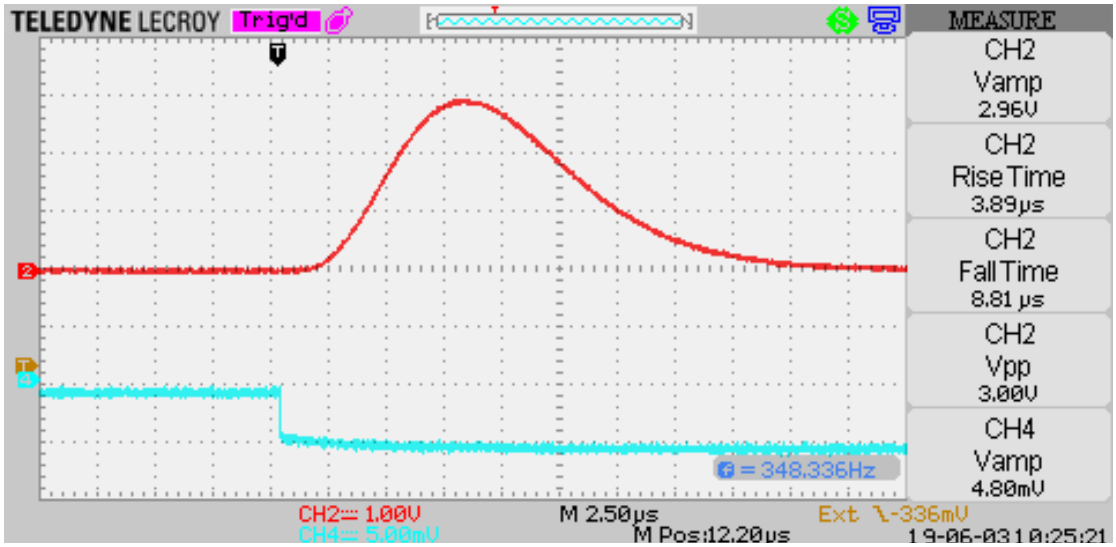
DIMENSIONS:

Desttop module has 165x160x52 mm.

Appendix:



Picture 1. Output signal: switch are set in 1 us positions, output signal is terminated to 1MOhms.



Picture 2. Output signal: switch are set in 2 us positions, output signal is terminated to 1MOhms.

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.