



*Electronic Instrumentation for Nuclear,  
Astroparticle Physics and Industrial Electronics.*

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6 channels Spectrometric Amplifier.

**DSDIG60 module.**

**Operation Manual.**

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## **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.

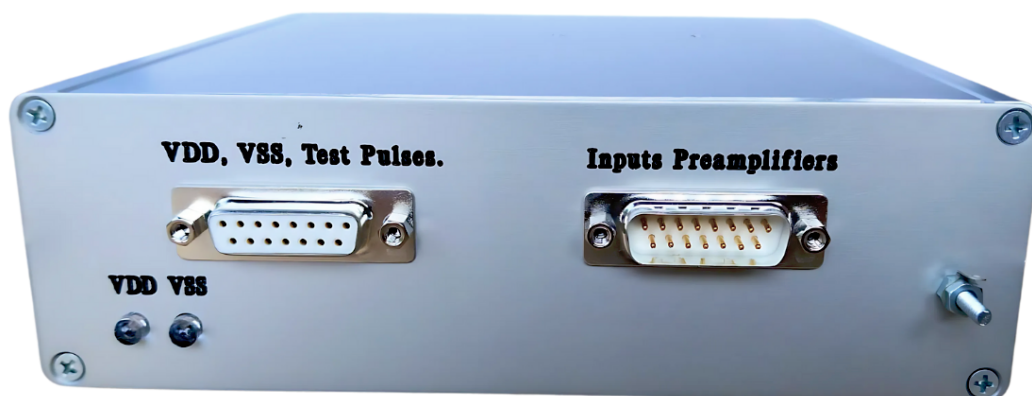
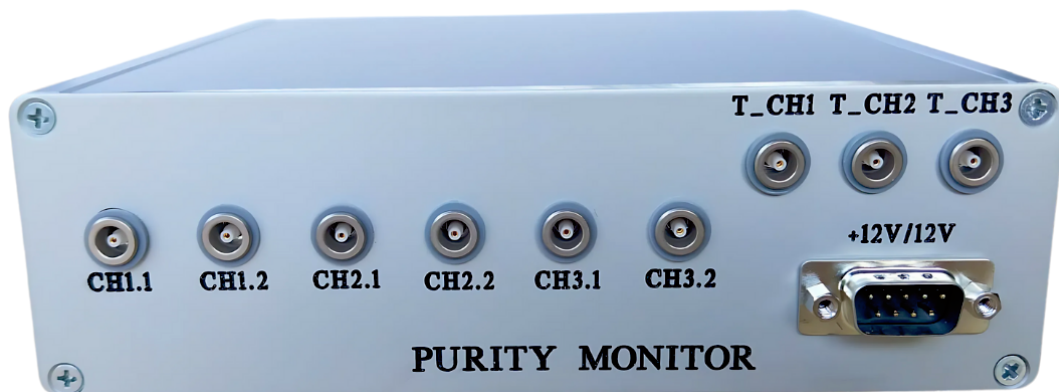
To exercise this warranty, write or call your local NAICAM SRL representative, or contact NAICAM SRL headquarters in Italy. You will be given prompt assistance and return instructions. Send the product, transportation prepaid, to the indicated service facility. Repairs will be made and the product returned,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

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## 1. GENERAL DESCRIPTION.

### 1.1. DESCRIPTION. FUNCTIONAL BLOCK DIAGRAM.

The DSDIG60 desktop single module has up to 6 channels SDIG60 spectrometric amplifier. Each channel has gain 60 dB, zero pole, differential and integration circuits (fig.1). The timing of circuit has been choused for best signal to noise resolution for specific application with CA05 preamplifier. The spectrometric chain CA05 preamplifier and SDIG60 give equivalent noise about 200 electrons. Input equivalent noise of shaper for 3 $\mu$ s (integration) and 3 $\mu$ s (differential)) signal time constant is less than 7  $\mu$ V

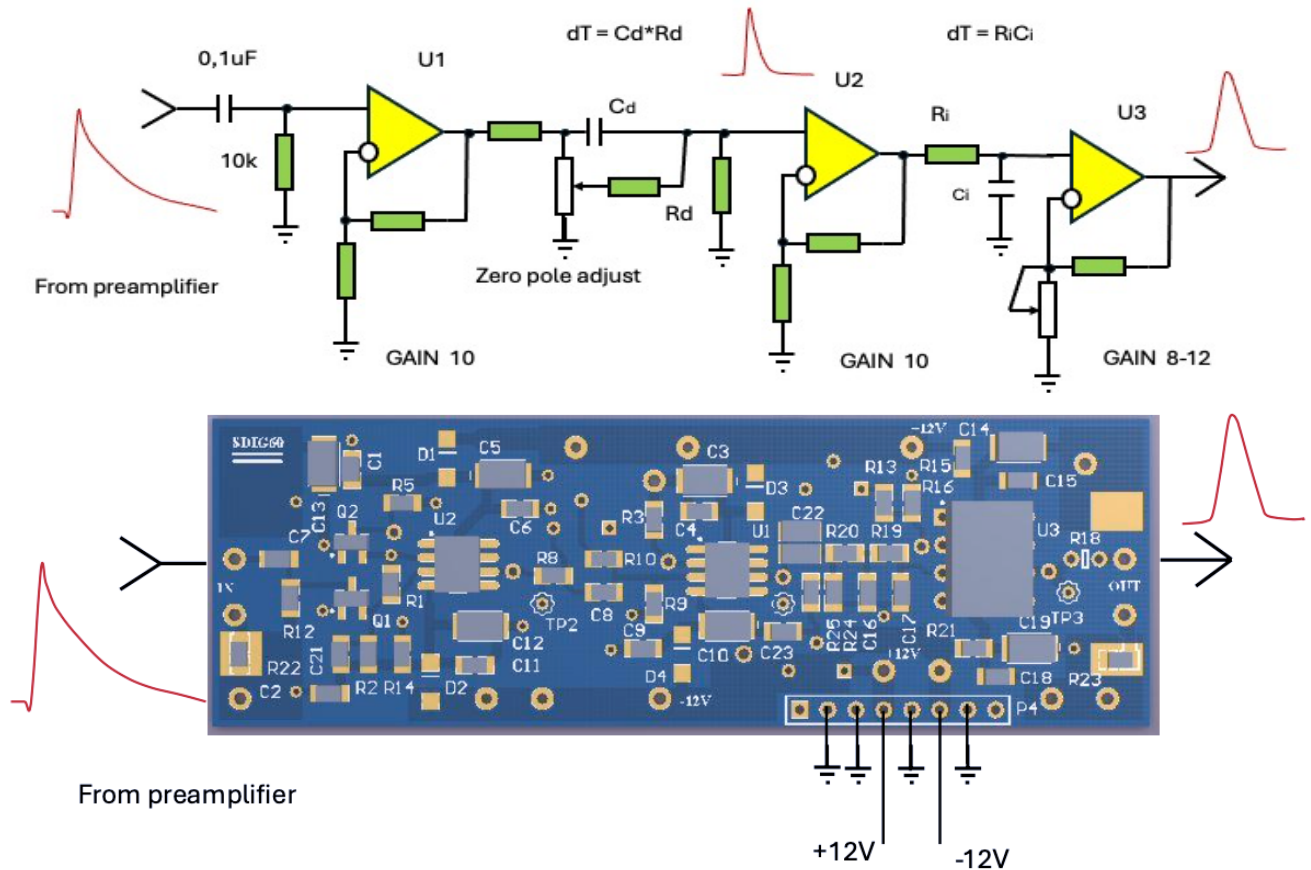


Fig.1 Circuit block diagram.

**1.2. PERFORMANCE.****INPUT AMPLITUDE**

**RANGE** Maximum input range 0 to  $\pm 30\text{mV}$ ; positive or negative polarity; input amplitude; protected to  $\pm 6\text{ V dc}$ ; impedance  $10\text{ k}\Omega$ , DC coupled. The range can be changed according to custom request).

**OUTPUT AMPLITUDE**

**RANGE** Unipolar non inverted. Amplitude of output signal 0 to  $\pm 10\text{ V}$  (without termination). Output impedance  $Z_o = 100\ \Omega$ . Output Offset voltage less than  $\pm 2\text{ mV}$ . The output can be terminated to  $50\text{-}\Omega$  load.

**NOISE RMS** less than  $\leq 5\ \mu\text{V}$ .

**RISE TIME**  $1,8\ \mu\text{s}$ .

**FALL TIME**  $9,8\ \mu\text{s}$ .

**NONLINEARITY**  $\leq \pm 0.05\%$  not over  $\pm 10\text{ V}$  range.  
Variation of nonlinearity in over range signal is less then  $0,1\%$ .

**TEMPERATURE**

**INSTABILITY DC** Level  $\leq \pm 25\ \mu\text{V/C}$  referred to the output (in range 0 to  $50^\circ\text{C}$ ).

**COARSE GAIN** 1000.

**FINE GAIN**  $\pm 20\%$  by 25 turns trimmer. Corresponding hole for access to trimmer user can find on the top of the module.

**GAIN STABILITY** less then  $0,01\ \%/C$  in full range.

**POLE ZERO ADJ** 25-turn Trimmer. Adjustment to compensate for the preamplifier decay time constant from  $25\ \mu\text{s}$  to  $\infty$ .

**Output Offset ADJ** 14-turn Trimmer.

**TIME CONSTANT** Integrate RC time constants -  $2\ \mu\text{s}$ .  
Differentiate RC time constant -  $3\ \mu\text{s}$ .

Note:

The RC time can be adjusted in fabric according user request.

### 1.3. INPUT/OUTPUT CONNECTIONS AND SIGNAL CHARACTERISTIC.

For all inputs and outputs connections coaxial cable RG178 is used ( output signals, test pulses and power supply voltages). This solution permit avoids cross talk between channels and loop connections. The table 1 and 2 show connector DSUB 15 and DSUB 25 pin out.

Table 1. DSUB15 connector pinout (2 or 4 channels).

| Description      | PIN     | Description           | PIN      |
|------------------|---------|-----------------------|----------|
| S1.1 Input CH1.1 | 8       | S2.1 Input CH1.1      | 5        |
| G1.1 GND CH1.1   | 15      | G2.1 GND CH1.1        | 13       |
| S1.2 Input CH1.1 | 14      | S2.2 Input CH2.2      | 12       |
| G1.2 GND CH1.1   | 7       | G1.1 GND CH1.1        | 4        |
| NC               | 3,6, 11 | Reserved but not used | 1,2,9,10 |

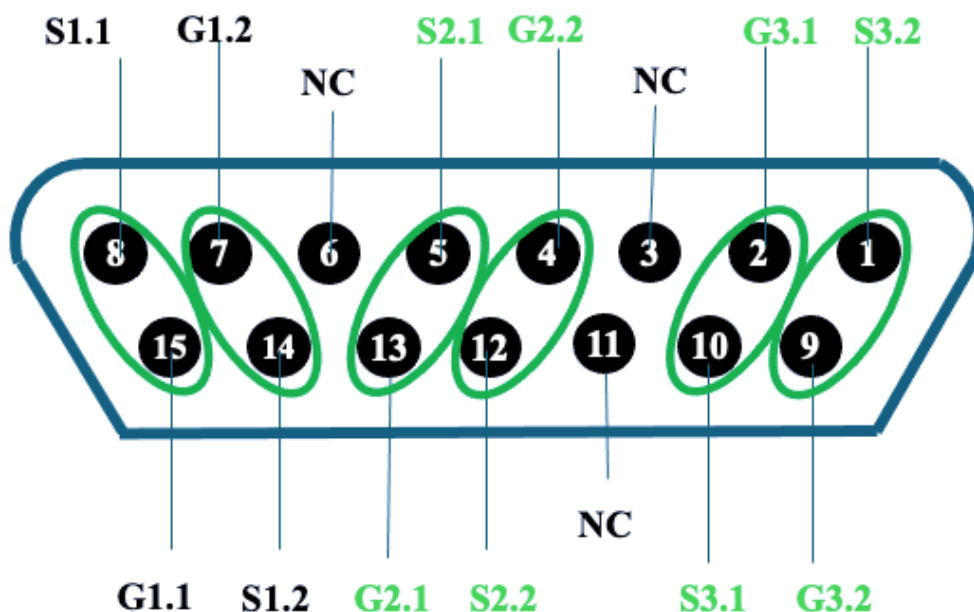


Figure 2. DSUB15 Preamplifiers Input connector.

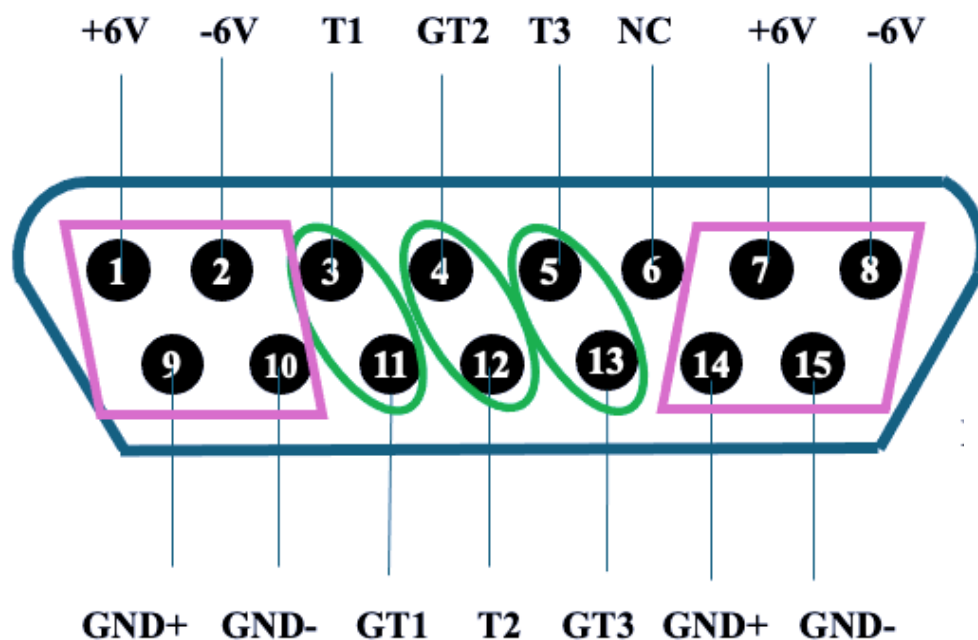


Figure 3. DSUB15 Power and test pulse connector. The -6 Volt for preamplifiers can be changed to -4 Volt (specified in order).

Table 2. DSUB25 connector pinout (6 channels).

| Description      | PIN             | Description      | PIN               |
|------------------|-----------------|------------------|-------------------|
| S1.1 Input CH1.1 | 12              | S2.2 Input CH2.2 | 19                |
| G1.1 GND CH1.1   | 25              | G2.2 GND CH1.1   | 7                 |
| S1.2 Input CH1.1 | 23              | S3.1 Input CH2.2 | 5                 |
| G1.2 GND CH1.1   | 11              | G3.1 GND CH1.1   | 17                |
| S2.1 Input CH1.1 | 9               | S3.2 Input CH2.2 | 15                |
| G2.1 GND CH1.1   | 21              | G3.2 GND CH1.1   | 3                 |
| NC               | 12,10,8,6,4,2,1 | NC               | 24,22,20,18,16,14 |

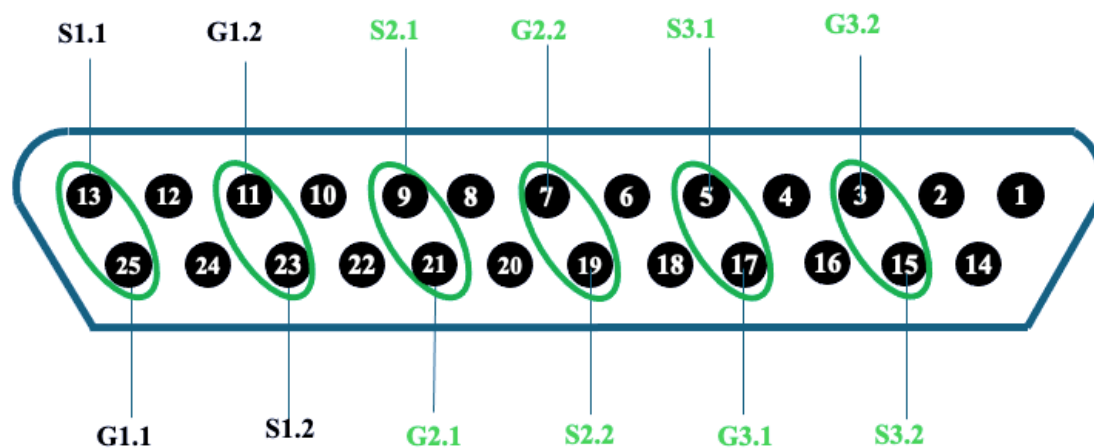


Figure 4. DSUB25 Preamplifiers Input connector.

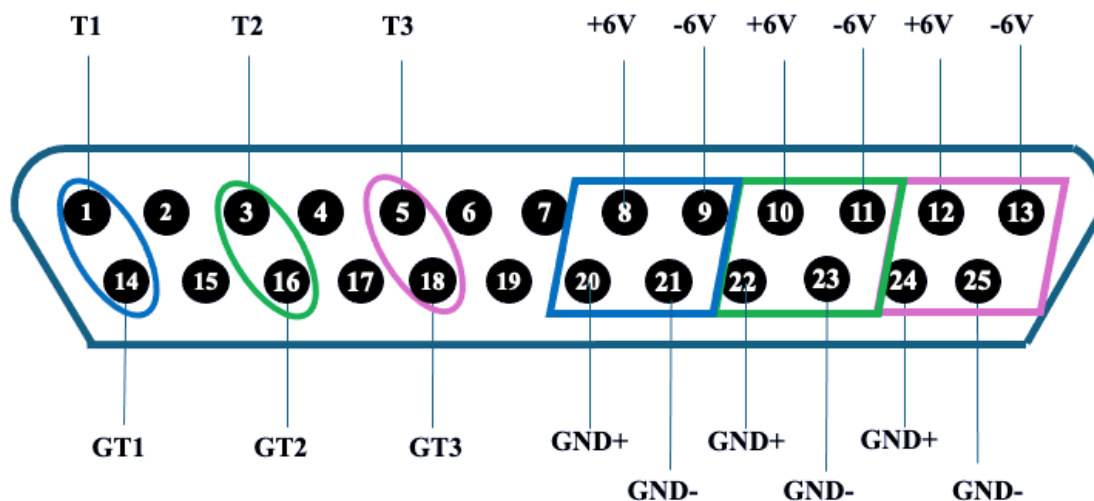


Figure 5. DSUB25 Power and test pulse connector. The -6 Volt for preamplifiers can be changed to -4 Volt (specified in order).

Calibration signals T1, T2, T3 corresponds to group signals S1, S2, S3. The signals T1, T2, T3 send calibration signal through resistive divider with coefficient 20,6 and terminated to 50 Ohm.

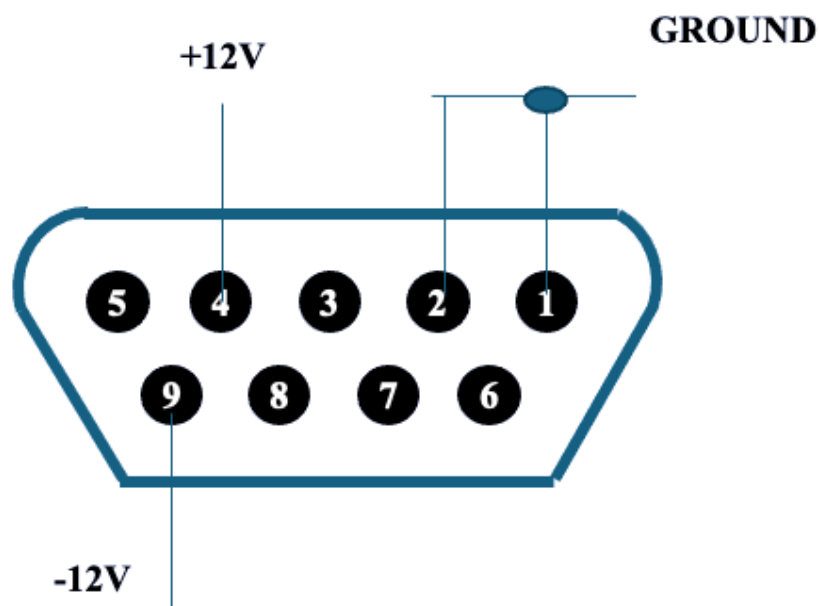


Figure 6. DSUB9 Power connector.

#### 1.4. POWER SUPPLY REQUIREMENTS:

Table 3.

| P. Voltage (V) | Current (mA) |
|----------------|--------------|
| +12            | 33 x N       |
| -12            | 33 x N       |

Note: N – number of channels

#### 1.5 DIMENSIONS:

160x165x51 mm

WEIGHT: not more than 750 g.

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

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