Rev.0 - 21/12/1992

N401

Quad Linear FAN IN - FAN OUT

CAEN
Tools for Discovery

User Manual

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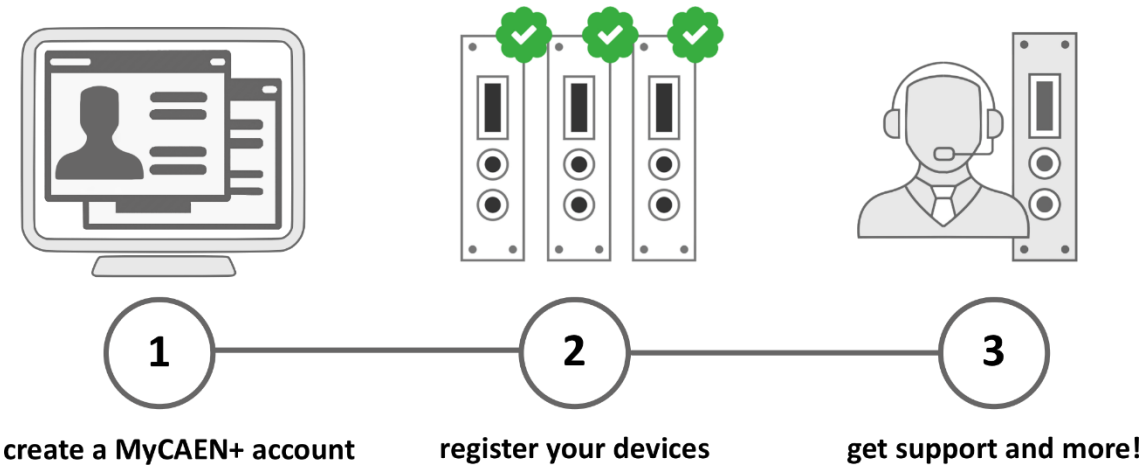

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Technical Information Manual

MOD. N 401

QUAD LINEAR
FAN-IN FAN-OUT

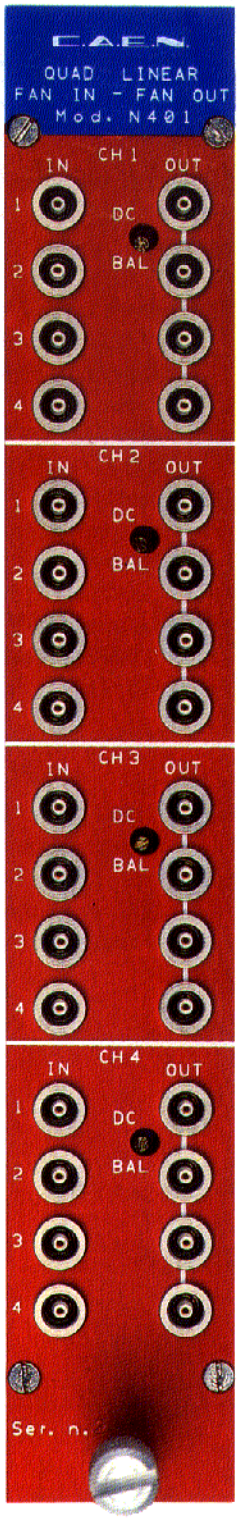
21st December 1992

CAEN will repair or replace any product within the guarantee period if the Guarantor declares that the product is defective due to workmanship or materials and has not been caused by mishandling, negligence on behalf of the User, accident or any abnormal conditions or operations.

CAEN declines all responsibility for damages or injuries caused by an improper use of the Modules due to negligence on behalf of the User. It is strongly recommended to read thoroughly the CAEN User's Manual before any kind of operation.

CE

CAEN reserves the right to change partially or entirely the contents of this Manual at any time and without giving any notice.


C.A.E.N.
QUAD LINEAR
FAN IN - FAN OUT
Mod. N401
CH 1
IN
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DC
BAL
CH 2
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CH 3
IN
OUT
1
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3
4
DC
BAL
CH 4
IN
OUT
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DC
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1. DESCRIPTION

1.1 FUNCTIONAL DESCRIPTION

The CAEN Model N 401 QUAD LINEAR FAN-IN FAN-OUT is a single width NIM module equipped with four independent sections, whose input signals can be negative, positive or bipolar.

Each section is provided with:

- four inputs ("IN" connectors) ;
- four outputs ("OUT" connectors);
- an external screwdriver trimmer "DC BAL", which allows the output offset to be adjusted within ± 100 mV;
- an internal 3-jumper switch, which allows the inverting or non inverting mode to be selected.

Both the input and output signals are DC coupled, with no duty-cycle limitation.

For each section, a single input signal generates four identical output signals with a ±1xgain. By using several input signals, an output signal with an amplitude equal to the sum of the inputs' amplitudes is available at each "OUT" connector.

The functional block diagram of the N 401 is shown in Figure 1.

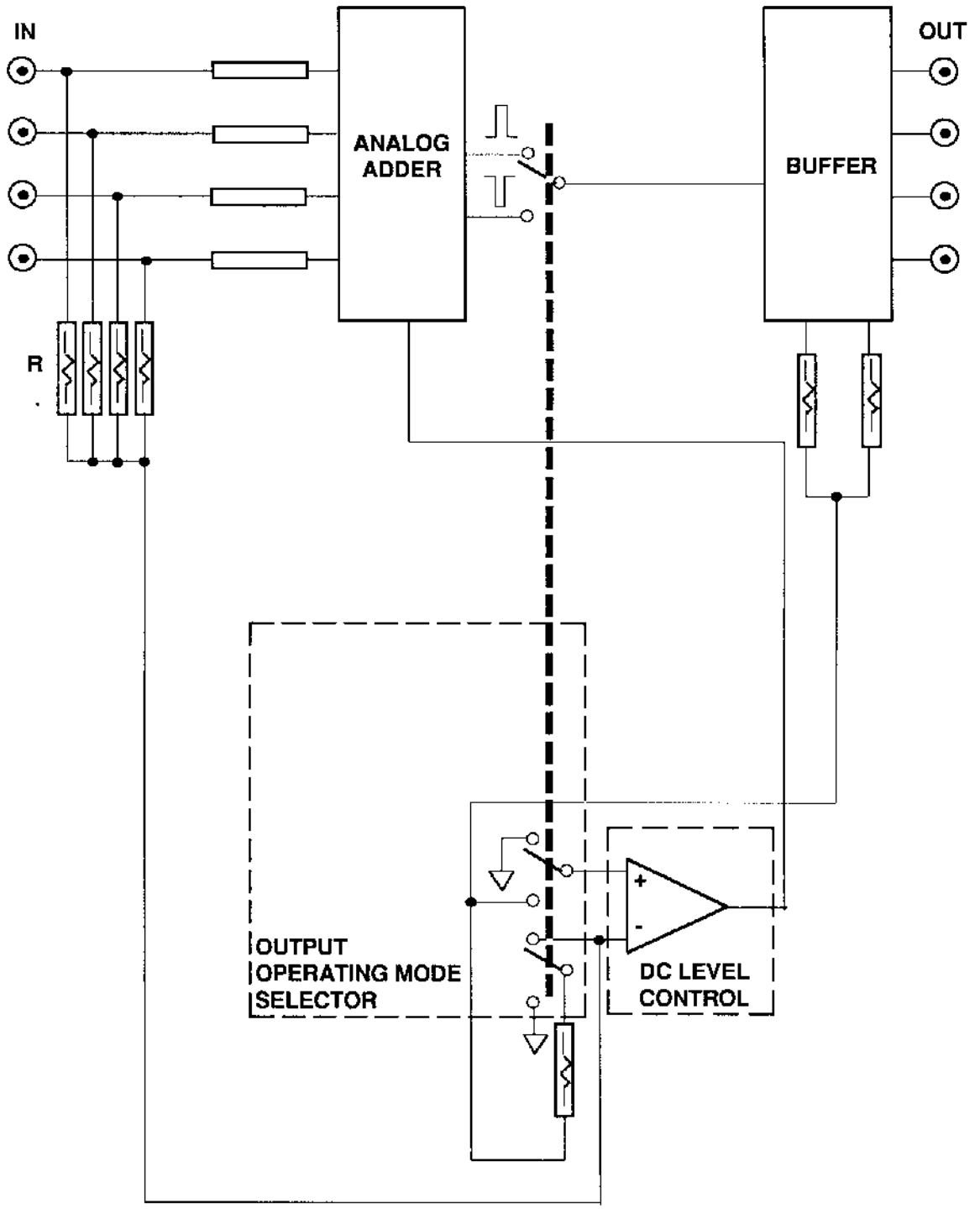


Figure 1 - Functional Block Diagram of the N 401 (One Section).

2. SPECIFICATIONS

2.1 PACKAGING

1-unit wide NIM module.

2.2 EXTERNAL COMPONENTS

CONNECTORS:

- No. 16 LEMO 00 type "IN" (four per section). Input signal connectors.
- No. 16 LEMO 00 type "OUT" (four per section). Output signal connectors.

TRIMMERS:

- No. 4 screwdriver trimmers "DC BAL" (one per section). Output offset adjustment.

2.3 INTERNAL COMPONENTS

- No. 12 two-position jumpers (three per section). For the output polarity selection.

2.4 CHARACTERISTICS OF THE SIGNALS

INPUTS:

- DC-coupled linear signals, linear range ±1.5 V.
- Minimum width: 5 ns (FWHM).
- Impedance: 50 Ω ±1%.
- Polarity: positive, negative or bipolar.
- Reflection: less than 10% for inputs of 2 ns risetime.
- DC level: less than ±2 mV.

OUTPUTS:

- DC-coupled linear signals into 50 Ω impedance.

- Inverted or non inverted polarity.
- Integral non linearity: ± 1% up to 1 V.
- Dynamics: ± 1.5 V.
- Rise/fall time: ≤2.5 ns, from 10% to 90% of the output signal. All unused inputs and outputs are terminated in 50 Ω.
- Gain: in the linear range 1.0 ±2% (±1% on request).
- Duty cycle limitation: none.
- DC Offset: selectable for each section within ± 100 mV (via front panel trimmer).
- DC Offset stability: ≤ 100 µV/°C.
- Crosstalk: better than 40 dB.
- Section insulation: > 70 dB.
- Noise: ≤ 300 µV RMS.
- Stage delay: ≤7 ns.

GENERAL:

- Small signal bandwidth: DC to 170 MHz, at -3 dB with an input signal of 0.1 V_{pp} and the unused outputs terminated in 50 Ω.
- Large signal bandwidth: DC to 110 MHz, at -3 dB with an input signal of 2 V_{pp} and the unused outputs terminated in 50 Ω.
- INPUT/OUTPUT delay: < 11 ns.

2.5 POWER REQUIREMENTS

+12 V at 750 mA

-12 V at 750 mA

+6 V at 550 mA

-6 V at 330 mA

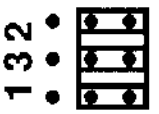
3. OPERATING MODE

3.1 GENERAL INFORMATION

The Model N 401 QUAD LINEAR FAN-IN FAN-OUT has four linear fan-in/fan-out sections, each one with four inputs and four outputs.Both the inputs and outputs are DC coupled.

An internal 3-jumper switch per section allows the inverting or non inverting mode to be selected (see figure below).

NON INVERTING MODE



INVERTING MODE

3.2 OPERATIONS TO BE PERFORMED

CAUTION: *turn OFF the NIM crate before inserting or removing the module.*

1. By setting the internal 3-jumper groups to the appropriate positions, select the required operating mode (inverting or non inverting).

2. Insert the N 401 module into the NIM crate.

3. Connect the signal sources to the "IN" connectors of the selected module's sections (see par. 2.3 for signal characteristics).

4. Connect the module's output connectors to the detection devices to be used.

> ***IMPORTANT ADVICE:***
>
> *The unused input and output connectors must be terminated in 50Ω.*

5. Turn on all the equipment devices.

4. TEST PROCEDURE

4.1 INTRODUCTION

The operations to be performed to test the N 401 module are listed in the procedure below and have to be carried out according to their numerical sequence. None of the procedural step can be omitted.

Each procedural step contains the operation to be performed and the corresponding effect or the verification to be accomplished.

4.2 NECESSARY INSTRUMENTS

- No. 1 Oscilloscope (300 MHz minimum bandwidth).
- No. 1 Signal Generator capable of producing bipolar signals (5 ns minimum width).
- 1 NIM crate.

4.3 PROCEDURE

The N 401 module comes from CAEN fully tested and calibrated. This procedure allows the user to accomplish a functional test of the module.

CAUTION: *Turn OFF the crate before inserting or removing the module.*

1. On the N 401 printed-circuit board, set the four 3-jumper groups to the position corresponding to the non inverting operating mode (refer to par. 3.1).
2. Insert the module into the crate.
3. Turn ON the crate.
4. For each section of the module perform the following operations:

The input and output connectors of the remaining sections must be terminated in 50 Ω.

(a) With a screwdriver, turn the "DC BAL" trimmer of the current section, and verify that the output offset can vary within ± 100 mV, then set the offset value to 0 V.

(b) Via Signal Generator, supply one of the four inputs ("IN" connectors) with a proper signal (5 ns minimum width), and verify that a corresponding output signal (1x gain) is present at each "OUT" connector with the same input polarity.

(c) Via Signal Generator, supply the four inputs ("IN" connectors) with proper signals (5 ns minimum width), and verify that a signal with an amplitude equal to the algebraic sum of the input signals' amplitudes is present at each "OUT" connector with the same input polarity.

5. Turn OFF the crate.

6. Remove the module from the crate.

7. On the N 401 printed-circuit board, set the four 3-jumper groups to the position corresponding to the inverting operating mode (refer to par. 3.1).

8. Repeat the procedural step 4.: the same effects are observed, except an inverted output polarity.

THE MODULE IS TESTED AND OPERATES CORRECTLY

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