Technical Information Manual

MOD. N 407

24 CHANNEL
ANALOG ADDER

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.

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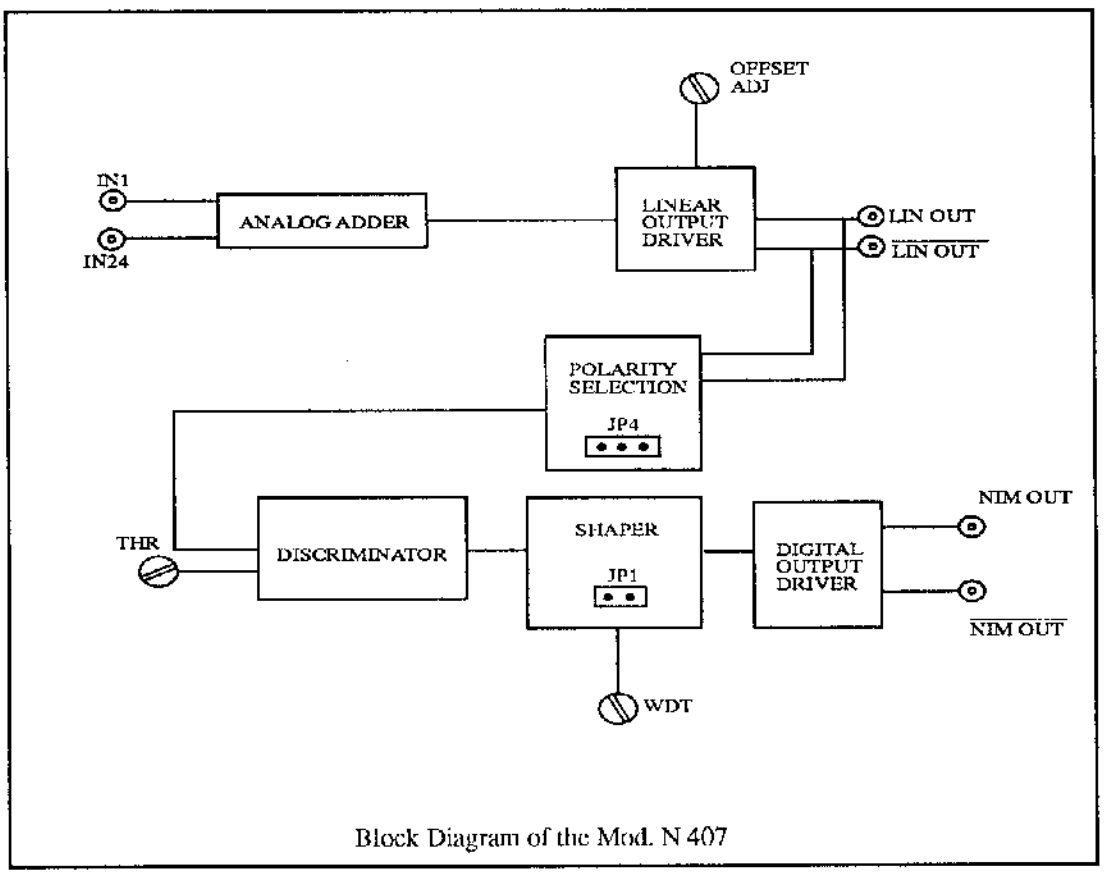
1. DESCRIPTION

The Model N 407, 24 Channel Analog Adder, is a single width NIM module which performs the analog sum of the 24 input signals independently from their polarity.

The input signals are taken to an analog adder, whose output, whether inverting or non-inverting polarity, is available externally.

The output offset is adjustable by means of a front panel trimmer. The analog sum signal is taken to an updating discriminator whose threshold is programmable with the trimmer and test point foreseen on the front panel.

The discriminator outputs formed, normal and complementary, are available on front panel connectors as std. NIM signals. The outputs width are programmable by a front panel trimmer.



Block Diagram of the Mod. N 407

2. SPECIFICATIONS

2.1 PACKAGING

One unit wide module.

2.2 EXTERNAL COMPONENTS

- No.24, LEMO 00 type Connectors, "IN". Input signal connectors.

- No.2, LEMO 00 type Connectors, "LIN OUT-$\overline{\text{LIN OUT}}$". Linear output signal connectors.

- No.2, LEMO 00 type Connectors, "NIM OUT-$\overline{\text{NIM OUT}}$". Digital output signal connectors.

- No. 1, screwdriver trimmer, "OFFSET ADJ". Linear output offset adjustment.

- No.1, screwdriver trimmer, "THR". Discriminating Threshold setting.

- No.1, screwdriver trimmer, "WDT". Digital output signal width adjustment.

- No.1, test point, "THR". Discriminating threshold monitor.

2.3 INTERNAL COMPONENTS

- No.1, jumper, "JP1". Digital output width range selection.

- No. 1 jumper, "JP4". Analog sum signal polarity selection.

2.4 POWER REQUIREMENTS

+ 24 V	10 mA
- 24 V	50 mA
+ 12 V	370 mA
-12 V	50 mA
+ 6 V	300 mA (max.)
-6 V	900 mA (max.)

2.5 CHARACTERISTICS OF THE SIGNALS

INPUTS

impedance :	50 Ω, DC coupled
dynamic range:	± 400 mV
max. frequency:	> 100 MHz
amplification:	1 ± 2%
max. offset:	± 100 mV
crosstalk:	< 60 dB

OUTPUTS

Analog output:

impedance:	50 Ω
dynamic range:	± 2 V
adjustable offset range:	± 150 mV
in/out delay:	< 10 ns

Digital output:

Std. NIM level on 50 Ω impedance.

rise/fall time:	2 ns
two adjustable width ranges:	10 ns to 50 ns
	10 ns to 400 ns
adjustable threshold:	-15 mV to -1.6 V
digital output signal delay with respect to the linear output analog signal:	12 ns

3. OPERATING MODE

The module N 407 accepts bipolar input signals. The discriminator that generates the digital NIM OUT and $\overline{\text{NIM OUT}}$ signals works only with negative signals: it is therefore necessary to present to the discriminator the sum signal with negative polarity. In order to do this the user must:

1. Position the JP4 jumper as shown in figure 2a if the sum signal is positive or, as shown in figure 2b if the sum signal is negative.

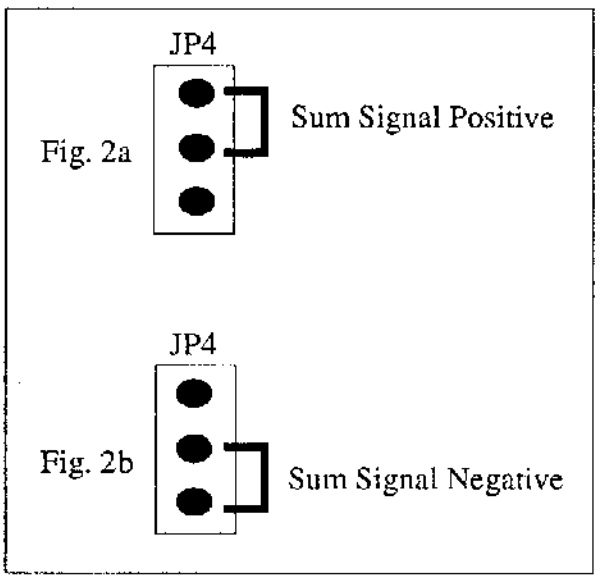


Fig. 2a

Fig. 2b

2. Choose the width range of the signals NIM OUT and $\overline{\text{NIM OUT}}$ with the jumper JP1.

JP1	ON	range = 10 ns to 400 ns
JP1	OFF	range = 10 to 50 ns

For the jumpers position see Components Location (Appendix A).

4. TEST PROCEDURES

4.1 INTRODUCTION

The following Test Procedure is intended to be a guide for the user. We do not claim it to be exhaustive and therefore the module may be tested in various other ways.

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

4.2 SUGGESTED INSTRUMENTS

- No.1 Signal Generator.

- No. 1 Analog Fan-Out.

- No. 1 Voltmeter.

- No. 1 Oscilloscope (300 MHz).

4.3 PROCEDURE

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

1. Set the JP4 jumper to analog sum signal with positive polarity position and JP1 to OFF position.

2. By acting on the "OFFSET ADJ" front panel trimmer verify that a continuous variable level from -150 mV to +150 mV is present on the output OUT LIN and $\overline{\text{OUT LIN}}$.

3. Set the continuous level to about 0 V.

4. By acting on the "THR" trimmer verify that a variable threshold voltage from -15 mV to -1.6 V is present on the relative Test Point .

5. Set a threshold voltage of about -50 mV.

6. Send a signal compatible with the input specifcations and with an amplitude of > 50 mV to the first input and terminate all the other inputs at 50 Ω.

7. Verify that a replica of the input signal is present in the output OUTLIN and an inverted replica in the output $\overline{\text{OUT LIN}}$.

8. Verify that a std. NIM signal is present on the output NIM OUT and $\overline{\text{NIM OUT}}$.

9. By acting on the "WDT" trimmer verify that the width of these two outputs vary from 10 ns to 50 ns.

10. Set JP1 to ON position and verify that the width of these two outputs vary from 10 ns to 400 ns.

11. Repeat steps 6 to 7 for all the inputs.

12. Send 24 input signals, keeping into account the input and output characteristics of the module.

13. Verify that a signal is present equal to the sum of the 24 input signals on the output OUT LIN.

THE MODULE IS TESTED AND OPERATES CORRECTLY.