

Technical  
Information  
Manual

**MOD. N 93 B**

*DUAL TIMER*

*30th August 1991*

## **DESCRIPTION**

The Dual Timer **Model N 93 B** consists of two identical triggered pulse generators. They produce fast NIM and ECL pulses with adjustable width from 50 ns to 10 s, and are retriggerable before the end of the output signal.

The END-MARKER, a short output pulse at the end of the timing cycle, can be used for delayed triggering of other units or, if fed back into the START input, it provides a self-running rate generator that can be started and stopped at will.

By cascading the two sections of the module, a pulse generator with an independent adjustable rate and width can be obtained.

It is possible to disable start inputs by feeding a NIM signal to the "Veto" input.

## **SPECIFICATIONS**

(each section)

### **Input Characteristics**

- START INPUT ..... 2, NIM and ECL leading edge sensitive.  
Minimum width 5 ns.  
Momentary Switch for single cycle operation.
- VETO INPUT..... 1, NIM input.  
NIM true level at VETO input disables the START input ( within  $\pm 2$  ns of START leading edge ).
- RESET INPUT ..... 1, NIM signal.  
Minimum width : 7 ns ( 15 ns for recursive operation)  
It can be applied at any point of the timing cycle.  
Produces END-MARKER

### **Output Characteristics**

- OUTPUTS ..... Two normal independent, one complementary NIM output and one ECL.
- WIDTH ..... 50 ns to 10 s in 9 decade steps, with a potentiometer and locking dial for fine adjustment (\*).  
Accuracy  $\pm 10\%$  of full scale, with adequate range overlap.  
Temperature coefficient :  $10^{-3}/^{\circ}\text{C}$  of setting.  
Switch position « $\infty$ » for bistable operation.

(\*) Fine adjustment below the low end of any range is unpractical.  
A smoother setting is obtained at the high end of the lower range.

DEAD TIME ..... Shorter than the cycle time.  
The timer can be triggered well before the end of the timing cycle.

RISE/FALL TIME...  $\leq 2$  ns.

INPUT-OUTPUT DELAY ..... Delay from Start to leading edge of output, or from Reset to trailing edge, is  $\approx 13$  ns.

END MARKER ... NIM and ECL output, 15 ns wide output pulse  
Leading edge is coincident with the trailing edge of outputs within 2 ns.  
Can be connected to Start input for free running operation (sequence activated by the START switch).

LED ..... Flashes for 0.1 s or output width, whichever is longer.  
At high rates the lamp has its own flashing rate.

NIM Connectors LEMO 00 type.

ECL Connectors "Twisted Pairs" type.

Power requirements

|       |        |
|-------|--------|
| +24 V | 40 mA  |
| -24 V | 18 mA  |
| +12 V | 17 mA  |
| + 6 V | 55 mA  |
| - 6 V | 560 mA |

## **TEST PROCEDURES**

(on 1 of 2 identical channels)

Necessary instruments: 20 MHz pulse generator NIM standard and ECL outputs; Oscilloscope: Tektronix Model 475A or equivalent.

### **Procedures:**

- 1) Put the front panel selector on " $\infty$ " position.
- 2) Move the START/RESET switch to the right: the lamp will light and remain on.
- 3) Move the START/RESET switch to the left or feed the RESET input the proper signal: the lamp must switch off.
- 4) Put the selector switch in any other position.
- 5) Feed the START input a NIM signal having a period greater than the selected width.
- 6) Check that the OUT and OUT signals have the same period as the START input and that the width varies uniformly within the selected limits controlled by the FINE WIDTH potentiometer.
- 7) Check that the END-MARKER output signal starts on the trailing edge of OUT and has 15-20 nsec width.
- 8) Repeat points 4,5,6,7 for all selectable positions.
- 9) Feed the START input an ECL signal having a period greater than the selected width. Repeat points 6,7 and 8.
- 10) Feed the START input a NIM signal, feed VETO input another NIM signal: if the leading edge of the START input occurs in coincidence with the leading edge of the VETO input ( $\pm 1$  nsec) the Dual Timer must be inhibited.

Note: in the " $\infty$ " position the outputs are d.c. levels.

# MODEL N 93 B

## DUAL TIMER

### FEATURES

- One unit wide NIM module.
- Manual or pulse triggered START (NIM or ECL input).
- Monostable (retriggerable) or bistable operation.
- NIM and ECL output pulses from 50 ns to  $\infty$ .
- Manual or electrical RESET.
- (NIM and ECL) END-MARKER pulse.
- Flashing LED for operation monitoring.
- Veto input.

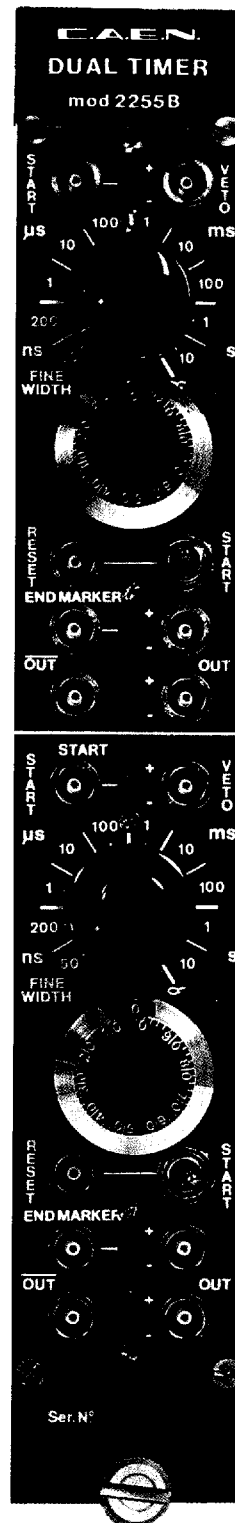
### DESCRIPTION

The Dual Timer Model N 93 B (derived from CERN type 2255) consists of two identical triggered pulse generators in a one unit wide NIM module.

They produce fast NIM and ECL pulses with adjustable width from 50 ns to 10 s, and are retriggerable before the end of the output signal.

The END-MARKER, a short output pulse at the end of the timing cycle, can be used for delayed triggering of other units or, if fed back into the START input, it provides a self-running rate generator that can be started and stopped at will.

By cascading the two sections of the module, a pulse generator with independently adjustable rate and width can be obtained.



**SPECIFICATIONS**

(each section)

**INPUT CHARACTERISTICS**

|                    |   |                           |   |
|--------------------|---|---------------------------|---|
| <b>START INPUT</b> | 2, NIM and ECL, leading edge sensitive.<br>Minimum width 5 ns.<br>Momentary Switch for single cycle operation.  | <b>DEAD TIME</b>          | Shorter than the cycle time.<br>The timer can be triggered well before the end of the timing cycle.   |
| <b>VETO INPUT</b>  | 1, NIM input.<br>NIM true level at VETO input disables the START input (within $\pm 2$ ns of START leading edge).                                     | <b>RISE/FALL TIME</b>     | $\leq 2$ ns.  |
| <b>RESET INPUT</b> | 1, NIM signal.<br>Minimum width: 7 ns (15 ns for recurring operations).<br>It can be applied at any point of the timing cycle.<br>Produces END-MARKER | <b>INPUT-OUTPUT DELAY</b> | Delay from Start to leading edge of output, or from Reset to trailing edge, is $\approx 13$ ns.   |
|                    |   | <b>END MARKER</b>         | NIM and ECL output, 15 ns wide output pulse leading edge is coincident with the trailing edge of outputs within 2 ns.<br>Can be connected to Start input for free running operation (sequence activated by the START switch). |

**OUTPUT CHARACTERISTICS**

|                |   |            |  |
|----------------|---|------------|--|
| <b>OUTPUTS</b> | Two normal independent, one complementary NIM level and one ECL.                                | <b>LED</b> | Flashes for 0.1 s or output width, whichever is longer.<br>At high rates the lamp has its own flashing rate. |
| <b>WIDTH</b>   | 50 ns to 10 s in 9 decade steps, with a potentiometer and locking dial for fine adjustment (*). |            |  |

Accuracy  $\pm 10\%$  of full scale, with adequate range overlap.

Temperature coefficient  $10^{-3}/^{\circ}\text{C}$  of setting.

Switch position « $\infty$ » for bistable operation.

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**COSTRUZIONI APPARECCHIATURE ELETTRONICHE NUCLEARI S.p.A.**

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