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 **X-TRONIX AG/SA** • Av. de Morges 52
1027 Lonay (VD) • Switzerland

 021-80x xx xx •  021-80x xx xx

 xtronix@msn.com • Natel: 079-340 63 71

Technical Information Manual

MOD. N 93 B

DUAL TIMER

30th August 1991

CAEN
DUAL TIMER
mod 2255B



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TABLE OF CONTENTS

DESCRIPTION	Page 1
SPECIFICATIONS	Page 2
TEST PROCEDURES	Page 4
ELECTRIC DIAGRAM	Page 5
COMPONENTS LOCATION	Page 6
LIST OF COMPONENTS	Page 7

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 ± 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 « ∞ » 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... ≤ 2 ns.

INPUT-OUTPUT
DELAY Delay from Start to leading edge of output, or from Reset to trailing edge, is ≈ 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

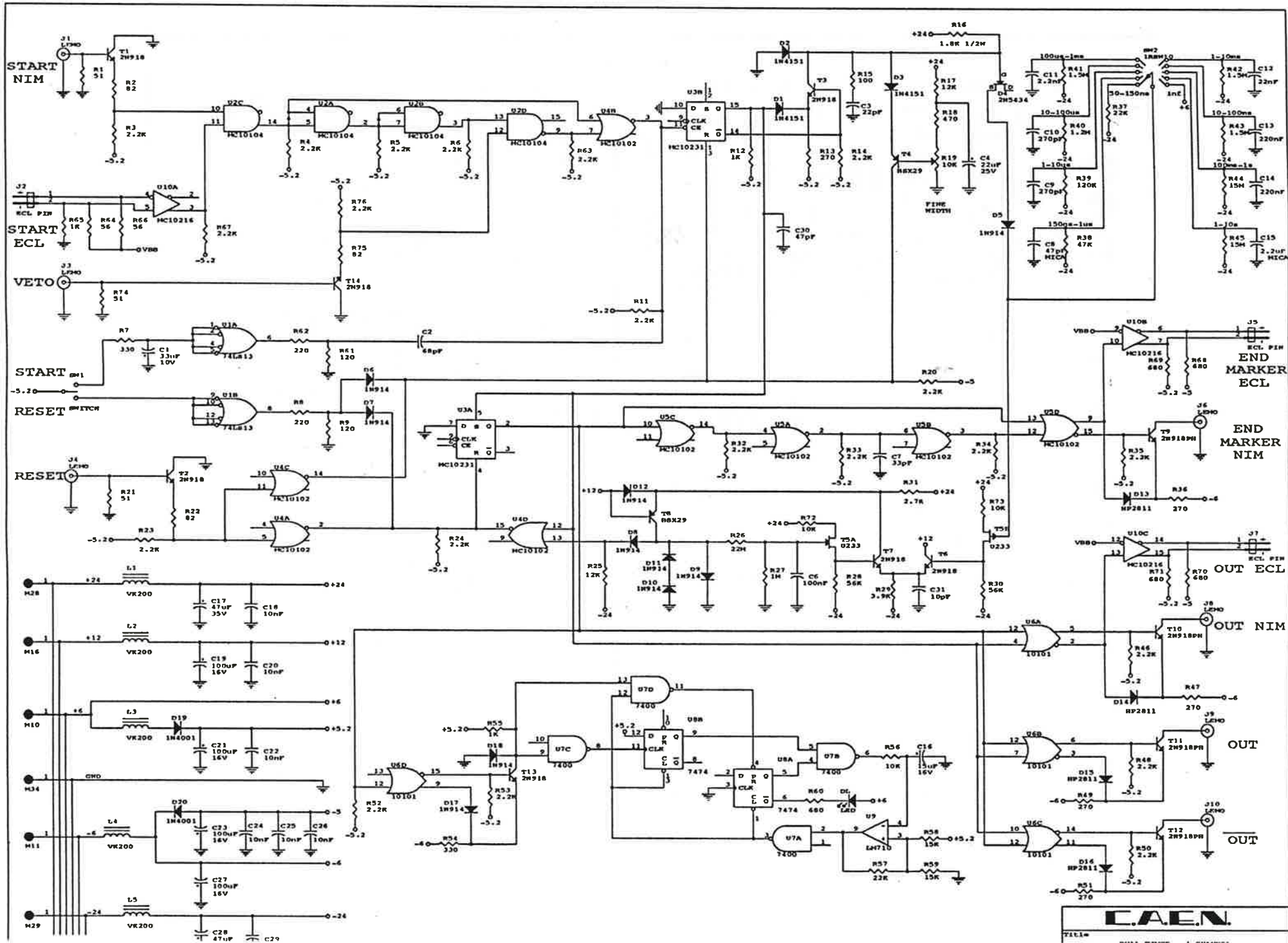
(on 1 of 2 identical channels)

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

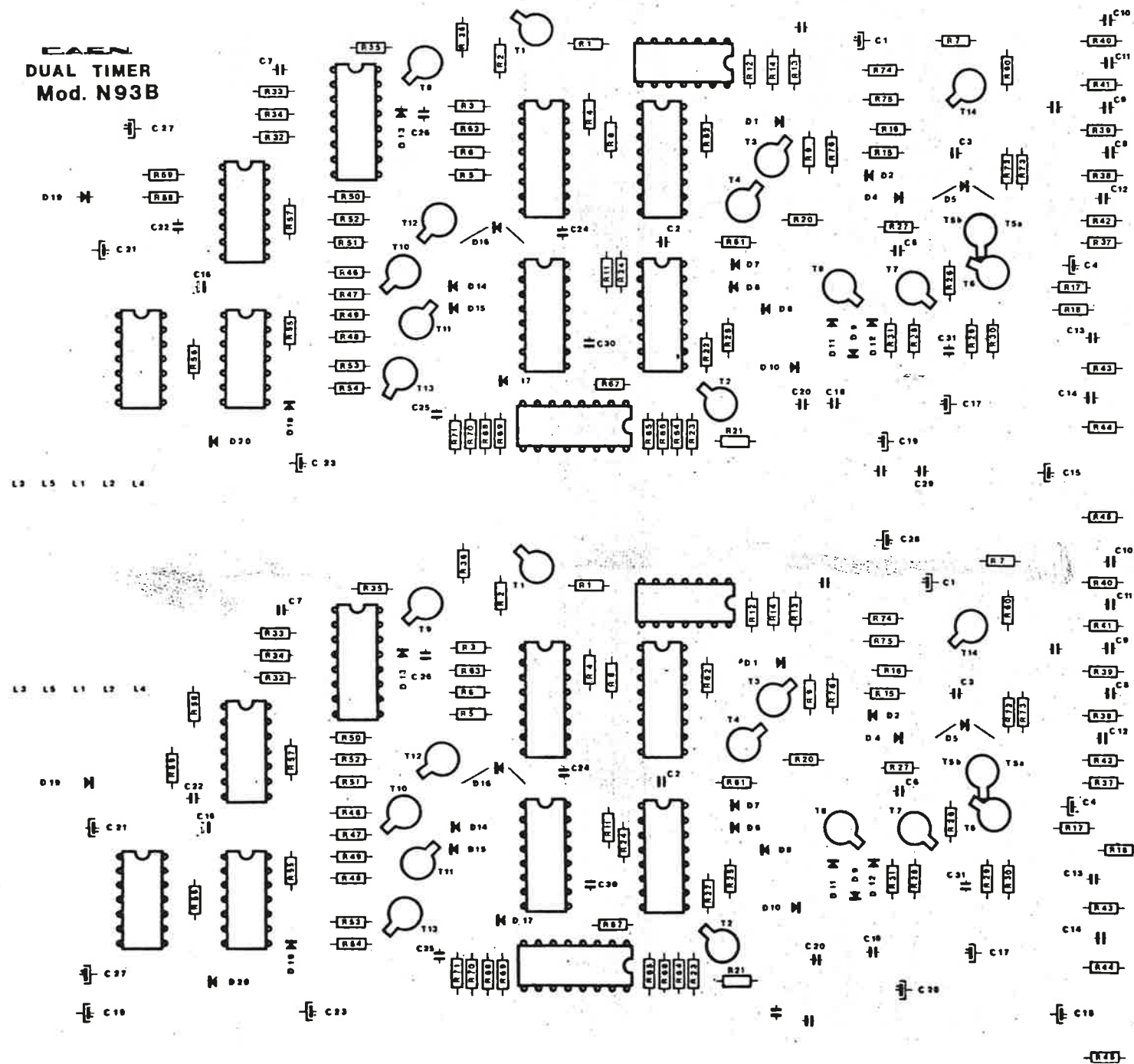
Procedures:

- 1) Put the front panel selector on " ∞ " 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 (± 1 nsec) the Dual Timer must be inhibited.

Note: in the " ∞ " position the outputs are d.c. levels.



CAEN
DUAL TIMER
Mod. N93B



LIST OF COMPONENTS

(1 of 2 identical channels)

I. C.s.

IC7	.....	SN7400	(1)
IC1	.....	SN7413	(1)
IC8	.....	SN7474	(1)
IC9	.....	LM710 or μ A710C	(1)
IC6	.....	MC10101	(1)
IC4,IC5	.....	MC10102	(2)
IC2	.....	MC10104	(1)
IC10	.....	MC10216	(1)
IC3	.....	MC10231	(1)

TRANSISTORS

T9+T12,T14	.....	2N918 Philips or BFY 90 Philips	(5)
T1+T3,T6,T7,T13	.....	2N918 Motorola	(6)
T5	.....	2N4084 or U233	(1)
T4,T8	.....	BSX 29 S.G.S.	(2)

DIODES

D1+D3,D5+D12,D17,D18	1N914 A	(13)
D19,D20	1N4001	(2)
D4	OA 202	(1)
D13+D16	HP2800 or HP2900	(4)

LEDs

M1	TIL 209 A	(1)
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INDUCTANCES

L1+L5	4312.020.36700 Philips	(5)
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<u>TRIMMERS</u>	Elipot Beckman 7286
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R19	10 K Ω	(1)
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CAPACITORS

C31	10 pF Ceramic	(1)
C3	22 pF Ceramic	(1)
C7	33 pF Ceramic	(1)
C30	47 pF Ceramic	(1)
C8	.....	47 pF Mica	(1)
C2	.....	68 pF Ceramic	(1)
C9,C10	.....	270 pF Mica	(2)
C11	.....	2.2 nF Mica	(1)
C18,C20,C22,C24+C26,C29	.....	10 nF Mica	(7)
C12	.....	22 nF Polyester	(1)
C6	.....	100 nF Polyester	(1)
C13,C14	.....	220 nF Polyester	(2)
C15	.....	2.2 μ F Mica	(1)
C16	.....	15 μ F 16V Elect.	(1)
C4	.....	22 μ F 25V Elect.	(1)
C1	.....	33 μ F 25V Elect.	(1)
C17,C28	.....	47 μ F 35V Elect.	(2)
C19	.....	68 μ F 15V Elect.	(1)
C21,C23,C27	.....	100 μ F 16V Elect.	(2)

RESISTORS

1/4 W 5% unless otherwise specified

R1,R21,R74	.....	51 Ω	(3)
R64,R66	.....	56 Ω	(2)
R2,R22,R75	.....	82 Ω	(3)
R15	.....	100 Ω	(1)
R9,R61	.....	120 Ω	(2)
R8,R62	.....	220 Ω	(2)
R13,R36,R47,R49,R51	.....	270 Ω	(5)
R7,R54	.....	330 Ω	(2)
R18	.....	470 Ω	(1)
R60,R68+R71	.....	680 Ω	(5)
R12,R55,R65	.....	1 K Ω	(3)
R16	.....	1.8 K Ω 1/2 W	(1)
R3+R5,R6,R11,R14,R20,R23,R24,R32+R35,R46,R48, R50,R52,R53,R63,R67,R76	.....	2.2 K Ω	(21)
R31	.....	2.7 K Ω	(1)
R29	.....	3.9 K Ω	(1)
R16,R56	.....	10 K Ω	(3)
R10,R25	.....	12 K Ω	(2)
R58,R59	.....	15 K Ω	(2)
R37,R57	.....	22 K Ω	(2)
R38	.....	47 K Ω	(1)
R28,R30	.....	56 K Ω	(2)
R39	.....	120 K Ω	(1)
R27	.....	1 M Ω	(1)
R40	.....	1.2 M Ω	(1)
R41+R43	.....	1.5 M Ω	(3)
R44,R45	.....	15 M Ω	(2)
R26	.....	22 M Ω	(1)

SWITCHES

RESET,START	.....	APR 9633N	(2)
SELECTOR	.....	Elma 01/1180	(1)