AVTECH ELECTROSYSTEMS LTD.
NANOSECOND WAVEFORM ELECTRONICS

P.O. BOX 265
OGDENSBURG, NY
U.S.A. 13669-0265
TEL: (315) 472-5270
FAX: (613) 226-2802

BOX 5120 STN. F
OTTAWA, ONTARIO
CANADA K2C 3H4
TEL: (613) 226-5772
FAX: (613) 226-2802

INSTRUCTIONS

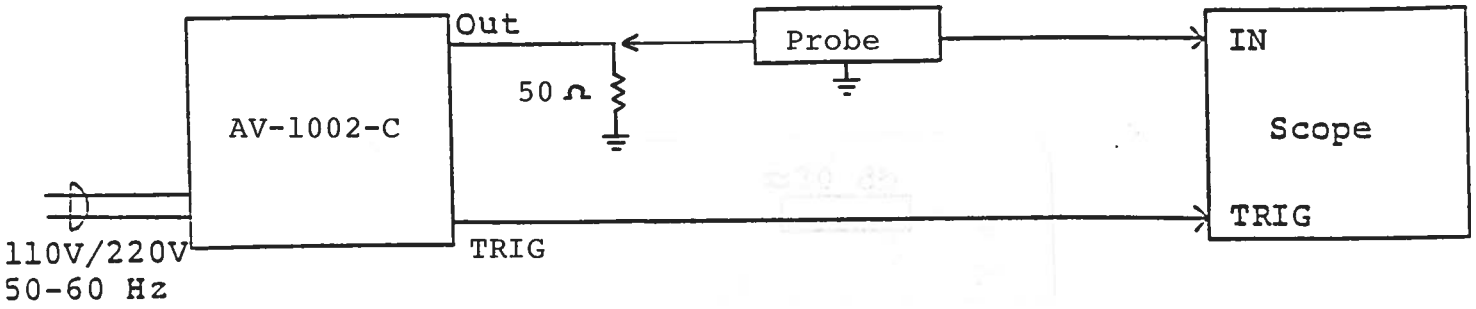
MODEL AV-1002-C-R4-TUB PULSE GENERATOR

S.N.:

WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been dissembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation or liability assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

Fig. 1 PULSE GENERATOR TEST ARRANGEMENT



Notes:

1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 100 MHz.

2) The pulse generator should be terminated using a shunt 50 Ohm resistor.

3) The TRIG output channel provides TTL level signals. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.

4) To obtain a stable output display the PW and PRF controls on the front panel should be set mid range. The front panel TRIG toggle switch should be in the INT position. The DELAY controls and the scope triggering controls are then adjusted to obtain a stable output. The scope may then be used to set the desired PRF by rotating the PRF controls.

5) The output pulse width is controlled by means of the front panel PW control.

5A) CAUTION: The output stage may be damaged if the unit is operated at duty cycles exceeding 50%.

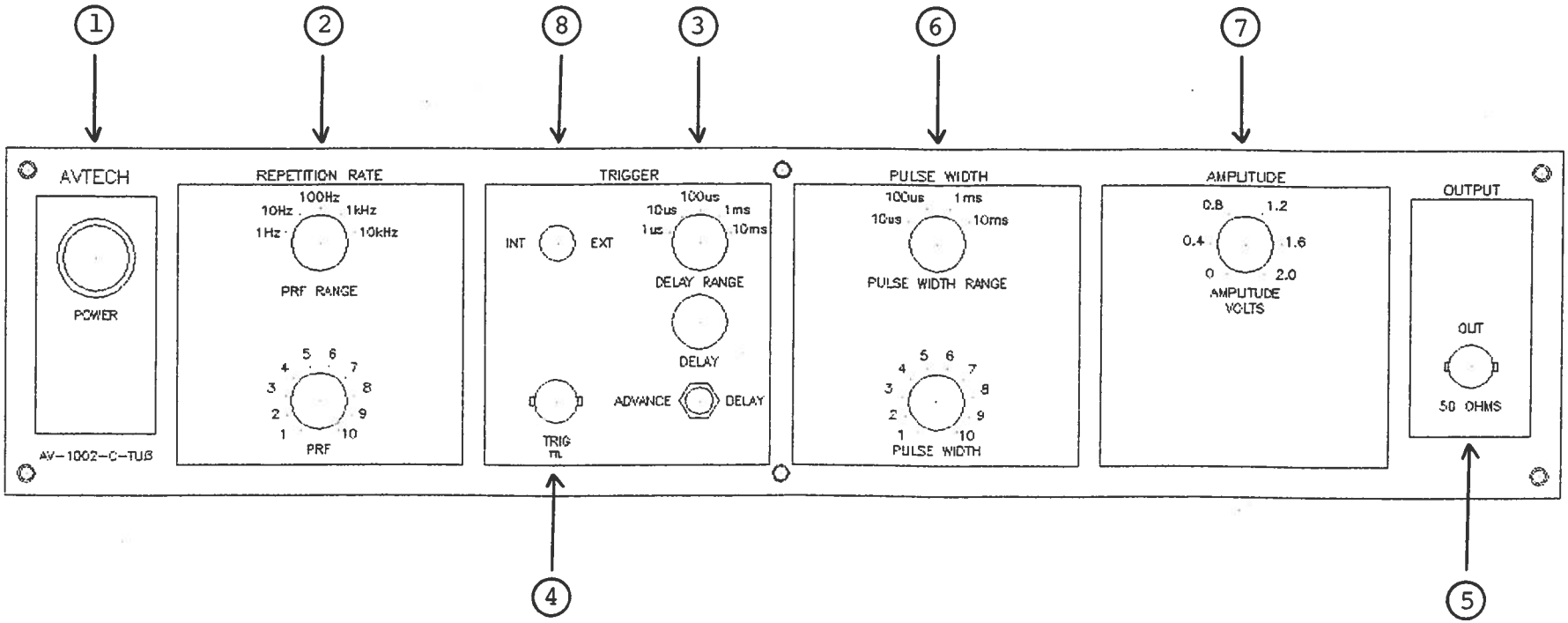
6) The output pulse amplitude is controlled by means of the front panel one turn AMP control.

7) An external clock may be used to control the output PRF and PW of the unit by setting the front panel TRIG toggle switch in the EXT position and applying a TTL level pulse of the desired PW (and PRF) to the TRIG BNC connector input. For operation in this mode, the scope time base must also be triggered by the external clock rather than from the TRIG output.

8) The unit can be converted from 110 to 220V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector-cable connnector assembly.

9) For additional assistance, call (613) 226-5772 or Fax (613) 226-2802.

Fig. 2 MODEL AV-1002-C-R4-TUB FRONT PANEL



(1) ON-OFF Switch. Applies basic prime power to all stages.

(2) PRF Control. Varies PRF from 0.1 Hz to 10 kHz.

(3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (5). This delay is variable over the range of 0 to ±10 ms. The TRIG output precedes the main output when the ADVANCE-DELAY switch is in the ADVANCE position and lags when the switch is in the DELAY position.

(4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty ohm load.

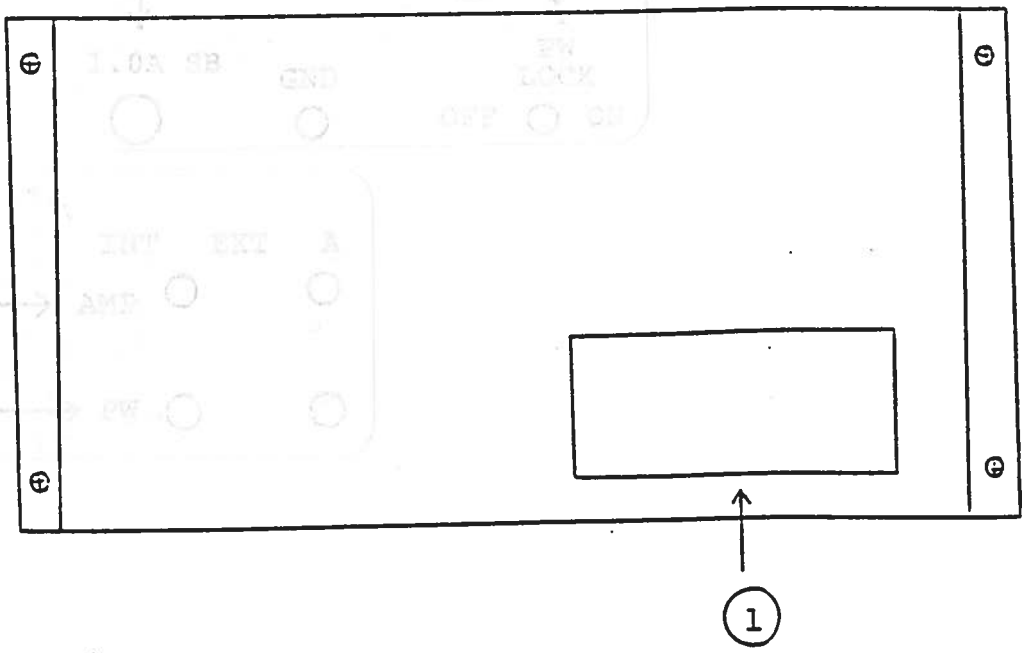
(5) OUT Connector. BNC connector provides output to a fifty ohm load.

(6) PW Control. A one turn control which varies the output pulse width from 1.0 us to 10 ms.

(7) AMP Control. A one turn control which varies the output pulse amplitude from 0 to +2V to a fifty ohm load.

(8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the unit is controlled via an internal clock which in turn is controlled by the PRF controls. With the toggle switch in the EXT position, the unit requires a TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered by the external trigger source. In this mode, the applied TTL pulse also controls the output pulse width.

Fig. 3 BACK PANEL CONTROLS



(1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.25 A SB).

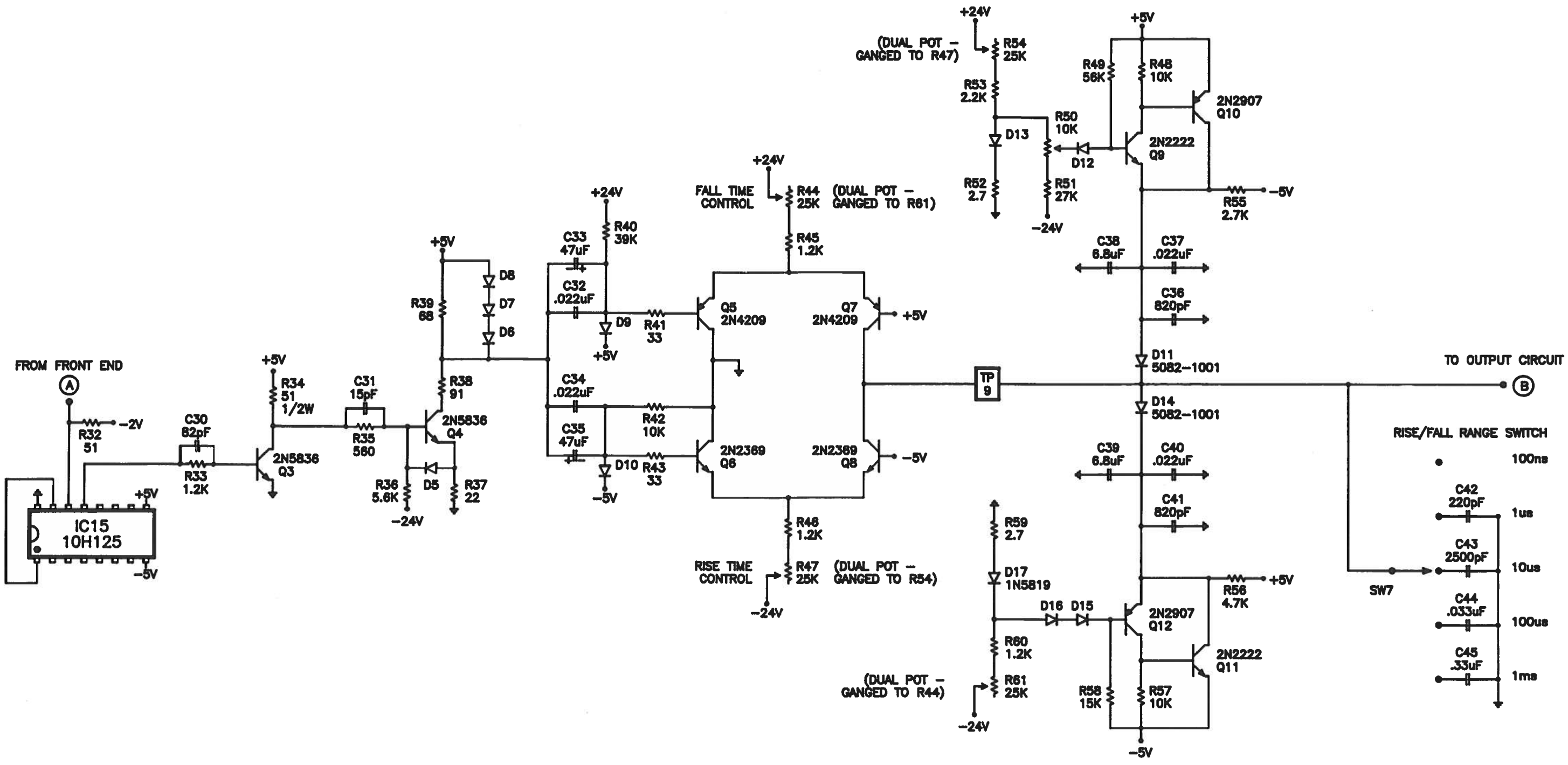
SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AV-1002-C consists of a pulse generator module, a clock module, a pulse width module and a power supply board which supplies +24 Volts (600 mA max) to the pulse generator module. In the event that the unit malfunctions, remove the instrument cover by removing the four Phillips screws on the back panel of the unit. The top cover may then be slid off. Measure the voltage at the +24 V pin of the PG module. If this voltage is substantially less than +24 Volts, unsolder the line connecting the power supply and PG modules and connect 100 ohm 10 W load to the PS output. The voltage across this load should be about +24 V DC. If this voltage is substantially less than 24 Volts the PS module is defective and should be repaired or replaced. If the voltage across the resistor is near 24 Volts, then the PG module should be replaced or repaired. The sealed PG module must be returned to AVTECH for repair (or replacement). The clock module provides a 0.1 us TTL level trigger pulse at Pin 2 to trigger the PG module and a 0.1 us TTL level sync pulse at Pin 3 to trigger the sampling scope display device. The output at Pin 3 precedes the output at Pin 2 by almost 0 to 100 ns depending on the DELAY control setting. The clock module is powered by +5.8 V supplied by the PG module (from Pin 2 to Pin 1). With the INT-EXT switch in the EXT position, the clock module is disconnected from the PG module. The clock module is functioning properly if:

a) 0.1 us TTL level outputs are observed at pins 2 and 3.
b) The PRF of the outputs can be varied over the range of 1 kHz to 1 MHz using the PRF and PRF RANGE controls.
c) The relative delay between the Pin 2 and 3 outputs can be varied by at least 500 ns by the DELAY control.

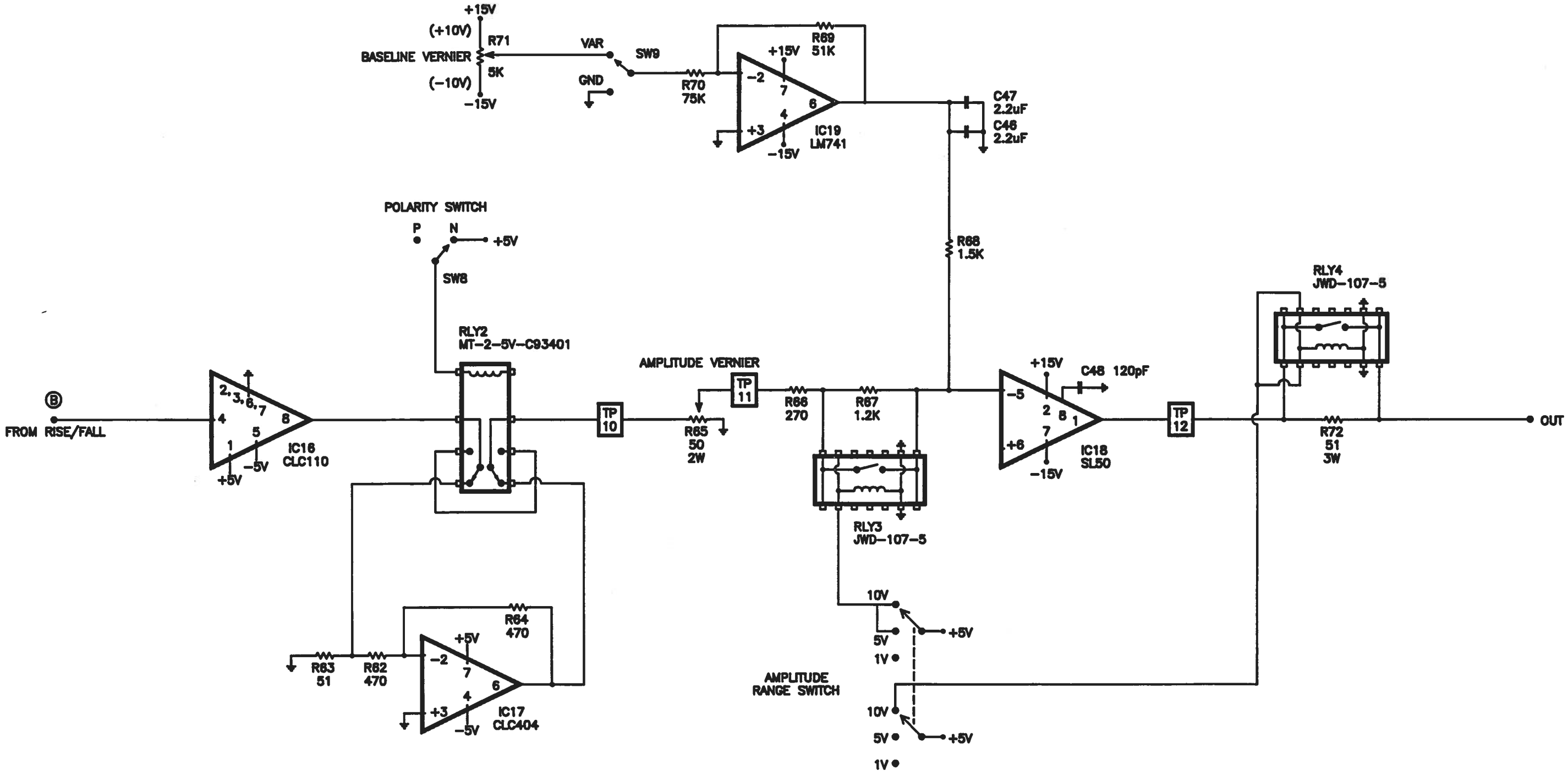
The sealed clock module must be returned to AVTECH for repair or replacement if the above conditions are not observed.

NOTE: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTANCES ARE IN OHMS
2. ALL RESISTORS ARE 1/4W
3. ALL DIODES ARE 1N4150
4. ALL POWER SUPPLIES ARE DECOUPLED TO GROUND WITH 0.1uF AND 22uF CAPACITORS (NOT SHOWN)
5. "TP" MARKERS INDICATE TEST POINTS



AV-1000 RISE/FALL CCT.	AVTECH ELECTROSYSTEMS LTD. PO BOX 265 OGDENSBURG, NY 13669 USA
SEPT. 2, 1991	
1000.2 REV 1	MICHAEL J. CHUDOBIAK

NOTE: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTANCES ARE IN OHMS
2. ALL RESISTORS ARE 1/4W
3. ALL DIODES ARE 1N4150
4. ALL POWER SUPPLIES ARE DECOUPLED TO GROUND WITH 0.1uF AND 22uF CAPACITORS (NOT SHOWN)
5. "TP" MARKERS INDICATE TEST POINTS



AV−1000 OUTPUT STAGE	AVTECH ELECTROSYSTEMS LTD. PO BOX 265 OGDENSBURG, NY 13669 USA
SEPT. 2, 1991	
1000.3 REV. 1	MICHAEL J. CHUDOBIAK

NOTE: UNLESS OTHERWISE SPECIFIED:
1. ALL RESISTANCES ARE IN OHMS
2. ALL RESISTORS ARE 1/4W
3. ALL DIODES ARE 1N4150
4. ALL POWER SUPPLIES ARE DECOUPLED TO GROUND WITH 0.1uF AND 22uF CAPACITORS (NOT SHOWN)
5. "TP" MARKERS INDICATE TEST POINTS

REPETITION RATE RANGE SWITCH SW3

3kHz C3 0.47uF
10kHz C4 0.15uF
30kHz C5 0.047uF
100kHz C6,C7 10000pF || 5000pF
300kHz C8,C9 2400pF || 2000pF
1MHz C10,C11 1000pF || 300pF
3MHz C12 470pF
10MHz C13 120pF
30MHz C14 33pF
50MHz C15 8.2pF

C1 820pF
C2 0.01uF

IC2 1658

REP RATE FINE
R5 25K
-2V

TP 1
R10 51
-2V

TP 3

IC5 10198
D3
DELAY FINE
-5V
R14 200
R15 10K
DELAY RANGE SWITCH
SW4
100ns
1us C16 100pF
10us C17,C18 1000pF||300pF
100us C19,C20 4700||6800pF
1ms C21,C22 0.1uF||0.022uF

R16 51
-2V
TP 5

IC8 10198
D4
PW FINE
-5V
R17 200
R18 10K
PW RANGE SWITCH
SW5
100ns
1us C23 100pF
10us C24,C25 1000pF||300pF
100us C26,C27 4700||6800pF
1ms C28,C29 0.1uF||0.022uF

TP 6

IC11 CLC110
+5V
-5V

R21 100
R22 470

IC12 CLC404

A
TO RISE/FALL CIRCUIT

LOGIC OUT

TTL
SW6
+5V
ECL

RLY1 MT-2-5V-93401

LOGIC OUT

1/2 SW1
EXT
INT
+5V
R1 4.7K
R2 4.7K

IC1 74F00

+5V
R3 4.7K
R4 4.7K
NC
NO
SINGLE PULSE SW2

IC3 10174
D1
-5V
R6 51
R30 51
R8 51
R7 51
R31 51

TP 2
SYNC OUT/ TRIG IN
EXT
INT 1/2 SW1
R9 51 1/2W
GATE IN

IC4 10H124

D4
IC6 10198
R11 51

IC7 10H125

R12 51 1/2W
Q1 2N2222
Q2 2N2907
R13 1K

TP 4

R19 51
IC9 10104
R20 51

IC10 10H125

R24 390
R25 100
R26 390
R27 100

TP 7
R23 51

IC13 CLC110

R28 100
R29 470

IC14 CLC404

AV-1000 FRONT END	AVTECH ELECTROSYSTEMS LTD. PO BOX 265 OGDENSBURG, NY 13669 USA
SEPT. 2, 1991	
1000.1 REV. 2	MICHAEL J. CHUDOBIAK

04.20.93

In Word File: as of oct 8/97

File: c:\instruct\AV-\1002cr4t.doc

Note: Not adjusted