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INSTRUCTIONS

MODEL AVR-G2-C-PN-OS 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 assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

TECHNICAL SUPPORT

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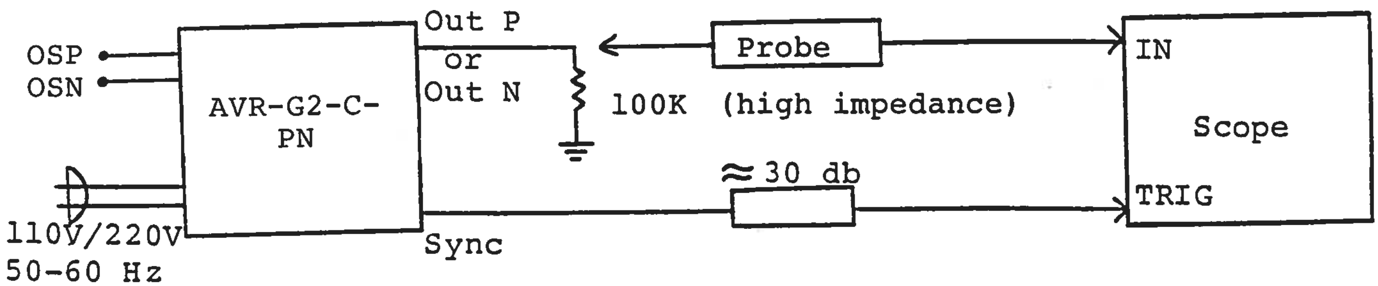
Fig. 1 PULSE GENERATOR TEST ARRANGEMENT



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) This unit was specifically designed to drive high impedance loads ($R_L \geqslant$ 100K). The unit may fail if operated into low impedance loads (eg. 50 ohm) at very wide pulse width (eg. $\geqslant$ 100 usec).

3) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some scopes, a 30 db attenuator should be placed at the input to the scope trigger channel. The TRIG output precedes the main output when the front panel LEAD-LAG switch is in the LEAD position. The TRIG output lags the main output when the switch is in the LAG position.

4) With the MODE AB switch in the A position the output pulse widths for the positive and negative outputs are controlled by means of the front panel one turn PW control and by the PW RANGE control. The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding 50%.

	PW min	PW max
Range 1	0.1 usec PRF max 1 KHz	1.0 usec PRF max 1 KHz
Range 2	1.0 usec PRF max 1 KHz	10 usec PRF max 1 KHz
Range 3	10 usec PRF max 1 KHz	100 usec PRF max 1 KHz
Range 4	100 usec PRF max 1 KHz	1 msec PRF max 500 Hz

To voltage control the output pulse width within each range, set the rear panel switch in the EXT position and apply 0 to +10 volts between terminal A and ground (R_{IN} > 10K). (option).

5) With the MODE AB switch in the B position the output pulse width equals the pulse width of a TTL pulse applied to the TRIG port (INT-EXT switch in the EXT position).

6) The output pulse amplitudes for the positive and negative outputs are controlled by means of the front panel AMP P and AMP N controls. To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10 volts between terminal A and ground (R_{IN} > 10K). (option).

7) To obtain a stable output display the PRF control 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 and PRF FINE controls.

8) An external clock may be used to control the output PRF of the AVR unit by setting the front panel TRIG toggle switch in the EXT position and applying a 0.2 usec (approx.) TTL level pulse 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 SYNC output.

9) The DELAY control controls the relative delay between the reference output pulse provided at the TRIG output and the main output. This delay is variable over the range of 0.1 usec to 1 sec. The TRIG output precedes the main output when the LEAD-LAG switch is in the LEAD position and lags when the switch is in the LAG position.

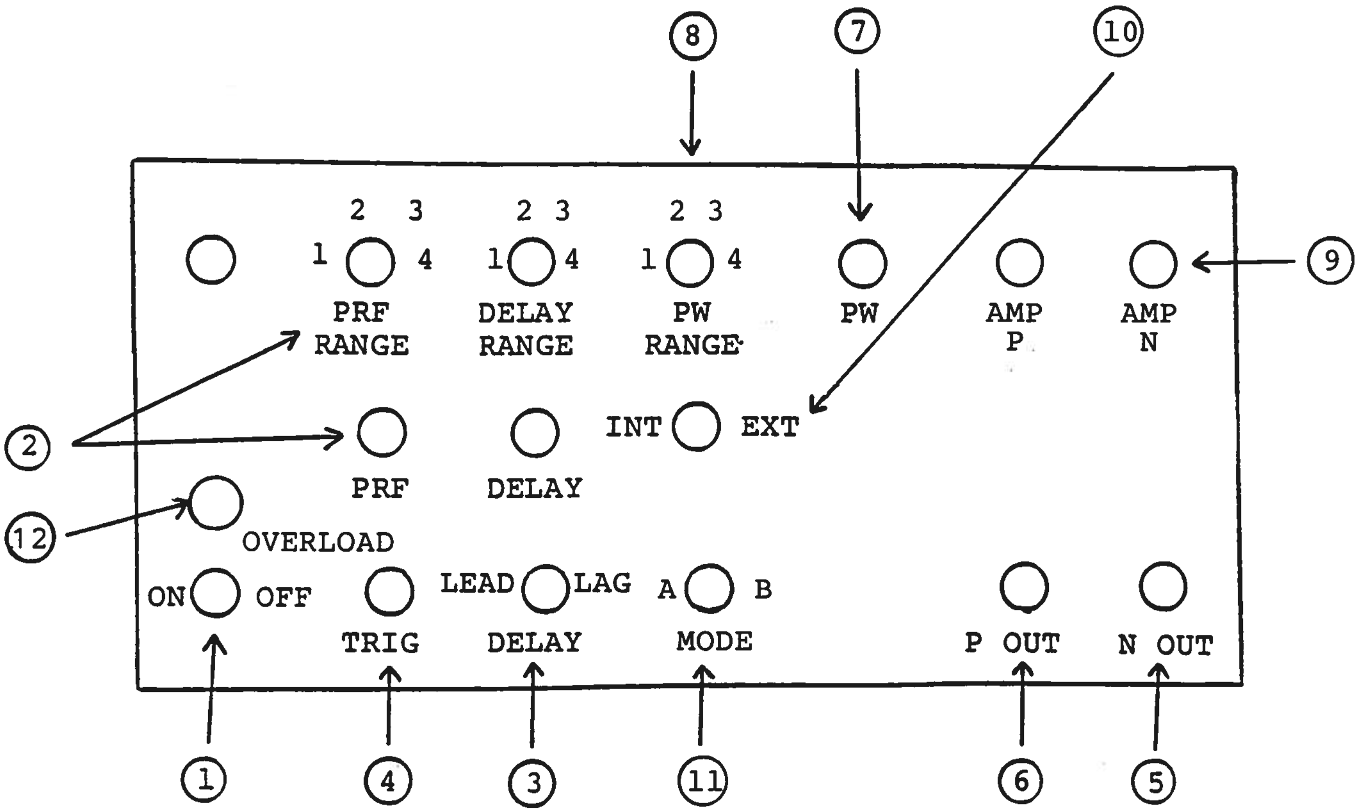
	MIN	MAX
Range 1	0.1 usec	1.0 usec
Range 2	1.0 usec	10 usec
Range 3	10 usec	100 usec
Range 4	100 usec	1 msec

10) AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on

and resume normal operation. Overload conditions may be removed by:

1) Reducing PRF (i.e. switch to a lower range)
2) Reducing pulse width (i.e. switch to a lower range)
3) Removing output load short circuit (if any)

Fig. 2 FRONT PANEL CONTROLS



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

(2) PRF Control. Varies PRF from 1.0 Hz to 1 KHz as follows:

Range 1	1 to 10	Hz
Range 2	10 to 100	Hz
Range 3	100 to 1	KHz

(3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) the main output (5) and (6). This delay is variable over the range of 0.1 to about 1 sec. Delay LEADS or LAGS depending on the position of the LEAD-LAG switch.

	MIN	MAX
Range 1	0.1 usec	1.0 usec
Range 2	1.0 usec	10 usec
Range 3	10 usec	100 usec
Range 4	100 usec	1 msec

(4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 nsec (approx.) pulse capable of driving a fifty ohm load. This output precedes the output at (5) or (6) if the two position LEAD-LAG switch is in the LEAD position. This output follows the output at (5) or (6) if the switch is in the LAG position. The delay range is variable from 0.1 usec to 1 msec. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.

(5) OUT N Connector. BNC connector provides output to a high impedance load ($\geq$ 100K).

(6) OUT P Connector. BNC connector provides output to a high impedance load ($\geq$ 100K).

(7)
(8) PW Control. A one turn control and 4 position range switch which varies the positive output pulse width from 0.1 usec to 1.0 msec. The minimum and maximum PW for each range and the corresponding maximum PRF are as follows. Note that the unit may fail if operated at duty cycles exceeding the above.

	PW min	PW max
Range 1	0.1 usec PRF max 1 KHz	1.0 usec PRF max 1 KHz
Range 2	1.0 usec PRF max 1 KHz	10 usec PRF max 1 KHz
Range 3	10 usec PRF max 1 KHz	100 usec PRF max 1 KHz
Range 4	100 usec PRF max 1 KHz	1 msec PRF max 500 Hz

(9) AMP Control. One turn controls which vary the output pulse amplitudes from 0 to +250 V to a high impedance load (R_L > 100K).

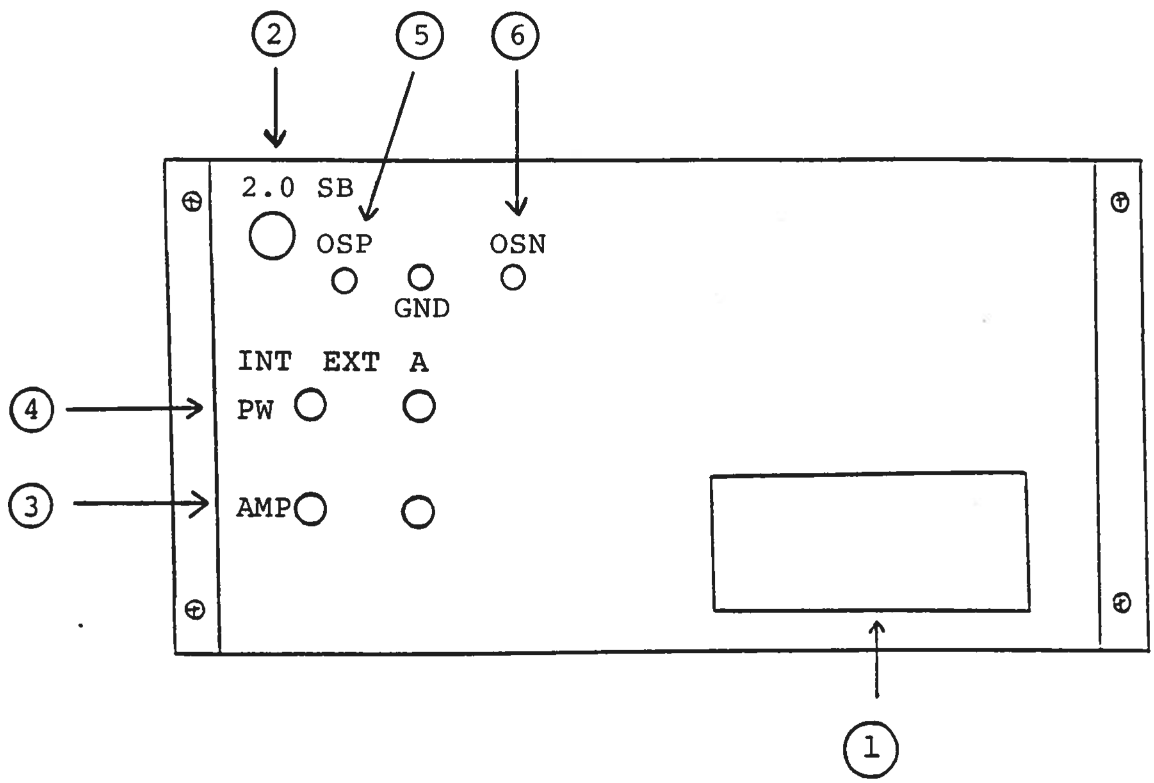
(10) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock which in turn is controlled by the PRF control. With the toggle switch in the EXT position, the AVR unit requires a 0.2 usec TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered by the external trigger source. To obtain an output pulse width equal to the input trigger pulse width, set the MODE AB switch in the B position.

(11) MODE AB. With this switch in the A position, the output pulse width is controlled by the front panel PW controls (7) and (8). With the switch set in the B position and the INT-EXT switch (10) in the EXT position, the output pulse width is equal to a TTL level pulse width applied at the TRIG port (4).

(12) AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

1) Reducing PRF (i.e. switch to a lower range)
2) Reducing pulse width (i.e. switch to a lower range)
3) Removing output load short circuit (if any)

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 (0.5 Amp SB).

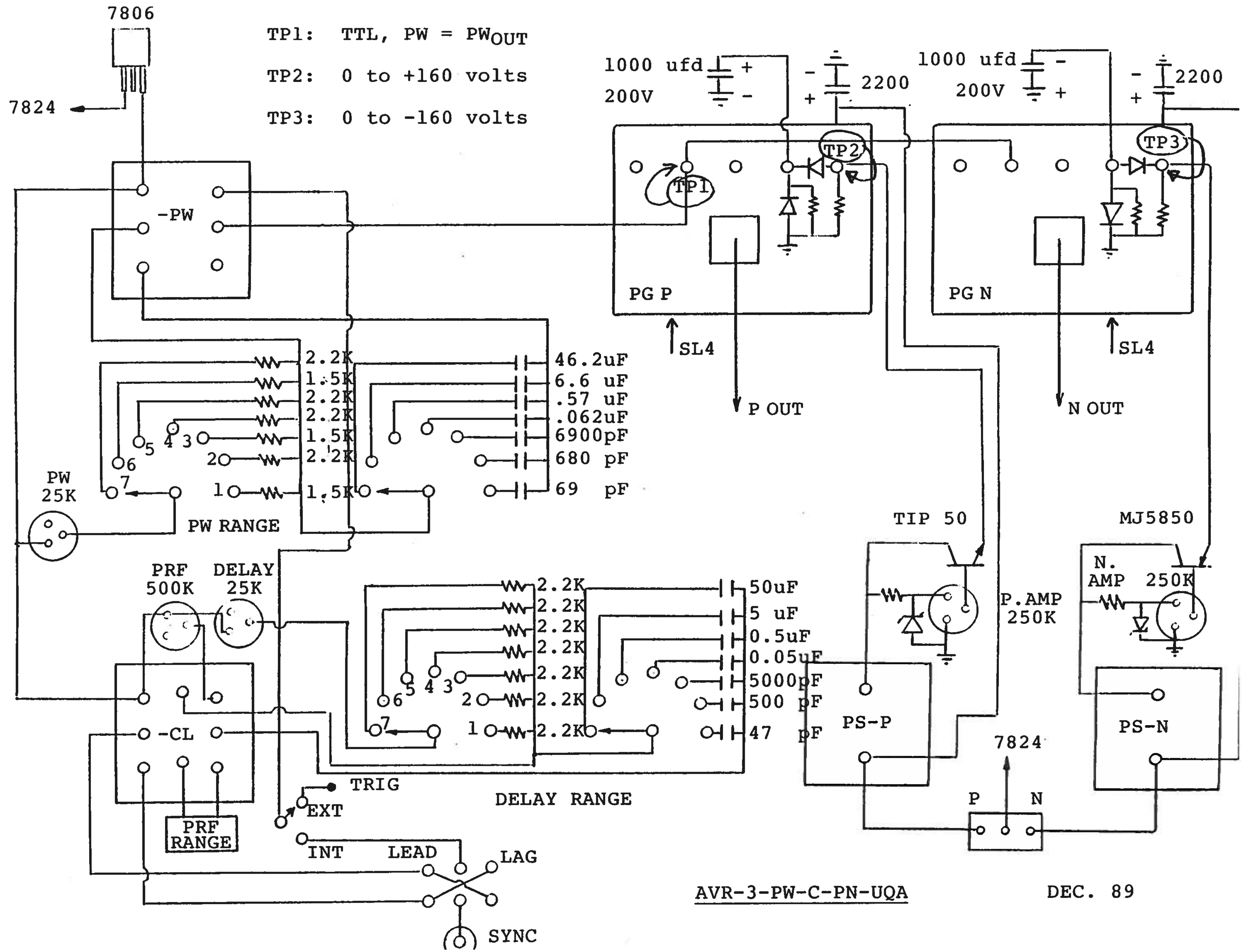
(2) 2.0 SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.

(3) EA. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 volts between terminal A and ground (R_{IN} > 10K). (option).

(4) EW. To voltage control the output pulse width, set the switch in the EXT position and apply 0 to +10 volts between terminal A and ground (R_{IN} > 10K). (option).

(5) OSP. To DC offset the P out pulse from 0 to ±50 volts, apply the required DC potential (0 to ±50 volts) to this terminal. Note that if a potential is not applied to this terminal then it must be shorted to ground. The unit is shipped with a short in position.

(6) OSN. To DC offset the N out pulse from 0 to ±50 volts, apply the required DC potential (0 to ±50 volts) to this terminal. Note that if a potential is not applied to this terminal then it must be shorted to ground. The unit is shipped with a short in position.



7806
7824
TP1: TTL, PW = PWOUT
TP2: 0 to +160 volts
TP3: 0 to -160 volts
1000 ufd
200V
2200
1000 ufd
200V
2200
TP1
TP2
TP3
-PW
PG P
PG N
SL4
SL4
P OUT
N OUT
2.2K
1.5K
2.2K
2.2K
1.5K
2.2K
1.5K
46.2uF
6.6 uF
.57 uF
.062uF
6900pF
680 pF
69 pF
PW 25K
PW RANGE
TIP 50
MJ5850
N. AMP 250K
P.AMP 250K
PRF 500K
DELAY 25K
50uF
5 uF
0.5uF
0.05uF
5000pF
500 pF
47 pF
PS-P
PS-N
7824
P
N
-CL
PRF RANGE
TRIG
EXT
INT
LEAD
LAG
SYNC
DELAY RANGE
AVR-3-PW-C-PN-UQA
DEC. 89

Fig. 4a

POWER SUPPLY

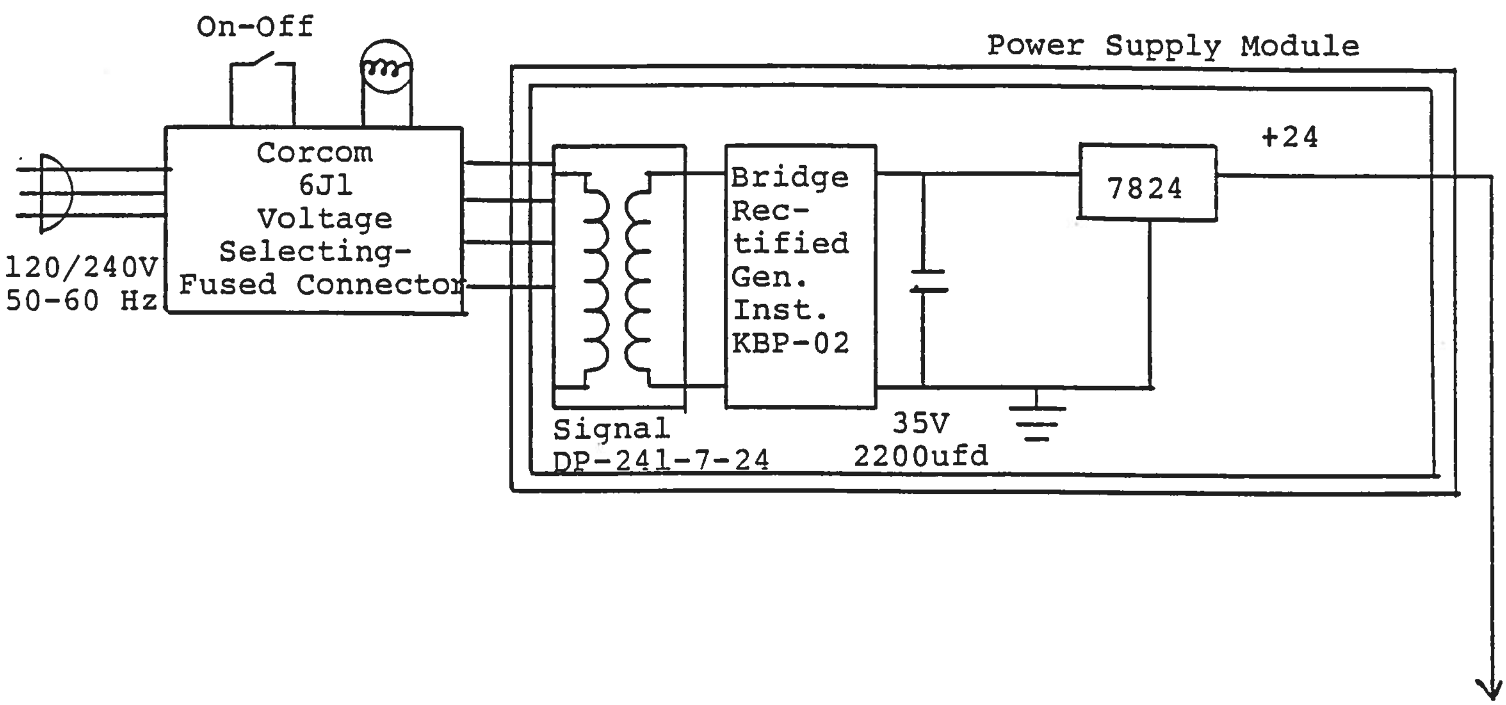


Fig. 4b

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-G2-C consists of the following basic modules:

1) AVR-G2-PG pulse generator module
2) AVR-G2-CL clock module
3) +24V power supply board
4) AVR-G2-PS power supply module
5) AVR-G2-PW pulse width module
6) AVR-OL overload module

The modules are interconnected as shown in Fig. 4. The clock module controls the output PRF and the relative delay between the main output and the SYNC outputs. The PG pulse generator modules generate the output pulse. The PS module generates 0 to +250 volts to power the pulse generator module. The PW module controls the output pulse width. In the event of an instrument malfunction, it is most likely that the rear panel 2.0A SB fuse or some of the output switching elements (SL9HT) may have failed due to an output short circuit condition or to a high duty cycle condition. The switching elements may be accessed by removing the cover plate on the bottom side of the instrument. NOTE: First turn off the prime power. CAUTION: Briefly ground the SL9HT tabs to discharge the 250 volts power supply potential. The elements may be removed from their sockets by means of a needle nosed pliers. The SL9HT is a selected VMOS power transistor in a TO 220 package and may be checked on a curve tracer. If defective, replacement units should be ordered directly from Avtech. When replacing the SL9HT switching elements, take care to insure that the short lead (of the three leads) is adjacent to the back of the chassis. If the switching elements are not defective, then the four Phillips screws on the back panel should be removed. The top cover may then be slid off and operation of the clock and power supply modules should be checked. The clock module is functioning properly if:

a) 0.1 usec TTL level outputs are observed at pins 2 and 3.
b) The PRF of the outputs can be varied over the range of 1 Hz to 1 KHz using the PRF controls.
c) The relative delay between the pin 2 and 3 outputs can be varied by at least 0.1 usec to 1.0 usec by the DELAY controls.

Schroff 09.19.91

- EW

- EA