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INSTRUCTIONS

MODEL AVR-A-1-C-PN 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   <u>PULSE GENERATOR TEST ARRANGEMENT</u>
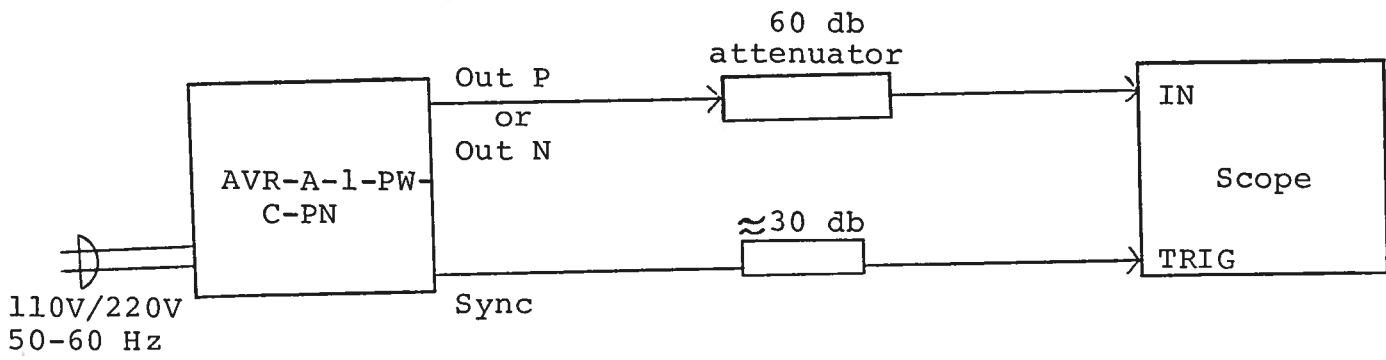
Notes:

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 use of 60 db attenuator at the scope vertical input channel will insure a peak input signal to the scope of less than one volt (necessary only if sampling scope used). If a high impedance real time scope is used, the pulse generator should be terminated using a shunt 50 ohm resistor.

3) The sync 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 SYNC output precedes the main output when the front panel LEAD-LAG switch is in the LEAD position. The SYNC output lags the main output when the switch is in the LAG position.

4) The desired output polarity is selected by means of the front panel POLARITY switch.

5) To obtain a stable output display the PW, PRF and PRF FINE 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 and PRF FINE controls.

6) The output pulse widths for the positive and negative outputs are controlled by means of the front panel one turn PW control.

7) The output pulse amplitudes for the positive and negative outputs are controlled by means of the front panel one turn AMP control.

8) To voltage control the output pulse width, set the rear panel switch in the EXT position and apply 0 to +10V between terminal A and ground ($R_{IN} \geqslant 10K$). (option).

9) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V between terminal A and ground ($R_{IN} \geqslant 10K$). (option).

10) 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.

11) The AVR-A-1-PW features an output impedance of the order
     of several ohms (rather than 50 ohms). The following
     consequences of this feature should be noted:

     a) When used to switch some semiconductor devices (eg.
         bipolar and VMOS power transistors), the AVR unit
         will yield much faster switching times than those
         provided by 50 ohm pulse generators.

     b) The AVR unit will safely operate in to load
         impedances in the range of 50 ohms to an open
         circuit. However, the fall time may degrade for
         load impedances higher than fifty ohms.

     c) The AVR unit may be effectively converted to a fifty
         ohm output impedance generator by placing a fifty
         ohm 1/2 watt carbon composition resistor in series
         with the output of the unit and the load. The
         maximum available load voltage will then decrease to
         100 volts (from 200 volts).

     d) The output switching elements may fail if the unit
         is inadvertently operated into a short circuit. The
         switching elements are easily replaced in the field
         following the procedure outlined in the REPAIR
         Section.

12) The maximum allowable output pulse width for each PRF
     range (1, 2 and 3, MAX and MIN) is given in the
     following table. The output amplitude will decrease and
     the rear panel 0.5A SB fuse may blow and in extreme
     cases the unit may fail if the pulse width (ie. duty
     cycle) conditions are exceeded.

	MAX PW (usec)
Range 1	
PRF MAX ($\simeq$ 1.5 KHz)	1 usec
PRF MIN ($\simeq$ 100 Hz)	1 usec
Range 2	
PRF MAX ($\simeq$ 20 KHz)	0.2 usec
PRF MIN ($\simeq$ 1.5 KHz)	1 usec
Range 3	
PRF MAX ($\simeq$ 100 KHz)	0.05 usec
PRF MIN ($\simeq$ 10 KHz)	0.5 usec

Fig 1 MAXIMUM PW VERSUS PRF FOR MODEL AVR-A-1 ($R_L = 50\Omega$)

PW_{MAX} (μSEC)

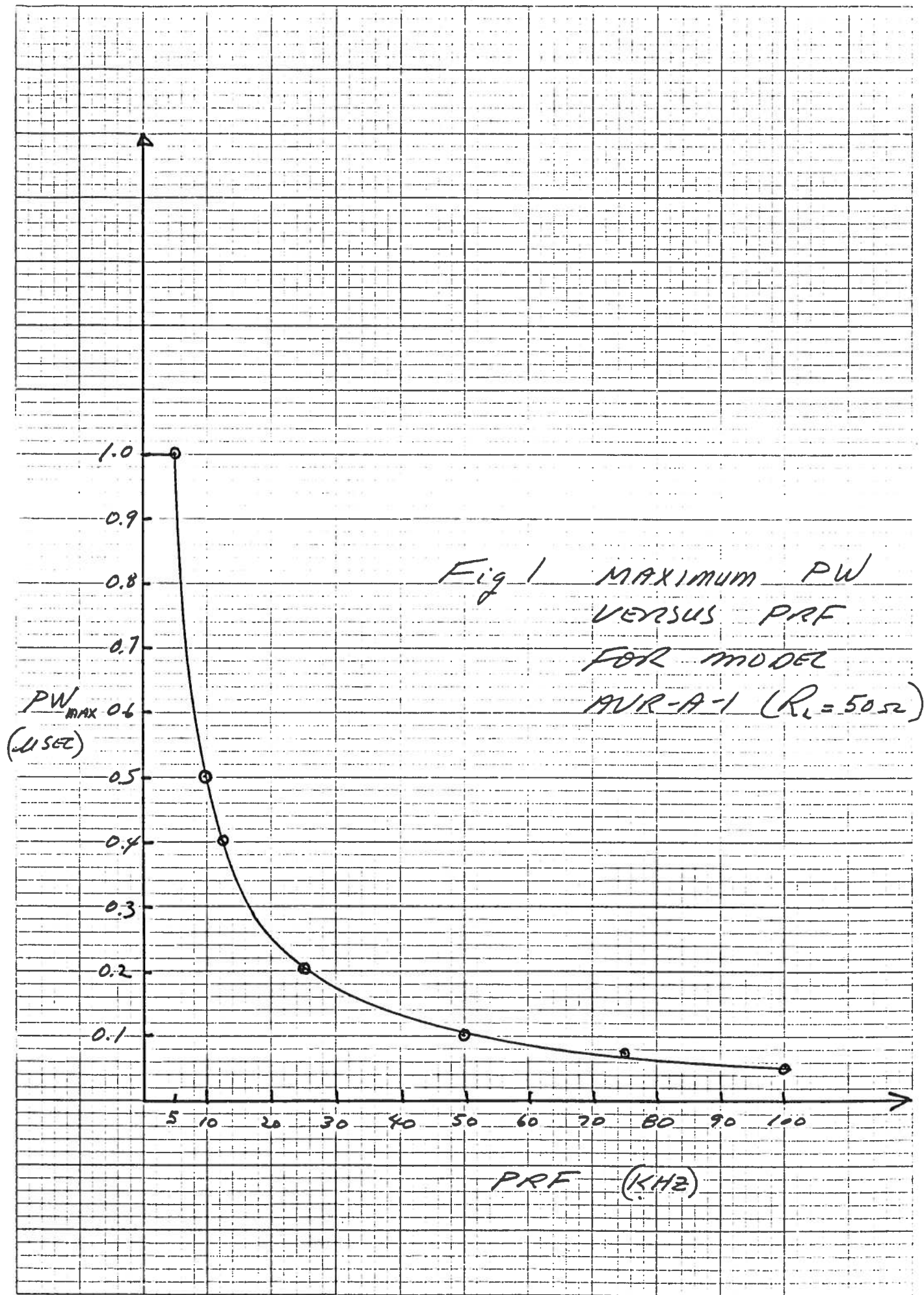PRF (KHZ)
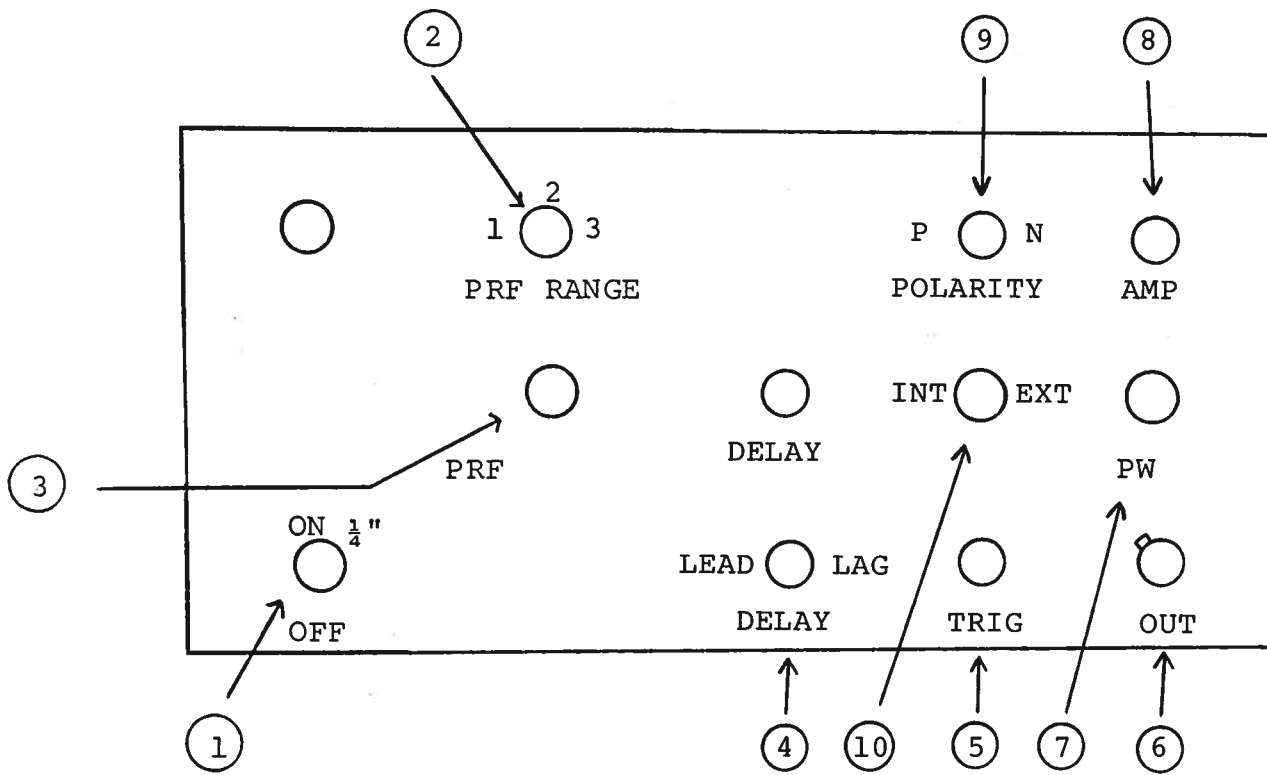
Fig. 2   FRONT PANEL CONTROLS

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

(2)   PRF   Control.   With   the   PRF   range   switch   (2)   in 1
(3)   position, PRF   control   will   vary   PRF from 0.1 KHz to
        about 1.5 KHz.   With the PRF range switch in 2 position,
        varies PRF from about 1.5 KHz to about 20.0 KHz.   With
        the PRF range switch in the 3 position, varies PRF from
        about 10.0 KHz to 100 KHz.   The operating PRF should be
        set using a scope.

(4)   DELAY Control.   Controls the relative delay between the
        reference output pulse provided at the TRIG output (5)
        the main output (6) and (7).   This delay is variable
        over the range of 0 to about 1.0 usec.   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.

(5)   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.

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

(7)   PW Control.   A one turn control which varies the output
        pulse width from 0.05 usec to 1.0 usec.

(8)   AMP Control.   A one turn control which varies the output
        pulse amplitude from 0 to 200 V to a fifty ohm load.

(9)   POLARITY Control.   Controls polarity of output pulse.

(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
        and PRF FINE controls. 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.

Fig. 3   BACK PANEL CONTROLS
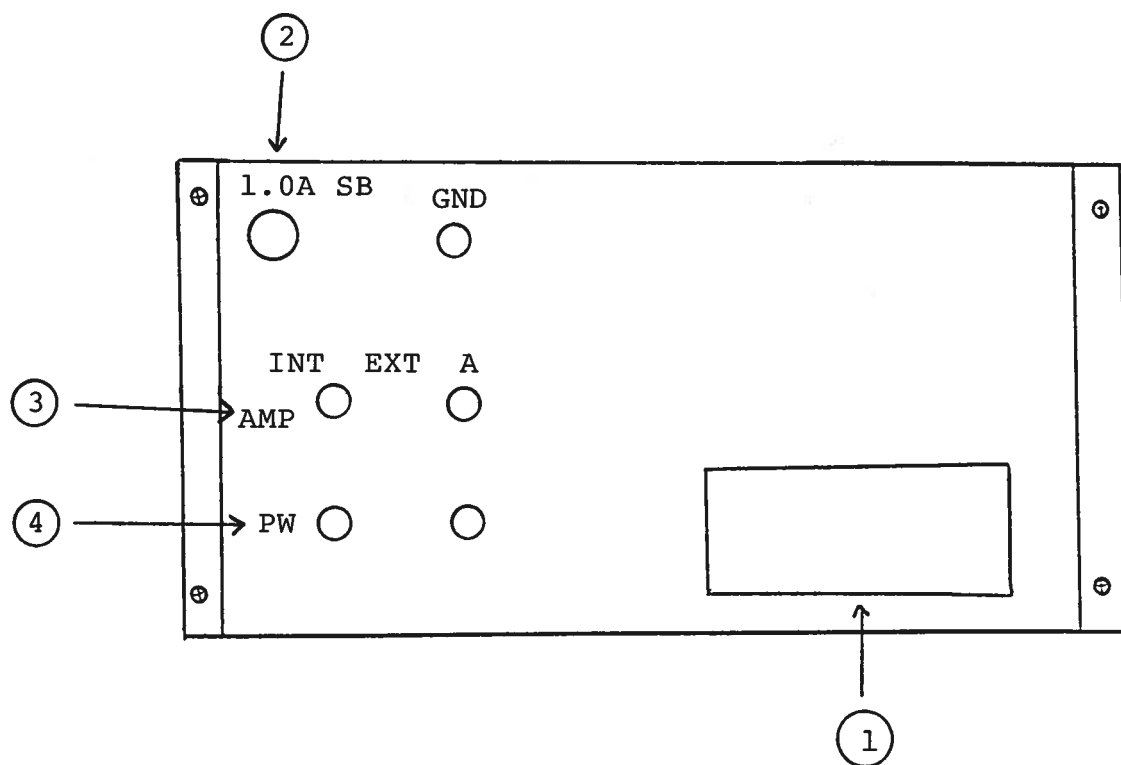
(1)   FUSED CONNECTOR, VOLTAGE SELECTOR.   The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse.

(2)   1.0A 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 ($R_{IN} \geqslant 10K$). (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 ($R_{IN} \geqslant 10K$). (option).

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-A-1-C-PN consists of the following basic modules:

1)   AVR-A-1-PG pulse generator modules (-P and -N)
2)   AVR-A-1-CL clock module
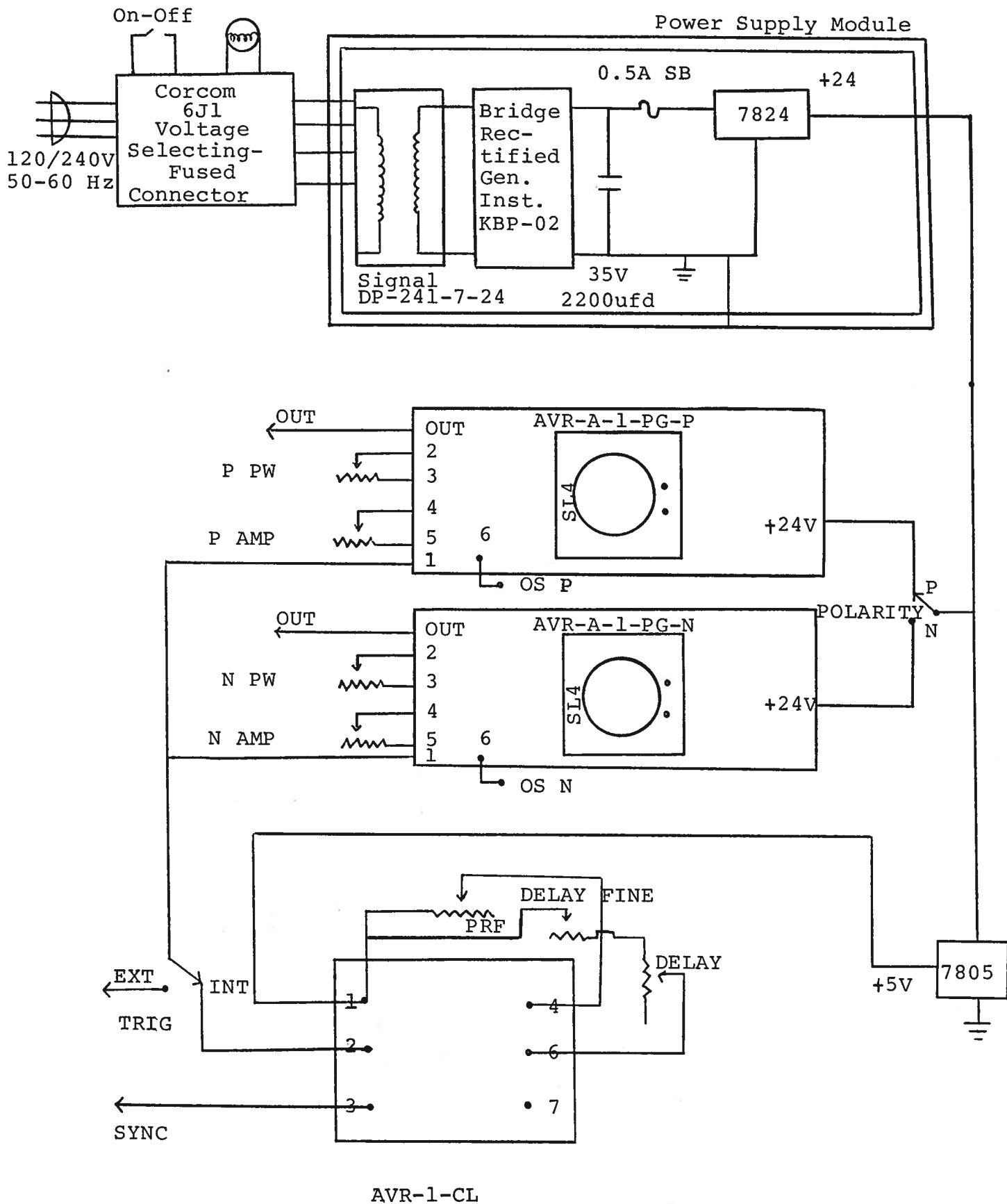3)   +24V power supply board

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.   In the event of an
instrument malfunction, it is most likely that the rear panel
1.0A   SB fuse or some of the output switching elements (SL4)
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.   The
elements   may be   removed from   their sockets   by means   of a
needle   nosed   pliers.   The   SL4   is   a   selected VMOS power
transistor in a TO 220 packages and may be checked on a curve
tracer.   If   defective, replacement   units should   be ordered
directly   from   Avtech.   When   replacing   the   SL4 switching
elements, take   care to   insure that   the short   lead (of the
three leads) is adjacent to the black dot on 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
     0.1 KHz to 0.1 MHz using the PRF & PRF FINE controls.
c)   The relative delay between the pin 2 and 3 outputs can be
     varied by at least 500 nsec by the DELAY controls.

The sealed clock module must be returned to Avtech for repair
or replacement if   the above conditions are not observed. The
power   supply   board   generates   +24V   DC   to power the other
modules.   If the   voltage is   less than   +24V, turn   off the
prime power   and unsolder   the lead   from the   7824 regulator
chip   on the   power supply   board.   Solder   a 100   ohm 5 watt
resistor to the   7824 output to ground and   turn on the prime
power.   A   voltage   of   +24   volts   should   be read.   If the
voltage is less then the power supply board is defective   and
should be repaired or replaced.

Fig. 4   SYSTEM BLOCK DIAGRAM

On-Off

Power Supply Module

120/240V
50-60 Hz

Corcom
6J1
Voltage
Selecting-
Fused
Connector

Signal
DP-241-7-24

Bridge
Rec-
tified
Gen.
Inst.
KBP-02

0.5A SB

7824

+24

35V
2200ufd

OUT

OUT
2
3
4
5
6
1

AVR-A-1-PG-P

SL4

+24V

P PW

P AMP

OS P

POLARITY

OUT

OUT
2
3
4
5
6
1

AVR-A-1-PG-N

SL4

+24V

N PW

N AMP

OS N

P

N

DELAY FINE

PRF

DELAY

EXT

INT

TRIG

1

2

3

4

6

7

SYNC

+5V

7805

AVR-1-CL

Schroff   12.01.89   (Edition B)

-EW

-EA

- PW