AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
ENGINEERING · MANUFACTURING

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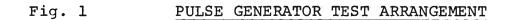CANADA K2C 3H4
(613) 226-5772
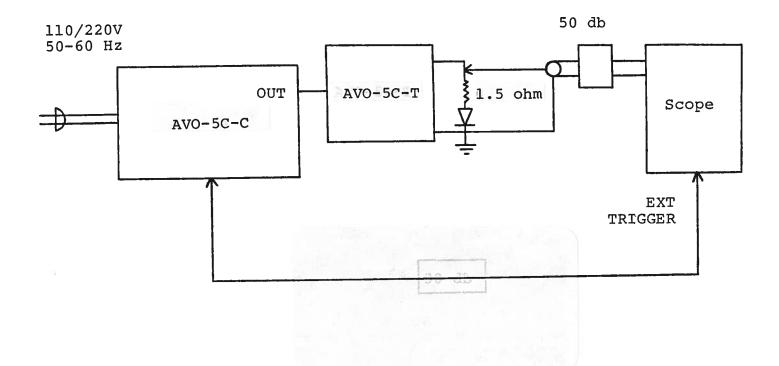TELEX 053-4591

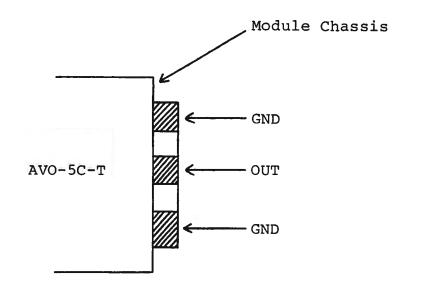INSTRUCTIONS

MODEL AVO-5C-C 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
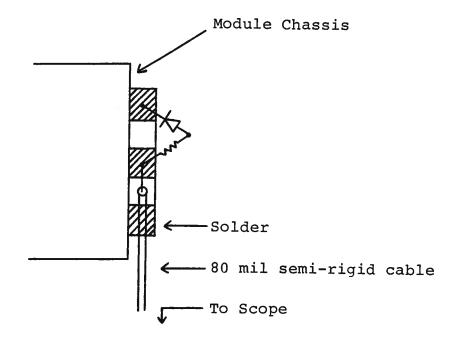no other warranty or guarantee is either expressed or implied.

Fig. 1   PULSE GENERATOR TEST ARRANGEMENT

110/220V
50-60 Hz

50 db

OUT

AVO-5C-C

AVO-5C-T

1.5 ohm

Scope

EXT
TRIGGER

Notes:

1)   The equipment should be connected in the general fashion
     shown   above.   Since   the   AVO   unit provides an output
     pulse rise time as low as 5 nsec a fast oscilloscope (at
     least 50   MHz and preferably 200 MHz)   should be used to
     display the waveform.   If a sampling scope is used, a 50
     db (or greater) attenuator should be used to insure a
     peak input to the scope of less than 0.5 volts.

2)   The sync output channel provides a +0.5 volt 100 nsec
     pulse.

3)   To obtain a stable output display the PRF controls on
     the   front   panel   should   be   set mid-range.   The front
     panel TRIG toggle switch should be in the INT position.
     The front panel DELAY control 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. The main output is delayed
     with respect to the SYNC output by about 0 to 200 nsec
     depending on the DELAY control setting.

4)   The AVO-5C-T transformer module transforms the 50 volt
     output of the AVO-5C mainframe to 12 volts to 1.5 ohm.
     The AVO-5C-T module connects to the mainframe via two
     parallel 50 ohm miniature coaxial cables approx. 2 feet
     in length.   The output terminals of the transformer
     module consists of a short length of microstrip
     transmission line protruding from the module chassis.
     The OUT terminal is the center conductor which is
     bounded on both sides by the ground plane (see below):

The diode load and series resistor (1.2 to 1.7 ohm 1/4 W
carbon composition resistor) should be connected between
the OUT and GND terminals using very short leads ($\leqslant$ 0.2
cm). The voltage across the resistor-diode load may be
monitored by connecting a length of 80 mil semi-rigid 50
ohm cable as shown below:

Module Chassis

Solder

80 mil semi-rigid cable

To Scope

Take care to insure that during soldering the OUT
conductor is not shorted to the chassis. Also, use
minimal heat when soldering.

5)   To voltage control the output pulse width, remove the
     jumper wire between banana plugs A and B on the back
     panel and apply 0 to +10V to connector B ($R_{IN} \geqslant$ 10K).
     (option).

6)   To voltage control the output amplitude, remove the
     jumper wire between banana plugs A and B on the back
     panel and apply 0 to +10V to connector B ($R_{IN} \geqslant$ 10K).
     (option).

7)   CAUTION: The maximum output duty cycle should not
     exceed 10%.   For example, at 5 MHz the output pulse
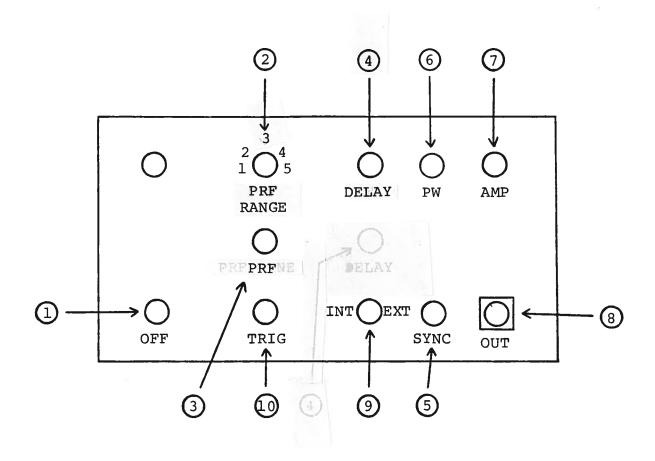   width should not exceed 20 nsec.

Fig. 2   FRONT PANEL CONTROLS
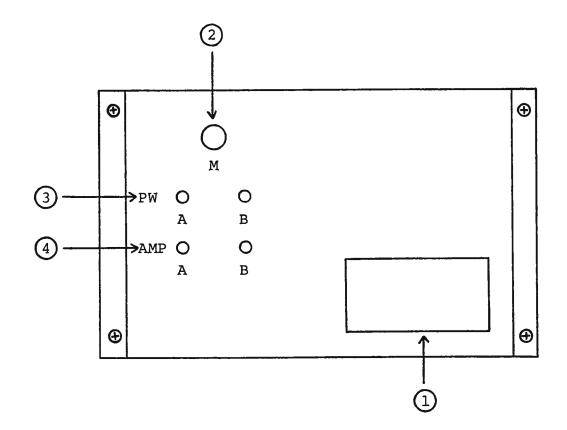

Fig. 2 FRONT PANEL CONTROLS

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

(2)   PRF Control. Varies PRF from about 50 Hz to 5 MHz. The
(3)   operating PRF should be set using a scope.

	PRF MIN	PRF MAX
RANGE 1	1.6 KHz	8 KHz
RANGE 2	8 KHz	40 KHz
RANGE 3	40 KHz	200 KHz
RANGE 4	200 KHz	1.0 MHz
RANGE 5	1.0 MHz	5.0 MHz

(4)   DELAY Control. Controls the relative delay between the
       reference output pulse provided at the SYNC output (5)
       and the main output (8). This delay is variable over
       the range of about 0 to 200 nsec.

(5)   SYNC Output.   This output precedes the main output (8)
       and is used to trigger the sampling scope time base.
       The output is a TTL level 100 nsec (approx) pulse
       capable of driving a fifty ohm load.

(6)   PW Control. A one turn control which varies the output
       pulse width from 5 to 50 nsec. Note that the output
       duty cycle should not exceed 10%.

(7)   AMP Control. The output pulse amplitude is controlled
       by means of the one turn potentiometer (AMP).

(8)   OUT Connectors.   Two SMA connectors for two miniature
       coaxial cables connected to the AVO-5C-T module.

(9)   EXT-INT Control. With this toggle switch in the INT
       position, the PRF of the AVO 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 AVO unit requires a 20 nsec 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.

(10)   TRIG Input. The external trigger signal is applied at
       this input when the EXT-INT toggle switch is in the EXT
       position. The output pulse at (8) appears about 30 nsec
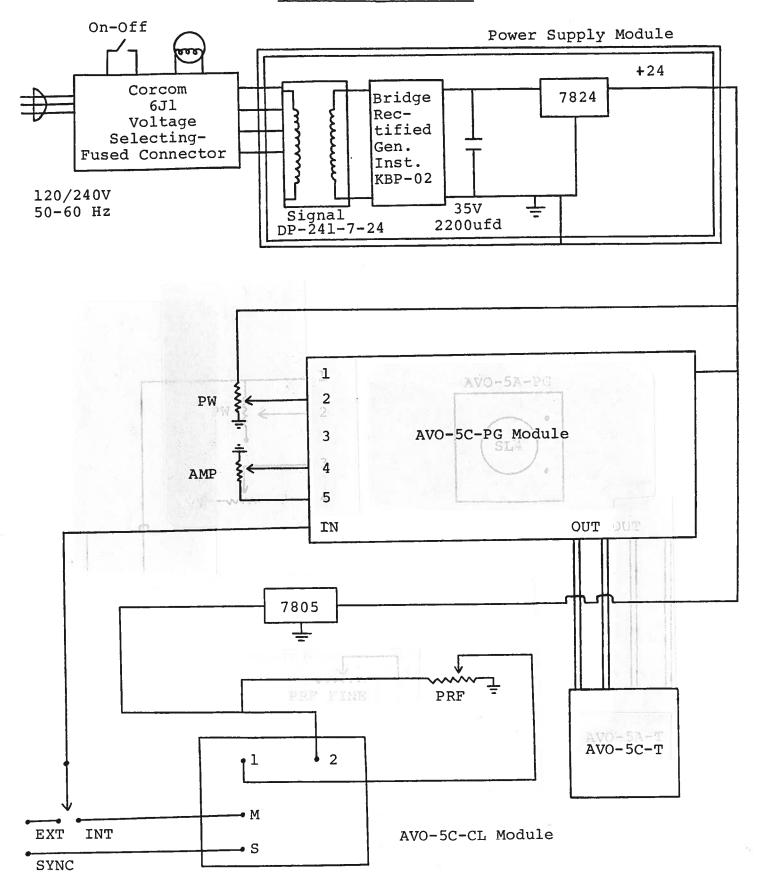   after the application of the TRIG pulse.

Fig. 3   BACK PANEL CONTROLS

②

M

③ →PW ○   ○
            A   B

④ →AMP ○   ○
            A   B

①

(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)   MONITOR Output (M).   Output voltage (to fifty ohms) at
        this point (V_M) can be related to AVO—5A—T output
        current (I_{OUT}) as follows (option):

$$I_{OUT} = 1.6 \ V_M \qquad \text{(Volts and Amps)}$$

(3)   To voltage control the output pulse width, remove the
        jumper wire between banana plugs A and B and apply 0 to
        +10V to connector B $(R_{IN} \geqslant 10K)$.   (option).

(4)   To voltage control the output amplitude, remove the
        jumper wire between banana plugs A and B and apply 0 to
        +10V to connector B $(R_{IN} \geqslant 10K)$.   (option).

Fig. 4   <u>SYSTEM BLOCK DIAGRAM</u>

Power Supply Module

On-Off

Corcom
6J1
Voltage
Selecting-
Fused Connector

120/240V
50-60 Hz

Signal
DP-241-7-24

Bridge
Rec-
tified
Gen.
Inst.
KBP-02

35V
2200ufd

7824

+24

1

2

PW

3

4

AMP

5

IN

AVO-5C-PG Module

OUT OUT

7805

PRF FINE

PRF

1   2

M

EXT   INT

S

SYNC

AVO-5C-CL Module

AVO-5C-T

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVO-5C-C consists of a pulse generator module (AVO-5C-PG), a clock module (AVO-5C-CL) 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 +24V 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 20 nsec TTL level trigger pulse at pin M to trigger the PG module and a 20 nsec 0.5 V sync pulse at pin S to trigger the sampling scope display device. The output at pin S precedes the output at pin M by 0 to 200 nsec depending on the DELAY control setting. 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) 20 nsec outputs are observed at pins M and S.

b) The PRF of the outputs can be varied over the range of 2 KHz to 5 MHz using the PRF and PRF RANGE controls.

c) The relative delay between the pin M and S outputs can be varied by at least 200 nsec by the DELAY control.

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

Schroff   05.27.86   (Edition A)

-EW

-EA

-M