



**AVTECH ELECTROSYSTEMS LTD.**

NANOSECOND WAVEFORM ELECTRONICS  
SINCE 1975

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

TEL: 1-800-265-6681  
FAX: 1-800-561-1970  
U.S.A. & CANADA

e-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)

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

INSTRUCTIONS

MODEL AVO-8B-C-IA2 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 disassembled, 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

(-PGA)

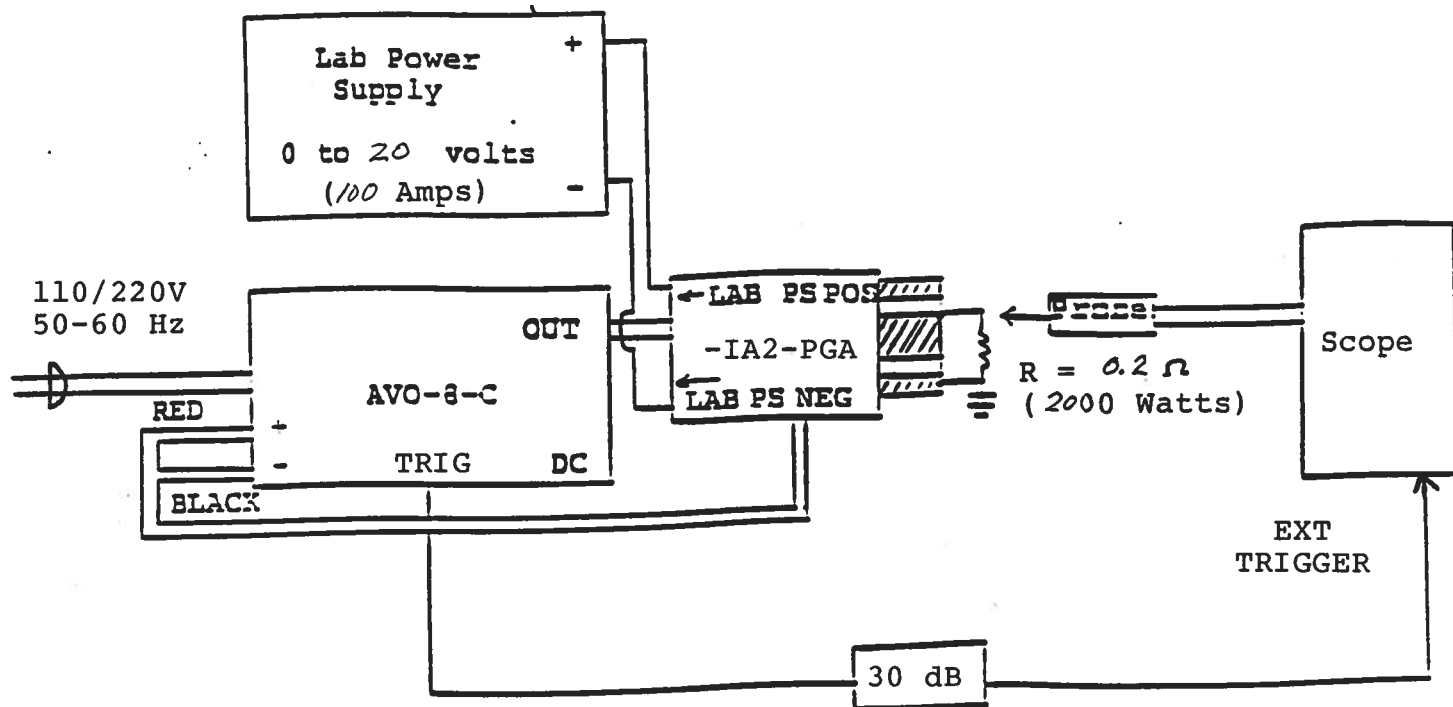
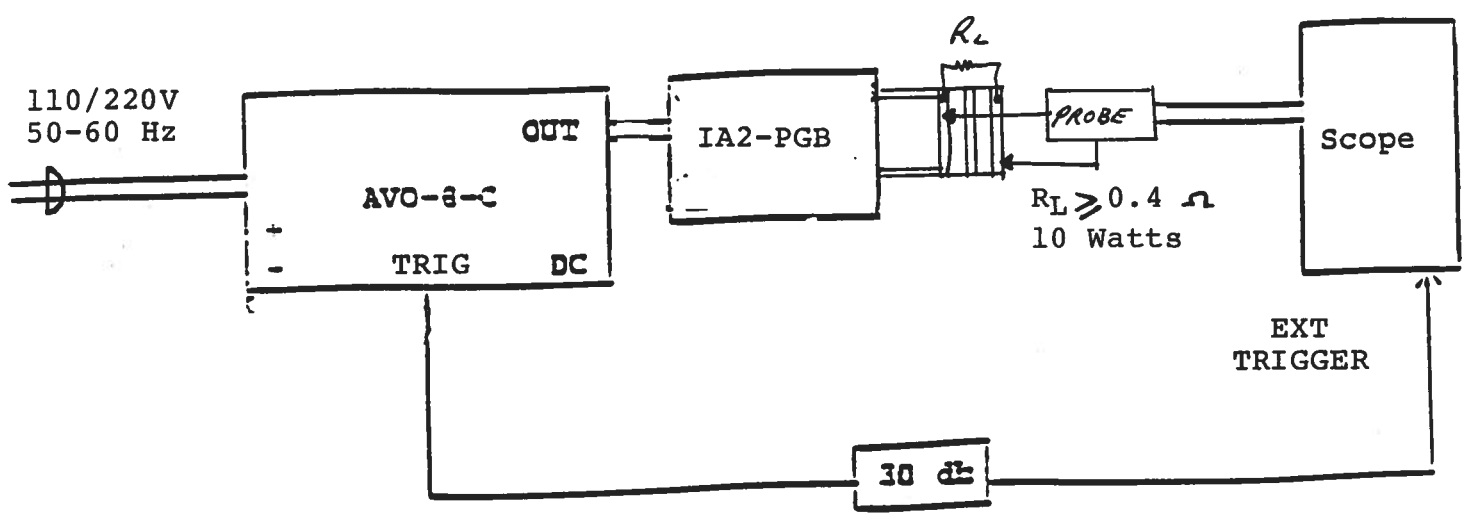


Fig. 2

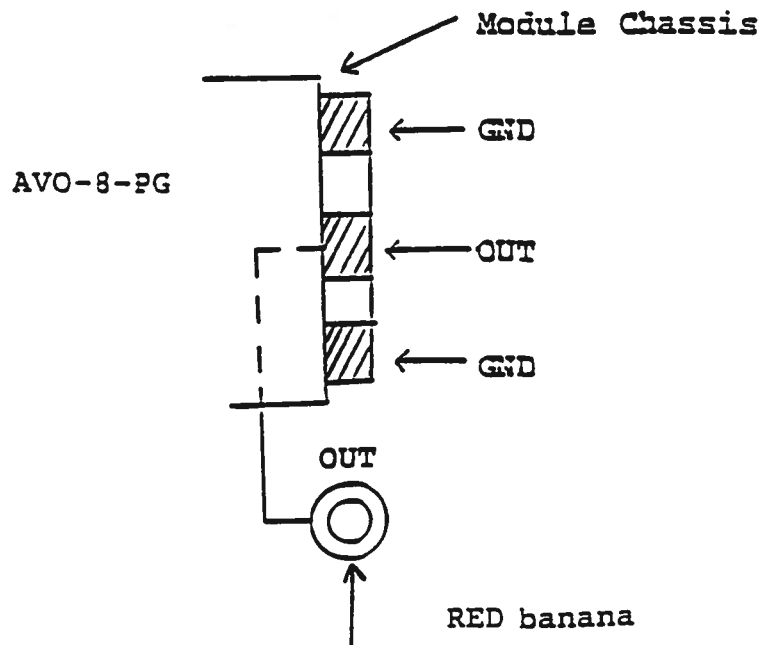
PULSE GENERATOR TEST ARRANGEMENT

(-PGB)

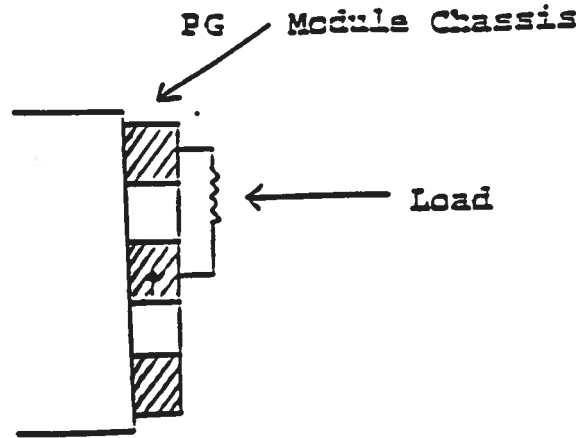


## GENERAL OPERATING INSTRUCTIONS

- 1) The equipment should be connected in the general fashion shown above (see Fig. 1 for PGA and Fig. 2 for PGB). Since the AVO unit provides an output pulse rise time as low as 50 ns a fast oscilloscope (at least 100 MHz) should be used to display the waveform.
- 2) PGA: The user supplied lab power supply attaches to the -PG output module via the red and black SUPERCON connectors which are supplied. The positive terminal of the power supply is to be connected to the RED SUPERCON connector on the -PG module. The negative terminal on the lab power supply is to be connected to ground and to the BLACK SUPERCON connector on the -PG module. The black 1/2" diameter power cable which is permanently attached to the -PG module connects to the banana terminals on the rear panel of the instrument mainframe. The RED lug on the end of the cable is to be connected to the RED banana while the BLACK lug is to be connected to the BLACK banana. To activate PGA, the module switch must be set in the A position. The output terminals of the pulse generator 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). Note that the "OUT" red banana terminal is in parallel with the microstrip center conductor and so may also be used as the output terminal. Note that the monitor function works only with banana terminals (and not with the microstrip terminals).

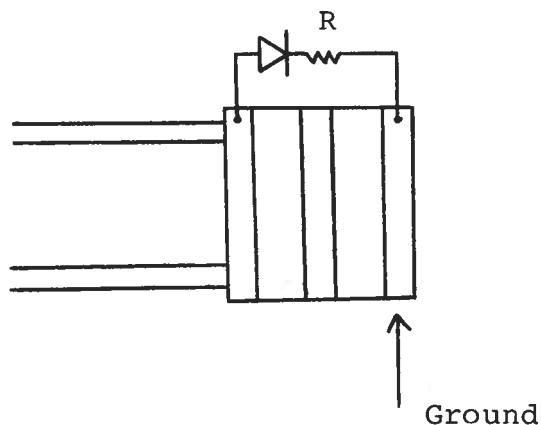


The load should be connected between the OUT and GND terminals using very short leads ( $\leq 2.0$  cm).



Take care to insure that during soldering the OUT conductor is not shorted to the chassis. Also, use minimal heat when soldering. The output amplitude (voltage) is controlled by the amplitude of the DC potential supplied to the SUPERCON connectors on the PGA module.

- 3) PGB: Connect PGB as shown in Fig. 2. Note that PGB will function only when the module switch is in the B position and the PW range switch is in the 2.0  $\mu$ s range. A four inch length of AV-LZ1 protrudes from the side of the -PGB module and is terminated in a piece of PCB as shown below:



The diode load (along with the series resistor) should present more than 0.4 Ohm total resistance to insure that the peak current does not exceed 50 Amps. The output amplitude (voltage) is controlled by the one turn control on the end of the PGB module.

- 4) 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 ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.
- 5) To obtain a stable output display the PW and PRF controls on the front panel should be set mid-range. The front panel INT-EXT-MAN-DC 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.
- 6) When the PW MODE switch is in the INT position, the output pulse width is controlled by the 5 position range switch and one turn fine control. 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 ( $R_{IN} \geq 10K$ ). (option). (See (8) for PW control when the PW MODE switch is in the EXT position).
- 7) An external clock may be used to control the output PRF of the unit by setting the front panel INT-EXT-MAN-DC switch in the EXT position and applying a 0.2 us (approx) TTL level pulse to the TRIG BNC connector input. The external clock may also be used to control the output pulse width by setting the PW mode switch in the EXT position (in this case,  $PW_{OUT} = PW_{IN}$ ).
- 8) The AVO-8B is designed to supply up to 100 Amperes peak to a maximum load voltage of 20 Volts. Factory tests are conducted with a 0.2 Ohm load capable of dissipating at least 2000 Watts. Higher load resistance values may be used but the input voltage must be limited to 20 Volts or less. Note that the unit may fail if the average output current exceeds 100 Amp.

- 9) Model AVO-8B will operate with a duty cycle at least as high as 85% when the pulse width is controlled by the front panel Pulse Width and Pulse Width Range controls. A duty cycle of 100% is obtained by setting the pulse width mode switch in the DC position. In this position the PW controls are no longer active. In this position the load voltage will be about 1.0 Volts less than the applied DC voltage for a load current of 100 Amperes. Note that the average output current must never exceed 100 Amp.
- 10) Model AVO-8B-C includes a high voltage protection circuit which sounds a loud audible alarm if the applied DC voltage exceeds  $\approx +25$  VDC. The output stages of the unit will not trigger while the alarm is sounding. The unit also includes a temperature limit circuit which sounds an audible alarm if the temperature of the output stage switching elements exceeds  $+35^{\circ}\text{C}$ .
- 11) 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 connector assembly.
- 12) The rear panel monitor output BNC (M) provides an output voltage (to 50 Ohms or higher) which is proportional to the current flowing through the banana output terminals (5 V  $\approx$  100 Amps). Note that the monitor function is not connected to the microstrip output terminals (option).
- 13) If application assistance is required:

Tel: (613) 226-5772

Fax: (613) 226-2802



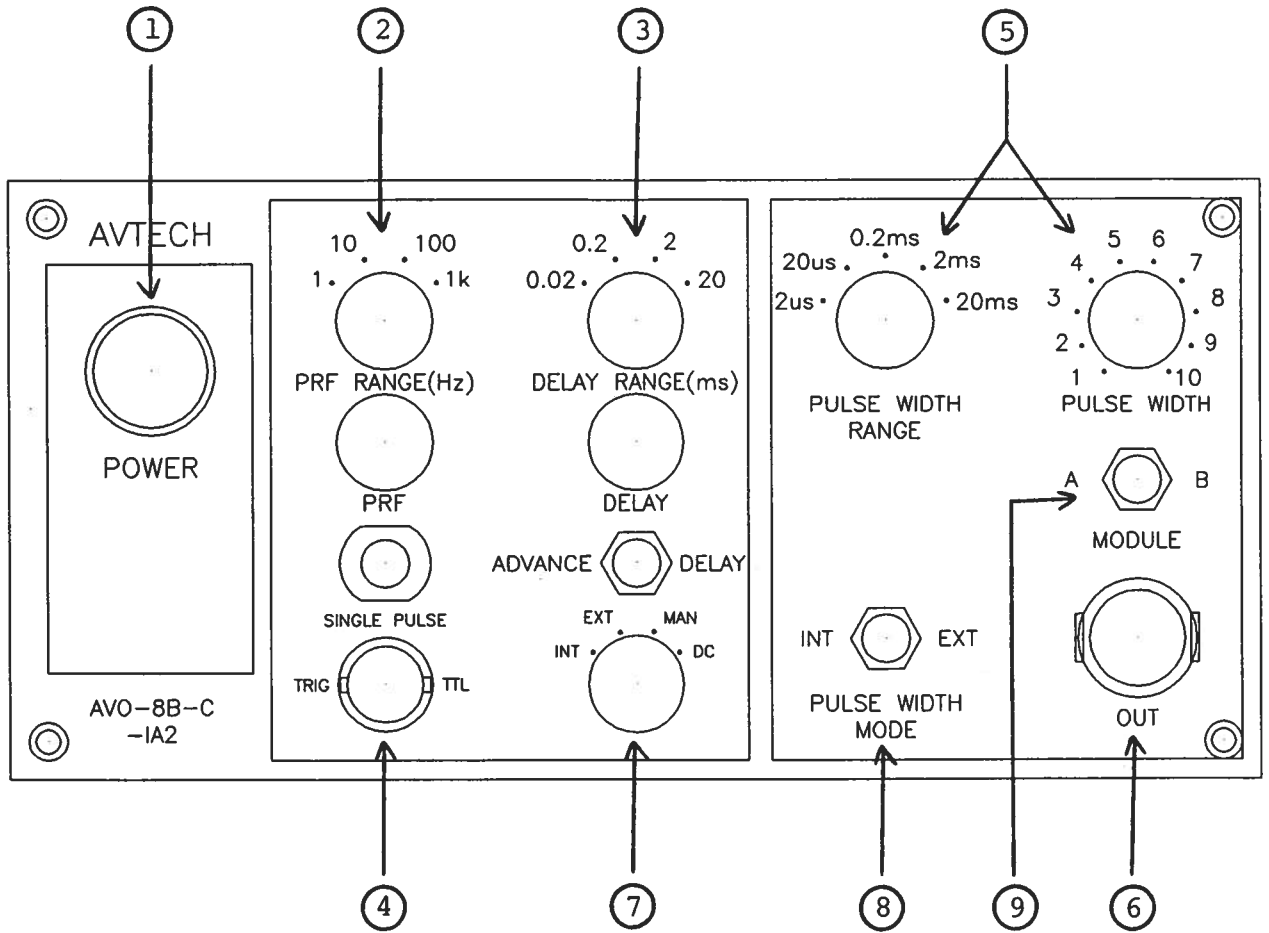


Fig. 3

FRONT PANEL CONTROLS

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

(2) PRF Control. Varies PRF from 10 Hz to 5 kHz as follows:

Range 1	0.1 Hz	to	1 Hz
Range 2	1 Hz	to	10 Hz
Range 3	10 Hz	to	0.1 kHz
Range 4	0.1 kHz	to	1 kHz

(3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the -PG output. This delay is variable as follows:

Range 1	2 us	to	20 us
Range 2	20 us	to	200 us
Range 3	200 us	to	2 ms
Range 4	2 ms	to	20 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) PW Control. A one turn control and four position range switch which varies the output pulse width as follows (when the PW MODE switch is in the INT mode):

Range 1	50 ns	to	2 us
Range 2	2.0 us	to	20 us
Range 3	20 us	to	200 us
Range 4	200 us	to	2 ms
Range 5	2 ms	to	20 ms

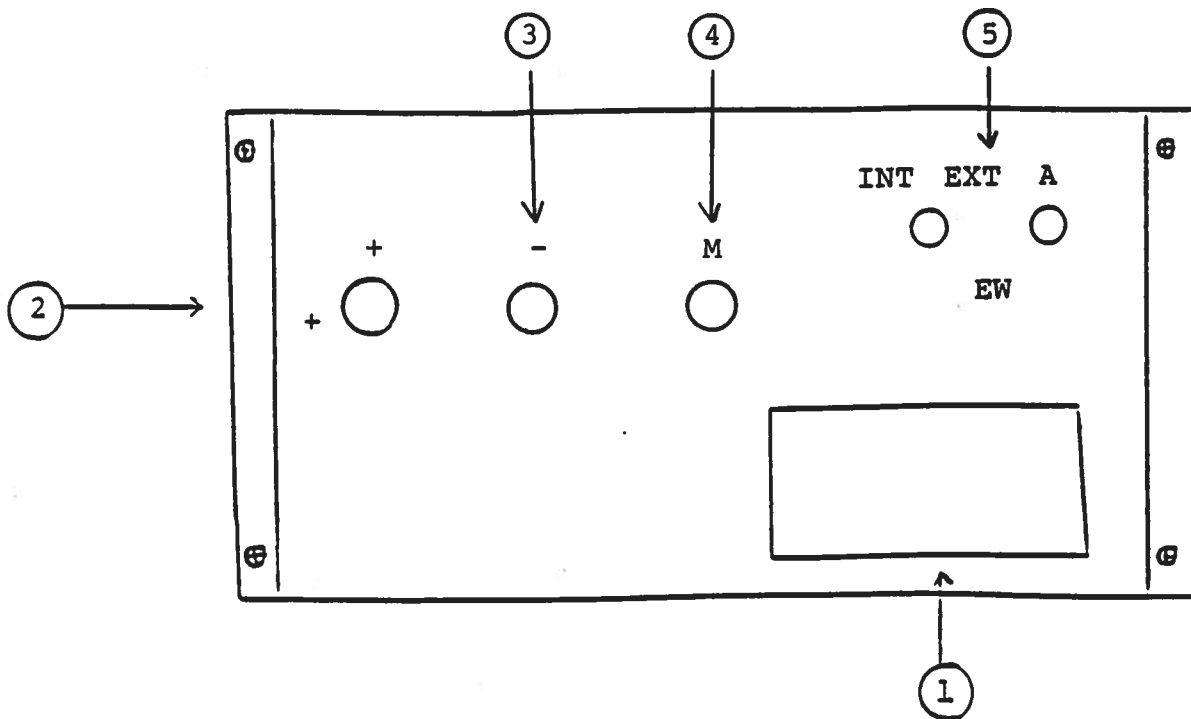
(6) OUT Connector. A multi pin connector which attaches the 2 foot cable from the pulse generator module to the main frame.

(7) 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 0.2 us 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. For single pulse operation, place the switch in the MAN position and push the single pulse button. For DC operation (i.e. 100% duty cycle) place the switch in the DC position.

- (8) PW MODE. With the MODE switch in the INT position the PW is controlled by the front panel controls whether the unit is triggered internally or externally. When the switch is in the EXT position, the PW is controlled by the TTL PW applied externally to the TRIG input. Model AVO-8B-C will operate with a duty cycle at least as high as 85% when the PW MODE switch is in the INT position and the pulse is controlled by the front panel Pulse Width and Pulse Width Range controls. A duty cycle of 100% is obtained by setting the INT-EXT-MAN-DC switch in the DC position. In this position the PW controls are no longer active. In this position the load voltage will be about 1.5 Volts less than the applied DC voltage for a load current of 100 Amperes.
- (9) MODULE A, B. The setting of this switch must correspond with the type of output module (-PGA or -PGB) connected to the output connector (6). Note that the -PGB module will function only when the PW range switch is in the 2.0 us position.

Fig. 4

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 (0.50 A SB).
- (2) RED BANANA. RED lug on 1/2" BLACK cable from PG module connects to this terminal.
- (3) BLACK BANANA. BLACK lug on 1/2" BLACK cable from PG module connects to this terminal.
- (4) M OUT. BNC connector provides output voltage (to  $R_L \geq 50$  Ohms) which is proportional to load current through microstrip output terminals (5 Volts = 100 Amp). (option).
- (5) 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 ( $R_{IN} \geq 10K$ ). (option).

AVO-8-C BLOCK DIAGRAM

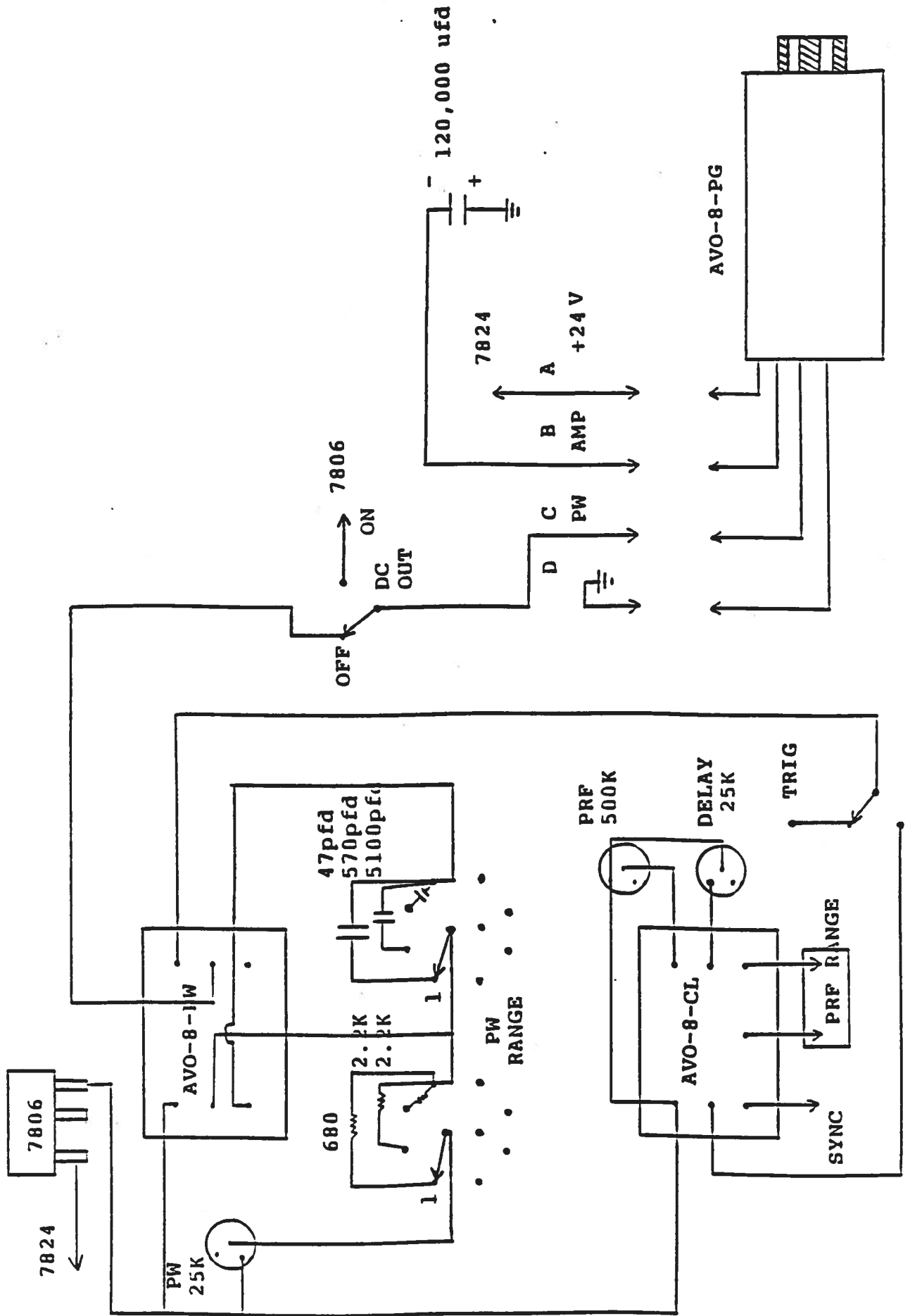
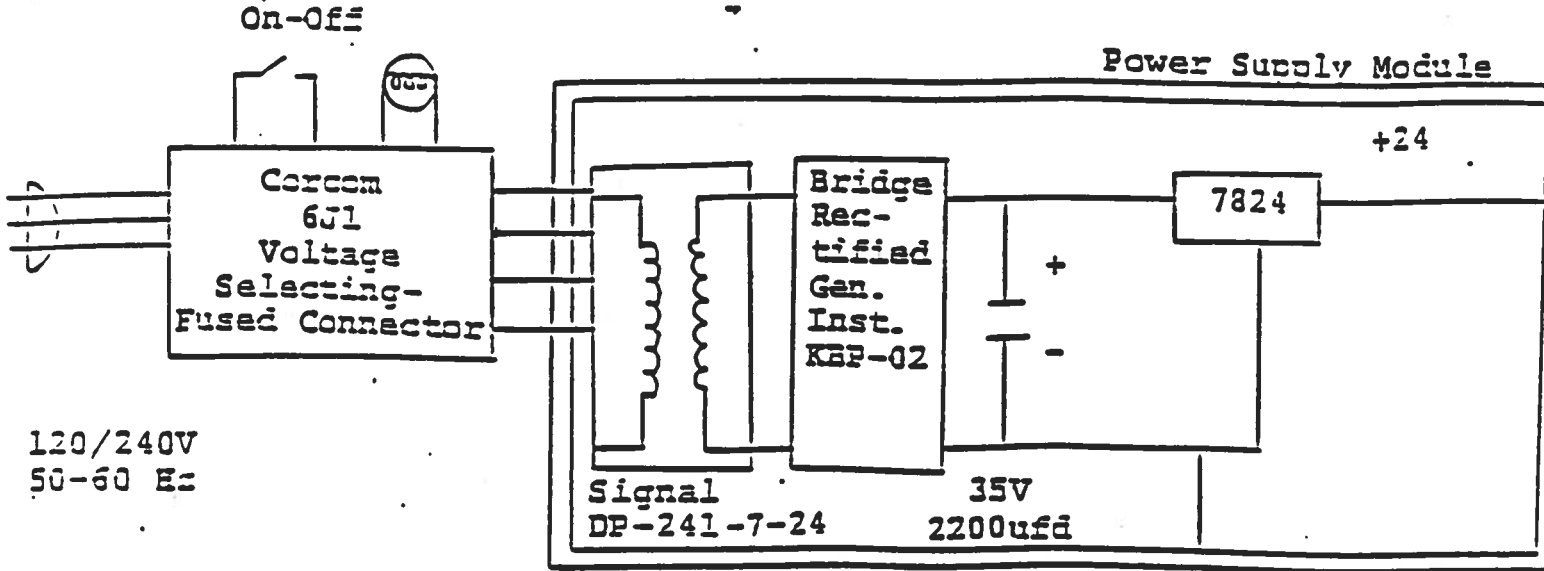


Fig. 4

SYSTEM BLOCK DIAGRAM





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1150

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

TEL: 1-800-265-6681  
FAX: 1-800-561-1970  
U.S.A. & CANADA

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

e-mail: info@avtechpulse.com

Fax Ref No: 11310 From: Avtech Electrosystems Ltd.

To: IMRA America Our Fax No: (613) 226-2802

Date: November 1, 1995

Attn: Harry Haran Receivers Fax No: 313-930-9957  
Tel: 313-930-2571

Subject: Quotation No. of pages: 2

Following my quotation of October 23rd and our telephone conversation of November 1st, I am pleased to offer the following revised price and delivery quotation:

Model designation: AVO-8B-C-IA2.

Number of output modules: Two. One module (Module A) is the standard AVO-8B-C output module providing the standard output parameters. The second output module (Module B) provides the output parameters described below. The required module is plugged into the front panel output connector and a two-position selector switch placed in the required position.

Output pulse width: 50 ns to 2.0 us controlled by a front panel one turn control.

Output pulse amplitude: 0 to 20 Volts to  $R_L \geq 0.4$  Ohms (50 Amps max). The output amplitude is controlled by a one turn control on the output module. Module B does not require the use of a user-supplied DC lab power supply.

PRF: 0 to 1 kHz.

Chassis size: 1.7 x 3.0 x 6.0 inches.



Price:

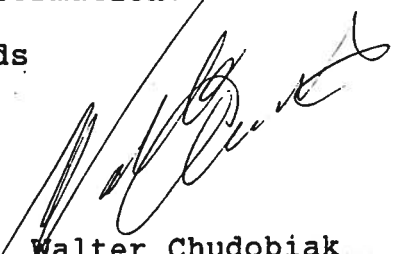
\$5,198.00 US each, FOB destination  
(this price includes the mainframe  
and the two output modules).

Delivery:

60 days ARO.

Thank you for your continuing interest in our products. Please  
call me again (1-800-265-6681) if you require any additional  
information.

Rgds



Dr. Walter Chudobiak  
Chief Engineer

WC:pr

Jan. 29/96

-M

Disk: AVO-8

-EW

Name: SBCIA2.INS