



AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

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INSTRUCTIONS

MODEL AVMH-4-C-MUA PULSE GENERATOR

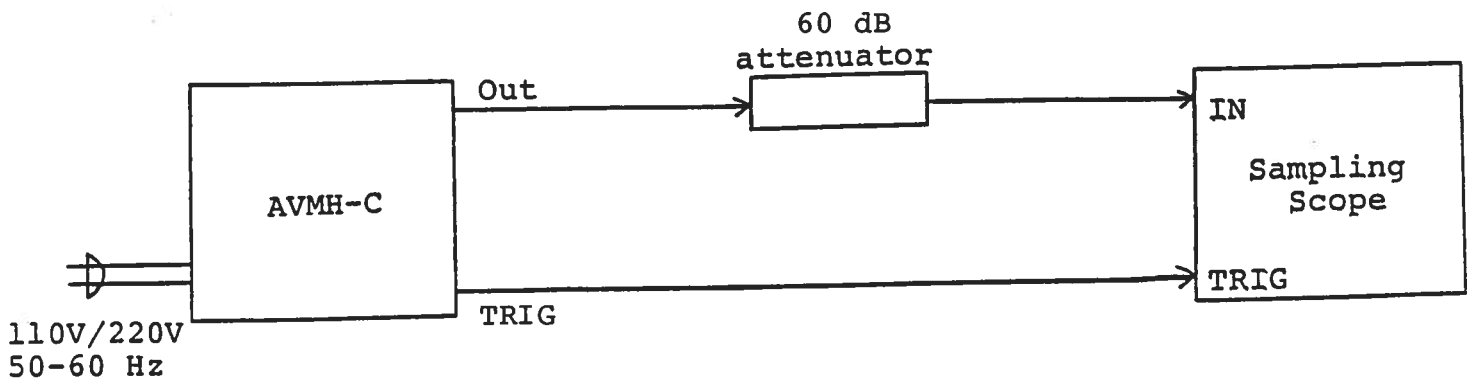
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WARRANTY

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



Notes:

- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed ten gigahertz.
- 2) The use of 60 dB attenuator at the sampling scope vertical input channel will insure a peak input signal to the sampling scope of less than one Volt.
- 3) The TRIG output channel provides a 0.2 Volt 10 ns pulse.
- 4) To obtain a stable output display the PRF control on the front panel should be set mid-range while the PRF range switch may be in either 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. It is recommended that the DELAY control first be set max counter clockwise and then turned clockwise until a stable display is obtained. The scope may then be used to set the desired PRF by rotating the PRF control and by means of the PRF range switch. The stability of the display on some sampling scopes is very sensitive to the trigger delay setting, particularly at high PRF (eg. 5 to 10 MHz). If necessary, consult your sample scope instructions manual for the proper triggering method.
- 5) The output pulse width is controlled by means of the one turn T_R and T_F controls. The T_R control controls the position of the leading edge while the T_F control determines the position of the falling edge. Clockwise rotation of these controls causes the pulse edge to move to the right. It is necessary to sequentially adjust the T_R , T_F and AMP controls to obtain the desired output pulse width and amplitude.
- 6) The output pulse amplitude is controlled by means of the front panel one turn AMP control. The pulse width may change by several nanoseconds as the output amplitude is reduced from maximum to minimum. Therefore it is convenient to first set the desired amplitude and then set the desired pulse width as described above.

- 7) The output pulse position or propagation delay can be varied for up to 5 ns by means of the DELAY T_p control below the T_f control. Rotating the DELAY control clockwise increases the delay. To voltage control the propagation delay, set the rear panel switch in the EXT position and apply 0 to +10V to the BNC connector A ($R_{IN} \geq 10K$). (ED option).
- 8) An external clock may be used to control the output PRF of the AVMH unit by setting the front panel TRIG toggle switch in the EXT position and the TTL -30V, 3 ns switch in the TTL position and applying a 15 ns (or wider) TTL level pulse to the TRIG BNC connector input. A +10 to +30 Volt, 3 ns wide pulse may be used to trigger the unit externally by placing the TTL -30V, 3 ns switch in the 30V, 3 ns position. The TRIG port input impedance in this configuration is 50 Ohms. The AVMH unit triggers on the rising edge of the input trigger pulse. For operation in this mode, the scope time base must also be triggered by the external clock rather than from the SYNC output.
- 9) WARNING: Model AVMH-C may fail if triggered at a PRF greater than 10 MHz. Such failures are not covered by the warranty.
- 10) The Model AVMH-C pulse generator can withstand an infinite VSWR on the output port.
- 11) To invert the output of the AVMH unit, connect the AVX-2-T unit to the OUT port. An inverted pulse is then obtained at the OUT port of the AVX-2-T unit. To offset the inverted pulse, apply the required DC level to the DC terminal of the AVX-2-T unit. (PN option).
- 12) 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 the amplitude
 - 3) Reducing pulse width (i.e. switch to a lower range)

13) The AVMH-C 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.

14) For additional assistance:

Tel: 613-226-5772

Fax: 613-226-2802

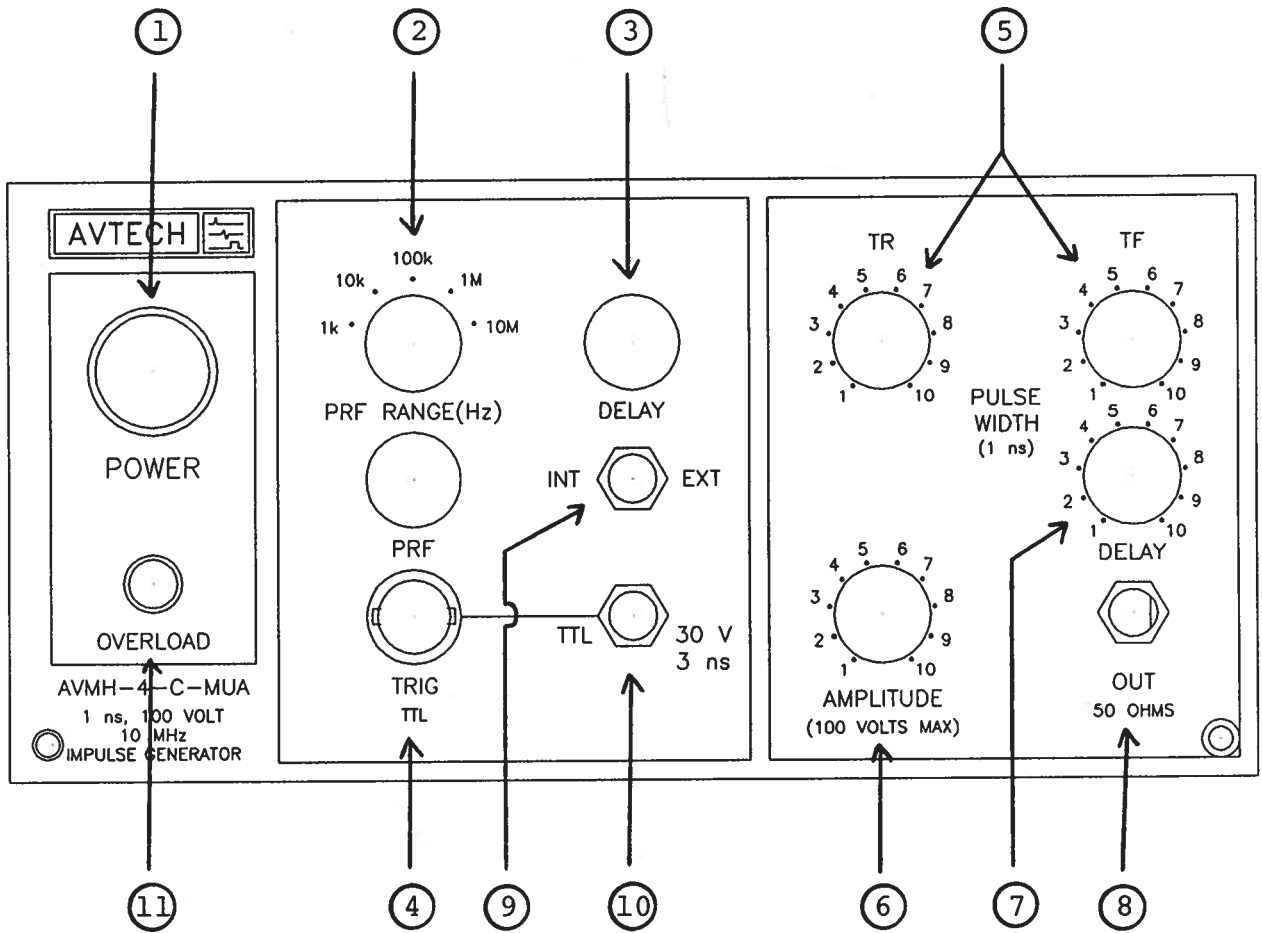


Fig. 2

FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. PRF RANGE and PRF controls determine output PRF as follows:

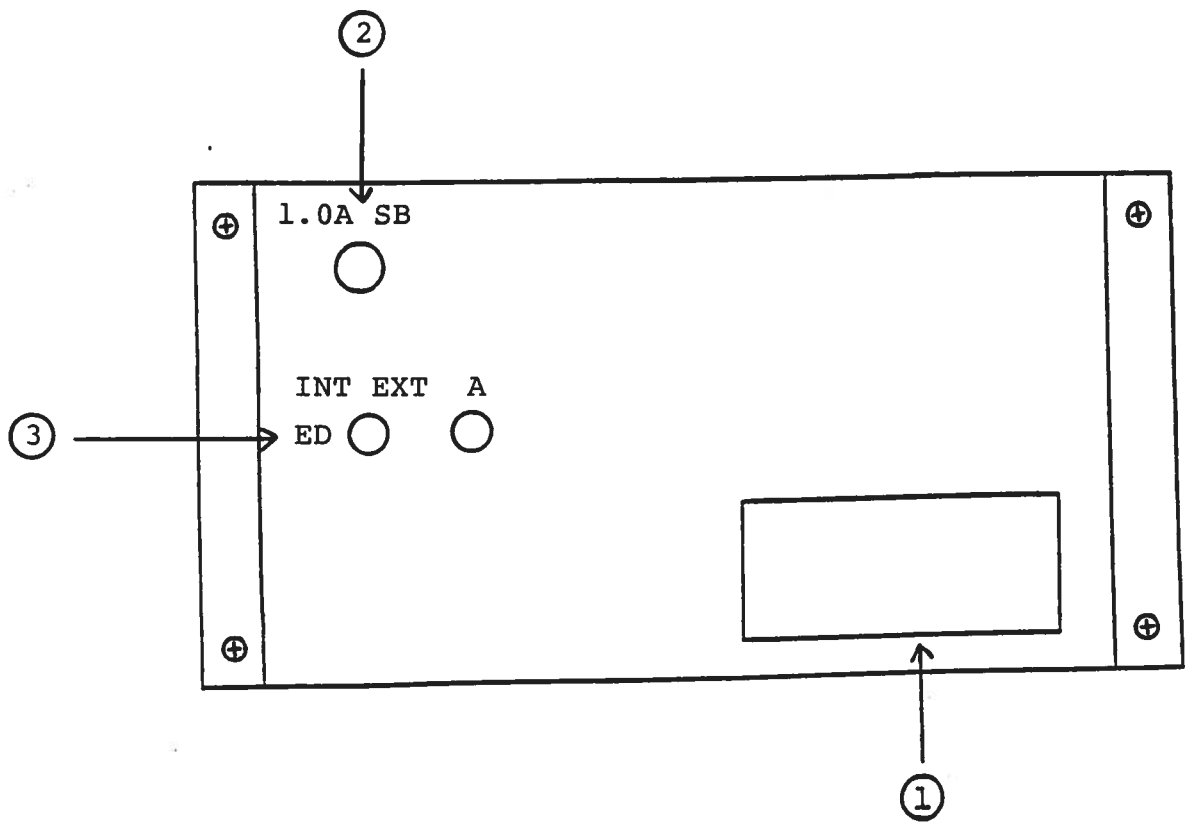
	PRF MIN	PRF MAX
Range 1	0.1 kHz	1 kHz
Range 2	1 kHz	10 kHz
Range 3	10 kHz	100 kHz
Range 4	100 kHz	1 MHz
Range 5	1 MHz	10 MHz

- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) and the main output (8). This delay is variable over the range of 0 to at least 100 ns.
- (4) TRIG Output. This output precedes the main output (8) and is used to trigger the sampling scope time base. The output is a 200 mV 10 ns (approx) pulse capable of driving a fifty Ohm load.
- (5) PW Control. Two one turn controls which varies the output pulse width. T_R determines the position of the rising edge while T_F determines the position of the falling edge.
- (6) AMP Control. A one turn control which varies the output pulse amplitude from 0 to max output to a fifty Ohm load.
- (7) DELAY. The output pulse position or propagation delay can be varied for up to 5 ns by means of the DELAY T_p control below the T_f control. Rotating the DELAY control clockwise increases the delay. To voltage control the propagation delay, set the rear panel switch in the EXT position and apply 0 to +10V to the BNC connector A ($R_{IN} \geq 10K$). (ED option).
- (8) OUT Connector. SMA connector provides output to a fifty Ohm load.

- (9) EXT-INT Control. With the EXT-INT toggle switch in the INT position, the PRF of the AVMH unit is controlled via an internal clock which in turn is controlled by the PRF controls. With this toggle switch in the EXT position and the TTL -30V switch (10) in the TTL position, the AVMH unit requires a 15 ns (or wider) 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. A +10 to +30 Volt, 3 ns wide pulse may be used to trigger the unit externally by placing the TTL -30V, 3 ns switch in the 30V, 3 ns position. The TRIG port input impedance in this configuration is 50 Ohms.
- (10)
- (11) OVERLOAD INDICATOR. 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 the amplitude
 - 3) Reducing pulse width (i.e. switch to a lower range)

Fig. 3

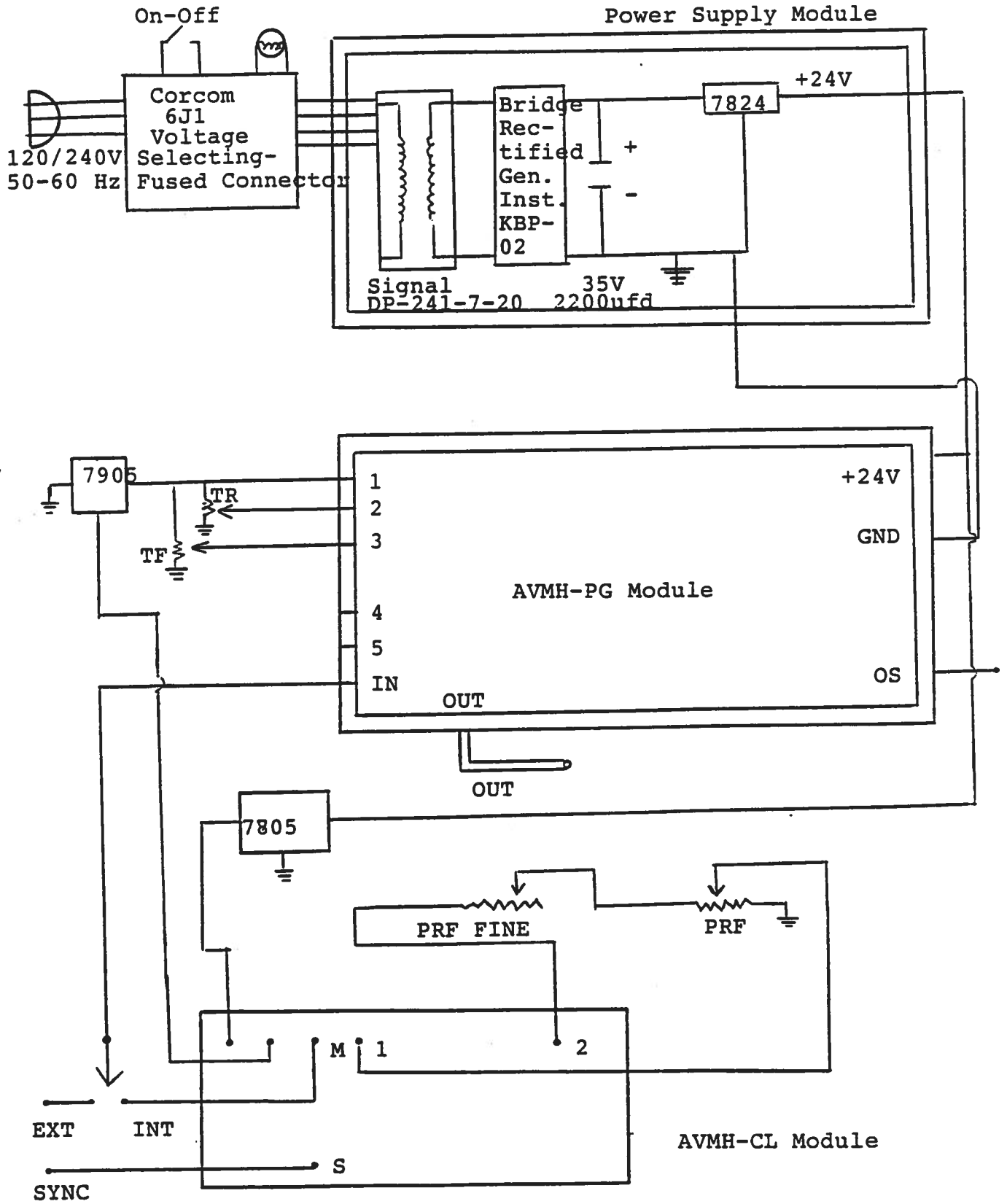
BACK PANEL CONTROLS



- (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 (0.5A SB).
- (2) 1.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.
- (3) ED. To voltage control the propagation delay, set the rear panel switch in the EXT position and apply 0 to +10V to the BNC connector A ($R_{IN} \geq 10K$). (ED option).

Fig. 4

SYSTEM BLOCK DIAGRAM



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVMH-C consists of a pulse generator module (AVMH-PG), a clock module (AVMH-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 50 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 20 ns TTL level trigger pulse at pin M to trigger the PG module and a 20 ns 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 100 ns 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) 10 ns, or wider, outputs are observed at pins M and S.
- b) The PRF of the outputs can be varied over the range of 10 kHz to 25 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 100 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.



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Fax Ref No: 739 From: Avtech Electrosystems Ltd.

To: McMaster University, Our Fax No: (613) 226-2802
Institute for
Materials Research Date: August 9, 1996

Attn: Prof. John Preston Receivers Fax No: 905-521-2773
Tel: 905-525-9140 Ext. 27294

Subject: Quotation No. of pages: 2

Following our telephone conversation of August 9th, I am pleased to provide the following price and delivery quotation:

Model designation: AVMH-4-C-P-ED-MUA.

Basic specifications: As per standard AVMH-4-C-P (see page 88, Cat. 9) but with the -ED and -MUA options which are described below.

-ED option: As per AVM-C series (see pages 10 and 11). Allows the relative propagation delay of the unit to be varied from 0 to 5 ns either by a front panel one turn control or by an externally applied 0 to +10 VDC control voltage.

-MUA option: Permits the unit to be triggered externally either by a standard TTL pulse or by a +60 to 100 Volt 3 ns pulse. A two-position selector switch is provided. The propagation delay varies by less than 300 ps for an input amplitude variation from 30 to 100 Volts.

Other: See standard Model AVMH-4-C.

CHANGE TO 70 TO 100V AT M.U. REF 4651

Price: \$4,282.00 US each, FOB destination.

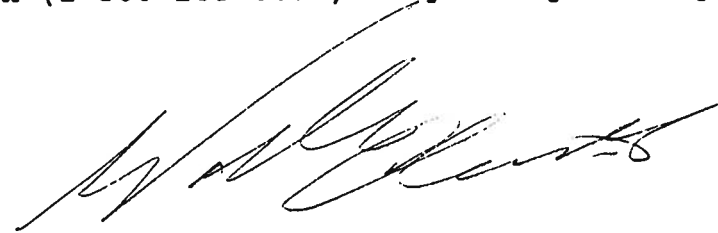
Please note that this price includes our standard 5% academic discount. Please also note that we can also provide this unit in the -PS version (i.e. no internal clock). The price for the -PS version is \$3,692.00 US each, FOB destination.

GST: 7% extra; PST extra if applicable.

Delivery: 45 days ARO.

Thank you for your 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

Oct. 30/96

Disk: AVMR-H

-ED

Name: MH4CMUR.INS

-PN