INSTRUCTIONS

MODEL AVMN-3A-C-P-EA-EW-IBMA 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

Phone: 613-226-5772 or 1-800-265-6681
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FIG. 1: PULSE GENERATOR TEST ARRANGEMENT

(AVX-S3A-IBME MODULE DISCONNECTED)

GENERAL OPERATING INSTRUCTIONS

1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 200 MHz and the pulse generator should be terminated in a 50 Ohm load.

2) The sync output channel provides a +0.5 V, 10 ns pulse.

3) To obtain a stable output display the PRF and PRF FINE controls 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 RANGE 3. 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 and PRF FINE controls and by means of the PRF range switch. CAUTION: The output duty cycle must not exceed 50%.

4) The output pulse width is controlled by means of the front panel ten turn PW control. The control should initially be set mid-range and the pulse width adjusted using an oscilloscope. Rotation of the PW pot causes the position of the falling edge of the pulse to change. CAUTION: The output duty cycle must not exceed 50%.

5) To voltage control the output pulse width, set the rear panel switch in the EXT position and apply 0 to +10V to connector A ($R_{IN} \geq 10K$). (Option).

6) The output pulse amplitude is controlled by means of the front panel ten turn AMP control.

7) To voltage control the output amplitude, set the rear panel switch in the EXT position and apply 0 to +10V to connector B ($R_{IN} \geq 10K$). (Option).

8) An external clock may be used to control the output PRF of the AVMN unit by setting the front panel TRIG toggle switch in the EXT position and applying a 10 ns (or wider) TTL level pulse to the TRIG BNC connector input. The AVMN 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 AVMN-C may fail if triggered at a PRF greater than 50.0 MHz or if operated at a duty cycle exceeding 50%.

10) AVMN-C 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 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:

    11) Reducing PRF (i.e. switch to a lower range)
    12) Reducing pulse width (i.e. switch to a lower range)
    13) Removing output load short circuit (if any)

14) The AVMN-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.

15) For additional assistance:

Tel: 1-800-265-6681
Fax: (613) 226-2802

FIG. 2: PULSE GENERATOR TEST ARRANGEMENT

(AVX-S3A-IBME MODULE CONNECTED)

PULSE GENERATOR TEST ARRANGEMENT

1) The AVMN-3A-C, the AVX-S3A-IBME, a DC power supply, a 200 MHz source and a scope should be connected as shown in Fig.2.

2) A diode should be installed in the socket. For preliminary testing, it is recommended that two series silicon high speed computer switching diodes (such as the 1N459A) be installed so as to simulate the laser diode.

3) Note that if a DC bias is not applied to the diode, then the DC port should be shorted to ground. When applying a DC bias take care to insure that the current does not exceed 100 mA. The DC current is limited by the 10 Ohm resistor and the diode resistance.

4) The RF signal applied to the RF IN port is passed directly through the AVX-S3A module (and a series DC blocking capacitor).

5) The scope probe may be used to view the voltage pulse applied to the diode by connecting the probe to the point where the 10 Ohm resistor joins the 12 Ohm line. The voltage at this point will be as high as 8 volts when the AMP pot is set fully clockwise.

6) The pulse diode current may be determined by determining the voltage across the 10 Ohm resistors (by connecting the voltage probe to both the input and output of the 10 Ohm resistors). The diode current is then given by:

$$I_D = \frac{V_R}{10}$$

7) CAUTION: It is important to note that the AVMN-2A-C mainframe is DC coupled and will operate with duty cycles as high as 50%. However, the AVX-S3A-IBME unit is AC coupled and as a consequence, significant reverse voltages may be applied to the diode as the duty cycle is advanced to near 50%. This condition can be partially alleviated by the application of the DC bias (but do not exceed 100 mA) and by connecting a fast, low-capacitance switching diode between the output to the 10 Ohm resistor and ground (connects the cathode to the resistor). The voltage should be monitored at this port to insure that the pulse waveform is not grossly distorted as this may result in severe overloading of the AVMN-3A-C unit.

8) The functional equivalent circuit of the AVX-S3A-IBME unit is shown on the following page.

9) Repeated flexing of the 12 Ohm flexible transmission line relative to the pin socket PCB should be avoided as this may result in reversing of the line next to the PCB. Similarly, the connection between the 12 Ohm line and the aluminum chassis should not be stressed.

10) Mounting of the pin socket PCB section on a translation stage can be facilitated by soldering to the bare areas of the PCB or by the drilling of holes.

FIG. 3: AVX-S3A-IBME FUNCTIONAL EQUIVALENT CIRCUIT

FIG. 4: FRONT PANEL CONTROLS

FRONT PANEL CONTROLS

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

(2) PRF Control. PRF RANGE, PRF and PRF FINE controls
(3) determine output PRF as follows:

	PRF MIN	PRF MAX
Range 1	10 Hz	50 KHz
Range 2	500 KHz	250 KHz
Range 3	185 KHz	650 KHz
Range 4	650 KHz	3.3 MHz
Range 5	3.3 MHz	10 MHz
Range 6	14 MHz	50 MHz

(4) PRF FINE Control. This control varies PRF but is about 10 times less sensitive than the main PRF control.

(5) DELAY Control. Controls the relative delay between the reference output pulse provided at the SYNC output (6) and the main output (9). This delay is variable over the range of 0 to at least 100 nS.

(6) SYNC Output. This output precedes the main output (9) and is used to trigger the sampling scope time base. The output is a 500 mV 20 nS (approx) pulse capable of driving a fifty ohm load.

(7) PW Control. A one turn control which varies the output pulse width.

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

(9) OUT Connector. SMA connector provides output to a fifty ohm load.

(10) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVMN 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 AVMN unit requires a 10 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.

(11) TRIG Input. The external trigger signal is applied at this input when the EXT-INT toggle switch is in the EXT position.

(12) AVMN-C 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 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:

(13) Reducing PRF (i.e. switch to a lower range)
(14) Reducing pulse width (i.e. switch to a lower range)
(15) Removing output load short circuit (if any)

FIG. 5: BACK PANEL CONTROLS

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) 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).

(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).

FIG. 6: SYSTEM BLOCK DIAGRAM (WITH EA, EW, ED OPTIONS)

SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVMN-C consists of a pulse generator module (AVMN-PG), a clock module (AVMN-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 10 to 120 nsec TTL level trigger pulse at pin M to trigger the PG module and a 10 nsec 0.5 V sync pulse at pin S to trigger the sampling scope display device. The AVMN-PG triggers on the rising edge of the pulse provided by the M pin. The rising edge at pin S precedes the rising edge at pin M by 0 to 100 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) 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 50 MHz using the PRF, PRF FINE 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.

(2) PERFORMANCE CHECK SHEET