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# INSTRUCTIONS

## MODEL AV-1011-C-OP1 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.

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## EC Declaration of Conformity

We

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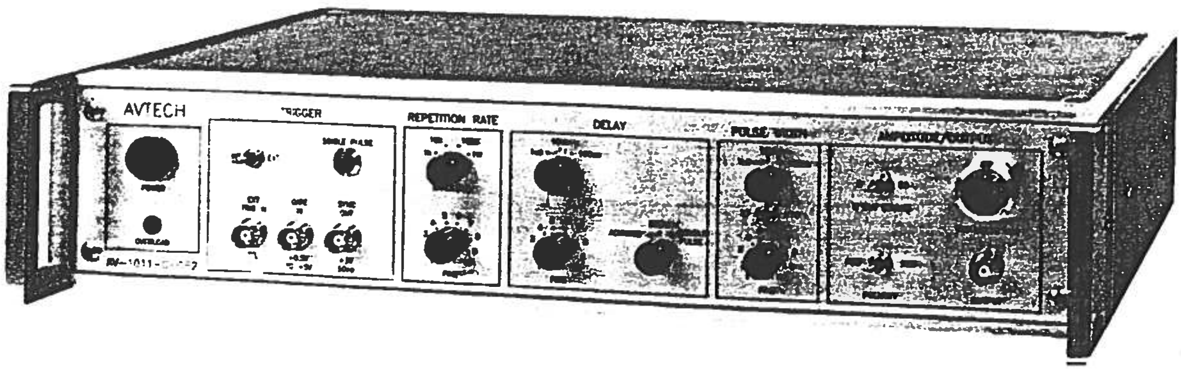
declare that the AV-1011-C pulse generator meets the intent of Directive 89/336/EEC for Electromagnetic Compatibility. Compliance pertains to the following specifications as listed in the official Journal of the European Communities:

EN 50081-1 Emission

EN 50082-1 Immunity




## INTRODUCTION

MODEL AV-1011-C PULSE GENERATOR

The Model AV-1011-C is a high performance instrument capable of 200 W peak pulse power at repetition rates up to 1 MHz. The output polarity is selectable and the amplitude is variable up to 100 V into 50 Ohms. Pulse delay, advance and width are variable up to 1 ms. Rise and fall times are fixed at less than 15 ns. Model AV-1011-C provides single or double pulse output and can be triggered or gated by an external source. The output pulse width can be set to follow an input trigger pulse width and the output amplitude can be controlled by an externally applied 0 to +10 Volts DC control voltage.

## A) SPECIFICATIONS

| | |
|---|---|
| Pulse output amplitude[1,2]: ($R_L$ = 50 Ohms) | 0 to 100 Volts (2 Ohm $Z_{out}$ range)<br>0 to 50 Volts (50 Ohm $Z_{out}$ range)<br>Within each range, the amplitude is controlled by a 10 turn locking dial. |
| Output polarity: | Positive or negative (Front panel selector switch) |
| Rise time, fall time: | ≤ 10 ns |
| Pulse aberrations: | ≤ ± 5 % of amplitude |
| Pulse width[2,3]: | x 1 Mode: 100 ns to 1 us, 1.00 us to 10 us, 10.00 us to 100 us<br>x 10 Mode: 1 us to 10 us, 10 us to 100 us, 100 us to 1 ms<br>3 position range switch, 1 turn control and 2 position multiplier switch |
| Jitter: | Pulse width: ≤ 0.1%, (typically ≤ 0.01 %)<br>Delay/Advance: ≤ 0.1%, + 0.5 ns<br>Period: ≤ 0.1%, + 0.5 ns |
| Pulse repetition rate[2]: | 100 Hz to 1.0 MHz, (4-position range switch and a one-turn fine control) |
| GPIB control: | Option available. Specify -OP1 or -OP2[2]. |
| Maximum duty cycle: | ≥ 25 %, for amplitudes between 0.5 V and 20 V<br>≥ 10 %, for amplitudes between 20 V and 100 V |
| Output impedance: | 2 Ohms or 50 Ohms (two position selector switch) |
| Double pulse spacing: | 100 ns to 100 us |
| Delayed and advanced pulse range[2]: | 100 ns to 1 us<br>1 us to 10 us<br>10 us to 100 us<br>( between sync out and main pulse output) |
| Sync output: | + 3 Volts, 50 ns ($R_L$ > 1 K) |
| Gated operation: | The unit will not trigger (i.e. no output) when the gate input signal is at + 5 Volts. |
| External trigger[2]: | The unit may be triggered by a signal source with : Amplitude: + 3 to + 5V<br>Repetition rate: ≤ 1 MHz<br>Pulse width: ≥ 50 ns |
| Minimum propagation delay external trigger modes: | Advance: 200 ns<br>Delay: 300 ns<br>Double pulse: 200 ns<br>$PW_{IN} = PW_{OUT}$: 100 ns |
| Output protection: | The output is protected against short circuits, open circuits, and high duty cycle. |
| Connectors: | BNC female |
| Power source: | 120/240 Volts, ± 10% (switchable)<br>48 Hz to 66 Hz, 100 VA maximum |
| Dimensions (H x W x D): | 100 mm x 430 mm x 375 mm (3.9" x 17" x 14.8") |
| Weight: | ≤ 10 kg (22 lbs) |
| Chassis material: | Aluminum. Anodized aluminum front panel with cast aluminum side panels ( with blue-gray plastic trim) and aluminum top and bottom panels with blue-gray plastic trim. |
| Operating temperature: | + 10° C to + 50° C |
| Accessories furnished: | one detachable 6' power cord, one operation-maintenance manual |
| Option available: | 19" rack mount kit (-R5) |

1) The output amplitude may also be controlled by applying 0 to + 10 Volts DC to a rear panel banana connector.
2) For IEEE-488 GPIB control of amplitude, pulse width, PRF and delay, suffix model No. by -OP1 or -OP2. (see page 6 - 8).
3) The output pulse width may also be controlled externally by applying a TTL level trigger of the desired width to a rear panel banana connector ($PW_{IN} = PW_{OUT}$ mode).

## B) INSTALLATION

### VISUAL CHECK

After unpacking the instrument, examine to ensure that it has not been damaged in shipment. Visually inspect all connectors, knobs and the handles. Confirm that a power cord and instruction manual are with the instrument. (If the instrument has been damaged in shipment, file a claim immediately with the company that transported the instrument).

### PLUGGING IN THE INSTRUMENT

Examine the rear of the instrument. There will be a male power receptacle, a fuse holder and the edge of the power selector card will be visible. Confirm that the power selector is in the correct orientation - it should be marked either 120 or 240, indicating whether it expects 120V AC or 240V AC. If it is not set for the proper voltage, remove the fuse then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse. In the 120V setting, a 1.0A slow blow fuse is required. In the 240V setting, a 0.5A slow blow fuse is required.

### OPERATIONAL CHECK

For front panel manual control of the output parameters, the rear panel LOCAL-REMOTE switch must be in the LOCAL position. For remote control using a personal computer, the switch should be in the REMOTE position. See the AN-101-1011 section (at the end of the manual) for the instructions for this mode of operation. Note that it is recommended that the front panel manual mode be mastered before attempting GPIB control of the instrument.

This check is to confirm that the instrument is fully functional. Set the controls to the following values:

## FRONT PANEL

INT/EXT Switch: INT position

REPETITION RATE RANGE Switch: 10 kHz

REPETITION RATE Vernier: MAX

DELAY RANGE Switch: 1 us

DELAY Vernier: MID range

ADVANCE, DELAY, DOUBLE PULSE: DELAY

PULSE WIDTH RANGE Switch: 1 us

PULSE WIDTH Vernier: MAX

POLARITY Switch: +

R OUT RANGE Switch: 50 Ohms

AMPLITUDE Vernier: 2.0

## REAR PANEL

LOCAL-REMOTE: LOCAL

AMP: INT

PW: INT

HV: ON

Connect a cable from the SYNC OUT connector to the TRIG input of an oscilloscope. Connect a 2W (or higher) 50 Ohm load to the OUT connector and place the scope probe across this load.

Set the oscilloscope to trigger externally with the vertical setting at 5 Volts/div and the horizontal setting at 1 us/div. Then follow the instructions below and compare what is seen on the oscilloscope to what is described. Only approximate values are needed to confirm operation.

| STEP | CONTROL | OPERATION | RESULTS |
| --- | --- | --- | --- |
| 1 | POWER | Push in (ON) | +10V pulses at the main output, with period 100 us, pulse width 1.0 us, < 15ns rise & fall times. |
| 2 | REPETITION RATE VERNIER | Rotate to MIN, then to MAX | Period rises to about 1 ms then falls to about 100 us. |
| 3 | DELAY VERNIER | Rotate to MAX, then to MIN | Pulses shift to the right on the oscilloscope by 1 us, then back. |
| 4 | PULSE WIDTH VERNIER | Rotate to MIN, then to MAX | Pulse width varies from 100 ns to 1.0 us. |
| 5 | POLARITY SWITCH | Switch to -, then to + | Pulse polarity becomes negative & then positive. |
| 6 | R OUT RANGE | Switch to 2 Ohms and then back to 50 Ohms | The output pulse amplitude will jump to 20 Volts and then to 10 Volts. The voltage will then decay slowly to 10 Volts. |

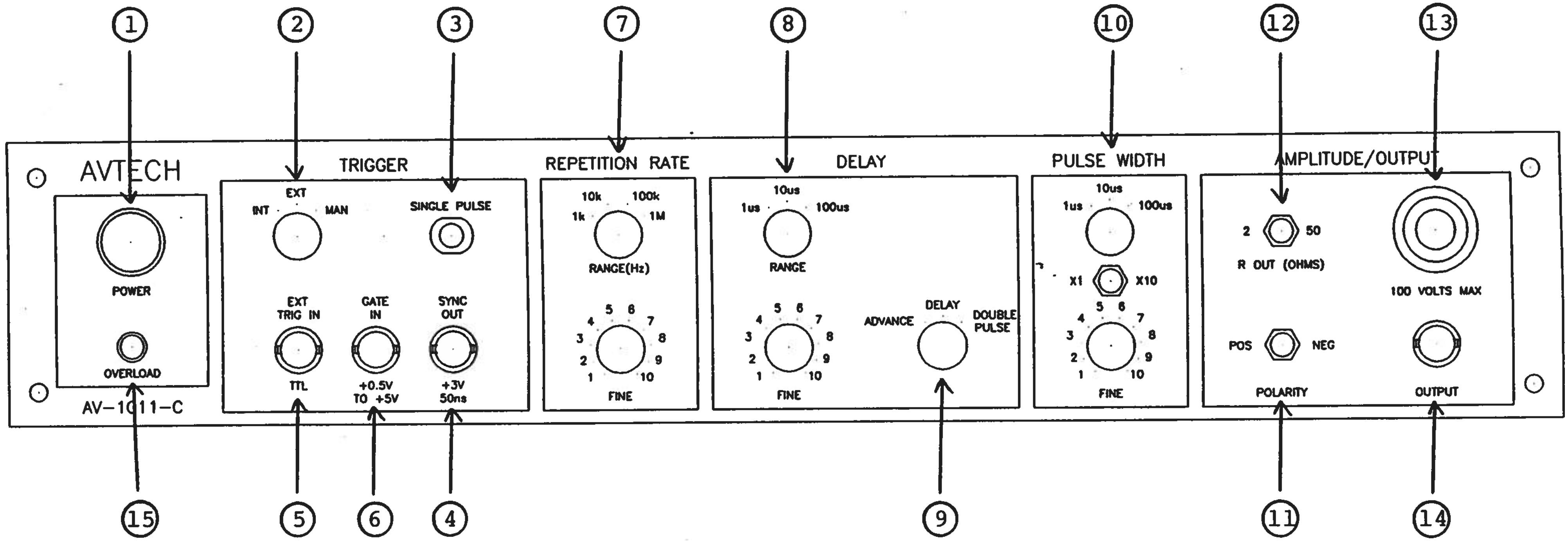



Fig. 1 FRONT PANEL CONTROLS

## C) FRONT PANEL CONTROLS

For front panel manual control of the output parameters, the rear panel LOCAL-REMOTE switch must be in the LOCAL position. For remote control using a personal computer, the switch should be in the REMOTE position. See the AN-101-1011 section (at the end of the manual) for the instructions for this mode of operation. Note that it is recommended that the front panel manual mode be mastered before attempting GPIB control of the instrument.

(1) POWER Switch. The POWER push button switch applies AC prime power to the primaries of the transformer, turning the instrument on. The push button lamp (#382 type) is connected to the +15V DC supply.

(2) INT/EXT Switch. In the "INT" position the instrument is internally triggered and the "SYNC OUT" connector provides a SYNC output which allows one to trigger other instruments, such as oscilloscopes. In the "EXT" position the instrument is triggered by a +5 Volt 50 ns (or wider) input pulse on the "TRIG IN" connector, or by pressing the "SINGLE PULSE" push button.

(3) SINGLE PULSE Push Button. The "SINGLE PULSE" push button will trigger the instrument manually for one cycle of output, when the "INT/EXT/MAN" switch is in the "MAN" position. Otherwise, the push button has no effect.

(4) SYNC OUT. When the "INT/EXT" switch is in the "INT" position, this connector supplies a SYNC output that can be used to trigger other equipment, particularly oscilloscopes. This signal leads, or lags, the main output by a duration set by the "DELAY" controls and has an approximate amplitude of +3 Volts to $R_L$ > 1K with a pulse width of about 50 ns.

(5) TRIG IN. When the "INT/EXT" switch is in the "EXT" position, the external trigger (+5 Volts, PW ≥ 50 ns) is applied to this connector. This input presents a high impedance (1 M Ohm).

(6) GATE Input. The GATE input will suppress the triggering of the instrument if taken to a TTL HIGH level (i.e. 0.5 to 5.0V). If it is left open or taken to a TTL LOW, normal triggering will occur ($R_{IN}$ = 1K).

(7) REPETITION RATE Controls. The rotary switch marked "RANGE" selects the pulse repetition rate for the internally triggered mode. The venier (labeled "MIN-MAX") provides continuously variable control of each range. There are four ranges and the instrument is set to the rate indicated on the front panel when the vernier is in the "MAX" position.

100 Hz - 1 kHz
1 kHz - 10 kHz
10 kHz - 100 kHz
100 kHz - 1.0 MHz

(8) DELAY Controls. The rotary switch selects one of three ranges and the vernier provides continuously variable control of each range. The instrument is set to the delay indicated on the front panel when the vernier is in the "MAX" position.

100 ns - 1 us
1 us - 10 us
10 us - 100 us

(9) ADVANCE, DELAY, DOUBLE PULSE. With this three position switch in the ADVANCE position, the leading edge of the output pulse precedes the leading edge of the SYNC output. When in the DELAY position, the leading edge of the SYNC output precedes the leading edge of the main output. When in the DOUBLE PULSE position, the main output provides two successive output pulses having a separation determined by the DELAY (8) controls.

(10) PULSE WIDTH Controls. The rotary switch selects one of three ranges and the vernier provides continuously variable control of each range. The instrument is set to the pulse width indicated on the front panel when the vernier is in the "MAX" position.

| | | | |
|---|---|---|---|
| x1 Range: | 100 ns- 1 us | x10 Range: | 1 us- 10 us |
| | 1 us- 10 us | | 10 us-100 us |
| | 10 us-100 us | | 100 us- 1 ms |

(11) POLARITY Switch. If the polarity switch is in the "+" position, the main output pulse will pulse upwards (i.e. to a more positive level). If it is in the "-" position, the output will pulse downwards to a more negative level. If the setting of the polarity switch is changed when the output amplitude is relatively high (eg. > 25 Volts in the 2 Ohm range or ≥ 12 Volts in the 50 Ohm range), the output pulse will vanish for several tens of seconds until the high voltage levels on the output stage decay to a safe level. At that time the output will again become active. Note that the decay-delay time may be reduced significantly by briefly setting the rear panel HV switch in the "OFF" position (and then returning it to the "ON" position).

(12) R OUT RANGE Switch. A two-position switch which sets the output resistance at 2 Ohms or 50 Ohms. In the 2 Ohm range, the unit will provide up to 100 Volts (to a 50 Ohm load) while in the 50 Ohm range, the unit will provide up to 50 Volts to a 50 Ohm load.

(13) AMPLITUDE FINE. The ten turn amplitude vernier provides continuously variable control of the peak amplitude of the main output from 0 to 50 Volts (50 Ohm range) or 0 to 100 Volts (2 Ohm range). When the unit is operating at a low duty cycle and an attempt is made to reduce the output amplitude, the amplitude will decay slowly with a time constant of several tens of seconds. If a rapid decay is required, briefly switch the rear panel HV switch to the "OFF" position (and then back to the "ON" position).

(14) OUT. BNC connector provides output to load impedance of 50 Ohms or higher.

(15) OVERLOAD. An automatic overload protective circuit controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a very low impedance), 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 pulse width (i.e. switch to a lower range)
3) Removing output low load impedance (if any)
4) Reducing the output amplitude (i.e. switch to a lower range)

Note that the output stage will safely withstand a short circuited load condition.

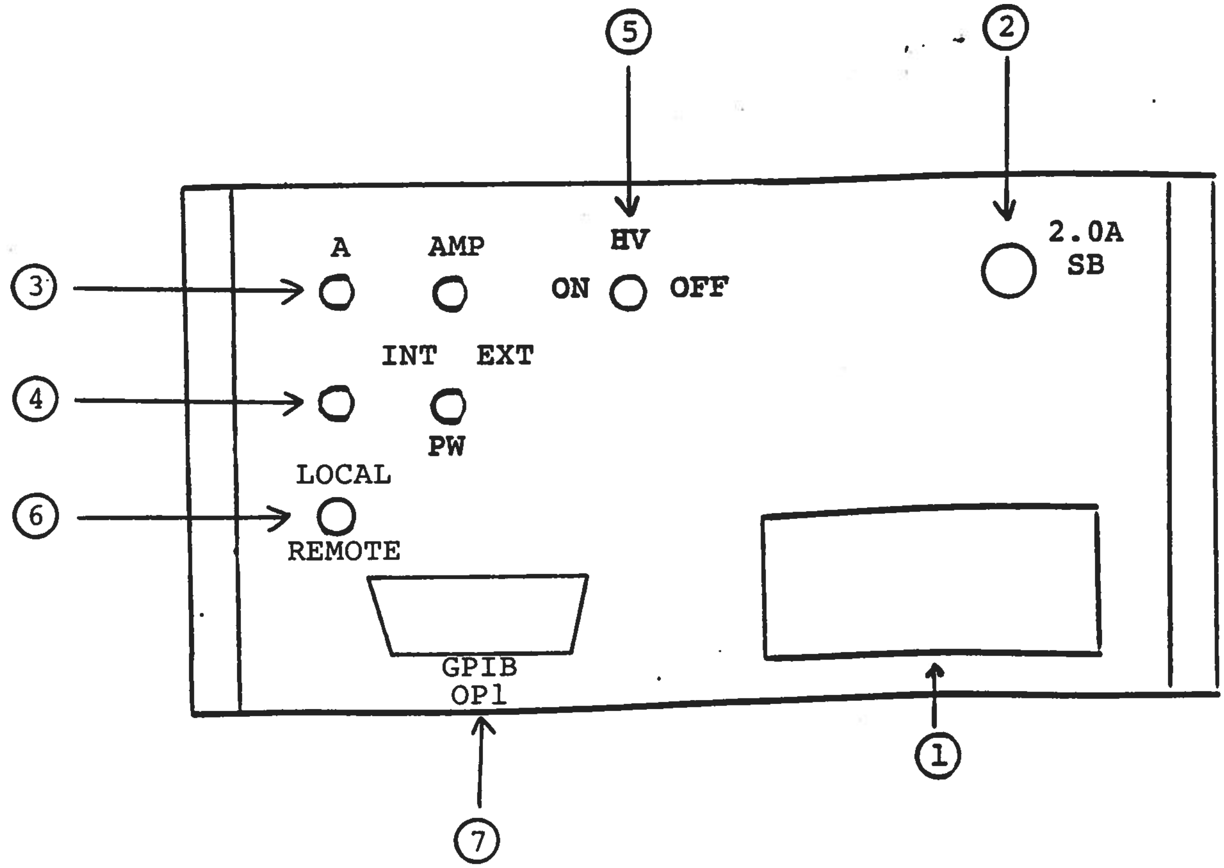



Fig. 2 **REAR PANEL**

## D) REAR PANEL CONTROLS

(1) AC POWER INPUT. A three-pronged recessed male connector is provided on the back panel for AC power connection to the instrument. Also contained in this assembly is a 1.0A slow blow fuse and a removable card that can be removed and repositioned to switch between 120V AC in and 240V AC in.

(2) 2.0A SB. This fuse protects the output stage if the output duty cycle rating is exceeded.

(3) AMP. To voltage control the output amplitude, set the switch in the EXT position and apply 0 to +10 Volts to the "A" BNC connector ($R_{IN} \geq 10K$).

(4) PW. The pulse generator may be triggered externally in a $PW_{OUT} = PW_{IN}$ mode by setting this switch in the EXT position and the front panel INT/EXT/MAN switch in the EXT position and applying a TTL level pulse of the desired pulse width to the A BNC connector.

(5) HV SWITCH. This switch must be in the "ON" position to obtain an output pulse. Note when the unit is operating at a low duty cycle and an attempt is made to reduce the output amplitude, the amplitude will decay slowly with a time constant of several tens of seconds. If a rapid decay is required, briefly switch the rear panel HV switch to the "OFF" position (and then back to the "ON" position). Also note that if the output pulse vanishes due to a changing of the position of the polarity (see paragraph 12, Front Panel Controls), the pulse recovery time may be reduced significantly by briefly setting the HV switch in the "OFF" position (and then returning it to the "ON" position).

(6) LOCAL-REMOTE SWITCH. This two-position switch must be in the LOCAL position to operate the instrument from the front panel controls. To control the instrument using your personal computer, the switch must be in the REMOTE position.

(7) OP1 CONNECTOR. GPIB cable (supplied) connects between this connector and your personal computer.

## E) TOP COVER REMOVAL AND RACK MOUNTING

1) The interior of the instrument may be accessed by removing the four Phillips screws on the top panel (see Fig. 1). With the four screws removed, the top cover may be slid back (and off).

2) The -R5 rack mount kit may be installed after first removing the one Phillips screw on the side panel adjacent to the front handle (see Fig. 1).

## F) ELECTROMAGNETIC INTERFERENCE

To prevent electromagnetic interference with other equipment, all used outputs should be connected to shielded 50 Ohm loads using shielded 50 Ohm coaxial cables. Unused outputs should be terminated with shielded 50 Ohm BNC terminators or with shielded BNC dust caps, to prevent unintentional electromagnetic radiation. All cords and cables should be less than 3m in length.

## F) THEORY OF OPERATION AND BASIC CIRCUITS

### BLOCK DIAGRAM DESCRIPTION

Refer to the Block Diagram (Fig. 3) for the following explanation.

The instrument is triggered by either an internal oscillator or an external source.

The INT/EXT switch controls a gate that selects either the internal oscillator or the EXT trigger input. The output of this gate leads to an AND gate. The second input of the AND gate is the TTL complement of the GATE input, so that when the GATE input is TTL low (0V), the AND gate passes the trigger pulses and inhibits them when the GATE input is high.

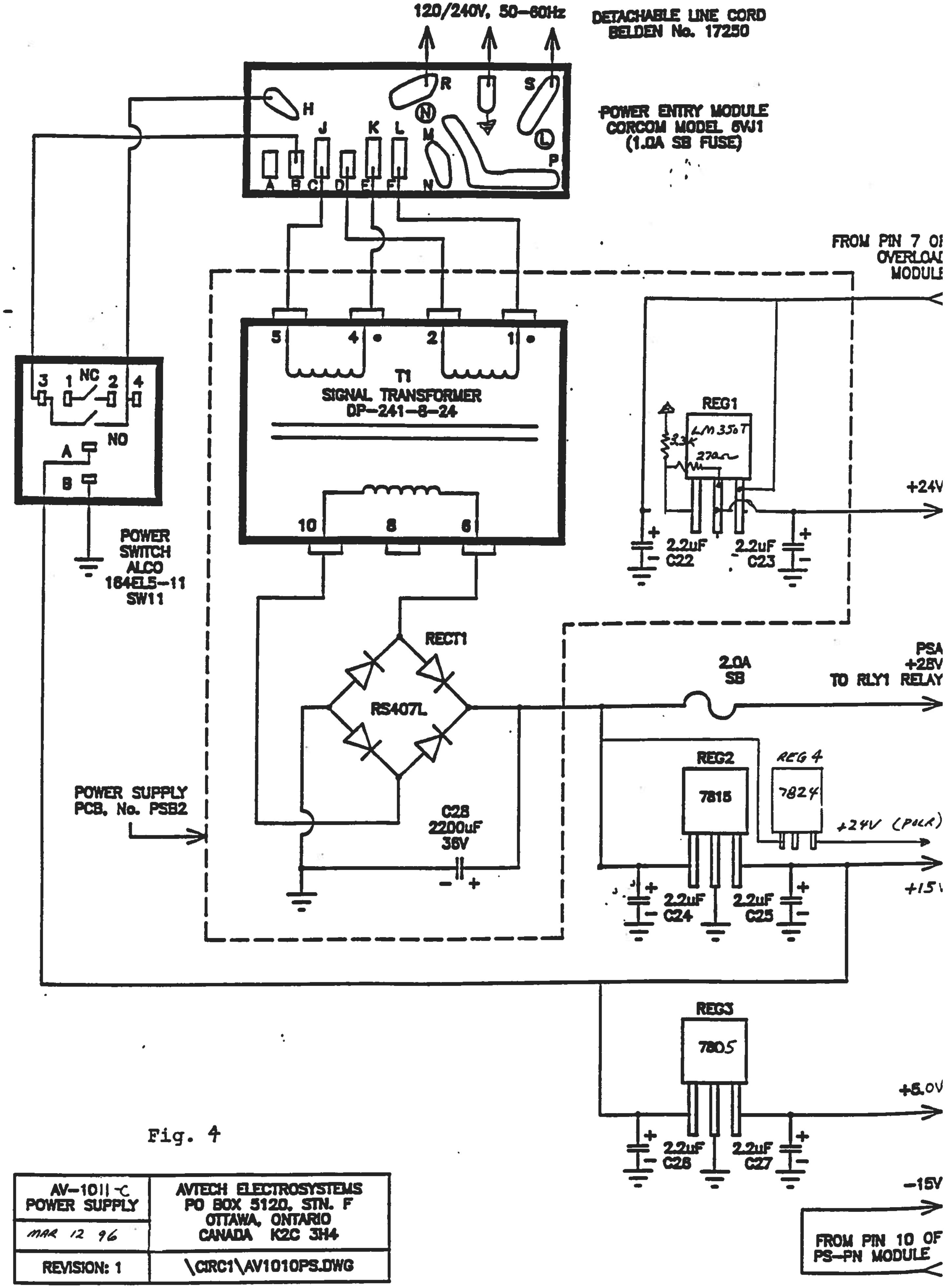
At this point, the trigger signal is split into two parts. The lower channel drives a one-shot circuit, which delays the pulse, which is then buffered. The upper channel is buffered only. When in the DELAY or DOUBLE PULSE modes, the upper channel is connected, by a switch, to the front panel SYNC output. In the ADVANCE mode, the lower channel is connected instead.

The two channels then pass through the double-pulse circuitry. When in the ADVANCE or DELAY modes, both signal pass unaltered. In the DOUBLE PULSE mode, the upper channel is unaltered, but the two input channels are combined to create a new signal on the lower channel, yielding a series of double pulses.

When in the ADVANCE mode, the upper channel is switched in to drive the next circuit stage, the pulse width controller. In the DELAY or DOUBLE PULSE mode, the delayed lower channel drives the pulse width circuit. The output of the pulse width stage is a TTL pulse whose pulse width is equal to the pulse width of the instrument's front panel output.

At this stage, the user has the option of completely bypassing the instrument's timing circuitry by using the back panel PW switch and input connector. When the switch is in the INT position, the output of the pulse width stage is connected to the output stages of the instrument. In the EXT position, the output stages can be driven by TTL pulses on the back panel connector.

The output stages are all-solid-state, MOSFET totem pole circuits. There is a positive output and a negative output stage and the polarity switch selects one of the two outputs. The pulse width of the output pulse is equal to the pulse width of the input pulse and the amplitude of the output pulse is controlled by the DC voltage applied to the circuit.



120/240V, 50-60Hz
DETACHABLE LINE CORD
BELDEN No. 17250
POWER ENTRY MODULE
CORCOM MODEL 6VJ1
(1.0A SB FUSE)
H
R
S
N
L
J
K
L
M
P
A B C D E F N
FROM PIN 7 OF
OVERLOAD
MODULE
5
4
2
1
T1
SIGNAL TRANSFORMER
DP-241-8-24
10
8
6
3 1 NC 2 4
NO
A
B
POWER
SWITCH
ALCO
164EL5-11
SW11
REG1
LM 350T
3.3K
270Ω
+24V
2.2uF
C22
2.2uF
C23
RECT1
RS407L
C28
2200uF
35V
POWER SUPPLY
PCB. No. PSB2
PSA
+28V
TO RLY1 RELAY
2.0A
SB
REG2
7815
REG 4
7824
+24V (POLR)
+15V
2.2uF
C24
2.2uF
C25
REG3
7805
+5.0V
2.2uF
C26
2.2uF
C27
-15V
FROM PIN 10 OF
PS-PN MODULE
AV-1011-C
POWER SUPPLY
MAR 12 96
REVISION: 1
AVTECH ELECTROSYSTEMS
PO BOX 5120, STN. F
OTTAWA, ONTARIO
CANADA K2C 3H4
\CIRC1\AV1010PS.DWG


Fig. 4

## 1.0 Introduction

This section describes how to use the OP-1 GPIB interface for remote computer control of the Avtech pulse generator, by means of the IEEE 488 General Purpose Interface Bus (GPIB).

The available commands and their structure, a typical command sequence and a sample program are included. In addition, possible methods of incorporating remote duty cycle limit checking and instructions on how to change the GPIB address are provided

## 2.0 Interface to the GPIB

The IEEE 488 compatible Bus functions available to the user for GPIB control are as follows: The listed functions define a listen-only capability:

- SH0, AH1, T0, TE0, L2, LE0, SR0, RL0, PP0, DC1, DT0, C0.

## 2.1 Available Commands

The OP-1 GPIB user interface is designed to be used to remotely program the Avtech pulse generator to control the pulse repetition rate, pulse width, pulse amplitude and delayed (or advanced) trigger output.

The available command acronyms, outputs, units and range of acceptable values for the AV-1011-C generator are defined in the table below:

| Acronym | Output | Units | Range | Decades |
|---|---|---|---|---|
| V | Voltage amplitude | Volts | 0 to 100 | |
| R | Repetition rate | Hertz | 1 to 1000000 | 4 |
| W | Width of pulse | micro-sec | 0.1 to 100 | 3 |
| D | Delay (trigger) | micro-sec | 0.1 to 100 | 3 |
| A | Advance (trigger) | micro-sec | 0.1 to 100 | 3 |
| P | Polarity | | + or - | |

## 2.2 Command Interpretation

The command may utilize the defined single letter acronym, or may be expanded to a longer word to make the control program easier to understand. This is because letters following the defined acronym letter are ignored. For example, a command of "V 70.2" will result in exactly the same result if the command is sent as "Voltage of output pulse = 70.2". However, it is mandatory that the first letter of each command be one of the five defined acronyms.

Acronyms are case insensitive, for example, "R" or "r" are the same.

The number following the acronym letter may be any number in the range specified, however, the number of significant digits are limited to one part in 255 (for 8 bits of output resolution). For example, amplitude values of 12.82, 12.83 or 12.82145 will all result in the same output. (Note that output resolution and accuracy are not necessarily the same).

Leading or trailing zeros in numbers will be ignored.

Numbers expressed in "exponential" format will NOT be interpreted correctly. For example, 3e+3 will be interpreted as 3, not as 3000.

The range of the specified values must be as specified for the equipment. Numbers outside the range will be ignored.

If desired, trailing text may be added to make the control program easier to understand, since it will be ignored. For example, a command of "width =77" will result in the same output as the command " width = 77 microseconds".

The term "Delay" is used to specify the duration of the delay between the trigger output pulse and the occurrence of the actual output pulse. The term "Advance" similarly refers to the amount of time the trigger pulse will occur prior to the output pulse.

If an invalid command is sent, the unit will ignore the command and the previous value will remain unchanged. If an "out-of-range" value is sent, the unit will also ignore the command.

The polarity of the output pulse is controlled by sending the letter P followed by a + sign for positive or a - sign for negative.

## 2.3 Typical Command Sequence Interpretation

Assume the following commands are sent using the computer, using the appropriate command structure as specified for the user's GPIB controller. Note that the default GPIB address is eight.

```
R=1000
W=30
V= 30
A=10
P=+
```

For example, for a GPIB controller from National Instruments, the following set of commands would be sent:

```
ibwrt "r=1000"
ibwrt "w=30"
ibwrt "v=30"
ibwrt "a=10"
ibwrt "P=+"
```

This command sequence will cause the generator to produce a series of positve output pulses of width 30 micro-sec and an amplitude of 30 volts peak, repeated at a rate of 1000 pulses per second. An oscilloscope attached to the generator output will confirm the result. If the generator output trigger port is used, it will be noted that each output pulse will be delayed 10 micro-sec after the trigger pulse occurs.

## 2.4 Sample Program

To illustrate the remote control process by means of the GPIB, a sample program written in BASIC is provided. While this example is prepared for use with the B&C MicroSystems PC488 circuit card, the general principles of control apply to any IEEE 488 GPIB Controller.

```
'TEST of Pulser Controller
OPEN "PC488" FOR OUTPUT AS #1
PRINT #1, "ABORT"
PRINT #1, "CLEAR"
PRINT #1, "OUTPUT 8;V", 30
PRINT #1, "OUTPUT 8;W", 30
PRINT #1, "OUTPUT 8;R", 1000
PRINT #1, "OUTPUT 8;A", 10
PRINT #1, "OUTPUT 8;P", +
END
```

## 3.0 Duty Cycle Limits

Typically, Avtech pulse generators are limited to a maximum duty cycle because of thermal constraints, where duty cycle is the ratio of Pulse Width to the reciprocal of the Repetition Rate (i.e.; R times W). Although the generator contains automatic protection against an excessive duty cycle, whenever this protection is activated, the output is inhibited. Therefore, it may be desirable to have the control computer calculate the duty ratio, then generate a warning message to the operator whenever the limits are exceeded (preferably prior to actually sending the command sequence).

This message could caution the user either to reduce the repetition rate or the pulse width, to avoid thermal overload.

While this calculation is not mandatory, it could avoid the annoyance of automatic inhibiting of the generator output.

## 4.0 Changing the Unit GPIB Address

Since the GPIB data bus address for the pulse generator has been preset to "8" in the factory, commands are required to be sent to this address. However, the user may wish to change the address to any address in the allowed range of 0 to 30. This address may be easily changed by re-setting the GPIB address switch on the GPIB Interface board located inside the pulse generator chassis.

The address is set by means of a five position "Dipswitch " located on the top of a small circuit card located inside the enclosure near the top rear. The switch may observed to be set to the default address by noting that the Dipswitch position 4 is set in the OFF position, defining a binary address of 8.

The switch setting is calculated as the sum of the switch weights in the OFF position, calculated as follows: (a switch in the ON position it has a weight of zero):

| Switch Number | OFF Weight |
|---|---|
| 1 | 1 |
| 2 | 2 |
| 3 | 4 |
| 4 | 8 |
| 5 | 16 |

For example, a switch with positions 1, 4 and 5 set to OFF will result in an address setting of 25 (16 plus 8 plus 1 = 25).

## 5.0 Trouble-Shooting Aid

In the event that difficulties are encountered communicating via the GPIB interface, two auxiliary communications status indicators have been included on the GPIB interface circuit card. These status indicators are small LED lamps, one which flashes briefly whenever a properly addressed command is received. The second LED will light whenever an out-of-range value or invalid command is received, and will remain lit until a valid command with a valid in-range value is subsequently received.

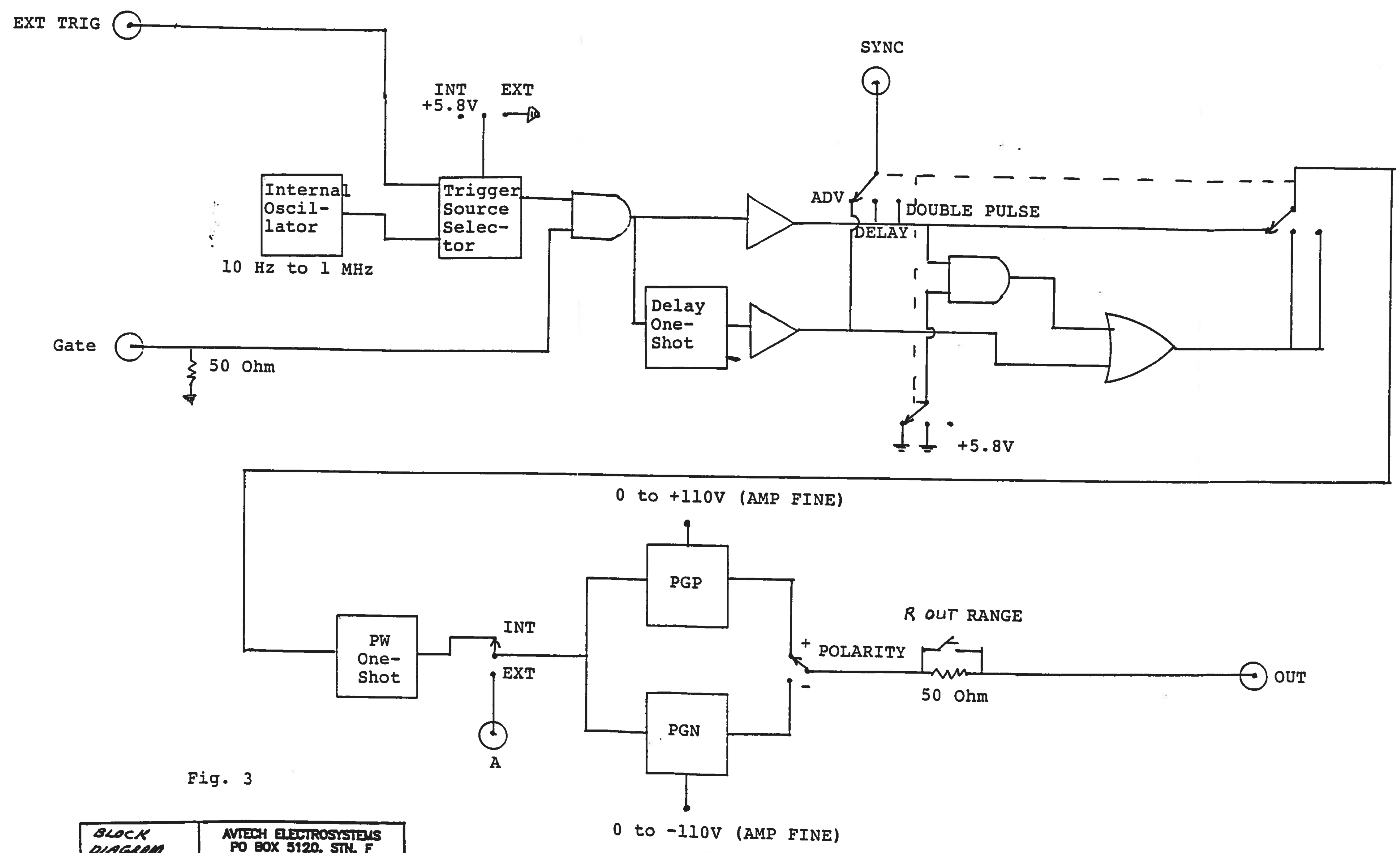



Fig. 3

| | |
|---|---|
| BLOCK DIAGRAM | AVTECH ELECTROSYSTEMS PO BOX 5120, STN. F OTTAWA, ONTARIO CANADA K2C 3H4 |
| AUG. 2 1994 | |
| REVISION: 1 | \CIRC1\AV1010PS.DWG |

MODEL AV-1011-C BLOCK DIAGRAM

March 12/96

Old - use the set saved in word

Disk: AV-1011

Name: 1011COP1.INS