AVTECH ELECTROSYSTEMS LTD.
NANOSECOND WAVEFORM ELECTRONICS

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

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

INSTRUCTIONS

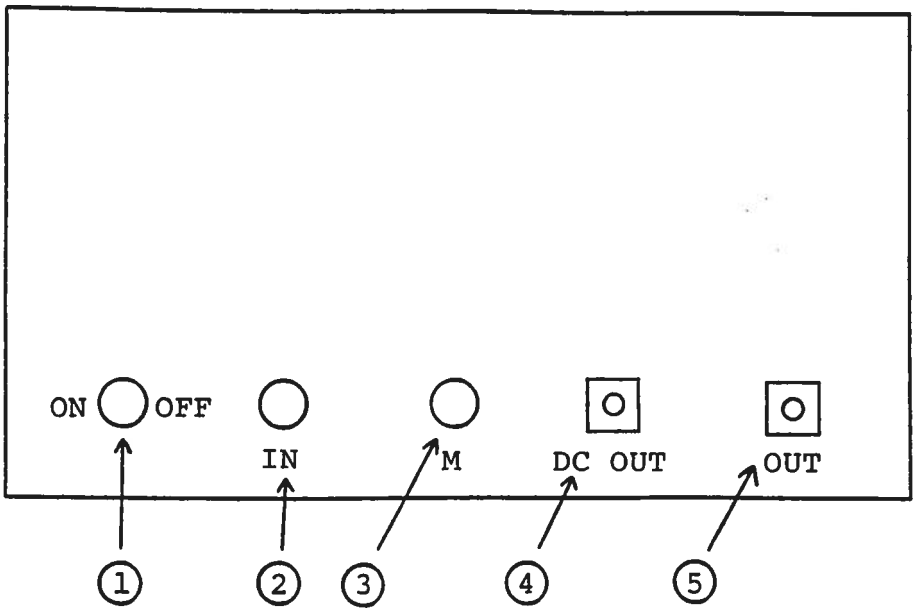
MODEL AVS-100-PS-R4-USN2 SAMPLE AND HOLD UNIT

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 FRONT PANEL CONTROLS



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

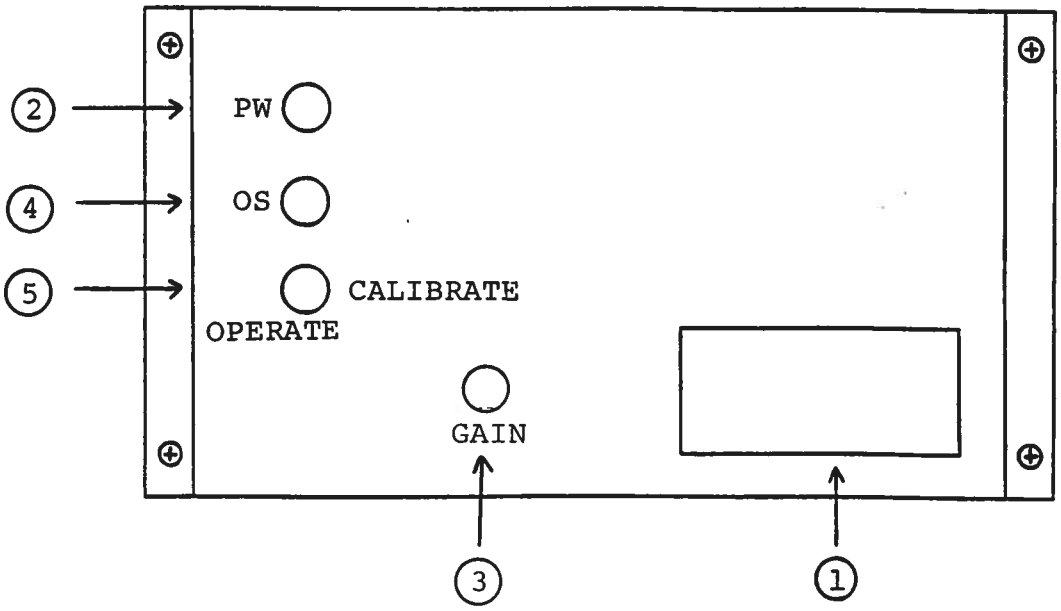
(2) IN. SMA connector to which +5 to +500 mV 5 ns wide trigger pulse is applied to activate sampler and to be sampled. Sample is taken 12 ns after the leading edge of the input pulse. Fifty ohm input impedance.

(3) M (MONITOR) Output. SMA connector provides a +1 volt replica of the sample pulse to a fifty ohm load. The width of the M output pulse is controlled by the back panel PW control and is equal to the width of the sample pulse which operates the sampling gate (0.2 to 4 ns). The M output appears 14 ns after the application of the IN pulse. The input signal is sampled 2 ns before the leading edge of the M output.

(4) DC OUT. DC output amplitude equals IN amplitude. GAIN control used to set output amplitude equal to IN amplitude and OS control to set to zero when IN set to zero. Terminate in 1 K or higher impedance. Will withstand short-circuit load.

(5) OUT. BNC connector connects 4 to 100 us wide pulse output to fifty ohm load. Output amplitude equals IN amplitude (GAIN control adjusts this). DC offset when IN amplitude equals zero set to zero using OS control.

Fig. 2 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 (0.25 Amp SB).

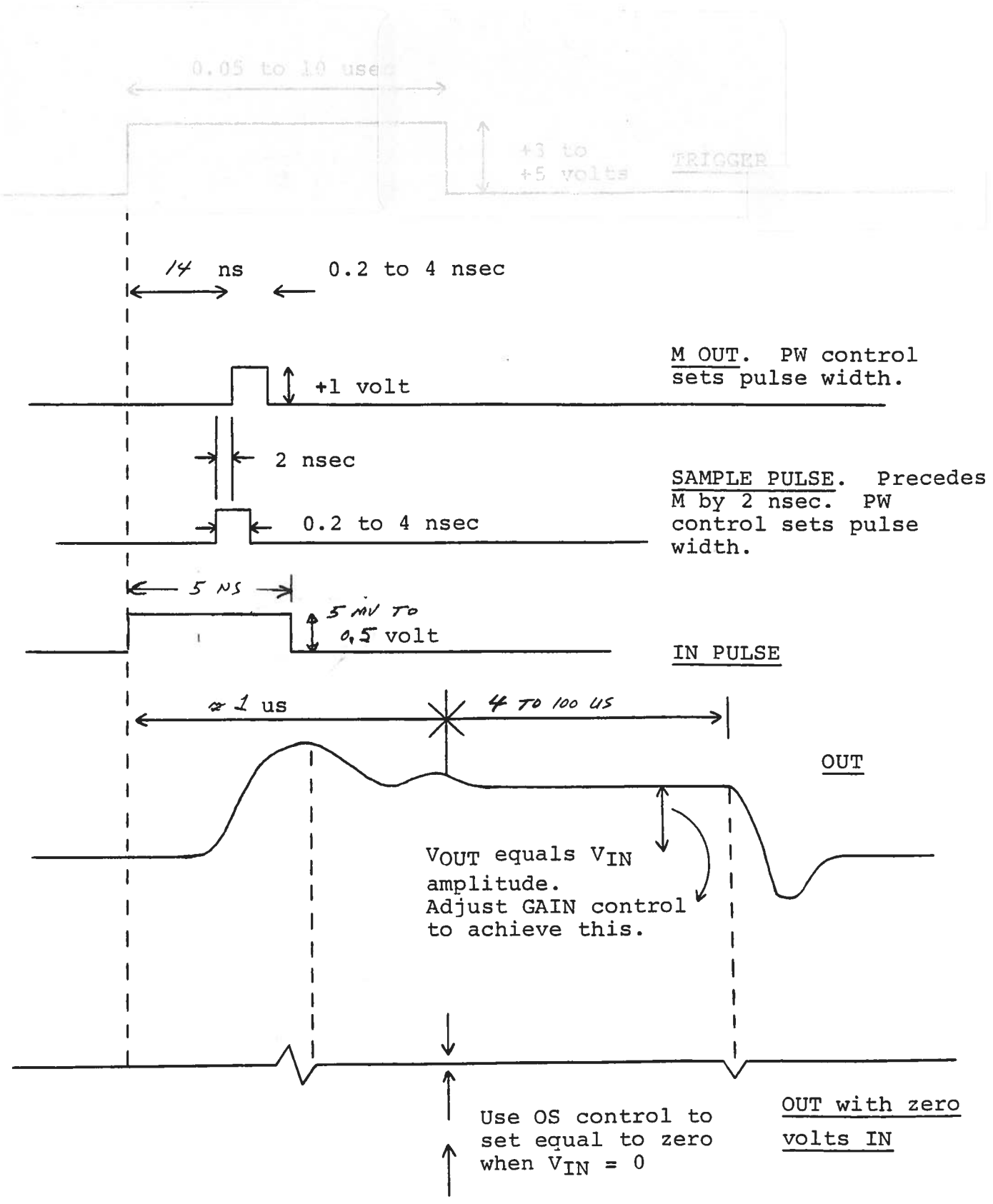
(2) PW Control. A one turn control which varies the M (and sample) pulse width from 0.2 to 4 ns. PW set at 1.0 ns at time of shipping.

(3) GAIN Control. A one turn control used to set OUT amplitude equal to IN amplitude. Note that this control has a small locking screw on the side of the mounting bearing.

(4) OS Control. A one turn offset control used to set OUT amplitude equal to zero when IN amplitude equals zero.

(5) OPERATE-CALIBRATE. A DC signal of known amplitude (500 mV) is applied to the input of the AVS-100-PG module (see Fig. 5) when the switch is in the calibrate position (and the DC control pot on the side of the -AMP module is set fully CW, as at time of shipping). The gain pot (3) is then adjusted to set the output amplitude to 500 mV. The unit is now calibrated and to be used, the switch is placed in the operate position.

Fig 3. TIMING WAVEFORMS



TEST PROCEDURE AND OPERATION INSTRUCTIONS

1) The arrangement shown in Fig. 4 may be used to calibrate and test the unit. Note that a warm-up period of 5 to 10 minutes is recommended.

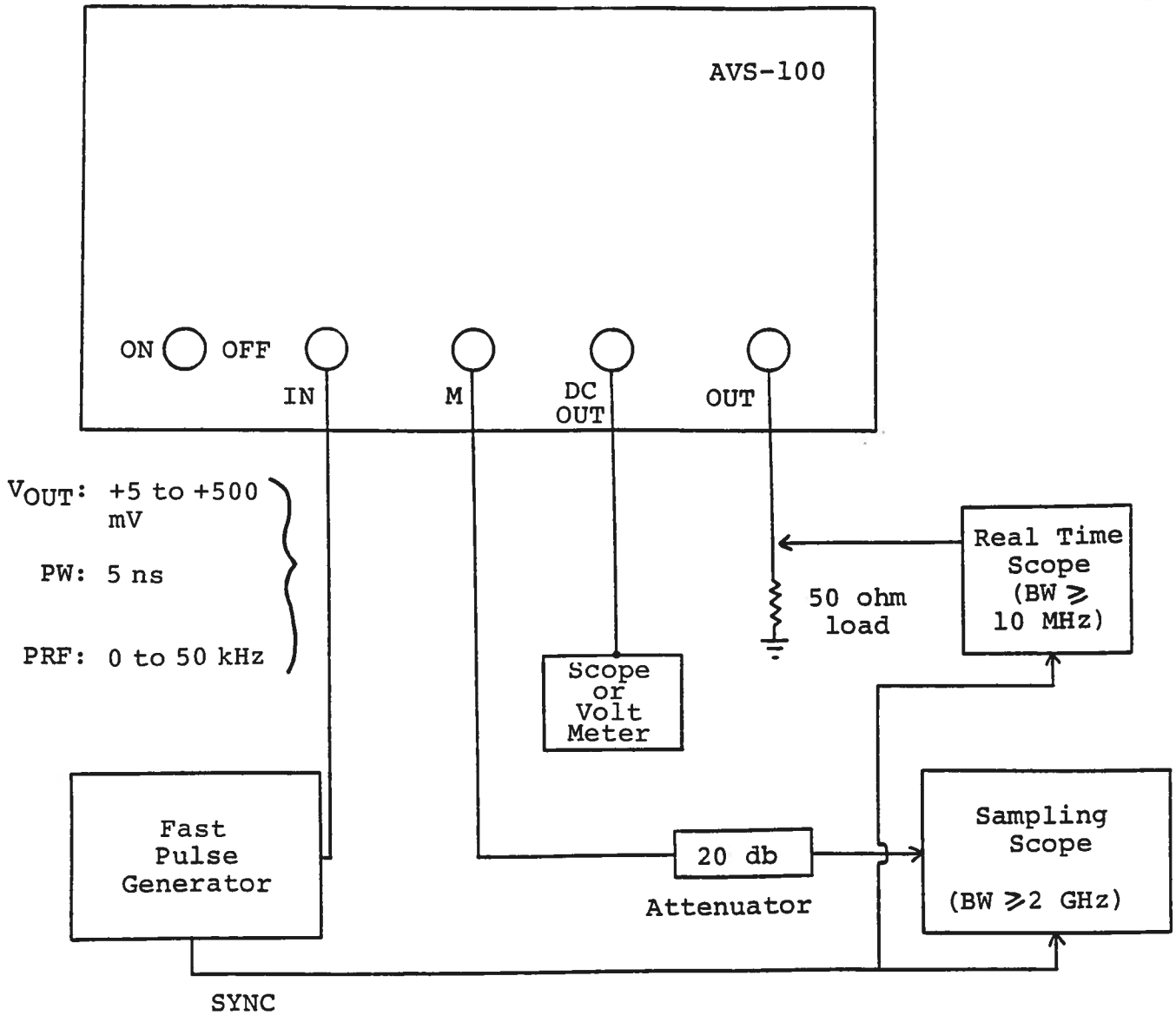


Fig. 4 TEST PROCEDURE

2) Apply prime power and with sampling scope and back panel PW control, set sampling pulse (or M) to desired width (see timing waveforms).

3) Set the CALIBRATE-OPERATE switch in the CALIBRATE position and use real time scope and OS control to set OUT level between pulses to approximately zero volts. (see timing waveforms).

4) Adjust GAIN control to obtain +0.5 Volt at OUT point (see timing waveforms) and at the DC OUT point. Note that the GAIN control has a small locking screw on the side of the mounting bearing.

5) The unit is now calibrated. Note that if PW of sample pulse is changed, it will be necessary to reset the GAIN control. Increasing the PW increases the output amplitude thereby requiring that the GAIN control be turned counter clockwise to again set the OUT amplitude equal to the IN amplitude.

6) The unit may now be tested with a short pulse applied to the IN port by setting the CALIBRATE-OPERATE switch in the OPERATE position. It should not be necessary to readjust the OS or GAIN controls but note that power splitter at the input to the PREAMP module will cause the amplitude at the OUT or DC output ports to be equal to 0.5 of the input pulse amplitude. Note that if the amplitude of the input pulse is known (eg. determined using the sampling scope) the unit may be calibrated using only the short pulse rather than using the DC levels.

7) When operating properly, the pulse output should appear as a train of 4 to 100 us pulses having 0.5 of the amplitude of the 5 ns pulses applied at the IN port. The base line between the pulses should be near zero and constant (or horizontal). If the base line between the pulses is not constant it may not be possible to calibrate the unit as previously described or the output amplitude may be a function of the PRF. To adjust the inter pulse base line, remove the instrument top cover by removing the four Phillips screws on the back panel of the instrument. The top cover may then be slid off exposing the module in the interior. With the unit triggered, the prime power on and the IN voltage set to zero adjust pots 5, 6, 7 and 8 on the module until the OUT voltage is near zero and constant. Note that only very minor adjustments of the pots should be necessary.

8) As the PW sample width is varied from 0.2 to 4.0 ns, the OUT level during the 4 to 100 us pulse out interval may vary and it may not be possible to zero using the rear panel OS control. In such cases, a minor change in the

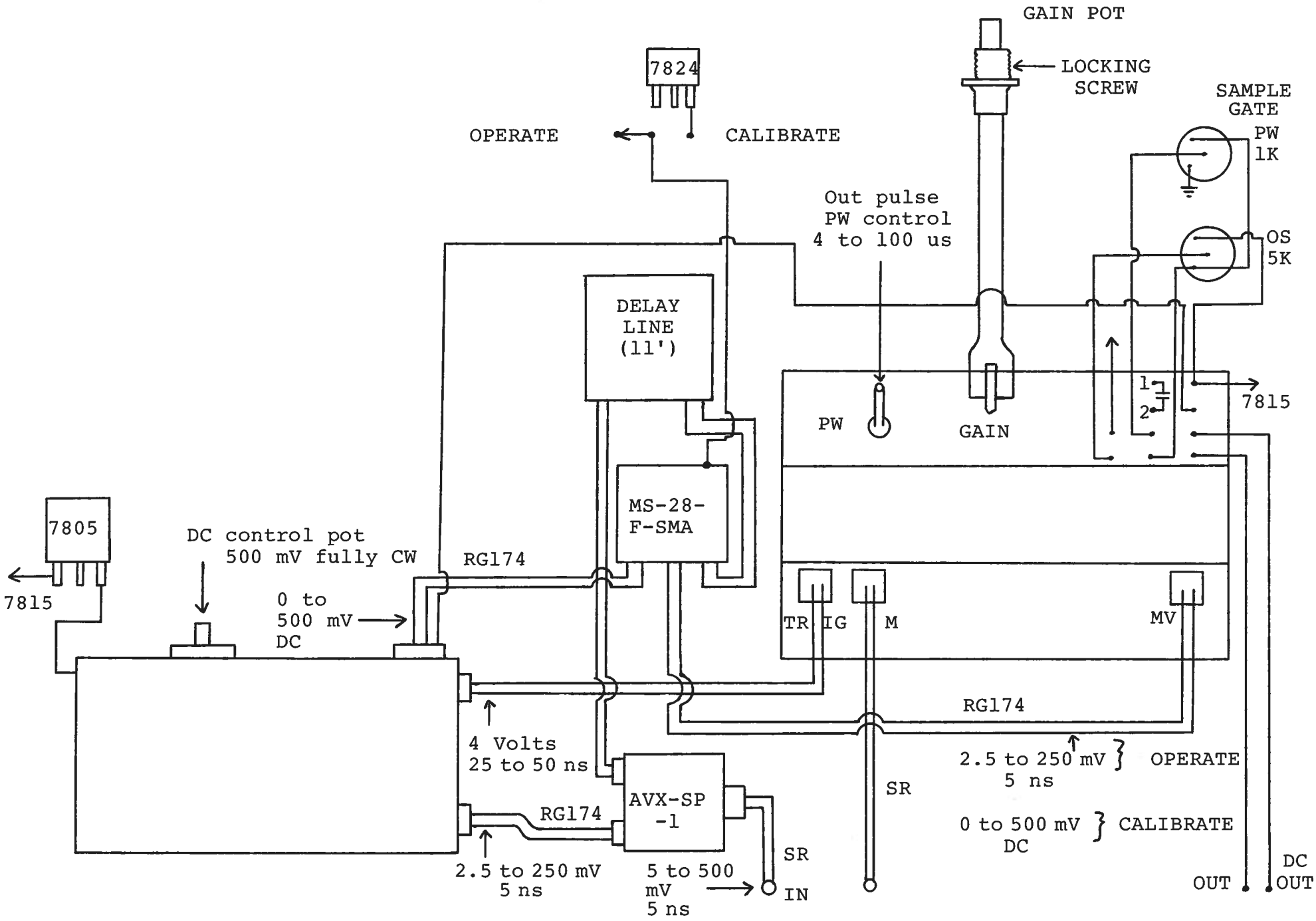
PW control may make a zero output possible. If this is not possible then minor adjustment to pots 1 and 2 on the sampler module can be made to establish a zero output.

9) Note that the output pulse width at the OUT port may be varied from 4 to 100 us using the one turn locking pot on the side of the AVS-100-PG module.

10) The droop on the DC OUT waveform is controlled by the capacitor connected between PINS 1 and 2 on the AVS-100-PG module (see Fig. 5). The unit is shipped with a 0.01 ufd PHILLIPS METALLIZED POLYESTER FILM CAPACITOR (SERIES 369) in this position. The value of this capacitor may be varied from 1000 pfd to 0.1 ufd but the capacitors should be the SERIES 369 type. CAUTION: When soldering and desoldering the capacitors, insure that the prime power to the unit is off. A NATIONAL LH0023CG sample and hold amplifier is used as the output element for the DC output. Note that this output will withstand a short circuit condition but is designed to operate into 1 K or higher.

11) Note that when the AVS-100-PS-R4-USN2 is untriggered (or triggered by an input substantially less than 5 mV) the output signal goes to about -1.5 Volts.

Fig. 5 AVS-100-PS-USN2-R4 (BLOCK DIAGRAM)



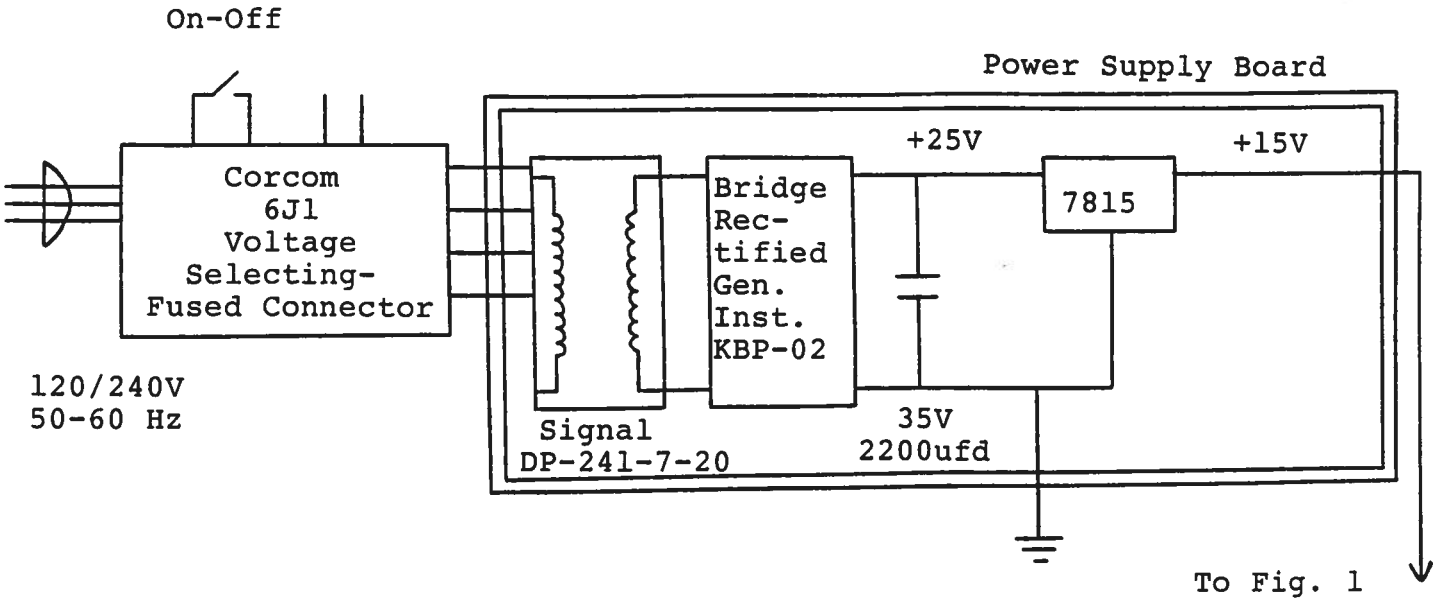
SYSTEM DESCRIPTION

The AVS-100 comprises the following basic modules:

1) AVS-100-PG sampler
2) AVX-SP-1 power splitter
3) AVS-USN2-AMP preamplifier
4) 110V 60 Hz to +15V power supply board

The modules are interconnected as shown in the preceding diagram.

The sampler attenuates the signal applied at the IN port of the module and takes a 0.2 to 4 ns wide sample of this signal. The resulting sample voltage is stored on a small capacitor which shunts a high impedance input amplifier. The capacitor is discharged to zero after 4 to 100 us by a shunting switch. Variable gain output amplifiers boost the capacitor voltage so that the peak output voltage equals the amplitude of the voltage applied to the IN terminal of the AVS-100 unit. The AVX-SP-1 power splitter splits the signal applied to the IN port and provides 0.5 to the AVS-USN2-AMP preamplifier and 0.5 to the AVS-100 sampler module (via an 11 foot long delay line). The AVS-USN2-AMP preamplifier amplifies the input pulse to +4 Volts (for input pulses from +5 to +500 mV) and stretches the pulse width to $\geqslant$ 20 ns. This stretched pulse is then used to trigger the sampling circuits in the AVS-100-PG module.


On-Off
Power Supply Board
Corcom
6J1
Voltage
Selecting-
Fused Connector
120/240V
50-60 Hz
Signal
DP-241-7-20
Bridge
Rec-
tified
Gen.
Inst.
KBP-02
+25V
35V
2200ufd
7815
+15V
To Fig. 1

Schroff 02.04.92

- M
- OS