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NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

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INSTRUCTIONS

MODEL AV-151B-C-LT1 FUNCTION 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 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

Fax: 613-226-2802 or 1-800-561-1970

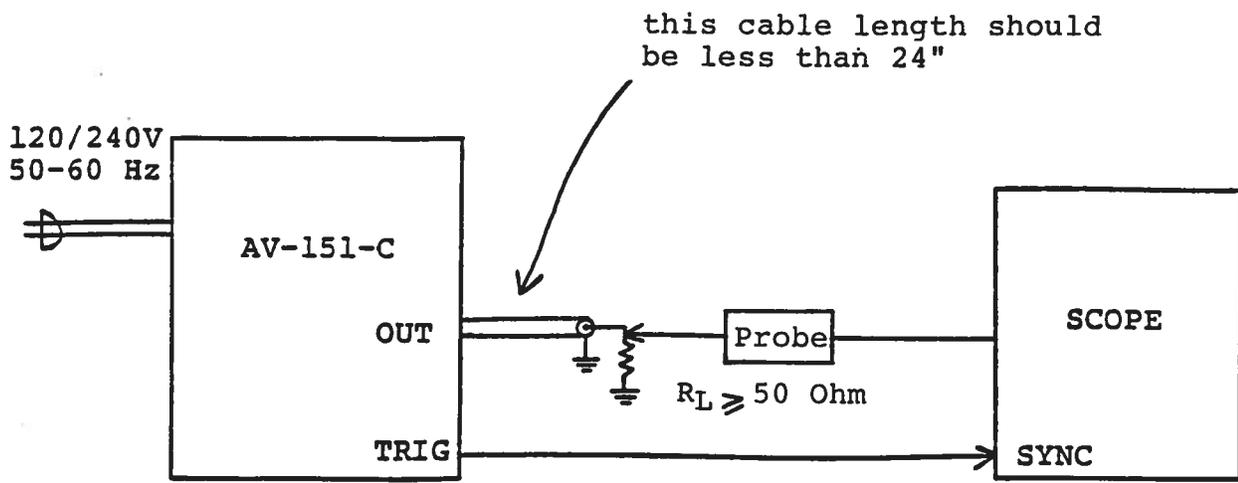
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FIG.1 BASIC TEST SET-UP



GENERAL OPERATING PROCEDURE

- 1) Connect the instrument as shown above. Do not apply prime power.
- 2) Terminate OUT in a load impedance of 50K (or higher). Note that the length of 50 Ohm cable between the output connector and the load should be less than 24" in order to avoid distortion of the waveform.
- 3) Set the amplitude control to maximum counter clockwise.
- 4) Set the offset control at 5.0 and the offset ON-OFF switch in the OFF position.
- 5) Set the INT-EXT switch in the INT position and the WAVEFORM selector switch in the SINE position.
- 6) Set the PRF range switch in the 10 kHz position (mid range).
- 7) Set the scope time base on about 50 us/div and the vertical on about 50 Volts/div and set the scope time base to trigger on EXT (+).
- 8) Turn on the prime power and adjust scope trigger controls to obtain a trace.
- 9) Rotate the amplitude control clockwise to obtain the desired output amplitude (as high as 400 Volts peak to peak).
- 10) Set the OFFSET ON-OFF switch in the ON position and rotate the OFFSET amplitude control to obtain the desired offset (0 to ± 150 Volts).
- 11) **CAUTION:** Take great care not to operate into a low impedance (i.e. $< 50K$) or into a short circuit as this may result in damage to the output stage.

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) Removing output load short circuit (if any)
- 2) Reducing the output amplitude

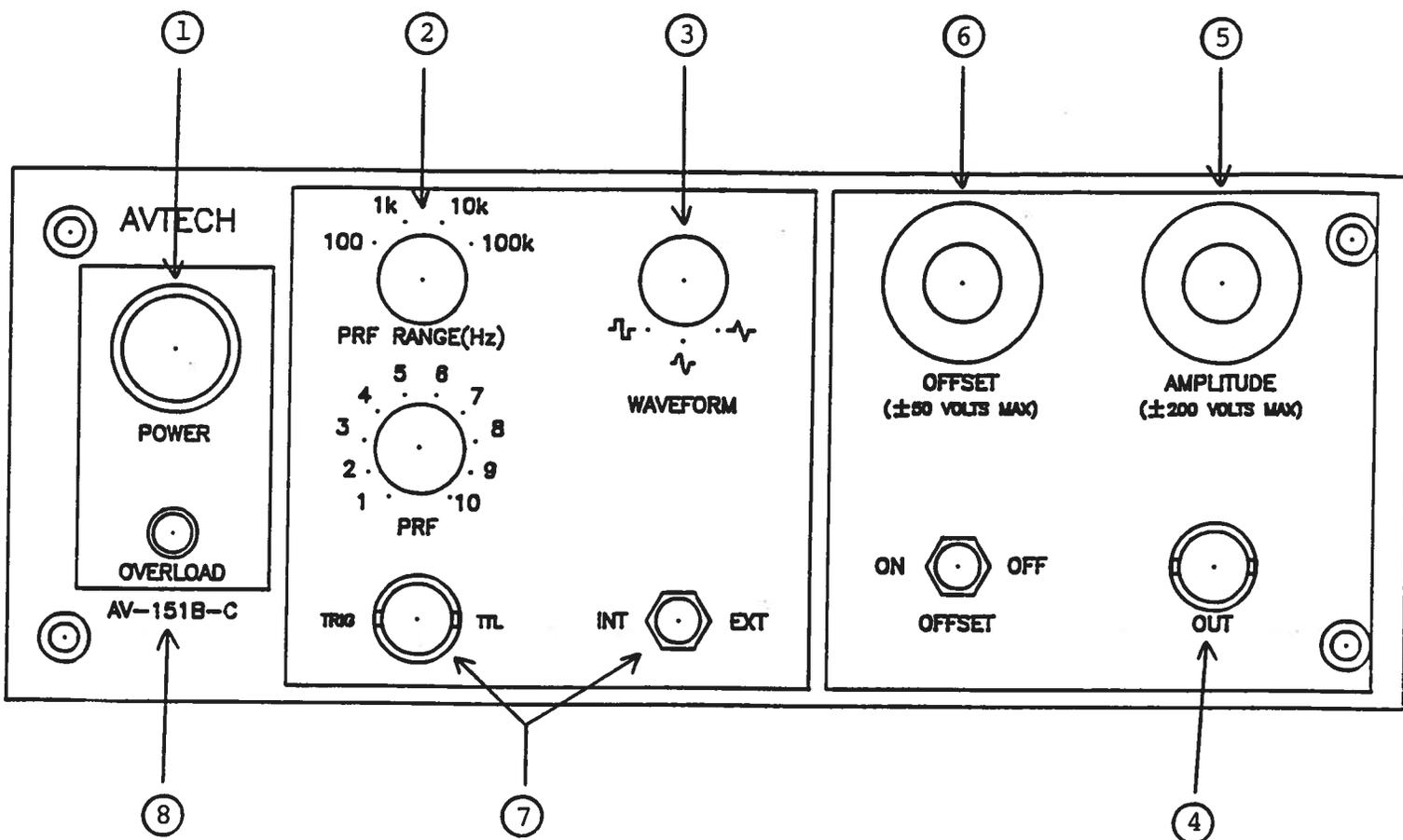
Note the overload light may activate when the prime power is turned on. The light will extinguish after a few seconds.

- 13) The output waveform may be changed to square wave or triangle by simply changing the position of the waveform selector switch.
- 14) To trigger the unit externally, set the INT-EXT switch in the EXT position and apply the signal to be amplified to the TRIG port ($V_{pp} \leq 4$ Volts, DC to 100 kHz). The AV-151-C unit then operates as a variable gain amplifier with a maximum gain of x100 and a maximum output of ± 200 Volts.
- 15) The unit can be converted from 120 to 240V 50-60 Hz operation by adjusting the voltage selector card in the rear panel fused voltage selector-cable connector assembly.
- 16) For additional assistance:

Tel: (613) 226-5772

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FIG. 2 FRONT PANEL CONTROLS



FRONT PANEL CONTROLS

- (1) ON-OFF Switch. Applies prime power to all stages.
- (2) PRF Control. Varies output PRF as follows:

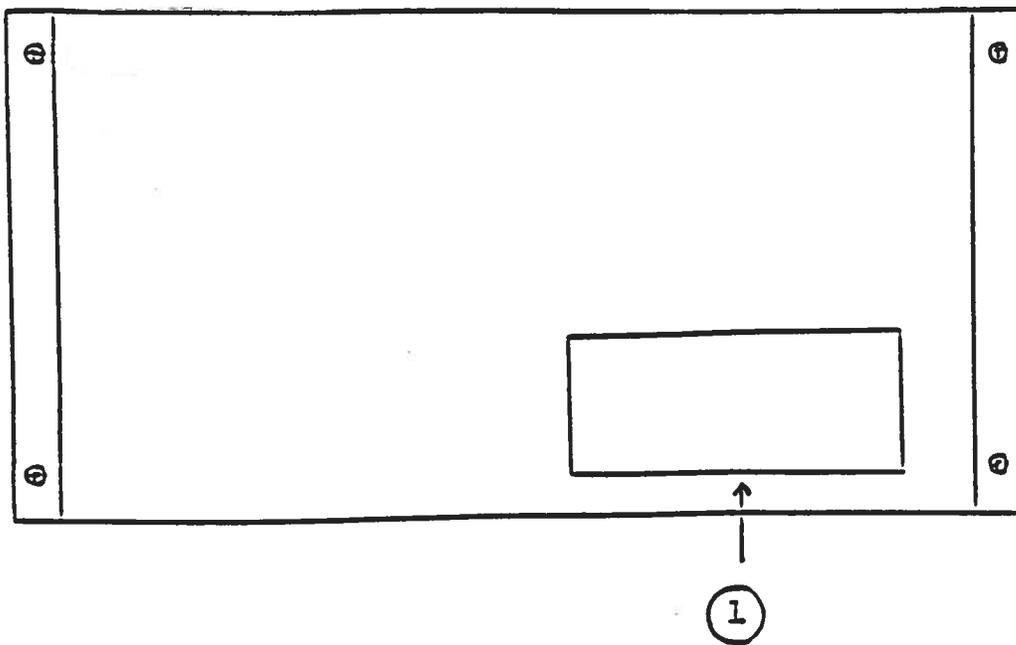
Range 1	10 Hz	100 Hz
Range 2	100 Hz	1 kHz
Range 3	1 kHz	10 kHz
Range 4	10 kHz	100 kHz
- (3) WAVEFORM. 3-position switch selects between square, sine or triangular output at (4).
- (4) OUT. BNC connector provides output to high impedance load ($\geq 50K$). Output may include 10 Hz to 100 kHz component and DC offset component.
- (5) AMPLITUDE. Ten turn control determines amplitude of 1 Hz to 1 kHz component at (4).
- (6) OFFSET. Ten turn control allows DC offset at (4) to be varied from 0 to ± 150 Volts. ON-OFF switch turns DC offset on or off.
- (7) INT-EXT, TRIG. With the two position switch in the INT position, the frequency and shape of the 10 Hz to 100 kHz component at (4) is determined by controls (2) and (3). Also, in this position a 5 Volt square wave is provided at the TRIG BNC connector for the purpose of triggering a scope. When the two position switch is in the EXT position, the AV-151B-C may be used as a DC-100 kHz variable gain (x100 max) amplifier. The required input signal is applied at TRIG for this mode of operation.
- (8) OVERLOAD. 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) Removing output load short circuit (if any)
- 2) Reducing the output amplitude

Note that the overload light may come on when the prime power is applied. The light will extinguish after a few seconds.

FIG. 3 BACK PANEL CONTROLS

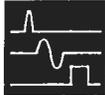


BACK PANEL CONTROLS

- (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 (0.5A SB).

OUTPUT DISTORTION, AMPLIFIER MODE

- 1) Clipping will result if the input amplitude exceeds 4 Volts peak to peak and please note that this input amplitude must be measured when the input signal is connected to the AV-151B-C Trig input. The Performance Check Sheet confirms that this unit does not exhibit clipping for inputs of less than 4 Volts peak to peak and confirms a maximum gain of 100.
- 2) The overshoot performance is demonstrated on the Performance Check Sheet. Overshoot may be caused by:
 - a) An uncompensated scope probe. This is critical. Please see your probe instruction manual.
 - b) Long (≥ 1 meter) 50 Ohm cables on the output, particularly if terminated in a capacitive load. We recommend that the cable length not exceed 24". Please call for assistance if this is not possible or if the load is capacitive in nature.

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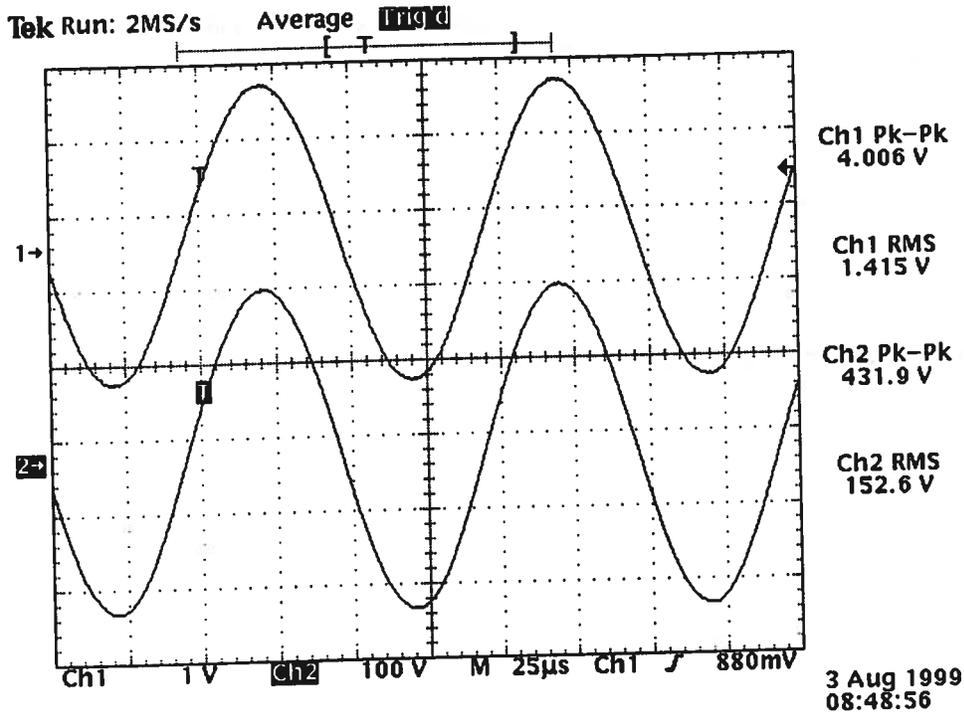
Fax No:	<u>4469</u>	Sender's Fax:	<u>613-226-2802</u>
File:	<u>Q:\office\FAXES\A-Z\Lucent Technology 4469.doc</u>	Receiver's Fax:	<u>908-582-3260</u>
To:	<u>Lucent Technology, Inc.</u> <u>Murray Hill, NJ</u>	Receiver's Phone:	<u>908-582-2254</u>
Attn:	<u>Arman Gasparyan</u>	Date:	<u>August 3, 1999</u>
Subject:	<u>AV-151B-C, SN 8947</u>	Number of pages:	<u>3, including cover</u>

- 1) We could not find a Model P6120 Probe in the Tektronix catalogue (or at their website). Which probe are you using and which scope?
- 2) We suspect that you are confusing peak to peak, RMS, and zero to peak voltage values in your measurements. We specify a maximum output of 400 Volts peak to peak. This corresponds to an RMS value of 140 Volts. A peak to peak input (when connected to the AV-151B-C) of 4 Volts (or 1.4 Volts RMS) will yield up to 400 Volts peak to peak on the output without clipping. If you are observing clipping on the output at voltages of less than 400 Volts peak to peak then your input voltage is larger than 4 Volts peak to peak (or 1.4 Volts RMS). Is it possible that your HP function generator LCD reads in RMS? Is it possible that the HP LCD reading assumes a 50 Ohm load impedance (rather than a high load impedance as is the case when connected to the AV-151B-C input)? What is the model number of the function generator?
- 3) I am enclosing detailed test results (and procedures) we have obtained using a unit which is identical to SN 8947. These results are essentially identical to those returned with SN 8947 and they are essentially identical to those obtained over many years of production. Our scope readings and volt meter readings are in complete agreement. You will note the absence of clipping and that peak to peak output voltages of at least 400 Volts are readily obtained.
- 4) To date we have not received from you any hard copy test results. Could you please provide such results along with a detailed sketch of your test procedures. Hopefully, such results would help us identify the error in your procedures.

Regards,

Dr. Walter Chudobiak
Chief Engineer

Results:



Top: 4.006 V peak-to-peak in (1.415 V_{RMS}), 10 kHz

Bottom: 431.9 V peak-to-peak out (152.6 V_{RMS})

HP400F measurement: 152 V_{RMS}