

**INSTRUCTION MANUAL**  
**FOR**  
**MODEL 370**  
**SOUND PRESSURE**  
**LEVEL METER**

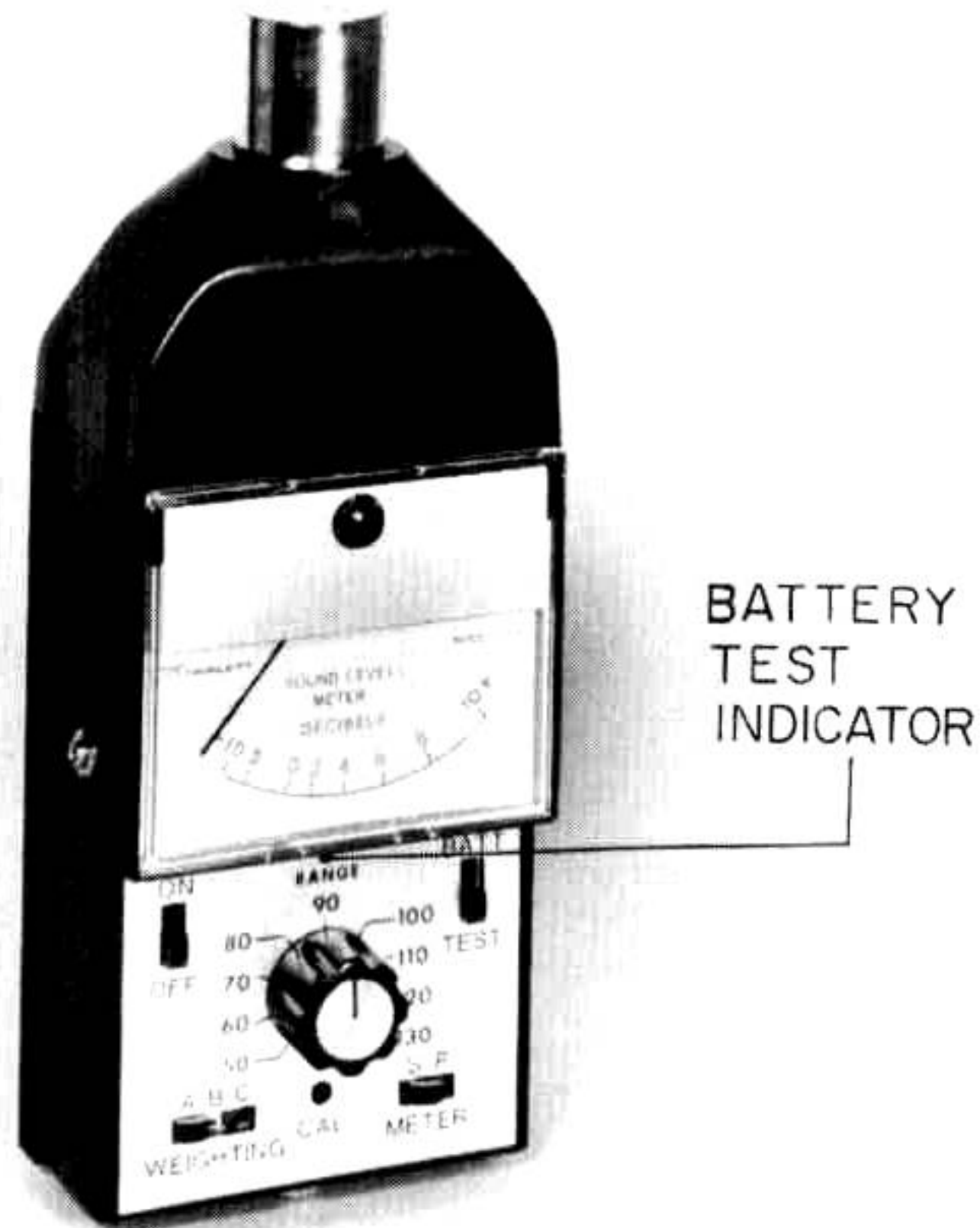
 **TRIPLETT**

BLUFFTON, OHIO 45817

**MODEL 370**  
**SOUND PRESSURE**  
**LEVEL METER**

# SOUND PRESSURE LEVEL METER

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# TRIPLETT 370 SOUND LEVEL METER

## SPECIFICATIONS

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<b>RANGE:</b>	40 to 140 dB (Re <del>.002</del> <sup>.0002</sup> Microbar).
<b>WEIGHTING:</b>	A, B, and C weighting in accordance with USA Standard S1.4-1971 for Type III Meters.
<b>MICROPHONE:</b>	Lead – Zirconate-Titanate Ceramic Unit.
<b>OUTPUT:</b>	Approximately 100 MV RMS into a 10K ohm load for a full scale meter reading. Output impedance is less than 10 ohm.
<b>METER:</b>	Quasi RMS response, with fast and slow meter speeds in accordance with USA S1.4-1971 Type III.
<b>OVERLOAD:</b>	With the indicating instrument replaced by an equivalent impedance the output of the 370 will not overload for input levels up to 8dB above maximum scale reading for frequencies from 63Hz to 8000Hz or any range or weighting.
<b>CALIBRATION:</b>	The Model 370 can be acoustically calibrated at frequencies from 125Hz to 2000Hz with any calibrator fixtured to accept a .936 diameter microphone. ANSI recommended frequency is 500Hz.
<b>OPERATING TEMPERATURE:</b>	20° F to 125° F temperature coefficient is +.02dB/° F.

**TRIPLETT MODEL 370  
SOUND PRESSURE LEVEL METER**

**STORAGE TEMPERATURE:** 0° F to 150° F battery removed.

**OPERATING HUMIDITY RANGE:** 5% to 85% R.H.

**POWER SUPPLY:** Two Neda 1604 batteries: life is approximately 40 hours, typical (Intermittent operation).

**MAGNETIC FIELD:** 1-Orsted field of 50 or 60Hz has no measurable effect on the Model 370.

**DIMENSIONS:** 7 1/4" long x 2" deep x 3" wide

**WEIGHT:** 1 lb. with batteries

**ACCESSORIES:** Carrying case and wind screen.

**CONDENSED OPERATING INSTRUCTION  
FOR CHECKING COMPLIANCE WITH OCCUPATIONAL  
SAFETY AND HEALTH ACT REGULATIONS**

1. Check Battery.
2. Place weighting switch in "A" position.
3. Place meter response switch in slow position.
4. Turn instrument on and point the microphone at right angles to the direction of the noise path keeping your body out of the path.
5. Adjust the range switch for an on scale reading (ie, between 0dB and +10dB on meter).
6. Add the meter reading to the level indicated on the range switch.

## 1.0 GENERAL DESCRIPTION

The TRIPLETT Model 370 is a general purpose sound level meter having a measuring range of 40 to 140dB referred to .0002 microbar. The instrument meets or exceeds the ANSI specifications S1.4-1971 for Type III Sound Level Meters. The 370 has A, B, and C weighting capability and fast or slow meter response. An AC output jack supplies an analog output signal of approximately 100MV RMS capable of being fed into external magnetic tape recorders, octave band analyzers or other similar analytical equipment.

The instrument is housed in a plastic and aluminum case with a tapered front end to minimize the effect of case diffraction.

## 1.1 CONTROLS

### 1.1.1 Range

A nine-position rotary switch selects the meter range in 10dB steps from 50dB to 130dB.

### 1.1.2 Weighting

A three-position slide switch selects A, B, or C weighted response of the meter and analog output.

### 1.1.3 Meter

A two-position slide switch selects either fast or slow response of the meter action.

### 1.1.4 On-Off

A slide switch energizes the amplifier when readings are to be taken.

### 1.1.5 Battery Test

A self return slide switch activates the battery test circuit.

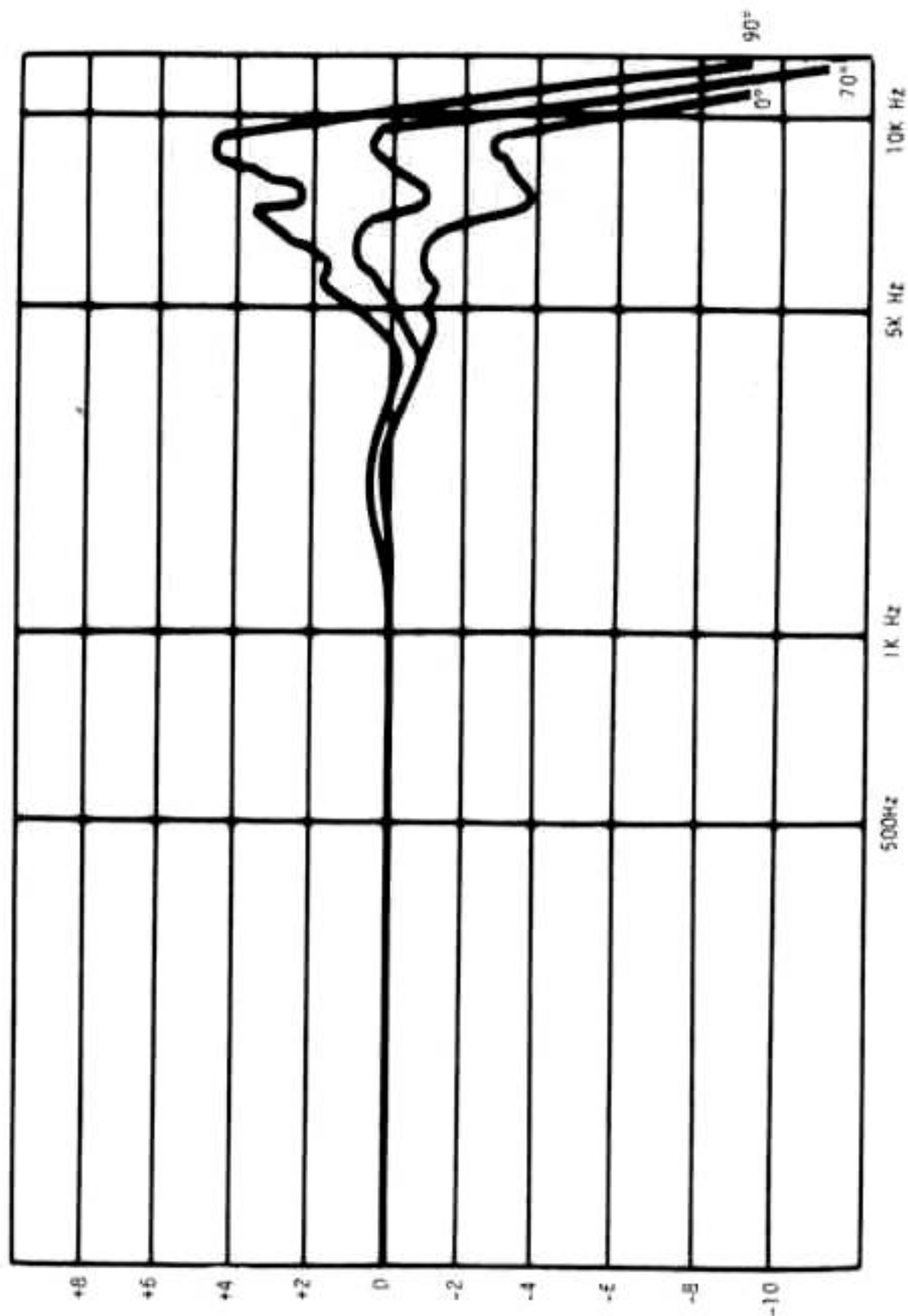


Fig. 1 Frequency Response as a Function of Incidence of the Type 370

### 1.1.6 Output Jack

A miniature phone jack supplies an AC output voltage proportional to the meter indication. The output for a full scale meter indication is approximately 100 MV RMS. The output should be loaded with no less than a 10K ohm load. The output impedance is less than 10 ohms.

## 2.0 PRINCIPLES OF OPERATION

### 2.1 MICROPHONE

The TRIPLETT Model 370 is supplied with an omnidirectional, measurement quality microphone. The generating element is of the lead-zirconate-titanate ceramic type. The dimensions of the microphone are such that it will adapt into any fixture designed to accept the current industry-standard Western Electric 640 AA Condenser Microphone.

### 2.2 CIRCUIT

The circuit of the 370 is entirely solid-state, employing three transistors and one integrated circuit.

A variable gain input circuit buffers the microphone from the weighting networks and permits selection of the appropriate meter range. The input from the weighting network is fed into a variable gain non-inverting voltage amplifier. The purpose of this amplifier is to boost the microphone signal and provide a means of calibrating the overall instrument sensitivity. The amplifier output drives the meter rectifier circuit which converts the AC analog signal to a DC current capable of driving the meter.

All circuits containing active elements are stabilized by means of negative feed back, insuring constant performance throughout the life of the batteries, and over the environmental temperature range of the instrument.

### 3.0 OPERATION

#### 3.1 BATTERY CHECK

Always check the battery before using the instrument. This is accomplished by turning the instrument on, pressing the battery test slide switch and observing the small LED indicator lamp. The battery condition is satisfactory if the lamp glows. Replace both batteries when the lamp does not glow or glows at a very low luminance.

Refer to the maintenance section of this manual to replace the batteries. If the instrument is to be stored for an extended period of time, the batteries should be removed.

#### 3.2 USING THE MODEL 370 INSTRUMENT

The instrument should be set to a high range before it is energized. Adjust the range switch for an indication between 0 and +10dB on the meter. The sound level is the algebraic sum of the range switch setting and the meter indication. The weighting of the response should be noted and included with any sound level data. Noise codes and acceptance-test procedures frequently specify the weighting characteristics to be used. OSHA requirements and the Walsh-Healey Act, for example, specify the measurements under relatively constant noise levels be taken with an A weighted meter. Fig. 2 shows typical weighting characteristics for the Model 370 instrument.

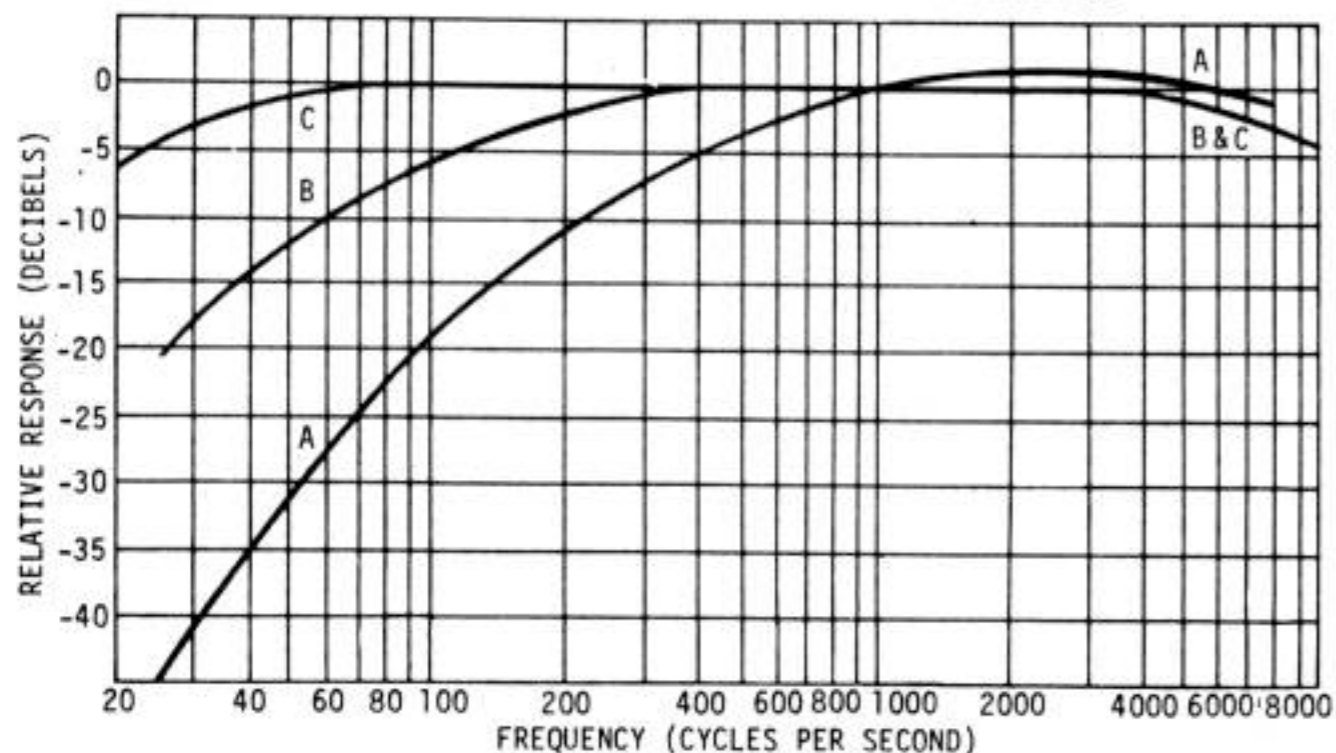


Fig. 2 A, B and C Weighted Responses for Sound Level Meters

If the sound level being measured is emanating from a specific direction, the instrument should be held perpendicular to the direction from which the sound is originating. When the meter fluctuations are too great to interpret, place the meter response switch in the slow position.

#### 3.3 EFFECT OF THE OPERATOR'S PRESENCE

If the sound is coming mainly from one direction, the sound-level reading may be affected by the relative positions of the measuring instrument and the observer. The Model 370 unit should not be held in front of the observer with the microphone pointed toward the source of the sound. The sound is reflected from the observer producing errors resulting in loss of accuracy in the response at high frequencies. The meter should be held with the microphone pointing perpendicular to the direction from which the sound is emanating.

#### 3.4 USING THE 370 IN ADVERSE ENVIRONMENTS

**3.4.1** Ambient vibration normally has very little effect on the performance of the 370. However, precautions should be taken to isolate the meter from excessive vibration when the more sensitive ranges are being used. Use of a tripod is often desirable as a means of vibration isolation.

**3.4.2** A wind screen should be employed if the 370 is used out of doors. The wind screen has no effect on sensitivity for frequencies up to 3K Hz, approximately .5dB loss up to 5K Hz and approximately 2dB loss up to 12K Hz. The wind screen is available as an accessory.

**3.4.3** Normal temperature variations do not significantly effect the performance of the 370; however in

extreme cases the use of the temperature coefficient should be employed to compute a correction to be added or subtracted from the meter indication. An alternate technique would be to calibrate the 370 just prior to making a measurement.

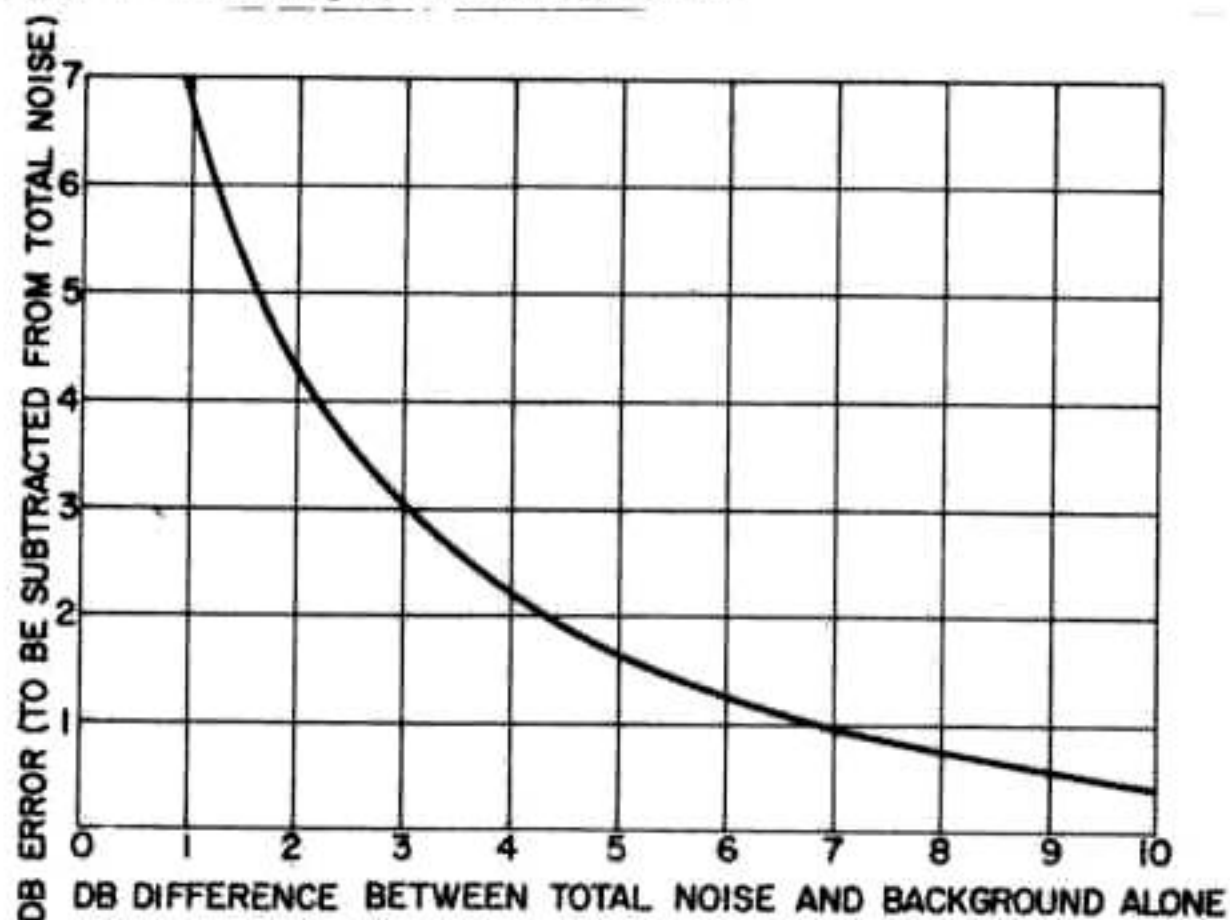


Fig. 3 Effect of Background Noise on Measurements

### 3.5 BACKGROUND NOISE

When measurements are being made to determine the noise levels generated by a specific source or piece of equipment, the background noise in the area should be as low as possible. For all weightings the background level should be at least 10dB below the level being measured. If this is not possible, use the corrections from Fig. 3. In Table 1 a list of typical noise levels is given for a variety of commonly occurring conditions.

### 3.6 OSHA AND WALSH-HEALEY NOISE PROVISIONS

The Walsh-Healey Public Contracts Act which was modified in May of 1970 includes safety standards

aimed at protecting employees' hearing from losses caused by long-term exposure to excessive noise level.

With regard to noise exposure, the act in part reads:

- (a) Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown in Table 2.
- (b) When employees are subjected to sound exceeding those listed, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of the table, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table.
- (c) If the variations in noise level involved maxima at intervals of 1 second or less, it is to be considered continuous.
- (d) In all cases where the sound levels exceed the values shown herein, a continuing, effective hearing conservation program shall be administered.

This permissible noise exposure table is specified by the Walsh-Healey Public Contracts Acts modified in 1970 and is subject to government revisions.

When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each. If the sum of the following fractions:  $C_1/T_1 + C_2/T_2 \dots C_n/T_n$  exceeds unity, then the mixed exposure should be considered to exceed the limit value.  $C_n$  indicates the total time of exposure at a specified noise level, and  $T_n$  indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise should not exceed 140dB(C) peak sound pressure level, fast response.



NOISE LEVEL (IN DECIBELS)

	130	Threshold of Pain
Small Aircraft Engine	120	
	110	Riveting Machine 30 or 40 ft. away
	100	
Subway train passing	90	Automobile horn 15 or 20 ft. away
Stenographic Room	80	
	70	Average Conversation
Noisy Office	60	
	50	Very Noisy Residence
Quiet Office	40	
Voice-Very Soft Whisper	30	
	20	
	10	Outdoor in Country
Threshold of Audibility	0	

Table 1 Typical Sounds and Their Corresponding Noise Levels

DURATION PER DAY, HOURS	SOUND LEVEL dB(A) SLOW RESPONSE
8	90
6	92
4	95
3	97
2	100
1 1/2	102
1	105
1/2	110
1/4 or less	115

Table 2 Permissible Noise Exposures

## 4.0 MAINTENANCE

### 4.1 BATTERY REPLACEMENT

The batteries are replaced by removing the thumb screw at the rear of the meter and sliding the bottom cover off the unit. The batteries can be lifted out of the plastic nose cone and changed, replace the cover and press the battery test button to insure proper installation of the new batteries. The new batteries will have no effect on the calibration of the instrument.

### 4.2 CALIBRATION

A high degree of negative feedback is used in the amplifier and meter driver circuits of the 370; therefore, it is not anticipated that the accuracy of the instrument should drift from its' original setting due to aging of components under normal use and storage conditions. If at any time the instrument fails to operate properly, the batteries should first be checked. During the normal calibration routine of the 370 it may be necessary to trim the sensitivity up or down by only a small amount. A large deviation from the nominal calibration should be cause of alarm and result in a review of calibration procedure or an investigation into the possibility of an instrument malfunction.

The Model 370 instrument may be calibrated using the TRIPLETT Model 371 or 372 Sound Level Calibrator. The recommended calibration frequency per ANSI Specification is 500Hz. The gain control should be adjusted for the meter indication corresponding to the sound level applied. The microphone should be inserted and removed from the calibrator slowly to avoid damage to the diaphragm. No attempt should be made to calibrate the 370 by means of a calibrator which is not provided with a pressure vent hole in the acoustic coupler as damage to the microphone diaphragm may result.

Set the weighting switch to the "C" position and the range on 110dB. Apply 114dB to the microphone and observe the indicator. The reading should be 114dB  $\pm$ 1dB at 125, 250, 500 and 1000Hz and  $\pm$ 2dB at 2000Hz. Should the above conditions not be met adjust the Cal. control to obtain 114dB.

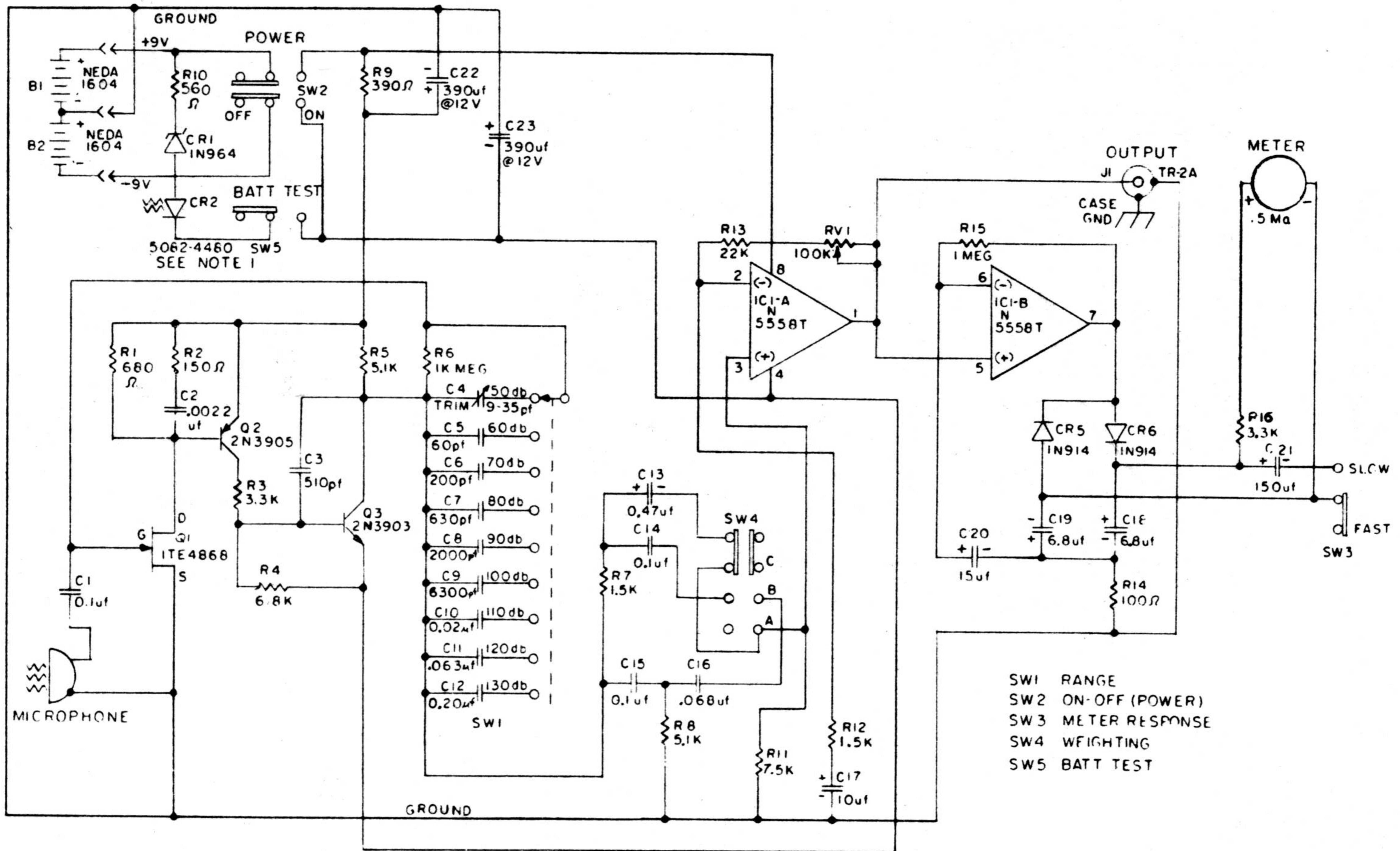
### 4.3 INTERNAL NOISE

Table 3 is a table of typical noise levels measured in octave bands for each setting of the range attenuator. The internal noise is measured by replacing the microphone with a well shielded 750 pf capacitor.

		ATTENUATOR SETTINGS								
		130	120	110	100	90	80	70	60	50
OCTAVE BANDS CENTER FREQUENCY	31.5 Hz	67	67	67	67	67	67	65	59	53
	63 Hz	62	62	62	62	62	61	59	53	47
	125 Hz	62	62	62	61	61	61	59	49	43
	250 Hz	59	59	59	59	59	59	55	47	40
	500 Hz	59	59	59	59	59	59	53	49	40
	1000 Hz	67	67	67	67	67	65	59	47	42
	2000 Hz	65	65	65	65	65	62	57	49	39
	4000 Hz	63	63	63	62	62	61	59	49	40
	8000 Hz	62	62	62	62	62	62	59	49	42
	ALL PASS	55	55	55	55	55	53	49	42	35

Table 3 Octave-Band Noise Levels – db Below Full Scale

Noise levels shown in dB below Full Scale Output with the instrument set to the C weighted response.



- SW1 RANGE
- SW2 ON-OFF (POWER)
- SW3 METER RESPONSE
- SW4 WRIGHTING
- SW5 BATT TEST

NOTE  
 (1) R10 IS 330 Ω IF H.P. 5082-4480 DIODE IS USED IN BATTERY TEST CIRCUIT

**PARTS LIST**  
**MODEL 370**

**REF. NO.**

**DESCRIPTION**

**RESISTORS**

R1	Composition, 680 ohm, 1/4w, ±5%
R2	Composition, 150 ohm, 1/4 w, ±5%
R3	Composition, 3.3K, 1/4w, ±5%
R4	Composition, 6.8K, 1/4w, ±5%
R5	Composition, 5.1K, 1/4w, ±5%
R6	Composition, 1000 meg, 1/4w, ±20%
R7	Composition, 1.5K, 1/4w, ±5%
R8	Composition, 5.1K, 1/4w, ±5%
R9	Composition, 390 ohm, 1/4w, ±5%
R10	Composition, 560 ohm, 1/4w, ±5%
R11	Composition, 7.5K, 1/4w, ±5%
R12	Composition, 1.5K, 1/4w, ±5%
R13	Composition, 22K, 1/4w, ±5%
R14	Composition, 100 ohm, 1/4w, ±5%
R15	Composition, 1 meg, 1/4w, ±5%
R16	Composition, 3.3K, 1/4w, ±5%

**POTENTIOMETERS**

RV1	Cermet, 100K
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**CAPACITORS**

C1	Ceramic, 0.10 mf @ 100VDC
C2	Ceramic, 0.0022 mf @ 100VDC
C3	Silver Mica, 510 pf, ±10%, 500VDC
C4	Ceramic Trimmer, 9-35 pf, 200VDC
C5	Silver mica, 60 pf, ±2%, 500VDC
C6	Silver mica, 200 pf, ±2%, 500VDC
C7	Silver mica, 630 pf, ±2%, 300VDC
C8	Polycarbonate, .002 mf, ±5%, 100VDC
C9	Polycarbonate, .0063 mf, ±5%, 100VDC
C10	Polycarbonate, .02 mf, ±5%, 100VDC

C11	Polycarbonate, .063 mf, ±5%, 100VDC
C12	Polycarbonate, 0.2 mf, ±5%, 100VDC
C13	Tantalum, 0.47 mf, ±20%, 35VDC
C14	Tantalum, 0.1 mf, ±20%, 35VDC
C15	Tantalum, 0.1 mf, ±20%, 35VDC
C16	Tantalum, 0.068 mf, ±20%, 35VDC
C17	Tantalum, 10 mf, ±20%, 20VDC
C18	Tantalum, 6.8 mf, ±20%, 35VDC
C19	Tantalum, 6.8 mf, ±20%, 35VDC
C20	Tantalum, 15 mf, ±20%, 20VDC
C21	Tantalum, 150 mf, ±20%, 6VDC
C22	Electrolytic, 390 mf, ±20%, 12VDC
C23	Electrolytic, 390 mf, ±20%, 12VDC

**DIODES**

CR1	IN964B, Zener, 13VDC, ±5%
CR2	5082-4480, Light emitting
CR5	IN914, Silicon, 100 ma, 75 PRV
CR6	IN914, Silicon, 100 ma, 75 PRV

**TRANSISTORS**

Q1	ITE-4868, Field effect, N channel
Q2	2N3905, Silicon, PNP
Q3	2N3902, Silicon, NPN

**INTEGRATED CIRCUITS**

A1	N5558T, Dual operational amplifier
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**MISC.**

SW1	Miniature rotary, 9 position
SW2	Slide type, DPDT
SW3	Slide type, SPDT
SW4	Slide type, DP3T
SW5	Slide type, SPDT
M1	500 ua, left to right inverted scale
J1	Ultra-miniature phone jack, TR-2A
B1	Battery, NEDA-1604
B2	Battery, NEDA-1604
S1	Microphone, Ceramic

## **CLAIM FOR DAMAGE IN SHIPMENT**

The instrument should be tested as soon as it is received. If it fails to operate properly, or is damaged in any way, a claim should be filed with the carrier. A full report of the damage should be obtained by the claim agent, and this report should be forwarded to us. We will then advise you of the disposition to be made of the equipment and arrange for repair or replacement. Include model number and serial number when referring to this instrument for any reason.

## **WARRANTY**

The Triplett Corporation warrants instruments manufactured by it to be free from defective material or factory workmanship and agrees to repair or replace such instruments which under normal use and service, disclose the defect to be the fault of our manufacturing. Our obligation under this warranty is limited to repairing or replacing any instrument or test equipment which proves to be defective, when returned to us transportation prepaid, within ninety (90) days from the date of original purchase.

This warranty does not apply to any of our products which have been repaired or altered by unauthorized persons or service stations in any way so as, in our judgment to injure their stability or reliability or which have been subject to misuse, negligence or accident or which have had the serial number altered, effaced, or removed. Neither does this warranty apply to any of our products, which have been connected, installed, or adjusted otherwise than in accordance with the instructions furnished by us. Accessories including transistors, fuses, cables and batteries not of our manufacture used with this product are not covered by this warranty.

The Triplett Corporation reserves the right to discontinue models at any time, or change specifications, price or design, without notice and without incurring any obligation.

Upon acceptance of this material the purchaser agrees to assume all liability for any damages, and bodily injury which may result from the use or misuse of the material by the purchaser, his employees, or others and that the Triplett Corporation shall incur no liability for direct or consequential damage of any kind.

This warranty and conditions of sale are in lieu of all others expressed or implied and no representative or person is authorized to assume for us any other liability in connection with the sale of our products.

### **IF ANY FAULT DEVELOPS, THE FOLLOWING STEPS SHOULD BE TAKEN:**

1. Notify us, giving full details of the difficulty, and include the model number and serial number. On receipt of this information, we will give you service data or shipping instructions.
2. On receipt of shipping instructions, forward the instrument prepaid, to the factory. If requested, an estimate of the charges will be made before the work begins provided the instrument is not covered by the warranty.

**TRIPLETT CORPORATION**  
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