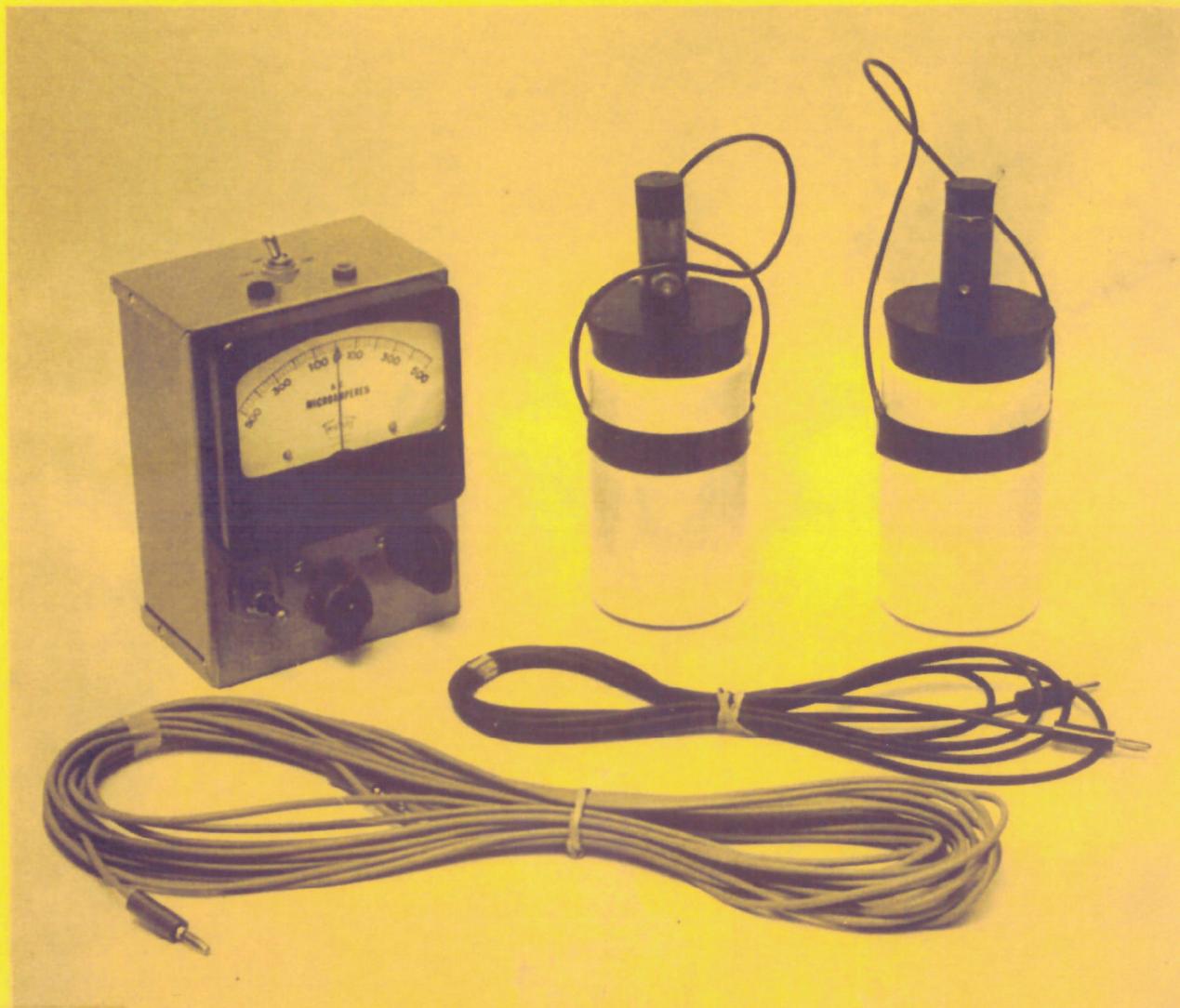


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MODEL THREE – LIGHTWEIGHT,
LOWCOST SELF POTENTIAL
UNIT



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no. 17-B
c.1

by
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M.I.R.L.

Report No. 17-B

MODEL THREE — LIGHTWEIGHT
LOW COST SELF POTENTIAL
UNIT

by

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June 1969

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INTRODUCTION

This brief report is a supplement to M.I.R.L. Report No. 17 and describes an improved version of the low cost self potential unit. Improvements incorporated in this new model contribute to amplifier stability (less zero drift), longer battery life, and ease of operation. This unit is used as a prospecting tool in the same manner as described in Report No. 17.

DEVICE DESCRIPTION

This improved version (Model 3) of the self potential unit has only three controls on the front panel and a 4½ inch panel meter for ease of operation. A complete set-up is shown in Figure 1. Figure 2 gives an inside view showing the new battery holders and amplifier socket, and Figure 3 is a complete electrical schematic. Notice on top of the box the two electrode cable jacks and a meter shorting switch. This shorting switch is only for meter protection—it is not connected to the batteries.

DEVICE OPERATION

After the electrodes have been filled with a saturated copper sulfate (CuSO_4) solution (approximately 5 parts water to 1 part CuSO_4 by weight), planted in the ground, and attached as described in Report No. 17, the main unit is ready to be used.

To begin a series of readings, first place the meter shorting switch in the "on" (open) position. The unit is now ready to be used. Select a range for starting—usually 50 or 500 mv. To check the zero, press the main switch to the left to "zero" and adjust the "zero" knob for a center scale reading. To take a reading, press the main switch to "read" and read the potential directly on the meter. A deflection toward the right indicates a positive potential, to the left negative.

Always check the meter zero when changing meter ranges, and occasionally during operation for drift. Leave the meter shorting switch in the "on" position for all readings. Place in the "off" position during

extended transportation and rough handling. This switch is only for meter movement protection.

The top half of the front panel is covered by a 500-0-500 microampere panel meter. Proceeding from left to right on the bottom, one will notice the zero-off-read switch, a range selecting switch (50 mv, 500 mv, 1.5 v) and a zero adjust control. The zero, read on-off, controls on the original unit are now combined in one switch. Model 3 is always off when not making a reading. This is possible due to the extremely fast warm-up time of solid state devices. Operation through two complete prospecting seasons without battery replacement is now anticipated.

CONSTRUCTION NOTE

It is essential in constructing this unit that there is NO ELECTRICAL CONTACT between the case and any part of the S-P circuit. A "floating" system is necessary to insure correct readings since body contact or other foreign contact with the circuitry can generate potentials on the order of the ones being measured.



Figure 1. Complete Self Potential System with Model 3 S.P. Unit.

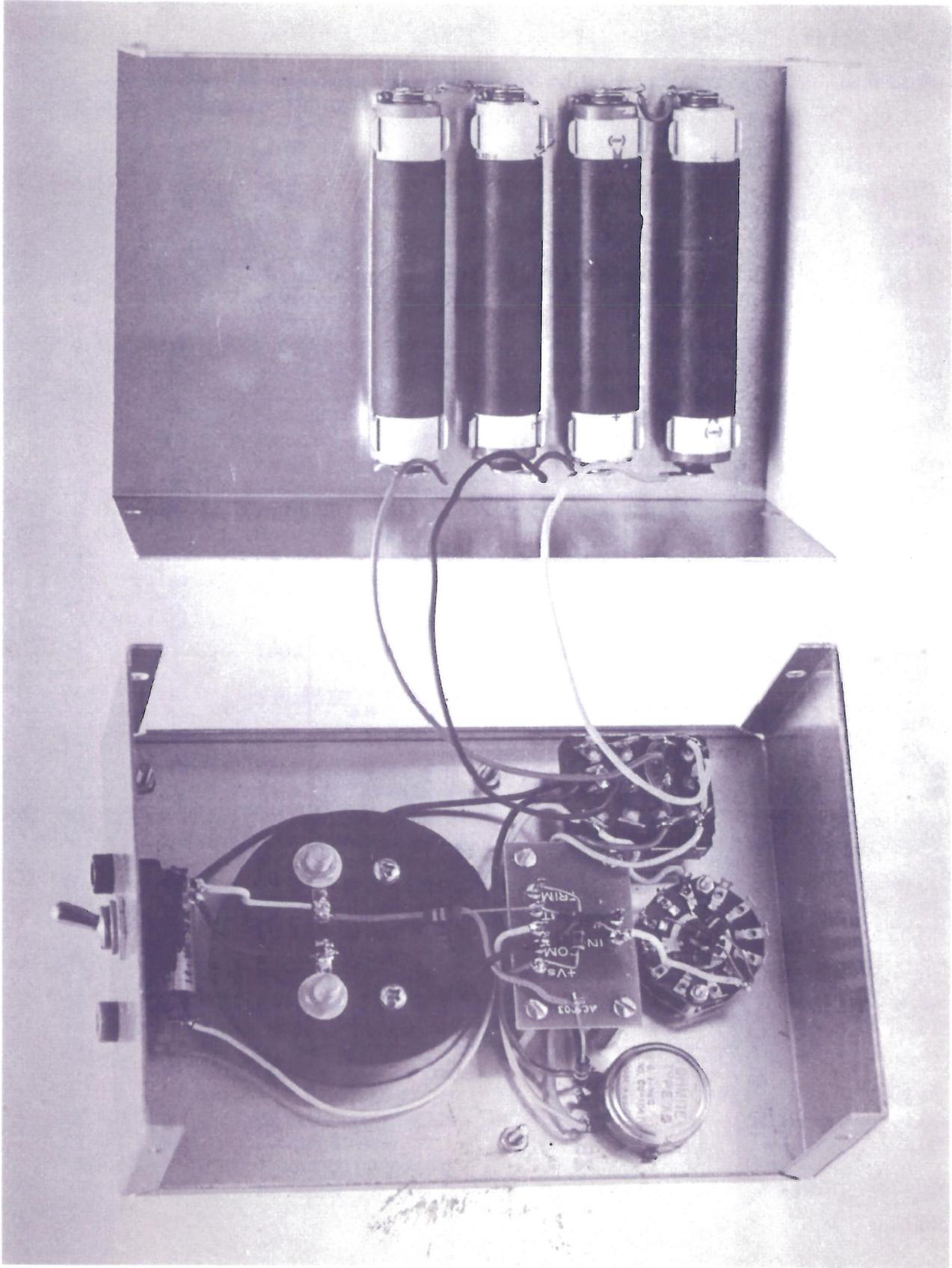


Figure 2. Interior View of the Model 3 S.P. Unit.

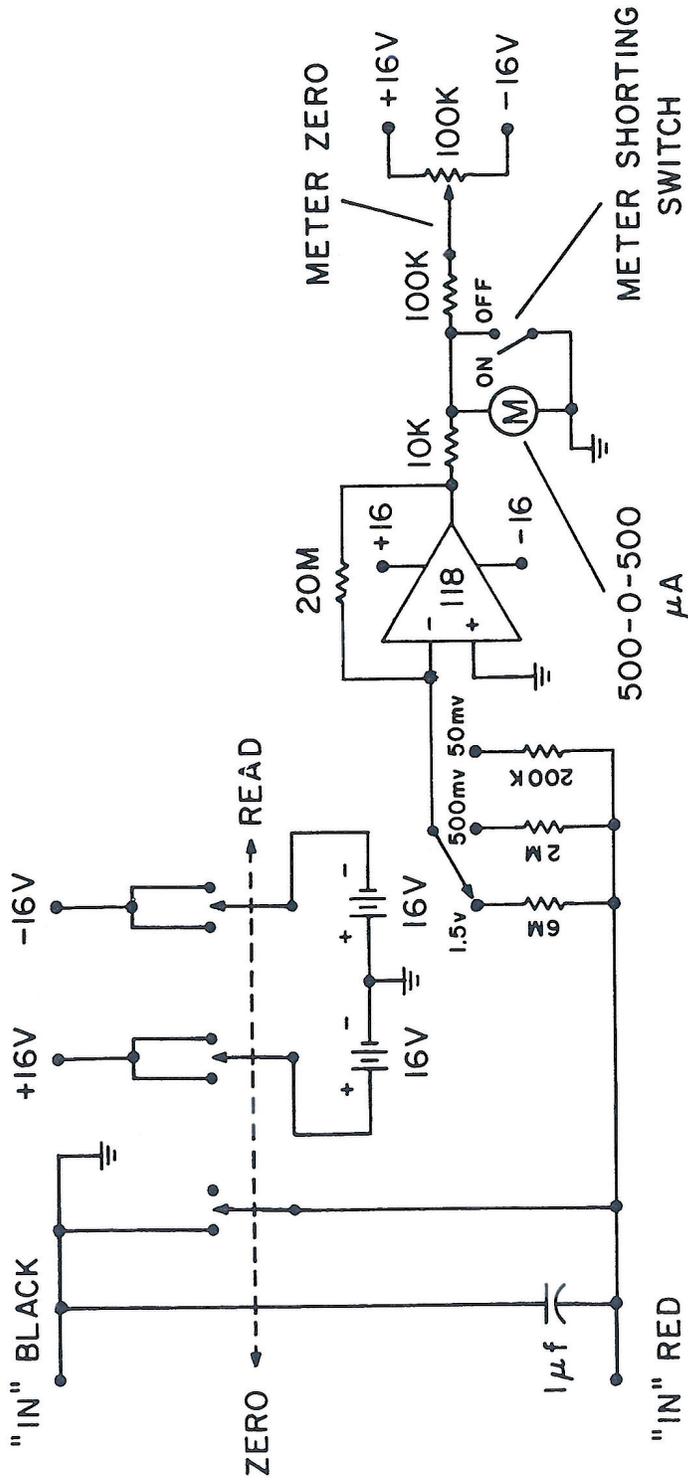


Figure 3. Electrical Schematic of the Model 3 S.P. Unit

PARTS LIST

Materials used for this meter are given as follows. Prices quoted are for the items at the time of this writing and are subject to change.

	<u>Qty</u>	<u>Description</u>	<u>Mfg. Type</u>	<u>Unit Cost</u>	<u>Total Cost</u>
1.	1	3x5x7" Aluminum Box	Bud CU-3008A	1.80	1.80
2.	4	Mercury Batteries 8.1v	Eveready E136N	1.40	5.60
3.	4	Battery Holders	Keystone 2189	.38	1.52
4.	1	Panel Meter—4½"	Triplett Mod.		
		500-0-500 uA Taut-Band	420	21.50	21.50
5.	2	Banana Jacks (for Meters)	Smith 1508	.12	.24
6.	2	Banana Jacks (for Pots)	Pomona 1581	.25	.50
7.	4	Banana Plugs (for Connecting Wire)	Smith 295	.25	1.00
8.	1	SPST Switch		.50	.50
9.	1	1 uf 50V Capacitor (Non Polarized)	Sprague 431P	1.40	1.40
10.	1	OP AMP	Analog Devices 118A	11.00	11.00
11.	1	OP AMP Socket	Analog Devices AC1003	2.75	2.75
12.	1	100K OHM Potentiometer	Ohmite CU-1041	1.75	1.75
13.	1	3 Position Rotary Switch	Centralab PA-1000	1.56	1.56
14.	1	3 PDT Switch Momentary On, Center Off	Cutler-Hammer 7672K5 (4PDT)	8.00	8.00
15.	8	4-40x1/4" Machine Screw		.01	.08
16.	8	4-40x1/8" Machine Screw		.01	.08
17.	8	4-40 Threaded Bushing	USECO 9004	.05	.40
18.	4	4-40 Threaded Spacer	Smith 2334	.12	.48
19.	1	47 K OHM 1/2 Watt Retestor		.08	.08
20.	1	100 K OHM 1/2W		.08	.08
21.	1	10 K OHM 1/2W		.08	.08
22.	1	20 M OHM 1/2W		.08	.08
23.	1	6 M OHM 1/2W		.08	.08
24.	1	2 M OHM 1/2W		.08	.08
25.	1	200 K OHM 1/2W		.08	.08
26.	2	Knobs		.15	.30
27.	50 ft. (or more)	Hookup Wire for Pots	Belden 8899	.05	2.50
28.	2	Porous Pots Complete	Heinrichs	15.00	30.00
29.	1 lb.	Copper Sulfate		1.00	1.00
30.		Assorted Hookup Wire for Meter		1.00	1.00
					<u>95.52</u>