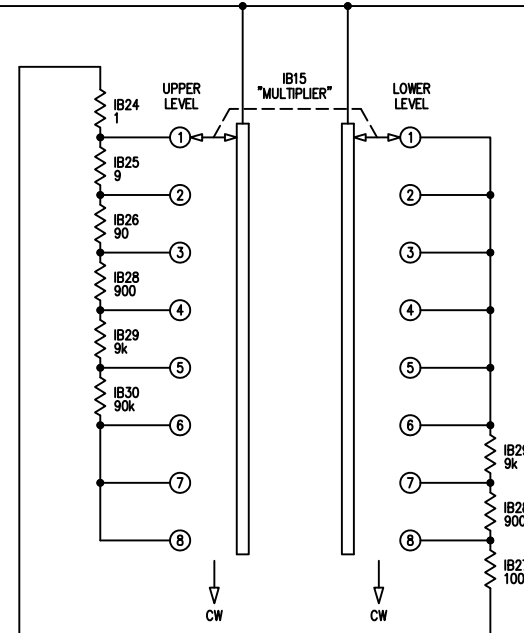


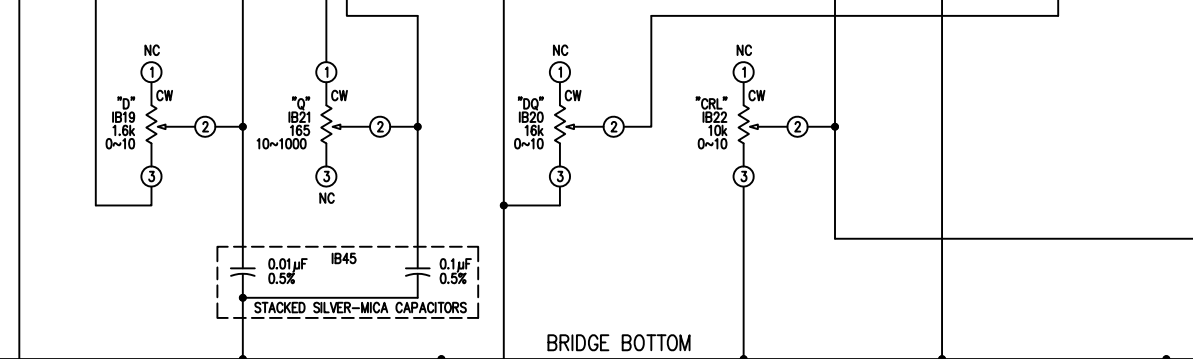
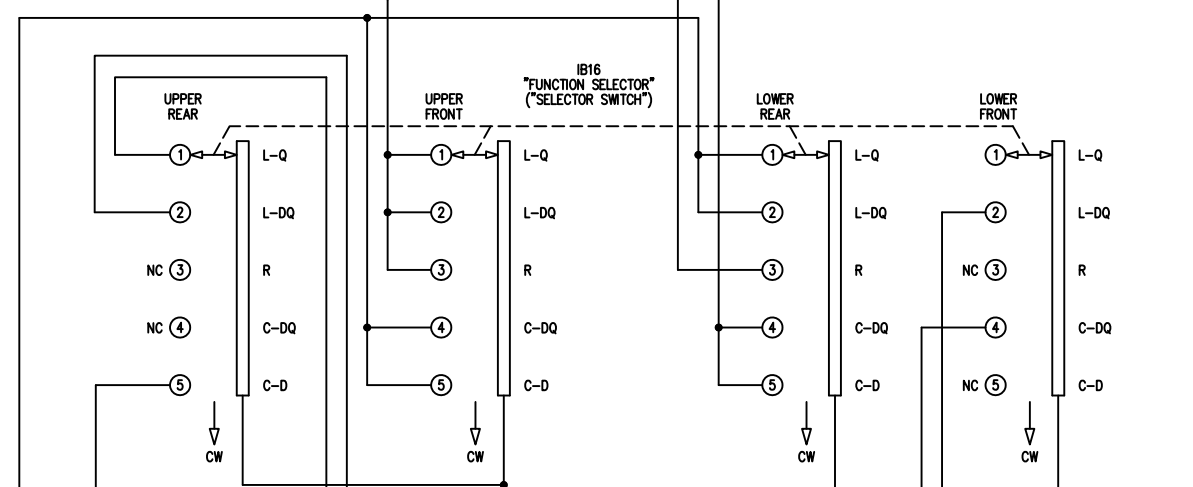
EQUIVALENT BRIDGE CIRCUIT DIAGRAMS

BRIDGE TOP



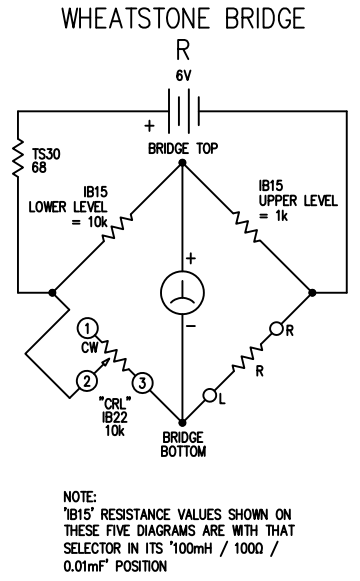
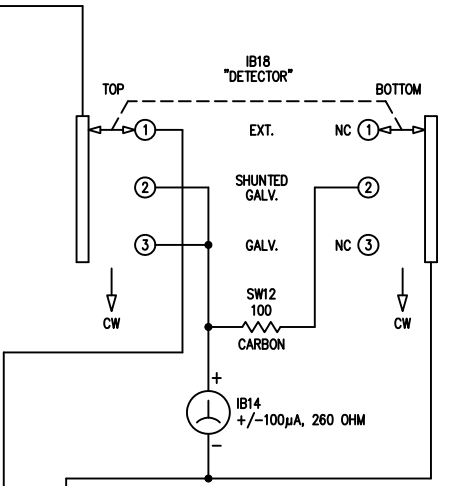
IB15 FRONT PANEL MARKINGS			MULTIPLIER EFFECTIVE RANGES ON 'CRL' CONTROL		
L	R	C	L RANGE	R RANGE	C RANGE
100μH	0.1Ω	10mF	10μH ~ 1000μH	0.01Ω ~ 1Ω	1μF ~ 100μF
1mH	1.0Ω	1mF	0.1mH ~ 10mH	0.1Ω ~ 10Ω	0.1μF ~ 10μF 100nF ~ 10μF
10mH	10Ω	0.1mF	1mH ~ 100mH	1Ω ~ 100Ω	0.01μF ~ 1μF 1nF ~ 100nF
100mH	100Ω	0.01mF	10mH ~ 1000mH	10Ω ~ 1kΩ	0.001μF ~ 0.1μF 100pF ~ 10nF
1H	1kΩ	0.001mF	100mH ~ 10H	100Ω ~ 10kΩ	0.0001μF ~ 0.01μF 10pF ~ 1nF
10H	10kΩ	0.0001mF	1H ~ 100H	1kΩ ~ 100kΩ	0.00001μF ~ 0.001μF 10pF ~ 1nF
	100kΩ			10kΩ ~ 1MΩ	
	1MΩ			100kΩ ~ 10MΩ	

ROWS IN THIS TABLE ALIGN WITH ASSOCIATED POSITIONS ON MULTIPLIER SWITCH IB15 AT LEFT

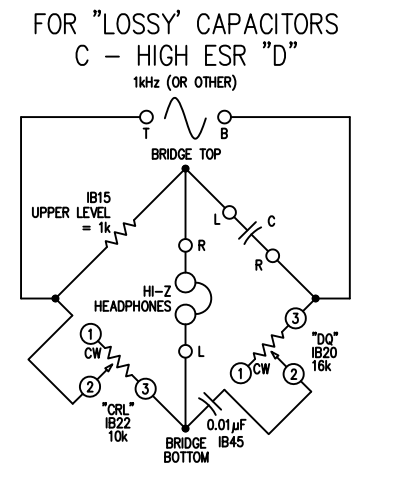
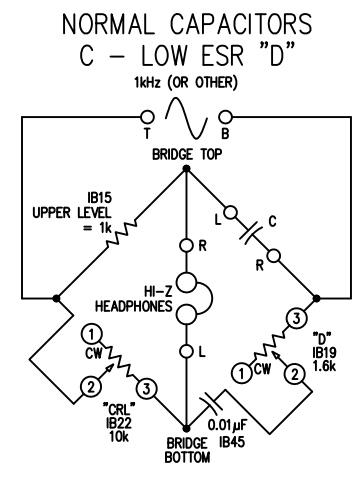
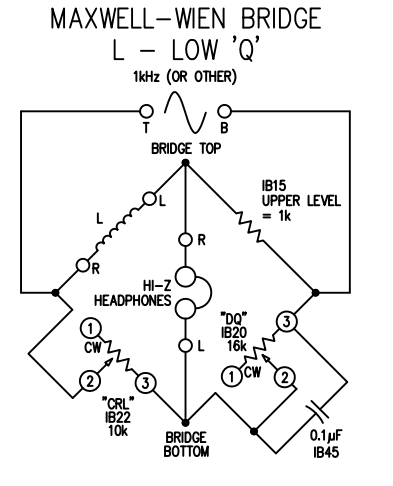
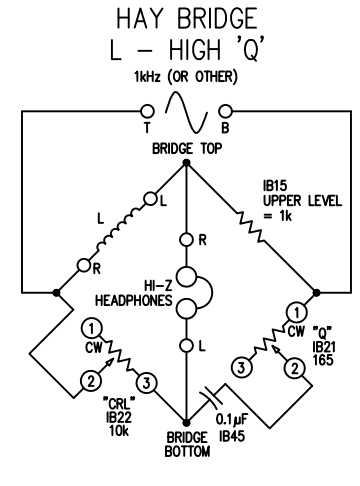


NOTE: TERMINAL POSTS ARE ORIENTED, VERTICALLY AND HORIZONTALLY, AS THEY ARE ON THE FRONT PANEL. 'L' & 'R' PERTAIN TO LEFT POST AND RIGHT POST.

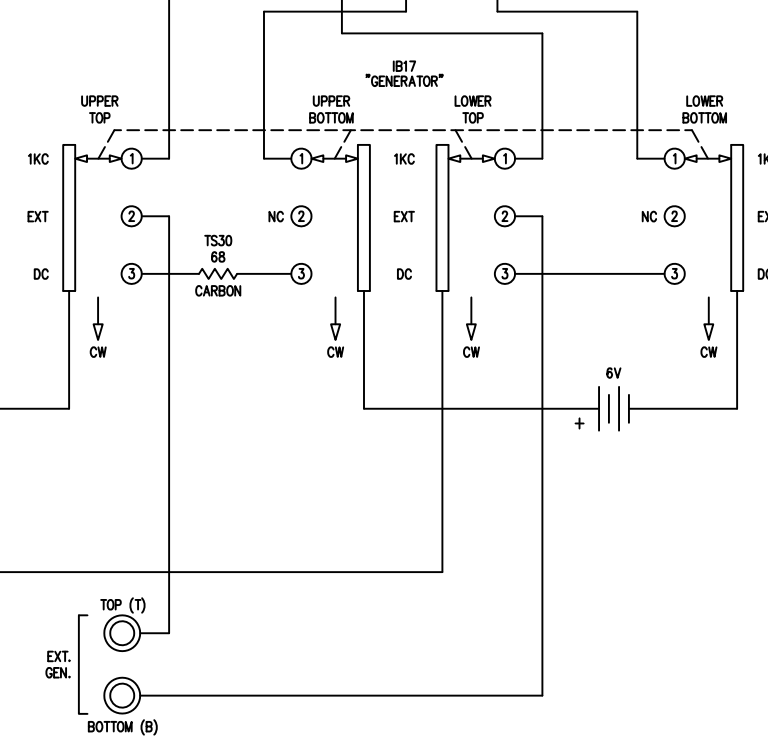
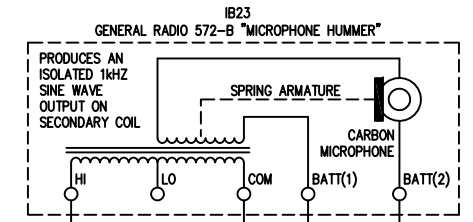
OPERATIONAL HINTS:
 FOR RESISTORS, START WITH THE "SHUNTED GALV." DETECTOR SETTING, AND AFTER GETTING CLOSE TO BALANCING THE BRIDGE, SWITCH THE DETECTOR SETTING TO "GALV."
 FOR CAPACITORS, START WITH THE FUNCTION SELECTOR ("SELECTOR") SET TO "C-DQ" AND SIMULTANEOUSLY ADJUST THE "CRL" AND "DQ" CONTROLS (INTERACTIVE) TO BALANCE THE BRIDGE; IF BEST RESULTS ARE WITH "DQ" BELOW 1, CHANGE SELECTOR TO "D" AND ADJUST THAT AND "CRL" TO BALANCE THE BRIDGE.
 FOR INDUCTORS, START WITH THE FUNCTION SELECTOR ("SELECTOR") SET TO "L-DQ" AND SIMULTANEOUSLY ADJUST THE "CRL" AND "DQ" CONTROLS (INTERACTIVE) TO BALANCE THE BRIDGE; IF BEST RESULTS ARE WITH "DQ" ABOVE 10, CHANGE SELECTOR TO "Q" AND ADJUST THAT AND "CRL" TO BALANCE THE BRIDGE.



NOTE: 'IB15' RESISTANCE VALUES SHOWN ON THESE FIVE DIAGRAMS ARE WITH THAT SELECTOR IN ITS '100mH / 100Ω / 0.01mF' POSITION



SWITCH ORIENTATION NOTE:
 - FOR 'IB15', 'LOWER LEVEL' IS TOWARDS THE FRONT PANEL, WHILE 'UPPER LEVEL' IS FURTHER FROM THE PANEL.
 - FOR 'IB16', 'LOWER FRONT' IS ON WAFER CLOSER TO THE PANEL, ON THE SIDE OF THE WAFER FACING THE PANEL. 'LOWER REAR' IS THE SIDE OF THE SAME WAFER FACING AWAY FROM THE PANEL. 'UPPER FRONT' IS ON THE WAFER FURTHER FROM THE PANEL, ON THE SIDE OF THE WAFER FACING THE PANEL, WHILE 'UPPER REAR' IS THE SIDE OF THE SAME WAFER FACING AWAY FROM THE PANEL.
 - FOR 'IB17', THE 'LOWER' WAFER IS CLOSER TO THE PANEL, WHILE THE 'UPPER' WAFER IS FURTHER FROM THE PANEL. ON THOSE TWO WAFERS, 'TOP' REFERS TO THE CONTACTS LOCATED ON THE EDGE OF THE WAFER CLOSER TO THE TOP OF THE PANEL, WHILE 'BOTTOM' REFERS TO THE CONTACTS ON THE OPPOSITE WAFER EDGE.
 - FOR 'IB18', THERE IS A SINGLE WAFER, WITH ITS CONTACT SETS IDENTIFIED 'TOP' AND 'BOTTOM', AS WITH 'IB17'.



(1kHz SINE WAVE, APPROX. 1~2Vpp FROM EXTERNAL FUNCTION GENERATOR)

- NOTES:
- 1) RESISTORS ARE 1/2W, 0.5% PRECISION WIRE-WOUND TYPES, UNLESS MARKED 'CARBON', IN WHICH CASE THEY ARE 1/2W, 5% . RESISTOR VALUES NOT MARKED 'k' (KILO) OR 'M' (MEGA) ARE IN OHMS (Ω SYMBOL NOT SHOWN).
 - 2) FRONT PANEL MARKINGS ARE SHOWN HERE AS THEY APPEAR ON THE ACTUAL PANEL; UNITS MARKINGS ARE TYPICAL FOR ELECTRONIC NOMENCLATURE ON THE 1940s. EXAMPLES: WHILE INDUCTORS ARE DENOTED WITH 'μ' (MICRO) AND 'm' (MILLI), CAPACITANCES ARE MARKED ENTIRELY IN MICROFARADS, BUT USING THE 'm' TO DENOTE THIS INSTEAD OF THE 'μ'. WHERE CAPACITANCES ARE SHOWN HERE IN PLACES OTHER THAN FRONT PANEL MARKINGS, THEY USE MODERN NOMENCLATURE. THIS INCLUDES Hz FOR FREQUENCY INSTEAD OF 'kc' (KILOCYCLES). RANGE VALUES IN TABLE ARE EXPRESSED USING MODERN NOMENCLATURE AND SYMBOLS.
 - 3) COMPONENT IDENTIFIER NUMBERS, e.g. 'IB25', WITH FEW EXCEPTIONS USE THE SAME 'IB' PREFIX REGARDLESS OF COMPONENT TYPE, AND THE NUMERICAL PORTION IS RELATED TO A SPECIFIC VALUE OR INSTANCE, e.g. THERE ARE TWO 'IB29' COMPONENTS, BOTH OF THEM BEING 9k RESISTORS. LIKEWISE, CAPACITOR 'IB45' IS ACTUALLY A DUAL CAPACITOR WITH VALUES OF 0.01μF & 0.1μF. SEE NOTES 7 & 8.
 - 4) CIRCLED NUMBERS AT POTENTIOMETER TERMINATIONS ARE NOT BASED ON HEATHKIT DOCUMENTATION; THEY ARE ONLY APPLICABLE TO THIS DIAGRAM.
 - 5) FRONT PANEL TERMINAL MARKINGS IN () ARE ALTERNATES PER VARIATIONS IN FRONT PANEL ARTWORK BETWEEN THE ORIGINAL IB-1 AND SUBSEQUENT IB-1A & IB-1B VERSIONS.
 - 6) METER 'IB14' IS NOT MARKED WITH ITS COIL RESISTANCE, NOR DOES HEATHKIT DOCUMENTATION MENTION THIS SPECIFICATION. THE 260 OHM VALUE SHOWN IN THIS SCHEMATIC IS BASED ON A DIRECT MEASUREMENT WITH AN OHMMETER; 265 OHMS WAS MEASURED, AND ROUNDED TO 260 OHMS.
 - 7) THE HEATHKIT MANUAL DOES NOT SPECIFY CAPACITOR VOLTAGES, AND THE SILVER-MICA PRECISION CAPACITOR(S) 'IB45' ARE NOT MARKED WITH A VOLTAGE RATING. THE CAPACITOR(S) HAVE THE APPEARANCE OF BEING GOOD FOR A FEW HUNDRED VOLTS, BUT WITH THE BATTERY VOLTAGE BEING ONLY 6V AND LIKELY EXTERNAL SINE WAVE GENERATOR VOLTAGES BEING LOW, IT IS NOT RECOMMENDED TO CONNECT THIS BRIDGE TO HIGH VOLTAGE POTENTIALS.
 - 8) REPORTEDLY, SOME PRODUCTIONS OF THE IB-1(A)(B) KITS USED DISCRETE CAPACITORS INSTEAD OF THE STACK OF 11 IDENTICAL 0.01μF CAPACITORS NORMALLY USED TO BUILD THE 0.01μF AND 0.1μF CAPACITANCES REQUIRED BY THIS CIRCUIT.
 - 9) AN EXTERNAL SINE WAVE GENERATOR ('EXT. GEN. ') DOES NOT NEED TO BE ONLY 1kHz, OR ONLY IN THE 1~2Vpp VOLTAGE RANGE. DIFFERENT FREQUENCIES AND VOLTAGES MAY BE USED IF DESIRED, ALTHOUGH THIS MIGHT NEGATIVELY AFFECT THE ACCURACY OF SOME POTENTIOMETER PANEL MARKINGS.
 - 10) THIS SCHEMATIC WAS DRAWN, USING AUTOCAD, AS A MEANS TO GET A LEGIBLE AND MORE EASILY UNDERSTANDABLE SCHEMATIC FOR THE HEATHKIT IB-1, IB-1A & IB-1B IMPEDANCE BRIDGES. AN EFFORT HAS BEEN MADE TO SIZE AND SCALE COMPONENTS AND TEXT FOR THE LARGEST AND BEST VISIBILITY AND LEGIBILITY WHILE STILL FITTING ON A NORMAL 11 x 17" SHEET OF PAPER. ALL COMPONENT VALUES AND DESIGNATIONS, TERMINALS, ETC. ARE SHOWN AS VERIFIED BY EXAMINATION OF A BUILT AND WORKING IB-1B IMPEDANCE BRIDGE.
 - 11) THE COPYRIGHT HOLDER HEREBY GIVES PERMISSION TO FREELY DISTRIBUTE THIS DOCUMENT, AS LONG AS NO ALTERATIONS ARE MADE AND CREDIT IS GIVEN, ALONG WITH THE COPYRIGHT NOTICE.

HEATHKIT
 IMPEDANCE BRIDGE IB-1, IB-1A, IB-1B
 SCHEMATIC DIAGRAM