'SUPPLY B' CIRCUIT (TYPICAL)

SUPPY A VERSION OF REFERENCE ADJUST
SEE SUPPLY B VERSION AT RIGHT

R116 500 VOLTAGE CALIBRATE (CW, N)
SW3 MODE: TRACKING, INDEPENDENT
R8 10k 'A TRACKING B' (RED KNOB) (CW)
R7 10k 'SUPPLY A' (BLK KNOB) (CW)
SEE NOTE 8
BLU, GRN, RED, BLK
TO R9
P (5.8V) TO Q107
Q BLK FROM SUPPLY A (–) OUTPUT TERMINAL

SW1 POWER: ON, OFF, LUG 6 CUT OFF, PL1 POWER LAMP, R1 47k
SW2 LINE SELECTOR: 120V, 240V
F1 1–1/2A SLO–BLO 3AG
100 ~ 135VAC OR 200 ~ 270VAC 50 ~ 60 Hz
HOT, BLK, WHT NEUTRAL, GRN
C1 0.005uF 1400V

T1
[RED] BLU H [A]
[RED–YEL] BLU–YEL K [B]
[RED] BLU J [C]

D206 1N2071, D201 1N2071, D207 1N2071, D202 1N2071
D203 1N2071
D205 1N2071
(37.6V)
BIPOLAR + SUPPLY
C203 2200µF 50V
R205 1.5k 1W
C204 47µF 50V
MAIN FILTER
(37V)
SEE NOTE 3
ZD204 3V
C202 47µF 35V
R202 4.7k
R204 820
(34.6V)
CONSTANT CURRENT SOURCE
(34V)
R203 3.9k
Q202 X29A829 OR D29A4 OR 2N390
(20.7V)
BRIDGE B SEE NOTE 4
C207 0.05µF 50V
C206 100pF 75V
OVER–CURRENT LIMITING
QUICK TURN–ON SLOW TURN–OFF
Q201 MPSA20
R201 33k
C201 0.1µF 100V
R211 2k 5%
R212 2k 5%
Q205 MPSA20
Q204 MPSA20
FEEDBACK AMPLIFIER
R208 470 5%
R207 555 1/4W 1%
R209 1.1 5% 1W
CURRENT SHUNT
(REF)

Q1 & Q2 ARE MOUNTED ON REAR PANEL
[Q1] Q2 MJ2841
[GRY] BLU AA [E]
[RED] ORG (20V)
[R5] R6 47
[F] AB YEL [VLT]
Q203 MPSA42
SERIES PASS TRANSISTOR OUTPUT STAGE
[A SUPPLY OUTPUT] B SUPPLY OUTPUT

R206 1k 1W (12.3V)
R215 390 (7V)
REFERENCE VOLTAGE SUPPLY
ZD208 1N716A 12V 400mW
ZD209 PS18775 6.8V > 100mW
R216 500 VOLTAGE CALIBRATE (CW)
R217 470

SUPPY B VERSION OF REFERENCE ADJUST
SEE SUPPLY A VERSION AT LEFT
SEE NOTE 8
TO R8
VLT AD
R9 10k 'SUPPLY B' (BLK KNOB) (CW)
BLK OR BRN
RED AE (5.8V)

R223 12.2k 1%
R224 5k 1%
C209 10µF 80V
(5.8V)
OUTPUT VOLTAGE MONITORING
AC [G]
AF [Q]
[RED] ORG
[BLK] BRN
RED J7 [J5] +
BLK J6 [J4] –
OUTPUT 'B' 0–20V, 0.5A
[C6] C7 0.01µF 50V

ERROR AMPLIFIER
FEEDBACK BUFFER
(36.2V)
R219 2.4k 5%
R214 10k
(35.2V)
R218 33k
R221 33k
Q206 X29A829 OR D29A4 OR 2N390
(5.8V)
Q207 TIS87
Q208 TIS87
R222 62k 5%
(–37.5V)
BIPOLAR – SUPPLY
C205 10µF 80V
R213 1.2k 1W
D210 1N2071
C208 47µF 50V
(–32.6V)

NOTE:
OVER–CURRENT LIMITING USES Q104/Q204'S BASE–EMITTER JUNCTION TO MONITOR THE VOLTAGE DROP ACROSS THE CURRENT SHUNT RESISTOR, AND TRANSISTOR TURNS ON WHEN THERE IS EXCESSIVE OUTPUT CURRENT, THEREBY REDIRECTING SOME OF THE CONSTANT CURRENT SOURCE'S CURRENT THAT WOULD NORMALLY GO THROUGH Q105/Q205, THUS LOWERING THE CONTROL VOLTAGE INTO Q103/Q203.

NOTE:
ALL THREE SUPPLIES ARE 'FLOATING', IN OTHER WORDS NOT REFERENCED TO EARTH/CHASSIS GROUND. EACH SUPPLY'S OUTPUT TERMINALS MAY BE CONNECTED TO CIRCUITS THAT HAVE FLOATING POTENTIALS UP TO 200V IN RESPECT TO EARTH GROUND. HOWEVER, NO COMBINATION OF EXTERNALLY INTERCONNECTED SUPPLY OUTPUTS MAY RESULT IN A POTENTIAL RELATIVE TO EARTH GROUND THAT IS IN EXCESS OF 200V WITHIN THE SUPPLY.

5V SUPPLY

R3 150 1%
D1 & D2 MAY ALSO BE 1N4005 OR 1N5397 OR =
GRN D1 3A1 (12.2V)
GRN–YEL
GRN D2 3A1
C2 12,000µF 15V
R4 0.1 1/2W 1%
CURRENT SHUNT
R2 220 1W
C3 0.0022µF 25V
IC–1 UA309K
IN BLU, OUT (5V) RED, GND BLK
5V VOLTAGE REGULATOR
IC–1 IS MOUNTED ON REAR PANEL
VLT, BLU, RED, BLK, (REF)

ALTERNATE IC–1 LM350K: CASE (OUT), IN, ADJ
IC–1 UA309K: CASE (GND), OUT, IN
Q1 & Q2 MJ2841: CASE (COLLECTOR), EMITTER, BASE
BOTTOM VIEWS
(SEE BELOW RIGHT)

SWITCH SW4 VIEWED FROM REAR SHOWING REAR WAFER SW4R (FRONT WAFER SW4F IS IDENTICAL)
'SUPPLY A' PCB HOLE 'R' (YEL)
'SUPPLY A' (–) OUTPUT TERMINAL

METER
SW4F: BLU, BLK, GRN, BRN, YEL, BLK
5V 'AMPS', 5V 'VOLTS', B 'AMPS', B 'VOLTS', A 'AMPS', A 'VOLTS'
SW4R: VLT, BRN, BLK, RED
M1 1mA, 50 OHM
METER 'M1' IS SCALED AS:
– 0 ~ 20 (0 ~ 20V & 0 ~ 2A)
– 0 ~ 5.5 (0 ~ 5.5V & 0 ~ 550mA)

SW4R TERMINALS
R12 5490 1% RED
R11 19.9k 1% ORG
R13 19.9k 1% RED
'SUPPLY A' (+) OUTPUT TERMINAL

RED J3 +
C4 0.2µF 50V
BLK J2 –
C5 0.01µF 50V
GRN J1
5V 1.5A

UA309K REGULATOR IC'S ARE HARD TO FIND; IF ONE FAILS IT MAY BE REPLACED WITH THE ALTERNATE CIRCUIT AT RIGHT
R4
1N4004
IN LM350K OUT
ADJ
C3
120
1N4004
(MAY USE 330 + 33)
360
25uF APPROX. 50V
(5V) RED
BLK

NOTES:
1) RESISTORS ARE 1/2W, 10% UNLESS MARKED DIFFERENTLY. RESISTOR VALUES NOT MARKED 'k' (KILO) OR 'M' (MEGA) ARE IN OHMS (Ω SYMBOL NOT SHOWN).
2) ALL VOLTAGES SHOWN IN ( ) ARE MEASURED FROM THE POINT (REF) IN THE SAME SUPPLY CIRCUIT. FOR THE 'SUPPLY A' AND 'SUPPLY B' CIRCUITS, THE FRONT PANEL VOLTAGE CONTROL POTENTIOMETERS MUST BE IN THEIR FULLY CLOCKWISE POSITIONS WHEN MEASURING THESE VOLTAGES.
3) ZENER DIODES ZD104 & ZD204 ARE MIS–IDENTIFIED IN THE HEATHKIT MANUAL; WHILE THE TEXT AND THE COMPONENT DESIGNATOR CONFIRMS THAT THEY ARE ZENER DIODES, THE HEATHKIT PART NUMBER GIVEN IS FOR A REGULAR DIODE, AND THE GENERIC PART NUMBER IS MERELY A DIODE PACKAGE SIZE. FOR THIS SCHEMATIC, VOLTAGE MEASUREMENTS WERE TAKEN ACROSS THESE DIODES IN A PROPERLY FUNCTIONING POWER SUPPLY, AND THE APPROXIMATELY 3V ZENER VOLTAGE AGREES WITH HEATHKIT'S DIAGNOSTIC VOLTAGE MARKINGS ON EITHER SIDE OF THE DIODE. THE NEAREST MODERN VALUE FOUND FOR AN APPROPRIATE WATTAGE ZENER DIODE IS MTZJ3V0SA–ROG (2.96V, 500mW) OR EQUAL.
4) THE 'BRIDGE A' AND 'BRIDGE B' ARE SOLDER–BRIDGE JUMPERS ON THE CIRCUIT BOARD FOILS. THEY SHOULD BE TEMPORARILY REMOVED WHEN TROUBLESHOOTING THE VOLTAGE REGULATOR CIRCUITRY. THEY MUST BE PRESENT IN ORDER FOR THE OVER–CURRENT LIMITING FEATURE TO FUNCTION.
5) ROUND TERMINALS WITH LETTER MARKINGS ABOVE/BELOW SMALL CIRCLES ○ ARE PRINTED CIRCUIT BOARD HOLES FOR TRANSFORMER AND WIRE HARNESS WIRES.
6) THIS SCHEMATIC SHOWS THE 5V SUPPLY CIRCUIT AND ALSO THE 'SUPPLY B' CIRCUIT, WHICH IS ALSO TYPICAL FOR 'SUPPLY A'. COMPONENT DESIGNATORS, CIRCUIT BOARD HOLE LETTER CODES, AND WIRE COLORS ARE SHOWN FOR THE 'SUPPLY B' CIRCUIT, WHILE FOR THE 'SUPPLY A' CIRCUIT THE COMPONENT DESIGNATORS BEGIN WITH '1' INSTEAD OF '2' (e.g. R101 INSTEAD OF R201), WHILE OTHER 'SUPPLY A' INFORMATION IS SHOWN IN BRACKETS [ ] .
7) THE HEATHKIT MANUAL DOES NOT SPECIFY CAPACITOR VOLTAGES; VOLTAGES SHOWN HERE ARE EITHER AS MARKED ON THE ACTUAL PARTS, OR ARE REASONABLE GUESSES.
8) R8 IS THE 'A TRACKING B' POTENTIOMETER (WITH THE SMALL RED KNOB), AND R9 IS THE 'SUPPLY B' POTENTIOMETER (WITH THE BLACK KNOB), THESE TWO HAVING CONCENTRIC SHAFTS, COUPLED WITH A CLUTCH. R7 IS THE 'SUPPLY A' POTENTIOMETER, AND IS NOT MECHANICALLY ASSOCIATED WITH R8 & R9; IT ALSO HAS A BLACK KNOB.
9) THIS SCHEMATIC WAS DRAWN, USING AUTOCAD, AS A MEANS TO GET A LEGIBLE AND MORE EASILY UNDERSTANDABLE SCHEMATIC FOR THE HEATHKIT IP–2718. 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, WIRE COLORS, AND PRINTED CIRCUIT BOARD HOLES ARE SHOWN AS VERIFIED BY EXAMINATION OF A BUILT AND WORKING IP–2718 POWER SUPPLY.
10)

HEATHKIT
DC "TRI–POWER" SUPPLY IP–2718
SCHEMATIC DIAGRAM

REVISION A 3–7–2021