SCHEMATIC OF THE HEATHKIT® TERMINAL NODE CONTROLLER MODEL HD-4040

NOTES:

1. ALL RESISTORS ARE 1/4-WATT, 5% AND ARE MARKED IN OHMS (k-1,000; M-1,000,000).
2. ALL CAPACITORS ARE IN µF (MICROFARADS) UNLESS STATED OTHERWISE.
3. ○ INDICATES A WIRE CONNECTION ON THE CIRCUIT BOARD.
4. ⏚ INDICATES CHASSIS GROUND.
5. ▽ INDICATES CIRCUIT BOARD GROUND.
6. ⟩ INDICATES A FEMALE (SOCKET) CONNECTION.
7. → INDICATES A MALE (PLUG) CONNECTION.
8. ✦ INDICATES A CONNECTION POINT.
9. + INDICATES A NO CONNECTION POINT.
10. **J6-1** INDICATES SOCKET AND PIN NUMBER.
11. NUMBERS SUCH AS **(1)** OR **8** NEXT TO A COMPONENT INDICATES A PIN NUMBER.
12. ✱ — U30 16 PIN PLUG.
    ✱✱ — U34 16 PIN PLUG.
    ✱✱✱ — U35 14 PIN PLUG.
13. PARTS IN SHADED AREAS IN THE POWER SUPPLY'S PRIMARY CIRCUIT ARE CRITICAL FOR CONTINUED SAFETY. REPLACE THEM ONLY WITH PARTS OF THE SAME RATING OR WITH THE PROPER HEATH PARTS.

Part of 595-3334-01

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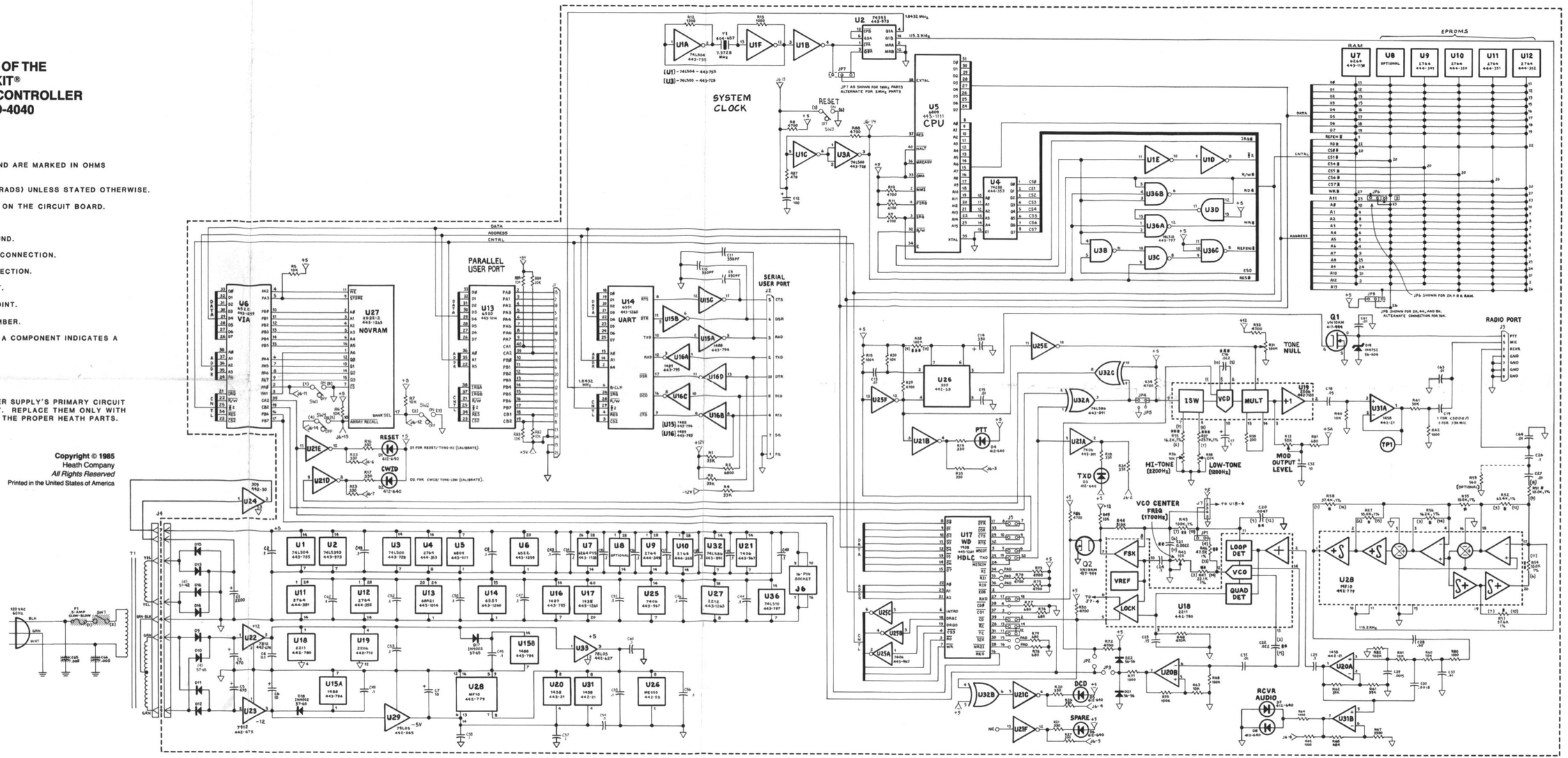

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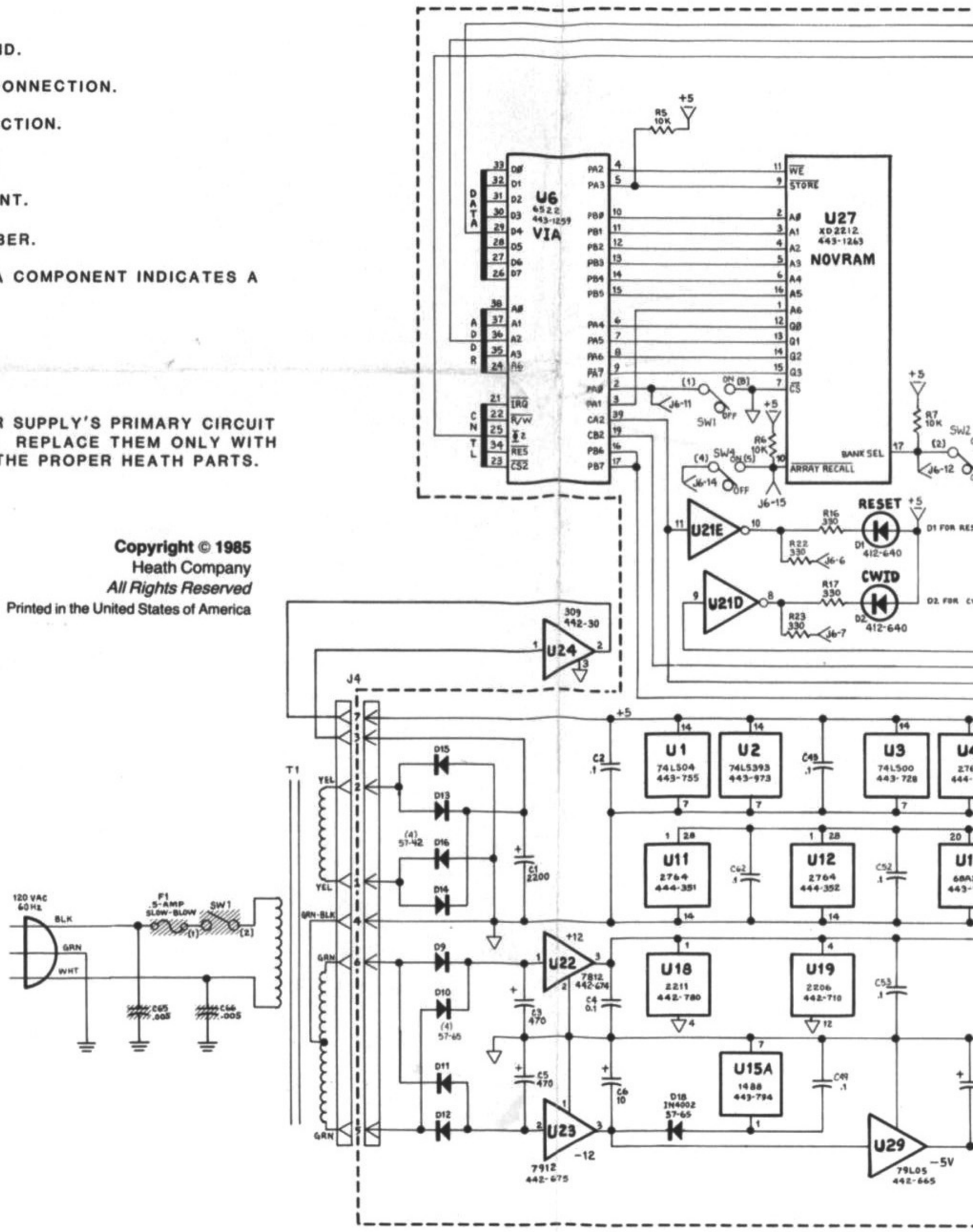

SYSTEM CLOCK

R12 1000 — U1A (74L504 443-755) — Y1 4.03-657 7.3728 MHz — R13 1000 — U1F — U1B

(U1) - 74L504 - 443-755

(U3) - 74L500 - 443-728

U2 74393 443-973 — 1.8432 MHz — 115.2 KHz — JP7

JP7 AS SHOWN FOR 1MHz PARTS
ALTERNATE FOR 2MHz PARTS

J6-13 — RESET SW3 — +5 — R8 4700 — J6-14 — R88 4700

U1C — U3A (74L500 443-728) — R87 470 — C12 100

U5 6809 443-1111 CPU — EXTAL — RES — HALT — MREADY — DMA — NMI — FIRQ — IRQ — R/W — E — XTAL — D0-D7 — A0-A15

R10 4700 — R11 4700 — R9 4700

U4 74288 444-353 — Q0-Q7 — A0-A7 — G1

DATA
ADDRESS
CNTRL

PARALLEL USER PORT

+5V — R85 10K — R84 10K — J1

U13 6520 443-1014 — DATA — ADDR — CNTL — PA0-PA7 — CA1 — CA2 — PB0-PB7 — CB1 — CB2 — IRQA — IRQB — R/W — Ø2 — RES — CS2

R83 10K — R82 10K — +5V

+5 — R7 10K — SW2 — J6-12 — ON (7) — OFF (2)

D1 FOR RESET/ TONE-HI (CALIBRATE).

D2 FOR CWID/ TONE-LOW (CALIBRATE).

SERIAL USER PORT

J2

U14 6551 443-1260 UART — DATA — ADDR — CNTL — D0-D7 — A0 A1 A4 — B-CLK — IRQ — R/W — Ø2 — RES — CS2 — RTS — DTR — TXD — RXD — DSR — DCD — CTS

1.8432 MHz

C11 330PF — C10 330PF — C9 330PF

U15C — U15B — U15A (1488 443-794) — U16A (1489 443-795) — U16D — U16C — U16B

(U15) 1488 443-794

(U16) 1489 443-795

+12V — R1 33K — R2 6800 — R3 33K — -12V — R4 33K

CT5 — DSR — RXD — TXD — DTR — DCD — RTS — SQ — FQ

+5 — R28 100K — C14 330 — R15 100K — R30 10K — C13 .01 — U25F — R29 4700 — U26 555 442-53 — C15 .01

U21B — PTT — D4 412-640 — R19 330 — R25 330 — J6-3

U3 74L500 443-728 — U4 2764 444-353 — U5 6809 443-1111 — U6 6522 443-1259 — U7 6264 P15 443-1138 — U8 OPTIONAL — U9 2764 444-349 — U10 2764 444-350 — U32 74LS86 443-891 — U21 7406 443-967

C8 — C43 — C44 — C35 — C36 — C37 — C38 — C39 — C40 — C41 — C42 — C46 — C47 — C48 — C49 — C50 — C51 — C52 — C53 — C45 — C55 — C56 — C54 — C57 — C58 — C7 10

U13 6821 443-1014 — U14 6551 443-1260 — U16 1489 443-795 — U17 1935 443-1261 — U25 7406 443-967 — U27 2212 443-1263 — U36 74LS10 443-797

16-PIN SOCKET J6

D17 IN4002 57-65

U15B 1488 443-794 — U33 78L05 442-627 — U28 MF10 442-779 — U20 1458 442-21 — U31 1458 442-21 — U26 ME555 442-53

U29 79L05 442-665 — -5V

U17 WD 1935 443-1261 HDLC — DATA — ADDR — CNTL — D0-D7 — A0-A2 — INTRQ — DRQI — DRQO — CS3 — RD — WR — DTR — DSR — CTS — RTS — MSCOT — TXD — MISCIN — RI — RII — RIO — EOB — RXD — CD0 — CD1 — CD — RC — TC — 32X — NRZI — RES

U25C — U25B — U25A 7406 443-967

J5 — PAD — NC

U32B

EPROMS

RAM

U7 6264 443-1138 | U8 OPTIONAL | U9 2764 444-349 | U10 2764 444-350 | U11 2764 444-351 | U12 2764 444-352

DATA: D0 D1 D2 D3 D4 D5 D6 D7

CNTRL: REFEN# RD# CS0# CS1# CS4# CS5# CS6# CS7# WR#

ADDRESS: A11 A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A12 A13

JP6 SHOWN FOR 2K X 8 K RAM.

JP8 SHOWN FOR 2K, 4K, AND 8K. ALTERNATE CONNECTION FOR 16K.

U4 74288 444-353 — A0 A1 A2 A3 A4 E1 — Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7 — CS0 CS1 CS2 CS3 CS4 CS5 CS6 CS7

U1E U1D U36B U3D U36A U3B U3C U36C

74LS10 443-797

IRQ# R/W# RD# WR# REFEN# CS0 RES#

U25E U32C U32A 74LS86 443-891 U21A 7406 443-891 U32B U21C U21F

PTT D4 412-640 — TXD D3 412-640 — DCD D5 412-640 — SPARE D6 412-640

Q1 VN10KM 417-999 — D19 IN4752 56-604

RADIO PORT J3: PTT MIC RCVR GND GND GND

TONE NULL R31 100K

U19 2206 442-7101: ISW VCD MULT +1

HI-TONE (2200Hz) R35 16.2K,1% R36 10K

LOW-TONE (1200Hz) R37 23.7K,1% R38 2.0K

MOD OUTPUT LEVEL R37 50K R81 680 C32 10

U31A 1458 442-21 — TP1

C19 1 FOR <3000Ω .1 FOR >3K MIC

VCO CENTER FREQ (1700Hz) R45 100K,1% R44 510K R49 10K R86 4700

Q2 VN10KM 417-999

U18 2211 442-780: FSK VREF LOCK LOOP DET VCO QUAD DET

R46 47.5K 1% R47 22.1K 1% C21 0.0022 C24 .1

U28 MF10 442-779: +S +S S+ S+

R58 37.4K,1% R57 10.0K,1% R56 16.2K,1% R55 10.0K,1% R52 63.4K,1% R54 10.0K 1% R53 57.6K 1%

115.2 KHz

U20A 1458 442-21 — U20B — U31B

RCVR AUDIO D7 412-640 D8 412-640

J5: DTR DSR CTS RTS MSCOT TXD DISCIN RI RII RIO EOB RXD CD0 CD1 CD RC TC 32X NRZI RES

R73 R74 R75 R77 R76 R79 R78 4700 680

R30 4700 R72 4700 R71 1000 R70 100K R63 10K R68 100K R64 1000 R65 1000 R66 68K R67 3300

R18 330 R24 330 R20 330 R26 330 R21 330 R27 330

C14 330 C15 .01 C16 .022 C23 .15 C22 .022 C31 .01 C18 .05 C17 1 C25 .1 C26 .1 C27 .01 C28 .05 C29 .0015 C30 .0015 C33 .01 C61 .01 C63 .01 C64 .01

R34 4700 R48 470K R39 200 R40 10K R41 30K R42 1000 R59 560 (OPTIONAL) R51 10.0K,1%

JP4 JP5 JP1 JP2 JP3

TO U18-6 TO J7-4 J6-2 J6-3 J6-4 J6-5 J6-6