

COMPUTER: RADIO SHACK® TRS-80 MODEL 26-3002



TECHNICAL SERVICE DATA FOR YOUR COMPUTER

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool which is designed for quick isolation and repair of Computer malfunctions.

Check all interconnecting cables for good connection and correct hookup before making service checks.

Disconnect all peripherals except the Monitor from the Computer to eliminate possible external malfunctions.

Replacement or repair of the power supply board, main board, keyboard, or connectors may be necessary after the malfunction has been isolated.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT	TOOLS
Digital Volt/Ohm Meter	Low Wattage Soldering Iron
Logic Probe	Desoldering Equipment
Frequency Counter	Switch Cleaner (non spray type)
TV Monitor	Phillips Screwdriver
	Small Flat Blade Screwdriver
	IC Insertion and Removal Tools 14, 16, 24, and 40 pin
	Alignment Tools GC Electronics: 9440

REPLACEMENT PARTS AND DESCRIPTION

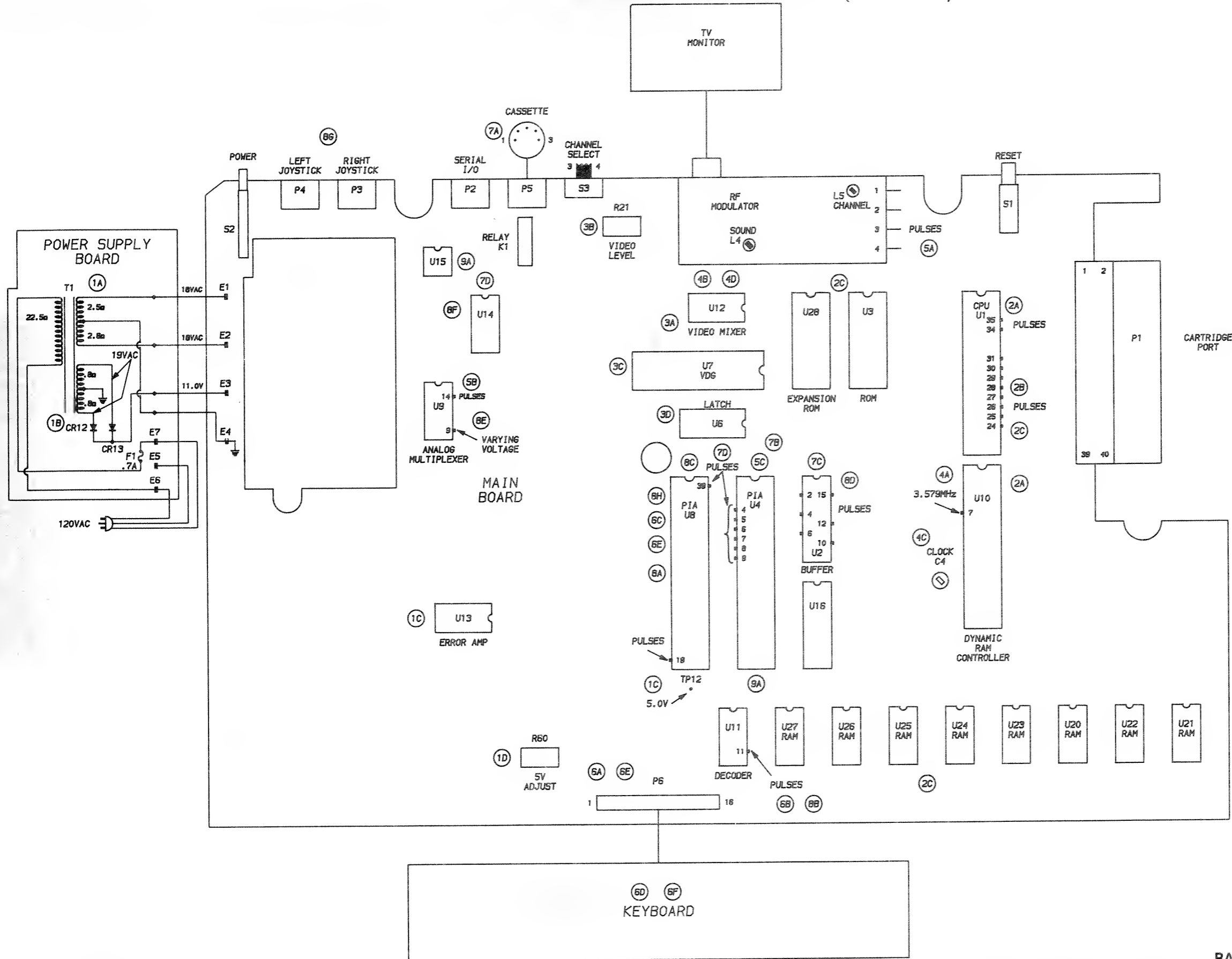
IDENT	PART NO.	DESCRIPTION
CR12	ADX1474	Diode, 1N5401
CR13	ADX1474	Diode, 1N5401
F1	AHF1185	Fuse, .7A @ 250V
K1	AR8130	Relay
T1	ATA0856	Power Transformer
U1	AXX3051	IC, MC6809E
U2	AMX4584	IC, MC14050B
U3		IC, SCM90590P
U4		IC, MC6821P
U6		IC, SN74LS273N
U7		IC, MC6847P
U8		IC, MC6821P
U9	AMX4585	IC, MC14529B
U10		IC, SN74LS783N
U11		IC, SN74LS138N
U12		IC, MC1372P
U13		IC, MC1723CP
U14		IC, LM339N
U15		IC, MC1741CP
U20		IC, RAM MK4116N-3GP
thru		
U27		
U28		IC, SCM90522P

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CC13

CC13
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PRELIMINARY SERVICE CHECKS (Continued)

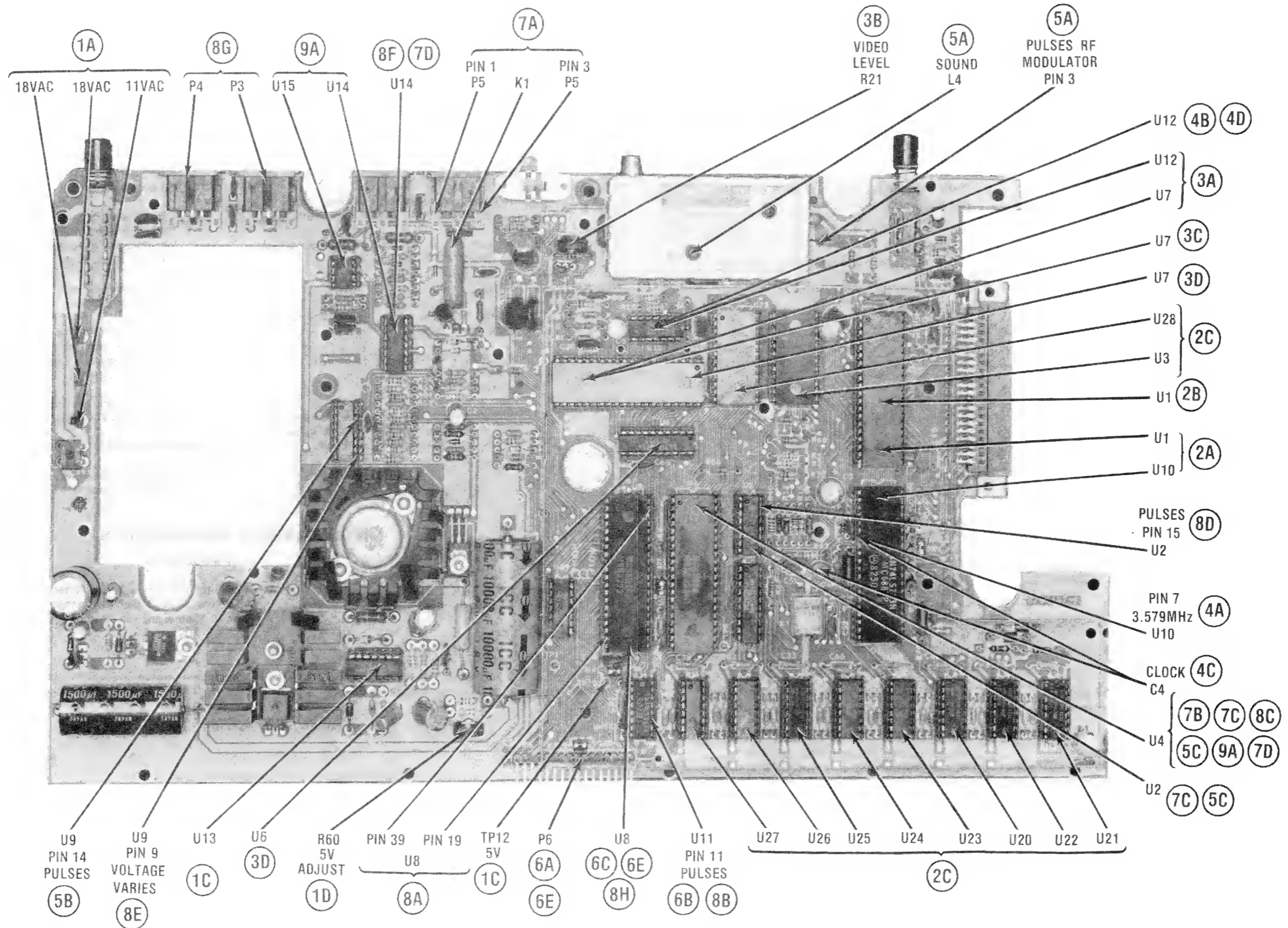


INTERCONNECTING DIAGRAM

INTERCONNECTING DIAGRAM

RADIO SHACK TRS-80
MODEL 26-3002

PRELIMINARY SERVICE CHECKS (Continued)



CC13
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PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① COMPUTER DEAD

- (A) Check for 18VAC at connectors E1 and E2 and 11.0V at connector E3. If the voltages are missing check Fuse F1. If Fuse is good check the windings of Transformer T1 for continuity.
- (B) If 11.0V is missing at pin 3 of connector E, check the 19VAC winding of Transformer T1 for continuity and check Diodes CR12 and CR13.
- (C) If the voltages are correct at connectors E1, E2 and E3, check for 5.0V at TP12. If 5.0V is missing check the Error Amp IC (U13) by substitution.
- (D) If the voltage is not correct at TP12, check the adjustment of the 5V Adjust Control (R60) (see "Miscellaneous Adjustments").

② MICROPROCESSOR (CPU) OPERATION

- (A) Computer is dead. Check for pulses at pins 34 and 35 of the CPU IC (U1). If pulses are missing, check the Dynamic RAM Controller IC (U10) by substitution.
- (B) If pulses are present at pins 34 and 35 of IC U1, check for pulses on pins 24 thru 31 of IC U1 while turning the Computer On. If no pulses appear check IC U1 by substitution.
- (C) If pulses appear on pins 24 thru 31 of IC U1, then suddenly stop, check RAM IC's (U20 thru U27), ROM IC (U3) and Expansion ROM IC (U28) by substitution.

③ VIDEO

- (A) No video. Check the VDG IC (U7) and Video Mixer IC (U12) by substitution.
- (B) If IC's U7 and U12 check good, check the adjustment of the Video Level Control (R21) (see Miscellaneous Adjustments).
- (C) Dots are missing from the alphanumeric characters. Check IC U7 by substitution.
- (D) Wrong characters appear on the Monitor screen. Check IC's U6 and U7 by substitution.

④ COLOR

- (A) No color. Check for a frequency of 3.579MHz at pin 7 of the Dynamic RAM Controller IC (U10). If the 3.579MHz signal is missing, check IC U10 by substitution.
- (B) If the 3.579MHz signal is good, check the Video Mixer IC (U12) by substitution.

(C) Colors are not correct. Check for a frequency of 3.579MHz at pin 7 of IC U10. If the frequency is not correct, check the adjustment of the Clock Trimmer (C4) (See "Miscellaneous Adjustments") and check IC U10 by substitution.

(D) If the frequency is correct at pin 7 of IC U10, check IC U12 by substitution.

⑤ SOUND

(A) No sound. Type in and run the following Basic program:

```
10 SOUND 200,200: GOTO 10
```

Check for pulses at pin 3 of the RF Modulator. If pulses are present, check the adjustment of the Sound Coil (L4) (See "Miscellaneous Adjustments").

(B) If pulses are not present at pin 3 of the RF Modulator, check for pulses at pin 14 of the Analog Multiplexer IC (U9). If pulses are present, check IC U9 by substitution.

(C) If pulses are not present at pin 14 of IC U9, check for pulses at pins 4 thru 9 of the PIA IC (U4). If pulses are present, check the Buffer IC (U2) by substitution. If pulses are missing check IC U4 by substitution.

⑥ KEYBOARD

(A) Keyboard is dead. Check the Keyboard Connector (P6) for good connections.

(B) If the Keyboard Connector (P6) checks good, check for pulses at pin 11 of IC U11. If pulses are missing, check IC U11 by substitution.

(C) If pulses are present at pin 11 of IC U11, check the PIA IC (U8) by substitution.

(D) One key is erratic. Clean the contacts of the bad key and recheck the operation of the key.

(E) A group of keys do not work. Check the Keyboard Connector (P6) for good connections and check IC U8 by substitution.

(F) More than one letter appears on the Monitor screen when a key is pressed. Check for shorted keys or keys that are stuck down.

PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS (Continued)

7 CASSETTE

- (A) Cassette motor will not run or runs all the time. Check Relay K1 contacts from pin 1 to pin 3 of connector P5. Check for continuity while saving or loading a program from tape if the cassette motor will not run. Check for a short (contacts stuck) if the cassette motor runs all the time.
- (B) If Relay K1 checks good, check the PIA IC (U4) by substitution.
- (C) Programs can not be saved to tape. Check the PIA IC (U4) and Buffer IC (U2) by substitution.
- (D) Programs can not be loaded from tape. Check IC's U4 and U14 by substitution.

8 JOYSTICKS

- (A) Joystick does not work. Type in and run the following program:

```
10 FOR X = 0 TO 3
20 Y = JOYSTK(X)
30 NEXT X: GOTO 10
```

While the program is running check for pulses at pins 19 and 39 of the PIA IC (U8). If pulses are missing, check IC U8 by substitution.

- (B) If pulses are present at pins 19 and 39 of IC U8, check for pulses at pin 11 of the Decoder IC (U11). If pulses are missing, check IC U11 by substitution.
- (C) If pulses are present at pin 11 of IC U11, check for pulses at pins 4 thru 9 of the PIA IC (U4). If pulses are missing, check IC U4 by substitution.
- (D) If pulses are present at IC U4, check for pulses at pin 15 of IC U2. If pulses are missing, check IC U2 by substitution.
- (E) If pulses are present at IC U2, check for a varying voltage at pin 9 of the Analog Multiplexer IC (U9) while operating the joystick. If the voltage does not vary, check IC U9 by substitution.
- (F) If the voltage varies at pin 9 of IC U9, check IC U14 by substitution.
- (G) Joystick buttons do not work. Check the joystick button switches for continuity and check the joystick Connectors (P3 and P4) for good connections.
- (H) If the joystick buttons and connectors check good, check PIA IC (U8) by substitution.

9 SERIAL I/O PORT

- (A) Serial port does not work. Check the PIA IC (U4) and IC's U14 and U15 by substitution.

MISCELLANEOUS ADJUSTMENTS

5V ADJUST

Connect the input of a voltmeter to TP12. Adjust the 5V Adjust Control (R60) for a voltage of 5.0V at TP12.

CLOCK ADJUST

Connect the input of a frequency counter to pin 13 of the Dynamic RAM Controller IC (U10). Adjust the Clock Trimmer (C4) for a frequency of 894.886kHz.

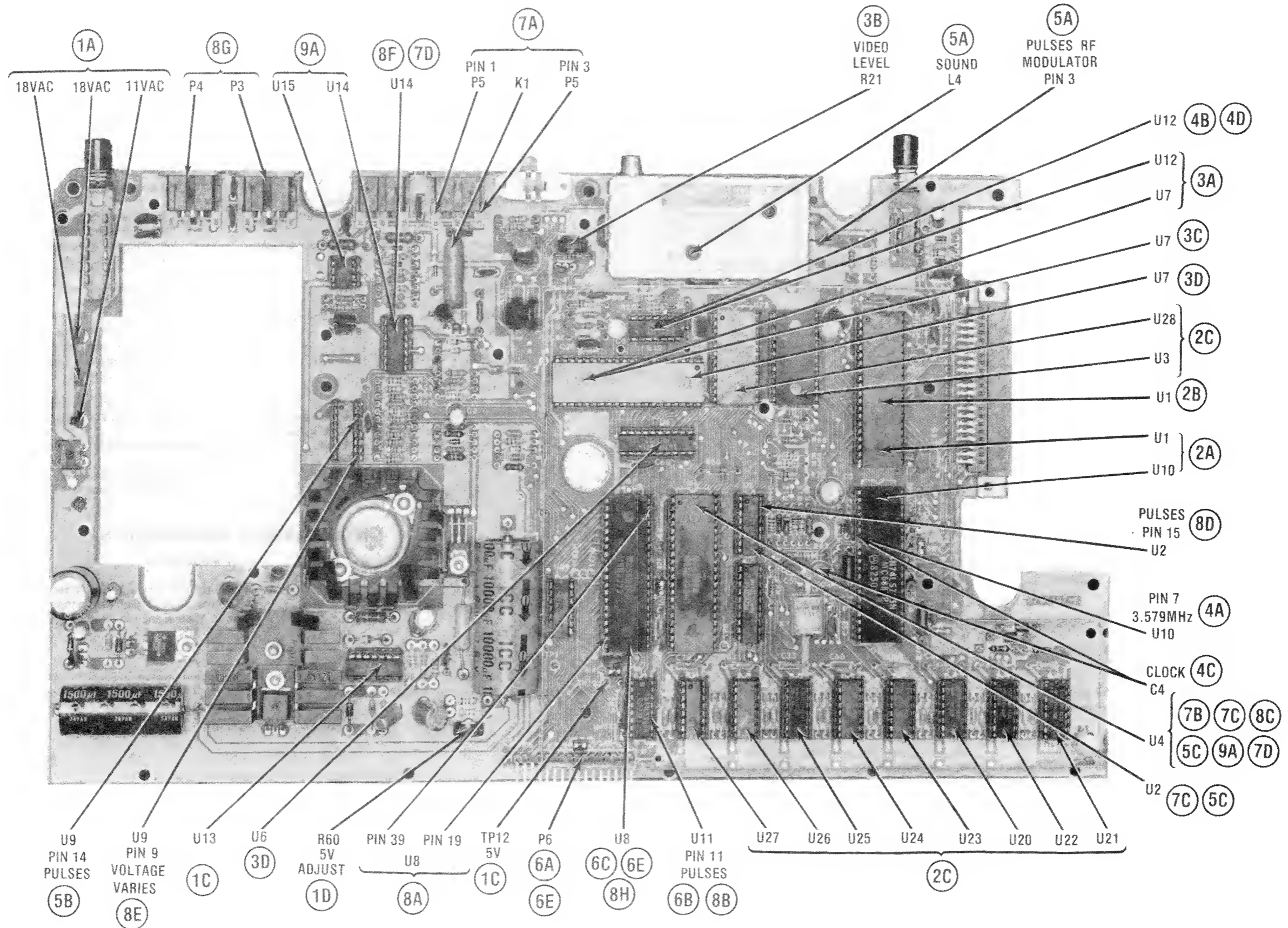
RF MODULATOR

Connect the Computer to a TV Monitor and set the TV and Channel Select Switch (S3) to the same channel (channel 3 or 4). Type in and run the following Basic program:

```
10 SOUND 200,2: GOTO 10
```

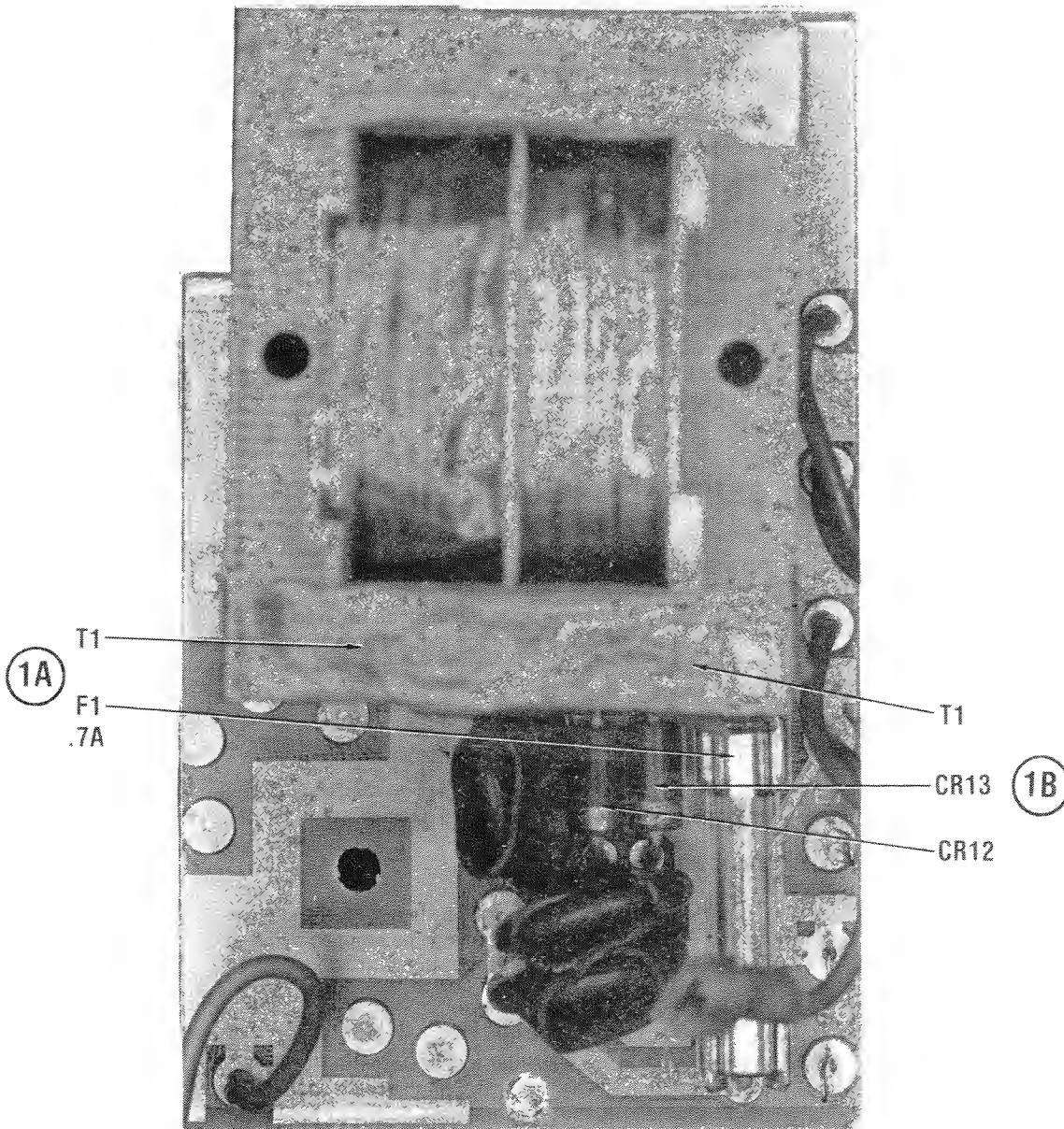
Adjust the Channel Coil (L5) for best picture and sound and adjust the Sound Coil (L4) for best sound with minimum noise.

PRELIMINARY SERVICE CHECKS (Continued)



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PRELIMINARY SERVICE CHECKS (Continued)



PRELIMINARY SERVICE CHECKS (Continued)

PREVENTATIVE MAINTENANCE

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of any of the Computer system; Computer, Monitor, Printer, or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptible power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If the disk drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long periods of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

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PRELIMINARY SERVICE CHECKS

ENCLOSED

SAFETY PRECAUTIONS

See page 18.

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SAMS™ Howard W. Sams & Co., Inc.
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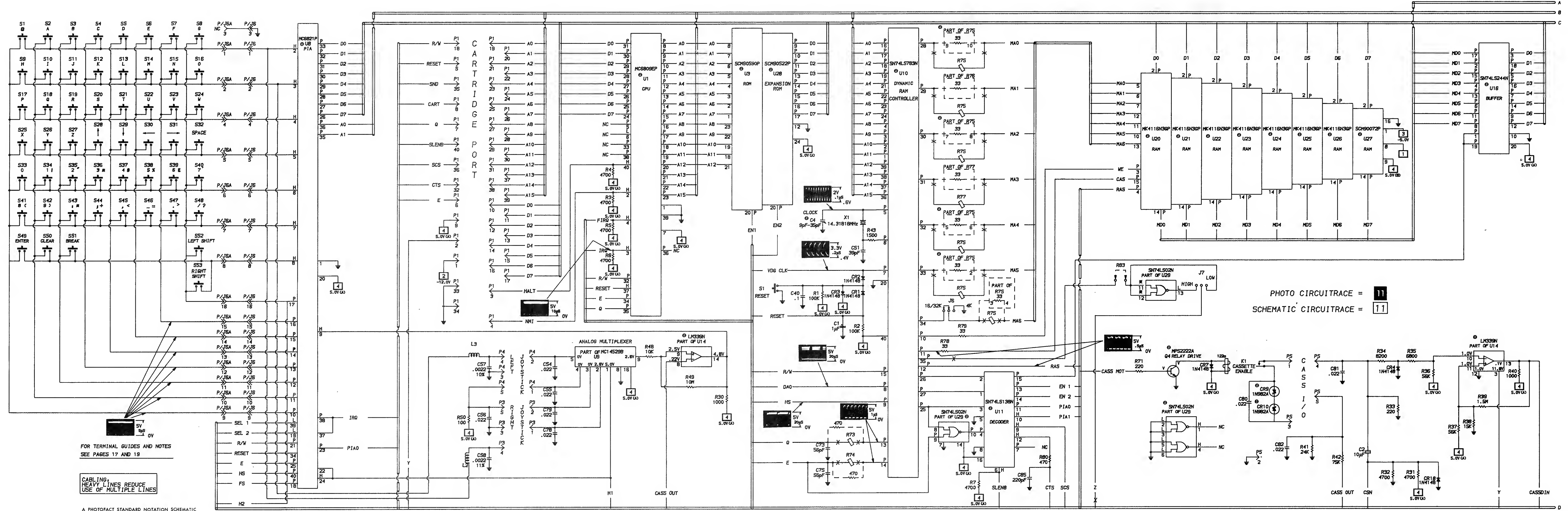
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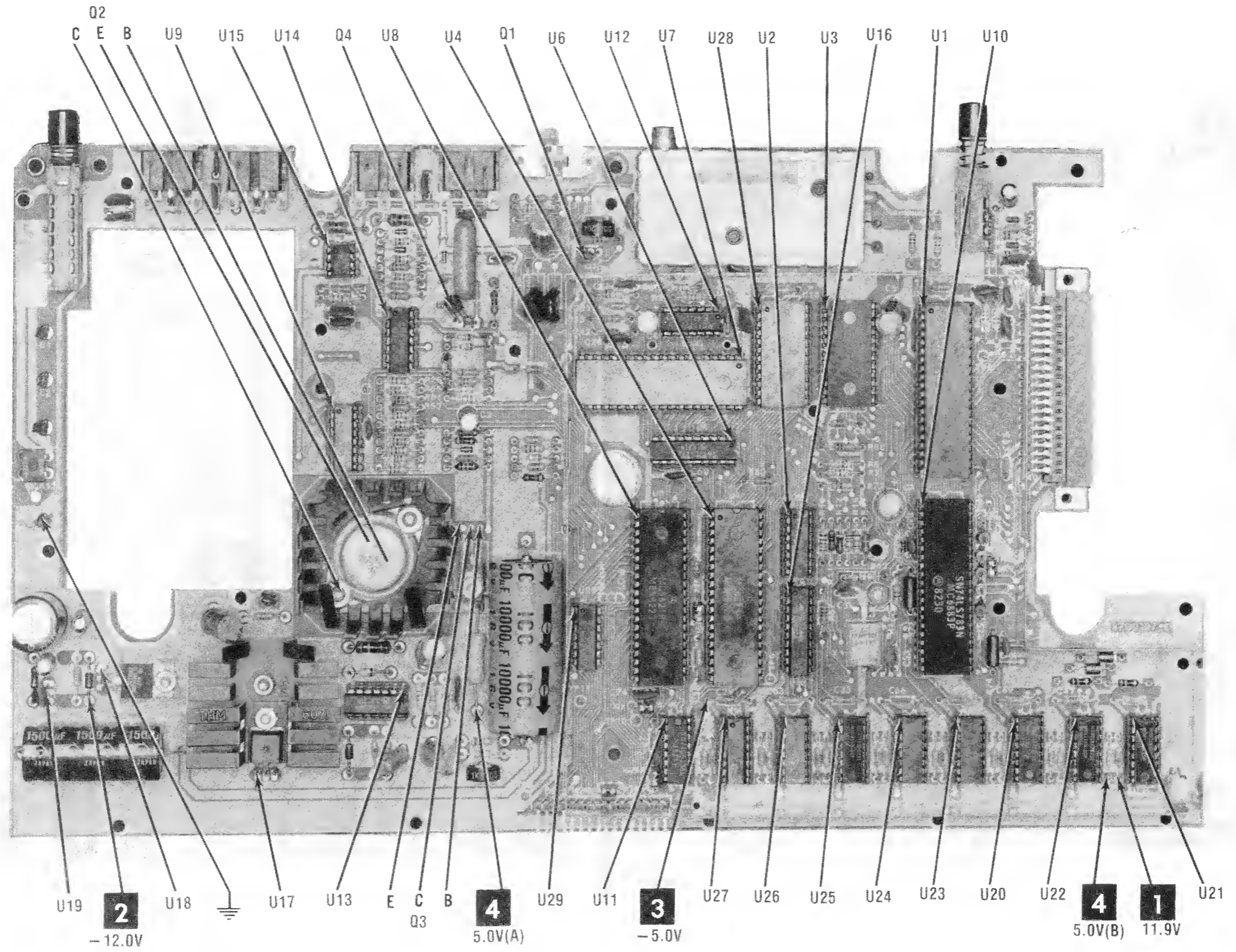
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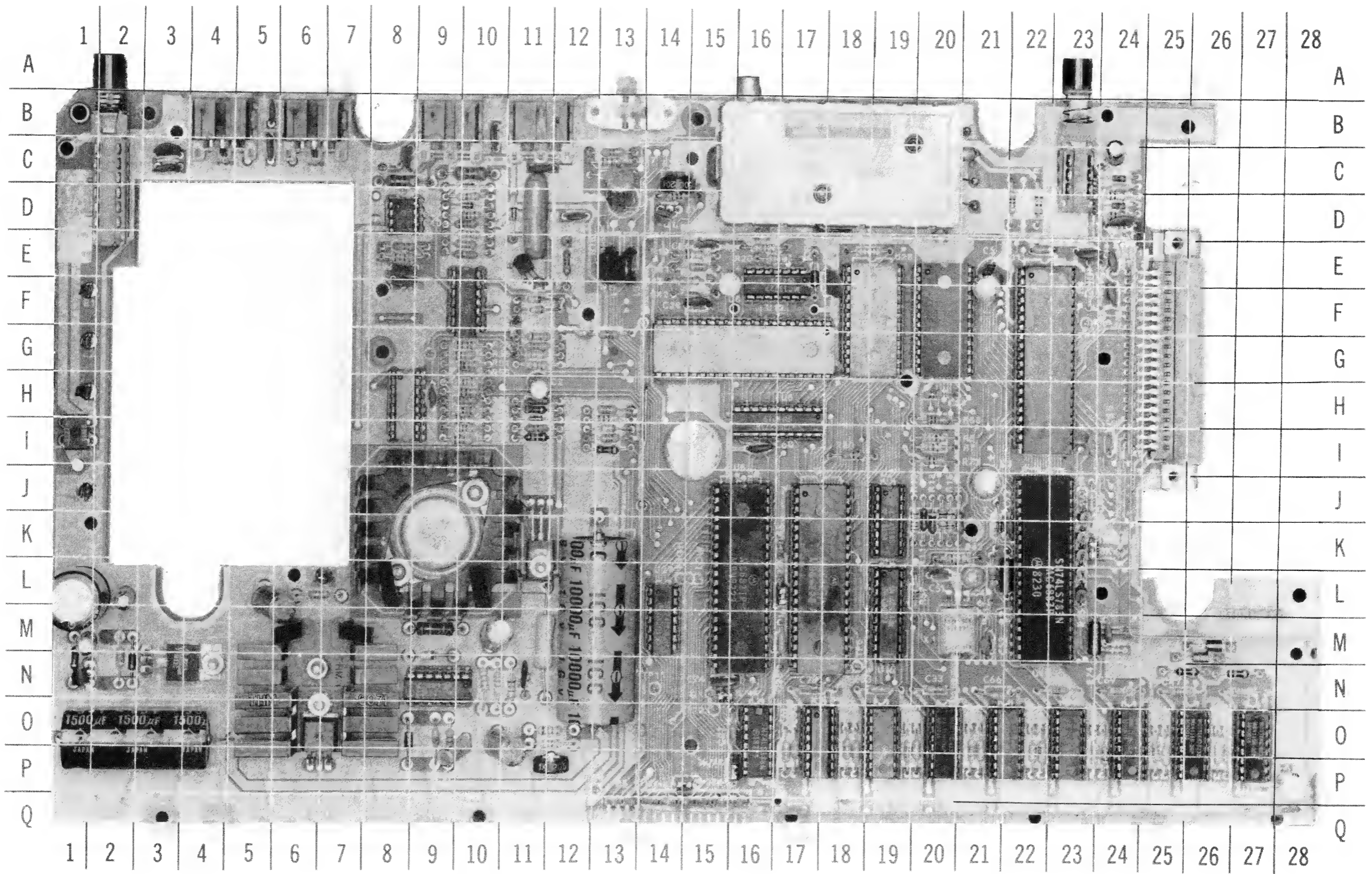
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ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED



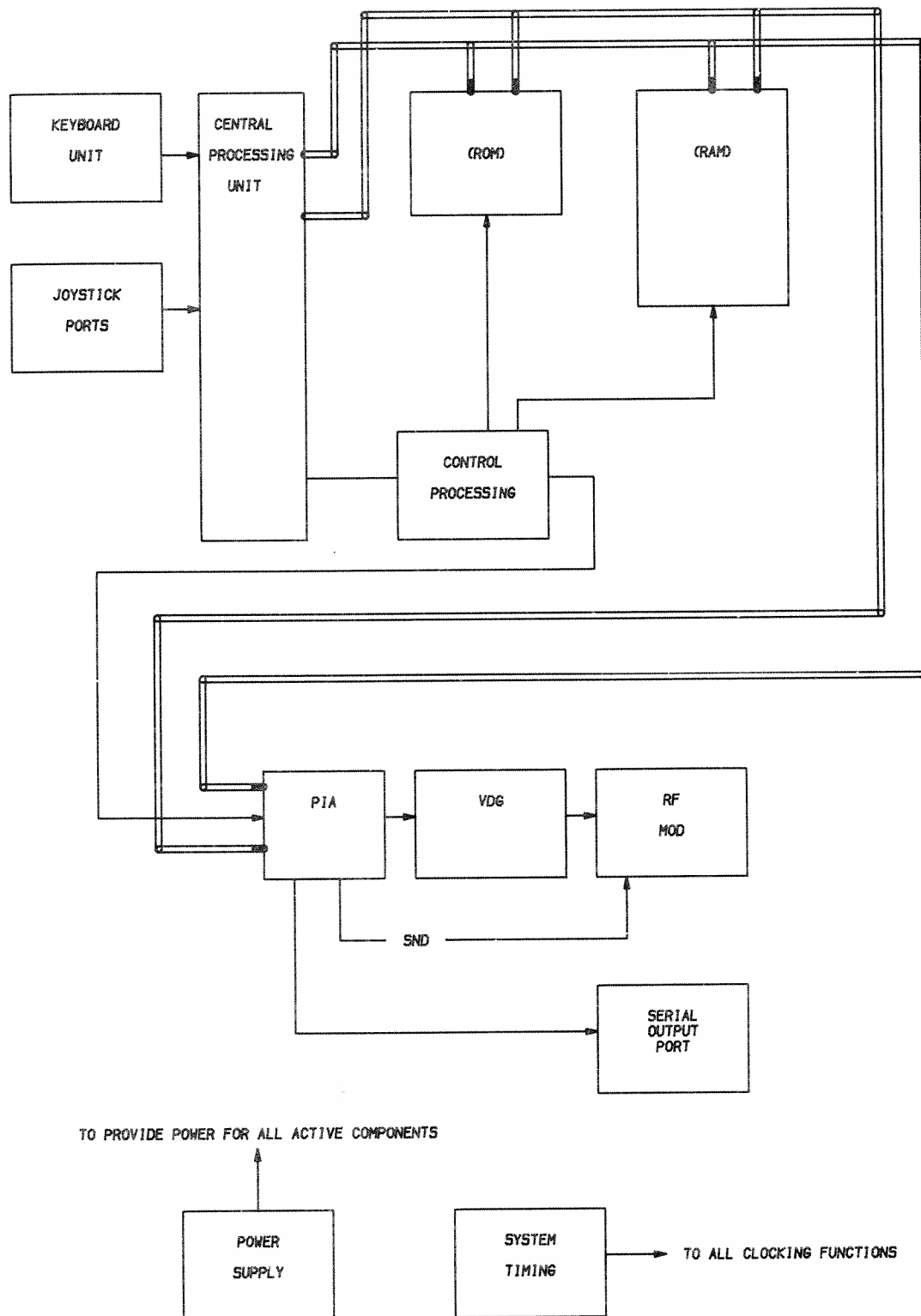
RADIO SHACK TRS-80
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GridTrace LOCATION GUIDE

C1	C-24	C78	E-8	R24	E-8	U13	N-9
C2	H-11	C79	F-8	R25	G-10	U14	F-10
C3	J-21	C80	C-11	R26	H-10	U15	O-8
C4	L-21	C81	B-10	R27	C-10	U16	L-19
C5	F-21	C82	D-12	R28	O-10	U17	O-7
C6	F-15	C83	F-24	R29	O-10	U18	N-3
C7	O-2	C84	E-15	R30	I-10	U19	N-1
C8	P-28	C85	I-23	R31	G-11	U20	O-24
C9	L-1	CR1	C-24	R32	G-11	U21	O-27
C10	M-13	CR2	K-21	R33	H-11	U22	O-26
C11	N-11	CR3	D-24	R34	H-11	U23	O-23
C12	C-13	CR4	H-11	R35	I-11	U24	O-22
C13	E-24	CR5	C-10	R36	I-11	U25	O-20
C14	P-11	CR6	D-10	R37	E-10	U26	O-19
C15	M-6	CR7	D-11	R38	E-10	U27	O-18
C16	M-10	CR8	E-17	R39	E-10	U28	F-19
C17	L-2	CR9	F-11	R40	O-10	U29	M-14
C18	M-1	CR10	F-11	R41	G-11	X1	M-21
C19	P-9	CR11	I-1	R42	G-11		
C23	N-23	CR14	O-8	R43	K-21		
C24	I-13	CR15	N-2	R44	E-18		
C25	H-13	CR16	I-13	R45	O-22		
C26	F-15	CR17	N-9	R46	C-23		
C27	O-16	CR18	G-11	R47	C-13		
C28	M-17	E1	F-1	R48	H-10		
C29	N-17	E2	G-1	R49	I-10		
C30	E-18	E3	H-1	R50	C-8		
C31	O-18	E4	J-1	R51	G-10		
C32	O-18	E8	L-7	R52	H-10		
C33	N-20	J1	P-15	R53	G-10		
C34	H-20	J2	N-15	R54	H-10		
C35	O-21	J3	P-16	R55	G-10		
C36	O-9	J4	L-17	R56	H-10		
C37	L-6	J5	K-17	R57	L-20		
C38	N-2	J6	K-23	R58	O-9		
C39	O-21	J7	L-5	R59	M-9		
C40	C-24	K1	D-11	R60	P-12		
C41	E-15	L2	E-13	R61	O-12		
C42	F-15	L3	E-13	R62	O-12		
C43	G-13	L4	O-17	R63	N-11		
C44	J-23	L5	B-19	R64	N-10		
C45	O-24	P1	G-26	R65	N-10		
C46	O-24	P2	B-9	R66	M-11		
C47	N-25	P3	B-7	R67	N-1		
C48	O-26	P4	B-4	R68	H-20		
C49	O-26	P5	B-11	R69	H-13		
C50	E-22	P6	Q-14	R71	E-12		
C51	L-20	Q1	D-14	R72	I-20		
C52	H-9	Q2	K-9	R73	L-22		
C53	M-21	Q3	L-11	R74	M-23		
C54	C-3	Q4	E-11	R75	L-23		
C55	C-3	R1	D-24	R76	M-26		
C56	C-5	R2	D-24	R77	M-26		
C57	B-5	R3	E-24	R78	N-26		
C58	C-8	R4	E-23	R79	N-27		
C59	E-23	R5	I-20	R80	I-18		
C60	I-16	R6	E-16	R82	D-22		
C61	P-17	R7	I-20	R83	J-23		
C62	O-17	R8	C-13	S1	C-23		
C63	N-19	R9	D-14	S2	C-2		
C64	O-19	R10	K-20	S3	B-13		
C65	O-20	R11	K-20	TP12	O-15		
C66	N-21	R12	K-20	U1	G-23		
C67	O-22	R13	K-20	U2	K-19		
C68	O-22	R14	K-20	U3	F-20		
C69	N-24	R15	K-21	U4	L-17		
C70	O-25	R16	E-13	U5	C-18		
C71	O-25	R17	L-21	U6	H-17		
C72	N-27	R18	E-15	U7	G-16		
C73	K-22	R19	E-15	U8	L-16		
C74	N-15	R20	E-17	U9	H-8		
C75	M-24	R21	C-14	U10	L-22		
C76	O-25	R22	I-13	U11	O-16		
C77	O-24	R23	E-8	U12	F-17		

CC-13

**RADIO SHACK TRS-80
MODEL 26-3002**



BLOCK DIAGRAM

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

Remove seven phillips screws from cabinet bottom, turn Computer right side up and lift cabinet top off.

POWER SUPPLY BOARD REMOVAL

Remove three phillips screws holding power supply board. Unplug power supply connectors and remove power supply board.

MAIN BOARD REMOVAL

Remove Power Supply Board and Keyboard. Remove ten phillips screws holding Main Board and remove from cabinet.

KEYBOARD REMOVAL AND DISASSEMBLY

Unplug keyboard from Main Board and remove keyboard from cabinet. Turn the keyboard upside down and remove 21 phillips screws from the bottom. CAREFULLY lift bottom cover off the keyboard (the keys and contacts are held in place by the bottom cover and will fall out if the keyboard is not laying face down).

GENERAL OPERATING INSTRUCTIONS

POWER UP

The Computer will come up in Basic mode when turned On with no cartridge in the cartridge slot. If a cartridge is installed, the Computer will come up running the program in the cartridge.

RESET

The Computer can be Reset by pressing the Reset Button (S1) located on the right rear of the cabinet.

BASIC PROGRAMS

A program in Basic can be started by typing RUN and pressing the ENTER key. The program can be stopped by pressing the BREAK key or the Reset button.

CASSETTE OPERATION

Connect a Cassette Recorder to the Cassette Socket (P5) on the Computer. The black plug on the cable connects to the Earphone jack, the large gray plug connects to the Auxiliary jack and the small gray plug connects to the Remote On/Off jack on the Recorder. To load a program, type CLOAD, press the Return key, then put the Recorder in Play mode with the volume turned about halfway up. An S will appear on the Monitor screen while the Computer searches for the program. When the Computer finds the program the letter F will appear on the Monitor screen, then the word OK will appear after the program has been loaded.

To Save a program to tape, put the Recorder in Record mode, type CSAVE and press the Return key. The word OK will appear on the Monitor screen after the program is Saved.

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MODEL 26-3002

MISCELLANEOUS ADJUSTMENTS

5V ADJUST

Connect the input of a voltmeter to TP12. Adjust the 5V Adjust Control (R60) for a voltage of 5.0V at TP12.

CLOCK ADJUST

Connect the input of a frequency counter to pin 13 of the Dynamic RAM Controller IC (U10). Adjust the Clock Trimmer (C4) for a frequency of 894.886kHz.

RF MODULATOR

Connect the Computer to a TV Monitor and set the TV and Channel Select Switch (S3) to the same channel (channel 3 or 4). Type in and run the following Basic program:

```
10 SOUND 200,2: GOTO 10
```

Adjust the Channel Coii (L5) for best picture and sound and adjust the Sound Coil (L4) for best sound with minimum noise.

VIDEO LEVEL

Connect the input of a scope to the emitter of the Video Amp Transistor (Q1). Set the scope sweep to 20 μ Sec, voltage range to 1V, DC input and trigger to negative slope. Adjust the Video Level Control (R21) for a blanking level of 2.35V (See Figure 1).



Figure 1

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

TEST EQUIPMENT (COMPUTERFACTS)

Equipment Name	B & K Precision Equipment No.	Sencore Equipment No.	Simpson Equipment No.
OSCILLOSCOPE	1570A,1590A,1596	SC61	454
LOGIC PROBE	DP51		
LOGIC PULSER	DP101		
DIGITAL VOM	2830	DVM37,DVM56,SC61	463,467,470,474,467E
ANALOG VOM	277		260-7,160,165, 260-6XL,260-7P, 260-6XLP
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	710
COLOR BAR GENERATOR	1211A,1248,1251,1260	CG25,VA62	431
RGB GENERATOR	1260		
FUNCTION GENERATOR	3020		420A,420D
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44	HP200	248 00168,00411,00749
TEMPERATURE PROBE	TP-28		IR-10,00760,00758; 383,389,388
CRT ANALYZER	467,470	CR70	

TROUBLESHOOTING

COMPUTER DEAD

Remove all peripheral equipment that is connected to Computer except the Monitor. Turn Computer On. Check the operation of Computer. If Computer works properly, turn Computer Off, plug peripherals in one at a time and recheck operation of Computer until peripheral causing the problem is found. If Computer does not work with peripherals disconnected, check for 5.0V at TP12, -5.0V at TP11 and 11.9V at pin 3 of Voltage Regulator IC (U17). If voltages are missing, refer to "Power Supply" section. If voltages are correct, check for pulses on Data pins (24 thru 31) and Address pins (8 thru 23) of CPU IC (U1). If pulses are missing at any of the pins, refer to "Microprocessor Operation" section. If pulses are present, refer to "Video" section.

POWER SUPPLY

Computer is Dead. Check Fuse (F1). If Fuse is bad, check for possible shorts to ground at Voltage Regulator IC's (U17, U18 and U19), Regulator Transistor (Q2) and check for possible shorted primary or secondary windings on Transformer T1. If Fuse F1 is good, apply 120V AC power and check for 36V AC from pin 1 to pin 2 and 11.0V from pin 3 to ground of connector E. If all voltages are missing, check for open windings on Transformer T1. If 36V AC is present from pin 1 to pin 2 and 11.0V is missing at pin 3 of Connector E, check 19V AC winding of Transformer T1 for possible open circuit and check Diodes CR12 and CR13. If voltages are correct at Connector E, check for 5.2V at Collector of Regulator Transistor (Q2). If 5.2V is missing, check voltages and components associated with pins 2 thru 6 and 10 thru 13 of Error Amp IC (U13) and Regulator Transistors (Q2 and Q3). If voltage reading is not correct at Collector of Q2, check adjustment of 5V Adjust Control (R60), see "Miscellaneous Adjustments". If voltage is correct at Collector of Transistor Q2, check for -12.1V at pin 3 of Voltage Regulator IC (U18). If -12.1V is missing check Diodes CR11 and CR15, Electrolytics C9 and C17 and IC U18. If

-12.1V is present at pin 3 of IC U18, check for -5.0V at pin 3 of IC U19. If -5.0V is missing, check Resistor R67, Electrolytic C18 and IC U19. If -5.0V is present at pin 3 of IC U19, check for 11.9V at pin 3 of IC U17. If 11.9V is missing, check Diodes CR11 and CR14, Electrolytic C7 and IC U17.

MICROPROCESSOR (CPU) OPERATION

Computer is dead, power supply checks good. Use a scope to check data lines (pins 24 thru 31 of IC U1) for activity. If there is no activity check operation of reset circuit by checking logic reading at pin 37 of CPU IC (U1). The reading should be Low when the Computer is turned On then immediately go High. The logic reading should also be Low whenever Reset switch (S1) is pressed. If logic reading is not correct at pin 37 of IC U1 when Computer is turned On, check Electrolytic C1, Diodes CR1, CR2 and CR3 and Resistor R2. If Power On reset works but Reset Switch (S1) does not work, check Switch (S1), Capacitor C40, Diodes CR1 and CR3 and Resistor R1. If reset circuit is operating properly, check for 894.886kHz clock pulses at pins 34 and 35 of IC U1. If clock pulses are missing, check waveform at pin 5 of the Dynamic Ram Controller IC (U10). If waveform is missing, check Crystal X1, Capacitor C51, Trimmer C4, Resistor R43 and IC U10. If waveform is present at pin 5 of IC U10, check waveforms at pins 13 and 14 of IC U10. If waveforms are missing at pins 13 and 14 of IC U10, check IC U10 and Capacitors C73 and C75.

If clock pulses check good at pins 34 and 35 of IC U1, check for a logic High at pins 2, 3, 4 and 40 of IC U1. If logic reading is not correct at any pin, check IC's and components that are connected to defective pin.

To check for address lines that may be stuck logic High or Low, connect a jumper from pin 40 of IC U1 to ground. All address lines (pins 8 thru 23 of IC U1) should check logic open. If any address line checks logic Low or High, check IC's that are connected to defective line. Grounding pin 40 of IC U1 also causes pins 24, 25, 27 and 28 of IC U1 to go

TROUBLESHOOTING (Continued)

logic Low and pins 26, 29, 30 and 31 to go logic High. If any readings are not correct on pins 24 thru 31 of IC U1, check IC's connected to pin with incorrect reading.

Computer will come up properly when turned On, if PIA IC (U8), Analog Multiplexer IC (U9), IC U14 and Expansion ROM IC (U28) are removed. Turn Computer Off and reinstall IC's one at a time and recheck operation of Computer until defective IC is located.

If pulses appear on data pins (24 thru 31) of IC U1 when Computer is turned On then suddenly stop, check RAM IC's (U20 thru U27), ROM IC (U3) and Expansion ROM IC (U28).

VIDEO

No video. Check waveform at emitter of Video Amp Transistor (Q1). If waveform is present check adjustment of Video Level Control (R21) and check for 6.1V at pin 2 of RF Modulator. If Control R21 is adjusted properly and 6.1V is present at pin 2 of RF Modulator, check RF Modulator. If 6.1V is missing at pin 2 of RF Modulator, check Resistor R45. If R45 is good refer to the "Power Supply" section of this Troubleshooting guide.

If waveform is missing at emitter of Transistor Q1, check waveform at pin 12 of Video Mixer IC (U12). If waveform is present at pin 12 of IC U12, check voltages and components associated with Transistor Q1. If waveform is missing at pin 12 of IC U12, check waveform at pin 9 of IC U12. If waveform is present at pin 9 of IC U12, check IC U12. If waveform is missing at pin 9 of IC U12 check VDG IC (U7).

Dots are missing from alphanumeric characters. Check IC U7.

Wrong characters appear on Monitor screen. Check for pulses at pins 2, 5, 6, 9, 12, 15, 16 and 19 of Latch IC (U6). If pulses are missing at any pins, check IC U6. If pulses are present at IC U6, check IC U7.

VIDEO GRAPHICS

One or more Graphics modes do not work. Type in and run following program:

```
10 FOR X=0 TO 4
20 PMODE X: SCREEN X
30 NEXT X: GOTO 10
```

The program continually switches between five Graphics modes that are available. While program is running, check for pulses at pins 27, 29, 30 and 35 of the VDG IC (U7). If pulses are missing, check PIA IC (U4) and Dynamic RAM Controller IC (U10). If pulses are present, check IC U7.

COLOR

No Color. Check 3.58MHz waveform at pin 33 of VDG IC (U7). If waveform is missing, check Dynamic RAM Controller IC (U10). If waveform is present at pin 33 of IC U7, check waveforms at pins 8 and 10 of Video Mixer IC (U12). The waveform at pin 10 of IC U12 should look like the waveform at pin 8 with an amplitude of .3V peak to peak. If waveform is present at pin 8 and missing at pin 10 of IC U12, check Capacitor C42 and Resistor R18. If waveform is missing at pin 8 of IC U12, check IC U12.

Colors are not correct. Check for a frequency of 3.57954MHz at pin 7 of Dynamic RAM Controller IC (U10). If frequency is not correct, check adjustment of the 14.31818MHz Clock Trimmer (C4), see "Miscellaneous Adjustments". If correct frequency cannot be obtained by adjusting Trimmer C4, check Crystal X1, Capacitor C51, Resistor R43 and IC U10. If frequency is correct at pin 7 of IC U10, check waveforms at pins 5 and 7 of Video Mixer IC (U12). If waveforms are missing or incorrect, check VDG IC (U7). If waveforms are present, check IC U12.

SOUND

No sound. Type in and run following Basic program. The program produces a continuous tone from Monitor speaker.

```
10 SOUND 200,200: GOTO 10
```

While program is running, check for pulses at pins 3, 5, 7, 9, 11 and 14 of Buffer IC (U2). If pulses are missing, check PIA IC (U4). If pulses are present at pins 3, 5, 7, 9, 11 and 14 of IC U2, check for pulses at pins 2, 4, 6, 10, 12 and 15 of IC U2. If pulses are missing, check IC U2. If pulses are present at pins 2, 4, 6, 10, 12 and 15 of IC U2, check for pulses at pin 14 of Analog Multiplexer IC (U9). If pulses are missing at pin 14 of IC U9, check Capacitor C52 and Resistors R10 thru R15 and R72. If pulses are present at pin 14 of IC U9, check for pulses at pin 10 of IC U9. If pulses are missing at pin 10 of IC U9, check for a logic Low at pins 6 and 7 of IC U9. If pin 6 or 7 of IC U9 do not read logic Low, check PIA IC (U8). If pins 6 and 7 of IC U9 are correct, check IC U9. If pulses are present at pin 10 of IC U9 check adjustment of Sound Coil (L4) on RF Modulator, see "Miscellaneous Adjustments".

KEYBOARD

Keyboard dead. Check keyboard Connector (P6) for good connections. If connector checks good, check for pulses at pin 11 of Decoder IC (U11). If pulses are missing, check IC U11. If pulses are present at pin 11 of IC U11, check PIA IC (U8).

One key is erratic or dead. Check bad key for continuity. If key checks bad, clean key contacts and recheck key.

A group of keys do not work. Check keyboard Connector (P6) for good connections. If connector checks good, check IC U8.

More than one letter appears on Monitor screen when a key is pressed. Check for shorted keys or keys that are stuck down.

CASSETTE

Cassette motor does not turn Off. Check for 0V at pin 39 of PIA IC (U4). If the voltage is not correct, check IC U4. If voltage is correct at pin 39 of IC U4, check for 5.0V at collector of Relay Driver Transistor (Q4). If voltage is not correct, check Transistor Q4. If voltage is correct at collector of Transistor Q4, check for possible sticking contacts in Relay K1 and check Capacitor C80 and Zener Diodes CR9 and CR10 for possible shorts.

Cassette motor will not turn On. Type in and run the following Basic program. The program turns On Cassette Motor.

```
10 POKE 65313,60
```

TROUBLESHOOTING (Continued)

After running program, check for .9V at pin 38 of PIA IC (U4). If voltage is not correct at pin 38 of IC U4, check IC U4. If voltage is correct at pin 38 of IC U4, check for .1V at collector of Relay Driver Transistor (Q4). If voltage is not correct, check Transistor Q4, Diode CR7 and Relay K1.

Programs can not be saved on cassette. Type in and run the following Basic program which continuously saves itself to cassette.

```
10 CSAVE: GOTO 10
```

While program is running, check for pulses at pins 5 thru 9 of IC U4. If pulses are missing at pins 5 thru 9 of IC U4, check IC U4. If pulses are present at pins 5 thru 9 of IC U4, check for pulses at pins 4, 6, 10, 12 and 15 of Buffer IC (U2). If pulses are missing at pin 4, 6, 10, 12 or 15 of IC U2, check IC U2. If pulses are present at IC U2, check for a 1V peak to peak waveform at pin 5 of Connector P5. If waveform is missing at pin 5 of Connector P5, check Capacitors C52 and C82 and Resistors R41 and R42.

Programs cannot be loaded from cassette. Inject a 4V peak to peak 1000Hz square wave at pin 4 of cassette Connector (P5). Check for pulses at pin 13 of IC U14. If pulses are missing, check voltages and components associated with pins 10, 11 and 13 of IC U14. If pulses are present at pin 13 of IC U14, check PIA IC (U4).

JOYSTICK

Joysticks do not work. Type in and run the following Basic program to check operation of joysticks.

```
10 FOR X = 0 TO 3
20 N(X) = JOYSTK(X)
30 NEXT X
40 PRINT "RIGHT JOYSTICK HORIZONTAL = ";N(0)
50 PRINT "RIGHT JOYSTICK VERTICAL = ";N(1)
60 PRINT "LEFT JOYSTICK HORIZONTAL = ";N(2)
70 PRINT "LEFT JOYSTICK VERTICAL = ";N(3)
80 PRINT "RIGHT BUTTON = ";(PEEK(65280) AND 1)
90 PRINT "LEFT BUTTON = "; PEEK(65280) AND 2)
100 FOR T = 1 TO 100:NEXT T:CLS:GOTO 10
```

The numbers that appear on Monitor screen for joystick horizontal and vertical positions should vary from 0 to 63 while the joystick is being operated. The numbers that appear for the joystick buttons should change to the number 0 whenever the button is pressed.

Check the joystick Connectors (P3 and P4) for good connections. While program is running, check for pulses at pins 19 and 39 of PIA IC (U8). If pulses are missing at pin 19 or 39 of IC U8, check IC U8. If pulses are present at pin 19 and 39 of IC U8, check for pulses at pin 10 of Decoder IC (U11). If pulses are missing at pin 10 of IC U11, check IC U11. If pulses are present at pin 10 of IC U11, check for pulses at pins 4 thru 9 of PIA IC (U4). If pulses are missing at pins 4 thru 9 of IC U4, check IC U4. If pulses are present at pins 4 thru 9 of IC U4, check for pulses at pins 2, 4, 6, 10, 12 and 15 of Buffer IC (U2). If pulses are missing at pin 2, 4, 6, 10, 12, or 15 of IC U2, check IC U2. If pulses are present at IC U2, check voltage at pin 9 of Analog Multiplexer IC (U9) while operating joystick. The voltage should vary between 0V and 5V. If voltage does not vary at pin 9 of IC U9, check Capacitors C54, C55, C78 and C79 and IC U9. If voltage readings are correct at pin 9 of IC U9, check for pulses at pin

14 of IC U14. If pulses are missing at pin 14 of IC U14, check IC U14. If pulses are present at pin 14 of IC U14, check voltage at pin 8 of IC U14 while operating the joystick. The voltage should vary between 0V and 5V. If voltage reading is not correct, check Capacitor C52 and Resistors R10 thru R15 and R72.

Joystick buttons do not work. If right joystick button does not work, check for a logic Low at pin 2 of PIA IC (U8) while pressing right joystick button. If reading is correct, check IC U8. If reading is not correct, check Coil L2, check pins 3 and 4 of Connector P3 for good connections and check joystick button for continuity. If left joystick button does not work, check for a logic Low at pin 3 of IC U8 while pressing left joystick button. If reading is correct, check IC U8. If reading is not correct, check Coil L3, check pins 3 and 4 of Connector P4 for good connections and check joystick button for continuity.

SERIAL I/O PORT

Serial I/O port (Connector P2) does not work. Disconnect any equipment connected to serial port and connect a jumper from pin 4 to pins 1 and 2 of Connector P2. Type in and run the following Basic program.

```
10 POKE 65312,0
20 PRINT "0 OUTPUT ON U4,PIN 3"
30 PRINT "PIN 40 = ";(PEEK(65313) AND 128)
40 X = PEEK(65312)
50 PRINT "PIN 10 = ";(PEEK(65314) AND 1)
60 POKE 65312,255
70 PRINT "1 OUTPUT ON U4,PIN 3"
80 PRINT "PIN 40 = ";(PEEK(65313) AND 128)
90 X = PEEK(65312)
100 PRINT "PIN 10 = ";(PEEK(65314) AND 1)
110 FOR T = 1 TO 50:NEXT T:CLS:GOTO 10
```

The program toggles the serial output pin (pin 3) of PIA IC (U4) back and forth from 1 to 0 and reads the Carrier Detect pin (pin 40) and RS232 IN pin (pin 10) of IC U4. The program continuously prints results on Monitor screen. When a 0 is output on pin 3, pin 40 should read 128 and pin 10 should read 0. When a 1 is output on pin 3, pin 40 should read 0 and pin 10 should read 1. If readings are correct on Monitor screen, problem may be in equipment that was connected to port or in software used to operate the port.

If readings are not correct on Monitor screen, check for pulses at pin 3 of IC U4 while program is running. If pulses are missing on pin 3 of IC U4, check IC U4. If pulses are present at pin 3 of IC U4, use a scope to check for pulses that swing from -10V to +10V at pin 6 and IC U15. If the pulses are missing or are not correct at pin 6 of IC U15 check voltages and components associated with pins 1 thru 4 and 6 of IC U15 and check IC U15. If pulses are present at pin 6 of IC U15, check for pulses at pins 1 and 2 of IC U14. If pulses are missing at pin 1 or 2 of IC U14 check voltages and components associated with pins 1, 2, 4, 5, 6 and 7 of IC U14 and check IC U14. If pulses are present at pins 1 and 2 of IC U14, check IC U4.

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	NOTES	REPLACEMENT DATA					
				NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.	
CR1 thru CR7	1N4148	ADX1152		NTE519	ECG519	SK3100/519	WEP25/519	103-131	
CR8	1N4002	ADX1148		NTE116	ECG116	SK3311	WEP155	212-76-02	
CR9, 10	1N982A 1N982	ADX1103		NTE5046A NTE5046A	ECG5046A ECG5046A	SK75A/5046A SK75A/5046A	WEP1452/5046 WEP1452/5046		
CR11	VM28	AMX4582		NTE5332	ECG5332	SK9232/5332			
CR12, 13	VM-28 1N5401	ADX1474		NTE5332 NTE5801	ECG5332 ECG5801	SK9232/5332 SK9004/5801	WEP4001/5801	903-334	
CR14, 15	1N4002	ADX1148		NTE116	ECG116	SK3311	WEP155	212-76-02	
CR16	(1N)5228B 1N5228	ADX1473		NTE5007A	ECG5007A	SK3A9/5007A	WEP1407/5007		
CR17	1N4735	ADX0214		NTE5007A	ECG5007A	SK3A9/5007A	WEP1407/5007		
CR18	1N4148	ADX1152		NTE137A	ECG137A	SK6V2/137A	WEP1154/137	103-Z9008	
Q1	MP3904	AMX3583		NTE519	ECG519	SK3100/519	WEP925/519	103-131	
Q2	2N6594	AMX3799		NTE123AP	ECG123AP	SK3854/123AP	WEP736/123A	121-Z9000A	
Q3	T1P29	AMX3982		NTE219	ECG219	SK3173/219	WEP160/219	121-Z9058	
Q4	MP5222A 2N2222	AMX4263		NTE291+ NTE123AP	ECG291+ ECG123AP	SK3440/291+ SK3854/123AP	WEP780/291+ WEP736/123A	121-Z9047+	
U1	MC6809EP MC6809E	AXX3051		NTE123A NTE6809E	ECG123A ECG6809E	SK3444/123A	WEP736/123A	121-Z9000A	
U2	MC14050B	AMX4584		NTE4050B	ECG4050B	SK4050B		221-Z9163	
U3	SCM90590P MCM68A364	AXX3052							
U4	MC6821P 6821 MC6821	AMX4578		NTE6821 NTE6821 NTE6821	ECG6821 ECG6821 ECG6821			HE-443-843 HE-443-843 HE-443-843	
U6	SN74LS273N 74LS273	AMX4227		NTE74LS273 NTE74LS273	ECG74LS273 ECG74LS273	SK74LS273 SK74LS273		HE-443-805 HE-443-805	
U7	MC6847P MC6847	AMX4575							

2 PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFG. PART No.	NOTES	REPLACEMENT DATA					
				NTE PART No.	ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.	
U8	MC6821P 6821	AMX4578		NTE6821	ECG6821			HE-443-843	
U9	MC14529B	AMX4585		NTE6821	ECG6821			HE-443-843	
U10	SN74LS783N MC6883 MC6883P MC6883L	AMX4579		NTE4529B	ECG4529B				
U11	SN74LS138N 74LS138	AMX4583		NTE74LS138	ECG74LS138	SK74LS138		HE-443-877	
U12	MC1372P MC1372	AMX4574		NTE855	ECG855	SK74LS138 SK7616/855		HE-443-877	
U13	MC1723CP 723C	AMX3548		NTE923D	ECG923D	SK3165/923D	WEP2331/923D	221-Z9020	
U14	LM339N LM339	AMX4200		NTE923D	ECG923D	SK3165/923D	WEP2331/923D	221-Z9020	
U15	MC1741CP 741C(1C)	AMX4258		NTE834	ECG834	SK3569/834		221-121	
U16	SN74LS244N 74LS244	AMX3864		NTE834	ECG834	SK3569/834		221-121	
U17	MC78M1 2CT 78M1 2	AMX4577		NTE941M	ECG941M	SK3552/941M	WEP933/941M	HE-442-22	
U18	79M1 2C 79M1 2	AMX4188		NTE941M	ECG941M	SK3552/941M	WEP933/941M	HE-442-22	
U19	MC79L05ACP 79L05	AMX4260		NTE74LS244	ECG74LS244	SK74LS244		HE-443-791	
U20 thru	MC4116N-3GP			NTE74LS244	ECG74LS244	SK74LS244		HE-443-791	
U26	SCM90072C MCM4027AC3	AMX4577		NTE966	ECG966	SK3592/966	WEP966L/966	HE-442-674	
U27	SCM90072P SCM90072C	AMX4188	(1)	NTE966	ECG966	SK3592/966	WEP966L/966	HE-442-674	
U28	MCM4027AC3 SCM90522P	AMX4188	(1)	NTE967	ECG967	SK3673/967		HE-442-675	
U29	MCM68A364 SN74LS02N 74LS02	AMX3054	(2)	NTE1917	ECG1917	SK9219/1917		HE-442-665	
		AMX3551	(2)	NTE1917	ECG1917	SK9219/1917		HE-442-665	
		AMX3055	(1)	NTE2117	ECG2117	SK3592/966		HE-443-904	
		AMX3044	(2)	NTE2117	ECG2117	SK3592/966		HE-443-904	
		AMX3055	(1)	NTE2104	ECG2104	SK3673/967		HE-443-904	
		AMX3044	(2)	NTE2117	ECG2117	SK3673/967		HE-443-904	
		AMX3054	(2)	NTE2117	ECG2117	SK9219/1917		HE-443-904	
		AMX3551	(2)	NTE2104	ECG2104	SK9219/1917		HE-443-904	
		AMX3551		NTE74LS02	ECG74LS02	SK74LS02		HE-443-779	
		AMX3551		NTE74LS02	ECG74LS02	SK74LS02		HE-443-779	

+ Rotate 180° to conform with original lead configuration.

(1) For 4K RAM version

(2) For 16K RAM version only.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C17 thru C19	1uF 50V	ACC105QJTP

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C4	9pF-35pF	AC-4926

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
R10 R11 R12 R13 R14 R15 R75	10K 1% 1/4W Carbon Film 20K 1% 1/4W Carbon Film 40.2K 1% 1/4W Carbon Film 80.6K 1% 1/4W Carbon Film 162K 1% 1/4W Carbon Film 324K 1% 1/4W Carbon Film Resistor Network (1)	AN0281BEE AN0306BEE AN0597BEE AN0359BEE AN0385BEE AN0408BEE ARX0220		

(1) Contains four (4ea) 33 ohms.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L2	RF Choke (3.3uH)	ACA8059
L3	RF Choke (3.3uH)	ACA8059

TRANSFORMER (Power)

ITEM No.	RATING			REPLACEMENT DATA		
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.		NOTES
	SEC. 3	SEC. 4	SEC. 5			
T1	120V AC @ 130mA AC	18V AC @ 50mA AC	18V AC @ 160mA AC	ATA0856 993-0433 (1)		
	19V AC @ 600mA DC					

(1) Number on unit.

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R21 R60	Video Level +5V Adjust	500 1000	AP7156 AP0835	

RADIO SHACK TRS-80
MODEL 26-3002

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
F1	.7A @ 250V Fast-Acting	AHF1185	AF1176	

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
K1	Relay	AR8130	Cassette Enable Reset Power Channel Select 14.31818MHz Complete
R73	Ferrite Bead	2643021801	
R74	Ferrite Bead	2643021801	
R75	Ferrite Bead	264000301	
R76	Ferrite Bead	264000301	
R77	Ferrite Bead	264000301	
S1	Switch	S0852	
S2	Switch	S0851	
S3	Switch	S9142	
X1	Crystal	AMX2797	
	Keyboard	AXX0206	
	Keyboard Cable	AW2589	
	Power Cord	AW2587	

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.
Cabinet Top	AZ5844
Cabinet Bottom	AZ5845
Cartridge Door	ADA0337

WIRING DATA

Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor) 8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8529 (Solid) Available in 13 Colors 8522 (Stranded) Available in 13 Colors
300-Ohm Input Lead	Use BELDEN No. 8225
75-Ohm Input Lead	Use BELDEN No. 8241

LOGIC CHART

PIN NO.		PIN NO.		PIN NO.		PIN NO.		PIN NO.		PIN NO.		
U1	U1	U1	U2	U3	U3	U3	U4	U4	U4	U4		
1	L	21	P	1	H	P	21	P	1	L	21	P
2	H	22	P	2	L	P	22	P	2	L	22	H
3	P	23	P	3	L	P	23	P	3	H	23	H
4	H	24	P	4	L	P	24	H	4	L	24	H
5	P	25	P	5	L	P			5	L	25	P
6	L	26	P	6	L	P			6	L	26	P
7	H	27	P	7	L	P			7	L	27	P
8	P	28	P	8	L	P			8	L	28	P
9	P	29	P	9	L	P			9	L	29	P
10	P	30	P	10	L	P			10	H	30	P
11	P	31	P	11	L	P			11	*	31	P
12	P	32	P	12	L	L			12	H	32	P
13	P	33	P	13	*	P			13	L	33	P
14	P	34	P	14	L	P			14	L	34	H
15	P	35	P	15	L	P			15	L	35	P
16	P	36	P	16	*	P			16	L	36	P
17	P	37	H	17		P			17	L	37	H
18	P	38	P	18		P			18	H	38	H
19	P	39	L	19		P			19	L	39	L
20	P	40	H	20		P			20	H	40	H

PIN NO.		PIN NO.		PIN NO.		PIN NO.		
U6	U7	U7	U7	U8	U8	U8	U8	
1	H	L	21	P	1	L	21	P
2	P	P	22	P	2	H	22	H
3	P	P	23	P	3	H	23	P
4	P	P	24	P	4	H	24	H
5	P	P	25	P	5	H	25	P
6	P	P	26	P	6	H	26	P
7	P	P	27	L	7	H	27	P
8	P	P	28		8	H	28	P
9	P		29	L	9	H	29	P
10	L		30	L	10	P	30	P
11	P	11	31	L	11	P	31	P
12	P	P	32	P	12	P	32	P
13	P	P	33		13	P	33	P
14	P	P	34	P	14	P	34	H
15	P	P	35	L	15	P	35	P
16	P	P	36	P	16	P	36	P
17	P	H	37	P	17	P	37	P
18	P	P	38	P	18	P	38	P
19	P	P	39	L	19	L	39	L
20	H	P	40	P	20	H	40	P

**RADIO SHACK TRS-80
MODEL 26-3002**

LOGIC CHART (Continued)

PIN NO.	U10	PIN NO.	U10	PIN NO.	U11	PIN NO.	U16	U20	U21	U22	U23	U24
1	P	21	P	1	P	1	P	L	L	L	L	L
2	P	22	P	2	P	2	P	P	P	P	P	P
3	P	23	P	3	P	3	P	P	P	P	P	P
4	P	24	P	4	P	4	P	P	P	P	P	P
5	P	25	P	5	L	5	P	P	P	P	P	P
6	P	26	P	6	H	6	P	P	P	P	P	P
7	P	27	P	7	P	7	P	P	P	P	P	P
8	P	28	P	8	L	8	P	H	H	H	H	H
9	P	29	P	9	H	9	P	H	H	H	H	H
10	P	30	P	10	H	10	L	P	P	P	P	P
11	P	31	P	11	P	11	P	P	P	P	P	P
12	P	32	P	12	H	12	P	P	P	P	P	P
13	P	33	P	13	P	13	P	P	P	P	P	P
14	P	34	P	14	P	14	P	P	P	P	P	P
15	P	35	P	15	P	15	P	P	P	P	P	P
16	P	36	P	16	H	16	P	L	L	L	L	L
17	P	37	P			17	P					
18	P	38	P			18	P					
19	P	39	P			19	P					
20	L	40	H			20	H					
PIN NO.	U25	U26	U27	U28	PIN NO.	U28	PIN NO.	U29				
1	L	L	L	P	21	P	1	H				
2	P	P	P	P	22	P	2	L				
3	P	P	P	P	23	P	3	L				
4	P	P	P	P	24	H	4	H				
5	P	P	P	P			5	L				
6	P	P	P	P			6	L				
7	P	P	P	P			7	L				
8	H	H	H	P			8	P				
9	H	H	H	P			9	P				
10	P	P	P	P			10	P				
11	P	P	P	P			11	*				
12	P	P	P	L			12	*				
13	P	P	P	P			13	L				
14	P	P	P	P			14	H				
15	P	P	P	P								
16	L	L	L	P								
17				P								
18				P								
19				P								
20				P								

SCHEMATIC NOTES

—*— Circuitry not used in some versions

--- Circuitry used in some versions

⦿ See parts list

⊕ Ground

⌚ Chassis

▽ Common tie point

Waveforms and voltages taken from ground, unless noted otherwise.

Voltages, Waveforms and Logic probe readings taken with computer turned On, no keys pressed, unless otherwise noted.

Waveforms taken with triggered scope and Sweep/Time switch in Calibrate position, scope input set for DC coupling on 0 reference voltage waveforms. Switch to AC input to view waveforms after DC reference is measured when necessary. Each waveform is 7 cm. width with DC reference voltage given at the bottom line of each waveform.

Time in μ sec. per cm, given with p-p reading at the end of each waveform.

Item numbers in rectangles appear in the alignment/adjustment instructions.

Supply voltages maintained as shown at input.

Voltages measured with digital meter, no signal.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are $\frac{1}{2}W$ or less, 5% unless noted.

Value in () used in some versions.

Measurements with switching as shown, unless noted.

Logic Probe Display

L = Low

H = High

P = Pulse

* = Open (No light On)

LINE DEFINITIONS

A0 THRU A15 Address
CART Cartridge Presence Interrupt
CAS Column Address Strobe
CASS MOT Cassette Motor
CASS OUT Cassette Output
CASSDIN Cassette Data Input
CD Status Interrupt Input (RS232C)
CSN Cartridge Sound
CTS Cartridge Select Signal
D0 THRU D7 Data
DA0 Display Address Error
E Clock, 1/16 Master Clock, CPU RAM Addressing
EN1 ROM Enable
EN2 ROM Expansion Enable
FIRQ . Fast Interrupt Request, Does Not Maintain Registers
FS Field Sync
H1 Chip Select, PIA CS0 and CS1
HALT Halt CPU Input
HS Horizontal Sync
IRQ Interrupt Request

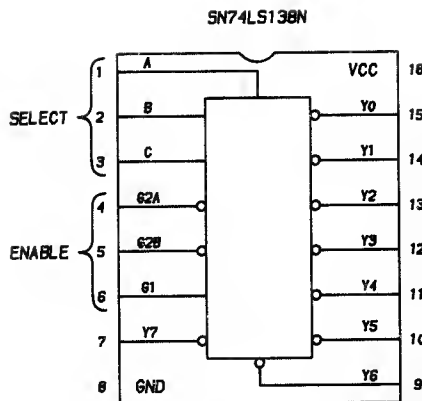
MA0 THRU MA6 Memory Address
MD0 THRU MD7 Memory Data
NMI Nonmaskable Interrupt
PIA0 Peripheral Interface Adapter Error
PIA1 Peripheral Interface Adapter One
Q Clock, 1/16 Master Clock, Leads E Clock by Ninety Degrees
R/W Read/Write
RAS Row Address Strobe
RESET Reset
RS232 RS232 Interface System
RS232 IN RS232 Interface System Input
SCS Spare Cartridge Signal, Selects Address Space
SEL 1, SEL 2 PIA Select Outputs, Joy Sticks or Sound
SLENB Select Enable, Disables Internal Selection, Utilities Unused Memory
SND Sound Source in Cartridge
VDG CLK Video Display Generator Clock
WE Write Enable

RADIO SHACK TRS-80
MODEL 26-3002

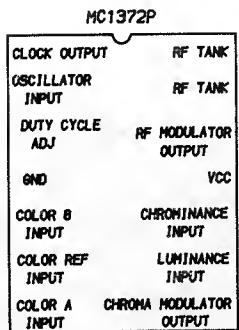
SAFETY PRECAUTIONS

1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Computer before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install board, floppy disk drives, printers, or other peripherals with power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. The Computer cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
10. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
11. Never expose the Computer to water. If exposed to water, turn the unit off. Do not place the Computer near possible water sources.
12. Never leave the Computer unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
13. Never use liquids or aerosols directly on the Computer. Spray on cloth and then apply to the Computer cabinet. Make sure the Computer is disconnected from the AC power line.

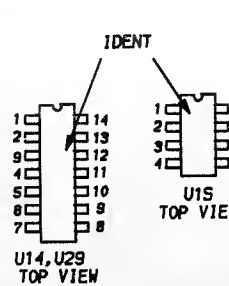
IC PINOUTS & TERMINAL GUIDES



U11
DECODER
TOP VIEW

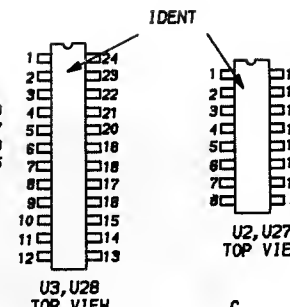


U12
VIDEO MODULATOR
TOP VIEW



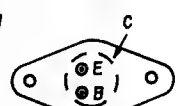
U14, U29
TOP VIEW

U15
TOP VIEW

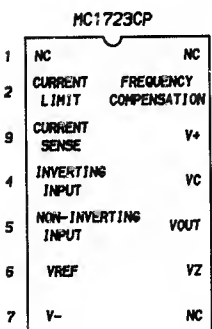


U3, U28
TOP VIEW

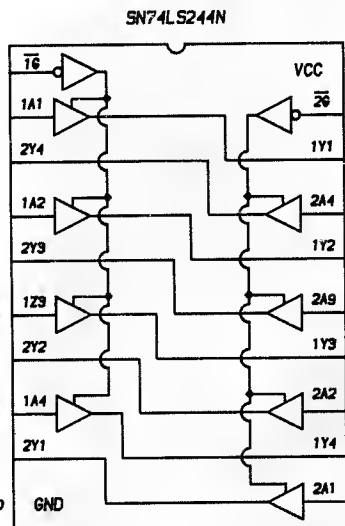
U2, U27
TOP VIEW



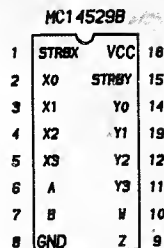
Q2
BOTTOM VIEW



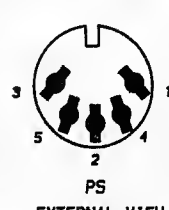
U13
REGULATOR
TOP VIEW



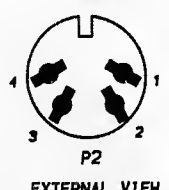
U16
BUFFER
TOP VIEW



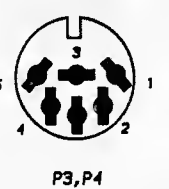
U9
SOUND SELECT
TOP VIEW



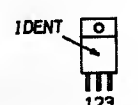
PS
EXTERNAL VIEW



P2
EXTERNAL VIEW



P3, P4
EXTERNAL VIEW



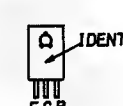
U17, U18
FRONT VIEW



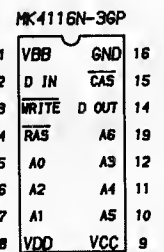
U19
BOTTOM VIEW



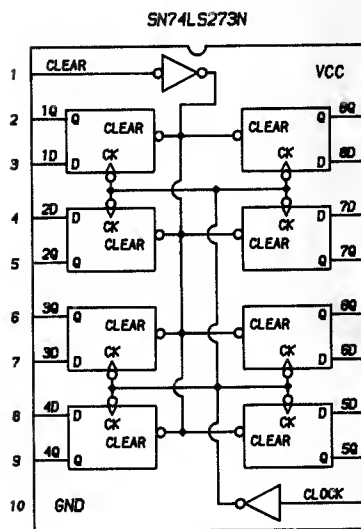
Q1, Q4
BOTTOM VIEW



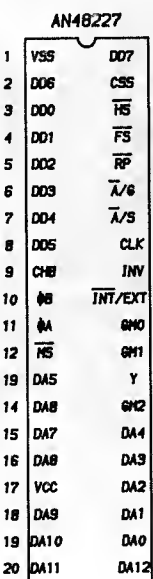
Q3
FRONT VIEW



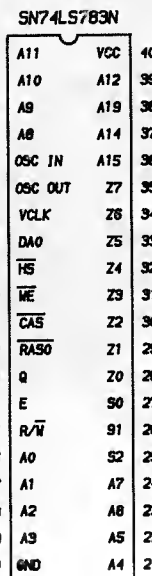
U20 THRU U26
RAM
TOP VIEW



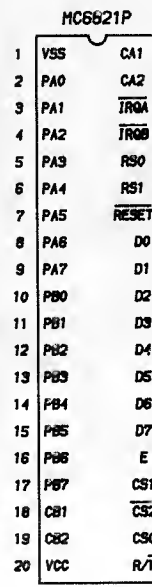
U6
FLIP/FLOP
TOP VIEW



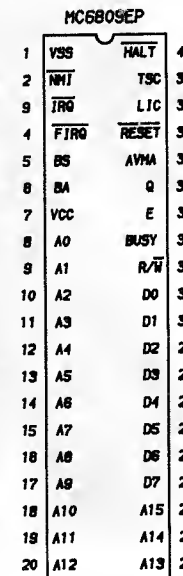
U7
VIDEO DISPLAY
GENERATOR
TOP VIEW



U10
MULTIPLEXER
TOP VIEW

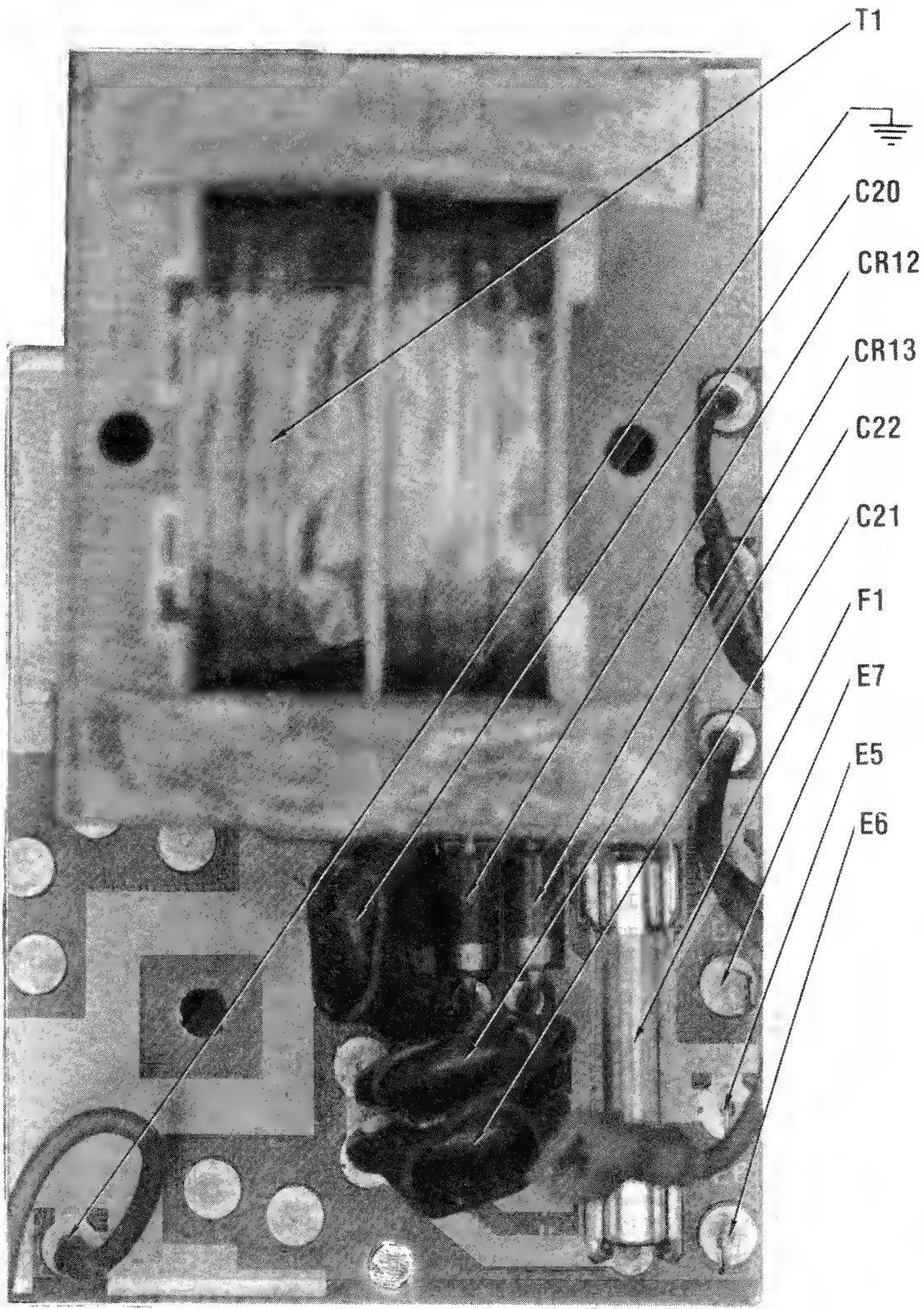


U4, U8
PIA
TOP VIEW

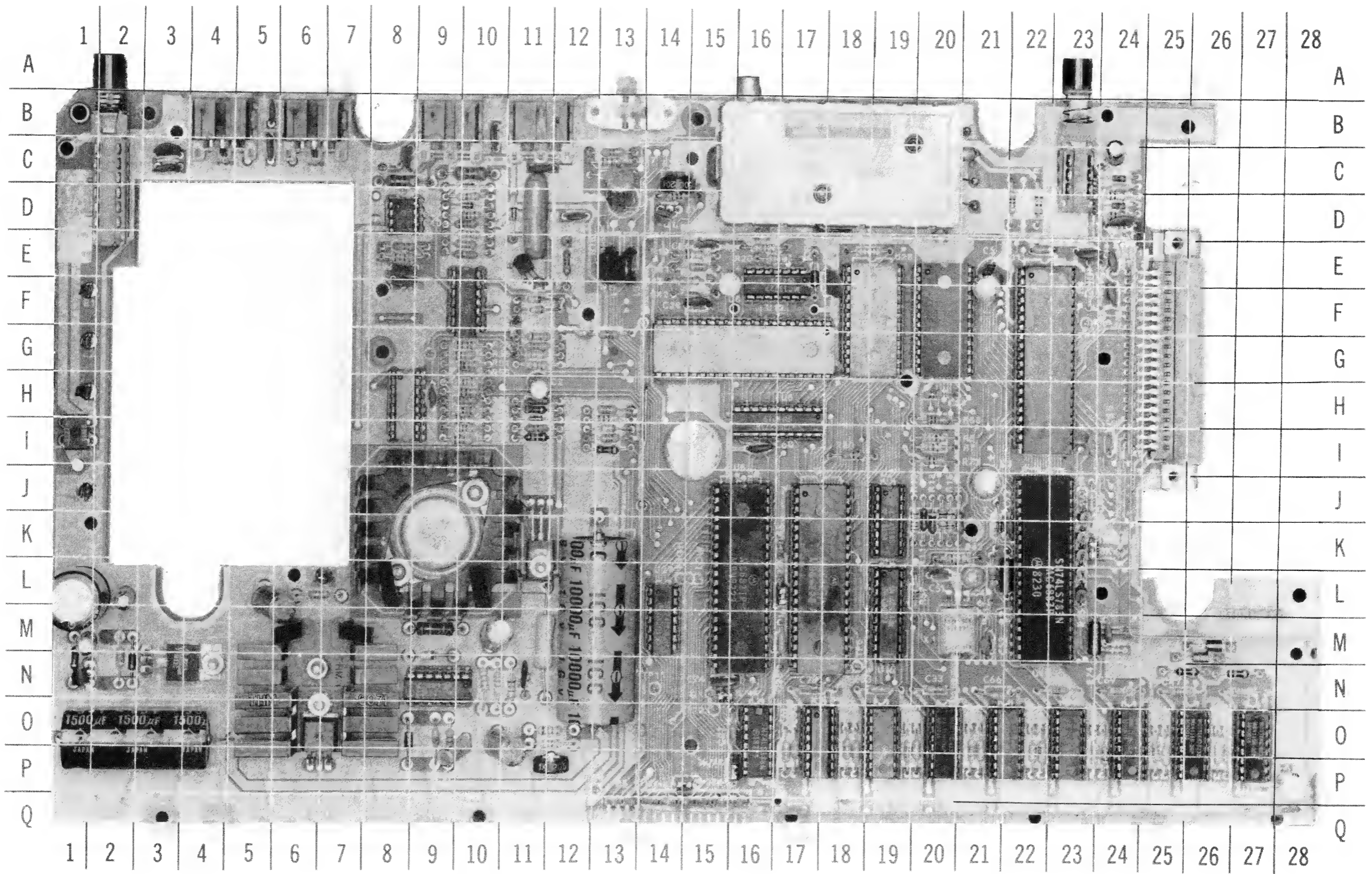


U1
MICROPROCESSOR
TOP VIEW

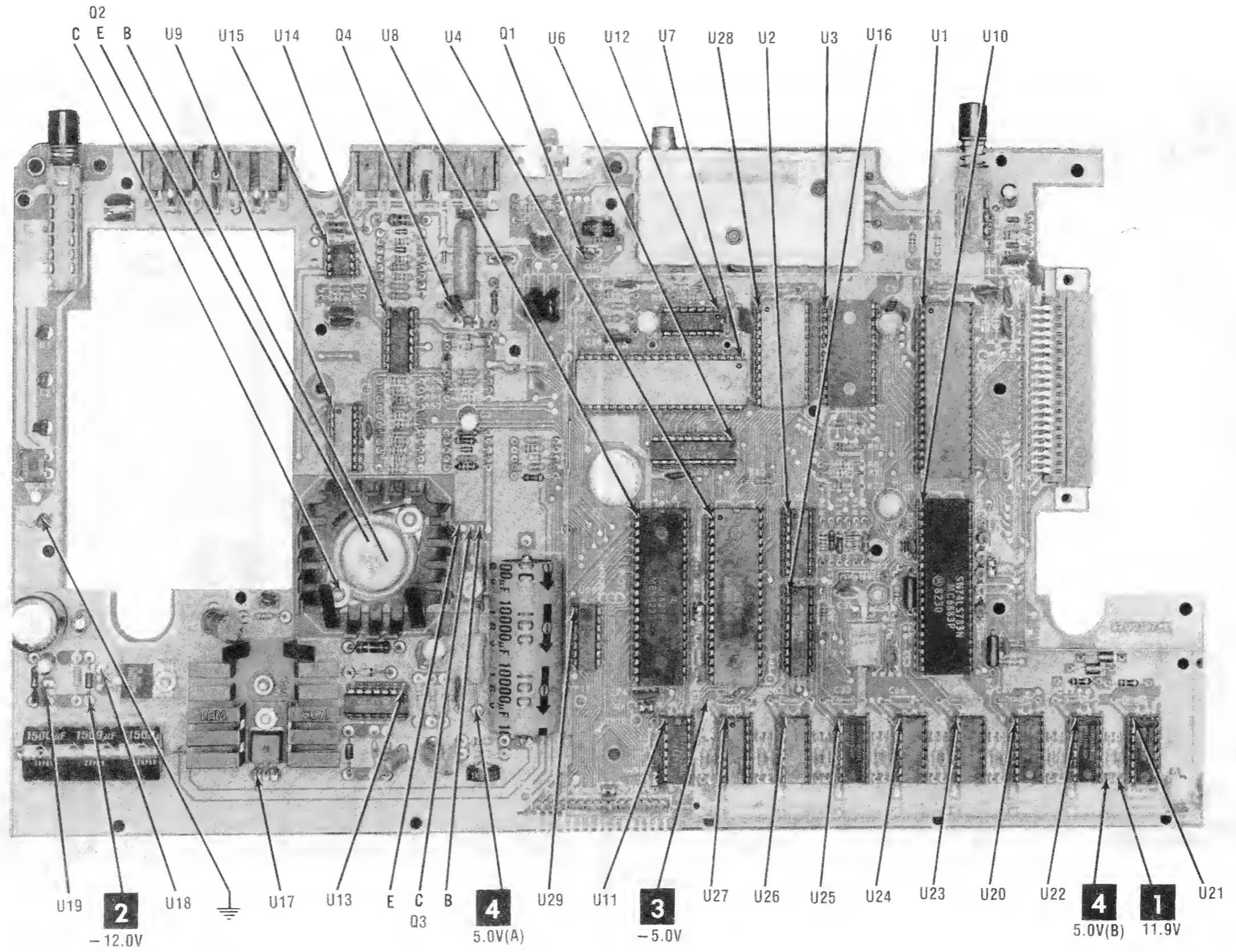
RADIO SHACK TRS-80
MODEL 26-3002



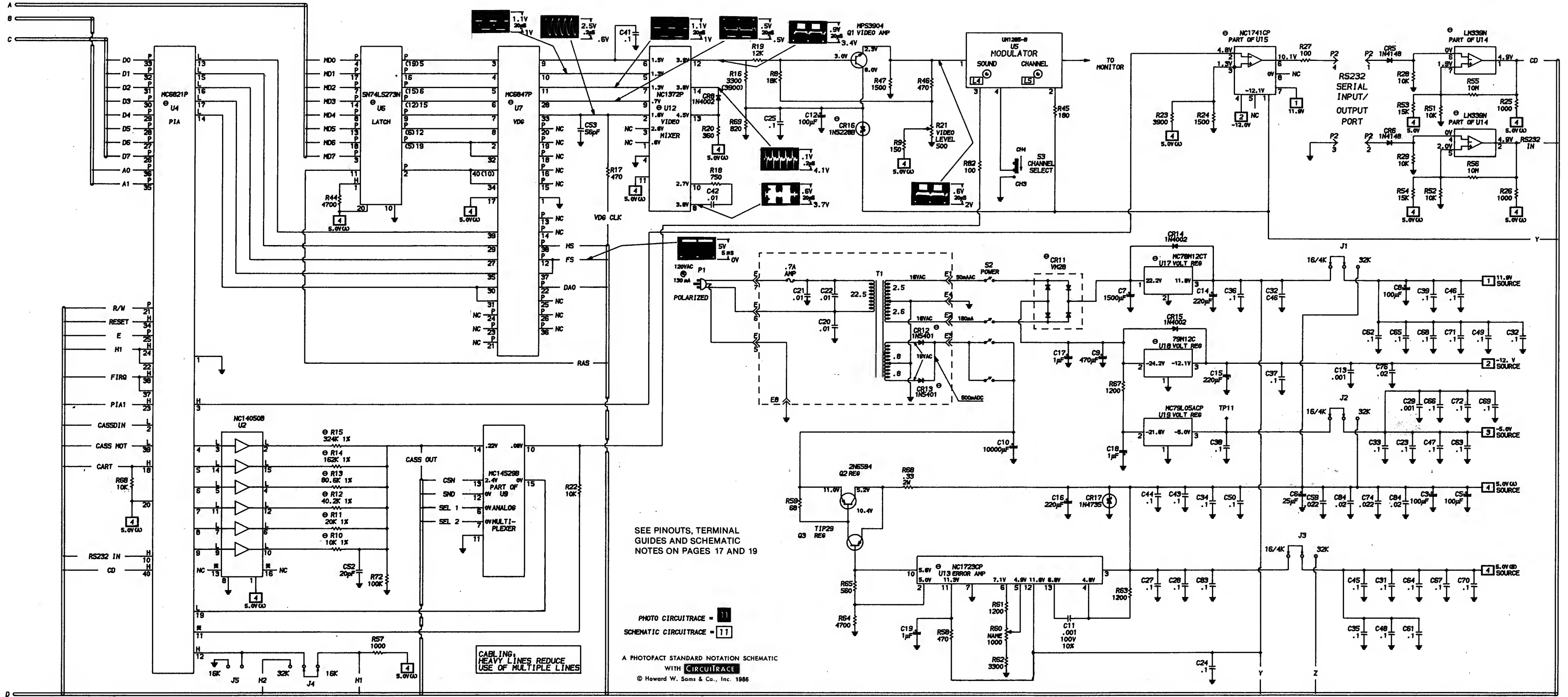
POWER SUPPLY BOARD



RADIO SHACK TRS-80
 MODEL 26-3002



ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED



SEE PINOUTS, TERMINAL GUIDES AND SCHEMATIC NOTES ON PAGES 17 AND 19

PHOTO CIRCUITRACE = 11
 SCHEMATIC CIRCUITRACE = 11

A PHOTOFAC STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE
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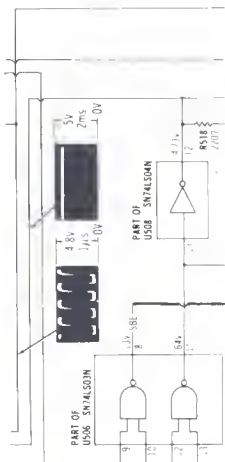
CABLING HEAVY LINES REDUCE USE OF MULTIPLE LINES



COMPUTERFACTS™ put easy to use, informative technical data right at your fingertips. Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

The following information is just a sample of the many valuable time saving features contained in this exclusive Sams COMPUTERFACTS publication:

- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.
- SAMS famous industry accepted standardized notation schematics containing CIRCUITRACE®, GRIDTRACE™, waveforms, voltages and stage identification.

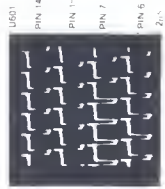


- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

TROUBLESHOOTING

MICROPROCESSOR CHIP CPU OPERATION

When the processor is functioning the following waveforms on the address lines (pins 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100) and the data lines (pins 1 through 16) using a logic probe or a scope. If a logic probe is used refer to the Logic Chart for the correct interpretation of the probe readings. The correct interpretation of the probe readings is given in the Logic Chart. The correct interpretation of the probe readings is given in the Logic Chart. The correct interpretation of the probe readings is given in the Logic Chart.



- Logic Chart containing logic probe readings to isolate defective circuitry and components.

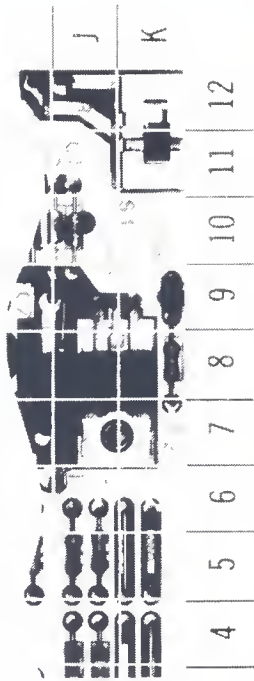
LOGIC

PIN NO.	IC U100	PIN NO.	IC U100	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1	P	21	P	1	P	L	L	L	L	L	L
2	P	22	P	2	P	P	P	P	P	P	P
3	P	23	P	3	H	H	H	H	H	H	H

If seal is broken, nonreturnable.

Each edition includes specific service information on the individual component, along with some overall troubleshooting hints.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITRACE, and component photographs.



- Complete Components Parts List in an easy to use format with field replacements shown when possible. SAMS unique semiconductor, chip and IC cross-reference gives you many replacements to choose from and is available at your Electronic Distributor.

SEMICONDUCTORS (Select replacement for best results)

ITEM NO.	TYPE	MFR PART NO.	EGC PART NO.	GENERAL ELECTRIC PART NO.	MOTOROLA PART NO.	REPLACEMENT DATA			
						NTE PART NO.	RCA PART NO.	WORKMAN PART NO.	ZENITH PART NO.
D102	1S553	1149-2576	EGC519	GE-514	1M4935	NTE519	5K9091/177	WEP925/519	103-131
D103	1M60M	1149-2527	EGC109	1M60	1M4004	NTE109	5K3088	WEP154/109	103-2901
D201	1M4004CP	1201-4205	EGC116	GE-504A	1M4004	NTE116	5K3317	WEP157	212-76-02
D301 thru D305	1S553	1149-2576	EGC519	GE-514	1M4935	NTE519	5K9091/177	WEP925/519	103-131

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