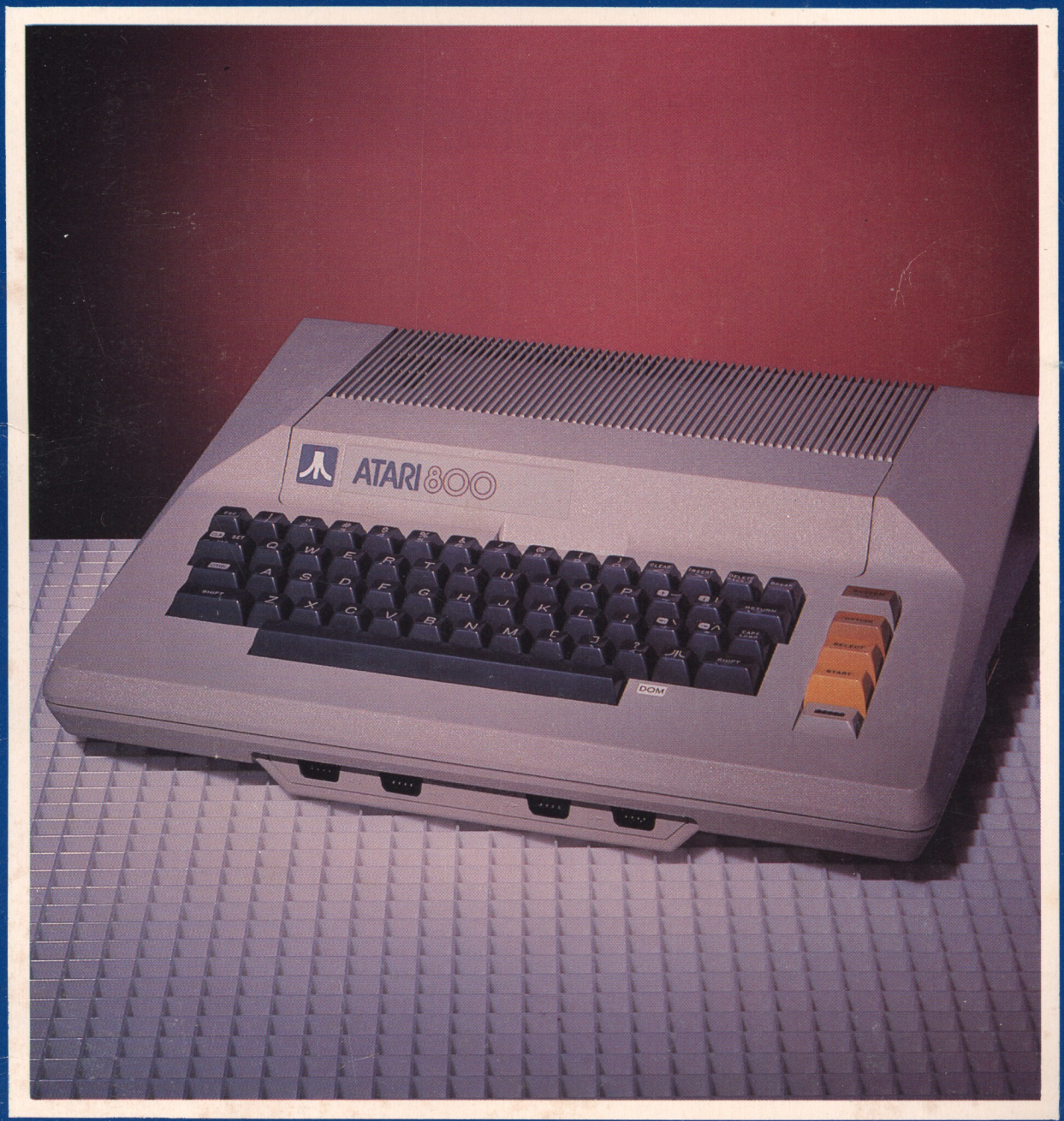
SAMS

CC7 08915

COMPUTERFACTS™

TECHNICAL SERVICE DATA

ATARI®
MODEL 800
COMPUTER



FEATURES: COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS • EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

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 hook-up before making service checks.

Disconnect all peripherals except the monitor from the computer to eliminate possible external malfunctions. However, problems involving the interaction between computer and a peripheral will require the connection of the device for voltage and logic readings.

Replacement or repair of the keyboard, main board, RF Modulator, CPU Board, Personality Board, RAM Board, connectors or components may be necessary after the malfunction has been isolated.

CC7 ATARI MODEL 800

GENERAL OPERATING INSTRUCTIONS

POWER UP

The computer will come up ready to program in Basic when a Basic cartridge is plugged in and the computer is turned On.

For instructions on loading and saving programs with an Atari Recorder see the "Cassette Operation" section.

To run a program type RUN and press the RETURN key. To stop a program, press the BREAK key or press the system RESET key.

CASSETTE OPERATION

Connect the Atari Program Recorder to the connector on the right side of the computer. NOTE: A standard tape recorder will not work with this computer.

To load a program, type CLOAD and press the RETURN key. The speaker will beep once. After the speaker beeps, push the play button on the recorder and press the RETURN key again. The program will then load. READY on the screen indicates the loading is completed. The recorder will shut-off automatically.

To save a program, type CSAVE and press the RETURN key. The speaker will beep twice and after the speaker beeps, press the play and record buttons on the recorder and then press the RETURN key. The program will then save. READY on the screen indicates the program has been saved. The recorder will shut-off automatically.

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PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

SEE INTERCONNECTING DIAGRAM AND PHOTOS TO MATCH THE NUMBER IN THE CIRCLES WITH THOSE IN THE FOLLOWING DATA FOR SERVICE CHECKS TO BE PERFORMED.

(1) RF MODULATOR

(A) Apply power to computer and set Power Switch (S202) to On. Verify the Power Indicator LEDs (CR210 and CR211) are lit. If LEDs CR210 and CR211 are not lit, refer to the "Power Supply" section.

(B) Verify the Channel Select Switch (S203) is set to the same channel as the monitor (Channel 2 or 3).

(C) Verify that the TV/Computer Switch (Part of Switch box) has been set to the computer position.

(D) Check for bad connections and improper hookup of the monitor and computer.

(E) If the computer still does not come On when the power is applied, check the voltages at the RF Modulator connection points. If the voltages are correct, substitute the RF Modulator.

(2) POWER SUPPLY

(A) Connect the power pack to 120VAC. Disconnect Connector J206 from computer and check for 10.4VAC at connector. If the voltage is not correct, substitute the power pack.

(B) Check for 12.5V at the cathode of Diode CR206.

(C) Check for 5.1V at pin 3 of Voltage Regulator IC (A202).

(D) Check for 24.4V at pin 1 of Voltage Regulator IC (A201).

(E) Check for 11.8V at pin 3 of Voltage Regulator IC (A201).

(F) Check for −5.0V at the anode of Zener Diode CR201.

(G) If all the voltages check in (B) thru (F) are missing, check Interlock Switch (S201) and Power Switch (S202). If switches are normal, substitute the power board.

(3) MAIN BOARD

(A) Power supply checks out properly, but the computer does not come up when power is applied. Verify the 3.579575MHz Crystal (X101) is oscillating at the proper frequency.

(B) Crystal X101 is oscillating correctly, but the computer still does not come up. Check the CPU board and the 16K RAM boards by substitution.

(C) If the computer still does not come up, check the personality board by substitution.

(D) The computer comes up properly, but the cartridge does not work. Check the personality board by substitution.

(E) Joysticks or paddles do not function. Check PIA IC (A102) by substitution.

(F) Computer comes up improperly with power applied. Check Decoder IC (Z101), Buffer ICs (Z105 and Z106) and IC Z102 by substitution.

(G) No color, vertical or horizontal sync or audio, check the CPU board by substitution.

(H) Computer will not load or save a program on a cassette. Check Pokey IC (A101) by substitution.

(4) KEYBOARD

(A) One or more keys do not function, substitute the keyboard.

(B) Several keys do not function. Check the Keyboard Connector (J106) and check Pokey IC (A101) and Decoder ICs (Z103 and Z104) by substitution.

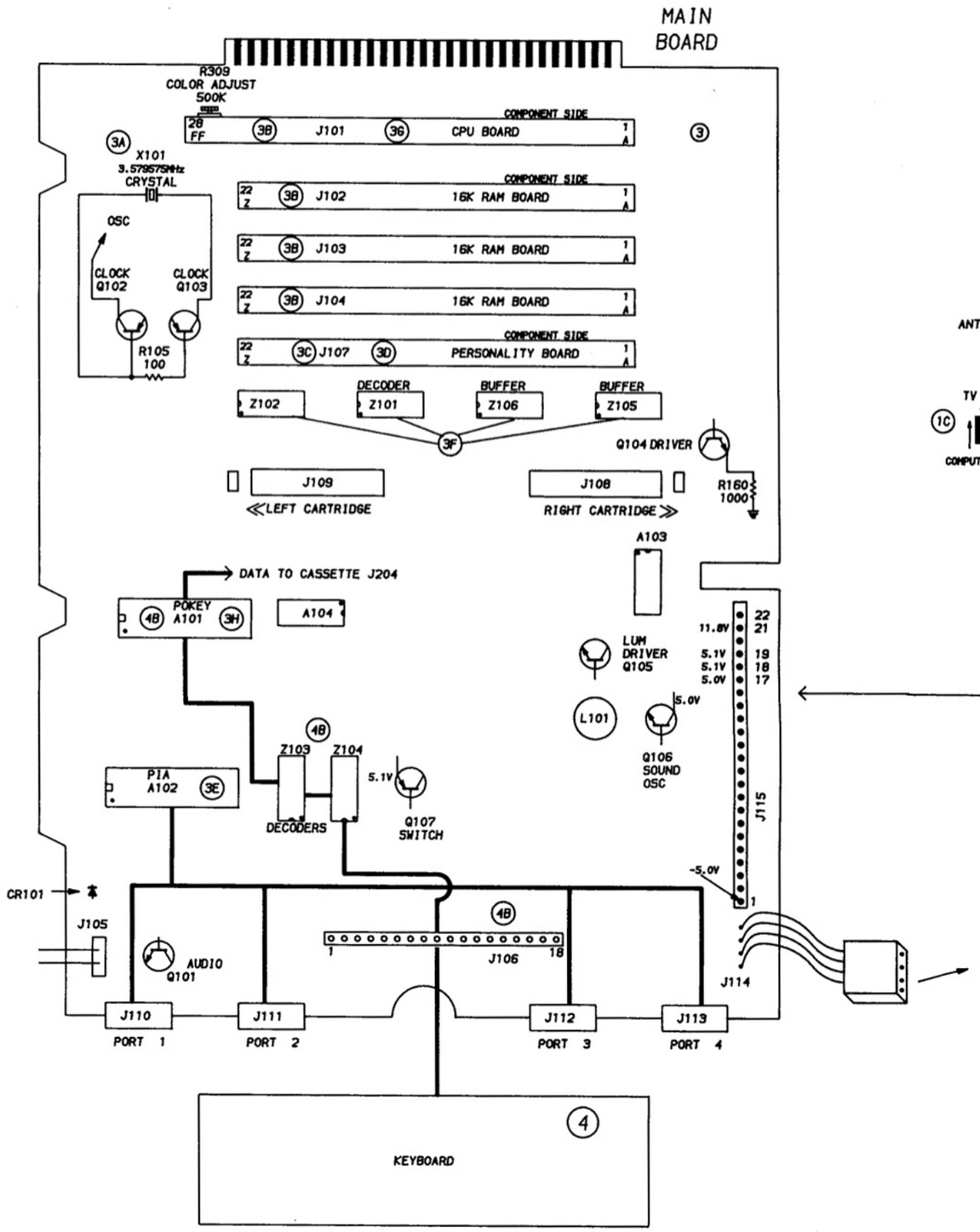
TEST EQUIMENT AND TOOLS

TEST EQUIPMENT

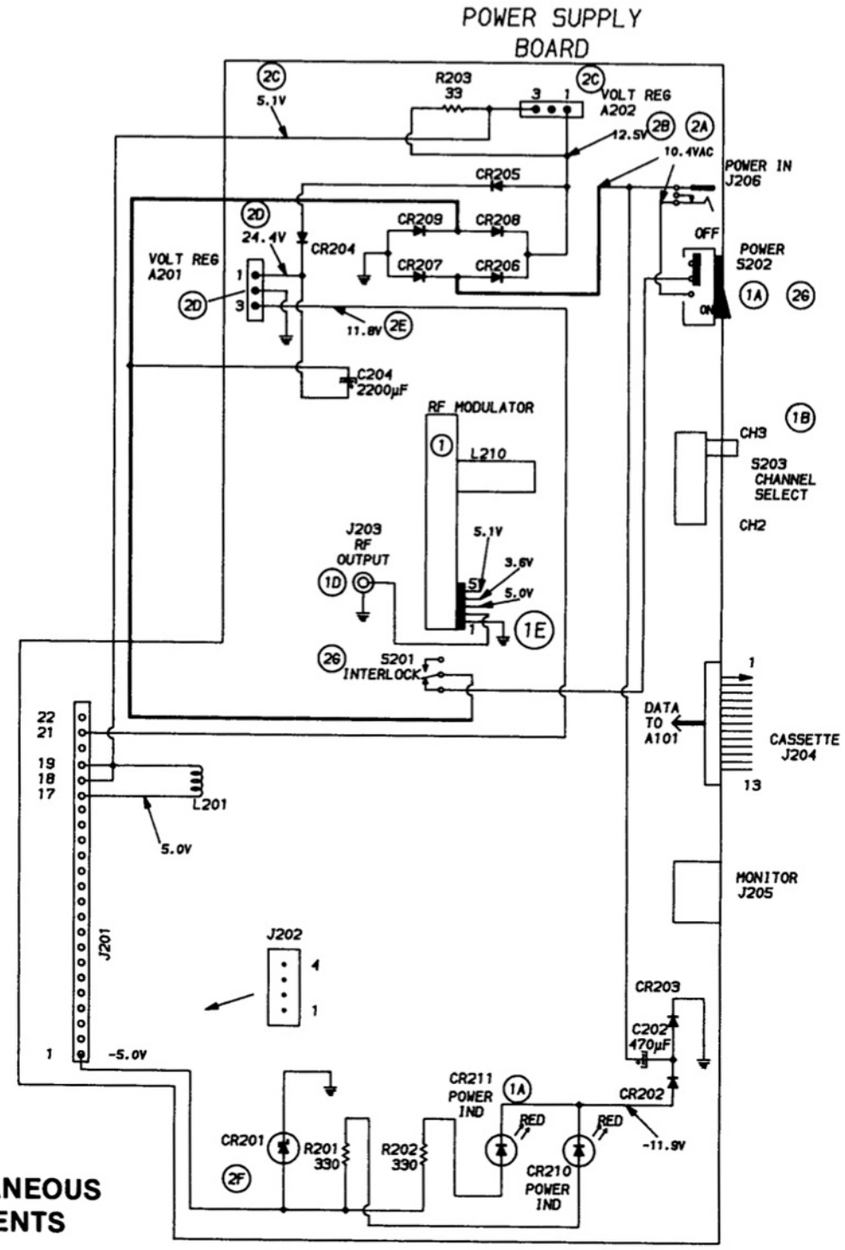
Digital Volt/Ohm Meter
Logic Probe
Frequency Counter

TOOLS

Phillips Screwdriver
Low-Voltage Soldering Iron
Alignment Tool - GC Electronics 9300, 9302, 9303



INTERCONNECTING DIAGRAM



MISCELLANEOUS ADJUSTMENTS

Suggested Alignment Tools: GC Electronics
L101, L210 ..... 9300, 9302, 9304

COLOR ADJUSTMENT
Turn On the computer and adjust the Color Adjust Control (R309) for a blue screen on the monitor.

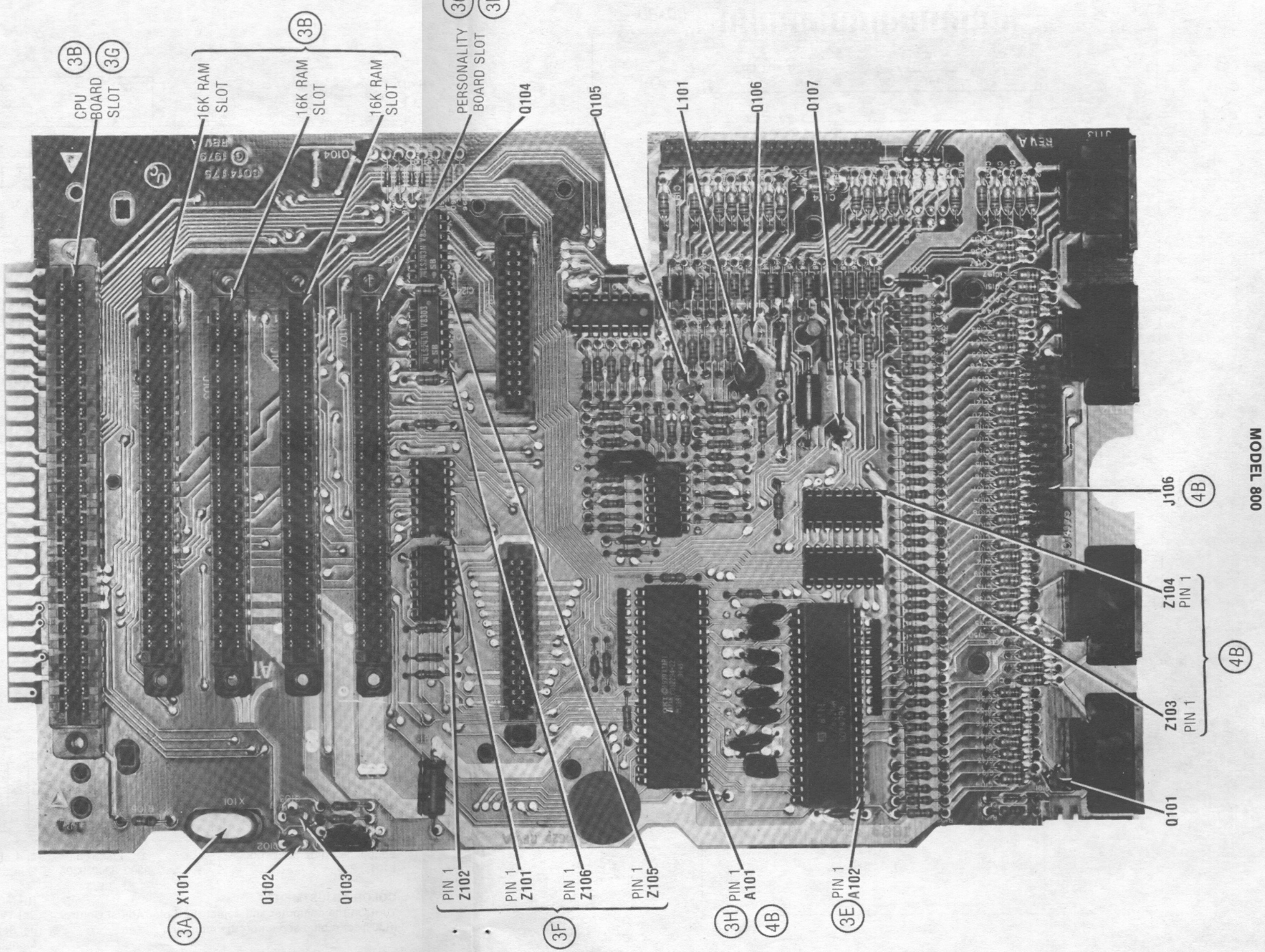
SOUND ADJUSTMENT
Connect a pickup loop to the input of a Frequency Counter and slip the loop over 4.5MHz Adjust Coil (L101). Adjust Coil L101 for a frequency of 4.5MHz.

RF MODULATOR ADJUSTMENT
Set TV on a channel 2 or 3 with the AFC Off. Set the Channel Select Switch (S203) to the same channel and adjust RF Modulator Adjust Coil (L210) for the best picture.

INTERCONNECTING DIAGRAM

REPLACEMENT PARTS

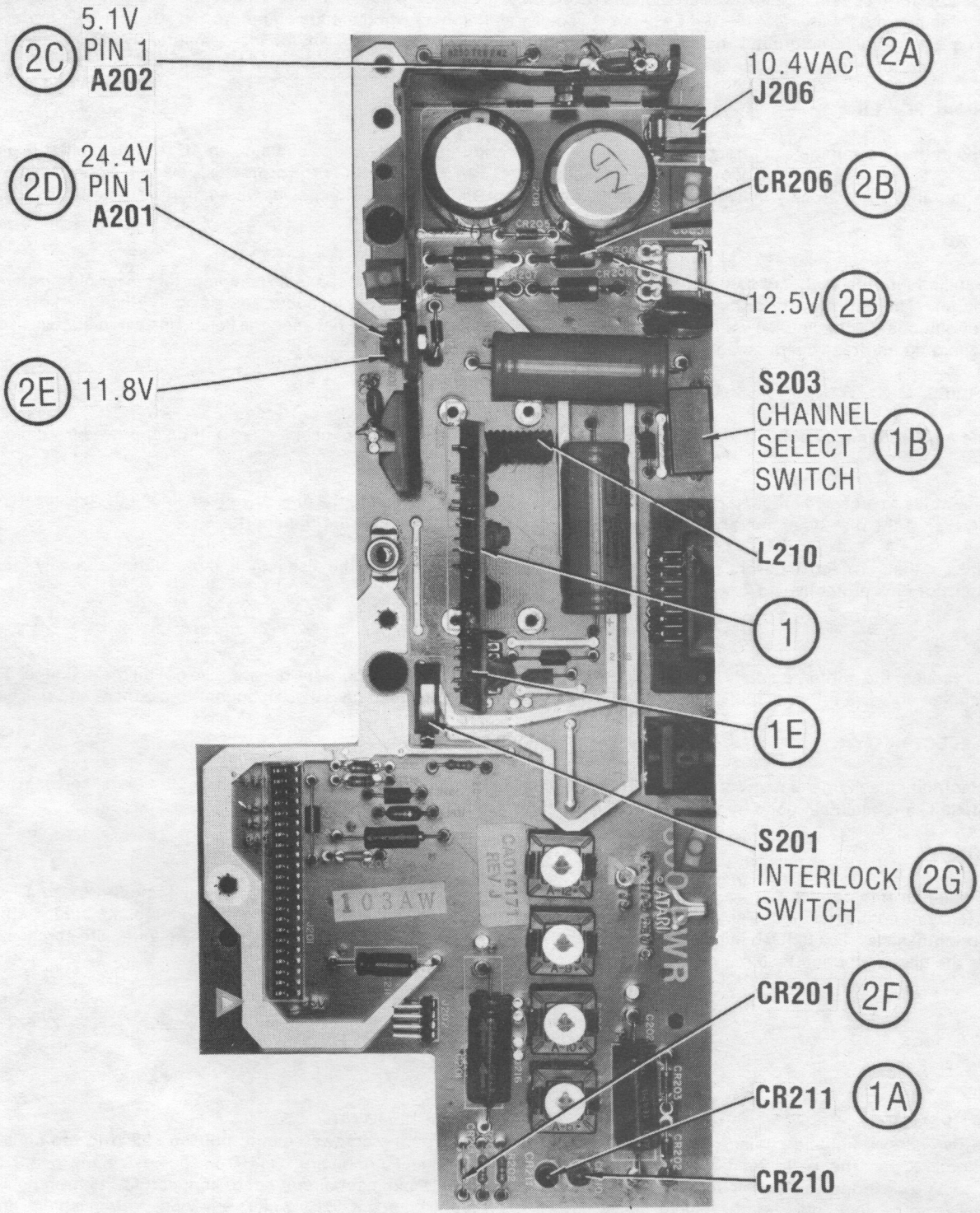
ITEM NO.	PART NO.	Description
A101		IC, 12294B-11
A102		IC, P6520A
A201		IC, UA78M12UC
A202		IC, LM340T
C202		Electrolytic, 470μF
C205		Electrolytic, 2200μF
CR201		Zener Diode, 1N5231A
CR206		Diode, GI501
CR210		LED
CR211		LED
L101		Coil
L201		Coil
L210		Coil
Q101		Transistor, 2N3904
Q102		Transistor, 2N3906
Q103		Transistor, 2N3906
Q104		Transistor, 2N3904
Q105		Transistor, 2N3904
Q106		Transistor, FPN3563
Q107		Transistor, 2N3906
R105		Resistor, 100 5% ¼W
R201		Resistor, 330 5% ¼W
R202		Resistor, 330 5% ¼W
R203		Resistor, 33 5% 2W
R309		Control, 500K
S201		Switch
S202		Switch
S203		Switch
X101		Crystal, 3.579575MHz
Z101		IC, DM74LS42N
Z102		IC, DM74LS32N
Z103		IC, TC4051BP
Z104		IC, TC4051BP
Z105		IC, SN74LS243N
Z106		IC, SN74LS243N
		Board, CPU
		Board, Keyboard
		Board, Personality
		Board, RAM
		Power Pack
		RF Modulator
		Switch Box (TV/Computer)



MAIN BOARD

ATARI MODEL 800

MAIN BOARD


2C 5.1V PIN 1 A202
2D 24.4V PIN 1 A201
2E 11.8V
10.4VAC 2A J206
CR206 2B
12.5V 2B
S203 CHANNEL SELECT SWITCH 1B
L210
1
1E
S201 INTERLOCK SWITCH 2G
CR201 2F
CR211 1A
CR210

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-interruptable 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 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.

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL

Remove five screws holding cabinet bottom and remove the bottom. Open the cartridge door and remove two screws holding cartridge door assembly. Lift cartridge door assembly from cabinet top. Remove three black screws holding main board to cabinet top. Disconnect keyboard cable and speaker plug from main board and lift main board assembly from cabinet top.

KEYBOARD REMOVAL

Remove four black screws holding keyboard to cabinet top. Keyboard may now be removed from cabinet top.

SHIELD REMOVAL

Remove nine screws holding bottom shield to top shield. Disconnect connector J114 from power supply board at J202. Disconnect circuit board connector J115 from power supply board at J201 while removing bottom shield and main board from top shield. Remove three screws holding top shield to power supply board.

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SAFETY PRECAUTIONS

See page 8

PRELIMINARY SERVICE CHECKS

ENCLOSED

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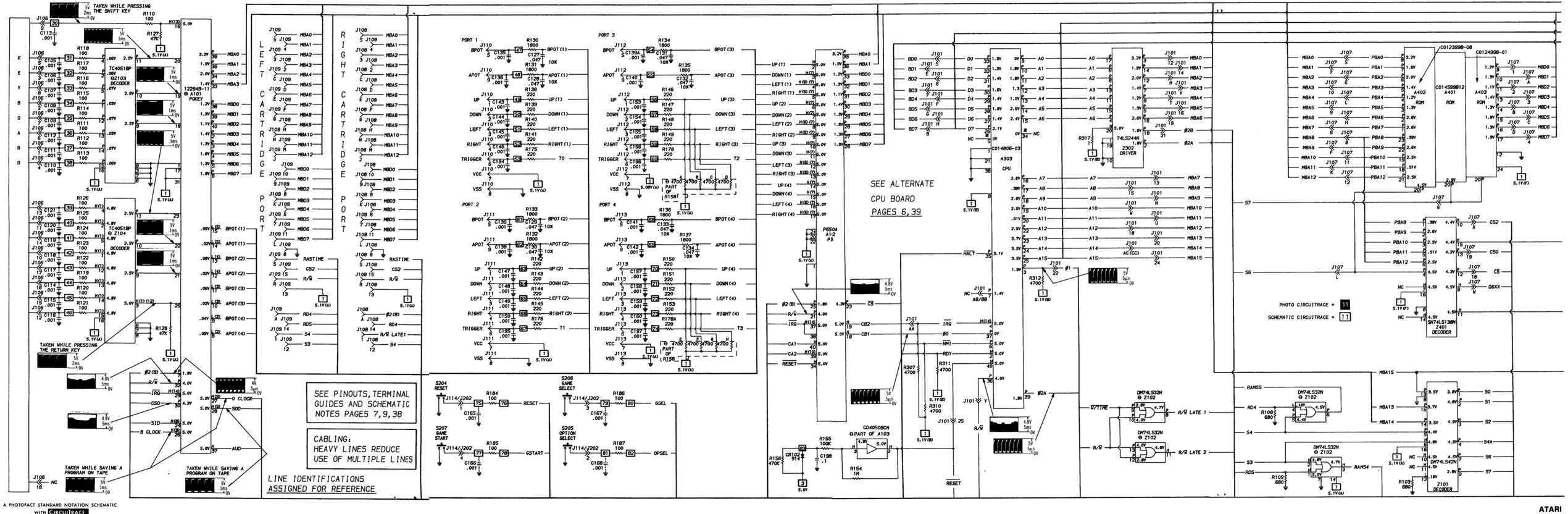

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE

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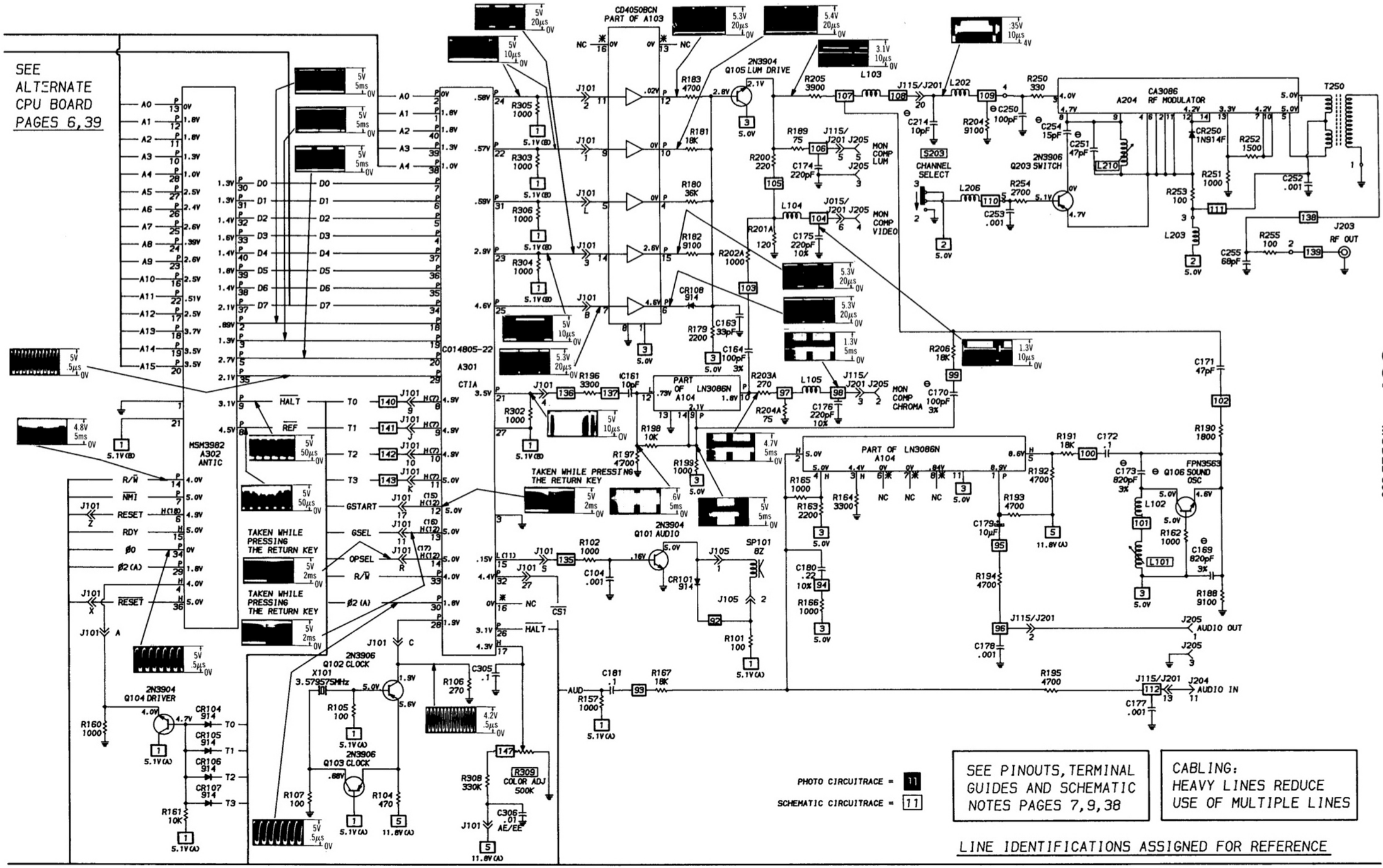
KEYBOARD, MAIN BOARD, CPU BOARD, PERSONALITY BOARD

SEE LINE DEFINITIONS ON PAGE 8

KEYBOARD, MAIN BOARD, CPU BOARD, PERSONALITY BOARD

ATARI MODEL 800



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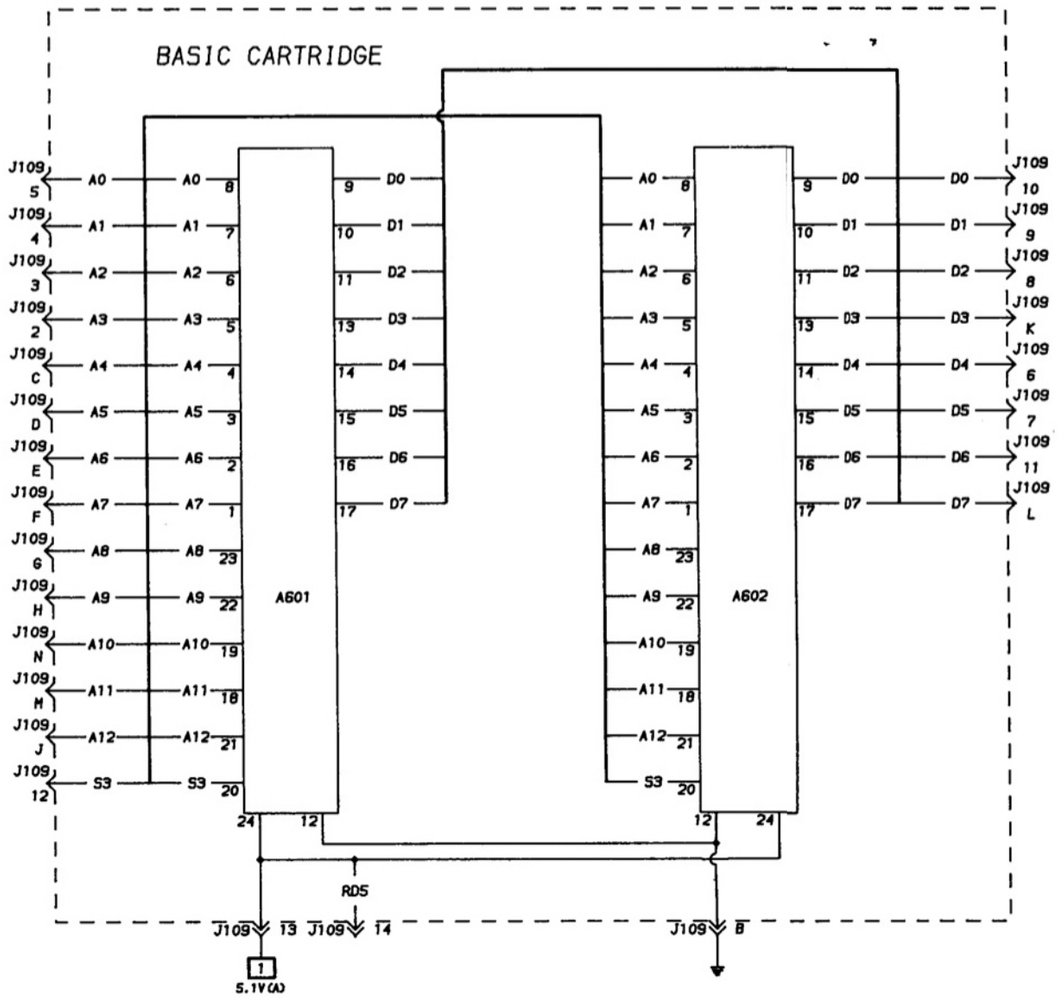

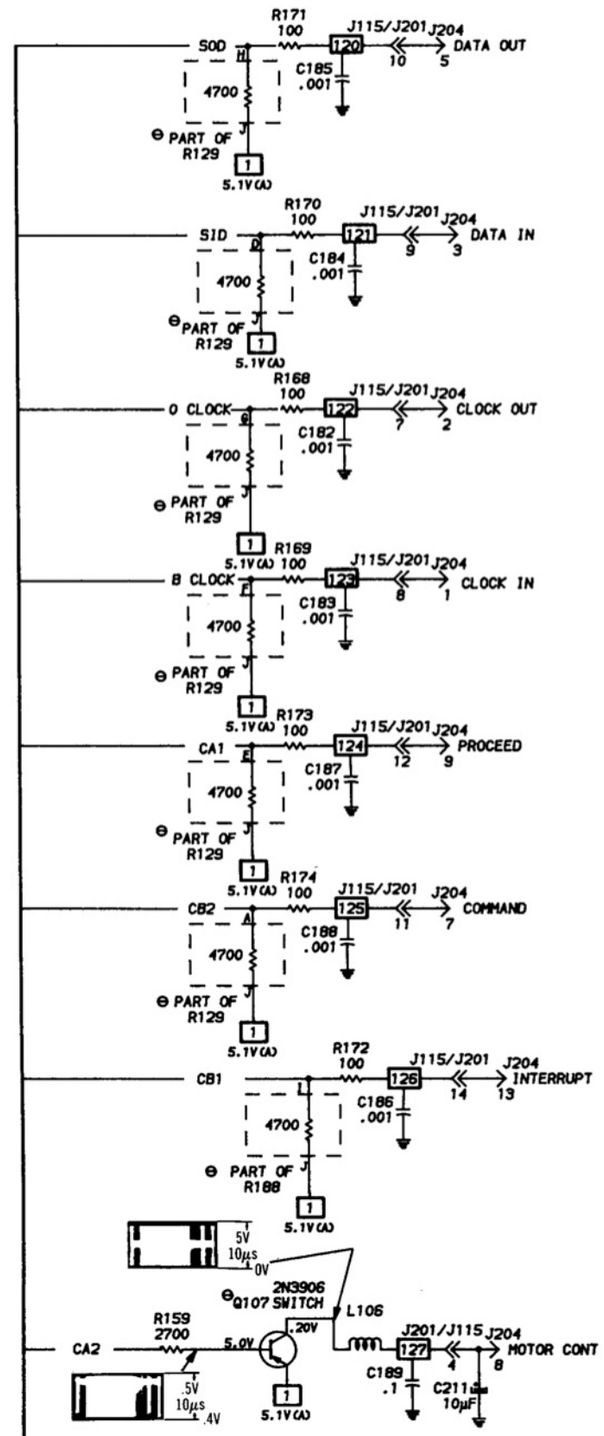

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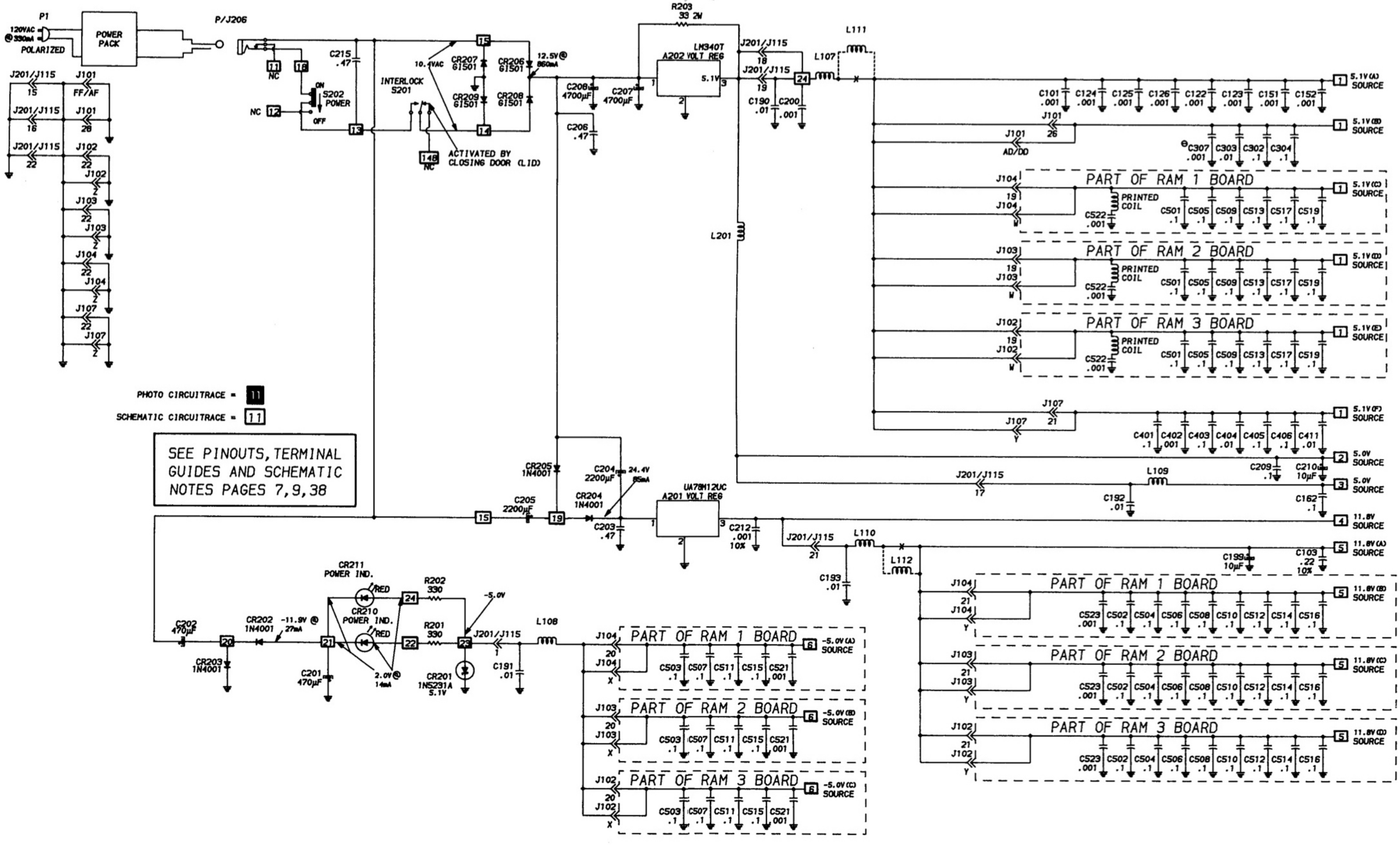

PHOTO CIRCUITRACE = 11

SCHEMATIC CIRCUITRACE = 11

SEE PINOUTS, TERMINAL GUIDES AND SCHEMATIC NOTES PAGES 7,9,38

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE
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ALTERNATE
CPU BOARD

(20) P6502B A303 CPU

(20) SN74LS244N Z303 DRIVER

(20) SN74LS244N Z304 DRIVER

(20) C012295-03 A301 CTIA

(20) 12296B11 A302 ANTIC

DM7474M PART OF Z302 FLIP/FLOP

DM7474M PART OF Z302 FLIP/FLOP

DM74LS02N PART OF Z301

DM74LS02N PART OF Z301

DM74LS02N PART OF Z301

DM74LS02N PART OF Z301

SEE PINOUTS, TERMINAL GUIDES AND SCHEMATIC NOTES PAGES 7,9,38

PHOTO CIRCUITRACE = 11

SCHEMATIC CIRCUITRACE = 11

CABLING:
HEAVY LINES REDUCE
USE OF MULTIPLE LINES

LINE IDENTIFICATIONS ASSIGNED FOR REFERENCE 5

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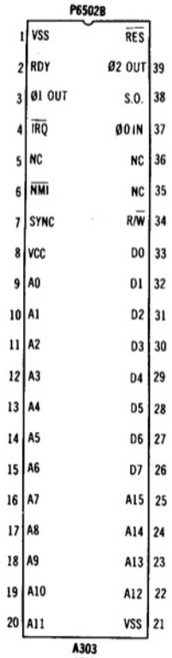
TERMINAL GUIDES & IC PINOUTS

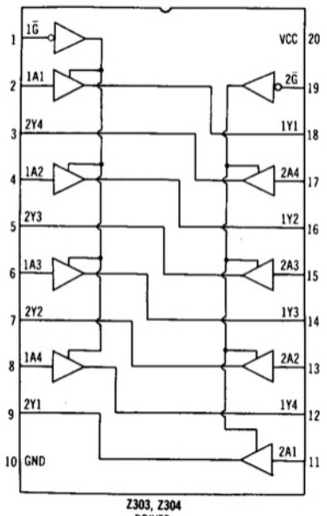
ALTERNATE CPU BOARD

P6502B



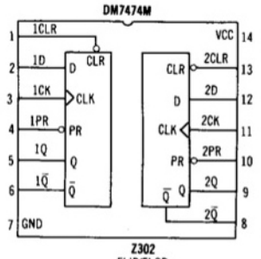
A303
CPU
TOP VIEW

SN74LS244N

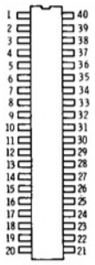


Z303, Z304
DRIVER
TOP VIEW

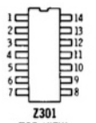
DM7474M



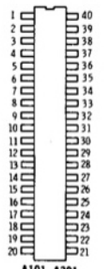
Z302
FLIP/FLOP
TOP VIEW



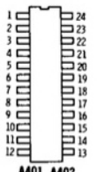
A301, A302
TOP VIEW



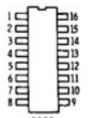
Z301
TOP VIEW



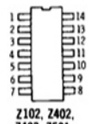
A101, A301,
A302, A303
TOP VIEW



A401, A402,
A403, A601, A602
TOP VIEW



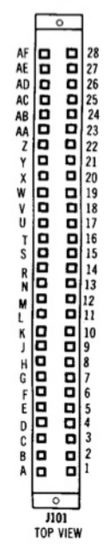
A103
TOP VIEW



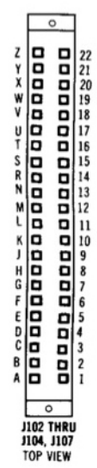
Z102, Z402,
Z403, Z501
TOP VIEW

Q101 THRU
Q701, Q203
BOTTOM VIEW

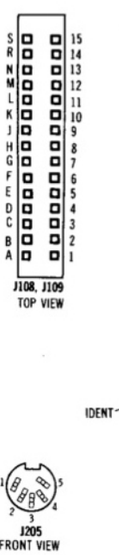
A201, A202
FRONT VIEW



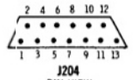
J101
TOP VIEW



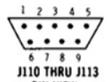
J102 THRU
J104, J107
TOP VIEW



J108, J109
TOP VIEW

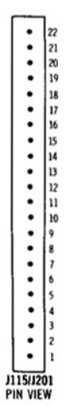


J204
PIN VIEW

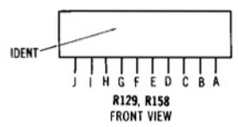


J110 THRU J113
PIN VIEW

J114
FRONT VIEW



J115/J201
PIN VIEW

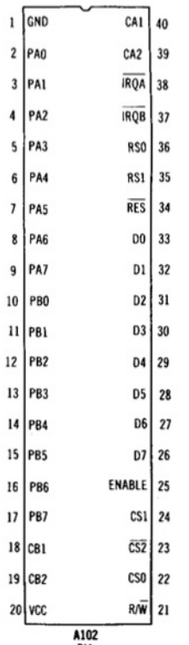


R129, R158
FRONT VIEW

J205
FRONT VIEW

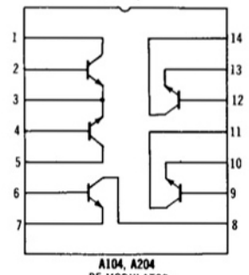
J105
PLUG VIEW

P6520A



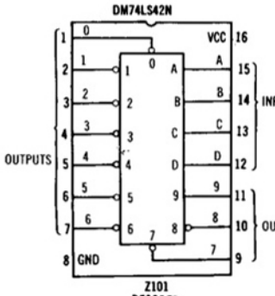
A102
PIA
TOP VIEW

LM3086N,
CA3086



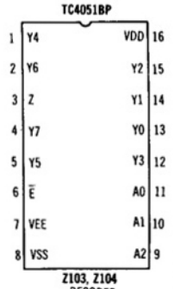
A104, A204
RF MODULATOR
TOP VIEW

DM74LS42N



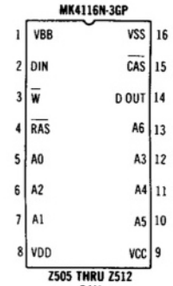
Z101
DECODER
TOP VIEW

TC4051BP



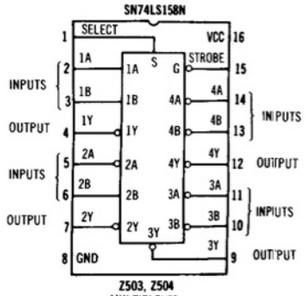
Z103, Z104
DECODER
TOP VIEW

MK4116N-3GP



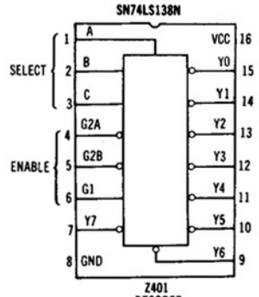
Z505 THRU Z512
RAM
TOP VIEW

SN74LS158N



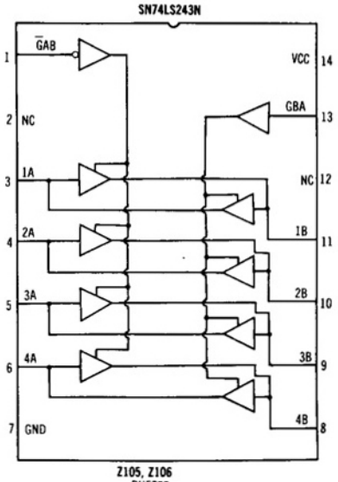
Z503, Z504
MULTIPLEXER
TOP VIEW

SN74LS138N



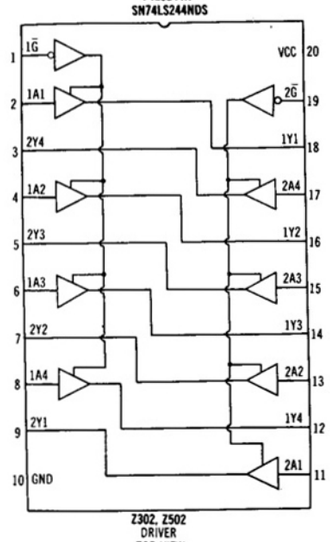
Z401
DECODER
TOP VIEW

SN74LS243N



Z105, Z106
BUFFER
TOP VIEW

74LS244N
SN74LS244NDS



Z302, Z502
DRIVER
TOP VIEW

CC7 ATARI MODEL 800

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 boards, floppy disk drives, printers, or other peripherals with computer AC power On.
8. D not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This computer is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The computer cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
12. 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.
13. Never expose the computer to water. If exposed to water turn the unit Off. Do not place the computer near possible water sources.
14. 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.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning computer.
17. 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.

LINE DEFINITIONS

A0 Thru A15 ..... Address Lines
APOT(1) Thru APOT(4) ..... Joystick A Potentiometer Lines
AUD ..... Audio
B CLOCK ..... Bidirectional Clock
BD0 Thru BD7 ..... Buffered Data Lines
BPOT(1) Thru BPOT(4) ..... Joystick B Potentiometer Lines
CA1, CA2 ..... Control Output Lines
CB1, CB2 ..... Control Input Lines
COL ..... Color
CR/W ..... Read/Write
CS ..... Chip Select
CS0 Thru CS2 ..... Chip Select Lines
CSYNC ..... Sync
CØ0 ..... Phase 0
D0 Thru D7 ..... Data Lines
D6XX
DOWN(1) Thru DOWN(2) ..... Joystick Down Lines
ENABLE ..... Enable
ENSEL ..... Enable Select
GSEL ..... Game Select
GSTART ..... Game Start
HALT ..... Halt
IRQ ..... Interrupt Request
LEFT(1) Thru LEFT(4) ..... Joystick Left Lines
LUM0 Thru LUM3 ..... Luminance Lines
LP
MBA0 Thru MBA15 ..... Address Lines
MBD0 Thru MBD7 ..... Data Lines
PBA0 Thru PBA12 ..... Address Lines
NMI ..... Non-Maskable Interrupt
OPSEL ..... Option Select
OSC ..... Oscillator
R/W ..... Read/Write
R/W LATE1, R/W LATE2 ..... Read/Write Late Lines
RAMS4, RAMS5
RD4, RD5
RDY ..... Ready
REF
RESET ..... Reset
RIGHT(1) Thru RIGHT(4) ..... Joystick Right Lines
S0 Thru S4, S4A, S6, S7 ..... Select Lines
SID ..... Serial Input Data
SOD ..... Serial Output Data
SOUND ..... Sound
SYNC ..... Sync
T0 Thru T3 ..... Joystick Trigger
UP(1) Thru UP(4) ..... Joystick Up Lines
W/TIME
0 CLOCK
Ø0 ..... Phase 0
Ø1 ..... Phase One
Ø2(A), Ø2(B) ..... Phase Two

Any Bar above any alphabetical or numerical combination indicates line active in a low (0) state.

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 a Basic cartridge plugged in, 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 μsec. 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 ½W 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)

(1) Use the following chart to determine which keys produce pulses for the pin given.

Z104

PIN	KEYS
1	6, 7, Y, U, N
2	H, J, SPACE
3	All keys except BREAK, CTRL and SHIFT
4	4, 9, R, O, F, L, V, ,
5	3, 0, E, P, D, ;, C, .
12	ESC, BACKS, TAB, RETURN, LOWR
13	1, >, Q, =, A, *, Z, ATARI
14	2, <, W, −, S, +, X, /
15	5, 8, T, I, G, K, B, M

Z103

PIN	KEYS
1	ESC, 1, 2, 3, 4, 5, 6
2	U, I, O, P, −, =, RETURN
4	J, K, L, ;, +, *, CTRL
5	SHIFT, Z, X, C, V, B
12	N, M, ,, ., /, ATARI, SPACE
13	A, S, D, F, G, H, LOWR
14	BREAK, 7, 8, 9, 0, <, >, BACKS
15	TAB, Q, W, E, R, T, Y

(2) Probe indicates P with paddles connected to Port 4.
(3) Probe indicates P with paddles connected to Port 3.
(4) Probe indicates P with paddles connected to Port 2.
(5) Probe indicates P with paddles connected to Port 1.
(6) Probe indicates L when paddle triger is pressed. Use the following chart to determine which pin is affected by each paddle trigger.

PADDLE TRIGGER	A102 PIN
0	4
1	5
2	8
3	9
4	12
5	13
6	16
7	17

(7) Probe indicates L when joystick is used. Use the following chart to determine which pin is affected by each joystick function.

	PORT 1		PORT 2		PORT 3		PORT 4	
JOYSTICK	IC	PIN	IC	PIN	IC	PIN	IC	PIN
UP	A102	2	A102	6	A102	10	A102	14
DOWN	A102	3	A102	7	A102	11	A102	15
LEFT	A102	4	A102	8	A102	12	A102	16
RIGHT	A102	5	A102	9	A102	13	A102	17
BUTTON	A301	8	A301	9	A301	10	A301	11

(8) Probe indicates P while loading a program from tape.
(9) Probe indicates P while saving a program on tape.
(10) Probe indicates L while saving or loading a program from tape recorder.
(11) Probe indicates P when the internal speaker is being used.
(12) Probe indicates P when any key except BREAK, CTRL or SHIFT is pressed.
(13) Probe indicates P when BREAK, CTRL or SHIFT key is pressed.
(14) Probe indicates one pulse when any key except SHIFT or CTRL is pressed.
(15) Probe indicates L when START key is pressed.
(16) Probe indicates L when SELECT key is pressed.
(17) Probe indicates L when OPTION key is pressed.
(18) Probe indicates L when SYSTEM RESET key is pressed.
(19) Logic probe readings not taken.
(20) Voltages and logic probe readings not taken for Alternate CPU Board.

GENERAL OPERATING INSTRUCTIONS

POWER UP
The computer will come up ready to program in Basic when a Basic cartridge is plugged in and the computer is turned On.

For instructions on loading and saving programs with an Atari Recorder see the "Cassette Operation" section.

To run a program type RUN and press the RETURN key. To stop a program, press the BREAK key or press the system RESET key.

CASSETTE OPERATION
Connect the Atari Program Recorder to the connector on the right side of the computer. NOTE: A standard tape recorder will not work with this computer.

To load a program, type CLOAD and press the RETURN key. The speaker will beep once. After the speaker beeps, push the play button on the recorder and press the RETURN key again. The program will then load. READY on the screen indicates the loading is completed. The recorder will shut-off automatically.

To save a program, type CSAVE and press the RETURN key. The speaker will beep twice and after the speaker beeps, press the play and record buttons on the recorder and then press the RETURN key. The program will then save. READY on the screen indicates the program has been saved. The recorder will shut-off automatically.

DISASSEMBLY INSTRUCTIONS

CABINET REMOVAL
Remove five screws holding cabinet bottom and remove the bottom. Open the cartridge door and remove two screws holding cartridge door assembly. Lift cartridge door assembly from cabinet top. Remove three black screws holding main board to cabinet top. Disconnect keyboard cable and speaker plug from main board and lift main board assembly from cabinet top.

KEYBOARD REMOVAL
Remove four black screws holding keyboard to cabinet top. Keyboard may now be removed from cabinet top.

SHIELD REMOVAL
Remove nine screws holding bottom shield to top shield. Disconnect connector J114 from power supply board at J202. Disconnect circuit board connector J115 from power supply board at J201 while removing bottom shield and main board from top shield. Remove three screws holding top shield to power supply board.

MISCELLANEOUS ADJUSTMENTS

Suggested Alignment Tools: GC Electronics
L101, L210 ..... 9300, 9302, 9304

COLOR ADJUSTMENT
Turn On the computer and adjust the Color Adjust Control (R309) for a blue screen on the monitor.

SOUND ADJUSTMENT
Connect a pickup loop to the input of a Frequency Counter and slip the loop over 4.5MHz Adjust Coil (L101). Adjust Coil L101 for a frequency of 4.5MHz.

RF MODULATOR ADJUSTMENT
Set TV on a channel 2 or 3 with the AFC Off. Set the Channel Select Switch (S203) to the same channel and adjust RF Modulator Adjust Coil (L210) for the best picture.

TROUBLESHOOTING

POWER SUPPLY
Check for 10.4VAC from the cathode of Diode CR207 to the cathode of Diode CR209. If 10.4VAC is missing, check Interlock Switch (S201), Power Switch (S202), Jack J206 and the Power Pack.

Check for 12.5V at pin 1 of Voltage Regulator IC (A202). If 12.5V is missing, check Diodes CR206 thru CR209, Electrolytics C207 and C208 and check for possible shorts to ground. Check for 5.1V at pin 3 of IC A202. If 5.1V is missing, check for possible shorts to ground and check IC A202 by substitution.

Check for 24.4V at pin 1 of Voltage Regulator IC (A201). If 24.4V is missing, check Diodes CR204 and CR205, Capacitors C203 and C212, Electrolytics C204 and C205, and check for possible shorts to ground.

Check for 11.8V at pin 3 of IC A201. If 11.8V is missing, check for possible shorts to ground and check IC A201 by substitution.

Check for −11.9V at the anode of Diode CR202. If −11.9V is missing, check Diodes CR202 and CR203, Electrolytics C201 and C202 and check for possible shorts to ground.

Check for −5.0V at the anode of Zener Diode CR201. If −5.0V is missing, check Zener Diode CR201, Power Indicator LEDs (CR210 and CR211), Resistor R201 and R202 and check for possible shorts to ground.

CPU OPERATION
Verify the CPU IC (A303) is functioning by using a logic probe to check for pulses on pins 9 thru 20 and 22 thru 33 of IC A303. If IC A303 is not functioning, check for 5.1V at pin 8 of IC A303. If 5.1V is missing, refer to the "Power Supply" section of this Troubleshooting guide.

Check the waveform at pin 37 of IC A303. If the waveform is missing, check the waveform at the collector of the Clock Transistor (Q102). If the waveform at the collector of Transistor Q102 is missing, check the voltages and components associated with Clock Transistors (Q102 and Q103). If the waveform at the collector of Transistor Q102 is good, check the waveform at pin 30 of the CTIA IC (A301). If the waveform is missing, check IC A301 by substitution.

If waveform at pin 37 of IC A303 is correct, check the logic probe readings on pins 2, 3, 4, 6, 7, 34, 38, 39 and 40 of IC A303.

VIDEO
No video. Check for a video waveform at pin 20 of Jack J201. If the waveform is correct, check the RF Modulator (A204). If the waveform is missing, check the waveforms and voltages on pins 9 thru 12, 14 and 15 of IC A103. If any of the waveforms are missing, check IC A103 by substitution. Check voltages, waveforms and logic probe readings on pins 1 thru 40 of the CTIA IC (A301) and if any are in error, check IC A301 by substitution.

SYNC
No vertical or horizontal sync. Check the waveform at pin 25 of the CTIA IC (A301). If the waveform is missing, check IC A301 by substitution. If the waveform is correct, check voltages and waveforms associated with pins 6 and 7 of IC A103.

KEYBOARD
Computer comes up with the proper display on the monitor screen but the keyboard does not function. Check the waveforms on pins 18 thru 23 of the POKEY IC (A101). If the waveforms are missing, check IC A101 by substitution.

If the waveforms are correct, check the waveforms on pins 16 and 25 of IC A101. The waveform on pin 16 of IC A101 appears when the BREAK, CTRL or SHIFT keys are pressed. The waveform on pin 25 appears when any key except BREAK, CTRL, SHIFT, SYSTEM, RESET, OPTION, SELECT or START key is pressed. Check for a pulse on pin 29 of IC A101 with a logic probe while any key is pressed.

If the waveforms on pins 16 or 25 of IC A101 are missing, check the voltages and logic probe readings on pins 1 thru 16 of Decoder ICs (Z103 and Z104). If the readings are not correct, check the ICs A101, Z103 and Z104 by substitution.

If the readings are correct, check the keyboard connector J106 and check the keyboard switch contacts. If a pulse does not appear on pin 29 of IC A101 when a key is pressed, check IC A101 by substitution.

The START, SELECT, OPTION or SYSTEM RESET keys do not function. Check the logic probe readings on pins 12, 13 and 14 of the CTIA IC (A301) and pin 6 of the ANTIC IC (A302) while the malfunctioning key is pressed. If any of the logic readings stay high when the key is pressed, check the connectors at J114 and J202 for proper connection. If the logic readings are correct, check ICs A301 and A302 by substitution.

If there is no sound from the internal speaker when a key is pressed, refer to the "Audio" section of this Troubleshooting guide.

COLOR OSCILLATOR
Check for 3.57957MHz at the collector of Clock Transistor (Q102). If the frequency is incorrect, check the Oscillator Crystal (X101) by substitution.

COLOR
No color, check the waveform at pin 21 of the CTIA IC (A301). If the waveform is missing, check the adjustment of the Color Adjust Control (R309). The voltage at pin 17 of IC A301 should vary from about 0V to 7V as Control R309 is adjusted from Maximum to MINIMUM. If the voltage does not change, check Control R309, Capacitor C305, Resistor R308, the 11.8V source and check IC A301 by substitution.

If there is no problem with Control R309, check the waveform at pin 28 of IC A301. If the waveform is missing, check the logic probe readings on pins 1 thru 40 of the ANTIC IC (A302) and if incorrect, check IC A302 by substitution.

If the waveform at pin 21 of IC A301 is correct, check the voltages, waveforms and components associated with pins 12, 14 and 10 of IC A104. Check the waveform at pin 3 of Connector J201 on the power supply board.

If the colors are incorrect, check the adjustment of Control R309 and check the frequency of 3.57957MHz oscillator at pin 28 of IC A301. If the oscillator is off frequency see "Color Oscillator" section of this Troubleshooting guide.

TROUBLESHOOTING (Continued)

AUDIO

No sound from the internal speaker when a key is pressed. Check the speaker (SP101). If the speaker is good, type and run the following Basic program:

10 PRINT CHR$(253): GOTO 10

Check for 1.4V p-p pulses at pin 15 of CTIA IC (A301). If the pulses are missing, check IC A301 by substitution. If the pulses are present, check for .5V p-p pulses at the base of Audio Transistor (Q101). If the pulses are missing, check Resistor R102 and Transistor Q101. If the pulses are normal, check Transistor Q101, Diode CR101, Resistor R101 and the 5.1V source.

If the computer does not produce sound from the monitor, type and run the following Basic program:

10 SOUND 0, 100, 10, 15: GOTO 10

Check for waveform at pin 37 of the POKEY IC (A101), see Figure 1. If the waveform is missing, check IC A101 by substitution. If the waveform is correct, check the frequency of the Sound Oscillator Transistor (Q106) by connecting a pickup loop to the input of a Frequency Counter and slip the loop over 4.5MHz Adjust Coil (L101). The frequency should be 4.5MHz. If transistor Q106 is not functioning properly, check the voltages and components associated with Transistor Q106.

If external audio output is not working, check the connections at pin 2 of Jack J201 and check the voltages and components associated with IC A104.

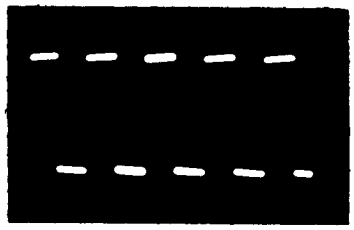


Figure 1

CASSETTE SAVE AND LOAD

Computer will not save a program on tape. Type a program or load an existing program into the computer. Save the program back on tape, see "Cassette Operation" section of the General Operating Instructions. While saving the program, check the waveforms on pins 26, 27 and 28 of the POKEY IC (A101). If any of the waveforms are missing, check IC A101 by substitution. If the waveforms are correct, check the connections at pins 8, 7 and 10 of Jack J201 and pins 1, 2 and 5 of Jack J204.

Computer will not load a program from tape. Check for pulses at pin 24 of IC A101 while loading a program from tape, see "Cassette Operation" section of the General Operating Instructions. If the pulses are correct, check the connections at pin 9 of Jack J201 and pin 3 of Jack J204.

Recorder motor will not start when saving or loading a program. Type POKE 54018,52 and press the RETURN key. Check the logic probe reading on pin 39 of the PIA IC (A102). The reading should go from high to low to start the recorder motor. If the reading stays high, check IC A102 by substitution. If the reading operates normally, check Switch Transistor (Q107) and check the connections at pin 4 of Jack J201 and pin 8 of Jack J204. To turn the recorder motor Off, type POKE 54018,60 and press RETURN key.

JOYSTICKS

Joysticks do not function. Check the logic probe readings on the PIA IC (A102) and the CTIA IC (A301). If reading does not go low when its joystick function is used, check the connector contacts on the port being used and check the joystick switches. If the readings are correct, check IC's A102 and A301 by substitution.

The following Basic program can be used to check the operation of the joystick ports. Plug a joystick into the port being tested, type in and run the program.

```
10 PRINT, "JOYSTICK", "BUTTON"
20 FOR P = 0 TO 3
30 PRINT "PORT"; P, STICK (P), STRIG (P)
40 NEXT P
50 FOR T = 1 TO 200: NEXT T
60 GOTO 10
```

On the monitor screen the number 1 under BUTTON should change to 0 when the button is pressed. The number 15 under JOYSTICK should change to the following for each position of the joystick:

UP 14	LEFT 11
DOWN 13	RIGHT 7

TROUBLESHOOTING (Continued)

PADDLES

If a paddle does not function, use the following chart to determine which pin of the POKEY IC (A101) the paddle is connected to and check the waveform on the pin.

PORT	PADDLE	A101 PIN	BUTTON	A102 PIN
1	0	14	0	4
1	1	15	1	5
2	2	12	2	8
2	3	13	3	9
3	4	10	4	12
3	5	11	5	13
4	6	8	6	16
4	7	9	7	17

The waveform should vary from the sawtooth waveform shown in Figure 2 to the pulse waveform shown in Figure 3. If the waveform is missing, check the port connector, the paddle control and check IC A101 by substitution. If a button is not functioning, use the chart to determine which pin the button is connected to and use a logic probe to check the pin while the button is pressed. The logic probe reading should go from high to low when the button is pressed. If the reading does not go low, check the button switch and the port connector. If the logic reading is correct, check the PIA IC (A102) by substitution.

The following Basic program can be used to check the operation of the paddles.

```
10 PRINT, "PADDLE", "BUTTON"
20 FOR P=0 TO 7
30 PRINT "PADDLE"; P, PADDLE (P), PTRIG (P)
40 NEXT P
50 FOR T=1 TO 200: NEXT T
60 GOTO 10
```

On the monitor screen the number under PADDLE should vary from 228 to 1 as the paddle is varied from MINIMUM to Maximum. The number 1 under BUTTON should change to 0 when the button is pressed.

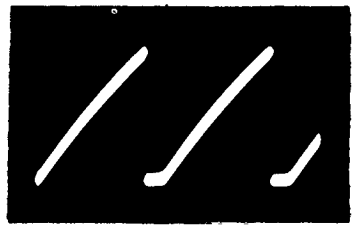


Figure 2

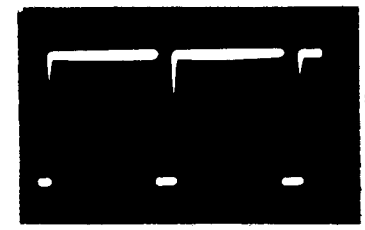
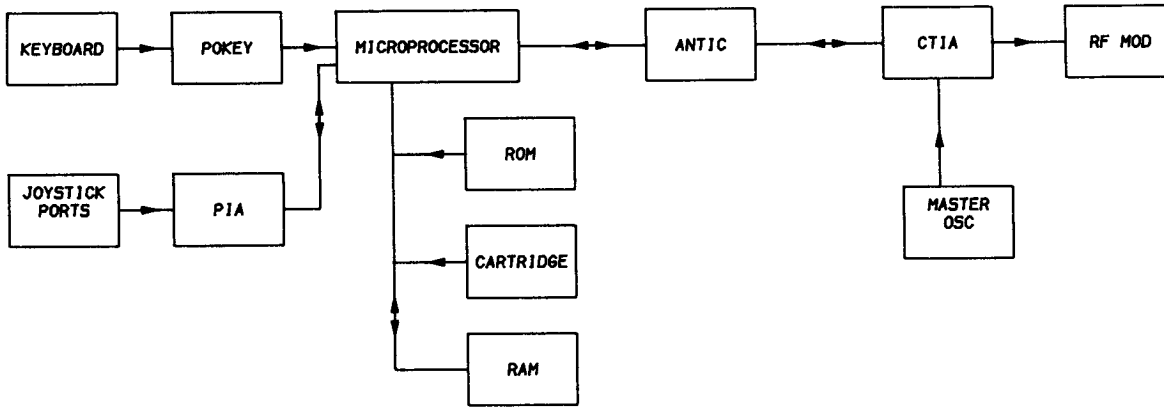


Figure 3

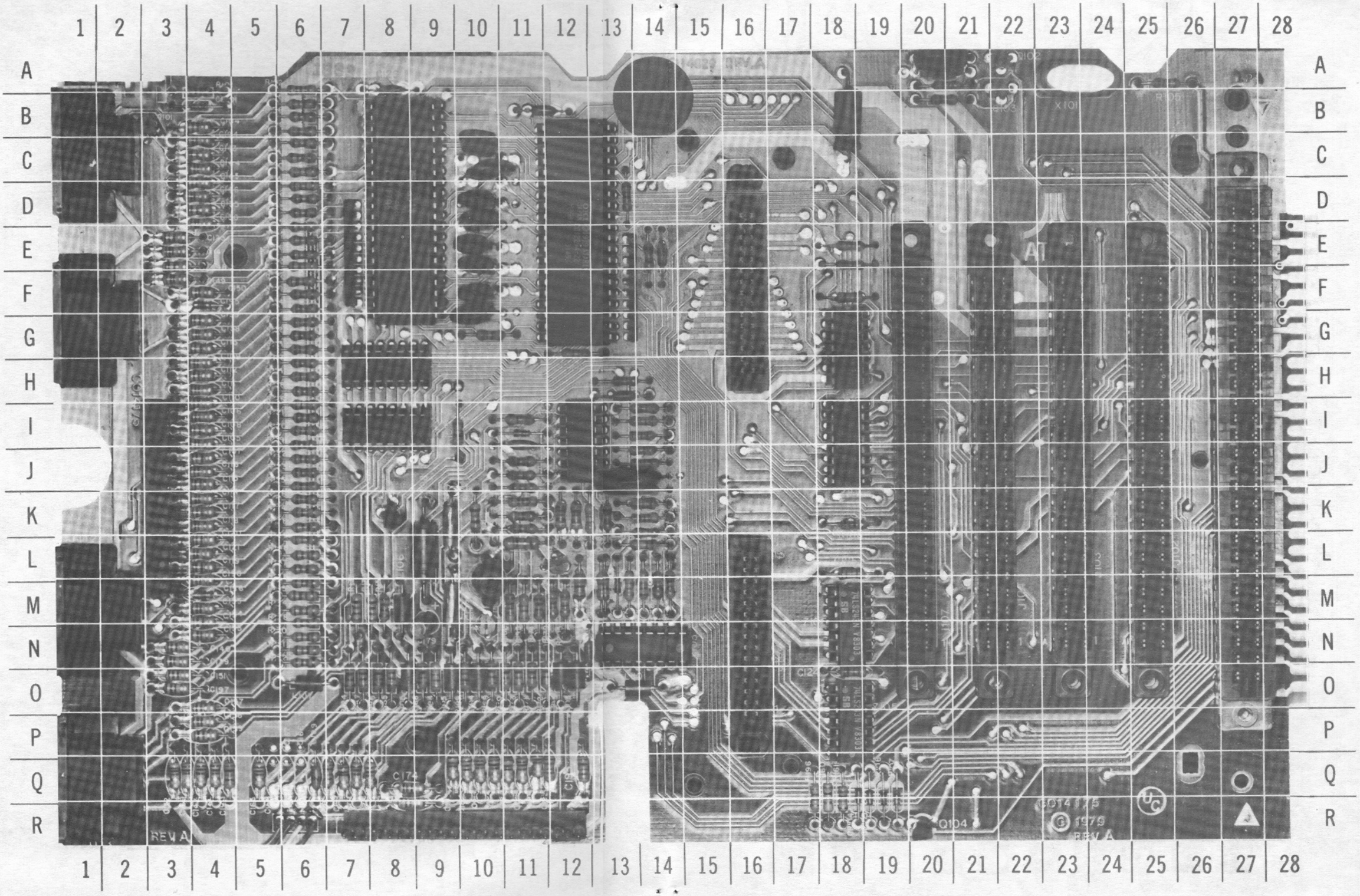


BLOCK DIAGRAM

MAIN BOARD GridTrace LOCATION GUIDE

A101	D-12	C175	R-8	R110	F-6	R185	O-8
A102	D-8	C176	Q-7	R111	G-6	R186	O-8
A103	N-14	C177	Q-11	R112	G-6	R187	O-7
A104	I-12	C178	Q-7	R113	G-6	R188	K-11
C101	F-18	C179	N-9	R114	F-6	R189	O-10
C103	A-20	C180	J-13	R115	H-6	R190	K-10
C104	B-4	C181	E-14	R116	I-6	R191	H-13
C105	I-4	C182	Q-7	R117	H-6	R192	I-14
C106	I-4	C183	Q-9	R118	H-6	R193	I-14
C107	J-4	C184	Q-10	R119	I-6	R194	O-9
C108	I-4	C185	Q-10	R120	I-6	R195	M-11
C109	H-4	C186	Q-11	R121	I-6	R196	Q-17
C110	H-4	C187	Q-10	R122	J-6	R197	K-12
C111	H-4	C188	Q-11	R123	J-6	R198	K-13
C112	H-4	C189	Q-6	R124	K-6	R199	K-14
C113	G-4	C190	Q-4	R125	J-6	R200	K-11
C114	K-4	C191	Q-7	R126	K-6	R291A	J-11
C115	J-4	C192	Q-11	R127	G-10	R202A	K-11
C116	J-4	C193	Q-12	R128	G-12	R203A	J-11
C117	K-4	C194	C-4	R129	G-13	R204A	J-11
C118	K-4	C195	F-4	R130	C-6	R205	M-12
C119	L-4	C196	L-4	R131	D-6	R206	K-14
C120	L-4	C197	O-7	R132	F-6	X101	A-23
C121	L-4	C198	I-11	R133	E-6	Z101	I-18
C122	B-11	C199	B-18	R134	M-6	Z102	G-18
C123	E-3	C200*	R-11	R135	M-6	Z103	H-8
C124	O-18	CR101	B-4	R136	M-8	Z104	I-8
C125	L-18	CR102	I-11	R137	M-7	Z105	P-18
C126	A-8	CR103	M-13	R138	B-6	Z106	N-18
C127	C-10	CR104	Q-18	R139	B-6		
C128	C-10	CR105	Q-19	R140	C-6		
C129	D-10	CR106	Q-19	R141	C-6		
C130	D-10	CR107	Q-19	R142	D-6		
C131	F-10	J101	K-27	R143	D-6		
C132	F-10	J102	J-25	R144	E-6		
C133	E-10	J103	J-25	R145	E-6		
C134	E-10	J104	J-22	R146	M-6		
C135	D-4	J105	A-3	R147	L-6		
C136	D-4	J106	J-3	R148	L-6		
C138	G-4	J107	J-20	R149	L-6		
C139	G-4	J108	N-16	R150	N-6		
C139A	N-3	J109	F-16	R151	N-6		
C140	N-3	J110	C-1	R152	N-6		
C141	Q-4	J111	G-1	R153	M-8		
C142	Q-4	J112	M-1	R154	M-14		
C143	C-4	J113	Q-1	R155	L-14		
C144	C-4	J114	R-6	R156	I-11		
C145	D-4	J115	R-10	R157	D-13		
C146	D-4	L101	M-10	R158	C-7		
C147	E-3	L102	L-9	R159	I-9		
C148	E-3	L103	O-12	R160	Q-18		
C149	F-3	L104	O-10	R161	Q-18		
C150	F-4	L105	O-9	R162	M-11		
C151	O-1	L106	M-8	R163	I-14		
C152	Q-3	L107	O-6	R164	J-14		
C153	N-4	L108	O-8	R165	J-14		
C154	M-4	L109	O-12	R166	J-14		
C155	M-4	L110	O-13	R167	E-14		
C156	M-4	Q101	B-3	R168	O-9		
C157	O-4	Q102	A-22	R169	O-10		
C158	P-4	Q103	B-22	R170	O-11		
C159	P-4	Q104	R-20	R171	O-11		
C160	Q-3	Q105	L-12	R172	O-11		
C161	K-14	Q106	N-10	R173	O-11		
C162	N-12	Q107	K-8	R174	M-11		
C163	M-12	R101	A-4	R175	B-6		
C164	K-12	R102	A-6	R176	E-6		
C165	Q-5	R103	K-18	R178	K-6		
C169	K-9	R104	A-21	R179	M-12		
C170	K-12	R105	A-25	R180	M-14		
C171	L-11	R106	A-21	R181	M-13		
C172	H-13	R107	B-20	R182	M-14		
C173	M-9	R108	E-18	R183	M-13		
C174	Q-8	R109	E-18	R184	O-7		

* Located on other side of board.



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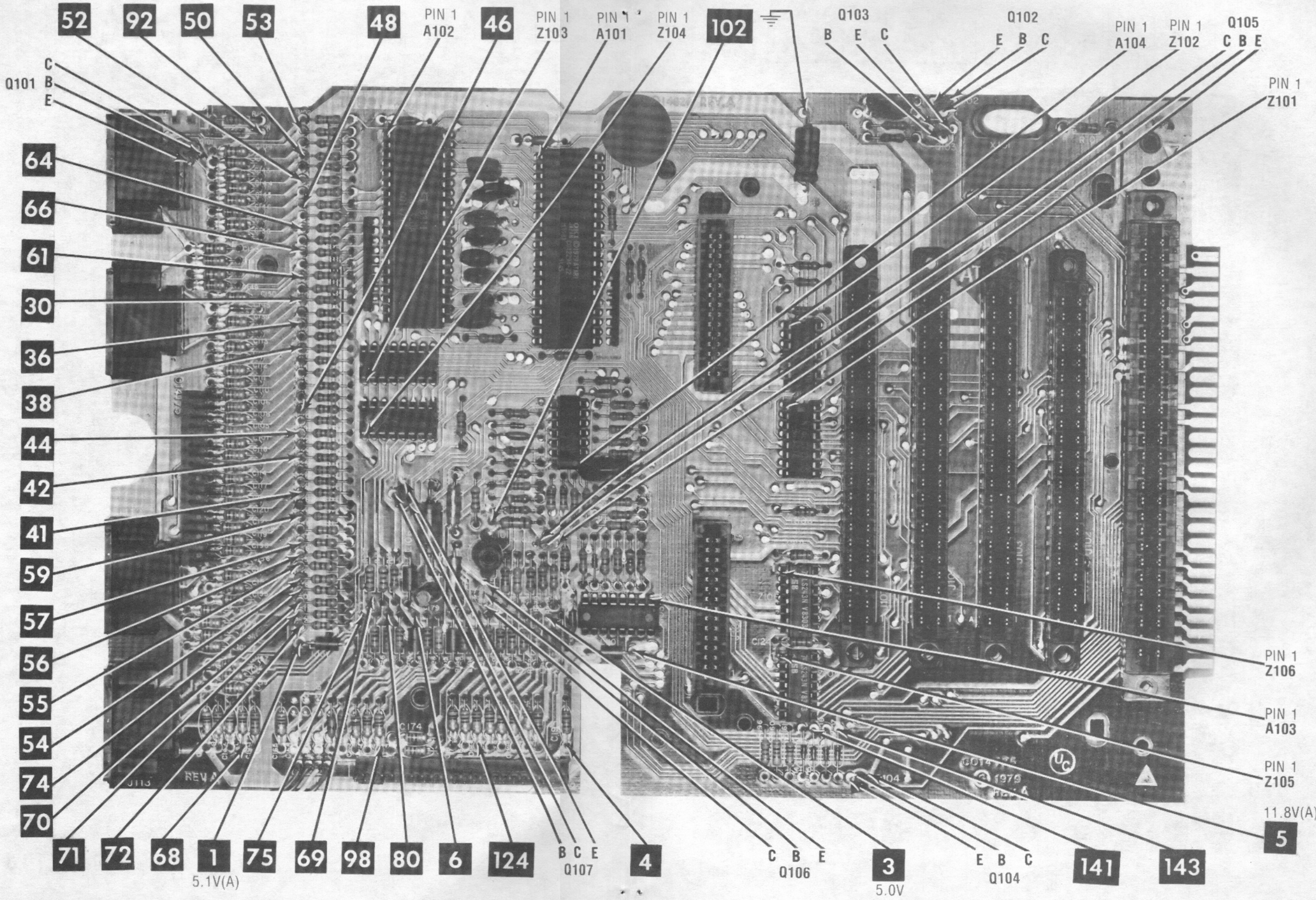

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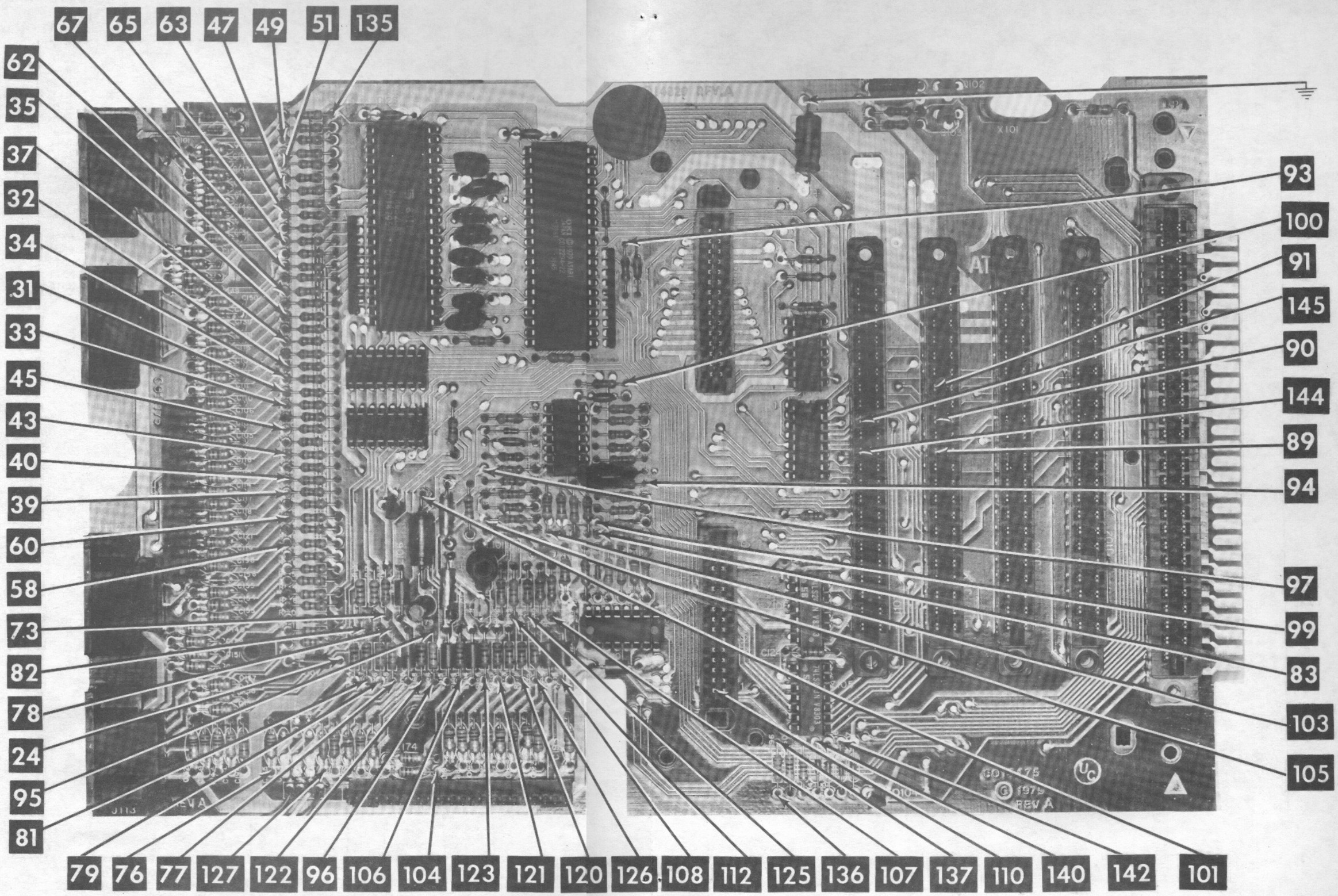

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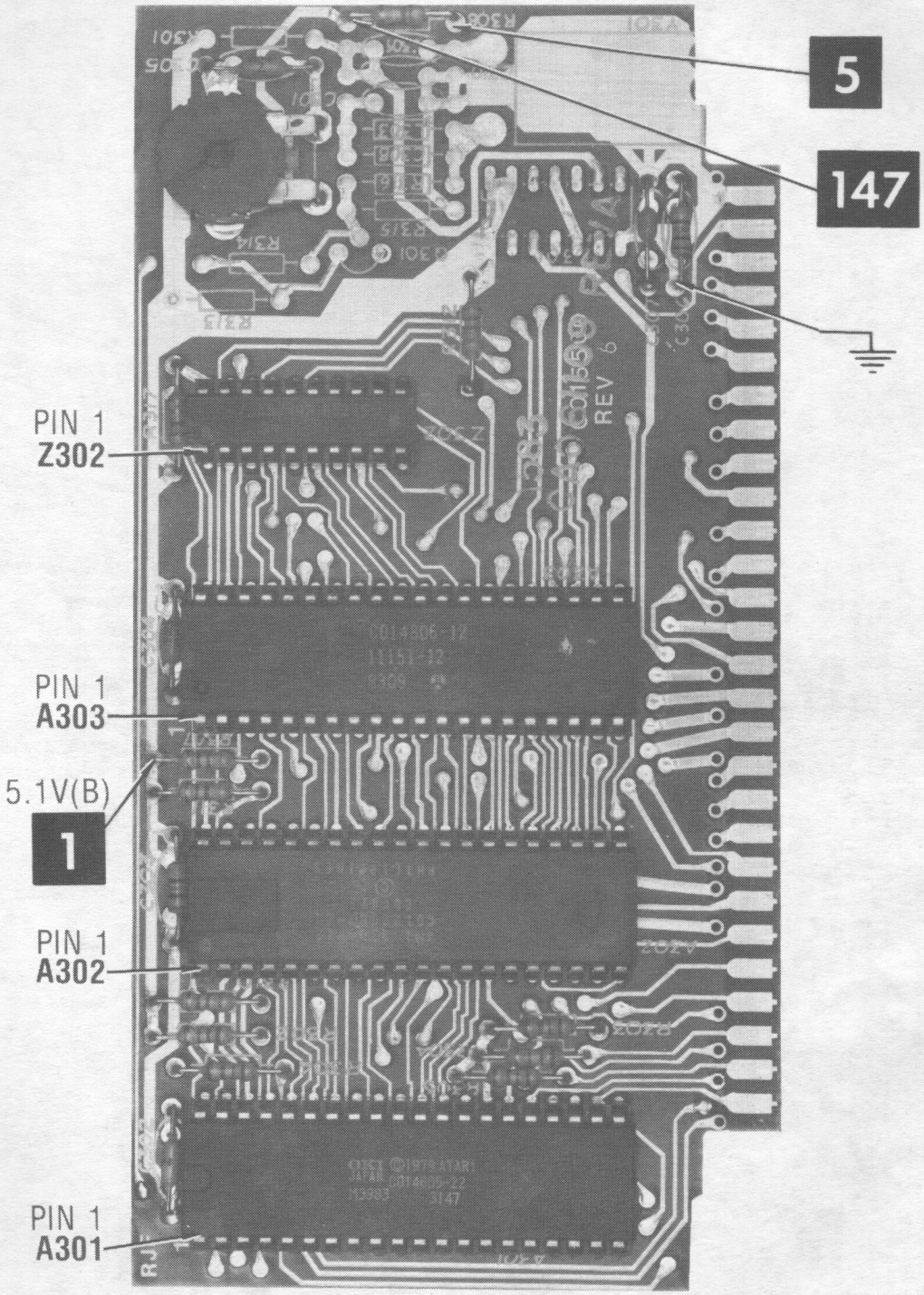

CPU BOARD

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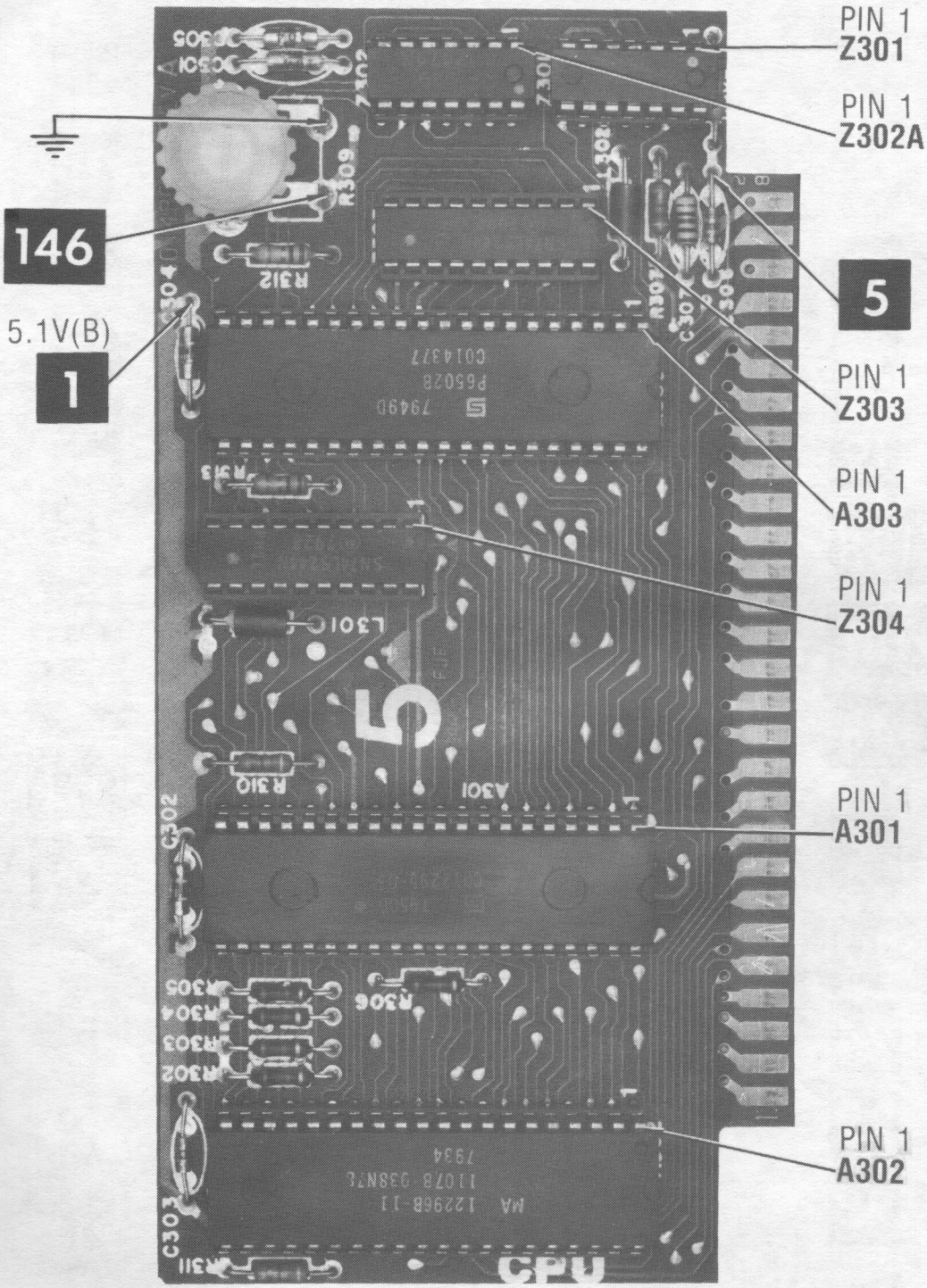

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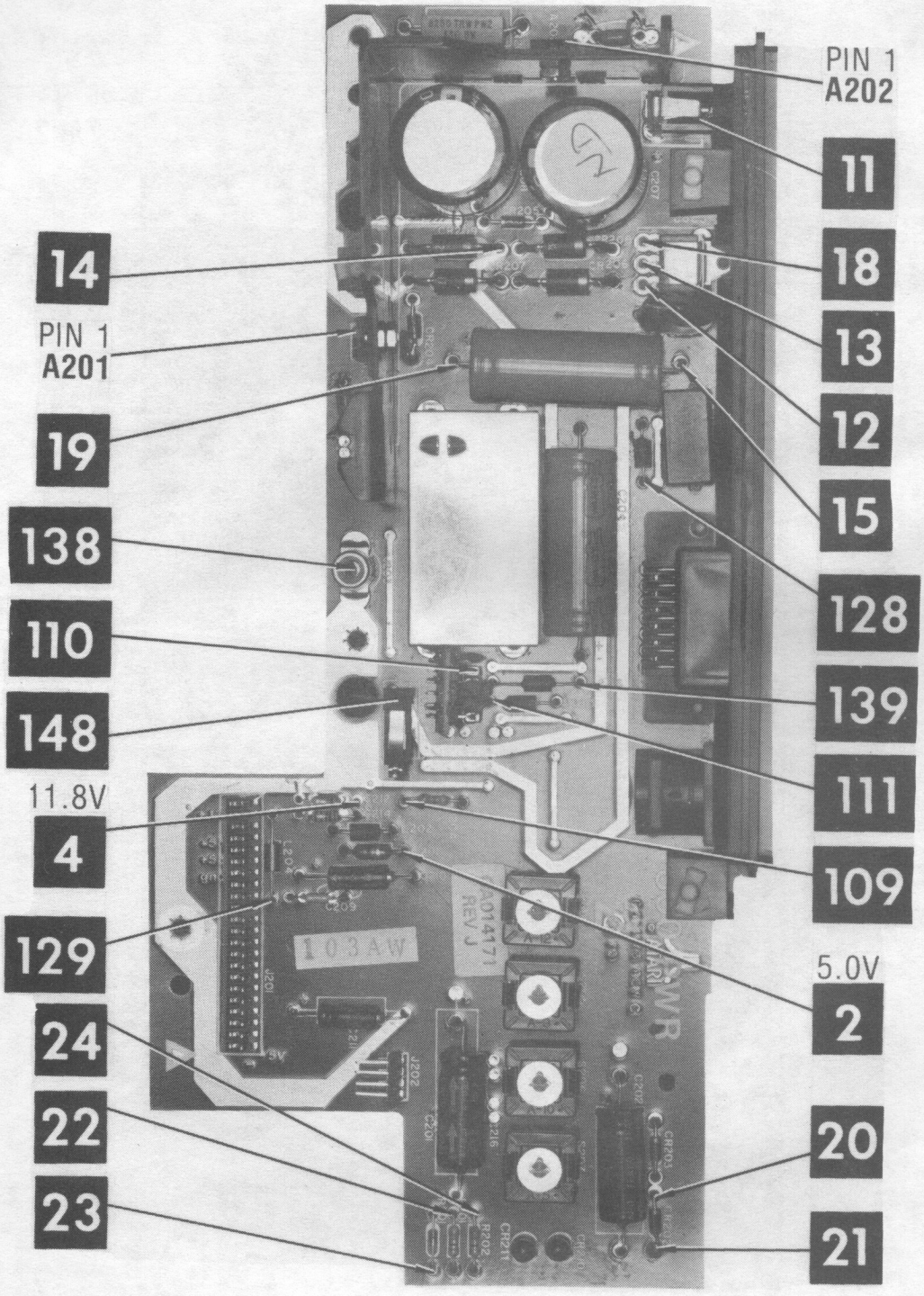
ALTERNATE CPU BOARD



POWER SUPPLY BOARD

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PARTS LIST AND DESCRIPTION

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

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

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
A101	12294B-11 C012294-22								
A102	P6520A C012298								
A103	CD4050BCN MM5650BN C010816-01		GE-4050	MC14050BCP	NTE4050B	ECG4050B	SK4050B		221-Z9163
A104	LM3086N		GEIC-172	MC3346P	NTE912	ECG912	SK3543/912	WEP2104/912	221-Z9018
A201	UA78M12UC		GEVR-111	MC7812CT	NTE966	ECG966	SK3592/966	WEP966L/966	HE-442-674
A202	LM340T		GEVR-102	MC7805CT	NTE960	ECG960	SK3591/960		221-Z9043
A204	CA3086		GEIC-172	MC3346P	NTE912	ECG912	SK3543/912	WEP2104/912	221-Z9018
A301	C014805-22 C012295-03 (2)								
A302	MSM3982 C012296D-22 12296B11 1107B-938N78 (2)								
A303	C014806-03 P6502B C014377(2)				NTE6502 NTE6502	ECG6502 ECG6502			
A401	C014599B12 R3279-13								
A402	C012399B-08 CN32536N								
A403	C012499B-01								
CR101,2	914		GE-300	1N4935	NTE177	ECG177	SK9091/177	WEP1062/177	103-131
CR104 thru CR108	914		GE-300	1N4935	NTE177	ECG177	SK9091/177	WEP1062/177	103-131

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
CR201	1N5231A		GEZD-5.1	1N5231A	NTE5010A	ECG5010A	SK5A1/5010A	WEP1411/5010	103-279-10
CR202 thru CR205	1N4001		GE-504A	1N4001	NTE116	ECG116	SK3311	WEP154	212-76-02
CR206 thru CR209	GI501		GE-504A	1N4003	NTE116	ECG116	SK3311	WEP156	212-76-02
CR250	1N914F		GE-300	1N4935	NTE177	ECG177	SK9091/177	WEP1062/177	103-131
Q101	2N3904		GE-123AP	MPSA05	NTE123AP	ECG123AP	SK3854/123AP	WEP736/123A	121-Z9000A
Q102,3	2N3906		GE-82	2N5401	NTE159	ECG159	SK3466/159	WEP62/159	121-Z9003
Q104,5	2N3904		GE-123AP	MPSA05	NTE123AP	ECG123AP	SK3854/123AP	WEP736/123A	121-Z9000A
Q106	FPN3563			MPS6543	NTE108	ECG108	SK3452/108	WEP56/108	121-925
	MPS3563			MPS6543	NTE108	ECG108	SK3452/108	WEP56/108	121-925
Q107	2N3906		GE-82	2N5401	NTE159	ECG159	SK3466/159	WEP62/159	121-Z9003
	MPSA55		GE-82	2N5401	NTE159	ECG159	SK3466/159	WEP62/159	121-Z9003
Q203	2N3906		GE-82	2N5401	NTE159	ECG159	SK3466/159	WEP62/159	121-Z9003
Z101	DM74LS42N			SN74LS42N	NTE74LS42	ECG74LS42	SK74LS42		HE-443-807
	SN74LS42NDS			SN74LS42N	NTE74LS42	ECG74LS42	SK74LS42		HE-443-807
Z102	DM74LS32N			SN74LS32N	NTE74LS32	ECG74LS32	SK74LS32		HE-443-875
	SN74LS32NDS			SN74LS32N	NTE74LS32	ECG74LS32	SK74LS32		HE-443-875
Z103,4	TC4051BP		GE-4051	MC14051BCP	NTE4051B	ECG4051B	SK4051B		905-380
	MC4051B		GE-4051	MC14051BCP	NTE4051B	ECG4051B	SK4051B		905-380
Z105,6	SN74LS243N			SN74LS243N	NTE74LS243	ECG74LS243	SK74LS243		HE-443-839
	74LS243N			SN74LS243N	NTE74LS243	ECG74LS243	SK74LS243		HE-443-839
Z301	DM74LS02N(2)			SN74LS02N	NTE74LS02	ECG74LS02	SK74LS02		HE-443-779
Z302	74LS244N			SN74LS244N	NTE74LS244	ECG74LS244	SK74LS244		HE-443-791
	DM7474M(2)		GE-7474		NTE7474	ECG7474	SK7474	WEP7474/7474	HE-443-6
Z303,4	SN74LS244N(2)			SN74LS244N	NTE74LS244	ECG74LS244	SK74LS244		HE-443-791
Z401	SN74LS138N			SN74LS138N	NTE74LS138	ECG74LS138	SK74LS138		HE-443-877
Z402	DM74LS00N			SN74LS00N	NTE74LS00	ECG74LS00	SK74LS00		HE-443-728
Z403	DM74LS09N			SN74LS09N	NTE74LS09	ECG74LS09			HE-443-816
Z501	SN74LS10NDS			SN74LS10N	NTE74LS10	ECG74LS10	SK74LS10		HE-443-797

PARTS LIST AND DESCRIPTION (Continued)

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

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFGR. PART No.	REPLACEMENT DATA						
			GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NEW-TONE NTE PART No.	PHILIPS ECG PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
Z502	SN74LS244NDS			SN74LS244N	NTE74LS244	ECG74LS244	SK74LS244		HE-443-791
Z503,4	SN74LS158N			SN74LS158N		ECG74LS158			
Z505 thru	MK4116N-3GP				NTE2117	ECG2117			HE-443-904
Z512	C014331-09				NTE2117	ECG2117			HE-443-904
	MM5290N-4								

(2) Used in alternate CPU board.

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C164	100 NPO 50V 3%	
C169	820 3%	
C170	100 NPO 50V 3%	
C173	820 3%	
C214	10 NPO 50V 5%	
C250	100 N750 50V 5%	
C251	47 N150 50V 5%	

ITEM No.	RATING	MFGR. PART No.
C254	15 NPO 50V	
C307	.001 N075 50V	
C407	47 NPO 50V 5%	
C408	68 NPO 50V 5%	
C409	47 NPO 50V 5%	
C410	68 NPO 50V 5%	
C518	47 NPO 50V 5%	

CONTROLS (All wattages ½ watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R309	Color Adjust	500K		

PARTS LIST AND DESCRIPTION (Continued)

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

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NEW-TONE PART No.	WORKMAN PART No.
R129 R158	Resistor Network (1) Resistor Network (1)			

(1) Contain nine 4700.

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L101	4.5MHz Adjust	
L102	RF Choke	
L103	Peaking	
L104	Peaking	
L105	Peaking	
L106	RF Choke	
L107	RF Choke	
L108	RF Choke	
L109	RF Choke	
L110	RF Choke	
L111	RF Choke	
L112	RF Choke	
L201	RF Choke	
L202	Peaking	

ITEM No.	FUNCTION	MFGR. PART No.
L203	RF Choke	
L204	RF Choke	
L205	RF Choke	
L206	RF Choke	
L210	RF Modulator Adjust	
L301	RF Choke (1)	
L302	RF Choke (1)	
L401	RF Choke	
L402	RF Choke	
L403	RF Choke	
L501	RF Choke	
T250	RF Modulator Output	

(1) Used In Alternate CPU.

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP101	2 1/4" PM 57 Ohms			

MISCELLANEOUS

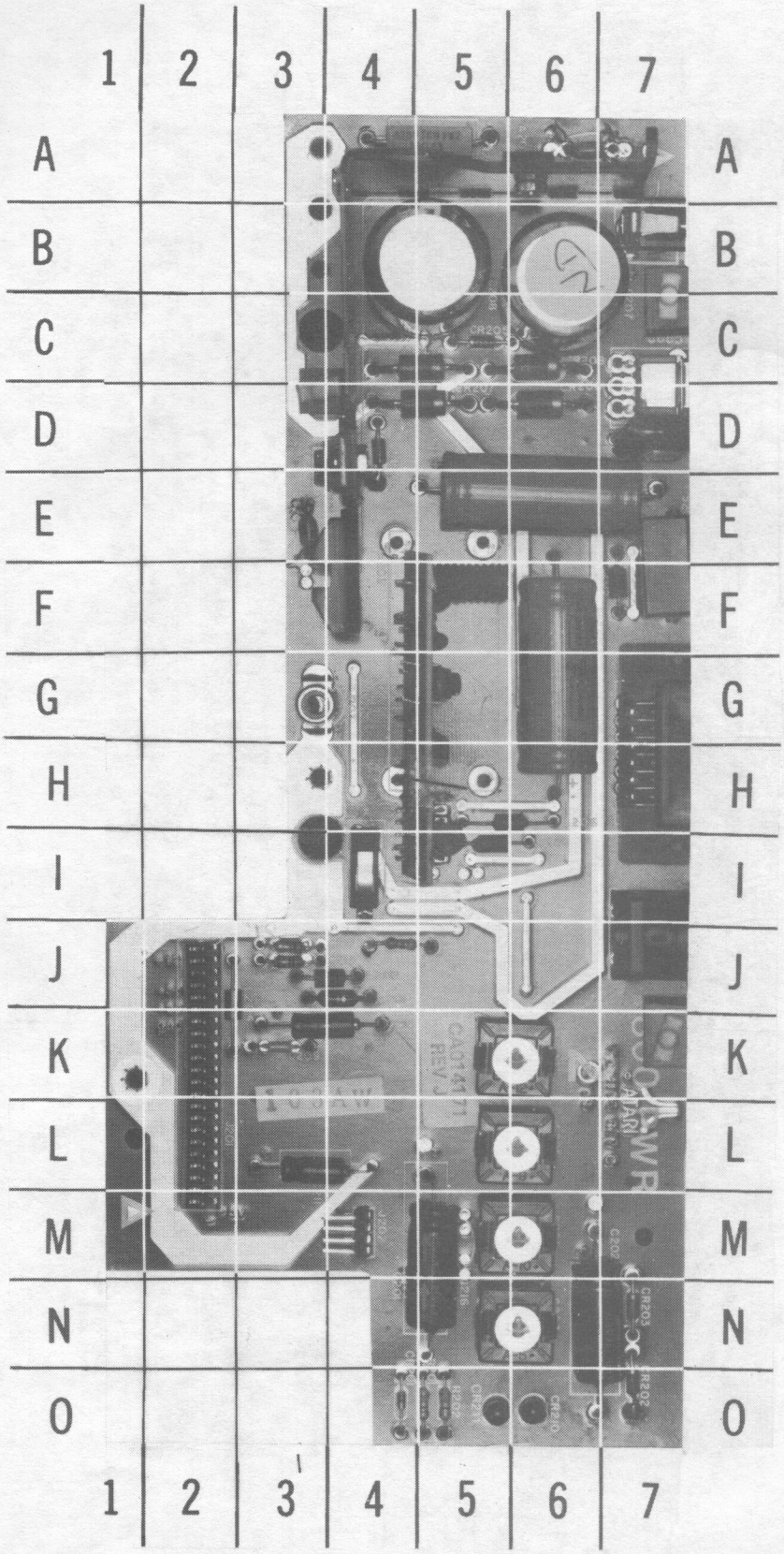
ITEM No.	PART NAME	MFGR. PART No.	NOTES
CR210	LED		Power, Red (2.0V @ 14mA)
CR211	LED		Power, Red (2.0V @ 14mA)
P1	Power Cord		AC, Polarized
S201	Switch		Interlock
S202	Switch		Power (On/Off)
S203	Switch		Channel Select (2/3)
S204	Switch		Reset
S205	Switch		Option Select
S206	Switch		Game Select
S207	Switch		Game Start
X101	Crystal		3.579575MHz

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

POWER SUPPLY BOARD GridTrace LOCATION GUIDE

A201	D-4
A202	A-6
C201	M-5
C202	N-7
C203	E-3
C204	G-6
C205	E-6
C206	A-6
C207	B-6
C208	B-5
C209	K-3
C210	K-3
C211	L-3
C212	J-3
C214	J-3
C215	D-7
CR201	O-4
CR202	O-7
CR203	N-7
CR204	D-4
CR205	C-5
CR206	D-6
CR207	D-5
CR208	C-6
CR209	C-5
CR210	O-6
CR211	O-5
J201	L-2
J202	M-3
J203	G-3
J204	H-7
J205	J-7
J206	B-7
L201	J-4
L202	J-4
L203	I-5
L204	J-2
L205	F-7
L206	H-5
R201	O-5
R202	O-5
R203	A-5
R204	J-4
S201	I-4
S202	C-7
S203	E-7
S204	K-6
S205	L-6
S206	M-6
S207	N-6



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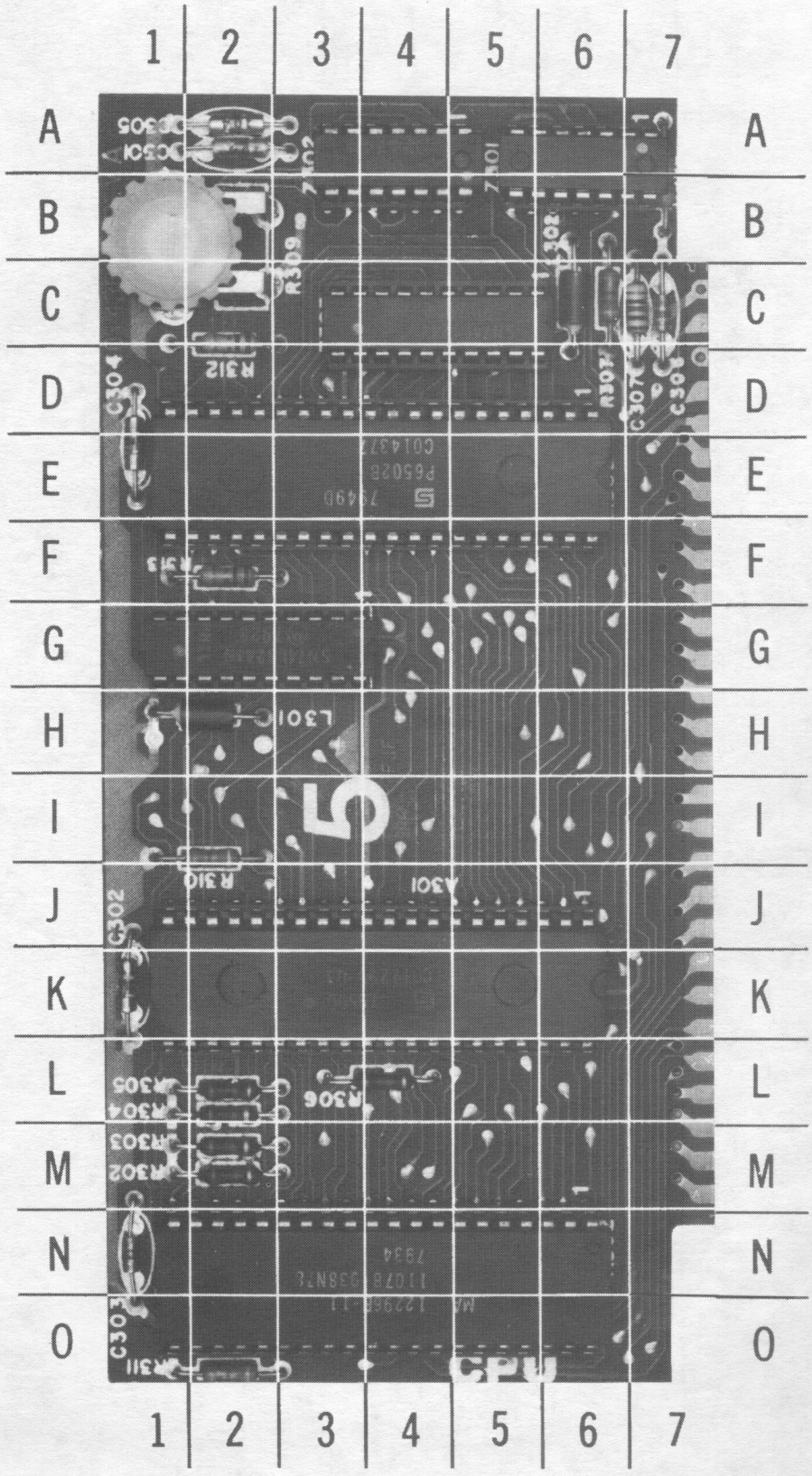
POWER SUPPLY BOARD

ALTERNATE CPU BOARD GridTrace LOCATION GUIDE

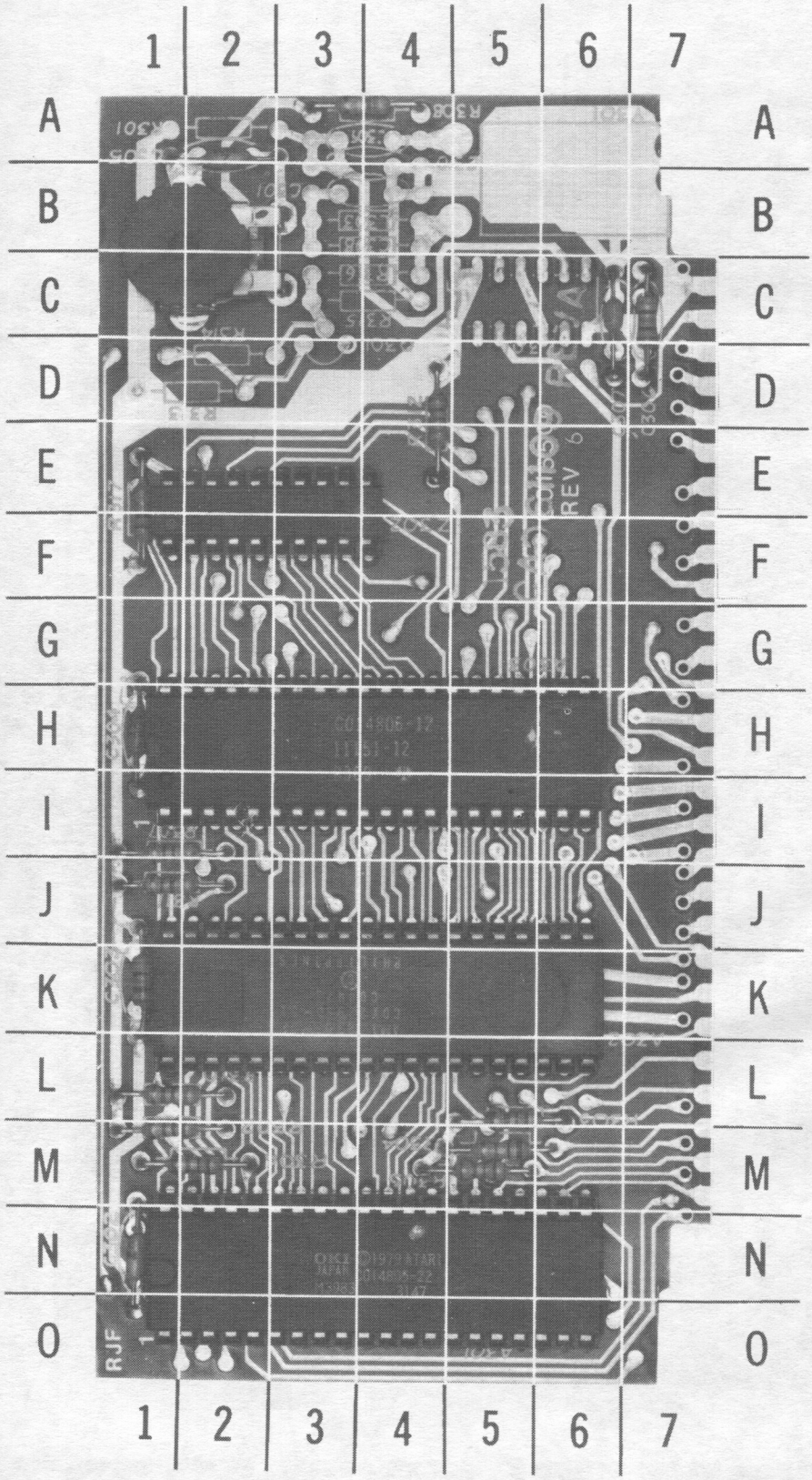
A301	K-4
A302	N-4
A303	E-4
C301	A-2
C302	K-1
C303	N-1
C304	E-1
C305	A-2
C306	C-7
C307	C-7
L301	H-2
L302	C-6
R302	M-2
R303	M-2
R304	L-2
R305	L-2
R306	L-4
R307	C-6
R308	B-7
R309	A-2
R310	I-2
R311	C-2
R312	C-2
R313	F-2
Z301	A-6
Z302A	A-4
Z303	C-4
Z304	G-2



ALTERNATE CPU BOARD A Howard W. Sams GRIDTRACE™ Photo

CPU BOARD
GridTrace
LOCATION GUIDE

A301	N-3
A302	K-4
A303	H-4
C302	N-1
C303	K-1
C304	H-1
C305	A-2
C306	C-7
C307	C-6
R302	M-1
R303	L-5
R304	M-5
R305	M-5
R306	M-2
R307	I-1
R308	A-4
R309	B-1
R310	L-1
R311	J-1
R312	D-4
Z302	E-2



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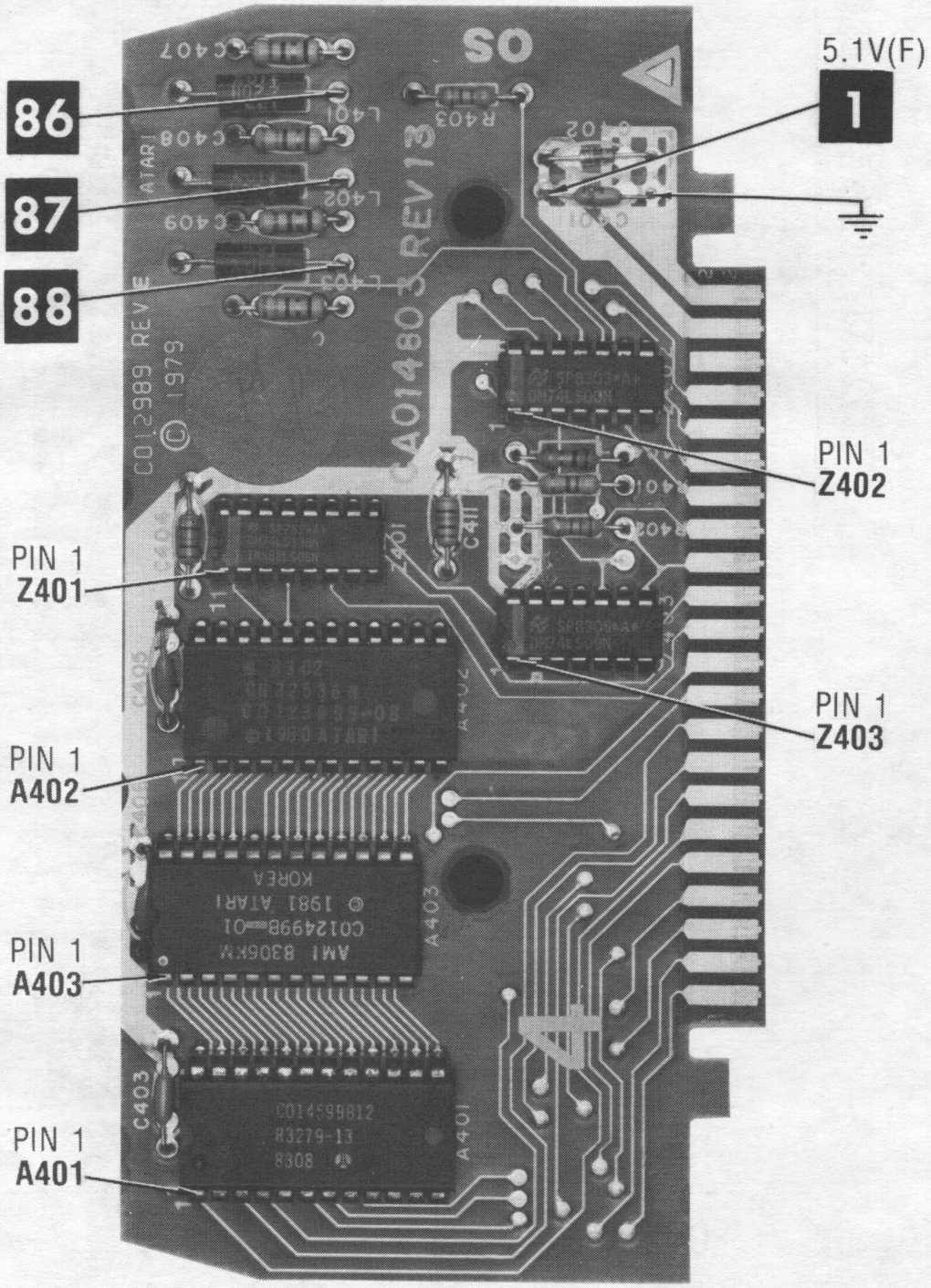

ATARI
MODEL 800

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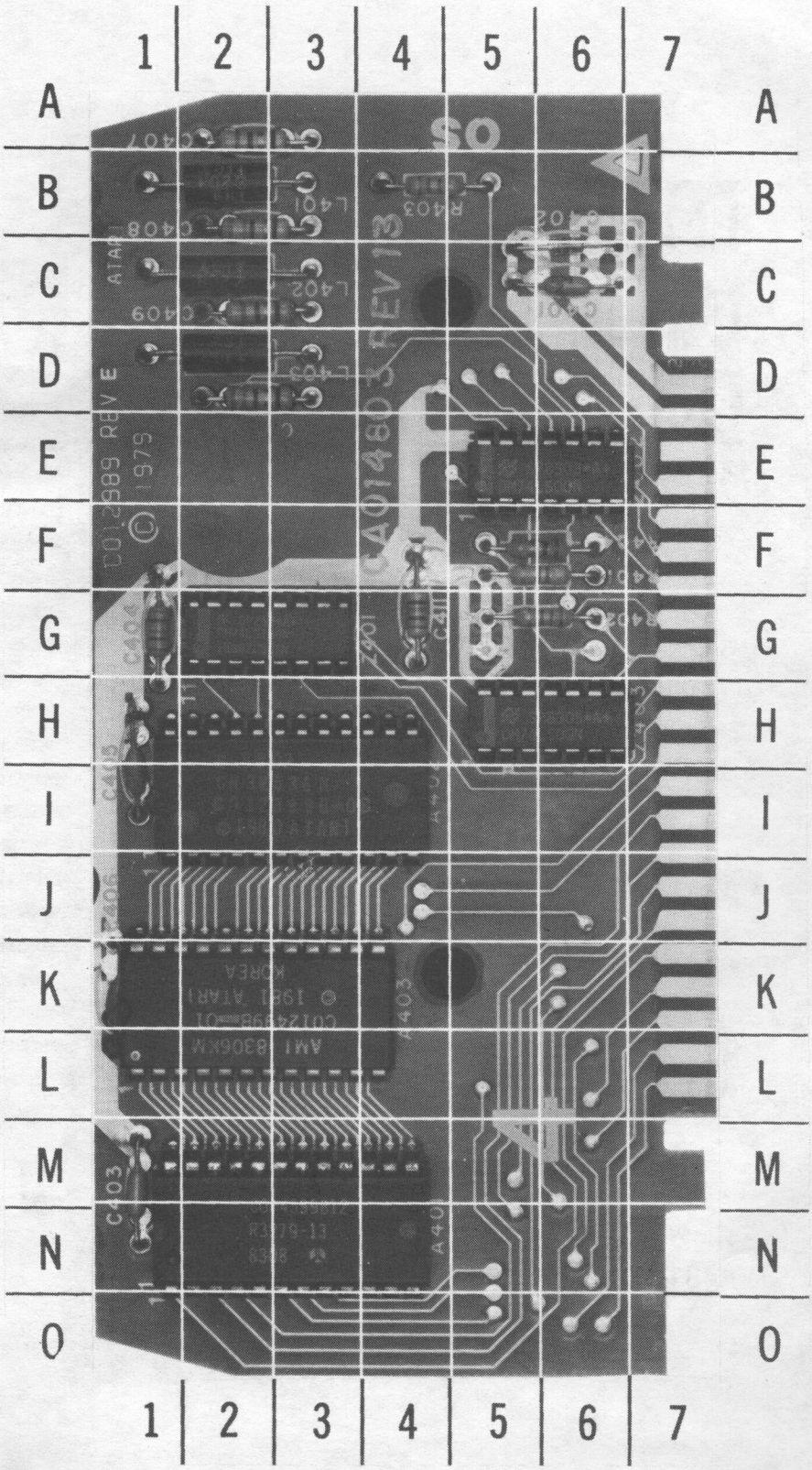
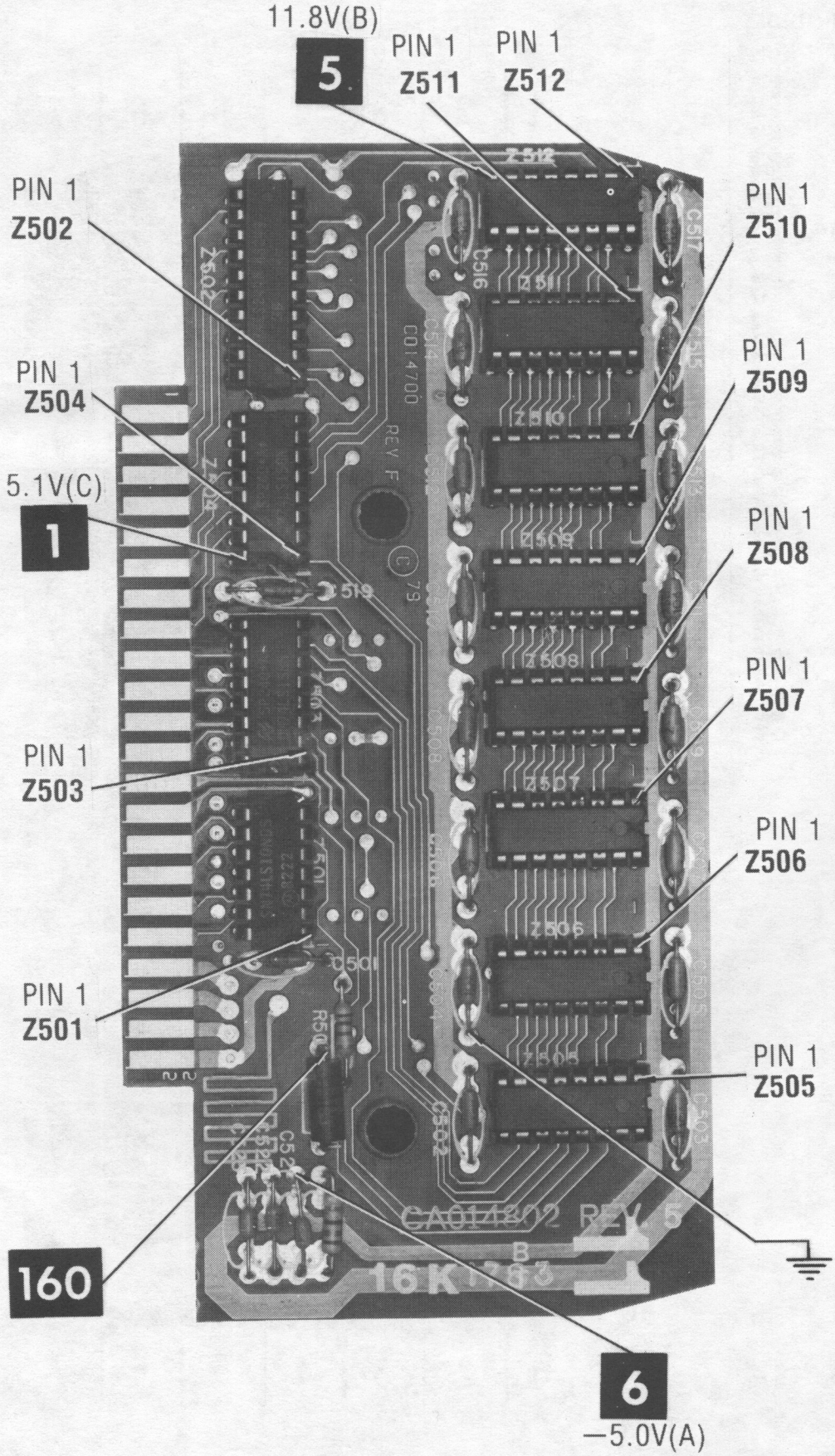
PERSONALITY BOARD

PERSONALITY BOARD GridTrace LOCATION GUIDE

A401	N-2
A402	I-2
A403	K-2
C401	B-6
C402	B-6
C403	M-1
C404	G-1
C405	I-1
C406	K-1
C407	A-2
C408	B-2
C409	C-2
C410	D-2
C411	G-4
L401	B-2
L402	C-2
L403	D-2
R401	F-6
R402	G-6
R403	B-4
R404	F-5
Z401	E-6
Z402	G-2
Z403	H-6



PERSONALITY BOARD A Howard W. Sams GRIDTRACE™ Photo



ATARI
MODEL 800

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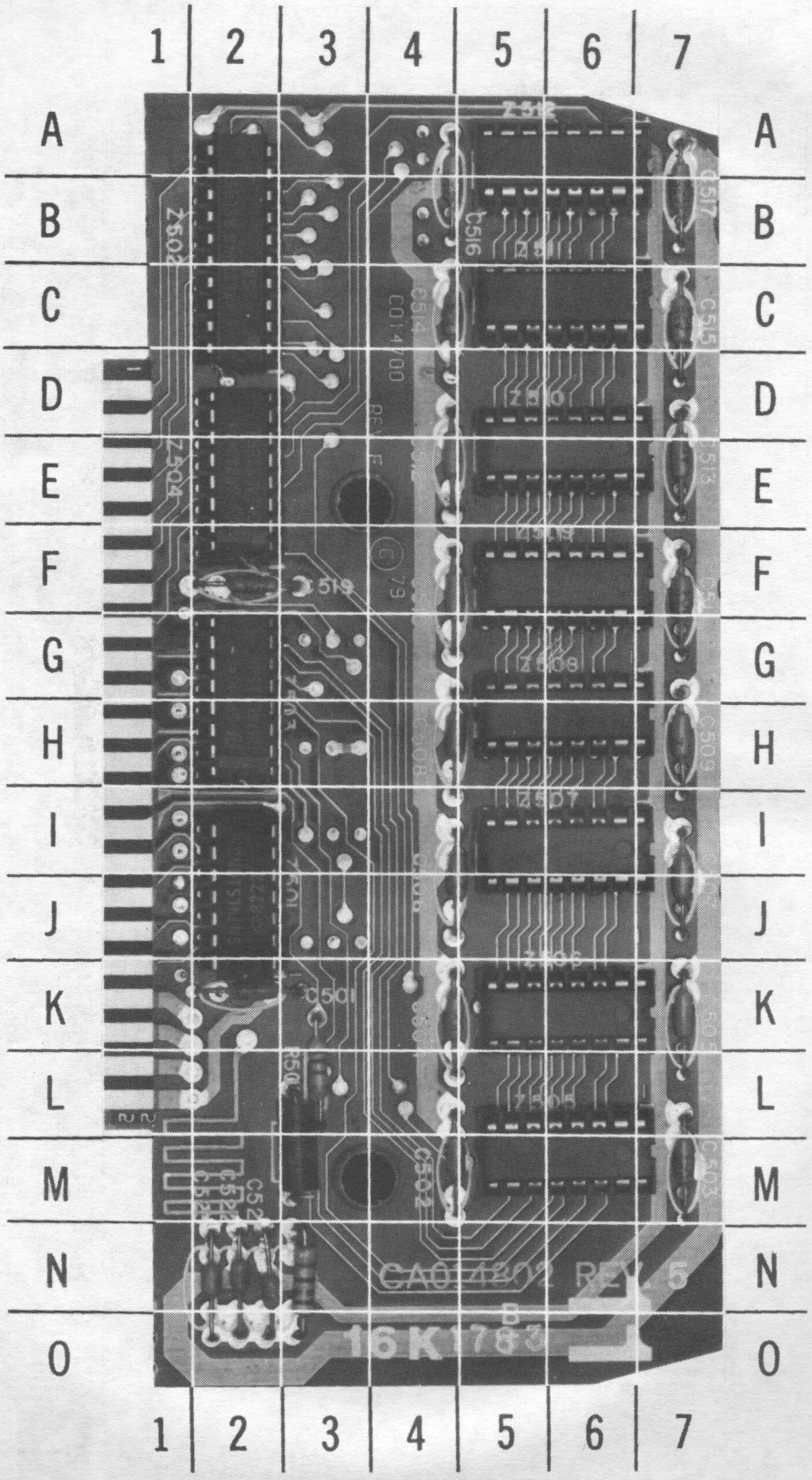
RAM BOARD

RAM BOARD
GridTrace
LOCATION GUIDE

C501	K-2
C502	M-4
C503	M-7
C504	K-4
C505	K-7
C506	I-4
C507	J-7
C508	H-4
C509	H-7
C510	F-4
C511	F-7
C512	E-4
C513	E-7
C514	C-4
C515	C-7
C516	A-4
C517	B-7
C518	N-3
C519	F-2
C521	N-2
C522	N-2
C523	N-2
L501	M-3
R501	L-3
Z501	J-2
Z502	B-2
Z503	H-2
Z504	E-2
Z505	M-6
Z506	K-6
Z507	I-6
Z508	H-6
Z509	F-6
Z510	E-6
Z511	C-6
Z512	A-6



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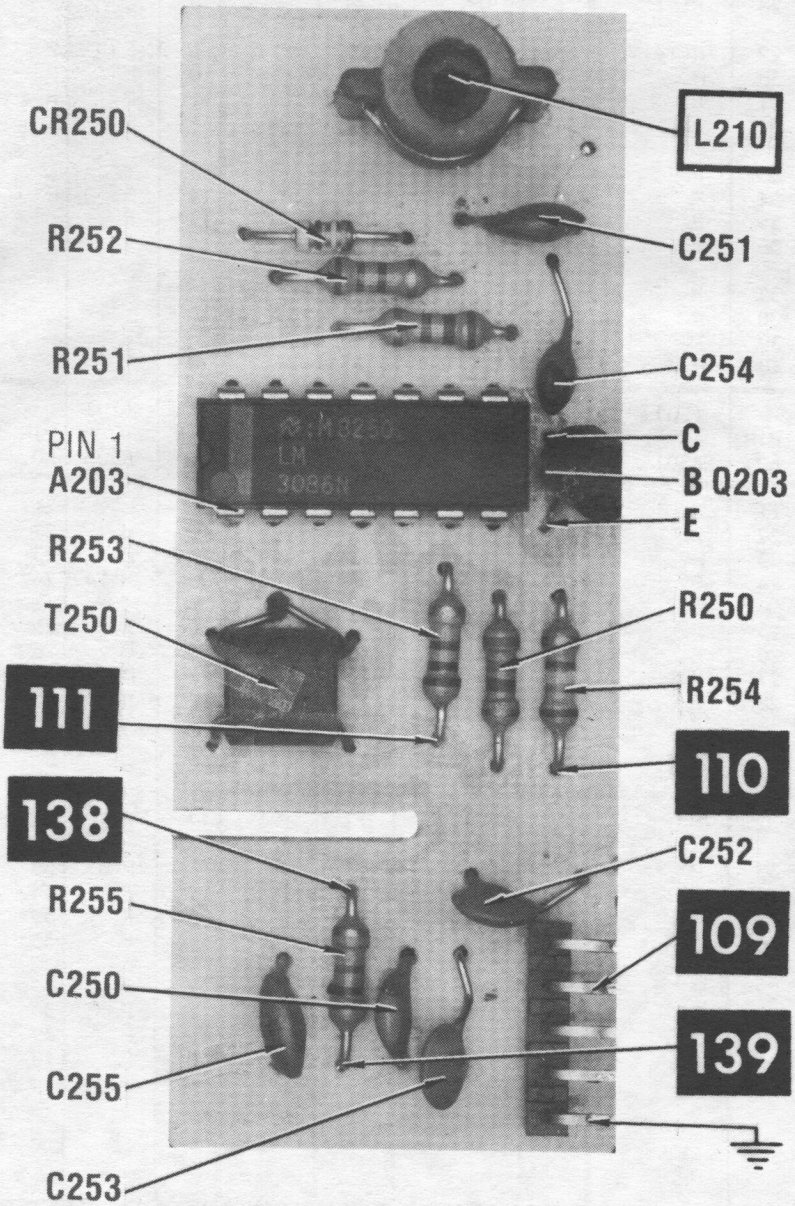

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RF MODULATOR BOARD

LOGIC CHART

PIN NO.	IC A101	PIN NO.	IC A101
1	L	21	P
2	P	22	P
3	P	23	P
4	P	24	H(8)
5	P	25	H(1)(12)
6	P	26	H(9)
7	P	27	H(9)
8	L(2)	28	H(9)
9	L(2)	29	H(14)
10	L(3)	30	P
11	L(3)	31	H
12	L(4)	32	P
13	L(4)	33	P
14	L(5)	34	P
15	L(5)	35	P
16	H(13)	36	P
17	H	37	H
18	P	38	P
19	P	39	P
20	P	40	P

PIN NO.	IC A102	PIN NO.	IC A102
1	L	21	P
2	H	22	H
3	H(7)	23	P
4	H(6)(7)	24	H
5	H(6)(7)	25	P
6	H(7)	26	P
7	H(7)	27	P
8	H(6)(7)	28	P
9	H(6)(7)	29	P
10	H(7)	30	P
11	H(7)	31	P
12	H(6)(7)	32	P
13	H(6)(7)	33	P
14	H(7)	34	H
15	H(7)	35	P
16	H(6)(7)	36	P
17	H(6)(7)	37	H(14)
18	H	38	H(14)
19	H	39	H(10)
20	H	40	H

PIN NO.	IC A103	IC A104	IC A201	IC A202	IC A204
1	H	P	(19)	(19)	(19)
2	H	H			
3	H	H			
4	P	H			
5	P	H			
6	P	*			
7	P	*			
8	L	*			
9	P	P			
10	P	P			
11	P	H			
12	P	L			
13	*	L			
14	P	P			
15	P				
16	*				

PIN NO.	(20) IC A301	PIN NO.	(20) IC A301
1	P	21	P
2	P	22	P
3	L	23	P
4	P	24	P
5	P	25	P
6	P	26	P
7	P	27	H
8	H(7)	28	P
9	H(7)	29	P
10	H(7)	30	P
11	H(7)	31	P
12	H(12)(15)	32	P
13	H(12)(16)	33	P
14	H(12)(17)	34	P
15	L(11)	35	P
16	*	36	P
17	H	37	P
18	P	38	P
19	P	39	P
20	P	40	P

PIN NO.	(20) IC A302	PIN NO.	(20) IC A302
1	L	21	H
2	P	22	P
3	P	23	P
4	H	24	P
5	P	25	P
6	H(18)	26	P
7	P	27	P
8	P	28	P
9	P	29	P
10	P	30	P
11	P	31	P
12	P	32	P
13	P	33	P
14	P	34	P
15	H	35	P
16	P	36	H
17	P	37	P
18	P	38	P
19	P	39	P
20	P	40	P

PIN NO.	(20) IC A303	PIN NO.	(20) IC A303
1	L	21	L
2	H	22	P
3	P	23	P
4	H(14)	24	P
5	*	25	P
6	P	26	P
7	P	27	P
8	H	28	P
9	P	29	P
10	P	30	P
11	P	31	P
12	P	32	P
13	P	33	P
14	P	34	*
15	P	35	P
16	P	36	P
17	P	37	P
18	P	38	L
19	P	39	P
20	P	40	H

PIN NO.	IC A401
1	P
2	P
3	P
4	P
5	P
6	P
7	P
8	P
9	P
10	P
11	P
12	L
13	P
14	P
15	P
16	P
17	P
18	P
19	P
20	P
21	P
22	P
23	P
24	H

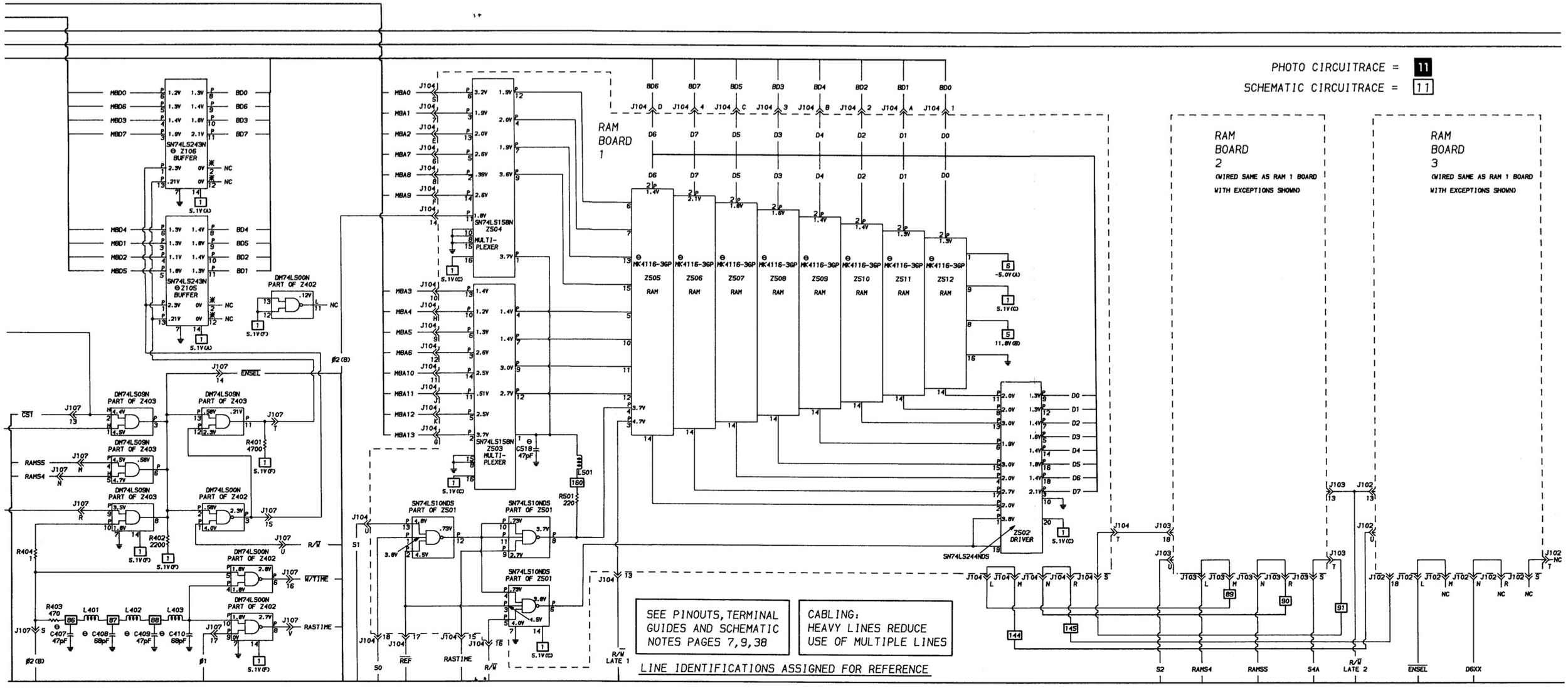
FOR LOGIC CHART NOTES
SEE SCHEMATIC NOTES ON PAGE 9

LOGIC CHART (Continued)

PIN NO.	IC A402	IC A403	IC Z101	IC Z102	IC Z103	IC Z104	IC Z105	IC Z106	(20) IC Z301	(20) IC Z302	(20) IC Z303	(20) IC Z304	IC Z401	IC Z402
1	P	P	P	H	P	H(1)	P	P		L			P	P
2	P	P	P	H	P	H(1)	*	*		P			P	P
3	P	P	H	H	L	H(1)(12)	P	P		P			P	P
4	P	P	P	L	P	H(1)	P	P		P			P	P
5	P	P	P	P	P	H(1)	P	P		P			P	P
6	P	P	H	P	L	L	P	P		P			P	P
7	P	P	P	L	L	L	L	L		P			H	L
8	P	P	L	P	L	L	P	P		P			L	P
9	P	P	P	P	P	P	P	P		P			H	P
10	P	P	H	P	P	P	P	P		L			H	P
11	P	P	H	H	P	P	P	P		P			H	L
12	L	L	L	P	P	H(1)	*	*		P			P	H
13	P	P	P	P	P	H(1)	P	P		P			P	H
14	P	P	P	H	P	H(1)	H	H		P			H	H
15	P	P	P		P	H(1)				P			H	
16	P	P	H		H	H				P			H	
17	P	P								P				
18	P	P								P				
19	P	P								L				
20	P	P								H				
21	P	P												
22	P	P												
23	P	P												
24	H	H												

PIN NO.	IC Z403	IC Z501	IC Z502	IC Z503	IC Z504	IC Z505	IC Z506	IC Z507	IC Z508	IC Z509	IC Z510	IC Z511	IC Z512
1	H	P	P	P	P	L	L	L	L	L	L	L	L
2	H	P	P	P	P	P	P	P	P	P	P	P	P
3	P	P	P	P	P	P	P	P	P	P	P	P	P
4	P	P	P	P	P	P	P	P	P	P	P	P	P
5	H	P	P	P	P	P	P	P	P	P	P	P	P
6	P	P	P	P	P	P	P	P	P	P	P	P	P
7	L	L	P	P	P	P	P	P	P	P	P	P	P
8	P	P	P	L	L	H	H	H	H	H	H	H	H
9	P	P	P	P	P	H	H	H	H	H	H	H	H
10	P	P	L	P	L	P	P	P	P	P	P	P	P
11	P	P	P	P	P	P	P	P	P	P	P	P	P
12	P	P	P	P	P	P	P	P	P	P	P	P	P
13	P	P	P	P	P	P	P	P	P	P	P	P	P
14	H	H	P	P	P	P	P	P	P	P	P	P	P
15			P	L	L	P	P	P	P	P	P	P	P
16			P	H	H	L	L	L	L	L	L	L	L
17			P										
18			P										
19			P										
20			H										

FOR LOGIC CHART NOTES
SEE SCHEMATIC NOTES ON PAGE 9



A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE
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MAIN BOARD, RAM BOARDS

SEE LINE DEFINITIONS ON PAGE 8

ATARI
MAIN BOARD, RAM BOARDS MODEL 800

SAMS

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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.

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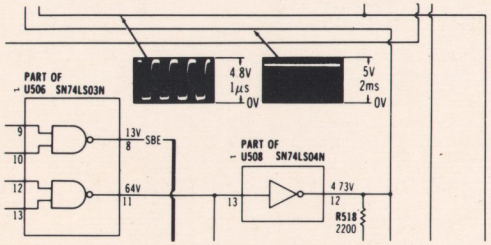
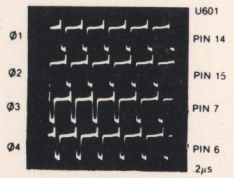


- Step by Step Troubleshooting guides the technician through the necessary procedures to quickly locate the problem.

TROUBLESHOOTING

MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U600) and the data lines (pins 41 thru 56) using a logic probe or a scope. If a logic probe is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.

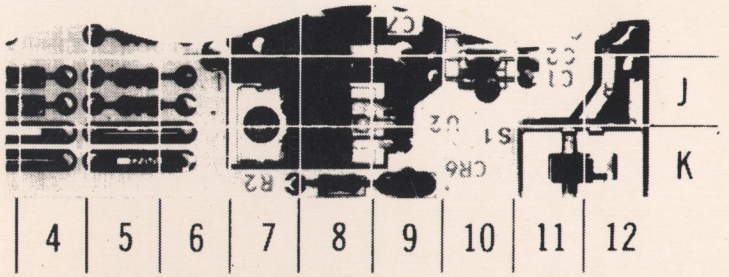


- Logic Chart containing logic probe readings to isolate defective circuitry and components.

LOGIC

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

- 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 No.	MFGR. PART No.	REPLACEMENT DATA						
			ECG PART No.	GENERAL ELECTRIC PART No.	MOTOROLA PART No.	NTE PART No.	RCA PART No.	WORKMAN PART No.	ZENITH PART No.
D102	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WEP925/519	103-131
D103	1N60FM	1149-2527	ECG109	1N60		NTE109	SK3088	WEP134/109	103-Z9001
D201	1N4004GP	1201-4205	ECG116	GE-504A	1N4004	NTE116	SK3312	WEP157	212-76-02
D501 thru D503	1SS53	1149-2576	ECG519	GE-514	1N4935	NTE519	SK9091/177	WEP925/519	103-131

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