

ATARI

1200XL HOME COMPUTER FIELD SERVICE MANUAL



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INTRODUCTION

The Atari 1200XL Computer Field Service Manual is a reference guide for the service technician.

This Field Service Manual is organized in six sections:

- THEORY OF OPERATION - Overview of how the 1200XL works and what its basic assemblies look like.
- SCHEMATICS AND SILKSCREENS - Electrical drawings and layouts of the 1200XL printed circuit board.
- TESTING - Review of Diagnostic Tests available for diagnosing 1200XL problems.
- SYMPTOM CHECKLIST - Failure information to assist the experienced technician arrive at a rapid diagnosis of 1200XL problems.
- PARTS LIST - Detailed breakdown of all parts used in the 1200XL.
- SERVICE BULLETINS - Section to be used to hold Field Change Orders, Upgrade Bulletins and Tech Tips.

SECTION 1
THEORY OF OPERATION

The Atari 1200XL™ is an enhanced version of the existing Atari computer systems. It can be used with any existing Atari peripheral devices which are compatible with the 400™/800™ computer, although not all are necessary.

The console contains 64K of RAM and has an operating system which contains two 8K X 8 ROMs. The console also contains the keyboard with a HELP key, four application function keys, a single cartridge slot, connector jacks for adding peripherals and hand controllers, a detachable (RF) TV interface cable and three status LED's.

Use Figures 1-1 and 1-2 as reference for the following discussion.

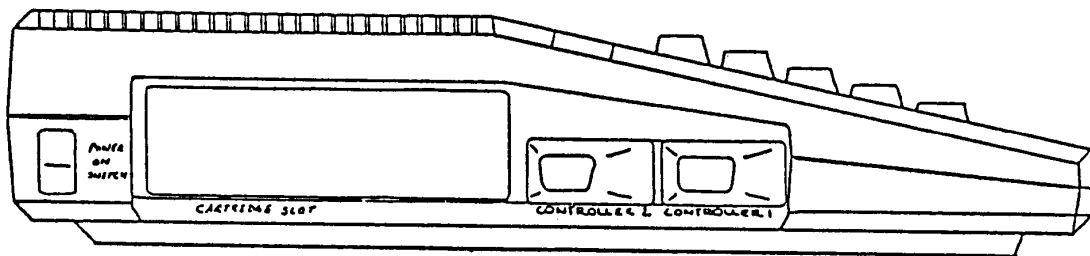


Figure 1-1. 1200XL Left Side Panel

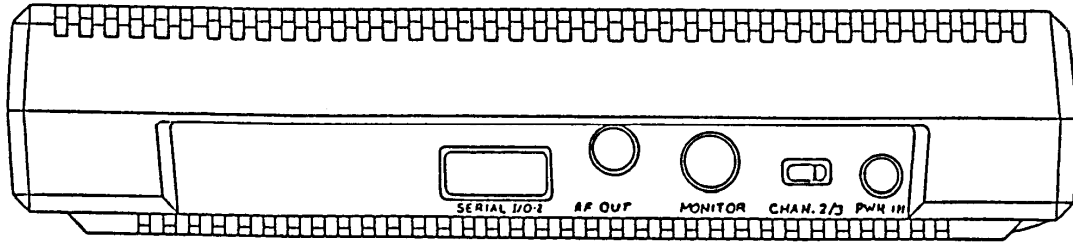


Figure 1-2. 1200XL Back View.

User Interface

The Atari 1200XL is a general purpose microcomputer which uses a 6502 (modified) microprocessor. The 1200XL console is the central processing unit for its respective system.

The left side panel (refer to Figure 1-1) contains the power ON/OFF switch, one cartridge slot and two controller jacks. The controller jacks accept the X-Y joystick and the paddle controllers available from Atari.

The rear panel (refer to Figure 2-1) contains the Serial Input/Output (I/O) jack, the RF cable jack, the monitor jack, the channel 2-3 switch, and the Power Jack.

The console has a full stroke 54 key alphanumeric keyboard, which includes special characters and controls, a space bar, three LED indicators, and 11 function keys.

The 11 function keys above the keyboard are made of brushed and formed aluminium nameplate material. A translucent plexiglass strip above the function keys indicates the operation (function) and covers the three LEDs.

From left to right the function keys and LED indicators are:

RESET - Interrupts and restarts the operating system or cartridge.

POWER - Lights when Power to the unit is ON.

L1 - Lights if the keyboard is disabled.

L2 - Lights if the International character set is selected. START - Starts the game or program.

SELECT - Selects different games.

OPTION - Allows the player to choose among the variations of a program.

F1-F4 - User programmable function keys. The following functions are only applicable when software, such as BASIC; is inserted.

Press F 1 to move cursor up.

Press F2 to move cursor down.

Press F3 to move cursor left.

Press F4 to move cursor right.

HELP - Press to display self-test options.



- Inverse Video

BREAK - Used for interrupt of program.

Mechanical Description

The 1200XL computer console contains a single motherboard which houses all the chips of the system and provides connectors for interfacing external modules to the console. It includes the CPU, RAM, ROM Operating System and power supply, and includes all functions except for the keyboard and LED display. The motherboard uses a common address bus, data bus and clock lines. The sixteen-line address bus allows the microprocessor to directly address 64K of memory locations. The eight-line data bus provides the communication and data path between the functional modules. The various power requirements are routed from the power supply throughout the console.

The keyboard is connected to the PC Board by a 15-conductor ribbon cable terminating in a molex connector. The LED board is connected to the PC Board by a 5-conductor ribbon cable.

Figure 1-3 is a block diagram of the functional flow of the 1200XL.

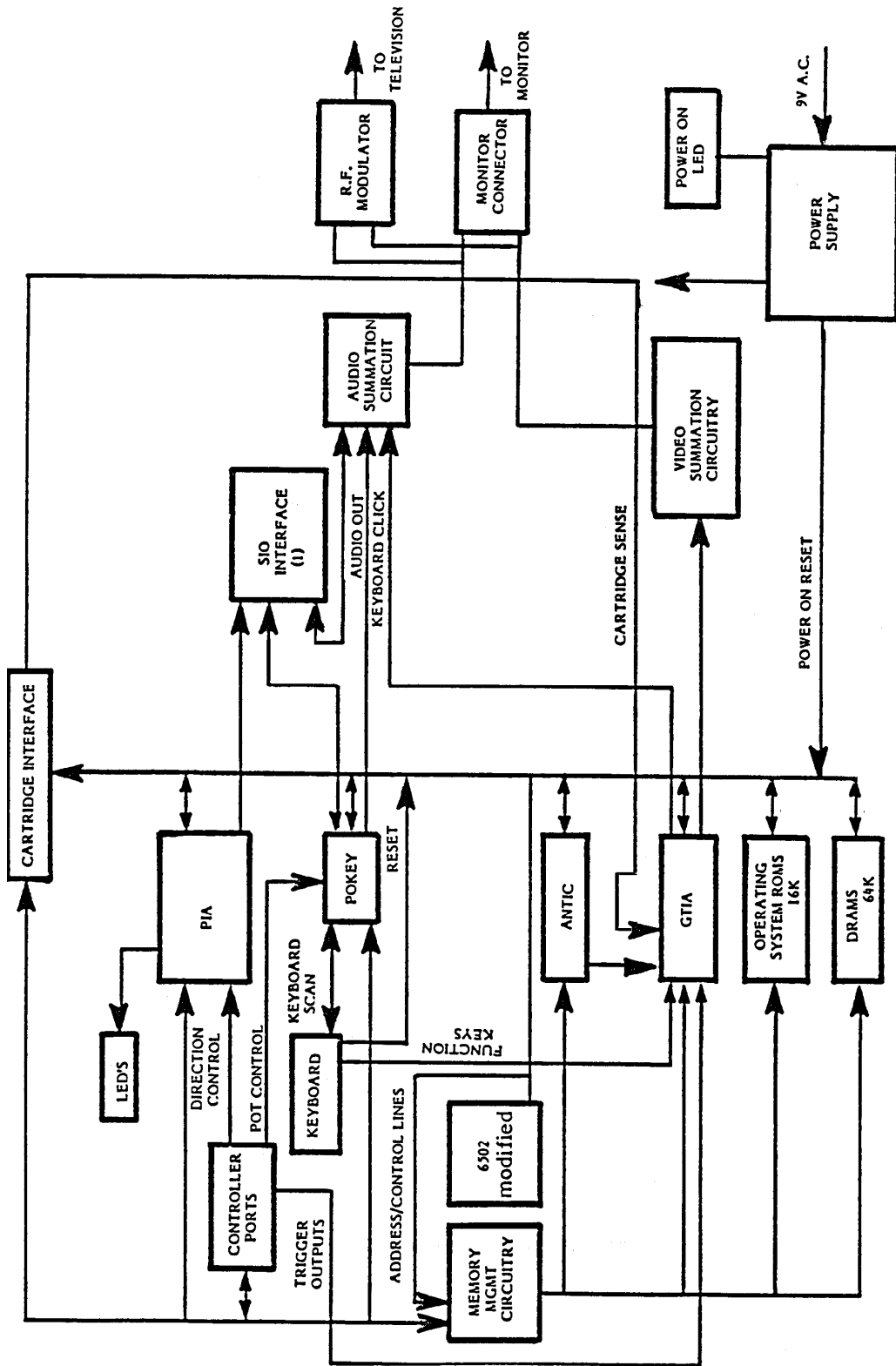


Figure 1-3. 1200XL Functional Block Diagram.

Digital Hardware

The digital hardware consists of:

- The 6502 (modified) CPU microprocessor
- The Alphanumeric Television Interface Controller (the ANTIC Display Processor)
- The Graphics Television Interface Adaptor (GTIA)
- The POT Keyboard Integrated Circuit (POKEY)
- The Peripheral Interface Adaptor (PIA)
- The Memory (ROM and RAM)
- Miscellaneous Logic
- Memory Management Unit (MMU)
- Delay Line

6502 (modified) CPU Microprocessor

The 6502 (modified) CPU microprocessor contains register flags, interconnections, arithmetic logic, control logic, and all recognized operation codes. The characteristics of the microprocessor are:

- Byte-oriented structure
- 151 opcodes
- Decimal and binary arithmetic modes Seven addressing modes
- True indexing Stack pointer
- Two interrupt levels 64K address range
- Integral clock circuit
- Single +5 volt DC power Requirement

Figure 1-4 is an illustration of the 6502 (modified) CPU Pin Assignments.

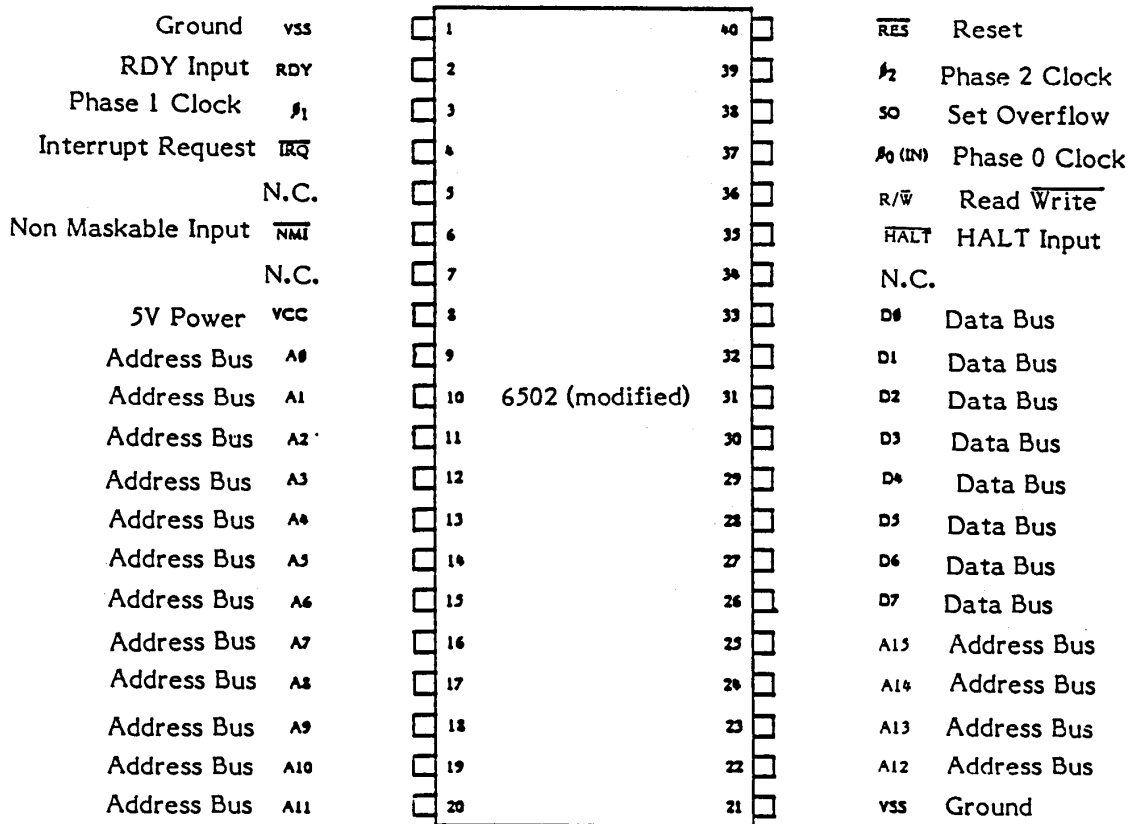


Figure 1-4. 6502 (Modified) CPU Pin Assignments

Alphanumeric Television Interface Controller (The ANTIC Display Processor)

The ANTIC Display Processor is a custom display microprocessor with an instruction set customized for graphics generation. It also has the ability to control bus and RAM REFRESH.

Figure 1-5 is an illustration of the ANTIC Display Processor pin assignments.

GROUND	VSS	1	ANTIC	40	D4	Data Bus
Alphanum. Data	AN0	2		39	D5	Data Bus
Alphanum. Data	AN1	3		38	D6	Data Bus
Light Pen	LP	4		37	D7	Data Bus
Alphanum. Data	AN2	5		36	RST	Reset
Interrupt Input	RNMI	6		35	F00	Fast Phase 0 Clock
Interrupt Output	NMI	7		34	00	Phase 0 Clock
Refresh	REF	8		33	D3	Data Bus
HALT	HALT	9		32	D2	Data Bus
Address Bus	A3	10		31	D1	Data Bus
Address Bus	A2	11		30	D0	Data Bus
Address Bus	A1	12		29	02	Phase 2 Clock
Address Bus	A0	13		28	A4	Address Bus
Read/Write	R/W	14		27	A5	Address Bus
Ready	RDY	15		26	A6	Address Bus
Address Bus	A10	16		25	A7	Address Bus
Address Bus	A12	17		24	A8	Address Bus
Address Bus	A13	18		23	A9	Address Bus
Address Bus	A14	19		22	A11	Address Bus
Address Bus	A15	20		21	VCC	5V Power

Figure 1-5. Antic Display Processor Pin Assignments

Graphics Television Interface Adaptor (GTIA)

The GTIA interfaces with the ANTIC processor on one side and with the video summation circuitry on the other. Its primary task is to generate color and luminance signals from the display information bit stream it receives from the ANTIC Display Processor.

Figure 1-6 is an illustration of the GTIA pin assignments.

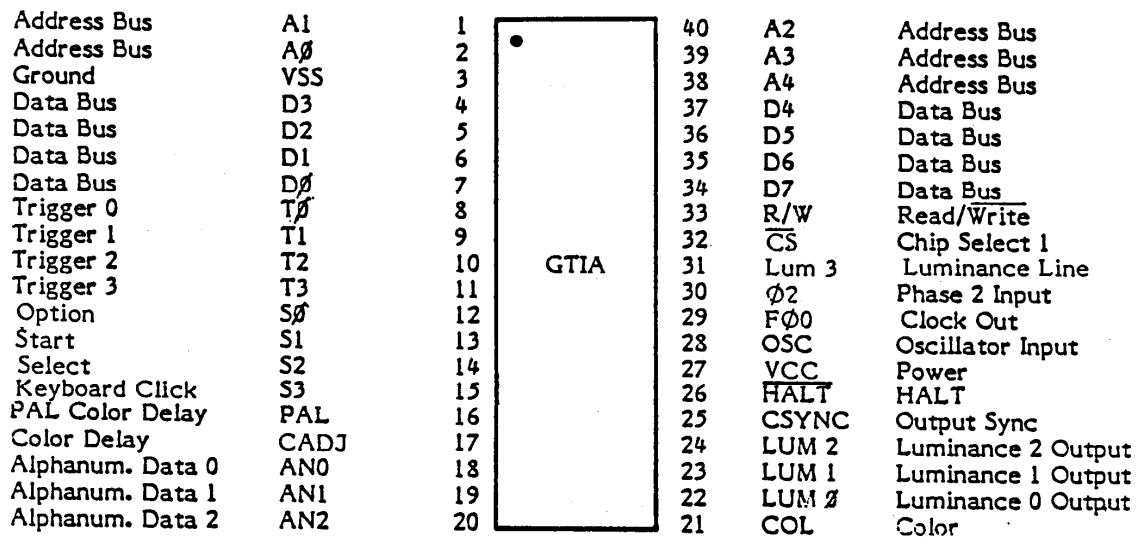


Figure 1-6. GTIA pin assignments

POT Keyboard Integrated Circuit (POKEY)

The POKEY is a Custom Large Scale Integrated Circuit (LSI) chip. It is used for audio generation, Serial Input/Output (SIO) control, controller interface scan and keyboard scan.

Figure 1-7 is an illustration of the POKEY pin assignments.

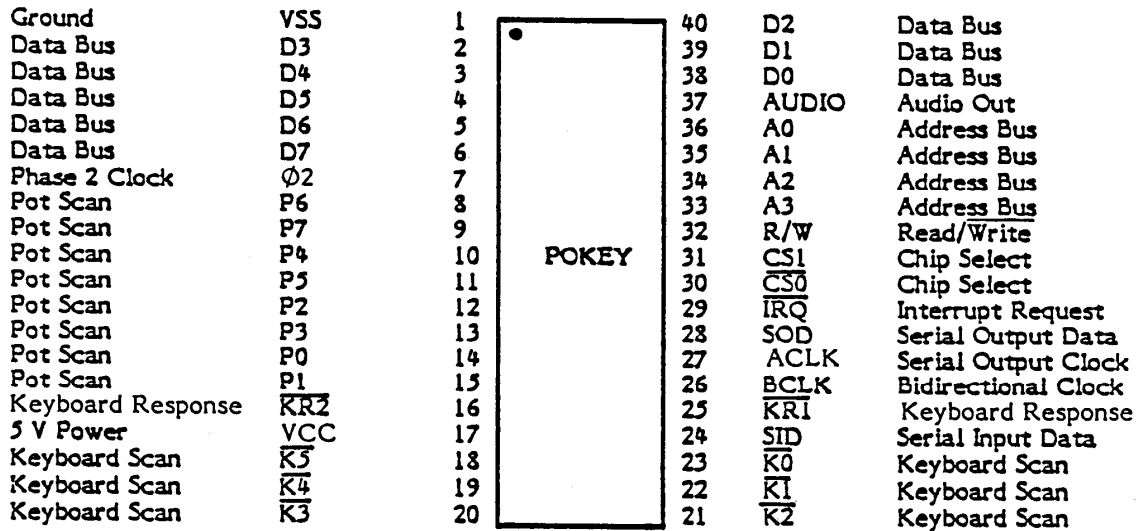


Figure 1-6. POKEY pin assignments

Peripheral Interface Adaptor (PIA)

The PIA is a general purpose Input/Output (I/O) chip.

Figure 1-7 is an illustration of the PIA pin assignments.

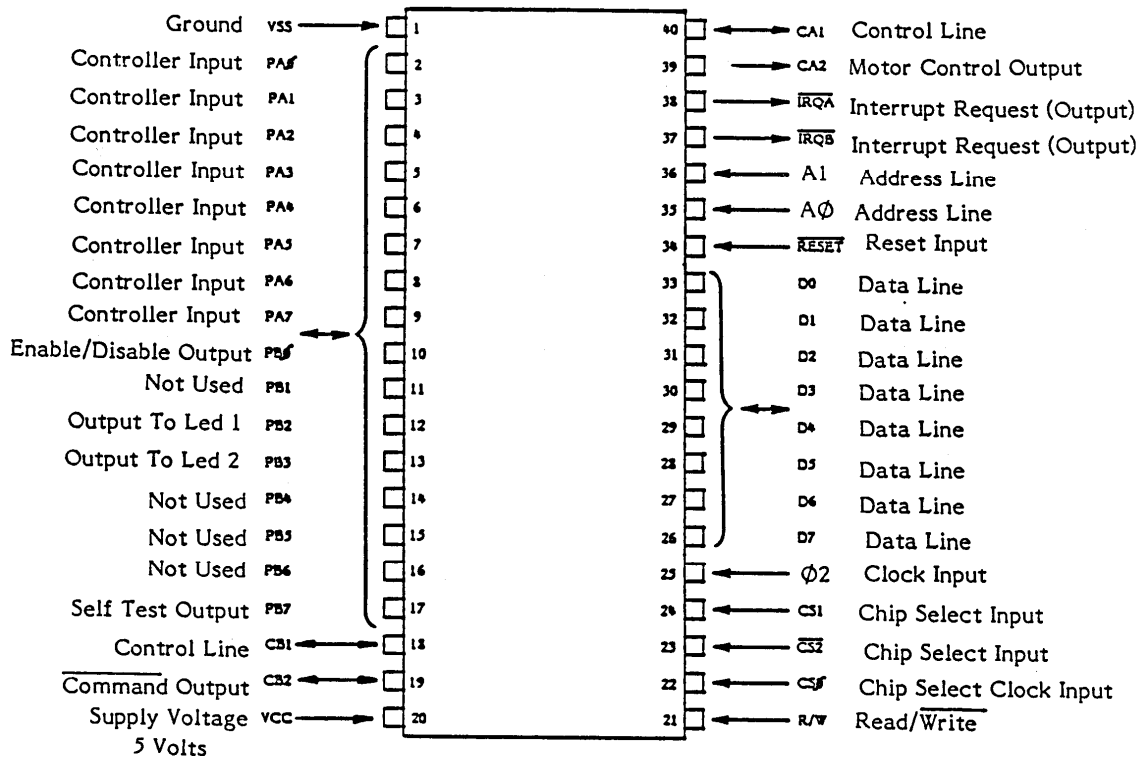


Figure 1-8. PIA pin assignments

Memory (ROM and RAM)

The 1200XL operating system is resident to two 8K X 8 ROMs. The ROMs input CPU address lines AO through A12 and the chip selects from the address decoding circuitry and generates data on CPU data lines DO through D7. RAM is organized as 8-64K x 1 chips, one for each data line. 48K RAM is directly available.

Memory Management Unit (MMU)

The Memory Management (Address Decoding) circuitry consists of a Hard Array Logic (HAL), one 3 to 8 decoder and a few gates. The input to this circuitry are the address lines A8 thru A15 and control signals like ROM enable (From PIA) and Refresh. The outputs of this circuitry are GTIA chip select, POKEY chip select, PIA chip select, O.S. ROM selects, RAM selects, cartridge selects and COMM A, COMM B, COMM C.

The RF Modulator

The RF Modulator inputs the composite video from the video summation circuitry and the monoaural audio signals and produces a modulated signal suitable for the television.

The modulated signal will have the following characteristics with a 75Ω termination:

Maximum Voltage: 2 mV

Minimum Voltage: 1 mV

Audio Sound Carrier Frequency: 4.5 MHz

Frequency Response:

Ch. 3 61.25 MHz ± 0.5

Ch. 2 55.25 MHz

Power Supply

The 1200XL has a linear power supply. The power supply electronics is resident on the motherboard. The power supply accepts a 9VAC input through the power jack. An external step-down transformer accepts 115 VAC from the power line and steps it down to 9VAC. The 9VAC input is rectified by a bridge rectifier and then regulated power outputs from the regulators are bussed on separate power rails to power distinct sections of the motherboard. All power rails have a common ground.

The DC. output of each regulator is 5V ±5% (1.7A Max). Input voltage is 9 VAC. Input power is 31 VA.

SYSTEM INTERFACE

The 1200XL provides the following interfaces:

- The Serial Input/Output (SIO) interface
- The keyboard interface
- The controller jack interface
- The cartridge interface
- The monitor interface
- The LED board interface

Serial Input/Output (SIO) Interface

The Atari 1200XL communicates with peripheral devices over an asynchronous serial port (19.2K Baud Rate Max). Data is transmitted and received as 8 bits of serial data (LSB sent first) preceded by a logic zero start bit and succeeded by a logic one stop bit. The serial data out is transmitted as positive logic. The serial DATA OUT line always assumes its new state when the serial CLOCK OUT line goes high; CLOCK OUT goes low in the center of the DATA OUT time.

The bus protocol specifies that all commands must originate from the computer, and that peripherals present data on the bus only when commanded to do so. Every bus operation goes to completion before another bus operation is initiated (no overlap). An error detected at any point in the bus operation will abort the entire sequence. A bus operation consists of the following elements:

Command Frame (From Computer)

Acknowledge Frame (From Peripheral)

Optional Data Frame (To or From Computer)

Complete Frame (From Peripheral)

Command Frame

The serial bus protocol provides for three types of commands:

- 1) Data Send
- 2) Data Receive
- 3) Immediate (No Data-Command Only)

Figure 1-9 is an illustration of the SIO pin assignments.

PIN		PIN	
1	Clock In	7	Command
2	Clock Out	8	Motor Control
3	Data Into CPU	9	Proceed
4	GND	10	Ready (Computer ON)
5	Data Out	11	Audio In (175 MV)
6	GND	12	+12 VDC (Not used on 1200XL)
		13	Interrupt

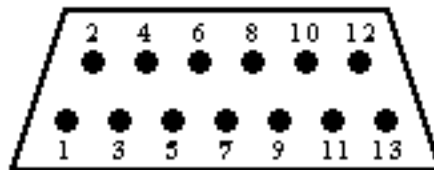


Figure 1-9. SIO Interface Pin Assignments (looking into jack on unit)

Keyboard Interface

Figure 1-10 is an illustration of the keyboard interface pin assignments.

The 1200XL keyboard uses a 15-pin Molex Connector, which provides inputs to POKEY, GTIA (S0,S1,S2) and CPU (Reset).

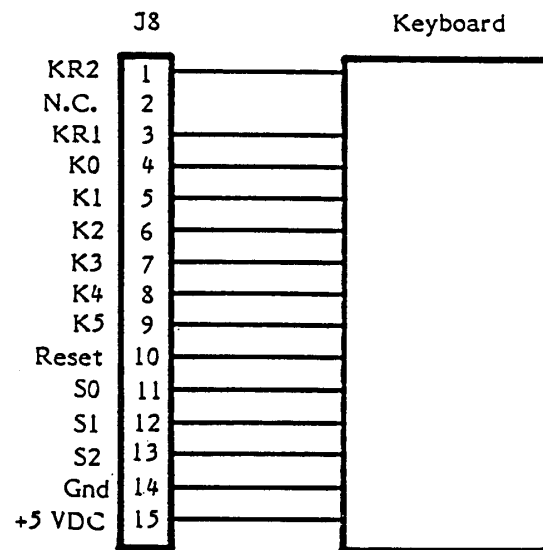


Figure 1-10. Keyboard Interface Pin Assignments.

Controller Jack Interface

The 1200XL provides two controller jack interfaces. Both are functionally and electrically identical. The controller jacks are 9-pin D-type connectors.

Figure 1-11 is an illustration of the controller jack pin assignments.

- | | |
|-----------------------------|------------------|
| 1. (Joystick) Forward Input | 6. Trigger Input |
| 2. (Joystick) Back Input | 7. +5 volts |
| 3. (Joystick) Left Input | 8. Ground |
| 4. (Joystick) Right Input | 9. Pot A Input |
| 5. Pot B Input | |

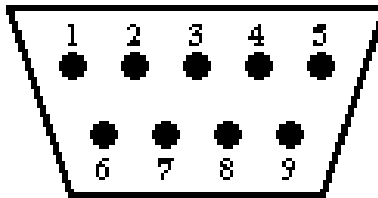


Figure 1-11. Controller Jack Pin Assignments (from left side of 1200XL)

Monitor Interface

The Monitor Interface is a 5-pin DIN connector.

Figure 1-12 is an illustration of the monitor interface pin assignments

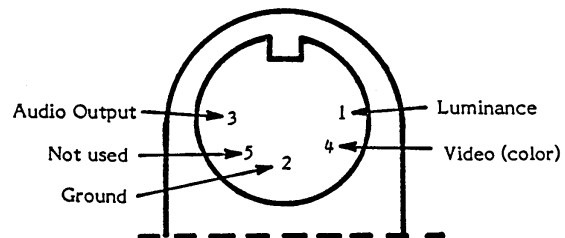


Figure 1-12. The Monitor Interface pin assignments

Cartridge Interface

The cartridge interface is a 30 pin edge connector.

Figure 1-13 is an illustration of the cartridge interface pin assignments.

Select	S4	1	A	RD4	Input from cartridge
Address Bus	A3	2	B	GND	Ground
Address Bus	A2	3	C	A4	Address Bus
Address Bus	A1	4	D	A5	Address Bus
Address Bus	A0	5	E	A6	Address Bus
Data Bus	D4	6	F	A7	Address Bus
Data Bus	D5	7	H	A8	Address Bus
Data Bus	D2	8	J	A9	Address Bus
Data Bus	D1	9	K	A12	Address Bus
Data Bus	D0	10	L	D3	Data Bus
Data Bus	D6	11	M	D7	Data Bus
Select	S5	12	N	A11	Address Bus
VCC	+5V	13	P	A10	Address Bus
Input from cartridge	RD5	14	R	R/W	Read/ $\overline{\text{Write}}$
Cartridge Control	CCTL	15	S	B02	Buffered Phase 2

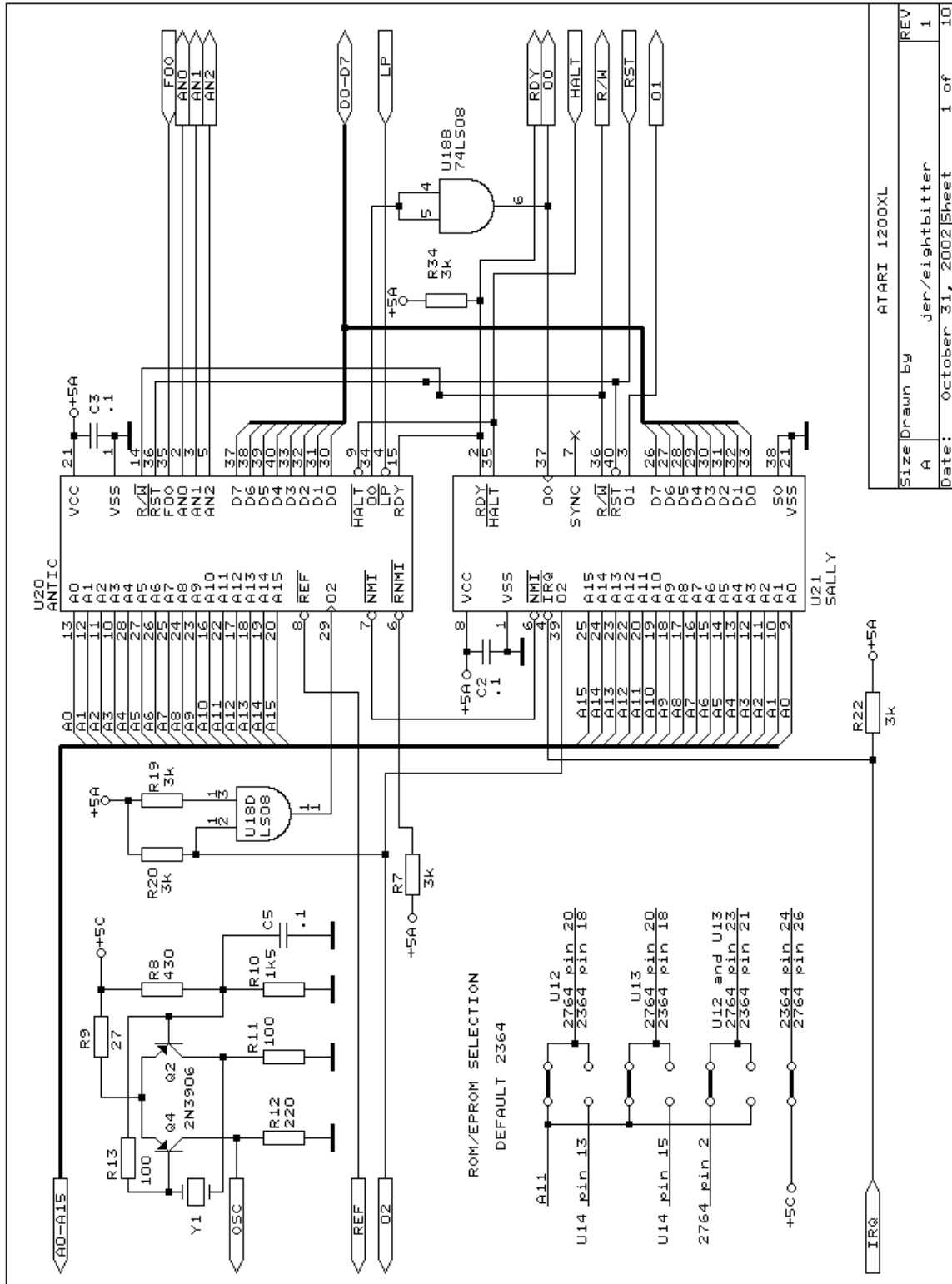
Figure 1-13. Cartridge Interface Pin Assignments (from left side of 1200XL)

SECTION 2

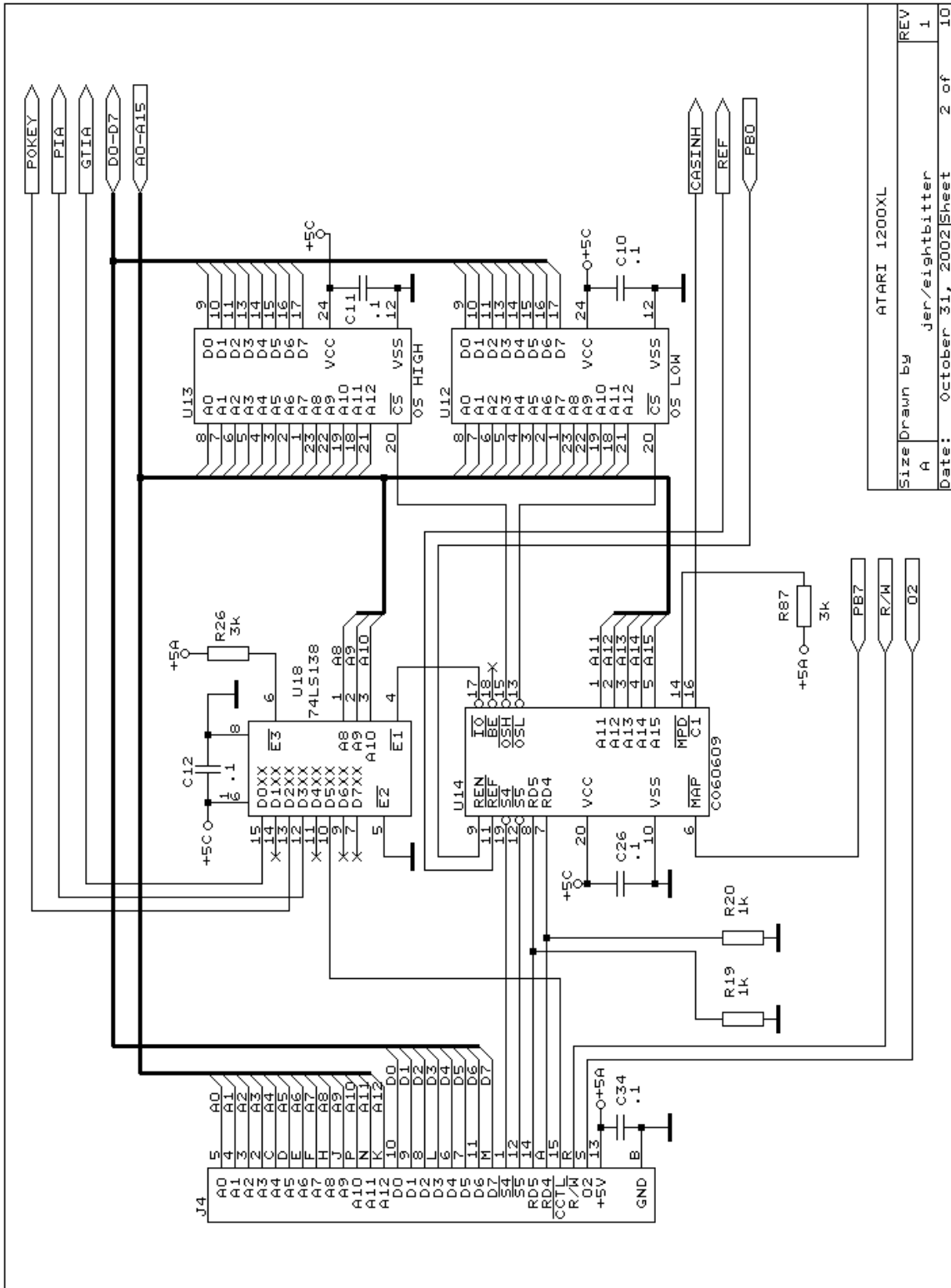
SCHEMATICS AND SILKSCREENS

The schematics and silkscreens for the 1200XL, originally they were attached to the cover of this manual, but due to the poor condition of copies have been redesigned and presented in this chapter.

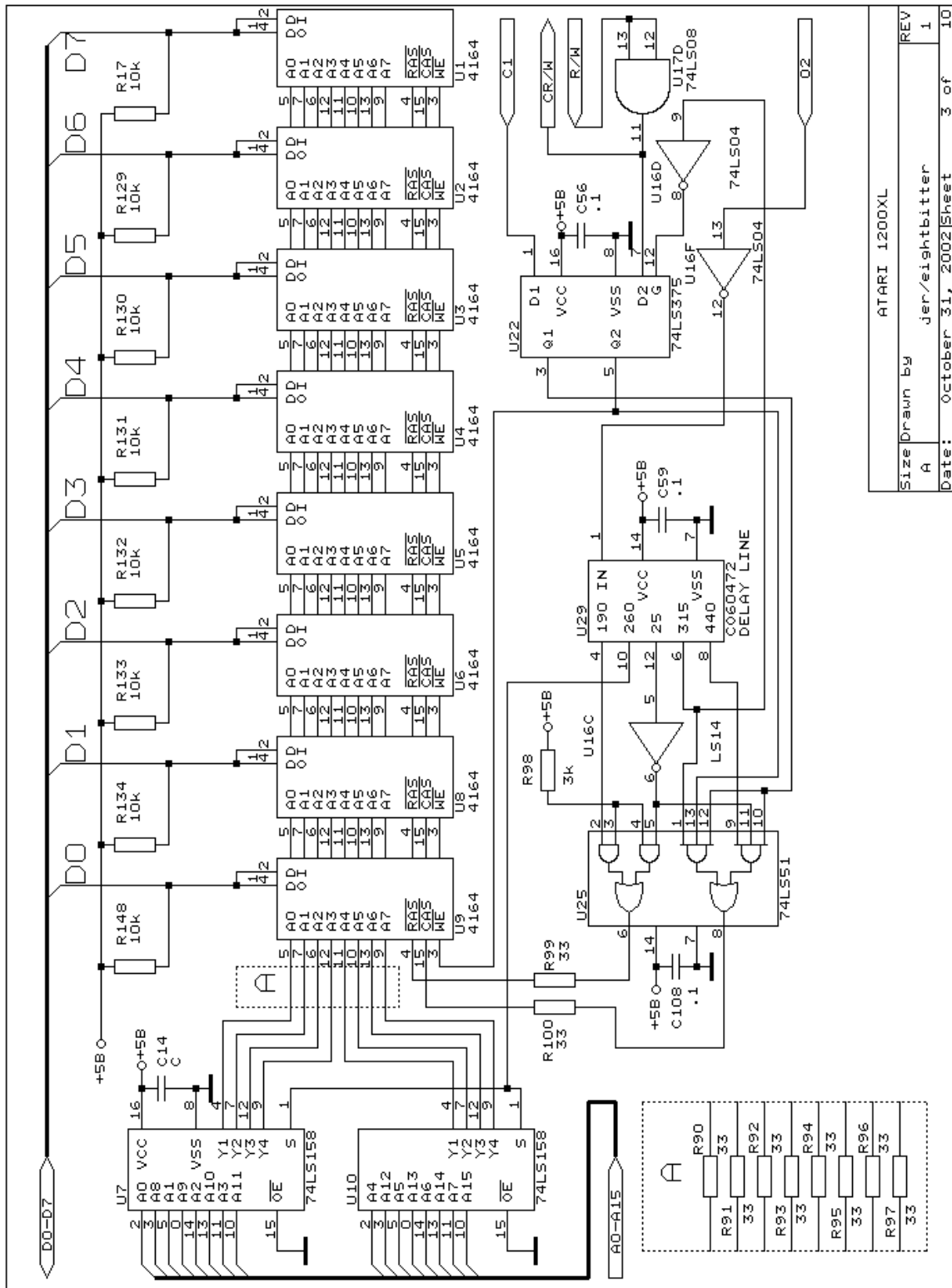
Minor variations in design may be encountered depending upon the production date of the console. Shown below drawings provide all details required for an in-depth understanding of the 1200XL.



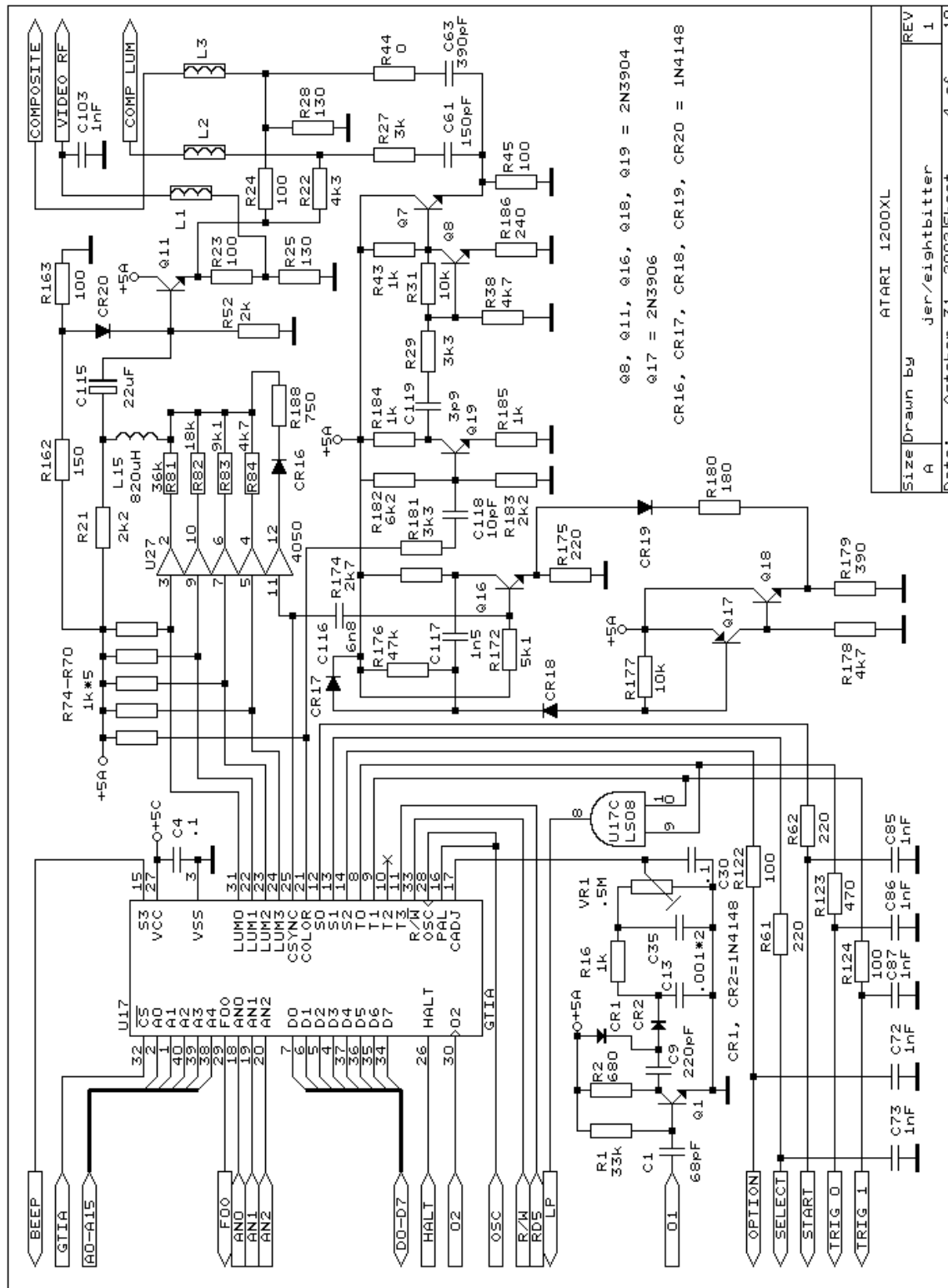
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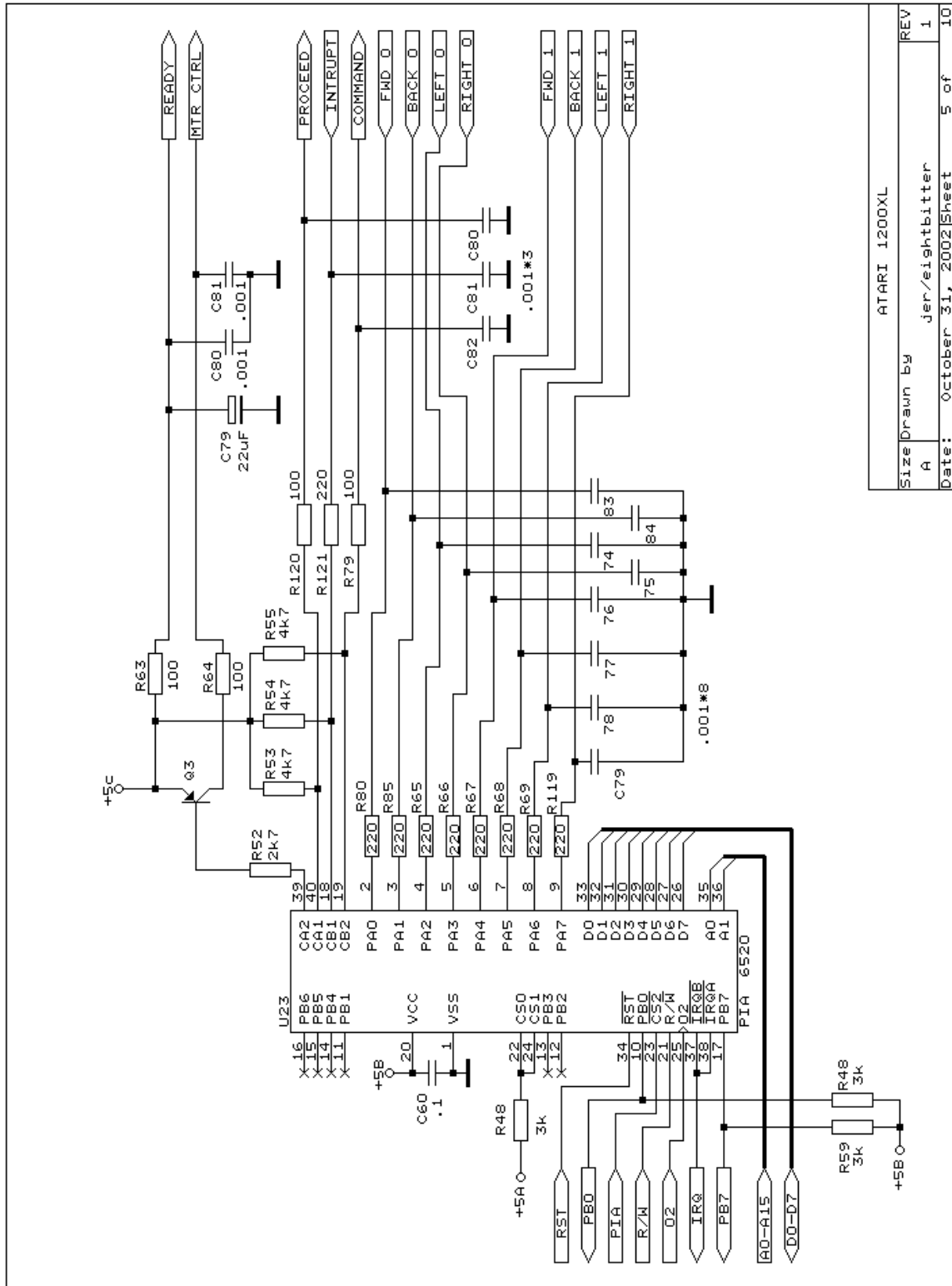


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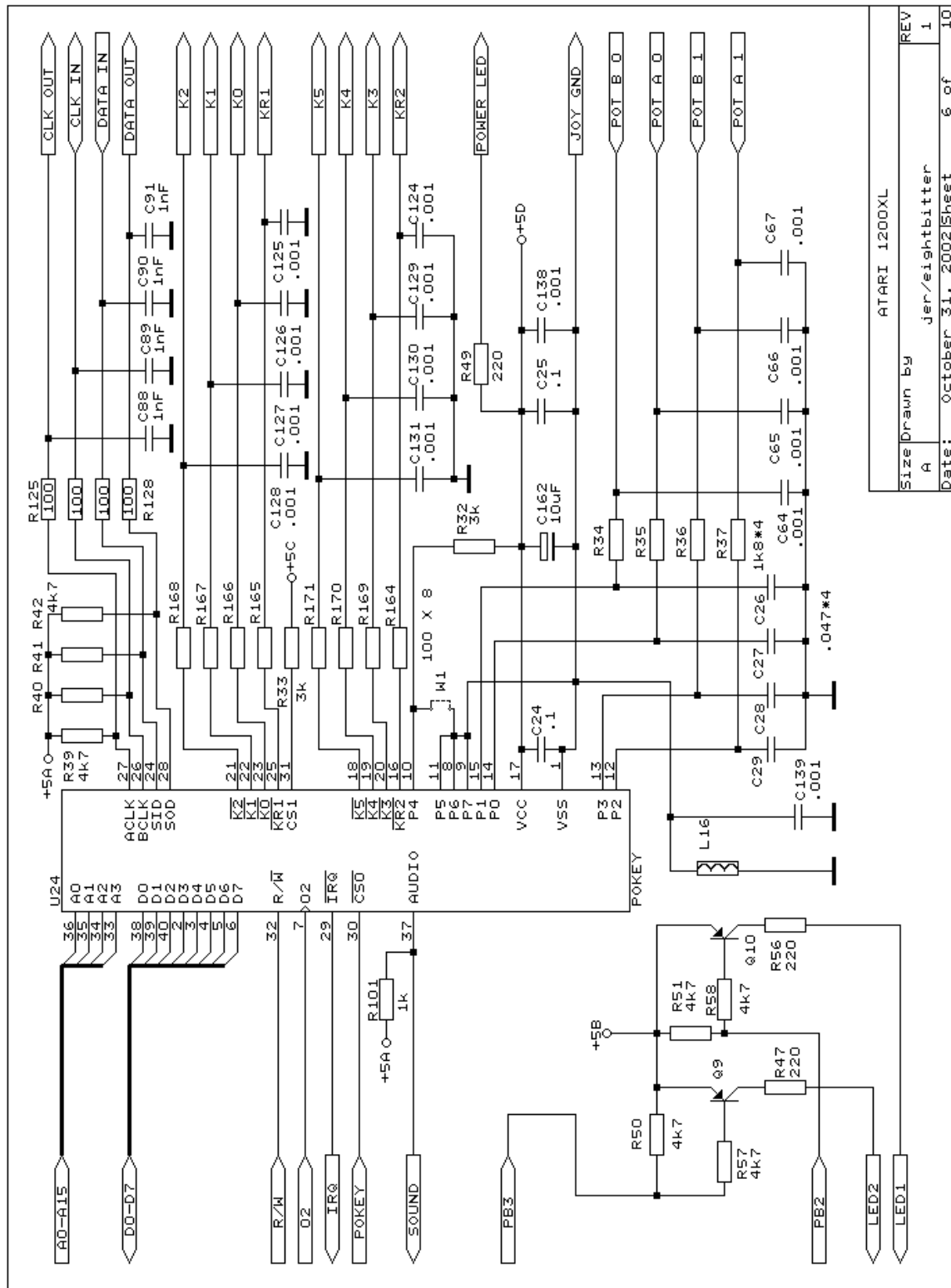


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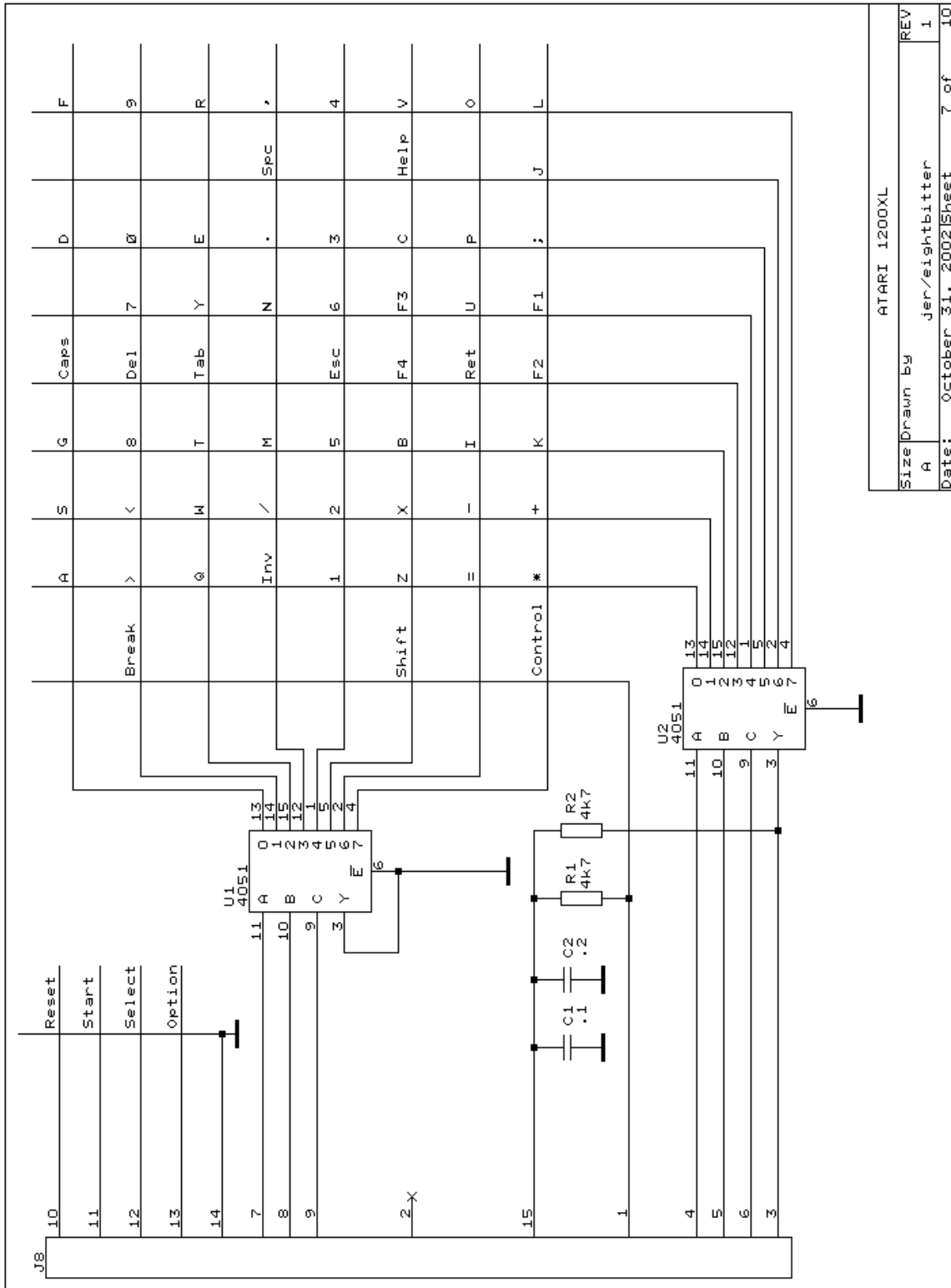




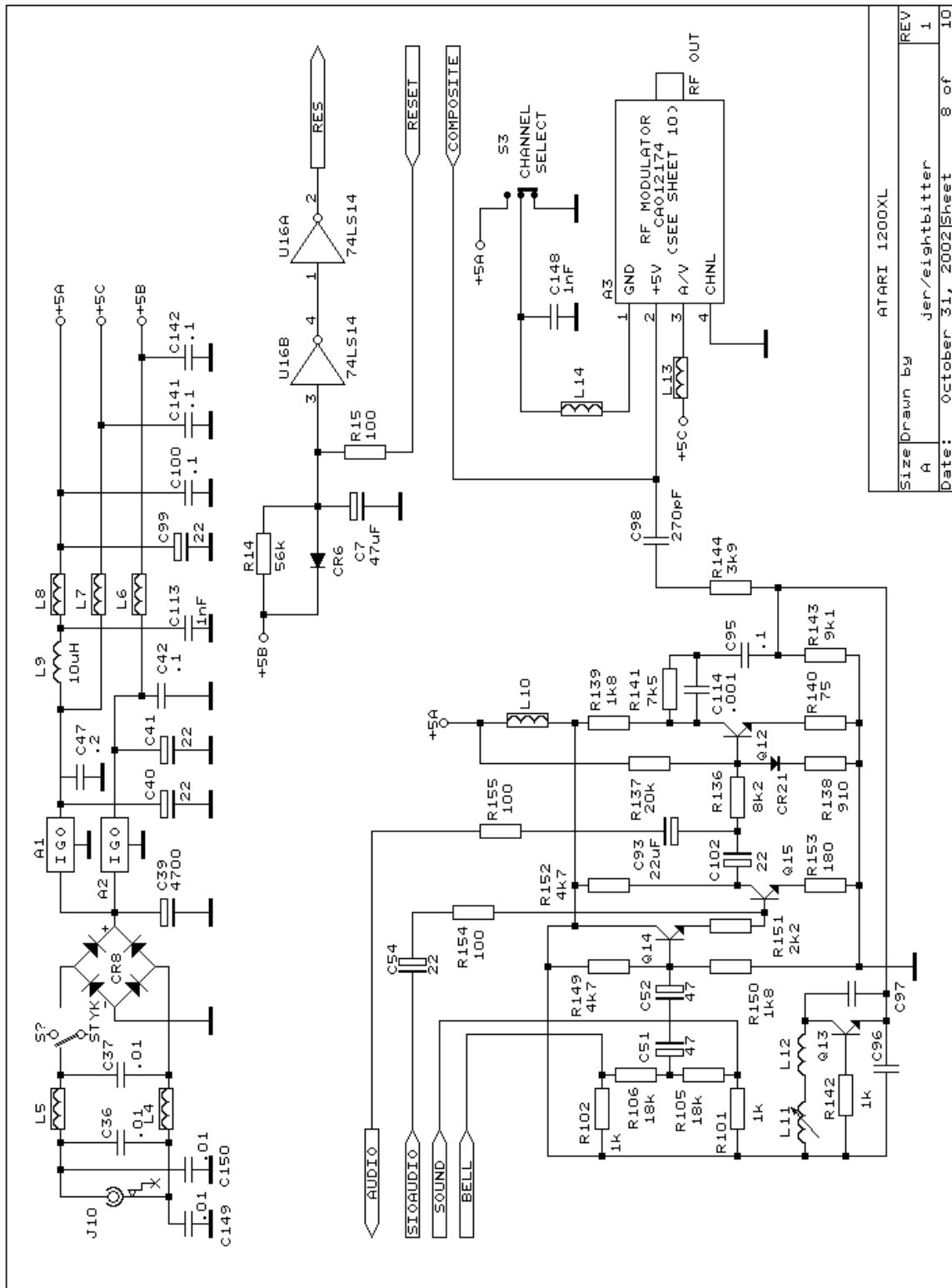
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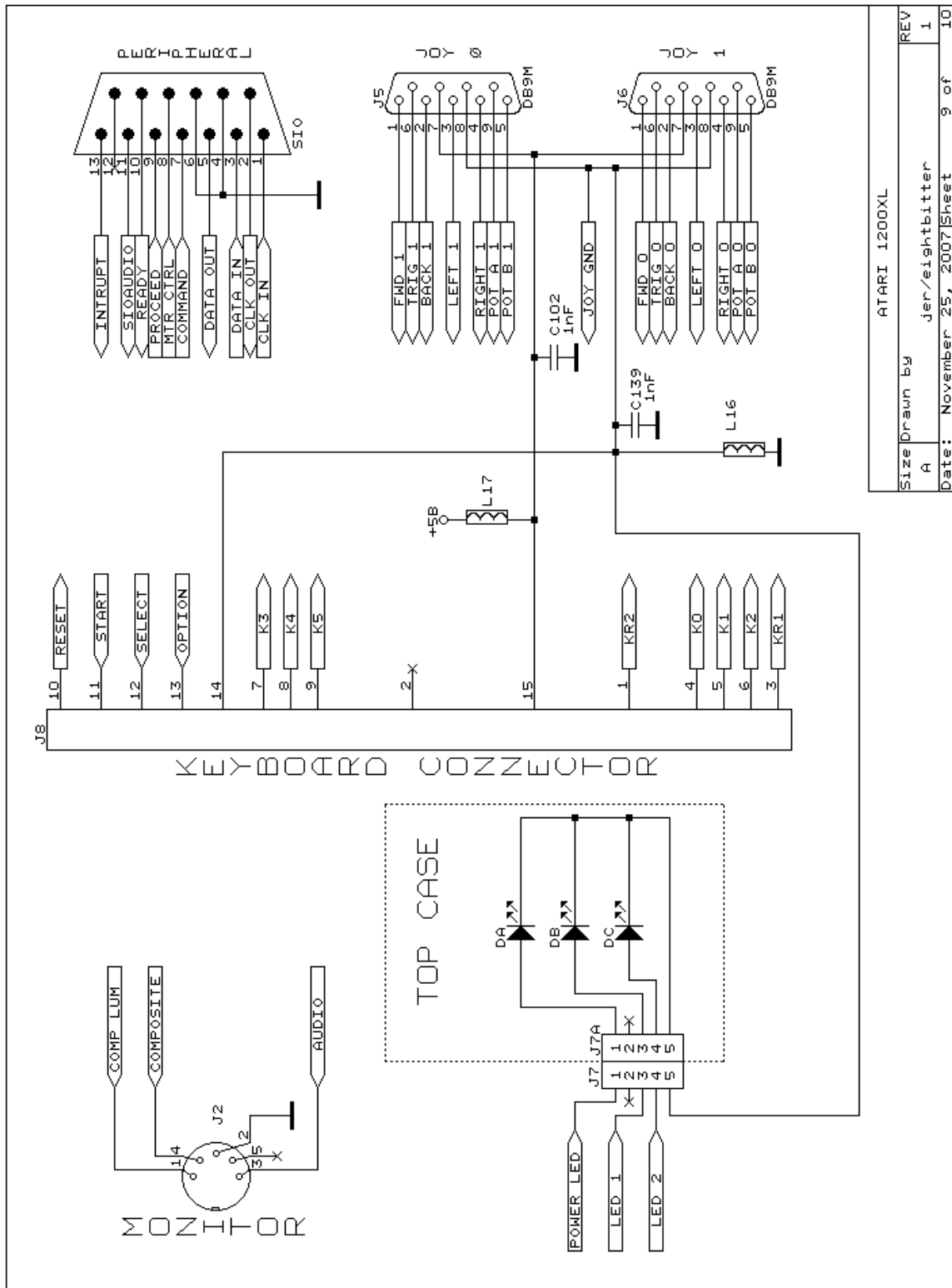
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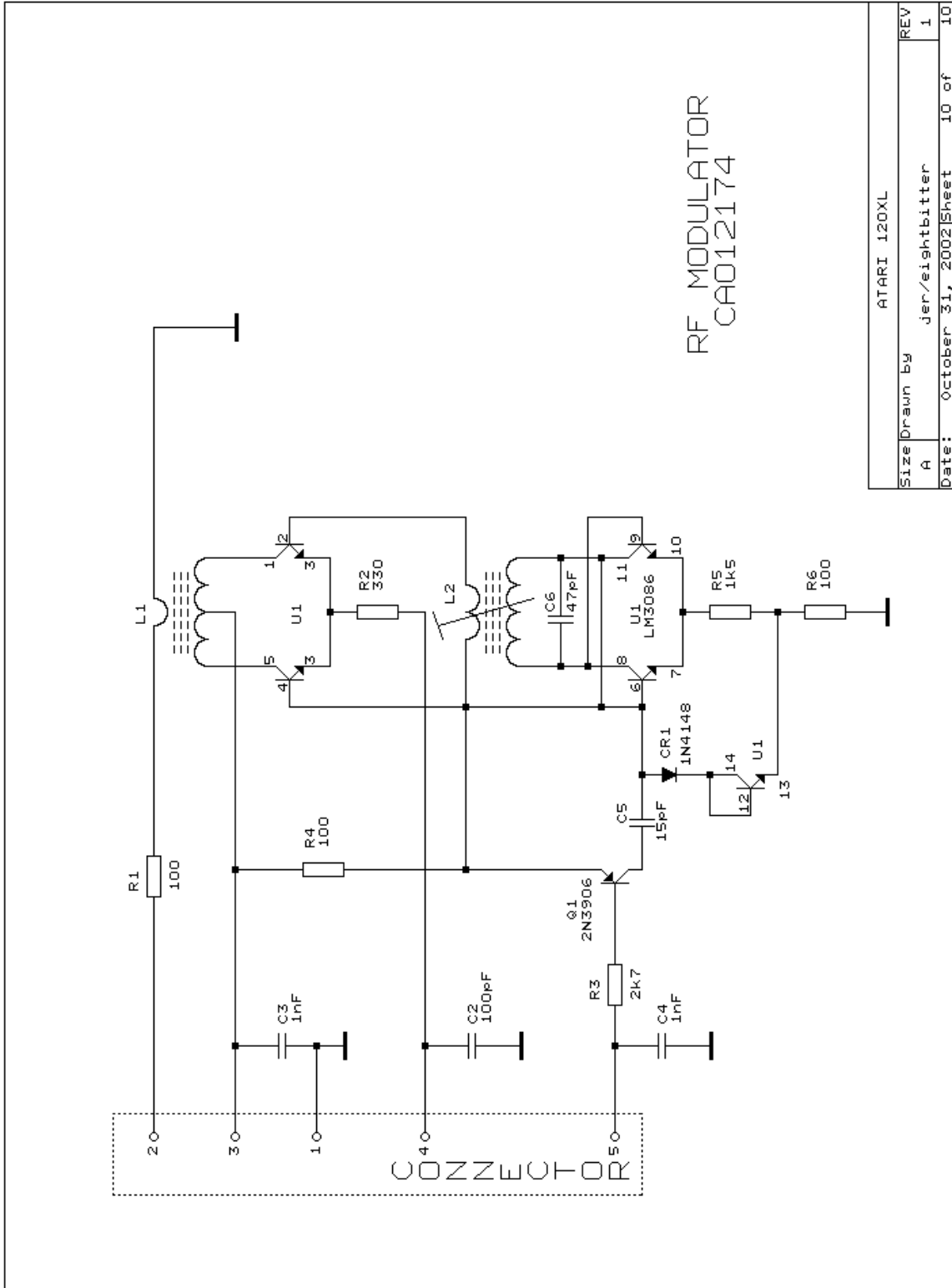
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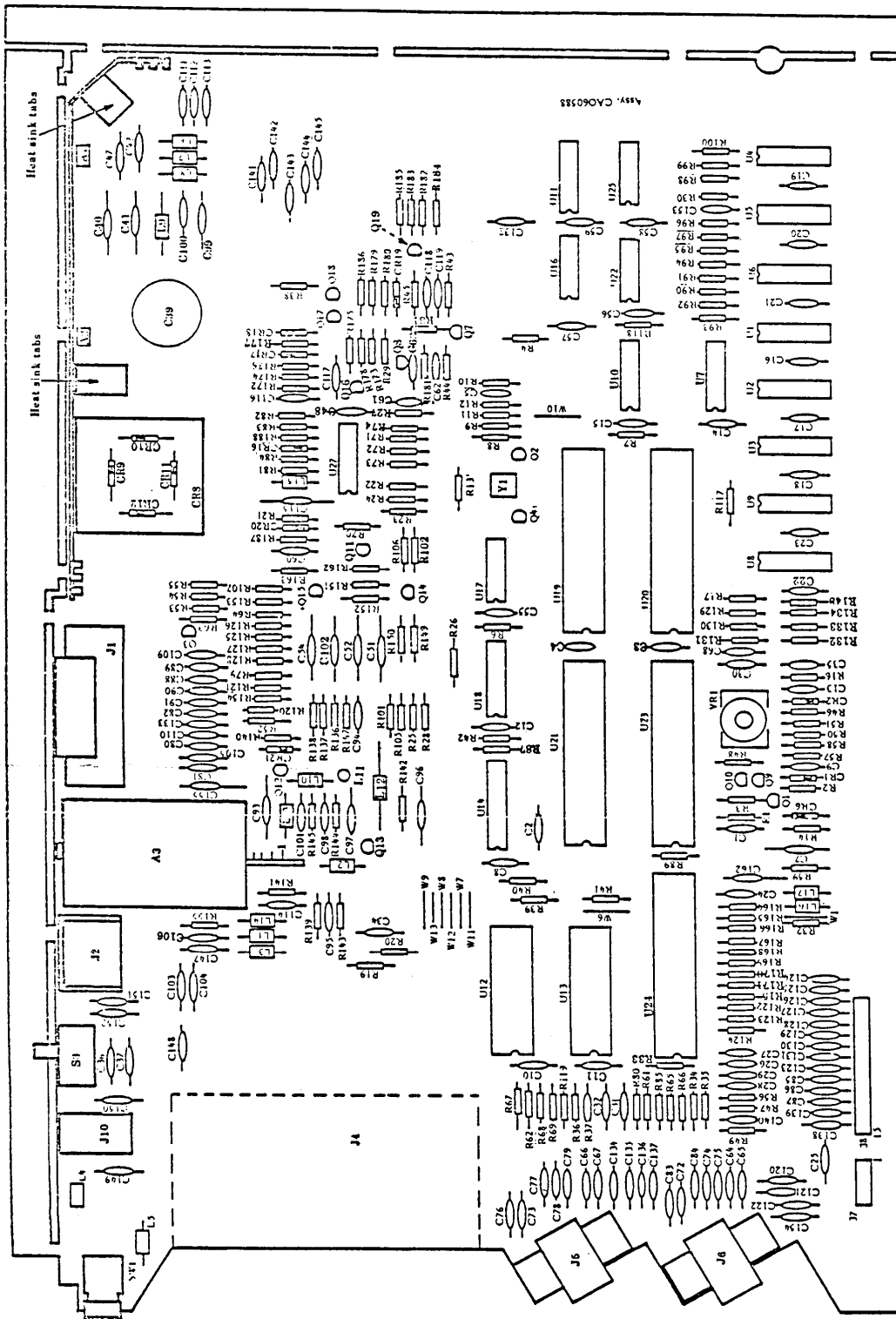


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SECTION 3

TESTING

OVERVIEW

This section describes the procedures available for testing the 1200XL. They are:

- Self Test
- Using SALT 2.05 Diagnostic Cartridge

EQUIPMENT NEEDED

- a 1200XL console with accessories
- a TV set, properly adjusted
- a SALT 2.05 Diagnostic Cartridge

SELF TEST

The Self Test feature allows the user to perform minimal tests on the following components:

- Memory - RAM, ROM and ANTIC
- Audio/Visual - ANTIC, GTIA, and POKEY
- Keyboard - POKEY and ANTIC

To enter the testing sequence, press the HELP key while the power-on logo is on the screen.

NOTE: No cartridge should be inserted in the unit.

To exit the test, press the SYSTEM RESET key (causes the power-on initialization sequence) or the HELP key (exits back to the Self Test Screen Menu).

NOTE: Pressing the HELP key has no effect while the HELP (Self Test) screen is displayed.

Procedure:

1. Connect 1200XL console to TV set as shown in owners manual.
2. Turn on computer and TV set.
3. Press HELP key when power-on logo appears.
4. The Self Test menu displays four options:

Memory
Audio Visual
Keyboard
All Tests



Press the SELECT key to move the selection down a line until you reach the desired test. Press the START key to begin the test.

CAUTION: Self Test will not go into Attract Mode. Do not leave the TV set on any of the Self Test screens for any length of time, since screen burning can occur.

MEMORY TEST SCREEN

Purpose: To test ROM, RAM and ANTIC chips.

Format: Two long bars display at the top of the screen. Below them are three rows with sixteen blocks representing the RAM (each block represents 1 K). The two long bars displayed at the top of the screen represent the two 8K ROMs in the system. When either ROM or RAM is being tested, the corresponding bar segment color is white. If the ROM or RAM tests good, the bar color changes to light green. If the ROM or RAM tests defective, the color changes to red. Once a ROM or RAM has been tested and found defective the bar remains red and is not tested again on subsequent test passes.



During the RAM test the LEDs cycle one on and one off. On exiting the Memory tests the LEDs will be left in the off state.

The Memory Test loops and continues testing until either the HELP or RESET key is pressed.

AUDIO VISUAL TEST SCREEN

Purpose: To test the ANTIC and POKEY chips.

Format: This screen displays a music staff and treble clef. A sequence of six notes plays and the corresponding note shows on the staff. The tune plays sequentially from channel one through channel four. The channel number changes for each according to the sound channel in use. Voice #1-4 under the staff and treble clef indicates the channel in use. There is a slight pause between each voice.



The Audio Visual Test loops and continues testing until either the HELP or RESET key is pressed.

KEYBOARD TEST SCREEN

Purpose: To test the POKEY, the ANTIC and ROM chips.

Format: A full keyboard displays. Press each keyboard key. The corresponding key on the screen should change to inverse video. It should change back to the original color when the key is released. NOTE: The control and shift keys change only when pressed at the same time as another key - the display for both keys will change to inverse video and then back. As each key (except RESET) is pressed, a tone is generated.



NOTE: The BREAK key does not change appearance or generate a note when pressed.

ALL TESTS

All of the Self Tests are continuously executed one after another until either the HELP or RESET key is pressed.

NOTE: When All Tests is executing, the Memory Test and the Audio-Visual Test exit after a complete test cycle.

Keyboard Test during All Tests is software controlled. No operator input is required.

USING THE SALT 2.05 DIAGNOSTIC CARTRIDGE

NOTE: Not all of the tests available on the SALT 2.05 Diagnostic cartridge are applicable to the 1200XL. Only the tests discussed in the following paragraphs are applicable.

Procedure:

1. Connect the 1200XL console to the TV set as shown in the Operators Manual.
2. Turn on the computer and TV set.
3. Insert the SALT 2.05 Diagnostic Cartridge in the cartridge slot.
4. After a few seconds the SALT header displays (See Figure 3-1).



Figure 3-1. SALT Header

Note that the following do not indicate failures:

- ERR in the ROM: row
- Red screen

5. Type ? and RETURN to display the SALT Menu (See Figure 3-2). The highlighted character in red on the display is the command letter for each test. Press the command letter then RETURN to select a test.



Figure 3-2. SALT Menu

A number of tests on this menu are not applicable to the 1200XL and should be disregarded. They are:

- KEYBOARD (use Self Test instead of SALT 2.05)
- PORT TEST
- SWITCHES
- TONE TEST (Use Self Test instead of SALT 2.05)
- VERIFY ROM (Use Self Test instead of SALT 2.05)
- ADJUST
- TIA

Disregard the other functions:

- BOOT B
- EXAMINE
- LIGHT PEN
- PRODUCTION TEST

RESET is used to take you from a test back to the SALT Header.

The tests applicable to the 1200XL are discussed on the following pages.

COLOR BAR TEST

This test verifies and allows for adjustment to the color circuitry. Enter the command letter C and press RETURN to activate this test. Figure 3-3 is a black and white representation of what your television display screen should look like.

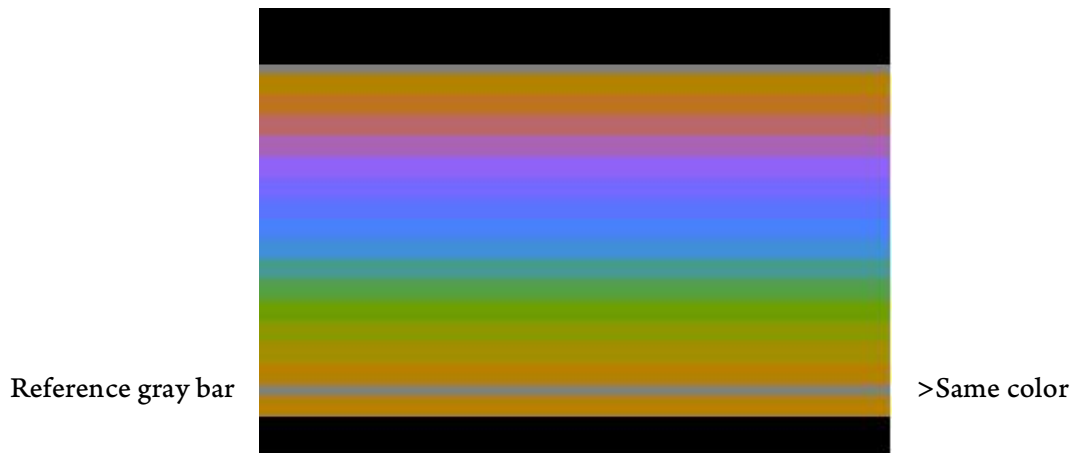


Figure 3-3. Color Bar Test Screen

A 15-color rainbow scale is displayed above the reference bar with a single color bar below. The color, bars directly above and below the reference bar should be the same color (golden rod). If not, proper adjustment of VR1 makes the color bars above and below the reference bar identical, thus adjusting the color frequency of the console to the proper setting. See Figure 4-1 for VR1 location. Minor glitches on the edges of the color bars are acceptable. Leave this test on for at least 60 seconds in order to catch any intermittent problems, such as a bar momentarily changing colors or blanking out. .

ANY VIDEO TEST

This test verifies the console's ability to generate a video (TV) display. This test also checks for pattern sensitivity of the ANTIC chip.

Enter the command letter A and press RETURN to activate this test.

Figure 3-4 illustrates the screen display for the Any Video Test. NOTÉ: Figure 3-4 is a black and white representation of a colored screen.

The screen should have a black background with eight vertical bars. Half of the vertical bars should be narrow, and the other half, much wider. A horizontal bar should appear across the top of the screen. From the left to right, the shade of color on the horizontal bar should change. On the right of the bar, two Vs should be displayed, right side up; one in normal video and the other in inverse video.

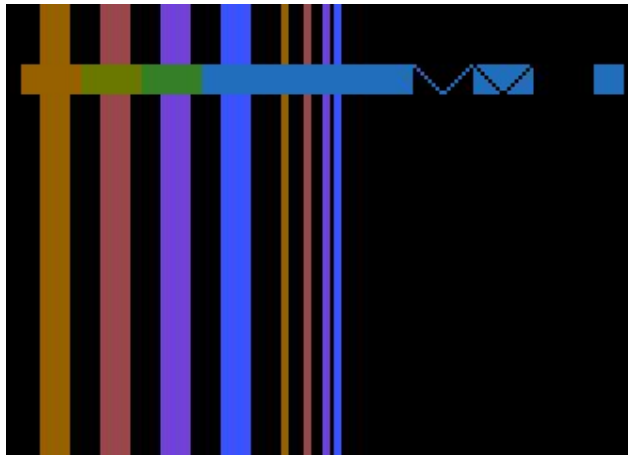


Figure 3-4. Any Video Test Screen

GRAY BAR TEST

This test verifies that the GTIA is generating Lum 0, 1 and 2. L3 is not tested. Press the command letter G and then RETURN to activate this test.

Figure 3-5 illustrates the screen display of the Gray Bar Test. The screen is divided into eight equal sized horizontal bars. The bar at the top of the screen should be black and subsequent bars should progress to white at bar eight. The bars should lighten in even shades. The screen should be steady and unchanging. These lines may have minor glitches at their edges. A thin white line should always appear just over the top (black) bar. No color should appear anywhere on the screen. The areas above the top (black) bar and below the bottom (white) bar are of no importance to this test. This test should be left on for at least 60 seconds to ensure that there is no "flashing" of color or shifting of the gray bars.

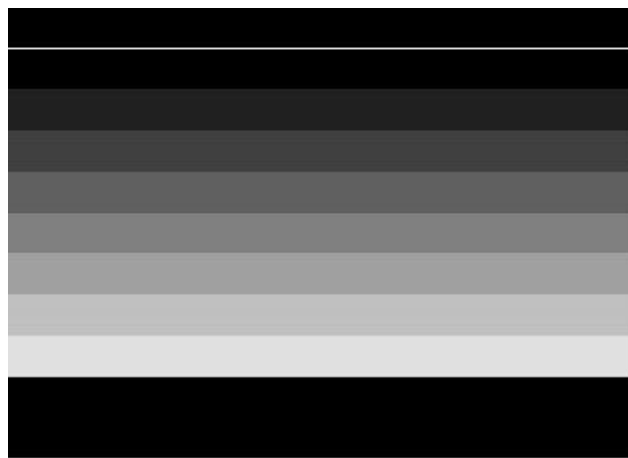


Figure 3-5. Gray Bar Test Screen

1

DISPLAY OPTIONS

This function, which is not a test, displays a diagnostic matrix when used in conjunction with the RAM TEST.

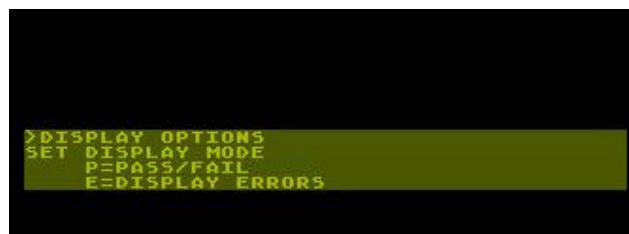


Figure 3-6. Display Options Screen

To enter test, select letter D and RETURN. The screen returns the prompt to enter a test format. Enter command E and press RETURN. Enter the command letter C and press RETURN for continuous testing.

Press the command letter R and then RETURN to activate the RAM test. To terminate the test press the SPACE BAR. NOTE: The RAM test completes its current test before stopping.

RAM TEST

This test verifies the operation of the RAM chips. Press the command letter R and then RETURN to activate this test. Figure 3-6 illustrates the RAM test screen display when command letter E is pressed under Display Options. The four digit number in white at the bottom right of the screen indicates the number of tests completed. A red four digit number directly above this is used to count the number of failures.

Failures appear as red 1's in this display.

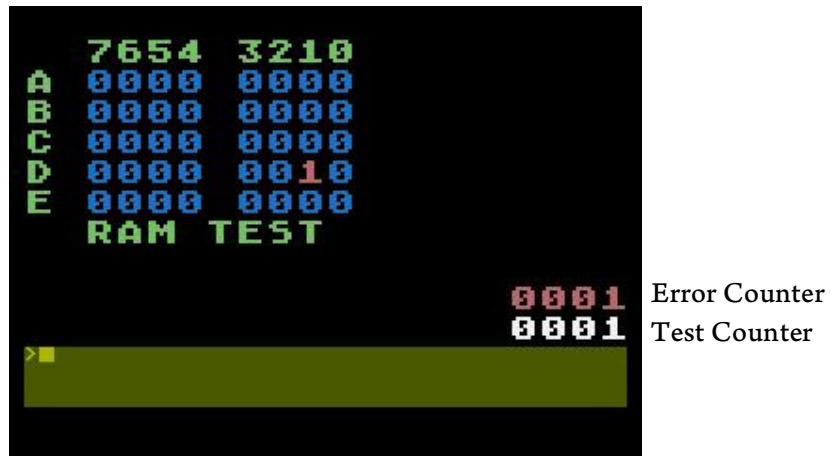


Figure 3-7. RAM Test Screen.

Only the D row is applicable for the 1200XL. Use the information below to identify the defective RAM.

Each red 1 from matrix row D indicates a failing chip. Use the information_ below to identify each chip location.

Defective RAM Identifier
Bad Bit

Column	Chip No.
D0	U9
D1	U8
D2	U6
D3	U5
D4	U4
D5	U3
D6	U2
D7	U1

SECTION 4
SYMPTOM CHECKLIST

The Symptom Checklist is designed to assist you arrive at a rapid diagnosis for problems. Each symptom is accompanied by some possible causes. Instructions for Disassembly/Assembly, adjustments and/or replacements are on the pages following this Symptom Checklist.

SYMPTOM	POSSIBLE CAUSES	REMEDY
Snowy Screen	Switch Box, AC Adaptor, Channel Select Switch, RF Modulator or Cable Damage	Adjust or replace (See Page 4-4)
Black/Gray Screen	A1-A2(7805), +5V DC, L4-L8, ANTIC, CR8, Power Plug, SW1, Y1	Replace
Green/Yellow Screen	U27, U1-U9, U12, U13	Replace
Solid Blue Screen	U24, Q3, Y1, Q2, Q4, U19	Replace
No Color or Bad Color Bars	VR1 Adjust, U20, U2, U19, Q3, Y1, RF Modulator	Adjust or replace (VR1 Adjust – Page4-2; RF Modulator Adjust Page 4-4)
No Color Bars on TIA test	U19	Replace
No Lights (L1, L2, L3)	LED 3, LED Pin 1, +5A Power Supply, U23, Q9 Q10, Pin 3, Pin 4	Replace. If problem is LED – replace the LED Board
No Gray Bars	RF Modulator, Y1, VR1, Q3, U19	Adjust or replace (VR1 Adjust – Page4-2; RF Modulator Adjust Page 4-4)
Upside down Alphanumerics or Player Field	U20, U19, U3	Replace
Some Keyboard Keys Fail	U24, Keyboard	Replace (See Page 4-4)
All Keyboard Key Fail	U24, Keyboard	Replace (See Page 4-4)
Tones Missing During Sound or Games	U24, L11, L12	Adjust or Replace (Adjust Audio Figure 4-1)
Console (Game) Switches will not Function	U19, U23	Replace
ROM Test Failed	U12, U13, U14. U18, U22	Replace
RAM Test Failed	U1-U9, U7, U14, U22	Replace

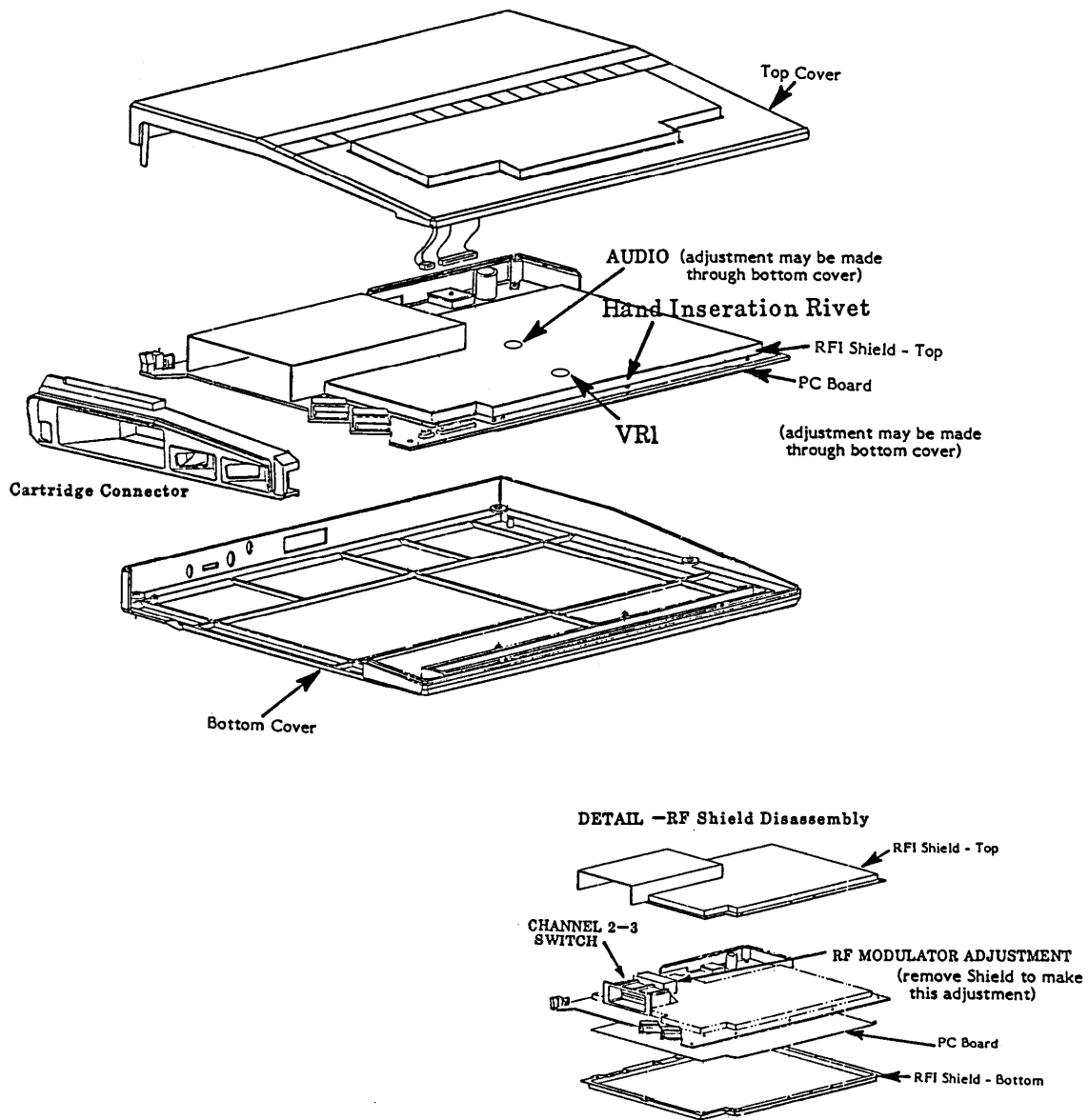


Figure 4-1. 1200XL and RF Shield

ADJUSTMENTS AND REPLACEMENTS

Use Figure 4-1 as reference for the following discussion.

CONSOLE DISASSEMBLY

1. Turn console upside down and place on the workbench.
2. Remove the six screws that hold the bottom cover to the top cover.
3. Remove the bottom cover containing PCB and turn it right side up.
4. Remove the six screws that hold the PCB in place.
5. Remove the PCB and cartridge connector from the bottom cover.
6. Remove the push rivets from shielding (11 rivets).
7. Separate the top and bottom RF Shields and remove the fish paper. Take care that PCB is not damaged.

CONSOLE ASSEMBLY

1. Position the top shield upside down on the bench.
2. Position the PCB upside down on the top shield.
3. Place the fish paper inside of bottom shield.
4. Hold the fish paper and bottom shield together and position upside down on top of PCB. Be sure that adjustment holes are clear.
5. Place one push rivet in a hole in the bottom shield. Repeat for ten more push rivets.
6. Place bottom cover with right side up on bench.
7. Insert cartridge connector into PCB/shields assembly.
8. Hold the assembly together, and position within bottom cover assembly. Be sure that screw holes are aligned.
9. Attach with six screws.

KEYBOARD REMOVAL/REPLACEMENT

1. Remove the top cover from the console.
2. Remove the keyboard connector and LED connector. Note the position of the LED connector for reference during assembly.
3. Remove the four screws which hold the keyboard to the top cover. 4. Remove the keyboard from the top cover.

TO REPLACE THE KEYBOARD

1. Place the top cover upside down on the workbench. 2. Install and position the new keyboard.
2. Insert and tighten the four screws which hold the keyboard to the top cover.
3. Attach the keyboard connector and the LED connector (Be careful not to twist the LED connector cable).

RF MODULATOR ADJUSTMENT

1. Disassemble the console (See Page 4-3).
2. Remove the RF Shield.
3. Adjust RF modulator for correct Color Bar Test Screen (See Page 3-5, Figure 3-3).
4. Replace the RF Shield.

NOTE: RF modulator may also be adjusted using a frequency meter.

Procedure:

- Connect the frequency meter to the RF output jack on the modulator (A3).
- Set SW3 to Channel 3 position. Adjust modulator to 61.25 MHz.

SOUND ADJUSTMENT

See Figure 4-1, Page 4-2.

Adjustment can be made through top or bottom cover.

COLOR ADJUSTMENT

See Figure 4-1, Page 4-2.

Adjustment can be made through top or bottom cover.

SECTION 5

1200XL PARTS LIST

MAJOR ASSEMBLIES

LINE NO.	DESCRIPTION	PART NO.
1.	Final Assembly (unpackaged)	CA060276
2.	Top Cover Assembly	CA060278
3.	PCB-RFI Shield Assembly	CA061074
4.	Bottom Cover Assembly	CA060277
5.	Cartridge Conn Panel	C060096
	Antenna Switch Box	CA010112
	Power Adaptor	CA017964

LOCATION	DESCRIPTION	PART NO.
Top	COVER ASSEMBLY	CA060278
Top	Top Cover	C060103
Top	Keyboard Mask (64K)	C060105
Top	Indicator Strip	C060106
Top	Trim	C060281
Top ~	Key caps	C060562
Top	Standoff (LED)	C060944
Top	Label/Nameplate	C061071
Top.	Keyboard Assy	CA060046
Top	Indicator PC Board Assy	CA060568
Top	Connector/Cable Assy	CA060606
LED1-3	LED Pilot Lamp	C014776
	PCB/RFI SHIELD ASSEMBLY	CA061074
Main	Fastener Latching (Heatsink)	C014796
Main	Fastener Latching	C015344
Main	Cartridge Guide	C060097
Main	Conn Retainer	C060098
Main	Upper CPU Shield	C060285
Main	Lower CPU Shield	C060286
Main	Conn, Edge, Rt Angle 15/30	C060410
Main	Heatsink	C060581
Main	Stud, tri-mount	C061488
Main	Insulator Lower Shield	C061123
Main	Plastic Rivet	C061490
Main	PC Board Assy (MAIN)	CA060588
Main	Heat Sink Assy	CA061135
Main	RF Cable Assy (12 Ft)	CA061177

SECTION 5
1200XL PARTS LIST

LOCATION	DESCRIPTION	PART NUMBER
A1,2	Voltage Regulator (78M05) 5V	C014348
A3	Modulator	C060618
Main	Socket IC (24 pin)	C014386-08
	Alternate for P/N C014386-07-1	
Main	Diode (1N914)	31-1N914
	Alternate for P/N C060607-2	
	PCB/RFI SHIELD ASSEMBLY	CA061074
C1	Cap. Ceramic Axial 68pF	C014179-12
C2-5,8,10-12,14-25, 30-32 34,48,55-59,68,95,100	Cap. Ceramic Axial .1μF (25V)	C014181-03
C7,51,52	Cap. Alum Elec Axial 47μF (10V)	24-100476
C9,98	Cap. 270pF (25V)	C061336-02
C13,35,64-67,72-91, 103-106,109-114,120-145, 147,148,151-154	Cap. Ceramic Axial .001μF (25V)	C014181-01
C26-29	Cap. Ceramic Axial .047μF (25V)	C014180-09
C36,37,149,150	Cap. 0.1μF (100V)	C061337-01
C39	Cap, 10000μF (16V)	C060603
C40,41,54,93,99, 102,155	Cap. Alum Elec Axial 22μF (16V)	C014393
C42,47	Cap. Ceramic Axial 0.1μF (25V)	C014181-02
C60,118	Cap. Ceramic Axial 100pF (25V)	C014179-19
C61	Cap. Ceramic Axial 150pF (25V)	C014179-09
C63	Cap. Ceramic Axial 390pF (25V)	C014180-10
C96,97	Cap. 820pF (25V)	C061336-03
C115,162	Cap. Alum Elect Axial 10μF (16V)	C014371
C116	Cap. Ceramic Axial 6800pF (25V)	C014180-12
C117	Cap. Ceramic Axial 1500pF (25V)	C014180-15
C119	Cap. 3.9pF (25V)	C061336-01
CR1,2,6,16-21	Diode (1N4148) Alternate listed	C060607
CR8	Diode Bridge (MDA 990-2)	C060584
J1	Connector Rt Angle (13 pin)	C012995
J2	Connector DIN (5 pin female)	C014388
J4	Cartridge Connector Assy	CA060287
J5,6	Connector "D" (9 pin male)	C010448
J7	Connector LED (5 pin)	C060450-01
J8	Connector Keyboard 15 pin	C060450-02
J 10	Connector Power Jack	C014715
L1-8,10,13,14,16,17	Inductor Ferrite Bead	C014384
L9	Inductor Axial 1μH	C014383
L11	Inductor Adjustable	C010823
L12	Inductor 2μH	C010822
L15	Inductor 820μH	C061338-01

SECTION 5
1200XL PARTS LIST

LOCATION	DESCRIPTION	PART NUMBER
Q1,7,8,11,12,14-16, 18,19	Transistor (2N3904)	34-2N3904
Q2,4,9,10,17	Transistor (2N3906)	33-2N3906
Q3	Transistor (MPSA55)	C014809
Q13	Transistor (2N3563) NPN	34-2N3563
R 1	Resistor 1 /4 W 39k Ω	14-5393
R2	Resistor 1/4W 680 Ω	14-5681
R3,4,6,7,26,27,30, 32,33,46,48,59,87, 89,98,117,118	Resistor 1/4W 3k Ω	14-5302
R8	Resistor 1/4W 430 Ω	14-5431
R9	Resistor 1/4W 27 Ω	14-5270
R 10	Resistor 1 /4 W 1.5k Ω	14-5152. .-
R11,13,15,45,63,64, 79,120-128,154,155, 163-171	Resistor 1/4W 100 Ω	14-5101
R12,47,49,56,61,62, 65-69,80,85,119, 175	Resistor 1/4W 220 Ω	14-5221
R14	Resistor 1/4W 56k Ω	14-5563
R16,19,20,43,70-74, 101,102,142,184,185	Resistor 1/4W 1k Ω	14-5102
R17,31,129-134, 148,177	Resistor 1/4W 10k Ω	14-5103
R21,107,151,183	Resistor 1/4W 2.2k Ω	14-5222
R22	Resistor 1/4W 4.3k Ω	14-5432
R23,24,153,180	Resistor 1/4W 180 Ω	14-5181
R25,28	Resistor 1/4W 130 Ω	14-5131
R29,173,181	Resistor 1/4W 3.3k Ω	14-5332
R34-37,139,150	Resistor 1/4W 1.8k Ω	14-5182
R38-42,50,51,53-55, 57,58,84,152,178	Resistor 1 /4W 4.7k Ω	14-5472
R52,174	Resistor 1/4W 2.7k Ω	14-5272
R81	Resistor 1/4W 36k Ω	14-5363
R82,105,106	Resistor 1/4W 18k Ω	14-5183
R83,143	Resistor 1/4W 9.1 Ω	14-5912
R90-97,99,100	Resistor 1/4W 33 Ω	14-5330
R136	Resistor 1/4W 8.2k Ω	14-5822
R137	Resistor 1/4W 20k Ω	14-5203
R 138,188	Resistor 1 /4 W 910 Ω	14-5911
R 140	Resistor 1 /4 W 75 Ω	14-5750
R141,172	Resistor 1/4W 5.1k Ω	14-5512
R144	Resistor 1/4W 3.9k Ω	14-5392

SECTION 5
1200XL PARTS LIST

LOCATION	DESCRIPTION	PART NUMBER
R149	Resistor 1/4W 2.4k Ω	14-5242
R162	Resistor 1/4W 150 Ω	14-5151
R176 ~	Resistor 1/4W 47k Ω	14-5473
R179	Resistor 1/4W 390 Ω	14-5391
R182	Resistor 1/4W 6.2k Ω	14-5622
R 186	Resistor 1 / 4 W 240 Ω	14-5241
R187	Resistor 1/4W 1 Meg	14-5105
S 1	Switch Power	C061022
S3	Switch SPDT (Channel Select)	C012241
U1-6,8,9	IC 64K X 1 RAM	C060612
U7,10	IC Multiplexer (74LS158)	C014345
U11	IC (74LS375)	C060613
U12	IC OS ROM A (8K X 8)	C060617
U13	IC OS ROM B (8K X 8)	C060616
U 14	Memory Mngt Unit HAL	C060609
U16	IC (74LS14)	C016541
U17	IC Quad AND (74LS08)	C017097
U18	IC Decoder (74LS138)	C014344
U19	IC GTIA	C014805
U20	IC ANTIC	C012296
U21	IC (6502 Modified)	C014806
Ć122	IC (DDU-4) 14 pin	C060472
U23	IC PIA	C014795
U24	IC POKEY	C012294
U25	IC (74I:551)	C060474
U27	IC HEX CMOS Buffer (CD4050B)	C010816
VR1	Resistor Variable 500k Ω	19-411504
W1,6-9,R44	Jumper 0 Ω	C060629
XU1-11,18,27	Socket IC (16 pin)	C014386-03
XU12,13	Socket IC (24 pin) (Alternate listed)	C014386-07
XU14	Socket IC (20 pin)	C014386-05
XU16,17,25	Socket IC (14 pin)	C014386-02
XU 19-21,23,24	Socket IC (40 pin)	C014386-09
Y1	Crystal 3.579545 MHz	C061090
	BOTTOM COVER ASSEMBLY	CA060277
	Rubber Feet	88-1004
	Cartridge Connector Panel	C060096
	Lower Cover	C060102
	FCC/Serial Label (Hong Kong)	C061335
	FCC/Serial Label (Taiwan)	C061334
	FCC/Serial Label (USA)	C061333

SECTION 6

SERVICE BULLETINS

This section is to be used by you to file the three classifications of service bulletins which are periodically released by the Manager of Technical Support.

The following are brief descriptions of each classification:

FIELD CHANGE ORDER

A Field Change Order describes hardware or software changes to ATARI products and instructs how to implement these changes. This identifies a failure mode which affects reliability and describes a procedure to correct the failure. This procedure must be performed on all units serviced or repaired.

UPGRADE BULLETIN

An Upgrade Bulletin describes product improvements or modifications which the consumer may wish to purchase. These Bulletins allow you to modify the customer's unit to add capabilities which may not have been available when the unit was originally manufactured.

TECH TIP

A Tech Tip is a document of a general nature which transmits routine service or repair information. By communicating methods developed since you attended training classes, Tech Tips aid to continuously improve repair skills and increase knowledge of ATARI Products. Other times, Tech Tips alert you to units which have been modified and are now standard from ATARI Manufacturing, but are different from many existing units and require different repair techniques.