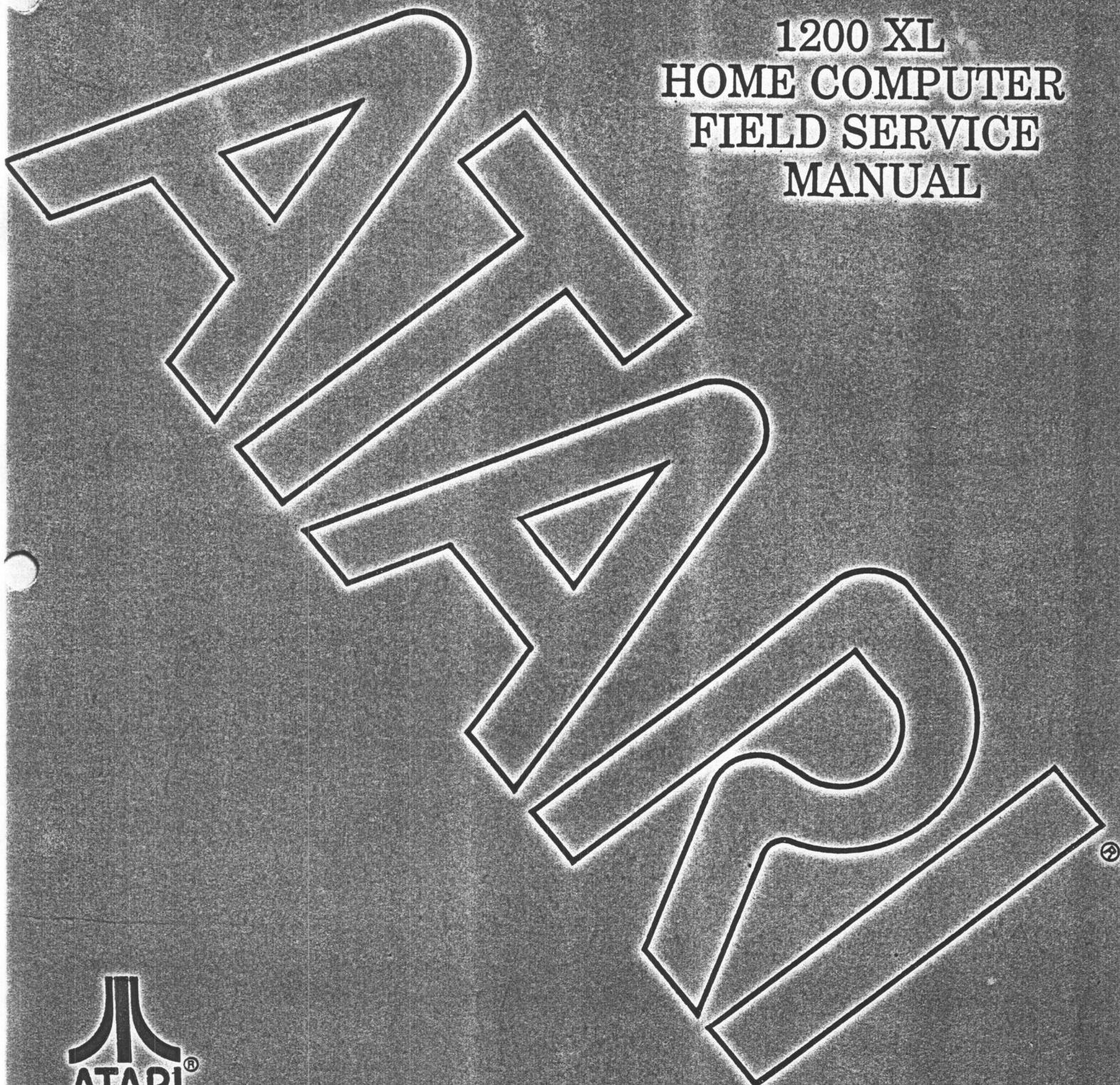


# 1200 XL HOME COMPUTER FIELD SERVICE MANUAL

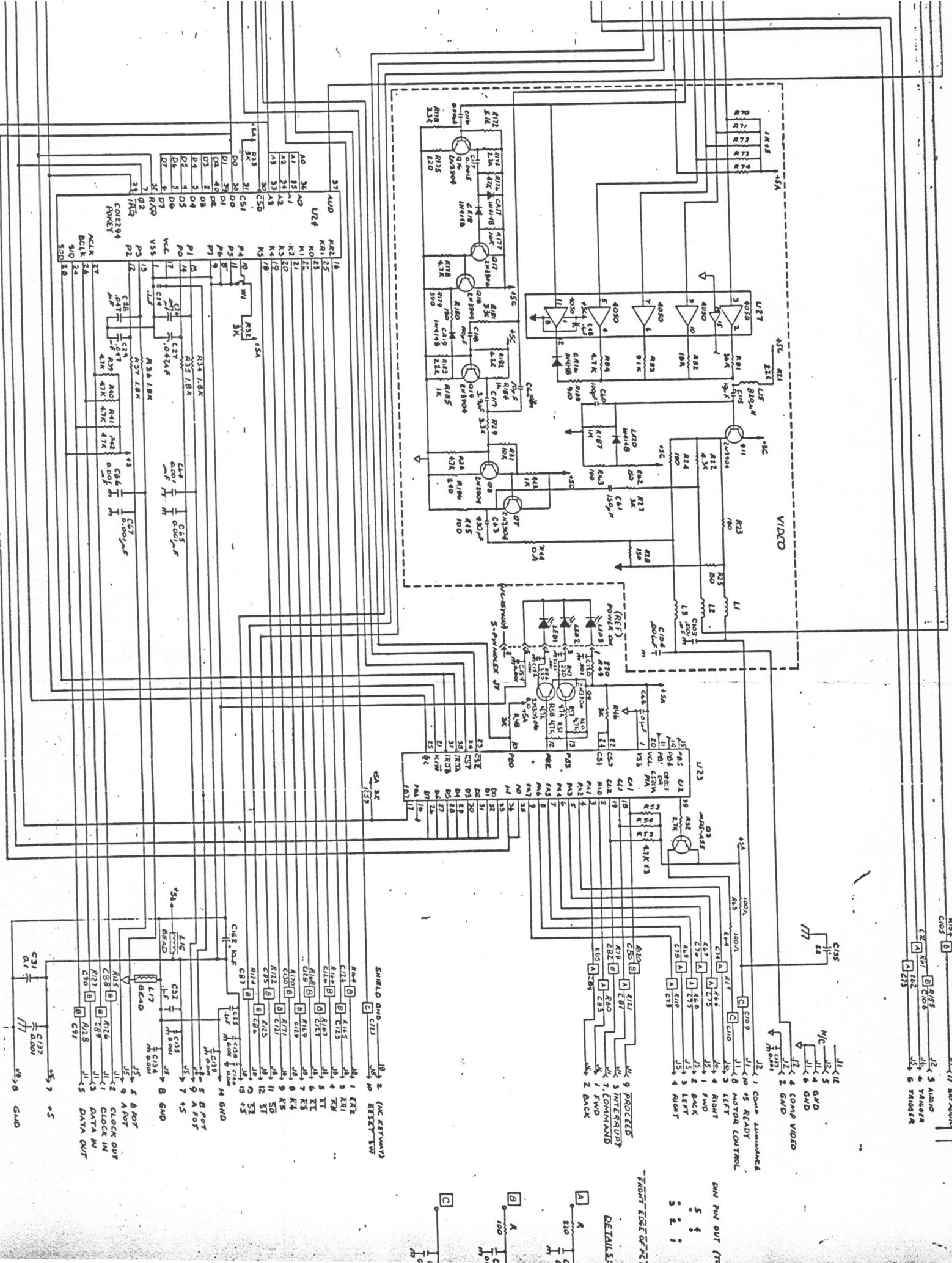


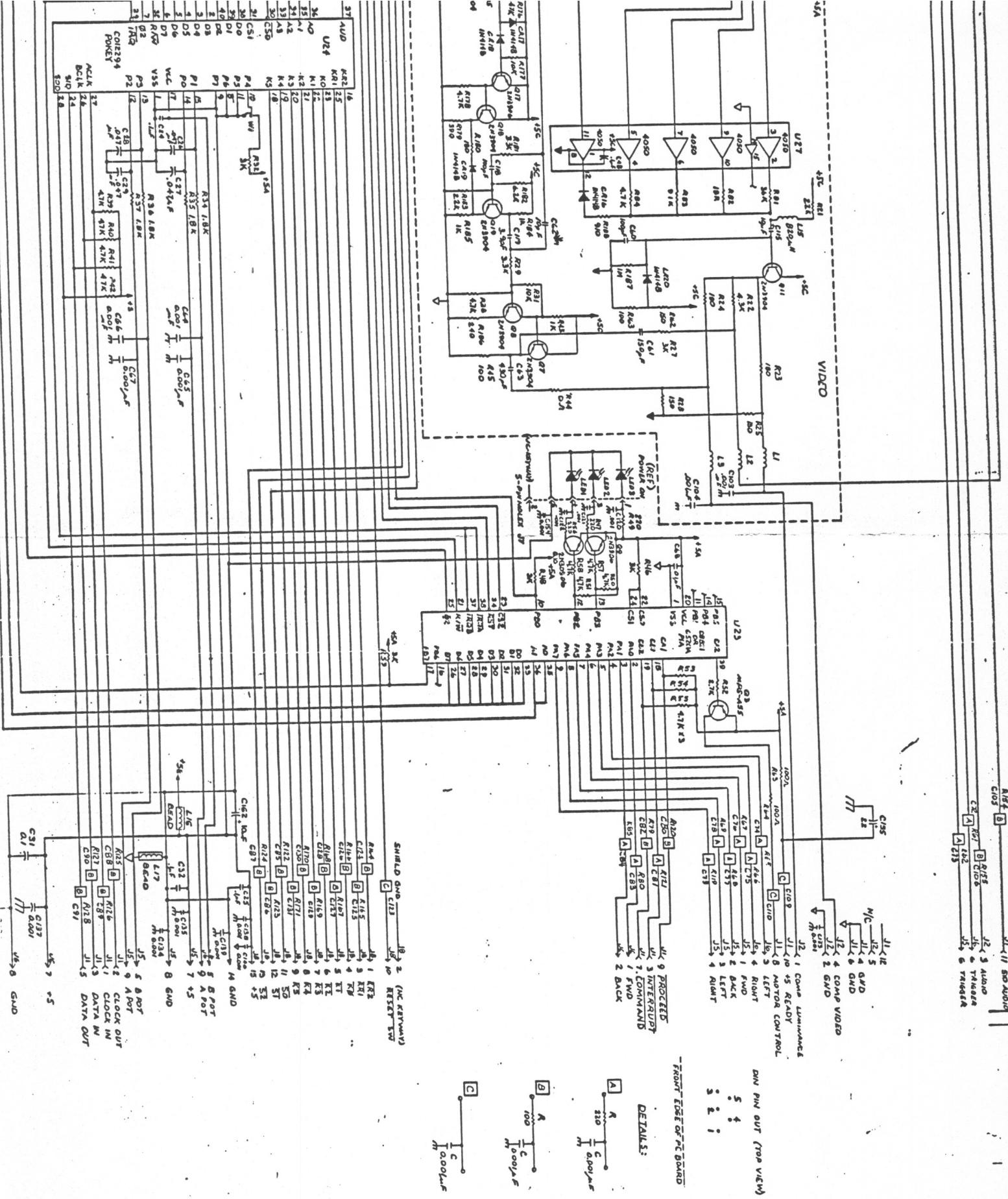
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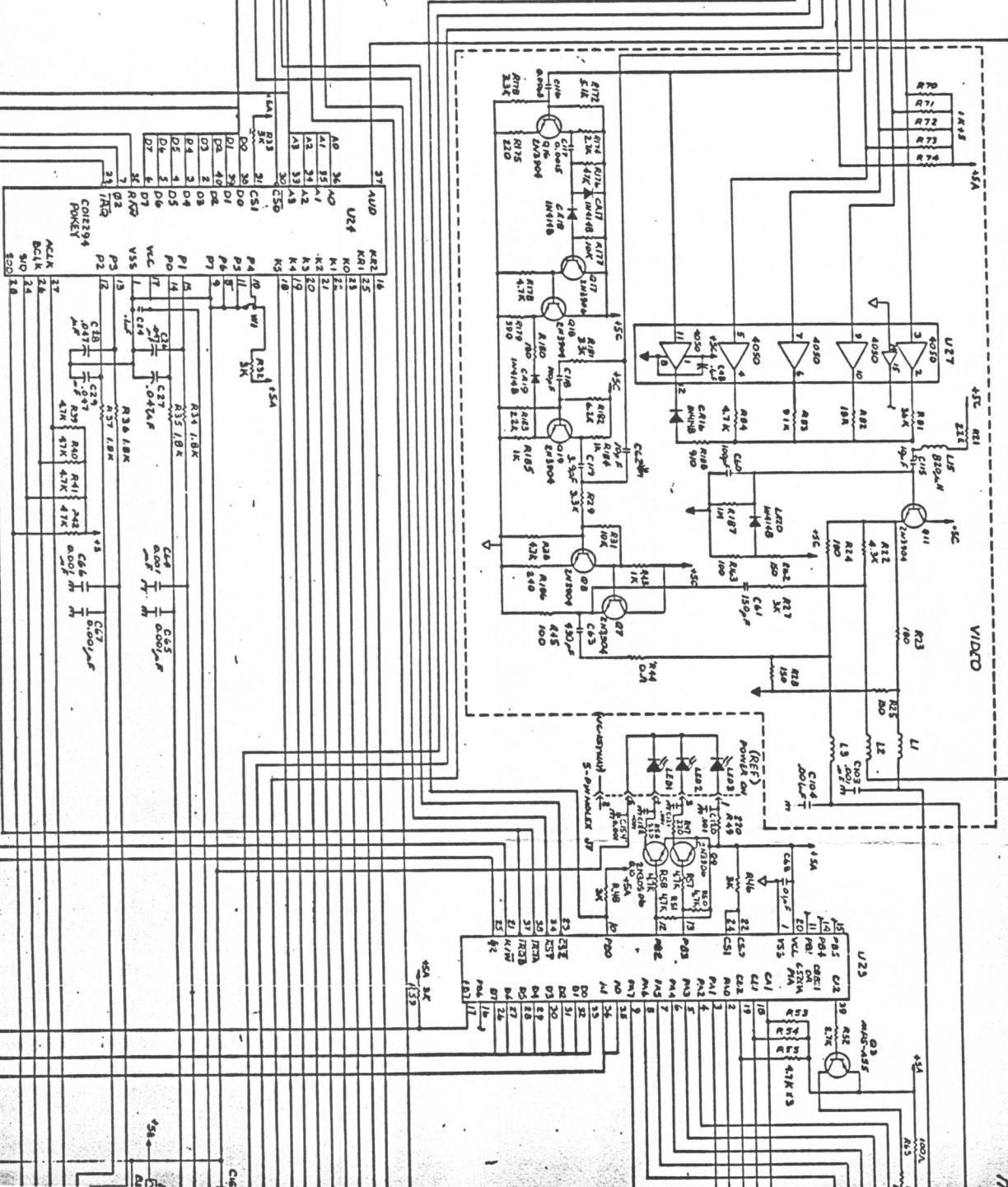
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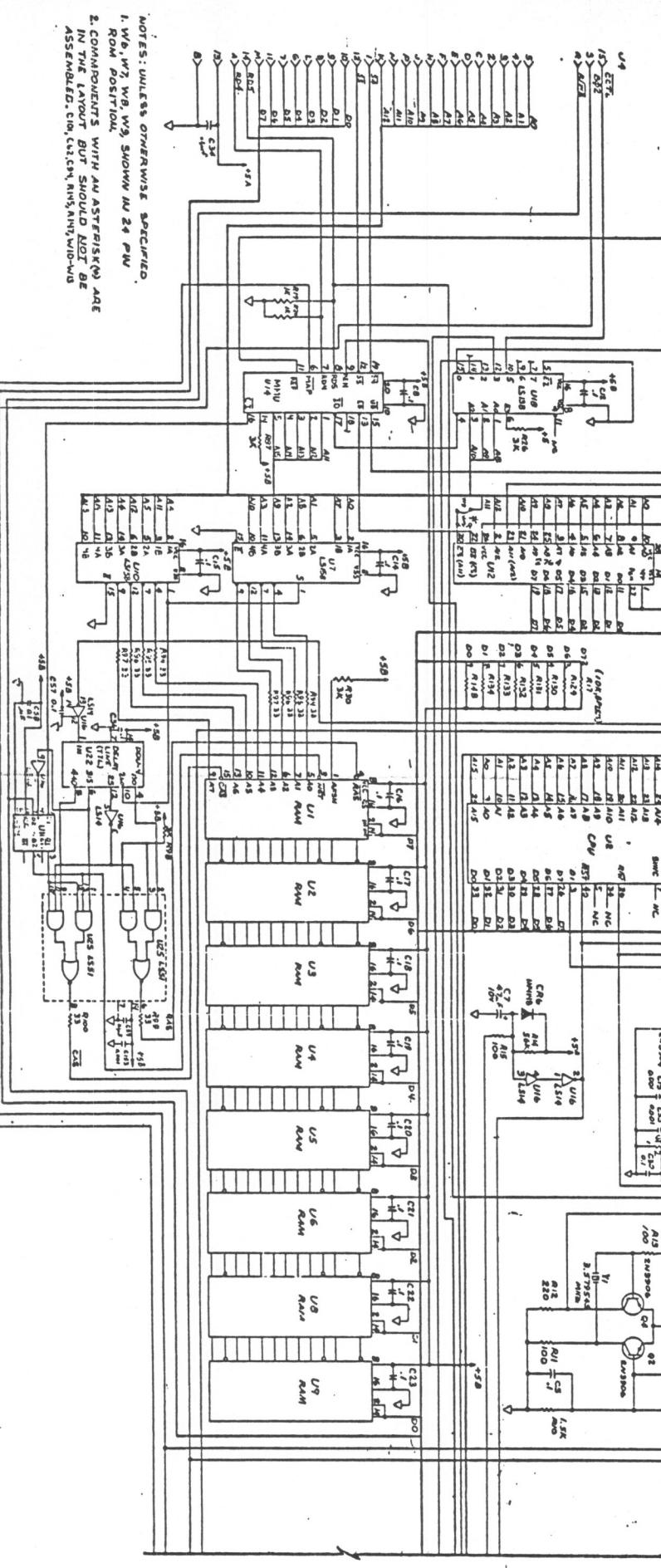
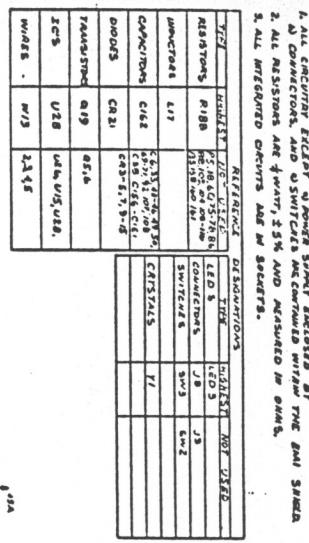
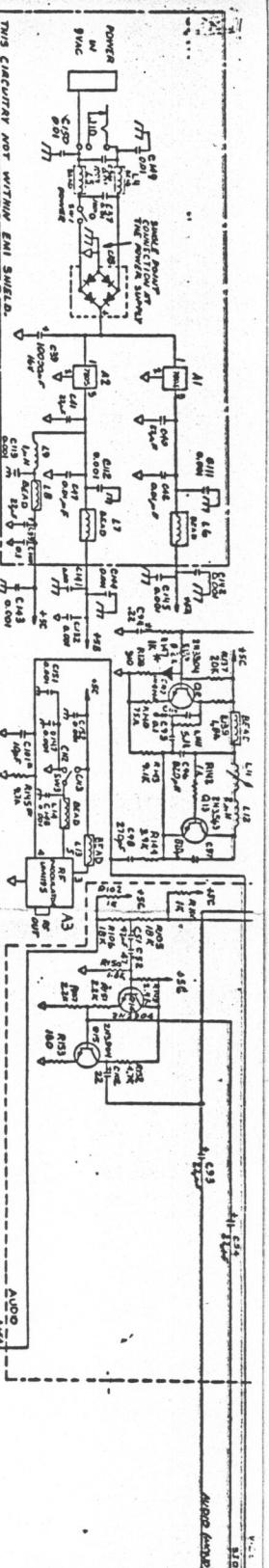
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February 1983

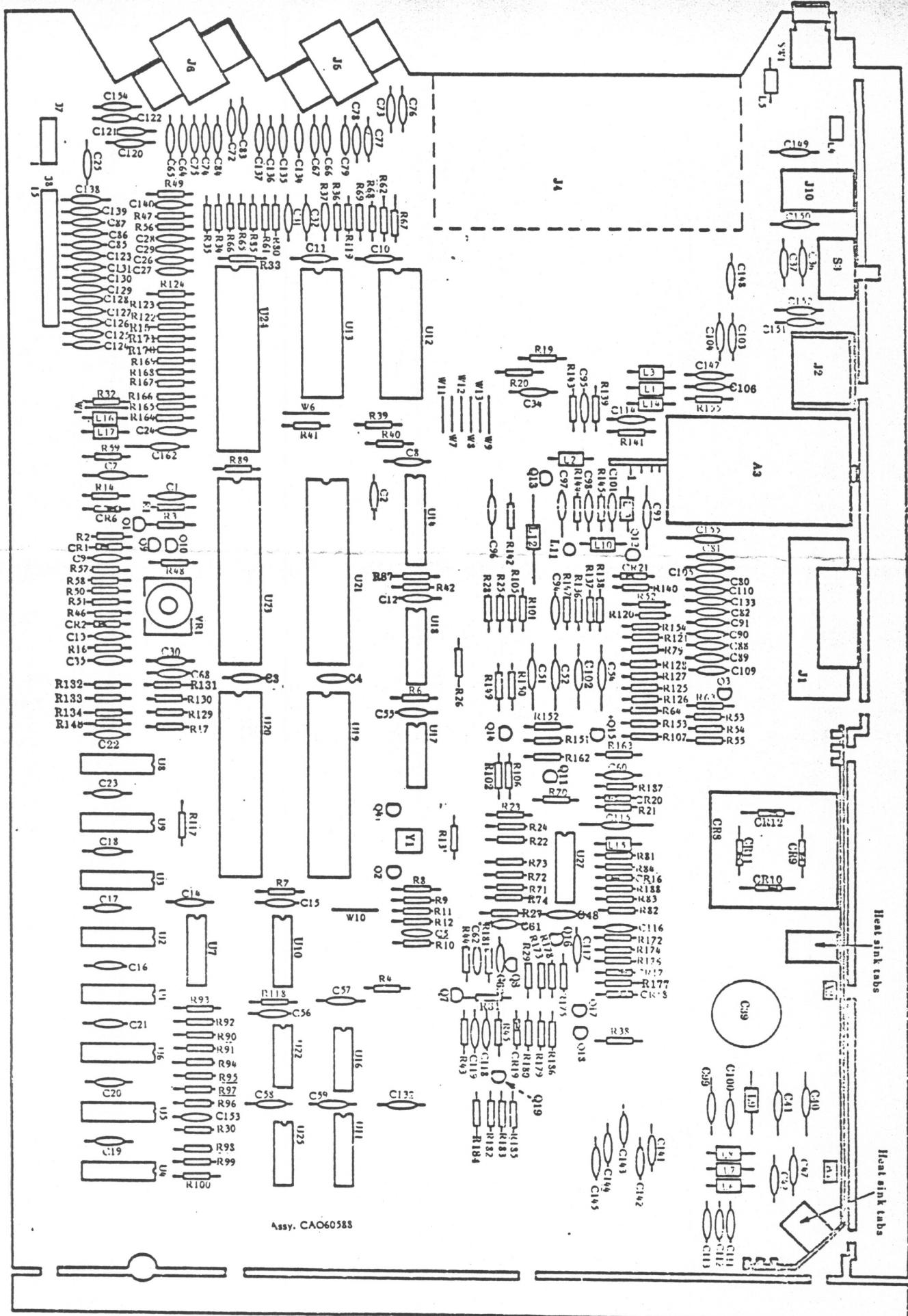
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**ATARI**  
**1200 XL HOME COMPUTER**  
**FIELD SERVICE MANUAL**

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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.

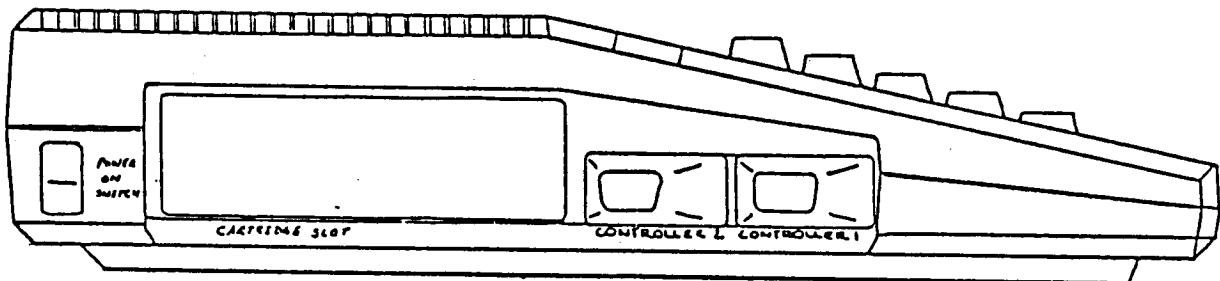


Figure 1-1. 1200XL Left Side Panel

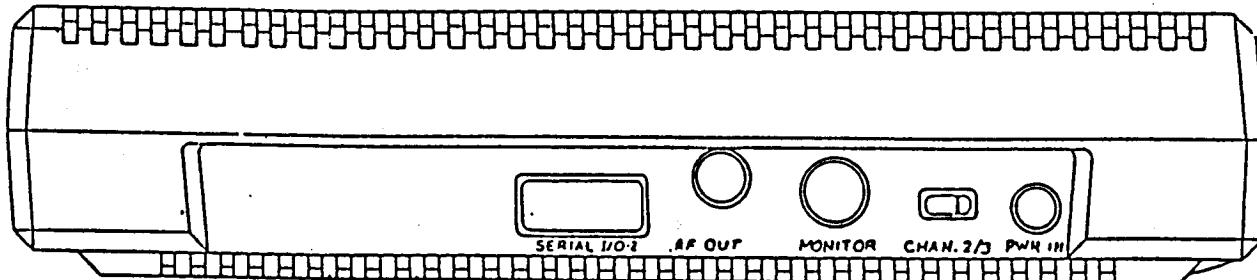


Figure 1-2. 1200XL Back View.

### 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 aluminum 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 F1 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.

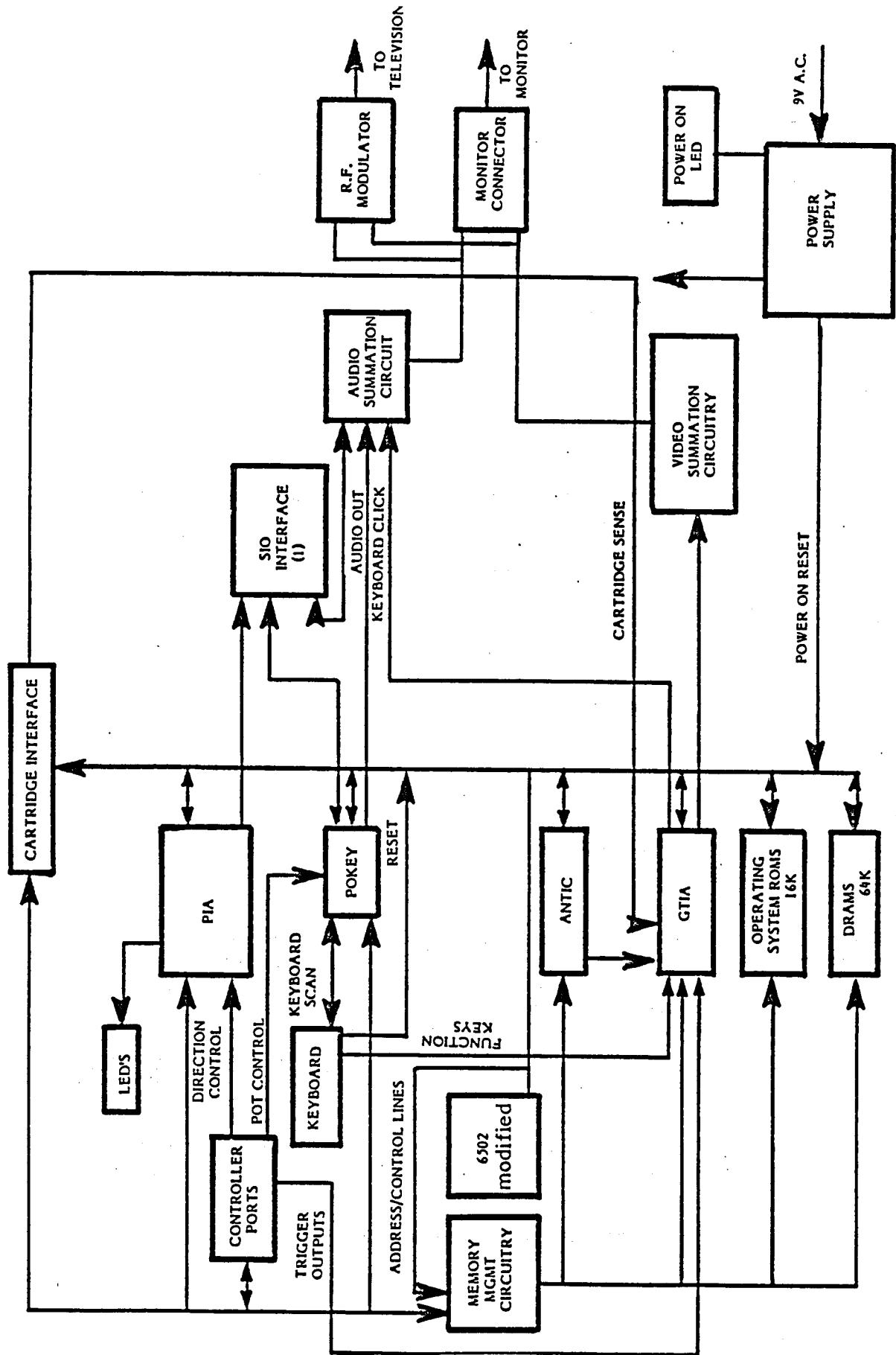


Figure 1-3. 1200XL Functional Block Diagram.

## 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.

Ground	vss	1	40	RES	Reset
RDY Input	RDY	2	39	$\#_2$	Phase 2 Clock
Phase 1 Clock	$\#_1$	3	38	SO	Set Overflow
Interrupt Request	IRQ	4	37	$A_0$ (IN)	Phase 0 Clock
	N.C.	5	36	R/W	Read Write
Non Maskable Input	NMI	6	35	HALT	HALT Input
	N.C.	7	34	N.C.	
5V Power	VCC	8	33	D6	Data Bus
Address Bus	A0	9	32	D1	Data Bus
Address Bus	A1	10	6502 (modified)	D2	Data Bus
Address Bus	A2	11		D3	Data Bus
Address Bus	A3	12		D4	Data Bus
Address Bus	A4	13		D5	Data Bus
Address Bus	A5	14		D6	Data Bus
Address Bus	A6	15		D7	Data Bus
Address Bus	A7	16		A15	Address Bus
Address Bus	A8	17		A14	Address Bus
Address Bus	A9	18		A13	Address Bus
Address Bus	A10	19		A12	Address Bus
Address Bus	A11	20		vss	Ground

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		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	F $\phi$ 0	Fast Phase 0 Clock
Interrupt Output	NMI	7		34	$\phi$ 0	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	$\phi$ 2	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.

Address Bus	A1	1		40	A2	Address Bus
Address Bus	A $\emptyset$	2		39	A3	Address Bus
Ground	VSS	3		38	A4	Address Bus
Data Bus	D3	4		37	D4	Data Bus
Data Bus	D2	5		36	D5	Data Bus
Data Bus	D1	6		35	D6	Data Bus
Data Bus	D $\emptyset$	7		34	D7	Data Bus
Trigger 0	T $\emptyset$	8		33	R/W	Read/Write
Trigger 1	T1	9	GTIA	32	CS	Chip Select 1
Trigger 2	T2	10		31	Lum 3	Luminance Line
Trigger 3	T3	11		30	$\phi$ 2	Phase 2 Input
Option	S $\emptyset$	12		29	F $\emptyset$ 0	Clock Out
Start	S1	13		28	OSC	Oscillator Input
Select	S2	14		27	VCC	Power
Keyboard Click	S3	15		26	HALT	HALT
PAL Color Delay	PAL	16		25	CSYNC	Output Sync
Color Delay	CADJ	17		24	LUM 2	Luminance 2 Output
Alphanum. Data 0	AN0	18		23	LUM 1	Luminance 1 Output
Alphanum. Data 1	AN1	19		22	LUM 0	Luminance 0 Output
Alphanum. Data 2	AN2	20		21	COL	Color

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.

Ground	VSS	1		40	D2	Data Bus
Data Bus	D3	2		39	D1	Data Bus
Data Bus	D4	3		38	D0	Data Bus
Data Bus	D5	4		37	AUDIO	Audio Out
Data Bus	D6	5		36	A0	Address Bus
Data Bus	D7	6		35	A1	Address Bus
Phase 2 Clock	Ø2	7		34	A2	Address Bus
Pot Scan	P6	8		33	A3	Address Bus
Pot Scan	P7	9		32	R/W	Read/Write
Pot Scan	P4	10		31	CS1	Chip Select
Pot Scan	P5	11		30	CS0	Chip Select
Pot Scan	P2	12		29	IRQ	Interrupt Request
Pot Scan	P3	13		28	SOD	Serial Output Data
Pot Scan	P0	14		27	ACLK	Serial Output Clock
Pot Scan	P1	15		26	BCLK	Bidirectional Clock
Keyboard Response	KR2	16		25	KRI	Keyboard Response
5 V Power	VCC	17		24	SID	Serial Input Data
Keyboard Scan	K5	18		23	K0	Keyboard Scan
Keyboard Scan	K4	19		22	K1	Keyboard Scan
Keyboard Scan	K3	20		21	K2	Keyboard Scan

Figure 1-7. POKEY pin assignments.

#### Peripheral Interface Adaptor (PIA)

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

Figure 1-8 is an illustration of the PIA pin assignments.

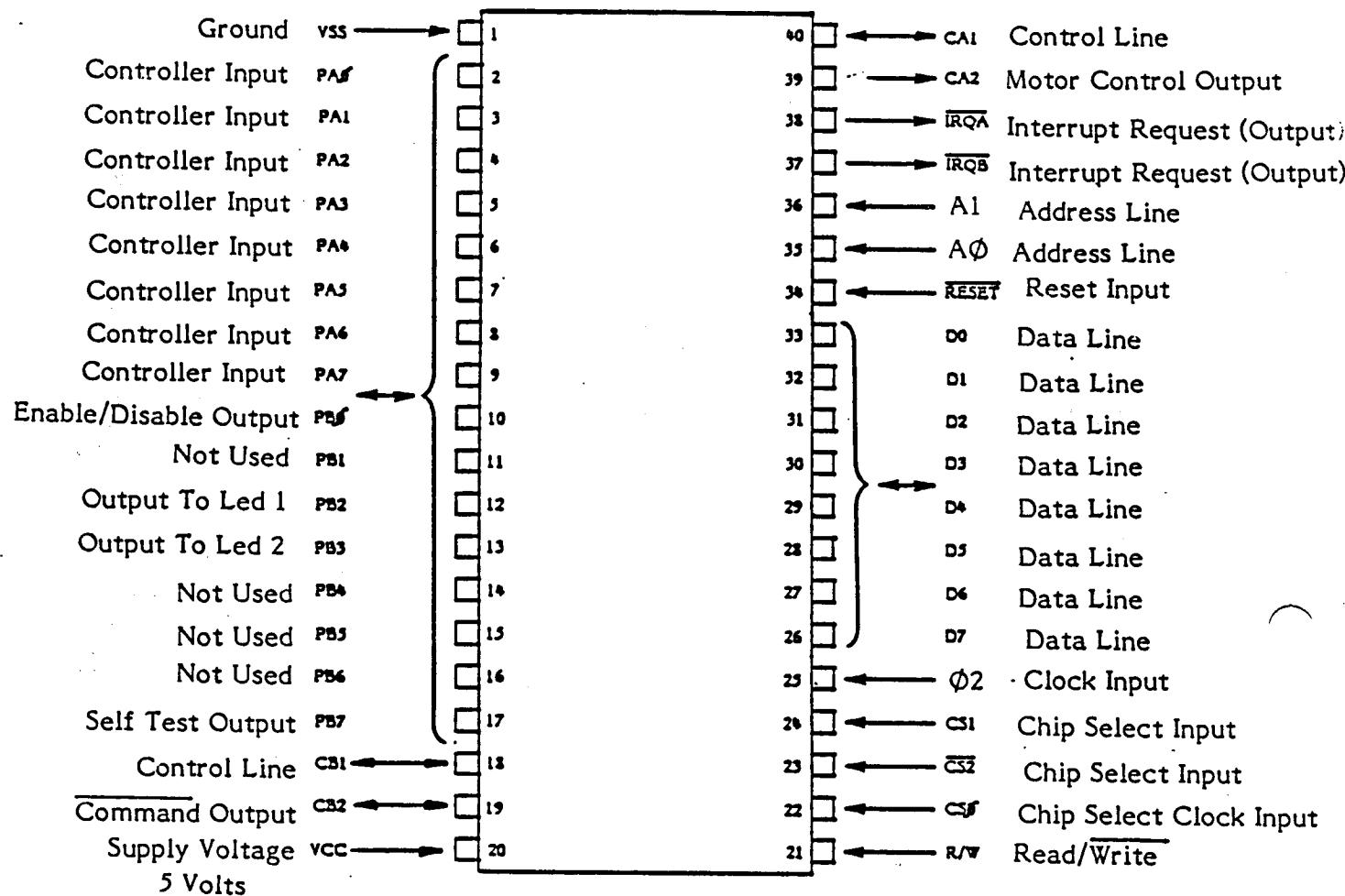


Figure 1-8. PIA Pin Assignments.

### Memory (ROM and RAM)

The 1200XL operating system is resident to two 8K X 8 ROMs. The ROMs input CPU address lines A0 through A12 and the chip selects from the address decoding circuitry and generates data on CPU data lines D0 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 75 Ohm termination:

Maximum Voltage: 2MV  
Minimum Voltage: 1MV

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 RAt 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.

<u>PIN</u>	<u>PIN</u>
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

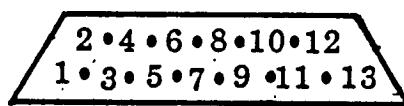


Figure 1-9. SIO Interface Pin Assignments (looking into jack on unit)

#### 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).

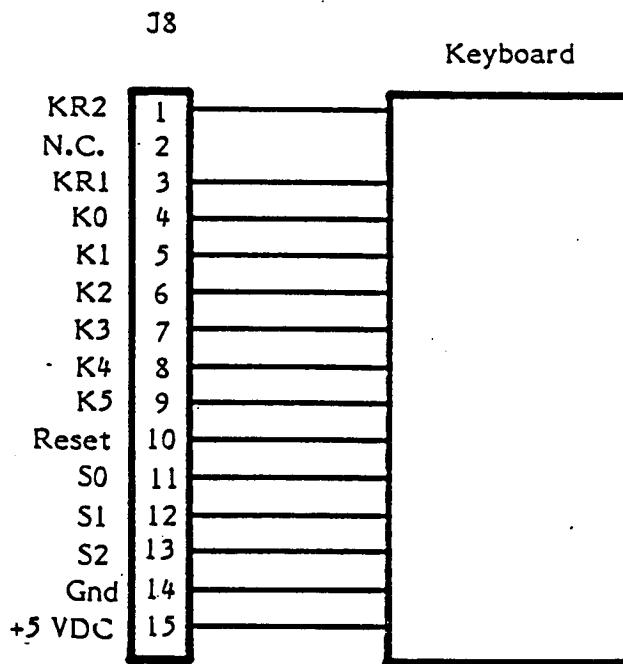


Figure 1-10. Keyboard Interface Pin Assignments.

### 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              |                  |

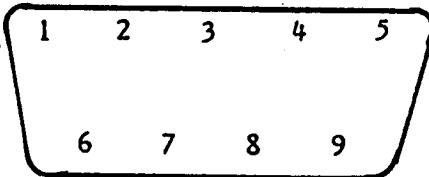


Figure 1-11. Controller Jack Pin Assignments (from left side of 1200XL)

### Cartridge Interface

The cartridge interface is a 30 pin edge connector.

Figure 1-12 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	D6	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/Write
Cartridge Control	CCTL	15	S	B02	Buffered Phase 2

Figure 1-12. Cartridge Interface Pin Assignments  
(from left side of 1200XL)

### Monitor Interface

The monitor interface is a 5-pin DIN connector.

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

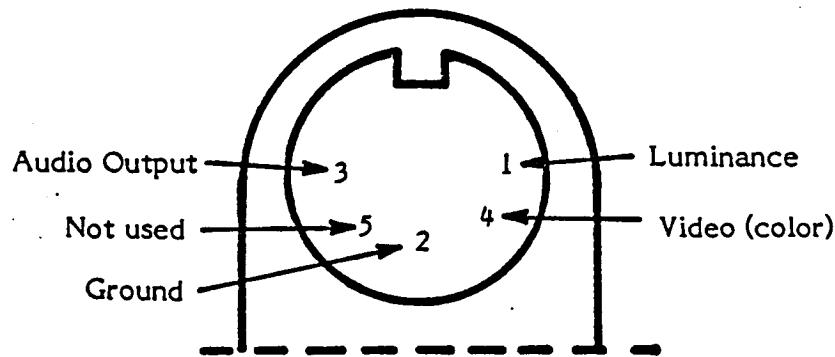


Figure 1-13. Monitor Interface Pin Assignments

### LED Board Interface

The LED Board is connected to the CPU Board with a 5 wire flat cable terminating in a 5 pin molex connector with the following pin assignments.

<u>Pin</u>	<u>Signal</u>
1	LED 3 (Power On)
2	No Connect (N.C.)
3	LED 2 (International Character Set)
4	LED 1 (Keyboard Disable)
5	Ground

## SECTION 2

### SCHEMATICS AND SILKSCREENS

The schematics and silkscreens for the 1200XL are attached to the front cover of this manual.

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

## **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 1K). 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).

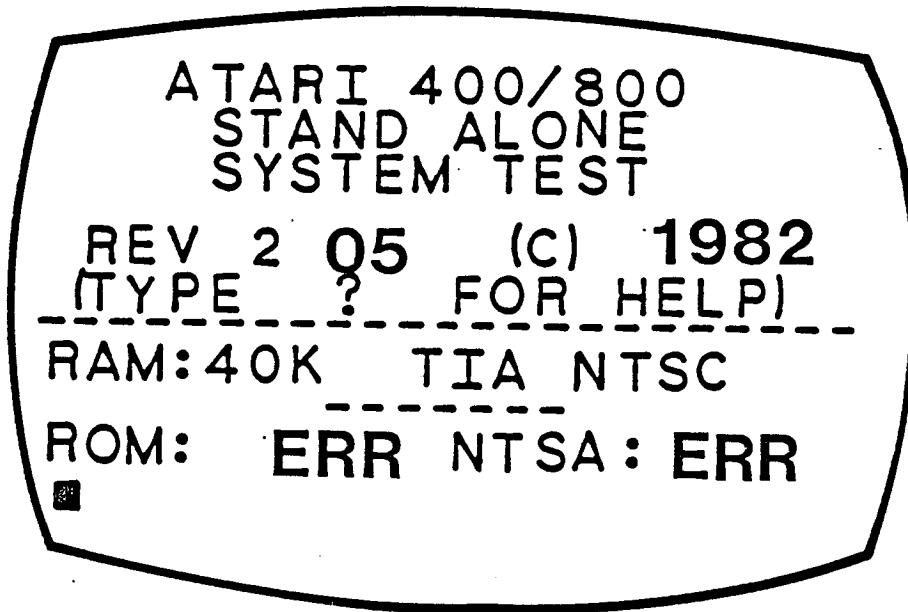


Figure 3-1. SALT Header

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.

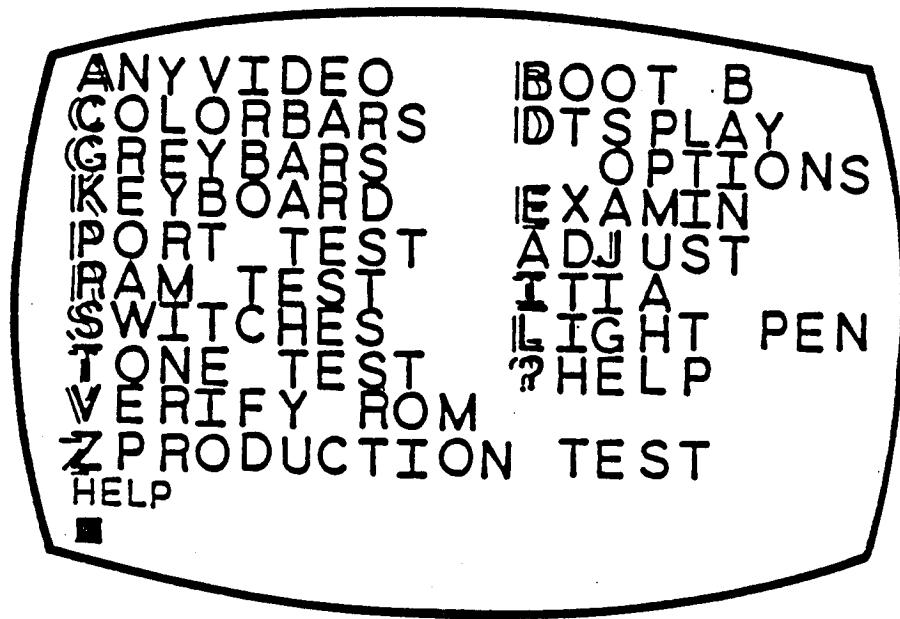


Figure 3-2. SALT Menu

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.

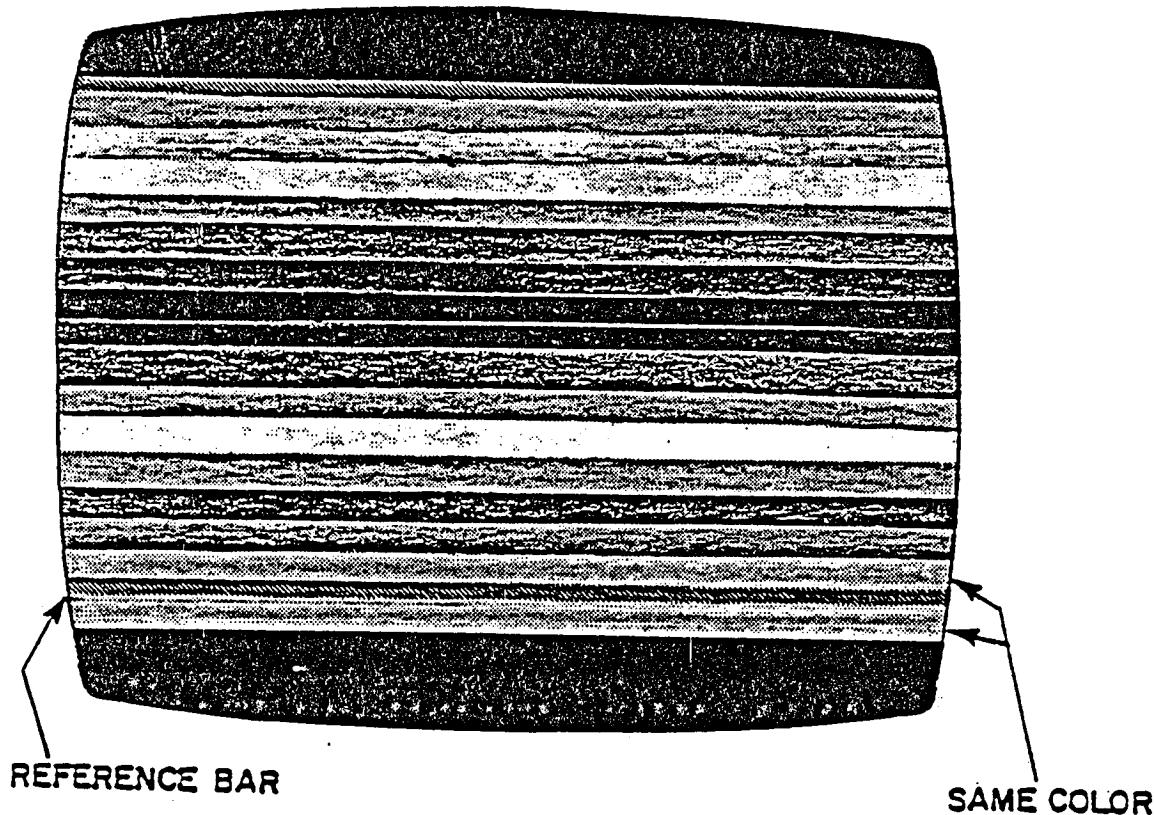


Figure 3-3. Color Bar Test Screen

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. NOTE: 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.

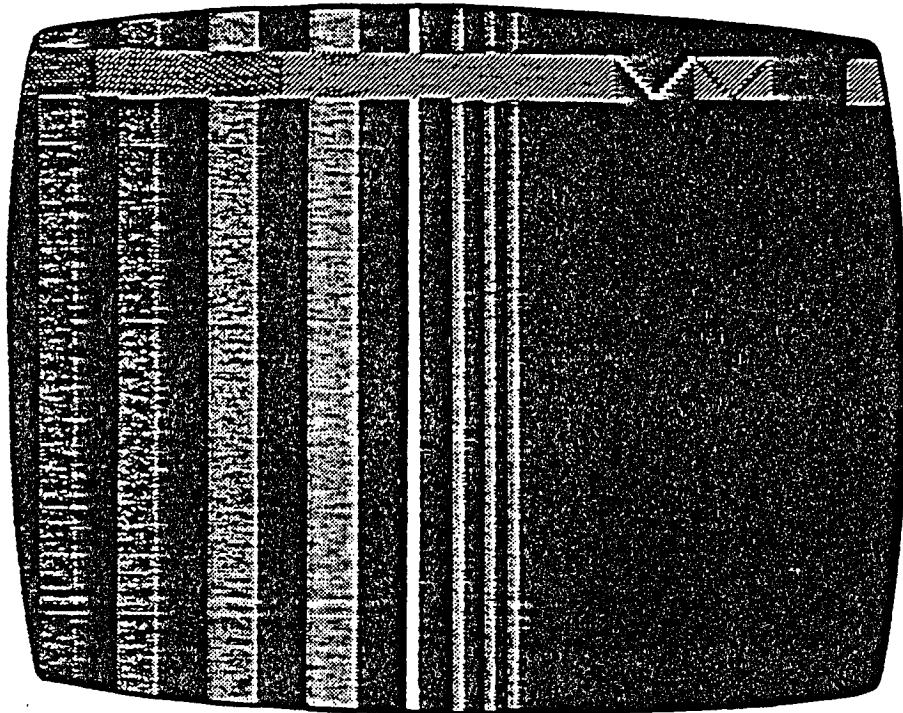


Figure 3-4. Any Video Test Screen

## 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.

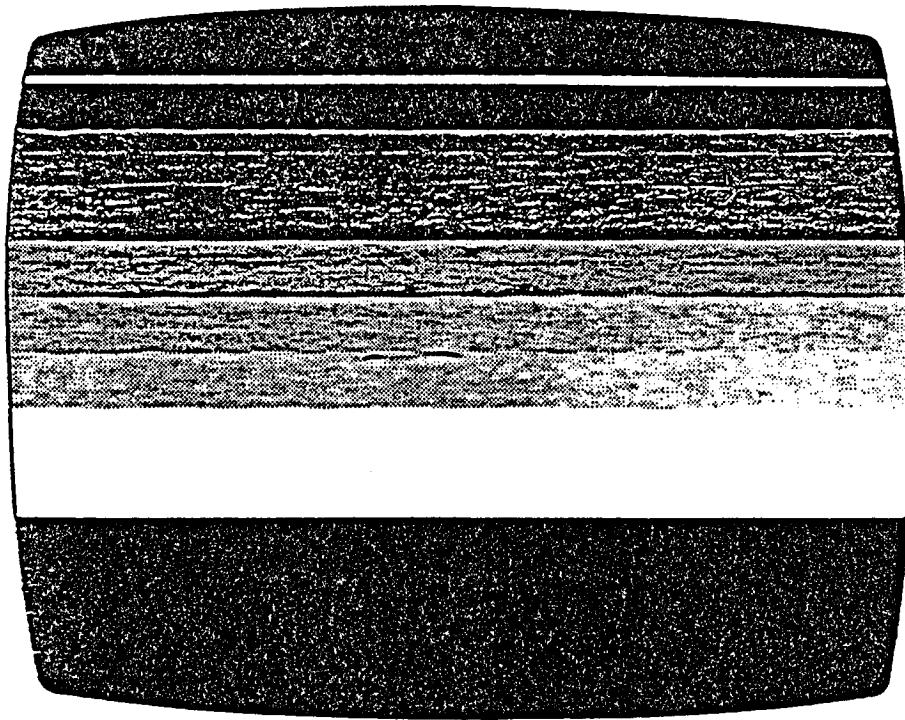


Figure 3-5. Gray Bar Test Screen

## DISPLAY OPTIONS

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

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. Only the D row is applicable for the 1200XL.

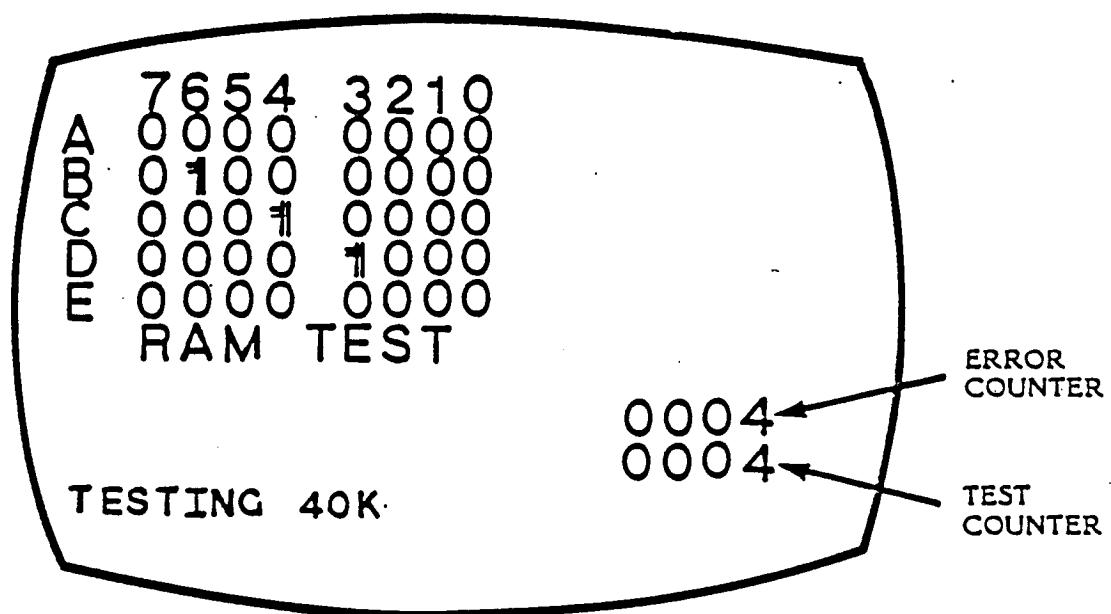


Figure 3-6. RAM Test Screen.

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

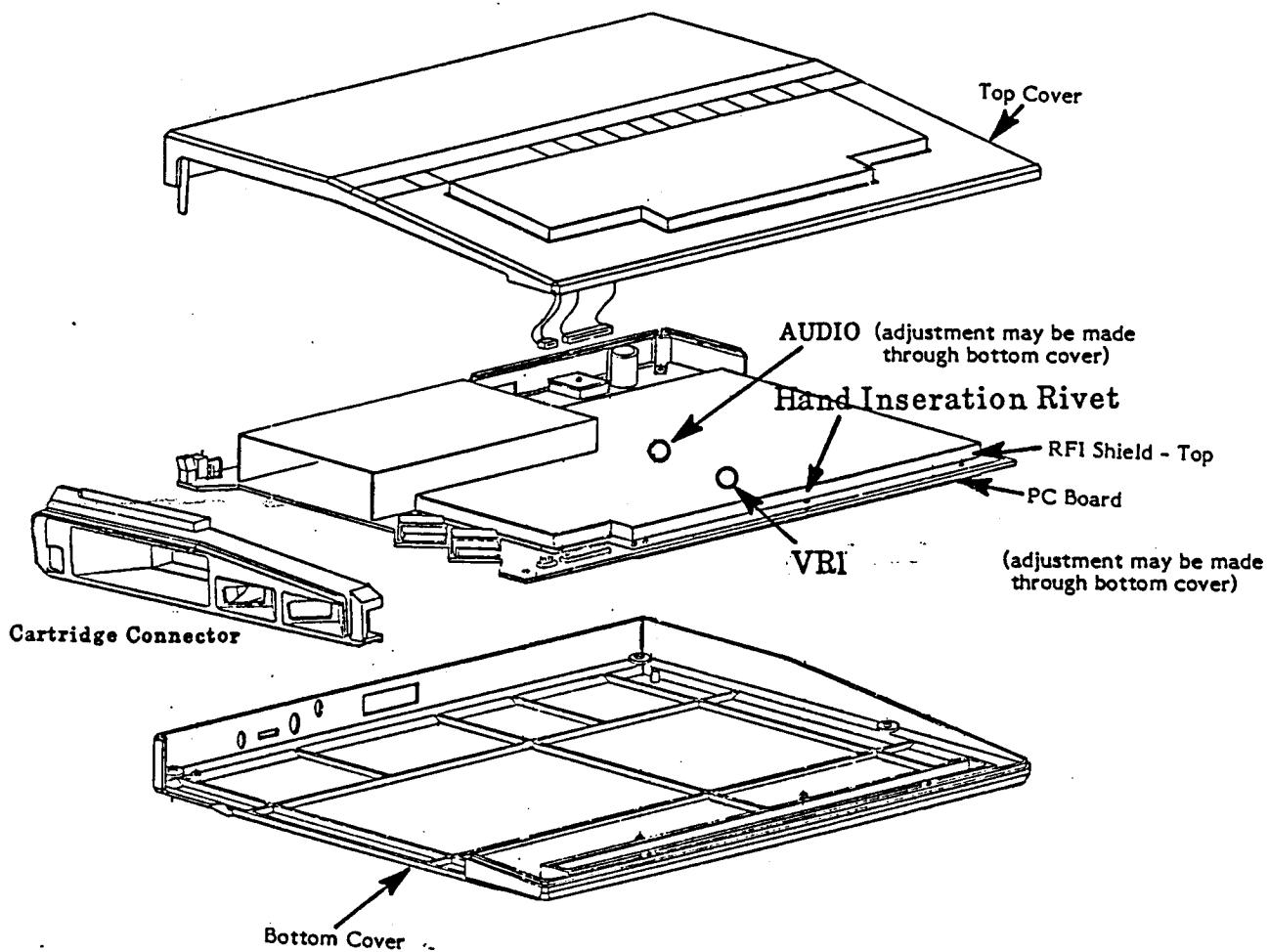
<u>Column</u>	<u>64 K</u>
D0	U9
D1	U8
D2	U6
D3	U5
D4	U4
D5	U3
D6	U2
D7	U1

## SECTION 4

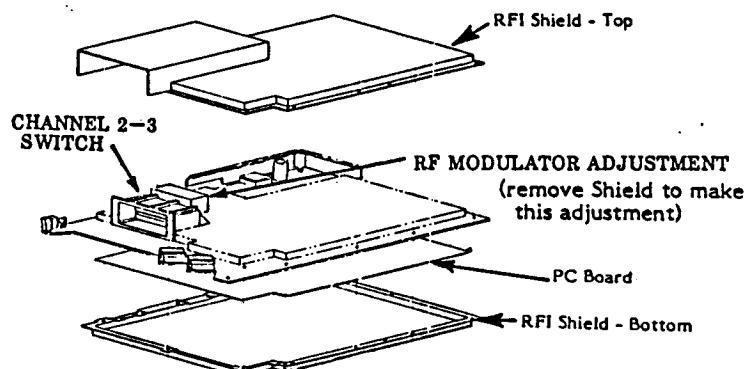
### SYMPTOM CHECKLIST

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.

<u>SYMPTOM</u>	<u>POSSIBLE CAUSES</u>	<u>REMEDY</u>
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), +5VDC, 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 - Page 4-2; 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 - Page 4-2; RF Modulator Adjust - Page 4-4)
Upside down Alpha/ Numerics or Player Field	U20, U19, Q3	Replace
Some Keyboard Keys Fail	U24, Keyboard	Replace (See Page 4-4)
All Keyboard Keys 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



#### DETAIL -RF Shield Disassembly



## 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.
3. Insert and tighten the four screws which hold the keyboard to the top cover.
4. 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 3-6, 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

<u>LINE NO.</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
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

<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
	<b>TOP COVER ASSEMBLY</b>	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
	<b>PCB/RFI SHIELD ASSEMBLY</b>	CA061074
Main	Fasterner Latching (Heatsink)	C014796
Main	Fasterner 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

<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
A1,2	Voltage Regulator (78M05) 5V	C014348
A3	Modulator	C060618
Main	Socket IC (24 pin) Alternate for P/N C014386-07-1	C014386-08
Main	Diode (1N914) Alternate for P/N C060607-2	31-1N914
C1	PCB/RFI SHIELD ASSEMBLY	CA061074
C2-5,8,10-12,14-25, 30-32,34,48,55-59, 68,95,100	Cap. Ceramic Axial 68pF	C014179-12
C7,51,52	Cap. Ceramic Axial .1uF (25V)	C014181-03
C9,98	Cap. Alum Elec Axial 47uF (10V)	24-100476
C13,35,64-67,72-91, 103-106,109-114, 120-145,147,148, 151-154	Cap. 270pF (25V)	C061336-02
C26-29	Cap. Ceramic Axial .001uF (25V)	C014181-01
C36,37,149,150	Cap. Ceramic Axial .047uF (25V)	C014180-09
C39	Cap. .01uF (100V)	C061337-01
C40,41,54,93,99, 102,155	Cap. 10000uF (16V)	C060603
C42,47	Cap. Ceramic Axial 22uF (16V)	C014393
C60,118	Cap. Ceramic Axial .01uF (25V)	C014181-02
C61	Cap. Ceramic Axial 100pF (25V)	C014179-19
C63	Cap. Ceramic Axial 150pF (25V)	C014179-09
C96,97	Cap. Ceramic Axial 390pF (25V)	C014180-10
C115,162	Cap. 820pF (25V)	C061336-03
C116	Cap. Alum Elect Axial 10uF (16V)	C014371
C117	Cap. Ceramic Axial 6800pF (25V)	C014180-12
C119	Cap. Ceramic Axial 1500pF (25V)	C014180-15
CR1,2,6,16-21	Cap. 3.9pF (25V)	C061336-01
CR8	Diode (1N4148)Alternate listed	C060607
J1	Diode Bridge (MDA 990-2)	C060584
J2	Connector Rt Angle (13 pin)	C012995
J4	Connector DIN (5 pin female)	C014388
J5,6	Cartridge Connector Assy	CA060287
J7	Connector "D" (9 pin male)	C010448
J8	Connector LED (5 pin)	C060450-01
J10	Connector Keyboard 15 pin	C060450-02
L1-8,10,13,14,16,17	Connector Power Jack	C014715
L9	Inductor Ferrite Bead	C014384
L11	Inductor Axial 1uH	C014383
L12	Inductor Adjustable	C010823
L15	Inductor 2uH	C010822
	Inductor 820uH	C061338-01

## SECTION 5

### 1200XL PARTS LIST

<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
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
R1	Resistor 1/4W 39K	14-5393
R2	Resistor 1/4W 680 Ohm	14-5681
R3,4,6,7,26,27,30, 32,33,46,48,59,87, 89,98,117,118	Resistor 1/4W 3K	14-5302
R8	Resistor 1/4W 430 Ohm	14-5431
R9	Resistor 1/4W 27 Ohm	14-5270
R10	Resistor 1/4W 1.5K	14-5152
R11,13,15,45,63,64, 79,120-128,154,155, 163-171	Resistor 1/4W 100 Ohm	14-5101
R12,47,49,56,61,62, 65-69,80,85,119, 175	Resistor 1/4W 220 Ohm	14-5221
R14	Resistor 1/4W 56K	14-5563
R16,19,20,43,70-74, 101,102,142,184,185	Resistor 1/4W 1K	14-5102
R17,31,129-134, 148,177	Resistor 1/4W 10K Ohm	14-5103
R21,107,151,183	Resistor 1/4W 2.2K	14-5222
R22	Resistor 1/4W 4.3K	14-5432
R23,24,153,180	Resistor 1/4W 180 Ohm	14-5181
R25,28	Resistor 1/4W 130 Ohm	14-5131
R29,173,181	Resistor 1/4W 3.3K	14-5332
R34-37,139,150	Resistor 1/4W 1.8K	14-5182
R38-42,50,51,53-55, 57,58,84,152,178	Resistor 1/4W 4.7K	14-5472
R52,174	Resistor 1/4W 2.7K	14-5272
R81	Resistor 1/4W 36K	14-5363
R82,105,106	Resistor 1/4W 18K	14-5183
R83,143	Resistor 1/4W 9.1K	14-5912
R90-97,99,100	Resistor 1/4W 33 Ohm	14-5330
R136	Resistor 1/4W 8.2K	14-5822
R137	Resistor 1/4W 20K	14-5203
R138,188	Resistor 1/4W 910 Ohm	14-5911
R140	Resistor 1/4W 75 Ohm	14-5750
R141,172	Resistor 1/4W 5.1K	14-5512
R144	Resistor 1/4W 3.9K	14-5392

## SECTION 5

### 1200XL PARTS LIST

<u>LOCATION</u>	<u>DESCRIPTION</u>	<u>PART NUMBER</u>
R149	Resistor 1/4W 2.4K	14-5242
R162	Resistor 1/4W 150 Ohm	14-5151
R176	Resistor 1/4W 47K	14-5473
R179	Resistor 1/4W 390 Ohm	14-5391
R182	Resistor 1/4W 6.2K	14-5622
R186	Resistor 1/4W 240 Ohm	14-5241
R187	Resistor 1/4W 1 Meg	14-5105
S1	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
U14	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
U22	IC (DDU-4) 14 pin	C060472
U23	IC PIA	C014795
U24	IC POKEY	C012294
U25	IC (74LS51)	C060474
U27	IC HEX CMOS Buffer (CD4050B)	C010816
VR1	Resistor Variable 500K	19-411504
W1,6-9,R44	Jumper Zero Ohm	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
XU19-21,23,24	Socket IC (40 pin)	C014386-09
Y1	Crystal 3.579545 MHz	C061090
<b>BOTTOM COVER ASSEMBLY</b>		<b>CA060277</b>
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.



Consumer Product Service  
Manager of Technical Support  
**TECH TIP**

TT  
HOD  
**15**

number   

MODEL: Atari 1200XL Computer

DATE: June 7, 1983

**SUBJECT:**

Audio Frequency (Sound) Drift

**DESCRIPTION:**

The audio is of poor quality or does not exist at all.

**PROBLEM:**

The audio must be constantly readjusted or cannot be adjusted. The problem is caused by components which do not meet specification.

**SOLUTION:**

Most audio frequency drift problems will be resolved by the following series of component changes. It is necessary to substitute polystyrene capacitors in place of the ceramic capacitors in the AUDIO OSCILLATOR CIRCUITRY.

**NOTE:** Perform the following modification procedure only on those units which display audio frequency drift problems.

**MODIFICATION PROCEDURE:**

Silk Screen Location	Remove Comp Descrip	Part Number	Replacement Component Descr.	Part No.
C96,97	Cap Cer 820pF 25V	C061336-03	Cap Poly 820pF 25V	C018261*

\* = Alternate for C018261 is C010821.

**TROUBLESHOOTING:**

These changes do not effect the troubleshooting procedures outlined in the 1200XL Computer Field Service Manual (FD100217).

**DIFFICULTY REPORTING:**

If you have questions or need further assistance, call the Atari Techline Specialist:

Inside California  
(800) 672-1466

Outside California  
(800)538-1535



Consumer Product Service  
Manager of Technical Support  
**TECH TIP**

TT  
HCD  
**12**

number

MODEL: ATARI 1200XL COMPUTER

DATE: June 16, 1983

**SUBJECT:**

Color Burst/Video Sync

**DESCRIPTION:**

Loss of video sync on certain televisions and monitors.

**PROBLEM:**

The screen distorts with high intensity (black to white) screens. Characters appear to be very wavy, torn or ghost images, and the video on the screen seems to enlarge.

**SOLUTION:**

Most video sync problems will be resolved by the following series of component changes.

**NOTE:** Perform the following modification procedure only on those units which display video sync problems.

**MODIFICATION PROCEDURE:**

Silk Screen Location	Remove Comp Desc.	Part Number	Replacement Comp. Descr.	Part No.
R22	Res 1/4W 4.3K	14-5432	Res 1/4W 6.2K	14-5622
R188	Res 1/4W 910 Ohm	14-5911	Diode 1N914 Place cathode closest to bridge rectifier.	31-1N914
R163	Res 1/4W 100 Ohm	14-5101	Res 1/4W 150 Ohm	14-5151
R145	Unused		Res 1/4W 18K	14-5183

**TROUBLESHOOTING:**

These changes do not effect the troubleshooting procedures outlined in the 1200XL Computer Field Service Manual (FD100217).

**DIFFICULTY REPORTING:**

If you have questions or need further assistance, call the Atari Techline Specialist:

Inside California  
(800) 672-1466

Outside California  
(800) 538-1535



Consumer Product Service  
Manager of Technical Support  
**TECH TIP**

TT  
HCD  
**18**

number

MODEL: ATARI 1200XL COMPUTER

DATE: July 12, 1983

**SUBJECT:**

Operating System (OS) ROMs

**DESCRIPTION:**

Early production 1200XLs were manufactured with OS EPROMs rather than OS ROMs. Silk screen locations U12 and U13.

**PROBLEM:**

If an EPROM fails, you must replace both EPROMs with new OS ROMs (U12-C060617 and U13 - C060616).

**SOLUTION:**

After inserting the new ROMs, it is necessary to change the current 0.0 Ohm jumpers per the following modification instruction.

**MODIFICATION INSTRUCTION:**

Remove jumpers (C060629) W1, W11, W12, W13 and R44 (28-pin device ONLY).

Install jumpers (C060629) W1, W6, W7, W8, W9, and R44 (24-pin device ONLY).

**NOTE:** Remember that if you replace an EPROM at U12 or U13 with a ROM, you must REPLACE BOTH.

**TROUBLESHOOTING AND MAINTENANCE:**

These changes do not affect the troubleshooting procedures outlined in the 1200XL Field Service Manual (FD100217).

**DIFFICULTY REPORTING:**

If you have questions or need further assistance, call the Atari Techline Specialist.

Inside California  
(800) 672-1466

Outside California  
(800) 538-1535



Consumer Product Service  
Manager of Technical Support  
**TECH TIP**

TT  
HCD  
**19**

number

MODEL:

ATARI 1200XL CPU

DATE:

August 15, 1983

SUBJECT:

No Picture on Star Raiders™.

PROBLEM:

Some 1200XL CPU's display no picture when the Star Raiders cartridge is powered up.

DESCRIPTION:

The reset timing to the 6502 CPU is incorrect for the cartridge. The placement of a 1000pF (NPO, 50VDC) capacitor between Pins 3 and 7 on U16 eliminates this problem.

SOLUTION:

Solder one lead of a 1000pF NPO, 50VDC capacitor (C014131-01) to Pin 3 of U16, and the other lead to Pin 7 of U16.

TESTING AND TROUBLESHOOTING:

These changes do not affect the troubleshooting procedures outlined in the 1200XL Home Computer Field Service Manual (FD100217).

DIFFICULTY REPORTING:

If you have questions or require further explanation concerning this Tech Tip, contact your Atari Techline Specialist:

Inside California  
(800) 672-1466

Outside California  
(800) 538-1535