Table of Contents

Table of Contents ..... Sheet 1A

MAJOR HAVOC Main Wiring Diagram (041335-01 A) ..... Sheet 1B

MAJOR HAVOC Regulator/Audio II PCB Schematic Diagram (035435-02 H) . Sheet 2A

MAJOR HAVOC Color X-Y Power Supply Wiring Diagram (037394-01 D) ... Sheet 2B

MAJOR HAVOC Game Interfaces ..... Sheet 3A

Coin Door Wiring Diagram (A037542-01 E),
Utility Panel Wiring Diagram (A039254-01 C),
Fluorescent Light Wiring Diagram (035833-01 A)
Coupler PCB Schematic (A035220-02 D)

MAJOR HAVOC Memory Map–Alpha (α) Microprocessor ..... Sheet 3B

MAJOR HAVOC Memory Map– Gamma (γ) Microprocessor ..... Sheet 4A

Game PCB Schematics (041347-01 A), Sheets 4B–10A

Power Input, Microprocessor Clock, Alpha Clock, Microprocessor Timing Chain, Watchdog and Reset ..... Sheet 4B

Alpha Input/Output, Power Up Reset, Alpha Microprocessor ..... Sheet 5A

Program ROM, Program RAM, Decoder ..... Sheet 5B

Vector Generator Memory, OP Code and Intensity Latches ..... Sheet 6A

Vector Generator Data Shifters, Vector Generator Address Controller, Vector Generator State Machine ..... Sheet 6B

Vector Generator Oscillator, Vector Generator Timing Chain, Vector Flag, Center Flag, Halt Flag, Normalization Flag ..... Sheet 7A

Vector Generator Timer, Binary Scaling ..... Sheet 7B

Window, Linear Scaling– Bipolar Offset Adjustments ..... Sheet 8A

Y Output, X Output– X and Y Video Adjustments ..... Sheet 8B

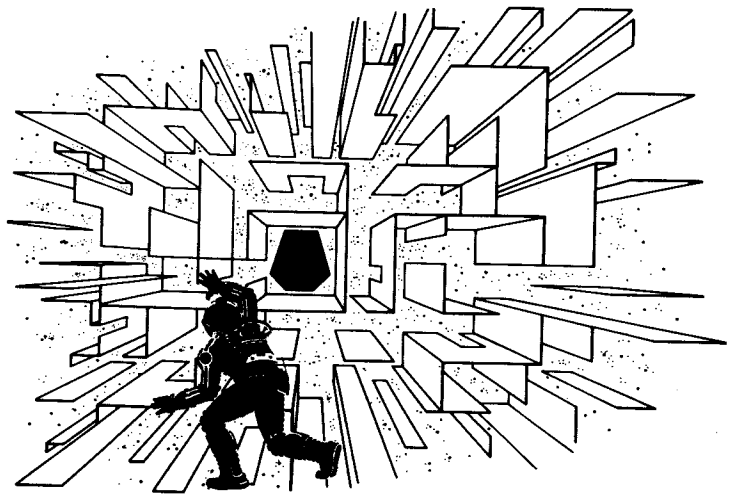
Sparkle, RGB Output ..... Sheet 9A

Gamma Microprocessor, Alpha/Gamma Communication Port ..... Sheet 9B

Gamma Input/Output, Audio ..... Sheet 10A

NOTE

This staple temporarily holds the schematic package together. Remove the staple before using these schematics.



Schematic Package Supplement to

The Adventures of

MAJOR HAVOC

Operators Manual

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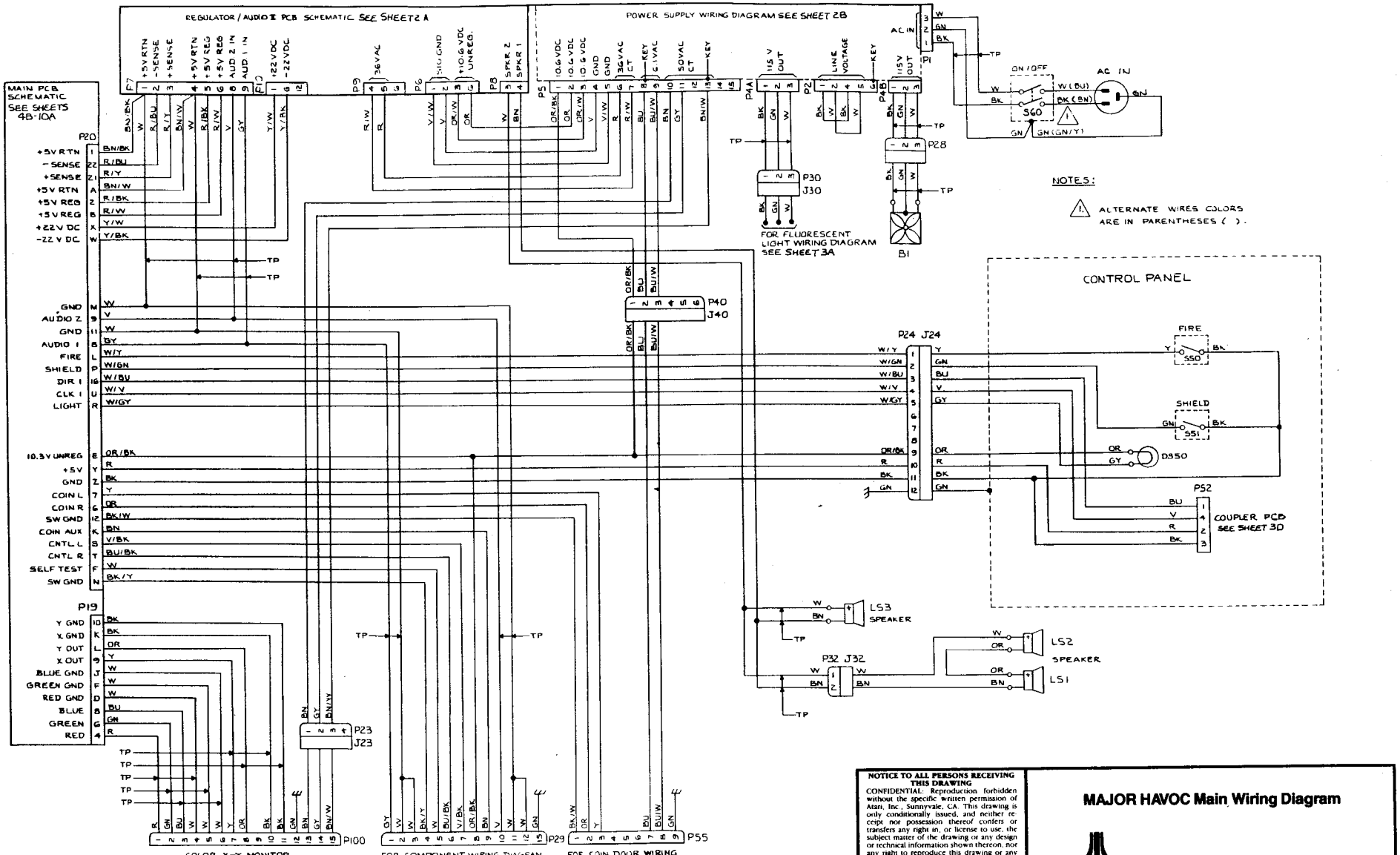

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MAJOR HAVOC Main Wiring Diagram

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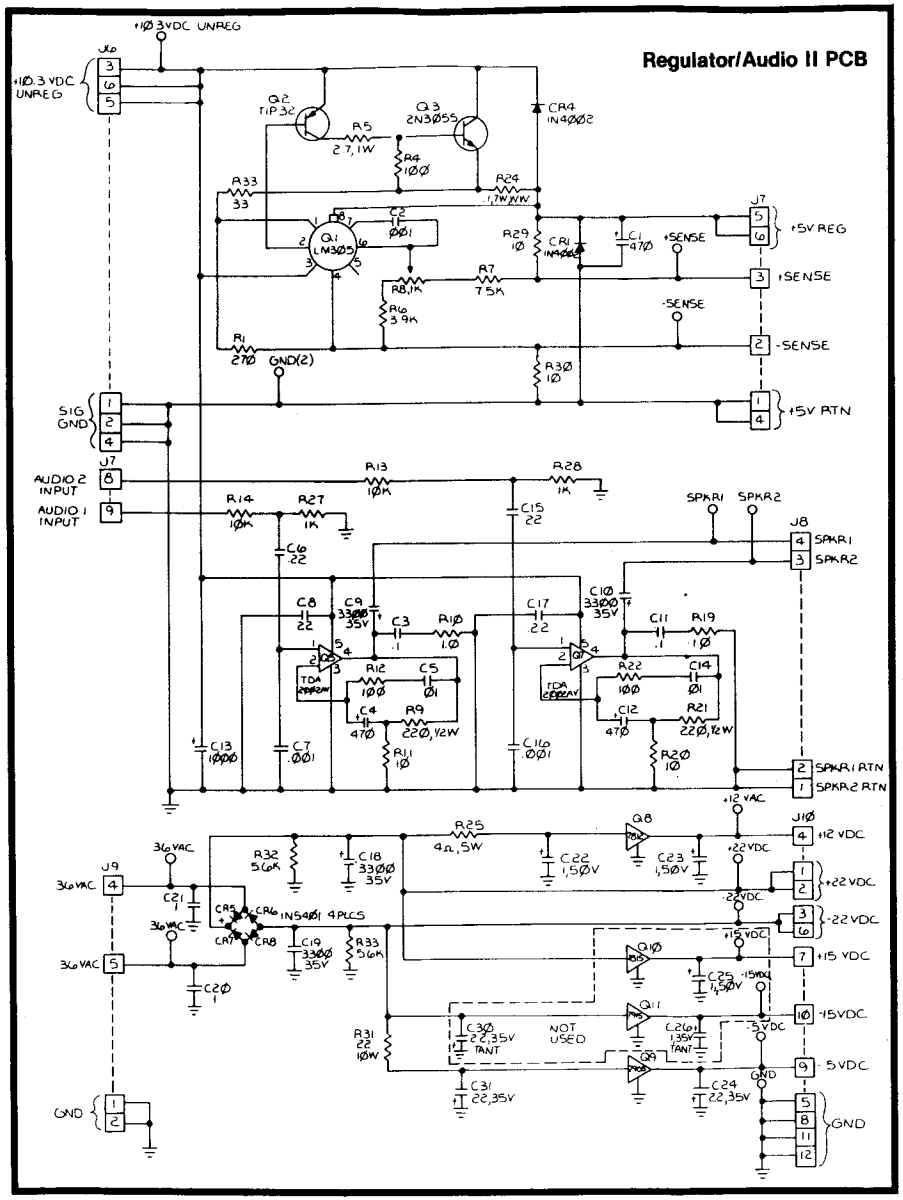

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MAJOR HAVOC Regulator/Audio II PCB
Schematic Diagram

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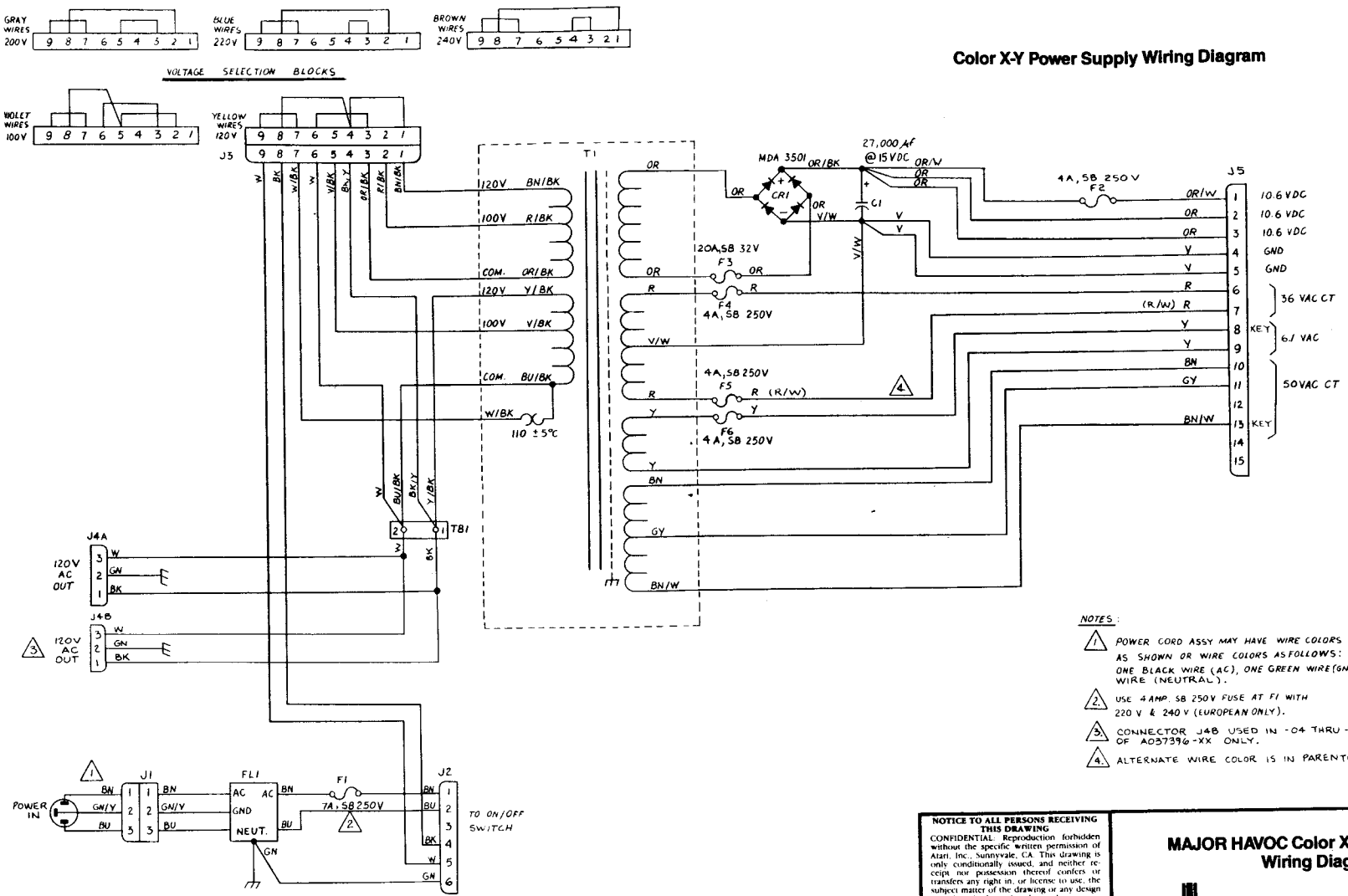
Color X-Y Power Supply Wiring Diagram



NOTES:

1. POWER CORD ASSY MAY HAVE WIRE COLORS AS SHOWN OR WIRE COLORS AS FOLLOWS: ONE BLACK WIRE (AC), ONE GREEN WIRE (GND), & ONE WHITE WIRE (NEUTRAL).
2. USE 4 AMP. SB 250 V FUSE AT F1 WITH 220 V & 240 V (EUROPEAN ONLY).
3. CONNECTOR J4B USED IN -04 THRU -06 VERSIONS OF A037396-XX ONLY.
4. ALTERNATE WIRE COLOR IS IN PARENTHESES.

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MAJOR HAVOC Color X-Y Power Supply Wiring Diagram

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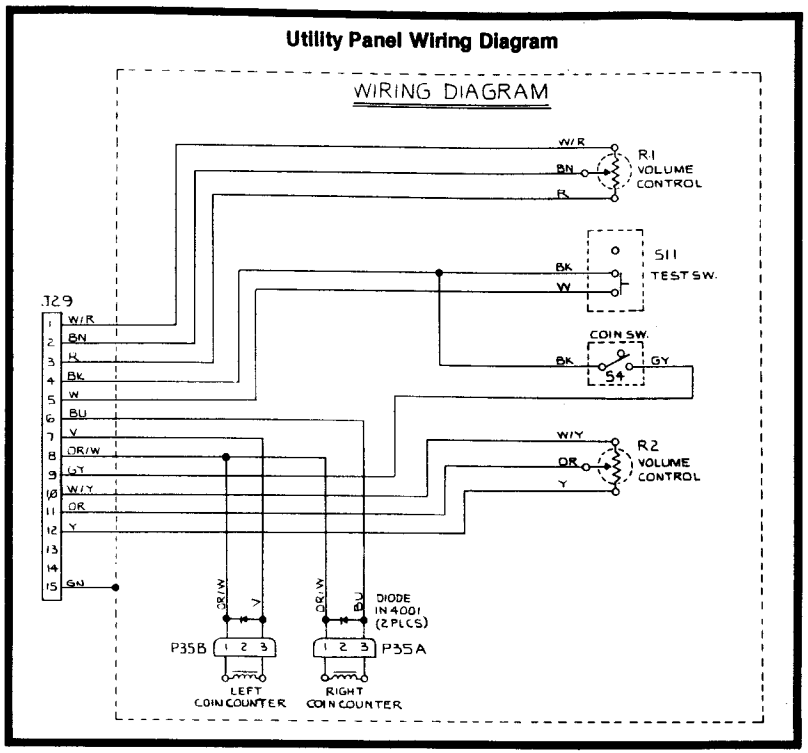
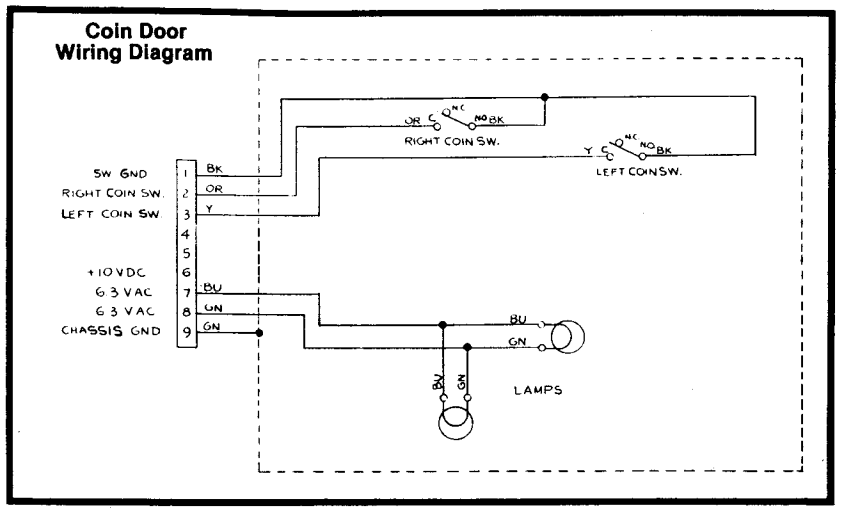
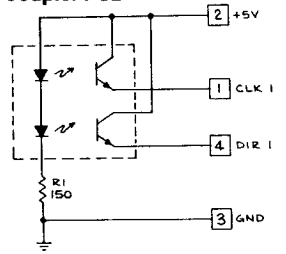
Utility Panel Wiring Diagram



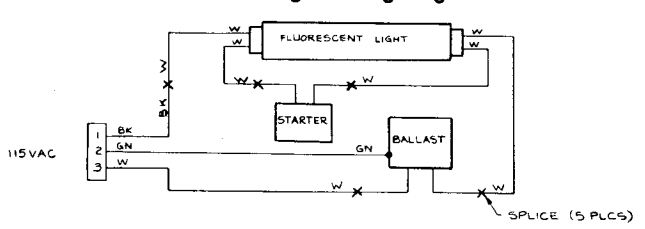
Coin Door Wiring Diagram



Coupler PCB



Fluorescent Light Wiring Diagram



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MAJOR HAVOC Game Interfaces

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Major Havoc Memory Map
Alpha (α) Microprocessor

HEXA-DECIMAL ADDRESS	ADDRESS BUS SIGNAL LINES A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	READ/WRITE	DATA BUS SIGNAL LINES D7	D6	D5	D4	D3	D2	D1	D0	FUNCTION
0000–01FF	0	0	0	0	0	0	0	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	PROGRAM RAM (1/2K)
0200–07FF	0	0	0	0	0	A	A	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	PAGED PROGRAM RAM (3K)
0800–09FF	0	0	0	0	1	0	0	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	PROGRAM RAM (1/2K)
1000	0	0	0	1	0	0	0										R	D	D	D	D	D	D	D	D	GAMMA COMM. READ PORT
1200	0	0	0	1	0	0	1										R	D								RIGHT COIN SW. (PLAYER 1=0)
1200	0	0	0	1	0	0	1										R		D							LEFT COIN SW. (PLAYER 1=0)
1200	0	0	0	1	0	0	1										R			D						AUX. COIN SW. (PLAYER 1=0)
1200	0	0	0	1	0	0	1										R	D								SELF-TEST (PLAYER 1=1)
1200	0	0	0	1	0	0	1										R		D							CABINET SW. (PLAYER 1=1)
1200	0	0	0	1	0	0	1										R			D						AUX. COIN SW. (PLAYER 1=1)
1200	0	0	0	1	0	0	1										R					D				GAMMA RCVD FLAG
1200	0	0	0	1	0	0	1										R						D			GAMMA XMTD FLAG
1200	0	0	0	1	0	0	1										R							D		2.4KHz
1200	0	0	0	1	0	0	1										R								D	VEC. GEN. HALT FLAG
1400–141F	0	0	0	1	0	1	0					A	A	A	A		W					D	D	D	D	COLORAM
1600	0	0	0	1	0	1	1	0	0	0							W	D								INVERT Y
1600	0	0	0	1	0	1	1	0	0	0							W		D							INVERT X
1600	0	0	0	1	0	1	1	0	0	0							W			D						PLAYER 1
1600	0	0	0	1	0	1	1	0	0	0							W					D				GAMMA RESET
1600	0	0	0	1	0	1	1	0	0	0							W								D	ROLLER CONTROL LIGHT
1640	0	0	0	1	0	1	1	0	0	1							W									VEC. GEN. GO
1680	0	0	0	1	0	1	1	0	1	0							W									WATCHDOG CLEAR
16C0	0	0	0	1	0	1	1	0	1	1							W									VEC. GEN. RESET
1700	0	0	0	1	0	1	1	1	0	0							W									IRQ ACKNOWLEDGE
1740	0	0	0	1	0	1	1	1	0	1							W									PROGRAM ROM MMU
1780	0	0	0	1	0	1	1	1	1	0							W									PROGRAM RAM SELECT
17C0	0	0	0	1	0	1	1	1	1	1							W									GAMMA COMM. WRITE PORT
2000–3FFF	0	0	1	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	PAGED PROG. ROM (32K)
4000–4FFF	0	1	0	0	A	A	A	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	VEC. GEN. RAM (4K)
5000–5FFF	0	1	0	1	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	VEC. GEN. ROM (4K)
6000–7FFF	0	1	1	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	PAGED VEC. GEN. ROM (32K)
8000–FFFF	1	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	PROGRAM ROM (32K)

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MAJOR HAVOC Memory Map
Alpha (α) Microprocessor

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Major Havoc Memory Map
Gamma (γ) Microprocessor

HEXA-DECIMAL ADDRESS	ADDRESS BUS SIGNAL LINES A15	A14	A13	A12	A11	A10	A9	A8	A7	A6	A5	A4	A3	A2	A1	A0	READ/ WRITE	DATA BUS SIGNAL LINES D7	D6	D5	D4	D3	D2	D1	D0	FUNCTION
0000–07FF	0	0	0			A	A	A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	PROGRAM RAM (2K)
2000–203F	0	0	1	0	0						A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	QUAD. CUSTOM I/O
2800	0	0	1	0	1												R	D							FIRE 1 SWITCH
2800	0	0	1	0	1												R		D						SHIELD 1 SWITCH
2800	0	0	1	0	1												R			D					FIRE 2 SWITCH
2800	0	0	1	0	1												R				D				SHIELD 2 SWITCH
2800	0	0	1	0	1												R							D	ALPHA RCVD FLAG
2800	0	0	1	0	1												R								D	ALPHA XMTD FLAG
3000	0	0	1	1	0												R	D	D	D	D	D	D	D	D	ALPHA COMM. READ PORT
3800–3803	0	0	1	1	1										A	A	R	D	D	D	D	D	D	D	D	ROLLER CONTROL INPUT
4000	0	1	0	0	0												W									IRQ ACKNOWLEDGE
4800	0	1	0	0	1												W							D		LEFT COIN COUNTER
4800	0	1	0	0	1												W								D	RIGHT COIN COUNTER
5000	0	1	0	1	0																			D		ALPHA COMM. WRITE PORT
6000–61FF	0	1	1					A	A	A	A	A	A	A	A	A	R/W	D	D	D	D	D	D	D	D	EEROM
8000–BFFF	1		A	A	A	A	A	A	A	A	A	A	A	A	A	A	R	D	D	D	D	D	D	D	D	PROGRAM ROM

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MAJOR HAVOC Memory Map
Gamma (γ) Microprocessor

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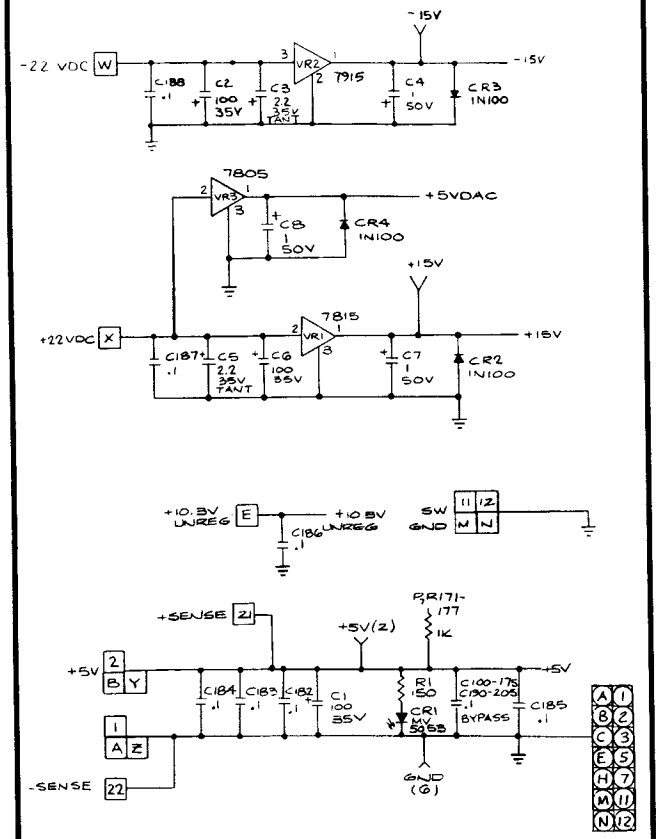
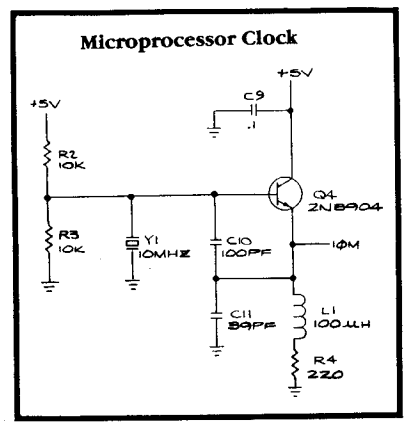
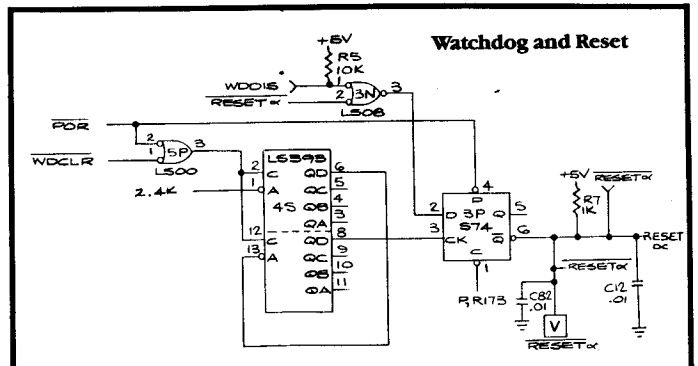
Power Input



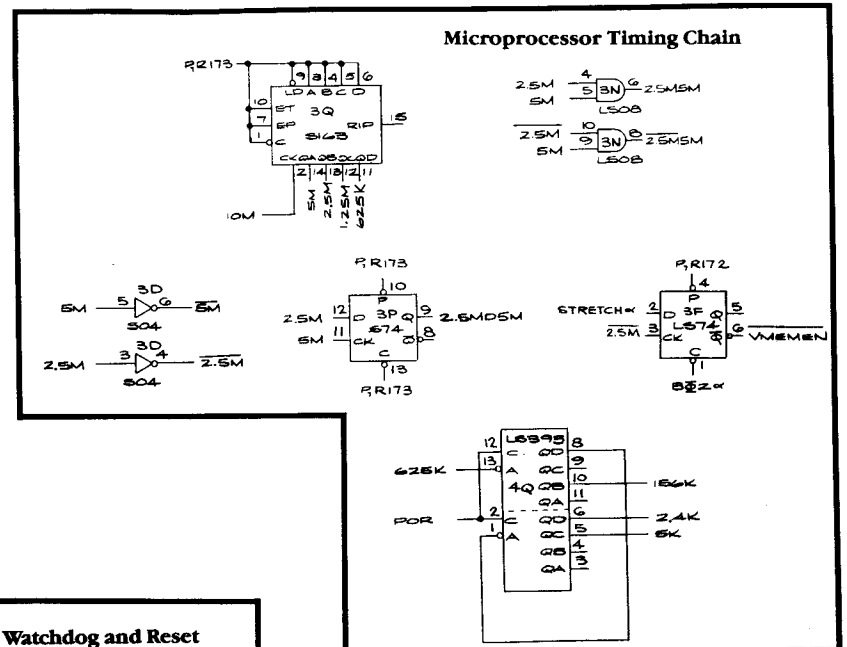
Microprocessor Clock



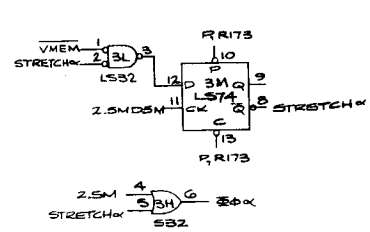
Watchdog and Reset



Microprocessor Timing Chain



Alpha (α) Clock



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MAJOR HAVOC Main PCB Schematic Diagram

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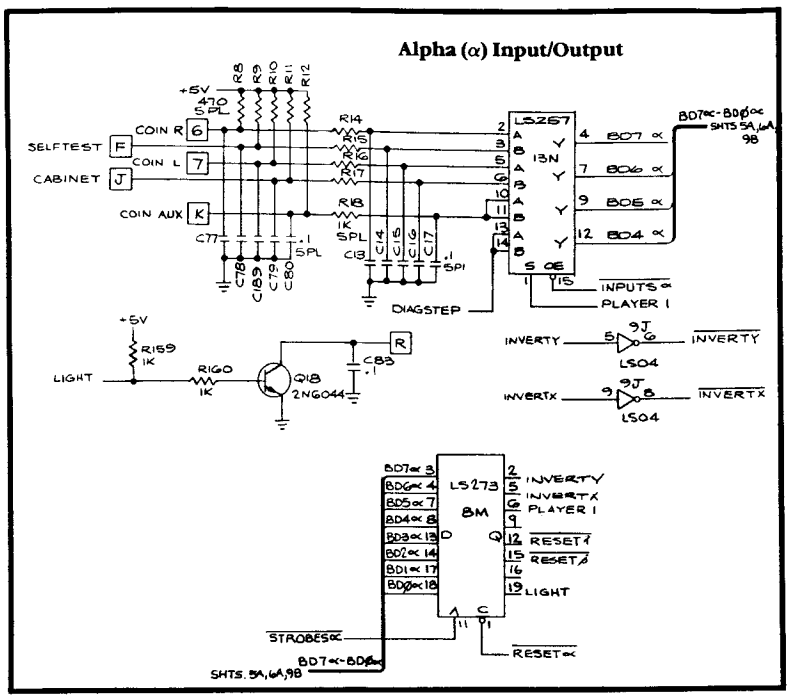

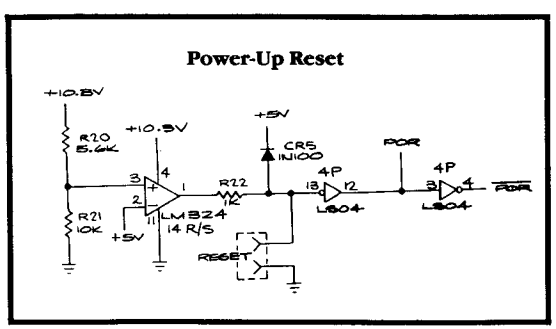

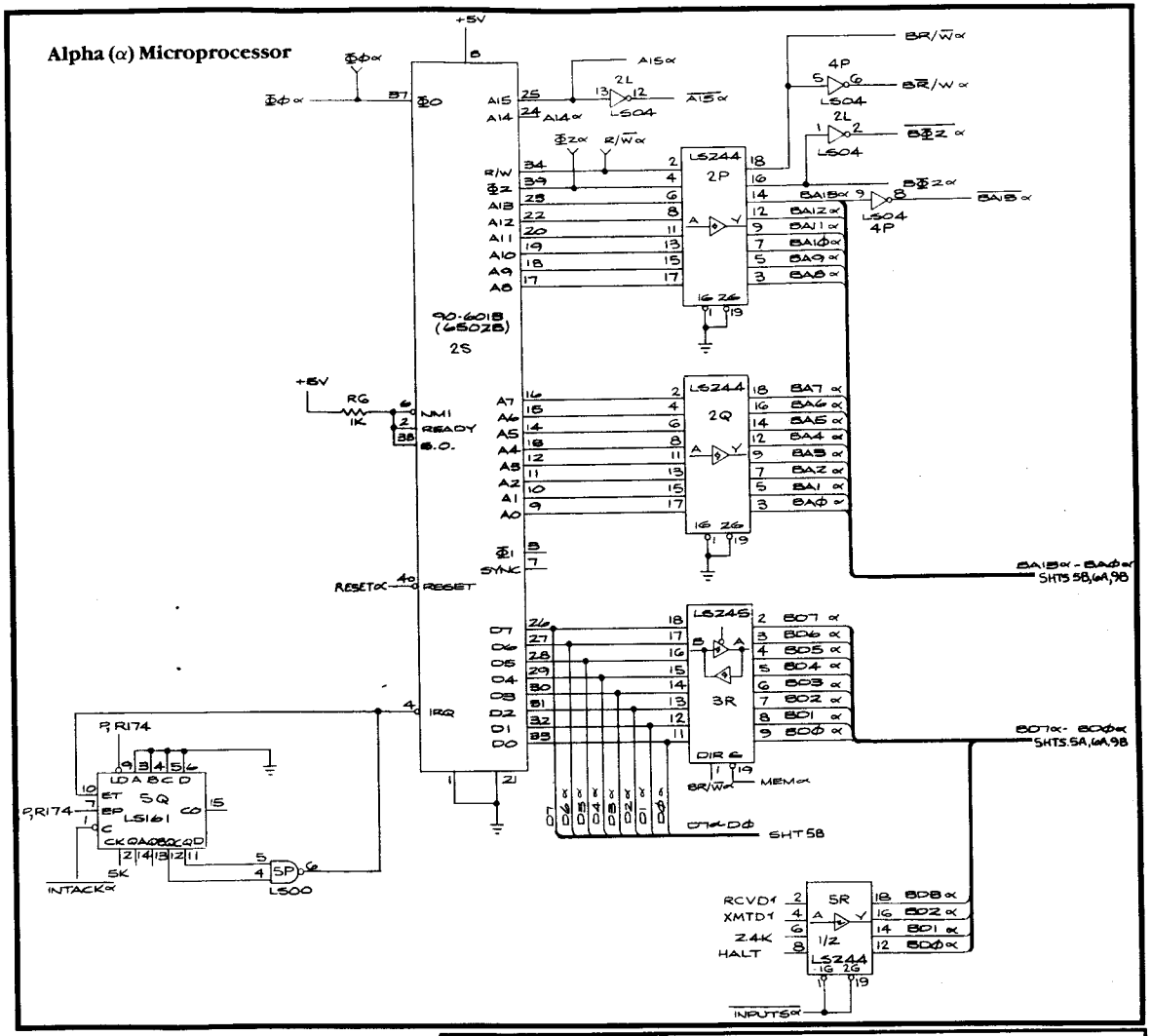

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MAJOR HAVOC Main PCB Schematic Diagram

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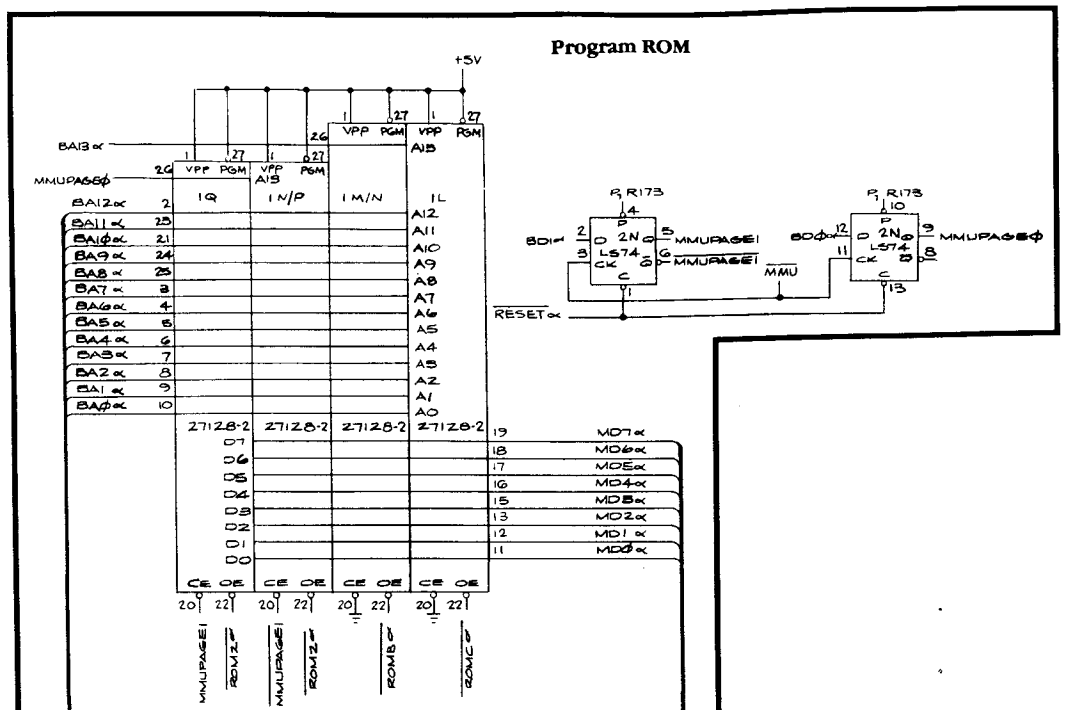

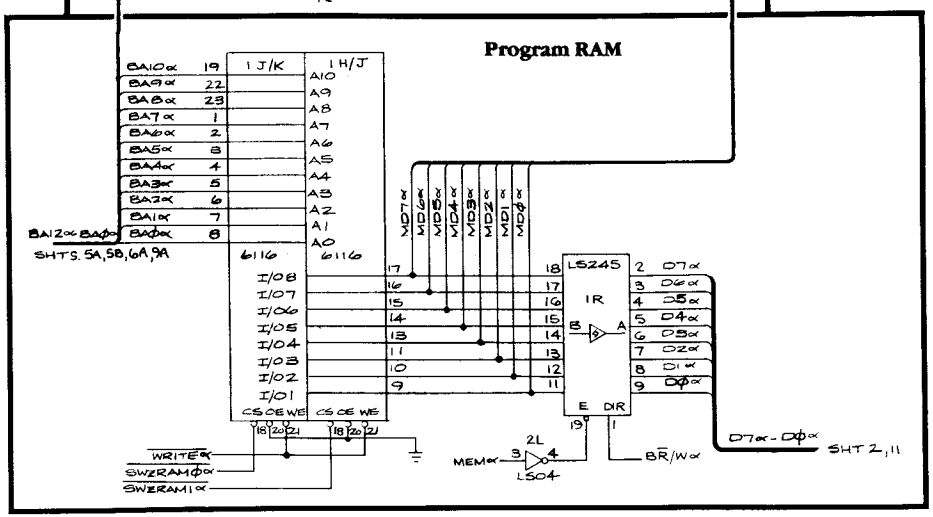

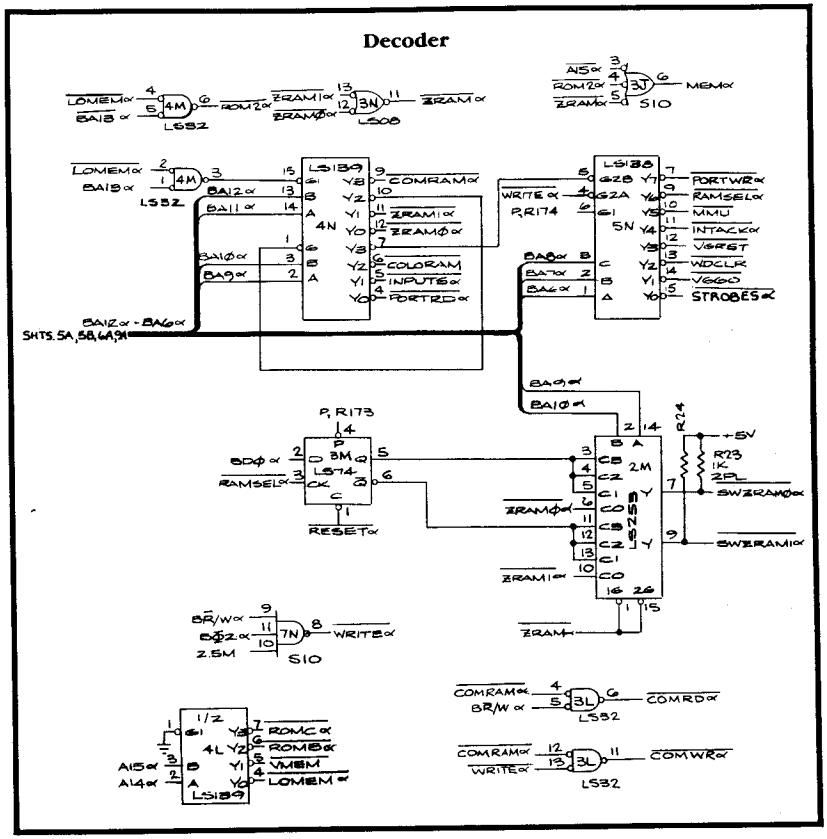

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MAJOR HAVOC Main PCB Schematic Diagram

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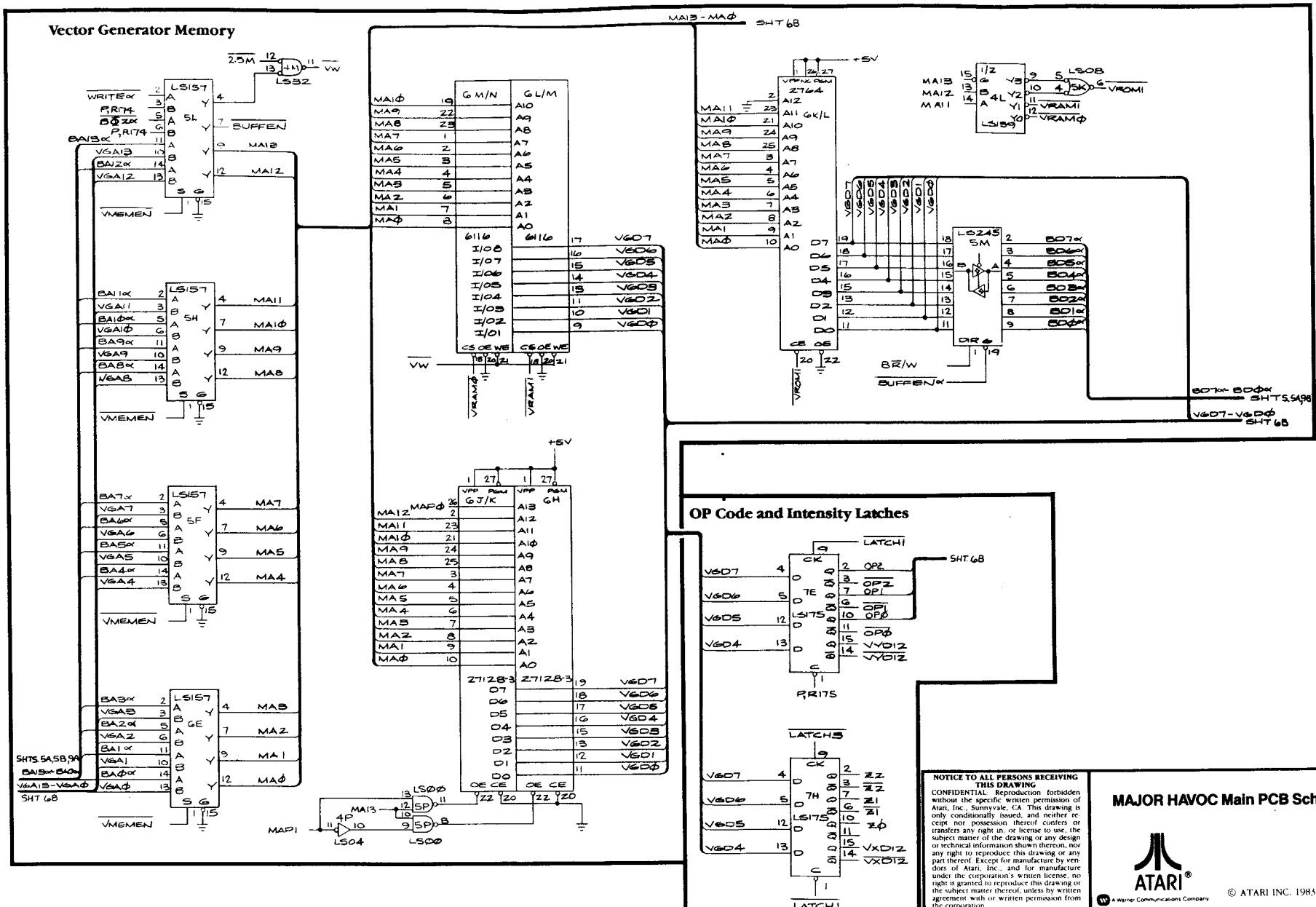
Vector Generator Memory
OP Code and Intensity Latches
MAJOR HAVOC Main PCB Schematic Diagram
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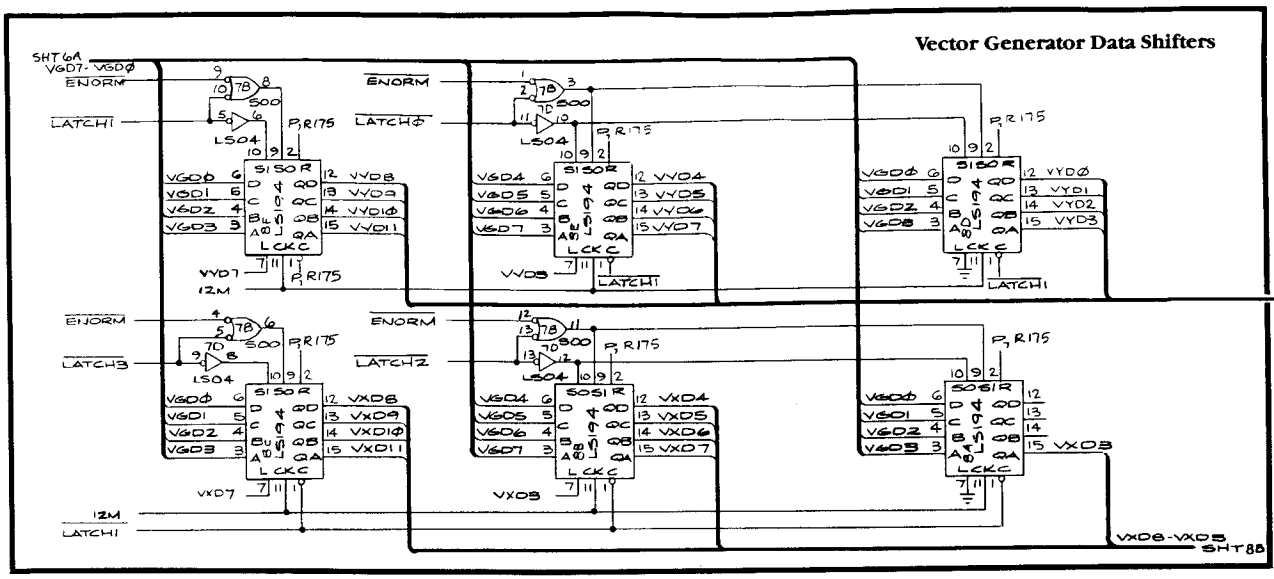

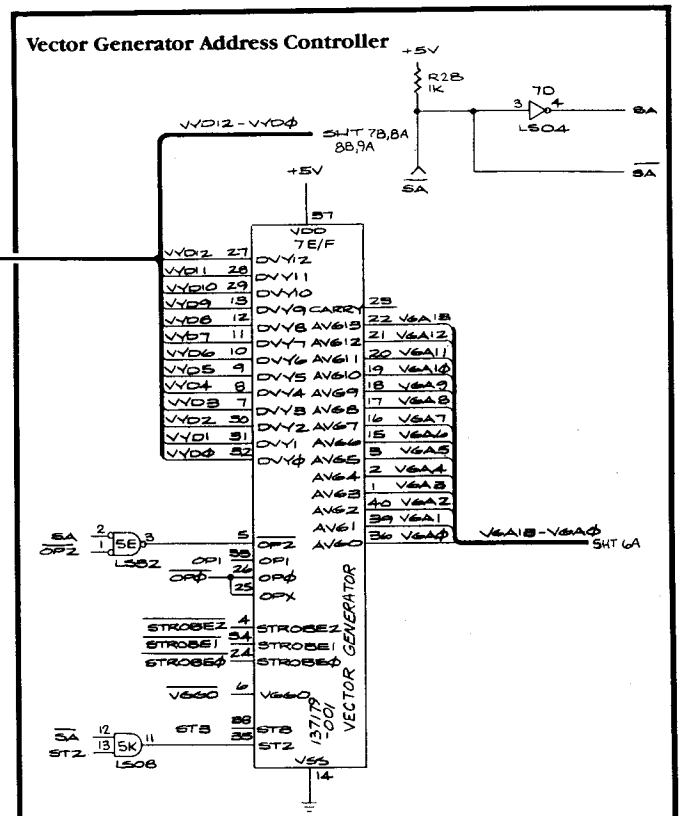

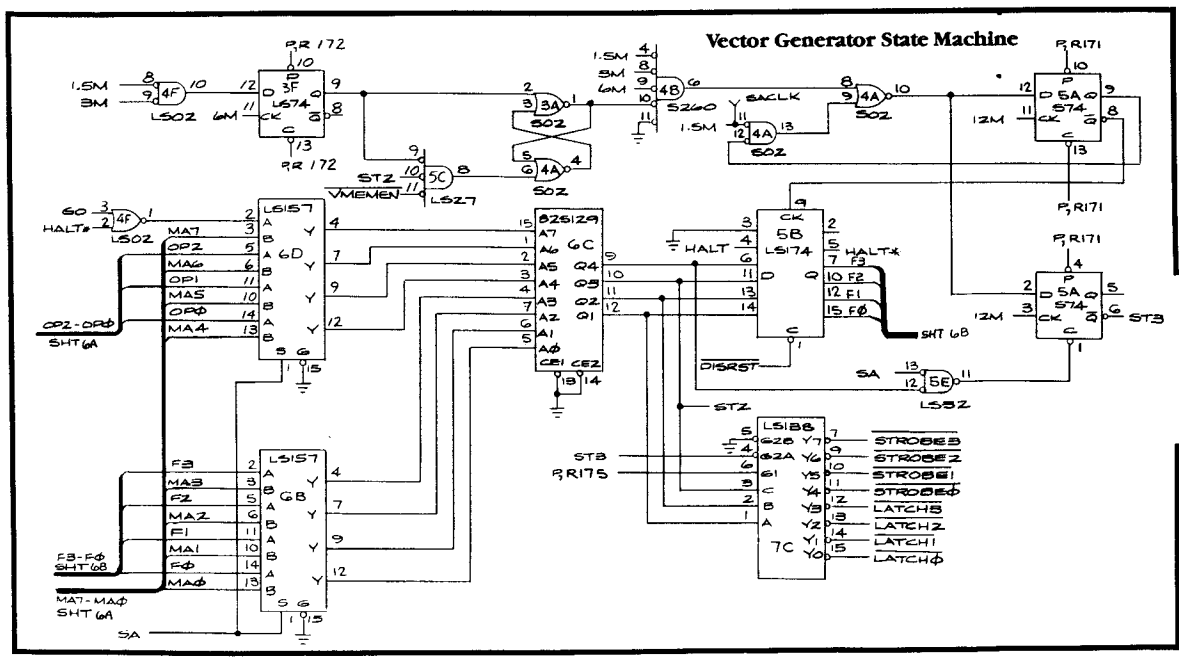

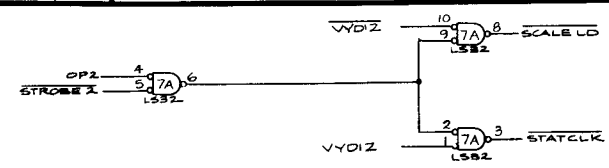

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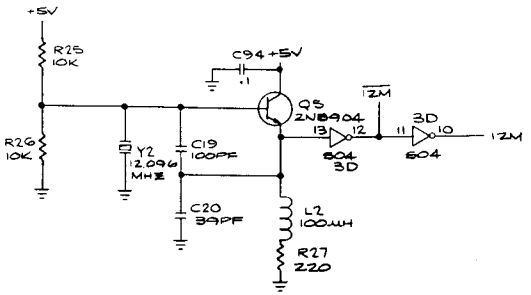
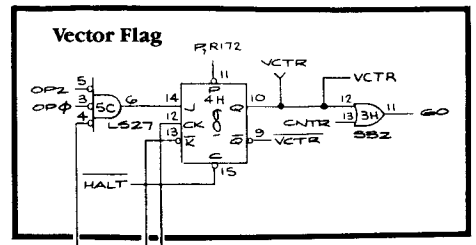
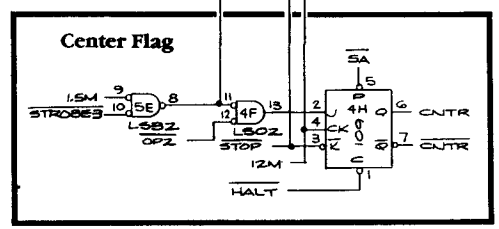
Vector Generator Oscillator



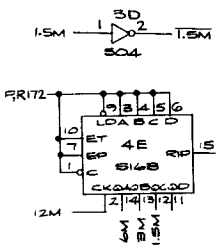
Vector Flag



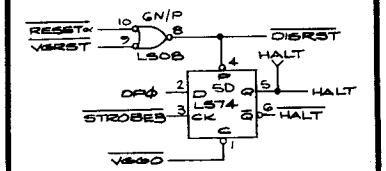
Center Flag



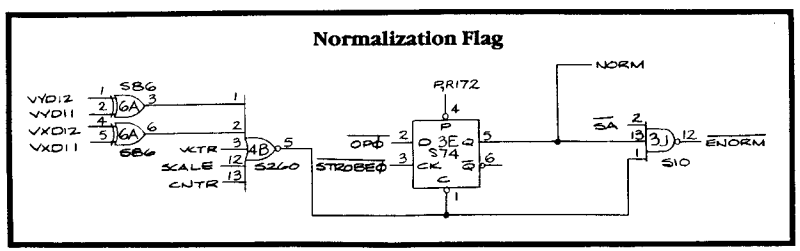
Vector Generator Timing Chain



Halt Flag



Normalization Flag



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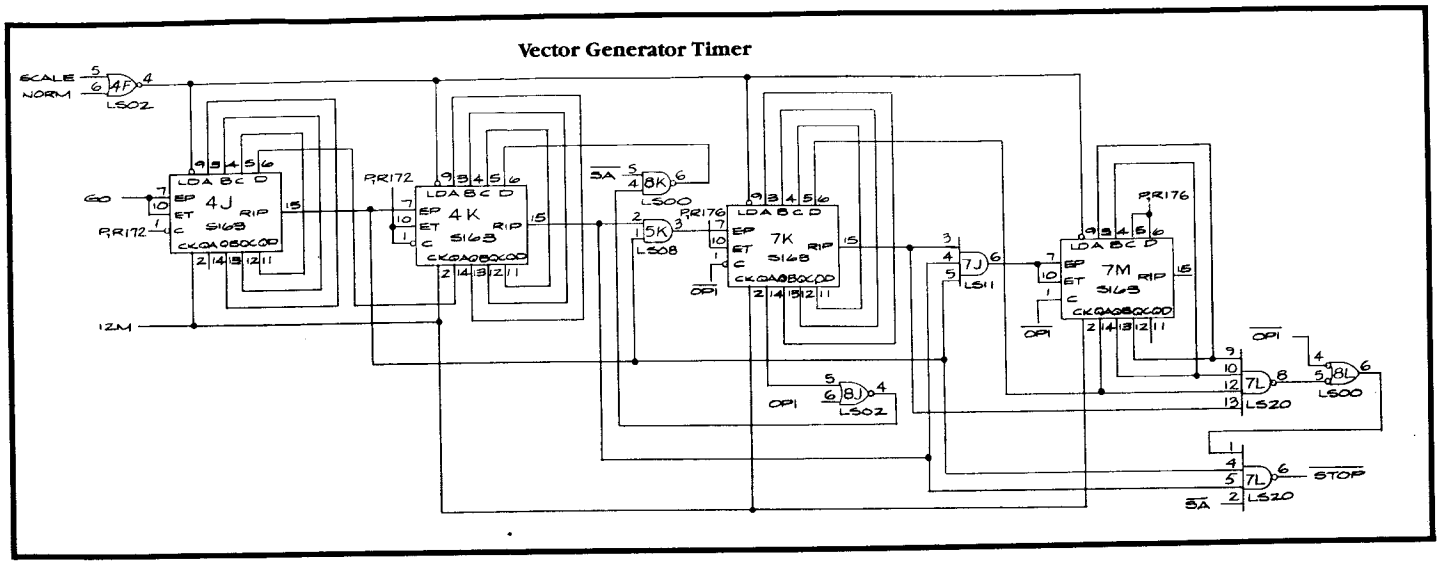
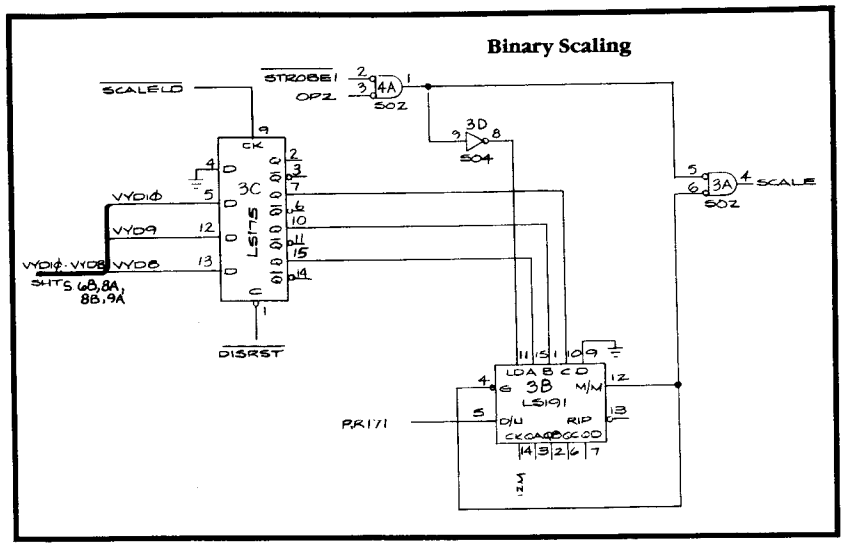
Vector Generator Timer



Binary Scaling



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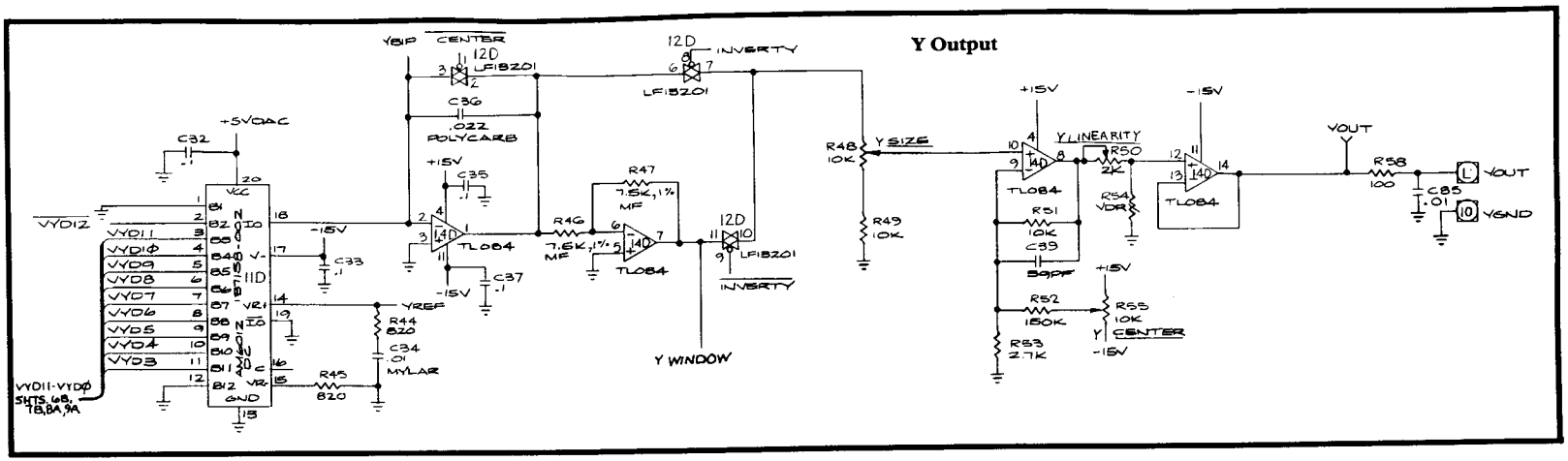
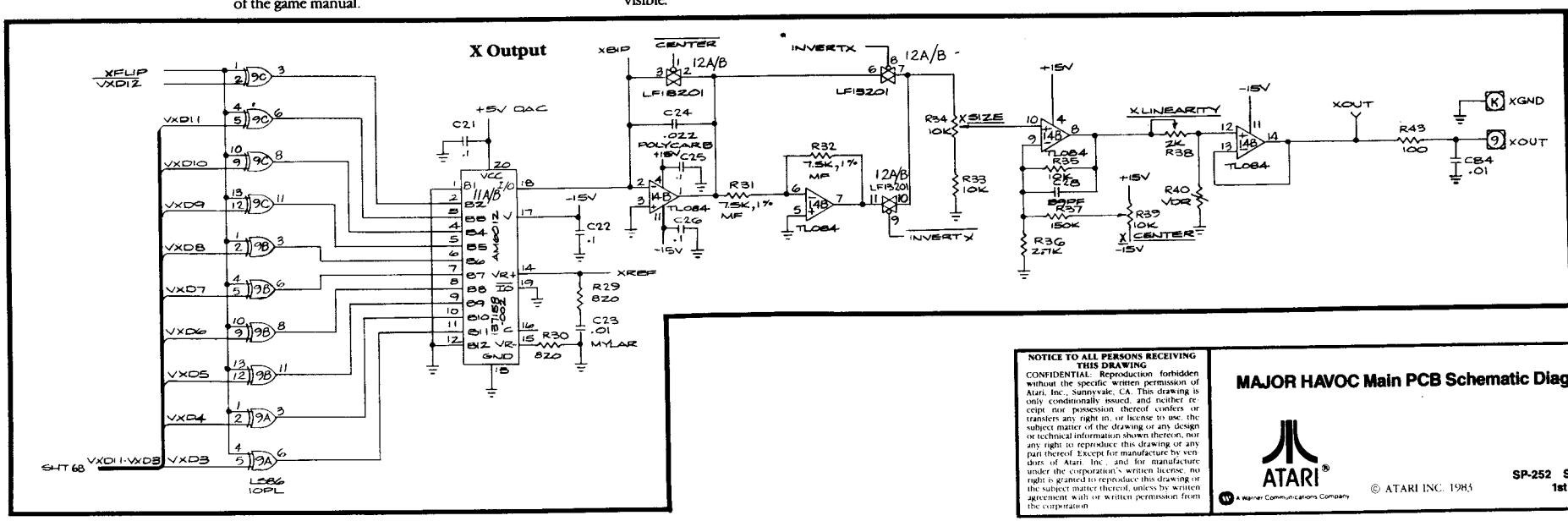


X and Y Video Adjustments

Perform the following procedure to adjust the display size, centering, and linearity:

1. Set the game to the Self-Test Mode and select the Crosshatch Pattern Display as described in Chapter 2 of the game manual.
2. Adjust XCENTER (R39) and YCENTER (R55) so that the crosshatch pattern is centered on the screen.
3. Adjust XSIZE (R34) and YSIZE (R48) so that all four corners of the red outline are off the screen and all four corners of the white outline are completely visible.
4. Adjust XLINEARITY (R38) and YLINEARITY (R50) so that the diagonal lines are straight and the diamond-shaped squares are symmetrical. Since the linearity potentiometers change the size of the display, it may be necessary to repeat step 3 to obtain the correct display.



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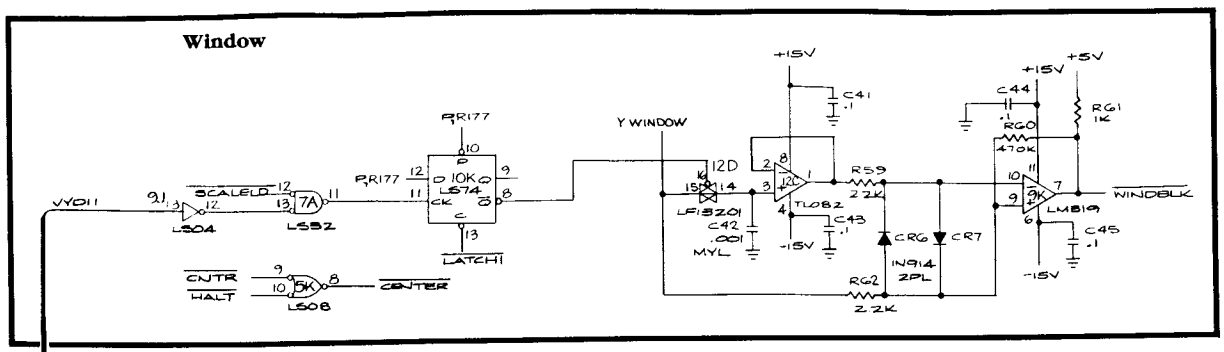
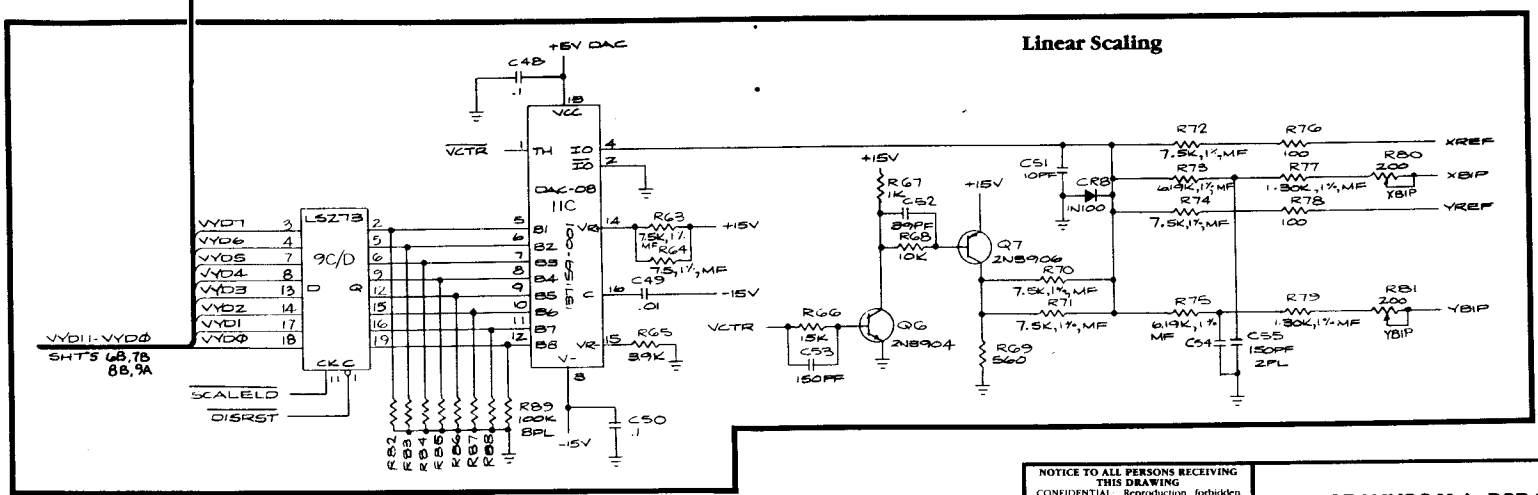


Bipolar Offset Adjustments

Perform the following procedure to adjust the bipolar offset current:

1. Set the game to the Self-Test Mode and select the Bipolar Offset Test Display as described in Chapter 2 of the game manual.
2. Adjust XBIP (R80) and YBIP (R81) so that the lines in the center of the screen cleanly overlap to form a single orange square. The upper right-hand corner of the orange square is the critical adjustment point.



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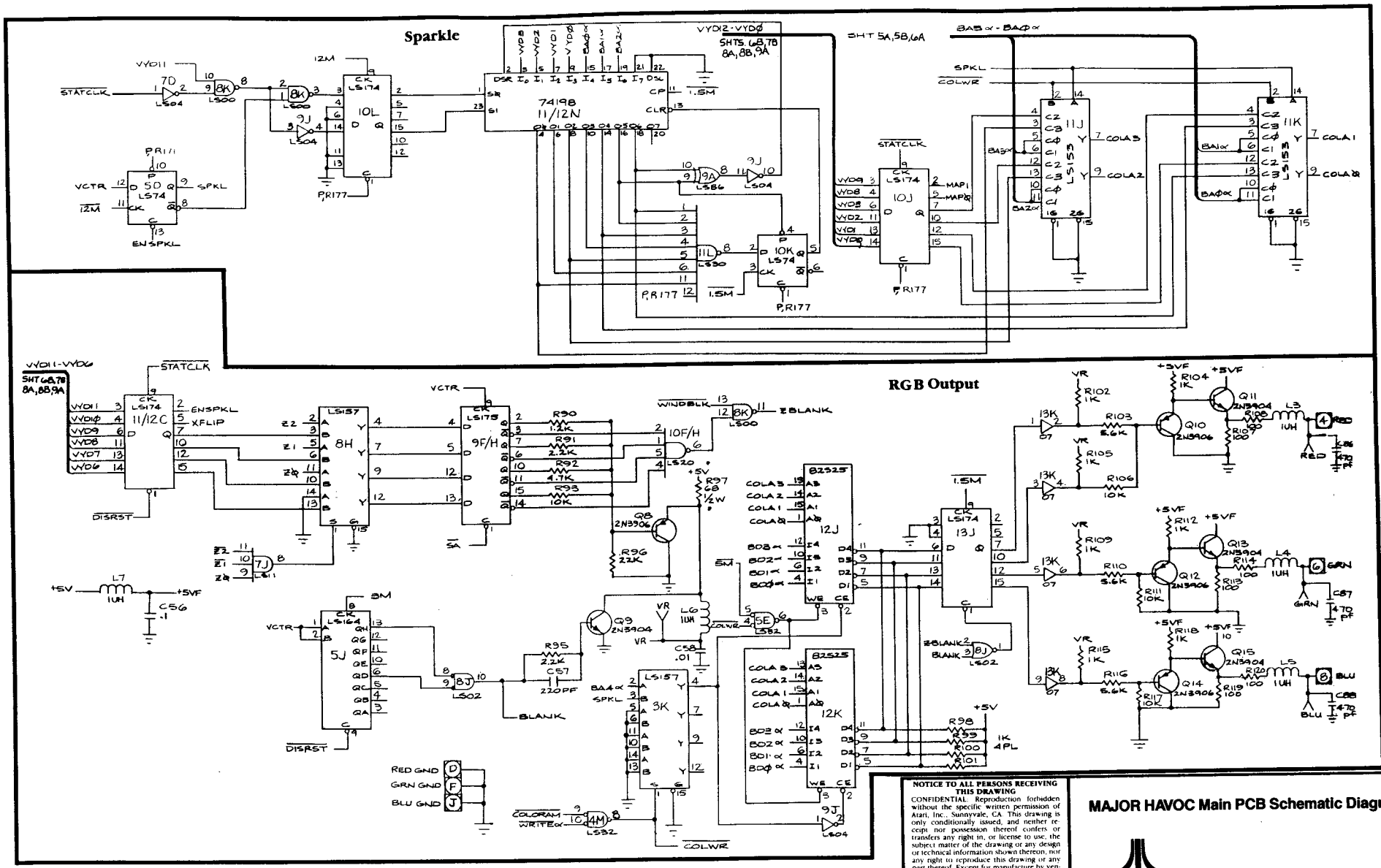
Sparkle
RGB Output
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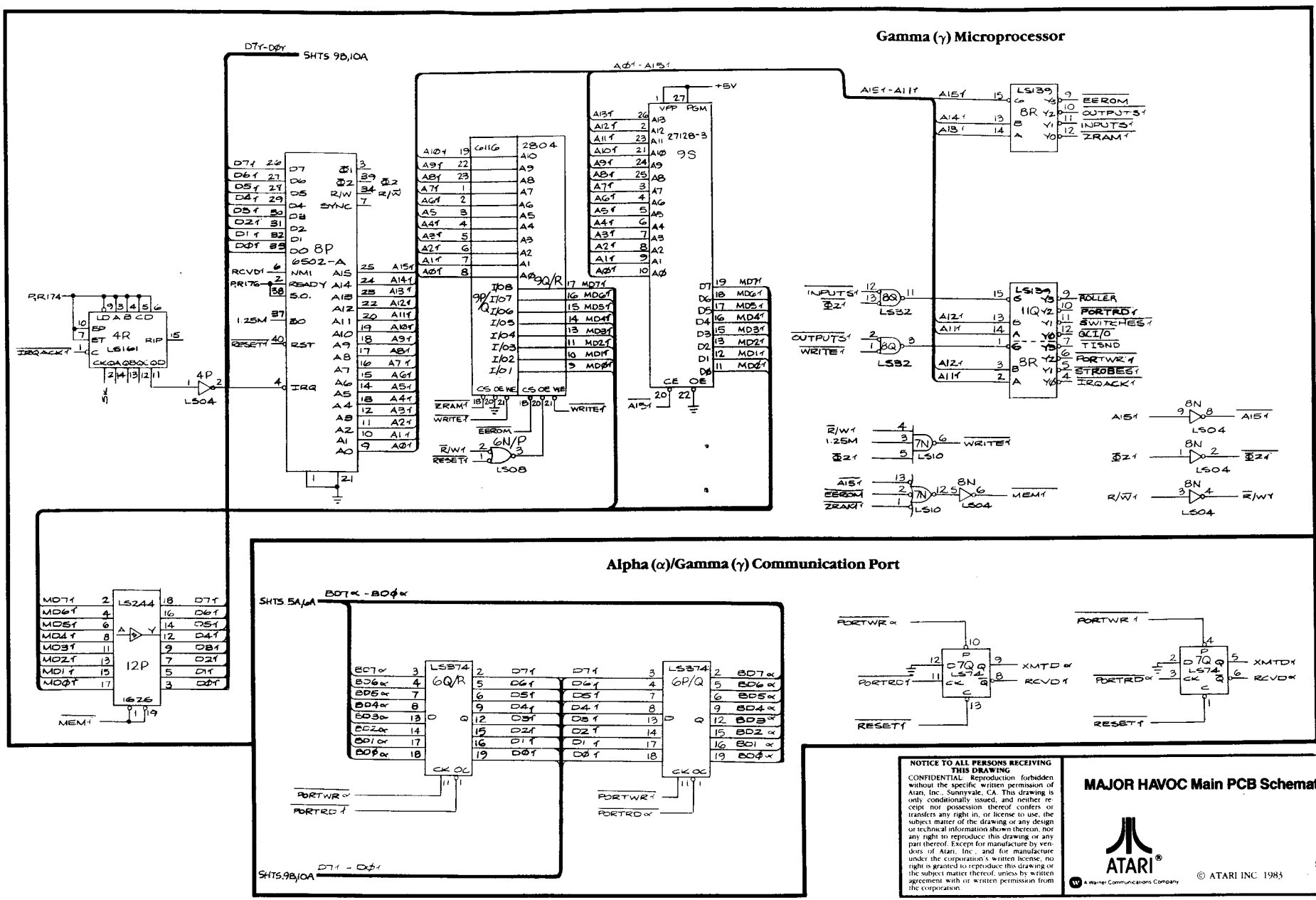

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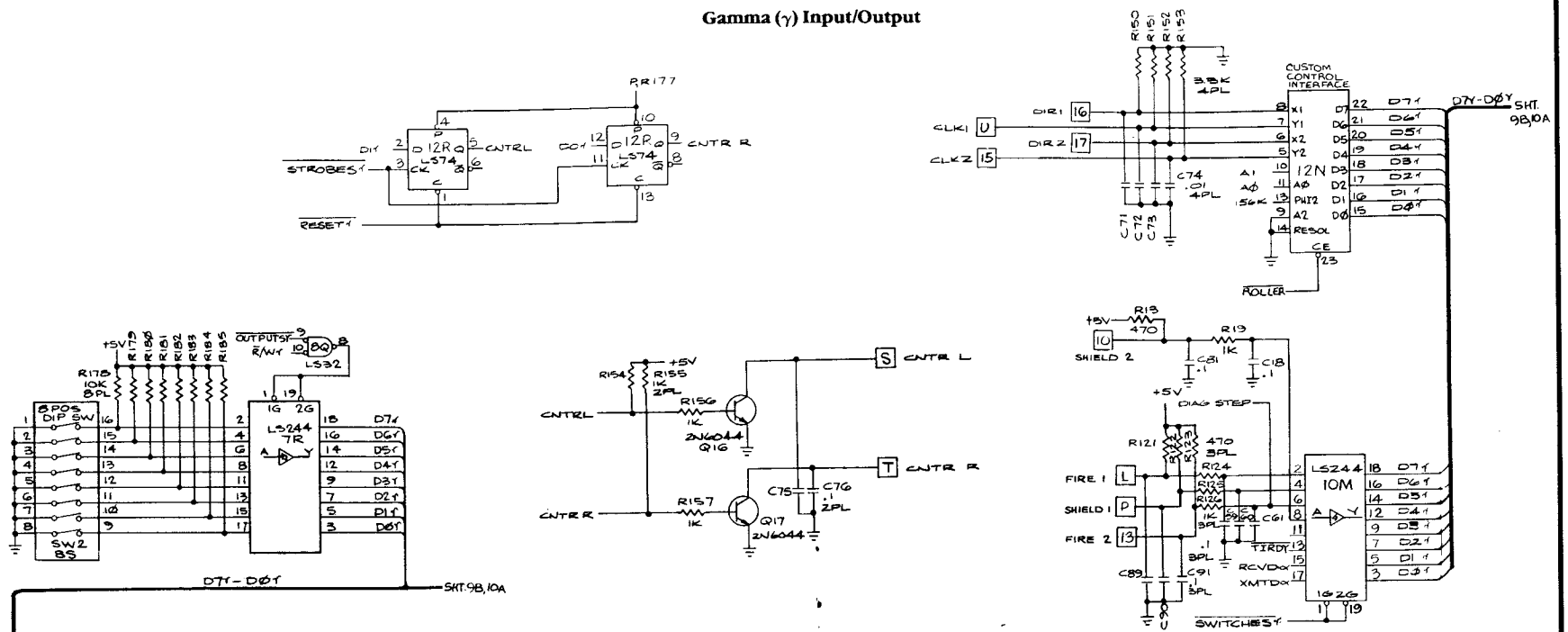
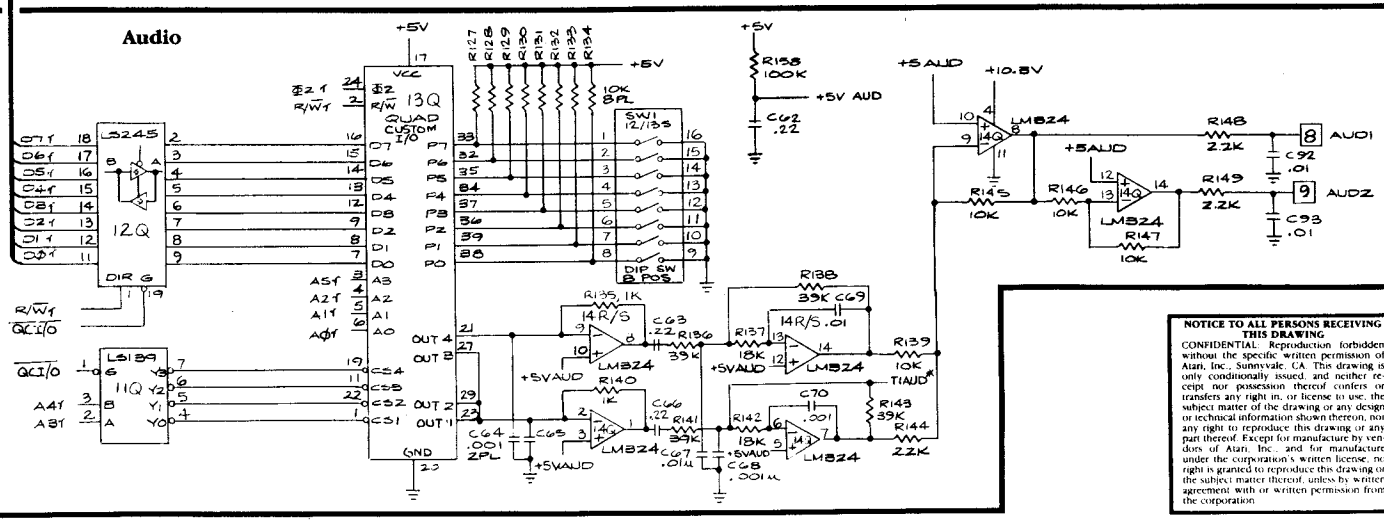
Gamma (γ) Input/Output



Audio



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