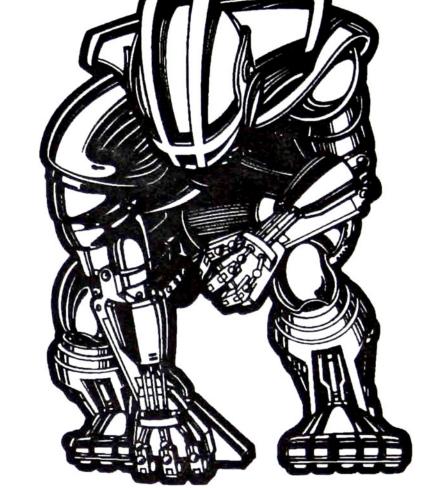
## **Table of Contents**

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| Cyberball™ Game PCB Assembly Schematic Diagram  | Sheets 1-12 |
| Cyberball Memory Map  | Sheet 13    |
| Cyberball Main Wiring Diagram   | Sheet 14    |
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| Wiring Diagrams for Switching/Linear (SL) Power Supply, Hitron 5V 13A Switching Power Supply, and Coin Door | Sheet 18    |



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#### NOTE

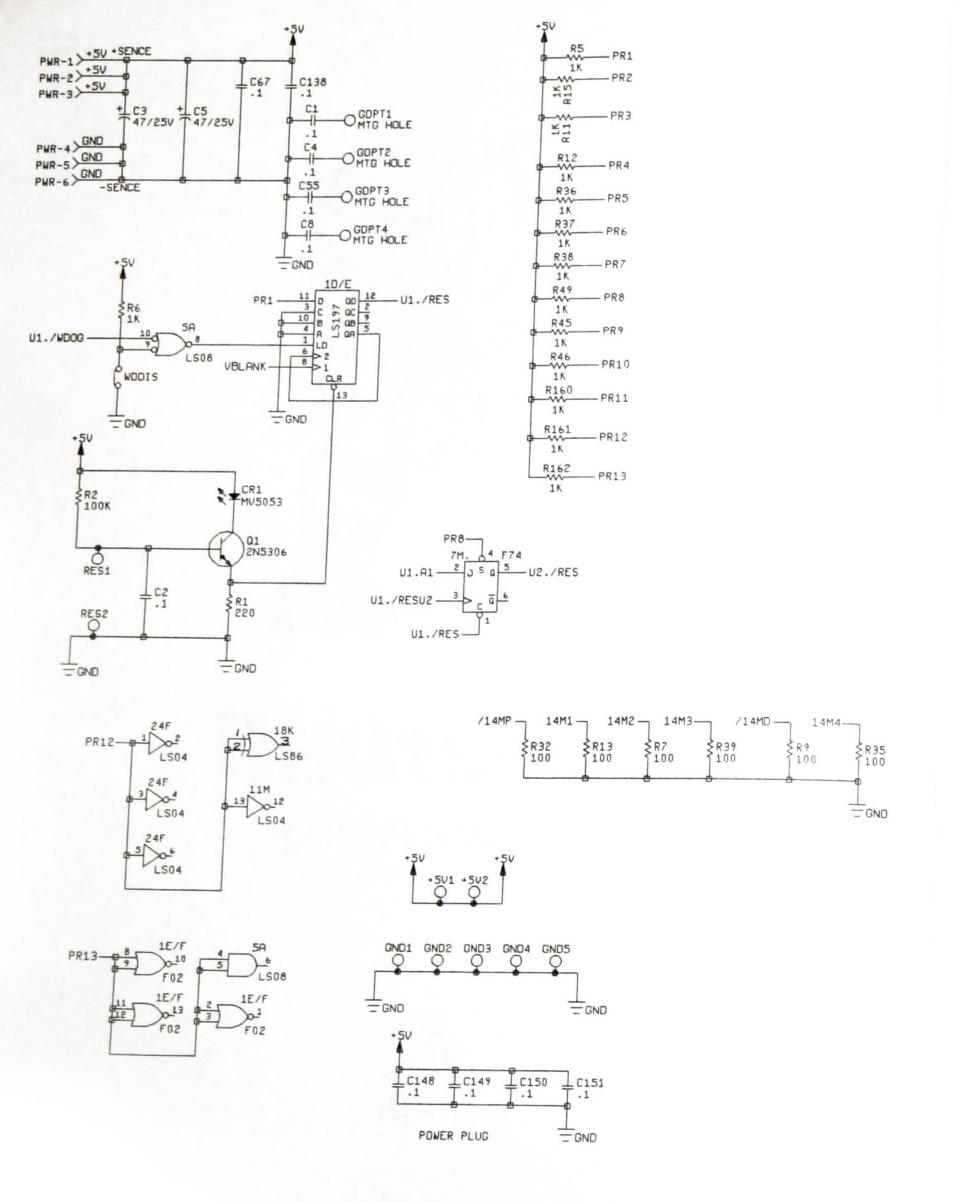
This staple temporarily holds the schematic package together.
Remove the staple before using these schematics



# **Schematic Package**

Supplement to the Operators Manual





## Table 1 RAM and Communication Error Messages

| P 16   |                        | ,00                  |
|--|------------------------|----------------------|
| P22—Working RAM Bad                                  | Display Background Red | Location             |
| Video—Left RAM Bad<br>Video—Right RAM Bad            | Green                  | 4E, 4F<br>9K, 11K    |
| Color RAM-Left Bad                                   | Green<br>Black         | 8K, 10K              |
| Color RAM—Right Bad P22—Common RAM Bad               | Black                  | 21M, 22M<br>25M, 26M |
| P22—Detects Communications Error <sup>3</sup>        | Blue                   | 4E, 4F               |
| P12—Working RAM Bad                                  | Purple<br>Red          | 45 45                |
| P12—Common RAM Bad P12—Detects Communications Error3 | Blue                   | 4E, 4F<br>4E, 4F     |
| If two errors are described for                      | Purple                 |                      |

<sup>1</sup> If two errors are detected, for instance, P2 finds the common RAM bad and P1 finds a communications error, then the screen may be split or may have only one color. However, both messages will appear, no matter what the display background is.

| Table 2 Faulty ROM Locations |                  |                      |        |  |  |  |  |  |  |  |
|------------------------------|------------------|----------------------|--------|--|--|--|--|--|--|--|
| Micro-<br>processor          | Error<br>Address | Location on Game PCI |        |  |  |  |  |  |  |  |
| P1                           | 0                | U=1M                 | L=1K/L |  |  |  |  |  |  |  |
| P2                           | 0                | U=3C/D               | L=1B   |  |  |  |  |  |  |  |
| P2                           | 20000            | U=1C/D               | L=3B   |  |  |  |  |  |  |  |

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### Cyberball™ Game PCB Assembly Schematic Diagram, Faulty RAM/ROM Tables

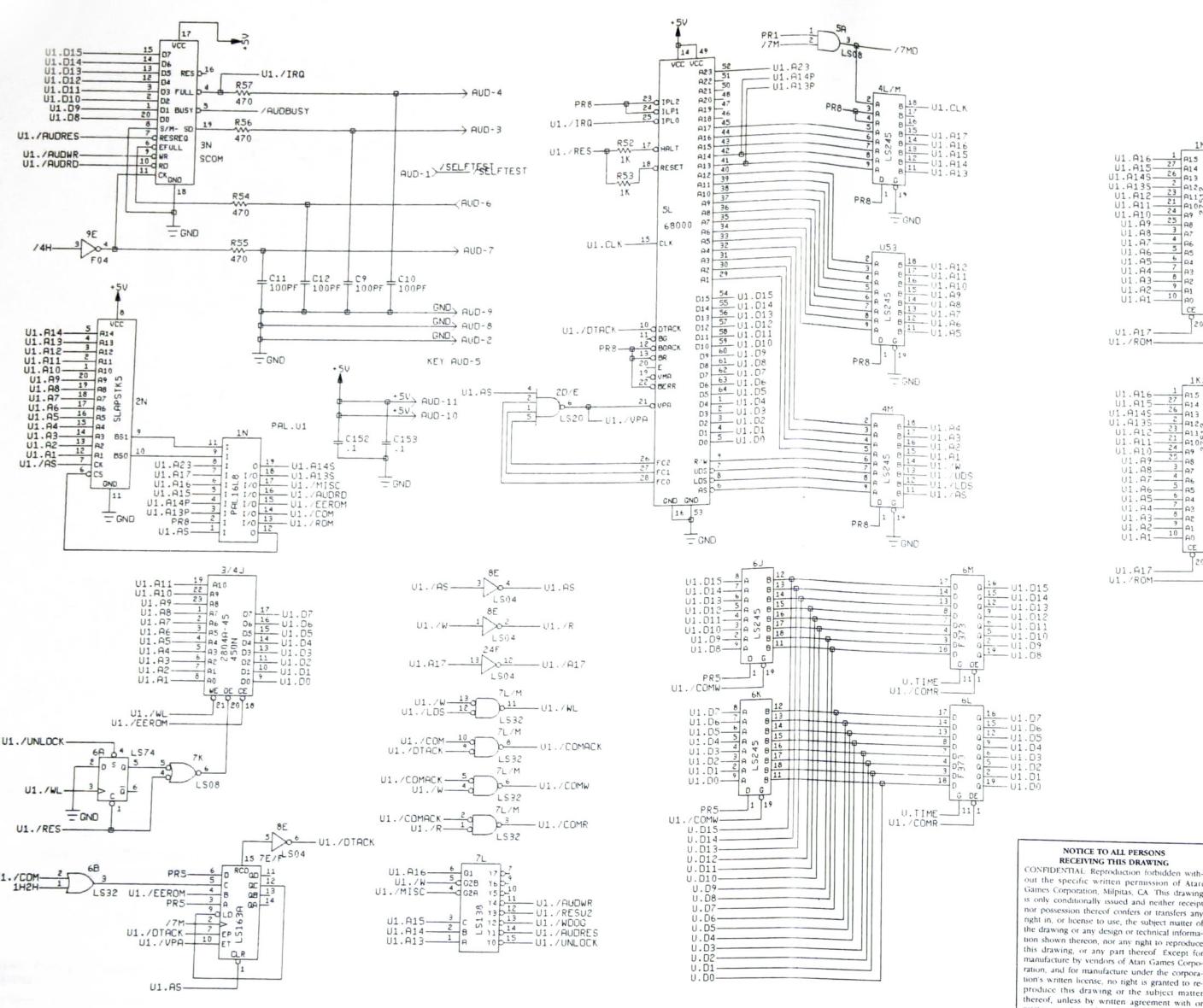


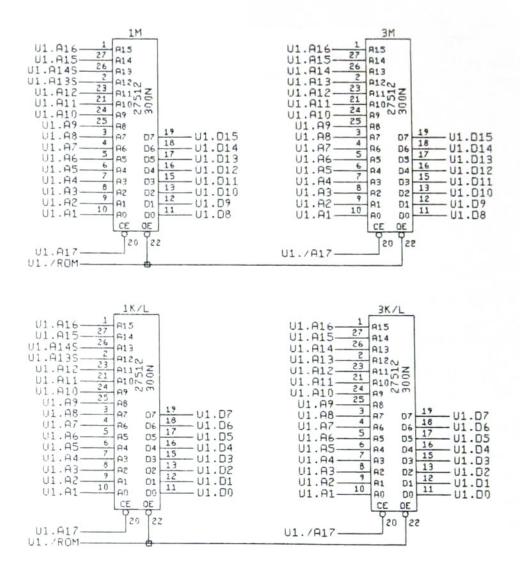
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<sup>&</sup>lt;sup>2</sup> P1 and P2 are the dual microprocessors.

<sup>3 &</sup>quot;Detects Communications Error" applies to communications problems other than the common RAM being bad.





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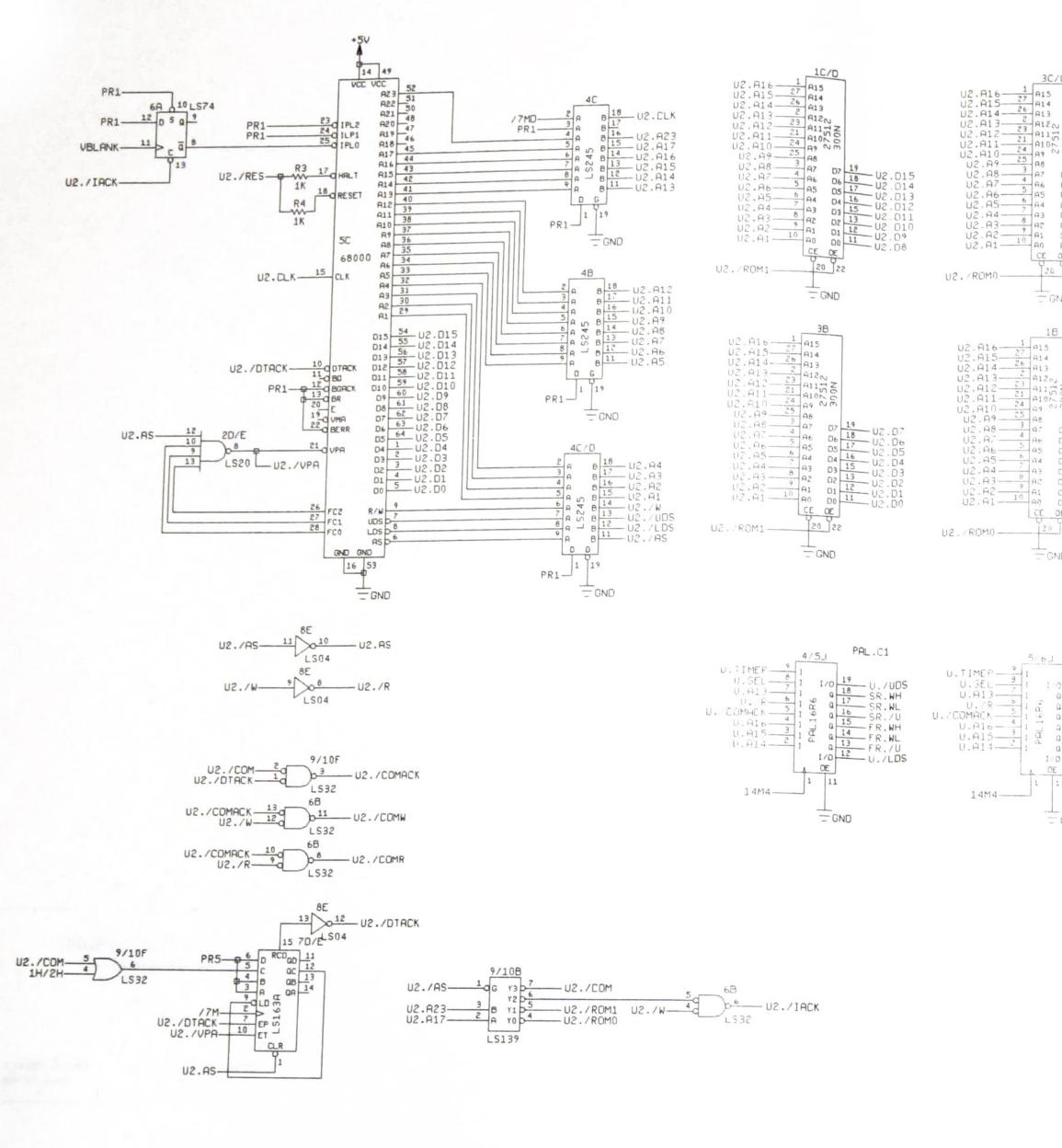
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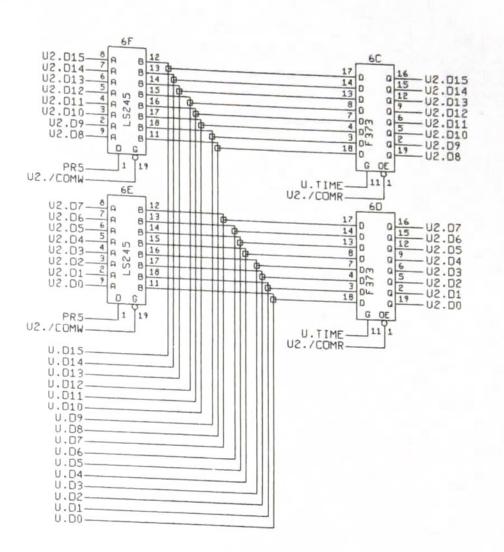
## Cyberball™ Game PCB Assembly Schematic Diagram



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PAL.C2

T GND

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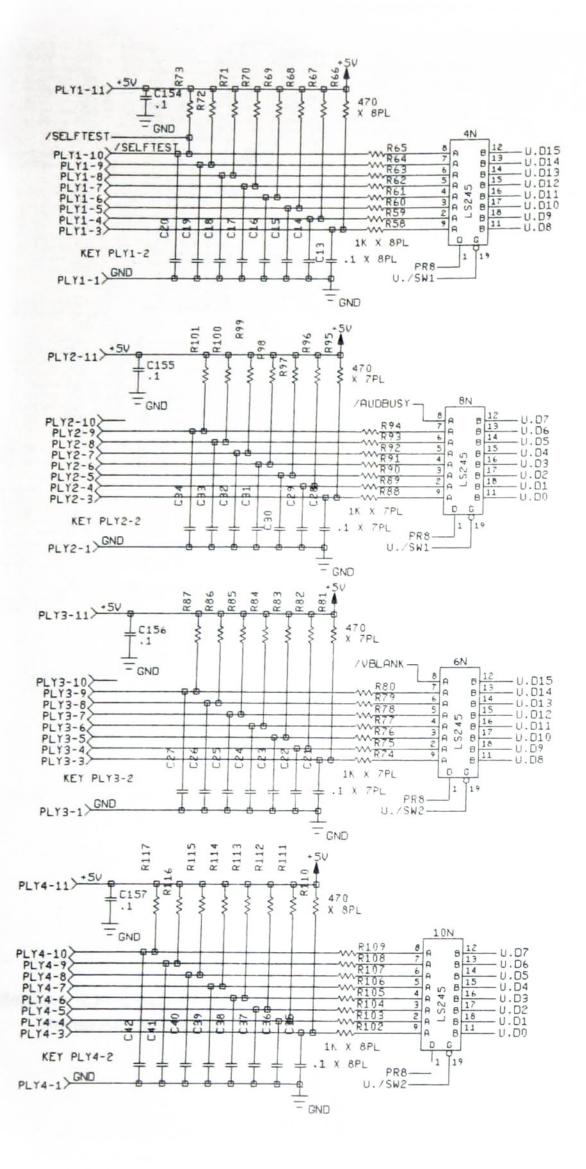
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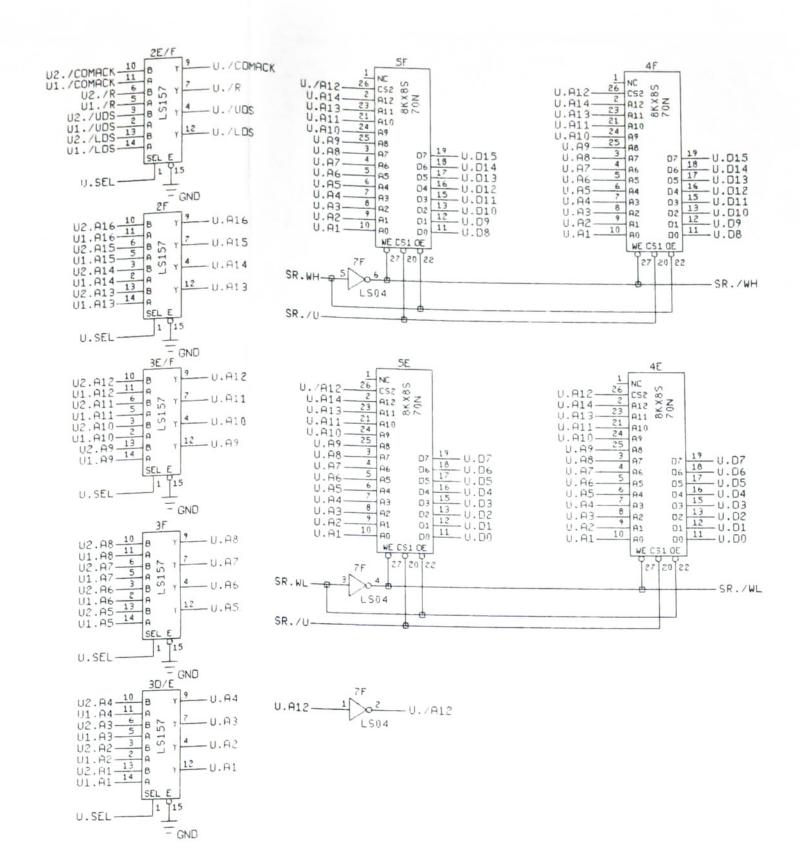


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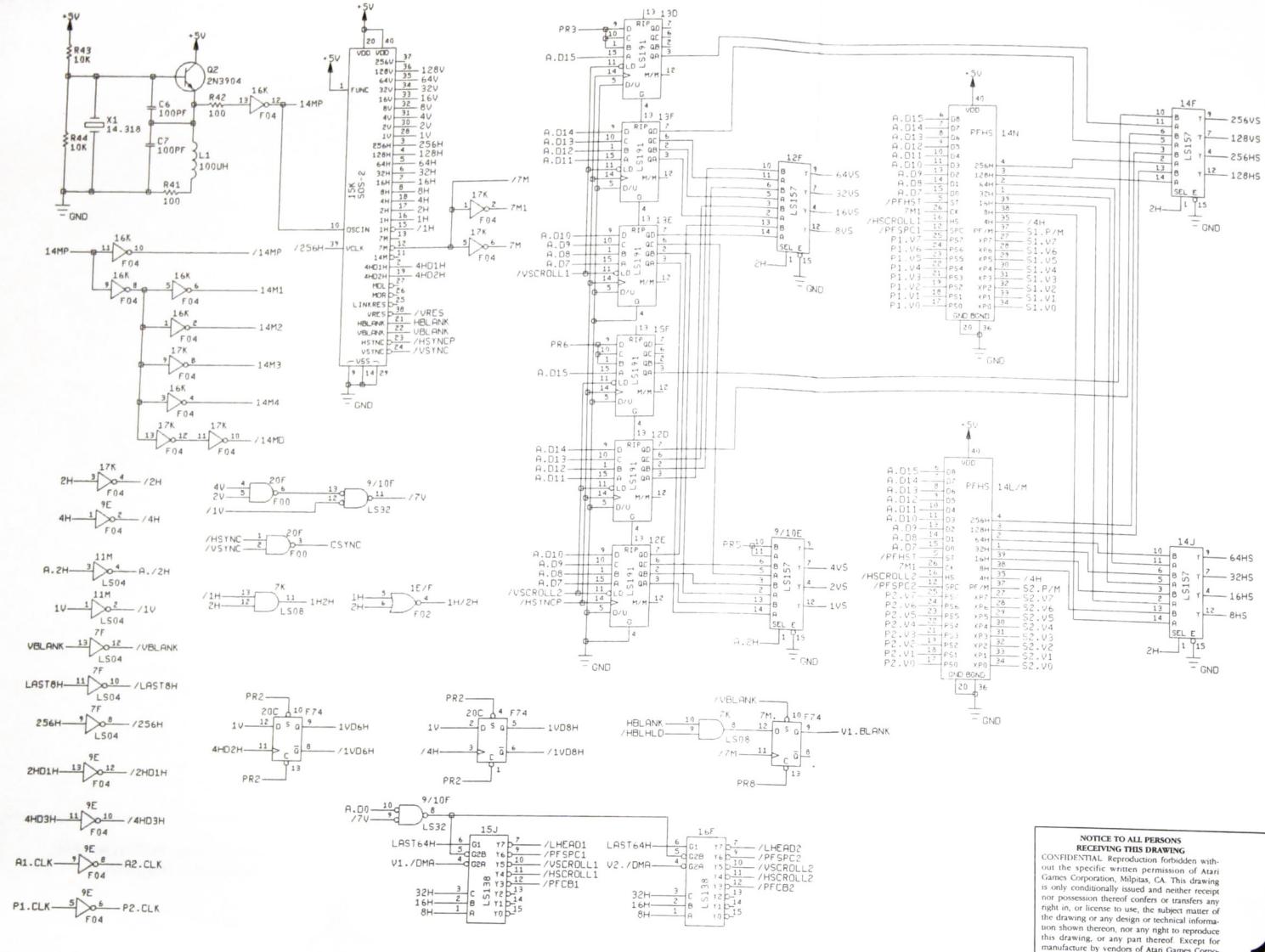
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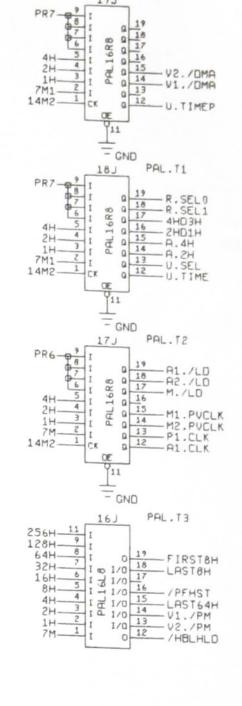
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### Cyberball™ Game PCB Assembly Schematic Diagram



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PAL.T4

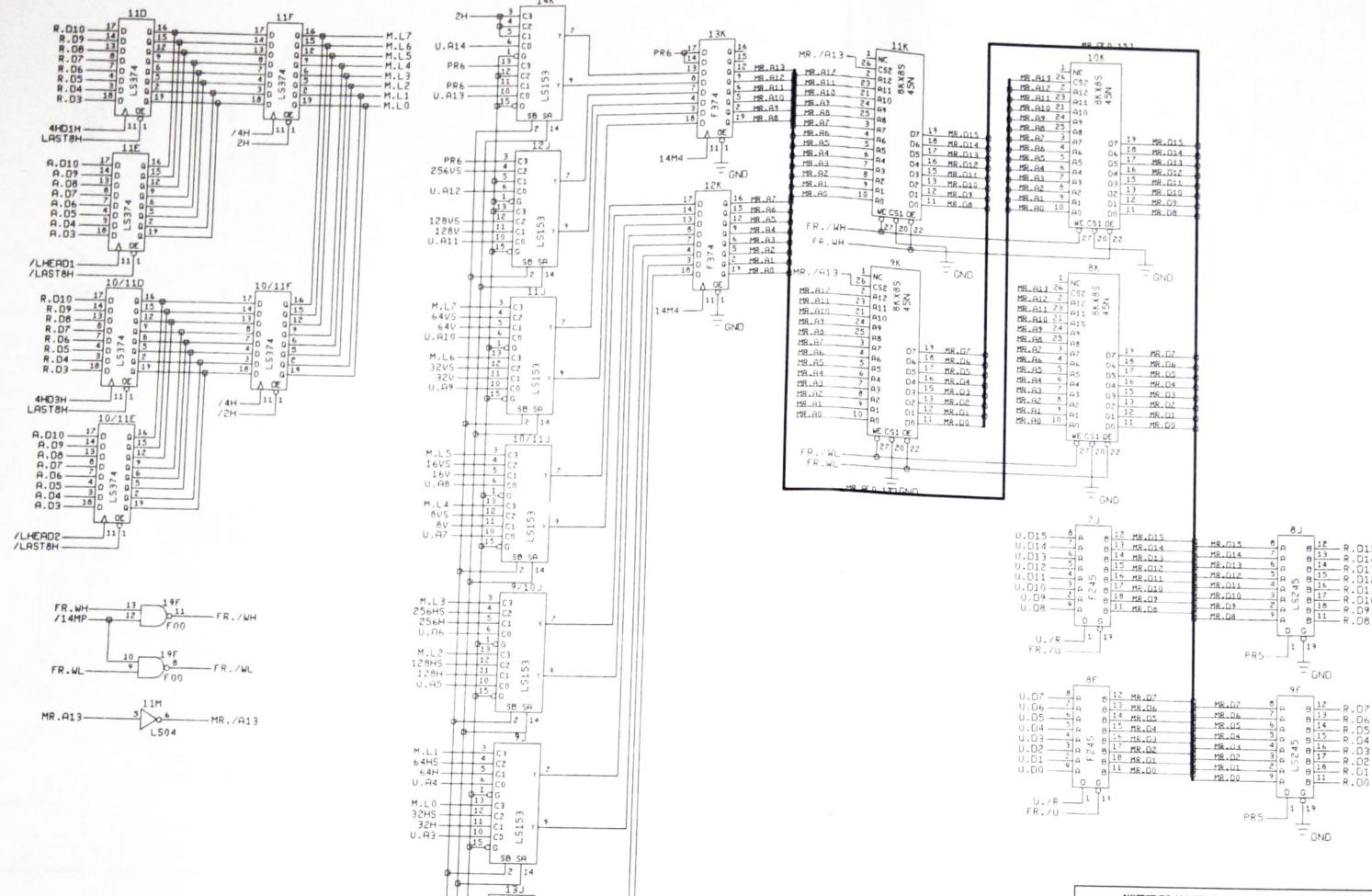
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16H5 -

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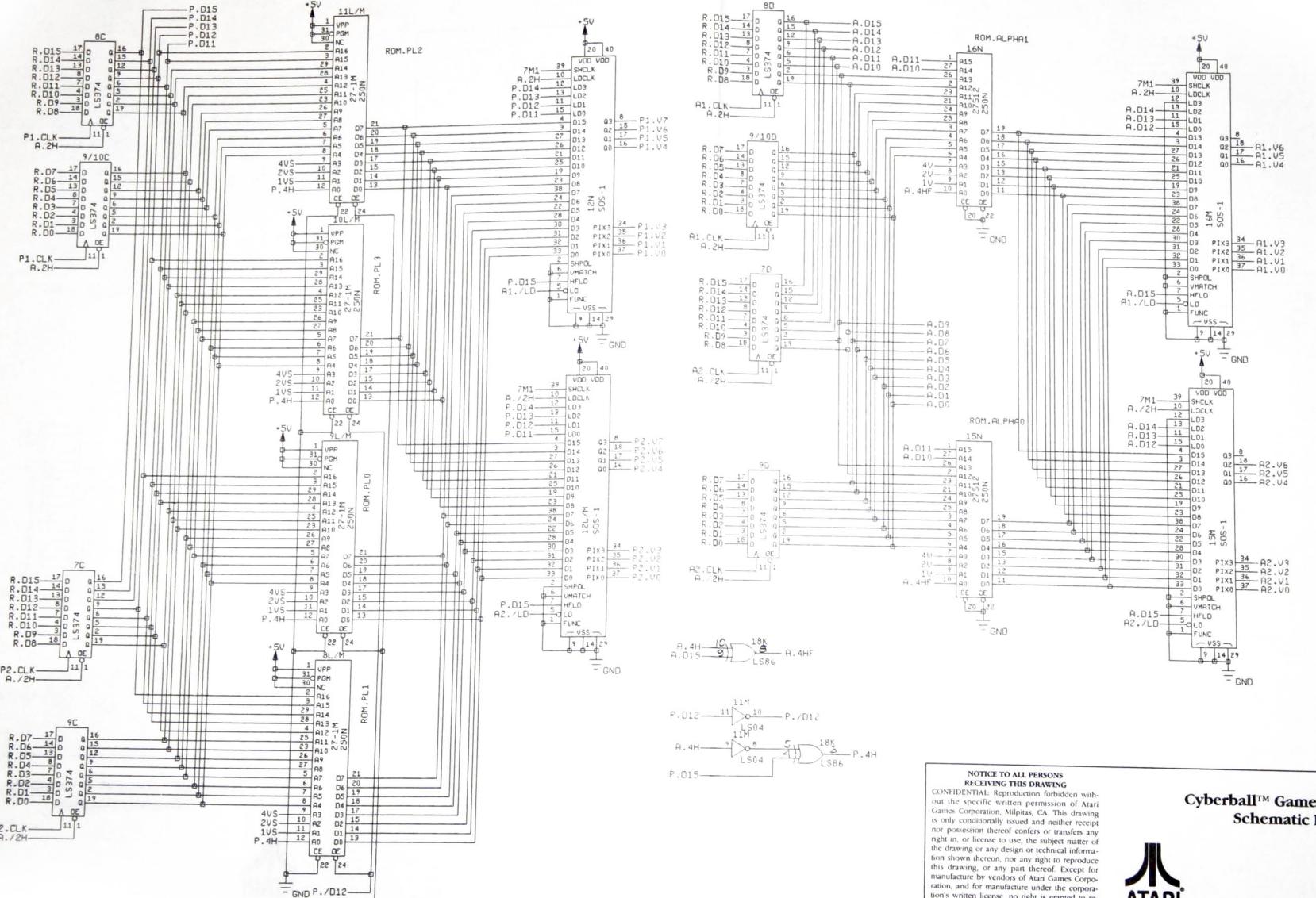
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### Cyberball™ Game PCB Assembly Schematic Diagram



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P.D12-

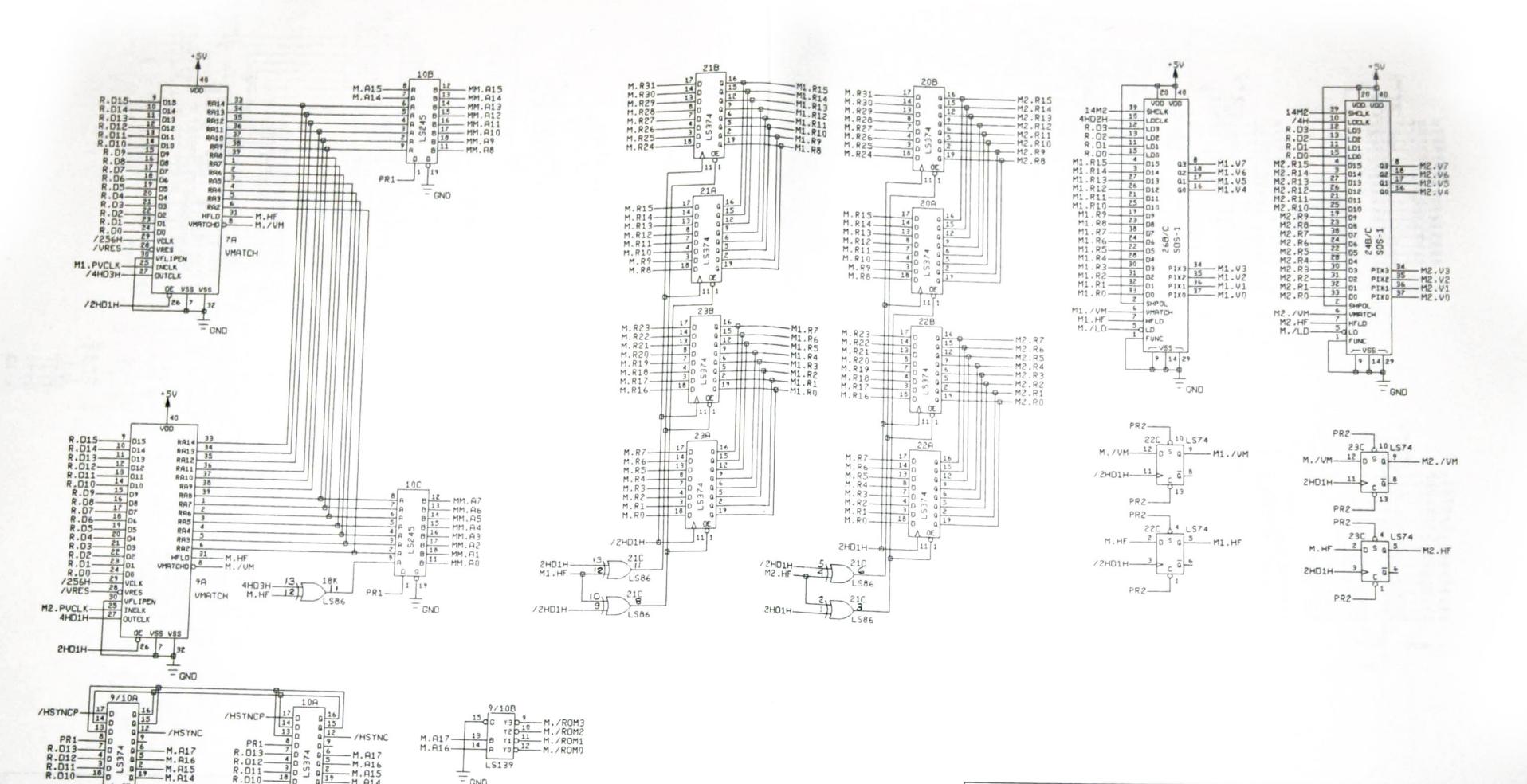
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### Cyberball™ Game PCB Assembly Schematic Diagram



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- GND

MI.PUCLK-/2HD1H-

M2. PUCLK-

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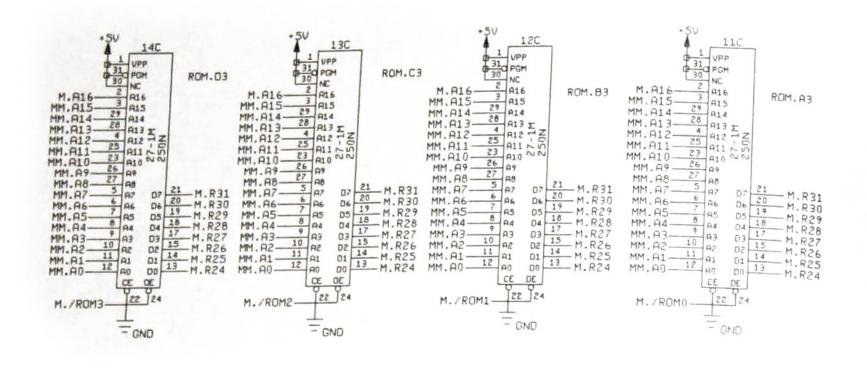
## Cyberball™ Game PCB Assembly Schematic Diagram

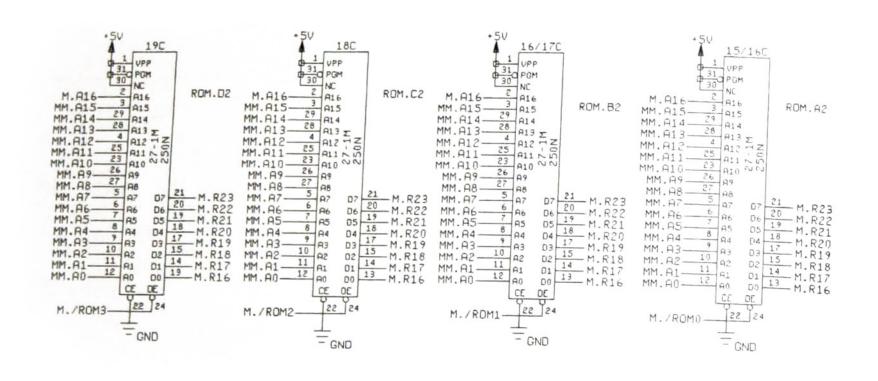


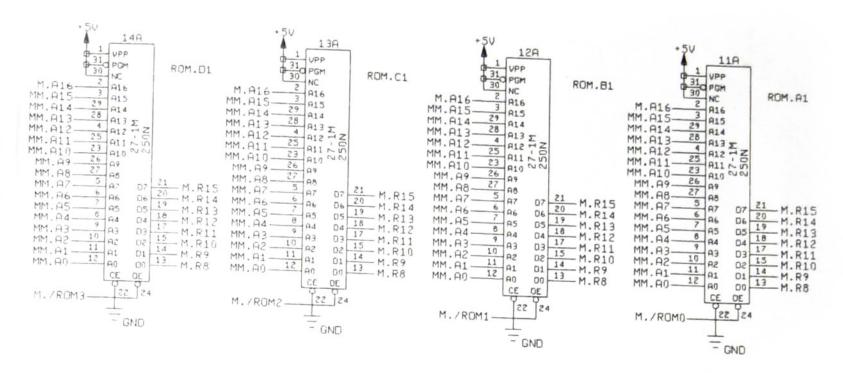
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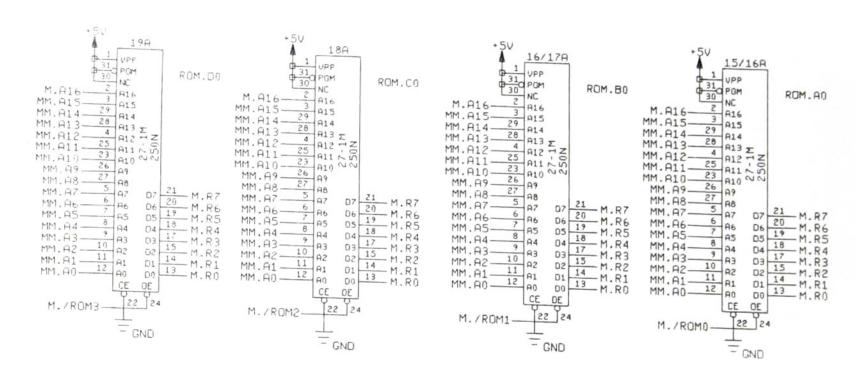
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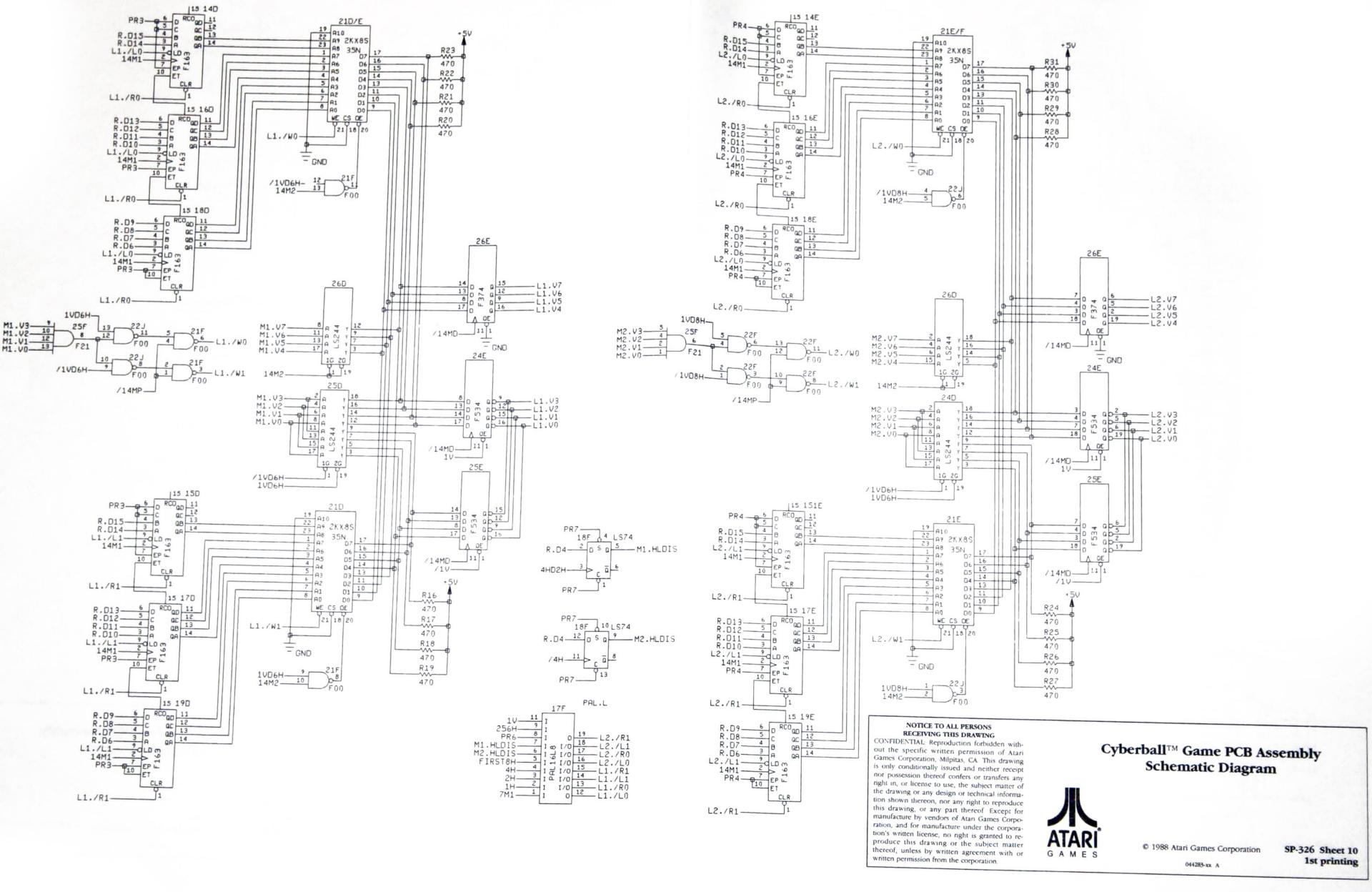
### Cyberball Game PCB Assembly Schematic Diagram

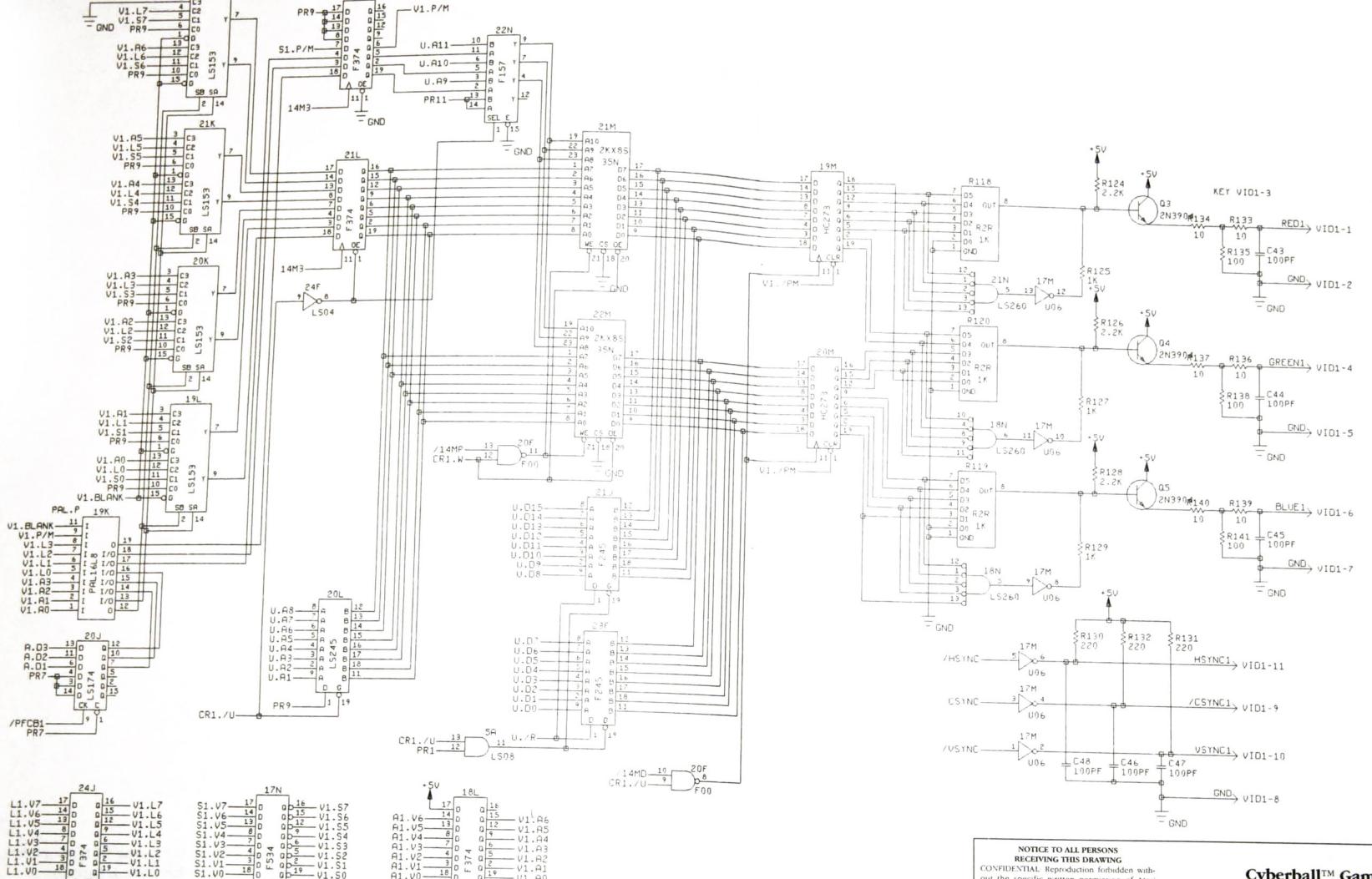


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14M3-

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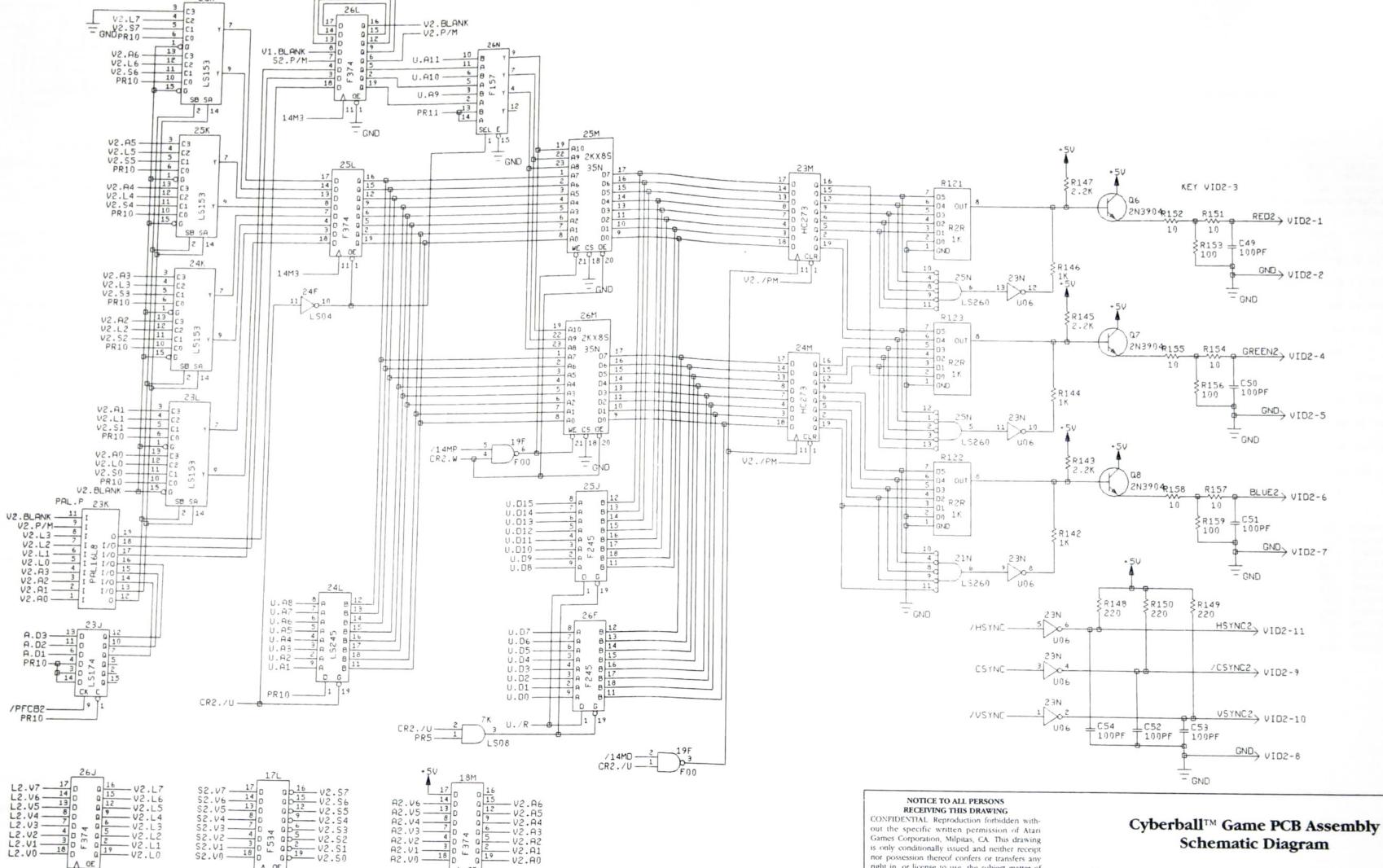
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#### Cyberball™ Game PCB Assembly Schematic Diagram



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14M3

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# Schematic Diagram



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## Memory Map Main Processor (P1)

Every time the main processor (P1) is reset, the video processor (P2) is also reset. P1 must clear P2's reset.

| ADDRESS  | SIZE                                    | ADDRESS BUS<br>2222 1111 1111 1100 0000 00<br>3210 9876 5432 1098 7654 32   | 00<br>10   R/   | W   5                      | 111 11                             | DATA BU<br>00 0000<br>98 7654  | 0000                                   | FUNCTION   |
|--|---|---|---|----------------------------|------------------------------------|--|--|--|
| 000000-007FFF<br>008000-00FFFF<br>010000-03FFFF<br>040000-7FFFF<br>FC0000-FC03FE<br>FC8000<br>FD0000<br>FD2000<br>FD4000<br>FD4000<br>FD6000<br>FD6000<br>FD8000 | 16KW<br> 96KW<br> 28KW                  | 0000 0AAA AAAA AAAA AAA<br>  0000 1AAA AAAA AAAA AAAA<br>  00AA AAAA AAAA AAAA AAAA<br>  01AA AAAA AAAA AAAA AAAA<br>  100 0<br>  101 000<br>  101 010  <br>  101 011 | A   R<br>A   R<br>A   R<br>O   R/W<br>-   W<br>-   W<br>-   W | 10                         | DDD DD                             | DDDD   | D DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD | SLAPSTIC PROGRAM PROM<br>  LONG ABSOLUTE PROGRAM PROM<br>  UNIMPLEMENTED PROGRAM PROM  |
| FE0000   | 1 | 110 0-00  | R<br> <br> <br> <br> <br>                                     | I D                        |                                    | DD DDDD<br>DD<br>DD  | DDDD                                   | SWITCH 1 (TEAM 1)   SELF TEST   UNUSED   RIGHT ACTION   FREEZE (DEVELOPMENT ONLY)   RIGHT PLAYER JOYSTICK (L,R,D,U)   UNUSED   LEFT ACTION                         |
| FE1000   |   | 110 0-01  | R   | I<br>I DDI<br>I D<br>I D   |                                    | D DDDD   | DDDD  <br>DDDD  <br> <br> <br>         | STEP (DEVELOPMENT ONLY) LEFT PLAYER JOYSTICK (L,R,D,U) SWITCH 2 (TEAM 2) VBLANK UNUSED RIGHT ACTION REPLAY (DEVELOPMENT ONLY)                                      |
|  |   |   |   |                            | DDDI                               | DD<br>D  | <br> <br> <br>  DDDC                   | RIGHT PLAYER JOYSTICK (L,R,D,U) UNUSED LEFT ACTION UNUSED LEFT PLAYER JOYSTICK (L,R,D,U)   |
| FE8000-FE8FFE  2<br>FEC000-FECFFE  2<br>FF0000-FF1FFF  K<br>FF2000-FF2FFF  2<br>FF3000-FF3FFF  2<br>FF4000-FF5FFF  4<br>FF6000-FF6FFF  K                         | KW   KW   KW                            | 110 10 AAAA AAAA AAAO<br>110 11 AAAA AAAA AAAO<br>111 0000 AAAA AAAA AAAA  <br>111 0010 AAAA AAAA AAAA  <br>111 0011 AAAA AAAA AAAA  <br>111 0100 AAAA AAAA AAAA      | R/W  <br>  R/W  <br>  R/W  <br>  R/W                          | DDD<br>DDD<br>DDDI<br>DDDI | D DDDD D DDDD D DDDD D DDDD D DDDD | DODD I DO | DDDD   DDDD   DDDD   DDDD              | COLORAM 1 COLORAM 2 PLAYFIELD 1 PARAMETER RAM ALPHANUMERICS 1 PARAMETER RAM MOTION OBJECTS 1 PARAMETER RAM PLAYFIELD 2 PARAMETER RAM ALPHANUMERICS 2 PARAMETER RAM |
| FF7000-FF7FFF   2F<br>FF8000-FF9FFF   4F<br>FFA000-FFFFFFF   8K  | CM I                                    | 111 0111 AAAA AAAA AAAA I   | R/W  <br>R/W  <br>R   | DDDI<br>DDDI               | DDDD DDDD DDDD                     | DDDD D DDDD D  | DDD  <br>DDD                           | MOTION OBJECTS 2 PARAMETER RAM COMMUNICATIONS RAM P2 PROTECTED PROGRAM RAM P1 PROTECTED PROGRAM RAM  |

# Memory Map Video Processor (P2)

Everytime the main processor (P1) is reset, the video processor (P2) is also reset. P1 must clear P2's reset.

|  |   |   |                            |                                  | ADDRES   |  |  |  |   |  |         |  | Dama   | Tirre.   |  |                       |  |
|--|---|---|----------------------------|----------------------------------|--|--|--|--|---|--|---------|--|--|--|--|-----------------------|--|
| ADDRESS  | SIZE  | 1 | 3210                       | 3816                             | 5432   | 1098   | 7654   | 0000<br>3210                                 | 1 | R/W                                    | ı       | 1111<br>5432   | 1100<br>1098   | 0000   | 0000<br>3210   | 1                     | FUNCTION   |
| 008000-03FFFF<br>040000-07FFFF<br>FC0000<br>FE0000   | 1112KW  |   | 0 0 1 1                    | -0AA<br>-1AA<br>0-<br>10         | AAAA<br>AAAA<br><br>0-00                                     | AAAA<br>AAAA<br>                             | AAAA<br>AAAA<br>AAAA                         | AAAA<br>AAAA<br>AAAA                         | 1 | R<br>R<br>R                            | 1 1 1 1 | DDDD DDDD  | DDDD DDDD  | DDDD<br>DDDD<br>DDDD   | DDDD<br>DDDD<br>DDDD<br>DDDD   | 1 1 1 1 1 1 1 1 1 1 1 | SHORT ABSOLUTE PROGRAM PROM LONG ABSOLUTE PROM UNIMPLEMENTED PROGRAM PROM SCREEN INTERRUPT ACKNOWLEDGE SWITCH 1 (TEAM 1) SELF-TEST UNUSED RIGHT ACTION FREEZE (DEVELOPMENT ONLY) RIGHT PLAYER JOYSTICK (L,R,D,U) UNUSED LEFT ACTION STEP (DEVELOPMENT ONLY)  |
| FE1000   |   |   | 1                          | 10                               | 0-01   |  |  |  |   | R                                      |         | D<br>D   | DDDD   |  | ממטט   |                       | LEFT PLAYER JOYSTICK (L,R,D,U) SWITCH 2 (TEAM 2) VBLANK UNUSED RIGHT ACTION REPLAY (DEVELOPMENT ONLY) RIGHT PLAYER JOYSTICK (L,R,D,U) UNUSED LEFT ACTION   |
| FE8000-FE8FFE<br>FEC000-FECFFE<br>FF0000-FF1FFF<br>FF2000-FF3FFF<br>FF3000-FF5FFF<br>FF6000-FF6FFF<br>FF7000-FF7FFF<br>FF8000-FF9FFF<br>FFA000-FF8FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF | 12KW<br>1KW<br>12KW<br>12KW<br>1KW<br>12KW<br>12KW<br>1KW<br>14KW |   | 1<br>1<br>1<br>1<br>1<br>1 | 11<br>11<br>11<br>11<br>11<br>11 | 000A<br>0010<br>0011<br>010A<br>0110<br>0111<br>100A<br>101A | AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA | AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA | AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA<br>AAAA |   | R/W<br>R/W<br>R/W<br>R/W<br>R/W<br>R/W |         | DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD | DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD | DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD | DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD<br>DDDD | 1 1 1 1 1 1 1 1 1     | UNUSED LEFT PLAYER JOYSTICK (L,R,D,U) COLORAM 1 COLORAM 2 PLAYFIELD 1 PARAMETER RAM ALPHANUMERICS 1 PARAMETER RAM MOTION OBJECTS 1 PARAMETER RAM PLAYFIELD 2 PARAMETER RAM ALPHANUMERICS 2 PARAMETER RAM MOTION OBJECTS 2 PARAMETER RAM COMMUNICATIONS RAM P2 PROTECTED PROGRAM RAM P1 PROTECTED PROGRAM RAM |

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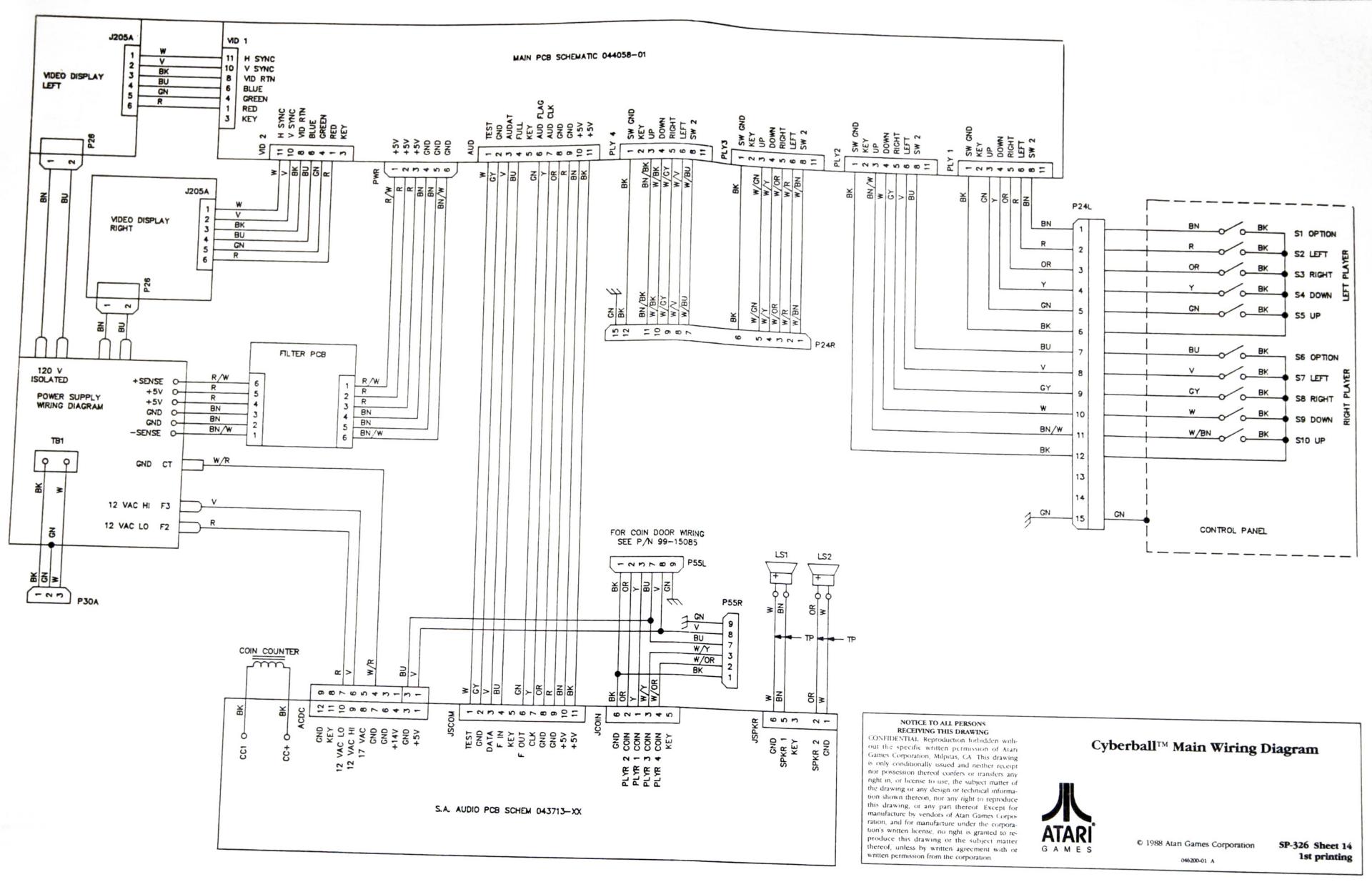
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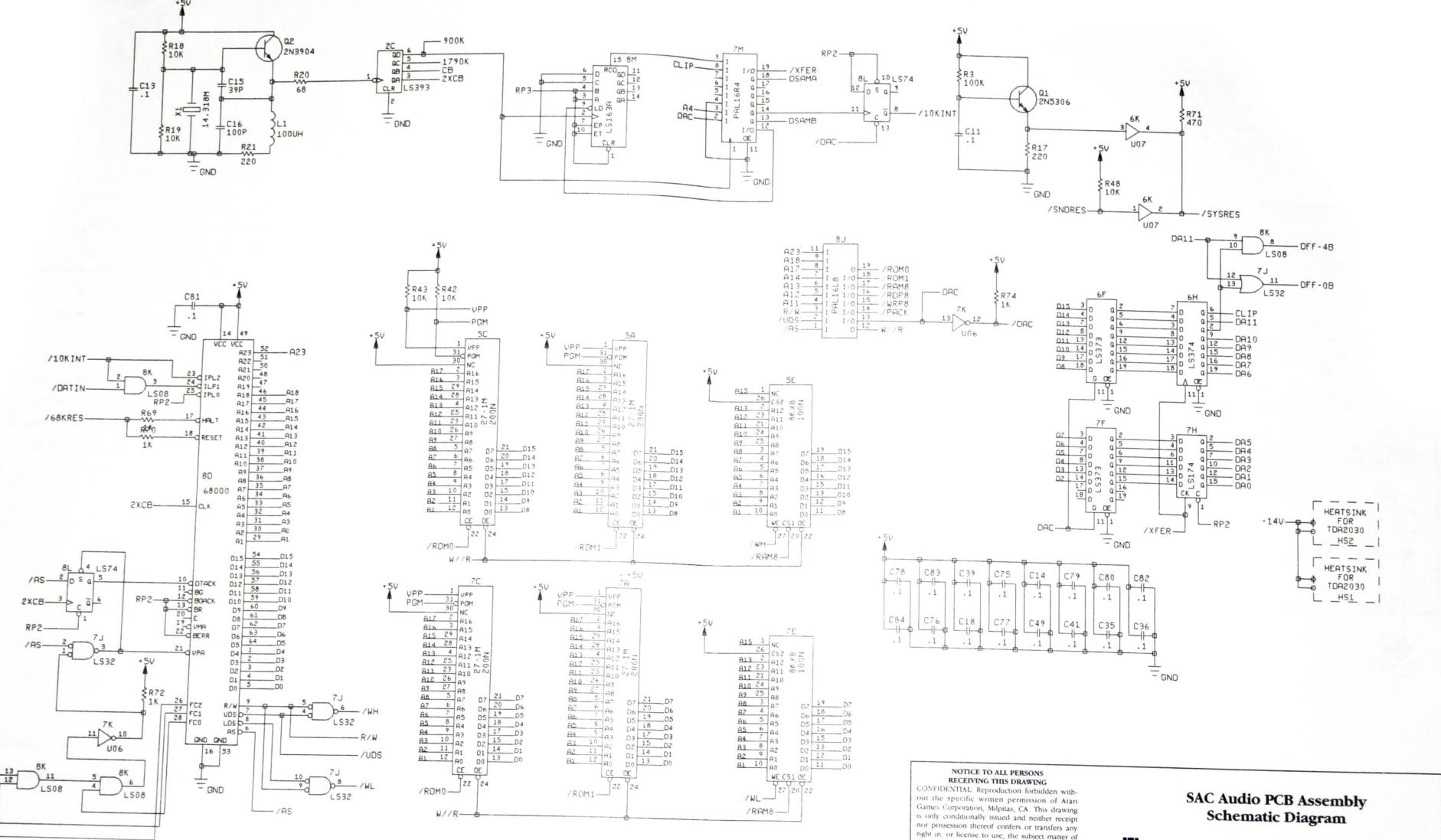
## Cyberball™ Memory Map



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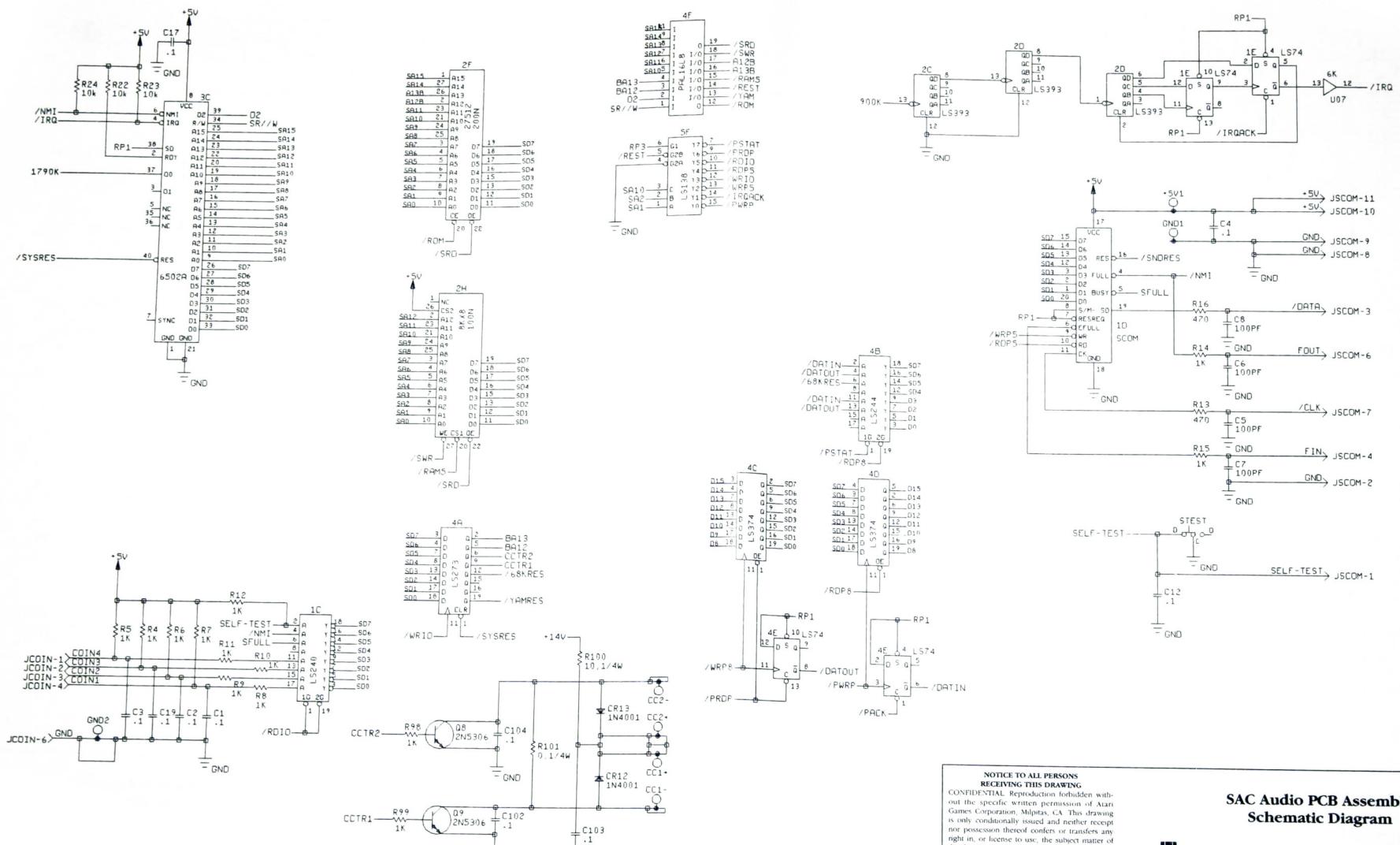


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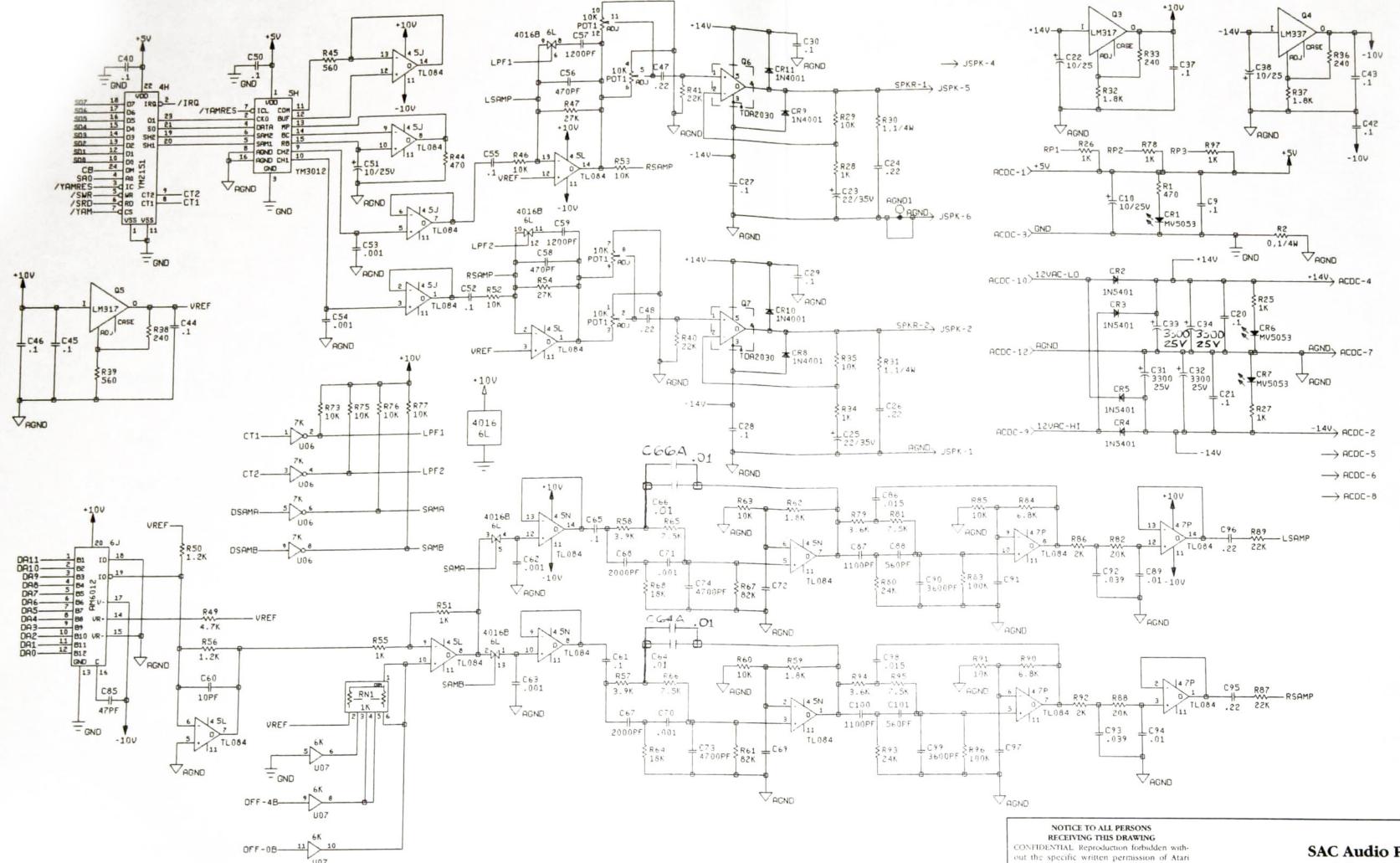
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# **SAC Audio PCB Assembly**



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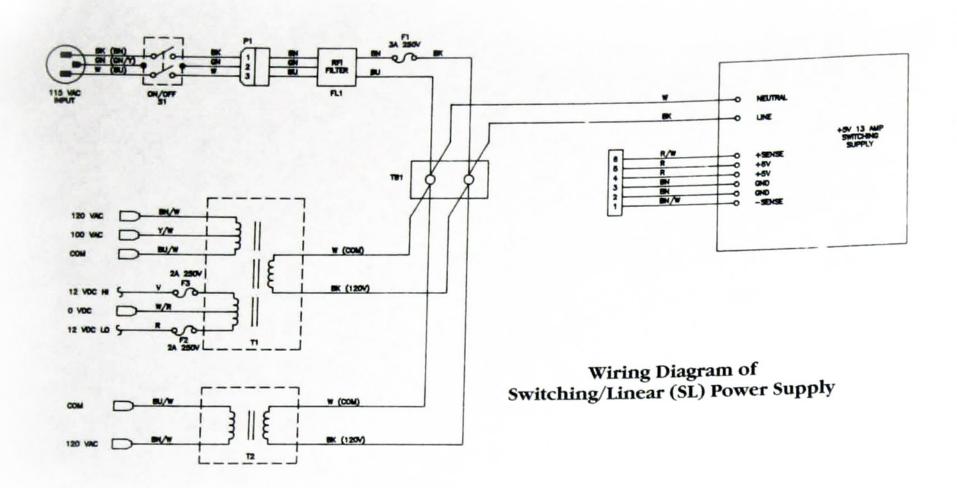
#### SAC Audio PCB Assembly Schematic Diagram

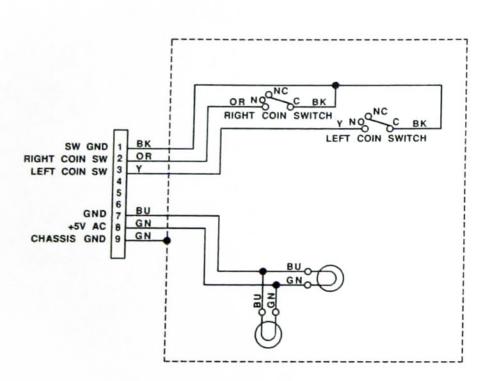


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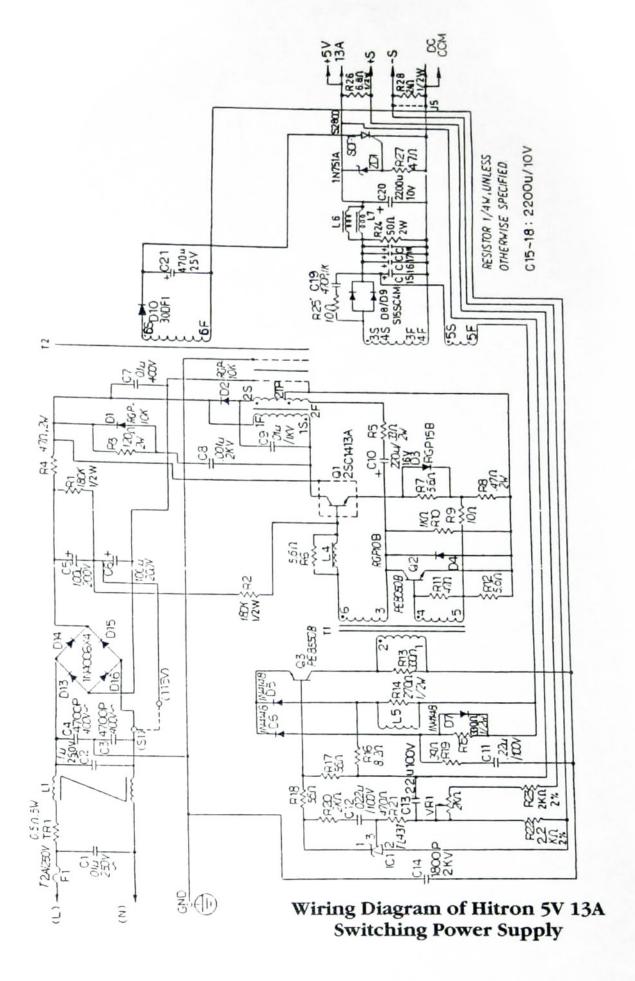
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Coin Door Wiring Diagram



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Wiring Diagrams of Switching/Linear (SL) Power Supply, Hitron 5V 13A Switching Power Supply, and Coin Door



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