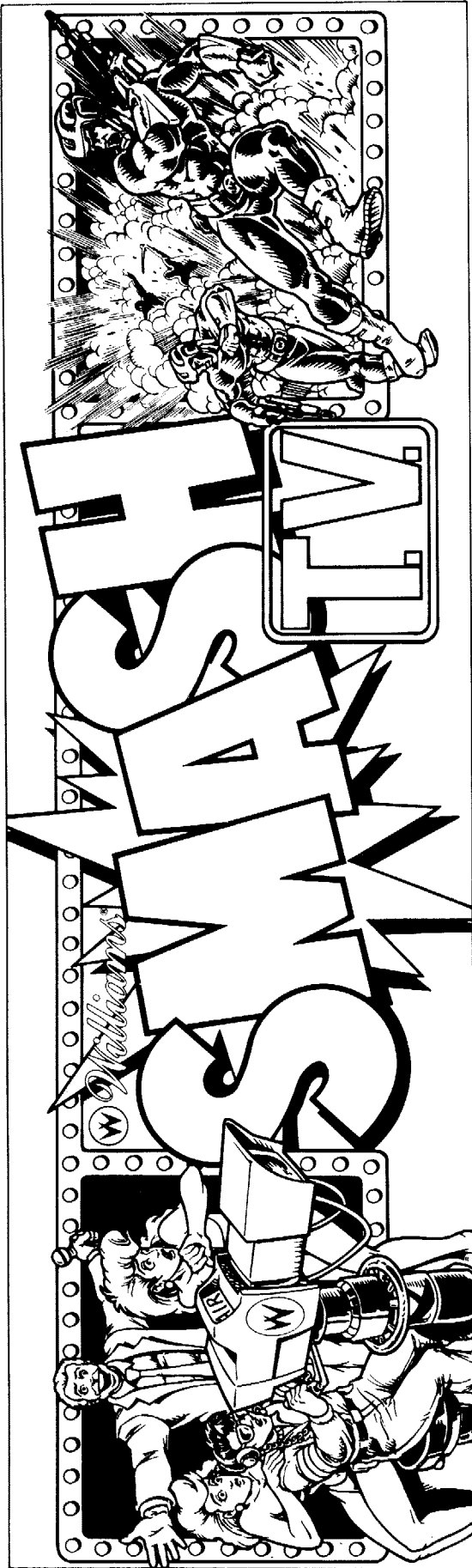


910

April 1990
16-3044-U1-101
25" Monitor
Game 3044-U1



OPERATIONS MANUAL

including:

- Game Operation & Adjustment
- Game Testing & Problem Diagnosis
- Parts Information
- Reference Diagrams & Schematics

WILLIAMS ELECTRONICS GAMES, INC.
3401 N. California Avenue
Chicago, IL 60618

The year is 1999

Television has adapted to the more violent nature of man.

The most popular form of television remains the game show.

One show in particular has dominated the ratings. That show is SMASH TV. The most violent game show of all time.

Two lucky contestants compete for cash and prizes. Each contestant is armed with an assortment of powerful weapons and sent into a closed arena.

The action takes place in front of a studio audience and is broadcast live via satellite around the world.

Be prepared.

The future is now.

You are the next lucky contestant!

SMASH TV GAME RULES:

- 1. Move with LEFT joystick to avoid enemies and gather prizes (cash and game show gifts).*
 - 2. Fire weapons with RIGHT joystick and collect power-up icons for increased firepower.*
 - 3. Advance to next game arena when enemies are gone.*
-

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SMASH TV

S E C T I O N

one

Operation and Troubleshooting

Safety Notices

The following safety hints apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page, and also all of Section 1, before preparing your game for play.

WARNINGS

AC POWER CONNECTION. Before connecting the game to the AC power source, verify that the "line voltage selection chart" jumper wires are installed correctly for the line voltage in your area. For details, refer to Section 3.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. WILLIAMS games should only be plugged into a grounded 3-wire outlet. Shocks will also result, if the control panel is not properly grounded! After servicing any parts on the panel, assure that the ground wires are secure. Only then should you lock up the game.

DISCONNECT POWER DURING REPAIRS. To avoid electrical shock, disconnect the game from the AC power source before removing or repairing any part of the game. When removing or repairing the monitor, extra precautions must be taken to avoid electrical shock because high voltages may exist within the monitor circuitry and cathode ray tube (crt) even after power has been disconnected. Do not touch internal parts of the display with your hands or metal objects! Always discharge the crt: attach one end of a large, well-insulated, 20-kV jumper to ground. Momentarily touch the free end of the grounded jumper to the anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

USE THE PROPER FUSE. To avoid electrical shock, use the replacement fuse which is specified in the parts list for this game. The replacement fuse must match the original fuse in fuse type, voltage rating, and current rating.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

CAUTION

PROPERLY ATTACH ALL CONNECTORS. Make sure that the connectors on each printed circuit board (pcb) are properly connected. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. All connectors are keyed to fit specific pins on each board.

Setup Procedure

Installation and Inspection

1. Remove the game from its shipping carton, and inspect the exterior of the cabinet for any signs of damage. Remove the shipping cleats from the bottom of the cabinet.
2. Remove keys from the taped coin return slot (or attached to joystick). Unlock and open the coin and cash box doors. (Leg levellers and spare parts are stored in the cash box.)
3. Locate the four threaded holes on the bottom of the cabinet (one in each corner), and install one leg leveller (with its hex nut) in each hole.
4. Stand the cabinet upright and make certain that it is in a stable position. Level the cabinet.
5. Unscrew (or unlock) and remove the rear doors/panels of the cabinet. Inspect the interior for any signs of damage. Check all major assemblies to assure that they are mounted securely.
6. Refer to the game's cabinet wiring diagram (Section 3), and check to see that all cable connectors are correctly secured and firmly seated. **DO NOT FORCE CONNECTORS.** Watch for damaged connectors and avoid making reversed connections.
7. **Line Voltage Selection.** Your game is designed to work properly on the line voltage where you are located. Determine the value of your line voltage with a meter. Then, check the power input wires to the main power supply transformer on your game to be sure they are connected to taps which correspond to your local line voltage value. If necessary, reconnect the power input wires to the transformer in accordance with the Transformer Chart in Section 3.

If the line voltage in your area falls outside the upper or lower limits of the range of voltage inputs covered by the main power supply transformer, **DO NOT PLUG YOUR GAME IN** until you have contacted your distributor or the WILLIAMS Service Department and obtained a solution to the problem. Otherwise, you could damage your game.
8. Lay the line cord (connected to the Power Chassis) in the slot along the bottom edge of the lower rear cabinet door/panel. Install the rear cabinet doors/panels and screw (lock) them securely. Close and lock the front coin and cash box doors.
9. Connect the line cord to a grounded (3-terminal) AC wall outlet.
10. Switch ON the game, using the ON/OFF switch located on the upper left rear of the cabinet, to verify proper operation.

GAME LOCATION REQUIREMENTS

Power

Domestic 115V @ 60 Hz
Foreign 230V @ 50 Hz

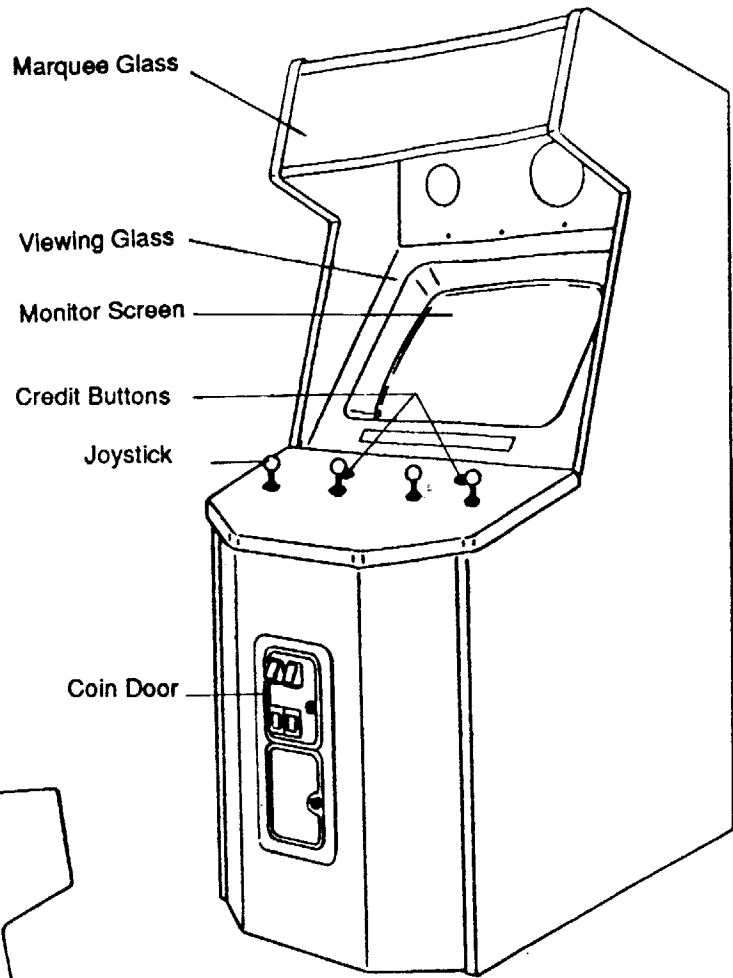
Temp.

32° F to 100° F
(0° C to 38° C)

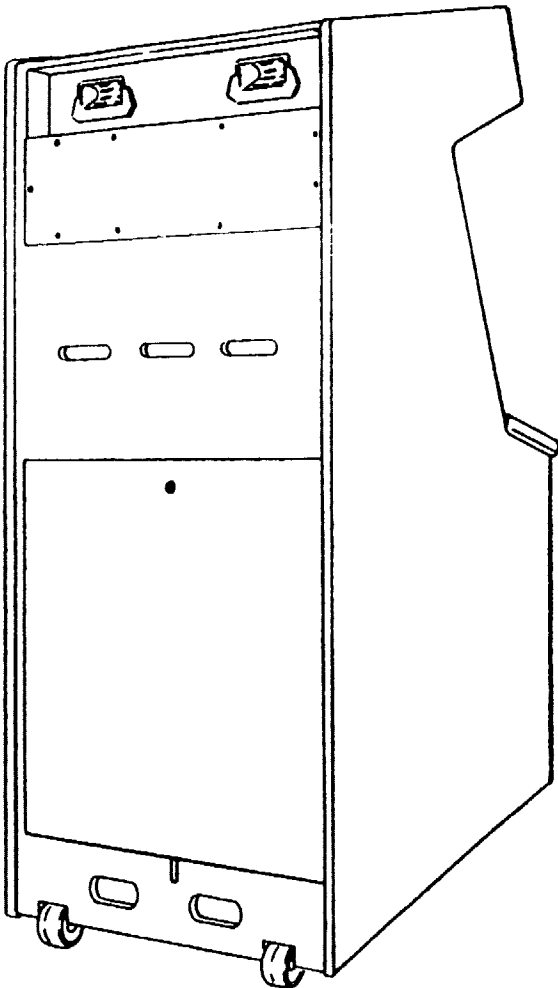
Humidity

Not to exceed 95% relative.

25" Cabinet (Front View)



25" Cabinet (Rear View)



Servicing

■ Servicing the Control Panel

Switch OFF power to the game. The control panel is held in place by four latches (located on the left and right sides of the cabinet) which provide constant pressure on the strikes. The latches can be reached through the coin door opening. To release the latches, lift the latch handle and unhook the wire fasteners. Carefully use the joysticks to lift the control panel. Rest the panel on its support bracket, while working on it. To reinstall the control panel, check for proper cable connections, including the ground strap, and use the joysticks to lower it into position, avoiding pinched wires. Reclamp the latches.

NOTE

To remove the control panel for bench servicing, release the latches and lift the control panel, until it rests on its support bracket. Disconnect the cables and the ground strap. Lift the control panel out of the game cabinet.

■ Removal of Viewing Glass

Switch off power to the game, and open the control panel. Unscrew the four nuts at the bottom of the glass and remove the protective black plastic strip. Carefully lift the glass from its bottom groove and lift it clear of the cabinet.

■ Removal of Monitor Bezel

Switch off power to the game, and remove the viewing glass. Remove the bezel securing screws to free the monitor bezel.

■ Monitor Replacement

We recommend that you read the WARNINGS section thoroughly before beginning this procedure.

Switch off power to the game. Open the upper rear door/panel. Remove the viewing glass and the monitor bezel. Completely disconnect the monitor from all of its cabling, including its chassis ground strap. Remove the four bolts securing the monitor's mounting flanges to its mounting panel. Pull the monitor carefully from the cabinet front.

CAUTION

The monitor DOES NOT contain an isolation transformer in its chassis (it is mounted instead in the Power Chassis Assembly located on the floor of the cabinet). When servicing the monitor on a test bench, YOU MUST ISOLATE THE MONITOR FROM THE LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.


CAUTION

While removing the four bolts, firmly support the monitor from the front of the crt so that it will not slip.



WARNING

If you drop a fluorescent tube and it breaks, it will implode! Use care in handling.



■ Removal of the Marquee Glass

Switch off power to the game. Remove the screws in the black plastic strip on top of the cabinet. Remove the strip and carefully lift the glass. Store the glass carefully to prevent damage.

The fluorescent tube is now accessible for replacement. Grasp the tube, give it a quarter turn, and remove it from its socket. Carefully place a new tube into the socket, and turn to reinstall.

■ Removal of the Fluorescent Light Assembly

Switch off power to the game. Remove the marquee glass. Disconnect the fluorescent light assembly from its power cable. Remove the screws fastening the assembly to the cabinet and lift out the assembly.

■ Removal of the Speakers

Switch off power to the game. Remove the upper rear cabinet door/panel, taking care to *not* damage the speaker enclosure seals. Disconnect the speakers from their cabling. Remove the nuts on the speaker mounting bolts. Remove the speakers. Because the speakers are mounted in an acoustical enclosure, carefully reinstall the seals upon completing any task in the speaker enclosure.

■ Volume Control, Test/Diagnostics Switch, and Service Credit Switch

Open the coin door to locate the game's volume control and Diagnostic switches on the small panel atop the cash box cover. The Volume Control is the white knob on left end of the panel. Turning the knob clockwise increases the volume. The upper right switch on the bracket is the Test/Diagnostics Switch that enables activating the game's test mode. The lower right switch is the Service Credit Switch, which allows adding credits to a game for service testing without affecting the game's bookkeeping total.

Game Features

Starting Up

Switch on power to the game. A 'rug' pattern appears on the crt screen. When the 'rug' pattern ends, the screen shows CHECKING SCRATCH RAMS, and then CHECKING ROMS. The next screen shows SMASH TV REVISION LEVEL, CMOS TEST OK and the COIN SETTING. The game then moves to the attract mode. After the proper coinage has been inserted, the game exits the attract mode and enters the play mode.

SMASH TV is a one or two player game.

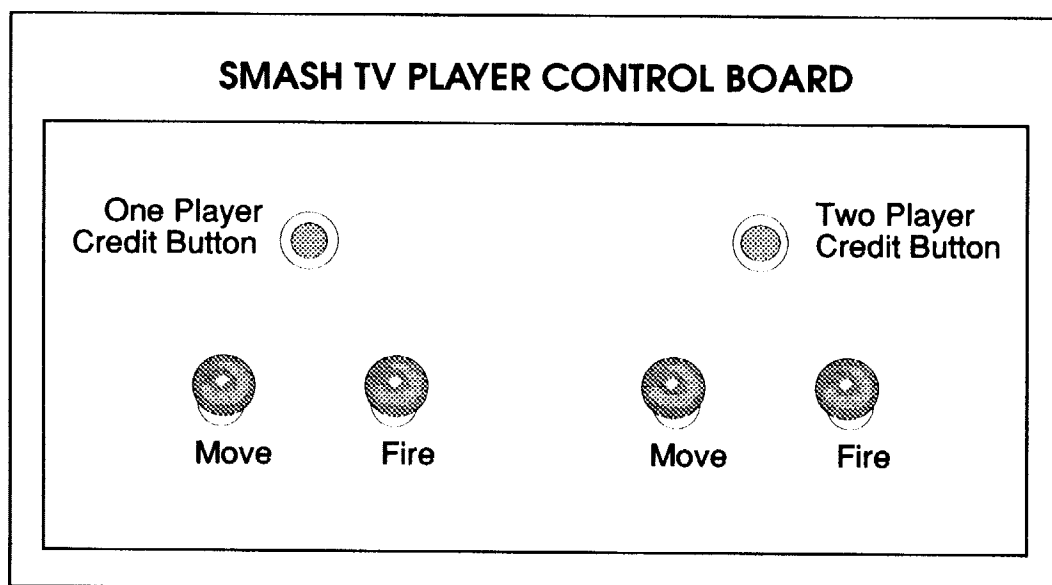
Player Controls

- Each Credit button allows (1 or 2) players to begin play or continue play.
- Left Joysticks enable players to move through arenas.
- Right Joysticks enable players to fire on enemies in arenas.

NOTE

SMASH TV will operate in the Test Mode, when the Test Switch (on the cash box cover) is closed or DIP Switch Bank #2 Switch #8 is closed.

When an error is detected during Start-up Tests, game start-up does not progress, and an error message appears on the screen.

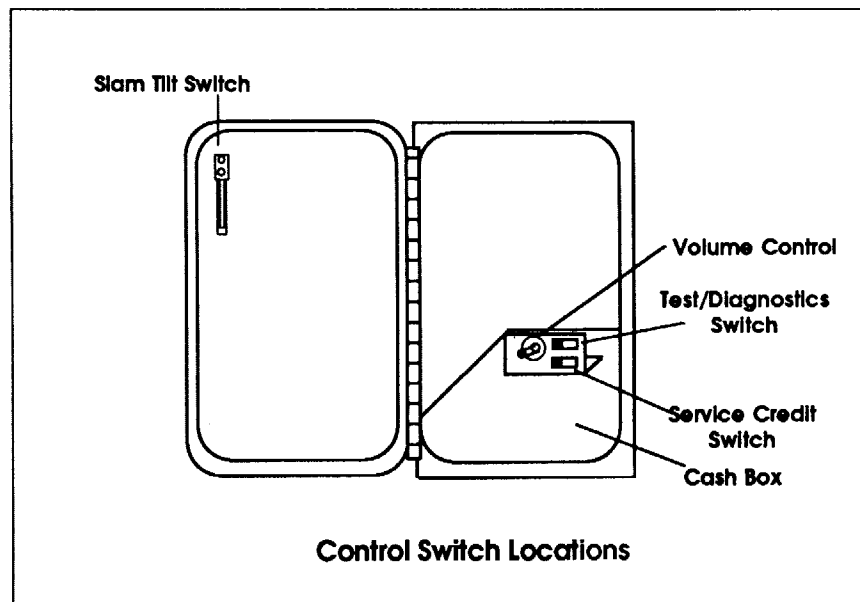


Game Operation

SMASH TV is a one or two player video game with a color monitor. From the player's perspective, the game has two modes of operation: Ready-to-Play and Play. For the owner/operator, the game has an additional mode of operation called Game Diagnostics and Adjustments.

Control Switches

- The **COIN DOOR SLAM TILT SWITCH** detects any forceful vibrations against the Coin Door. This eliminates pounding for free games.
- The **VOLUME CONTROL** allows increasing or decreasing the volume level of the game music and speech. For greater profits, set your game's volume level at its maximum.
- The **TEST/DIAGNOSTICS SWITCH** allows you to enter into the game's Diagnostic mode. Move the Test Switch to the left, then back to the right to enter the Diagnostics Mode. To exit this mode, select EXIT TO GAME OVER from the Diagnostics main menu.
- The **SERVICE CREDIT SWITCH** is a special feature switch that allots credit without affecting the game's bookkeeping total.
- The **POWER INTERLOCK SWITCH** is a safety switch that ensures power to the game is turned off during servicing. This switch is located inside the lower rear door/panel.



Game Audits, Adjustments & Diagnostics

Operation

All SMASH TV Game Audits, Adjustments, and Diagnostics are options of the Main Test Menu. Each option, in turn, has its own menu, listing several choices that you may act upon as desired.

Move the Test Switch (on the cashbox lid panel) left, then back to the right to activate the SMASH TV Adjustments and Diagnostics. Main Test Menu (shown below) then appears. Game adjustments, bookkeeping, and diagnostics are all accessible from this menu.

Move the left joystick up or down to cycle through the menu options. Notice that the options are highlighted in sequence. Selecting a desired option requires it to be highlighted. To activate the selected option, move the right joystick.

The Main Test Menu lists six options.

**SELECT WITH LEFT STICK
ACTIVATE WITH RIGHT STICK**

**DIAGNOSTIC TESTS
COIN BOOKKEEPING
GAME AUDITS
GAME ADJUSTMENT
UTILITIES
EXIT TO GAME OVER**

Main Test Menu

DIAGNOSTIC TESTS

To enter the Diagnostic Tests from the Main Test Menu, move the left joystick to select (highlight) the Diagnostic Test option, and move the right joystick to activate the option. The Diagnostic Tests Menu lists seven options.

**SELECT WITH LEFT STICK
ACTIVATE WITH RIGHT STICK**

**SWITCH TEST
ROM BOARD TEST
CPU BOARD TEST
SOUND BOARD TEST
MONITOR PATTERNS
RUN BURN-IN TEST
RETURN TO MAIN MENU**

Diagnostic Test Menu

Switch Test

The Switch Test allows the operator to test the switches on the control panel and the coin door.

Select the Switch Test by using the left joystick to highlight the Switch Test option; then, move the right joystick to activate it. The top of the screen shows a layout of the control panel and the bottom of the screen lists the coin door switches. Pressing a switch causes the corresponding switch location on the screen to light. Release the switch and the screen returns to normal.

Select the RETURN TO MAIN MENU option to return to the Diagnostic Test Menu.

DIP SWITCH TEST

Please Note: Dip Switch information will be provided when available.

NOTE

As soon as a faulty chip is detected, the CPU Test stops. The remaining chips are not tested.

CPU Board Test

The CPU Board Test (much like the Start-up Test) allows the operator to check the RAMs and ROMs.

Move any joystick to select the CPU Board Test; then, press any control panel button to activate the automatic test of the CPU Board's RAMs and ROMs. When this test is activated, a "rug" pattern appears on the screen. The screen then changes to show the layout of the RAMs, and ROMs on the CPU. Any chip that is shown as black with a white outline is part of the CPU and should turn either red or green during the CPU Test. Any chip that is shown as gray with a white outline is not installed in the game. During the test, chips are good, if they turn green; they are faulty, if they turn red.

Press any control panel button to return to the Diagnostic Test Menu.

Sound Board Test

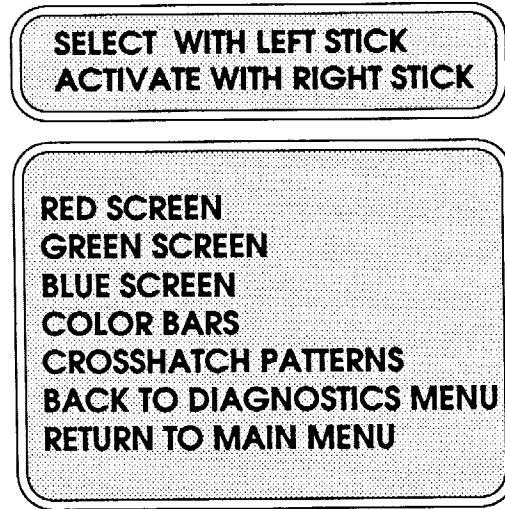
The Sound Test allows listening to some of the sounds that SMASH TV is capable of producing. This test also emits a tone for each fault that is detected.

Move any joystick to select the Sound Board Test; then, press any control panel button to activate the test.

Monitor Patterns

The Monitor Patterns Test provides a menu for testing the monitor.

Move the left joystick to select a test; move the right joystick to activate the test.



Monitor Pattern Menu

The **RED**, **GREEN**, and **BLUE SCREEN** tests fill the screen with either red, green or blue.

The **COLOR BARS** test fills the screen with several gradiated colors to help with red, green and, blue level adjustments. Each color should appear sharp and clear.

The **CROSSHATCH PATTERNS** test fills the screen with a grid and a series of dots. The grid and the dots should be clear. The dots should appear round.

If any of the Monitor Pattern Tests shows a need for adjustment, use the proper white knobs on the Monitor Board.

Move right joystick to return to the Monitor Patterns Menu. From this menu, select **RETURN TO MAIN MENU** with left joystick and activate with right joystick.

NOTE:

SMASH TV provides front-mounted Monitor Board controls. These controls are accessible within the control panel opening beneath the monitor.

Burn-in Test

The Burn-in Test continually repeats the CPU Board Test. Move any joystick to select the Burn-in Test; then, press any button to activate the test. When the Burn-in Test detects an error, the test stops and displays an error message on the screen. The third page of the Audit Table specifies the number of Burn-in cycles successfully completed. Use this test to find intermittent CPU problems.

To exit this test, switch off the game; then, switch it on again.

COIN BOOKKEEPING

To enter the Coin Bookkeeping from the Main Test Menu, move the left joystick to select the Coin Bookkeeping option; then, move the right joystick to activate it.

The Coin Bookkeeping Table records the coinbox totals and game play counters. The left side of the table names the bookkeeping item; the right side shows the number of coins, credits, or plays for each item.

| | |
|---------------------------------------|-------------|
| LEFT SLOT COINS | 0 |
| CENTER SLOT COINS | 0 |
| RIGHT SLOT COINS | 0 |
| PAID CREDITS | 0 |
| GAMES STARTED (FROM ANYWHERE) | 0 |
| GAMES CONTINUED | 0 |
| TOTAL PLAYS | 0 |
| PLAYS UNTIL HIGH SCORE RESET | 5000 |
| MORE DETAILED INFORMATION | |
| RETURN TO MAIN MENU | |

Coin Bookkeeping Table

To exit Coin Bookkeeping, move the left joystick to select RETURN TO MAIN MENU; then, move right joystick to activate it.

GAME AUDITS

To enter Game Audits from the Main Test Menu, move the left joystick to select the Game Audits option; then, move the right joystick to activate it. To advance to the next (or return to the previous) page of the Game Audit Table, move any joystick to select either "Next Audit Page", or "Previous Audit Page"; then, press any control panel button to change the page.

The Game Audits Table records the game play statistics. The left side of the table names the Audit item; the right side shows the amount of play.

| | | | |
|---|---|-----------------|---------------------|
| TOTAL PLAYS | 0 | | |
| EXTRA MEN COLLECTED/EARNED | 0 | | |
| HOURS OF SINGLE PLAY | 0 | | |
| HOURS OF DUAL PLAY | 0 | | |
| TOTAL HOURS OF PLAY | 0 | | |
| AVG. "PLAYER" GAME TIME (MIN.) | 0 | | |
| AVG. ELAPSED TIME/PLAY | 0 | | |
| <table border="1"> <tr><td>NEXT AUDIT PAGE</td></tr> <tr><td>RETURN TO MAIN MENU</td></tr> </table> | | NEXT AUDIT PAGE | RETURN TO MAIN MENU |
| NEXT AUDIT PAGE | | | |
| RETURN TO MAIN MENU | | | |

PAGE 1 OF AUDIT TABLE

| | | | |
|---|---|---------------------|---------------------|
| GAMES STARTED (ALWAYS FROM WAVE 1) | 0 | | |
| REACHED WAVE 2 | 0 | | |
| REACHED MUTOID MAN | 0 | | |
| REACHED CIRCUIT 2 WAVE 1 | 0 | | |
| REACHED SCAR FACE | 0 | | |
| REACHED CIRCUIT 3 WAVE 1 | 0 | | |
| REACHED TEMPLE WAVES | 0 | | |
| REACHED BOSS SNAKES | 0 | | |
| REACHED END OF GAME | 0 | | |
| WATCHDOG LOCKUPS | 0 | | |
| <table border="1"> <tr><td>PREVIOUS AUDIT PAGE</td></tr> <tr><td>RETURN TO MAIN MENU</td></tr> </table> | | PREVIOUS AUDIT PAGE | RETURN TO MAIN MENU |
| PREVIOUS AUDIT PAGE | | | |
| RETURN TO MAIN MENU | | | |

PAGE 2 OF AUDIT TABLE

To exit the Game Audit Table , move the left joystick to select RETURN TO MAIN MENU; then, move right joystick to activate it.

GAME ADJUSTMENTS

Move the left joystick to select the Game Adjustment option on the Main Test Menu; then, move the right joystick to activate it.

The Game Adjustments option allows the owner/operator to change the Game Pricing and Game Difficulty.

The Game Adjustment Menu offers several choices. Each choice has its own menu. Move the left joystick to select your choice to be changed from the Game Adjustments Menu; then, move right joystick to activate that choice. On the next menu screen, move the left joystick to select the item you wish to modify; then, move the right to activate that item. If the activated item only provides a setting choice, move the left joystick to change the current setting to the desired value; then, move the right joystick to lock in the desired value. Moving the joystick up increases the setting value shown on the screen. Moving the joystick down causes the value shown on the screen to decrease.

**SELECT WITH LEFT STICK
MOVE RIGHT STICK TO MODIFY**

RETURN TO MAIN MENU
STANDARD PRICING
CUSTOM PRICING
GAME DIFFICULTY
LIVES PER PLAY
ATTRACT-MODE SOUND
AUTO HIGH SCORE RESET
VIOLENCE LEVEL
RETURN TO MAIN MENU

Game Adjustment Menu

Standard Pricing

Standard Pricing allows the operator to choose any of the "Standard" selections for the Standard Pricing Table. Standard Pricing *cannot* be installed when either Custom or DIP Switch Pricing is in effect.

NOTE

The SMASH TV Standard Pricing Table is on page 1-19.

Move the right joystick to return to the Game Adjustments Menu.

Custom Pricing

Custom Pricing allows the operator to install pricing other than that of the Standard Pricing Table. Custom Pricing also allows the operator to select the maximum amount of credits per game, the amount of credits required to start a game, and the amount or credits required to continue a game. Custom Pricing *cannot* be installed when DIP Switch Pricing is in effect.

Move the right joystick to return to the Game Adjustments Menu.

Game Difficulty

Game Difficulty allows the operator to select the difficulty level of the game. The range of this setting is Easiest (1) to Hardest (10).

Move the right joystick to return to the Game Adjustments Menu.

Lives per Play

Lives per Play allows the operator to select the number of lives a player receives each time a game is started or continued.

Move the right joystick to return to the Game Adjustments Menu.

Attract Mode Sound

Attract Mode Sounds allows the operator to determine if the game has sound during the Attract Mode.

Move the right joystick to return to the Game Adjustments Menu.

Auto High Score Reset

Auto High Score Reset allows the operator to determine how many plays must occur before the all time high scores are automatically reset to factory settings.

Move the right joystick to return to the Game Adjustments Menu.

Violence Level

Allows the operator to determine the Violence Level of the game.

Move the right joystick to return to the Game Adjustments Menu.

To return to the Main Test Menu, move the left joystick to select RETURN TO MAIN MENU; then, move the right joystick to activate.

SMASH TV STANDARD PRICING TABLE

| NAME | SETTING | LEFT CHUTE | RIGHT CHUTE |
|----------|---------------|------------|-------------|
| USA 1 | 1/25¢ | 25¢ | 25¢ |
| GERMAN 1 | 1/1 DM 6/5 DM | 1 DM | 5 DM |
| FRANCE 1 | 2/5 F 5/10 F | 5 F | 10 F |

UTILITIES

On the MainTest Menu, move the left joystick to select the Utilities option; then, move the right joystick to activate it.

The Utilities option allows the owner/operator to clear the game's bookkeeping memory and to install a custom message.

**SELECT WITH LEFT STICK
ACTIVATE WITH RIGHT STICK**

**CLEAR CREDITS
CLEAR COIN COUNTERS
CLEAR GAME AUDITS
RESET HIGH SCORES
DEFAULT ADJUSTMENTS
FULL FACTORY RESTORE
RETURN TO MAIN MENU**

Utilities Menu

Move the left joystick to select an item from the Utilities Menu; then, move the right joystick to activate that item. After an item has been activated, you are given the option of resetting the item or not. For example;

**CLEAR CREDITS
ARE YOU SURE ?**

| |
|------------|
| YES |
| NO |

Move the left joystick to choose YES or NO; then, move the right joystick to lock in your choice and to return to the Utilities Menu.

To exit Utilities, move the left joystick to select RETURN TO MAIN MENU; then, move the right joystick to activate it.

Troubleshooting

| Problem | Possible Solution |
|--|--|
| NO PICTURE OR DISTORTED PICTURE. | Check for faulty video board or monitor. Check for disconnected video signal cable. |
| TURN GAME ON & NOTHING HAPPENS | Check line fuse. Check for +5V dc at pins C, D, 3, and 4 of the JAMMA Connector. |
| NO SOUND | Check the speaker and speaker connection to pins L and 10 on JAMMA Connector. Check volume control setting. Check for +12V dc at pins F and 6 on the JAMMA Connector. Check interboard wiring from CPU Board to Sound Board. |
| NO GENERAL ILLUMINATION | Check the 1A., S-B fuse on the cabinet wall above the coin box. |
| MOVE JOYSTICK, BUT PLAYER DOES NOT MOVE OR FIRE | Check for open wires between Joystick and CPU Board. Check for contamination on joystick switch contacts and CPU Board pins. Check for proper ground. |
| PRESS START BUTTON AND NOTHING HAPPENS | Check for open wires between button and CPU Board. Check for contamination on CPU Board pins or button switch blade contacts. Check for proper ground. |
| NO CREDIT GIVEN WHEN COINS ARE INSERTED | Check DIP switch coin setting. Check for contamination on coin switch contacts. Check for an open wire between Coin Switch 1 and pin 16 on JAMMA Connector or Coin Switch 2 and pin T of JAMMA Connector. |
| TOO MANY CREDITS FOR NUMBER OF COINS INSERTED | Check Game Pricing setting. Check for a short between pins T & 16 on JAMMA Connector. |
| GAME STAYS IN THE TEST MODE. | Check that the Test Switch in the coin door and the Test Switch (Position 8) on DIP Switch 2 are set to Off. |

SEE NOTE

NOTE: Due to the physical playing nature of SMASH TV, joysticks should be periodically checked and adjusted as necessary.

SMASH TV

S E C T I O N

two

Parts Information

Cabinet Hardware

| | |
|-----------------------------|------------------|
| Cabinet Assembly | A-11-948-3044-U1 |
| Caster Wheel Assembly | B-13086 |
| Control Panel Assembly | D-13570 |
| Leg Leveler Plate | 01-9155 |
| Leg Adjuster | 08-7377 |
| Wood Cabinet | 11-948 |
| | |
| Back Door Assembly | B-13574 |
| Lock Retainer | 01-7264 |
| Upper Door Cam Lock | 01-8989 |
| Rear Wood Door | 11-934 |
| Door Cam Lock | 20-6542-TB |
| | |
| Line Voltage Cable Assembly | C-12773-4 |
| Mtg Pft Toggle Assembly | A-9958 |
| Interlock Spring Brkt. Assy | B-12907 |
| Line Voltage Cable | H-13555 |
| Protective Cap | 17-1038-2 |
| Toggle Switch, 227V,15A. | 5640-10932-00 |
| Interlock Cheat Switch | 5643-09556-00 |
| | |
| Over/Under Coin Door | D-13250 |
| Test Switch | A-13115 |
| Coin Door Cable | H-13215 |
| Coin Door USA | 09-20000-V-1 |
| 12 pin "Z" Header | 5791-12235-12 |
| | |
| Speaker Grille | 31-1554-3044-U |
| Test Switch Bracket | 01-9383 |
| Marquee Retainer | 03-8252-2 |
| Lock Lamp | 03-8327 |
| Glass Edge Channel | 03-8358 |
| Wood Speaker Door | 11-935 |
| Wood Control Panel | 11-950 |
| Toggle Latch | 20-9347 |
| SMASH TV Marquee | 31-1551-3044-U1 |
| Glass CRT Cover | 31-1552-3044-U1 |

Speakers

| | |
|-----------------------------|---------------|
| Piezo Speaker Assembly | B-13587-1 |
| 4" Piezo Speaker, 50W | 5555-12068-00 |
| 6" Round Speaker, 8ohm, 20W | 5555-12015-00 |

Fluorescent Lamp Parts

| | |
|-------------------------------|---------|
| Fluorescent Housing & Bracket | C-12679 |
| Housing Mounting Brkt | 01-9146 |
| Light Fixture | 20-9590 |
| 18" Fluorescent Bulb, 15 W | 24-8809 |

PC Boards

| | |
|----------------------------|--------------|
| Y-Unit CPU Assembly | C-13234-3044 |
| Power Supply Assembly | C-13253-1 |
| Audio Sound Board Assembly | D-11581-3044 |

Transformer Assembly

| | |
|--------------------------|---------------|
| Power Pack Assembly | D-13252 |
| Line Cord Assembly | A-13340 |
| Power Transformer | A-13771 |
| Power Pack Chassi Assy | C-13251 |
| Power Pack Jumper Cable | H-13265 |
| Line Filter Jumper Cable | H-13344 |
| Transformer Jumper Cable | H-13378 |
| Varistor, 130V, 10J | 5017-09044-00 |
| Line Filter, 5Amp | 5102-08895-00 |
| Fuse, SB3A, 125V | 5731-08633-00 |
| Fuse Holder, Panel | 5733-10358-00 |

Control Panel

| | |
|--------------------------|--------------|
| Control Panel Assembly | D-13570 |
| Control Panel Plate Assy | C-13560 |
| White Button Assembly | C-9214-5 |
| Control Panel Bracket | 01-9651 |
| Wood Control Panel | 11-950 |
| 5/8 Palnut | 20-9222 |
| 8 Way Red Joystick | 20-9319-1 |
| Screened Overlay | 31-1547-3044 |

Monitor

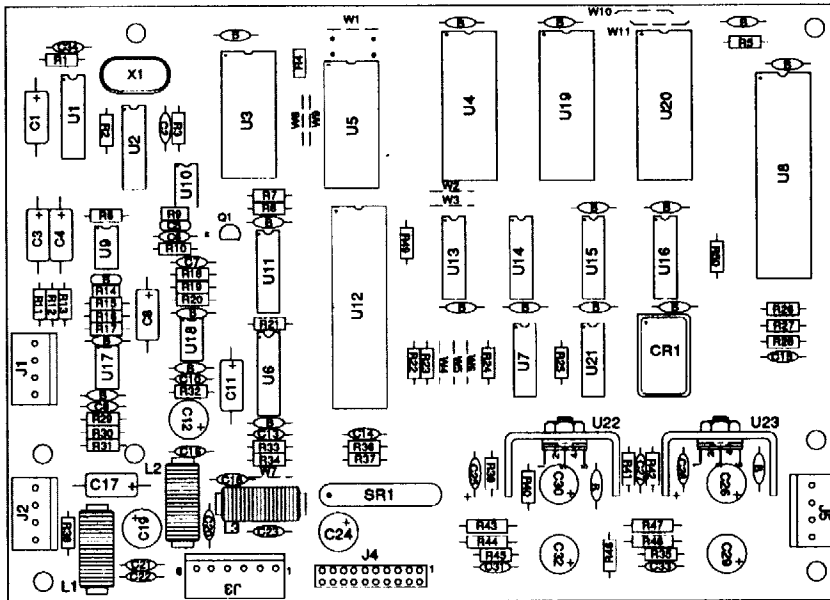
| | |
|-------------|---------------|
| Monitor 25" | 5675-12621-00 |
|-------------|---------------|

Cables

| | |
|----------------------------|---------------|
| Video Sound/Power Cable | H-10217-4 |
| Sound Board Jumper Cable | H-12758 |
| Speaker Cable | H-13213 |
| Coin Door Cable | H-13215 |
| Power Pack Jumper Cable | H-13265 |
| Line Filter Jumper Cable | H-13344 |
| Transformer Jumper Cable | H-13378 |
| Main Harness Cable | H-13583 |
| Line Voltage Cable | H-13555 |
| Control Panel Cable | H-13584 |
| Sound/ Power Speaker Cable | H-13257 |
| 20 pin Ribbon Cable | 5795-10937-18 |

Manuals

| | |
|--------------------|----------------|
| Monitor Manual | 16-3000-103 |
| Instruction Manual | 16-3044-U1-101 |



Audio Board Assembly

p/n D-11581-3044

| Part Number | Ckt Designator | Description | Part Number | Ckt Designator | Description |
|------------------|---|-----------------------------------|---------------|--------------------------|---|
| 5786-12130-00 | | Bare P. C. Board | 5010-10985-00 | R14, R15 | Resistor, 20K, 1/4w, 5% |
| 5371-11087-00 | U1 | IC, D/A Conv, YM3012 | 5010-09034-00 | R22-R24, R17, R34 | Resistor, 10K, 1/4w, 5% |
| a) 5700-09008-00 | | Socket, IC, 16-pin (U1) | 5010-09324-00 | R6, R19, R20, R21 | Resistor, 27K, 1/4w, 5% |
| 5370-11086-00 | U3 | IC, Sound Processor, YM2151 | 5010-09162-00 | R39 | Resistor, 100K, 1/4w, 5% |
| a) 5700-09004-00 | | Socket, IC, 24-pin (U3) | 5010-09331-00 | R18 | Resistor, 13K, 1/4w, 5% |
| 5400-10320-00 | U8 | IC, μ Processor, MC68B09E | 5010-08772-00 | R18 | Resistor, 15K Ω , 1/4W, 5% |
| a) 5700-08985-00 | | Socket, IC, 40-pin (U8) | 5010-08824-00 | R32 | Resistor, 43K Ω , 1/4W, 5% |
| A-5343-3044-3 | U4 | IC, Audio ROM 1 | 5010-08846-00 | R31 | Resistor, 220K Ω , 1/4W, 5% |
| A-5343-3044-4 | U19 | IC, Audio ROM 2 | 5010-08991-00 | R12 | Resistor, 4.7K Ω , 1/4W, 5% |
| A-5343-3044-5 | U20 | IC, Audio ROM 3 | 5010-09219-00 | R38 | Resistor, 8.2K, 1/4W, 5% |
| a) 5700-10176-00 | | Socket, IC, 28-pin (U4, U19) | 5010-10258-00 | R40 | Resistor, 1M, 1/4w, 5% |
| 5371-09152-00 | U11 | IC, D/A Convtr, MC1408 | 5010-09179-00 | R10 | Resistor, 3.3M, 1/4w, 5% |
| 5430-10322-00 | U12 | IC, PIA, MC68B21 | 5010-09333-00 | R29 | Resistor, 180K Ω , 1/4W, 5% |
| 5340-10139-00 | U5 | IC, RAM/S 5516-2 2Kx8 | 5010-09342-00 | R30 | Resistor, 38K Ω , 1/4W, 5% |
| 5281-09487-00 | U16 | IC, Dual D Flipflop, 74LS74 | 5010-09534-00 | W9 | Resistor, 0 Ω , 1/4w, 5% |
| 5281-10043-00 | U13 | IC, 74LS175 | 5040-09343-00 | C1, C3, C4, C8 | Capacitor, 10 μ fd, 20v, \pm 20% |
| 5281-09235-00 | U21 | IC, Triple NAND, 74LS10 | 5040-10974-00 | C12, C19, C24 | Capacitor, 100 μ fd, 35v |
| 5370-09321-00 | U9, U10, U17, U18 | IC, Op Amp, MC1458 | 5040-09776-00 | C26, C30 | Capacitor, 470 μ fd, 16v, \pm 10% |
| 5281-09215-00 | U2 | IC, Hex Inv, 74LS04 | 5040-12006-00 | C29, C32 | Capacitor, 1000 μ fd, 16v, 20% |
| 5281-09246-00 | U14 | IC, 2-4 Dec, 74LS139 | 5041-09243-00 | C25, C28 | Capacitor, 10 μ fd, 10v, \pm 10% |
| 5281-09745-00 | U15 | IC, Dual Mux, 74LS138 | 5043-08990-00 | C5, B (17)* | Capacitor, 0.01 μ fd, 50v, \pm 80, -20% |
| 5370-09156-00 | U22, U23 | IC, Audio Amp, TDA2002 | 5043-08996-00 | C31, C33 | Capacitor, 0.1 μ fd, 50v, \pm 20% |
| a) 5705-09199-00 | | Heatsink, #8030B | 5043-09065-00 | C13 - C15 | Capacitor, 470 pfd, 50v, \pm 20% |
| b) 4006-01003-06 | | Mach. Screw, 6-32 x 3/8 | 5043-09492-00 | C2, C34 | Capacitor, 100 pfd, 50v, \pm 10% |
| c) 4406-01117-00 | | Nut, 6-32 Hex. | 5043-09844-00 | C6 | Capacitor, 47 pfd, 50v, \pm 20% |
| d) 4703-00007-00 | | Lockwasher, #6 Ext. | 5043-09845-00 | C16, C18, C20 - C23, C27 | Capacitor, 1000 pfd, 50v, \pm 20% |
| 5160-10289-00 | Q1 | Transistor, 2N3904, NPN | 5520-09020-00 | X1 | Crystal, 3.58 MHz |
| 5060-10396-00 | SP1 | SIP 4.7K & 470pfd, 8R8C | 5521-10931-00 | CR1 | Oscillator, 8 MHz |
| 5010-09181-00 | R44, R48 | Resistor, 1.0 Ω , 1/2w, 5% | 5551-09822-00 | L1 - L3 | Inductor, 4.7 μ H, 3A |
| 5010-09161-00 | R35, R45 | Resistor, 2.2 Ω , 1/4w, 5% | 5791-09437-00 | J4 | Connector, 20 pin, (Hdr), Rib. Cbl |
| 5010-09361-00 | R43, R46, R47 | Resistor, 220 Ω , 1/2w, 5% | 5791-10862-04 | J1, J2, J5 | Connector, 4 pin (Hdr) |
| 5010-09358-00 | R41, R42 | Resistor, 1K, 1/4w, 5% | 5791-10862-06 | J3 | Connector, 6 pin (Hdr) |
| 5010-08998-00 | R2, R3, | Resistor, 2.2K, 1/4w, 5% | 16-8850-250 | | P.C.B. I.D. Label |
| 5010-08983-00 | R7-R9 | Resistor, 3.3K, 1/4w, 5% | 20-9229 | | Thermal Compound |
| 5010-08991-00 | R1, R4, R5, R11, R25 - R28, R33, R36, R37, R49, R50 | Resistor, 4.7K, 1/4w, 5% | | | |

Notes: *17 capacitors (shown on diagram with "B" symbol) provide +5VDC filtering for ICs.
 All capacitors are ceramic, 50v, axial, unless otherwise noted.
 All resistors are 5%, 1/4w, Carbon Film, unless otherwise noted.

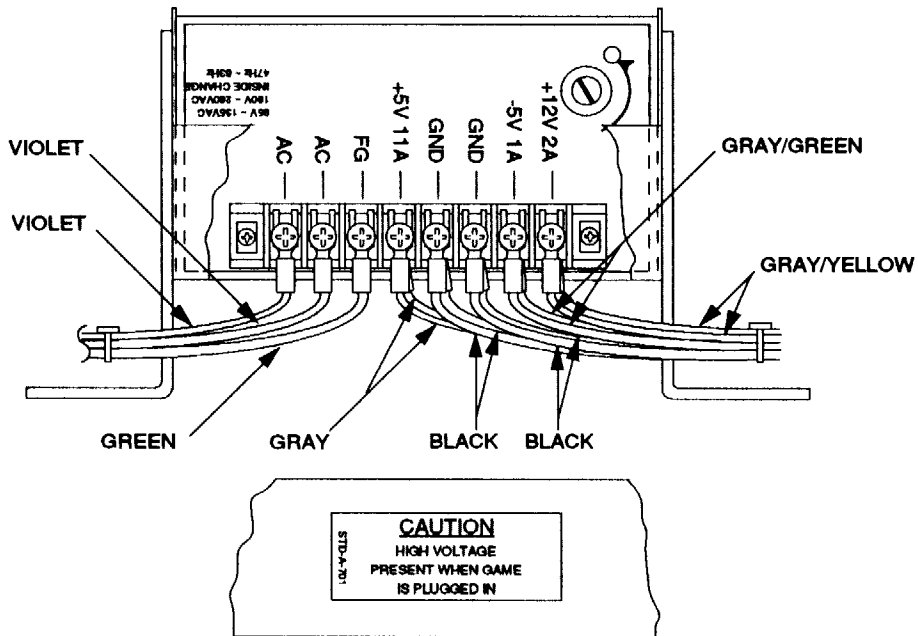
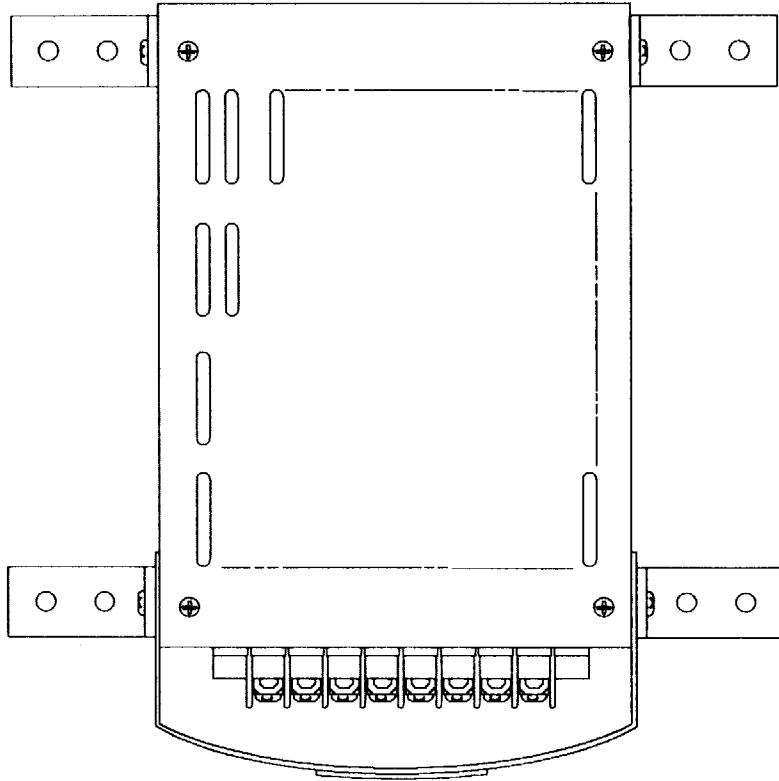
Y-UNIT CPU ASSEMBLY
p/n C-13234-3044

| Part No. | Ckt. Designator | Description | Part No. | Ckt. Designator | Description |
|---------------|------------------------------|--------------------|-----------------|------------------------|--|
| 5770-12555-00 | | Bare PC Brd. | 5019-09362-00 | SR3, SR4, SR6 | SIP, 4.7KΩ |
| 5281-09737-00 | U1 | IC, 74LS 86 | | SR7, SR11, SR15 | |
| 5317-12211-00 | U2, U20, U24, U43 | | | SR17, SR19-SR24 | |
| | U81, U62, U70 | IC, 74ALS541 | | SRC1-SRC3 | |
| 5317-12212-00 | U3, U6, U7, U21, U25 | 74ALS574 | 5019-10143-00 | SR5 | SIP, 470Ω 9 Res. |
| | U50, U58, U63, U64 | | 5060-10396-00 | SRC4, SRC5 | SIP, 4.7KΩ 470pf |
| | U71, U72, U74, U79, U84, U85 | | | SRC10, SRC14 | |
| 5317-12208-00 | U4, U22, U54-U57 | 74ALS245 | | SRC16 | |
| | U59, U60, U75-U78 | | 5671-09019-00 | LED1, LED 2 | LED, Red |
| | U80, U81, U94, U110 | | 5651-09822-00 | L1 | Inductor, 4.7UH |
| 5340-12242-00 | U5, U23 | IC, 8K x 8 S RAM | 5645-09025-00 | DS1, DS2 | DIP. Sw. 16 pin |
| 5700-12047-00 | U8, U52, U53, U65 | 24 pin Socket | 5641-12551-00 | SW1 | Pushbutton Sw. |
| 5340-12213-00 | U10, U11, U28-U33 | IC, 4461 VRAM | 5881-12315-00 | B1 | Battery Holder |
| 5521-12604-00 | U16 | 40 MHZ Xtal | 5791-10862-00 | J2 | 8 pin Connector |
| 5521-10318-00 | U17 | 24 MHZ Xtal | 5791-12461-00 | J4 | 12 pin Connector |
| 5283-10468-00 | U19, U45 | IC, 74F74 | 5791-10850-00 | J6, J7 | 26 pin Ribbon Connector |
| | | | 5791-09437-00 | J8 | 20 pin Ribbon Connector |
| | | | 5791-12461-10 | J12 | 10 pin Connector |
| 5019-10849-00 | U27, U34, U44, U48 | 100Ω DIP Res. | | | |
| 5317-12305-00 | U35 | IC, 74ALS00 | | | |
| 5700-12253-00 | U36 | 68 pin Socket | | | |
| 5280-09309-00 | U37 | IC, 7407 | | | |
| 5281-09487-00 | U38 | IC, 74LS74 | | | |
| 5434-12255-00 | U39 | IC, MAX691 | | | |
| 5700-09915-00 | U40-U42 | 20 pin Socket | Part No. | Ckt. Designator | Description |
| 5311-12287-00 | U47, U46, U87, U100 | IC, 74HC541 | C13235-1 | | CPU Subassembly |
| | U101, U103, U104 | | | | (includes all parts except the following list) |
| 5700-10176-00 | U49 | 28 pin Socket | A-5343-3044-1 | U89 | IC, Game EPROM |
| 5311-12285-00 | U51, U73, U82 | IC, 74HC573 | A-5343-3044-10 | U105 | IC, Game EPROM |
| 5340-12014-00 | U66-U69 | IC, 4464 DRAM | A-5343-3044-11 | U106 | IC, Game EPROM |
| 5283-10552-00 | U83 | IC, 74F04 | A-5343-3044-12 | U107 | IC, Game EPROM |
| 5370-12602-00 | U86 | IC, ULN2064B | A-5343-3044-13 | U108 | IC, Game EPROM |
| 5317-12023-00 | U88 | IC, 74ALS138 | A-5343-3044-14 | U109 | IC, Game EPROM |
| 5700-12088-00 | U89-U93, U95-U98 | 32 pin Socket | A-5343-3044-15 | U111 | IC, Game EPROM |
| | U105-U109, U111-U114 | | A-5343-3044-16 | U112 | IC, Game EPROM |
| 5700-12254-00 | U99 | 144 pin Socket | A-5343-3044-17 | U113 | IC, Game EPROM |
| 5317-12024-00 | U102 | IC, 74ALS139 | A-5343-3044-18 | U114 | IC, Game EPROM |
| 5700-08985-00 | U115 | 40 pin Socket | A-5343-3044-2 | U90 | IC, Game EPROM |
| 5010-08991-00 | R1, R24, R27 | Res. 4.7KΩ 5% 1/4W | A-5343-3044-3 | U91 | IC, Game EPROM |
| 5010-10204-00 | R2, R7, R12 | Res. 1KΩ 2% 1/4W | A-5343-3044-4 | U92 | IC, Game EPROM |
| 5010-10205-00 | R3, R8, R13 | Res. 2KΩ 2% 1/4W | A-5343-3044-5 | U93 | IC, Game EPROM |
| 5010-10000-00 | R4, R9, R14 | Res. 3.9KΩ 5% 1/4W | A-5343-3044-6 | U95 | IC, Game EPROM |
| 5010-09219-00 | R5, R10, R15 | Res. 8.2KΩ 5% 1/4W | A-5343-3044-7 | U96 | IC, Game EPROM |
| 5010-08772-00 | R6, R11, R16 | Res. 15KΩ 5% 1/4W | A-5343-3044-8 | U97 | IC, Game EPROM |
| 5010-09001-00 | R23, R25 | Res. 330Ω 5% 1/4W | A-5343-3044-9 | U98 | IC, Game EPROM |
| 5010-09036-00 | R26, R29-R34 | Res. 100Ω 5% 1/4W | A-5346-3044-1 | U8 | IC, PLD Color RAM Control |
| 5010-09416-00 | R35-R37, R46-R48 | Res. 470Ω 5% 1/4W | A-5346-3044-2 | U40 | IC, PLD Address Decode |
| 5010-08997-00 | R38-R45 | Res. 2.7Ω 5% 1/4W | A-5346-3044-3 | U41 | IC, PLD Video RAM Control |
| 5010-09534-00 | W2, W8, W11, W12 | Res. 0Ω | A-5346-3044-4 | U42 | IC, PLD Local Control |
| | W14, W20, W22, W24 | | A-5346-3044-5 | U52 | IC, PLD Video RAM Sequencer |
| | W27, W28, W31, W32, | | A-5346-3044-6 | U53 | IC, PLD Image ROM Control |
| | W35, W39, W41, W43 | | A-5346-3044-7 | U65 | IC, PLD Miscellaneous Control |
| | W44, W46, W48, W50, | | A-5346-3044-8 | U115 | IC, PLD Autoerase Controller |
| | W52, W54, W56, W58 | | 5340-12558-00 | U49 | IC, 8K x 8 Static RAM 150ns Low Power |
| | W60, W62, W66, W68, | | 5400-12220-00 | U36 | IC, TMS34010-50 GSP |
| | W69, W72, W74, W76 | | 5410-12239-00 | U99 | IC, Custom Asic |
| | W78, W80 | | 5880-11056-00 | B1 | Battery, Lithium 3V |
| 5043-08980-00 | B | Cap. .01 μfd 10V | | | |
| 5040-08988-00 | C1, C2, C5, C10 | Cap. 100μfd 10V | | | |
| 5043-09845-00 | C3, C4 | Cap. .001μfd 10V | | | |
| 5041-09243-00 | C6-C9 | Cap. 10μfd 10V | | | |
| 5043-8996-00 | C11 | Cap. .1μfd | | | |
| 5019-12611-00 | SR1, SR2, SR8 | SIP, 470Ω 5 Res. | | | |
| | SR9, SR12, SR13, SR18 | | | | |

POWER SUPPLY SWITCHER ASSEMBLY

p/n C-13253

| Part Number | Description |
|-------------|--------------------|
| 20-9633 | Power Supply, 85W |
| 01-9254 | Shield |
| 16-8587-701 | High Voltage Label |



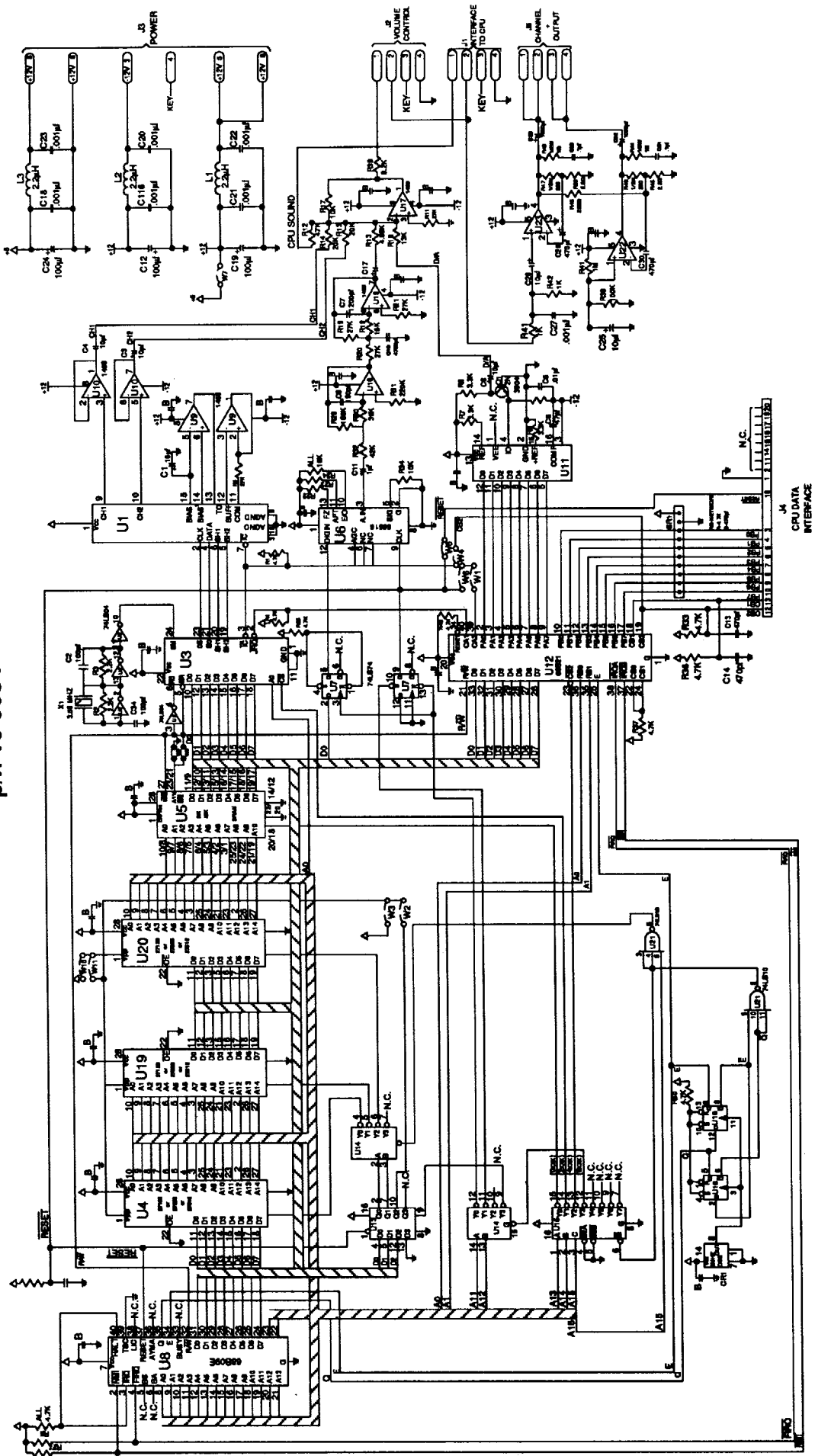
SMASH TV

S E C T I O N THREE

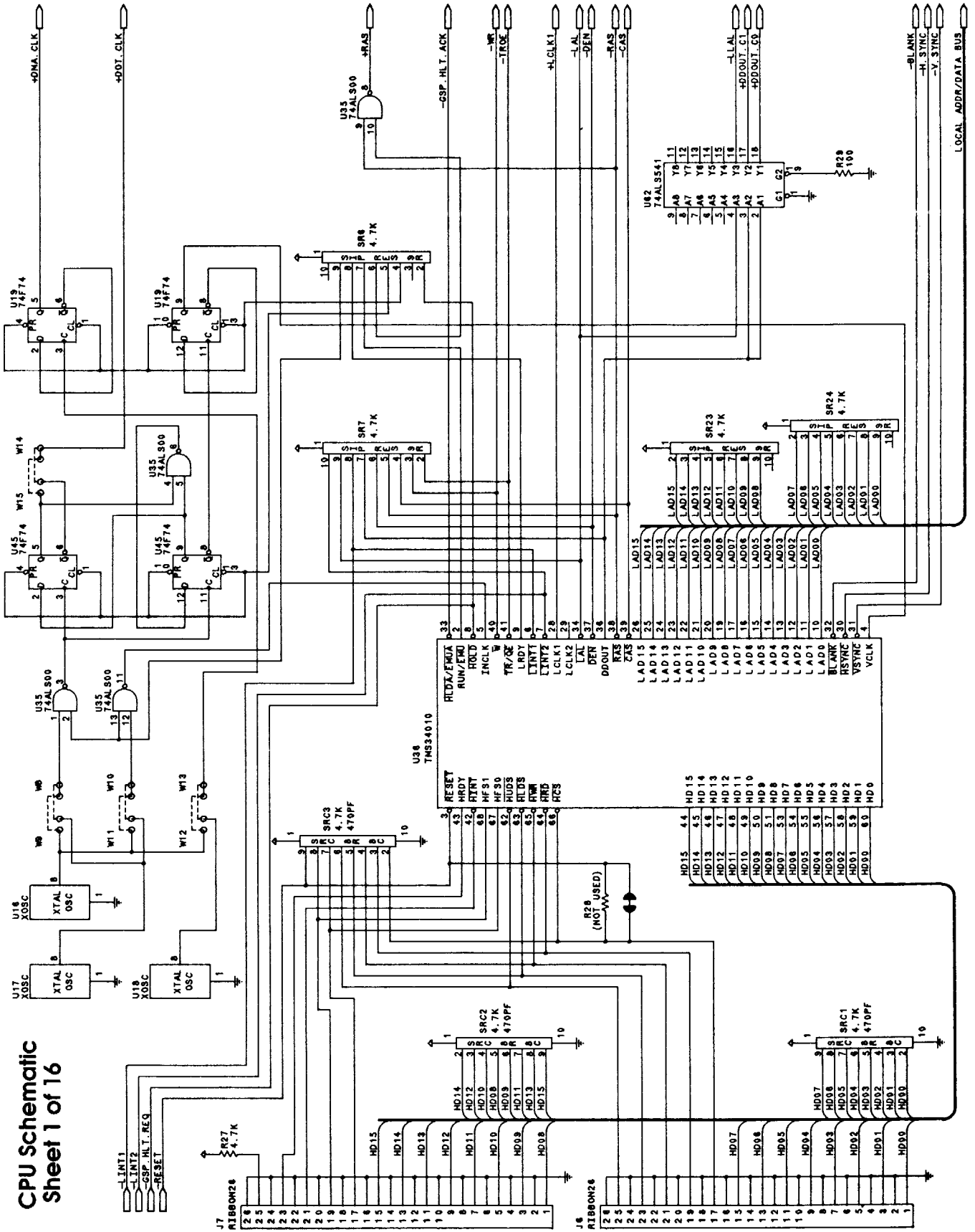
Diagrams & Schematics

AUDIO SCHEMATIC

p/n 16-9084

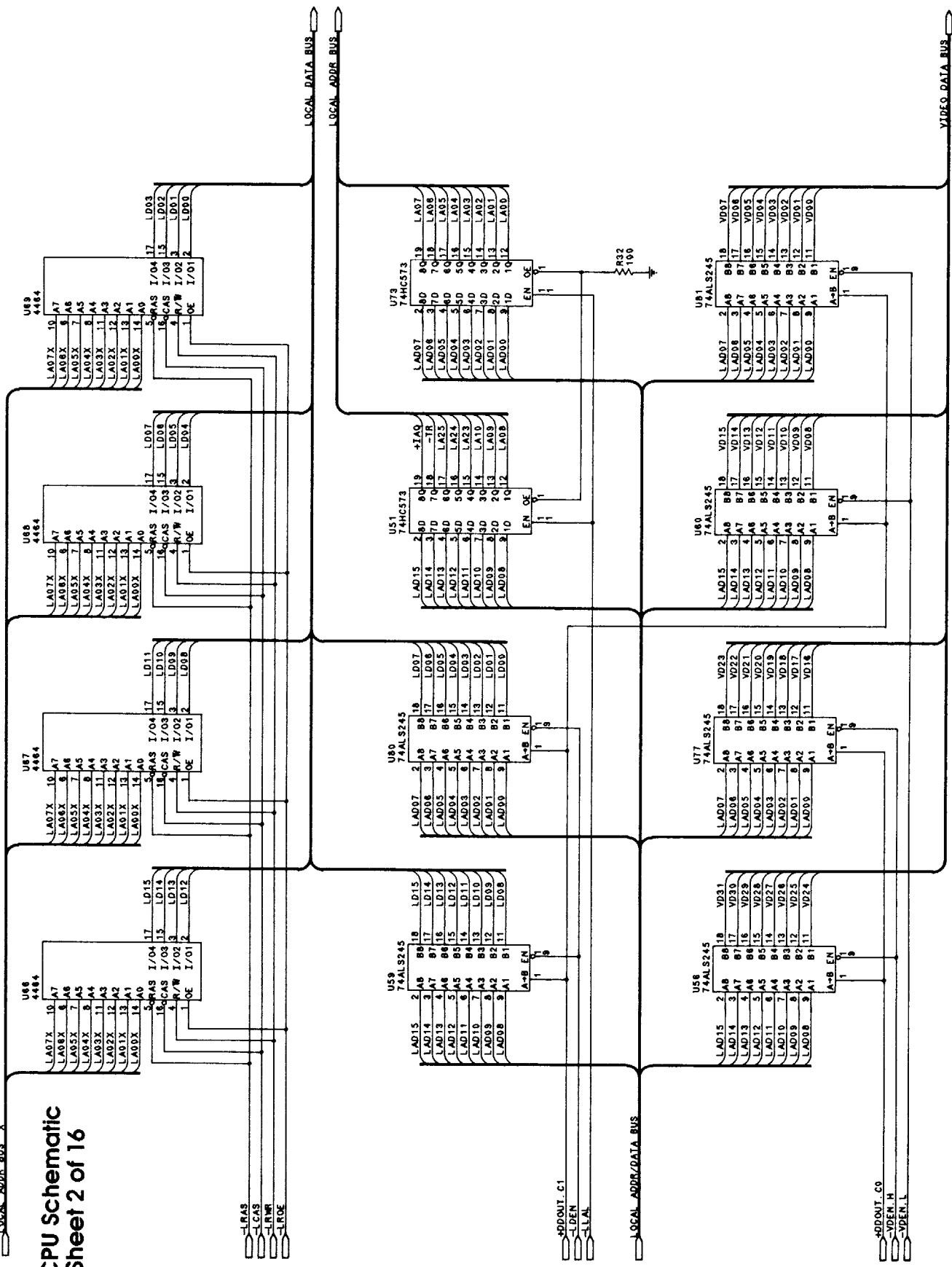


CPU Schematic Sheet 1 of 16



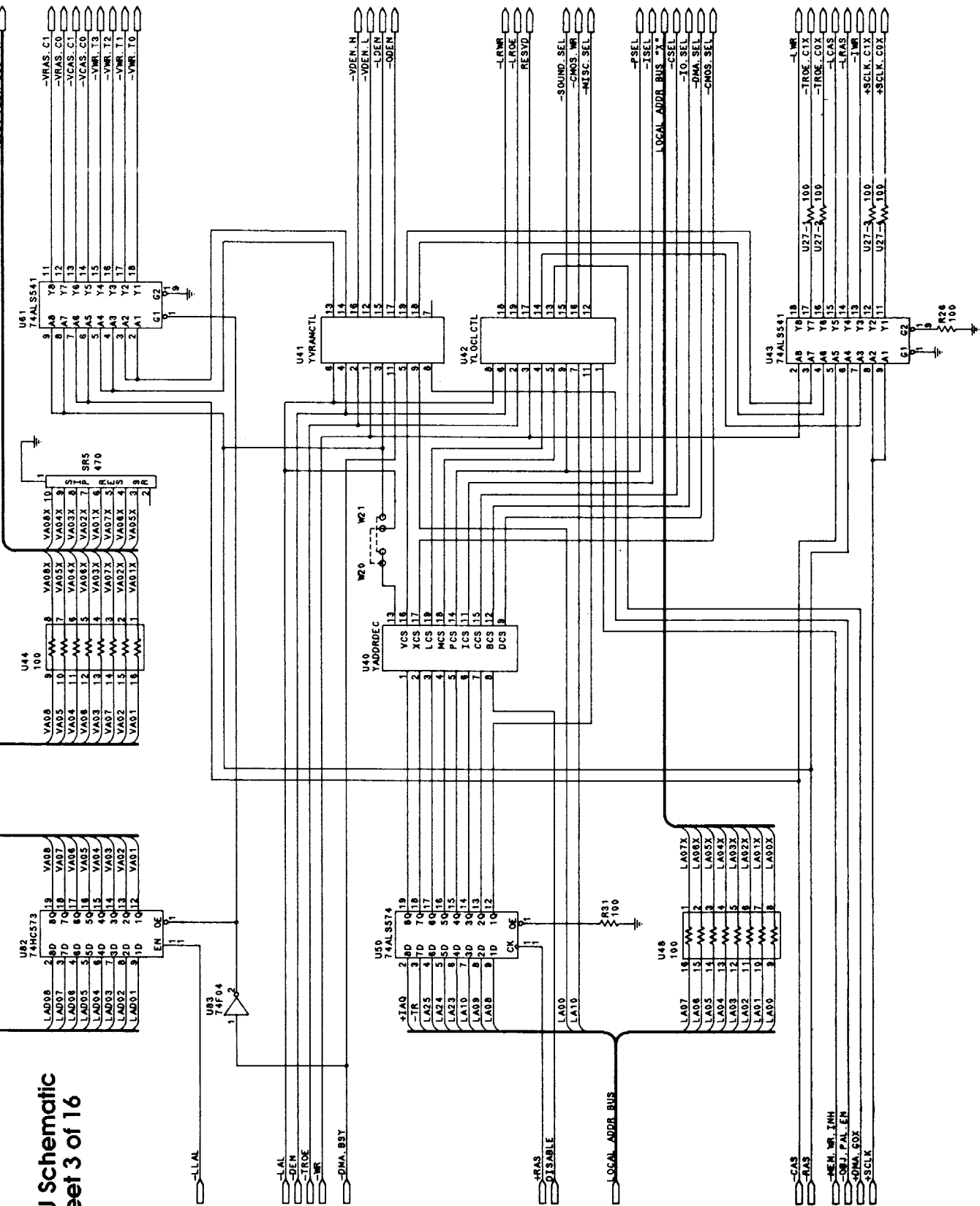
LOCAL_ADDR_BUS -X-

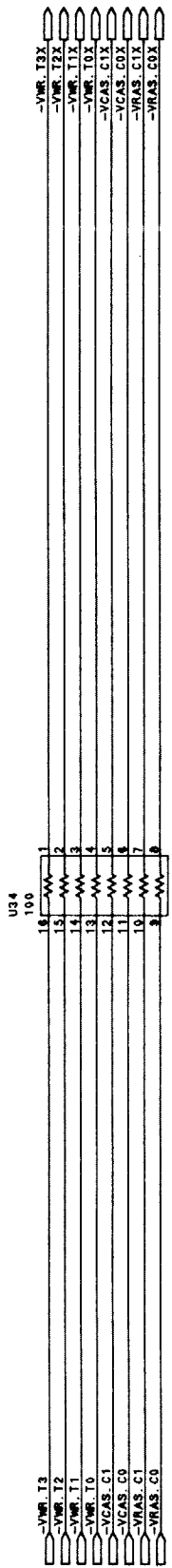
CPU Schematic Sheet 2 of 16



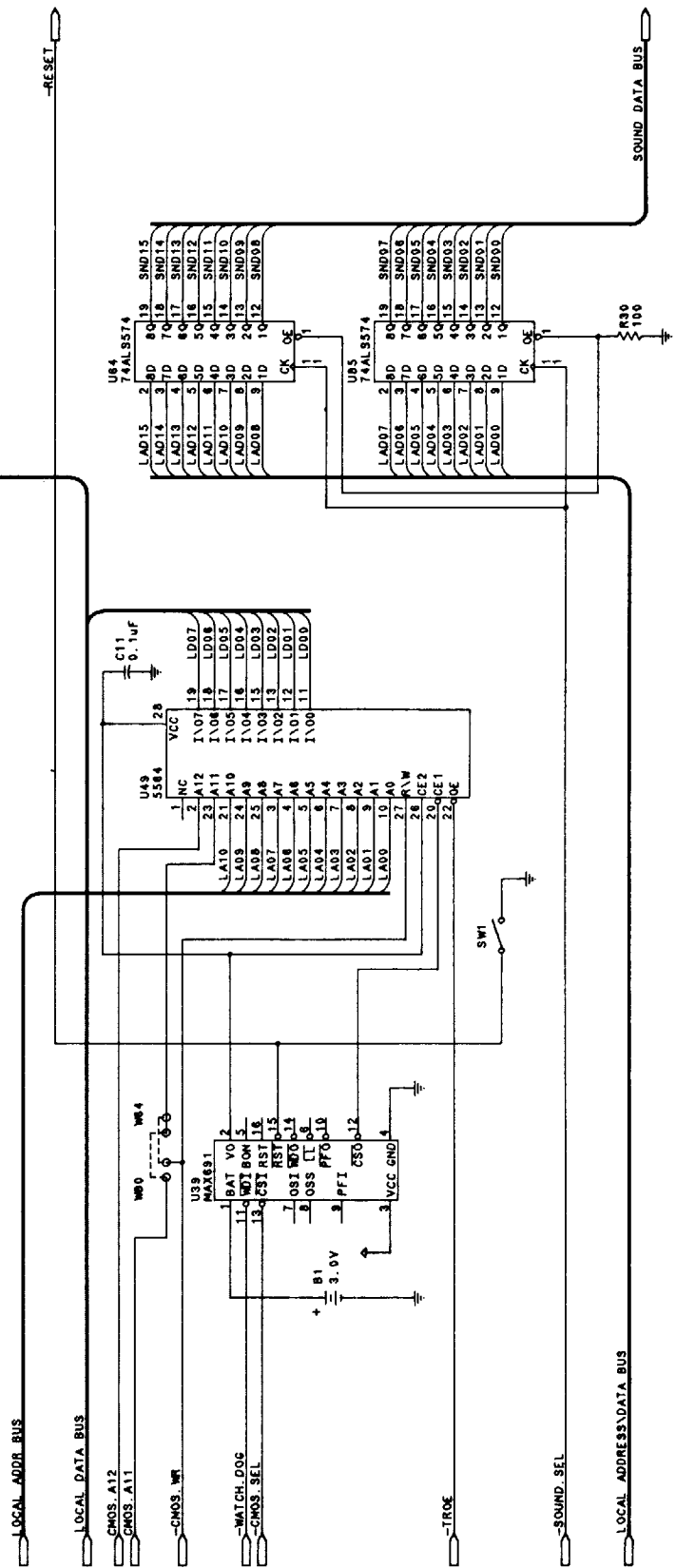
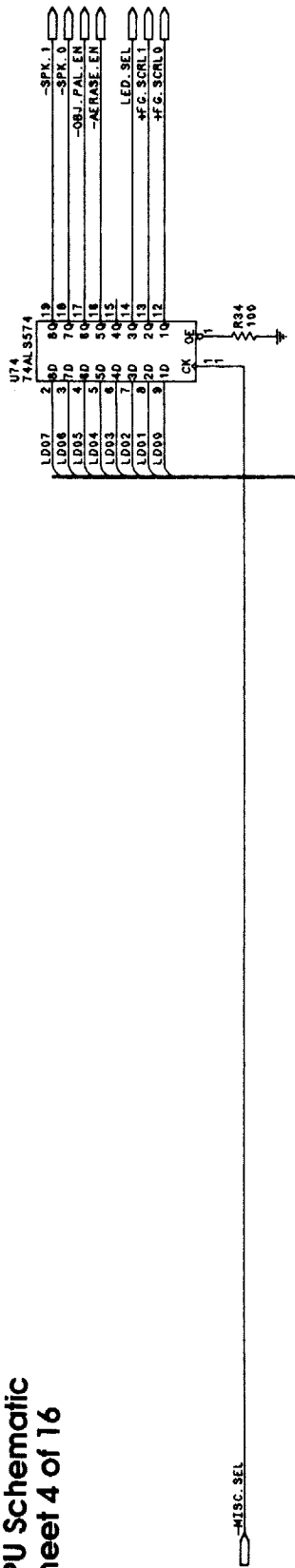
LOCAL_ADDR/DATA_BUS VIDEO_ADDR_BUS VIDEO_ADDR_BUS "X"

CPU Schematic Sheet 3 of 16



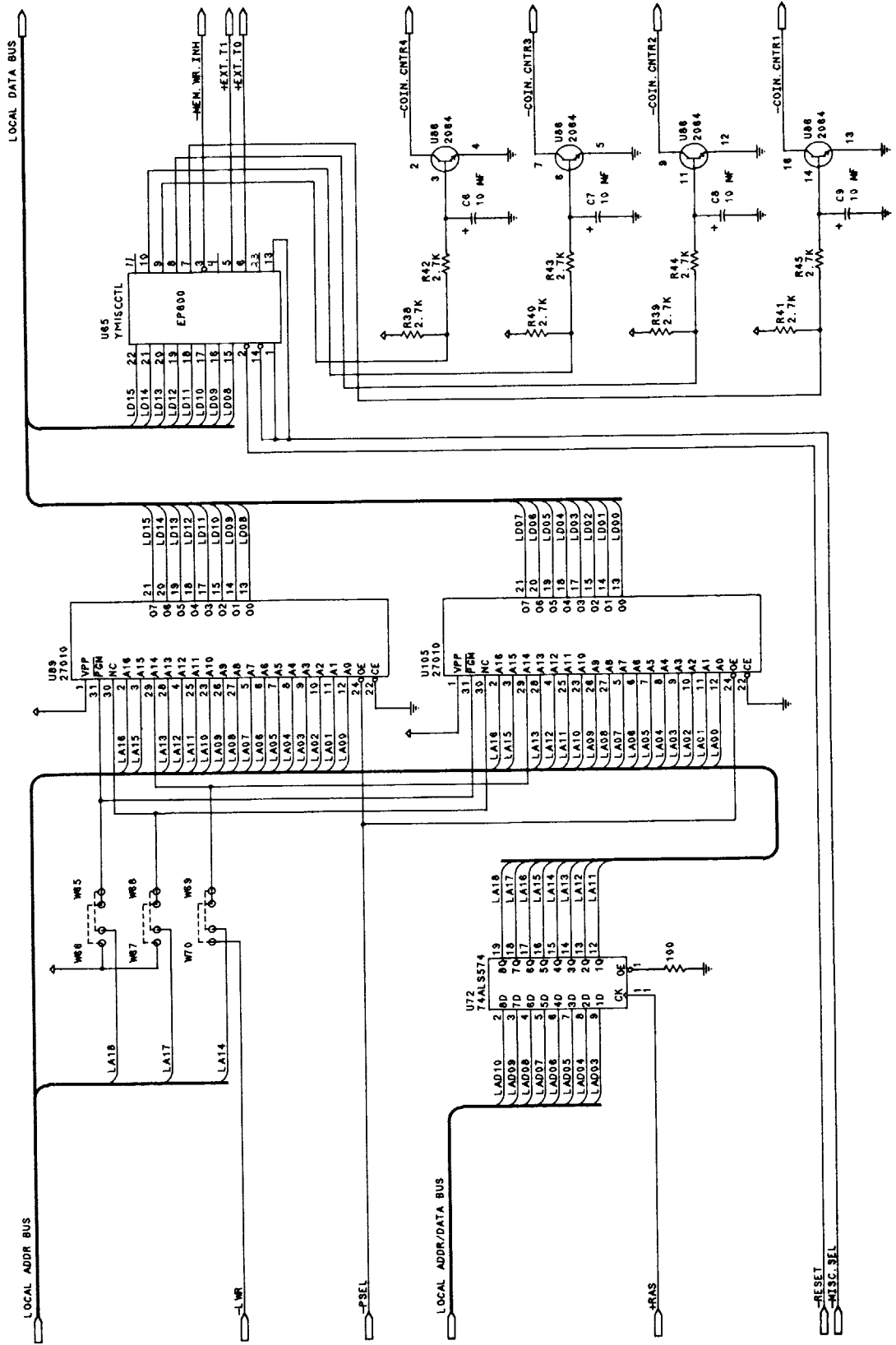


CPU Schematic
Sheet 4 of 16



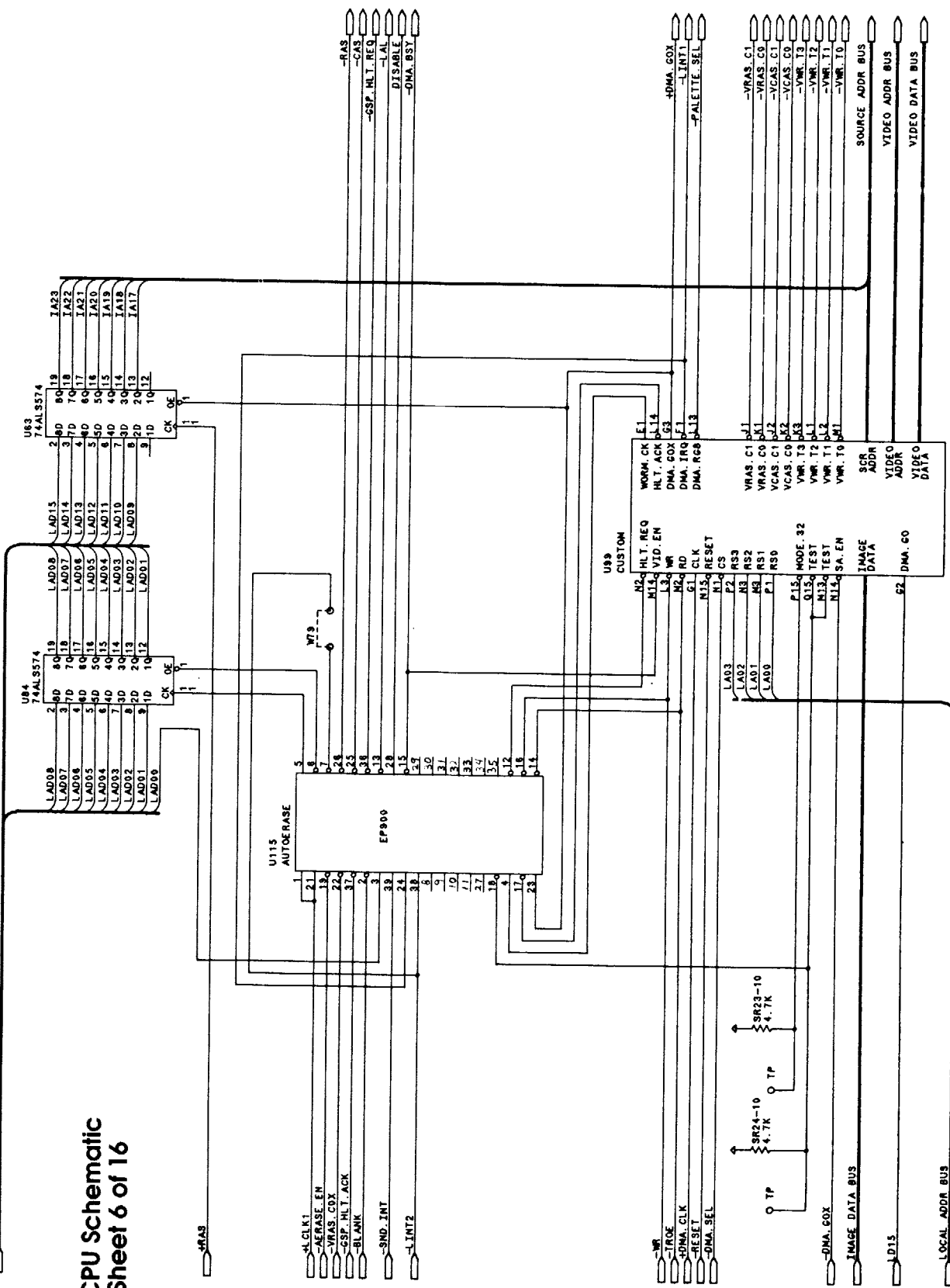
CPU Schematic Sheet 5 of 16

PROGRAM MEMORY



LOCAL_ADDR/DATA BUS

CPU Schematic Sheet 6 of 16



LOCAL DATA BUS

CPU Schematic Sheet 7 of 16

-DOUT.CO

LOCAL ADDR BUS

IMAGE ADDR BUS

-HRAS

-DMA.GOX

-TMR

-DEN

-ISEL

-DMA.SEL

-IROE.T3H

-IROE.T3L

-IROE.T2H

-IROE.T2L

-IROE.T1H

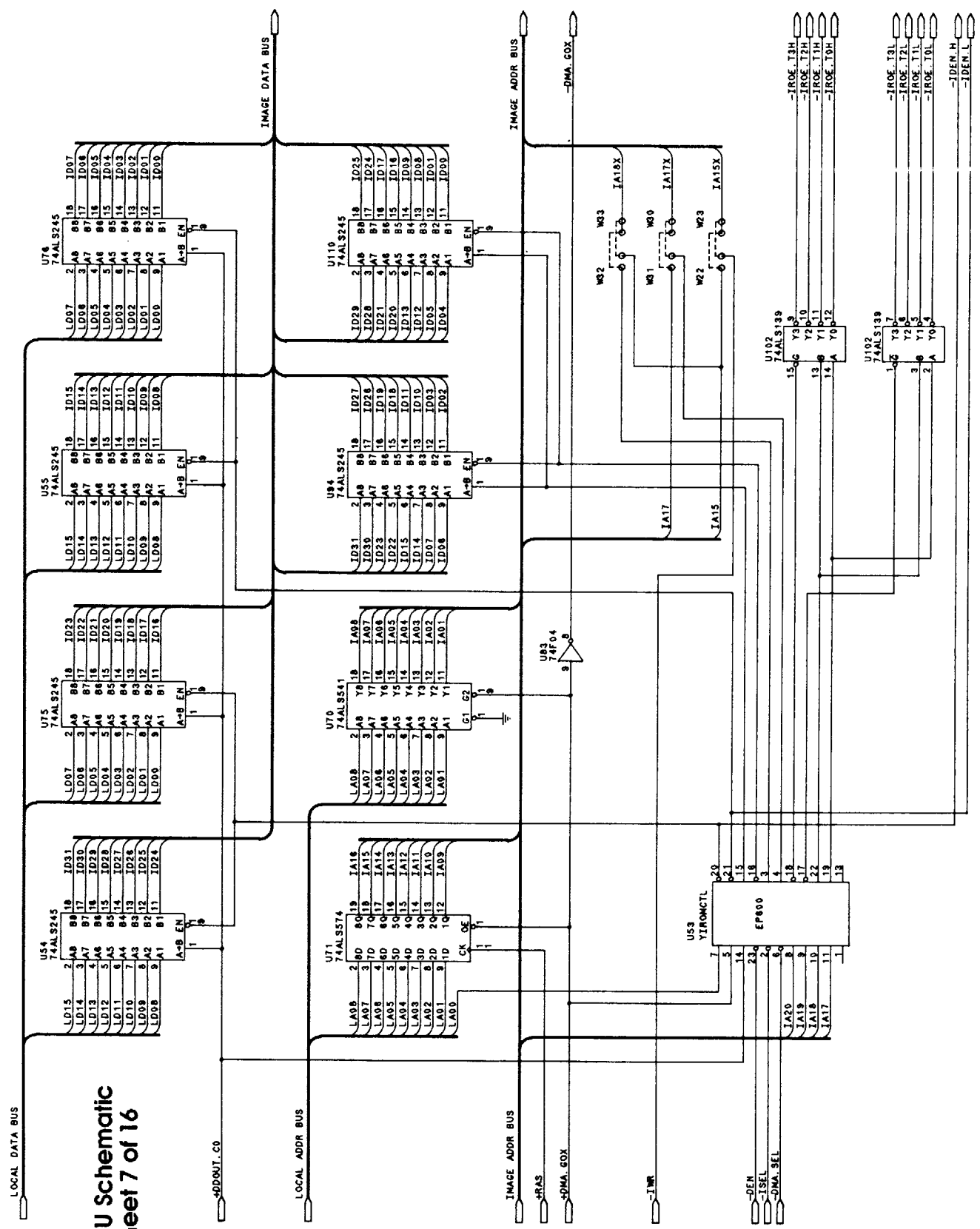
-IROE.T1L

-IROE.T0H

-IROE.T0L

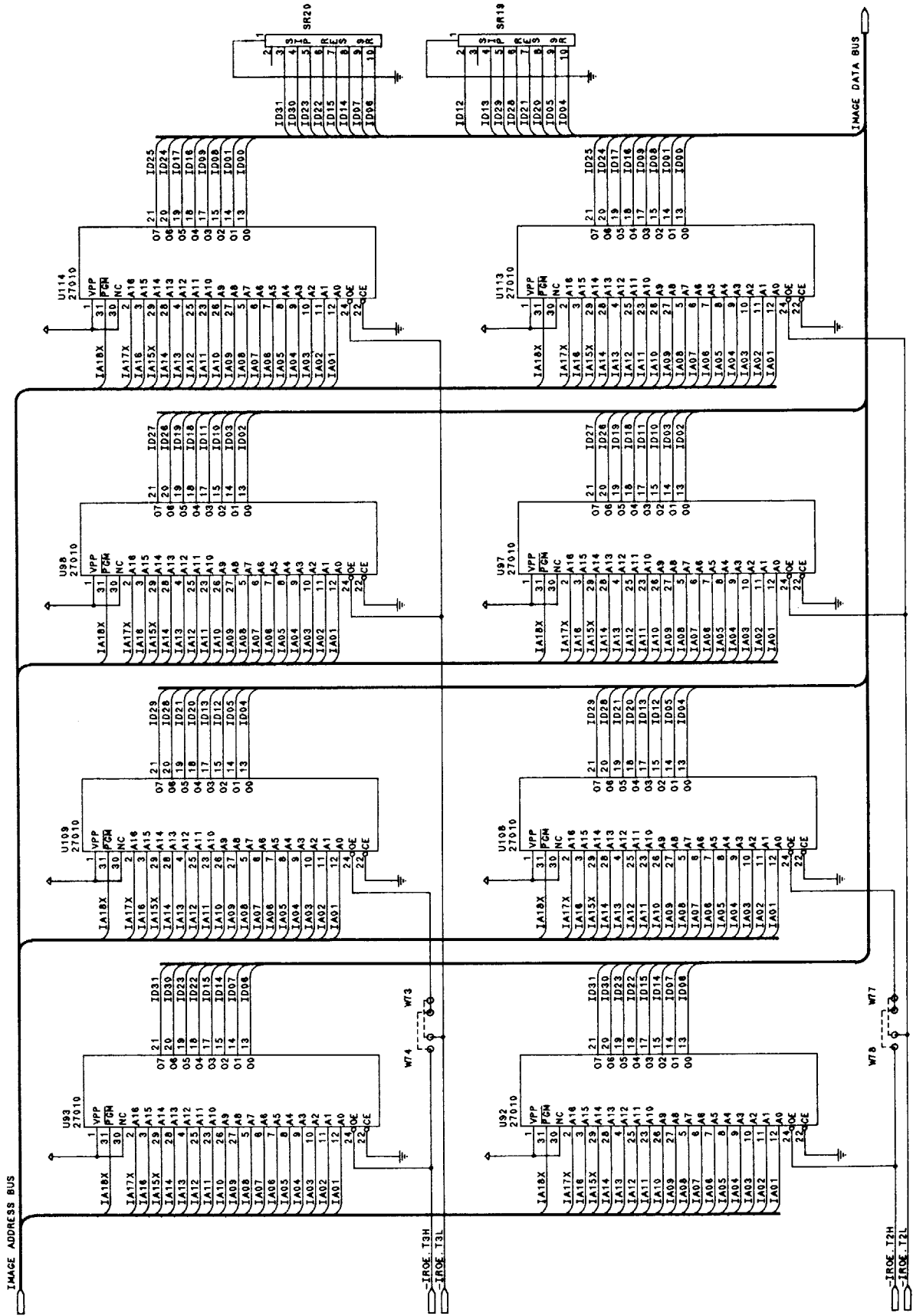
-IDEN.H

-IDEN.L



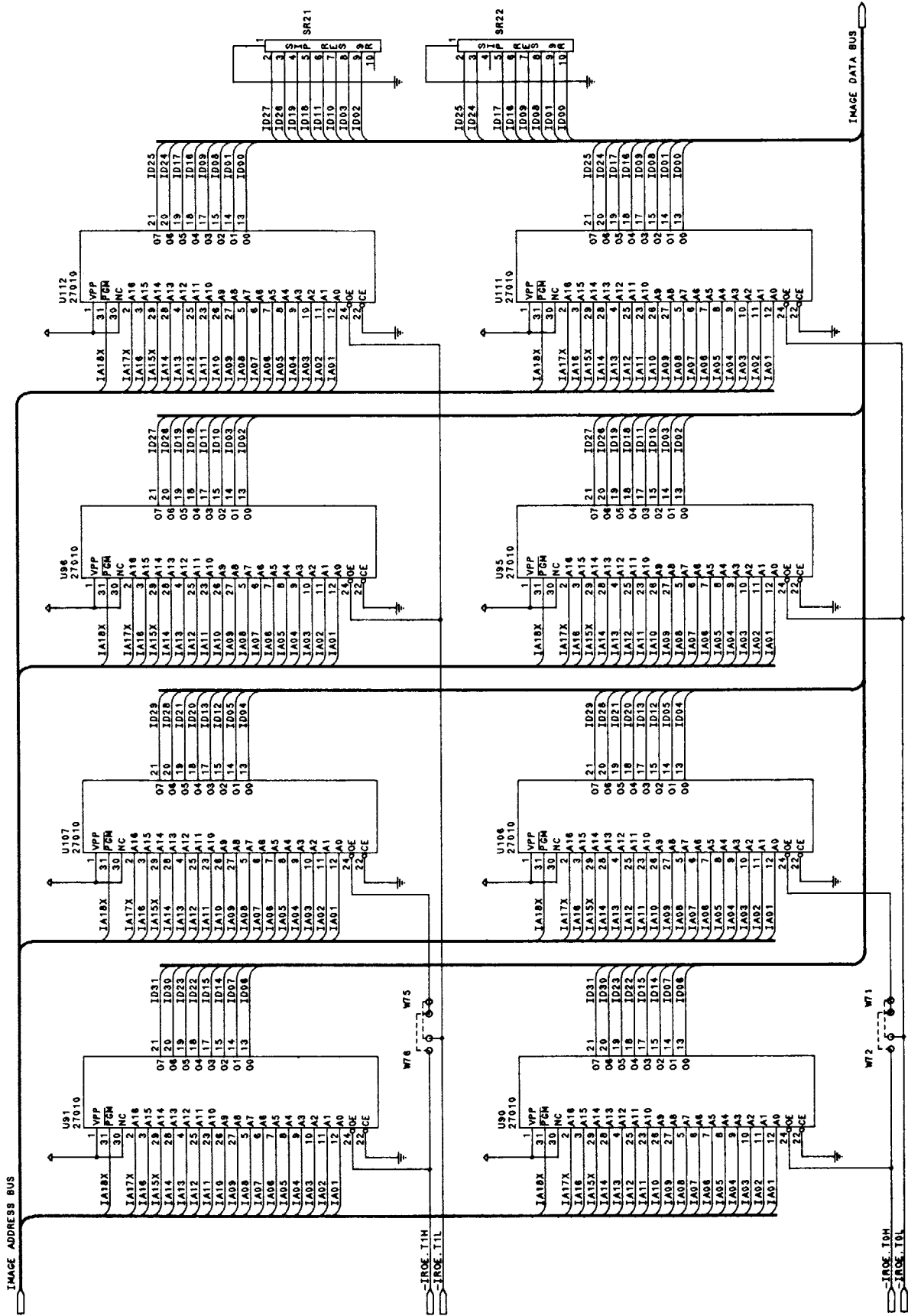
CPU Schematic Sheet 8 of 16

IMAGE MEMORY

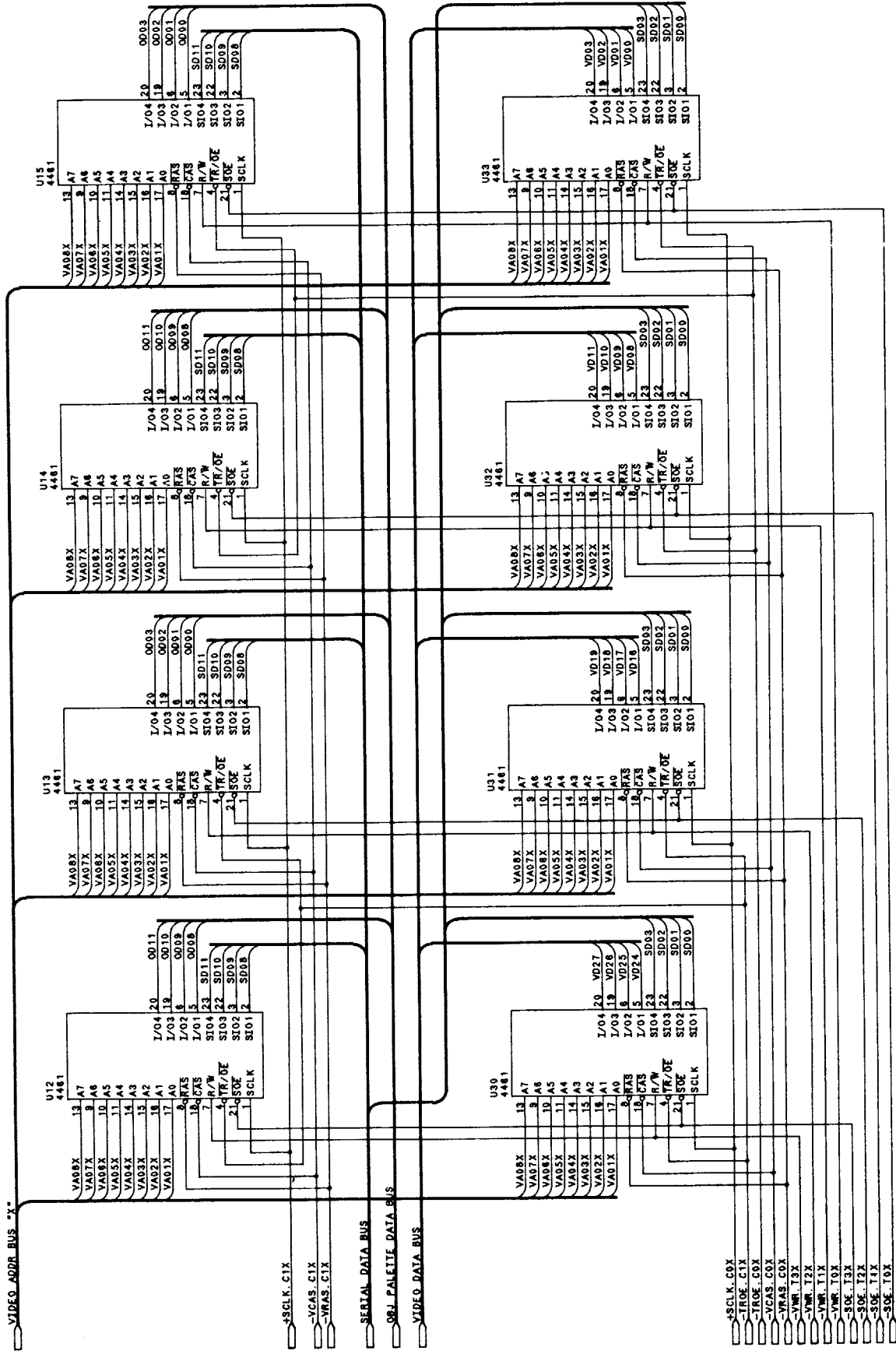


CPU Schematic Sheet 9 of 16

IMAGE MEMORY

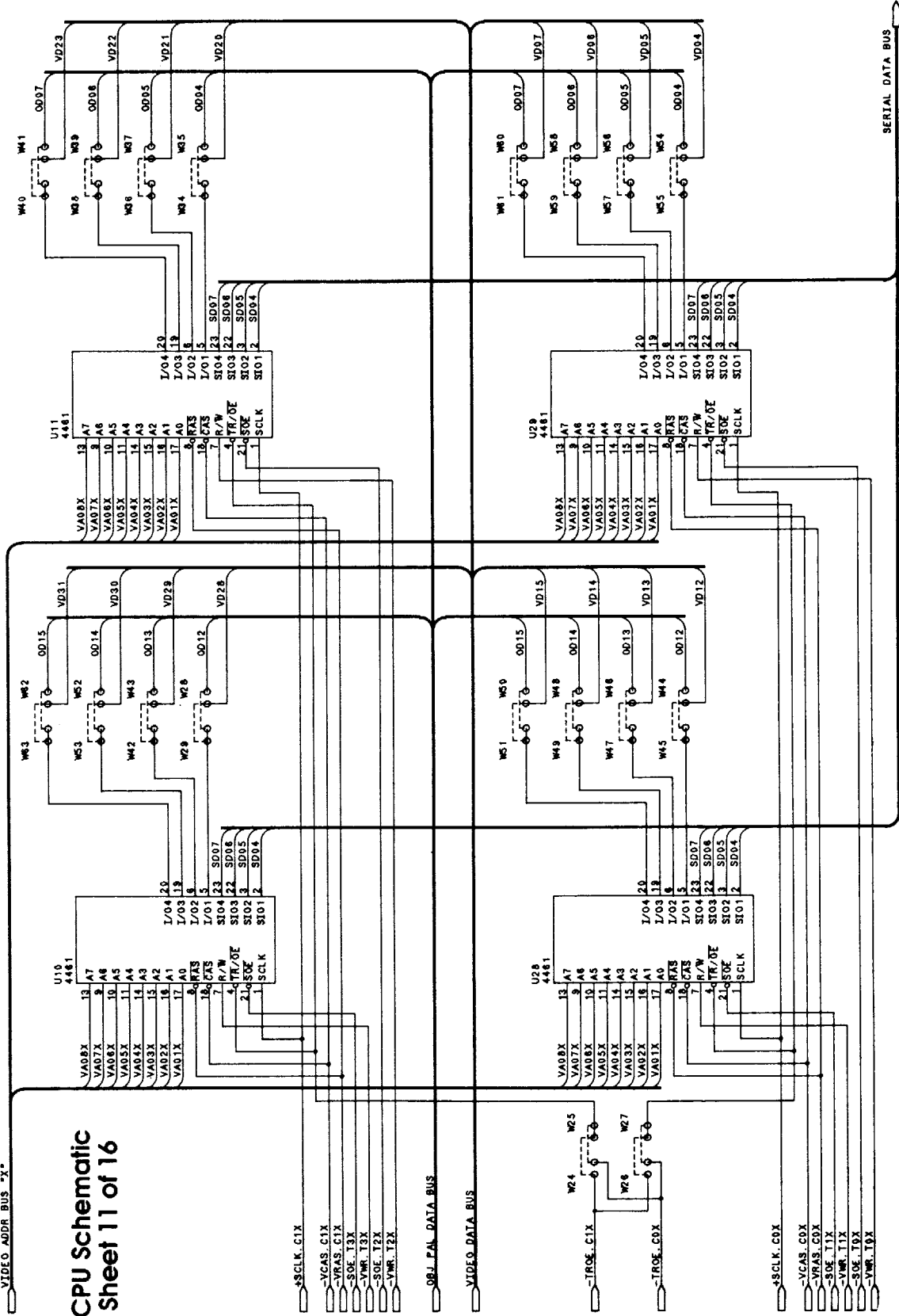


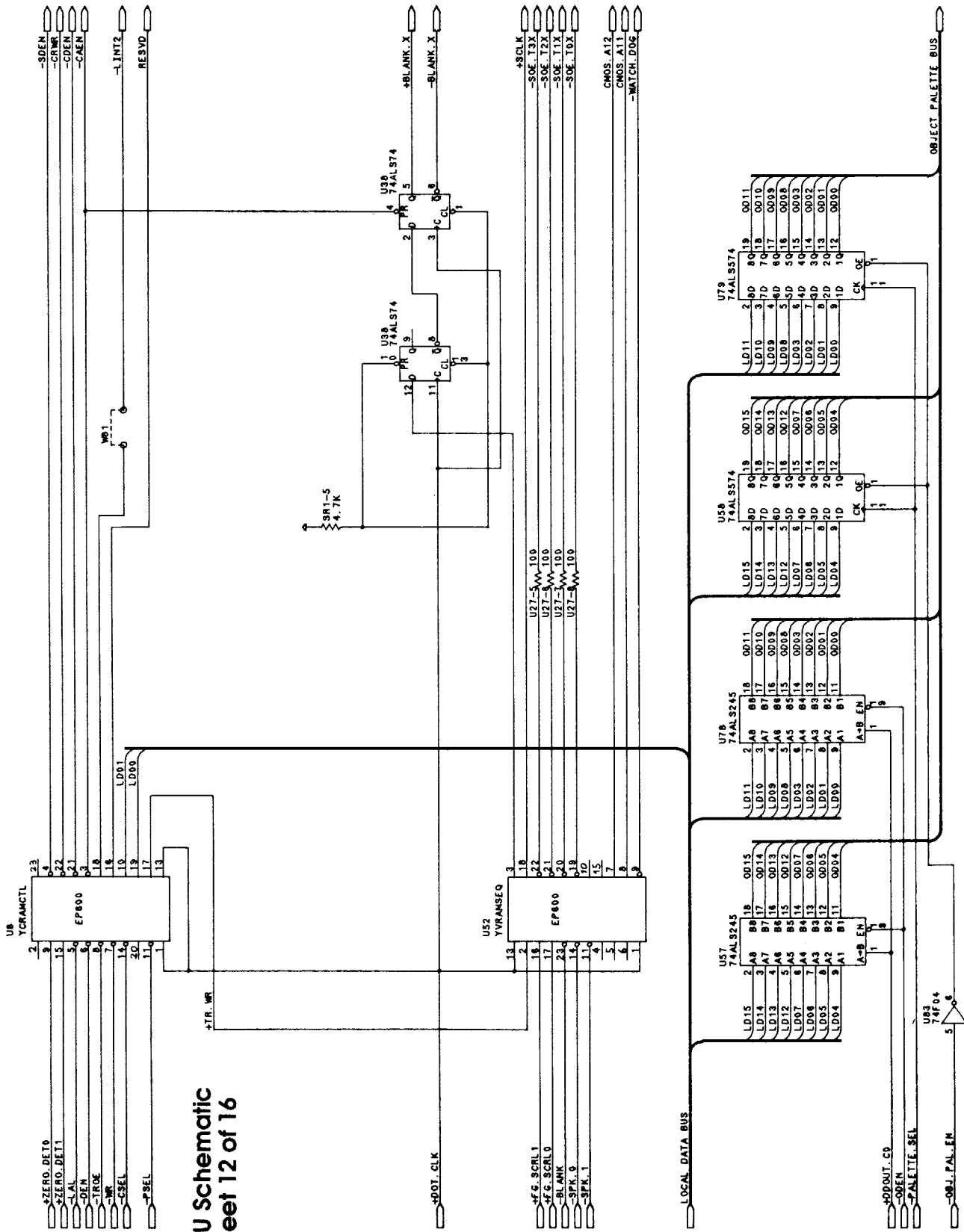
CPU Schematic Sheet 10 of 16



VIDEO ADDR BUS "X"

CPU Schematic Sheet 11 of 16



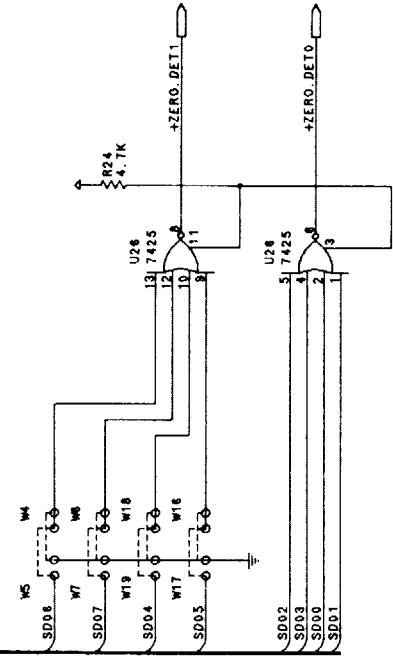


CPU Schematic
Sheet 12 of 16

SERIAL DATA BUS

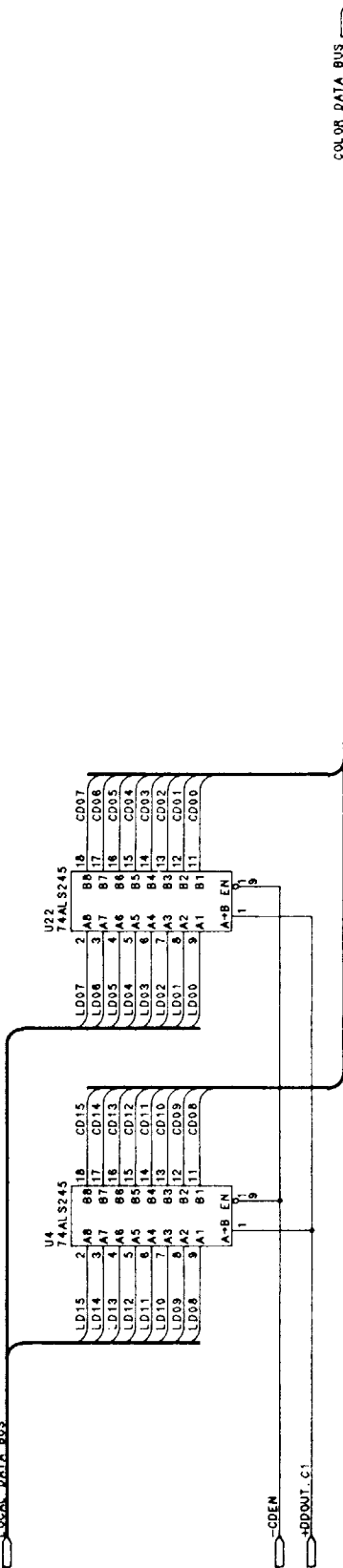
LOCAL ADDR. BUS

CPU Schematic Sheet 13 of 16



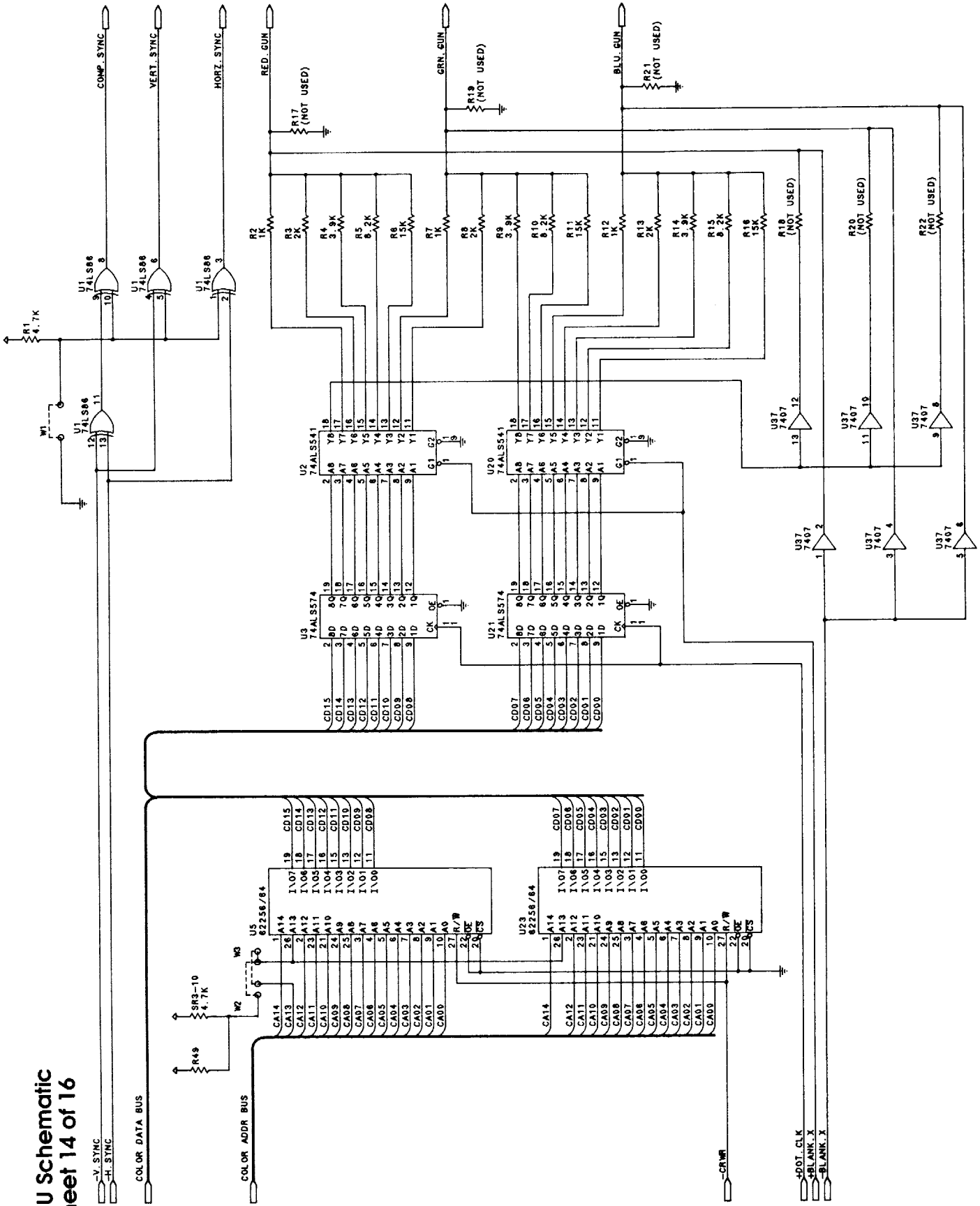
SRAS
SDOT. CLK
CAEN
SDEN

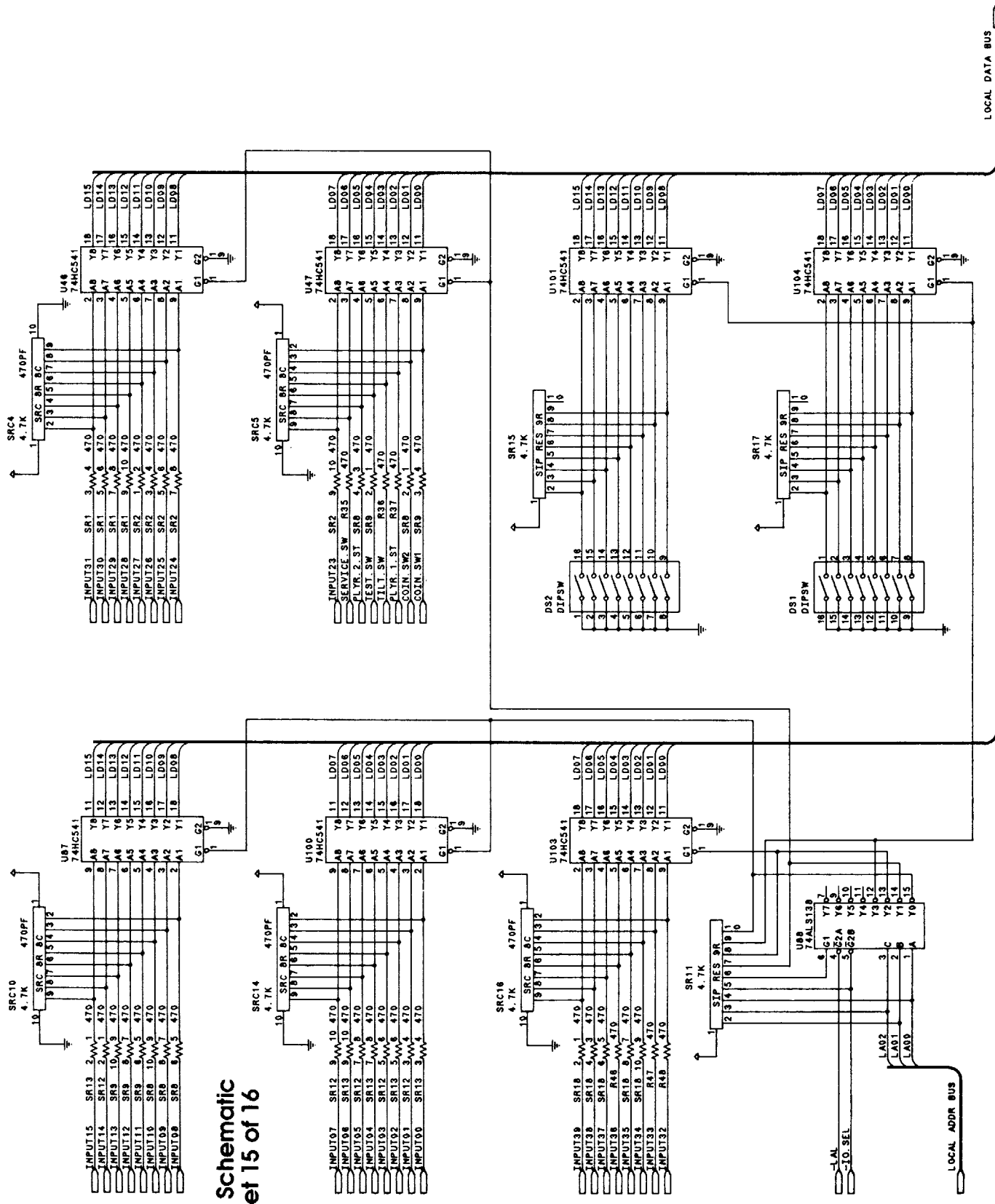
LOCAL DATA BUS



-CDEN
+DDOUT.C1

CPU Schematic Sheet 14 of 16

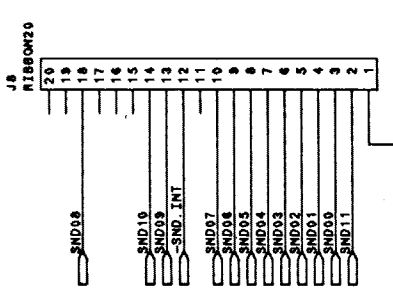




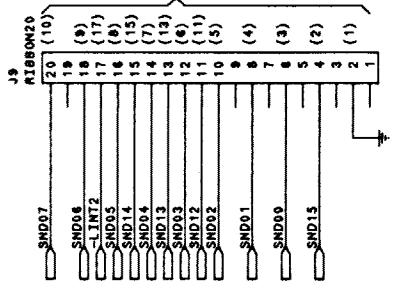
**CPU Schematic
Sheet 15 of 16**

CPU Schematic Sheet 16 of 16

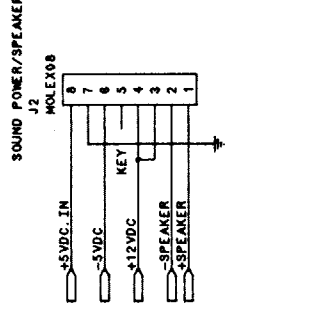
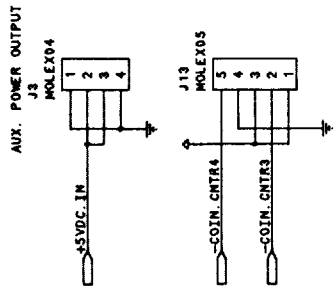
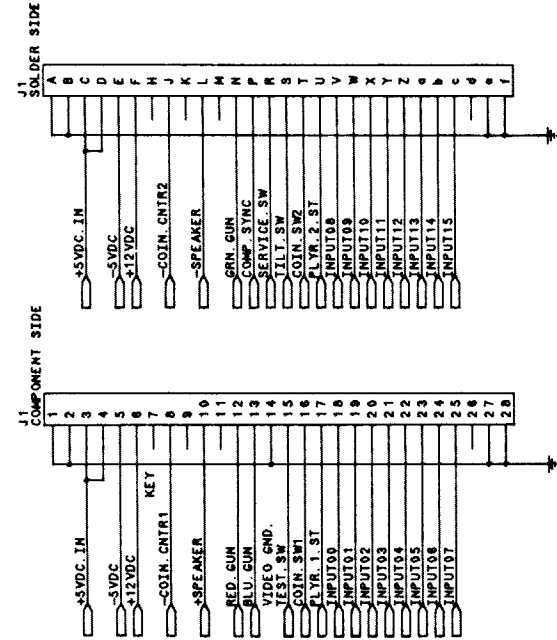
SOUND BOARD INTERFACE



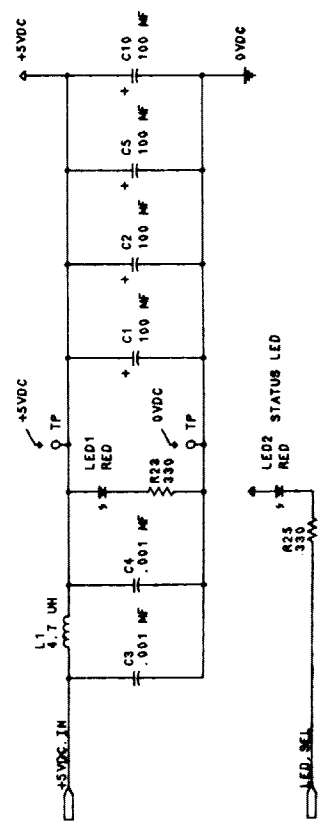
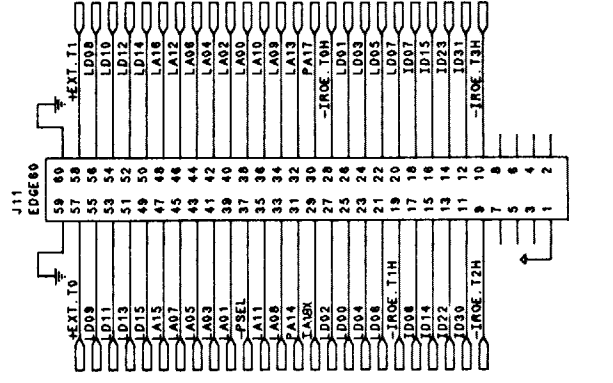
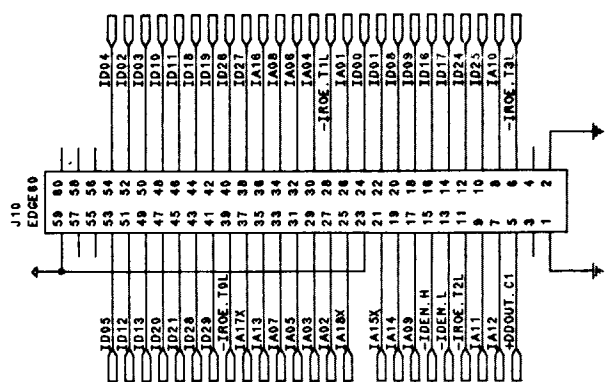
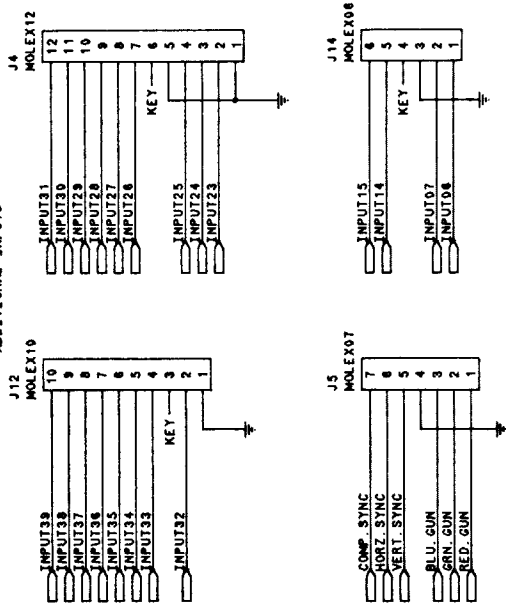
INTERRUPT INTERFACE



JAMMA INTERFACE



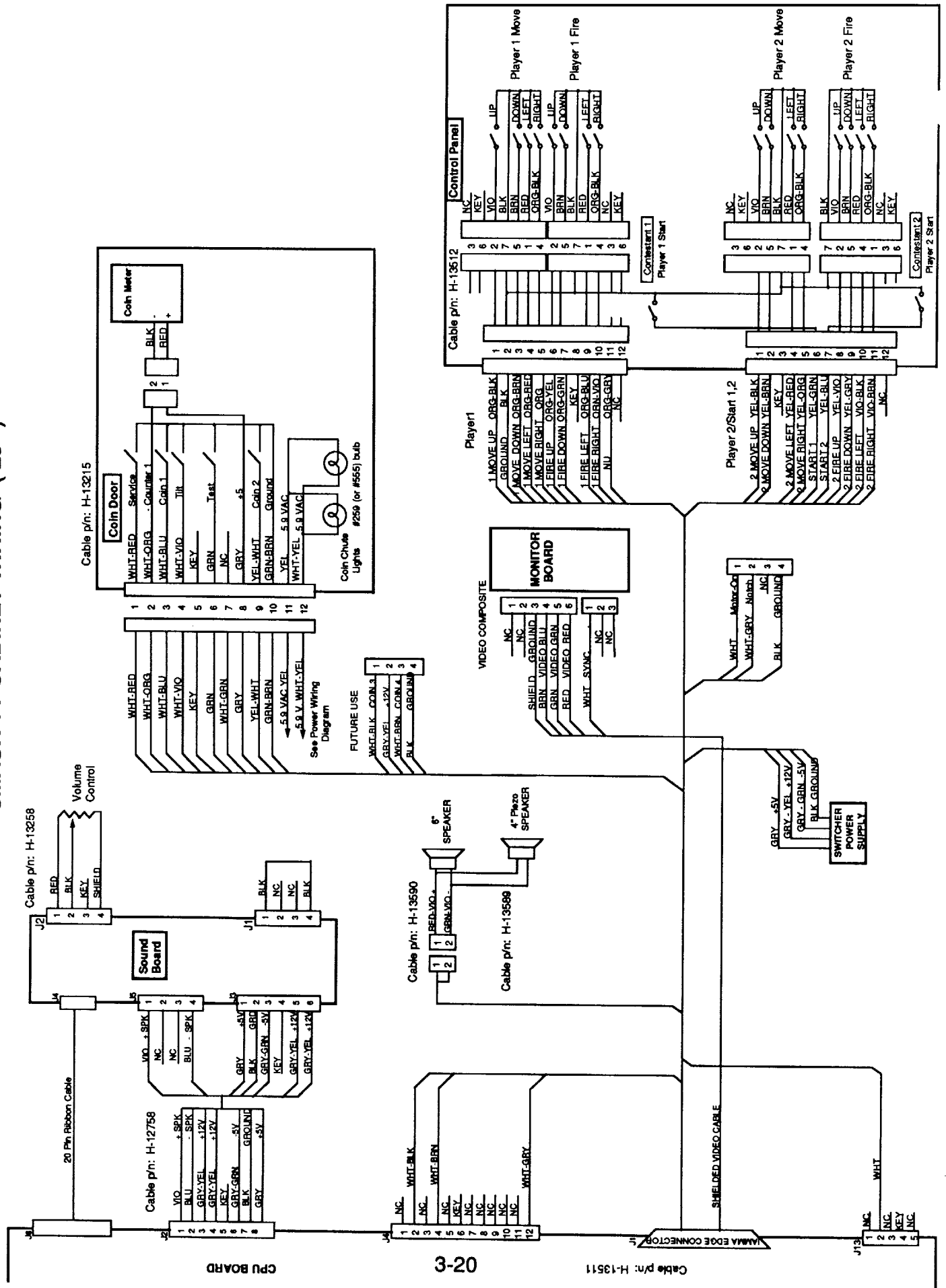
ADDITIONAL INPUTS



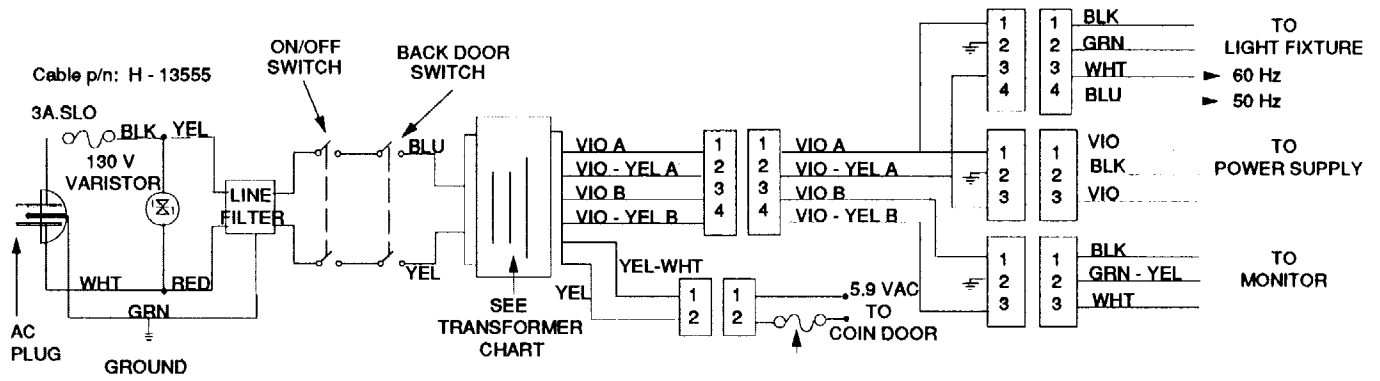
SMASH TV Jamma Chart

| Function | Wire Color | Pin | Pin | Wire Color | Function |
|--------------|------------|-----|-----|------------|--------------|
| GROUND | BLK | 1 | A | BLK | GROUND |
| GROUND | GRN-BRN | 2 | B | BLK | GROUND |
| +5 VOLTS DC | GRY | 3 | C | GRY | +5 VOLTS DC |
| +5 VOLTS DC | GRY | 4 | D | GRY | +5 VOLTS DC |
| - 5 VOLTS DC | GRY-GRN | 5 | E | GRY-GRN | - 5 VOLTS DC |
| +12 VOLTS DC | GRY-YEL | 6 | F | GRY-YEL | +12 VOLTS DC |
| | KEY | 7 | H | KEY | |
| COUNTER 1 | WHT-ORG | 8 | J | WHT-GRN | COUNTER 2 |
| | NC | 9 | K | NC | |
| SPEAKER (+) | RED-VIO | 10 | L | GRN-VIO | SPEAKER (-) |
| | NC | 11 | M | NC | |
| VIDEO RED | RED | 12 | N | GRN | VIDEO GRN |
| VIDEO BLU | BRN | 13 | P | WHT | VIDEO SYNC |
| VIDEO GND | SHIELD | 14 | R | WHT-RED | SERVICE |
| TEST | GRN | 15 | S | WHT-VIO | TILT |
| COIN 1 | WHT-BLU | 16 | T | YEL-WHT | COIN 2 |
| START 1 | YEL-GRN | 17 | U | YEL-BLU | 2 START |
| 1 UP MOVE | ORG-BLK | 18 | V | YEL-BLK | 2 UP MOVE |
| 1 DOWN MOVE | ORG-BRN | 19 | W | YEL-BRN | 2 DOWN MOVE |
| 1 LEFT MOVE | ORG-RED | 20 | X | YEL-RED | 2 LEFT MOVE |
| 1 RIGHT MOVE | ORG | 21 | Y | YEL-ORG | 2 RIGHT MOVE |
| 1 UP FIRE | ORG-YEL | 22 | Z | YEL-VIO | 2 UP FIRE |
| 1 DOWN FIRE | ORG-GRN | 23 | a | YEL-GRY | 2 DOWN FIRE |
| 1 LEFT FIRE | ORG-BLU | 24 | b | VIO-BLK | 2 LEFT FIRE |
| 1 RIGHT FIRE | ORG-VIO | 25 | c | VIO-BRN | 2 RIGHT FIRE |
| NC | ORG-GRY | 26 | d | VIO-RED | NC |
| | NC | 27 | e | NC | |
| GROUND | BLK | 28 | f | BLK | GROUND |

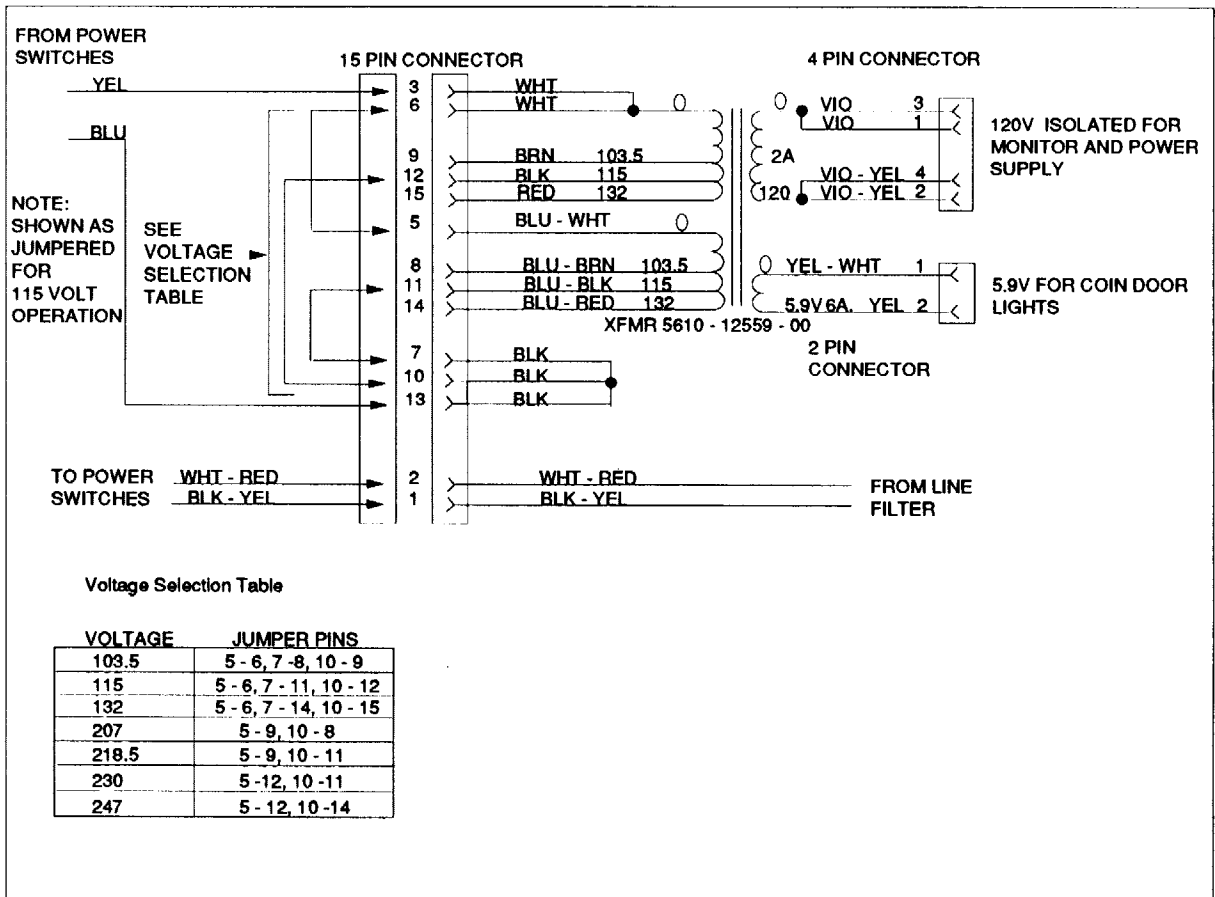
SMASH TV CABINET WIRING (25 ")



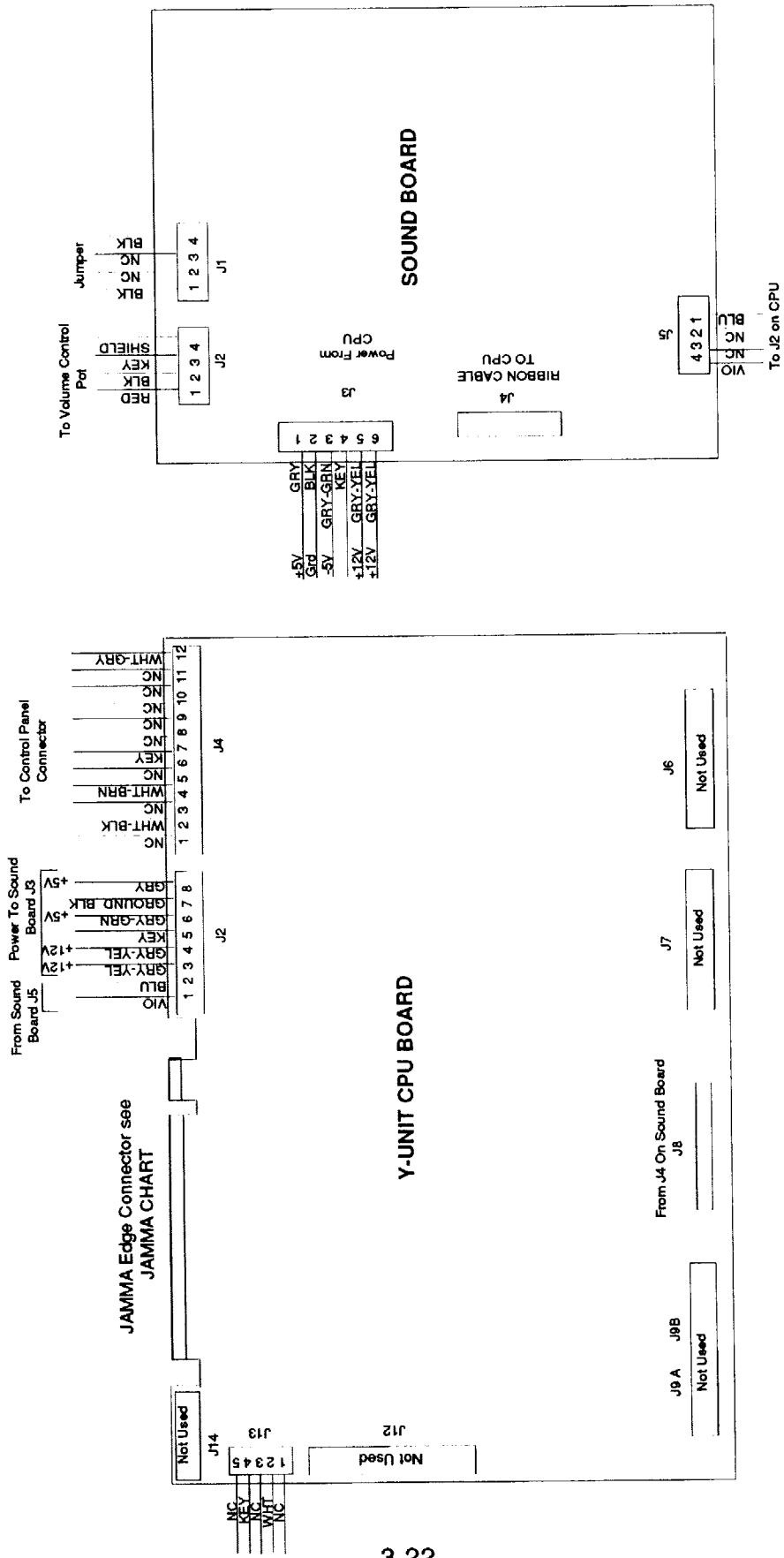
SMASH TV POWER WIRING DIAGRAM



TRANSFORMER CHART



SMASH TV INTERBOARD WIRING



Control Panel Wire Colors

PLAYER ONE

START/CONTINUE

Yellow-Green
Black
Black

MOVE & FIRE

Red
Violet
Orange-Brown
Brown
Black

PLAYER TWO

START/CONTINUE

Yellow-Blue
Black
Black

MOVE & FIRE

Red
Violet
Orange-Brown
Brown
Black

Smash TV Inserted Jumpers

AUDIO BOARD P/N D-11581-3044

| |
|-----|
| W2 |
| W9 |
| W11 |

CPU BOARD P/N C-13234-3044

| | | | |
|-----|-----|-----|-----|
| W2 | W29 | W47 | W66 |
| W8 | W31 | W48 | W68 |
| W11 | W32 | W50 | W69 |
| W12 | W34 | W52 | W71 |
| W14 | W36 | W55 | W73 |
| W21 | W39 | W57 | W75 |
| W22 | W41 | W58 | W77 |
| W24 | W42 | W60 | W80 |
| W27 | W45 | W62 | |

WARNINGS & NOTICES

Warning

USE OF NON-WILLIAMS' PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY WILLIAMS' AUTHORIZED PARTS.

- * For safety and reliability, substitute parts and modifications are not recommended.
- * Substitute parts or modifications may void FCC type acceptance.
- * This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under Federal law. This also applies to WILLIAMS' logos, designs, publications and assemblies. Moreover, facimiles of WILLIAMS' equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facimilies are manufactured with WILLIAMS' components.

Warning

This equipment generates, uses and can emit radio frequency energy and, if not installed properly and used according to the directions in this manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of part 15 of FCC rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference to radio communications, in which the user, at his or her own expense, will be required to take whatever measures may be needed to correct the interference.

Warning

Prevent shock hazard and assure proper game operation. Only plug this game into a properly grounded outlet. Do not use a cheater plug to defeat the power cord's grounding pin. Do not cut off the ground pin.

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