September 1990
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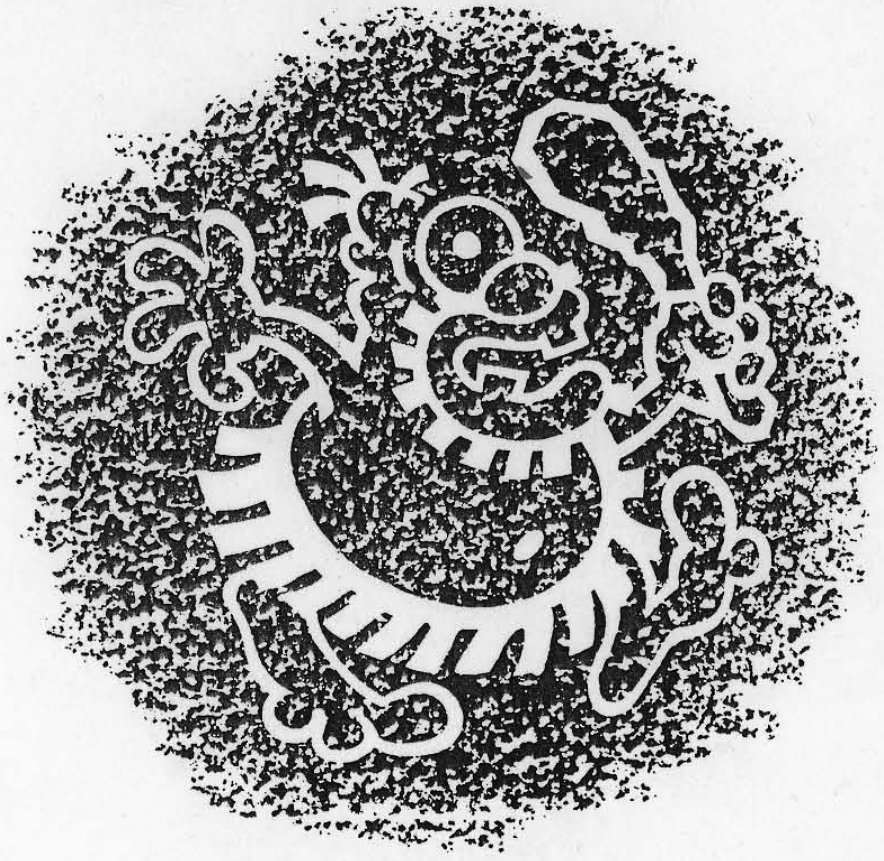
MIDWAY
T.M.

TRAG
IN PLAYmation!™

ONE to FOUR PLAYERS

KIT

OPERATIONS MANUAL



MIDWAY MANUFACTURING COMPANY

TROG
is available to kit 1-4 player Games!

SETTINGS

The number of players is selectable by setting switches #5 and #6 on DIP Switch #2.

Switch #5	Switch #6	
OFF	OFF	4 Players
ON	OFF	3 players
OFF	ON	2 Players
ON	ON	1 Player

NOTE: Always use the DIP Switch Test provided in the software diagnostics to verify your settings.

CONNECTION

Players 1 & 2 connect through the JAMMA Harness. Players 3 & 4 connect through a separate cable. Connect the player 3 & 4 joystick harness from the CPU board to the joysticks. The 3rd player connector has red wires and is connected from the J4 on the CPU board to the player 3 joystick. The 4th player connector has blue wires and is connected from J12 on the CPU board to the player 4 joystick.

TROG

The Legend of .....

TROG™ IN PLAYmation!™

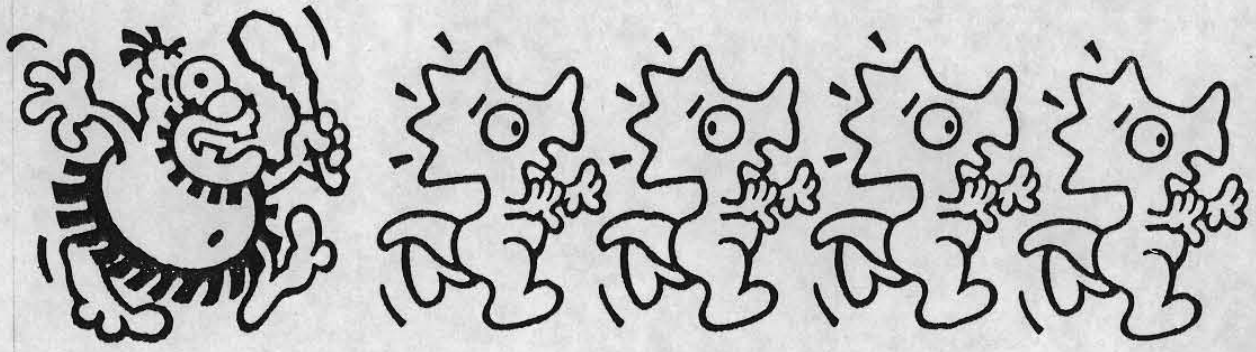
Long, long ago,
In a land named **OG**-
There lived a One-eyed Caveman
by the name of **TROG** !

And in that land
There lived four friends-
REX and **BLOOP**,
SPIKE and **GWEN** !

They need your help
to get home you see-
For if you don't lead them
TROG'S **DINNER** they'll be !

TROG is always thinking,
Inventing something new-
The wheel and the club
and the bouncing spring shoe!!

When they've picked up all their
eggs,
You'll see them smile and shout-
`Cause leading Dinos **HOME**
is what the game's about !



RULES

Up to four people can play simultaneously.

Each person chooses their own DINO, Rex, Bloop, Spike, or Gwen.

Use the joystick to move the DINO.

Press the PUNCH Button to make the DINO PUNCH.

Pick up a HOT CHILI PEPPER and press the PUNCH Button to make the DINO FIRE.

Pick up all of your DINOS EGGS to reveal HOME.

The first DINO HOME WINS.

Keep DINOS away from DANGEROUS areas, like the EDGE OF THE WATER and THE PITS.

Especially, keep DINOS away from TROG.

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SECTION

one

INSTALLATION and OPERATION

Safety Notices

The following safety hints apply to all kit 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 kit for play.

NOTICE: SALVAGED PARTS

Parts salvaged from old games are required to complete your kit. These salvaged parts must operate perfectly: otherwise, the converted game cannot perform properly or safely. Always repair circuit board malfunctions and cabinet damage before conversion is attempted.

NOTICE: POWER SUPPLY

Be sure the power supply from your old game is capable of +5V dc at 5A , -5V dc at 1A and +12V at 1A. These operating voltages are necessary for your kit. Your power supply must be FCC approved.

NOTICE: MONITOR

This kit is not intended for use with X-Y monitors. Suitable monitors have horizontally mounted CRTs and raster electronics with inputs for red, green and blue video, as well as composite Negative sync input.

NOTICE: COIN MECHANISM

Be sure to clean and lubricate your old coin mechanisms. Servicing them is crucial to your game's earning potential and operation.

NOTICE: COIN METERS

Coin meters are not provided with this kit. Wiring information is provided as a convenience to the operator.

NOTICE: SERVICING, INSTALLING

Always turn your game OFF and unplug it before attempting to service or install your kit.

CAUTION

PROPERLY ATTACH ALL CONNECTORS. *Be 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 kit and void the warranty. All connectors are keyed to fit specific pins on each board.*

Conversion Procedure

Inspection

Unpack the materials from the carton and inspect for obvious signs of damage. Use this checklist to be sure your kit is complete.

Part No.	Item	Quantity
( ) A-8550-1	Pot & Bracket Assembly	1
( ) C-13234-40003	CPU Y-unit	1
( ) C-9214-1	Button Assy-Blue	2
( ) C-9214-4	Button Assy Red	2
( ) C-9214-22	Button Assy-Purple	2
( ) C-9214-23	Button Assy-Yellow	2
( ) D-11581-40003	Audio Board	1
( ) H-8865	Volumn Control Cable	1
( ) H-12758	Audio Board Jumper Cable	1
( ) H-13257	Sound Pwr/ Spker Cable	1
( ) H-13649	JAMMA Cable	1
( ) 03-8250	Control Panel Cover	1
( ) 16-40203-101	Manual	1
( ) 16-9155	Controls Template	1
( ) 20-9457	Button Holder w/Switch	8
( ) 20-9662-1	4-way Joystick- Red	1
( ) 20-9662-5	4-way Joystick- Yellow	1
( ) 20-9662-7	4-way Joystick- Purple	1
( ) 20-9662-9	4-way Joystick- Blue	1
( ) 31-1480-40103	Marquee	1
( ) 31-1481-40203	Control Panel Overlay	1
( ) 31-1482-40103	Decal Set	1
( ) 5795-10937-18	Ribbon Cable	1
( ) Assorted Hardware		

Recommended Tools and Supplies

( ) black semi-gloss paint
( ) electric drill
( ) electric screwdriver
( ) grease pencil or marker
( ) hex driver
( ) 180 grit sandpaper or electric sander
( ) pliers
( ) razor knife
( ) soldering iron and solder
( ) wire cutters
( ) black electrical tape
( ) quick-hardening wood putty

Cabinet Modifications

1. Fill in gouges with a good quick-hardening wood putty. Sand cabinet and wipe it clean.

2. Repaint the cabinet with black semi-gloss paint (Games wood grain sides: remove the old decals and clean the glue residue from the old decal before painting). Allow paint to dry completely.

3. Pencil a line roughly at the top of the old graphic. Lightly moisten the cabinet with soapy water. Apply the decal starting at the top and working down. After the decal is in place, use a squeegee and smooth the decal down, taking care to squeeze out the air bubbles. If you miss an air bubble, pop it with a razor blade or a pin and burnish it down. Allow 12 hours for the adhesive in the decals to set. Remove masking.

4. Check the TROG Kit for an FCC sticker and apply it over the existing sticker on the cabinet.

   When Midway ships a game, it is in compliance with FCC regulations. The FCC sticker is proof. If the sticker is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game kit does not contain an FCC sticker, call Midway Manufacturing immediately.

5. Apply the Instructions (Card or Decals) to the CRT viewing glass.

Control Panel Modifications

1. Remove the control panel buttons and joysticks and remove the old vinyl covering.

2. Place the template on the control panel and use it to help you design your control panel. - You will need to use the Mounting Template for each player you intend to install.

3. Drill holes as needed for the joysticks and buttons. Plug previous holes with wood blocks, putty, cardboard or epoxy. File the new holes smooth.

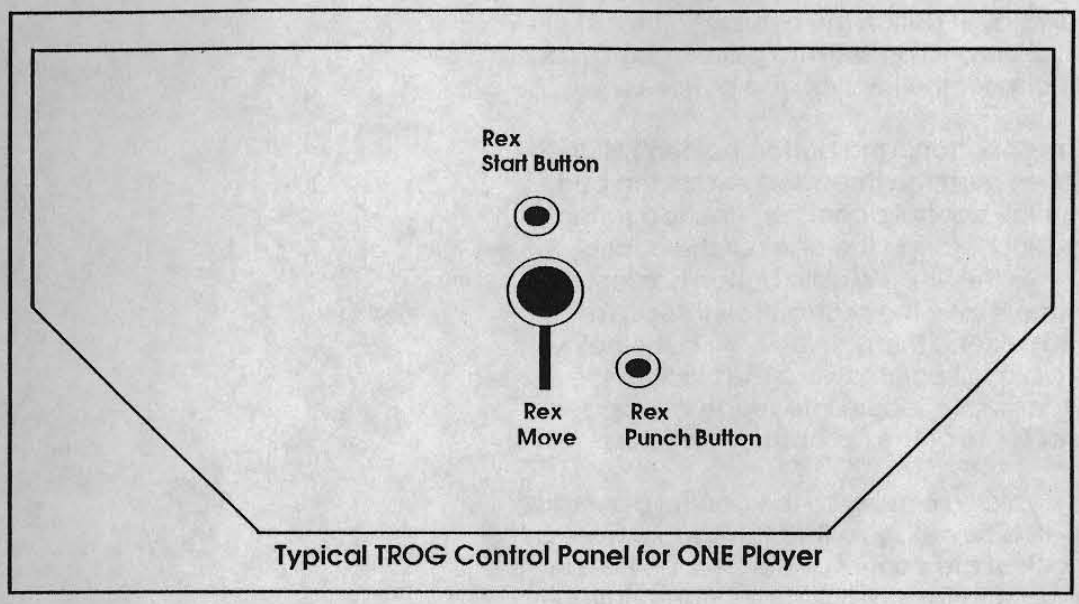
4. Carefully remove the backing on the vinyl control panel overlay. Place the overlay on top of the control panel. Prevent air bubbles from getting under the vinyl overlay.

5. a) After the overlay is on securely , use a razor knife to cut holes for the buttons and joysticks.
   b) Position the stickers around the appropriate button locations. Refer to the Typical Control Panel Layout diagrams on the next pages for suggested button and joystick locations.
   c) Peel the backing from the adhesive on the clear protective overlay. Position the overlay so that it covers the stickers and press it into place. Use a razor knife to cut holes for the joystick and buttons.

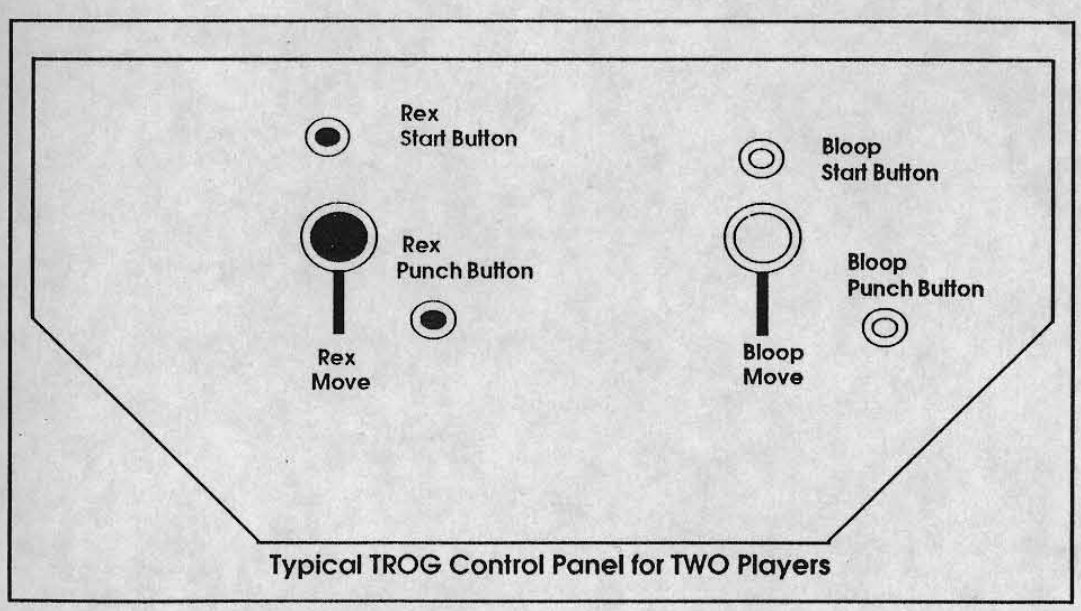
6. To mount the pushbuttons and button-holder/switch to the control panel, push the threaded end of the push-button through the control panel from the top so that the threads extend through the back of the control panel. Then, take the white plastic button holder/ switch and place it over the push button threads so that the threads extend through the hole in the holder. The blade switch must point toward the back of the cabinet and face you. Secure into place with a palnut. Repeat for all of the pushbutton switches.

7. To mount the joystick assembly to the control panel first position the switch assembly so that the square base is against the back of the control panel and the hole in the base lines up with the joystick hole in the control panel. Secure the switch assembly to the control panel. Be sure that the blade switch with the red wire (move up) faces the monitor when the control panel is closed. Remove the "E"-ring , white plastic spacer and spring from the joystick shaft. Slip the black plastic washer around the joystick shaft so the rough side faces the handle. Push the shaft through the joystick base from the front of the control panel. After the shaft is through the base, replace the spring, spacer and "E"-ring.

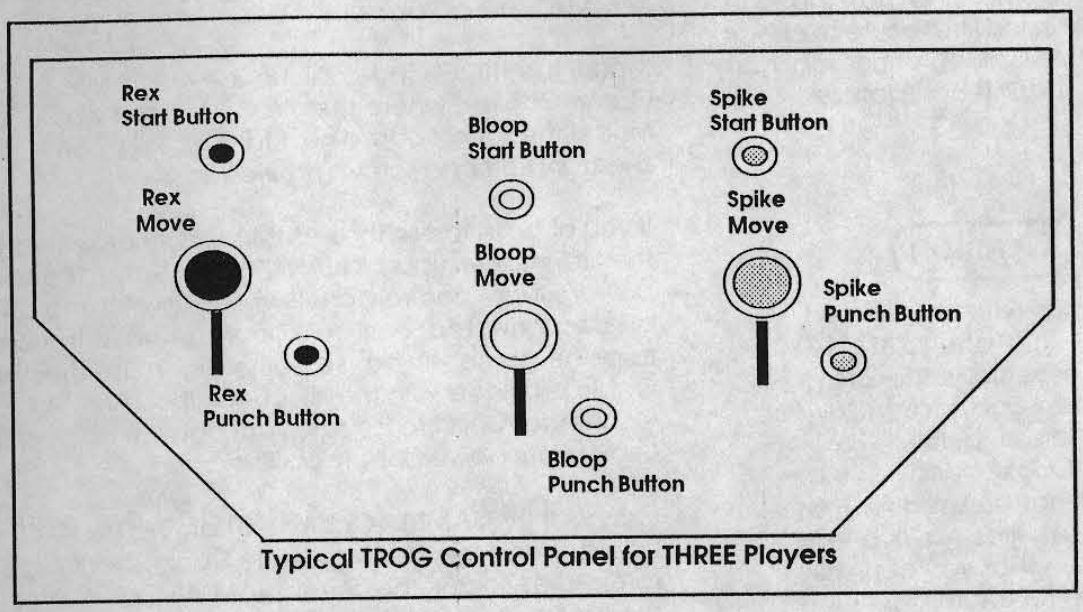
Control Panel Layout Diagrams



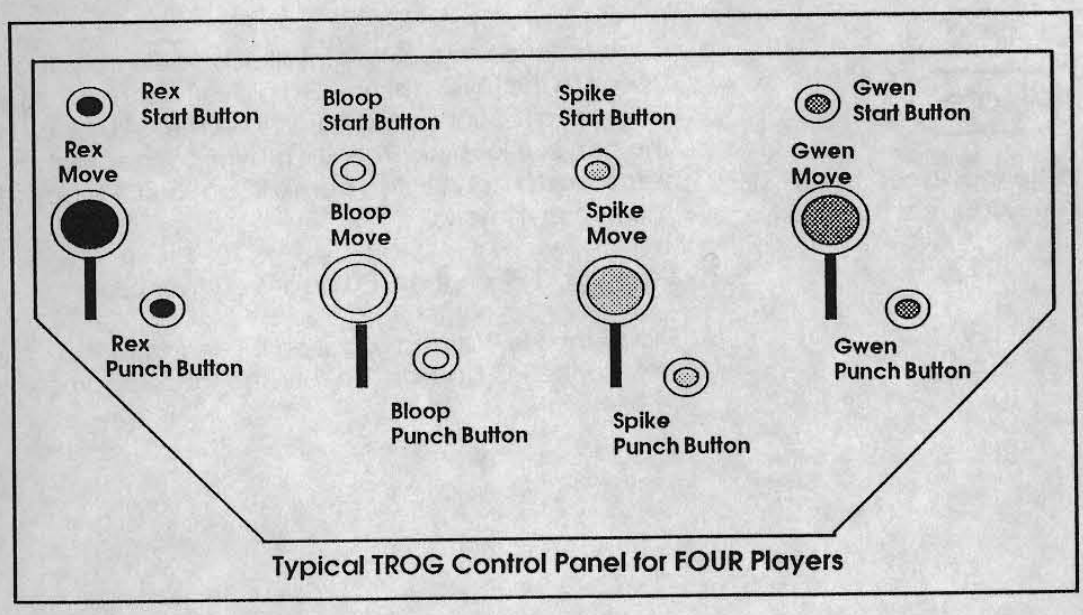
Typical TROG Control Panel for ONE Player



Typical TROG Control Panel for TWO Players



Typical TROG Control Panel for THREE Players



Typical TROG Control Panel for FOUR Players

Installing the PC Boards and Wiring into a JAMMA Game Cabinet

Note

If you choose to use your own JAMMA Cable and not the one provided in the kit, be sure to check the JAMMA Cable Connector Chart to verify that it is compatible.

1. Disconnect and remove the existing CPU board in the JAMMA Game Cabinet.
2. Mount the TROG CPU board inside the JAMMA Game Cabinet where the old CPU board was located Mount the sound board next to the CPU board using the stand-off and screws provided.
3. If you choose to use the JAMMA Cable provided with the kit, unsolder your old JAMMA cable from the speaker, power supply, control panel switches (which may already be disconnected) and coin door. Remove the cable from the game. If you are not going to use the JAMMA Cable provided with the kit, check the JAMMA Cable Connector Chart to be sure your cable is compatible. Leave your power supply chassis as is.
4. Connect the JAMMA Cable to J1 on the TROG CPU board. Using the JAMMA Cable Connector Chart for reference, solder the correct JAMMA Cable wires to the speaker, power supply, control panel switches and coin door. Plug the player1 & 2 JAMMA connectors into their joystick cable connectors.
5. Connect the ribbon cable from J4 on the sound board to J8 on the CPU board. Be sure that the red line goes to the same pin on both boards. Connect the wire harness cable from J5 (speaker), and J3 (power), on the sound board to J2 (sound power speaker connector) on the CPU board.

Caution

Properly insulate any unused wires within the JAMMA Cable, especially the gray, gray-green and gray-yellow wires. This is a fully wired JAMMA Cable. Many of the wires will not be used for this kit. These wires have been installed so that you can use this cable for future kits.

Note

The Ribbon Cable may need to be twisted in order to connect it properly.

6. Connect the player 3 & 4 joystick harness from the CPU board to the joysticks. The 3rd player connector has red wires and is connected from J4 on the CPU board to the player 3 joystick. The 4th player connector has blue wires and is connected from J12 on the CPU board to the player 4 joystick.
7. J6, J7, and J9 on the CPU board are not used.
8. Place the FBI Warnng Label on the inside of the cabinet next to the PC boards. Be sure the label is completely visible.

Installing the PC Boards and Wiring into a NON-JAMMA Game Cabinet.

1. Disconnect and remove the existing CPU board in the game cabinet.

2. Mount the TROG CPU board inside the Game Cabinet where the old CPU board was removed. Mount the sound board next to the CPU board using the stand-offs and screws provided.

3. Leaving several inches of wire, cut the wires at the coin door, control panel switches (which may already be disconnected) speaker and power supply.

4. Connect JAMMA Cable to CPU board at J1. Follow the JAMMA Cable Connector Chart and splice the wires of the JAMMA Cable to the existing wires for the coin door, power supply, speaker and control panel. Be sure all of the spliced wires are well insulated with black electrical tape. Plug the player 1& 2 JAMMA connectors into their joystick cable connectors.

5. Connect the ribbon cable from J4 on the sound board to J8 on the CPU board. Be sure that the red line goes to the same pin on both boards. Connect the wire harness cable from J5 (speaker), and J3 (power) on the sound board to J2 (sound power speaker connector) on the CPU board.

7. Connect the player 3& 4 joystick harness from the CPU board to the joysticks. The 3rd player connector has red wires and is connected from J4 on the CPU board to the player 3 joystick. The 4th player connector has blue wires and is connected from J12 on the CPU board to the player 4 joystick.

8. J6, J7, and J9 on the CPU board, are not connected.

9. Place the FBI Warning Label on the inside of the cabinet next to the PC boards. Be sure the label is completely visible.

Note

Be sure all spliced wires are well insulated with black electrical tape.

Caution

Properly insulate any unused wires within the JAMMA Cable, especially the gray, gray-green and gray-yellow wires. This is a fully wired JAMMA Cable. Many of the wires will not be used for this kit. These wires have been installed so that you can use this cable for future kits.

Note

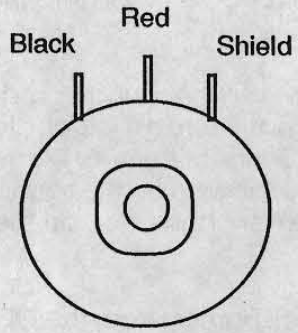
The Ribbon Cable may need to be twisted in order to connect it properly.

Installing the Volume Control

1. Mount the volumn control, using screws provided, where it is easily accessible. On top of the cash box, or on the wall near sound board are two possible locations.

2. The volume control cable attaches the volume control to the sound board at connector J2. When viewed with the white plastic knob facing you, the shield wire should be soldered to the right lug, the red wire should be soldered to the middle lug, and the black wire should be soldered to the left lug. Refer to Volume Control Diagram.

Volume Control Wiring Diagram



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 TROG 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.

TROG is a one- to-four player game. Each player chooses his/her own DINO. Any combination of DINOS can be played simultaneously.

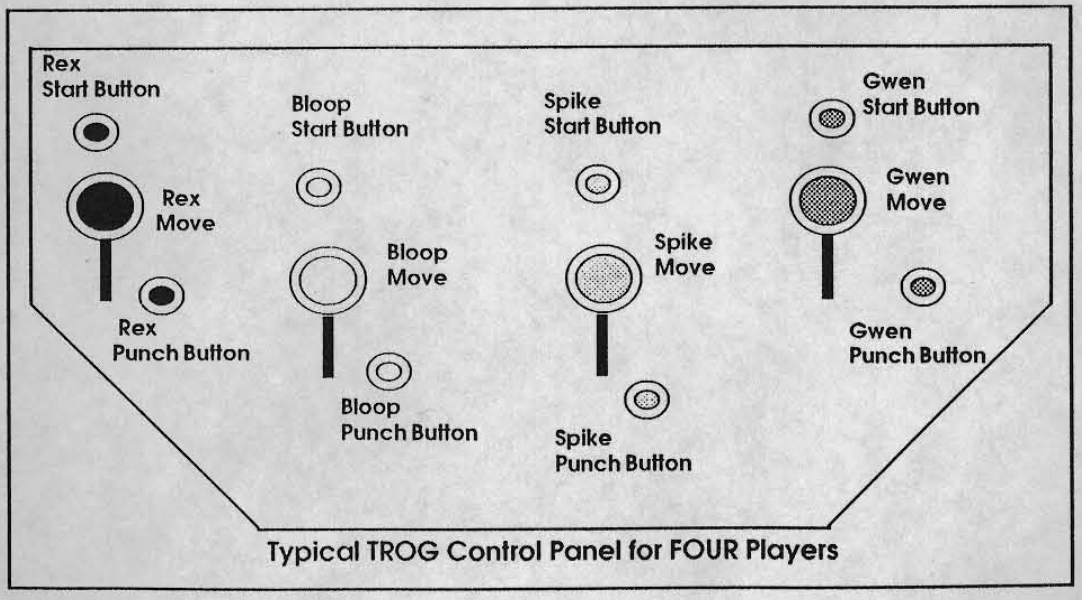
Player Controls

- Each **START** button allows the player to choose a Dino. BLOOP (blue); GWEN (purple); SPIKE (yellow); and REX (red).
- Each **PUNCH** button allows the player to either Punch or Fire. Press Punch to make your Dino punch. Pick up a HOT CHILI PEPPER and press Punch to make your Dino Fire.
- Each **JOYSTICK** allows each player to move their Dino up, down, left, or right.

NOTE

TROG will operate in the Test Mode, when the Test Switch (if you have installed one) 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.



Typical TROG Control Panel for FOUR Players

Game Operation

TROG is a one- to four-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 Audit, Adjustments and Diagnostics.

Control Switches

- 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. Turn the Test Switch ON to enter the Diagnostics mode. To exit this mode, turn the OFF. This switch is optional. Game diagnostics can be reached via the DIP Switches or menu settings

- The **SERVICE CREDIT SWITCH** is a special feature switch that allots credit without affecting the game's bookkeeping total. This switch is optional, the game operates without it.

- The **COIN DOOR SLAM TILT SWITCH** detects any forceful vibrations against the Coin Door. This eliminates pounding for free games. This switch is optional, the game operates without it.

Game Audits, Adjustments & Diagnostics

Operation

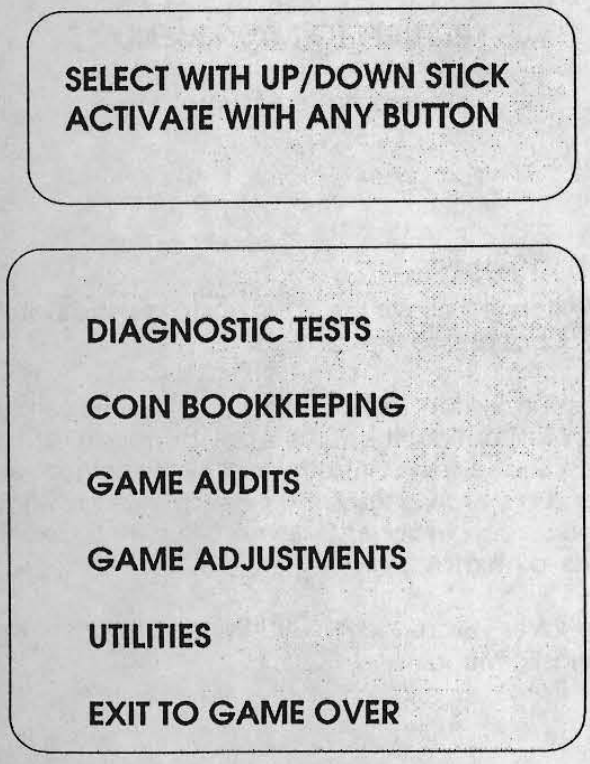
All TROG Game Audits, Adjustments, and Diagnostics are options of the Main Test Menu. Each option, in turn, has its own menu, listing several choices that you may act upon as desired.

To enter the Main Menu, turn ON the Test Switch (if you have installed one), or turn ON DIP Switch #8 in switch bank 2. The Main Test Menu (shown below) then appears. Game adjustments, bookkeeping, and diagnostics are all accessible from this menu.

Move any 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, press any control panel button.

To exit, use any joystick to highlight Exit To Game Over and turn OFF either the Test Switch or DIP Switch #8 in switch bank 2.

The Main Test Menu lists six options.

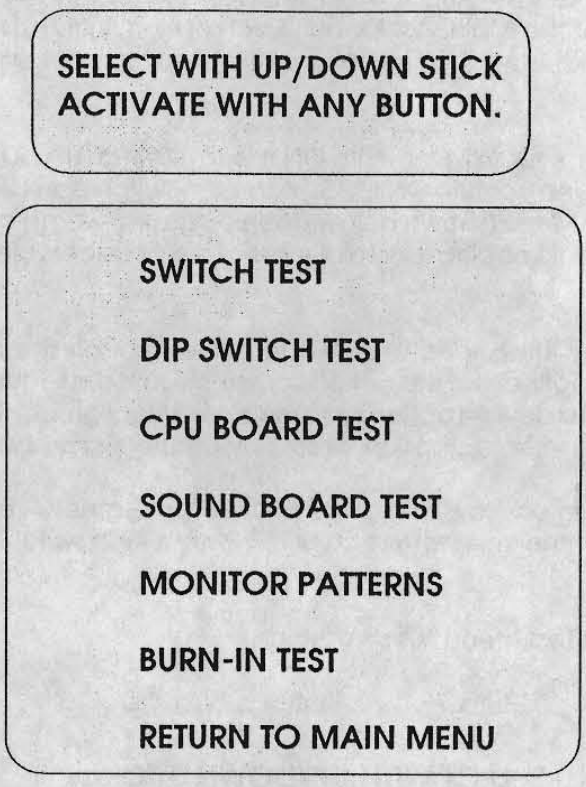


Main Test Menu

DIAGNOSTIC TESTS

To enter the Diagnostic Tests from the Main Test Menu, move any joystick to select (highlight) the Diagnostic Tests option, and press any control panel button to activate the option.

The Diagnostic Tests Menu lists seven options.



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 any joystick to highlight the Switch Test option; then, press any button to activate it. The screen shows the control panel and 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.

Press Player 1 Start and Player 1 Punch buttons to return to the Diagnostic Menu.

DIP Switch Test

The DIP Switch Test allows the operator to check the position of the two 8-position DIP switches on the CPU Board. The operator can also change the setting of each position of each DIP switch during this mode.

Select the DIP Switch Test by moving any joystick to highlight the DIP Switch Test option; then, press any control panel button to activate the test. The screen displays a layout of the DIP switches and their current settings.

To change the setting of either DIP switch, press the switch position (SW1 - SW8) to the desired setting (ON from OFF, or vice versa). Check the screen to verify that the switch now shows the setting desired.

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

DIP Switch 1 Settings Table

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8
Upright Midway Cocktail	Off * On							
CMOS Coinage DIP Switch Coinage		On Off *						
Coin Settings								
USA 1 / Ger 1 / Fr 1			Off *	Off *	Off *			
USA 2 / Ger 2 / Fr 2			On	Off	Off			
USA 3 / Ger 3 / Fr 3			Off	On	Off			
USA 4 / Ger 4 / Fr 4			On	On	Off			
USA ECA / Ger ECA / Fr ECA			Off	Off	On			
N/U / N/U / N/U			On	Off	On			
N/U / N/U / N/U			Off	On	On			
Free Play / Free Play / Free Play			On	On	On			
Not Used						Off *	Off *	Off *

DIP Switch 2 Settings Table

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
USA German French Not Used	Off * On Off On	Off * Off On On						
Not Used			Off *					
One Counter Two Counters				Off * On				
4 Players 3 Players 2 Players 1 Player					Off * On Off On	Off * Off On On		
Video Freeze (activates when change detected)							Off * On	
Test Switch Game Mode Test Mode								Off * On

* Indicates Factory Setting

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.

If no errors are detected, the screen automatically returns to the Diagnostic Menu.

Sound Board Test

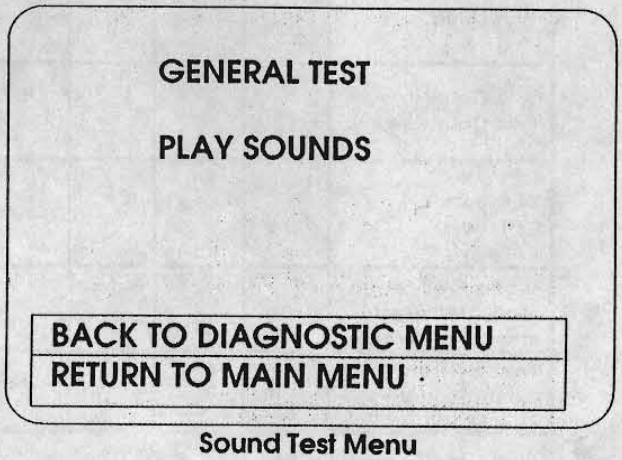
The Sound Test allows listening to some of the sounds that TROG is capable of producing. This test also emits a tone for each fault that is detected.

Move any joystick to select the Sound Board Test; then, press any control panel button to activate the test. The screen displays two test options:

GENERAL TEST analyzes the sound circuitry. A successful test causes a single "tone" to sound. Detection of a fault causes a series of tones, or no tone at all to sound.

PLAY SOUNDS tests synthesized sounds from the Sound Board. Press any Punch Button to advance to the next sound.

To exit this test, use any joystick to select Back to Diagnostic Menu, or Return to Main Menu; then press any control panel button.



Sound Test Menu

Monitor Patterns

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

Move any joystick to select a test; press any control panel button 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.

Exit this test by pressing any control panel button to return to the Monitor Patterns Menu. Use any joystick to select Back to Diagnostic Menu, or Return to Main Menu; then press any control panel button.

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 control panel 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 any joystick to select the Coin Bookkeeping option; then, press any control panel button 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 COIN	0
RIGHT SLOT COIN	0
THIRD SLOT COIN	0
FOURTH SLOT COIN	0
SERVICE CREDITS	0
PAID CREDITS	0
GAMES STARTED	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 any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate it.

GAME AUDITS

To enter Game Audits from the Main Test Menu, move any joystick to select the Game Audits option; then, press any button 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
TOTAL PLAY TIME	0
TOTAL GAME UP TIME	0
AVERAGE TIME/LIFE	0
AVERAGE TIME/CREDIT	0
TIME 1 PLAYER ONLY	0
TIME 2 PLAYERS SIMULTANEOUS	0
TIME 3 PLAYERS SIMULTANEOUS	0
TIME 4 PLAYERS SIMULTANEOUS	0

NEXT AUDIT PAGE
RETURN TO MAIN MENU

PAGE 1 OF AUDIT TABLE

TOTAL PLAYS	0
AVERAGE CREDITS/GAME	0
BEGINNER STARTS	0
ADVANCED STARTS	0
EXPERT STARTS	0
AVERAGE WAVE REACHED	0
GAMES PLAYED TO COMPLETION	0
MAXIMUM WAVE COMPLETED	0

NEXT AUDIT PAGE
PREVIOUS AUDIT PAGE
RETURN TO MAIN MENU

PAGE 2 OF AUDIT TABLE

TOTAL EXTRA DINOS EARNED	0
GAME CONTINUES OFFERED	0
GAME CONTINUES TAKEN	0
PERCENTAGE OF CONTINUES TAKEN	0
COIN DOOR SLAMS	0
BURN-IN LOOPS SUCCESSFULLY COMPLETED	0

PREVIOUS AUDIT PAGE
RETURN TO MAIN MENU

PAGE 3 OF AUDIT TABLE

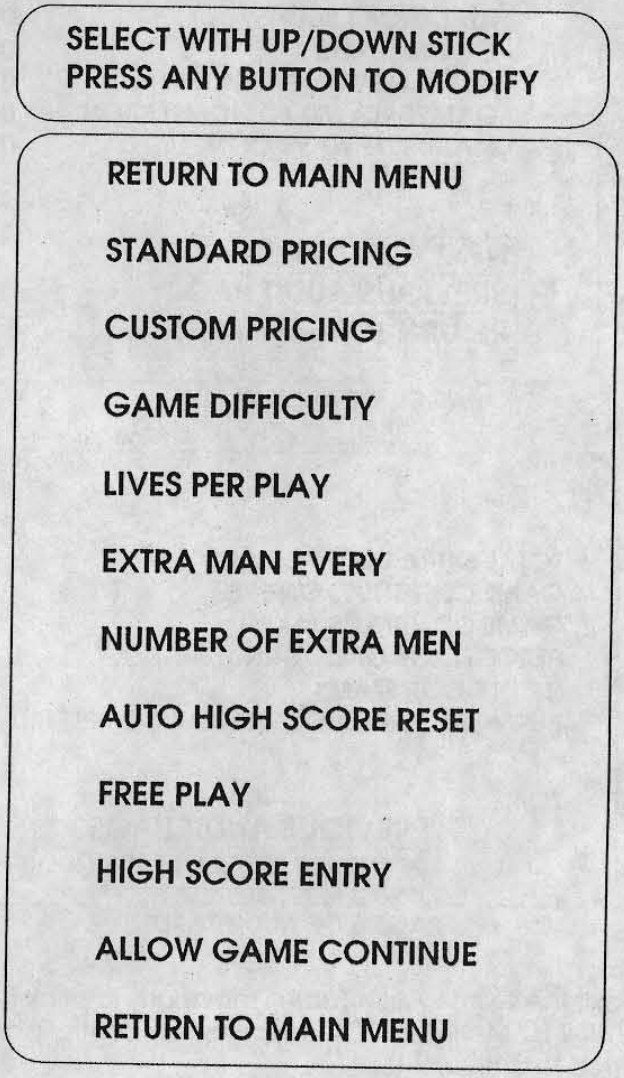
To exit the Game Audit Table , move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate it.

GAME ADJUSTMENTS

Move any joystick to select the Game Adjustment option on the Main Test Menu; then, press any control panel button to activate it.

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

The Game Adjustment Menu offers 12 choices. Several of these choices have their own menu. Move any joystick to select your choice from the Game Adjustments Menu; then, press any control panel button to activate that choice. On the next menu, either move any joystick to select the item you wish to modify; then, press any control panel button to activate that item, or if the item only provides a setting choice, move any joystick to change the current setting to the desired value; then, press any control panel button 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.



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.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

NOTE

The TROG Standard Pricing Table is on page 1-23.

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.

Press any control panel button to lock in the selected setting and 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).

Press any control panel button to lock in the selected setting and 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.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

Extra Man Every

Extra Man Every allows the operator determine how many points the player must earn before receiving an extra life.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

Number of Extra Men

Number of Extra Men allows the operator to determine how many men the player can earn per credit.

Press any control panel button to lock in the selected setting and 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.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

Free Play

Free Play allows the operator to determine whether game play can occur without any coins being dropped into the coin chutes. Free Play *cannot* be installed when DIP Switch Pricing is in effect.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

High Score Entry

Allows the operator to determine whether the game has a High Score Entry Table and Display.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

Allow Game Continue

Allow Game Continue allows the operator to determine whether a player can continue to play even though all other players are dead.

Press any control panel button to lock in the selected setting and return to the Game Adjustments Menu.

To return to the Main Test Menu, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate the return.

TROG Standard Pricing Table

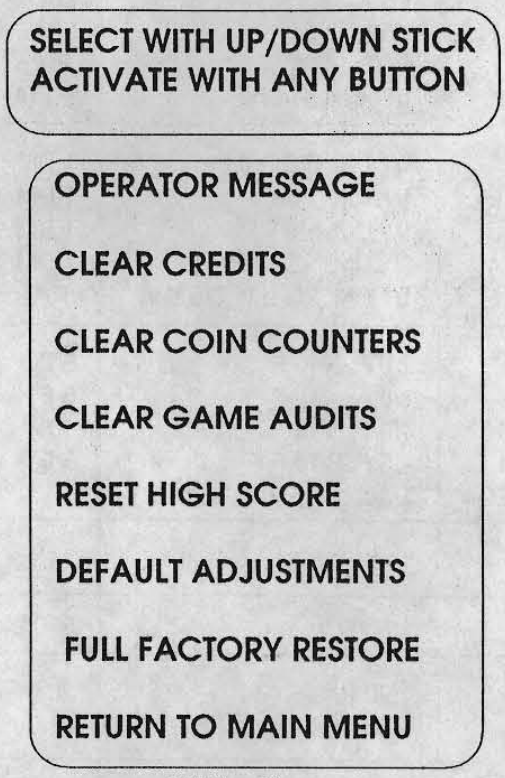
NAME	SETTING Credit/Coin	LEFT CHUTE	CENTER CHUTE	RIGHT CHUTE	FOURTH CHUTE
USA 1	1/25¢	25¢		25¢	
USA 2	1/50¢	25¢		25¢	
USA 3	1/50¢, 3/$1.00	25¢		25¢	
USA 4	1/50¢, 4/$1.00	25¢		25¢	
USA ECA	1/25¢, 4/$1.00	$ 1.00	10¢	25¢	5¢
German 1	1/1 DM, 6/5 DM	1 DM		5 DM	
German 2	1/1 DM, 7/5 DM	1 DM		5 DM	
German 3	1/1 DM, 8/5 DM	1 DM		5 DM	
German 4	1/1 DM, 5/5 DM	1 DM		5 DM	
German ECA	1/1 DM, 2/2 DM, 6/5 DM	5DM	1DM	2DM	
France 1	2/5 F, 5/10 F	5 F		10 F	
France 2	2/5 F, 4/10 F	5 F		10 F	
France 3	1/5 F, 3/10 F	5 F		10 F	
France 4	1/5 F, 2/10 F	5 F		10 F	
France ECA	1/3 X 1 F, 2/5 F, 5/2 X 5 F	1F	10F	5F	
Swiss	1/1 F, 6/5 F	1 F		5 F	
Italy	1/500 Lire	500 Lire		500 Lire	
UK 1	1/20 P, 3/50 P	20 P		50 P	
UK ECA	1/30 P, 2/50 P, 4/£1.00	£1.00	20P	50 P	10 P
Spain 1	1/25 Peseta, 5/100 Peseta	25 Peseta		100 Peseta	
Japan 1	1/100 Yen	100 Yen		100 Yen	

If option desired is not shown above, use custom pricing .

UTILITIES

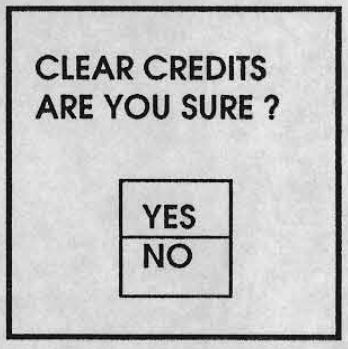
On the MainTest Menu, move any joystick to select the Utilities option; then, press any control panel button to activate it.

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



Utilities Menu

Move any joystick to select an item from the Utilities Menu; then, press any control panel button to activate that item. After an item has been activated, you are given the option of resetting the item or not. For example;



Move any joystick to choose YES or NO; then, press any control panel button to lock in your choice and to return to the Utilities Menu.

To exit Utilities, move any joystick to select RETURN TO MAIN MENU; then, press any control panel button to activate it.

Troubleshooting

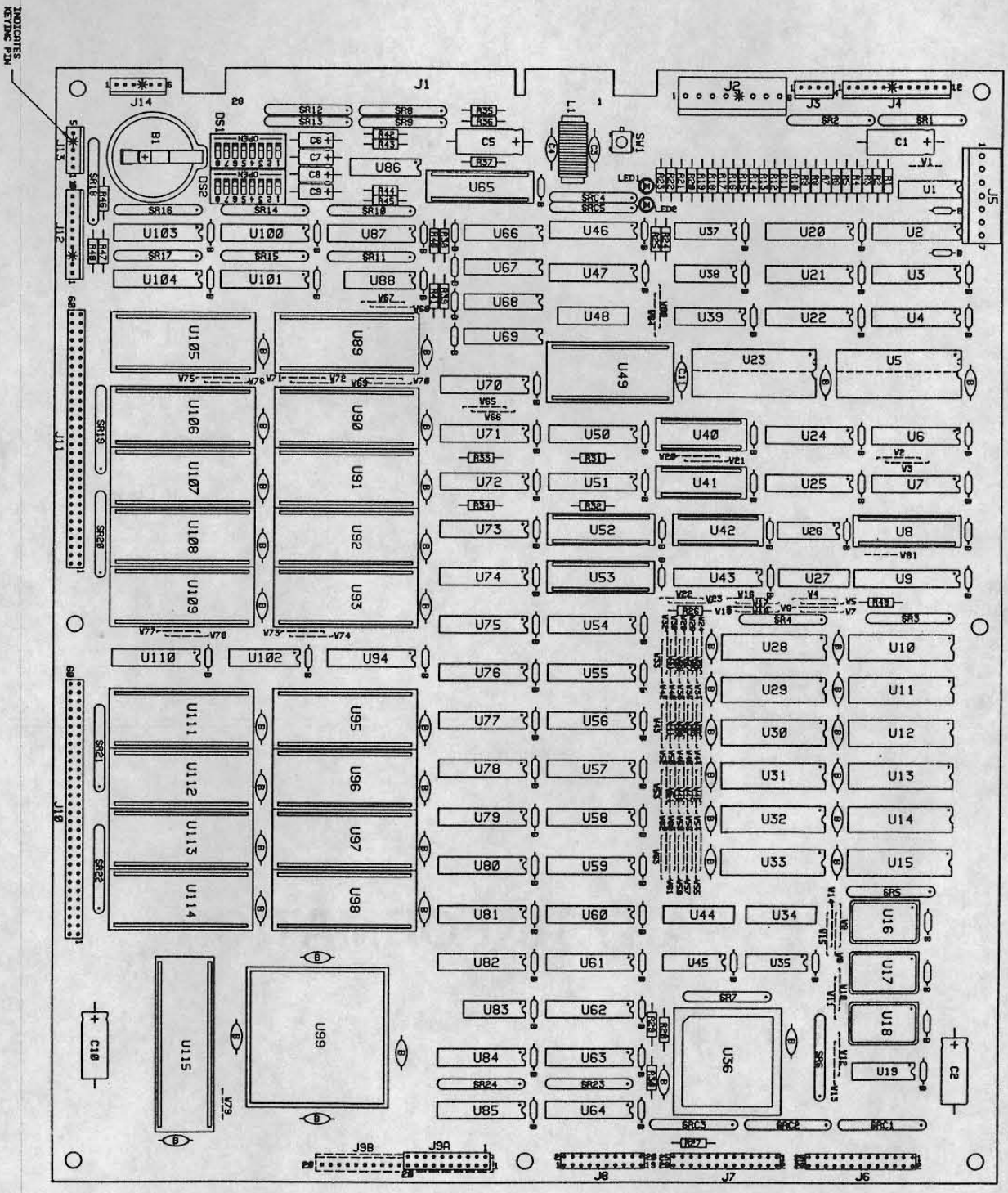
Problem	Possible Solution
NO PICTURE OR DISTORTED PICTURE.	Check for faulty video board or monitor. Check for disconnected video signal cable.
TURN GAME ON & NOTHING HAPPENS	Check line fuse. Check for +5V dc at pins C, D, 3, and 4 of the JAMMA Connector.
NO SOUND	Check the speaker and speaker connection 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.
MOVE JOYSTICK, BUT DINO DOES NOT MOVE	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** or **PUNCH 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 (if you have installed one) and the Test Switch (Position 8) on DIP Switch 2 are set to OFF.

SECTION

two

PARTS INFORMATION

Y-UNIT CPU BOARD

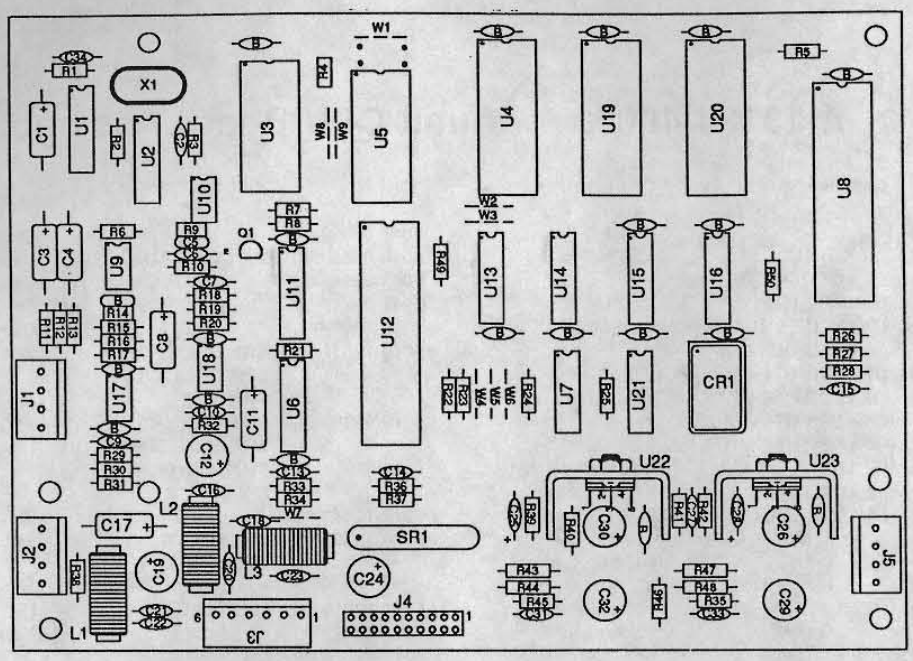


A-13234-40003 Y-unit CPU Board Assembly

Part No.	Ckt.Designator	Description
5770-12555-00		Bare PC Brd.
5281-09737-00	U1	IC, 74LS 86
5317-12211-00	U2, U20, U24, U43	
	U61, U62, U70	IC, 74ALS541
5317-12212-00	U3, U6, U7, U21, U25	74ALS574
	U50, U58, U63, U64	
	U71, U72, U74, U79, U84, U85	
5317-12208-00	U4, U22, U54-U57	74ALS245
	U59, U60, U75-U78	
	U80, U81, U94, U110	
5340-12242-00	U5, U23	IC, 8K x 8 S RAM
5700-12047-00	U8, U52, U53, U65	24 pin Socket
5340-12213-00	U10, U11, U28-U33	IC, 4461 VRAM
5521-12604-00	U16	40 MHZ Xtal
5521-10318-00	U17	24 MHZ Xtal
5283-10468-00	U19, U45	IC, 74F74
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
5311-12287-00	U47, U46, U87, U100	IC, 74HC541
	U101, U103, U104	
5700-10176-00	U49	28 pin Socket
5311-12285-00	U51, U73, U82	IC, 74HC573
5340-12014-00	U66-U69	IC, 4464 DRAM
5283-10552-00	U83	IC, 74F04
5370-12602-00	U86	IC, ULN2064B
5317-12023-00	U88	IC, 74ALS138
5700-12088-00	U89-U93, U95-U98	32 pin Socket
	U105-U109, U111-U114	
5700-12254-00	U99	144 pin Socket
5700-08985-00	U115	40 pin Socket
5010--08991-00	R1,R24, R27	Res. 4.7KΩ 5% 1/4W
5010-10204-00	R2, R7, R12	Res. 1KΩ 2% 1/4W
5010-10205-00	R3, R8, R13	Res. 2KΩ 2% 1/4W
5010-10000-00	R4, R9, R14	Res. 3.9KΩ 5% 1/4W
5010-09219-00	R5, R10, R15	Res. 8.2KΩ 5% 1/4W
5010-08772-00	R6, R11, R16	Res. 15KΩ 5%1/4W
5010-09001-00	R23, R25	Res. 330Ω 5% 1/4W
5010-09036-00	R26, R29-R34	Res. 100Ω 5% 1/4W
5010-09416-00	R35-R37, R46-R48	Res. 470Ω 5% 1/4W
5010-08997-00	R38-R45	Res. 2.7Ω 5% 1/4W
5010-09534-00	W2, W8, W11, W12	Res. 0Ω
	W14, W20, W22, W24	
	W27, W28, W31, W32,	
	W35, W39, W41, W43	
	W44, W46, W48, W50,	
	W52, W54, W56, W58	
	W60, W62, W66, W68,	
	W69, W72, W74, W76	
	W78, W80	

Part No.	Ckt.Designator	Description
5043-08980-00	B	Cap. .01 µfd 10V
5040-08986-00	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	
5019-09362-00	SR3, SR4, SR6	SIP, 4.7KΩ
	SR7, SR11, SR15	
	SR17, SR19-SR24	
	SRC1-SRC3	
5019-10143-00	SR5	SIP, 470Ω 9 Res.
5060-10396-00	SRC4, SRC5	SIP. 4.7KΩ 470pf
	SRC10, SRC14	
	SRC16	
5671-09019-00	LED1, LED 2	LED, Red
5551-09822-00	L1	Inductor, 4.7UH
5645-09025-00	DS1, DS2	DIP. Sw. 16 pin
5641-12551-00	SW1	Pushbutton Sw.
5881-12315-00	B1	Battery Holder
5791-10862-08	J2	8 pin Connector
5791-12461-12	J4	12 pin Connector
5791-10850-00	J6, J7	26 pin Ribbon Connector
5791-09437-00	J8	20 pin Ribbon Connector
5791-124-10	J12	10 pin Connector
C-13235-2		CPU Sub-assembly
A-5346-40003-1	U8	IC, PLD Color RAM Control
5400-12220-00	U36	IC, TMS 30410
A-5346-40003-2	U40	IC, PLD Address Decoder
A-5346-40003-3	U41	IC, PLD Video RAM Control
A-5346-40003-4	U42	IC, 8K x 8 Static RAM
A-5346-40003-5	U52	IC, PLD Video RAM Sequen.
A-5346-40003-6	U53	IC, PLD Image ROM Control
A-5346-40003-7	U65	IC, PLD Misc. Control
A-5343-40003-1	U89	IC, Game EPROM
A-5343-40003-2	U90	IC, Game EPROM
A-5343-40003-3	U91	IC, Game EPROM
A-5343-40003-4	U92	IC, Game EPROM
A-5343-40003-5	U93	IC, Game EPROM
A-5343-40003-6	U95	IC, Game EPROM
A-5343-40003-7	U96	IC, Game EPROM
A-5343-40003-8	U97	IC, Game EPROM
A-5343-40003-9	U98	IC, Game EPROM
5410-12239-00	U99	IC, Custom ASIC
A-5343-40003-10	U105	IC, Game EPROM
A-5343-40003-11	U106	IC, Game EPROM
A-5343-40003-12	U107	IC, Game EPROM
A-5343-40003-13	U108	IC, Game EPROM
A-5343-40003-14	U109	IC, Game EPROM
A-5343-40003-15	U111	IC, Game EPROM
A-5343-40003-16	U112	IC, Game EPROM
A-5343-40003-17	U113	IC, Game EPROM
A-5343-40003-18	U114	IC, Game EPROM
A-5343-40003-8	U115	IC, Game EPROM
5880-11056-00	B1	Battery, Lithum 3V
03-8338-1		1/4 Inch Spacer

D-11581-40003 Audio Board Assembly



Part No.	Ckt Designator	Description
5766-12130-00		Bare P. C. Board
5371-11087-00	U1	IC, D/A Conv, YM3012
a) 5700-09006-00		Socket, IC, 16-pin (U1)
5370-11086-00	U3	IC, Sound Processor, YM2151
a) 5700-09004-00		Socket, IC, 24-pin (U3)
5400-10320-00	U8	IC, µProcessor, MC68B09E
a) 5700-08985-00		Socket, IC, 40-pin (U8)
A-5343-40003-19	U4	IC, Audio ROM 1
A-5343-40003-20	U19	IC, Audio ROM 2
A-5343-40003-21	U20	IC, Audio ROM 3
a) 5700-10176-00		Socket, IC, 28-pin (U4, U19)
5371-09152-00	U11	IC, D/A Convtr, MC1408
5430-10322-00	U12	IC, PIA, MC68B21
5340-10139-00	U5	IC, RAM/S 5516-2 2Kx8
5281-09487-00	U16	IC, Dual D Flipflop, 74LS74
5281-10043-00	U13	IC, 74LS175
5281-09235-00	U21	IC,Triple NAND, 74LS10
5370-09321-00	U9, U10, U17, U18	IC, Op Amp, MC1458
5281-09215-00	U2	IC, Hex Inv, 74LS04
5281-09246-00	U14	IC, 2-4 Dec, 74LS139
5281-09745-00	U15	IC, Dual Mux, 74LS138
5370-09156-00	U22, U23	IC, Audio Amp, TDA2002
a) 5705-09199-00		Heatsink, #6030B
b) 4006-01003-06		Mach. Screw, 6-32 x 3/8
c) 4406-01117-00		Nut, 6-32 Hex.
d) 4703-00007-00		Lockwasher, #6 Ext.
5160-10269-00	Q1	Transistor, 2N3904, NPN
5060-10396-00	SP1	SIP 4.7K & 470pfd, 8R8C
5010-09181-00	R44, R48	Resistor, 1.0Ω, 1/2w, 5%
5010-09161-00	R35, R45	Resistor, 2.2Ω, 1/4w, 5%
5010-09361-00	R43, R46, R47	Resistor, 220Ω, 1/2w, 5%
5010-09358-00	R41, R42	Resistor, 1K, 1/4w, 5%
5010-08998-00	R2, R3,	Resistor, 2.2K, 1/4w, 5%
5010-08983-00	R7-R9	Resistor, 3.3K, 1/4w, 5%
5010-08991-00	R1, R4, R5, R11, R25 - R28, R33, R36, R37, R49, R50	Resistor, 4.7K, 1/4w, 5%

Part No.	Ckt Designator	Description
5010-10985-00	R14, R15	Resistor, 20K, 1/4w, 5%
5010-09034-00	R22-R24, R17, R34	Resistor, 10K, 1/4w, 5%
5010-09324-00	R6, R19, R20, R21	Resistor, 27K, 1/4w, 5%
5010-09162-00	R39	Resistor, 100K, 1/4w, 5%
5010-09331-00	R16	Resistor, 13K, 1/4W, 5%
5010-08772-00	R18	Resistor, 15KΩ, 1/4W, 5%
5010-08824-00	R32	Resistor, 43KΩ, 1/4W, 5%
5010-08846-00	R31	Resistor, 220KΩ, 1/4W, 5%
5010-08991-00	R12	Resistor, 4.7KΩ, 1/4W, 5%
5010-09219-00	R38	Resistor, 8.2K, 1/4W, 5%
5010-10258-00	R40	Resistor, 1M, 1/4w, 5%
5010-09179-00	R10	Resistor, 3.3M, 1/4w, 5%
5010-09333-00	R29	Resistor, 180KΩ, 1/4W, 5%
5010-09342-00	R30	Resistor, 36KΩ, 1/4W, 5%
5010-09534-00	W9	Resistor, 0Ω, 1/4w, 5%
5040-09343-00	C1, C3, C4, C8	Capacitor, 10µfd, 20v, ±20%
5040-10974-00	C12, C19, C24	Capacitor, 100µfd, 35v
5040-09776-00	C26, C30	Capacitor, 470µfd, 16v; +50, -10%
5040-12006-00	C29, C32	Capacitor, 1000µfd, 16v, 20%
5041-09243-00	C25, C28	Capacitor, 10µfd, 10v,±10%
5043-08980-00	C5, B (17)*	Capacitor, 0.01µfd, 50v,+80, -20%
5043-08996-00	C31, C33	Capacitor, 0.1µfd, 50v, ±20%
5043-09065-00	C13 - C15	Capacitor, 470 pfd, 50v, ±20%
5043-09492-00	C2, C34	Capacitor, 100 pfd, 50v, ±10%
5043-09844-00	C6	Capacitor, 47 pfd, 50v, ±20%
5043-09845-00	C16, C18, C20 - C23, C27	Capacitor, 1000 pfd, 50v, ±20%
5520-09020-00	X1	Crystal, 3.58 MHz
5521-10931-00	CR1	Oscillator, 8 MHz
5551-09822-00	L1 - L3	Inductor, 4.7 µH, 3A
5791-09437-00	J4	Connector, 20 pin, (Hdr), Rib. Cbl
5791-10862-04	J1, J2, J5	Connector, 4 pin (Hdr)
5791-10862-06	J3	Connector, 6 pin (Hdr)
16-8850-250		P.C.B. I.D. Label
20-9229		Thermal Compound

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.

SECTION
three

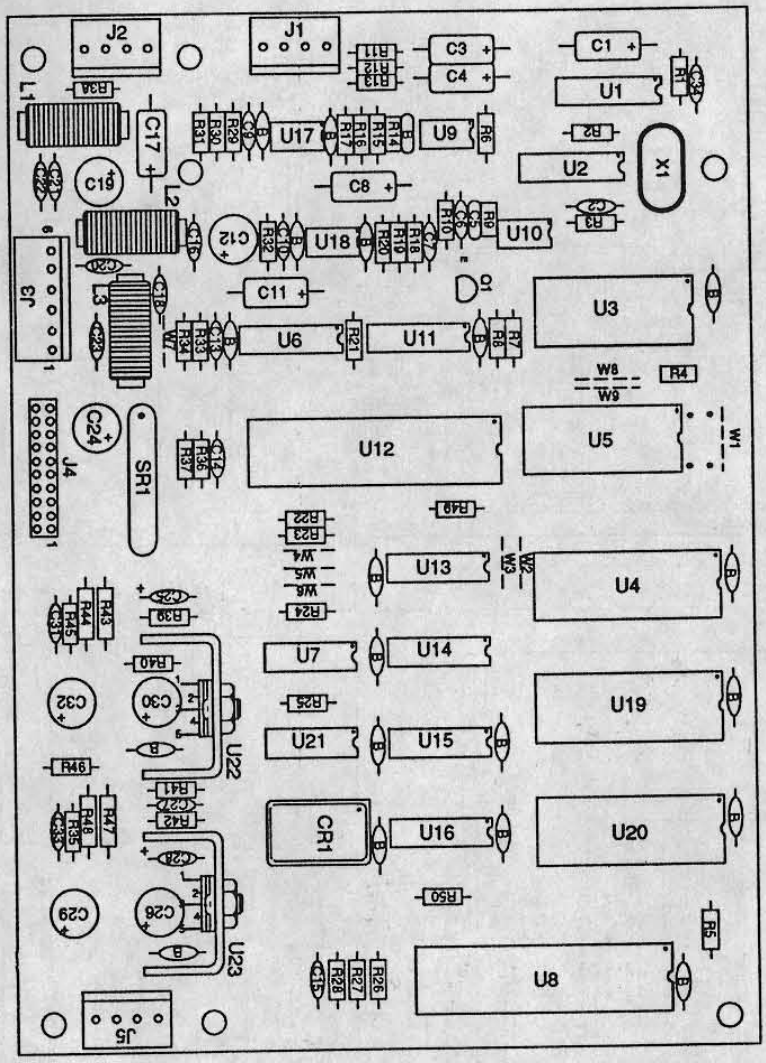
DIAGRAMS and SCHEMATICS

TROG
JAMMA Chart

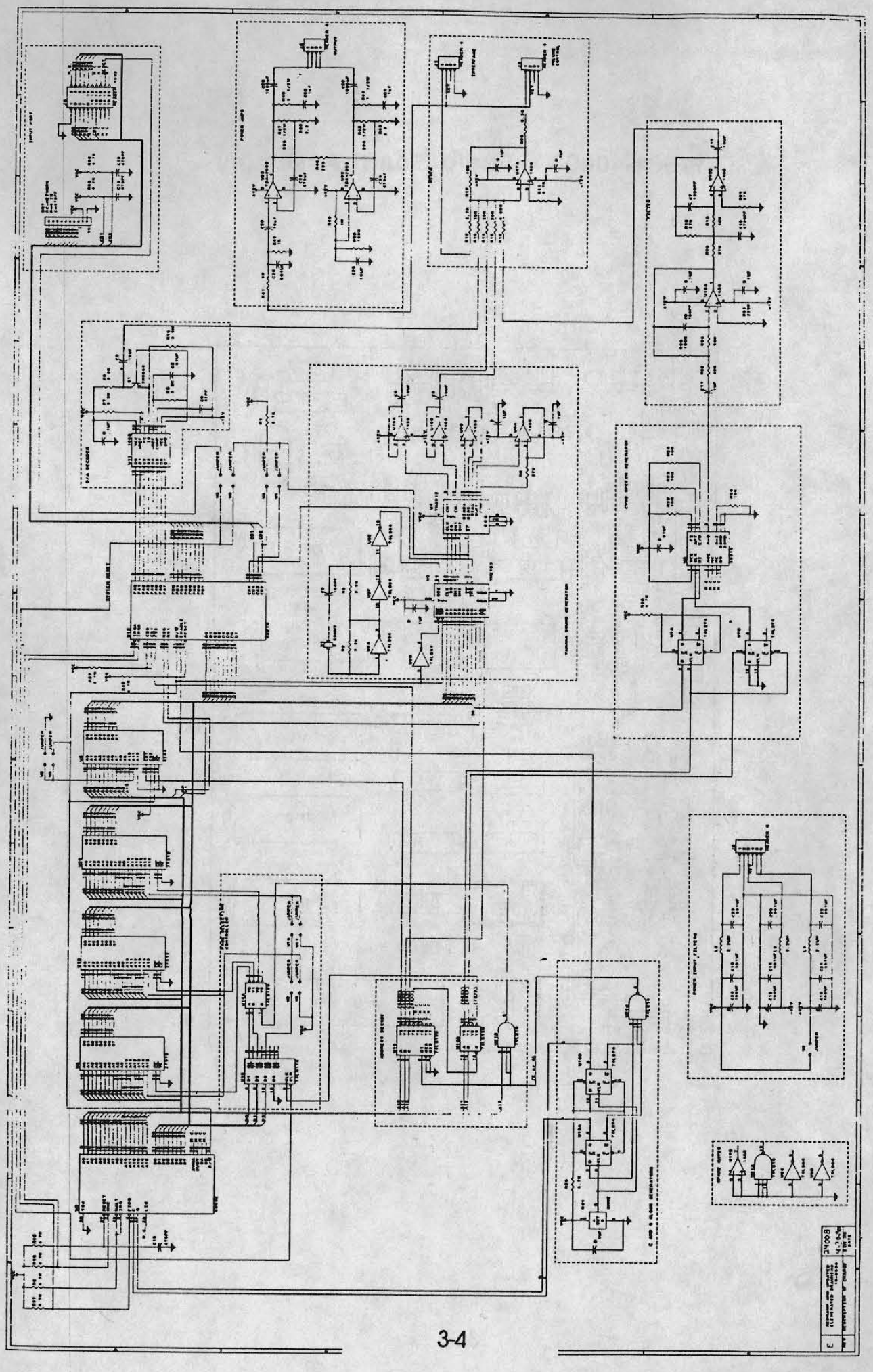
FUNCTION	WIRE COLOR	PIN	PIN	WIRE COLOR	FUNCTION
Ground	Blk	1	A	Blk	Ground
Ground	Blk	2	B	Blk	Ground
+5 Volts DC	Gry	3	C	Gry	+5 Volts DC
+5 Volts DC	Gry	4	D	Gry	+5 Volts DC
-5 Volts DC	Gry-Grn	5	E	Gry-Grn	-5 Volts DC
+12 Volts DC	Gry-Yel	6	F	Gry-Yel	+12 Volts DC
	Key	7	H	Key	
Counter 1 *	Wht-Orn	8	J	Wht-Grn	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 Blue	Brn	13	P	Wht	Video Sync
Video Grd	Shield	14	R	Wht-Red	Service Credit *
Test *	Grn	15	S	Wht-Vio	Slam Tilt *
1 Coin	Wht-Blu	16	T	Yel-Wht	2 Coin
1 Start	Yel-Grn	17	U	Yel-Blu	2 Start
1 Up	Org-Blk	18	V	Yel-Blk	2 Up
1 Down	Org-Brn	19	W	Yel-Brn	2 Down
1 Left	Org-Red	20	X	Yel-Red	2 Left
1 Right	Org	21	Y	Yel-Org	2 Right
1 Punch	Org-Yel	22	Z	Yel-Vio	2Punch
NC	Org-Grn	23	a	Yel-Gry	NC
NC	Org-Blu	24	b	Vio-Blk	NC
NC	Org-Vio	25	c	Vio-Brn	NC
NC	Org-Gry	26	d	Vio-Red	NC
Ground	NC	27	e	Blk	Ground
Ground	Blk	28	f	Blk	Ground

* Optional function- Game will operate without these.

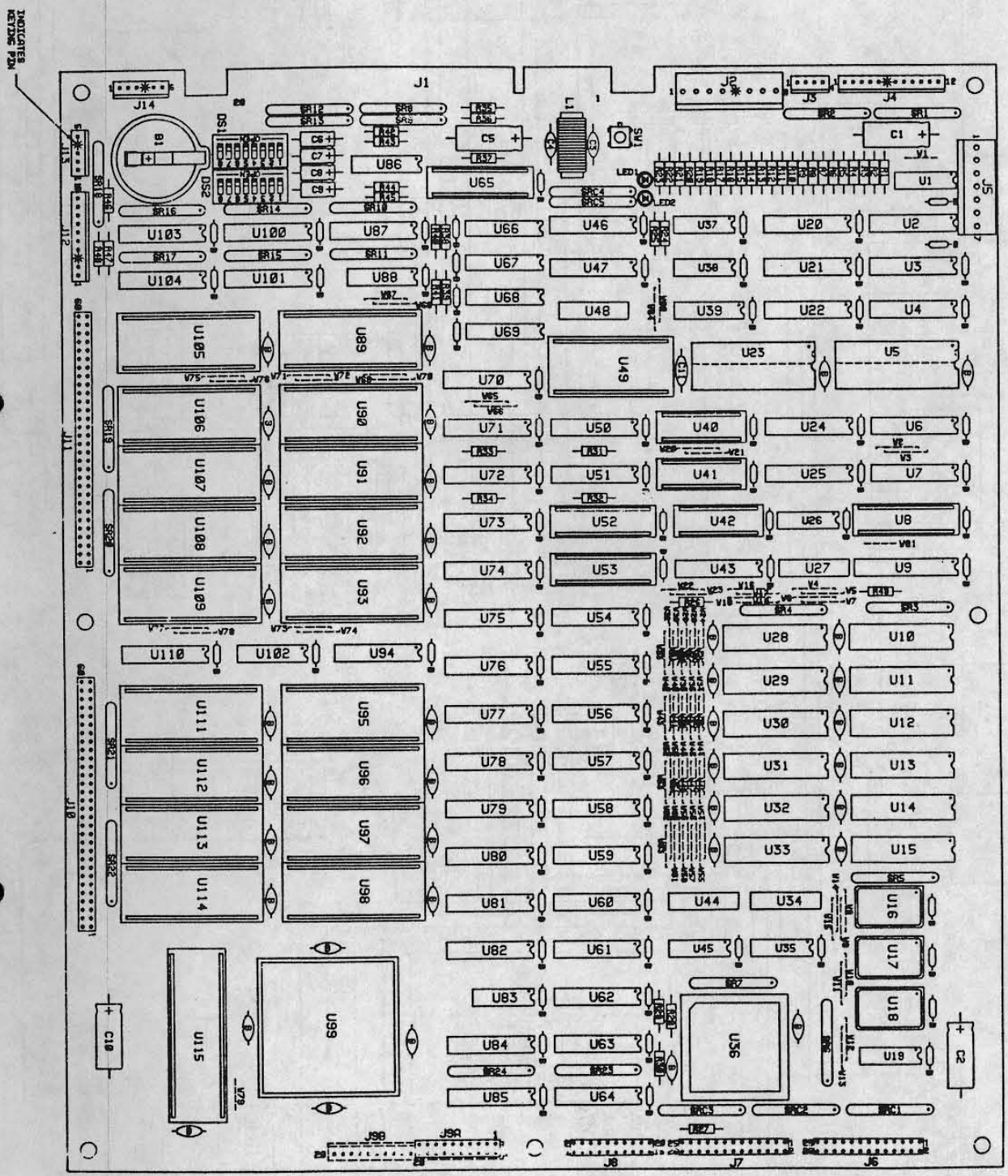
D-11581-40003 Audio Board Assembly

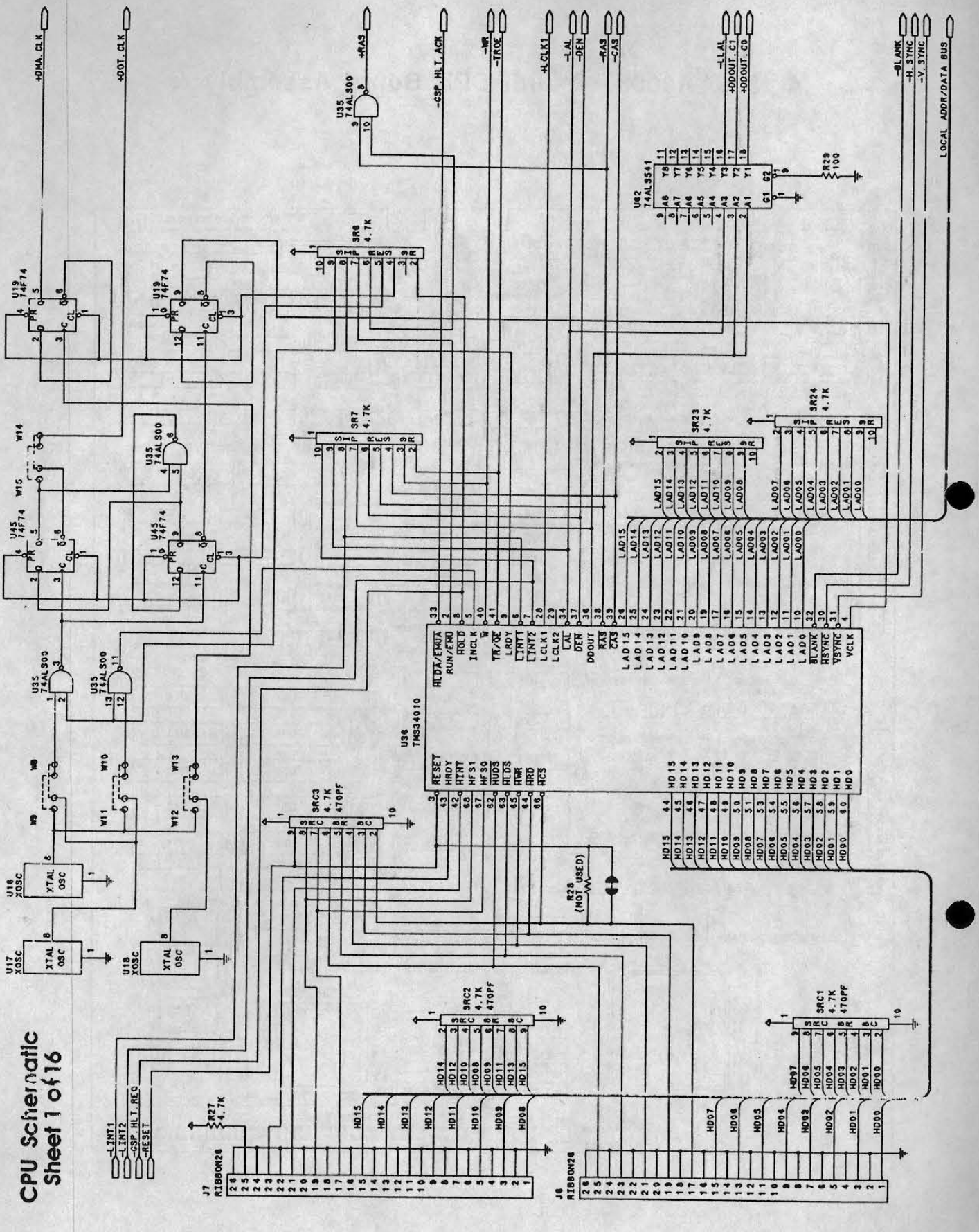


AUDIO BOARD SCHEMATIC

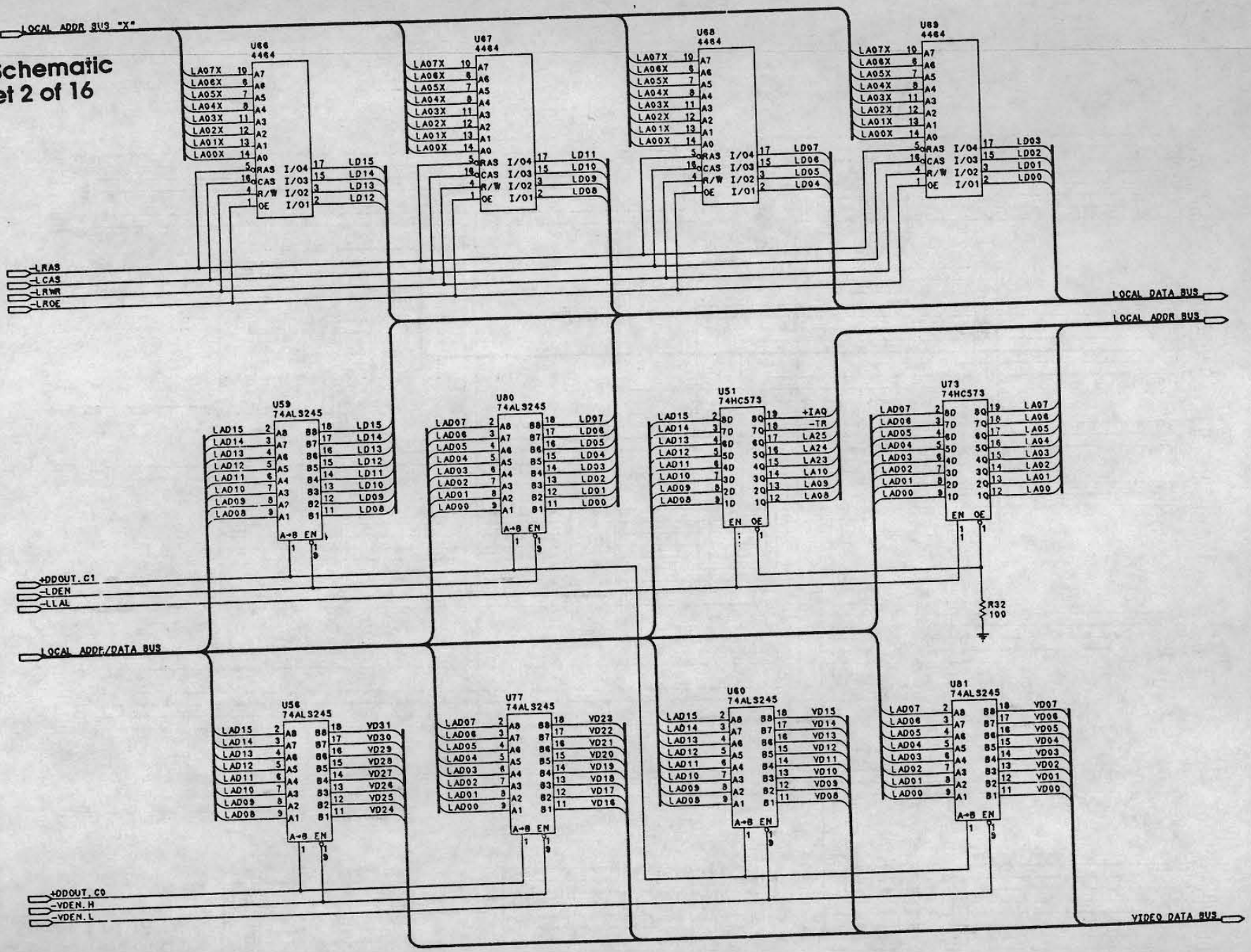


A-13234-40003 Y-unit CPU Board Assembly

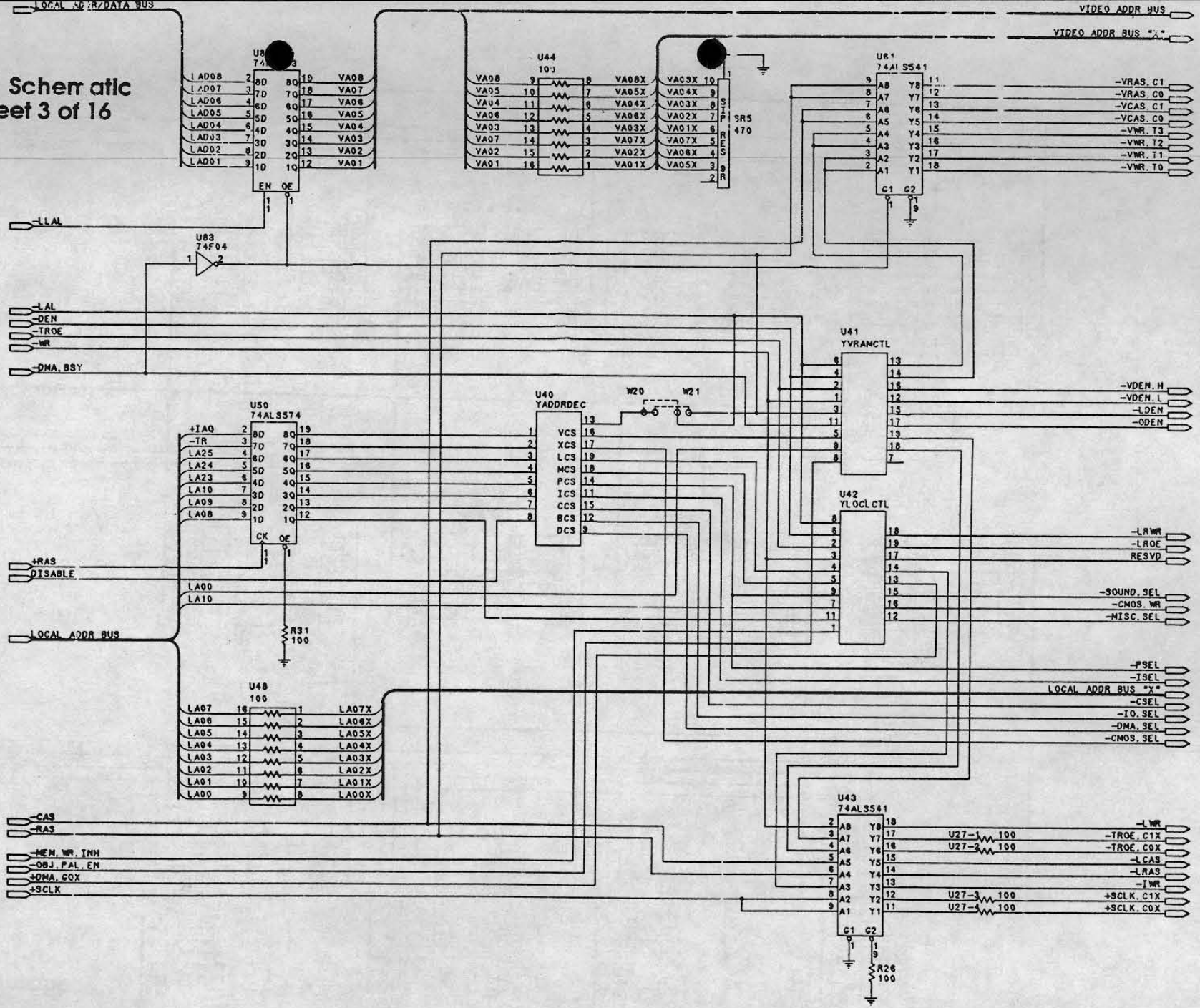



CPU Schematic
Sheet 1 of 16
+DMA.CLK
+DOT.CLK
-GSP.HLT.ACK
-MR
-TROE
+LCLK1
-LAL
-DEN
-RAS
-CAS
-BLANK
-H.SYNC
-V.SYNC
LOCAL ADDR/DATA BUS
U35 74ALS00
U19 74F74
U45 74F74
U16 XOSC
U17 XOSC
U18 XOSC
XTAL OSC
U36 TMS34010
U62 74ALS541
SR1 4.7K 470PF
SR2 4.7K 470PF
SR3 4.7K 470PF
SR4 4.7K
SR7 4.7K
SR23 4.7K
SR24 4.7K
R27 4.7K
R28 (NOT USED)
R29 100
W0
W9
W10
W11
W12
W13
W14
W15
-LINT1
-LINT2
-GSP.HLT.REQ
-RESET
J7 RIBBON26
J8 RIBBON26

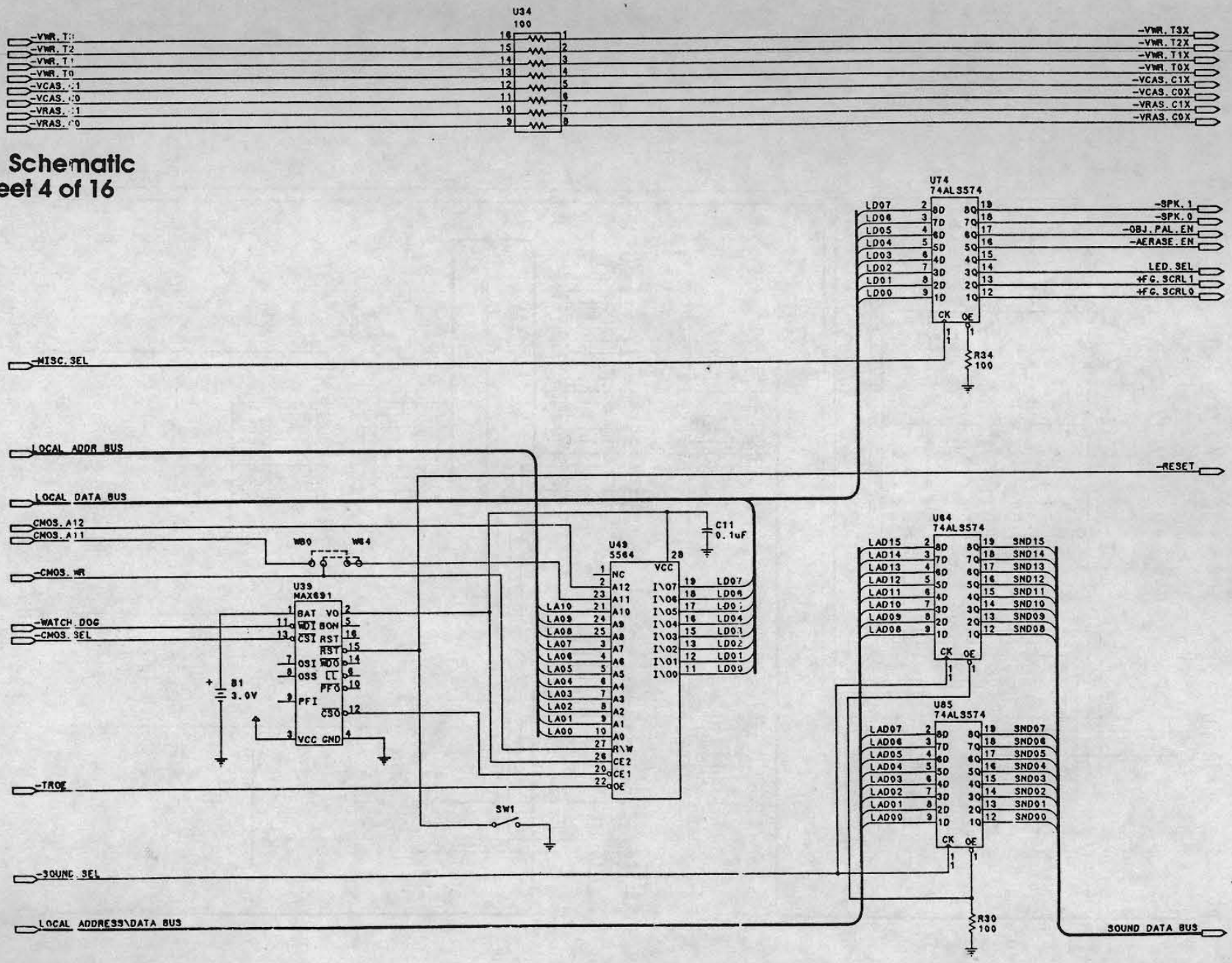
CPU Schematic
Sheet 2 of 16



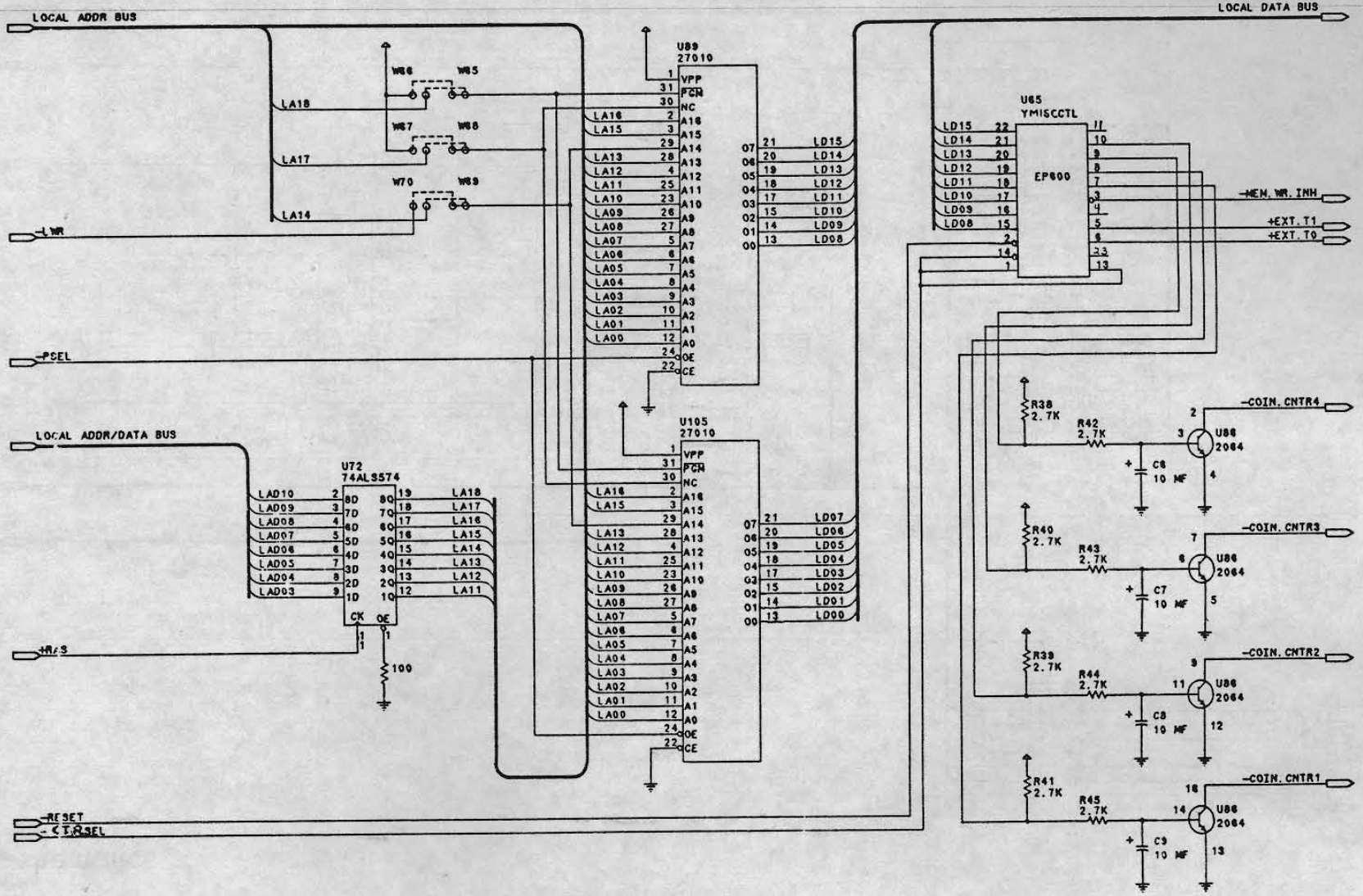
CPU Schematic
Sheet 3 of 16

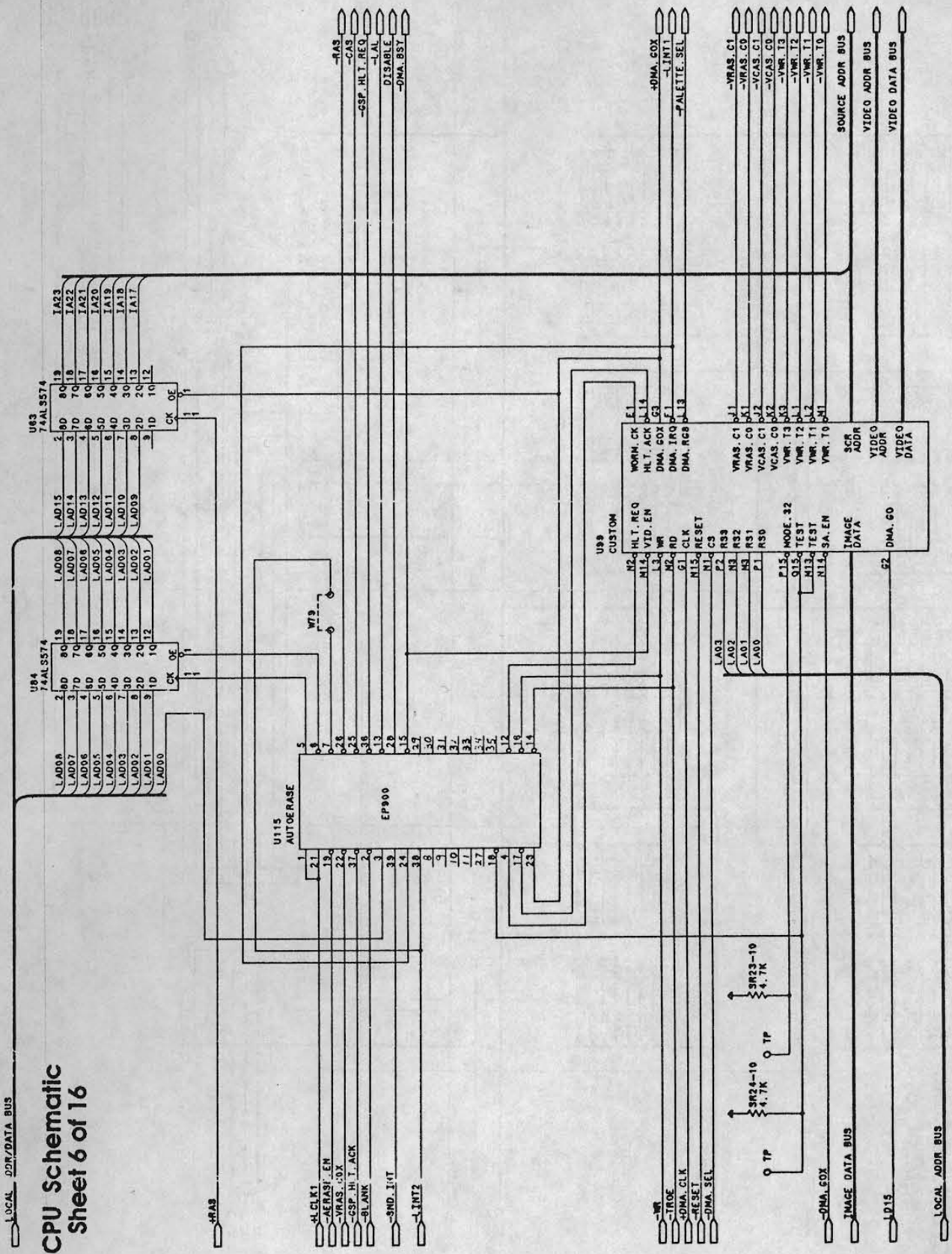


CPU Schematic
Sheet 4 of 16



CPU Schematic
Sheet 5 of 16




CPU Schematic
Sheet 6 of 16
LOCAL DDR/DATA BUS
U84
74ALS574
U63
74ALS574
LAD15
LAD14
LAD13
LAD12
LAD11
LAD10
LAD09
LAD08
LAD07
LAD06
LAD05
LAD04
LAD03
LAD02
LAD01
LAD00
IA23
IA22
IA21
IA20
IA19
IA18
IA17
-RAS
-CAS
-GSP.HLT.REQ
-LAL
DISABLE
-DMA.BSY
+DMA.GOX
-L.INT1
-PALETTE.SEL
-VRAS.C1
-VRAS.C0
-VCAS.C1
-VCAS.C0
-VWR.T3
-VWR.T2
-VWR.T1
-VWR.T0
SOURCE ADDR BUS
VIDEO ADDR BUS
VIDEO DATA BUS
U115
AUTOERASE
EP900
W79
U89
CUSTOM
WORM.CK
HLT.ACK
DMA.GOX
DMA.IRQ
DMA.RGB
HLT.REQ
VID.EN
WR
RD
CLK
RESET
VRAS.C1
VRAS.C0
VCAS.C1
VCAS.C0
VWR.T3
VWR.T2
VWR.T1
VWR.T0
MODE.32
TEST
TEST
SA.EN
IMAGE DATA
SCR ADDR
VIDEO ADDR
VIDEO DATA
DMA.GO
+RAS
+LCLK1
-AERASE.EN
-VRAS.GOX
-GSP.HLT.ACK
-BLANK
-GND.INT
-L.INT2
SR23-10
4.7K
SR24-10
4.7K
TP
-WR
-TROE
+DMA.CLK
-RESET
-DMA.SEL
-DMA.GOX
IMAGE DATA BUS
LD15
LOCAL ADDR BUS

CPU Schematic
Sheet 7 of 16

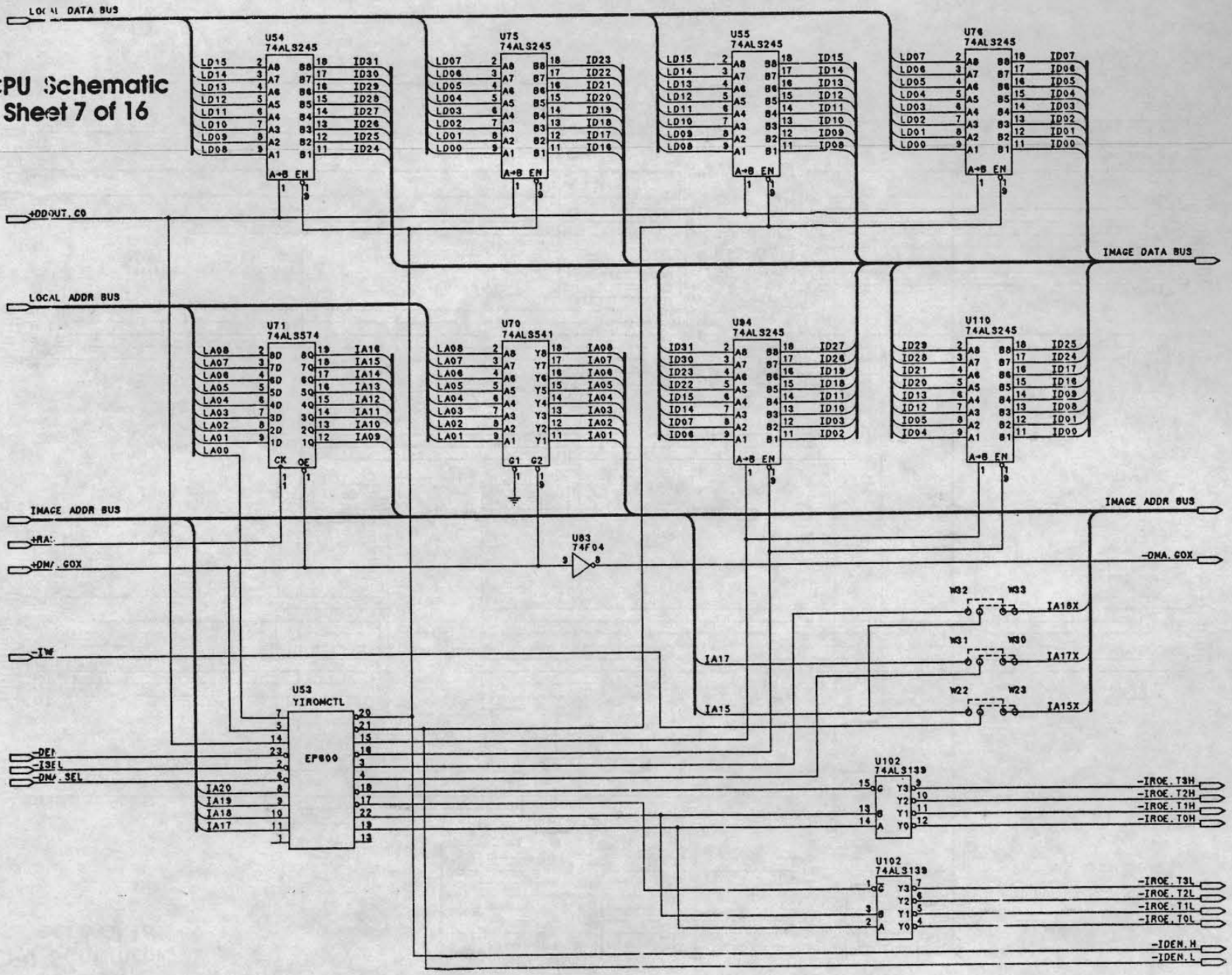


IMAGE MEMORY

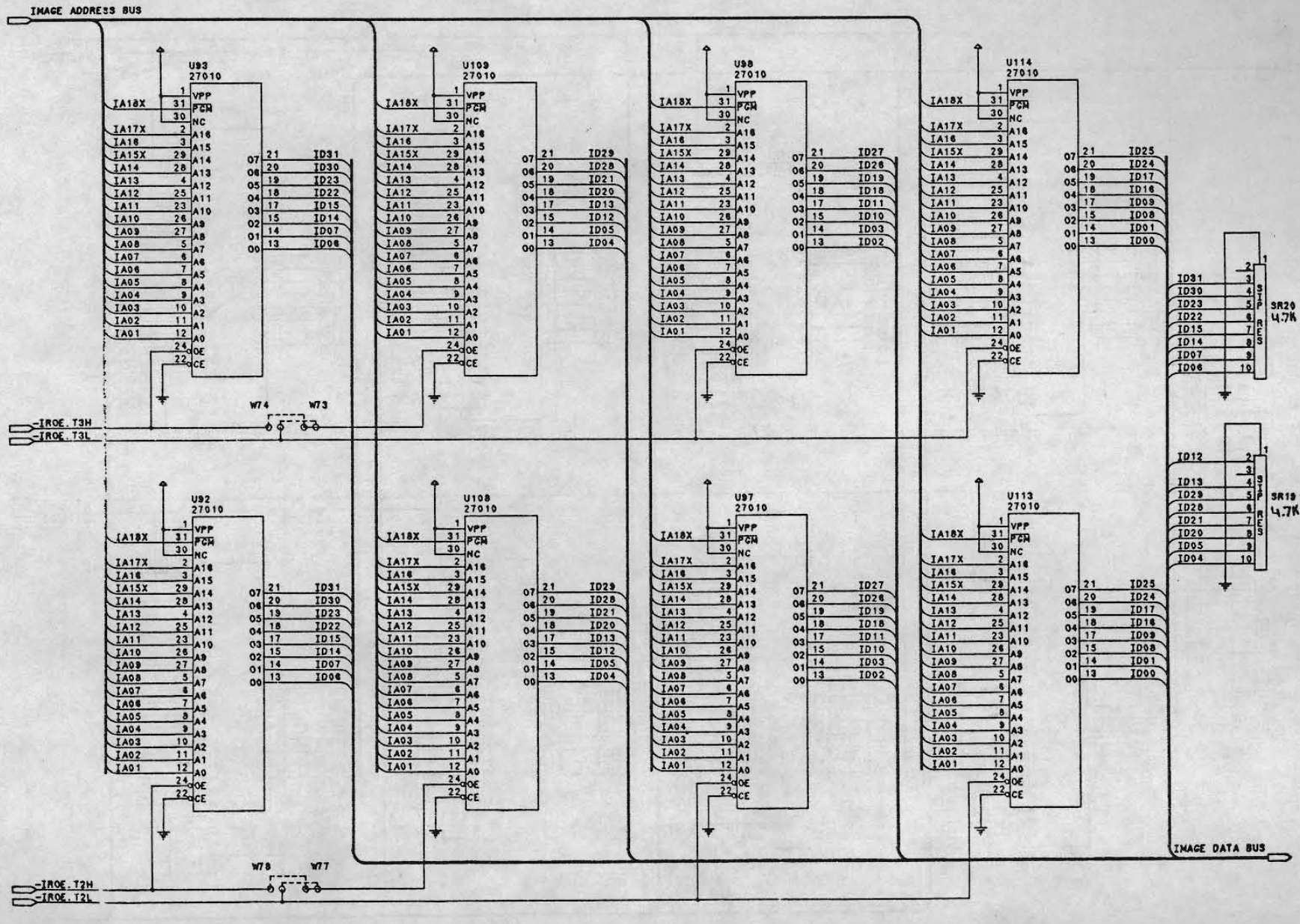
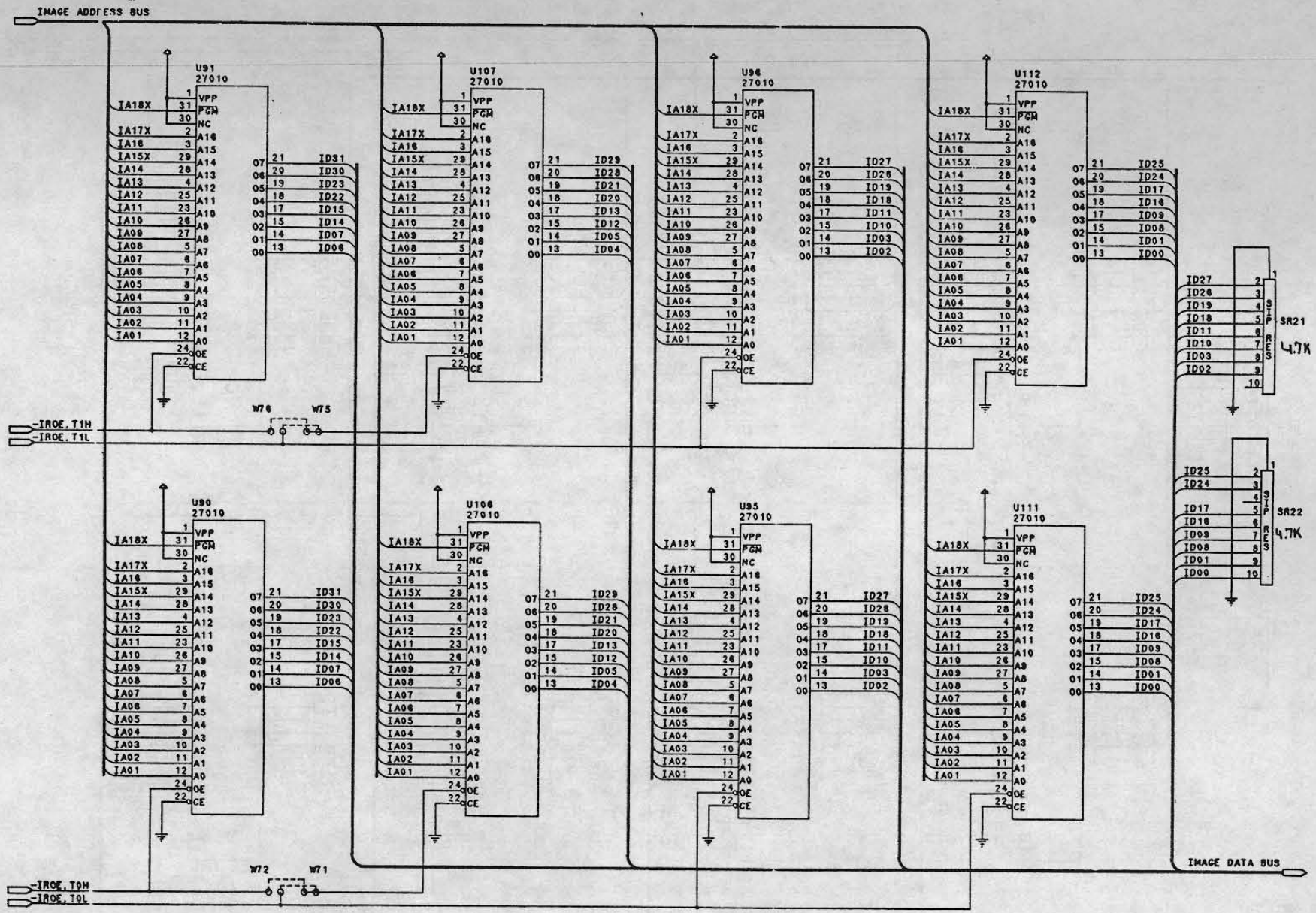
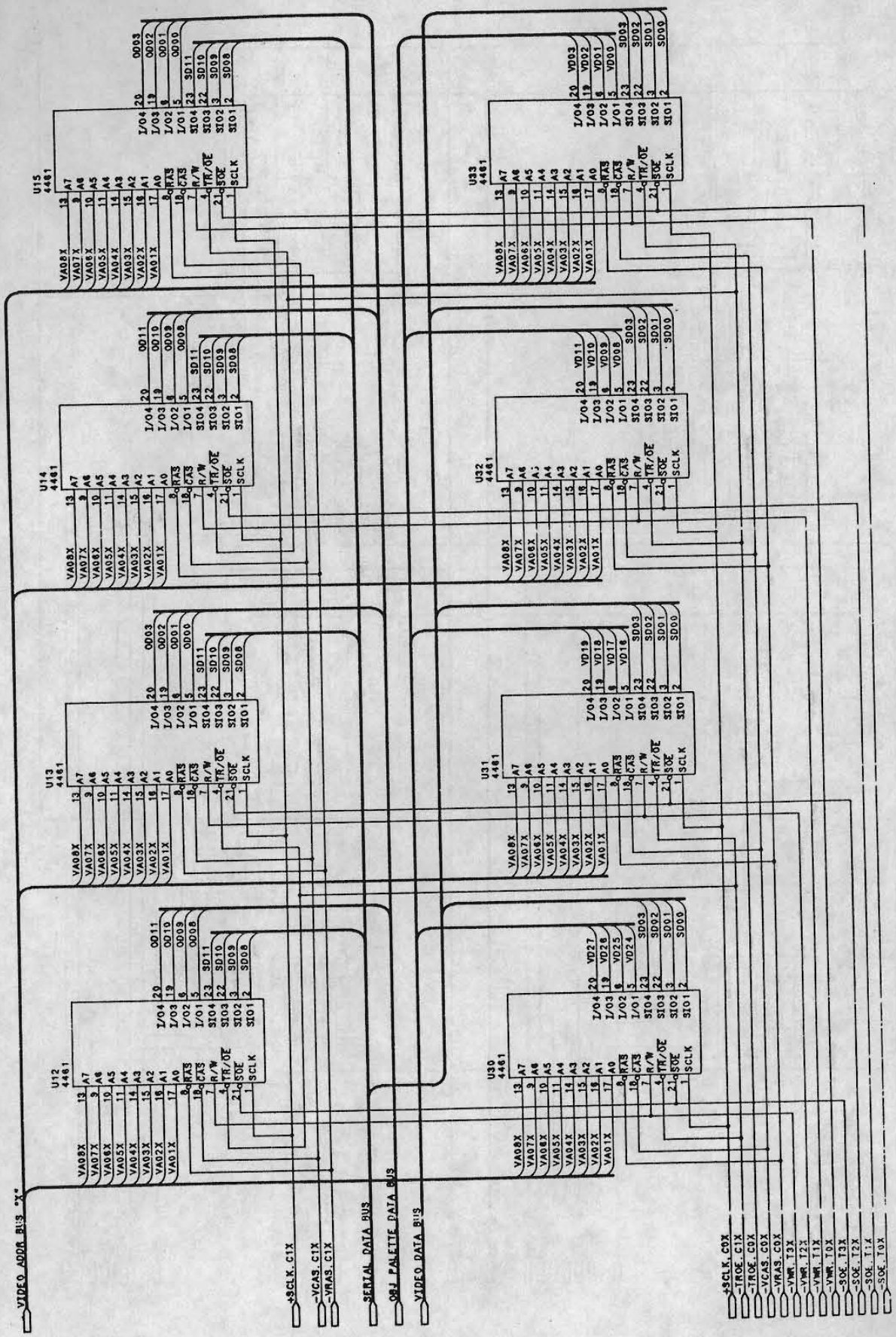
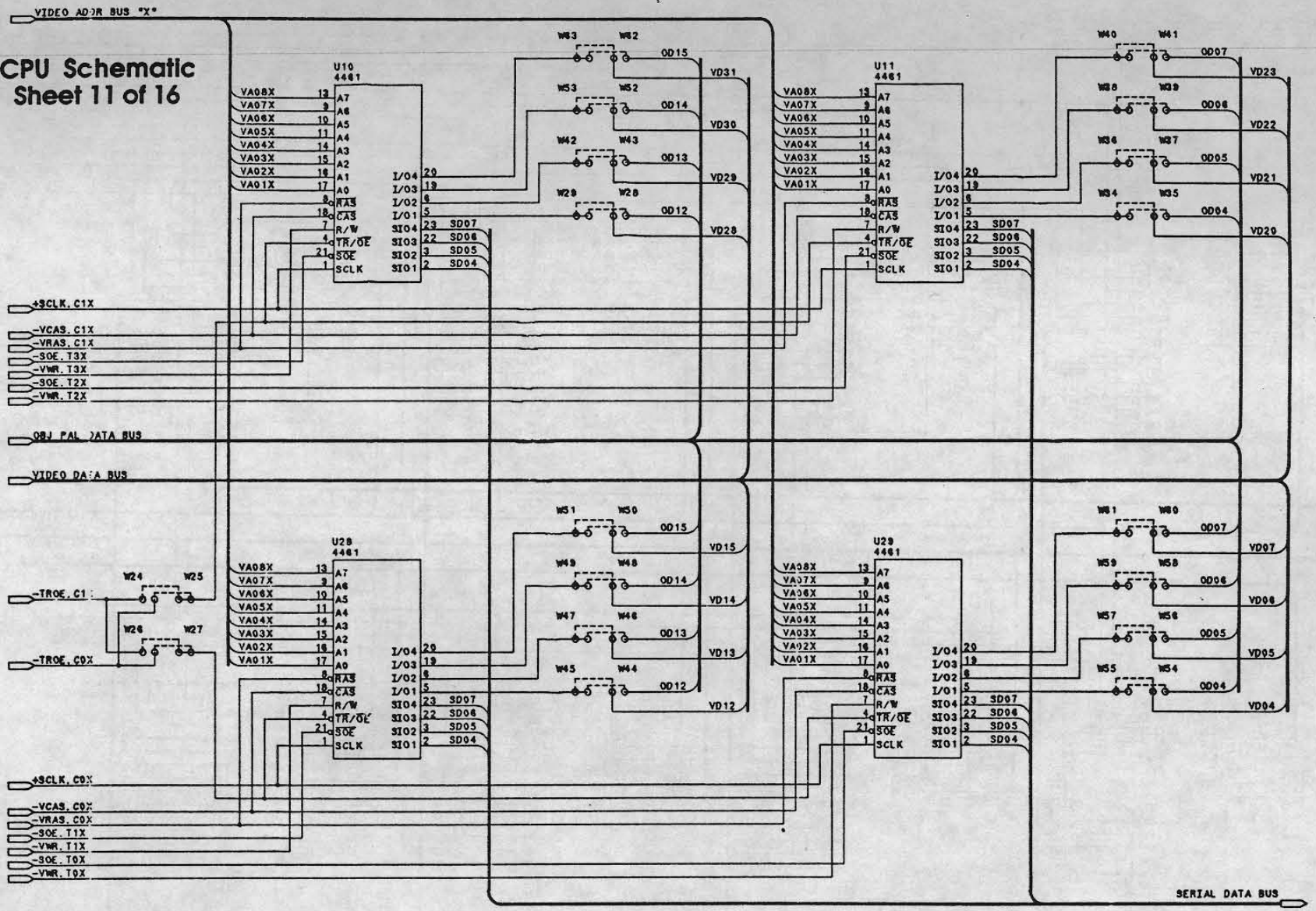


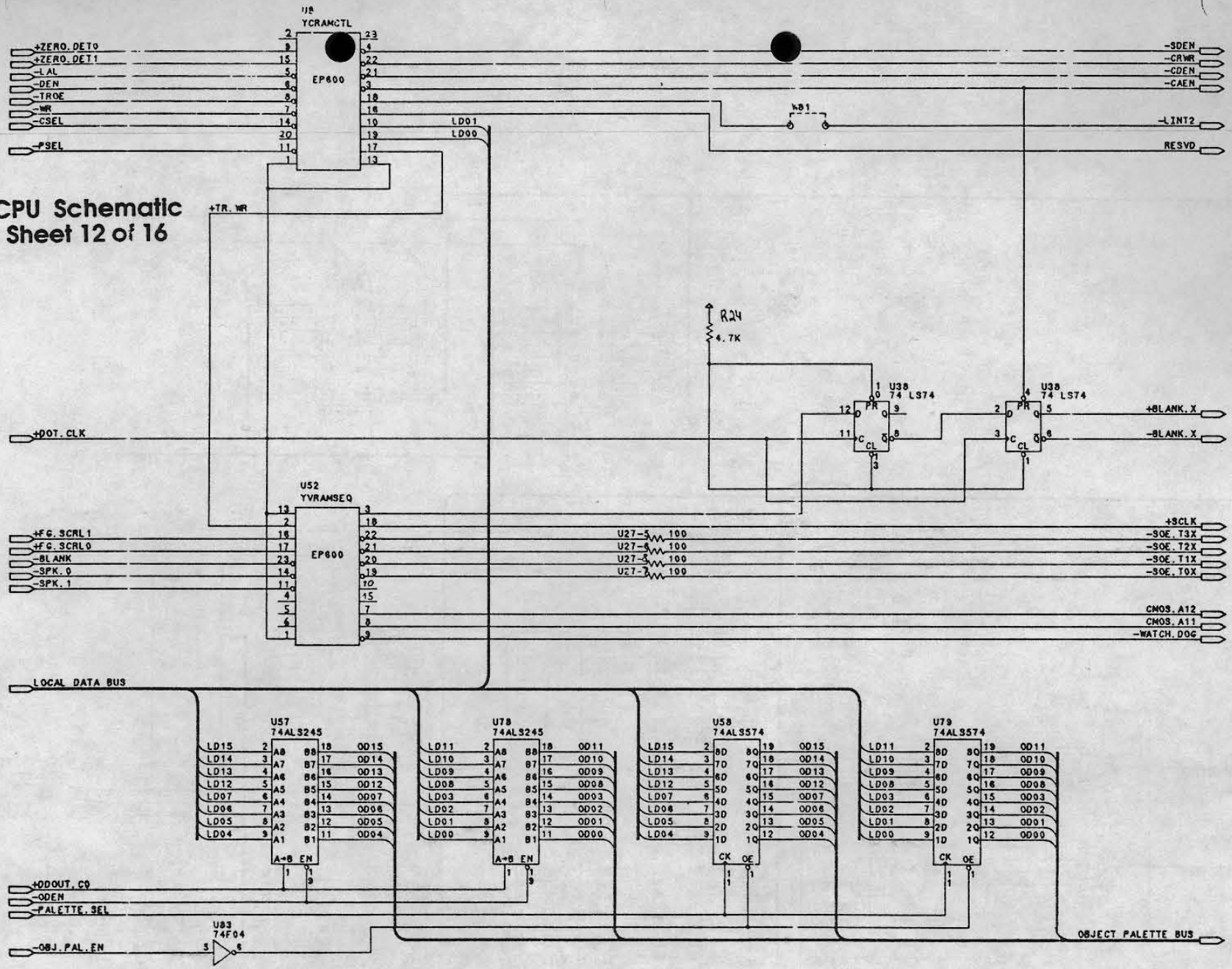
IMAGE MEMORY



CPU Schematic
Sheet 10 of 16

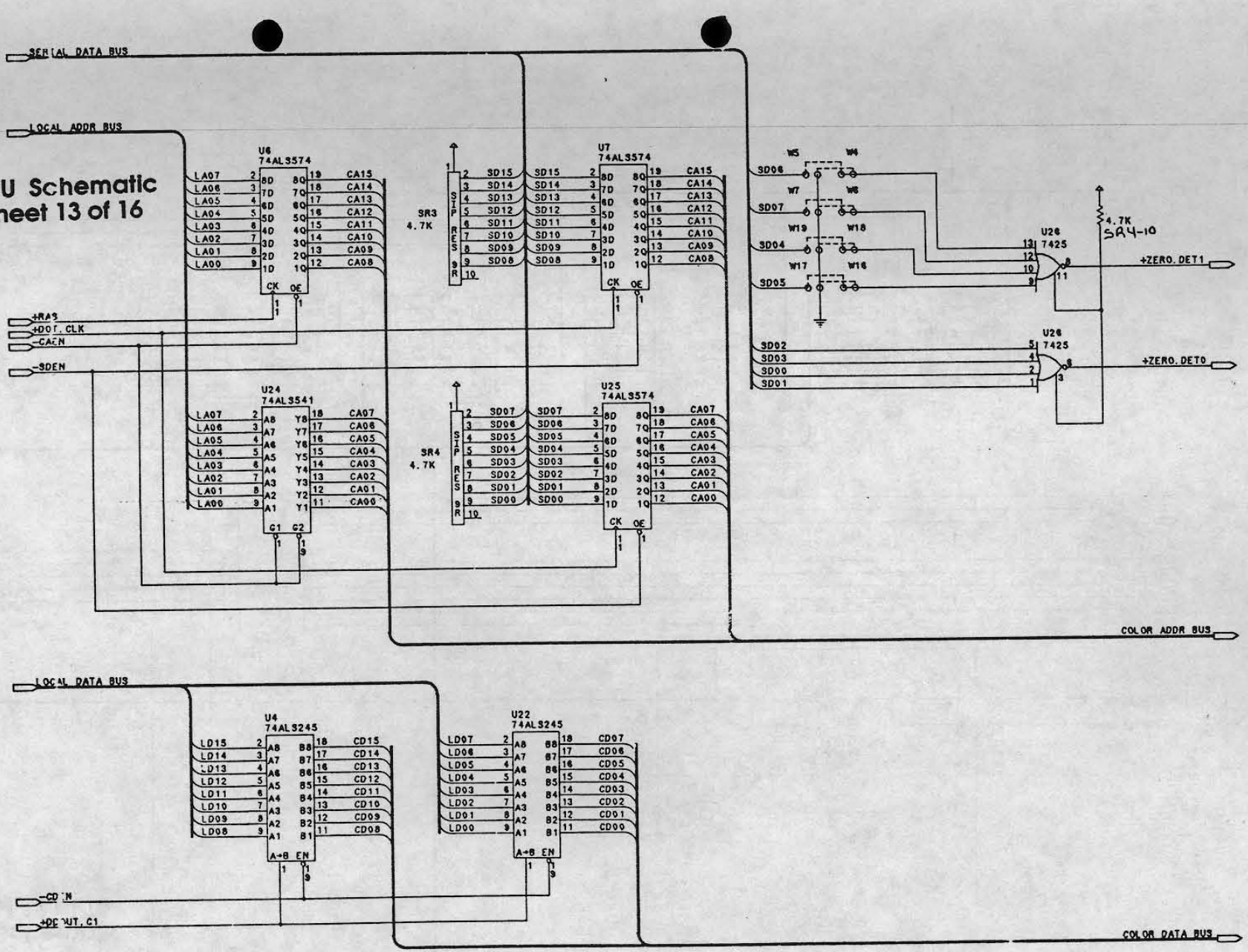



VIDEO ADDR BUS "X"
U10
4461
U11
4461
U28
4461
U29
4461
VA08X
VA07X
VA06X
VA05X
VA04X
VA03X
VA02X
VA01X
A7
A6
A5
A4
A3
A2
A1
A0
RAS
CAS
R/W
TR/OE
SOE
SCLK
I/O4
I/O3
I/O2
I/O1
SIO4
SIO3
SIO2
SIO1
SD07
SD06
SD05
SD04
W63
W62
W53
W52
W42
W43
W29
W28
W40
W41
W38
W39
W34
W37
W34
W35
W51
W50
W49
W48
W47
W46
W45
W44
W61
W60
W59
W58
W57
W56
W55
W54
OD15
OD14
OD13
OD12
OD07
OD06
OD05
OD04
VD31
VD30
VD29
VD28
VD23
VD22
VD21
VD20
VD15
VD14
VD13
VD12
VD07
VD06
VD05
VD04
W24
W25
W26
W27
-TROE. C1X
-TROE. C0X
+SCLK. C1X
-VCAS. C1X
-VRAS. C1X
-SOE. T3X
-VWR. T3X
-SOE. T2X
-VWR. T2X
OBJ PAL DATA BUS
VIDEO DATA BUS
+SCLK. C0X
-VCAS. C0X
-VRAS. C0X
-SOE. T1X
-VWR. T1X
-SOE. T0X
-VWR. T0X
SERIAL DATA BUS

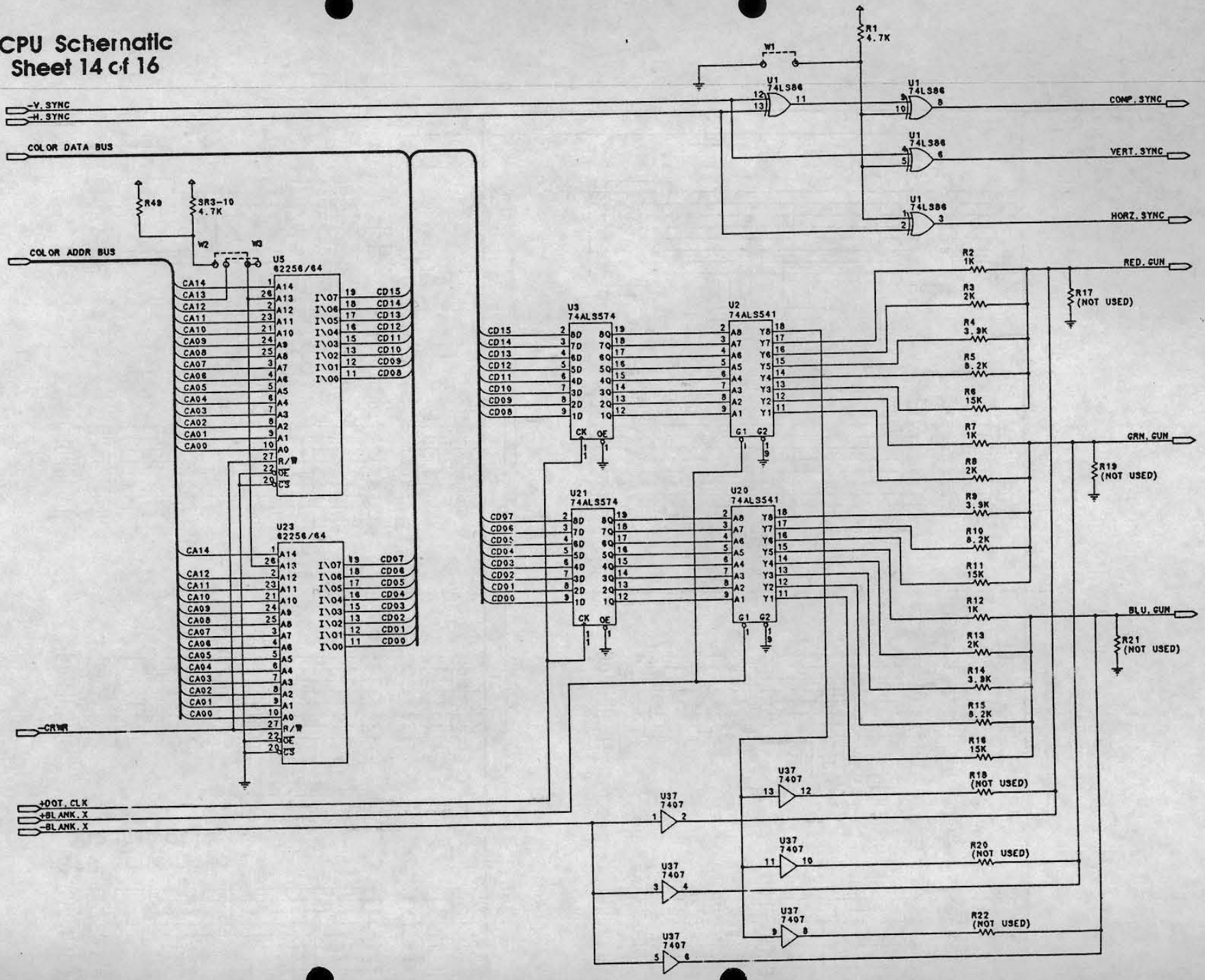


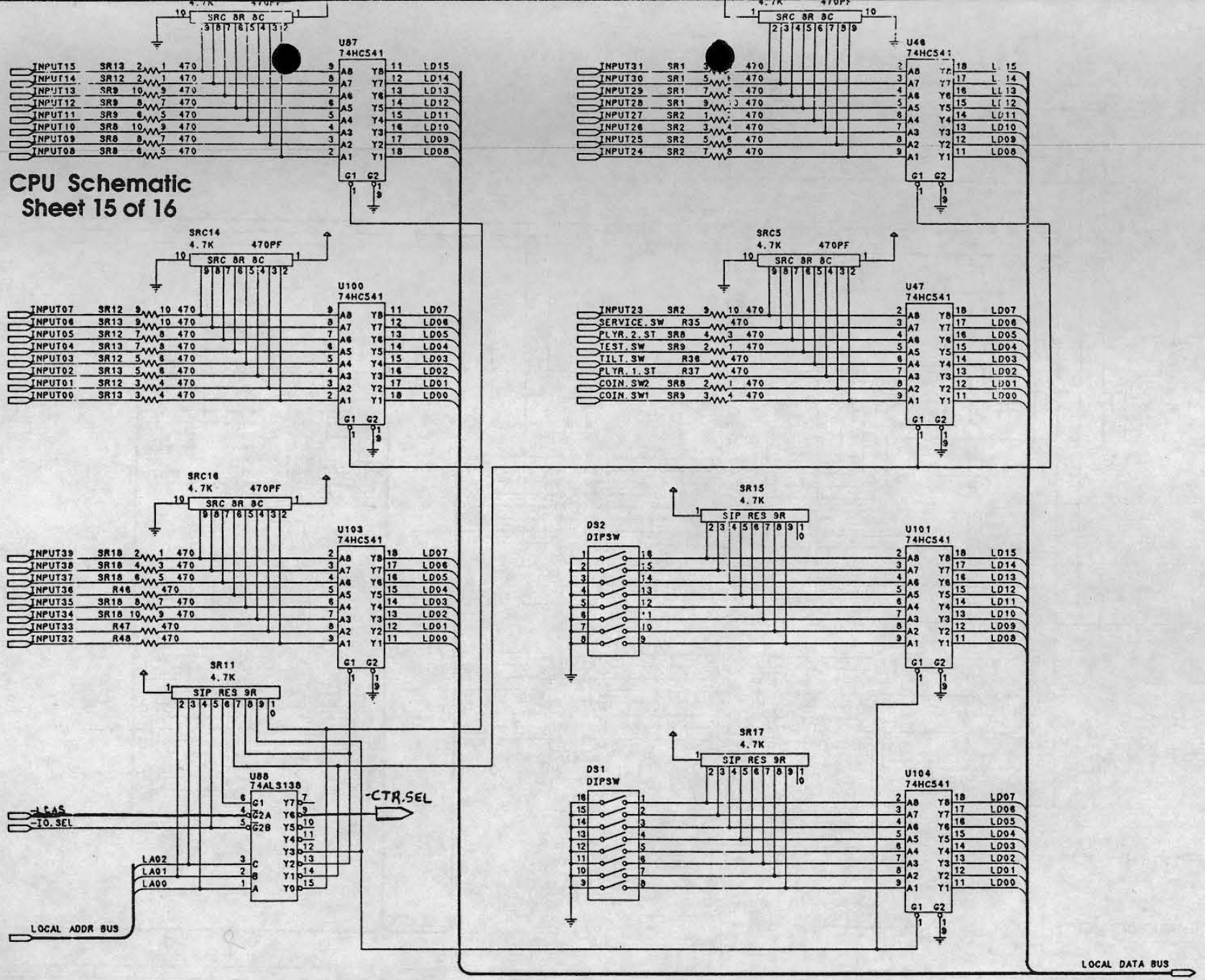
CPU Schematic
Sheet 12 of 16

CPU Schematic
Sheet 13 of 16

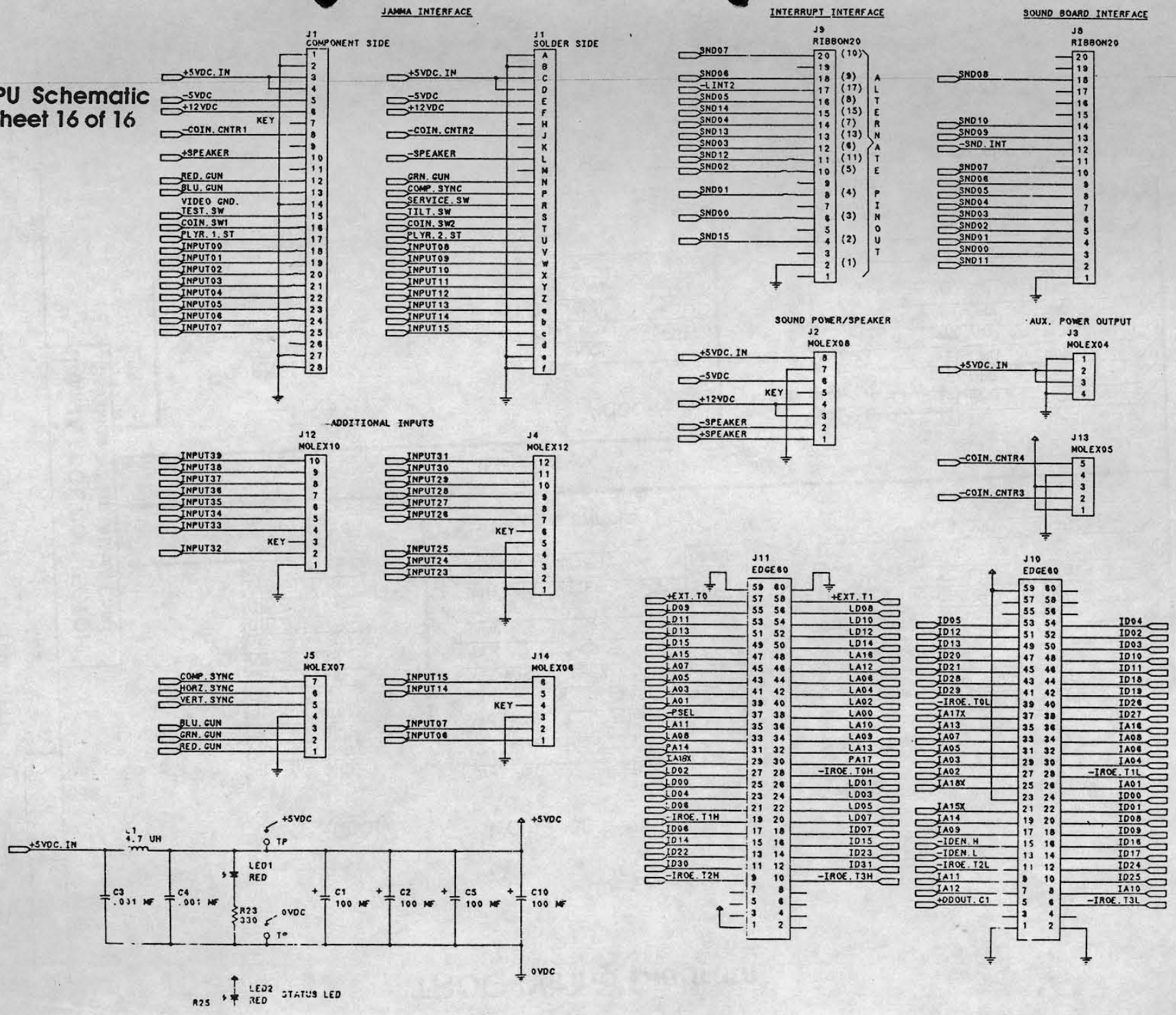


CPU Schematic
Sheet 14 of 16

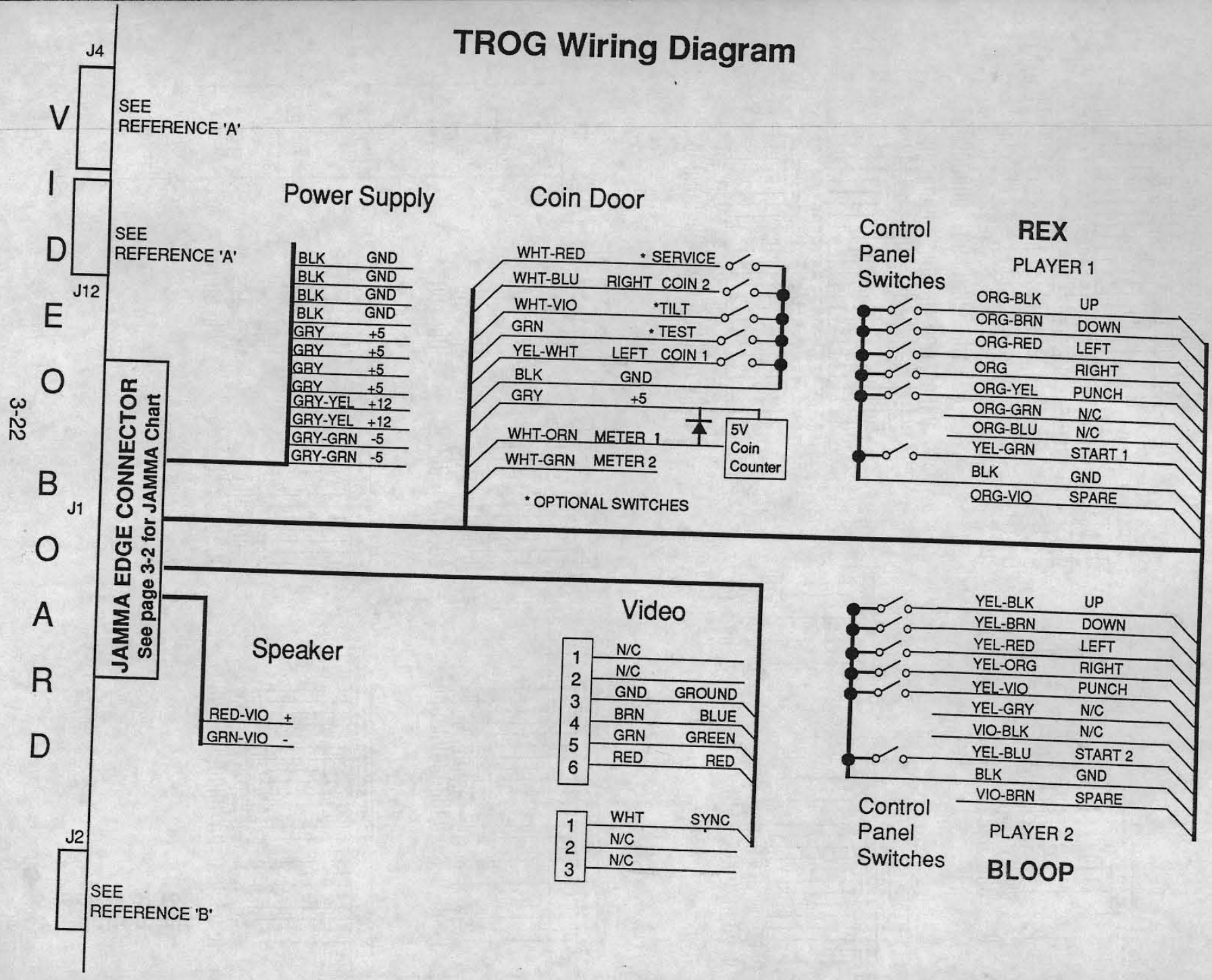



CPU Schematic
Sheet 15 of 16
SRC 8R 8C
4.7K
470PF
U87
74HC541
U46
74HC541
SRC14
U100
74HC541
SRC5
U47
74HC541
SRC16
U103
74HC541
SR15
SIP RES 9R
DS2
DIPSW
U101
74HC541
SR11
SIP RES 9R
U88
74AL3138
SR17
SIP RES 9R
DS1
DIPSW
U104
74HC541
-CTR.SEL
LOCAL ADDR BUS
LOCAL DATA BUS

CPU Schematic
Sheet 16 of 16

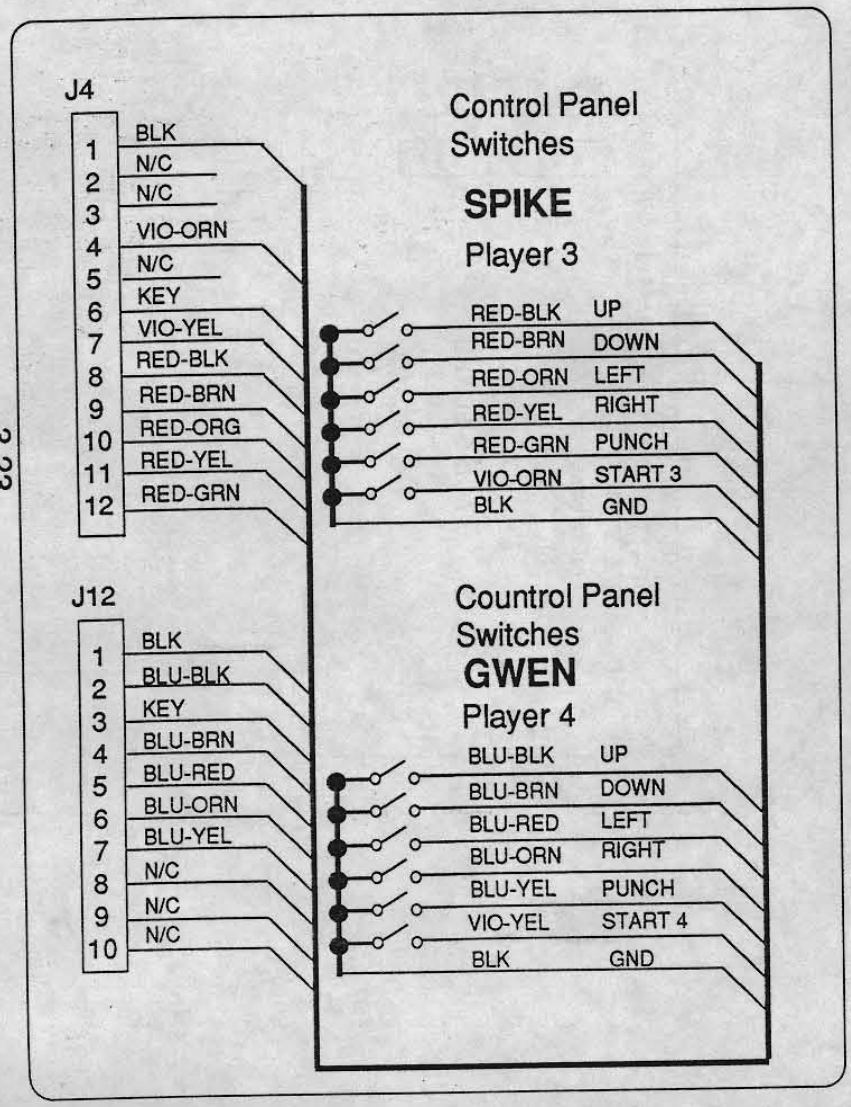


TROG Wiring Diagram



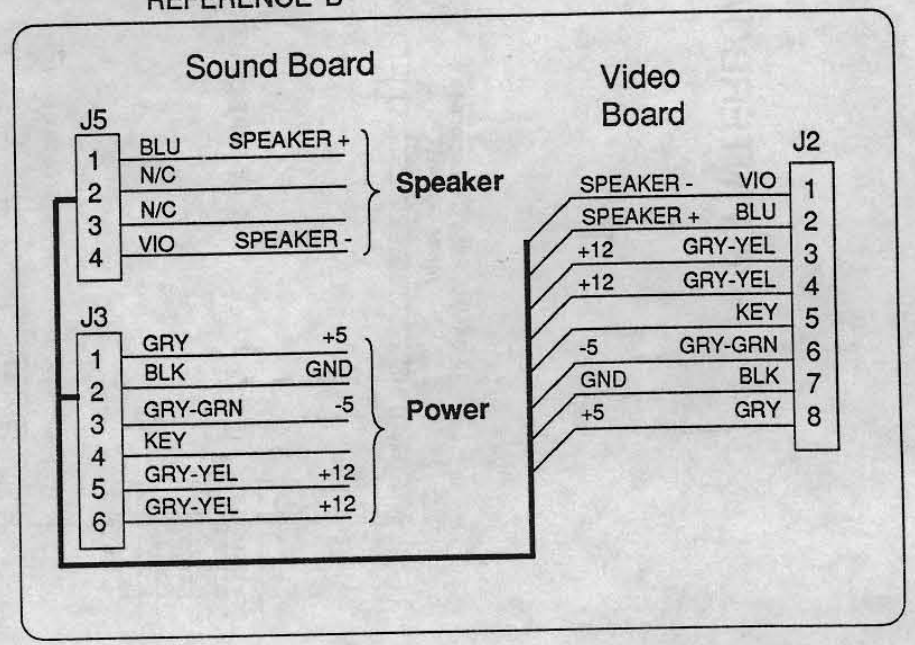
TROG Control Panel & Sound Wiring

REFERENCE 'A'

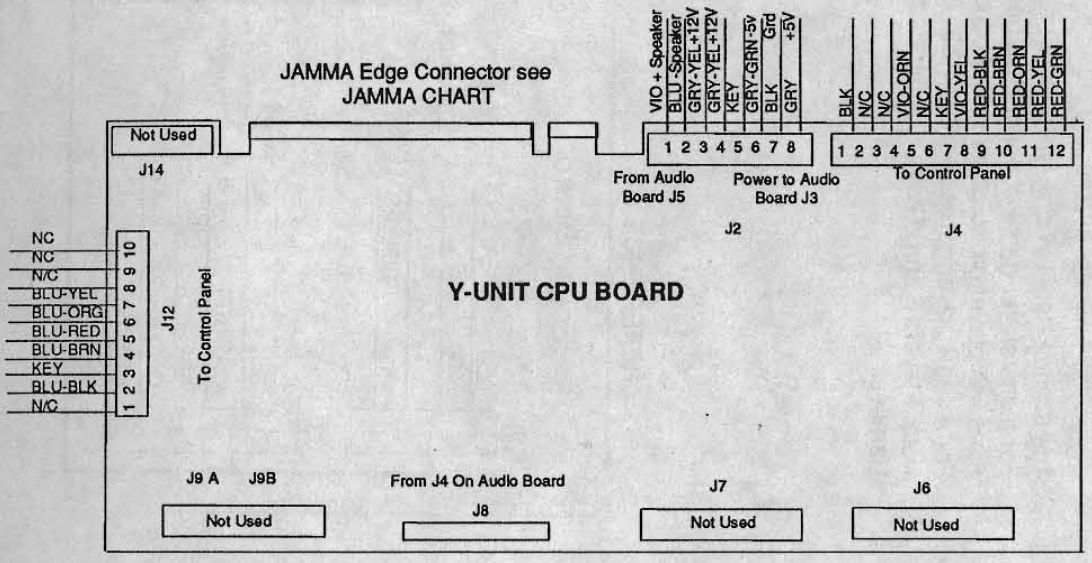


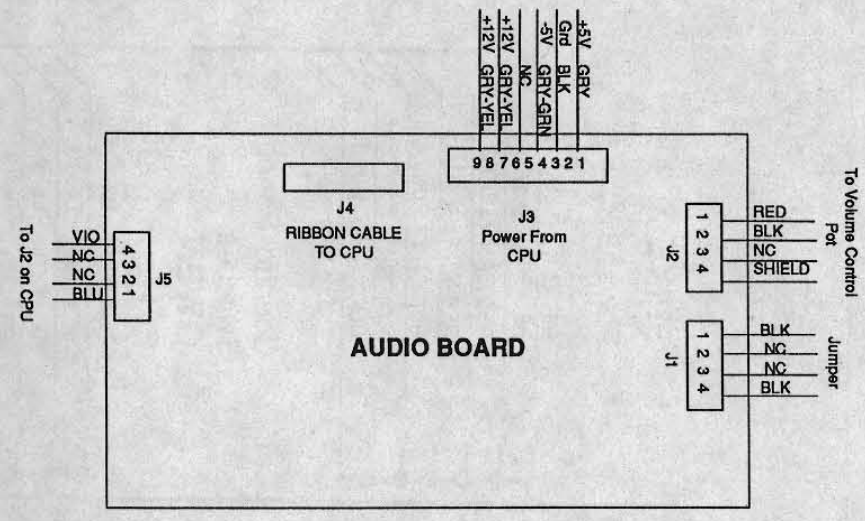
The Control Panel Wiring is shown for a four player game.
For a one player game connect REX and Player 1 Start only.
For a two player game connect REX and BLOOP only.
For a three player game connect REX, BLOOP, SPIKE and Player 3 Start only.
Note: Players 3 and 4 have a separate cable and are not part of the JAMMA Harness.

REFERENCE 'B'



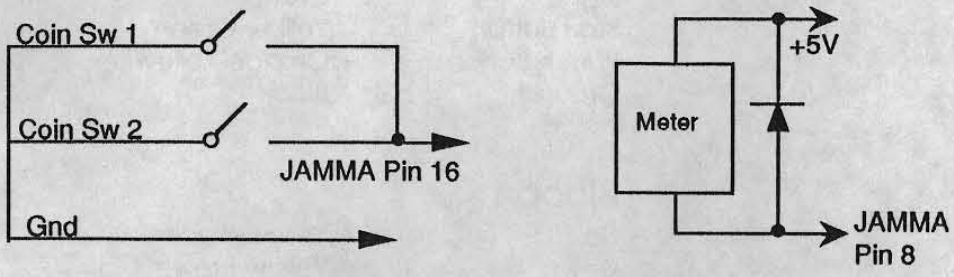
TROG INTERBOARD WIRING



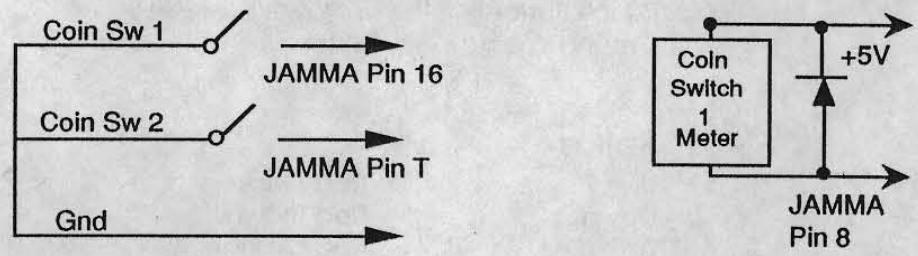


Coin Switch and Meter Wiring

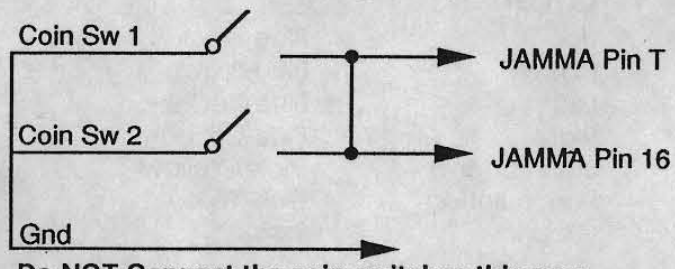
Option 1



Option 2



Wrong Way !



Do NOT Connect the coin switches this way.
This Circuit is INCORRECT and will cause twice as many credits per coin.

Control Panel Wire Colors

Rex

Up	Orange-Black
Down	Orange-Brown
Left	Orange-Red
Right	Orange
Start Button	Yellow-Green
Punch Button	Orange-Yellow
Ground	Black

Bloop

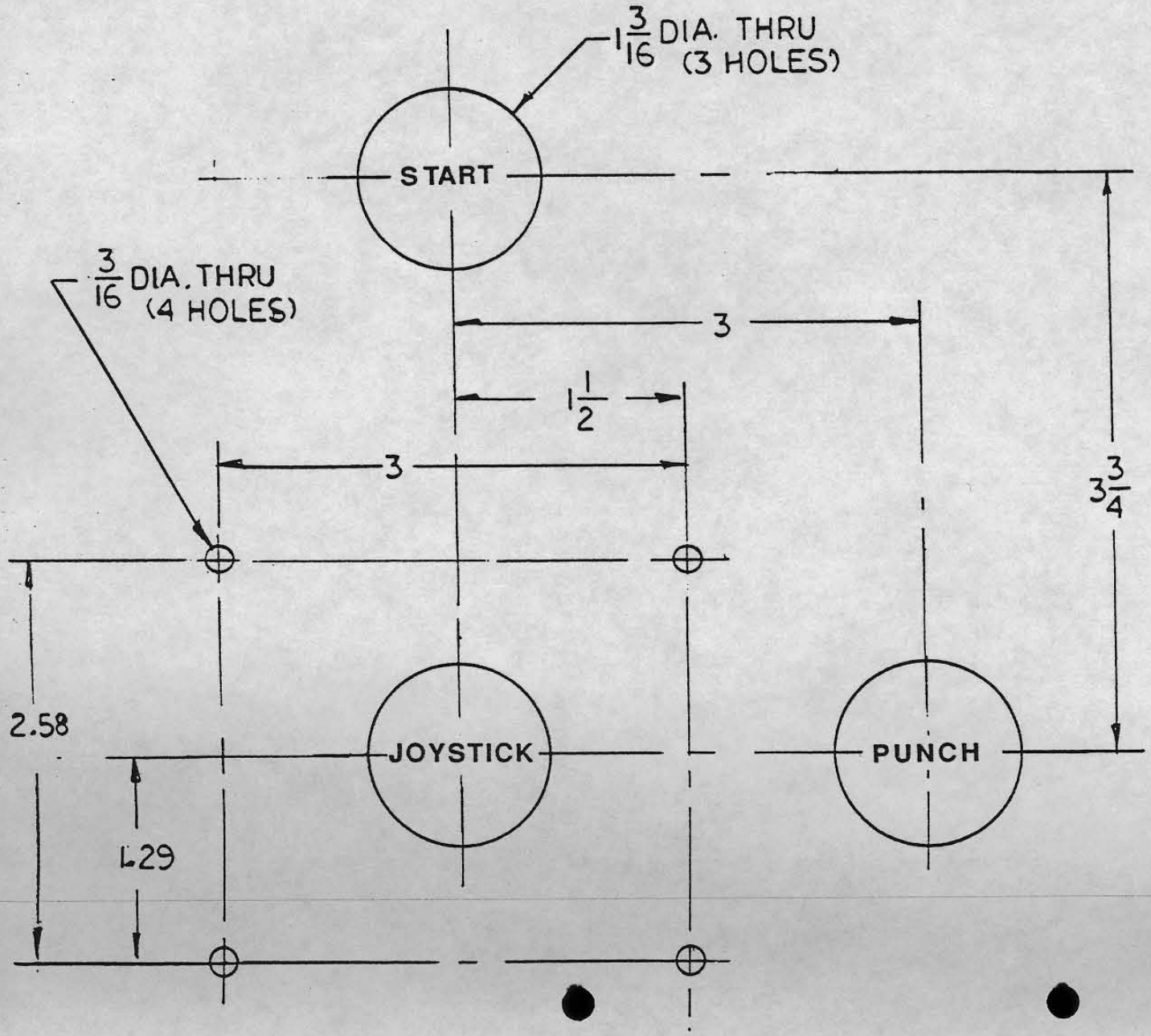
Up	Yellow-Black
Down	Yellow-Brown
Left	Yellow-Red
Right	Yellow-Orange
Start Button	Yellow-Blue
Punch Button	Yellow-Violet
Ground	Black

Spike

Up	Red-Black
Down	Red-Brown
Left	Red-Orange
Right	Red-Yellow
Start Button	Violet-Orange
Punch Button	Red-Green
Ground	Black

Gwen

Up	Blue-Black
Down	Blue-Brown
Left	Blue-Red
Right	Blue-Orange
Start Button	Violet-Yellow
Punch Button	Blue-Yellow
Ground	Black



16-9171
TEMPLATE - CONTROLS
USE ON 40203 KIT.

DIP Switch 1 Settings Table

	SW 1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Upright Cocktail	Off * On							
CMOS Coins DIP Switch Coins		On Off *						
Coin Settings USA 1 Ger 1 Fr 1 USA 2 Ger 2 Fr 2 USA 3 Ger 3 Fr 3 USA 4 Ger 4 Fr 4 USA 5 - Fr 9 USA 6 - Fr 10 USA 7 - Fr 11 Free Play			Off * On Off On Off On Off On	Off * Off On On Off Off On On	Off * Off Off Off On On On On			
Not Used						Off *	Off *	Off *

DIP Switch 2 Settir

	SW1	SW2	SW3	SW·
USA German French Not Used	Off * On Off On	Off * Off On On		
Not Used			Off *	
One Counter Two Counters				Off Or
4 Players 3 Players 2 Players 1 Player				
Video Freeze (activates when change detected)				
Test Switch Game Mode Test Mode				

* Indicates Factory Setting

TROG Standard Pricing Table

NAME	SETTING Credit/Coin	LEFT CHUTE	CENTER CHUTE	RIGHT CHUTE
USA 1	1 /25¢	25¢		25¢
USA 2	1/50¢	25¢		25¢
USA 3	1/50¢, 3/$1	25¢		25¢
USA 4	1/50¢, 4/$1	25¢		25¢
USA 5	1/25¢, 4/$1	25¢	$1.00	25¢
USA 6	1/50¢, 2/$1	25¢	$1.00	25¢
USA 7	1/50¢, 3/$1	25¢	$1.00	25¢
USA 8	1/50¢, 4/$1	25¢	$1.00	25¢
German 1	1/1 DM, 6/5 DM	1 DM		5 DM
German 2	1/1 DM, 7/5 DM	1 DM		5 DM
German 3	1/1 DM, 8/5 DM	1 DM		5 DM
German 4	1/1 DM, 5/5 DM	1 DM		5 DM
France 1	2/ 5F, 5/ 10 F	5 F		10 F
France 2	2/5 F, 4/10 F	5 F		10 F
France 3	1/5 F, 3/10 F	5 F		10 F
France 4	1/5 F, 2/10 F	5 F		10 F
France 5	2/5 F, 5/10 F, 11/2 X 10 F	5 F		10 F
France 6	2/5 F, 4/10 F, 9/2 X 10 F	5 F		10 F
France 7	1/5 F, 3/10 F, 7/2 X 10 F	5 F		10 F
France 8	1/5 F, 2/10 F, 5/2 X 10 F	5 F		10 F
France 9	1/3 X 1 F, 2/5 F	1 F		5 F
France 10	1/2 X 1 F. 3/5 F	1 F		5 F
France 11	1/2 X 1 F, 2/5 F, 5/2 X 5 F	1 F		5 F
France 12	1/2 X 1 F, 3/5 F, 7/2 X 5F	1 F		5 F

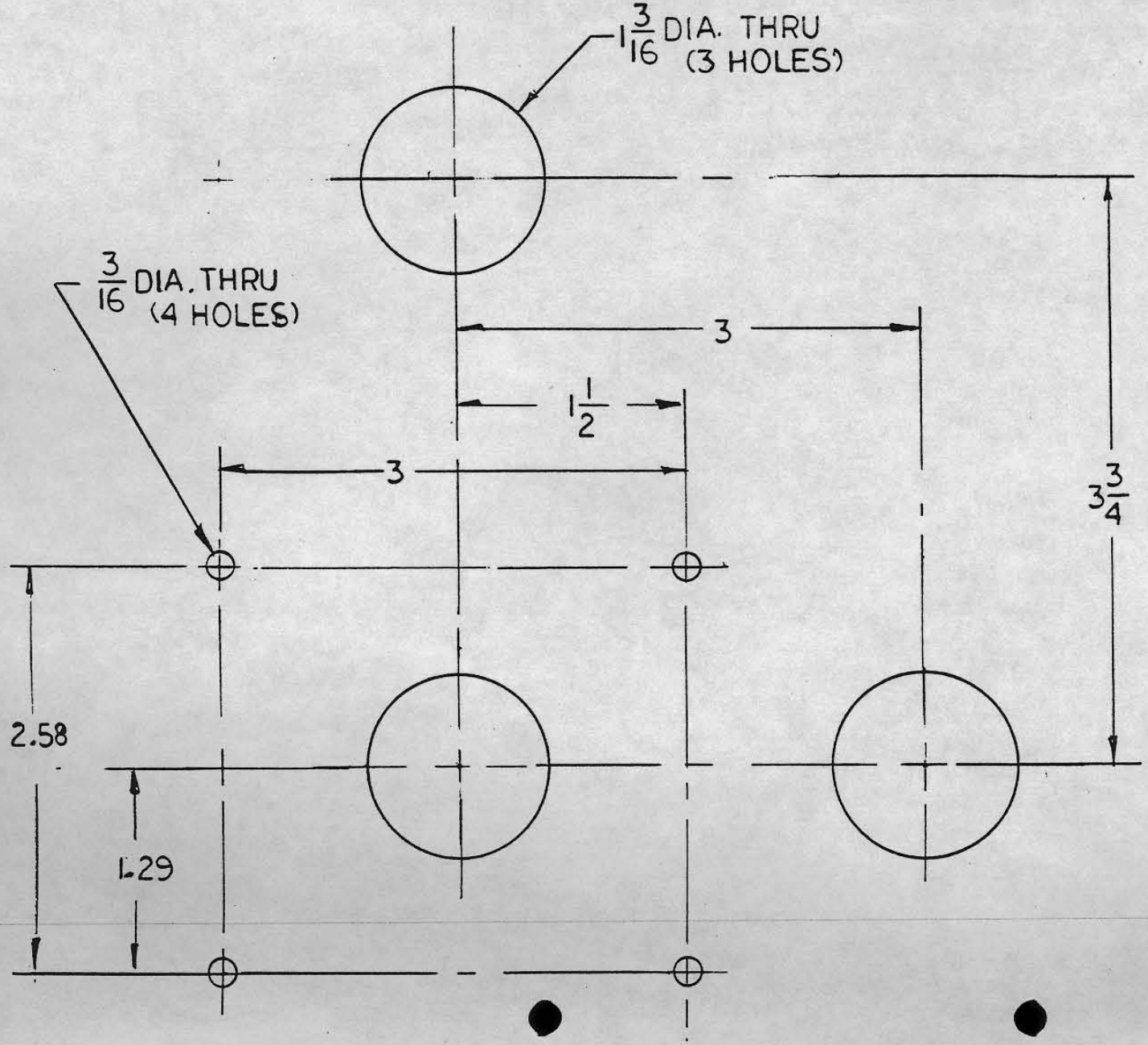
s Table

SW5	SW6	SW7	SW8
Off * / On	Off * / Off		
Off / On	On / On		
		Off * / On	
			Off * / On

TROG
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	
	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
BONE BUTTON	ORG-YEL	22	Z	YEL-VIO	2 BONE BUTTON
NC	ORG-GRN	23	a	YEL-GRY	NC
NC	ORG-BLU	24	b	VIO-BLK	NC
NC	ORG-VIO	25	c	VIO-BRN	NC
NC	ORG-GRY	26	d	VIO-RED	NC
GROUND	NC	27	e	NC	GROUND
GROUND	BLK	28	f	BLK	GROUND

16-9115



16-9171
TEMPLATE - CONTROLS
USE ON 40203 KIT.

TROG
is available to kit 1-4 player Games!

SETTINGS

The number of players is selectable by setting switches #5 and #6 on DIP Switch #2.

Switch #5	Switch #6	
OFF	OFF	4 Players
ON	OFF	3 players
OFF	ON	2 Players
ON	ON	1 Player

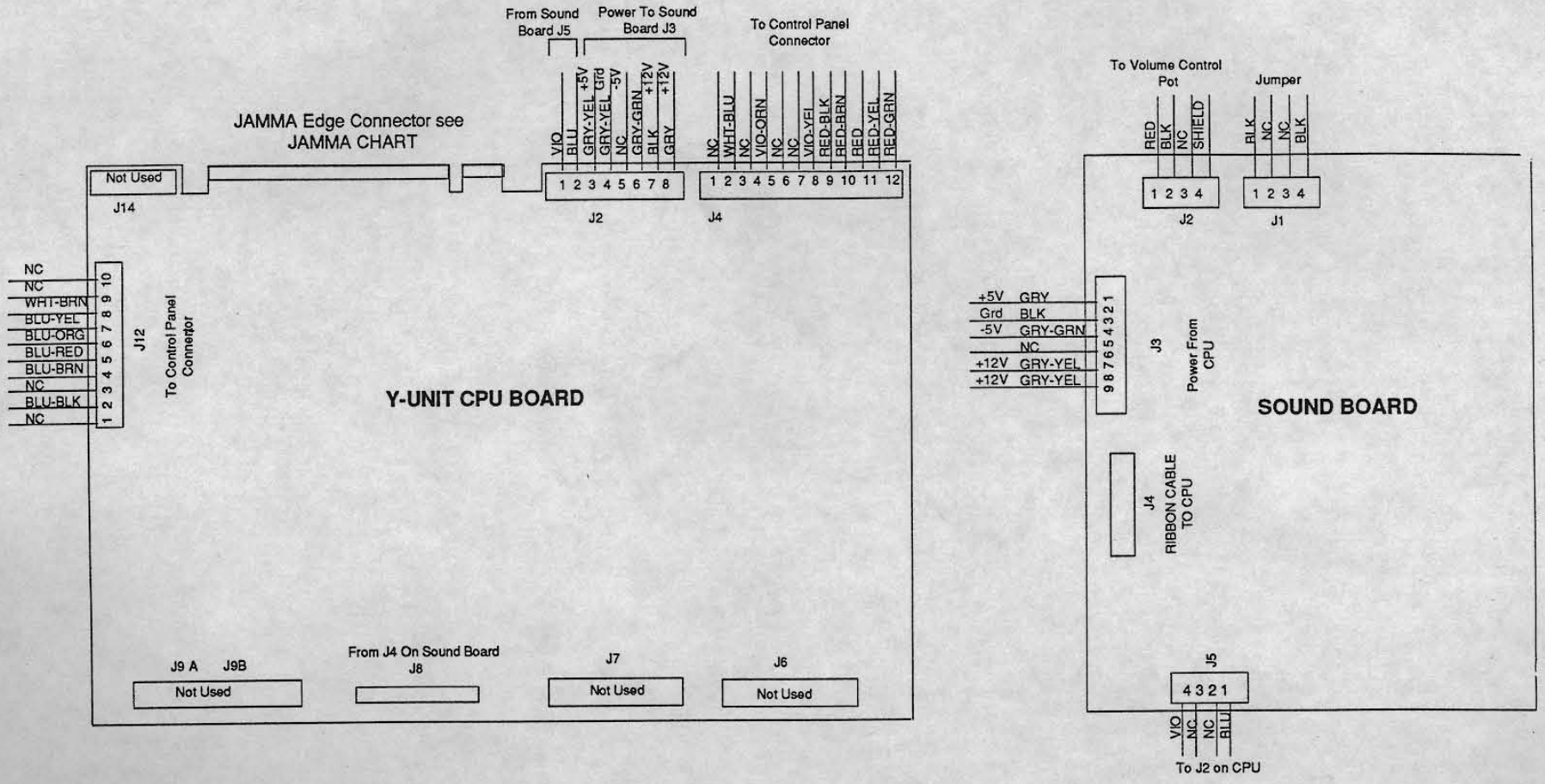
NOTE: Always use the DIP Switch Test provided in the software diagnostics to verify your settings.

CONNECTION

Players 1 & 2 connect through the JAMMA Harness. Players 3 & 4 connect through a separate cable. Connect the player 3 & 4 joystick harness from the CPU board to the joysticks. The 3rd player connector has red wires and is connected from the J4 on the CPU board to the player 3 joystick. The 4th player connector has blue wires and is connected from J12 on the CPU board to the player 4 joystick.

16-9114

TROG INTERBOARD WIRING



TROG CABINET WIRING

