MIDWAY

May 1994
16-40019-101

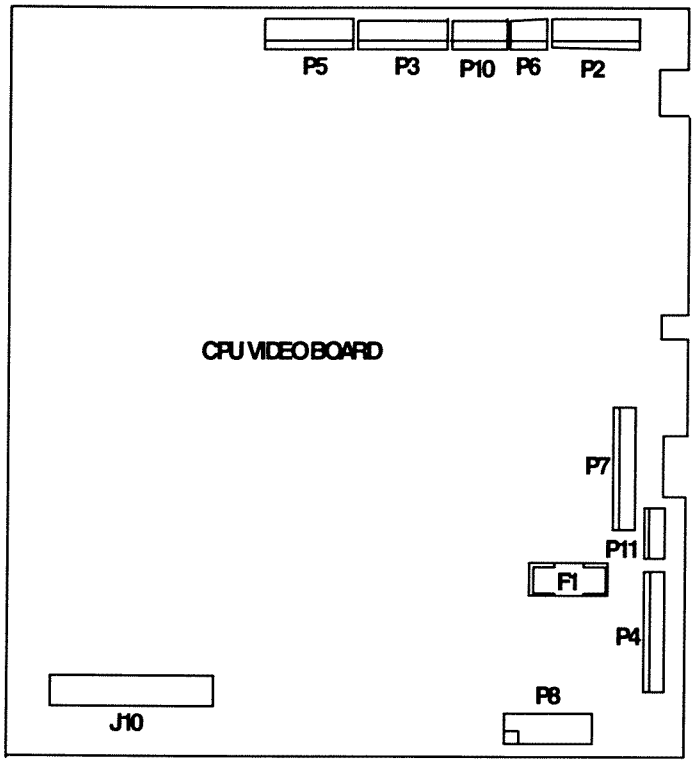
REVOLUTION -X-

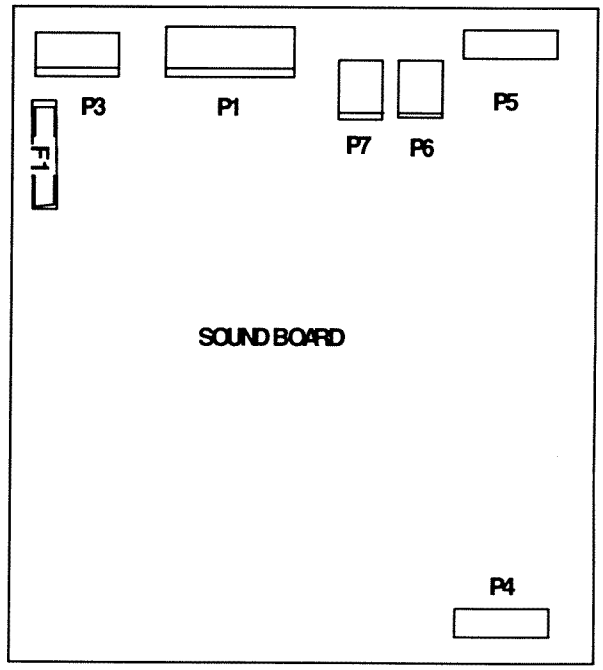
MUSIC IS THE WEAPON.

2-PLAYER
OPERATIONS MANUAL

operation & adjustments
testing & problem diagnostic
parts information
wiring diagrams & schematics

FUSE LIST





CPU Video Board
F1 - 1/4A F.B. 5 x 20mm

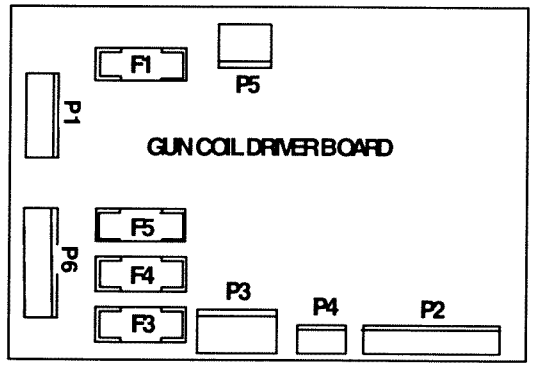
Sound Board
F1 - 2A S.B. 5 x 20mm

Gun Coil Driver Board
F1 - 5A S.B.
F3, F4, F5- 1.5A S.B.

Line Fuse*
(Country Specific)

G.I. Fuse*
1A S.B.

*Not shown



REVOLUTION X

2 PLAYER

MIDWAY Manufacturing Company reserves the rights to make modifications and improvements to its products. The specifications and parts identified in this manual are subject to change without notice.

REVOLUTION X

Monday, November 11, 1996: The New Order Nation - a corrupt alliance of government and big business led by "Headmistress Helga" - has abducted rock superstars Aerosmith from a Los Angeles concert hall and launched an offensive to control the world's youth. Legions of NON party troops now control the world's cultural and technological centers.

You, one of the world's last free youth, are armed with an AUTOLOAD MULTI-CD LAUNCHER/SONIC ASSAULT WEAPON. You must battle all New Order Forces to get backstage at LA'S "Club X" to receive a secret message left for you by AEROSMITH!

Continuing on, you illegally requisition a New Order Chopper and take it on a devastating joy ride above the streets of LA. You must ultimately locate AEROSMITH'S "X" car where you will receive another message from AEROSMITH, letting you choose your next destination from the Pacific Rim, the Amazon and the Middle East.

When you have successfully Completed all four levels of the game, you arrive on stage at Wembley Arena in England for the final surprising confrontation with Headmistress Helga. You must defeat Headmistress Helga to overthrow the New Order Nation and make you contribution to the Revolution!

- Remember, Music Is The Weapon!

game rules...

You need two credits to start a game, and two credits to continue.

Use trigger and yellow Bomb button on gun in combination to discover secret weapons.

Look for hidden passages and entry ways into unknown areas.

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SAFETY NOTICES

The following safety instructions 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 before preparing your game for play.

⚠ CAUTION

WEIGHT. This game cabinet weights apx. 425Lbs crated.

MIRROR. This game cabinet contains a front-silvered mirror and a horizontal monitor.

AC POWER CONNECTION. Before connecting the game to the AC power source, verify 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. MIDWAY games should only be plugged into a grounded 3-wire outlet. Shocks may 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.

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.

MONITOR PRECAUTIONS. 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 monitor with you hands or metal objects! Always discharge the CRT by the following method: Attach one end of a large, well-insulated, 20kV 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.

TRANSFORMER. This video game uses a monitor that requires an isolation transformer. This transformer also provides power for the gun coils and the audio amp.

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.

ATTENTION !

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 game and void the warranty. All connectors are keyed to fit specific pins on each board.*

REVOLUTION X

SECTION
one

Operation

SETUP PROCEDURE

INSTALLATION & INSPECTION

Game Location Requirements	*Power*	*Temp*	*Humidity*
	Domestic 115V @ 60 Hz Foreign 230V @ 50 Hz	32° F to 100° (0° C to 38° C)	Not to exceed 95% relative.

1. Remove all items from the shipping containers and set them aside. Inspect the exterior of the cabinet and the control panel for any damage. Remove the packing material from around the guns.

2. The coin door keys are attached to one of the guns. Unlock and open the coin and cash box doors. Remove the spare parts stored in the cash box and remove the rear door keys located on a key hook inside the coin door.

3. Remove the screws holding the rear door then unlock and remove the door. *Be careful. The marquee and the marquee glass are shipped in a cardboard carton attached to the rear door.* Inspect the cabinet interior for any signs of damage. Check all major assemblies to assure that they are mounted securely.

4. Refer to the Cabinet Wiring Diagram (Section 3), and check to see that all cable connectors are correctly secured. *Do not force connectors.* Watch for damaged connectors and avoid making reversed connections.

5. If a padlock is desired, turn the rear door hasp so that it protrudes from the hole in the back of the cabinet. Remove the two nuts inside the cabinet, at the top and middle of the rear door opening. Then slide the hasp off of the bolts. Turn the hasp, slide it back on the bolts and replace the nuts.

6. Slowly, flip the header forward. *Be careful. Do not let the header slam down onto the cabinet.* Fasten the header into place with two 1/4-20x1-1/2 hex-head bolts (shipped in the cash box). Remove the marquee carton from the rear door. Unscrew and remove the black marquee retaining strip at the top of the header. Fit the marquee into the grooves, then slide the glass in in front of the marquee. Replace the marquee retaining strip.

7. Next, locate the four leg levelers among the spare parts in the cash box. There are four threaded holes on the bottom of the cabinet; one in each corner. Place one leg leveler (with its hex nut) in each of the threaded holes. Lower each leg leveler until the cabinet is stable and level.

!! WARNING !!

The cabinet is top heavy. Do not tilt the cabinet.

8. Determine the value of your line voltage with a meter. Then, check the power input wires to the main power supply transformer. Be sure they are connected to the 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.

9. Lay the line cord (connected to the power chassis) in the slot along the bottom edge of the rear cabinet door. Replace the rear cabinet door. Close and lock the front coin and cash box doors. Plug the game into a grounded (3-terminal) AC wall outlet. Switch on the game, using the On/Off switch located on the upper left rear of the cabinet.

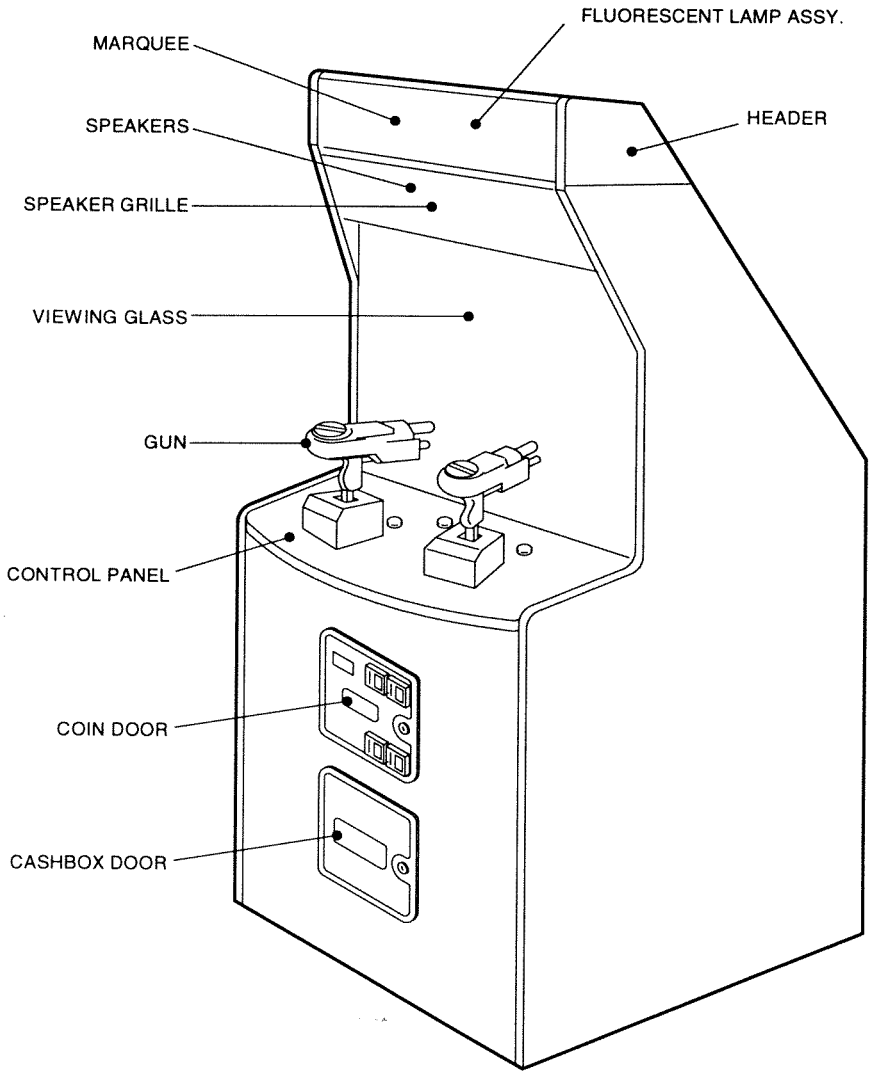
10. If the following message appears on the screen when the game is turned on, the guns must be calibrated.

****CMOS RAM Error****
Unable to read gun calibration values.

NOTE

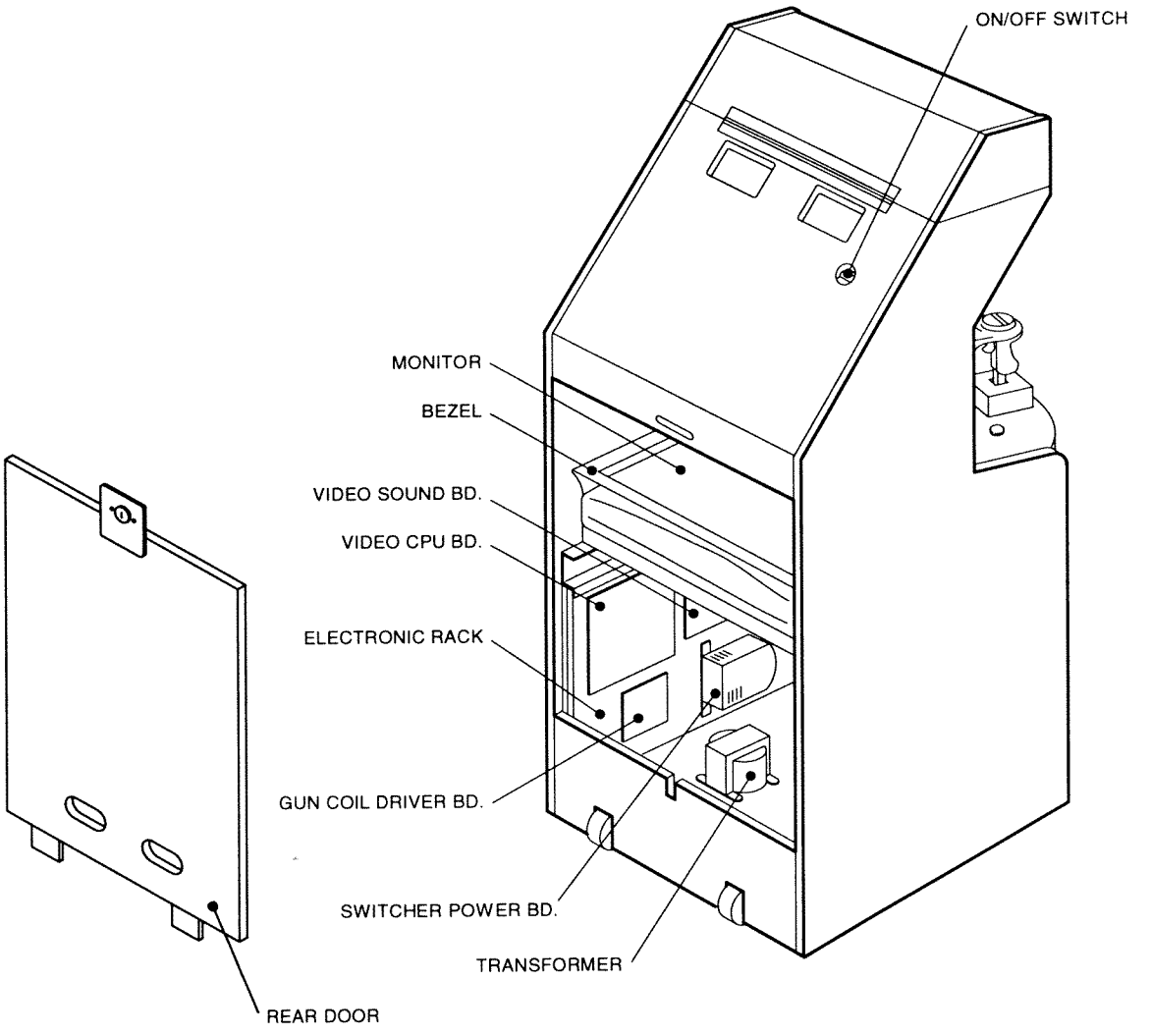
Check the gun calibration when you receive the game. Guns might of been jarred during shipping and be in need of calibration. The guns are calibrated from the factory. However, if you change PC boards or replace ROMs, RAMs, or the battery, they must be re-calibrated. Guns do not operate unless they are calibrated. ***DO NOT ATTEMPT TO CALIBRATE BY OPENING THE GUNS AND ADJUSTING THE POTENTIOMETERS MANUALLY. GUN CALIBRATION INSTRUCTIONS ARE ON PAGE 1-26 OF THIS MANUAL.***

CABINET ASSEMBLY



Front View

CABINET ASSEMBLY



Rear View

SERVICING

Servicing the Control Panel

Switch off power to the game and open the coin door. The control panel is held in place by four latches (located inside the cabinet) which provide constant pressure on the strikes. To release the latches, reach through the coin door opening toward the right, left and front of the cabinet. Do not reach straight back through the coin door or you could damage the monitor control board. Lift the latch handle and unhook the wire fasteners.

There are three cables with Z-header connectors; one for each gun and one for all of the buttons. Unplug the connectors. Lift the control panel off of the cabinet and place it on a work surface.

To replace the control panel, position it so that it fits in the cabinet opening. Be sure that the cables do not get caught between the cabinet and the underside of the control panel. Carefully, lower it into position. Do not let the guns hit the viewing glass. Reach through the coin door and reconnect the three cables and the four latches.

Removal of the Viewing Glass

Switch off power to the game, open the coin door and unlatch the control panel. Carefully, lift and slide the control panel away from the viewing glass. Do not slide the control panel so far as that it could lean back and fall off of the cabinet. Reach the center bottom of the viewing glass and carefully, lift the glass out of its bottom groove and slide it clear of the cabinet. Lower the control panel to its original position.

Removal of the Monitor Bezel

Switch off power to the game. Remove the rear door. Remove the two hex-head screws holding the bezel to the monitor bracket. Lift the bezel off of the monitor and slide it out the rear of the cabinet.

Monitor Replacement

We recommend that you read the SAFETY NOTICES section thoroughly before beginning this procedure. Switch off power to the game. Remove the rear door and the monitor bezel. Completely disconnect the monitor from all of its cables, including its chassis ground strap. Remove the four bolts securing the monitor's mounting flanges. CAREFULLY, pull the monitor from the back of the cabinet.

CAUTION

This video game uses a monitor that requires an isolation transformer. The monitor does not contain an isolation transformer. It is mounted instead to 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 LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.

THE 25" MONITOR IS HEAVY. BE SURE IT IS FIRMLY SUPPORTED IF IT MUST BE REMOVED FROM THE CABINET.

Removal of the Marquee

Switch off power to the game. Remove the hex-head screws from the black marquee retaining strip located on top of the header. Remove the strip and carefully lift the marquee and the marquee glass from the top of the header. Store the marquee carefully to prevent damage.

Removal of the Fluorescent Light Assembly

Switch off power to the game. Remove the marquee glass and the marquee. The fluorescent bulb is now accessible for replacement. Remove the plastic lamp locks. Grasp the bulb, give it a quarter turn, and remove it from its socket. Carefully, place a new bulb into the socket, and turn to reinstall.

To remove the entire light fixture, disconnect the fluorescent light assembly from its power cable. Remove the screws that hold the assembly to the cabinet then lift out the assembly.

!! WARNING !!

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

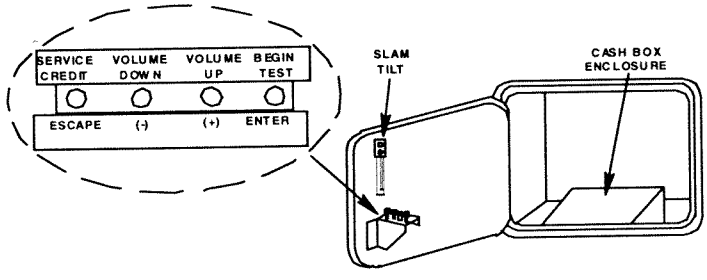
Removal of the Speakers

Switch off power to the game. Remove the marquee and the marquee glass. Unbolt the header from the cabinet and flip it back until it rests on the cabinet. The speakers come out from the top of the cabinet. Be sure to disconnect the cabling and remove the nuts on the mounting screws before attempting to remove the speakers from the enclosure. Carefully, reinstall the seals upon completing any task in the speaker enclosure.

Volume Control, Begin Test Switch, and Service Credit Switch

Open the coin door. The game's volume control and diagnostic push-button switches are located on a small bracket on the door. The volume is controlled by the two center buttons. Press the Volume Up or the Volume Down button until the desired sound level is reached. The Begin Test switch, on the right, activates the game's menu system. The Service Credit switch, on the left, allows credits to be allotted for service testing without affecting the game's bookkeeping total.

CONTROL SWITCHES LOCATION



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 **REVOLUTION X** revision level, CMOS test, coin settings and the serial number of the game. The software also performs a security test. If the security test fails, the game will not power up. After the Start-up tests have been successfully completed, the game begins the Attract Mode.

Insert the desired amount of coins, bills or tokens. Select which player receives the credit by pressing the appropriate Start button.

NOTE

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

PLAYER CONTROLS

Start Button

Each player has two Start buttons located to the left and right of the guns. The Start buttons allow one or two players to begin or continue play.

Guns

Each player has a gun. The guns allow the player to aim for and shoot at moving targets.

Bomb Buttons

Each player has a bomb button located on the front left side of their gun. This button allows the player to fire bombs at targets.

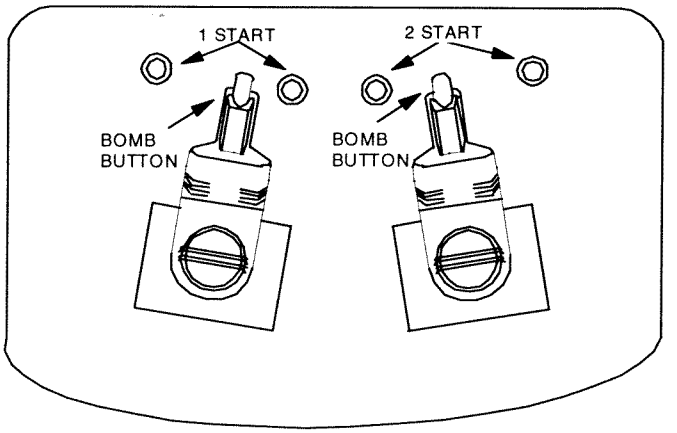
LEDs

Each player has two red LEDs located on each side of their gun. The LEDs are illuminated during game play.

NOTE

Discover secret weapons by using trigger and Bomb button combinations.
Discover hidden passages and entry ways into unknown areas.

CONTROL PANEL



GAME OPERATION

The **REVOLUTION X** Control switches are located inside the coin door.

CONTROL SWITCHES

Control switches are located on a bracket inside the coin door. Each control switch (except Slam Tilt) performs two functions: one during normal operation and one during the menu system operation.

NORMAL OPERATION

The **Slam Tilt** switch detects any forceful vibrations against the coin door. This eliminates pounding for free games.

The **Volume Down** and **Volume Up** push-button switches increase or decrease the volume level of the music and speech. The volume level can be adjusted during the Attract Mode or during menu system operation. For greater profits, set your game's volume level at a nice loud setting.

The **Begin Test** push-button switch enters the game's menu system. Press the Begin Test switch to access any of the menu system functions.

The **Service Credit** push-button switch is a special feature switch that allots credit without affecting the game's bookkeeping total.

NOTE

The coin door must be open for the control switches to work.

MENU SYSTEM OPERATION

The **(-)** and **(+)** push-button switches move the cursor up and down the screen, raise and lower the volume level, and increase and decrease adjustment setting values.

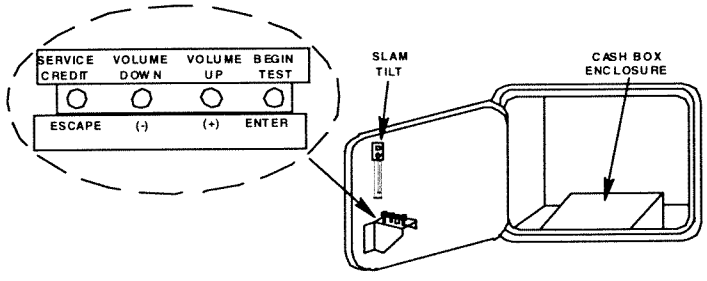
The **Enter** push-button switch moves into the next menu. This switch also locks in an adjustment setting value.

The **Escape** push-button switch backs out of a menu and returns to the previous menu.

NOTE

Control panel switches can substitute for the control switches in the coin door.
Player 1 Start button = (-); Player 2 Start button = (+); Bomb button = Escape; Trigger = Enter.

CONTROL SWITCHES LOCATION



MENU SYSTEM OPERATION

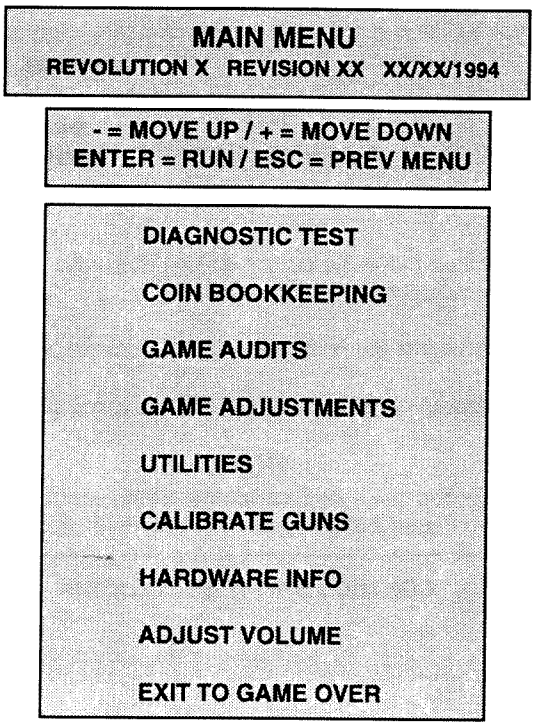
OPERATION

All game audits, adjustments and diagnostics are options of the Main Menu. Each option, in turn, has its own menu that lists several choices which you may act upon as desired.

Press the Begin Test switch on the coin door or close switch #8 of DIP switch bank #2, to open the Main Menu (shown below). Game adjustments, bookkeeping and diagnostics are all accessible from this menu.

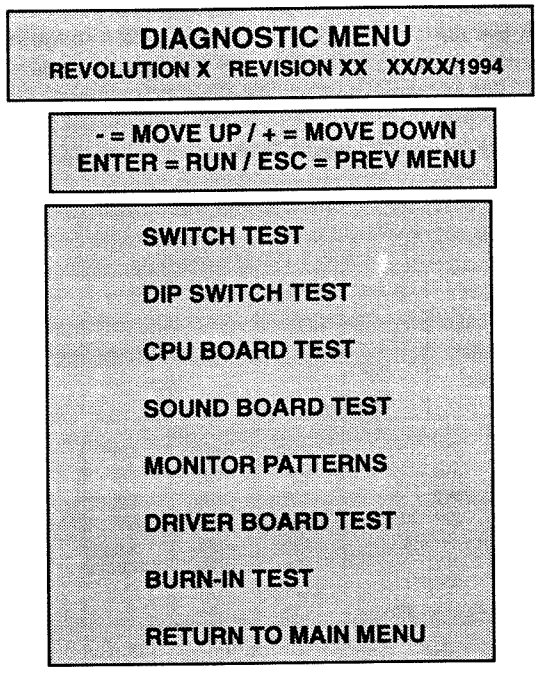
Press the (-) button, to move the cursor up the menu screen. Press the (+) button to move the cursor down the screen. Notice that the options are highlighted in sequence. Press the Enter button to open a highlighted option. *Only highlighted options can be opened.*

To exit the Main Menu, press the (-) or (+) button to select EXIT TO GAME OVER, then press the Escape button. **It is necessary to turn off switch #8 of DIP switch bank #2, if this switch was used to enter the menu system.**



DIAGNOSTIC TESTS

To enter the diagnostic tests from the Main Menu, use the (-) or (+) button to highlight Diagnostic Menu, then press the Enter button to open the menu. The Diagnostic Menu is shown below.



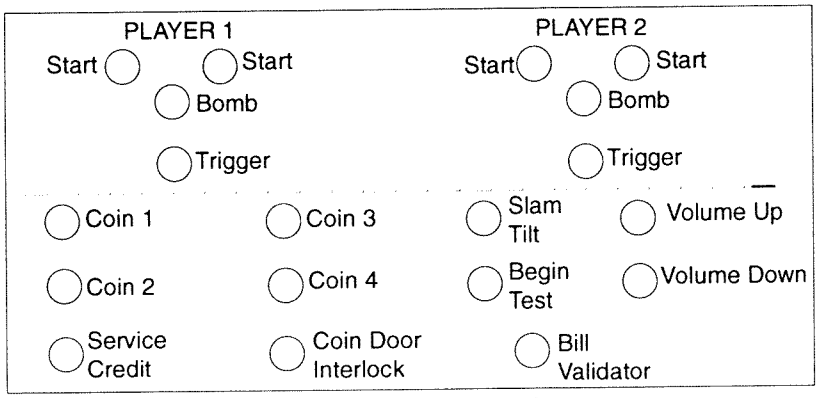
Switch Test

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

Press the (-) or (+) button to highlight the Switch Test, then press the Enter button to begin the test.

During the Switch Test the top of the screen shows the control panel switches while the bottom of the screen shows the coin door switches. Press a control panel or coin door switch and the switch location on the screen lights. Release the switch and the screen returns to normal.

To exit the Switch Test press the Enter and Escape buttons together, or press the player one Start button and trigger together.



SWITCH TEST SCREEN

DIP Switch Test

The DIP Switch Test allows the operator to check or change the position of the DIP Switches on the CPU Board.

Use the (-) or (+) button to select the DIP Switch Test. Press the Enter button to access the DIP Switch Setting Tables. The screen displays the current DIP Switch settings. To change a setting, slide the switch to the desired position, then check the screen to verify the new setting. *In some cases, setting a function to OFF actually enables the function. For example, setting DIP Switch Coinage to Off enables DIP Switch Coinage.*

Press the Escape button to return to the Diagnostic Menu.

DIP Switch 1 (U105) Setting Table

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Mirror Display	Off*							
	On							
DIP Switch Coinage		Off*						
CMOS Coinage		On						
Coinage								
USA1 Ger1 Fr1			Off*	Off*	Off*			
USA2 Ger2 Fr2			On	Off	Off			
USA3 Ger3 Fr3			Off	On	Off			
USA4 Ger4 Fr4			On	On	Off			
USAECA GerECA FrECA			Off	Off	On			
N/N 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			
Credits								
2 to Start - 2 to Continue						Off*	Off*	Off*
1 to Start - 1 to Continue						On	Off	Off
1 to Start - 1 to Continue						Off	On	Off
1 to Start - 2 to Continue						On	On	Off
2 to Start - 1 to Continue						Off	Off	On
2 to Start - 3 to Continue						On	Off	On
3 to Start - 1 to Continue						Off	On	On
1 to Start - 4 to Continue						On	On	On

DIP Switch 2 (U108) Setting Table

	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Country								
USA	Off*	Off*						
German	On	Off						
French	Off	On						
Not Used	On	On						
Dollar Bill Validator Not Installed			Off*					
Dollar Bill Validator Installed			On					
One Counter				Off*				
Two Counters				On				
Players								
3 Players					Off*			
2 Players					On			
Rev. X Cabinet						Off*		
T2 Retrofit Cabinet						On		
Video Freeze							Off*	
							On	
Test Switch								
Game Mode								Off*
Test Mode								On

* Indicates Factory Setting.

CPU Board Test

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

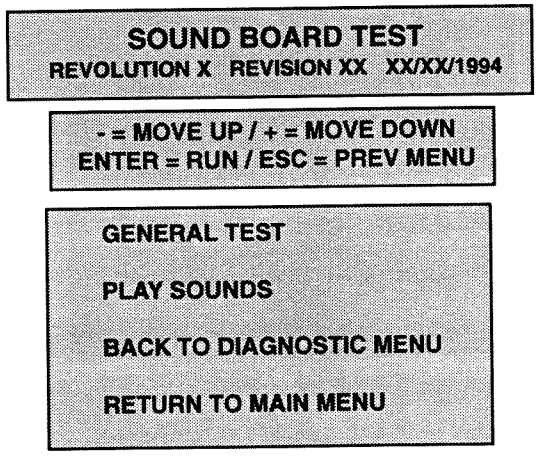
Select the CPU Board Test with the (-) or (+) button, then press the Enter button to start the automatic test of the CPU Board's RAMs and ROMs. When this test is activated, a "rug" pattern appears on the screen. The screen then changes to show the layout of the RAMs, and ROMs. During the test, ROMs or RAMs are good if they turn green: they are faulty if they turn red. The CPU Test pauses when a bad ROM or RAM is detected. Press the (-) or (+) button to continue the test.

This test returns to the Diagnostic Menu automatically.

Sound Board Test

This test allows the operator to listen to some of the sounds this game is capable of producing.

Use the (-) or (+) button to select the test, then press the Enter button to open the test menu. The screen displays two test options. Use the (-) or the (+) button to select an option and press the Enter button to access the option.



GENERAL TEST analyzes the sound circuitry. The screen shows a list of error codes. 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. Press the Escape button to return to the Sound Test Menu.

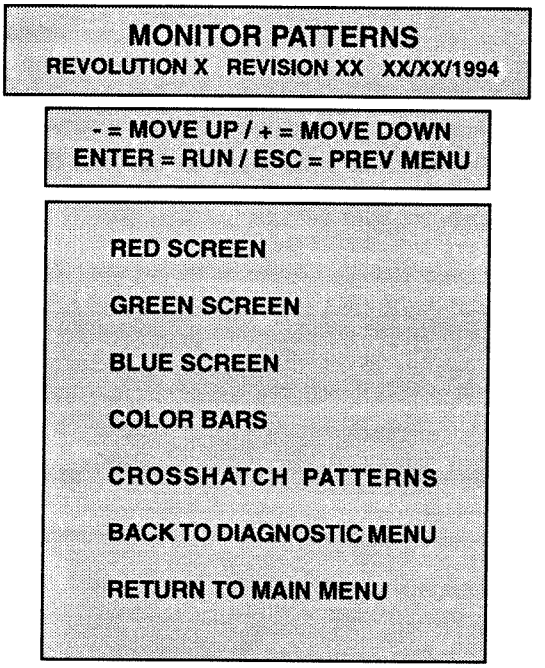
PLAY SOUNDS test synthesized and digitized sounds from the Sound Board. Advance to the next sound with the (-) or (+) button. Repeat a sound by pressing Enter button. Press the Escape button to end the test.

Select RETURN TO MAIN MENU or BACK TO DIAGNOSTIC MENU and press the Escape button.

Monitor Patterns

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

Select the test with the (-) or (+) button. Press the Enter button to open the test menu. Once the Monitor Patterns Test menu is open, use the (-) or (+) button to select an option, then press the Enter button access the option.



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

The **COLOR BAR**S test fills the screen with several shades of 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 be round.

If any of the Monitor Patterns Test shows a need for adjustment, use the proper knobs on the Monitor Controls Board. Press the Escape button to return to the Monitor Patterns Menu.

Use the (-) or (+) button to select RETURN TO MAIN MENU or BACK TO DIAGNOSTIC MENU. Press the Escape button to activate the selection.

Driver Board Test

This test provides the operator with a way to test the gun coils and the gun LEDs. Press the (-) or (+) button to select the Driver Board Test. Press the Enter button to begin the test.

The test cycles through and pulses the gun coils and the gun LEDs. As each device is activated the name is displayed on the screen.

Press the Escape button or the Bomb button to return to the Diagnostic Test.

Burn-in Test

The Burn-in Test continually repeats the CPU Board Test. Use this test to find intermittent CPU Board problems.

Press the (-) or (+) button to select the test, then press the Enter to begin the test. When the Burn-in Test detects an error the test stops and an error message is displayed on the screen.

The Audit Table specifies the number of Burn-in cycles that have been successfully completed.

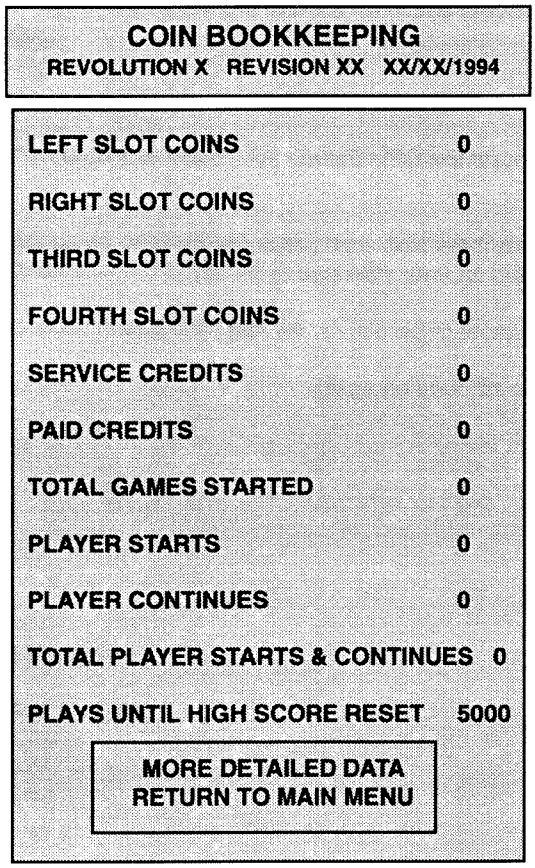
To exit this test, switch the game off, then on again.

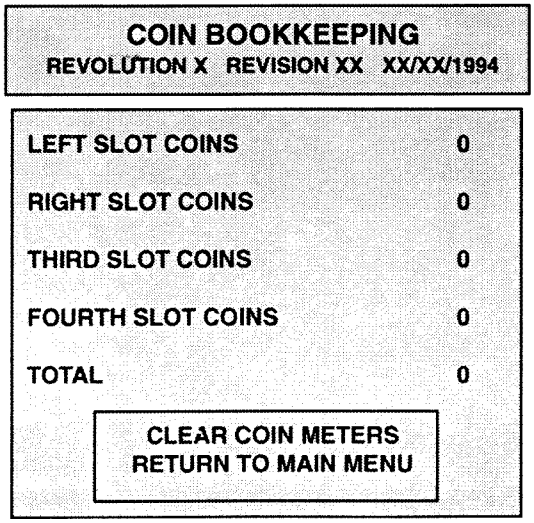
COIN BOOKKEEPING

Use the (-) or (+) button to select the Coin Bookkeeping Menu, then press the Enter button to open the menu.

The Coin Bookkeeping Table records the coin box totals and the game play counters.

To exit Coin Bookkeeping, use the (-) or (+) button to select RETURN TO MAIN MENU, then press the Escape button.



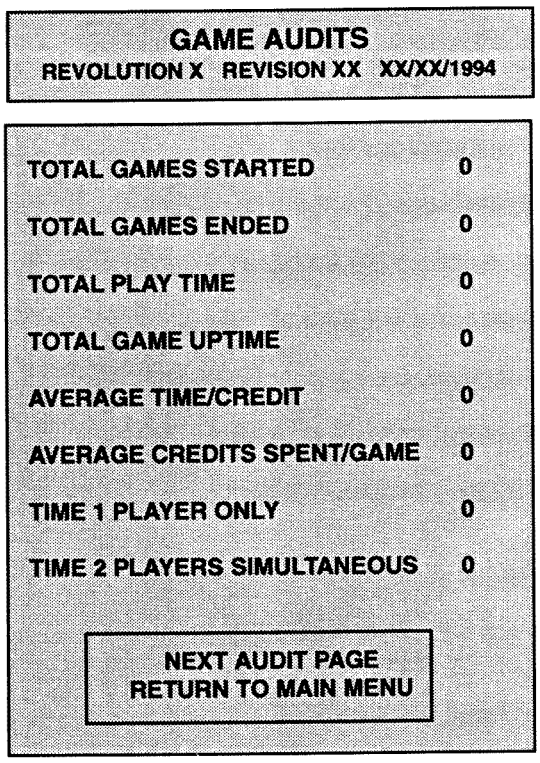


GAME AUDITS

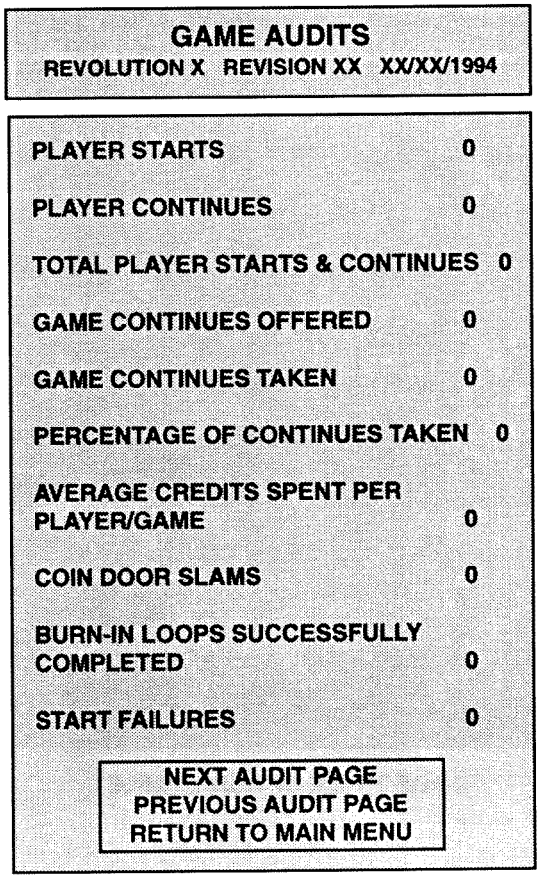
Use the (-) or (+) button to select the Game Audits Menu, then press the Enter button to open it. Page through the available audits by selecting NEXT AUDIT PAGE or PREVIOUS AUDIT PAGE. Select RETURN TO MAIN MENU and press the Escape button to exit Game Audits.

NOTE

Game audits cannot be set. They can only be cleared.

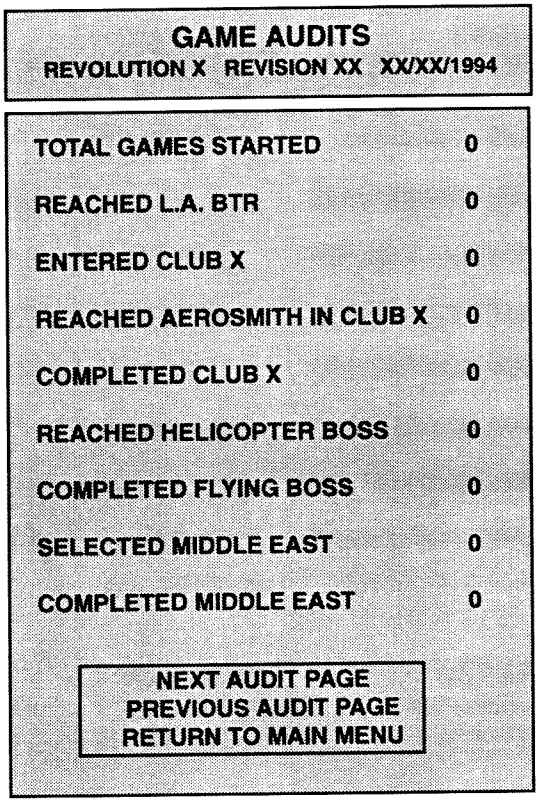


PAGE ONE OF AUDIT TABLE

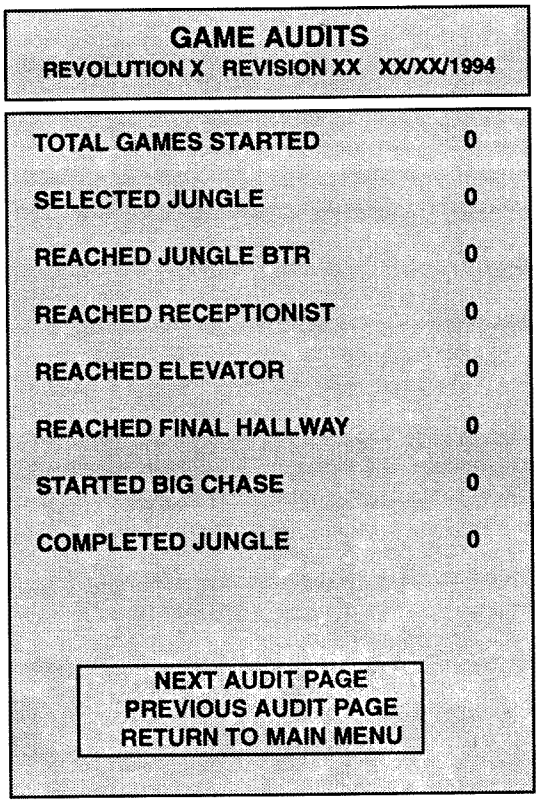


PAGE TWO OF AUDIT TABLE

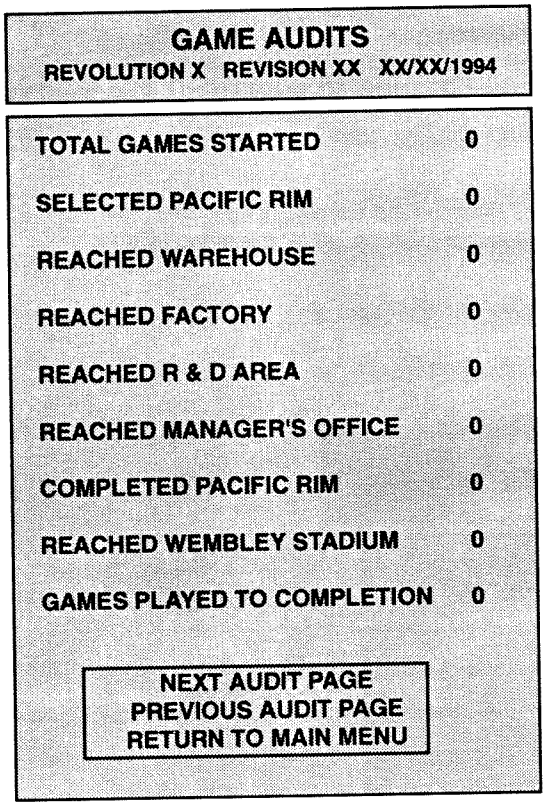
Game Audits continued...



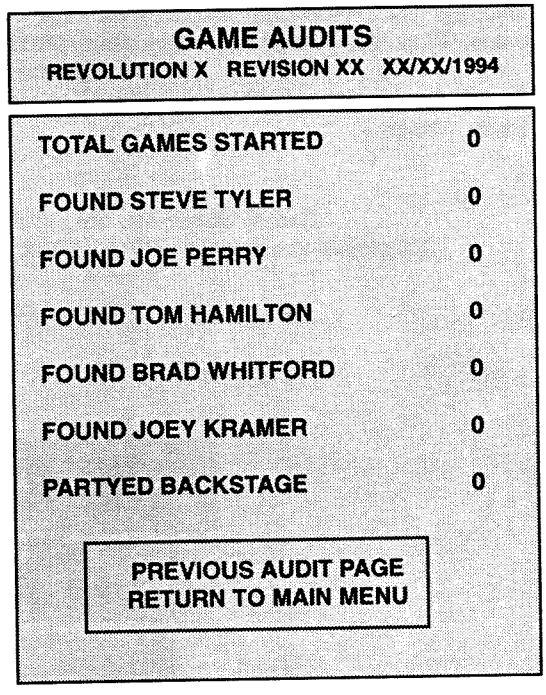
PAGE THREE OF AUDIT TABLE



PAGE FOUR OF AUDIT TABLE



PAGE FIVE OF AUDIT TABLE



PAGE SIX OF AUDIT TABLE

GAME ADJUSTMENTS

The Game Adjustments allow the operator to customize the game.

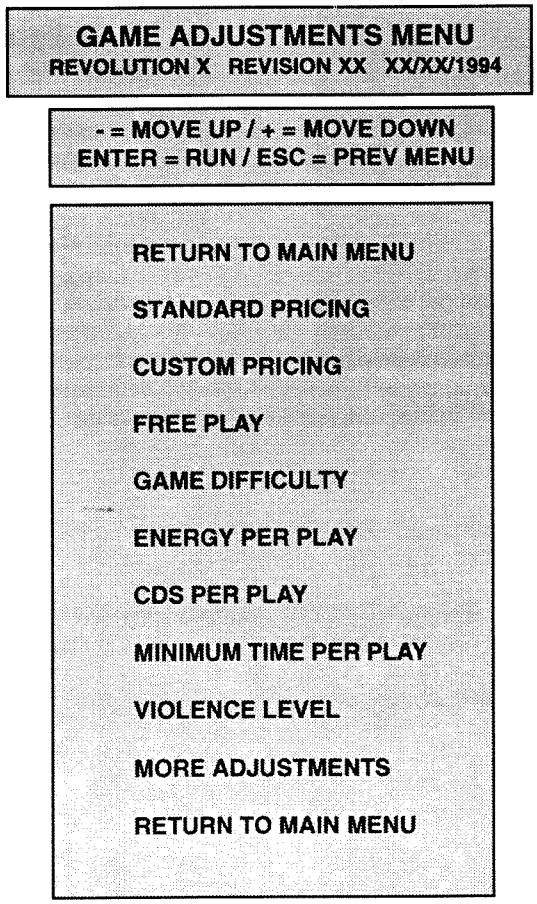
To select the Game Adjustments Menu press the (-) or (+) button, then press the Enter button to open the menu.

The Game Adjustments Menu offers several options. Each option has several choices. Press the (-) or (+) button to select an option, then press the Enter button to open the option. The next menu screen provides a setting choice. Press the (+) button to increase the setting value and press the (-) button to decrease the setting value. When the desired value is reached, press the Enter button to lock it in.

To exit the Adjustments Menu, use the (-) or (+) button to select RETURN TO MAIN MENU, then press the Escape button.

NOTE

Game adjustments are explained in more detail on the following page.
Adjustment values set by DIP SWITCH, override adjustment values set by the menu system.



Game Adjustments

Standard Pricing
Standard pricing allow the operator to choose any of the "standard" selections from the Standard Pricing Table. See page 1-23.

Modify the setting value with the (-) or (+) button. Press the Enter button to lock in the new value and return to the 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 of credits required to continue a game. This option is being adjusted from the DIP Switch settings. See page 1-24.

Modify the setting value with the (-) or (+) button. Press the Enter button to lock in a new value and return to the Adjustment Menu.

Free Play
This option selects free play. The setting choices for this adjustment are:
- No
- Yes
- Factory Setting: No

Game Difficulty
This option determines the difficulty level of the game play. The setting choices for this adjustment are:
- Easiest Setting: Easy
- Hardest Setting: Hard
- Factory Setting: Medium

Energy Per Play
The amount of energy a player receives each time he starts or continues a game. The setting range is:
- Maximum Setting: 200
- Minimum Setting: 5
- Factory Setting: 150

CDS Per Play
The number of CDS a player receives each time he starts or continues a game. The setting range is:
- Maximum Setting: 99
- Minimum Setting: 10
- Factory Setting: 25

Minimum Time Per Play
The minimum time, in seconds, the player is guaranteed to receive each play. The setting range is:
- Maximum Setting: 300
- Minimum Setting: 5
- Factory Setting: 75

Violence Level
This controls the level of graphic violence. The setting choices are:
- High = Blood is red.
- Medium = All blood is green.
- Low = No blood displayed.
- Factory Setting: High

MORE ADJUSTMENTS
This gains access to the following adjustments

Attract Mode Sounds
This determines whether the game has attract mode sounds. The setting choices are:
- Off
- On
- Factory Setting: On

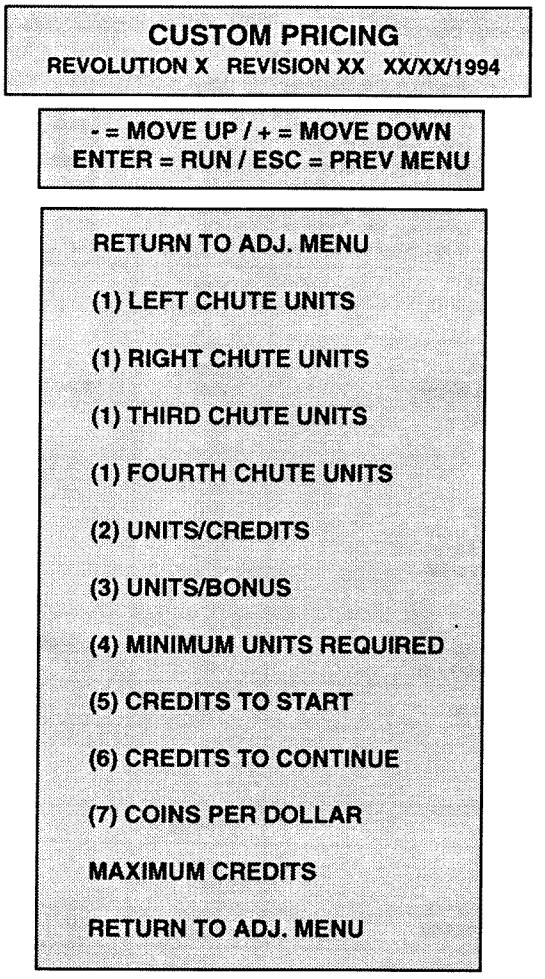
Auto High Score Reset
The All-time High Score Table will be reset to factory values each time this many plays occur. The setting range is:
- Off
- Maximum Setting: 25,000
- Minimum Setting: 250
- Factory Setting: 5000

High Score Entry
This determines whether the game will allow High Score Entry and Display Table. The setting choices are:
- No
- Yes
- Factory Setting: Yes

Set Minimum Volume
This determines the minimum level allowed when setting the volume of the Sound board. The setting range is:
- Maximum Setting: 128
- Minimum Setting: 0
- Factory Setting: 31

STANDARD PRICING TABLE

Name	Setting - Credit/Coin	Left Chute	Center Chute	Right Chute	Fourth Chute
USA 1	1/25¢ (2 to Start; 2 to Continue)	25¢	$1.00	25¢	
USA 2	1/25¢ (2 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 3	1/25¢ (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 4	1/50¢, 3/$1.00 (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 5	1/50¢, 4/$1.00 (2 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 6	1/50¢ (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 7	1/50¢, 3/$1.00 (1 to Start; 1 to Continue)	25¢	$1.00	25¢	
USA 8	1/50¢, 4/$1.00 (2 to Start; 2 to Continue)	25¢	$1.00	25¢	
USA ECA	1/25¢, 4/$1.00 (2 to Start; 2 to Continue)	$1.00	10¢	25¢	5¢
German 1	1/1DM, 6/5DM	1DM		5DM	
German 2	1/1DM, 7/5DM	1DM		5DM	
German 3	1/1DM, 8/5DM	1DM		5DM	
German 4	1/1DM, 5/5DM	1DM		5DM	
German 5	1/1DM, 6/5DM	1DM		5DM	
German ECA	1/1DM, 2/2DM, 6/5DM	5DM	1DM	2DM	
France 1	2/5F, 5/10F	5F		10F	
France 2	2/5F, 4/10F	5F		10F	
France 3	1/5F, 3/10F	5F		10F	
France 4	1/5F, 2/10F	5F		10F	
France 5	2/5F, 5/10F, 11/2 x 10F	5F		10F	
France 6	2/5F, 4/10F, 9/2 x 10F	5F		10F	
France 7	1/5F, 3/10F, 7/2 x 10F	5F		10F	
France 8	1/5F, 2/10F, 5/2 x 10F	5F		10F	
France 9	1/3 x 1F, 2/5F	1F		5F	
France 10	1/2 x 1F, 3/5F	1F		5F	
France 11	1/3 x 1F, 2/5F, 5/2 x 5F	1F		5F	
France 12	1/2 x 1F, 3/5F, 7/2 x 5F	1F		FF	
France ECA	1/3 x 1F, 2/5F, 5/2 x 5F	1F	10F	5F	
Canada	1/2 x 25¢, 3/$1.00	25¢		$1.00	
Swiss 1	1/1F, 6/5F	1F		5F	
Swiss 2	1/1F, 7/5F	1F		5F	
Swiss 3	1/1F, 8/5F	1F		5F	
Italy	1/500 lire	500 lire		500 lire	
UK 1	1/20P, 3/50P	20P		50P	
UK 2	2/20P, 5/50P	20P		50P	
UK ECA	1/20P, 3/50P, 7/£1.00	£1.00	20P	50P	10P
UK Elec w/CCU	1/30P, 2/50P, 4/£1.00	£1.00	20P	50P	10P
Spain 1	1/100 peseta, 6/500 peseta	100 peseta		500 peseta	
Spain 2	1/100 peseta, 5/500 peseta	100 peseta		500 peseta	
Australia 1	1/3 x 20¢, 2/$1.00	20¢		$1.00	
Australia 2	1/5 x 20¢, 1/$1.00	20¢		$1.00	
Japan 1	1/100 yen	100 yen		100 yen	
Japan 2	2/100 yen	100 yen		100 yen	
Austria 1	1/5 schilling, 2/10 schilling	5 schilling		10 schilling	
Austria 2	1/2 x 5 schilling, 3/2 x 10 schilling	5 schilling		10 schilling	
Belgium 1	1/20F	20F		20F	
Belgium 2	3/20F	20F		20F	
Belgium 3	2/20F	20F		20F	
Belgium ECA	1/20F	50F	5F	20F	
Sweden	1/3 x 1 krona, 2/5 krona	1 krona		5 krona	
New Zealand 1	1/3 x 20¢	20¢		20¢	
New Zealand 2	1/2 x 20¢	20¢		20¢	
Netherlands	1/1 HFI, 3/2.5 HFI	1 HFI		2.5 HFI	
Finland	1/1 markka	1 markka		1 markka	
Norway	1/2 x 1 krone, 3/5 x 1 krone	1 krone		1 krone	
Denmark	1/2 x 1 krone, 3/5 krone, 7/2 x 5 krone	1 krone		5 krone	
Antillies	1/25c, 4/1 guilder	25¢		1 guilder	
Hungary	1/2 x 10 forint, 3/2 x 20 forint	10 forint		20 forint	



(1) Coins inserted accumulate units. This adjustment specifies the number of units given for each coin in the fourth chute (see "units/credit").

(2) This is the number of coin units required to buy one credit.

(3) There is one bonus credit awarded after this many coin units have accumulated.

(4) No credits will be awarded until this many coin units have accumulated.

(5) Each player needs this many credits to begin a game.

(6) Each player needs this many credits to continue a game.

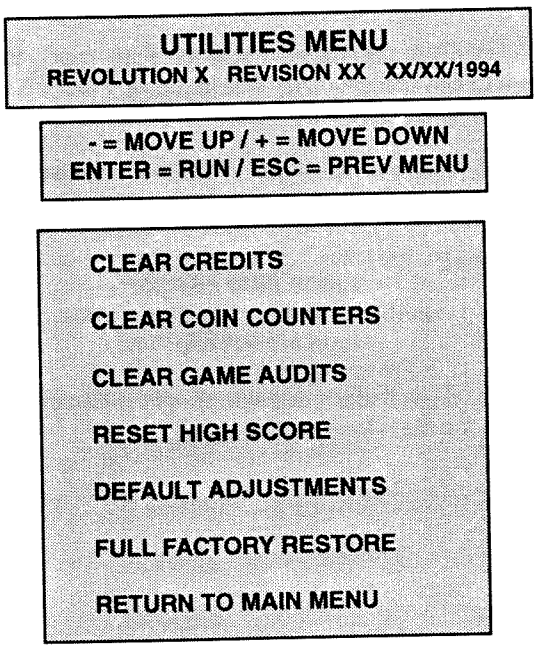
(7) The detailed bookkeeping screen shows total collections based on this many coins per dollar. (Set to zero to disable the display of money totals.)

(8) This is the limit for the credit counter. Additional coins inserted will be lost (factory setting: 30).

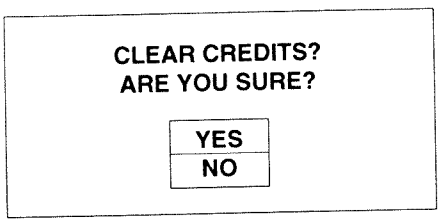
UTILITIES

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

To select the Utilities Menu press the (-) or (+) button, then press the Enter button.



Press the player (-) or (+) button to select a utility. Press the Enter button to activate the selection. A dialogue box appears and the operator can choose to reset the utility. For example:



Press the (-) or (+) button to choose a setting value. Press the Enter button to lock in the new setting value.

To exit the Utilities Menu press the (-) or (+) button to select RETURN TO MAIN MENU, then press the Escape button.

CALIBRATE GUNS

The calibrate Guns option allows the operator to align the guns.

NOTE

Check gun calibration when the game is received. The gun assemblies are calibrated from the factory. However, guns might of been jarred during shipping and may need to be re-calibrated.

If you change boards or replace ROMs, RAMs or the battery, you must re-calibrate the guns. Guns do not operate unless they are calibrated.

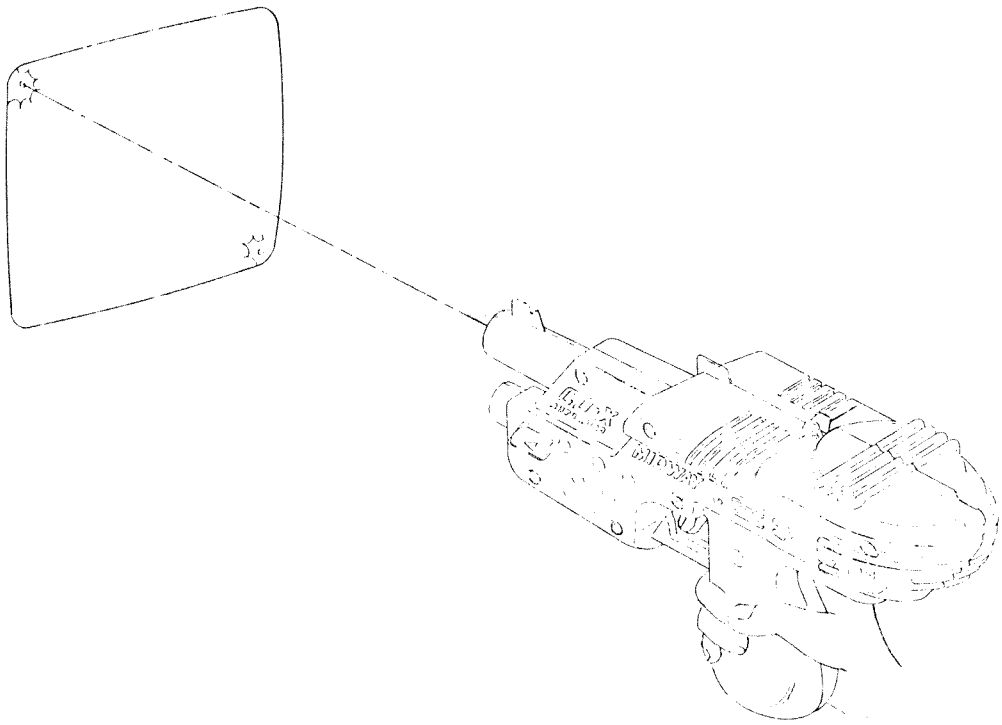
Press the (-) or (+) button to select Calibrate Guns. Press the Enter button to access the option. The screen shows the operator two targets to aim and shoot at. The targets are located at the top left and bottom right of the screen. Calibrate the left gun first, then the right gun.

When the guns are calibrated correctly the message, **-**Calibration Successful**-**, appears on the screen. The data is stored in the CMOS RAM and the game automatically returns to the Main Menu.

If the gun calibration is not successful, the following message appears on the screen:

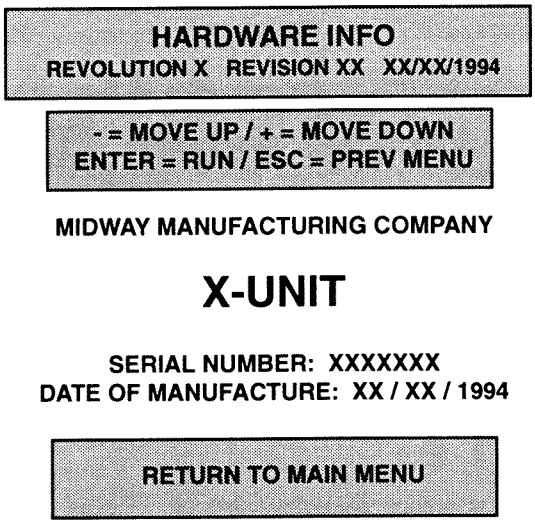
-CMOS RAM ERROR**-**
Unable to write calibration values.
Guns are not aligned.
Press any button to continue.

Begin again to calibrate the guns. If you make a mistake, press the Escape button to abort the procedure and start over. The screen returns to the Main Menu automatically.



HARDWARE INFO

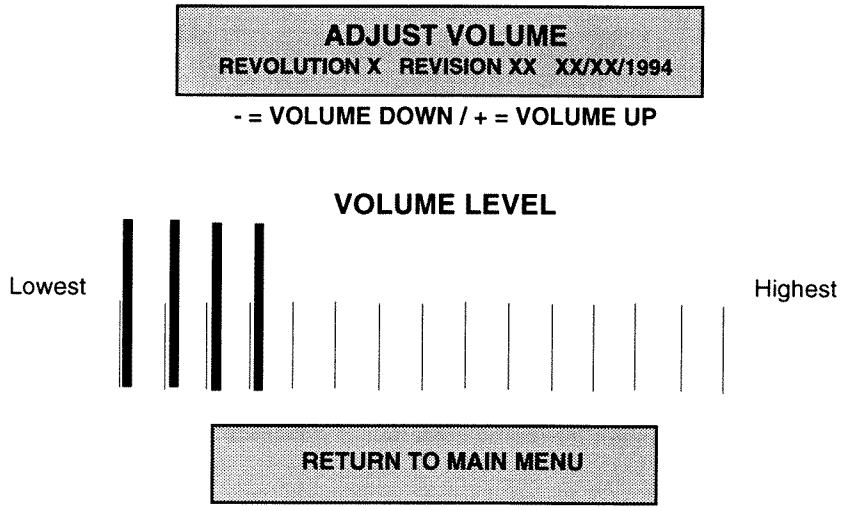
The Hardware Info option allows access to a screen that shows information specifically about the individual game.



ADJUST VOLUME

The Adjust Volume feature allows the operator to determine the sound and music level of the game.

Press the (+) button to raise the volume level of the game and the (-) to lower the volume level. The current volume level is shown with a red line. Press the Escape button to return to the Main Menu.



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 and nothing happens.	Check line fuse. Check for +5Vdc at pins C, D, 3 and 4 of the JAMMA connector.
No sound.	Check the speaker and the speaker connection to pin L and 10 on the JAMMA connector. Check volume control setting. Check for +12Vdc at pins F and 6 on the JAMMA connector. Check interboard wiring from CPU board to sound board. Also, check the fuse on the sound board.
No general illumination.	Check the 1A, S.B. fuse in the A.C. power pack assembly.
Press start button and nothing happens.	Check for open wires between the button and the CPU board. Check for contamination on CPU board pins or the Start button switch blade contacts. Check for proper ground.
No credit given for number of coins inserted.	Check DIP switch coin settings. Check for contamination on the coin switch contacts. Check for an open wire between Coin Switch 1 and pin 16 on the JAMMA connector or Coin Switch 2 and pin T of the JAMMA connector.
Too many credits for number of coins inserted.	Check the game pricing settings. Check for a short between pins T & 16 on the JAMMA connector.
Game stay in test mode.	Check that the switch #8 of DIP switch bank #2 is set to off.

NOTES

REVOLUTION X

SECTION
two

Parts

Cabinet Hardware

Cabinet Assembly	A-16200
Lock Retainer Plate	01-7264
Upper Door Lock Cam	01-8989
Leg Leveler Plate	01-9155
Lock Plate	01-11285
Pad Lock Bracket	01-11286
Key Lock Bracket	01-11287
Door Bracket	01-11291
Shaft Caster	02-4404
20" Vent Hole Cover	03-7602
Leg Adjuster, 3.0"	08-7377
Door Cam Lock	20-6542-TB
Toggle Latch	20-9347
Caster Wheel	20-9627
Marquee Hinge	20-9939
Coin Door Assembly	09-50000-33
DBV Adapter Cable - USA	H-18136
Mars DBV Chute	01-11379
Coin Chute Assembly	01-12324
Video Cash Box Tub	03-8863
Vault Door - Blank with Lock	09-41000
Coin Meter with Diode	5580-13476-00
Tamper Proof Screw Tool, T-20	20-9620
#555 Bulb, 6.3V	24-8768
Silver Front Mirror*	31-1900
Screened Viewing Glass	31-1901
Marquee	31-1907-1
Marquee Retainer	03-8252-2
Marquee Glass	08-7786
Interlock Switch	5643-09268-00

**** The mirror is a large tempered VERY HEAVY glass. Servicing should not be needed.***

Manuals

Instruction Manual	16-40019-101
Tamper-proof Screws Sheet	16-9416
DBV Installation Instructions	16-9637
Rear Latch Instructions	16-9718

Control Panel

Control Panel Assembly	A-17033
Gun	A-18027
Control Panel Cable	H-17999
Security Latch Bracket	01-11955
Clear Overlay	03-9086
Red Push-button	20-9687-1
Blue Push-button	20-9687-3
Screened Overlay	31-1903

Electronic Rack

Electronic Rack	A-17876
Power Supply Switcher Assy	A-15202-1
X-unit CPU Board	A-16744-40019
Gun Coil Driver Board	A-17024.1
DCS Sound Board	A-17026-40019

Speakers

Cabinet Speaker Cable	H-17035
Speaker Grille	01-12421
Full Range Speaker	5555-13961-00

Transformer Assembly

Power Pack Assembly	A-17031 - (country)

Fluorescent Lamp Assembly

Fluorescent Housing & Bracket	A-15890
Lamp Lock	03-8327
18" Fluorescent Bulb, 15W	24-8809

Cables

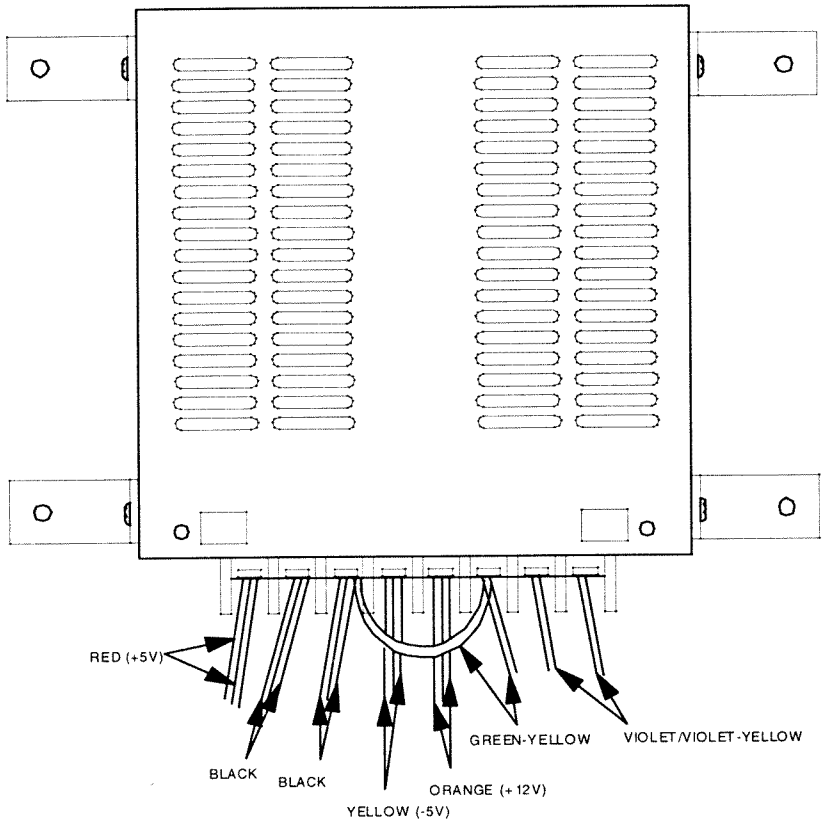
Line Voltage Cable Assembly	A-17877-2
Dixie-Mars Interconnect Cable	H-17019
Cabinet Speaker Cable	H-17035
Main Harness Cable	H-17715.1
Control Panel Cable	H-17999
DBV Adapter Cable - USA	H-18136
20-pin Ribbon Cable	5795-10937-18

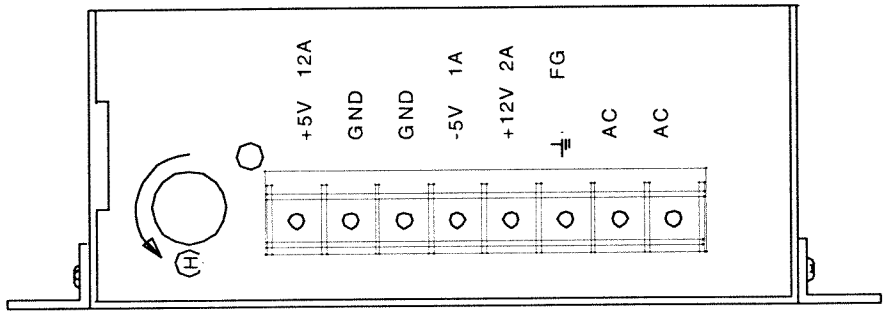
Monitor

Monitor Support Bracket, Left	A-14769
Monitor Support Bracket, Right	A-14770
Monitor Bezel	03-8497-2
25" Monitor	5675-12787-05

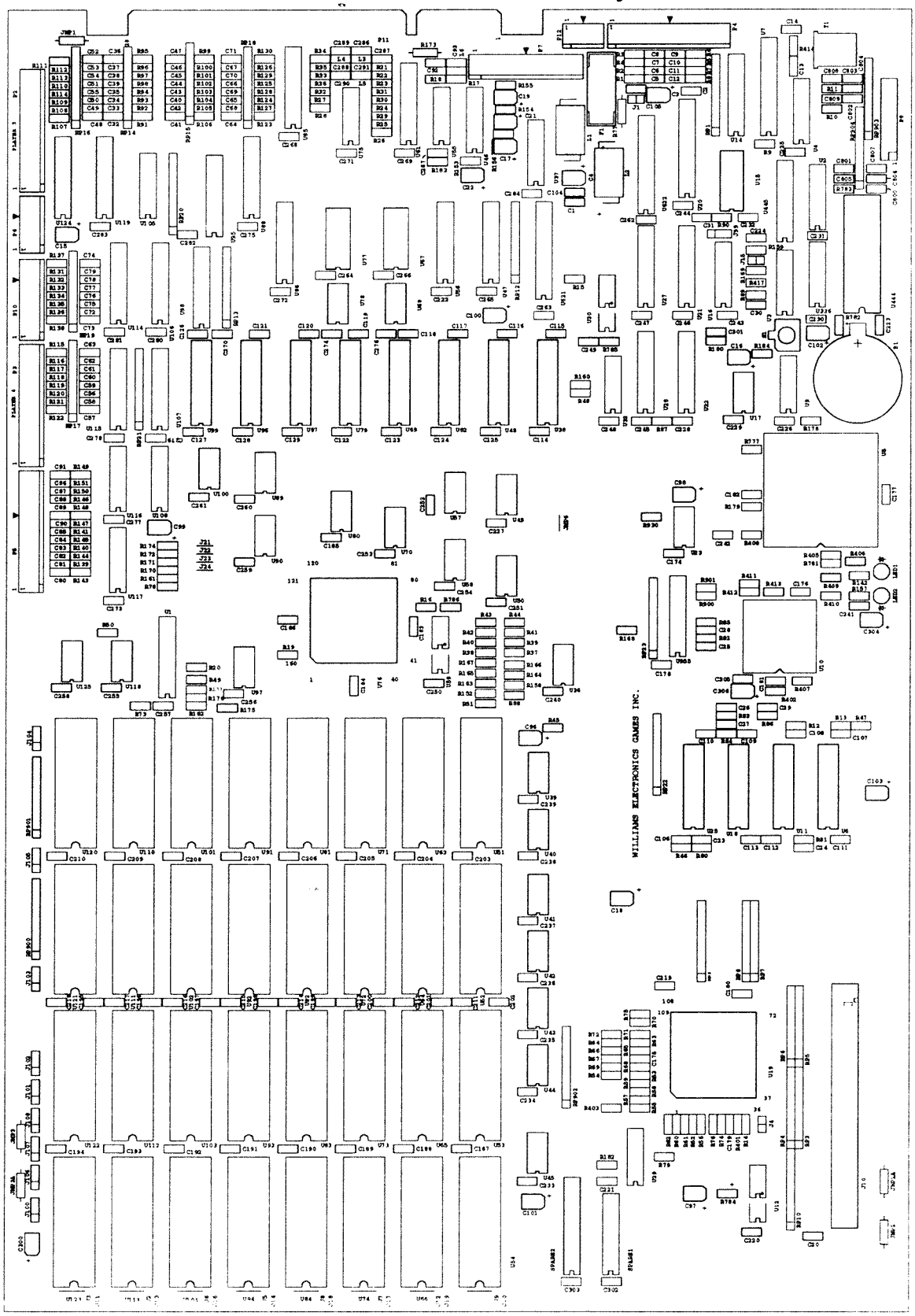
A-15202-1
Power Supply Switcher Assembly

Part Number	Description
H-17914	Switcher Power Cable
01-10500	Mounting Bracket
01-12162	Shield
20-9920	P/S Switcher Supply





A-16744-40019
X-unit CPU Board Assembly



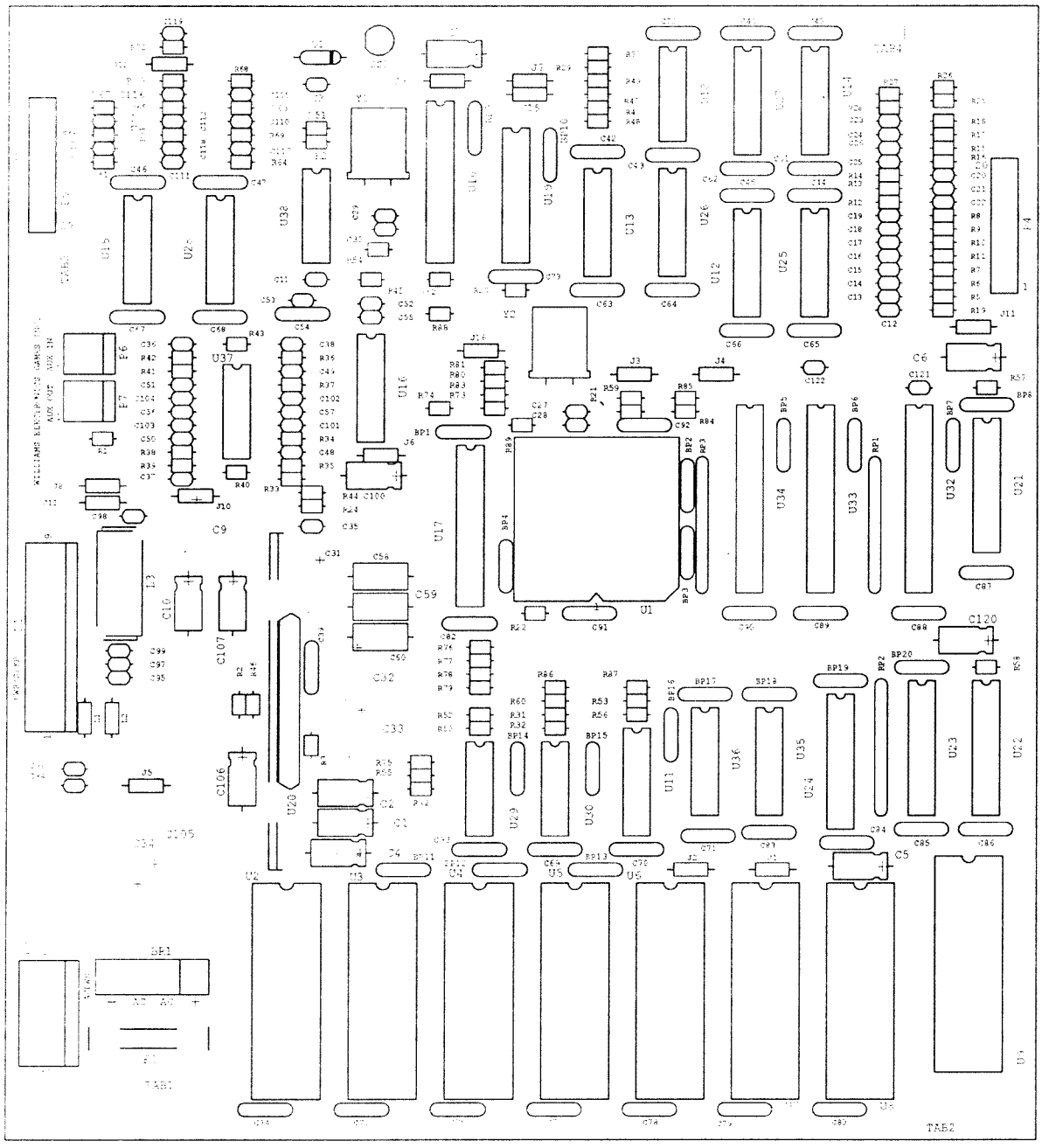
A-16744-40019
X-unit CPU Board Parts

Part Number	Part Designator	Description
5020-13637-00	R12, R13, R47 R139-R141, R143-R151, R777	Res., 33Ω, 1/8W, 5%
5020-13668-00	R25, R31, R36	Res., 15Ω, 1/8W, 5%
5020-13669-00	R24, R30, R35	Res., 8.2KΩ, 1/8W, 5%
5020-13671-00	R1-R8, R48, R91-R138	Res., 470Ω, 1/8W, 5%
5020-13672-00	R23, R29, R34	Res., 3.9KΩ, 1/8W, 5%
5020-13673-00	R22, R28, R33	Res., 2KΩ, 1/8W, 5%
5020-13674-00	R80-R86, R142, R153-R157, R180, R401, R410	Res., 330Ω, 1/8W, 5%
5020-13676-00	R10, R11, R18, R19, R26 R74, R75, R87, R169, R404, R930	Res., 100Ω, 1/8W, 5%
5020-13677-00	R14-R16, R37-R45 R51-R72, R76, R79, R88, R152, R158, R160, R163-R167, R402, R403, R405-R409, R411-R413	Res., 47Ω, 1/8W, 5%
5020-13735-00	R9, R20, R46, R50, R89-R90, R159, R182-R184, R781-R786, R417, R900, R901	Res., 47KΩ, 1/8W, 5%
5022-13761-00	R21, R27, R32	Res., 1KΩ, 1/8W, 2%
5020-13678-00	L3-L6	Res., 0Ω, 1/8W, 5%
5019-09362-00	RP1, RP3-RP10, RP12-RP22, RP900-RP902	SIP, 4.7KΩ, 9R,10, 5%
5019-13838-00	RP903, RP904	SIP, 47Ω, 5R,10, 5%
5019-09669-00	RP23	SIP, 1KΩ, 9R, 10, 5%
5050-13679-00	C3, C4, C15-C19, C21, C22, C96-C103, C300, C304, C306	Cap., 10μF, 16V, +80/-20
5052-13633-00	C106-C129, C31	Cap., .33μF, 50V, z5u
5052-13645-00	C20	Cap., .1μF, 50V, z5u
5052-13648-00	C13, C14, C23-C29, C92, C93, C286-C291, C301	Cap., 22pF, 50V, npo, 5%
5052-13680-00	C1, C2, C80-C91, C174-C284, C302, C303, C305	Cap., .01μF, +80/-20
5052-13681-00	C104, C105	Cap., .001μF, 10%
5052-13682-00	C30	Cap., 470pF, npo, 10%
5052-13683-00	C5-C12, C32-C79, C800-C809	Cap., 100pF, npo, 10%
5287-13689-00	U40, U42, U44, U57 U58, U68, U78	IC., 74ABT374
5287-13690-00	U17, U39, U41, U43 U45, U49, U50, U70, U80, U89-U90, U100	IC., 74ABT245
5287-13691-00	U23, U36, U97, U118, U125	IC., 74ABT244
5340-13849-00	U38, U48, U62, U69, U79, U87, U96, U99	IC., V/RAM, 48121
5349-13685-00	U15	IC., RAM, STAT-S, 8Kx8
5349-13686-00	U6, U11, U18, U25	IC., RAM, DYN, 256Kx16
5349-13687-00	U67, U77	IC., RAM, STAT-S, 32Kx8
5400-13684-00	U19	IC., MPU-GSP, 34020
5410-12862-00	U76	IC., Custom Video, DMA2
5280-08974-00	U75	IC., 7406 Hex Inv Oc
5281-09733-00	U37, U116, U117, U336	IC., 74LS174 Hex F/F
5281-09737-00	U55	IC., 74LS86 Quad Xor
5281-09851-00	U9	IC., 74LS14 Smt/Trg
5283-10552-00	U29	IC., 74F04 Inverter
5283-12489-00	U32	IC., 74F32 Quad Or
5283-13737-00	U16	IC., 74F138 3/8 Dmx Dip
5315-12031-00	U88, U95, U106, U107, U114, U115, U119, U124	IC., 74HCT244
5317-12208-00	U14, U47, U98	IC., 74ALS245 Xovr
5317-13736-00	U22, U28, U56, U86	IC., 74ALS374 Dip 20
5317-13738-00	U21, U27, U61, U85, U445	IC., 74ALS244 Dip 20
5340-12958-00	U2	IC., 26LS31 Bal Drvr
5340-12959-00	U4	IC., 26LS32
5370-12602-00	U46	IC., ULN 2064B

Part Number	Part Designator	Description
5372-13323-00	U20	IC., ADC0848, +/-1LSB
5430-13692-00	U7	IC., UART 2691 D28-300
5434-12255-00	U3	IC., Max691 MCS4.65V
5520-13093-00	Y1	Crystal 3.6864MHZ
5521-13603-05	U12	Osc., CMOS 40MHZ
5521-13806-03	U30	Osc., TTL 8MHZ
5521-13806-04	U59	Osc., TTL 25MHZ
5551-09822-00	L1, L2	Inductor., 4.7μH, 3A
5641-12551-00	S1	Sw., PB, PCB Mount
5645-09025-00	U105, U108	Sw., DIP, 8 pos.
5671-13732-00	LED1, LED2	LED, Red
5700-09915-00	U1, U955	Socket, IC, 20-pin, .3"
5700-10176-00	U444	Socket, IC, 28-pin, .6
5700-12088-00	U51-U54, U63-U66, U71-U74, U81-U84, U91-U94, U101-U113, U120-U123	Socket, DIP 32-pin, .6"
5700-12424-00	U5	Socket, 84-pin, PLCC
5700-13173-00	U10	Socket, 44-pin, PLCC
5791-10862-09	P7	Header, 9-pin str sq, .156
5791-12461-05	P12	Header, 5-pin str sq, .100
5791-12461-07	P6	Header, 7-pin str sq, .100
5791-12461-10	P10	Header, 10-pin strsq,.100
5791-12461-15	P2-P5	Header, 15-pin strsq,.100
5881-12315-00	B1	Battery Holder, Btn, Sgnl
5880-11056-00	B1	Battery, Lithium, 3V
5733-14113-00	F1	Fuse Holder, 5x20mm
5735-13839-00	F1	Fuse, 250mA, 250V, F.B.
5791-09437-00	P8	100 C 10 x 2
20-9915	JMP1-JMP3, JMP2A, JMP3A, JMP6, R77, R173	Wire Insulated Jumper
5343-40019-01	U120	IC., EPROM
5343-40019-02	U121	IC., EPROM
5343-40019-03	U122	IC., EPROM
5343-40019-04	U123	IC., EPROM
5343-40019-05	U110	IC., EPROM
5343-40019-06	U111	IC., EPROM
5343-40019-07	U112	IC., EPROM
5343-40019-08	U113	IC., EPROM
5343-40019-09	U101	IC., EPROM
5343-40019-10	U102	IC., EPROM
5343-40019-11	U103	IC., EPROM
5343-40019-12	U104	IC., EPROM
5343-40019-13	U91	IC., EPROM
5343-40019-14	U92	IC., EPROM
5343-40019-15	U93	IC., EPROM
5343-40019-16	U94	IC., EPROM
5343-40019-17	U81	IC., EPROM
5343-40019-18	U82	IC., EPROM
5343-40019-19	U83	IC., EPROM
5343-40019-20	U84	IC., EPROM
5343-40019-21	U71	IC., EPROM
5343-40019-22	U72	IC., EPROM
5343-40019-23	U73	IC., EPROM
5343-40019-24	U74	IC., EPROM
5343-40019-25	U63	IC., EPROM
5343-40019-26	U64	IC., EPROM
5343-40019-27	U65	IC., EPROM
5343-40019-28	U66	IC., EPROM
5343-40019-29	U51	IC., EPROM
5343-40019-30	U52	IC., EPROM
5343-40019-31	U53	IC., EPROM
5343-40019-32	U54	IC., EPROM
A-17719	U5*	IC., PLD PLSI 1032 Assy
A-17720	U10*	IC., PLD MACH 110 Assy
A-17721	U955*	IC., PLD 16V8 Assy
A-17722	U1*	IC., PLD 16L8 Assy
5400-13823-00	U444*	PIC1657

***NONUSER SERVICEABLE/REPLACEABLE PARTS**

A-17026-40019
Sound Board Assembly

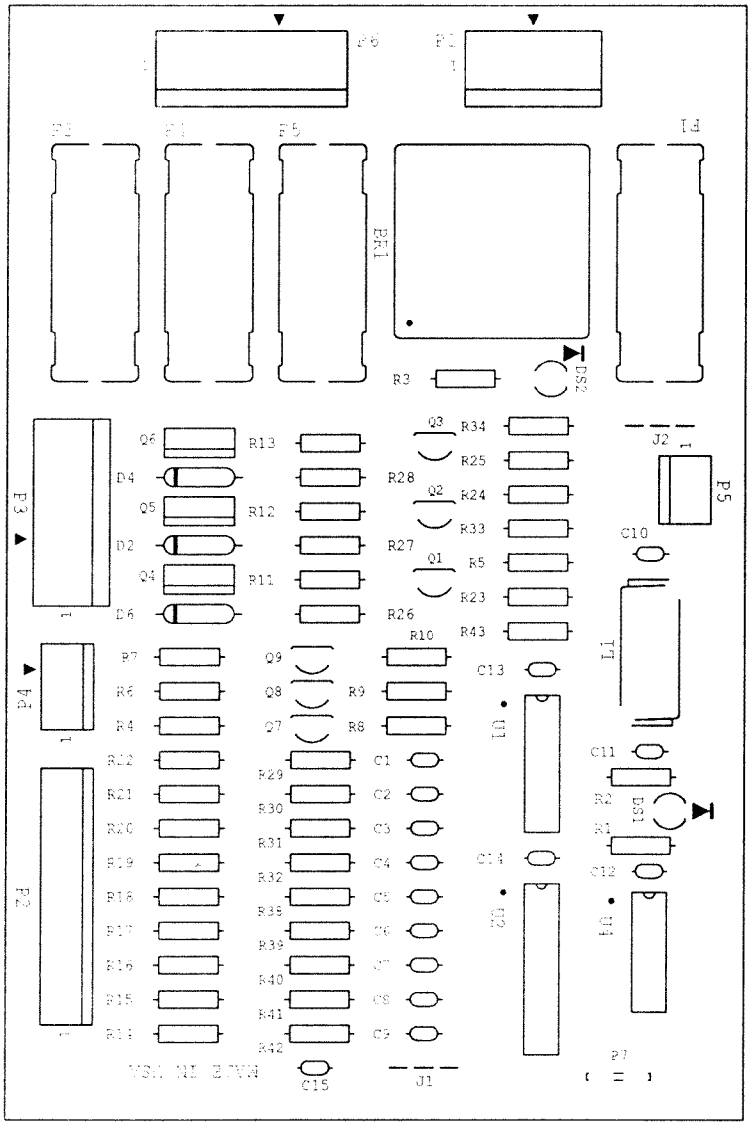


A-17026-40019
Sound Board Parts

Part Number	Part Designator	Description
20-9915	J1, J4, J6, J8, J9, J10, J13, J16	Jumper Wire, Insulated
5010-13361-00	R1	Res., 1KΩ, 1/8W, 2%
5010-13363-00	R45, R51, R57-R62	Res., 100Ω, 1/8W, 5%
5010-13365-00	R21-R23, R31, R32, R50, R53, R55, R56, R73-R75, R88	Res., 4.7KΩ, 1/8W, 5%
5010-13371-00	R52	Res., 330Ω, 1/8W, 5%
5010-13472-00	R63-R72, R76-R87, R89	Res., 47Ω, 1/8W, 5%
5010-13844-00	R3, R20, R54	Res., 100KΩ, 1W, 5%
5010-13858-00	R2	Res., 820Ω, 1/8W, 5%
5010-13962-00	R46	Res., 12KΩ, 1/8W, 5%
5013-13842-00	R33-R44	Res., 6.19KΩ, 1/8W, 1%
5010-13841-00	R24	Res., 47KΩ, 1/8W, 5%
5019-10661-00	RP1-RP3	SIP, 10KΩ, 9R, 5%
5040-09343-00	C1, C2, C4-C7, C10, C100, C106, C107, C120	Cap., 10µF, 20V, +/-20%
5043-08996-00	BP1-BP9, BP11-BP20, C3, C39, C40, C46, C47, C52-C57, C65, C67-C71, C73-C80 C82-C99, C121, C122	Cap., .1µF, 50V, +/-20%
5045-12926-00	C58-C60	Cap., .1µF, 100V, 10%
5048-11028-00	C27-C30	Cap., 22pF, 50V
5048-13375-00	C11, C110-C119	Cap., 100pF, 50V, 10%
5048-13608-00	C51	Cap., 6800pF, 50V, 5%
5048-13609-00	C48-C50	Cap., 3900pF, 50V, 5%
5048-13610-00	C35-C38	Cap., 1000pF, 50V, 5%
5048-13611-00	C101-C104	Cap., 680pF, 50V, 5%
5040-09421-00	C9, C31, C32	Cap., 100µF, 25V,+50/-10
5040-09506-00	C33	Cap., 220µF, 16V,+50/-10
5040-13417-00	C105	Cap., 10,000µF, 35V
5070-08919-00	D1	Diode, 1N4148
5556-12513-00	L1, L2	Ferrite Bead, t & reel
5551-09822-00	L3	Inductor, 4.7µH, 3A
01-10516	HSNK1	Heatsink
20-9690-18		Standoff, Spacer PCB
4006-01003-06		MS, 6-32x3/8 P-PH-S
4406-01128-00		Nut, 6-32 KEPS
5100-13945-02	BR1	Bridge Diode SIP, 200V
5280-08974-00	U29	IC., 7406
5283-10551-00	U30	IC., 74F00
5311-10948-00	U11	IC., 74HC138
5311-12043-00	U35, U36	IC., 74HC174
5311-12287-00	U21-U23	IC., 74HC541
5311-12538-00	U38	IC., 74HC14
5287-13966-00	U24	IC., 74ABT245
5340-12958-00	U28	IC., 26LS31
5340-12959-00	U15	IC., 74LS32
5340-13304-00	U32-U34	IC., RAM, STATIC 2Kx8
5370-12730-00	U37	IC., TL084, op-amp
5370-13308-00	U20	IC., Audio Amp MB, 3731
5371-13299-00	U16	IC., AD-1851,16 bit mono
5430-13692-00	U10	IC., UART/DUAL 2691
5700-12047-00	U17	Socket, IC., 24-pin, .300
5700-12088-00	U2-U9	Socket, IC., 32-pin, .600
5700-12533-00	U1	Socket, IC., 68-pin,PLCC
5520-13093-00	Y1	Crystal, 3.6864MHZ
5520-13301-00	Y2	Crystal, 10MHZ
5671-13732-00	DS1	LED, Red
5791-09437-00	P5	Conn., 20HCN, 2x10 st.
5791-10862-05	P3	Conn., 5H, str sq pin,.156
5791-10862-09	P1	Conn., 9H, str sq pin,.156
5733-13826-00	F1	Fuse Holder, 5x20mm

Part Number	Part Designator	Description
A-17481	U17	IC., PLD 20V8 Assy
5400-13298-00	U1	IC., MPU 2105KP-40
5735-13853-00	F1	Fuse, 250V, 2A, S.B.
A-5343-40019-33	U2	IC., EPROM
A-5343-40019-34	U3	IC., EPROM
A-5343-40019-35	U4	IC., EPROM
A-5343-40019-36	U5	IC., EPROM
A-5343-40019-37	U6	IC., EPROM
A-5343-40019-38	U7	IC., EPROM
A-5343-40019-39	U8	IC., EPROM
A-5343-40019-40	U9	IC., EPROM

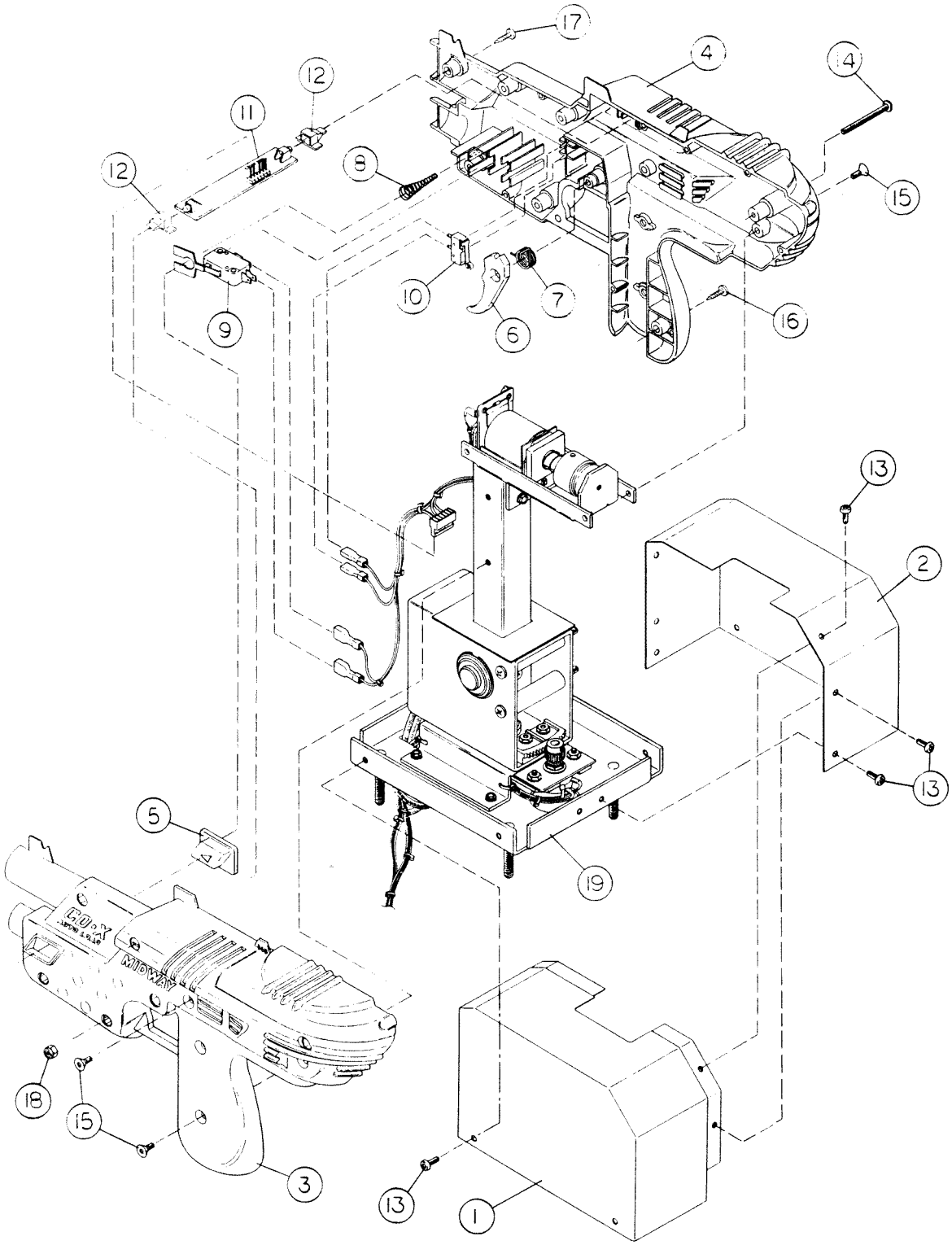
A-17024.1
Gun Coil Driver Board Assembly



A-17024.1
Gun Coil Driver Board Parts

Part Number	Part Designator	Description
5100-09690-00	BR1	Bridge, 35A, 100V
5791-10862-05	P1	Conn., 5-pin, .156
5791-12461-15	P2	Conn., 15-pin, .100
5791-12461-04	P5	Conn., 4-pin, .100
5791-10862-07	P3, P6	Conn., 7-pin, .156
5791-12461-00	P4	Conn., 5-pin, .100
5048-13375-00	C1-C11	Cap., 100pF, 50V, +/-20%
5043-08980-00	C12-C15	Cap., .01µF, 50V, +80/-20%
5070-09054-00	D2, D4, D6	Diode, 1N4004, 1.0A
5733-12060-01	F1, F3, F4, F5	Fuse Holder
5731-09651-00	F1	Fuse, 5A, 250V, S.B.
5731-14144-00	F3, F4, F5	Fuse, 1.8A, 250V, S.B.
5551-09822-00	L1	Inductor, 4.7µH, 3.0A
5671-13732-00	DS1, DS2	LED, Red
5434-12255-00	U1	IC., MAX691
5311-12688-00	U2	IC., 74HCT273
5311-12669-00	U4	IC., 74HCT14
5162-12635-00	Q4, Q5, Q6	Trans., TIP 102, 100V, 8A
5190-09016-00	Q7, Q8, Q9	Trans, 2N4403
5160-10269-00	Q1, Q2, Q3	Trans., 2N3904
5010-09187-00	R4, R6, R7	Res., 150Ω, 5%
5010-09085-00	R8, R9, R10	Res., 1.5KΩ, 5%
5010-08998-00	R3	Res., 2.2KΩ, 5%
5010-08997-00	R26, R27, R28	Res., 2.7KΩ, 5%
5010-09001-00	R2	Res., 330Ω, 5%
5010-09416-00	R14-R25	Res., 470Ω, 5%
5010-08991-00	R1, R5, R29-R34, R38-R43	Res., 4.7KΩ, 5%
5010-12480-00	R11, R12, R13	Res., 68Ω, 5%

A-18027
Gun Assembly



A-18027
Gun Parts

Item	Part Number	Description
1	01-13026	Base Housing, Left
2	01-13027	Base Housing, Right
3	03-8986	Gun Housing, Molded Left
4	03-8987	Gun Housing, Molded Right
5	03-8989	Bomb Button
6	03-8988	Trigger
7	10-465	Spring, Trigger
8	10-466	Spring, Bomb Button
9	A-18603	Switch, Bomb Button
10	5647-12693-06	Switch, Trigger
11	A-18834	LED Board Assembly
12	03-9230-9	LED Extension
13	4008-01090-06B	TS, 8-32 x 3/8 PH-Trx-TP Typ23 Blk (10)
14	4008-01093-22B	MS, 8-32 x 1-3/8 TPR Black (6)
15	4010-01148-06B	MS, 10-32 x 3/8 FH Torx TP Black (6)
16	4010-01148-10B	MS, 10-32 x 5/8 FH Torx TP Black (4)
17	4108-01092-10B	SMS, #8 x 5/8 #1 Riser PH-T-20 TP Blk (2)
18	4408-01119-00B	Nut, 8-32 ESNA Black (6)
19	Gun Mechanism Parts	
a)	AE-23-800-08	Coil Assembly
b)	03-7067-5	Tubing, Plastic
c)	23-6735	Bumper, Plunger Rev X Gun
d)	01-13028	Solenoid Bracket
e)	23-6736	Bumper, Recoil Pad Rev X Gun
f)	10-482	Spring, Compression
g)	02-5059	Plunger
h)	20-10105	Bumper, 3/4" Diameter
i)	5014-12909-00	Potentiometer (2)
j)	03-8528-1	Gear, Segment, 32DP
k)	20-10107	Gear, Segment, Hubless
m)	20-10106	Gear, Spur
n)	03-9202	Spacer
p)	20-10108	Bumper
q)	03-9203	Disk, Plastic Washer
r)	20-10109	Bearing, .625 Bore (4)

NOTES

REVOLUTION X

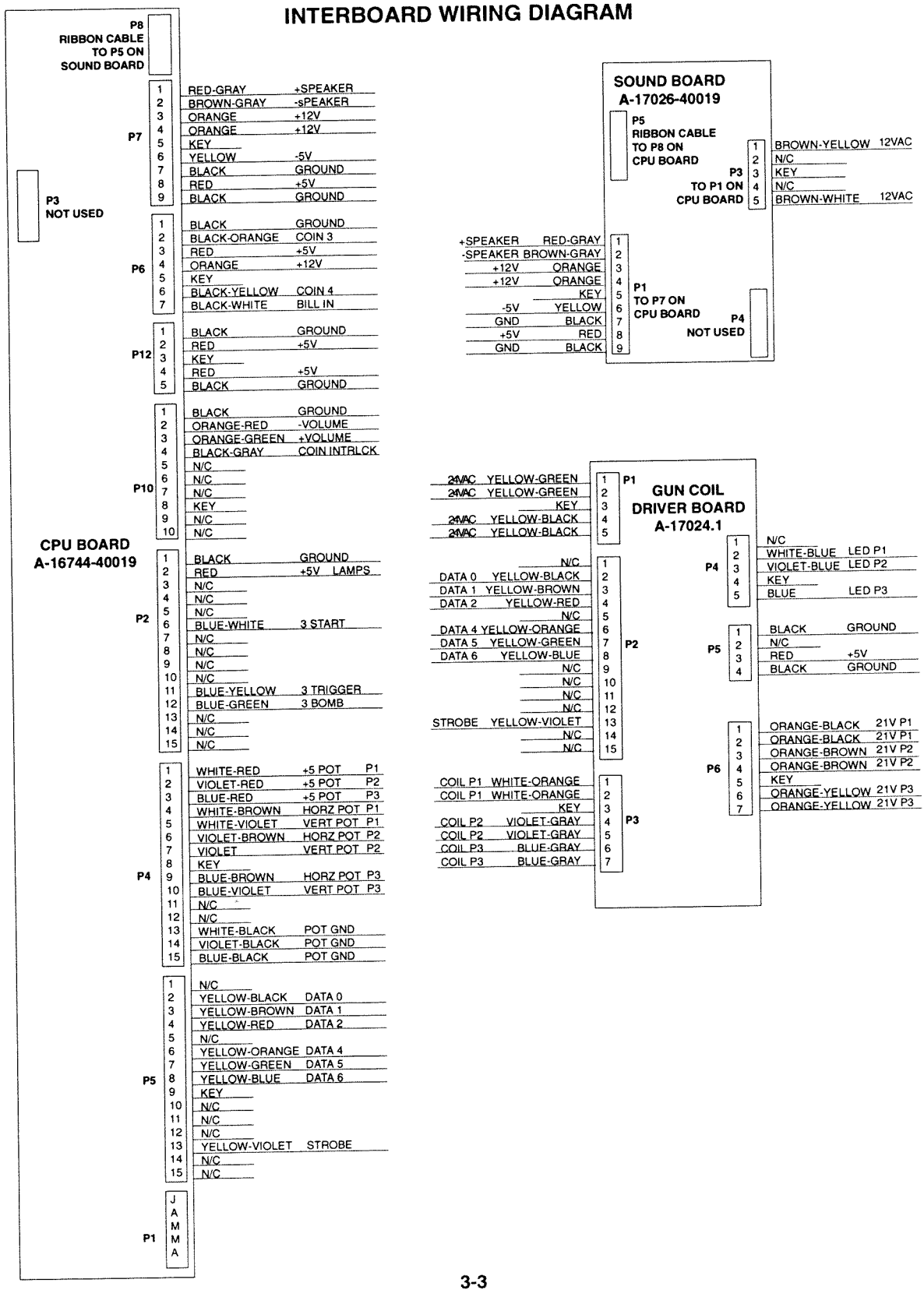
SECTION
three

Wiring Diagrams and Schematics

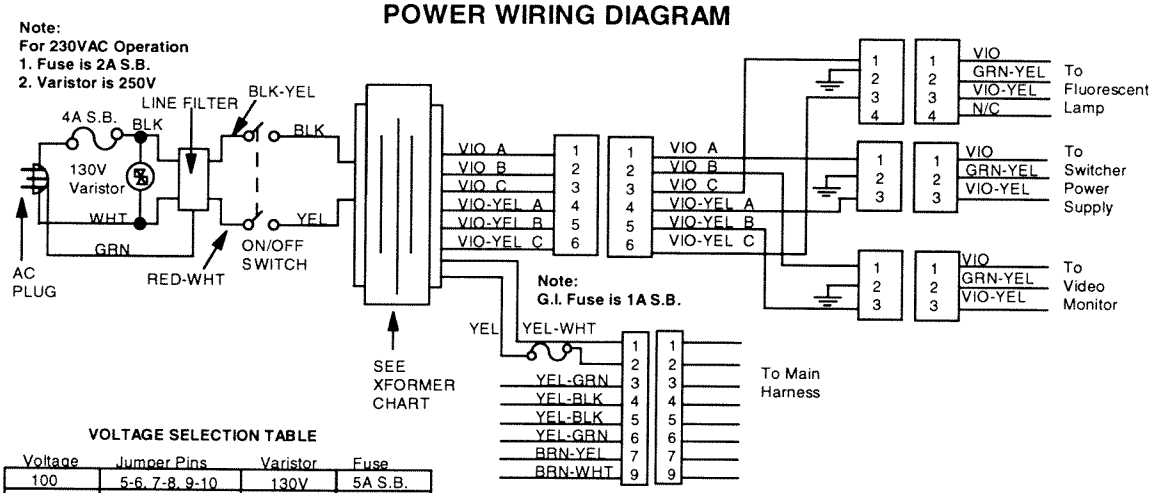
JAMMA CHART

Function	Wire Color	Pin	Pin	Wire Color	Function
Ground	Black	1	A	Black	Ground
Ground	Black	2	B	Black	Ground
+5Vdc	Red	3	C	Red	+5Vdc
+5Vdc	Red	4	D	Red	+5Vdc
-5Vdc	Yellow	5	E	Yellow	-5Vdc
+12Vdc	Orange	6	F	Orange	+12Vdc
	Key	7	H	Key	
Meter 1	Brown	8	J	Brown-Red	Meter 2
	N/C	9	K	N/C	
Speaker (+)	Red-Gray	10	L	Brown-Gray	Speaker (-)
	N/C	11	M	N/C	
Video Red	Red	12	N	Green	Video Green
Video Blue	Brown	13	P	White	Video Sync
Video Ground	Shield	14	R	White-Gray	Service Switch
Test Switch	Black-Blue	15	S	Black-Green	Tilt Switch
Coin 1	Black-Brown	16	T	Black-Red	Coin 2
Start 1	White	17	U	Violet-White	Start 2
	N/C	18	V	N/C	
	N/C	19	W	N/C	
	N/C	20	X	N/C	
	N/C	21	Y	N/C	
1 Push 1	White-Yellow	22	Z	Violet-Yellow	2 Push 1
1 Push 2	White-Green	23	a	Violet-Green	2 Push 2
	N/C	24	b	N/C	
	N/C	25	c	N/C	
	N/C	26	d	N/C	
Ground	Black	27	e	Black	Ground
Ground	Black	28	f	Black	Ground

INTERBOARD WIRING DIAGRAM



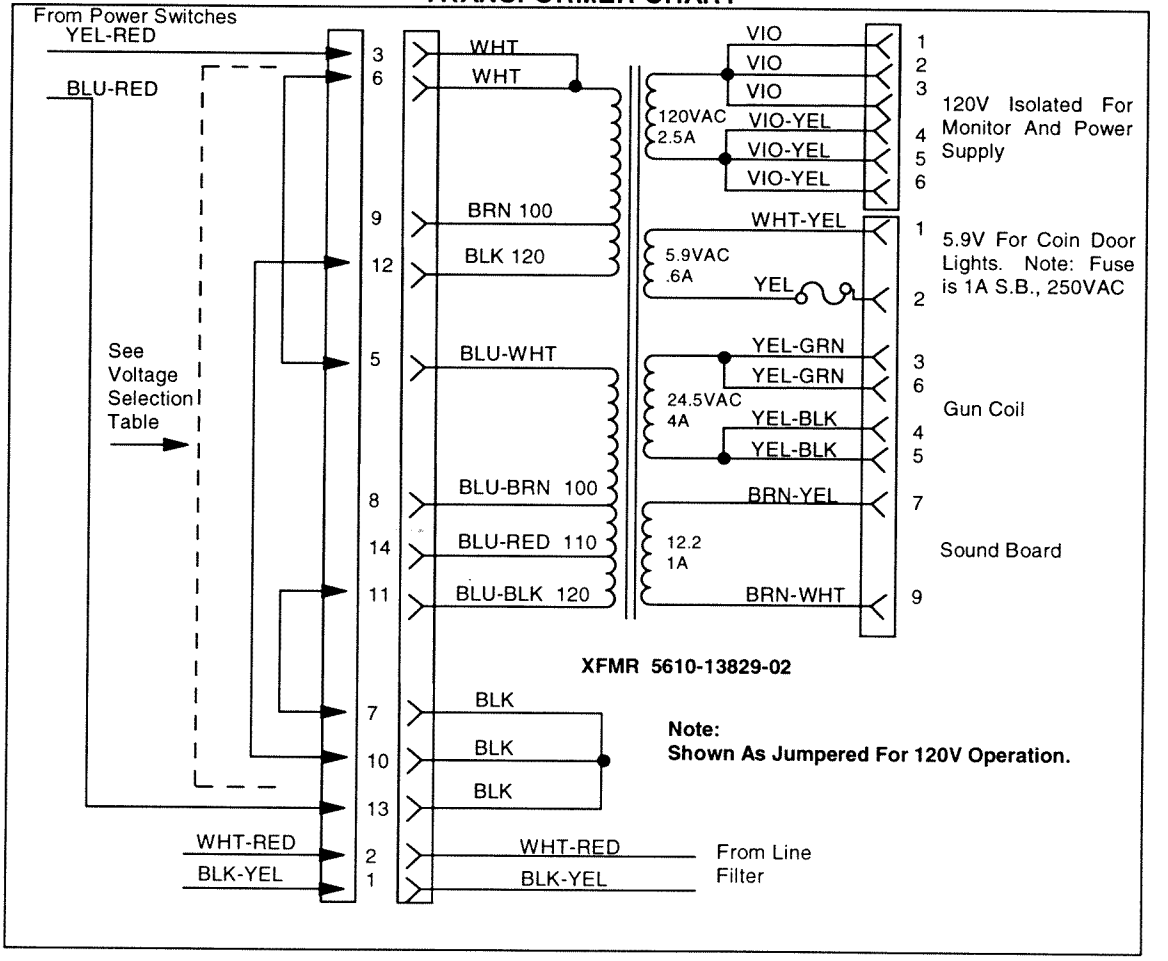
POWER WIRING DIAGRAM



VOLTAGE SELECTION TABLE

Voltage	Jumper Pins	Varistor	Fuse
100	5-6, 7-8, 9-10	130V	5A S.B.
120	5-6, 7-11, 10-12	130V	5A S.B.
200	5-9, 10-8	275V	3A S.B
210	5-9, 10-14	275V	3A S.B.
220	5-9, 10-11	275V	3A S.B.
230	5-12, 10-14	275V	3A S.B.
240	5-12, 10-11	275V	3A S.B.

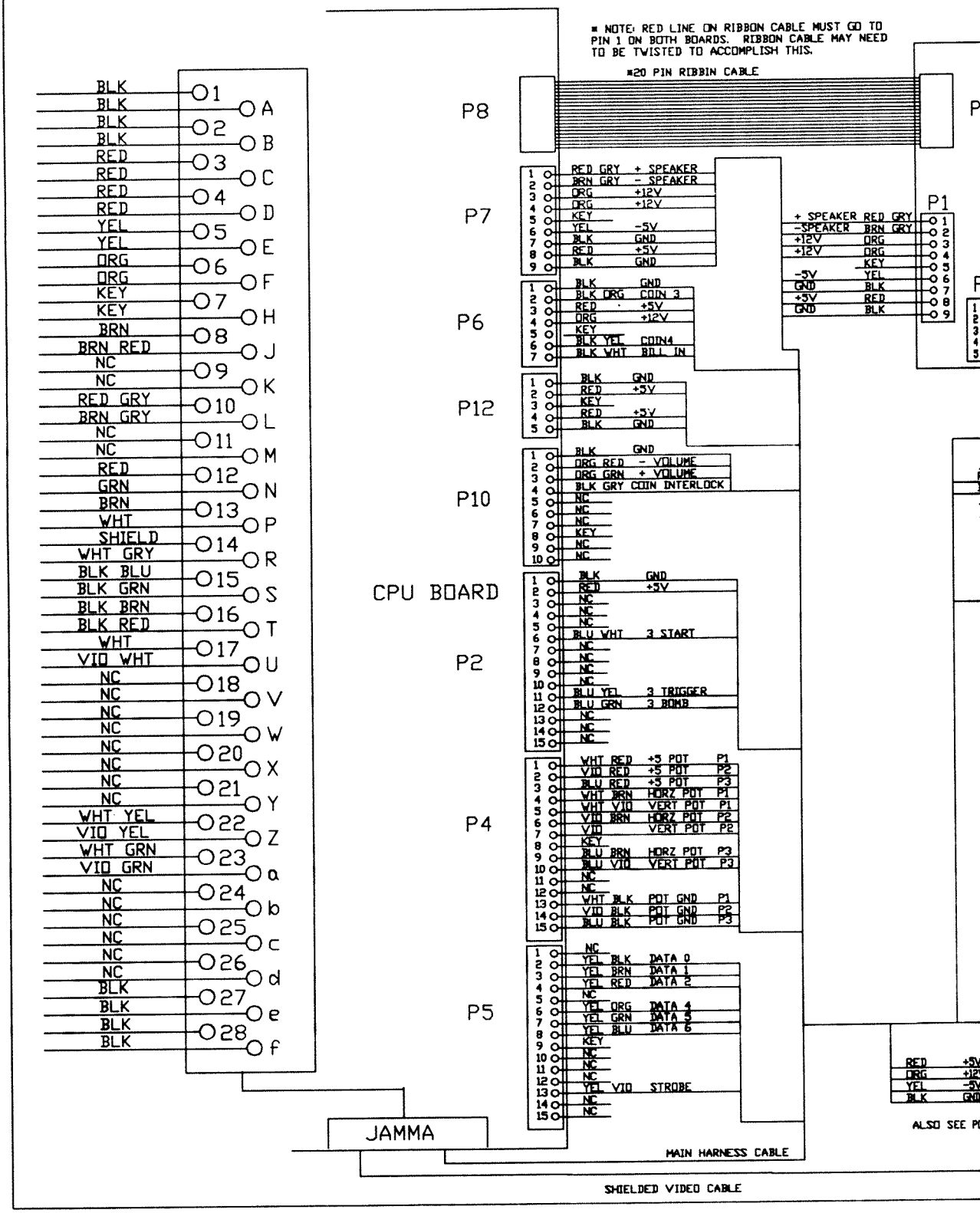
TRANSFORMER CHART



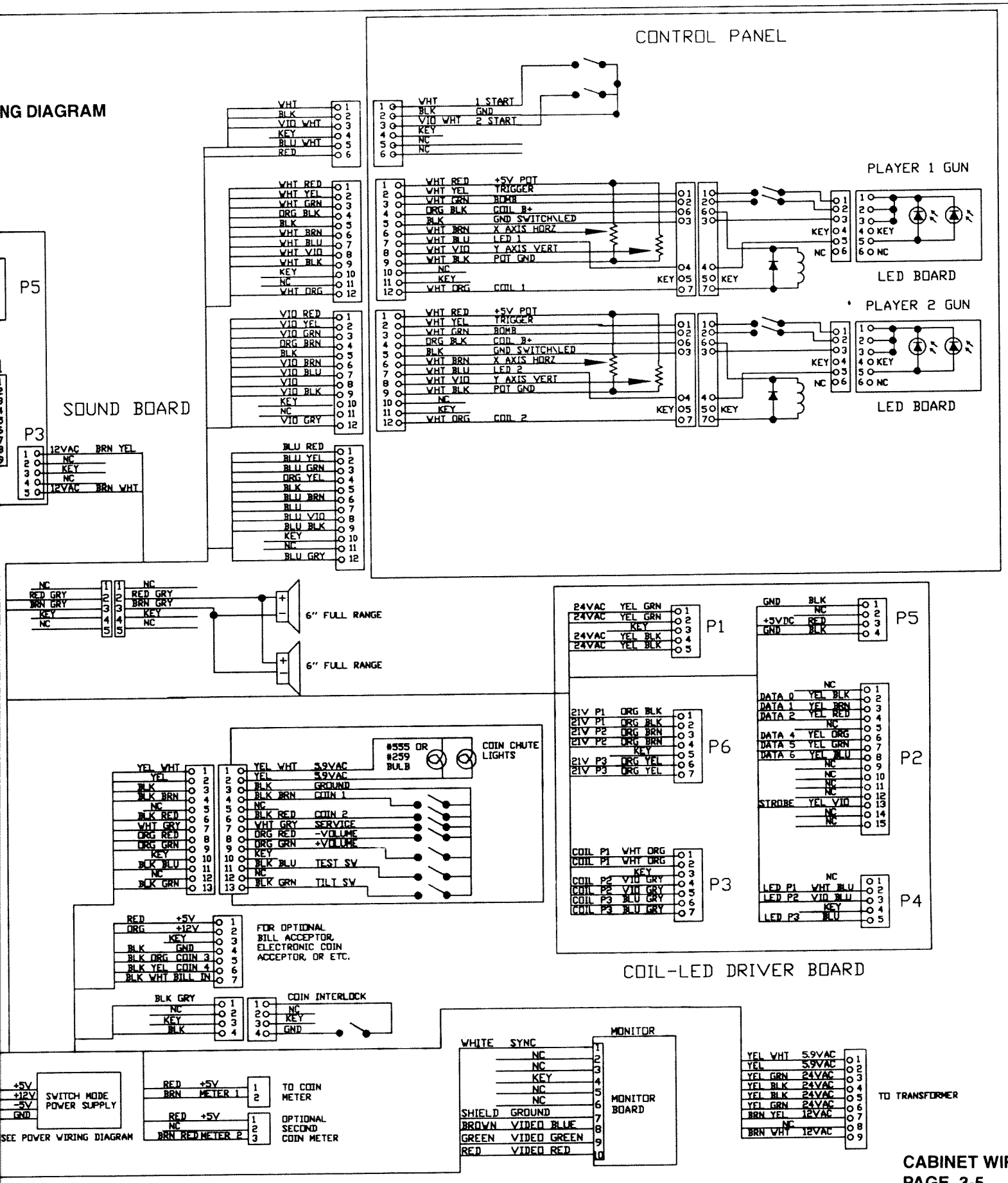
XFMR 5610-13829-02

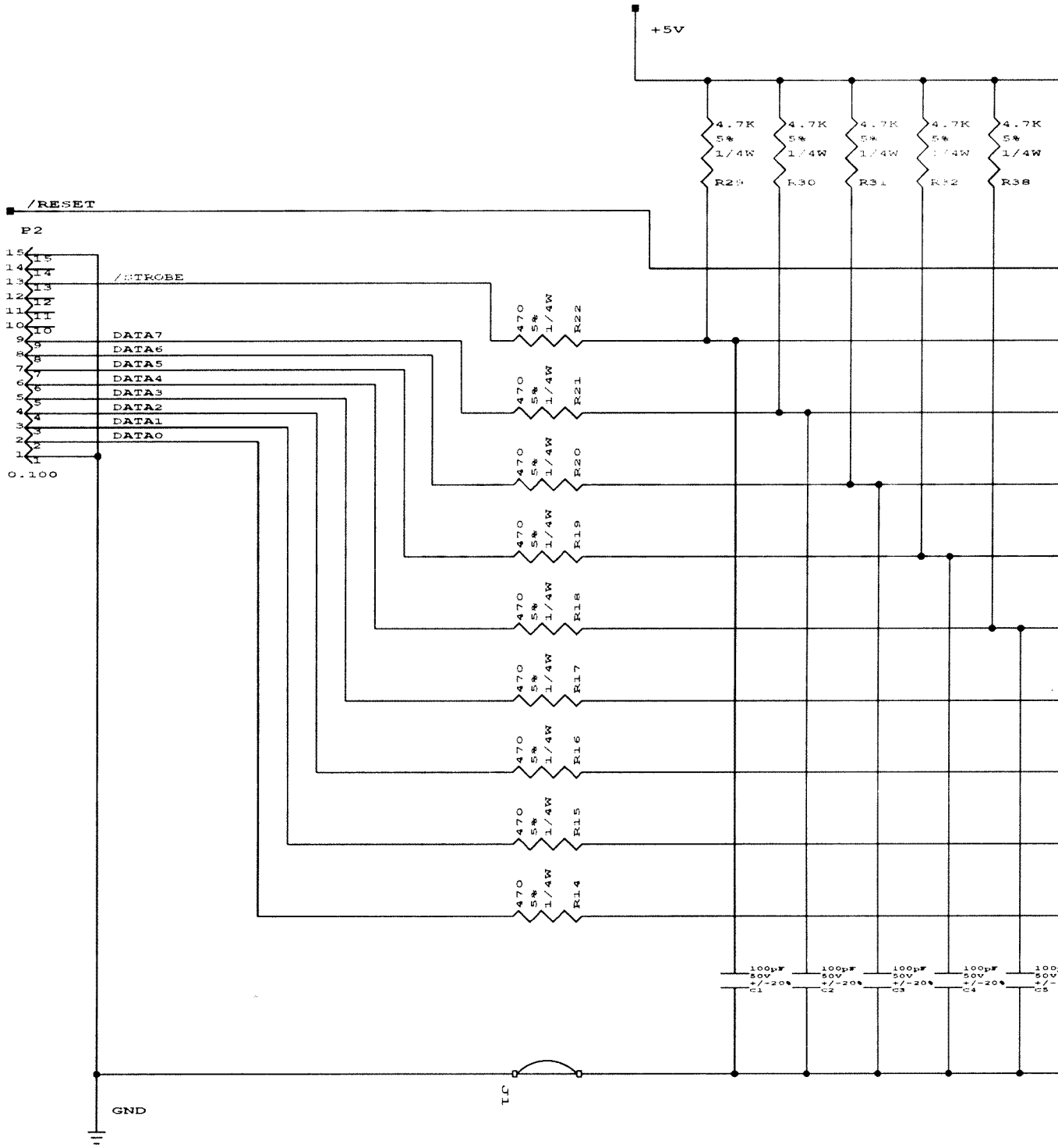
Note:
Shown As Jumpered For 120V Operation.

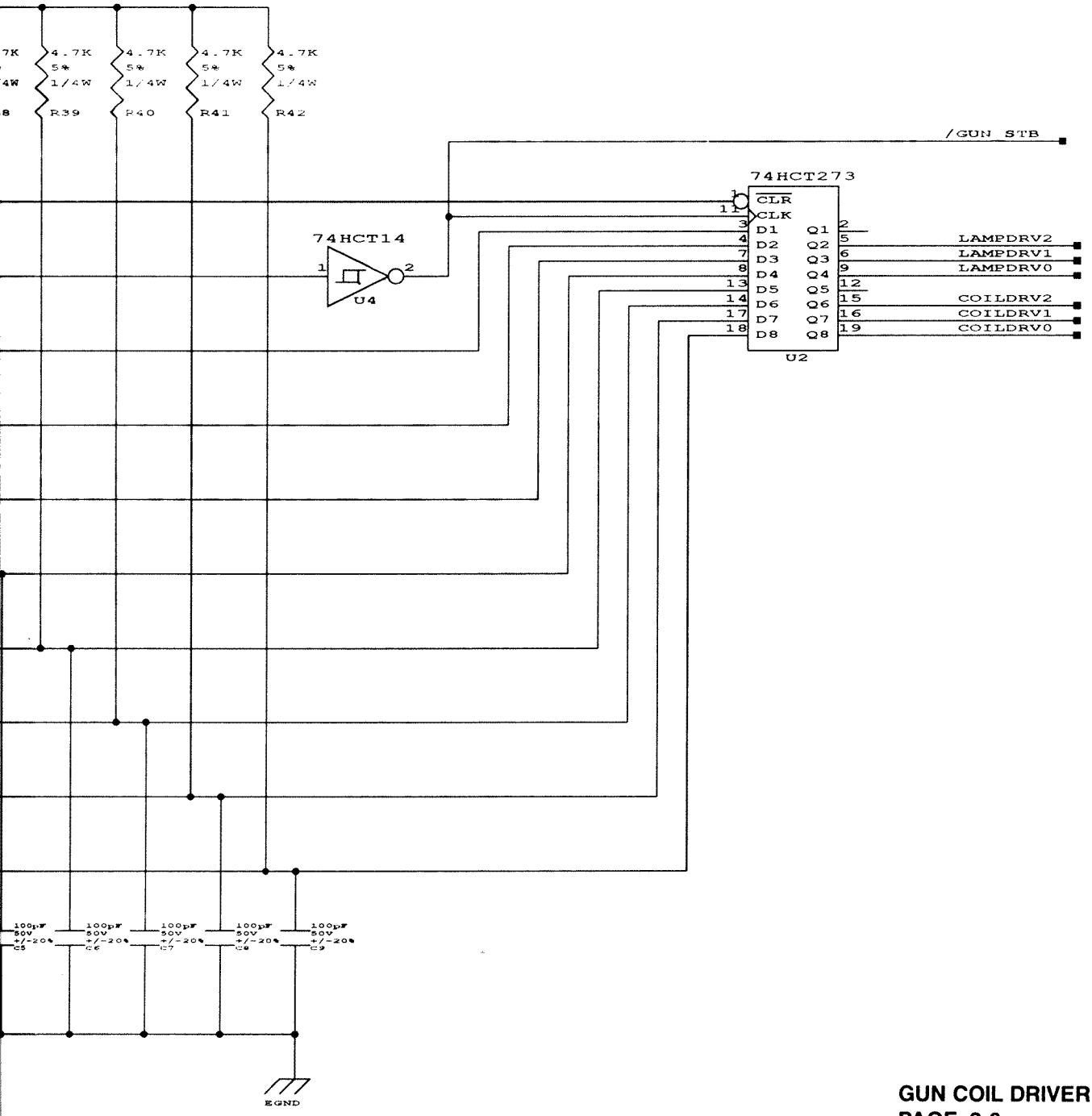
CABINET WIRING



NG DIAGRAM


CONTROL PANEL
PLAYER 1 GUN
LED BOARD
PLAYER 2 GUN
LED BOARD
SOUND BOARD
P5
P3
12VAC BRN YEL
12VAC BRN WHT
6" FULL RANGE
6" FULL RANGE
P1
P5
P6
P2
P3
P4
COIL-LED DRIVER BOARD
#555 OR #259 BULB
COIN CHUTE LIGHTS
FOR OPTIONAL BILL ACCEPTOR, ELECTRONIC COIN ACCEPTOR, OR ETC.
COIN INTERLOCK
MONITOR
MONITOR BOARD
SWITCH MODE POWER SUPPLY
SEE POWER WIRING DIAGRAM
TO COIN METER
OPTIONAL SECOND COIN METER
TO TRANSFORMER


+5V
4.7K 5% 1/4W R29
4.7K 5% 1/4W R30
4.7K 5% 1/4W R31
4.7K 5% 1/4W R32
4.7K 5% 1/4W R38
/RESET
P2
/STROBE
DATA7
DATA6
DATA5
DATA4
DATA3
DATA2
DATA1
DATA0
0.100
470 5% 1/4W R22
470 5% 1/4W R21
470 5% 1/4W R20
470 5% 1/4W R19
470 5% 1/4W R18
470 5% 1/4W R17
470 5% 1/4W R16
470 5% 1/4W R15
470 5% 1/4W R14
100pF 50V +/-20% C1
100pF 50V +/-20% C2
100pF 50V +/-20% C3
100pF 50V +/-20% C4
J1
GND



GUN COIL DRIVER BOARD
PAGE 3-6

	UPDATE REF. DES. SEE SHEETS 2 AND 3
ECN 36074	CHANGE NPR — DATE 2-23-94

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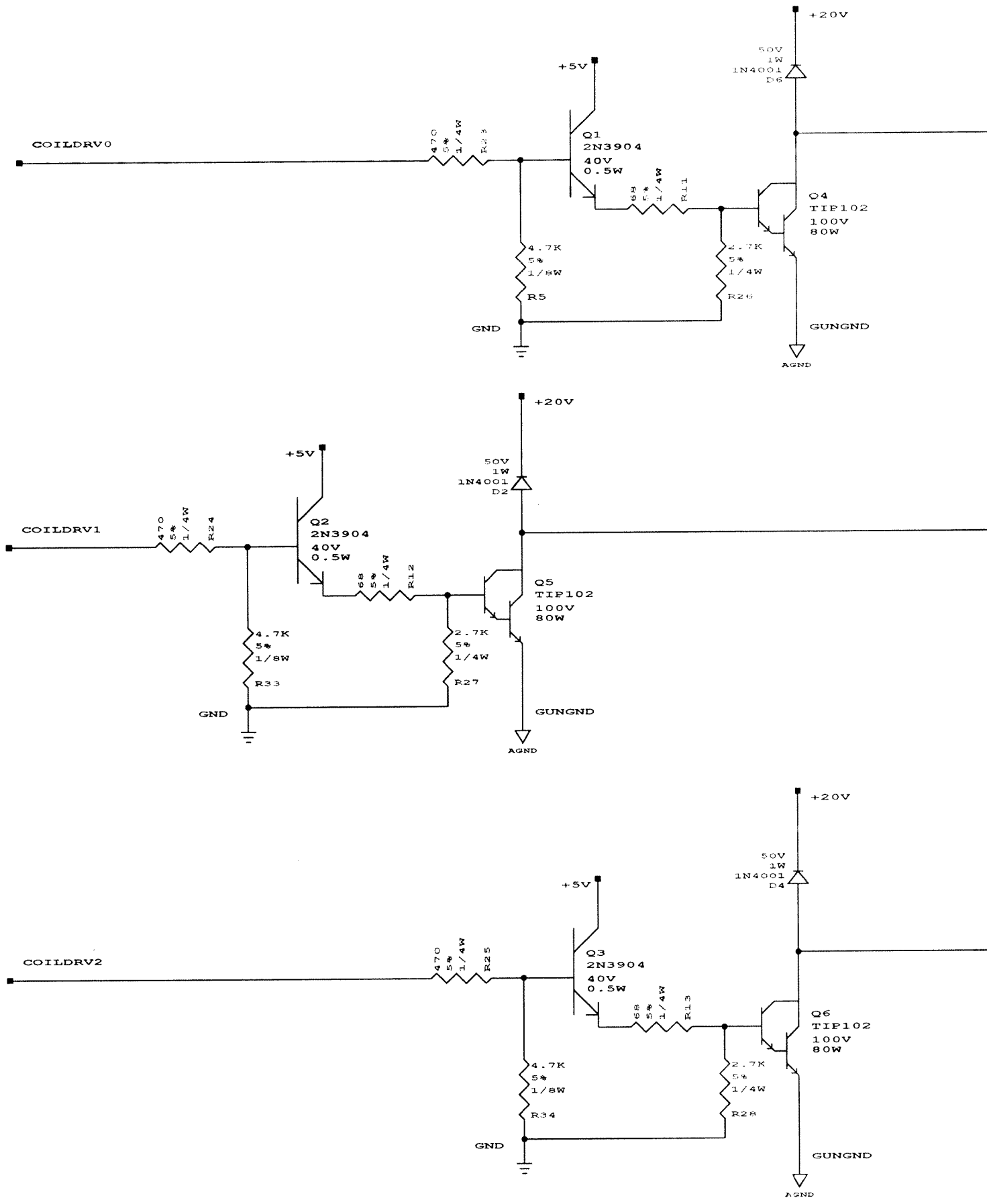
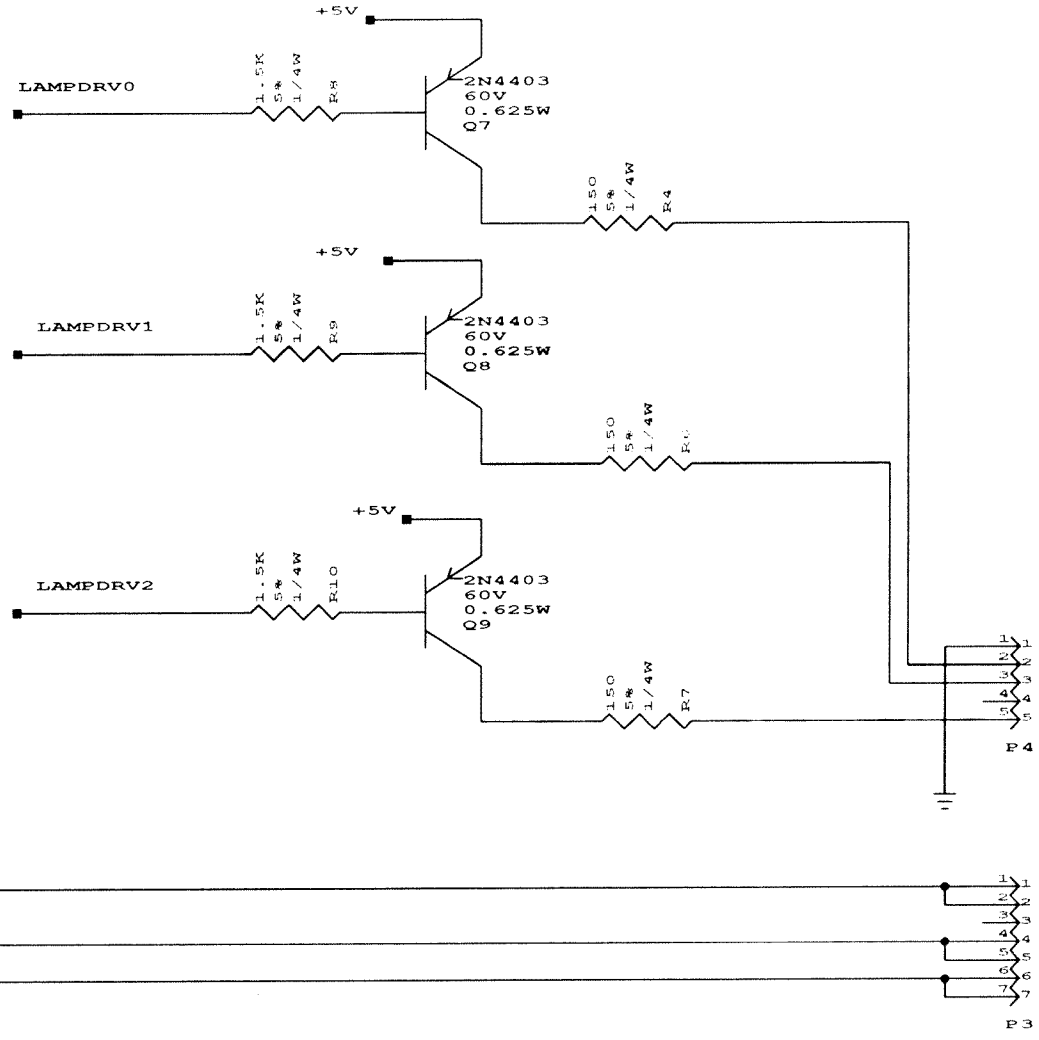
PROJECT ENG. P COX	1ST PROJ. NO. 40040 — DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY P COX — DATE	1ST USEAGE A-17876 — DATE	TITLE GUNDRVR
CHECKED 5-13-1994 13:45 — DATE	CURRENT PROJ. 40040 — DATE	
APPROVED — DATE	SHEET 1 OF 3	PART NO. 16-9554 — REV. 1


A
B
1
2
3
4
COILDRV0
470 5% 1/4W R23
+5V
Q1
2N3904
40V
0.5W
68 5% 1/4W R11
+20V
50V 1W 1N4001 D6
Q4
TIP102
100V
80W
4.7K 5% 1/8W R5
2.7K 5% 1/4W R26
GND
GUNGND
AGND
COILDRV1
470 5% 1/4W R24
+5V
Q2
2N3904
40V
0.5W
68 5% 1/4W R12
+20V
50V 1W 1N4001 D2
Q5
TIP102
100V
80W
4.7K 5% 1/8W R33
2.7K 5% 1/4W R27
GND
GUNGND
AGND
COILDRV2
470 5% 1/4W R25
+5V
Q3
2N3904
40V
0.5W
68 5% 1/4W R13
+20V
50V 1W 1N4001 D4
Q6
TIP102
100V
80W
4.7K 5% 1/8W R34
2.7K 5% 1/4W R28
GND
GUNGND
AGND



GUN COIL DRIVER BOARD
PAGE 3-7

	UPDATE REF. DES. FOR R33, R34, R5
ECN 36074	CHANGE NPR — DATE 2-23-94

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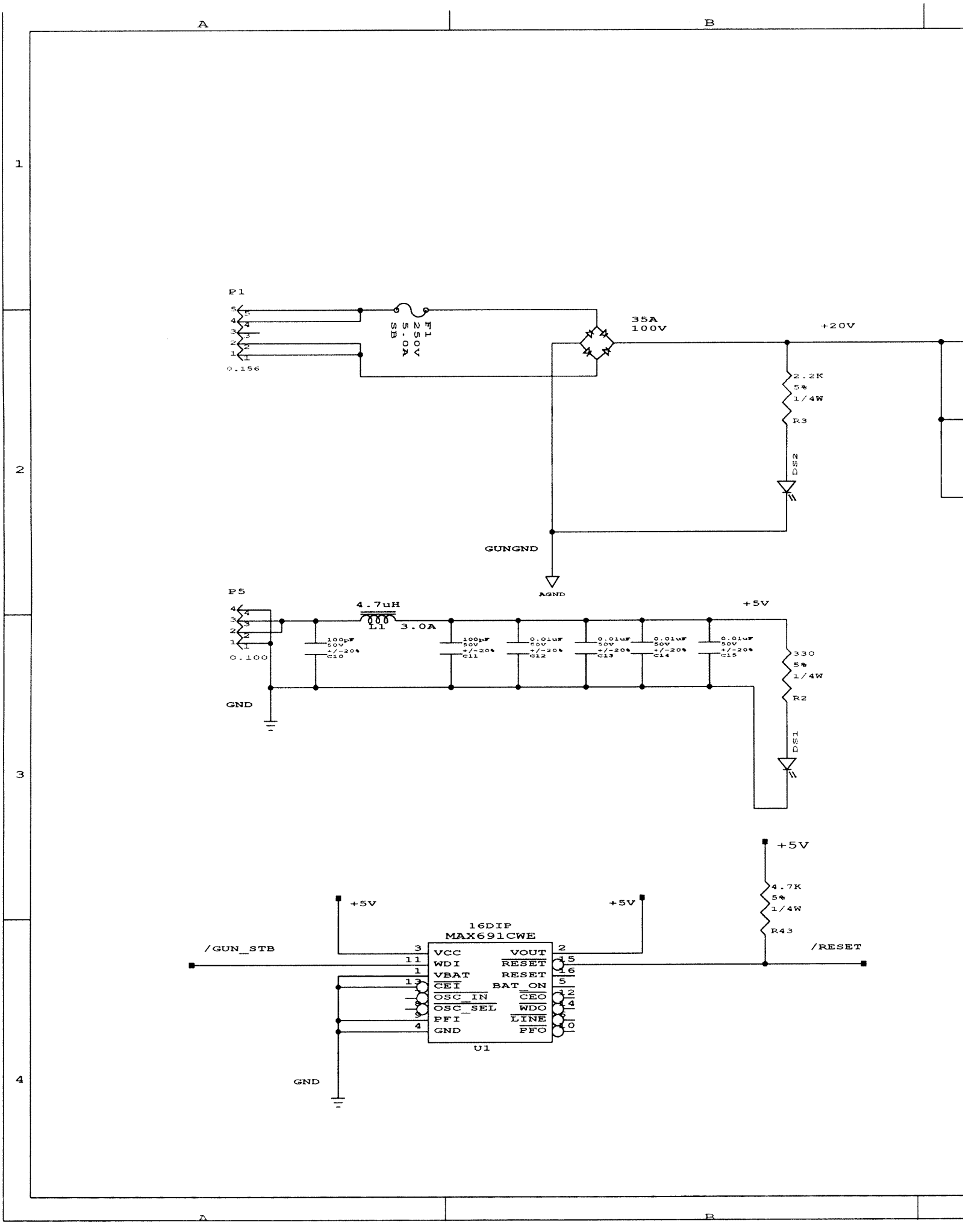
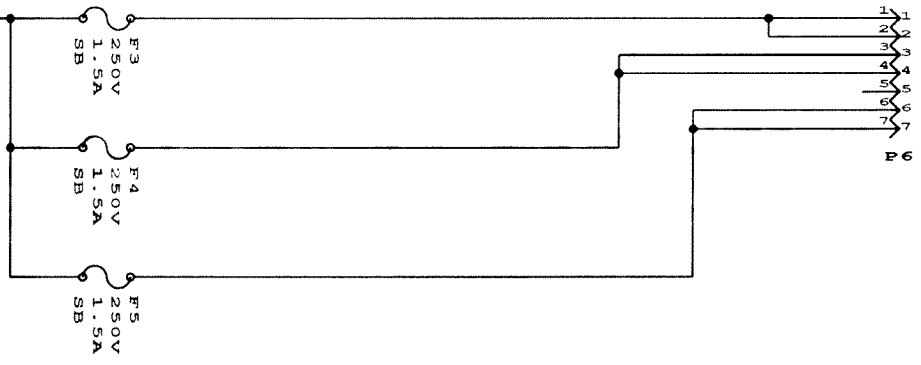
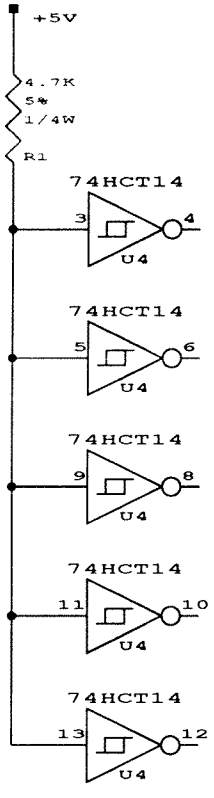
PROJECT ENG. P COX	1ST PROJ. NO. 40040 — DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY P COX — DATE	1ST USEAGE A-17876 — DATE	TITLE GUNDRVR
CHECKED 5-13-1994_13:45 — DATE	CURRENT PROJ. 40040 — DATE	
APPROVED — DATE	SHEET 2 OF 3	PART NO. 16-9554 — REV. 1


A
B
1
2
3
4
P1
0.156
F1
250V
5.0A
SB
35A
100V
+20V
2.2K
5%
1/4W
R3
DS2
GUNGND
AGND
P5
0.100
4.7uH
L1 3.0A
100pF
50V
+/-20%
C10
C11
0.01uF
50V
+/-20%
C12
C13
C14
C15
GND
+5V
330
5%
1/4W
R2
DS1
+5V
4.7K
5%
1/4W
R43
/RESET
16DIP
MAX691CWE
/GUN_STB
VCC
WDI
VBAT
CEI
OSC_IN
OSC_SEL
PFI
GND
VOUT
RESET
RESET
BAT_ON
CEO
WDO
LINE
PFO
U1
GND





GUN COIL DRIVER BOARD
PAGE 3-8

	ADD REF. DES. FOR F1
ECN 36074	CHANGE NPR — DATE 2-23-94

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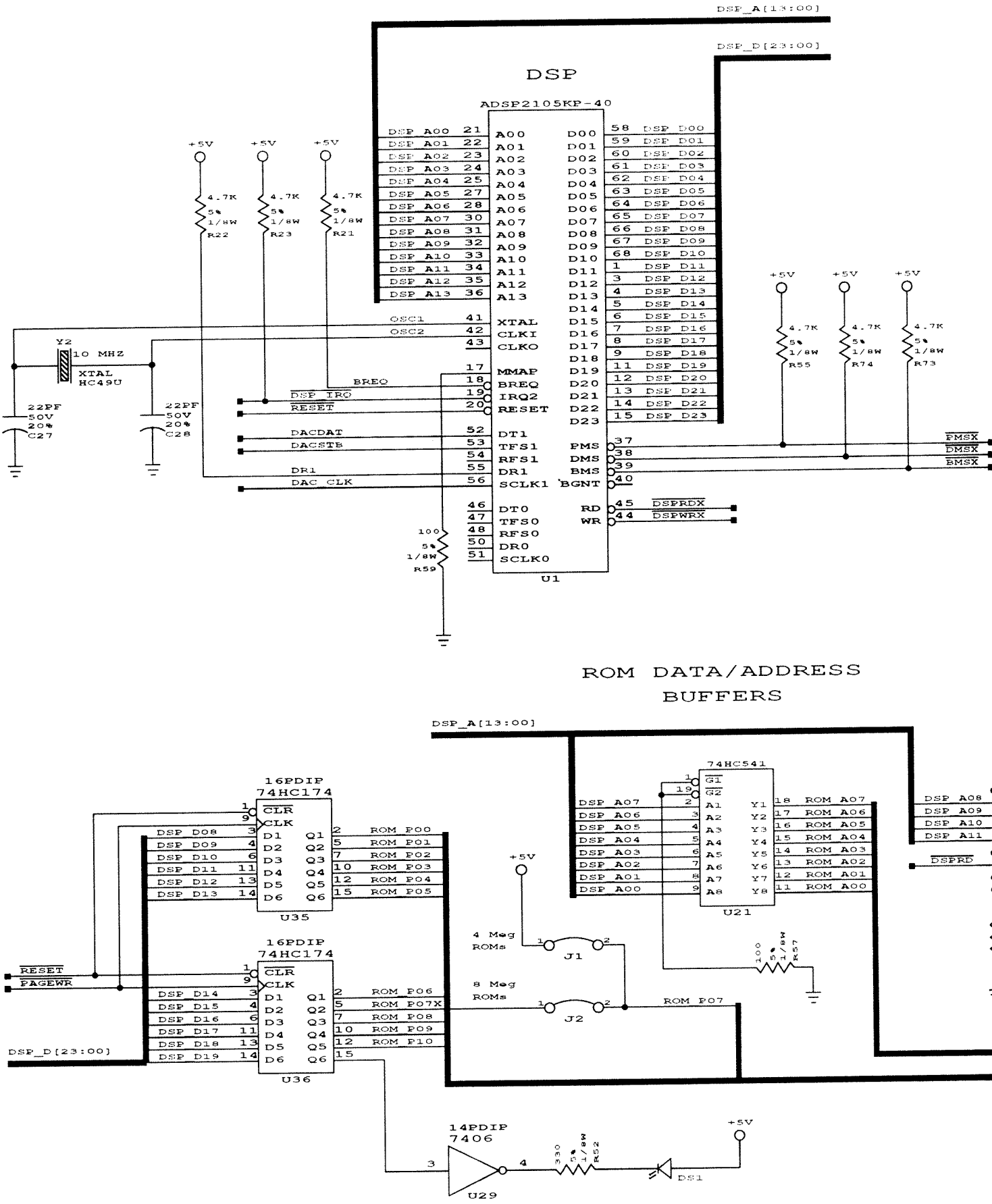
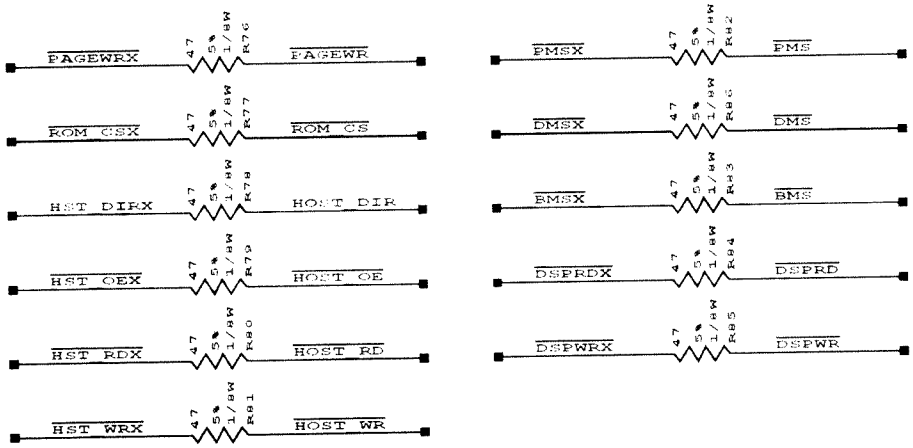
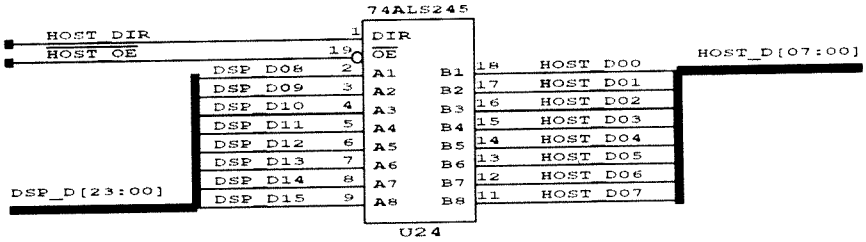
PROJECT ENG. P COX	1ST PROJ. NO. 40040 — DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY P COX — DATE	1ST USEAGE A-17876 — DATE	TITLE GUNDRVR
CHECKED 5-13-1994_13:46 — DATE	CURRENT PROJ. 40040 — DATE	
APPROVED — DATE	SHEET 3 OF 3	PART NO. 16-9554 — REV 1

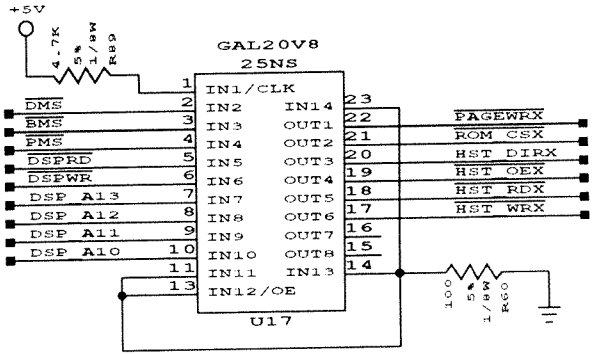

DSP
ADSP2105KP-40
DSP_A[13:00]
DSP_D[23:00]
U1
Y2
10 MHZ
XTAL
HC49U
22PF
50V
20%
C27
C28
4.7K
5%
1/8W
R22
R23
R21
R55
R74
R73
100
R59
DSP_IRQ
RESET
BREQ
DACDAT
DACSTB
DR1
DAC_CLK
PMS
DMS
BMS
BGNT
RD
WR
DSPRDX
DSPWRX
ROM DATA/ADDRESS BUFFERS
16PDIP
74HC174
U35
U36
ROM_P00
ROM_P01
ROM_P02
ROM_P03
ROM_P04
ROM_P05
ROM_P06
ROM_P07X
ROM_P08
ROM_P09
ROM_P10
74HC541
U21
ROM_A07
ROM_A06
ROM_A05
ROM_A04
ROM_A03
ROM_A02
ROM_A01
ROM_A00
4 Meg
ROMs
8 Meg
ROMs
J1
J2
ROM_P07
R57
14PDIP
7406
U29
330
R52
DS1
RESET
PAGEWR

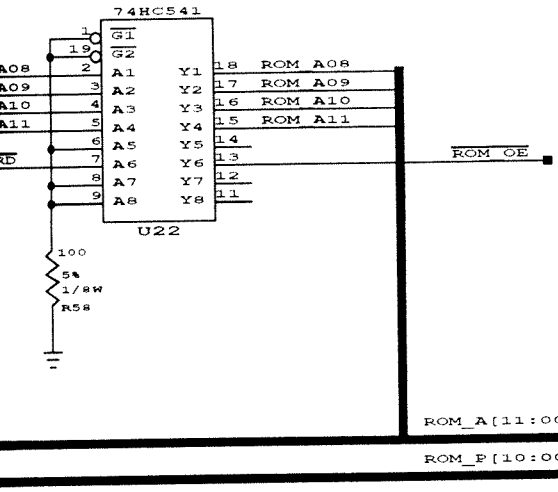


HOST BUFFER



CONTROL PAL



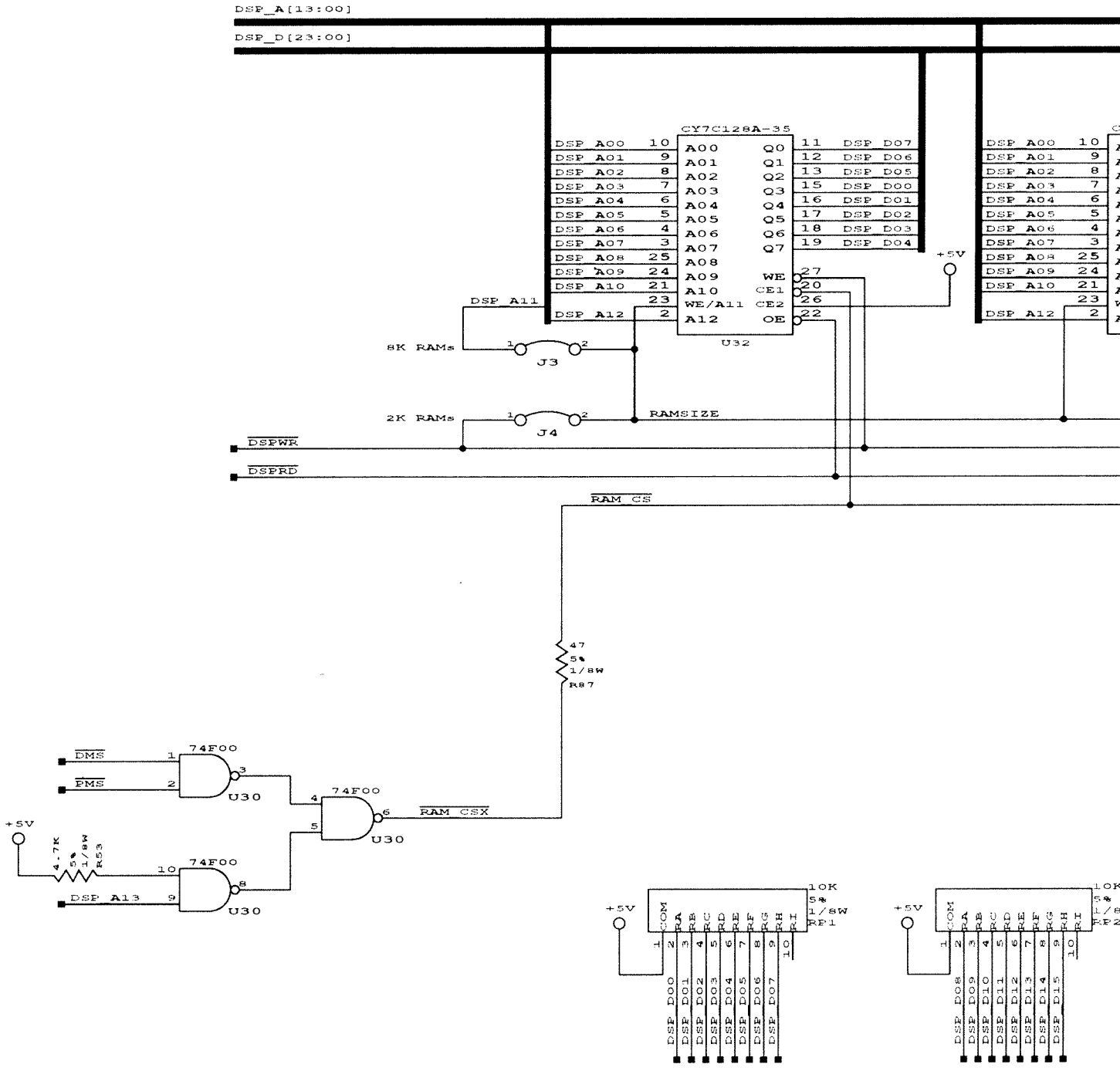


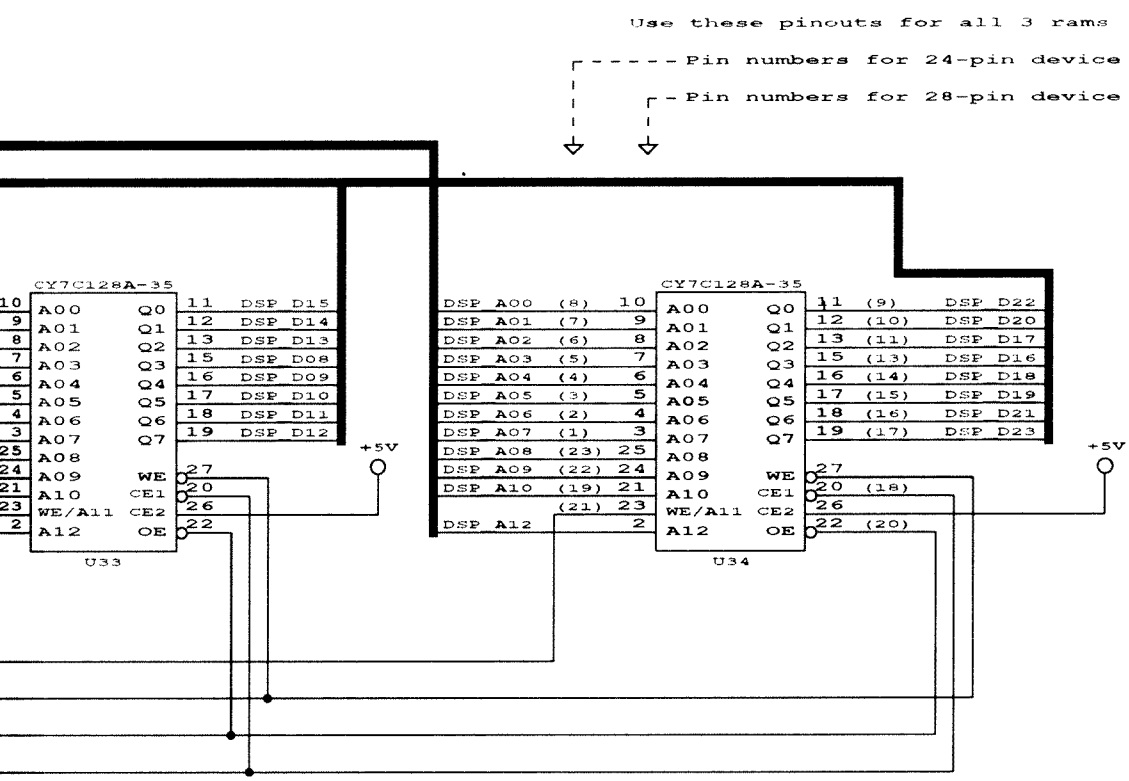
VIDEO SOUND BOARD
PAGE 3-9

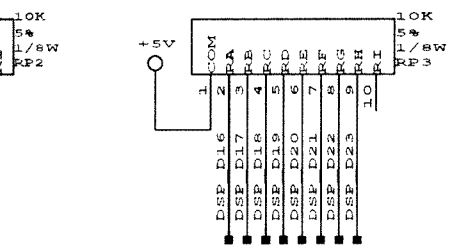
ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 11-19-1993_16:38	1ST USEAGE DATE	TITLE DCS Video Sound Board DSP/BUS Interface
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 1 OF 7	PART NO. 16-9615 REV. -


DSP_A[13:00]
DSP_D[23:00]
CY7C128A-35
DSP_A00
DSP_A01
DSP_A02
DSP_A03
DSP_A04
DSP_A05
DSP_A06
DSP_A07
DSP_A08
DSP_A09
DSP_A10
DSP_A12
A00
A01
A02
A03
A04
A05
A06
A07
A08
A09
A10
WE/A11
A12
Q0
Q1
Q2
Q3
Q4
Q5
Q6
Q7
WE
CE1
CE2
OE
DSP_D07
DSP_D06
DSP_D05
DSP_D00
DSP_D01
DSP_D02
DSP_D03
DSP_D04
U32
+5V
DSP_A11
8K RAMs
J3
2K RAMs
J4
RAMSIZE
DSPWR
DSPRD
RAM_CS
47
5%
1/8W
R87
74F00
DMS
PMS
U30
RAM_CSX
+5V
4.7K
5%
1/8W
R53
DSP_A13
10K
5%
1/8W
RP1
COM
DSP_D00
DSP_D01
DSP_D02
DSP_D03
DSP_D04
DSP_D05
DSP_D06
DSP_D07
DSP_D08
DSP_D09
DSP_D10
DSP_D11
DSP_D12
DSP_D13
DSP_D14
DSP_D15



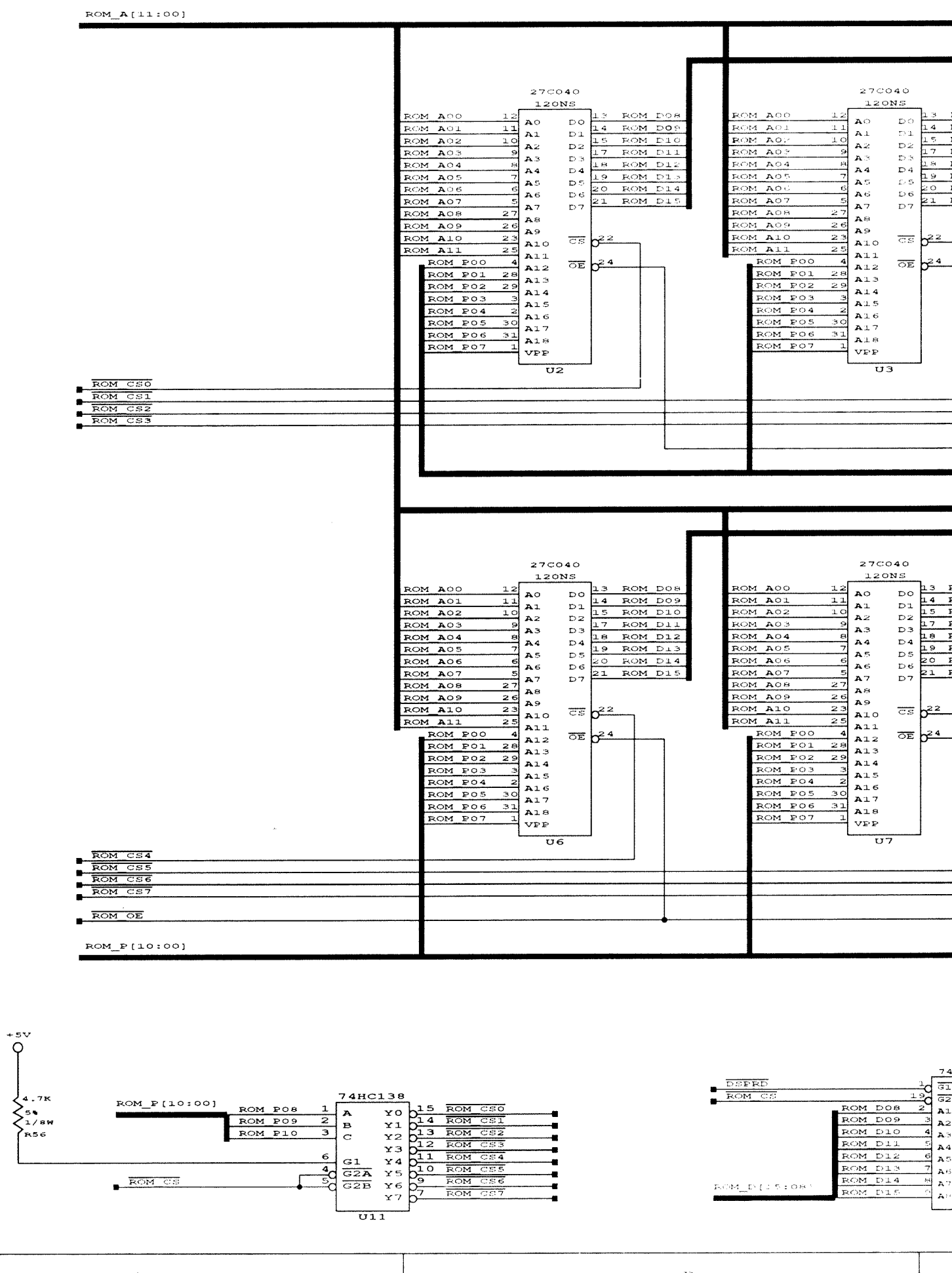


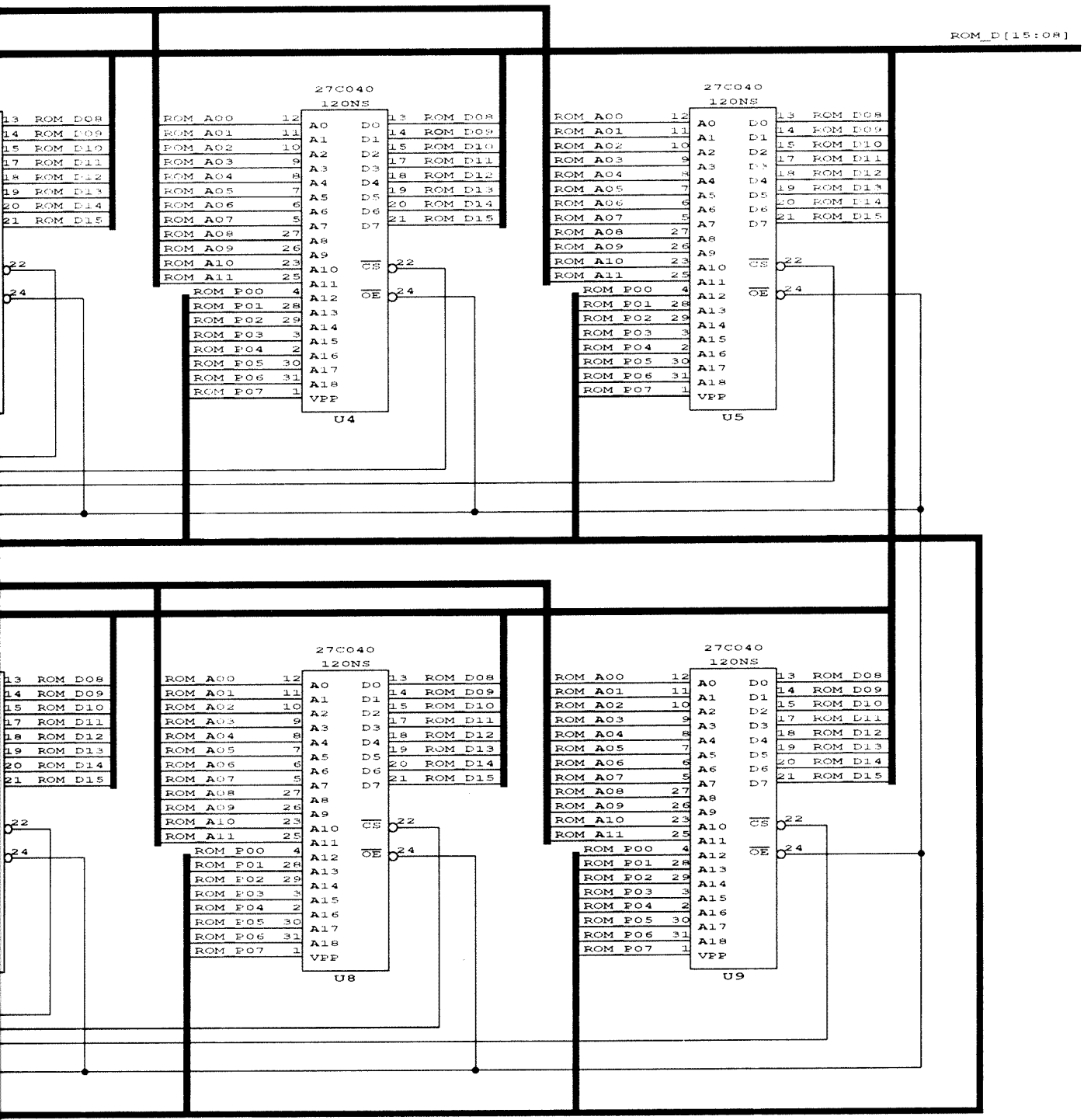
VIDEO SOUND BOARD
PAGE 3-10

ECN	CHANGE	DATE

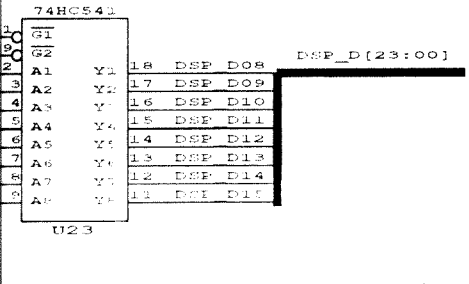
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 11-19-1993 13:41	1ST USEAGE DATE	TITLE DCS Video Sound Board System RAMs
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 2 OF 7	PART NO. 16-9615 REV. -


ROM_A[11:00]
27C040
120NS
U2
U3
U6
U7
ROM_CS0
ROM_CS1
ROM_CS2
ROM_CS3
ROM_CS4
ROM_CS5
ROM_CS6
ROM_CS7
ROM_OE
ROM_P[10:00]
+5V
4.7K
5%
1/8W
R56
74HC138
U11
ROM_CS
DSPRD
ROM_D[15:08]



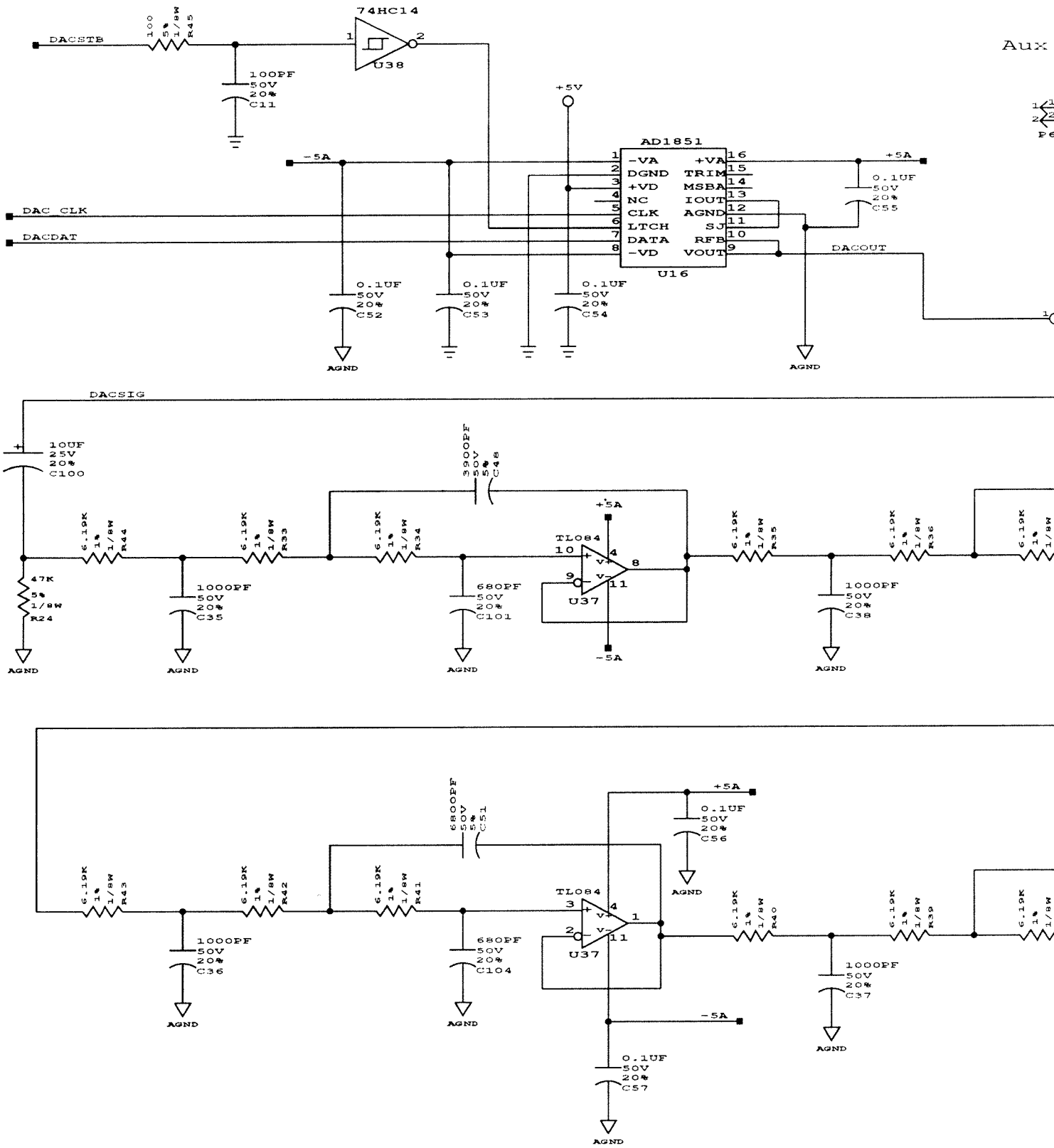
VIDEO SOUND BOARD
PAGE 3-11



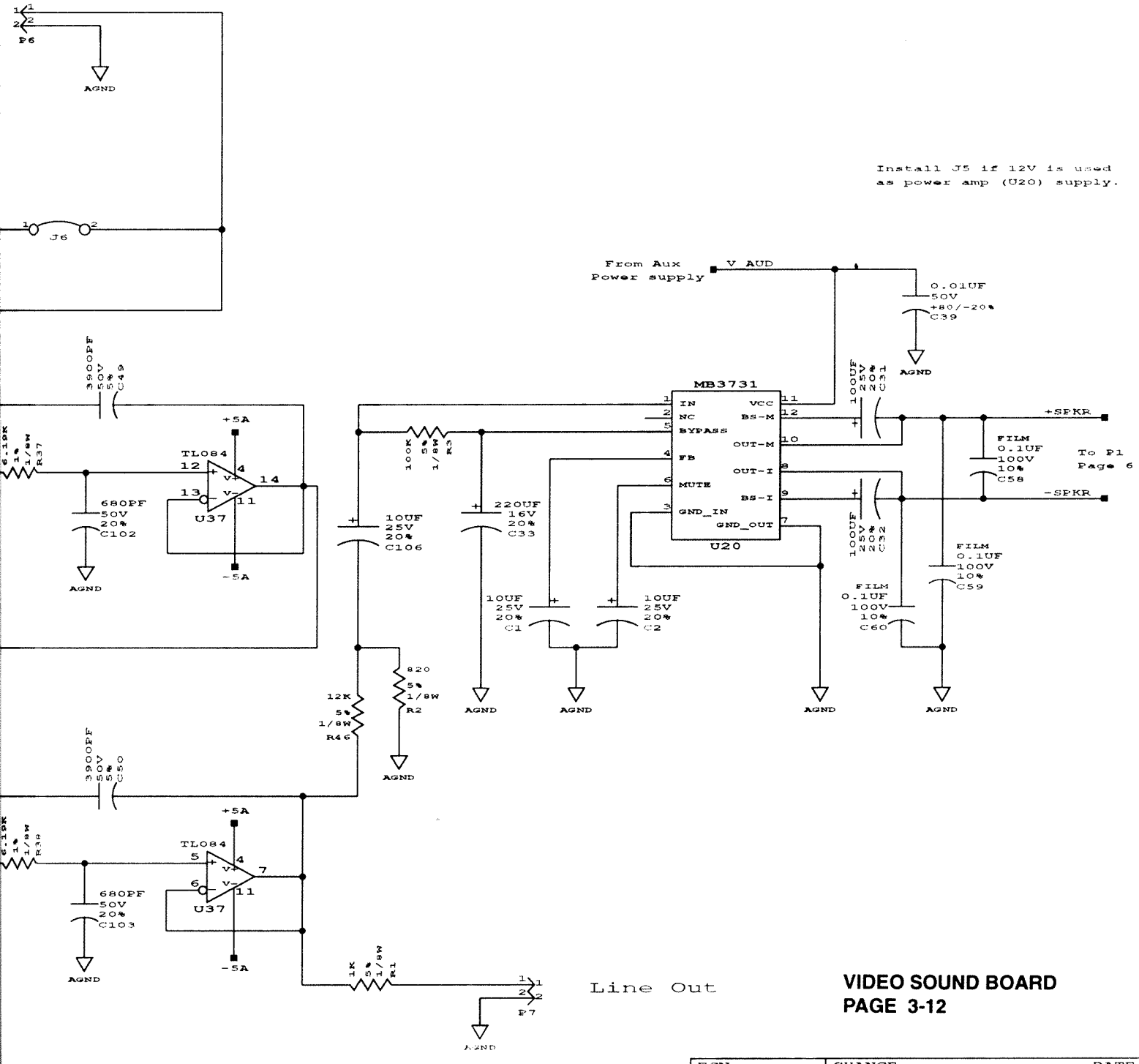
ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 11-19-1993_14:03	1ST USEAGE DATE	TITLE DCS Video Sound Board Program/Data Roms
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 3 OF 7	PART NO. 16-9615 REV. -


Aux
DACSTB
100
5%
1/8W
R45
74HC14
U38
100PF
50V
20%
C11
+5V
AD1851
-VA
DGND
+VD
NC
CLK
LTCH
DATA
-VD
+VA
TRIM
MSBA
IOUT
AGND
SJ
RFB
VOUT
U16
-5A
+5A
0.1UF
50V
20%
C55
DAC_CLK
DACDAT
DACOUT
0.1UF
50V
20%
C52
0.1UF
50V
20%
C53
0.1UF
50V
20%
C54
AGND
DACSIG
10UF
25V
20%
C100
3900PF
50V
5%
C48
6.19K
1%
1/8W
R44
6.19K
1%
1/8W
R33
6.19K
1%
1/8W
R34
TL084
U37
6.19K
1%
1/8W
R35
6.19K
1%
1/8W
R36
47K
5%
1/8W
R24
1000PF
50V
20%
C35
680PF
50V
20%
C101
1000PF
50V
20%
C38
6800PF
50V
5%
C51
0.1UF
50V
20%
C56
6.19K
1%
1/8W
R43
6.19K
1%
1/8W
R42
6.19K
1%
1/8W
R41
TL084
U37
6.19K
1%
1/8W
R40
6.19K
1%
1/8W
R39
1000PF
50V
20%
C36
680PF
50V
20%
C104
1000PF
50V
20%
C37
0.1UF
50V
20%
C57

ux In



VIDEO SOUND BOARD
PAGE 3-12

ECN	CHANGE	DATE

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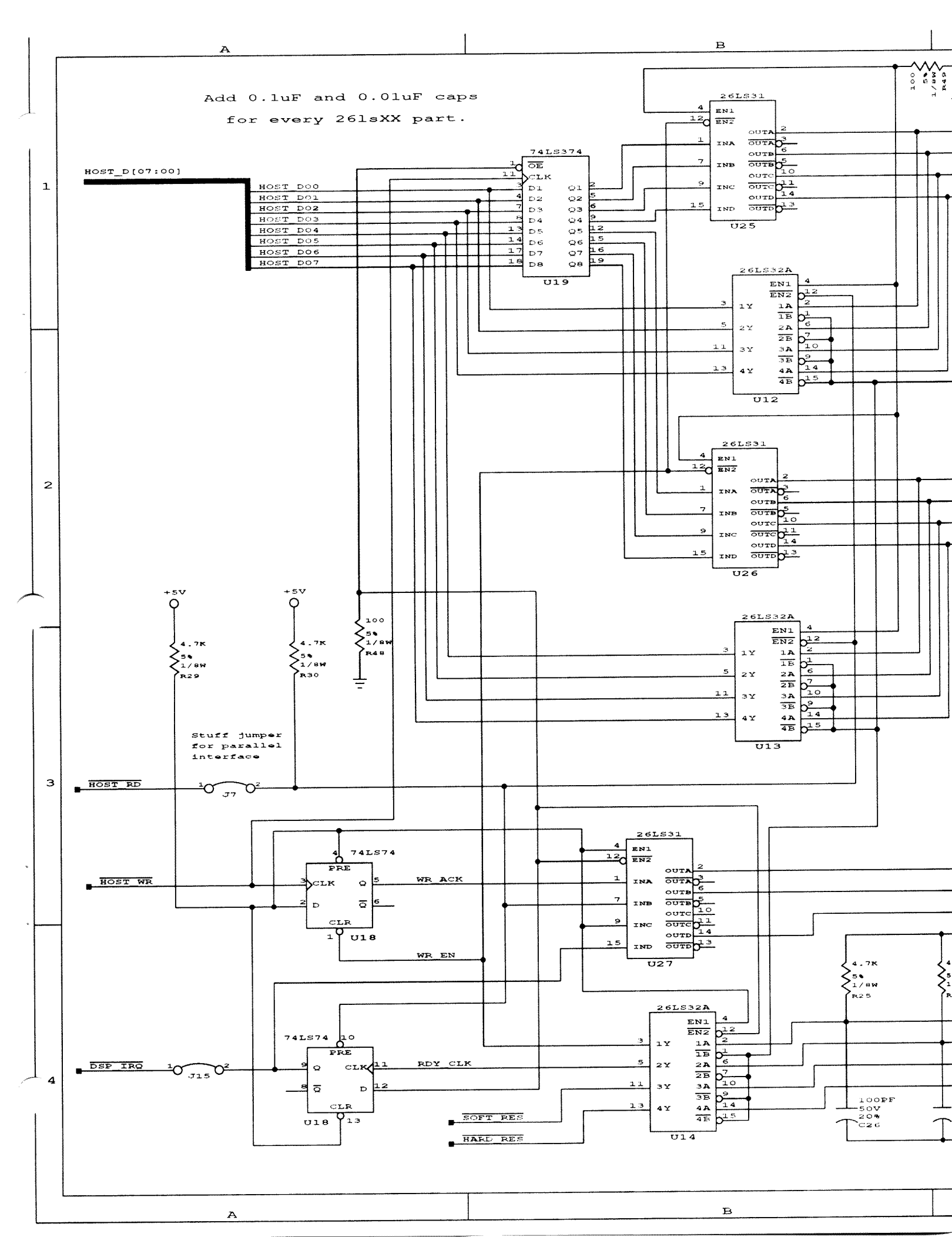
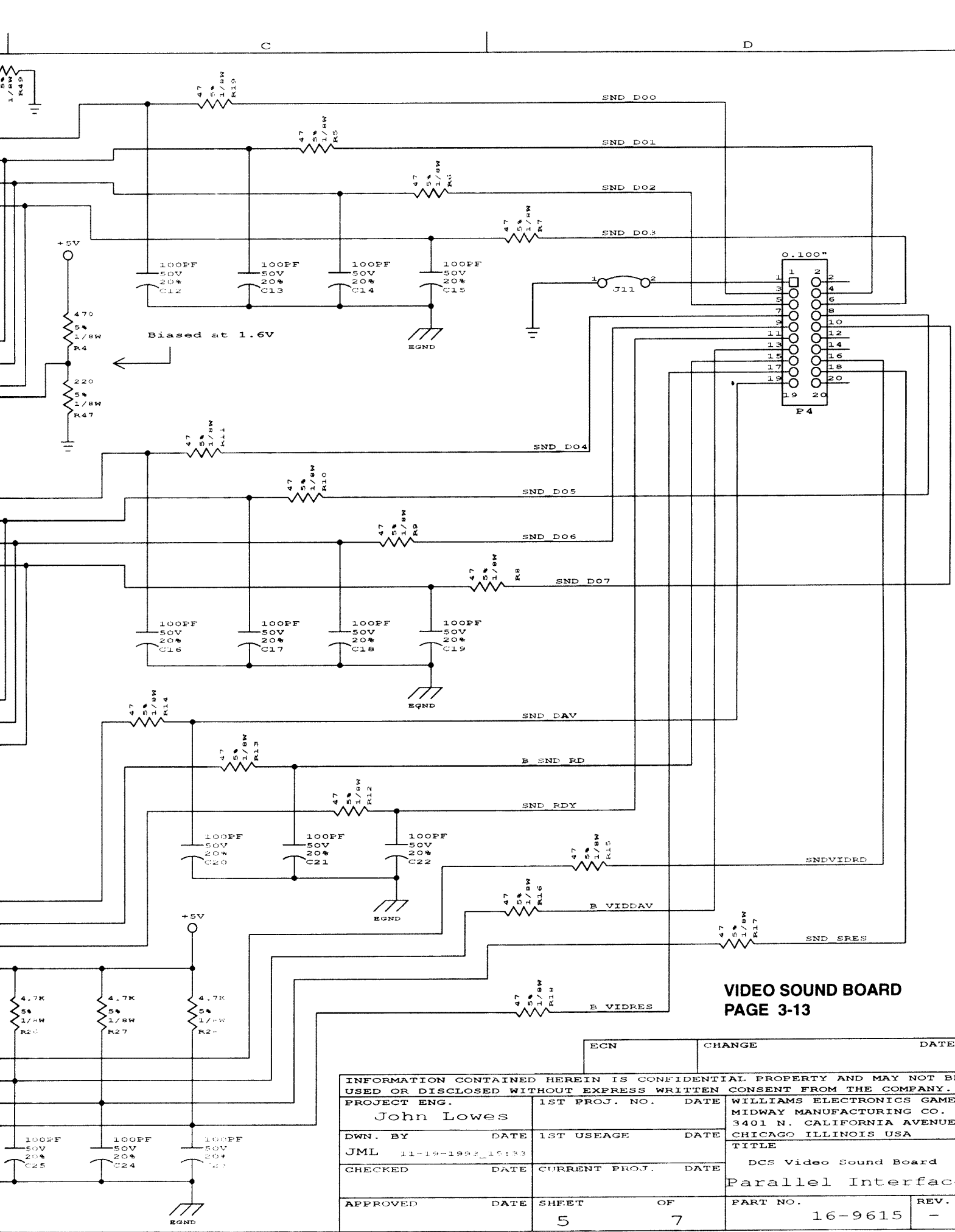
PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:22	1ST USEAGE DATE	TITLE DCS Video Sound Board Anti-Aliasing Filter
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 4 OF 7	PART NO. 16-9615 REV. -


Add 0.1uF and 0.01uF caps
for every 26lsXX part.
HOST_D[07:00]
HOST_D00
HOST_D01
HOST_D02
HOST_D03
HOST_D04
HOST_D05
HOST_D06
HOST_D07
74LS374
U19
26LS31
U25
26LS32A
U12
26LS31
U26
26LS32A
U13
+5V
4.7K
5%
1/8W
R29
+5V
4.7K
5%
1/8W
R30
100
5%
1/8W
R48
Stuff jumper
for parallel
interface
HOST_RD
J7
HOST_WR
74LS74
U18
WR_ACK
WR_EN
26LS31
U27
DSP_IRQ
J15
74LS74
U18
RDY_CLK
26LS32A
U14
SOFT_RES
HARD_RES
4.7K
5%
1/8W
R25
100PF
50V
20%
C26



VIDEO SOUND BOARD
PAGE 3-13

ECN	CHANGE	DATE

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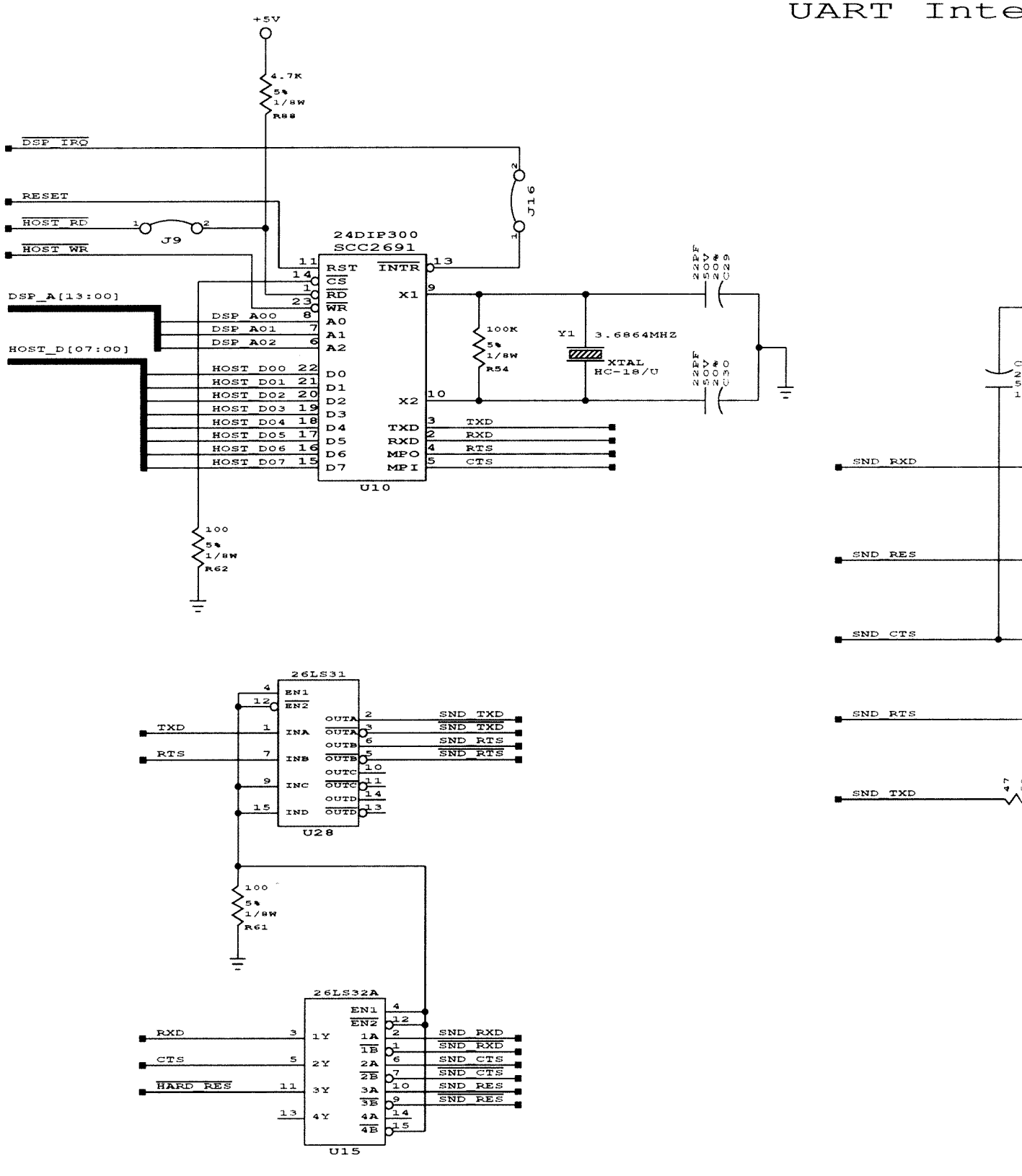
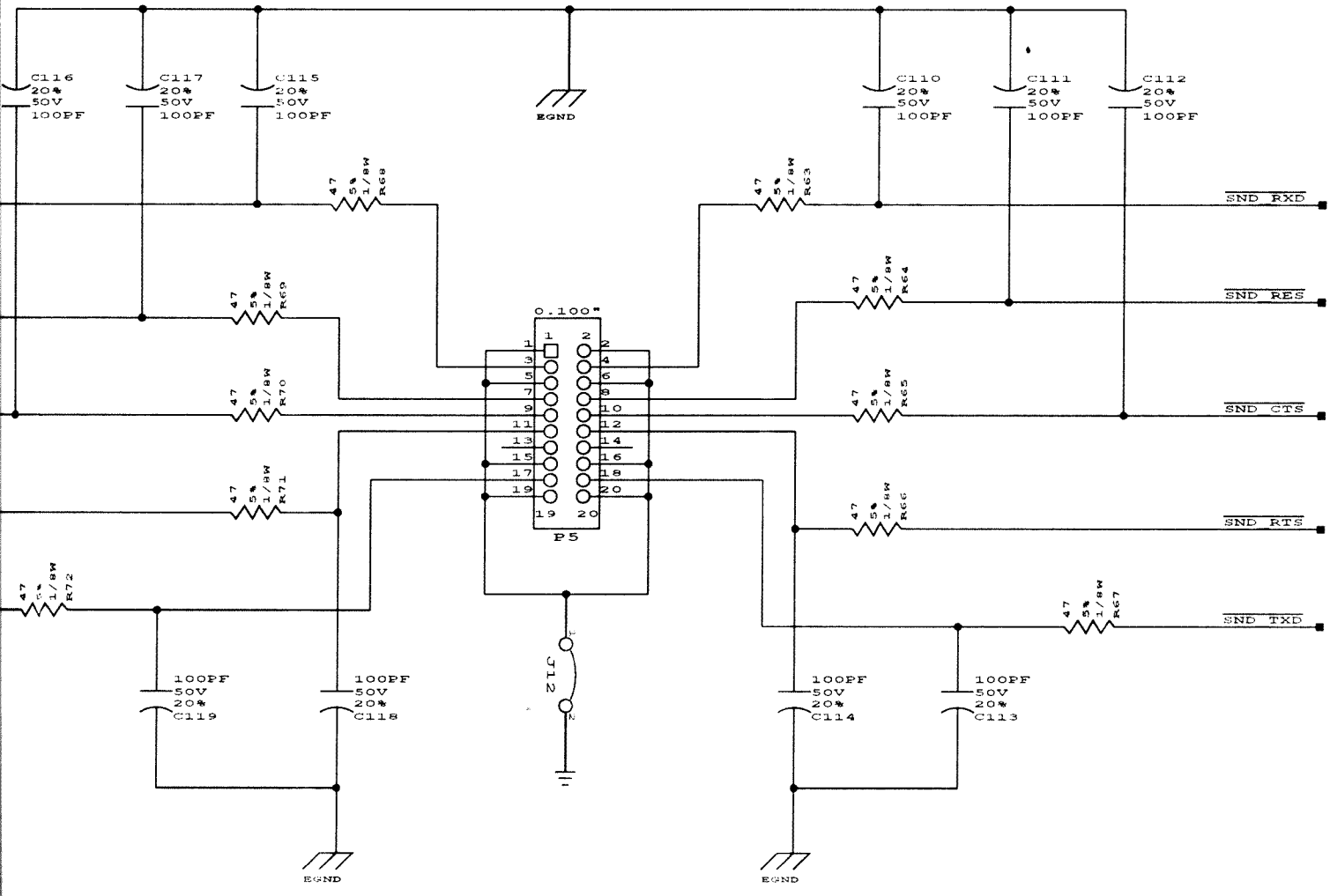
PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 11-19-1993_15:33	1ST USEAGE DATE	TITLE DCS Video Sound Board Parallel Interface
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 5 OF 7	PART NO. 16-9615 REV. -


UART Inte
+5V
4.7K
5%
1/8W
R88
DSP_IRQ
RESET
HOST_RD
HOST_WR
J9
J16
24DIP300
SCC2691
DSP_A[13:00]
HOST_D[07:00]
DSP_A00
DSP_A01
DSP_A02
HOST_D00
HOST_D01
HOST_D02
HOST_D03
HOST_D04
HOST_D05
HOST_D06
HOST_D07
RST
CS
RD
WR
A0
A1
A2
D0
D1
D2
D3
D4
D5
D6
D7
INTR
X1
X2
TXD
RXD
MPO
MPI
U10
100K
5%
1/8W
R54
Y1
3.6864MHZ
XTAL
HC-18/U
22PF
50V
20%
C29
C30
100
5%
1/8W
R62
SND_RXD
SND_RES
SND_CTS
SND_RTS
SND_TXD
26LS31
EN1
EN2
INA
INB
INC
IND
OUTA
OUTB
OUTC
OUTD
U28
100
5%
1/8W
R61
26LS32A
1Y
2Y
3Y
4Y
1A
1B
2A
2B
3A
3B
4A
4B
U15
HARD_RES

terface



VIDEO SOUND BOARD
PAGE 3-14

ECN	CHANGE	DATE

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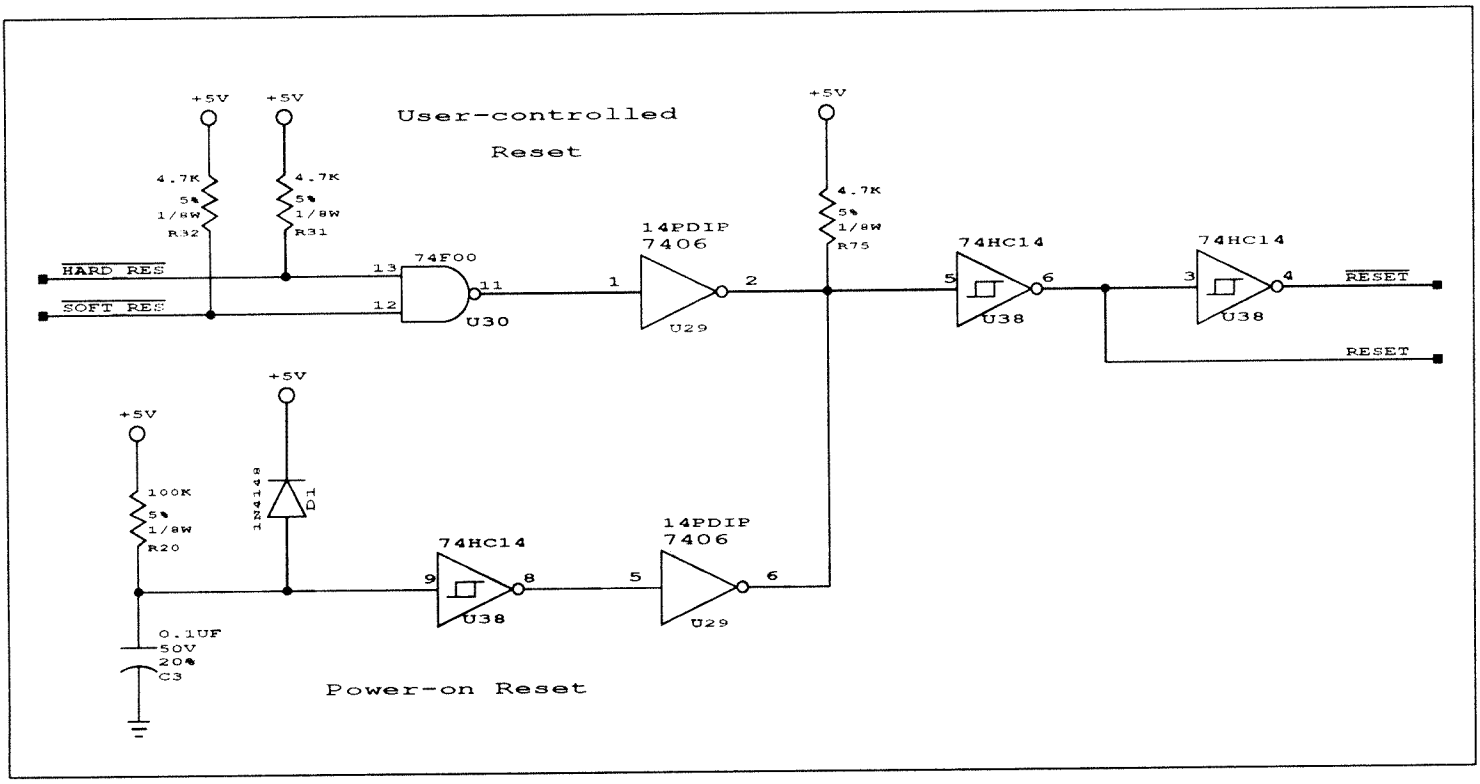
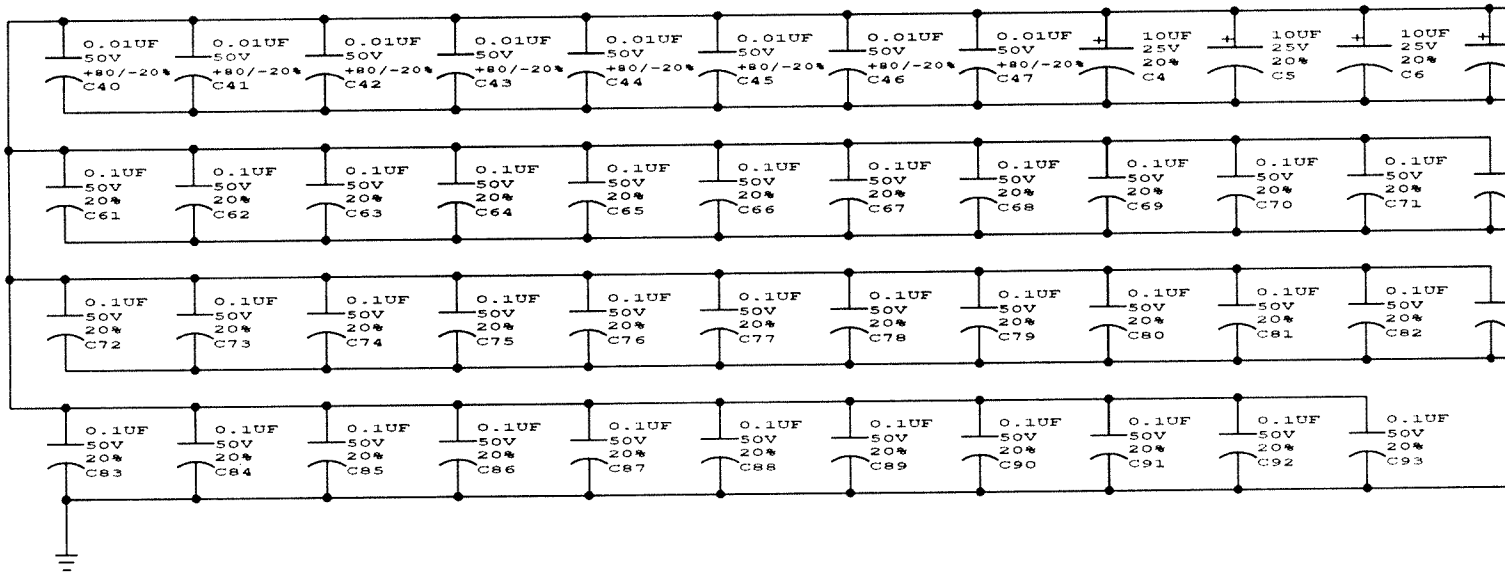
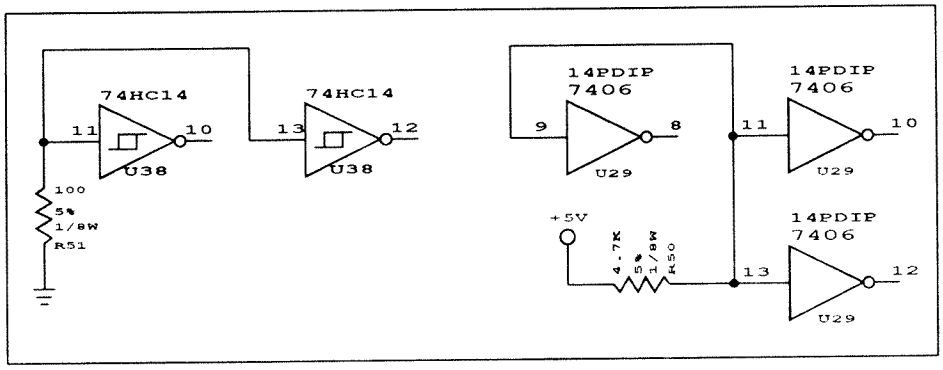
PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 11-19-1993_15:53	1ST USEAGE DATE	TITLE DCS Video Sound Board UART Serial Interface
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 6 OF 7	PART NO. 16-9615 REV. -

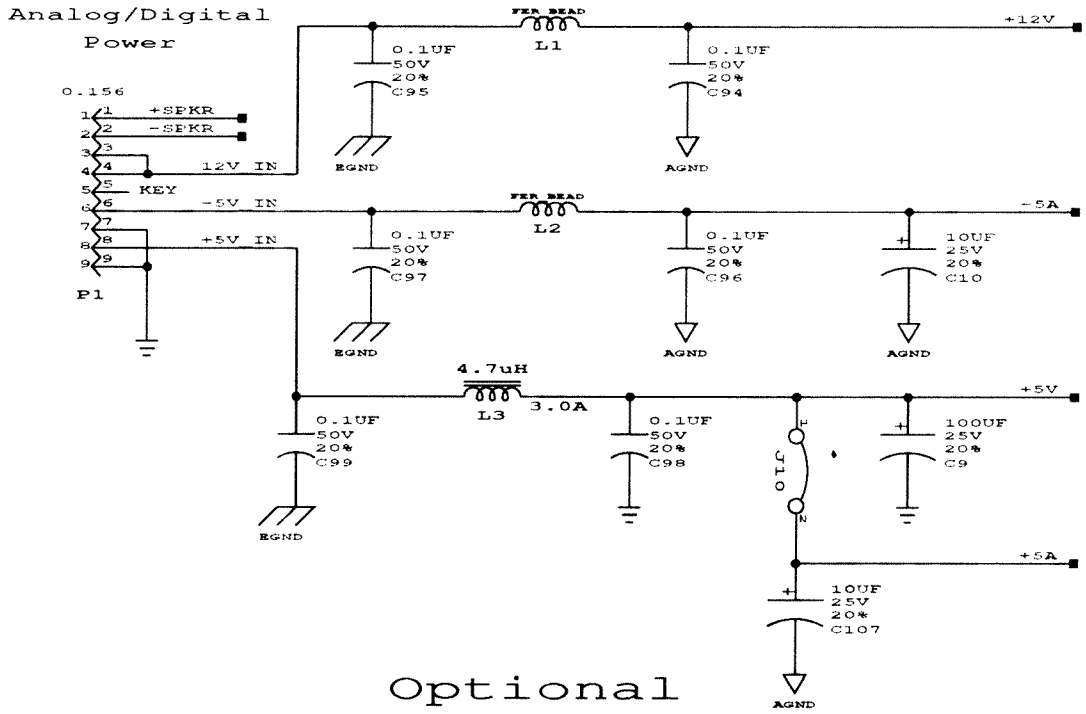
Reset Circuit





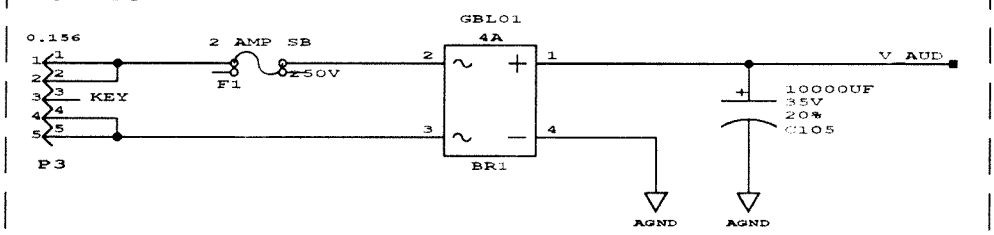
Spare Gates

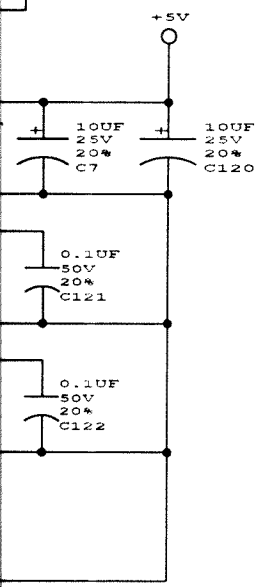


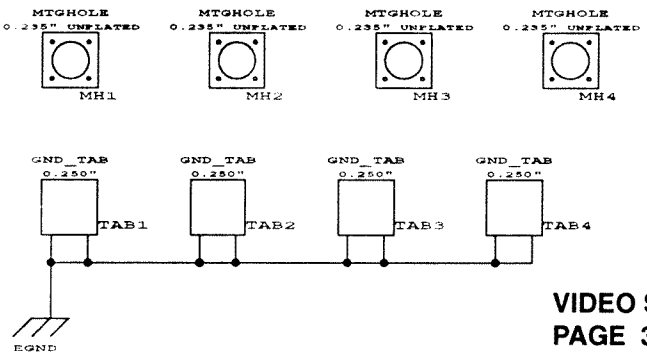


Optional

Aux Power: If used, then do NOT stuff C34, C94, C95, L1, and J5.
This circuit replaces +12V as the power amp (U20) supply.

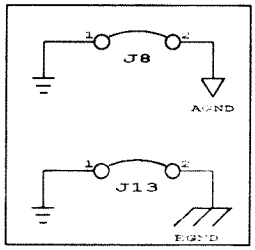






VIDEO SOUND BOARD
PAGE 3-15

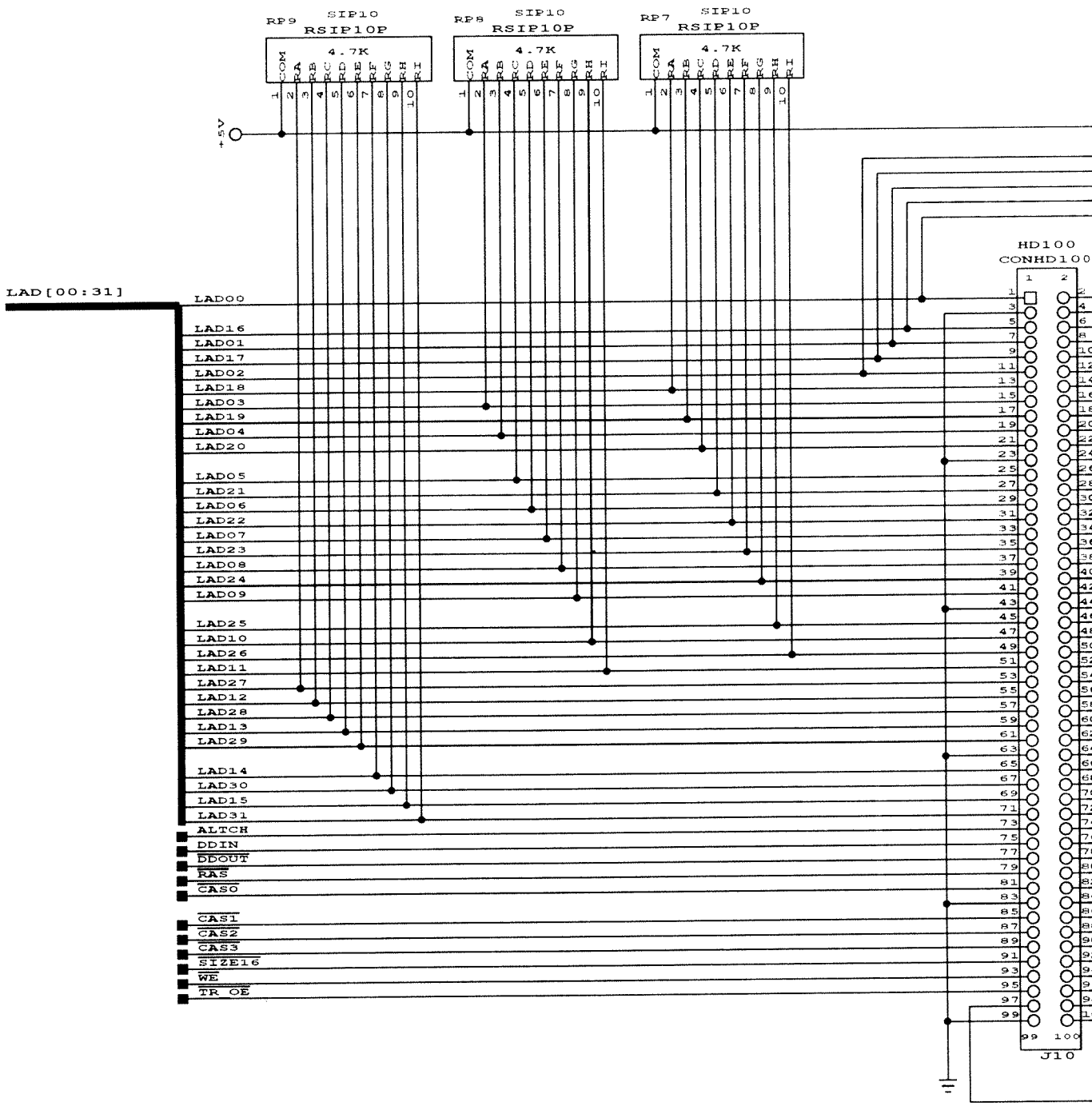
GROUND ISOLATION

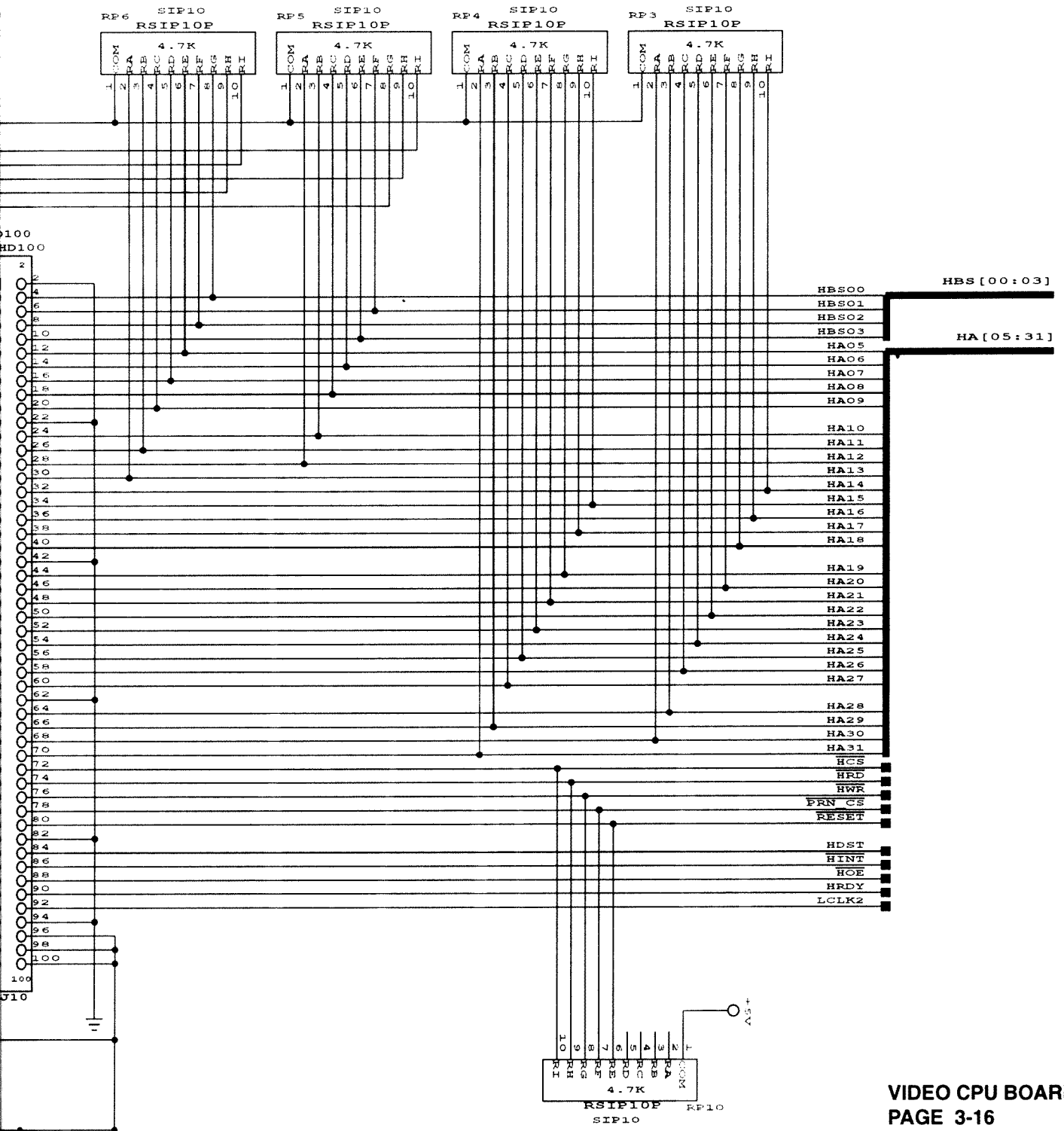


ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. John Lowes	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 12-28-1993_10:14	1ST USEAGE DATE	TITLE DCS Video Sound Board Reset and Power
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 7 OF 7	PART NO. 16-9615 REV. -


RP9 SIP10 RSIP10P
RP8 SIP10 RSIP10P
RP7 SIP10 RSIP10P
4.7K
COM RA RB RC RD RE RF RG RH RI
+5V
HD100
CONHD100
J10
LAD[00:31]
LAD00
LAD16
LAD01
LAD17
LAD02
LAD18
LAD03
LAD19
LAD04
LAD20
LAD05
LAD21
LAD06
LAD22
LAD07
LAD23
LAD08
LAD24
LAD09
LAD25
LAD10
LAD26
LAD11
LAD27
LAD12
LAD28
LAD13
LAD29
LAD14
LAD30
LAD15
LAD31
ALTCH
DDIN
DDOUT
RAS
CAS0
CAS1
CAS2
CAS3
SIZE16
WE
TR OE

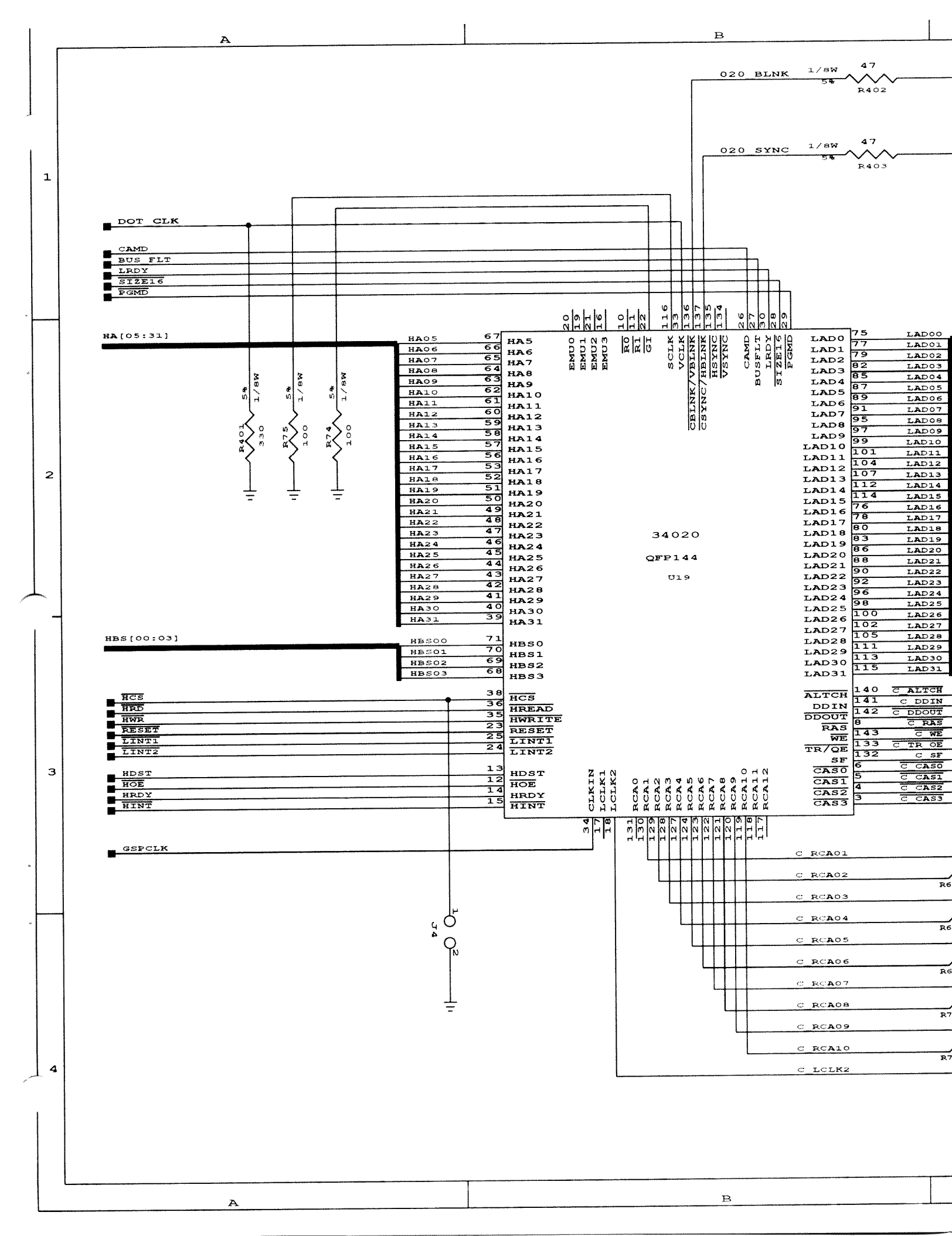


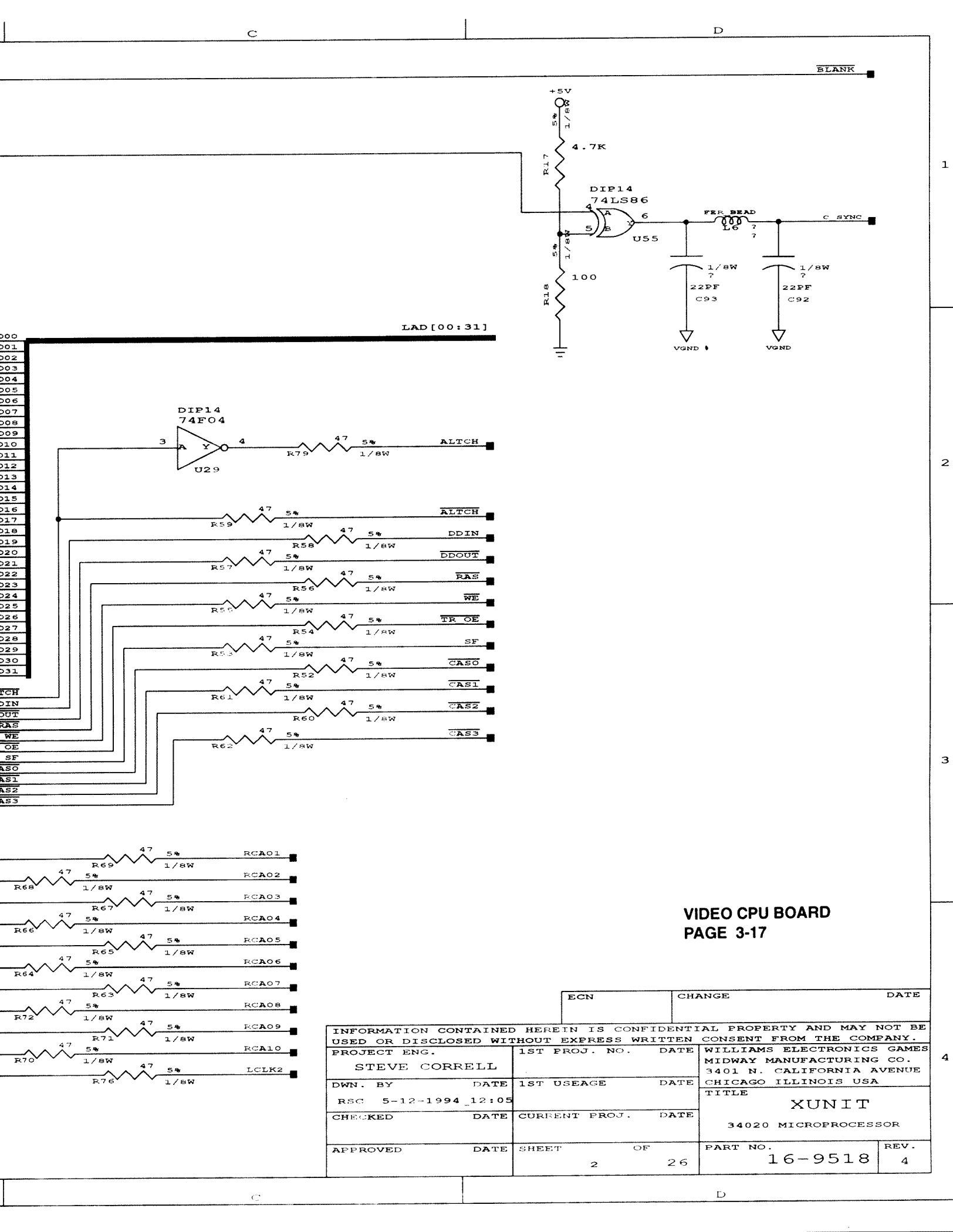
VIDEO CPU BOARD
PAGE 3-16

ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:04	1ST USEAGE DATE	TITLE XUNIT HOST INTERFACE
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 1 OF 26	PART NO. 16-9518 REV. 4


020 BLNK
1/8W
5%
47
R402
020 SYNC
1/8W
5%
47
R403
DOT CLK
CAMD
BUS FLT
LRDY
SIZE16
PGMD
HA[05:31]
HBS[00:03]
R401
330
R75
100
R74
100
1/8W
5%
34020
QFP144
U19
HCS
HRD
HWR
RESET
LINT1
LINT2
HDST
HOE
HRDY
HINT
GSPCLK
J4
C_RCA01
C_RCA02
C_RCA03
C_RCA04
C_RCA05
C_RCA06
C_RCA07
C_RCA08
C_RCA09
C_RCA10
C_LCLK2
A
B
1
2
3
4

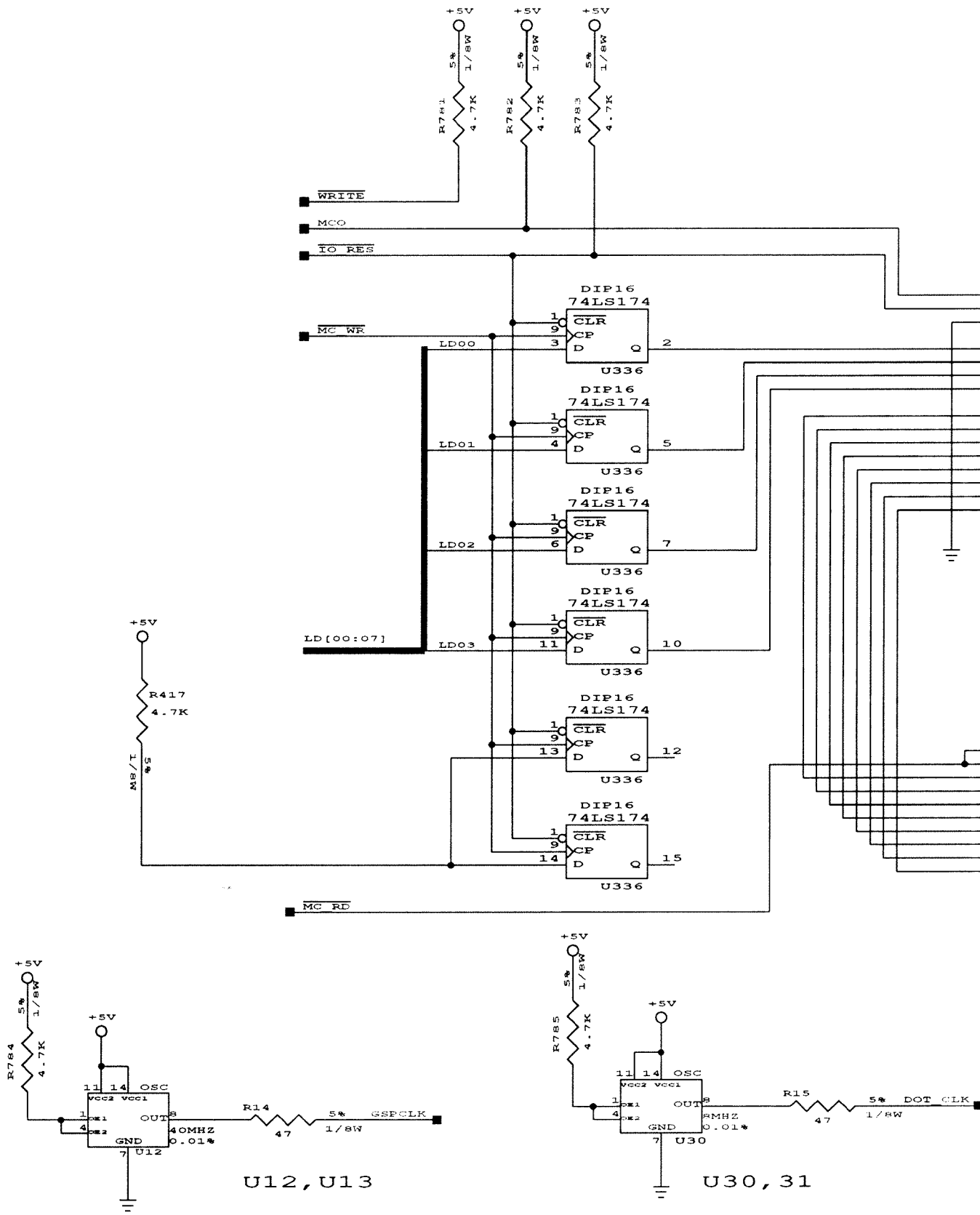


VIDEO CPU BOARD
PAGE 3-17

ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

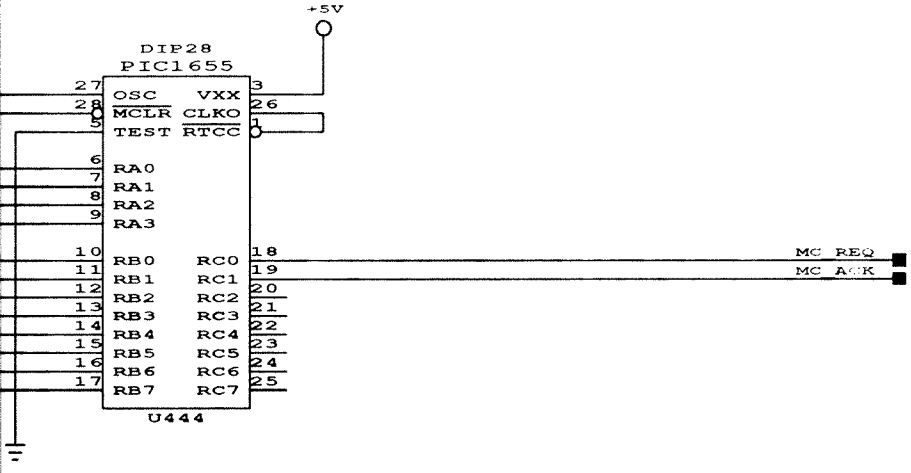
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994 12:05	1ST USEAGE DATE	TITLE XUNIT 34020 MICROPROCESSOR
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 2 OF 26	PART NO. 16-9518 REV. 4

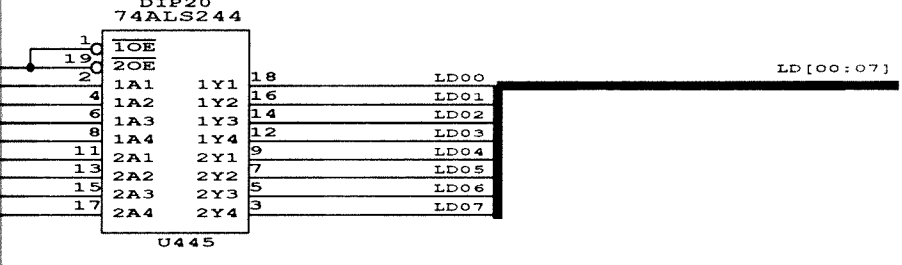


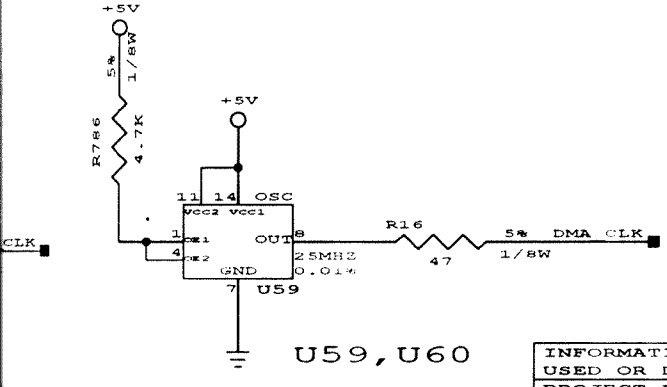
U12,U13

U30,31

NOTE : OSCILLATORS HAVE DUAL FOOTPRIN
WITH TWO REFDES ATTRIBUTES.
REFDES USED IS DEPENDANT UPON







VIDEO CPU BOARD
PAGE 3-18

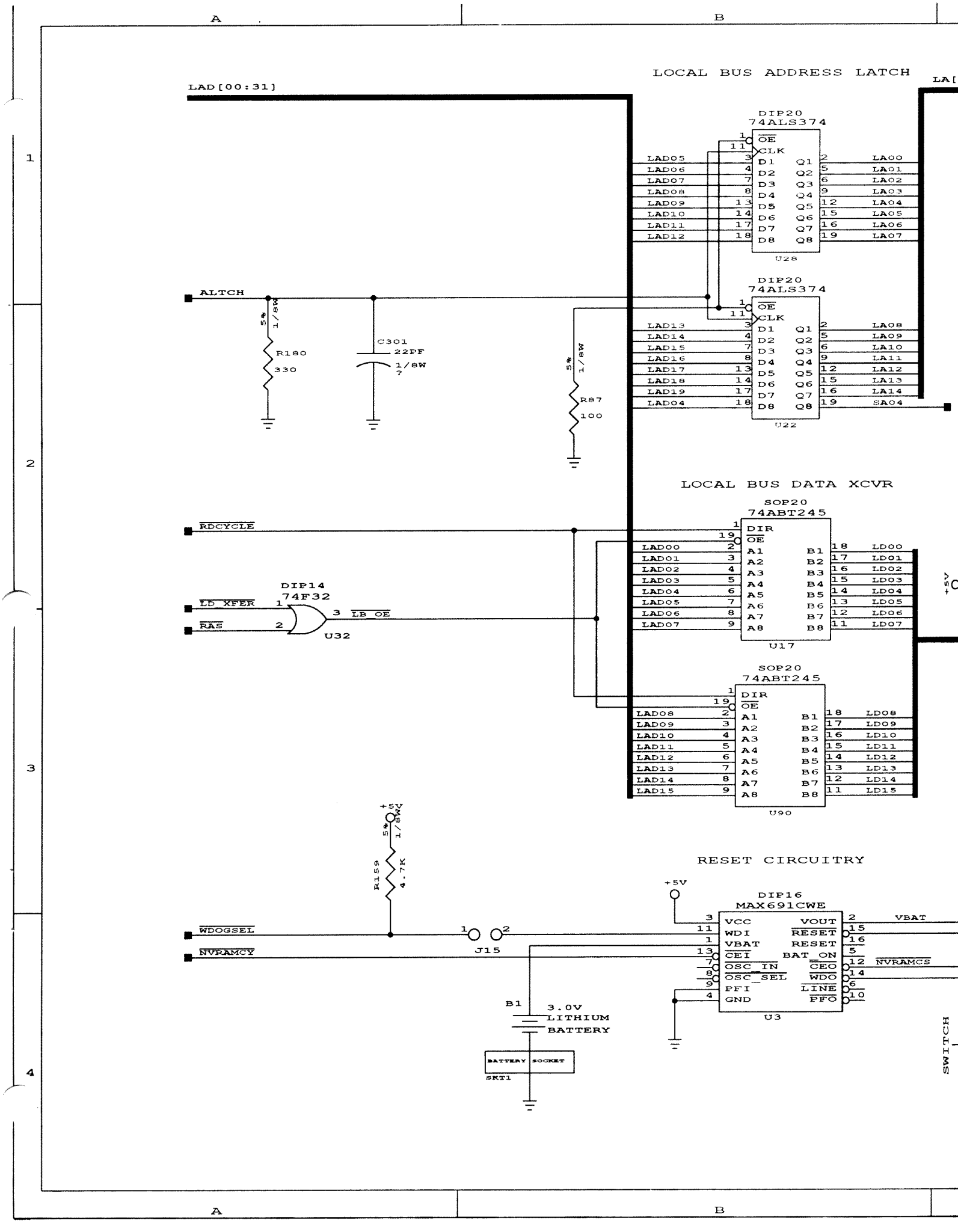
ECN	CHANGE	DATE

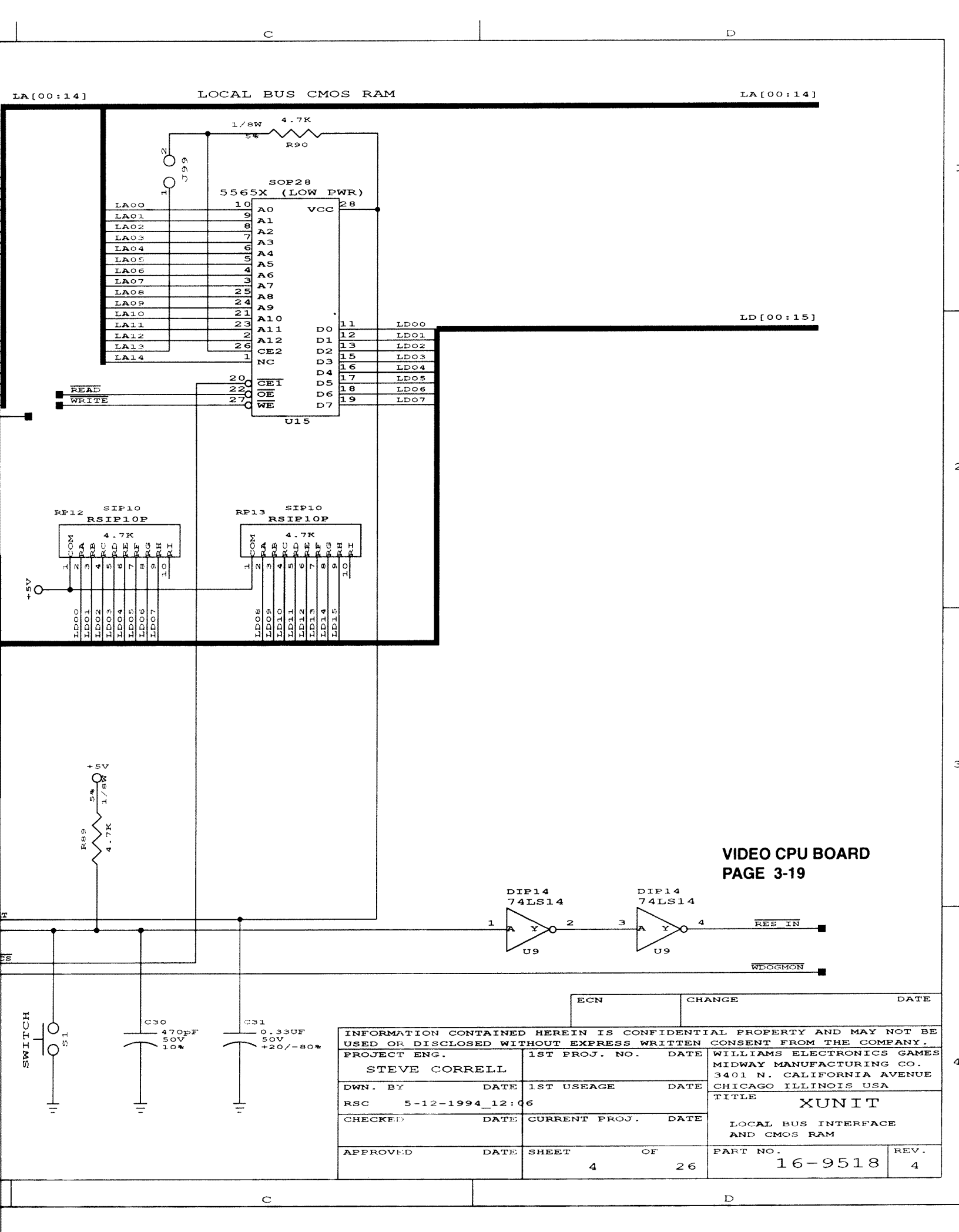
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:06	1ST USEAGE DATE	TITLE XUNIT CAN BUS AND CLOCK GENERATION CIRCUITRY
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 3 OF 26	PART NO. 16-9518 REV. 4

RINTS

ON PACKAGE USED.


LOCAL BUS ADDRESS LATCH
LAD[00:31]
DIP20
74ALS374
U28
U22
ALTCH
R180
330
C301
22PF
R87
100
LOCAL BUS DATA XCVR
SOP20
74ABT245
U17
U90
RDCYCLE
LD_XFER
RAS
DIP14
74F32
U32
LB_OE
RESET CIRCUITRY
R159
4.7K
WDOGSEL
NVRAMCY
J15
DIP16
MAX691CWE
U3
VBAT
NVRAMCS
B1
3.0V
LITHIUM
BATTERY
BATTERY SOCKET
SKT1
SWITCH

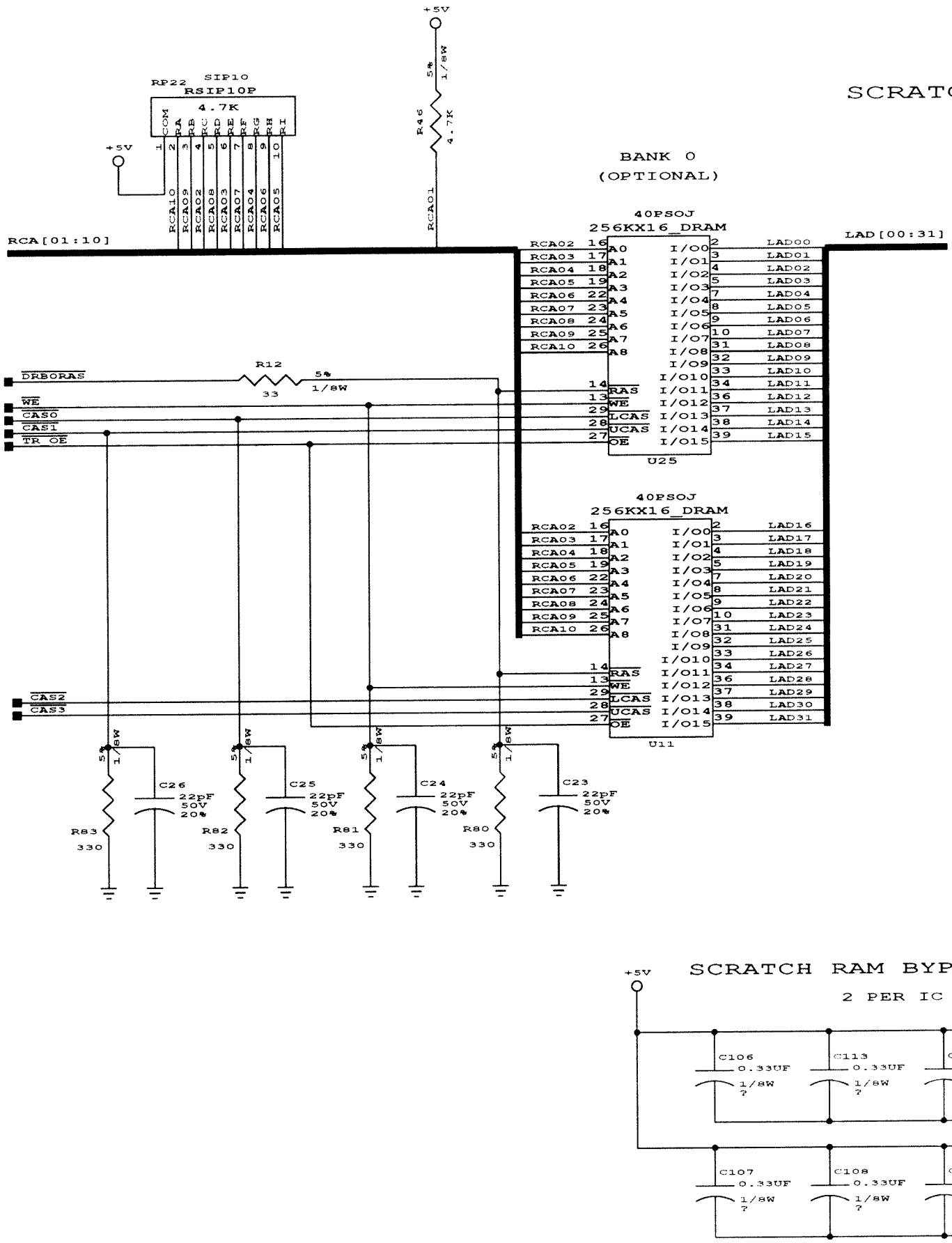


VIDEO CPU BOARD
PAGE 3-19

ECN	CHANGE	DATE

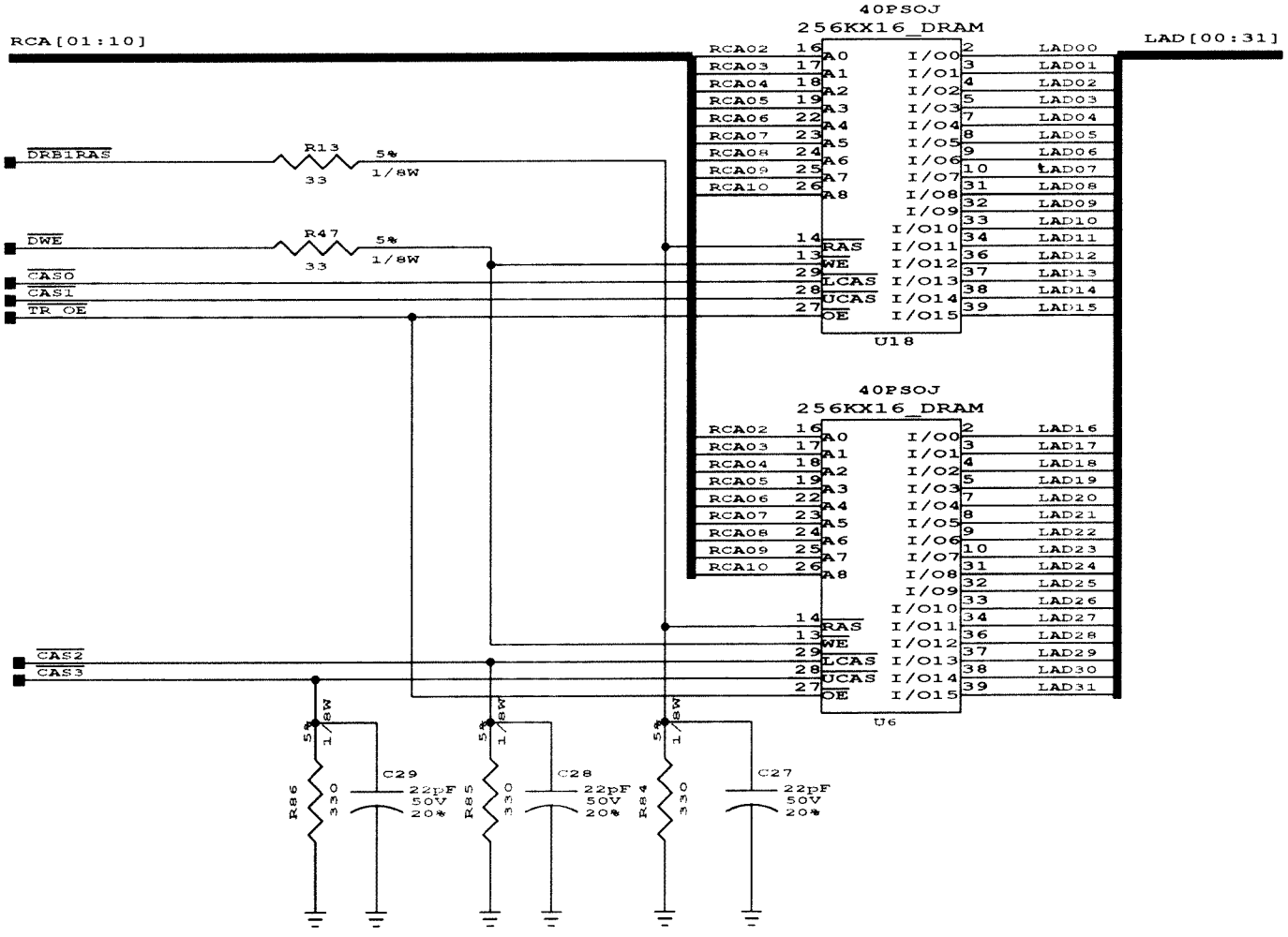
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:06	1ST USEAGE DATE	TITLE XUNIT LOCAL BUS INTERFACE AND CMOS RAM
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 4 OF 26	PART NO. 16-9518 REV. 4

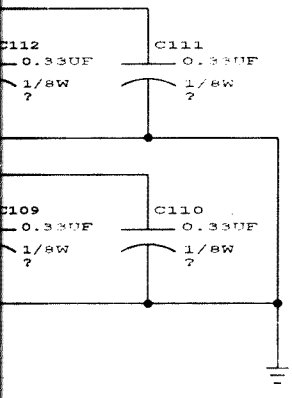

SCRATCH
BANK 0
(OPTIONAL)
RP22 SIP10
RSIP10P
4.7K
+5V
R46
4.7K
5%
1/8W
RCA[01:10]
RCA01
RCA02
RCA03
RCA04
RCA05
RCA06
RCA07
RCA08
RCA09
RCA10
40PSOJ
256KX16_DRAM
U25
U11
LAD[00:31]
LAD00
LAD01
LAD02
LAD03
LAD04
LAD05
LAD06
LAD07
LAD08
LAD09
LAD10
LAD11
LAD12
LAD13
LAD14
LAD15
LAD16
LAD17
LAD18
LAD19
LAD20
LAD21
LAD22
LAD23
LAD24
LAD25
LAD26
LAD27
LAD28
LAD29
LAD30
LAD31
A0
A1
A2
A3
A4
A5
A6
A7
A8
I/O0
I/O1
I/O2
I/O3
I/O4
I/O5
I/O6
I/O7
I/O8
I/O9
I/O10
I/O11
I/O12
I/O13
I/O14
I/O15
RAS
WE
LCAS
UCAS
OE
R12
33
DRBORAS
WE
CAS0
CAS1
TR_OE
CAS2
CAS3
R83
330
R82
330
R81
330
R80
330
C26
C25
C24
C23
22pF
50V
20%
SCRATCH RAM BYPAS
2 PER IC
C106
C113
C112
C107
C108
C109
0.33UF
1/8W

CH/MEMORY DRAM

BANK 1



ASS CAPS:

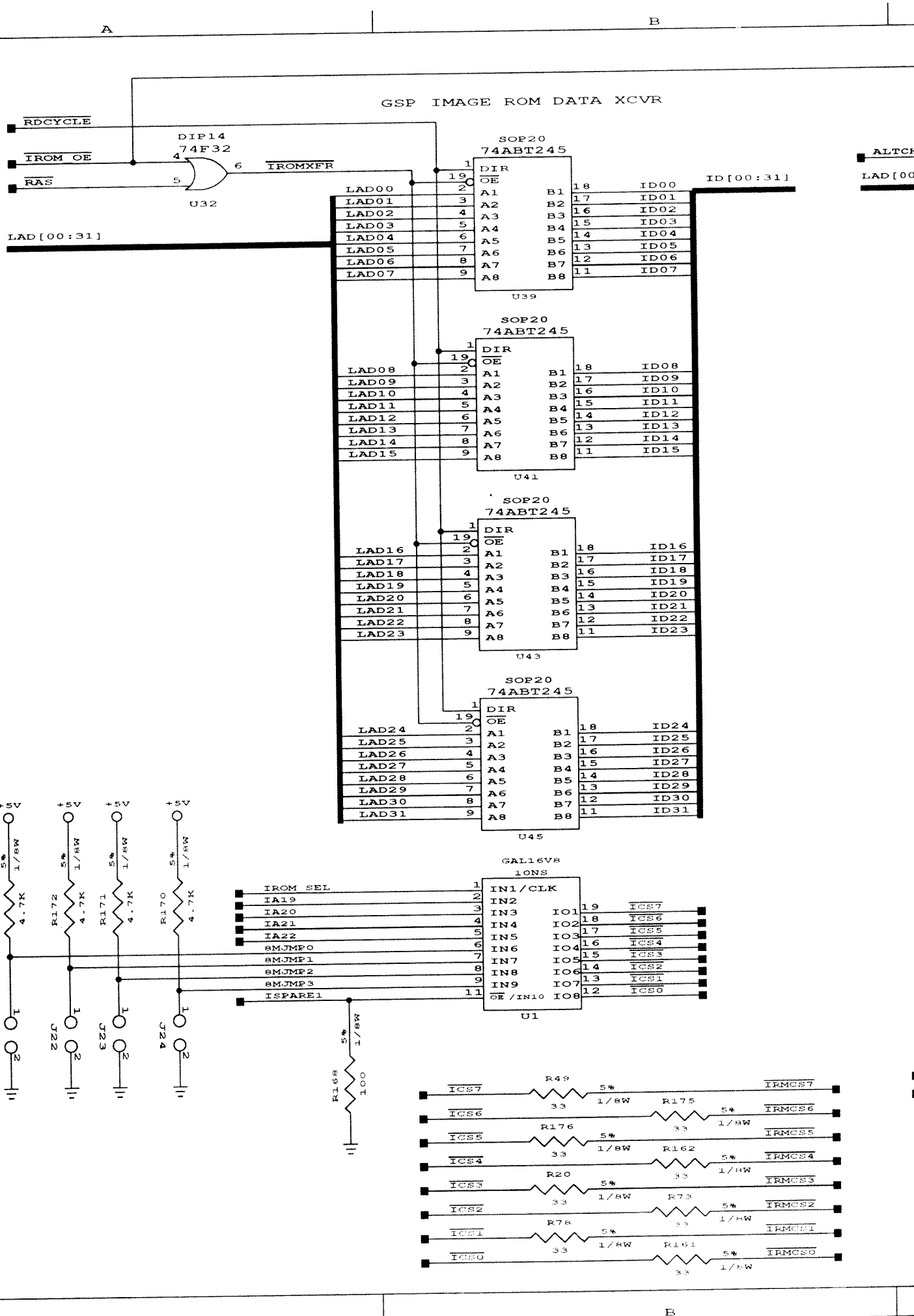


VIDEO CPU BOARD
PAGE 3-20

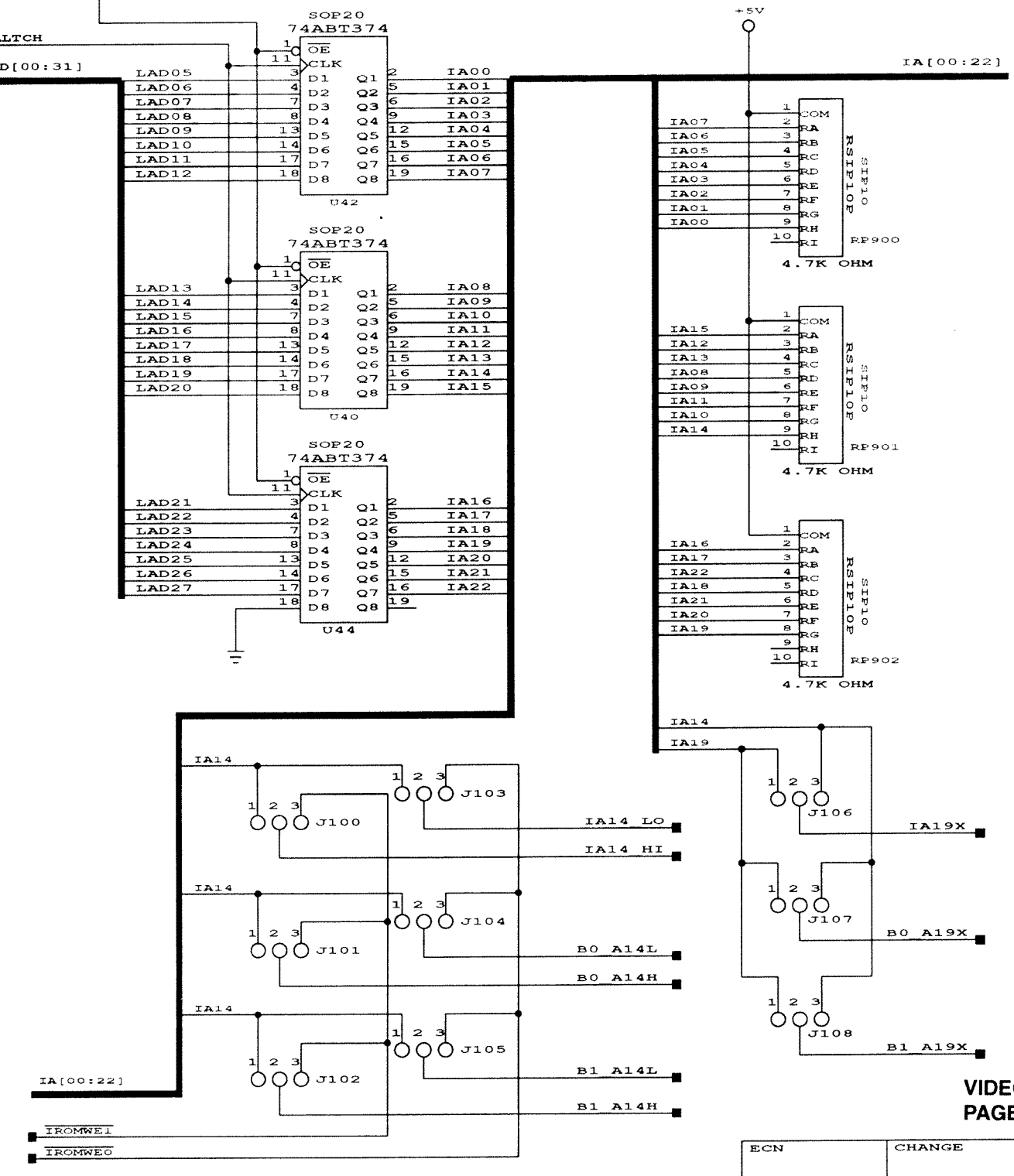
ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:06	1ST USEAGE DATE	TITLE XUNIT EXECUTION/SCRATCH RAM
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 5 OF 26	PART NO. 16-9518 REV. 4


GSP IMAGE ROM DATA XCVR
RDCYCLE
IROM OE
RAS
DIP14
74F32
U32
IROMXFR
LAD[00:31]
ID[00:31]
SOP20
74ABT245
U39
U41
U43
U45
LAD00
LAD01
LAD02
LAD03
LAD04
LAD05
LAD06
LAD07
LAD08
LAD09
LAD10
LAD11
LAD12
LAD13
LAD14
LAD15
LAD16
LAD17
LAD18
LAD19
LAD20
LAD21
LAD22
LAD23
LAD24
LAD25
LAD26
LAD27
LAD28
LAD29
LAD30
LAD31
ID00
ID01
ID02
ID03
ID04
ID05
ID06
ID07
ID08
ID09
ID10
ID11
ID12
ID13
ID14
ID15
ID16
ID17
ID18
ID19
ID20
ID21
ID22
ID23
ID24
ID25
ID26
ID27
ID28
ID29
ID30
ID31
+5V
R174
R172
R171
R170
4.7K
5%
1/8W
J21
J22
J23
J24
GAL16V8
10NS
U1
IROM SEL
IA19
IA20
IA21
IA22
8MJMP0
8MJMP1
8MJMP2
8MJMP3
ISPARE1
R168
100
ICS7
ICS6
ICS5
ICS4
ICS3
ICS2
ICS1
ICS0
R49
R175
R176
R162
R20
R73
R78
R161
33
IRMCS7
IRMCS6
IRMCS5
IRMCS4
IRMCS3
IRMCS2
IRMCS1
IRMCS0

GSP IMAGE ROM ADDRESS LATCH

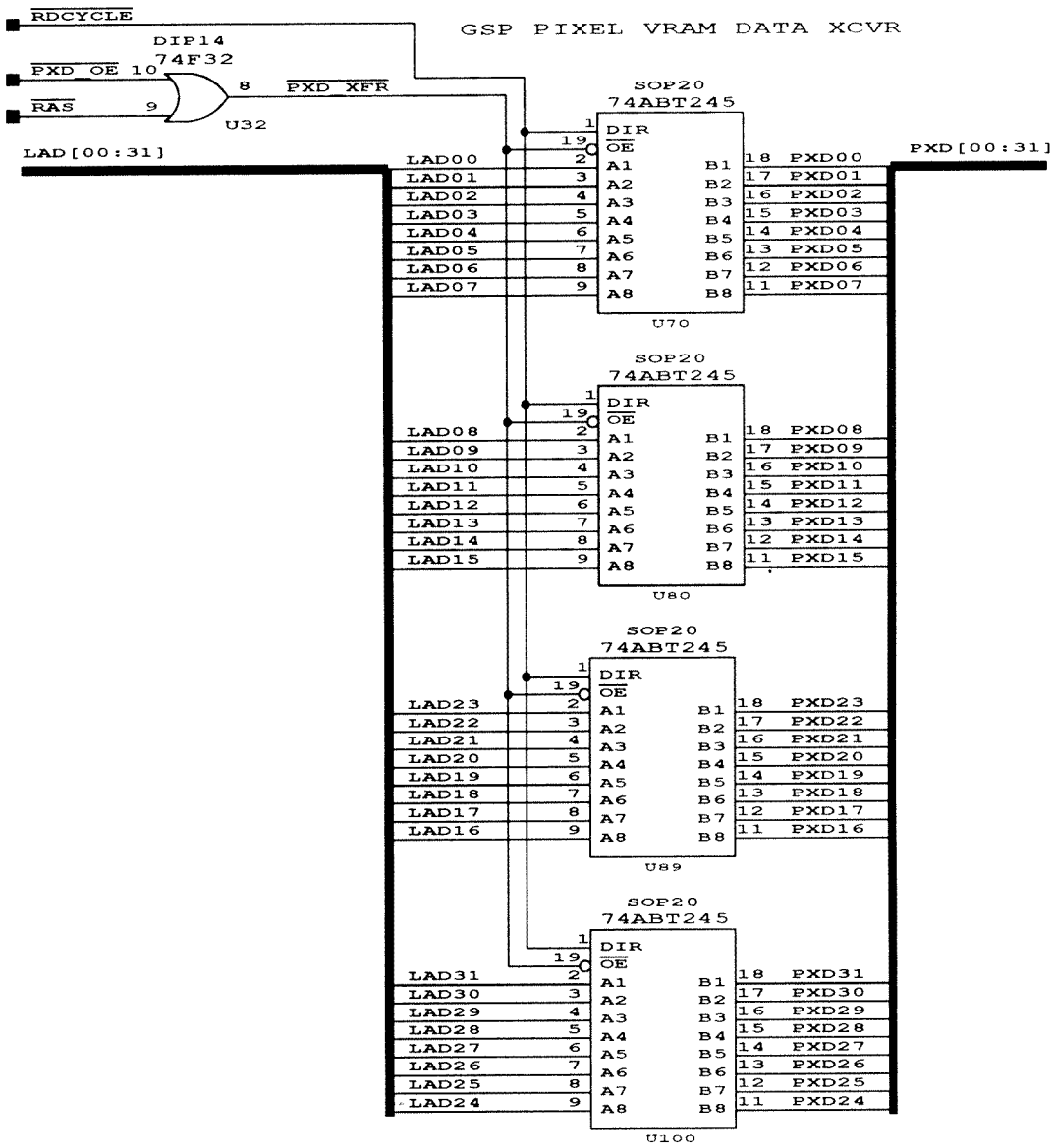


VIDEO CPU BOARD
PAGE 3-21

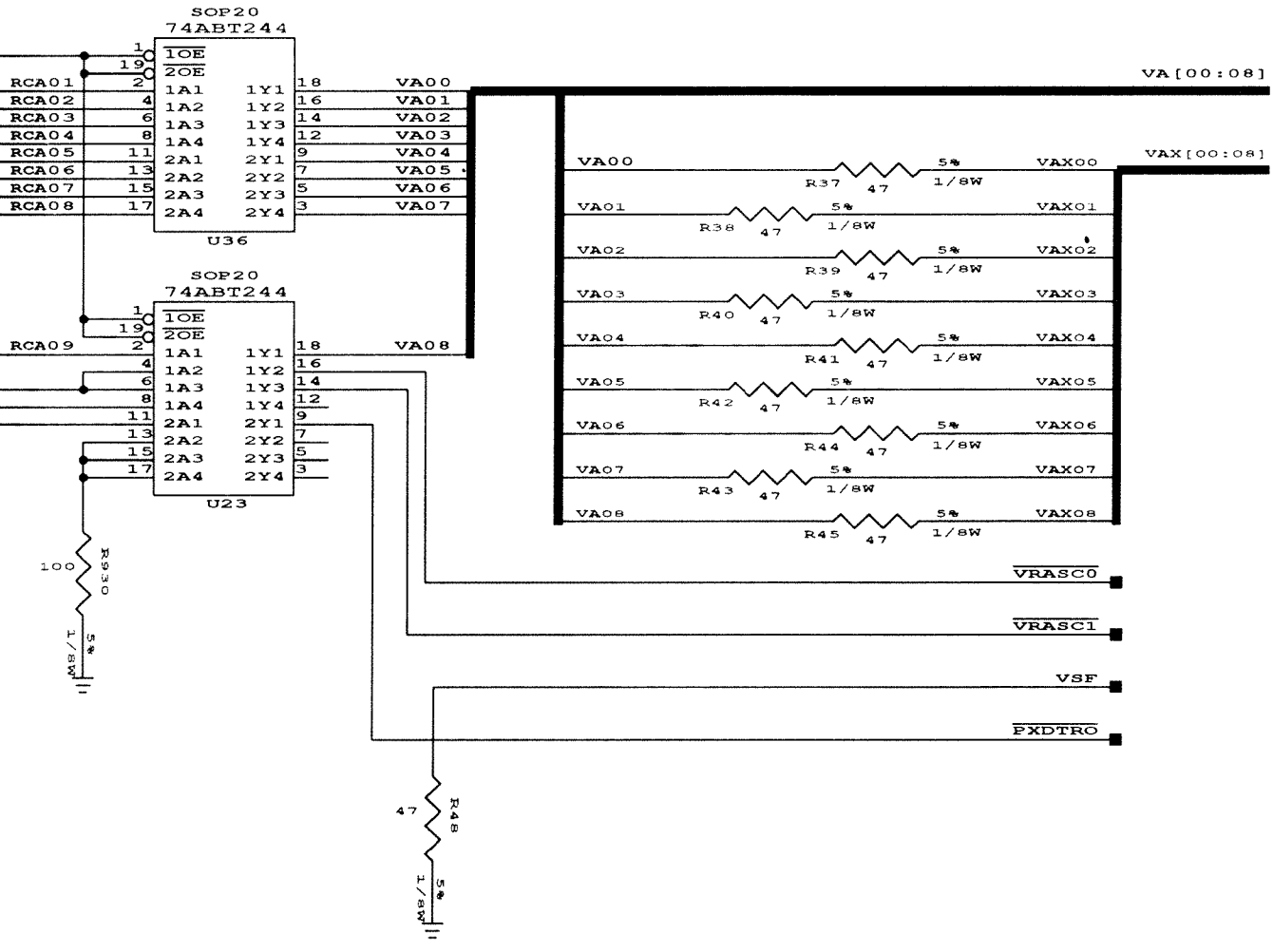
ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994 12:07	1ST USEAGE DATE	TITLE XUNIT GSP TO IMAGE ROM INTERFACE CIRCUITRY
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 6 OF 26	PART NO. 16-9518 REV. 4


GSP PIXEL VRAM DATA XCVR
RDCYCLE
DIP14
74F32
PXD_OE 10
RAS 9
8
PXD_XFR
U32
LAD[00:31]
PXD[00:31]
SOP20
74ABT245
DIR
OE
A1 A2 A3 A4 A5 A6 A7 A8
B1 B2 B3 B4 B5 B6 B7 B8
LAD00 LAD01 LAD02 LAD03 LAD04 LAD05 LAD06 LAD07
PXD00 PXD01 PXD02 PXD03 PXD04 PXD05 PXD06 PXD07
U70
LAD08 LAD09 LAD10 LAD11 LAD12 LAD13 LAD14 LAD15
PXD08 PXD09 PXD10 PXD11 PXD12 PXD13 PXD14 PXD15
U80
LAD23 LAD22 LAD21 LAD20 LAD19 LAD18 LAD17 LAD16
PXD23 PXD22 PXD21 PXD20 PXD19 PXD18 PXD17 PXD16
U89
LAD31 LAD30 LAD29 LAD28 LAD27 LAD26 LAD25 LAD24
PXD31 PXD30 PXD29 PXD28 PXD27 PXD26 PXD25 PXD24
U100
DMA_BSY
RCA[01:10]
VRAS
SF
TR_OE

GSP VRAM ADDRESS BUFFER

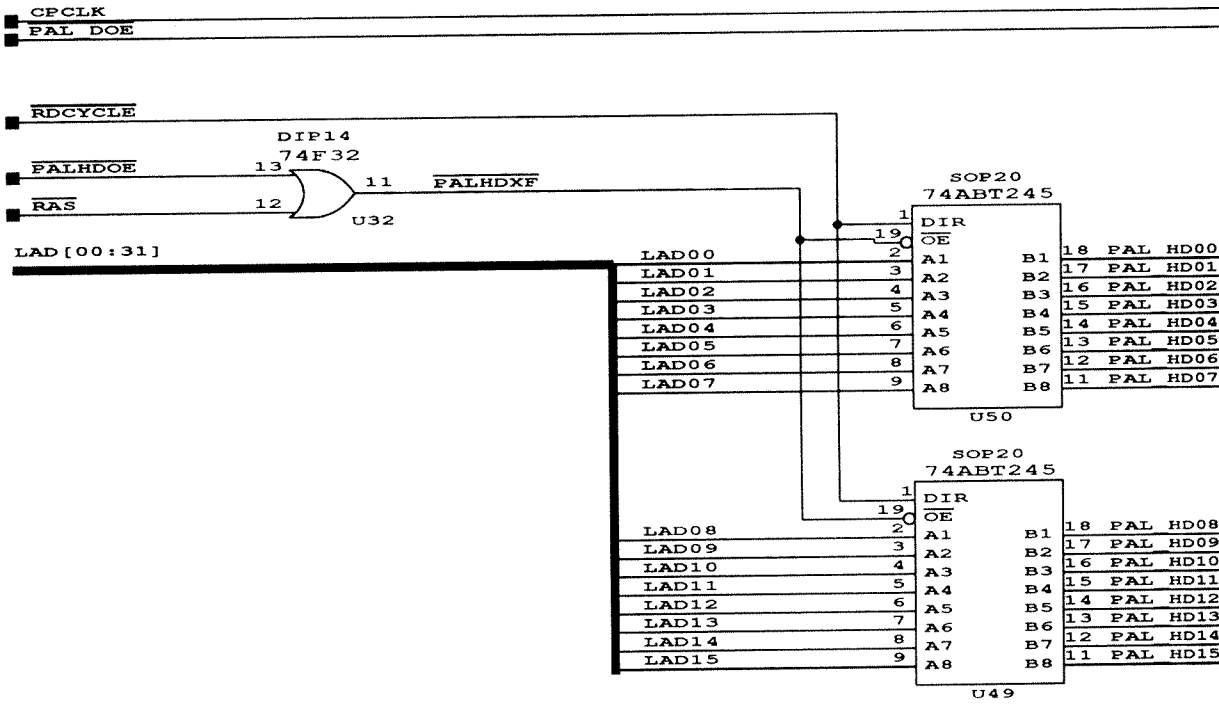


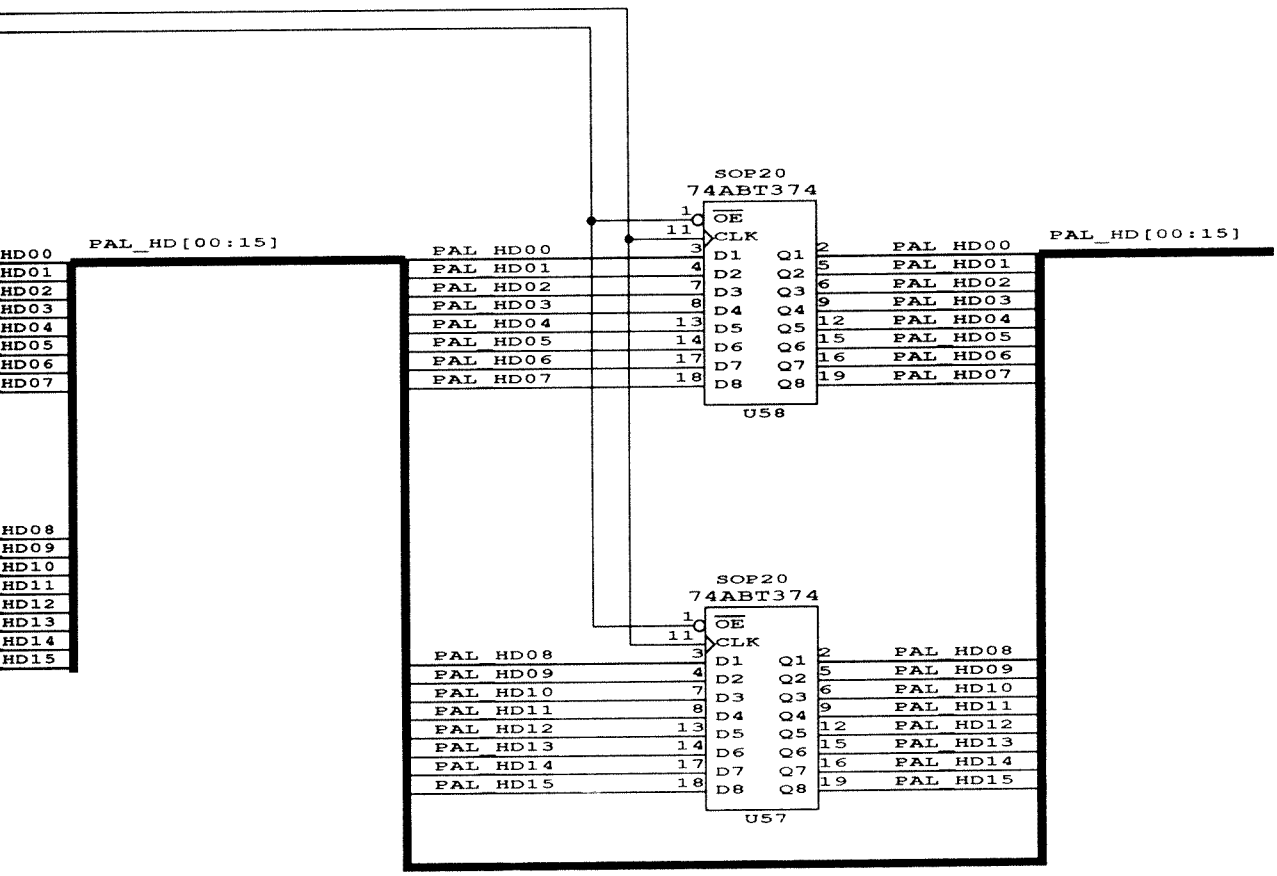
VIDEO CPU BOARD
PAGE 3-22

ECN	CHANGE	DATE

INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:07	1ST USEAGE DATE	TITLE XUNIT GSP TO VRAM INTERFACE CIRCUITRY
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 7 OF 26	PART NO. 16-9518 REV. 4


CPCLK
PAL_DOE
RDCYCLE
PALHDOE
RAS
LAD[00:31]
DIP14
74F32
U32
PALHDXF
SOP20
74ABT245
DIR
OE
A1
A2
A3
A4
A5
A6
A7
A8
B1
B2
B3
B4
B5
B6
B7
B8
U50
U49
LAD00
LAD01
LAD02
LAD03
LAD04
LAD05
LAD06
LAD07
LAD08
LAD09
LAD10
LAD11
LAD12
LAD13
LAD14
LAD15
PAL_HD00
PAL_HD01
PAL_HD02
PAL_HD03
PAL_HD04
PAL_HD05
PAL_HD06
PAL_HD07
PAL_HD08
PAL_HD09
PAL_HD10
PAL_HD11
PAL_HD12
PAL_HD13
PAL_HD14
PAL_HD15



VIDEO CPU BOARD
PAGE 3-23

ECN	CHANGE	DATE

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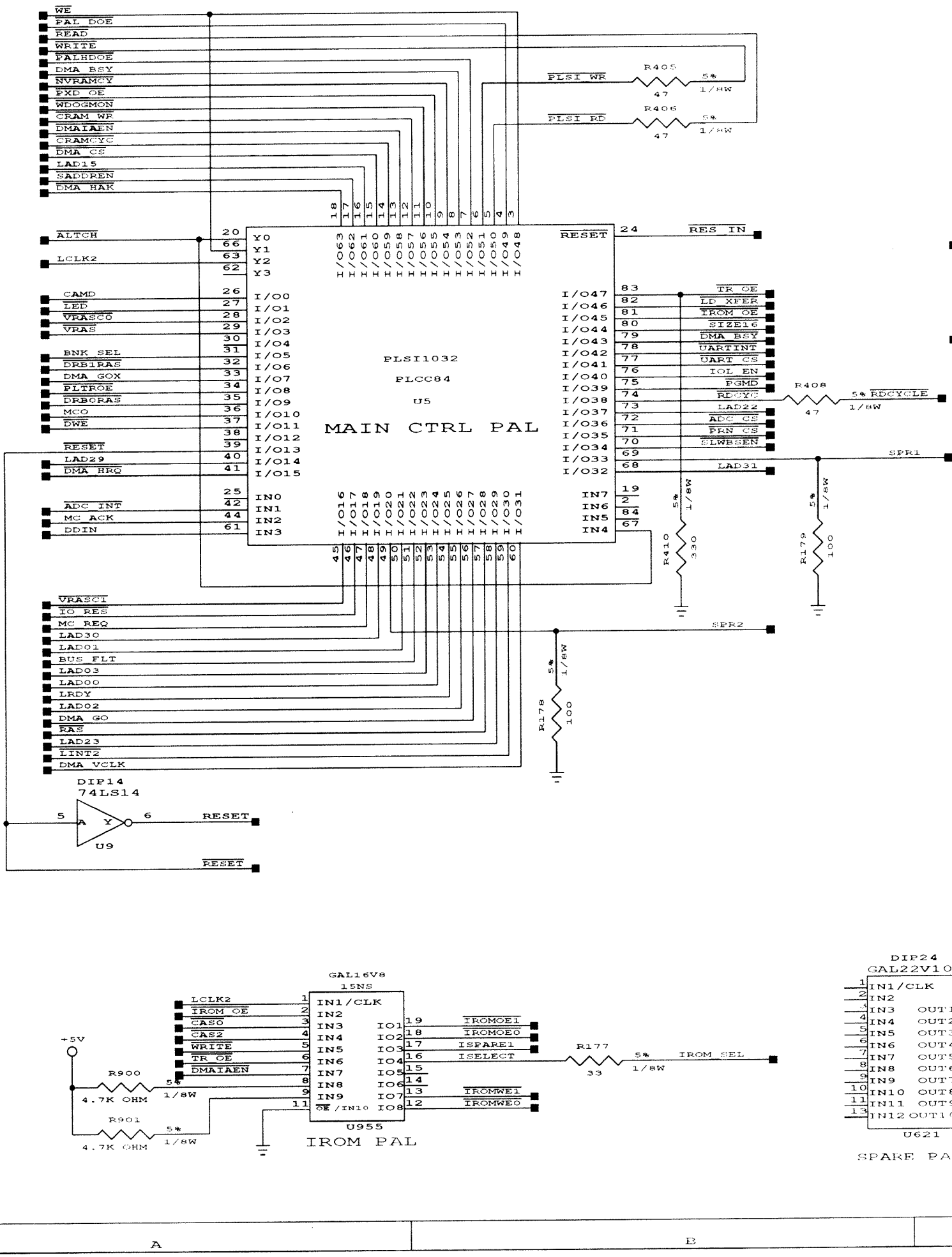
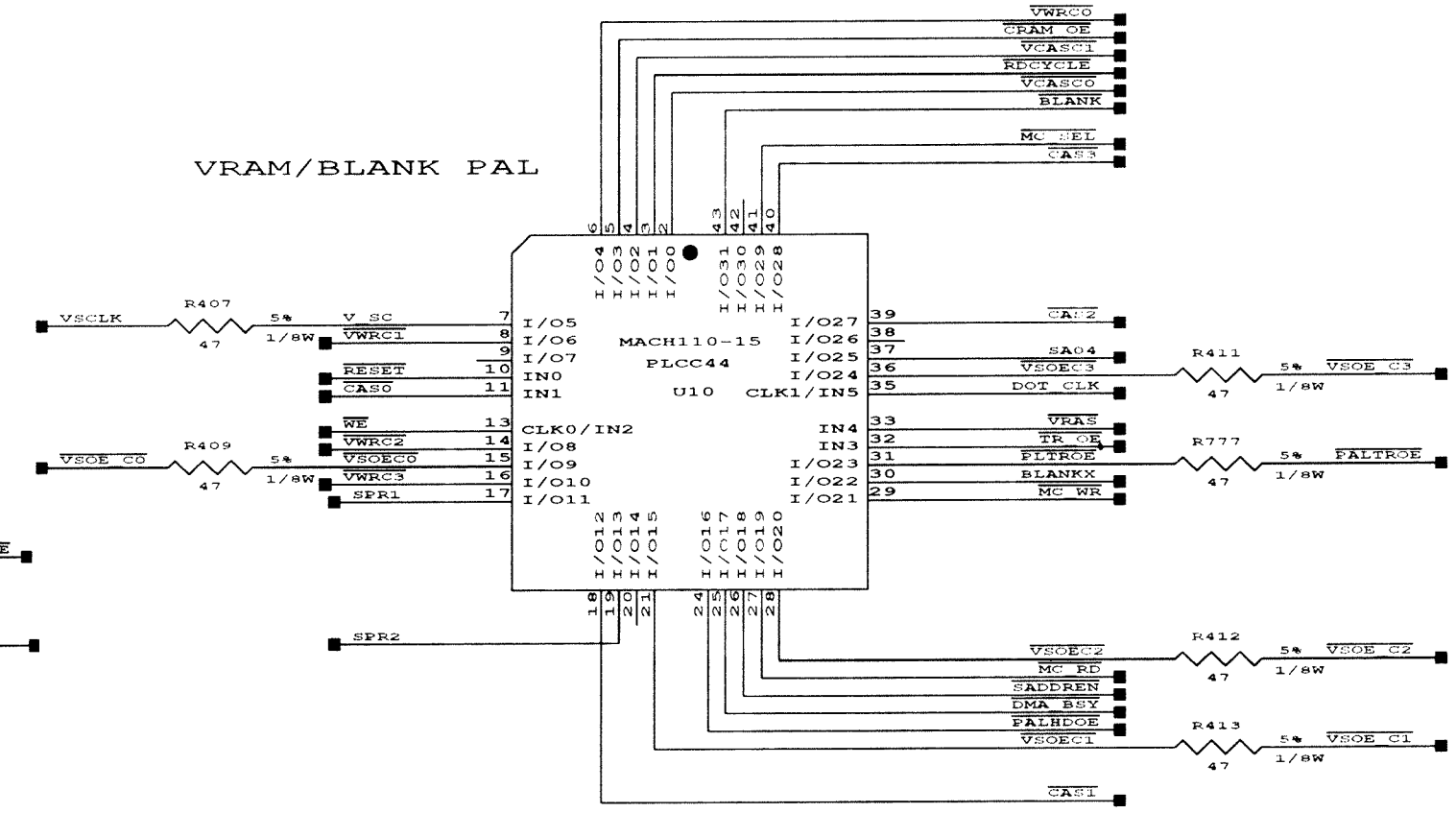
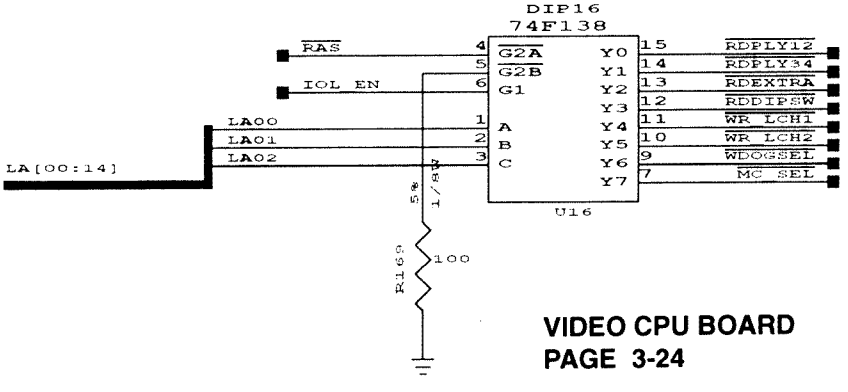
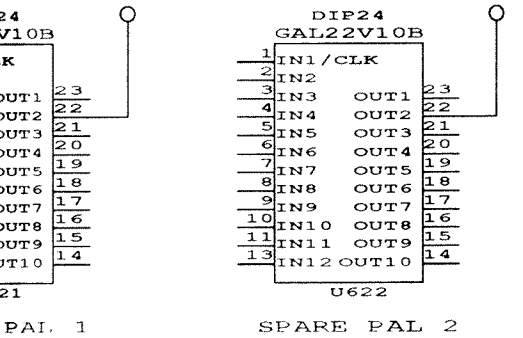
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:09	1ST USEAGE DATE	TITLE XUNIT
CHECKED DATE	CURRENT PROJ. DATE	FIFO CIRCUITRY/ PALETTE AND DMA COMMAND BUS
APPROVED DATE	SHEET 8 OF 26	PART NO. 16-9518 REV. 4


WE
PAL DOE
READ
WRITE
PALHDOE
DMA BSY
NVRAMCY
PXD OE
WDOGMON
CRAM WR
DMAIAEN
CRAMCYC
DMA CS
LAD15
SADDREN
DMA HAK
PLSI WR
PLSI RD
R405
R406
47
5%
1/8W
ALTCH
LCLK2
CAMD
LED
VRASC0
VRAS
BNK SEL
DRB1RAS
DMA GOX
PLTROE
DRB0RAS
MCO
DWE
RESET
LAD29
DMA HRQ
ADC INT
MC ACK
DDIN
PLSI1032
PLCC84
U5
MAIN CTRL PAL
RES IN
TR OE
LD XFER
IROM OE
SIZE16
DMA BSY
UARTINT
UART CS
IOL EN
PGMD
RDCYC
LAD22
ADC CS
PRN CS
SLWBSEN
LAD31
R408
RDCYCLE
SPR1
SPR2
R410
330
R179
100
R178
VRASC1
IO RES
MC REQ
LAD30
LAD01
BUS FLT
LAD03
LAD00
LRDY
LAD02
DMA GO
RAS
LAD23
LINT2
DMA VCLK
DIP14
74LS14
U9
RESET
GAL16V8
15NS
U955
IROM PAL
+5V
R900
4.7K OHM
R901
IROMOE1
IROMOE0
ISPARE1
ISELECT
IROMWE1
IROMWE0
R177
33
IROM SEL
DIP24
GAL22V10
U621
SPARE PA







VIDEO CPU BOARD
PAGE 3-24

ECN	CHANGE	DATE

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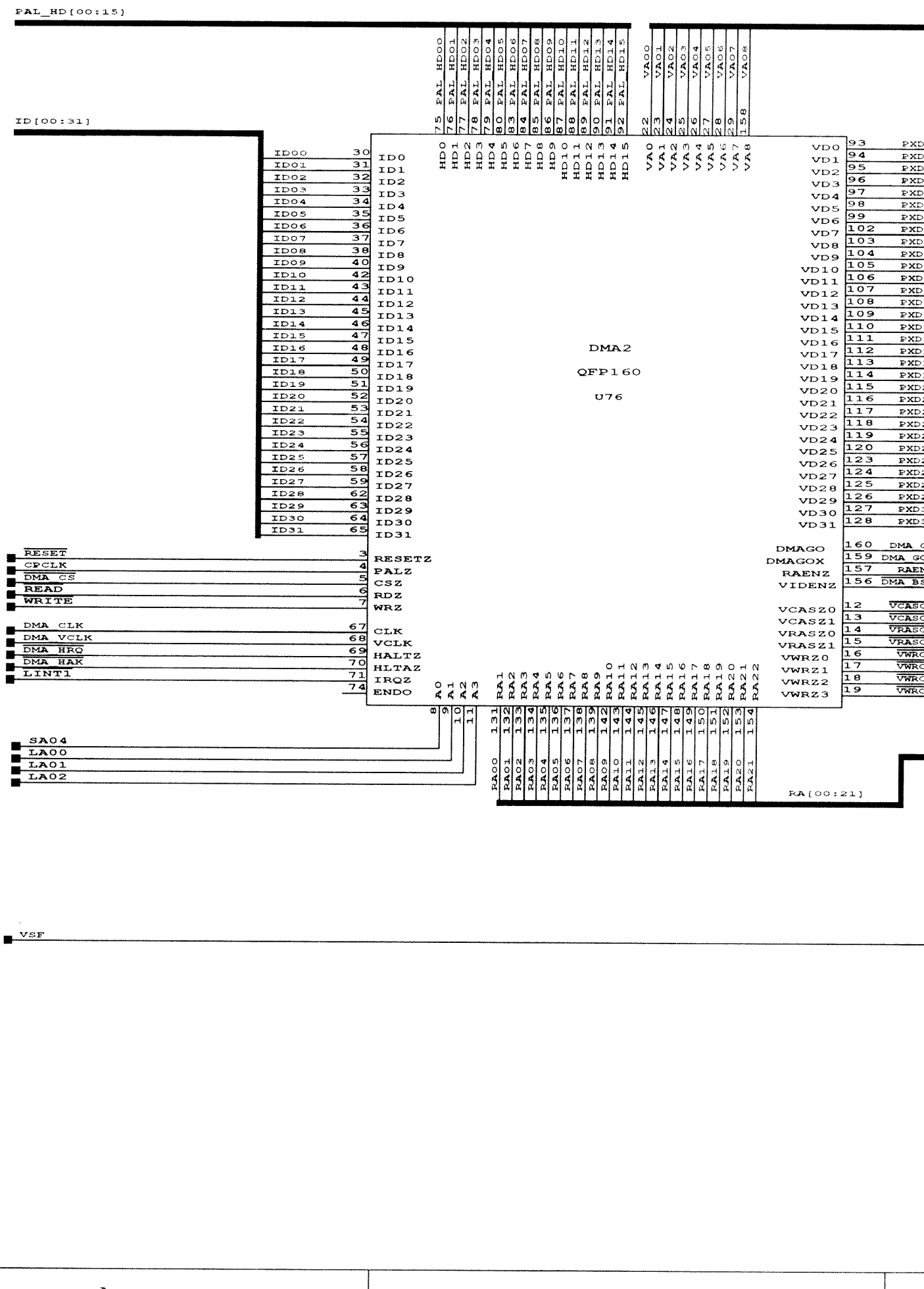
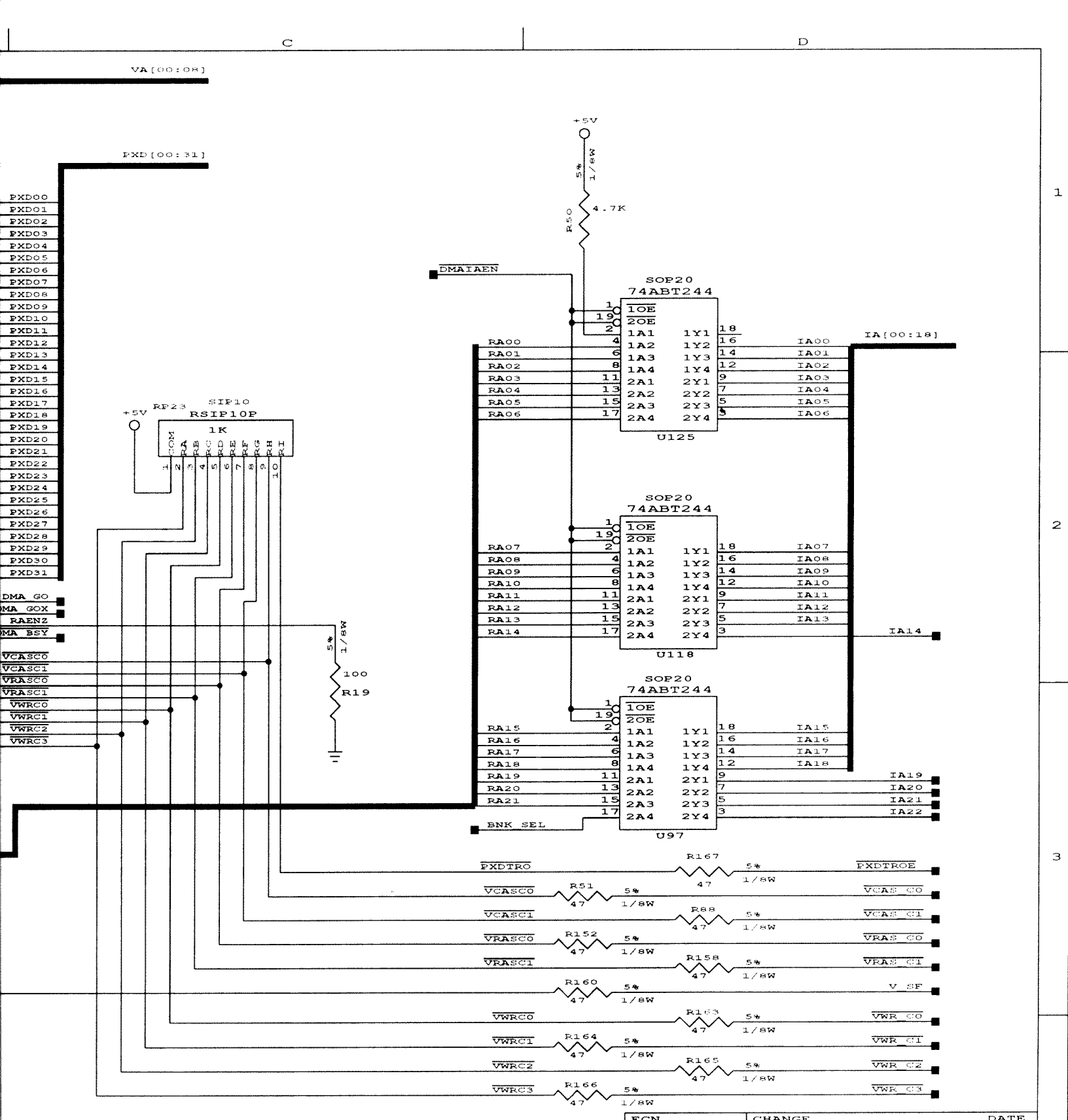
DWN. BY DATE JML 5-12-1994_12:10	1ST USEAGE DATE	TITLE XUNIT PLD/CONTROL
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 9 OF 26	PART NO. 16-9518 REV. 4


PAL_HD[00:15]
ID[00:31]
DMA2
QFP160
U76
RESET
CPCLK
DMA_CS
READ
WRITE
DMA_CLK
DMA_VCLK
DMA_HRQ
DMA_HAK
LINT1
SA04
LA00
LA01
LA02
VSF
RA[00:21]



ECN	CHANGE	DATE

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PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:10	1ST USEAGE DATE	TITLE XUNIT DMA2
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 10 OF 26	PART NO. 16-9518 REV. 4

VIDEO CPU BOARD
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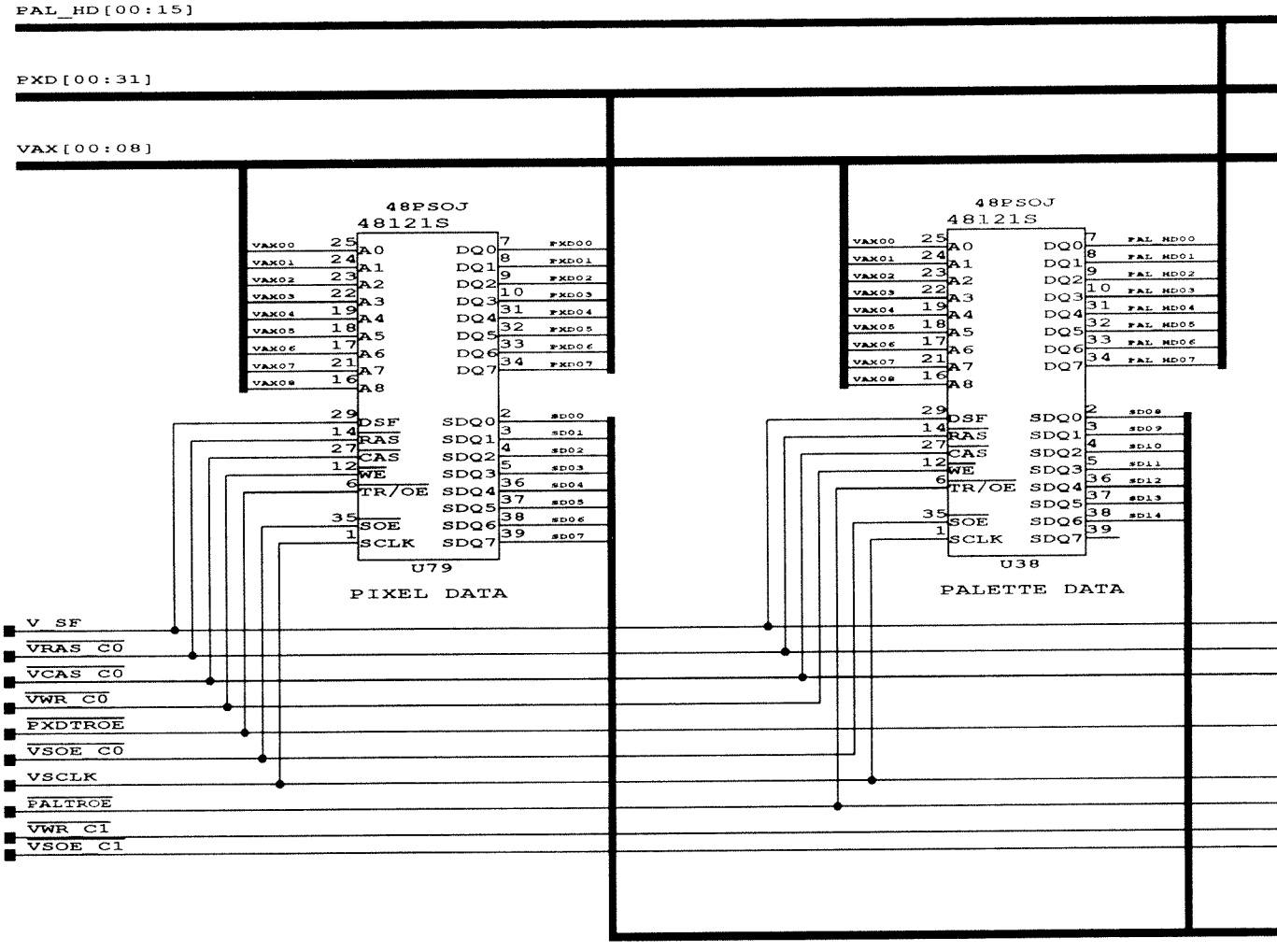
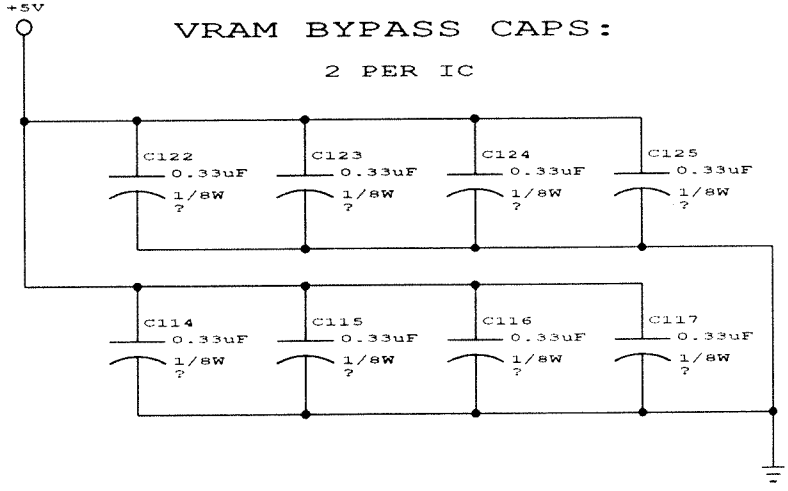
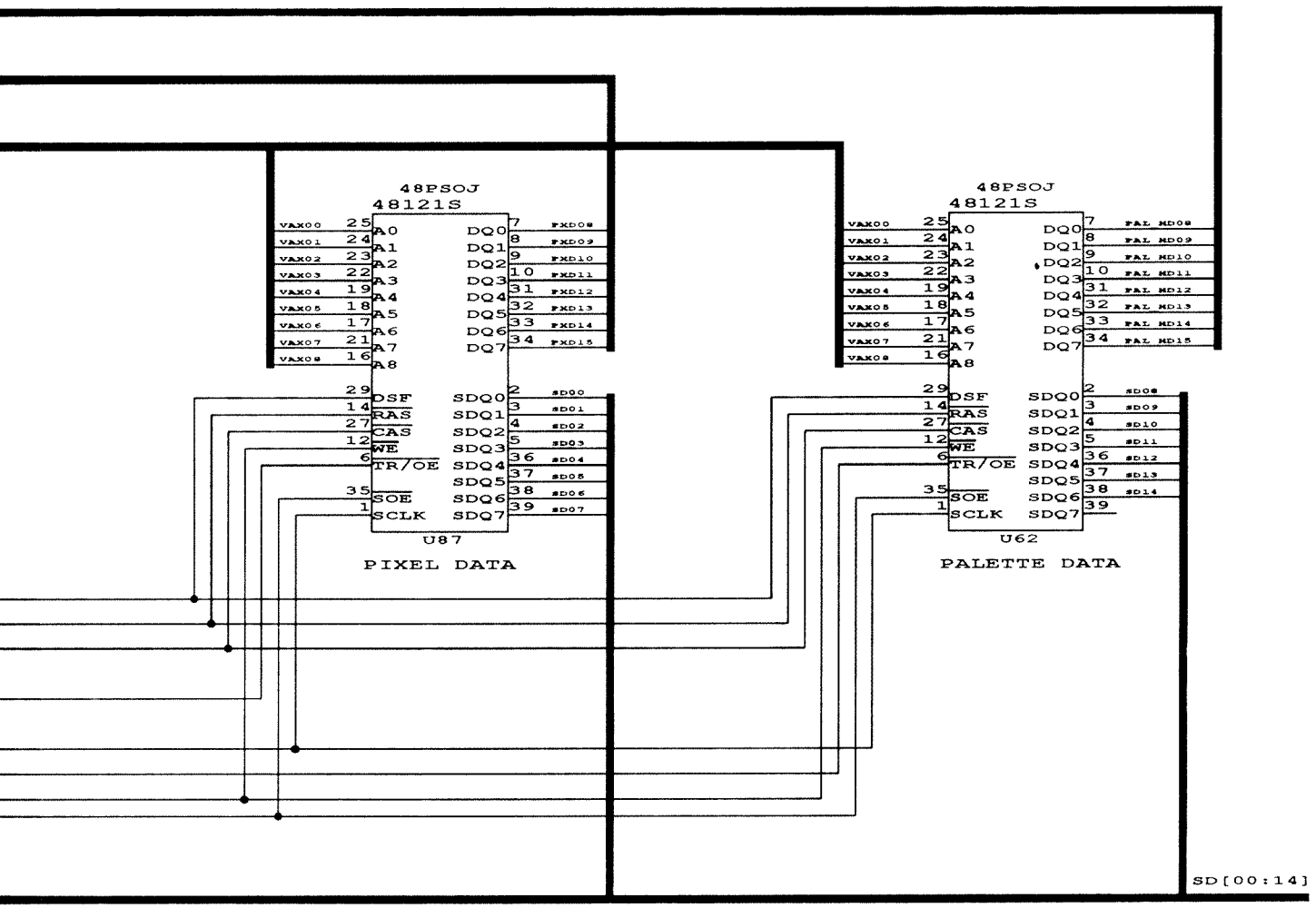
VIDEO RAM - BANK 0





VIDEO RAM - BANK 1



VIDEO CPU BOARD
PAGE 3-26

ECN	CHANGE	DATE

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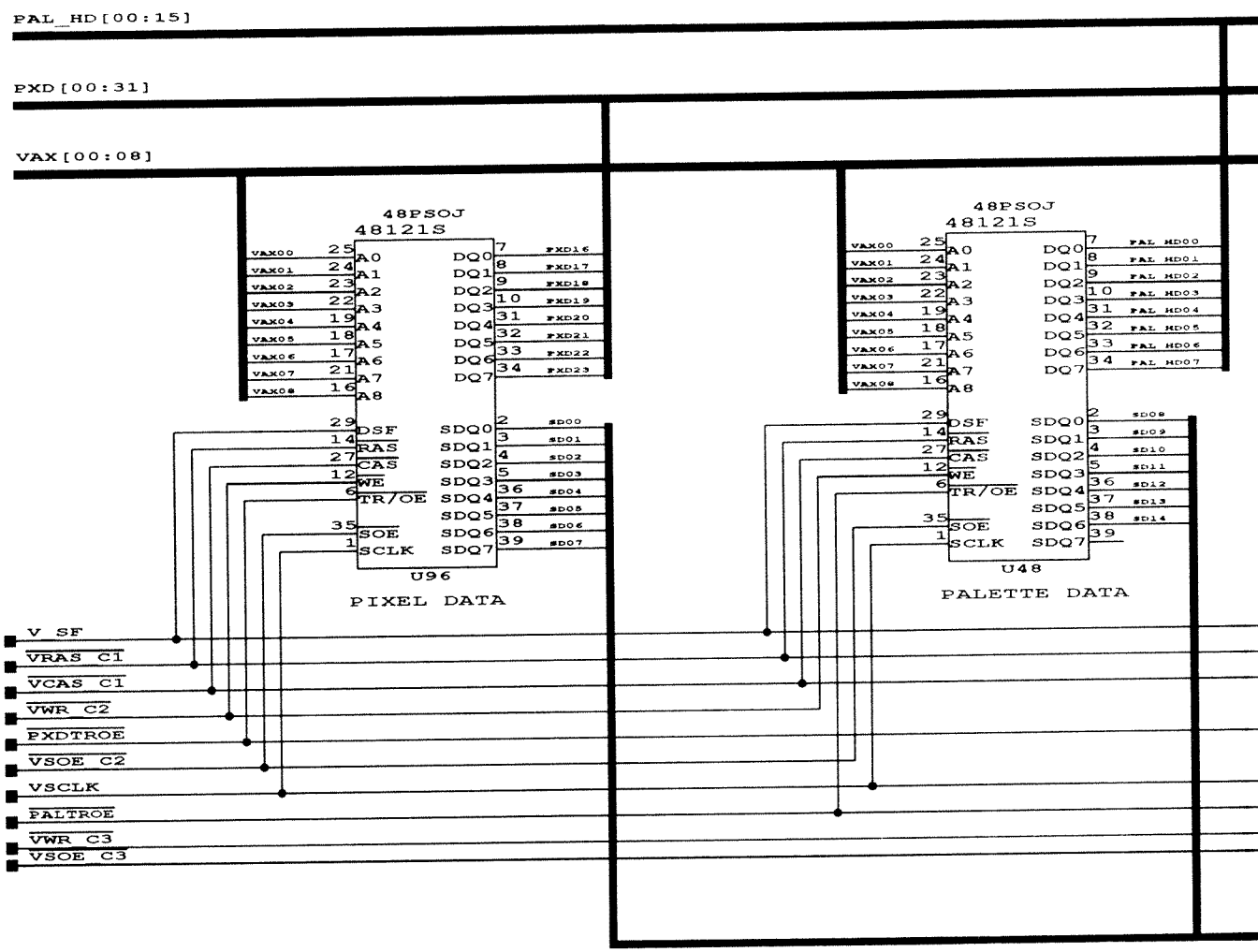
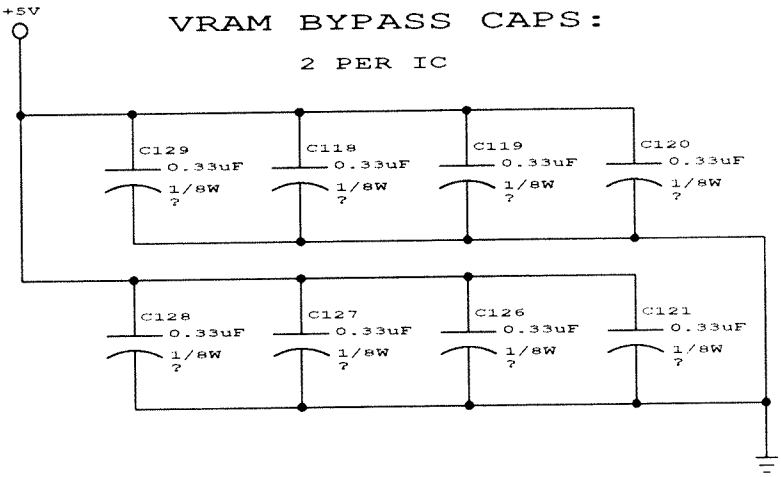
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:11	1ST USEAGE DATE	TITLE XUNIT
CHECKED DATE	CURRENT PROJ. DATE	VIDEO RAM BANK 0/BANK 1
APPROVED DATE	SHEET 11 OF 26	PART NO. 16-9518 REV. 4

VIDEO RAM - BANK 2

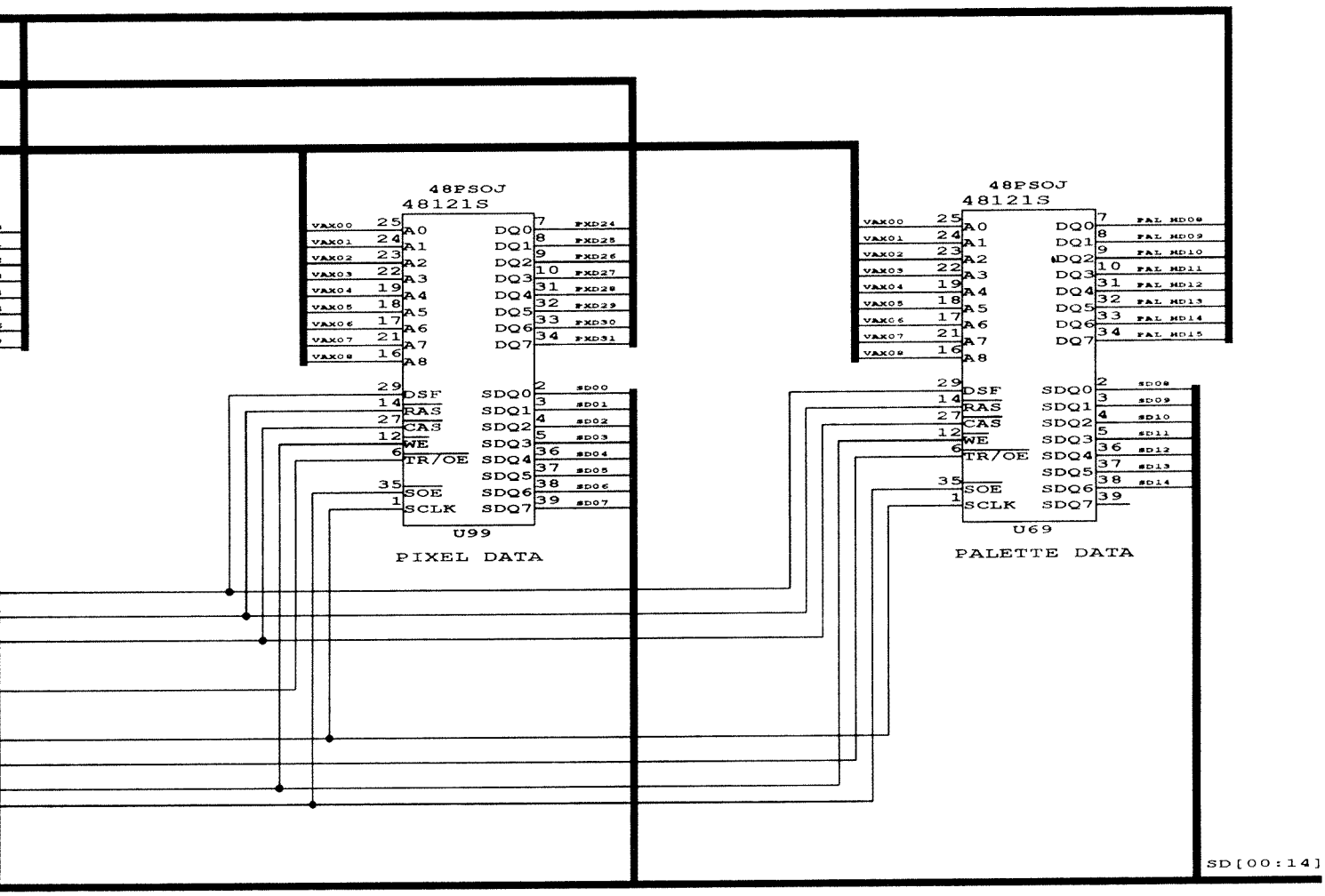


VRAM BYPASS CAPS:

2 PER IC



VIDEO RAM - BANK 3



VIDEO CPU BOARD
PAGE 3-27

ECN	CHANGE	DATE

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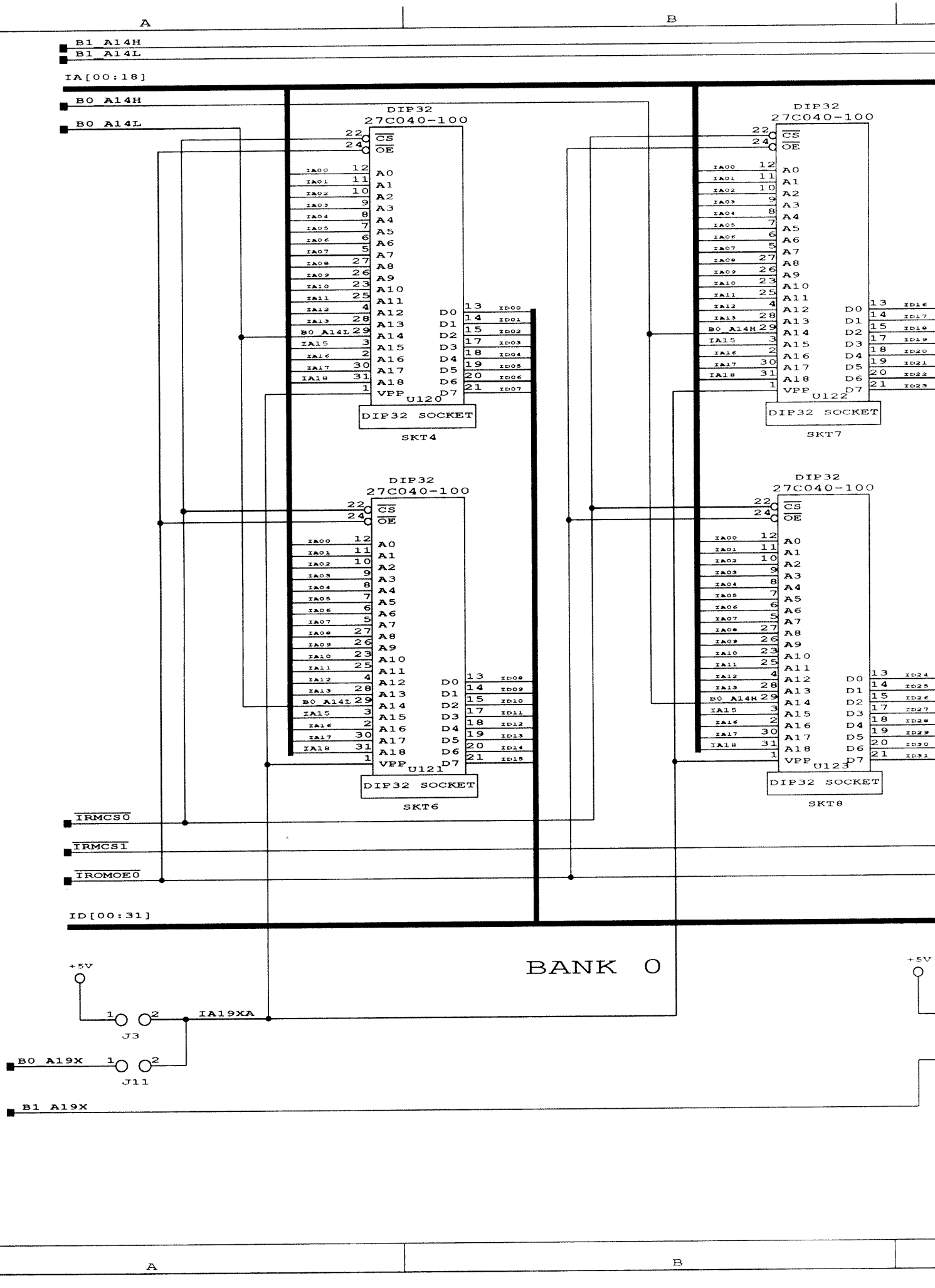
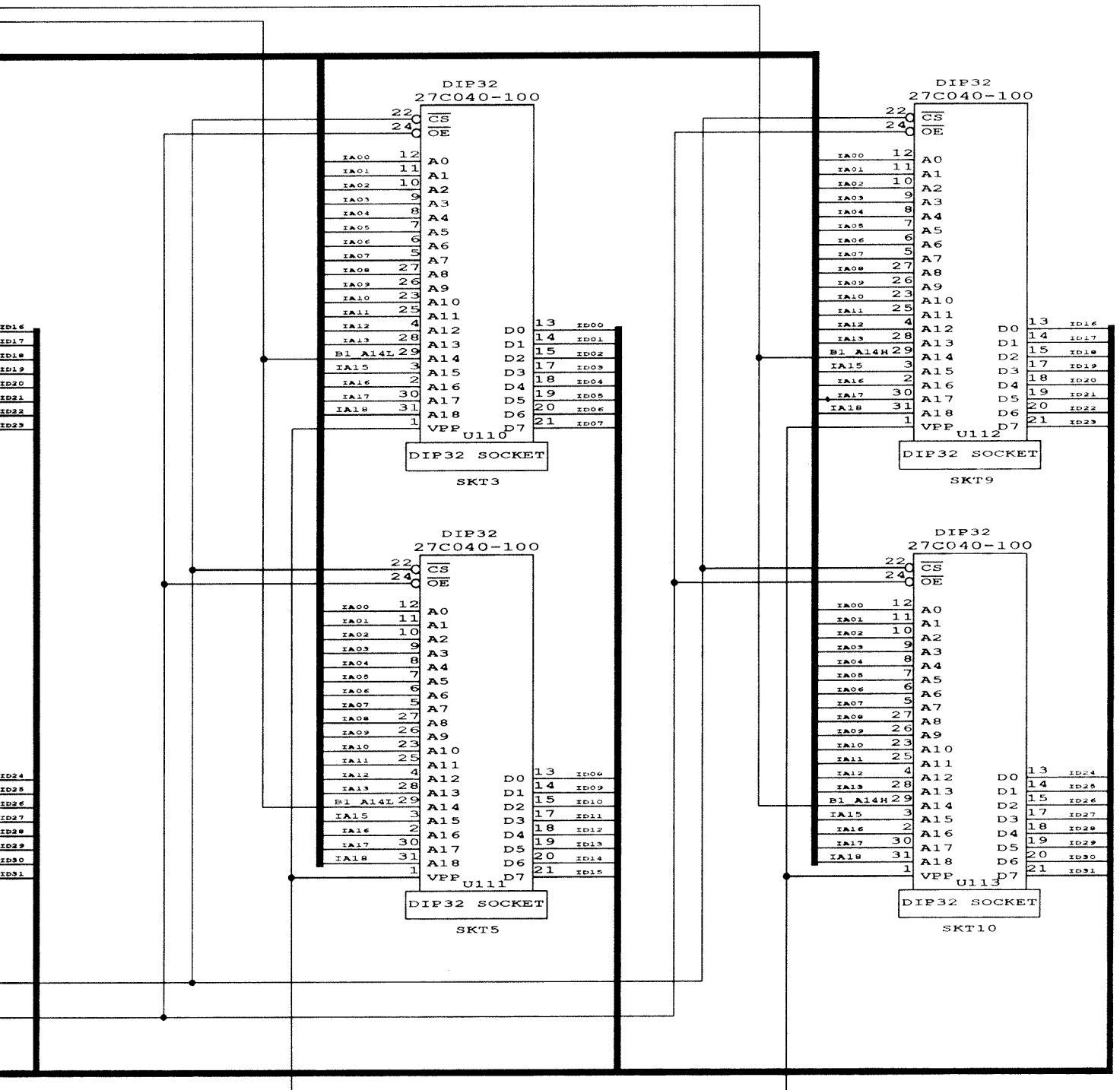
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:11	1ST USEAGE DATE	TITLE XUNIT VIDEO RAM BANK 2/BANK 3
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 12 OF 26	PART NO. 16-9518 REV. 4


A
B
1
2
3
4
B1_A14H
B1_A14L
IA[00:18]
B0_A14H
B0_A14L
DIP32
27C040-100
U120
DIP32 SOCKET
SKT4
U121
SKT6
U122
SKT7
U123
SKT8
IRMCS0
IRMCS1
IROMOE0
ID[00:31]
BANK 0
+5V
J3
IA19XA
B0_A19X
J11
B1_A19X



BANK 1

VIDEO CPU BOARD
PAGE 3-28

+5V

J2

J13

IA19XB

ECN	CHANGE	DATE

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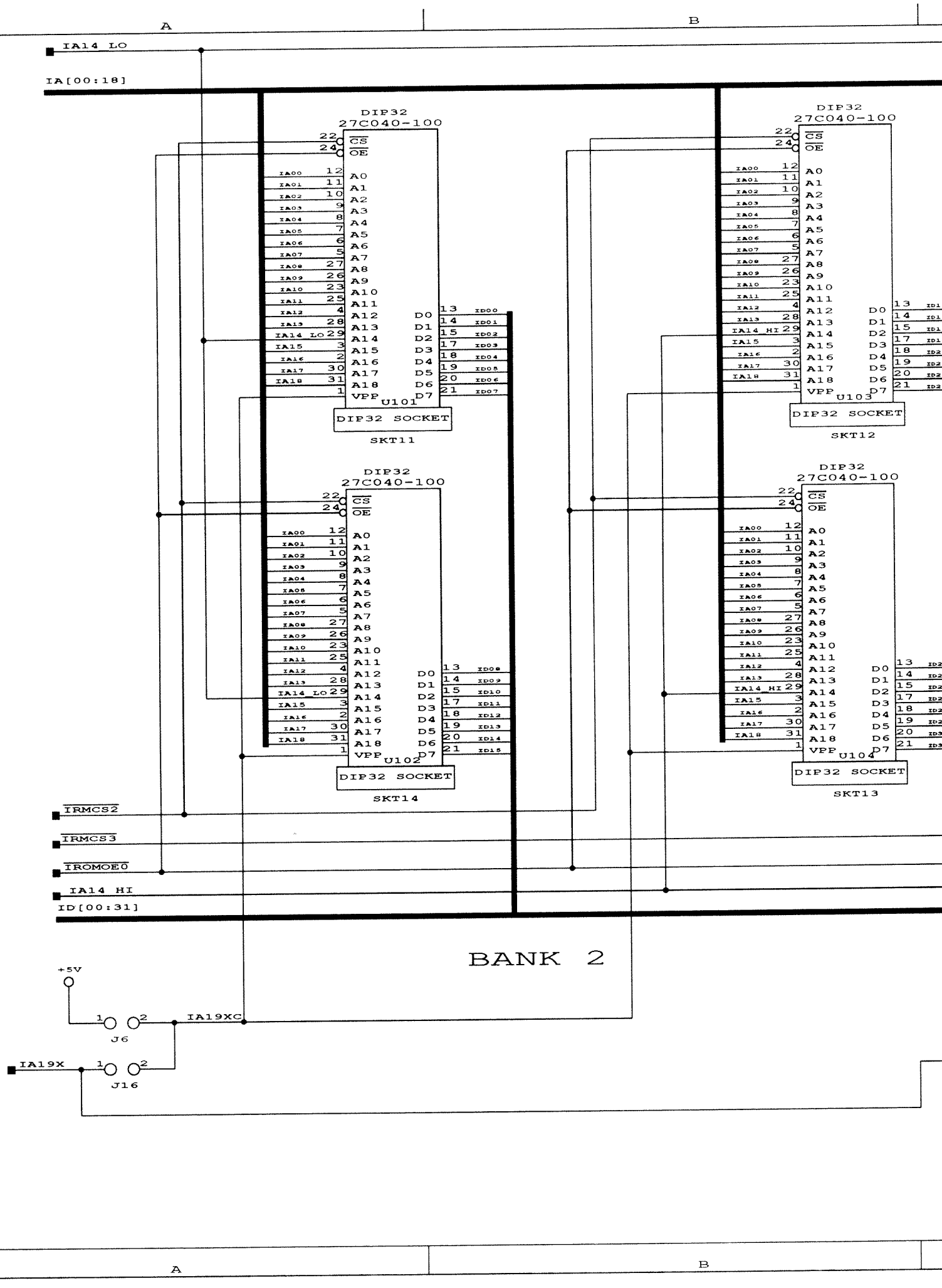
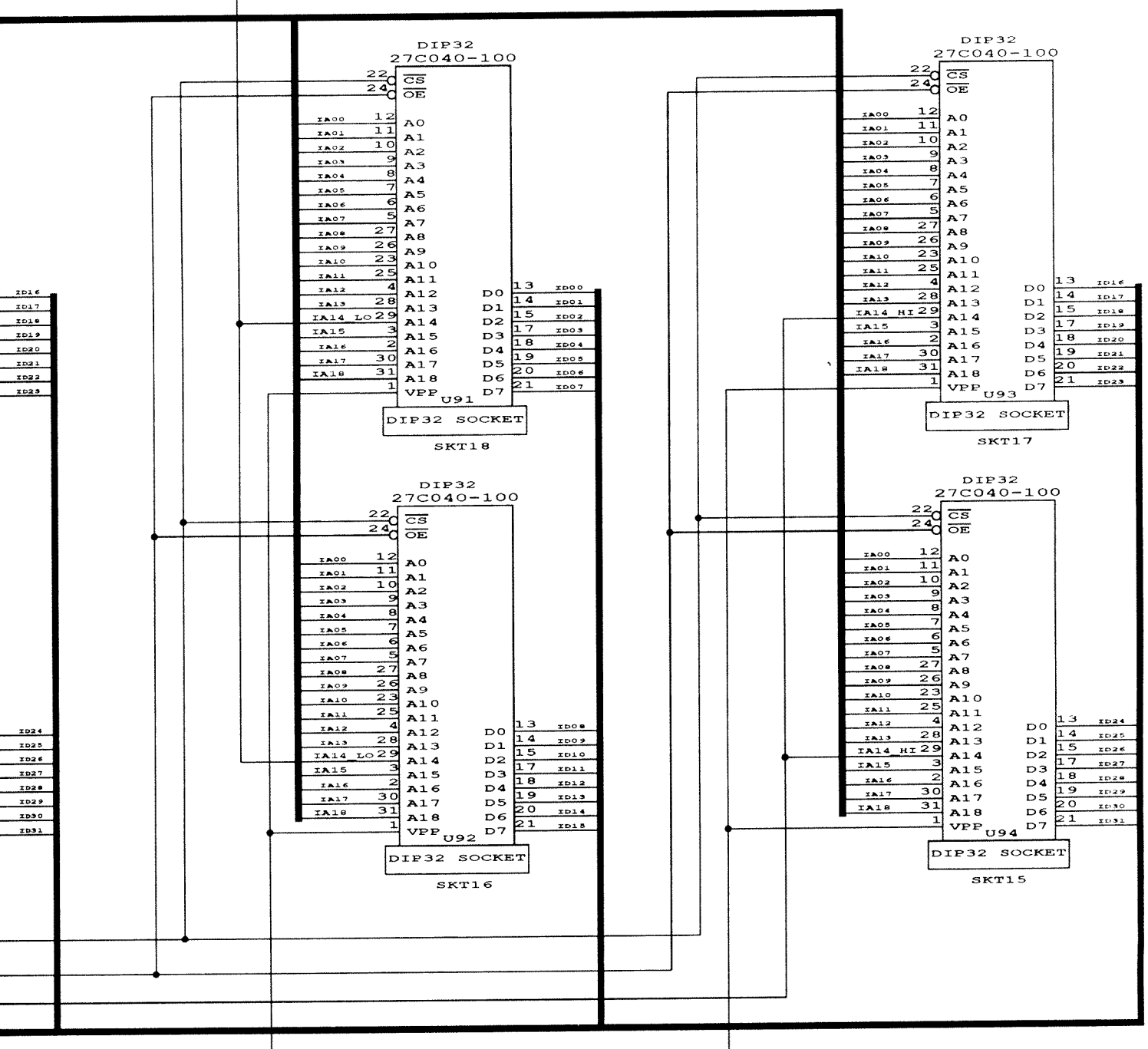
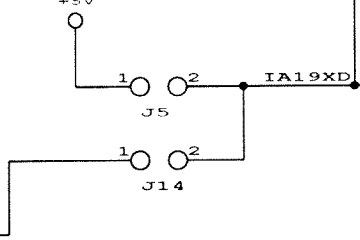
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994 12:12	1ST USEAGE DATE	TITLE XUNIT
CHECKED DATE	CURRENT PROJ. DATE	IMAGE ROM BANK 0/BANK 1
APPROVED DATE	SHEET OF 13 26	PART NO. 16-9518 REV. 4


A
B
1
2
3
4
IA14 LO
IA[00:18]
DIP32
27C040-100
U101
DIP32 SOCKET
SKT11
U103
SKT12
U102
SKT14
U104
SKT13
IRMCS2
IRMCS3
IROMOE0
IA14 HI
ID[00:31]
BANK 2
+5V
J6
IA19XC
IA19X
J16



BANK 3

VIDEO CPU BOARD
PAGE 3-29



ECN	CHANGE	DATE

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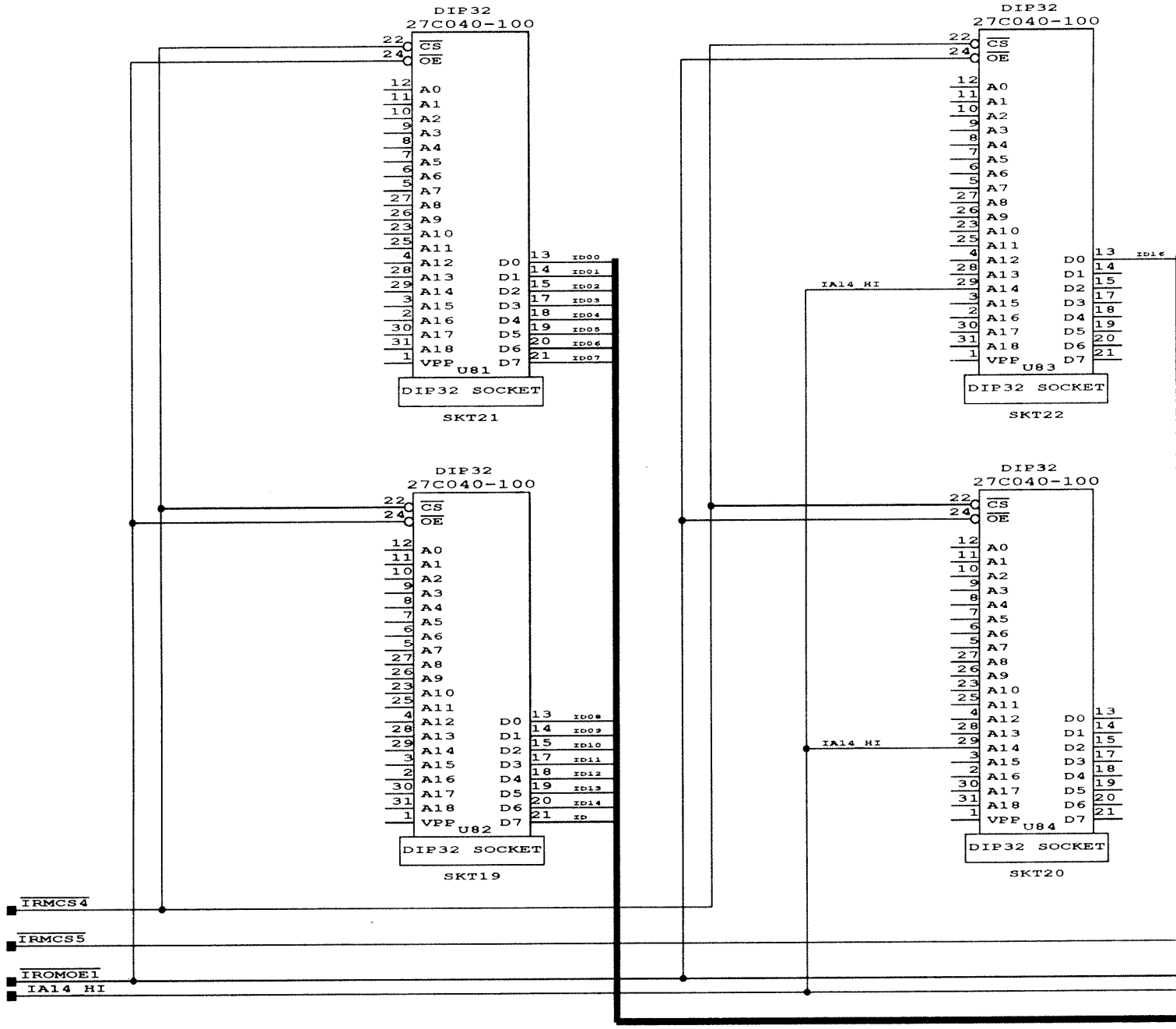
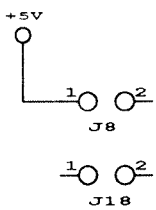
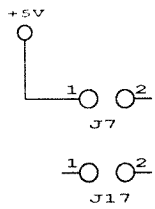
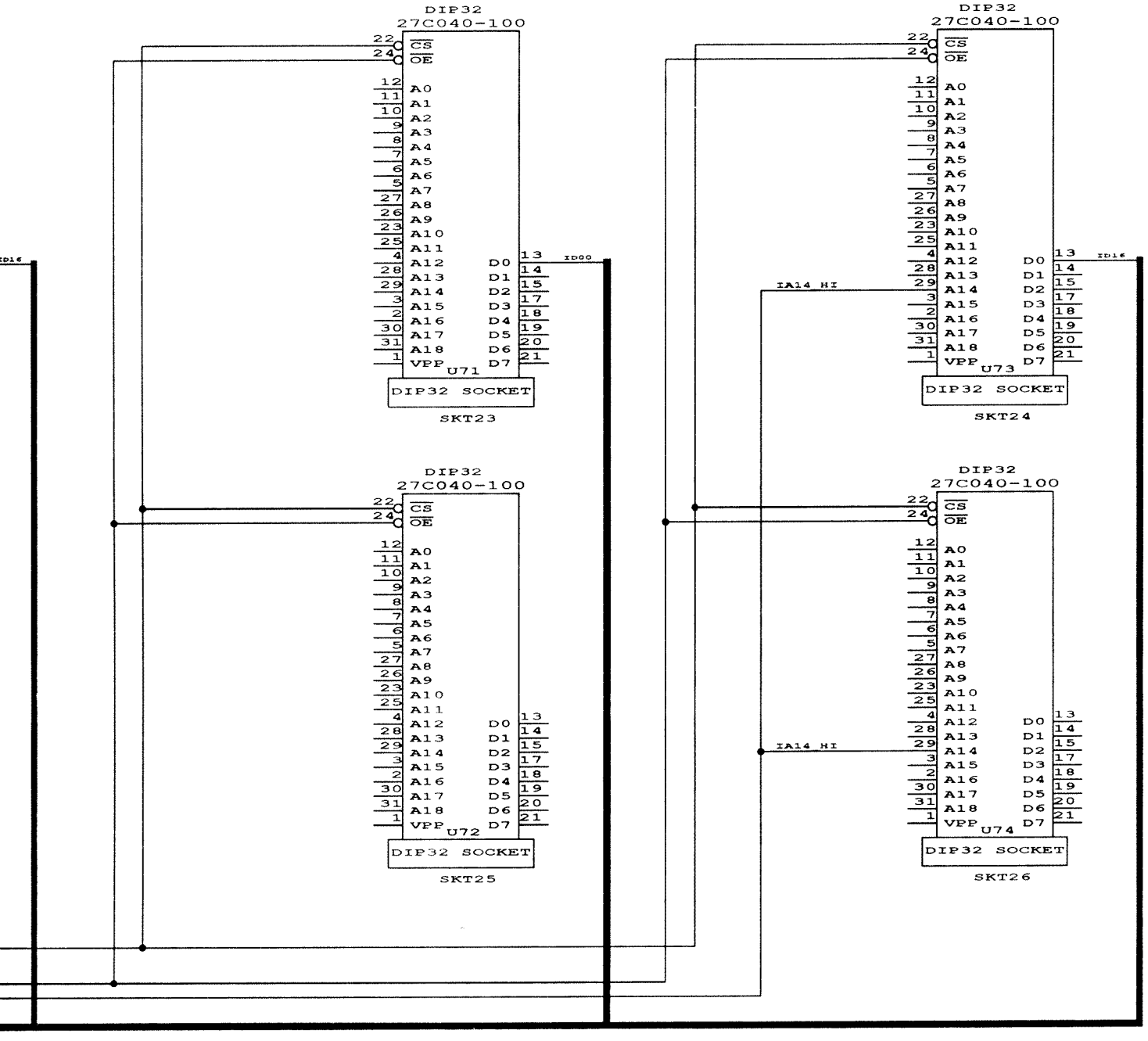
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY JML DATE 5-12-1994_12:12	1ST USEAGE DATE	TITLE XUNIT
CHECKED DATE	CURRENT PROJ. DATE	IMAGE ROM BANK 2/BANK 3
APPROVED DATE	SHEET 14 OF 26	PART NO. 16-9518 REV. 4


DIP32
27C040-100
U81
DIP32 SOCKET
SKT21
U83
SKT22
U82
SKT19
U84
SKT20
IA14_HI
IRMCS4
IRMCS5
IROMOE1
IA14_HI

BANK 4


+5V
J8
J18


+5V
J7
J17



BANK 5

VIDEO CPU BOARD
PAGE 3-30

ECN	CHANGE	DATE

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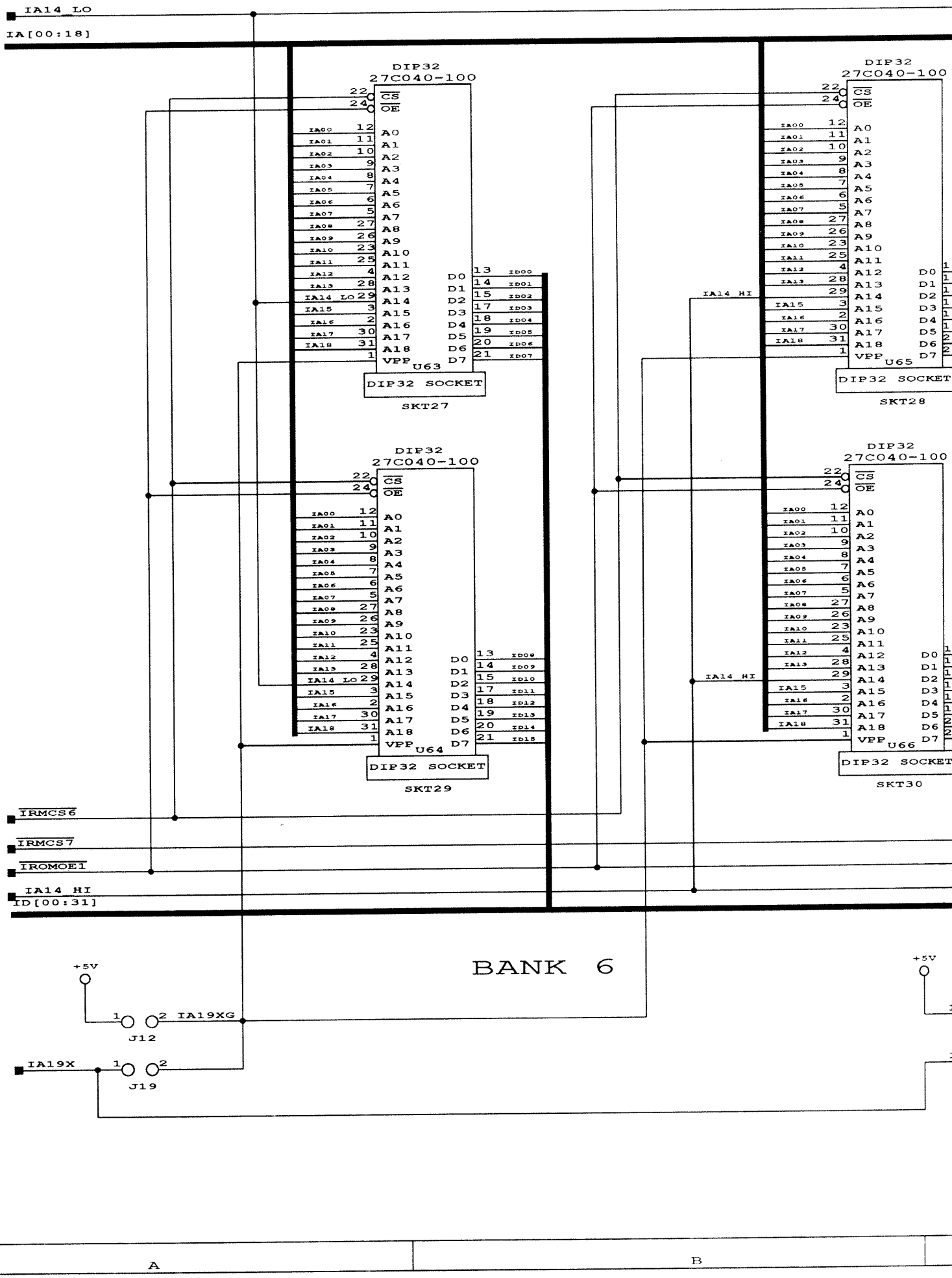
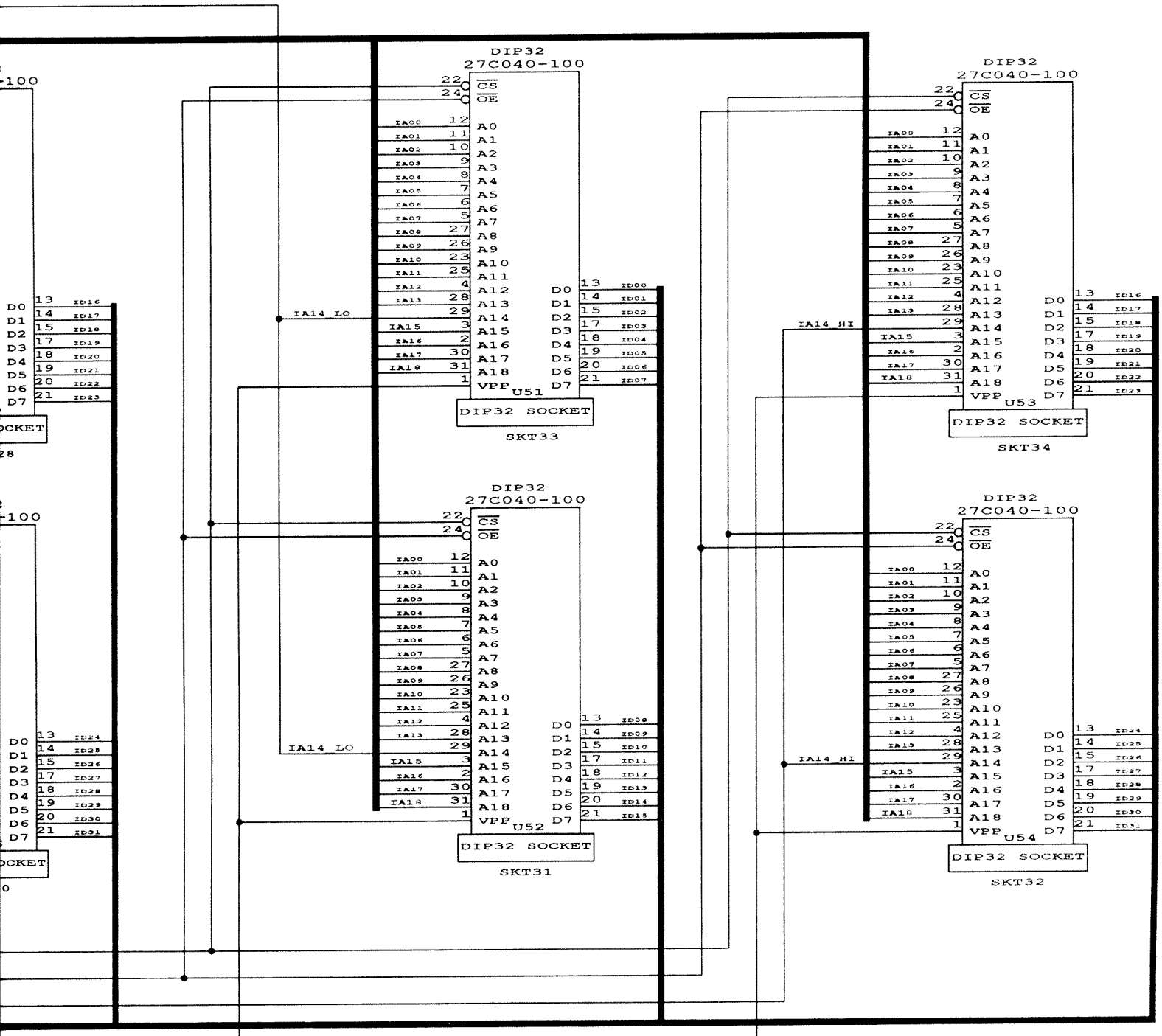
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:12	1ST USEAGE DATE	TITLE
CHECKED DATE	CURRENT PROJ. DATE	IMAGE ROM BANK 4/BANK 5
APPROVED DATE	SHEET 15 OF 26	PART NO. / REV.


IA14_LO
IA[00:18]
DIP32
27C040-100
U63
DIP32 SOCKET
SKT27
DIP32
27C040-100
U65
DIP32 SOCKET
SKT28
DIP32
27C040-100
U64
DIP32 SOCKET
SKT29
DIP32
27C040-100
U66
DIP32 SOCKET
SKT30
IA14_HI
IRMCS6
IRMCS7
IROMOE1
IA14_HI
ID[00:31]
BANK 6
+5V
IA19XG
J12
IA19X
J19
+5V



VIDEO CPU BOARD
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+5V

J9

J20

IA19XH

ECN	CHANGE	DATE

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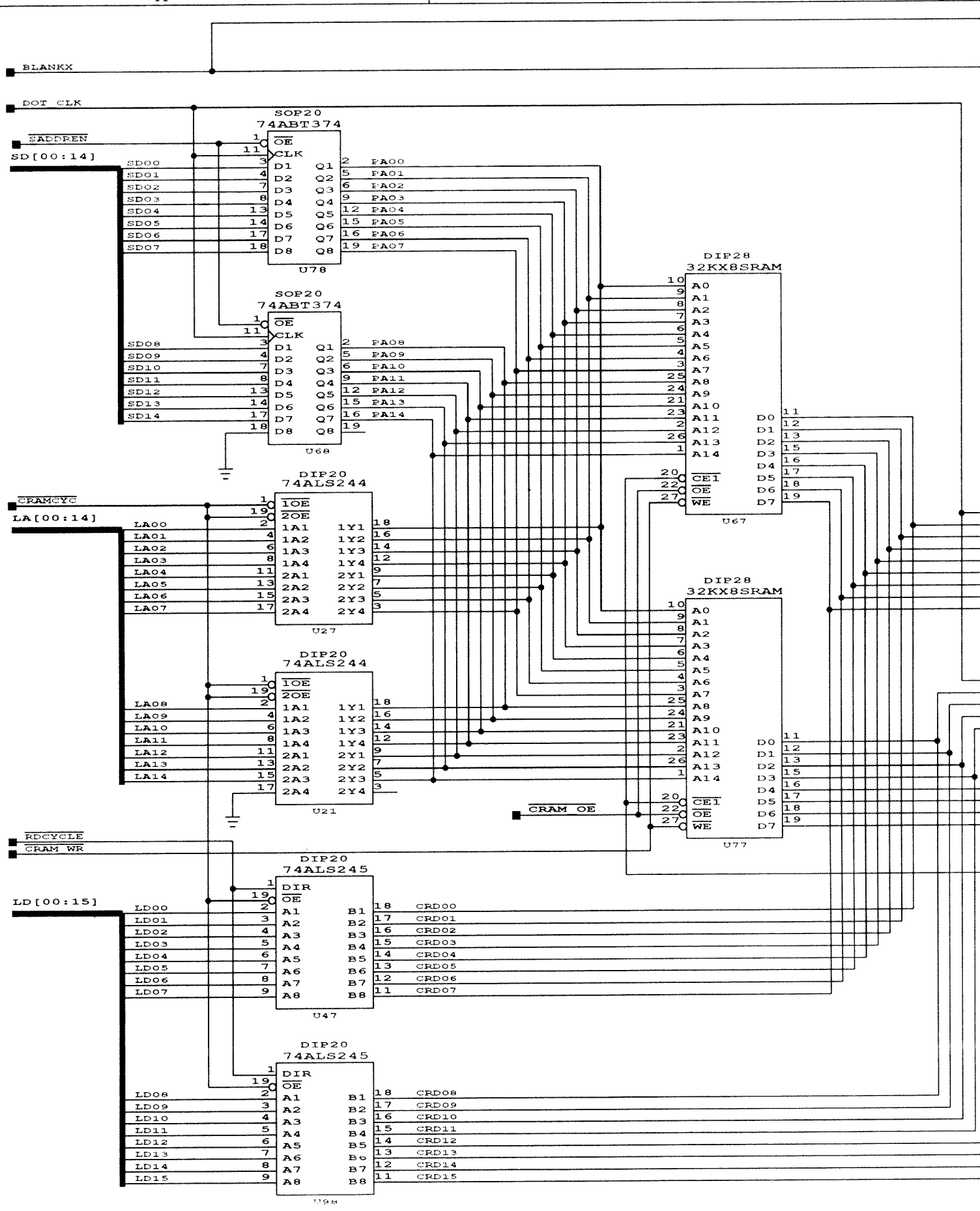
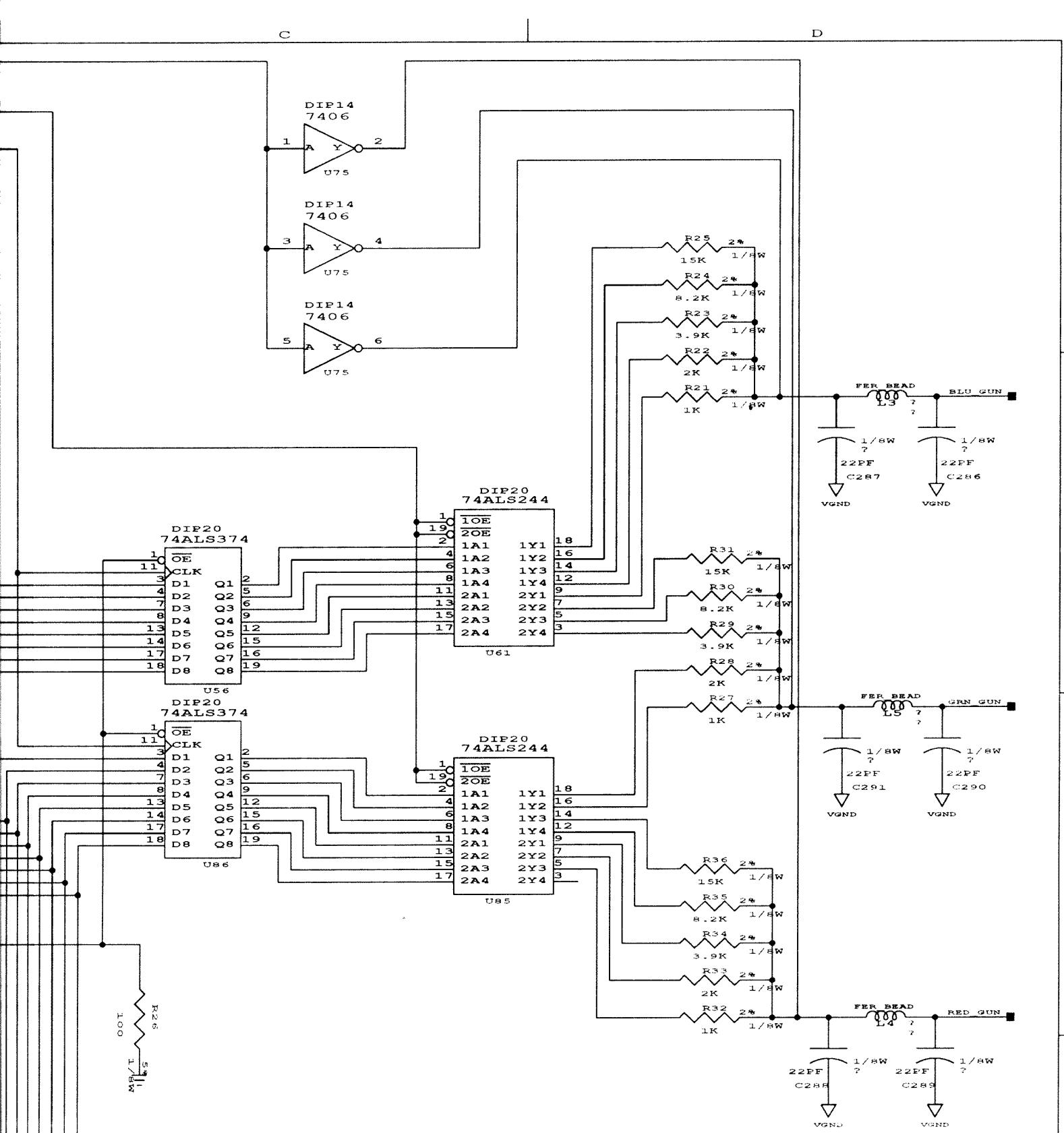
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:16	1ST USEAGE DATE	TITLE XUNIT IMAGE ROM BANK 6/BANK 7
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 16 OF 26	PART NO. 16-9518 REV. 4


A
B
1
2
3
4
BLANKX
DOT CLK
SADDREN
SD[00:14]
SOP20
74ABT374
U78
U68
DIP20
74ALS244
U27
U21
DIP28
32KX8SRAM
U67
U77
CRAMCYC
LA[00:14]
CRAM OE
RDCYCLE
CRAM WR
LD[00:15]
74ALS245
U47
U98



ECN	CHANGE	DATE

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PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:15	1ST USEAGE DATE	TITLE XUNIT
CHECKED DATE	CURRENT PROJ. DATE	RAMDAC/COLOR OUTPUT
APPROVED DATE	SHEET 17 OF 26	PART NO. 16-9518 REV. 4

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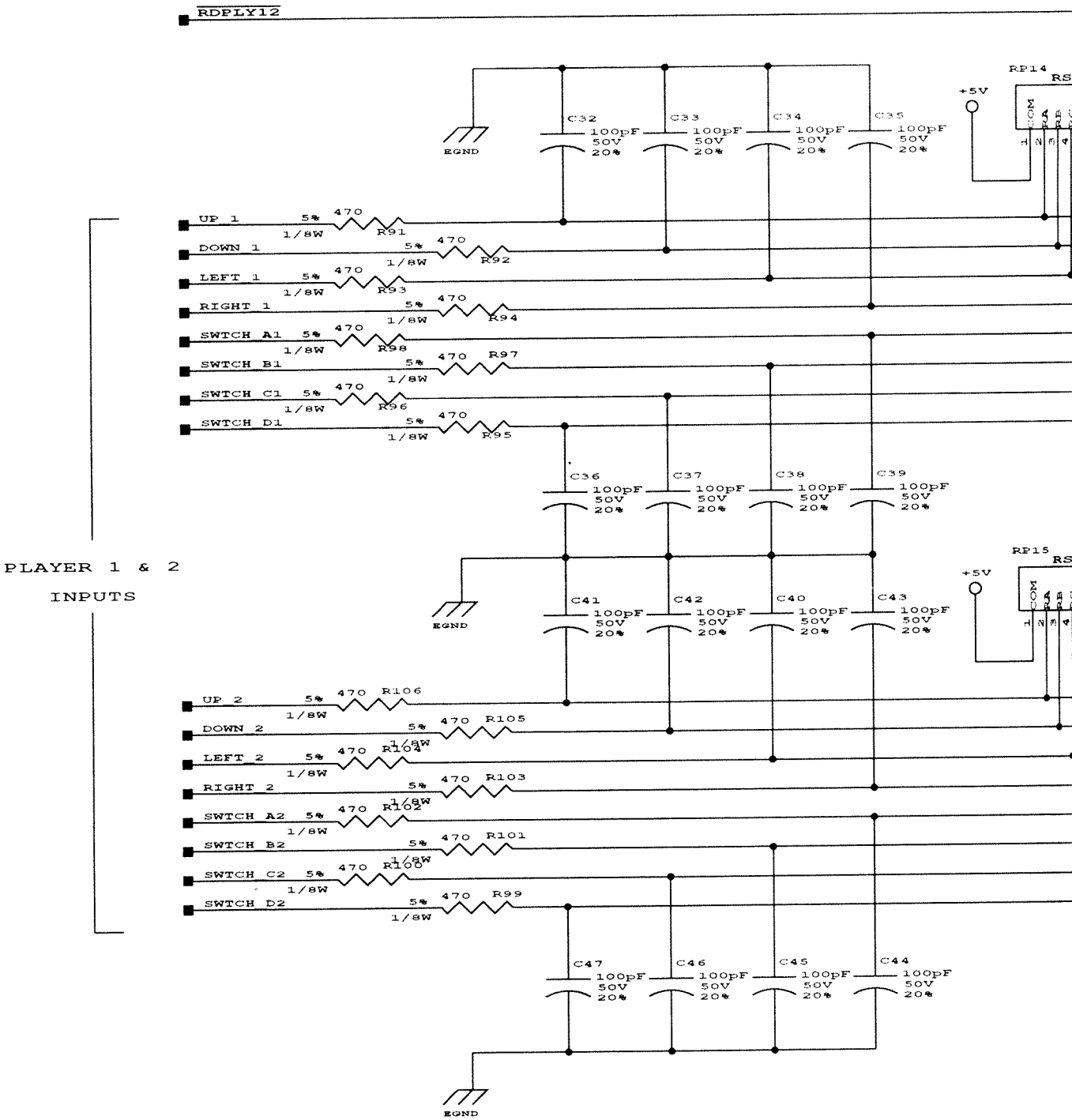
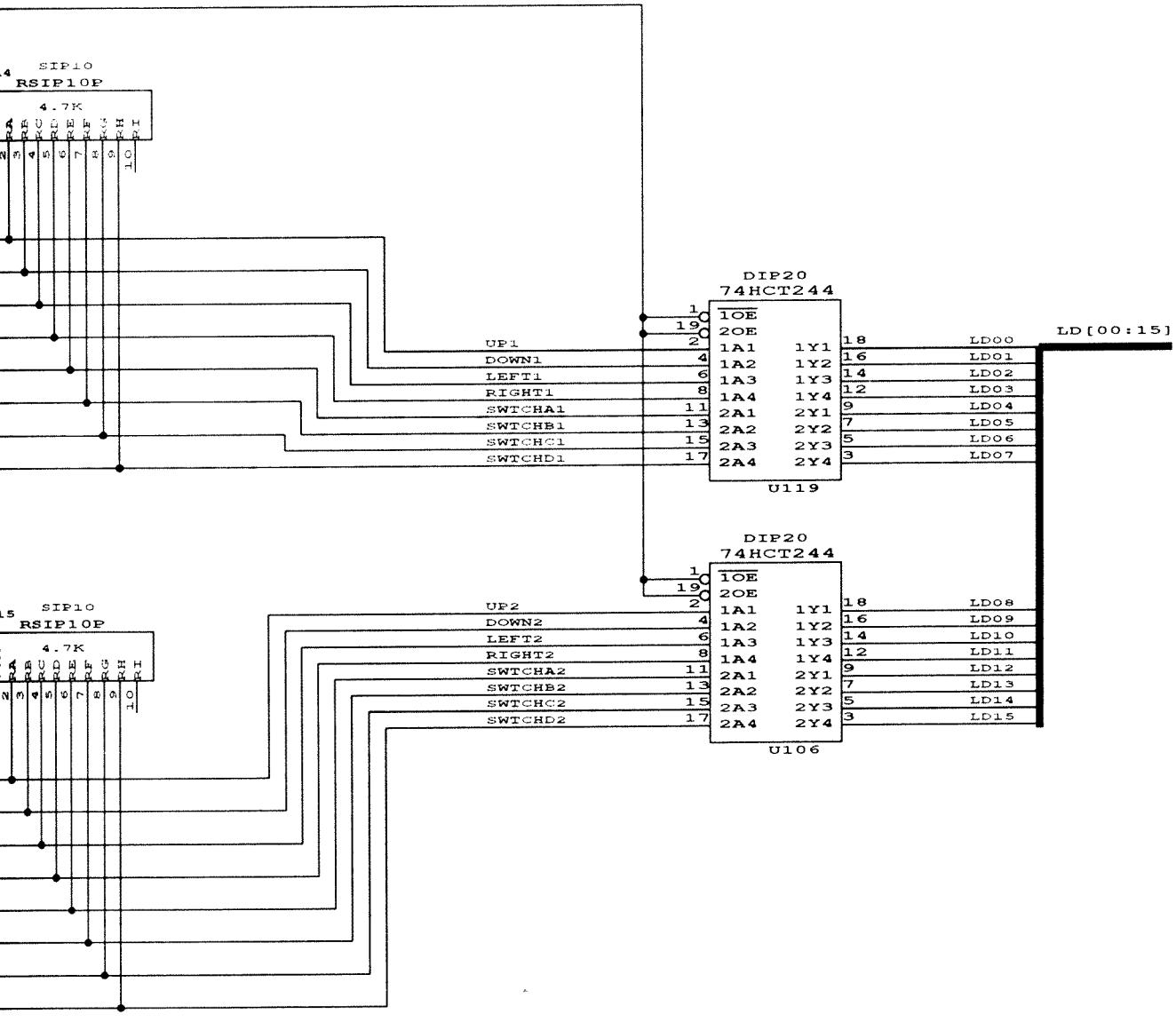

RDPLY12
EGND
C32 100pF 50V 20%
C33 100pF 50V 20%
C34 100pF 50V 20%
C35 100pF 50V 20%
RP14
+5V
UP 1 5% 1/8W 470 R91
DOWN 1 5% 1/8W 470 R92
LEFT 1 5% 1/8W 470 R93
RIGHT 1 5% 1/8W 470 R94
SWTCH A1 5% 1/8W 470 R98
SWTCH B1 5% 1/8W 470 R97
SWTCH C1 5% 1/8W 470 R96
SWTCH D1 5% 1/8W 470 R95
C36 100pF 50V 20%
C37 100pF 50V 20%
C38 100pF 50V 20%
C39 100pF 50V 20%
PLAYER 1 & 2
INPUTS
EGND
C41 100pF 50V 20%
C42 100pF 50V 20%
C40 100pF 50V 20%
C43 100pF 50V 20%
RP15
+5V
UP 2 5% 1/8W 470 R106
DOWN 2 5% 1/8W 470 R105
LEFT 2 5% 1/8W 470 R104
RIGHT 2 5% 1/8W 470 R103
SWTCH A2 5% 1/8W 470 R102
SWTCH B2 5% 1/8W 470 R101
SWTCH C2 5% 1/8W 470 R100
SWTCH D2 5% 1/8W 470 R99
C47 100pF 50V 20%
C46 100pF 50V 20%
C45 100pF 50V 20%
C44 100pF 50V 20%
EGND



VIDEO CPU BOARD
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ECN	CHANGE	DATE

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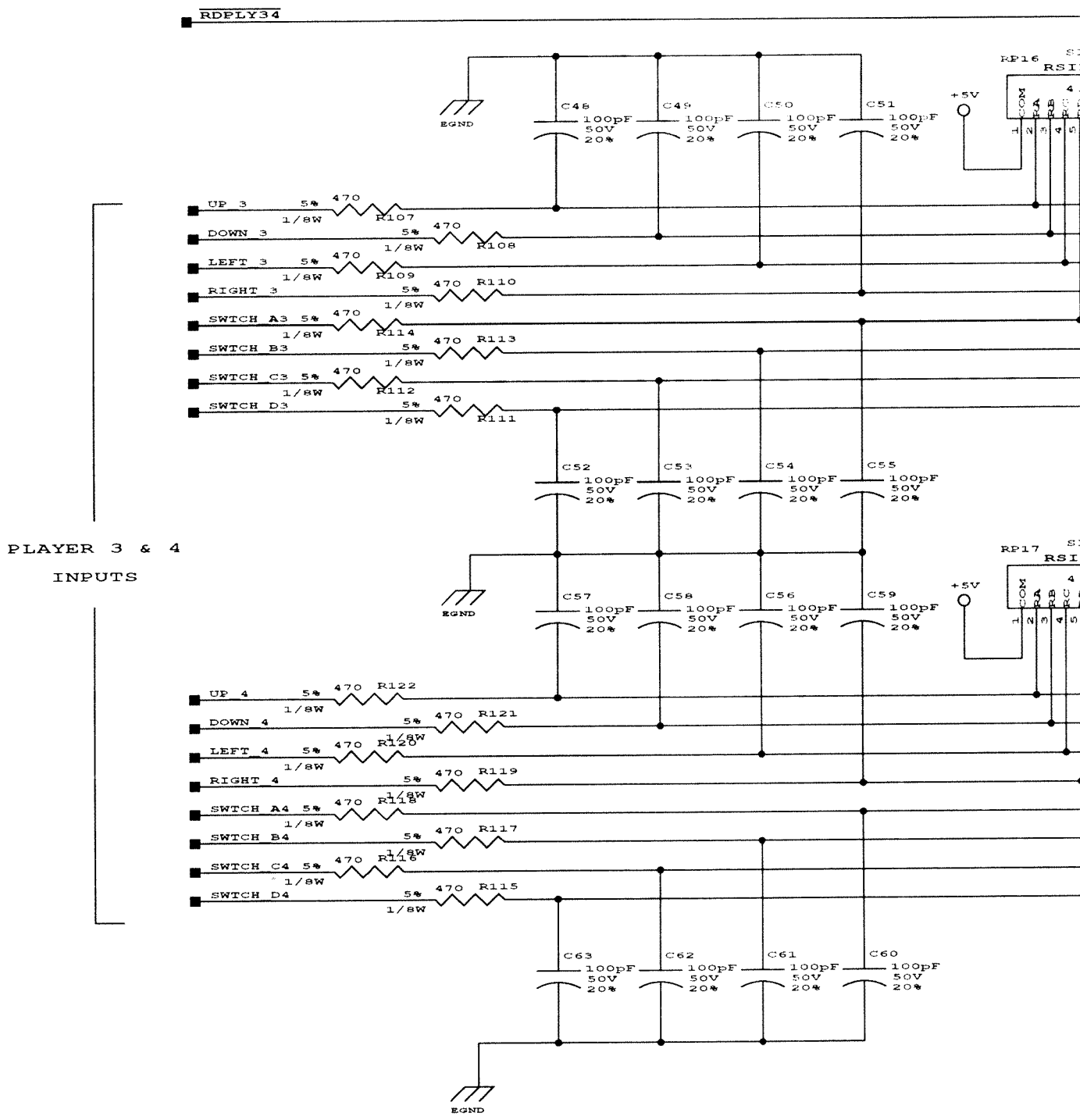
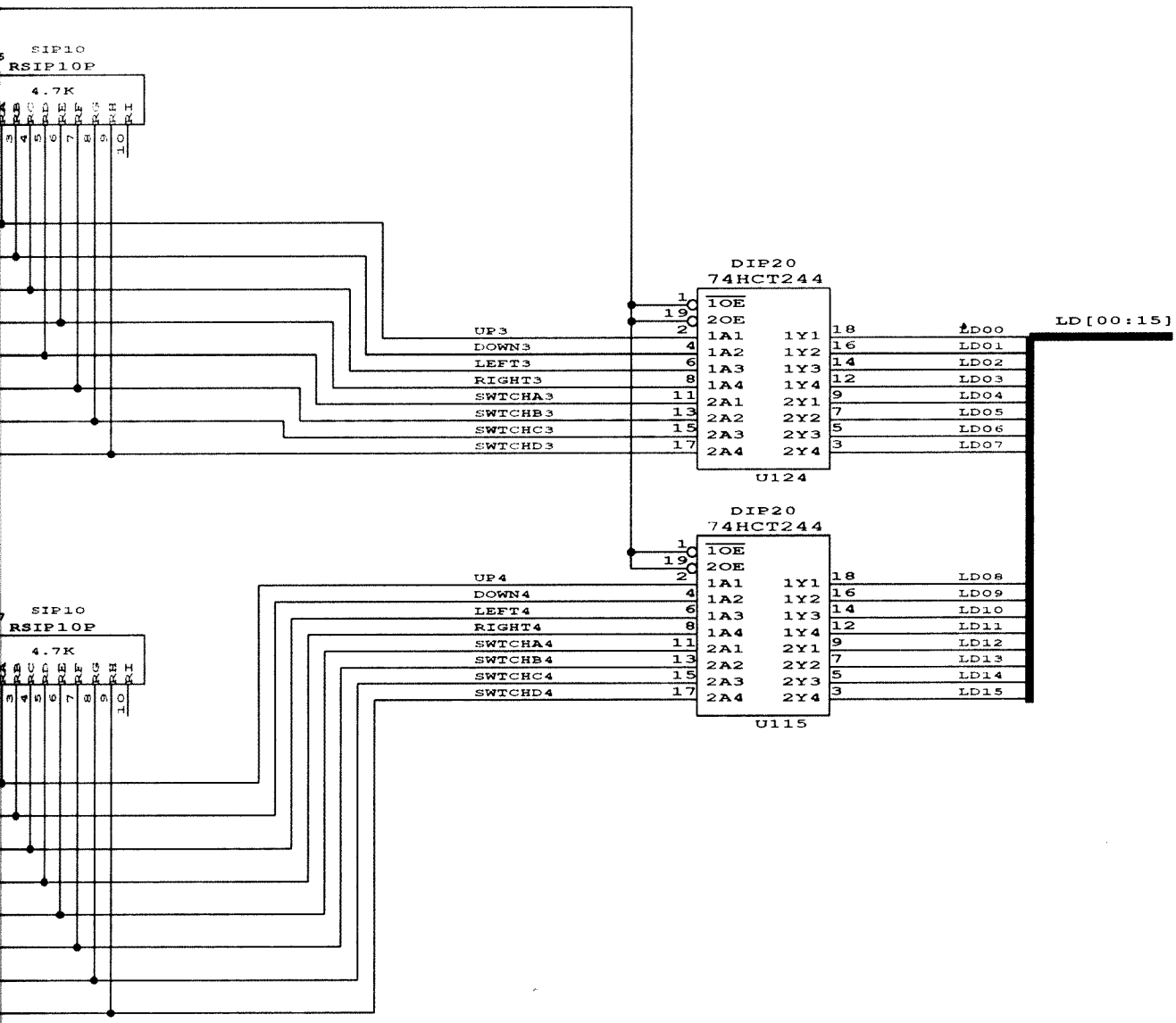
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:16	1ST USEAGE DATE	TITLE XUNIT PLAYER 1 AND 2 INPUTS
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 18 OF 26	PART NO. 16-9518 REV. 4


RDPLY34
PLAYER 3 & 4
INPUTS
EGND
+5V
RP16
RP17
C48 100pF 50V 20%
C49 100pF 50V 20%
C50 100pF 50V 20%
C51 100pF 50V 20%
C52 100pF 50V 20%
C53 100pF 50V 20%
C54 100pF 50V 20%
C55 100pF 50V 20%
C57 100pF 50V 20%
C58 100pF 50V 20%
C56 100pF 50V 20%
C59 100pF 50V 20%
C63 100pF 50V 20%
C62 100pF 50V 20%
C61 100pF 50V 20%
C60 100pF 50V 20%
UP 3 5% 1/8W 470 R107
DOWN 3 5% 1/8W 470 R108
LEFT 3 5% 1/8W 470 R109
RIGHT 3 5% 1/8W 470 R110
SWTCH A3 5% 1/8W 470 R114
SWTCH B3 5% 1/8W 470 R113
SWTCH C3 5% 1/8W 470 R112
SWTCH D3 5% 1/8W 470 R111
UP 4 5% 1/8W 470 R122
DOWN 4 5% 1/8W 470 R121
LEFT 4 5% 1/8W 470 R120
RIGHT 4 5% 1/8W 470 R119
SWTCH A4 5% 1/8W 470 R118
SWTCH B4 5% 1/8W 470 R117
SWTCH C4 5% 1/8W 470 R116
SWTCH D4 5% 1/8W 470 R115



VIDEO CPU BOARD
PAGE 3-34

ECN	CHANGE	DATE

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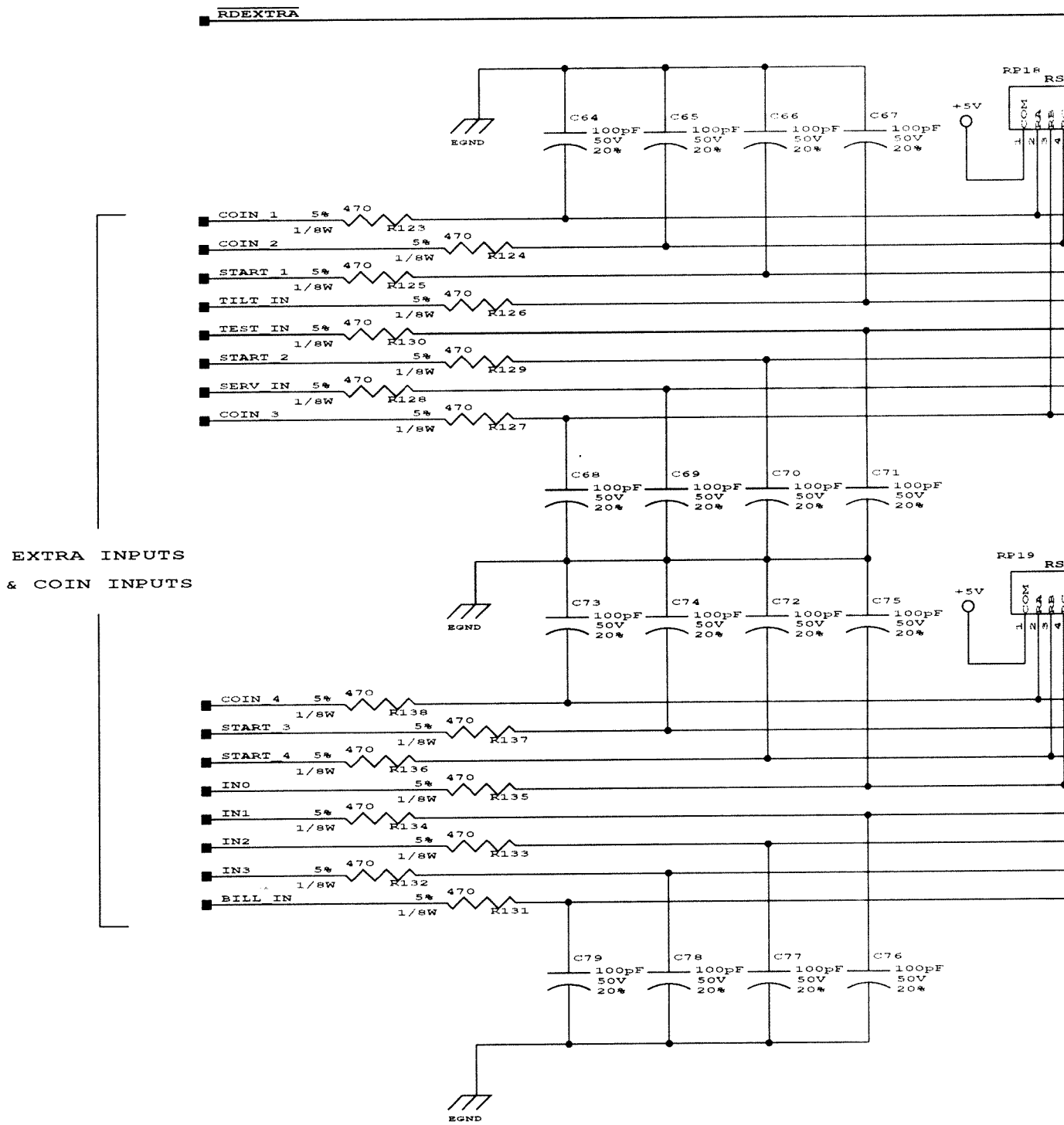
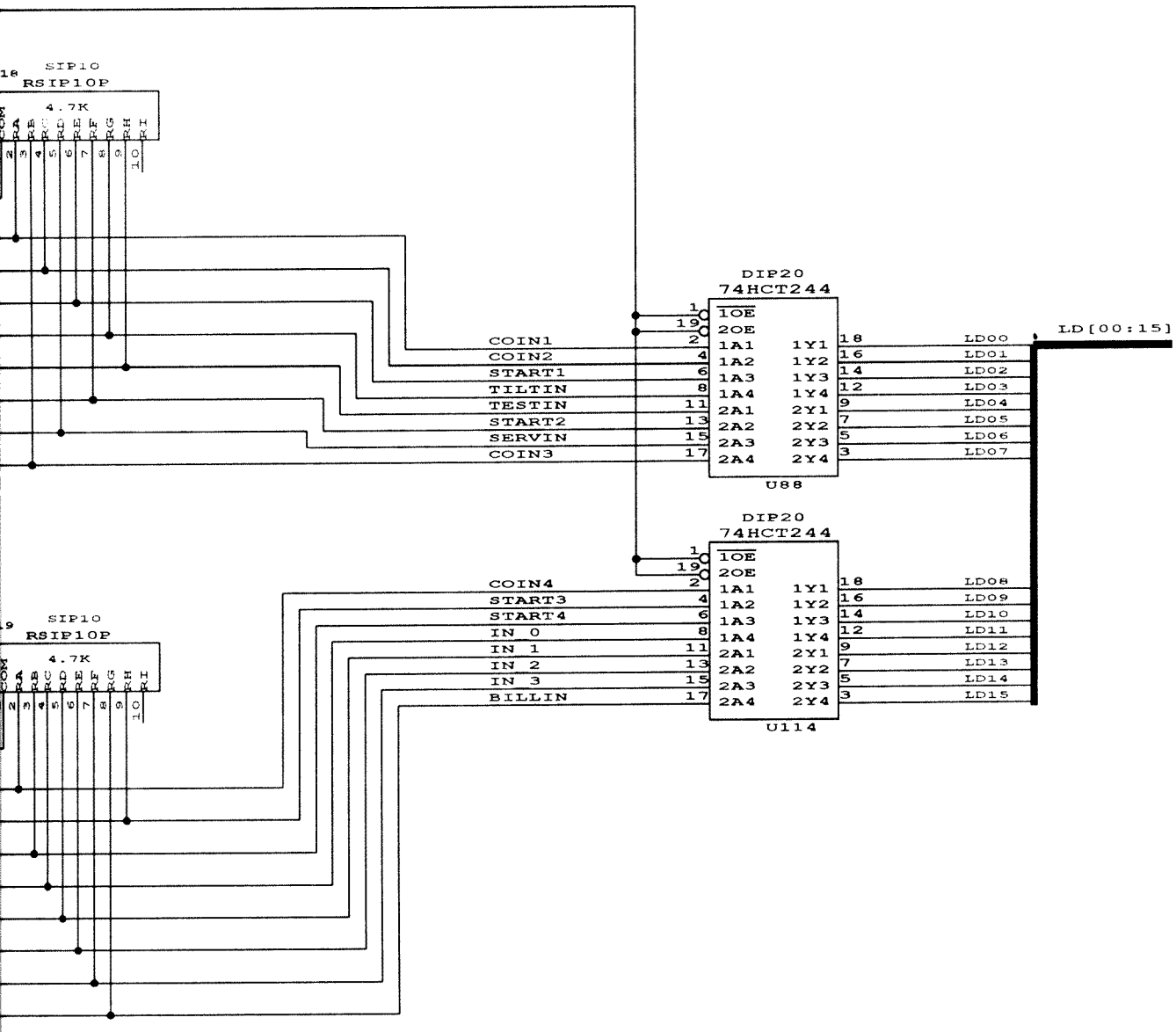
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:16	1ST USEAGE DATE	TITLE XUNIT PLAYER 3 AND 4 INPUTS
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 19 OF 26	PART NO. 16-9518 REV. 4


RDEXTRA
EGND
C64 100pF 50V 20%
C65 100pF 50V 20%
C66 100pF 50V 20%
C67 100pF 50V 20%
+5V
RP18
COIN 1 5% 1/8W 470 R123
COIN 2 5% 1/8W 470 R124
START 1 5% 1/8W 470 R125
TILT IN 5% 1/8W 470 R126
TEST IN 5% 1/8W 470 R130
START 2 5% 1/8W 470 R129
SERV IN 5% 1/8W 470 R128
COIN 3 5% 1/8W 470 R127
C68 100pF 50V 20%
C69 100pF 50V 20%
C70 100pF 50V 20%
C71 100pF 50V 20%
EXTRA INPUTS
& COIN INPUTS
EGND
C73 100pF 50V 20%
C74 100pF 50V 20%
C72 100pF 50V 20%
C75 100pF 50V 20%
+5V
RP19
COIN 4 5% 1/8W 470 R138
START 3 5% 1/8W 470 R137
START 4 5% 1/8W 470 R136
IN0 5% 1/8W 470 R135
IN1 5% 1/8W 470 R134
IN2 5% 1/8W 470 R133
IN3 5% 1/8W 470 R132
BILL IN 5% 1/8W 470 R131
C79 100pF 50V 20%
C78 100pF 50V 20%
C77 100pF 50V 20%
C76 100pF 50V 20%
EGND

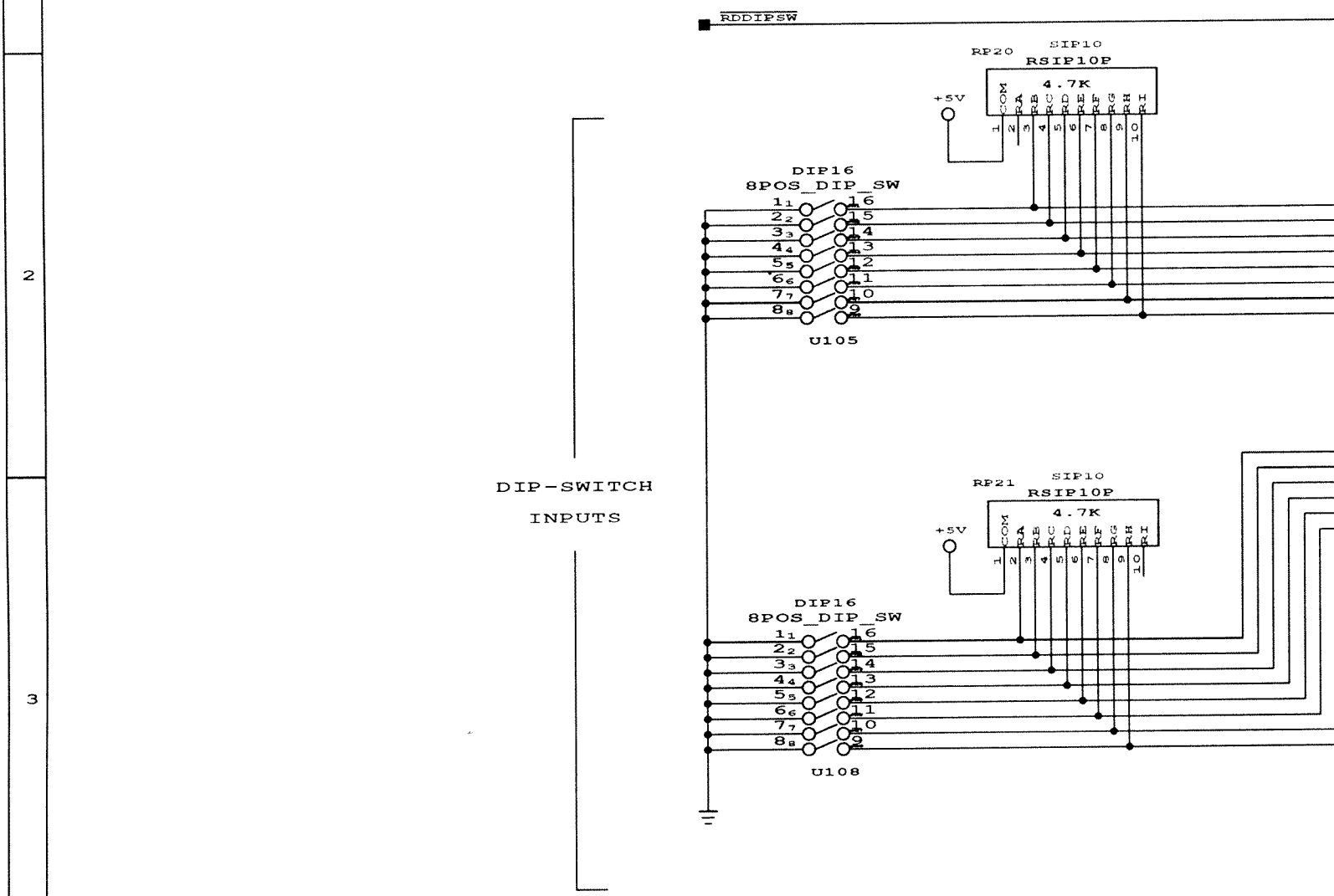


VIDEO CPU BOARD
PAGE 3-35

ECN	CHANGE	DATE

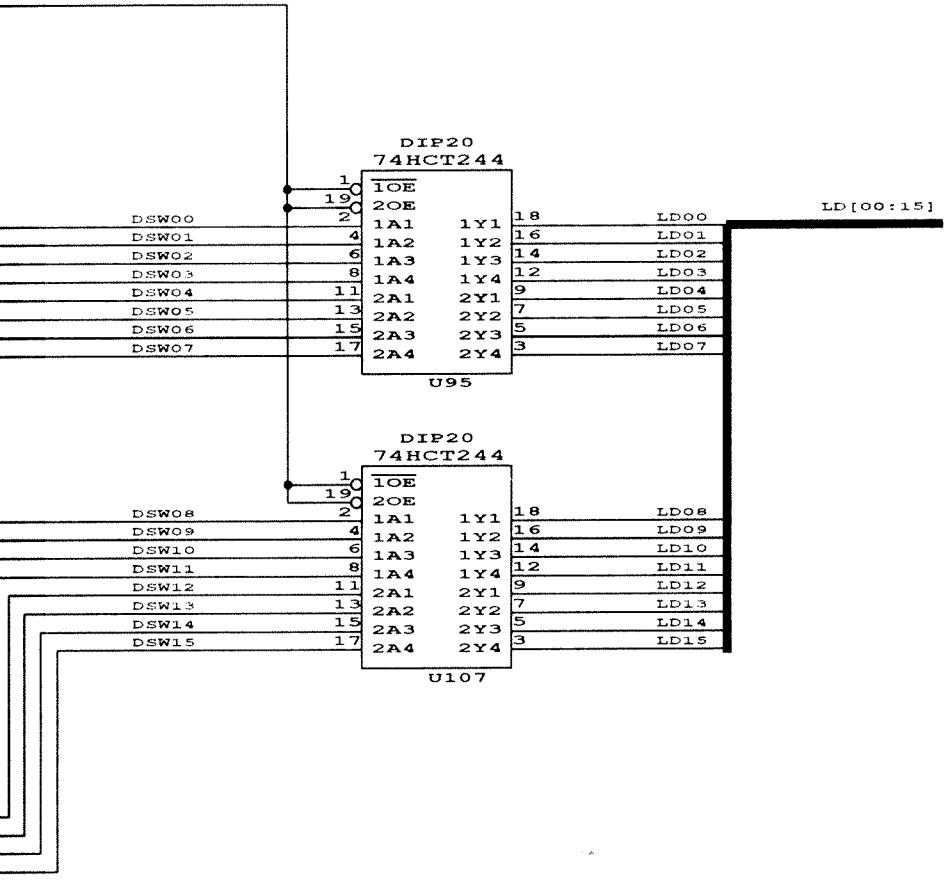
INFORMATION CONTAINED HEREIN IS CONFIDENTIAL PROPERTY AND MAY NOT BE USED OR DISCLOSED WITHOUT EXPRESS WRITTEN CONSENT FROM THE COMPANY.

PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:17	1ST USEAGE DATE	TITLE XUNIT EXTRA INPUTS, COIN/START
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 20 OF 26	PART NO. 16-9518 REV. 4



DIP-SWITCH

INPUTS



VIDEO CPU BOARD
PAGE 3-36

ECN	CHANGE	DATE

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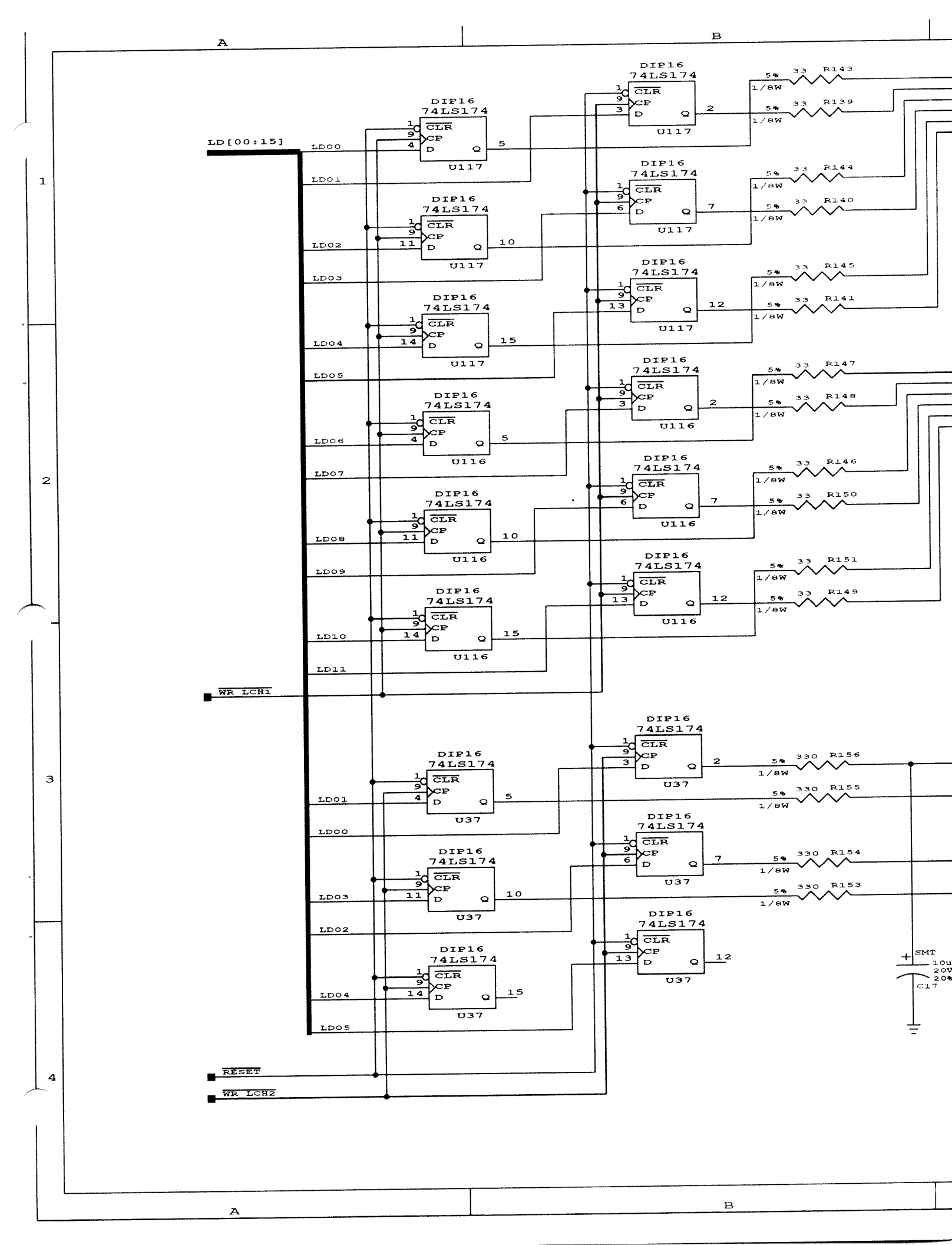
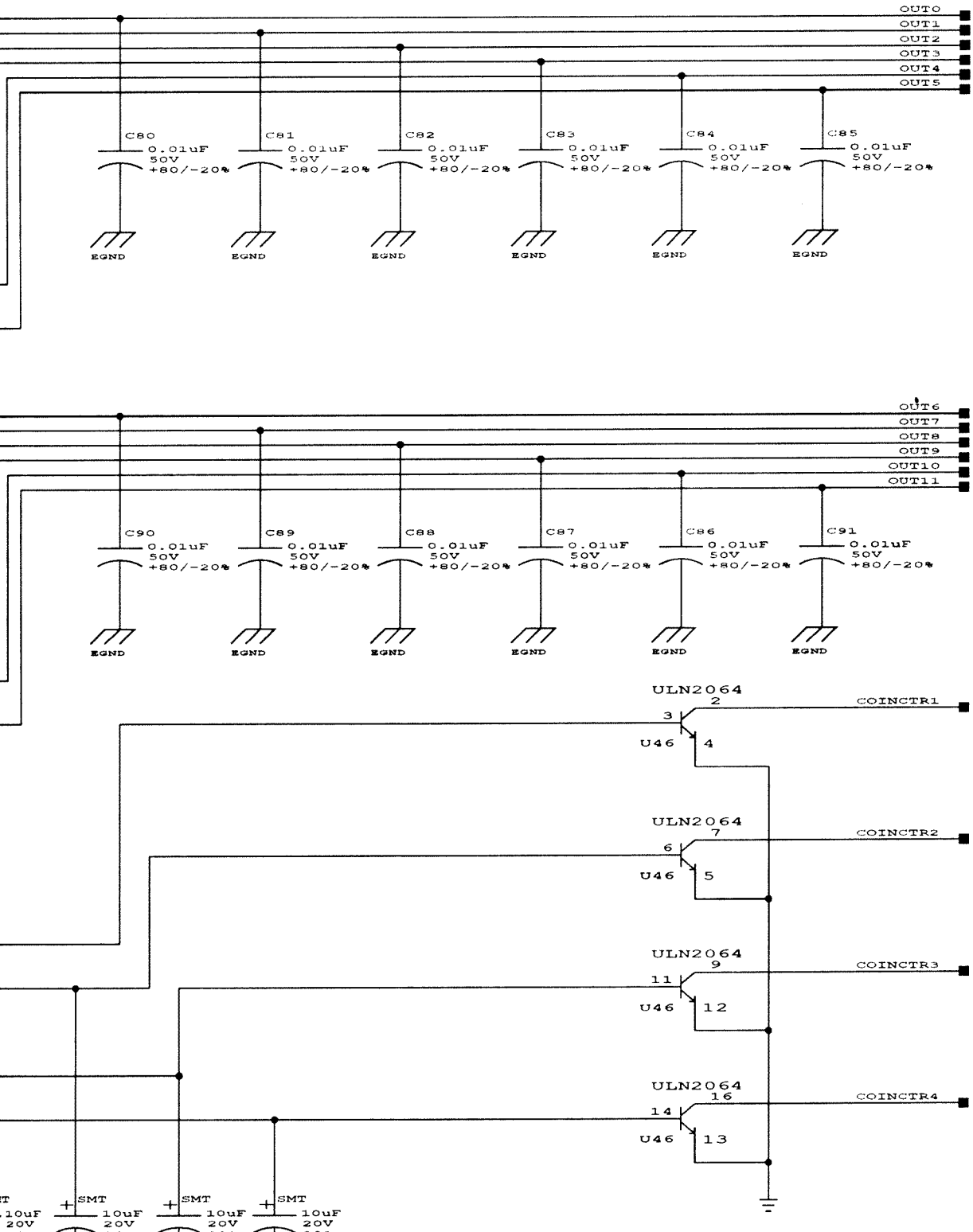
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:17	1ST USEAGE DATE	TITLE XUNIT DIP-SWITCH INPUTS
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 21 OF 26	PART NO. 16-9518 REV. 4


A
B
1
2
3
4
LD[00:15]
LD00
LD01
LD02
LD03
LD04
LD05
LD06
LD07
LD08
LD09
LD10
LD11
WR LCH1
RESET
WR LCH2
DIP16
74LS174
U117
U116
U37
R143
R139
R144
R140
R145
R141
R147
R148
R146
R150
R151
R149
R156
R155
R154
R153
33
330
5%
1/8W
SMT
10u
20V
20%
C17



VIDEO CPU BOARD
PAGE 3-37

ECN	CHANGE	DATE

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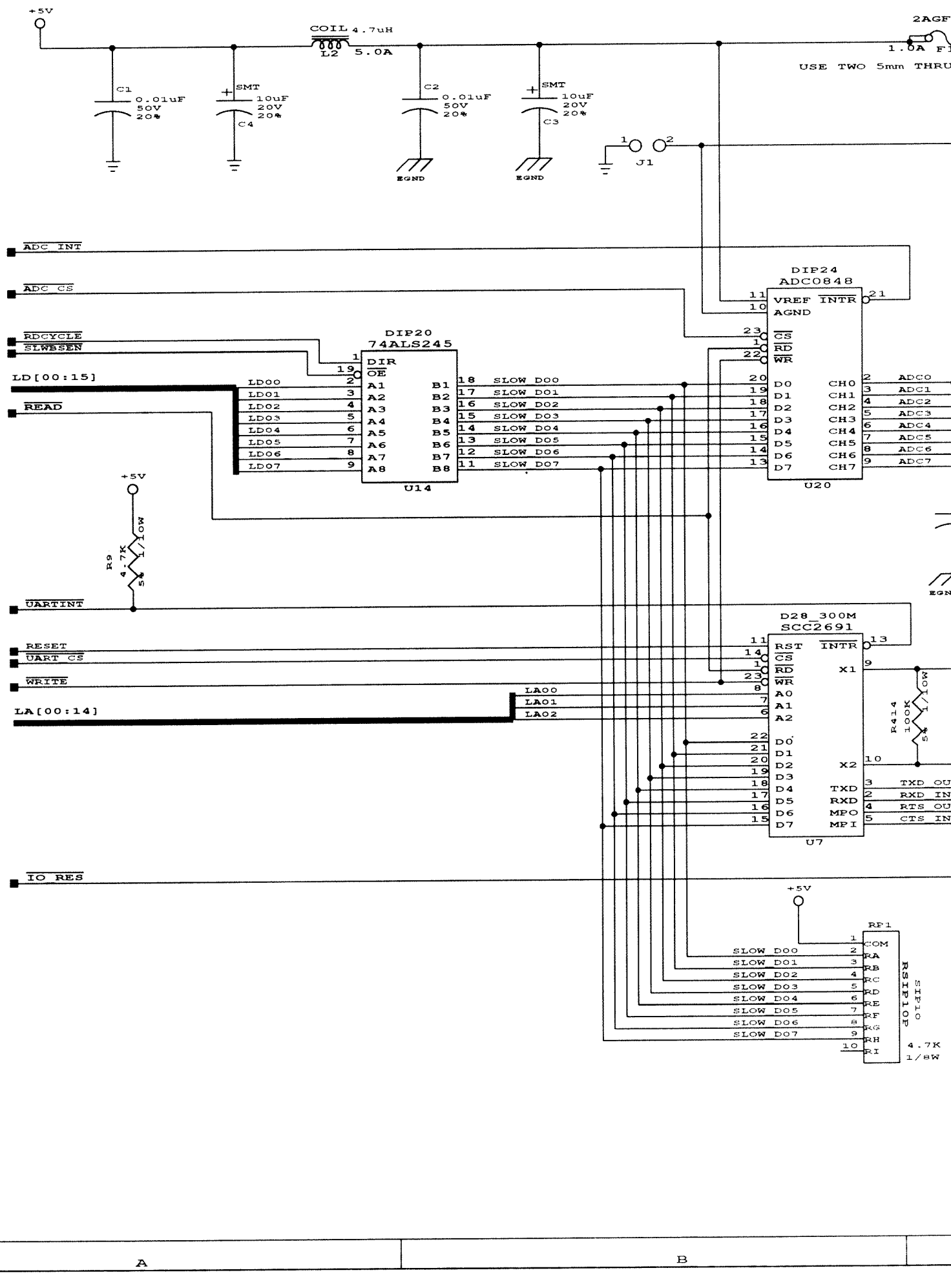
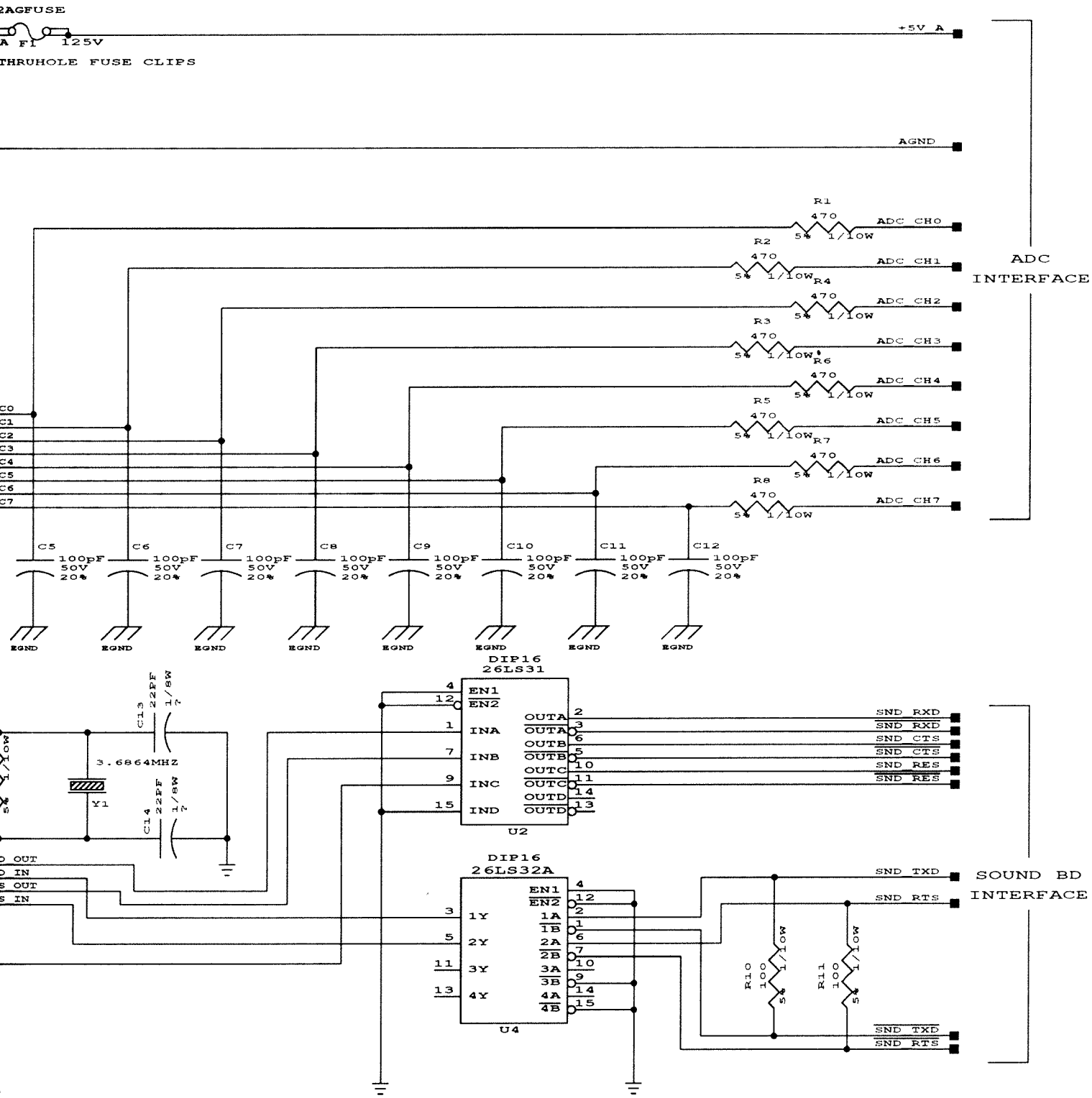
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:18	1ST USEAGE DATE	TITLE XUNIT OUTPUTS
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 22 OF 26	PART NO. 16-9518 REV. 4


+5V
COIL 4.7uH
L2 5.0A
2AGF
1.0A F
USE TWO 5mm THRU
C1 0.01uF 50V 20%
C4 SMT 10uF 20V 20%
C2 0.01uF 50V 20%
C3 SMT 10uF 20V 20%
EGND
EGND
J1
ADC INT
ADC CS
RDCYCLE
SLWBSEN
LD[00:15]
READ
UARTINT
RESET
UART CS
WRITE
LA[00:14]
IO RES
DIP20
74ALS245
U14
DIP24
ADC0848
U20
D28_300M
SCC2691
U7
R9 4.7K 5% I/IOW
R414 100K 5% I/IOW
RP1
RSIP10P
SIP10
4.7K 1/8W



ECN	CHANGE	DATE

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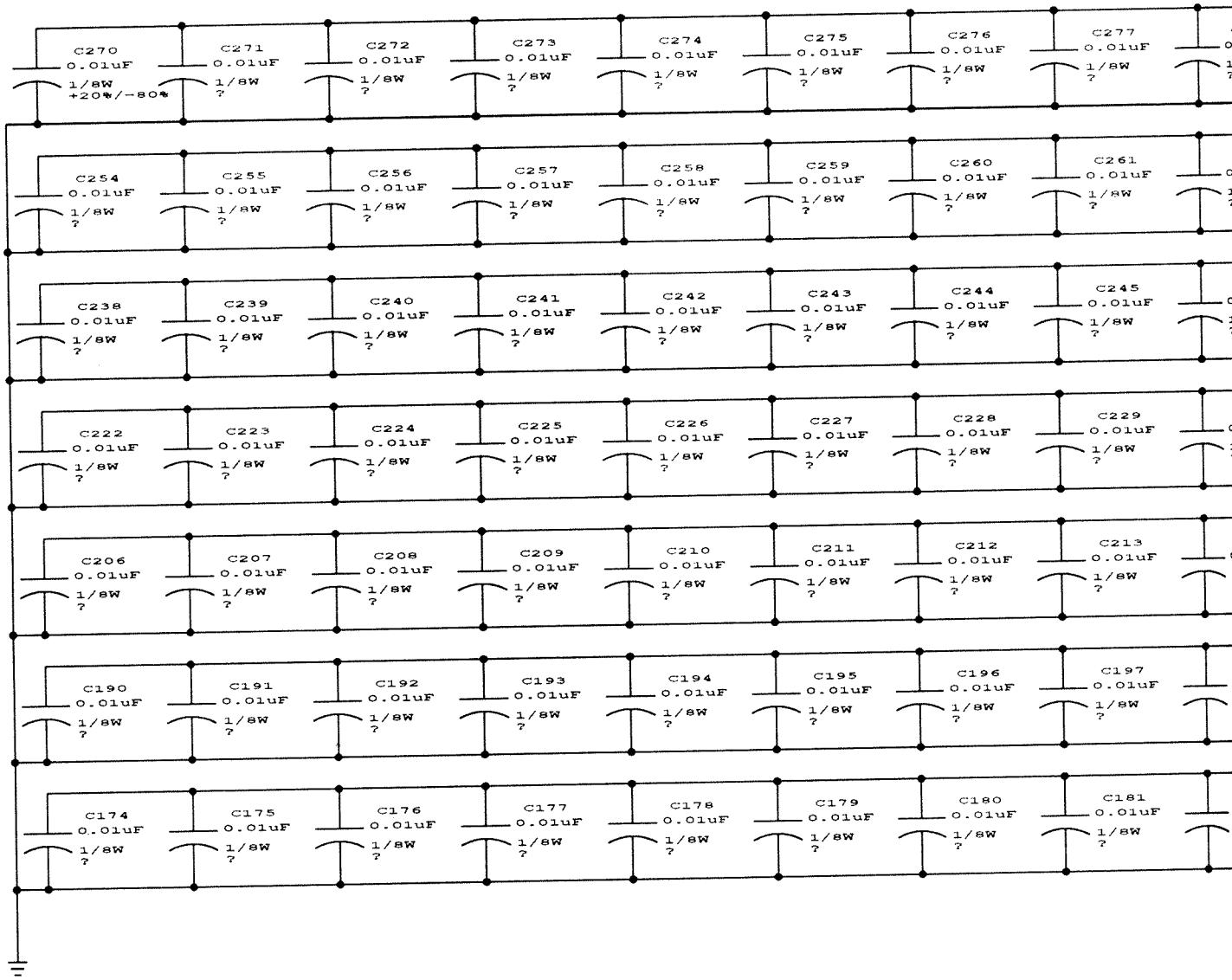
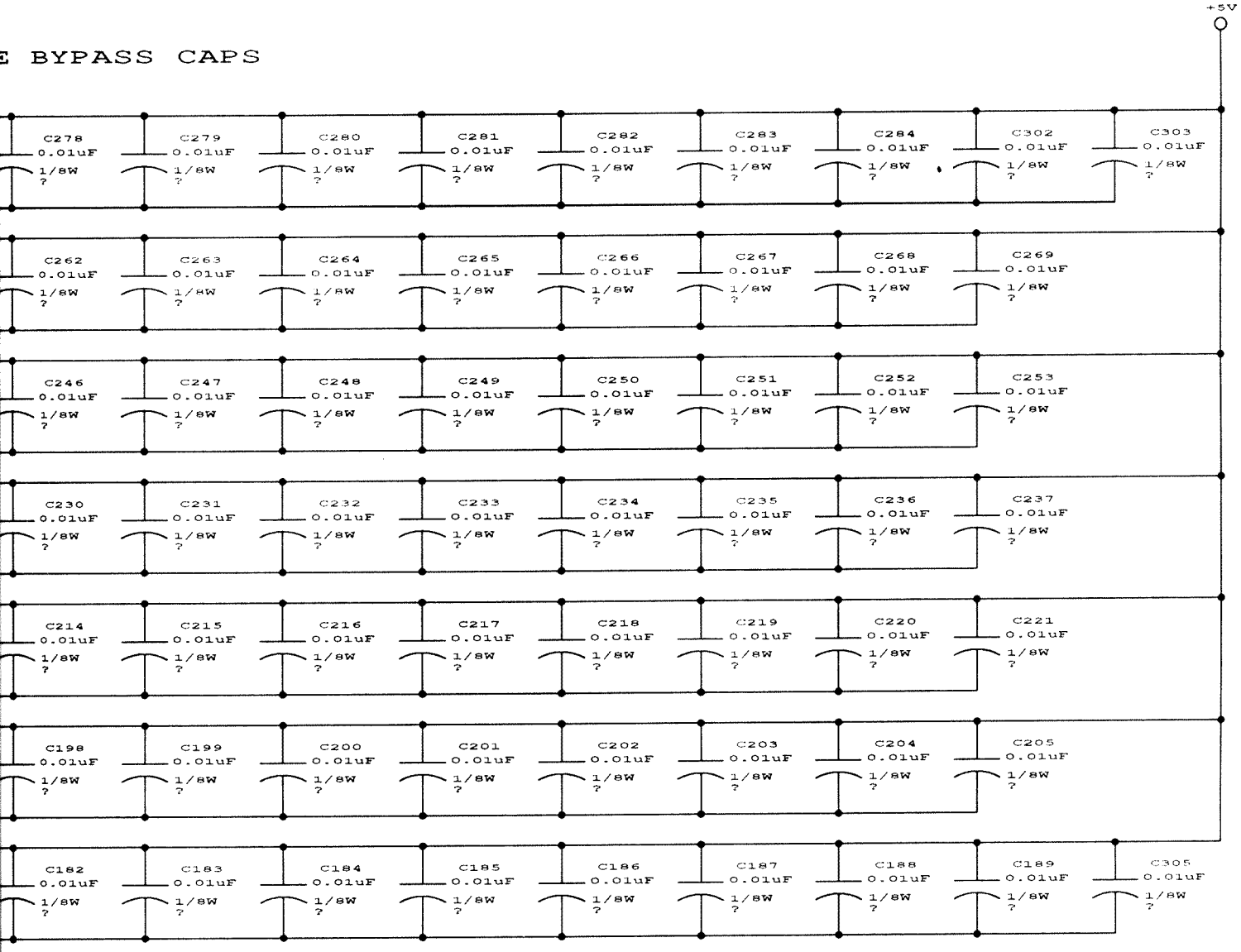
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE RSC 5-12-1994_12:18	1ST USEAGE DATE	TITLE XUNIT A/D CONVERTER AND UART (SOUND INTERFACE)
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 23 OF 26	PART NO. 16-9518 REV. 4

VIDEO CPU BOARD
PAGE 3-38

GENERAL PURPOSE B



E BYPASS CAPS



VIDEO CPU BOARD
PAGE 3-39

ECN	CHANGE	DATE

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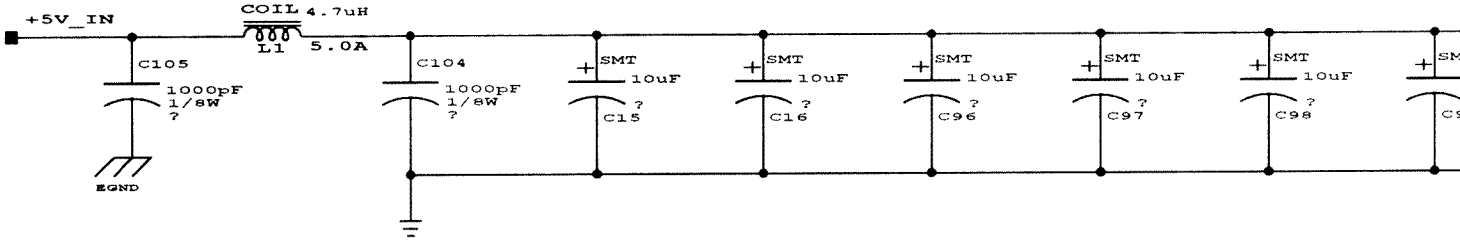
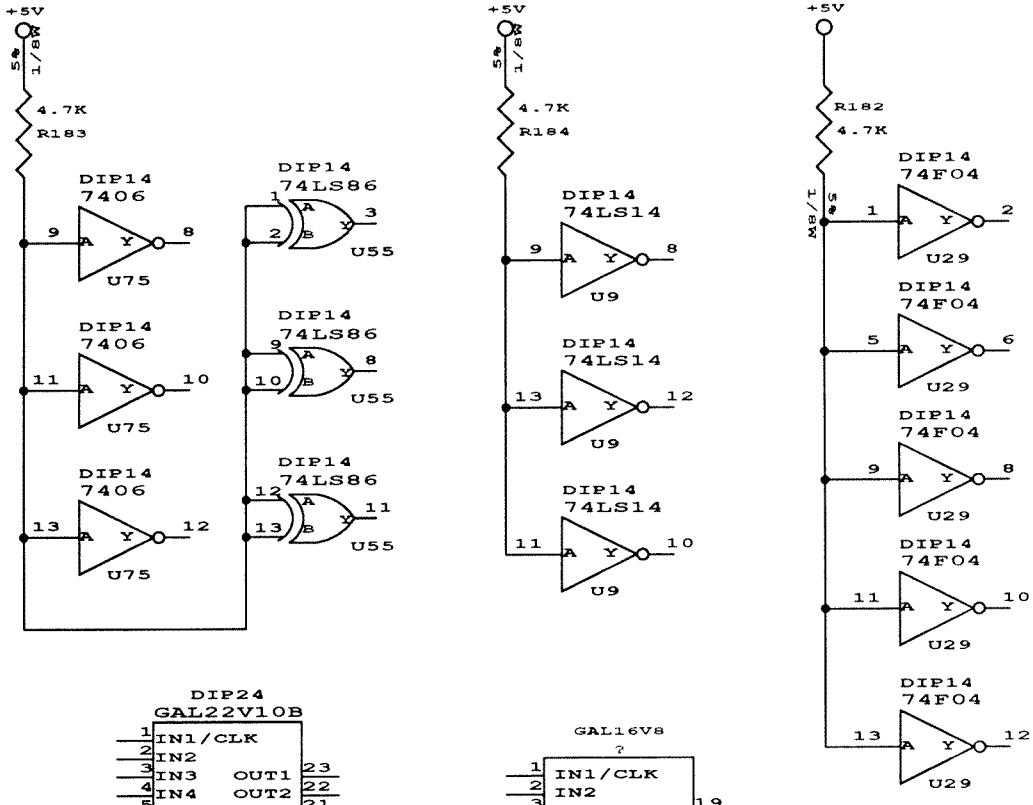
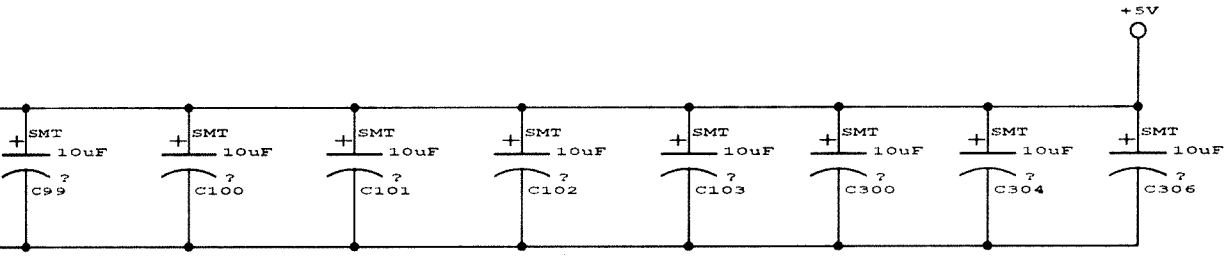
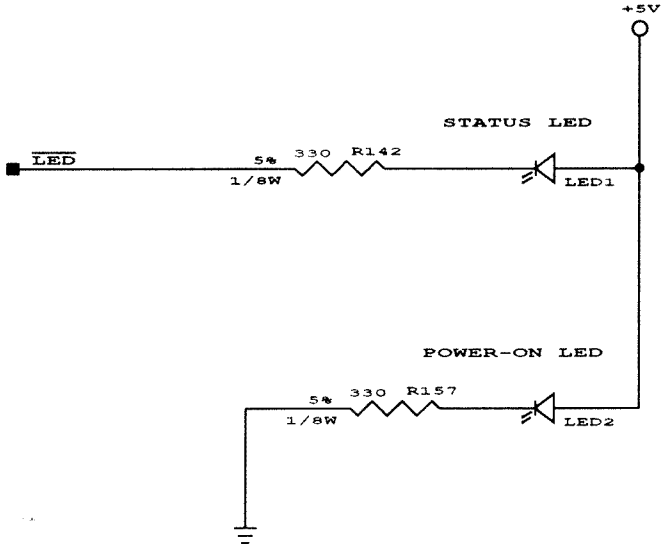
PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:18	1ST USEAGE DATE	TITLE XUNIT BYPASS CAPS
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 24 OF 26	PART NO. 16-9518 REV. 4


+5V_IN
COIL 4.7uH
L1 5.0A
C105
1000pF
1/8W
?
EGND
C104
1000pF
1/8W
?
SMT
10uF
?
C15
C16
C96
C97
C98

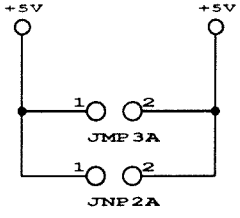
SPARE GATES

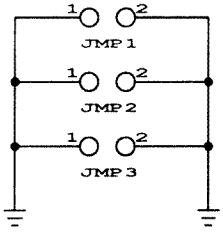

+5V
5%
1/8W
4.7K
R183
R184
R182
DIP14
7406
U75
74LS86
U55
74LS14
U9
74F04
U29
DIP24
GAL22V10B
IN1/CLK
IN2
IN3
IN4
IN5
IN6
IN7
IN8
IN9
IN10
IN11
IN12
OUT1
OUT2
OUT3
OUT4
OUT5
OUT6
OUT7
OUT8
OUT9
OUT10
SPARE2
GAL16V8
IO1
IO2
IO3
IO4
IO5
IO6
IO7
IO8
OE /IN10
SPARE1





Test points





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ECN	CHANGE	DATE

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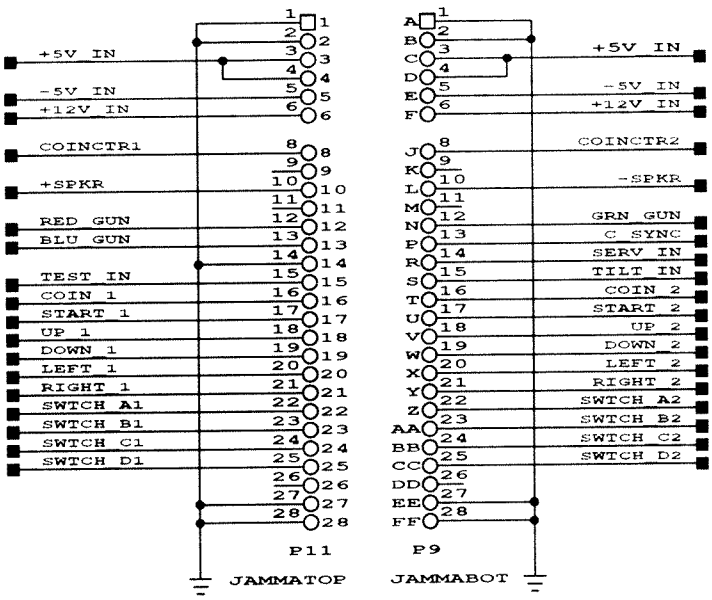
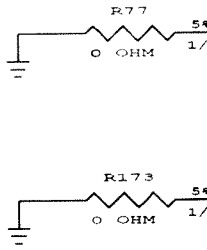
DWN. BY DATE JML 5-12-1994_12:18	1ST USEAGE DATE	TITLE XUNIT PLD/CONTROL
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET 25 OF 26	PART NO. 16-9518 REV. 4

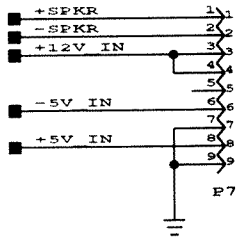
JAMMA INTERFACE
EDGE CONNECTOR

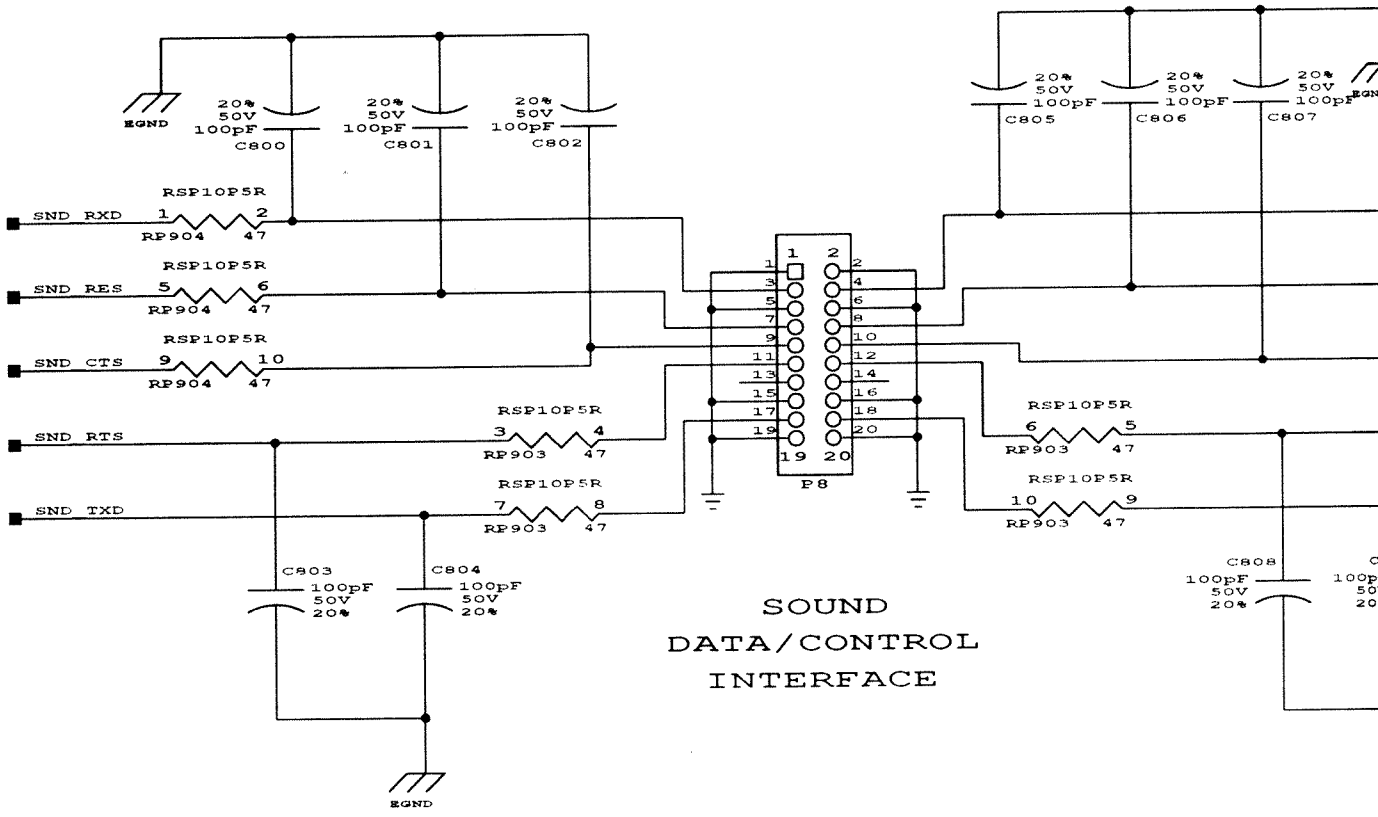


ISOLATED GR



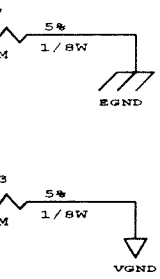
SOUND
POWER/SPEA
INTERFAC



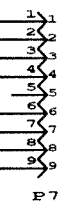


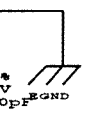
SOUND
DATA/CONTROL
INTERFACE

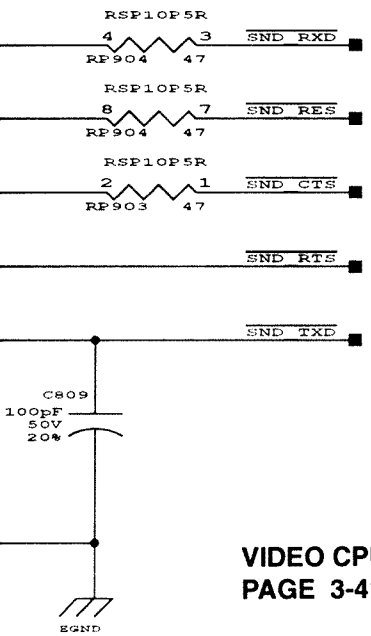
GROUNDS



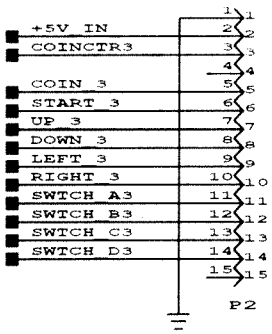
ND
PEAKER
FACE



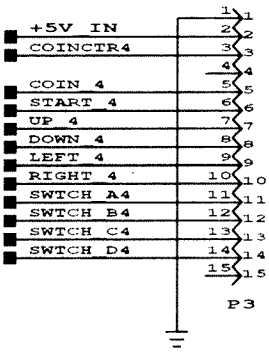




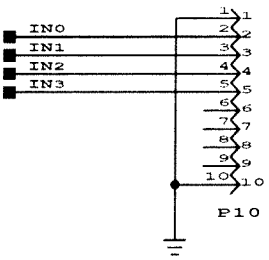
PLAYER 3 I/O CONNECTOR



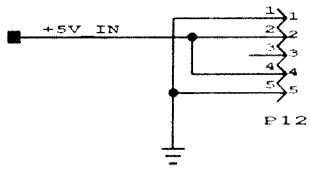
PLAYER 4 I/O CONNECTOR



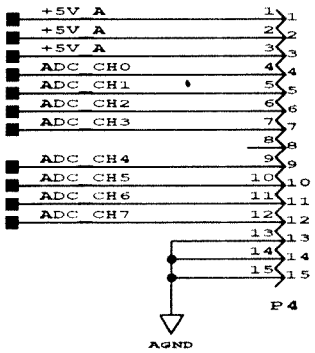
EXTRA INPUTS



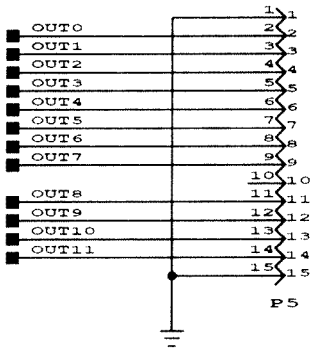
AUX. POWER OUT



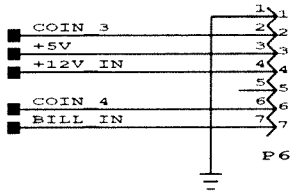
8 CHANNEL A/D



AUX. LATCHED OUTPUTS



COIN 3 & 4 INPUTS



ECN	CHANGE	DATE

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PROJECT ENG. STEVE CORRELL	1ST PROJ. NO. DATE	WILLIAMS ELECTRONICS GAMES MIDWAY MANUFACTURING CO. 3401 N. CALIFORNIA AVENUE CHICAGO ILLINOIS USA
DWN. BY DATE JML 5-12-1994_12:18	1ST USEAGE DATE	TITLE XUNIT connectors
CHECKED DATE	CURRENT PROJ. DATE	
APPROVED DATE	SHEET OF 26 26	PART NO. 16-9518 REV. 4

VIDEO CPU BOARD
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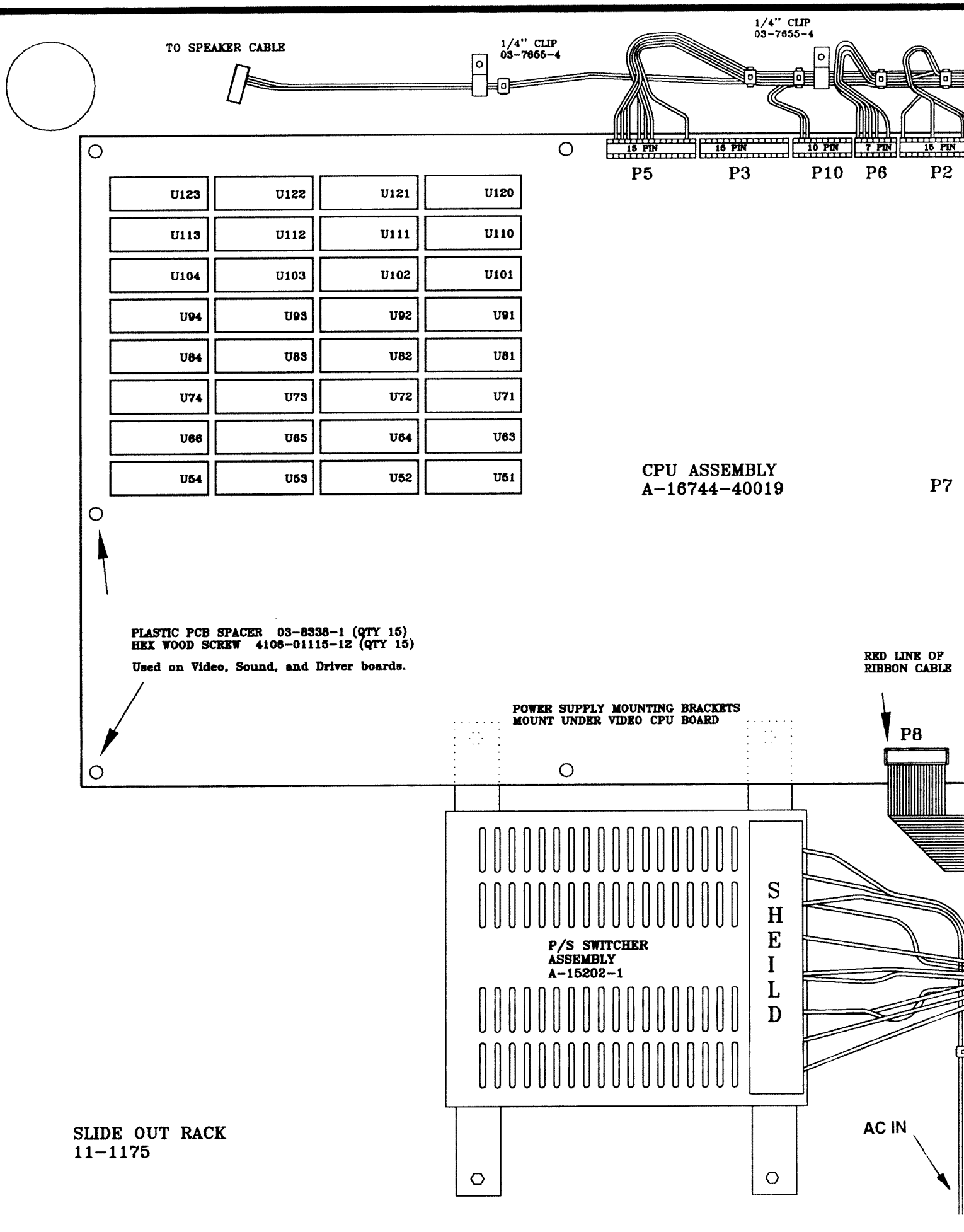
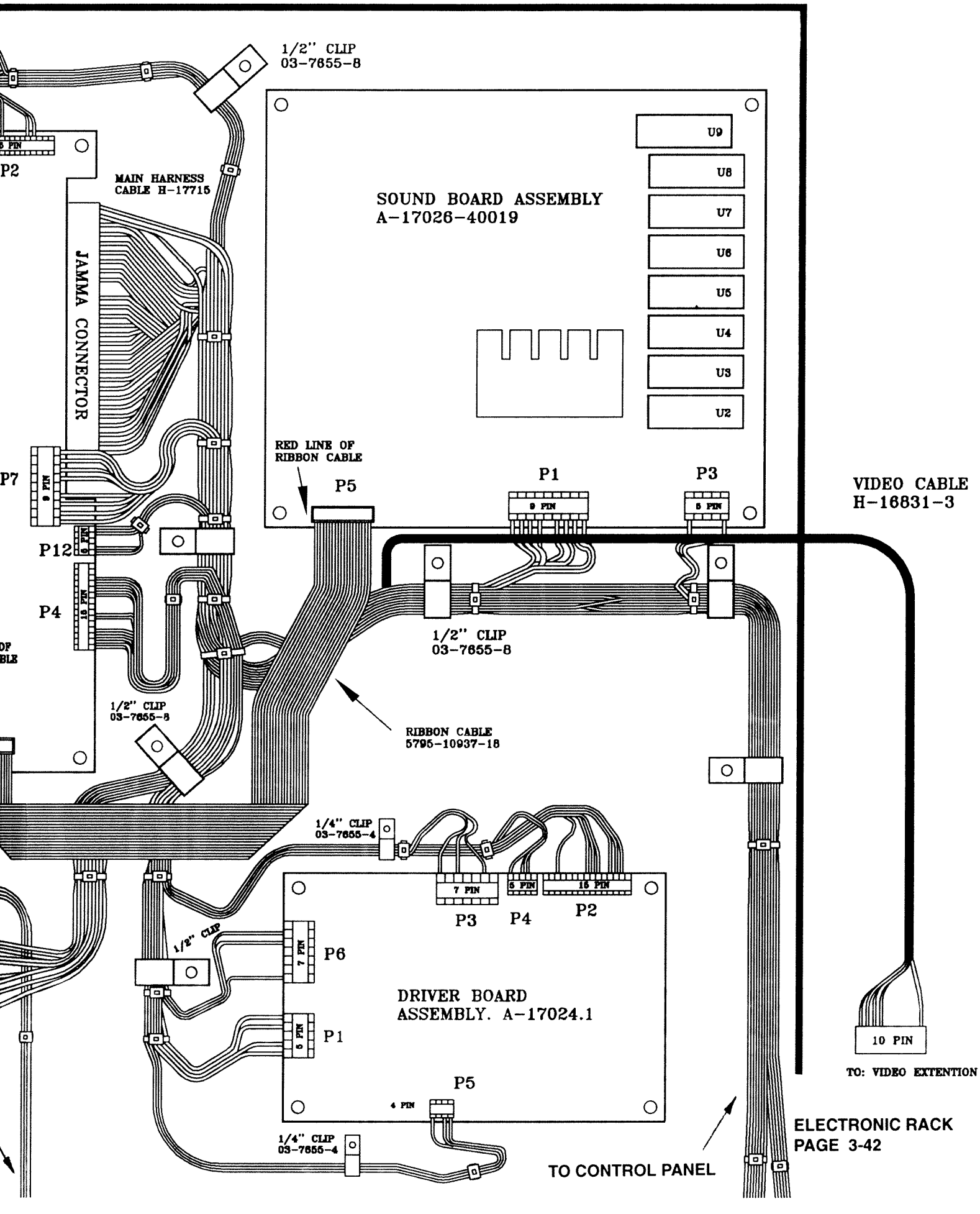


SLIDE OUT RACK
11-1175



ELECTRONIC RACK
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WARNING & NOTICES

WARNING

USE OF NON-MIDWAY PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY MIDWAY 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 MIDWAY logos, designs, publications and assemblies. Moreover, facsimiles of MIDWAY equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with MIDWAY components.

WARNING

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generated, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

NOTICE

When MIDWAY ships a game, it is in compliance with FCC regulations. Your 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 does contain an FCC sticker, call MIDWAY immediately.

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