



NFL HARD YARDAGE INSTALLATION MANUAL

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**Warranty,
Repair and
Return Policy**

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1. Full 90-day warranty on all electronic components. All warranty periods begin on the date of purchase from Strata Group, Inc.
 2. There is a minimum \$40.00 service charge for all non-warranty repairs or returns.
 3. For all servicing return to Strata Group, Inc.
 4. ANY non-factory repair or attempted repair voids warranty.
 5. AAMA decal must not be removed from the PCB.

**Return
Merchandise
Authorization**

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1. All returned merchandise must have a Return Merchandise Authorization (RMA) number marked clearly on the outside of the package.
 2. You must obtain all RMA numbers from your authorized Strata Group, Inc. distributor. Please have your Strata Group, Inc. serial number available when calling for an RMA number.
 3. Merchandise returned without an RMA number will not be accepted.
 4. Advance replacement boards will be shipped to distributors or, at the distributor's request, will be shipped directly to the operator.
 5. Advance replacement boards will be billed to the distributor until Strata Group, Inc. receives the returned board, at which time a credit will be issued.
 6. All repairs and/or replacements will be shipped within 24 hours of receipt or request (subject to availability).

**FCC
Regulation
Compliance**

This equipment complies 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 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.

UPRIGHT KIT

- | | |
|------------------------------------|---------------------------|
| 1) Printed Circuit Board (PCB) | 12) Button Assemblies |
| 1) Connecting Wire Harness (JAMMA) | 1) Control Panel Overlay |
| 1) Player 3 Wire Harness | 1) Set of Function Labels |
| 1) Player 4 Wire Harness | 1) Instruction Card |
| 4) Joystick Assemblies | 1) Manual |
-

One to four players can play at the same time.

Insert coins for credits.

Two credits gives a player one period in a 4-period game.

Eight credits gives a player a full game.

Players select any of the 28 official NFL teams.

Each team has player and team attributes that are true to the official NFL teams.

To Select a Play

Move joystick to choose your formation type and press the select button. Then move joystick to select your play and press the button.

On Offense

Press the select button or pull back on the joystick to snap the ball. Press the pass button to throw or hand-off the ball. Use the joystick to run up the field to try and score a touchdown.

On Defense

Press the select button to choose the player you wish to control. Move the joystick to maneuver your player into position. Press the JUMP button to activate a super tackle.

Experiment with different button and joystick combinations to find hidden maneuvers and special features.

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- | | |
|--|--|
| Phillips and Slotted Screwdrivers
Socket Set | Heat Shrink Tubing (3/32", 1/8",
and 3/16") |
| Wire Cutters and Strippers | Masking Tape |
| Pliers or Channel Locks | 3-1/2" or 4" Wire Ties |
| Electric Drill with 3/32", 1/4",
and 7/16" Bits | Mild Liquid Soap and Water Solution |
| Small File | Painting Supplies |
| Razor Knife and Sharp Blades | Air Brush or Paint Sprayer |
| Straight Edge | Paint Roller and Pan |
| Staple Gun and Staples | Paint Brush |
| 1-3/16" Chassis or Sheet Metal Punch | Paint (and Primer) |
| Soldering Iron | Sand Paper |
| 60/40 Resin Core Solder | Putty Knife |
| Vacuum Cleaner | Wood Putty |
| Assorted Fastening Hardware | |
-

**Game
Contents**

**Game
Description**

**Recommended
Tools and
Supplies**

Installation Preparations

BEFORE YOU START

1. Have you checked to see if all the needed parts have been included? See the GAME PACKAGE CONTENTS on page 3.
2. Is the game you have chosen to convert able to supply all the required voltages for the new game (+5vdc & +12 vdc)?

NOTE

Some games regulate their voltages on the main PCB. This makes the existing power supply inappropriate and hazardous to your new game. These games will require a power supply change. Many game supply houses can offer you a switching regulated power supply for a relatively low cost. Ask your distributor.

3. Is the monitor configuration compatible? It can be difficult to change the monitor from a vertical to a horizontal mount. Installation will be easier if you choose a horizontal mount cabinet.

4. Do you have the necessary tools? Check RECOMMENDED TOOLS & SUPPLIES on page 3.

The Cabinet

POWER AND MONITOR REQUIREMENTS

POWER

+5VDV	5 amps
+12 VDC	2 amps

CABINET SELECTION

You can choose either a new cabinet or a used cabinet for your new game. Reusing a cabinet is by far the most cost-effective way to maximize the return of your initial investment. In either case, all you provide is the cabinet with a power supply and monitor. We provide the rest. The end result is a new game at a very low cost.

Spend time on the cabinet's appearance (i.e., marquee, control panel, and cabinet graphics). You will raise your profits with the introduction of a new game package, especially if the cabinet looks clean and new.

The "new game look" should always apply to the inside of your game as well. A few wire ties and shrink tubing on your harness, some fastening hardware on your subassemblies, and a sweep with the vacuum cleaner will ensure that glitches do not occur.

PREPARING A USED CABINET FOR THE NEW GAME

Remove the following:

1. Main Logic Board(s)
2. Control Panel
3. Monitor Plexiglas
4. Monitor Bezel
5. Marquee
6. Cabinet Graphics

Thoroughly clean out your cabinet. Remove all the old buttons, joysticks and wires from the control panel and set aside. Remove the original overlay. DO NOT remove monitor and speaker wires.

If your cabinet has wood grain sides, remove the old graphics and adhesive. Remove adhesive with lacquer thinner.

For a fresh look, painting is highly recommended. Spray painting gives a better finish but if an air brush or paint sprayer is unavailable, a roller is second best. Cover all exposed surfaces not to be painted, such as the coin door and monitor. Use a small brush to finish up the details. If you do not have the facilities for painting, try an auto body shop.

NFL Hard Yardage has been designed as a four-player game. It is recommended that your control panel accommodate up to four players. Try to allow for enough room so players will not feel crowded or uncomfortable. If your cabinet only allows for two players at a time, NFL Hard Yardage can be made a 2-player game through the DIP Switch Settings. DIP Switch 2 in the ON position will allow for four players. DIP Switch 2 in the OFF position will limit the game to a two player game.

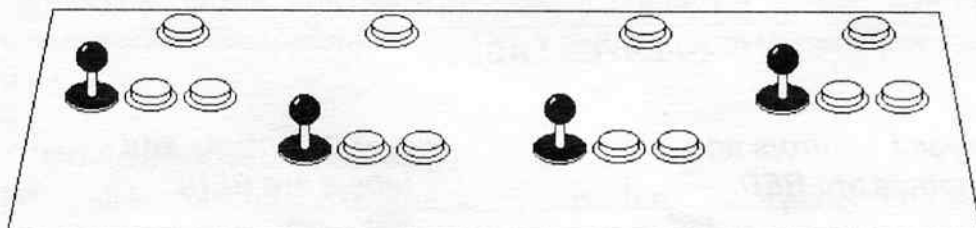
1. Mark positions for the joysticks and buttons on the control panel. Use the diagram below for correct positioning. Try to space all sets of controls evenly. Some special moves require both the PASS/JUMP and SELECT buttons be pressed simultaneously, Be sure to place each set of buttons close together so they can both be pressed at the same time.

2. Drill or punch the holes marked for buttons or bolts. Use a chassis or sheet metal punch for best results on button holes.

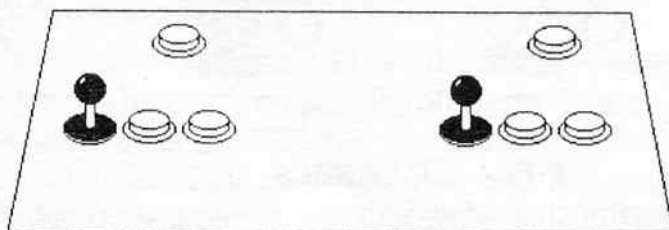
3. Use a file to smooth any rough edges on the new holes.

3. Fill any old and unused holes with a wood or metal plate.

It is recommended that you cover your control panel with plexiglas. Now would be a good time to cut it to fit while the dimensions and tools are at hand.



4-Player Control Panel Layout



2-Player Control Panel Layout

Control Panel Preparations

Graphic Installation

CONTROL PANEL OVERLAY

Make sure the control panel is clean and free from dust, grease, metal filings, and sawdust. The lexan background overlay provided with NFL HARD YARDAGE is oversized to accommodate most control panel sizes. The lexan overlay must be centered along its length. Be sure to leave enough excess material above and below the control panel surface, especially if you have to wrap the overlay around the panel edges.

Remove the protective backing from the lexan overlay. Center the lexan overlay over the control panel and place down gently, making sure to keep it square. Using your hands, press down firmly, starting from the center and smooth the lexan overlay outward, making sure all bubbles have been pressed out for a clean, flat surface.

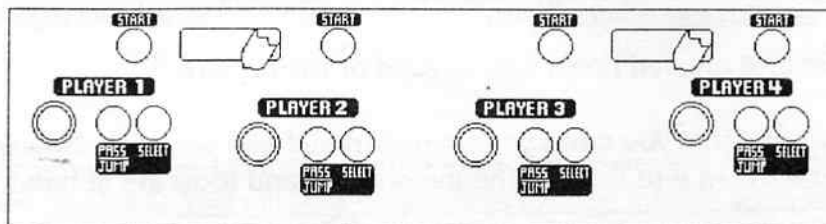
Using a sharp razor knife, trim any excess from the lexan overlay. Carefully pierce through overlay above each control panel hole that you have marked. Cut out material covering pre-drilled holes with the razor knife. Be sure to cut the lexan overlay above each hole and trim cleanly and evenly.

FUNCTION LABELS

The supplied function label set supplied with NFL HARD YARDAGE has been designed to accommodate either a 4-player or a 2-player game. In both cases, the controls and labels for the players on the left should be all RED and the controls and labels for the players on the right should be all BLUE. This color scheme will help players identify with Team and Play Selection during the game. Refer to the diagrams below for correct button and label placement.

*Player 1 and 2 controls
and labels are RED.*

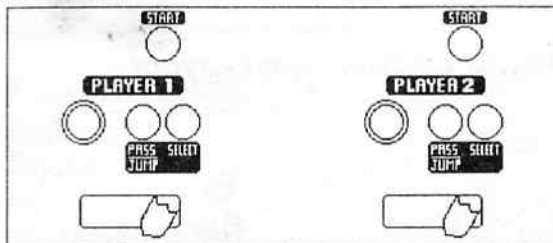
*Player 3 and 4 controls
and labels are BLUE.*



4-PLAYER LABELS

*Player 1 controls and
labels are RED.*

*Player 2 controls and
labels are BLUE.*



2-PLAYER LABELS

NOTE
START BUTTONS
ARE WHITE.

Line up the supplied function labels with the corresponding control panel holes. Remove the backing and carefully press into place. Be sure they are straight.

BUTTON AND JOYSTICK INSTALLATION

Install the controls into the control panel assembly. If you are using plexiglas for added protection, don't forget to place it on the panel before inserting the buttons. In a four player game, RED BUTTONS are used for PLAYER ONE and PLAYER TWO on the left-most side of the control panel. The BLUE BUTTONS are used for PLAYER THREE and PLAYER FOUR on the right side of the control panel. The WHITE BUTTONS are used as START BUTTONS.

For a 2-player configuration, PLAYER ONE (on the left) uses RED buttons and PLAYER TWO uses BLUE buttons (on the right). Two WHITE BUTTONS are used as PLAYER START buttons.

Wire the PLAYER ONE and PLAYER TWO buttons to the JAMMA harness from the wiring diagram on page 31. PLAYER THREE and PLAYER FOUR harnesses are separate from the JAMMA harness. Wire PLAYER THREE and PLAYER FOUR buttons to these harnesses from the wiring diagram on pages 32 and 33.

MARQUEE INSTALLATION

Using the old marquee glass as a template, center the plexiglas on your new marquee graphics, making sure that all the printed images will be visible. Using a razor knife, score the new marquee deeply, following the edges of the old glass. Carefully break off the styrene. Be sure the light behind the marquee works and that the glass is clean on both sides. Now install the marquee graphics and glass securely.

REMEMBER! DO NOT work with any part of the system plugged in (lights, monitor, or power supply).

NOTE

All switch wires used in this game need to be wired to the normally open connection on the switches. Each switch requires a ground wire on one connector and the appropriate control or switch wire on the other connector of the switch.

CONTROL PANEL ASSEMBLY

Install all buttons on the control panel as per the control panel configuration. (See illustration on page 6.)

PRINTED CIRCUIT BOARDS

Mount the PCB to the side of the cabinet with the edge connector toward the top. This will keep the wire harness from slipping off due to vibration. Using the board standoffs as a guide, mark where to drill the mounting holes. Drill pilot holes (3/32") being careful to not drill through to the outside. Attach the PCB standoffs to the cabinet using wood screws and spacers — snug but not too tight or the board may warp or crack. Be sure the board is not being flexed in any way.

**Wiring and
Hardware
Installation**

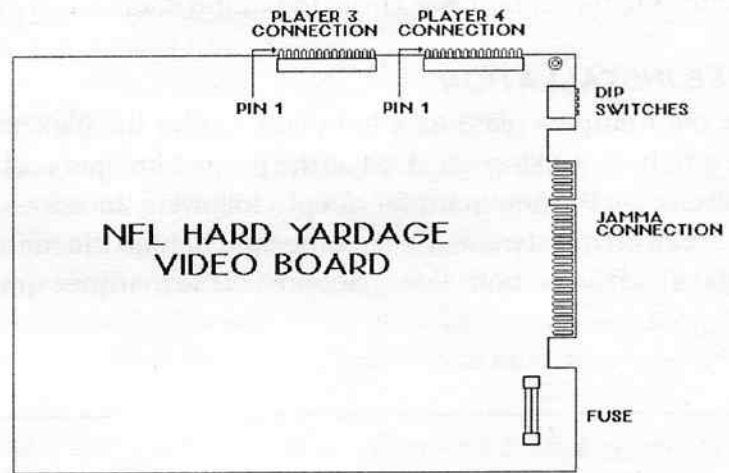
WIRE HARNESS

If you are installing this game into a Dynamo cabinet with a pre-installed JAMMA harness, you will notice that it does not have a wire for the test switch. You will have to add a contact to the edge connector at the proper position (position 15). Some cabinets (Dynamo included) have only one coin switch input and the coin switches are wired together. Connect the designated wires to the coin switches separately. See JAMMA HARNESS CONNECTIONS on page 31.

Attach the wire harness connector to the PCB. This connector should be keyed. Be sure to mount it correctly. Incorrect mounting will cause damage to the PCB.

PLAYER THREE AND FOUR HARNESS DESCRIPTION

Player 3 and 4 are connected using two separate sets of cables, supplied in this kit. (Check pages 32 and 33 to find out the color coding of each.) Connect each cable to the two white right angle connectors adjacent to the JAMMA connector.



**COMPONENT SIDE VIEW
OF MAIN PCB**

Be sure to match pin 1 on the cable to pin 1 on the connector. If the 4-player mode is used, be sure that DIP switch 2 on the PCB is set to the ON position.

It is best to use connectors (not supplied) whenever joining a set of harness wires to a subassembly. If you choose to solder wires together, follow this procedure:

1. Strip off about 1/2" of insulation from the black wire.
2. Slide a piece of heat-shrink tubing over the end.
3. Do not leave a lot of excess wire spooled up in your cabinet. Cut the wires to the length you need plus a few extra inches. Leave enough for proper cable dressing-do not make it stretch across the inside of the cabinet.
4. Solder the new wire to the original wire. Use a straight in-line splice.
5. Melt the heat-shrink over the splice.

NOTE CONCERNING JAMMA HARNESSSES

This game uses the JAMMA standard wiring harness. Therefore, if the cabinet you are using is not equipped with a JAMMA harness, you may want to change it. (See page 31 for JAMMA HARNESS CONNECTIONS.)

POWER WIRES

1. Connect the wires that are designated for your power supply. You will need a supply of +5 vdc, and +12 vdc. **The +5 vdc must be regulated to within 5% (+ or - 0.25 vdc).** The +12 vdc may be unregulated but should not stray too far or the sound may be affected. **If the cabinet's supply does not provide these voltages, it will have to be replaced.** A switching-type supply is recommended.
2. You will notice that you have more than one wire for each voltage. **Use all wires supplied on the harness.** This will ensure better power transmission and prevent overloading of the edge connector pads.
3. Tin all power supply wires before connecting them to the power supply. **Loose strands may short out the supply.** For best results, connect spade lugs to the ends of the power wires and attach to the screw terminals of the power supply.

ALWAYS solder all wire splices. Just twisting the wires together will cause intermittent problems in the future.

ALWAYS use shrink tubing over wire splices. **NEVER** use electrical tape. Electrical tape may unravel due to the heat inside the cabinet.

ALWAYS use wire ties to keep associated wires bundled. Attach to the cabinet where ever it seems necessary to keep them neat and secure.

AVOID bundling unrelated wires (such as the control panel and the monitor) as this may increase the likelihood of intermittent problems due to noise. Run different bundles separately.

COIN DOORS AND TEST SWITCH WIRING

Wire the coin doors and the test switch as per the JAMMA HARNESS CONNECTIONS information on page 31.

1. Connect the door lamps to the +12 vdc supply. Some games have separate power supply outputs for the lamps.
2. Mount a test switch (not included) somewhere convenient inside the coin door area. This switch allows you to enter adjustables, run diagnostics, and see or clear audits. Make it readily accessible through the coin door. Wire it to the Test wire on the JAMMA Harness.
3. Clean and lubricate your coin mechs.

MONITOR WIRES

You will be connecting the RED, GREEN, and BLUE video drives along with the composite SYNC and video GROUND wires.

SYNC

This is the recommended approach for a Wells-Gardner monitor and should work with some others as well.

This game generates a composite sync signal which is accepted by most monitors. A DIP switch (SW1 Position 4) on the logic board allows you to choose between positive and negative composite sync. Most monitors require negative sync. If your monitor requires positive sync, flip the switch towards the OFF position.

If your monitor does not have a composite sync input but has separate horizontal and vertical sync inputs, try connecting the composite sync signal from the PCB to the negative horizontal sync signal on the monitor. This should produce a satisfactory result, although some adjustment of the monitor's sync controls may be necessary.

FINISHING TOUCHES

1. Check the game inside and out for any imperfections. Secure any loose wiring or fastening hardware.
2. Make sure the coin door is tight and the coin mechs are well adjusted.
3. Make sure all assemblies are firmly attached. Anything that is not mounted securely will rattle when the game is played. This game makes use of low-frequency sounds which can cause any loose joints to rattle.

STEREO SOUND

A sound system is only as good as its weakest link. Make sure your cabinet setup does not have any weak links:

- Power supply needs at least 2 amps on the 12-volt supply
- Use two speakers, each capable of reproducing sound from 100Hz to 15kHz
- Both speakers must be wired in phase and properly placed in the cabinet.

Good conversion cabinets generally have two speaker holes, but might have inferior speakers. You will not be able to benefit from STRATA'S superior sound system if your speakers have any of the following problems:

- Low efficiency (for a given input, the resulting sound output is low)
- Poor frequency response (the speakers' bandwidth is limited, thus only reproducing sounds in the middle of the audio spectrum)
- Inadequate power handling capability (typically cannot handle more than 6-8 watts at 4 ohms). STRATA SOUND's stereo amp can produce up to 12 watts without distortion.

GET GREAT SOUND FROM YOUR NFL HARD YARDAGE KIT

Upgrading your cabinet's speakers will greatly enhance the sound quality. Replace the \$2.00 speakers with \$6.00 speakers available through your distribu-

**Sound
System**

tor or a reputable electronics store, such as Radio Shack. Part numbers 40-1909B and especially 40-1268C are good choices.

Mount the speakers properly. Connect the speaker wires, paying attention to their polarity.

If your cabinet has two speakers, connect them both.

Position the speakers as far from the monitor as possible. If placed too close, the speaker's magnet may deflect the monitor and cause strange coloration, which can usually be corrected by degaussing the monitor.

Be sure to attach each speaker securely with all four screws to minimize vibration and rattling. Make sure everything else in the cabinet is attached securely for the same reason.

Ensure that the speaker gasket is deep enough to keep the speaker cone from rubbing against the protective material (screen or vinyl grill material). When you connect the speakers (using the supplied JAMMA harness), pay attention to:

Orientation	L(Yellow-Green) - 10(Yellow-Red) to left speaker M(White-Green) - 11(White-Red) to right speaker
Proper Phasing	L(Yellow-Green) to left speaker negative 10(Yellow-Red) left speaker positive M(White-Green) right speaker negative 11(White-Red) right speaker positive

NOTE

If you are not using the JAMMA harness provided in the NFL HARD YARDAGE kit and have no provisions for a second speaker, do the following:

- use the wire at the same position of your JAMMA harness
- if there are no wires at these positions, you can use the 4-pin Molex speaker output connector at JP3 (see diagram on page 8).
- the orientation of the signals is on the legend of the board.

FINAL CHECK

1. Carefully inspect the game for loose power wires, exposed connections, and extra fastening hardware. Look for any stray strands from wires.
2. Make sure the PCB, monitor, power supply, and speakers are secure.
3. Doublecheck your connections.
4. With the board disconnected from the JAMMA harness, turn the power on and adjust the +5 vdc supply to be as close to +5 vdc as possible. This is very important to prevent damage to the game board. Turn the power off and connect the JAMMA harness to the board.

NOTE

Make sure the JAMMA connector is keyed properly. Unkeyed JAMMA connectors can be put on backwards, causing damage to the PCB.

**Initial
Power-Up**

DIP Switch Chart

Test/Service Buttons

Applying Power

SETTING THE DIP SWITCHES

Position 4 (OFF) :	positive video sync.
Position 4 (ON) :	negative video sync.
Position 3 (ON):	Upright
Position 2 (ON):	4-player Mode
Position 2 (OFF):	2-player Mode
Position 1 (ON):	Game Mode
Position 1 (OFF):	Strata Test Mode

Install a service switch inside the coin door area. The service switch allows the operator to give credits to players without affecting the game's credit audits or coin meters. Example: A player puts in a coin and gets no credit, the operator can then push the service button (found in the cabinet) and a credit is given to the player without affecting the game's AUDITS and coin meter.

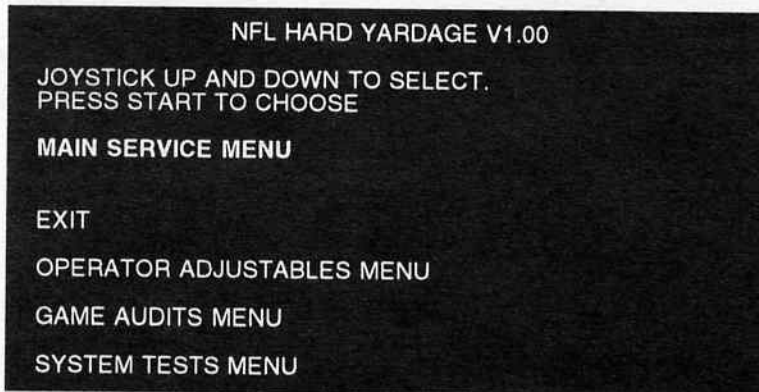
1. Attach JAMMA Harness if needed. Plug in the game and turn it on.
 2. Look and smell for smoke (TURN IT OFF IMMEDIATELY IF ANY IS NOTICED).
 3. Make sure the green and yellow LEDs on the PCB are flashing. If not, something is wrong, turn off the game.
 4. Listen for sound. A few notes or some speech should play on power up.
 5. If you do not hear any sounds and the yellow LED is flashing, try turning up the volume and check the speaker connections. Dropping a coin through a coin switch should cause a sound.
 6. Look at the image on the monitor. If it is not in sync and you cannot stop it from rolling by adjusting the monitor's sync controls, try flipping SW4 on the logic board.
 7. How is the picture? Is it centered or is it too bright or too dim? Is it in focus? Check your monitor manual to make adjustments. Some test patterns are available through the game's system tests by pressing the Test switch. Use them when making any adjustments. See "SYSTEM TESTS" information on page 13. Proper monitor adjustment is very important.
 8. Try all coin switches. Drop quarters or tokens through to check the coin mechs. Make sure the game is adding credits. You can use the Player Control Tests by pressing the test switch and entering the System Tests Menu. Do the joystick and push buttons work? Try playing the game with the volume up and listen for rattling as you play. Tighten anything that is making noise.
 9. Upon initial power-up, the game will initialize to factory default settings. These settings affect game elements such as number of credits per coin, difficulty settings, etc. The "OPERATOR MODE" section will describe how to alter these settings and view the system audits or run system tests.
-



NFL Hard Yardage comes equipped with a test button that allows you to test and customize your game. A DIP switch on the PCB will also access the test mode.

To enter Strata Test Mode, press the Test Button. Flip DIP Switch 1 to the OFF position when the Strata Test Mode is accessed. The screen displays the Main Service Menu.

The Main Service Menu allows you to enter into three different areas:



MAIN SERVICE MENU

OPERATOR ADJUSTABLES is used for customizing your game for your location. Some of the features in Operator Adjustables are number of coins per game, sounds on or off when no one is playing, difficulty settings, etc.

GAME AUDITS allows you to check your game's overall earnings, game times, game scores, etc. The Audits can be reset through this menu as well.

SYSTEM TESTS tests the integrity of the hardware, controls, and monitor through easy and automatic procedures accessed through these menus.

To exit any of these tests and return the game to its normal state, use any player joystick to highlight the line that says **EXIT** and press any player start button.

NOTE If you used the DIP switch to enter the TEST MODE, you will need to flip the DIP switch back to the ON position in order to return to the game.

**Strata
Test Mode**

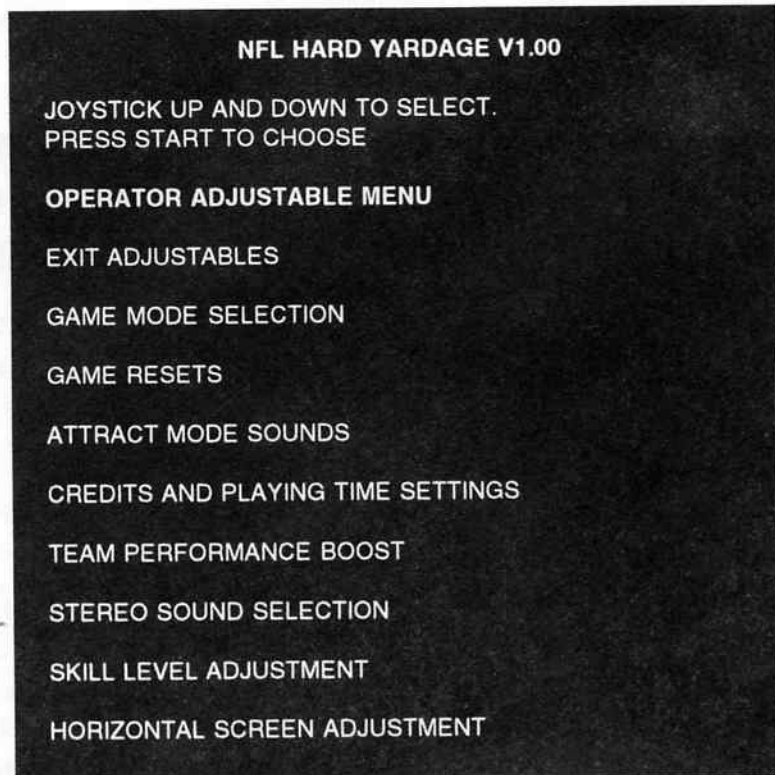
Operator Adjustables

COLOR KEY

For easy identification, all test screens have been color coded. Items displayed in GREEN are the Menu titles. This is the name of the menu that is currently displayed. Items appearing in YELLOW are the menu's instructions. The BLUE items are choices available in this menu. The WHITE item is the selection that is currently highlighted. If RED is ever displayed there is a problem with that item and it should be corrected.

OPERATOR ADJUSTABLES

The Operator Adjustables section is accessed through the Main Service Menu. From the Main Service Menu, move any player joystick down until the word **OPERATOR ADJUSTABLES MENU** appears in white letters. Now press any Player Start button, and the Operator Adjustables Menu will appear on the screen.

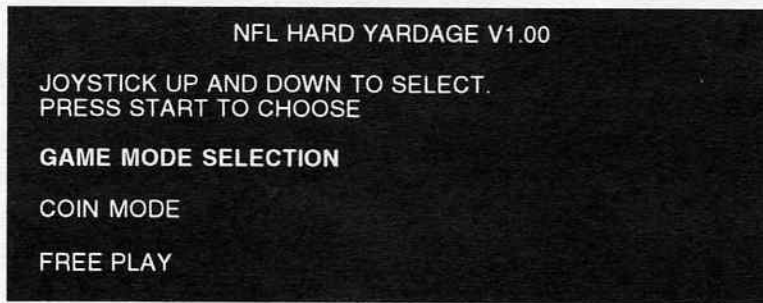


OPERATOR ADJUSTABLES MENU

As you can see, there are a lot of possible customizing procedures that you can control. Below is a brief description of each adjustable function and what the screen looks like when displayed. Remember, to select an item from any menu, use any player joystick to highlight the item in white, and then press any Player Start button.

GAME MODE SELECTION

This menu allows you to place the game in standard Coin Mode, or choose Free Play.

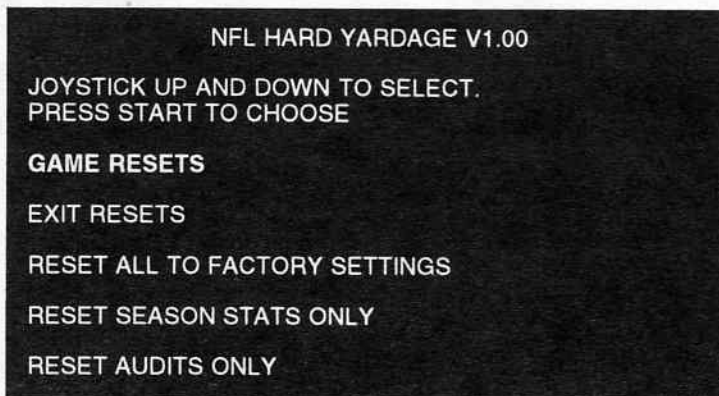


GAME MODE SELECTION SCREEN

In **COIN MODE**, the game will only work if coins are deposited into the game. In **FREE PLAY**, coins are not needed for play, and the Start buttons are always active.

GAME RESETS

The Game Resets Menu will cancel or zero out any custom features or bookkeeping figures that are no longer wanted.



GAME RESETS SCREEN

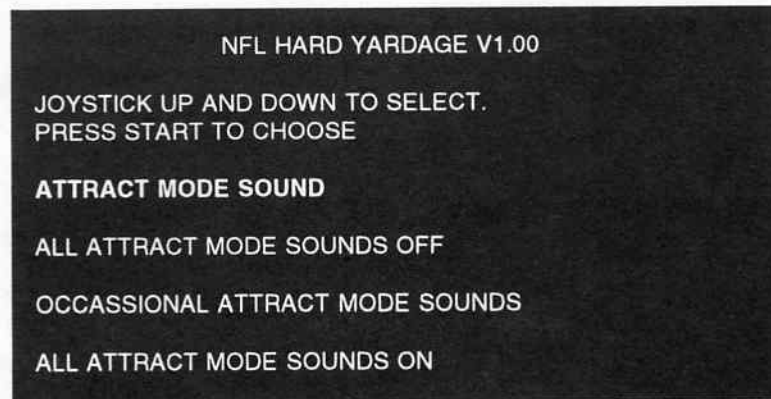
RESET ALL TO FACTORY SETTINGS will change the game back to the way the game was pre-set when new. Any custom features such as Free Play and Skill Levels will be changed back to the original settings set at the factory.

RESET SEASON STATS ONLY will leave all of your custom adjustments intact, but will erase any current season stats from the game's displays. This comes in handy when running a competition or changing the difficulty settings on the game.

RESET AUDITS ONLY is used when all of your bookkeeping and statistics have been gathered from the Audits section, and are no longer needed. If you like to gather all of your accounting information each week, or after each collection, it is a good practice to reset all of the audits so your coin count will match the audit information.

ATTRACT MODE SOUNDS

This menu is used to adjust the sounds that are heard while no one is playing the game.



ATTRACT MODE SOUNDS MENU

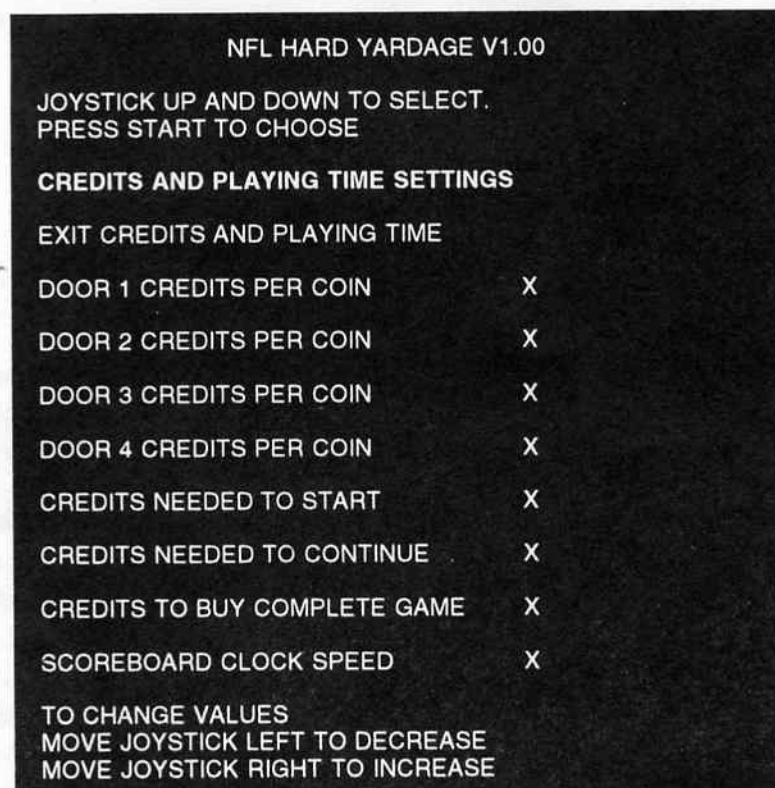
ALL ATTRACT MODE SOUNDS OFF will not allow any sounds to be played during the attract mode.

OCCASSIONAL ATTRACT MODE SOUNDS plays sounds about every ten or twelve times the attract mode is repeated.

ALL ATTRACT MODE SOUNDS ON will play sounds during every attract cycle.

CREDITS AND PLAYING TIME SETTINGS

This menu allows you to change the number of coins needed to play NFL Hard Yardage, as well as the average play time per coin.



CREDITS AND PLAYING TIME SETTINGS SCREEN

You can set each coin door at different credit values by highlighting **DOOR 1 CREDITS PER COIN** for coin door 1 or **DOOR 2 CREDITS PER COIN** for coin door 2. Moving any player joystick left or right will change the number of credits that each coin represents.

CREDITS NEEDED TO START will adjust the number of credits it takes for a player to begin a game. For example, the factory setting is 1 coin per credit, but it takes two credits to begin a game. Therefore, two coins are needed to begin a game.

If you want the number of credits needed to continue a game already in progress to be different than the number of credits needed for the initial game start, you can set the new value using **CREDITS NEEDED TO CONTINUE**.

A complete game, consisting of four football quarters, is factory set at 8 credits. Use **CREDITS TO BUY COMPLETE GAME** if you wish to change the number of credits needed to play a complete game.

Playing time is bought in increments of football quarters. Each credit gives the player a certain amount of playing time per credit. The game clock displayed on the scoreboard during the game will always show that a quarter lasts 15:00, but you can determine how fast the clock ticks down to zero. Highlight **SCOREBOARD CLOCK SPEED** and change it to a higher number to make the clock count faster, or a smaller number to make the clock tick slower.

TEAM PERFORMANCE BOOST

This setting can be used to improve a team's overall abilities.

NFL HARD YARDAGE V1.00

TEAM PERFORMANCE BOOST

TEAMS IN WHITE ARE BOOSTED

MOVE JOYSTICK TO SELECT TEAM
PRESS SELECT TO CHANGE BOOST

PRESS START TO EXIT

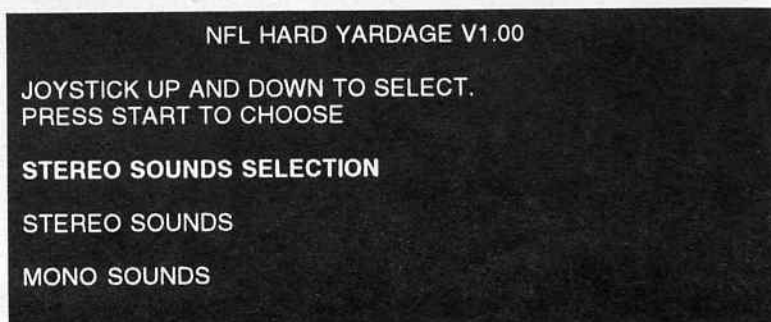
CINCINNATI BENGALS	CHICAGO BEARS
BUFFALO BILLS	TAMPA BAY BUCS
DENVER BRONCOS	PHOENIX CARDINALS
CLEVELAND BROWNS	DALLAS COWBOYS
SAN DIEGO CHARGERS	PHILADELPHIA EAGLES
KANSAS CITY CHIEFS	ATLANTA FALCONS
INDIANAPOLIS COLTS	SAN FRANCISCO 49ERS
MIAMI DOLPHINS	NEW YORK GIANTS
NEW YORK JETS	DETROIT LIONS
HOUSTON OILERS	GREEN BAY PACKERS
NEW ENGLAND PATRIOTS	LOS ANGELES RAMS
LOS ANGELES RAIDERS	WASHINGTON REDSKINS
SEATTLE SEAHAWKS	NEW ORLEANS SAINTS
PITTSBURGH STEELERS	MINNESOTA VIKINGS

TEAM PERFORMANCE BOOST SCREEN

Move any player joystick to select the team that you would like to make play better. The selected team will begin flashing. Press any Player Select button. The team name will change from blue to white, indicating that the Performance Boost is active. This feature is a clever addition to add to your home team, which is likely to be played most often. Giving the home team an added advantage over the competition is a nice way to reward fans and players.

STEREO SOUNDS SETTINGS

NFL Hard Yardage comes factory set with high-fidelity stereo sounds.

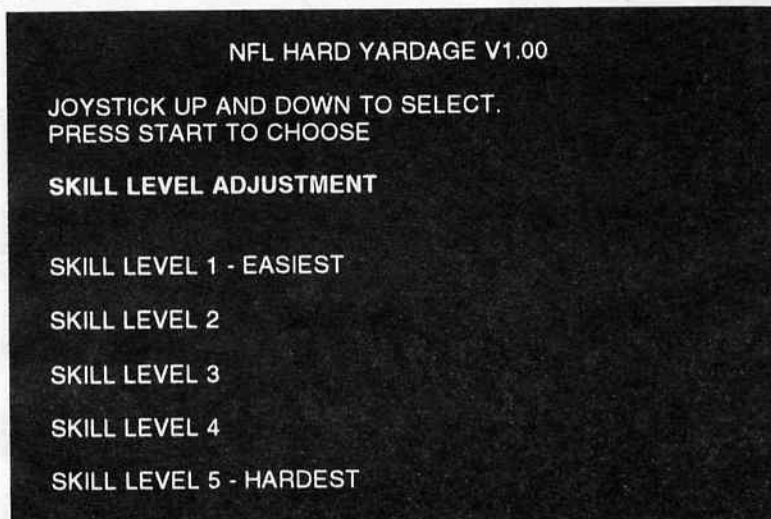


STEREO SOUNDS SELECTION SCREEN

It is highly recommended that this setting remain on **STEREO SOUNDS**, so players can experience the full range and power of the audio soundtrack. If for some reason you are unable to play stereo sounds, highlighting **MONO SOUNDS** will force all of the sounds through one speaker and boost the overall fidelity of the game's sound track.

SKILL LEVEL ADJUSTMENT

NFL Hard Yardage allows for changing the level of skill needed to play the game. This feature is good for locations with younger or novice players who are less skilled at the game, or expert or accomplished players who demand a greater challenge.



SKILL LEVEL ADJUSTMENT SCREEN

To set the game to an easy skill level, highlight **SKILL LEVEL 1 - EASIEST**. To set the game to a difficult skill level, highlight **SKILL LEVEL 5 - HARDEST**. **SKILL LEVEL 2**, **SKILL LEVEL 3**, and **SKILL LEVEL 4** are settings between the easiest and hardest levels. Some times it is best if the skill level is adjusted gradually over a period of time.

HORIZONTAL SCREEN ADJUSTMENT

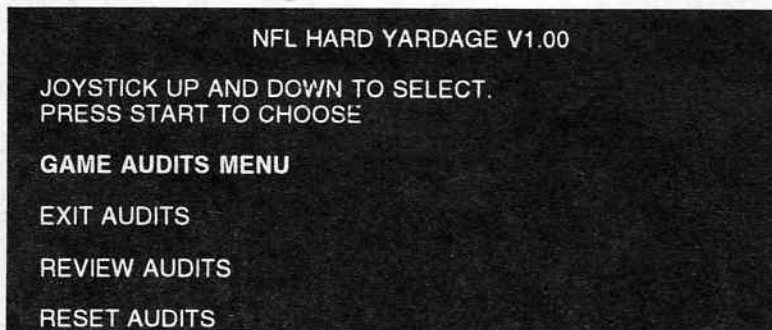
The monitor on NFL Hard Yardage should be adjusted properly to give the best picture possible. If for some reason the picture is not centered, use this menu to correct the problem.



HORIZONTAL SCREEN ADJUSTMENT SCREEN

SCREEN ADJUST - 1 LEFT MOST will move the picture far to the left.
SCREEN ADJUST - 5 RIGHT MOST will move the picture far to the right.
SCREEN ADJUST - 3 CENTER will attempt to center the picture on the video monitor.

The Audits section will supply you with a detailed accounting of helpful and informative bookkeeping and statistics. To enter the Audits section, first go to the Main Service Menu by pressing the test switch or flip DIP switch 1 to the OFF position on the PCB. From the Main Service Menu, move any joystick down until the word **GAME AUDITS MENU** appears in white letters. Now press any Player Start button, and the Game Audits Menu will appear on the screen.



GAME AUDITS SCREEN

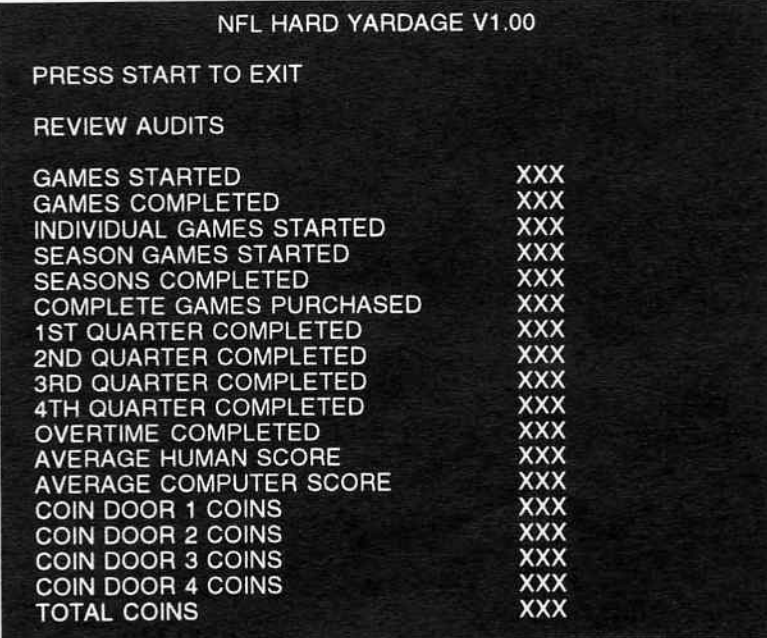
To look at the current statistics, highlight **REVIEW AUDITS** and press any Player Start button.

To set all of the statistics back to zero, highlight **RESET AUDITS** and press any Player Start button.

Audits

REVIEW AUDITS

When you choose to review the audits, the Audits Review Screen will appear.



NFL HARD YARDAGE V1.00	
PRESS START TO EXIT	
REVIEW AUDITS	
GAMES STARTED	XXX
GAMES COMPLETED	XXX
INDIVIDUAL GAMES STARTED	XXX
SEASON GAMES STARTED	XXX
SEASONS COMPLETED	XXX
COMPLETE GAMES PURCHASED	XXX
1ST QUARTER COMPLETED	XXX
2ND QUARTER COMPLETED	XXX
3RD QUARTER COMPLETED	XXX
4TH QUARTER COMPLETED	XXX
OVERTIME COMPLETED	XXX
AVERAGE HUMAN SCORE	XXX
AVERAGE COMPUTER SCORE	XXX
COIN DOOR 1 COINS	XXX
COIN DOOR 2 COINS	XXX
COIN DOOR 3 COINS	XXX
COIN DOOR 4 COINS	XXX
TOTAL COINS	XXX

AUDITS REVIEW SCREEN

GAMES STARTED is the total number of games that were started by pressing any one of the start buttons.

GAMES COMPLETED is the total number of full games, consisting of four periods, that were finished.

INDIVIDUAL GAMES STARTED shows the number of games that were started as a single game in casual play, as opposed to season play.

SEASON GAMES STARTED shows the number of times players chose Season Play during the game.

SEASONS COMPLETED is the total number of players who completed season play. Season Play is a game play function that keeps track of player stats over many games.

COMPLETE GAMES PURCHASED displays the number of times players bought a full game of football, consisting of four periods, from the start of play, as opposed to adding quarters in buy-in fashion during the game.

1ST QUARTER COMPLETED shows how many times games finished the first period of football. Each period begins with 15:00 on the clock and counts down to zero. There are four periods in a complete game.

2ND QUARTER COMPLETED shows how many times games finished the second period.

3RD QUARTER COMPLETED shows how many times games finished the third period.

4TH QUARTER COMPLETED shows how many times games finished the fourth period.

OVERTIME COMPLETED will give you the number of times this event has occurred. If a game's score is tied at the end of 4 periods, the game goes into Overtime.

AVERAGE HUMAN SCORE and **AVERAGE COMPUTER SCORE** provide information about competition between players versus computer. The human and computer

average scores are based on complete games played. This information can be used to adjust skill level from the skill level adjustment screen accessed through the operator adjustable menu.

COIN DOOR 1 COINS is the total number of coins through Coin Door 1.

COIN DOOR 2 COINS is the total number of coins through Coin Door 2.

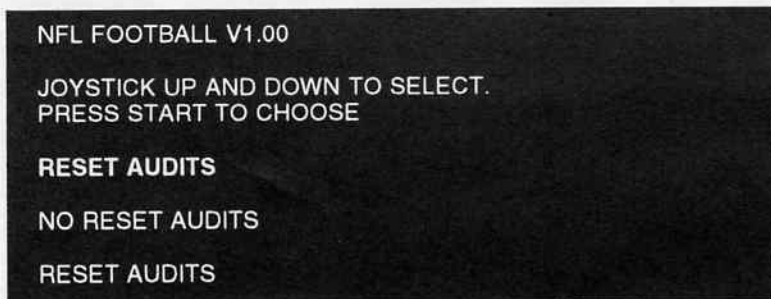
COIN DOOR 3 COINS is the total number of coins through Coin Door 3.

COIN DOOR 4 COINS is the total number of coins through Coin Door 4.

TOTAL COINS is the total number of coins through all coin doors.

RESET AUDITS

When you choose to reset the audits, the Game Resets Screen will appear.

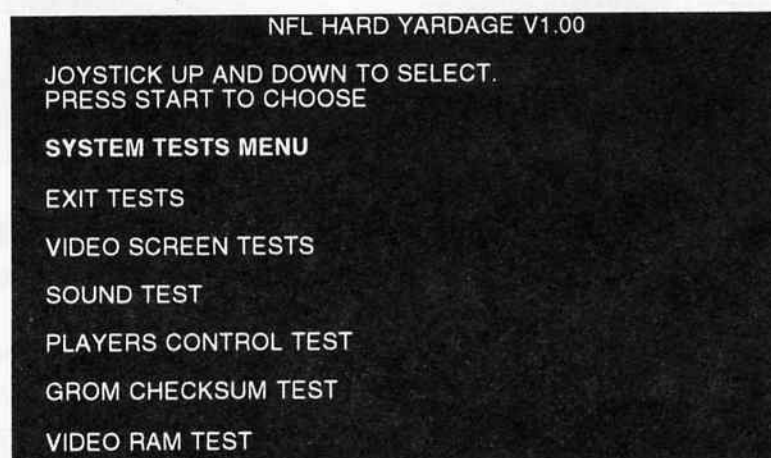


GAME RESETS SCREEN

If you wish to set all of the game audits (described above) back to zero, highlight **RESET AUDITS** from this menu and press any Player Start button. The screen will briefly display **AUDIT RESET**.

If you change your mind and decide not to reset the audits to zero, highlight **NO RESET AUDITS** and you will exit this screen without making any changes to the audits.

The NFL Hard Yardage PCBs have been inspected and tested at the factory, and most likely the game will be in perfect working order when you install them in your cabinet. If you are experiencing any problems with the game, the System Tests are a good place to start when tracking down the problem. To enter the System Tests section, first go to the Main Service Menu by pressing the test switch or set DIP Switch 1 on the PCB to the OFF position. From the Main Service Menu, move any joystick down until the word **SYSTEM TESTS MENU** appears in white letters. Now press any Player Start button, and the System Tests Menu will appear on the screen.

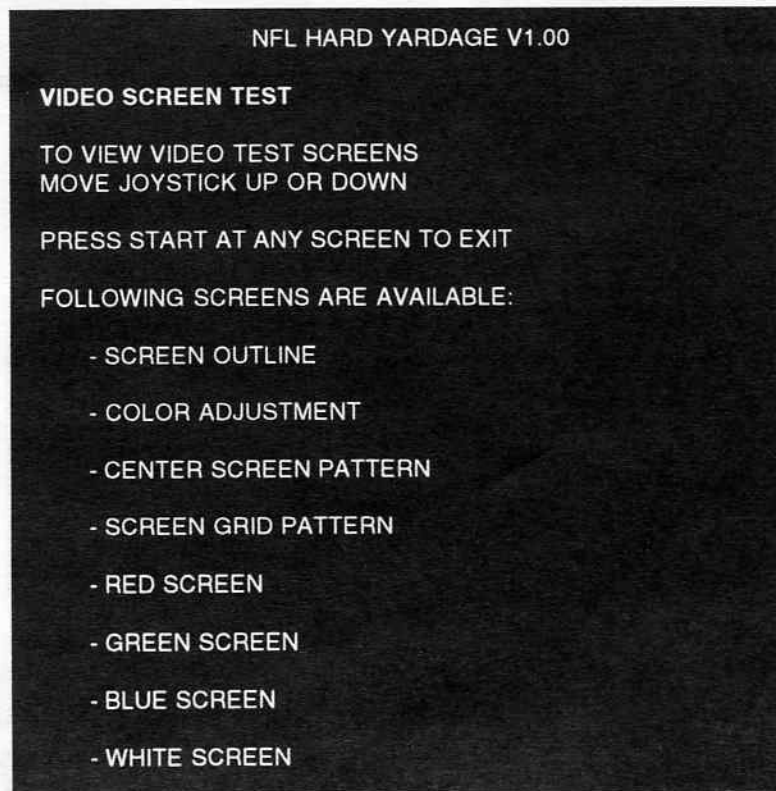


SYSTEM TESTS MENU

**System
Tests**

VIDEO SCREEN TESTS

You can test your monitor and adjust colors by choosing VIDEO SCREEN TESTS and pressing any Player Start button.



VIDEO SCREEN TEST MENU

Test screens are viewed by moving any joystick up and down. These screens can be used to adjust the monitor. Following is a description of each screen.

SCREEN OUTLINE - A single white line around the edge of the screen.

COLOR ADJUSTMENT - 12 color blocks for adjusting colors.

CENTER SCREEN PATTERN - White grid pattern with a box in the center. Adjust the monitor to center the box.

SCREEN GRID PATTERN - White grid pattern.

RED SCREEN - Screen of pure red color.

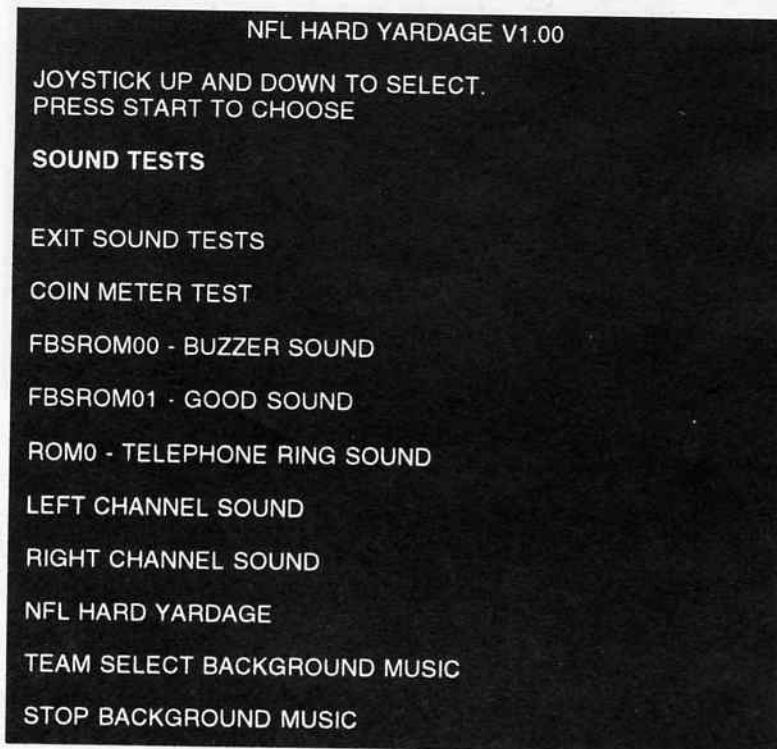
GREEN SCREEN - Screen of pure green color.

BLUE SCREEN - Screen of pure blue color.

WHITE SCREEN - Screen of pure white color.

SOUND TEST

Choose **SOUND TEST** from the System Test Menu to test the sounds and speakers in the game. The sound section also controls the coin meter, and you can test it from this section as well.



SOUND TESTS SCREEN

To test the coin meter, choose **COIN METER TEST** from this menu. If everything is working properly, the meter should increment each time any Player Start button is pressed while this line is highlighted.

FBSROM00 tests the sound chip in SROM0. You should hear a buzzer sound if it is okay.

FBSROM01 tests the sound chip in SROM1. You should hear the word "Good" if it is okay.

ROM0 tests the sound chip in ROM0. You should hear a ringing sound if it is okay.

The game is wired in stereo, and the factory setting is stereo sounds. To test the stereo, choose **LEFT CHANNEL SOUND** to hear sounds from the left speaker, and **RIGHT CHANNEL SOUND** to hear sounds from the right speaker.

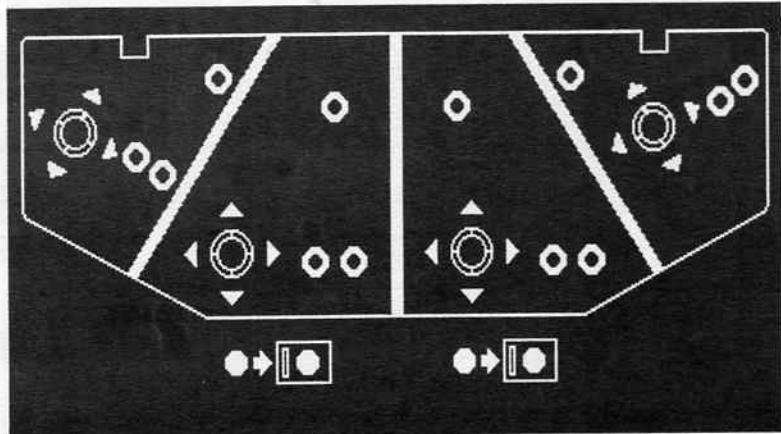
NFL Hard Yardage sounds feature a tremendous amount of digitized speech. To test a sample of the speech, choose **NFL HARD YARDAGE** from this menu.

To test the background music, select **TEAM SELECT BACKGROUND MUSIC**.

When you want the background music to stop, select **STOP BACKGROUND MUSIC** and press any Player Start button.

PLAYER CONTROL TEST

Choose **PLAYER CONTROL TEST** from the System Test Menu to test the switches



PLAYER CONTROL SCREEN

and controls of your game cabinet.

The screen displays a graphic representation of the players' control layout. Images on the screen will change color when the control is activated. Coin slots can also be tested from this screen.

Pressing the test or service button highlights the test or service text located in the lower left part of the screen.

To exit the test, Player 1 and Player 2 Start buttons must be pressed at the same time.

GROM CHECKSUM TEST

Choose **GROM CHECKSUM TEST** from the System Test Menu to test the Graphics chips on the PCB.

This test performs a complete test of the Graphics ROMs.

RUNNING GROM CHECKSUM TEST. 1 MINUTE TO FINISH

While the test is in progress the following message is displayed:

```
NFL HARD YARDAGE V.100
GROM CHECKSUM TEST

GROM CHECKSUM STAT GROM CHECKSUM STAT
ITFB0 CHECKSUM GOOD ITFB8 CHECKSUM GOOD
ITFB1 CHECKSUM GOOD ITFB9 CHECKSUM GOOD
ITFB2 CHECKSUM GOOD ITFB10 CHECKSUM GOOD
ITFB3 CHECKSUM GOOD ITFB11 CHECKSUM GOOD

ITFB4 CHECKSUM GOOD
ITFB5 CHECKSUM GOOD
ITFB6 CHECKSUM GOOD
ITFB7 CHECKSUM GOOD

[CHECKSUM TEST FAILED] -OR- [CHECKSUM TEST PASSED]
PRESS START TO CONTINUE
```

GROM TEST SCREEN

When the test is completed the GROM Test Screen is displayed.

If all checksums are shown in white, the test passed and your game is in good working order. If any checksums are bad, they will be displayed in red text on this screen. This means that the GROM is defective and needs to be replaced. Call your distributor or the Strata Service Department for further help.

To exit this test, press any Player Start button.

VIDEO RAM TEST

This test performs a complete test of the Graphics video RAM. The video RAM is tested in two pages. The following message will be displayed as each page is tested.

```
RUNNING VIDEO RAM TEST. FIRST PAGE
```

followed by

```
RUNNING VIDEO RAM TEST. SECOND PAGE
```

When the test completes the results will be displayed as follows

```
NFL HARD YARDAGE V1.00
VIDEO RAM TEST
VIDEO RAM FIRST PAGE STATUS - 0000
VIDEO RAM SECOND PAGE STATUS - 0000
VIDEO RAM TEST [PASSED OR FAILED]
PRESS START TO CONTINUE
```

If the game passes this test, two sets of zeros will be displayed in white along with a **VIDEO RAM TEST PASSED** message. If the test fails, a non-zero status and **VIDEO RAM TEST FAILED** message will be displayed in red. Call your distributor or the Strata Service Department for further help.

To exit this test, press any Player Start button.

GENERAL TROUBLESHOOTING

VIDEO PROBLEMS

Symptom	Probable Cause	Solution
No picture	Video inputs are not hooked up. (Refer to harness outputs and monitor specifications.)	Make sure switch 1 pos. 4 is in the correct position: ON for negative sync monitors and OFF for positive sync monitors. Most monitors are negative sync.
	Bad connections	Make sure there are good connections from the board's video outputs to the monitor's video inputs.
	Monitor	Make sure the monitor is operating correctly. (Check it with another compatible logic board.)
Scrambled Picture	Sync switch set incorrectly	SW1 pos.4, OFF for positive sync, ON for negative sync.
Missing colors or a washed out color	Bad video connections	Check the video red, green and blue connections.
Bright, blurry or rolling picture	Misadjusted monitor	Adjust the monitor, not the board. (Refer to your monitor manual.)
Picture too large, too small, or off center	Misadjusted monitor	Adjust the monitor, not the board. (Refer to your monitor manual.)
Video image is flipped	Misadjusted monitor	Manually flip the monitor or reverse the monitor's convergence wires. (Refer to your monitor manual.)
Bad images in picture	Bad GROM	Do GROM Test. Check IC pins to make sure none are bent over.
Diagonal white lines	GND problem	Earth and Logic GNDs should be connected at power supply.

CONTROL PROBLEMS

Symptom

Probable Cause

Solution

Buttons do not work or are partly inoperable

Switches not properly connected

Make sure that the common post of the switch is connected to ground.

Make sure each individual switch is working.

Make sure that the signal wire for that particular switch is connected to the normally open post of the switch.

Coin counter not working

Miscellaneous

Make sure that the signal wire has a connection from the switch to the board.

Make sure +12v is hooked up to the counter.

The signal wire is not connected to the coin counter. (Check continuity.)

Verify that the counter is good.

SOUND PROBLEMS

Symptom

No sound

Probable Cause

+12v power supply is bad

Bad connection to the board

Miscellaneous

Solution

Try another +12v power supply.

Check for +12v power on the board.

Check for +5 v power on the board.

Check the volume setting.

Check the speaker connections.

Make sure the sound status light is flashing on the board.

POWER UP PROBLEMS

<u>Symptom</u>	<u>Probable Cause</u>	<u>Solution</u>
No reaction when game is turned on.	Blown fuse	Power supply is too high. Power should be between +5v & +5.2v. (Measured on the circuit board.) Cabinet is not connected to earth ground. (All metal should be connected to the earth ground.) Short between power and ground. Check for foreign material. Disconnect the harness and measure the resistance between power and ground. It should read around 300 ohms. (0 ohms is a dead short.) Make sure the harness is not shorting to anything, such as bare or frayed wires shorting out each other or hitting bare metal.
	No power from the power supply	Replace power supply.
	Power supply	Power supply too low. (Should ideally be between +5v & +5.2v.) (Measured on the circuit board.)
	Short on the board	Check for loose or foreign material on the board.
Power up sounds repeats itself	Open on socketed ICs	Check for bent pins on socketed parts. Make sure that all ICs are seated in their sockets properly.
	+5 v setting too low	Measured on the circuit board.

NOTE

If fuse continually blows, please call STRATA service department. Sending the board in for repair is usually not necessary.

MISCELLANEOUS PROBLEMS

<u>Symptom</u>	<u>Probable Cause</u>	<u>Solution</u>
Green L.E.D. not blinking	Program not running	Make sure all socketed I.C.'s are seated correctly. Look for bent pins.
	No power	Blown Fuse. Check for +5V before and after the fuse. Adjust power supply for +5V after the fuse. Use fast blow fuses only.
	Bad connections	Make sure you have continuity from PCB to power supply.
Buttons don't work	Loose pin on ASIC (UI)	Call Strata.
		Do Player Control test in System Tests.
Diagonal lines in picture	Grounding	Check continuity from switch to PCB.
		Connect field ground to logic ground on power supply.
Operator adjustables keep changing	Low battery voltage	Battery should be 2 to 3 volts.
	Bad static RAM	Replace.
Sounds bad	Mono/stereo	Check operator adjustables for the proper setting
	Misc.	Check the speaker connections

HARNES CONNECTIONS

JAMMA HARNES CONNECTIONS

FOR NFL HARD YARDAGE

WIRE COLOR	PARTS SIDE		SOLDER SIDE	WIRE COLOR
Black	GND	A 1	GND	Black
Black	GND	B 2	GND	Black
Red	+5 v	C 3	+5 v	Red
Red	+5 v	D 4	+5 v	Red
		E 5		
Orange	+12 v	F 6	+12 v	Orange
	KEY	H 7	KEY	
Blue-Green	Ticket Counter	J 8	Coin Counter	Red-Green
		K 9		
Yellow-Green	Left Speaker -	L 10	Left Speaker +	Yellow-Red
White-Green	Right Speaker-	M 11	Right Speaker+	White-Red
Green-Black	Green	N 12	Red	Red-Black
White	C Sync	P 13	Blue	Blue-Black
Orange-Black	Service	R 14	Video GND	White-Black
		S 15	Test	Blue
Green-Blue	Coin 2	T 16	Coin 1	Red-Blue
Red-Yellow	Start 2	U 17	Start 1	Red-White
Green-Yellow	Player 2 Up	V 18	Player 1 Up	Green-White
Blue-Yellow	Player 2 Down	W 19	Player 1 Down	Blue-White
Black-Yellow	Player 2 Left	X 20	Player 1 Left	Black-White
Violet-Yellow	Player 2 Right	Y 21	Player 1 Right	Violet-White
Brown-Yellow	Player 2 Pass/Block	Z 22	Player 1 Pass/Block	Brown-White
White-Yellow	Player 2 Select	a 23	Player 1 Select	Yellow-White
		b 24		
		c 25		
		d 26		
Black	GND	e 27	GND	Black
Black	GND	f 28	GND	Black

PLAYER 3 HARNESS CONNECTIONS

FOR NFL HARD YARDAGE

.100 Ramp Housing -- (molex 22-26-8151 or equivalent)

PIN	DESCRIPTION	WIRE COLOR
1	GND	Black
2	Not Used	
3	Not Used	
4	Not Used	
5	Not Used	
6	Start 3	Red/Orange
7	Up 3	Green/Orange
8	Down 3	Blue/Orange
9	Left 3	Black/Orange
10	Right 3	Violet/Orange
11	Switch A3 - Pass/Block	Brown/Orange
12	Switch B3 - Select	Yellow/Orange
13	Not Used	
14	Undefined	
15	Undefined	

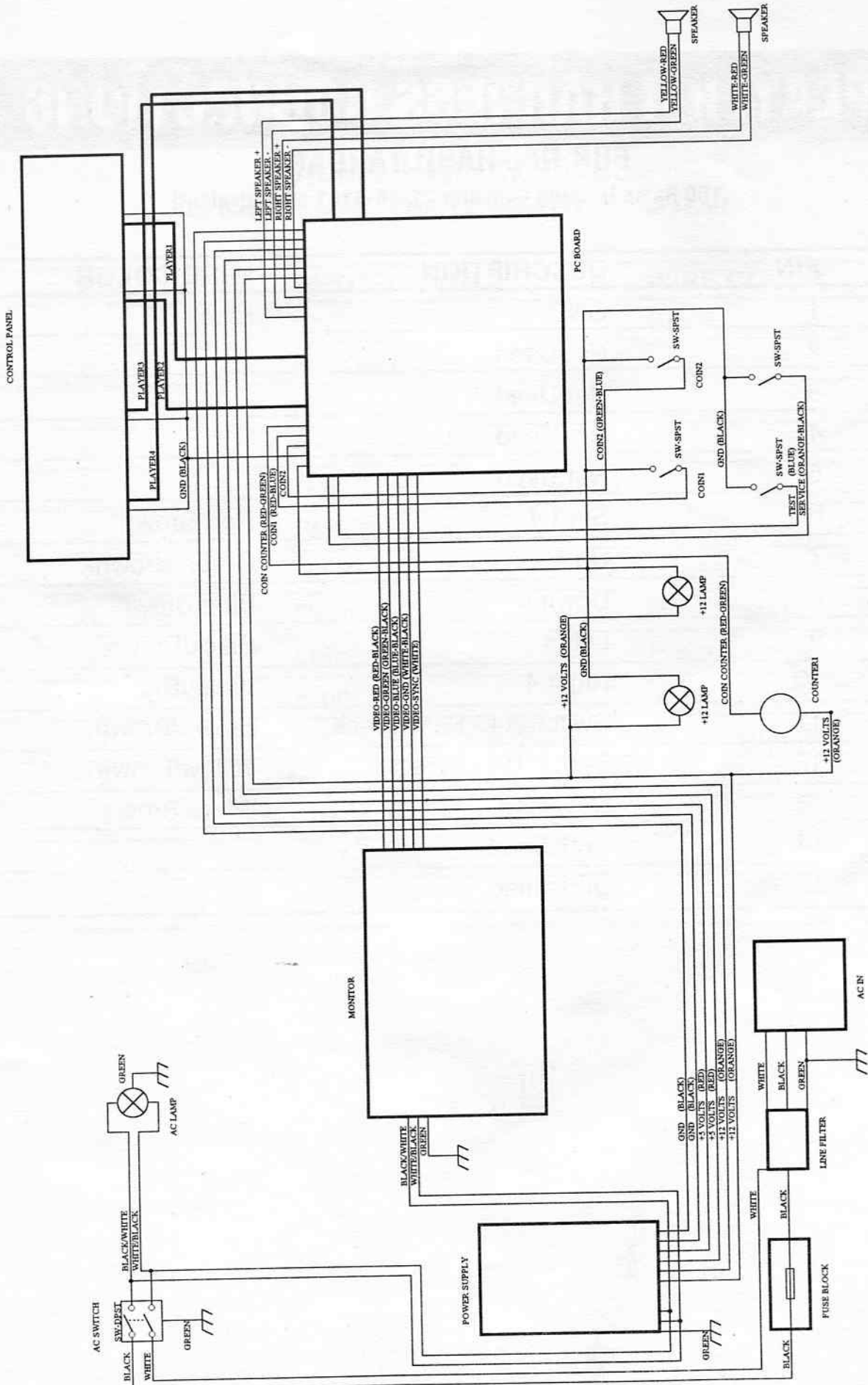
PLAYER 4 HARNESS CONNECTIONS

FOR NFL HARD YARDAGE

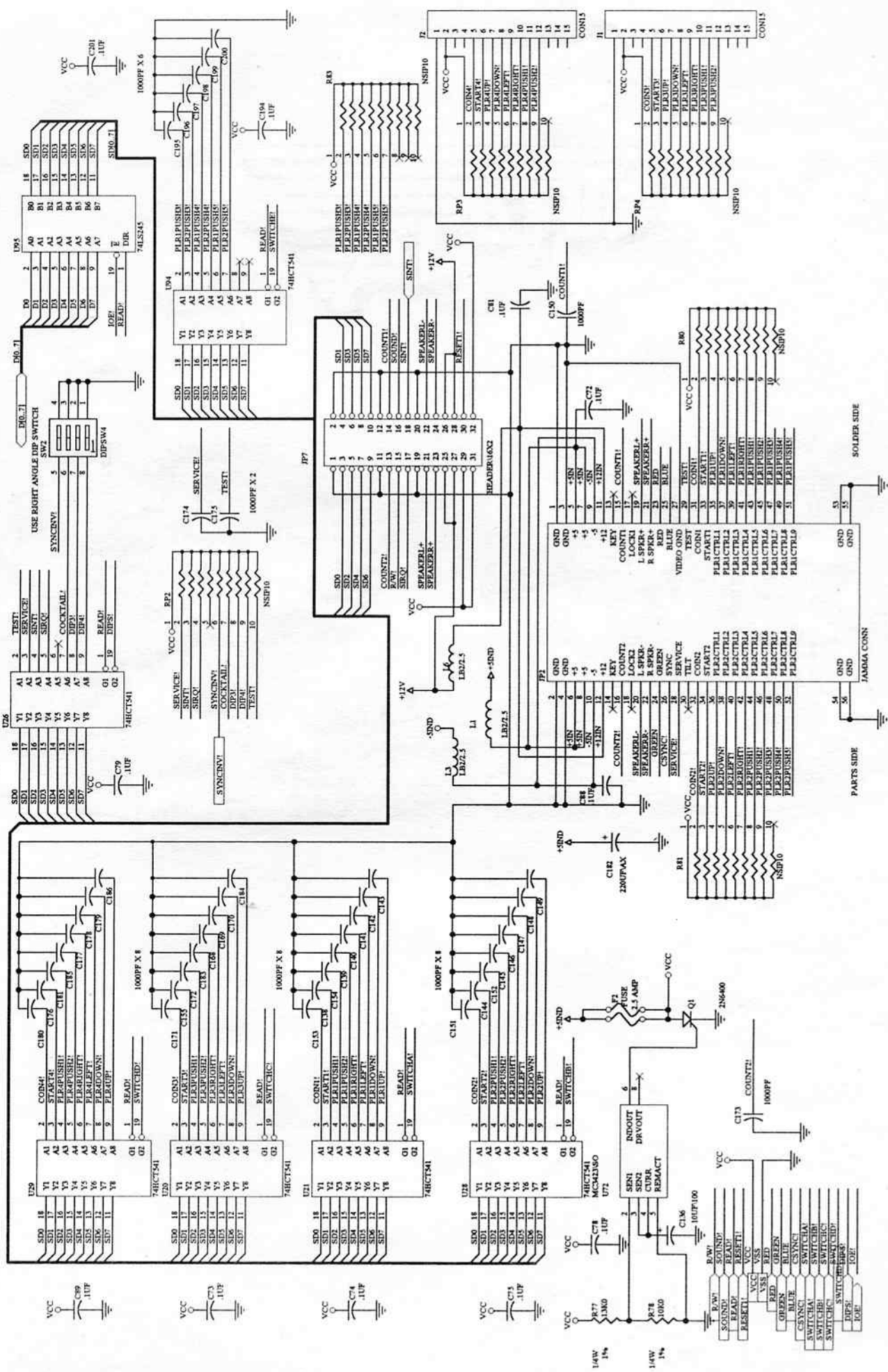
.100 Ramp Housing -- (molex 22-26-8151 or equivalent)

PIN	DESCRIPTION	WIRE COLOR
1	GND	Black
2	Not Used	
3	Not Used	
4	Not Used	
5	Not Used	
6	Start 4	Red/Brown
7	Up 4	Green/Brown
8	Down 4	Blue/Brown
9	Left 4	Black/Brown
10	Right 4	Violet/Brown
11	Switch A4 - Pass/Block	Brown/Brown
12	Switch B4 - Select	Yellow/Brown
13	Not Used	White/Brown
14	Undefined	
15	Undefined	

STRATA NFL HARD YARDAGE CABINET WIRING DIAGRAM



STRATA NFL HARD YARDAGE I/O SECTION



STRATA™



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