



# STAR RIDER

## SUPPLEMENT

including...

- block diagrams
- service notes
- wiring diagrams

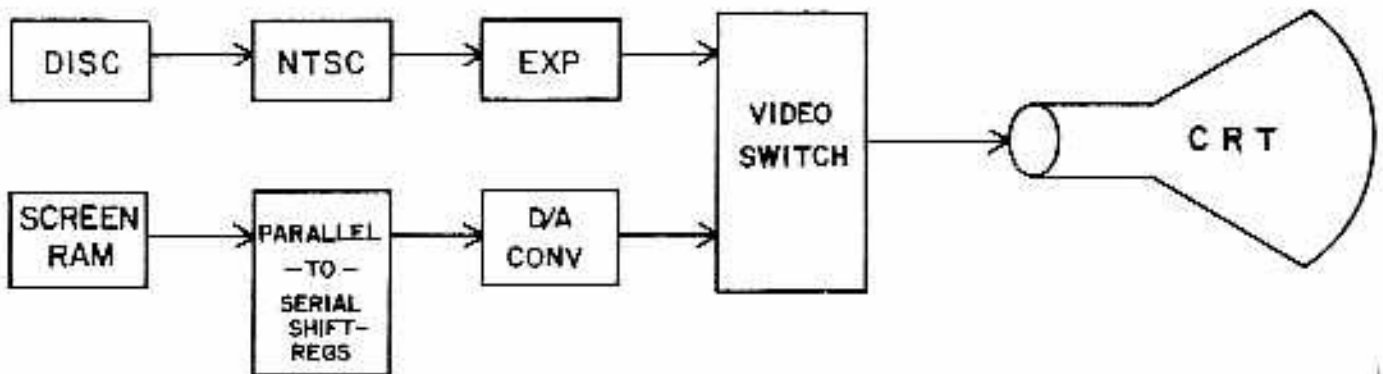


## TABLE OF CONTENTS

Background/Foreground Signal Path	2
Troubleshooting Background-Video Circuits	3
Troubleshooting Background-Video Circuits	4
Disc Player Error Signals	5
Background Video Generator System	6
Game Computer & Foreground Video Generator System	7
Sound System	8
Service Notes	9
Notes	10
Discan System Block Diagram	11
Inter-board Wiring Diagram	12
Inter-board Wiring Diagram	13
Power Wiring Diagram	14
Cabinet Wiring Diagram	15
Speaker & Volume Control Wiring Diagram	16
Parts Location Diagram	17
Parts Location Diagram	18

## VIDEO - INFORMATION PATH

### BACKGROUND VIDEO



### FOREGROUND VIDEO

PIF, DISC PLAYER, NTSC, EXP OR VGG? These tests help you find which one is faulty. Our method is to use the CRT as a diagnostic tool and to eliminate various boards in the background-video path from disc to CRT.

FROM DISC TO CRT. Disc video travels an interesting route to the CRT...

- PIF: The PIF (processor-interface board) controls the player via the 26-pin connector. The PIF board carries out commands from the CPU board and reports to the CPU board on player activity.
- PLAYER: Under instructions from PIF, the player yields NTSC composite-video (not RF).
- NTSC: NTSC composite-video is converted to RGB (red, green and blue video) and positive composite-sync on the NTSC board. (NTSC stands for the National Television System Committee that established parameters for US video.
- EXP: At the expander (EXP) board the RGB is converted to digital information, expanded and once again changed into analog RGB.
- VGG: Here the RGB information runs through an analog switch that discriminates between foreground and background information. Also on the VGG (video graphics-generator) board, composite sync is separated into positive horizontal and vertical sync.
- CRT: Finally combined VGG and disc video are passed to the screen.

I. NTSC BOARD OK? (Operating player without VGG and EXP)

- A. Turn game on.
- B. Display DISC TEST on CRT.
- C. Remove monitor-plug 3P3 from top of VGG board.
- D. Remove 10-pin plug 6P1 from NTSC board.
- E. Reconnect only pin 10 of plug 6P1 (RED-WHT wire to top pin). Angle body of plug to left.
- F. Connect plug 3P3 to NTSC board on pins 1 through 7 of jack 6J1. (Red wire goes to pin 1.)
- G. Observe video. Its width should be normal (not expanded as in game).
  1. RESULT: NO VIDEO OR BAD VIDEO...Replace NTSC board.
  2. RESULT: VIDEO NORMAL (NOT EXPANDED)...NTSC board is OK; continue.

II. EXP BOARD OK? (Operating player without VGG)

- A. Remove monitor-plug 3P3 from jack 6J1 on NTSC board.
- B. Reconnect plug 6P1 to jack 6J1 on NTSC board.

- C. Disconnect plug 5P3 from EXP board. This plug is topmost of three plugs on right side of board.
- D. Connect monitor-plug 3P3 to jack 5J3 on EXP board (RED wire to pin 1).
- E. Use a piece of wire to short BLK and WHT wires on plug 3P3 (pins 5 and 6, vertical and horizontal sync) together. This procedure temporarily provides composite sync to both monitor inputs.
  - 1. Monitor needs composite sync on both lines to lock.
  - 2. Monitor then separates sync into vertical and horizontal signals.
- F. Press AUTO-UP and MANUAL-DOWN several times and observe video. It should expand and contract with operation of control.
  - 1. RESULT: NO VIDEO OR BAD VIDEO... Replace EXP board.
  - 2. RESULT: VIDEO EXPANDS AND CONTRACTS... EXP board is OK; continue.

### III. PLAYER OK? (Operating player without PIF, EXP and VGG)

- A. Remove shorting wire from pins 5 and 6 of plug 3P3.
- B. Remove monitor-plug 3P3 from jack 5J3 on EXP board.
- C. Reconnect jack 5J3 to plug 5P3 on EXP board.
- D. Remove 10-pin plug 6P1 from NTSC board.
- E. Reconnect only pin 10 of plug 6P1 (RED-WHT wire to top pin). Angle body of plug to left.
- F. Connect plug 3P3 to NTSC board on pins 1 through 7 of jack 6J1. (RED wire goes to pin 1.)
- G. Disconnect 26-pin connector 7J3 from player.
- H. Press PLAY on front of player.
- I. Observe video. It may take a minute or so to come up, but you should see normal (non-expanded) video.
  - 1. RESULT: NO VIDEO OR BAD VIDEO...
    - a. Clean lens and disc; observe video.
    - b. Try other side of disc (or another disc); observe video.
    - c. Check or replace player or coaxial cable; observe video.
  - 2. RESULT: VIDEO NORMAL... Player, disc and coaxial cable are OK.
- J. TESTING DISC SOUND: Sound only occasionally comes from disc (crowd noise at Cosmodrome, etc.), so test sound with another disc.

## Disc-Player Error Signals

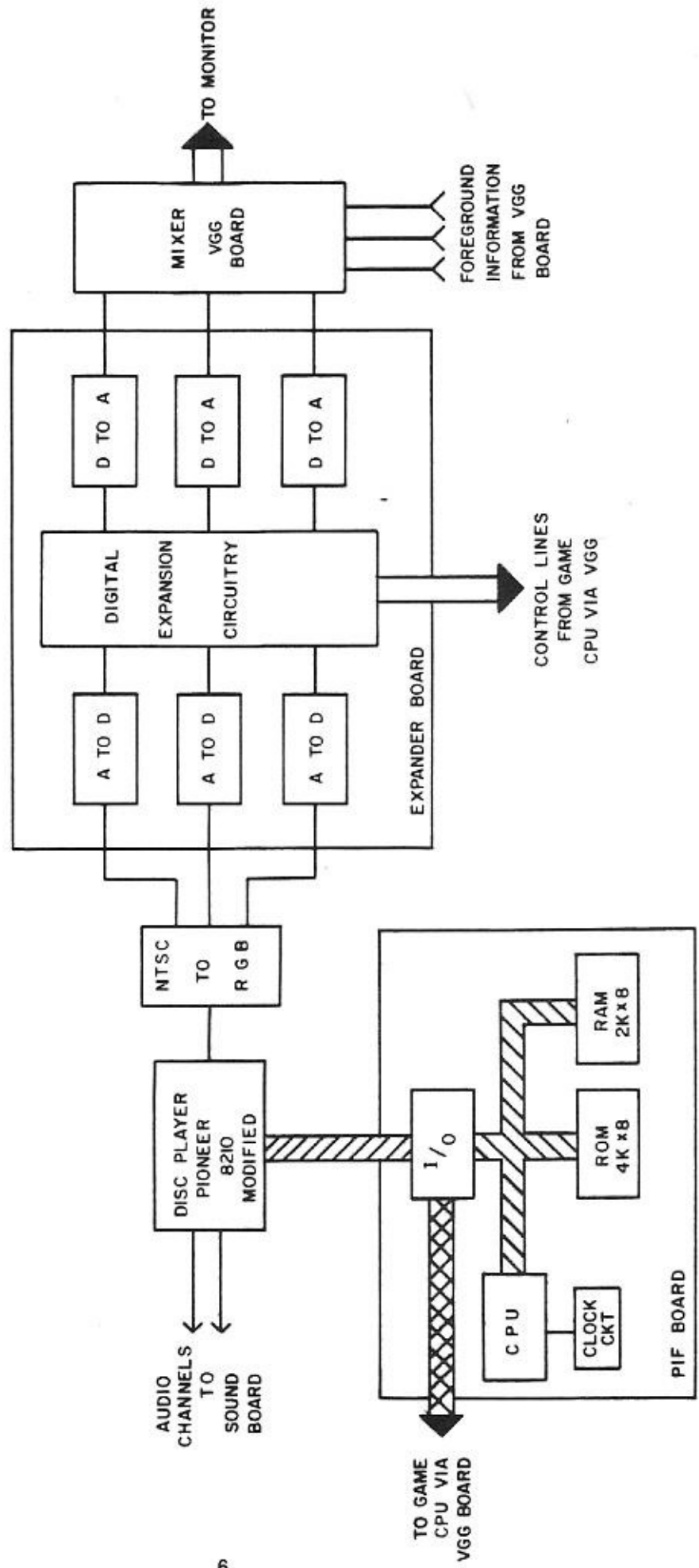
THE DISC PLAYER CAN SIGNAL PROBLEMS even when no error codes can be displayed by the CPU-board display or CRT. In our application, new meanings have been assigned to six player-lamps even though the player's front panel still bears the old legends.

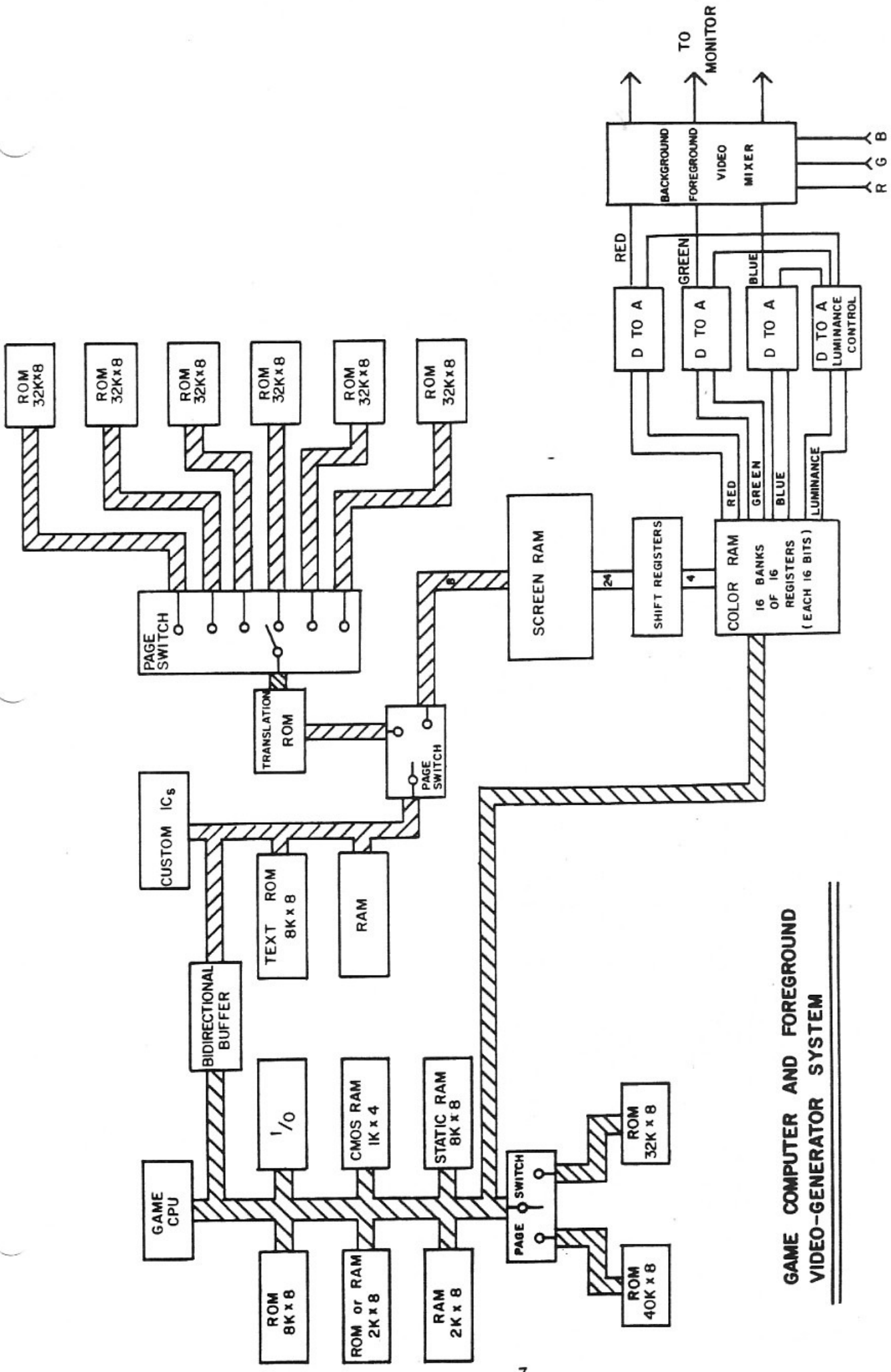
SLIDE THE PLAYER BOARD out of the game (see Setting Up Your Videodisc Player in the instruction manual). Now you can watch the panel-lamps to help you diagnose problems. The following chart shows common player failure-messages.

STANDBY	CLV	PAUSE	1/LEFT CHANNEL	2/RIGHT CHANNEL	REMOTE	MEANING
FLASHING	ON	OFF	ON	ON	OFF	1. Disc spinning up or down.
OFF	ON	OFF	OFF	OFF	FLASHING	2. Disc can't spin up. Wait to see if indication changes. If not, (A) close lid of player, clean disc and lens or (B) replace disc, 26-pin cable or player.
OFF	ON	OFF	OFF	OFF	OFF	3. ROM error: replace U3 on PIF board.
OFF	ON	OFF	ON	OFF	OFF	4. RAM error: replace U2 on PIF board.
OFF	OFF	ON	OFF	ON	OFF	5. Indicates failure of IRQ timing-test. Bus noise or bad crystal.
OFF	--	--	ON	ON	OFF	6. Video error. Bad PIF board or VGG board.
OFF	OFF	ON	FLASHING	ON	--	7. Player malfunction or bad cable; bad or dirty disc.
--	--	--	ON	FLASHING	OFF	8. Player malfunction.
OFF	OFF	ON	FLASHING	FLASHING	OFF	9. Possibly a bad CPU board. Reset game. Check PIA's on PIF, VGG and CPU boards for stuck bits.



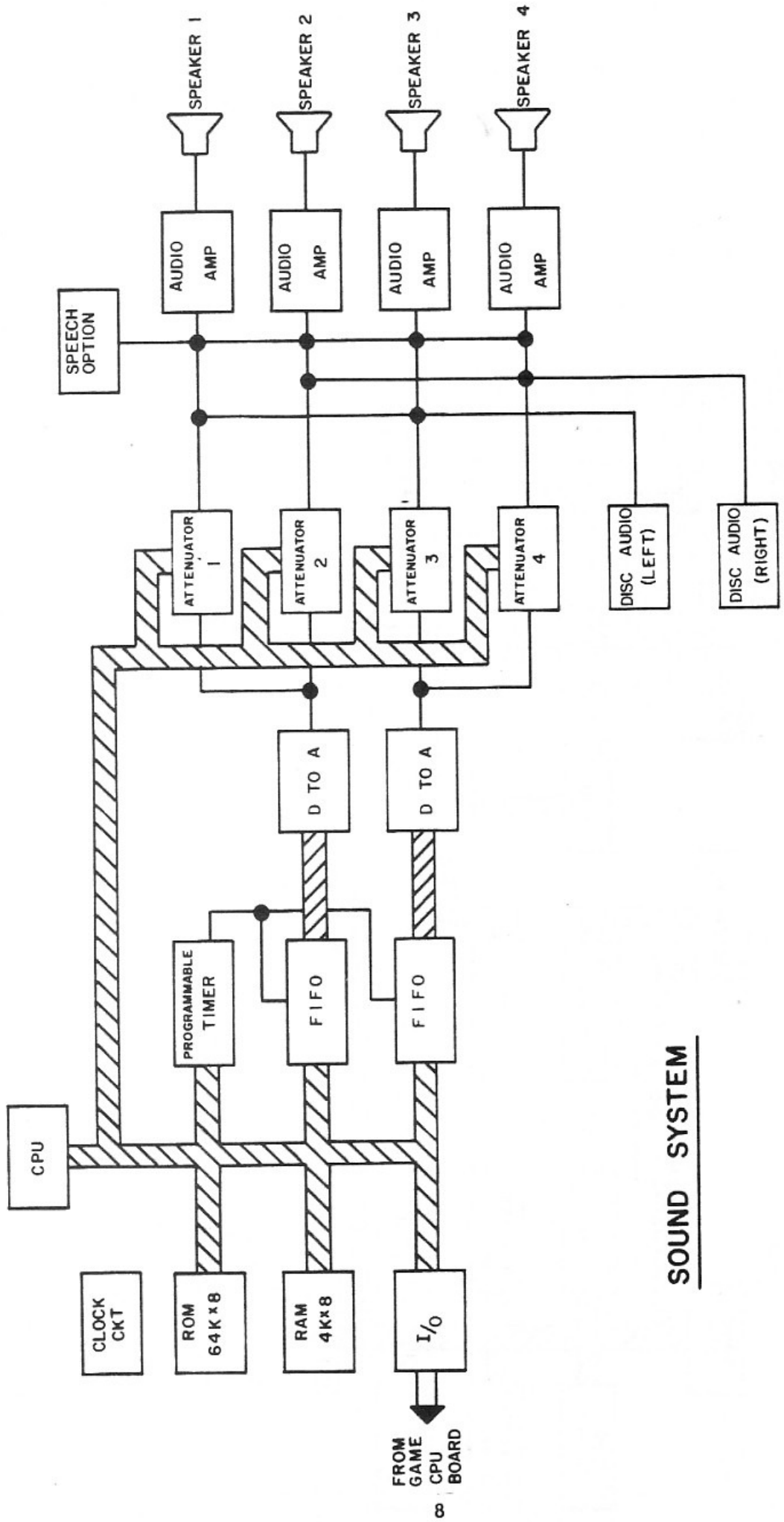
# BACKGROUND VIDEO GENERATOR SYSTEM





**GAME COMPUTER AND FOREGROUND VIDEO-GENERATOR SYSTEM**

BACKGROUND VIDEO-INFORMATION FROM EXPANDER BOARD



**SOUND SYSTEM**

FROM  
GAME  
CPU  
BOARD



## Service Notes

FAN GUARD. For safety we've added a guard (Part No. 20-9420) to the fan on the shroud assembly. You should retrofit your game with this guard. You'll also need to add 4 washers 5/32 x 7/16 (16 Gauge) and replace the wood screws with #6 x 2-1/4" slotted wood screws.

THE DISC PLAYER in Williams' DISCAN system is a PR8210 modified to meet the system's unique control capabilities. Standard PR8210 (or other) players won't operate in the DISCAN system.

IMPORTANT SWITCH-MAINTENANCE. Switches are particularly sophisticated and continuously stressed in the DISCAN system. Maintaining them is necessary for optimum playing conditions...and your earnings will prove it. That's why our switch test is the best in the industry.

AS A PART OF YOUR WEEKLY MAINTENANCE-ROUTINE, you should perform the switch test and verify that switches are working flawlessly. Pay close attention to steering and throttle switches. Make sure they operate smoothly and provide full deflection in the bar graphs.

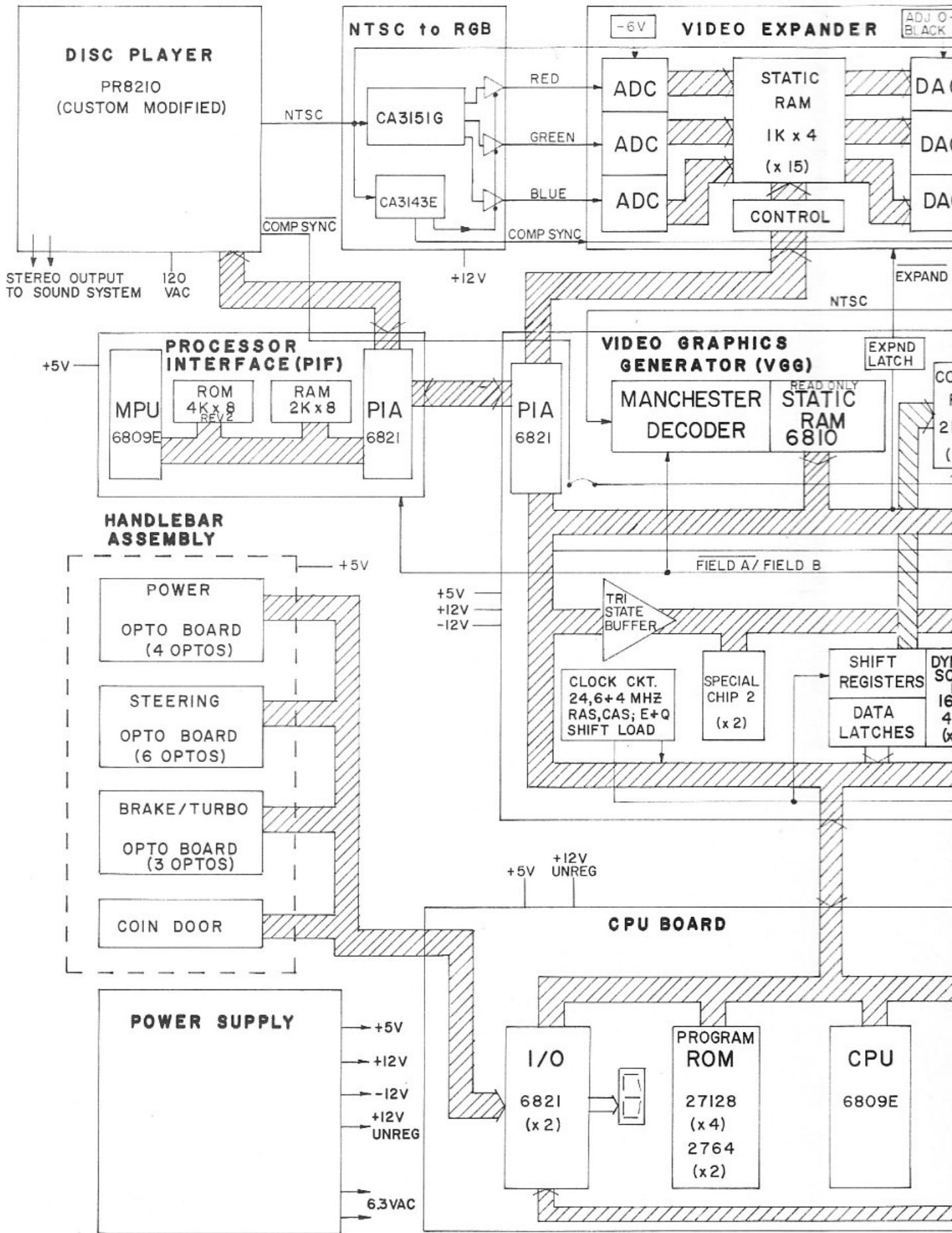
### A Word About Troubleshooting

WILLIAMS PROVIDES EXTENSIVE DIAGNOSTICS in the games it manufactures. These can be a dramatic timesaver in your servicing work. Familiarity with the drawing set and instruction manual can also enhance troubleshooting. In the few instances when you can't find the problem using self-tests, these rules of thumb should help...

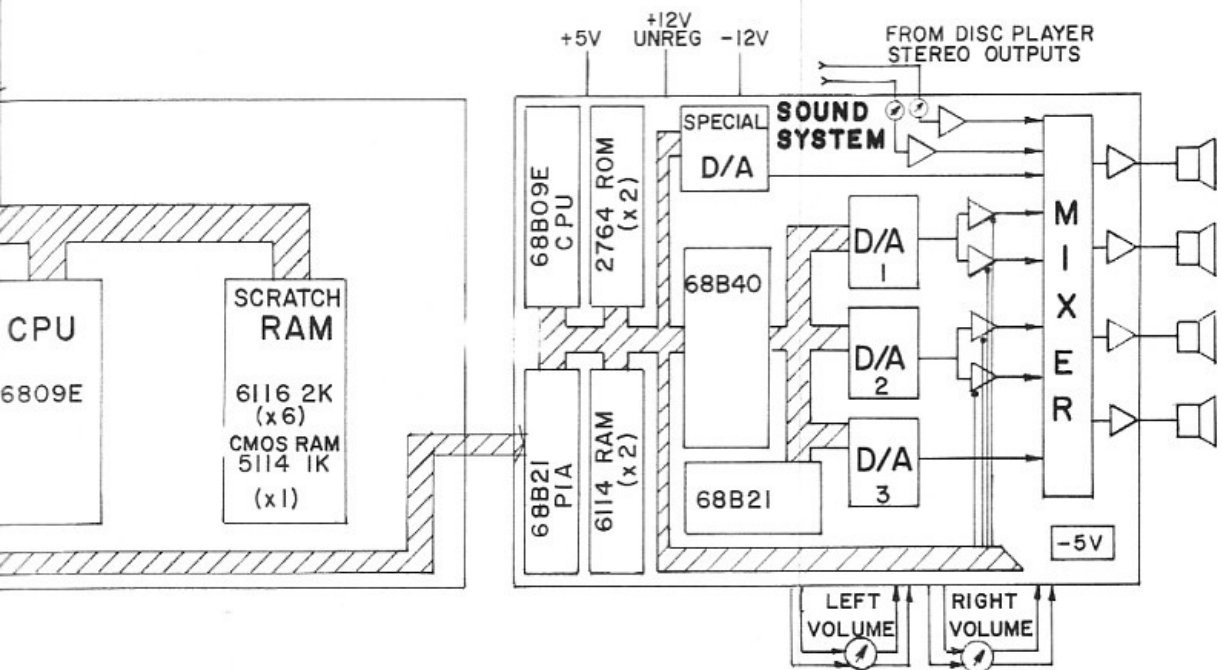
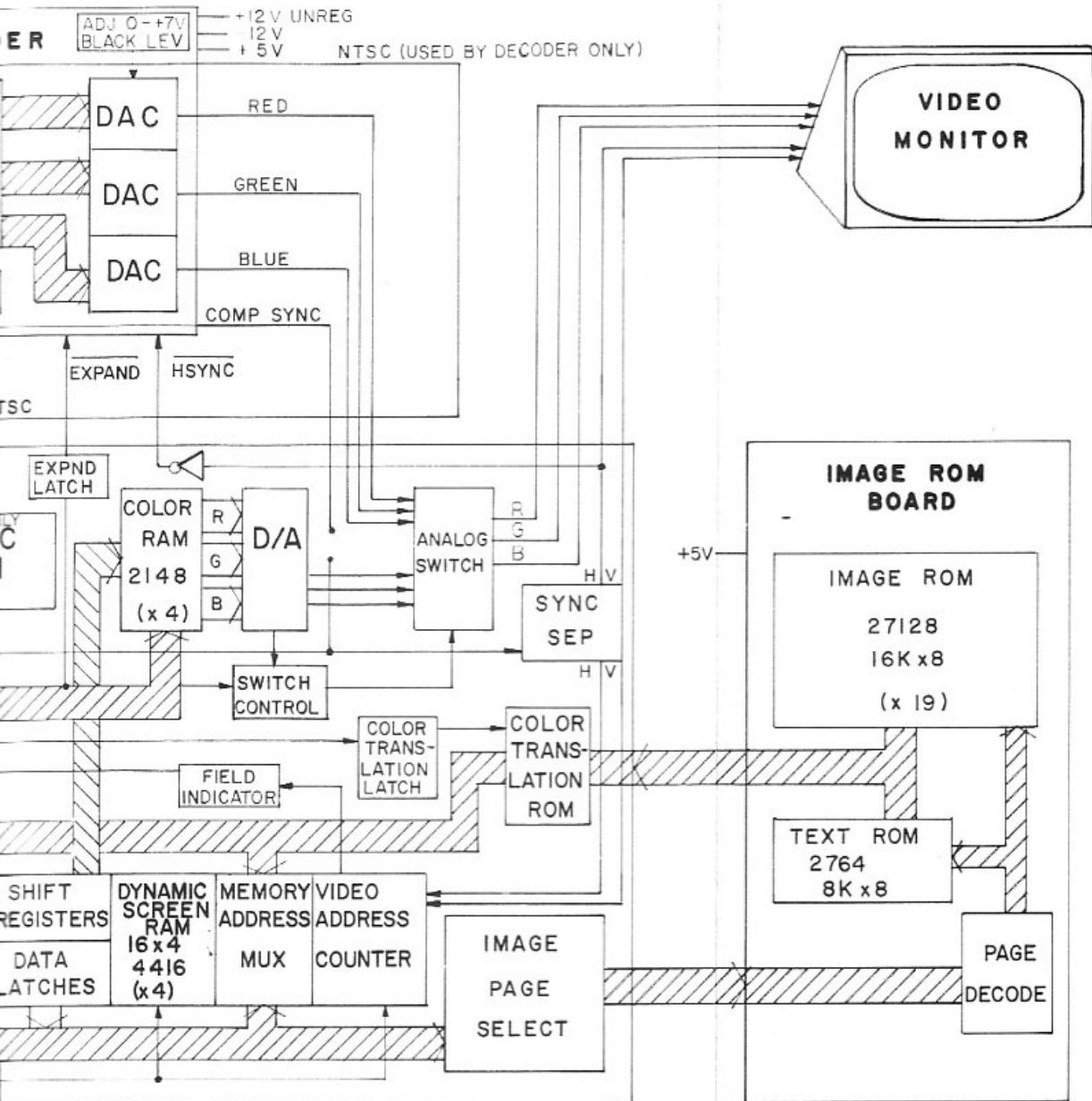
1. GIVE YOUR GAME A VISUAL INSPECTION in the suspected area. Bad connections are common in older games.
2. THINK OVER THE SYMPTOMS and then jot them down. Keeping notes pins down the details of your problem and prevents wasted time going over the same tests.
3. YOUR ANALYSIS SHOULD REVEAL which tools you need: Multimeter (analog or digital), logic probe, oscilloscope or other diagnostic equipment. Gather your tools.
4. CHECK YOUR VOLTAGES. Check regulated and unregulated DC voltages first at the output of the power supply. If any DC voltage is missing check your AC voltage at the fuse (with reference to its return line to the transformer). Use your Power-Wiring Diagram and Interboard-Wiring Diagram to find the fuse's location.
5. SWAP INTERCHANGEABLE BOARDS and chips that relate to your problem.
6. ONCE YOU'VE ISOLATED THE SUSPECTED CIRCUIT use your logic probe or oscilloscope to test for normal operation.

# NOTES

# DISCAN SYSTEM BLOCK DIAGRAM



# BLOCK DIAGRAM

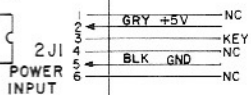
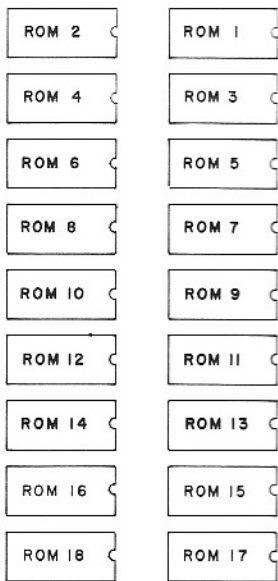


D-9926  
ROM BD.

2

ROM 25

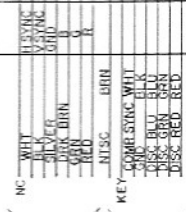
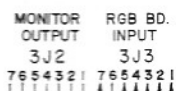
2PI  
TO CPU BD



A-5580-1022A

A-55 1063

VID

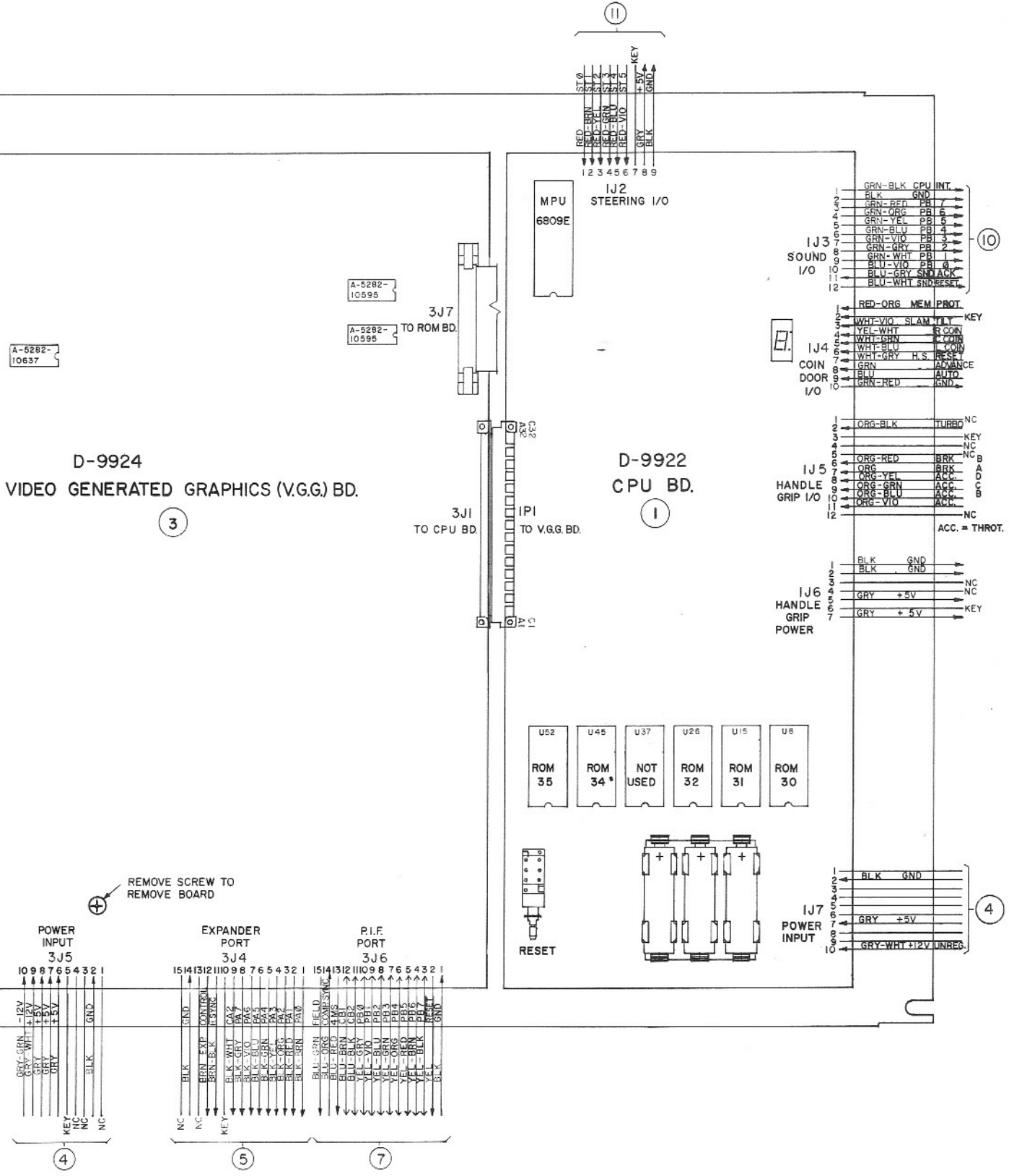


6

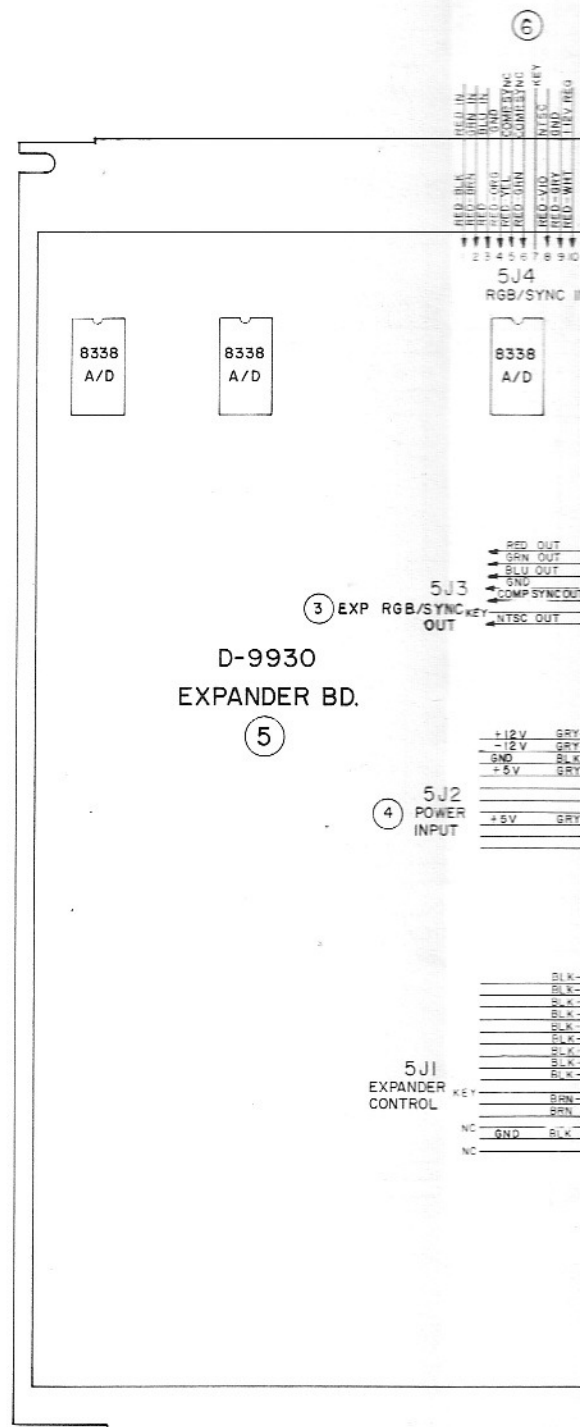
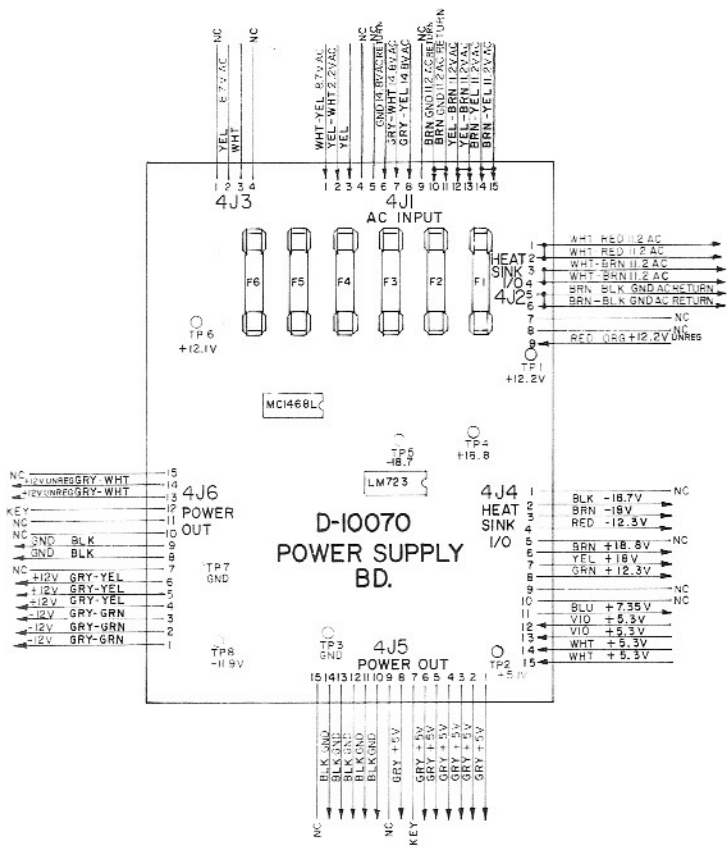
10

12V  
GRY-WHT  
+5V

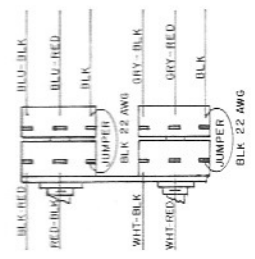
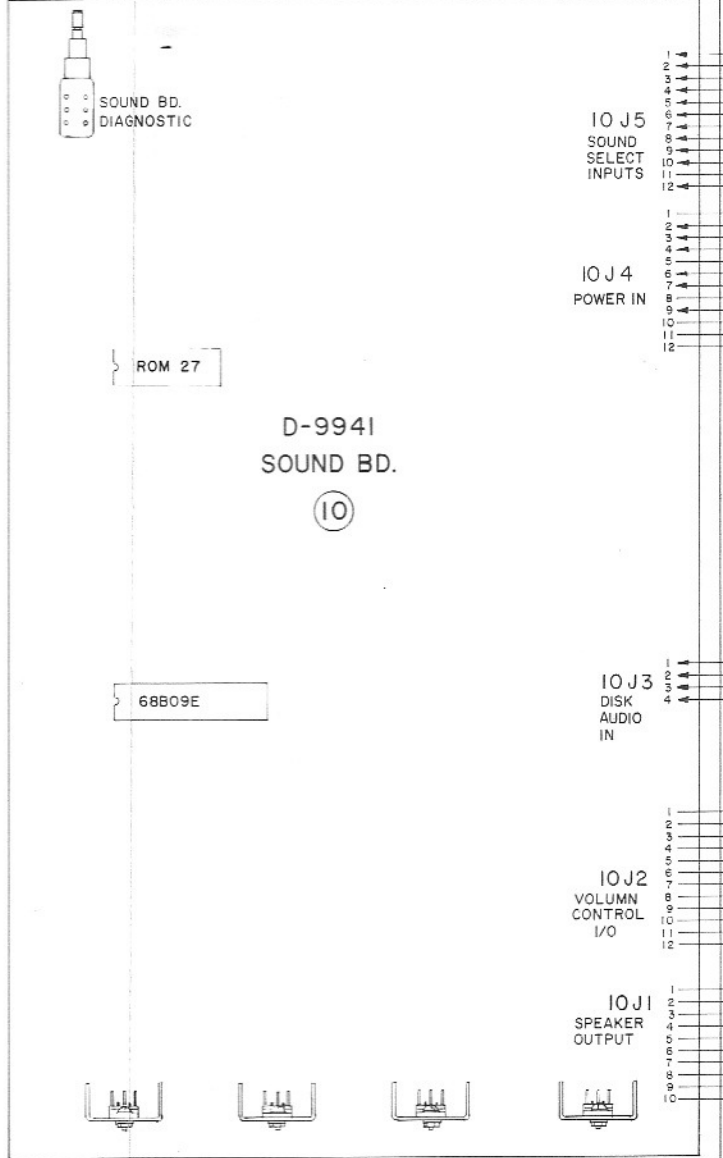
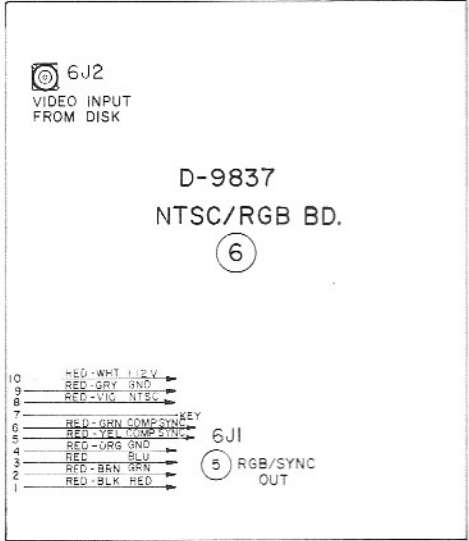
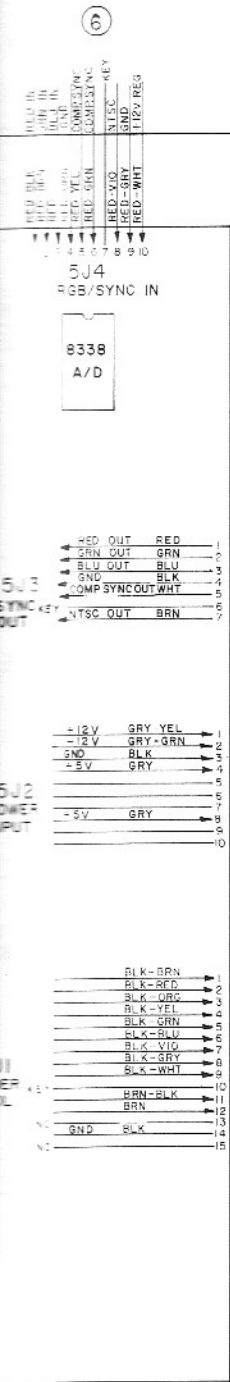
# BOARD WIRING

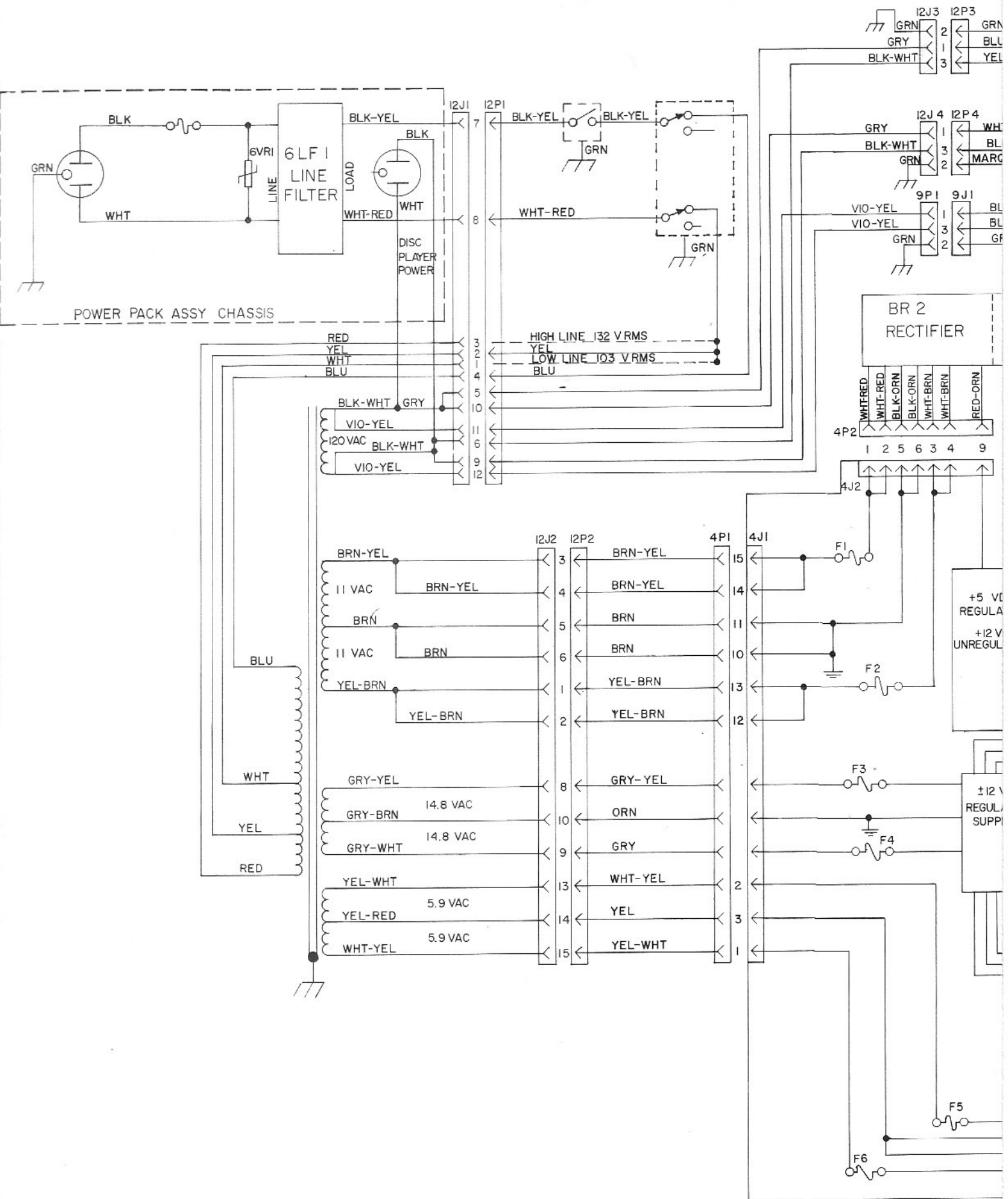


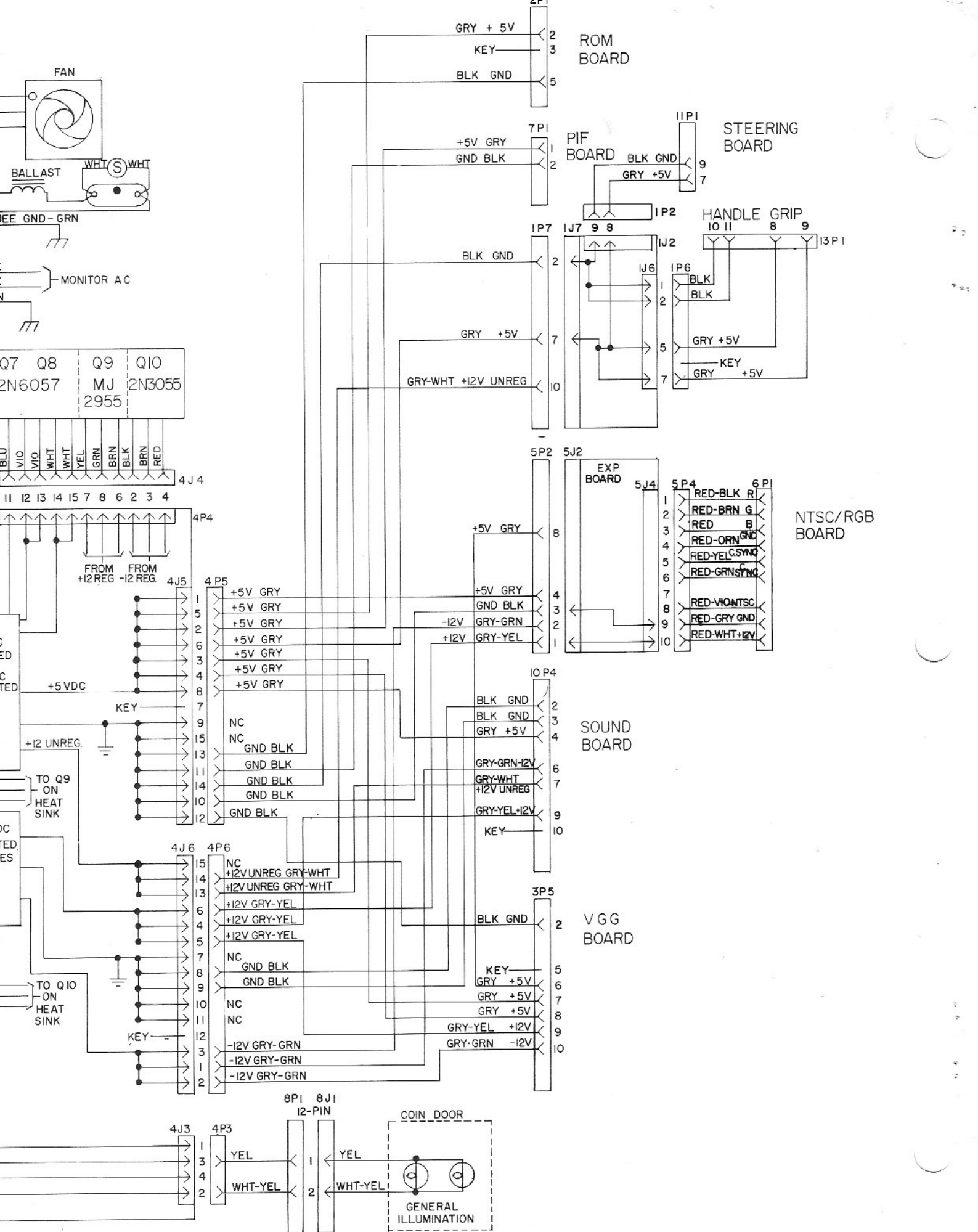




# PC BOARD WIRING, CONTINUED

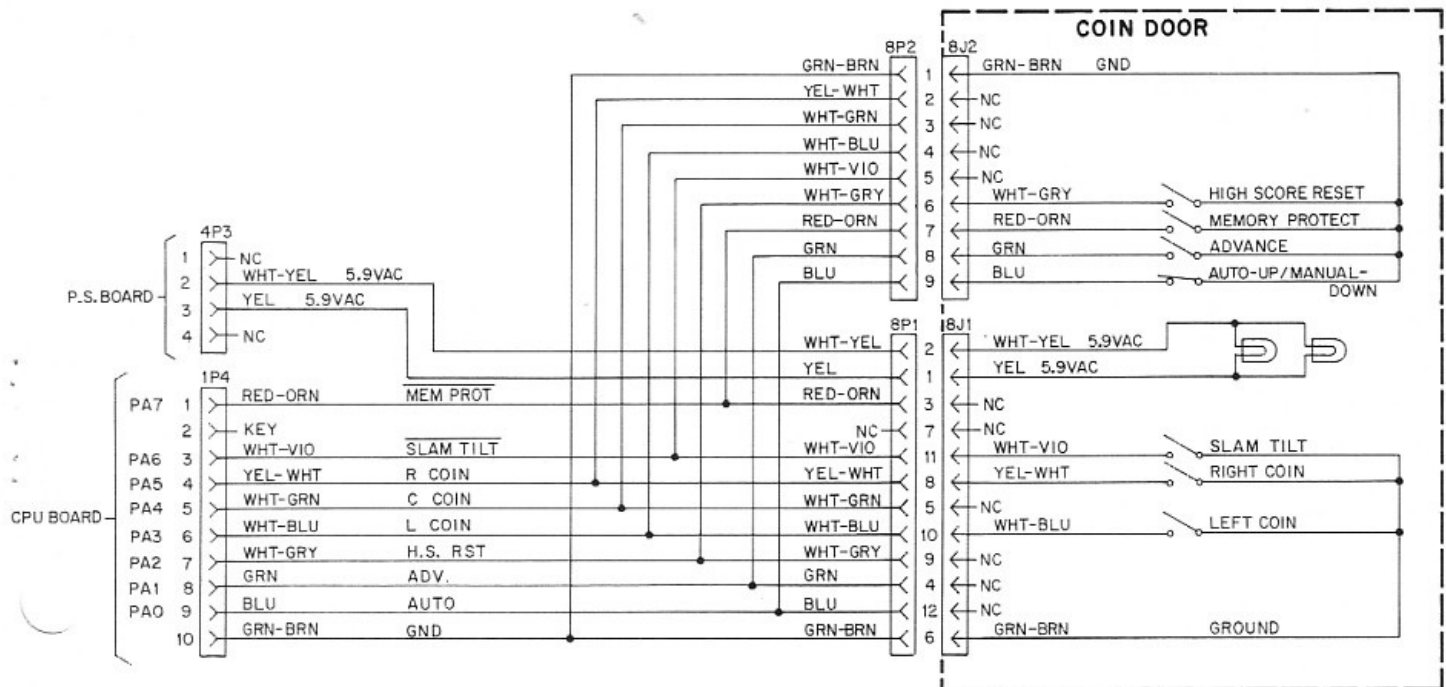
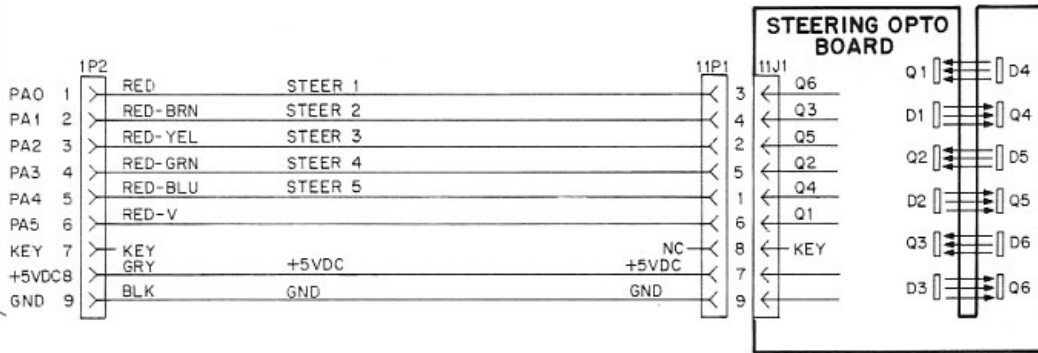
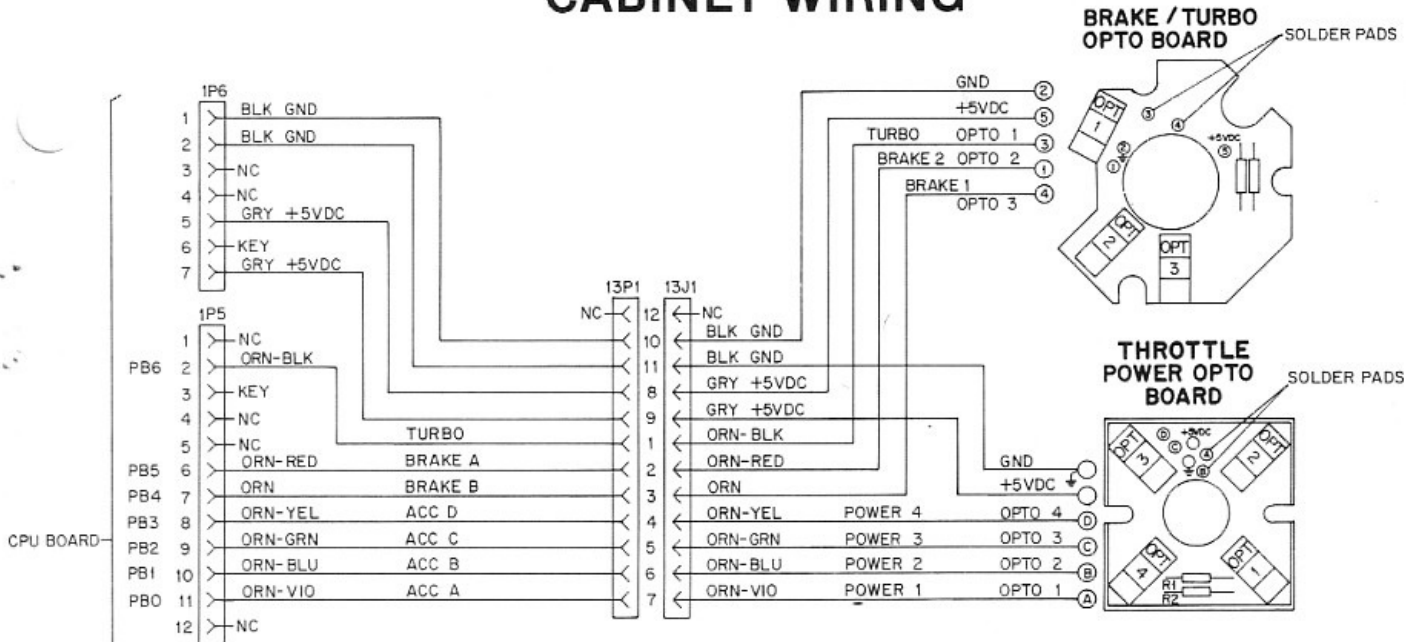




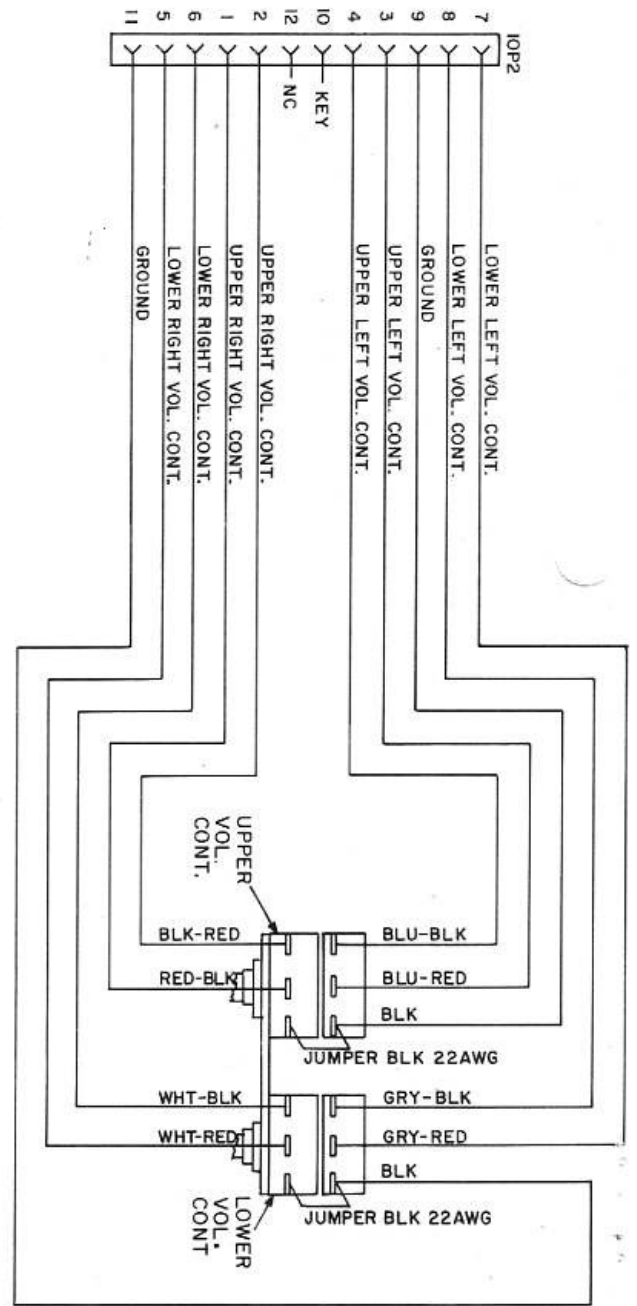
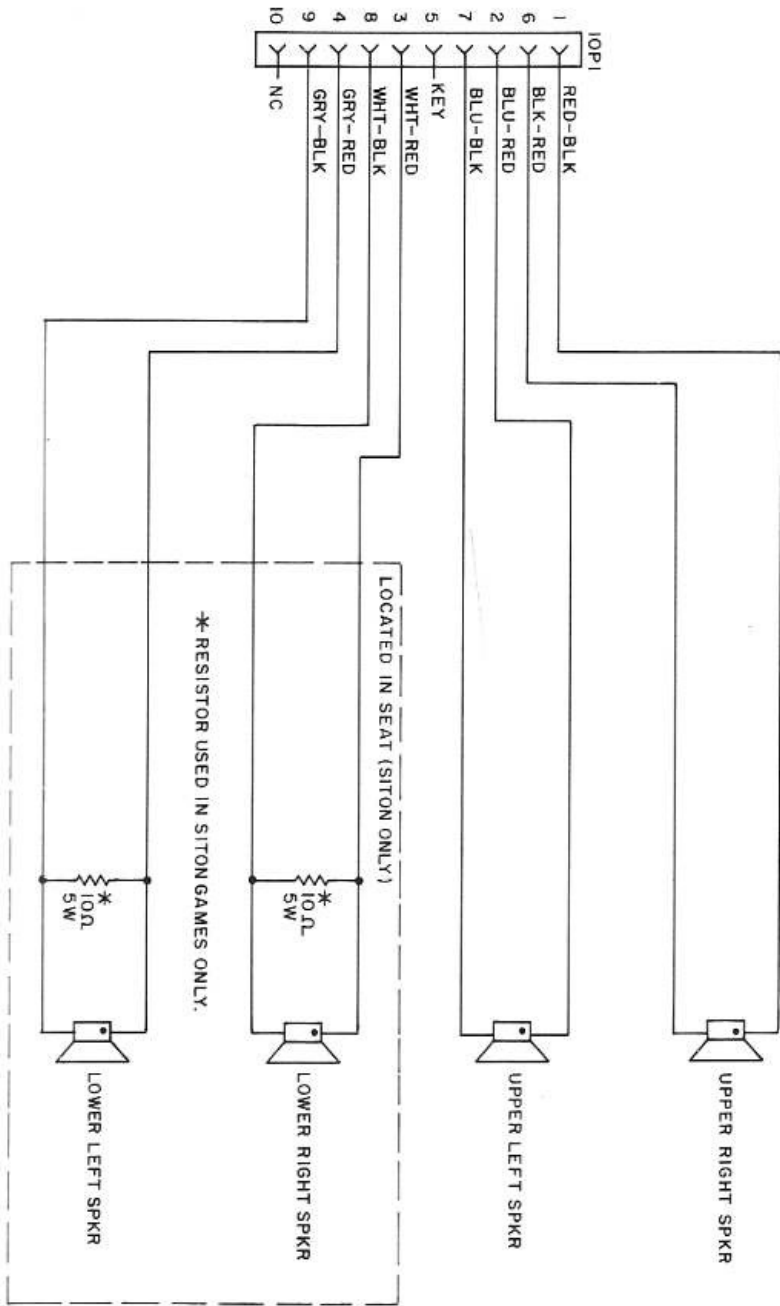


**POWER WIRING**

# CABINET WIRING



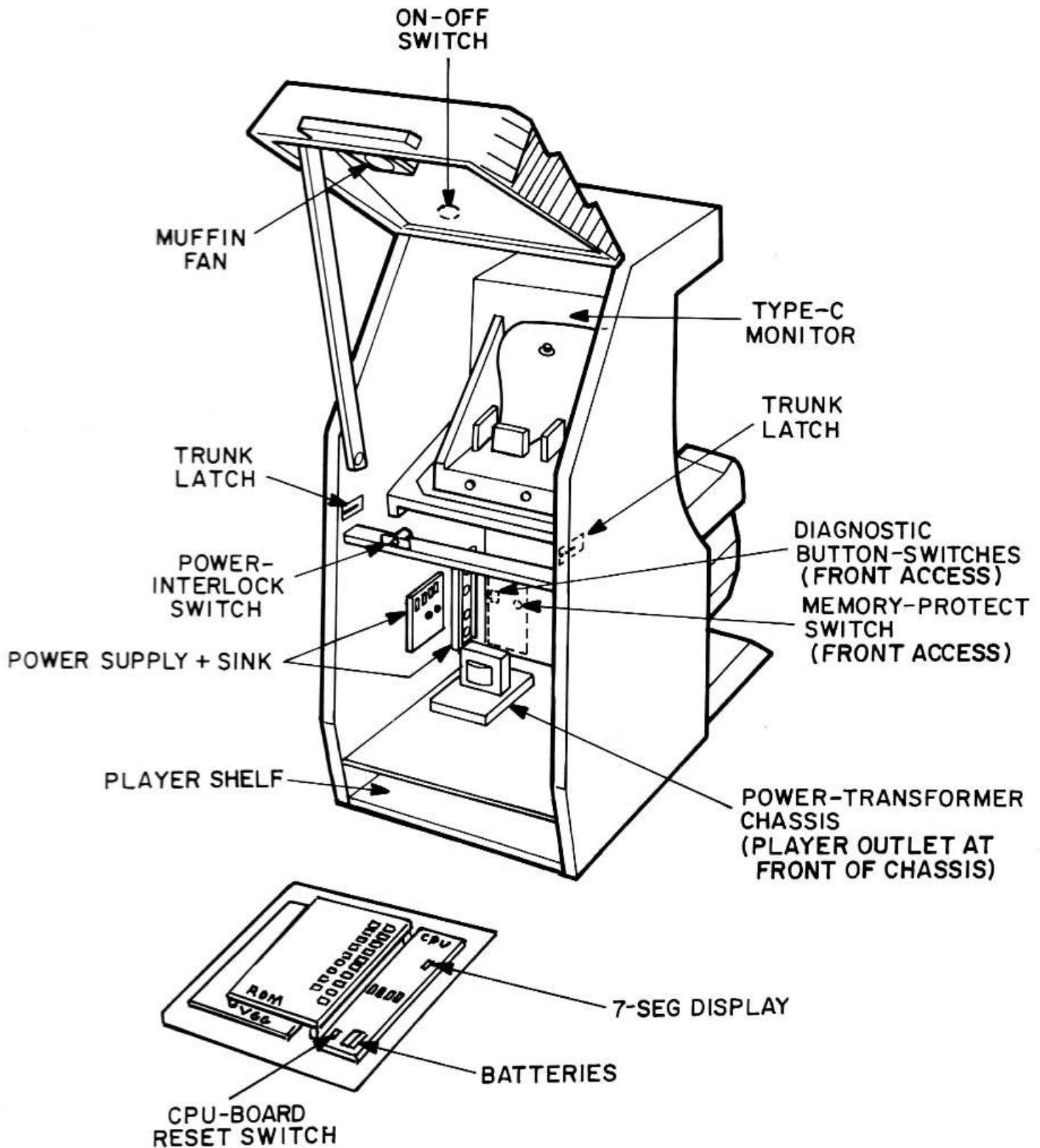
# SPEAKER & VOLUME-CONTROL WIRING

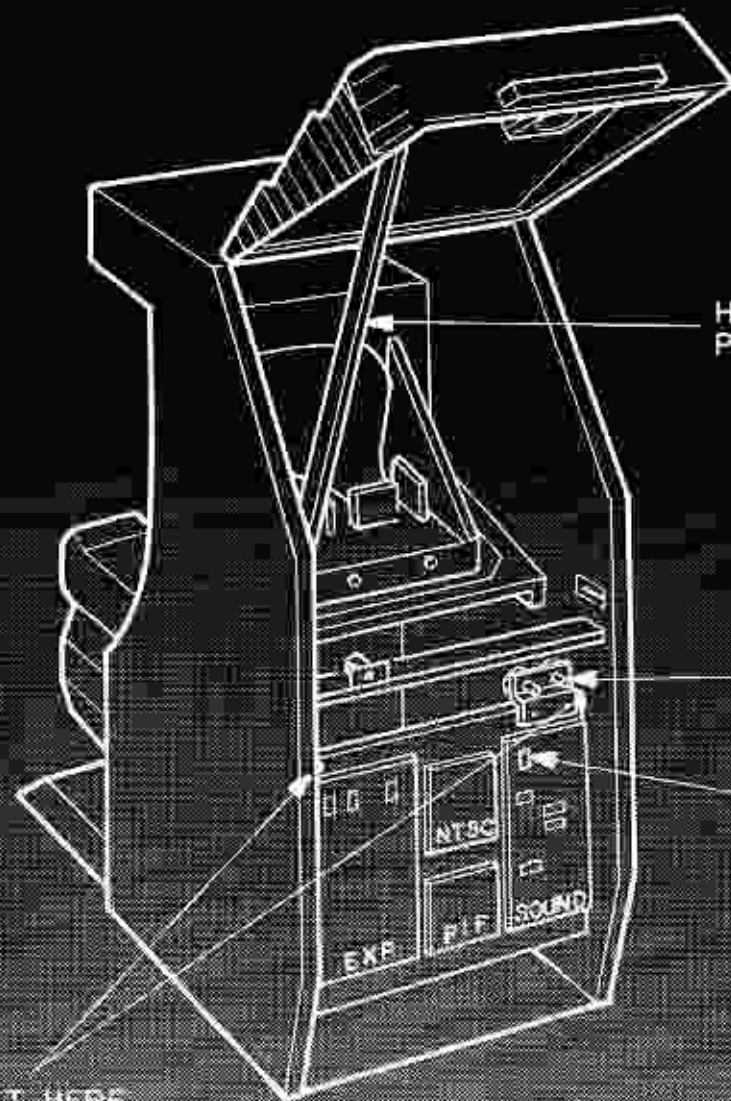




# PARTS LOCATION DIAGRAM

(CONTINUED ON BACK COVER)





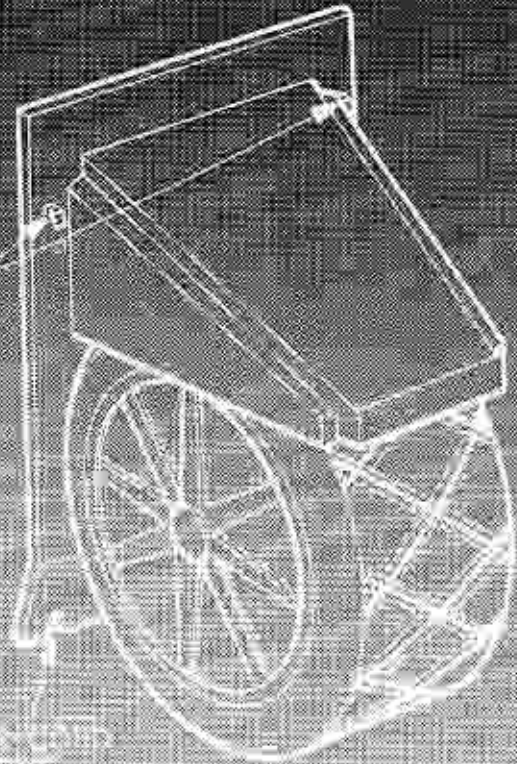
HOOD  
PROP

2 DUAL  
VOLUME-  
CONTROLS

SOUND DIAGNOSTIC-  
SWITCH

UNBOLT HERE  
TO VIEW REAR  
OF CIRCUIT BOARD-  
ACCESS PANEL

DUAL  
KEYLOCKS



DUAL KEYLOCK  
GROOVE