



STERN

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12G-10-219

For Disc-Player Service
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CLIFF HANGER MANUAL INDEX

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SAFETY INSTRUCTIONS

READ INSTRUCTIONS!! Please read all the CARE AND MAINTENANCE AND DISC PLAYER INSTALLATION instructions before installing or operating the disc player or game.

PLEASE FOLLOW all warnings on the disc player, and operating instructions in the manual included with the machine.

- . Moisture forms in the operating sections of the disc player, and the players performance will be impaired if the appliance is brought from cool surroundings into a warm room or if the room temperature suddenly rises, and the player is put into use.
- . To prevent this, allow the game and player to warm up for about an hour before turning on. Also be sure to keep game away from any heat sources (i.e. radiator or heat register).
- . Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the game and protect it from overheating these openings must not be blocked or covered.
- . There should be a 3-4 inch space between the back of the game and the wall to provide adequate ventilation for the fan.
- . Stern recommends that you change the air filter by the front intake vents every two months to keep the disc player area as clean as possible.
- . The game should not be placed in an area where the room temperature will exceed 90 degrees F.
- . If all these steps are followed, the internal cabinet temperature will remain approximately 2-3 degrees F. above ambient.

PR-8210 VIDEO DISC PLAYER CARE AND MAINTENANCE

CLEANING: Unplug the game from the wall outlet before cleaning. DO NOT use liquid cleaners or aerosol cleaners on the disc player. If necessary, use a damp cloth for cleaning.

- . Use a soft, clean cloth to wipe off dust and dirt accumulated on the player. If necessary, moisten a soft cloth with water to remove heavy dirt.
- . Never use paint-thinner, benzene, or other solvents. They react with the players surface and cause color changes and melting.

OBJECTIVE LENS CARE:

The objective lens is a key part of the player. Note that the lens surface must be clean in order to maintain the best performance.

NEVER TRY TO TOUCH THE LENS SURFACE!!

If too much dust or dirt accumulates, it may degrade the picture quality. Dust can be removed from the lens with an air blower for a camera lens.

CARE AND STORAGE OF VIDEO DISCS:

- . The disc may be dusted with a clean soft cloth and safely cleaned using a mild plastic cleaner.
- . Dirt on the disc does not affect information stored on it, but may cut down on the amount of light reflected back from the disc.
- . Discs should be stored in their jackets and in a vertical position.

CLIFF HANGER

PR-8210 VIDEO DISC PLAYER INSTALLATION

PLEASE READ ALL INSTRUCTIONS CAREFULLY BEFORE INSTALLING PLAYER TO PREVENT DAMAGE, AND MAINTAIN WARRANTY!!

INSTALL DISC PLAYER WHEN MACHINE IS ON LOCATION ONLY!!

Step 1: Open carton. Lift player out of carton with wrappers and end caps attached. After lifting out, remove and save wrappers and end caps.

The carton, wrappers and end caps MUST be saved to repack the disc player if the machine is to be moved.

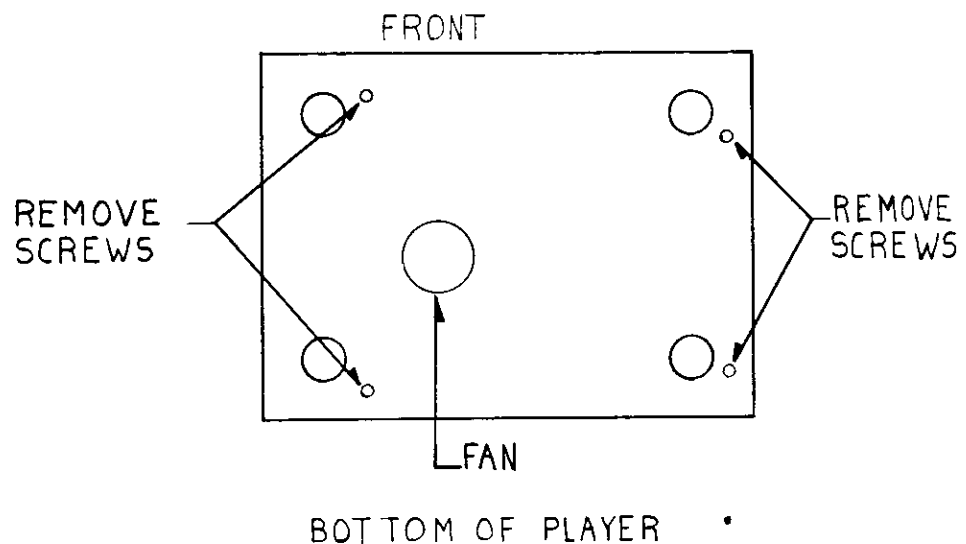
Step 2: Mounting Disc Player:

CAUTION: DO NOT CONNECT ANY WIRES TO PLAYER AT THIS TIME. PUT PLAYER ON ITS TOP ONLY!! DO NOT PLACE ON ITS SIDE!!

The disc player must be mounted to the shock absorbers on the disc player panel located behind the front access panel of the game.

Locate the spacers and mounting screws as they will be needed for this operation.

- 1). Open front access panel and slide panel out from game.
- 2) Remove the four corner screws from the bottom of the disc player. (See illustration below).



Step 2 (Cont'd):

- 3). Use spacers and mounting screws included with game. Mount the player to the panel. The spacers go between the shock absorbers and the Player so that when assembled the PLAYERS FEET DO NOT TOUCH THE MOUNTING PANEL. (See illustration 2 below).



The front of the disc player when mounted, faces the front of the machine.

CAUTION: DISC PLAYER MUST BE REMOVED FROM GAME IF IT IS MOVED TO NEW LOCATION.

Step 3.

Disc Player Set-Up: Opening the Hood

The Disc Player hood can only be opened when the power is turned on.

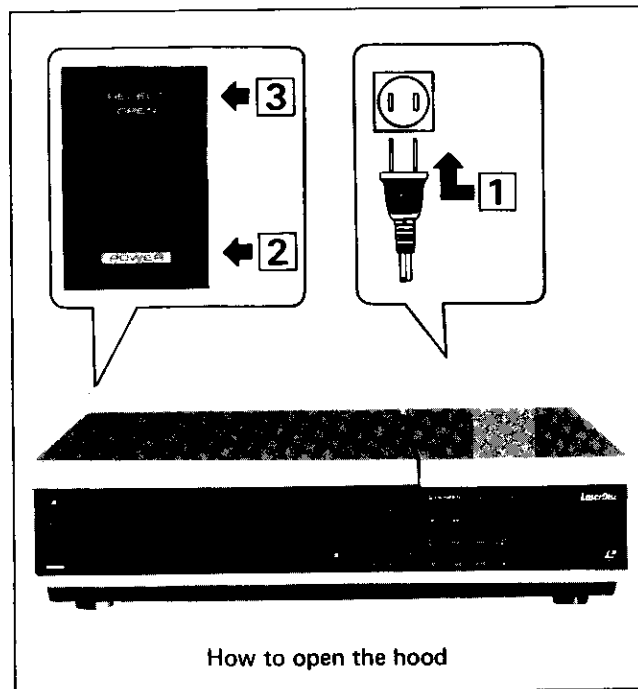
To open the hood: (See illustration 3 below)

- 1). Plug the unit into the Disc Player Service Outlet.

Note: The Disc Player Service Outlet is NOT the service outlet on the electronics drawer. A Special Switched Outlet is provided for the Disc Player. It is located near the right rear of the cabinet (looking from back of machine) above the Player area. The Disc Player line cord goes up through the front cable feed hole.

- 2). Press the Power Switch to turn the unit on.
- 3). Press the Reject/Open Switch to unlock the hood, and lift the hood gently with your hand.

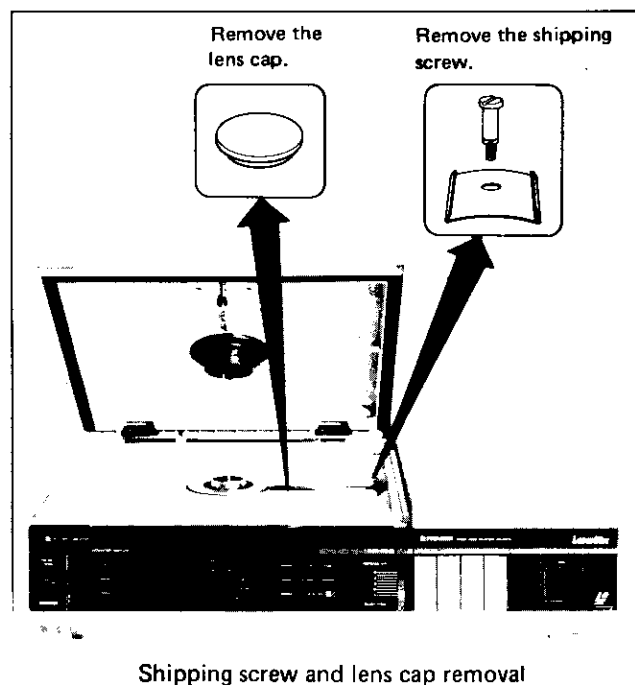
LEAVE UNIT ON!!



Step 4:

Disc Player Set-Up: Removing Shipping Screw and Lens Cap

To prevent damage to the internal mechanism during shipment, a shipping screw and plate is placed beside the center shaft at the factory. (See illustration 4 below). Use a screwdriver or coin to unscrew and remove the SCREW and SCREW PLATE. Next remove the LENS CAP which is placed over the lens to protect it from dust and dirt. (See illustration 4 below). LEAVE UNIT ON!!



NOTE:

Store shipping screw, plate and lens cap, with the carton and wrappers. The screw, plate and lens cap MUST be replaced if the unit is to be moved to a new location.

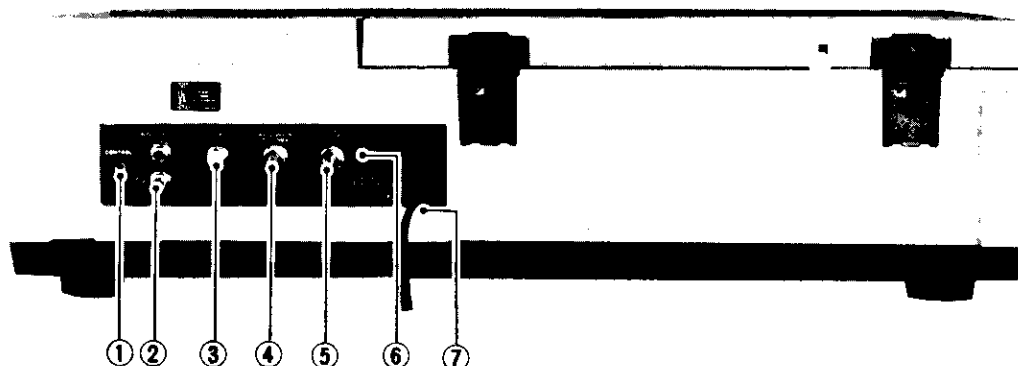
WHEN REPLACING SHIPPING SCREW AND PLATE, THE POWER TO THE PLAYER MUST BE ON!!

Step 5: Disc Player Set-Up: Installing the Disc

With hood open, insert the disc with the label side of the disc facing up. Close the hood so that it clicks shut.
TURN PLAYER OFF!!

Step 6: Disc Player Set-Up: Connecting Disc Player

Connect the video out, audio out and control wires to the back of the player at this time. (See illustration 5 below).



- 1) Control Wire
- 2) Audio Out
- 3) Video Out
- 4) N/U

- 5) N/U
- 6) N/U
- 7) Line Cord

NOTE:

The disc player is completely controlled by the logic boards. Once player is turned on, no control switches have to be pushed to operate the player.

TURN PLAYER ON.

PUSH UNIT INTO MACHINE.

Step 7:

Power-Up Entire Game:

When the logic boards have reset, they will begin to control the disc player. The disc will begin to rotate and the stand-by light will begin to flash on and off. In 15 to 30 seconds, the disc will reach its rated speed. A picture will appear on the monitor and the stand-by indicator will go out. The unit is now functional.

On all games, there are some items that must be checked after shipment. Making these visual inspections may avoid time consuming service work later. Minor troubles caused during shipment are unavoidable. Cable connectors may be loosened, switches may go out of adjustment, and chips in sockets may have come loose.

- . Check cable connectors and socketed chips to make sure they are properly seated and tight.
- . Check switches for proper adjustments.
- . Check transformer for any foreign material shorting across wiring lugs.
- . Check that fuses are firmly seated and making good contact.
- . Check switches for foreign material that may have come loose in shipment and could cause shorting of contacts.
- . Check for any wires that may have become disconnected.
- . Check that all cable connectors are completely seated on printed circuit board assemblies.
- . Check that cables are clear of all moving parts.
- . Check adjustment of the two normally open tilt switches located on the left side of cabinet by control panel.

NOTE: To protect solid state components, before touching any component in the back box, discharge any possible static build-up by touching any ground circuit, e.g. ground braid.

INSTRUCTIONS

In Cliff Hanger, Cliff is trying to enter Count Dragoe's castle to save the kidnapped Princess from Dragoe's evil clutches.

Control Cliff as he first sees and tries to save the Princess only to be outfoxed by Dragoe's henchmen as they kidnap her and spirit her off to the Count's castle.

Cliff finds the ring the Count gave the princess and his search for her leads him to a town where, in an incredible chase scene, Cliff is pursued through the town and the town's sewer system by the Count's helicopter.

Cliff's adventures lead him through numerous other perilous situations that require him to have quick reflexes, great leaping ability and the skills of a Ninja.

When cliff enters the castle, he finally meets the Count face to face, and their bitter struggle in the castle clock tower almost does Cliff in.

In the surprise ending, Cliff rises up to the occasion and saves the princess.

Control Cliff's actions by using the two action buttons or joystick.

Use hand button to control movements of Cliff's arms.

Use foot button to control movements of Cliff's legs.

Use joystick to start movement or change directions of Cliff or car.

Use individual controls or combinations for successful moves.

CONTROL PANEL:

Joystick: 4-way joystick is used to begin movement on the screen or change the direction of movement on the screen of Cliff or Cliff's car. These direction changes are from the players perspective.

Example: If the action on the screen changes from left to right, you would have to move the joystick to the right.

Hand Button: Is used to control the movements of Cliff's arms and hands.

Example: If Cliff uses his arm or hand to block or grab something, then the Hand Button would be used for the correct move.

Foot Button: Is used to control the movement of Cliff's legs.

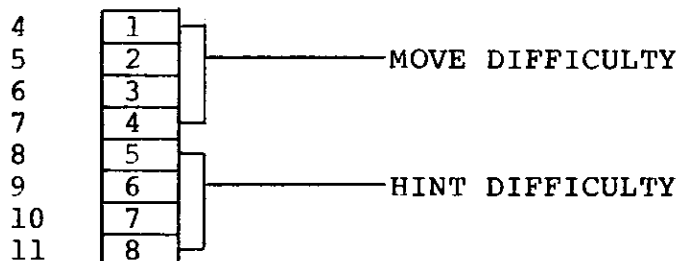
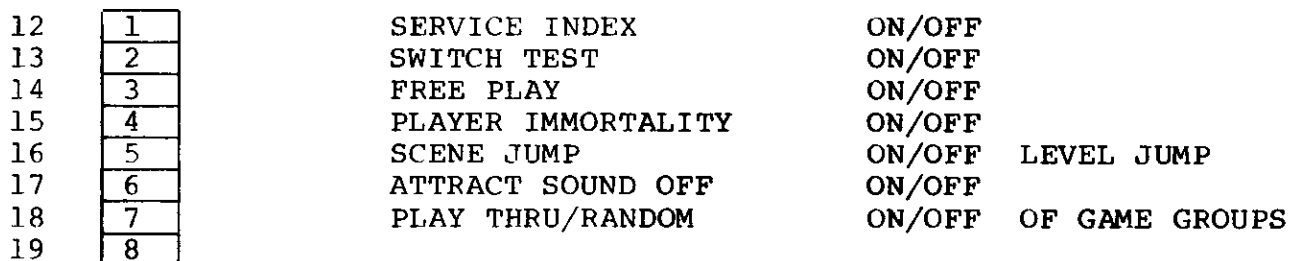
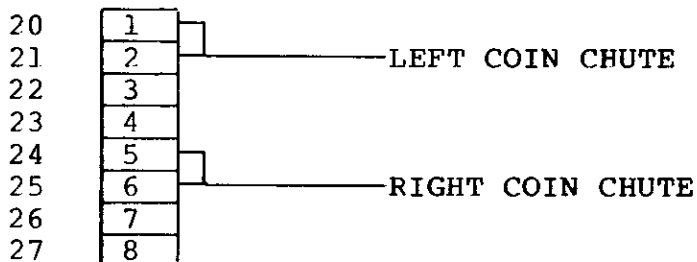
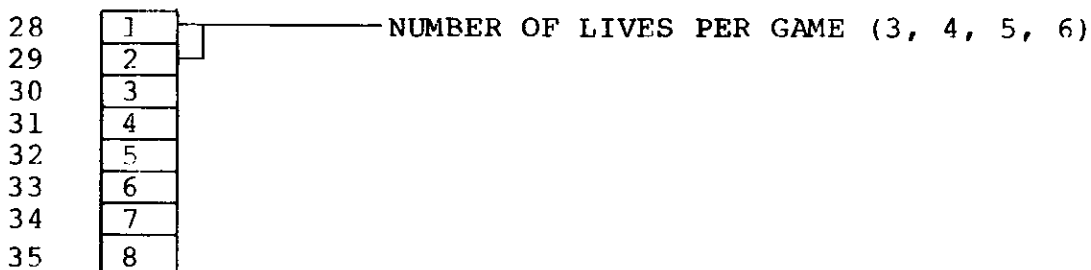
Example: If Cliff is jumping across something or climbing up something, the Foot Button would be used for the correct move.

SECTION II:

GAME ADJUSTMENTS

All dip switches used for game adjustments are located on the ZPU-2000 board. The ZPU-2000 board is the bottom board in the card cage.

ZPU-2000 DIP SWITCH DESIGNATION

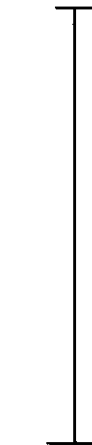
H11G11F11E11

MOVE DIFFICULTY:

SWITCHES

4	3	2	1
OFF	OFF	OFF	OFF
OFF	OFF	OFF	ON
OFF	OFF	ON	OFF
OFF	OFF	ON	ON
OFF	ON	OFF	OFF
OFF	ON	OFF	ON
OFF	ON	ON	OFF
OFF	ON	ON	ON
ON	OFF	OFF	OFF
ON	OFF	OFF	ON
ON	OFF	ON	OFF
ON	OFF	ON	ON
ON	ON	OFF	OFF
ON	ON	OFF	ON
ON	ON	ON	OFF
ON	ON	ON	ON

EASIEST



HARDEST

This setting determines the difficulty of the moves in the game by opening or closing the "WINDOW" that these moves can be made in.

HINT DIFFICULTY:

SWITCHES

8	7	6	5
OFF	OFF	OFF	OFF
OFF	OFF	OFF	ON
OFF	OFF	ON	OFF
OFF	OFF	ON	ON
OFF	ON	OFF	OFF
OFF	ON	OFF	ON
OFF	ON	ON	OFF
OFF	ON	ON	ON
ON	OFF	OFF	OFF
ON	OFF	OFF	ON
ON	OFF	ON	OFF
ON	OFF	ON	ON
ON	ON	OFF	OFF
ON	ON	OFF	ON
ON	ON	ON	OFF
ON	ON	ON	ON

MOST HINTS



LEAST HINTS

If used, this setting determines the amount of visual clues the game will give the player.

FREE PLAY
YES
NO

DIP SWITCH 14
ON
OFF

PLAYER IMMORTALITY
YES
NO

DIP SWITCH 15
ON
OFF

Used for test purposes. In this mode, your player is never destroyed.

SCENE JUMP
YES
NO

DIP SWITCH 16
ON
OFF

Used for test purposes. In this mode, pushing the Player One button jumps to next scene.

ATTRACT MODE SOUND OFF
ON
OFF

DIP SWITCH 17
OFF
ON

NUMBER OF LIVES PER GAME:

LIVES
3
4
5
6

SWITCH 28
OFF
ON
OFF
ON

SWITCH 29
OFF
OFF
ON
ON

COIN SWITCH SETTINGS:

COIN
Left Chute
Right Chute

SWITCHES
20 21
24 25
OFF OFF
ON OFF
OFF ON
ON ON

CREDITS COIN
1 2
1 2
1 3
1 4

IF BOTH COIN CHUTES ARE ADJUSTED THE SAME FOR MULTIPLE COINS, CREDITS WILL INCREASE AS IF DROPPED IN SAME CHUTE.

SECTION III:

SERVICE MODES

The System provides three service modes:

- (1) Power on self test for each board
- (2) Service Index
- (3) Switch Test

I. POWER ON SELF TEST:

ZPU-2000: This board has its own test L.E.D. and goes through its own self test on power-up. Each flash checks a particular section of the board. The L.E.D. flashes upon completion of a test.

Listed below is the sequence of flashes of the L.E.D. and what section of the board is being checked.

ZPU-2000 - 7 Flashes:

1st	=	Z80 Microprocessor
2nd	=	Rom 0 Position 1H
3rd	=	Rom 1 Position 2H
4th	=	Rom 2 Position 3H
5th	=	Rom 3 Position 4H
6th	=	Scratch Ram 6C
7th	=	Bookkeeping 6F

II. SERVICE INDEX:

Access into the Service Index can be made by turning Switch No. 12 of the ZPU Board on.

<u>SERVICE INDEX</u>
ON
OFF

<u>DIP 12</u>
ON
OFF

The Service Index displays six (6) categories on the screen that provide access to Bookkeeping Information, Game and Coin Adjustment Settings and Various Diagnostic Tests.

A. The categories in the Service Index are listed below:

01	Bookkeeping
02	Game Adjustment
03	Credit/Coin Adjustment
04	Monitor Test
05	Sound Test
06	Game Play Statistics

B. Selecting a category:
To select a category you:

- (1) Push the Joystick to move the cursor up the index.
- (2) Push the Joystick to move the cursor down the index.
- (3) To select a category, push the Player 1 Start.
- (4) To exit from a category, push the Player 2 Start.

C. Description of Categories:

01 BOOKKEEPING: The Bookkeeping category contains information on:

- (1) Total Plays
- (2) Coins through the Left Coin Chute.
- (3) Coins through the Right Coin Chute.
- (4) Total seconds played
- (5) Longest game in seconds
- (6) Shortest game in seconds
- (7) Highest Game Score
- (8) Highest Score Reached

To reset the categories back to zero, push Switch Number Two (2) on the ZPU-2000 Board (See ZPU Illustration. This resets all categories except Number 7, Highest Game Score - this is handled separately.

NOTE: Number 6 - Shortest Game in seconds is reset to 99.

HIGHEST GAME SCORE:

The System displays twenty (20) high scores in two different categories: All Time and Today.

Scores in the Today Column are reset every time the machine is turned off.

Scores in the All Time Column are retained in memory and are not reset when the machine is turned off.

Scores in the All Time Column can be cleared One At A Time by pushing Switch Number One on the ZPU-2000 Board (See ZPU Illustration. Each push of Switch One clears the highest score of the group and all other scores move up. To clear the entire column push Switch One, ten (10) times.

02 GAME ADJUSTMENTS:

Displays how a particular adjustment has been set, the dip switches controlling that function, and the status of those switches.

03 CREDIT/COIN ADJUSTMENTS:

Show what Coin/Credit combination has been set for both the Left and Right Coin Chutes, and which switches control each chute.

04 MONITOR TEST:

Displays a Red, Blue, Green or Crosshatch pattern on the screen for monitor adjustments.

To change screens, push the Player One Button.

05 SOUND TEST:

Allows you to test each sound of the game individually. To do this use the joystick to call up the sound (See Chart) you want to test. Pushing the Player One Button creates the sound.

To exit the Sound Test, push Player Two Button.

LIST OF GAME SOUNDS:

- 01 Good Action (Beep)
- 02 Bad Action (Boop)

06 GAME PLAY STATISTICS:

This category contains informatin on:

(1) Range of Scores:

This page shows the range of scores achieved in 10K points increments. It displays values from 0 to 140K points. It also shows how many times each level was reached.

(2) Range of Times:

This page shows the range of time played, in minutes. Times shown are from 0 to 14 minutes and increase at one minute intervals.

(3) Range of Scenes:

This page shows the number of times the highest scene was reached per game.

Pushing the Player One Button changes the display to the next page.

Pushing Switch #2 on ZPU Board clears the page being displayed back to zero.

The Switch Test can be turned on by:

- (1) Turning Switch Number 13 of the ZPU Board on and pushing the Reset Button (SW3).

0 = Switch Open

1 = Switch Closed

CONTROL PANEL AND COIN SWITCHES:

<u>SWITCH</u>	<u>STROBE</u>	<u>BIT</u>
Player One/Feet	5	2
Player Two/Feet	5	3
Left Hand Button	5	4
Right Coin Switch	5	1
Left Coin Switch	5	0
ZPU Switch 1	0	6
ZPU Switch 2	0	7
Right Hand Button	5	5
N/U	5	6
Tilt Switch (2)	5	7
Joystick Up	6	0
Joystick Right	6	1
Joystick Down	6	2
Joystick Left	6	3

ZPU DIP SWITCHES:

Dip Switch 4	4	0
Dip Switch 5	4	1
Dip Switch 6	4	2
Dip Switch 7	4	3
Dip Switch 8	4	4
Dip Switch 9	4	5
Dip Switch 10	4	6
Dip Switch 11	4	7
Dip Switch 12	3	0
Dip Switch 13	3	1
Dip Switch 14	3	2
Dip Switch 15	3	3
Dip Switch 16	3	4
Dip Switch 17	3	5
Dip Switch 18	3	6
Dip Switch 19	3	7
Dip Switch 20	2	0
Dip Switch 21	2	1
Dip Switch 22	2	2
Dip Switch 23	2	3
Dip Switch 24	2	4
Dip Switch 25	2	5
Dip Switch 26	2	6
Dip Switch 27	2	7
Dip Switch 28	1	0
Dip Switch 29	1	1
Dip Switch 30	1	2
Dip Switch 31	1	3
Dip Switch 32	1	4
Dip Switch 33	1	5
Dip Switch 34	1	6
Dip Switch 35	1	7

CLIFF HANGER HARDWARE SYSTEM

Cliff Hanger uses a Z80 based microprocessor system consisting of seven (7) boards:

- | | |
|---------------|---------------|
| (1) ZPU Board | (5) RFB Board |
| (2) GSI Board | (6) CRF Board |
| (3) VMB Board | (7) PS1200 |
| (4) UIB Board | |

(1) ZPU Board (located in card rack):

This board contains a Z80 microprocessor running at 4.00 MHZ. ZPU Board also contains program memory, scratch pad memory, battery backed-up CMOS ram, coin counter and lamp drivers which are used to power the infra red LED's that control the disc player in games using the LD-1100 disc player. The ZPU Board also contains the Switch Matrix Controller. This circuit controls up to 80 switches. The switches are arranged in a matrix of 10 rows (strokes) and 8 columns (bits). A diode must be in series with all switches; anode to the column (bit) line, cathode to the row (stroke) line.

(2) GSI Board (located in card rack):

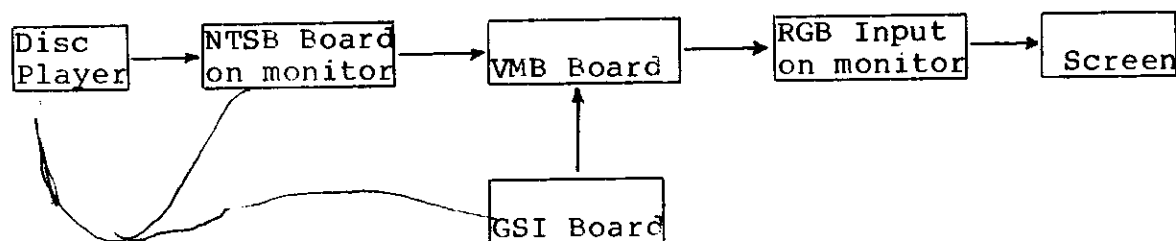
Graphics and Sound Interface Board:

- . Generates non-disc graphics and sound.
- . Reads the frame number from the disc and feeds that information to the ZPU Board.
- . Provides an interrupt to the ZPU Board when the disc player is in search mode (INT).
- . Provides an interrupt to the ZPU Board each time it reads a frame number on the disc.
- . Had dual audio amps for stereo sound.
- . Has volume controls.
- . Provides switching signal to VMB Board. B-Y and R-Y signal the VMB Board to switch from disc player graphics to GSI generated graphics. They are analog signals, when the signals are negative, disc player video is on the screen, when the signals are positive, GSI graphics are on screen. (With Analog signals ground = positive).

(3) VMB Board (located on side of cabinet behind monitor):

Video Multiplexer Board:

The VMB board is a video matrix board which acts as a matrix switch. It controls what video will be on the screen, disc player video or GSI generated video. The switching signal comes from the GSI Board (see explanation of GSI Board).



- (4) RFB Board:
Rectifier and Filter Board
Provides +12 VDC unregulated at 2 amps for audio amps on GSI Board.
- (5) UIB Board (Located on front wall of cabinet below control panel):
Universal Interface Board
The UIB Board is the diode board fro the switch matrix. All switches except ZPU switches go through this board.
- (6) CRF Board (Located in cage):
This is the R.F. Filter Board for the logic system, as well as providing static protection for the system.
- (7) PS1200:
Provides voltages for the logic boards. This system is using:
+5 VDC +/- .20
+12 VDC
-5 VDC