

**RDI**

*Video Systems* <sup>TM</sup>

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**OPERATION / SERVICE  
MANUAL**

*Chayer's Quest*

**THAYER'S QUEST**

**OPERATION MANUAL**

A Conversion Kit for Dragon's Lair and Space Ace Games

**RDI VIDEO SYSTEMS**

**AUGUST 31, 1984**

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## 1.0 GENERAL INFORMATION

### 1.1 GENERAL AND SAFETY INFORMATION

Thayer's Quest is a conversion kit specifically designed for use in Dragon's Lair and Space Ace games (manufactured by Cinematronics, Inc.). This conversion kit makes use of a significant amount of componentry already in these games. PLEASE RETAIN ALL OPERATION MANUALS AND OTHER APPLICABLE DATA FOR THESE GAMES. They may be needed should these components require servicing or adjustment.

RDI Video Systems does not recommend nor authorize any substitute parts or modifications to the equipment contained within this kit. Alterations may affect performance, safety, or void warranty. When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or which have the same characteristics as the original part.

### 1.2 RF INTERFERENCE

Cable harness placements and ground strap routing on your original game have been designed to keep RF radiation and conduction within levels accepted by FCC regulations. To maintain these levels, reposition harnesses and reconnect ground straps to their original placements if they should be disconnected during maintenance.

### 1.3 IMPORTANT !!!!!!!!!!!!!

DUE TO THE NATURE OF THIS INTERACTIVE ADVENTURE, IT IS ESSENTIAL THAT THE GAME PLAYER HEAR THE CONVERSATIONS IN THE GAME CLEARLY. THEREFORE, YOU MUST TURN THE VOLUME CONTROLS UP HIGHER THAN FOR MOST GAMES. IN ADDITION, COPIES OF THE ENCLOSED GAME INSTRUCTIONS SHOULD BE MADE AVAILABLE TO THE GAME PLAYERS, IN ORDER TO PROVIDE VALUABLE INFORMATION REGARDING THE GAME FEATURES AND PLOT. WE RECOMMEND MAKING COPIES AVAILABLE IN THE GAME'S IMMEDIATE VICINITY, OR ELSE AT AN INFORMATION CENTER FOR THE ARCADE (IF ONE EXISTS). COPIES CAN ALSO BE PUT UP IN AREAS WHICH RECEIVE HIGH TRAFFIC, SUCH AS A WALL NEAR THE ENTRANCE TO THE ARCADE. FAILURE TO OBSERVE AND FOLLOW THESE RECOMMENDATIONS WILL RESULT IN THE PLAYER'S LACK OF UNDERSTANDING OF THE GAME AND LIMIT EARNINGS POTENTIAL.

## 2.0 GAME SET UP

### 2.1 INSPECTION AND UNPACKING

Prior to assembly, please perform a brief inspection to help insure that your new kit was delivered to you in good condition. We suggest the following:

1. Check the shipping carton for damage. This may indicate internal damage.
2. Carefully unpack and inspect the contents of the carton. The following items should be enclosed (Refer to Figure 1):
  - Circuit Board Module
  - Control Panel Assembly
  - Fluorescent Lamp Fixture and Bulb
  - Upper Marquee with Decal
  - Laser Videodisc with Jacket
  - Coaxial Cable, RCA to RCA
  - Keyboard Cable, 4 Conductor
  - Adhesive-backed cable ties (6 sets)
  - Left Side Panel Decal
  - Right Side Panel Decal
  - Display Panel Decal
  - Instruction Sheet Brochure (10 each)
  - Instruction Sheet Master (2 Each)
  - Full Color Wall Poster (2 Each)
  - Operations and Maintenance Manual
3. Make sure that all socketed integrated circuits are firmly seated.
4. Make sure all nuts, bolts and fasteners are secure.

### 2.2 ASSEMBLY INSTRUCTIONS

Make sure that the arcade cabinet remains unplugged at all times during assembly. Remove the cabinet rear panel by unlocking it and lifting it out of place.

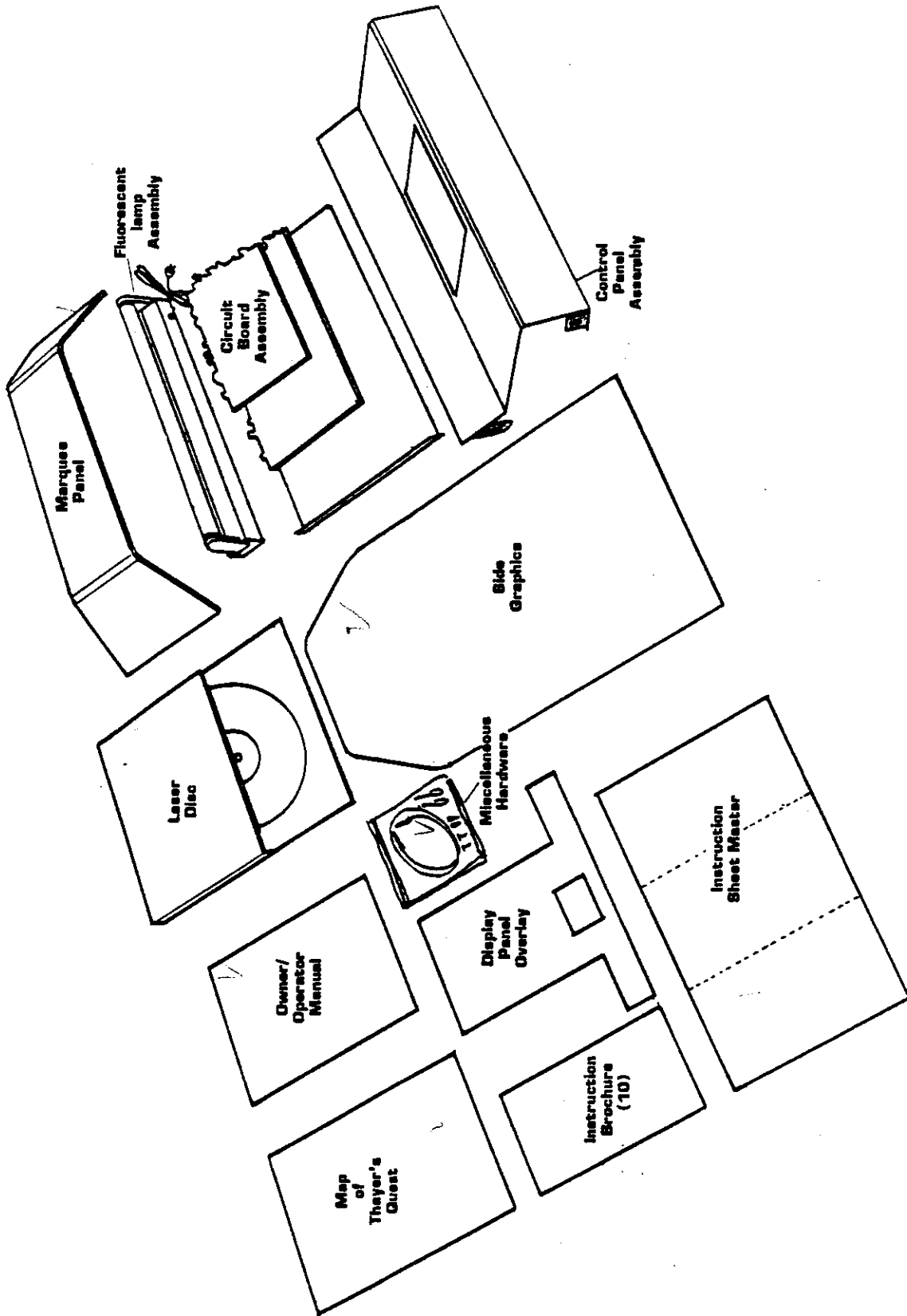


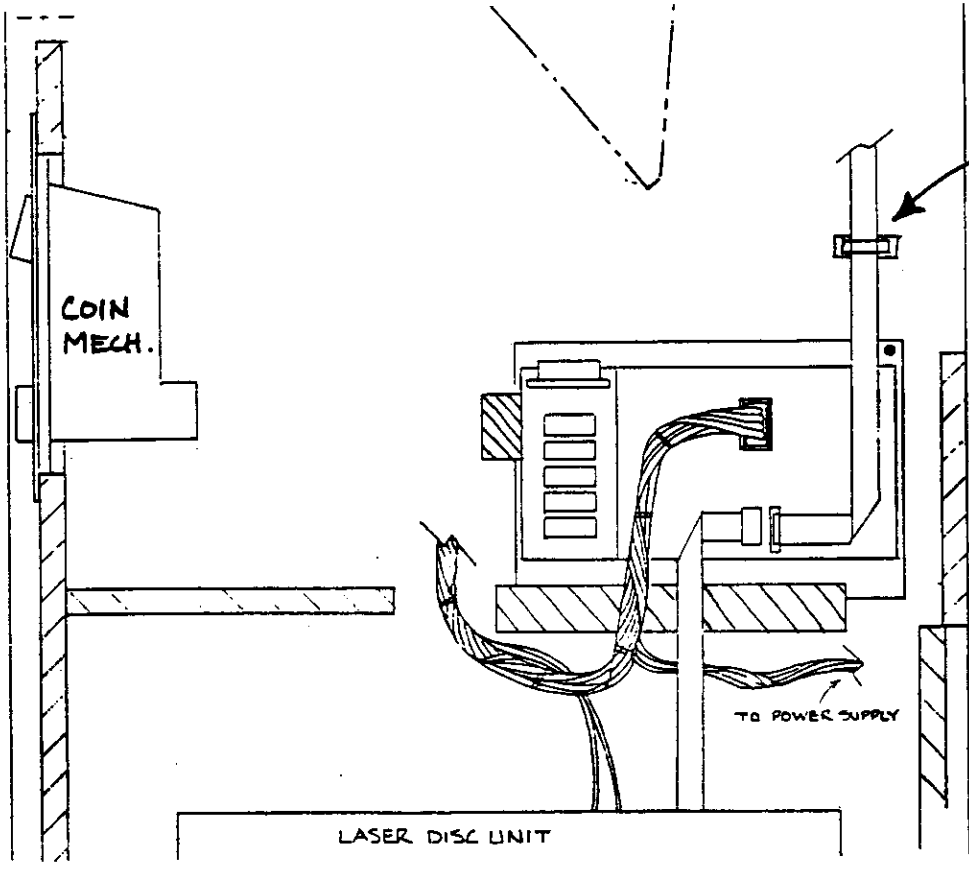
FIGURE 1

### 2.2.1 CIRCUIT BOARD MODULE

Note: Some Space Ace games have an additional small circuit board called a "Panel Annunciator Board" (See Figure 3). This board is usually mounted near the mainboard assembly, and connects with the control panel, the LED display panel and the mainboard. Locate the flat cable going to the mainboard, and disconnect it at the mainboard. The three remaining cables connected to the "Panel Annunciator Board" (at J2, J3, and J4) should be disconnected, and the board removed. Finally, remove the 36 pin main harness extension cable. Proceed with the instructions below, but omit Step 1 and 2.

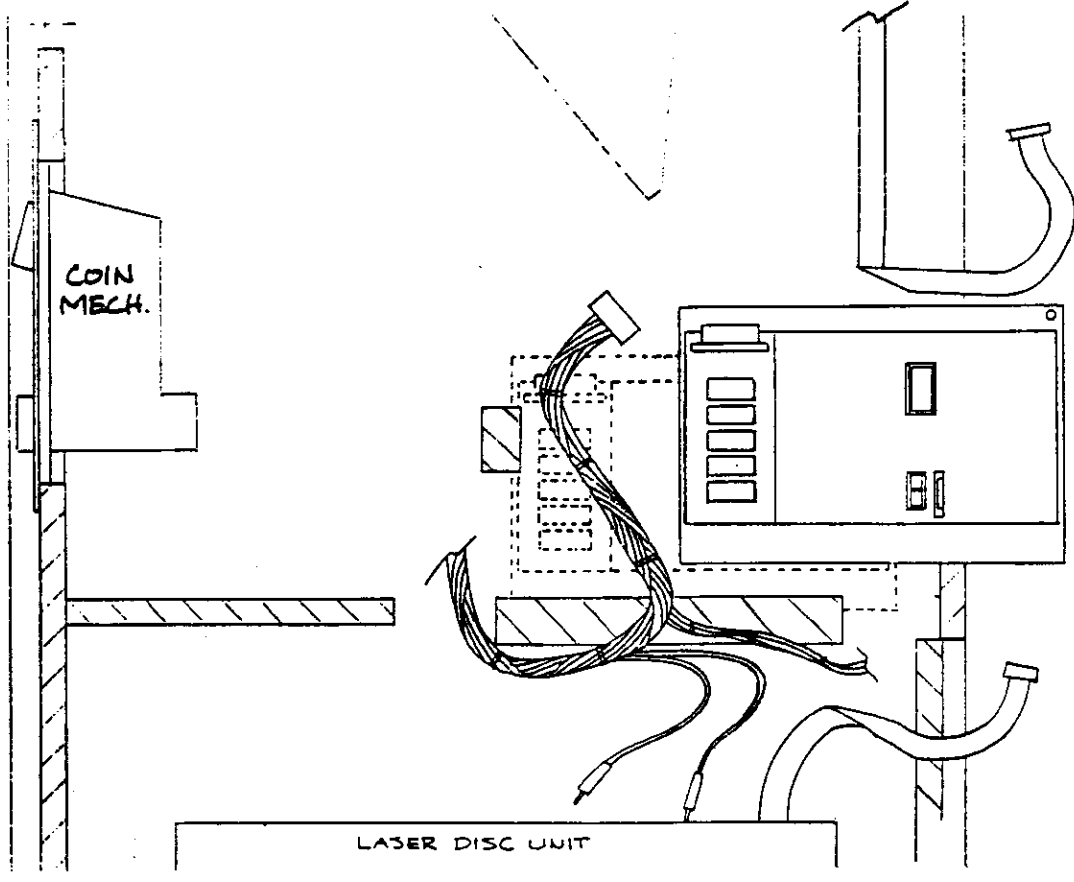
1. Using Figure 2 as a reference, locate the block connector that mates the main wiring harness with the old main circuit board on the right hand side of the cabinet (as viewed from the rear). Pull firmly, but carefully, to separate the plug from the jack.
2. Locate the ribbon cable that connects the LED display board to the main circuit board. Disconnect this cable at the main board end by grabbing the cable firmly at the connector and wiggle it as you pull it off.
3. Locate the ribbon cable that leads to the laser disc player. Remove this from the mainboard by inserting the blade of a small flat bladed screwdriver between the plug and the socket and carefully prying the two apart.
4. Remove the wood screw that holds down the main board mounting plate. It is located in the upper-rear most corner of the plate and may also ground a ring lug to the plate. Save this screw.
5. Remove the mainboard assembly from the cabinet.

A.



CABLE MOUNT MAY NEED TO BE MOVED - SEE TEXT

B.



UNPLUG THREE CABLES AND REMOVE MAIN BOARD ASSEMBLY

FIGURE 2



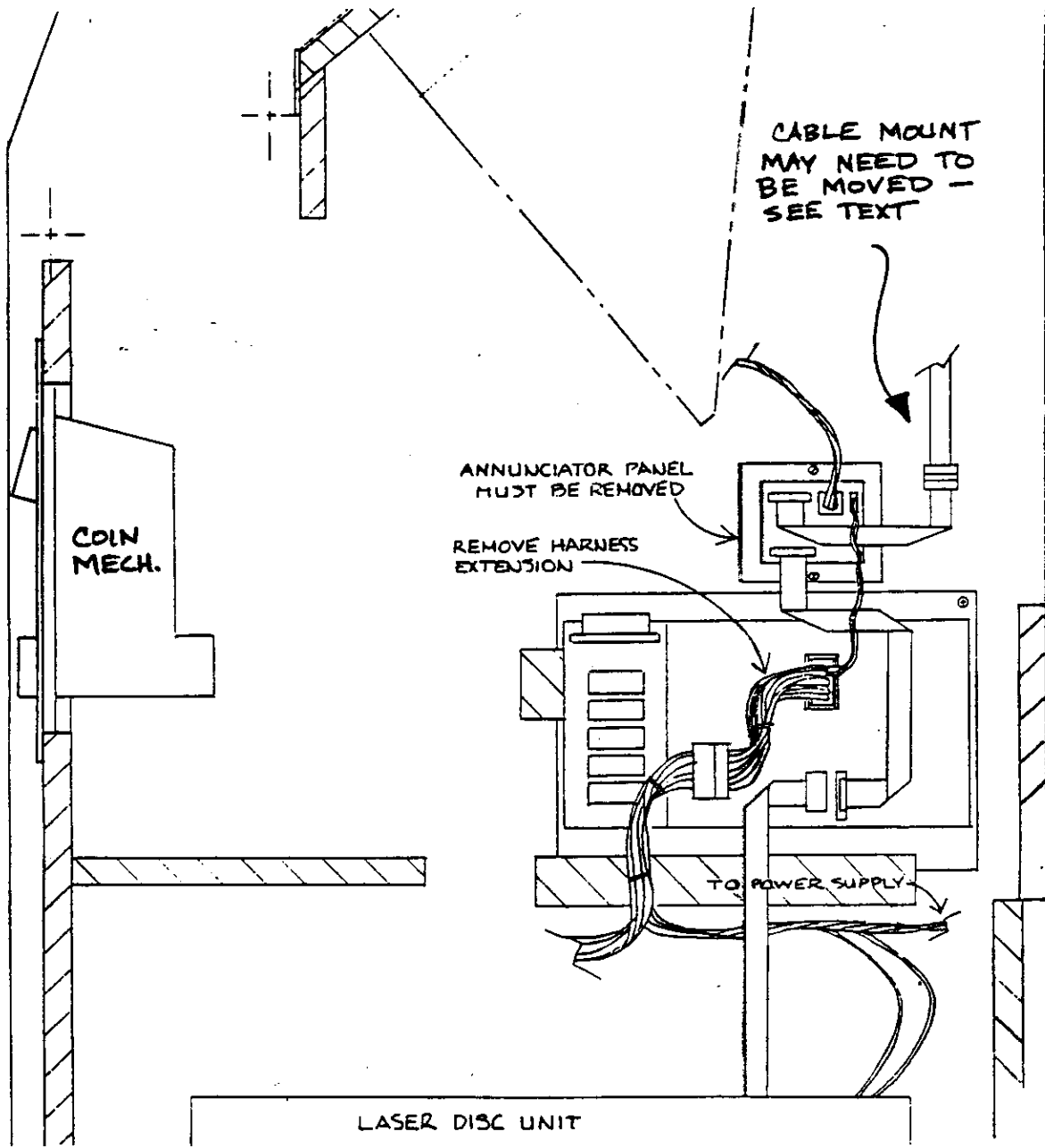


FIGURE 3

6. Install the new circuit board module in the same wooden guides as before (See Figure 4). Note that two edges of the metal mounting plate are flat. These edges slide into the wooden guides. If necessary, relocate the lowest display panel cable mount so it does not interfere with the new module. Remove the screw and position it a few inches above the top edge of the metal panel.
7. Remount the woodscrew and grounding ring lug to the plate and cabinet wall.
8. Reinstall the main harness, LED display panel and laser disc control cable connectors to the appropriate mating connectors on the I/O board of the circuit board module. Please note polarity of the connectors.
9. Locate the RCA cable that plugs into the right channel audio output of the laser disc player. Remove this cable from the player and plug it into the jack marked "R OUT" on the I/O board.
10. Repeat this procedure for the left channel cable; plug it into the jack marked "L OUT" on the I/O board.
11. Locate the dual RCA-to-RCA cable supplied. Plug one end of this cable into the right and left audio jacks of the laser disc player. Plug the respective ends into the "R IN" and "L IN" jacks on the I/O board.
12. Locate the remaining cable supplied. One end of the cable mates with a 4 pin PC mounted connector on the CPU board (bottom board) of the board module. Coil the loose end of the cable and set it on the shelf next to the coin box for now.

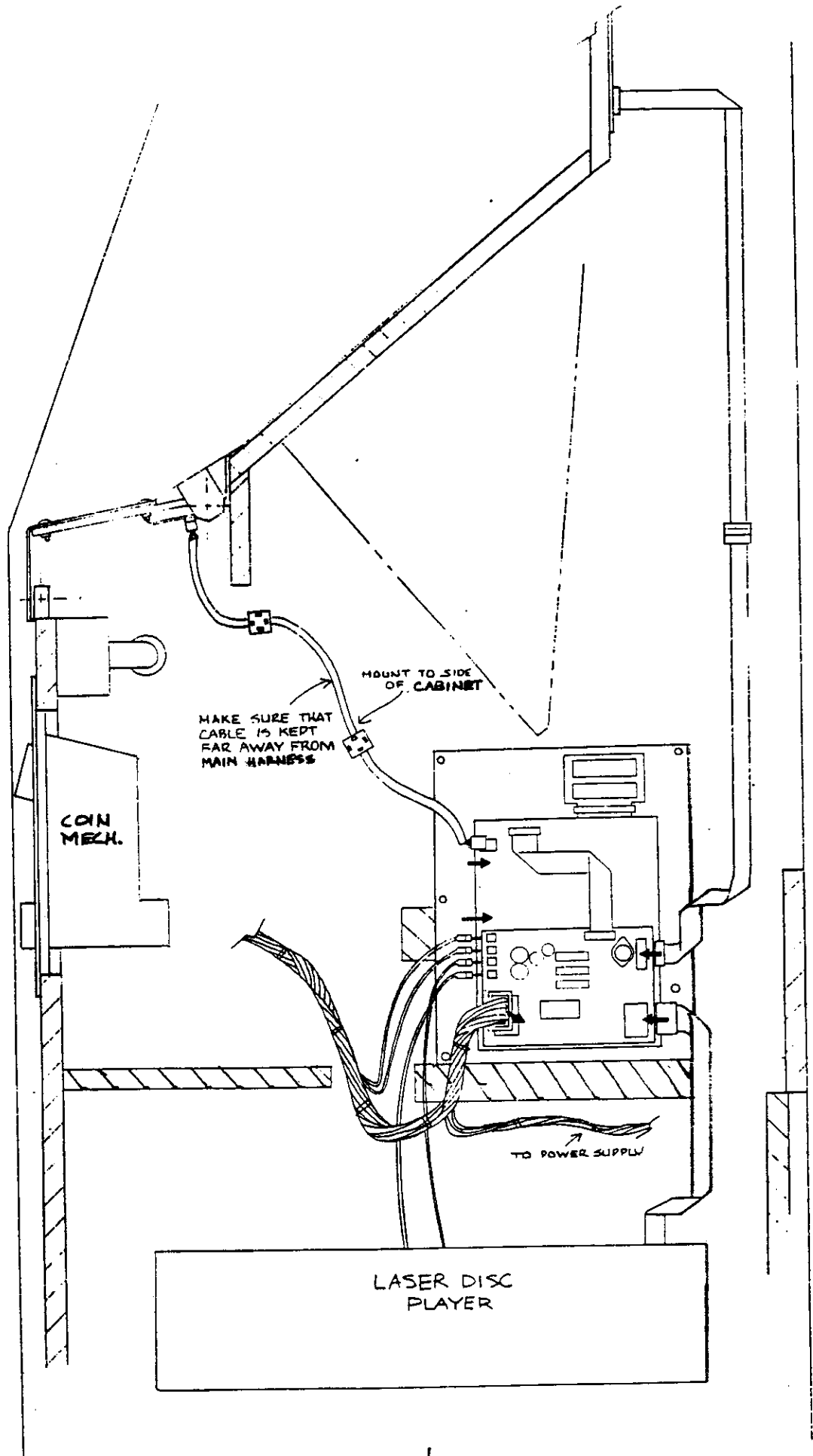


FIGURE 4

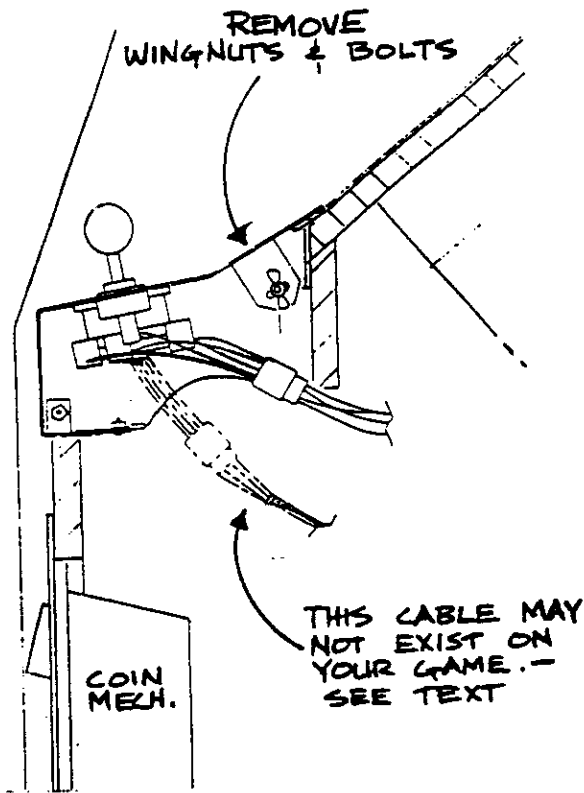
### 2.2.2 CONTROL PANEL REMOVAL

1. Open the coin door and locate four bolts which mount the control panel to the cabinet (See Figure 5). Remove the two wingnuts mounted on the bolts nearest the rear of the cabinet, and pull out the bolts. Keep the washers, noting their placement.
2. Pull the joystick back so that the control panel swings toward you. Disconnect the control panel cable harness from the main harness. For some Space Ace games, a second cable harness may need to be disconnected from the control panel.
3. Remove the remaining two nuts, washers and bolts and completely remove the control panel.

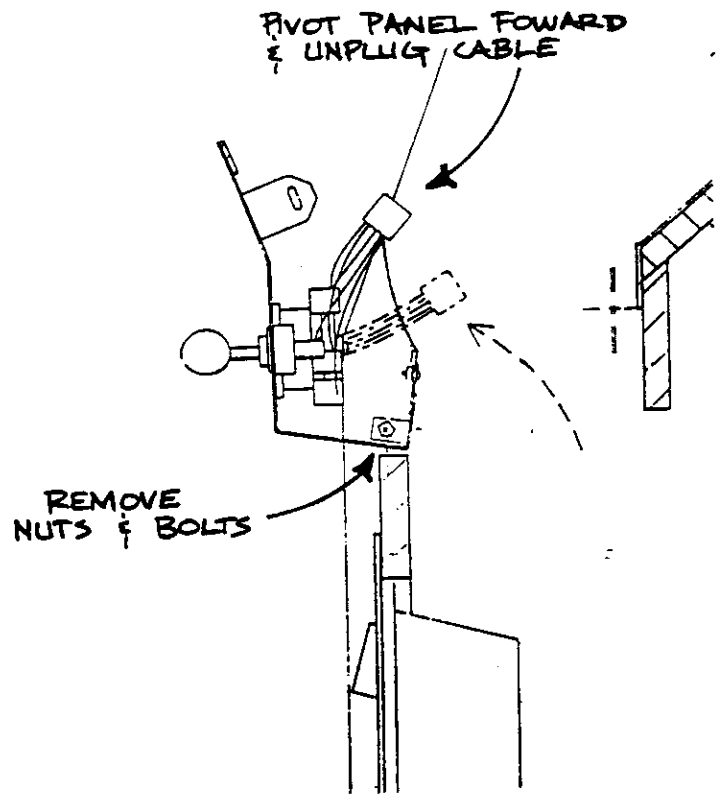
NOTE: DO NOT INSTALL THE NEW CONTROL PANEL BEFORE APPLYING THE SIDE DECALS.

### 2.2.3 FLOORESCENT LAMP FIXTURE

1. Locate the fluorescent lamp fixture and pop off the cover plate. Position this fixture on the inside of the cabinet front wall, directly above the coin mechanism door as indicated in Figure 6. Make sure that the power cord protrudes from the bottom left side of the fixture (as viewed from the front of the cabinet). Use the supplied wood screws to mount the fixture after threading the left screw through the green ground wire's ring terminal and the included star washer as depicted in Figure 6.
2. Route the lamp fixture power cord down along the left side of the coin door, under the door to the right side of the cabinet, and back along the wall so it ends near the top of the wall-mounted power supply module. Anchor this cable in place with four of the supplied adhesive-backed cable mounts. Disconnect the four pin plug from the power supply PCB and plug it into the mating connector on the end of the lamp's power cord. Connect the remaining four pin plug of the power cord to the power supply PCB.

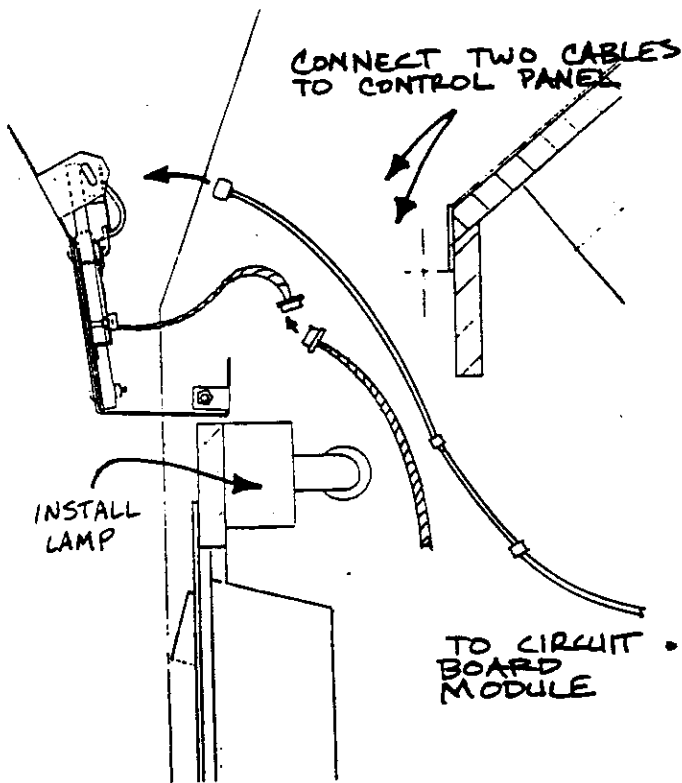


A.



B.

C



D.

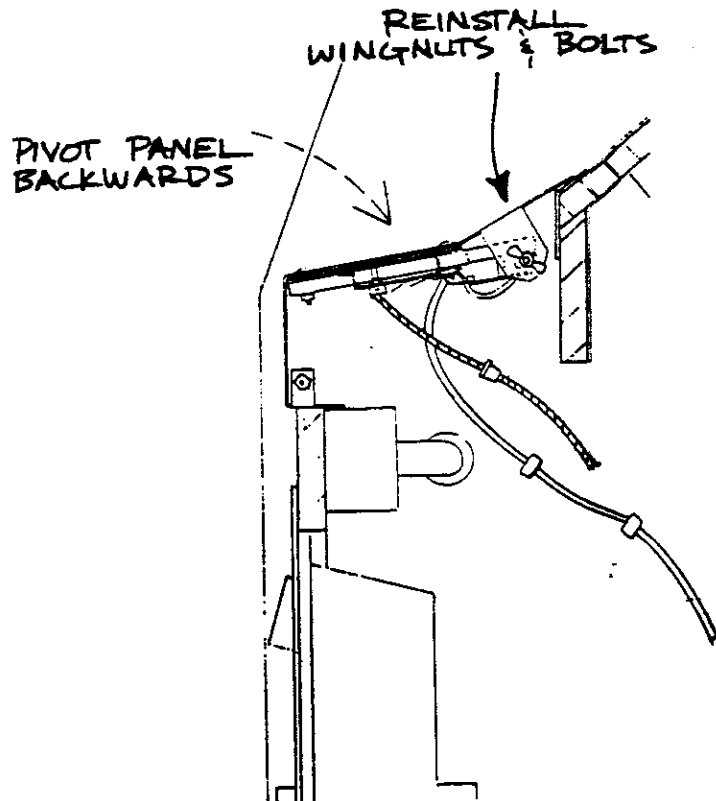


FIGURE 5

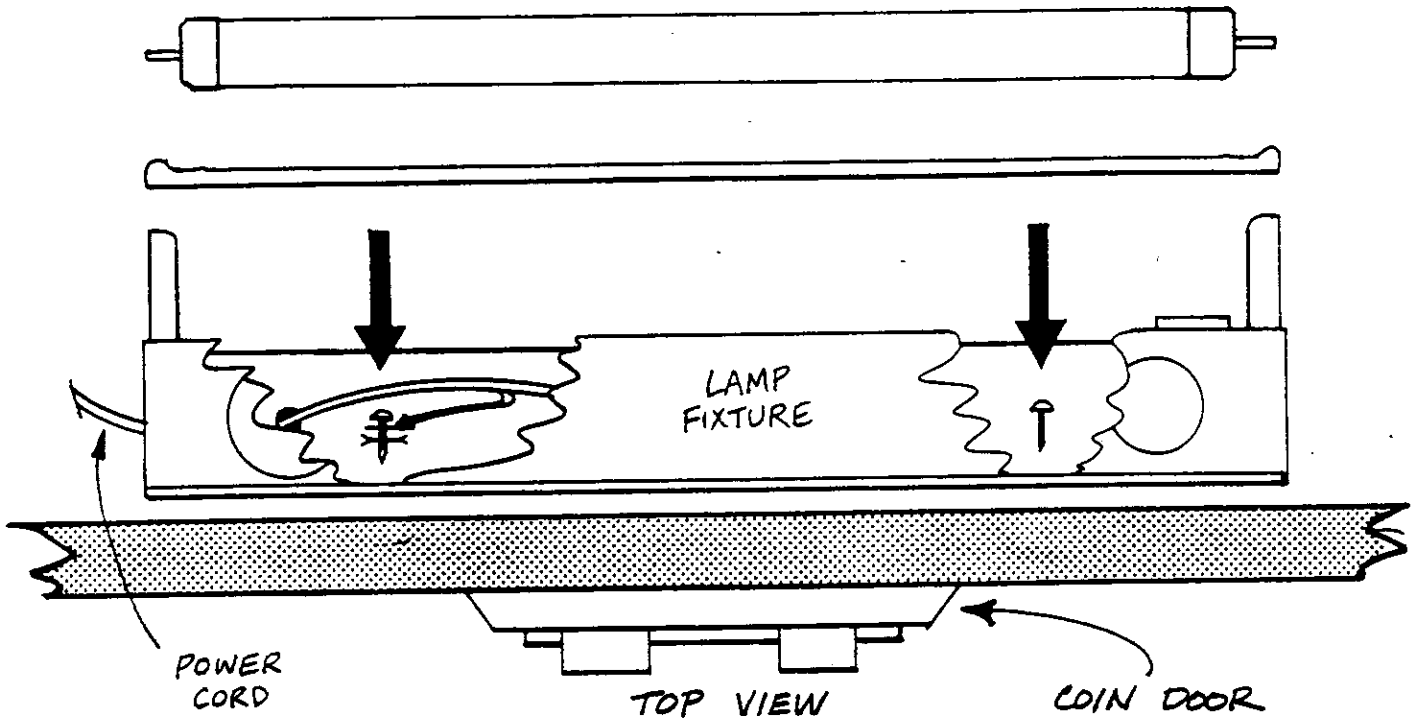


FIGURE 6

3. Remove the hex nut and washer holding down the top edge of the power supply module to the mounting plate. Slip the ground wire ring terminal over the bolt and reinstall the nut and washer.

#### 2.2.4 DECALS

Decals are supplied for both sides of the existing cabinet and the LED display panel. When applying these, take care to insure that two sticky sides do not touch each other.

1. Before applying the side panel decals, position them so they completely cover the existing artwork and make small alignment marks on the cabinet with a pencil. Lightly spray the side of the cabinet with a soapy water solution. Peel off the decal backing, position the decal on the panel, and press in place. Spray the decal front and use a rubber squeegee to remove any air bubbles. Finally, use a pencil or other sharp object to punch four holes through the decal for the control panel bolts.
2. The display panel overlay should be positioned to cover the entire display except for the two digits of "CREDIT". Peel off the backing and adhere the decal so that the credit digits are visible through the "TIME" window as depicted in Figure 7.

#### 2.2.5 CONTROL PANEL INSTALLATION

1. Locate the Thayer's Quest control panel and mount the two front-most nuts, washers and bolts, leaving the control panel in the "swung open" position.
2. Connect the control panel harness to the main harness connector.

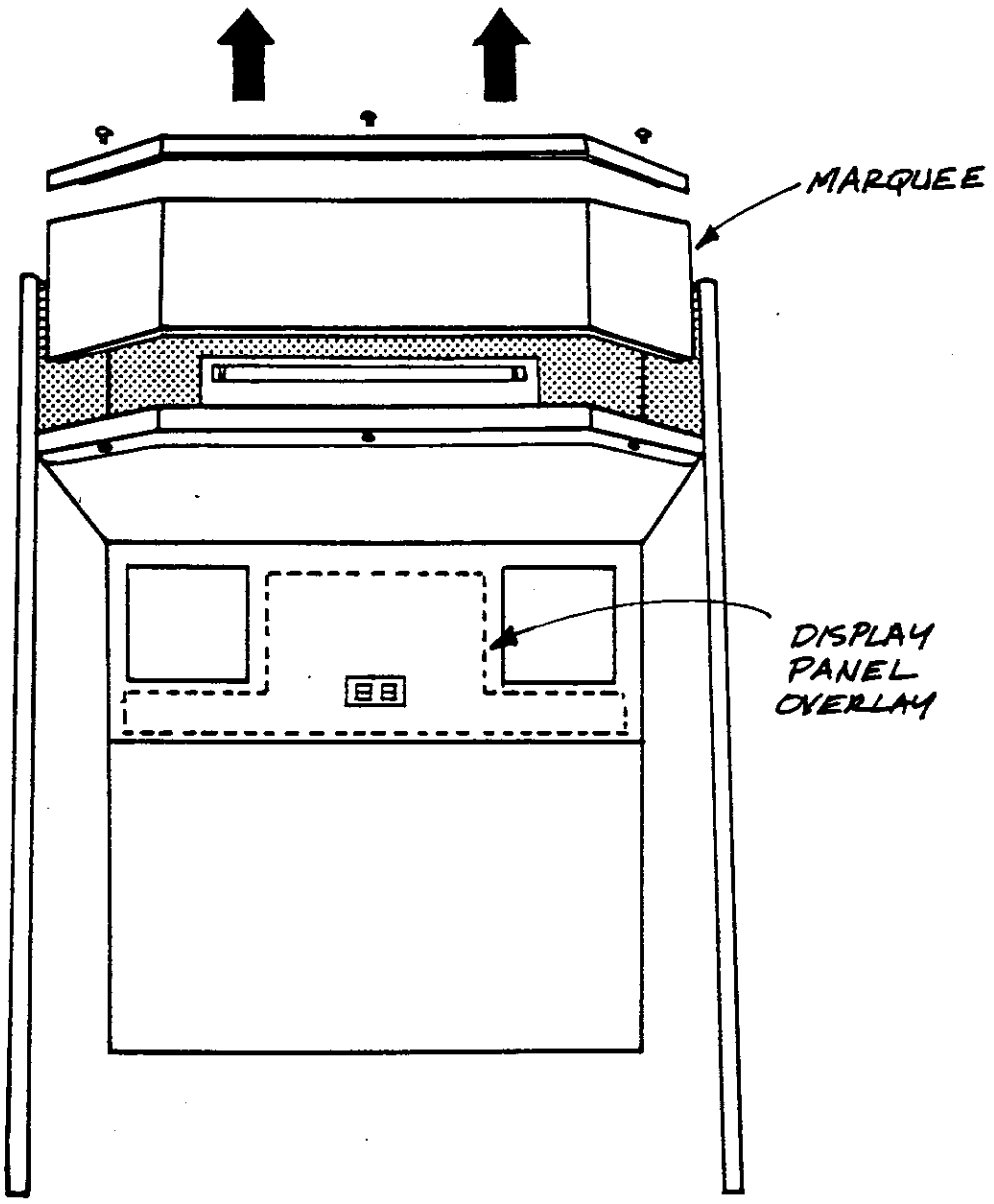


FIGURE 7



3. Connect the cable installed in step 12 of the CIRCUIT BOARD MODULE section to the small circuit board under the keypad. Use two of the supplied adhesive-backed cable ties to route this cable along the cabinet side wall at least one inch from the existing main harness. DO NOT TIE THIS CABLE TO THE MAIN HARNESS - THIS WILL RESULT IN AUDIO DISTORTION.
4. Pop the fluorescent lamp fixture cover back in place and install the bulb with a twisting motion.
5. Swing the control panel shut and mount the remaining two wingnuts, washers and bolts.

NOTE: DO NOT INSTALL THE NEW CONTROL PANEL BEFORE APPLYING THE SIDE DECALS.

#### 2.2.6 MARQUEE

1. Refer to Figure 7 as you remove the three screws which fix the top marquee retainer strip to the cabinet.
2. Remove the retainer strip and marquee.
3. Insert the new marquee.
4. Remount the retainer strip and screws.

This completes the installation of the arcade modification kit.

Refer to Section 3 regarding operator controls and laser disc installation before applying power to your unit.

### 3.0 GAME OPERATION

#### 3.1. POWER REQUIREMENTS

Your kit and the game you are converting require 115 VAC 60 HZ for proper operation. To prevent shock and/or damage to electronic components, this game MUST be grounded. Use a properly grounded outlet and do not use a "cheater plug" or other ground defeating device.

#### 3.2 OPERATOR CONTROLS

Thayer's Quest makes use of several existing controls already in your original game. Their function is repeated here for convenience.

3.2.1 ON/OFF Switch: This switch is mounted on the rear of the cabinet next to the AC input receptacle. Pull the switch out to turn on the game. NOTE: Some newer games have a back door activated interlock switch.

3.2.2 COIN COUNTER: Mounted on the operator convenience panel behind the coin door, this mechanism is software controlled and increments one count for each coin accepted.

3.2.3 VOLUME: Two volume controls, one for the left channel and one for the right, adjust the game's stereo sound. These controls are mounted immediately below the coin counter on the operator convenience panel.

IT IS IMPERATIVE THAT THE VOLUME CONTROLS ARE SET AT A LOUD LEVEL, SO THAT GAME PLAYERS CAN HEAR AND UNDERSTAND THE DIALOGUE DURING THE GAME. FAILURE TO DO SO WILL RESULT IN POOR EARNINGS POTENTIAL.

3.2.4 COVER-OPEN Switch: This switch allows access to the laser disc and is located on the player's front panel. Laserdisc player power must be on and the player in the reject position before this switch can operate.

In addition, the following new controls are available:

3.2.5 RESET Switch: Located on the I/O board (the smaller PCB of the circuit board module). This momentary push button switch, when depressed, initializes the Z80 processor.

3.2.6 DIP Switches: Located on the arcade I/O board. The function of these switches is discussed in Section 3.3.

3.2.7 HEADPHONE VOLUME CONTROL: Located on the control panel, this control is available to game players who want to plug Walkman-style headphones into the headphone jack for private listening. This volume control is independent of the volume controls mounted in the operator convenience panel.

### 3.3 GAME OPTION SETTINGS

The following game options are controlled by dip switches arrays A and B on the top board of the circuit board module (I/O Board).

- a. Length of game time per credit: Switches A1-A3
- b. Number of coins required prior to game start: Switch A4
- c. Number of lives per game: Switch A5
- d. Attract mode audio control: Switches A6 and A7
- e. Self-diagnostics: Switch B1
- f. Videodisc player model selection: Switches B4 and B5

Three time "units" are awarded for each coin inserted. However, the length of playing time per unit is adjustable by the operator. Note below that time is given in seconds per coin.

<u>Switch Combination</u>			<u>Time Per Coin (1 Coin = 3 Units of Time)</u>
<u>A3</u>	<u>A2</u>	<u>A1</u>	
Off	Off	Off	110 Seconds
Off	Off	On	95 Seconds
Off	<b>On</b>	Off	<b>80 Seconds</b>
Off	On	On	70 Seconds
On	Off	Off	60 Seconds
On	Off	On	45 Seconds
On	On	Off	30 Seconds
On	On	On	Free Play

- A4** Off = one coin required for start of game  
 On = two coins required for start of game

NOTE: In both cases 3 units of time are awarded per coin.

- A5** Off = 3 lives per game  
 On = 5 lives per game
- A6** Off = attract mode audio enabled per setting of A7  
 On = attract mode audio muted
- A7** Off = attract mode audio always on  
 On = attract mode audio plays only one out of eight times
- A8** Not used

Suggested switch settings are indicated by **BOLD PRINT**.

- B1 Off = normal game play mode  
On = self diagnostics mode
- B2 Not used
- B3 Not used
- B4 Off = LDV-1000 player On = PR-7820 player
- B5 Off = LDV-1000 player On = PR-7820 player

NOTE: B4 and B5 must BOTH be off or on.

- B6 Not used
- B7 Not used
- B8 Not used

### 3.4 VIDEODISC PLAYER CARRIAGE MECHANISM

The game you are converting may have one of two videodisc players: Pioneer PR-7820 or LDV1000. The carriage mechanism on either disc player MUST be locked in place during shipping or moving. An unlocked carriage may result in disc player alignment problems. Since your old game may be subject to moving in the game conversion process, please take note of the following instructions.

#### 3.4.1 Pioneer PR-7820: (Tan Player Enclosure):

After the game cabinet is in the desired location, unlock the carriage mechanism on the disc player by inserting a small flathead screwdriver into the hole just below the cover on the front of the left side of the disc player. Turn the screw counterclockwise until it releases. The carriage mechanism is now free; the disc player is ready to operate.

### 3.4.2 Pioneer LDV-1000: (Black Player Enclosure)

The locking screw for the carriage is located inside this player. After the game is in the desired location, momentarily turn the power on and press the COVER-OPEN switch to open the disc player cover. Located on the right side of the disc cavity is a large 3/8" flathead screw. Remove this locking screw and its washer plate, and save them, along with the lens cap. The disc player is now ready to operate.

ALWAYS SECURE THE CARRIAGE MECHANISM PRIOR TO SHIPPING OR MOVING THE GAME.

## 3.5 LASERDISC INSTALLATION

Turn the power on momentarily and press the COVER-OPEN switch to open the disc player. The cover should open as soon as the disc is in reject position.

### 3.5.1 Pioneer PR-7820:

Turn the power off. Data-side (reflective) up, set the laserdisc on the spindle of the player. Press the "Lock" buttons on the spindle to hold the disc in place. Close the cover of the disc player.

### 3.5.2 Pioneer LDV-1000:

Turn the power off. Data-side (reflective) down, set the laser disc onto the spindle of the player. Close the cover of the disc player to automatically lock the disc in place.

DO NOT OPERATE EITHER DISC PLAYER UNTIL THE DISC IS LOCKED ONTO THE SPINDLE.

### 3.6 POWER UP

After assembly, setting game play switches, unlocking laser disc play carriage and installing the laser disc, replace the back panel and plug in the game. Pull out the ON/OFF switch in the back. Immediately on power up, the system will say "Thank You. Initializing system." (check the volume controls). At this time, the disc player is in the reject position. After 15 seconds "Disc spinning up. Please wait." will be heard indicating that the disc has begun to play.

### 3.7 COIN OPERATION

One coin awards the game player with three "units" of playing time. The actual amount of playing time per coin can be set by the operator as described in Section 3.3. The number of time units remaining is displayed in the LED display above the CRT monitor. The number of units remaining decrements at a regular rate as time passes. Bonus time units are awarded for good performance. Additional coins may be inserted during a game to extend the duration of that game. See Section 3.3 for further information.

### 3.8 GAME PLAY AND PLAYER CONTROLS

Thayer's Quest is an adventure in high fantasy in which the player controls the actions of apprentice wizard Thayer Alconrad as he searches for the lost relics of Quoid (pronounced "Quode").

The player chooses where Thayer goes and what he does by entering choices on the keypad. Most choices will appear on the screen at the end of each scene. The player enters his choice by pressing one of the large numbered keys.

Additional choices MAY be available to the player which are not listed on the screen. There are 22 keys corresponding to 22 items which the player may acquire and use during the course of the game.

**NOTE:** The Great Circlet, the Medallion, the Crown, the Shield and the Amulet are found in Thayer's Quest II, coming fall 1984. These keys are included to facilitate conversion. If the player presses one of these keys, the system will say: "That item is not here."

If the player is in the appropriate place to acquire an item, he must press the key corresponding to that item. This item will now be added to the player's inventory. A Player may always check his inventory by pressing the ITEMS key. A player may drop an item at any time by pressing the DROP ITEM key. The system will ask which item the player wishes to drop. The player responds by pressing the appropriate item key.

A player may use an item in his inventory, if appropriate. Again, this choice will NOT appear on the screen. The player may use an item by pressing the key corresponding to that item. Using an item may result in the removal of that item from the player's inventory.

Items may be used to overcome enemies or obstacles, or - occasionally - to acquire other items.

**Example:** The player must use the Orb of Quoid to acquire the Coins. When the player reaches the scene containing the Coins, he presses the Orb of Quoid key. (This option does NOT appear on the screen.) The animation shows the Orb glowing, and the Coins floating into Thayer's sachel.

Thayer may be wounded and healed at various locations in the game. Wounding affects the player's carrying capacity and his ability to withstand further wounds. Additional wounds may result in the loss of a life, and often require starting from the beginning of the adventure.



Certain locations are designated as places of healing. Healing restores Thayer to full health and strength.

Thayer begins the game with three or five lives (operator selectable). When Thayer dies, he will be reincarnated at a location nearby. After the last death, the players must begin the game over again.

NOTE: Beginning the game does not require additional coins as long as there are time units remaining.

When the player reaches the Cloud Keep, a timer will start. Feldon, Keeper of the Clouds, asks for the return of the Golden Chalice "before the sands run out." The player has approximately four minutes to find the Chalice and return it to Feldon, or else he will lose a life and have to begin the game again.

Normally, the player has plenty of time to enter a decision. However, at certain times (in life-threatening situations), the decision must be made quickly, or the system will automatically go to another scene - usually a death or wound will occur.

A successful player will have to remember all the clues he receives throughout the adventure. If the player misses a clue, he can review a scene again by pressing the REPLAY key.

A player can always hear his score by pressing the SCORE key.

Thayer's Quest contains a speech synthesis chip and artificial intelligence which allows the system to call the player by name and remember up to ten games in progress.

When the player activates the machine, the system will ask him to spell his name on the keyboard. The player may enter first and last names by using LETTER and SPACE keys. The system will repeat the player's name, asking if the player "likes the sound of that." If the system's pronunciation is correct, the player presses YES and continues. If not, the player may press NO and can respell his name phonetically. If the player makes a mistake, he presses the CLEAR key and begins again.

NOTE: The player is given 60 "free" seconds to enter his name. After that he may continue to do so, but his time remaining starts decreasing.

If the player wishes to stop playing and have the system remember his game, he may press the SAVE GAME key. The system will remember the last ten games saved (until the power is turned off). When the player returns and enters his name, the system will say it remembers the player and ask if the player wishes to continue where he left off.

Two instruction sheet masters have been included with your Thayer's Quest conversion unit. IT IS ESSENTIAL THAT COPIES OF THESE INSTRUCTIONS BE AVAILABLE TO ARCADE PATRONS. Market tests indicate that arcade patrons not only find the brochures invaluable in acquainting them with Thayer's Quest, but also that they take the brochures home, study them, and show them to their friends. YOUR THAYER'S QUEST UNIT WILL BE MOST SUCCESSFUL IF THE BROCHURES ARE DISTRIBUTED.

#### 4.0 PERIODIC MAINTENANCE PROCEDURES

Very little maintenance is required of the Thayer's Quest kit components.

**Control Panel Keyboard:** Clean the keyboard overlay using a mild detergent and cloth exercising care so that moisture doesn't seep in around the edge and into the control panel.

**Laserdisc:** Clean weekly with a soft cloth and an ammonia based cleaning solution such as Windex. Do not use record cleaning sprays, static prevention sprays, or any cleaner containing alcohol, benzene or other volatile chemicals. Hold the disc by its edges to avoid fingerprints and smudges.

Over a period of time, dust and other airborne contaminants may settle in the volume control potentiometers and affect the headphone and main system audio quality. RDI Video Systems recommends the use of any commercially available contact cleaner spray to clean the affected pot.

For maintenance procedures for original equipment components, please consult the applicable operations manual.

## 5.0 SELF-DIAGNOSTICS

The on-board diagnostics is a set of tests performed on the system's hardware to verify the integrity of the hardware components. Resident in the system's operating system, the diagnostic software routines are initiated by setting the diagnostic switch of the game option switches prior to powering up the system (see Section 3.3).

Once initiated, the diagnostic program will introduce itself with the message "Diagnostic Tests". This phrase is the operator's chance to insure that the voice synthesizer is operating properly. Next, the program cycles through the following tests as indicated by frames on the monitor or they may be individually selected by entering into a menu mode (discussed later).

Exit the diagnostics mode by returning the diagnostics DIP switch of the game option switches back to the OFF position and pressing the reset button on the I/O board.

### 5.1 RAM TEST

Each Ram cell is first loaded with 55 (Hex) and read to insure that all of the cells retained the data. Next, each byte is inverted by loading it with AA (Hex) and verified. If the RAM is operating properly, the system proceeds with the EPROM Test. If a bad cell is found, the system displays "RAM test failed" on the monitor and halts until it receives a reset.

### 5.2 EPROM TEST

The Diagnostic program calculates a 16 bit checksum for each EPROM chip and compares it to the pre-stored correct checksum values. If all of the checksums match, the program proceeds to the next test. If an EPROM fails, the monitor displays "ROM test failed" and the failing chip number is displayed on the digital display.

### 5.3 DIGITAL DISPLAY TEST

The digital displays will then cycle through the digits 0 to 9 pausing briefly between digit changes. Visually verify that all the display units are functioning properly. When all the digits have been verified, press any key on the keyboard to continue onto the next test.

### 5.4 KEYBOARD TEST

The keyboard test verifies each of the keys on the keyboard. As prompted on the monitor, press each key on the keyboard and insure that the speech synthesizer echoes each key correctly. The operator is given approximately two minutes to verify all of the keys on the keyboard. When finished, wait for the remaining time to expire to proceed to the next test.

### 5.5 COMMUNICATIONS LINK TEST

A discussion of this test is currently beyond the scope of this document. Contact the manufacturer if a failure is indicated.

### 5.6 MONITOR TEST

The program will now display a color test pattern or a scene from the game. Adjust the video monitor to satisfaction. The image will stay on the monitor until the diagnostic switch is reset or the zero key is pressed to enter menu mode.

### 5.7 MENU MODE

Menu Mode is initiated by pressing the "M" key during the introductory message, during the EPROM test, during the Communications Link test, or during the Monitor test. Upon entering the Menu Mode, the system will say "Menu mode. Press keys 'A' through 'G' to select a test". Each test will be preceded and followed by the voice synthesizer pronouncing a phrase indicating the beginning and end of the test. If an error is detected during the RAM or EPROM test, an error frame will be displayed.

The following table lists each test and the corresponding key used to select them:

<b>KEY</b>	<b>TEST</b>
A	RAM TEST
B	EPROM TEST
C	DISPLAY TEST
D	KEYBOARD TEST
E	COMMUNICATIONS LINK TEST
F	MONITOR TEST
G	RESTART DIAGNOSTICS FROM BEGINNING

APPENDIX - A

PARTS LIST

DESCRIPTION	PART NO.	QTY	COMMENTS
<b>LASERCADE KIT</b>			
SHIPPING CARTON	421-0008	1	
INSERT, LARGE EPS	421-0009	1	
INSERT, TOP EPS	421-0010	1	
INSERT, PAD EPS	421-0011	1	
INSERT, PAD POLYETHYLENE	421-0012	1	
INSERT, LAMP HOLDER, CORR	421-0014	1	
MAILING TUBE	421-0013	1	
CIRCUIT BOARD MODULE	834-5007	1	
CONTROL PANEL ASSY	834-5006	1	
DISC W/ JACKET THAYER'S QUEST	590-0002	1	
MARQUEE, ASSY	834-5013	1	
DECAL, SIDE PANEL LEFT	420-0009	1	
DECAL, SIDE PANEL RIGHT	420-0010	1	
INSTRUCTION SHEET MASTER	420-0003	2	
DISPLAY PANEL	253-0013	1	
FLUORESCENT LAMP ASSY	834-5016	1	
MAP, THAYER'S QUEST	420-0011	2	
POLY BAG, ASSY	834-5015	1	
BULB, FLUORESCENT	390-0001	1	
ENVELOPE, ASSY	834-5017	1	
<b>CIRCUIT BOARD MODULE</b>			
METAL MOUNTING PLATE	250-0009	1	
CPU BOARD ASSY	834-5003	1	
CABLE ASSY, 50 COND FLAT	600-0007	1	
I/O BOARD ASSY	834-5004	1	
SPACER, HEX, THD, ALUM	280-0006	2	4-40 11/16X1/4 OD
SPACER, HEX, THD, ALUM	280-0007	8	4-40 1/2X1/4 OD
STANDOFF, HEX, THD, NYLON	280-0008	5	4-40 1 1/8X1/4 OD
SCREW MACH PH PHILIPS, ZINC PL	281-0003	2	4-40 5/8
SCREW MACH PH PHILIPS, ZINC PL	281-0002	18	4-40 1/4
LOCK WASHER, INTERNAL STAR	284-0004	18	4
EPROM BOARD ASSY	834-5005	1	
<b>EPROM BOARD ASSY</b>			
EPROM 8KX8 250NS	328-0064	1	2764
SOCKET IC	214-0001	1	DIP 28
CAP CER 0.1MF 50V 20%	151-1005-64	2	
<b>CONTROL PANEL ASSY</b>			
CONTROL PANEL MAIN HOUSING	250-0008	1	
OVERLAY, CONTROL PANEL	253-0014	1	
KEYPAD, 40 KEY DOME MEMBRANE	253-0004	1	
FOAM CUSHION, KEYBD	380-0002	1	
OVERLAY, THAYER'S QUEST KEYBD	253-0011	1	
MOUNTING PLATE, KEYBRD	253-0015	1	
KEYBOARD LOGIC BOARD ASSY	834-5008	1	
JACK STEREO CHASSIS MT W/NUT	209-0003	1	3.5MM
POT LINEAR 100 OHM W/NUT	240-0001	1	
CABLE ASSY, CONTROL PANEL	834-5014	1	



DESCRIPTION	PART NO.	QTY	COMMENTS
WIRE 20 AWG, BLUE, S&T	600-0017	2	3 1/2"
SCREW MACH PH PHILIPS ZINC PL	281-0007	1	6-32 1 1/4"LG
SCREW MACH CAR HD STEEL BK	286-0001	4	10-24 1"LG
NUT HEX ZINC PL STL	283-0002	4	10-24
LOCK WASHER SPLIT ZINC PL STL	284-0002	4	10
FLAT WASHER ZINC PL STL	284-0003	4	10
SPACER, THD, ALUM	280-0013	1	6-32 3/8"LG
LOCK NUT, ZPS, W/NYLON INSERT	283-0003	1	6-32
FLAT WASHER, ZPS	284-0005	1	6
LOCK WASHER, SPLIT, ZPS	284-0006	2	6
TIE, CABLE	280-0009	1	
TAPE FOAM ADHESIVE 1" WIDE	380-0001	1	23"
CPU BOARD ASSY			
Z80A	326-0080-01	1	DIP 40
COP421L-PCA/N	326-0421	1	DIP 40
27256	328-0256	1	DIP 28
2187A	327-2187-01	1	DIP 28
74LS244	323-0244	4	DIP 20
74LS245	323-0245	2	DIP 20
74LS139	323-0139	1	DIP 16
74LS273	323-0273	1	DIP 20
74LS138	323-0138	1	DIP 16
74LS374	323-0374	1	DIP 20
SSI 263	333-0263	1	DIP 24
74LS00	323-0000	1	DIP 14
74LS74	323-0074	2	DIP 14
74LS21	323-0021	1	DIP 14
74LS32	323-0032	5	DIP 14
74LS08	323-0008	2	DIP 14
74LS04	323-0004	1	DIP 14
2N3904	482-3904	4	TO92
LN914	481-0914-02	6	DO35
4.0 MHZ 100PPM	230-0001	1	HC-18U
RES CF 330 OHM 5% 1/4W	470-0331-05	2	
RES CF 1K OHM 5% 1/4W	470-0102-05	4	
RES CF 1.5K OHM 5% 1/4W	470-0152-05	1	
RES CF 2.2K OHM 5% 1/4W	470-0222-05	1	
RES CF 3.3K OHM 5% 1/4W	470-0332-05	1	
RES CF 4.7K OHM 5% 1/4W	470-0472-05	10	
RES CF 10K OHM 5% 1/4W	470-0103-05	3	
RES CF 33K OHM 5% 1/4W	470-0333-05	1	
RES CF 200K OHM 5% 1/4W	470-0204-05	1	
CAP ELECT 47UF 10V 20%	150-4707-14	2	
CAP ELECT 1000UF 10V 20%	150-1009-14	3	
CAP CER 22PF NPO 5%	151-2201-62	2	
CAP CER 100PF 50V 10%	151-1002-93	1	
CAP CER 1000PF 50V 10%	151-1003-93	1	
CAP CER 0.01UF 50V +80-20%	151-1004-45	11	
CAP POLY .01 UF 10% 100V	152-1004-73	1	
CAP CER 0.1UF 50V 20%	151-1005-64	4	
SOCKET IC	214-0002	1	DIP 40
SOCKET IC	214-0001	3	DIP 28
SOCKET IC	214-0003	1	DIP 24
CONNECTOR, PC EDGE	212-0001	1	

DESCRIPTION	PART NO.	QTY	COMMENTS
CONNECTOR 4 PIN MALE PCB MT	212-0004	1	
WIRE 24 AWG, YELLOW, S&T	600-0011	1	3"
WIRE 26 AWG, YELLOW, S&T	600-0013	1	2 1/2"
WIRE 26 AWG, YELLOW, S&T	600-0014	1	4 1/2"
WIRE 26 AWG, YELLOW, S&T	600-0015	1	1 1/2"
I/O BOARD ASSY			
74LS21	323-0021	1	DIP 14
74LS138	323-0138	1	DIP 16
74LS175	323-0175	1	DIP 16
74LS244	323-0244	3	DIP 20
74LS374	323-0374	1	DIP 20
LM2002T01	307-2002	2	TO-220/5
LM324N	300-0324	1	DIP 14
LM386N-1	300-0386	2	DIP 8
7812	311-7812	1	TO-220/3
555	305-0555	1	DIP 8
1N4003	481-4003	2	DO-41
2N5877	482-5877	1	TO-3
2N3904	482-3904	4	TO-92
2N3906	482-3906	1	TO-92
RES CF 2.2 OHM 5% 1/4 W	460-0220-05	4	
RES CF 10 OHM 5% 1/4 W	470-0100-05	2	
RES CF 100 OHM 5% 1/4 W	470-0101-05	1	
RES CF 220 OHM 5% 1/4 W	470-0221-05	5	
RES CF 270 OHM 5% 1/4 W	470-0271-05	2	
RES CF 1K OHM 5% 1/4 W	470-0102-05	4	
RES CF 2.2K OHM 5% 1/4 W	470-0222-05	3	
RES CF 10K OHM 5% 1/4 W	470-0103-05	14	
RES CF 20K OHM 5% 1/4 W	470-0203-05	2	
RES CF 33K OHM 5% 1/4 W	470-0333-05	2	
RES CF 51K OHM 5% 1/4 W	470-0513-05	3	
RES CF 100K OHM 5% 1/4 W	470-0104-05	6	
RES CF 150K OHM 5% 1/4 W	470-0154-05	2	
RES CF 300K OHM 5% 1/4 W	470-0304-05	5	
RES CF 510K OHM 5% 1/4 W	470-0514-05	1	
RES CF 750K OHM 5% 1/4 W	470-0754-05	1	
RES CF 10M OHM 5% 1/4 W	470-0106-05	1	
RES CF 360 OHM 5% 1 W	472-0361-05	1	
CAP CER 1000 PF -20+80% 50V	151-1003-65	2	
CAP CER .005 UF -20+80% 50V	151-5003-65	2	
CAP CER .01 UF -20+80% 50V	151-1004-65	13	
CAP CER .05 UF -20+80% 50V	151-5004-65	2	
CAP CER 0.1 UF -20+80% 25V	151-1005-45	9	
CAP POLY .01 UF 10% 100V	152-1004-73	1	
CAP ELEC 1 UF -10+75% 50V	150-1006-36	6	
CAP ELEC 4.7 UF -10+75% 35V	150-4706-35	2	
CAP ELEC 10 UF -10+50% 25V	150-1007-34	7	
CAP ELEC 47 UF 20% 10V	150-4707-14	1	
CAP ELEC 220 UF -10+50% 16V	150-2208-33	3	
CAP ELEC 220 UF -10+50% 35V	150-2208-35	5	
CAP ELEC 470 UF -10+50% 35V	150-4708-35	4	
DIPSWITCH 8 POSITION	510-0002	2	DIP 16
CONNECTOR 16 PIN ID	211-0004	1	
CONNECTOR 50 PIN ID	212-0003	1	

DESCRIPTION	PART NO.	QTY	COMMENTS
CONNECTOR 36 PIN	212-0002	1	
CONTACT PC MOUNT	208-0001	36	
JACK RCA PC MOUNT	209-0002	4	
SOCKET IC	214-0003	1	DIP 24
SWITCH SPST MOM PC MT	510-0003	1	
HEATSINK	530-0003	2	
HEATSINK	530-0004	1	
SCREW MACH, PH, PHIL, ZPS	281-0006	2	4-40 3/8"LG
LOCK WASHER, INTERNAL STAR	284-0004	2	4
NUT HEX ZPS	283-0001	2	4-40
WIRE, 22 AWG, YELLOW, S&T	600-0023	1	9 1/4"

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 KYBD LOGIC BD ASSY
 

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CD4014B	325-4014-02	1	
CD4017B	325-4017-02	1	
CD4510B	325-4510-02	1	
1N914	481-0914-02	10	
RES CF 10K OHM 5% 1/4 W	470-0103-05	5	
RES CF 100K OHM 5% 1/4 W	470-0104-05	4	
RES CF 1M OHM 5% 1/4 W	470-0016-05	3	
CAP ELEC 47UF -10+50% 16V	150-4707-33	1	
CONNECTOR, FLEXTAIL	211-0001	1	
CONNECTOR, 4 PIN MALE PCB MT	212-0004	1	

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 MARQUEE ASSY
 

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PLEXIGLASS MARQUEE	253-0010	1	
DECAL, THAYER'S QUEST	253-0016	1	

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 FLUORESCENT LAMP ASSY
 

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FIXTURE, LAMP	400-0001	1	
WIRE NUT	280-0012	2	
GROMMET	601-0002	1	
CONNECTOR, 4 COND, RECEP	211-0005	1	
CONNECTOR, 4 COND, PLUG	211-0006	1	
TERMINAL, RING	280-0014	1	6
TERMINAL, RING	280-0015	1	10
CONTACT, MALE CRIMP 16 AWG	208-0002	2	
CONTACT, MALE CRIMP 20 AWG	208-0003	2	
CONTACT, FEMALE CRIMP 20 AWG	208-0004	4	
WIRE, 18 AWG, GREEN, S&T	600-0018	1	72"
WIRE, 18 AWG, WHITE, S&T	600-0019	1	78"
WIRE, 18 AWG, BLACK, S&T	600-0020	1	78"
WIRE, 18 AWG, WHITE, S&T	600-0021	2	4"
WIRE, 18 AWG, BLACK, S&T	600-0022	2	4"
TIE, CABLE	280-0009	4	

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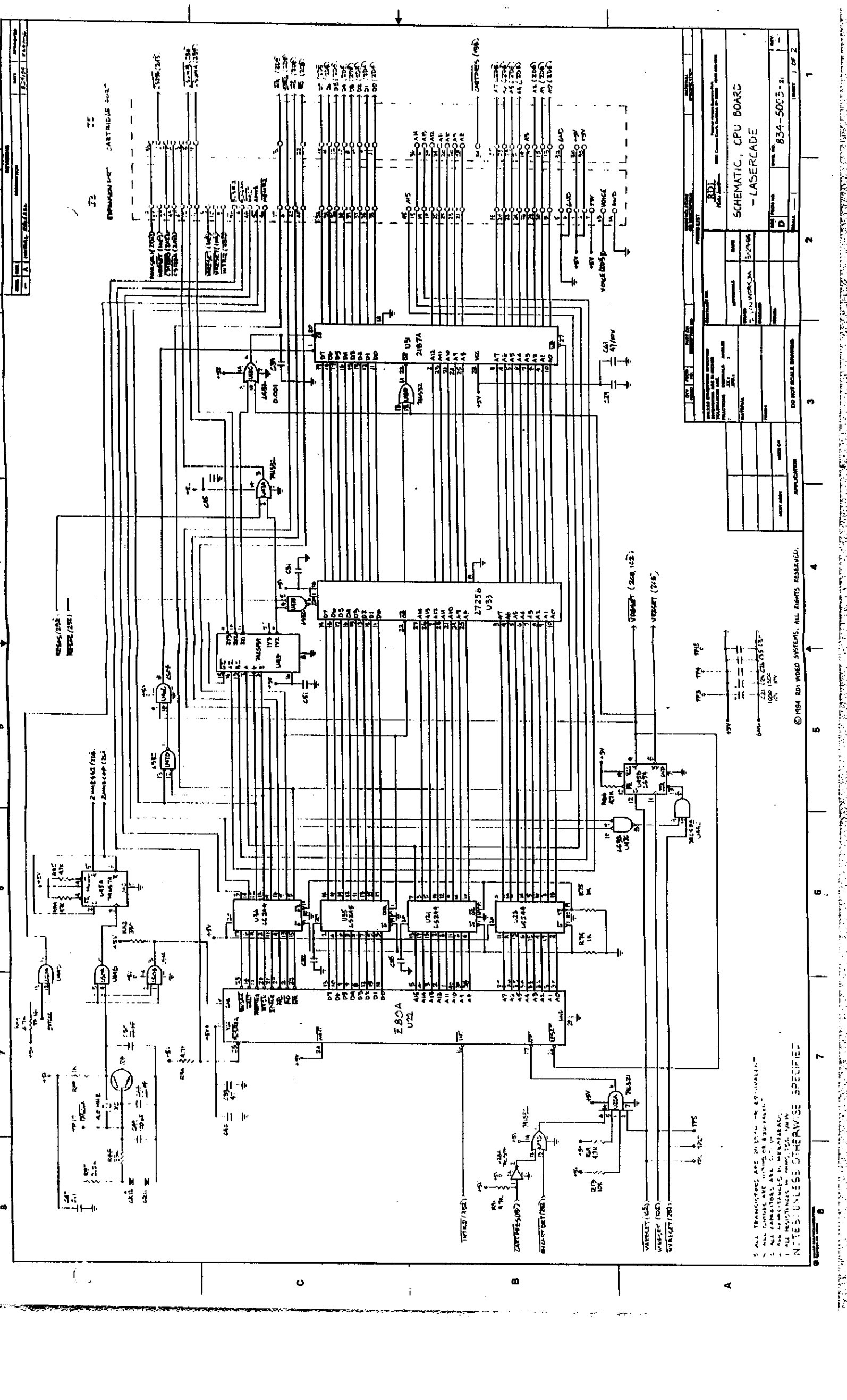
 POLY BAG ASSY
 

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POLY BAG	165-0001	1	
CABLE ASSY, 4 COND	600-0004	1	
TIE, CABLE	280-0009	6	
MOUNT, CABLE TIE	280-0010	6	
CABLE RCA - RCA DUAL 3'	600-0009	1	

DESCRIPTION	PART NO.	QTY	COMMENTS
WOOD SCREW, PH, PHIL, ZPS	281-0008	2	6 3/4"LG
LOCK WASHER, EXTERNAL STAR	284-0007	1	6
ENVELOPE ASSY			
CLASP ENVELOPE	420-0011	1	9 1/2 X 12 1/2
INSTRUCTION SHEET	420-0003-01	10	
OPERATION / SERVICE MANUAL	420-0002	1	

APPENDIX B  
SCHEMATICS



<b>834-5003-21</b> PART NUMBER		<b>834-5003-21</b> PART NUMBER	
<b>834-5003-21</b> PART NUMBER		<b>834-5003-21</b> PART NUMBER	
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**SCHEMATIC, CPU BOARD**  
**- LASERCAD**

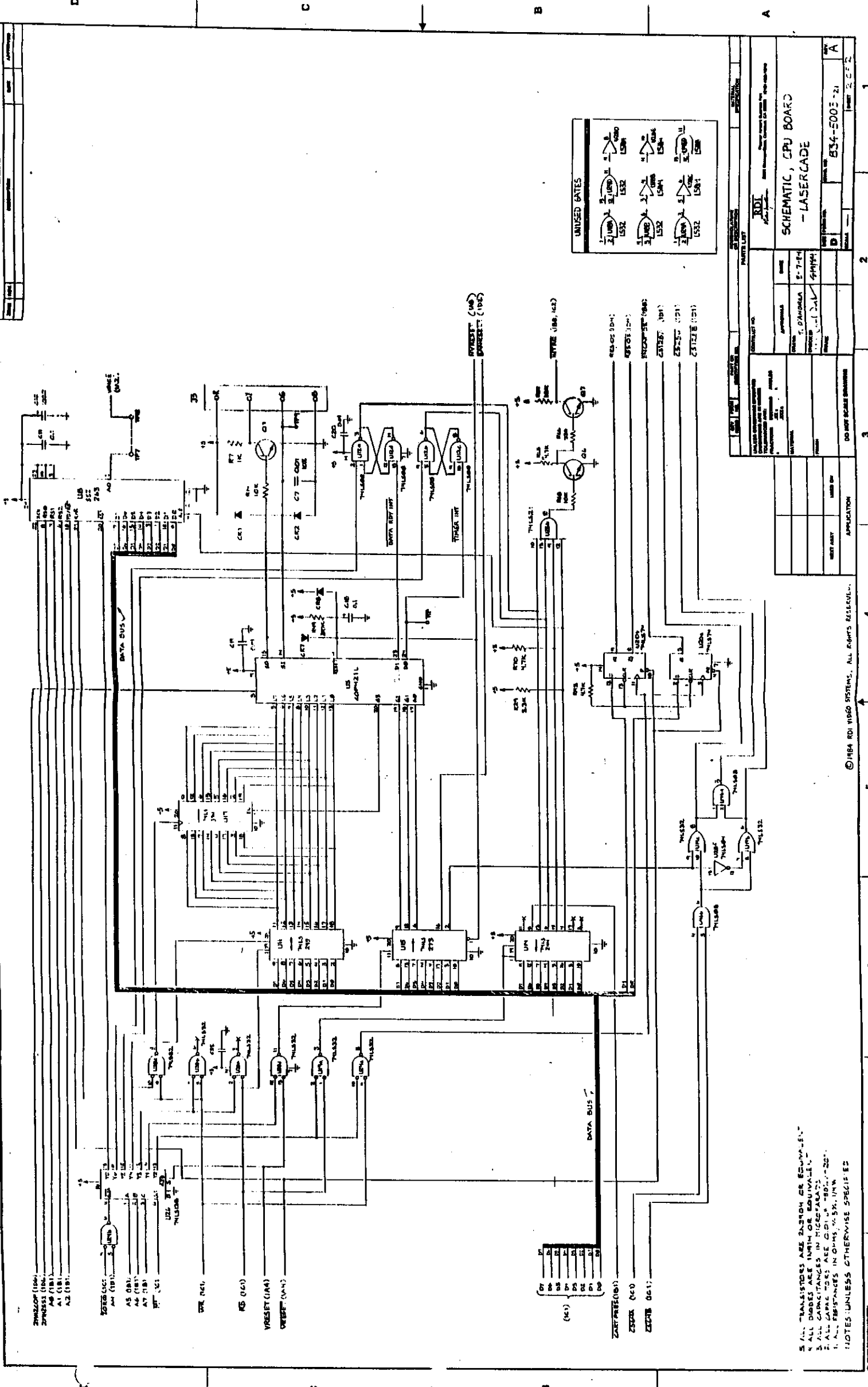
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 100% WORKING

DO NOT SCALE DIMENSIONS  
 APPLICATION

1 ALL TRANSISTORS ARE 2N3904 UNLESS OTHERWISE SPECIFIED  
 2 ALL CAPACITORS ARE 50V UNLESS OTHERWISE SPECIFIED  
 3 ALL RESISTORS ARE 1/4W 5% UNLESS OTHERWISE SPECIFIED

NOTES: UNLESS OTHERWISE SPECIFIED

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UNUSED GATES	
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SCHEMATIC, CPU BOARD - LASERCADE	
DATE	834-5003-21
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DESIGNER	
CHECKED BY	
APPROVED BY	
DATE	
PROJECT NO.	
PART NUMBER	
DRAWING NO.	
REV. NO.	
REV. DATE	
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REV. BY	
APP. DATE	
DO NOT SCALE DIMENSIONS	

5 ALL TRANSISTORS ARE SAMSUNG OR EQUIVALENT  
 6 ALL DIODES ARE IN HIGH-SPEED  
 7 ALL CAPACITORS ARE 0.01"  $\mu$ F 50V, 20%  
 8 ALL RESISTORS ARE 0.25W, 1/8"  $\Omega$ , 1%  
 9 NOTES: UNLESS OTHERWISE SPECIFIED

REVISION	DATE	APPROVED
A INITIAL RELEASE	12-7-84	SL/PL/AC
B	12-7-84	SL/PL/AC

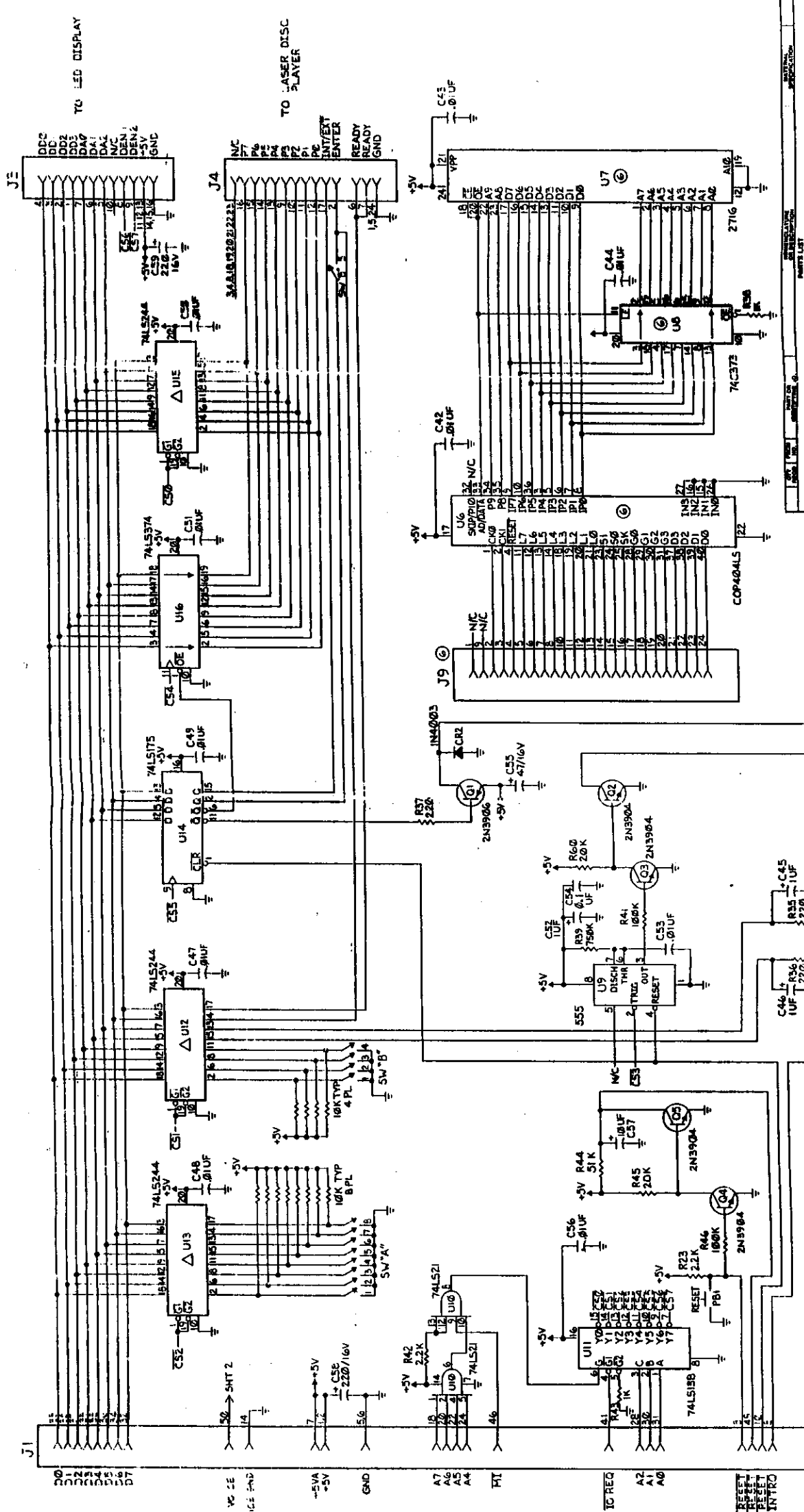
DATE	REVISION
12-7-84	1
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12-7-84	9
12-7-84	10



SCHEMATIC I/O BOARD LASERSCOPE

290

APPROVED: K.M. DREMS, P.S. 84

DESIGNED: S. S. C. L. 12/7/84

DATE: 12/7/84

REV: 1 OF 2

554-5004-2

DO NOT SCALE DIMENSIONS

APPLICATION: LASERSCOPE

PARTS LIST

REVISIONS

REVISION NO. DESCRIPTION

1. INITIAL RELEASE

2. REVISED TO CORRECT DIMENSIONS

3. REVISED TO CORRECT DIMENSIONS

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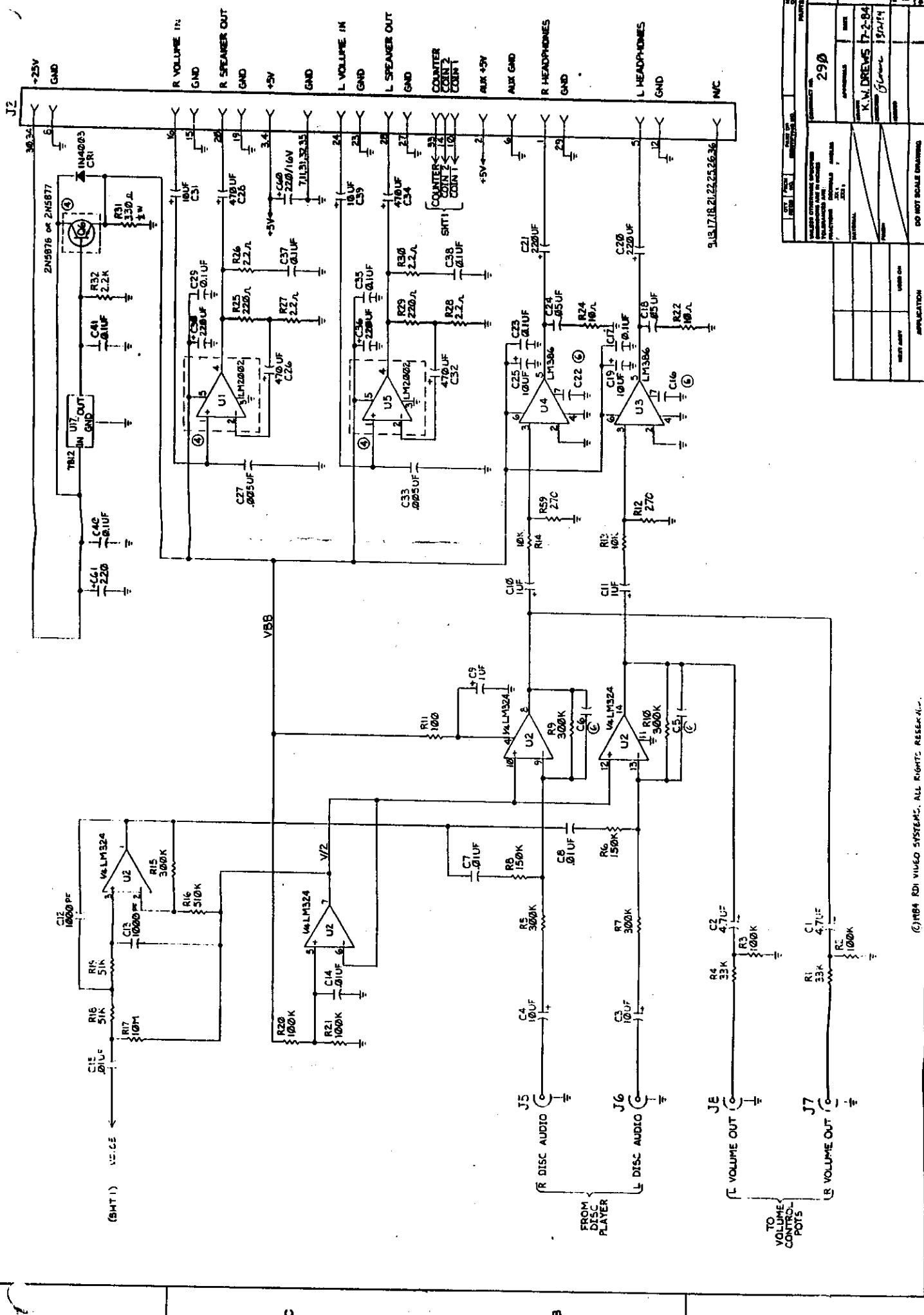
98. REVISED TO CORRECT DIMENSIONS

99. REVISED TO CORRECT DIMENSIONS

100. REVISED TO CORRECT DIMENSIONS

- UNMOUNTED COMPONENTS: R40
- UNMOUNTED COMPONENTS: C5, C6, C16, C22, J9, U6, U7, U8
- ALL POLARIZED CAPACITORS ARE ±20% .35V ELECTROLYTIC.
- DOTTED AREA DENOTES HEAT SINK.
- LAST REFERENCE DESIGNATORS USED: C61, CR2, J9, Q6, R40, U17.
- CAPACITANCE IN MICROFARADS.
- ALL CAPACITANCE IN OHMS V/W ±5%.
- RESISTANCE IN OHMS UNLESS OTHERWISE SPECIFIED.
- NOTES: UNLESS OTHERWISE SPECIFIED



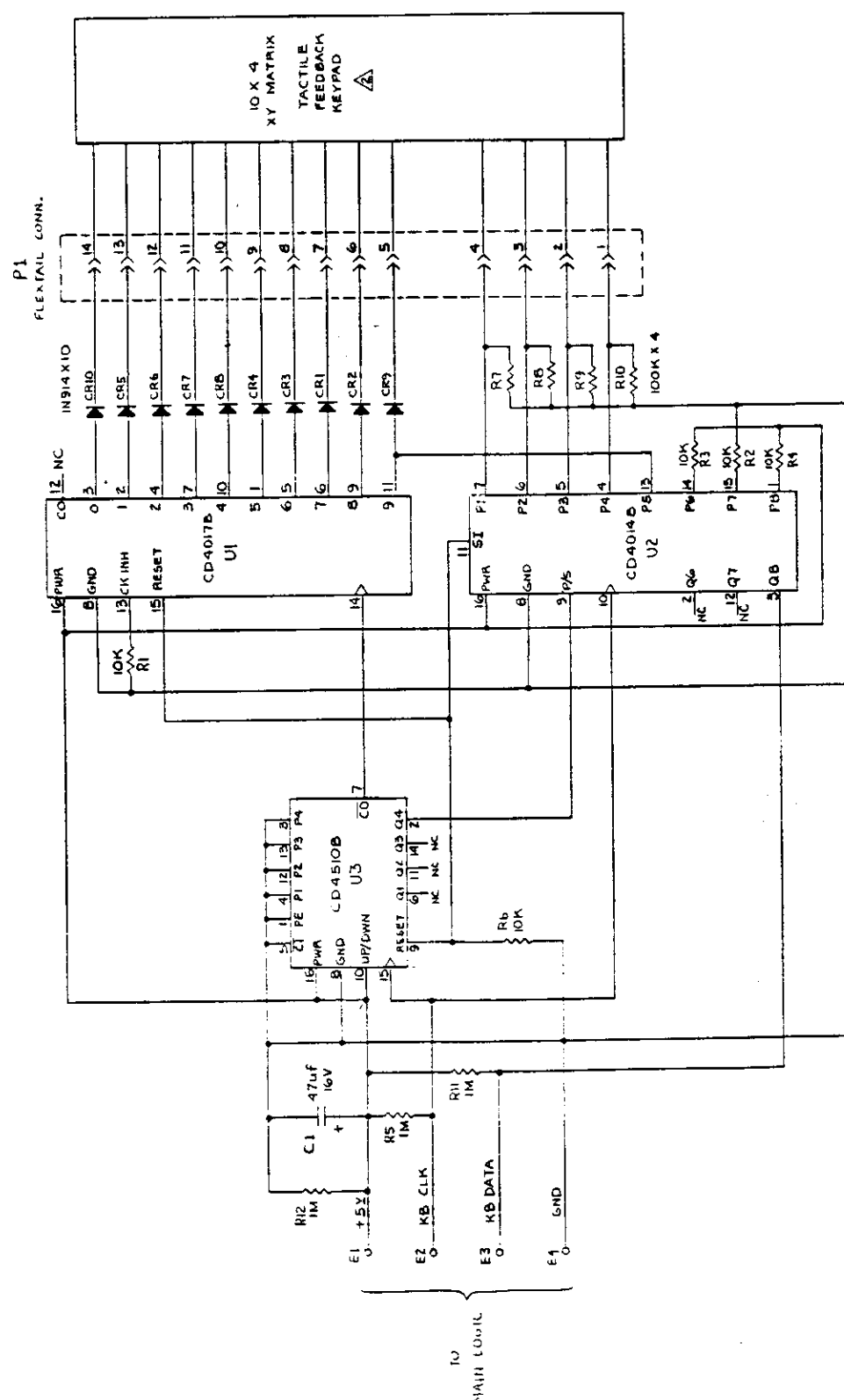


DATE	REV	BY	CHKD	APP'D	DESCRIPTION
PARTS LIST					
QTY	REF	DESCRIPTION	QTY	REF	DESCRIPTION
SCHEMATIC					
I/O BOARD					
LASER					
534-5004-2					
REV 2 OF 2					

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REV	DATE	APPROVED
A	6/13/84	FLW/L
B	4/6/85	GLW/MC

REV	DESCRIPTION
A	INITIAL RELEASE
B	DELETED MOD. CONN. RETITLED.



QTY	FROM	PART OR	DESCRIPTION	REVISION

DATE	APPROVAL	CONTRACT NO.
6-1-84	K. HOANTON	
6-1-84	FLW/L	

DATE	APPROVAL	CONTRACT NO.
6-1-84	K. HOANTON	
6-1-84	FLW/L	

DATE	APPROVAL	CONTRACT NO.
6-1-84	K. HOANTON	
6-1-84	FLW/L	

5. (AS-1) REF. DESIGNATIONS USED: C1, P1, R12, U3.  
 6. TACTILE FEEDBACK KEYPAD PER DWG #2774L5503H1000.  
 7. SHOW FOR REFERENCE ONLY.  
 1. RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE SPECIFIED.

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APPENDIX C

ARCADE MAIN HARNESS DEFINITIONS

FROM	PIN	TO	PIN	SIGNAL
LF	HOT	SW	COMMON	AC LINE HOT
SW	N/OPEN	PS1	3	AC LINE HOT
SW	N/OPEN	VDP	HOT	AC LINE HOT
LF	NEUTRAL	PS1	2	AC LINE NEUTRAL
LF	NEUTRAL	VDP	NEUTRAL	AC LINE NEUTRAL
PS2	1	ISO	PRI	115V AC #1 HOT
PS2	3	LAMP	HOT	115V AC #2 HOT
PS2	3	FAN	HOT	115V AC #2 HOT
PS2	2	ISO	PRI	115V AC #1 NEUTRAL
PS2	4	LAMP	NEUTRAL	115V AC #2 NEUTRAL
PS2	4	FAN	NEUTRAL	115V AC #2 NEUTRAL
MON	FRAME	LAMP	FRAME	FRAME GROUND
PS1	1	MON	FRAME	FRAME GROUND
LF	FRAME	PS1	1	FRAME GROUND
LF	FRAME	CPU	FRAME	FRAME GROUND
CPU	FRAME	COIN	3	FRAME GROUND
COIN	3	OCP	9	FRAME GROUND
OCP	9	CP	7	FRAME GROUND
PS1	9	CPU	3	+5V
PS1	10	CPU	4	+5V
PS1	11	CPU	7	+5V RETURN
PS1	7	CPU	30	+25V
PS1	12	CPU	8	+25V RETURN
PS1	5	COIN	8	6.3V AC LAMPS
PS1	4	COIN	9	6.3V AC LAMPS RETURN
COIN	1	CPU	10	COIN SLOT 0
COIN	2	CPU	14	COIN SLOT 1
COIN	7	CPU	11	COIN RETURN
CP	2	CPU	6	AUX GROUND
CP	3	CPU	2	AUX +5V
CP	4	CPU	1	NOT USED
CP	5	CPU	29	NOT USED
CP	6	CPU	5	HEADPHONE (LEFT)
CP	8	CPU	9	NOT USED
CP	9	CPU	13	NOT USED
CP	1	CPU	12	HEADPHONE RETURN (LEFT)
OCP	4	CPU	33	COIN COUNTER
OCP	8	CPU	32	COIN COUNTER RETURN
OCP	3	CPU	J8CENTER	L VOLUME OUT
OCP	1	CPU	J8SHIELD	L VOLUME OUT RETURN
OCP	5	CPU	J7CENTER	R VOLUME OUT
OCP	7	CPU	J7SHIELD	R VOLUME OUT RETURN

FROM	PIN	TO	PIN	SIGNAL
OCP	2	CPU	24	L VOLUME IN
OCP	1	CPU	23	L VOLUME IN RETURN
OCP	6	CPU	16	R VOLUME IN
OCP	7	CPU	15	R VOLUME IN RETURN
CPU	28	SPKR	L+	SPEAKER (LEFT)
CPU	27	SPKR	L-	SPEAKER RETURN (LEFT)
CPU	20	SPKR	R+	SPEAKER (RIGHT)
CPU	19	SPKR	R-	SPEAKER RETURN (RIGHT)

PS1 = POWER SUPPLY 12 PIN CONNECTOR  
 PS2 = POWER SUPPLY 4 PIN CONNECTOR  
 FAN = COOLING FAN  
 SW = POWER SWITCH  
 CPU = CIRCUIT BOARD MODULE  
 LAMP = FLUORESCENT LAMP (MARQUEE)  
 CP = CONTROL PANEL  
 SPKR = SPEAKERS  
 COIN = COIN DOOR  
 MON = MONITOR  
 VDP = VIDEODISC PLAYER  
 LF = AC LINE FILTER  
 OCP = OPERATOR CONVENIENCE PANEL  
 ISO = MONITOR ISOLATION TRANSFORMER

NOTE: GAMES EQUIPPED WITH PR7820 DISC PLAYERS HAVE DISC PLAYER FRAME GROUND TIED TO LINE FILTER FRAME GROUND.