SERIES 7000 PARTS MANUAL

Arachnid INC

The Originator of Electronic Darts

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INTRODUCTION

This manual contains description, unpacking/assembly, operation, and troubleshooting information for the model 7000 English Mark Darts machine.

The purpose of this manual is to provide the user with a basic installation and field service guide. If you should encounter a problem that is not covered, please call the factory using our toll-free number, 800-435-8319. In Illinois use 815-654-0212.

SECTION 1 - GENERAL DESCRIPTION

The 7000 series English Mark Darts machine is a patented microprocessor controlled dart game (patent #4057 251) where players may select one of seven different games. It is a coin operated game offering players a choice of one credit games or more challenging two credit games.

Occupying only 2.5 square feet of floor space (see Figure 1), this unit uses a revolutionary sealed switch matrix scoring system behind the dart face. As the darts strike the target, the machine's computerized digital scoring system gives the player an instantaneous displayed score.
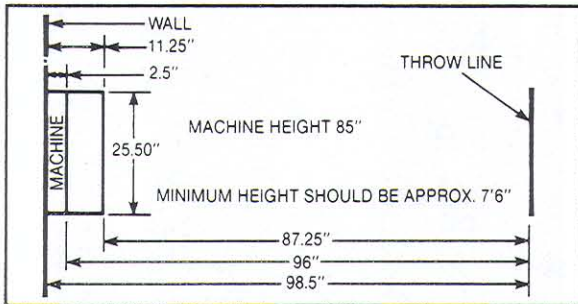

Figure 1. Plan view of the 7000 Series play field.

SECTION 2 - UNIQUE FEATURES OF THE 7000 SERIES GAME

There are several features that are unique to the 7000 series English Mark Dart Game from previous series games, such as:

1. There are seven games on the 7000 Series.
   A. Black Jack Darts™ - 1 credit per player

   A game for one to four players. Ace is the triple 1 segment; King is the triple 13 segment; Queen is the triple 12 segment; Jack is the triple 11 segment. Two thru ten are the corresponding triple segments. All other segments will produce a random card. The object of the game is to get a Black Jack or close to 21 points without going over 21 using 6 darts or less.

   B. Poker Darts™ - 1 credit per player

   A game for two to four players. Ace is the triple 1 segment; King is the triple 13 segment; Queen is the triple 12 segment; Jack is the triple 11 segment; Two thru ten are corresponding triple segments. All other segments will produce a random card, as will pressing Player Change if all three darts don't stick. The object of the game is to get the best poker hand in 2 rounds, or 6 darts per player. The free game is used by all players to fill out the seventh card. The best 5 card hand wins.

   C. Ship/Captain/Crew Darts™ - 1 credit per player

   Played similar to the dice game. The object is to hit the 6 segment, the 5 segment, and then the 4 segment in that order. Hits will carry over to the next round. Once the segments have been hit in the correct order, the remaining darts may be used to score points. A maximum of 9 darts will be thrown. The player with the highest score wins.

   D. 301 Double In/Double Out - 2 credits per player

   This is for the more experienced players. One to four players, played the same as 301 except the player must start counting down and end the game by hitting a number in the outer double score ring, or by hitting a bullseye.

   E. 701 Open In/Double Out - 2 credits per player

   One to four teams, played the same as 301 except to go out a double or a bullseye must be hit. Count down game popular with three to four person teams.

   F. Darts Roulette 200™ - 2 credits per player

   A game for 2 players. The wheel will spin and land on a random number. The current player must hit that number to score points. Singles, doubles and triples will score the appropriate scores. If the current player misses the given segment with all three darts then 50 points will be deducted from that player's score. The first player to reach 200 points is the winner.

   G. Cricket - Two to four players - 2 credits per player

   The game of Cricket is played with the numbers 15 through 20 and the bullseye. Each player must hit a number three times to close the number and score before the number is closed by the opponent. The winner is the first person to close all the numbers and have the highest score. Cricket can be limited to 200 points over the opponent, at the operator's descretion.

   Three options are offered when playing Cricket on the 7000:
   1) Two to four players can use the regular game. The highest score with all the numbers closed wins.
   2) Two to four can play the game of Cut Throat Cricket. Close a number and give points to your opponents. In this game, the lowest score wins.
   3) Four players participate as two teams. Both you and your partner must close the number before your team can score.

2. Credit Accumulation. Players may insert as much money as they wish, and the game will accumulate the credits, using only the amount that is necessary for the particular game chosen. This feature allows the use of large denomination coin mechanisms and bill acceptors with this game. See special insert on the Coin Credit option for information on how to use this feature to its full advantage.

3. Double Bullseyes Option. With the flip of a switch, the operator or distributor can choose between a 25 point/50 point bullseye or our original 50 point only bullseye. See Section 4 for Instructions on how this is done.

4. League Slot™. In the 7000 Series game, a league money slot is provided so that league captains may deposit their money envelopes into the safety of the game cabinet, for operators to collect later.

5. Atract mode continuously displays messages and sample game screens. Following completion of a game, attract mode starts again after about a minute and a half.

6. Reset mode. If there is no play within a 10 minute period, the game will reset as if it had just been turned on. This will help when a player leaves the game, as other players will know that no one is currently playing.

7. Target lamps surround the target head with light. Darts already stuck in the board no longer cast shadows on other segments. In the "off" condition, the lamps go dim, just enough to let the dart player see the target without giving him enough light to play for free. The level of light is adjustable internally to suit the ambient light conditions at the location. The fact that the lamp doesn't get "cold" gives longer life as the surges of current when turned on are reduced (i.e. a warm bulb has a higher resistance than a cold bulb).

8. External video is available for displaying the scores to large crowds at tournaments or to attract other player's attention. Section 5.8 shows how to do this.

9. Electronic popularity meter and coin meter to keep track of statistics. You can tell how many times each game was selected and total number of coins inserted. See section 4.1 Test Mode for further information. A mechanical counter is mounted inside the coin door as well due to the fact that the electronic meter can be reset.

10. Stuck segment indication on screen to immediately let the player know to check for broken tips or any other foreign objects holding a segment back. It also indicates which segment is closed (i.e. S1 for single one; D3 for double three; T20 for triple 20' and Bull for Bullseye).
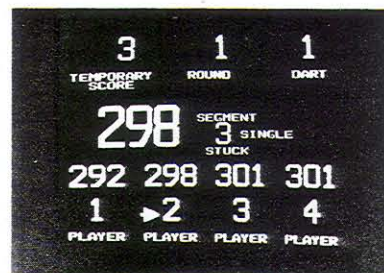

Figure 2. Stuck segment indicator display

11. Instructions can be read at any time a game is not being played by pressing "ENTER" to bring up the instruction menu, selecting the game you want to see instructions on with "SELECT", and pressing "ENTER" again. Return to attract mode is automatic after approximately a minute and 30 seconds or by inserting a coin and pressing "ENTER". After inserting coins, instructions can still be selected as it is the last item on the menu.
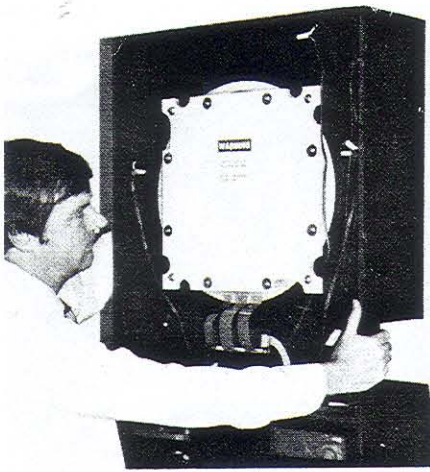
Figure 3. Attaching top assembly to base

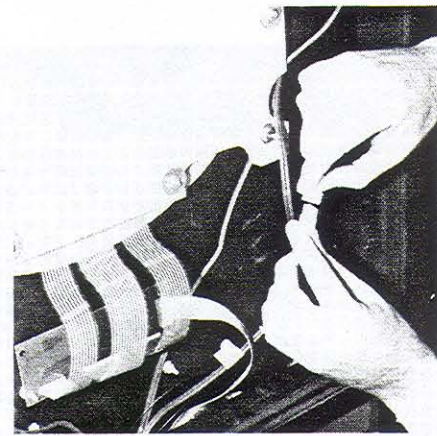

Figure 3A. Hex cap bolt holding top to bottom

Figure 4. Attaching speaker harness

SECTION 3 - UNPACKING/ASSEMBLY

3.1 UNPACKING

a) Using a sharp knife, cut around top edge and remove.

b) Take out bag containing darts, tips, manuals, and bolts/nuts.

c) Slit all four sides from top to bottom allowing the sides of the container to fall away from the machine. The machine is now ready for assembly.

-CAUTION-

DO NOT LIFT BASE UNIT BY ITS INSTRUCTION PANEL

3.2 ASSEMBLY

a) Remove back to top unit.

b) Feed ribbon cable and lamp plugs through the hole in center of bottom.

c) Attach top assembly into base assembly as shown in Fig. 2 using four 1/4-20 carriage bolts and nuts and two 1/4" hex cap bolts as shown in Fig. 3A.

d) Feed speaker connector up through hole in base of top assembly and connect (Fig. 4).

e) Bring power cord out of hole in back of game and plug into a 120V AC (or proper input voltage for your country) GROUNDED wall outlet. The machine is now ready for power up sequence.

SECTION 4 - OPERATION

4.1 POWER UP, CHECKOUT, AND TEST

a) Turn on dart machine using on/off switch on the back of the machine. The remove darts/throw darts lamps should start to flash alternately. After a few seconds, the monitor should come on displaying the attract sequence.

b) Inside the coin door you will find a slam switch, Fig. 5, which when activated will cause the game to reset, and a slide switch will put the game into test mode when depressed and released.

c) Slide the test switch down and release. The screen will show a hatch test pattern plus a message that the lamp test is starting. At this time all lamps on the machine will illuminate to check for proper operation. These lamps are:

1. target lamps (3)
2. remove darts (2) on PC board
3. throw darts (2) on PC board
4. select pushbutton lamp
5. enter/player change lamp

While the lamps are lit, the sounds of the game are played. Next the lamps will go out and the message "TEST TARGET HEAD" will appear at the top and "PRESS ENTER FOR TEXT INPUT" and "PRESS SELECT FOR REPORT" at the bottom. If you press any segment at this time, the score should appear in the center of the screen (Fig. 6).

After testing the segments in the dart head, pressing select will display the report screen (Fig. 7). From this screen, you can tell how many times each game has been played. The last item is
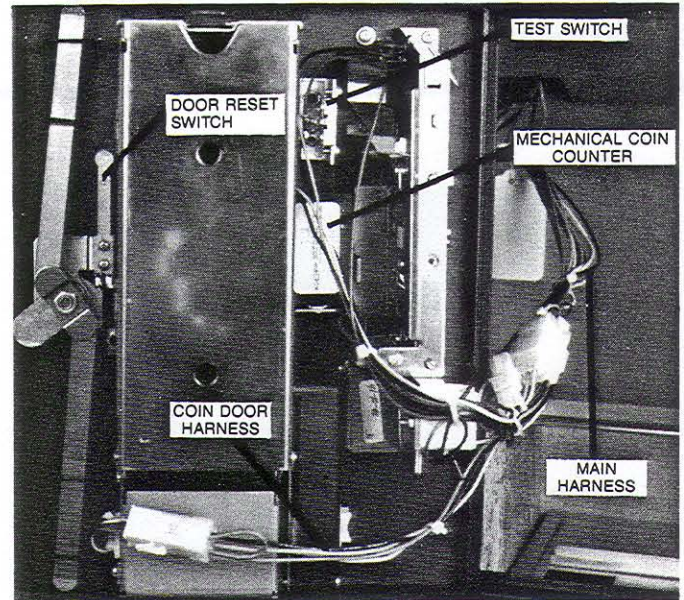

Figure 5. Coin door open showing coin mechanism, reset switch, and test switch

an electronic coin counter. The numbers displayed on the report screen can be cleared by pressing the Bullseye while in this mode.

Information on the popularity screen is retained when the power is turned off (see Section 5.2.6).

Pressing ENTER instead of SELECT will put you into the SPIDER WRITER mode. SEE SPIDER WRITER page (Fig. 10) for more information.

Pressing the test switch, inserting a coin, closing the slam switch, or turning power off and on will cancel test mode.

4.2 MAIN P.C. BOARD D.I.P. SWITCH OPTIONS

There is a four position D.I.P. (S1) located near U5 on the Main P.C. Board. This switch package has many functions.

Switch number 1 and 2 are used for certain coin accumulation options. See Coin Credit insert for more information on the settings of these. Switch number 3 is used to select a single, 50 point bullseye, or a 25/50 point Double Bullseye. In the "Off" position, the Bullseye is 50 points, in the "On" position the Bullseye's outer ring is 25 points, and its inner ring is 50 points. This option makes games like Cricket more challenging to expert dart players. If you opt for the 50 point only Bull score, you may change the Bullseye to the one-piece solid Bull included in your accessory kit. Simply follow the instructions for disassembling the Dart Head in Section 5, replace the Bull segment, and reassemble per instructions.

Switch number 4 is used for selecting Regular Cricket or Cricket 200. Cricket 200 limits the point spread between players to 200 points in regular Cricket and 400 points in team Cricket. Cut Throat Cricket is not affected. (See Section 2 for a more complete description of Cricket 200). With Switch #4 in the "Off" position, traditional Cricket scoring is selected. In the "On" position the Cricket 200 scoring system is selected.
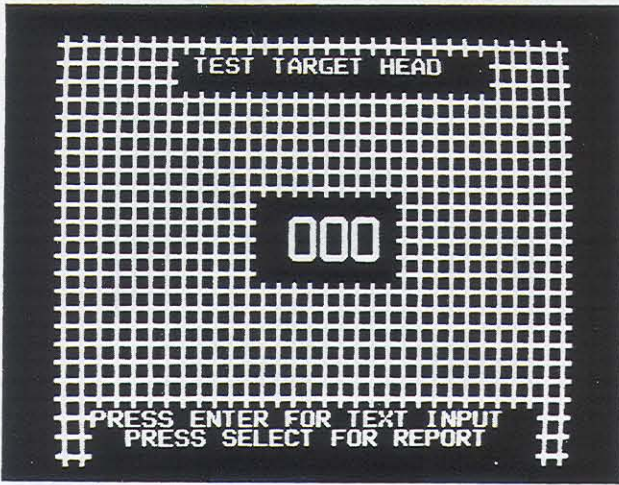
Figure 6. Test mode ready for dart head test
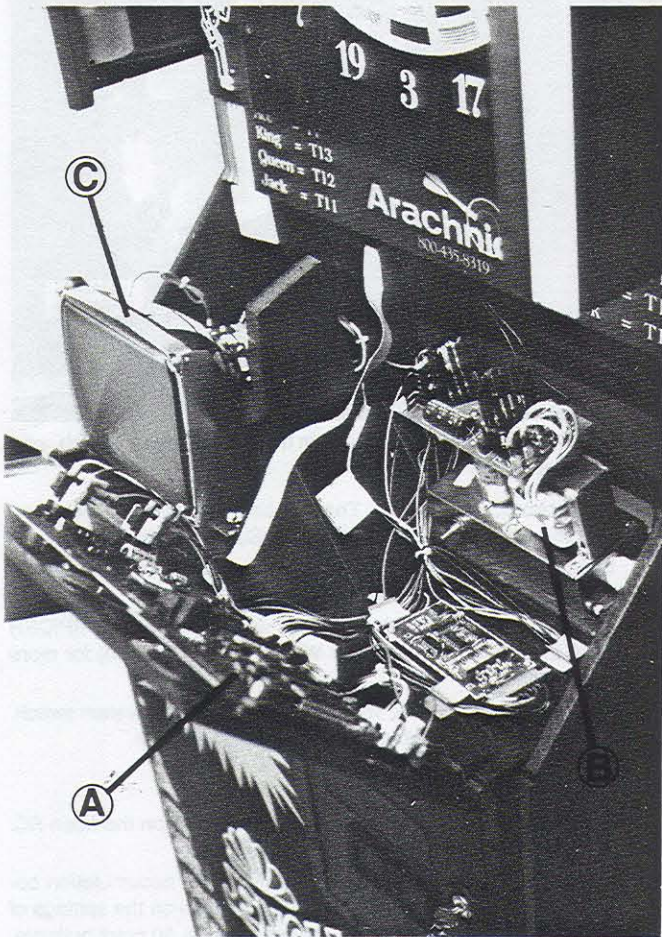

Figure 7. Report Screen

SECTION 5 - TECHNICAL DESCRIPTION

5.1 GENERAL

    a) Main CPU Board

    b) Power Supply

    c) 9" Monitor

    d) Target Interface Board

    e) Dart Head Assembly

The assembly containing the main board, monitor, and power supply is designed for easy access as shown in Fig. 8. Most service can be performed by swinging the front door open. However, if desired, the component tray can be removed entirely by unscrewing three screws in the bottom of the tray, disconnecting target lamp wires (3), ribbon cable, and coin harness. This way the unit can be bench tested by attaching a dart head w/target interface, a low wattage (40W) lamp, and switches to simulate the coin in, test, and reset.
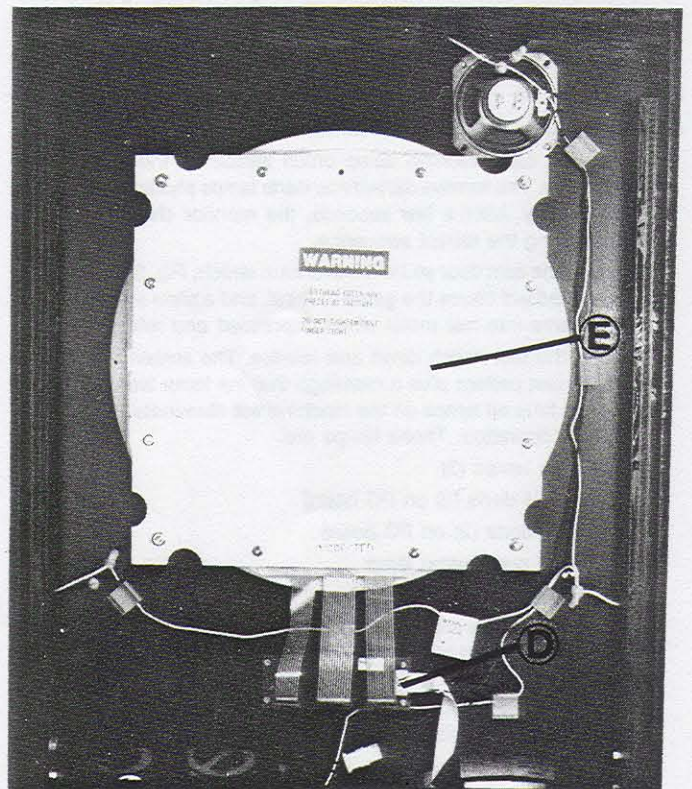

Figure 8. Front view of 7000 series game

Figure 9. Rear view of 7000 series game

4

Spider Writer

Arachnid INC
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## SPIDER WRITER INSTRUCTIONS: EASY AS 1 2 3

1. Put the game into the test mode by depressing the slide switch inside the coin door. At the end of the test mode the message "press Enter for text input - press Select for report" will appear. Press the Enter button.

2. A cursor will appear in the upper left corner of the screen. Use the dart head as a "keyboard" to move the cursor around and to enter your custom message. The diagram to the right illustrates which symbols are represented by segments in the single, double and triple rings.

3. Press the bullseye when you are satisfied with the screen you have created. The Spider Writer will remain in the input mode for ten minutes before returning to normal game operations. If time expires while you are entering a screen, simply put the game back in Test mode and continue where you left off. The screen you were working on was automatically saved.

HELPFUL HINTS:

Use the 32 x 16 grid below to create the screen on paper before writing it on the game. It will save you time in deciding where to place words or graphics. Make copies of this original and draw on the copies, saving the original to make additional copies from.

Be careful of the Single 5! It clears the screen completely and should only be pressed when you wish to change the entire screen.

Note: A game that is not properly grounded may place strange characters in random locations on the screen. Please make sure the ground plug on the wall receptacle is properly connected.
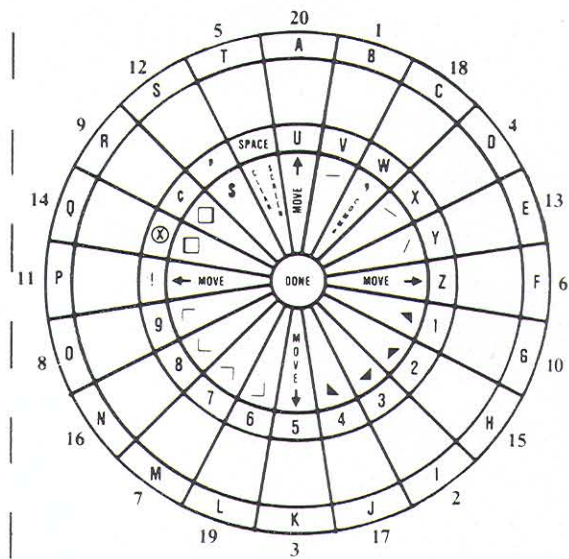
Keyboard Legend

Each segments in the Singles, Doubles, and Triples rings correspond to the letter, number or graphic represented on the diagram above. Use "Move" segments to position the cursor on the screen. Be careful of the single 5 - It clears the screen completely.

SPIDER WRITER WORKSHEET
Use this grid to design your custom screen

Spider Writer

Arachnid INC
The Originator of Electronic Darts
P.O. Box 2901
Rockford, IL 61132-2901
800-435-8319 (IL) 815-654-0212

Figure 10. Spider Writer instruction page

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5.2 MAIN CPU BOARD

The main CPU board (Figure 19, page 11) contains a 6809 microprocessor and associated IC's consisting of:

TMS4416 16KX4 Dynamic Memory - U20, U21
TMS9118 Video Generator - U19
MK48Z08 8KX8 Memory W/Battery - U14
27512 64K Programmable ROM - U12
74LS04 Hex Inverter - U1
556 Dual Timer - U2
6821 Peripheral Interface Adapter - U4, U5
PLS153 Programmable Logic Array - U10
LM340-15 15V Regulator - U16
LM383T Audio Amp - U15
6840 Programmable Timer - U13
ULN2003 Transistor Network - U7, 17, 6
Capacitor Network, 01UFDX8 - U11, 24
Resistor Network, 2KX8 - U8
Resistor Network, 10KX8 - U18, 23
Diode Network, IN4148X8 - U9

5.2.1 MONITOR - SEE MONITOR MANUAL

5.2.2 PLAYER CHANGE - SELECT

The player change and select pushbutton is located on the front slanted panel. When the player change is closed, pin 3 of U5 is shorted to ground. When select is closed, it shorts pin 2 of U5 to ground. When the switches are open, the inputs are held high by 10K OHM resistor network. C22 and C23 (.01ufd) are used for noise suppression.

5.2.3 SOUND CIRCUIT

Sound is generated in U13 by programming timer 1 (of three timers) to free run at specific frequencies. The sound is output at pin 27 (01) and is fed thru R22 which is the volume control accessible from the top of the main PC board. U15 (LM383T) is an 8 watt audio power amplifier whose gain is controlled by the ratio of R23 and R24. The voltage for U15 is controlled by U16 (LM340-15) a 15 volt regulator. Input should be 21 to 24 volts DC depending on line voltage.

5.2.4 RESET

The microprocessor can be reset either by shutting off power for a few seconds and then turning back on, or by closing the slam switch inside the coin door.

a) The slam switch on the coin door is buffered with two sections of U17. When the switch is closed, pin 2 of U17 is grounded. U17 inverts this signal twice so the effect on the reset line is that it goes low. C31 is used for preventing electrical noise from triggering a reset.
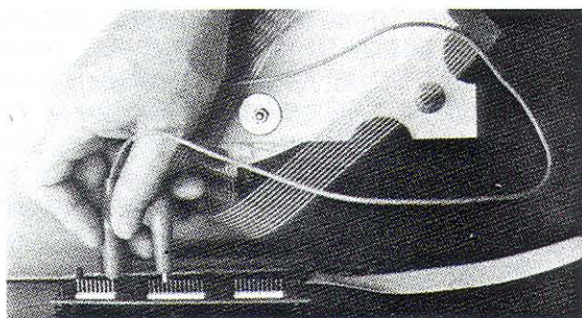

Figure 11. Target interface board with test jumper

| TABLE 1 | | | |
| Letter Designation of Scores | | | |
SCORE	SINGLE	DOUBLE	TRIPLE
1	DN	EN	FN
2	AL	BL	CL
3	AN	BN	CN
4	DL	EL	FL
5	AP	BP	CP
6	GL	HL	GP
7	DO	EO	FO
8	GI	HI	GM
9	AO	BO	CO
10	AI	BI	CI
11	AK	BK	CK
12	DP	EP	FP
13	AM	BM	CM
14	GK	HK	GO
15	GJ	HJ	GN
16	AJ	BJ	CJ
17	DM	EM	FM
18	DI	EI	FI
19	DJ	EJ	FJ
20	DK	EK	FK
BULL		HM	

b) The purpose of half of the 556 timer is to give a short delay to the reset line after power up. The reset line cannot come to 5 volts at the same time as the 5 volts on Pin 7 on U3, but must be delayed a few clock cycles for reset to work properly.

5.2.5 INTERRUPTS

The microprocessor can be interrupted in three different ways at which time it will jump to the part of the program that controls that particular interrupt.

a) Two of the three timers (U13 - 6840) are cascaded to give approximately a ten-minute delay before an interrupt will occur, at which time the game resets as if you had just turned it on. Any activity during a game automatically resets the timer back to 10 minutes (i.e., as long as there is someone playing the game it will not reset, only if it is left unattended for 10 minutes).

b) The coin input switch will override any game or other mode that the game may be in.

c) The test switch will also be acknowledged any time.

5.2.6 MEMORY

Memory in this system consists of 8K of RAM (U14-MK48ZO8) with internal lithium batteries. This gives data retention when power is off for the popularity screen. The manufacturers data sheet (MOSTEK) states the minimum expected data retention time as 10 years based on statistical studies made by MOSTEK.

The Programmable ROM holds the main program. If this IC has a window, it should always be covered with our stick-on label as Eproms are erasable when exposed to ultraviolet light over a period of time.

5.2.7 ADDRESS DECODING

Address decoding is done with U10 a Programmable Logic device. This IC determines if the microprocessor is addressing memory, one of the two peripheral interface adapters, the 6840 sound IC, memory, or the video IC.

5.3 TARGET INTERFACE BOARD

The target interface board is used to combine the 33 conductors from the switch matrix into 16 conductors. At times it can be important to know which pins on the target interface board will give a particular score. This information is in Table 1 and Figure 12. With the game in test mode (at the end of test when the dart head is sensitive) or in game mode, shorting, momentarily, the correct pair of pins in the target interface board with a jumper wire will give a score (see Figure 11). Doing this might save troubleshooting time as you can determine if a problem is in the switch matrix or the electronics.

-NOTE-
THE SCORE WILL NOT APPEAR UNTIL THE JUMPER WIRE IS REMOVED.

You will note from Table 1 that the 13 pin connector is common to all switches. Since the microprocessor won't score until the switch opens, pulling off the 13 pin connector while in test mode will give you the score of a stuck segment or switch. The effect is that the switch gets opened so the microprocessor can give the score. This can save troubleshooting time. Another method of operating the switch is to pull the ribbon cable from the main 7000 series board.
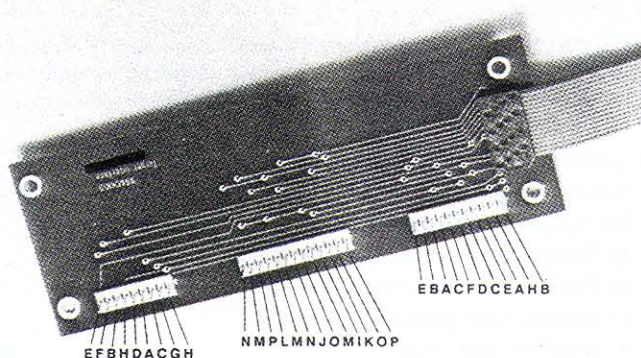

EBACFDCEAHB
NMPLMNJOMIKOP
EFBHDACGH

Figure 12. Target interface board letter designations

5.4 TARGET ILLUMINATION

The target illumination consists of three "showcase" bulbs 5-1/2" long frosted. These are used for illuminating the game during attract mode as well as during play. In the attract mode, the brightness of the lamps should be adjusted so the dart head is barely visible, not bright enough to allow free play. This is adjusted with a scewdriver on the base of the power supply inside the component tray (see Figure 13).
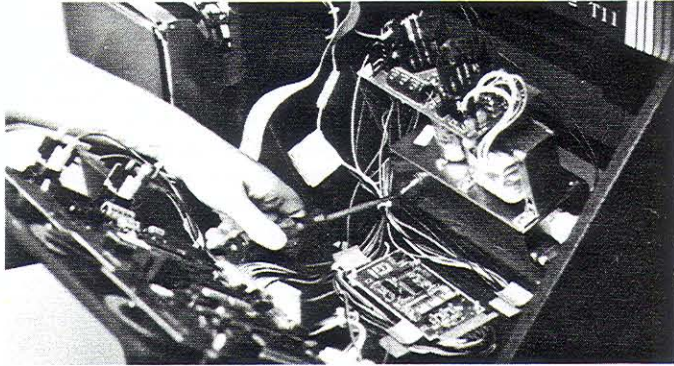

Figure 13. Adjusting "off" condition target illumination

The off brightness is a result of (see power supply schematics) R4, C10, and a ST-4 DIAC. These components turn on the gate of the Triac (SC1461D) for only a portion of each cycle of AC, the same as a wall dimmer switch would do.

When the game is coined up, the gate of the Triac is turned on all the time through the MOC3030. This off brightenss also keeps the filament of the bulb warm which greatly reduces the turn-on shock and should give longer life to the lamps and Triac.

5.5 POWER SUPPLY

The power supply consists of three voltage levels, +5V, +12V, and +21VDC. The 5V and 12V come from the same transformer output. The 12V supply consists of two regulators, a LAS1612 for the monitor rated at 2 Amps and a LM340-12 for the lamps rated at a 1 AMP.

The 5V regulator should only vary ±.1V with load and line. All of the logic is powered from this supply.

The +21V supply is unregulated and will vary with line and load. This supply feeds the +15V regulator located on the main PC board. The 15V regulator powers the audio circuit.

There are three fuses in the power supply. The main fuse is located on the chassis. It is a 1.5 amp 250 volt slow blow 3AG size. Nothing will function if this fuse blows.

The other 2 fuses are located on the small printed circuit board on top of the power supply. The one closest to the edge is FS1, a 5 amp 250 volt slow blow 3AG size. This protects the lamps and 5 volt circuit. The fuse next to it (FS2) protects the sound circuit. It is a .75 amp 250 volt slow blow 3AG size.

-NOTE-

THE GROUND ON THIS GAME IS FLOATING AND MUST NOT BE CONNECTED TO THE POWER SUPPLY CHASSIS GROUND. THEREFORE, ALL VOLTAGE MEASUREMENTS SHOULD BE REFERENCED TO THE GROUND ON THE SMALL PC BOARD ON TOP OF THE POWER SUPPLY OR GROUND ON THE MAIN BOARD.

5.6 DART HEAD

The dart head is set to exact specifications at the factory. The bolts that hold the board together are tightened to finger tight only. Do not tighten any further as this can close switches in the switch matrix and cause the dart head to lock up or misscore.

5.7 DART HEAD DISASSEMBLY/REASSEMBLY

To clean or replace parts in the dart head it is necessary to disassemble and reassemble as follows:

a) Remove the 8 nuts holding the target back to the spider.
b) Remove the switch matrix.
c) Remove .020" gasket.
d) Remove rubber damper.
e) Check for dirt and broken tips between spider and cups.

f) Replace any worn or broken cups.
g) Clean and re-install rubber damper.
h) Re-install gasket, making sure that it is installed right side up and in the right rotation.

-IMPORTANT-

THERE SHOULD BE A SMALL U SHAPE CUTOUT ON THIS GASKET. POSITION IT TO THE LEFT OF CENTER (BEHIND THE "DOUBLE 1" SEGMENT) AT THE TOP AS SHOWN IN FIGURE 11.

-NOTE-

SOME GAMES MAY HAVE A ONE PIECE MATRIX CUSHION TO REPLACE THE ITEMS DESCRIBED IN "g" AND "h" ABOVE. THIS CUSHION WILL ALSO HAVE A U-SHAPED CUTOUT, AND IT MUST BE POSITIONED TO THE LEFT OF CENTER (BEHIND THE "DOUBLE 1" SEGMENT) AS WITH THE .020 GASKET.

i) Place the switch matrix with the tails on the left and the 9 pin connector on top.
j) Clean and re-install target back and 8 nuts, tighten only finger tight.

-NOTE-

BOLTS MUST BE FINGER TIGHT ONLY. ANY TIGHTER WILL CLOSE CONTACTS IN THE MATRIX AND CAUSE INACCURATE SCORING OR NO SCORING AT ALL.

-NOTE-

IT IS IMPORTANT TO KEEP DIRT OUT OF THE AREA BETWEEN THE SPIDER AND SEGMENTS AS THIS CAN CAUSE NON-SCORING OR IMPROPER SCORING. ON A HEAVILY PLAYED GAME IT IS A GOOD IDEA TO DO PREVENTIVE MAINTENANCE ON A REGULAR BASIS IN THE FORM OF DISASSEMBLING THE DART HEAD, CLEANING, AND REASSEMBLING. THIS CAN HELP PREVENT SERVICE CALLS IN BETWEEN REGULAR VISITS.

-NOTE-

ALTHOUGH THE DART HEAD IS DIS-ASSEMBLED AND RE-ASSEMBLED AS IN THE PAST (WITH 4500 AND 5000 SERIES GAMES), WITH THE 7000 IT IS INSTALLED WITH THE 3 LEADS IN THE DOWNWARD DIRECTION. THIS MEANS THAT THE "20" ON THE YELLOW SPIDER IS NOT AT THE TOP. THE PROGRAM WAS CHANGED TO REFLECT THIS CHANGE. MAKE SURE THAT IF USING A DART HEAD FROM ANOTHER SERIES GAME THAT THE RED AND BLACK SEGMENTS ARE IN THEIR PROPER PLACE (SINGLE 20 IS RED).

5.8 VIDEO

The video signal is created with the TMS9118, U19 along with video RAM chips U20 and U21, TMS4416 dynamic memory. The output signal is at pin 36 of the TMS9118 and is buffered to protect the video chips with Q1.

On the main printed circuit board there is one RCA style phono jack, and a two pin header. The two pin header is the video connection for the monitor (see Fig. 15 and 16). The RCA jack is to be used if external TV's are desired to be set up. To do this, run a cable from the RCA video jack to an RF modulator or the video input of a VCR. The output of the modulator or VCR is usually on channel 3 or 4 and should be connected appropriately to the TV. This is a great way to display for tournaments or just to create added interest in the location.

The TMS9118 contains circuitry for an 10.7MHZ crystal and divides it by 3 to create a CPUCLK signal. This way a separate crystal is not necessary for the microprocessor.
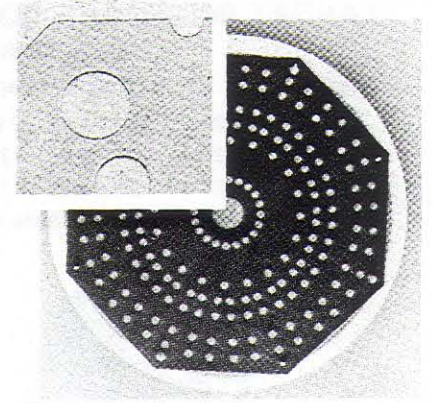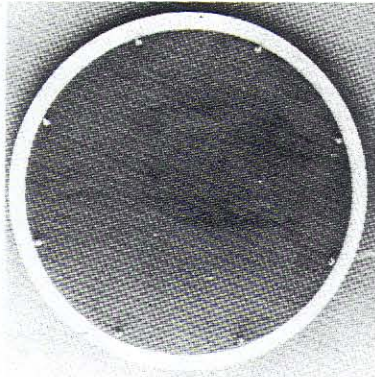
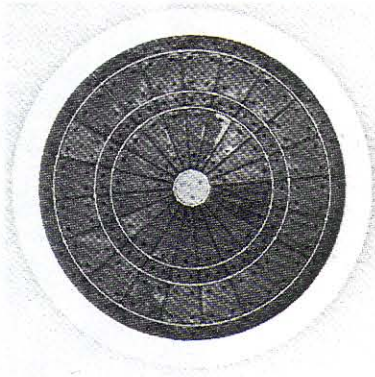Figure 14. Dart Head Assembly

A - Complete Assembly from back
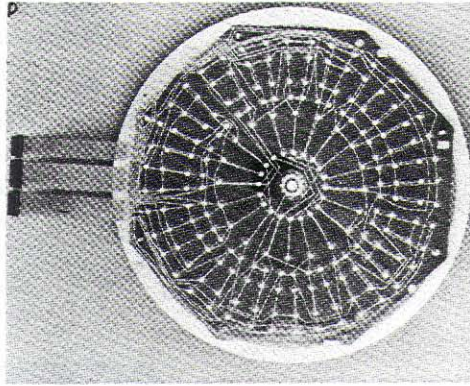
B - Matrix, on top of Dart Head Assembly

C - .020 gasket

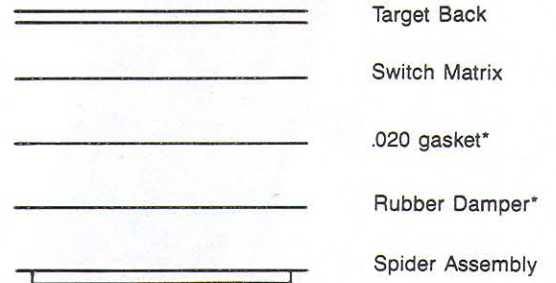D - Silicone Rubber Gasket

E - Spider Assembly

Target Back

Switch Matrix

.020 gasket*

Rubber Damper*

Spider Assembly
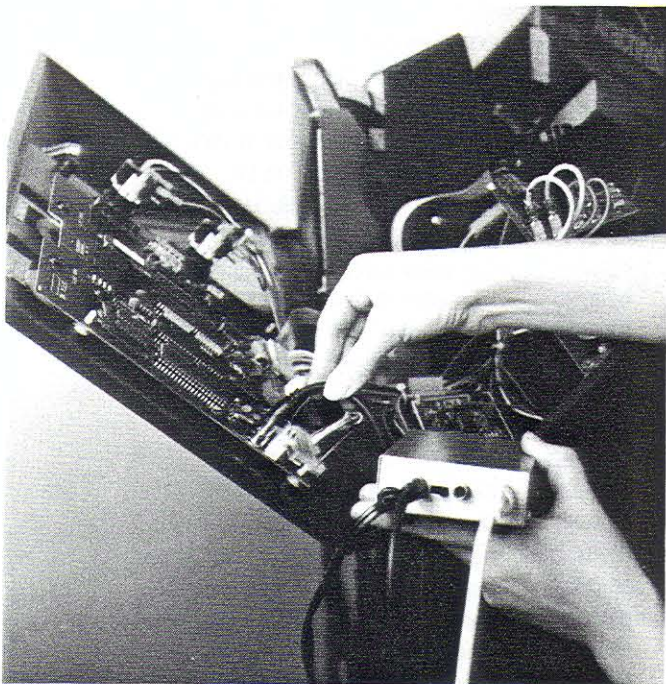
*May be replaced with one-piece matrix cushion.

Figure 15. Hooking up a modulator for external TV

Figure 16. External TV

9

SECTION 6 - PARTS LISTING

TARGET INTERFACE BOARD (Figure 17)

00-6000-02R

ITEM #	PART #	DESCRIPTION
1	10-0020	Connector - 9 Pin
2	10-0022	Connector - 13 Pin
3	10-0021	Connector - 11 Pin
4	15-0144	Ribbon Cable - 16 Wire
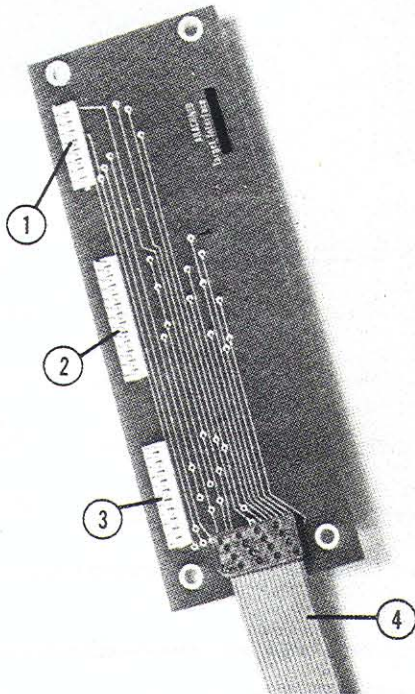
Figure 17. Target interface board

COIN DOOR ASSEMBLY (Figure 18)

00-6200-04R	U.S.A. - 25 cents	00-6002-04R	French - 1 Franc
00-7000-04BR	U.S.A. w/Bill Accep.	00-6005-04R	Spanish - 25 Pesetas
00-7000-04BSR	U.S.A. w/Bill Accep.	00-6006-04R	England - 20p
	and Stacker	00-6008-04R	Japan - 100 Yen
00-6001-04R	German - 1 DM	00-6009-04R	Kenya - 1 Shilling

ITEM #	PART #	DESCRIPTION
1	13-0098	Bill Acceptor - U.S.A.
2	13-0043	Coin Mechanism - U.S.A. 25¢
2	13-0044	Coin Mechanism - Canadian 25¢
3	03-0005	Capacitor .1 mfd 16V
4	18-0014	Cash Box - Tall
4	18-0107	Cash Box - Short (Bill Accept. Version)
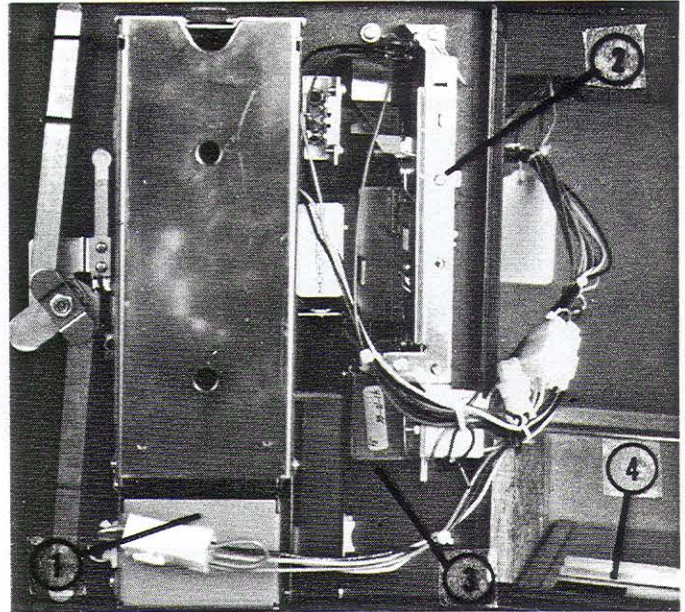
Figure 18. Coin door

MAIN P.C. BOARD ASSEMBLY (Figure 19)

00-7000-01R

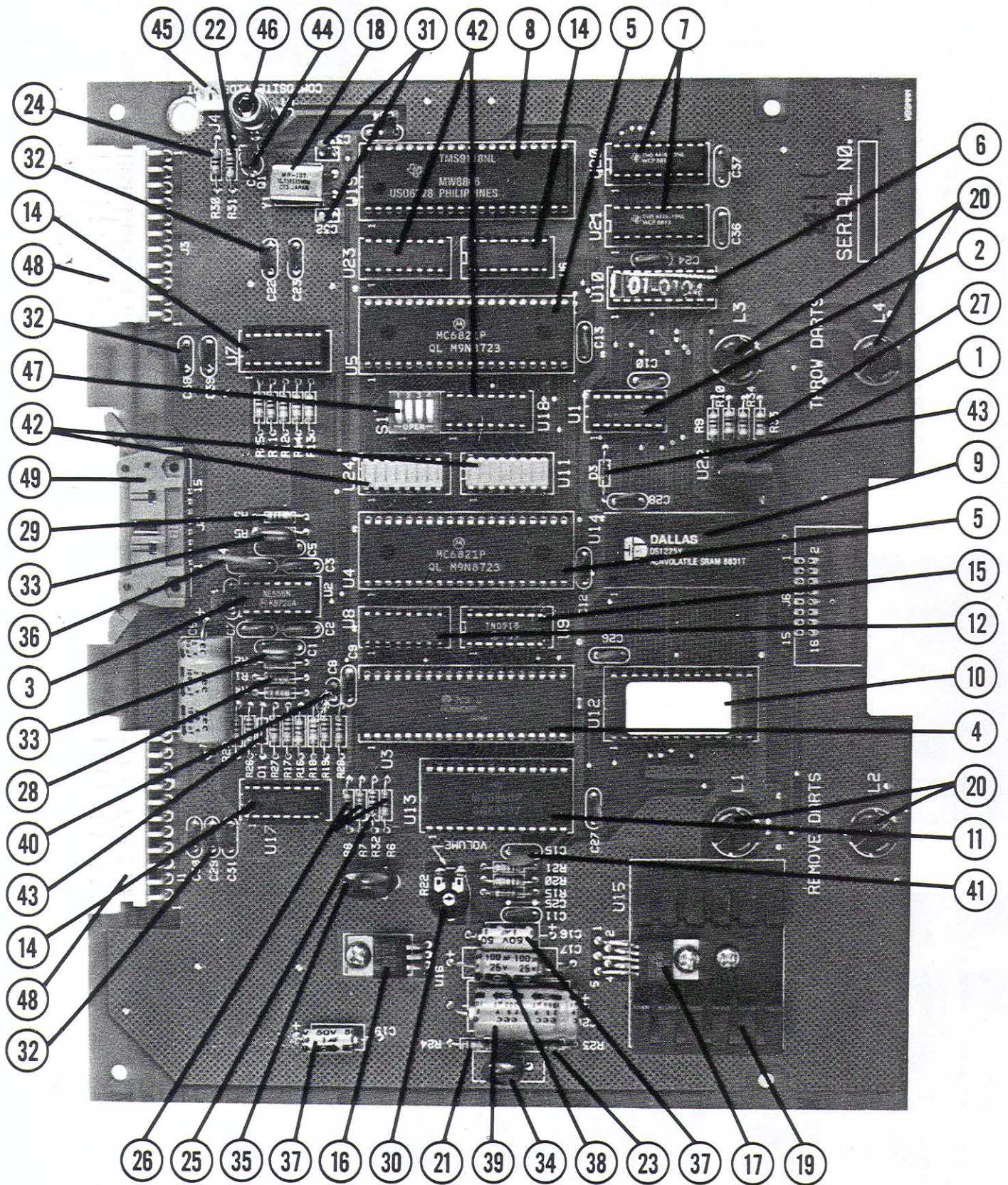| ITEM #	PART #	DESCRIPTION	ITEM #	PART #	DESCRIPTION
1	01-0105	DS1204U-4 Electronic key (sold with Programmable ROM)	25	02-0017	Resistor - 1K Ohm 1/4 W (11)
2	01-0014	74LS04	26	02-0047	Resistor - 3.3K Ohm 1/4 W (3)
3	01-0035	556	27	02-0021	Resistor - 10K Ohm 1/4 W (10)
4	01-0056	6809	28	02-0048	Resistor - 12K Ohm 1/4 W
5	01-0037	6821 (2)	29	02-0036	Resistor - 1 MEG Ohm 1/4 W (2)
6	01-0104	PLS 153 (PLHS18P8AN) PLD	30	02-0041	Resistor - 10K Ohm Variable
7	01-0052	TMS4416 Memory (2)	31	03-0044	Capacitor 33pf, 16V (2)
8	01-0053	TMS9118 Video	32	03-0002	Capacitor .01 mfd 50V (21)
9	01-0106	MK48Z08 Memory w/Battery	33	03-0005	Capacitor .1 mfd 16V (2)
10	01-0107	Programmable ROM - U.S.A. 7000	34	03-0007	Capacitor .22 mfd 16V
11	01-0039	6840	35	03-0008	Capacitor .33 mfd 100V
12	02-0045	Resistor Network - 2K Ohm	36	03-0009	Capacitor .47 mfd 16V
13	02-0001	Resistor Network - 10K Ohm (2)	37	03-0012	Capacitor 1 mfd 50V (2)
14	19-0018	Transistor Network - HLN2003A (3)	38	03-0021	Capacitor 100 mfd 25V
15	19-0020	Diode Network - TND903	39	03-0031	Capacitor 1000 mfd 25V (2)
16	01-0033	LM340-15	40	03-0032	Capacitor 4.7 mfd 25V Tantalum (2)
17	01-0027	LM383T	41	03-0057	Capacitor .47 mfd 16V
18	06-0005	Crystal 10.738635 MHZ	42	03-0042	Capacitor Network .01 x 8 (2)
19	13-0020	Heat Sink	43	19-0007	Diode IN4148 (2)
20	11-0013	Lamp with Socket (4)	44	19-0011	Transistor, 2N4400
21	02-0003	Resistor - 2.2 Ohm 1/4 W	45	10-0069	Connector, 2 Pin
22	02-0055	Resistor - 75 Ohm 1/4 W	46	10-0076	Phono Jack, PC Mount
23	02-0011	Resistor - 220 Ohm 1/4 W	47	08-0020	Dip Switch, 4 Position
24	02-0056	Resistor - 470 Ohm 1/4 W	48	10-0053	Connector, 11 Pin, .156" Centers (2)
			49	10-0081	Connector, 16 Pin Dual Row, .100" Centers

Figure 19.

MAIN CABINET ASSEMBLY (Figure 20)

| FIG. #	ITEM #	PART #	DESCRIPTION
20	1	16-0102	Bottom Decal - Lexan
20	2	00-7000-04BR	Coin Door Assembly with Bill Acceptor and Cash Box - U.S.A. - (see coin door Assembly section for other coin door#'s)
20	3	18-0034	Top Cabinet - Unassembled
20	4	16-0108	Top Decal
20	5	16-0109	Top Edge Decal
20	6	17-0001	Competitor Strip
20	7	18-0106	Cabinet Bottom - Unassembled
20	8	16-0104	Decal, Instructions, U.S.A.
20	9	16-0103	Decal, Game List, Master 7, U.S.A.
20	10	04-0024	Socket, Lamp, Med. Base (3)
20	11	11-0007	Lamp, 120V, 40W, 5-1/2" Frosted (3)
20	12	17-0036	Deflectors, Lamp (3)
20	13	13-0069	Foil, Alum. 2-5/8" x 9"
20	14	00-7000-29R	Component Tray Assembly, Complete
20	15	00-6000-33R	Arachnid Web
21		13-0009	Lock, Back Door
22		00-4500-12R	Speaker & Harness
23	1	00-7000-08R	Main Harness
23	2	00-6000-16R	Switch & Lamp Harness
23	3	00-6000-27R	Video Harness
23	4	11-0019	Monitor 9" Amber
23	4	09-0026	PC Board, Monitor, Complete
23	4	11-0022	CRT For Monitor, 9"
23	5	00-7000-01R	Main PC Board Assembly
23	6	00-4500-35R	Credit Card PC Board Assembly
23	7	00-6000-17R	Power Supply Chassis Assembly
24	1	08-0009	Switch, Illuminated w/o Bulb
24	2	11-0021	Bulb GE658
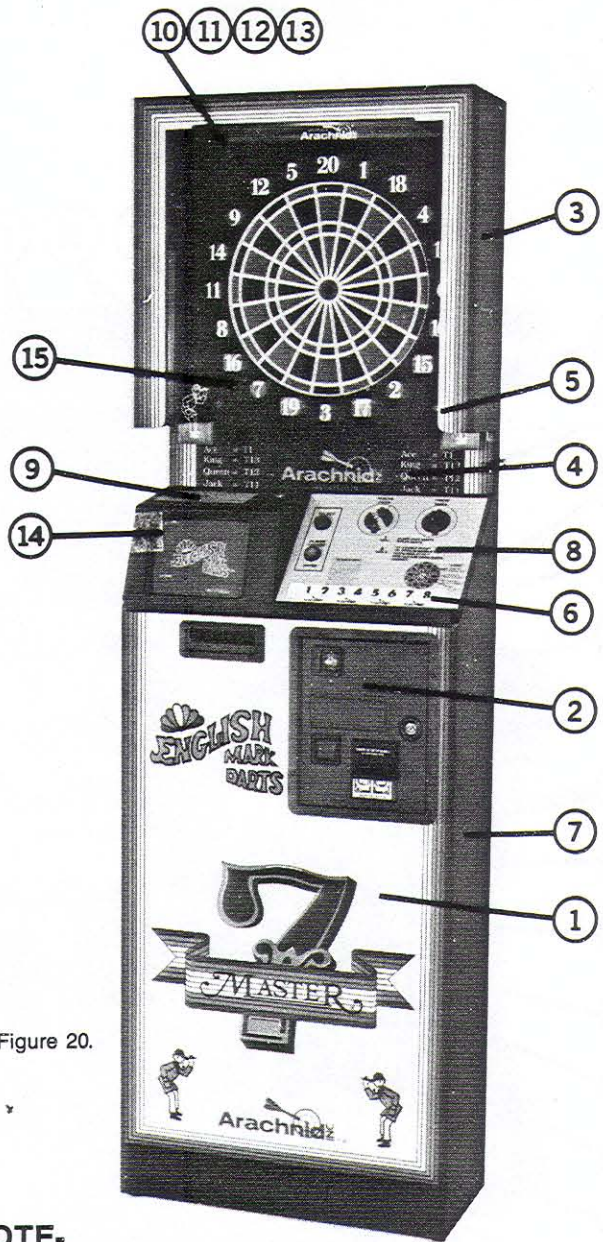
Figure 20.

Figure 21.

Figure 22.

-NOTE-

The part numbers listed are the Arachnid part numbers. Please use these numbers when placing your order. Some descriptions are followed by a number in parentheses. This number is the quantity used in that assembly.
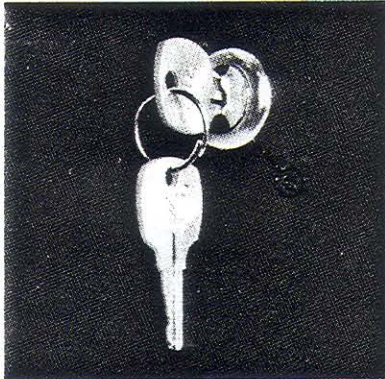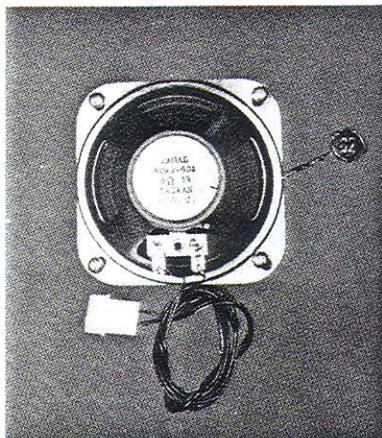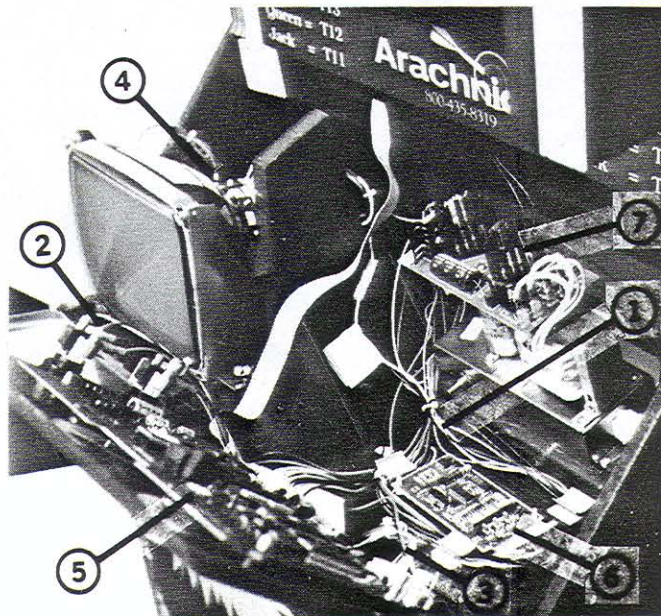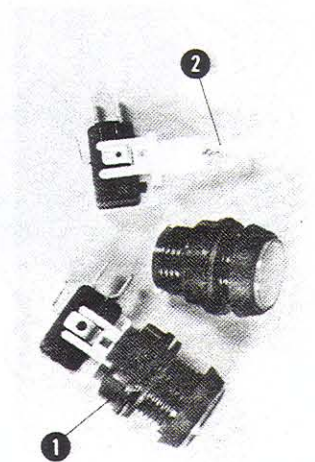

Figure 23.

Figure 24.

POWER SUPPLY CHASSIS ASSEMBLY
00-6000-17R

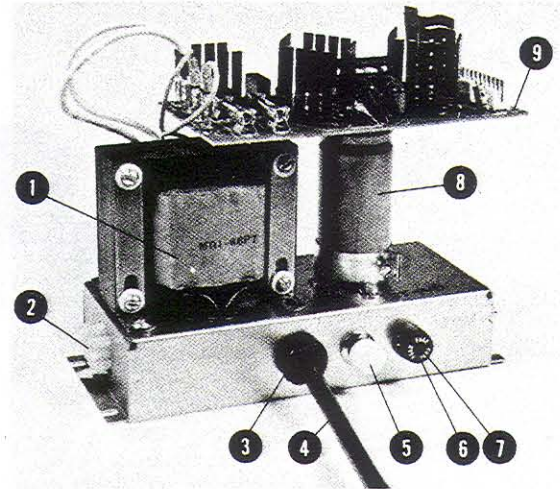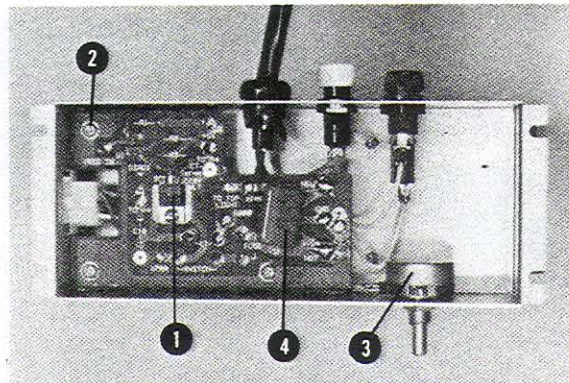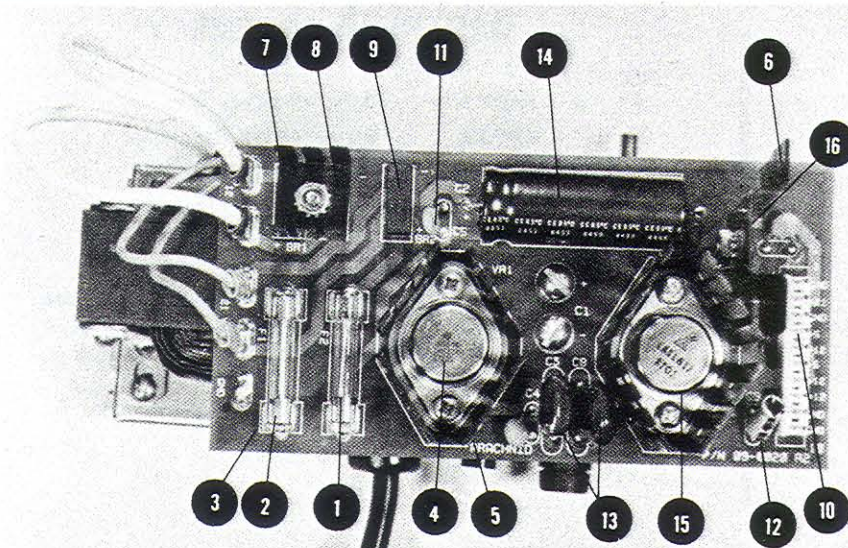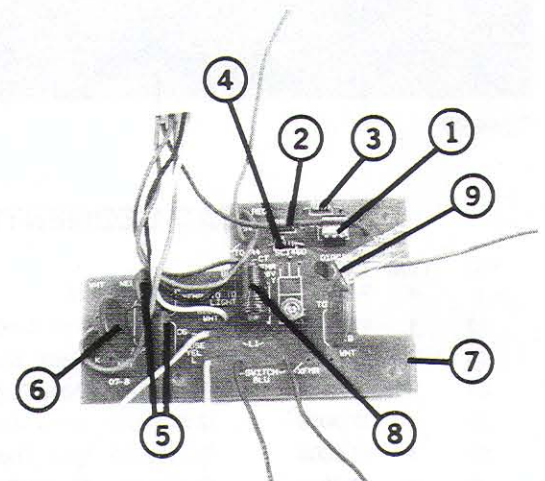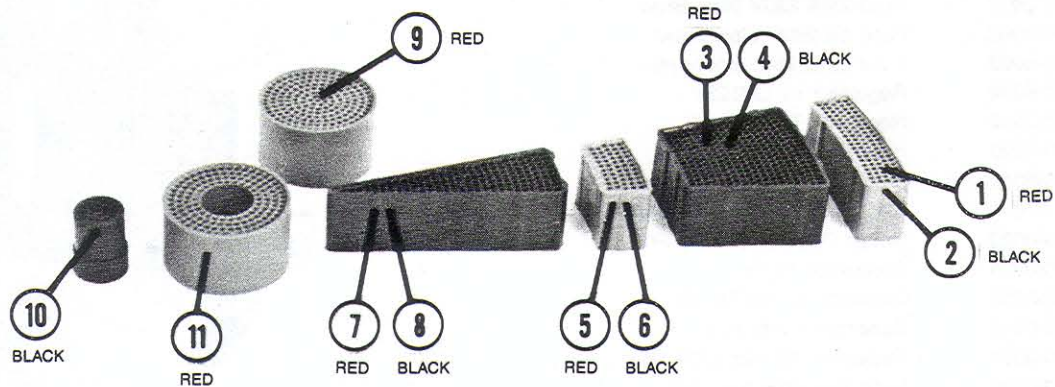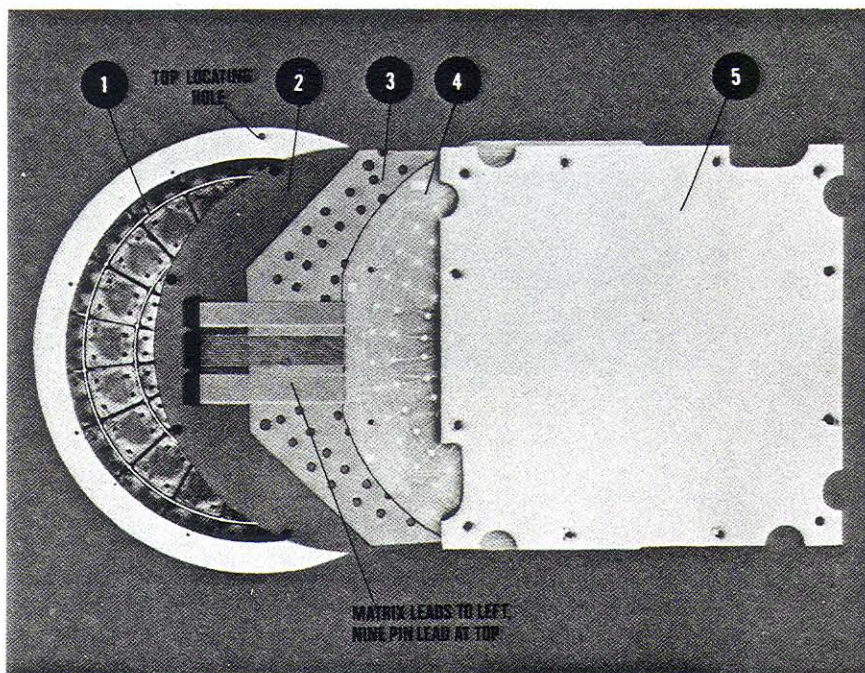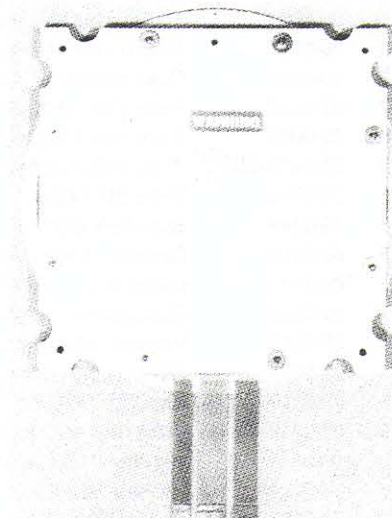| FIG.#	ITEM#	PART #	DESCRIPTION
25	1	07-0007	Fuse 3/4A 250V Slow Blow
25	2	07-0003	Fuse 5A 250V Slow Blow
25	3	13-0003	Fuse Clips P.C. Mount (4)
25	4	01-0032	Regulator 5V-LM323K
25	5	13-0040	Heat Sink T03 (2)
25	6	13-0020	Heat Sink
25	7	13-0041	Heat Sink, Square
25	8	19-0021	Bridge Rectifier 8A 200 PIV
25	9	19-0022	Bridge Rectifier 2A 200 PIV
25	10	10-0035	Connector 10 Pin
25	11	03-0002	Capacitor .01 mfd 50 (2)
25	12	03-0012	Capacitor 1 mfd 50V
25	13	03-0008	Capacitor .33 mfd 100V (2)
25	14	03-0026	Capacitor 4700 mfd 35V
25	15	01-0059	12V Regulator MC78T12ACK, TO3 - 2A
25	16	01-0060	12V Regulator, LM340-12, TO-220
26	1	20-0011	Transformer 115V Primary
26	1	20-0015	Transformer 100V Primary
26	1	20-0013	Transformer 230V Primary
26	2	10-0009	Connector 6 Pin Chassis Mount
26	3	13-0034	Strain Relief
26	4	15-0002	Power Cord 12'
26	5	08-0004	Switch On/Off - Push Button - Round
26	6	08-0031	Switch On/Off - Rocker - Square
26	7	13-0039	Fuse Holder, Chassis Mount
26	7	07-0008	Fuse 1.5A 250V Slow Blow
26	8	03-0033	Capacitor 8900 mfd 25V
26	9	00-6000-05R	Printed Circuit Assembly Top
27	1	19-0015	Triac SC 146D
27	2	13-0042	Standoffs 5/8"
27	3	02-0057	Resistor, 500K, Variable
27	4	03-0043	Capacitor .1 ufd 600V
28	1	01-0025	Opto Isolator MOC 3030
28	2	02-0010	Resistor 180 Ohm 1/4 W
28	3	02-0007	Resistor 120 Ohm 1/4 W
28	4	02-0017	Resistor 1K Ohm 1/4 W
28	5	03-0034	Capacitor .022 mfd 600V (2)
28	6	19-0014	Varistor V150LA20A (110V units)
28	6	19-0024	Varistor V250LA20A (220V units)
28	7	00-6000-24R	Printed Circuit Assembly Bottom
28	8	20-0012	Inductor, 50 mh, 3 amp
28	9	19-0026	Asymmetrical Bilateral Switch, ST4

Figure 26.

Figure 27.

Figure 28.

Figure 25.

Figure 29.

Figure 30.

Figure 31.

DARTHEAD SEGMENTS

FIG.#	ITEM #	PART #	DESCRIPTION
29	1	17-0003	A Segment, Red, Double
29	2	17-0008	A Segment, Black, Double
29	3	17-0005	C Segment, Red, Single
29	4	17-0009	C Segment, Black, Single
29	5	17-0006	D Segment, Red, Triple
29	6	17-0010	D Segment, Black, Triple
29	7	17-0007	E Segment, Red, Pie, Single
29	8	17-0011	E Segment, Black, Pie, Single
29	9	17-0004	B Segment, Red Bullseye
29	10	17-0073	B Segment, Double Bullseye, Center, Black
29	11	17-0074	B Segment, Double Bullseye, Outer Ring, Red

DARTHEAD ASSEMBLY

FIG.#	ITEM #	PART #	DESCRIPTION
30	1	17-0002	Spider without Segments
30	2	12-0001	Rubber Damper
30	3	12-0004	Gasket - .20″
30	4	08-0001	Switch Matrix - 6″ Leads
30	5	18-0003	Target Back
(Not Shown)		17-0076	Matrix Cushion - if used, replaces items 114 and 115)
31		00-6000-06R	Dart Head Assy. - Complete

Problem	Probable Cause	Procedure
Nothing lit on game.	a. Blown fuse. b. No power at outlet. c. Fuse FS1 on top of power supply blown. d. 5 volt regulator bad. e. Game not turned on.	a. Replace fuse in power supply with 1.5A 250V slow blow fuse. b. Check main breaker in building. c. Replace fuse with 5A 250V slow blow. d. Check for 15V on input to regulator and +5V on output. If input is OK but +5 is not present, replace 5V regulator LM323K. e. Turn on switch located on power supply.
Player change and/or game select switches not functioning.	a. Bad U5 6821. b. Broken connection from PC Board to switches.	a. Replace. b. Check and repair wire harness.
Coin switch and/or test mode not functioning.	a. If both are not working, plus lamps on coin door are not lighting, there may be a bad ground to the coin door. b. If both are not working, but the lamps on the coin door are lit, the problem could be U4-6821. c. If just one switch isn't working check buffer IC U17.	a. Repair ground. NOTE - System ground is floating (not connected to power supply chassis) and is connected only to the PC board on top of the power supply. b. Swap U4 with U5 to see if the problem goes away; if so, replace 6821. c. Swap U17 and U7 to see if the problem changes. If so, replace the bad ULN2003.
Small lamps on printed circuit board not lighting.	a. Lamp burned out. b. Transistor driver for lamp bad. c. Peripheral interface adapter (PIA) bad.	a. Replace lamp. b. Replace drive U7. c. Replace PIA U4.
Target lamps won't light at all.	a. Lamp burned out. b. Triac bad (if triac were shorted the lamp would be on all the time). c. Opto isolator (MOC3030) bad. d. Buffer U7 is bad. e. PIA U5 bad (6821).	a. Replace lamp. b. Replace triac located under power supply chassis. c. Replace; located under power supply chassis. d. Replace U7 (ULN2003). e. Swap with U4 to check. If problem moves, then replace bad PIA.
Sound problems.	a. Blown fuse, FS2, on top of power supply. b. 15V regulator (LM340-15) faulty on main board. c. Amplifier faulty (LM383T). d. Timer IC U13 (6840). e. Sound is fuzzy or garbled. Bad 4700 mfd 35V capacitor (C2) on power supply board. f. Sound sticks on - game must be shut off to stop it.	a. Replace with 3/4A 250V slow blow. b. Check for +24V on pin 1 and +15V on pin 3. If +15V is not present on pin 3 replace regulator. If +24V is zero, replace fuse (FS2 on power supply) or check wiring from power supply to main board. c. Check input (pin 1) with an oscilloscope to see if square waves are coming in (make sure volume is turned up, R22). If no square waves present, see "d" below. If square waves are present, but not coming out of pin 4, replace U15 LM383T amplifier. d. If no square wave is present on pin 27 of U13 (during the time that sound is supposed to be present), replace either U13 or U10 (PLS153 address decoder). e. Resolder connections first to make sure that the problem is not a cold solder joint. If no improvement replace C2. f. Replace capacitor C19 on the Main PC Board.
No score.	a. Dirt or broken tips in dart head holding a switch in the switch matrix closed (game won't score until switch in the matrix opens). b. If the problem is not in the dart head, may be U4 (6821) on the main board.	a. Clean dart head assembly by disassembling/reassembling and removing any foreign material. When reassembling make sure to tighten the 8 screws and nuts that hold the target head together only finger tight. b. Swap U4 with U5 to see if problem changes. If it does, replace bad 6821.
Select or player change lamps not working.	a. Lamp burned out. b. Transistor driver for lamp bad. c. Peripheral interface adapter (PIA) bad. d. If coin door lamps also out, check LM340-12 or 12V. Also check for proper lamps GE 658.	a. Replace with GE 658 (do not use a GE 194 or GE 161 lamps). b. Replace U6 ULN2003. c. Replace PIA U5. d. Turn off power supply, let cool. If they come on after cooling, then lamps may be drawing too much current. Make sure that the bulbs are NOT GE 194 or GE 161.
Popularity screen has garbage for numbers.	a. Service person has touched main board or wiring going to main board when he was charged with static. b. Batteries in MK48Z08 ram bad. c. Game not grounded properly.	a. Reset popularity screen by pressing bullseye while popularity screen is being displayed. Discharge static to front coin door before touching electronics in component tray. b. Batteries inside device are not replaceable: replace IC MK48Z08 U14. c. Check that the 3 prong outlet is properly grounded.
Target lamp in off condition doesn't vary in brightness.	a. Variable resistor, DIAC ST-4 or C10 .1 ufd Capacitor bad.	a. With power off, check variable resistor for proper resistance. Replace defective parts.
No video display.	a. No 12V to monitor. b. Transistor Q1 bad.	a. Check 12V regulator MC78T12ACK for 12 VDC or plug in external modulator. If external TV works through modulator, the main board circuitry is OK. Problem is with monitor or 12V regulator. b. With an oscilloscope check output of TMS9118 for about 1-1/2V P-P video signal. Then check for same at center connector of video jack. If not present, replace Q1 (2N4400). Q1 is used as a buffer for the TMS9118 for protection against accidental shorting.
Garbage on display.	a. Video memory bad. b. Video chips bad.	a. Replace U20 and U21, TMS4416. b. Replace U19, TMS9118.

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