

Galaxy II

Series Operator's Manual



The Originator of Electronic Darts

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Introduction

This manual contains assembly, operation and troubleshooting information for Arachnid's Galaxy II dart machine.

If you encounter a problem that is not covered in this manual, or if you have any questions, contact Arachnid at 800-435-8319 from 8 a.m. to 5 p.m. CST.

Section 1 General Description

The dart machine is a coin operated unit offering players a wide variety of game choices to challenge all skill levels. The unit occupies only 3.9 square feet (27" x 21") of floor space.

The machine uses a sealed matrix scoring system behind the dart face. As the darts strike the target, the machine's computerized scoring system instantly displays the score on the color monitor.

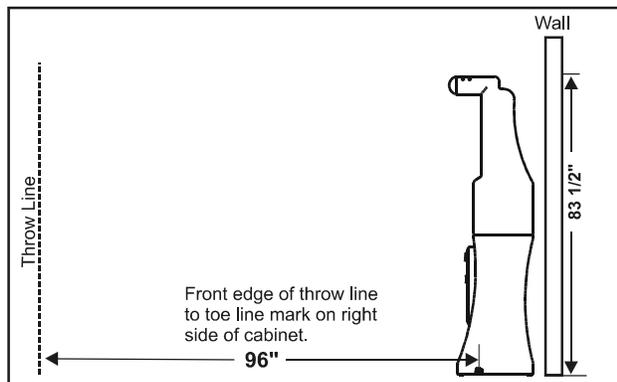


Figure 1: Side view of play field

Section 2 Features of the Machine

This section lists the features and games available on the machine.

2.1 Features

A. Automatic Player Change.

The machine is equipped with automatic player change, which is operator selectable between manual and auto in

the test/setup mode. If this option is used, the game will change players automatically at the end of each player's turn. The remove and throw darts delay time is also operator selectable.

B. All coin and credit settings are "software selectable." Free play is also available.

The selection of coins (1 - 20) and the number of credits (1 - 50) allow a wide variety of coin-up options. Both these settings and a "Free Play" option are available in the test/setup mode.

C. Credits required per game are "software selectable" for each individual game on the menu.

The number of credits required to play each game, preset at the factory, can be changed as desired for any game in the test/setup mode.

D. Happy Hour reduced pricing.

Reduced pricing for "Happy Hour" is available along with time settings for each day of the week in the test/setup mode.

E. No dip-switches for game options; all features are software selectable.

All selectable options are set in the test/setup mode. (Spread Limits, Round Limits, Single or Double Bullseye, etc.)

F. Sounds for player feats.

Individual sounds are played for each player feat accomplished. (Triples, Hat Tricks, Whitehorses, Wins, etc.)

G. VGA color graphics and monitor.

Color graphics provide crisp, clear game and menu screens.

H. Missed Dart Detector.

Arachnid's exclusive dart catching front (web) will detect a dart hit, and count it as a dart thrown, without giving a score.

I. Normal game play statistics.

The machine displays player statistics on the screen following the end of every game

J. Operator reports.

Game popularity and coin slot reports are available in the test/setup mode.

K. Hours of Operation.

Setting the location's hours of operation in the software allows the machine to automatically dim the lights and blank the monitor when the location is closed.

L. League Mode.

Completely automated league mode including: Two-way communications - NO TEAM CARDS, Statistics are shown at the end of each game and are stored for easy retrieval via modem.

2.2 Available Games

Available for play are all the old favorites and some new challenging "speed" games. The games and their descriptions are listed below:

A. 01 Games.

The 01 (oh one) family of games are count-down games for 1 to 8 players, where each player starts with 301, 501 or 701 points, depending on the game chosen. The first player to reach exactly zero, or the lowest score when the round limit is reached is declared the winner.

The 01 games are available with the following opening round options:

Open In: A hit on any numbered segment will begin the count-down process.

Double In: The player must hit any double or the bullseye to begin the count-down process.

Master In: The player must hit any double, triple or the bullseye to begin the count-down process.

The 01 games are available with the following final round options:

Open Out: Any segment that will bring the players score to exactly zero can be used to "take the game out."

Double Out: Any double or the Bullseye that will bring the player to exactly zero must be used "to take the game out."

Master Out: Any double, triple or the bullseye that will

bring the players score to exactly zero must be used to "take the game out."

B. Cricket Games.

Cricket is a game of skill and strategy played with the numbers 15 through 20 and the bullseye. A player must "mark" each number three times before that number is "closed." A single counts one mark, a double two, and a triple three. Points are scored every time a player hits a number he has closed. Once all players have a number closed, no one can score points on that number. The first player to close all the numbers and the bullseye and have equal to or more points than all his opponents is declared the winner.

Maximum points scored by players may be governed by a preset spread limit in some games. Spread limits control the point spread between players in an effort to keep the better player from running up the score and over-extending the game. For example: If player "A" has 89 points, then player "B" cannot score more than 289 points under a 200 point spread limit. When a player reaches the spread limit, he is forced to try and close another number, as no further scoring is possible until the other player(s) add points to their score. Spread limits can be toggled off or on in the test/setup mode.

Cricket comes in five variations as described below:

Cricket

1 to 8 players. This is the basic version of cricket. A 200 point spread limit is the default.

Cut-throat Cricket

2 to 8 players. The object is close all the numbers and have the lowest score. Once a player closes a number, additional marks will score point for opponents who have not closed that number. There is no point spread limit for this game.

Team Cricket

4 players. Played by four players as two teams. Each player marks individually; however, team partners score together as a team. Both partners must have a number closed before either can score on that number. The team with all numbers and the bullseye closed for both partners and equal or more points is declared the winner. A 400 point spread limit is the default.

Lowball Cricket

1 to 8 players. Playing numbers are 1 through 6 and the bullseye. If the double bull is used, it will score 4 points for and outer and 8 points for an inner. Single bull scores 8 points for either. The first player to close all the numbers and the bullseye and has equal or more points than his

opponents is declared the winner.

A player can win the game with a “Wicket.” End the game with a “Wicket” by scoring a triple 1, triple 2, and triple 3 all in the same turn. You can only “Wicket Out” if you have not previously marked numbers 1, 2, or 3, with any dart during the game. A 20 point spread limit is the default.

Wildcard Cricket

1 to 8 Players. Instead of the traditional numbers, this game will start with a random selection of six numbers from 7 through 20 (the bullseye will always be present). All numbers are “Wild” and will change at the end of each player’s turn if not marked. Once a number is marked, it will remain the same throughout the rest of the game. A 200 point spread limit is the default.

C. Count up.

1 to 8 Players. Count Up is a good game to begin learning darts, allowing the player to develop throwing technique without being distracted by strategy. Each player begins with zero points and tries to score the most points to win the game. All segments will score points and a winner is declared at the end of 8 rounds.

D. Tic Tac Darts.

2 Players. This is a variation of traditional Tic Tac Toe. The same nine square grid is used. The machine places the bullseye in the center square with randomly selected numbers in the other eight squares. Player “X” or player “O” claim a square by marking the number four times. Singles score 1 mark, doubles 2, and triples 3. The bullseye scores 1 mark; double bull if used will score 1 for the outer and 2 for the inner. The first player to get three squares in a row is declared the winner. In the event of a “Cats” game, where it is not possible to have three squares in a row, the game ends with no winner declared.

E. Bermuda Triangle.

1 to 8 players. Players shoot at a new number each round. The numbers used are 12, 13, 14, Double, 15, 16, 17, Triple, 18, 19, 20, Bull, and Double Bull. Hitting any segment of the current number accumulates points for the player. For example: The first number is 12. A single will score 12 points, a double 24, and a triple 36. When “Double” is the current target, any double (except double bull) will score. The same applies to “Triple” when it is the current target. When a player misses the current number with all three darts, their current total score is cut in half! The highest score at the end of the game wins. In the event of a tie, the player with the fewest “halves” is declared the winner.

F. Gotcha!

2 to 8 players. The object of the game is to be the first player to go from zero to exactly 301 points. Players try to match their opponent(s) score with each dart thrown. Every time there is a match, a bomb is detonated which destroys the opponents score and sets it back to zero. If, as you approach 301 points, you go over, the amount exceeded will be deducted from your original score for that turn, and no matching bombs will be detonated. However, the player with the matched score, on their next turn, can throw a “missed dart” scoring no points and set you back to zero. There is also a “Master Out” option, requiring a double, triple, or bull to reach exactly 301 points and win the game.

G. Speed Games

These two games allow a single player to compete against the clock.

Count Down

The clock times how long it takes to go from 901 to exactly zero. When a game is completed within the ten fastest times, an input screen appears, where the player adds their name to the Top Ten List.

Quick Cricket

The clock shows how long it takes to close the 15 through 20 and the bullseye. Three marks are required to close a number, as in regular cricket above. No points are scored for extra hits on closed numbers. When a game is completed within the ten fastest times, an input screen appears, where the player adds their name to the Top Ten List.

Section 3 Unpacking/Assembly

3.1 Unpacking

Unpack the machine per the instructions listed on the carton.

3.2 Assembly

1. Place the upper cabinet assembly on the lower cabinet.
2. Open the upper cabinet door and remove the monitor bezel by lifting upward and outward.
2. Secure the upper cabinet to the lower cabinet using the four wing bolts provided.

3. Feed the wiring harness and connector through the hole in the upper cabinet to the lower cabinet and connect to the coin door harness.
4. Replace the monitor bezel by placing the lower T-brackets into the T-cutouts on the cabinet then rotate the top inward. Align the plastic pins near the top of the bezel with the holes in the cabinet and press the bezel flush. Close the door to secure the bezel.

Section 4 Operation

4.1 Power Up

Once the machine is assembled and set in place, connect the power cord to a wall outlet. **Note: The outlet must have an earth ground and be wired for the correct polarity.** The incoming line voltage is not switched and power is immediately applied to the Main Board. The monitor and target lights are controlled by the switch on the back of the machine.

4.2 Game Play

Upon power-up, the machine is ready for play. Players select their game and options using the on screen menus. The up and down buttons are used to negotiate menus and the enter button to make selections. On-screen instructions are provided from the main menu.

4.3 Test/Setup Mode

To enter the test/setup mode, press the test button on the main PC board. All game options and hardware tests are selectable through software via the test/setup mode. The flow chart in Appendix A shows functions of the test/setup menus and where to access them. The following are descriptions of the various options available in test/setup mode. Use the chart and these descriptions as references and follow the instructions on the screen to make changes or view the settings. Generally the up and down buttons are used to negotiate menus and the enter button to make selections or changes.

A. Machine Setup Menu.

Language Setup: Used to set the display language on the machine.

Time Settings Menu: Used to access current date and time, Happy Hour and Hours of Operation time settings.

Set Time/Date: Used to set the machine's clock and internal calendar.

Set Happy Hour Times: Allows the operator to offer reduced game pricing for a set period each day. To activate this feature, the time period must be set on this screen and the reduced credits (Happy Hour) set in the Price Settings screen.

Set Hours of Operation Times: Setting the location's Hours of Operation will allow the machine to enter **Sleep Mode** outside normal business hours. In Sleep Mode, the target lights will dim and the monitor screen will blank out. While in Sleep Mode, inserting a coin or pressing any button will return the machine to Normal Mode.

Coinslot Assignment: Used to set coins per credit and credits per coin. Adjust the number of coins that have to be inserted to register the number of credits shown or adjust the number of credits that will register for the number of coins shown. Default: 1 coin = 1 credit.

Input Machine Name: Used to input a "human friendly" name for each machine.

Free Play: Used to set free play on or off.

More Machine Setup: Contains the following setup options.

Reset Menu:

Reset All: A one-step method of activating all the resets listed on this menu.

Reset to Factory Defaults: Resets all options to the original factory setting.

Reset Countdown Top Ten List: Clears information stored in this list.

Reset Quick Cricket Top Ten List: Clears information stored in this list.

Reset Popularity Counters: Resets all the counters back to zero.

Clear Machine Credits: Clears any accumulated credits from the machine.

Reset League Stats: Clears all stored match statistics.
Warning: Once they have been cleared they cannot be retrieved. Make sure all stats have been collected from the machine prior to using this function!

League Attract Menu:

List League/Attract Files: Lists the league and graphic files currently on the machine and includes memory size information.

Delete League/Attract Files: Allows league and graphic files to be selectively deleted.

Delete All League/Attract Files: Used to delete ALL the league and graphic files from the machine.

B. Game Setup Menu.

Price Settings: Used to set the number of credits required by each player in normal game mode and happy hour mode, for each individual game.

Bull Setting: Used to set the single or double bull for each individual game.

Round Limit Setting: Used to set round limits for each individual game.

Spread Limit Setting: Used to set Spread Limits on or off for Cricket games.

Out Option Setting: Used to set the “Out Option,” for games that have special requirements for winning the game.

Last Chance Setting: Used to set last chance on or off for each game where applicable.

More Game Setup: Used to access the following items:

Auto Player Change: Used to set auto player change on or off.

Player Change Delay: Used to set the time, in seconds, allowed to remove darts between player turns.

Cheater Alarm: Used to set free dart sound on or off. When set to ON, the machine will make an alarm sound when players throw darts without inserting any credits. Used to discourage free play.

League Dues: Used to have the machine automatically collect league dues from each team prior to a match. Can be turned “ON” or “OFF” The amount to collect is determined and sent by Arachnid’s League Management Software.

C. Communications Menu

Modem Menu:

Modem Information: Displays information about the modem if it is installed properly and working.

Modem Receive Test: Displays all data sent by the modem in yellow and all data received in white.

Input Modem Password: Used to input the password used for modem security. The password can be from 1 to 8 characters. Only calls submitting the correct password will be allowed to establish communications.

Modem Call Window: Used to set the number of rings within the call window and outside the call window, after which the modem will pick up an incoming call. The call window is defined by the beginning time and ending time set on this screen. This feature is contingent on the machine having the correct time set.

Modem Call-Out Menu:

View Settings: Used to view the current call-out settings.

Edit Phone Number: Used to set the call-out phone number.

Call Now: Used to force the machine to call out immediately.

Network Menu:

Reconfigure Network: Is used to examine the entire network of machines and configure network machine node numbers. Shows the status of each node on the network.

View Network Configuration: Shows the last known status of all machines on the network.

Adjust Network Speed: Used to set the network transmission speed. If Galaxy or Black Widow machines are networked with Galaxy II machines, the network speed must be set to 9600. If only Galaxy II machines are networked, any speed can be used, but they all must be set to the same speed.

Network Monitor: Displays all network data sent by the machine in yellow and all network data received in white.

Network Send Test: Tests the ability of the machine to send data across the network. (Displays the alphabet in yellow as the characters are being sent.) Used in conjunction with another machine running the

Network Receive Test (see below) to verify network communications.

Network Receive Test: Tests the ability of a machine to receive data across the network. (See Network Send Test above.) When another machine is set up to send, the receiving machine will display the alphabet in white letters as they are being sent.

Network Help: Displays frequently used information on network setup for the technician.

Direct Connect: Used to connect a PC directly to the Galaxy II through the network. For configuration and diagnostic purposes only.

D. Popularity Menu.

Game Popularity Counter: Displays a history of machine usage. Shows all games on the machine, the number of times each game was played and the number of credits collected toward each game.

Coinslot Report: Displays the number of credits taken in by each of the coin slots - individually.

Credits Report: Used by the collector to display credits taken in (since last reset) for game play and league dues.

E. Test/Software Update Menu

Hardware Test/Software Update Menu

System Info: Provides status of Eproms 1 through 4, Manufacturer's ID Number, and Serial ID Number.

Hardware Test Menu: Allows technician to check the operation of inputs and outputs.

Receive RS-485 Software Update: Used to update software Eproms from a PC. See Appendix B.

Send RS-485 Software: Used to copy the software from one networked Galaxy II to another Galaxy II that has been set to Receive RS-485 Software Update. Only one Galaxy II machine can be set to receive on the network at a time. See Appendix B.

Reboot: Used to exit the Software Update Menu and reboot the machine.

Duplicate Boot Flash (To Eprom 1): Copies the software contents of Eprom 0 to Eprom 1. See Appendix B.

Update Boot Flash (From Eprom 1): Copies the software contents of Eprom 1 to Eprom 0. See Appendix B.

Section 5 Technical Description

5.1 General Information

5.2 Power Supply

The machine is equipped with a switching power supply. This supply has a universal 85 VAC to 264 VAC 50/60 HZ input. The inputs connect to J1, and the outputs are on J2.

J1

Pin 1 AC Line
Pin 2 AC Neutral

J2

Pin 1 +12 VDC
Pin 2 +5 VDC
Pin 3 +5 VDC
Pin 4 Logic Ground
Pin 5 Logic Ground
Pin 6 Unused

5.3 Main PC Board

The main PC board is controlled with a Motorola ColdFire 5206e microprocessor and associated IC's consisting of the following:

MCF5206EFT54: U15
Microprocessor

XCS30XL-5PQ208C: U16 - Inputs/Outputs
Field Programmable Gate Array

SST28VF040A-250-4C-NH: U4 - Boot Flash
512Kx8 250nS Flash Rom

CY7C1049V33-12VC: U14 - Video Memory, U13 - Ram
512Kx8 12nS SRAM

SST39VF160-90-4C-EK: U5 - Main Program Flash
1Mx16 90nS Flash Rom

DS1746W-70: U3 - Real Time Clock
128Kx8 NVSRAM W/RTC

MC34064P-5: U11
Low Voltage Inhibit

Z86E0412PSC: U1
Power On / Watchdog Reset / Target Head / Low
Voltage Detect

LT1086CT-3.3: VR2
3.3 Volt LDO Regulator

ULN2003A: U12,U18,U19
Line Driver

TDA2003H: U8
Audio Amp

SN75176B: U9
RS-485 Line Driver

MM74HCT04N: U10
Hex Inverter I.C.

The ColdFire 5206e interfaces with the memory that includes two Flash memory IC's (U4, U5), and a battery backed Dallas memory IC that includes a clock function. The Flash memory is divided into:

1. Boot Flash which is required for the most basic functions including loading new software (U4).
2. Program Flash (U5).

The ColdFire 5206e also interfaces to the Xilinx IC which provides almost all of the INPUT and OUTPUT functions including the VGA video output. The only INPUT/OUTPUT that comes direct from the ColdFire 5206e is the serial communications for the COM IN, COM OUT and MODEM.

A. Reset Circuit.

The circuitry can be RESET by pressing the reset button (SW2) on the main board. This will trigger the Zilog IC, U1, and a reset pulse of the proper length will be sent to all IC's that would require that signal.

B. Low Voltage Circuit.

IC U11, a 34064, will trigger the RESET function if the DC voltage (5 Volts) at the main board is too low. This will help prevent bad data from getting into the Dallas volatile memory area. If the voltage stays low, the game will lock up until the voltage goes to an acceptable level.

C. Player Change and Up Down Buttons.

The player change and up/down push buttons are buffered through ULN2003 IC's to prevent damage to the Xilinx IC. The ULN2003 IC's are in sockets so they can be replaced easily should they be damaged.

D. Player Change and Up Down Button Lamps.

The player change and up/down buttons contain lamps that are controlled by the game. The signals are generated from the Xilinx IC, and buffered by ULN2003 IC's to control the lamps.

E. Sound Circuit.

Sound is generated by the Xilinx IC, pin 185, and amplified by U8, a TDA2003 amplifier. Volume can be adjusted with RP1 volume control on the main board.

5.4 Video and Monitor

Video is generated with the Xilinx IC, and the weighted RGB outputs are buffered with transistors Q1, Q2 and Q3. The horizontal and vertical sync is buffered through U10, a 74HCT04. All of the video signals go out through J13, a standard PC style VGA connector. The monitor is a standard PC style VGA monitor.

5.5 Target Illumination

The target is illuminated by two standard 40 watt bulbs mounted in reflecting boxes above the dart head. During attract mode the bulbs are dimmed to discourage free play. This is done by means of a dimmer PC board, mounted next to the power supply.

5.6 Dart Head

The dart head assembly consists of (from front to back): the spider and segments, a matrix cushion, and the switch matrix. This assembly is resting on two screws at the bottom and is secured to the door (backboard) by means of five spider retaining latches.

A single 19 pin ribbon cable on the switch matrix, brings the signals to connector J14 on the main PC board.

A. Dart head disassembly/reassembly.

To clean or replace parts in the dart head:

1. Remove the four retaining screws and remove the catch web.
2. Disconnect the switch matrix cable from the main PC board.
3. Hold the spider and segments against the backboard while sliding the retaining latches off the spider. **Do not remove the two resting screws at the bottom of the spider.**
4. Grasp the switch matrix, matrix cushion, and spider together as a unit and gently pull the assembly (top first) off the back board. **Keep the face of the spider and segments angled downward. Tipping the assembly face up will allow the segments to fall out.**
5. Lay the assembly face down on a flat surface.

NOTE: It is recommended, at this point, that the switch matrix, matrix cushion, and spider be marked with a permanent marker before disassembly to make proper orientation during reassembly easier.

6. Lift off the switch matrix, then lift off the matrix cushion, exposing the segments.
7. Check for dirt, broken tips, or other foreign matter between the spider, segments, matrix cushion and switch matrix. Check and remove any broken tips inside the segments. Remove the segment back cover by gently prying it up. Snap the cover back in place when finished.
8. Replace any worn or broken segments.
9. There is a small locating hole on the outer edge of the yellow spider. It is smaller and closer to the edge than any other hole. With the spider and segments face down, position this hole at approximately 10 o'clock (top and slightly left). The two alignment pins should be near the top and away from you.
10. Check the matrix cushion for badly worn spots or holes. If none are found, clean the cushion and set it over the alignment pins and back on the spider. There is a small "U" shaped cutout on the edge of the cushion. Place the cutout toward the top of the dart head. This cutout will line up with a similar cutout on the switch matrix in the next step.
11. Clean the switch matrix and place it over the alignment pins and back on the matrix cushion with the tail at 9 o'clock. Make sure the cutout on the switch matrix lines up over the one on the matrix cushion. Adjust the matrix cushion if necessary.
12. Grasp the spider, matrix cushion and switch matrix as a unit. Install it on the back board by placing the bottom first on the resting screws. Gently rock the top backward, aligning the pins with the holes in the backboard. Make sure the matrix ribbon cable goes through the hole in the backboard. Press it against the backboard until fully seated. Turn the retaining latches over the spider to secure the assembly in place.
13. Make sure the ribbon cable is through the backboard and the top (12 o'clock) double segment is black and aligned straight up. Remove the assembly and make any adjustments if necessary.
14. If all alignment is correct, reinstall the catch web with the four screws provided and reattach the ribbon cable to the main PC board. Installation is now complete.

It is important to keep dirt and foreign material out of the area between the spider and segments as non scoring or improper scoring can result. On heavily played machines it is a good practice to disassemble and clean the dart head regularly. Following this suggestion will prevent service calls between scheduled visits.

B. Missed Dart Detector.

The machine has the ability to detect darts that miss the dart head and strike the surrounding catch web. Mounted behind the web is a vibration sensitive piezoelectric switch circuit board. The wiring harness from this switch is connected to the main PC board at connector P5.

If the Missed Dart Detector detects a hit anywhere on the catch web face, the machine will record a dart thrown and

no score will be given.

There is a small sensitivity adjustment pot on the detector assembly. Turning it clockwise will increase the sensitivity and counter-clockwise will decrease the sensitivity. **This is a single revolution pot, there are no stops when turning it.** One complete revolution brings the setting back to the same point, adjustments should be made in one tenth revolution increments.

Ideally, the detector should effectively sense darts striking anywhere on the web surface, even the lightest dart. Optimum sensitivity will vary from one location to location depending on the environmental circumstances. For instance, if a machine is in close proximity to a loudspeaker which gives off vibrations, or possibly a dance floor, sensitivity may have to be decreased to compensate for the interference. Adjust as needed for each location's needs.

C. Target interface.

The switch matrix is connected to the main board via the 19 pins of J14. For troubleshooting purposes, it is important to know which pins on J14 will give a particular score. This information is given in the table below.

With the machine in setup mode. choose Dart Head Test from the Hardware Test Menu. After removing the switch matrix connector from J14, pairs of pins can be shorted and opened (quickly - less than 60 milliseconds) with a jumper wire to simulate a dart hit. The score will not register until the jumper wire is removed from one of the pins. This procedure can determine whether a scoring problem is caused by the switch matrix or in the machine's electronic circuits.

Pin #	13	12	11	10	9	8	7	6
1	D20	O20	T20	I20	D19	O19	T19	I19
2	D5	O5	T5	I5	D7	O7	T7	I7
3	D12	O12	T12	I12	D16	O16	T16	I16
4	D9	O9	T9	I9	D8	O8	T8	I8
5	D14	O14	T14	I14	D11	O11	T11	I11
14			OB	IB				
15	D1	O1	T1	I1	D17	O17	T17	I17
16	D18	O18	T18	I18	D2	O2	T2	I2
17	D4	O4	T4	I4	D15	O15	T15	I15
18	D13	O13	T13	I13	D3	O3	T3	I3
19	D6	O6	T6	I6	D10	O10	T10	I10

Section 6 Parts Listing

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

27148	31	Segment, Inner Bull Black
35845	32	Spring, Inner Bull
29078	30	Segment, Outer Bull Red
29268	22	Spider
41590	25	Alignment Pin (2)
37008	25	Alignment Pin Screw (2)
40767	14	Latch (5)
41534	14	Spacer 5/8" (5)
41535	14	Spacer 1/8" (5)
41536	14	Screw 1 1/2" (5)
41176	13	Spider Resting Screw (2)
39169	17	Missed Dart Detector

6.1 Lower Cabinet

Part#	Ref#	Description
41651	1	Lower Cabinet
41674	2	Leveler (4)
41685	3	Coin Door
41790	4	League Chute

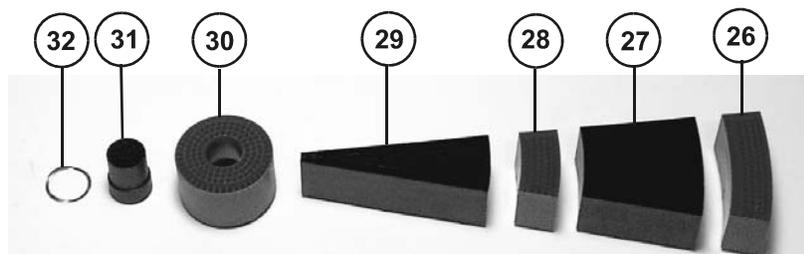
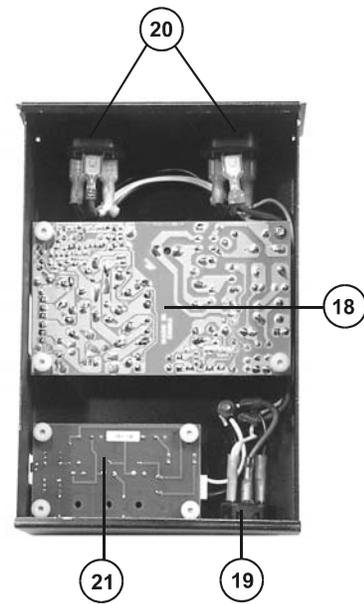
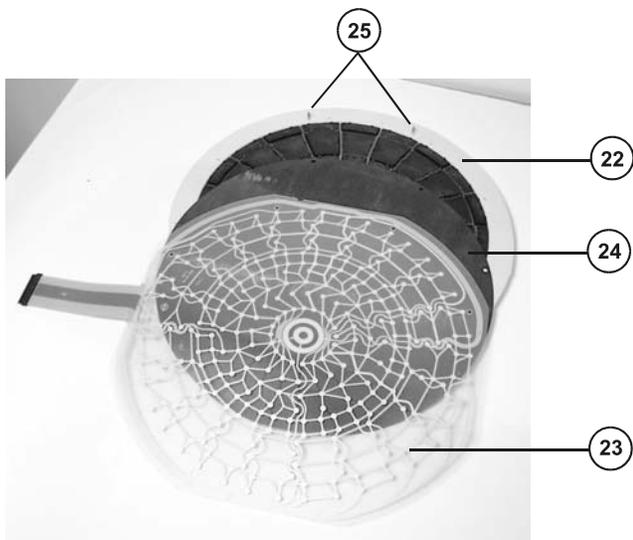
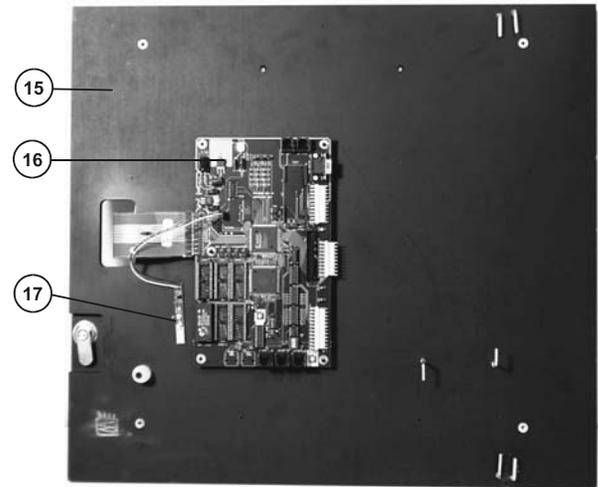
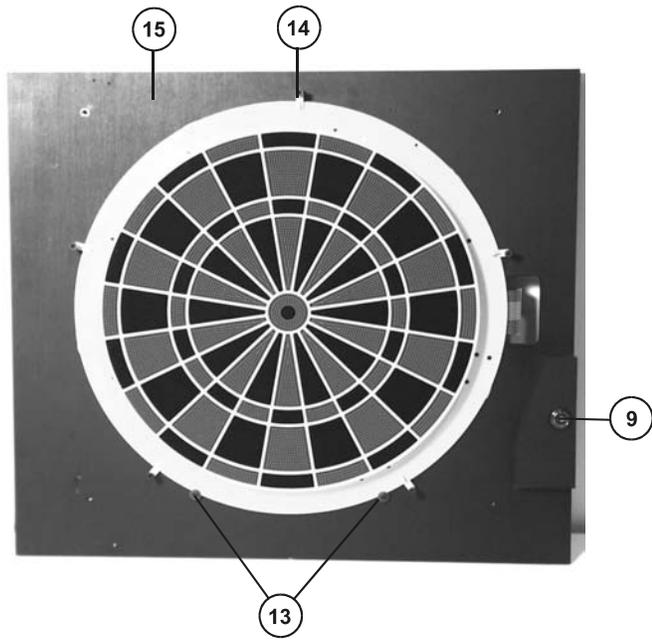
6.2 Upper Cabinet

19131	5	Switch - Player Change (black/red)
41676	6	Switch - Up/Down (black/yellow) (2)
21484		Speaker
37024	7	Light Bulb 40 watt (2)
39267	18	Power Supply Board
41679	19	Socket, Power Inlet
41680	20	Socket, Power Outlet (2)
40126	8	Color Monitor
41647	10	Upper Cabinet
41656	12	Monitor Bezel
41667	7	Lamp Reflector (2)
41670	21	Lamp Dimmer Board
41684	7	Lamp Socket (2)
41766		Knob Bolt -Top to Base (4)
41774		Monitor Mounting Plate
41784	16	Main PC Board, Complete
41929		Modem (optional)

6.3 Dart Head

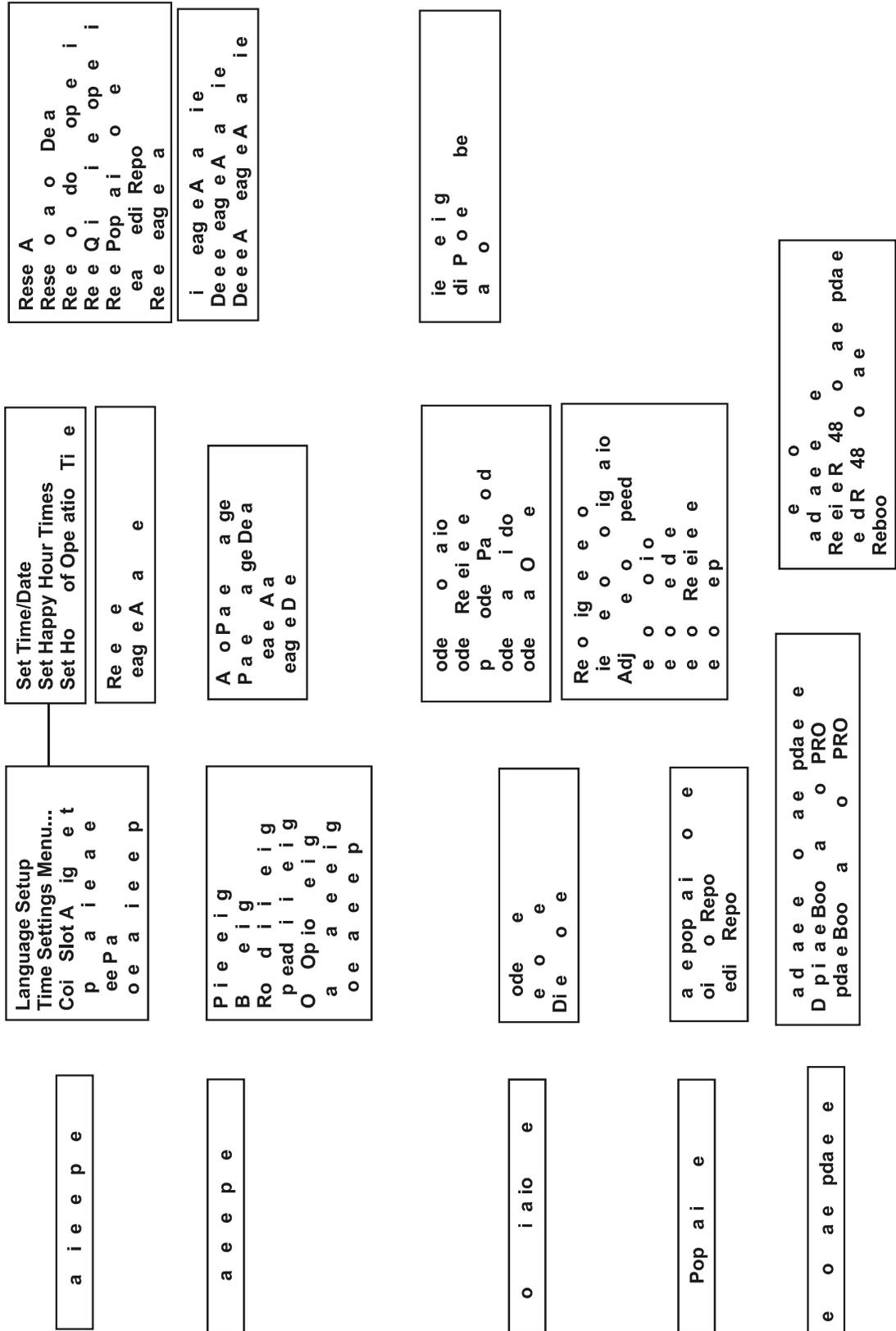
37376	22	Dart Head Assembly (spider and segments)
12575	23	Switch Matrix
28258	24	Matrix Cushion
41681	11	Catch Web
41658	15	Target Back (Door)
41570	9	Lock Assembly
18069	26	Segment, Double Red (10)
19079	26	Segment, Double Black (10)
21408	27	Segment, Outer Single Red (10)
22518	27	Segment, Outer Single Black (10)
23628	28	Segment, Triple Red (10)
24738	28	Segment, Triple Black (10)
25848	29	Segment, Inner Single Red (10)
26958	29	Segment, Inner Single Black (10)





Appendix A

Test/Setup Menu System



Appendix B

Updating Memory in the Machine

Overview of Memory on the Galaxy II

Memory on the Galaxy II machine consists of:

1. PROGRAM FLASH memory – U5
2. BOOT FLASH memory – U4
3. Battery backed RAM – U3

The BOOT FLASH and the PROGRAM FLASH must be programmed before the Galaxy II will work.

At the very least, the machine must have a programmed BOOT FLASH. If the machine does not have a programmed BOOT FLASH, make a copy one from another Galaxy II main board that has a working BOOT FLASH. See instructions: **Duplicating the Boot Flash IC**.

The PROGRAM FLASH (and BOOT FLASH) can also be updated using a PC computer. See instructions: **Updating the Galaxy II from a PC**.

Duplicating the Boot Flash IC (from another programmed Boot Flash IC)

1. Remove power from the machine (unplug the power cord).
2. Insert a blank FLASH IC (or a FLASH IC that needs to be updated) into IC socket U6. Make sure that it is in the socket with pin 1 in the proper position. (See figure B1)
3. Restore power to the machine (plug in the power cord).
4. Press the TEST switch.
5. Choose HARDWARE TEST/SOFTWARE UPDATE MENU
6. Choose DUPLICATE BOOT FLASH (To EPROM 1)
 - a. Screen will say FLASH COPY – BYTES COPIED XXX K – where XXX will increment as it programs the FLASH.
 - b. When done it will say SUCCESS! DONE COPYING FLASH
7. Remove power from the machine (unplug the power cord).
8. Remove the FLASH IC in socket U6.
9. The Galaxy II machine, where the programming was done, can now be plugged in and returned to service.
10. Take the programmed FLASH IC to the machine that needs the new BOOT FLASH and with the POWER OFF (machine unplugged), insert the FLASH IC into U4, making sure that pin 1 is in the proper position.

11. Restore power to the machine (plug in the power cord). The Machine should boot properly and run at least the BOOT FLASH CODE. If the PROGRAM FLASH (in U5) is not programmed, or is corrupted, the software may need to be updated to run. If unexpected results occur with the PROGRAM FLASH, the BOOT FLASH should run by itself to allow loading or copying software.

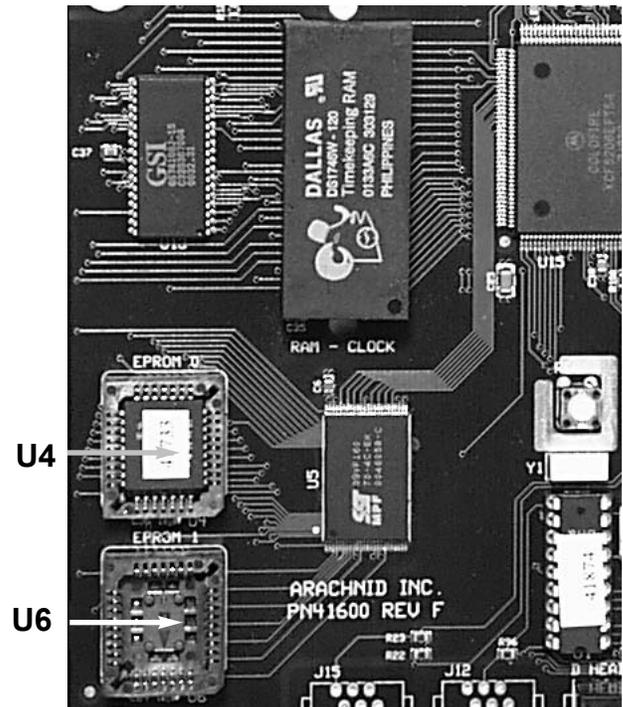


Figure B1 - Main board Detail

Updating the Galaxy II from a PC.

What is needed:

1. RS232 to RS485 adapter with 6 wire cable. Arachnid Part Number 41955.
2. Laptop or PC with an available serial port.
3. G2UPDATE software loaded on the PC.
4. Standard 9-pin serial cable (if the RS232 to RS485 converter will not plug directly into the laptop. (This cable cannot be a null-modem cable)

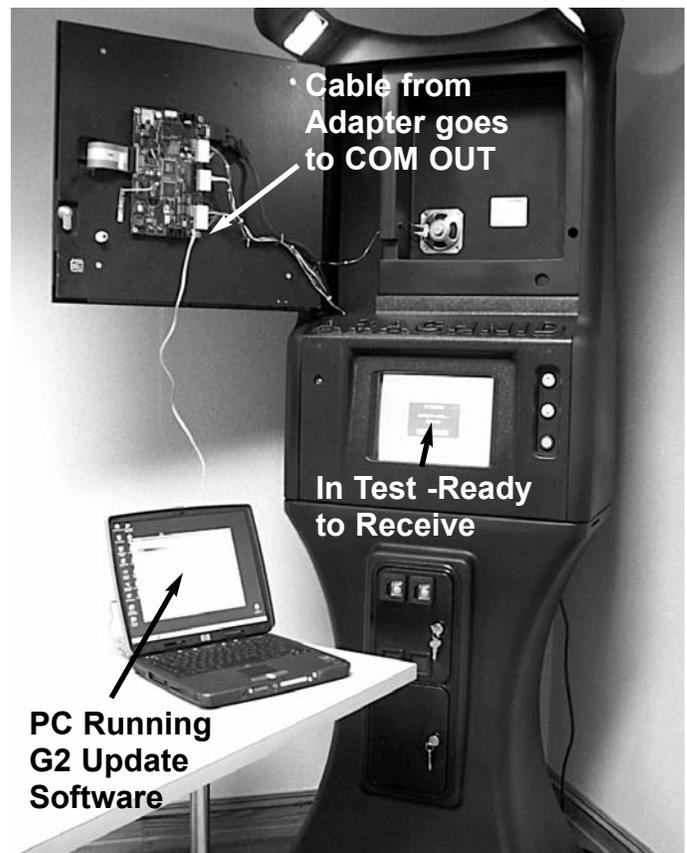
Procedure: (Unplug the power cord to the Galaxy II first)

1. Connect the 6-wire cable from the adapter into the COM OUT connector on the Galaxy II main board.
2. Plug the RS232 to RS485 adapter into the serial port of the laptop or connect through serial cable from the serial port on the computer to the RS232 to RS485 adapter.
3. Set the DIP SWITCHES on Galaxy II main board so that 1, 2, and 3 are on.

4. Start the G2UPDATE program on the PC. The first time G2UPDATE is executed, OPTIONS need to be set.
 - a. From the FILE MENU, choose OPTIONS.
 - b. Choose the COM port you will be using. On a laptop, this will usually be COM1.
 - c. Choose the RATE (speed) that you want to transfer such as 57600 bps. This has to be the same as the speed set on the Galaxy II (see below).
 - d. Under TRANSFER SETUP, choose what you want to do. For software update, choose UPDATE SOFTWARE.
 - e. At the bottom of the OPTIONS window, choose the drive letter where the update file is located.

NOTE:The actual software update file must be in an UPDATE folder directly off the root folder of the drive. For example: If the drive is "A" the file must be in A:\UPDATE; for "C" drive it must be in C:\UPDATE. If ASSET MANAGER has saved the file to the drive or floppy, you will be ready to proceed. If the file was downloaded from the Internet, make sure to copy the file to a DIRECTORY called UPDATE on the drive. This is where G2UPDATE will expect to find the file.

5. At the Galaxy II machine:
 - a. Turn on power (plug in the power cord).
 - b. Press the TEST switch.
 - c. From the menu select: COMMUNICATIONS > NETWORK MENU > RECONFIGURE NETWORK and follow the prompts. This procedure must be run even if the machine is not networked.
 - d. Select HARDWARE TEST/SOFTWARE UPDATE MENU.
 - e. Again select HARDWARE TEST/SOFTWARE UPDATE MENU from the next menu.
 - f. Select RECEIVE RS485 SOFTWARE UPDATE. The screen should say "Waiting for update – 57600* bps." Change the rate so that it is the same as the rate set in step 4c above.
6. At this time select Connect in the G2UPDATE program on the PC.
7. After transfer has been started, the GALAXY II screen should say "Received XXX K" with the "XXX" being a number that should change and get larger as the file transfers
8. When the transfer has been completed, the Galaxy II screen will say "SUCCESS! Done receiving update." At this time the Galaxy II needs to be RESET or powered OFF and then back ON to use the new updated software.
9. Press the test switch, you will be asked if you would like to update the boot flash memory if a boot flash update was included with the software update. Answer YES and you will have the latest program in the boot memory as well as the program memory.



Updating The Galaxy II from another Galaxy II (Networked)

When Galaxy II machines are networked, software updates can be transferred from one machine to another on the network.

1. Update the software on the first machine from a PC as described above.
2. Make sure the machines are networked properly and communicating with one another.
3. Put the two machines (the updated machine and the one to be updated) in test mode by pressing the test switch on both machines.

ON THE MACHINE TO RECEIVE THE UPDATE:

4. Select HARDWARE TEST/SOFTWARE UPDATE MENU.
5. On the next menu: Select HARDWARE TEST/SOFTWARE UPDATE MENU again.
6. Select RECEIVE RS-485 UPDATE. Set the speed at which the update will be received.

ON THE MACHINE TO SEND THE UPDATE:

7. Select HARDWARE TEST/SOFTWARE UPDATE MENU.
8. On the next menu: Select HARDWARE TEST/SOFTWARE UPDATE MENU again.
9. Select SEND RS-485 SOFTWARE. Adjust the speed to match that set in step 6 above. When the update is finished, reboot the machine that received the update and press the test button. If a BOOT FLASH update was sent, answer yes to update the boot software.

Repeat steps 3 through 9 on the remaining Galaxy II machines in the network that need to be updated. When finished reboot all machines to resume normal operation.

Note: Only one machine on the network can be updated at a time.