WARNING
Important Health Warning: PHOTOSENSITIVE SEIZURES
A very small percentage of people may experience a seizure when exposed to certain visual images, including
flashing lights or patterns. Even people with no history of seizures of epilepsy may have an undiagnosed condition
that can cause "photosensitive epileptic seizures" due to certain visual images, flashing lights or patterns.
Symptoms can include light-headedness, altered vision, eye or face twitching, jerking or shaking of arms or legs,
disorientation, confusion, momentary loss of awareness, and loss of consciousness or convulsions that can lead
to injury from falling down or striking nearby objects.
IMMEDIATELY STOP PLAYING AND CONSULT A DOCTOR IF YOU EXPERIENCE ANY OF THESE SYMPTOMS.

Please visit www.sternpinball.com
For part numbers and mechanical drawings.

Stern Pinball machines are assembled in Melrose Park, Illinois, USA; each pinball machine has unique
characteristics that make it a one of a kind American made product. Each machine will have variations
in appearance resulting from differences in the machine's particular wood parts, individual silk screened
art and mechanical assemblies. Stern Pinball has inspected each game element to insure it meets our
quality standards.

Pinball Service Game Manual
Please call, email, or visit us online for technical support,
questions or comments regarding this pinball game.
Go to www.sternpinball.com and click SERVICE & SUPPORT.
Find Service Game Manual (with updates), Coin Cards, Game Code Library,
Appendixes, Care & Maintenance, Service Bulletins and much more
- Toll-Free: 1-800-KICKERS (542-5377) or 1-708-345-7700 - Email: parts.service@sternpinball.com

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Printed in the U.S.A.
JANUARY 2014

SPI Part Number
780-50F1-00
HOW TO UPDATE YOUR GAME CODE FOR S.A.M. SYSTEM MACHINES

USB Compatible Data Storage Device (Thumb, Flash or Jump Drives) required to copy game code into system. S.A.M. System compatible, tested & SPI approved USB Data Storage Devices 128MB+ available through your local distributor: Ask for SPI Part Number 970-0128-00

* to get the Data Storage Device with the latest Game Code copied to it, add "game title" to above part number.

STYLE, COLOR, SIZE AND MANUFACTURER SUBJECT TO CHANGE.

Game Code is subject to change. Update this game with the latest code downloaded from our website, from another game or order through your local distributor (use SPI PN + name above).

Upon power-up the display will describe the version of code installed in your game. When directed to do so (via Service Bulletin or website announcement) you will need to update your code ... with the BOOT FLASH EPROM® installed, here's how:

STEP 1 Open the Back Box and locate the 8-Position Dip Switch (SW1 on the CPU/Sound Board).

STEP 2 Switch Dip Switch #8 to 'ON'. (*BOOT FLASH EPROM must be installed.)

STEP 3 Press the White Reset Button (S1 RESET on the CPU/Sound Board) or Power Cycle the game OFF/ON (ON/OFF Switch is located on the outside of the cabinet bottom, front right).

STEP 4 Using the 4-Button Service Switch Set (inside the Coin Door):

4A ) Press [SELECT] to begin.

4B ) With the "UPDT" Icon highlighted, press [SELECT].

4C ) Insert the Data Storage Device [with latest file(s)] into the USB Port.

4D ) If more than one file is present on the Data Storage Device, press [<] or [>] to locate your file. Press [SELECT] to update.

4E ) Follow on-screen prompts.

CPU/Sound Board (S.A.M. System)

! Quick Tip – Try backing up your current code prior to installing your new code, just in case your Data Storage Device file was corrupted by a computer glitch while you were copying /

You can also retrieve your latest code from another game! From the MENU, select the "BKUP" Icon instead and download to your Data Storage Device.

For Proper Operation of this Pinball Game, <6> Pinballs must be installed in the 6-Ball Trough!

Backbox Fuses*, Cabinet Fuses, Playfield Fuses and Cabinet Switches

*Note: The CPU/Sound PCB does not have fuses.

Quick Reference Fuse Chart

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Description</th>
<th>AHF</th>
<th>S.B.</th>
<th>50VDC/90VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>5A S.B. 5.7VAC G.I. Lamps</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F2</td>
<td>5A S.B. 5.7VAC G.I. Lamps</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>5A S.B. 5.7VAC G.I. Lamps</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F4</td>
<td>5A S.B. 5.7VAC G.I. Lamps</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F5</td>
<td>7A S.B. 50VDC Coils / Flippers</td>
<td>7A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F6</td>
<td>3A S.B. 24Vac Motor or Special Application</td>
<td>3A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F7</td>
<td>4A S.B. 50VDC Magnet(s) or Special Application</td>
<td>4A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F8</td>
<td>3A S.B. 50VDC Coils</td>
<td>3A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F9</td>
<td>8A S.B. 18VDC Control Lamps</td>
<td>8A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F10</td>
<td>5A S.B. 20VDC Coils / Flashers</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
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<tr>
<td>F11</td>
<td>4A S.B. 5VDC Logic Power</td>
<td>4A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F12</td>
<td>5A S.B. 12VDC Audio</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
<tr>
<td>F13</td>
<td>5A S.B. 12VDC Audio</td>
<td>5A</td>
<td>S.B.</td>
<td></td>
</tr>
</tbody>
</table>

Display Power Supply Board

F1 | 9A S.B. 90VDC High Voltage Dot Display Board

Cabinet Fuses

Power (Service Outlet) Box

<table>
<thead>
<tr>
<th>Fuse</th>
<th>Description</th>
<th>AHF</th>
<th>S.B.</th>
<th>110-120V Main Line US / Canada / Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>5A S.B.</td>
<td>5A</td>
<td>S.B.</td>
<td>110-120V Main Line US / Canada / Japan</td>
</tr>
<tr>
<td>F2</td>
<td>5A S.B.</td>
<td>5A</td>
<td>S.B.</td>
<td>220-240V Main Line International</td>
</tr>
</tbody>
</table>

Playfield Fuses

Flipper or Special Application (Coil Fuses are located under the playfield near assembly)

F3 A S.B. 50VDC R. Flipper [BLU-YEL+RED-YEL]
F4 A S.B. 50VDC L. Flipper [CRY-YEL+RED-YEL]
F5 A S.B. 50VDC Ad. Flipper Coil, if used
F6 A S.B. 50VDC Sp. Application Coil, if used

DISPLAY POWER SUPPLY BOARD

F1 | 9A S.B. 90VDC High Voltage Dot Display Board
OPEN THE COIN DOOR TO ACCESS THE SERVICE SWITCH X4 SET.

Service Switch X4 Set Overview

The four buttons (inside Coin Door) have dual functions depending if you have entered the Service Menu or not.

Functions in Game or Attract Mode

- **Green Button** Press for Service Credit(s).
- **Red Buttons** Press for Volume Adjustment – for less (quieter), + for more (louder)
- **Black Button** Press for Service Menu entry.

Functions in the Service Menu

- **Green Button** Press to move < Left, Right >. Press to ~ Decrease or + Increase values or to change settings.
- **Red Buttons** Press to move or to change settings.
- **Black Button** Press to Enter Select (or OK).

EXAMPLE:

To enter the SERVICE MENU, then enter the SWITCH TEST MENU via the DIAGNOSTIC MENU, perform the below steps.

Step 1 Press [ SELECT ].

Step 2 With the "DIAG" Icon highlighted, press [ SELECT ].

Step 3 With the "SW" Icon highlighted, press [ SELECT ].

Step 4 With the "TEST" Icon highlighted, press [ SELECT ].

Press any switch. If wired correctly, the information in the display will match the information in the Switch Matrix (see DR. 4).

Press [ < ] or [ > ] to move left or right through the menus.

Press [ BACK ] to go back a menu, exit or escape at any time. Continue through the other menus.

The Service Menu is subject to change. Update this game with the latest code downloaded from our website with a USB Data Storage Device (64MB min., recommendation 128MB or higher). See the inside front cover for directions or in the Service Menu "Go To Utilities Menu" then "Go To USB Menu" and follow prompts.
**DIAGNOSTIC AIDS**

**50V / 20V DISABLED**
CLOSE COIN DOOR
OR PULL INTERLOCK SWITCH
TO RESTORE POWER

This audible / visual alert display is shown when the 50V / 20V Power is disabled (by opening the Coin Door). PULL OUT THE INTERLOCK SWITCH ONLY WHILE IN THE SERVICE MENU FOR COIL TEST OR PLAY TESTING WHEN THE COIN DOOR IS REQUIRED TO STAY OPEN FOR SERVICE BUTTON USE! Pulling out the Power Interlock Switch or pressing the alert display. Initial display presentation is accompanied by 3 audible tones (the bright display warning will go dim after approximately 30 seconds).

**OPERATOR ALERT! AUTO PLUNGER DEVICE MALFUNCTION**

Also appear if a switch associated with a device (e.g. Ball Trough, Auto Plunger, etc.) is stuck closed (caused by a switch jam or stuck ball); the game will activate the device a predetermined number of times and if the problem is still detected, this device or switch will be noted in Switch Alerts and/or Technician Alerts.

**GAME NAME**

**SERVICE MENU**

**GAME NAME**

**SERVICE MENU**

**V0.00 SYS. 0.00 HDW. 0**

USE +/- TO VIEW TECH. ALERTS

Upon entering the SERVICE MENU, if an asterisk " * " is displayed after the words "SERVICE MENU," the game has detected possible faulty devices, switches and/or missing pinballs. Press the either of the Red Buttons (short-cut to the TECHNICIAN ALERTS MENU) or continue into the SERVICE MENU (press the Black Button again), select the "TECH" Icon and "TECH" Icon for the Technician Alerts information.

**CPU DIP SWITCH SETTINGS**

The 8-Pos. Dip Switch [SW1] is on the CPU/Sound Board (between Conn. J3 & J13, lower left corner)

<table>
<thead>
<tr>
<th>CPU COUNTRY SETTING</th>
<th>Pos. 1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td>USA</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
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<td>OFF</td>
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<tr>
<td>Australia</td>
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<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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</tr>
<tr>
<td>Austria</td>
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<td>OFF</td>
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<td>ON</td>
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<td>OFF</td>
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<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Canada 1</td>
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<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>Canada 2</td>
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<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
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<td>Middle East</td>
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<tr>
<td>New Zealand</td>
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<tr>
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<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
</tr>
</tbody>
</table>

Note: Slide Dip Switch 8 to Position ON (with Dip Switches 1-7 in the OFF Position) only to reboot the game with the latest version BOOT EPROM installed at U9 on the CPU/Sound Board (S.A.M. System only). Currently, this is also the procedure to update your game with the latest software code update file. For the latest version, visit our website. If you have questions about updating your game code, call Technical Support for assistance.
NOTE: Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some icons may appear non-functional or may not appear at all. Some Icons change depending on selections (e.g. Selecting and activating the "STRT" Icon will be replaced with the "STOP" Icon). In displays where changes can be made or to perform a function, remember, use the GREEN Button to go [BACK], exit or escape, the RED Buttons to [ +/- ] DECREASE / [ +/- ] INCREASE a value or setting, and the BLACK Button to [SELECT] next or as 'OK' / 'ENTER'.
Service Menu Introduction

Important: The Switch Bracket holds the Playfield Power Interlock. It is located just inside the Coin Door frame (see pictorial of the Coin Door on the previous page). The Button Switch for the Playfield Power Interlock Switch must be pulled out for electro-mechanical device testing or diagnostic purposes (this is required). If this button is pushed in, the Playfield Power is disabled while the Coin Door is OPEN.

To get into the SERVICE MENU MODE review "Function 3: SERVICE MENU" on the next page. After Power-Up, push down the Black [ SELECT ] Button to begin. Looking at the display you will momentarily see "SERVICE MENU" followed by the MAIN MENU:

Use the Red [ < / - ] / [ + / > ] Buttons to move the selected Icon left or right, and the Black [ SELECT ] Button to activate the selected Icon.

The MAIN MENU now appears with the "DIAG" Icon (GO TO DIAGNOSTICS MENU) highlighted:

As the operator views the Menu Screen(s), the ▶ symbols indicates that there are more Icons to select in each direction. The Icon selected will blink. Pushing the Black [ SELECT ] Button will select the Icon and the Menu Screen will change to the menu selected. Select the Green [ BACK ] Button to move backwards through the menu levels. Press the Green [ BACK ] Button repeatedly or select the "QUIT" Icon to completely exit the SERVICE MENU Mode.

View the SERVICE MENU Icon Tree on the next pages for a complete overview of all menus used in this system. The "HELP" Icon provides an explanation of ICON usage or any other information in the Menu where the "HELP" Icon was selected (when available).

DIAG: GO TO DIAGNOSTICS MENU
AUD: GO TO AUDITS MENU
ADJ: GO TO ADJUSTMENTS MENU
UTIL: GO TO UTILITIES MENU
(INSTALLS, CUSTOM MSG., CUSTOM PRICING, SET TIME, RESET & USB)
TOUR: GO TO TOURNAMENT MENU (START TOURNAMENT, VIEW TOURNAMENT DATA, SIGN MESSAGES)

>> TO UPDATE THE GAME CODE, REVIEW THE STEPS ON THE INSIDE FRONT COVER OF THIS MANUAL.

Use both the manual and the display to help customize, troubleshoot and/or diagnose faults, if any.
Exit Service Menu

In the MAIN MENU and in all SUB-MENUS (where the "QUIT" Icon is present), if the "QUIT" Icon is selected and activated, or the Green [ BACK ] Button is selected repeatedly (depending on which sub-menu you're in...), the SERVICE MENU Session will be exited and returned to the Attract Mode.

EXIT SERVICE MENU

Turning the game on/off will start the Power-Up Routine. Upon Power-Up, the DISPLAY will indicate the COUNTRY, FILE VERSION and LANGUAGE(S) installed. LANGUAGE/COUNTRY: change via Dip Switch.

The below Problem / Solution Table was designed to answer some common problems frequently asked.

Problem / Solution Table

<table>
<thead>
<tr>
<th>PROBLEM</th>
<th>SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Will not enter the SERVICE MENU after depressing the Black [ SELECT ] Button. All Service Buttons [ * * * Buttons ] appear non-functional.</td>
<td>• Check the Service Switches [ GREEN, RED exp &amp; BLACK Buttons ] for loose connections or bad ground. • Check the associated wiring harness to/from the CPU/Sound Board, Connector J13. • Check CPU/Sound Board for possible failure.</td>
</tr>
<tr>
<td>The Green Button in the Attract Mode will not enter the SERVICE CREDITS MENU to add Service Credits.</td>
<td>• Check the Service Switches wiring harness for poor or no connection and/or broken wires.</td>
</tr>
<tr>
<td>The Display &quot;blanks out.&quot;</td>
<td>• Check the Dot Matrix Display for loose wiring harness for poor or no connection and/or broken wires. • Check F1 (3/4A Fuse) on the Display Power Supply Board. Refer to the Yellow Pages (SCHEMATICS &amp; TROUBLESHOOTING).</td>
</tr>
<tr>
<td>Icons &quot;scroll&quot; along continuously in the MAIN MENU. The Start and Flipper Buttons do not select or activate Icons in the SWITCH TEST MENU. Can't move selection of Icon with the Left and/or Right Flipper Buttons.</td>
<td>• Check for a stuck switch on either of the Red Buttons. • This is normal. These switches are deactivated, as they are a part of the Switch Test. Refer to the Diagnostics Section (GO TO DIAGNOSTICS MENU, Switch Test). • Check the Flipper Buttons for loose connections or bad Ground and refer to Section 5, Chapter 2, Playfield Wiring, 4-Flipper Circuit Wiring Diagram. • This is normal only in Diagnostic's Switch &amp; Active Switch Tests (see previous Problem).</td>
</tr>
<tr>
<td>Some Icons appear non-functional in the MENU or missing.</td>
<td>• Some functionality of the Service Menu may not have been completed during development. If exists, it should only be a non-critical function, such as the &quot;HELP&quot; Icon, which will explain the usage of Icons. When completed, a software update will correct the problem. Software updates are announced via Service Bulletins (if critical) and on our website <a href="http://www.sternpinball.com/GAME-code.shtml">http://www.sternpinball.com/GAME-code.shtml</a>; view the Game Code Library Message Board Marquee or click Previous Messages for past announcements.</td>
</tr>
<tr>
<td>In COIL TEST MENU, the coils and flashlamps do not fire after pressing the Black [ SELECT ] Button. In the SERVICE MENU, the volume cannot be adjusted with either of the Red Buttons. In the SERVICE MENU, the display seems to lock up, or the Help Display appears to be non-functional.</td>
<td>• Ensure the POWER INTERLOCK SWITCH is pulled out (see the start of this Chapter). • The Volume adjustment can only be made when in the Attract Mode (see the start of this Chapter).</td>
</tr>
</tbody>
</table>

IF YOU NOTE ANY OTHER PROBLEMS OR HAVE ANY SYMPTOMS NOT DESCRIBED ABOVE, PLEASE CALL TECHNICAL SUPPORT 800-542-5377 (708-345-7700 OPTION #1), SO WE MAY ASSIST YOU.
To initiate, from the MAIN MENU, select the "DIAG" icon. The DIAGNOSTICS MENU provides tests for switches, coils, flash lamps, lamps, sounds and dots in the Dot Matrix Display. Each feature may be tested manually or automatically after entering the SERVICE MENU (see Service Menu Introduction Section). The [ CYCLING COIL TEST ] / [ FLASH LAMP TEST ] may be used for a quick verification of automatic test functions. The [ SWITCH TEST ] / [ SINGLE COIL TEST ] / [ SINGLE LAMP TEST ] / [ ALL LAMPS TEST ] / [ ROW LAMPS TEST ] / [ COLUMN LAMPS TEST ] / [ FLASH LAMP TEST ] may be used for troubleshooting.

All DIAGNOSTICS MENU icons and their usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. NOTE: Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some icons may appear non-functional or may not appear at all. Some icons change depending on selections (e.g. Selecting and activating the "STR" or "LT"图标 [Start Tournament] will be replaced with the "STOP" icon [Stop Tournament]). Icons and/or functions, order and operation are subject to change.

In displays where changes can be made or to perform a function, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < / - ] MOVE BACK / LEFT / DECREASE / [ + / > ] MOVE FORWARD / RIGHT / INCREASE a value or setting, and the BLACK Button to [ SELECT ] next or as "OK" / ENTER / ENERGIZE.*

Important: Upon Power-Up (Game CPU Reset) or opening the Coin Door watch the Display for any Alerts.*

50V / 20V DISABLED
CLOSE COIN DOOR
OR FULL INTERLOCK SWITCH TO RESTORE POWER
pressing the 'escape' Green [ BACK ] Button will remove the alert display. Initial display presentation is accompanied by 3 audible tones (the bright display warning will go dim after approximately 30 seconds).

OPERATOR ALERT!
AUTO PLUNGER
DEVICE MALFUNCTION
also appear if a switch associated with a device (switch jam or stuck ball); the game will activate the device or switch will be noted in Switch Alerts (next page) and/or Technician Alerts.

GAME NAME
SYS. 0.00
HDW. 0
SERVICE MENU
*USING -/+ TO VIEW TECH. ALERTS

CAUTION! Remove all pinballs from the Ball Trough prior to lifting the playfield to it's full upright position for servicing. PULL OUT the Power Interlock Switch for operation. To eject pinballs, select the "DIAG" icon from the MAIN MENU to enter the DIAGNOSTICS MENU. Select the "CLR" icon to enter the BALL TROUGH TEST MENU. Press the Black [ SELECT ] Button. To return to the DIAGNOSTICS MENU, press the Green [ BACK ] Button. This feature also useful to retrieve a pinball for game testing in Switch or Coil Tests.
Go To Switch Menu

To initiate, from the DIAGNOSTICS MENU, select the "SW" Icon. Switches are configured in an 4 X 16 Matrix of Rows [Switch Drives] and Columns [Sw. Returns] with up to 64 possible switches. Dedicated Switches are configured in a 2 X 16 Matrix of Rows [Dedicated Sw. Drives / Ground] and Column [Ded. Switch Returns] with up to 32 possible dedicated switches (includes the 8 dip switch positions). The SWITCH TEST MENU consists of three (3) parts: Switch & Active Switch Tests and Switch Alerts to test all switches.

Reminder: The Flipper & Start Buttons (part of Switch Tests) are temporarily disabled as Service Menu Navigation Buttons during these test(s) so they can be tested and shown on-screen. Pressing the Green [BACK] Button (Dedicated Switch D-21), Light Green-Black / Black (GND), will exit Switch Test or Active Switch Test.

Switch Test

To initiate, from the SWITCH MENU, select the "TEST" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open and the activation of coils is required. Upon entering Switch Test, you will notice that some switches are already indicated as closed. In the examples, the 4-Ball Trough Switches #18, #19, #20 & #21 are shown closed (pinballs at rest in the ball trough), along with the Flipper E.O.S. Dedicated Switches D-10 & D-12 (End-of-Stroke Switches are 'normally closed'). If the game has more flippers with E.O.S. Dedicated Switches, CPU Dip Switch Setting other than OFF or switches stuck closed, more dots will be indicated (enter Active Switch Test to reveal the names).

In Switch Test, close each switch and observe the display (switch closure is accompanied by a short audible tone). In the example, the Black [SELECT] Button Dedicated Switch D-24 is pressed. The Dot Matrix Display will light up (highlight) the corresponding dot in the on-screen matrix, display the switch name, switch number and the Switch Drive / Return wire colors. When not closing a switch, the display indicates NONE and the last switch number closure. For the Switch Matrix Grid and Dedicated Switch Grid, see Find-It-In-Front: Dr. Pinball, Dr. 4 or escape out of this test and enter Active Switch Test (described below) to view the names of the switches closed. Note: Pressing the Green [BACK] Button (Ded. Switch D-21), Lt. Green-Black / Black (GND), will exit the Switch Test.

CAUTION! COIL MECHANISMS WHEN ACTIVATED HAVE FAST MOVING PARTS! While performing Switch Test with the Coin Door closed or open (with the Power Interlock Switch is pulled out), DO NOT USE YOUR FINGER to test switches which are associated with a coil mechanism such as a Vertical Up-Kicker (hole with a switch), Slingshots, Bumpers, etc..

Active Switch Test

To initiate, from the SWITCH MENU, select the "ACT" Icon. In Active Switch Test, if any switches are stuck closed (or normally closed from the presence of pinball(s) as in the Ball Trough), the display will flash the corresponding dot(s) in the on-screen matrix, display the name and the Switch Drive / Return wire colors. If more than one switch is closed, the switch information will change with each switch. This cycle continues until all switches are open or until Active Switch Test is exited. In the example, the Black [SELECT] Button Dedicated Switch D-24 is pressed and held down. The display will cycle and flash each dot, naming each switch which is closed. To determine the switch number, compare the highlighted dot to the same position in the Switch Matrix Grid at the beginning of this manual.

Switch Alerts

To initiate, from the SWITCH MENU, select the "ALRT" Icon. In Switch Alerts Menu, possible inoperable switches are marked with an "X" (OUT OF SERVICE). Mark switches IN or OUT OF SERVICE by pressing the Black Button while the intended switch is highlighted and change with either the Red Buttons. Switches which are determined as "OUT OF SERVICE" by the game or manually, will be automatically marked as "IN SERVICE" as soon as the game determines a valid switch closure (after adjusting, fixing or replacing the switch, then testing/actuating the switch). Note: A Factory Reset will also put the switch back "IN SERVICE" in which the game will need to redefine if the switch should be marked OUT OF SERVICE.
Go To Coil Menu
To initiate, from the DIAGNOSTICS MENU, select the "COIL" Icon. Coils #01 – #16 are typically High Current Coils (although Low Current Coils may be used in these positions & will be noted). Coils #17 – #32 are typically Low Current Coils. Flash Lamps are typically used in positions #25 – #32 (although Flash Lamps may be used in any position and will be noted). Auxiliary Coils may be used in positions #33 – #35.

Remember, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < / – ] GO BACK [ + / > ] GO FORWARD, and the BLACK Button to [ SELECT ] ENERGIZE the coil (solenoid) or flash lamp.

Single Coil Test
To initiate, from the COIL MENU, select the "TEST" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open. Upon entering Single Coil Test, you will notice the #1 coil is shown. The Dot Matrix Display will indicate the coil or flash lamp name, coil (solenoid) or flash lamp number and the Coil or Flash Lamp Power Line / Drive Transistor Control Line wire colors. To determine the "Pin-Outs" from the I/O Power Driver Board, the Coil Voltage Gauge (e.g. 23-800) or lamp type (e.g. #89 or #906 Bulb), view the Coils Detailed Chart Table at the beginning of this manual or for more on troubleshooting and diagnosing, see the Yellow Pages (Schematics & Wiring).

Cycling Coil Test
To initiate, from the COIL MENU, select the "CYC" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open. The test pulses each regular coil or flash lamp sequentially (cycling) on the Playfield and in the Backbox (if coils or flash lamps are used). The Dot Matrix Display indicates the same information you will find in Single Coil Test.

Go To Flash Lamps Menu
To initiate, from the DIAGNOSTICS MENU, select the "FLASH" Icon. The two tests allows the technician to easily spot any burned-out flash lamps and replace them. Unlike Single Coil Test, which tests all coil (solenoids), including flash lamps, Single and Cycling Flash Lamp Tests, test only the flash lamps used in the game. Flash Lamps are typically used in positions #25 – #32 (although Flash Lamps may be used in any position and will be noted).

Remember, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < / – ] GO BACK [ + / > ] GO FORWARD, and the BLACK Button to [ SELECT ] ENERGIZE the flash lamp.

Single Flash Lamp Test
To initiate, from the FLASH LAMPS MENU, select the "TEST" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open. Upon entering Single Flash Lamp Test, you will notice the first Flash Lamp is shown. The Dot Matrix Display will indicate the flash lamp name, flash lamp number and the Flash Lamp Power Line / Drive Transistor Control Line wire colors. To determine the "Pin-Outs" from the I/O Power Driver Board or lamp type (e.g. #89 or #906 Bulb), view the Coils Detailed Chart Table at the beginning of this manual or for more on troubleshooting and diagnosing, see the Yellow Pages (Schematics & Wiring).

Cycling Flash Lamp Test
To initiate, from the FLASH LAMPS MENU, select the "CYC" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open. The test pulses each flash lamp sequentially (cycling) on the Playfield and in the Backbox (if flash lamps are used). The Dot Matrix Display indicates the same information you will find in Single Flash Lamp Test.
## COILS DETAILED CHART TABLE

### High Current Coils Group 1

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Device Q</th>
<th>Power Line Color</th>
<th>Power Line Connection</th>
<th>Power Voltage</th>
<th>Drive Transistor Control Line Color</th>
<th>D.T. Control Line Connect</th>
<th>Coil GA-Turn or Bulb Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>TROUGH UP-KICKER</td>
<td>Q1</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-BLK</td>
<td>J8-P1</td>
<td>090-5044-ND</td>
</tr>
<tr>
<td>#2</td>
<td>AUTO LAUNCH</td>
<td>Q2</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-RED</td>
<td>J8-P3</td>
<td>22-1600-090-5001-ND</td>
</tr>
<tr>
<td>#3</td>
<td>MID RAMP</td>
<td>Q3</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-RED</td>
<td>J8-P3</td>
<td>22-1600-090-5001-ND</td>
</tr>
<tr>
<td>#4</td>
<td>MID RAMP HOLD POWER</td>
<td>Q4</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-ORG</td>
<td>J8-P4</td>
<td>22-1600-090-5003-03</td>
</tr>
<tr>
<td>#5</td>
<td>UPPER RAMP</td>
<td>Q5</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-YEL</td>
<td>J8-P5</td>
<td>22-1600-090-5003-03</td>
</tr>
<tr>
<td>#6</td>
<td>UPPER RAMP HOLD POWER</td>
<td>Q6</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-GRN</td>
<td>J8-P6</td>
<td>22-1600-090-5003-03</td>
</tr>
<tr>
<td>#7</td>
<td>CENTER 5- BANK DROP RESET</td>
<td>Q7</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-BLU</td>
<td>J8-P7</td>
<td>22-1600-090-5003-03</td>
</tr>
<tr>
<td>#8</td>
<td>SHAKER MOTOR (OPTIONAL)</td>
<td>Q8</td>
<td>YEL-VIO</td>
<td>J10-P9/10</td>
<td>50VDC</td>
<td>BRN-BLU</td>
<td>J8-P8</td>
<td>22-1600-090-5003-03</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>RED-WHT</td>
<td>J17-P7</td>
<td>16VAC</td>
<td>BRN-GRY</td>
<td>J8-P9</td>
<td>502-5027-00</td>
</tr>
</tbody>
</table>

### High Current Coils Group 2

| #9  | LEFT POP BUMPER                   | Q9       | YEL-VIO          | J10-P8/10             | 50VDC        | BLU-BRN                           | J9-P1                    | 090-5044-ND              |
| #10 | RIGHT POP BUMPER                  | Q10      | YEL-VIO          | J10-P8/10             | 50VDC        | BLU-RED                           | J9-P2                    | 22-1600-090-5004-03      |
| #11 | BOTTOM POP BUMPER                 | Q11      | YEL-VIO          | J10-P8/10             | 50VDC        | BLU-ORG                           | J9-P4                    | 22-1600-090-5004-03      |
| #12 | TOP POP BUMPER                    | Q12      | YEL-VIO          | J10-P9/10             | 50VDC        | BLU-YEL                           | J9-P5                    | 22-1600-090-5004-03      |
| #13 | LEFT SLINGSHOT                    | Q13      | YEL-VIO          | J10-P9/10             | 50VDC        | BLU-GRN                           | J9-P6                    | 22-1600-090-5004-03      |
| #14 | RIGHT SLINGSHOT                   | Q14      | YEL-VIO          | J10-P9/10             | 50VDC        | BLU-BLU                           | J9-P7                    | 22-1600-090-5004-03      |
| #15 | LEFT FLIPPER (50V RED/YEL)        | Q15      | YEL-VIO          | J10-P6/7              | 50VDC        | ORG-GRY                           | J9-P8                    | 22-1600-090-5003-03      |
| #16 | RIGHT FLIPPER (50V RED/YEL)       | Q16      | YEL-VIO          | J10-P6/7              | 50VDC        | ORG-BLU                           | J9-P9                    | 22-1600-090-5003-03      |

### Low Current Coils Group 1

| #17 | FLASH: LEFT ORBIT ARROW           | Q17      | ORG              | J6-P10                | 20VDC        | VIO-BRN                           | J7-P2                    | 113-0034-06              |
| #18 | FLASH: RIGHT ORBIT ARROW          | Q18      | ORG              | J6-P10                | 20VDC        | VIO-BRN                           | J7-P3                    | 113-0034-06              |
| #19 | FLASH: SLINGSHOT (LEFT)           | Q19      | ORG              | J6-P10                | 20VDC        | VIO-ORG                           | J7-P4                    | 113-0034-06              |
| #20 | FLASH: SLINGSHOT (RIGHT)          | Q20      | ORG              | J6-P10                | 20VDC        | VIO-ORG                           | J7-P4                    | 113-0034-06              |
| #21 | FLASH: BACK PANEL (LEFT)          | Q21      | ORG              | J6-P10                | 20VDC        | VIO-YEL                           | J7-P6                    | 113-0034-06              |
| #22 | FLASH: BACK PANEL (RIGHT)         | Q22      | ORG              | J6-P10                | 20VDC        | VIO-BLU                           | J7-P8                    | 113-0034-06              |
| #23 | OPTIONAL (e.g. COIN METER)        | Q23      | ORG              | J6-P10                | 20VDC        | VIO-BLU                           | J7-P8                    | 113-0034-06              |
| #24 |                                  | Q24      | RED              | J16-P4-8              | 5VDC         | VIO-GRY                           | J7-P10                   | 090-5004-ND              |

### Low Current Coils Group 2

| #25 | FLASH: POP BUMPERS (RIGHT)        | Q25      | ORG              | J6-P10                | 20VDC        | BLK-BRN                           | J6-P1                    | 113-0034-08              |
| #26 | FLASH: POP BUMPERS (LEFT)         | Q26      | ORG              | J6-P10                | 20VDC        | BLK-RED                           | J6-P2                    | 113-0034-08              |
| #27 | FLASH: (RIGHT) SCOOP ARROW        | Q27      | ORG              | J6-P10                | 20VDC        | BLK-ORG                           | J6-P3                    | 113-0034-08              |
| #28 | FLASH: 180                        | Q28      | ORG              | J6-P10                | 20VDC        | BLK-YEL                           | J6-P4                    | 113-0034-08              |
| #29 | FLASH: SKILLSHOT                  | Q29      | ORG              | J6-P10                | 20VDC        | BLK-GRN                           | J6-P5                    | 113-0034-08              |
| #30 |                                  | Q30      | ORG              | J6-P10                | 20VDC        | BLK-BLU                           | J6-P6                    | 113-0034-08              |
| #31 | ORBIT POST (STEP-UP DRV BD)       | Q31      | ORG              | J10-P9/10             | 50VDC        | BRK-VIO                           | J6-P7                    | 090-5044-ND              |
| #32 | RIGHT SCOOP (STEP-UP DRV BD)      | Q32      | ORG              | J10-P9/10             | 50VDC        | BRK-VIO                           | J6-P7                    | 090-5044-ND              |
Go To Lamp Menu

To initiate, from the DIAGNOSTICS MENU, select the "LAMP" Icon. Controlled lamps are configured in and 8 x 10 Matrix of Rows [Lamp Returns / Ground] and Columns [Lamp Drives / 18VDC] with up to 80 lamps possible. The LAMP TEST MENU consists of five (5) parts: Single Lamp Test, Test All Lamps, Row Lamps Test, Column Lamps Test and Ordered Lamps Test to test all lamps.

Remember, use the GREEN Button to go [BACK], exit or escape, the RED Buttons to [< / - ] GO BACK / LEFT / [+ / >] GO FORWARD / RIGHT, and the BLACK Button to [SELECT] next or as "OK / ENTER."

**Single Lamp Test**
To initiate, from the LAMP MENU, select the "ONE" Icon. As each lamp is selected, the lamp will light at its location on the playfield as well as the Dot Matrix Display. Upon entering Single Lamp Test, you will notice the #1 lamp is shown. The Dot Matrix Display will light up (highlight) the corresponding dot in the on-screen matrix, display the lamp name, lamp number and the Lamp Return / Drive wire colors. For the Lamp Matrix Grid, see the beginning section of this Service Game Manual.

**All Lamps Test**
To initiate, from the LAMP MENU, select the "ALL" Icon. Upon entering All Lamps Test, you will notice the Dot Matrix Display is flashing "ALL LAMPS ON" and the lamps on the playfield will be lit, alternating between the rows in the Lamp Matrix Grid. The Dot Matrix Display will light up (highlight) all of the dots in the on-screen matrix.

**Row Lamps Test**
To initiate, from the LAMP MENU, select the "ROW" Icon. As each lamp row is selected, the lamps in the row will light on the playfield as well as the Dot Matrix Display. Upon entering Row Lamps Test, you will notice the #1 lamp row is shown. The Dot Matrix Display will light up (highlight) the corresponding row of dots in the on-screen matrix, display the lamp row number, the Lamp Return wire colors, the I/O PCB Connector and transistor number.

**Column Lamps Test**
To initiate, from the LAMP MENU, select the "COL" Icon. As each lamp column is selected, the lamps in the column will light on the playfield as well as the Dot Matrix Display. Upon entering Column Lamps Test, you will notice the #1 lamp column is shown. The Dot Matrix Display will light up (highlight) the corresponding row of dots in the on-screen matrix, display the lamp column number, the Lamp Drive (18VDC) wire colors, the I/O PCB Connector and IC number.

Bulb Types used for Control Lamps

Ordered Lamps Test
To initiate, from the LAMP MENU, select the "ORD" Icon. If required, this icon will appear in the LAMP MENU. Identical to Single Lamp Test, however, the lamps lit are not in the Lamp Matrix numeric order, but ordered or arranged in separate localized grouping(s) for easier lamp checking.

Typical Lamp Wiring & Schematic

* If not required in this game, Icon will not be shown.
<table>
<thead>
<tr>
<th>LAMP</th>
<th>NAME</th>
<th>BOARD</th>
<th>COMPONENT</th>
<th>TYPE</th>
<th>LOCATION</th>
<th>BOARD PART#</th>
</tr>
</thead>
<tbody>
<tr>
<td>81</td>
<td>GRID RED 1</td>
<td>5</td>
<td>D37</td>
<td>White</td>
<td>PF</td>
<td>520-6822-00A</td>
</tr>
<tr>
<td>82</td>
<td>GRID RED 2</td>
<td>5</td>
<td>D38</td>
<td>White</td>
<td>PF</td>
<td>520-6822-00A</td>
</tr>
<tr>
<td>83</td>
<td>GRID RED 3</td>
<td>5</td>
<td>D39</td>
<td>White</td>
<td>PF</td>
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<td>84</td>
<td>GRID RED 4</td>
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<td>5</td>
<td>D52</td>
<td>White</td>
<td>PF</td>
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<td>SHIFT LEFT TARGET</td>
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<td>D53</td>
<td>White</td>
<td>PF</td>
<td>520-6822-00A</td>
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<tr>
<td>98</td>
<td>TOOLBOX</td>
<td>5</td>
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<td>NEW CAR</td>
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<td>CN19-P3</td>
<td>Yel</td>
<td>Sign</td>
<td>112-5034-06</td>
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<td>CN19-P1</td>
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<td>360 TOP</td>
<td>5</td>
<td>CN20-P3</td>
<td>Red</td>
<td>Sign</td>
<td>112-5034-02</td>
</tr>
<tr>
<td>103</td>
<td>SHOOT COMBO JACKPOT</td>
<td>5</td>
<td>CN20-P4</td>
<td>Blue</td>
<td>Sign</td>
<td>112-5034-05</td>
</tr>
<tr>
<td>104</td>
<td>SHORT CUT</td>
<td>5</td>
<td>CN20-P5</td>
<td>Green</td>
<td>Sign</td>
<td>112-5034-04</td>
</tr>
<tr>
<td>105</td>
<td>18(0)</td>
<td>5</td>
<td>CN20-P6</td>
<td>Org</td>
<td>Sign</td>
<td>112-5034-07</td>
</tr>
<tr>
<td>106</td>
<td>1(18)</td>
<td>5</td>
<td>CN20-P7</td>
<td>Org</td>
<td>Sign</td>
<td>112-5034-07</td>
</tr>
<tr>
<td>107</td>
<td>1(1)80</td>
<td>5</td>
<td>CN20-P8</td>
<td>Org</td>
<td>Sign</td>
<td>112-5034-07</td>
</tr>
<tr>
<td>108</td>
<td>MYSTERY FORD</td>
<td>5</td>
<td>CN20-P9</td>
<td>White</td>
<td>PF</td>
<td>520-5307-00</td>
</tr>
</tbody>
</table>
Game-Specific Tests

To initiate from the DIAGNOSTICS MENU, select the "GAME" Icon. Ensure the Power Interlock Switch is pulled out when testing with the Coin Door open. This Menu is provided to allow the technician a simple method of testing game specific coils and/or switches, if required. If used, select the Icon (and Sub-Menu Icons, if any) and follow on-screen prompts.

Ball Trough Test

To initiate from the DIAGNOSTICS MENU, select the "CLR" Icon. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open. This Menu is provided to allow the technician a simple method of removing the balls from the trough and also, to test functionality of the trough, ensuring proper trough operation. Upon entering Ball Trough Test, you will notice that four switches are already indicated as closed. In the example, the 4-Ball Trough Switches #18, #19, #20 & #21 are shown closed (pinballs at rest in the ball trough). To return to the DIAGNOSTICS MENU, press the Green [ BACK ] Button.

Press the Black [ SELECT ] Button to eject the ball in the first position Switch #21 (VUK OPTO Trough #1 (R)). Simultaneously, the Dot Matrix Display and the playfield will eject the ball to the Trough Up-Kicker, eject from the Trough Up-Kicker into the Shooter Lane, momentarily closing Switch #23 (Shooter Lane), and is ejected onto the playfield where the technician can easily retrieve the pinball or allow the ball(s) to re-enter the trough to continue Ball Trough Test. The Dot Matrix Display indicates Switch #18 (4-Ball Trough #4 (L)) as open as the remaining three (3) pinballs shift over one (1) position to the right. If the technician allows the ejected pinball to reenter the ball trough, the Dot Matrix Display will indicate Switch #18 as closed. REMINDER: Switch #22 is the stacking OPTO switch; if more than five (5) pinballs are used, the additional switches will be noted. Typically, four (4) pinballs are used and required for proper operation; if this amounts differs, it will be noted on the front page of this Service Game Manual.

CAUTION! Continuous use off the above test may overheat the Trough Up-Kicker Coil.

Technician Alerts

To initiate from the DIAGNOSTICS MENU, select the "TECH" Icon. This Menu is provided to show any switch or solenoid problems and/or missing pinballs. If upon entering the SERVICE MENU the display indicated an asterisk (*) and "USE +/- TO VIEW TECH. ALERTS", alerts are present.

After pressing either Red [ < / - ] [ + / > ] Button or selecting this Icon in the DIAGNOSTICS MENU, the display will indicate the alert(s). If there are 2 alerts present, the display will indicate (1/2) with the 1st alert on the display. Press the Red [ + / > ] Button to view the second alert (2/2). The second number in the parenthesis () after the slash (/) indicates how many alerts are present. Refer to the start of this chapter regarding "Upon entering the SERVICE MENU" indication and to SWITCH ALERTS. To return to the DIAGNOSTICS MENU, press the Green [ BACK ] Button. Note: While in this menu, an option may be present to jump (short-cut) to the appropriate Testing Menu (e.g. Coil Test, Switch Test, Game Specific Test or Ticket Dispenser Test, if installed).

NOTE ON SWITCH DETECTION: During game play, activation of switches are continuously monitored. For a switch to be determined as inoperable or OUT OF SERVICE, up to twenty games or so must be played for a switch to automatically be marked as OUT OF SERVICE. In programming, if a switch is determined to be faulty, game play is compensated. Switches noted as OUT OF SERVICE are determined to be stuck closed or open depending on switch usage. Free up the switch actuator, adjust or replace, if necessary. Performing a valid switch closure will put the switch back "IN SERVICE."

Determination of switch usage can be checked in Audits (review the Audits Section). Find the associated Audit with the switch in question and check usage; compare the numbers to commonly used switches. After any switch is checked and repaired or replaced, it's suggested to test the switch in the Switch Test or Single Coil Test (reviewed earlier in this section) where the associated coil to the switch can be tested as well. After correcting the problem, the switch will marked "IN SERVICE" and the switch is again monitored as specified above. Only you can determine if a switch marked OUT OF SERVICE is actually inoperable, or if it is just not getting actuated during game play.

NOTE ON PINBALL DETECTION: While in TECHNICIAN ALERTS MENU, if the following is displayed, the game has detected one (1) or more pinball(s) missing and has compensated for the lost pinball(s) to provide normal game play.

Technician Alerts continued on the next page.
Technician Alerts continued from previous page.

During game play, a pinball can get trapped or stuck. If after approximately 15 seconds of inactivity or "no scoring," Ball Search is started. **Note:** If the pinball is in the Plunger Lane or "held" on the flipper, no Ball Search will be performed. The game will perform one Ball Search in an attempt to "find" or free-up the pinball.

If the game does not see a switch closure (indicating the pinball has not been found), the Dot Matrix Display may indicate [ LOCATING PINBALLS PLEASE WAIT ... ], during which Ball Search will continue until the timer runs out (this feature will not happen if the game is in Competition Mode; Ball Search will continue until the pinball is found, unstuck and/or replaced manually). The display will momentarily acknowledge the missing pinball(s). The game will provide another pinball into play and will compensate for the lost pinball. Game play will appear normal.

**Note:** This detection and compensation will happen with every pinball, if each suffers the same fate of a ball trap. If all balls get trapped, the game cannot be played or started until the situation is rectified.

**Important:** Determine where the pinball is! **Do not add pinball(s) until** it is determined the pinball(s) are indeed missing and not just stuck. The most common places for a pinball to be stuck is in device holes (ejectors and VUKs) or ball troughs. Determine that all devices are functioning properly. Check around plastic pieces and ramps to see if the pinball got jammed or stuck.

When the found pinball or a replacement pinball is added to the Ball Trough, the Technician Alert will immediately clear and will then indicate any remaining alerts (if present) or NO TECHNICIAN ALERTS.

Enter the BALL TROUGH TEST (review the previous page) to cycle the pinballs and to check proper switch and coil operation. If a pinball was added, and the originally stuck pinball has freed itself at a later time, the game will not operate correctly.

**NOTE ON DEVICE MALFUNCTION:** While in TECHNICIAN ALERTS MENU, if the following is displayed, the game has detected a "device malfunction." Check the device indicated (coil and/or switch).

---

**Knocker Test**

To initiate, from the DIAGNOSTICS MENU, select the "KNOCKER" icon. The digitally mastered "Knocker" is sounded. The knocker sound is used to alert the player if he/she has received a special, replay or a credit from the Match Award feature. Press the Black [ SELECT ] Button to activate the knocker. To return to the DIAGNOSTICS MENU, press the Green [ BACK ] Button.

**FACTOID:** The knocker got it's name from the 'original knocker' (20th century pinball games), which used a coil and when energized (fired), the plunger would strike a wood panel inside the cabinet.

---

**Sound / Speaker Test**

To initiate, from the DIAGNOSTICS MENU, select the "SPKR" icon. This system produces true digital stereo sound from Backbox & Cabinet Speakers or "Mono" on the Cabinet Speaker (when used by itself). This Menu is provided to allow the technician a simple method of testing the speakers if rewired or replaced.

Upon entering Sound / Speaker Test, you will notice the Dot Matrix Display indicating the first option of available music and/or sound(s) in this test. Press the Red [ +/- ] Button to cycle through the available music and/or sounds, and press the Black [ SELECT ] Button to play the option shown in the Dot Matrix Display. Press the Green [ BACK ] Button to exit.

**Speaker Phase Testing**

Connections to each of speakers are polarized and each must be connected appropriately for the best quality sound. If one speaker has the positive and negative connections reversed with respect to the other one, bass frequencies will not be produced properly and the overall sound quality will be poor. To test for proper speaker phasing, use the Sound / Speaker Test to cycle through the available music and sound.

**Speaker Phase Testing cont. next page.**
Speaker Phase Testing continued from previous page.
If the sound is not balanced or doesn’t sound correct, check the speaker wiring.

- **CPU/Sound PCB**

1. Check each speaker for polarity markings. If the speakers have polarity markings, verify that the Backbox Speaker’s RED-BLK Wires and the Cabinet Speaker YEL-BLK Wire(s) are connected to the negative (−) terminal.

2. Disconnect the speaker output Connector J10 (AUDIO) from the CPU / Sound PCB (in the Backbox) and connect a 1.5-volt battery across each speaker pair one at a time while observing the speakers.

3. Make sure the positive (+) battery terminal is connected to the positive lead [ J10, Pin-2, CH A+ ] (RED-WHT) or [ J10, Pin-4, CH B+ ] (YEL-WHT) each time. As the connection is made, check speaker cone movement; proper connections are indicated by outward movement.

### Begin Burn-In
To initiate, from the DIAGNOSTICS MENU, select the “BURN” Icon. After selecting this Icon, press the Black [ SELECT ] Button to begin (initiate) the Burn-In Test. Ensure the Power Interlock Switch is pulled out if testing with the Coin Door open (required for coil function). Upon entering Burn-In Test, the game will exercise all CPU I/O Functions: Dot Matrix Display Test, Coil Cycling Testing, All Lamps Test and Sound / Speaker Test. Press the Green [ BACK ] Button, to pause and to view the cumulative Burn-In minutes. Press the Green [ BACK ] Button again to return to the DIAGNOSTICS MENU.

**Note:** To reset Burn-In minutes back to 0:00, see Section 3, Chapter 5, GO TO RESET MENU (via the UTILITIES MENU), Reset Factory Settings. **CAUTION:** Performing a FACTORY RESET will reset all other information as well (read the Utilities Section (GO TO RESET MENU), for more information).

### Dot Matrix Test
To initiate, from the DIAGNOSTICS MENU, select the “DOT TEST” Icon. After selecting this Icon the Dot Matrix Test immediately begins. The Dot Matrix Display will immediately and continuously illuminate and cycle each of the 5 Tests for 1 pass each. To return to the DIAGNOSTICS MENU, press the Green [ BACK ] Button.

<table>
<thead>
<tr>
<th>Test 1</th>
<th>Test 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illuminates 1 vertical column of dots, turning it off &amp; illuminating the next column, until each column has been individually lit, while the other columns are off.</td>
<td>Illuminates 1 horizontal row of dots, turning it off &amp; illuminating the next row, until each row has been individually lit, while the other rows are off.</td>
</tr>
<tr>
<td>Test 3</td>
<td>Test 4</td>
</tr>
<tr>
<td>Illuminates all the dots, except for one column from left to right.</td>
<td>Illuminates all the dots, except for one row from top to bottom.</td>
</tr>
<tr>
<td>Test 5</td>
<td>Test 1</td>
</tr>
<tr>
<td>Illuminates all the dots alternating even &amp; odd, in both the rows and columns.</td>
<td>Illuminates 1 vertical column of dots, turning it off &amp; illuminating the next column, until each column has been individually lit, while the other columns are off.</td>
</tr>
</tbody>
</table>
Ticket Dispenser Test

To initiate, from the DIAGNOSTICS MENU, select the "TIX" icon. This Menu (Icon) will only appear if Standard Adjustment 56, Ticket Dispenser, is set to YES (Default = NO*). *Note: Some games shipped from the factory with a unique Dip Switch Setting will default to YES). To view and/or change your setting, see Adjustments Section (GO TO ADJUSTMENTS MENU). Please remember, if you install an optional Ticket Dispenser, and your default setting is "NO," you will have to reset it back to "YES" if a Factory Reset is performed.

After selecting this Icon, the Ticket Dispenser Test will start. With the Ticket Dispenser properly installed, manually feed your tickets into the dispenser. The dispenser will activate and pull in the first ticket. Press the Black [SELECT] Button (which energizes Coil #35, Aux 3: Switched Ground) to advance a ticket. Feeding your Tickets into the dispenser works because Coil #33, Aux 1: Ticket Advance (Enable) is always 'energized'. With a Ticket Meter installed, as one Ticket Passes through the Ticket Dispenser, one 'click' is fired to the Meter (Coil #34, Aux 2: Ticket Meter) for each ticket passing through. Dedicated Switch D-19, Ticket Notch, will also be indicated on-screen (in combination with a audible sound) as "closing" as the notch between the tickets passes through. In this test you can clear ticket jams and check and/or clear tickets in Escrow, if necessary. To return to the DIAGNOSTICS MENU, press the Green [BACK] Button.
Perform the below steps to review the audits. Enter the SERVICE MENU, then enter the EARNINGS AUDITS or STANDARD AUDITS MENUS. For audit definitions or summary, review the Audits Section (GO TO AUDITS MENU). Try the "DUMP AUDITS TO USB" Feature to create a text file of your audits. Don’t forget to set the DATE & TIME in the UTILITIES MENU. See the Utilities Section (GO TO UTILITIES MENU).

Step 1 Press [SELECT]. Press [BACK] to exit for escape at any time.

Step 2 Press [>] to go to the "AUD" Icon. Press [SELECT].

Step 3 Press [>] to go to the "EARN" or "S.P.I." Icon. Press [SELECT].

Step 4 Press [<] [>] to move between audits.

### EARNINGS AUDITS [ #1 - #13 ] ▼

<table>
<thead>
<tr>
<th>Nr.</th>
<th>EARNING Audit Name</th>
<th>YOUR RESULT</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>TOTAL PAID CREDITS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>FREE GAME PERCENTAGE</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>AVERAGE BALL TIME</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>AVERAGE GAME TIME</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>COINS THROUGH LEFT SLOT</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>COINS THROUGH RIGHT SLOT</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>COINS THROUGH CENTER SLOT</td>
<td></td>
</tr>
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</table>

### STANDARD AUDITS [ #1 - #59 ] ▼

<table>
<thead>
<tr>
<th>Nr.</th>
<th>STANDARD Audit Name</th>
<th>YOUR RESULT</th>
<th>Nr.</th>
<th>STANDARD Audit Name</th>
<th>YOUR RESULT</th>
</tr>
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<tr>
<td>1</td>
<td>TOTAL BALLS PLAYED</td>
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<td>21</td>
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</tr>
<tr>
<td>2</td>
<td>TOTAL EXTRA BALLS</td>
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<td>22</td>
<td>10.0M - 12.49M SCORES</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EXTRA BALL PERCENTAGE</td>
<td></td>
<td>23</td>
<td>12.5M - 14.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>REPLAY 1 AWARDS</td>
<td></td>
<td>24</td>
<td>15.0M - 17.49M SCORES</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>REPLAY 2 AWARDS</td>
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<td>25</td>
<td>17.5M - 19.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>REPLAY 3 AWARDS</td>
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<td>26</td>
<td>20.0M - 24.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>REPLAY 4 AWARDS</td>
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<td>27</td>
<td>25.0M - 29.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>REPLAY TOTAL REPLAYS</td>
<td></td>
<td>28</td>
<td>30.0M - 39.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>REPLAY PERCENTAGE</td>
<td></td>
<td>29</td>
<td>40.0M - 49.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>TOTAL SPECIALS</td>
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<td>30</td>
<td>50.0M - 74.99M SCORES</td>
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</tr>
<tr>
<td>11</td>
<td>SPECIAL PERCENTAGE</td>
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<td>31</td>
<td>75.0M - 99.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>TOTAL MATCHES</td>
<td></td>
<td>32</td>
<td>100.0M - 149.99M SCORES</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>HIGH SCORE AWARDS</td>
<td></td>
<td>33</td>
<td>150.0M+ SCORES</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>HIGH SCORE PERCENT</td>
<td></td>
<td>34</td>
<td>AVERAGE SCORES</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>TOTAL FREE PLAYS</td>
<td></td>
<td>35</td>
<td>SERVICE CREDITS</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>TOTAL PLAYS</td>
<td></td>
<td>36</td>
<td>BALL SEARCH STARTED</td>
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</tr>
<tr>
<td>17</td>
<td>0.0M - 1.99M SCORES</td>
<td></td>
<td>37</td>
<td>LOST BALL FEEDS</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>2.0M - 3.99M SCORES</td>
<td></td>
<td>38</td>
<td>LOST BALL GAME STARTS</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>4.0M - 5.99M SCORES</td>
<td></td>
<td>39</td>
<td>LEFT DRAINS</td>
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</tr>
<tr>
<td>20</td>
<td>6.0M - 7.99M SCORES</td>
<td></td>
<td>40</td>
<td>CENTER DRAINS</td>
<td></td>
</tr>
</tbody>
</table>

Note: Audits are subject to change (with or without notice).

---

Go to the "AUD" Icon.
Press [SELECT].
### Feature Adjustments [ #1 - #+ ]

To initiate, from the **ADJUSTMENTS** **MENU**, select the "GAME" **Icon**. The Dot Matrix Display will indicate the adjustment number (in this group), adjust name, adjust setting and comment line. The current adjustment will remain on the display until the next adjustment is viewed or when this sub-menu is exited.

#### FACTORY RESET or CODE UPDATE NOTE:
Don’t forget, any changes you make to your adjustments will revert back to the Factory Default settings if you perform a Factory Reset or update your Game Code. See Utilities Section (GO TO RESETS MENU and GO TO USB MENU).

View the Coils Detailed Chart Menu to see if this game is Shaker Motor Enabled. If it is, set the options in the Feature Adjustment as seen below. (typically the last one).

**# SHAKER MOTOR (OPTIONAL):** Set to **NONE, MINIMAL USE, MODERATE USE** or **MAXIMAL USE**.

Factory Default = **MODERATE USE**. Set to any of the varying "...USES" if an Optional Shaker Motor Kit (SPI Part Number 502-5027-00) was installed correctly in this pinball machine. See the assembly (kit) on the last page of Blue Pages (Major Assemblies). Also see Shaker Motor Coil (Q8) in the Coils Detailed Chart Table at the beginning of this Service Game Manual or the beginning of the Yellow Pages.
## USA & International (non-Euro) Standard Pricing Select Table

### Coin Mechanisms (Switches)

<table>
<thead>
<tr>
<th>Pos.</th>
<th>USA 1</th>
<th>USA 2</th>
<th>USA 3</th>
<th>USA 4</th>
<th>USA 5</th>
<th>USA 6</th>
<th>USA 7</th>
<th>USA 8</th>
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<tbody>
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<tr>
<td>OFF</td>
<td>Default Highlighted</td>
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<td>Default Highlighted</td>
<td>Default Highlighted</td>
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<td>Default Highlighted</td>
</tr>
</tbody>
</table>

### Coin Slot Options

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<td>OFF</td>
<td>OFF</td>
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<td>OFF</td>
</tr>
</tbody>
</table>

### Pricing Scheme

- **USD** / UNITED STATES DOLLAR / [1] $1
  - USD 1: 0.25 1.00 2.00
  - USD 2: 0.25 1.00 2.00
  - USD 3: 0.25 1.00 2.00
  - USD 4: 0.25 1.00 2.00
  - USD 5: 0.25 1.00 2.00
  - USD 6: 0.25 1.00 2.00
  - USD 7: 0.25 1.00 2.00
  - USD 8: 0.25 1.00 2.00
  - USD 9: 0.25 1.00 2.00
  - USD 10: 0.25 1.00 2.00
  - USD 11: 0.25 1.00 2.00

- **EUR** / EURO / [2] €1
  - EUR 1: 0.25 1.00 2.00
  - EUR 2: 0.25 1.00 2.00
  - EUR 3: 0.25 1.00 2.00
  - EUR 4: 0.25 1.00 2.00
  - EUR 5: 0.25 1.00 2.00
  - EUR 6: 0.25 1.00 2.00
  - EUR 7: 0.25 1.00 2.00
  - EUR 8: 0.25 1.00 2.00
  - EUR 9: 0.25 1.00 2.00
  - EUR 10: 0.25 1.00 2.00
  - EUR 11: 0.25 1.00 2.00

- **JPY** / JAPANESE YEN / [3] ¥1
  - JPY 1: 0.25 1.00 2.00
  - JPY 2: 0.25 1.00 2.00
  - JPY 3: 0.25 1.00 2.00
  - JPY 4: 0.25 1.00 2.00
  - JPY 5: 0.25 1.00 2.00
  - JPY 6: 0.25 1.00 2.00
  - JPY 7: 0.25 1.00 2.00
  - JPY 8: 0.25 1.00 2.00
  - JPY 9: 0.25 1.00 2.00
  - JPY 10: 0.25 1.00 2.00
  - JPY 11: 0.25 1.00 2.00

- **RUB** / RUSSIAN RUBLE / [4] ₽1
  - RUB 1: 0.25 1.00 2.00
  - RUB 2: 0.25 1.00 2.00
  - RUB 3: 0.25 1.00 2.00
  - RUB 4: 0.25 1.00 2.00
  - RUB 5: 0.25 1.00 2.00
  - RUB 6: 0.25 1.00 2.00
  - RUB 7: 0.25 1.00 2.00
  - RUB 8: 0.25 1.00 2.00
  - RUB 9: 0.25 1.00 2.00
  - RUB 10: 0.25 1.00 2.00
  - RUB 11: 0.25 1.00 2.00

- **ZAR** / SOUTH AFRICAN RAND / [5] R1
  - ZAR 1: 0.25 1.00 2.00
  - ZAR 2: 0.25 1.00 2.00
  - ZAR 3: 0.25 1.00 2.00
  - ZAR 4: 0.25 1.00 2.00
  - ZAR 5: 0.25 1.00 2.00
  - ZAR 6: 0.25 1.00 2.00
  - ZAR 7: 0.25 1.00 2.00
  - ZAR 8: 0.25 1.00 2.00
  - ZAR 9: 0.25 1.00 2.00
  - ZAR 10: 0.25 1.00 2.00
  - ZAR 11: 0.25 1.00 2.00

- **GBP** / UNITED KINGDOM POUNDS / [6] £1
  - GBP 1: 0.25 1.00 2.00
  - GBP 2: 0.25 1.00 2.00
  - GBP 3: 0.25 1.00 2.00
  - GBP 4: 0.25 1.00 2.00
  - GBP 5: 0.25 1.00 2.00
  - GBP 6: 0.25 1.00 2.00
  - GBP 7: 0.25 1.00 2.00
  - GBP 8: 0.25 1.00 2.00
  - GBP 9: 0.25 1.00 2.00
  - GBP 10: 0.25 1.00 2.00
  - GBP 11: 0.25 1.00 2.00

### Additional Notes

- **Attention:** UK 5th coin slot tied to 6th channel on ELEC. COIN MACH.
#19 **MATCH PERCENTAGE:** Set between 0% – 10% or OFF. Factory Default = 9%. At 0% the Match Animation Feature occurs at the end of the game but never awards the Match Award (Standard Adjustment 20). Set to OFF, no Match Animation Feature is shown.

#20 **MATCH AWARD:** Set to CREDIT, TICKET*, or TOKEN*. Factory Default = CREDIT. This adjustment is not shown if OFF is installed in Match Percentage (Standard Adjustment 19).

*Note: If TICKET or TOKEN is selected, the game will require an optional Ticket or Token Dispenser and then 024 Option (Standard Adj. 55) must be changed accordingly.

#21 **BALLS PER GAME:** Set between 1 – 10. Factory Default = 3. Set the number of balls per game.
To initiate, from the MAIN MENU, select the "UTIL" Icon. The UTILITIES MENU provides ways to quickly and easily customize your game with Installs (pre-sets for game Standard & Feature Adjustments), setup a Custom Message (short-cuts to Standard Adjustment 41, Custom Message), setup Custom Pricing (short-cuts to Standard Adjustment 18, to the Custom Pricing Sub-Menu), setup the Date and Time (required if the date and time is needed to be accurate for data dumps and for tournaments), reset certain particular game data or perform a complete Factory Reset and to download game data, update or backup game code in the USB MENU.

All UTILITIES, INSTALLS, RESETS MENU and USB MENU Icons and there usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. NOTE: Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some Icons may appear non-functional or may not appear at all. Installs (Adjustments), Icons and/or functions, order and operation are subject to change. If in doubt use the Factory Default Settings (review Install Factory on the next page).

In displays where changes can be made or to perform a function, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < / - ] MOVE BACK / LEFT / [ + / > ] MOVE FORWARD / RIGHT to view the next audit in the group, and the BLACK Button to [ SELECT ] the sub-menus.

Go To Installs Menu

To initiate, from the UTILITIES MENU, select the "INST" Icon. The INSTALLS MENU provides 13 Installs to vary Game Play Difficulty (set with Feature Adjustments) or Game Play Type and Install Factory (restores all adjustments to Factory Defaults).

For detailed customization or to check current Adjustments Defaults (either changed by YOU in the Adjustments Menu or by this INSTALLS MENU or for Factory Default Settings), see Section 3, Chapter 4, GO TO ADJUSTMENTS MENU. After completing one or more of the Installs in this chapter, go back to the ADJUSTMENTS MENU to see which Standard and/or Feature Adjustments have changed (Feature Adjustments and/or settings are subject to change during production, and may differ than what is described in the tables at the end of this chapter). The Dot Display will indicate if a setting is a Factory Default or not. If the settings are not to your liking, perform one of the following:

1.: Manually change the Standard & Feature Adjustments Settings (perform this task in the ADJUSTMENTS MENU, see the Adjustments Section).

2.: Install Factory (see the last install) on how to reset all of the Standard & Feature Adjustments back to the Factory Default Settings.

Multiple Installs can be set to vary game play; however, for Installs that have one or more Adjustments in common, the last "Install" selected & activated, will supersede any previously changed Adjustment(s) from any prior Installs. Any adjustments which you changed and are not affected by the Install will remain as set.

For example, if you want a 5-BALL Game set to EXTRA EASY: Select and activate the "5BAL" Icon first (which will typically change any Feature Difficulty Adjustments to HARD), then select & activate the "X.EZ" Icon to change back the Difficulty Adjustments to EXTRA EASY. However, if the "X.EZ" Icon was selected & activated first, then the "5BAL" Icon was selected & activated, the game will be set to a 5-BALL Game set to HARD.

Remember, use the GREEN Button to go [ BACK ], exit or escape and the BLACK Button to [ SELECT ] to INSTALL your new setting(s).

Install Extra Easy

To initiate, from the INSTALLS MENU, select the "X.EZ" Icon. The Dot Matrix Display will indicate the INSTALL EXTRA EASY. Follow the on-screen prompts to perform the Install. Set the Game Play Difficulty level.

Installs Menu continued on the next page.
Installs Menu continued from previous page.

Install Easy
To initiate, from the INSTALLS MENU, select the "EASY" icon. The Dot Matrix Display will indicate the INSTALL EASY. Follow the on-screen prompts to perform the Install. Set the Game Play Difficulty level.

Install Medium (Normal or Factory Settings)
To initiate, from the INSTALLS MENU, select the "FACT" icon. The Dot Matrix Display will indicate the INSTALL MEDIUM. Follow the on-screen prompts to perform the Install. Set the Game Play Difficulty level.

Install Hard
To initiate, from the INSTALLS MENU, select the "HARD" icon. The Dot Matrix Display will indicate the INSTALL HARD. Follow the on-screen prompts to perform the Install. Set the Game Play Difficulty level.

Install Extra Hard
To initiate, from the INSTALLS MENU, select the "X.HD" icon. The Dot Matrix Display will indicate the INSTALL EXTRA HARD. Follow the on-screen prompts to perform the Install. Set the Game Play Difficulty level.

Install 3-Ball or 5-Ball
To initiate, from the INSTALLS MENU, select either the "3BAL" or "5BAL" icons. The Dot Matrix Display will indicate the INSTALL 3-BALL or 5-BALL depending on choice. Follow the on-screen prompts to perform the Install. Set the Game Play Type to 3 Balls per game. (Factory Default is 3 Balls per game, not including extra balls earned by the player, if any).

Install Competition
To initiate, from the INSTALLS MENU, select the "COMP" icon. The Dot Matrix Display will indicate the INSTALL COMPETITION. Follow the on-screen prompts to perform the Install. Set the Game Play Type to "Tournament" Rules. Programming varies and is subject to change.

Install Director's Cut
To initiate, from the INSTALLS MENU, select the "DCUT" icon. The Dot Matrix Display will indicate the INSTALL DIRECTOR'S CUT. Follow the on-screen prompts to perform the Install. Set the Game Play Type to programmer's choice. Programming varies and is subject to change.

Install Home Play
To initiate, from the INSTALLS MENU, select the "HOME" icon. The Dot Matrix Display will indicate the INSTALL HOME PLAY. Follow the on-screen prompts to perform the Install. Set the Game Play Type to "Home" Rules. Programming varies and is subject to change.

Install Novelty
To initiate, from the INSTALLS MENU, select the "NOV" icon. The Dot Matrix Display will indicate the INSTALL NOVELTY. Follow the on-screen prompts to perform the Install. ********** This setting is recommended where local laws restrict certain game features. ********** Set the Game Play Type to "Restricted" Rules. Programming varies and is subject to change.

Install Add-A-Ball
To initiate, from the INSTALLS MENU, select the "A.A.B." icon. The Dot Matrix Display will indicate the INSTALL ADD-A-BALL. Follow the on-screen prompts to perform the Install. ********** This setting is recommended where local laws restrict certain game features. ********** Set the Game Play Type to "Restricted" Rules. Programming varies and is subject to change.

Install Factory
To initiate, from the INSTALLS MENU, select the "FACT" icon. The Dot Matrix Display will indicate the INSTALL FACTORY. Follow the on-screen prompts to perform the Install. CAUTION! All Standard and Feature Adjustments which were changed in the INSTALLS MENU or ADJUSTMENTS MENU are returned to the Factory Defaults (as indicated in the Dot Display in the ADJUSTMENTS MENU). Note: To perform a complete Factory Reset, GO TO THE RESETS MENU. Escape back to the UTILITIES MENU, select the "RESET" icon, then select the "FACT" icon in the RESETS MENU (review the end of this section, Reset Factory Settings).
Enter Custom Message

To initiate, from the UTILITIES MENU, select the "ABCD CUST MSG" icon. The SET CUSTOM MESSAGE (a short-cut for Standard Adjustment 41, Custom Message) provides an opportunity to have a text message appear in the the Attract Mode. Follow the on-screen prompts to complete [ END ].

Remember, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < / - ] MOVE LEFT / CHOOSE NEXT [ + / > ] MOVE RIGHT / CHOOSE PREVIOUS, and the BLACK Button to [ SELECT ] as 'OK'.

Set Custom Pricing

To initiate, from the UTILITIES MENU, select the "PRIC" icon. The CUSTOM PRICING MENU (a short-cut for Standard Adjustment 18, Game Pricing, and setting selected is CUSTOM) provides an opportunity to set Custom Pricing.

Note: MONETARY AMOUNT MUST BE SELECTED FIRST! Press [ BACK ] to − DECREASE or [ SELECT ] to + INCREASE the [ < > ] monetary amount (e.g. look at the right side of the display from $0.25 to $0.50). Press [ < / - ] to − DECREASE or [ + / > ] to + INCREASE the credit quantity (e.g. look at the left side of the display from 0 CREDITS AT: to 1 CREDIT AT:).

IF EXAMPLE CUSTOM PRICING SETTING DESIRED IS:
1 Play for $0.50, 3 Plays for $1.00 and 7 Plays for $2.00
THEN YOU WILL NEED TO PERFORM THE FOLLOWING:

**Step 1**  The starting display appears as below if no prior Custom Pricing was installed.

```
CUSTOM PRICING
0 CREDITS AT:   $0.25
USE +/- TO CHANGE CREDITS
```

**Step 2**  Press [ SELECT ] to + INCREASE to $0.50.

```
CUSTOM PRICING
1 CREDIT AT:    $0.50
1/0.50
USE +/- TO 'INSTALL'
```

**Step 3**  Press [ SELECT ] to + INCREASE to $1.00.

```
CUSTOM PRICING
2 CREDITS AT:  $1.00
1/0.50 3/1.00
USE +/- TO CHANGE CREDITS
```

**Step 4**  Press [ SELECT ] to + INCREASE to $2.00.

```
CUSTOM PRICING
4 CREDITS AT:  $2.00
1/0.50 3/1.00 7/2.00
USE +/- TO CHANGE CREDITS
```

**Step 5**  Press [ SELECT ] to + INCREASE the amount once (example = $2.25).

```
CUSTOM PRICING
0 CREDITS AT:   $2.25
1/0.50 3/1.00 7/2.00
USE +/- TO 'INSTALL'
```


**Step 6**  Press [ SELECT ] to INSTALL.

```
CUSTOM PRICING
INSTALL
1/0.50 3/1.00 7/2.00
PRESS 'SELECT' TO INSTALL
```

**Step 7**  Press [ SELECT ], press [ BACK ] twice to exit the SERVICE MENU with your Custom Pricing installed.

CUSTOM PRICING INSTALLED
PRESS 'SELECT' TO CONTINUE

To correct or make new changes, reenter, which brings you to Step 6. Press [ BACK ] repeatedly until the monetary amount shown is the desired amount and then continue following the above steps with your new or corrected settings. If you are still having difficulty or if you have any questions, please call Technical Support 800-542-5377 or 708-345-7700, option 1.
Set Date / Time
To initiate, from the UTILITIES MENU, select the "TIME" Icon. The SET TIME MENU appears with the MONTH flashing. Setting the date and time is required for Data Dumps and Tournament Start and End Dates. If the setting of Standard Adjustment 61, Time Format, is set to 12-HOUR (Factory Default) the time will be expressed in the AM/PM format. If Standard Adjustment 61, Time Format, is set to 24-HOUR the time will be expressed in the 24-hour format.

Go To Resets Menu
To initiate, from the UTILITIES MENU, select the "RESET" Icon. The RESETS MENU provides six (6) functions to reset only the Coin Audits, reset only the Game Audits, reset only the Grand Champion Score, reset only the High Score(s), reset only the paid Credits (includes Service Credits) or to reset ALL DATA back to the Factory Default Settings.

Reset Coin Audits
To initiate, from the RESET MENU, select the "COIN" Icon. ▲ ONLY the Coin Audits [Earnings Audits 5–12], will be reset to zero (0), Factory Default Settings. Follow the on-screen prompts to perform the Reset.

Reset Game Audits
To initiate, from the RESET MENU, select the "AUD" Icon. ▲ ONLY the Game Audits [Earnings Audits 1–4, Standard Audits 1–59 and Feature Audits 1–XX*], will be reset to zero (0), Factory Default Settings. Follow the on-screen prompts to perform the Reset. *varies per game title.

Reset Grand Champion (Score)
To initiate, from the RESET MENU, select the "GC" Icon ▲ ONLY the Grand Champion Score [adjustable via Standard Adjustment 31], will be reset to Factory Default Setting. Follow the on-screen prompts to perform the Reset.

Reset High Scores
To initiate, from the RESET MENU, select the "HSTD" Icon. ▲ ONLY the High Score(s) [adjustable via Standard Adjustments 32–35], will be reset to Factory Default Setting(s). Follow the on-screen prompts to perform the Reset. Note: High Scores (but not Grand Champion Score) are reset automatically every 2,000 games (Factory Default Setting) [adjustable via Standard Adjustment 37, HSTD Reset Count].

Reset Credits
To initiate, from the RESET MENU, select the "CRED" Icon. ▲ ONLY the Credits (includes Service Credits) [adjustable via Standard Adjustment 23, Credit Limit], will be reset to zero (0), Factory Default Settings. Follow the on-screen prompts to perform the Reset.

Reset Factory Settings
To initiate, from the RESET MENU, select the "FACT" Icon. ▲ ALL GAME DATA IS RESET! (with the exception of Earnings Audit 13, Software Meter). NOTE: IF YOU HAD SET-UP CUSTOM PRICING OR HAD CHANGED ANY ADJUSTMENTS OR PERFORMED INSTALLS, IT IS SUGGESTED TO WRITE DOWN YOUR CHANGES PRIOR TO THE FACTORY RESET. Follow the on-screen prompts to perform the Reset.

Go To USB Menu
To initiate, from the UTILITIES MENU, select the "USB" Icon. The USB MENU provides three (3) functions to download game data, update your game code or backup your code onto a USB Memory Stick. Review the inside cover for information on how to update your game code.

Update Game Code
To initiate, from the USB MENU, select the "UPDT" Icon. Follow the on-screen prompts or review the inside cover for more information.

Dump Audits to USB
To initiate, from the USB MENU, select the "DUMP" Icon. Follow the on-screen prompts to perform a Data Dump (download). Note: If Icon is not present, access via the Audits Menu, see the Audits Section.

Backup to USB Memory Stick
To initiate, from the USB MENU, select the "BKUP" Icon. Follow the on-screen prompts to perform a Backup (game code only). This backup feature does not retain adjustments and/or settings changes made.
To initiate, from the MAIN MENU, select the "TOUR" icon. The TOURNAMENT MENU provides ways to quickly and easily start and stop a tournament. Also, tournament data can be viewed (audits, prize info, etc.).

All TOURNAMENT MENU icons and their usages are explained throughout this chapter in the same order as seen in the Dot Matrix Display. NOTE: Depending on Game Type, Version, selections made, Dip Switch settings, location and/or areas, some icons may appear non-functional or may not appear at all. Icons and/or functions, order and operation are subject to change.

In displays where changes can be made or to perform a function, use the GREEN Button to go [ BACK ], exit or escape, the RED Buttons to [ < ], HIGHLIGHT PREVIOUS or DECREASE / [ + ] HIGHLIGHT NEXT or INCREASE to highlight the desired option, and the BLACK Button to [ SELECT ] it or activate.

Start Tournament
To initiate, from the TOURNAMENT MENU, select the "STRRT" icon. The START MENU allows the operator to start a tournament. Select QUICK START or CUSTOM Tournament Start. For the first time Tournament Set-Up, it is recommended to select CUSTOM. Follow the on-screen prompts. After completion of all options in QUICK START or CUSTOM, the Tournament is started, the START TOURNAMENT MENU is exited and returns to the TOURNAMENT MENU.

QUICK START:
Increase or decrease the: • DAYS, HOURS and MINUTES • PRIZE POOL $ (DOLLAR) and ¢ (CENT) AMOUNT • INCREMENT THE PRIZE POOL PER PLAY INCREASES $ and ¢ AMOUNT

CUSTOM START:
• Confirm the current date and time (if it was not set previous via the UTILITIES MENU it can be set-up in this display as well). Enter the MONTH, DAY, YEAR and TIME
• Choose the Tournament Start Date: MONTH, DAY, YEAR and TIME
• Choose the Tournament End Date: MONTH, DAY, YEAR and TIME
• Choose the CREDITS per play desired (01-10). Set the maximum number of Credits that may be accumulated per game. Note: The current pricing is displayed; to change pricing GO TO THE ADJUSTMENTS MENU.

Increase or decrease the: • PRIZE POOL $ (DOLLAR) and ¢ (CENT) AMOUNT • INCREMENT THE PRIZE POOL PER PLAY INCREASES $ and ¢ AMOUNT • MAXIMUM (CAP) PRIZE POOL $ and ¢ AMOUNT.

Increase or decrease the number of PRIZES (01-05 HIGH SCORE; 02-05 B'N'W). Set the maximum # of Prize Positions to be awarded during a Tournament. Selections are as follows (% distribution cannot be changed): BUMP N' WIN:

| Set to 01 | 1 Winner 100% (1) Prize Pool |
| Set to 02 | 2 Winners 65% (1) 35% (2) |
| Set to 03 | 3 Winners 50% (1) 30% (1) 20% (3) |
| Set to 04 | 4 Winners 50% (1) 25% (1) 15% (3) 10% (4) |
| Set to 05 | 5 Winners 50% (1) 20% (1) 15% (3) 10% (4) 5% (5) |

Cannot set to 01. Minimum of 2 winners required.

| Set to 02 | 2 Winners 65% (1) 35% (2) |
| Set to 03 | 3 Winners 50% (1) 25% (1) 25% (2) |
| Set to 04 | 4 Winners 40% (1) 20% (1) 20% (1) 20% (2) 20% (4) |
| Set to 05 | 5 Winners 40% (1) 15% (1) 20% (1) 15% (3) 15% (4) 15% (5) |

Select the AWARD TYPE (CASH, POINTS, PRIZE, TICKETS or NONE). Select CASH for the displays to represent the Prize Pool amount (based on Jackpot Base and Max.) in $ Dollars. Select POINTS for the display to represent the Prize Pool amount in Points. Select PRIZE, if applicable. Select TICKET for the display to represent the Prize Pool amount in Tickets. Select NONE NOT TO represent anything.
POWER REQUIREMENTS

This game must be connected to a properly grounded outlet to reduce shock hazard and ensure proper game operation. See the Yellow Pages (Schematics & Wiring) for transformer connections required for Normal, High, and Low Line conditions.

<table>
<thead>
<tr>
<th>Normal Line: 110v AC - 125v AC @ 60Hz</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Domestic</strong></td>
<td></td>
</tr>
<tr>
<td>use an 8AMP 250v Slo-Blo Fuse.</td>
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<tr>
<td><strong>AVG OPERATION</strong></td>
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<tr>
<td>CURRENT: 2.8AMP</td>
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<tr>
<td>WATTAGE: 329W</td>
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<tr>
<td><strong>MAX OPERATION</strong></td>
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<tr>
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</tr>
<tr>
<td>WATTAGE: 940W</td>
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</tr>
<tr>
<td><strong>High Line: 218v AC - 240v AC @ 50Hz</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Export</strong></td>
<td></td>
</tr>
<tr>
<td>use 2x 5AMP 250v Slo-Blo Fuses.</td>
<td></td>
</tr>
<tr>
<td>(&quot;England &amp; Hong Kong use an 8amp 250v 5/B Fuse.&quot;)</td>
<td></td>
</tr>
<tr>
<td><strong>AVG OPERATION</strong></td>
<td></td>
</tr>
<tr>
<td>CURRENT: 1.8AMP</td>
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</tr>
<tr>
<td>WATTAGE: 412W</td>
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</tr>
<tr>
<td><strong>MAX OPERATION</strong></td>
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<tr>
<td>CURRENT: 5AMP</td>
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<tr>
<td>WATTAGE: 1145W</td>
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</tr>
<tr>
<td><strong>Low Line: 95v AC - 108v AC @ 50Hz / 60Hz</strong></td>
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</tr>
<tr>
<td><strong>Export Japan Only</strong></td>
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<tr>
<td>use an 8AMP 250v Slo-Blo Fuse.</td>
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</tr>
<tr>
<td><strong>AVG OPERATION</strong></td>
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<td>WATTAGE: 264W</td>
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<td><strong>MAX OPERATION</strong></td>
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<tr>
<td>CURRENT: 8AMP</td>
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</tr>
<tr>
<td>WATTAGE: 812W</td>
<td></td>
</tr>
</tbody>
</table>

GANE DIMENSIONS

The overall Front / Back Height dimensions include the added 1" with the Leg Levelers turned all the way in.

*PLEASE NOTE:* The TOURNAMENT PLAY Sign or betaBRITE Color Dot Display will add up to 4¾" to the overall Back Height for a total of 79¾".

Ceiling Height Requirement:
- An additional 1½" is required for the rotation (5") of the Backbox to the upright position.
- The complete Back Height required with Sign or Dot Display and rotation: 81"

BEFORE TRANSPORTING

To reduce the possibility of damage, observe ALL precautions whenever transporting the game.

Read & follow the next page on How to Secure the Backbox for Transporting. Remove the legs and secure the game within the transporting vehicle.

SAVE AND RETAIN ALL PRINTED INFORMATION INSIDE THE CABINET!

Shipping Box Dimensions
- Height 56" Width 31"
- Depth 31"
- Approx. Unboxed Weight: 260lbs. (+-10)
- Boxed Weight: 290lbs. (+-15)

CAUTION
- At least 2 people are required to move and maneuver this game. Use proper moving equipment & extreme care while handling!

The Cabinet is designed to give the recommended 6.5° pitch to the Playfield when all four (4) Legs are installed with the Leg Levelers turned all the way in.

With the Leg Levelers turned all the way out (not recommended), an additional 1¼" should be added to the respective Back or Front Height dimensions.
How to Secure the Backbox for Transporting

For more Backbox details & part numbers, see the Pink Pages (Parts Identification & Location, Backbox ...).

Step 2.
Carefully pull the Backbox forward into the "down" position.

Step 3.
The top of the Backbox will rest on the Pinball Side Armor. Strap or tie down the Backbox to keep from "bouncing" during transport.

Ensure Cables do not bind, pinch or are being pulled tight. Hunt Feed Out with Backbox so Cables are not tight.

Leg Leveler Adjustment
Attach the four (4) Leg Assemblies to cabinet corners with the eight (8) leg bolts provided.

Start adjustment with the leg levelers turned all the way in.

View the bubble in the level provided on the right side wood rail.

Adjust the front or rear levelers as necessary to cause the bubble to float between the two (2) black lines.

Use a pinball to roll down the center of the playfield for side-to-side leveling.

YOUR PLAYFIELD PITCH IS NOW AT 6.5° AS REQUIRED FOR PROPER GAME PLAY!

Note: For custom adjustment greater than >6.5° can be achieved by turning out the rear leg leveler(s), however, it is not recommended.

Easy Access Service System - 2 Positions
With the front molding & glass removed, carefully lift the playfield (take care when using the Bottom Arch to hoist).

Position 1
When lifted high enough, the Playfield Support Slide Brackets (Fig. 1A) can be seen and can clear the cabinet front (Fig. 1B). At this time, pull the playfield toward the front of the cabinet, checking that the mechanical components clear the cabinet front, then rest the playfield on the Playfield Support Slide Brackets at the front channel of cabinet (Fig. 1C);

Position 2
With the playfield at rest, hold the sides & pull toward the front of the cabinet (approx. 6° to 8°), until resistance is felt from Edge Slide Brackets stopping against the Slide & Pivot Support Brackets located on either side of the cabinet (Fig. 2A). At this time, swivel the playfield toward the Backbox, then rest on the top edge (Fig. 2B & 2C).
<table>
<thead>
<tr>
<th>Game Name</th>
<th>CPU Bd. No.</th>
<th>I/O PWR DRV Bd. No.</th>
<th>U9 Pinball Boot ROM</th>
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<tr>
<td>World Poker Tour</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>V3.1</td>
</tr>
<tr>
<td>Pirates Of The Caribbean</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>V3.1</td>
</tr>
<tr>
<td>Family Guy</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>V3.1</td>
</tr>
<tr>
<td>Spider-Man</td>
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<td>520-5249-00</td>
<td>V3.1</td>
</tr>
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<td>Wheel Of Fortune</td>
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<td>V3.1</td>
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<td>CSI</td>
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<td>Big Buck Hunter</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>V3.1</td>
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<td>Iron Man</td>
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<td>520-5249-00</td>
<td>V3.1</td>
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<td>The Rolling Stones</td>
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<td>520-5249-00</td>
<td>V3.1</td>
</tr>
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<td>Tron</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>V3.1</td>
</tr>
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<td>Avatar L/E</td>
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<td>520-5249-00</td>
<td>V3.1</td>
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<td>Transformers</td>
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<td>V3.1</td>
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<td>Transformers L/E</td>
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<td>520-5249-00</td>
<td>V3.1</td>
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<td>AC/DC</td>
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<td>X-MEN (L/E)</td>
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<td>V2.0</td>
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<tr>
<td>Avengers</td>
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<td>V2.0</td>
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<td>Metallica L/E</td>
<td>520-5337-00</td>
<td>520-5249-00 (REV. D)</td>
<td>V1.0 (64M)</td>
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<tr>
<td>Star Trek</td>
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<td>520-5317-00</td>
<td>V1.0 (64M)</td>
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<tr>
<td>Star Trek L/E</td>
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<td>V1.0 (64M)</td>
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<td>Mustang</td>
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<td>V1.0 (64M)</td>
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<td>Mustang L/E</td>
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<td>520-5317-00</td>
<td>V1.0 (64M)</td>
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<tr>
<td>Batman (Standard)</td>
<td>520-5303-00</td>
<td>520-5349-00</td>
<td>V3.1</td>
</tr>
<tr>
<td>Iron Man (Classic)</td>
<td>520-5303-01</td>
<td>520-5349-00</td>
<td>V3.1</td>
</tr>
<tr>
<td>The Simpsons Kooky Carnival (RED)</td>
<td>520-5246-00</td>
<td>520-5249-00</td>
<td>Not Used</td>
</tr>
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</table>
Take Note:

For Blue Rubber Pads, see the next page and/or the Blue Pages for the assembly the pads are found on for the part number.
Playfield Rubber Parts
G/I MAP
MUSTANG PRO
Opto Amplifier Board Wiring Configuration

Transceiver Boards
500-6775-01

Switch 39

- 2-conductor cable
  - SILVER Anode
  - COPPER Cathode

- 2-conductor cable
  - SILVER Anode
  - COPPER Cathode

- 2-conductor cable
  - SILVER Anode
  - COPPER Cathode

- 2-conductor cable
  - SILVER Anode
  - COPPER Cathode

Amplifier Board #
520-5239-01

Switch 40

1 2
1 1
1 2
1 2

J1 TRANSMITTER 1
J2 RECEIVER 1
J3 TRANSMITTER 2
J4 RECEIVER 2

1 2 3 4 5
WHT V/I Matrix Rows To CPU Board J6-2
WHT GRY Matrix Rows To CPU Board J6-1
GRN ORG Matrix Columns To CPU Board J1-4
BLK Ground To CPU Board J13 pin 10
RED +5V DC To I/O Board J16 pin 7

Part of Playfield Cable

Date: 12-11-13
Title: Opto Amplifier Board Wiring
Scale: N/S
Rev: -

STERN PINBALL INC
OWN. REYNA
1st USE MUSTANG

47
MUSTANG
TOP LED Board 520-6822-00

Board 5
VBB (the data cable) should be disconnected when programming to prevent conflict from the programmer on the node bus. nISP from the programmer is connected to nTXEN to ensure the RS485 transceiver won't conflict during programming.

1) drive nRESET low
2) drive nISP low
3) release nRESET (float, pulled high)
4) download new code
5) release nISP (float, pulled high)
6) drive nRESET low
7) release nRESET (float, pulled high)

VDD = 48V
VNB = 8V
VLED = 6V
VCC = 5V
VDD = 3.3V

LPC1112 inputs are 5V tolerant when not configured as ADC

PI01.4 HIGH INDICATES VBB ABSENT. SINCE THIS BOARD DOESN'T EXPECT VBB THIS PIN IS TIED LOW.

FIDUCIALS

MOUNTING HOLES

Title: Top_cpu
Size: A
Document Number: 520-6822-00
Date: Friday, January 17, 2014
Sheet: 4 of 4
ADD HEATSINK FOR Q29
ADD HEATSINK FOR D36

5.7 VAC NOM.

Title: Nodebus Power Supply
Size: A
Document Number: 520-6621-00
Date: Wednesday, October 09, 2013
Sheet: 1 of 1
Cabinet Universal Voltage Jumper Plugs (for use with Universal AC Cable, 036-5530-00 ONLY)

JUMPER PLUG ▼
(SPI PART #036-5530-120)
110+VAC
N. AMERICA LINE VOLTAGE

1 BLK
2 BLK
3 WHT-BLK
4 WHT-BRN
5 WHT-BRN
6 BRN (or YEL-WHT)
7 WHT-ORG
8 WHT-ORG
9 ORG
10 BLK
11 WHT
12 N/U

12-PIN FEM. SIDE TO JUMPER
12-PIN MALE SIDE CONNECTOR

9-PIN MALE SIDE TO TRANSFORMER
5-PIN FEM. SIDE CONN.

JUMPER PLUG ▼
(SPI PART #036-5530-100)
98VAC – 109VAC
JAPAN or N. AMERICA LOW LINE VOLTAGE

100 VOLTS

12-PIN FEM. CONN.
BACK VIEW ▲

Black & White wires from the POWER BOX, cabinet bottom to 12-Pin Conn., Pins 10 & 11.

JUMPER PLUG ▼
(SPI PART #036-5530-206)
200VAC – 211VAC EUROPE and MID. EAST LOW LINE VOLTAGE

206 VOLTS

JUMPER PLUG ▼
(SPI PART #036-5530-220)
212VAC – 224VAC EUROPE and MID. EAST LINE VOLTAGE

218 VOLTS

JUMPER PLUG ▼
(SPI PART #036-5530-230)
225+VAC EUROPE and MID. EAST HIGH LINE VOLTAGE

230 VOLTS

Cabinet and Coin Door Wiring
Technicians Notes
Stern® Pinball, Inc. ("seller") warrants only to the initial purchaser of its products that the items listed below are free from defects in material and workmanship under normal use and service for the warranty period specified:

Printed Circuit Boards PCBs (game logic): 2 months
Dot Matrix Display PCB: 9 months

No other parts of seller’s product are warranted. Warranty periods are effective from the initial date of shipment from seller to its authorized distributors.

Seller’s sole liability shall be, at its option, to repair or replace products which are returned to seller during the warranty periods specified, provided:

1. Seller is notified promptly upon discovery by purchaser that stated products are defective.
2. Such products are properly packaged and then returned freight prepaid, to seller’s plant.

This warranty does not apply to any parts damaged during shipment and/or due to improper handling, or due to improper installation or usage, or alteration. In no event shall the seller be liable for any anticipated profits, loss of profits, loss of use, accidental or consequential damages or any other losses incurred by the customer in connection with the purchase of a Stern® Pinball, Inc. product.

WARRANTY DISCLAIMER

Except as specifically provided in a written contract between seller and purchaser, there are no other warranties, express or implied, including any implied warranties of merchantability or fitness for a particular purpose.

CAUTIONS, WARNINGS & NOTICES

For safety and reliability, substitute parts and equipment modifications are not recommended (and may void warranties).

Use of non-Stern® Pinball Inc. parts or modifications of game circuitry, may adversely affect game play, or may cause injuries. Transport pinball games with hinged backbox in the down position only! Always take great care when servicing any game. Always read the service manual before replacing or servicing components. SUBSTITUTIONS OF PARTS OR EQUIPMENT MODIFICATIONS may void FCC Type acceptance.

Always disconnect the line voltage before servicing. Some parts may still hold current when unplugged.

**WARNING**

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a class B computing device pursuant to SUBPART J OF PART 15 OF FCC RULES, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

**RF INTERFERENCE NOTICE:** Cable harness placements and ground strap routing on this game have been designed to keep RF radiation and conduction within levels accepted by the FCC rules. To maintain these levels, reposition harnesses and reconnect ground straps to their original placements, if they become disconnected during maintenance.

(a) "The appliance has to be placed in a horizontal position."
(b) "This appliance is not to be cleaned by a Water Jet."

60335-7.12.1 (i) "Do not locate this appliance in an area where a Water Jet is used." (ii) "Do not clean this appliance with a Water Jet." 60335-7.12.5 (b) If the supply cord is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.

IEC 60825-1 2ND EDITION AND WAS ISSUED IN 2007

NOTICES

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