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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 **Tech. Support & Parts Sales** [Tech Support & Parts Sales] Find **Service Game Manual** (with updates), **Game Code**, **Appendixes**, **Coin Cards**, **Service Bulletins** and much more!

• *Toll-Free:* **1-800-KICKERS (542-5377)** *or* **1-708-345-7700** • *eMail:* **parts.service@sternpinball.com** •

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:*
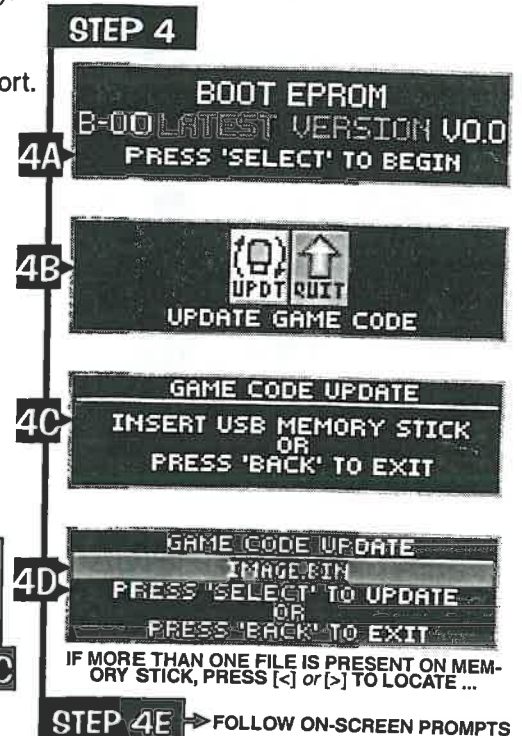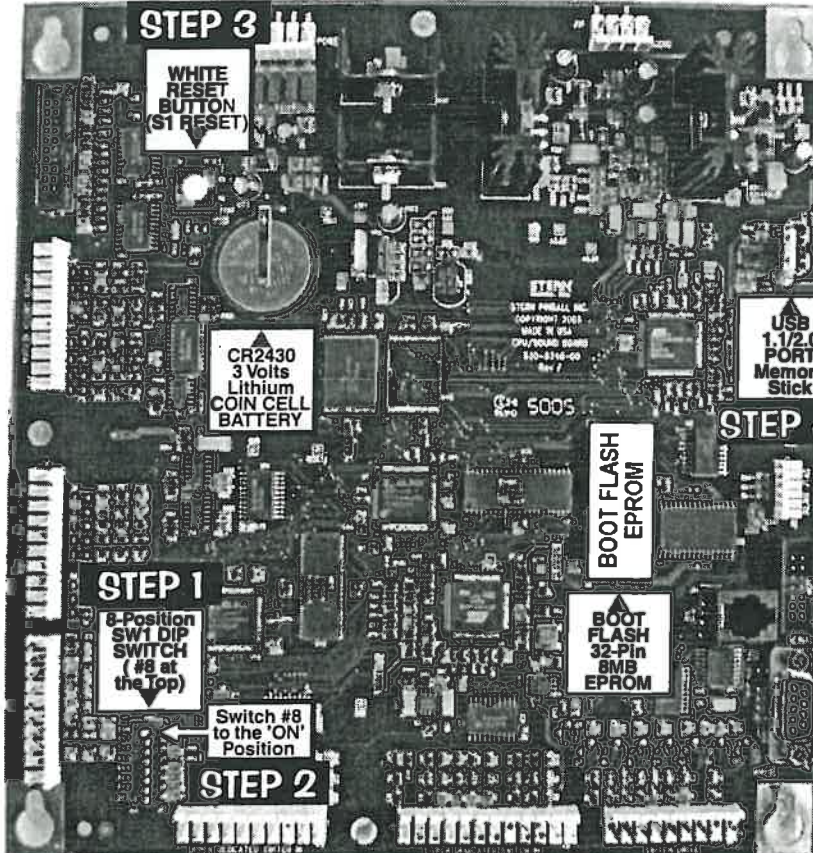
Press 🔘 **SELECT** for **SERVICE MENU** -01F

BACK ◀ ➖ ➕ ▶ **SELECT**

• **Green Button** Press to **Escape Back** (or *Exit*).	•• **Red Buttons** Press to move < Left , Right >. Press to – **Decrease** or + **Increase** values or to change settings.	• **Black Button** Press to **Enter Select** (or 'OK').

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 [w/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)

STEP 4

4A BOOT EPROM B-00 LATEST VERSION V0.0 PRESS 'SELECT' TO BEGIN

4B UPDT QUIT UPDATE GAME CODE

4C GAME CODE UPDATE INSERT USB MEMORY STICK OR PRESS 'BACK' TO EXIT

4D GAME CODE UPDATE IMAGE.BIN PRESS 'SELECT' TO UPDATE OR PRESS 'BACK' TO EXIT

IF MORE THAN ONE FILE IS PRESENT ON MEMORY STICK, PRESS [<] or [>] TO LOCATE ...
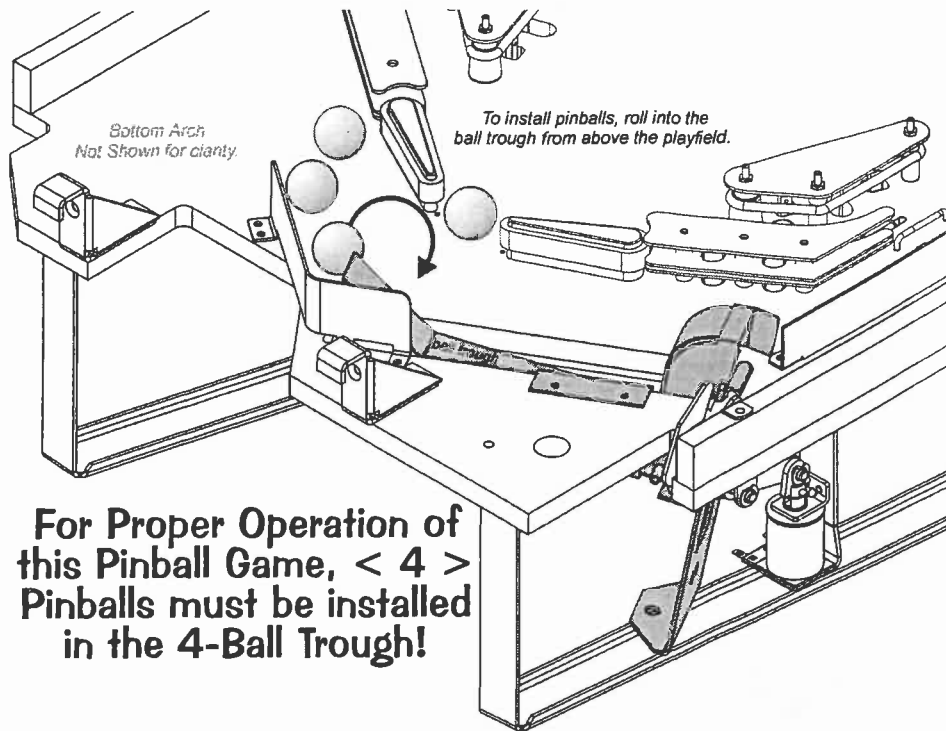
STEP 4E ➜ FOLLOW ON-SCREEN PROMPTS

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

BKUP

//

! 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 /*
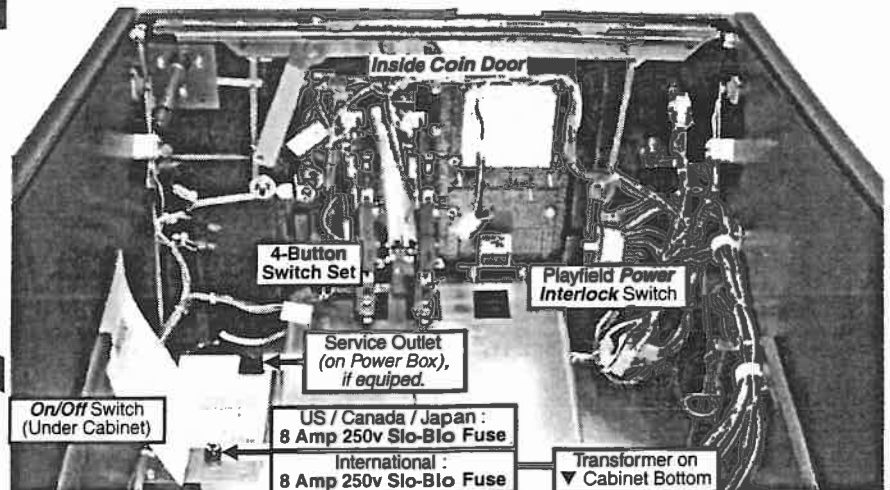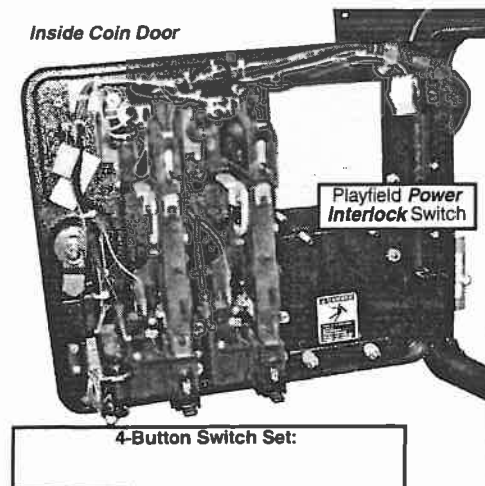
Got confused? Comments? Questions? Call Technical Support at 800-542-5377 or 708-345-7700 (Option 1).

Bottom Arch Not Shown for clarity.

To install pinballs, roll into the ball trough from above the playfield.

For Proper Operation of this Pinball Game, < 4 > Pinballs must be installed in the 4-Ball Trough!

QUICK REFERENCE FUSE CHART
3/4A S.B. 200-5000-17 | 3A S.B 200-5000-08 | 4A S.B 200-5000-06 | 5A S.B 200-5000-01 | 7A S.B 200-5000-03 | 8A S.B 200-5000-05

BACKBOX FUSES
I/O POWER DRIVER BOARD
with **RED LED** STATUS INDICATORS (if any **RED LED** is **OFF**, check the fuse)

F1	5A S.B.	5.7VAC– G.I. Lamps	[BROWN-WHITE⇆WHT-BRN]
F2	5A S.B.	5.7VAC– G.I. Lamps	[YELLOW⇆WHITE-YEL Circuit]
F3	5A S.B.	5.7VAC–G.I. Lamps	[GREEN⇆WHITE-GRN Circuit]
F4	5A S.B.	5.7VAC– G.I. Lamps	[VIOLET⇆WHITE-VIO Circuit]
F5	7A S.B.	50VDC Coils / Flippers	{ 48VAC feed to BRDG 1 }
F6	3A S.B.	24VAC– Motor or *Special Application*	
F7	4A S.B.	50VDC Magnet(s) or *Special Application*	
F8	3A S.B.	50VDC Coils	
F9	8A S.B.	18VDC Control Lamps	{ 13VAC feed to BRDG 4 }
F10	5A S.B.	20VDC Coils / Flashers	{ 16VAC feed to BRDG 2 }
F11	4A S.B.	5VDC Logic Power	{ 8VAC feed to BRDG 5 }
F12	5A S.B.	12VDC Audio	{ 19VAC feed to BRDG 3 }
F13	5A S.B.	12VDC Audio	{ 18VAC feed to BRDG 3 }

DISPLAY POWER SUPPLY BOARD

F1	¾A S.B.	90VDC High Voltage Dot Display Board

CABINET FUSES
POWER (SERVICE OUTLET) BOX
(Access through Coin Door inside cabinet, front bottom)

8A S.B.	110-120V Main Line US / Canada / Japan
5A S.B.	220-240V Main Line International

PLAYFIELD FUSES
FLIPPER OR SPECIAL APPLICATION
(Coil Fuses are located under the playfield near assembly.)

3A S.B.	50VDC R. Flipper [BLU-YEL⇆RED-YEL]
3A S.B.	50VDC L. Flipper [GRY-YEL⇆RED-YEL]
3A S.B.	50VDC Additional Flipper Coil, if used.
3A S.B.	50VDC Spcl. Application Coil, if used.

For location & more details on fuses, see Sec. 5 Chp. 2

⚠ **ALL FUSES ARE 250V S.B. (SLO-BLO) SEE FUSE OR TABLES FOR AMP RATING CAUTION** - FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE FUSE WITH IDENTICAL ELECTRICAL RATING! ⚡
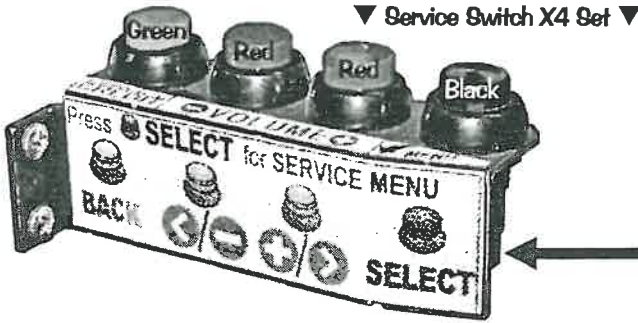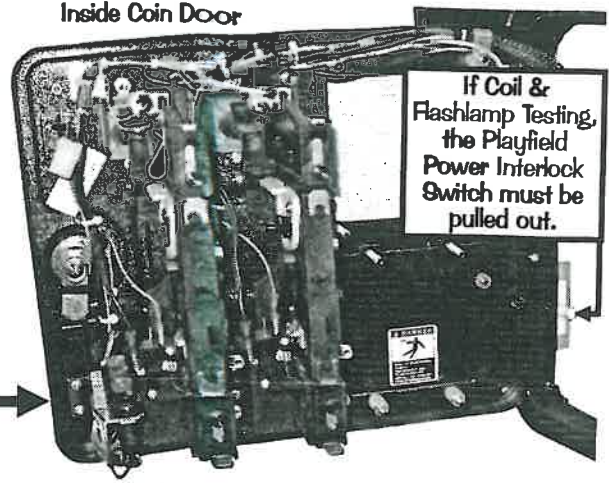
Stern Pinball®, Inc. ©2008   820-6384-00 Rev. C

Inside Coin Door

Playfield *Power Interlock* Switch

4-Button Switch Set:

Inside Coin Door

4-Button Switch Set

Playfield *Power Interlock* Switch

Service Outlet (on Power Box), if equiped.

On/Off Switch (Under Cabinet)

US / Canada / Japan : **8 Amp 250v Slo-Blo Fuse**

International : **8 Amp 250v Slo-Blo Fuse**

Transformer on ▼ Cabinet Bottom

Service Switch X4 Set Access & Use

The **4-Button Service Switch Set** provides access for *three (3)* *functions* available for your use: **1: SERVICE CREDIT**, **2: VOLUME [–] / [+]** and **3: SERVICE MENU**.

Inside Coin Door

If Coil & Flashlamp Testing, the Playfield Power Interlock Switch must be pulled out.
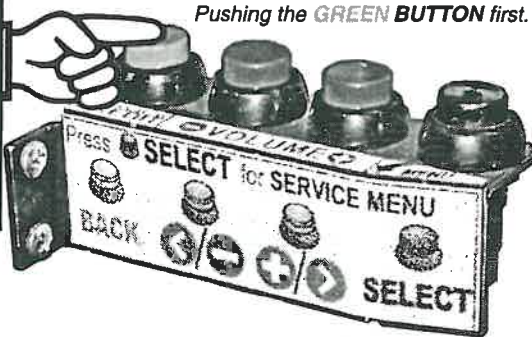
▼ **Service Switch X4 Set** ▼

To access any of these *three (3) functions* you must first open the **Coin Door** *(see pictorial above)* with the Game in the *Attract Mode (not already in any Function or Menu stated below) and then follow below.*

Pushing the GREEN BUTTON first.

### ◀ Function 1: SERVICE CREDITS MENU

Pushing the **Green [SERVICE CREDIT] Button** first, adds a *Service Credit* per push *(will not affect your audits as "paid" credits).* This is useful for the technician to test games in regular play without affecting the game audits. Each depression adds **1 credit**; up to **50 credits** can be applied. **Standard Adjustment 23, Credit Limit,** determines this, however, it can be changed from 04-50; *for details see the Adjustments Section.*

Note: Once your credits are added, this menu will automatically exit a few seconds after the last button depression or when the Green [BACK] or Black [SELECT] Button is pushed. This function is disabled if Standard Adjustment 38, Free *Play, is set to YES. The Service Credits are limited to the Credit Limit in addition to any paid credits present in the game (e.g. If the Credit Limit is 30, with 8 paid credits present, only 22 Credits can be applied.).*
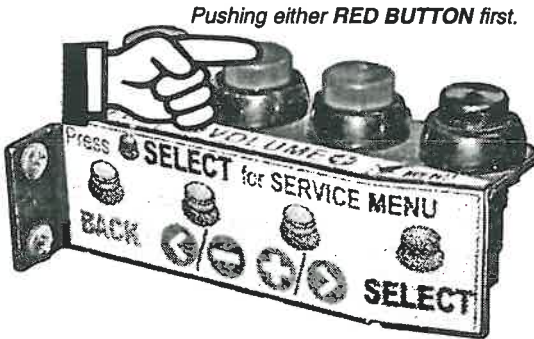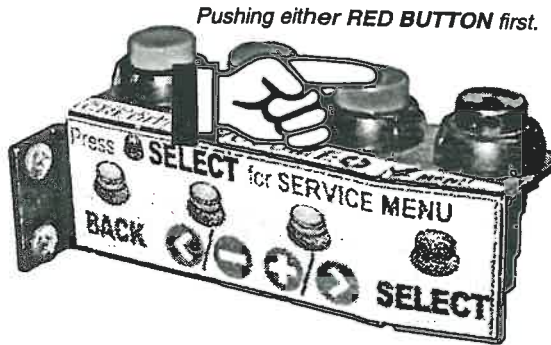
Pushing either RED BUTTON first.   *Pushing either RED BUTTON first.*

▲ Function 2: VOLUME MENU ▲

Pushing either of the **Red [VOLUME] Buttons** first, enters the *VOLUME MENU*. While in this Mode, to **DECREASE** the volume, hold down or depress the **1st Red [< / –] Button** until desired the volume is achieved; to **INCREASE** the volume, hold down or depress the **2nd Red [+ / >] Button** until the desired volume is achieved.

Note: The volume can be set between 0-63; Once your adjustments are made, this menu will automatically exit a few seconds after the last button depression or when the Green [BACK] or Black [SELECT] Button is pushed.
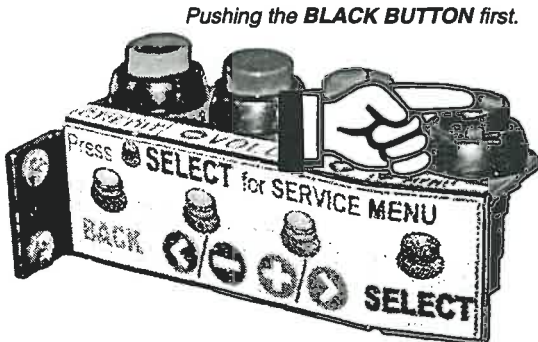
Pushing the BLACK BUTTON first.

◀ Function 3: SERVICE MENU

Pushing the **Black [SELECT] Button** first, enters the *SERVICE MENU.* Once in, navigate through all menus by depressing the **Service Menu Buttons.** Use the **Red [< / –]** or **[+ / >] Buttons** to move LEFT / RIGHT, NEXT/PREVIOUS *(audits/adjustments)* or to INCREASE / DESCREASE an adjustment (setting). Use the **Black [SELECT] Button** to select a highlighted *Icon,* move to the next line of text *or* to answer "OK" where applicable. Use the **Green [BACK] Button** to exit *or* escape back.

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, SWITCH 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 '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

This *alert display* is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a device malfunction *(device or mechanism doesn't energize or is energized repeatedly)*. **OPERATOR ALERT!** works by monitoring any *switch activated device* that has the potential to trap a ball when disabled *(e.g. in the Shooter Lane, Scoop or Eject Holes, etc.)*. This alert can 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
V0.00   SYS. 0.00   HDW. 0
SERVICE MENU *
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 "DIAG" *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)

CPU COUNTRY SETTING: USA
Pos.	1	2	3	4	5	6	7	8
ON					▲			
OFF	▼		▼	▼		▼	▼	▼

CPU COUNTRY SETTING: Australia
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲	▲				
OFF		▼			▼	▼	▼	▼

CPU COUNTRY SETTING: Austria
Pos.	1	2	3	4	5	6	7	8
ON	▲							
OFF		▼	▼	▼	▼	▼	▼	▼

CPU COUNTRY SETTING: Belgium
Pos.	1	2	3	4	5	6	7	8
ON		▲						
OFF	▼		▼	▼	▼	▼	▼	

CPU COUNTRY SETTING: Canada 1
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲						
OFF			▼	▼	▼	▼	▼	

CPU COUNTRY SETTING: Canada 2
Pos.	1	2	3	4	5	6	7	8
ON		▲		▲	▲			
OFF	▼		▼			▼	▼	

CPU COUNTRY SETTING: Croatia
Pos.	1	2	3	4	5	6	7	8
ON		▲	▲					
OFF	▼			▼	▼	▼	▼	

CPU COUNTRY SETTING: Denmark
Pos.	1	2	3	4	5	6	7	8
ON	▲			▲				
OFF		▼	▼		▼	▼	▼	

CPU COUNTRY SETTING: Finland
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲					
OFF		▼		▼	▼	▼	▼	

CPU COUNTRY SETTING: France
Pos.	1	2	3	4	5	6	7	8
ON		▲	▲					
OFF	▼			▼	▼	▼	▼	

CPU COUNTRY SETTING: Germany
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲					
OFF				▼	▼	▼	▼	▼

CPU COUNTRY SETTING: Greece
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲	▲				
OFF					▼	▼	▼	▼

CPU COUNTRY SETTING: Italy
Pos.	1	2	3	4	5	6	7	8
ON				▲				
OFF	▼	▼	▼		▼	▼	▼	

CPU COUNTRY SETTING: Japan
Pos.	1	2	3	4	5	6	7	8
ON	▲		▲		▲			
OFF		▼		▼		▼	▼	

CPU COUNTRY SETTING: Lithuania
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲		▲	▲			
OFF			▼			▼	▼	

CPU COUNTRY SETTING: Middle East
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲	▲		▲			
OFF				▼		▼	▼	

CPU COUNTRY SETTING: Netherlands
Pos.	1	2	3	4	5	6	7	8
ON				▲				
OFF	▼	▼	▼		▼	▼	▼	▼

CPU COUNTRY SETTING: New Zealand
Pos.	1	2	3	4	5	6	7	8
ON						▲		
OFF	▼	▼	▼	▼			▼	

CPU COUNTRY SETTING: Norway
Pos.	1	2	3	4	5	6	7	8
ON		▲		▲				
OFF	▼		▼		▼	▼	▼	▼

CPU COUNTRY SETTING: Portugal
Pos.	1	2	3	4	5	6	7	8
ON	▲				▲			
OFF		▼	▼	▼		▼	▼	▼

CPU COUNTRY SETTING: Russia
Pos.	1	2	3	4	5	6	7	8
ON	▲			▲	▲			
OFF		▼	▼			▼	▼	▼

CPU COUNTRY SETTING: So. Africa
Pos.	1	2	3	4	5	6	7	8
ON			▲		▲			
OFF	▼	▼		▼		▼	▼	▼

CPU COUNTRY SETTING: Spain
Pos.	1	2	3	4	5	6	7	8
ON		▲			▲			
OFF	▼		▼	▼		▼	▼	▼

CPU COUNTRY SETTING: Sweden
Pos.	1	2	3	4	5	6	7	8
ON	▲	▲		▲				
OFF			▼		▼	▼	▼	▼

CPU COUNTRY SETTING: Switzerland
Pos.	1	2	3	4	5	6	7	8
ON			▲	▲				
OFF	▼	▼			▼	▼	▼	▼

CPU COUNTRY SETTING: Taiwan
Pos.	1	2	3	4	5	6	7	8
ON				▲	▲			
OFF	▼	▼	▼			▼	▼	▼

CPU COUNTRY SETTING: UK
Pos.	1	2	3	4	5	6	7	8
ON		▲	▲	▲				
OFF	▼				▼	▼	▼	▼

CPU/SND PCB SETTING: UPDATE CODE
Pos.	1	2	3	4	5	6	7	8
ON								▲
OFF	▼	▼	▼	▼	▼	▼	▼	

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.*

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** fto 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 MORE MORE 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
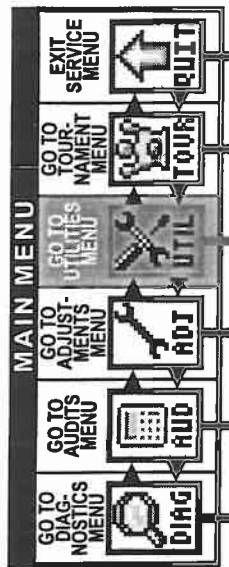 ON THE INSIDE FRONT COVER OF THIS MANUAL.

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

4
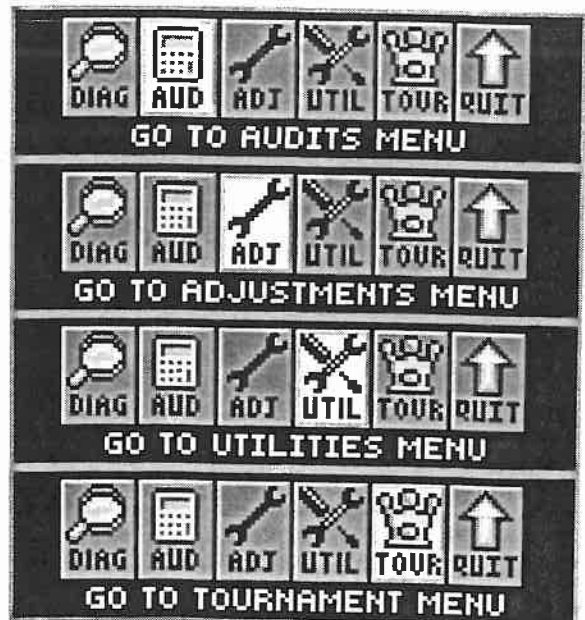
This page is intentionally blank.
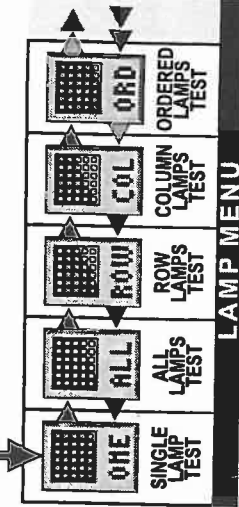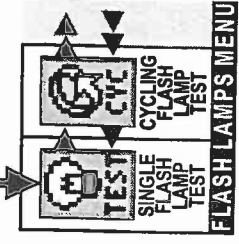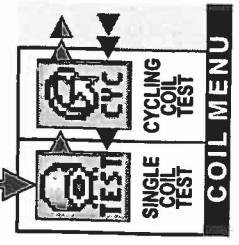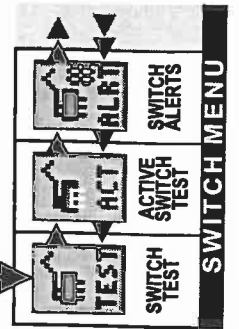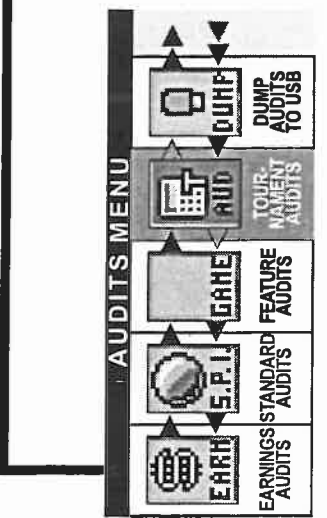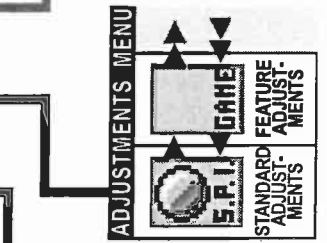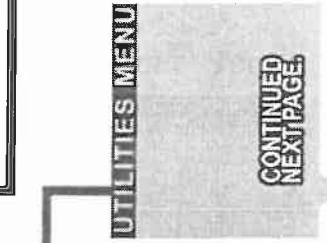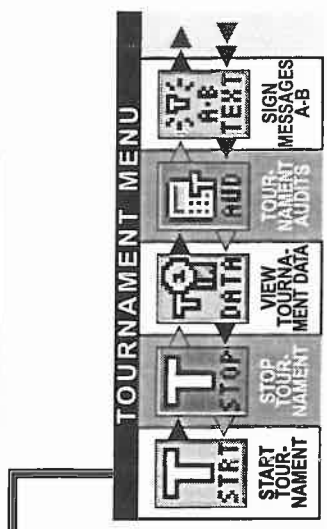
5

Pinball Service Menu Icon Tree

These *non-selectable Icons* appear in the *selected Menu* only when there are MORE *Icons* to the LEFT or to the RIGHT available for selection.

MORE

MORE

EXIT THE SERVICE MENU BY SELECTING THIS ICON IN ANY MENU AND RETURN INTO THE ATTRACT MODE.

CONTINUED NEXT PAGE.

... MENUS CONT.

CONTINUATION OF SUB-MENUS.

TOURNAMENT MENU

SIGN MESSAGES A-B | TOURNAMENT AUDITS | VIEW TOURNAMENT DATA | STOP TOURNAMENT | START TOURNAMENT

MAIN MENU

EXIT SERVICE MENU (QUIT) | GO TO TOURNAMENT MENU (TOUR) | GO TO UTILITIES MENU (UTIL) | GO TO ADJUSTMENTS MENU (ADJ) | GO TO AUDITS MENU (AUD) | GO TO DIAGNOSTICS MENU (DIAG)

UTILITIES MENU

CONTINUED NEXT PAGE.

LAMP MENU

ORDERED LAMPS TEST (ORD) | COLUMN LAMPS TEST (COL) | ROW LAMPS TEST (ROW) | ALL LAMPS TEST (ALL) | SINGLE LAMP TEST (ONE)

ADJUSTMENTS MENU

FEATURE ADJUSTMENTS (GAME) | STANDARD ADJUSTMENTS (S.P.I.)

DIAGNOSTICS MENU

TICKET DISPENSER TEST (TIX) | DOT MATRIX TEST (DOT TEST) | BEGIN BURN IN (BURN) | SOUND/SPEAKER TEST (SPKR) | FIRE KNOCKER (KNOCKER) | TECHNICIAN ALERTS (TECH) | BALL TROUGH TEST (CLR) | GAME-SPECIFIC TESTS (GAME) | GO TO LAMP MENU (LAMP) | GO TO FLASH LAMPS MENU (FLASH) | GO TO COIL MENU (COIL) | GO TO SWITCH MENU (SW)

FLASH LAMPS MENU

CYCLING FLASH LAMP TEST (CYC) | SINGLE FLASH LAMP TEST (TEST)

AUDITS MENU

DUMP AUDITS TO USB (DUMP) | TOURNAMENT AUDITS (AUD) | FEATURE AUDITS (GAME) | STANDARD AUDITS (S.P.I.) | EARNINGS AUDITS (EARN)

COIL MENU

CYCLING COIL TEST (CYC) | SINGLE COIL TEST (TEST)

SWITCH MENU

SWITCH ALERTS (ALRT) | ACTIVE SWITCH TEST (ACT) | SWITCH TEST (TEST)

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

*WHEN ENTERING THE NOTED MENUS, YOU MUST PULL OUT THE POWER INTERLOCK SWITCH FOR OPERATION WITH THE COIN DOOR OPEN.

These *non-selectable Icons* appear in the selected *Menu* only when there are MORE *Icons* to the LEFT or to the RIGHT available for selection.

MORE / **MORE**

EXIT THE SERVICE MENU BY SELECTING THIS ICON IN ANY MENU AND RETURN TO THE ATTRACT MODE.

MAIN MENU

DIAG	AUD	ADJ	UTIL	TOUR	QUIT
GO TO DIAG-NOSTICS MENU	GO TO AUDITS MENU	GO TO ADJUST-MENTS MENU	GO TO UTILITIES MENU	GO TO TOUR-NAMENT MENU	EXIT SERVICE MENU

SEE PREVIOUS PAGE.

Chapter 2   Chapter 3   Chapter 4   Chapter 5   Chapter 6
For more detailed information on the Menus and, Sub-Menus, review Section 3, Chapters 2—6.

DIAG   AUD   ADJ   UTIL   TOUR

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* [Start Tournament] will be replaced with the "STOP" *Icon* [Stop Tournament]). 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'.

USB MENU

UPDT	BKUP	DUMP
UPDATE GAME CODE	BACKUP TO USB MEMORY STICK	DUMP AUDITS TO USB

...MENUS CONTINUED

PREV	QUIT	HELP
RETURN TO [MENU]	EXIT SERVICE MENU	DISPLAY HELP SCREEN

CONTINUATION OF SUB-MENUS.

UPDATE GAME CODE

UPDT   QUIT

TO UPDATE GAME CODE, MOVE DIP SWITCH #8 to 'ON' (on CPU/SND PCB). PERFORM CPU/ SND PCB RESET PRESS THE WHITE BUTTON. FOLLOW ON-SCREEN PROMPTS (REVIEW INSIDE COVER).

UTILITIES MENU

INST	CUST MSG	PRIC	TIME	RESET	USB
GO TO INSTALLS MENU	ENTER CUSTOM MESSAGE	SET CUSTOM PRICING	SET DATE/ TIME	GO TO RESETS MENU	GO TO USB MENU

RESET MENU

COIN	AUD	CC	HSTD	CRED	FACT
RESET COIN AUDITS	RESET GAME AUDITS	RESET GRAND CHAMPION	RESET HIGH SCORES	RESET CREDITS	RESET FACTORY SETTINGS

INSTALLS MENU

R.EZ	EASY	FACT	HARD	X.HD	3BAL	5BAL	COMP	DCUT	HOME	NOV	A.A.B	FACT
INSTALL EXTRA EASY	INSTALL EASY	INSTALL MEDIUM	INSTALL HARD	INSTALL EXTRA HARD	INSTALL 3-BALL	INSTALL 5-BALL	INSTALL COMPETI-TION	INSTALL DIRECTOR'S CUT	INSTALL HOME PLAY	INSTALL NOVELTY	INSTALL ADD-A-BALL	INSTALL FACTORY

Note: Press [SELECT] to Install; Press [BACK] to cancel. After selection of any of the Install Icons, the request is installed and returns to the Install Menu. The last icon activated before exiting this menu will supercede any previous Icon selected in the group.

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

PROBLEM	SOLUTION
Will not enter the **SERVICE MENU** after depressing the **Black [SELECT] Button.**	• Check the Service Switches [GREEN, RED (X2) & 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.
All **Service Buttons [• • • • Buttons]** appear nonfunctional.	• Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Green Button** in the Attract Mode will not enter the **SERVICE CREDITS MENU** to add Service Credits.	• Check to make sure the Game is not in **"Free Play."** *If the game is set to Free Play, adding Service Credits is not required.* • Check the Service Switches wiring harness for poor or no connection and/or broken wires.
The **Display** "blanks out."	• 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 & TROUBLESHOOTING).*
Icons *"scroll"* along continuously in the **MAIN MENU.**	• Check for a stuck switch on either of the **Red Buttons.**
The **Start and Flipper Buttons** do not select or activate *Icons* in the **SWITCH TEST MENU.**	• 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).*
Can't move selection of *Icon* with the **Left** and/or **Right Flipper Buttons.**	• Check the **Flipper Buttons** for loose connections or bad Ground and refer to Section 5, Chapter 2, Playfield Wiring, #-Flipper Circuit Wiring Diagram. • This is normal *only* in *Diagnostic's Switch & Active Switch Tests (see previous Problem).*
Some *Icons* appear non-functional in the **MENU** or missing.	• 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 "HELP" *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 **http://www.sternpinball.com/GAME-code.shtml**; view the Game Code Library Message Board Marquee or click **Previous Messages** for past announcements.
In **COIL TEST MENU**, the coils and flashlamps **do not** fire after pressing the **Black [SELECT] Button.**	• Ensure the **POWER INTERLOCK SWITCH** *is pulled out (see the start of this Chapter).*
In the **SERVICE MENU**, the volume cannot be adjusted with either of the **Red Buttons.**	• The Volume adjustment can only be made when in the **Attract Mode** *(see the start of this Chapter).*
In the **SERVICE MENU**, the display seems to lock up, or the Help Display appears to be non-functional.	• If you cannot clear the situation by exiting back one Menu, exit completely out of the **SERVICE MENU**, and re-enter. If the problem persists, call Technical Support for additional help.

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.

GO TO DIAGNOSTICS MENU

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 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. Some *Icons* change depending on selections *(e.g. Selecting and activating the "STRT" Icon [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.***

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 OR SWITCH TESTING & BURN-IN WHEN THE COIN DOOR IS REQUIRED TO STAY OPEN FOR SERVICE BUTTON USE!** Pulling out the Power Interlock Switch or 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).*

This *alert display* is shown momentarily during **Game Mode** or **Power-Up** to alert the operator of a device malfunction *(device or mechanism doesn't energize or is energized repeatedly).* **OPERATOR ALERT!** works by monitoring any *switch activated device* that has the potential to trap a ball when disabled *(e.g. in the Shooter Lane, Scoop or Eject Holes, etc.).* This alert can 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** *(next page)* and/or **Technician 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 "DIAG" *Icon* and "TECH" *Icon* for the **Technician Alerts** information.

⚠ **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. Pressinng 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* 1-8 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: Pressinng 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 pin-ball(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 cleared *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.

Upon entering **Switch Test**, you will notice that some switches are already indicated as 'closed'. ▼

SWITCH TEST
NONE

D-24 position is highlighted and accompanied by a short audible tone when pressed. ▼

SWITCH TEST
SELECT
LAST SW. D-24
LGN-GRY BLK

After pressing the switch *(to make it close)*, the display will indicate the last switch number. ▼

SWITCH TEST
NONE
LAST SW. D-24

Typical Switch Wiring & Schematic

Column: Switch Drive Wire J1	Blocking Diode (1N4004)	Row: Switch Return Wire J6 or J12
GRN-XXX		WHT-XXX or TAN-XXX

N.O. Normally Open Switch Terminal **COM.** Common Switch Terminal **N.C.** Normally Closed Switch Terminal

CATHODE *banded side of diode*

-XXX = Varying Wire Color. See Matrix Grid for color.

Row: Switch Return Wire WHT-XXX or TAN-XX
Column: Switch Drive Wire GRN-XXX

Switches from CPU / Sound PCB

Dedicated Switch Schematic

PNK-XXX, GRY-XXX or LGN-XXX Dedicated Switch Input Wire J2, J3 or J13		BLACK Ground Wire J2-P1/11, J3-P10 or J13-P10
	N.O. Normally Open Switch Terminal	**COM.** Common Switch Terminal

... D-24 is held down. The display will cycle and flash each dot, naming each switch ... closed. ▼

ACTIVE SWITCHES
SELECT
LGN-GRY BLK

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 of 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 redetermine if the switch should be marked **OUT OF SERVICE**.

Diagnostics

SWITCH MATRIX GRID [#1 - #64] {Switch Locations : next page}

Matrix column (CPU/Sound Board) — RETURN lines:

Col	IC	Wire Color	Connector
01	IC-U22A	WHT-BRN	J6-P9
02	IC-U22B	WHT-RED	J6-P8
03	IC-U22C	WHT-ORG	J6-P7
04	IC-U22D	WHT-YEL	J6-P6
05	IC-U16A	WHT-GRN	J6-P5
06	IC-U16B	WHT-BLU	J6-P3
07	IC-U16C	WHT-VIO	J6-P2
08	IC-U16D	WHT-GRY	J6-P1
09	IC-U36A	TAN-BLK	J12-P9
10	IC-U36B	TAN-RED	J12-P8
11	IC-U36C	TAN-ORG	J12-P7
12	IC-U36D	TAN-YEL	J12-P6
13	IC-U40A	TAN-GRN	J12-P4
14	IC-U40B	TAN-BLU	J12-P3
15	IC-U40C	TAN-VIO	J12-P2
16	IC-U40D	TAN-WHT	J12-P1

Matrix rows (DRIVE): Q1 = GRN-BRN J1-P1 · Q2 = GRN-RED J1-P3 · Q3 = GRN-ORG J1-P4 · Q4 = GRN-YEL J1-P5

S.W.	Name	Part / Location
#1	L. 2 BANK TARGET (BOT)	515-7568-08 BELOW PF
#2	L. 2 BANK TARGET (TOP)	515-7568-08 BELOW PF
#3		
#4	LEFT EJECT	180-5183-00 BELOW P.F.
#5		
#6		
#7	R. 2 BANK TARGET (TOP)	515-7640-08 BELOW P.F.
#8	R. 2 BANK TARGET (BOT)	515-7640-08 BELOW P.F.
#9		
#10		
#11	L. RAMP EXIT	180-5087-00 ABOVE P.F.
#12	LEFT SPINNER	180-5010-04 ABOVE P.F.
#13	L. RAMP ENTRANCE	180-5087-00 ABOVE P.F.
#14	LEFT ORBIT (BOTTOM)	500-6227-04 BELOW P.F.
#15	TOURN START	180-5174-00 IN CABINET
#16	START	180-5174-00 IN CABINET
#17		
#18	TROUGH #4 LEFT	180-5119-02 BELOW PF
#19	TROUGH #3	180-5119-02 BELOW PF
#20	TROUGH #2	180-5119-02 BELOW PF
#21	TROUGH #1 RIGHT	515-0173-00 / 515-0174-00
#22	TROUGH JAM	515-0173-00 / 515-0174-00
#23	SHOOTER LANE	515-6157-00 BELOW P.F.
#24	LEFT OUTLANE	515-7640-08 BELOW P.F.
#25	LEFT RETURN LANE	500-6227-03 BELOW P.F.
#26	LEFT SLINGSHOT	180-5054-00 BELOW P.F.
#27	RIGHT SLINGSHOT	180-5054-00 BELOW P.F.
#28	R. INNER RETURN LANE	500-6227-03 BELOW P.F.
#29	RIGHT OUTLANE	500-6227-03 BELOW P.F.
#30	LEFT POP BUMPER	180-5015-04 BELOW P.F.
#31	RIGHT POP BUMPER	180-5015-04 BELOW P.F.
#32	BOTTOM POP BUMPER	180-5015-04 BELOW P.F.
#33	RIGHT RETURN LANE	500-6227-03 BELOW P.F.
#34		
#35		
#36	DISK MAGNET SW. 1	180-5218-00 BELOW PF.
#37		
#38	CENTER LOCK 2	500-8775-01 ABOVE P.F.
#39	CENTER LOCK 3	500-8775-01 ABOVE P.F.
#40	CENTER LOCK 4 (TOP)	500-8775-01 BELOW P.F.
#41	CENTER TARGET (LEFT)	515-7581-04 BELOW P.F.
#42	CENTER TARGET (RIGHT)	515-7581-04 BELOW P.F.
#43		
#44		
#45		
#46		
#47	RIGHT SPINNER	180-5010-04 ABOVE P.F.
#48	R. RAMP ENTRANCE	180-5087-00 ABOVE P.F.
#49	RIGHT ORBIT	500-6227-04 BELOW P.F.
#50		
#51	CENTER LOCK 1 (BOTTOM)	500-6227-04 BELOW P.F.
#52	R. RAMP EXIT	180-5087-00 ABOVE P.F.
#53	L. INNER LOOP	500-6227-04 BELOW P.F.
#54	LEFT UPPER VUK	180-5209-00 BELOW P.F.
#55		
#56		
#57		
#58		
#59		
#60		
#61		
#62		
#63		
#64		

Wire Color Abbreviations used: BLK Black · BRN Brown · BLU Blue · GRY Gray · GRN Green · ORG Orange · PNK Pink · RED Red · TAN Tan · VIO Violet · WHT White · YEL Yellow · LGN Light Green

◄ FOR MORE ABOUT DIODE ON TERMINAL STRIPS OR INT'S SEE SECTION 5 CHAPTER 2 PAGES 104-105 ►

Dedicated Switches [#D-1 - #D-32] {Dedicated Switch Locations : next page}

GROUND (BLK) J2-P1/11 & J3-P10

S.W.	Name	Part / Location
D-1	LEFT COIN SLOT	180-5204-00 COIN DOOR
D-2	CENTER COIN SLOT	DBA COIN DOOR
D-3	RIGHT COIN SLOT	180-5204-00 COIN DOOR
D-4	FORTH COIN SLOT	180-5204-00 COIN DOOR
D-5	FIFTH COIN SLOT	IF USED
D-6		
D-7		
D-8		
D-9	LEFT FLIPPER BUTTON	500-6880-01 CABINET
D-10	LEFT FLIPPER E.O.S.	180-5149-00 FLIP ASSY.
D-11	RIGHT FLIPPER BUTTON	500-6880-01 CABINET
D-12	RIGHT FLIPPER E.O.S.	180-5149-00 FLIP ASSY.
D-13		
D-14		
D-15	U.R. FLIPPER BUTTON	500-6880-01 CABINET
D-16		

GROUND (BLK) J13-P10

S.W.	Name	Part / Location
D-17	TILT PENDULUM	CABINET
D-18	SLAM TILT	
D-19	TICKET NOTCH	IF USED
D-20		
D-21	BACK (GREEN)	180-5192-04 COIN DOOR
D-22	MINUS (RED)	180-5192-02 COIN DOOR
D-23	PLUS (RED)	180-5192-02 COIN DOOR
D-24	SELECT (BLACK)	180-5192-00 COIN DOOR

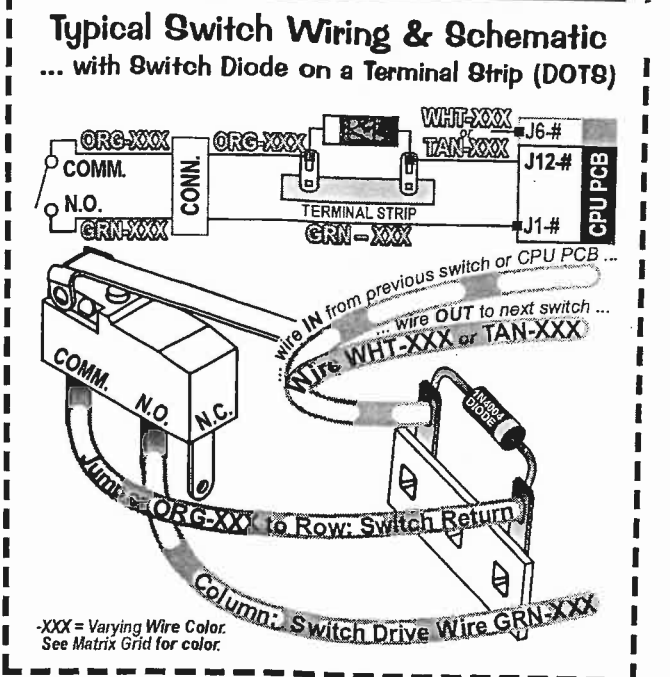# CPU/SOUND BD. SW1 DIP SWITCH (located between Connectors J3/J13)

S.W.	DIP	Position
D-25	DIP (1)2345678	S.W. POS. #1 ON
D-26	DIP 1(2)345678	S.W. POS. #2 ON
D-27	DIP 12(3)45678	S.W. POS. #3 ON
D-28	DIP 123(4)5678	S.W. POS. #4 ON
D-29	DIP 1234(5)678	S.W. POS. #5 ON
D-30	DIP 12345(6)78	S.W. POS. #6 ON
D-31	DIP 123456(7)8	S.W. POS. #7 ON
D-32	DIP 1234567(8)	S.W. POS. #8 ON

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GO TO DIAGNOSTICS MENU

GO TO SWITCH MENU

SWITCH TEST

SWITCH MENU: SWITCH, ACTIVE, SINGLE & SERVICE

Typical Switch Wiring & Schematic

Column: Switch Drive Wire J1 GRN-XXX

Blocking Diode (1N4004)

Row: Switch Return Wire J6 or J12 WHT-XXX or TAN-XXX

COMM. N.O. N.C.

N.O. Normally Open Switch Terminal

COM. Common Switch Terminal

N.C. Normally Closed Switch Terminal

1N4004 DIODE

CATHODE banded side of diode

Switches from CPU / Sound PCB

Row: Switch Return Wire WHT-XXX or TAN -XX

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

Dedicated Switch Schematic

PNK-XXX, GRY-XXX or LGN-XXX Dedicated Switch Input Wire J2, J3 or J13

N.O. Normally Open Switch Terminal

COM. Common Switch Terminal

BLACK Ground Wire J2-P1/11, J3-P10 or J13-P10

Typical Switch Wiring & Schematic
... with Switch Diode on a Terminal Strip (DOTS)

ORG-XXX COMM. ORG-XXX WHT-XXX or TAN-XXX J6-#

CONN. J12-#

N.O. TERMINAL STRIP CPU PCB

GRN-XXX GRN - XXX J1-#

wire IN from previous switch or CPU PCB ...

wire OUT to next switch ...

Wire WHT-XXX or TAN-XXX

COMM. N.O. N.C.

1N4004 DIODE

Jump: ORG-XX to Row: Switch Return

Column: Switch Drive Wire GRN-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

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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-Turns *(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)*.
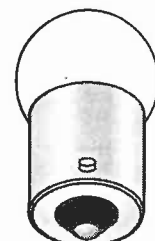
COIL TEST
TROUGH UP-KICKER
#1
YEL-VIO BRN-BLK

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**.

Typical Coil Wiring & Schematic

Power Voltage Supply 50VDC
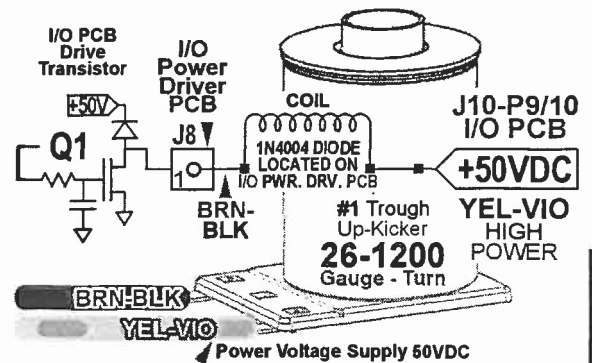
Go To Flash Lamps Menu

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)*.

FLASH LAMP TEST
FLASH: NAME OF FLASHER
#25
ORG BLK-BRN

Bulb Types used for Flash Lamps

#906 Bulb
(Wedge Base)
165-5004-00

#89 Bulb
(Bayonet)
165-5000-89-HF

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**.
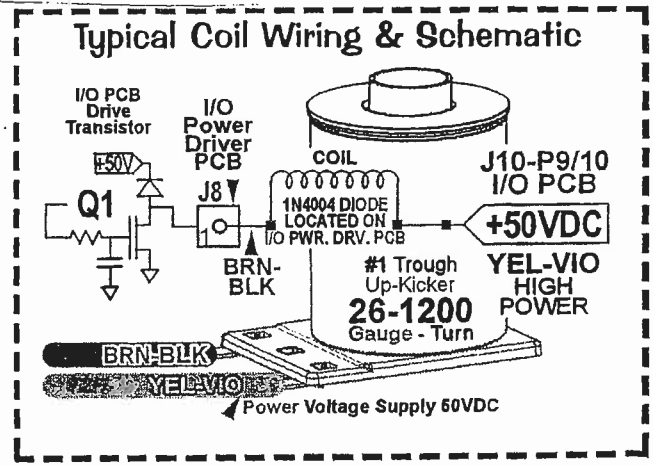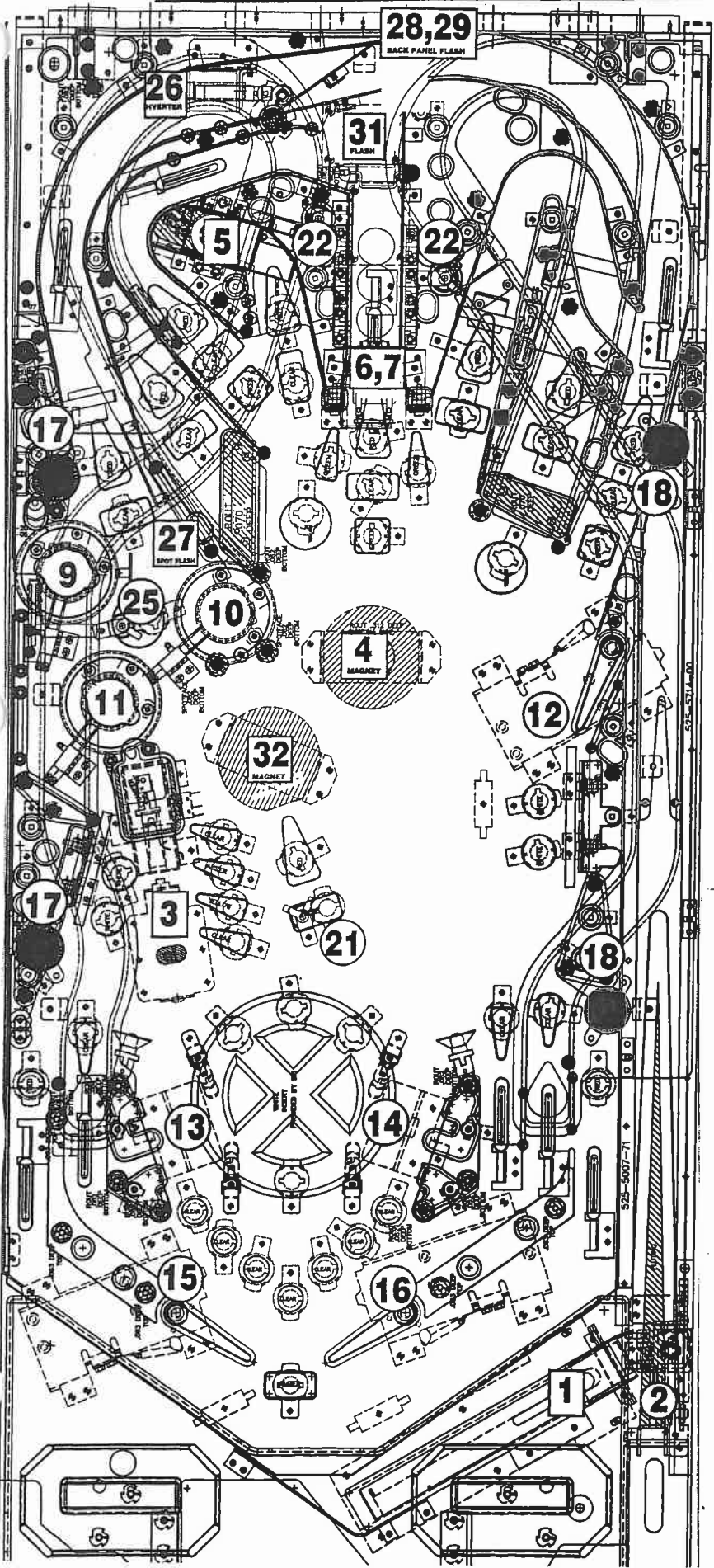
Diagnostics

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COILS DETAILED CHART TABLE

High Current Coils Group 1		Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#1	TROUGH UP-KICKER	Q1		YEL-VIO	J10-P9/10	50VDC	BRN-BLK	J8-P1	26-1200 090-5044-ND
#2	AUTO LAUNCH	Q2	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BRN-RED	J8-P3	24-940 090-5038-ND
#3	LOWER LEFT EJECT	Q3		YEL-VIO	J10-P9/10	50VDC	BRN-ORG	J8-P4	23-800 090-5001-ND
#4	MAGNETO MAGNET	Q4		VIO-YEL	J10-P8	50VDC	BRN-YEL	J8-P5	22-800 090-5078-00
#5	LEFT VUK	Q5		YEL-VIO	J10-P9/10	50VDC	BRN-GRN	J8-P6	23-800 090-5001-ND
#6	CENTER LOCKUP UP	Q6		YEL-VIO	J10-P9/10	50VDC	BRN-BLU	J8-P7	26-1200 090-5044-ND
#7	CENTER LOCKUP LATCH	Q7		YEL-VIO	J10-P9/10	50VDC	BRN-VIO	J8-P8	32-1500 515-7695-00 ND
#8	SHAKER MOTOR (OPTIONAL)	Q8		RED-WHT	J17-P7	16VAC	BRN-GRY	J8-P9	502-5027-00

High Current Coils Group 2		Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#9	LEFT POP BUMPER	Q9		YEL-VIO	J10-P9/10	50VDC	BLU-BRN	J8-P1	26-1200 090-5044-ND
#10	RIGHT POP BUMPER	Q10	▲ I/O Power Driver ▼	YEL-VIO	J10-P9/10	50VDC	BLU-RED	J8-P2	26-1200 090-5044-ND
#11	BOTTOM POP BUMPER	Q11		YEL-VIO	J10-P9/10	50VDC	BLU-ORG	J8-P4	26-1200 090-5044-ND
#12	UPPER RIGHT FLIPPER	Q12		GRY-YEL 3A	J10-P6/7	50VDC	BLU-YEL	J8-P5	22-1080 090-5032-ND
#13	LEFT SLINGSHOT	Q13		YEL-VIO	J10-P9/10	50VDC	BLU-GRN	J8-P6	26-1200 090-5044-ND
#14	RIGHT SLINGSHOT	Q14		YEL-VIO	J10-P9/10	50VDC	BLU-BLU	J8-P7	26-1200 090-5044-ND
#15	LEFT FLIPPER (50V RED/YEL)	Q15		GRY-YEL-3A Fuse-RED-YEL	J10-P6/7	50VDC	ORG-GRY	J8-P8	22-1080 090-5032-ND
#16	RIGHT FLIPPER (50V RED/YEL)	Q16		BLU-YEL-3A Fuse-RED-YEL	J10-P6/7	50VDC	ORG-VIO	J8-P9	22-1080 090-5032-ND

Low Current Coils Group 1		Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#17	FLASH: LEFT SIDE (X2)	Q17		ORG	J6-P10	20VDC	VIO-BRN	J7-P2	# 89 BULB 165-5000-89
#18	FLASH: RIGHT SIDE (X2)	Q18	▲ I/O Power Driver ▼	ORG	J6-P10	20VDC	VIO-RED	J7-P3	# 89 BULB 165-5000-89
#19		Q19					VIO-ORG	J7-P4	
#20		Q20		ORG	J6-P10	20V	VIO-YEL	J7-P6	# 89 BULB 165-5000-89
#21	FLASH: WOLVERINE INSERT	Q21		ORG	J6-P10	20VDC	VIO-GRN	J7-P7	# 89 BULB 165-5000-89
#22	FLASH: MAGNETO (X2)	Q22		ORG	J6-P10	20VDC	VIO-BLU	J7-P8	# 89 BULB 165-5000-89
#23		Q23					VIO-BLK	J7-P9	
#24	OPTIONAL (e.g. COIN METER)	Q24		RED	J16-P4-8	5VDC	VIO-GRY	J7-P10	COIN METER

Low Current Coils Group 2		Drive Translator	Driver Output PCB	Power Line Color	Power Line Connection	Power Voltage	Drive Translator Control Line Color	D.T. Control Line Connect	Coil GA-Turn or Bulb Type
#25	FLASH: POP BUMPER	Q25		ORG	J6-P10	20VDC	BLK-BRN	J6-P1	# 89 BULB 165-5000-89
#26	ORBIT DIVERTER	Q26	▲ I/O Power Driver ▼	BRN	J7-P1	20VDC	BLK-RED	J6-P2	24-940 090-5038-ND
#27	FLASH; MAGNETO SPOT LIGHT	Q27		ORG	J6-P10	20VDC	BLK-ORG	J6-P3	# 161 BULB 165-5032-00
#28	FLASH: BACKPANEL # 1 (X3)	Q28		ORG	J6-P10	20VDC	BLK-YEL	J6-P4	# 89 BULB 165-5000-89
#29	FLASH: BACKPANEL # 2 (X3)	Q29		ORG	J6-P10	20VDC	BLK-GRN	J6-P5	# 89 BULB 165-5000-89
#30		Q30					BLK-BLU	J6-P6	
#31	FLASH: MAGNETO FIGURINE	Q31		ORG	J6-P10	20VDC	BLK-VIO	J6-P7	# 89 BULB 165-5000-89
#32	WOLVERINE MAGNET	Q32		VIO-YEL	J10-P8	50VDC	BLK-GRY	J6-P8	22-800 090-5078-00

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28,29
BACK PANEL FLASH

26
INVERTER

31
FLASH

5

22

22

6,7

17

18

27
SPOT FLASH

9

25

10

4
MAGNET

11

12

32
MAGNET

3

21

17

18

13

14

15

16

1

2

Typical Coil Wiring & Schematic

I/O PCB Drive Transistor

I/O Power Driver PCB

COIL

J10-P9/10 I/O PCB

+50V

Q1

J8

1N4004 DIODE LOCATED ON I/O PWR. DRV. PCB

+50VDC

BRN-BLK

#1 Trough Up-Kicker

YEL-VIO HIGH POWER

26-1200 Gauge - Turn

BRN-BLK

YEL-VIO

Power Voltage Supply 50VDC

//

🔋 Go To Lamp Menu

LAMP

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."

Upon entering Single Lamp Test, ... the #1 lamp is shown. .... Display will light up ... the dot ... ▶

Single Lamp Test

ONE

To initiate, from the **LAMP MENU**, select the "ONE" *Icon*. As each lamp is selected, the lamp will light at it's location on the playfield as well as the Dot Matrix

```
SINGLE LAMP TEST
   START BUTTON
     LAMP #1
YEL-BRN / RED-BRN
```

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.

Upon entering All Lamps Test, ... the Dot Matrix Display is flashing "ALL LAMPS ON" ... ▶

All Lamps Test

ALL

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

```
ALL LAMPS TEST

ALL LAMPS ON
```

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.

Upon entering Row Lamps Test, you will notice the #1 lamp row is shown. ▶

Row Lamps Test

ROW

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

```
ROW LAMPS TEST
   LAMP ROW #1
     RED-BRN
  J12-P1 / Q33
```

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.*

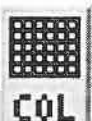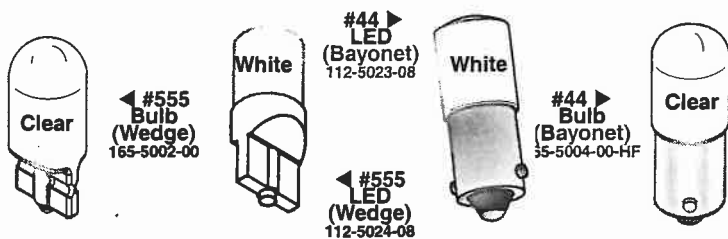*Upon entering Column Lamps Test, you will notice the #1 lamp column is shown.* ▶
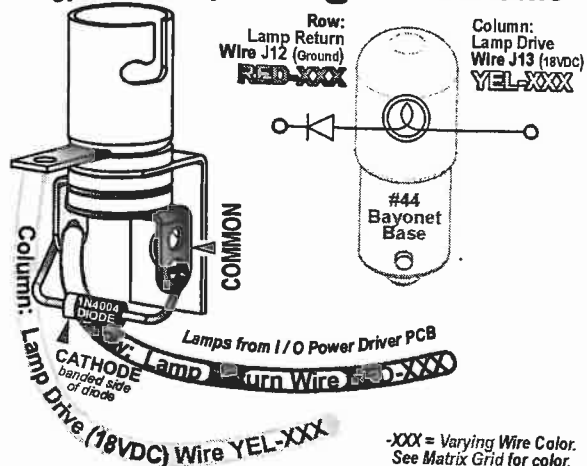
Column Lamps Test

COL

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

```
COLUMN LAMPS TEST
  LAMP COLUMN #1
      YEL-BRN
   J13-P9 / U17
```

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

Clear — #555 Bulb (Wedge) 165-5002-00

White — #44 LED (Bayonet) 112-5023-08

White — #555 LED (Wedge) 112-5024-08

#44 Bulb (Bayonet) 35-5004-00-HF

Clear

Typical Lamp Wiring & Schematic

Row: Lamp Return Wire J12 (Ground) RED-XXX

Column: Lamp Drive Wire J13 (18VDC) YEL-XXX

#44 Bayonet Base

COMMON

Column: Lamp Drive (18VDC) Wire YEL-XXX

1N4004 DIODE

CATHODE banded side of diode

Lamps from I/O Power Driver PCB

Lamp Return Wire RED-XXX

-XXX = Varying Wire Color. See Matrix Grid for color.

* *If not required in this game, Icon will not be shown.*

Ordered Lamps Test

ORD

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.

Diagnostics

I/O Power Driver Board	IC-U17 01 18VDC YEL-BRN J13-P9	IC-U16 02 18VDC YEL-RED J13-P8	IC-U15 03 18VDC YEL-ORG J13-P7	IC-U14 04 18VDC YEL-BLK J13-P6	IC-U13 05 18VDC YEL-GRN J13-P5	IC-U12 06 18VDC YEL-BLU J13-P4	IC-U11 07 18VDC YEL-VIO J13-P3	IC-U10 08 18VDC YEL-GRY J13-P1
Q33 01 GROUND RED-BRN J12-P1	#1 555 CLEAR LP. START BUTTON 165-5002-00	#2 555 CLEAR LP. TOURNEY START 165-5002-00	#3 555 CLEAR LP. SHOOT AGAIN 165-5002-00	#4 555 CLEAR LP. LEFT SPECIAL 165-5002-00	#5 555 CLEAR LP. LEFT RETURN LANE 165-5002-00	#6 555 CLEAR LP. RIGHT RETURN LANE 1 165-5002-00	#7 555 CLEAR LP. RIGHT RETURN LANE 2 165-5002-00	#8 555 CLEAR LP. RIGHT SPECIAL 165-5002-00
Q34 02 GROUND RED-BLK J12-P2	#9 555 CLEAR LP. LEFT 2 BANK (BOTTOM) 165-5002-00	#10 555 CLEAR LP. LEFT 2 BANK (TOP) 165-5002-00	#11 555 CLEAR LP. LEFT RAMP ENTRANCE 165-5002-00	#12 555 CLEAR LP. DARK PHOENIX 165-5002-00	#13 555 CLEAR LP. EXTRA BALL 165-5002-00	#14 555 CLEAR LP. DANGER ROOM 165-5002-00	#15 555 CLEAR LP. VILLAIN 165-5002-00	#16 555 CLEAR LP. GAMBIT 165-5002-00
Q35 03 GROUND RED-ORG J12-P3	#17 555 CLEAR LP. LEFT ORBIT RED 165-5002-00	#18 555 CLEAR LP. BEAST 165-5002-00	#19 555 CLEAR LP. STORM 165-5002-00	#20 555 CLEAR LP. LEFT RAMP RED 165-5002-00	#21 555 CLEAR LP. LEFT INNER LOOP RED 165-5002-00	#22 555 CLEAR LP. ROGUE 165-5002-00	#23 555 CLEAR LP. LEFT INNER LOOP GREEN 165-5002-00	#24 555 CLEAR LP. VUK RED 165-5002-00
Q36 04 GROUND RED-YEL J12-P4	#25 555 CLEAR LP. XAVIER 165-5002-00	LP. #26	LP. #27	#28 555 CLEAR LP. CENTER TARGETS (LEFT) 165-5002-00	#29 555 CLEAR LP. CENTER TARGETS (RIGHT) 165-5002-00	#30 555 CLEAR LP. WOLVERINE RED 165-5002-00	#31 555 CLEAR LP. WOLVERINE 165-5002-00	LP. #32
Q37 05 GROUND RED-GRN J12-P5	#33 555 CLEAR LP. CENTER MAGNETO RED 165-5002-00	#34 555 CLEAR LP. MAGNETO 165-5002-00	#35 555 CLEAR LP. CENTER MAGNETO GREEN 165-5002-00	#36 555 CLEAR LP. RIGHT INNER LOOP RED 165-5002-00	#37 555 CLEAR LP. CYCLOPS 165-5002-00	#38 555 CLEAR LP. RIGHT RAMP ENTRANCE 165-5002-00	LP. #39	LP. #40
Q38 06 GROUND RED-BLU J12-P6	LP. #41	LP. #42	#43 555 CLEAR LP. RIGHT RAMP RED 165-5002-00	#44 555 CLEAR LP. ICEMAN 165-5002-00	#45 555 CLEAR LP. RIGHT ORBIT RED 165-5002-00	#46 555 CLEAR LP. PHOENIX 165-5002-00	#47 555 CLEAR LP. RIGHT ORBIT GREEN 165-5002-00	#48 555 CLEAR LP. RIGHT 2 BANK (TOP) 165-5002-00
Q39 07 GROUND RED-VIO J12-P8	#49 555 CLEAR LP. RIGHT 2 BANK (BOTTOM) 165-5002-00	#50 555 CLEAR LP. ICEMAN 165-5002-00	#51 555 CLEAR LP. WOLVERINE 165-5002-00	#52 555 CLEAR LP. XAVIER 165-5002-00	#53 555 CLEAR LP. STORM 165-5002-00	#54 555 CLEAR LP. PHOENIX 165-5002-00	#55 555 CLEAR LP. CYCLOPS 165-5002-00	#56 44 CLEAR LP. BEAST 165-5000-44-HF
Q40 08 GROUND RED-GRY J12-P9	#57 44 CLEAR LP. ROGUE 165-5000-44-HF	#58 555 CLEAR LP. LEFT EJECT TOP 165-5002-00	LP. #59	#60 LED LEFT POP BUMPER 112-5024-08	#61 LED RIGHT POP BUMPER 112-5024-08	#62 BOTTOM POP BUMPER 112-5024-08	LP. #63 LED	LP. #64
Q41 09 GROUND RED-WHT J12-P10	#65 555 CLEAR LP. SABERTOOTH 165-5002-00	#66 555 CLEAR LP. SHADOW KING 165-5002-00	#67 555 CLEAR LP. HELLFIRE CLUB 165-5002-00	#68 555 CLEAR LP. JUGGERNAUT 165-5002-00	#69 555 CLEAR LP. BROTHERHOOD 165-5002-00	#70 555 CLEAR LP. SENTINELS 165-5002-00	#71 555 CLEAR LP. OMEGA RED 165-5002-00	LP. #72
Q42 10 GROUND RED J12-P11	LP. #73	LP. #74	LP. #75	LP. #76	LP. #77	LP. #78	LP. #79	LP. #80

⯇ FOR MORE ABOUT DIODE ON TERMINAL STRIPS (DOTS), SEE SEC.5, CHP2, PAGES 104-105. ⯈

Wire Color Abbreviations used:

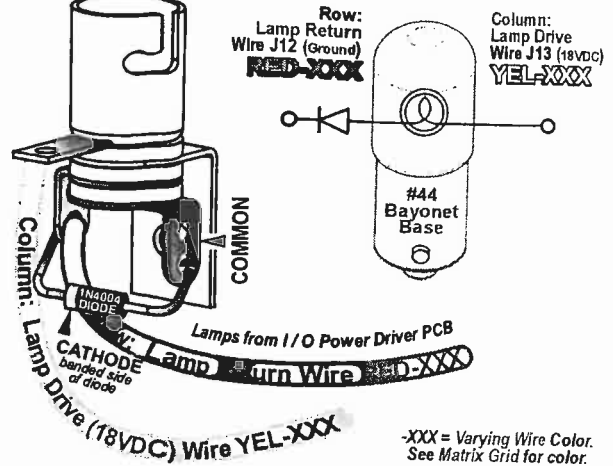| BLK Black	BLU Blue	BRN Brown	GRY Gray	GRN Green	ORG Orange	RED Red	VIO Violet	WHT White	YEL Yellow

DIAG

MORE · COIL · FLASH · LAMP · GAME · CLR · MORE

ONE · ALL · ROW · COL · ORD · MORE

Typical Lamp Wiring & Schematic

Row:
Lamp Return
Wire J12 (Ground)
RED-XXX

Column:
Lamp Drive
Wire J13 (18VDC)
YEL-XXX

COMMON

#44
Bayonet
Base

Column: Lamp Drive (18VDC) Wire YEL-XXX

Row: Lamp Return Wire RED-XXX

1N4004 DIODE

CATHODE banded side of diode

Lamps from I / O Power Driver PCB

-XXX = Varying Wire Color.
See Matrix Grid for color.
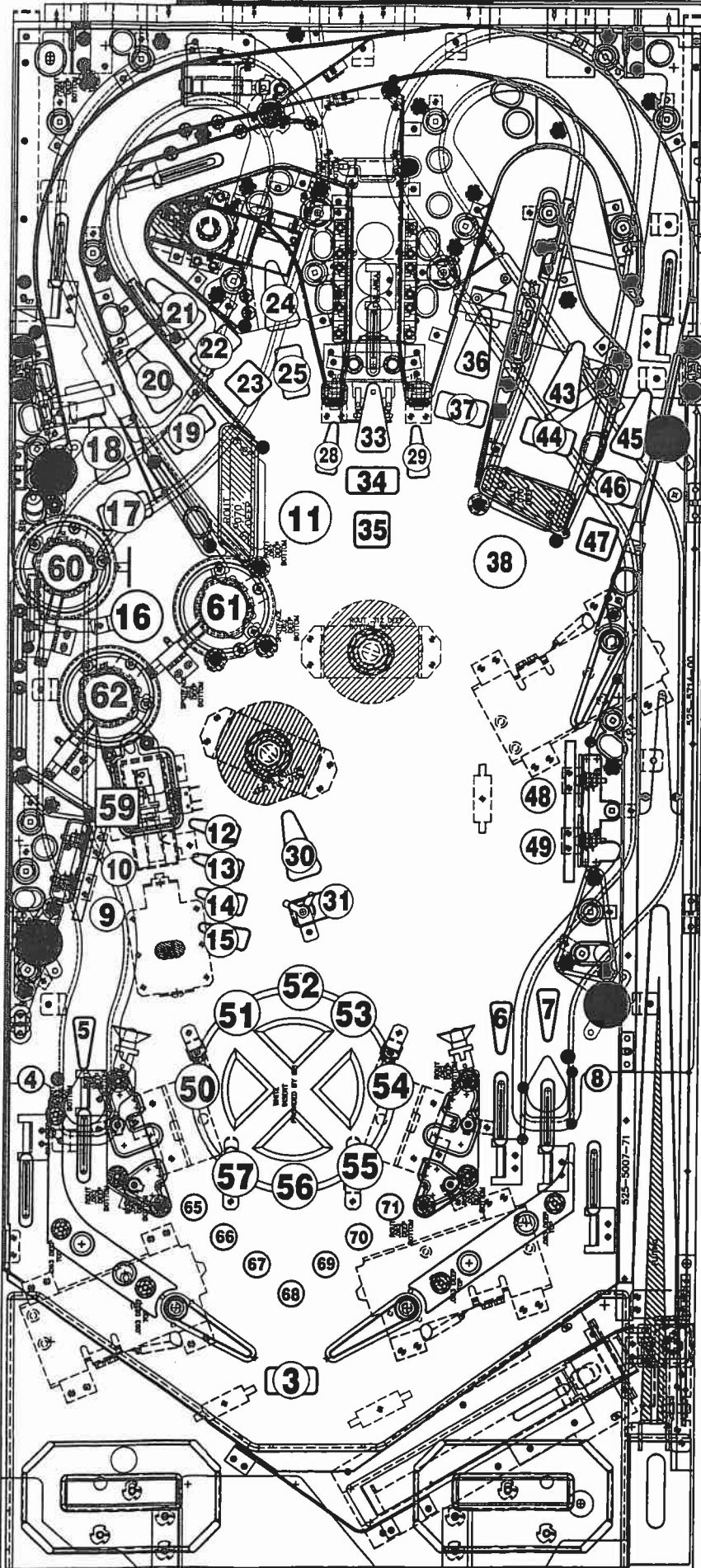
Typical Lamp Wiring & Schematic
... with Lamp Diode on a Terminal Strip (DOTS)
Usually when an LED Module is used as a Controlled Lamp for a Pop Bumper.

BLACK —
LED Wedge Base
BLACK +
RED-XXX
TERMINAL STRIP
YEL-XXX
J12-#
J13-#
I/O PCB

... with Lamp Diode on a Terminal Strip (DOTS)
Usually when a #555 Bulb is used as a Controlled Lamp for a Spot Light.

ORG-XXX · ORG-XXX · RED-XXX
#555 Wedge Base
CONN.
TERMINAL STRIP
YEL-XXX
YEL-XXX
J12-#
J13-#
I/O PCB

wire IN from previous lamp or I/O PCB ...

... wire OUT to next lamp ...
Wire RED-XXX

1N4004 DIODE

Jumper ORG-XXX to Row: Lamp Return

Column: Lamp Drive Wire YEL-XXX

-XXX = Varying Wire Color.
See Matrix Grid for color.

//

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**.
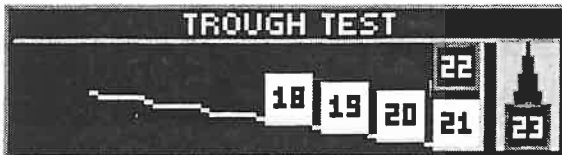
Press the **Black [SELECT] Button** to eject the ball in the first position Switch #21 (VUK OPTO Trough #1 (R)). Simultaneously, the Dot Matrix Display and the playfield will eject the ball to the Trough Up-Kicker, eject from the Trough Up-Kicker into the Shooter Lane, momentarily closing Switch *#23 (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 be automatically 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.

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.

```
TECHNICIAN ALERT - (1/2)
           2
     BALLS MISSING
PRESS 'SELECT' FOR TROUGH TEST
```

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 (ejects and VUKs) or ball troughs. Determine that all devices are functionally 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 **Technican 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.*

```
TECHNICIAN ALERT - (2/2)
    DEVICE MALFUNCTION
       AUTO PLUNGER
USE -/+ TO VIEW OTHER ALERTS
```

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 "KNO- CKER" *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.

```
SOUND / SPEAKER TEST
MUSIC: MAIN PLAY
       #1
PRESS 'SELECT' TO PLAY
```
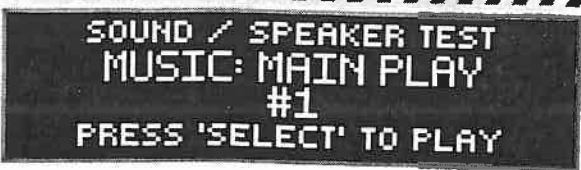
Upon entering **Sound / Speaker Test**, you will notice the Dot Matrix Display indicating the first option of *available* music *and/or* sound(s) in this test. Press the **Red [+ / >] Button** to cycle through the *available* music *and/or* sounds, and press the **Black [SELECT] Button** to play the option shown in the Dot Matrix Display. Press the **Green [BACK] Button** to exit.

```
SOUND / SPEAKER TEST
MUSIC: MAIN PLAY
       #1
PLAYING SOUND #1
```
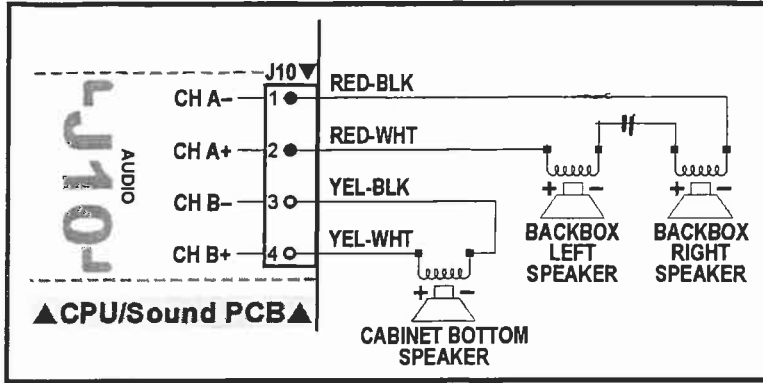
Speaker Phase Testing

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.

SPKR

If the sound is not balanced or doesn't sound correct, check the speaker wiring.

▲CPU/Sound PCB▲

J10 ▼
CH A– — 1 ● RED-BLK
CH A+ — 2 ● RED-WHT
CH B– — 3 ○ YEL-BLK
CH B+ — 4 ○ YEL-WHT

AUDIO / J10

BACKBOX LEFT SPEAKER
BACKBOX RIGHT SPEAKER
CABINET BOTTOM SPEAKER

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

BURN

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).*
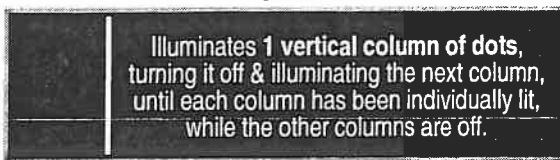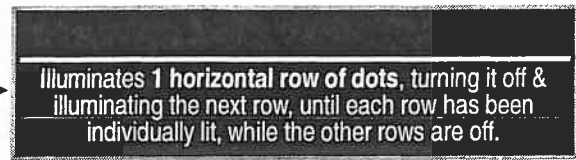
///

Dot Matrix Test

DOT 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**.
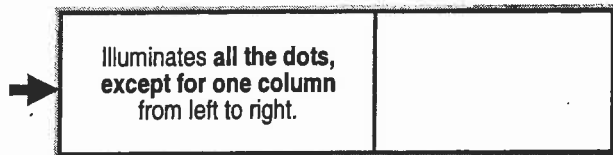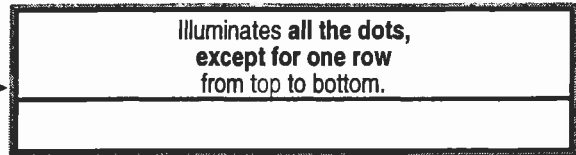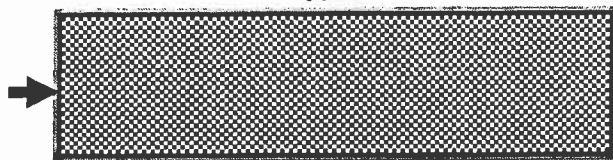
Diagnostics

Test 1
Illuminates **1 vertical column of dots**, turning it off & illuminating the next column, until each column has been individually lit, while the other columns are off.

Test 2
Illuminates **1 horizontal row of dots**, turning it off & illuminating the next row, until each row has been individually lit, while the other rows are off.

Test 3
Illuminates **all the dots, except for one column** from left to right.

Test 4
Illuminates **all the dots, except for one row** from top to bottom.

Test 5
Illuminates **all the dots alternating even & odd**, in both the *rows and columns*.

Test 1
Illuminates **1 vertical column of dots**, turning it off & illuminating the next column, until each column has been individually lit, while the other columns are off.

21

Ticket Dispenser Test

To initiate, from the **DIAGNOSTICS MENU**, select the "TIX" *Icon*. This Menu *(Icon)* <u>will only appear</u> 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.**

GO TO AUDITS MENU: EARNINGS AUDITS [#1 – #13] / STANDARD AUDITS [#1 – #59]

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 [>]. Go to the "AUD" *Icon.*
Press [**SELECT**].

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

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

Audit Number ➡ **EARNINGS AUDIT #1**
Audit Name ➡ **TOTAL PAID CREDITS**
Audit Result ➡ **0**

EARNINGS AUDITS [#1 – #13] ▼

Nr.	EARNINGS AUDIT NAME	YOUR RESULT	Nr.	EARNINGS AUDIT NAME	YOUR RESULT
1	TOTAL PAID CREDITS		8	COINS THROUGH FOURTH SLOT	
2	FREE GAME PERCENTAGE		9	COINS THROUGH FIFTH SLOT	
3	AVERAGE BALL TIME		10	TOTAL COINS	
4	AVERAGE GAME TIME		11	TOTAL EARNINGS	
5	COINS THROUGH LEFT SLOT		12	METER CLICKS	
6	COINS THROUGH RIGHT SLOT		13	SOFTWARE METER	
7	COINS THROUGH CENTER SLOT				

STANDARD AUDITS [#1 – #59] ▼

Nr.	STANDARD AUDIT NAME	YOUR RESULT	Nr.	STANDARD AUDIT NAME	YOUR RESULT	Nr.	STANDARD AUDIT NAME	YOUR RESULT
1	TOTAL BALLS PLAYED		21	8.0M – 9.99M SCORES		41	RIGHT DRAINS	
2	TOTAL EXTRA BALLS		22	10.0M – 12.49M SCORES		42	TILTS	
3	EXTRA BALL PERCENTAGE		23	12.5M – 14.99M SCORES		43	TOTAL BALLS SAVED	
4	REPLAY 1 AWARDS		24	15.0M – 17.49M SCORES		44	LEFT FLIPPER USED	
5	REPLAY 2 AWARDS		25	17.5M – 19.99M SCORES		45	RIGHT FLIPPER USED	
6	REPLAY 3 AWARDS		26	20.0M – 24.99M SCORES		46	0 – 1 MINUTE GAMES	
7	REPLAY 4 AWARDS		27	25.0M – 29.99M SCORES		47	1 – 1.5 MINUTE GAMES	
8	TOTAL REPLAYS		28	30.0M – 39.99M SCORES		48	1.5 – 2 MINUTE GAMES	
9	REPLAY PERCENTAGE		29	40.0M – 49.99M SCORES		49	2 – 2.5 MINUTE GAMES	
10	TOTAL SPECIALS		30	50.0M – 74.99M SCORES		50	2.5 – 3 MINUTE GAMES	
11	SPECIAL PERCENTAGE		31	75.0M – 99.99M SCORES		51	3 – 3.5 MINUTE GAMES	
12	TOTAL MATCHES		32	100.0M – 149.99M SCORES		52	3.5 – 4 MINUTE GAMES	
13	HIGH SCORE AWARDS		33	150.0M+ SCORES		53	4 – 5 MINUTE GAMES	
14	HIGH SCORE PERCENT		34	AVERAGE SCORES		54	5 – 6 MINUTE GAMES	
15	TOTAL FREE PLAYS		35	SERVICE CREDITS		55	6 – 8 MINUTE GAMES	
16	TOTAL PLAYS		36	BALL SEARCH STARTED		56	8 – 10 MINUTE GAMES	
17	0.0M – 1.99M SCORES		37	LOST BALL FEEDS		57	10 – 15 MINUTE GAMES	
18	2.0M – 3.99M SCORES		38	LOST BALL GAME STARTS		58	15+ MINUTE GAMES	
19	4.0M – 5.99M SCORES		39	LEFT DRAINS		59	RECENT REPLAY PERCENT	
20	6.0M – 7.99M SCORES		40	CENTER DRAINS				

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

Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING		Nr.	STANDARD ADJUSTMENT NAME	USA DEFAULT	YOUR SETTING
1	REPLAY TYPE	AUTO			32	HIGH SCORE #1	__,000,000	
2	‡ REPLAY PERCENTAGE	10%			33	HIGH SCORE #2	__,000,000	
3	‡ REPLAY AWARD	CREDIT			34	HIGH SCORE #3	__,000,000	
4	‡ REPLAY LEVELS	1			35	HIGH SCORE #4	__,000,000	
5	‡ AUTO REPLAY START	__,000,000			36	HSTD INITIALS	3 INITIALS	
6	‡ DYNAMIC REPLAY START	__,000,000			37	HSTD RESET COUNT	2000	
7	‡ REPLAY LEVEL #1	__,000,000			38	FREE PLAY	NO	
8	‡ REPLAY LEVEL #2	__,000,000			39	LANGUAGE	ENGLISH	
9	‡ REPLAY LEVEL #3	__,000,000			40	PLAYER LANGUAGE SELECT	YES	
10	‡ REPLAY LEVEL #4	__,000,000			41	CUSTOM MESSAGE	ON	
11	‡ REPLAY BOOST	YES			42	FLASH LAMP POWER	NORMAL	
12	SPECIAL LIMIT	1			43	COIL PULSE POWER	NORMAL	
13	‡ SPECIAL PERCENTAGE	10%			44	KNOCKER VOLUME	NORMAL	
14	SPECIAL AWARD	CREDIT			45	GAME RESTART	YES	
15	FREE GAME LIMIT	5			46	BILL VALIDATOR	NO	
16	EXTRA BALL LIMIT	5			47	MUSIC VOLUME	1	
17	‡ EXTRA BALL PERCENTAGE	25%			48	BALL SAVE TIME	0:05	
18	GAME PRICING	USA 10			49	TIMED PLUNGER	OFF	
19	MATCH PERCENTAGE	9%			50	FLIPPER BALL LAUNCH	OFF	
20	MATCH AWARD	CREDIT			51	COINDOOR BALL SAVER	NO	
21	BALLS PER GAME	3			52	COMPETITION MODE	NO	
22	TILT WARNINGS	2			53	CONSOLATION BALL	YES	
23	CREDIT LIMIT	30			54	FAST BOOT	YES	
24	ALLOW HIGH SCORES	YES			55	Q24 OPTION	COIN METER	
25	HIGH SCORE AWARD	CREDIT			56	TICKET DISPENSER	NO	
26	GRAND CHAMPION AWARDS	1			57	PLAYER COMPETITION	YES	
27	HIGH SCORE #1 AWARDS	1			58	TEAM SCORES	NO	
28	HIGH SCORE #2 AWARDS	0			59	LOCATION ID	0	
29	HIGH SCORE #3 AWARDS	0			60	GAME ID	0	
30	HIGH SCORE #4 AWARDS	0			61	TIME FORMAT	12-HOUR	
31	GRAND CHAMPION SCORE	__,000,000			62	COIN INPUT DELAY	30	
					63	LOST BALL RECOVERY	YES	

Factory Defaults Settings are subject to change during production (especially Standard Adjustments 2, 4, 5, 13, 16-17, 19, 31-35 & 47).
*‡ Not all Standard Adjustments are shown. Depending on the setting (whether Factory Default or if changed by the operator), associated adjustments do not appear, if not required. **Note:** If **Game Dip Switch** other than USA is installed, different Defaults will appear.*

//

Feature Adjustments [#1 – # +]

GAME

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 begining of this Service Game Manual or the beginning of the Yellow Pages.*

Adjustments

USA & International (non-Euro) Standard Pricing Select Table

S.P.I

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT:				PRICING SCHEME Number of Plays (Credits) for Price Amount Shown See "Appendix J" for Coin Cards Examples & Info!					Requires SPI Coin Card(s) Part Number
		LEFT	CENTER	RIGHT	4TH						

USA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					USD // UNITED STATES DOLLAR // [$]					
ON (all)	USA 1					1/0.25					755-5400-01-Y
OFF ▼▼▼▼▼▼▼▼	USA 2					1/0.50	2/0.75	3/1.00			755-5400-09-Y
	USA 3					1/0.50	For USA 6 and USA 7 use: 755-5400-02-Y				755-5400-02-Y
HIGHLIGHTED = Factory Default	USA 4					1/0.50	USA 6 Note: If player uses X4 25¢ quarters = 2 plays. However, $1 bill = 3 plays!				755-5400-02-Y
	USA 5	0.25	1.00	0.25		1/0.50 2/1.00	3/1.50	5/2.00			755-5400-08-Y
HIGHLIGHTED = Not Shown on Coin Card	USA 6					1/0.50	2 /'4 X 25¢'	3 /$ 1.00 Bill		◄ Used to promote the Bill Validator.	
	USA 7					1/0.50 2/1.00	4/1.50	6/2.00			
	USA 8					1/0.50	3/1.00				755-5400-00-Y
	USA 9					1/1.00					755-5400-07-Y
	USA 10					1/0.75	2/1.50	3/2.00			755-5400-11-Y

AUSTRALIA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					AUD // AUSTRALIAN DOLLARS // [$AUS]					
ON ▲ ▲▲	AUSTRALIA 1	0.20	1.00	2.00		1/1.00	3/2.00				755-5406-00-Y
OFF ▼ ▼▼▼▼	AUSTRALIA 2					1/1.00					(1 Side)

CANADA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					CAD // CANADIAN DOLLARS // [$CAN]					
ON ▲▲	CANADA 1 [25¢ door]	0.25	0.25	1.00	2.00	1/0.50	2/0.75	3/1.00			755-5400-00-Y
OFF ▼▼▼▼▼▼											-01-Y or -02-Y
ON ▲ ▲▲	CANADA 2 [dollar door]	1.00		2.00		1/1.00	3/2.00				755-5400-10-Y
OFF ▼ ▼ ▼▼▼											

CROATIA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					HRK // CROATIAN KUNA // [kuna]					
ON ▲▲ ▲	CROATIA	1	2	5		1/3	2/5				755-5410-00-Y
OFF ▼ ▼ ▼▼▼											(2-Sided)

DENMARK

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					DKK // DANISH KRONER // [Kr]					
ON ▲ ▲	DENMARK 1	1	5	10	20	1/3		2/5			755-5402-00-Y
OFF ▼▼ ▼▼▼▼	DENMARK 2					1/2	2/4	3/5	4/7	5/9	7/10	(2-Sided)

JAPAN

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					JPY // JAPANESE YEN // [¥]					
ON ▲ ▲ ▲	JAPAN 1	100		100		1/100					755-5408-01-Y
OFF ▼ ▼ ▼▼▼	JAPAN 2					1/100	3/200				(2-Sided)

LITHUANIA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					LTL // LITHUANIA LITAI // [Lt]					
ON ▲▲ ▲▲	LITHUANIA	1	2	5		1/2					755-5416-00-Y
OFF ▼ ▼▼▼											(1 Side)

MIDDLE EAST

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					TOKEN // Middle East currency used to buy token // [TOKEN]					
ON ▲▲▲ ▲	MIDDLE EAST	token		token		1/1					755-5416-00-Y
OFF ▼ ▼▼▼											(use Side 1)

NEW ZEALAND

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					NZD // NEW ZEALAND DOLLAR // [$NZD]					
ON ▲	NEW ZEALAND 1	1		2		1/1					755-5406-00-Y
OFF ▼▼▼▼ ▼▼▼	NEW ZEALAND 2					1/1	3/2				(Side 2)

NORWAY

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					NOK // NORWEGIAN KRONE // [Kr]					
ON ▲ ▲	NORWAY 1	10	5	20		1/10					755-5403-01-Y or
OFF ▼ ▼ ▼▼▼▼	NORWAY 2					1/10	3/20				-02-Y / (2-Sided)
	NORWAY 3					1/20					755-5403-03-Y
	NORWAY 4					1/20	3/40				(2-Sided)

RUSSIA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted	▼ LEFT SWITCH CAN BE WIRED TO BILL ACCEPTOR ▼				RUB // RUSSIAN RUBLE // [Ruble]					
ON ▲ ▲▲	RUSSIA	10	5	1		1/5					755-5411-00-Y
OFF ▼▼ ▼▼▼											(2-Sided)

SO. AFRICA

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					ZAR // SOUTH AFRICAN RAND // [R]					
ON ▲ ▲	SO. AFRICA 1	0.50	1.00	2.00	5.00	1/2.00					755-5409-01-Y
OFF ▼▼ ▼ ▼▼▼	SO. AFRICA 2					1/3.00	2/5.00				(2-Sided)

SWEDEN

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					SEK // SWEDISH KRONOR // [kr]					
ON ▲▲ ▲	SWEDEN 1	1	5	10		1/10	2/15	3/20			755-5404-00-Y
OFF ▼ ▼▼▼▼	SWEDEN 2					1/5					(2-Sided)

SWITZERLAND

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					CHF // SWISS FRANCS // [Sf]					
ON ▲▲	SWITZERLAND 1	1	2	5		1/1	2/2	3/3	4/4	6/5	755-5405-00-Y
OFF ▼▼ ▼▼▼▼	SWITZERLAND 2					1/1	3/2	5/3	7/4	9/5	(2-Sided)

TAIWAN

Pos. 1 2 3 4 5 6 7 8	Default Highlighted					TWD // TAIWANESE DOLLAR // [TWD]					
ON ▲▲	TAIWAN	10		10		1/10					755-5412-00-Y
OFF ▼▼▼ ▼▼▼											(use Side 1)

UK

Pos. 1 2 3 4 5 6 7 8	Default Highlighted	▼ 5TH COIN SLOT NOT AVAILABLE WITH CUSTOM PRICING ▼					GPB // UNITED KINGDOM POUNDS // [£]				
		LEFT	CENTER	RIGHT	4TH	5TH					
ON ▲▲▲	UK 1						3/1.00	7/2.00			755-5407-00-Y
OFF ▼ ▼▼▼▼	UK 2						4/1.00				755-5407-01-Y*
	UK 3						1/0.50 2/1.00	3/1.50	5/2.00		755-5407-01
ATTENTION: UK 5TH COIN SLOT TIED TO 6TH CHANNEL ON ELEC. COIN MECH	UK 4	0.10	0.50	1.00	0.20	2£	1/0.30 2/0.60	3/0.90	4/1.00		755-5407-01-Y*
	UK 5					▲ Coin Only	1/1.00	3/2.00			755-5407-01
	UK 6						3/2.00	*use blank side			755-5407-01-Y*

HIGHLIGHTED = Factory Default   HIGHLIGHTED = Not Shown on Coin Card

Adjustments

Euro 1-12 Summary & International (Euro) Standard Pricing Select Table

CPU/SOUND PCB DIP SWITCH SW1 SETTING	COUNTRY SETTING OPTION(S)	COIN MECHANISMS (SWITCHES) COINS THRU ... SLOT:				PRICING SCHEME — Number of Plays (Credits) for Price Amount Shown. See "Appendix J" for Coin Cards Examples & Info!				Requires SPI Coin Card(s) Part Number
		LEFT	CENTER	RIGHT	4TH	EUR // EUROPEAN UNION EUROS // [€]				
Pos. 1 2 3 4 5 6 7 8	Default Highlighted									
ON: S E E B E L O W	Euro 1					1/0.50				755-5401-01-Y
OFF: S E T T I N G S	Euro 2					1/0.50	2/1.00	3/1.50	5/2.00	755-5401-02-Y
Euro 1-12 are alternate settings for countries using the Euro.	Euro 3					1/0.50		3/1.00		755-5401-03-Y
	Euro 4					1/0.50	2/1.00	3/1.50	6/2.00	755-5401-04-Y
HIGHLIGHTED = Factory Default	Euro 5					1/0.50	3/1.00	4/1.50	7/2.00	755-5401-05-Y
	Euro 6					2/0.50				755-5401-06-Y
HIGHLIGHTED = Not Shown on Coin Card	Euro 7	0.50	1.00	2.00	0.20 (optional)	1/1.00	2/2.00	3/3.00	5/4.00	755-5401-07-Y
	Euro 8					1/1.00		3/2.00		755-5401-08-Y
	Euro 9				optional	1/1.00	2/1.50	3/2.00		755-5401-09-Y
	Euro 10					1/1.00	3/2.00	7/3.00		755-5401-10-Y
	Euro 11					1/1.00	4/2.00			755-5401-11-Y
	Euro 12					2/1.00	4/2.00	6/3.00	9/4.00	755-5401-12-Y

For a different **Euro Pricing Scheme** (other than Factory Default listed below), scroll through **Standard Adjustment 18**: Euro 1-12 or CUSTOM* for new setting (reference above Euro 1-12 Summary). Keep the Country Dip Switch Setting the same as listed below.

Adjustments

Pos. 1 2 3 4 5 6 7 8 (Default Highlighted)	COUNTRY / Euro	LEFT	CENTER	RIGHT	4TH	EUR // EUROPEAN UNION EUROS // [€]			Part Number
ON: ▲ / OFF: ▼▼▼▼▼▼▼	AUSTRIA Euro 9	0.50	1.00	2.00		1/1.00	2/1.50	3/2.00	755-5401-09-Y
ON: ▲ / OFF: ▼ ▼▼▼▼▼▼	BELGIUM Euro 1	0.50	1.00	2.00		1/0.50			755-5401-01-Y
ON: ▲ ▲ / OFF: ▼ ▼▼▼▼▼	FINLAND Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
ON: ▲▲ / OFF: ▼ ▼▼▼▼▼	FRANCE Euro 10	0.50	1.00	2.00		1/1.00	3/2.00	7/3.00	755-5401-10-Y
ON: ▲▲▲ / OFF: ▼▼▼▼▼	GERMANY 1	0.50	1.00	2.00		1/0.50			755-5401-01-Y
	GERMANY 2					1/0.50	2/1.00	3/1.50	5/2.00 / 755-5401-02-Y
	GERMANY 3					1/0.50	2/1.00	3/1.50	6/2.00 / 755-5401-04-Y
ON: ▲▲▲▲ / OFF: ▼▼▼▼	GREECE Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y
ON: ▲ / OFF: ▼▼▼ ▼▼▼▼	ITALY 1	0.50		0.50		1/0.50			755-5401-01-Y
	ITALY 2					1/1.00	3/2.00		755-5401-08-Y
ON: ▲ / OFF: ▼▼ ▼▼▼▼▼	NETHERLANDS Euro 3	0.50	1.00	2.00		1/0.50	3/1.00		755-5401-03-Y
ON: ▲ ▲ / OFF: ▼▼▼ ▼▼▼	PORTUGAL Euro 1	0.50		0.50		1/0.50			755-5401-01-Y
ON: ▲ ▲ / OFF: ▼ ▼▼▼ ▼▼	SPAIN Euro 8	0.50	1.00	2.00		1/1.00	3/2.00		755-5401-08-Y

HIGHLIGHTED = Factory Default   HIGHLIGHTED = Not Shown on Coin Card

For the associated **Coinage Card** required *if the Factory Default Setting was changed*, view on-line at:
http://www.sternpinball.com/coinagecards.shtml

You can download and print the replacement card. *Adobe® Reader 5.0 or higher required (links on site).* Use **Yellow Card Stock**: **ASTROBRIGHTS® SOLAR YELLOW #65 FROM WAUSAU PAPER PRODUCTS** (Stock #22731)

GO TO UTILITIES MENU

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)*, set-up a **Custom Message** *(short-cut to Standard Adjustment 41, Custom Message)*, set-up **Custom Pricing** *(short-cut to Standard Adjustment 18, to the Custom Pricing Sub-Menu)*, set-up 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.

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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).*

//

ABCD CUST MSG 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 :

REMINDER
In these menus:

Press [BACK] to − DECREASE [< $]

Press [SELECT] to + INCREASE [$ >]

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**. Press [+ / >] to + INCREASE to **1 CREDIT AT:**

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

Step 3   Press [**SELECT**] to + INCREASE to **$1.00**. Press [+ / >] to + INCREASE to **2 CREDITS AT:**

```
      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**. Press [+ / >] to + INCREASE to **4 CREDITS AT:**

```
      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'
```

Press [< / −] once *or* press [+ / >] *eleven times until INSTALL appears.*

Step 6   Press [**SELECT**] to INSTALL. Press [< / −] / [+ / >] *or* [BACK] to edit.

```
      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.*

Utilities

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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**.
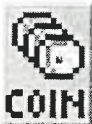
Reset Coin Audits

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 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. *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 "STRT" *Icon*. The **START TOURNAMENT 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 TOURNA-MENT** 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):*

HIGH SCORE:			BUMP N' WIN :		
Set to **01**	1 Winner	**100%** (1) Prize Pool	*Cannot set to 01. Minimum of 2 winners required.*		
Set to **02**	2 Winners	**65%** (1) **35%** (2)	Set to **02**	2 Winners	**65%** (1) **35%** (2)
Set to **03**	3 Winners	**50%** (1) **30%** (2) **20%** (3)	Set to **03**	3 Winners	**50%** (1) **25%** (2) **25%** (3)
Set to **04**	4 Winners	**50%** (1) **25%** (2) **15%** (3) **10%** (4)	Set to **04**	4 Winners	**40%** (1) **20%** (2) **20%** (3) **20%** (4)
Set to **05**	5 Winners	**50%** (1) **20%** (2) **15%** (3) **10%** (4) **5%** (5)	Set to **05**	5 Winners	**40%** (1) **15%** (2) **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.

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

Normal Line:	110v AC - 125v AC @ 60Hz		
Domestic use an 8AMP 250v Slo-Blo Fuse.	**AVG OPERATION**		**MAX OPERATION**
	CURRENT: **2.8AMP**		CURRENT: **8AMP**
	WATTAGE: **329w**		WATTAGE: **940w**
High Line:	218v AC - 240v AC @ 50Hz		
Export use 2x 5AMP 250v Slo-Blo Fuses. (*England & Hong Kong use an 8AMP 250v S/B Fuse.)	**AVG OPERATION**	**MAX OPERATION**	England & Hong Kong use an 8A Fuse.
	CURRENT: **1.8AMP**	CURRENT: **5AMP** | **8AMP***	
	WATTAGE: **412w**	WATTAGE: **1145w** | **1832w***	
Low Line:	95v AC - 108v AC @ 50Hz / 60Hz		
Export Japan Only use an 8AMP 250v Slo-Blo Fuse.	**AVG OPERATION**		**MAX OPERATION**
	CURRENT: **2.6AMP**		CURRENT: **8AMP**
	WATTAGE: **264w**		WATTAGE: **812w**

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 4⅜" to the overall Back Height for a total of 79⅝".*

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

TOURNAMENT PLAY

(+ 4⅜")

27¾"

Back Width

STERN

75¼"

28"

Back Height *

23¾"

47¼"

51½"

22"

55"

Front Height

36"

+1"

Leg Length = 30⅝"

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 1¾" should be added to the respective **Back** or **Front Height** dimensions.

BEFORE TRANSPORTING

SECURE BACKBOX

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:
Wt. 290lbs. (+/- 15)

CAUTION

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

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. Hand-Feed out with Backbox so Cables are not tight.

Step 1.

Unlock the Roto-Lock (Counter-Clockwise)

A

B
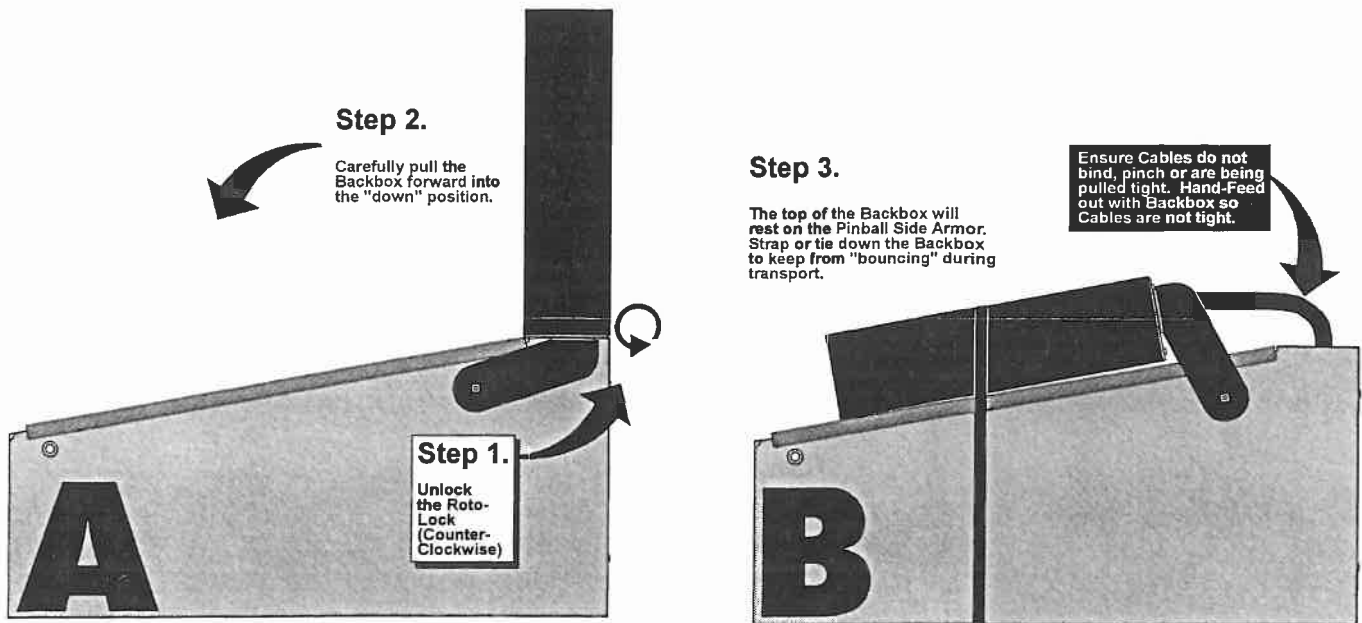
Leg Leveler Adjustment

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

Cabinet Leg

Bubble Level located on the wood rail next to the Shooter Lane.

Bubble

Bubble should be between the 2 black lines.
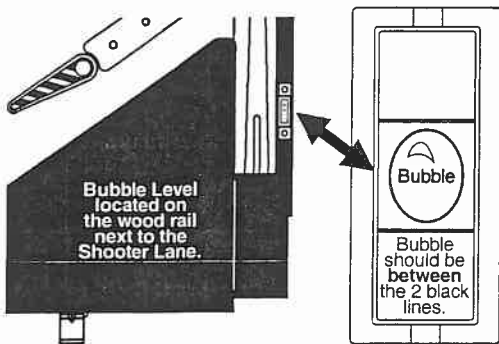
Start adjustment with the leg levelers *turned all the way in.*

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

$\frac{3}{8}$-16 Hex Nut

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.

Leg Leveler turned all the way in.

YOUR PLAYFIELD PITCH IS NOW AT 6.5° AS REQUIRED FOR PROPER GAME PLAY!
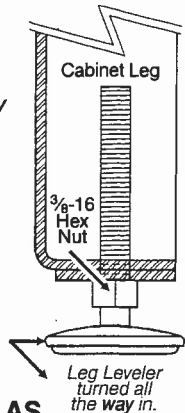
Note: *For custom adjustment greater than >6.5° can be achieved by turning out the rear leg leveler(s), however, **it is not recommended.***

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**);

Fig. 1A

Fig. 1B

LINE OF SIGHT

Fig. 1C

Support Slide Brackets
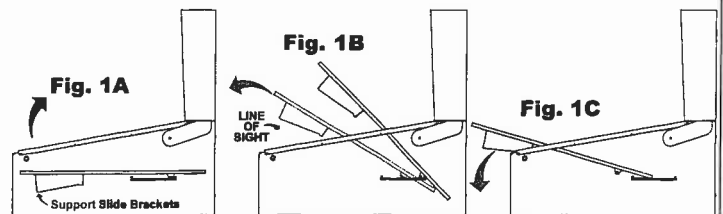
Position 2
With the playfield at rest, hold the sides & pull toward the front of the cabinet *(approx. 6" to 8")*, until resistance is felt from **Edge Slide Brackets** stopping against the **Slide & Pivot Support Brackets** located on either side of the cabinet (**Fig. 2A**). At this time, swivel the playfield toward the Backbox, then rest on the top edge (**Fig. 2B & 2C**).

Fig. 2A

Fig. 2B

Fig. 2C

Slide & Pivot Support Brackets

33
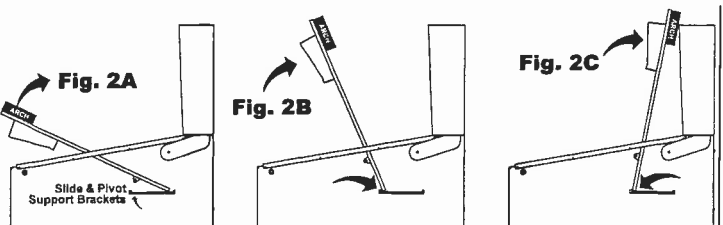
Cabinet Universal Voltage Jumper Plugs *(for use with Universal AC Cable, 036-5530-00 ONLY)*
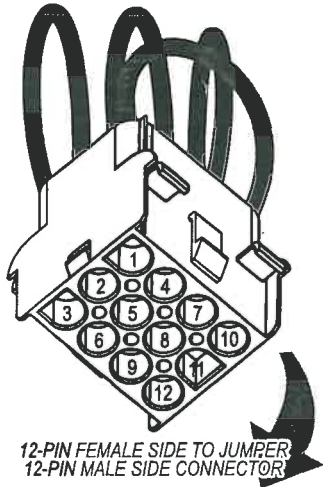
JUMPER PLUG ▼
(SPI PART #036-5530-120)
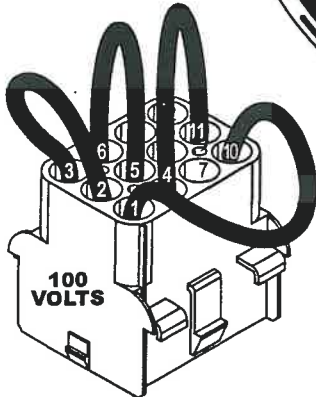**110+VAC**
N. AMERICA
LINE VOLTAGE

115 VOLTS
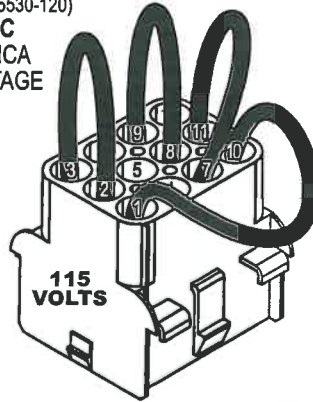
12-PIN FEMALE SIDE TO JUMPER
12-PIN MALE SIDE CONNECTOR

9-PIN MALE SIDE TO TRANSFORMER
9-PIN FEMALE SIDE CONN.

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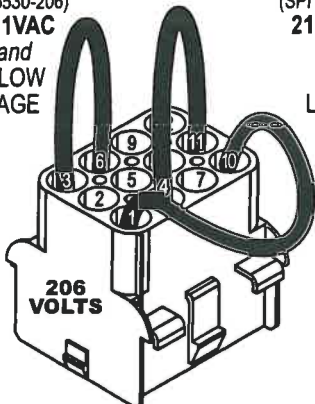9 ORG
10 BLK
11 WHT
12 N/U

12-PIN F/M CONN.
BACK VIEW ▲

9-PIN F/M CONN.
▲ BACK VIEW

100 VOLTS

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

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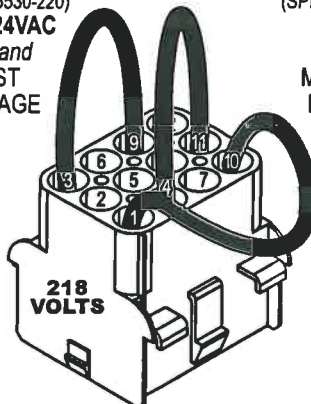
JUMPER PLUG ▼
(SPI PART #036-5530-230)
225+VAC
EUROPE *and*
MID. EAST HIGH
LINE VOLTAGE

230 VOLTS

Cabinet and Coin
Door Wiring
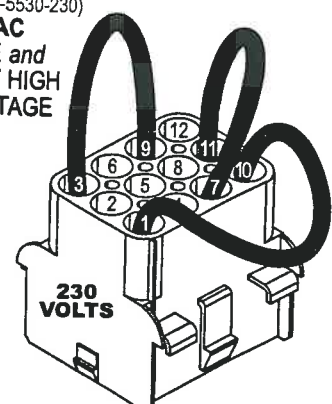
STERN® PINBALL, INC. LIMITED WARRANTY

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.

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CAUTIONS, WARNINGS & NOTICES

CAUTION

⚠️ For safety and reliability, substitute parts and equipment modifications are not recommended *(and may void any 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 a 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.

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

Ⓤ🇱 **603335-7.12.1 (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.

NOTICES

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Dorothy Brown

Parts Sales Supervisor

Patrick Powers

Director of Technical Support

Chas Siddiqi

Technical Support
ENGINEER

STERN PINBALL, INC.

Stern Pinball, Inc. is the only coin-op pinball manufacturer on the planet!

2020 Janice Avenue
Melrose Park, IL 60160
phone: 708.345.7700
fax: 708.345.7813
info@sternpinball.com

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We at STERN Pinball continuously strive to provide our distributors, operators, and game owners with the best technical support possible. We, therefore, have provided you with the service options listed below. If your game requires parts and/or service, please contact your nearest STERN Pinball distributor (See our Distribution List). For any additional assistance, contact our technical service staff at 800-KICKERS (**800-542-5377**) or by e-mail (parts.service@sternpinball.com).

If your STERN Pinball is in need of repair, please contact your nearest STERN Distributor.

Pinball Game Parts
• **2006+** Complete Pinball Service Game Manuals in PDF Format available *(includes parts and schematics)*.
• **2004 — 2005** Select Pinball Service Game Manual Excerpts only : Parts Identification & Location (The Pink Pages), Drawings for Major Assemblies & Ramps (The Blue Pages)
• Appendixes **A — J** *(updated with each game)*

Schematics, Theory of Operation and Troubleshooting Tips
• Current S.A.M. System Games complete Schematic Section
• Archived Drawings for the White Star Board System™

Service Bulletins
• Detailing Technical Information, Tips, FYIs, Notices and Updates

NTE Semi-Conductor Cross Reference

Game Code Library
• Offering S.A.M. System Game Code
• Offering archived White Star Game Code for all Data East®, Sega™ and STERN® Pinballs *(EPROM Programmer required)*

Coinage Cards
• Offering a range of Coinage Cards for download
• Country Setting, Pricing Scheme, Dip Switch Setting *(opens a pop-up window)*
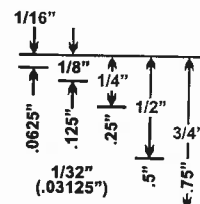• Custom Pricing Demonstration *(for S.A.M. System)*

Tricks & Tips
• *Pinball Machine Foam Cushion Packing*
• *1st Time Pinball Set-Up & Preventative Maintenance*
• *Pinball Location Maintenance*
• *How to Update Your Game Code (S.A.M. System)*

Track Your Order Via UPS
Radio Shack Component Catalogue

Metric Conversion

1/16"
1/8"
1/4"
1/2"
.0625"
.125"
.25"
3/4"
1/32"
(.03125")
.5"
.75"

1" = 2.54 cm or 25.4 mm
1 cm = .3937"
1 mm = .03937"

For metric, multiply the inch value by the metric value:
e.g.: 5" X 2.54 cm = 12.7 cm or 127 mm

For US, multiply the metric value by the inch value:
e.g.: 13 cm X .3937" = 5.1181"

Visit our website **www.sternpinball.com** for Pinball & Redemption game information!

Click **Tech Support & Parts Sales** to view, print or download all of the above!

HELP US, HELP YOU! *If you have any suggestions, questions, need technical advice, find errors or have comments, contact us through our website or call!*

This Game Service Manual and all other documents relating to this product, playfield components, features, rules, programming and operation are subject to change without notice (Service Bulletins, if applicable, available through our website).

CE
Games shipped factory direct to Europe from Stern Pinball, Inc. are CE approved and will have an "E" prefix attached to the Serial Number.

800-KICKERS
⑤④②⑤③⑦⑦

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