

CPU JUMPER TABLE

Game	CPU* Version	ROM Location	Installed	Jumpers	Removed
Laser Wars	Ver 1	5C	J1b,J3,J4,J6a,J7a,&J8	J1a,J2,J5,J6,&J7b	
	Ver 2	5C	J1b,J3,J4,J5a,J6a,J7b,&J8	J1a,J2,J5,J6b,&J7a	
Secret Service	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J6a,&J7a	
Torpedo Alley	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J6a,&J7a	
Time Machine	Ver 2	5B,5C	J1b,J3,J4,J5b,J6b,J7b,&J8	J1a,J2,J5,J6a,&J7a	

*Version 1 has a 2K RAM which is a 24-pin IC at location 5D.
*Version 2 has an 8K RAM which is a 28-pin IC at location 5D.

Power-up CPU Self Tests

Upon power-up, the CPU board performs a series of self tests of major components. Turn the game on while observing the LEDs on the CPU board. Tests of the PIAs, RAM, and EPROMs are performed automatically and results of the test are indicated by the PIA LED.

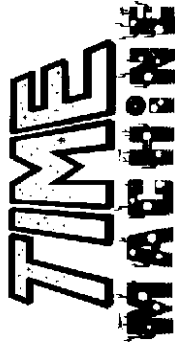
With all tests passed, the LEDs illuminate in the following sequence at power turn-on. The PIA and +5V LEDs illuminate immediately. Approximately 1/2-second later the PIA LED goes out and the Blanking LED illuminates; the +5V and Blanking LEDs remain illuminated until the game is turned off. Test failures are indicated with the PIA LED:

PIA LED	SUSPECT COMPONENT
Stays On	One of the 6821 PIAs
Flashes 1 Time	6064 RAM at location D5.
Flashes 2 Times	EPROM at location B5.
Flashes 3 Times	EPROM at location C5.

QUICK REFERENCE FUSE CHART

PPB BOARD	POWER SUPPLY BOARD
F1 5A Slo-Blo G.I. 6.3VAC	F1 7A Slo-Blo +5VDC Regulator Input (9VAC)
F2 5A Slo-Blo G.I. 6.3VAC	F2 7A Slo-Blo +5VDC Regulator Input (9VAC)
F3 5A Slo-Blo G.I. 6.3VAC	F3 0.25A Slo-Blo Display Reg. Input (90VAC)
F4 5A Slo-Blo G.I. 6.3VAC	F4 8A Slo-Blo Switched Illumination Buss (18VDC)
F5 5A Slo-Blo Flipper Power 48VAC	F5 3A Slo-Blo Solenoid Buss (34VDC)
F6 3A Slo-Blo PPB Solenoids/Flash Lamps (34VDC)	F6 5A Slo-Blo Solenoid Buss (34VDC)

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AUDIT FUNCTIONS

There are 70 audit functions provided for accounting purposes and for evaluation of game difficulty adjustments. Audit functions are split into two groups. There are eleven most-used audits (AU01 through AU11) in a "quick look" group and 58 less-used audits (E AU13 through E AU70), in an "expanded" group. The various auditing functions are summarized in the **AUDITING FEATURES TABLE** and, when accessed, are shown on the player score displays. The *Audit Number* is shown in the Player 3 Display, the *Description* in the Player 1 and 2 Displays, and the *Audit Total* in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

To access audit functions, open the coin door and make sure that the **FORWARD/REVERSE** switch is in the **FORWARD** (up) position. Depress the **STEP** switch and the game name is shown in the Player 1 and 2 displays, the Player 3 display is blank, and the **PROM** revision level is shown in the Player 4 display. This indicates access to audit functions.

With the **FORWARD/REVERSE** push-button switch still in the **FORWARD** (up) position, depressing the **STEP** push-button switch advances through the audit functions one at a time. To review lower-numbered functions, set the forward/reverse push-button switch to the **REVERSE** (down) position and operate the **STEP** push-button switch.

To access expanded audits, operate the step push-button until AU12, **EXPAND AUDITS** is displayed. Set the choice to ON as indicated in the Player 4 display by depressing the **Credit** push-button and then depress the step push-button. The request is installed and E AU13 is displayed. When you exit audits and adjustments, the AU12 setting is returned to off for the next time that a review of audits are required.

Audit totals may be reset to zero using Game Adjustment Ad17, **Audits Reset**. Game adjustments (Ad01 to Ad19 and E Ad20 to E Ad60) begin after the last audit function (AU12 or E AU70). Once audits functions have been recorded, and if no adjustments are required, you may return the game to the attract mode. If adjustments are required, continue pressing the **STEP** button until the game adjustments are reached. See **Game Adjustments** for details.

Audit Number (Player 3 Display)	Audit Description (Players 1 & 2 Displays: Solds in Player 4 Display)	
AU 01	Total Paid Credits	E AU 36
AU 02	Percent Free	E AU 37
AU 03	Average Ball Time	E AU 38
AU 04	Coins Left	E AU 39
AU 05	Coins Right	E AU 40
AU 06	Coins Center	E AU 41
AU 07	Replay Percent	E AU 42
AU 08	High Score Percent	E AU 43
AU 09	Extra Ball Total	E AU 44
AU 10	Extra Ball Percent	E AU 45
AU 11	Cycles Burn In	E AU 46
AU 12	Expand Audits (ON/OFF)	E AU 47
E AU 13	Plays Total	E AU 48
E AU 14	Free Total	E AU 49
E AU 15	Replay Total	E AU 50
E AU 16	Special Percent	E AU 51
E AU 17	Match Total	E AU 52
E AU 18	High Score Awards	E AU 53
E AU 19	Play Time (Minutes)	E AU 54
E AU 20	Balls Total	E AU 55
E AU 21	Replay 1 Awards	E AU 56
E AU 22	Replay 2 Awards	E AU 57
E AU 23	Replay 3 Awards	E AU 58
E AU 24	Replay 4 Awards	E AU 59
E AU 25	Games 1 Player	E AU 60
E AU 26	Games 2 Player	E AU 61
E AU 27	Games 3 Player	E AU 62
E AU 28	Games 4 Player	E AU 63
E AU 29	Cycles Attract Mode	E AU 64
E AU 30	Cycles High Score Reset	E AU 65
E AU 31	Enter 3 Ball	E AU 66
E AU 32	Percent 3 Ball	E AU 67
E AU 33	Percent Lock Ball	E AU 68
E AU 34	1870 Lit	E AU 69
E AU 35		E AU 70
	Return 1970	
	Return 1980	
	Return 1990	
	Return 1950	
	Laser Kick Scored	
	Laser Kick Ball	
	Left Ramp	
	Center Ramp	
	Right Ramp	
	Mini Jackpot Scored	
	Left E = MC ²	
	Right E = MC ²	
	Special Lit	
	Jackpot Scored	
	25K Lanes	
	50K Lanes	
	100K Lanes	
	Bonus Hold	
	Top Extra Ball	
	2x Scores	
	Star Warp Lit	
	Star Warp Scored	
	Drain Left	
	Drain Right	
	2x Bonus	
	3x Bonus	
	4x Bonus	
	5x Bonus	
	Lane Extra Ball	
	1680 Extra Ball	
	Buy in Games	
	Average Game Time	

GAME ADJUSTMENTS

There are 60 adjustable functions provided to vary difficulty of play and to periodically reset audits and the high score levels. The various game adjustments are summarized in the **Game Adjustments Table** and, when accessed, are shown on the player score displays. The **Adjustment Number** is shown in the Player 3 Display, the **Description** in the Player 1 and 2 Displays, and the **Setting** in the Player 4 Display. Access and control is provided from switches located on the inside of the coin door.

Game adjustments are accessed from the audit mode. With the audits displaying game identification and the FORWARD/REVERSE switch in the REVERSE (down) position, depress the STEP switch and E Ad60 (Expanded Adjustment 60) is shown in the Player 3 display. FACTORY RESET is shown in the Player 1 & 2 displays and OFF is shown in the Player 4 display. With the audits displaying AU12 (or expanded E Ad70) and the FORWARD/REVERSE switch in the FORWARD (up) position, depress the STEP switch and Ad01 is shown in the Player 3 display, REPLAY MANUAL/FIXED is shown in the Player 1 and 2 displays, and the setting is shown in the Player 4 display.

With the FORWARD/REVERSE switch in the FORWARD (up) position, depressing the STEP switch advances through the game adjustments one at a time. With it in the REVERSE (down) position, the STEP switch selects lower-numbered adjustments. To rapidly scroll through adjustments, hold the STEP switch depressed. Adjustment values are changed by operating the GAME START switch. The FORWARD/REVERSE switch setting determines whether the values are increased or decreased (With the FORWARD/REVERSE switch up, the value increases, with it down, the value decreases). When the STEP switch is depressed the Player 1 and 2 displays indicate REQUEST INSTALLED.

CUSTOM PRICING TABLE

Coin Mechs			Adjustment Numbers								
Left	Right	Center	Plays/Coins		14	19	38	39	40	41	42
25c	25c	\$1.00	1/25c 3/50c		Custom	ON	01	01	04	01	02
			1/25c 5/\$1.00		Custom	ON	01	01	04	01	04
			1/25c/ 6/\$1.00		Custom	ON	05	05	20	04	20
5SCH	10SCH	10SCH	1/10 SCH		Custom	ON	01	02	02	02	00
			1/10 SCH 4/30SCH		Custom	ON	04	08	08	06	00
20c	\$1.00	--	1/20c		Custom	ON	01	05	00	01	00
			1/50c 2/\$1.00		Custom	ON	01	05	00	03	05
10P	10P	50P	1/10P 6/50P		Custom	ON	01	01	05	01	05
			1/20P 3/50P		Custom	ON	01	01	05	02	05

INSTALL ADJUSTMENT TABLE

Install Adjustment	Ad 05 Extra easy	Ad 07 Easy	Ad 08 Factory	Ad 09 Hard	Ad 10 Extra Hard
E Ad 49 General Scores	EASY	FACTORY	FACTORY	FACTORY	HARD
E Ad 50 General Timer	EASY	EASY	FACTORY	FACTORY	HARD
E Ad 51 General Spotting	EASY	EASY	FACTORY	FACTORY	HARD
E Ad 52 General Memory	EASY	FACTORY	FACTORY	HARD	HARD
E Ad 53 Starwarp Memory	HOLD	HOLD	HOLD	1 PLAYER	RESET
E Ad 55 Extra Ball 1950	ON	ON	ON	OFF	OFF
E Ad 56 Extra Ball 6x	ON	ON	ON	ON	HARD
E Ad 57 Lane Percent	EASY	FACTORY	FACTORY	HARD	HARD
E Ad 58 Laser Kick	EASY	EASY	FACTORY	HARD	HARD

GAME ADJUSTMENT TABLE

Adjustment Number (Player 3)	Description (Players 1 & 2)	Factory Setting (Player 4)
Ad 01	REPLAY/MANUAL	1000
Ad 02	START REPLAY/LEVEL 1 REPLAY	2010
Ad 03	LEVEL 3 REPLAY	1,000,000
Ad 04	LEVEL 4 REPLAY	01
Ad 05	EASY RULES	OFF
Ad 06	EASY RULES	OFF
Ad 07	EASY RULES	ON
Ad 08	HARD RULES	OFF
Ad 09	HARD RULES	OFF
Ad 10	NOVELTY RULES	OFF
Ad 11	NOVELTY RULES	OFF
Ad 12	5 BALL RULES	OFF
Ad 13	ADDBALL RULES	OFF
Ad 14	STANDARD/CUSTOM PRICING	LIGHT CUSTOM
Ad 15	AVERAGE BALL TIMER	ON
Ad 16	COIN RESET	OFF
Ad 17	COIN RESET	OFF
Ad 18	HIGH SCORE RESET	OFF
Ad 19	EXPAND ADJUSTMENTS	OFF
E Ad 20	AWARDS REPLAY	OFF
E Ad 21	AWARDS SPECIAL	CREDITS
E Ad 22	MATCH FEATURE	ent 01c
E Ad 23	BALLS/GAME	03
E Ad 24	WARNING TILT	01
E Ad 25	MAXIMUM EXTRA BALL	30-1
E Ad 26	CREDITS MAXIMUM	30
E Ad 27	SCORES HIGHEST	ON
E Ad 28	CREDITS HSCR 1	03
E Ad 29	CREDITS HSCR 2	00
E Ad 30	CREDITS HSCR 3	00
E Ad 31	CREDITS HSCR 4	00
E Ad 32	BACKUP HSCR 1	5,000,000
E Ad 33	BACKUP HSCR 2	4,000,000
E Ad 34	BACKUP HSCR 3	3,000,000
E Ad 35	BACKUP HSCR 4	2,500,000
E Ad 36	HSCRESET EVERY	700
E Ad 37	FREE PLAY	OFF
E Ad 38	LEFT COIN PULSES	1
E Ad 39	RIGHT COIN PULSES	30
E Ad 40	CENTER COIN PULSES	1
E Ad 41	PULSES FOR CREDIT	---
E Ad 42	PULSES FOR BONUS CREDIT	---
E Ad 43	MESSAGE CUSTOM	ON
E Ad 44	TEXT	ON
E Ad 45	ATTITUDE MUSIC	ON
E Ad 46	FEATURE	ALL
E Ad 47	CHIMES	ON
E Ad 48	FLASH LAMPS	ON
E Ad 49	GENERAL SCORES	FACTORY
E Ad 50	GENERAL TIMER	FACTORY
E Ad 51	GENERAL SPOTS	FACTORY
E Ad 52	GENERAL MEMORY	FACTORY
E Ad 53	STARWARP SCORES	FACTORY
E Ad 54	STARWARP MEMORY	1,000,000
E Ad 55	EXTRA BALL 1950	ON
E Ad 56	EXTRA BALL 5x	ON
E Ad 57	LANE PERCENT	ON
E Ad 58	LASER KICK	FACTORY
E Ad 59	KLACKER WARNING	ON
E Ad 60	FACTORY RESET	OFF

GAME DIAGNOSTICS

The Data East Pinball system provides tests for sounds, digital displays, lamps, switches, and solenoids. Each feature may be tested manually or automatically using the STEP and FORWARD/REVERSE push-button switches inside the coin door and the Game Start push-button switch on the front of the cabinet. The automatic tests may be used for a quick verification of automatic test functions and the manual tests, for troubleshooting.

ENTERING DIAGNOSTICS

With the game in the game-over mode, open the coin door and make sure that the FORWARD/REVERSE push-button switch is set to REVERSE (down) and depress the STEP push-button switch. The Player displays will show the tollfree Customer Service number 1-800-KICKERS; that is 1-800-542-5377 (outside Illinois) and the toll number (312) 345-7700 (inside Illinois). This indicates entry into game diagnostics.

SOUND TESTS

The Data East Pinball sound system produces true digital stereo sound on left and right speakers and mono on a center speaker. During Sound tests, the Player 1 and 2 displays show the sound board circuit under test and the corresponding sounds are produced. Refer to the Sound Test Chart for the sound circuits displayed and the sounds produced.

The sine wave functions allow verification that all channels are functioning properly and that the speaker connections are correct. Speaker Phase Testing procedures follow for checking speaker connections.

SOUND TEST CHART

Auto/Manual Tests (Player 1 & 2)	Sounds Produced
LEFT SINE CENTER SINE VOICE ROM1 (Loc F6) VOICE ROM2 (Loc F4) MUSIC TEST (Sound ROM Loc F7)	60 CYCLE TONE (Left Speakers Only) 60 CYCLE TONE (All speakers) PRESS. FIELD; NEAT-O SEE YA LATER ALLIGATOR PSYCHEDELIC MAN...70'S, GAG ME WITH A, FAR OUT! MUSIC

Automatic Test

With Customer Service telephone numbers displayed, depress the STEP push-button switch. Player 1 and 2 displays indicate SOUNDS AUTO and the system sequences through the test producing the sounds indicated in the Sound Test Chart.

Manual Test

Operate the STEP push-button switch during the Automatic tests until SOUNDS MANUAL is indicated in the Player 1 and 2 displays. Depressing the Game Start push-button switch allows you to advance through each sound function.

DIGITAL DISPLAY TEST

Digital displays are driven by digit and segment driver circuits. Digit drivers sequentially select individual character positions (Player 1 and 2 displays) and digit positions (Player 3 and 4 displays). Segment drivers (16 for Player 1 and 2 characters; 7 for Player 3 and 4 digits) select the individual segments of each position.

Automatic Test

To enter Display tests, operate the STEP push-button switch from the Sound Manual test. Player 1 and 2 displays indicate DISPLAY AUTO. The displays will sequence from all ZEROS to all nines in the four displays. Next all segments are lit for each digit position in sequence.

Manual Test

Operate the TEST push-button switch from the automatic test. Player 1 and 2 displays indicate DISPLAY MANUAL and then display ZEROS in all positions. Operate the Game Start push-button switch to cycle through each position of the test.

Switches

Switches are configured on an 8 x 8 matrix of columns (switch drives) and rows (switch returns) with up to 64 switches possible. The switch tests include three parts: switch test, active switches, and bad switches. Row and column wire colors are indicated in each test using corresponding resistor color code numbers.

0 = Black
1 = Brown
2 = Red
3 = Orange
4 = Yellow

5 = Green
6 = Blue
7 = Violet
8 = Grey
9 = White

From the Display Manual test, operate STEP push-button switch. Player 1 and 2 displays indicate SWITCH TEST. Close each switch and observe the displays. The Player 1 and 2 displays will indicate the switch name. When a switch is released, the name and number disappear until another switch is closed or the test is exited.

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate ACTIVE SWITCHES. If any switches are stuck closed (or made from the presence of a ball), the Player 1 and 2 displays sequence through the switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until all switches are cleared or until the STEP push-button switch is depressed.

Operate the STEP push-button switch from the Switch Test. Player 1 and 2 Displays indicate BAD SWITCHES. During game play, the system keeps track of the last game in which each switch was made. Should a switch not be made for 100 games, it is considered to be bad. If there are any, the Player 1 and 2 displays sequence through the switch names, the Player 3 display indicates the row and column wire colors, and the switch numbers are indicated in the Player 4 display. This cycle continues until the STEP push-button switch is depressed.

Exploded view diagram of the front of a vehicle chassis. The diagram shows various components numbered 1 through 28. The components include the engine (1), transmission (2), and various suspension and steering parts. The diagram is oriented vertically with the front of the vehicle at the top.

SWITCH MATRIX CHART

[illegible]

2

DIAGNOSTICS

LAMP TESTS

Controlled lamps are configured on an 8 x 8 matrix of columns (lamp drivers) and rows (lamp returns) with up to six lamps possible. The lamp tests include four cards: all lamps (lamp return row), lamp drive (column), and discrete lamps. Row and column wire colors are indicated in the discrete lamp test using corresponding resistor color code numbers.

All Lamps

From the Back Switch test, operate the STEP push-button switch. Player 1 and 2 displays indicate ALL LAMPS and all controlled lamps will light.

Lamp Returns

From the ALL LAMPS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP ROWS and the Player 4 display indicates 01 for row 1. All controlled lamps in row 1 should be lit. Operating the Game Start push-button switch cycles through each of the rows separately.

Lamp Drives

From the LAMP ROWS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP COLUMNS and the Player 4 display indicates 01 for column 1. All controlled lamps in column 1 should be lit. Operating the Game Start push button switch cycles through each of the columns separately.

Discrete Lamp

From the LAMP COLUMNS test, depress the STEP push-button switch. Player 1 and 2 displays indicate LAMP TEST and then the name assigned to lamp 01; the Player 1 and 2 displays indicate the lamp name, the Player 3 display indicates the row and column wire colors, and the Player 4 display indicates 01. Lamp 01 should light. With the FORWARD/REVERSE push button switch in the FORWARD (up) position, operating the Game Start push-button switch selects higher-numbered lamps; with in the REVERSE (down) position, Game Start selects lower-numbered lamps.

Lamp Description

Lamp Number

01* Starwarp

02* Starwarp

03* Starwarp

04* Starwarp

05* Starwarp

06* Starwarp

07* Starwarp

08* Starwarp

09 Center Square

10 Center Circle

Center Triangle

Left Ramp 1970

Left Ramp 1960

Left Ramp 1950

5X

4X

Special

3 Ball Jackpot

Left Ramp E - MC²

Left Mini Jackpot

Center Mini Jackpot

Right Mini Jackpot

3X

2X

2X All Scores Ctr Playfield

Extra Ball Back Panel

Bonus Hold Back Panel

100K Back Panel

50K Back Panel

25K Back Panel

Targets Light Special

2X All Scores

Left Triangle

Left Circle

Left Square

Left Extra Ball

Laser Kick

Left Return

Extra Ball Center Playfield

Bonus Hold Center Playfield

Right Square

Right Circle

Right Triangle

Right Hexog

Right Return

Right Extra Ball

Left Hexog

Starwarp Center Playfield

Lane 1

Lane 2

Lane 3

Left Pop Bumper

Center Pop Bumper

Right Pop Bumper

1980

1970

Top Right Arrow

Right Ramp E - MC²

Right Ramp 1960

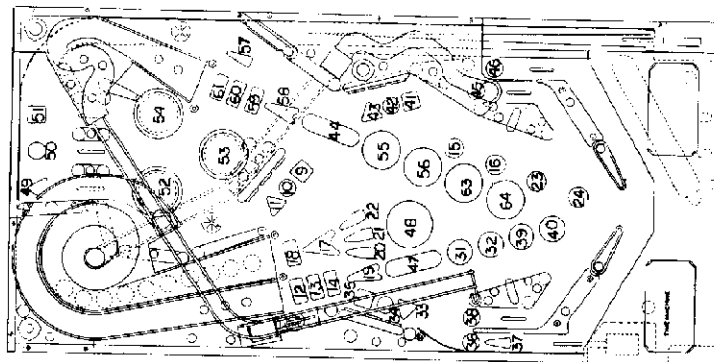
Right Ramp 1950

Engine

1960

1950

*Indicates Insert Lamp



LAMP MATRIX CHART

ROW COLUMN (*)	1 VEL-BRN (41)	2 VEL-RED (42)	3 VEL-ORN (43)	4 VEL-BLK (40)	5 VEL-BRN (45)	6 VEL-BLU (46)	7 VEL-VIO (47)	8 VEL-GRY (48)
1	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9	Starwarp Center Square 9
2	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10	Starwarp Center Circle 10
3	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11	Starwarp Center Triangle 11
4	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12	Starwarp Center Mini 12
5	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13	Starwarp Center Mini 13
6	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14	Starwarp Center Mini 14
7	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15	Starwarp Center Mini 15
8	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16	Starwarp Center Mini 16

(*) 2 DIGIT NUMBER IN PARENTHESES INDICATES RESISTOR COLOR CODE NUMBER DISPLAYED DURING DIAGNOSTICS

COIL TESTS

Sixteen regular (pulsed under microprocessor control) and six switch-triggered coil drivers are provided to switch ground to coils. Coil number 10 is used in conjunction with drives 1 through 8 to switch +34 volts between coils or flash lamps; these sets are termed "left" and "right". Coil number 10 is located on the PPB board which provides isolation diodes and current limiting and heater resistors. This effectively provides 23 regular coils.

Automatic Test

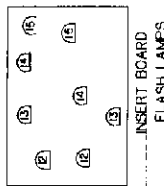
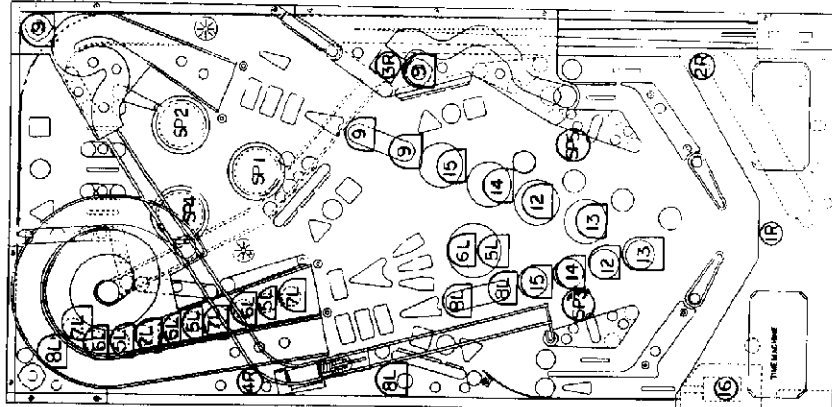
From the Discrete Lamps test, depress the STEP push-button switch. Player 1 and 2 displays indicate COIL TEST. The test pulses each regular solenoid or flash lamp sequentially with the coil/flash lamp name indicated in the Player 1 and 2 displays and the drive number in the Player 4 display.

Select Coil

From the Coil Test, depress the STEP push-button switch. Player 1 and 2 displays indicate SELECT COIL and then the name of drive 1L, the drive number is indicated in the Player 4 display. Operate the Game Start push-button switch to select the coil or flash lamp to be tested. With the desired drive number indicated in the Player 4 display, depress the STEP push-button switch to cause it to be pulsed repeatedly.

RETURN TO GAME OVER

From the Select Coil test, depress the STEP push-button switch one time if a selected coil is pulsing or two times more is pulsing. The game returns to the game-over mode.



SWITCH TRIGGERED SOLENOIDS

Coil Number	Coil Description	Control Line (CPU to Coil)	Power Line (PS to Coil)	Trigger Line (CPU to Coil)	Driver Transistor (CPU 122)	Coil Type
SP1	Center Pop Bumper	BLU-ORN 3	RED PS ORN 3	ORN-BLK CPU CH 16.2	Q8	23 800
SP2	Right Pop Bumper	BLU-RED 4	RED PS RED 4	ORN-BLK CPU CH 16.2	Q9	23 800
SP3	Left SingShot	BLU-YEL 4	RED PS YEL 4	ORN-BLK CPU CH 16.3	Q10	23 800
SP4	Left Pop Bumper	BLU-ORN 5	RED PS ORN 5	ORN-YEL CPU CH 16.4	Q11	23 800
SP5	Right SingShot	BLU-ORN 6	RED PS ORN 6	ORN-BLK CPU CH 16.5	Q12	23 800
SP6	NOT USED	BLU-ORN 7	RED PS ORN 7	ORN-BLK CPU CH 16.6	Q13	23 800

FLIPPER SOLENOIDS

Coil Description	Flipper GND (CPU to Coil)	Power Line (PS to Coil)	Coil Type
Left Flipper	ORN-BLU CPU CH 16.2	BLU-GRY 1M/24	23 750/OL-2600
Right Flipper	ORN-RED CPU CH 16.1	BLU-VIO 1M/21	23 750/OL-2600

TIME MACHINE COIL PART NUMBER CHART

QUANTITY USED	COIL TYPE	DATA EAST PART NUMBER
1	23 800	000 501 00
2	23 800	000 502 00
2	23 800	000 503 00
3	23 800	000 504 00
	23 750/OL-2600	000 501 00
	23 750/OL-2600	000 502 00
	23 750/OL-2600	000 503 00
	23 750/OL-2600	000 504 00

TOP

