

PRELIMINARY OWNER/OPERATOR'S SECTION

FIREBALL CLASSIC

Bally

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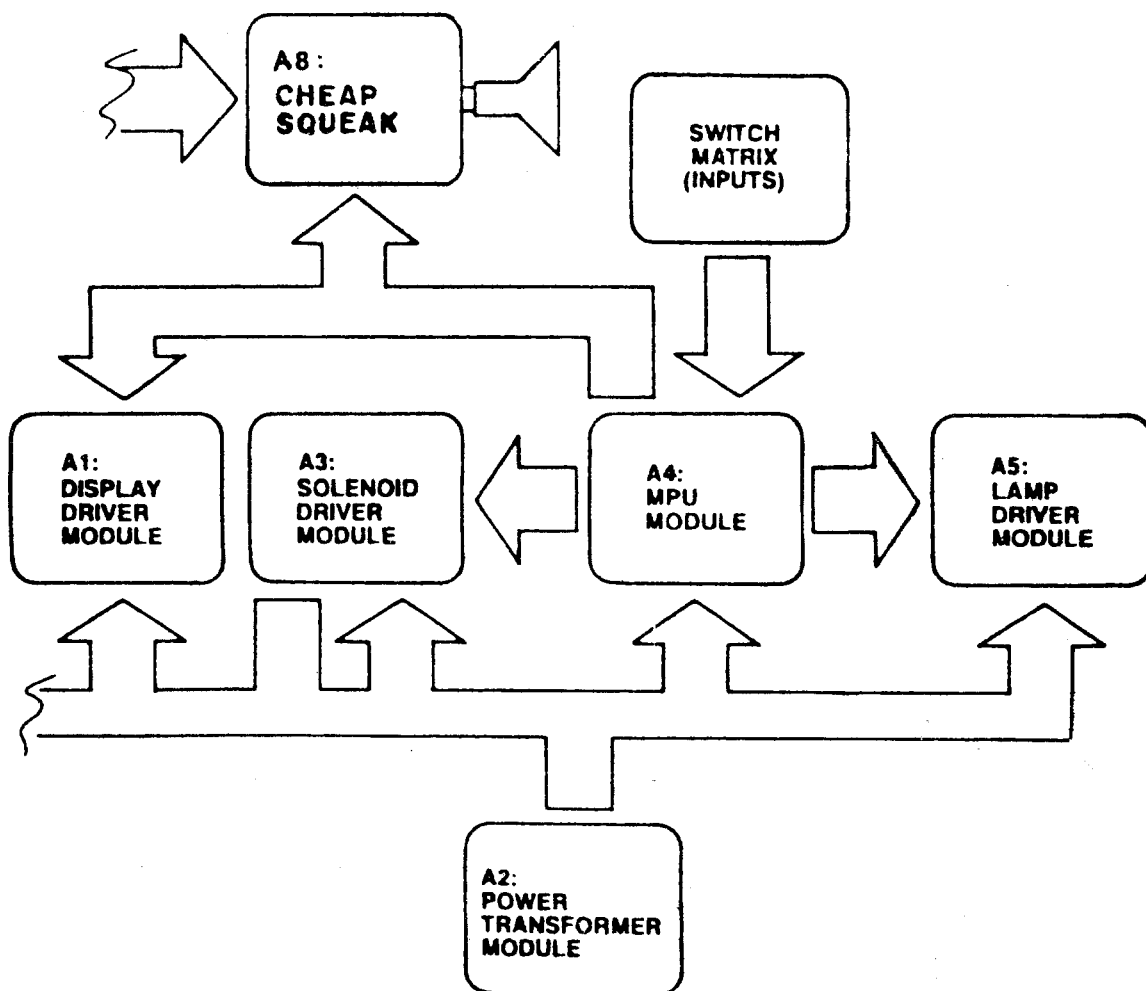
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OWNER/OPERATOR'S SECTION

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BLOCK DIAGRAM-ELECTRONIC PINBALL GAME



BOOKKEEPING FUNCTION QUICK REFERENCE

- 01 High Score Threshold #1 - See Page 8
- 02 High Score Threshold #2 - See Page 8
- 03 High Score Threshold #3 (if used) -
See Page 8
- 04 High Score to Date Register - See Page 8
- 05 Current Credits - See Page 3
- 06 Total Plays - See Page 3
- 07 Total Replays - See Page 3
- 08 Game Percentage - See Page 3
- 09 Total Times "High Score to Date" is
Beaten - See Page 3
- 10 Coins Dropped Thru Coin Chute #1 (Left) -
See Page 3
- 11 Coins Dropped Thru Coin Chute #2 (Middle)-
See Page 3
- 12 Coins Dropped Thru Coin Chute #3 (Right) -
See Page 3
- 13 Number of Specials Awarded Only From
Playfield Features - See Page 3
- 14 Total Number Minutes of Game Play -
See Page 3
- 15 Number of Service Credits - See Page 3
- 16 Playfield Special Award Feature -
See Page 6
- 17 High Score Special Award Feature -
See Page 6
- 18 Sound Option - See Page 7 (Sound Options
& Feature Options)
- 19 High Score to Date Award Feature -
See Page 6
- 20 Not used
- 21 Not used

BACK BOX ADJUSTMENTS

Each game has thirty-two switches located on the MPU module, located in the backbox, that allows play to be customized to the location (See Fig. 3). Credits per coin, maximum credits, credit display, balls (3 or 5) per game, match feature, high game feature special award, are selectable by means of switches. The switches are contained in four-sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The "On" position is marked on the assembly. **TURN OFF POWER BEFORE MAKING ADJUSTMENTS, MAKE ADJUSTMENTS BEFORE TURNING POWER BACK ON.**

FIREBALL FIXED SWITCH ADJUSTMENT

- 32 Balls Per Game - See Page 6
- 31 Balls Per Game - See Page 6
- 30 Attract Sound - See Page 7
- 29 1 Credit Awarded Per Player Per Game -
See Page 7
- 28 Match Feature - See Page 6
- 27 Credit Display - See Page 6
- 26 Maximum Credits - See Page 5
- 25 Maximum Credits - See Page 5
- 24 Ball on Playfield - See Page 7
- 23 Ball(s) Kicked From Saucer at Game Over-
See Page 7
- 22 Boop Ball Arrow On With Multiplier -
See Page 7
- 21 Boop Ball Arrow On With Multiplier -
See Page 7
- 20 Middle Coin Chute #2 Adjustment -
See Page 5
- 19 Middle Coin Chute #2 Adjustment -
See Page 5
- 18 Middle Coin Chute #2 Adjustment -
See Page 5
- 17 Middle Coin Chute #2 Adjustment -
See Page 5
- 16 Recall Bonus - See Page 7
- 15 Lane Specials Per Game - See Page 7
- 14 Bonus Special Per Game - See Page 7
- 13 Right Coin Chute #3 Adjustment -
See Page 5
- 12 Right Coin Chute #3 Adjustment -
See Page 5
- 11 Right Coin Chute #3 Adjustment -
See Page 5
- 10 Right Coin Chute #3 Adjustment -
See Page 5
- 09 Right Coin Chute #3 Adjustment -
See Page 5
- 08 Initial Bonus Special With 50K Thru 200K-
See Page 7
- 07 Initial Bonus Special With 50K Thru 200K-
See Page 7
- 06 Additional Special With 50K or 100K -
See Page 7
- 05 Left Coin Chute # Adjustment - See Page 5
- 04 Left Coin Chute # Adjustment - See Page 5
- 03 Left Coin Chute # Adjustment - See Page 5
- 02 Left Coin Chute # Adjustment - See Page 5
- 01 Left Coin Chute # Adjustment - See Page 5

DETACHING OF PIN-GAME BACK BOX

When the back box is in an up-right position and the 3/8" hold-down bolts are removed, the back box can be removed from the main cabinet by lifting the right corner of the back box (about 3/4") and pulling it slightly towards you. Now both hinges are disengaged and the back box can be removed.

I. INSTALLATION

Assemble the game as follows:

Bolt legs to cabinet. Bolt back box to cabinet. Use flat washers under bolt heads. Gently feed cable connectors and ground braid through cable port in back box. Screw ground braid to braid in back box. Carefully and fully insert connectors on printed circuit assemblies.

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable connectors may be loosened, switches (especially tilt switches) may go out of adjustment. Plumb bob tilt switch should always be adjusted after game is set on location and leg levelers are adjusted.

Visual inspections before plugging in line cord:

1. Check that all cable connectors are completely seated on printed circuit assemblies.
2. Check that cables are clear of all moving parts.
3. Check for any wires that may have become disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could cause shorting of contacts.
5. Check wires on coils for proper soldering. Cold solder connections may not show up in factory inspection, but vibration in shipment may break contact.
6. Check that fuses are firmly seated and making good contact.
7. Check the transformer for any foreign material shorting across wiring lugs.
8. Check wiring of transformer to correspond to location voltage. See figure 1.

Check adjustment of the three (normally open) tilt switches:

1. Panel tilt on bottom of playfield panel.
2. Plumb bob tilt on left side of cabinet near front door.
3. Ball tilt above plumb bob tilt. Insert the smaller ball (15/16" dia.) into the ball tilt assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

TRANSFORMER CONNECTION INSTRUCTIONS

REFER TO POWER SUPPLY SCHEMATIC
IN GAME MANUAL FOR TABLE "A"

115 VAC, 2-8, 3-6, 7-10
120 VAC, 2-8, 4-6, 7-11
220 VAC, 4-8, 7-9
240 VAC, 4-8, 7-11

PART OF POWER TRANSFORMER MODULE A2,
LOCATED IN LOWER CABINET

II. GENERAL GAME OPERATION

Place ball into playfield by outhole.

Coin game. Coin should be rejected. Plug in line cord. Move power ON-OFF master switch at bottom right front corner of cabinet to "ON" position. The game will play a power-up tune to announce game-readiness. Drop targets are reset, scores are set to zero, alternating with the "High Score to Date", and the game is ready for play. Coin game. The game should accept the coin and post credits* for coins accepted (adjustable). Pressing the credit button on the door will cause the outhole kicker to serve the ball to the shooter alley. A game-up tune* is played to announce play-readiness.

One player is posted each additional time the credit button is pressed (one to four can play). The credits are reduced by one each time the credit button is pressed until the credits are reduced to zero.

Shooting the ball initiates play.

The game awards all points earned by the player. If spinner is turned and scoring when the ball hits a target, the spinner and the target scores are awarded.

When the ball enters the outhole, the bonus score is added to the total score. The player-up and/or ball in play on the back box is advanced one position. The outhole kicker serves the ball to the shooter alley and play is resumed. This continues until each player has played the allowable number of balls per game (adjustable). At this time 'Game Over' light is lit. A random Match* number appears and the "Match" light is lit. If the number is the same as the last two digits in a player's score, a free game is awarded.

Extra balls won during the course of the game are played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play on the back box are not advanced for extra ball play. Bonus score is added to the player's score before the game serves the extra ball for play.

Scoring over 10,000,000 gives "High Score to Date" award.

At the end of the game, a "High Score to Date" is alternately flashed with all 4 player scores. If the "High Score to Date" is beat, this feature* awards

* Some tunes and features can be disabled by operator if so desired. See Back Box Adjustments.

NOTE: Scoring and feature units will differ from game to game.

free games.

Tilting the game results in loss of a ball. The flippers, thumper bumpers, etc., go 'dead'. Bonus points are not scored. The purpose of the tilt penalty is to discourage the player from jostling the machine in an attempt to prolong play. Game action becomes normal after the ball kicker assembly serves the ball to the shooter alley.

Slamming the machine results in loss of the game. All feature lights go out, the game goes "dead", and a time delay occurs. The purpose of the time delay is to discourage unnecessary abuse of the machine. After the delay, the "Game Over" light lights and the power-up tune is played. The time delay occurs anytime one of the slam switches is made to contact. There are two factory installed slam switches, one on the front door, and one on the left side of the cabinet. (Any number of slam switches could be installed by the operator, to meet his individual requirement.) The switch should be adjusted to have approximately 1/16" gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

III. BOOKKEEPING FUNCTIONS

The game is designed to help the operator perform certain accounting functions. The game can display the number of total plays and replays (free games). It can display the number of coins dropped down each coin chute. The bookkeeping functions are displayed on all player score displays simultaneously. An identification number, 05 to 15, appears on the Match/Ball in Play window as follows:

- 05 - 00 to - 40 = Current Credits
- *06 - 10000 to -99999 = Total Plays (Paid & Free Games)
- *07 - 10000 to -99999 = Total Replays (Free Games)
- 08 - 00 to -99999 = Game Percentage
- 09 - 00 to -99999 = Total times "High Score to Date" is beat
- *10 - 10000 to -99999 = Coins Dropped thru Coin Chute #1
- *11 - 10000 to -99999 = Coins Dropped thru Coin Chute #2**
- *12 - 10000 to -99999 = Coins Dropped thru Coin Chute #3**
- *13 - 00 to -99999 = Number of Specials awarded from Playfield Specials Only
- *14 - 00 to -99999 = Number of minutes of Game Play (Total)
- *15 - 00 to -99999 = Number of Service Credits

The game displays the first bookkeeping entry if the Self-Test button (See Fig. III) on the inside of the front door is pressed ten times. Alternately push and release the Self-Test button at one second intervals. The number 05 appears in the "Match/Ball in Play" window. Current credits appear on the player score displays. Each additional press of the button causes the next entry to be displayed.

After the data in each bookkeeping register is recorded, it can be set to zero simply by pressing switch button S33, located on A4, the MPU module in the back box (See Fig. III), or by pressing the Coin Chute #3 switch. Any or all registers can be cleared by alternating between the Self-Test button and the switch button S33 on the MPU module or Coin Chute #3 switch. The operator is given this option as a possible convenience and can elect to use or not use it as his needs direct.

Pressing the button 5 more times causes the game

* The 10,000 level is pre-set at the factory; can be set to zero, initially, if desired.

** If Coin Chute is not used in game, number displayed (if other than 00) on Player Score displays has no significance.

to play the power-up tune and light the Game Over light.

Service credits are designed to allow the serviceman to test the game under actual play conditions without disturbing the bookkeeping records that reside at identification numbers 06, 07, 10, 11 and 12.

To obtain Service Credits, push and release the Self-Test switch until identification number 05 appears in the "Match/Ball in Play" window. Hold in the Credit button until the desired number of Service Credits (up to five) appears on the player score displays.

NOTE: If, upon accessing identification number 05, a number of credits greater than five is displayed, pressing the credit button has no effect.

Identification number 15 is reserved as a record of the total number of Service Credits obtained.

NOTE: If "Total Play" register is reset to zeroes then "Total Replays" register should also be reset to zeroes to maintain the game percentage value.

IV FEATURE OPERATIONS & SCORING

A) TOP RAMP (Skill Shot) scores 50,000 pts., advances Bonus 3 steps and flashes two Top Bumper lites to score 3,000 pts. each.

B) LOWER RAMP (Skill Shot) Scores 20,000 pts. and lites two Top Bumpers to score 1,000 pts. each.

C) WOTAN HOLE (Captive Ball) Feature:

When a ball goes into the Wotan Hole, another ball is released from the ball trough to the Shooter Lane and the same player continues to play. The ball in the Wotan Hole remains captive until the Wotan Mushroom-Bumper is hit, or until the target in left lane is hit by a permanent Captive Ball. When the ball is released from the Wotan Hole, all Playfield Score Values will be doubled, and if the gate at the bottom of the Shooter Lane is open, the ball is returned to the Shooter Lane, the gate closes, and the same player continues to play. If the gate is closed, the ball is returned to playing area of the Playfield.

D) ODIN HOLE (Captive Ball) Feature:

When a ball goes into the Odin Hole another ball is released to the Shooter Lane and the same player continues to play. The ball in the Odin Hole remains captive until the Odin Mushroom-Bumper is hit, or until the target in the left lane is hit by a permanent Captive Ball. The ball in the Odin Hole will flash the Odin Hole score lites. When the Captive Ball is released, the flashing lites stop and the game will score the lighted score. All Playfield Score Values will be doubled when the Odin Hole Ball is released.

E) LEFT LANE (Permanent Captive Ball) Feature:

The ball in the left Lane is activated when hit by another ball. The target at the top releases both Captive Balls in the Wotan and/or the Odin Holes and opens the gate at the bottom of the Right

Shooter Lane, plus it lites the Multipliers (2X-3X and 5X) and when the target Special Arrow is lit (when the target switch is activated) it will light the Right Outlane Arrow to score Special. In addition the target scores 30,000 pts. every time it is hit. All Playfield Score Values will be tripled when the Odin and the Wotan Balls released at the same time.

F) ON KICKER FEATURE:

The "On Kicker" is located at the Left Out Roll-Over Alley, and operates when "On Kicker" lite is flashing and the ball actuates the Left Out Roll-Over, the ball is kicked back into play area of the Playfield instead of going into the Outhole. "On Kicker" feature as activated by the "On Kicker Roll-Over Button" (top button above spinning rubber disc) and de-activated by "Off Kicker Roll-Over Buttons" (2) (lower left and right of spinning disc).

G) DOUBLE PLAYFIELD SCORE VALUE FEATURE:

All Playfield Score Values are doubled when 2 balls are on Playfield simultaneously and while the Double Score Value lite is flashing.

H) TRIPLE PLAYFIELD SCORE VALUE FEATURE:

All Playfield Score Values are tripled when 3 balls are on Playfield simultaneously and while triple Playfield Score Value is flashing.

I) BONUS SCORE FEATURE:

Outhole scores 5,000 pts. for each lit bonus lite times Multipliers if any.

J) SPECIAL REPLAY/X-BALL/NOVELTY MODES:

Self-Test positions 16 and 17 give the operator flexibility to award a replay ball or score (Novelty) when a special is scored. A combination of X-Ball, Novelty can be obtained through the following chart:

Self-Test position 16 Playfield X-Balls and Specials	Set to "03"	Set to "02"	Set to "01"
Bonus Special	AWARD	AWARD	AWARD
Right Lane Special	REPLAY	NO AWARD	50,000
Fire Ball Bonus Special	REPLAY	NO AWARD	50,000
Self-Test position 17 Scoring Thresholds	Set to "03"	Set to "02"	Set to "01"
	AWARD	AWARD	AWARD
	REPLAY	NO AWARD	25,000

V. GAME ADJUSTMENTS

A. PLAYFIELD PANEL POST ADJUSTMENTS:

Posts that control left and right outlane opening on panel can be removed to make access to outlanes easier or harder for ball to enter. See Figure II.

Easier entry will decrease playing time and scoring (conservative).

Harder entry will increase playing time and scoring (liberal).

B. BACK BOX GAME ADJUSTMENTS:

Each game has thirty-two switches located on A4,

the MPU module, located in the back box, that allow play to be customized to the location. See Figure III. Credits per coin, maximum credits, credit display, balls per game, match feature, high game feature, special award and melody are selectable by means of the switches. The switches are contained in four-sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The "ON" toggle position is marked on the assembly.

Turn off power before making adjustments.

Credits/Coin Adjustments:

The credits per coin are selectable by means of S17-S20 for coin chute #2 (Center). The switch settings and resultant credits/coin are as follows:

S20	S19	S18	S17	Credits/Coin	S20	S19	S18	S17	Credits/Coin
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings	ON	OFF	OFF	OFF	8/1 Coin
OFF	OFF	OFF		1/1 Coin	ON	OFF	OFF	ON	9/1 Coin
OFF	OFF	ON	OFF	2/1 Coin	ON	OFF	ON	OFF	10/1 Coin
OFF	OFF	ON	ON	3/1 Coin	ON	OFF	ON	ON	11/1 Coin
OFF	ON	OFF	OFF	4/1 Coin	ON	ON	OFF	OFF	12/1 Coin
OFF	ON	OFF	ON	5/1 Coin	ON	ON	OFF	ON	13/1 Coin
OFF	ON	ON	OFF	6/1 Coin	ON	ON	ON	OFF	14/1 Coin
OFF	ON	ON	ON	7/1 Coin	ON	ON	ON	ON	15/1 Coin

The credits given are selectable by means of switches 1-5 incl., for coin chute #1 and switches 9-13 incl., for coin chute #3. Thirty-one different credit

ratios are available for each coin chute. The switch settings and resultant credits/coin are listed below.

CREDITS/COIN ADJUSTMENTS

COIN CHUTE	5	4	3	2	1	CREDITS	CREDITS	CREDITS	CREDITS	TOTAL CREDITS/COINS
#1(HINGE SIDE)	13	12	11	10	9					
OR #3	OFF	OFF	OFF	OFF	OFF	1/1 Coin				
(RIGHT SIDE)	OFF	OFF	OFF	OFF	ON	2/1 Coin				
	OFF	OFF	OFF	ON	OFF	3/1 Coin				
	OFF	OFF	OFF	ON	ON	4/1 Coin				
	OFF	OFF	ON	OFF	OFF	5/1 Coin				
	OFF	OFF	ON	OFF	ON	6/1 Coin				
	OFF	OFF	ON	ON	OFF	7/1 Coin				
	OFF	OFF	ON	ON	ON	8/1 Coin				
	OFF	ON	OFF	OFF	OFF	9/1 Coin				
	OFF	ON	OFF	OFF	ON	12/1 Coin				
	OFF	ON	OFF	ON	OFF	14/1 Coin				
	OFF	ON	OFF	ON	ON	1/2 Coins*				
	OFF	ON	ON	OFF	OFF	2/2 Coins*				
	OFF	ON	ON	OFF	ON	3/2 Coins*				
	OFF	ON	ON	ON	OFF	4/2 Coins*				
	OFF	ON	ON	ON	ON	5/2 Coins*				
	ON	OFF	OFF	OFF	OFF	6/2 Coins*				
	ON	OFF	OFF	OFF	ON	7/2 Coins*				
	ON	OFF	OFF	ON	OFF	8/2 Coins*				
	ON	OFF	OFF	ON	ON	9/2 Coins*				
	ON	OFF	ON	OFF	OFF	12/2 Coins*				
	ON	OFF	ON	OFF	ON	14/2 Coins*				
	ON	OFF	ON	ON	OFF	1/1ST Coin	2/2nd Coin			3/2
	ON	OFF	ON	ON	ON	0/1ST Coin*	1/2nd Coin	1/3rd	1/4th	3/4
	ON	ON	OFF	OFF	OFF	0/1ST Coin*	1/2nd Coin	0/3rd**	2/4th	3/4
	ON	ON	OFF	OFF	ON	1/1ST Coin	1/2nd Coin	1/3rd	2/4th	5/4
	ON	ON	OFF	ON	OFF	1/1ST Coin	2/2nd Coin	1/3rd	3/4th	7/4
	ON	ON	OFF	ON	ON	1/1ST Coin	2/2nd Coin	2/3rd	2/4th	7/4
	ON	ON	ON	OFF	OFF	0/1ST Coin***	0/2nd Coin***	1/3rd	1/3	
	ON	ON	ON	OFF	ON	0/1ST Coin**	0/2nd Coin**	0/3rd** 1/4th	1/4	
	ON	ON	ON	ON	OFF	0/1ST Coin****	0/2nd Coin****	0/3rd****	0/4th**** 1/5th	1/5
	ON	ON	ON	ON	ON	0/1ST Coin****	0/2nd Coin****	1/3rd	0/4th**** 1/5th	2/5

*No Credits until 2nd coin is dropped.

***No Credits until 3rd coin is dropped.

**No Credits until 4th coin is dropped.

****No Credits until 5th coin is dropped.

MAXIMUM CREDITS:

The maximum credits accepted by the machine limits the number of games that can be accumulated by coining, by winning replays or both. The maximum number of credits is selectable by means of switches 25 and 26. Four credit limits are available. Switch settings are listed below.

MAXIMUM CREDITS	26	SWITCHES	25
10	OFF		OFF
15	OFF		ON
25	ON		OFF
40	ON		ON

BALLS PER GAME:

# BALLS/ GAME	32	SWITCHES	31
5	OFF		ON
4	ON		OFF
3	OFF		OFF
2	ON		ON

MATCH FEATURE:

When the Match Feature is ON, a random number appears on the Match/Ball in Play window and the word Match is illuminated. If the number matches the tens digit in a player's score, a free game is awarded. The Match Feature creates an incentive to play.

MATCH	SWITCH 28
ON	ON OFF OFF

CREDIT DISPLAY:

CREDITS DISPLAYED?	SWITCH 27
YES	ON
NO	OFF

HIGH SCORE FEATURE:

The game is designed to award an Extra Ball or Free Game at each of the two or three score levels. See Front Door Game Adjustments.

AWARD GIVEN	SELF TEST POSITION 16 (Playfield)	SELF TEST POSITION 17 (High Score)
REPLAY	SET TO "03"	SET TO "03"
NO AWARD	SET TO "02"	SET TO "02"
✓ NOVELTY	SET TO "01" ✓	SET TO "01"
NO AWARD	SET TO "00"	SET TO "00"

For combinations of replay/X-ball/Novelty Modes see page 4 "J". "Special Replay/X-ball/Novelty Modes".

HIGH SCORE TO DATE OR OVER 10,000,000 SCORE FEATURE:

The game is designed to award free games as an option if high score to date is beaten or player exceeds 10,000,000 points. Each time this happens, the winning score becomes the new high score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play. Recommended setting is underlined.

HIGH SCORE TO DATE FEATURE	SELF TEST POSITION 19
No Award	SET TO "00"
One Credit	SET TO "01"
Two Credits	SET TO "02"
Three Credits	SET TO "03"

State and local laws may regulate the use of the above features, and they have been designed to allow for appropriate adjustment in order to conform to such requirements.

GAME FEATURE OPTIONS:

3-BALL GAME:

ADDITIONAL SPL EVERY 100K.	SW. 6	OFF
INITIAL BONUS SPL WITH 150K.	SW. 7	ON
INITIAL BONUS SPL WITH 150K.	SW. 8	OFF
BONUS SPL PER GAME UNLIMITED.	SW. 14	ON
LANE SPL PER GAME "ONE".	SW. 15	OFF
RECALL ON BONUS LITES.	SW. 16	ON
BOOP BALL ARROW ON WITH 4X.	SW. 21	ON
BOOP BALL ARROW ON WITH 4X.	SW. 22	OFF
BALLS DO NOT KICK OUT OF THE SAUCERS ON GAME OVER.	SW. 23	OFF
IF THERE IS A BALL ON SHOOTER LANE, BALL WILL NOT KICK OUT OF THE OUTHOLE.	SW. 24	OFF
GAME IS SET FOR 3 BALLS.	SW. 31	OFF
GAME IS SET FOR 3 BALLS.	SW. 32	OFF

5-BALL GAME:

ADDITIONAL SPL EVERY 100K.	SW. 6	OFF
INITIAL BONUS SPL WITH 200K.	SW. 7	OFF
INITIAL BONUS SPL WITH 200K.	SW. 8	OFF
BONUS SPL PER GAME ONE.	SW. 14	OFF
LANE SPL PER GAME ONE.	SW. 15	OFF
RECALL ON BONUS LITES.	SW. 16	ON
BOOP BALL ARROW ON WITH 5X.	SW. 21	OFF
BOOP BALL ARROW ON WITH 5X.	SW. 22	OFF
BALLS DO NOT KICK OUT OF THE SAUCERS ON GAME OVER.	SW. 23	OFF
IF THERE'S A BALL ON SHOOTER LANE, BALL WILL NOT KICK OUT OF THE OUTHOLE.	SW. 24	OFF
GAME IS SET FOR 5 BALLS.	SW. 31	ON
GAME IS SET FOR 5 BALLS.	SW. 32	OFF

SOUND OPTION

The game is designed to make several tones and noises to announce power-up, game-up, etc. The tones are intended to attract attention to the game and increase game usage. The tones are controlled by pressing Self-Test button until the #18 shows on the match/ball in display. Now pulse replay button to desired sound setting.

Setting "00"

Most switches associated chimes without feature background.

Setting "01"

Playfield switches associated chimes with background.

Setting "02"

Most scoring will have a noise effect without background.

Setting "03"

Most all scoring will have a noise effect with background.

C. FRONT DOOR GAME ADJUSTMENTS

HIGH SCORE FEATURE ADJUSTMENTS:

The game is designed to award an extra ball (option) or a free game at each of three score levels. The recommended levels are on the score card in the game.

Any level from 10,000 to 990,000 can be set, as desired. It is also possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button (See Figure III) at one second intervals approximately six times or until identification number 01 appears on the "Match/Ball in Play" display.
2. The number on the Player Score Displays is the score level.* It can be increased, if desired, by holding the credit button in. To decrease the score level, hold the credit button in and depress and release the Self-Test button. Release the credit button when the desired number appears. Note that the level changes 10,000 points at a time. If the number "00" is left on the displays, the high score feature is eliminated for that level.
3. Repeat steps 1 and 2 for the second and third score levels. The identification numbers "02" and "03" on the Match/Ball in Play display are for the second and third levels, respectively.

HIGH SCORE TO DATE AND 10,000,000 FEATURE:

The game is designed to award free games when "High Score to Date" is beat, or if the player exceeds 10,000,000 points.

It is recommended that the level, which will build with play, be periodically reset to the factory recommended level to encourage game play. The adjustment procedure is the same as for the High Score Feature Adjustment, Steps 1 and 2. Continue pushing the Self-Test button until the identification number "04" appears on the "Match/Ball in Play" display and then do Step 2.

Any level from "00" to 9,990,000 can be set as described. It is to be noted that "00" does NOT turn off the feature, as it does on High Score feature. The feature is turned off by Self-Test position 19 as discussed under "Back Box Game Adjustments".

SELF-TEST SETUP FOR 16-19:

To set up positions 16-19 push and release Self-Test

button till 16 shows on match/ball in play. Now pulse replay button for recommended setup from "00" thru "03". Repeat for positions 17, 18, and 19.

SOUND

In addition to game sounds, there is also a Master Volume Control located on the front door. (refer to page 10)

Please note that the module volume controls should be adjusted prior to setting the control on the front door.

- * Can be quickly set to "00" by pressing S33 on the MPU assembly in the back box or Coin Chute switch #3. (See Figure III.)

FIREBALL CLASSIC

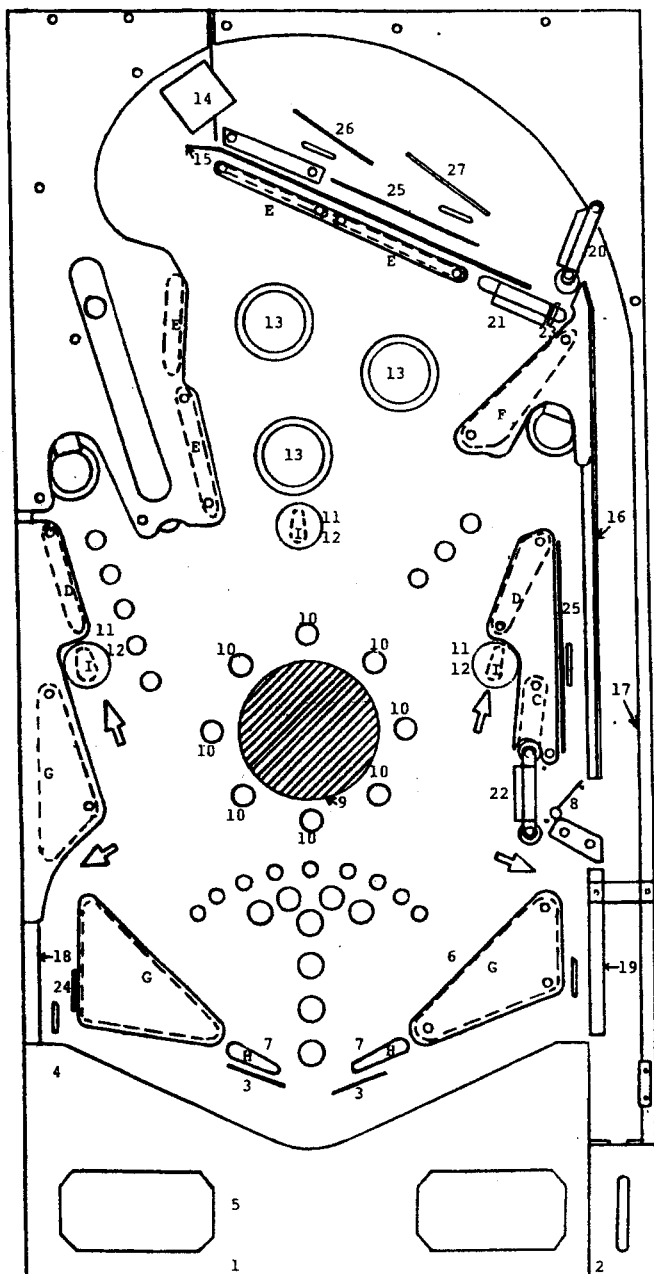
RUBBER PARTS

- A. 17-41-633 (2) POST
- B. 17-41-637 (4) POST
- C. 17-41-643 (1) 1" DIA.
- D. 17-41-644 (2) 1-1/2" DIA.
- E. 17-41-645 (4) 2" DIA.
- F. 17-41-646 (1) 2-1/2" DIA.
- G. 17-41-647 (3) 3" DIA.
- H. 17-41-687 (2) FLIPPER (YELLOW)
- I. 17-41-716 (3) M.B.

PANEL TOP PARTS

- 1. BOTTOM ARCH 0A40-00121-00XF
- 2. SHOOTER GAUGE 0A40-00123-0000
- 3. BUFFER WIRE 0360-00175-5300
- 4. KICK-BACK ASSY AA40-00025-0000
- 5. TOP MOUNTED KICKER (BALL RETURN) A360-00234-0000
- 6. SLINGSHOT KICKER (COIL ASSY) A967-00059-0000
- 7. MOLD FLIPPER ASSY (WHT. PURCH.) A967-00031-0000
- 8. FREE GATE RELAY ASSY * AA44-00036-0000
- 9. BALL SPINNER ASSY * AA40-00039-0000
- 10. ROLLOVER BUTTONS 0017-00042-0681
- 11. MUSHROOM BUMPER CAP (YELLOW) 0365-00936-0300
- 12. POST-MUSHROOM BUMPER 0365-00937-0800
- 13. THUMPER BUMPER ASSY A967-00053-0000
- 14. RAMP HOOD 0A40-00119-0000
- 15. RAMP SUPPORT (FRONT) 0A40-00109-0000
- 16. BALL GUIDE (SHOOTER LANE) 0A40-00108-00XF
- 17. SIDE RAIL (RIGHT) 0A40-00504-0000
- 18. SIDE RAIL (LEFT) 0A40-00505-0000
- 19. INSIDE RAIL 0A40-00503-0000
- 20. BALL GATE AND WIRE ASSY A360-00213-0000
- 21. BALL GATE AND WIRE ASSY AA40-00033-0000
- 22. BALL GATE AND WIRE ASSY AA40-00034-0000
- 23. BALL GUIDE WIRE ASSY 1-1/8" 0360-00175-0105
- 24. BALL GUIDE WIRE ASSY 2-9/16" 0360-00175-2900
- 25. BALL GUIDE WIRE ASSY 6-1/2" 0360-00175-3400
- 26. BALL GUIDE WIRE ASSY 2-7/8" 0360-00175-6500
- 27. BALL GUIDE WIRE ASSY 3-5/16" 0360-00175-7600

ASE 2308-22*



U2
U6 Same AS
1720-53

FIGURE II

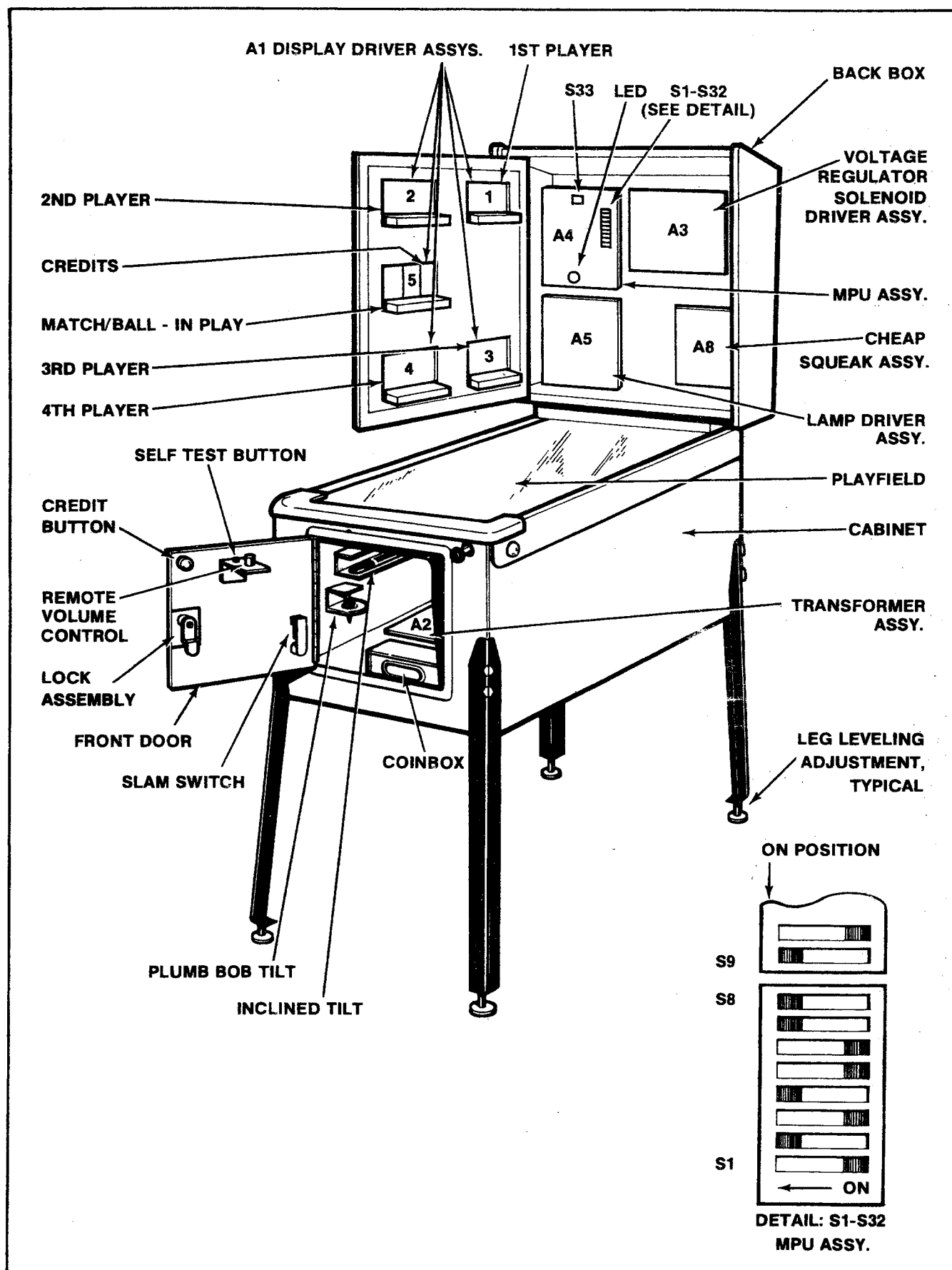


FIGURE III. ELECTRONIC PIN BALL MACHINE

RECOMMENDED

Instructions, Score Cards and High Score Feature Settings to be used on **Your New Game.**

REPLAYS
Instruction Card
Score Card

3-BALL
M051-00A40-A030
M051-00A40-A038

REPLAYS
Instruction Card
Score Card

5-BALL
M051-00A40-A031
M051-00A40-A039

1 Replay at 1,000,000
1 Replay at 2,800,000

1 Replay at 2,200,000
1 Replay at 4,800,000

ADDITIONAL CARDS

REPLAYS

M-051-00A40-A040	700,000	2,500,000
M-051-00A40-A041	800,000	2,600,000
M-051-00A40-A042	900,000	2,700,000
M-051-00A40-A043	1,100,000	2,900,000
M-051-00A40-A044	1,200,000	3,000,000
M-051-00A40-A045	1,300,000	3,100,000
M-051-00A40-A046	1,400,000	3,200,000
M-051-00A40-A047	1,500,000	3,300,000
M-051-00A40-A048	1,600,000	3,400,000
M-051-00A40-A049	1,700,000	3,500,000
M-051-00A40-A050	1,800,000	3,600,000
M-051-00A40-A051	1,900,000	3,700,000

RECOMMENDED SWITCH SETTINGS

SW#	3 BALL	5 BALL
ADDITIONAL SPL EVERY:	#6 OFF (100K)	OFF (100K)
INITIAL BONUS SPL WITH:	#7 ON (150K)	OFF (200K)
INITIAL BONUS SPL WITH:	#8 OFF (150K)	OFF (200K)
BONUS SPL PER GAME:	#14 ON (UNLIMITED)	OFF (ONE)
LANE SPL PER GAME:	#15 OFF (ONE)	OFF (ONE)
RECALL ON BONUS LIGHTS:	#16 ON ON	
BOOP BALL ARROW ON WITH:	#21 ON (4X)	OFF (5X)
BOOP BALL ARROW ON WITH:	#22 OFF (4X)	OFF (5X)
BALLS DO NOT KICK OUT OF THE SAUCERS ON GAME OVER:	#23 OFF OFF	
IF THERE'S A BALL ON SHOOTER LANE, BALL WILL NOT KICK OUT OF THE OUTHOLE:	#24 OFF OFF	
GAME IS SET FOR:	#31 OFF (3 BALLS)	ON (5 BALLS)
GAME IS SET FOR:	#32 OFF (3 BALLS)	OFF (5 BALLS)

VIII. ROUTINE MAINTENANCE ON LOCATION:

Self-Test routines are written into the game design. They are particularly useful for routine maintenance. The tests are described below. The first test is automatic and occurs on power-up. This test causes the MPU module A4 to examine itself for failures. Seven flashes of an LED indicates proper operation. The second series of self-diagnostic tests causes the MPU to "exercise" each of the other modules in such a way as to make their faults, if any, obvious. See Figure III and Page ii.

It is recommended that these tests be used several times a week to check out the games before play. If faults are discovered, they may be corrected on location if the operator has a stock of replacement modules. See "Trouble Shooting on Location".

MPU Module Self-Test:

At power on, the LED on the MPU module flashes once. (Flicker-Flash.) After a pause, it flashes six more times and goes out. A power-up tune is played to announce game readiness. This indicates proper MPU operating condition and successful completion of the power-up test.

Game Self-Diagnostic Tests:

1. Pressing the Self-Test button inside the door initiates the Self-Test routine. See Figures III and IV. All switched lamps flash off and on continuously.
2. Pressing the Self-Test button again causes each digit on each display to cycle from 0 thru 9, and repeat continuously.
3. Pressing the Self-Test button again causes each solenoid to be energized, one at a time, in a continuous sequence. Hold both flipper buttons "in" during this test. The number appearing on the Player Score displays is the same as the number assigned to the solenoid. The sound of a solenoid pulling-in as a number appears indicates proper operation. The absence of sound is improper. If sound is absent, See Page 17 for help in Solenoid Identification.
4. Pressing Self-Test button again causes the sound module to play same tune repeatedly.
5. Pressing the Self-Test button again causes the MPU to search each switch assembly for stuck contacts. If any are found, the number of the first set encountered is flashed on the Player Score displays. The number remains until the

fault is cleared. See Page 17 for help in Stuck Switch Identification. Other numbers may follow if more stuck contacts are present. If there are no stuck switches, the Match/Ball in Play display flashes "0".

6. Pressing the Self-Test button 20 more times causes the MPU to step thru the threshold and bookkeeping functions described previously and finally to repeat the power-up test. For more rapid exit to power-up, turn the game off, then on. The game is now ready to play.

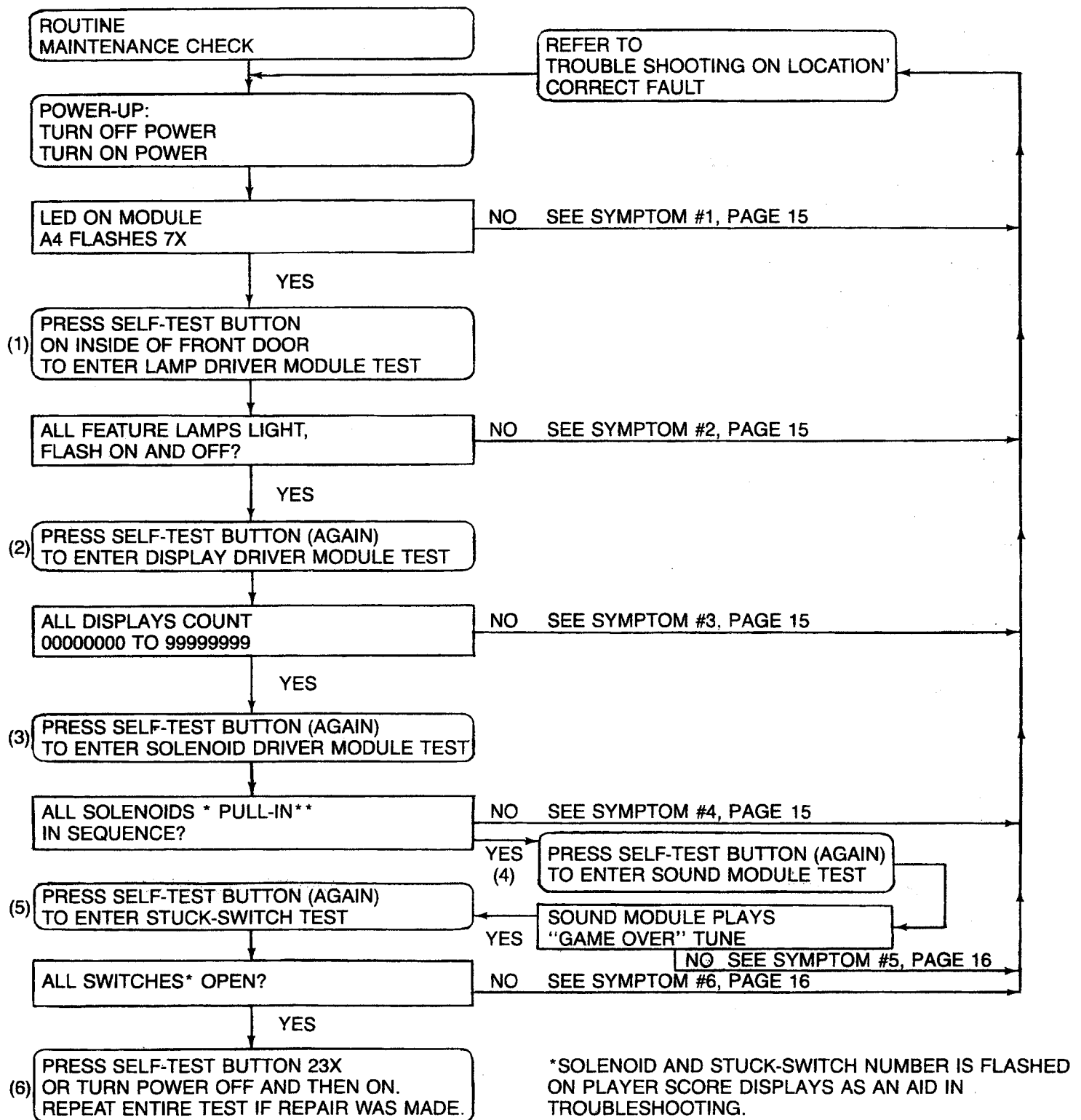
After successful completion of the Self Diagnostic Test Procedure, set the game up for play. Exercise each roll-over, thumper bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no response, clean contacts by gently closing them on a clean business card or piece of paper and wiping until they wipe clean. Re-gap, if necessary, to 1/16". **Do not burnish or file Gold Plated Switch Contacts.**

IX. TROUBLESHOOTING ON LOCATION

The game is designed to make troubleshooting easy. Several simple procedures are given herein that cover the greatest percentage of game failures. They are written for an operator on location and require module replacement. (See Figure III) Symptoms and the action to be taken are given for each type of problem.

If the problem is more complicated and is not solved by following this procedure, more detailed procedures are available from Bally/Midway. See the Parts List for ordering information.

FIGURE IV SELF DIAGNOSTIC TEST



*SOLENOID AND STUCK-SWITCH NUMBER IS FLASHED ON PLAYER SCORE DISPLAYS AS AN AID IN TROUBLESHOOTING.

See page 17.

*HOLD FLIPPER BUTTONS IN DURING TEST.

1A)

SYMPTOM:

Game does not play power-up tune when power is turned on. General illumination is present.

ACTION:

- A) Turn power OFF. Open back box. Locate light emitting diode (LED) on MPU module A4.
- B) Turn Power ON. LED must flash 7X to indicate that module A4 is good. Correct flash sequence is flicker/flash-pause-and then six more flashes and LED goes out.
- C) If LED does not come on, or does not flash, or flashes, but less than 7X, turn off power. Check fuses. If fuses are good, replace MPU Module A4.

CAUTION: Replacement MPU Module must have same Part Number or incorrect operation will result! See Parts List for MPU Module Part Number.

Turn power ON.

- D) If game is correct, it is now ready for play. If game is not correct, refer to Module Replacement procedure. (See Parts List).

2A)

SYMPTOM:

Not all feature lamps light during game play.

ACTION:

- A) With power ON, open front door. Press button (Self-Test switch) once. If game is correct, all feature lamps flash ON and OFF.
- B) Carefully raise playfield or open back box to gain access to lamps.
- C) Replace bulbs that do not flash.
- D) If game is correct, it is now ready for play.
- E) If game is not correct, turn power OFF. Replace Lamp Driver Module A5. Turn power ON and repeat A.
- F) If game is correct, it is now ready for play.*
- G) If game is not correct, turn power OFF. Replace MPU module A4. See CAUTION 1C. Turn power ON and repeat A.
- H) If game is correct, it is now ready for play.* If game is not correct, refer to Module Replacement Procedure. (See Parts List.)

2B)

SYMPTOM:

One or some switched lamps always ON.

ACTION:

Repeat 2AA, AN, AE, and AF and, if necessary AG & AH.

3A)

SYMPTOM:

Display digits improper on one or several, but less than all Display Driver module(s), A1. Improper: One or several segments always OFF, digits mottled or several segments or digit(s) always ON.

* Turn power On-Off switch OFF and then ON.

ACTION:

- A) With power ON, open front door. Press button (Self-Test switch) twice. If the game is correct, each digit on each Display Driver Module A1 (5 used/game) displays the count 1-9 and 0 continuously in all 6 digit positions. Note defective Display Driver modules.
- B) Turn power OFF.

WARNING: High Voltage is supplied to the Display Driver Modules, A1, from the Solenoid Driver/Voltage Regulator Module A3. Wait 30 seconds for High Voltage to Bleed Off.

- C) Replace Display Driver module(s) A1. Turn power ON. Repeat A.
- D) If game is correct, it is now ready for play.* If game is not correct refer to Module Replacement procedure. (See Parts List).

3B)

SYMPTOM:

All displays improper (all five display Driver modules). Improper: Digit(s) always on or off/segment(s) always on or off, all displays.

ACTION:

- A) Repeat 3AA, and AB.
- B) Replace MPU module A4. See CAUTION NOTE, 1C. Turn power ON. Repeat A.
- C) If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement Procedure. (See Parts List.)

3C)

SYMPTOM:

One or several displays always off.

ACTION:

- A) Do 3AA, AB, AC, and AD.
- B) Repeat 3BB and BC, if necessary.

4A)

SYMPTOM:

Solenoid(s) do(es) not pull-in during course of game.

ACTION:

- A) With power ON, open front door. Press button (Self-Test switch) three times.
- B) If game was correct, each solenoid would be energized. A number is flashed on the Player Score displays as each solenoid is pulsed. Note any numbers that do not have the sound of a solenoid associated. (NOTE: If most of the Playfield Solenoids DO NOT operate, check the Playfield Fuse to see if it is blown. It generally can be found near the Flipper Assemblies.) See Solenoid Identification Table, Page 17 and Figure V.
- C) Carefully lift the playfield (or open the back box)

to gain access to the solenoid. Turn power OFF. Inspect the solenoid.

- D) If a lead is broken off, repair. Repeat A & B. If game is correct, it is now ready for play.* If solenoid wiring was correct, turn power OFF.
- E) Replace Solenoid Driver/Voltage Regulator module A3. See CAUTION NOTE 3AB.
- F) Repeat AA & AB. If game is correct, it is now ready to play.* If game is not correct, turn power OFF.
- G) Replace Sound Module A8.
- H) Repeat AA & AB if game is correct. It is now ready to play.* If game is not correct, turn power OFF.
- I) Replace MPU module A4. See CAUTION NOTE, 1C.
- J) Repeat A & B. If game is correct, it is now ready to play.* If game not correct, refer to Module Replacement Procedure. (See Parts List).

4B)

SYMPTOM:

Solenoid(s) always energized—Note: if impulse solenoids (ball ejects, slingshots, thumper-bumpers, etc.) are energized continuously, they are subject to damage. Limit troubleshooting to one minute with power ON, followed by **five minutes with power OFF**. Repeat as necessary. Replace damaged solenoids. (NOTE: When troubleshooting Playfield Solenoid Circuits, be advised that a constantly energized Solenoid [i.e. Thumper Bumper] will blow the Playfield Fuse in a few seconds. To avoid replacing the Fuse repeatedly, Try to isolate the faulty Solenoid Circuit as soon as the game power switch is flipped ON.)

ACTION:

Do 4AA, AB, AE, AF, AG, AH and if necessary, AI and AJ.

5)

SYMPTOM:

No Sound.

ACTION:

- A) With power ON, open front door, press Self-Test switch four times.
- B) Turn volume control clockwise to Max.
- C) If correct, sound will be heard. If incorrect, try seating speaker lead connector (J2) and input connector (J1).
- D) If correct, sound will be heard. If incorrect, refer to Module Replacement procedure.

6) SYMPTOM:

Feature (Drop Targets, etc.) does not score.

ACTION: A)

With power ON, open front door. Press button (Self-

Test switch) five times.

- B) If the game is correct, Match/Ball in Play display would flash "0". If a number appears on the Player Score displays, see Switch Assembly Identification Table, Page 17 and Figure V.
- C) Carefully lift the playfield. Locate the switch assembly identified from the number. Visually inspect the switch assembly. If the contacts are "stuck", re-gap them to 1/16". See section under ADJUSTMENTS. Repeat A & B. If the game is correct, it is now ready to play.* If game is not correct, turn the power OFF.
- D) Replace MPU module A4. See CAUTION NOTE 1,C.
- E) Repeat A & B. If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement Procedure. (See Parts List).

7)

SYMPTOM:

Game blows fuse(s) repeatedly.

ACTION:

See Module Replacement Procedure. F.O. 560-3.

* Turn power On-Off switch OFF and then ON.

FIREBALL CLASSIC

SOLENOID IDENTIFICATION TABLE

SELF □ TEST#	SOLENOID IDENTIFICATION	SELF □ TEST#	SOLENOID IDENTIFICATION
01	LEFT SAUCER	08	RIGHT SLINGSHOT
02	RIGHT SAUCER	09	OUTHOLE
03	ITALIAN KICKER CONTROLLER	10	OUTHOLE
04	TOP BUMPER	11	KNOCKER
05	MID BUMPER	12	GATE
06	BOTTOM BUMPER LOCKOUT	13	COIN BOX
07	LEFT SLINGSHOT	14	FLIPPERS

SWITCH ASSEMBLY IDENTIFICATION TABLE

SWITCH SELF O TEST#	DESCRIPTION	SWITCH SELF O TEST#	DESCRIPTION
01	SLINGSHOT (RIGHT) 20K	17	TOP LANE 20K
02	SLINGSHOT (LEFT)	18	BUTTON 1K
03	BOTTOM BUMPER	19	BUTTON OFF KICKER
04	MID BUMPER	20	BUTTON ON KICKER
05	TOP BUMPER	21	OUTLANE (RIGHT)
06	CREDIT	22	OUTLANE (LEFT)
07	REBOUNDERS	23	SAUCER (RIGHT)
08	OUTHOLE	24	SAUCER (LEFT) TARGET
09	COIN III (RIGHT) — To ERASE	25	RELEASE BALLS
10	COIN I (LEFT)	26	
11	COIN II (MIDDLE)	27	
12	MUSHROOM BUMPER (RIGHT)	28	OUTHOLE #3
13	MUSHROOM BUMPER (MIDDLE)	29	OUTHOLE #2
14	MUSHROOM BUMPER (LEFT)	30	OUTHOLE #1
15	TILT	31	GATE LANE
16	SLAM	32	TOP LANE 50K

* R.O.B. Denotes Roll Over Button.

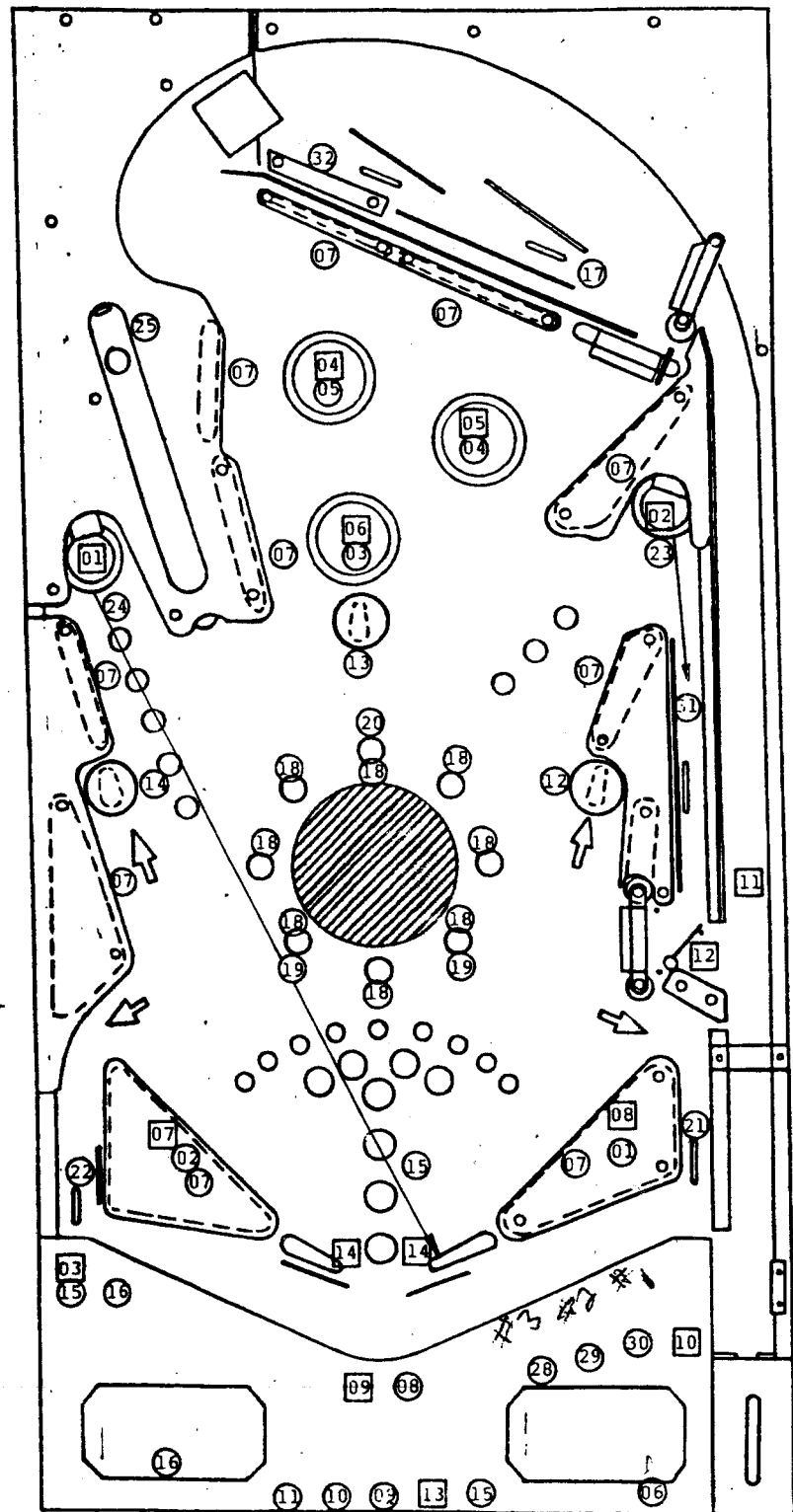
FIREBALL CLASSIC

□ INDICATES SWITCH ASSEMBLY
IDENTIFICATION NUMBERS

NOTE: CABINET: 15, 16,
DOOR: 06, 09
10, 11, 16

○ INDICATES SOLENOID
IDENTIFICATION NUMBERS:

NOTE: DOOR: 13
CABINET: 11



VECTORS SHOWING FOR EJECT SAUCERS

LEFT EJECT SAUCER: BALL SHOULD EXIT
TO RIGHT FLIPPER AS SHOWN

RIGHT EJECT SAUCER: BALL SHOULD EXIT
TO FREE BALL GATE LANE AS SHOWN

FIGURE V

ASSEMBLY ADJUSTMENTS:

GENERAL:

All switch assemblies consist of leaf springs, contacts, separators, plastic tubing and screws to hold them to the mounting surface. Before attempting to adjust a switch assembly, make sure that these screws are tight. If not, tighten screw closest to the contact end of the leaf spring first. This will prevent the assembly from being secured in such a manner that the leaf springs tend to fan out. In general, all leaf springs are adjusted for a 1/16" gap in the open position and .010" over-travel or wipe in the closed position. All contacts should be in good condition. Unless otherwise instructed, they should be dry or non-lubricated. All contacts should be free of dust and dirt. Contacts, with the exception of the flipper button switch assemblies, are plated to resist corrosion. Filing or burnishing breaks the finish and encourages corrosion. Clean by closing the contacts over a clean piece of paper (e.g., a business card) and wiping gently until the contacts are clean. For the flipper button switch assemblies **ONLY**: Tarnish can be removed with a contact file followed by burnishing tool. Severely pitted contacts must be placed and adjusted only when they are found to be a source of game malfunction.

Wildcat #125 is not available, Bally suggests you ask your Distributor to order it. Inspect and hand polish the ball in a clean cloth. A chipped ball must be replaced. It can ruin the finish on the playfield in a short period of time.

DON'T: Use water in large quantities, highly caustic cleaners, abrasive cleaners and cleaning pads on the playfield, or allow a wax or polish build up. Waxes yellow with age and spoil appeal.

X. SERVICE PARTS:

A parts catalogue is available upon request. The catalogue is illustrated and lists all replacement parts for each game manufactured by Bally. Requests should be addressed to:

**BALLY MIDWAY MFG. CO.
10601 WEST BELMONT AVENUE
FRANKLIN PARK, ILLINOIS 60131
ATTN: PARTS DEPARTMENT**

SERVICE HINTS:

The bally playfield has an improved tuff-coat finish with excellent wearing properties. Life expectancy of the playfield, as well as play appeal, can be extended by periodic cleaning.

DO: Bally recommends you clean your playfield with Wildcat #125 (Wildcat Chemical Co. 1349 East Seminary Drive; Fort Worth, Texas 76115; Phone 1-817/924-8321). Wildcat #125 is a combination cleaner and polish. Bally has tried and tested this product and found it to be very effective. If

XI. PARTS LIST FIREBALL CLASSIC

	BALLY	MIDWAY
	PART NUMBER	PART NUMBER
MISCELLANEOUS		
Transformer (Domestic or Export)	MT00-00114-A000	
Bulbs, #555 (75)	0017-00003-0484	E-125-73
Fuse, 1 Amp. 3 AG Slow Blow (Playfield Solenoid Protection)	0017-00003-0103	E-133-44
Fuse, 3 AMP, 3 AG Slow Blow	0017-00003-0262	
Back Glass	0A40-00905-00XF	
Ball Shooter Rod Assy. (Cabinet)	A360-00280-0000	ASE-2378-5
ASSEMBLY SWITCHES		
Rebound (8)	A360-00069-0000	ASW-A10-0047
Roll Over Button (8)	A390-00022-0000	
Saucer (2)	AA40-00036-0000	
Credit (door)	A360-00068-0000	ASW-A1-0146
Spinner	A360-00058-0000	ASW-A1-0151
Outhole	360-00055-0000	ASW-A1-0143
Coin (3) (Door)	0017-00005-0195	
Right Sling Shot (2)	A360-00069-0000	ASW-A10-0000
Left Sling Shot (2)	A360-00069-0000	ASW-A10-0047
Thumper Bumper (3)	A967-00074-0000	
Tilt	A360-00057-0000	ASW-A1-0145
Tilt (Cabinet)	A360-00054-0000	ASW-A0-0013
Slam (Cabinet)	A360-00076-0000	ASW-A2-0073
Slam (Door)	A360-00076-0000	ASW-A2-0073
Lanes (Out Lane & Ball Lane) (2)	A360-00069-0000	ASW-A10-0047
Lane (Upper Skill Shot & Lower Skill Shot) (2)	A360-00069-0000	ASW-A10-0047
Free Ball Gate Lane	A360-00069-0000	ASW-A10-0047
Free Ball Gate	AA40-00036-0000	
Mushroom Bumper (3)	AA40-00032-0000	
Ball Ramp (3)	0017-00032-0123	
Flipper-Break (2)	A365-00045-0000	
Flipper-Make (2) (Cabinet)	A360-00071-0000	ASW-A10-0061
ASSEMBLY COILS		
Coin Lockout	A360-00208-0000	FO-36-7000
Flipper(2)	A360-00045-0000	AQ-25-500/ 34-4500
Ball Release	A360-00211-0000	AO-27-1300
Kickback	A365-00055-0000	
Knocker	A360-00046-0000	AR-26-1200
Outhole Kicker	A360-00044-0000	AN-26-1200
Thumper Bumper(3)	A360-00044-0000	AN-26-1200
Saucer (2)	A360-00211-0000	AO-27-1300
Free Ball Gate	A390-00029-0000	GA-34-4000
Slingshot (2)	A360-00046-0000	AO-26-1200

XI. PARTS LIST FIREBALL CLASSIC

	MIDWAY PART NUMBER	BALLY PART NUMBER
PLAYFIELD PARTS		
	See Figure II	
Playfield Glass	0360-00921-0000	
Playfield & Inserts	AA40-00501-00XF	
Playfield Mylar	0A40-00902-0000	
Clear Plastic Set	AA40-00012-00XF	
Screened Plastic Set	AA40-00900-00XF	
Roll-Over Button (8)	0017-00042-0681	
Thumper Bumper Cap Assembly (2)	AA40-00030-0000	
Thumper Bumper Cap With Tape	AA40-00035-0000	
Collar-Thumper Bumper-Amber (3)	0017-00042-0403	
Thumper Bumper Locking Ring (3)	0017-00042-0414	
Thumper Bumpers Mylar-Combo	0A40-00910-0000	
Flipper (2)	A967-00031-0000	
Boop-Ball Target & Switch Assembly	A967-00019-0000	
MODULES		
Lamp Driver A5	A084-91613-A000	AS-2518-23
Display Driver A1 (4 used)	A084-91617-A000	AS-2518-58
Display Driver A1 (1 used)	A084-91491-A000	AS-2518-21
MPU A4	A084-91638-AA40	
Transformer & Rectifier A2	AA40-00037-0000	
Rectifier Board (Part of A2)	A084-91616-A000	AS-2518-54
Cheap Squeak	A084-91603-AA40	
Solenoid/Voltage Regulator	A084-91612-0000	
Solenoid Expander	A084-91618-A000	
REPAIR PROCEDURES/AIDES		
Module & Component Replacement		F.O. 560-3
AID (Assistance in Diagnostics) Kit, used with F.O. 560-1		KIT #485-1
MODULE COMPONENTS		
SEE MODULE PARTS LIST		

BALLY/MIDWAY'S FIREBALL CLASSIC PIN**#A40**ROM/EPROM PART NUMBERS**UNPROGRADED** MPU A084-91638-D000**PROGRADED** MPU A084-91638-AA40

POS.	MIDWAY PART NUMBER
U2	0A40-00803-0002
U6	0A40-00803-0001

JUMPERS	IN	OUT
E4 -E12	**	
E7 -E8	**	
E10 -E11	**	
E13A-E14	**	
E29 -E33	**	
E31 -E32	**	
E16A-E34	**	

UNPROGRADED CHEAP SQUEAK A084-91603-C000**PROGRADED** CHEAP SQUEAK A084-91603-AA40

POS.	MIDWAY PART NUMBER
U3	0A40-00803-0003
U4	0A40-00803-0004

JUMPERS	IN	OUT
JW1		**
JW2		**
JW3		**
JW4		**
JW5		**
JW6	**	
JW7		**
JW8		**
JW9	**	
JW10		**
JW11		**
JW12	**	

REVISIONS

11/28/84	RELEASE FOR PRODUCTION	

M051-00A40-A008

PRELIMINARY ELECTRICAL SECTION

FIREBALL CLASSIC

Bally

MIDWAY MFG. CO.

10601 W. Belmont Avenue
Franklin Park, Illinois 60131
U.S.A.



Phone (312) 451-9200 Cable Address MIDCO Telex No. 72-1596

MO51-00A40-A014

"IMPORTANT NOTICE"

**ALL 3 PLAYFIELD BALLS MUST BE INSERTED
IN THE OUTHOLE TROUGH.**

M051-00A40-A016

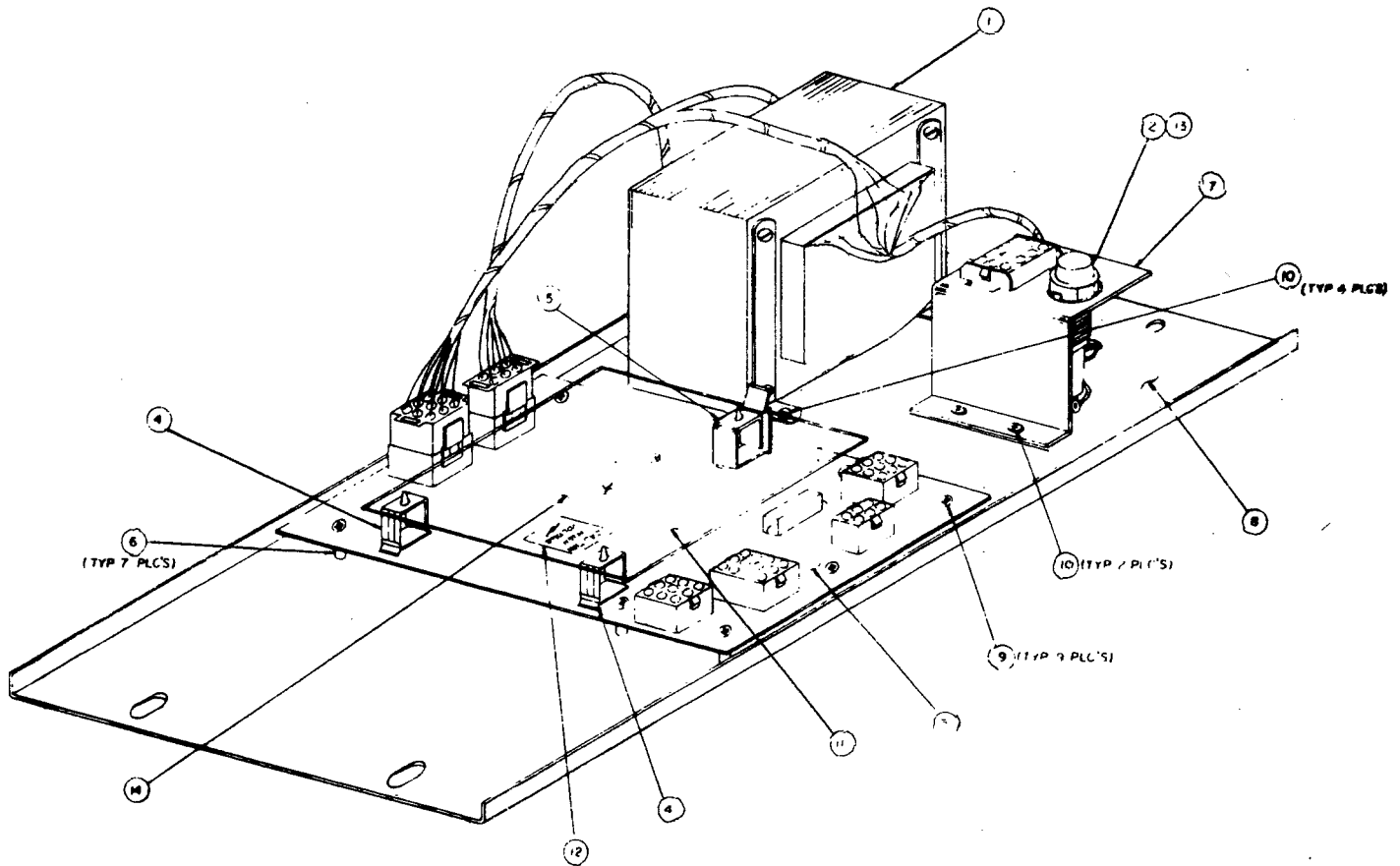
PLEASE NOTE:

A complete OPERATOR'S MANUAL was not available when your new game was shipped. If you will complete the enclosed postage free card and drop it in the mail to us, BALLY/MIDWAY MFG. CO. will be happy to send you the OPERATOR'S MANUAL for your new game by return mail.

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EPROM LIST	INSIDE BACK COVER

A2: POWER TRANSFORMER MODULE



A2: POWER TRANSFORMER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AA40-00037-0000	POWER TRANSFORMER MODULE, COMPLETE
1		MT00-00114-0000	TRANSFORMER
2		E-148-25	FUSE HOLDER
3	A2	AS-2518-54	POWER MODULE ASSEMBLY
4		M-1829-4	HINGED SUPPORT
5		M-1829-3	EDGE HOLDER
6		M-1829-5	SPACER
7		P-6442-244b	FUSE & CONNECT BRACKET
8		P-6442-246	CHASSIS
9		RLPP-832-1812	SCREW
10		RLPP-1032-1806	SCREW
11		P-2692-2	SHIELD
12		M-469-936a	HIGH VOLTAGE STICKER
13		E-133-24	3 AMP SLOW BLOW FUSE
14		M-1834	H. S. COMPOUND
15	(NOT SHOWN)	104E-00016-0014	TRIAC, MAC 38-2

NOTE 1 - ALL GAMES WITH 4 OR MORE FLIPPERS USE 7A

DESIGNATION LIST

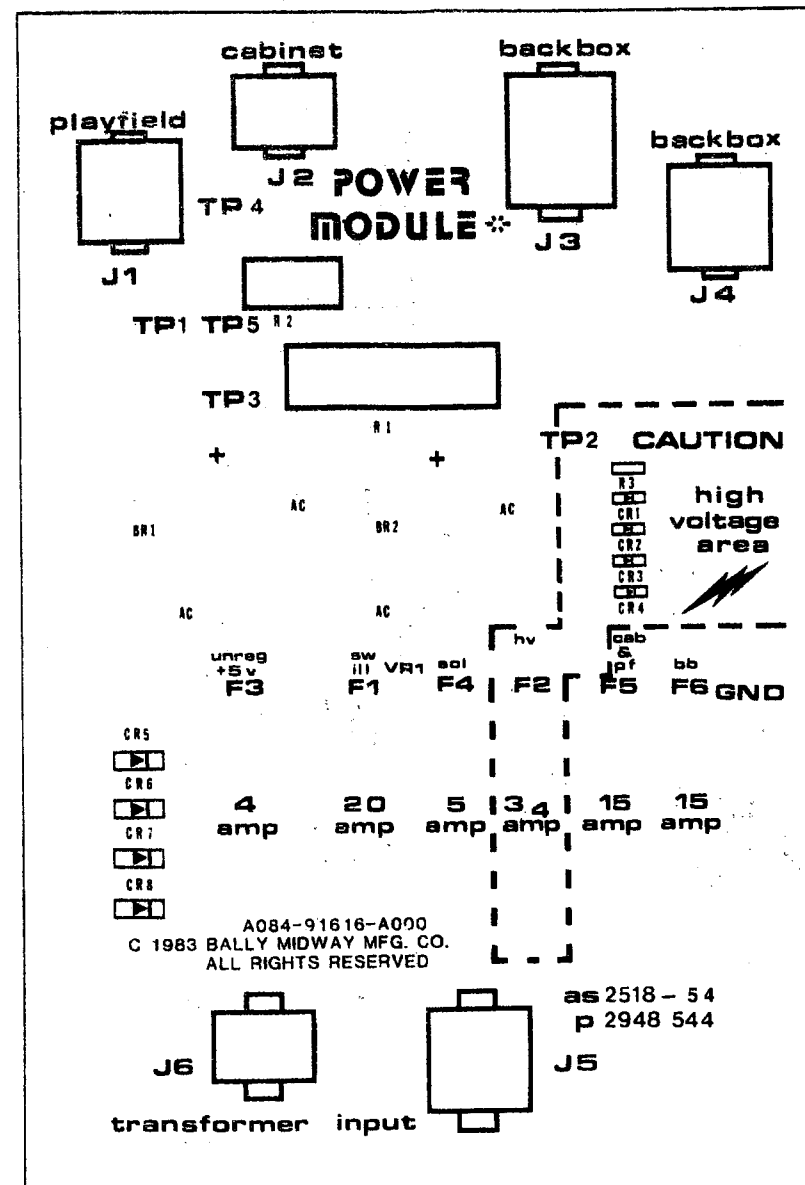
DESIGNATION NO.	DESCRIPTION
R1	600 OHM 5W 10%
R2	25 OHM 5W 10%
R3	100K OHM 1/4W 5%
VR1	VARISTOR
CR1-CR4	IN4004
CR5-CR8	GP10A/V330
HR1,HR2	KBPC35-02-W BRIDGE
P/O HR1,HR2	SPACER
F1	20 AMP FUSE - NOTE 1
F2	3/4 AMP FUSE
F3	4 AMP FUSE
F4	5 AMP FUSE - NOTE 2
F5,F6	15 AMP FUSE
P/O F1,F5,F6	FUSE CLIP BUSHMAN
P/O F2,F3,F4	FUSE CLIP LITTELFUSE
J1	9 COND. M&L PIN HEADER
J2	6 COND. M&L PIN HEADER
J3	12 COND. M&L PIN HEADER
J4	9 COND. M&L PIN HEADER
J5	9 COND. M&L PIN HEADER
J6	6 COND. M&L PIN HEADER
TP1-TP5,GND	TEST POINTS
PCB	POWER MODULE

NOTE 1 USE 10AMP FUSE WITH TRANSFORMER
MT00-00114-A000

NOTE 2 USE 6 AMP FUSE WITH 3 FLIPPER GAME
AND 7 AMP FUSE WITH 4 FLIPPER GAME

CROSS REF. LIST

DESCRIPTION	QTY	DESIGNATION NO.	PART NOS.
250 OHM 5W 10%	1	R2	100E-00002-0028
600 OHM 10W 10%	1	R1	100E-00002-0049
100K OHM 1/4W 5%	1	R3	100E-00005-0115
VARISTOR	1	VR1	115E-00001-0002
IN4004	4	CR1-CR4	103E-00003-0005
GP10A/V330	4	CR5-CR8	0360-00801-0007
KBPC35-02-W	2	BR1,HR2	103E-00005-0005
SPACER	2	P/O HR1,HR2	118E-00001-0001
3/4 AMP FUSE	1	F2	0017-00003-0177
4 AMP FUSE	1	F3	0017-00003-0176
5 AMP FUSE/LEC	1	F4	0017-00003-0175
15 AMP FUSE	2	F5,F6	0017-00003-0113
20 AMP FUSE	1	F1	0017-00003-0173
FUSE CLIP BUSHMAN	6	P/O F1,F5,F6	0017-00071-0034
FUSE CLIP LITTELFUSE	6	P/O F2,F3,F4	0017-00071-0033
6 COND. M&L PIN HEADER	2	J2,J6	0017-00021-0424
9 COND. M&L PIN HEADER	2	J4,J5	0017-00021-0425
9 COND. M&L SOCKET HEADER	1	J1	0017-00021-0426
12 COND. M&L PIN HEADER	1	J3	0017-00021-0427
TEST POINTS	6	TP1-TP5,GND	0017-00007-0131
POWER MODULE		PCB	A080-91616-A000



PROJECT ENG: A. AARSTAD		USED ON	
DO NOT SCALE D.V.G.		SCALE FULL	NO. REQ'D 1 PER
DIM TOLERANCES UNLESS SPECIFIED		ASSEMBLY DWG. POWER MODULE	
DATE 11/13/84		PART NO MO51-00114 -A054	

REVISIONS

Bally / MIDWAY MFG. CO.
FRANKLIN PK ILL

DESIGNATION LIST

DESIGNATION NO. DESCRIPTION

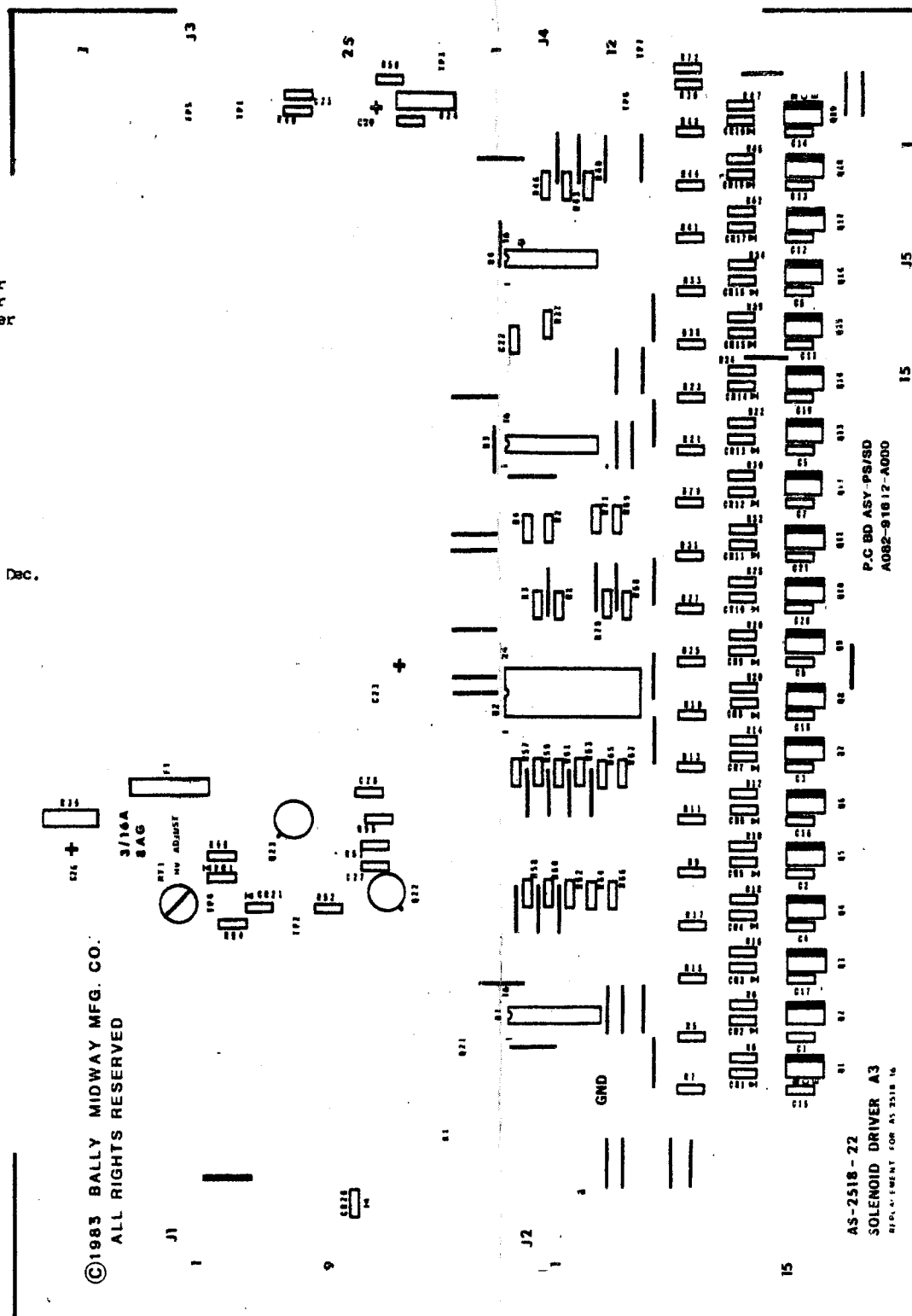
C1-C8 .002 uf 1KV Cer.
C11-C21 .002 uf 1KV Cer.
C22 .01 uf 50V Cer.
C23 11,000 uf 20V Elec.
P/O C23 Cable Tie
P/O C23 Jumper Wire 24awg.
C24 2 uf 25V Elec.
C25 .1uf 20V Cer.
C26 160 uf 350V Elec.
P/O C26 Cable Tie
C27, C28 .01 uf 500V Cer.
C29 .1 uf 20V Cer.
R1-R4 33K 1/4 W 5%
R5 120 ohm 1/4 W 5%
R6 330 ohm 1/4 W 5%
R7 120 ohm 1/4 W 5%
R8 330 ohm 1/4 W 5%
R9 120 ohm 1/4 W 5%
R10 330 ohm 1/4 W 5%
R11 120 ohm 1/4 W 5%
R12 330 ohm 1/4 W 5%
R13 120 ohm 1/4 W 5%
R14 330 ohm 1/4 W 5%
R15 120 ohm 1/4 W 5%
R16 330 ohm 1/4 W 5%
R17 120 ohm 1/4 W 5%
R18 330 ohm 1/4 W 5%
R19 120 ohm 1/4 W 5%
R20 330 ohm 1/4 W 5%
R21 120 ohm 1/4 W 5%
R22 330 ohm 1/4 W 5%
R23 120 ohm 1/4 W 5%
R24 330 ohm 1/4 W 5%
R25 120 ohm 1/4 W 5%
R26 330 ohm 1/4 W 5%
R27 120 ohm 1/4 W 5%
R28 330 ohm 1/4 W 5%
R29 120 ohm 1/4 W 5%
R30 330 ohm 1/4 W 5%
R31 120 ohm 1/4 W 5%
R32 330 ohm 1/4 W 5%
R33 120 ohm 1/4 W 5%
R34 330 ohm 1/4 W 5%
R35 100K 1W 5%
R36 120 ohm 1/4 W 5%
R37 3.9K 1/4 W 5%
R38 120 ohm 1/4 W 5%
R39 330 ohm 1/4 W 5%
R40 3.9K 1/4 W 5%
R41 120 ohm 1/4 W 5%
R42 330 ohm 1/4 W 5%
R43 3.9K 1/4 W 5%
R44 120 ohm 1/4 W 5%
R45 330 ohm 1/4 W 5%
R46 3.9K 1/4 W 5%
R47 330 ohm 1/4 W 5%
R48 120 ohm 1/4 W 5%
R49 100 ohm 1/2 W 5%
R50 2.2 ohm 1/4 W 5%
R51 22K 1/2 W 5%
R52 390 ohm 1/4 W 5%
R54 8.2K 1/4 W 5%
R55 1.2K 1/4 W 5%
R56 82K 1/2 W 5%
R57-R72 1.2K 1/4 W 5%
RT1 0-25K Linear Pot 1/4 W

DESIGNATION NO. DESCRIPTION

CR1-CR21 IN4004 Diode
Q1-Q19 2N6045 NPN Darl.
Q20 LM323 +5V Reg.
Q21 2N3584 NPN
HEATSINK P/O Q21 Heatsink T066
INSULATOR P/O Q21 Insulator T066
SCREWS P/O Q20, Q21 6-32 X 12 Screw
SCREWS P/O Q21 6-32 X 5 Screw
NUTS P/O Q20, Q21 6-32 Hex Nut
WASHERS P/O Q20, Q21 145-.290-019 Lockwasher
WASHERS P/O Q21 145-.313-019 Lockwasher
WASHERS P/O Q20, Q21 145-.375-032 Flat Washer
HEX SPACERS 6-32 Tapped Hex-Spacer
SHIELD P/O Q21 Plexiglass
HEATSINK P/O Q20 Heatsink T03
INSULATOR P/O Q20 Insulator T03
TAPE LABEL P/O Q21 High Voltage Label
Q22, Q23 2N3440 NPN
HEATSINK P/O Q23 Heatsink T05
INSULATOR P/O Q22, Q23 Insulator T05
TP1-TP7, GND. TEST POINTS
VR1 IN5275A Zener
U1 CA3081 Xstr Array
U2 74LS154 Binary Tr 1/16 Dec.
U3, U4 CA3041 Xstr Array
JW1-JW49 Tin 22awg Jumper
TW1, TW2 Cable Tie 7-5/8"
F1 3/16 A 8AG Fuse
CLIP P/O P1 Fuse Clip
J1, J2 .045 Auto Insert Pins
J3, J4 .025 Auto Insert Pins
J5 .045 Auto Insert Pins
K1 4R VDC Relay
P.C.B.

DESCRIPTION

IN4004 Diode
2N6045 NPN Darl.
LM323 +5V Reg.
2N3584 NPN
Heatsink T066
Insulator T066
6-32 X 12 Screw
6-32 X 5 Screw
6-32 Hex Nut
145-.290-019 Lockwasher
145-.313-019 Lockwasher
145-.375-032 Flat Washer
6-32 Tapped Hex-Spacer
Plexiglass
Heatsink T03
Insulator T03
High Voltage Label
2N3440 NPN
Heatsink T05
Insulator T05
TEST POINTS
IN5275A Zener
CA3081 Xstr Array
74LS154 Binary Tr 1/16 Dec.
CA3041 Xstr Array
Tin 22awg Jumper
Cable Tie 7-5/8"
3/16 A 8AG Fuse
Fuse Clip
.045 Auto Insert Pins
.025 Auto Insert Pins
.045 Auto Insert Pins
4R VDC Relay
P.C.B.



CROSS REF. LIST

DESCRIPTION

QTY

DESIGNATION NO.

PART NOS.

.002 uf 1KV Cer.	19	C1-C8, C11-C21	0360-00800-0012
.01 uf 50V Cer.	1	C22	0360-00800-0005
.01 uf 500V Cer.	2	C27, C28	0360-00800-0013
11 uf 20V Cer.	2	C25, C29	0360-00800-0026
2 uf 25V Elec.	1	C24	0360-00800-0019
160 uf 350V Elec.	1	C26	0360-00800-0020
11,000 uf 20V Elec.	1	C23	0360-00800-0024
2.2 OHM 1/4W 5%	1	R50	100E-00005-0003
120 OHM 1/4W 5%	20	R5, R7, R9, R11, R13	100E-00005-0035
		R15, R17, R19, R21, R23	
		R25, R27, R29, R31, R33	
		R36, R38, R41, R44, R48	
330 OHM 1/4W 5%	19	R6, R8, R10, R12, R14	100E-00005-0047
		R16, R18, R20, R22, R24	
		R26, R28, R30, R32, R34	
		R39, R42, R45, R47	
390 OHM 1/4W 5%	1	R52	100E-00005-0049
1.2K 1/4W 5%	17	R55, R57-R72	100E-00005-0063
3.9K 1/4W 5%	4	R37, R40, R43, R46	100E-00005-0077
8.2K 1/4W 5%	1	R54	100E-00005-0086
33K 1/4W 5%	4	R1-R4	100E-00005-0100
100 OHM 1/2W 5%	1	R49	100E-00006-0021
22K 1/2W 5%	1	R51	100E-00006-0065
82K 1/2W 5%	1	R56	100E-00006-0072
100K 1W 5%	1	R35	100E-00007-0037
RT1	1	0-25K Linear Pot 1/4W	0360-00804-0004
IN4004	21	CR1-CR21	103E-00003-0005
IN5275A 2 Zener	1	VR1	103E-00001-0027
LM323 +5V Reg.	1	Q20	0360-00003-0021
2N3440 NPN	2	Q22, Q23	104E-00003-0002
2N3584 NPN	1	Q21	104E-00005-0002
2N6045 NPN Darl.	19	Q1-Q19	0360-00802-0008
CA3081 Xstr Array	3	U1, U3, U4	0360-00803-0007
74LS154 Bin. to 1/16 Dec.	1	U2	0360-00803-0024
TIN 22awg Jumper	49	JW1-JW49	117E-00001-0001
3/16 A 8awg Fuse	1	F1	0017-00003-0206
Fuse Clip	2	P/O P1	0017-00071-0033
.045 Auto Insert Pins	36	J1, J2, J5	0304-00804-0010
.025 Auto Insert Pins	35	J3, J4	0304-00804-0009
TEST POINT	8	TP1-TP7, GND.	0017-00007-0131
Jumper Wire 24awg.	2	P/O C26	0017-00033-0448
Solder Lug	2	P/O C26	0017-00021-0257
Heatsink T05	1	P/O Q23	112E-00001-0004
Insulator T05	2	P/O Q22, Q23	0017-00042-0151
Heatsink T066	1	P/O Q21	112E-00001-0002
Insulator T066	1	P/O Q21	0017-00042-0158
6-32 X 12 Screw	4	P/O Q20, Q21	0017-00101-0132
6-32 X 5 Screw	2	P/O Q21	0017-00101-0767
6-32 Hex Nut	4	P/O Q20, Q21	0017-00103-0005
145-.290-019 Lockwasher	4	P/O Q20, Q21	0017-00104-0008
145-.313-019	4	P/O Q21	0017-00104-0009
145-.375-032 Flat Washer	4	P/O Q20, Q21	0017-00104-0106
6-32 Tapped Hex	2	Hex Spacer P/O Q21	0017-00042-0248
Spacer			
Heatsink T03	1	Heatsink P/O Q20	112E-00001-0003
Insulator T03	1	Insulator P/O Q20	0017-00042-0119
High Voltage Label	1	Tape Label P/O Q21	M051-00044-0000
48VDC Relay	1	K1	114E-00001-0011
P.C.B.	1	Solenoid Driver/Pwr Sply Bd.	A080-91612-A000

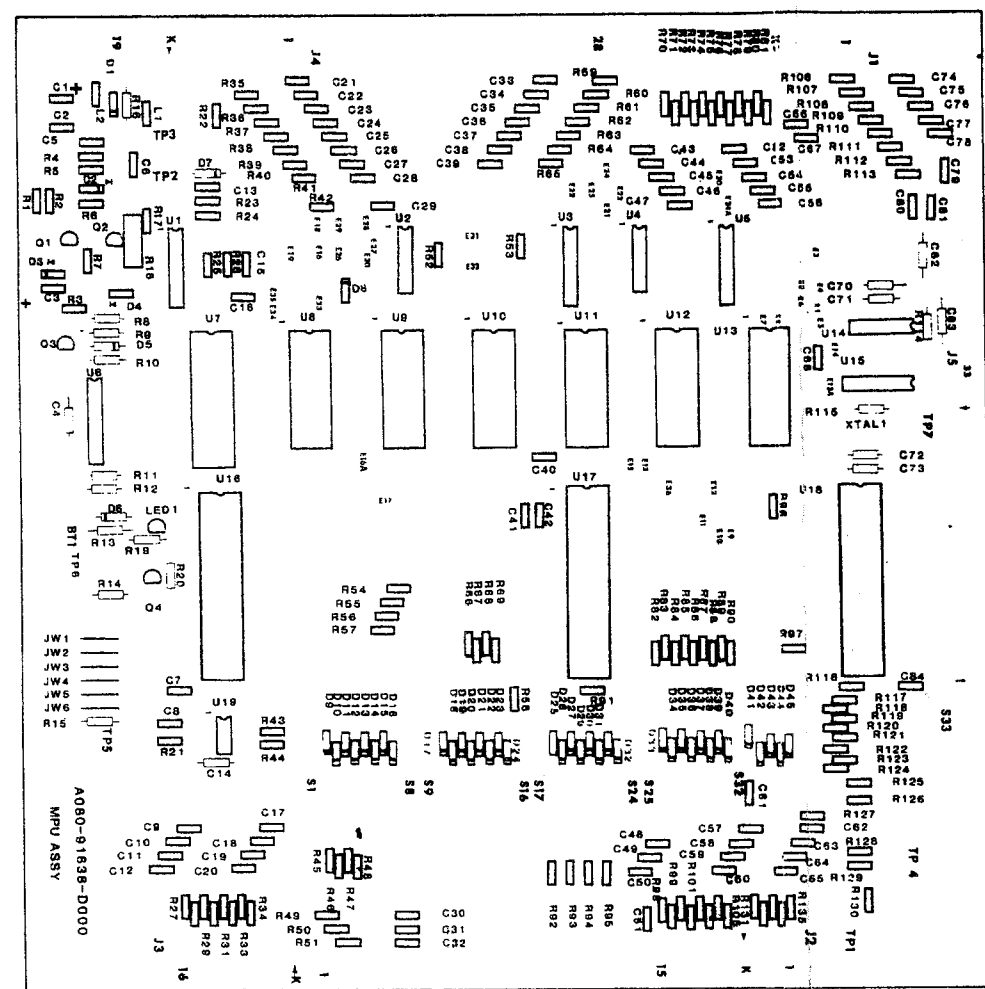
©1983 BALLY MIDWAY MFG. CO.
ALL RIGHTS RESERVEDAS-2518-22
SOLENOID DRIVER A3
REPLACEMENT FOR AS-2518-16

PROJECT ENG: A. AARSTAD			USED ON		PART NO.
DO NOT SCALE DWG		HEAT TREAT	SCALE	NO. REQ'D	
DIM TOLERANCES UNLESS SPECIFIED		DWG. BAK	ASSEMBLY DWG. SOLENOID DRIVER/PWR. SUPPLY BD.		M051-00114 - A046
DATE 11/27/84		A080-91612-A000			

REVISIONS	

Bally / MIDWAY MFG. CO.
FRANKLIN, PA. U.S.A.

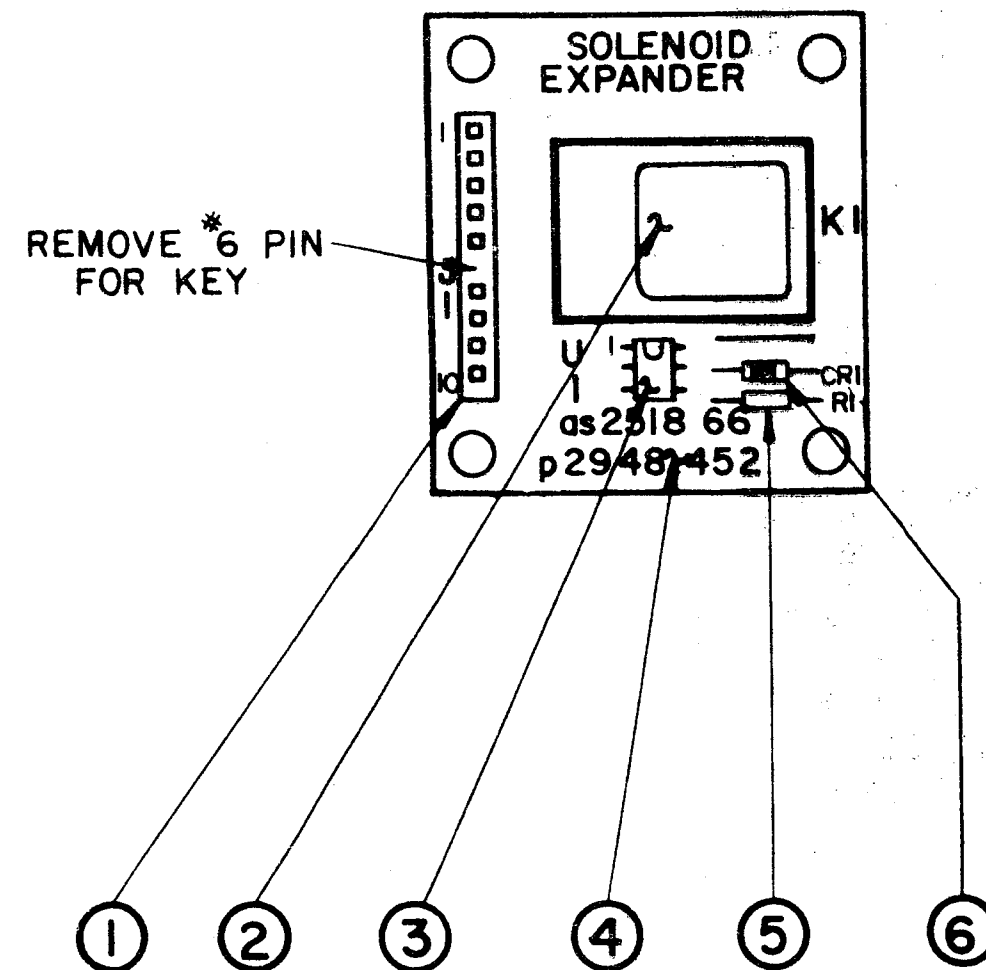
DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	4.7 UF TANT	R49,R50	1.2K
C2-C4	.01 UF	R51	110
C5,C6	820 PF	R52	30K
C7	.01 UF	R53	10K
C8	.1 UF	R54-R57	5.1K
C9-C12	390 PF	R58-R65	1.2K
C13	.015 UF	R66-R69	5.1K
C14	.01 UF	R70-R81	1.2K
C15	.05 UF	R82-R90	47K
C16	.01 UF	R91	3.3K
C17-C20	390 PF	R92-R95	56K
C21-C29	820 PF	R96	3.3K
C30,C31	390 PF	R97	30K
C32	3000 PF	R98-R113	1.2K
C33-C39	470 PF	R114	1.5M
C40-C42	.01 UF	R115	750K
C43-C47	470 PF	R116-R124	3.3K
C48-C51	390 PF	R125-R129	56K
C52-C56	470 PF	R130	1K
C57-C65	390 PF	R131-R135	1.2K
C66,C67	470 PF		
C68	.01 UF	D1	1N4148 *
C70	4.7 UF TANT	D2	1N9588 ZENER
C71	.01 UF	D3-D5	1N4148
C72,C73	33 PF	D6	1N4004
C74,C81	470 PF	D7-D45	1N4148
C82	.22 UF		
C83,C84	.01 UF	LED 1	LED (GREEN)
R1,R2	3K	Q1	2N3904
R3	270	Q2	2N4403
R4	2K	Q3,Q4	2N3904
R5	150K		
R6	1K	U1	4049B
R7	9.1K	U2	4011
R8	680	U3	4049B
R9	100K	U4	74LS00
R10	1.5K	U5	4502
R11	3K	U6	5114 RAM
R12	750	U14	74LS00
R13	470 1/2W	U15	74HC4538
R14	4.7K	U16,U17	6821
R15	8.2K	U18	6802
R16	2K *	U19	555
R17	33K		
R18	82 1W	BT 1	BATTERY 3.6VDC
R19	3.3K		
R20	8.2K	S1-S32	DIP SWITCH
R21	1K	S33	PUSH BUTTON SW
R22	470	U6	18 PIN SOCKET
R23	7.5K	U7	28 PIN SOCKET
R24	2K	U8,U12	24 PIN SOCKET
R25	1.5M	U16-U18	40 PIN SOCKET
R26	270K		
R27-R34	1.2K	J1-J5	.025 SQ PIN
R35-R37	470	TP1-TP7	TEST POINT LOOP
R38-R41	330		TY-WRAP JUMPR WIRE
R42	470		
R43	24K	L1,L2	.22 UH INDUCTOR
R44	4.7K	XTAL 1	CRYSTAL 2.000 MHZ
R45-R48	56K	P.C.B	AO84-91638-DU00



DESCRIPTION	QTY	DESIGNATION NO.	PART NOS.	DESCRIPTION	QTY	DESIGNATION NO.	PART NOS.
33 PF AX CER	2	C72,C73	0395-00800-0002	1N4004	1	D6	103E-00003-0005
390 PF AX CER	23	C9-C12,C17-C20, C30,C31,C48-C51, C57-C65	0360-00800-0001	1N4148	43	D1,D3-D5,D7-D45	103E-00002-0005
470 PF AX CER	27	C33-C39,C43-C47 C52-C56,C66,C67 C74-C81	0360-00800-0002	1N9588 ZENER	1	D2	103E-00001-0002
820 PF AX CER	11	C5,C6,C21-C29	0360-00800-0004	LED	1	LED 1	119E-00001-0001
3000 PF	1	C32	0360-00800-0025	2N3904	3	Q1,Q3,Q4	104E-00001-0006
.01 UF	13	C2-C4,C7,C14, C16,C40-C42,C68, C71,C83,C84	0360-00800-0005	2N4403	1	Q2	104E-00002-0006
.015 UF	1	C13	0395-00800-0001	555	1	U19	0360-00803-0001
.05 UF	1	C15	0360-00800-0006	4011	1	U2	0360-00803-0010
.1 UF	1	C8	0360-00800-0007	4049B	2	U1,U3	0360-00803-0011
.22	1	C82	0360-00800-0057	4502	1	U5	0360-00803-0005
4.7 UF TANT	2	C1,C70	0360-00800-0008	5114 RAM	1	U6	0395-00803-0003
82,1W	1	R18	100E-00007-0014	6802	1	U7	0395-00803-0002
110	1	R51	100E-00005-0034	6821	2	U16,U17	0360-00803-0017
270	1	R3	100E-00005-0044	74LS00	2	U4,U14	0360-00803-0052
330	4	R38-R41	100E-00005-0047	74HC4538	1	U15	0395-00803-0001
470,1/2W	1	R13	100E-00006-0034	BATTERY 3.6VDC	1	BT 1	0017-00003-0172
470	5	R22,R35-R37,R42	100E-00005-0051	DIP SWITCH	4	S1-S32	113E-00001-0003
680	1	R8	100E-00005-0056	PUSH BUTTON SW	1	S33	0017-00032-0038
750	1	R12	100E-00005-0057	18 PIN SOCKET	1	U6	110E-00001-0004
1K	3	R6,R21,R130	100E-00005-0061	24 PIN SOCKET	2	U8,U12	110E-00001-0007
1.2K	51	R27-R34,R49,R50 R58-R65,R70-R81, R98-R113,R131- R135	100E-00005-0063	40 PIN SOCKET	3	U16,U17,U18	110E-00001-0011
1.5K	1	R10	100E-00005-0065	28 PIN SOCKET	1	U7	110E-00001-0010
2K	3	R4,R24(R16 OPT.)	100E-00005-0068	.025 SQ PIN	14	J2	0304-00804-0009
3K	3	R1,R2,R11	100E-00005-0073	TEST POINT	7	TP1-TP7	0017-00007-0131
3.3K	12	R19,R91,R96,R116- R124	100E-00005-0074	TY-RAP	1		0017-00042-0105
4.7K	2	R14,R44	100E-00005-0079	INDUCTOR .22 UH	2	L1,L2	0360-00804-0007
5.1K	8	R54-R57,R66-R69	100E-00005-0080	CRYSTAL 2.000 MHZ	1	Y1	0395-00804-0002
7.5K	1	R23	100E-00005-0085				AO84-91638-0000
8.2K	2	R15,R20	100E-00005-0086				
9.1K	1	R7	100E-00005-0087				
10K	1	R53	100E-00005-0088				
24K	1	R43	100E-00005-0097				
30K	2	R52,R97	100E-00005-0099				
33K	1	R17	100E-00005-0100				
47K	9	R82-R90	100E-00005-0104				
56K	13	R45-R48,R92-R95 R125-R129	100E-00005-0106				
100K	1	R9	100E-00005-0115				
150K	1	R5	100E-00005-0120				
270K	1	R26	100E-00005-0126				
750K	1	R115	100E-00005-0137				
1.5M	2	R25,R114	100E-00005-0143				

PROJECT ENG: A. AARSTAD		USED ON PINBALL		REVISIONS	
DO NOT SCALE DWG		NO REVD		Bates / MIDWAY MFG. CO. FRANKLIN, PA. U.S.A.	
DIM TOLERANCES UNLESS SPECIFIED		DATE: 9/18/84		PART NO M051 - 00114 - 0076	
1/16" DECIMAL 1/32" DECIMAL 1/64" DECIMAL		FINISH		6802 MPU ASSY DRAWING AO84-91638-DU00	

A15: SOLENOID EXPANDER ASSEMBLY
AS-2518-66

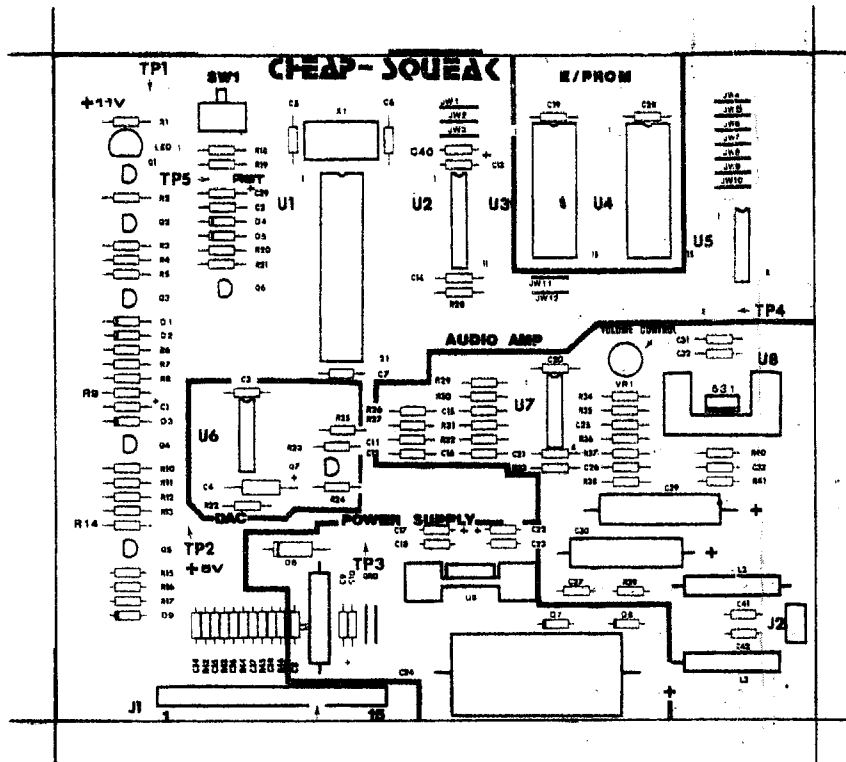


ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	J1	E-736-10	10 Pin 'Molex' KK156
2	K1	E-146-795	48 V. Relay
3	U1	E-620-172	MOC 3011
4	P-2948-452	M-645-585	P.C. Board
5	R1	E-105-219	330 Ohm Resistor
6	CR1	E-587-15	IN4004 Diode
Ref.		W-1251-I	Schematic

DESCRIPTION LIST

DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	0.8 UF @ 25V,	D1-D3	1N4004
C2,C3	0.01 UF	D4,D5	1N4004
C4	47 UF @ 16V	D6	VR330
C5,C6	27 PF,5%	D7,D8	1N4004
C7-C9	0.01 UF	D9	1N958B
C10	4.7 UF @ 25V,		
	TANT	Q1	2N3305
C11	1000 PF	Q2	2N4403
C12,C13	0.1 UF	Q3	2N3904 NPN
C14	47 PF	Q4	2N4403 PNP
C15	150 PF	Q5	2N3904 NPN
C16	220 PF	Q6	2N4403 PNP
C17	4.7 UF @ 25V,	Q7	2N3305 NPN
	TANT	U1	MC 6803
C18,C19	0.01 UF	U2	LS173
C20,C21	0.1 UF	U3,U4	SPROM
C22	4.7 UF @ 25V,	U5	LS10
	TANT	U6	2N429E-A
C23	0.01 UF	U7	LM 3900
C24	4700 UF @ 25V	U8	TDA 2002
C25	100 PF	U9	MC 7805
C26	300 PF		
C27	0.1 UF	L1,L2,L3	10 OHM CHOKF
C28	0.01 UF		
C29	470 UF @ 6V	XU1	40 PIN SOCKET
C30	1000 UF @ 16V	XU3,XU4	28 PIN SOCKET
C31	0.33 UF		
C32	0.1 UF	J1	.045 PIN
C33	0.05 UF	J2	.045 PIN
C34-C38	820 PF	TP1-TP5	TEST POINT
C39,C40	4.7 UF @ 25V		
	TANT	LED 1	RV5254
C41,C42	.22 UF		
X1	560 OHM	HEATSINK P/O U8	6030B-TT
X2	47K OHM	HEATSINK P/O U9	6100B
X3	910 OHM	SCREW P/O U8	SCREW 6-32
X4	5.6K OHM	NUT P/O U8	NUT 6-32
X5	62K OHM	SCREW P/O U9	SCREW 4-40
X6	10K OHM	NUT P/O U9	NUT 4-40
X7	82K OHM		
X8	10K OHM	STAR WASHER P/O U8	
X9	47K OHM		
X10	100 OHM	P/O U8,U9	INSULATOR
X11	82 OHM		
X12	9.1K OHM	SW1	SWITCH P.C.B.
X13	7.5K OHM		
X14	39K OHM	X1	3.579 MHZ
X15,X16	2.7K OHM		
X17	1K OHM		
X18,X19	3.3K OHM		
X20	10K OHM		
X21	16K OHM		
X22	2.7K OHM		
X23	68 OHM		
X24	180 OHM		
X25,X26	100K OHM		
X27	47K OHM		
X28	120 OHM		
X29	120K OHM		
X30	130K OHM		
X31	100K OHM		
X32	200K OHM		
X33	390K OHM		
X34	470K OHM		
X35	24K OHM		
X36	180K OHM		
X37	390K OHM		
X38	2.2 OHM		
X39	1 OHM		
X40	430 OHM		
X41	220 OHM		
X42-R46	470 OHM		

VR 1 PHAN. POT 0-1K 1/2W

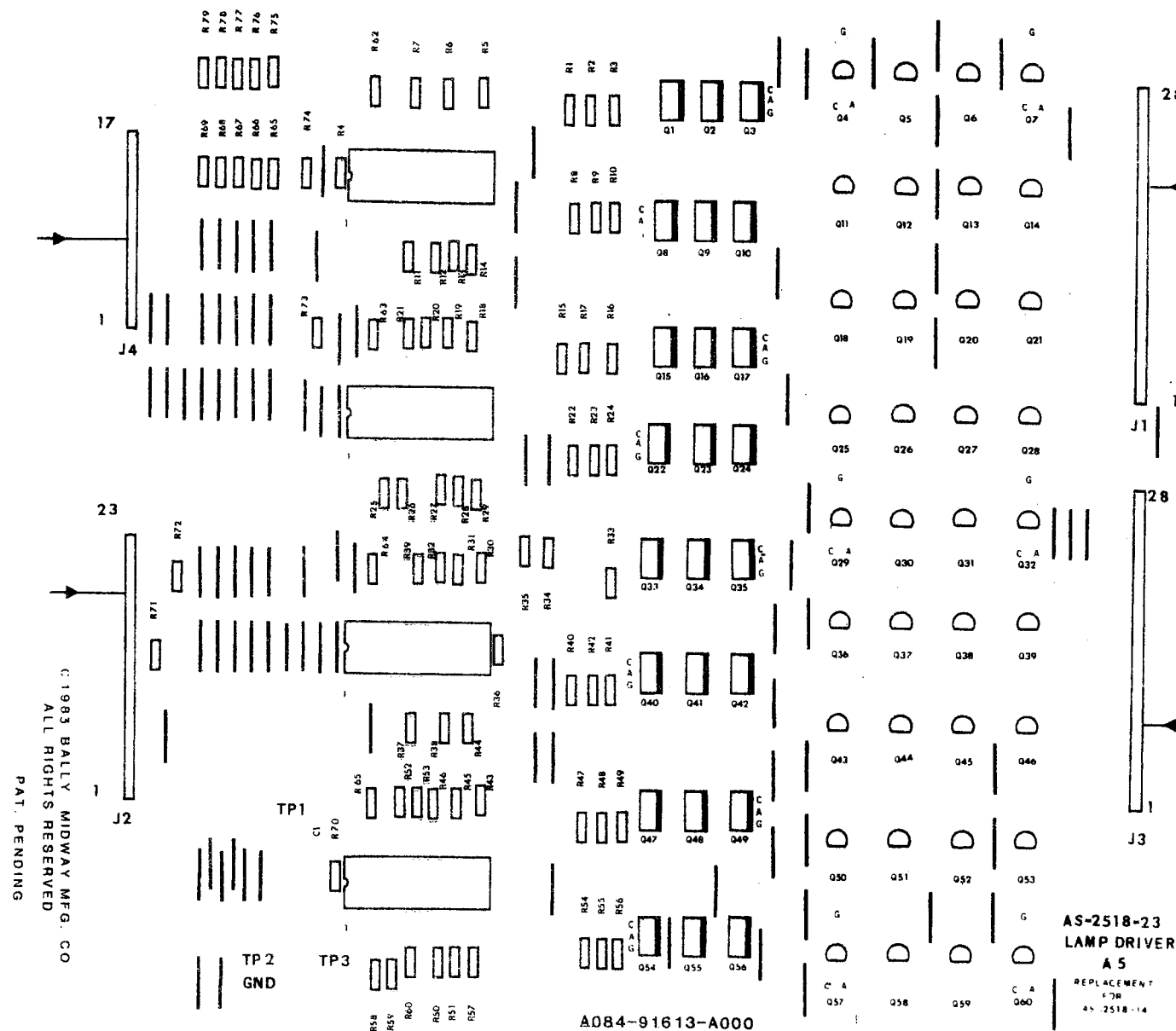


DESCRIPTION	QTY	DESIGNATION NO.	PART NOS.	DESCRIPTION	QTY	DESIGNATION NO.	PART NOS.
27 PF,5%	2	C5,C6	0360-00800-0052	PHAN. POT 0-1K 1/2W	1	VR1	0360-00804-0003
47 PF	1	C14	0360-00800-0027				
100 PF	1	C25	0360-00800-0046				
150 PF	1	C15	0360-00800-0053	1N4006	3	D1-D3	103E-00002-0006
220 PF	1	C16	0360-00800-0054	1N4004	4	D4,D5,D7,D8	103E-00003-0005
300 PF	1	C26	0360-00800-0055	VR 330	1	D6	0360-00801-0007
820 PF	5	C34-C38	0360-00800-0004	1N958B ZENER	1	D9	103E-00001-0002
3000 PF	1	C11	0360-00800-0056				
.01 UF	9	C2,C3,C7-C9, C18,C19,C23, C28	0360-00800-0005	2N3904 NPN	2	Q3,Q5	104E-00001-0006
.05 UF	1	C33	0360-00800-0006	2N4403 PNP	3	Q2,Q4,Q6	104E-00002-0006
0.1 UF	6	C12,C13,C20, C21,C27,C32	0360-00800-0058	2N5305 DARL NPN	2	Q1,Q7	104E-00007-0005
.22 UF	2	C41,C42	0360-00800-0057	74LS10	1	U5	0360-00863-0046
.33 UF	1	C31	0360-00800-0059	74LS373	1	U2	0360-00803-0059
4.7 UF @ 25V,	5	C10,C17,C22, C39,C40	0360-00800-0008	MC 6803, MPU	1	U1	0360-00803-0048
TANT	1	C1	0360-00800-0048	2N429E-A, DAC	1	U6	0360-00803-0049
6.8 UF @ 25V,	1			LM 3900, OP AMP	1	U7	0360-00803-0002
TANT	1			TDA 2002, AUD AMP	1	U8	0360-00803-0009
47 UF @ 16V	1			MC 7805, +5V REG.	1	U9	0360-00803-0050
470 UF @ 8V	1						
1000 UF @ 16V	1						
4700 UF @ 25V	1						
1 OHM	1	R39	100E-00005-0002	INDUCTOR 10 UH	3	L1,L2,L3	0360-00804-0031
2.2 OHM	1	R38	100E-00005-0003				
68 OHM	1	R23	100E-00005-0029	28 PIN IC SOCKET	2	XU3,XU4	0360-00804-0028
82 OHM	1	R11	100E-00005-0031	40 PIN IC SOCKET	1	XU1	0360-00804-0018
100 OHM	1	R10	100E-00005-0033	.045 SR. PIN	15	J1	0017-00033-0480
120 OHM	1	R28	100E-00005-0035	.045 SQ. PIN	2	J2	0017-00033-0480
180 OHM	1	R24	100E-00005-0039	TEST POINTS	5	TP1-TP5	0017-00007-0131
220 OHM	1	R41	100E-00005-0041	LED MV5254	1	LED 1	0360-00804-0015
430 OHM	1	R40	100E-00005-0050	HEATSINK, 6030B-TT	1	P/O U8	0360-00804-0010
470 OHM	5	R42-R46	100E-00005-0051	HEATSINK, 6100B	1	P/O U9	0360-00804-0032
560 OHM	1	R1	100E-00005-0054				
910 OHM	1	R3	100E-00005-0059	NUT 6 X 32	1	P/O U8	0017-00103-0005
1K OHM	1	R17	100E-00005-0061	SCREW 6 X 32	1	P/O U8	0017-00101-0339
2.7K OHM	3	R15,R16,R22	100E-00005-0071	NUT 4-40	1	P/O U9	0017-00103-0002
3.3K OHM	2	R18,R19	100E-00005-0074	SCREW 4-40	1	P/O U9	0017-00101-0731
5.6K OHM	1	R4	100E-00005-0082	STAR WASHER	1	P/O U9	0017-00104-0071
7.5K OHM	1	R13	100E-00005-0085				
9.1K OHM	1	R12	100E-00005-0087	INSULATOR, THERMAL	2	P/O U8,U9	0017-00042-0319
10K OHM	3	R6,R8,R20	100E-00005-0088	SWITCH	1	SW1	0017-00032-0038
16K OHM	1	R21	100E-00005-0165	CRYSTAL, 3.579 MHZ	1	X1	0360-00804-0019
24K OHM	1	R35	100E-00005-0097	P.C.B.	1		A080-91603-C000
39K OHM	1	R14	100E-00005-0102				
47K OHM	3	R2,R9,R27	100E-00005-0104				
62K OHM	1	R5	100E-00005-0107				
82K OHM	1	R7	100E-00005-0112				
100K OHM	3	R25,R26,R31	100E-00005-0115				
120K OHM	1	R29	100E-00005-0118				
130K	1	R30	100E-00005-0119				
180K	1	R36	100E-00005-0122				
200K	1	R32	100E-00005-0123				
390K	2	R33,R37	100E-00005-0130				
470K	1	R34	100E-00005-0132				

PROJECT ENG: D. MACDONALD		USED ON		REVISIONS	
DO NOT SCALE DWG		SCALE: FULL	NO. REQD: 1	PER	
DIM TOLERANCES UNLESS SPECIFIED		CHEAP SQUEAK PC BD. ASSY.		PART NO.	
A080-91603-C000		A080-91603-C000		M051 - 0014 - C044	
DATE: 01/18/84					

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION
C1	.01 MF 500V
R1-R60	2K 5% 1/4W
R61-R69	2.2M 5% 1/4W
R70	2K 5% 1/4W
R71-R79	20K 5% 1/4W
Q1-Q3	MCR106-1
Q4-Q7	2N5060
Q8-Q10	MCR106-1
Q11-Q14	2N5060
Q15-Q17	MCR106-1
Q18-Q21	2N5060
Q22-Q24	MCR106-1
Q25-Q32	2N5060
Q33-Q35	MCR106-1
Q36-Q39	2N5060
Q40-Q42	MCR106-1
Q43-Q46	2N5060
Q47-Q49	MCR106-1
Q50-Q53	2N5060
Q54-Q56	MCR106-1
Q57-Q60	2N5060
U1-U4	MC14514B
J1	28 PIN WAFER CONN.
J2	23 PIN WAFER CONN.
J3	28 PIN WAFER CONN.
J4	17 PIN WAFER CONN.
TP1-TP3	TEST CLIP LABEL JUMPER, 22 AWG P.C. BOARD



CROSS REFERENCE LIST

DESCRIPTION	QTY	DESIGNATION NO.	BALLY'S PART NOS.	MIDWAY'S PART NOS.
.01 MF 500V	1	C1	E-00586-0065	0360-00800-0013
2.2M 5% 1/4W	9	R61-R69	E-00105-0256	0062-33983-1XXX
2K 5% 1/4W	61	R1-R60, R70	E-00105-0237	0062-19383-1XXX
20K 5% 1/4W	9	R71-R79	E-00105-0242	0062-24183-1XXX
MCR106-1	24	Q1-Q3, Q8-Q10, Q15-Q17, Q22-Q24, Q33-Q35, Q40-Q42, Q47-Q49, Q54-Q56	E-00585-0029	0360-00802-0009
2N5060	36	Q4-Q7, Q11-Q14, Q18-Q21, Q25-Q32, Q36-Q39, Q43-Q46, Q50-Q53, Q57-Q60	E-00585-0014	0360-00802-0005
MC14514B	4	U1-U4	E-00620-0037	0360-00803-0013
17 PIN WAFER CONN.	1	J4	E-00715-0013	0151-00030-17XB
23 PIN WAFER CONN.	1	J2	E-00715-0014	0151-00030-23XB
28 PIN WAFER CONN.	2	J1, J3	E-00715-0004	0151-00030-28XB
TEST CLIP LABEL	3	TP1-TP3	P-05399	0017-00007-0131
JUMPER, 22 AWG	99		M-1777-126	0017-00081-0097
P.C. BOARD	1		P-02948-0301	0069-230XX-XBKX
				A080-91613-A000

PROJECT ENG		USED ON		REVISIONS	
DO NOT SCALE		NO REQ'D I PER		Bally / MIDWAY MFG. CO. FRANKLIN PK ILL	
DIM TOLERANCE UNLESS SPECIFIED		SCALE FULL		PART NO M051 - 00114 - A04	
DATE 05/31/83		LAMP DRIVER ASSY DWG A084-91613-A000			

FIREBALL CLASSIC QM40

DESCRIPTION	JACK	PIN	WIRE COLOR
RT. ARROW SPCL.	J3	2	95
BALL IN PLAY	J2	22	62
BALL RELEASE	J1	5	48
BONUS 2K	J1	23	12
BONUS 4K	J1	3	45
BONUS 6K	J3	17	13
BONUS 8K	J3	11	93
BONUS 10K	J1	14	67
BONUS 12K	J1	2	52
BONUS 14K	J3	16	25
BONUS 16K	J3	9	15
BONUS 18K	J1	15	31
BONUS 20K	J1	16	15
BONUS 40K	J1	7	34
BONUS 60K	J3	27	40
BONUS SPCL.	J3	4	14
CREDIT INDICATOR	J3	13	35
GAME OVER BACK BOX	J2	11	95
HIGH SCORE BACK BOX	J2	23	97
LT. KICKER ARROW	J3	23	98
MATCH	J2	8	82
MOTOR CONTROL	J3	3	81
RT. MUSHROOM ARROW	J3	10	91
LT. MUSHROOM ARROW	J3	21	64
SAUCER LT. 10K	J1	18	58
SAUCER LT. 20K	J1	1	41
SAUCER LT. 30K	J3	26	43
SAUCER LT. 40K	J3	1	10
SAUCER LT. 50K	J1	19	60
SAUCER RT. BOT. 30K	J1	9	43
SAUCER RT. MID. 30K	J3	25	36
SAUCER RT. TOP 30K	J3	12	21
SPSA BACK BOX	J2	21	47
SPSA PLAYFIELD	J2	26	91
SPCL. RT. LITE	J1	24	50
THUMPER BUMPER TOP & MID.	J1	10	32
TILT	J2	10	35
2X	J1	17	57
3X	J1	8	51
4X	J3	19	67
5X	J3	15	53
VALUE DOUBLE	J3	20	78
VALUE TRIPLE	J3	18	56

NOTE: ** INDICATES MCR 106-1 ALL OTHERS ARE -2N5060 OR EQUIVALENT.

FIREBALL CLASSIC SOLENOID DRIVER LOCATIONS AS

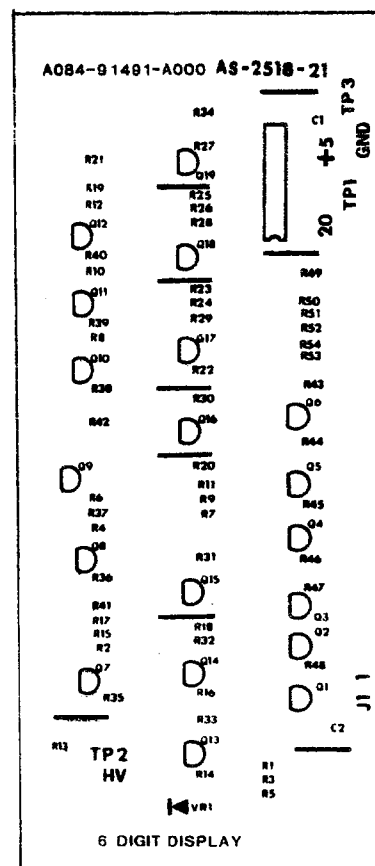
TRANSISTOR	DESCRIPTION	JACK	PIN	WIRE COLOR
Q14	BUMPER BOTTOM	J5	11	78
Q13	BUMPER MIDDLE	J5	12	80
Q8	BUMPER TOP	J5	10	85
Q19	COIN BOX LOCKOUT	J2	8	36
	FLIPPERS			
Q17	GATE	J5	7	91
Q4	SIDE RETURN KICKER	J1	5	95
Q16	KNOCKER	J2	5	85
Q12	OUTHOLE	J5	13	67
Q11	BALL RELEASE	J5	14	83
Q2	SAUCER LT.	J1	3	
Q1	SAUCER RT.	J1	2	
Q9	SLINGSHOT LT.	J5	9	71
Q10	SLINGSHOT RT.	J5	15	74

NOTE: TRANSISTORS ARE SE9302 OR EQUIVALENT.

WIRE COLOR CODE	
1 - RED -R-	6 - BROWN -BR-
2 - BLUE -BLU-	7 - ORANGE -O-
3 - YELLOW -Y-	8 - BLACK -B-
4 - GREEN	9 - GRAY
5 - WHITE -W-	0 - NO TRACER
J - JUMPER	
1 - FIRST NUMBER-BODY COLOR	
2 - SECOND NUMBER-TRACER COLOR	
EXAMPLE: 50 - WHITE	
51 - WHITE-RED	

DESIGNATION LIST

DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	.01 MF 25V	DS1MH	TACK-SCREW RPLCMNT
C2	.01 MF 500V		DISPLAY MTG. TOP
			DISPLAY MTG. BOTTOM
R1	100K OHM 1/4W 5%		PRESSURE SENSITIVE
R2	2.2K OHM 1/4W 5%		TAPE
R3	100K OHM 1/4W 5%		
R4	2.2K OHM 1/4W 5%		BUMPER
R5	100K OHM 1/4W 5%		
R6	2.2K OHM 1/4W 5%	J1	.045 SQ. PIN
R7	100K OHM 1/4W 5%		
R8	2.2K OHM 1/4W 5%	TP1-TP3	TEST POINTS
R9	100K OHM 1/4W 5%		
R10	2.2K OHM 1/4W 5%		JUMPER TIN 22 AWG
R11	100K OHM 1/4W 5%		
R12	2.2K OHM 1/4W 5%	A080-91491-A000	6 DIGIT DISPLAY
R13	1.5K OHM 1/4W 5%		
R14	300K OHM 1/4W 5%		
R15	1.5K OHM 1/4W 5%		
R16	300K OHM 1/4W 5%		
R17	1.5K OHM 1/4W 5%		
R18	300K OHM 1/4W 5%		
R19	1.5K OHM 1/4W 5%		
R20	300K OHM 1/4W 5%		
R21	1.5K OHM 1/4W 5%		
R22	300K OHM 1/4W 5%		
R23	1.5K OHM 1/4W 5%		
R24	300K OHM 1/4W 5%		
R25	1.5K OHM 1/4W 5%		
R26	300K OHM 1/4W 5%		
R27-R33	1.2K OHM 1/4W 5%		
R34	100K OHM 1/4W 5%		
R35-R40	300K OHM 1/4W 5%		
R41	39K OHM 1/4W 5%		
R42	240K OHM 1/4W 5%		
R43-R48	9.1K OHM 1/4W 5%		
R49-R54	20K OHM 1/4W 5%		
VR1	IN3045A		
Q1-Q6	MPS-A42		
Q7-Q12	2N5401		
Q13-Q20	MPS-A42		
U1	MC14543		
DS1	6 DIGIT DISPLAY PANEL		



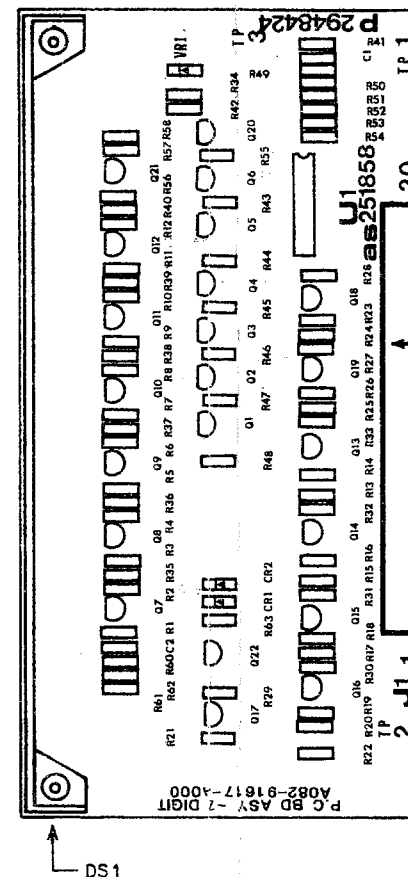
CROSS REF. LIST

DESCRIPTION	QTY.	DESIGNATION NO.	PART NUMBER
.01 MF 25V	1	C1	0360-00800-0005
.01 MF 500V	1	C2	0360-00800-0013
1.2K 1/4W 5%	7	R27-R33	100E-00005-0063
1.5K 1/4W 5%	7	R13, R15, R17, R19	100E-00005-0065
2.2K 1/4W 5%	6	R21, R23, R25	100E-00005-0069
9.1K 1/4W 5%	6	R2, R4, R6, R8, R10	100E-00005-0069
20K 1/4W 5%	6	R12	100E-00005-0087
39K 1/4W 5%	1	R43-R48	100E-00005-0095
100K 1/4W 5%	7	R49-R54	100E-00005-0102
METAL FILM	1	R41	100E-00005-0102
240K 1/4W 5%	1	R1, R3, R5, R7, R9	100E-00005-0111
300K 1/4W 5%	13	R11, R34	100E-00005-0125
		R42	100E-00005-0125
		R14, R16, R18, R20, R22, R24, R26, R35-R40	100E-00005-0127
IN3045A	1	VR1	103E-00001-0028
2N5401	6	Q7-Q12	104E-00002-0007
MPS-A42	13	Q1-Q6 Q13-Q20	104E-00001-0016
MC14543	1	U1	0360-00803-0014
6 DIGIT DISPLAY	1	DS1	0360-00804-0016
DS1 MTG. HDW			
TACK-SCREW RPLCMNT	2	DS1MH	0095-00900-0000
DISPLAY MTG. TOP	1		0017-00042-0155
DISPLAY MTG. BOTTOM	1		0017-00042-0156
PRESSURE SENSITIVE TAPE			0017-0081-0095
BUMPER	1		0017-00041-0598
.045 SQ. PIN	1	J1	0304-00804-0010
TEST POINTS	3	TP1-TP3	0017-00007-0131
JUMPER TIN 22 AWG	9		117E-00001-0001
6 DIGIT DISPLAY PCB.	1		A080-91491-A000

PROJECT ENG: A. AARSTAD		USED ON		REVISIONS	
DO NOT SCALE DWG.		HEAT TREAT	SCALE	NO. REQ'D PER	
			FULL		
DIM TOLERANCES UNLESS SPECIFIED		ASSEMBLY DWG. SIX DIGIT DISPLAY		PART NO.	
DRG. BAK		A082-91491-A000		M051-00114 -A028	
DATE 11/14/84					

DESIGNATION LIST

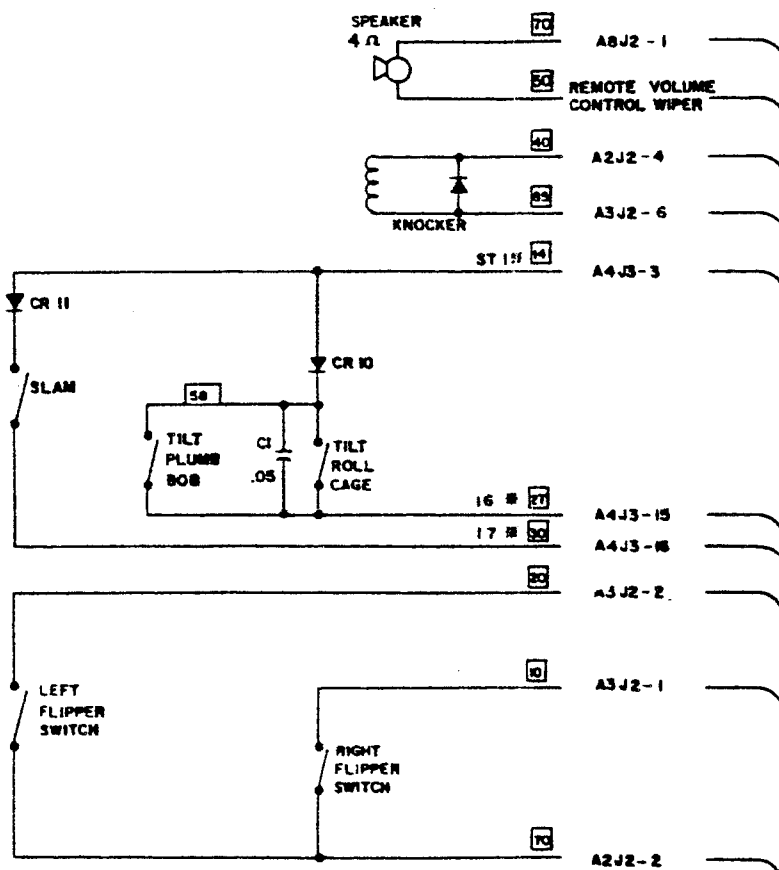
DESIGNATION NO.	DESCRIPTION	DESIGNATION NO.	DESCRIPTION
C1	.01 MF 25V	CR1,CR2	1N4148
C2	.01 MF 500V		
		VR1	1N3045A/110V ZENER
R1	100K OHM 1/4W 5%	Q1-Q6	MPS-A42
R2	2.2K OHM 1/4W 5%	Q7-Q12	2N5401
R3	100K OHM 1/4W 5%	Q13-Q20	MPS-A42
R4	2.2K OHM 1/4W 5%	Q21	2N5401
R5	100K OHM 1/4W 5%	Q22	MPS-A42
R6	2.2K OHM 1/4W 5%		
R7	100K OHM 1/4W 5%	U1	MC14543
R8	2.2K OHM 1/4W 5%		
R9	100K OHM 1/4W 5%	DS1	DISPLAY ASS'Y
R10	2.2K OHM 1/4W 5%		
R11	100K OHM 1/4W 5%	J1	10 PIN WAFER KK-156 (2)
R12	2.2K OHM 1/4W 5%		
R13	1.5K OHM 1/4W 5%	TP1-TP3	TEST LOOPS
R14	300K OHM 1/4W 5%		
R15	1.5K OHM 1/4W 5%		
R16	300K OHM 1/4W 5%		
R17	1.5K OHM 1/4W 5%		
R18	300K OHM 1/4W 5%		
R19	1.5K OHM 1/4W 5%		
R20	300K OHM 1/4W 5%		
R21	1.5K OHM 1/4W 5%		
R22	300K OHM 1/4W 5%		
R23	1.5K OHM 1/4W 5%		
R24	300K OHM 1/4W 5%		
R25	1.5K OHM 1/4W 5%		
R26	300K OHM 1/4W 5%		
R27-R33	1.2K OHM 1/4W 5%		
R34	100K OHM 1/4W 5%		
R35-R40	300K OHM 1/4W 5%		
R41	39K OHM 1/4W 5%		
R42	240K OHM 1/4W 5%		
R43-R48	9.1K OHM 1/4W 5%		
R49-R54	20K OHM 1/4W 5%		
R55	9.1K OHM 1/4W 5%		
R56	100K OHM 1/4W 5%		
R57	2.2K OHM 1/4W 5%		
R58	300K OHM 1/4W 5%		
R59	NOT USED		
R60,R61	1.5K OHM 1/4W 5%		
R62	300K OHM 1/4W 5%		
R63	150K OHM 1/4W 5%		



CROSS REFERENCE LIST

DESCRIPTION	QTY	DESIGNATION NO.	BALLY'S PART NOS.	MIDWAY'S PART NOS.
.01 MF 25V	1	C1	E-586-85	0360-00800-0005
.01 MF 500V	1	C2	E-586-65	0360-00800-0013
1.2K 1/4W 5%	7	R27-R33	E-105-222	100E-00005-0063
1.5K 1/4W 5%	9	R13,R15,R17,R19 R21,R23,R25,R60 R61	E-105-229	100E-00005-0065
2.2K 1/4W 5%	7	R2,R4,R6,R8,R10 R12,R57	E-105-287	100E-00005-0069
9.1K 1/4W 5%	7	R43-R48,R55	E-105-228	100E-00005-0087
20K 1/4W 5%	6	R49-R54	E-105-242	100E-00005-0095
39K 1/4W 5%	1	R41	E-105-231	100E-00005-0102
100K 1/4W 5%	8	R1,R3,R5,R7,R9, R11,R34,R56	E-105-331	100E-00001-0011
150K 1/4W 5%	1	R63	E-105-248	100E-00001-0120
240K 1/4W 5%	1	R42	E-105-271	100E-00001-0125
300K 1/4W 5%	15	R14,R16,R18,R20, R22,R24,R26,R35- R40,R58,R62	E-105-227	100E-00001-0127
1N3045A/110V ZENER	1	VR1	E-598-7	103E-00001-0028
1N4148	2	CR1,CR2	E-587-14	103E-00002-0005
2N5401	7	Q7-Q12,Q21	E-585-32	0360-00802-0006
MPS-A42	15	Q1-Q6,Q13-Q20,Q22	E-585-33	0360-00802-0007
MC14543	1	U1	E-620-38	0360-00803-0014
7 DIGIT DISPLAY DS1 MTG. HDW TACK - SCREW REPLACEMENT	1 2	DS1	E-680-7	0360-00804-0022 0095-00900-0000
DISPLAY MTG. TOP	1		P-2399	0017-00042-0155
DISPLAY MTG. BOTTOM	1		P-2399-1	0017-00042-0156
PRESSURE SENSITIVE TAPE				0017-00081-0095
BUMPER	1		R-206-9	0017-00041-0598
10 PIN WAFER KK156	2	J1	E-736-10	0151-00031-10XB
TEST LOOPS	3	TP1-TP3	P-5399	0017-00007-0131
7 DIGIT DISPLAY PCB.	1		P-2948-424	A080-91617-A000

PROJECT ENG: D. MACDONALD		USED ON		REVISIONS	
DO NOT SCALE DWG.		HEAT TREAT	SCALE	FULL	
DIM TOLERANCES UNLESS SPECIFIED		DRAWN: TBB	NO. REQ'D		1 PER
DATE: 12-09-83		SEVEN DIGIT DISPLAY ASSY DWG.		PART NO. M051 - 00114 - A056	
		A082 - 91617 - A000		FRANKLIN PK ILL	



TO	J1 PIN	TO	J1 PIN
A4J3-9	1	A4J3-3	11
A4J3-10	2	A2J2-4	15
A4J3-11	3	A3J2-0	16
A4J3-12	4	A2J2-6	17
A4J3-15	5	A2J2-3	18
A4J3-16	6	A4J3-1	19
A4J3-15	7	A3J2-7	20
A4J3-16	8	SPEAKER	9
A4J3-2	10	A8J2-1	12

DOOR PLUG A8J2-2 13

VRI (SEE NOTE)

POWER ON OFF (30)

SERVICE OUTLET (80)

INTERLOCK SAFETY S.W.

NOT USED ON ALL GAMES

FL I

BRN

BLU

120 VAC

EARTH GND

120 VAC RETURN

GND BRAID (43)

A2 POWER MODULE (AS 3071 X)

J1

F1-3ASB

T1

VOLTAGE JUMPER COMBINATIONS

VOLTAGE	JUMPER COMBINATIONS
115 VAC	2-8, 3-6, 7-10
120 VAC	2-8, 4-6, 7-11
220 VAC	4-8, 7-9
240 VAC	4-8, 7-11

1 AMP

TO MOTOR CIRCUIT (PLAYFIELD)

VOLTAGE JUMPERS SHOWN FOR 115 VAC

SEE W-1233 FOR PIN FUNCTIONS

CABINET

J2

POWER LINE GND

FLIP SW. RETURN

G.I. RETURN

43 BUS

G.I. BUS

PLAYFIELD

J1

70

N/U

50

10

20

40

60

N/U

80

9

G.I. BUS

G.I. RETURN

G.I. BUS

SW. ILL. BUS

G.I. RETURN

43 BUS

GND.

BACKBOX

J4

50

13

57

40

92

N/U

10

70

1

G.I. RETURN

2

ASJ3-23

3

ASJ3-24

4

G.I. RETURN

5

ASJ3-6

6

ASJ3-6

7

N/U

8

G.I. BUS

9

G.I. BUS

BACKBOX

J3

56

18

51

58

52

82

50

30

90

70

20

N/U

1

ASJ3-10

2

ASJ4-2

3

ASJ4-1

4

ASJ4-8

5

ASJ3-21

6

ASJ3-22

7

ASJ3-3

8

ASJ3-6

9

A4J4-25

10

ASJ3-12, ASJ1-10

11

SW. ILL. BUS

12

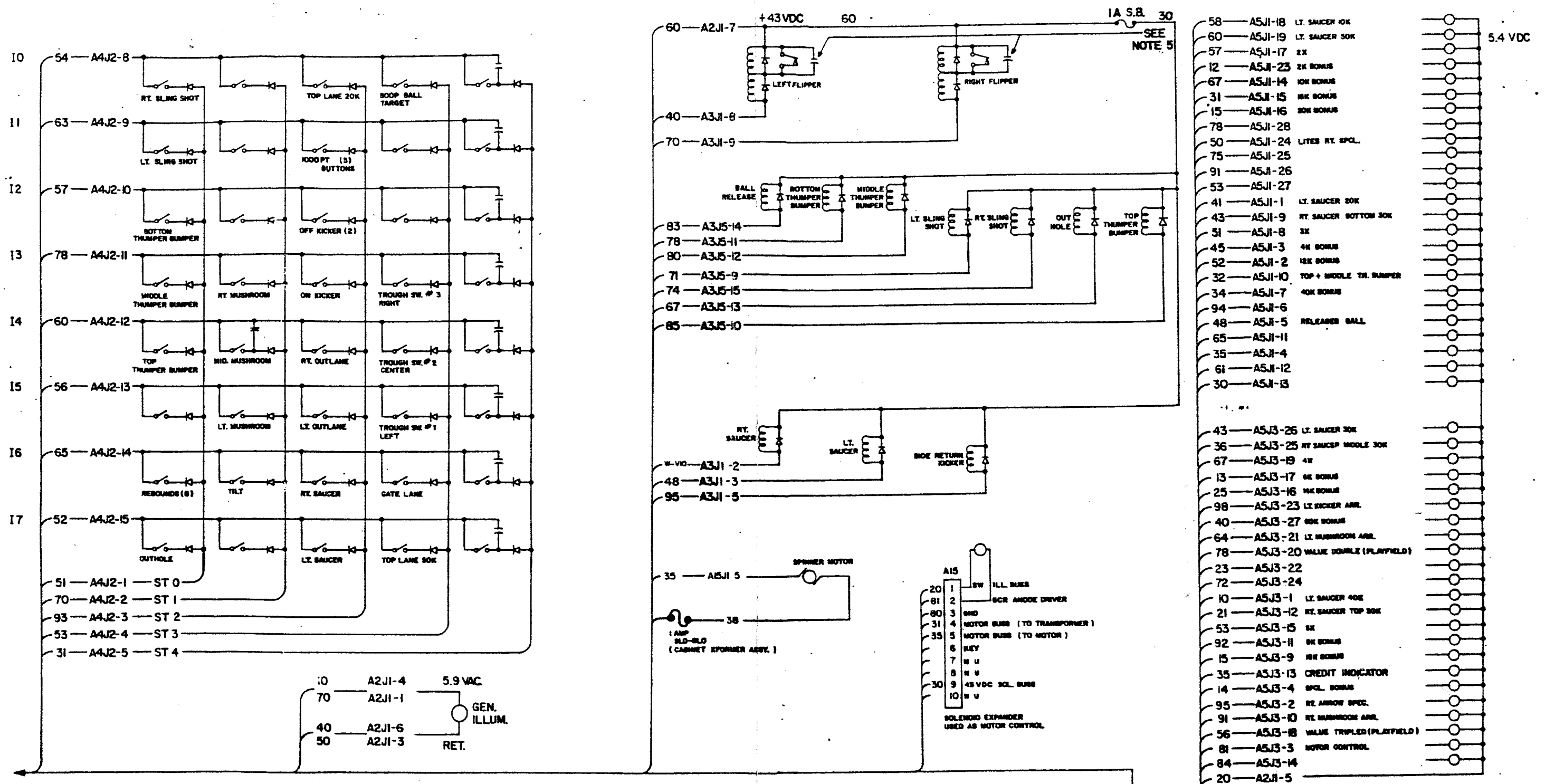
N/U

TO BACKBOX

TO BACKBOX

TO PLAYFIELD

PROJECT 100		USER 00		3A MONROE MFG. CO. MAY 1964
DATE 10-11-64		REV 0010		
1. TITLE 2. PROJECT 3. DRAWING 4. SHEET 5. SCALE 6. DATE 7. BY 8. CHECKED 9. APPROVED 10. REVISIONS	REV 0010	DATE 10-11-64	FIREBALL CLASSIC CABINET WIRING SCHEMATIC	PART NO M051 - 00A40 - A009
	REV 0010	DATE 10-11-64		



PLAYFIELD A6

- NOTES
1. INDICATES NOT USED
 2. N/U = NOT USED ON PLAYFIELD
 3. * INDICATES AID TEST POINT
 4. COIL DIODES ARE IN4004
 5. GERMANY ONLY - CAPACITOR .01 MFD. @ 500 V.

SWITCH DIODES ARE IN4148

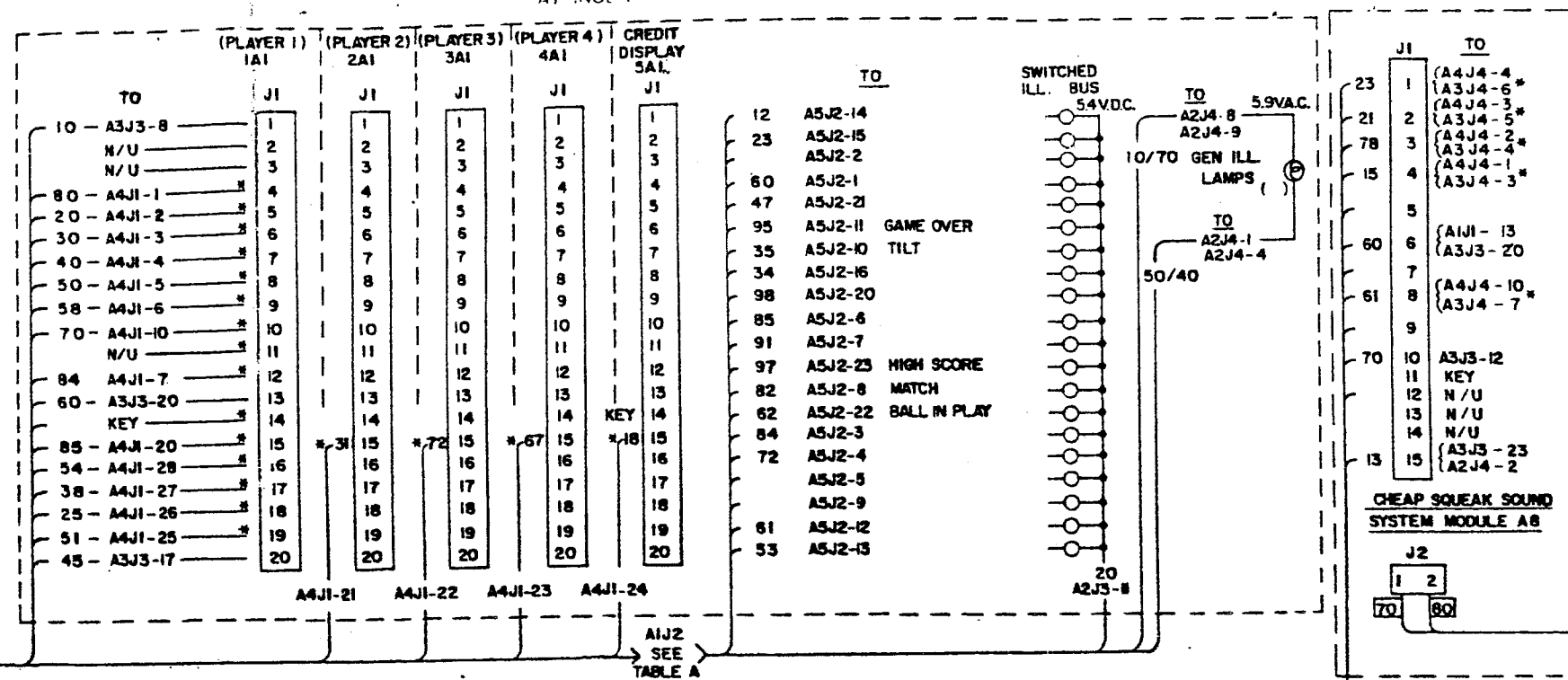
WIRE COLOR CODE			
1-RED	6-BROWN	7-ORANGE	8-BLACK
2-BLUE	9-GRAY	0-NO TRACE	
3-YELLOW			
4-GREEN			
5-WHITE			

PROJECT 100	DESIGN NO.	DATE	REVISED PER	BY / MIDWAY MFG. CO.
100-100000	100-100000	100-100000	100-100000	100-100000
FIRE BALL CLASSIC PLAYFIELD WIRING SCHEMATIC				PART NO. MO51-00A40-AQ10

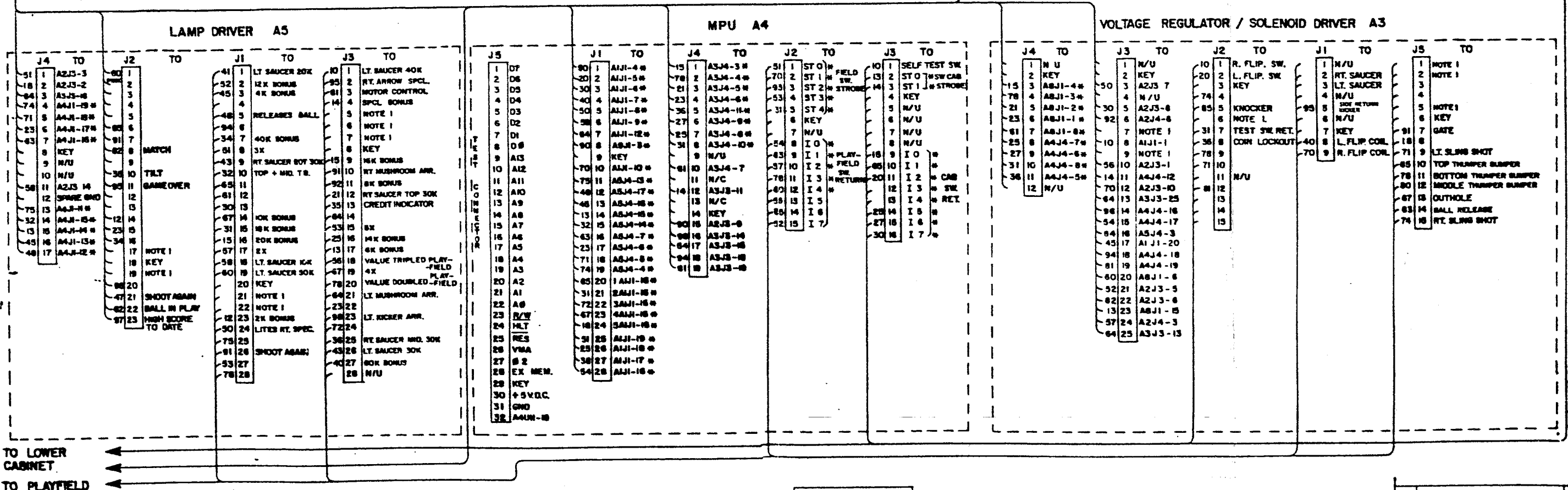
TABLE A AIJ2

FROM	PIN	WIRE
A2J4-8	1	10
A2J4-1	2	50
A5J2-14	3	12
A5J2-2	4	PINK
A5J2-15	5	23
A5J2-16	6	34
A5J2-10	7	35
A5J2-21	8	47
A5J2-1	9	60
A2J3-11	10	20
A5J2-22	11	62
A5J2-6	12	85
A5J2-7	13	91
A5J2-11	14	95
A5J2-23	15	97
A5J2-20	16	98
A5J2-8	17	82
	18	
	19	
	20	
	21	
	22	
A2J4-4	23	40
A2J4-9	24	70

INSERT TO BACK CAB.
PLUG



AIJ2
SEE
TABLE A



TO LOWER
CABINET
TO PLAYFIELD

NOTES:

1. THESE PINS ARE RESERVED FOR FUTURE USE.
2. WIRE COLOR ARE SHOWN FOR ALL CONNECTOR PINS, SOME WIRE MAY NOT BE USED IN ALL GAMES.
3. * INDICATES AID TEST POINT.

WIRE COLOR CODE

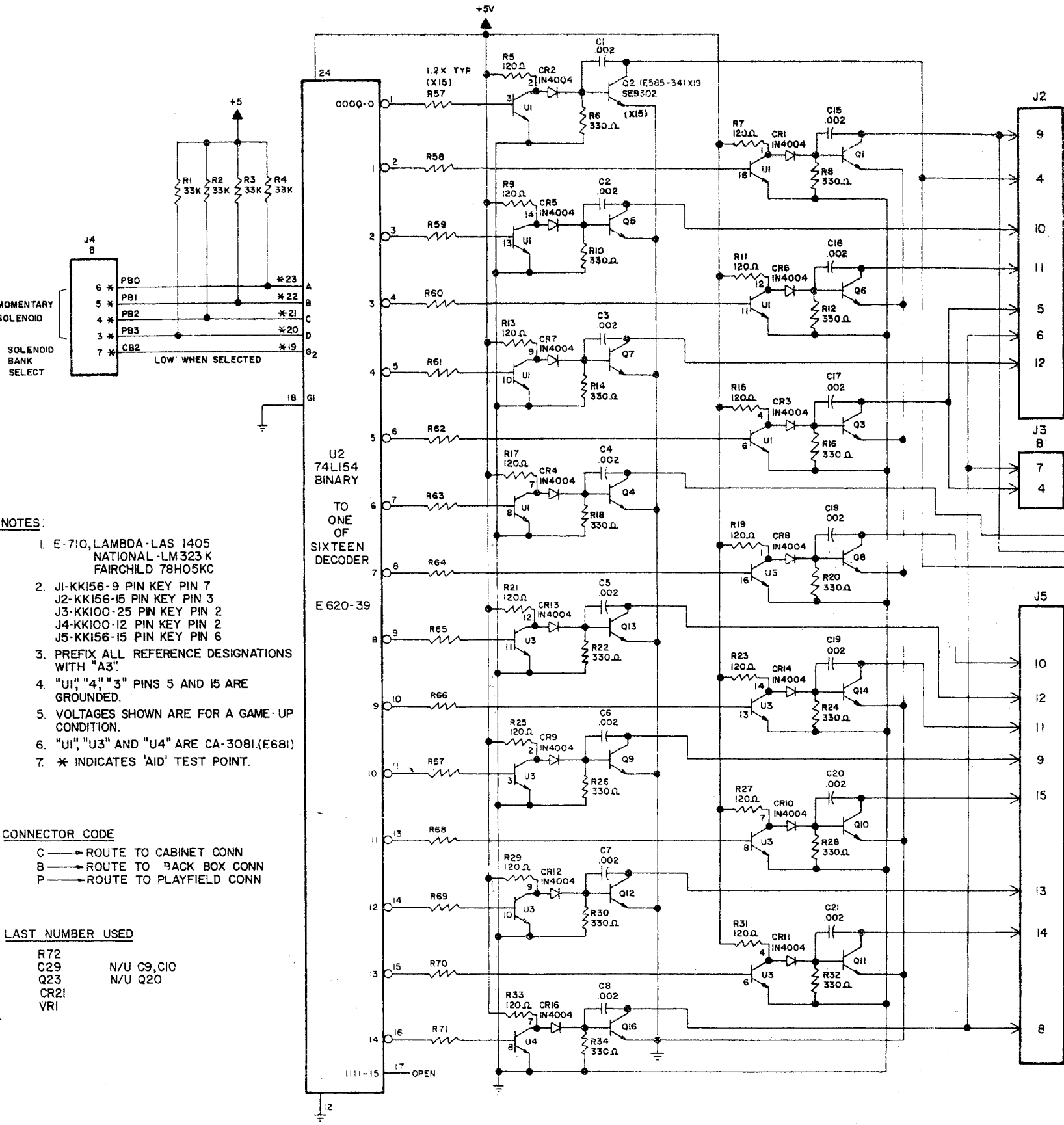
- | | |
|----------|------------|
| 1-RED | 6-BROWN |
| 2-BLUE | 7-ORANGE |
| 3-YELLOW | 8-BLACK |
| 4-GREEN | 9-GRAY |
| 5-WHITE | 0-NO TRACE |

1. FIRST NUMBER = BODY COLOR
 2. SECOND NUMBER = TRACER COLOR
- EXAMPLE:
50 = WHITE
51 = WHITE RED

PROJECT 100		DATE 00		BY 00	
DESIGNED BY M. K. KOPPE		CHECKED BY 00		APPROVED BY 00	
WIRING DIAGRAM BACK BOX				PART NO.	
FIRE BALL CLASSIC PINBALL				MOSI-00840-AOH	

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	A084-91624-AA40	MPU Module Complete.
2	A4 (see note 2)	A082-91624-A000	MPU Module less Program Memory, U1-6 incl.
3-32	See Schematic		Resistors, See schematic for value
33	C14, C15	E-00586-0067	Capacitor, 470 PFD, 1kv
34	C18	E-00586-0088	Capacitor, .05 MFD, 16V
35	C16	E-00586-0081	Capacitor, .1 MFD, 100V
36	C4, C5	E-00586-0073	Capacitor, 4.5 MFD, 25V
37	C3, C6-C13, C17, C81	E-00586-0085	Capacitor, .01 MFD, 25V
38	C79, C41-C67	E-00586-0083	Capacitor, 470 PFD, 50V
39	C19-C31, C78, C33-C40	E-00586-0082	Capacitor, 390 PFD, 50V
40	C1, C2, C88-C77	E-00586-0084	Capacitor, 820 PFD, 50V
41	C32	E-00586-0077	Capacitor, 3000 PF, 1 kv
43	Q5	E-00585-0023	Transistor PNP (MPS-3702)
44	Q1, Q2	E-00585-0031	Transistor (2N3904)
47	CR44	E-00587-0006	Diode (1N4004)
48	CR1-CR7, CR11-CR43, CR45-CR49, CR52	E-00587-0014	Diode (1N4148)
49	CR8	E-00679	LED (Green)
50	VR1	E-00598-0008	Diode Zener (8.2V, 1N9598)
52	L1, L2	E-00604-0003	Inductor, 22 Micro Hy.
53	U12	E-00620-0004	Timer (555)
54	U19	E-00620-0005	Quad 2 Input (4011)
55	U9	E-00620-0028	MPU I.C. (6800)
56	U10, U11	E-00620-0029	PIA I.C. (6820)
57	U7	E-00620-0030	RAM I.C. (6810)
59	U20	E-00620-0032	HEX Buffer I.C. (14502B)
60	U14, U18	E-00620-0033	HEX Inverter (4049B)
61	U15	E-00620-0034	Quad Memory Drive (MC3459L)
62	U16	E-00620-0035	Dual Monostable (9602)
64	U17	E-00620-0041	Quad 2 Inputs (74L00N)
65	U8	E-00620-0042	RAM (C MOS, P5101L-3)
68	BT1, BT2, BT3	E-00628-0003	Battery
70	S33	E-00658-0001	Push Button Switch
71	S1-S8, S9-S16, S17-S24, S25-S32	E-00677	DIP Switch
73		E-00712	24 Pin Socket
74		E-00712-0001	40 Pin Socket
75		E-00712-0003	22 Pin Socket
77	J2	E-00715	15 Pin Wafer Connector
78	J1	E-00715-0004	28 Pin Wafer Connector
79	J3, J5	E-00715-0017	16 Pin Wafer Connector
80	J4	E-00715-0018	19 Pin Wafer Connector
81	J5	E-00715-0024	17 Pin Wafer Connector

NOTE: Order replacement memory chips U1-U6, specifying game, socket and part number stamped on chip.



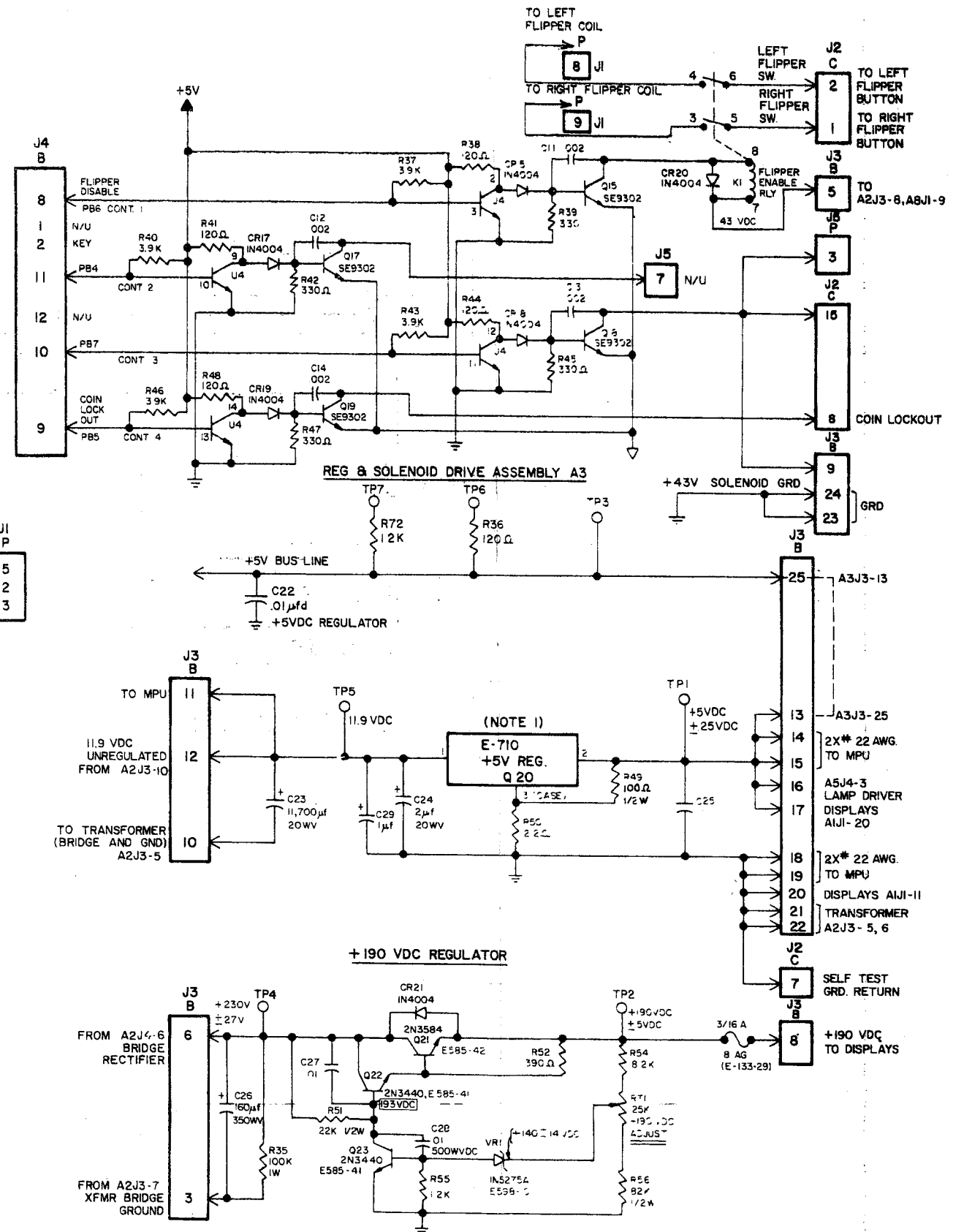
- NOTES:**
- E-710, LAMBDA-LAS 1405 NATIONAL-LM323K FAIRCHILD 78H05KC
 - J1-KK156-9 PIN KEY PIN 7
J2-KK156-15 PIN KEY PIN 3
J3-KK100-25 PIN KEY PIN 2
J4-KK100-12 PIN KEY PIN 2
J5-KK156-15 PIN KEY PIN 6
 - PREFIX ALL REFERENCE DESIGNATIONS WITH "A3".
 - "U1", "U3" AND "U4" ARE CA-3081(E681)
 - "U2" IS 74LS14
 - * INDICATES 'AID' TEST POINT.

CONNECTOR CODE

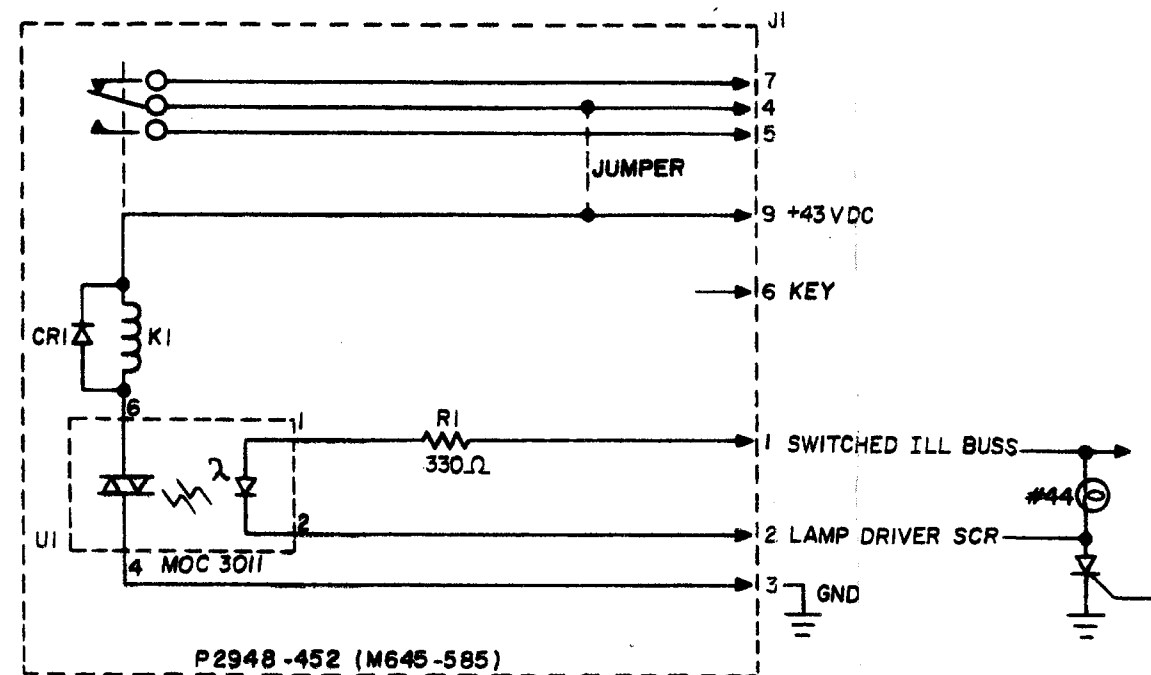
C → ROUTE TO CABINET CONN
B → ROUTE TO BACK BOX CONN
P → ROUTE TO PLAYFIELD CONN

LAST NUMBER USED

R72 N/U C9,C10
C29 N/U Q20
Q23
CR21
VR1

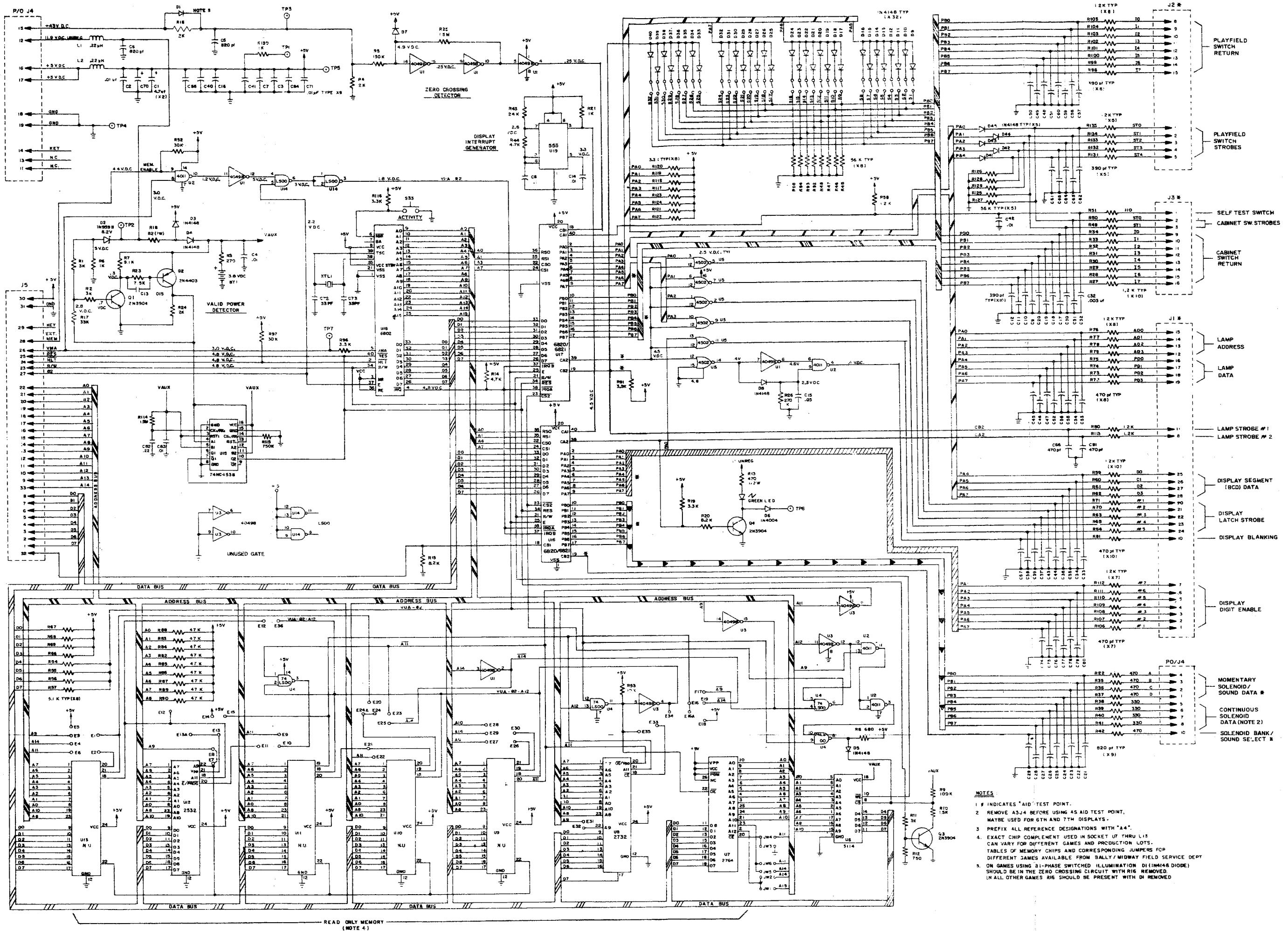


PROJECT ENG:		USED ON		REVISIONS	
DO NOT SCALE DWG.	DATE	NO. REQ'D	SCALE	PART NO.	
01% TOLERANCES UNLESS SPECIFIED	DATE			M051-00114- A047	
CONCENTRICITY TYP. 0.01	DATE			FRANKLIN PK. ILL.	
FRACTIONAL DECIMAL	DATE			MIDWAY MFG. CO.	
HOLE DIA. 0.001-0.005	DATE			SOLENOID DRIVER VOLTAGE REGULATOR SCHEMATIC	



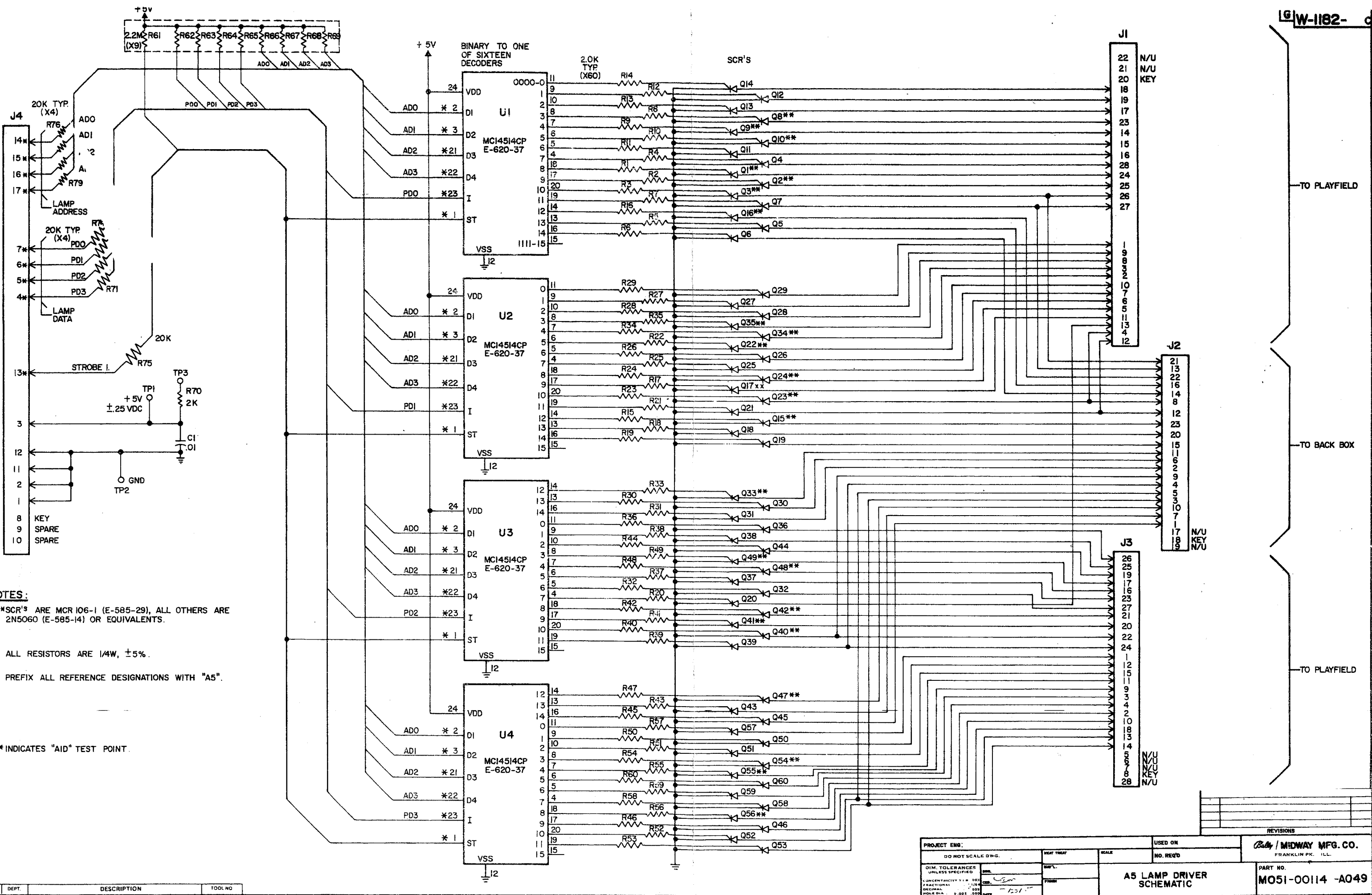
ALL DESIGN, OPERATIVE AND PROCESS DATA PERTAINING TO THE ARTICLE SHOWN ON THIS SHEET IS THE PROPERTY OF BALLY MFG. CORP., CHICAGO, ILL. THIS INFORMATION IS DISCLOSED IN CONFIDENCE AND IS NOT TO BE COPIED, REPRODUCED, REVEALED TO OR APPROPRIATED BY OTHERS, IN PART OR IN WHOLE, WITHOUT THE EXPRESS CONSENT OF THE OWNERS. THE PRINT IS LOANED AND MUST NOT BE USED IN ANY MANNER DETRIMENTAL TO THE INTEREST OF THE OWNERS, AND MUST BE RETURNED ON DEMAND.

REMOVE ALL BURRS		DR. BY FFC		DATE 1-21-81		Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS		# 1220	
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED		CK. BY		DATE		PRINT CONTROL		DIE SIZE- C.C. FT. PER M. LBS. PER M.	
FRACTIONS ± .008		AP'D BY FFC		DATE 1-23-81		NAME		ASSEM. NO. USED	
DECIMALS ± .003		AP'D BY FFC		DATE 1-23-81		FINISH:		SCALE	
EXCEPT HOLE DIA.'S		HARDENING:		MATERIAL		CODE		PART NO.	
ANGLES ± 1/2°		DO NOT SCALE DRAWING		NAME SOLENOID EXPANDER (SCHEMATIC)		ASSEM. NO. USED AS-2518 -66		SCALE	
								PART NO. W-1251 b	



- NOTES:
1. # INDICATES "AID" TEST POINT.
 2. REMOVE A3J4 BEFORE USING AS AID TEST POINT, MAYBE USED FOR 6TH AND 7TH DISPLAYS.
 3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A4".
 4. EXACT CHIP COMPLEMENT USED IN SOCKET U7 THRU U15 CAN VARY FOR DIFFERENT GAMES AND PRODUCTION LOTS. TABLES OF MEMORY CHIPS AND CORRESPONDING JUMPERS FOR DIFFERENT GAMES AVAILABLE FROM BALLY/MIDWAY FIELD SERVICE DEPT.
 5. ON GAMES USING 31-PHASE SWITCHED (ILLUMINATION DI (IN4148 DIODE) SHOULD BE IN THE ZERO CROSSING CIRCUIT WITH R16 REMOVED. IN ALL OTHER GAMES R16 SHOULD BE PRESENT WITH DI REMOVED.

BALLY/MIDWAY
 MARK STEINER
 FULL PER
 SCHEMATIC DRAWING
 5802 MPF CONTROL BD
 A080-91638-0000
 MOSI - C0114 - D077
 11/77



TO PLAYFIELD

TO BACK BOX

TO PLAYFIELD

REVISIONS

REV. NO. DESCRIPTION

1. 12/1/77

2. 12/1/77

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100. 12/1/77

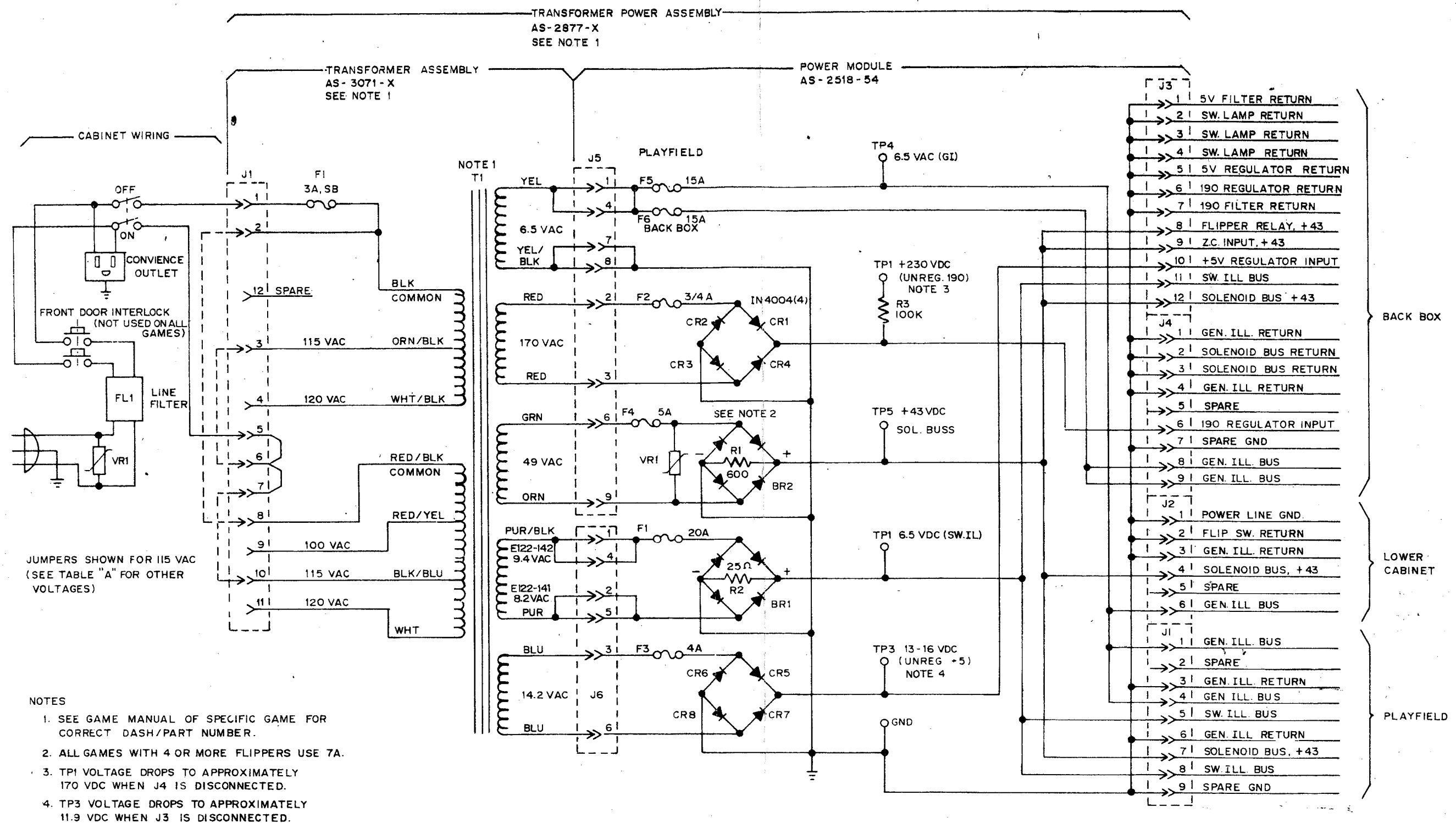


TABLE "A"

115 VAC,	2-8,	3-6,	7-10
120 VAC,	2-8,	4-6,	7-11
220 VAC,	4-8,	7-9	
240 VAC,	4-8,	7-11	

PROJECT ENG: A. AARSTAD		USED ON		REVISIONS
DO NOT ALTER		NO REQ'D 1 PER		
DRN: <i>ad</i>	HEAT TREAT	SCALE: FULL	Bally / MIDWAY MFG. CO. FRANKLIN, PA.	
CKD:	MAT'L	SCHEMATIC DWG POWER MODULE A080-91616-A000		PART NO. M051 - 00114 - A055
DATE: 5/5/84	FINISH			

FROM	PIN	WIRE
A2J4-8	1	10
A2J4-1	2	50
A5J2-14	3	12
A5J2-2	4	PINK
A5J2-15	5	23
A5J2-16	6	34
A5J2-10	7	35
A5J2-21	8	47
A5J2-1	9	60
A2J3-11	10	20
A5J2-22	11	62
A5J2-6	12	85
A5J2-7	13	91
A5J2-11	14	95
A5J2-23	15	97
A5J2-20	16	98
A5J2-8	17	82
	18	
	19	
	20	
	21	
	22	
A2J4-4	23	40
A2J4-9	24	70

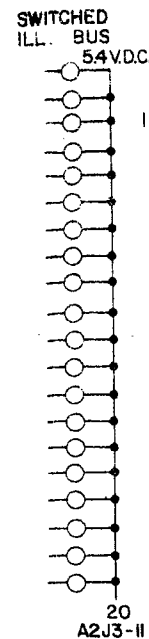
INSERT TO BACK CAB.
PLUG

(PLAYER 1) 1A1	(PLAYER 2) 2A1	(PLAYER 3) 3A1	(PLAYER 4) 4A1	CREDIT DISPLAY 5A1
TO	J1	J1	J1	J1
10 - A3J3-8	1	1	1	1
N/U	2	2	2	2
N/U	3	3	3	3
80 - A4J1-1	4	4	4	4
20 - A4J1-2	5	5	5	5
30 - A4J1-3	6	6	6	6
40 - A4J1-4	7	7	7	7
50 - A4J1-5	8	8	8	8
58 - A4J1-6	9	9	9	9
70 - A4J1-10	10	10	10	10
N/U	11	11	11	11
84 - A4J1-7	12	12	12	12
60 - A3J3-20	13	13	13	13
KEY	14	14	14	KEY 14
85 - A4J1-20	15	*31	*72	*67
54 - A4J1-28	16	16	16	*18
38 - A4J1-27	17	17	17	17
25 - A4J1-26	18	18	18	18
51 - A4J1-25	19	19	19	19
45 - A3J3-17	20	20	20	20

A4J1-21 A4J1-22 A4J1-23 A4J1-24

AIJ2
SEE
TABLE A

TO
12 A5J2-14
23 A5J2-15
A5J2-2
60 A5J2-1
47 A5J2-21
95 A5J2-11 GAME OVER
35 A5J2-10 TILT
34 A5J2-16
98 A5J2-20
85 A5J2-6
91 A5J2-7
97 A5J2-23 HIGH SCORE
82 A5J2-8 MATCH
62 A5J2-22 BALL IN PLAY
84 A5J2-3
72 A5J2-4
A5J2-5
A5J2-9
61 A5J2-12
53 A5J2-13



J1	TO
23	1 A4J4-4
21	2 A3J4-6
78	3 A4J4-3
15	4 A3J4-5
5	5 A4J4-2
60	6 A3J4-4
61	7 A4J4-1
9	8 A3J4-3
70	10 A3J3-12
11	11 KEY
12	12 N/U
13	13 N/U
14	14 N/U
13	15 A3J3-23
	A2J4-2

CHEAP SQUEAK SOUND
SYSTEM MODULE A8

J2
1 2
70 80

USE FOR PLAY FIELD WIRING

LAMP DRIVER A5

J4	TO	J2	TO	J1	TO	J3	TO
51	1 A2J3-3	60	1	41	1 LT. SAUCER 20K	10	1 LT. SAUCER 40K
18	2 A2J3-2	2	2	52	2 12K BONUS	95	2 RT. ARROW SPCL. OUTLINE
84	3 A3J3-16	3	3	45	3 4K BONUS	81	3 MOTOR CONTROL
74	4 A4J1-19*	4	4	4	4 RELEASES BALL	14	4 SPCL. BONUS
71	5 A4J1-18*	5	5	48	5 TOP SAUCER LIFE	5	5 NOTE 1
23	6 A4J1-17*	85	6	94	6 40K BONUS	6	6 NOTE 1
63	7 A4J1-16*	91	7	34	7 3X	7	7 NOTE 1
8	8 KEY	82	8	51	8 3X	8	8 KEY
9	9 N/U	9	9	43	9 RT. SAUCER BOT 30K	15	9 16K BONUS
10	10 N/U	35	10	10	10 TOP + MID. T.B.	10	10 RT. MUSHROOM ARR.
58	11 A2J3 14	95	11	65	11	11 8K BONUS	
12	12 SPARE GND	12	12	61	12	12 RT. SAUCER TOP 30K	
75	13 A4J1-11*	13	13	30	13	13 CREDIT INDICATOR	
32	14 A4J1-15*	12	14	14	14 10K BONUS	84	14 5X
13	15 A4J1-14*	23	15	15	15 18K BONUS	25	15 14K BONUS
45	16 A4J1-13*	34	16	16	16 20K BONUS	13	16 6K BONUS
48	17 A4J1-12*	17	17	57	17 2X	13	17 VALUE TRIPLED PLAY- -FIELD
		18	18	58	18 LT. SAUCER 10K	56	18 VALUE TRIPLED PLAY- -FIELD
		19	19	60	19 LT. SAUCER 50K	67	19 4X
		20	20	20	20 KEY	20	20 VALUE DOUBLED -FIELD
		21	21	21	21 NOTE 1	64	21 LT. MUSHROOM ARR.
		22	22	22	22 NOTE 1	23	22
		23	23	23	23 2K BONUS	96	23 LT. KICKER ARR.
		24	24	24	24 LITES RT. SPEC.	72	24 LIFE EXTRA
		25	25	25	25	36	25 RT. SAUCER MID. 30K
		26	26	26	26 SHOOT AGAIN	26	26 LT. SAUCER 30K
		27	27	27	27	40	27 60K BONUS
		28	28	28	28	28	28 N/U

MPU A4

J4	TO	J2	TO	J3	TO
15	1 A3J4-3*	51	1 ST 0*	10	1 SELF TEST SW
78	2 A3J4-4*	70	2 ST 1* FIELD SW	13	2 ST 0* SW CAB
21	3 A3J4-5*	93	3 ST 2* STROBE	14	3 ST 1* STROBE
23	4 A3J4-6*	53	4 ST 3*	4	4 KEY
36	5 A3J4-11*	31	5 ST 4*	5	5 N/U
27	6 A3J4-9*	6	6 KEY	6	6 N/U
25	7 A3J4-8*	7	7 N/U	7	7 N/U
31	8 A3J4-10*	8	8 I 0*	8	8 N/U
9	9 N/U	54	9 I 1*	15	9 I 0*
61	10 A3J4-7	63	10 I 2*	65	10 I 1*
11	11 N/C	57	11 I 3*	12	11 I 2*
14	12 A3J3-11	78	12 I 4*	20	12 I 3*
13	13 N/C	60	13 I 5*	13	13 I 4*
14	14 KEY	56	14 I 6*	14	14 I 5*
90	15 A2J3-9	65	15 I 7*	25	15 I 6*
96	16 A3J3-14	52	16 I 7*	30	16 I 7*
54	17 A3J3-15				
94	18 A3J3-18				
81	19 A3J3-19				

VOLTAGE REGULATOR / SOLENOID DRIVER A3

J4	TO	J3	TO	J2	TO	J1	TO	J5	TO
15	1 N/U	1	1 N/U	10	1 R. FLIP. SW.	1	1 N/U	1	1 NOTE 1
2	2 KEY	2	2 KEY	20	2 L. FLIP. SW.	2	2 RT. SAUCER	2	2 NOTE 1
3	3 A8J1-4*	3	3 A2J3 7	3	3 KEY	3	3 LT. SAUCER	3	3
78	4 A8J1-3*	4	4 N/U	74	4	4 N/U	4	4	4
21	5 A8J1-2*	30	5 A2J3-8	85	5 KNOCKER	5	5	5	5
23	6 A8J1-1*	92	6 A2J4-6	6	6 NOTE 1	6	6	6	6
61	7 A8J1-8*	7	7 NOTE 1	31	7 TEST SW. RET.	7	7 KEY	91	7 GATE
25	8 A4J4-7*	10	8 A1J1-1	36	8 COIN LOCKOUT	8	8 L. FLIP. COIL	18	8
27	9 A4J4-6*	9	9 NOTE 1	78	9	9	9 R. FLIP. COIL	71	9
31	10 A4J4-8*	56	10 A2J3-1	71	10	10	10	10	10
36	11 A4J4-5*	14	11 A4J4-12	11	11 N/U	11	11	11	11
12	12 N/U	70	12 A2J3-10	81	12	12	12	12	12
		64	13 A3J3-25	13	13	13	13	13	13
		96	14 A4J4-16	14	14	14	14	14	14
		54	15 A4J4-17	15	15	15	15	15	15
		45	16 A5J4-3	16	16	16	16	16	16
		52	17 A1J1-20	17	17	17	17	17	17
		94	18 A4J4-18	18	18	18	18	18	18
		81	19 A4J4-19	19	19	19	19	19	19
		60	20 A8J1-6	20	20	20	20	20	20
		52	21 A2J3-5	21	21	21	21	21	21
		82	22 A2J3-6	22	22	22	22	22	22
		13	23 A8J1-15	23	23	23	23	23	23
		57	24 A2J4-3	24	24	24	24	24	24
		64	25 A3J3-13	25	25	25	25	25	25

TO LOWER
CABINET

TO PLAYFIELD

NOTES:

- THESE PINS ARE RESERVED FOR FUTURE USE.
- WIRE COLOR ARE SHOWN FOR ALL CONNECTOR PINS, SOME WIRE MAY NOT BE USED IN ALL GAMES
- * INDICATES AID TEST POINT.

- ① RED ⑥ BROWN
② BLUE ⑦ ORANGE
③ YELLOW ⑧ BLACK
④ GREEN ⑨ GREY
⑤ WHITE ⑩

WIRE COLOR CODE

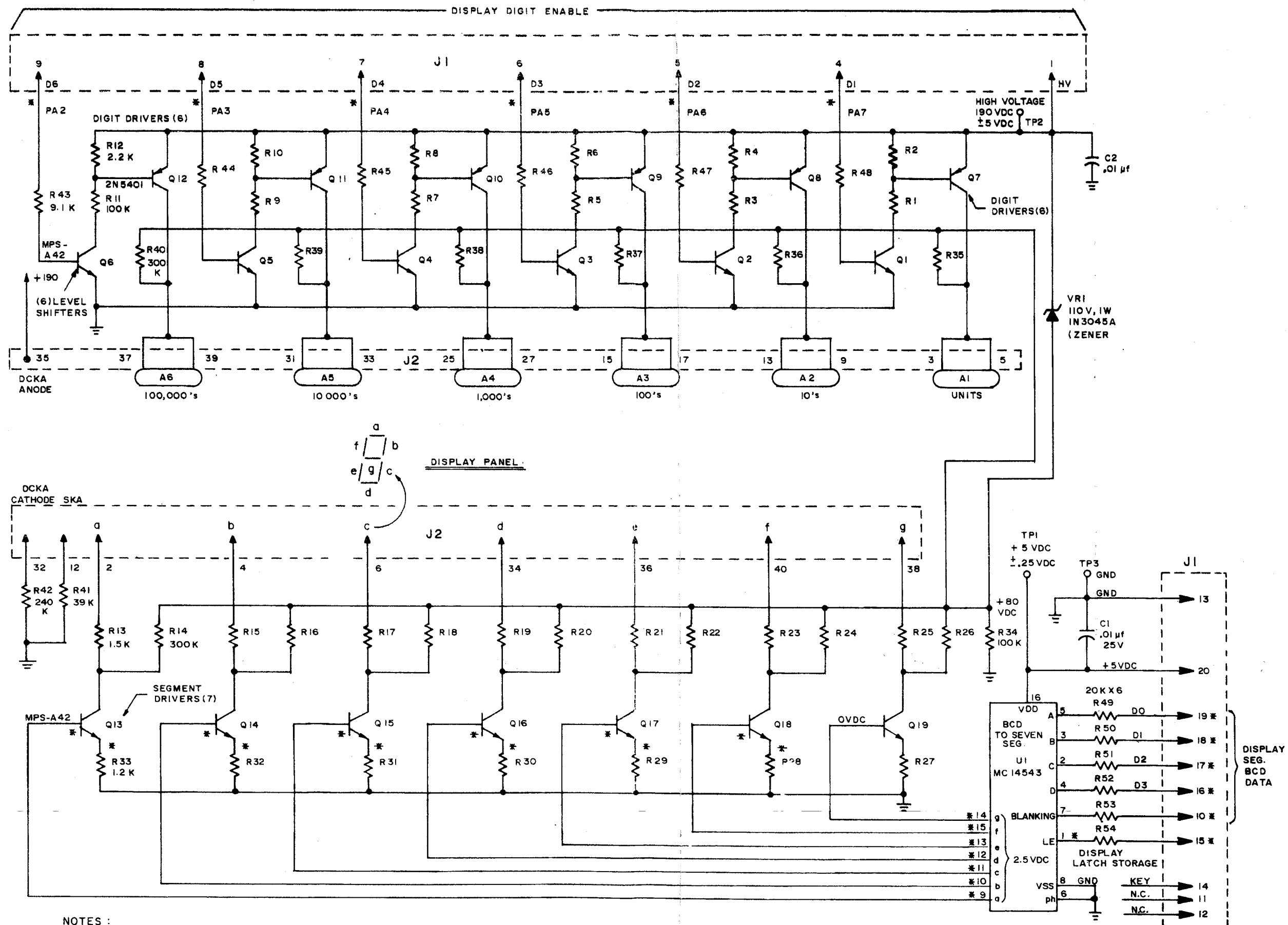
- 1-RED 6-BROWN
2-BLUE 7-ORANGE
3-YELLOW 8-BLACK
4-GREEN 9-GRAY
5-WHITE 0-NO TRACE

1. FIRST NUMBER = BODY
COLOR
2. SECOND NUMBER =
TRACER COLOR

EXAMPLE:
50 = WHITE
51 = WHITE RED

PROJECT ENG.		USED ON		REVISIONS	
DO NOT SCALE DWG.		HEAT TREAT		SCALE	
TOL. TOLERANCES UNLESS OTHERWISE SPECIFIED		MATERIAL		NO REQ'D	
DESIGNED BY M. KONOPA		FURNISH		WIRING DIAGRAM BACK BOX FIRE BALL CLASSIC PINBALL	
CHECKED BY		DATE		PART NO. M051 - 00A40-A011	

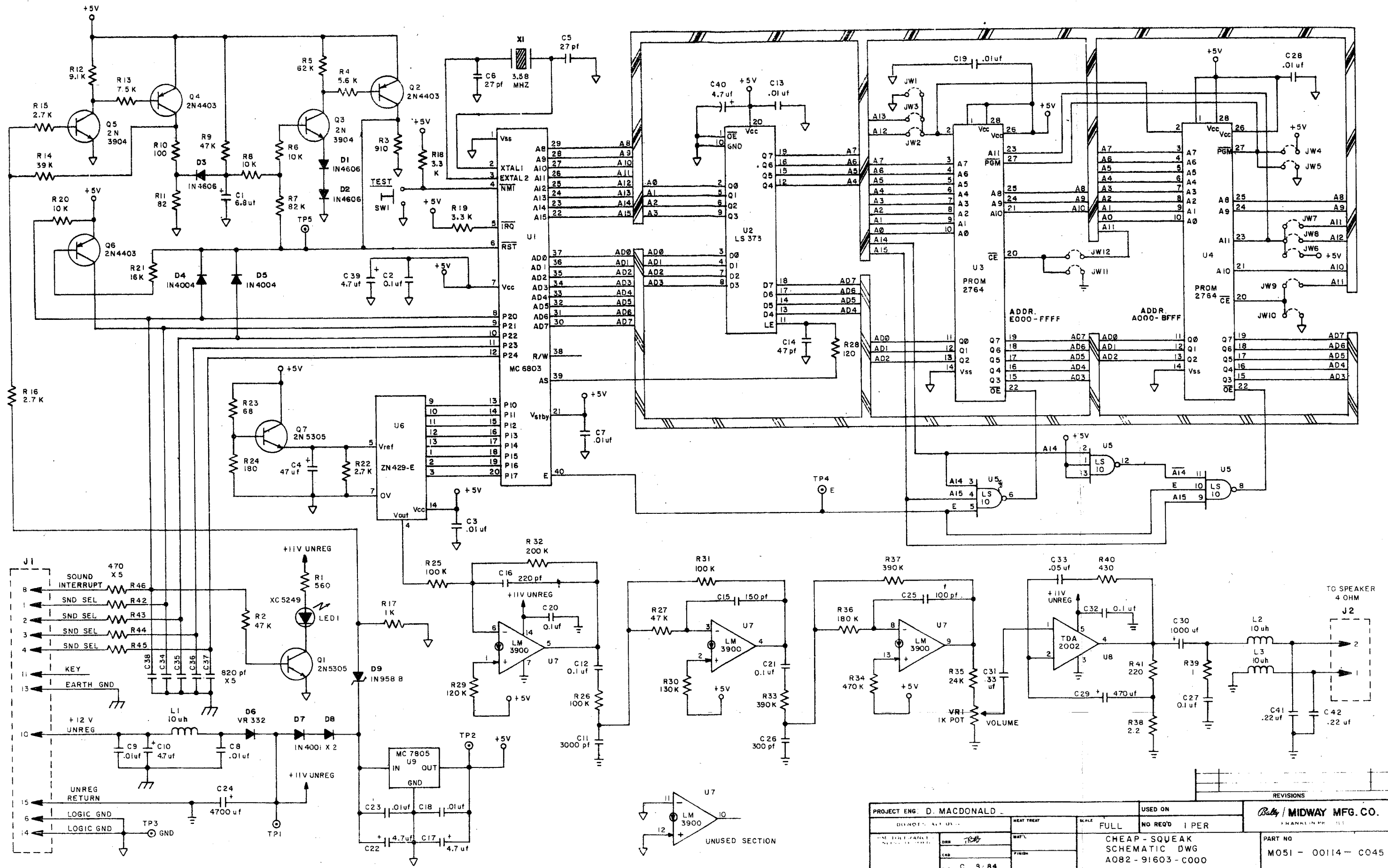
Body / MIDWAY MFG. CO.
FRANKLIN, PA. U.S.A.

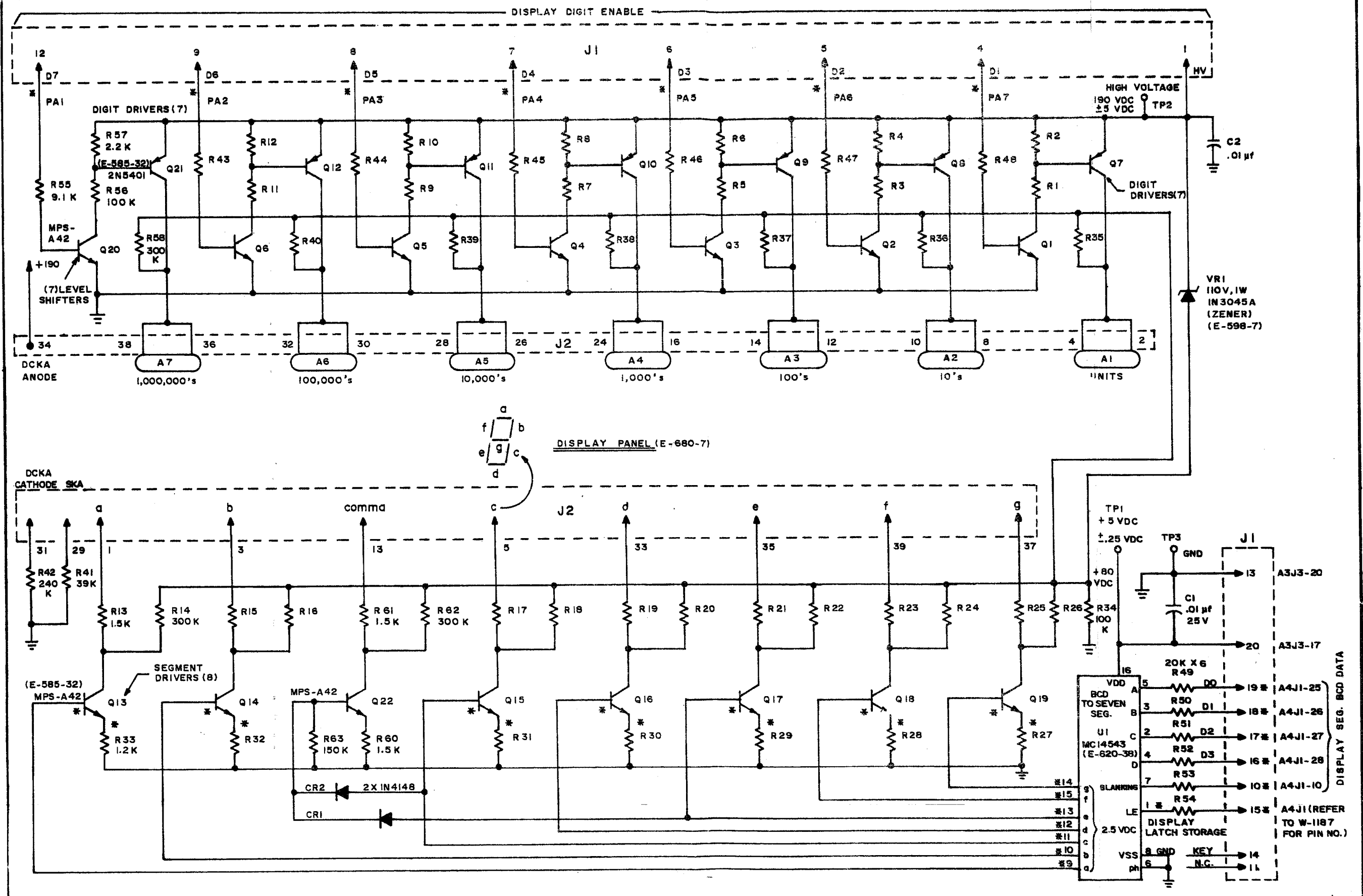


NOTES:

- 1) UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE $\pm 5\%$, 1/4 W.
- 2) PREFIX ALL REFERENCE DESIG. WITH ASSY REF. DESIG. "A1"
- 3) * INDICATES "AID" TEST POINT.

PROJECT ENG: D. MACDONALD		USED ON PINBALL		REVISIONS	
DO NOT SCALE DWG		SCALE FULL		NO. REQ'D 1 PER	
DIM TOLERANCES UNLESS SPECIFIED		HEAT TREAT		MAY'L	
UNLESS OTHERWISE SPECIFIED		FINISH		DATE 5/17/83	
SIX DIGIT DISPLAY BOARD SCHEMATIC "A1"				PART NO. MO51-00114 -A029	
A084-91491-A000				FRANKLIN PK ILL	



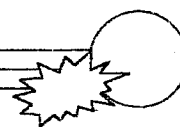


- NOTES:
- 1) UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE $\pm 5\%$, 1/4 W.
 - 2) PREFIX ALL REFERENCE DESIG. WITH ASSY REF. DESIG. "A1".
 - 3) * INDICATES "AID" TEST POINT.

PROJECT ENG: D. MACDONALD			USED ON PINBALL		REVISIONS
DO NOT SCALE DWG.		HEAT TREAT	SCALE	NO. REQ'D PER	
DIM. TOLERANCES UNLESS SPECIFIED		DRW. <i>DBB</i>	FULL		Bally / MIDWAY MFG. CO. FRANKLIN PK. ILL.
CONCENTRICITY T.Y.R. .003 FRACTIONAL .1/64 DECIMAL .005 HOLE DIA. +.002 - .000		CHKD. <i>DRM/shv</i>	SEVEN DIGIT DISPLAY BOARD SCHEMATIC "A1" A084-91617-A000		
DATE 5/13/83		FINISH	PART NO. M051 - 00114 - A057		



STEVE YOUNG'S



THE PINBALL RESOURCE

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