

GAME 1192
FO 655



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PINBALL DIVISION

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90 O'Leary Drive, Bensenville, Illinois 60106, U.S.A.
Telephone: (312) 860-6400

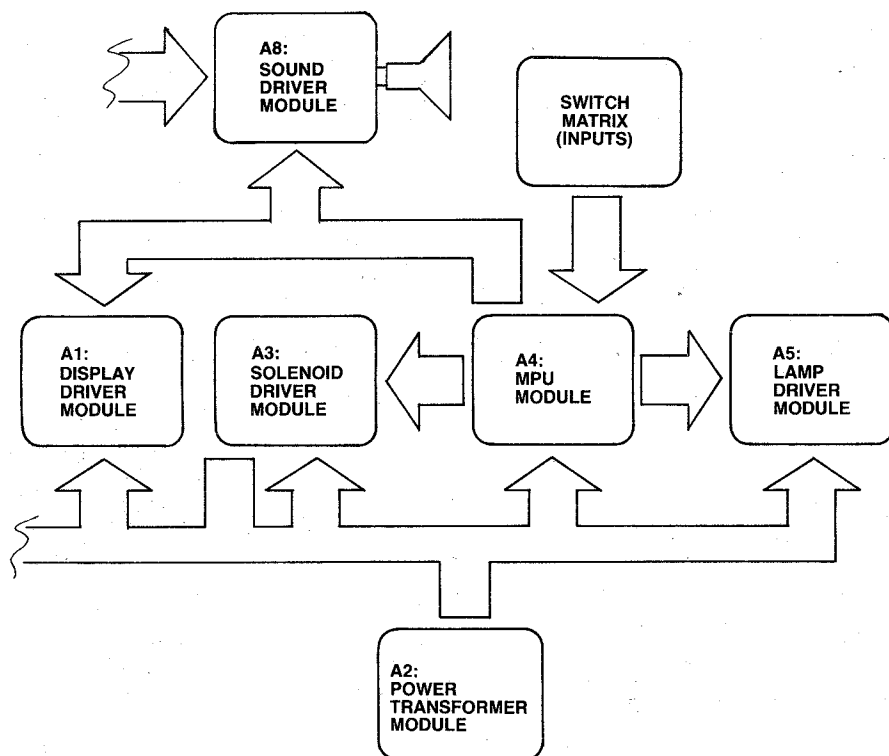


Installation and General Game Operation Instructions

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BLOCK DIAGRAM—ELECTRONIC PINBALL GAME



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:

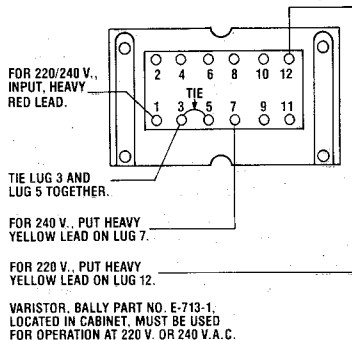
1. Check that all cable connectors are completely seated on printed circuit assemblies.
2. Check that cables are clear of all moving parts.
3. Check for any wires that may have become disconnected.
4. Check switches for loose solder or other foreign material that may have come loose in shipment and could 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

E-122-125 TRANSFORMER WIRING FOR 220/240 V.,
50/60 CYCLE INPUT.



E-122-125 TRANSFORMER WIRING FOR 115/120 V.,
50/60 CYCLE INPUT.

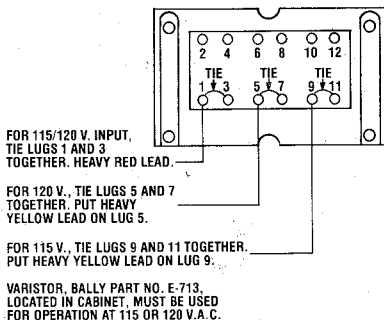


FIGURE I. TRANSFORMER
(PART OF POWER—TRANSFORMER MODULE A2, LOCATED IN BACK BOX).

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. The 1st player-up life is lit. A game-up tune* is played to announce play-readiness. The bonus score is advanced to 1000 points.

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. Rebound switches score 10 points. Thumper-bumpers, when not lit, score 10 points.

The game awards all points earned by the player. If spinner is turning 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 bonus score is advanced to 1000 points. 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 the '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 and the bonus is set to 1000 points before the game serves the extra ball for play.

Scoring over 1,000,000 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 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 lites and the power-up tune is played. The time delay occurs anytime one of the slam switches is made to contact. There is one factory installed slam switch on the front door. (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.

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

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 14, 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=Total times 'High Score to Date' is beat
- *09—10000 to—99999=Coins Dropped thru Coin Chute #1
- *10—10000 to—99999=Coins Dropped thru Coin Chute #2**
- *11—10000 to—99999=Coins Dropped thru Coin Chute #3**
- *12— 00 to—99999=Number of Specials awarded from Panel Specials Only
- *13— 00 to—99999=Number of minutes of Game Play
- *14— 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 once more with the 14th entry displayed causes the game 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, 09, 10 and 11.

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 14 is reserved as a record of the number of Service Credits used.

*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.

"MYSTIC"

FEATURE OPERATION & SCORING

A. BONUS SCORE FEATURE:

A Bonus of 3000 points for each lit Eye or Pyramid may be scored.

1A. 3 IN LINE BONUS:

When 3 Eyes or 3 Pyramids in the card are lit. (Diagonally, Vertically or Horizontally) 9000 thru 72000 bonus points lites depending on numbers of 3 in line lites. However, any lit 3 in line bonus value is carried over from ball to ball til the end of the game. The Eyes and Pyramids in square are spotted by the 3 sets of drop targets. Once 3 in line is made that set of drop target locks to arrow which then it scores 2000 points for each target down.

B. 4 STARS FEATURE:

Making the 4 star lites first time, 10,000 points is awarded. Making the 4 star lites second time, extra ball is awarded. Making the 4 star lites third and each additional time 1 replay is awarded.

C. SAUCER FEATURE:

Every time ball is landed in top saucer it will spot the star lite and lites the spinners and scores 500 points.

D. MYSTICAL TARGET FEATURE:

Mystical target scores as follows:

1st time 5000 points

2nd time 2X + 5000

3rd time 3X + 5000

4th time 4X + 5000

5th time SPL (1 replay)

6th and each additional time 30,000 points.

E. REPLAY FEATURE ON EYES & PYRAMIDS IN SQUARE:

Liting square with all Eyes or all Pyramids, awards 2 or 3 replays depending on switch setting #8.

Liting square with combination of Eyes and Pyramids will score 1 replay when special is lit.

F. SPECIAL REPLAY/X-BALL/NOVELTY MODES

Switch #6 and #7 give the operator flexibility to award a replay, extra ball or score (Novelty) when a special is scored (Mystic target, Pyramid and Eye, Pyramid or Eye, 4 stars SPECIAL). The following chart explains the settings.

SWITCH

Positions

Mystical Lane Special

Pyramid & Eye Special

All Pyramid or Eye (2 special)
(3 specials)

4 Stars Special

4 Stars X-BALL

Scoring Thresholds

- (*) 50,000 if Same Player Shoot Again is lit.
- (**) 25,000 if Same Player Shoot Again is lit.
- (***) 100,000 if Same Player Shoot Again is lit.
- (****) 150,000 if Same Player Shoot Again is lit.

SW. 6 ON

SW. 7 ON

REPLAY

REPLAY

REPLAY

REPLAY

REPLAY

X-BALL

REPLAY

SW. 6 OFF

SW. 7 ON

X-BALL

X-BALL*

X-BALL*

X-BALL & *

X-BALL & ***

X-BALL****

*

X-BALL**

X-BALL**

SW. 6 ON

SW. 7 OFF

NOVELTY

50,000

50,000

100,000

150,000

50,000

25,000

NO AWARD

V. GAME ADJUSTMENTS

A. Playfield Panel Post Adjustments:

Posts that control left and right outlane opening on panel can be moved 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. The switch settings and resultant credits/coin are as follows:

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

The credits given per coin 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	SWITCHES					CREDITS/COIN
#1 (HINGE SIDE)	5	4	3	2	1	
OR #3	13	12	11	10	9	
	OFF	OFF	OFF	OFF	OFF	3/2 COINS**
	OFF	OFF	OFF	OFF	ON	3/2 COINS**
	OFF	OFF	OFF	ON	OFF	1/COIN
	OFF	OFF	OFF	ON	ON	1/2 COINS*
	OFF	OFF	ON	OFF	OFF	2/COIN
	OFF	OFF	ON	OFF	ON	2/2 COINS*
	OFF	OFF	ON	ON	OFF	3/COIN
	OFF	OFF	ON	ON	ON	3/2 COINS*
	OFF	ON	OFF	OFF	OFF	4/COIN
	OFF	ON	OFF	OFF	ON	4/2 COINS*
	OFF	ON	OFF	ON	OFF	5/COIN
	OFF	ON	OFF	ON	ON	5/2 COINS*
	OFF	ON	ON	OFF	OFF	6/COIN
	OFF	ON	ON	OFF	ON	6/2 COINS*
	OFF	ON	ON	ON	OFF	7/COIN
	OFF	ON	ON	ON	ON	7/2 COINS*
	ON	OFF	OFF	OFF	OFF	8/COIN
	ON	OFF	OFF	OFF	ON	8/2 COINS*
	ON	OFF	OFF	ON	OFF	9/COIN
	ON	OFF	OFF	ON	ON	9/2 COINS*
	ON	OFF	ON	OFF	OFF	10/COIN
	ON	OFF	ON	OFF	ON	10/2 COINS*
	ON	OFF	ON	ON	OFF	11/COIN
	ON	OFF	ON	ON	ON	11/2 COINS*
	ON	ON	OFF	OFF	OFF	12/COIN
	ON	ON	OFF	OFF	ON	12/2 COINS*
	ON	ON	OFF	ON	OFF	13/COIN
	ON	ON	OFF	ON	ON	13/2 COINS*
	ON	ON	ON	OFF	OFF	14/COIN
	ON	ON	ON	OFF	ON	14/2 COINS*
	ON	ON	ON	ON	OFF	15/ COIN
	ON	ON	ON	ON	ON	15/2 COINS*

*No Credits until second coin is dropped.

**One Credit for first coin. Two Credits for second coin provided that no scoring occurred between 1st and 2nd coin drops. If scoring occurred, second coin gives one credit.

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

BALLS PER GAME:

# BALLS/GAME	SWITCH 31
5	ON
3	OFF

MATCH FEATURE:

When the Match Feature is ON, a random number appears in 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 three score levels. See Front Door Game Adjustments.

AWARD	SWITCH 7	SWITCH 6
REPLAY	ON	ON
EXTRA BALL	ON	OFF
NO AWARD	OFF	ON

HIGH SCORE TO DATE OR OVER 1,000,000 SCORE FEATURE:

The game is designed to award free games as an option if high score to date is beat or player exceeds 1,000,000 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	SWITCH 22	SWITCH 21
No Award	OFF	OFF
One Credit	OFF	ON
Two Credits	ON	OFF
<u>Three Credits</u>	<u>ON</u>	<u>ON</u>

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.

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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 switch settings as shown.

SW. 29, 30 ON

Playfield switches associated noises with background.

SW. 29 ON, SW. 30 OFF

Playfield switches associated noises without background.

SW. 29, 30 OFF

Most scoring will have a chime effect.

SW. 29 OFF, SW. 30 ON

Most all scoring will have a noise effect.

GAME FEATURE OPTIONS:

All Pyramid or Eye replay adjustment:

Liberal

SW. 8 ON

Lighting all Pyramids or Eyes gives 3 replays.

Conservative

SW. 8 OFF

Lighting all Pyramids or Eyes gives 2 replays.

Spinner lites adjustment:

Liberal

SW. 14 ON

When lit both lites will stay on.

Conservative

SW. 14 OFF

When lit both lites will go on and off by hitting thumpers, slingshots or 30 point rebounds.

Bonus 2X, 3X, 4X and Mystical lane lite adjustment:

Liberal

SW. 15, 16 ON

Any bonus or Mystical lites on will come back on.

Conservative

SW. 15, 16 Off

Any bonus or Mystical lites on will not come back on.

Medium

SW. 15 ON 16 OFF

Any bonus lites on will not come back on.

SW. 15, OFF 16 ON

Any Mystical lites on will come back on.

Center Eye and Pyramid lite recall adjustment:

Liberal

SW. 23 ON

Any Eye or Pyramid lit will come back on.

Conservative

SW. 23 OFF

Any Eye or Pyramid lit will not come back on.

4 Star lanes lite adjustment:

Liberal

SW. 24 ON

Any star lane lite out will not come back on.

Conservative

SW. 24 OFF

Any star lane lite out will come back on.

Mystical lane 5000, 2X lite adjustment:

Liberal

SW. 32 ON

5000, 2X lite will be on at start of game.

Conservative

SW. 32 OFF

5000 lite will be on at start of game.

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 1,000,000 Feature:

The game is designed to award free games when 'High Score to Date' is beat, or if the player exceeds 1,000,000 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 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 positioning switches as discussed under 'Back Box Game Adjustments.'

*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).

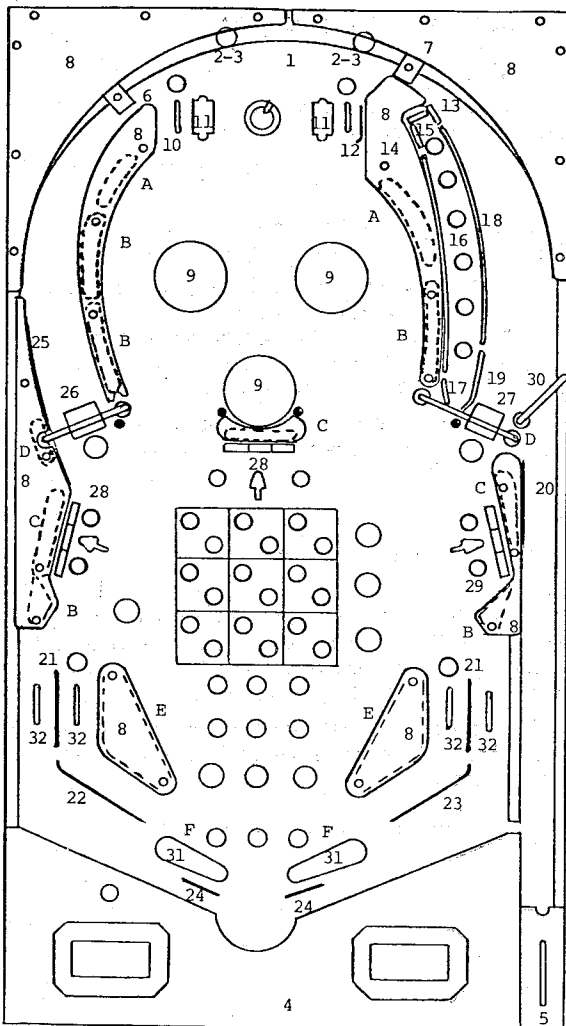
#1192 MYSTIC

RUBBER PARTS

A	R-521-1	1" Dia. (2)
B	R-521-2	1½" Dia. (5)
C	R-521-3	2" Dia. (6)
D	R-521	¾" Dia. (2)
E	R-521-4	2½" Dia. (2)
F	R-406-3	Flipper (2)
G	R-243	⅝" Dia. (10)

PANEL TOP PARTS

1	Arch Rail	M-1774
2	Rail Post (2)	C-907
3	Rail Post Cap (2)	C-908
4	Bottom Arch	P-5871-75
5	Shooter Gauge	P-6359-41
6	Ball Gate (L)	A-1475-12
7	Ball Gate (R)	A-1475-13
8	Screened Plastics (Set)	M-1330-171
9	Thumper Caps (3)	A-3713-62
10	R.O. Wire & Bracket (2)	A-2806-1
11	Guide Rail (2)	C-935-5
12	Guide Wire	M-121-98
13	Guide Wire	M-121-46
14	Guide Wire	M-121-99
15	Target Assy (Red)	AS-2911-3
16	Guide Wire	M-121-101
17	Guide Wire	M-121-32
18	Guide Wire	M-121-100
19	Guide Wire	M-121-102
20	Guide Wire	M-121-47
21	Guide Wire (2)	M-121-18
22	Guide Wire	M-121-43
23	Guide Wire	M-121-44
24	Buffer Wire (2)	M-121-53
25	Ball Guide Assy	A-3032-44
26	Spinner Gate Assy (L)	AS-2250-65
27	Spinner Gate Assy (R)	AS-2250-66
28	Drop Target Assy (2)	AS-2795-32
29	Drop Target Assy	AS-2795-33
30	Ball Gate & Wire Assy	AS-2250-24
31	Flipper & Shaft Assy (2)	AS-2214-21
32	R.O. Wire & Bracket (4)	AS-2806



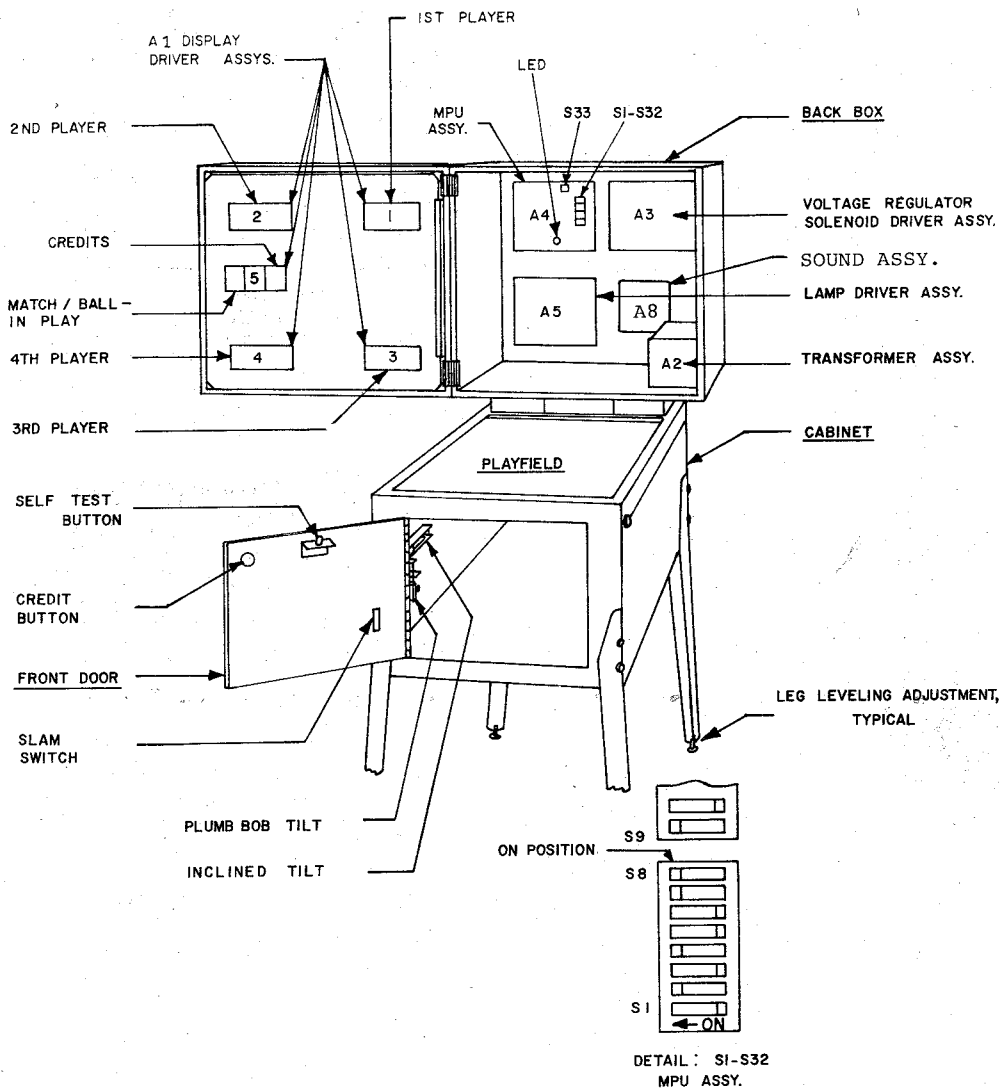


FIGURE III. ELECTRONIC PIN BALL MACHINE

RECOMMENDED

Instruction, Score Cards and High Score Feature Settings
to be used on **MYSTIC 1192**

3-BALL

REPLAYS

Instruction Card	M-1508-90-E
Score Card	M-1508-90-B
1 Replay at 260,000	
1 Replay at 500,000	

5-BALL

REPLAYS

Instruction Card	M-1508-90-E
Score Card	M-1508-90-A
1 Replay at 360,000	
1 Replay at 600,000	

EXTRA BALL

Instruction Card	M-1508-90-F
Score Card	M-1508-90-A/PP
1 Extra Ball at 330,000	
1 Extra Ball at 570,000	
1 Extra Ball at 790,000	

ADDITIONAL CARDS

REPLAYS

M-1508-H	120,000	360,000
M-1508-I	140,000	380,000
M-1508-J	160,000	400,000
M-1508-K	180,000	420,000
M-1508-L	200,000	440,000
M-1508-M	220,000	460,000
M-1508-N	240,000	480,000
M-1508-O	260,000	500,000
M-1508-P	280,000	520,000
M-1508-Q	300,000	540,000
M-1508-R	320,000	560,000
M-1508-S	340,000	580,000
M-1508-T	360,000	600,000
M-1508-U	380,000	620,000
M-1508-V	400,000	640,000
M-1508-W	420,000	660,000
M-1508-X	440,000	680,000
M-1508-Y	460,000	700,000
M-1508-AA	140,000	430,000 580,000
M-1508-BB	160,000	450,000 600,000
M-1508-CC	180,000	470,000 620,000
M-1508-DD	200,000	490,000 640,000
M-1508-EE	220,000	510,000 660,000
M-1508-FF	240,000	530,000 680,000
M-1508-GG	260,000	550,000 700,000
M-1508-HH	280,000	570,000 720,000
M-1508-II	300,000	590,000 740,000
M-1508-JJ	320,000	610,000 760,000
M-1508-KK	340,000	630,000 780,000
M-1508-LL	360,000	650,000 800,000

EXTRA BALL

M-1508-MM	240,000	480,000	700,000
M-1508-NN	270,000	510,000	730,000
M-1508-OO	300,000	540,000	760,000
M-1508-PP	330,000	570,000	790,000
M-1508-QQ	360,000	600,000	820,000
M-1508-RR	390,000	630,000	850,000
M-1508-SS	420,000	660,000	880,000

Instruction Card, Novelty
M-1508-90-G

Instruction Card, Replay
M-1508-90-TT

BLANKS (3)

High game to date recommended levels:
(reset periodically)
3 BALL 580,000
5 BALL 680,000

#1192 MYSTIC

RECOMMENDED SETTINGS

SPECIAL: REPLAY

ALL EYES OR TRIANGLES REPLAY
 SPINNER LITES
 BONUS 2X, 3X, 4X LITE RECALL
 MYSTICAL LANE LITES RECALL
 CENTER EYES AND PYRAMID LITE RECALL
 4 STAR LANES LITE RECALL
 MYSTIC LANE 5K & 2X LITE

	3-BALL	5-BALL
SW. 6	ON	ON
SW. 7	ON	ON
SW. 8	OFF	OFF
SW. 14	ON	OFF
SW. 15	OFF	OFF
SW. 16	ON	ON
SW. 23	ON	ON
SW. 24	ON	ON
SW. 32	ON	OFF

REPLAY

Instruction Card
 Score Card
 Major Mode
 Match
 High Score to Date

3-BALL

M-1508-90-E
 M-1508-90-B
 SW. 6, 7, ON
 SW. 28 ON
 SW. 21, 22, ON

5-BALL

M-1508-90-E
 M-1508-90-A
 SW. 6, 7, ON
 SW. 28 ON
 SW. 21, 22, ON

X-BALL

Instruction Card
 Score Card
 Major Mode
 Match
 High Score to Date

M-1508-90-O
 M-1508-90-A W/PP
 SW. 6 OFF
 SW. 7 ON
 SW. 28 OFF
 SW. 21, 22, OFF

NOVELTY

Instruction Card
 Major Mode
 Match
 High Score to Date

M-1508-90-G
 SW. 6 ON, 7 OFF
 SW. 28 OFF
 SW. 21, 22, OFF

M-1508-90-G
 SW. 6 ON, 7 OFF
 SW. 28 OFF
 SW. 21, 22, OFF

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 the "Game Over" 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 14 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.

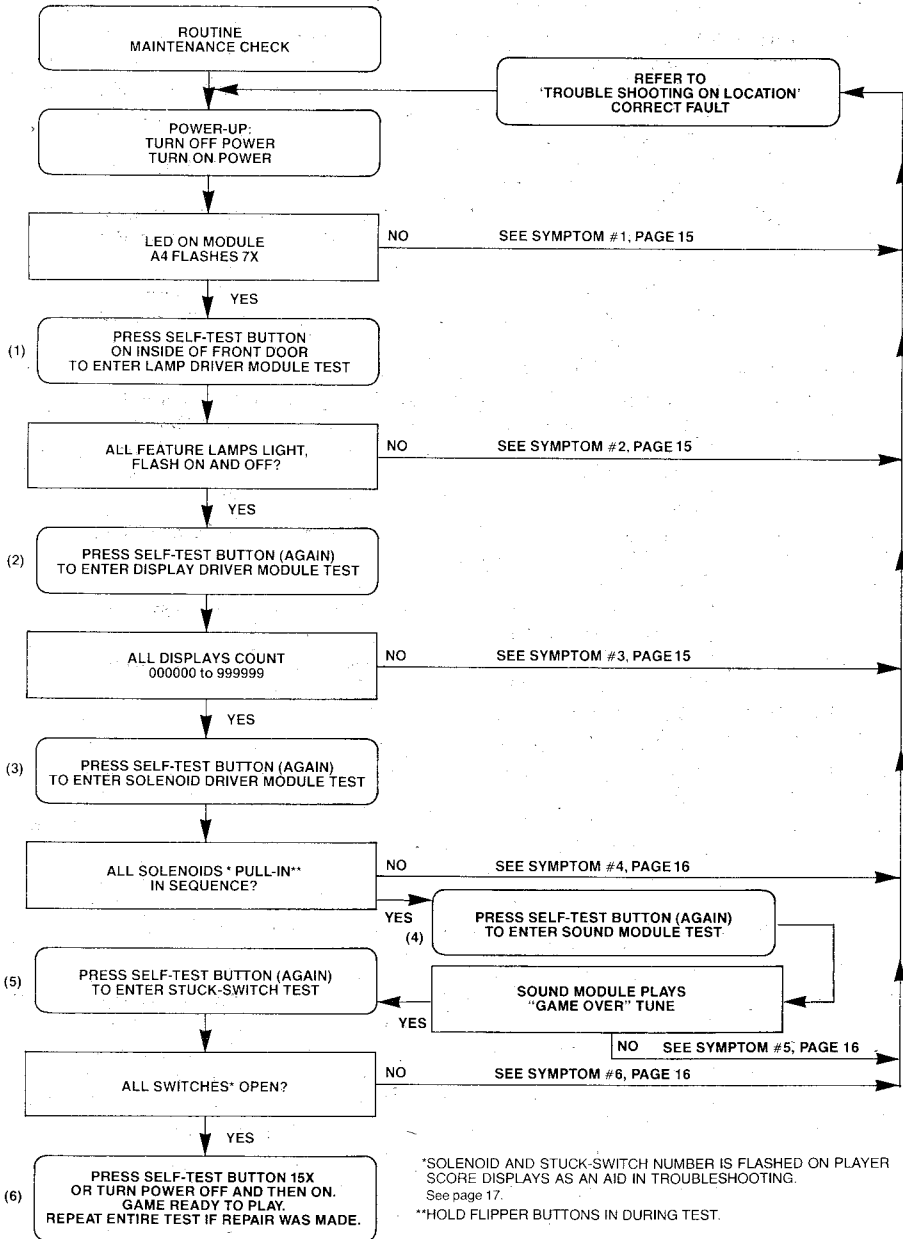
After successful completion of the Self Diagnostic Test procedure, set the game up for play. Exercise each rollover, thumper-bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no response, clean contacts by gently closing them on a clean business card or piece of paper and wiping until they wipe clean. Regap, 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. See the Parts List for ordering information.

FIGURE IV SELF DIAGNOSTIC 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. 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 the 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, AB, 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.
- 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.
- CAUTION: 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 to 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. 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 and 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 is 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.
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', regap 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 the game is correct, it is now ready to play.* If the 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

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

GAME #1192 MYSTIC (FIGURE V)
SOLENOID IDENTIFICATION TABLE

Self Test #	SOLENOID IDENTIFICATION
01	LEFT SLINGSHOT
02	RIGHT SLINGSHOT
03	KNOCKER
04	OUTHOLE KICKER
05	SAUCER
06	LEFT THUMPER BUMPER
07	RIGHT THUMPER BUMPER

Self Test #	SOLENOID IDENTIFICATION
08	BOTTOM THUMPER BUMPER
09	LEFT DROP TARGET
10	RIGHT DROP TARGET
11	CENTER DROP TARGET
12	COIN LOCKOUT DOOR
13	K1 RELAY (FLIPPER ENABLE)

SWITCH ASSEMBLY SELF-TEST DISPLAY NUMBERS

Switch Self Test #	DESCRIPTION
01	
02	TOP RIGHT ROLLOVER
03	TOP LEFT ROLLOVER
04	RIGHT SPINNER
05	LEFT SPINNER
06	CREDIT BUTTON
07	TILT (3)
08	OUTHOLE
09	COIN III (RIGHT)
10	COIN I (LEFT)
11	COIN II (MIDDLE)
12	30 POINT REBOUND (2)
13	#3 CENTER DROP TARGET (RT.)
14	#2 CENTER DROP TARGET
15	#1 CENTER DROP TARGET (LEFT)
16	SLAM (2)
17	RIGHT OUTLANE
18	LEFT OUTLANE
19	FLIP/FEED LANE (RT.)
20	FLIP/FEED LANE (LT.)

Switch Self Test #	DESCRIPTION
21	#3 RT. DROP TARGET (BOT.)
22	#2 RT. DROP TARGET
23	#1 RT. DROP TARGET (TOP)
24	PYRAMID SAUCER
25	
26	
27	
28	
29	#3 LT. DROP TARGET (TOP)
30	#2 LT. DROP TARGET
31	#1 LT. DROP TARGET (BOT.)
32	MYSTICAL LANE TARGET
33	
34	
35	
36	RIGHT Slingshot
37	LEFT SLINGSHOT
38	BOTTOM THUMPER BUM.
39	RIGHT THUMPER BUM.
40	LEFT THUMPER BUM.

NOTE: SLINGSHOT & THUMPER BUMPER COILS
WILL BE ENERGIZED WHEN SWITCH IS MADE.

#1192 MYSTIC

○ INDICATES SWITCH ASSEMBLY
IDENTIFICATION NUMBERS.

NOTE: CABINET: 07, 16
DOOR: 06, 09
10, 11, 16

□ INDICATES SOLENOID
IDENTIFICATION NUMBERS.

NOTE: DOOR: 12
BACKBOX: 13
CABINET: 03

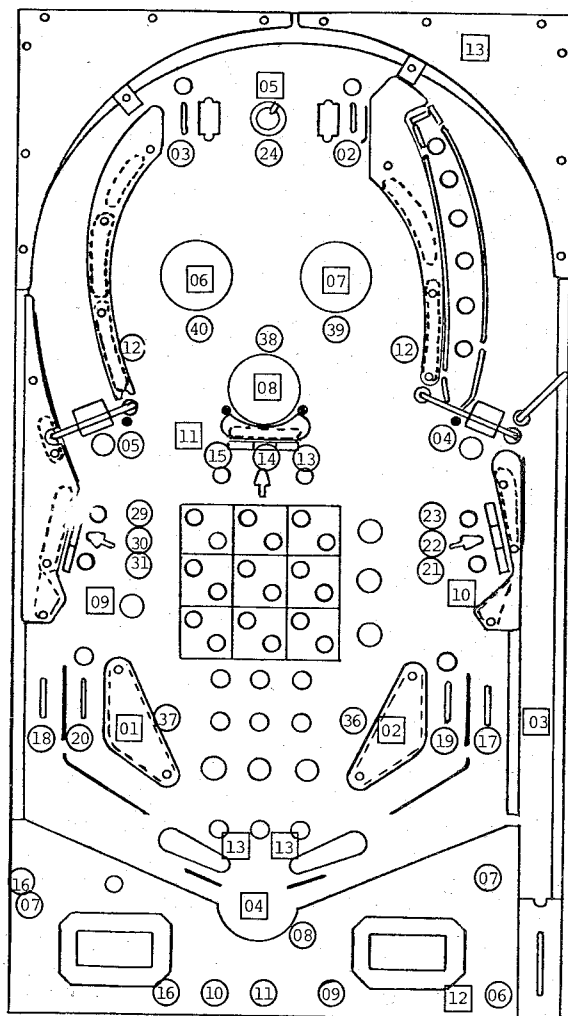


FIGURE V

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" overtravel 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 a burnishing tool. Severely pitted contacts must be replaced as an assembly. In general, contacts need be cleaned or replaced and adjusted only when they are found to be a source of game malfunction.

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 MANUFACTURING CORPORATION
2640 WEST BELMONT AVENUE
CHICAGO, ILLINOIS 60618
ATTN: PARTS DEPARTMENT

SERVICE HINTS:

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

DO: Bally recommends you clean your playfield with Wildcat #125 (Wildcat Chemical Co., 1333 W. Seminary Drive, Ft. Worth, Texas 76115). Wildcat #125 is a combination cleaner and polish. Bally has tried and tested this product and found it to be very effective. If 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 or cleaning pads on the playfield. Do not allow a wax or polish build up. Waxes yellow with age and spoil play appeal.

XI. PARTS LIST

#1192 MYSTIC

MISCELLANEOUS

PART NUMBER

Transformer (Domestic or Export)	E-122-125
Bulbs, #44	E-125-22
Fuse, 1 Amp. 3 AG Slow Blow (Playfield Solenoid Protection)	E-133-44

ASSEMBLY COILS

Coin Lockout	FO-36-7000
Flipper (2)	AQ-25-500/ 34-4500
Knocker	AR-26-1200
Outhole Kicker	AN-26-1200
Thumper-Bumper (3)	AO-26-1200
Sling-Shot (2)	AN-26-1200
Drop Target (3)	NO-26-1900
Saucer	AO-27-1300

PLAYFIELD PARTS

See Figure II

MODULES

Lamp Driver A5	AS-2518-23
Display Driver A1 (5 used)	AS-2518-21
Solenoid Driver/Voltage Regulator A3	AS-2518-22
MPU A4	AS-2962-18
Transformer & Rectifier A2	AS-2877-1
Rectifier Board (Part of A2)	AS-2518-18
Sound	AS-3022-7

REPAIRS PROCEDURES/AIDS

Module & Component Replacement	FO.560-1
AID (Assistance in Diagnostics)	
Kit, used with FO.560-1	KIT #485-1

MODULE COMPONENTS

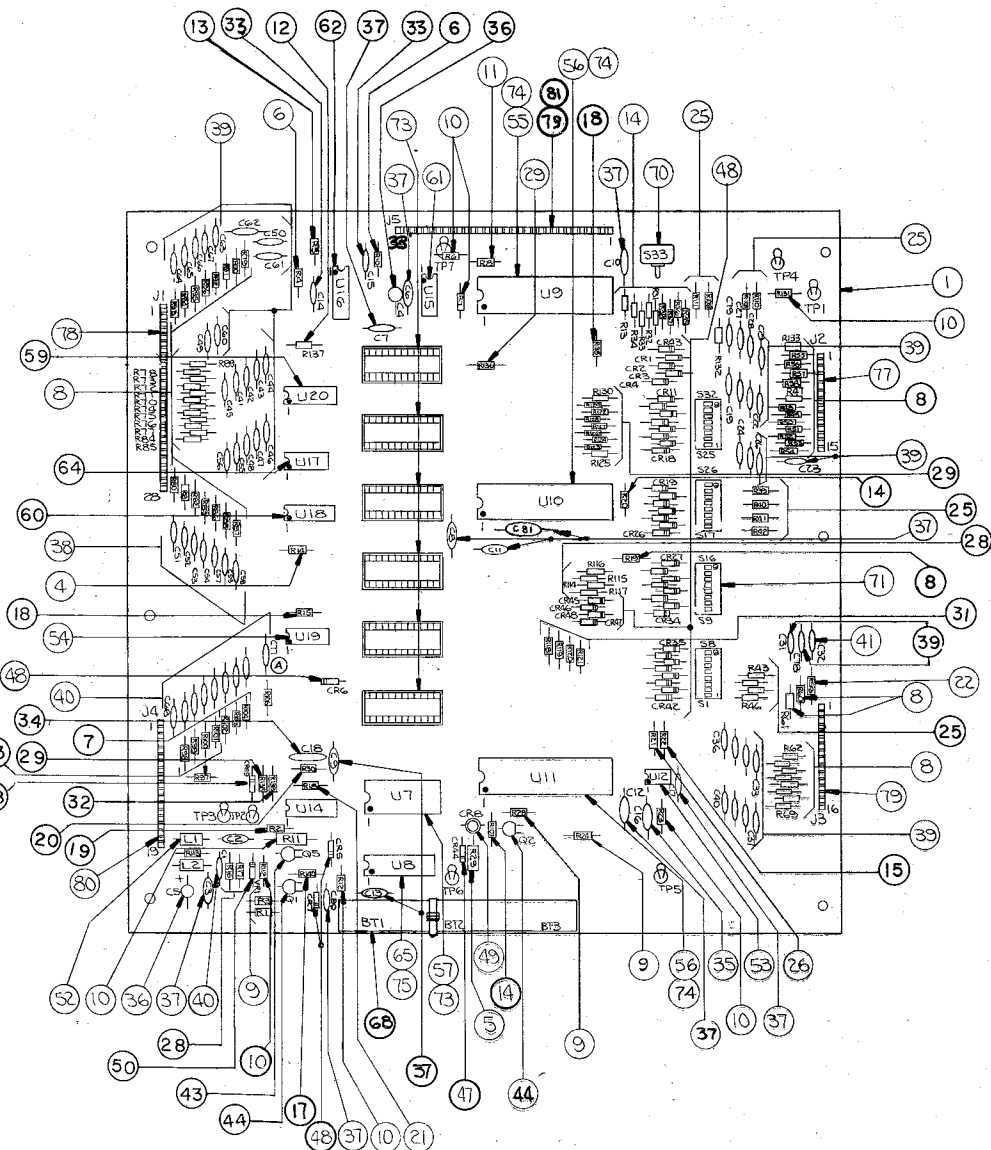
SEE MODULE PARTS LIST

MODULE COMPONENT STARTER KITS

(Each Kit contains an assortment of the most needed electronic parts for use in Module repair.)

- Kit #490—For Rectifier Board (Part of A2)
- Kit #503—For MPU Board A4 (Less Memory U1-U6)
- Kit #492—For Solenoid Driver/Voltage Regulator A3
- Kit #493—For Display Driver A1
- Kit #494—For Lamp Driver A5
- Kit #559—For Sound A8

AS-2518-35 MPU MODULE



A4: MPU MODULE COMPONENT PARTS LIST

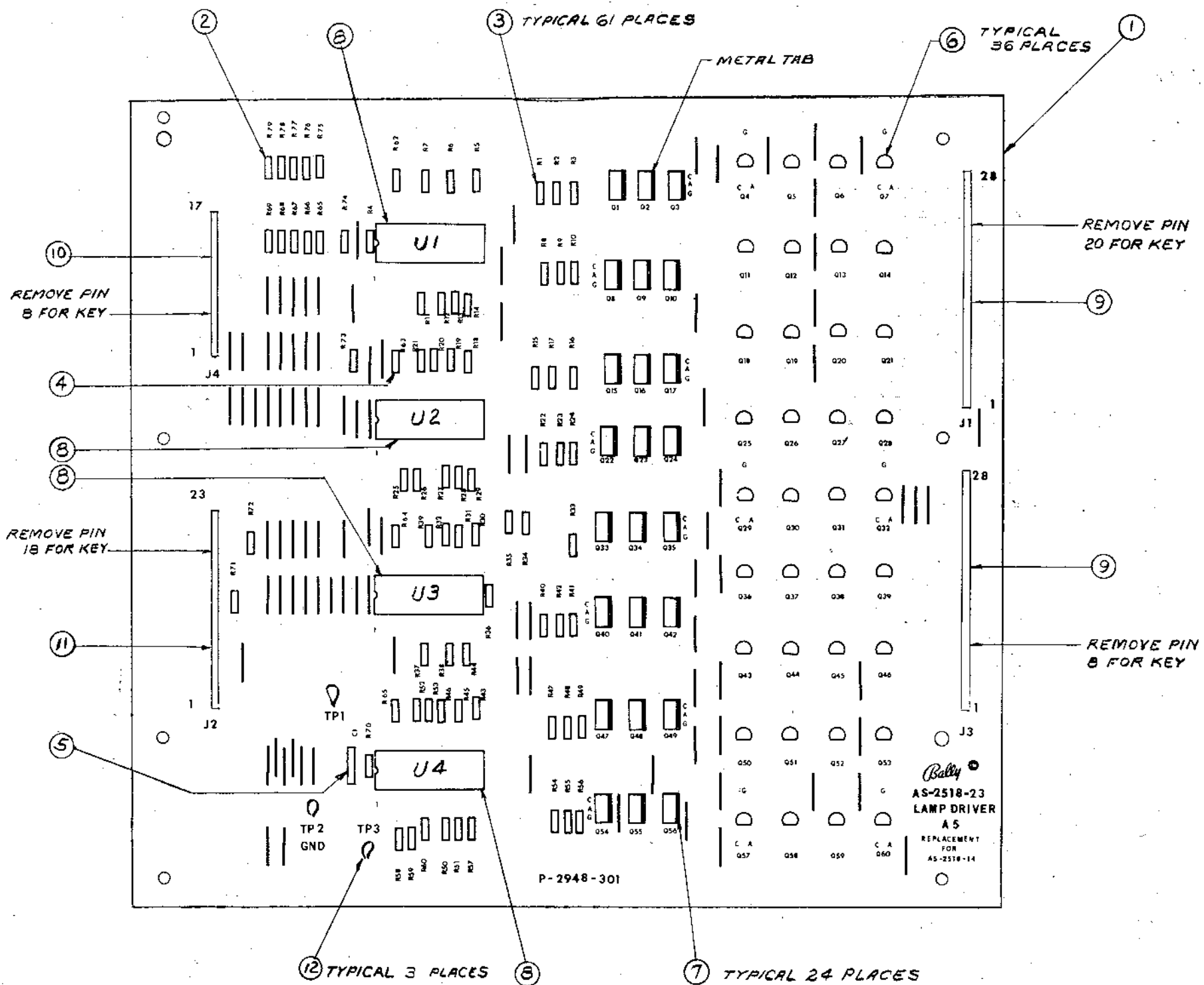
ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	AS-2962-18	MPU Module Complete. Mystic
2	A4 (see note 2)	AS-2518-35	MPU Module less Program Memory, U1-6 incl.
3-32	See Schematic		Resistors, See schematic for value
33	C14, C15	E-00586-0067	Capacitor, 470 PFD, 1kv
34	C18	E-00586-0088	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, C68-C77	E-00586-0084	Capacitor, 820 PFD, 50V
41	C32	E-00586-0077	Capacitor, 3000 PF, 1kv
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	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 1:

When ordering, fill in dash number. For example, AS-2962-0: LOST WORLD, AS-2962-2: SIX MILLION DOLLAR MAN, AS-2962-3: PLAYBOY, AS-2962-4: VOLTAN, AS-2962-5: SUPERSONIC, AS-2962-6: STAR TREK, AS-2962-7: KISS, AS-2962-8: PARAGON, AS-2962-9: GROUND SHAKER, AS-2962-10: HARLEM GLOBETROTTERS, AS-2962-12: DOLLY PARTON, AS-2962-13: SILVERBALL MANIA, AS-2962-18: MYSTIC

NOTE 2: Order replacement memory chips U1-U6, specifying game, socket and part number stamped on chip.

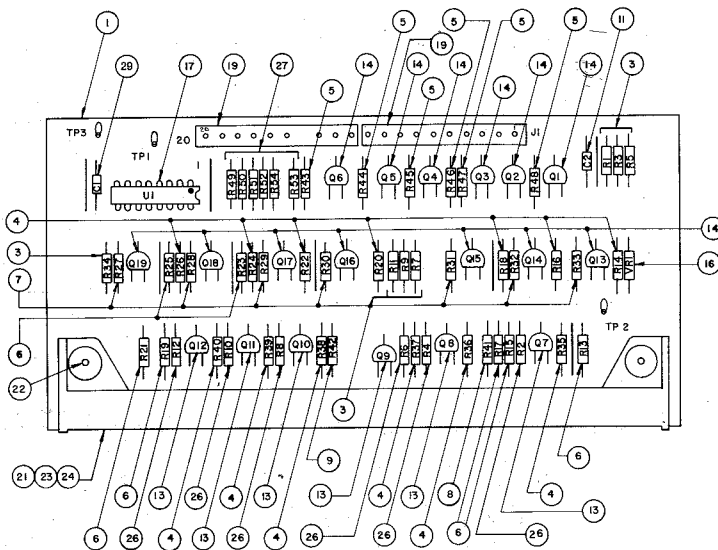
AS-2518-23 LAMP DRIVER MODULE



A5: LAMP DRIVER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A5	AS-2518-23	Lamp Driver Module, Complete
2	R71-R79	E-00105-242	Resistor, 20k Ω , 5%, 1/4 W
3	R1-R60, R70	E-00105-0237	Resistor, 2k Ω , 5%, 1/4 W
4	R61-R69	E-00105-0256	Resistor, 2.2M Ω , 1/4 W
5	C1	E-00586-0065	Capacitor, .01 MFD, 500V
6	Q4-Q7, Q11-Q14, Q18-Q21, Q25-Q32, Q36-Q39, Q43-Q46, Q50-Q53, Q57-Q60	E-00585-0014	SCR, 2N5060
7	Q1-Q3, Q8-Q10, Q15-Q17, Q22-Q24, Q33-Q35, Q40-Q42, Q47-Q49, Q54-Q56	E-00585-0029	SCR, MCR106-1
8	U1-U4	E-00620-0037	I.C., Decoder, 14514B
9	J1, J3	E-00715-0004	28 Pin Wafer Connector
10	J4	E-00715-0024	17 Pin Wafer Connector
11	J2	E-00715-0014	23 Pin Wafer Connector
12	TP1, TP2, TP3	P-05399	Test Clip

AS-2518-21 DISPLAY DRIVER MODULE

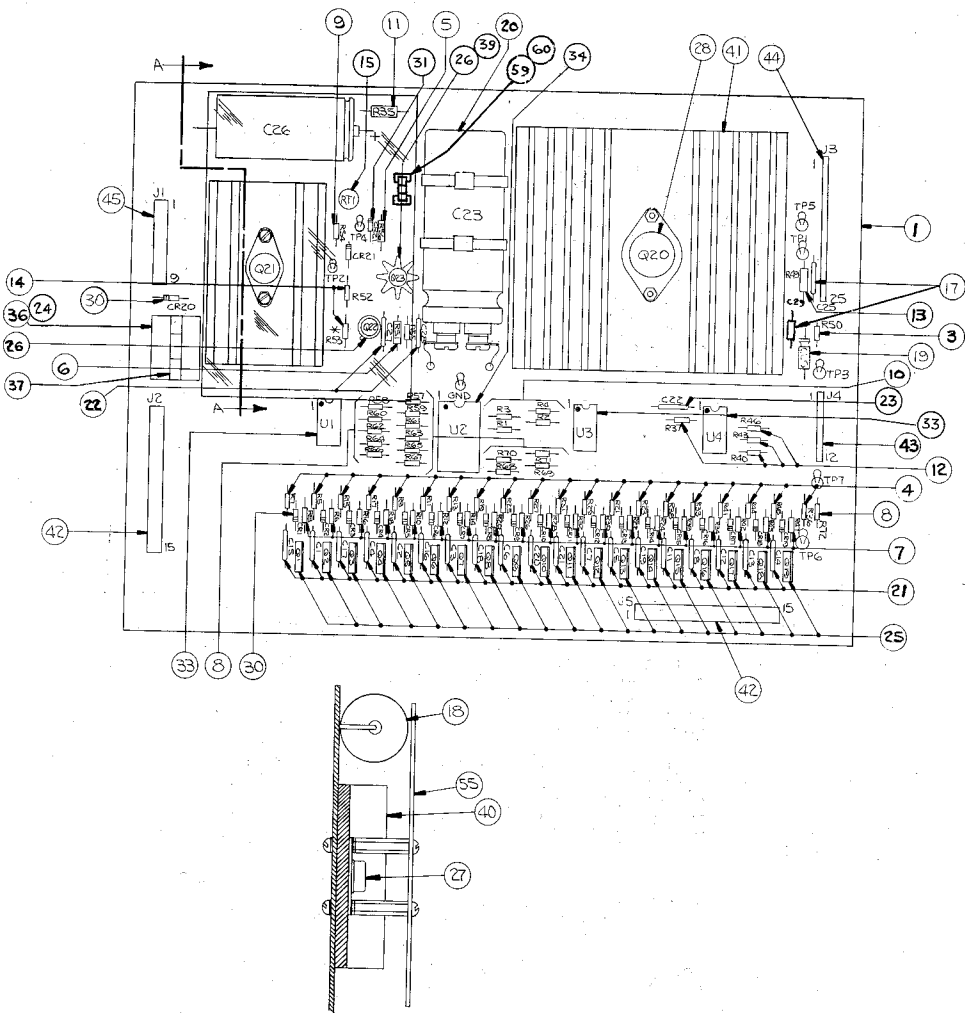


A1: DISPLAY DRIVER MODULE COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1		P-2948-296	P.C. Board, M-645-392
3	7	R1, R3, R5, R7, R9, R11, R34	E-105-226	Resistor, 100K Ω
4	13	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40	E-105-227	Resistor, 300K Ω
5	6	R43, R44, R45, R46, R47, R48	E-105-228	Resistor, 9.1K Ω
6	7	R13, R15, R17, R19, R21, R23, R25	E-105-229	Resistor, 1.5K Ω
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-230	Resistor, 1K Ω
8	1	R41	E-105-231	Resistor, 39K Ω
9	1	R42	E-105-271	Resistor, 240K Ω
10				
11	1	C2	E-586-65	Capacitor, .01 MFD, 500V
13	6	Q7, Q8, Q9, Q10, Q11, Q12	E-585-32	Transistor (2N5401)
14	13	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19	E-585-33	Transistor (MPS-A42)
16	1	VR1	E-598-7	Zener Diode, 110V
17	1	U1	E-620-38	I.C. Decoder
18				
19	2	J1	E-715-34	10 Pin Wafer Pin Connector
21	1	DS1	E-680	Digital Display Panel
22	2		M-1836	Hi-Lo Screw, W/H
23	1		P-2399	Display Mounting (Top)
24	1		P-2399-1	Display Mounting (Bottom)
26	6	R2, R4, R6, R8, R10, R12	E-105-287	Resistor, 2.2K Ω
27	6	R49, R50, R51, R52, R53, R54	E-105-242	Resistor, 20K Ω
28	As Req'd			Wire Jumper
29	1	C1	E-586-65	Capacitor, .01 MFD, 25V

NOTE: INTERCHANGEABLE WITH AS-2518-15

AS-2518-22 SOLENOID DRIVER/VOLTAGE REGULATOR MODULE



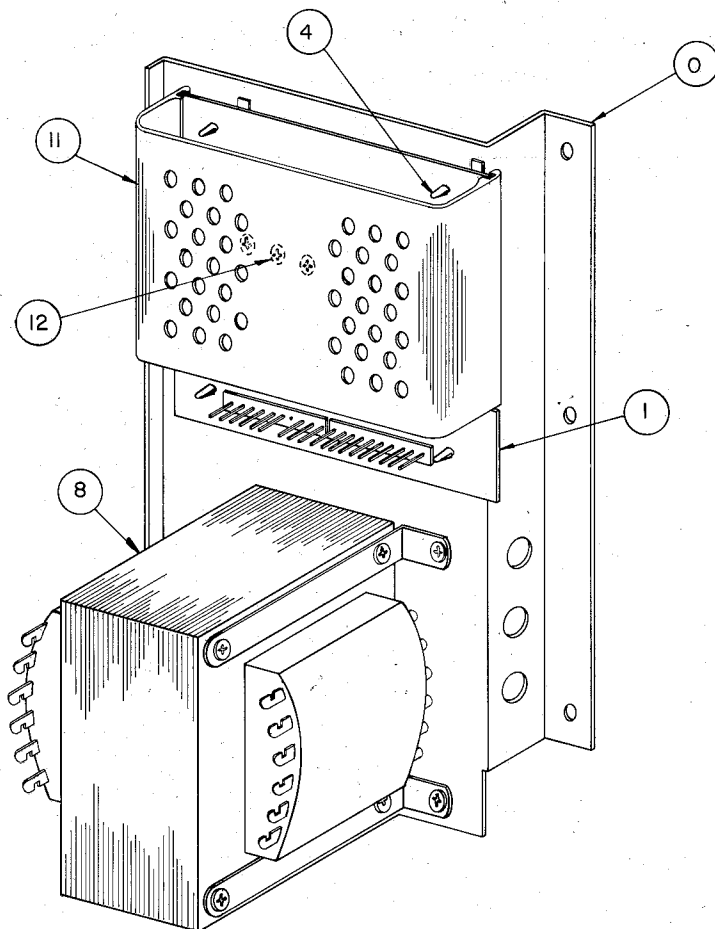
NOTE: INTERCHANGEABLE WITH AS-2518-16

A3: SOLENOID DRIVER/VOLTAGE REGULATOR MODULE

COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A3	AS-2518-22	Solenoid Driver/Voltage Regulator Module, Complete
3-14	Resistors		Resistor, See Schematic for value.
15	RT1	E-00599-0014	Pot. (Linear) 25K
17	C25, 29	E-00586-0014	Capacitor, .1 MFD, 20V
18	C26	E-00586-0059	Capacitor, 160 MFD, 350V
19	C24	E-00586-0063	Capacitor, 2 MFD @ 25V
20	C23	E-00586-0062	Capacitor, 11700 MFD, 20V
21	C1-C8, C11-C21	E-00586-0064	Capacitor, .002 MFD, 1kv
22	C27, C28	E-00586-0065	Capacitor, .01 MFD, 500V
24	K1	E-00146-0795	Relay, Printed Circuit
25	Q1-Q19	E-00585-0034	Transistor, SE9302
26	Q22, Q23	E-00585-0041	Transistor, 2N3440
27	Q21	E-00585-0042	Transistor, 2N3584
28	Q20	E-00710	+5V Regulator, LAS1405 or 78H05KC or LM323K
30	CR1-CR21	E-00587-0015	Diode (1N4004)
31	VR1	E-00598-0010	Diode, Zener 140V, IN5275A
33	U1, U3, U4	E-00681	I.C. Transistor Array, CA3081
34	U2	E-00620-0039	I.C. Binary to 1/16 Decoder, 74L154
36		E-00592-0002*	Relay Socket
37		M-1839*	Relay Holder
39		E-00682	Heat Sink, TO5
40		E-00682-0001	Heat Sink, TO66
41		E-00682-0002	Heat Sink, TO3 Case
42		E-00715-0039	15 Pin Wafer Connector
43		E-00715-0016	12 Pin Wafer Connector
44		E-00715-0020	25 Pin Wafer Connector
45		E-00715-0033	9 Pin Wafer Connector
55		M-1838	Shield-Plexiglass
59		E-00148-0021	Fuse Clips
60	F1	E-00133-0029	Fuse 8 AG-3/16 Amp.
23	C22	E-00586-0085	Capacitor, .01 MFD, 25V

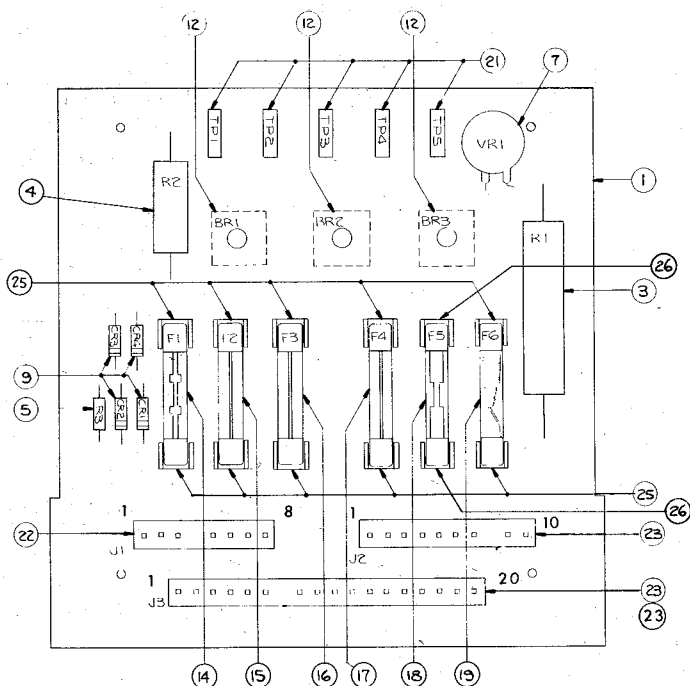
*USED WITH ITEM 24, E-00146-0791, PLUG IN RELAY ONLY



A2: POWER TRANSFORMER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-1	Power Transformer Module, Complete
1		AS-2518-18	Rectifier Board Assembly
4		M-1829-2a	Circuit Board Support (4 Req'd.)
8		E-00122-0125c	Transformer 120/240V, 50/60 Hz
11		P-2692b	P.C.B Cover
12		M-1834	Heat Sink Compound

AS-2518-18 RECTIFIER BOARD ASSEMBLY



RECTIFIER BOARD ASSEMBLY (Part of) A2: POWER TRANSFORMER MODULE COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	P/O A2	AS-2518-18	Rectifier Board Assembly, Complete
3	R1	E-00104-0092	Resistor, 10%, 600 Ohm, 10W
4	R2	E-00104-0091	Resistor, 25 Ohm, 5W
5	R3	E-00105-0226	Resistor, 5%, 100K Ohm, 1/4W
7	VR1	E-00623	Varistor
9	CR1, CR2, CR3, CR4	E-00587-0006	Diode (1N4004)
12	BR1, BR2, BR3	E-00602-0003	Bridge Rectifier (VJ248 VARO)
14	F1	E-00133-0010	Fuse, 10A, 32V, 3AG
15	F2	E-00133-0028	Fuse, 3/4A, 250V, 3AG,
16	F3	E-00133-0004	Fuse, 4A, 32V, 3AG
17	F4	E-00133-0005	Fuse, 5A, 32V, 3AG
18	F5	E-00133-0027	Fuse, 20A, 32V, 3AG
19	F6	E-00133-0024	Fuse, 3A, 3AG, S.B.
21		E-00684	Test Point
22	J1, J2, J3	E-00715-0032	8 Pin Wafer Connector
23		E-00715-0034	10 Pin Wafer Connector
25		E-00148-0021	Fuse Clips
26		E-00148-0022	Fuse Clips

A8: SOUND MODULE COMPONENT PARTS LIST

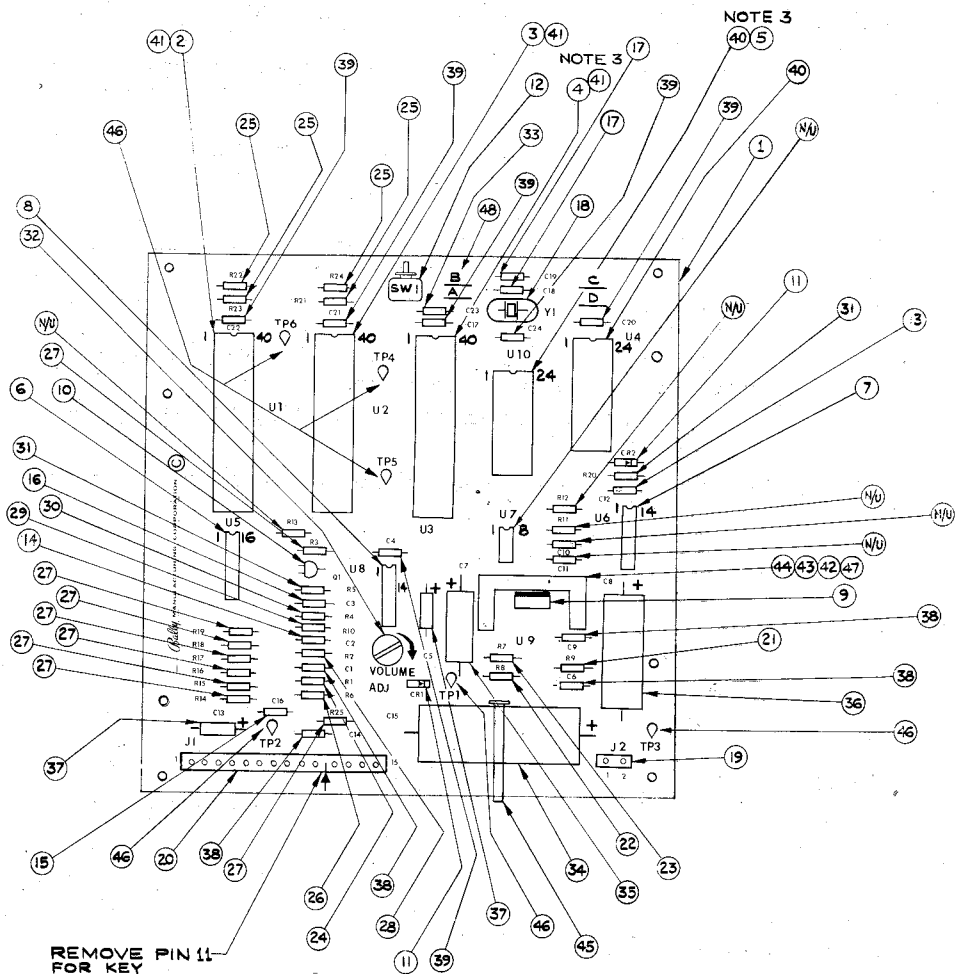
ITEM	REFERENCE DESIGNATION	BALLY PART NO.	DESCRIPTION
1	A8 (see note 1)	AS-3022-7	PWB Module Complete
2	U1	E-620-124	Sound Chip AY-3-8910
3	U2	E-620-29	PIA, 6820/21
4	U3	E-620-125 (E620-128)	CPU, 6808 (6802 Note 3)
5	U10	E-620-30	Ram, 6810 (Note 3)
6	U5	E-620-33	Hex Inverter 4049B
7	U6	E-620-5	Quad 2 Input 4011B
8	U8	E-620-126	Amp, LM3900
9	U9	E-620-127	Power Amp, TDA 2002
10	Q1	E-585-31	Transistor, 2N3904
11	CR1, 2	E-587-6	Diode, 1N4004
12	SW1	E-658-1	Switch
13	C12	E-586-118	Cap. .2MF $\pm$ 20% Y5P, 16 V.
14	C2	E-586-130	Cap. .47 $\pm$ 20%
15	C16	E-586-83	Cap. 470 PF 50 V.
16	C3	E-586-120	Cap. 68 PF $\pm$ 20% 1K
17	C18, 19	E-586-121	Cap. 27 PF $\pm$ 20% 1K
18	Y1	E-744-5	Crystal, 3.579545 MHZ
19	J2	E-736-2	Connector, Wafer, 2 Pin KK156
20	J1	E-736-15	Connector, Wafer, 15 Pin KK156
21	R9	E-105-196	Resistor, 1 Ohm, 1/4 W., 5%
22	R8	E-105-211	Resistor, 2.2 Ohm, 1/4 W., 5%
23	R7	E-105-303	Resistor, 220 Ohm, 1/4 W., 5%
24	R1	E-105-230	Resistor, 1 K, 1/4 W., 5%
25	R21, 22, 23, 24	E-105-238	Resistor, 3.3K. Ohm, 1/4 W., 5%
26	R6	E-105-239	Resistor, 4.7K., 1/4 W., 5%
27	R3, 14, 15, 16, 17, 18, 19, 25	E-105-185	Resistor, 10K., 1/4 W., 5%
28	R2	E-105-245	Resistor, 30K., 1/4 W., 5%
29	R10	E-105-252	Resistor, 180K., 1/4 W., 5%
30	R4	E-105-225	Resistor, 200K., 1/4 W., 5%
31	R5, 20	E-105-285	Resistor, 1M, 1/4 W., 5%
32	RT1	E-599-16	Potentiometer 1K
33	C23	E-586-122	Cap. .001 $\pm$ 20% 2SF
34	C15	E-586-123	Cap. 4700 MF @ 25 V.
35	C7	E-586-124	Cap. 470 MF @ 6.3 V
36	C8	E-586-129	Cap. 470 MF @ 16 V.
37	C5, 13	E-586-90	Cap. 1 MF @ 50 V.
38	C9, 1, 14, 6	E-586-89	Cap. .1 MF
39	C4, 22, 17, 21, 20, 24	E-586-85	Cap. .01 MF
40	XU10, XU4	E-712	Socket, 24 Pin
41	XU1, XU2, XU3	E-712-1	Socket, 40 Pin
42	Used with 43	LSPR-00632-1106	Bolt, 6 x 32 x 3/8
43	Used with 42	N-00632-2112	Nut, 6 x 32
44	H.S for U9	E-682-8	Heat Sink, 6030BTT
45	Used with C15	E-647-5	Ty Rap
46	TP1, 2, 3, 4, 5, 6	P-5399	Test Point
47	Use with 44, 9	M-1834	Thermal Grease
48	Jumper, B	W-1211c	22 AWG Wire, Solid Tinned Schematic

NOTE 1: When ordering specify name of game.

NOTE 2: Order replacement memory chip U4 specifying name of game and part no. stamped on chip.

NOTE 3: When using item 4, 6808 you must use item 5, 6810 and the "B" jumper. When item, 6802 is available delete item 5 and use "A" jumper.

AS-2518-51 SOUND MODULE



ATTACHMENT II: INSTRUCTION MANUAL

Female insulation displacement connectors are used in the backbox cable harnesses. These connectors can be identified by the side entry of the leads and by their black, plastic covers.

The mating, white, male connectors on the Sound, Solenoid Driver and Transformer modules have .156" center to center spacing. Two pin lengths are in use. This, and all current games have a .450" length. Older games have a .640" length.

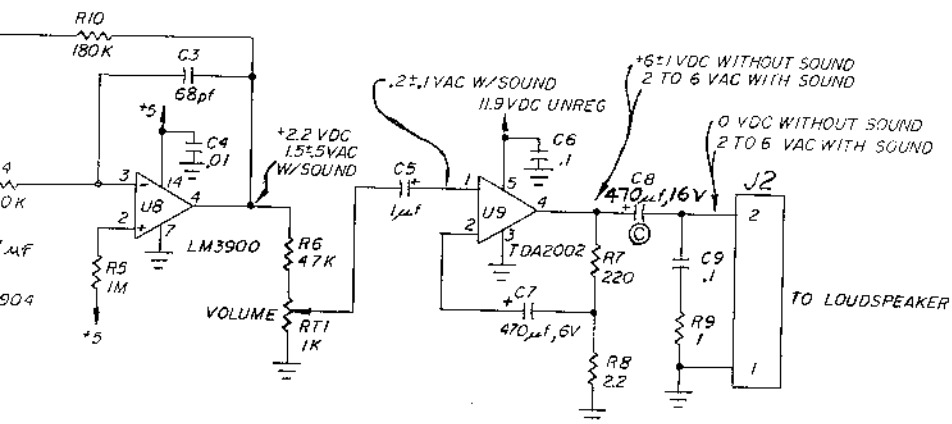
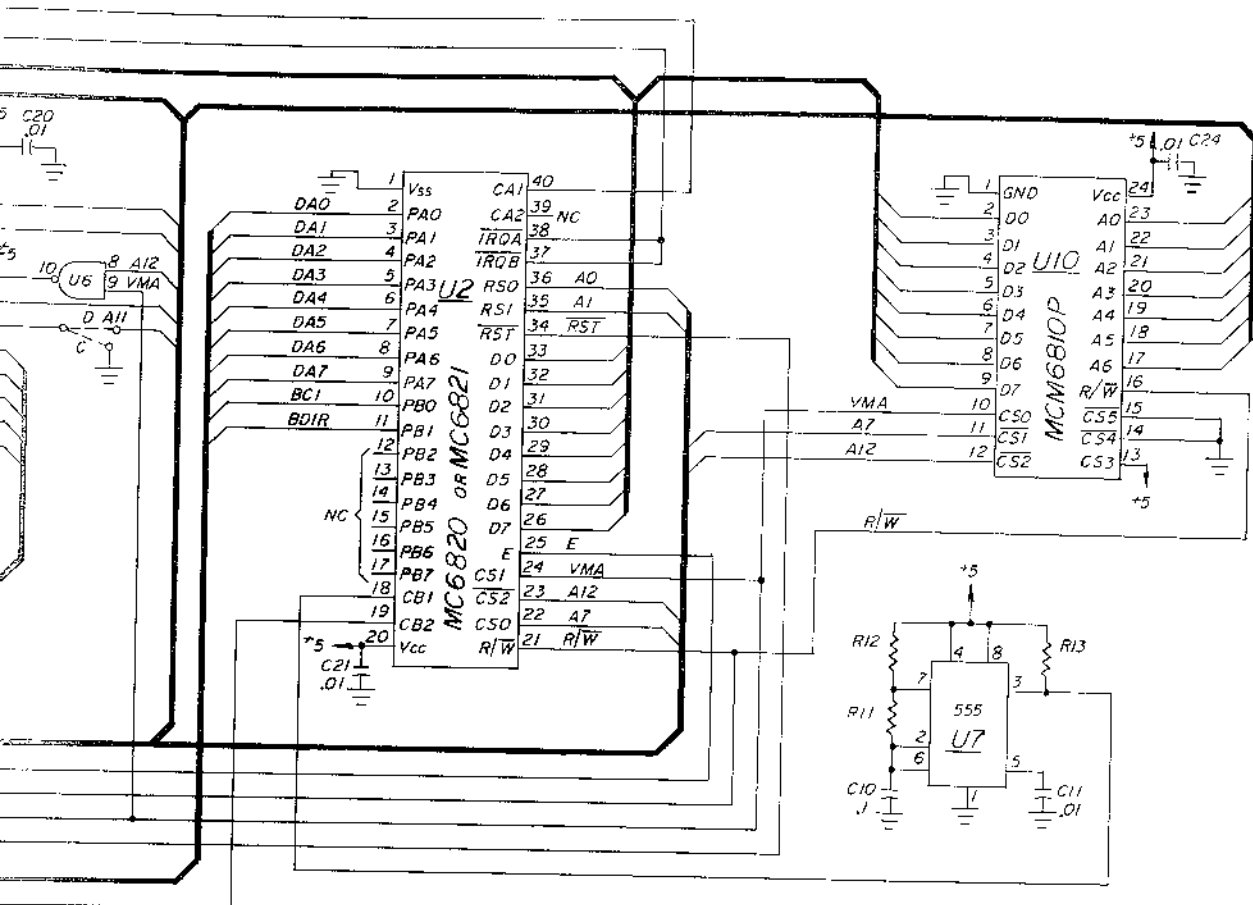
During servicing, when mating insulation displacement connectors on male connectors with a .640" pin length:

1. Hold the female connector parallel to the module surface.
2. Carefully align the openings in the female with the male pins.
3. Mate the connector set firmly but gently while maintaining the parallel relationship.
4. As resistance is encountered, stop applying force. An air gap of about .150" between the male and female connector bodies is normal at complete engagement.

CAUTION: It is not necessary or advisable to force the female connector further onto the male pins. Doing so may cause an intermittent connection.

When mating insulation displacement connectors on male connectors with a .450" pin length:

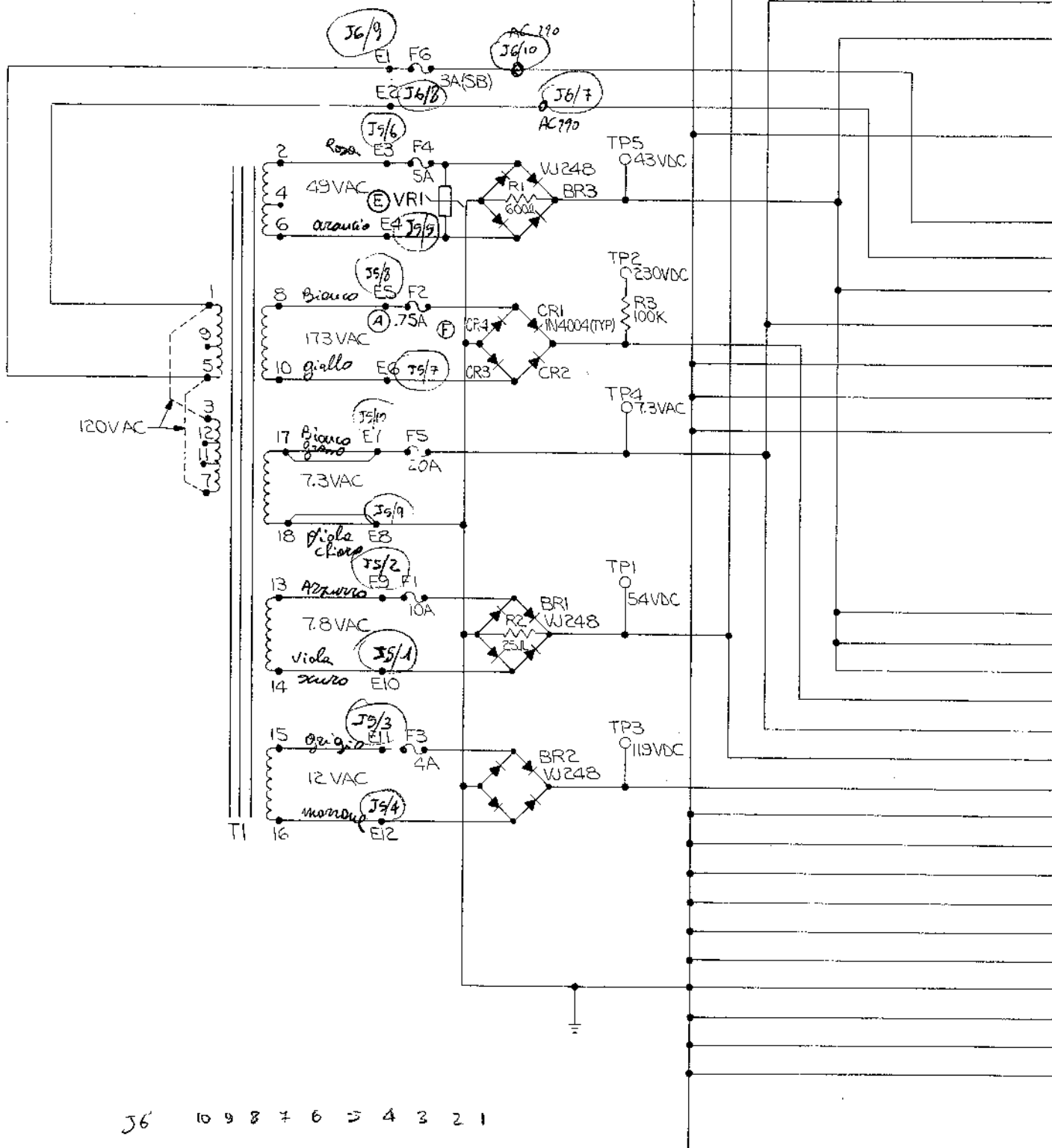
1. Follow steps 1-4 above, but—
2. Disregard the **CAUTION** note. Also, no air gap exists between the connector pair on total engagement.



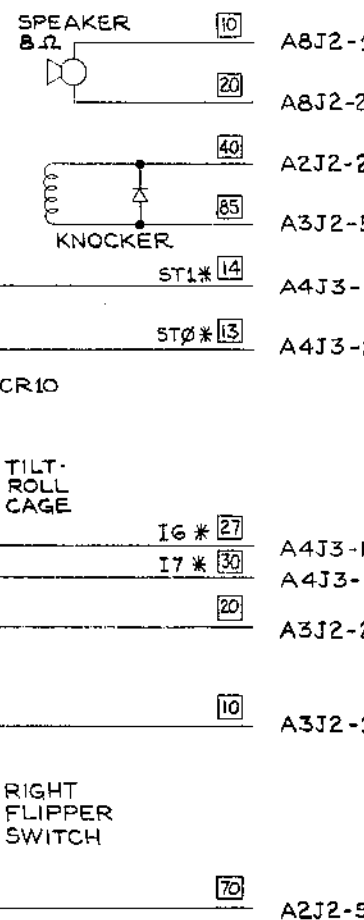
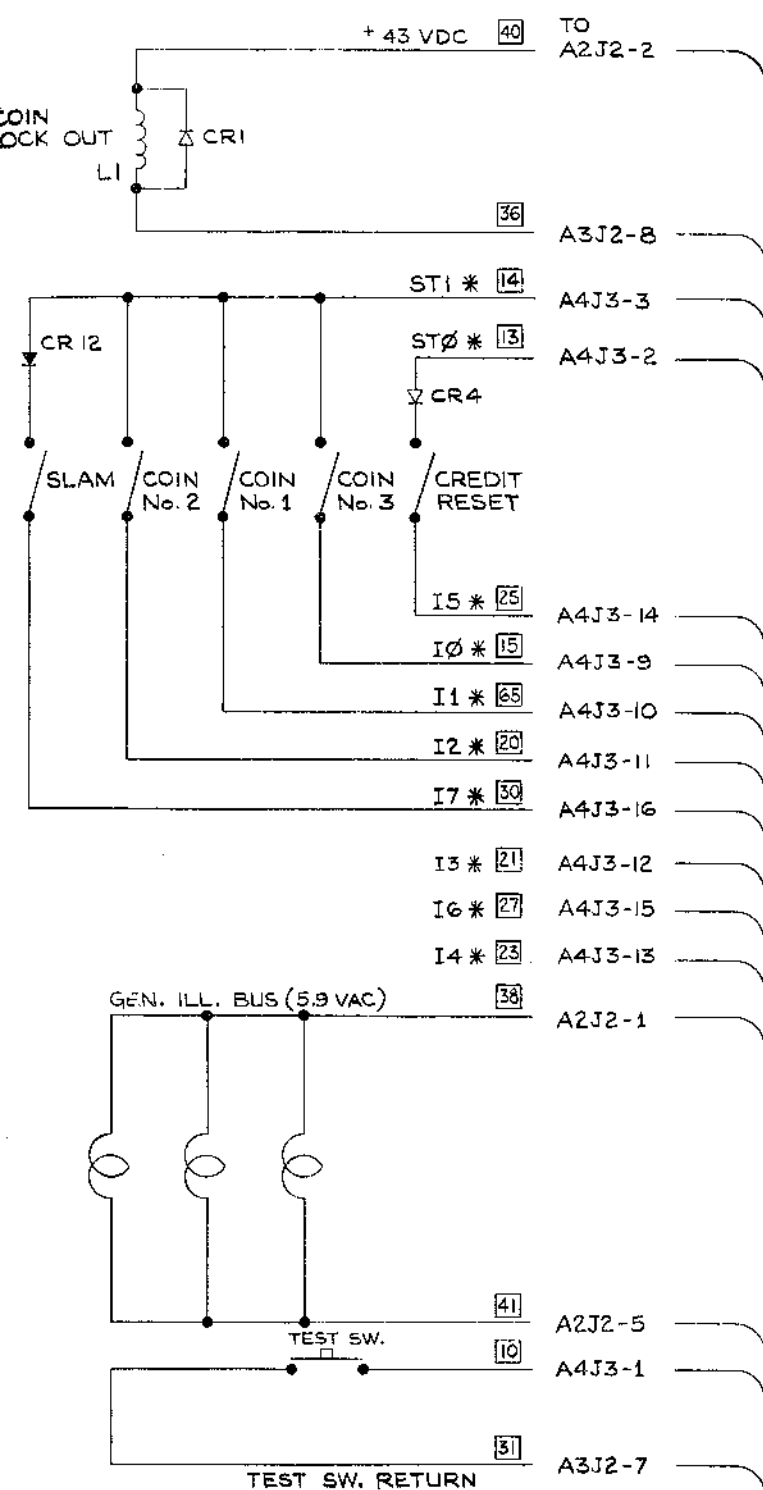
(6802 WITHOUT U10).
(6808 / 6810, U10).
(G19316B INTEL 2716 OR EQUIV.).
(T1 TMS 2532 TMS 4732 OR EQUIV.).
ASSEMBLY.
FOR VALUES ARE IN OHMS,
/ AB.

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DO BY NRW DATE 9-13-79		DATE 9-13-79	
CK BY DATE 9-13-79		DATE 9-13-79	
APPROV DATE 9-13-79		DATE 9-13-79	
FINISH DATE 9-13-79		DATE 9-13-79	
HARDENING DATE 9-13-79		DATE 9-13-79	
REMOVE ALL BURRS		TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED	
FRACTIONS ± .005		DECIMALS ± .001	
EXCEPT HOLE DIA'S		ANGLES ± 1°	
DO NOT SCALE DRAWING			
Bally MANUFACTURING CORP.		2640 BELMONT AVENUE CHICAGO, ILLINOIS	
NAME COMPUTER SOUND MODULE AB		SCHEMATIC	
ASSEMBLY NO. USED AS-2518-51		SCALE 1/16"	
PART NO. W-1211 c			

TRANSFORMER ASSEMBLY A2



J6 10 9 8 7 6 5 4 3 2 1



P1

J1

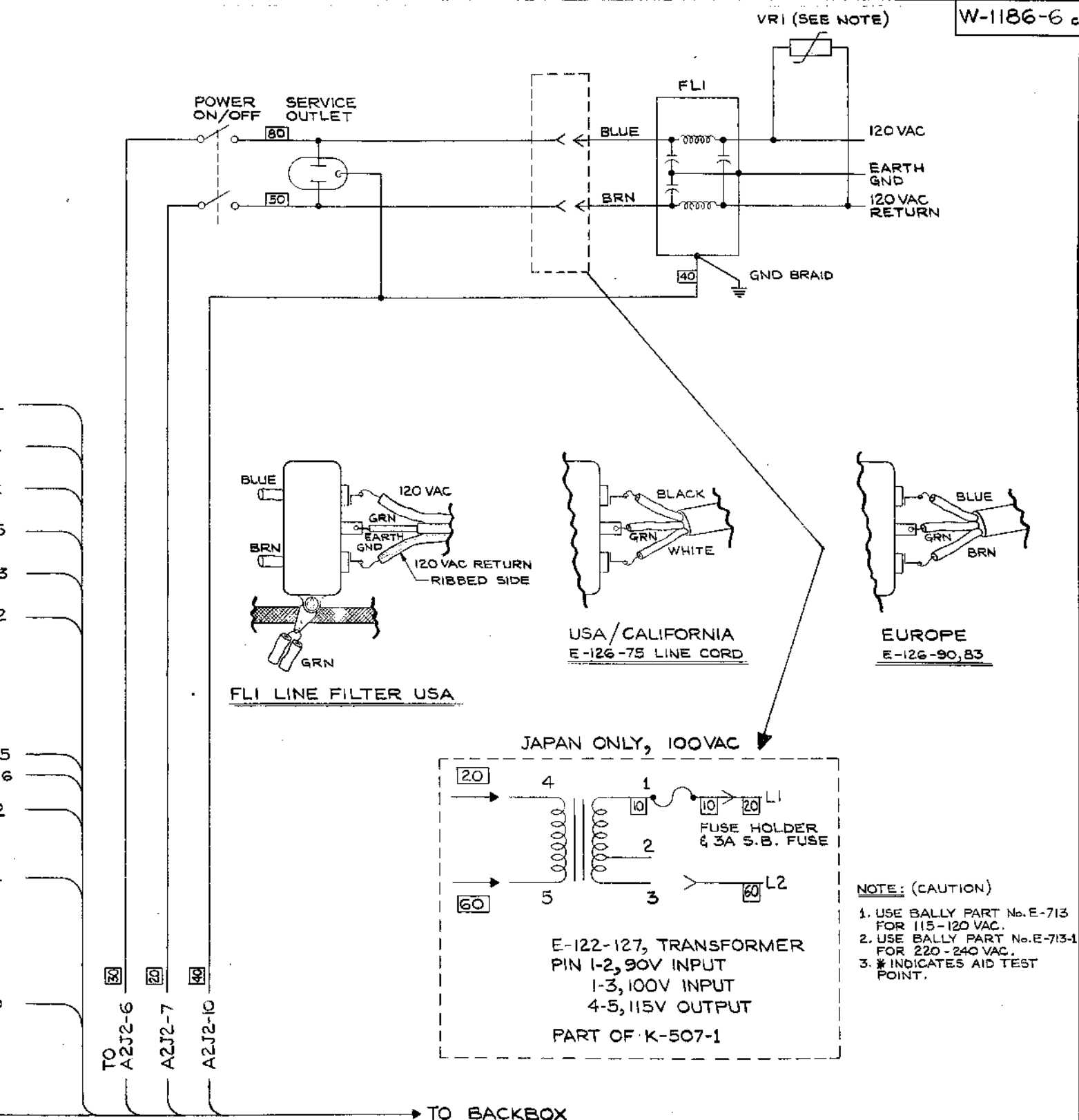
TO	J1 PIN	TO	J1 PIN
A4J3-9	1	A4J3-3	11
A4J3-10	2	A2J2-2	15
A4J3-11	3	A3J2-8	16
A4J3-12	4	A2J2-1	17
A4J3-13	5	A2J2-5	18
A4J3-14	6	A4J3-1	19
A4J3-15	7	A3J2-7	20
A4J3-16	8		
A4J3-2	10		

DOOR PLUG

A7 CABINET A

NOTE : -DIODES ARE

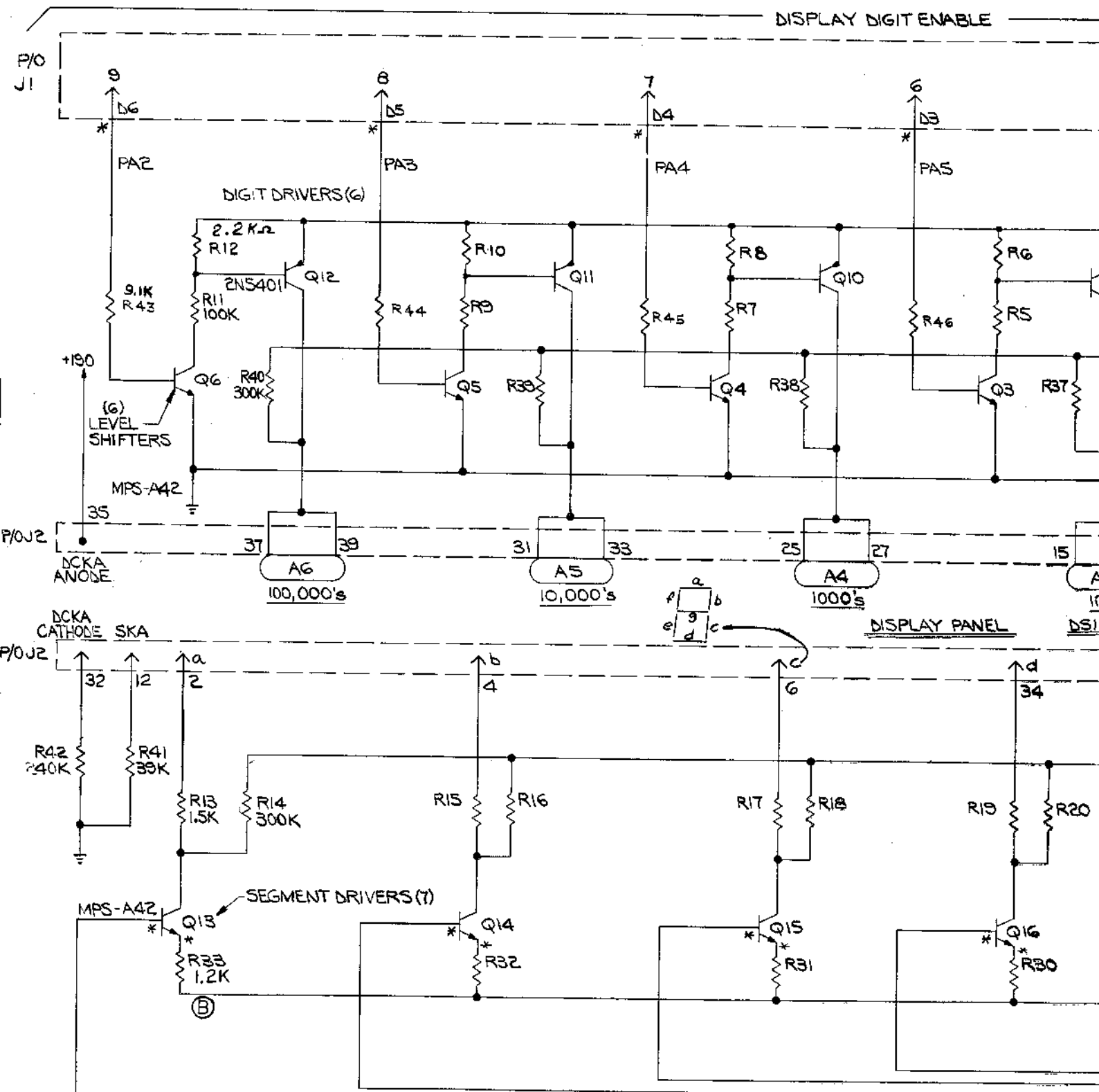
ER.	DESCRIPTION	TOOL No.



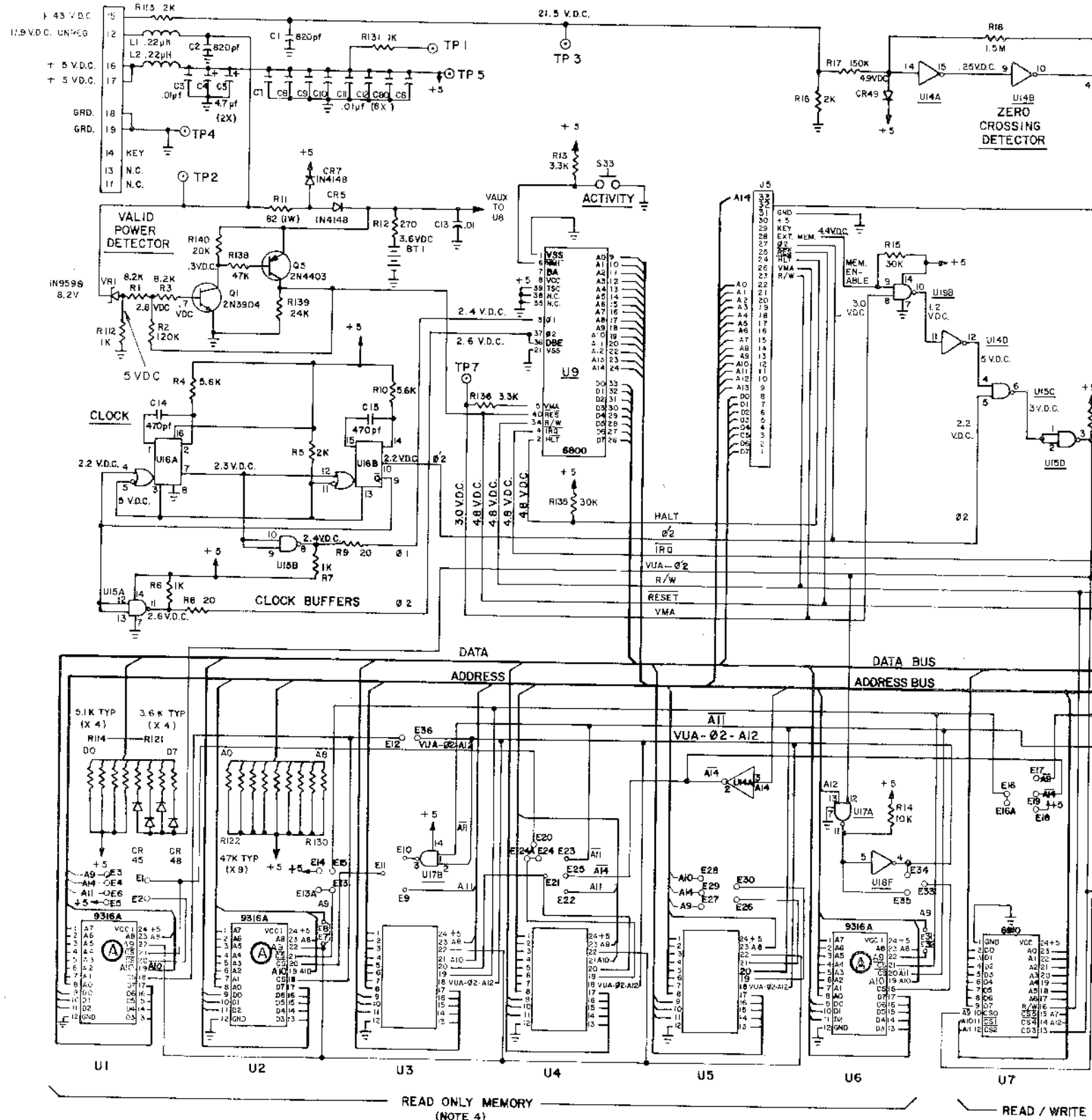
SSY. WIRING
E IN4004, (E-587-6)

REMOVE ALL BURRS		DR. BY DATE E.V. 3-28-79		Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS		1161-E	
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS ± DECIMALS ± ANGLES ±		CK. BY DATE J.D. 4-5-79		PRINT CONTROL		SCALE	
DO NOT SCALE DRAWING		AP'D BY DATE E.V. 4-5-79		NAME WIRING DIAGRAM ELECTRONIC		ASSEM. NO.	
LFT. CHANGE DATE BY CK.		FINISH		MATERIAL		PART NO. W-1186-6 c	

SCAN LINES, INC. CHICAGO

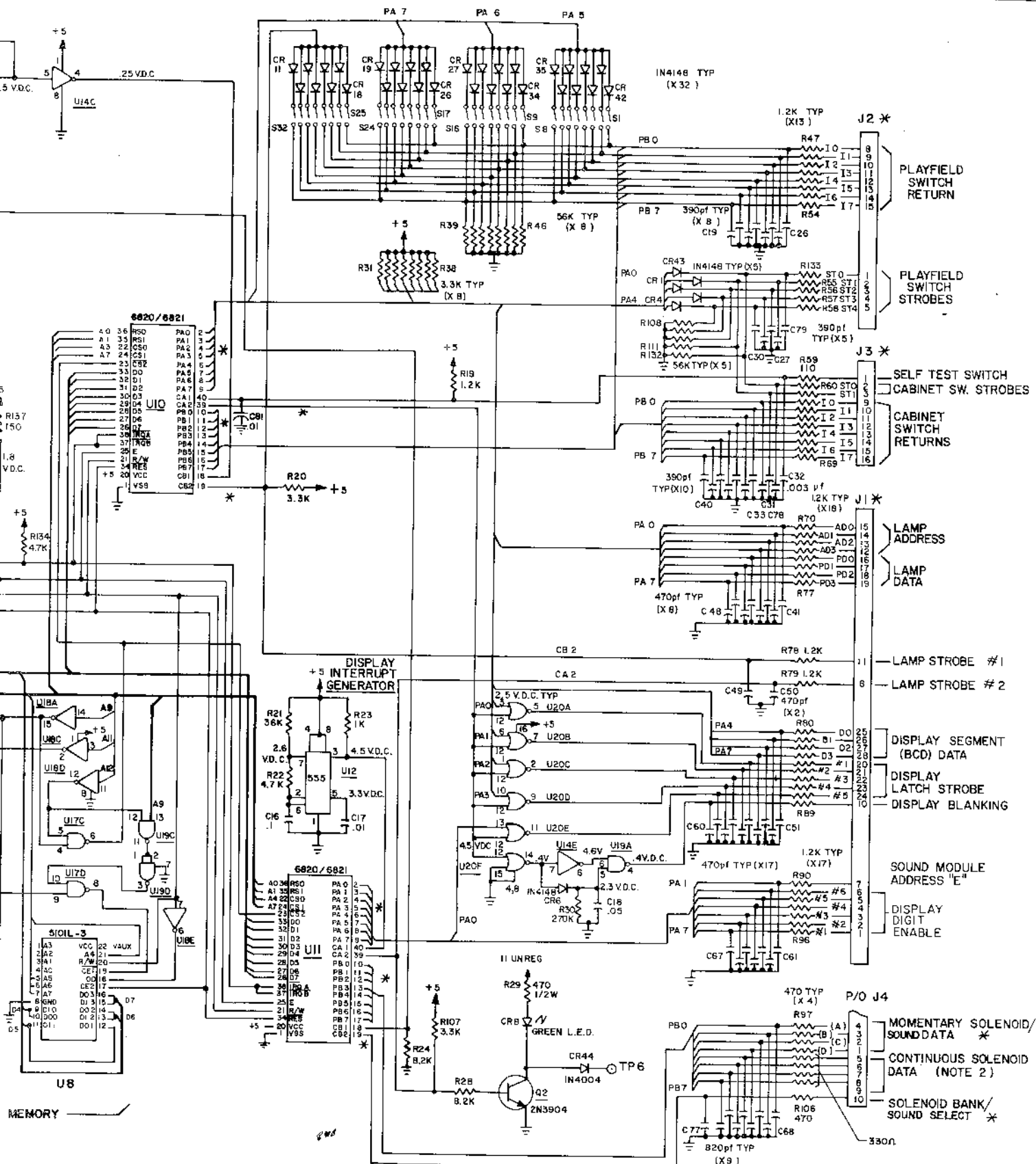


P/O J4



NOTES

1. * INDICATES "AID" TEST POINT.
2. REMOVE A3J4 BEFORE USING AS AID TEST POINT
3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A4"
4. EXACT CHIP COMPLEMENT USED IN SOCKETS U1 THRU U6 CAN VARY FOR DIFFERENT GAMES AND PRODUCTION LOTS. TABLES OF MEMORY CHIPS AND CORRESPONDING JUMPERS FOR DIFFERENT GAMES AVAILABLE FROM BALLY FIELD SERVICE DEPARTMENT.



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REMOVE ALL BURRS

TOLERANCES ON
DIMENSIONS UNLESS
OTHERWISE SPECIFIED
FRACTIONS - 1/64
DECIMALS - .005
ANGLES - 1°

DO NOT SCALE DRAWING

DR. BY DATE

E.V. 5-11-78

CK BY DATE

B.M. 5-5-78

APD BY DATE

10-1-78

APD BY DATE

10-1-78

FINISH:

HARDENING

PRINT

CONTROL

10-1-78

10-1-78

10-1-78

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10-1-78

Bally MANUFACTURING CORP.

2640 BELMONT AVENUE

CHICAGO, ILLINOIS

1119-E

TOTAL

SCALE

NAME

M.P.U. CONTROL BOARD SCHEMATIC

ASSEM NO USED ON #

MATERIAL

PART NO.

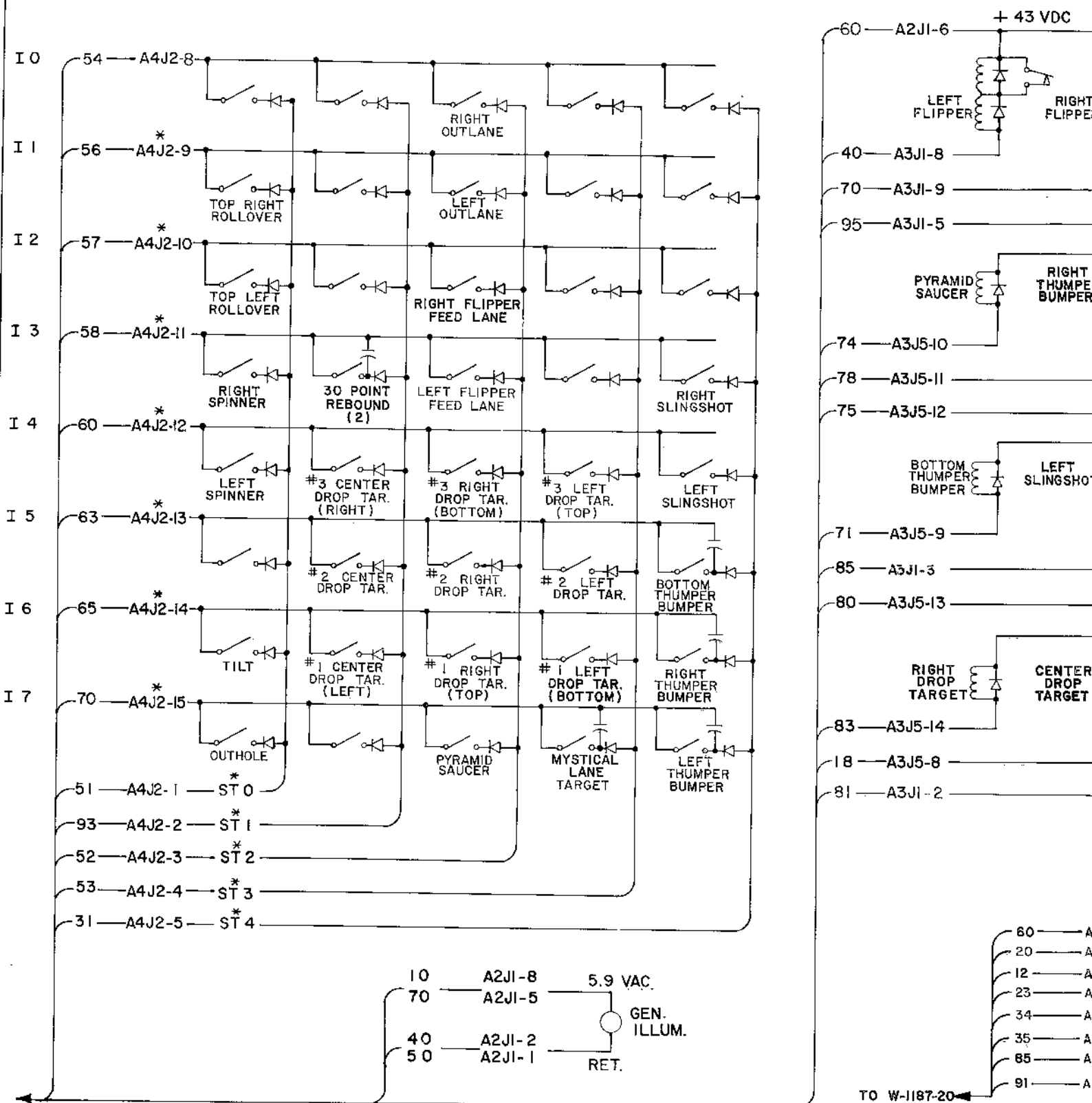
W-1181-3

1 A 10 WBS VCC2 ON U1, U2, U6

10 WBS CS

2-78 J.T.

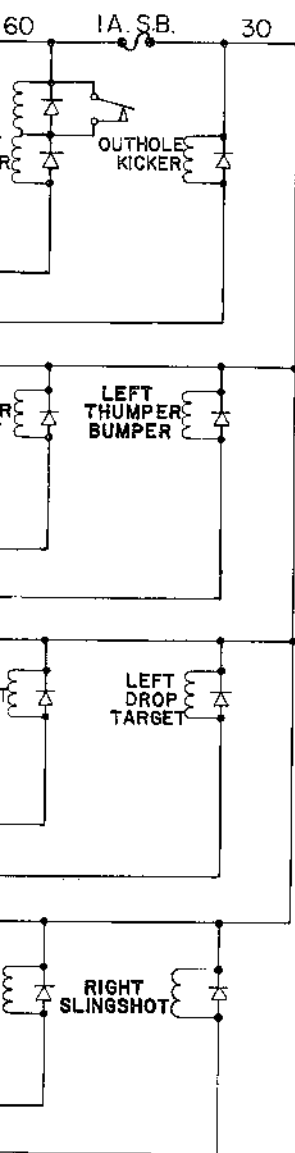
No. LET. CHANGE DATE BY CA.



PLAYFIELD A6

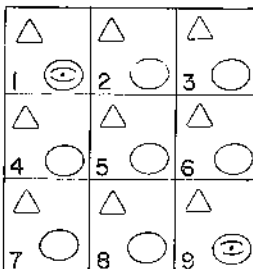
NOTES

1. INDICATES NOT USED
2. N/U = NOT USED ON PLAYFIELD
3. * INDICATES AID TEST POINT
4. COIL DIODES ARE IN4004, (E-587-6) SWITCH DIODES ARE IN 414
- ALL CAPACITORS ARE .05 MFD. (E-586-80)



5J2-1—RIGHT FLIP FEED STAR
 5J2-2—LEFT FLIP FEED STAR
 5J2-14—TOP LEFT R.O. STAR
 5J2-15—TOP RIGHT R.O. STAR
 5J2-16—CENTER DROP TAR. EYE
 5J2-20—CENTER DROP TAR. PYRAMID
 5J2-6—4X MYSTICAL LANE
 5J2-7—SPECIAL MYSTICAL LANE

58 — A5J1-18—9K BONUS
 60 — A5J1-19—45K BONUS
 57 — A5J1-17—LEFT D.T. ARROW
 56 — A5J1-23—RIGHT D.T. ARROW
 54 — A5J1-14—CENTER D.T. ARROW
 13 — A5J1-15—PYR. & EYE SPECIAL
 12 — A5J1-16—4 STARS EXTRA BALL
 78 — A5J1-28—4 STARS SPECIAL
 50 — A5J1-24—2X MYSTICAL LANE
 90 — A5J1-25—25K MYSTICAL LANE
 47 — A5J1-26—SAME PLAYER S. A.
 53 — A5J1-27—RIGHT D.T. EYE
 41 — A5J1-1—18K BONUS
 52 — A5J1-9—54K BONUS
 51 — A5J1-8—3 CENTER PYRAMID
 45 — A5J1-3—6 CENTER PYRAMID
 43 — A5J1-2—9 CENTER PYRAMID
 23 — A5J1-10—3 CENTER EYE
 34 — A5J1-7—6 CENTER EYE
 25 — A5J1-6—9 CENTER EYE
 48 — A5J1-5—3X MYSTICAL LANE
 65 — A5J1-11—2X BONUS
 35 — A5J1-4—N/U
 61 — A5J1-12—RIGHT D.T. PYRAMID
 96 — A5J1-13—8 CENTER EYE



38 — A5J3-26—27K BONUS
 36 — A5J3-25—63K BONUS
 67 — A5J3-19—2 CENTER PYRAMID
 27 — A5J3-17—5 CENTER PYRAMID
 25 — A5J3-16—8 CENTER PYRAMID
 98 — A5J3-23—2 CENTER EYE
 40 — A5J3-27—5 CENTER EYE
 30 — A5J3-21—PYRAMID (BACKGLASS)
 64 — A5J3-20—3X BONUS
 52 — A5J3-22—EYE (BACKGLASS)
 72 — A5J3-24—LEFT D.T. EYE
 10 — A5J3-1—36K BONUS
 21 — A5J3-12—72K BONUS
 53 — A5J3-15—1 CENTER PYRAMID
 20 — A5J3-11—4 CENTER PYRAMID
 15 — A5J3-9—7 CENTER PYRAMID
 13 — A5J3-13—CREDIT INDICATOR
 14 — A5J3-4—4 CENTER EYE
 95 — A5J3-2—7 CENTER EYE
 91 — A5J3-10—LEFT & RIGHT SPINNER
 56 — A5J3-18—4X BONUS
 81 — A5J3-3—1 CENTER EYE
 84 — A5J3-14—LEFT D.T. PYRAMID
 20 — A2J1-7—FEATURE LAMP BUS



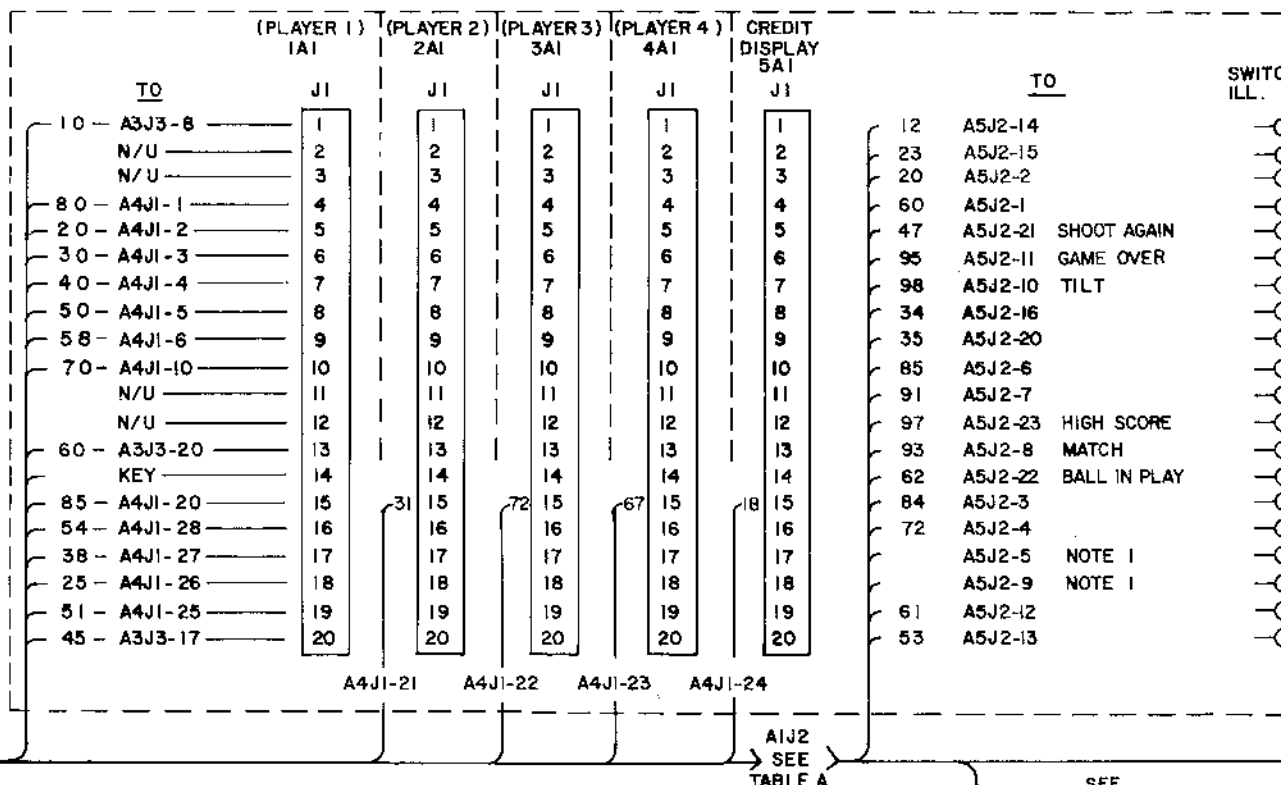
REMOVE ALL BURRS TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS: 1/64 DECIMALS: .005 ANGLES: °				DR. BY DATE CK. BY DATE AP'D BY DATE AP'D BY DATE FINISH: NAME HARDENING: MATERIAL				Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS #1192 TOTAL SCALE SWITCH MATRIX MYSTIC				ASSEM. NO. USED ON W PART NO. W-1192-20				
LET.	CHANGE	DATE	BY	CK.												

TABLE A AIJ2

FROM	PIN	WIRE
A2J3-6	1	20
A5J2-14	2	12
A2J3-2	3	50
A2J3-11	4	10
A5J2-23	5	97
A5J2-15	6	23
A5J2-22	7	62
A5J2-8	8	93
A5J2-1	9	60
A5J2-2	10	20
A5J2-11	11	95
A5J2-21	12	47
A5J2-10	13	98
A5J2-7	14	91
A5J2-6	15	85
A5J2-20	16	35
A5J2-16	17	34
A2J3-1	18	40
A2J3-10	19	70
A5J2-13	20	53
A5J2-4	22	72
A5J2-3	23	84
	24	

INSERT TO BACK CAB.
PLUG

AI INSERT



LAMP DRIVER A5

J4	TO	J2	TO	J1	TO	J3	TO
51	1 A2J3-4	60	1 RT. FLIP FEED STAR	41	1 78 K BONUS	10	1 36 K BONUS
18	2 A2J3-3	20	2 RT. FLIP FEED STAR	43	2 8 CENTER PYRAMID	95	2 7 CENTER EYE
84	3 A3J3-16	84	3 N/U	45	3 8 CENTER PYRAMID	81	3 1 CENTER EYE
74	4 A4J1-19	72	4 N/U	35	4 N/U	14	4 4 CENTER EYE
71	5 A4J1-18	5	5 N/U	48	5 3X MYSTIC LANE	5	5 N/U
65	6 A4J1-17	85	6 4X MYSTIC LANE	25	6 9 CENTER EYE	6	6 N/U
63	7 A4J1-16	91	7 SPEC. MYSTIC LANE	34	7 6 CENTER EYE	7	7 N/U
8	8 KEY	93	8 MATCH	51	8 3 CENTER PYRAMID	8	8 KEY
9	9 N/U	9	9 N/U	52	9 54 K BONUS	15	9 7 CENTER PYRAMID
10	10 N/U	98	10 TILT	23	10 3 CENTER EYE	91	10 LT& RT. SPINNER
58	11 A2J3-14	95	11 GAME OVER	65	11 2X BONUS	20	11 4 CENTER PYRAMID
12	12 SPARE GND	61	12 N/U	61	12 RT. D.T. PYRAMID	21	12 72 K BONUS
75	13 A4J1-11	53	13 N/U	96	13 8 CENTER EYE	13	13 CREDIT INDICATOR
32	14 A4J1-15	12	14 TOP LTR. D. STAR	54	14 CENTER D.T. ARROW	84	14 LEFT D.T. PYRAMID
13	15 A4J1-14	23	15 TOP RT. R.O. STAR	13	15 PYR. & EYE SPEC.	53	15 4 CENTER PYRAMID
45	16 A4J1-13	34	16 CENTER D.T. EYE	12	16 4 STARS EX. BALL	25	16 8 CENTER PYRAMID
48	17 A4J1-12	17	17 N/U	57	17 LEFT D.T. ARROW	27	17 5 CENTER PYRAMID
		18	18 KEY	58	18 9 K BONUS	56	18 4X BONUS
		19	19 N/U	60	19 45 K BONUS	67	19 2 CENTER PYRAMID
		35	20 STR. D.T. PYRAMID	20	20 KEY	64	20 3X BONUS
		47	21 SHOOT AGAIN	21	21 N/U	30	21 PYR. (BACKGLASS)
		62	22 BALL IN PLAY	22	22 N/U	52	22 EYE (BACKGLASS)
		97	23 HIGH SCORE TO DATE	56	23 RIGHT D.T. ARROW	98	23 7 CENTER EYE
				50	24 2X MYSTIC LANE	72	24 LEFT D.T. EYE
				90	25 25 K MYSTIC LANE	36	25 63 K BONUS
				47	26 SAME PLAYER S.A.	38	26 27 K BONUS
				53	27 RIGHT D.T. EYE	40	27 5 CENTER EYE
				78	28 4 STARS SPECIAL	28	28 N/U

MPU A4

J5	TO	J1	TO	J4	TO	J2	TO
1	D7	80	1 AIJ1-4	15	1 A3J4-3	51	1
2	D6	20	2 AIJ1-5	78	2 A3J4-4	2	2
3	D5	30	3 AIJ1-6	21	3 A3J4-5	52	3
4	D4	40	4 AIJ1-7	23	4 A3J4-6	53	4
5	D3	50	5 AIJ1-8	36	5 A3J4-11	31	5
6	D2	58	6 AIJ1-9	27	6 A3J4-9	6	6
7	D1	62	7 A8J1-12	25	7 A3J4-8	7	7
8	D0	8	8 NOTE 1	31	8 A3J4-10	54	8
9	A13	9	9 KEY	9	9 N/U	56	9
10	A12	70	10 AIJ1-10	61	10 A3J4-7	57	10
11	A11	75	11 A5J4-13	11	11 N/C	58	11
12	A10	48	12 A5J4-17	14	12 A3J3-11	60	12
13	A9	45	13 A5J4-16	13	13 N/C	63	13
14	A8	13	14 A5J4-15	14	14 KEY	65	14
15	A7	32	15 A5J4-14	90	15 A2J3-12	70	15
16	A6	63	16 A5J4-7	96	16 A3J3-14		
17	A5	65	17 A5J4-6	54	17 A3J3-15		
18	A4	71	18 A5J4-5	94	18 A3J3-18		
19	A3	74	19 A5J4-4	81	19 A3J3-19		
20	A2	85	20 AIJ1-15				
21	A1	31	21 2AIJ1-15				
22	A0	72	22 3AIJ1-15				
23	R/W	67	23 4AIJ1-15				
24	HLT	18	24 5AIJ1-15				
25	RES	51	25 AIJ1-19				
26	VMA	25	26 AIJ1-18				
27	02	38	27 AIJ1-17				
28	EX MEM.	54	28 AIJ1-16				
29	KEY						
30	+5V.D.C.						
31	GND						
32	A4J1-18						

TO CABINET

NOTES

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

A5J3-21	4	30
A5J3-22	7	52

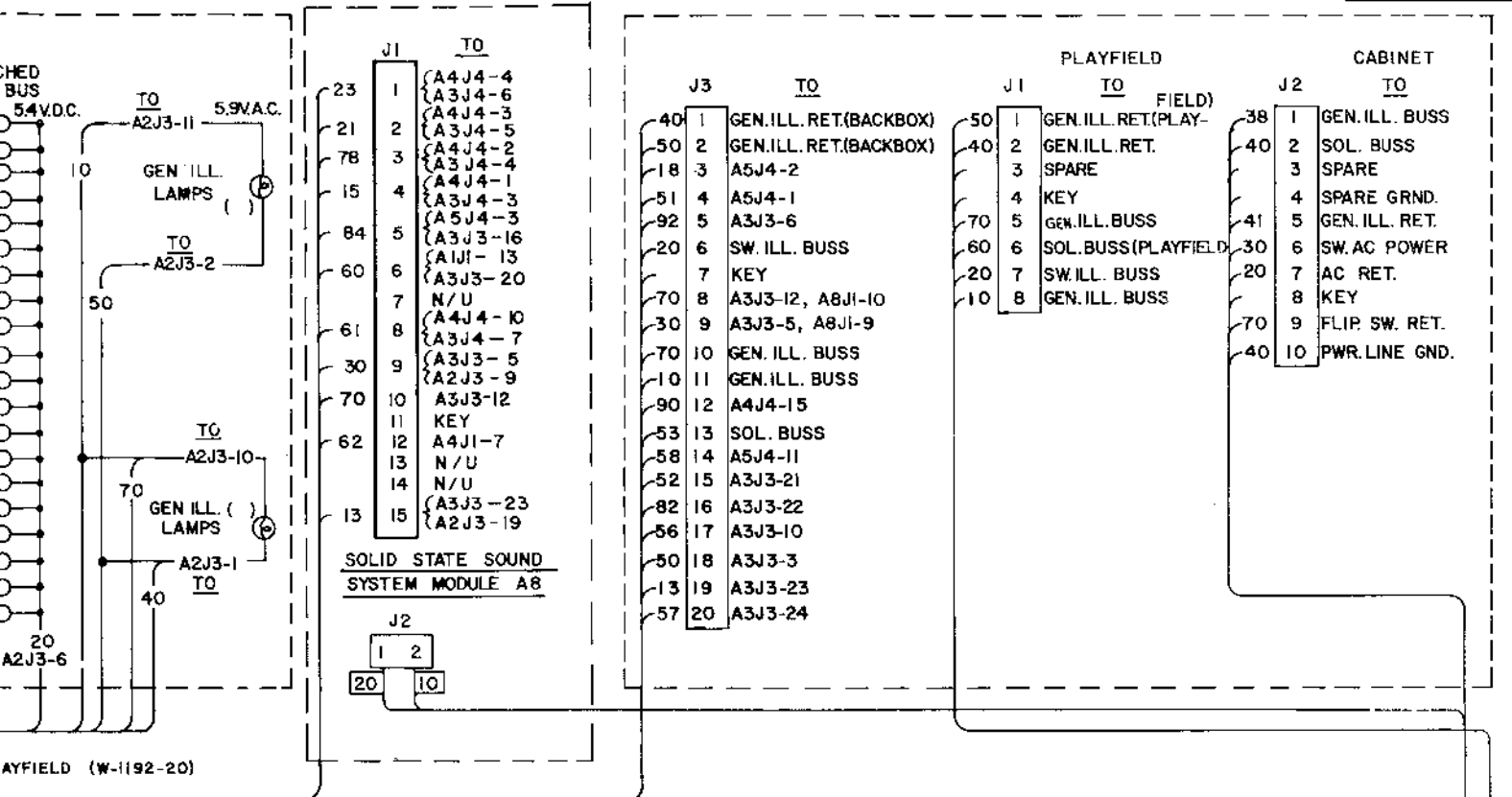
TABLE "B"

FROM	TO	WIRE
A5J2-14	1	12
A5J2-2	2	20
A5J2-15	3	23
A5J2-16	5	34
A5J2-20	6	35
A5J2-1	8	60
A5J2-6	9	85
A5J2-7	10	91

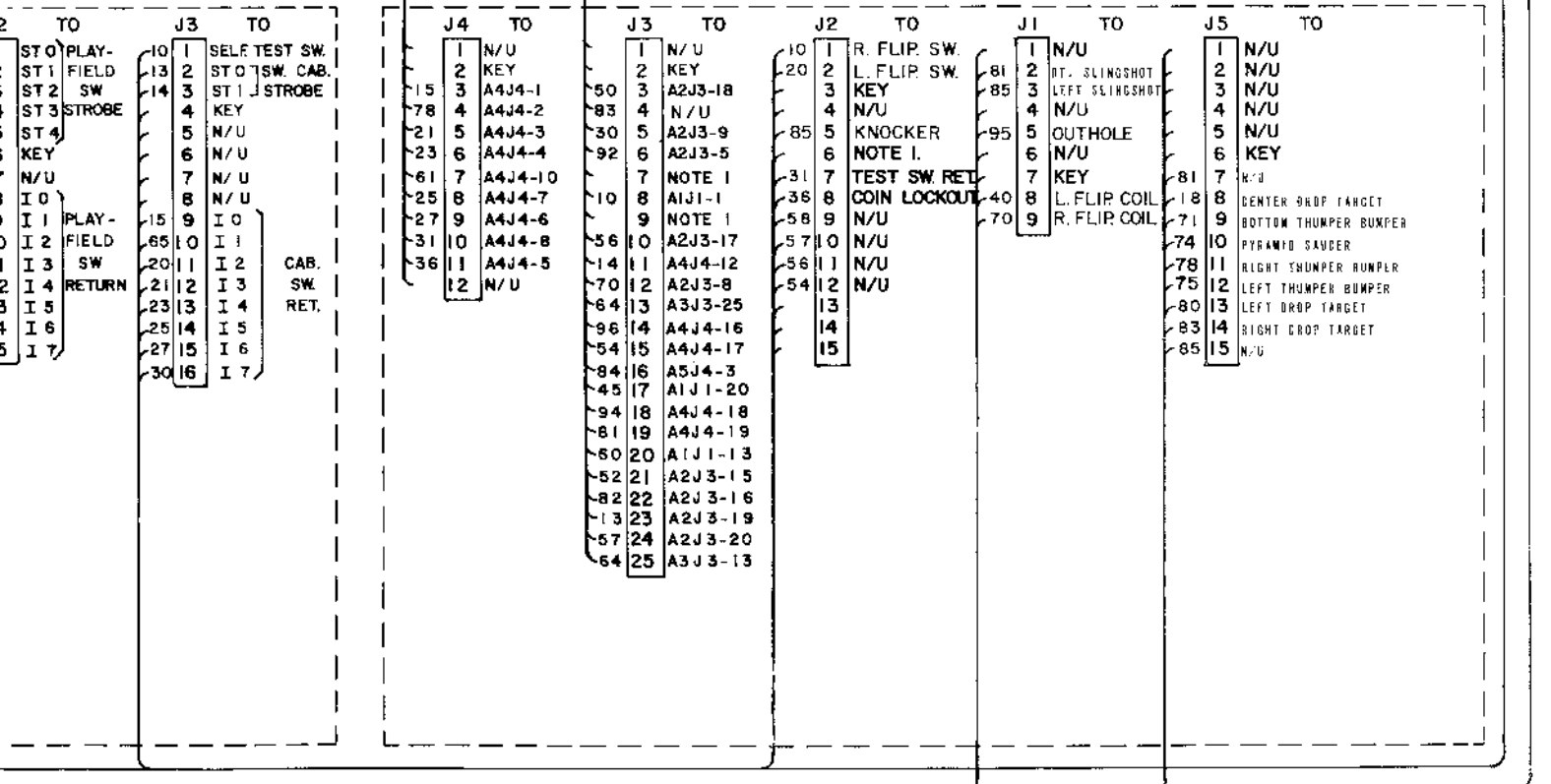
PANEL TO BACK CAB. PLUG

A2 TRANSFORMER

W-1187-20 c



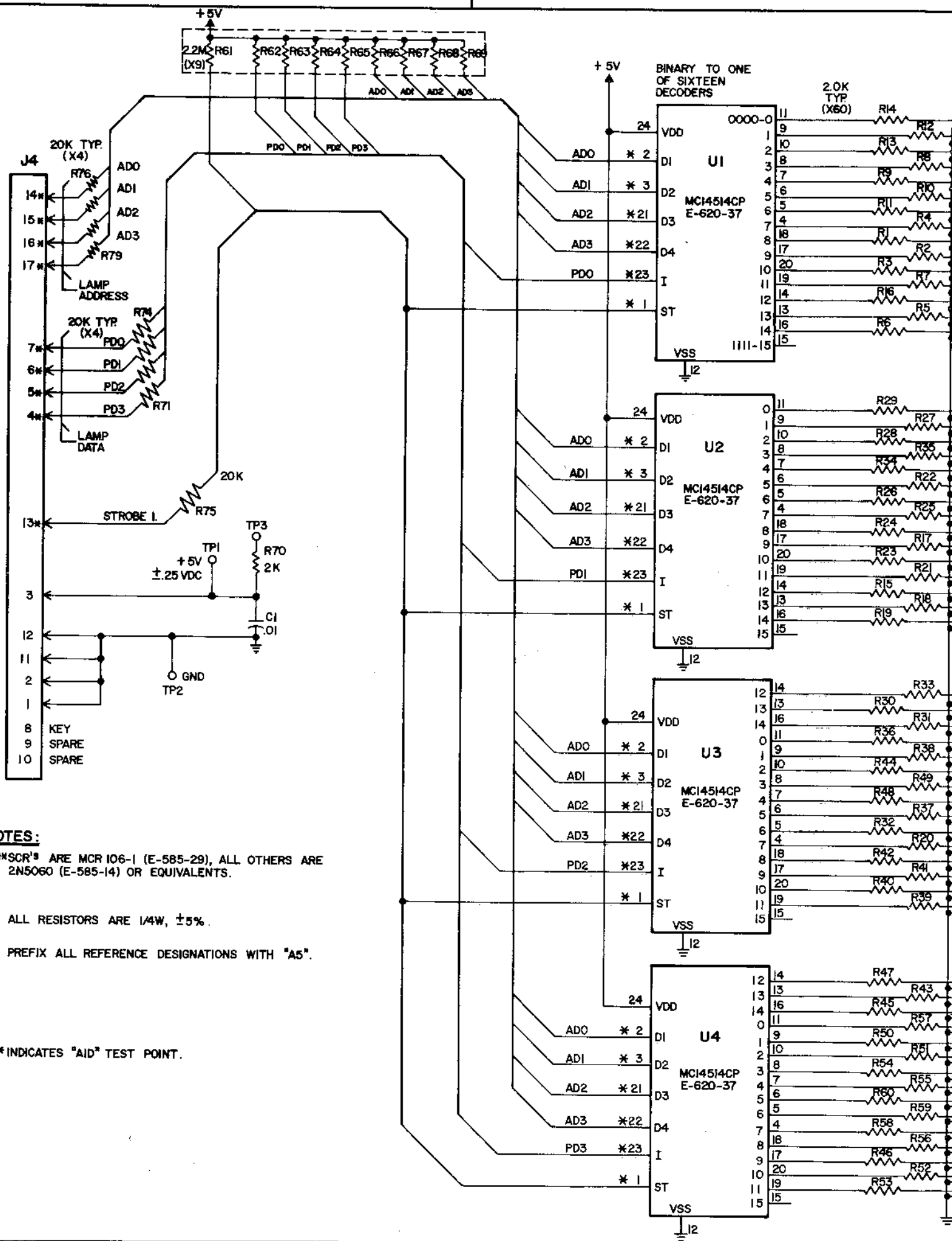
VOLTAGE REGULATOR / SOLENOID DRIVER A3



WIRE COLOR CODE

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

REMOVE ALL BURRS TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS - 1/64 DECIMALS - .005 ANGLES - °		DR. BY DATE CK. BY DATE APP'D BY DATE FINISH:		Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS #1192	
LIT. CHANGE DATE BY CK.		PRINT CONTROL 1207 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444 1445 1446 1447 1448 1449 1450 1451 1452 1453 1454 1455 1456 1457 1458 1459 1460 1461 1462 1463 1464 1465 1466 1467 1468 1469 1470 1471 1472 1473 1474 1475 1476 1477 1478 1479 1480 1481 1482 1483 1484 1485 1486 1487 1488 1489 1490 1491 1492 1493 1494 1495 1496 1497 1498 1499 1500 1501 1502 1503 1504 1505 1506 1507 1508 1509 1510 1511 1512 1513 1514 1515 1516 1517 1518 1519 1520 1521 1522 1523 1524 1525 1526 1527 1528 1529 1530 1531 1532 1533 1534 1535 1536 1537 1538 1539 1540 1541 1542 1543 1544 1545 1546 1547 1548 1549 1550 1551 1552 1553 1554 1555 1556 1557 1558 1559 1560 1561 1562 1563 1564 1565 1566 1567 1568 1569 1570 1571 1572 1573 1574 1575 1576 1577 1578 1579 1580 1581 1582 1583 1584 1585 1586 1587 1588 1589 1590 1591 1592 1593 1594 1595 1596 1597 1598 1599 1600 1601 1602 1603 1604 1605 1606 1607 1608 1609 1610 1611 1612 1613 1614 1615 1616 1617 1618 1619 1620 1621 1622 1623 1624 1625 1626 1627 1628 1629 1630 1631 1632 1633 1634 1635 1636 1637 1638 1639 1640 1641 1642 1643 1644 1645 1646 1647 1648 1649 1650 1651 1652 1653 1654 1655 1656 1657 1658 1659 1660 1661 1662 1663 1664 1665 1666 1667 1668 1669 1670 1671 1672 1673 1674 1675 1676 1677 1678 1679 1680 1681 1682 1683 1684 1685 1686 1687 1688 1689 1690 1691 1692 1693 1694 1695 1696 1697 1698 1699 1700 1701 1702 1703 1704 1705 1706 1707 1708 1709 1710 1711 1712 1713 1714 1715 1716 1717 1718 1719 1720 1721 1722 1723 1724 1725 1726 1727 1728 1729 1730 1731 1732 1733 1734 1735 1736 1737 1738 1739 1740 1741 1742 1743 1744 1745 1746 1747 1748 1749 1750 1751 1752 1753 1754 1755 1756 1757 1758 1759 1760 1761 1762 1763 1764 1765 1766 1767 1768 1769 1770 1771 1772 1773 1774 1775 1776 1777 1778 1779 1780 1781 1782 1783 1784 1785 1786 1787 1788 1789 1790 1791 1792 1793 1794 1795 1796 1797 1798 1799 1800 1801 1802 1803 1804 1805 1806 1807 1808 1809 1810 1811 1812 1813 1814 1815 1816 1817 1818 1819 1820 1821 1822 1823 1824 1825 1826 1827 1828 1829 1830 1831 1832 1833 1834 1835 1836 1837 1838 1839 1840 1841 1842 1843 1844 1845 1846 1847 1848 1849 1850 1851 1852 1853 1854 1855 1856 1857 1858 1859 1860 1861 1862 1863 1864 1865 1866 1867 1868 1869 1870 1871 1872 1873 1874 1875 1876 1877 1878 1879 1880 1881 1882 1883 1884 1885 1886 1887 1888 1889 1890 1891 1892 1893 1894 1895 1896 1897 1898 1899 1900 1901 1902 1903 1904 1905 1906 1907 1908 1909 1910 1911 1912 1913 1914 1915 1916 1917 1918 1919 1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945 1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1957 1958 1959 1960 1961 1962 1963 1964 1965 1966 1967 1968 1969 1970 1971 1972 1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 275			



SCR'S

J1

22 N/U
21 N/U
20 KEY
18 9K BONUS
19 45K BONUS
17 LEFT D.T. ARROW
23 RIGHT D.T. ARROW
14 CENTER D.T. ARROW
15 BONUS SPECIAL
16 4 STARS EXTRA BALL
28 4 STARS SPECIAL
24 2X MYSTICAL LANE
25 25X MYSTICAL LANE
26 SAME PLAYER S.A.
27 RIGHT D.T. EYE

TO PLAYFIELD

1 18K BONUS
9 54K BONUS
8 3 CENTER PYRAMID
3 6 CENTER PYRAMID
2 9 CENTER PYRAMID
10 3 CENTER EYE
7 6 CENTER EYE
6 9 CENTER EYE
5 3X MYSTICAL LANE
11 2X BONUS
13 8 CENTER EYE
4 N/U
12 RIGHT D.T. PYRAMID

J2

21 SHOOT AGAIN
13 N/U
22 BALL IN PLAY
16 CENTER D.T. EYE
14 TOP LEFT R.O. STAR
8 MATCH
12 N/U
23 HIGH SCORE TO DATE
20 CENTER D.T. PYRAMID
15 TOP RIGHT R.O. STAR
11 GAME OVER
6 4X MYSTICAL LANE
2 LEFT FLIP FEED STAR
9 N/U
4 N/U
5 N/U
3 N/U
10 TILT
7 SPC'L MYSTICAL LANE
1 RIGHT FLIP FEED STAR
17 N/U
18 KEY
19 N/U

TO BACK BOX

J3

26 27K BONUS
25 63K BONUS
19 2 CENTER PYRAMID
17 5 CENTER PYRAMID
16 8 CENTER PYRAMID
23 2 CENTER EYE
27 5 CENTER EYE
21 PYRAMID (BACKGLASS)
20 3X BONUS
22 EYE (BACKGLASS)
24 LEFT D.T. EYE
1 36K BONUS
12 72K BONUS
15 1 CENTER PYRAMID
11 4 CENTER PYRAMID
9 7 CENTER PYRAMID
3 1 CENTER EYE
4 4 CENTER EYE
2 7 CENTER EYE
10 LEFT & RIGHT SPINNER
18 4X BONUS
13 CREDIT INDICATOR
14 LEFT D.T. PYRAMID
5 N/U
6 N/U
7 N/U
8 KEY
28 N/U

TO PLAYFIELD

ALL DESIGN, OPERATIVE AND PROCESS DATA PERTAINING TO THE ARTICLE SHOWN ON THIS SHEET IS THE PROPERTY OF BALLY AND 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

TOLEANCES ON
DIMENSIONS UNLESS
OTHERWISE SPECIFIED
FRACTIONS ± .005
DECIMALS ± .001
EXCEPT HOLE DIA. S
ANGLES ± 1/2°

DO NOT SCALE DRAWING

DR. BY DATE

CK. BY DATE

AP'D BY DATE

AP'D BY DATE

FINISH:

HARDENING:

Bally MANUFACTURING CORP. 1192

2640 BELMONT AVENUE CHICAGO, ILLINOIS

PRINT CONTROL DIE SIZE C.C. FT. PER M. LBS. PER M.

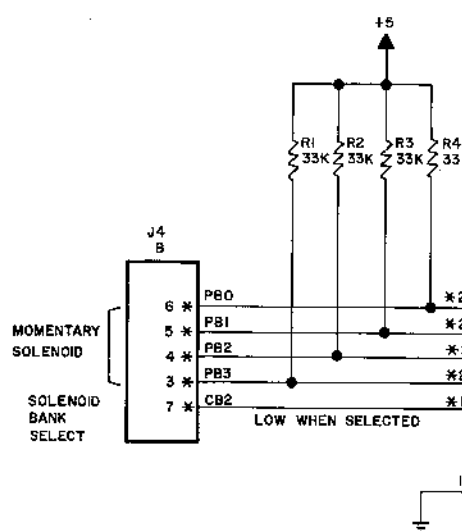
NAME ASSEM. NO. USED SCALE

MATERIAL

CODE MYSTIC

PART NO. W-1182-24c

NO. LET. CHANGE DATE BY



NOTES:

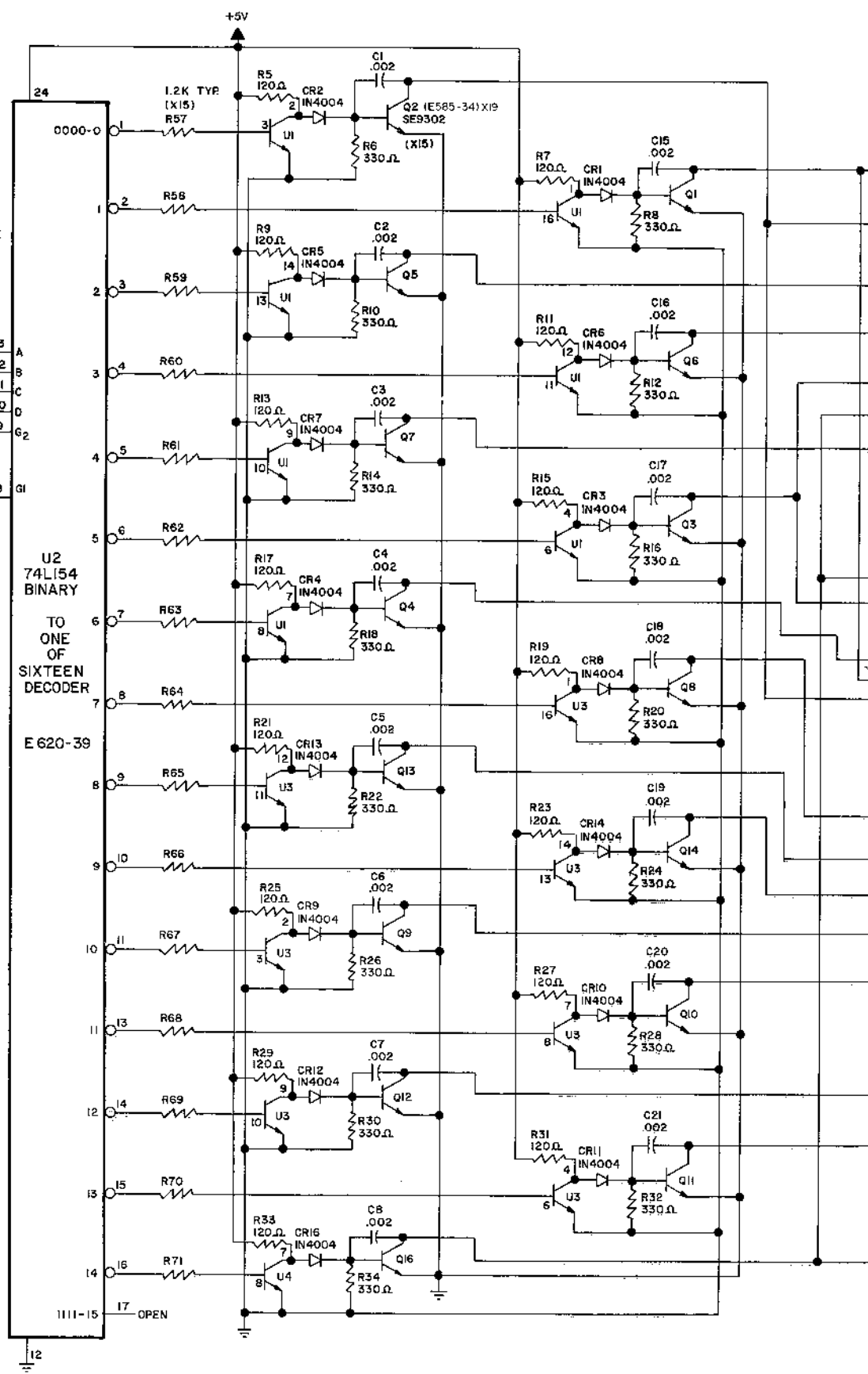
1. E-710, LAMBDA-LAS 1405
NATIONAL-LM323K
FAIRCHILD 78H05KC
2. J1-KK156-9 PIN KEY PIN 7
J2-KK156-15 PIN KEY PIN 3
J3-KK100-25 PIN KEY PIN 2
J4-KK100-12 PIN KEY PIN 2
J5-KK156-15 PIN KEY PIN 6
3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A3"
4. "U1", "U4", "U3" PINS 5 AND 15 ARE GROUND.
5. VOLTAGES SHOWN ARE FOR A GAME-UP CONDITION.
6. "U1", "U3" AND "U4" ARE CA-3081.(E681)
7. * INDICATES 'AID' TEST POINT.

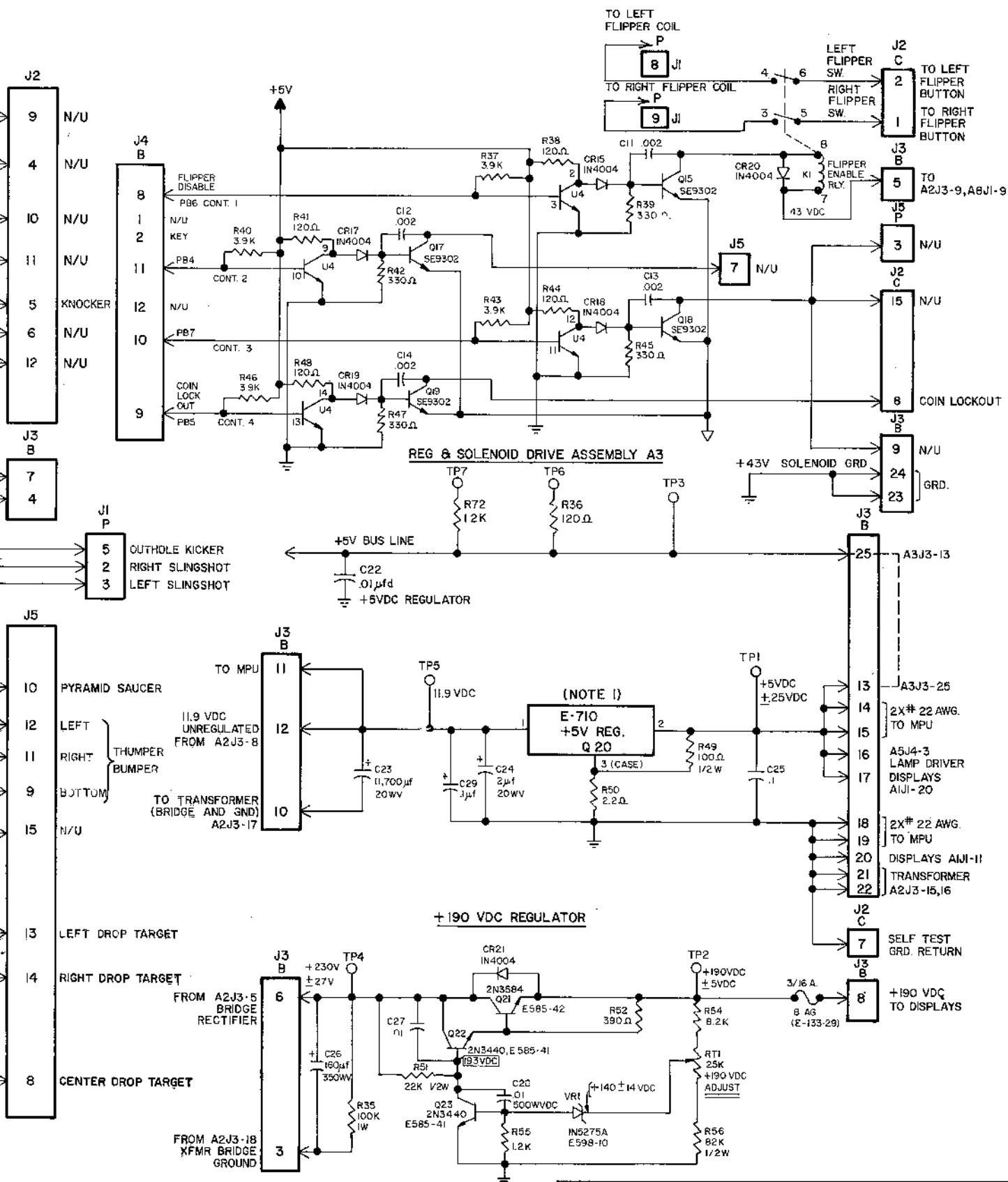
CONNECTOR CODE

- C → ROUTE TO CABINET CONN
- B → ROUTE TO BLACK BOX CONN
- P → ROUTE TO PLAYFIELD CONN

LAST NUMBER USED

- R72
- C29 N/U C9, C10
- Q23 N/U Q20
- CR21
- VRI





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REMOVE ALL BURS				DR. BY	DATE	Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS #192			
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED: FRACTIONS ± .008 DECIMALS ± .001 EXCEPT HOLE DIA'S ANGLES ± 1/2°				CK. BY	DATE				
DO NOT SCALE DRAWING				AP'D BY	DATE	PRINT CONTROL	DIE SIZE	C.C.	FT. PER M.
				AP'D BY	DATE	NAME	SOLENOID DRIVER VOLTAGE REGULATOR SCHEMATIC		ASSEM. NO. USED
				FINISH		MATERIAL	MYSTIC		SCALE
				HARDENING		CODE			PART NO.
									W-1183-24c
NO.	LET.	CHANGE	DATE	BY					

PLAYFIELD MYLAR PROTECTORS

FO-589

ENCLOSED ARE TWO MYLAR PROTECTORS WHICH MAY BE ATTACHED TO THE PLAYFIELD IN FRONT OF THE SLINGSHOT KICKERS AS SHOWN IN SKETCH. THESE WILL HELP TO PRESERVE PAINT FINISH IN FRONT OF SLINGSHOTS.

TO APPLY, SIMPLY REMOVE PAPER BACKING AND PLACE MYLAR WITH FLAT EDGE TOUCHING THE TWO SLINGSHOT POSTS.

