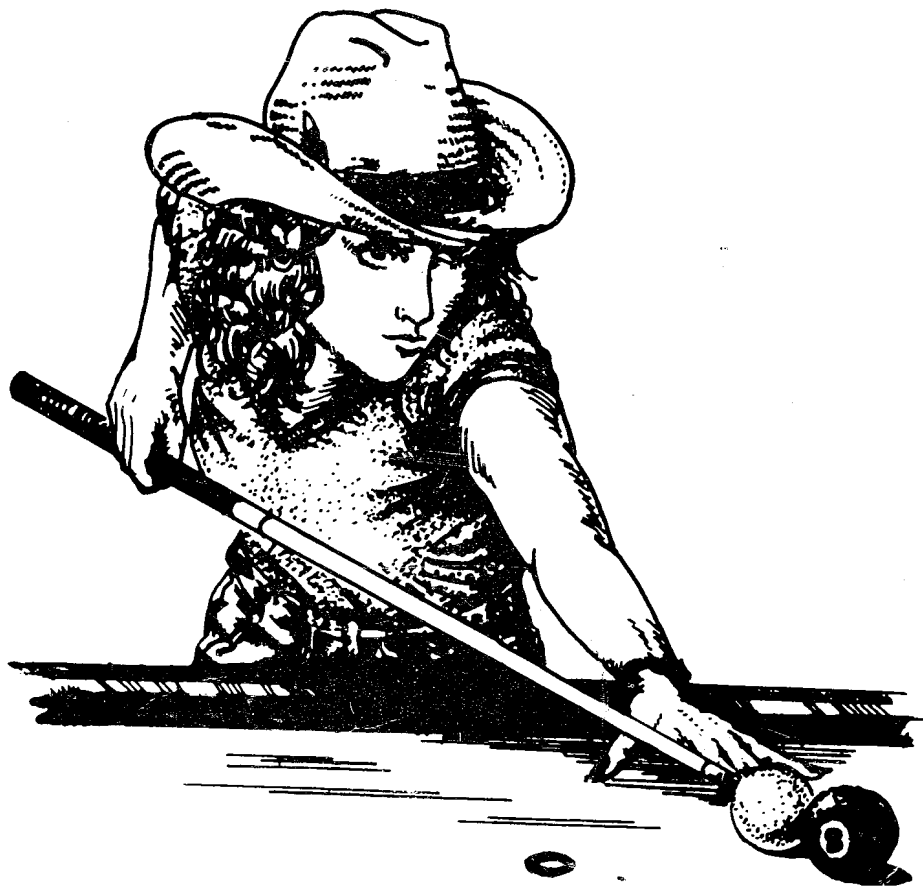




FLIPPERSPILL.COM

GAME No. 0B87
Form No. 0B87-00300-

Bally
Eight Ball Deluxe



Bally **MIDWAY** MFG CO

10601 W. Belmont Ave. • Franklin Park, Illinois 60131

Telephone (312) 451-9200



WARNING

**THIS GAME MUST BE GROUNDED. FAILURE TO DO SO MAY
RESULT IN DESTRUCTION TO ELECTRONIC COMPONENTS.**

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

ELECTRICAL BULLETIN: FOR ALL APPARATUS COVERED BY THE CANADIAN STANDARDS ASSOCIATION (CSA) STANDARD C22.2 NO. 1, WHICH EMPLOYS A SUPPLY CORD TERMINATED WITH A POLARIZED 2-PRONG ATTACHMENT PLUG.

CAUTION: TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.

ATTENTION: POUR PREVENIR CHOCS ELECTRIQUES NE PAS UTILISER CETTE FICHE POLARISEE AVEC UN PROLONGATEUR. UNE PRISE DE COURANT OU UNE AUTRE SORTIE DE COURANT, SAUF SI LES LAMES PEUVENT ETRE INSEREES A FOND SANS EN LAISSER AUCUNE PARTIE A DECOUVERT.

Bally MIDWAY TM

Invites You To Use

**OUR TOLL FREE NUMBERS FOR
SERVICE INFORMATION CONCERNING THIS GAME, OR ANY
OTHER BALLY MIDWAY GAME YOU NOW HAVE ON LOCATION.**

**CALL US FOR PROMPT, COURTEOUS
ANSWERS TO YOUR PROBLEMS.**

VIDEO ———> Continental U.S. 1-800-323-7182

PINBALL ———> Continental U.S. 1-800-323-3555

Bally MIDWAY TM

10601 West Belmont Avenue Franklin Park, Illinois, 60131

phone (312) 451-9200

© COPYRIGHT MCMLXXXIV BY BALLY MIDWAY MFG. CO.

ALL RIGHTS RESERVED

NO PART OF THIS PUBLICATION MAY BE REPRODUCED BY ANY MECHANICAL, PHOTOGRAPHIC, OR ELECTRONIC PROCESS, OR IN THE FORM OF A PHONOGRAPHIC RECORDING, NOR MAY IT BE TRANSMITTED, OR OTHERWISE COPIED FOR PUBLIC OR PRIVATE USE, WITHOUT PERMISSION FROM THE PUBLISHER. THIS MANUAL IS FOR SERVICE USE ONLY, AND NOT FOR GENERAL DISTRIBUTION. FOR PERMISSION REQUESTS, WRITE: BALLY MIDWAY MFG. CO., 10601 W. BELMONT AVE., FRANKLIN PARK, IL 60131

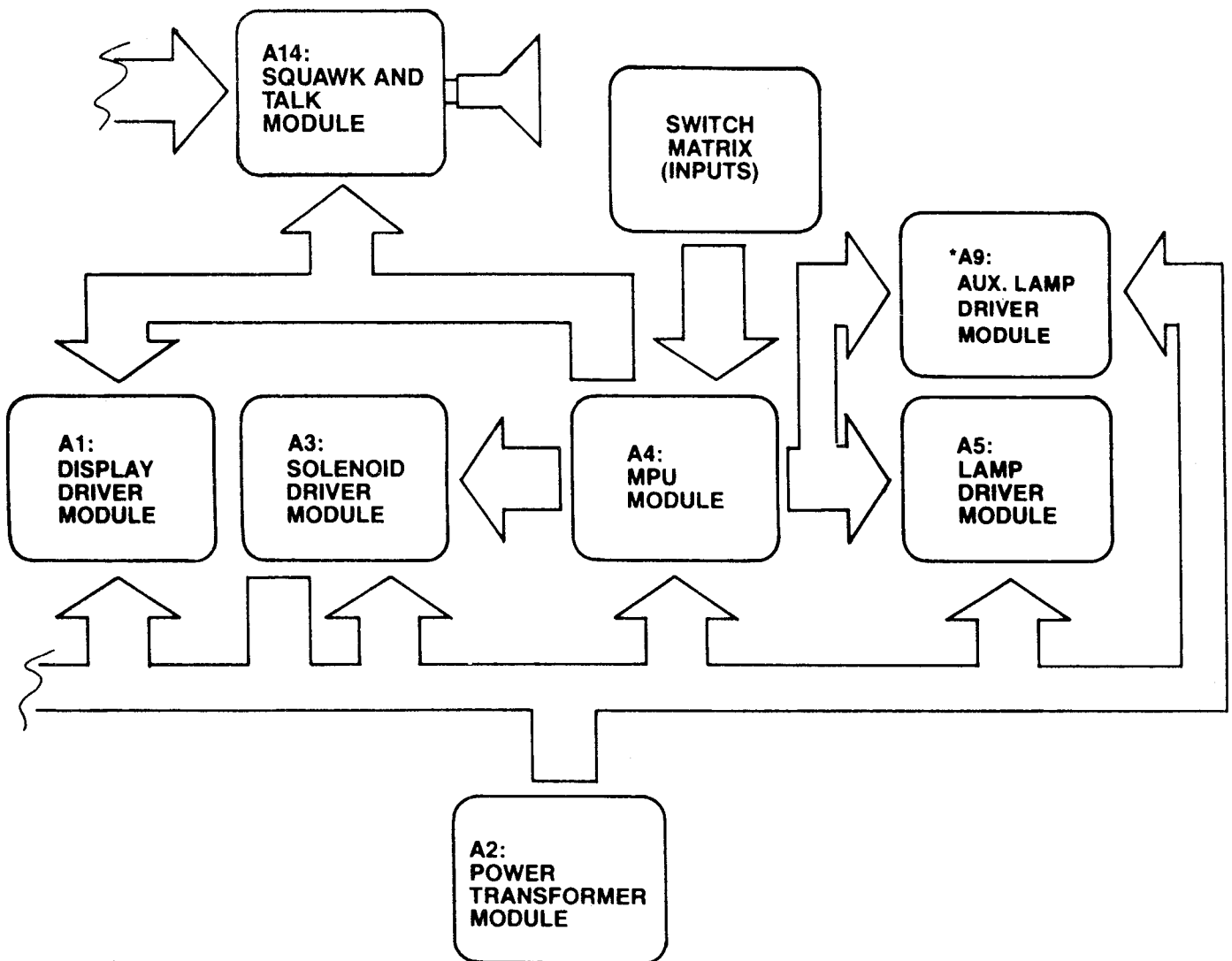
Printed in U.S.A.

Installation and General Game Operation Instructions

INDEX

	PAGE
I. INSTALLATION	1
II. GENERAL GAME OPERATION	2
III. BOOKKEEPING FUNCTIONS	3
IV. FEATURE OPERATION AND SCORING	4
V. GAME ADJUSTMENTS	5
A. PLAYFIELD ADJUSTMENTS	5
B. BACKBOX ADJUSTMENTS	5
CREDITS/COIN	5
MAXIMUM CREDITS	6
BALLS/GAME	6
MATCH FEATURE OPTION	6
CREDIT DISPLAY	6
HIGH SCORE FEATURE OPTION	6
HIGH SCORE TO DATE	6
GAME FEATURE OPTIONS	7
SOUND OPTION	7
C. FRONT DOOR GAME ADJUSTMENTS	
HIGH SCORE FEATURE	8
HIGH SCORE TO DATE FEATURE	8
VI. RECOMMENDED SCORE CARDS	11
VII. RECOMMENDED SETTINGS	12
VIII. ROUTINE MAINTENANCE ON LOCATION	13
IX. TROUBLE SHOOTING ON LOCATION	13
X. SERVICE/PARTS	19
XI. PARTS LIST	20-35

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

**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

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 lite is lit. 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 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 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 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 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 are two factory installed slam switches, on the front door, and one on left side of 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.

*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.

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— 100000 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 Panel Specials Only
- *14— 00 to— 99999 = Number of minutes of Game Play
- *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 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 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.

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.

A. ABCD FEATURE: FEATURE OPERATION & SCORING

Making A & B top rollovers, top arrow lites alternate to score 25,000 points.

Making A-B-C & D rollovers, drops one or two drop targets from 7 bank (depending on SW. #8 setting) and lites the right lane lite for 20K 1st time, 40K 2nd, 60K 3rd & so on.

A-B-C-D also flashes the bumper for 3000 points when made in this sequence. 1st time left bumper, 2nd time right bumper, 3rd time bottom bumper. Bumper flashing will reset after each ball.

B. SAUCER FEATURE

Saucer scores top Right lane SPL W/L and scores 500 or 7000 points for each lit ball on pool table, plus super bonuses of 56K and 112K timer multipliers (depending on SW.#16 setting)

C. INLINE DROP & BANK SHOT TARGET FEATURE

1st target down 5000 points awarded and 2X lites.

2nd target down 10,000 points awarded and 3X lites.

3rd target down 15,000 points awarded and 4X lites.

4th target down 20,000 points awarded and 5X lites.

Bank shot 1st time hit scores 50,000 points, 2nd time (1 replay), bank shot values ALT or after SPL is made, will camp on 50,000 points (depending on SW. #24 setting)

D. NO RECALL ON MULTIPLIERS

E. SINGLE DROP TARGET FEATURE

It scores 500 points if no right lane lite is lit, or will score the lite value and will advance it to next higher value. When target is down, it will not come back up until ball is ejected thru saucer and come thru either lane A or B.

F. ROLL OVER BUTTON FEATURE

Rollover button scores as follows:

500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000, SPL, and then will camp on 70,000 Pts. Or will score 500, 10,000, 30,000, 50,000, EXTRA BALL, 70,000 Pts. and will stay on 70,000 after this sequence is completed, on next ball will score 500, 10,000, 30,000, 50,000, 70,000, SPL, and will camp back on 70,000 Pts. (depending on SW. #14 setting).

G. 7 BANK DROP & DELUXE TARGETS FEATURE

Knocking 1 thru 7 or 9 thru 15 targets, single target 8 ball will flash. 2000 points for each target and 3000 points for each deluxe target is awarded when hit. Deluxe lites will not come on until 8 ball target is made. When 8 ball is made, deluxe lites will flash few times and will stay lit. By knocking the deluxe lites, 1st time 50,000 points will be awarded and deluxe SPL will lite, or 7 targets will reset (depending on SW. #23 setting)

Two more SWITCHES are involved with deluxe feature:

SW. #21 can recall or reset the deluxe lites after each ball.

SW. #22 can advance the deluxe lites on backbox on any time deluxe on playfield is made or only when playfield SPL deluxe is made.

SW. #24 is also provided for deluxe feature on playfield to score as follows:

See page 7 for deluxe 50K or special lite adjustment.

H. OUTLANE SPECIAL FEATURE

When right lane values are advanced all the way to top, the outlanes will lite to alternate for SPL.

I. 8 BALL SPL FEATURE

Could be turned on with 56K, and 112K bonus or with 112K bonus only.

J. LEFT & RIGHT LANE STROBE LITES FEATURE

When ball rolls on left lane or hits single drop target or hits inline targets, the lites on both lanes will be strobing and they will reset on outhole.

K. BACK BOX DELUXE FEATURE

Whenever all 6 deluxe lites on backbox are made game will award from 0 to 3 replays. Backbox deluxe lites will not reset until all are made.

BACKBOX DELUXE FEATURE

No Award
One Credit
Two Credits
Three Credits

SELF TEST POSITION 22

SET TO "00"

SET TO "01"

SET TO "02"

SET TO "03"

← 22

L. 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.

	Set to "03"	Set to "02"	Set to "01"
	Award	Award	Award
16 → Self test position 16 playfield X-Balls and Specials			
8 Ball Special	Replay	X-Ball*	50,000
Deluxe Special	Replay	X-Ball*	50,000
Saucer Special	Replay	X-Ball*	50,000
Left or right out Special	Replay	X-Ball*	50,000
Inline target special	Replay	X-Ball*	50,000
Left lane Special	Replay	X-Ball*	50,000
Left lane X-Ball	X-Ball	X-Ball**	25,000
Self -test position 17			
Scoring Thresholds	Set to "03"	Set to "02"	Set to "01"
	Award	Award	Award
	Replay	X-Ball**	No Award

(*) 50,000 if same player shoot again is lit.

(**) 25,000 if same player shoot again is lit.

Self test position 20-21 → Jamais Trouver
Dans Le Capier
mis à zero

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

*No Credits until 2nd coin is dropped.

**No Credits until 4th coin is dropped.

***No Credits until 3rd 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	SWITCHES	
	26	25
10	OFF	OFF
15	OFF	ON
25	ON	OFF
40	ON	ON

BALLS PER GAME:

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

CREDIT DISPLAY:	MATCH	SWITCH 28
	ON OFF	ON OFF
CREDITS DISPLAYED	YES NO	SWITCH 27
		ON 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
REPLAY
EXTRA BALL
NOVELTY
NO AWARD

SELF TEST 16
POSITION 16
SET TO "03"
SET TO "02"
SET TO "01"
SET TO "00"

SELF TEST 17
POSITION 17
SET TO "03"
SET TO "02"
SET TO "01"
SET TO "00"

For combinations of replay/X-ball/Novelty Modes see page 4A "K. 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 beat 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
No Award
One Credit
Two Credits
Three Credits

SELF TEST POSITION 19
SET TO "00"
SET TO "01"
SET TO "02"
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.

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 play 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 noise effect without background.

Setting "03"

Most all scoring will have a noise effect with background.

GAME FEATURE OPTIONS:

Inline target 50K or special lite adjustment:

Liberal	SW. 6 ON	50K and special lites alternate.
Conservative	SW. 6 OFF	Only 1 special per ball.

C and D rollover lane lite adjustment:

Liberal	SW. 7 ON	Making C or D lane puts both lites out.
Conservative	SW. 7 OFF	Making C or D lane only puts that lane lite out.

A, B, C, D rollover lane 7 drop target adjustment:

Liberal	SW. 8 ON	Completing A, B, C, D rollover drops 2 targets down.
Conservative	SW. 8 OFF	Completing A, B, C, D rollover drops 1 target down.

Left lane feature step up lite adjustment:

Liberal	SW. 14 OFF	Lite sequence, no lite, 10K, 30K, 50K, X-Ball, 70K, SPEC., 70K and 70K stays on
Conservative	SW. 14 OFF	First ball sequence, no lite, 10K, 30K, 50K, X-Ball, 70K and 70K stays On. Next ball sequence, no lite, 10K, 30K, 50K, 70K, SPECIAL 70K and 70K stays On.

8 Ball Special lite adjustment:

Liberal	SW. 15 ON	Completing 8-Ball 2nd and 3rd time scores 1 replay each.
Conservative	SW. 15 OFF	Completing 8-Ball 3rd time scores 1 replay.

Saucer hole scoring adjustment:

Liberal	SW. 16 ON	Saucer scores rack and bonus values plus any lit 2X, 3X, 4X or 5X.
Conservative	SW. 16 OFF	Saucer scores rack and bonus values only.

Panel D-E-L-U-X-E lite next ball adjustment:

Liberal	SW. 21 ON	Any D-E-L-U-X-E lite out will not come on after completion of 8-Ball for next ball.
Conservative	SW. 21 OFF	Any D-E-L-U-X-E lite out will come back on after completion of 8-Ball for next ball.

Back Box D-E-L-U-X-E lite advance adjustment:

Liberal	SW. 22 ON	Completing playfield D-E-L-U-X-E advances back D-E-L-U-X-E 1 step each time.
Conservative	SW. 22 OFF	Completing playfield D-E-L-U-X-E advances back D-E-L-U-X-E only when special is lit.

Panel D-E-L-U-X-E 7 drop target reset adjustment:

Liberal	SW. 23 ON	Completing 8-Ball and Deluxe does not reset 7 drop targets until outhole.
Conservative	SW. 23 OFF	Completing 8-Ball and D-E-L-U-X-E will reset targets.

DELUXE 50K OR SPECIAL LITE ADJUSTMENT:

Liberal	SW. 24, 6 ON	Lites Special, 50K, Special, 50K.
Medium	SW. 24 OFF, 6 ON	Lites 50K, Special, 50K, Special.*
Semi-Medium	SW. 24 ON, 6 OFF	Lites Special, 50K, 50K, 50K.
Conservative	SW. 24, 6 OFF	Lites 50K, Special 50K, 50K.

Number of games replays per game adjustment:

Liberal	SW. 29 ON	All replays earned will be collected.
Conservative	SW. 29 OFF	Only 1 replay per player per game.

Game Over Attract Adjustment:

SW. 30 ON	Voice says "Quit talking and start chalking"
	"8-Ball Deluxe."
SW. 30 OFF	No Voice

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 9,999,000 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 16-22:

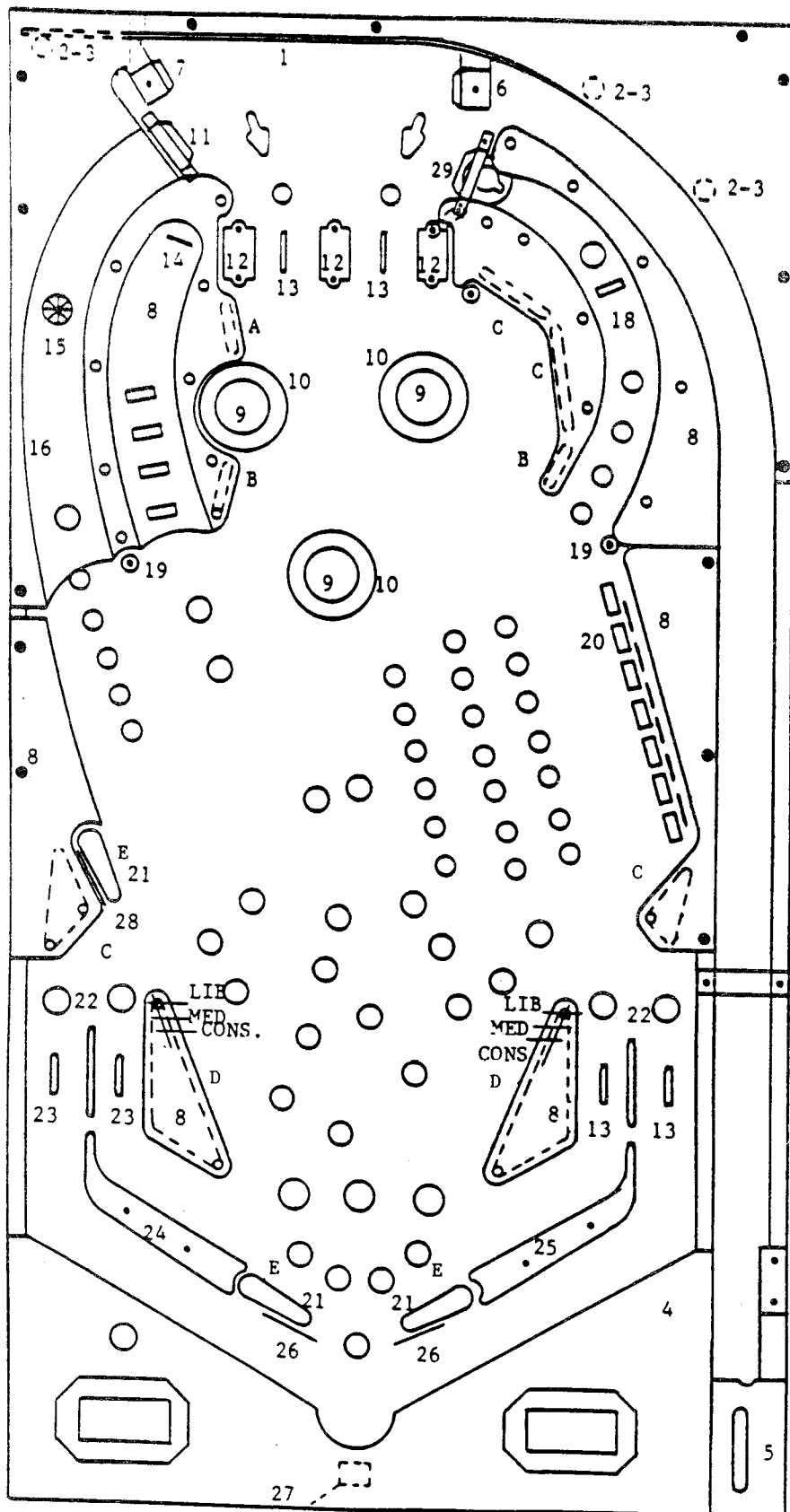
To set up positions 16-22 push and release self test button till 16 shows on match/ball in play. Now pulse replay button for recommended setup from "00" thru "03." Repeat for positions 17, 18, 19 or 22. Positions 20, 21 setups go from "00" thru "15."

SOUND

In addition to individual volume controls for speech and other game sounds on the Squawk and Talk Board. There is also a Master Volume Control located on the front door. (refer to page 10)

Please note that these 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).



RUBBER PARTS

A. R-521	3/4" DIA.	(1)
B. R-521-1	1" DIA.	(2)
C. R-521-2	1 1/2" DIA.	(4)
D. R-521-4	2 1/2" DIA.	(2)
E. R-533-3	FLIPPER	(3)
F. R-243	5/16" DIA.	(10)

PANEL TOP PARTS

1. Arch Rail	M-1774-6	
2. Rail Post	C-907	(3)
3. Rail Post Cap	C-908	(3)
4. Bottom Arch	P-5871-84	
5. Shooter Gauge	P-6359-45	
6. Ball Gate, (R)	A-1475-13	
7. Ball Gate (L)	A-1475-12	
8. Screened Plastics (Set)	A-2890-151	
9. Thumper Cap	A-4009-1	(3)
10. Thumper Cap Collar	A-4011-1	(3)
11. Ball Gate	ASE-2250-27	
12. Plastic Ball Guide (Blue)	C-935-2	(3)
13. Rollover Wire & Brkt.	ASE-2806	(4)
14. Target & Switch Assy.	ASE-2911-3	
15. Rollover Button	C-900	
16. Ball Guide Assy.	A-3032-69	
17. (4) Inline Target Assy.	ASE-2993-12	
18. (1) Inline Target Assy.	ASE-2993-5	
19. Minipost & Rubber	ASE-2836-2	(3)
20. (7) Drop target Assy./Memory	ASE-3038-3	
21. Flipper & Shaft Assy.	ASE-2214-21	(3)
22. Ball Guide Wire	M-121-27	(2)
23. Rollover Wire & Bracket	ASE-2806-1	(2)
24. Ball Guide Assy. (L)	A-2898-39	
25. Ball Guide Assy. (R)	A-2898-38	
26. Buffer Wire	M-121-53	(2)
27. Ball Return Wire & Brkt. Clear Plastics (Set) (Not Shown)	ASE-2806-21 A-2890-152	
28. Ball Guide Wire	M-121-93	
29. Ball Gate Assy.	ASE-2250-85	

LIB. - LIBERAL
MED. - MEDIUM
CONS. - CONSERVATIVE

INDICATES MOVABLE POSTS
FOR SCORING ADJUSTMENTS

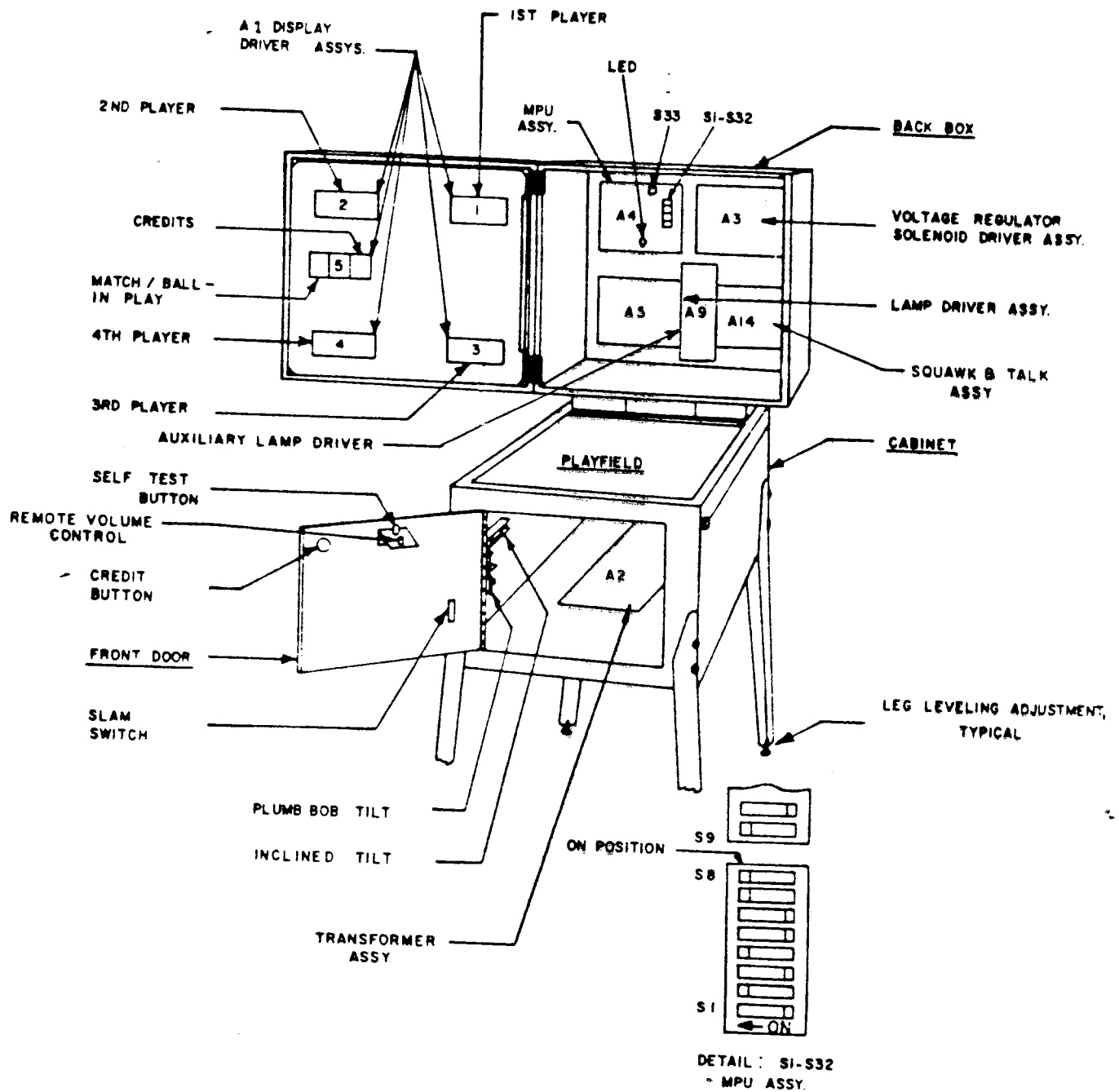


FIGURE III. ELECTRONIC PIN BALL MACHINE

RECOMMENDED

Instruction, Score Cards and High Score Feature Settings
to be used on **EIGHT BALL DELUXE**

3-BALL

REPLAYS

Instruction Card	M-1508-98-E
Score Card	M-1508-98-B
1 Replay at 600,000	
1 Replay at 1,100,000	

5-BALL

REPLAYS

Instruction Card	M-1508-98-E
Score Card	M-1508-98-A
1 Replay at 1,000,000	
1 Replay at 2,000,000	

EXTRA BALL

Instruction Card	M-1508-98-F
Score Card	M-1508-98-A W/NN-1
1 Extra Ball at 1,000,000	
1 Extra Ball at 1,600,000	

ADDITIONAL CARDS

REPLAYS

M-1508-H-1	400,000	950,000
M-1508-I-1	450,000	1,000,000
M-1508-J-1	500,000	1,000,000
M-1508-K-1	500,000	1,100,000
M-1508-L-1	550,000	1,100,000
M-1508-M-1	600,000	1,100,000
M-1508-N-1	650,000	1,200,000
M-1508-O-1	700,000	1,200,000
M-1508-P-1	700,000	1,400,000
M-1508-Q-1	800,000	1,400,000
M-1508-R-1	900,000	1,400,000
M-1508-S-1	900,000	1,500,000
M-1508-T-1	1,000,000	1,500,000
M-1508-U-1	1,000,000	1,600,000
M-1508-V-1	1,000,000	1,800,000
M-1508-W-1	1,000,000	2,000,000
M-1508-X-1	1,100,000	1,800,000
M-1508-Y-1	1,100,000	2,000,000
M-1508-FF-1	1,200,000	2,000,000
M-1508-GG-1	1,300,000	2,000,000
M-1508-HH-1	1,400,000	2,100,000
M-1508-II-1	1,400,000	2,200,000

EXTRA BALL

M-1508-NN-1	1,000,000	1,600,000
M-1508-OO-1	1,000,000	2,000,000
M-1508-PP-1	1,200,000	2,200,000
M-1508-QQ-1	1,400,000	2,400,000

Instruction Card, Novelty
M-1508-98-G

BLANKS (3)

High game to date recommended levels;
(reset periodically)
3 BALL 1,300,000
5 BALL 2,200,000

RECOMMENDED SETTINGS

RECOMMENDED REPLAY GAME SETTING FOR:

INLINE TARGET 50K OR SPECIAL
 C AND D ROLLOVER LITE
 A,B,C,D ROLLOVER 7 DROP TARGET
 LEFT LANE FEATURE STEP UP LITE
 8 BALL SPECIAL LITE
 SAUCER HOLE SCORING
 PANEL DELUXE LITE NEXT BALL
 BACK BOX DELUXE LITE ADVANCE
 PANEL DELUXE 7 DROP TARGET RESET
 DELUXE 50K OR SPECIAL (See Page 7)
 NUMBER OF REPLAYS PER GAME
 GAME OVER ATTRACT
 BALLS PER GAME
 BALLS PER GAME

REPLAY

Instruction Card
 Score Card
 Major Mode

Match
 High Score to Date

X-BALL

Instruction Card
 Score Card
 Major Mode

Match
 High Score to Date

NOVELTY

Instruction Card
 Major Mode

Match
 High Score to Date

3-BALL

M-1508-98-E
 M-1508-98-B
 Self Test Position 16, 17
 Set to "03"
 SW. 28 ON
 Self Test Position 19
 Set to "03"

M-1508-98-G
 Self Test Position 16, 17
 Set to "01"
 SW. 28 OFF
 Self Test Position 19
 Set to "00"

	3-BALL	5-BALL
SW. 6	ON	ON
SW. 7	ON	OFF
SW. 8	ON	ON
SW. 14	ON	ON
SW. 15	ON	OFF
SW. 16	ON	ON
SW. 21	ON	OFF
SW. 22	ON	ON
SW. 23	ON	ON
SW. 24	ON	OFF
SW. 29	ON	ON
SW. 30	ON	ON
SW. 31	OFF	ON
SW. 32	OFF	OFF

5-BALL

M-1508-98-E
 M-1508-98-A
 Self Test Position 16, 17
 Set to "03"
 SW. 28 ON
 Self Test Position 19
 Set to "03"

M-1508-98-E
 M-1508-98-A W/NN-1
 Self Test Position 16, 17
 Set to "02"
 SW. 28 OFF
 Self Test Position 19
 Set to "00"

M-1508-98-G
 Self Test Position 16, 17
 Set to "01"
 SW. 28 OFF
 Self Test Position 19
 Set to "00"

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 23 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.

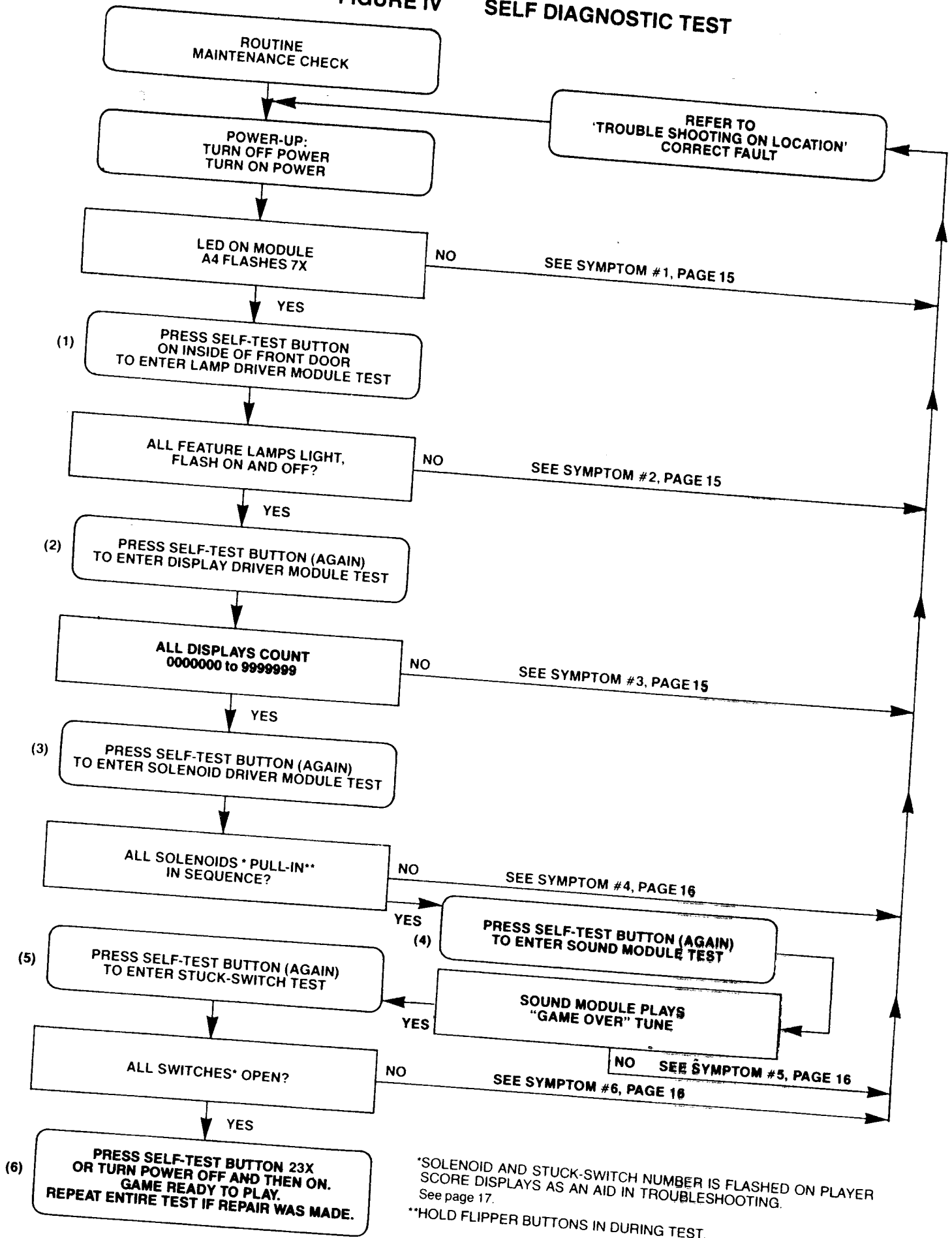
After successful completion of the Self Diagnostic Test procedure, set the game up for play. Exercise each rollover, thumper-bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no 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



*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. 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) **SYMPTON:** 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.

SOLENOID IDENTIFICATION TABLE

Self Test #	SOLENOID IDENTIFICATION
01	LEFT SLINGSHOT
02	RIGHT SLINGSHOT
03	KNOCKER
04	LEFT THUMPER BUMPER
05	RIGHT THUMPER BUMPER
06	BOTTOM THUMPER BUMPER
07	SINGLE DROP TARGET RESET
08	#1, 9 DROP TARGET (TOP)
09	#2, 10 DROP TARGET
10	#3, 11 DROP TARGET

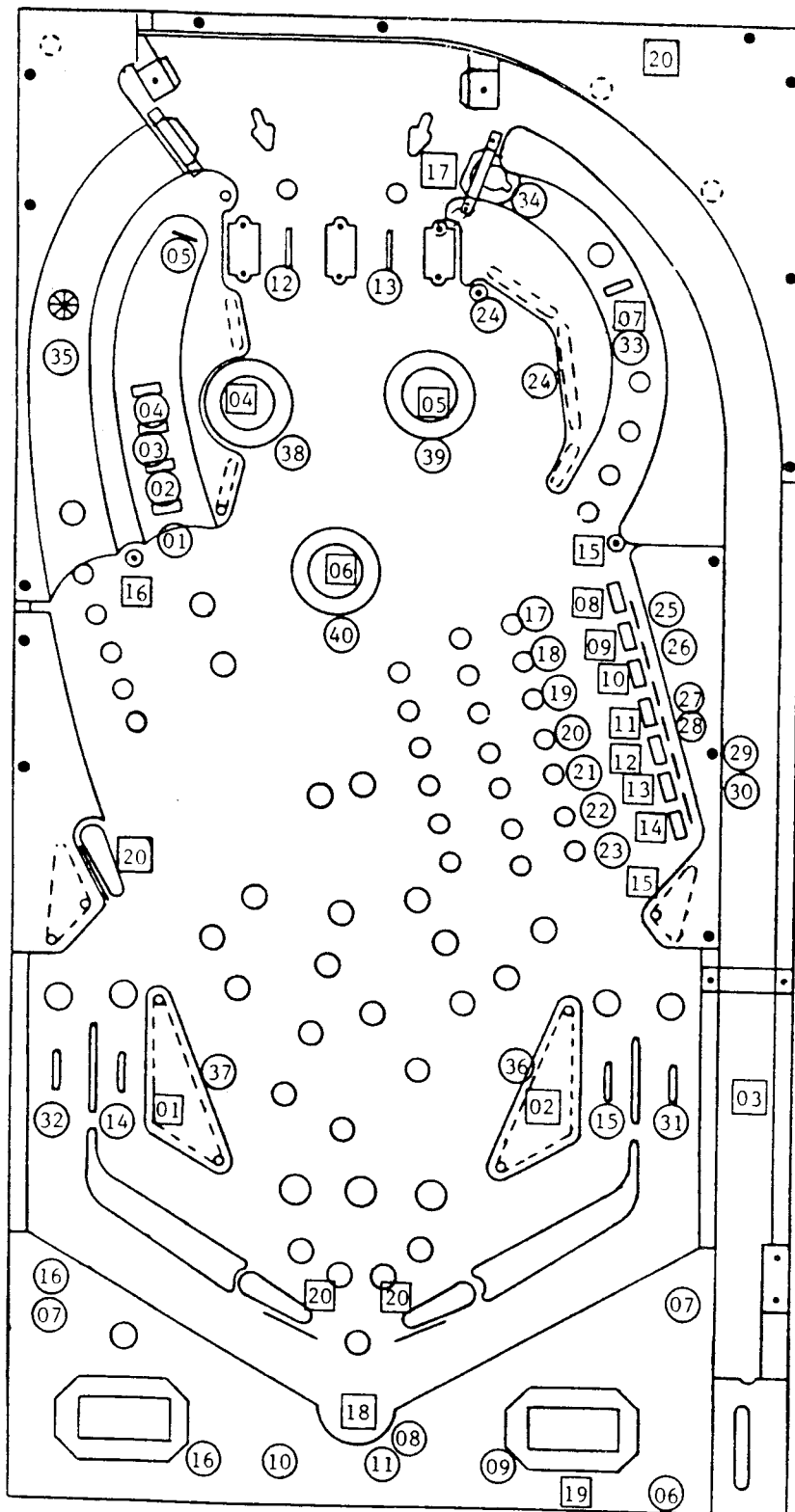
Self Test #	SOLENOID IDENTIFICATION
11	#4, 12 DROP TARGET
12	#5, 13 DROP TARGET
13	#6, 14 DROP TARGET
14	#7, 15 DROP TARGET (BOTTOM)
15	7 DROP TARGET RESET
16	4 DROP TARGET RESET
17	SAUCER
18	OUTHOLE KICKER
19	COIN LOCKOUT DOOR
20	KI RELAY (FLIPPER ENABLE)

SWITCH ASSEMBLY SELF-TEST DISPLAY NUMBERS

Switch Self Test #	DESCRIPTION
01	2X INLINE DROP TARGET
02	3X INLINE DROP TARGET
03	4X INLINE DROP TARGET
04	5X INLINE DROP TARGET
05	INLINE BACK TARGET
06	CREDIT BUTTON
07	TILT (3)
08	OUTHOLE
09	COIN 111 (RIGHT)
10	COIN 1 (LEFT)
11	COIN 11 (MIDDLE)
12	"A" ROLLOVER
13	"B" ROLLOVER
14	"C" ROLLOVER
15	"D" ROLLOVER
16	SLAM (2)
17	1, 9 DROP TARGET
18	2, 10 DROP TARGET
19	3, 11 DROP TARGET
20	4, 12 DROP TARGET

Switch Self Test #	DESCRIPTION
21	5, 13 DROP TARGET
22	6, 14 DROP TARGET
23	7, 15 DROP TARGET
24	30 POINT REBOUND (2)
25	"D" TARGET
26	"E" FIRST TARGET
27	"L" TARGET
28	"U" TARGET
29	"X" TARGET
30	"E" 2ND TARGET
31	RIGHT OUTLANE
32	LEFT OUTLANE
33	SINGLE DROP TARGET
34	SAUCER
35	ROLLOVER BUTTON
36	RIGHT SLINGSHOT
37	LEFT SLINGSHOT
38	LEFT THUMPER BUMPER
39	RIGHT THUMPER BUMPER
40	BOTTOM THUMPER BUMPER

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



○ INDICATES SWITCH ASSEMBLY
IDENTIFICATION NUMBERS.
NOTE: CABINET: 07, 16
DOOR 06, 09
10, 11, 16

□ INDICATES SOLENOID
IDENTIFICATION NUMBERS.
NOTE: DOOR: 19
BACKBOX: 20
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 EIGHT BALL DELUXE

MISCELLANEOUS

	PART NUMBER
Transformer (Domestic or Export)	E-122-142
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 (3)	AQ-25-500/ 34-4500
Knocker	AR-26-1200
Outhole Kicker	AT-26-1200
Thumper-Bumper (3)	AN-26-1200
Sling-Shot (2)	AN-26-1200
Drop Target Reset (3)	NB-26-1900
Individual Drop Target (2)	CV-31-2000
Individual Drop Target (5)	CJ-31-2000
Single Drop Target Reset	AO-27-1300
Saucer	AT-27-1300
PLAYFIELD PARTS	See Figure II

MODULES

Lamp Driver A5	AS-2518-23
Display Driver A1 (1 used)	AS-2518-21
Display Driver A1 (4 used)	AS-2518-58
Solenoid Driver/Voltage Regulator A3	AS-2518-22
MPU A4	AS-2962-26
Transformer & Rectifier A2	AS-2877-6
Rectifier Board (Part of A2)	AS-2518-54
Squawk & Talk	AS-3107-2
Auxiliary Lamp Driver A9	AS-2518-52
Solenoid Expander	AS-2518-66

REPAIRS PROCEDURES/AIDS

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

MODULE COMPONENTS

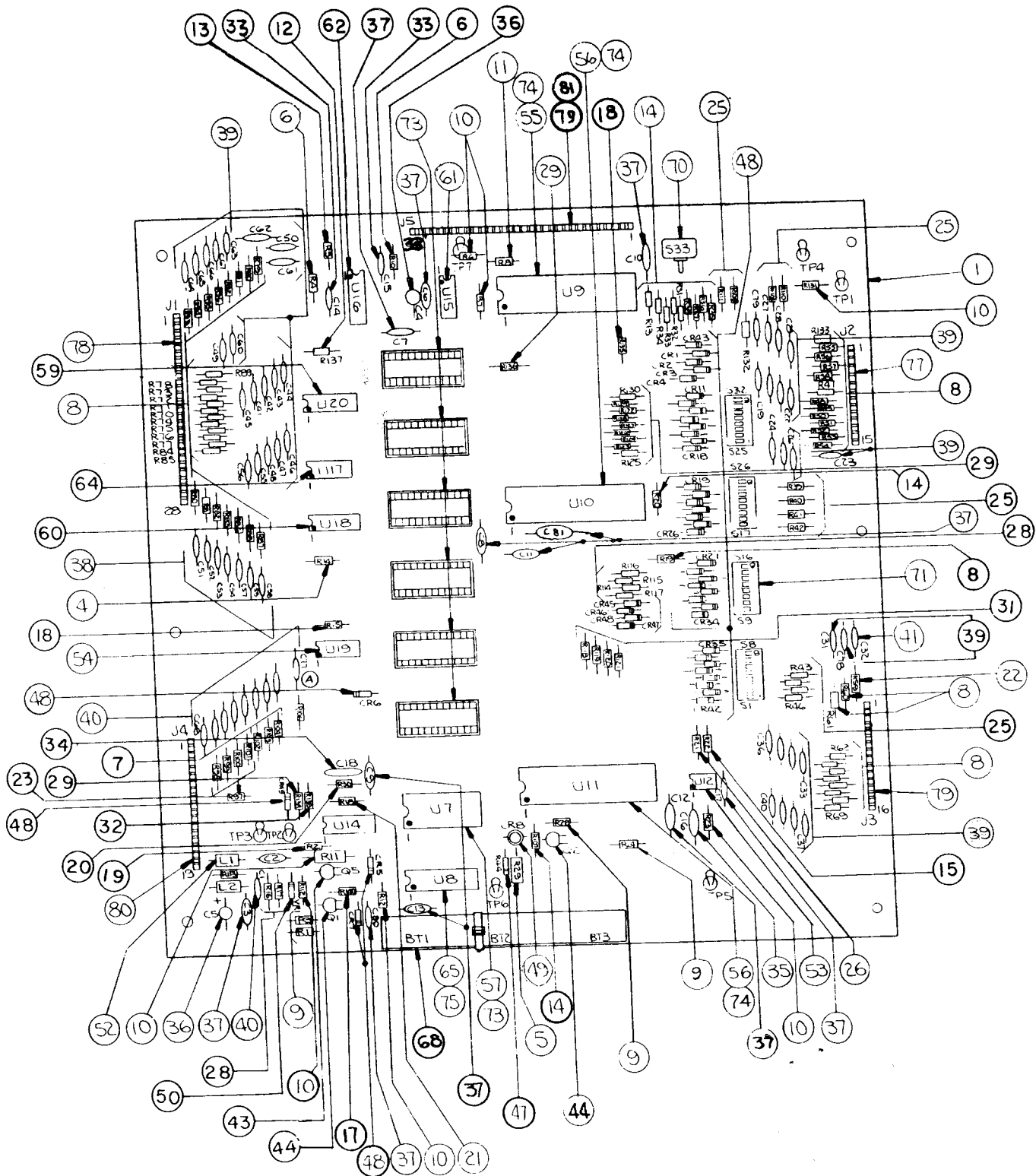
SEE MODULE PARTS LIST

MODULE COMPONENT STARTER KITS

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

- Kit #558—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

AS-2518-35 MPU MODULE



A4: MPU MODULE COMPONENT PARTS LIST

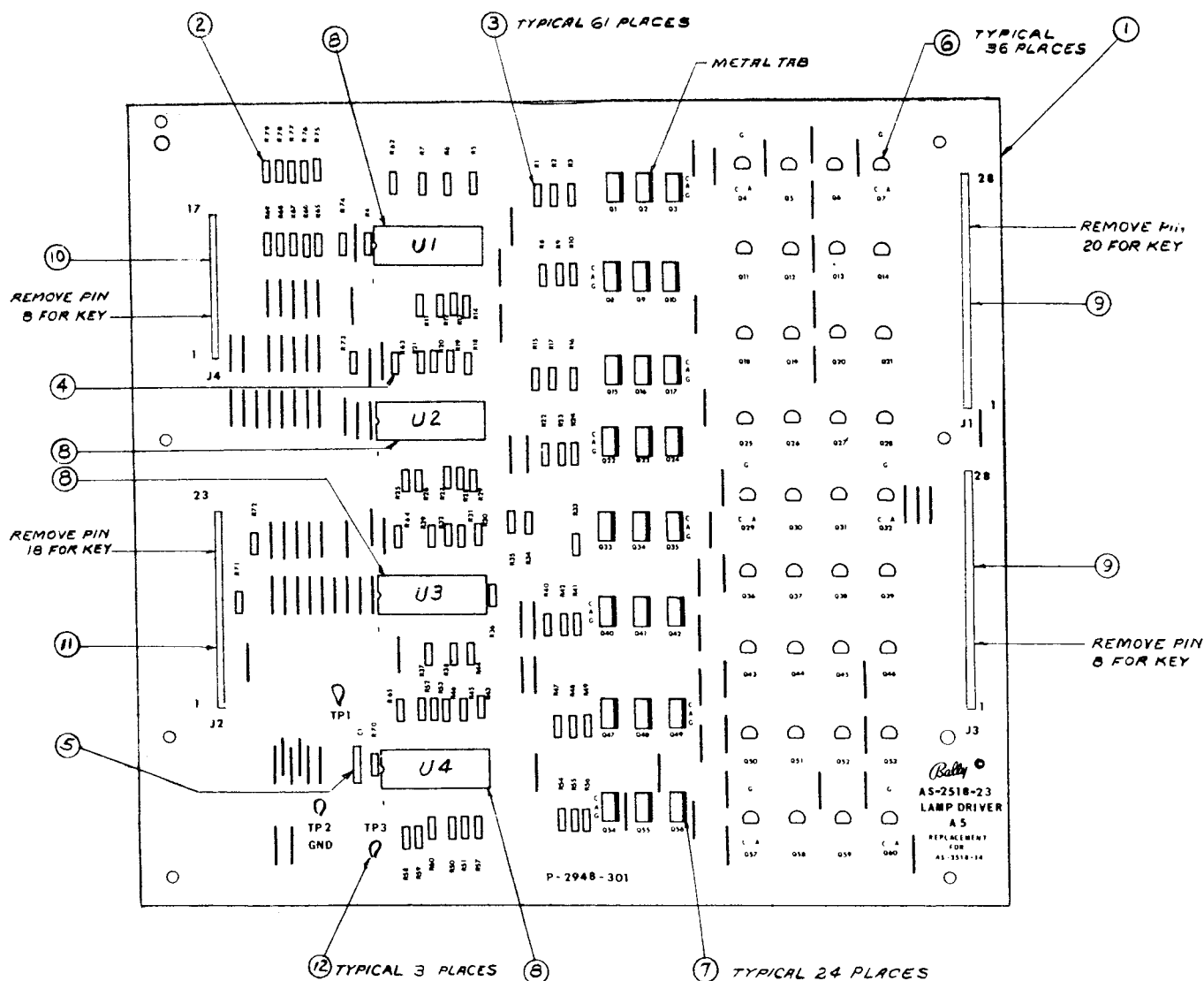
ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	AS-2962-26	MPU Module Complete.
2	A4 (see note 2)	AS-2518-35	MPU Module less Program Memory, U1-6 incl.
3-32	See Schematic		Resistors, See schematic for value
33	C14, C15	E-00586-0067	Capacitor, 470 PFD, 1kv
34	C18	E-00586-0088	Capacitor, .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 (IN4004)
48	CR1-CR7, CR11-CR43, CR45-CR49	E-00587-0014	Diode (IN4148)
49	CR8		
50	VR1	E-00679	LED (Green)
52	L1, L2	E-00598-0008	Diode Zener (8.2V, IN9598)
53	U12	E-00604-0003	Inductor, 22 Micro Hy.
54	U19	E-00620-0004	Timer (555)
55	U9	E-00620-0005	Quad 2 Input (4011)
56	U10, U11	E-00620-0028	MPU I.C. (6800)
57	U7	E-00620-0029	PIA I.C. (6820)
		E-00620-0030	RAM I.C. (6810)
59	U20		
60	U14, U18	E-00620-0032	HEX Buffer I.C. (14502B)
61	U15	E-00620-0033	HEX Inverter (4049B)
62	U16	E-00620-0034	Quad Memory Drive (MC3459L)
		E-00620-0035	Dual Monostable (9602)
64	U17		
65	U8	E-00620-0041	Quad 2 Inputs (74L00N)
68	BT1, BT2, BT3	E-00620-0042	RAM (C MOS, P5101L-3)
70	S33	E-00628-0003	Battery
71	S1-S8, S9-S16, S17-S24, S25-S32	E-00658-0001	Push Button Switch
		E-00677	DIP Switch
73			
74		E-00712	24 Pin Socket
75		E-00712-0001	40 Pin Socket
77	J2	E-00712-0003	22 Pin Socket
78	J1	E-00715	15 Pin Wafer Connector
79	J3, J5	E-00715-0004	28 Pin Wafer Connector
80	J4	E-00715-0017	16 Pin Wafer Connector
81	J5	E-00715-0018	19 Pin Wafer Connector
		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 GLOBE-TERS, AS-2962-12: DOLLY PARTON, AS-2962-13: SILVERBALL MANIA, AS-2962-18: MYSTIC, AS-2962-20: HOTDOGGIN, AS-2962-22: SKATEBALL, AS-2962-23: FRONTIER, AS-2962-21: XENON, AS-2962-24: FLASH GORDON, AS-2962-26: EIGHT BALL DELUXE

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

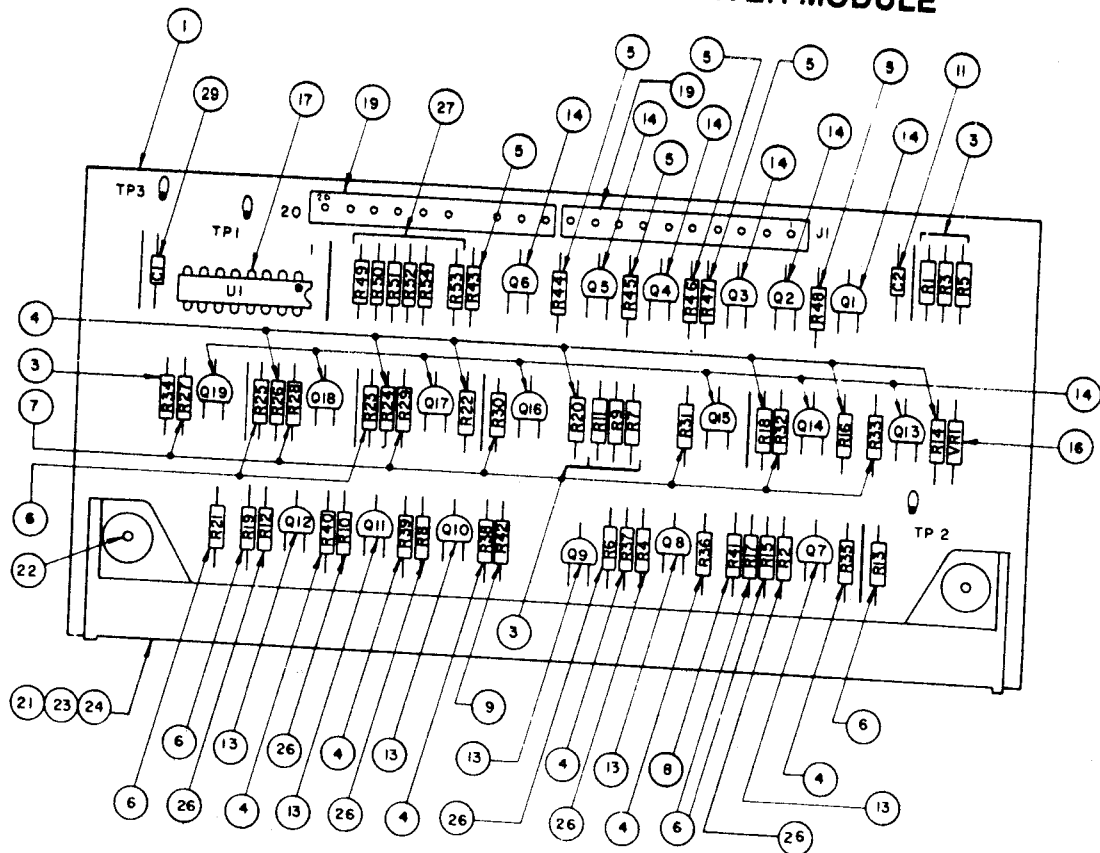
AS-2518-23 LAMP DRIVER MODULE



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 CREDIT DISPLAY DRIVER MODULE



A1: 6 DIGIT DISPLAY DRIVER MODULE COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1			
3	7	R1, R3, R5, R7, R9, R11, R34	P-2948-296	P.C. Board, M-645-392
4	13	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40	E-105-331	Resistor, 100K Ω
5	6	R43, R44, R45, R46, R47, R48	E-105-227	Resistor, 300K Ω
6	7	R13, R15, R17, R19, R21, R23, R25	E-105-228	Resistor, 9.1K Ω
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-229	Resistor, 1.5K Ω
8	1	R41	E-105-222	Resistor, 1.2K Ω
9	1	R42	E-105-231	Resistor, 39K Ω
10			E-105-271	Resistor, 240K Ω
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		
17	1	U1	E-598-7	Zener Diode, 110V
18			E-620-38	I.C. Decoder
19	2	J1		
21	1	DS1	E-715-34	10 Pin.Wafer Pin Connector
22	2		E-680	Digital Display Panel
23	1		M-1836	Hi-Lo Screw, W/H
24	1		P-2399	Display Mounting (Top)
26	6	R2, R4, R6, R8, R10, R12	P-2399-1	Display Mounting (Bottom)
27	6	R49, R50, R51, R52, R53, R54	E-105-287	Resistor, 2.2K Ω
28	As Req'd		E-105-242	Resistor, 20K Ω
29	1	C1		Wire Jumper
			E-586-85	Capacitor, .01 MFD, 25V

NOTE: INTERCHANGEABLE WITH AS-2518-15

1. *Journal of the American Medical Association*, 1997; 277: 103-107.
 2. *Journal of the American Medical Association*, 1997; 277: 108-112.
 3. *Journal of the American Medical Association*, 1997; 277: 113-117.
 4. *Journal of the American Medical Association*, 1997; 277: 118-122.



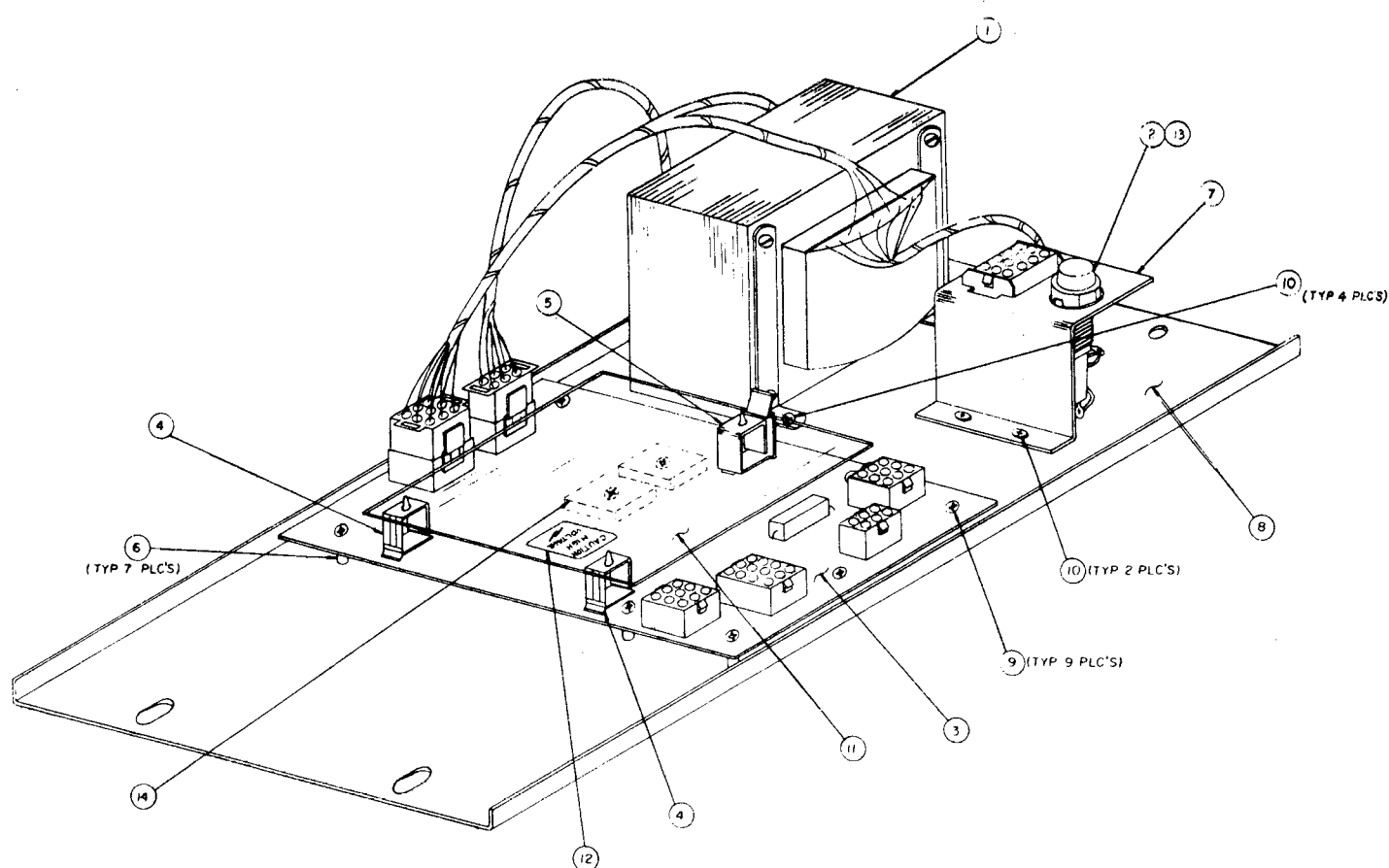
A3: SOLENOID DRIVER/VOLTAGE REGULATOR MODULE

COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A3	AS-2518-22	Solenoid Driver/Voltage Regulator Module, Complete Resistor, See Schematic for value.
3-14	Resistors		
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 (IN4004)
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

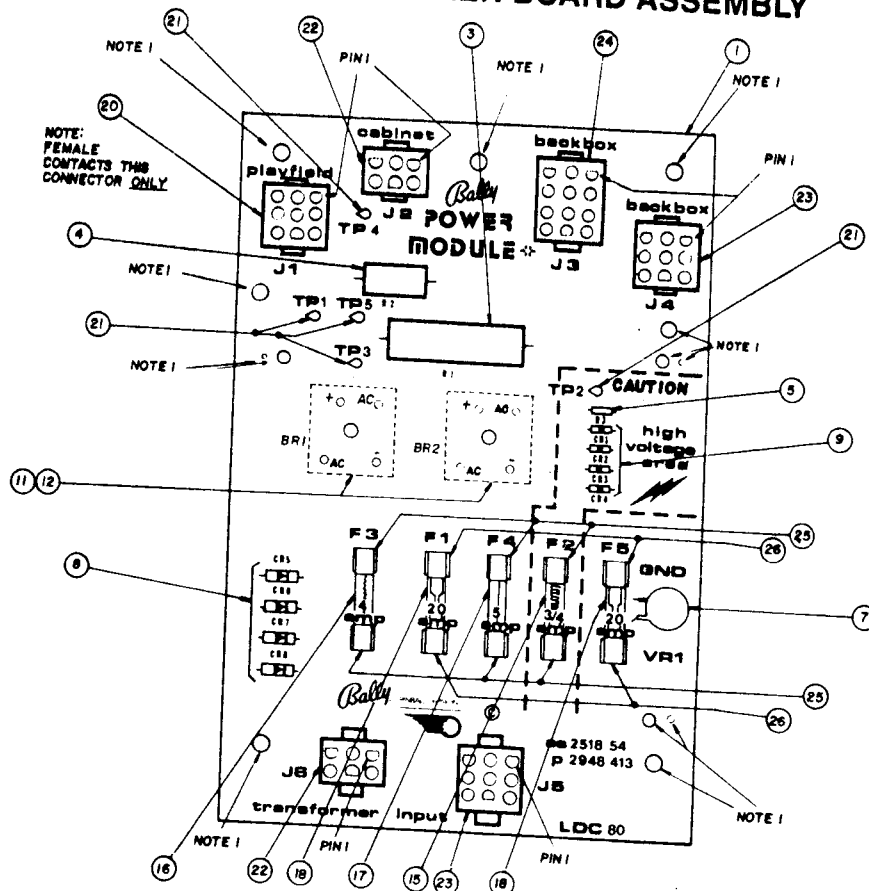
A2: POWER TRANSFORMER MODULE



COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-6	Power Transformer Module, Complete
1		AS-3071-2	Transformer
2		E-148-25	Fuse Holder
3	A2	AS-2518-54	Power Module Assy.
4		M-1829-4	Hinged Support
5		M-1829-3	Edge Holder
6		M-1829-5	Spacer
7		P-6442-244b	Fuse & Connect Brkt.
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	3A S.B. Fuse
14		M-1834	H. S. Compound

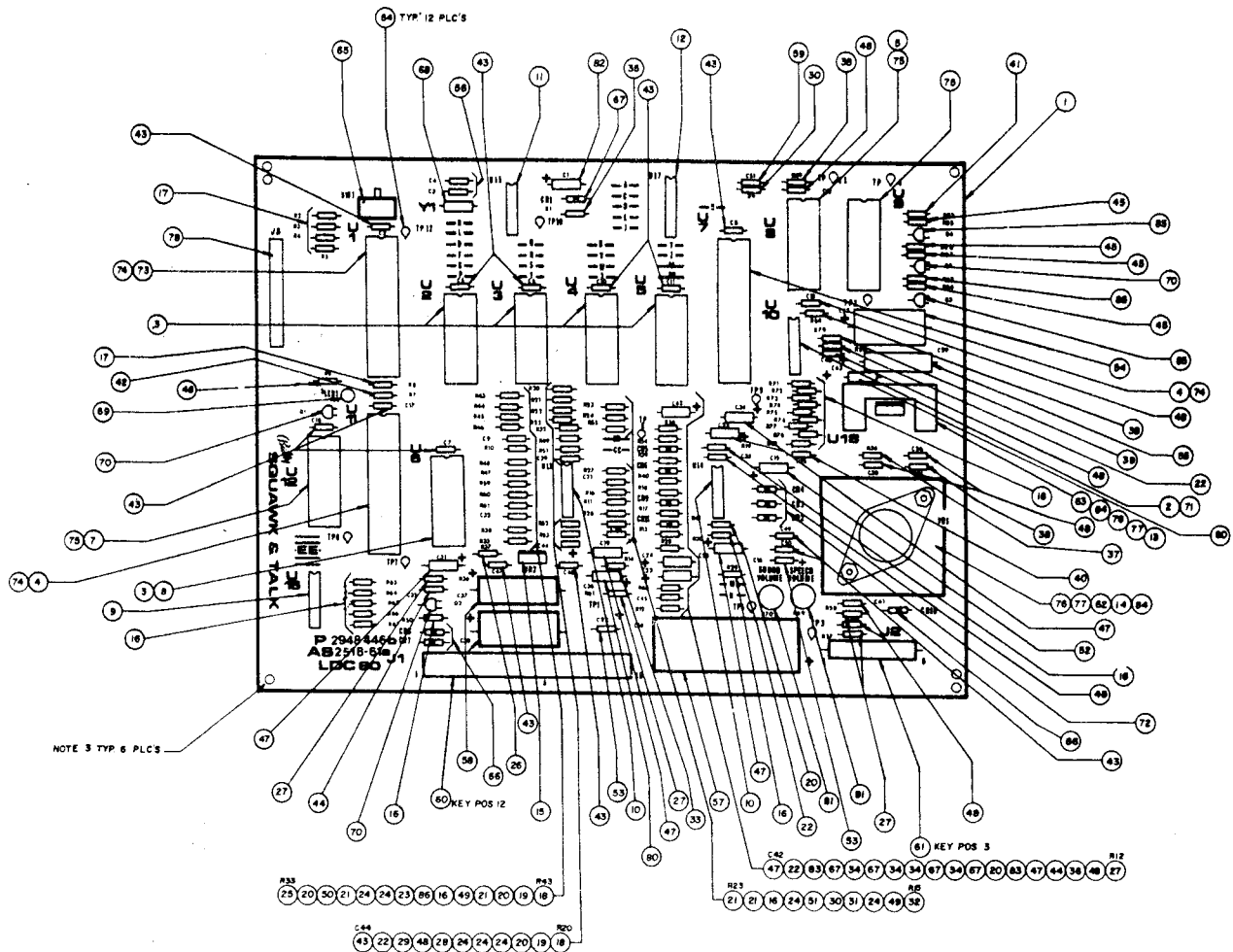
AS-2518-54 RECTIFIER BOARD ASSEMBLY



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

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-6	Power Transformer Module, Complete
1	P/O A2	AS-2518-54	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
8	CR5, CR6, CR7, CR8	E-00587-0022	3A Diode
9	CR1, CR2, CR3, CR4	E-00587-0015	Diode (IN4004)
10			
11	Used with BR1-2	P-1973-480	Spacer
12	BR1, BR2	E-00602-0006	Bridge Rectifier
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	F1, F5	E-00133-0027	Fuse, 20A, 32V, 3AG
19			
20	J1	E-806-9	9 CKT Socket Header
21	TP1, 2, 3, 4, 5	P-05399	Test Clip
22	J2, J6	E-805-6	6 CKT Pin Header
23	J4, J5	E-805-9	9 CKT Pin Header
24	J3	E-805-12	12 CKT Pin Header
25	F2, 3, 4	E-00148-0021	Fuse Clips
26	F1, 5	E-00148-0022	Fuse Clips (Low Resistance)

SQUAWK & TALK MODULE AS 2518-61A



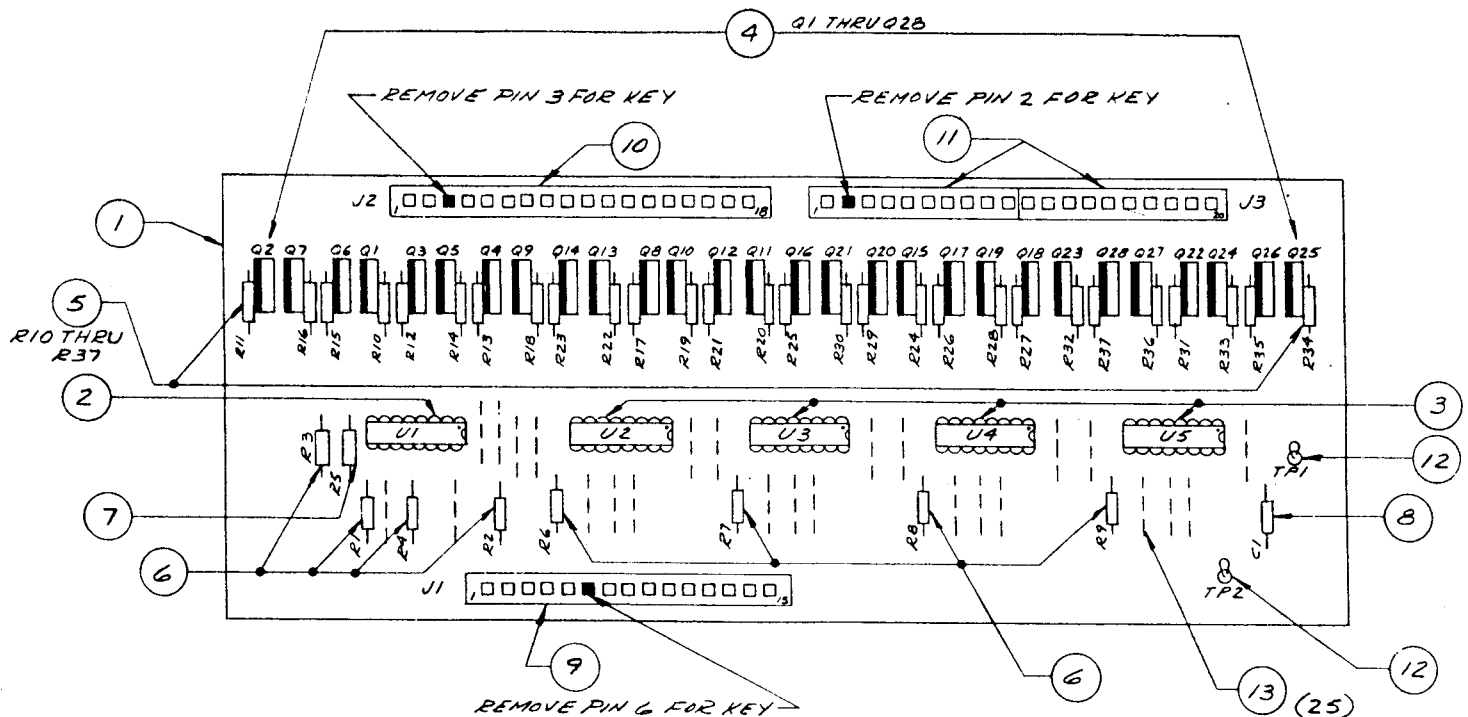
ITEM	QTY.	REFERENCE DESIGNATION	DESCRIPTION	BALLY PART #
1	1	PWB	M-645-577b	P-2948-446b
2	1	U10	AD 558 DAC	E-620-171
3	5	Used with U2 thru U6	24 Pin I.C. Socket	E-712
4	2	U7, U11	6821 P.I.A.	E-620-29
5	1	U8	Tms 5200 Speech	E-620-167
7	1	U12	AY3-8912 Sound	E-620-166
8	1	U6	6810 RAM (SEE NOTE 1)	E-620-30
9	1	U16	4049 Hex Inverter	E-620-33
10	2	U13, U14	LM 3900	E-620-126
11	1	U15	74LS14 Schmidt Inverter	E-620-169
12	1	U17	74LS155	E-620-168
13	1	U18	TDA 2002 Power Amp	E-620-127
14	1	VR1	LM323, 5V Regulator	E-710
15	1	VR2	7905, -5V Regulator	E-620-165
16	19	R10, 19, 29, 42, 50, 63-67, 71-78, 55	Resistor, 1/4W, 10K	E-105-185
17	5	R2-5,8	Resistor, 1/4W, 5%, 3.3K	E-105-238
18	2	R20, 43	Resistor, 1/4W, 5%, 820K	E-105-343
19	2	R21, 44	Resistor, 1/4W, 5%, 390K	E-105-310
20	5	R13, 22, 38, 41, 45	Resistor, 1/4W, 200K	E-105-225
21	4	R23, 24, 46, 61	Resistor, 1/4W, 5% 100K	E-105-226
22	4	R30, 53, 56, 80	Resistor, 1/4W, 5% 2K	E-105-237
23	1	R47	Resistor, 1/4W, 5%, 2.7K	E-105-151
24	7	R25, 26, 27, 32, 49, 59, 60	Resistor, 1/4W, 5% 1m	E-105-285
25	1	R33	Resistor, 1/4W, 5%, 91K	E-105-313

SQUAWK & TALK MODULE AS 2518-61A

COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	DESCRIPTION	BALLY PART #
26	1	R37	Resistor, 1/4W, 5%, 30K	E-105-245
27	5	R12, 36, 57, 58, 81	Resistor, 1/4W, 5%, 1K	E-105-230
28	1	R51	Resistor, 1/4W, 5%, 750K	E-105-344
29	1	R52	Resistor, 1/4W, 5%, 9.1K	E-105-228
30	2	R9, 16	Resistor, 1/4W, 5%, 130K	E-105-203
31	1	R11	Resistor, 1/4W, 5%, 150K	E-105-248
32	1	R15	Resistor, 1/4W, 5%, 220K	E-105-161
33	1	R14	Resistor, 1/4W, 5%, 1.8K	E-105-346
34	4	R17, 18, 39, 40	Resistor, 1/4W, 5%, 910K	E-105-347
35	1	R1	Resistor, 1/4W, 5%, 27K	E-105-243
36	1	R68	Resistor, 1/4W, 5%, 510 Ω	E-105-311
37	1	R34	Resistor, 1/4W, 5%, 2.2 Ω	E-105-211
38	3	R31, 88, 89	Resistor, 1/4W, 5%, 220 Ω	E-105-303
39	1	R79	Resistor, 1/4W, 5%, 7.5K	E-105-345
40	1	R35	Resistor, 1/4W, 5%, 1 Ω	E-105-196
41	1	R83	Resistor, 1/4W, 5%, 11K	E-105-360
42	1	R7	Resistor, 1/4W, 5%, 8.2K	E-105-223
43	14	C2, 5-8, 10, 11, 17, 18, 44, 47-50	Capacitor, Ceramic, .01 μ F, 25V	E-586-85
44	2	C23, 35	Capacitor, Ceramic, .47 μ F, 16V	E-586-130
45	4	R84-87	Resistor, 1/4W, 5%, 2.2K	E-105-287
46	1	R6	Resistor, 1/4W, 470 Ω	E-105-342
47	7	C19, 24, 25, 28, 31, 34, 42	Capacitor, Electrolytic, 1 μ F, 25V	E-586-90
48	10	C12, 13, 26, 30, 33, 39, 40, 41, 45, 46	Capacitor, Ceramic, .1 μ F, 25V	E-586-89
49	2	C9, 20	Capacitor, Ceramic, 470pF, 50V	E-586-83
50	1	C32	Capacitor, Ceramic, 68pF	E-586-120
51	1	C21	Capacitor, Ceramic, 100pF	E-586-68
52	1	C15	Capacitor, Electrolytic, 10 μ F, 16V	E-586-135
53	2	C16, 22	Capacitor, Tantalum, 4.7 μ F, 25V	E-586-73
54	1	C27	Capacitor, Electrolytic, 1000 μ F, 16V	E-586-136
55	1	C29	Capacitor, Electrolytic, 470 μ F, 6V	E-586-124
56	2	C3, 4	Capacitor, Ceramic, 27pF	E-586-121
57	1	C14	Capacitor, Electrolytic, 4700 μ F, 25V	E-586-123
58	2	C37, 38	Capacitor, Electrolytic, 330 μ F, 50V	E-586-147
59	1	C51	Capacitor, Monolithic, 10pF	E-586-150
60	1	J1	18 Pin Wafer Connector (156)	E-736-18
61	1	J2	6 Pin Wafer Connector (156)	E-736-6
62	1	Used with VR1	Heatsink, 6053B	E-682-11
63	1	Used with U18	Heatsink, 6030B	E-682-8
64	12		Test Points	P-5399
65	1	SW. 1	P.C.B. Switch	E-658-1
66	3	CR7, 8, 10	Diode (IN4004)	E-587-15
67	5	CR1, 5, 6, 9, 11	Diode (IN4148)	E-587-14
68	1	Y1	Crystal, 3.579	E-744-5
69	1	LED1	LED	E-679
70	3	Q1-2, 5	Transistor, 2N3904	E-585-31
71	1	Used with U10	Socket I.C. 16 Pin	E-712-16
72	3	CR2-4	Diode, VR332	E-587-22
73	1	U1	6808 or 6802 (SEE NOTE 1)	
74	3	Used with U1, 7, 11	Microprocessor	E-620-125 or 128
75	3	Used with U8, 9, 12	Socket, I.C. 40 Pin	E-712-1
76	3	Used with U18, VR1	Socket, I.C. 28 Pin	E-712-28
77	3	Used with U18, VR1	Screw	LSPR-00632-1106
78	2	J3	Nut	N-00632-2112
80	2	C36, 43	Header, 20 Pin	E-766-20
81	2	R69, 70	Capacitor, 2 μ F, 16V	E-586-63
82	1	C1	Pot. 1K	E-599-16
83	2	R28, 54	Capacitor, Electrolytic, 47 μ F	E-586-148
84	AR	Used with U18, VR1	Resistor, 82K	E-105-341
85	2	Q3, 4	Thermal Compound	M-1834
86	2	R82, 48	Transistor, 2N4403	E-585-23
			Resistor, 1/4W, 5%, 2.4K	E-105-312
			JUMPERS—SEE NOTES	

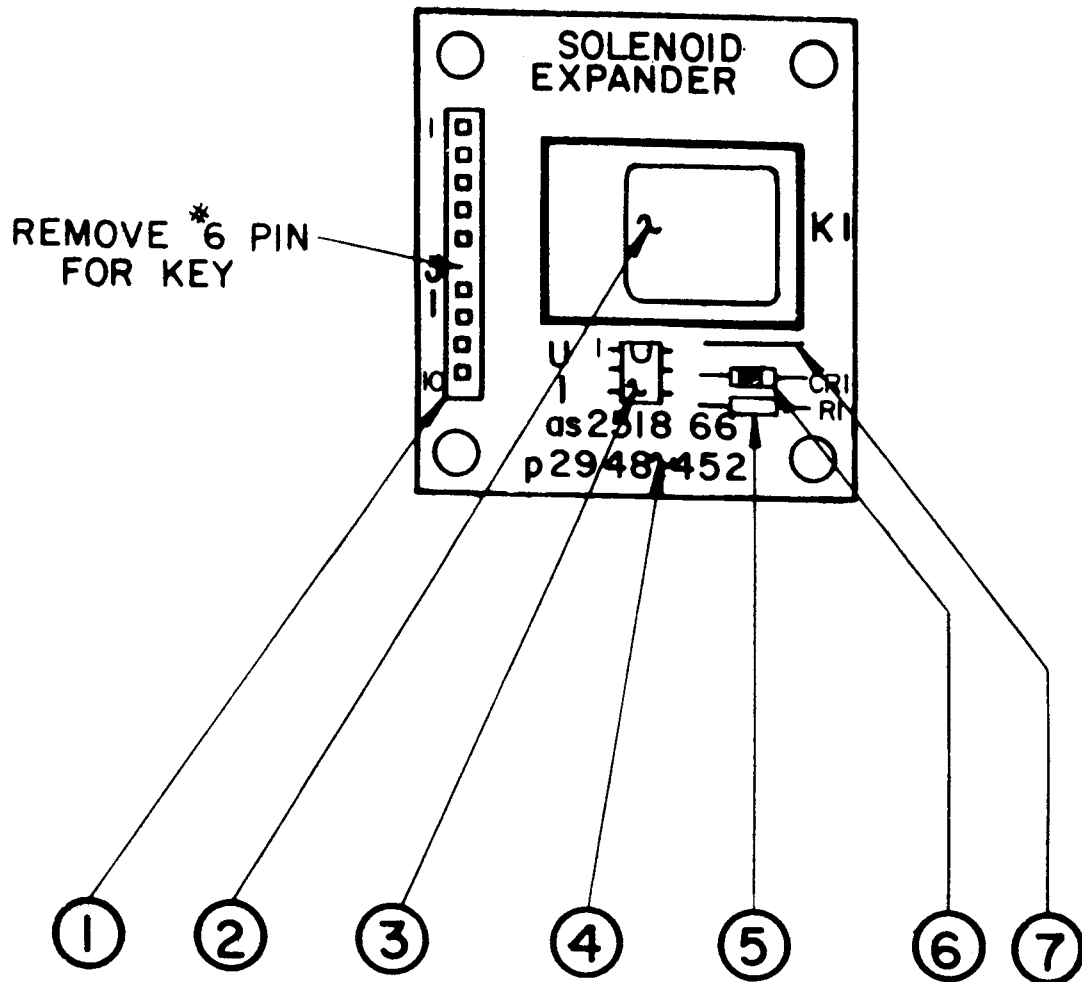
AS-2518-52 AUXILIARY LAMP DRIVER



A9: AUXILIARY LAMP DRIVER COMPONENT PARTS LIST

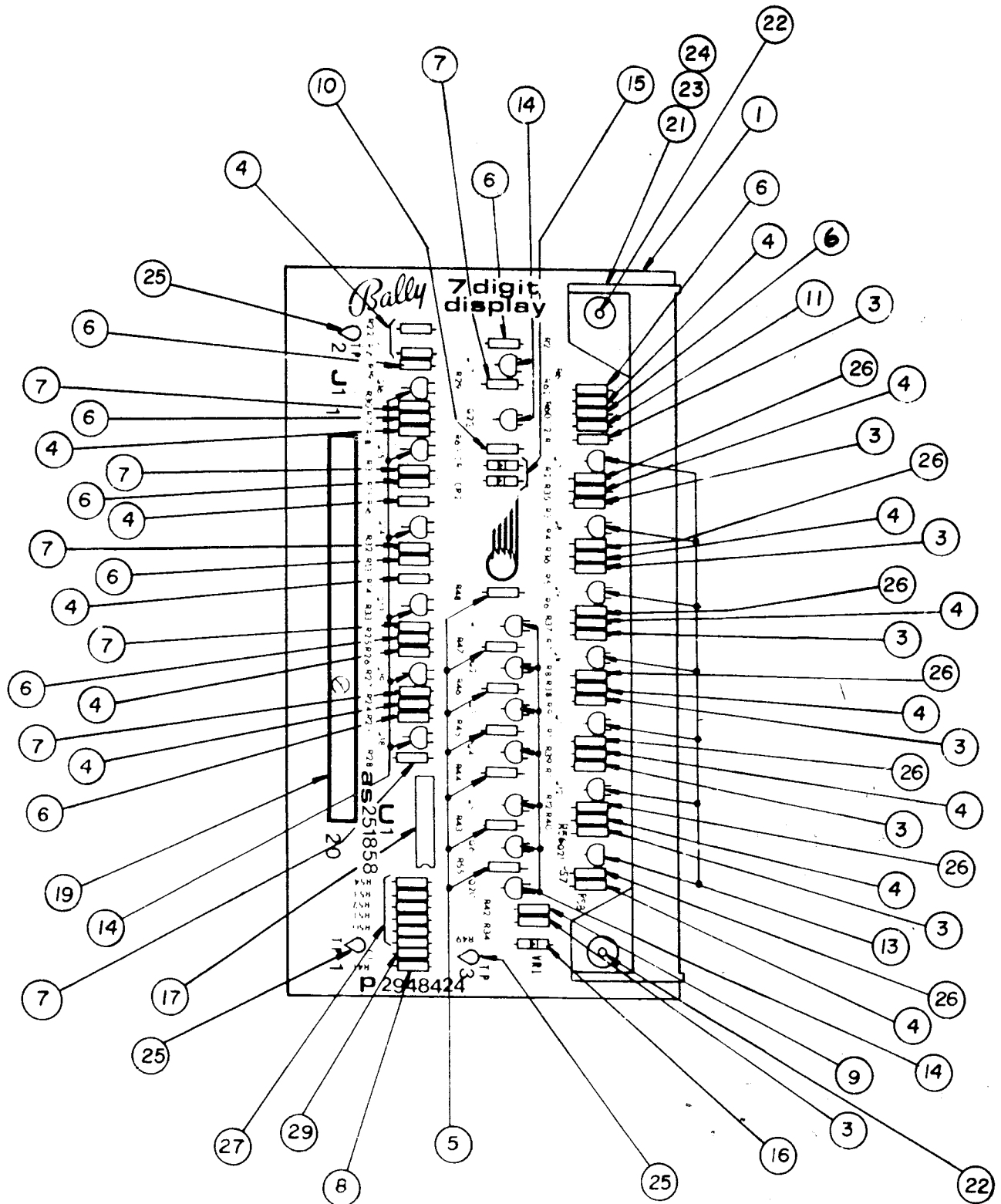
ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART NO.	DESCRIPTION
1	1		P-2948-504	P.C.B. (M-645-512)
2	1	U1	E-620-134	Quad Flip Flop
3	4	U2 Thru U5	E-620-108	BCD to Decimal Decoder
4	28	Q1 Thru Q28	E-585-29	S.C.R.
5	28	R10 Thru R37	E-105-237	Resistor, 2K Ω , 1/4 W, 5%
6	8	R1-4, R6-9	E-105-242	Resistor, 20K Ω , 1/4 W, 5%
7	1	R5	E-105-173	Resistor, 2.2M, 1/4 W, 5%
8	1	C1	E-586-85	Capacitor, .01 μ f, 25V, ± 20 %
9	1	J1	E-736-15	Connector, KK156 15 Pin
10	1	J2	E-736-18	Connector, KK156 18 Pin
11	2	J3	E-736-10	Connector, KK156 10 Pin
12	2	TP1, TP2	P-5399	Test Point
13	25		M-1777-126	Jumper

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
7		Jumper	AWG. 22 1½"
Ref.		W-1251b	Schematic

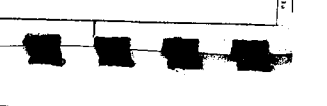
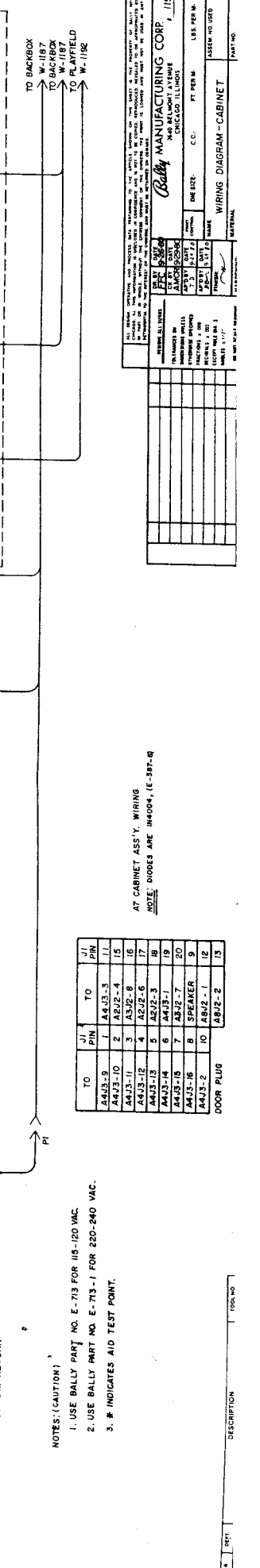
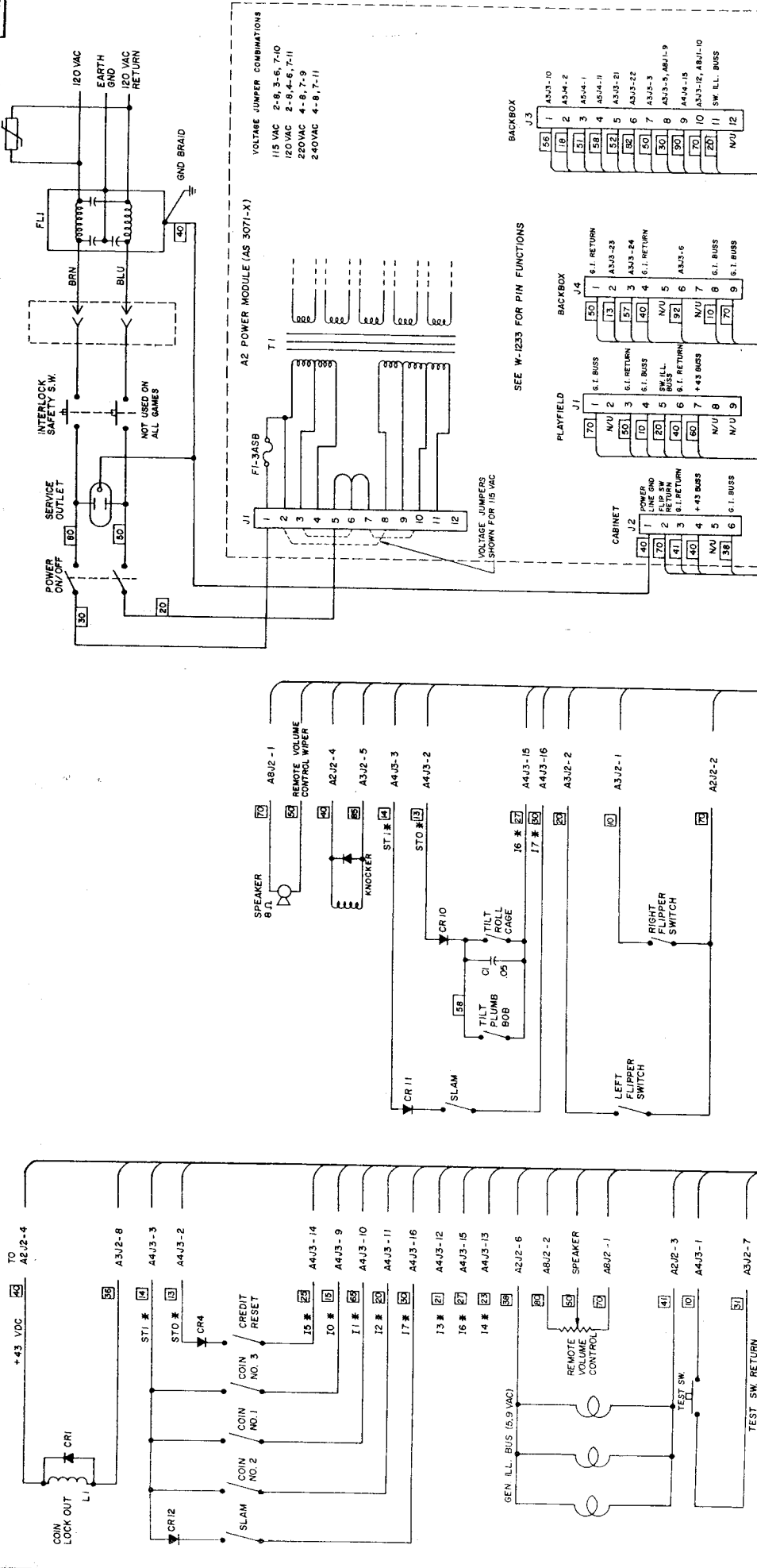
AS-2518-58 DISPLAY DRIVER MODULE



A1: 7 DIGIT DISPLAY DRIVER MODULE

COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1			
3	8	R1, R3, R5, R7, R9, R11, R34, R56	P-2948-424 E-105-331	P.C. Board, M-645 546 Resistor, 100K Ω
4	15	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40, R58, R62	E-105-227	Resistor, 300K Ω
5	7	R43, R44, R45, R46, R47, R48, R55	E-105-228	Resistor, 9.1K Ω
6	9	R13, R15, R17, R19, R21, R23, R25, R61, R60	E-105-229	Resistor, 1.5K Ω
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-222	Resistor, 1.2K Ω
8	1	R41	E-105-231	Resistor, 39K Ω
9	1	R42	E-105-271	Resistor, 240K Ω
10	1	R63	E-105-248	Resistor, 150K Ω
11	1	C2	E-586-65	Capacitor, .01 MFD, 500V
13	7	Q7, Q8, Q9, Q10, Q11, Q12, Q21	E-585-32	Transistor (2N5401)
14	15	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q22	E-585-33	Transistor (MPS-A42)
15	2	CR1-2	E-587-14	Diode (IN4148)
16	1	VR1	E-598-7	Zener Diode, 110V (IN3045A)
17	1	U1	E-620-38	I.C. Decoder (MC14543)
18				
19	2	J1	E-736-10	10 Pin Wafer Pin Connector (KK-156)
21	1	DS1	E-680-7	7 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)
25	3	TP1-3	P-5399	Test Clip
26	7	R2, R4, R6, R8, R10, R12, R57	E-105-287	Resistor, 2.2K Ω
27	6	R49, R50, R51, R52, R53, R54	E-105-242	Resistor, 20K Ω
28				
29	1	C1	E-586-85	Capacitor, .01 MFD, 25V



NOTES: (CAUTION)
 1. USE BALLY PART NO. E-713 FOR 115-120 VAC.
 2. USE BALLY PART NO. E-713-1 FOR 220-240 VAC.
 3. * INDICATES AID TEST POINT.

WIRING DIAGRAM - CABINET

DATE: 10/1/66
 BY: J. J. J.
 CHECKED: J. J. J.
 APPROVED: J. J. J.

WIRING DIAGRAM - CABINET

DATE: 10/1/66
 BY: J. J. J.
 CHECKED: J. J. J.
 APPROVED: J. J. J.

TO	FROM	TO	FROM
A4J3-9	1	A4J3-3	1
A4J3-10	2	A2J2-4	15
A4J3-11	3	A3J2-8	16
A4J3-12	4	A2J2-6	17
A4J3-13	5	A2J2-3	18
A4J3-14	6	A4J3-1	19
A4J3-15	7	A2J2-7	20
A4J3-16	8	SPEAKER	9
A4J3-2	10	A8J2-1	12
A8J2-2	13		

TO	FROM	TO	FROM
A4J3-9	1	A4J3-3	1
A4J3-10	2	A2J2-4	15
A4J3-11	3	A3J2-8	16
A4J3-12	4	A2J2-6	17
A4J3-13	5	A2J2-3	18
A4J3-14	6	A4J3-1	19
A4J3-15	7	A2J2-7	20
A4J3-16	8	SPEAKER	9
A4J3-2	10	A8J2-1	12
A8J2-2	13		

TO	FROM	TO	FROM
A4J3-9	1	A4J3-3	1
A4J3-10	2	A2J2-4	15
A4J3-11	3	A3J2-8	16
A4J3-12	4	A2J2-6	17
A4J3-13	5	A2J2-3	18
A4J3-14	6	A4J3-1	19
A4J3-15	7	A2J2-7	20
A4J3-16	8	SPEAKER	9
A4J3-2	10	A8J2-1	12
A8J2-2	13		

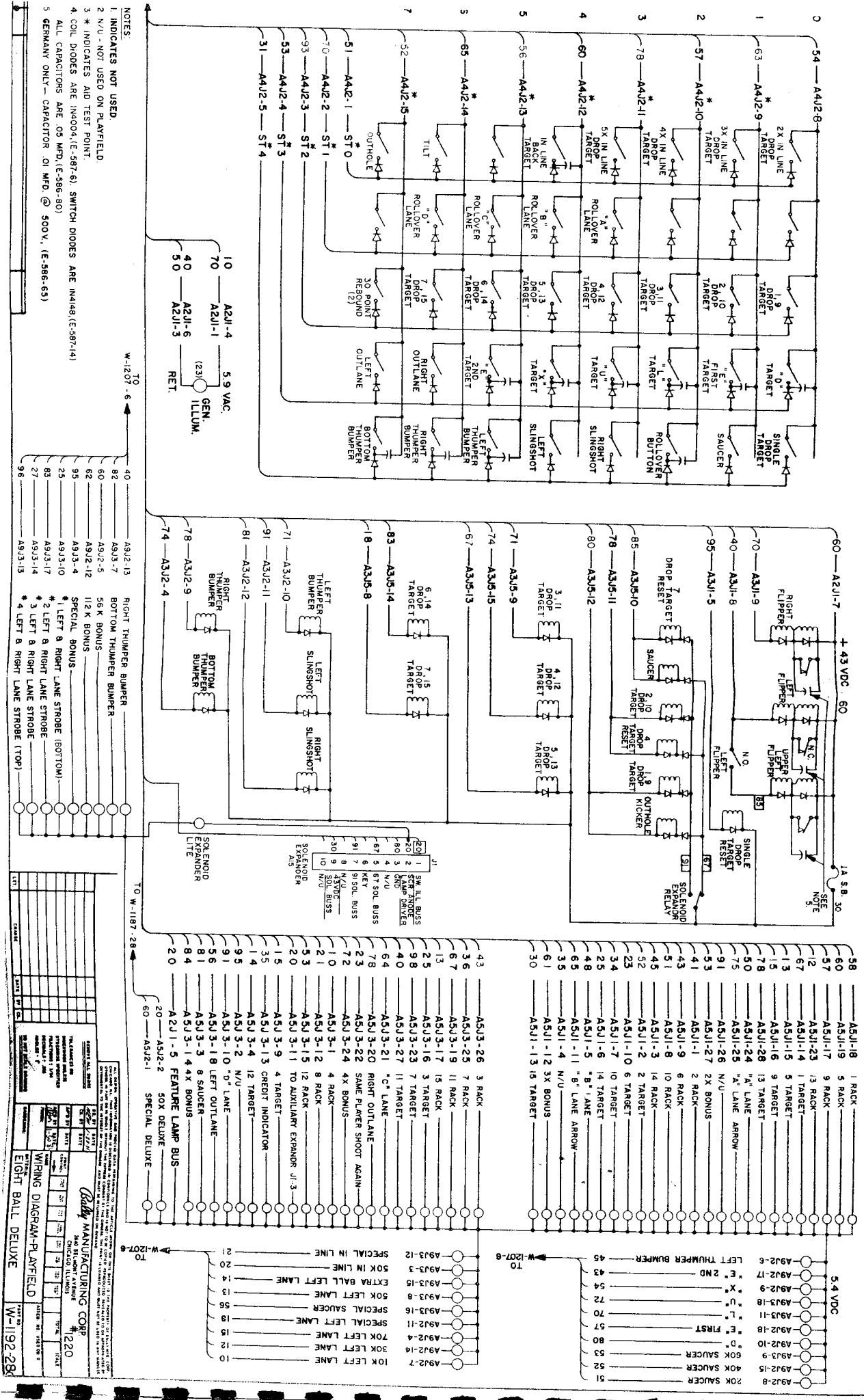


TABLE A

	FROM	PIN	WIRE
A2J3-1	1	20	
A2J3-2	1	2	
A2J4-1	2	1	
A2J4-4	3	40	
A2J4-6	4	10	
A2J5-2	5	97	
A2J5-23	5	97	
A2J5-12	6	23	
A2J5-22	7	62	
A2J5-28	6	70	
A2J5-2	9	60	
A2J5-22	10	20	
A2J5-11	11	95	
A2J5-21	12	47	
A2J5-2	10	35	
A2J5-2	14	91	
A2J5-6	15	85	
A2J5-2	16	98	
A2J5-16	17	34	
A2J4-1	18	50	
A2J4-2	19	70	
A2J4-2	20		
A2J5-12	21		
A2J5-4	22		
A2J5-3	23		
A2J5-3	24	70	

INSERT TO BACK CAB.
PLUG

1

A! INSERT

(PLAYER 1)	(PLAYER 2)	(PLAYER 3)	(PLAYER 4)	CREDIT
1A1	2A1	3A1	4A1	DISLAY
10 - A3J3-8	1	1	1	J1
N/U	2	2	2	2
80 - A4J1-1	3	3	3	3
20 - A4J1-2	4	4	4	4
30 - A4J1-3	5	5	5	5
40 - A4J1-4	6	6	6	6
50 - A4J1-5	7	7	7	7
60 - A4J1-6	8	8	8	8
70 - A4J1-10	9	9	9	9
N/U	10	10	10	10
84	11	11	11	11
80 - A3J3-20	12	12	12	12
KEY	13	13	13	13
84	14	14	14	KEY 14
88 - A4J1-20	15	15	15	15
94 - A4J1-28	16	16	16	16
38 - A4J1-27	17	17	17	17
23 - A4J1-26	18	18	18	18
81 - A4J1-25	19	19	19	19
45 - A3J3-17	20	20	20	20

84
 18
 67
 72
 31

A4J1-21 A4J1-22 A4J1-23 A4J1-24
 ALL2 SEE TABLE 4

SEE
TABLE A

5-AMP DRIVER A5

J4	J3	J2	J1	J0	J-1	J-2	J-3	J-4	J-5	J-6	J-7	J-8	J-9	J-10	J-11	J-12	J-13	J-14	J-15	J-16	J-17	J-18	J-19	J-20	J-21	J-22	J-23	J-24	J-25	J-26	J-27	J-28	J-29	J-30	J-31	J-32	J-33	J-34	J-35	J-36	J-37	J-38	J-39	J-40	J-41	J-42	J-43	J-44	J-45	J-46	J-47	J-48	J-49	J-50	J-51	J-52	J-53	J-54	J-55	J-56	J-57	J-58	J-59	J-60	J-61	J-62	J-63	J-64	J-65	J-66	J-67	J-68	J-69	J-70	J-71	J-72	J-73	J-74	J-75	J-76	J-77	J-78	J-79	J-80	J-81	J-82	J-83	J-84	J-85	J-86	J-87	J-88	J-89	J-90	J-91	J-92	J-93	J-94	J-95	J-96	J-97	J-98	J-99	J-100	J-101	J-102	J-103	J-104	J-105	J-106	J-107	J-108	J-109	J-110	J-111	J-112	J-113	J-114	J-115	J-116	J-117	J-118	J-119	J-120	J-121	J-122	J-123	J-124	J-125	J-126	J-127	J-128	J-129	J-130	J-131	J-132	J-133	J-134	J-135	J-136	J-137	J-138	J-139	J-140	J-141	J-142	J-143	J-144	J-145	J-146	J-147	J-148	J-149	J-150	J-151	J-152	J-153	J-154	J-155	J-156	J-157	J-158	J-159	J-160	J-161	J-162	J-163	J-164	J-165	J-166	J-167	J-168	J-169	J-170	J-171	J-172	J-173	J-174	J-175	J-176	J-177	J-178	J-179	J-180	J-181	J-182	J-183	J-184	J-185	J-186	J-187	J-188	J-189	J-190	J-191	J-192	J-193	J-194	J-195	J-196	J-197	J-198	J-199	J-200	J-201	J-202	J-203	J-204	J-205	J-206	J-207	J-208	J-209	J-210	J-211	J-212	J-213	J-214	J-215	J-216	J-217	J-218	J-219	J-220	J-221	J-222	J-223	J-224	J-225	J-226	J-227	J-228	J-229	J-230	J-231	J-232	J-233	J-234	J-235	J-236	J-237	J-238	J-239	J-240	J-241	J-242	J-243	J-244	J-245	J-246	J-247	J-248	J-249	J-250	J-251	J-252	J-253	J-254	J-255	J-256	J-257	J-258	J-259	J-260	J-261	J-262	J-263	J-264	J-265	J-266	J-267	J-268	J-269	J-270	J-271	J-272	J-273	J-274	J-275	J-276	J-277	J-278	J-279	J-280	J-281	J-282	J-283	J-284	J-285	J-286	J-287	J-288	J-289	J-290	J-291	J-292	J-293	J-294	J-295	J-296	J-297	J-298	J-299	J-300	J-301	J-302	J-303	J-304	J-305	J-306	J-307	J-308	J-309	J-310	J-311	J-312	J-313	J-314	J-315	J-316	J-317	J-318	J-319	J-320	J-321	J-322	J-323	J-324	J-325	J-326	J-327	J-328	J-329	J-330	J-331	J-332	J-333	J-334	J-335	J-336	J-337	J-338	J-339	J-340	J-341	J-342	J-343	J-344	J-345	J-346	J-347	J-348	J-349	J-350	J-351	J-352	J-353	J-354	J-355	J-356	J-357	J-358	J-359	J-360	J-361	J-362	J-363	J-364	J-365	J-366	J-367	J-368	J-369	J-370	J-371	J-372	J-373	J-374	J-375	J-376	J-377	J-378	J-379	J-380	J-381	J-382	J-383	J-384	J-385	J-386	J-387	J-388	J-389	J-390	J-391	J-392	J-393	J-394	J-395	J-396	J-397	J-398	J-399	J-400	J-401	J-402	J-403	J-404	J-405	J-406	J-407	J-408	J-409	J-410	J-411	J-412	J-413	J-414	J-415	J-416	J-417	J-418	J-419	J-420	J-421	J-422	J-423	J-424	J-425	J-426	J-427	J-428	J-429	J-430	J-431	J-432	J-433	J-434	J-435	J-436	J-437	J-438	J-439	J-440	J-441	J-442	J-443	J-444	J-445	J-446	J-447	J-448	J-449	J-450	J-451	J-452	J-453	J-454	J-455	J-456	J-457	J-458	J-459	J-460	J-461	J-462	J-4
----	----	----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	-----	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-----

Diagram illustrating the layout of a rectangular field, divided into three horizontal sections:

- LOWER
- NET
- PLAYFIELD

NOTE:

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.

MPU A4

[illegible]

2

31	Q40
32	A401-18

WINE 40

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

VOLTAGE REGULATOR / SOLENOID DRIVER A3

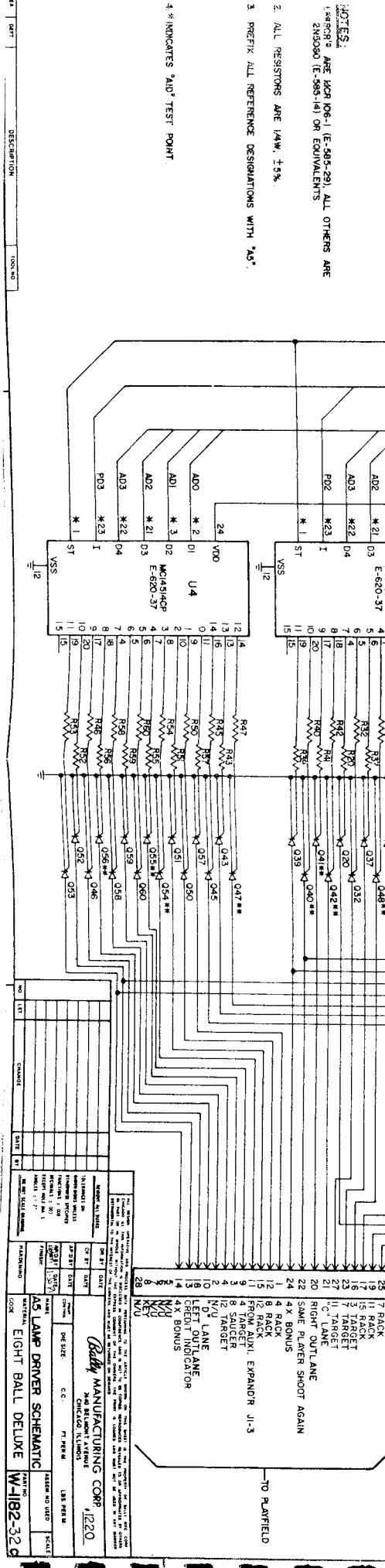
J4	J3	J2	J1	J5	TO
1 N/U	1 N/U	10 2 R FLIP SW	1 N/U	1 N/U	
2 KEY	2 KEY	20 3 R FLIP SW	2 N/U	2 N/U	
3 REJ-4-1	30 4 A23-7	30 4 KEY	3 N/U	3 N/U	
4 A4-4-1	40 5 A23-8	40 5 Bottom Thum.B.	4 N/U	4 N/U	
5 A4-4-3	50 6 A23-8	50 6 Bottom Thum.B.	5 N/U	5 N/U	
6 A4-4-4	60 7 A23-8	60 7 NOCKER	6 N/U	6 N/U	
7 A4-4-4	70 8 A23-8	70 8 NOCKER	7 N/U	7 N/U	
8 A4-4-4	80 9 A23-8	80 9 NOCKER	8 N/U	8 N/U	
9 A4-4-7	90 10 A23-8	90 10 NOCKER	9 N/U	9 N/U	
10 A4-4-7	100 11 A23-8	100 11 NOCKER	10 N/U	10 N/U	
11 A4-4-8	110 12 A23-8	110 12 NOCKER	11 N/U	11 N/U	
12 A4-4-8	120 13 A23-8	120 13 NOCKER	12 N/U	12 N/U	
13 A4-4-8	130 14 A23-8	130 14 NOCKER	13 N/U	13 N/U	
14 A4-4-8	140 15 A23-8	140 15 NOCKER	14 N/U	14 N/U	
15 A4-4-8	150 16 A23-8	150 16 NOCKER	15 N/U	15 N/U	
16 A4-4-8	160 17 A23-8	160 17 NOCKER	16 N/U	16 N/U	
17 A4-4-8	170 18 A23-8	170 18 NOCKER	17 N/U	17 N/U	
18 A4-4-8	180 19 A23-8	180 19 NOCKER	18 N/U	18 N/U	
19 A4-4-8	190 20 A23-8	190 20 NOCKER	19 N/U	19 N/U	
20 A4-4-8	200 21 A23-8	200 21 NOCKER	20 N/U	20 N/U	
21 A4-4-8	210 22 A23-8	210 22 NOCKER	21 N/U	21 N/U	
22 A4-4-8	220 23 A23-8	220 23 NOCKER	22 N/U	22 N/U	
23 A4-4-8	230 24 A23-8	230 24 NOCKER	23 N/U	23 N/U	
24 A4-4-8	240 25 A23-8	240 25 NOCKER	24 N/U	24 N/U	
25 A4-4-8	250 26 A23-8	250 26 NOCKER	25 N/U	25 N/U	
26 A4-4-8	260 27 A23-8	260 27 NOCKER	26 N/U	26 N/U	
27 A4-4-8	270 28 A23-8	270 28 NOCKER	27 N/U	27 N/U	
28 A4-4-8	280 29 A23-8	280 29 NOCKER	28 N/U	28 N/U	
29 A4-4-8	290 30 A23-8	290 30 NOCKER	29 N/U	29 N/U	
30 A4-4-8	300 31 A23-8	300 31 NOCKER	30 N/U	30 N/U	
31 A4-4-8	310 32 A23-8	310 32 NOCKER	31 N/U	31 N/U	
32 A4-4-8	320 33 A23-8	320 33 NOCKER	32 N/U	32 N/U	
33 A4-4-8	330 34 A23-8	330 34 NOCKER	33 N/U	33 N/U	
34 A4-4-8	340 35 A23-8	340 35 NOCKER	34 N/U	34 N/U	
35 A4-4-8	350 36 A23-8	350 36 NOCKER	35 N/U	35 N/U	
36 A4-4-8	360 37 A23-8	360 37 NOCKER	36 N/U	36 N/U	
37 A4-4-8	370 38 A23-8	370 38 NOCKER	37 N/U	37 N/U	
38 A4-4-8	380 39 A23-8	380 39 NOCKER	38 N/U	38 N/U	
39 A4-4-8	390 40 A23-8	390 40 NOCKER	39 N/U	39 N/U	
40 A4-4-8	400 41 A23-8	400 41 NOCKER	40 N/U	40 N/U	
41 A4-4-8	410 42 A23-8	410 42 NOCKER	41 N/U	41 N/U	
42 A4-4-8	420 43 A23-8	420 43 NOCKER	42 N/U	42 N/U	
43 A4-4-8	430 44 A23-8	430 44 NOCKER	43 N/U	43 N/U	
44 A4-4-8	440 45 A23-8	440 45 NOCKER	44 N/U	44 N/U	
45 A4-4-8	450 46 A23-8	450 46 NOCKER	45 N/U	45 N/U	
46 A4-4-8	460 47 A23-8	460 47 NOCKER	46 N/U	46 N/U	
47 A4-4-8	470 48 A23-8	470 48 NOCKER	47 N/U	47 N/U	
48 A4-4-8	480 49 A23-8	480 49 NOCKER	48 N/U	48 N/U	
49 A4-4-8	490 50 A23-8	490 50 NOCKER	49 N/U	49 N/U	
50 A4-4-8	500 51 A23-8	500 51 NOCKER	50 N/U	50 N/U	
51 A4-4-8	510 52 A23-8	510 52 NOCKER	51 N/U	51 N/U	
52 A4-4-8	520 53 A23-8	520 53 NOCKER	52 N/U	52 N/U	
53 A4-4-8	530 54 A23-8	530 54 NOCKER	53 N/U	53 N/U	
54 A4-4-8	540 55 A				

4. The State District Court has granted summary judgment in favor of the defendant, and the court has awarded the defendant costs and attorney's fees. The court has also awarded the defendant interest on the judgment from the date of the judgment until the date of payment. The court has also awarded the defendant interest on the judgment from the date of the judgment until the date of payment. The court has also awarded the defendant interest on the judgment from the date of the judgment until the date of payment.

- [illegible]

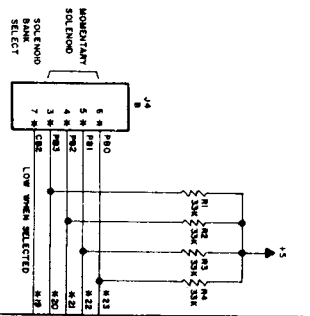
UNITED STATES GOVERNMENT

WINNING DIAGRAM - BACK BOX



4. ⁵⁸ INDICATES "AID" TEST POINT

[illegible]



NOTES:

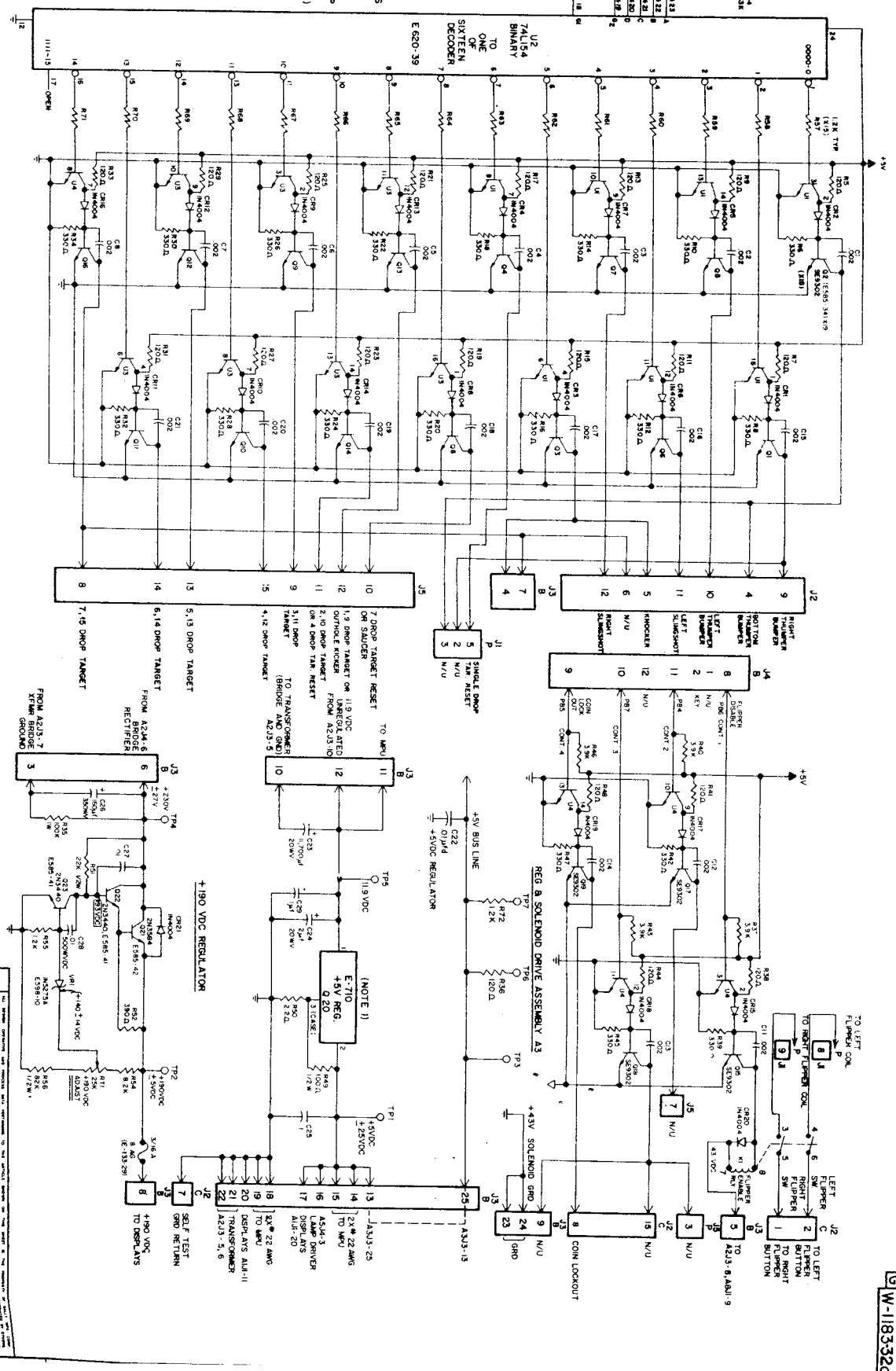
1. E-100 NATIONAL 1-1323X
FARCOLL 7B1053C
2. J1-KK156-5 PIN KEY PN 7
J2-KK156-25 PIN KEY PN 5
J3-KK156-25 PIN KEY PN 2
J4-KK156-25 PIN KEY PN 2
J5-KK156-15 PIN KEY PN 6
3. PREFIX ALL REFERENCE DESIGNATIONS
WITH "A3"
4. "U1" "A3" 3 PINS 5 AND 15 ARE
GROUNDING
5. VOLTAGES SHOWN ARE FOR A GAME "UP"
6. "U1" "U3" AND "U4" ARE CA 350A1 (E8B)
7. * INDICATES AID TEST POINT.

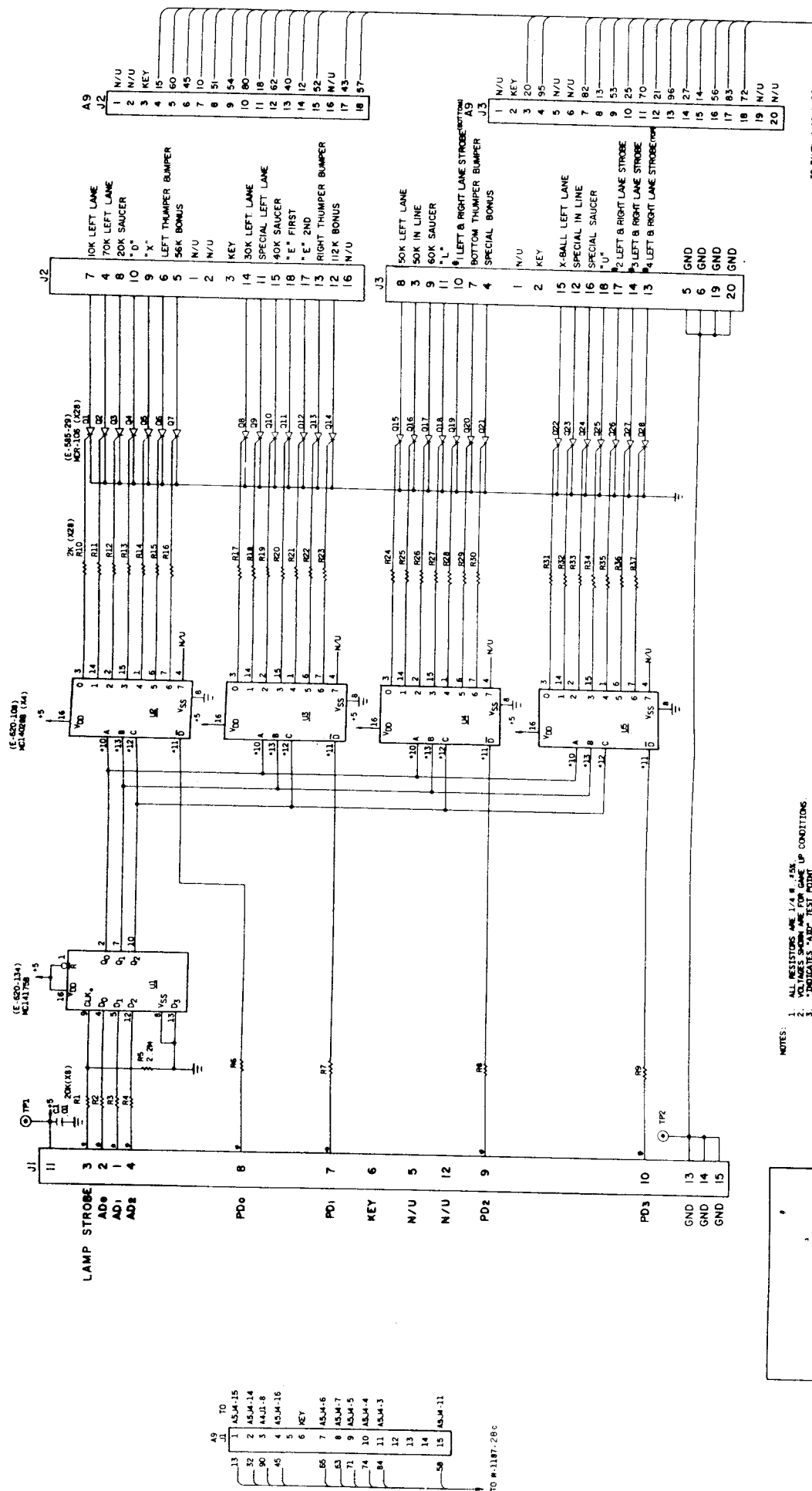
CONNECTOR CODE

C-----ROUTE TO CABINE 1 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	
VRI	

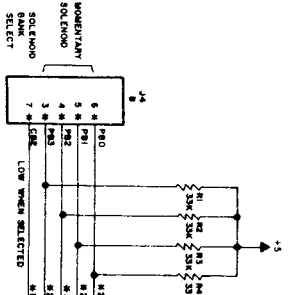
[illegible][illegible]



NOTES:

1. ALL RESISTORS ARE 1/4 W .25K.
2. VOLTAGES SHOWN ARE FOR GATE UP CONDITIONS.
3. *INDICATES "AIP" TEST POINT.
4. SOPS ARE NON-LOG-1. (E-SUB 29).
5. PREFIX ALL REFERENCE DESIGNATIONS WITH "AIP".

[illegible]



- NOTES:**

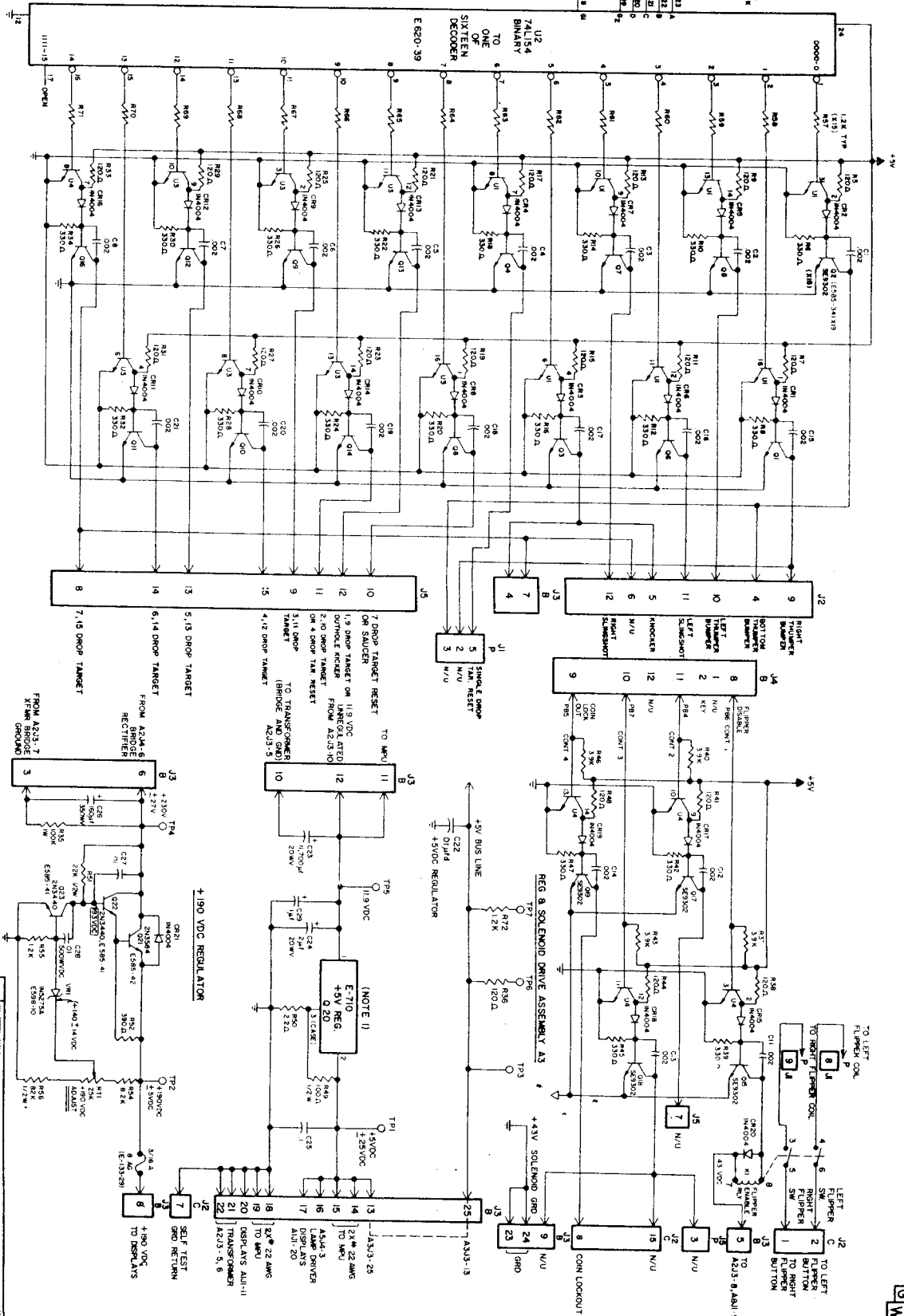
1. E-7LO, LAMBDA, LMS 1405
NATIONAL, LM323X
PARACHUT, TROUSING
2. JK-KRIS-6, P-NM KEY, PIN 3
J-2 KRIS-6, P-NM KEY, PIN 3
J-3 KRIS-6, P-NM KEY, PIN 2
J-4 KRIS-6, P-NM KEY, PIN 2
J-5 KRIS-6, P-NM KEY, PIN 6
3. PREFIX, ALL REFERENCE DESIGNATIONS
WITH "A3"
4. "U", "U*", "U**" PLUS 5 AND 15 ARE
GROUNDING
5. VOLTAGES SHOWN ARE FOR A GAME, UP
ON CONDITION
6. "U", "U*" AND "U*" ARE CA-500B (E881)
7. * INDICATES ALT TEST POINT.

CONNECTOR CODE

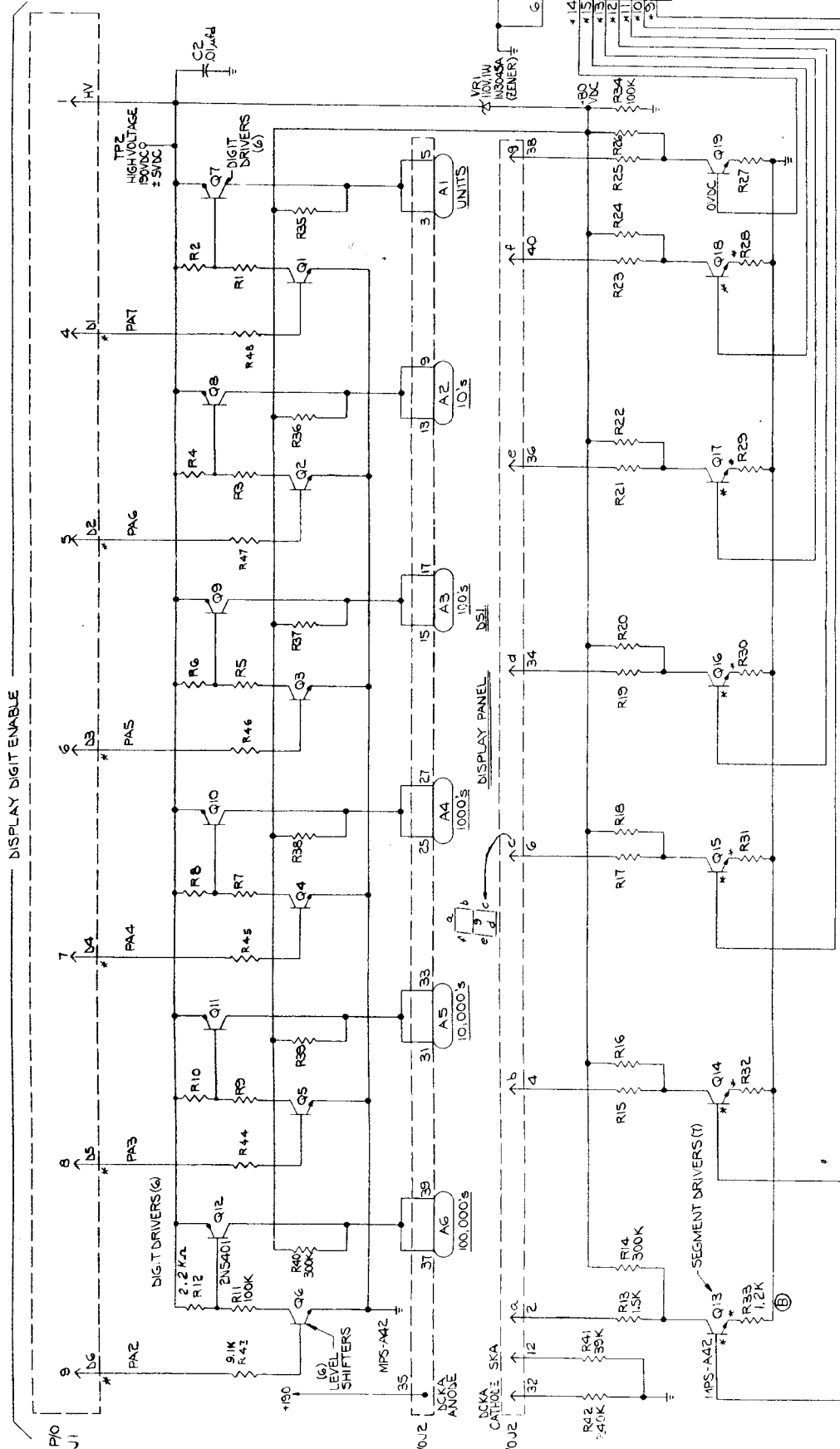
C——→ ROUTE TO CABINET CONN
B——→ ROUTE TO BACK BOX CONN
P——→ ROUTE TO PLAYFIELD CONN

LAST NUMBER USED

H/2	N/U C9,C10
C29	N/U Q20
Q23	
CR21	
VR1	

[illegible]

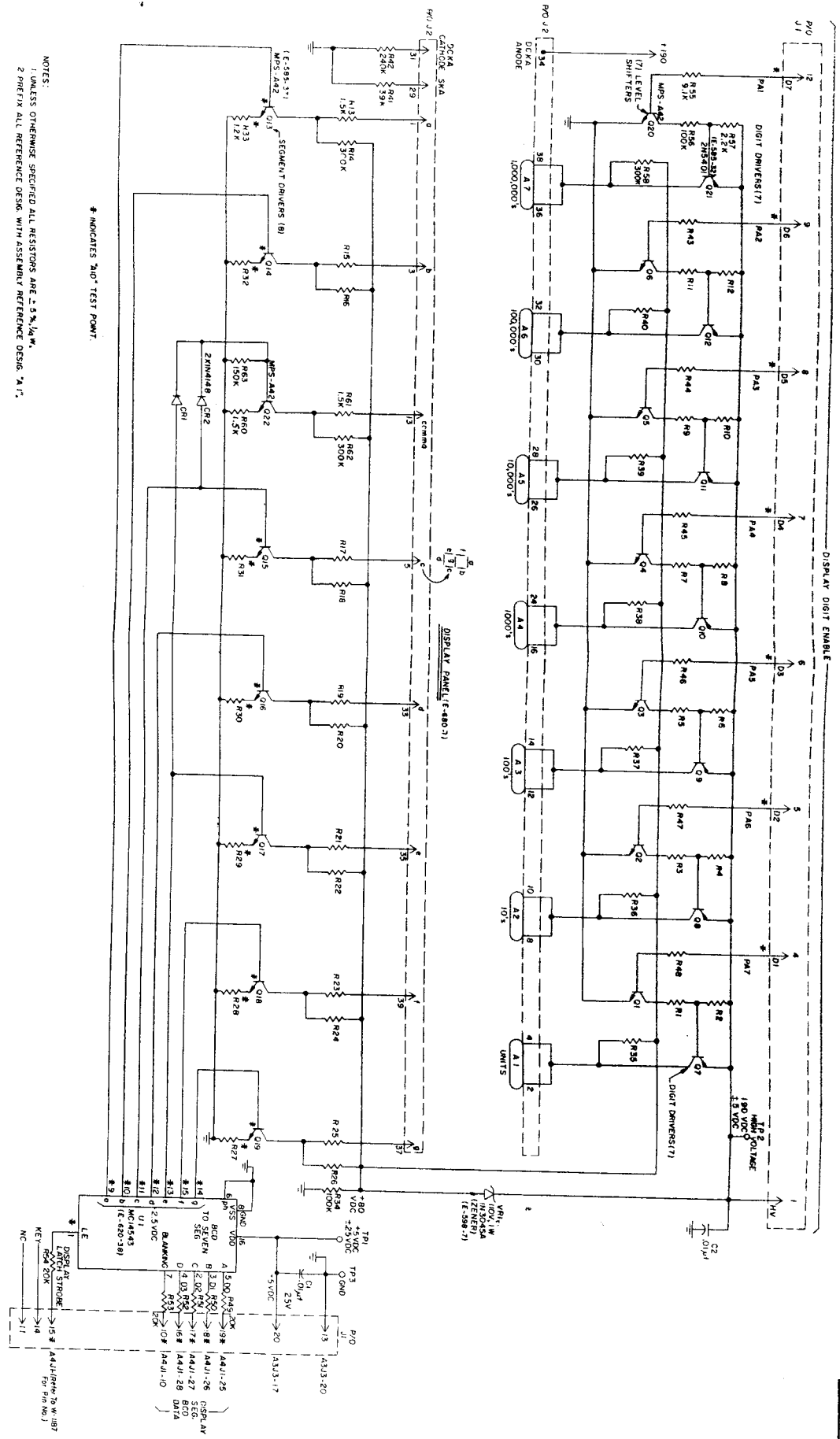
DISPLAY DIGIT ENABLE



NOTES:

- UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE $\pm 5\%$ 1/4W.
R. PREFIX ALL REFERENCE DESIG. WITH ASSEMBLY REFERENCE DESIG. "A"
* INDICATES 'AID' TEST POINT.

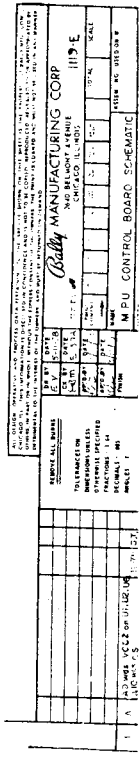
OPER.	DEPT.	DESCRIPTION	TOOL No.
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			



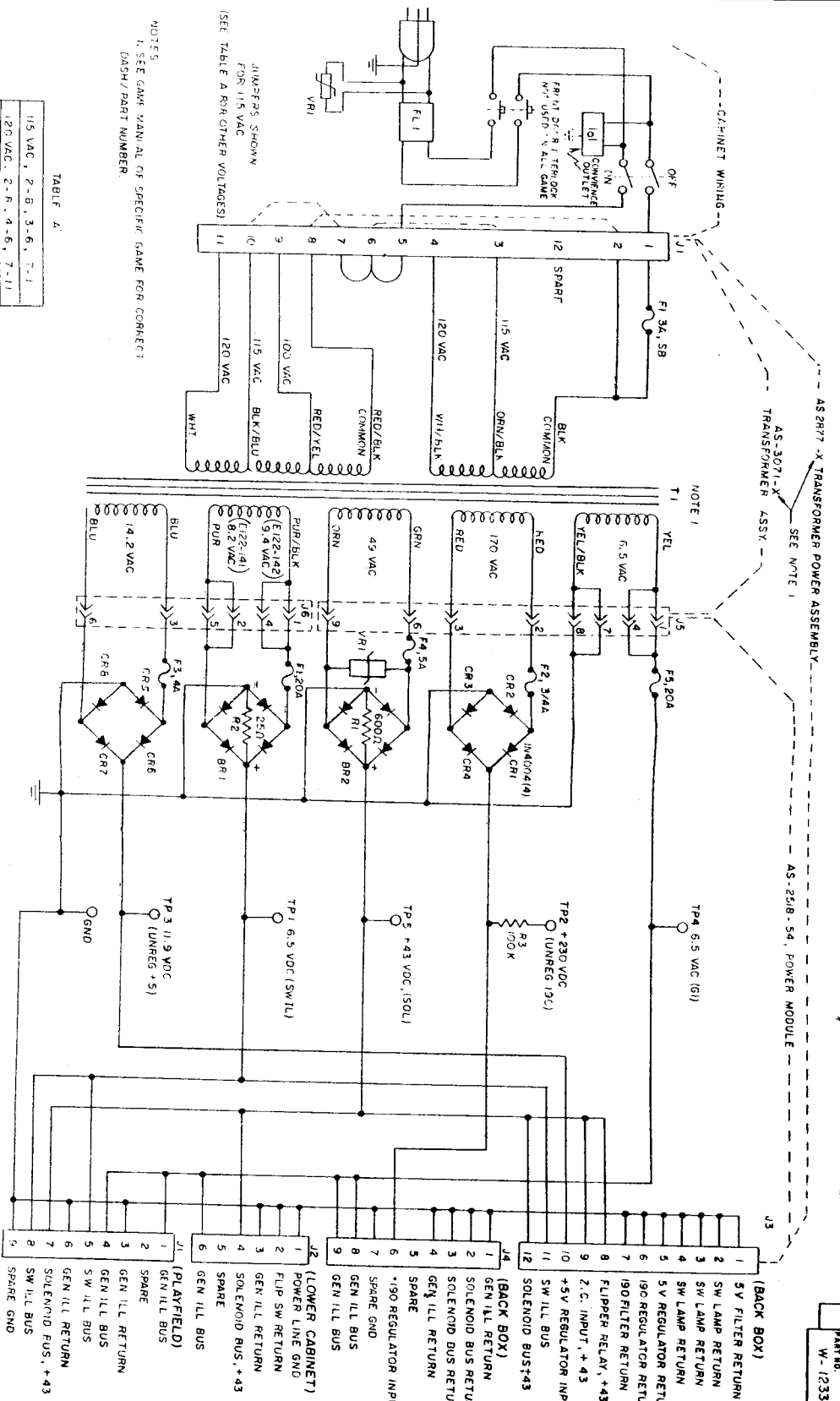
NOTES:
1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE $\pm 5\%$ $\frac{1}{4}$ W.
2. PREFIX ALL REFERENCE DESIG. WITH ASSEMBLY REFERENCE DESIG. 'A'.

* INDICATES 240° TEST POINT.

ITEM NO.		DESCRIPTION		ITEM NO.	
1184-2C		7-DIGIT DISPLAY BOARD SCHEMATIC		1184-2C	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	
11/18/52		11/18/52		11/18/52	
DESIGNED BY		DRAWN BY		TESTED BY	
11/18/52		11/18/52		11/18/52	
ASSEMBLED BY		INSPECTED BY		DATE	
11/18/52		11/18/52		11/18/52	
DATE		BY		DATE	
11/18/52		W. H. B. S. C.		11/18/52	
CHECKED		APPROVED		DATE	



- NOTES
1. * INDICATES "AID" TEST POINT
 2. REMOVE A3,4 BEFORE USING AS AID 15,51 POINT
 3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A4"
 4. EXACT CHIP COMPONENT USED IN SOCKETS IN THRU US. CAN VARY FOR DIFFERENT GAMES AND PRODUCTION LOTS. TABLES OF MEMORY CHIPS AND CORRESPONDING JUMPER PINS FOR DIFFERENT GAMES AVAILABLE FROM BALLY FIRE SERVICE DEPARTMENT

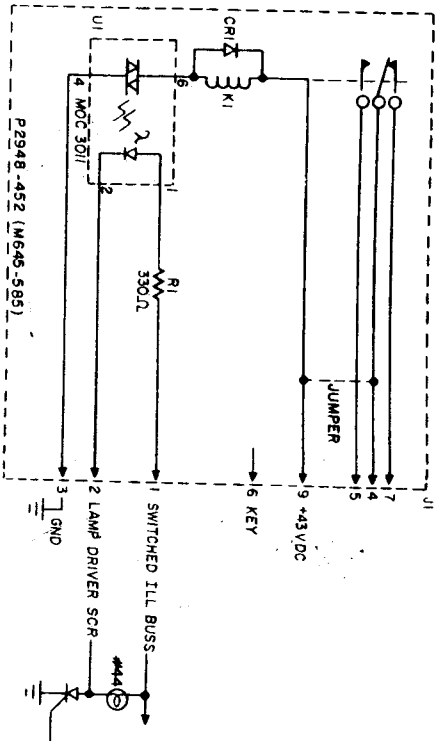


115 VAC, 2-8, 3-6, 7-1
120 VAC, 2-8, 4-6, 7-11
220 VAC, 4-8, 7-9
240 VAC, 4-8, 7-11

NOTES

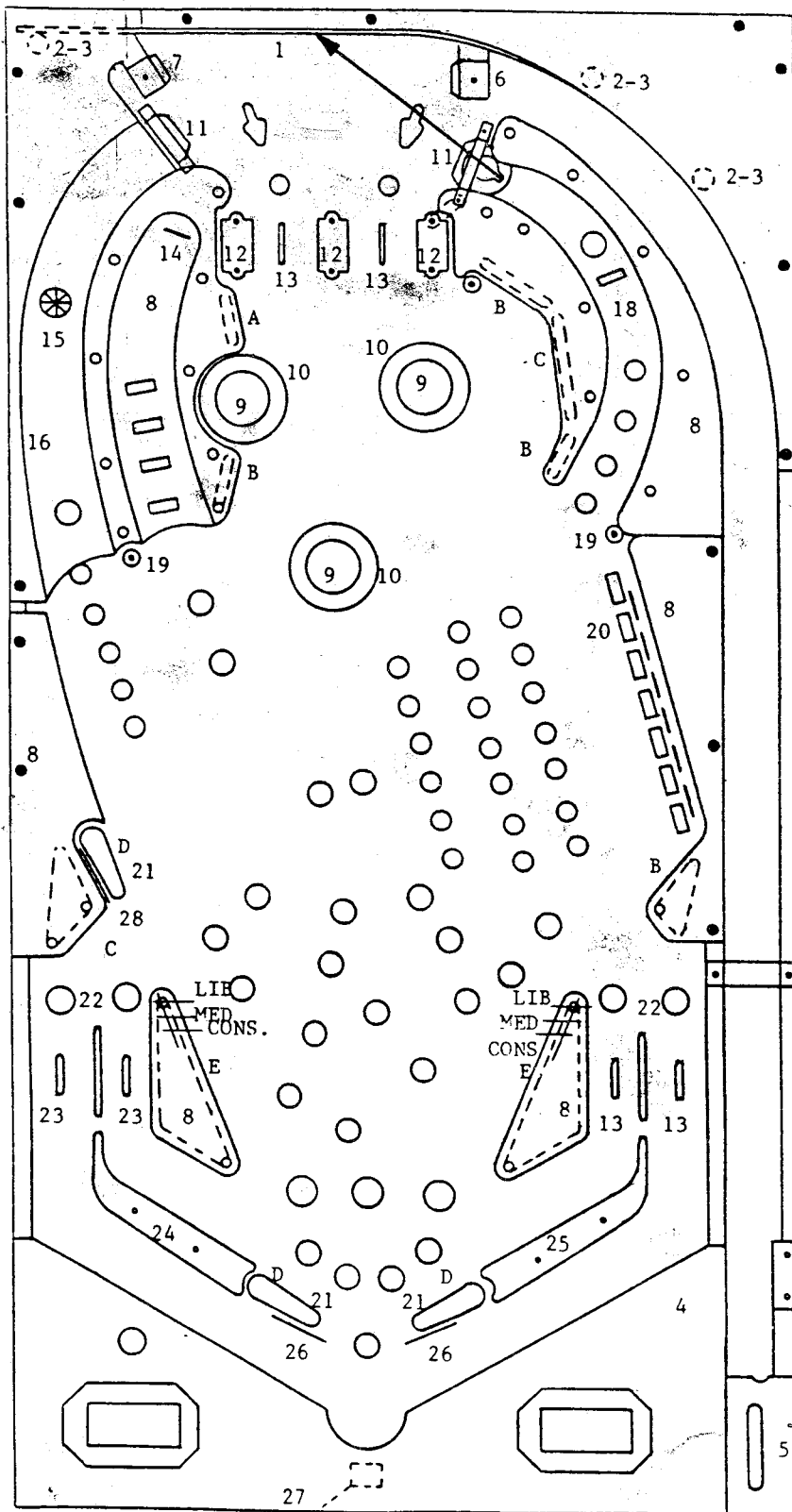
1. SEE GAME MANUAL OF SPECIFIC GAME FOR CORRECT DASH/PART NUMBER.

[illegible]



ORDER	DEPT.	DESCRIPTION	TOOL NO.	NO.	LT.	CHANGE	DATE	BY

ALL INQUIRY, ORDERING AND RECEIPT DATA PERTAINING TO THIS ORDER, SPECIMEN OR THIS SHEET IS THE PROPERTY OF BALLY MFG. CORP. CANCELLATION OF THIS ORDER OR RETURN OF THIS SHEET TO THE ORDERING OFFICE WITHOUT THE WRITTEN CONSENT OF THE COMPANY, THE FIRM IS OBLIGED AND MUST NOT BE MADE IN ANY MANNER. RETURN TO THE COMPANY FOR CANCELLATION.	
RETURN ALL ORDERS	
INSTRUCTIONS ON DIMENSIONS (UNLESS OTHERWISE SPECIFIED) FINISHES: 1. 00A 2. 00B 3. 00C 4. 00D 5. 00E 6. 00F 7. 00G 8. 00H 9. 00I 10. 00J 11. 00K 12. 00L 13. 00M 14. 00N 15. 00O 16. 00P 17. 00Q 18. 00R 19. 00S 20. 00T 21. 00U 22. 00V 23. 00W 24. 00X 25. 00Y 26. 00Z 27. 00A 28. 00B 29. 00C 30. 00D 31. 00E 32. 00F 33. 00G 34. 00H 35. 00I 36. 00J 37. 00K 38. 00L 39. 00M 40. 00N 41. 00O 42. 00P 43. 00Q 44. 00R 45. 00S 46. 00T 47. 00U 48. 00V 49. 00W 50. 00X 51. 00Y 52. 00Z 53. 00A 54. 00B 55. 00C 56. 00D 57. 00E 58. 00F 59. 00G 60. 00H 61. 00I 62. 00J 63. 00K 64. 00L 65. 00M 66. 00N 67. 00O 68. 00P 69. 00Q 70. 00R 71. 00S 72. 00T 73. 00U 74. 00V 75. 00W 76. 00X 77. 00Y 78. 00Z 79. 00A 80. 00B 81. 00C 82. 00D 83. 00E 84. 00F 85. 00G 86. 00H 87. 00I 88. 00J 89. 00K 90. 00L 91. 00M 92. 00N 93. 00O 94. 00P 95. 00Q 96. 00R 97. 00S 98. 00T 99. 00U 100. 00V 101. 00W 102. 00X 103. 00Y 104. 00Z 105. 00A 106. 00B 107. 00C 108. 00D 109. 00E 110. 00F 111. 00G 112. 00H 113. 00I 114. 00J 115. 00K 116. 00L 117. 00M 118. 00N 119. 00O 120. 00P 121. 00Q 122. 00R 123. 00S 124. 00T 125. 00U 126. 00V 127. 00W 128. 00X 129. 00Y 130. 00Z 131. 00A 132. 00B 133. 00C 134. 00D 135. 00E 136. 00F 137. 00G 138. 00H 139. 00I 140. 00J 141. 00K 142. 00L 143. 00M 144. 00N 145. 00O 146. 00P 147. 00Q 148. 00R 149. 00S 150. 00T 151. 00U 152. 00V 153. 00W 154. 00X 155. 00Y 156. 00Z 157. 00A 158. 00B 159. 00C 160. 00D 161. 00E 162. 00F 163. 00G 164. 00H 165. 00I 166. 00J 167. 00K 168. 00L 169. 00M 170. 00N 171. 00O 172. 00P 173. 00Q 174. 00R 175. 00S 176. 00T 177. 00U 178. 00V 179. 00W 180. 00X 181. 00Y 182. 00Z 183. 00A 184. 00B 185. 00C 186. 00D 187. 00E 188. 00F 189. 00G 190. 00H 191. 00I 192. 00J 193. 00K 194. 00L 195. 00M 196. 00N 197. 00O 198. 00P 199. 00Q 200. 00R 201. 00S 202. 00T 203. 00U 204. 00V 205. 00W 206. 00X 207. 00Y 208. 00Z 209. 00A 210. 00B 211. 00C 212. 00D 213. 00E 214. 00F 215. 00G 216. 00H 217. 00I 218. 00J 219. 00K 220. 00L 221. 00M 222. 00N 223. 00O 224. 00P 225. 00Q 226. 00R 227. 00S 228. 00T 229. 00U 230. 00V 231. 00W 232. 00X 233. 00Y 234. 00Z 235. 00A 236. 00B 237. 00C 238. 00D 239. 00E 240. 00F 241. 00G 242. 00H 243. 00I 244. 00J 245. 00K 246. 00L 247. 00M 248. 00N 249. 00O 250. 00P 251. 00Q 252. 00R 253. 00S 254. 00T 255. 00U 256. 00V 257. 00W 258. 00X 259. 00Y 260. 00Z 261. 00A 262. 00B 263. 00C 264. 00D 265. 00E 266. 00F 267. 00G 268. 00H 269. 00I 270. 00J 271. 00K 272. 00L 273. 00M 274. 00N 275. 00O 276. 00P 277. 00Q 278. 00R 279. 00S 280. 00T 281. 00U 282. 00V 283. 00W 284. 00X 285. 00Y 286. 00Z 287. 00A 288. 00B 289. 00C 290. 00D 291. 00E 292. 00F 293. 00G 294. 00H 295. 00I 296. 00J 297. 00K 298. 00	



VECTOR DRAWING FOR
EIGHT BALL DELUXE
EJECT SAUCER

TO BE KICKED ON BALL ROD
APPROXIMATELY CENTER OF PLAYFIELD.

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.

