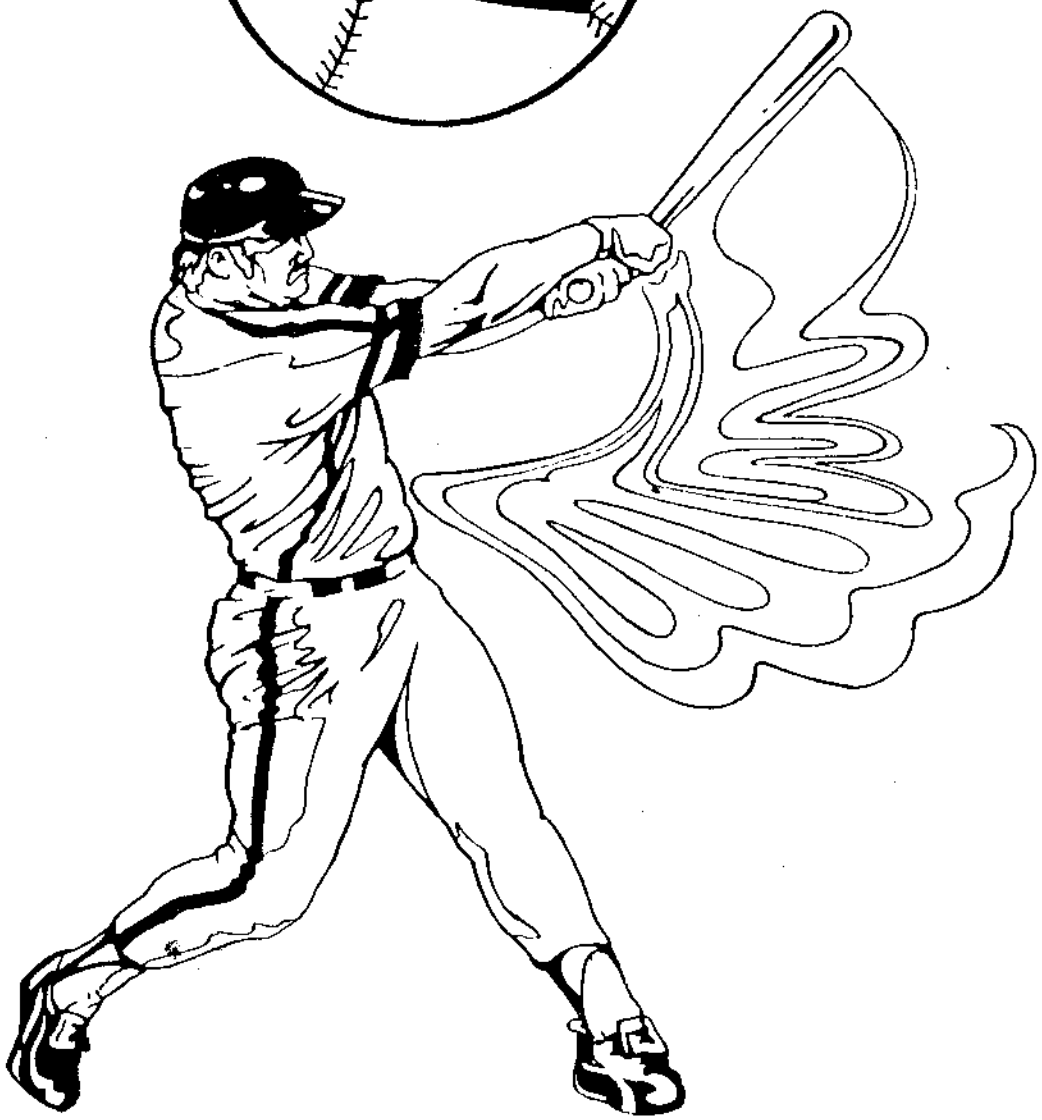
GAME 1311
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GRAND SLAM



Bally MIDWAY MFG. CO.

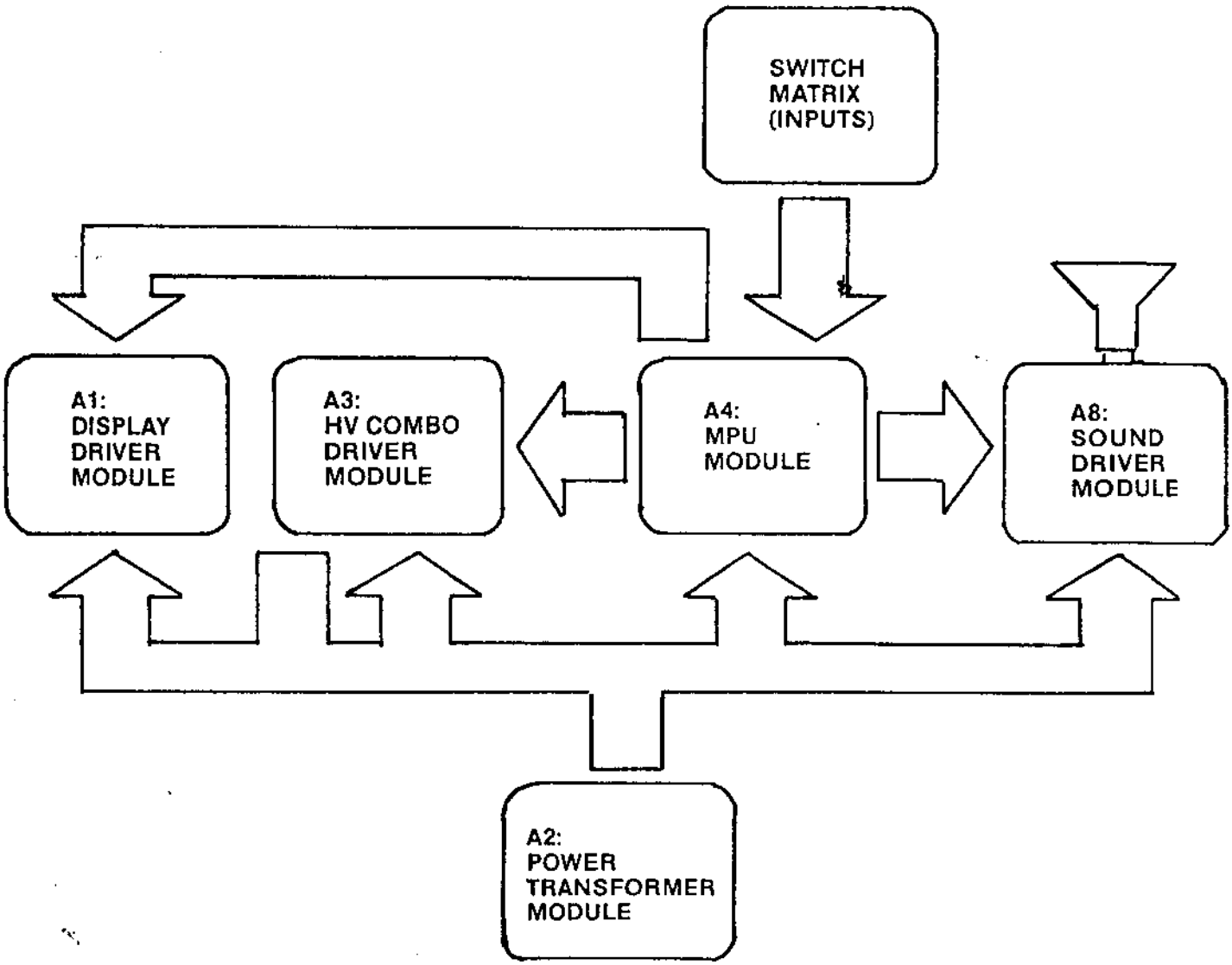
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Installation and General Game Operation Instructions

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

TRANSFORMER CONNECTION INSTRUCTIONS

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

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

PART OF POWER--TRANSFORMER MODULE A2, LOCATED IN LOWER CABINET

II. GENERAL GAME OPERATION

Place ball into playfield by outhole.

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

Extra balls won during the course of the game are added immediately to the player's regular balls.

When the ball enters the outhole, the bonus score is added to the total score. The outhole kicker serves the ball to the shooter alley and play is resumed. The next player up is lit up and the ball to play is shown until a score is made, at which time the ball to play steps down 1 ball for that player. 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.

Scoring over 1,999,990 gives "High Score to Date" award.

At the end of the game, a 'High Score to Date' is alternately flashed with 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 (Payed & 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.

GRAND SLAM #1311

Feature Operations & Scoring

H-O-M-E-R FLY-AWAY TARGETS FEATURE:

Each target scores 3000 points if hit in sequence, 1000 points if hit out of sequence. All target lites flash when reset.

1) OUT-OF-SEQUENCE: The lites stop flashing. When all of the targets are latched, a Home Run is scored on the center base path feature and registered on the total runs readout. (A Home Run will score any runner ahead of it).
2) IN-SEQUENCE: The lites remain flashing. When all of the targets are latched a Grand Slam Homer is scored on the center base path feature and registered on the total runs readout (all of the bases become filled and 4 runs are scored). Also 5000 points or the lit HOMER SEQUENCE VALUE is scored and advanced to the next value.

F.D.S #7 controls the initial HOMER SEQUENCE VALUE
ON: start of 25K OFF: start at 5K

F.D.S. #16 recalls the HOMER SEQUENCE VALUE
ON: In memory OFF: Reset ball-to-ball

F.D.S. #14 controls the number of *Specials* on the HOMER SEQUENCE VALUE
ON: Unlimited number of *Specials* (50K-SPL-50K-SPL-ETC).
OFF: Only 1 *Special* per game (reverts back to 50K).

F.D.S. #15 controls the number of EXTRA BALLS on the HOMER SEQUENCE VALUE
ON: Unlimited number of EXTRA BALLS possible. OFF: Only 1 EXTRA BALL per game.

TOP "GRAND SLAM HOMER" LANES

Each lane scores 3000 points & lites its respective lane lite. When all 3 lanes are lit, a Grand Slam Homer is scored on the center base path feature and registered on the total runs readout (all of the bases become filled regardless of bases previously empty and 4 runs are scored).

The right flipper cabinet button operates the lane change feature. The Grand Slam Homer lane lites are in memory.

TOP SAUCER "H-O-M-E-R" FEATURE:

The game starts with the "H" lit. The saucer scores 2000 points for each lit letter and advances one letter. When the last lite is lit (strobing) a Home Run is scored on the center base path feature and registered on the total runs readout. (A Home Run also scores any runner on a base ahead of it.)

The top saucer "H-O-M-E-R" lites are in memory.

"SINGLE" SCORING GATE & "DOUBLE" ROLLOVER LANE FEATURES:

The "Single" scoring gate and "Double" roll-over lane score 1000 points each. When lit, each feature advances a runner to its proper base: (1st base for a single, 2nd base for a double).

A single or double will advance any runner on a base ahead of it.

F.D.S. #6 controls the "SINGLE" & "DOUBLE" lites.
ON: both lites always ON OFF: lites alternate

"T-R-I-P-L-E" TARGETS FEATURE:

The game starts with the "T" lit. Each target scores 1000 points when lit or 100 points if not lit. When "T-R-I-P-L-E" is completed, a triple is scored on the center base path feature. (A triple will score any runner on base ahead of it).

The "T-R-I-P-L-E" lites must be hit in sequence and are in memory.

"S-T-E-A-L" TARGETS & LANES FEATURE:

Each target or lane scores 5000 points when lit or 500 points when not lit.

Making "S-T-E-A-L" 1st time = Awards Bonus Multiplier 2X
Making "S-T-E-A-L" 2nd time = Awards Bonus Multiplier 3X
Making "S-T-E-A-L" 3rd time and each additional time = 50X

2X and 3X Bonus Multiplier apply to player's runs collected in the outhole.

"S-T-E-A-L" lites and multipliers and 50K are not in memory.

F.D.S. #24 controls the "S" and "L" lanes
ON: lanes tied together OFF: Not tied together

ADVANCE RUNNER SPINNER FEATURE:

The Spinner scores 100 points. Every 3 consecutive spins, the farthest runner on base advances one base path lite.

If a runner does not reach his next base within one second of the last spinner revolution, he returns back to his previous base.

CENTER BASE PATH FEATURE:

All bases roll-over buttons score 1000 points. Bases flash to show a runner.

THUMPER BUMPERS:

Each thumper bumper scores 100 points.

REBOUNDS (3):

Each rebound switch scores 10 points.

RUNS TO BEAT & CENTER TOTAL RUNS READOUT FEATURE:

Each time a runner reaches home plate, one run is registered on the total runs readout on the backglass. The left two digits register the 1st player's total runs and the right two digits register the 2nd player's total runs. The center two digits display the RUNS-TO-BEAT threshold. Beating this threshold awards a SPECIAL.

F.D.S. #30 controls the points per run collected in the outhole.

ON: 10,000 points per run OFF: 5,000 points per run

F.D.S. #8 advances the RUNS-TO-BEAT threshold

ON: advances by 10 runs when threshold is beat –allows multiple *SPECIALS* per game.

OFF: does not advance—only permits one *SPECIAL* per game.

F.D.S. #21, #22, #23 control the Runs-To-Beat Threshold.

RUNS-TO-BEAT THRESHOLD

RUNS	#21	#22	#23
20	ON	ON	ON
25	OFF	ON	ON
30	ON	OFF	ON
35	OFF	OFF	ON
40	ON	ON	OFF
45	OFF	ON	OFF
50	ON	OFF	OFF
55	OFF	OFF	OFF

SPECIAL REPLAY/X-BALL/NOVELTY MODES

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

Self test position 16	Set to "03" AWARD	Set to "02" AWARD	Set to "01" AWARD
Playfield X-Balls and Specials			
Runs to Beat Special	REPLAY	X-BALL*	50,000
Flyaway Special	REPLAY	X-BALL*	50,000
Flyaway X-Ball	X-BALL	X-BALL**	25,000
Self Test Position 17	Set to "03" AWARD	Set to "02" AWARD	Set to "01" AWARD
Scoring Thresholds	REPLAY	X-BALL**	25,000

(*) 50,000 if same player shoot again is lit.
(**) 25,000 if same player shoot again is lit.

BACK BOX GAME ADJUSTMENTS:

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

GRAND SLAM SWITCH ASSIGNMENT

32, 31 — BALLS PER GAME—SEE PAGE 6
30 — OUTHOLE BONUS SCORE—SEE PAGE 7
29 — NUMBER OF SPECIALS PER GAME—SEE PAGE 7
28 — MATCH FEATURE—SEE PAGE 6
27 — CREDIT DISPLAY—SEE PAGE 6
26, 25 — MAXIMUM CREDITS—SEE PAGE 5
24 — S AND L RETURN LANE LITES—SEE PAGE 7
23, 22, 21 — RUNS TO BEAT—SEE PAGE 7
20, 19, 18, 17 — COIN CHUTE #3—SEE PAGE 5
16 — FLYAWAY VALUE LITES—SEE PAGE 7
15 — EXTRA BALLS PER GAME—SEE PAGE 7
14 — FLYAWAY SPECIAL LITE—SEE PAGE 7
13, 12, 11, 10, 9 — COIN CHUTE #2—SEE PAGE 5
8 — RUNS TO BEAT ADVANCES—SEE PAGE 7
7 — FLYAWAY 25K LITE—SEE PAGE 7
6 — SINGLE AND DOUBLE LITE—SEE PAGE 7
5, 4, 3, 2, 1 — COIN CHUTE #1—SEE PAGE 5

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
OFF	OFF	OFF	OFF	Same as Coin Chute #1 Settings
OFF	OFF	OFF	ON	1/1 Coin
OFF	OFF	ON	OFF	2/1 Coin
OFF	OFF	ON	ON	3/1 Coin
OFF	ON	OFF	OFF	4/1 Coin
OFF	ON	OFF	ON	5/1 Coin
OFF	ON	ON	OFF	6/1 Coin
OFF	ON	ON	ON	7/1 Coin

S20	S19	S18	S17	Credits/Coin
ON	OFF	OFF	OFF	8/1 Coin
ON	OFF	OFF	ON	9/1 Coin
ON	OFF	ON	OFF	10/1 Coin
ON	OFF	ON	ON	11/1 Coin
ON	ON	OFF	OFF	12/1 Coin
ON	ON	OFF	ON	13/1 Coin
ON	ON	ON	OFF	14/1 Coin
ON	ON	ON	ON	15/1 Coin

The credits given 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

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

o Credits until 2nd coin is dropped.
› Credits until 4th coin is dropped.
› Credits until 3rd coin is dropped.
› 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 32	31
5	OFF	ON
4	ON	OFF
3	OFF	OFF
2	ON	ON

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

MATCH	SWITCH 28
ON	ON
OFF	OFF

CREDIT DISPLAY:

CREDITS DISPLAYED	SWITCH 27
YES	ON
NO	OFF

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

AWARD	SELF-TEST POSITION 16	SELF-TEST POSITION 17
REPLAY	SET TO "03"	SET TO "03"
EXTRA BALL	SET TO "02"	SET TO "02"
NOVELTY	SET TO "01"	SET TO "01"
NO AWARD	SET TO "00"	SET TO "00"

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

HIGH SCORE TO DATE OR OVER 1,999,990 SCORE FEATURE:
The game is designed to award free games as an option if high score to date is beat or player exceeds 1,999,990 points. Each time this happens, the high score will reset to 1,999,990 as new high score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play. Recommended setting is underlined.

HIGH SCORE TO DATE FEATURE	SELF-TEST POSITION 19
No Award	SET TO "00"
One Credit	SET TO "01"
Two Credits	SET TO "02"
<u>Three Credits</u>	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.

#1311 GRAND SLAM

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 Selt-Test button until the #18 shows on the match/credit in display. Now pulse replay button to desired sound setting.

Settings "00", "01"
Most switches associated chimes without feature background.

Setting "02"
Most scoring will have noise effect without background.

Setting "03"
Most scoring will have a noise effect with background.

NOTE: To correct clarities of sound, adjust controls as follows:
- Turn remote volume control on front door all the way up.
- Turn the sound volume control full clockwise, then turn counterclockwise until sound is not garbled.
- Then adjust remote volume control to desired volume level.

GAME FEATURE OPTIONS

Single & double lite adjustment:

Liberal	SW.6 ON	Single & double lites will be on.
Conservative	SW.6 OFF	Single & double lites will alternate.

Flyaway 25K lite adjustment:

Liberal	SW.7 ON	25K will be on at start of game.
Conservative	SW.7 OFF	25K will not be on at start of game.

Runs to beat advances adjustment:

Liberal	SW.8 ON	Runs set up will step off by 10 after each ten is beat, by 20 after 50.
Conservative	SW.8 OFF	Runs will stay on set up runs.

Flyaway special lite adjustment:

Liberal	SW.14 ON	Flyaway special & 50K keep on alternating.
Conservative	SW.14 OFF	Flyaway special then 50K which stays on.

Extra Balls per game adjustment:

Liberal	SW.15 ON	More then 1 extra ball per game.
Conservative	SW.15 OFF	Only 1 extra ball per game.

Flyaway value lites recall adjustment:

Liberal	SW.16 ON	Any flyaway value lites on will come on for next ball.
Conservative	SW.16 OFF	Any flyaway value lites will not come on for next ball.

Runs to beat set-up adjustment.

	SW.21	SW.22	SW.23	RUNS
Liberal	ON	ON	ON	20
↑	OFF	ON	ON	25
	ON	OFF	ON	30
	OFF	OFF	ON	35
	ON	ON	OFF	40
	OFF	ON	OFF	45
	ON	OFF	OFF	50
Conservative ↓	OFF	OFF	OFF	55

S & L return lane lites adjustment:

Liberal	SW.24 ON	S & L lites will be tied together.
Conservative	SW.24 OFF	S and L lite will not be tied.

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.

5K or 10K outhole bonus score per run adjustment:

Liberal	SW.30 ON	5 K for each run scored.
Conservative	SW.30 OFF	10K for each run scored.

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 1,999,990 can be set, as desired. It is also possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button (See Figure III) at one second intervals approximately six times or until identification number 01 appears on the 'Match/Ball in Play' display.

2. The number on the Player Score Displays is the score level.* It can be increased, if desired, by holding the credit button in. To decrease the score level, hold the credit button in and depress and release the Self-Test button. Release the credit button when the desired number appears. Note that the level changes 10,000 points at a time. If the number '00' is left on the displays, the high score feature is eliminated for that level.

3. Repeat steps 1 and 2 for the second and third score levels. The identification numbers '02' and '03' on the Match/Ball in Play display are for the second and third levels, respectively.

High Score to Date and 1,999,990 Feature:

The game is designed to award free games when 'High Score to Date' is beat, or if the player exceeds 1,999,990 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 1,999,990 can be set as described. It is to be noted that '00' does NOT turn off the feature, as it does on High Score feature. The feature is turned off by self test position 19 as discussed under 'Back Box Game Adjustments.'

SELF TEST SETUP FOR 16-19:

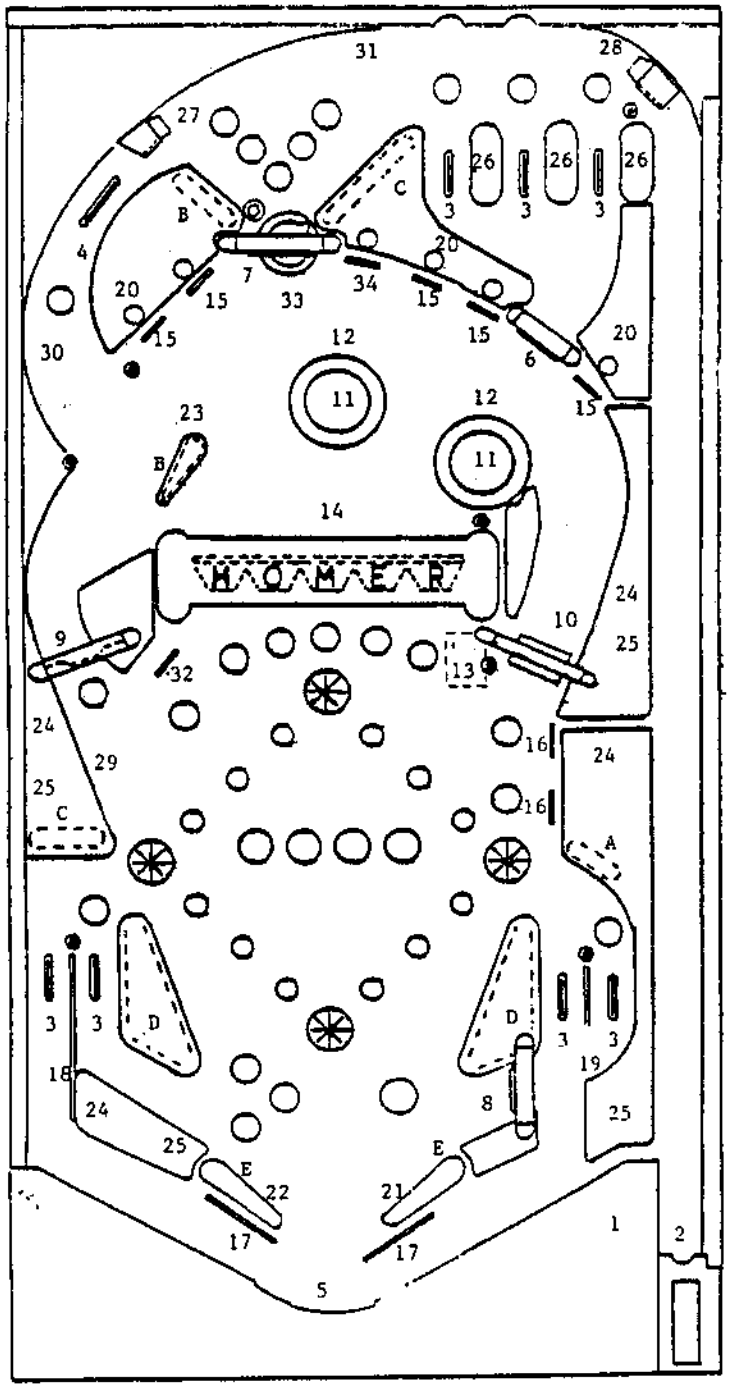
To set up positions 16-19 push and release self test button till 16 shows on match/ball in play. Now pulse replay button for recommended setup from "00" thru "03." Repeat for positions 17, 18 or 19.

SOUND

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

Please note that 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.)



GRAND SLAM #1311

RUBBER PARTS

A. R-521	¾" Dia. (1)
B. R-521-1	1" Dia. (3)
C. R-521-2	1½" Dia. (2)
D. R-521-4	2½" Dia. (2)
E. R-533-3	Flipper (2)
F. R-243	5/16" Dia. (20)
G. R-414	Post (2)

PANEL PARTS

1. Bottom Arch	P-58771-99
2. Shooter Gauge	P-6359-60
3. Rollover Wire & Bracket	ASE-2806-10 (7)
4. Rollover Wire & Bracket	ASE-2806-1
5. Rollover Wire & Bracket	ASE-2806-21
6. Ball Gate & Bracket	ASE-2250-11
7. Ball Gate & Bracket	ASE-2250-24
8. Ball Gate & Bracket	ASE-2250-90
9. Ball Gate & Bracket	ASE-2250-94
10. Spinner & Gate Ass'y	ASE-2250-118
11. Bumper Cap (Stamped)	A-4009-9 (2)
12. Bumper Collar	C-969-5 (2)
13. Reset Coil Ass'y	ASE-3152-1
14. Flyaway Target Ass'y	ASE-3155-1
15. Target Ass'y (White)	ASE-2911-20 (5)
16. Target Ass'y (Yellow)	ASE-2911-34 (2)
17. Buffer Wire	M-121-53 (2)
18. Ball Guide Wire	M-121-30
19. Ball Guide Wire	M-121-84
20. Light Shield (Red)	C-1026-11 (6)
21. Flipper Ass'y	ASE-1587-111
22. Flipper Ass'y	ASE-1587-112
23. Flipper Ass'y	ASE-1587-127
24. Screened Plastics	M-1330-206
25. Clear Plastics & Bushings	A-2890-171
26. Plastic Ball Guide (Blue)	C-693-12
27. Ball Rebound Ass'y	A-1475-12
28. Ball Rebound Ass'y	A-1475-13
29. Ball Guide Ass'y	A-3032-138
30. Ball Guide Ass'y	A-3032-139
31. Ball Guide Ass'y	A-3032-140
32. Target Switch Ass'y (Yellow)	ASE-29-1-21 (2)
33. Eject Hole Ass'y	ASE-428-41
34. Target Switch Ass'y (White)	ASE-2911-92 (1)

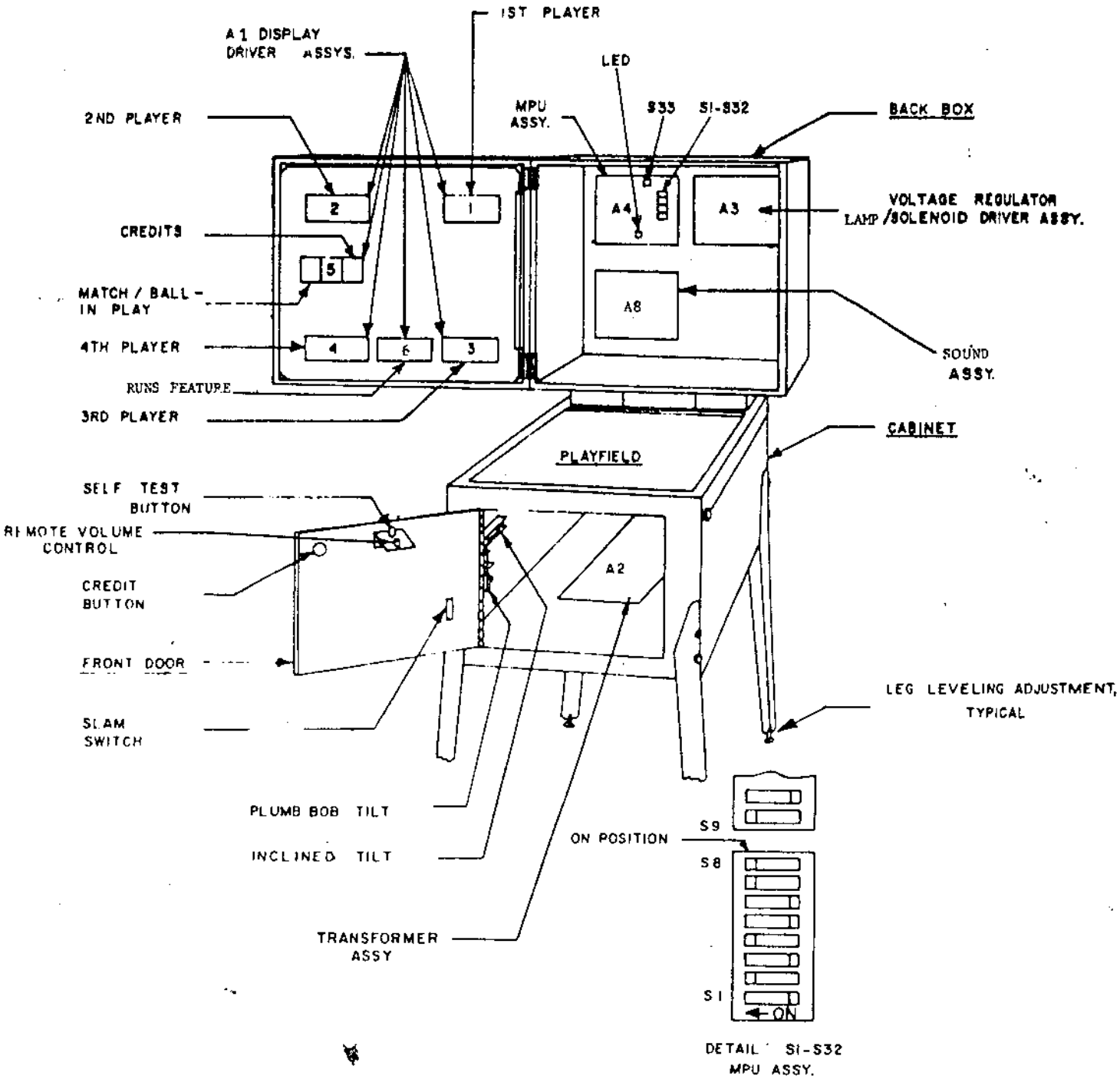


FIGURE III. ELECTRONIC PIN BALL MACHINE

RECOMMENDED

Instructions, Score Cards and High Score Feature Settings to be used on GRAND SLAM #1311

3-BALL

REPLAYS
Instruction Card M-1508-112-E-
Score Card M-1508-112-B W/R
1 Replay at 900,000
1 Replay at 1,400,000

5-BALL

REPLAYS
Instruction Card M-1508-112-E -1
Score Card M-1508-112-A W/R
1 Replay at 900,000
1 Replay at 1,400,000

EXTRA BALL
Instruction Card M-1508-112-F -1
Score Card M-1508-112-A W/EE
1 Extra Ball at 1,100,000
1 Extra Ball at 1,900,000

ADDITIONAL CARDS

REPLAYS

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

EXTRA BALL

M-1508-DD	1,000,000	1,800,000
M-1508-EE	1,100,000	1,900,000
M-1508-FF	1,200,000	1,800,000
M-1508-GG	1,400,000	1,900,000

Instruction Card Novelty
M-1508-112-G
M-1508-112-G-1

M-1508-112-G-2
M-1508-112-G-3

M-1508-112-E-1 Replay
M-1508-112-F-1 Extra Ball

BLANKS (3)
High game to date recommended levels;
(reset periodically)
3 BALL 1,600,000
5 BALL 1,600,000

Scoring over 2,000,000 points will display high score of 1,999,990 at end of game.

(Recommend resetting to lower score if needed)

#1311 GRAND SLAM
RECOMMENDED SETTINGS

RECOMMENDED REPLAY GAME SETTING FOR:		3-BALLS	5-BALL
SINGLE AND DOUBLE LITE	SW.6	ON	OFF
FLYAWAY 25K LITE	SW.7	ON	OFF
RUNS TO BEAT ADVANCES	SW.8	ON	ON
FLYAWAY SPECIAL LITE	SW.14	ON	ON
EXTRA BALLS PER GAME	SW.15	ON	ON
FLYAWAY VLAUE LITES RECALL	SW.16	ON	ON
	SW.21	OFF	ON
RUNS TO BEAT SET-UP	SW.22	ON	OFF
	SW.23	ON	ON
S AND L RETURN LANE LITES	SW.24	ON	OFF
NUMBER OF REPLAY PER GAME	SW.29	ON	ON
5K OR 10K OUTHOLE BONUS SCORE	SW.30	ON	OFF
BALLS PER GAME	SW.31	OFF	ON
BALLS PER GAME	SW.32	OFF	OFF

	3-BALL	5-BALL
REPLAYS		
Instruction Card	M-1508-112-E-	M-1508-112-E -1
Score Cards	M-1508-112-B W/R	M-1508-112-A W/R
Major Mode	Self Test Position 16, 17 Set to "03"	Self Test Position 16, 17 Set to "03"
Match	SW.28 ON	SW.28 ON
High Score to Date	Self Test Position 19 Set to "03"	Self Test Positon 19 Set to "03"
X-BALL		
Instruction Card		M-1508-112-F -1
Score Card		M-1508-112-A W/EE
Major Mode		Self Test Position 16, 17 Set to "02"
Match		SW.28 OFF
High Score to Date		Self Test Position 19 Set to "00"
NOVELTY		
Instruction Card	M-1508-112-G	M-1508-112-G-1
Major Mode	Self Test Position 16, 17 Set to "01"	Self Test Position 16, 17 Set to "01"
Match	SW.28 OFF	SW.28 OFF
High Score to Date	Self Test Position 19 Set to "00"	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 same tune repeatedly.

5. Pressing the Self-Test button again causes the MPU to search each switch assembly for stuck contacts. If any are found, the number of the first set encountered is flashed on the Player Score displays. The number remains until the fault is cleared. See Page 17 for help in Stuck Switch identification. Other numbers may follow if more stuck contacts are present. If there are no stuck switches, the Match/Ball in Play display flashes '0'.

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

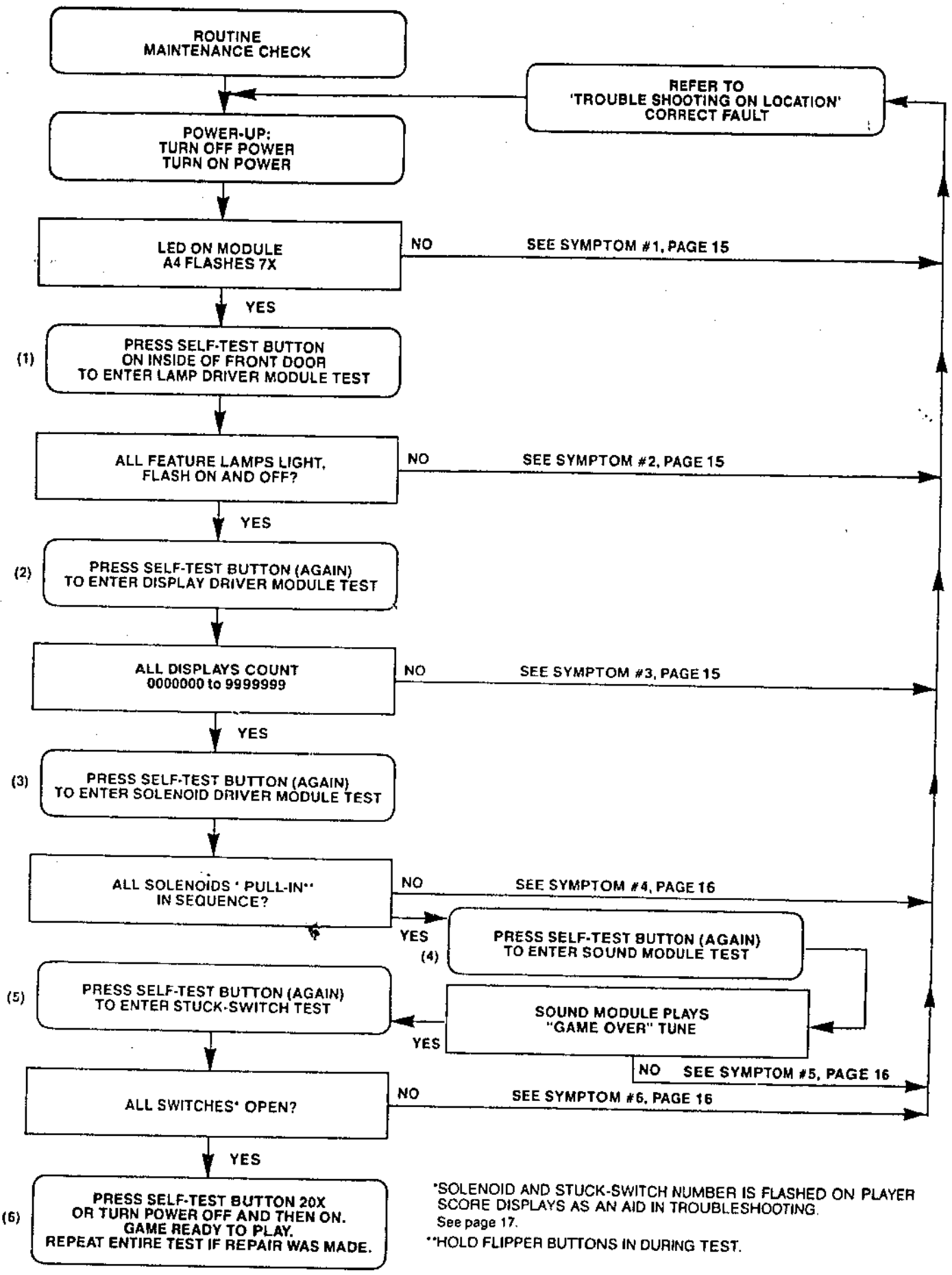
After successful completion of the Self Diagnostic Test procedure, set the game up for play. Exercise each rollover, thumper-bumper, slingshot, etc., by hand until each switch assembly on the playfield has been checked for proper operation. If actuating a switch assembly results in intermittent or no 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 comes on, or flashes, 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, check fuses F4 & F5 at power module.

C) Replace bulbs that do not flash. (Caution. Never change bulbs with power on)

D) If game is correct, it is now ready for play.

E) If game is not correct, turn power OFF. Replace H.V. Combo Board A3. 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 HV Combo Board 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/Credit display would flash '0'. If a number appears on the Player Score displays, see Switch Assembly Identification Table, Page 17 and Figure V.

C) Carefully lift the playfield. Locate the switch assembly identified from the number. Visually inspect the switch assembly. If the contacts are 'stuck,' regap them to 1/16". See section under ADJUSTMENTS. Repeat A & B. If the game is correct, it is now ready to play.* If game is not correct, turn the power OFF.

D) Replace MPU module A4. See CAUTION NOTE 1, C.

E) Repeat A & B. If the game is correct, it is now ready to play.* If the game is not correct, refer to Module Replacement Procedure. (See Parts List).

7) SYMPTOM: Game blows fuse(s) repeatedly.

ACTION: See Module Replacement Procedure. F.O. 560

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

GAME #1311 GRAND SLAM

SOLENOID IDENTIFICATION TABLE

Self Test #	SOLENOID IDENTIFICATION
01	LEFT THUMPER BUMPER
02	RIGHT THUMPER BUMPER
03	SAUCER
04	FLYAWAY RESET
05	OUTHOLE
06	KNOCKER
07	COIN LOCKOUT DOOR
08	K1 RELAY (FLIPPER ENABLE)

SWITCH ASSEMBLY SELF-TEST DISPLAY NUMBERS

Switch Self Test #	DESCRIPTION	Switch Self Test #	DESCRIPTION
01	"H" FLYAWAY	21	"L" RETURN LANE
02	"O" FLYAWAY	22	TOP RIGHT GRAND LANE
03	"M" FLYAWAY	23	TOP RIGHT SLAM LANE
04	"E" FLYAWAY	24	TOP RIGHT HOMER LANE
05	"R" FLYAWAY	25	"T" TRIPLE TARGET
06	CREDIT	26	"R" TARGET
07	RIGHT FLIPPER BUTTON	27	"I" TARGET
08	OUTHOLE	28	"P" TARGET
09	COIN III (RIGHT)	29	"L" TRIPLE TARGET
10	COIN I (LEFT)	30	"E" TRIPLE TARGET
11	COIN II (MIDDLE)	31	LEFT AND RIGHT OUTLANE
12	DOUBLE UPPER LEFT LANE	32	SAUCER
13	RIGHT THUMPER BUMPER	33	
14	LEFT THUMPER BUMPER	34	REBOUNDS (3)
15	TILT (3)	35	RIGHT SPINNER
16	SLAM (2)	36	LEFT SIDE GATE
17	"S" RETURN LANE	37	HOME BASE ROLLOVER BUTTON
18	"T" STEAL TARGET	38	#1 BASE ROLLOVER BUTTON
19	"E" STEAL TARGET	39	#2 BASE ROLLOVER BUTTON
20	"A" TARGET	40	#3 BASE ROLLOVER BUTTON

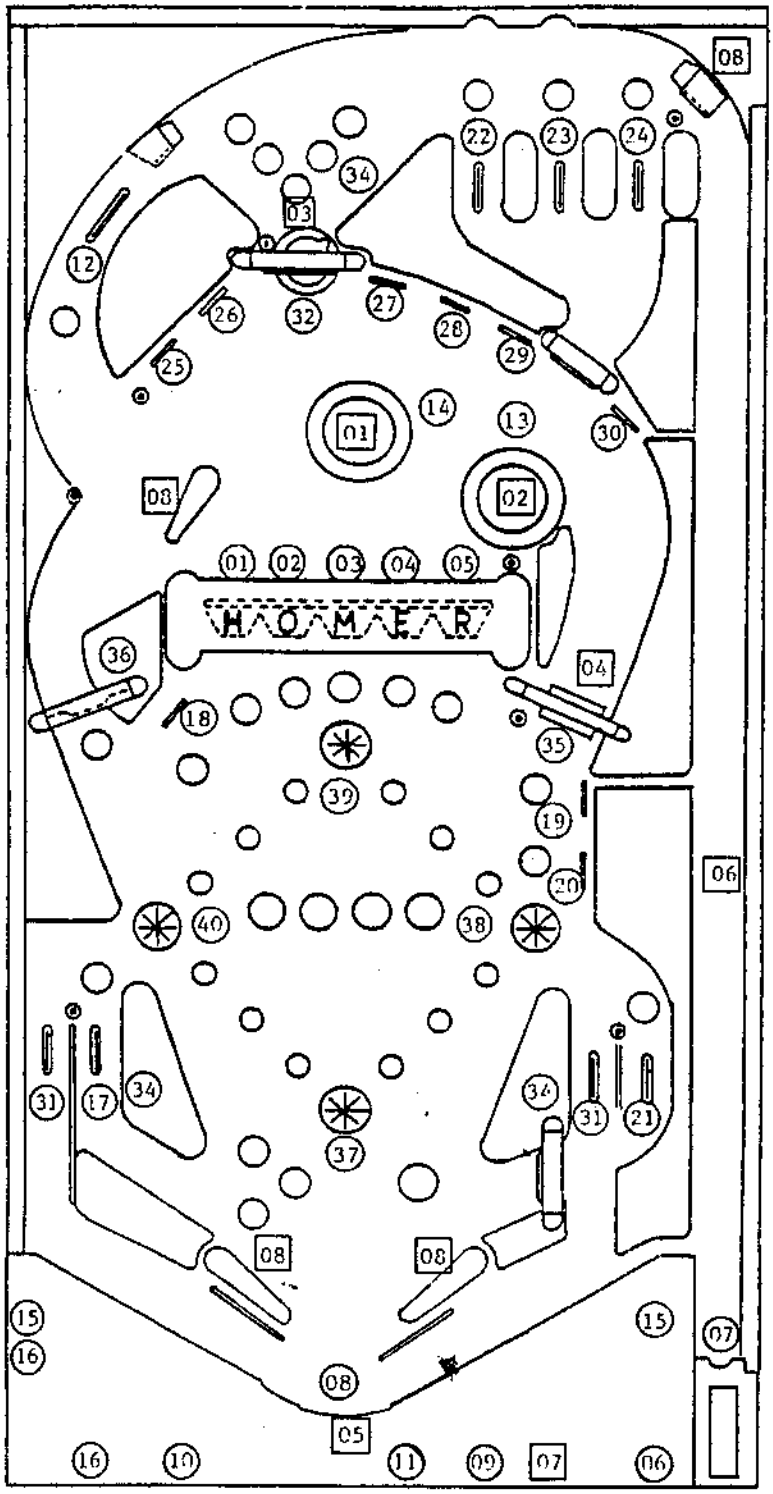


FIGURE V

#1311 GRAND SLAM

O INDICATES SWITCH ASSEMBLY IDENTIFICATION NUMBERS
NOTE: CABINET: 07,15,16
DOOR: 06,09
10,11,16

☐ INDICATES SOLENOID IDENTIFICATION NUMBERS
NOTE: DOOR: 07
BACKBOX: 08
CABINET: 06

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 expectance, 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

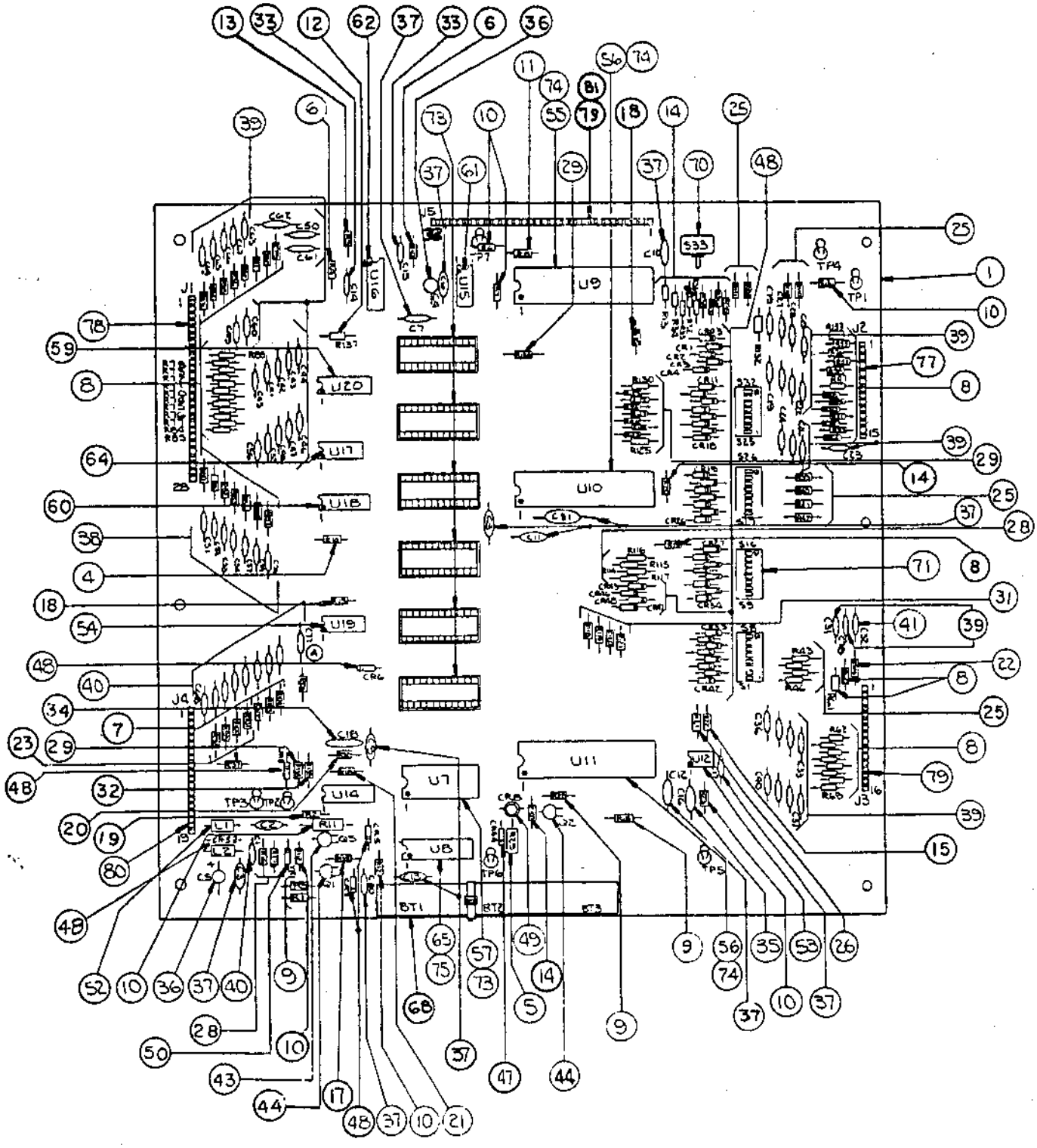
GRAND SLAM #1311

MISCELLANEOUS	PART NUMBER
Transformer (Domestic or Export)	E-122-170
Bulbs, #555	E-125-73
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
Flyaway Target Reset	AO-27-1300
Saucer	AO-27-1300
Knocker	AR-26-1200
Outhole Kicker	AN-26-1200
Thumper Bumper (3)	AN-26-1200
PLAYFIELD PARTS	See Figure II
MODULES	
H.V. Lamp/Solenoid Driver Comb.	AS-2518-147
Display Driver A1 (6 used) on 4 Player (4 used) on 2 Player	AS-2518-21
MPU A4	AS-3241-2
Transformer & Rectifier A2	AS-2877-13
Rectifier Board (Part of A2)	AS-2518-151
Sound	AS-3022-18
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 Drive/Voltage Regulator A3
KIT #493—For Display Drive A1
KIT #494—For Lamp Drive A3
KIT #559—For Sound A8

AS-2518-133 MPU MODULE



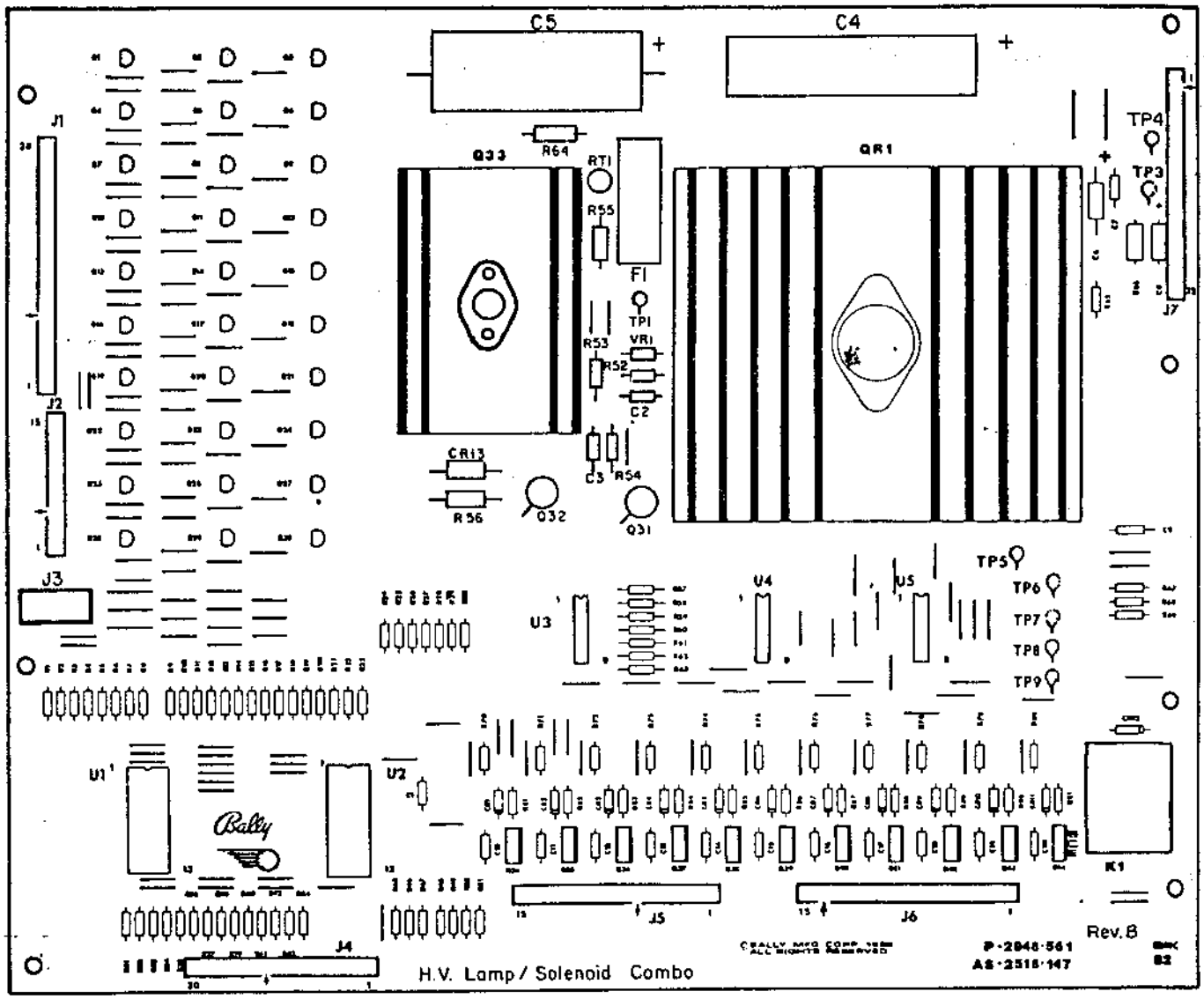
A4: MPU MODULE

COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	AS-3241-2	MPU Module Complete.
2	A4 (see note 2)	AS-2518-133	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, 1 kv
43	Q5	E-00585-0023	Transistor PNP (MPS-3702)
44	Q1, Q2	E-00585-0031	Transistor (2N3904)
47	CR44	E-00587-0006	Diode (IN4004)
48	CR1-CR7, CR11-CR43, CR45-CR49, CR52	E-00587-0014	Diode (IN4148)
49	CR8	E-00679	LED (Green)
50	VR1	E-00598-0008	Diode Zener (8.2V, IN9598)
52	L1, L2	E-00604-0003	Inductor, 22 Micro Hy.
53	U12	E-00620-0004	Timer (555)
54	U19	E-00620-0005	Quad 2 Input (4011)
55	U9	E-00620-0028	MPU I.C. (6800)
56	U10, U11	E-00620-0029	PIA I.C. (6820)
57	U7	E-00620-0030	RAM I.C. (6810)
59	U20	E-00620-0032	HEX Buffer I.C. (14502B)
60	U14, U18	E-00620-0033	HEX Inverter (4049B)
61	U15	E-00620-0034	Quad Memory Drive (MC3459L)
62	U16	E-00620-0035	Dual Monostable (9602)
64	U17	E-00620-0041	Quad 2 Inputs (74L00N)
65	U8	E-00620-0042	RAM (C MOS, P5101L-3)
68	BT1, BT2, BT3	E-00628-0003	Battery
70	S33	E-00658-0001	Push Button Switch
71	S1-S8, S9-S16, S17-S24, S25-S32	E-00677	DIP Switch
73		E-00712	24 Pin Socket
74		E-00712-0001	40 Pin Socket
75		E-00712-0003	22 Pin Socket
77	J2	E-00715	15 Pin Wafer Connector
78	J1	E-00715-0004	28 Pin Wafer Connector
79	J3, J5	E-00715-0017	16 Pin Wafer Connector
80	J4	E-00715-0018	19 Pin Wafer Connector
81	J5	E-00715-0024	17 Pin Wafer Connector

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

AS-2518-147 H.V. LAMP/SOLENOID DRIVER COMBINATION BOARD



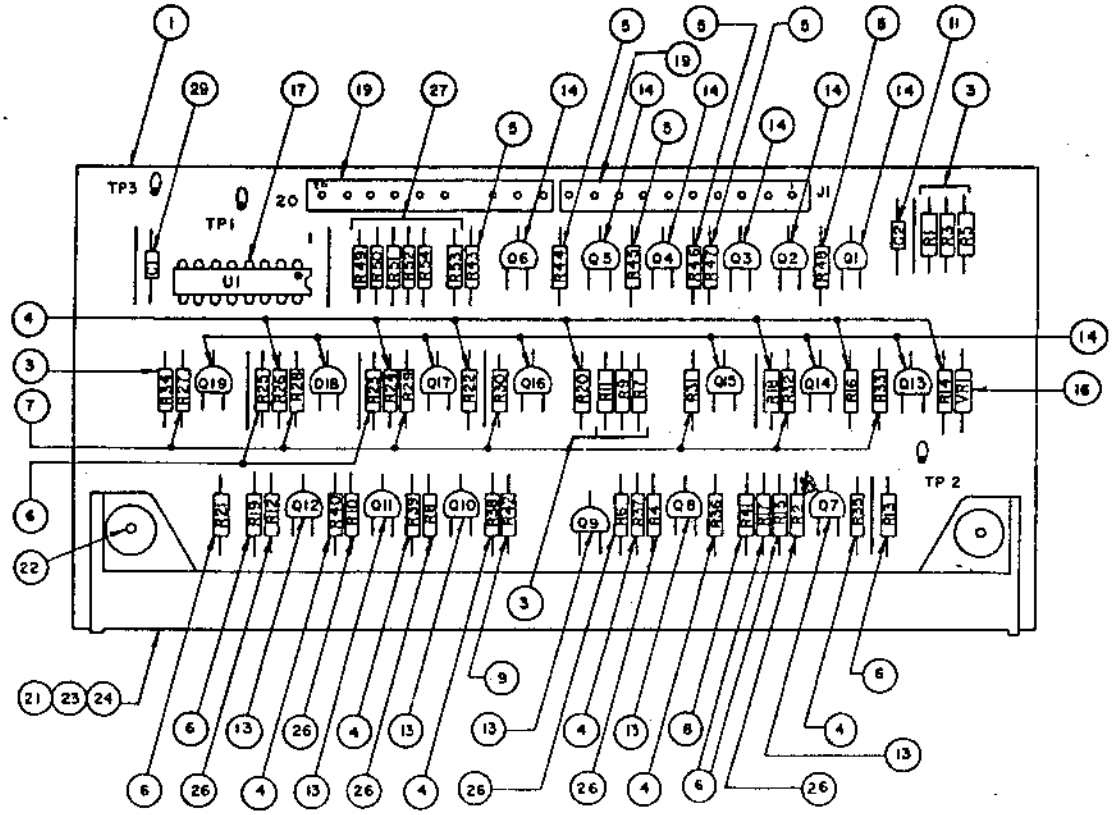
AS-2518-147 H. V. LAMP/SOLENOID COMBO ASSY.

DESCRIPTION	DESIGNATION	QUANTITY	PART NO.
.01uf 25v cer cap	C1	1	E-586-85
.01uf 500v cer cap	C2, 3	2	E-586-65
.1uf 50v cer cap	C6, 8, 9	3	E-586-159
.002uf 1kv cer cap	C10-20	11	E-586-64
2uf 50v Lythic cap	C7	1	E-586-63
160uf 350v Lythic cap	C5	1	E-586-59
11,000uf 20v Lythic cap	C4	1	E-586-62
Tie wraps	used with C4, 5	4	E-647-5
Jumpers red or eqv.	used with C4	2	M-1777-155 (or eqv.)
IN4004 Diode	CR1-13	13	E-587-15
3/16A 8AG Fuse	F1	1	E-133-29
Fuse Clips	F1	2	E-148-21
3 Pin M & L male header	J3	1	E-805-3
15 Pin .156 header*	J5, 6	2	E-736-15

AS-2518-147c H. V. LAMP/SOLENOID COMBO ASSY. (REV. B)

DESCRIPTION	DESIGNATION	QUANTITY	PART NO.
15 Pin .100 header*	J2	1	E-766-15
20 Pin .100 header*	J4	1	E-766-20
25 Pin .100 header*	J7	1	E-766-25
28 Pin .100 header*	J1	1	E-766-28
43v Relay	K1	1	E-146-795
2N5060 SCR	Q1-30	30	E-585-14
2N3440 Transistor	Q31, 32	2	E-585-41
2N3584 Transistor	Q33	1	E-585-42
5v Regulator	QR1	1	E-710
SE9302 or 2N6045 Transistor	Q34-44	11	E-585-34
T05 Heat Sink	used with Q32	1	E-682
T066 Heat Sink	used with Q33	1	E-682-1
T03 Heat Sink	used with QR1	1	E-682-2
T066 Sil Pad	used with Q33	1	E-889-2
T03 Sil Pad	used with QR1	1	E-889-1
Screws	used with Q33	2	SWPR-632-1112
Lock washers int. tooth	used with Q33, QR1	4	M-1701-6
Nuts	used with Q33, QR1	4	N-632-2112
Screws self-tapping	used with Q33	2	SWPR-632-1105
Screws self-tapping	used with Q33	2	SWPR-632-1112
Flat washers	used with Q33, QR1	4	PW-6-12
Screws	used with QR1	2	LSPR-632-1112
Hex standoffs	used with Q33	2	M-1827-1
H. V. Shield	used with Q33	1	M-1838
Lockwashers	used with Q33	2	M-1700-6
2.2ohm ¼w 5% Resistor	R65	1	E-105-211
100ohm ½w 5% Resistor	R66	1	E-105-265
120ohm ¼w 5% Resistor	R69-80	12	E-105-212
390ohm ¼w 5% Resistor	R56	1	E-105-266
1.2K ¼w 5% Resistor	R52, 57-63, 68	9	E-105-222
2K ¼w 5% Resistor	R1-30, 67	31	E-105-237
330ohm ¼w 5% Resistor	R81-91	11	E-105-219
3.9K ¼w 5% Resistor	R48-51	4	E-105-257
8.2K ¼w 5% Resistor	R55	1	E-105-223
20K ¼w 5% Resistor	R31, 33, 35, 37, 39, 41, 43	7	E-105-242 ~~E-105-219~~
22K ½w 5% Resistor	R54	1	E-105-218
33K ¼w 5% Resistor	R45-47	3	E-105-282
82K ½w 5% Resistor	R53	1	E-105-217
100K Iw 5% Resistor	R64	1	E-105-254
2.2m ½w 5% Resistor	R32, 34, 36, 38, 40, 42, 44	7	E-105-256
25K Pot P.C. 1 Turn	RT1	1	E-599-14
Test Point Loops	TP1-8	8	P-5399
4514 I.C.	U1, 2	2	E-620-37
74LS138 I. C.	U3	1	E-620-181
CA3081 Transistor array	U4, 5	2	E-681
IN5275A 140v Zener	VR1	1	E-598-10
P.C.B. M-645-723	—	1	P-2948-561
Jumpers	—	149	M-1777-126

AS-2518-21 CREDIT DISPLAY DRIVER MODULE

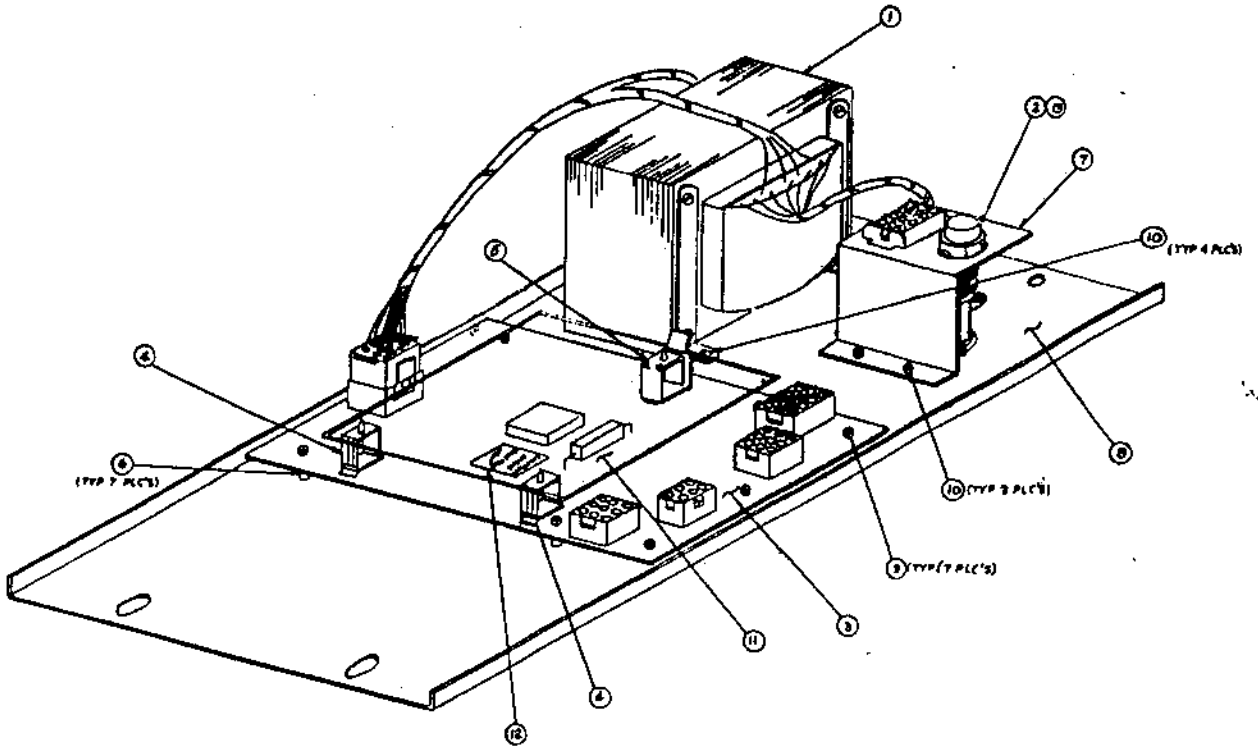


A1: 6 DIGIT DISPLAY DRIVER MODULE
COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1	A1	AS-2518-21	6 Digit Display Driver, Complete
3	7	R1, R3, R5, R7, R9, R11, R34	E-105-331	Resistor, 100K Ω
4	13	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40	E-105-227	Resistor, 300K Ω
5	6	R43, R44, R45, R46, R47, R48	E-105-228	Resistor, 9.1K Ω
6	7	R13, R15, R17, R19, R21, R23, R25	E-105-229	Resistor, 1.5K Ω
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-222	Resistor, 1.2K Ω
8	1	R41	E-105-231	Resistor, 39K Ω
9	1	R42	E-105-271	Resistor, 240K Ω
10				
11	1	C2	E-586-65	Capacitor, .01 MFD, 500V
13	6	Q7, Q8, Q9, Q10, Q11, Q12	E-585-32	Transistor (2N5401)
14	13	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19	E-585-33	Transistor (MPS-A42)
16	1	VR1	E-598-7	Zener Diode, 110V
17	1	U1	E-620-38	I.C. Decoder
18				
19	2	J1	E-715-34	10 Pin Wafer Pin Connector
21	1	DS1	E-680	Digital Display Panel
22	2		M-1836	Hi-Lo Screw, W/H
23	1		P-2399	Display Mounting (Top)
24	1		P-2399-1	Display Mounting (Bottom)
26	6	R2, R4, R6, R8, R10, R12	E-105-287	Resistor, 2.2K Ω
27	6	R49, R50, R51, R52, R53, R54	E-105-242	Resistor, 20K Ω
28	As Req'd			Wire Jumper
29	1	C1	E-586-85	Capacitor, .01 MFD, 25V

NOTE: INTERCHANGEABLE WITH AS-2518-15

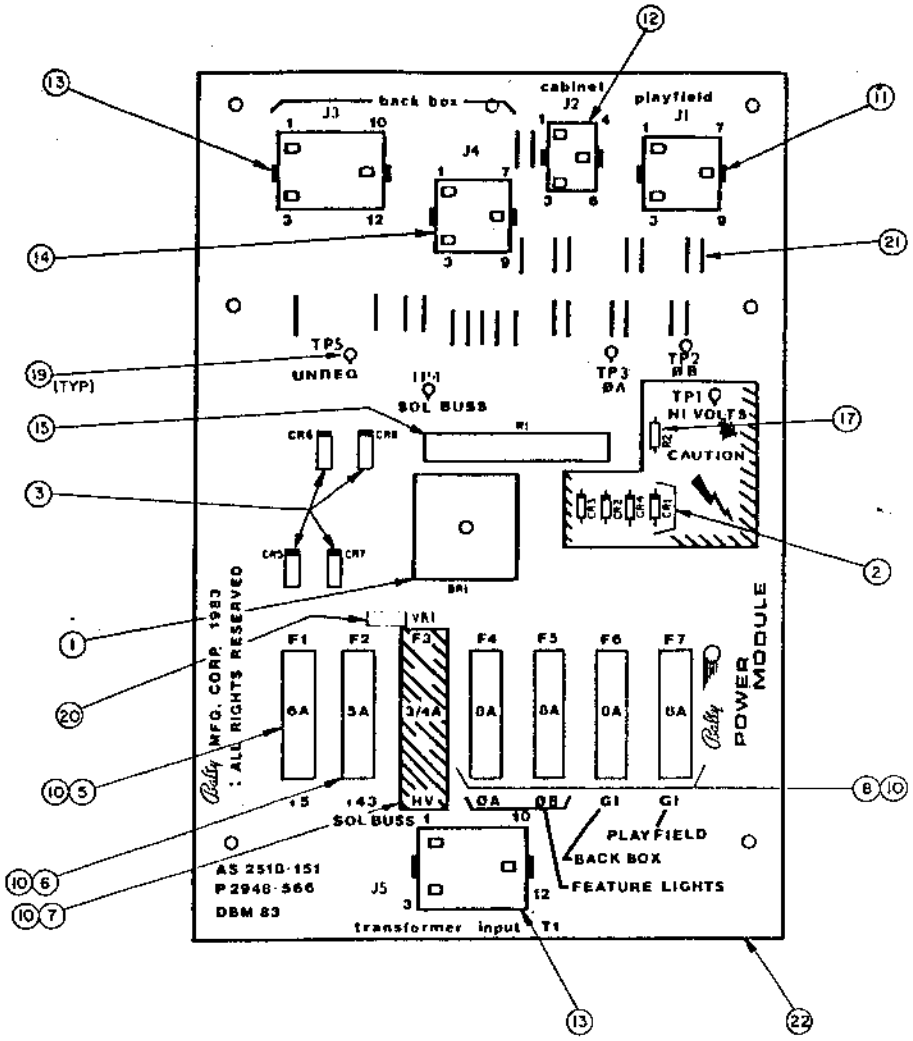
A2: POWER TRANSFORMER MODULE



COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
0	A2	AS-2877-13	Power Transformer Module, Complete
1		AS-3071-15	Transformer
2		E-148-25	Fuse Holder
3	A2	AS-2518-151	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-832-1114	Screw
10		RLPP-1032-1806	Screw
11		P-2692-2	Shield
12		M-469-963	High Voltage Sticker
13		E-133-24	3A S.B. Fuse

AS-2518-151 RECTIFIER BOARD ASSEMBLY



ITEM	DESIGNATION	DESCRIPTION	QUANTITY	PART NO.
1	BR1	35A BRIDGE, KBPC-35	1	E-602-7
2	CR1-4	1N4004 DIODE	4	E-587-15
3	CR5-8	6A DIODE, MR751	4	E-587-32
4				
5	F1	6A FUSE	1	E-133-6
6	F2	5A FUSE	1	E-133-5
7	F3	3/4A FUSE	1	E-133-28
8	F4-7	8A FUSE	4	E-133-8
9				
10	F1-7	FUSE CLIP	14	E-148-21
11	J1	9 CKT. M & L SOCKET HEADER	1	E-806-9
12	J2	6 CKT. M & L PIN HEADER	1	E-805-6
13	J3, 5	12 CKT. M & L PIN HEADER	2	E-805-12
14	J4	9 CKT. M & L PIN HEADER	1	E-805-9
15	R1	600 OHM 10W. 10% RESISTOR	1	E-104-92
16				
17	R2	100K 1/4W. 5% RESISTOR	1	E-105-226
18				
19	TP1-5	TEST POINT LOOPS	5	P-5399
20	VR1	VARISTOR	1	E-623
21		JUMPERS	24	M-1777-126
22		P.C.B. M-645-728	1	P-2948-566

A8: SOUND MODULE
COMPONENT PARTS LIST

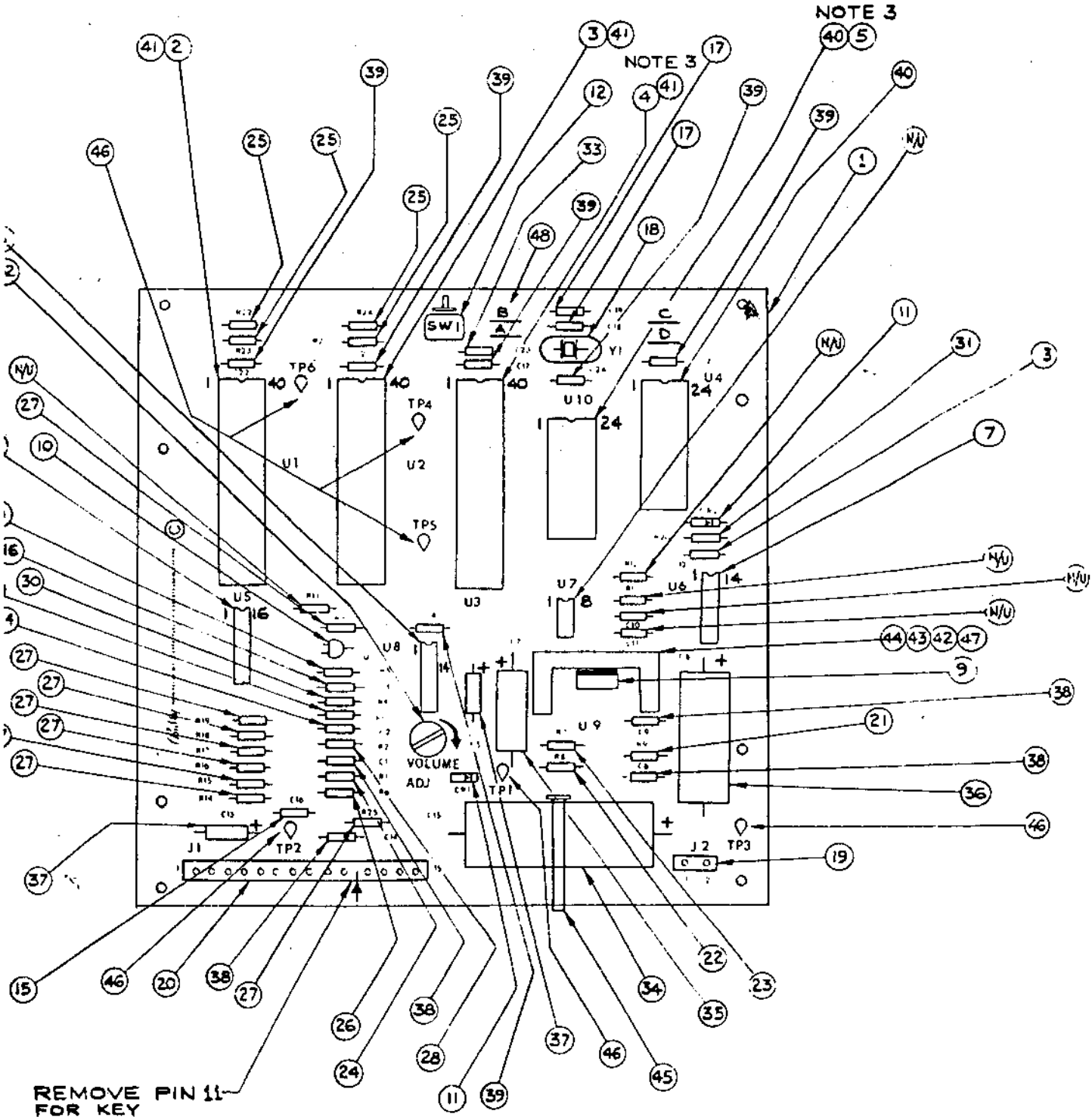
ITEM	REFERENCE DESIGNATION	BALLY PART NO.	DESCRIPTION
1	A8 (see note 1)	AS-3022-18	PWB Module Complete
2	U1	E-620-124	Sound Chip AY-3-8910
3	U2	E-620-29	PIA, 6820/21
4	U3	E-620-125 (E620-128)	CPU, 6808 (6802 Note 3)
5	U10	E-620-30	Ram, 6810 (Note 3)
6	U5	E-620-33	Hex Inverter 4049B
7	U6	E-620-5	Quad 2 Input 4011B
8	U8	E-620-126	Amp, LM3900
9	U9	E-620-127	Power Amp, TDA 2002
10	Q1	E-585-31	Transistor, 2N3904
11	CR1, 2	E-587-6	Diode, 1N4004
12	SW1	E-658-1	Switch
13	C12	E-586-118	Cap. .2MF ±20% Y5P, 16 V.
14	C2	E-586-130	Cap. .47 ±20%
15	C16	E-586-83	Cap. 470 PF 50 V.
16	C3	E-586-120	Cap. 68 PF, ±20% 1K
17	C18, 19	E-586-121	Cap. 27 PF, ±20% 1K
18	Y1	E-744-5	Crystal, 3.579545 MHZ
19	J2	E-736-2	Connector, Wafer, 2 Pin KK156
20	J1	E-736-15	Connector, Wafer, 15 Pin KK156
21	R9	E-105-196	Resistor, 1 Ohm, ¼ W., 5%
22	R8	E-105-211	Resistor, 2.2 Ohm, ¼ W., 5%
23	R7	E-105-303	Resistor, 220 Ohm, ¼ W., 5%
24	R1	E-105-230	Resistor, 1 K, ¼ W., 5%
25	R21, 22, 23, 24	E-105-238	Resistor, 3.3K. Ohm, ¼ W., 5%
26	R6	E-105-239	Resistor, 4.7K., ¼ W., 5%
27	R3, 14, 15, 16, 17, 18, 19, 25	E-105-185	Resistor, 10K., ¼ W., 5%
28	R2	E-105-245	Resistor, 30K., ¼ W., 5%
29	R10	E-105-252	Resistor, 180K., ¼ W., 5%
30	R4	E-105-225	Resistor, 200K., ¼ W., 5%
31	R5, 20	E-105-285	Resistor, 1M, ¼ W., 5%
32	RT1	E-599-16	Potentiometer 1K
33	C23	E-586-122	Cap. .001 ±20% 2SF
34	C15	E-586-123	Cap. 4700 MF @ 25 V.
35	C7	E-586-124	Cap. 470 MF @ 6.3 V
36	C8	E-586-129	Cap. 470 MF @ 16 V.
37	C5, 13	E-586-90	Cap. 1 MF @ 50 V.
38	C9, 1, 14, 6	E-586-89	Cap. .1 MF
39	C4, 22, 17, 21, 20, 24	E-586-85	Cap. .01 MF
40	XU10, XU4	E-712	Socket, 24 Pin
41	XU1, XU2, XU3	E-712-1	Socket, 40 Pin
42	Used with 43	LSPR-00632-1106	Bolt, 6 x 32 x ⅜
43	Used with 42	N-00632-2112	Nut, 6 x 32
44	H.S for U9	E-682-8	Heat Sink, 6030BTT
45	Used with C15	E-647-5	Ty Rap
46	TP1, 2, 3, 4, 5, 6	P-5399	Test Point
47	Use with 44, 9	M-1834	Thermal Grease
48	Jumper, B	W-1211c	22 AWG Wire, Solid Tinned
			Schematic

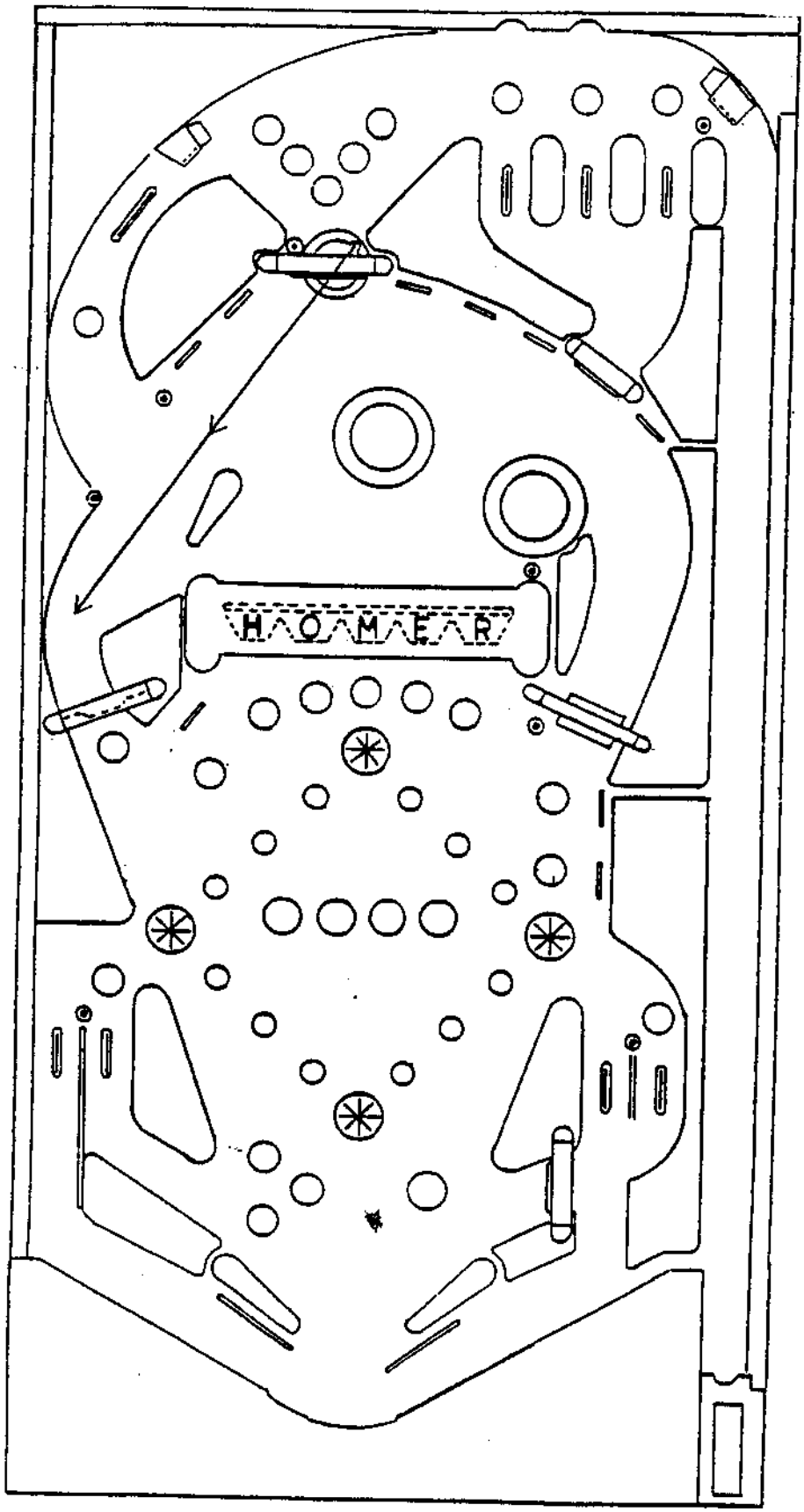
NOTE 1: When ordering specify name of game.

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

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

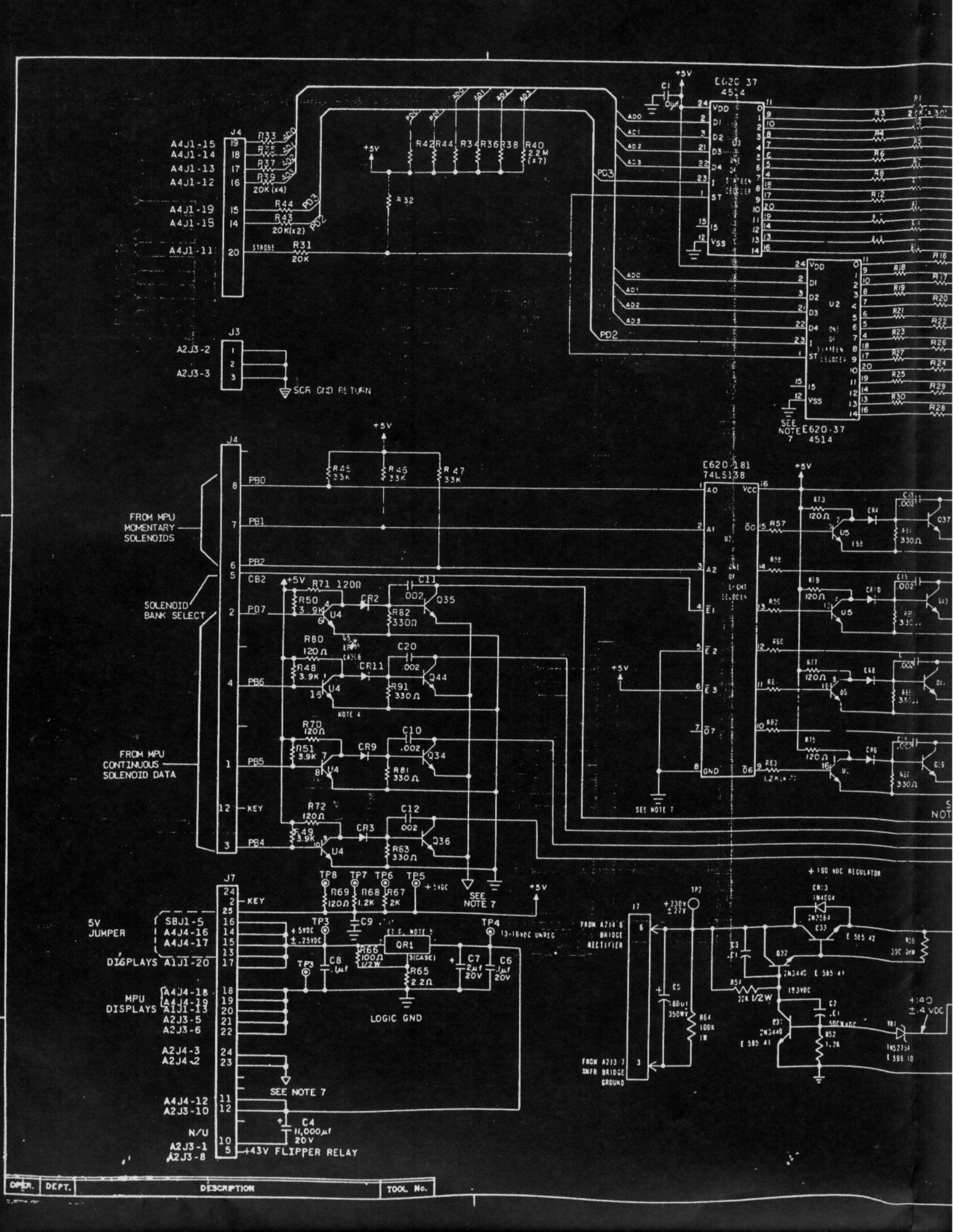
AS-2518-51 SOUND MODULE





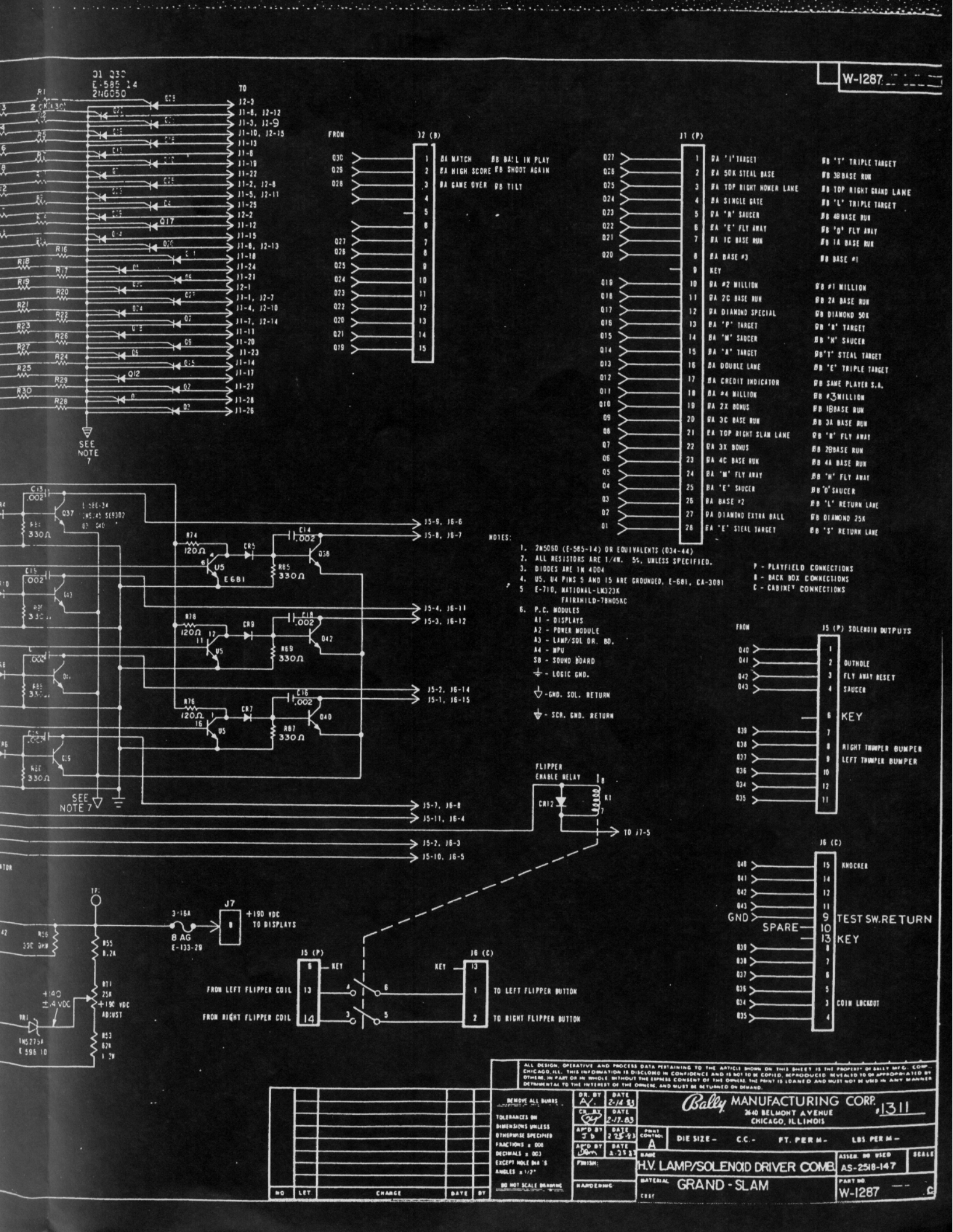
VECTOR DRAWING FOR
GRAND SLAM EJECT SAUCER

SAUCER BALL TO EJECT, OUT
AS SHOWN BY ARROW



OPER.	DEPT.	DESCRIPTION	TOOL No.

W-1287



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NO	LET	CHANGE	DATE	BY

REMOVE ALL BURRS
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± .008
DECIMALS ± .003
EXCEPT HOLE DIA'S
ANGLES ± 1/2°
DO NOT SCALE DRAWING

DR. BY A.V. DATE 2-14-83
CH. BY DATE 2-17-83
APP'D BY J.D. DATE 2-25-83
APP'D BY DATE 2-25-83
FINISH:
HARDENING

Bally MANUFACTURING CORP. #1311
2640 BELMONT AVENUE
CHICAGO, ILLINOIS

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

NAME H.V. LAMP/SOLENOID DRIVER COMB.
ASSEM. NO USED AS-2518-147
SCALE
MATERIAL GRAND - SLAM
PART NO W-1287 C

A1 INSERT

NOTE ON 4 PLAYER ONLY

12 PIN PLUG		
FROM	PIN	WIRE
A2J4-8	1	10
A2J4-1	2	50
A3J2-2	3	18
A3J1-18	4	35
A2J4-4	5	40
A3J2-1	6	31
A2J4-9	7	70
A2J4-7	8	90
A3J2-3	9	61
A2J3-11	10	20
A3J1-10	11	97
	12	

INSERT TO BACK CAB.

TO	(PLAYER 1) 1A1 J1	(PLAYER 2) 2A1 J1	(PLAYER 3) 3A1 (OPTIONAL) J1	(PLAYER 4) 4A1 (OPTIONAL) J1	CREDIT DISPLAY 5A1 J1	RUNS DISPLAY 6A1 J1
10 — A3J7-8	1	1	1	1	1	1
N/U	2	2	2	2	2	2
N/U	3	3	3	3	3	3
80 — A4J1-1	4	4	4	4	4	4
20 — A4J1-2	5	5	5	5	5	5
30 — A4J1-3	6	6	6	6	6	6
40 — A4J1-4	7	7	7	7	7	7
50 — A4J1-5	8	8	8	8	8	8
58 — A4J1-6	9	9	9	9	9	9
70 — A4J1-10	10	10	10	10	10	10
N/U	11	11	11	11	11	11
84 — A4J1-7	12	12	12	12	12	12
60 — A3J7-20	13	13	13	13	13	13
KEY	14	14	14	14	KEY	14
85 — A4J1-20	15	31	72	67	18	83
54 — A4J1-28	16	16	16	16	16	16
38 — A4J1-27	17	17	17	17	17	17
25 — A4J1-26	18	18	18	18	18	18
51 — A4J1-25	19	19	19	19	19	19
45 — A3J7-17	20	20	20	20	20	20
		A4J1-21	A4J1-22	A4J1-23	A4J1-24	A4J4-8

61 — A3J2-3
97 — A3J1-10
18 — A3J2-2
31 — A3J2-1
35 — A3J1-18
90 — A2J4-7
20 — A2J3-11

LAMP DRIVER P/O A3 (I)

J2

		TO	
31	1	0A MATCH	03 BALL IN PLAY
18	2	0A HIGH SCORE	0B SHOOT AGAIN
61	3	0A GAME OVER	0B TILT
	4		
	5	KEY	
	6		
	7		
	8		
	9		
	10		
	11		
	12		
	13		
	14		
	15		

J3

83	1	A2J3-2
	2	
83	3	A2J3-3

J1

43	1	0A "I" TARGET	0B "T" TRIPLE TARGET
64	2	0A 50K STEAL BASE	0B 3BBASE RUN
81	3	0A TOP RIGHT HOMER LANE	0B TOP RIGHT GRAND LANE
50	4	0A SINGLE GATE	0B "L" TRIPLE TARGET
14	5	0A "R" SAUCER	0B 4BBASE RUN
72	6	0A "E" FLYAWAY	0B "O" FLYAWAY
67	7	0A 1C BASE RUN	0B 1A BASE RUN
15	8	0A BASE #3	0B BASE #1
	9	KEY	
97	10	0A #2 MILLION	0B #1 MILLION
75	11	0A 2C BASE RUN	0B 2A BASE RUN
95	12	0A DIAMOND SPECIAL	0B DIAMOND 50K
91	13	0A "P" TARGET	0B "R" TARGET
13	14	0A "M" SAUCER	0B "H" SAUCER
83	15	0A "A" TARGET	0B "T" STEAL TARGET
32	16	0A DOUBLE LANE	0B "E" TRIPLE TARGET
47	17	0A CREDIT INDICATOR	0B SAME PLAYER S.A.
35	18	0A #4 MILLION	0B #3MILLION
45	19	0A 2X BONUS	0B 1BBASE RUN
85	20	0A 3C BASE RUN	0B 3A BASE RUN
25	21	0A TOP RIGHT SLAM LANE	0B "R" FLYAWAY
23	22	0A 3X BONUS	0B 2BBASE RUN
90	23	0A 4C BASE RUN	0B 4A BASE RUN
12	24	0A "M" FLYAWAY	0B "H" FLYAWAY
98	25	0A "E" SAUCER	0B "O" SAUCER
43	26	0A BASE #2	0B "L" RETURN LANE
21	27	0A DIAMOND EXTRA BALL	0B DIAMOND 25K
27	28	0A "E" STEAL TARGET	0B "S" RETURN LANE

J4

		TO
27	1	A4J4-6
	2	
36	3	A4J4-5
25	4	A4J4-7
61	5	A4J4-10
78	6	A4J4-2
21	7	A4J4-3
23	8	A4J4-4
	9	
	10	
	11	
	12	KEY
	13	
63	14	A4J1-18
53	15	A4J1-19
48	16	A4J1-12
45	17	A4J1-13
13	18	A4J1-14
32	19	A4J1-15
75	20	A4J1-11

VOLTAGE REGULATOR/SOLENOID DR

J7

		TO
	1	
	2	KEY
50	3	A2J3-7
	4	
30	5	A2J3-8
92	6	A2J4-6
	7	
10	8	A1J1-1
	9	
56	10	A2J3-1
14	11	A4J4-12
70	12	A2J3-10
64	13	A3J7-25
96	14	A4J4-16
54	15	A4J4-17
84	16	A8J1-5
45	17	A1J1-20
94	18	A4J4-18
81	19	A4J4-19
60	20	A1J1-13
52	21	A2J3-5
82	22	A2J3-6
13	23	A2J4-2
57	24	A2J4-3
64	25	A3J7-13

J6

		TO
20	1	LEFT FLIPPER SW.
10	2	RIGHT FLIPPER SW.
36	3	COIN LOCKOUT
	4	
	5	
	6	
	7	
	8	
31	9	TEST SW. RETURN
	10	
	11	
	12	
	13	KEY
	14	
85	15	KNOCKER

TO LOWER CABINET TO PLAYFIELD

NOTES:
1. THESE PINS ARE RESERVED FOR FUTURE USE.
2. WIRE COLOR ARE SHOWN FOR ALL CONNECTOR PINS, SOME WIRE MAY NOT BE USED IN ALL GAMES.
3. * INDICATES AID TEST POINT.
4. ALL DIODES 1N4148 UNLESS OTHERWISE NOTED.

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

OPER.	DEPT.	DESCRIPTION	TOOL No.

L PART NO. W-1282-1

ØA GAME OVER
ØB TILT
ØA NO. 2 MILLION
ØB NO. 1 MILLION
ØA HIGH SCORE
ØB SHOOT AGAIN
ØA MATCH
ØB BALL IN PLAY
ØA NO. 4 MILLION
ØB NO. 3 MILLION

TO 5.9V.A.C.
A2J4-8
A2J4-9

10/70 GEN. ILL. LAMPS ( )

TO
A2J4-1
A2J4-4

50/40

J1

23	1	A4J4-4, A3J4-4
21	2	A4J4-3, A3J4-3
78	3	A4J4-2, A3J4-2
15	4	A4J4-1
84	5	A3J7-18
60	6	A4J1-13, A3J7-20
	7	
61	8	A4J4-10, A3J4-5
	9	
70	10	A3J7-12
	11	KEY
80	12	N/U
80	13	N/U
80	14	N/U
13	15	A3J7-23, A2J4-2

SOLID STATE SOUND SYSTEM MODULE A8

J2

1	2
70	80

24 PIN PLUG		
FROM	PIN	WIRE
A3J7-8	1	10
A4J1-2	2	20
A4J1-26	3	25
A4J1-3	4	30
A4J1-27	5	38
A4J1-4	6	40
A3J7-17	7	45
A4J1-5	8	50
A4J1-25	9	51
A4J1-28	10	54
A4J1-6	11	58
A3J7-20	12	60
A4J1-23	13	67
A4J1-10	14	70
A4J1-22	15	72
A4J1-1	16	80
	17	
	18	

ADAPTER FOR 3rd & 4th PLAYER

LENOID DRIVER P/O A3 (I)

TO
LIPPER SW.
FLIPPER SW.
OCKOUT

W. RETURN

R

J5 TO

	1	
85	2	OUTHOLE
83	3	FLYAWAY RESET
75	4	SAUCER
	5	
	6	KEY
	7	
74	8	RIGHT THUMPER BUMPER
71	9	LEFT THUMPER BUMPER
	10	
	11	
	12	
40	13	
70	14	
	15	

J5 — TEST CONNECTOR

1	D7
2	D6
3	D5
4	D4
5	D3
6	D2
7	D1
8	D0
9	A13
10	A12
11	A11
12	A10
13	A9
14	A8
15	A7
16	A6
17	A5
18	A4
19	A3
20	A2
21	A1
22	A0
23	R/W
24	HLT
25	RES
26	VMA
27	Ø2
28	EX. MEM.
29	KEY
30	5 V.D.C.
31	GND.
32	A4J11-18

MPU A4 (C)

J1 TO

80	1	A1J1-4
20	2	A1J1-5
30	3	A1J1-6
40	4	A1J1-7
50	5	A1J1-8
58	6	A1J1-9
	7	
	8	
	9	KEY
70	10	A1J1-10
75	11	A3J4-20
18	12	A3J4-16
15	13	A3J4-17
13	14	A3J4-18
32	15	A3J4-19
	16	
	17	
53	18	A3J4-14
53	19	A3J4-15
85	20	1A1J1-15
31	21	2A1J1-15
72	22	3A1J1-15
67	23	4A1J1-15
18	24	5A1J1-15
51	25	A1J1-19
25	26	A1J1-18
38	27	A1J1-17
54	28	A1J1-16

J4 TO

15	1	A8J1
78	2	A3J4-6/A8J1-3
21	3	A3J4-7/A8J1-2
23	4	A3J4-8/A8J1-1
36	5	A3J4-3
27	6	A3J4-1
25	7	A3J4-4
83	8	6A1J1-15
	9	
61	10	A3J4-5 A8J1-8
	11	
14	12	A3J7-11
	13	
	14	KEY
90	15	A2J3-9
96	16	A3J7-14
54	17	A3J7-15
94	18	A3J7-18
81	19	A3J7-19

J2 TO

51	1	ST0
70	2	ST1
93	3	ST2
53	4	ST3
31	5	ST4
	6	KEY
	7	N/U
54	8	10
63	9	11
57	10	12
78	11	13
60	12	14
55	13	15
65	14	16
52	15	17

PLAY FIELD SW. STROBE

PLAY FIELD SW. RETURN

J3 TO

10	1	SELF TEST SW.
13	2	ST 0 SW. CAB.
14	3	ST 1 STROBE
	4	KEY
	5	N/U
	6	N/U
	7	N/U
	8	N/U
	9	10
15	10	11
65	11	12
20	12	13
	13	14
	14	15
25	15	16
27	16	17
30		

CAB. SW. RET.

COLOR CODE
6-BROWN
7-ORANGE
8-BLACK
9-GRAY
0-NO TRACER

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NO.	LET.	CHANGE	DATE	BY

REMOVE ALL BURRS
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± .008
DECIMALS ± .003
EXCEPT HOLE DIA'S
ANGLES ± 1/2°
DO NOT SCALE DRAWING

DR. BY AJ DATE 2-17-83
CHKD BY DATE 2-18-83
APP'D BY JD DATE 2-25-83
APP'D BY DATE 2-25-83
PRINT CONTROL A

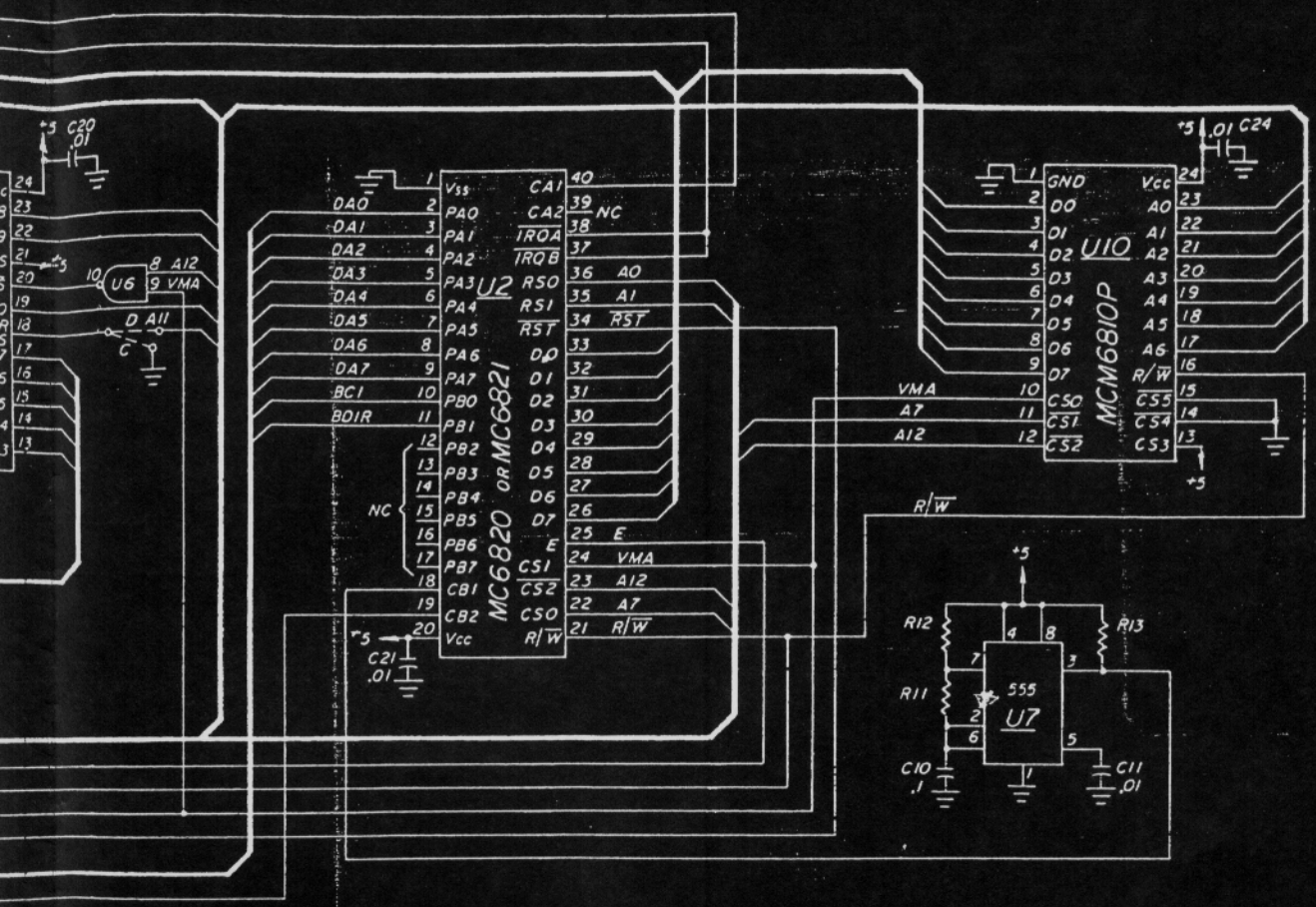
Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO, ILLINOIS
1311

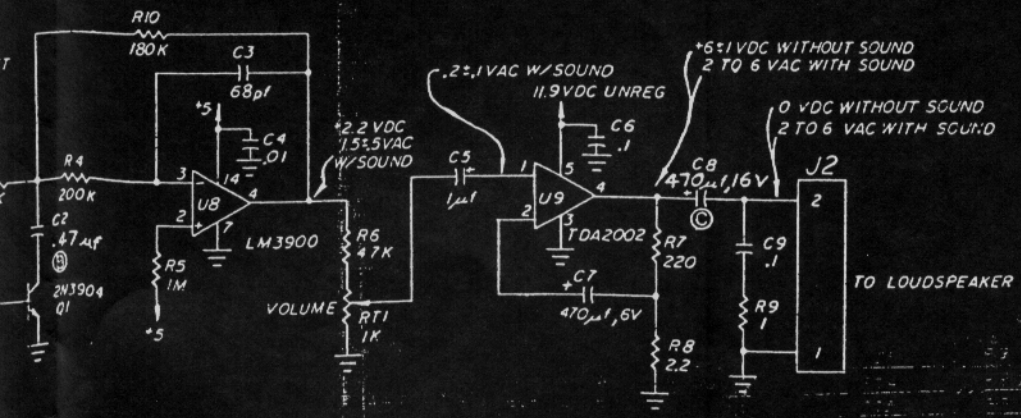
NAME WIRING DIAGRAM BACK BOX
ASSEM NO. USED
MATERIAL GRAND SLAM
CODE
PART NO. W-1282-1

NOTES:

1. USE JUMPER A IF INTERNAL RAM IS USED (680
2. " " B " EXTERNAL " " " (EPRO
3. " " C " 2K ROM (EPROM) " " " (GI 9
4. " " D " 4K " " " " (TI TM
5. U7, R12, R11, R13, C10, C11 NOT USED ON THIS ASSEMB
6. UNLESS OTHERWISE INDICATED, ALL RESISTOR VA
   ALL CAPACITOR VALUES ARE IN MMFD'S.
7. PREFIX ALL REFERENCE DESIGNATIONS WITH A0.
8. * INDICATES "AID" TEST POINT.

OPER.	DEPT.	DESCRIPTION	TOOL NO.





RAM IS USED (6802 WITHOUT U10).
" " " (6808/6810, U10).
OM) " " (GI 9316B INTEL 2716 OR EQUIV).
(TI TMS 2532 TMS 4732 OR EQUIV).
D ON THIS ASSEMBLY.
ALL RESISTOR VALUES ARE IN OHMS,
MMFD'S.
NATIONS WITH A8.

NO.	LET.	CHANGE	DATE	BY
3	C	WAS 220uf 25V	1-29-80	JD
2	B	WAS .1	1-29-80	JD
1	A	TEST INFO ADDED	12-11-79	MEW

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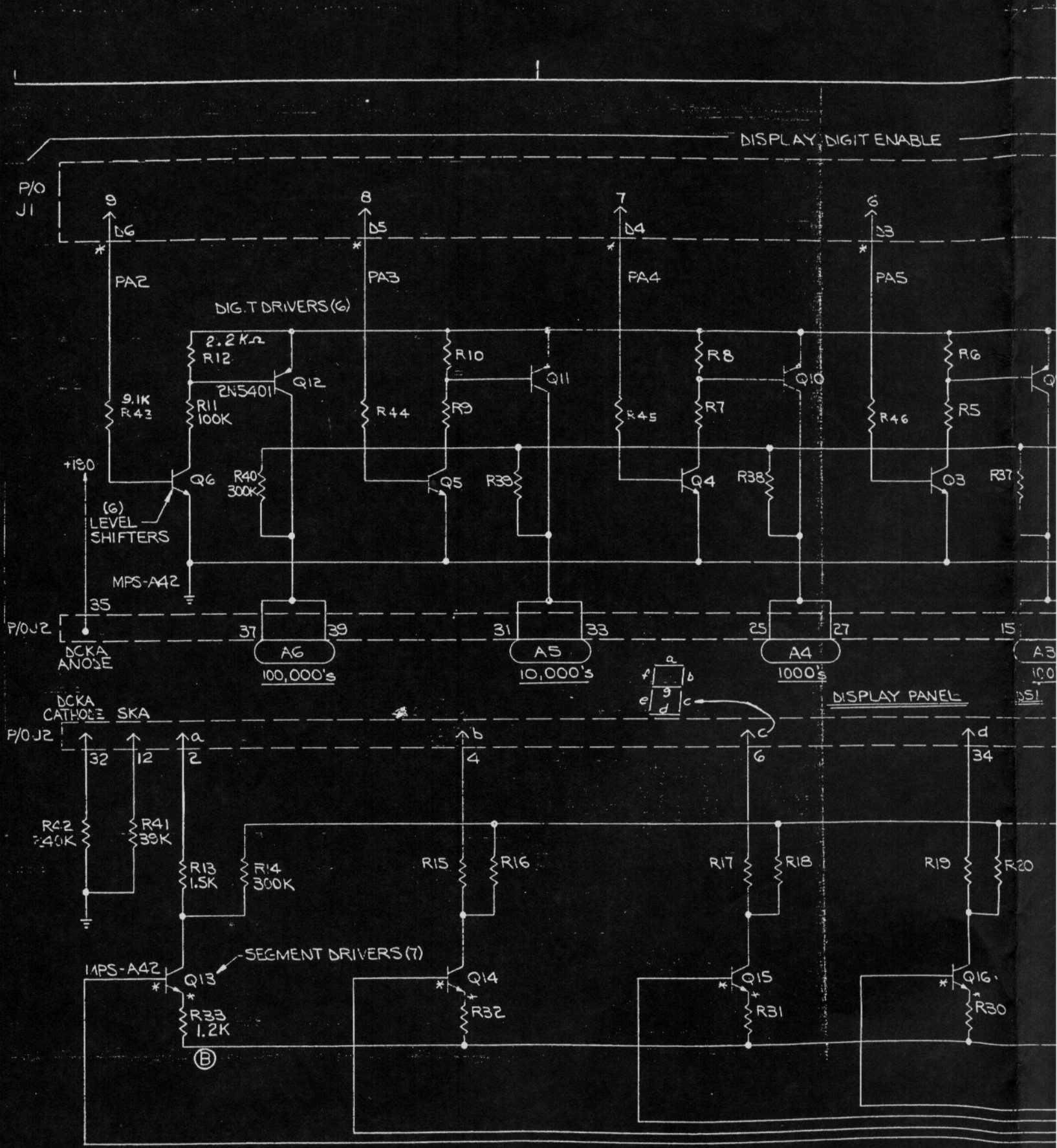
REMOVE ALL BURRS
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/64
DECIMALS ± .003
EXCEPT HOLE DIA ±
ANGLES ± 1/2°
DO NOT SCALE DRAWING

DR. BY NRW DATE 9-13-79
CK. BY DATE 9-19-79
AP'D BY DATE 9-19-79
DATE 9/24/79
FINISH:
HARDENING:

Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO, ILLINOIS
1173

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

NAME COMPUTER SOUND MODULE A8 SCHEMATIC
ASSEM. NO. USED AS-2518-51
SCALE NONE
MATERIAL
CODE
PART NO. W-1211 C



NOTES:

1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE ± 5%, 1/4W.
2. PREFIX ALL REFERENCE DESIG. WITH ASSEMBLY REFERENCE DESIG. "A1"
3. * INDICATES 'A1D' TEST POINT.

G PART NO. W-1184-

DIE SIZE — C.C. — FT. PER M — LBS. PER M —

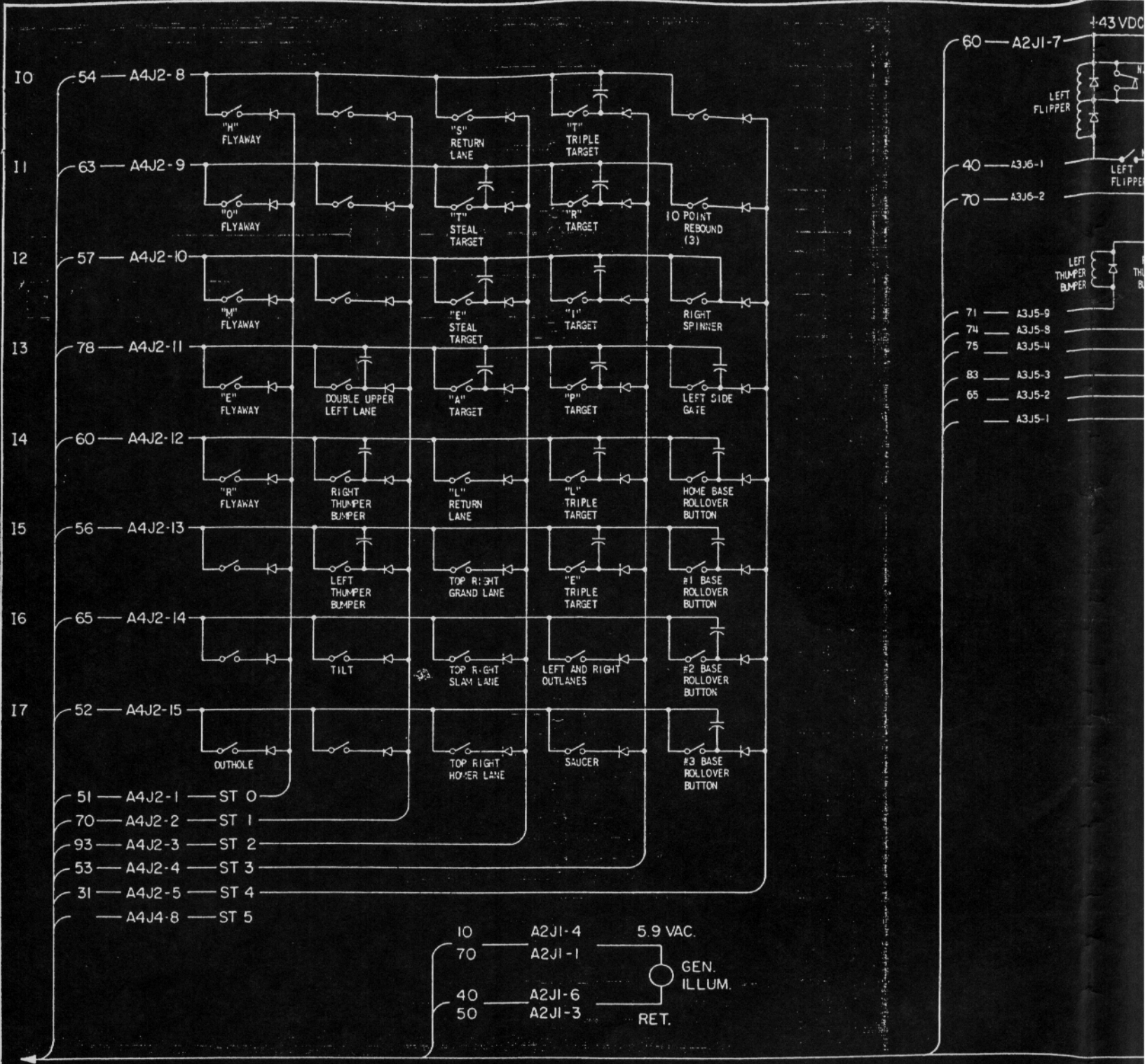
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REMOVE ALL BURRS

TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS ±

DR. BY	DATE	Bally MANUFACTURING CORP. 1120																	
CK. BY	DATE	2640 BELMONT AVENUE CHICAGO, ILLINOIS																	
APP'D BY	DATE	PRINT CONTROL →															TOTAL	SCALE	
APP'D BY	DATE	NAME																ASSY NO. USED ON	

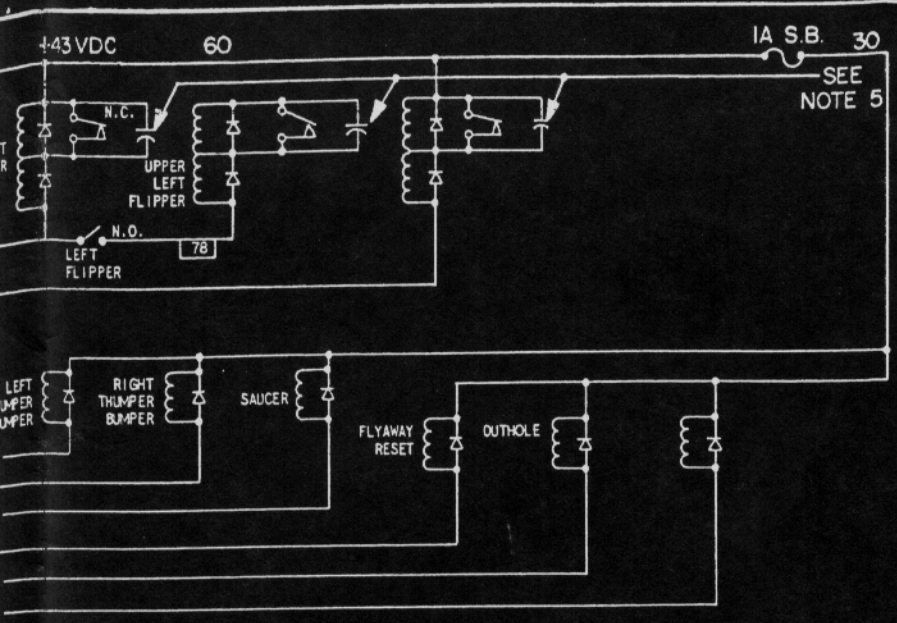
3 C WAS VEC

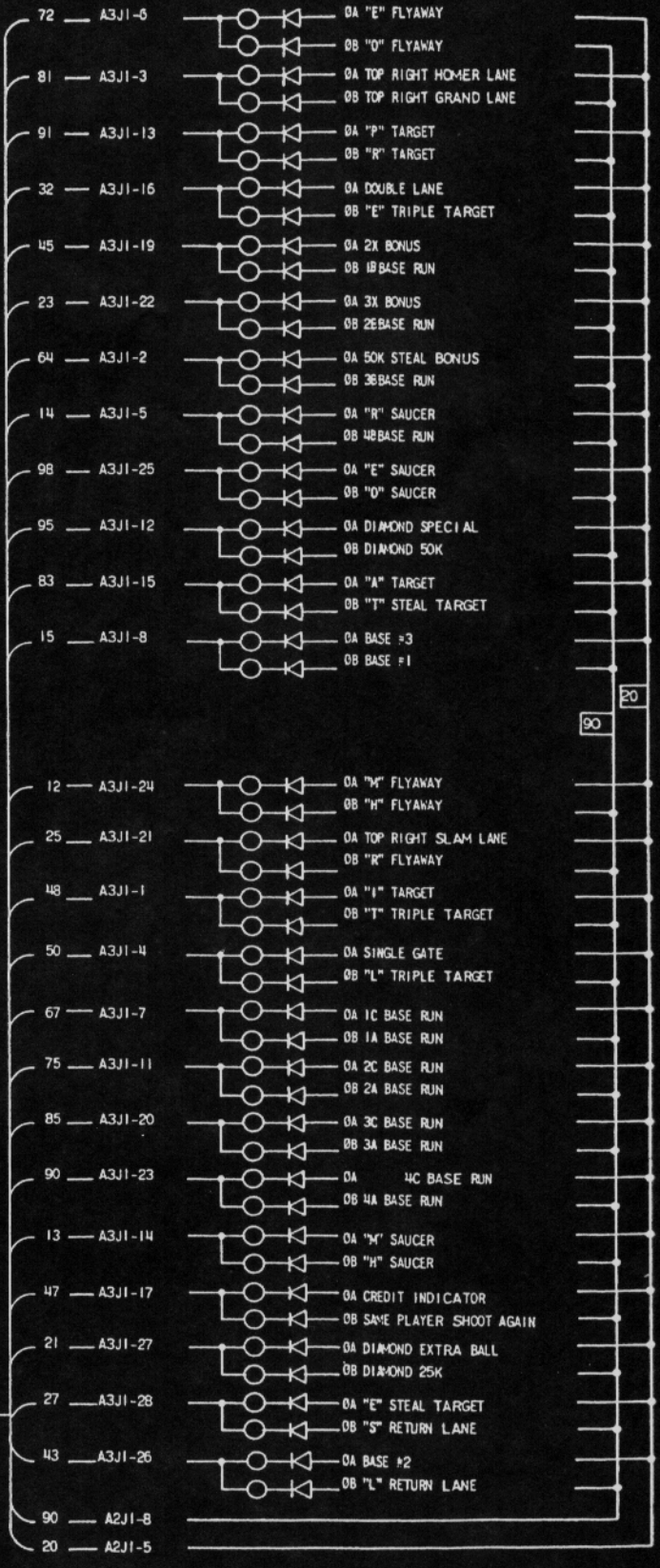


PLAYFIELD A6

NOTES

1. INDICATES NOT USED
2. N/U = NOT USED ON PLAYFIELD
3. * INDICATES AID TEST POINT
4. COIL DIODES ARE IN4004 (E-587-6) SWITCH DIODES ARE IN4148 (E-587-14)
   ALL CAPACITORS ARE .05 MFD. (E-586-80)
5. GERMANY ONLY - CAPACITOR .01 MFD. @ 500 V. (E-586-65)





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REMOVE ALL BURRS
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ±
DECIMALS ± .
EXCEPT HOLE DIA'S
ANGLES ±

DR BY A. DATE 2-6-13
CHK'D BY DATE 2-7-13
APP'D BY JD DATE 2-25-13
APP'D BY DATE 2-25-13

Bally MANUFACTURING CORP.
3640 BELMONT AVENUE
CHICAGO, ILLINOIS
#1311

PART CONTROL A

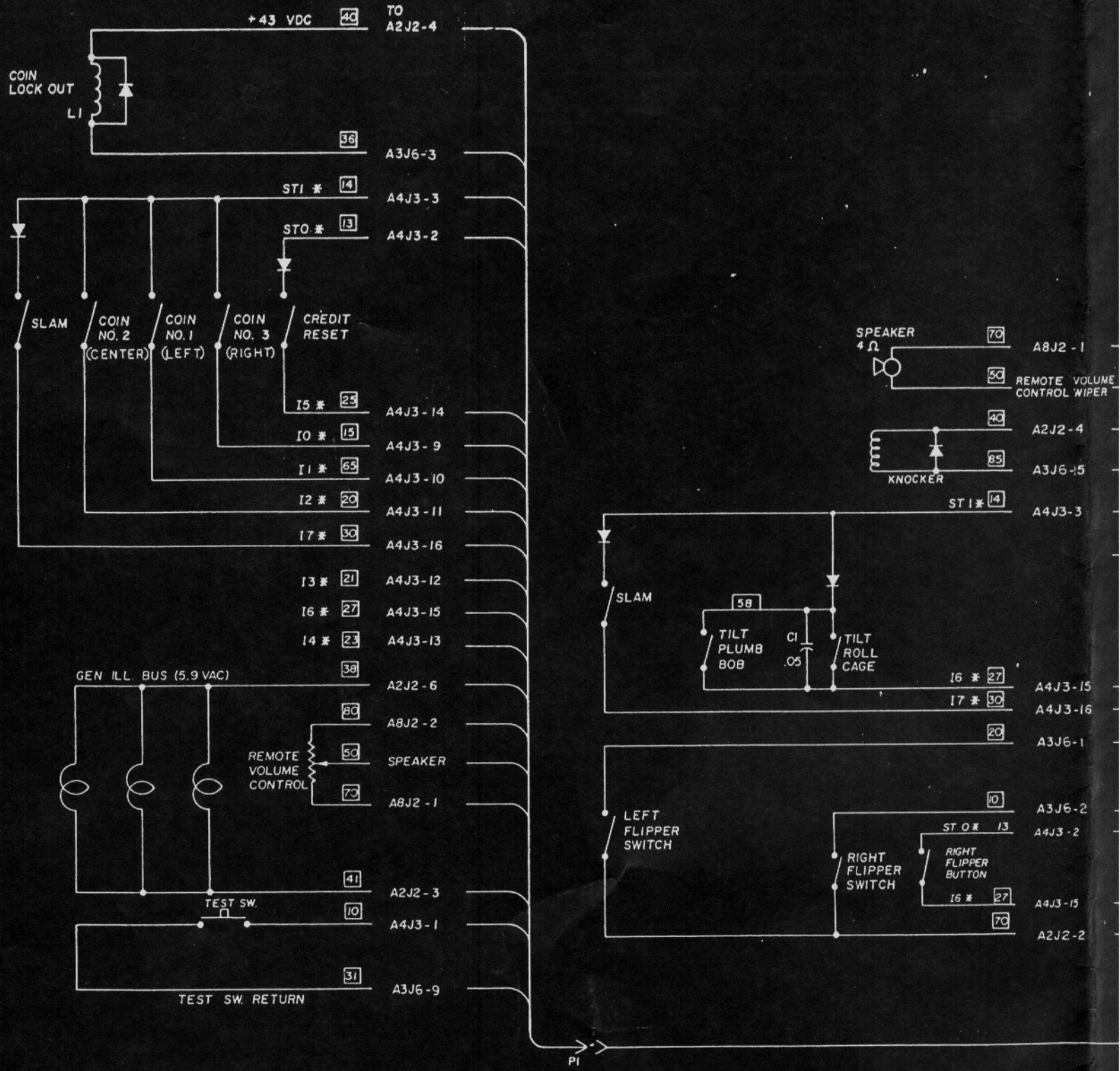
NAME WIRING DIAGRAM PLAYFIELD

USED ON

SIZE A

MATERIAL

PART NO



NOTES: (CAUTION)

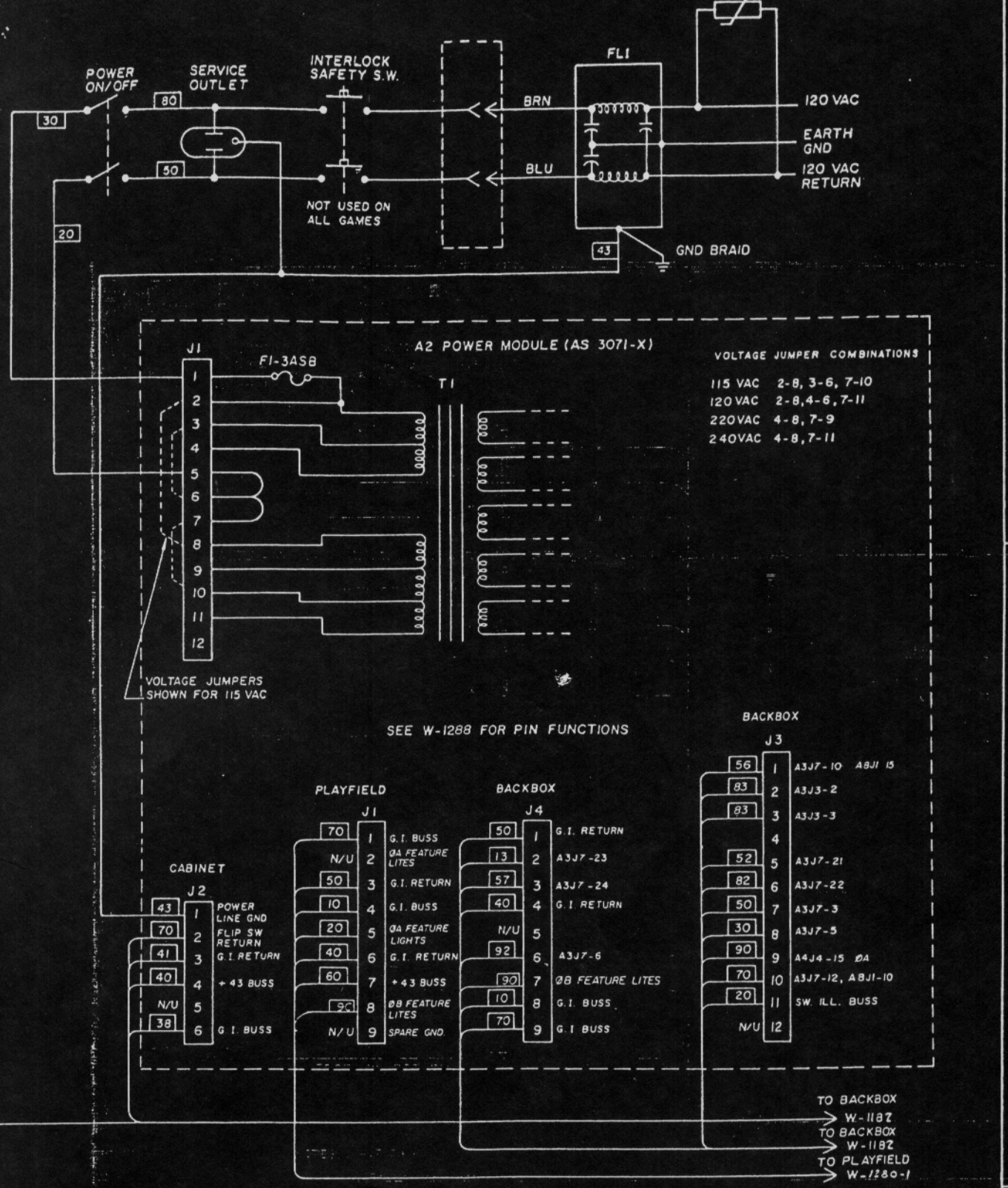
1. USE BALLY PART NO. E-713 FOR 115-120 VAC.
2. USE BALLY PART NO. E-713-1 FOR 220-240 VAC.
3. * INDICATES AID TEST POINT.

TO	J1 PIN	TO	J1 PIN
A4J3-9	1	A4J3-3	11
A4J3-10	2	A2J2-4	15
A4J3-11	3	A3J6-3	16
A4J3-12	4	A2J2-6	17
A4J3-13	5	A2J2-3	18
A4J3-14	6	A4J3-1	19
A4J3-15	7	A3J6-9	20
A4J3-16	8	SPEAKER	9
A4J3-2	10	A8J2-1	12
DOOR PLUG		A8J2-2	13

A7 CABINET ASS'Y. WIRING

NOTE: DIODES ARE IN4004, (E-587-6)

PER	DEPT	DESCRIPTION	TOOL NO



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NO	LET	CHANGE	DATE	BY

REMOVE ALL BURRS
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS ± DEC PLACES ± EXCEPT HOLE DIA ± ANGLES ±
DO NOT SCALE DRAWING
FINISH
HARDEN NO

DR BY A.	DATE 2-2-83	
CK BY	DATE 2-16-83	
APP'D BY J D	DATE 2-17-83	
APP'D BY	DATE 2-21-83	

Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO ILLINOIS
#1311

PRINT CONTROL A

NAME WIRING DIAGRAM - CABINET
ASSEM NO USED
SCALE
MATERIAL GRAND SLAM
PART NO W-1186-25 c

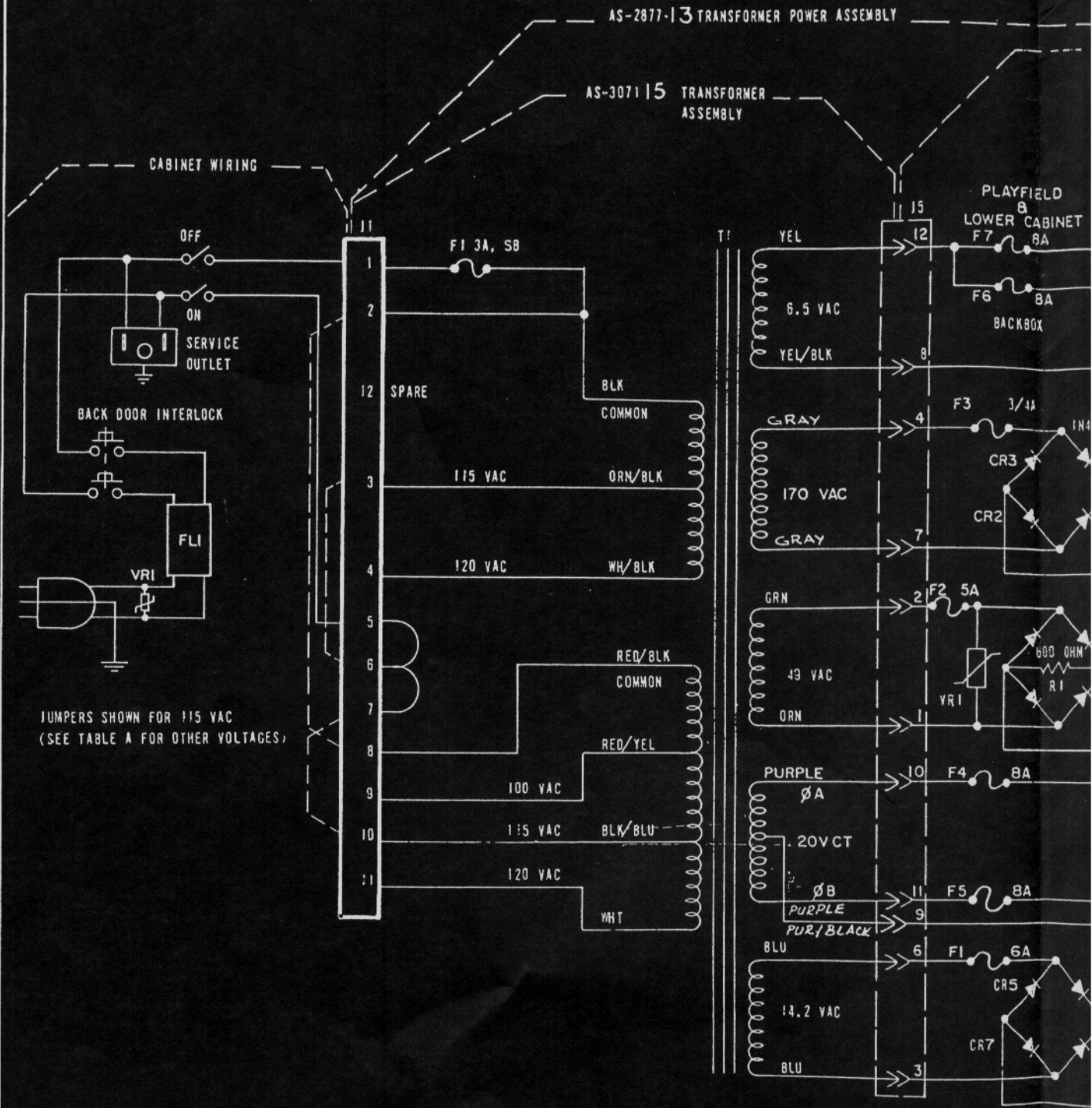


TABLE 'A'

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

OPER.	DEPT.	DESCRIPTION	TOOL NO.

NO.	LET.	CHANGE

G PART NO. W-1288 b

AS-2518-151 POWER MODULE

AYFIELD
8
R CABINET
8A

8A

ACKBOX

3/4A

IN4004 (4)

CR4

CR1

R3

TP1 +230 VDC (UNREG. 190)

R2
100K

SOL. BUSS
TP4 +43 VDC.

600 OHM
R1

BR1

TP3
ØA FEATURE LIGHTS

8A

TP2
ØB FEATURE LIGHTS

8A

6A

CR6

CR8

TP5 11.5 VDC (UNREG, +5)

J3 (BACK BOX)

1	5V FILTER RETURN
2	SW. LAMP RETURN
3	SW. LAMP RETURN
4	SW. LAMP RETURN
5	5V REGULATOR RETURN
6	190 REGULATOR RETURN
7	190 FILTER RETURN
8	FLIPPER RELAY, +43
9	ØA TO MPU
10	+5V REGULATOR INPUT
11	ØA - FEATURE LIGHTS
12	SOLENOID BUS +43

J4 (BACK BOX)

1	GEN. ILL RETURN
2	SOLENOID BUS RETURN
3	SOLENOID BUS RETURN
4	GEN. ILL. RETURN
5	SPARE
6	190 REGULATOR INPUT
7	ØB - FEATURE LIGHTS
8	GEN. ILL. BUS
9	GEN. ILL. BUS

J2 (LOWER CABINET)

1	POWER LINE GND
2	FLIP SW. RETURN
3	GEN. ILL. RETURN
4	SOLENOID BUS, +43
5	SPARE
6	GEN. ILL. BUS

J1 (PLAYFIELD)

1	GEN. ILL. BUS
2	ØA FEATURE LIGHTS
3	GEN. ILL. RETURN
4	GEN. ILL. BUS
5	ØA FEATURE LIGHTS
6	GEN. ILL. RETURN
7	SOLENOID BUS, +43
8	ØB FEATURE LIGHTS
9	SPARE GND

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DATE	BY

REMOVE ALL BURRS

TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 008
DECIMALS ± 003
EXCEPT HOLE DIA 'S
ANGLES ± 1/2°

DO NOT SCALE DRAWING

DR. BY J.J.G.	DATE 2-2-83	
CK. BY	DATE	
AP'D BY	DATE	
AP'D BY	DATE 2-4-83	

Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO, ILLINOIS
1311

PRINT CONTROL A

NAME: POWER SUPPLY SCHEMATIC

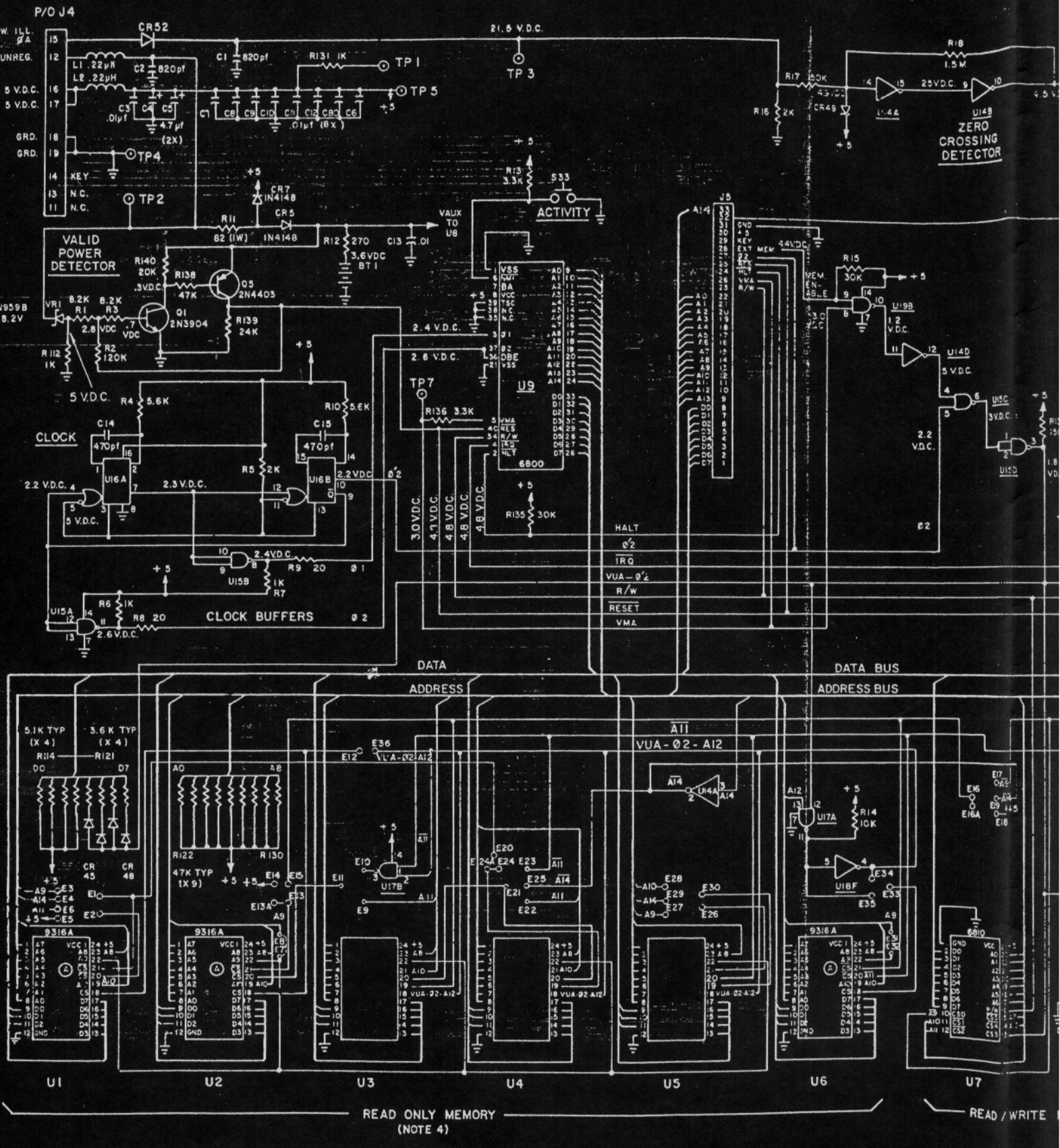
ASSEM. NO. USED: AS-2518-151

SCALE: NONE

MATERIAL: GRAND SLAM

CODE

PART NO. W-1288 b



NOTES

1. * INDICATES "AID" TEST POINT.
2. REMOVE A3J4 BEFORE USING AS AID TEST POINT, MAYBE USED FOR 6TH AND 7TH DISPLAYS
3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A4"
4. EXACT CHIP COMPLEMENT USED IN SOCKETS U1 THRU U6 CAN VARY FOR DIFFERENT GAMES AND PRODUCTION LOTS. TABLES OF MEMORY CHIPS AND CORRESPONDING JUMPERS FOR DIFFERENT GAMES AVAILABLE FROM BALLY FIELD SERVICE DEPARTMENT.

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REMOVE ALL BURRS

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

DR BY	DATE	
CK. BY	DATE	
APP'D BY	DATE	
APP'D BY	DATE	
FINISH		

Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO, ILLINOIS

TOTAL

NAME M.P.U. CONTROL BOARD SCHEMATIC

ASSEM. NO. [illegible]