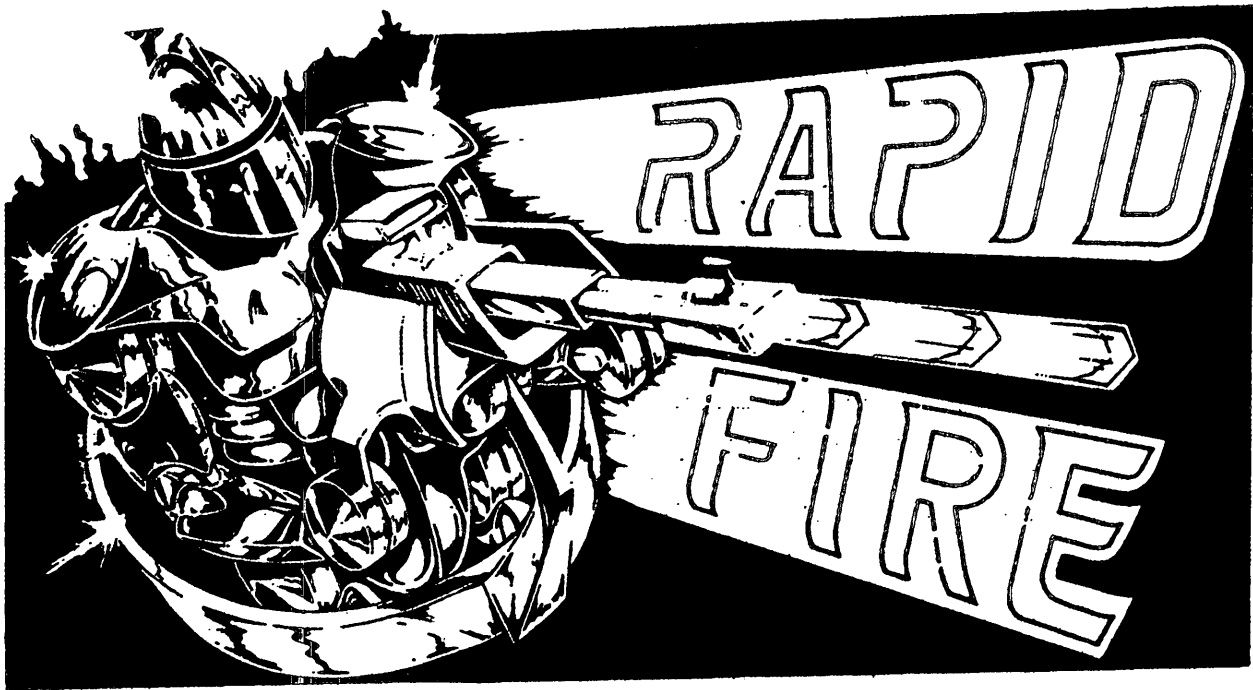


For service in the continental United States,
call toll free: (800)-323-3555;
in Illinois call: 312-860-6400.

GAME 1282
FO 734

Bally[®]



Bally[®]

PINBALL DIVISION

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

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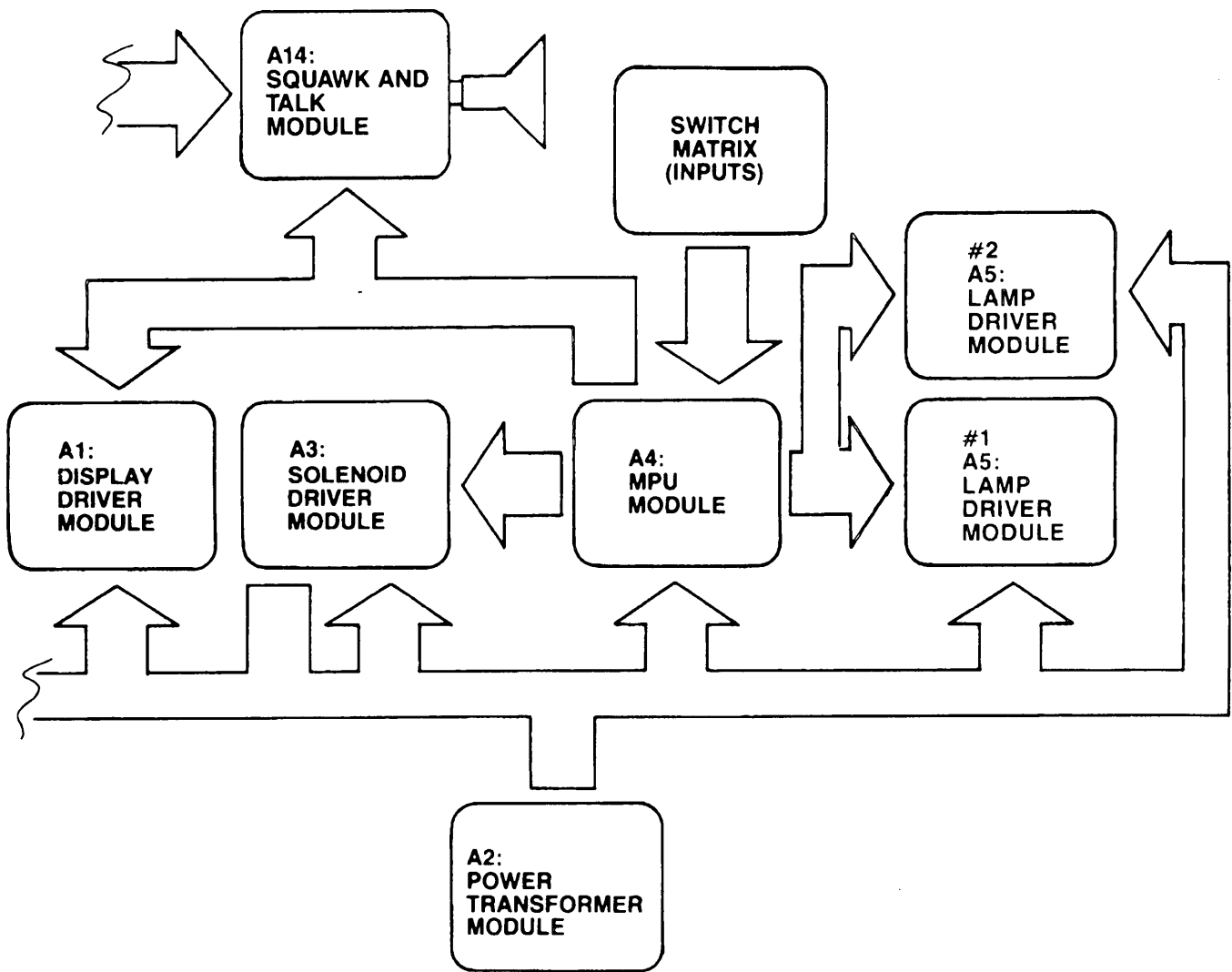
WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. AS TEMPORARILY PERMITTED BY REGULATION IT HAS NOT BEEN TESTED FOR COMPLIANCE TO SUBPART J OF PART 15 OF FCC RULES; WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE. 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.

Installation and General Game Operation Instructions

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BLOCK DIAGRAM—ELECTRONIC PINBALL GAME



I. INSTALLATION

Assemble the game as follows:

Bolt legs to cabinet. Bolt back box to cabinet. Use flat washers under bolt heads. Gently feed cable connectors and ground braid through cable port in back box. Screw ground braid to hinge 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 slam switches) may go out of adjustment.

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) slam switches:

1. Panel slam on bottom of playfield panel.
2. Ball slam on side of cabinet. Insert the smaller ball (15/16" dia.) into the ball slam 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

A20 AUX POWER MODULE AS-3200

SEE W 1186-19

100 VAC, J1-1 & J1-4
115 VAC, J1-1 & J1-5
120 VAC, J1-1 & J1-6
220 VAC, J1-1 & J1-7
240 VAC, J1-1 & J1-8

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

GENERAL GAME OPERATION

Place balls in lower playfield.

Coin game. Coin should be rejected. Plug in line cord. Move power ON-OFF master switch at the bottom right front corner of the cabinet to "ON" position. The game will play a power-up sound to announce game readiness. Scores are set to zero, alternating with the high 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 enter one player into play. One player is posted each additional time the credit button is pressed.

Pressing the credit button initiates play.

The game awards all points earned by the player.

The player up advances each time a base station is destroyed. Then continues until all base stations are destroyed.

Slamming the game 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 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. 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 Bases/Ball in Play window as follows:

- 05— 00 to— 40 = Current Credits
- *06— 100000 to—99999 = Total Plays
- *07— 10000 to—99999 = Not Used
- 08— 00 to—99999 = Not Used
- 09— 00 to—99999 = Not Used
- 10— 10000 to—99999 = Coins Dropped thru Coin Chute #1
- 11— 10000 to—99999 = Not Used
- 12— 10000 to—99999 = Coins Dropped thru Coin Chute #3**
- 13— 00 to—99999 = Not Used
- 14— 00 to—99999 = Number of minutes of Game Play
- 15— 00 to—99999 = Number of Service Credit

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 'Bases/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 (positions 05 thru 15) 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 game comes to Game Over position.

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 'Base/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.

#1282 RAPID FIRE

FEATURE OPERATION & SCORING

INVADER FEATURE (RED)

The Invader Feature consists of two groups of twenty four (24) lights and eight targets.

The lights will be identified in the following manner. Column number first then row; example 1.1, 4.6 etc.

The idea of this feature is for the "Invaders" to load their "Ships." This is accomplished by the lights descending to their two "Ships." Four entries into a "Ship" will activate that ship to fire upon your "Base Station." A shot which gets past your "Force Field" will destroy your "Base Station."

The player would ward off the attack by shooting the "Invader" targets which would kill an "Invader" in that column. As a wave is killed the following wave starts at a faster rate.

Any "Invaders" that make it to the "Ships" would restart at the top of its column except flashing. It will wait there until all other Invaders are killed. At that time the Flashing Invaders will come down in a fast side to side descending pattern.

SNEAK ATTACK FEATURE (GREEN)

This feature consists of one target and eight (8) lights down the center of the playfield. The attack starts at the top of the playfield and descends at a very fast rate.

A shot at its target only stops the attack, it does not destroy the attack. The missile is destroyed by pushing back the attack out the back of the playfield, this is accomplished by multiple shots, each shot moving the attack back on position.

If the attack is not destroyed it will restart at its present position.

TANK FEATURE (BLUE)

This feature consists of two separate attacks, the left tanks and the right tank. The tanks start at the top of the game and descend automatically when they reach their bottom position they fire at the Base Station. A shot which gets past your Force Field destroys your Base Station.

Shots from your Base Station will move the Tanks back one position. A shot from a Laser Cannon will destroy that tank.

FORCE FIELD (WHITE)

The Force Field feature consists of nine (9) white lights at the bottom of the playfield one light is lit at all times. This light is moved by the button in the hand controls to block oncoming shots. An offensive shot may be taken from a lit position.

START OF GAME SETTINGS

SW. #6

ON 2 Panic Buttons

OFF 1 Panic Button

SW. #7

ON 4 Laser Cannons

OFF 2 Laser Cannons

Threshold Laser Cannon Awards SW. #14 & #15

#14 #15

OFF OFF 1 Laser Cannon

ON OFF 2 Laser Cannons

OFF ON 3 Laser Cannons

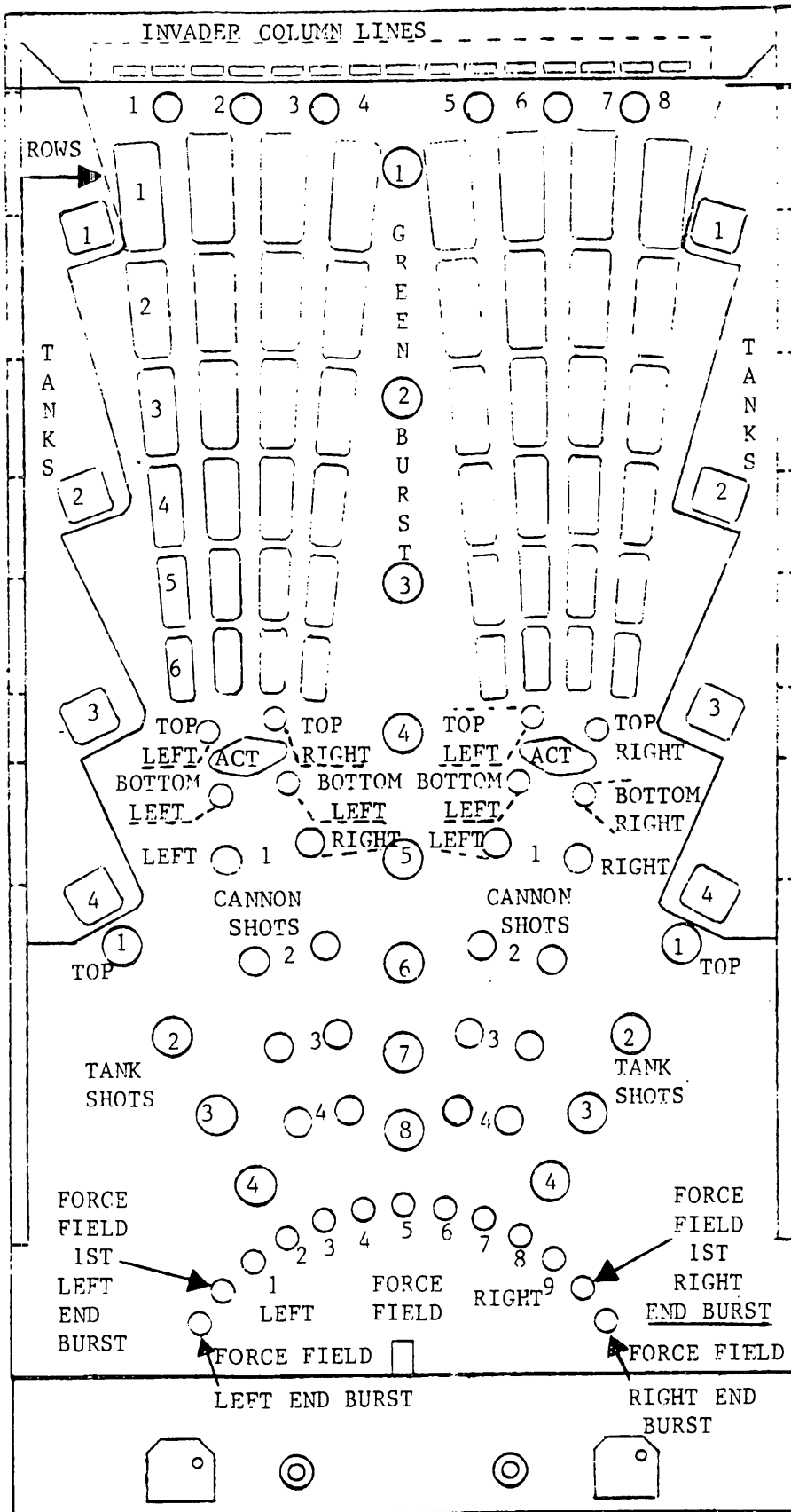
ON ON 4 Laser Cannons

Forcefield Laser Cannon Switch

#8

ON Stops Shot

OFF Stops shot player loses 1 laser cannon



LITE
LOCATION
CHART

V. GAME ADJUSTMENTS

A. 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. Credits per coin, credit display, and base per game, 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 #1 (HINGE SIDE) OR #3 (RIGHT SIDE)	SWITCHES					CREDITS	CREDITS	CREDITS	CREDITS	CREDITS	TOTAL CREDITS/COINS
	5	4	3	2	1						
	13	12	11	10	9						
	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

*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: 15 NONADJUSTABLE

BASES PER GAME:	# BASES/GAME	SWITCHES	32	31
	4		ON	ON
	3		ON	OFF
	2		OFF	OFF
	1		OFF	ON

CREDIT DISPLAY:	CREDITS DISPLAYED	SWITCH 27
	YES	ON
	NO	OFF

HIGH SCORE FEATURE:

The game is designed to award a laser shot, panic button and base station. See Front Door Game Adjustments.

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

The game is designed to show the high score to date only. Each time this happens, the winning score becomes the new high score to beat. This score is displayed on 2 player score displays at the end of each game as an incentive to play.

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

GAME FEATURE OPTIONS

Panic button display adjustment:

Liberal	SW. 6 ON	2 at start of game.
Conservative	SW. 6 OFF	1 at start of game.

Laser cannon force field orange burst lites adjustment:

Liberal	SW. 7 ON	2 left and right burst lites will be on at start of game.
Conservative	SW. 7 OFF	Only 2 left burst lites will be on at start of game.

Laser cannon lites shot adjustment:

Liberal	SW. 8 ON	Stopping offensive shot does not take any orange burst lites out.
Conservative	SW. 8 OFF	Stopping offensive shot also removes 1 orange burst lite.

Laser cannon threshold score adjustment:

Liberal	SW. 14, 15 ON	Adds 4 orange burst lites.
Medium	SW. 14 OFF, 15 ON	Adds 3 orange burst lites.
Semi-Medium	SW. 14 ON, 15 OFF	Adds 2 orange burst lites.
Conservative	SW. 14, 15 OFF	Adds 1 orange burst lite.

Set of 4 Invaders recall adjustment:

Liberal	SW. 16 ON	Knocking out sets of Invaders will recall each set knocked out for next base.
Conservative	SW. 16 OFF	Knocking out sets of Invaders will not recall for next base.

FRONT DOOR GAME ADJUSTMENTS

High Score Feature Adjustments:

The game is designed to award Laser Cannons Panic Buttons and Base Stations at each of three score levels. The recommended levels are on the score card in the game.

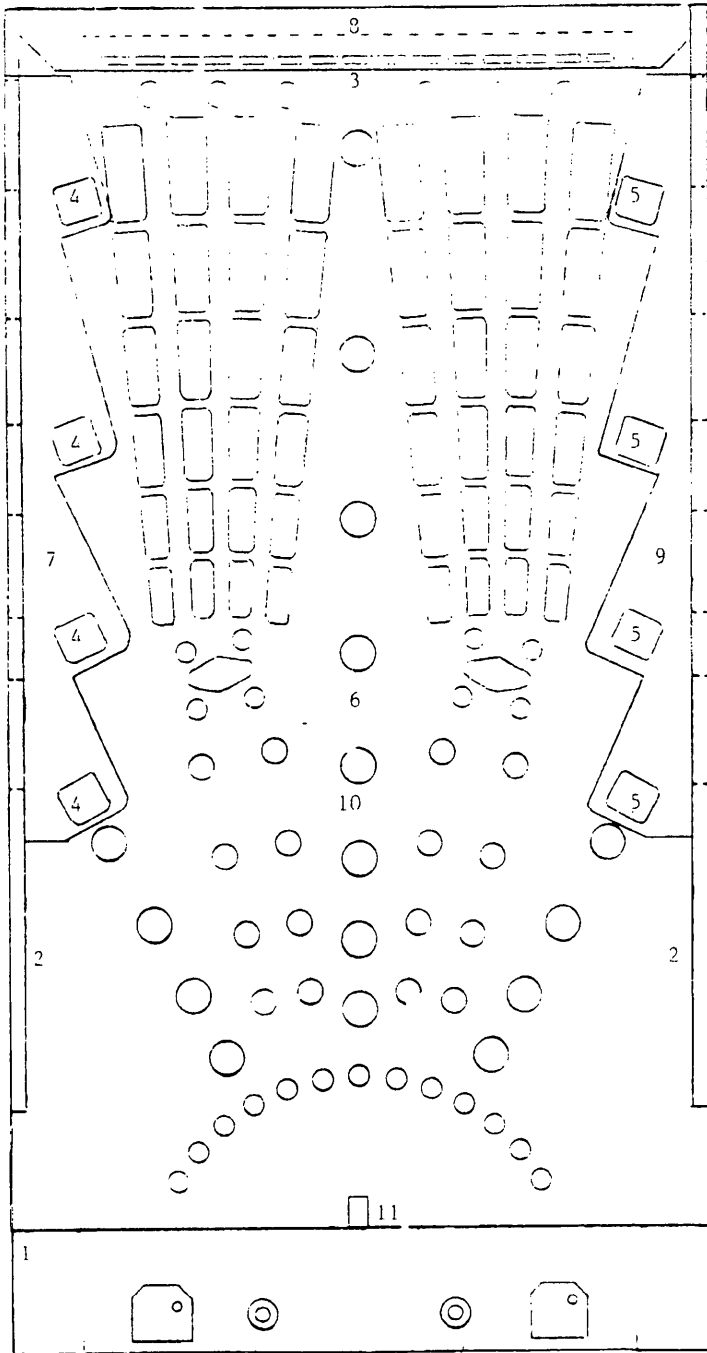
Any level from 50,000 to 9,950,000 can be set as desired. It is also possible to reset (00) any or all of the levels, if desired.

1. Push and release self test button (See Figure 111) at one second intervals approximately six times or until identification number 01 appears on the Base 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 50,000 points at a time. If the number "00" is left on the displays, the high score feature is eliminated.

Setting the first level automatically sets the second and third.

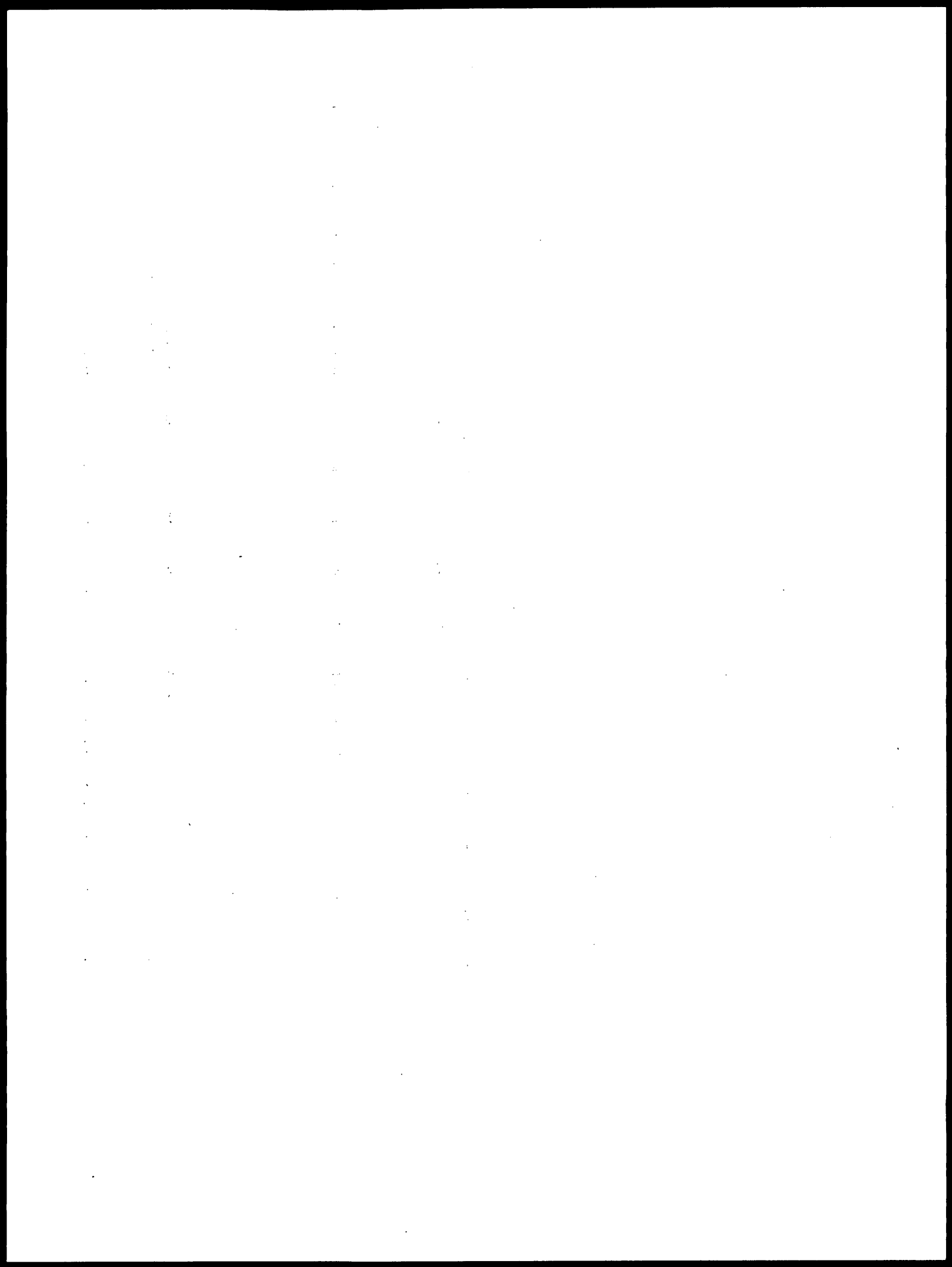
Sound:

The sound levels on this game are set thru the computer. Set the game to position #20 and set a number from 00 to 15 by use of the Credit Button. Position 00 is the lowest setting.



PANEL TOP PARTS

- | | |
|----------------------------|-------------|
| 1. Control Panel Assy. | ASE-3199 |
| 2. Rail (L & R) | CA-1208-146 |
| 3. Top Target Assy. | ASE-3188 |
| 4. Single Target Assy. (L) | ASE-3188-1 |
| 5. Single Target Assy. (R) | ASE-3188-2 |
| 6. Screened Panel Overlay | M-1787-52 |
| 7. Left Cannons | M-1629-3 |
| 8. Top Cover | M-1639-4 |
| 9. Right Cannons | M-1639-5 |
| 10. Playfield Plexiglass | M-1960-1 |
| 11. Gun Assembly | ASE-3190 |



RECOMMENDED

Instruction, Score Cards to be used on RAPID FIRE #1282

BASE STATIONS

Instruction Cards	M-1508-106-B
Score Card	M-1508-106-R
2 Laser Cannons every	350,000
1 Panic button every	700,000
1 Base station every	1,050,000

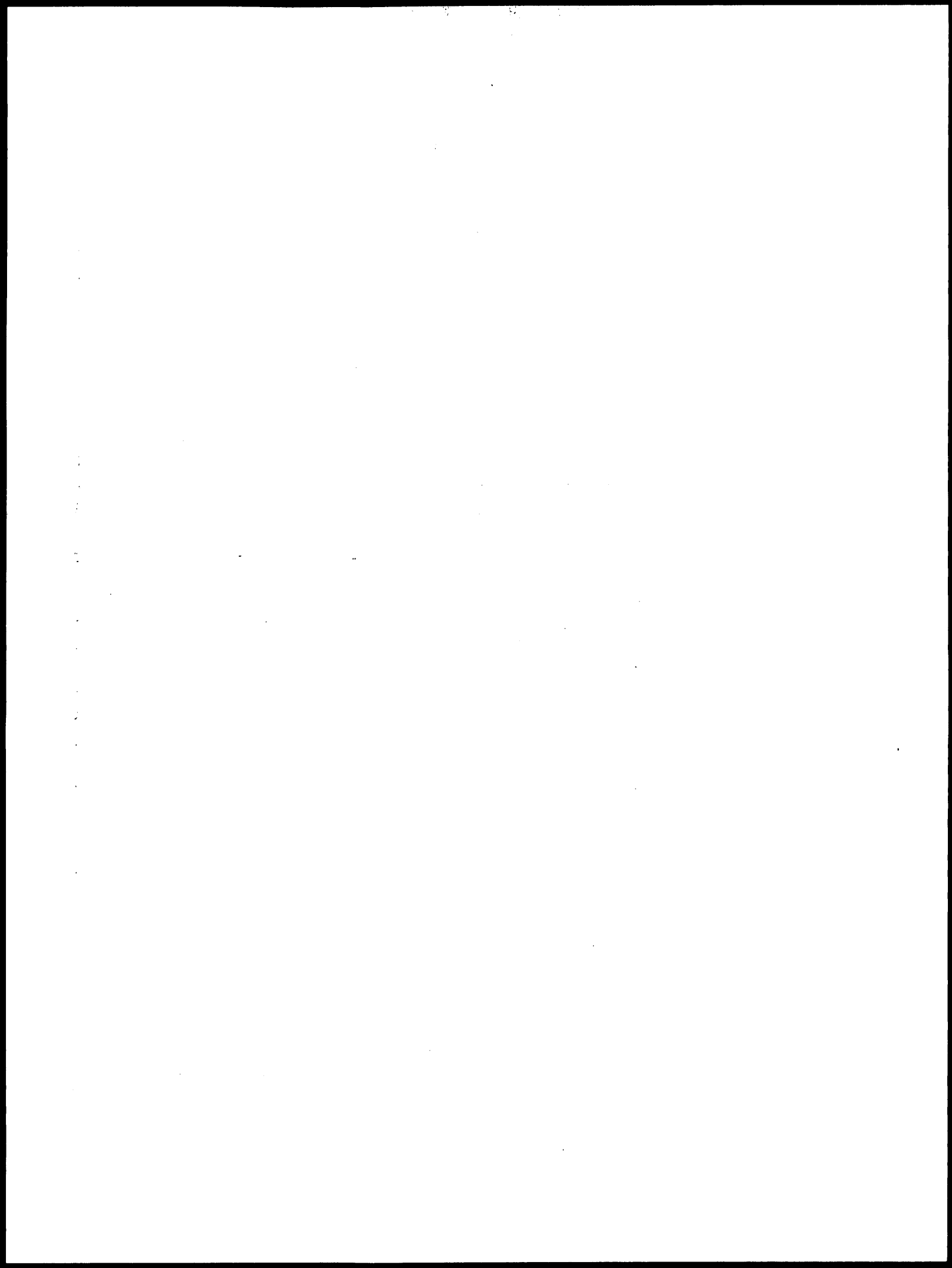
ADDITIONAL CARDS

	1 LASER CANNON	1 PANIC BUTTON	BASE STATION		3 LASER	1 PANIC	1 BASE
M-1508-106-E	200,000	400,000	600,000	M-1508-106-1	200,000	400,000	600,000
M-1508-106-F	250,000	500,000	750,000	M-1508-106-2	250,000	500,000	750,000
M-1508-106-G	300,000	600,000	900,000	M-1508-106-3	300,000	600,000	900,000
M-1508-106-H	350,000	700,000	1,050,000	M-1508-106-4	350,000	700,000	1,050,000
M-1508-106-I	400,000	800,000	1,200,000	M-1508-106-5	400,000	800,000	1,200,000
M-1508-106-J	450,000	900,000	1,350,000	M-1508-106-6	450,000	900,000	1,350,000
M-1508-106-K	500,000	1,000,000	1,500,000	M-1508-106-7	500,000	1,000,000	1,500,000
M-1508-106-L	550,000	1,100,000	1,650,000	M-1508-106-8	550,000	1,100,000	1,650,000
M-1508-106-M	600,000	1,200,000	1,800,000	M-1508-106-9	600,000	1,200,000	1,800,000
M-1508-106-N	650,000	1,300,000	1,950,000	M-1508-106-10	650,000	1,300,000	1,950,000
	2 LASER	1 PANIC	1 BASE		4 LASER	1 PANIC	1 BASE
M-1508-106-O	200,000	400,000	600,000	M-1508-106-11	200,000	400,000	600,000
M-1508-106-P	250,000	500,000	750,000	M-1508-106-12	250,000	500,000	750,000
M-1508-106-Q	300,000	600,000	900,000	M-1508-106-13	300,000	600,000	900,000
M-1508-106-R	350,000	700,000	1,050,000	M-1508-106-14	350,000	700,000	1,050,000
M-1508-106-S	400,000	800,000	1,200,000	M-1508-106-15	400,000	800,000	1,200,000
M-1508-106-T	450,000	900,000	1,350,000	M-1508-106-16	450,000	900,000	1,350,000
M-1508-106-U	500,000	1,000,000	1,500,000	M-1508-106-17	500,000	1,000,000	1,500,000
M-1508-106-V	550,000	1,100,000	1,650,000	M-1508-106-18	550,000	1,100,000	1,650,000
M-1508-106-X	600,000	1,200,000	1,800,000	M-1508-106-19	600,000	1,200,000	1,800,000
M-1508-106-Y	650,000	1,300,000	1,950,000	M-1508-106-20	650,000	1,300,000	1,950,000

RECOMMENDED GAME SETTING FOR:

PANIC BUTTON DISPLAY 1 OR 2
 LASER CANNON ORANGE BURST LITES 2 OR 4
 LASER CANNON ORANGE BURST LITES SHOTS
 LASER CANNON THRESHOLD SCORE ADDED BURST LITES
 LASER CANNON THRESHOLD SCORE ADDED BURST LITES
 SET OF 4 INVADERS RECALL
 BASES PER GAME
 BASES PER GAME

SWITCH	2-BASES
SW. 6	ON
SW. 7	ON
SW. 8	ON
SW. 14	ON
SW. 15	OFF
SW. 16	ON
SW. 31	OFF
SW. 32	OFF



VIII. ROUTINE MAINTENANCE ON LOCATION:

Self-Test routines are written into the game design. They are particularly useful for routine maintenance. The tests are described below. The first test is automatic and occurs on power-up. This test causes the MPU module A4 to examine itself for failures. Seven flashes of an LED indicates proper operation. The second series of self-diagnostic tests causes the MPU to 'exercise' each of the other modules in such a way as to make their faults, if any, obvious. See 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. 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 Self-Test button again causes the sound module to play the "Game Over" tune repeatedly.
4. 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'.
5. Pressing the Self-Test button 22 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.

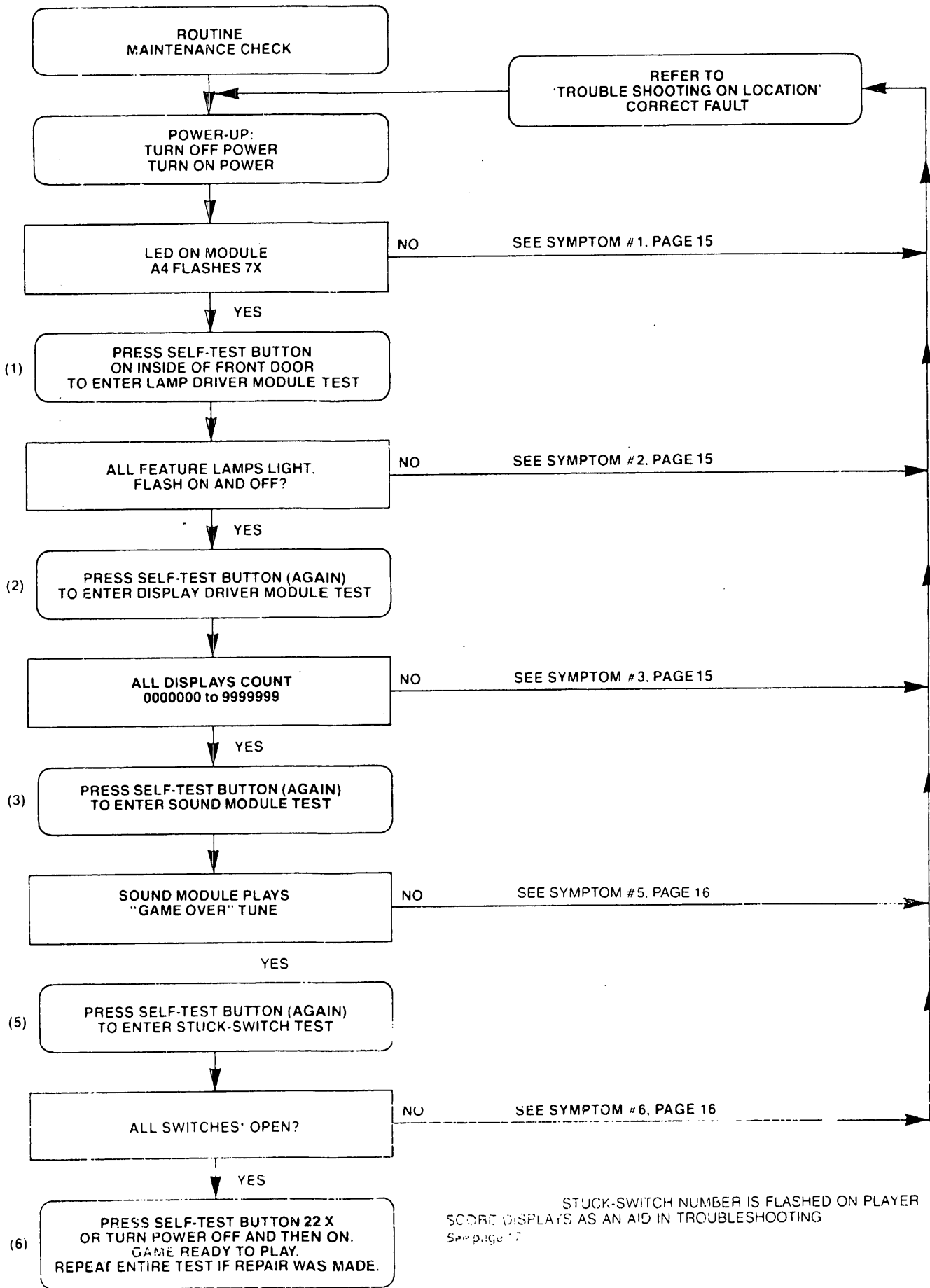
After successful completion of the Self Diagnostic Test procedure, set the game up for play. If actuating a switch assembly results in intermittent or no response, clean contacts by gently closing them on a clean business card or piece of paper and wiping until they wipe clean. Regap, if necessary, to 1/16". **Do not burnish or file Gold Plated Switch Contacts.**

IX. TROUBLESHOOTING ON LOCATION

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

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

FIGURE IV SELF DIAGNOSTIC TEST



- 1A) SYMPTOM:** Game does not play power-up tune when power is turned on. General Illumination is present.
- ACTION:**
- A)** Turn power OFF. Open back box. Locate light emitting diode (LED) on MPU module A4.
 - B)** Turn Power ON. LED must flash 7X to indicate that module A4 is good. Correct flash sequence is flicker/flash-pause-and then six more flashes and LED goes out.
 - C.** If LED does not come on, or does not flash, or flashes, but less than 7X, turn off power. Replace MPU module A4.
- CAUTION:** **Replacement MPU Module must have same Part Number or incorrect operation will result! See Parts List for MPU Module Part Number.**
- Turn power ON.
- D)** If game is correct, it is now ready for play. If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 2A) SYMPTOM:** Not all feature lamps light during game play.
- ACTION:**
- A)** With power ON, open front door. Press button (Self-Test switch) once. If the game is correct, **all** feature lamps flash ON and OFF.
 - B)** Carefully raise playfield or open back box to gain access to lamps.
 - C)** Replace bulbs that do not flash.
 - D).** If game is correct, it is now ready for play.
 - E)** If game is not correct, turn power OFF. Replace Lamp Driver Module A5. Turn power ON and repeat A.
 - F)** If game is correct, it is now ready for play.*
 - G)** If game is not correct, turn power OFF. Replace MPU module A4. See CAUTION, 1C. Turn power ON and repeat A.
 - H)** If game is correct, it is now ready for play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 2B) SYMPTOM:** One or some switched lamps always ON.
- ACTION:** Repeat 2AA, AB, AE, and AF and, if necessary AG & AH.
- 3A) SYMPTOM:** Display digits improper on **one** or **several**, but less than all Display Driver module(s), A1. Improper: One or several segments always OFF, digits mottled or several segments or digit(s) always ON.
- ACTION:**
- A)** With power ON, open front door. Press button (Self-Test switch) twice. If the game is correct, each digit on each Display Driver Module A1 (5 used/game) displays the count 1-9 and 0 continuously in all 6 digit positions. Note defective Display Driver modules.
 - B)** Turn power OFF.
- CAUTION: High Voltage is supplied to the Display Driver Modules, A1, from the Solenoid Driver/Voltage Regulator Module A3. Wait 30 seconds for High Voltage to Bleed Off.**
- C)** Replace Display Driver module(s) A1. Turn power ON. Repeat A.
 - D)** If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 3B) SYMPTOM:** **All** displays improper (all five display Driver modules). Improper: Digit(s) always on or off/segment(s) always on or off, all displays.
- ACTION:**
- A)** Repeat 3AA, and AB.
 - B)** Replace MPU module A4. See CAUTION NOTE, 1C. Turn power ON. Repeat A.

- C) If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)
- 3C) **SYMPTOM:** One or several displays always off.
ACTION: A) Do 3AA, AB, AC, and AD.
B) Repeat 3BB and BC, if necessary.
- 4A) **SYMPTOM:** Solenoid(s) do(es) not pull-in during course of game.
ACTION: A) Carefully lift the playfield (or open the back box) to gain access to the solenoid. Turn power OFF. Inspect the solenoid.
B) 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.
C) Replace Solenoid Driver/Voltage Regulator module A3. See CAUTION NOTE 3AB.
D) Replace Sound Module A8.
E) Replace MPU module A4. See CAUTION NOTE, 1C.
- 4B) **SYMPTOM:** Solenoid(s) always energized—Note: if impulse solenoids (gun strobe lights, 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, A1 and AJ.
- 5) **SYMPTOM:** No Sound.
ACTION: A) With Power ON, open front door, press Self-Test switch four times.
B) If correct, sound will be heard. If incorrect, try seating speaker lead connector (J2) and input connector (J1).
C) If correct, sound will be heard. If incorrect, refer to Module Replacement procedure.
- 6) **SYMPTOM:** Feature (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, Base 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. 560-3.

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

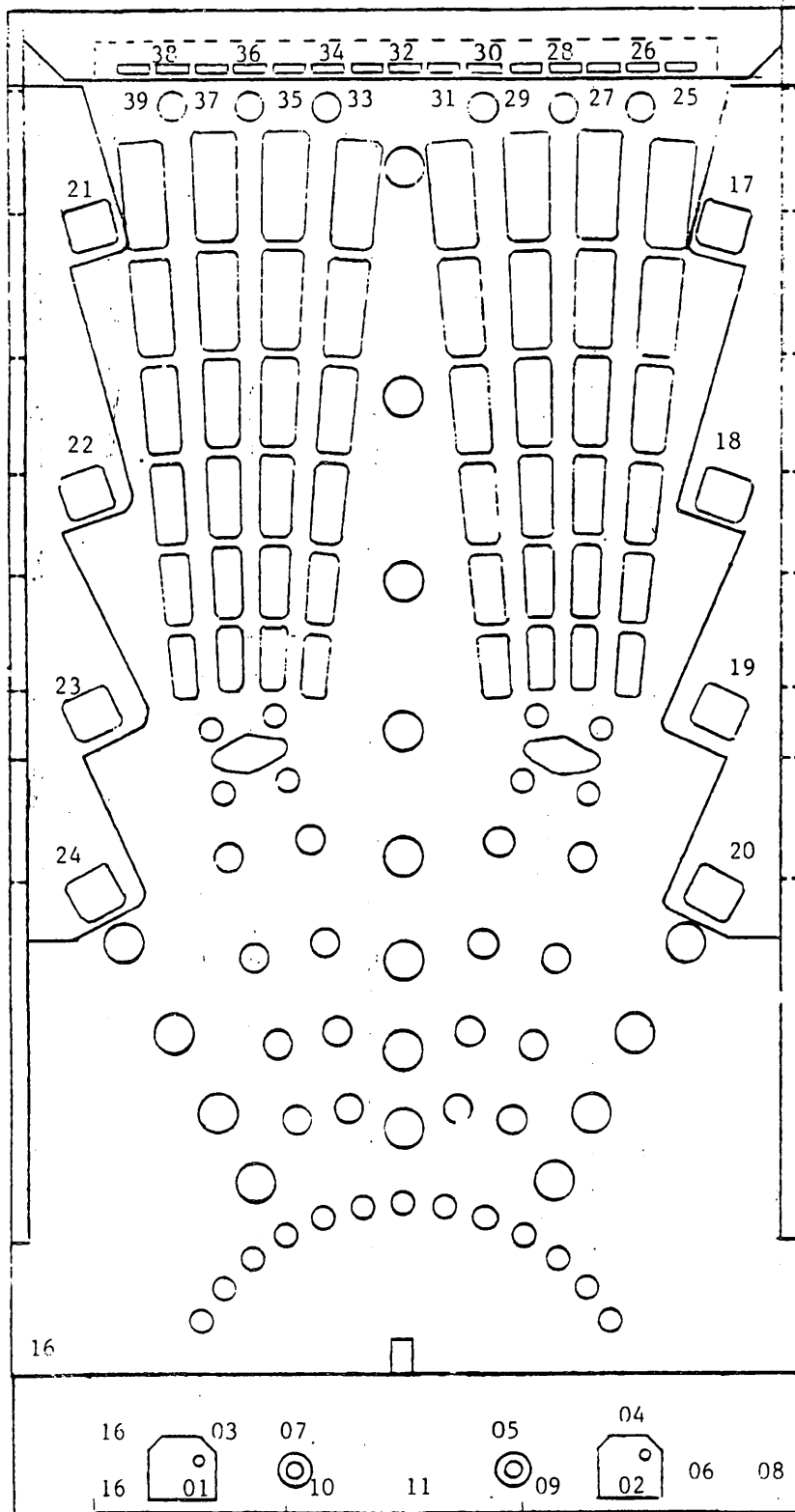
**GAME #1282 RAPID
SWITCH IDENTIFICATION TABLE**

**Self
Test # DESCRIPTION**

01 FIRE LEFT GUN
 02 FIRE RIGHT GUN
 03 GUN LEFT MOVE BUTTON
 04 GUN RIGHT MOVE BUTTON
 05 LASER BUTTON (RIGHT)
 06 CREDIT BUTTON (ON DOOR)
 07 PANIC BUTTON (LEFT)
 08 SPECIAL CREDIT BUTTON
 (ON CABINET)
 09 COIN III (RIGHT)
 10 COIN I (LEFT)
 11 COIN II (MIDDLE)
 12
 13
 14
 15
 16 SLAM (3)
 17 RIGHT #1 TANK (TOP)
 18 RIGHT #2 TANK
 19 RIGHT #3 TANK
 20 RIGHT #4 TANK (BOTTOM)

**Self
Test # DESCRIPTION**

21 LEFT #1 TANK (TOP)
 22 LEFT #2 TANK
 23 LEFT #3 TANK
 24 LEFT #4 TANK (BOTTOM)
 25 TOP #1 FLAP (RIGHT SIDE)
 26 TOP #2 FLAP
 27 TOP #3 FLAP
 28 TOP #4 FLAP
 29 TOP #5 FLAP
 30 TOP #6 FLAP
 31 TOP #7 FLAP
 32 TOP #8 FLAP
 33 TOP #9 FLAP
 34 TOP #10 FLAP
 35 TOP #11 FLAP
 36 TOP #12 FLAP
 37 TOP #13 FLAP
 38 TOP #14 FLAP
 39 TOP #15 FLAP (LEFT SIDE)
 40



#1282 RAPID FIRE

SWITCH ASSEMBLY IDENTIFICATION NUMBERS

NOTE: CABINET: 08, 16

DOOR: 06, 09, 10, 11, 16

CONTROL PANEL: 01, 02, 03, 04, 05, 07

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 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.

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:

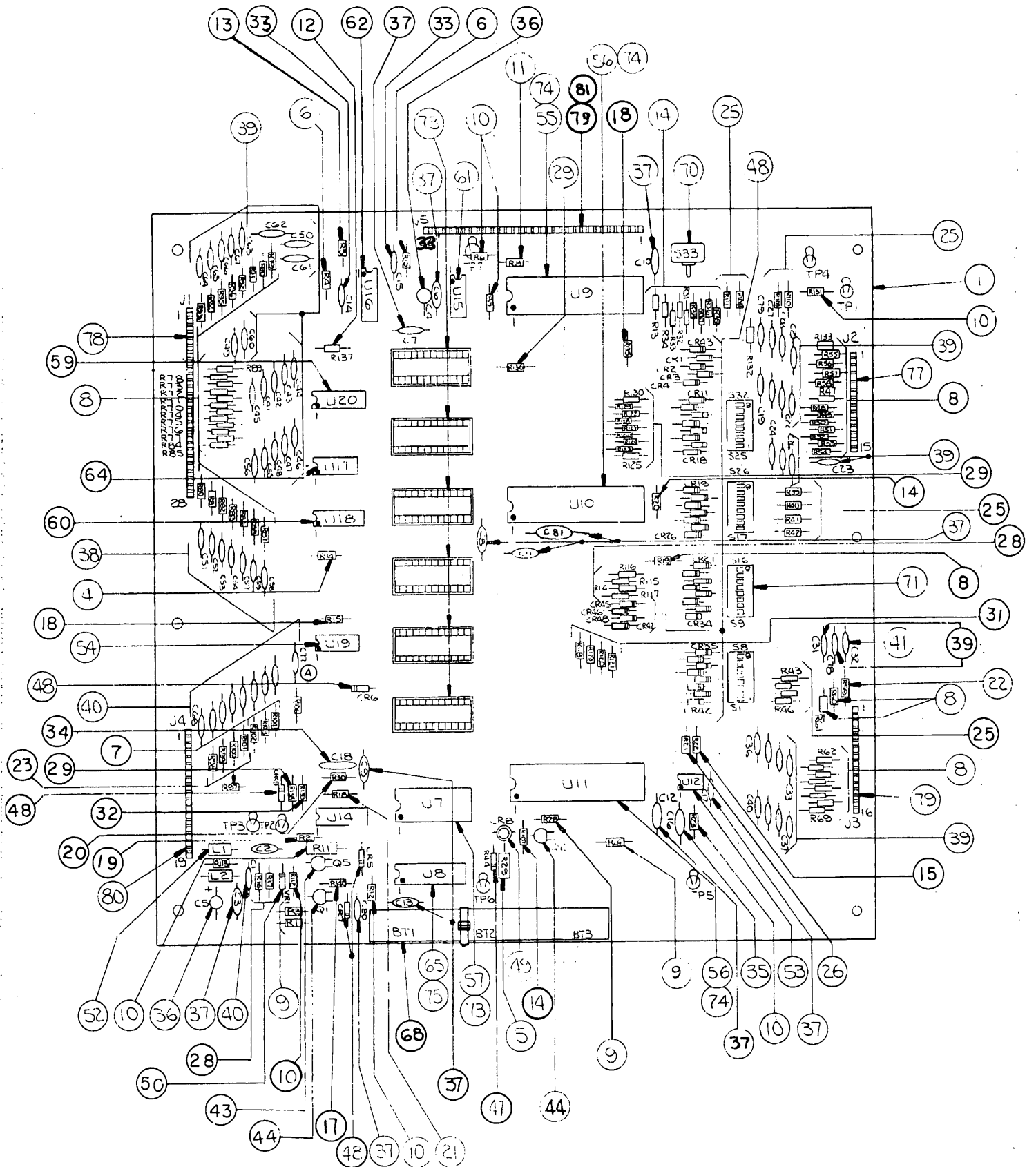
BALLY MANUFACTURING CORPORATION
2640 WEST BELMONT AVENUE
CHICAGO, ILLINOIS 60618
ATTN: PARTS DEPARTMENT

XI. PARTS LIST

#1282 RAPID FIRE

MISCELLANEOUS	PART NUMBER
Transformer (Domestic or Export)	E-122-142
Bulbs, #555	E-125-73
 ASSEMBLY COILS	
Coil Lockout	FO-36-7000
Gun	N-23-1110
 MOTORS	
Agitator	E-119-506
Ball Filler	E-119-505
Fan Motor	E-119-508
 PLAYFIELD PARTS	 See Figure II
 MODULES	
Lamp Driver A5 (2 used)	AS-2518-23
Display Driver A1 (1 used)	AS-2518-21
Display Driver A1 (2 used)	AS-2518-58
Solenoid Drive/Voltage Regulator A3	AS-2518-22
MPU A4	AS-2962-34
Transformer & Rectifier A2	AS-2877-6
Rectifier Board (Part of A2)	AS-2518-54
Squawk & Talk	AS-3107-11
Optical Switch	AS-2518-95
Single Target Optical Switch	AS-2518-100
Single Target Optical Switch	AS-2518-101
Ball Delivery Sensor & Motor Control	AS-2518-102
Ball Delivery (LED) Control	AS-2518-103
 REPAIRS PROCEDURES/AIDS	
Module & Component Replacement	F.O. 560-3
AID (Assistance in Diagnostics)	
Kit, used with F.O. 560-3	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 #492— For Display Driver A1	
Kit #494— For Lamp Driver A5	

AS-2518-35 MPU MODULE



A4: MPU MODULE COMPONENT PARTS LIST

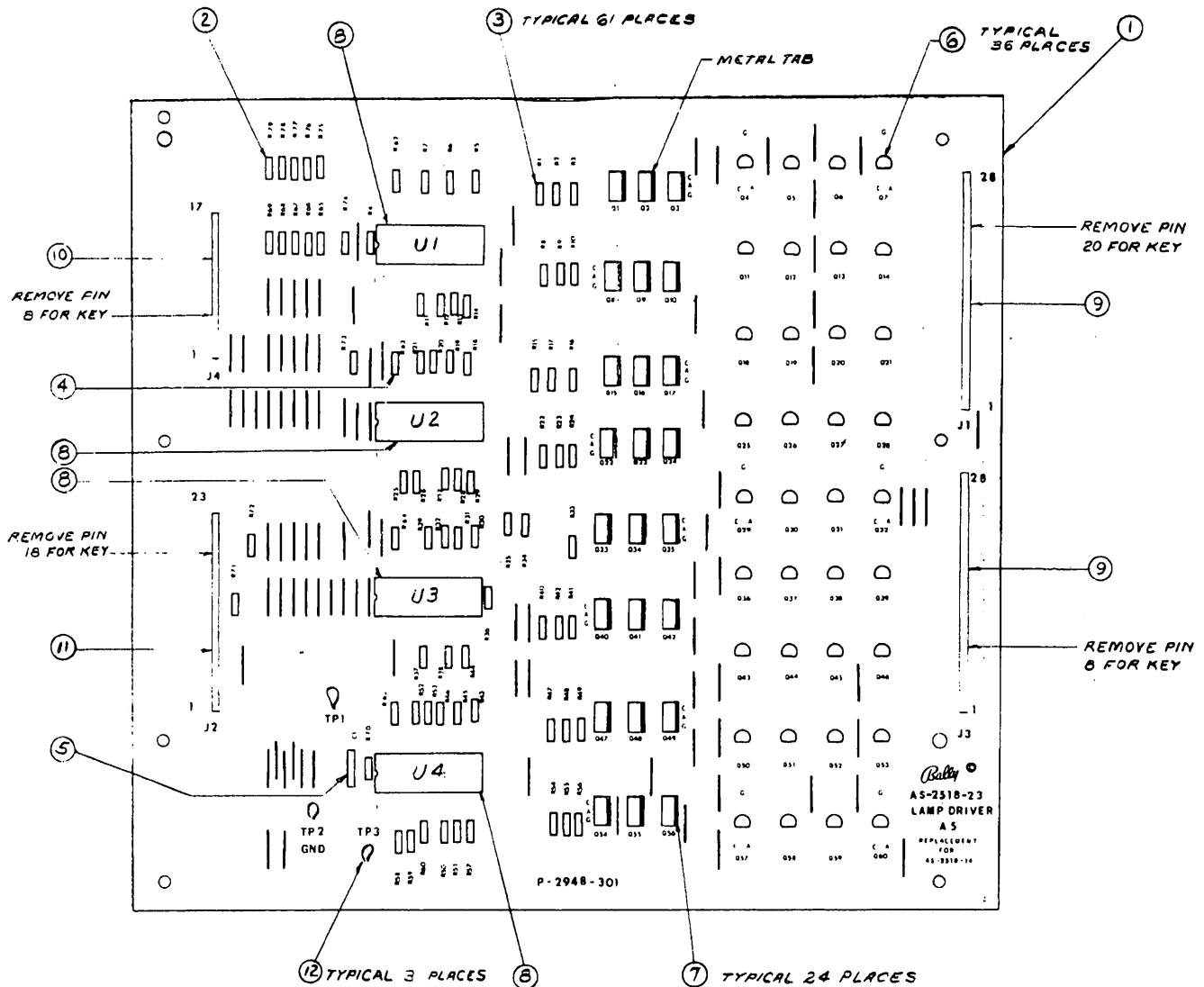
ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A4 (see note 1)	AS-2962-34	MPU Module Complete.
2	A4 (see note 2)	AS-2518-35	MPU Module less Program Memory, U1-6 incl.
3-32	See Schematic		Resistors, See schematic for value
33	C14, C15	E-00586-0067	Capacitor, 470 PFD, 1kv
34	C18	E-00586-0088	Capacitor, .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	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 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 GLOBETERS, AS-2962-12: DOLLY PARTON, AS-2962-13: SILVERBALL MANIA, AS-2962-18: MYSTIC, AS-2692-20: HOTDOGGIN, AS-2962-22: SKATEBALL, AS-2963-23: FRONTIER, AS-2962-21: XENON, AS-2962-24: FLASH GORDON, AS-2962-26: EIGHT BALL DELUXE, AS-2962-25: FIREBALL II, AS-2962-28: FATHOM, AS-2962-29: MEDUSA, AS-2962-30: CANTAUR, AS-2962-31: ELEKTRA, AS-2962-32: VECTOR, AS-2962-33: SPECTRUM, AS-2962-34: RAPID FIRE.

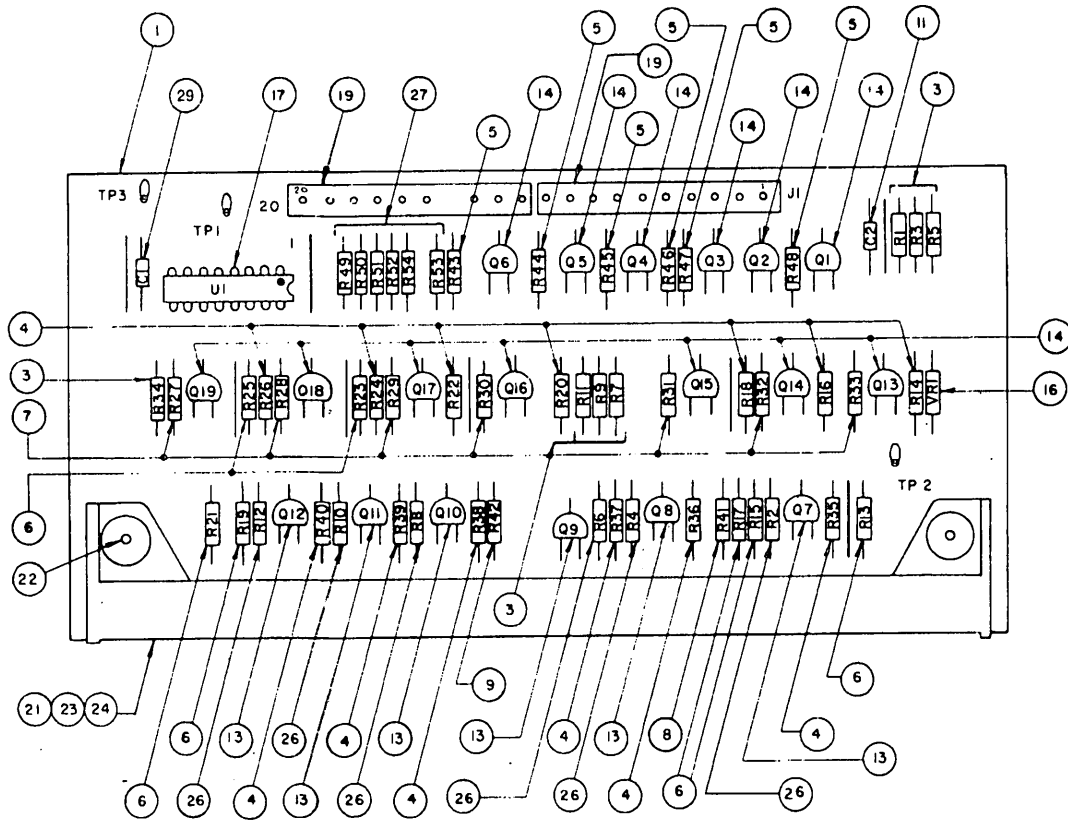
NOTE 2: Order replacement memory chips U1-U6, specifying game, socket and part number stamped on chip.

AS-2518-23 LAMP DRIVER MODULE



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

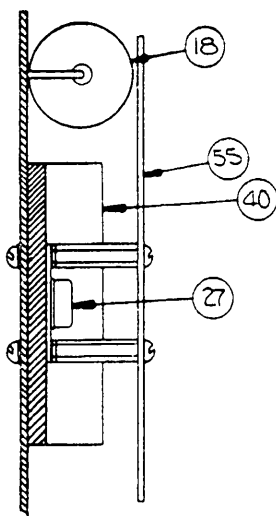
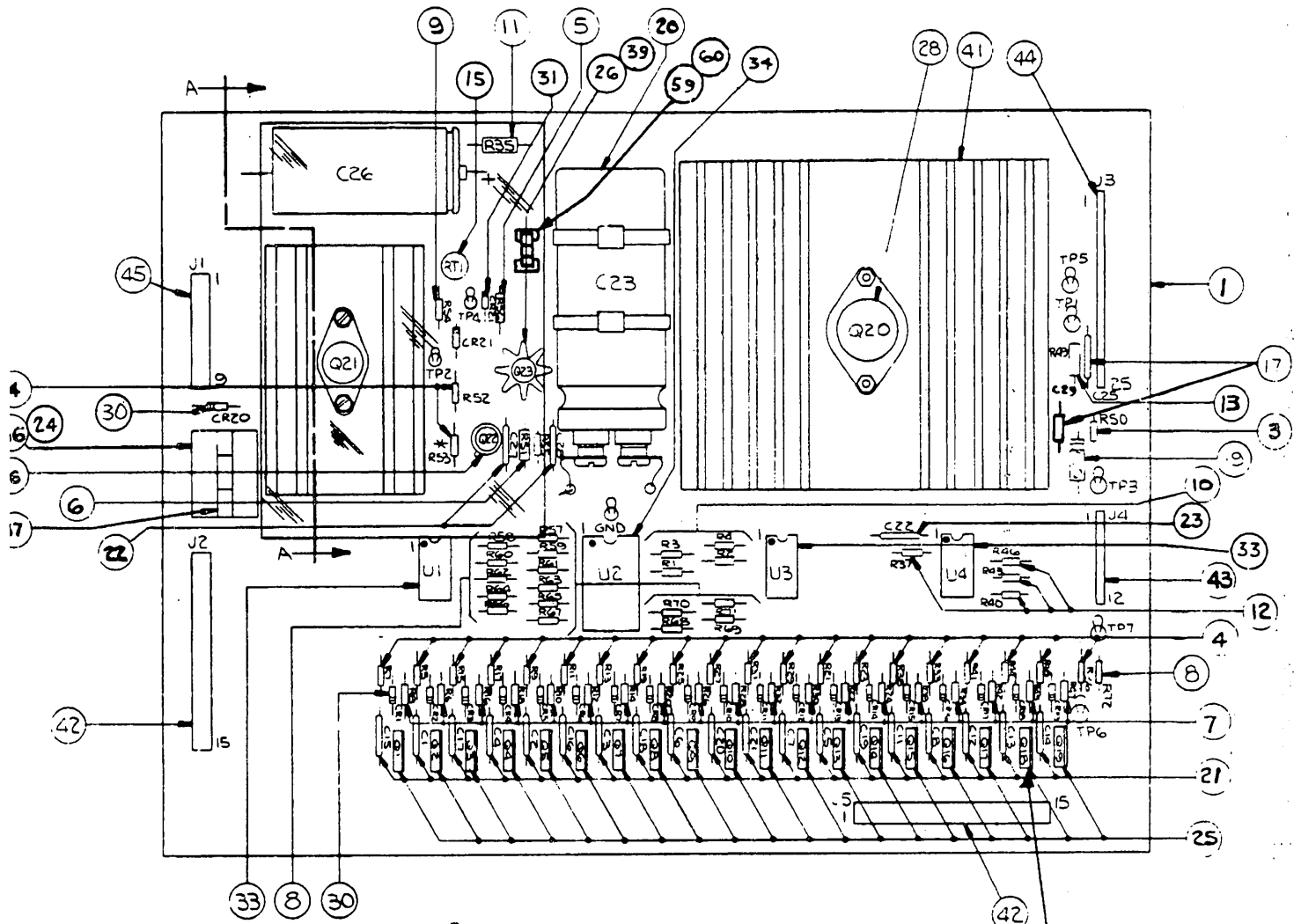


A1: 6 DIGIT DISPLAY DRIVER MODULE COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1	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

AS-2518-22 SOLENOID DRIVER/VOLTAGE REGULATOR MODULE



MODIFIED

- | | | |
|---|----------------------|-----------------|
| 1 | Bolt, #6-32 3/8" LG. | LSPR-00632-1106 |
| 1 | Nut, #6-32 | N-00632-2112 |
| 1 | Heat Sink, 6030BTT | E-682-8 |
| | Thermal Grease | M-1834 |

NOTE: INTERCHANGEABLE WITH AS-2518-16

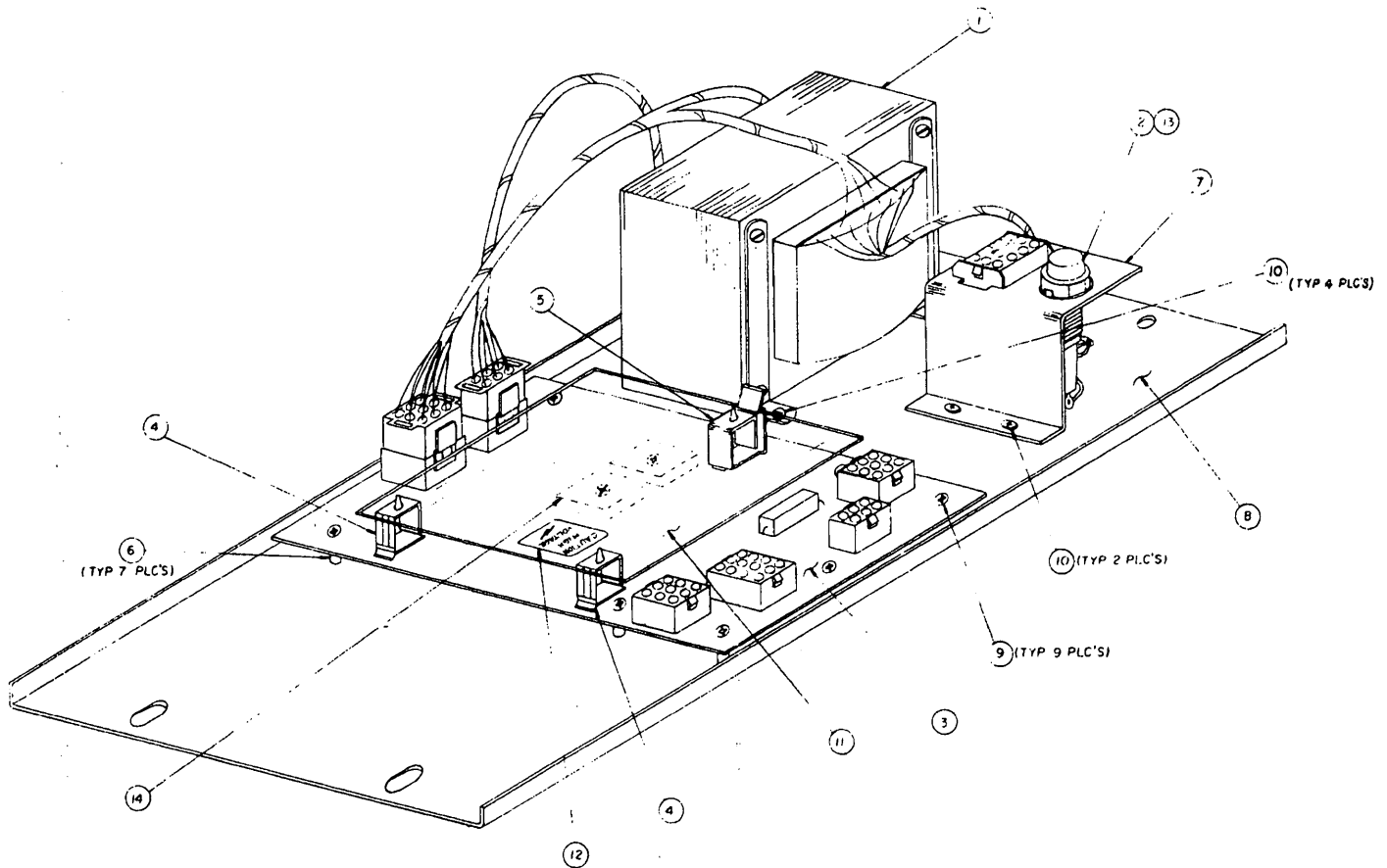
A3: SOLENOID DRIVER/VOLTAGE REGULATOR MODULE

COMPONENT PARTS LIST

ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A3	AS-2518-22	Solenoid Driver/Voltage Regulator Module, Complete
3-14	Resistors		Resistor, See Schematic for value.
15	RT1	E-00599-0014	Pot. (Linear) 25K
17	C25, 29	E-00586-0014	Capacitor, .1 MFD, 20V
18	C26	E-00586-0059	Capacitor, 160 MFD, 350V
19	C24	E-00586-0063	Capacitor, 2 MFD @ 25V
20	C23	E-00586-0062	Capacitor, 11700 MFD, 20V
21	C1-C8, C11-C21	E-00586-0064	Capacitor, .002 MFD, 1kv
22	C27, C28	E-00586-0065	Capacitor, .01 MFD, 500V
24	K1	E-00146-0795	Relay, Printed Circuit
25	Q1-Q19	E-00585-0034	Transistor, SE9302
26	Q22, Q23	E-00585-0041	Transistor, 2N3440
27	Q21	E-00585-0042	Transistor, 2N3584
28	Q20	E-00710	+5V Regulator, LAS1405 or 78H05KC or LM323K
30	CR1-CR21	E-00587-0015	Diode (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

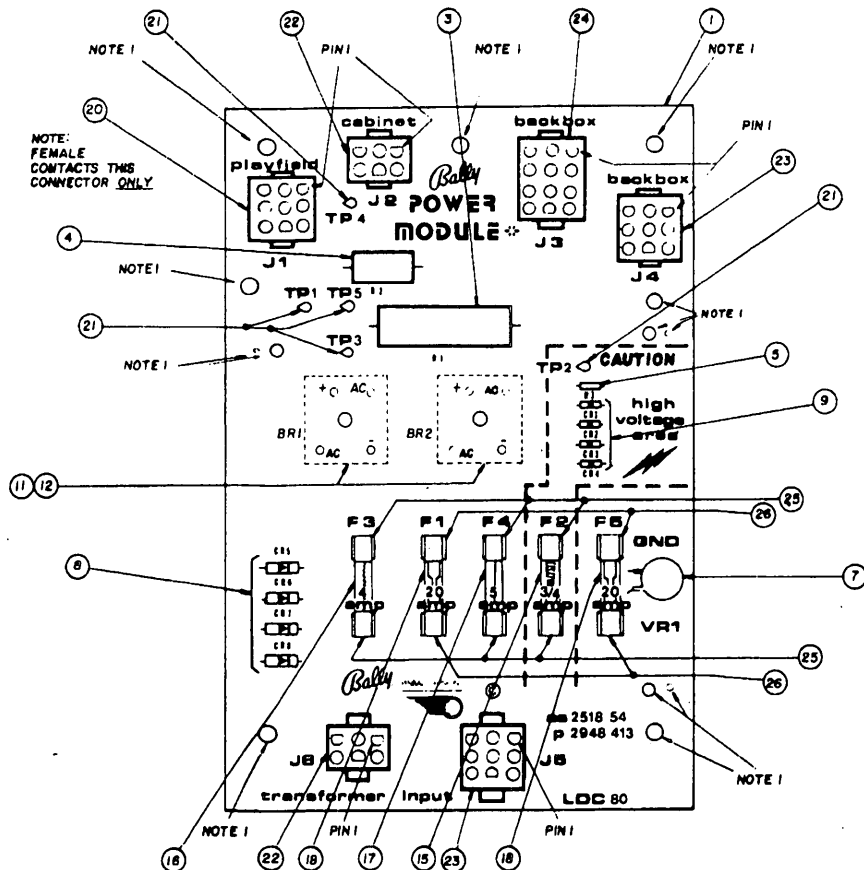
A2: POWER TRANSFORMER MODULE



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-00602-0007	Bridge Rectifier
15	F2	E-00133-0028	Fuse, 3/4A, 250V, 3AG
16	F3	E-00133-0004	Fuse, 4A, 32V, 3AG
17	F4 NOTE 1	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)

NOTE 1—All games with 4 or more flippers use 6A

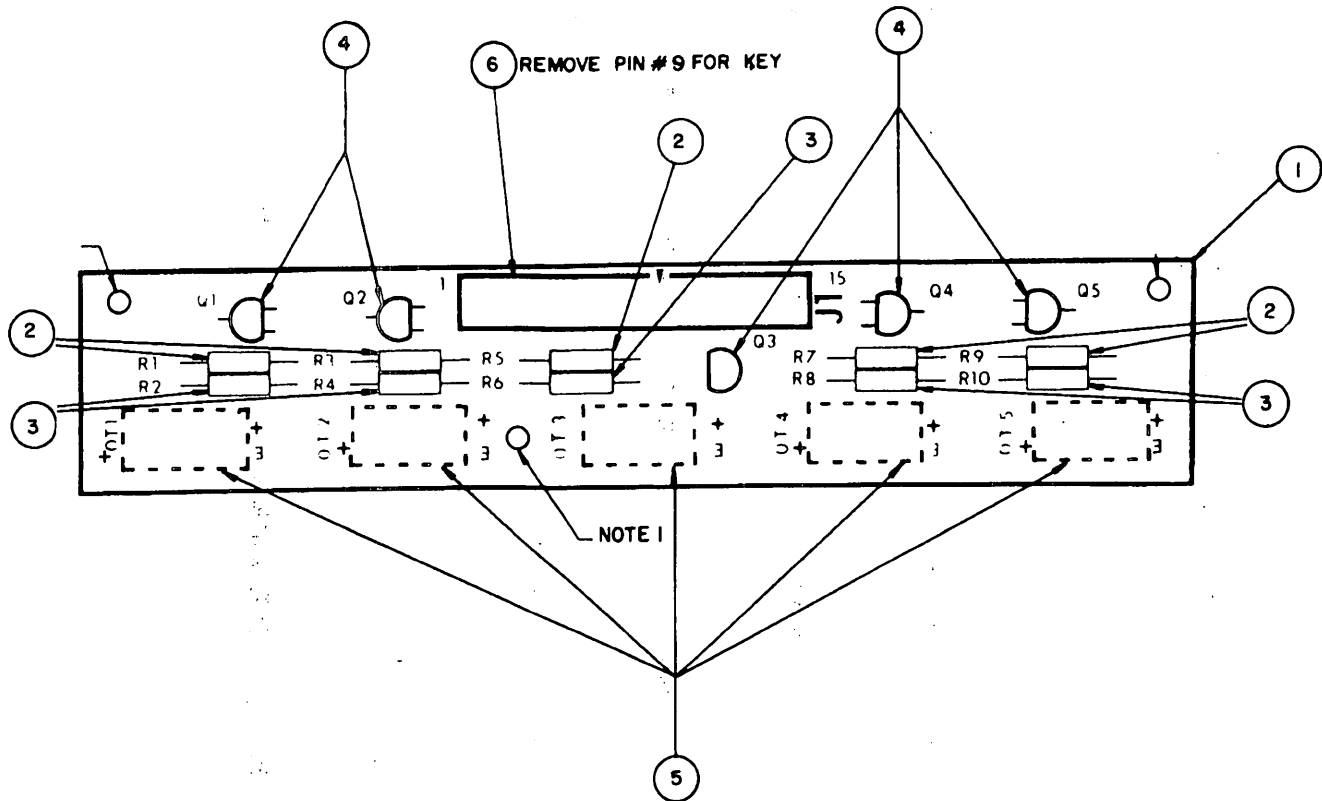
**SQUAWK & TALK MODULE
AS 2518-61B**

COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	DESCRIPTION	BALLY PART #
26	1	R37	Resistor, ¼W, 5%, 30K	E-105-245
27	5	R12, 36, 57, 58, 81	Resistor, ¼W, 5%, 1K	E-105-230
28	1	R51	Resistor, ¼W, 5%, 750K	E-105-344
29	1	R52	Resistor, ¼W, 5%, 9.1K	E-105-228
30	2	R9, 16	Resistor, ¼W, 5%, 130K	E-105-203
31	1	R11	Resistor, ¼W, 5%, 150K	E-105-248
32	1	R15	Resistor, ¼W, 5%, 220K	E-105-161
33	1	R14	Resistor, ¼W, 5%, 1.8K	E-105-346
34	4	R17, 18, 39, 40	Resistor, ¼W, 5%, 910K	E-105-347
35	1	R1	Resistor, ¼W, 5%, 27K	E-105-243
36	1	R68	Resistor, ¼W, 5%, 510 Ω	E-105-311
37	1	R34	Resistor, ¼W, 5%, 2.2 Ω	E-105-211
38	3	R31, 88, 89	Resistor, ¼W, 5%, 220 Ω	E-105-303
39	1	R79	Resistor, ¼W, 5%, 7.5K	E-105-345
40	1	R35	Resistor, ¼W, 5%, 1 Ω	E-105-196
41	1	R83	Resistor, ¼W, 5%, 11K	E-105-360
42	1	R7	Resistor, ¼W, 5%, 8.2K	E-105-223
43	14	C2, 5-8, 10, 11, 17, 18, 44, 47-50	Capacitor, Ceramic, .01μF, 25V	E-586-85
44	2	C23, 35	Capacitor, Ceramic, .47μF, 16V	E-586-130
45	4	R84-87	Resistor, ¼W, 5%, 2.2K	E-105-287
46	1	R6	Resistor, ¼W, 470Ω	E-105-342
47	7	C19, 24, 25, 28, 31, 34, 42	Capacitor, Electrolytic, 1μF, 25V	E-586-90
48	10	C12, 13, 26, 30, 33, 39, 40, 41, 45, 46	Capacitor, Ceramic, .1μF, 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, 10μF, 16V	E-586-135
53	2	C16, 22	Capacitor, Tantalum, 4.7μF, 25V	E-586-73
54	1	C27	Capacitor, Electrolytic, 1000μF, 16V	E-586-136
55	1	C29	Capacitor, Electrolytic, 470μF, 6V	E-586-124
56	2	C3, 4	Capacitor, Ceramic, 27pF	E-586-121
57	1	C14	Capacitor, Electrolytic, 4700μF, 25V	E-586-123
58	2	C37, 38	Capacitor, Electrolytic, 330μF, 50V	E-586-147
59	1	C51	Capacitor, Monolythic, 10pF	E-586-150
60	1	J1	18 Pin Wafer Connector (156)	E-736-18
61	1	J2	10 Pin Wafer Connector(156)	E-736-10
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, 3A, 50V. min.	E-587-24
73	1	U1	6808 or 6802 (SEE NOTE 1)	E-620-125 or 128
74	3	Used with U1, 7, 11	Microprocessor	E-712-1
75	3	Used with U8, 9, 12	Socket, I.C. 40 Pin	E-712-28
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			Nut	N-00632-2112
79		J3	Header, 7 Pin	E-766-7
80	2	C36, 43	Capacitor, 2μF, 25V	E-586-63
81	2	R69, 70	Pot. 1K	E-599-16
82	1	C1	Capacitor, Electrolytic, 47μF	E-586-148
83	2	R28, 54	Resistor, 82K	E-105-341
84	AR	Used with U18, VR1	Thermal Compound	M-1834
85	2	Q3, 4	Transistor, 2N4403	E-585-23
86	2	R82, 48	Resistor, ¼W, 5%, 2.4K	E-105-312

OPTICAL SWITCH (ASSEMBLY)

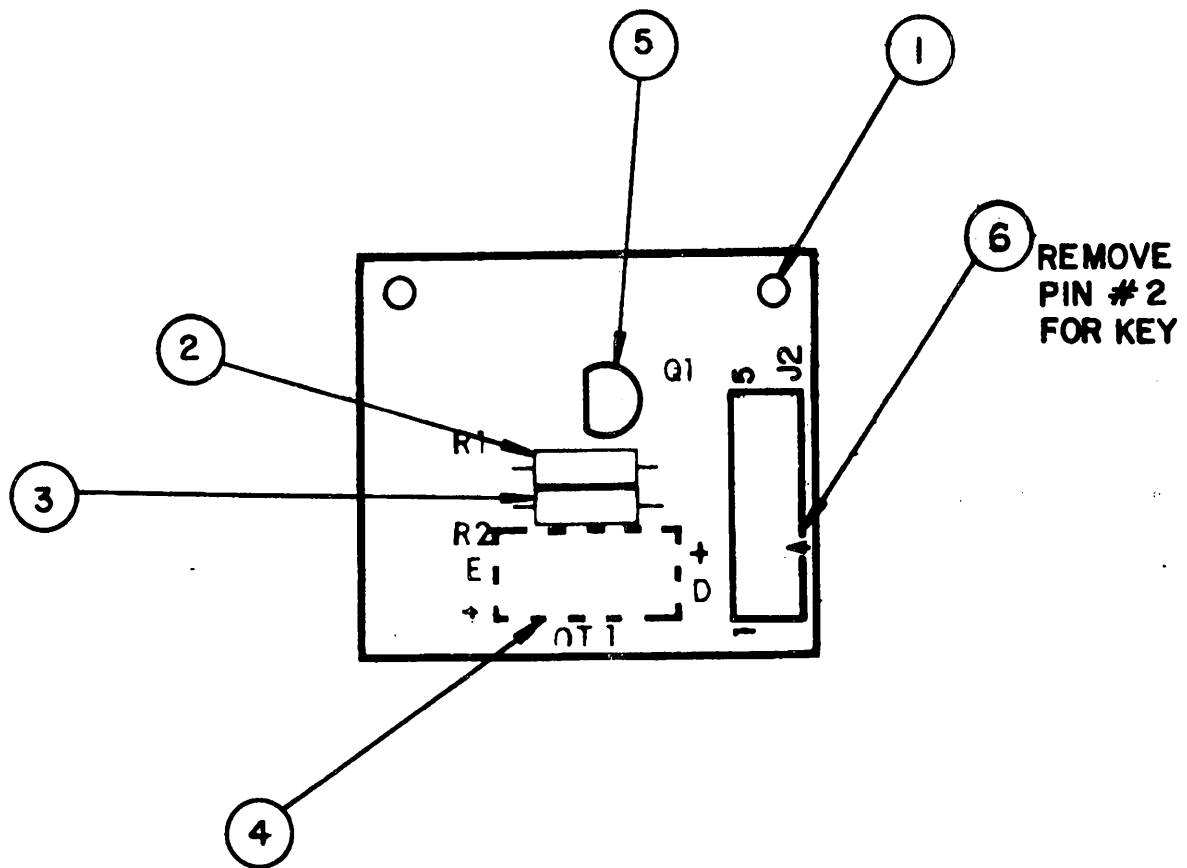
AS-2518-95



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	M-645-658	P-2948-507	P. C. B. Board
2	R1, R3, R5, R7, R9	E-105-227	300K Ω , 1/4 W, 5% Resistor
3	R2, R4, R6, R8, R10	E-105-234	160 Ω , 1/4 W, 5% Resistor
4	Q1, Q2, Q3, Q4, Q5	E-585-31	Transistor 2N3904
5	OT 1, 2, 3, 4, 5	E-585-79	Opt. Inter. H22A1
6	J1	E-766-15	15 Pin KK100 Connector
7	Used With 4 G.I. CNY 36 Only	C-1037	Spacer

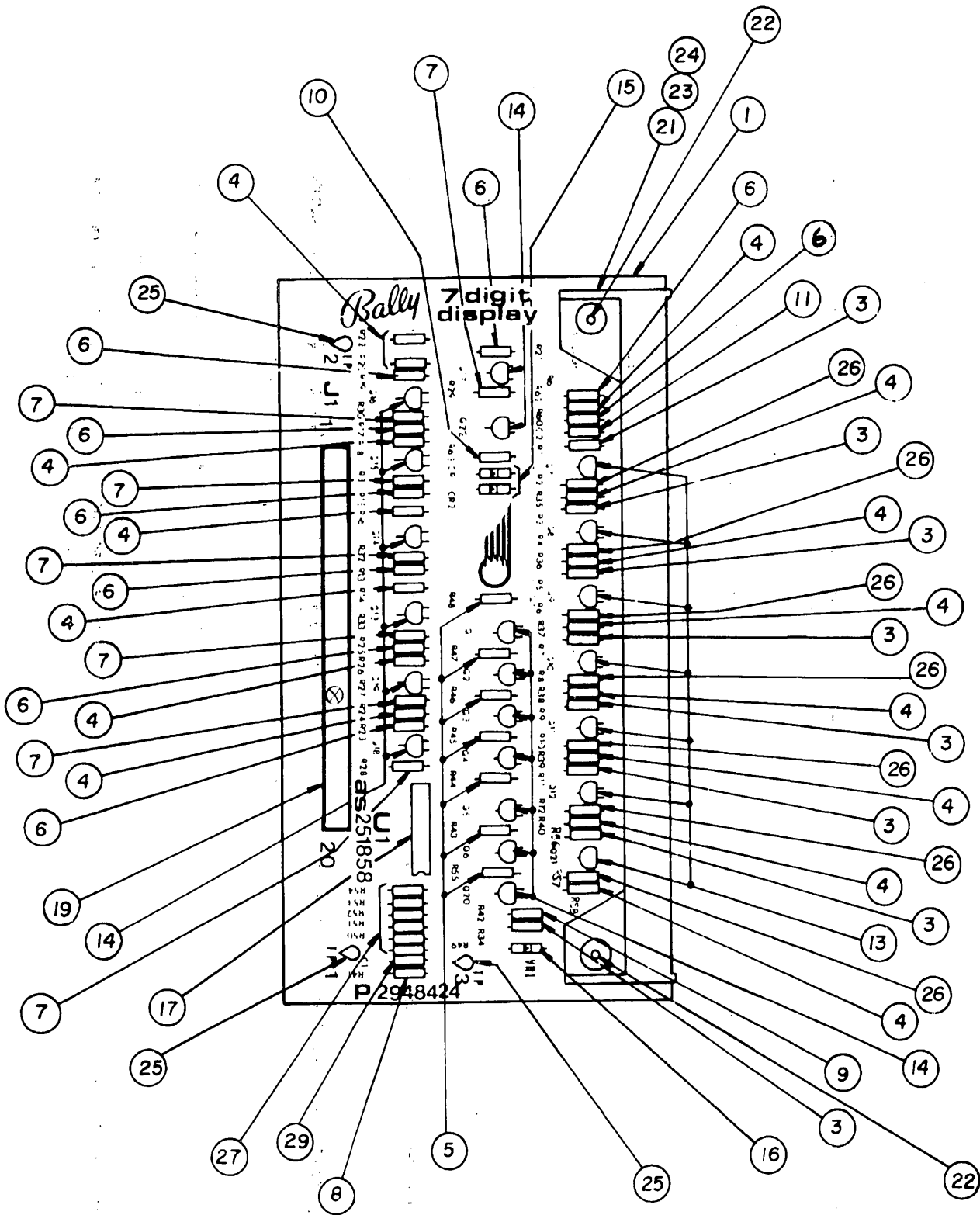
SINGLE TARGET OPTICAL SWITCH

AS-2518-100



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	M-645-659	P-2948-508	P. C. B.
2	R1	E-105-227	Resistor, 300K Ω , 1/4 W, 5%
3	R2	E-105-234	Resistor, 160 Ω , 1/4 W, 5%
4	OT1	E-585-79	Opt. Inter. H22A1
5	Q1	E-585-31	Transistor, 2N3904
6	J2	E-766-5	5 Pin KK100, Connector
7	Used With 4 G.I. CNY 36 Only	C-1037	Spacer

AS-2518-58 DISPLAY DRIVER MODULE



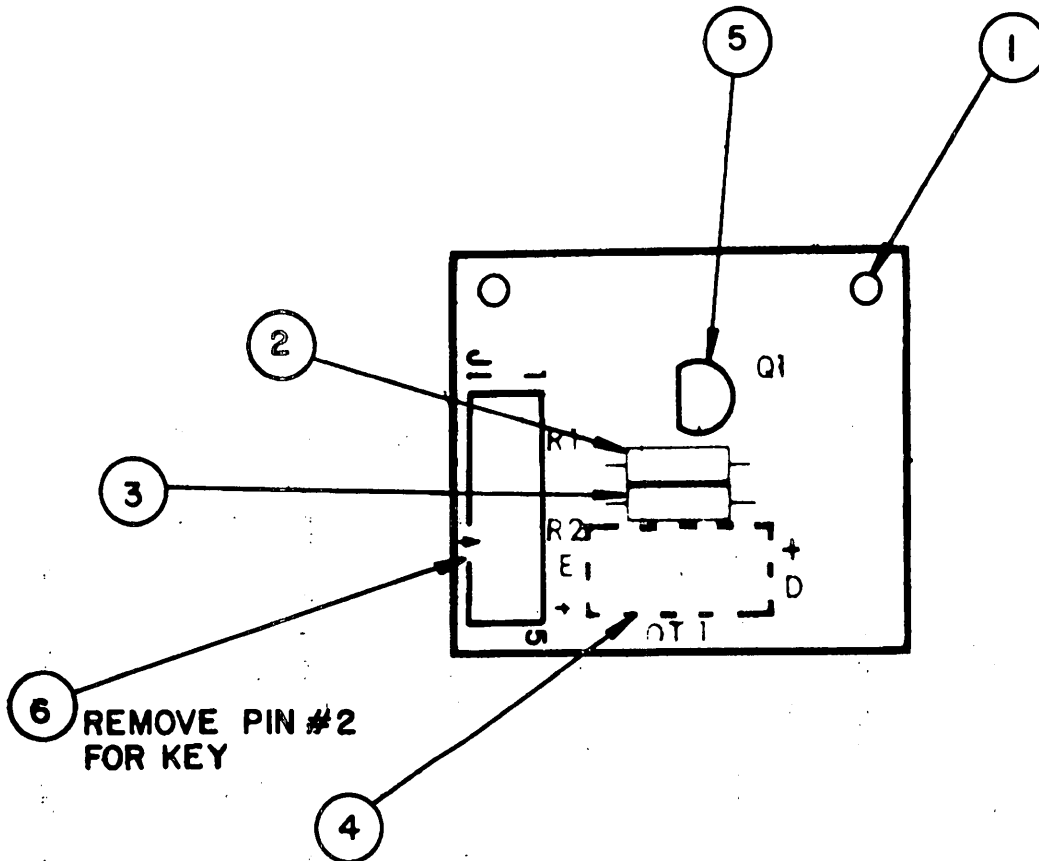
A1: 7 DIGIT DISPLAY DRIVER MODULE

COMPONENTS PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1	A1	AS-2518-58	7 Digit Display Driver, Complete
3	3	R1, R3, R5, R7, R9, R11, R34, R56	E-105-331	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

SINGLE TARGET OPTICAL SWITCH

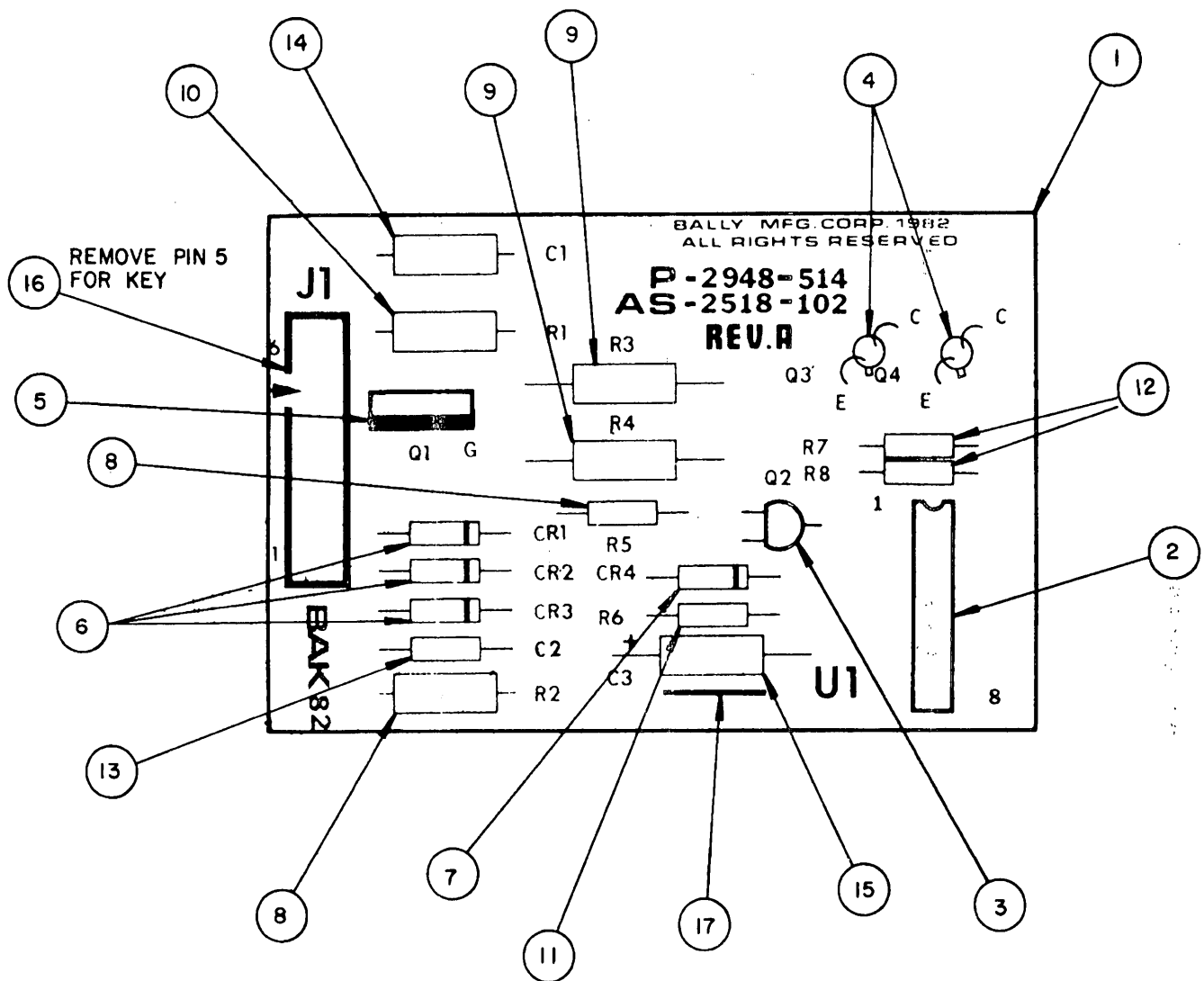
AS-2518-101



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	M-645-659	P-2948-508	P. C. B.
2	R1	E-105-227	Resistor, 300K Ω , 1/4 W, 5%
3	R2	E-105-234	Resistor, 160 Ω , 1/4 W, 5%
4	OT1	E-585-79	Opt. Inter. H22A1
5	Q1	E-585-31	Transistor, 2N3904
6	J1	E-766-5	5 Pin KK100, Connector
7	Used With 4 G.I. CNY 36 Only	C-1037	Spacer

BALL DELIVERY SENSOR & MOTOR CONTROL (ASSEMBLY)

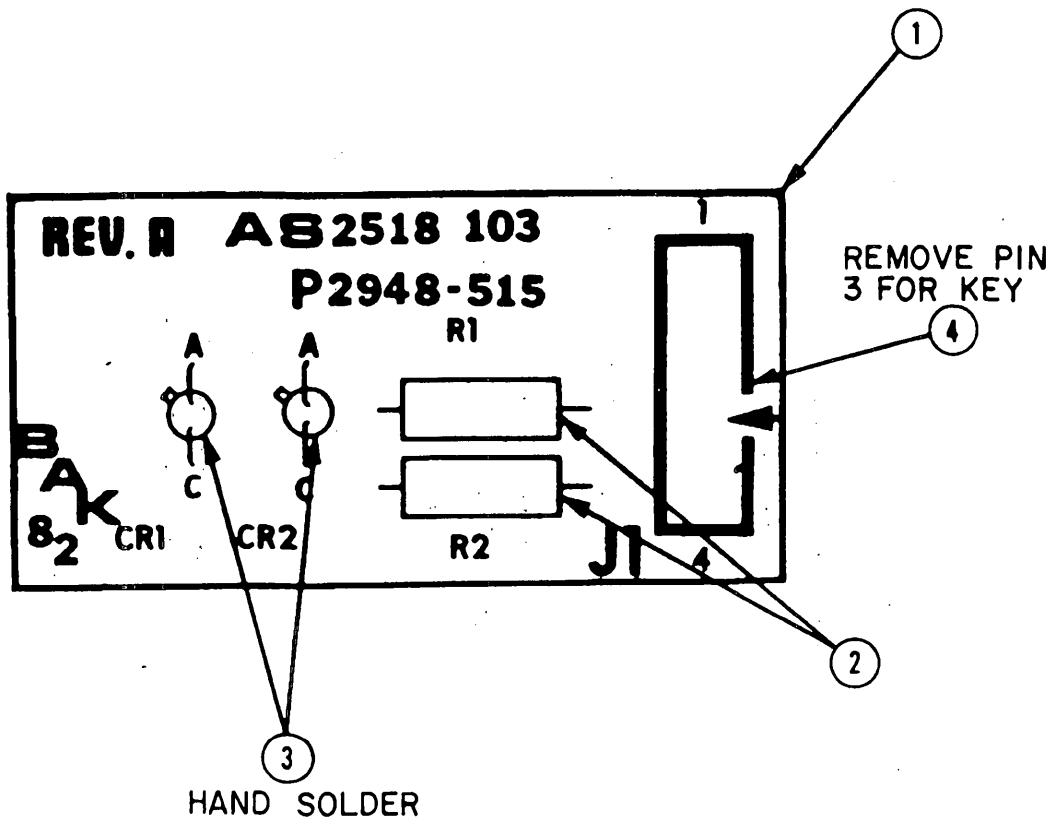
AS-2518-102



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	PWB	P-2948-514	M-645-665
2	U1	E-620-5	MC14011
3	Q2	E-585-2	MPS6566
4	Q3, Q4	E-585-81	Transistor Photo MRD 370
5	Q1	E-585-54	Triac, MAC 15A6
6	CR1-CR3	E-587-6	Diode IN4004
7	CR4	E-587-14	Diode IN4148
8	R2, R5	E-105-342	Resistor, 470Ω, ½ W
9	R3, R4	E-105-394	Resistor, 100Ω, 1W, 5%
10	R1	E-105-115	Resistor, 330Ω, ½ W, 10%
11	R6	E-105-248	Resistor, 150K, ¼ W, 5%
12	R7, R8	E-105-241	Resistor, 24K, ¼ W, 5%
13	C2	E-586-89	Capacitor, .1μF Ceramic
14	C1	E-586-87	Capacitor, .02μF, 500V
15	C3	E-586-74	Capacitor, 1μF Tant
16	J1	E-736-6	Connector, KK156
17		M-1777-126	Jumpers, See Note 2

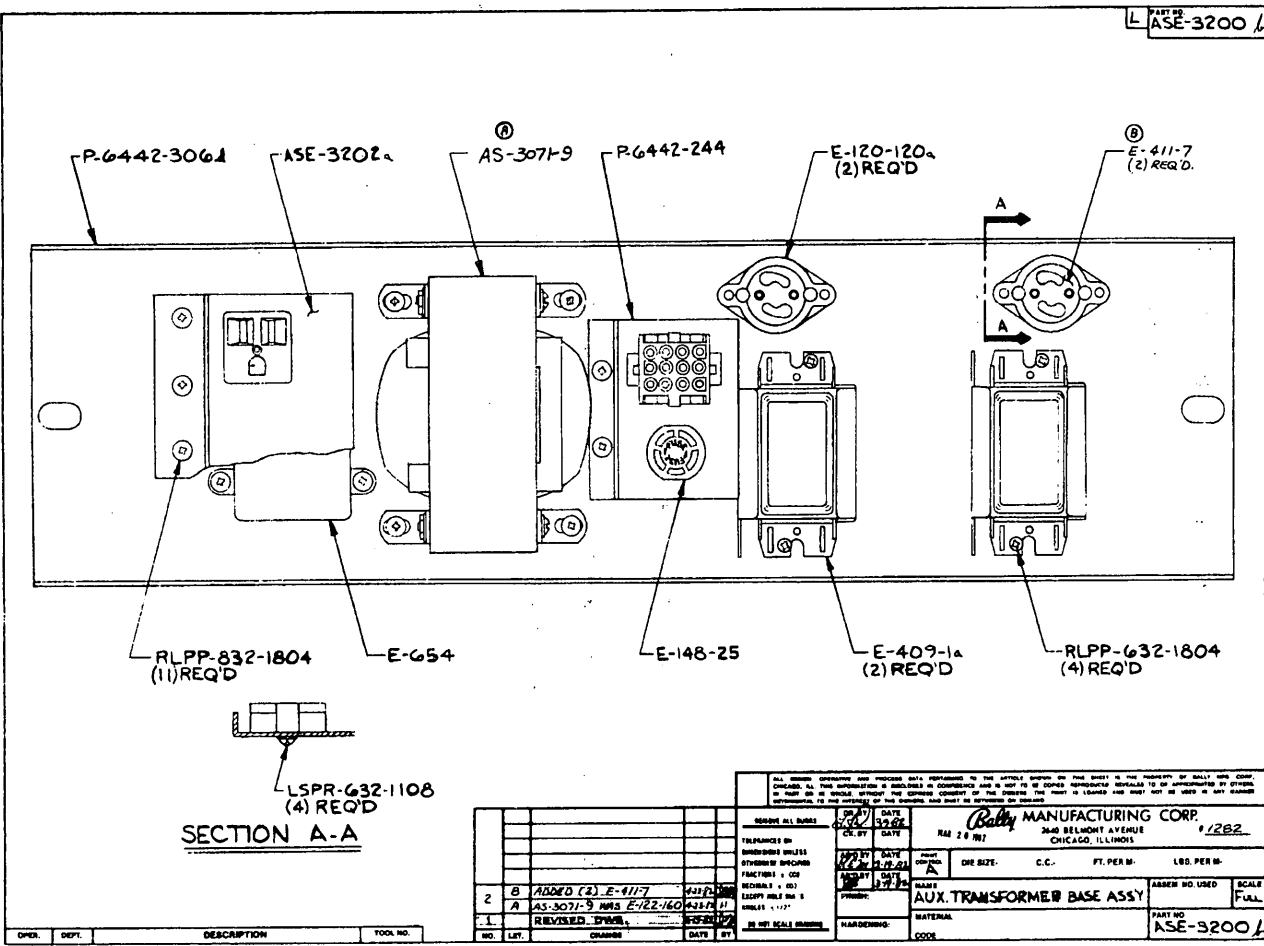
BALL DELIVERY (LED)
CONTROL BD. (ASSEMBLY)

AS - 2518 - 103



ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	P.W.B.	P-2948-515	M-645-666
2	R1, R2	E-105-342	Res. 470 Ω , 1/2W, 5%
3	CR1, CR2	E-587-27	Diode, LED MLED 930
4	J1	E-737-4	Connector, KK 156

L PART NO ASE-3200 L




LSPR-632-1108
(4) REQ'D
SECTION A-A

REQ'D ALL DIMS		DATE	3-2-52
TOLERANCES UNLESS OTHERWISE SPECIFIED		CL. BY	
FACTORY'S USE		DATE	2-27-52
SEALS & (0)		DATE	3-7-52
EXCEPT WHERE SHOWN OTHERWISE		DATE	
IN NET SCALE DIMENSIONS		DATE	

Bally MANUFACTURING CORP.			
3640 BELMONT AVENUE			
CHICAGO, ILLINOIS			
1282			
NO.	LET.	CHANGES	DATE BY
2	B	ADDED (2) E-411-7	3-2-52
1	A	AS-3071-9 WMS E-122-160	2-27-52
1		REVISED DIMS	3-7-52

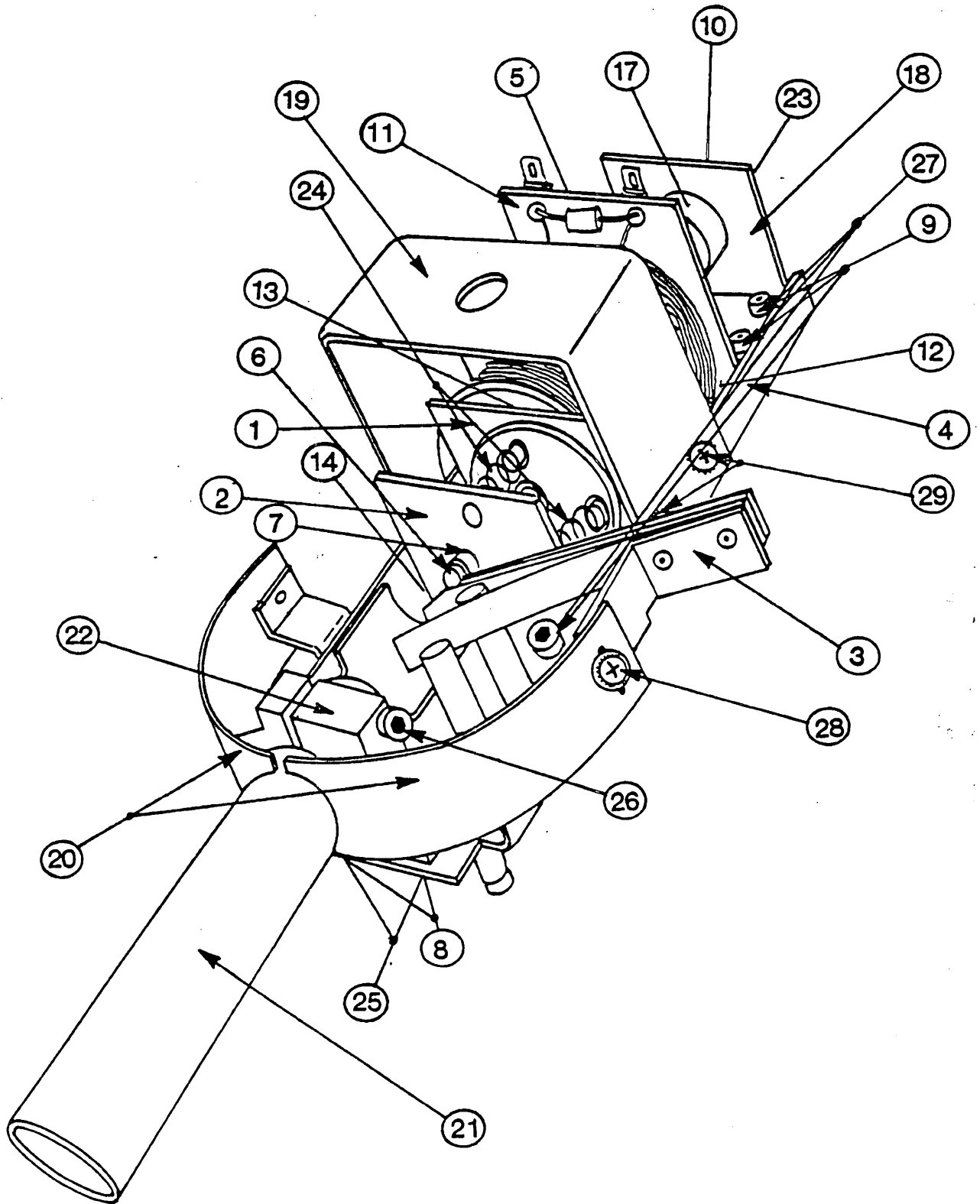
OPER.	DEPT.	DESCRIPTION	TOOL NO.

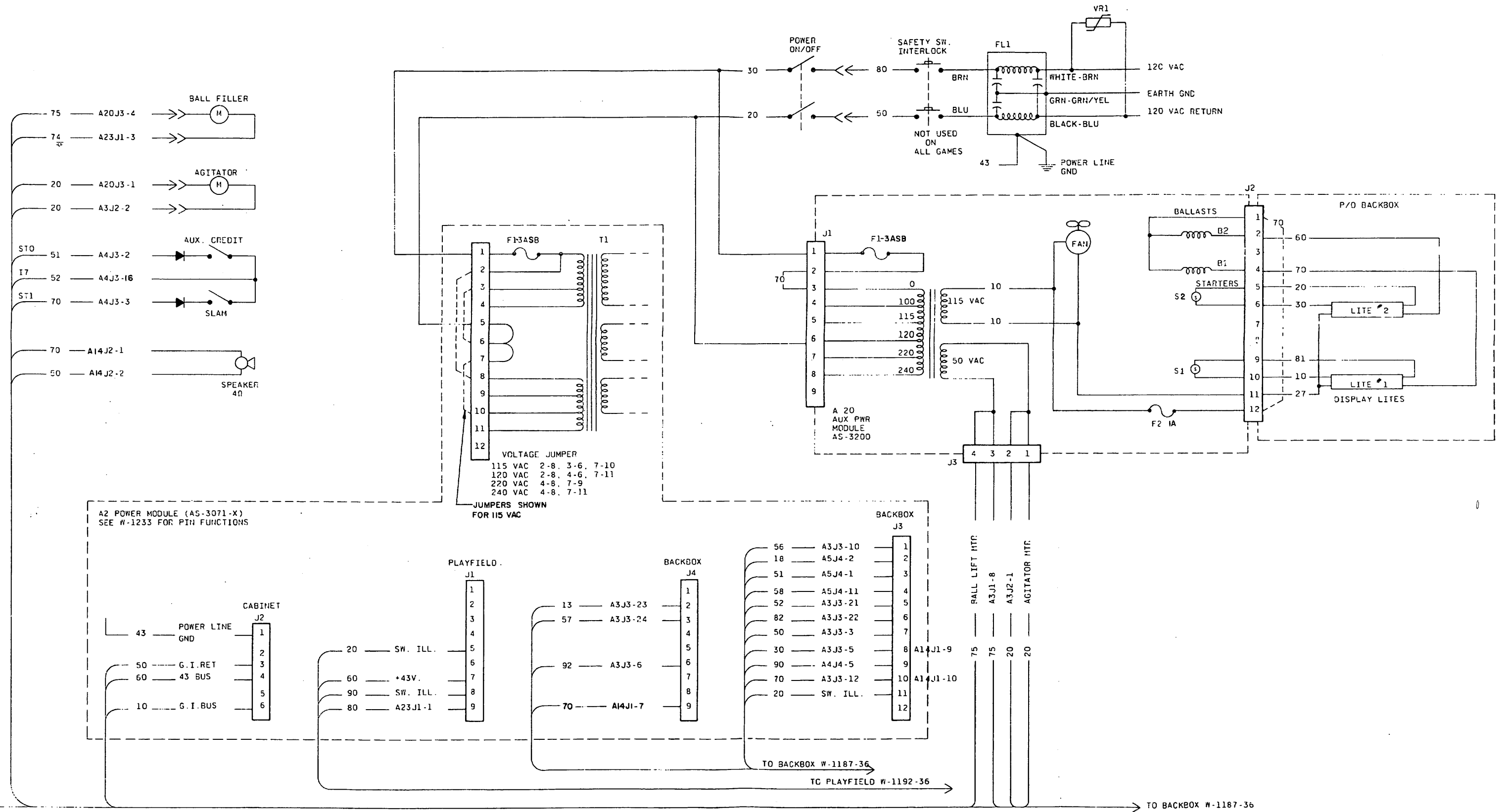
NAME	AUX. TRANSFORMER BASE ASSY	ASSEMB NO. USED	SCALE
MATERIAL	COOL		FULL
REWORKING		PART NO	ASE-3200 L

<u>ITEM NUMBER</u>	<u>BALLY PART NUMBER</u>	<u>DESCRIPTION</u>	*Indicates first time used
1.	A-4062-1	Core Plug Assy*	
2.	A-4064	Coil Bracket and Stud Assy*	
3.	A-4065	Position Arm & Bracket Assy*	
4.	A-4066	Gun Base Plate & Stud Assy*	
5.	A-4084	Coil Bracket & Plate Assy*	
6.	ASE-3209	Plunger Assy*	
7.	C-537-4	Nyliner Bushing	
8.	M-1705-6	Lock Washer (2)	
9.	M-1705-8	Lock Washer (8)	
10.	M-1964	Spring Retainer*	
11.	N-23-1110	Coil*	<i>22 Gauge wire</i>
12.	P-150-201	Fish Paper*	
13.	P-1158-31	Spring Washer	
14.	P-1973-526	Shimplate*	
15.	P-2236-22	Coil Bracket*	
16.	P-2236-23	Coil Bracket*	
17.	P-6264-225	Plunger Stop Bracket*	
18.	P-6442-299	Bracket*	
19.	P-6629-203	Pivot Bracket*	
20.	P-8251	Gun Shield (2)*	
21.	S-2212	Gun Barrel*	
22.	S-2215	Block*	
23.	SP-100-381	Extension Spring*	
24.	SP-200-231	Compression Spring (3)*	
25.	CSAE-632-1806	Screw (2)	
26.	CSAE-632-1816	Cap Screw	
27.	CSAE-632-1804	Screw (8)	
28.	LSPR-632-1104	Screw (7)	
29.	LSPR-832-1104	Screw (4)	

GUN ASSEMBLY

ASE-3190



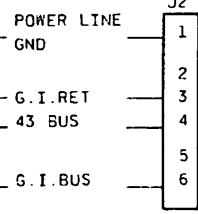


A2 POWER MODULE (AS-3071-X)
SEE W-1233 FOR PIN FUNCTIONS

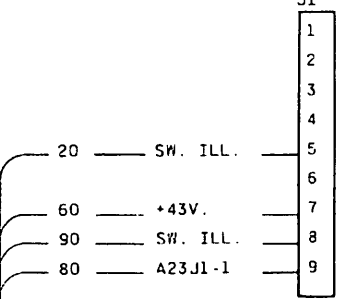
VOLTAGE JUMPER
115 VAC 2-8, 3-6, 7-10
120 VAC 2-8, 4-6, 7-11
220 VAC 4-8, 7-9
240 VAC 4-8, 7-11

JUMPERS SHOWN FOR 115 VAC

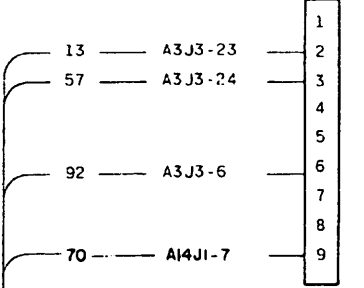
CABINET



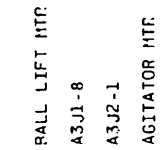
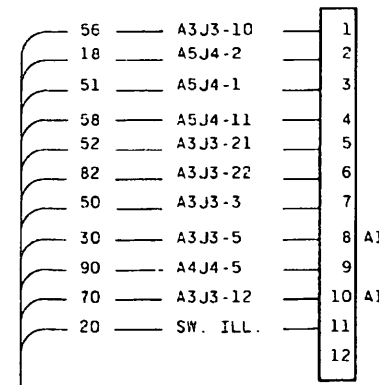
PLAYFIELD



BACKBOX J4



BACKBOX J3



TO FRONT DOOR & CONTROL PANEL W-1271b

TO BACKBOX W-1187-36
TO PLAYFIELD W-1192-36

TO BACKBOX W-1187-36

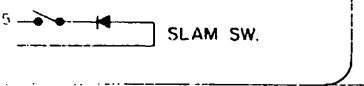
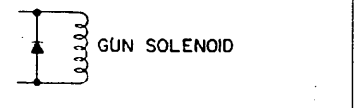
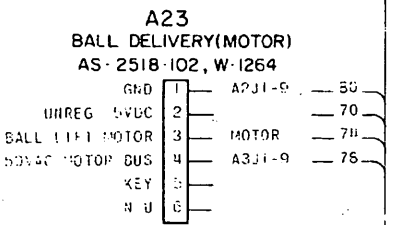
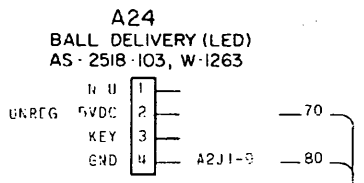
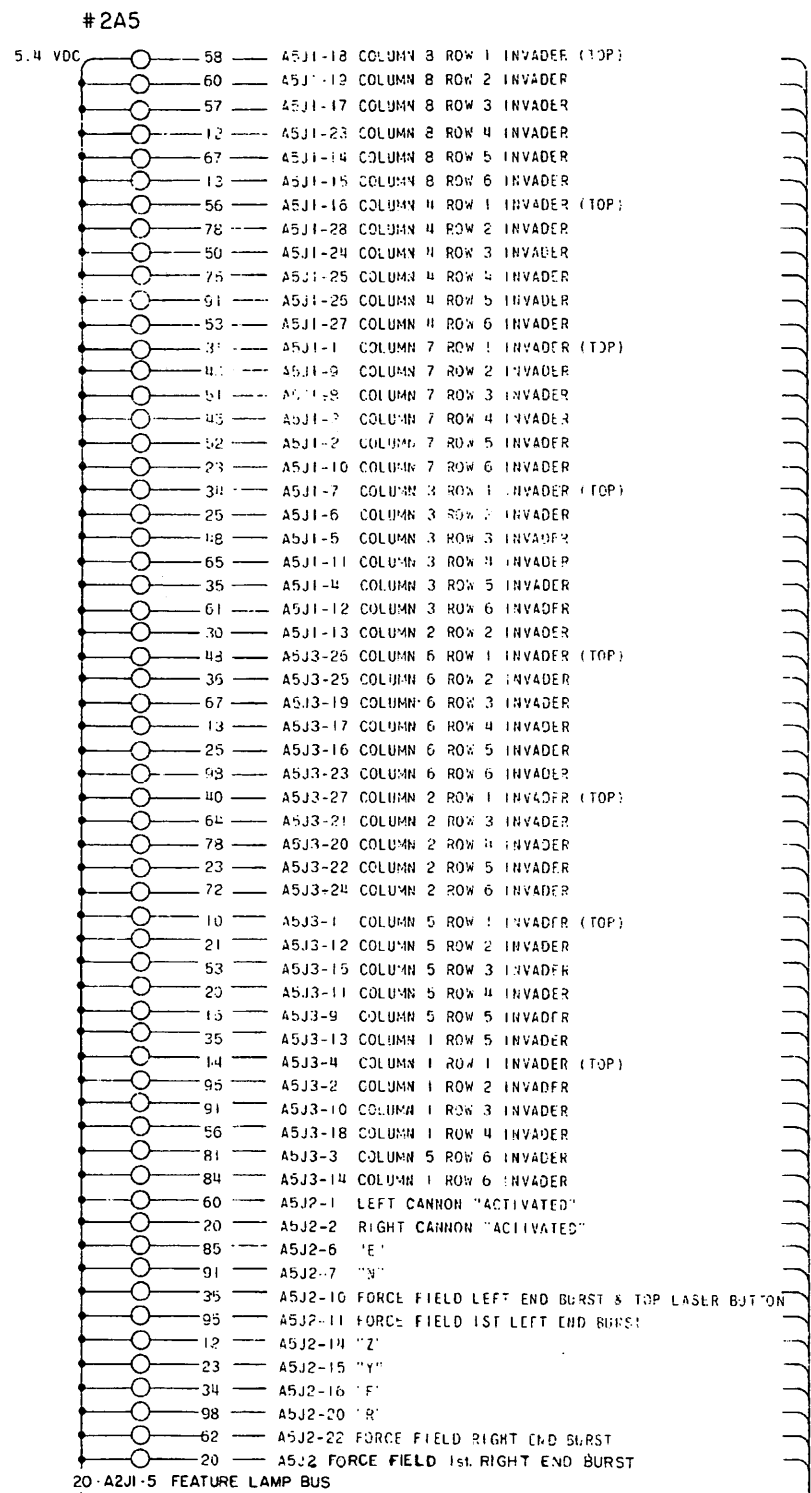
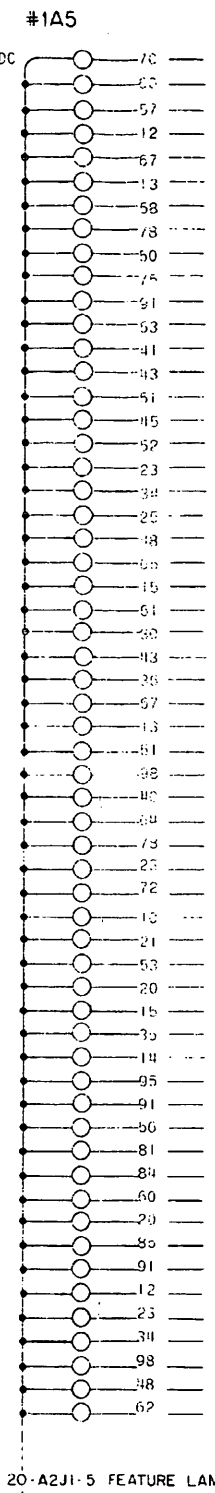
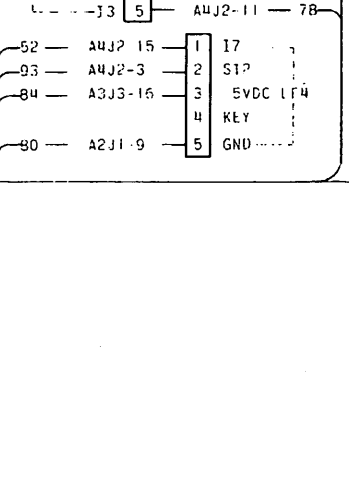
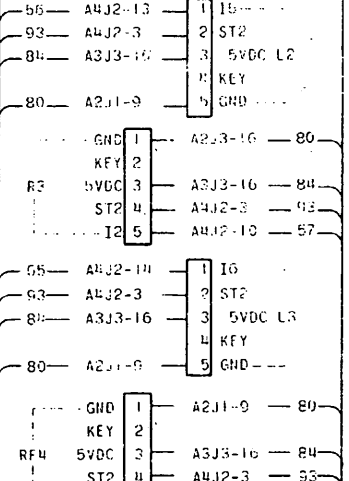
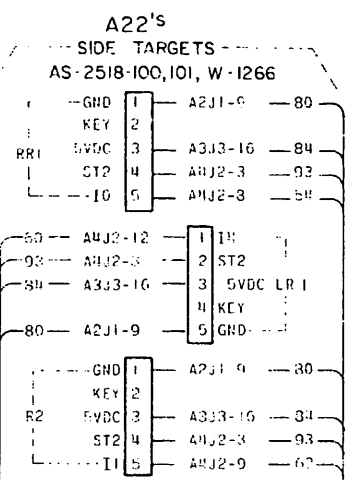
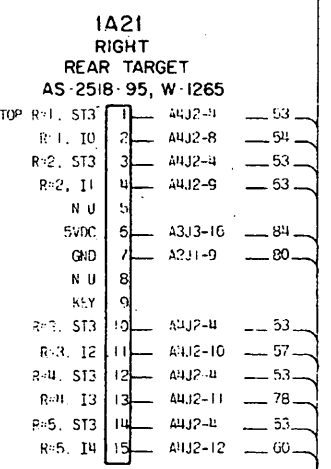
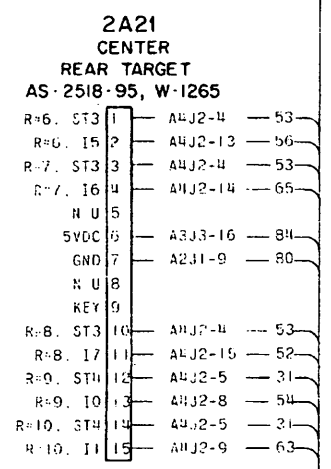
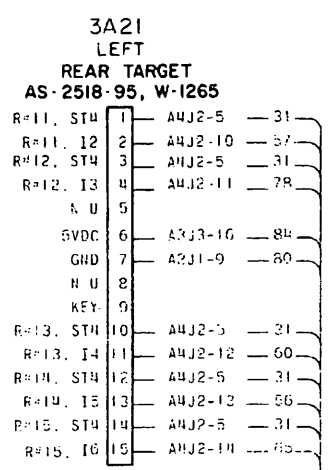
OPER.	DEPT.	DESCRIPTION	TOOL No.
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<p>REMOVE ALL BURRS</p> <p>DR BY JCG DATE 4-5-82</p> <p>AP'D BY DATE</p> <p>AP'D BY DATE</p> <p>FINISH</p> <p>DO NOT SCALE DRAWING</p>				<p>ALL DIMENSIONS UNLESS OTHERWISE SPECIFIED</p> <p>FRACTIONS: 1/32"</p> <p>DECIMALS: .001"</p> <p>EXCEPT WHERE SHOWN OTHERWISE</p> <p>DO NOT SCALE DRAWING</p>				<p>Bally MANUFACTURING CORP. 1282</p> <p>2840 BELMONT AVENUE CHICAGO, ILLINOIS</p>			
MATERIAL		WIRING DIAGRAM - CABINET		ASSEM NO USED		SCALE					
RAPID FIRE		PART NO		W-1186-19 c							

WIRE COLOR CODE

1-RED -R-	6-BROWN -BR-
2-BLUE -BLU-	7-ORANGE -O-
3-YELLOW -Y-	8-BLACK -B-
4-GREEN -G-	9-GRAY
5-WHITE -W-	0-NO TRACER

J JUMPER
 1-FIRST NUMBER-BODY COLOR.
 2-SECOND NUMBER-TRACER COLOR.
 3-NUMBER AFTER DASH INDICATES RE-JSC OF SAME COLOR WIRE.
 EXAMPLE 50 -WHITE
 51 -WHITE-RED
 51-1-WHITE-RED (USED AGAIN)



PLAYFIELD A6

OPER.	DEPT.	DESCRIPTION	TOOL No.

ALL DESIGN OPERATING AND PROCESS DATA PERTAINING TO THIS ARTICLE UNDER THIS SHEET IS THE PROPERTY OF BALLY MANUFACTURING CORP. ANY REPRODUCTION OR DISSEMINATION OF THIS INFORMATION IS PROHIBITED WITHOUT THE EXPRESS WRITTEN PERMISSION OF BALLY MANUFACTURING CORP. IN PART OR IN WHOLE WITHOUT THE EXPRESS WRITTEN PERMISSION OF BALLY MANUFACTURING CORP. IS PROHIBITED. THIS INFORMATION IS UNCLASSIFIED AND IS NOT TO BE RELEASED TO THE PUBLIC OR TO ANY OTHER PARTY WITHOUT THE EXPRESS WRITTEN PERMISSION OF BALLY MANUFACTURING CORP.

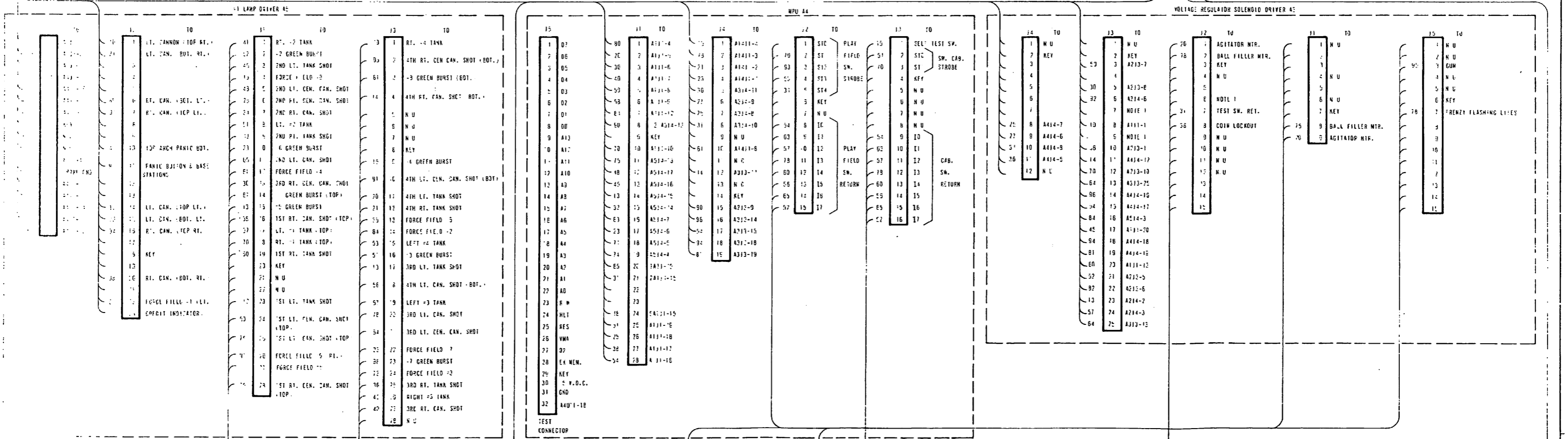
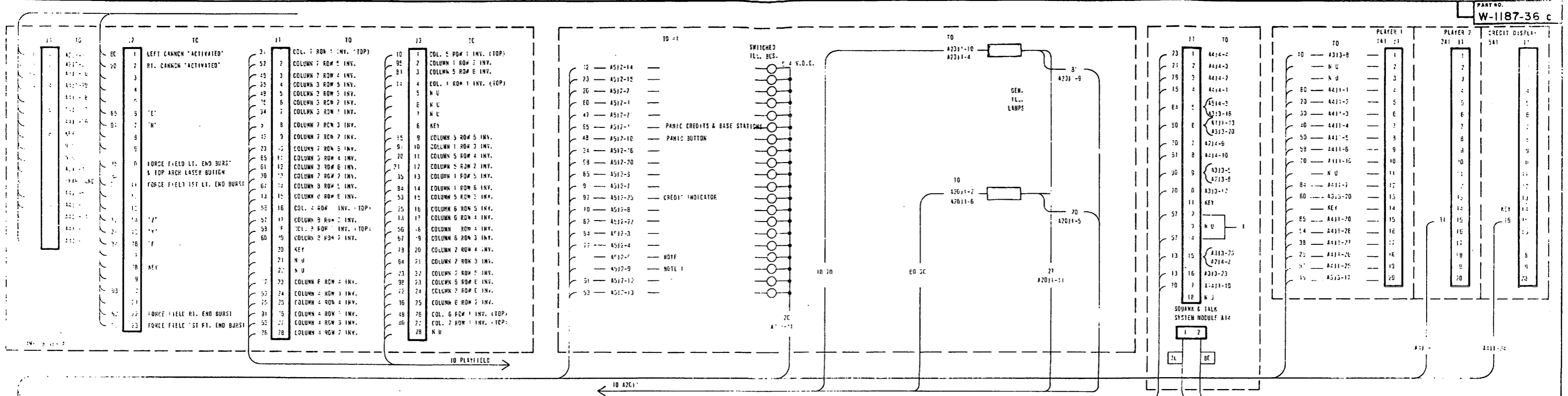
Bally MANUFACTURING CORP.
 2640 BELMONT AVENUE
 CHICAGO, ILLINOIS 60647

DATE: 4-28-82
 DRAWN BY: A.K.
 CHECKED BY: J.P.
 AP'D BY: DATE: 4-28-82
 FINISH:

REMOVE ALL BURS
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 FRACTIONS - 1/16
 DECIMALS - 0.001
 HOLE DIA. 3 ANGLES - 45°
 DO NOT SCALE DRAWING

NO.	LET.	CHANGE	DATE	BY

ASSEMBLY NO. 1150
 NAME: WIRING DIAGRAM PLAYFIELD
 MATERIAL: RAPID FIRE
 PART NO. W-1192-36c



WIRE COLOR CODE

1. RED	6. BROWN
2. BLUE	7. ORANGE
3. YELLOW	8. BLACK
4. GREEN	9. GRAY
5. WHITE	10. NO TRACER

REMOVE ALL BUDDS

DR BY DATE: JCG 4-6-82

APPROVED BY DATE: [] [] []

FINISH: [] [] []

Bally MANUFACTURING CORP. 1282

7640 BELMONT AVENUE CHICAGO, ILLINOIS

WIRING DIAGRAM - BACKBOX

MATERIAL: RAPID FIRE

ASSEM NO USED: [] [] []

PART NO: W-1187-36 c

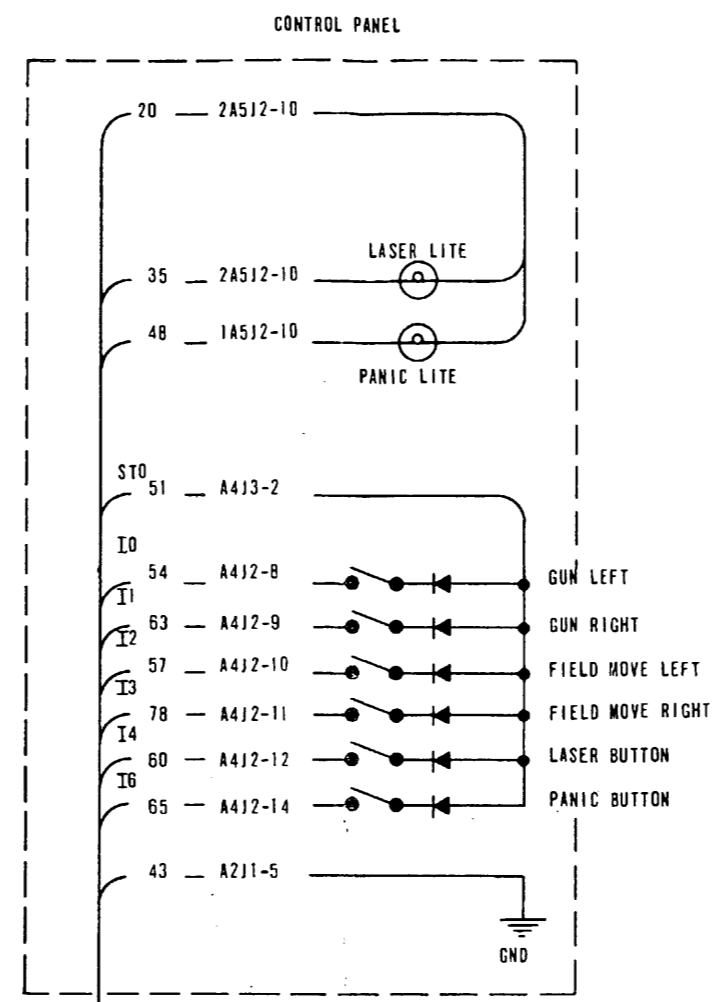
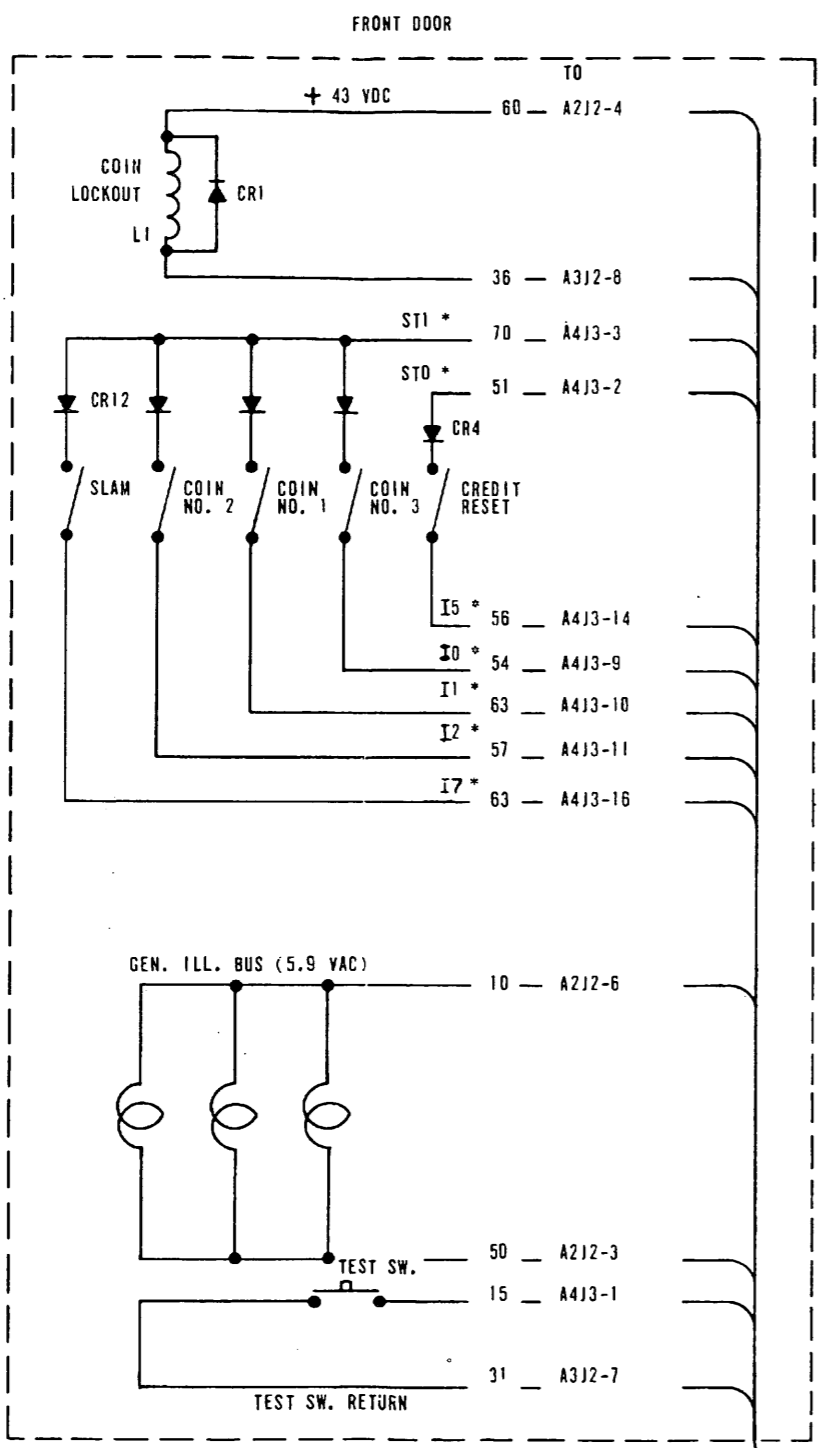


TABLE "A"

12 PIN PLUG		
FROM	PIN	WIRE
A413-2	1	51
A412-8	2	54
A412-10	3	57
A412-12	4	60
A412-9	5	63
A412-14	6	65
A412-11	7	78
	8	
A212-1	9	43
2A512-10	10	35
1A512-10	11	48
A211-5	12	20
GUN CONTROL TO CABINET		

TABLE "B"

15 PIN PLUG		
FROM	PIN	WIRE
A413-2	1	51
A413-3	2	70
A413-16	3	52
A413-9	4	54
A413-14	5	56
A413-11	6	57
A413-10	7	63
A212-4	8	60
A312-8	9	36
A212-6	10	10
A212-3	11	50
A413-1	12	15
A312-7	13	31
DOOR TO CABINET		

WIRE COLOR CODE

1-RED -R-	6-BROWN -BR-
2-BLUE -BLU-	7-ORANGE -O-
3-YELLOW -Y-	8-BLACK -B-
4-GREEN -G-	9-GRAY
5-WHITE -W-	0-NO TRACER
J-JUMPER	
1-FIRST NUMBER-BODY COLOR	
2-SECOND NUMBER-TRACER COLOR	
3-NUMBER AFTER DASH INDICATES RE-USE OF SAME COLOR WIRE	
EXAMPLE 50 -WHITE	
51 -WHITE-RED	
51-1-WHITE-RED (USED AGAIN)	

SEE TABLE "A"
 SEE TABLE "B"
 TO CABINET W-1186-19

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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 JCG DATE 3-31-82
 CK. BY [Signature] DATE 3-31-82
 AP'D BY [Signature] DATE 4-12-82
 AP'D BY [Signature] DATE 4-12-82
 FINISH: [Blank]
 HARDENING: [Blank]

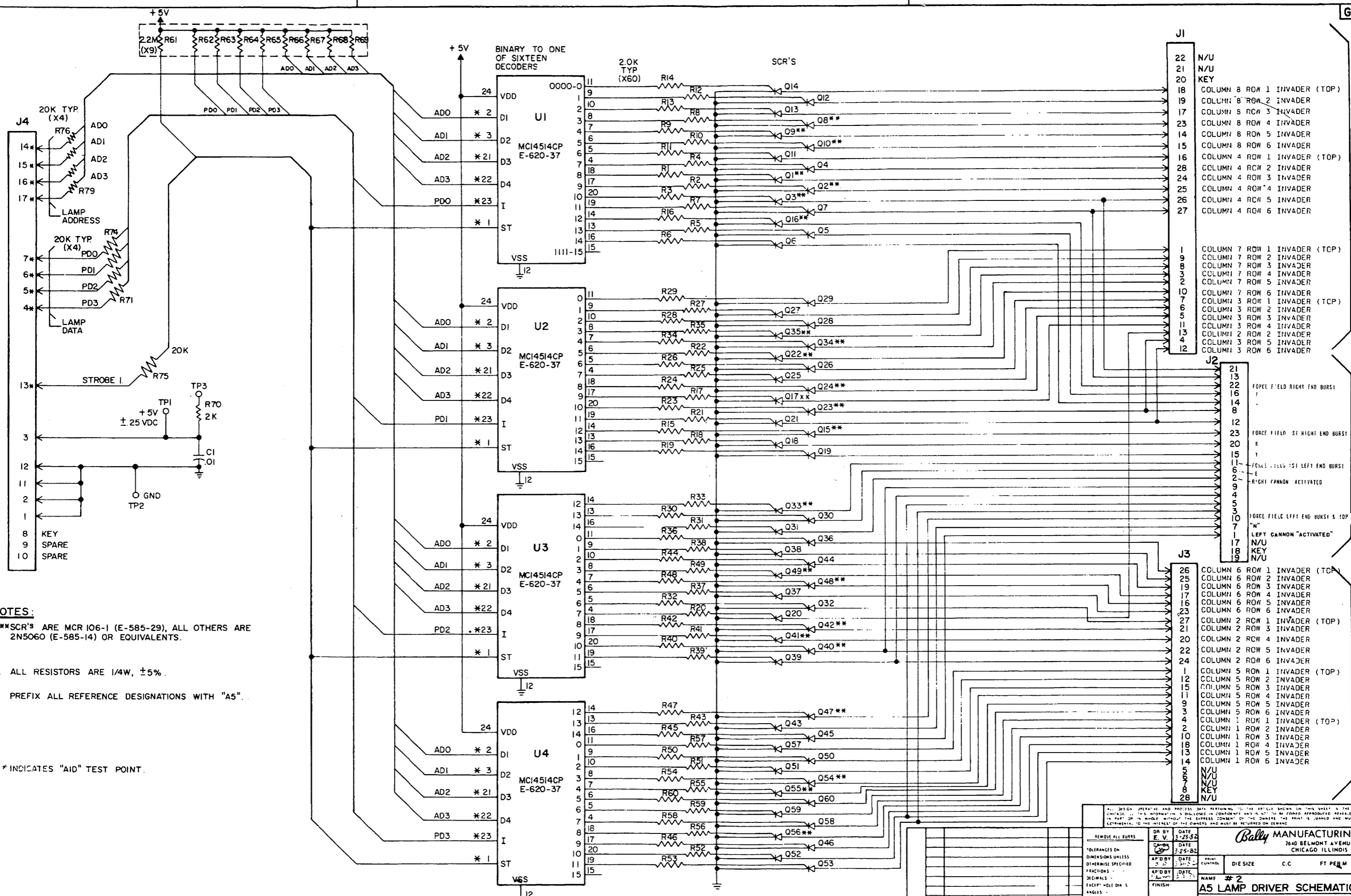
Bally MANUFACTURING CORP.
 2640 BELMONT AVENUE
 CHICAGO, ILLINOIS # 1282

PRINT CONTROL: [Blank] DIE SIZE: [Blank] C.C.: [Blank] FT. PER M.: [Blank] LBS. PER M.: [Blank]

NAME: FRONT DOOR & GUN CONTROL ASSEM. NO. USED: [Blank] SCALE: [Blank]

MATERIAL: RAPID FIRE PART NO.: W-1271 *l*

OPER.	DEPT.	DESCRIPTION	TOOL NO.



NOTES:
 1. **SCR'S ARE MCR 106-1 (E-585-29), ALL OTHERS ARE 2N5060 (E-585-14) OR EQUIVALENTS.
 2. ALL RESISTORS ARE 1/4W, ±5%.
 3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A5".

* INDICATES "AID" TEST POINT.

J1

22	N/U
21	N/U
20	KEY
18	COLUMN 8 ROW 1 INVADER (TOP)
19	COLUMN 8 ROW 2 INVADER
17	COLUMN 8 ROW 3 INVADER
23	COLUMN 8 ROW 4 INVADER
14	COLUMN 8 ROW 5 INVADER
15	COLUMN 8 ROW 6 INVADER
16	COLUMN 4 ROW 1 INVADER (TOP)
28	COLUMN 4 ROW 2 INVADER
24	COLUMN 4 ROW 3 INVADER
25	COLUMN 4 ROW 4 INVADER
26	COLUMN 4 ROW 5 INVADER
27	COLUMN 4 ROW 6 INVADER
1	COLUMN 7 ROW 1 INVADER (TCP)
9	COLUMN 7 ROW 2 INVADER
8	COLUMN 7 ROW 3 INVADER
3	COLUMN 7 ROW 4 INVADER
2	COLUMN 7 ROW 5 INVADER
10	COLUMN 7 ROW 6 INVADER
7	COLUMN 3 ROW 1 INVADER (TCP)
6	COLUMN 3 ROW 2 INVADER
5	COLUMN 3 ROW 3 INVADER
11	COLUMN 3 ROW 4 INVADER
13	COLUMN 3 ROW 5 INVADER
4	COLUMN 3 ROW 6 INVADER
12	

J2

21	FORCE FIELD RIGHT END BURST
22	
16	
14	
8	
23	FORCE FIELD ST RIGHT END BURST
20	
15	
11	FORCE FIELD ST LEFT END BURST
6	
2	RIGHT CANNON ACTIVATED
9	
4	
5	
10	FORCE FIELD LEFT END BURST & TOP ARCH LASER BUTTON
7	
17	LEFT CANNON "ACTIVATED"
18	
19	

J3

26	COLUMN 6 ROW 1 INVADER (TOP)
25	COLUMN 6 ROW 2 INVADER (TOP)
19	COLUMN 6 ROW 3 INVADER
17	COLUMN 6 ROW 4 INVADER
16	COLUMN 6 ROW 5 INVADER
23	COLUMN 6 ROW 6 INVADER
27	COLUMN 2 ROW 1 INVADER (TOP)
21	COLUMN 2 ROW 3 INVADER
20	COLUMN 2 ROW 4 INVADER
22	COLUMN 2 ROW 5 INVADER
24	COLUMN 2 ROW 6 INVADER
1	COLUMN 5 ROW 1 INVADER (TOP)
12	COLUMN 5 ROW 2 INVADER
15	COLUMN 5 ROW 3 INVADER
11	COLUMN 5 ROW 4 INVADER
9	COLUMN 5 ROW 5 INVADER
3	COLUMN 5 ROW 6 INVADER
4	COLUMN 1 ROW 1 INVADER (TOP)
2	COLUMN 1 ROW 2 INVADER
10	COLUMN 1 ROW 3 INVADER
18	COLUMN 1 ROW 4 INVADER
13	COLUMN 1 ROW 5 INVADER
14	COLUMN 1 ROW 6 INVADER
5	N/U
6	N/U
8	N/U
28	N/U

REMOVE ALL BURS
 DIMENSIONS UNLESS OTHERWISE SPECIFIED
 FRACTIONS -
 DECIMALS -
 EXCEPT HOLE DIA & ANGLES -
 DO NOT SCALE DRAWING

DR BY DATE
 E. V. 3-25-82
 CHEN DATE
 3-25-82

AP'D BY DATE
 ST 3-25-82

AP'D BY DATE
 3-25-82

FINISH: HARDENING

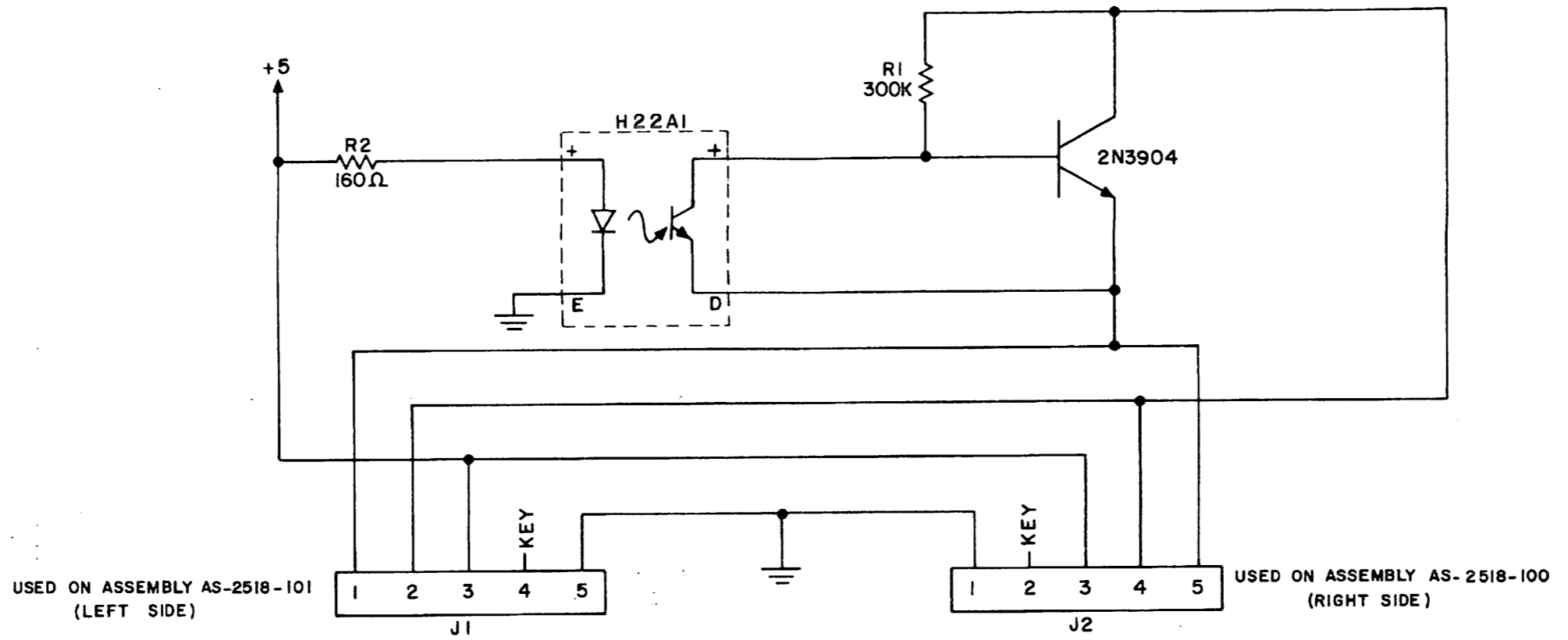
Bally MANUFACTURING CORP.
 2640 BELMONT AVENUE # 1282
 CHICAGO ILLINOIS

NAME # 2
A5 LAMP DRIVER SCHEMATIC

MATERIAL: RAPID FIRE

ASSEM NO USED SCALE
 PART NO W-1182-41

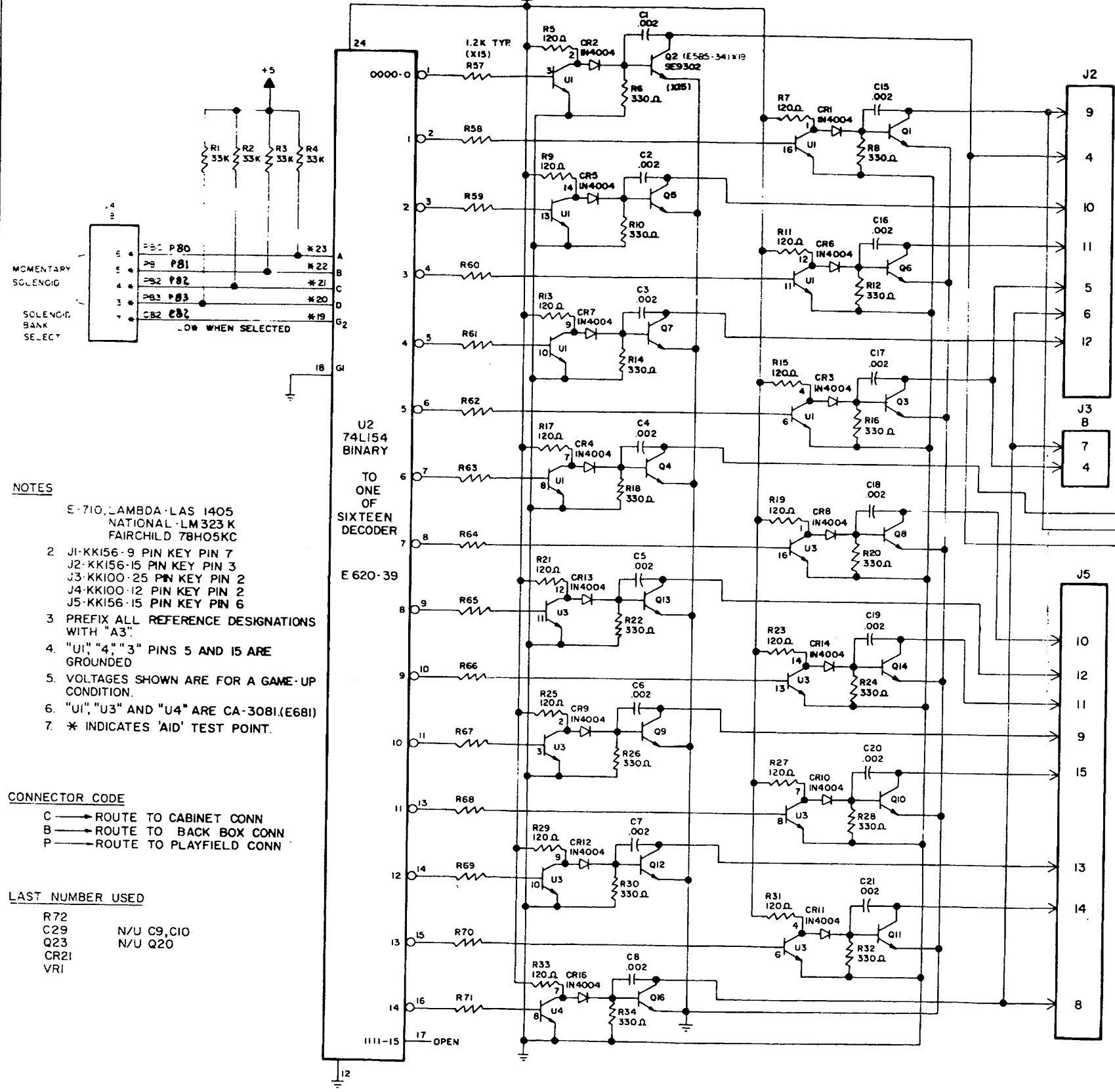
PART NO.
W-1266 b



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REMOVE ALL BURRS	DR. BY FFC	DATE 3-1-82	Bally MANUFACTURING CORP. 2640 BELMONT AVENUE # 1282 CHICAGO, ILLINOIS				
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED	CK. BY BK	DATE 3-2-82					
FRACTIONS = 008	AP'D BY	DATE	PRINT CONTROL	DIE SIZE	C.C.	FT. PER M.	LBS. PER M.
DECIMALS = 003	AP'D BY	DATE	NAME		(SCHEMATIC)		
EXCEPT HOLE DIA S	FINISH:		SINGLE TARGET OPTICAL SWITCH		ASSEM. NO. USED		SCALE
ANGLES = 1 2°	HARDENING:		MATERIAL		AS-2518-100		✓
DO NOT SCALE DRAWING					AS-2518-101		
					PART NO.		
					W-1266 b		

APPD DEPT DESCRIPTION TOL NO



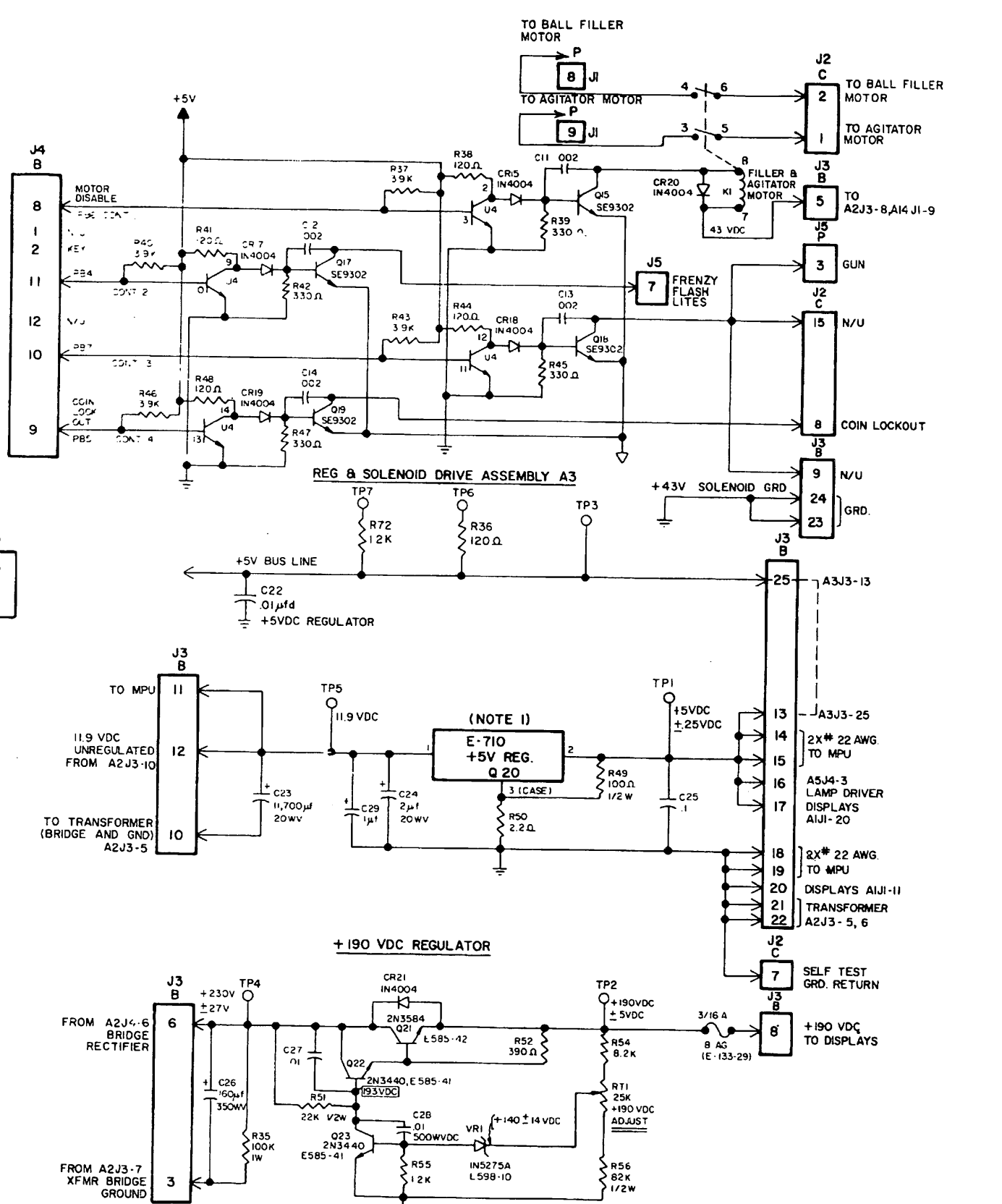
- NOTES**
- E-710, LAMBDA-LAS 1405 NATIONAL-LM323K FAIRCHILD 78H05KC
 - J1-KK156-9 PIN KEY PIN 7
J2-KK156-15 PIN KEY PIN 3
J3-KK100-25 PIN KEY PIN 2
J4-KK100-12 PIN KEY PIN 2
J5-KK156-15 PIN KEY PIN 6
 - PREFIX ALL REFERENCE DESIGNATIONS WITH "A3"
 - "U1", "U4", "U3" PINS 5 AND 15 ARE GROUNDED
 - VOLTAGES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

CONNECTOR CODE

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

LAST NUMBER USED

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



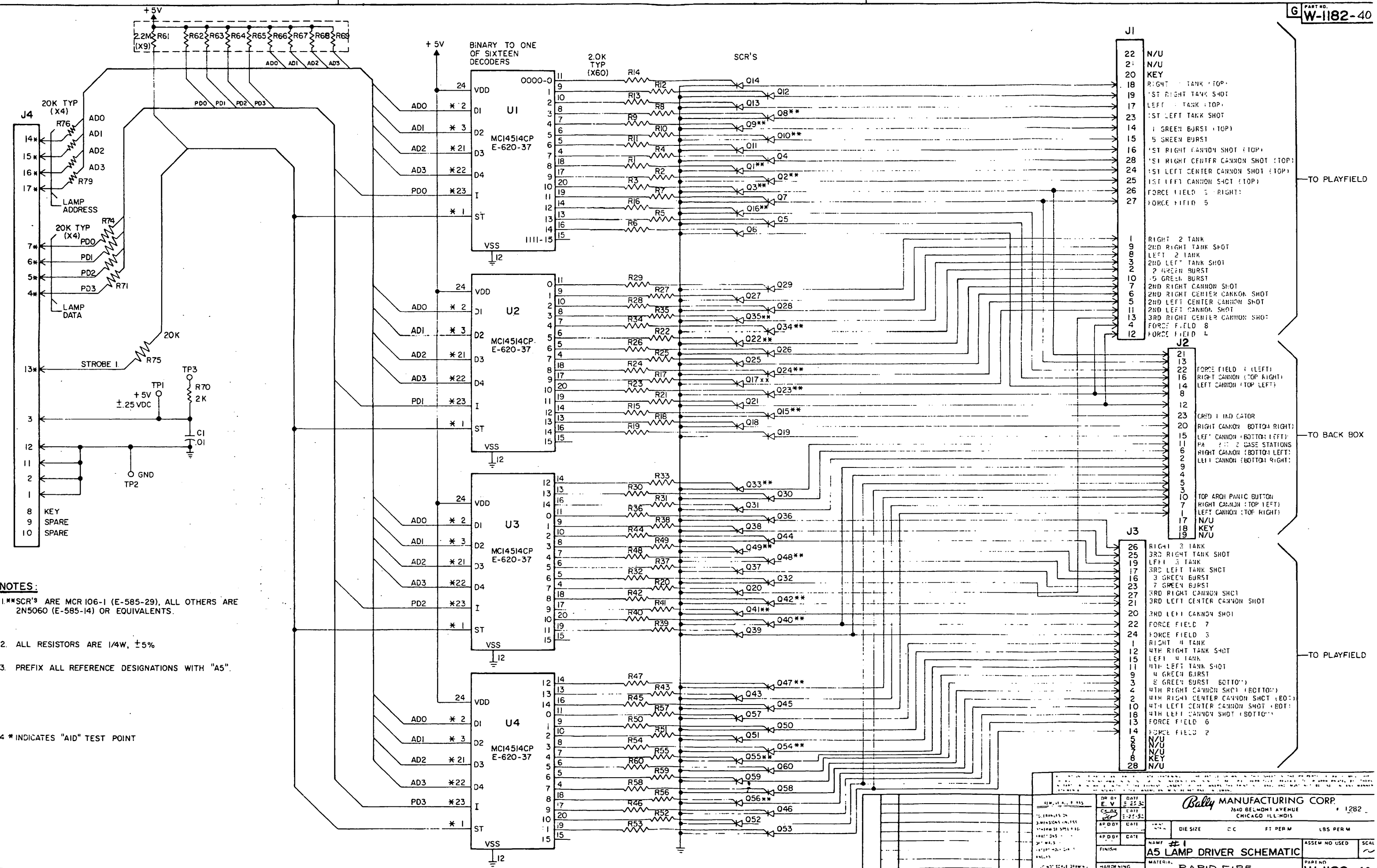
ALL DESIGN OPERATIVE AND PROCESS DATA PERTAINING TO THE ARTICLE SHOWN ON THIS SHEET IS THE PROPERTY OF BALLY LTD. COOP CHICAGO. ALL THIS INFORMATION IS DISCLOSED IN CONFIDENCE AND IS NOT TO BE COPIED, REPRODUCED, REVEALED TO OR APPROPRIATED BY OTHERS IN ANY MANNER OR BY WHOMEVER WITHOUT THE EXPRESS CONSENT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

REWORK ALL BURNS	DR BY	DATE	3-82
TOLERANCES UNLESS OTHERWISE SPECIFIED	CHK BY	DATE	
FRACTIONS = 308	AP'D BY	DATE	3-31-82
DECIMALS = 307	CHK'D BY	DATE	3-31-82
EXCEPT HOLE DIA'S	FINISH:	NAME	
ANGLES = 1/2"			

Bally MANUFACTURING CORP.
2640 BELMONT AVENUE
CHICAGO, ILLINOIS

1282

ASSEMBLY NO.	SOLENOID DRIVER VOLTAGE REGULATOR SCHEMATIC	SCALE
--------------	---	-------



NOTES:
 1. **SCR'S ARE MCR 106-1 (E-585-29), ALL OTHERS ARE 2N5060 (E-585-14) OR EQUIVALENTS.

2. ALL RESISTORS ARE 1/4W, ±5%

3. PREFIX ALL REFERENCE DESIGNATIONS WITH "A5"

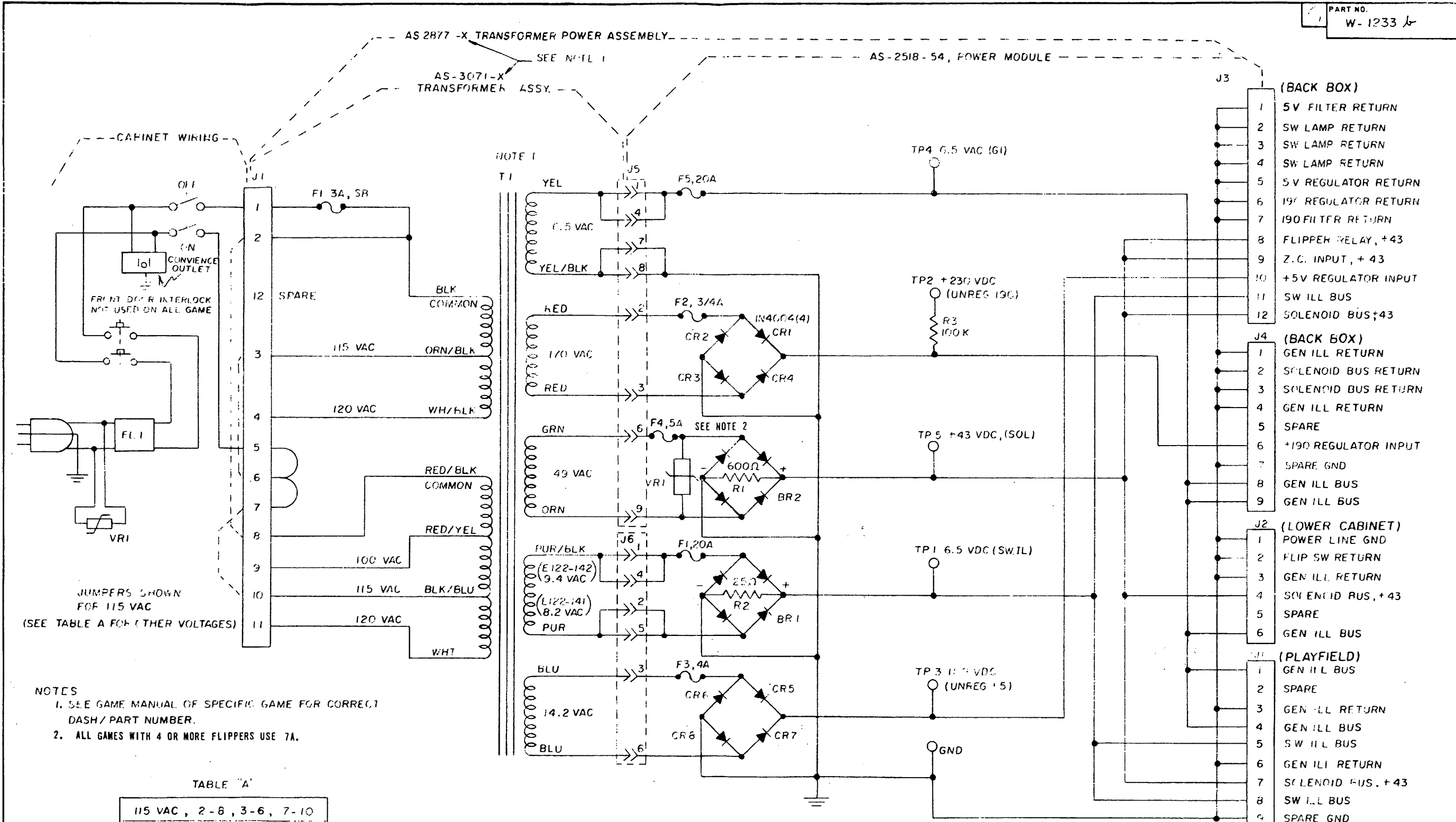
4 * INDICATES "AID" TEST POINT

- J1**
- 22 N/U
 - 21 N/U
 - 20 KEY
 - 18 RIGHT TANK (TOP)
 - 19 1ST RIGHT TANK SHOT
 - 17 LEFT TANK (TOP)
 - 23 1ST LEFT TANK SHOT
 - 14 1 GREEN BURST (TOP)
 - 15 5 GREEN BURST
 - 16 1ST RIGHT CANNON SHOT (TOP)
 - 28 1ST RIGHT CENTER CANNON SHOT (TOP)
 - 24 1ST LEFT CENTER CANNON SHOT (TOP)
 - 25 1ST LEFT CANNON SHOT (TOP)
 - 26 FORCE FIELD 5 (RIGHT)
 - 27 FORCE FIELD 5
- J2**
- 9 RIGHT 2 TANK
 - 8 2ND RIGHT TANK SHOT
 - 3 LEFT 2 TANK
 - 2 2ND LEFT TANK SHOT
 - 10 2 GREEN BURST
 - 10 5 GREEN BURST
 - 7 2ND RIGHT CANNON SHOT
 - 6 2ND RIGHT CENTER CANNON SHOT
 - 5 2ND LEFT CENTER CANNON SHOT
 - 11 2ND LEFT CANNON SHOT
 - 13 3RD RIGHT CENTER CANNON SHOT
 - 4 FORCE FIELD 8
 - 12 FORCE FIELD 4

- J3**
- 21 RIGHT 2 TANK
 - 13 2ND RIGHT TANK SHOT
 - 16 LEFT 2 TANK
 - 8 2ND LEFT TANK SHOT
 - 12 2 GREEN BURST
 - 23 5 GREEN BURST
 - 20 RIGHT CANNON (BOTTOM RIGHT)
 - 15 LEFT CANNON (BOTTOM LEFT)
 - 11 PA 2 2 CASE STATIONS
 - 6 RIGHT CANNON (BOTTOM LEFT)
 - 9 LEFT CANNON (BOTTOM RIGHT)
 - 10 TOP ARCH PANIC BUTTON
 - 7 RIGHT CANNON (TOP LEFT)
 - 17 LEFT CANNON (TOP RIGHT)
 - 18 N/U
 - 19 KEY
 - 19 N/U

- J4**
- 14* 20K TYP (X4) AD0
 - 15* 20K TYP (X4) AD1
 - 16* 20K TYP (X4) AD2
 - 17* 20K TYP (X4) AD3
 - LAMP ADDRESS
 - 7* 20K TYP (X4) PD0
 - 6* PD1
 - 5* PD2
 - 4* PD3
 - LAMP DATA
 - 13* STROBE I
 - TP3
 - TP1
 - 3 +5V
 - ±2.5VDC
 - TP2
 - 12 GND
 - 11
 - 2
 - 1
 - 8 KEY
 - 9 SPARE
 - 10 SPARE

DR BY E.V.		DATE 5-25-53		Bally MANUFACTURING CORP.	
AP'D BY		DATE		7400 BELMONT AVENUE CHICAGO ILL. 60612	
FINISH		DATE		# 1282	
MATERIALS		DATE		ASSEM NO USED	
HARDENING		DATE		SCALE	
NO		CHANGE		DATE BY	
NAME #1		A5 LAMP DRIVER SCHEMATIC		PART NO W-1182-40	
MATERIALS		RAPID FIRE		ASSEM NO USED	
HARDENING		DATE		SCALE	



CABINET WIRING

AS 2877 -X TRANSFORMER POWER ASSEMBLY
 AS-3071-X TRANSFORMER ASSY.
 AS-2518-54, POWER MODULE

NOTE 1

FRONT DOOR INTERLOCK NOT USED ON ALL GAME

JUMPERS SHOWN FOR 115 VAC (SEE TABLE A FOR OTHER VOLTAGES)

- NOTES
- SEE GAME MANUAL OF SPECIFIC GAME FOR CORRECT DASH / PART NUMBER.
 - ALL GAMES WITH 4 OR MORE FLIPPERS USE 7A.

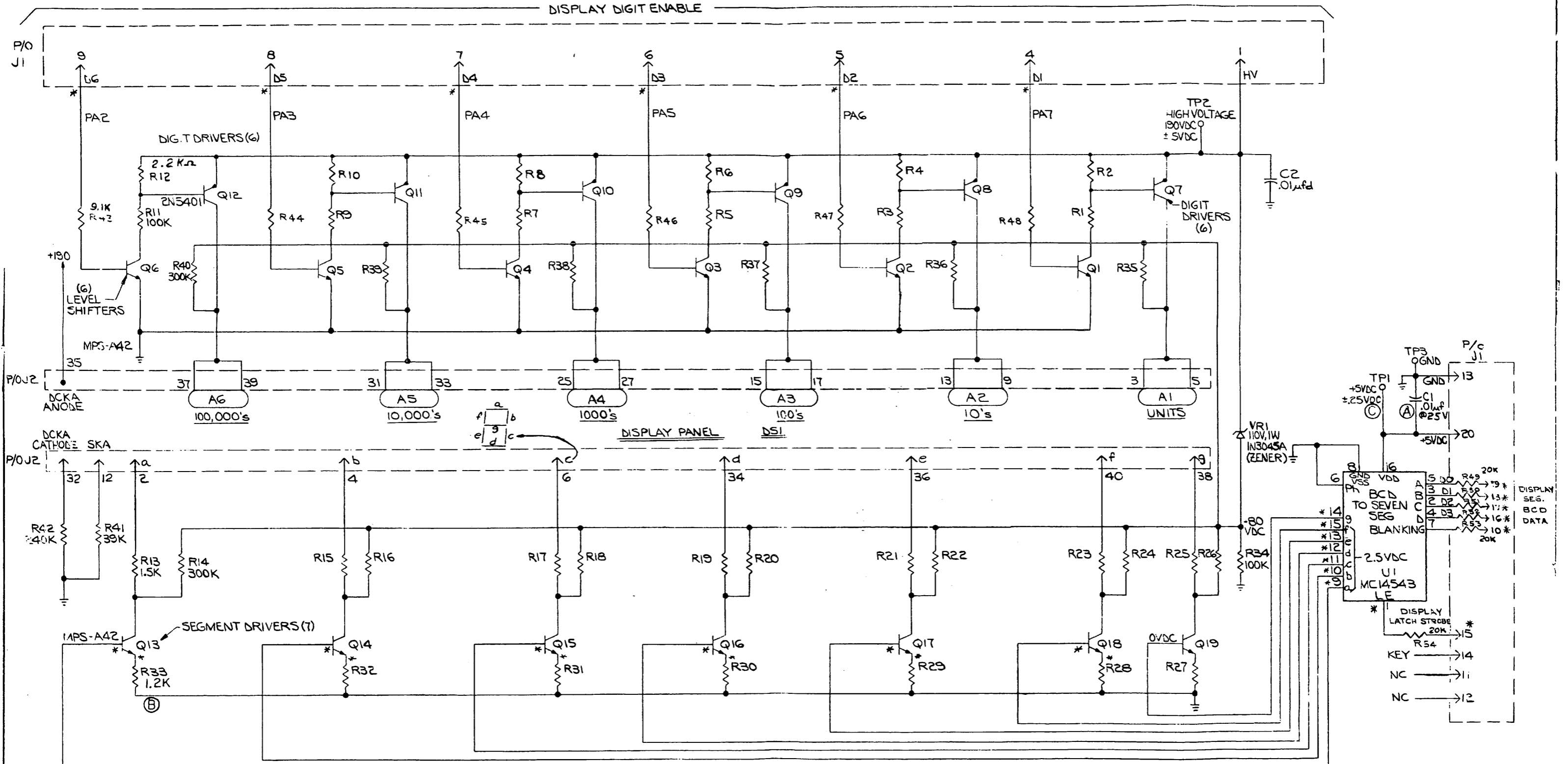
TABLE "A"

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

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REMOVE ALL BURRS		DR. BY FFC	DATE 7-10-80			2640 BELMONT AVENUE CHICAGO, ILLINOIS		# 1196	
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS = .008 DECIMALS = .003 EXCEPT HOLE DIA'S ANGLES = 1/2"		CK. BY AMCR	DATE 7-11-80			FEB 20 1981	PRINT CONTROL	DIE SIZE	C.C.
DO NOT SCALE DRAWING		AP'D BY	DATE	NAME POWER SUPPLY SCHEMATIC			ASSEM. NO. USED	SCALE	
NO.		LET.	CHANGE	DATE	BY	MATERIAL		PART NO. W-1233 b	

OPER.	DEPT.	DESCRIPTION	TOOL NO.



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

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

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

DR. BY	DATE	7/22
CR. BY	DATE	7/8/77
CHK. BY	DATE	2/14/77
APP. BY	DATE	2/14/77
FR. BY	DATE	2/14/77

REMOVE ALL BURS

TOLEANCES OR DIMENSIONS UNLESS OTHERWISE SPECIFIED

FRACTIONS: 1/16

DECIMALS: 2

ANGLES: 1

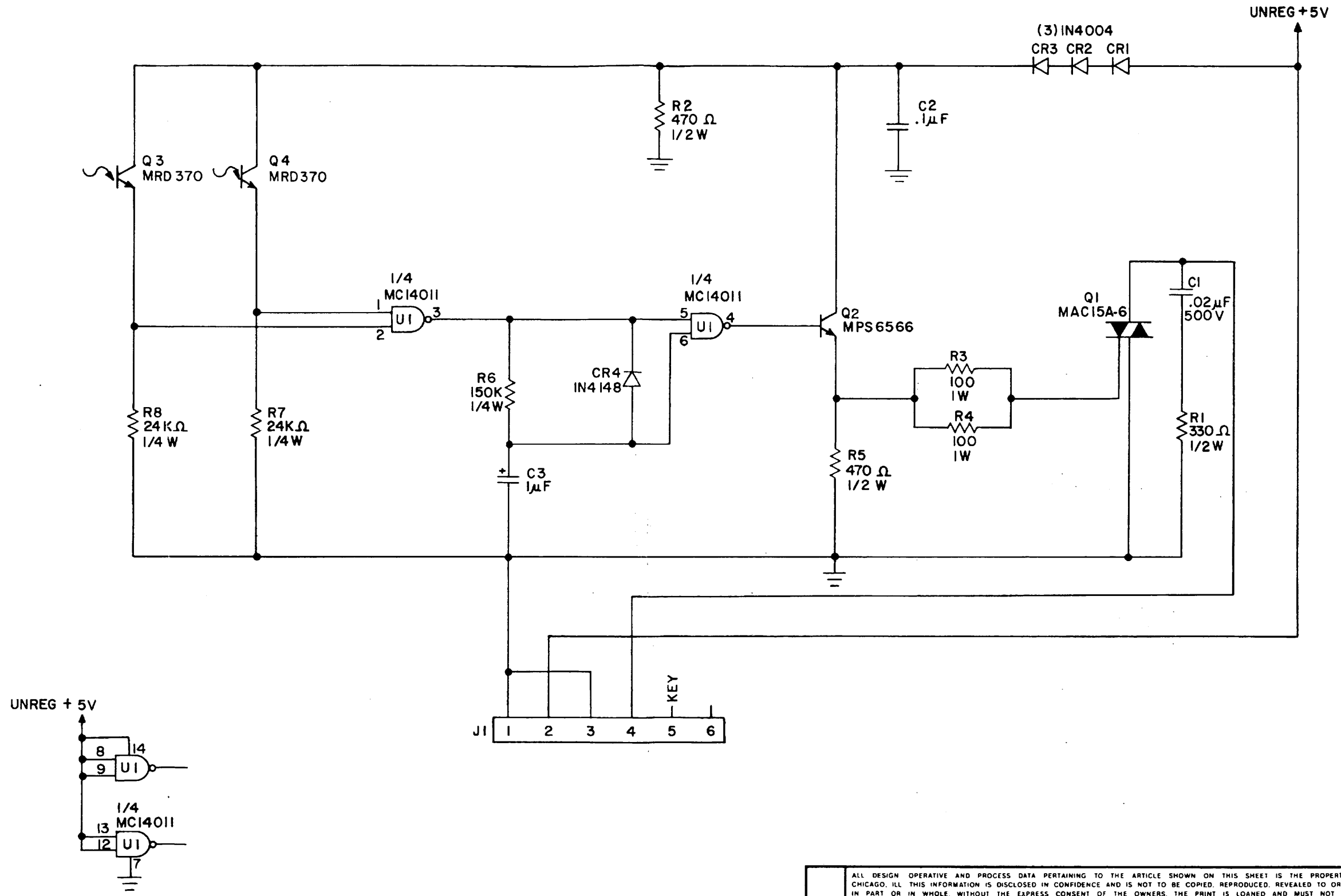
DO NOT SCALE DRAWING

Bally MANUFACTURING CORP. 2120 E. 75th St. CHICAGO, ILLINOIS 60649

NAME: 6 DIGIT DISPLAY BOARD SCHEMATIC A. ASSM. NO. USED ON: AS-2518-21

PART NO. 121112A

PART NO.
W-1264 b



OPER.	DEPT.	DESCRIPTION	TOOL NO.
-------	-------	-------------	----------

NO.	LET.	CHANGE	DATE	BY

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

REMOVE ALL BURRS

TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
 FRACTIONS = 008
 DECIMALS = 003
 EXCEPT HOLE DIA S
 ANGLES = 1/2"

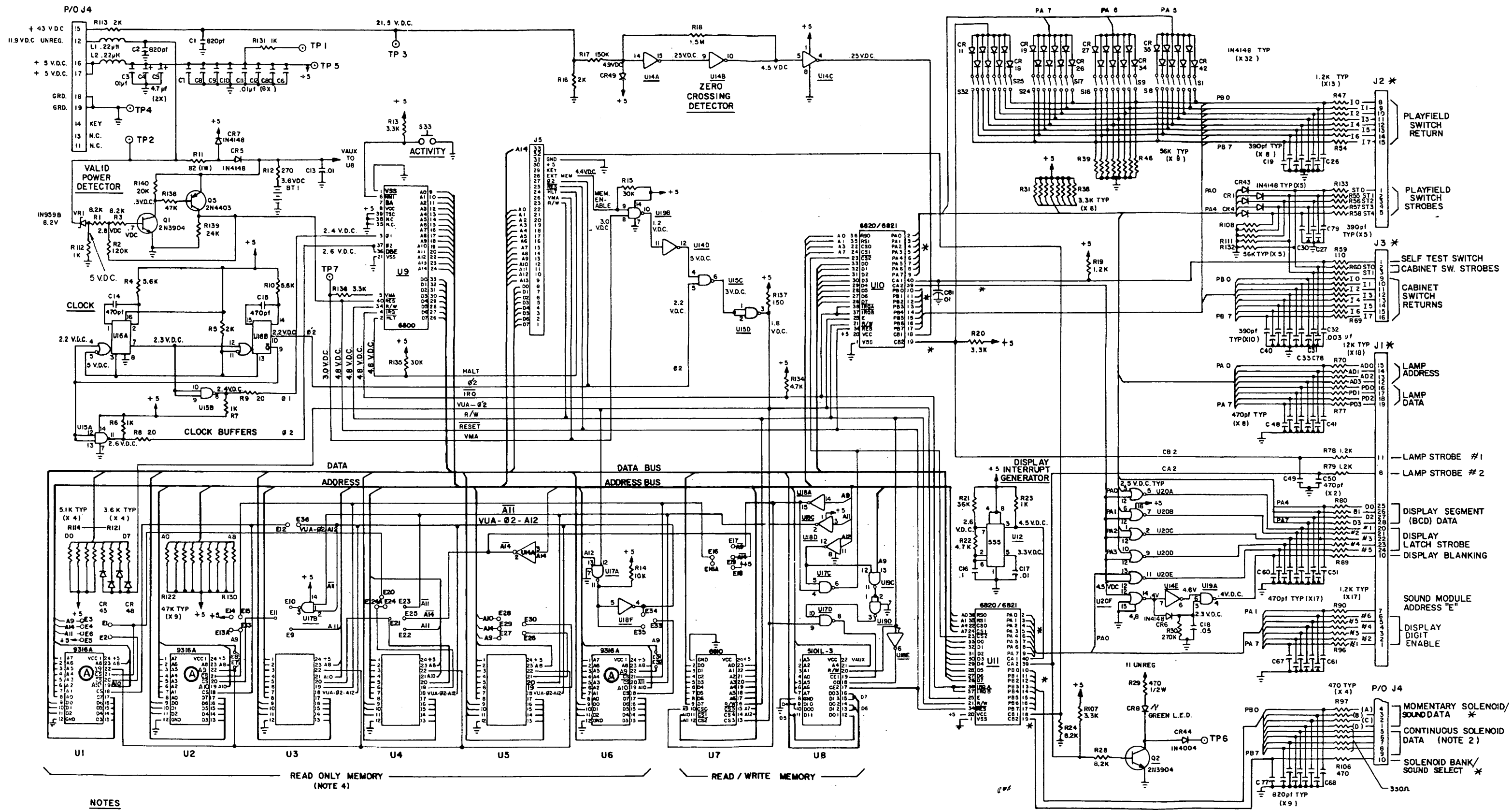
DO NOT SCALE DRAWING

DR. BY FFC DATE 3-12-82
 CK. BY [Signature] DATE [Signature]
 AP'D BY [Signature] DATE [Signature]
 AP'D BY [Signature] DATE [Signature]
 FINISH: [Signature]
 HARDENING: [Signature]

Bally MANUFACTURING CORP.
 2640 BELMONT AVENUE
 CHICAGO, ILLINOIS # 1282

PRINT CONTROL [] DIE SIZE: C.C.: FT. PER M.: LBS. PER M.:

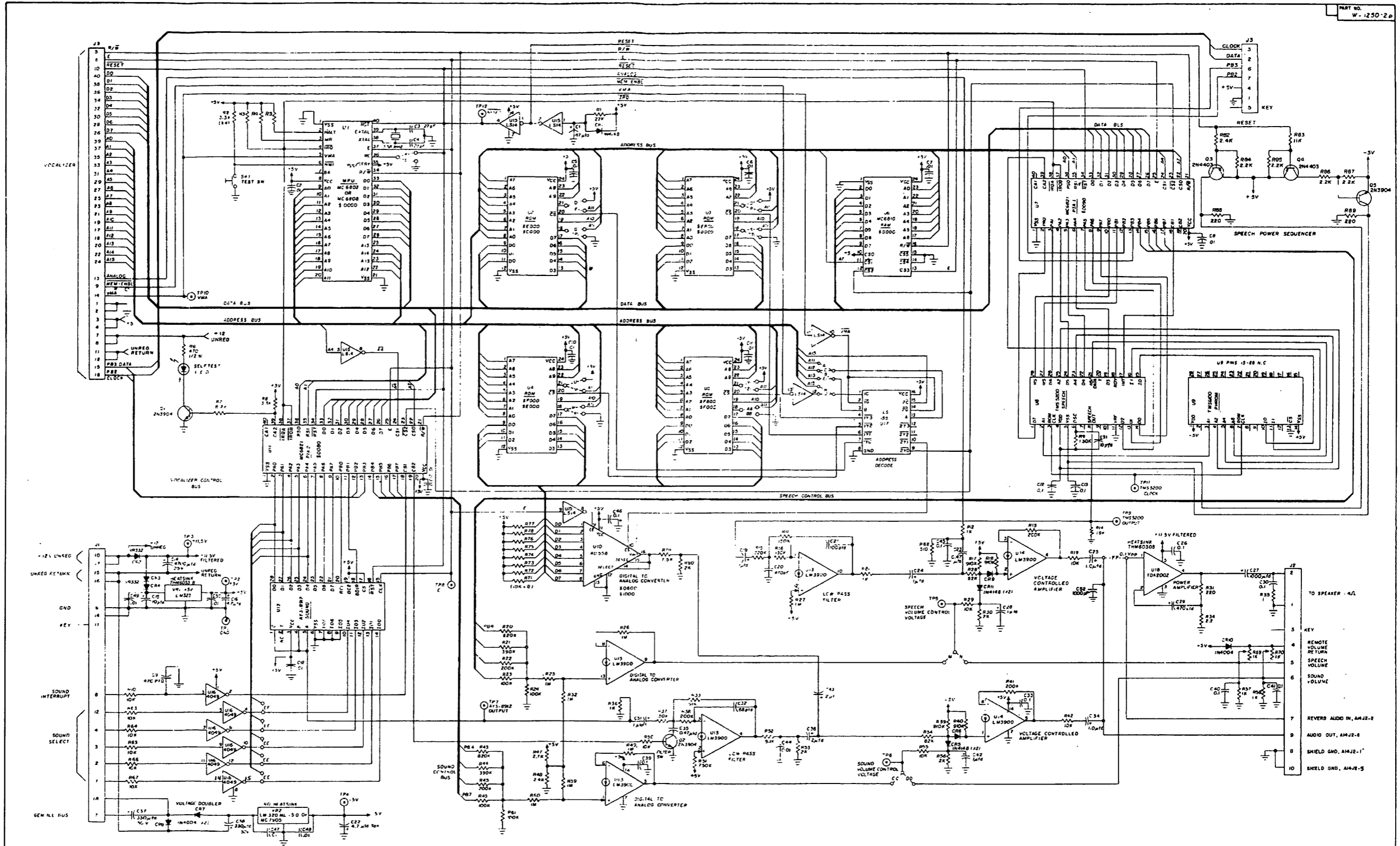
NAME BALL DELIVERY (SENSOR & MOTOR CONTROL SCHEMATIC) AS-2518-102
 MATERIAL: PART NO. W-1264 b
 CODE: SCALE: [Signature]



- NOTES**
- * INDICATES "AID" TEST POINT.
 - REMOVE A3J4 BEFORE USING AS AID TEST POINT
 - PREFIX ALL REFERENCE DESIGNATIONS WITH "A4"
 - 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.

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

REMOVE ALL BURRS		DATE: 5-11-78	
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED: FRACTIONS - 1/64		DATE: 5-15-78	
DECIMALS - .005		DATE: 5-15-78	
ANGLES - 1°		DATE: 5-15-78	
DO NOT SCALE DRAWING		DATE: 5-15-78	
DR. BY: E.V.		DATE: 5-11-78	
CK. BY: L.C.		DATE: 5-15-78	
APP'D BY: [Signature]		DATE: 5-15-78	
MATERIAL: M.P.U. CONTROL BOARD SCHEMATIC		PART NO: W-1181-3c	



NOTES:
1 UNLESS OTHERWISE INDICATED ALL RESISTOR VALUES ARE IN OHMS.

LAST NUMBERS USED
R89
C51
C10
U18
U12
DS
TP12
FF

SQUAWK & TALK TEST POINTS
TP1-GND
TP2-+5VDC
TP3-11.5VDC
TP4-5VDC
TP5-SPEECH VOLUME CONTROL VOLTAGE
TP6-SOUND VOLUME CONTROL VOLTAGE

SQUAWK & TALK JUMPER SETTINGS
PRM: ROM JUMPER
2716 2316 A,B,D,R0,T,U,T,K,BB
2532 0932 C,E,G,Q,S,U,W,Y,AB
NO VOCALIZER #
WITH VOCALIZER J
6808 MPU L (WITH 6810 RAM)
6802 MPU R (NO 6810 RAM)
NO 413-89-2 EE
NO "SAY IT AGAIN" FF

COMPUTER VOLUME CONTROL
REMOTE VOLUME CONTROL

SPEECH SOUND
CC DD N

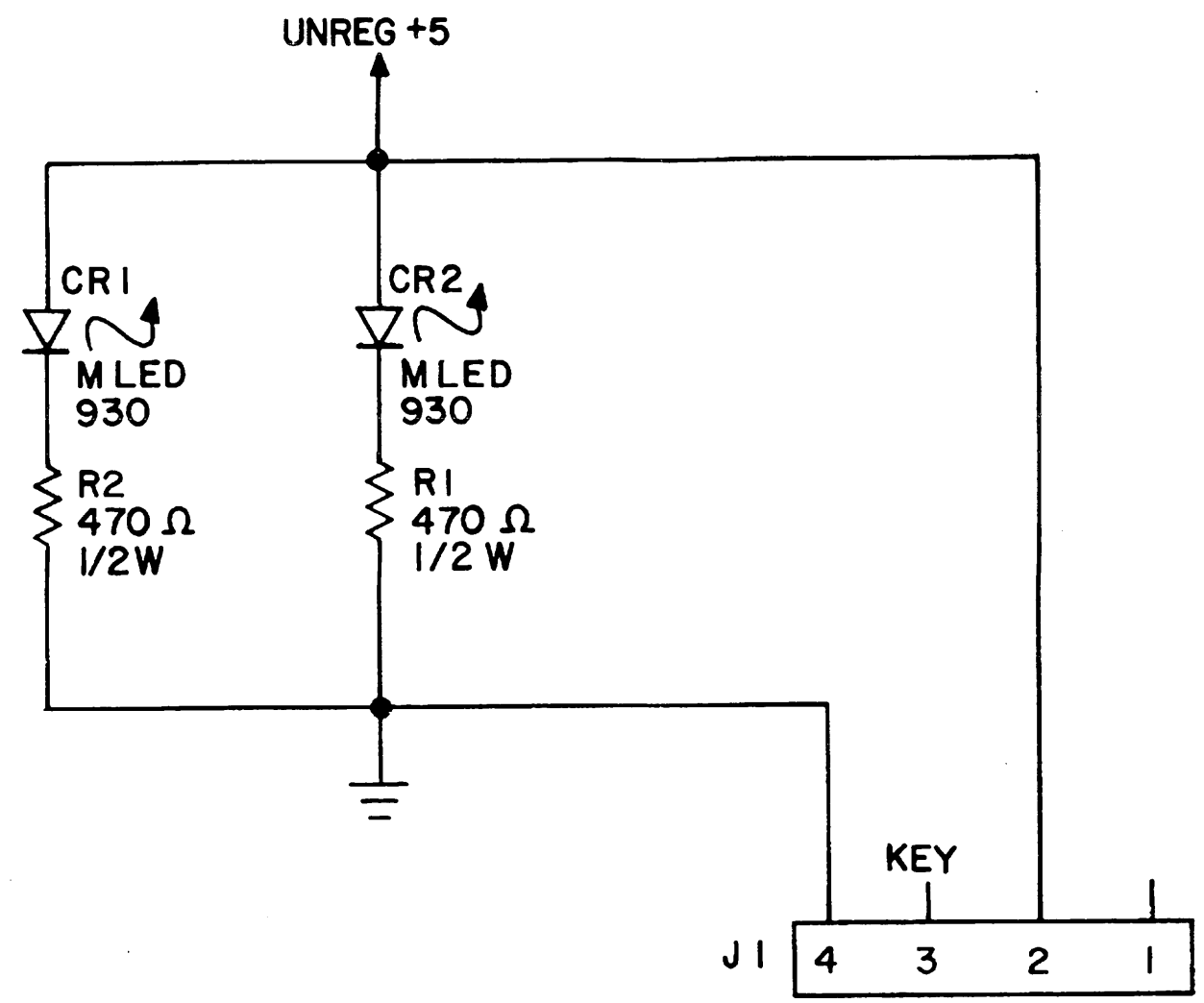
Balluff Manufacturing Corp.
348 BELLEVUE AVENUE
CHICAGO, ILLINOIS 60608

DATE: 11/83
C.C. P.T. PER: 1.00 PER 50

ASSEMBLY SHEET: SQUAWK & TALK SCHEMATIC AS
DRAWN BY: J.B. BROWN
CHECKED BY: J.B. BROWN

REVISIONS:
1. 11/83 J.B. BROWN

PART NO.
W-1263 a



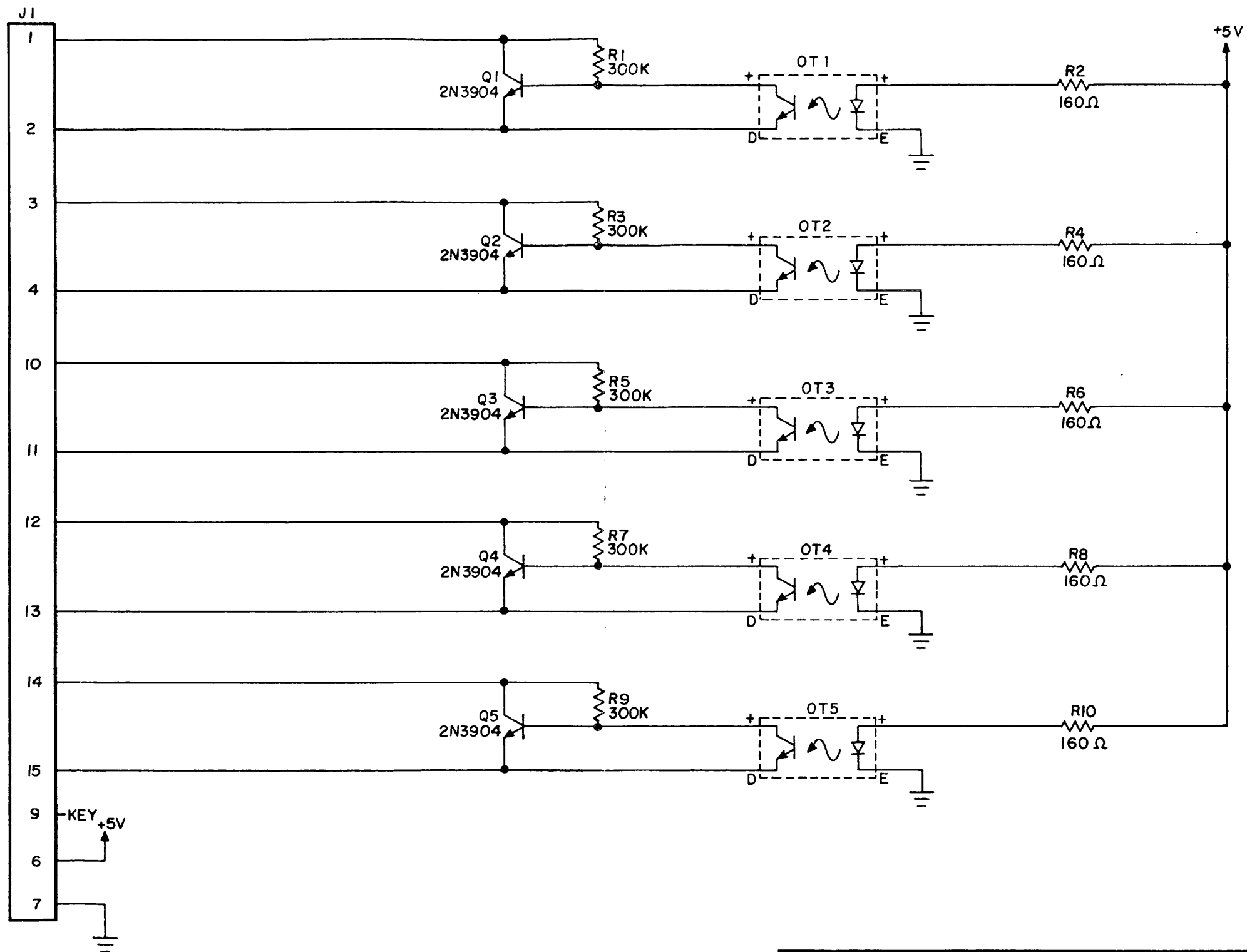
TOOL NO.
DESCRIPTION
DEPT.
OPER.

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

NO.	LET.	CHANGE	DATE	CK.

<u>REMOVE ALL BURRS</u>		DR. BY FFC	DATE 3-8-82	Bally MANUFACTURING CORP. 2640 BELMONT AVENUE CHICAGO, ILLINOIS # 1282	
TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED FRACTIONS ± .008 DECIMALS ± .003 ANGLES ± 1/2°		CK. BY B.K.	DATE 3-25-82		
DO NOT SCALE DRAWING		AP'D BY [Signature]	DATE 3/11/82	PRINT CONTROL	DIE SIZE - C.C. - FT. PER M - LBS. PER M -
		AP'D BY [Signature]	DATE 3/25/82	FINISH: [Signature]	NAME BALL DELIVERY (LED) CONTROL
		HARDENING: [Signature]			ASSEM. NO. USED AS-2518-103
					SCALE [Signature]
					PART NO. W-1263 a

PART NO.
W-1265 b



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NO	QTY	CHANGE	DATE	BY

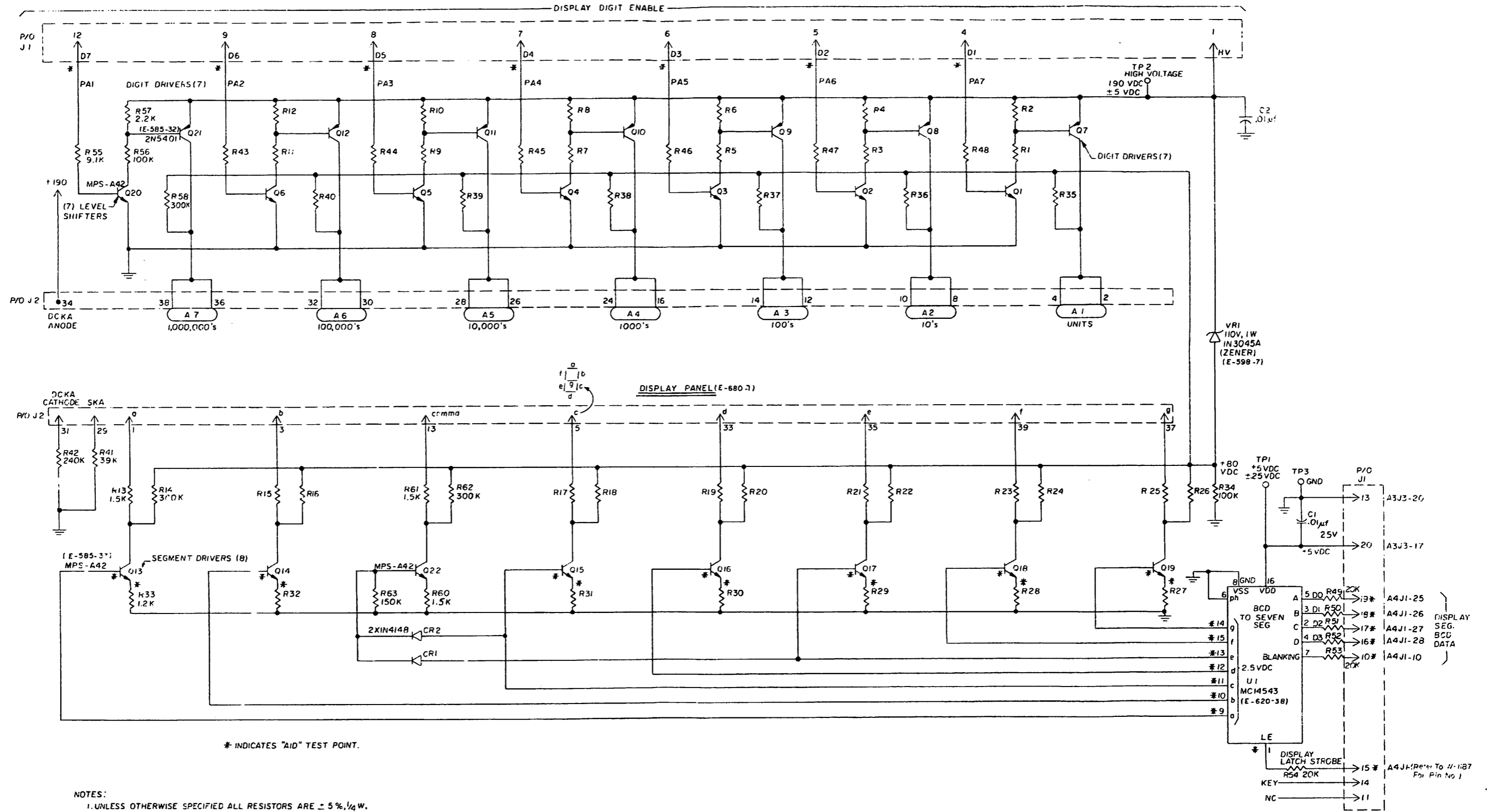
REMOVE ALL BURRS

TOLERANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
 FRACTIONS = .008
 DECIMALS = .003
 EXCEPT HOLE DIA S
 ANGLES = 1/2"

DO NOT SCALE DRAWING

DR. BY FFC	DATE 1-30-82	 2640 BELMONT AVENUE CHICAGO, ILLINOIS # 1282				
CK. BY BTK	DATE 3-1-82					
AP'D BY	DATE	PRINT CONTROL	DIE SIZE	C.C.	FT. PER M.	LBS. PER M.
AP'D BY JPA	DATE	NAME (SCHEMATIC) OPTICAL SWITCH M.P.U. INTERFACE		ASSEM. NO. USED AS-2518-95	SCALE 1/2"	
FINISH:	HARDENING:		MATERIAL		PART NO. W-1265 b	

OPER.	DEPT.	DESCRIPTION	TOOL NO.



NOTES:
 1. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE ± 5%, 1/4 W.
 2. PREFIX ALL REFERENCE DESIG. WITH ASSEMBLY REFERENCE DESIG. "A 1".

REWORK ALL BOM		DR. BY FFC	DATE 6-18-0	Bally MANUFACTURING CORP. 2840 BELMONT AVENUE CHICAGO, ILLINOIS	
CLEARANCES ON DIMENSIONS UNLESS OTHERWISE SPECIFIED		CHK. BY RSC	DATE 6-18-0	1210	
FUNCTIONS = 003 DECIMALS = 003 EXCEPT NOTE D & S ANGLES = 1:2		APP'D BY J...	DATE ...	DI. SIZE: C.C.	FT. PER M.
DO NOT SCALE DRAWING		FINISH:	NAME 7 DIGIT DISPLAY BOARD SCHEMATIC "A1"	ASSEM. NO. USED A5-2518-58	SCALE
MATERIAL		HARDENING:	MATERIAL	PART NO.	SCALE
NO. LIST		CHANGE	DATE	BY	W-1184-2C



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