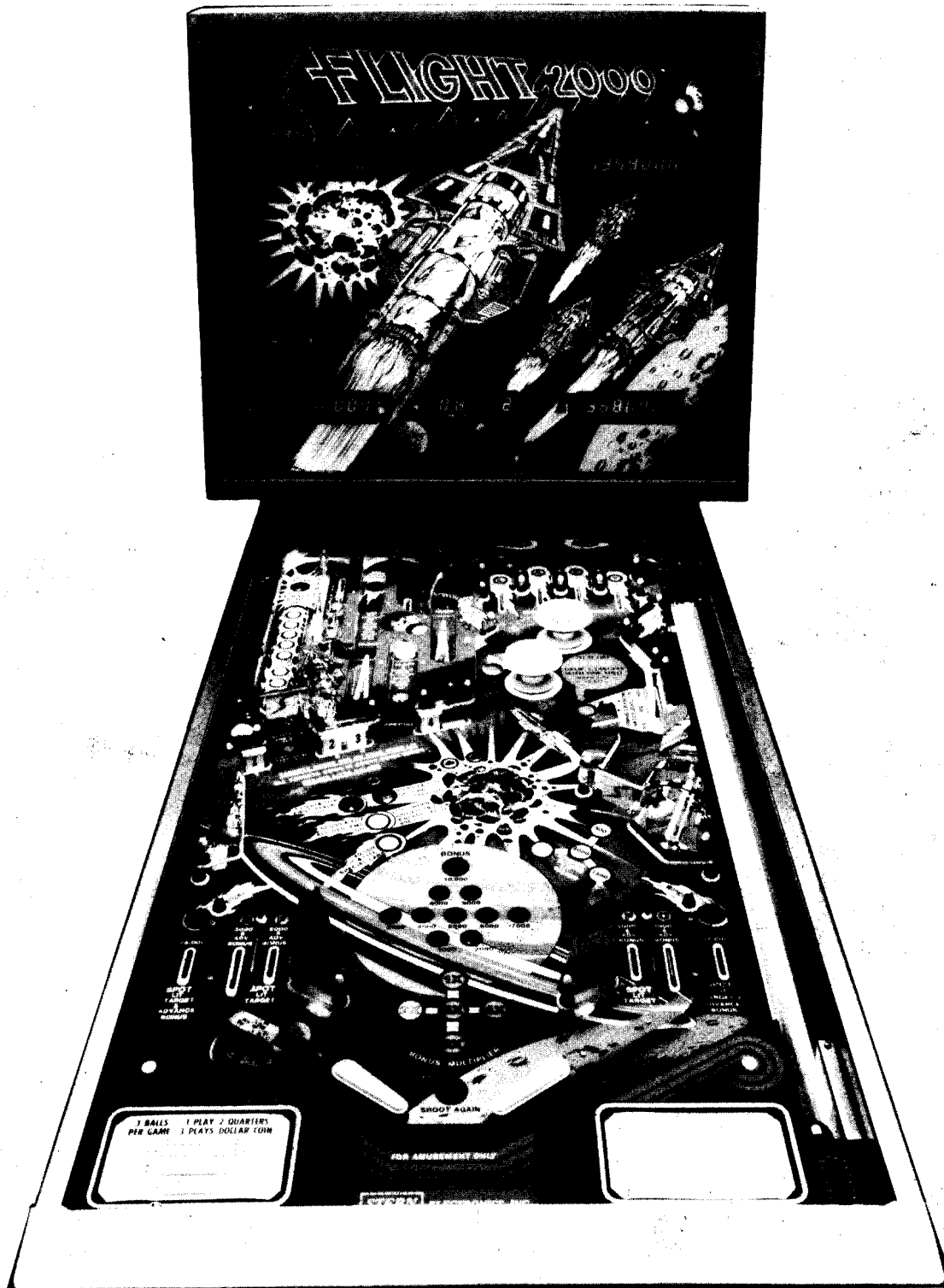




FLIPPERSPILL.COM



STERN

ELECTRONICS, INC.

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(312) 935-4600, Telex 25-4657
Toll Free Service Assistance (800) 621-6424

I. INSTALLATION

Assemble the game as follows:

Bolt legs to cabinet. Using flat washers under bolt heads, bolt back box to cabinet. Feed cable connectors and ground braid through cable port in back box. Screw ground braid to braid in back box. Insert connectors so they are completely seated on printed circuit board assemblies.

On all games there are some items that must be checked after shipment. Making these visual inspections 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 switches should always be adjusted after game is set on location and leg levelers are adjusted.

Visual inspections before plugging in line cord:

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

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

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

NOTE

TO PROTECT SOLID STATE COMPONENTS
BEFORE TOUCHING ANY COMPONENT IN THE
BACK BOX, DISCHARGE ANY POSSIBLE STATIC
BUILD-UP BY TOUCHING ANY GROUND
CIRCUIT, e.g. SIDE ARMOR, GROUND BRAID.

II. ROUTINE MAINTENANCE ON LOCATION

Self tests, which are programmed into the design of the game, are very helpful. As with any solid state piece of equipment the three prong grounding receptacle is an important piece part of the game, that must not be tampered with and must be used properly.

MPU MODULE SELF-TEST:

During power-up, the MPU assembly tests itself, which can visibly be seen by the flashing of a LED on the board. When the game is turned on, the LED will flash, have a pause, flash again, a longer pause, then flash five more times and then will be dimly lit. Accompanying each flash is one note (total of seven), this indicates proper MPU game operation conditions.

GAME SELF-DIAGNOSTIC TESTS:

Pressing the Self-Test button inside the coin door activates the game into its "Self-Diagnostic Test."

1. BURN IN TEST - All outputs tested.
2. FEATURE LAMPS - All feature lamps will flash on and off continuously, determining any burnt lamps.
3. DISPLAYS - Each digit on all displays will cycle from 0 thru 9, then a number 8 will shift left to right. This test will recycle continuously.
4. SOLENOIDS - Each solenoid will be energized, one at a time, in a continuous sequence. (Holding both flipper buttons "in" during this test will cause the flipper coils to be energized). The number appearing on the "Player Score" display is the same as the number assigned to the solenoid and also the same transistor number on the SDU board. The sound of a solenoid pulling-in as a number appears indicates proper operation (providing transistor is being used), the absence of a solenoid sound shows a fault. If sound is absent, see Solenoid I.D. page in book for help in Solenoid Identification. (After the solenoids are tested, the game sounds are tested.)
5. SWITCHES - The MPU will look at each switch assembly for stuck contacts. *(Flipper Button and flipper End of Stroke switches are not included). If there are any stuck, the lowest number encountered is flashed on the Player Score displays. The number remains until the fault is corrected. See Switch I.D. page in book for help in 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'. **DO NOT BURNISH OR FILE GOLD PLATED SWITCH CONTACTS.**
6. GAME LEVELS AND BOOKKEEPING FUNCTIONS: - Pressing the Self-Test button eighteen more times causes the MPU to step thru the game levels and bookkeeping functions and finally to repeat the power-up test. To bypass these functions, turn the game off, then on. The game is now ready to play, after the MPU Self-Test.

CONTACT SWITCH ADJUSTMENTS

All contact switches should be adjusted to have a gap 1/16" in the open position, and have .010" overtravel closed. All contact switches (except for flipper buttons & flipper end of stroke switches) are gold plated to resist corrosion and, **SHOULD NOT BE FILED OR BURNISHED**. If contacts have dirt or dust on them, a clean piece of paper should be used to clean them, by closing the contacts and wiping gently.

FLIPPER BUTTON & FLIPPER SWITCHES ONLY. Tarnish or pitted contacts can be corrected with a contact file followed by a burnishing tool. Severely pitted contact must be replaced as an assembly.

PLAYFIELD

Stern playfields have a durable long life playing finish. Its life expectancy, as well as playing appeal can be greatly extended by periodic cleaning. Inspect and hand polish the ball with a clean cloth. A chipped ball must be replaced, as it will ruin the finish on the playfield. (DO NOT USE WATER IN LARGE QUANTITIES, HIGHLY CAUSTIC CLEANERS, ABRASIVE CLEANERS OR CLEANING PADS ON THE PLAYFIELD SURFACE.

ELECTRONIC PIN BALL GAME

DISPLAY DRIVER ASSEM'S:-

1ST, 2ND, 3RD & 4TH PLAYERS, CREDITS
AND MATCH/BALL IN PLAY.

(SEE BACK-RACK GLASS FOR LOCATIONS)

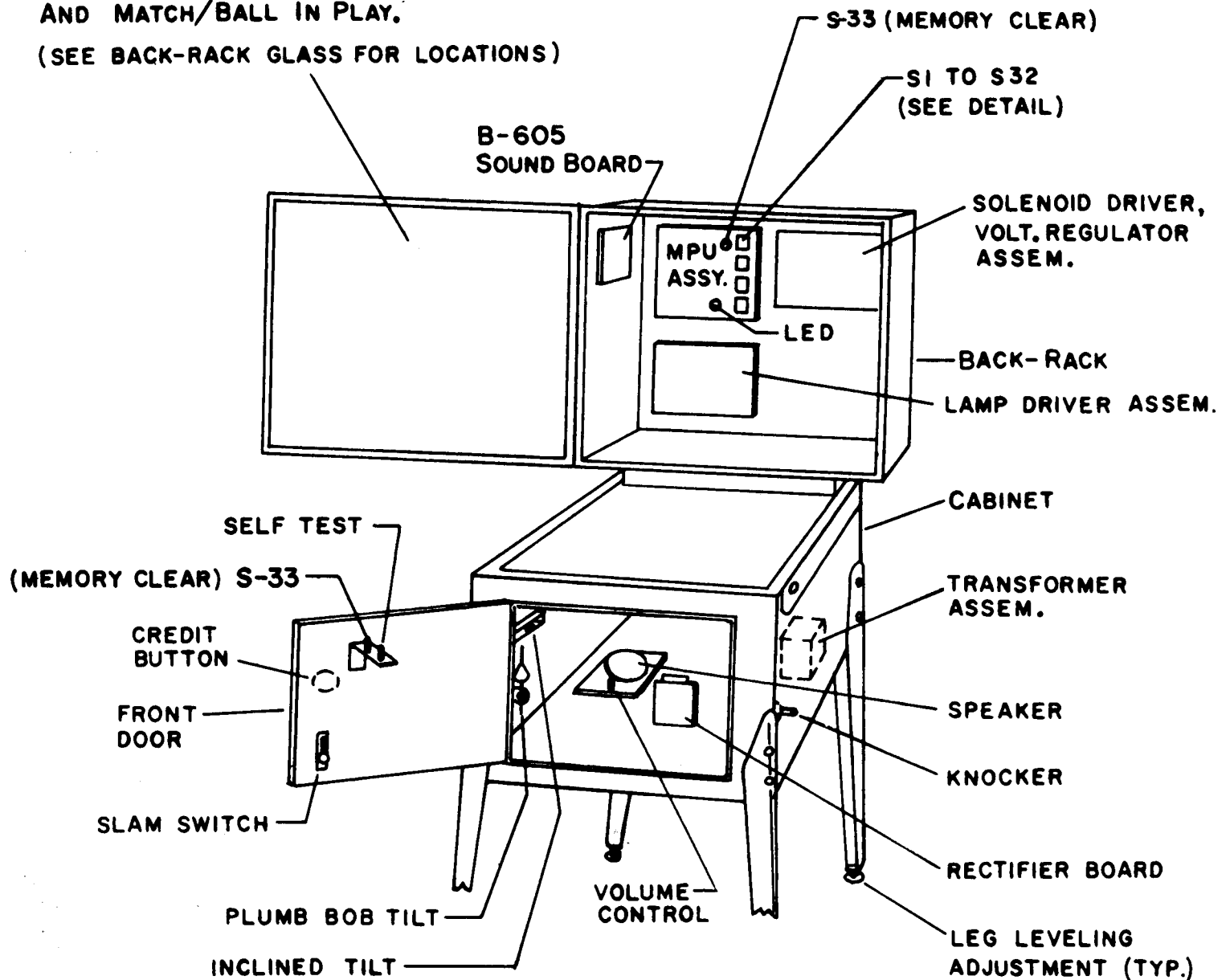
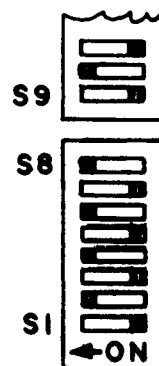


FIGURE 1



DETAIL S1-S32
MPU ASS'Y.

III. GENERAL GAME OPERATION

PLACE BALL INTO PLAYFIELD BY OUTHOLE:

COIN GAME. Coin should be rejected. Plug in line cord. (For proper game operation grounding circuit must be used). Move power ON-OFF toggle switch at bottom right front corner of cabinet to "ON" position. Seven singular tones will be heard to indicate game-readiness. Feature lites will flash in a programmed attract mode, "HIGH SCORE" lite is lit, player displays flash high score to date, numbers 1 to 7 will display from right to left, all 7's will flash, "HIGH SCORE" lite goes off, previous played scores are flashed, "Coin lock-out coil" is energized and game is ready for play. Coin Game. The game should accept the coin and post credits for coins accepted (*). Pressing the credit button on the door will reset drop targets and cause the outhole kicker to move the ball to the shooter lane. The first player display will flash 00.

One player is registered each 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. (Credit button is in-operative after 4 players are registered). Shooting the ball initiates play.

When the ball enters the outhole, the bonus score is added to the player's score. The player-up and/or ball in play on the back box is advanced one position. The bonus score starts at ** points. The outhole kicker moves the ball to the shooter lane and play is resumed. This continues until each player has played the allowable number of balls per game (3 or 5). At this time the "Game Over" light becomes lit. A random "Match" number appears and the "Match" light becomes lit. If the match number is the same as the last two digits in the player's score a free game can be awarded (*).

Extra ball won during the course of the game is played immediately after the player's regular ball enters the outhole. The player-up and/or ball in play is not advanced for extra ball play. Bonus score is added to the player's score, the bonus is reset to ** and the bonus multiplier earned is restored (memory) or reset (*) before the game moves the extra ball for play.

At the end of the game, a "High Game" is flashed on all players scores. If the "High Game" is beat, this feature(*) can award up to 3 free games.

Tilting while playing the game results in loss of the ball in play. The flippers, thumper-bumper, etc., go "dead". Bonus score is not added. 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 outhole kicker moves the ball to the shooter lane.

Slamming the machine results in the loss of the game. All feature lights go out and the game becomes "dead" through a built-in time delay circuit. The purpose of the time delay circuit is to discourage abuse of the machine. After the delay, the "Game Over" light lites "Shoot Again" lite flashes and the game is ready for play. The time delay occurs anytime one of the slam switches is made to contact.

There is a slam switch on the front door, one on the tilt board. (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 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.

**Bonus starts at 1,000

See back box adjustments.

IV. SELF TEST AND BOOKKEEPING FUNCTIONS

The game is designed to help the operator perform certain diagnostic tests as well as accounting functions as follows:

IV. A. SELF TEST

TEST SWITCH PUSH NUMBER	BALL/MATCH DISPLAY	DESCRIPTION
1st		Burn in test - all outputs tested
2nd		Lamp test - all feature lamps on and off
3rd		Display test - all digits display 000000 thru 999999 then an 8 shifts from left to right
4th		Solenoid test - continuous sequence of solenoids pulsed with solenoid driver transistor, "Q" number displayed
5th	Flashing O if all switches open	Switch test - switch I.D. No. displays if closed

IV. B. BOOKKEEPING FUNCTIONS

TEST SWITCH PUSH NUMBER	BALL/MATCH DISPLAY	DESCRIPTION	DISPLAYS
6th	01	1st Threshold (High Score)	
7th	02	2nd Threshold (High Score)	
8th	03	3rd Threshold (High Score)	
9th	04	Current High Game Threshold	
10th	05	Current Credits	00 to 40
11th	06	Total Plays	00 to 999999
12th	07	Total Replays	00 to 999999
13th	08	Total times high score is passed	00 to 999999
14th	09	Number of coins thru Chute No. 2	00 to 999999
15th	10	Number of coins thru Chute No. 1	00 to 999999
16th	11	Number of coins thru Chute No. 3	00 to 999999
17th	12	Total balls played	00 to 999999
18th	13	Total Extra Balls Awarded	00 to 999999
19th	14	Total Playfield Special Awards	00 to 999999
20th	15	N/U	00
21st	16	Total level 1 passed	00 to 999999
22nd	17	Total level 2 passed	00 to 999999
23rd	18	Total level 3 passed	00 to 999999

V. FRONT DOOR GAME ADJUSTMENTS:

HIGH SCORE FEATURE ADJUSTMENTS:

The game is designed to award a "Extra Ball" or "Free Game" (option) at three score levels. (See High Score Feature). The recommended levels are listed below.

Any level from 10,000 or 9,990,000 can be set, as desired. It is possible to reset or turn off (00) any or all of the levels, if desired.

1. Push and release Self-Test button at one second intervals six times or until number 01 appears on the Match/Ball in Play display.
2. The number on the Player Score Displays is the first score level*. It can be increased, if desired, by holding the credit button in. To decrease the score level, reset to '00', and then hold the credit button in. Release the credit button when the desired High Score 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 high score levels. The number '02' and '03' on the Match/Ball-in-Play display are for the second and third levels, respectively.

HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games (option) when "High Score to Date" is beat. **For the recommended, factory preset level, see below.**

It is recommended that the level, which will build with game 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 Adjustments, Steps 1 and 2. Continue pushing the Self-Test button until the number '04' appears on the Match/Ball-in-Play display and then do Step 2.

Any level from '00' to 9,990,000 can be set as described. It is to be noted that '00' does not turn off the feature, as it does on High Score feature. The feature can be turned off by positioning the correct MPU switches.

*Can be quickly set to '00' by pressing S33 on the MPU assembly in the back box or front door.

RECOMMENDED SETTING

	3 BALL	5 BALL
1st Level	500,000	900,000
2nd Level	840,000	1,460,000
3rd Level	_____	_____
High Score	_____	_____
To Date	1,200,000	2,000,000

VI. FEATURE OPERATION AND SCORING

To help explanation, playfield switches involved will be called out. See "Switch Identification" (Pg. 18) for location of playfield switches.

BONUS SCORE FEATURE:

Game starts at 1,000. Maximum bonus 10,000.

BONUS ADVANCEMENT

Pl. Sw. No.	Location	Advance Bonus
18, 19, 20, 21	Upper Right Rollovers	By 1,000
23, 24	Inner Return Lanes	By 1,000
17, 22	Outer Return Lanes	By 1,000
36, 37	Outlanes	By 1,000
(2) 17	Top Stand-Up Targets	By 1,000

BONUS MULTIPLIER

Pl. Sw. No.	Location	Advance Multiplier
38	Center Lane Stand-Up Target	Increases Multiplier by 1x (to 15x max.)
25, 26, 27	Right Bank Drop Targets	Increases Multiplier by 1x When All Three Targets Hit (to 15x max.)

Bonus multiplier can be adjusted to be reset after each new ball. See MPU Sw. #30.

BONUS COLLECTED:

Outhole (Pl. Sw. No. 33) When the ball enters the outhole bonus score (times the multiplier) is collected. The bonus resets to 1,000.

THREE BALL FEATURE

When Apollo 1 & 2 lites are lit (See Note #1), two balls are in the Apollo lane, B-L-A-S-T-O-F-F is lit and the countdown is made in order—third ball will release the three balls into play.

SPECIAL

"Special" can be awarded by means of three switches; the Center Lane Stand-Up Target (Pl. Sw. No. 38), and the two outlanes (Pl. Sw. No. 37 & 36).

SPECIAL COLLECTED

Pl. Sw. No.	Location	Award (Lites Special)
36, 37	Outlanes	B-L-A-S-T-O-F-F Must Be Spotted Twice
38	Center Lane Stand-Up Target	40,000/ Special Lite Must Be Lit and 5-4-3-2-1 Must Be Counted Down Again.

AWARD

NO AWARD
SHOOT AGAIN
100,000
REPLAY

MPU Sw. No.

31	32
OFF	OFF
OFF	ON
ON	OFF
ON	ON

SPECIAL ADJUSTMENTS

"Special" can be adjusted so there is only one Special per game or one Special per ball. (See MPU Sw. No. 29)

SHOOT AGAIN

"Shoot Again" can be awarded by means of four switches; the launcher (Pl. Sw. No. 39), the two outlanes (Pl. Sw. No. 36 & 37) and the Center Lane Stand-Up Target (Pl. Sw. No. 38).

SHOOT AGAIN COLLECTED

"Shoot Again" can be awarded by means of the SPECIAL feature on game (See MPU Sw. 31 & 32). "Shoot Again" can also be awarded by means of the HIGH SCORE FEATURE (See MPU Sw. 6). Putting ball into the first two empty spots in walker (Pl. Sw. No. 39) awards "Shoot Again".

RIGHT DROP TARGETS (Pl. Sw. No. 25, 26, 27)

Hitting all three targets down increases bonus multiplier and value of right spin target. Hitting all three targets down with one hit when purple lite is on (See Note #2) scores 50,000.

RIGHT SPIN TARGET (Pl. Sw. No. 5)

Scores lit value (starts at 500 to 5,000 max.). It can be adjusted to reset with each new ball. (See MPU Sw. No. 22)

LEFT SPIN TARGET (Pl. Sw. No. 4)

Scores 200 each spin or 500 per BLASTOFF Letter that is lit when purple lite is on (lites after B-L-A-S-T-O-F-F and countdown are made).

SLING SHOTS (Pl. Sw. No. 9, 10, 11, 12)

Scores 10 points. (See Note #2)

THUMPER BUMPERS (Pl. Sw. No. 13 & 14)

Scores 1,000 for three ball and 100 for five ball.

CENTER LANE STAND-UP (Pl. Sw. No. 38)

Scores 25,000, increases bonus multiplier, awards SPECIAL when red lite is lit, and spots B-L-A-S-T when yellow lite is lit (lites after B-L-A-S-T-O-F-F and countdown are made).

UPPER RIGHT ROLLOVERS (Pl. Sw. No. 18-21)

Scores 5,000, spots letters L-A-S-T, and advances bonus.

OUTER RETURN LANES (Pl. Sw. No. 17 & 22)

Scores 3,000, spots letters B & O, and advances bonus.

TOP RIGHT STAND-UP TARGETS (Pl. Sw. No. (2) 17)

Scores 3,000, spots letter B, and advances bonus.

INNER RETURN LANES (Pl. Sw. No. 23 & 24)

Scores 5,000, spots letters F & F, spots lit drop target, and advances bonus. Game can be adjusted so hitting one F spots both F's. (See MPU Sw. No. 13)

OUTLANES (Pl. Sw. No. 36 & 37)

Scores 25,000, spots lit target, advances bonus, and awards SPECIAL when lit.

1-5 DROP TARGETS (Pl. Sw. No. 29-32)

Scores 500 or 5,000 when arrow is lit. The lit arrow indicates next target to be hit. Hitting all five targets down in countdown order scores Apollo 1, Apollo 2, All Systems Go, and 40,000/Special values when they are lit.

OUTHOLE (Pl. Sw. No. 33)

Scores bonus plus (times the bonus multiplier).

"RELEASE NEXT ROCKET" SWITCH (Pl. Sw. No. 40)

Located in top trapped ball area, releases next ball when B-L-A-S-T-O-F-F and countdown are made.

FIRST STAGE KICKOUT (Pl. Sw. No. 15)

Scores 10,000 and scores 5,000 for each blastoff letter lit after B-L-A-S-T-O-F-F and countdown are made.

SECOND STAGE KICKOUT (Pl. Sw. No. 16)

Scores 10,000

BALL LAUNCHER (Pl. Sw. No. 29)

Scores 10,000 and advances Apollo 1 & 2 lites.

HIGH SCORE FEATURE

Up to three replays or shoot agains awarded for surpassing three different high score levels. (See MPU Sw. No. 6)

HIGH GAME TO DATE

Up to three replays awarded for surpassing high game score to date (See MPU Sw. No. 15 & 16).

NOTE # 1

Player must place two balls in launcher to light Apollo 1 & 2 lites or Apollo 1 & 2 lights can light for next game or next player if they are already in launcher. (See MPU Sw. No. 24)

NOTE # 2

Slingshots alternate lighting the SPECIALS and the purple Right 3 Bank Drop Target 50,000 value lite on and off.

VII. CREDIT/COIN AND GAME ADJUSTMENTS

A. Playfield Post Adjustments:

Posts that control left and right outlane openings on playfield can be moved to make access to outlanes conservative or liberal for ball to enter. (See Fig. 3).

Conservative entry will decrease playing time and scoring.

Liberal entry will increase playing time and scoring.

B. Back Box Game Adjustments:

Each game has thirty-two switches located on the MPU module, located in the back box, that allows play to be customized to the location. (See Fig. 1). Credits per coin, maximum credits, credit display, balls (3 or 5) per game, match feature, high game feature, special award, maximum extra balls and background sound 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.

FLIGHT 2000 SWITCH ASSIGNMENT

		NONE	X BALL	100K	REPLAY		ON	OFF
32	Special	OFF	ON	OFF	ON	32	←	←
31	Award	OFF	ON	OFF	ON	31	←	←
30	Multiplier - Reset or Leave After Drain					30	Reset	Leave
29	Special - Per Game or Per Ball					29	1/Game	1/Ball
28	Coin Chute #3					28	See Catalog	
27						27		
26						26		
25						25		
24	Apollo 1-2 Lites W/Balls					24	Turn On	Start New
23	Not Used					23	Not Used	Not Used
22	Right Spinner - Reset or Leave After Drain					22	Reset	Leave
21	Match Feature					21	YES	NO
20	Credit Display					20	YES	NO
19	Maximum Credits	10	15	25	40	19	←	←
18		OFF	OFF	ON	ON	18	←	←
17	Talking Feature	OFF	ON	OFF	ON	17	YES	NO
16	High Game To	0	1	2	3	16	←	←
15		OFF	OFF	ON	ON	15	←	←
14	Background Sound					14	ON	OFF
13	Spot 1 or 2 'F's' in OFF					13	2 F's	1 F
12	Coin Chute #2					12	See Catalog	
11						11		
10						10		
9						9		
8	Maximum Add-A-Balls					8	5	3
7	Ball Per Game					7	5	3
6	High Score Feature					6	Replay	X Ball
5	Add-A-Ball (Memory)					5	3 or 5	1 Only
4	Coin Chute #1					4	See Catalog	
3						3		
2						2		
1						1		

CREDITS/COIN ADJUSTMENTS:

The credits given are selectable by means of MPU switches. Sixteen credit ratios are available. The MPU switch settings and resultant credits/coin are as follows:

CREDITS/COIN ADJUSTMENTS SWITCHES

SWITCH No. 1 (BLU)	4	3	2	1		
SWITCH No. 2 (BRN-WHITE)	12	11	10	9		
SWITCH No. 3 (RED-WHITE)	28	27	26	25	CREDITS	COIN
OFF	OFF	OFF	OFF	OFF	1	1
OFF	OFF	OFF	ON	ON	2	
OFF	OFF	ON	OFF	OFF	3	
OFF	OFF	ON	ON	ON	4	
OFF	ON	OFF	OFF	OFF	5	
OFF	ON	OFF	ON	ON	6	
OFF	ON	ON	OFF	OFF	7	
OFF	ON	ON	ON	ON	10	
ON	OFF	OFF	OFF	OFF	14	

				CREDITS	COINS	SEQUENCE OF CREDITS PER COIN			
						1	2	3	4
ON	OFF	OFF	ON	1	2	0	1		
ON	OFF	ON	OFF	3	2	1	2		
ON	OFF	ON	ON	5	2	0	5		
ON	ON	OFF	OFF	7	2	0	7		
ON	ON	OFF	ON	3	4	0	1	0	2
ON	ON	ON	OFF	5	4	1	1	1	2
ON	ON	ON	ON	7	4	1	2	1	3

If two or three coin chutes are adjusted the same for multiple coins, credits will increase as if dropped in same chute.

Credit sequence will reset when:

- 1) credit button is pressed
- 2) any points are scored

ADD-A-BALL (MEMORY):

This adjustment can store in memory 3 or 5 "Add-A-Balls."

ADD-A-BALL (MEMORY)

1 Only
3
5

MPU SWITCHES

5	8
OFF	
ON	OFF
ON	ON

HIGH SCORE FEATURE:

The game is designed to award an Extra Ball or Free Game at one, two or three high score levels. See Front Door Game Adjustments.

AWARD
Extra Ball
Replay

MPU SWITCH 6

OFF
ON

BALL PER GAME:

NO. OF BALLS PER GAME

3
5

MPU SWITCH 7

OFF
ON

SPOT 1 OR 2 "F" LITES:

The number of "F's" in B-L-A-S-T-O-F-F can be spotted as follows:

"F" LITES

1 "F"
2 "F's"

MPU SWITCH 13

OFF
ON

BACKGROUND SOUND:

The background sound during game play can be controlled as follows:

SOUND
OFF
ON

MPU SWITCH 14

OFF
ON

HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games as an option of high score to date is beat. Each time this happens, the winning score becomes the new high game score to beat. This score is displayed on all 4 player score displays at the end of each game as an incentive to play.

AWARD

MPU SWITCHES

Novelty	15	16
	OFF	OFF
1 Free Game.....	ON	OFF
2 Free Games	OFF	ON
3 Free Games.....	ON	ON

TALKING FEATURE:

The "Talking Feature" during game play can be controlled as follows:

TALKING FEATURE

MPU SWITCH 17

NO	OFF
YES	ON

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 are adjustable by means of switches 18 and 19. Four credit limits are available.

MAXIMUM CREDITS

MPU SWITCHES

	18	19
10	OFF	OFF
15.....	ON	OFF
25	OFF	ON
40.....	ON	ON

CREDIT DISPLAY:

CREDIT DISPLAY

MPU SWITCH 20

YES	ON
NO	OFF

MATCH FEATURE:

When the MATCH FEATURE is On, a random number appears in the "MATCH/BALL in Play" window and the word MATCH is illuminated. If the number matches the tens digit in player's score a free game is awarded. The MATCH feature creates an incentive to play.

MATCH

MPU SWITCH 21

ON	ON
OFF	OFF

RIGHT SPINNER:

"Spinner Scores Lit Values" can be retained from ball to ball or adjusted to start fresh for each ball.

RIGHT SPINNER LITES

Start Fresh
Retain

MPU SWITCH 22

OFF
ON

APOLLO 1 & 2 LITES:

Lites can be turned on or left off with captive ball (or balls) in Apollo lane at start of game.

APOLLO LITES

Left Off
Turn On

MPU SWITCH 24

OFF
ON

NO. OF SPECIALS:

The number of specials per game can be limited as follows:

REPLAYS

1 Per Ball
1 Per Game

MPU SWITCH 29

OFF
ON

BONUS MULTIPLIER RESET:

The bonus multiplier during the course of the game can be retained from ball to ball or can be adjusted to start fresh for each ball.

BONUS MULTIPLIER

Retain
Reset

MPU SWITCH 30

OFF
ON

SPECIAL AWARD:**AWARD**

No Award
Extra Ball
100,000 Points
Replay

MPU SWITCHES

31	32
OFF	OFF
OFF	ON
ON	OFF
ON	ON

PARTS LIST FLIGHT 2000

MISCELLANEOUS

PART NUMBER

Transformer (Domestic or Export)	16B-6
Transformer & Rectifier Board	B438-4
Bulbs, #44	8A-101
U1	25A-128-E1A10
U2	25A-128-E2A9
U5	25A-128-E5A10
U6	25A-128-E6A9
U9 Voice E-Prom	25A-128-E9

ASSEMBLY COILS

Apollo Lane Kicker (2)	J-26-1500
Ball Launcher	J-26-1500
Coin Lockout	C-36-5300
Drop Target	C1-34-3400
Drop Target Reset (5)	B-24-1600
Drop Target Reset (3)	B-27-2300
Flippers	J-25-475/34-4500
Outhole	J-26-120C
Slingshot	J-26-1500
Thumper	J-26-1500

MODULES

Lamp Driver	B-431
Display Driver	A-645
Match/Ball in Play Display	A-434
Solenoid Driver/Voltage Regulator	B-432
MPU (FOR E PROM SEE MISCELLANEOUS ABOVE)	C-602
Rectifier Board	A-430
Sound Module	C-605
Voice Synthesizer Unit (E PROM SEE MISCELLANEOUS ABOVE)	A-720

PLAYFIELD PARTS

SEE PLAYFIELD DIAGRAM

STERN 16B-6 TRANSFORMER WIRING CONNECTION INSTRUCTIONS

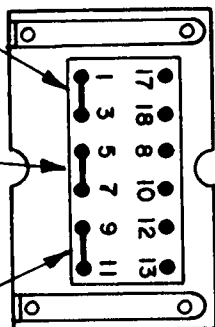
115/120V., 50/60 Cycle Input.

Varistor - Soldered to Line Filter on Left Side of Cabinet
Must Be Stern Part No. 25A-18-1.

Solder Lugs 1 & 3
Together. Solder Heavy
Red Wire To Lug 1

120V
Solder Lugs 5 & 7
Together. Solder Heavy
Yellow Wire To Lug 5

115V
Solder Lugs 9 & 11
Together. Solder Heavy
Yellow Wire To Lug 9



220/240V., 50/60 Cycle Input.

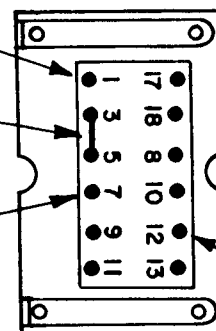
Varistor - Soldered to Line Filter on Left Side of Cabinet
Must be Stern Part No. 25A-18-2.

Solder Heavy Red Wire
To Lug 1

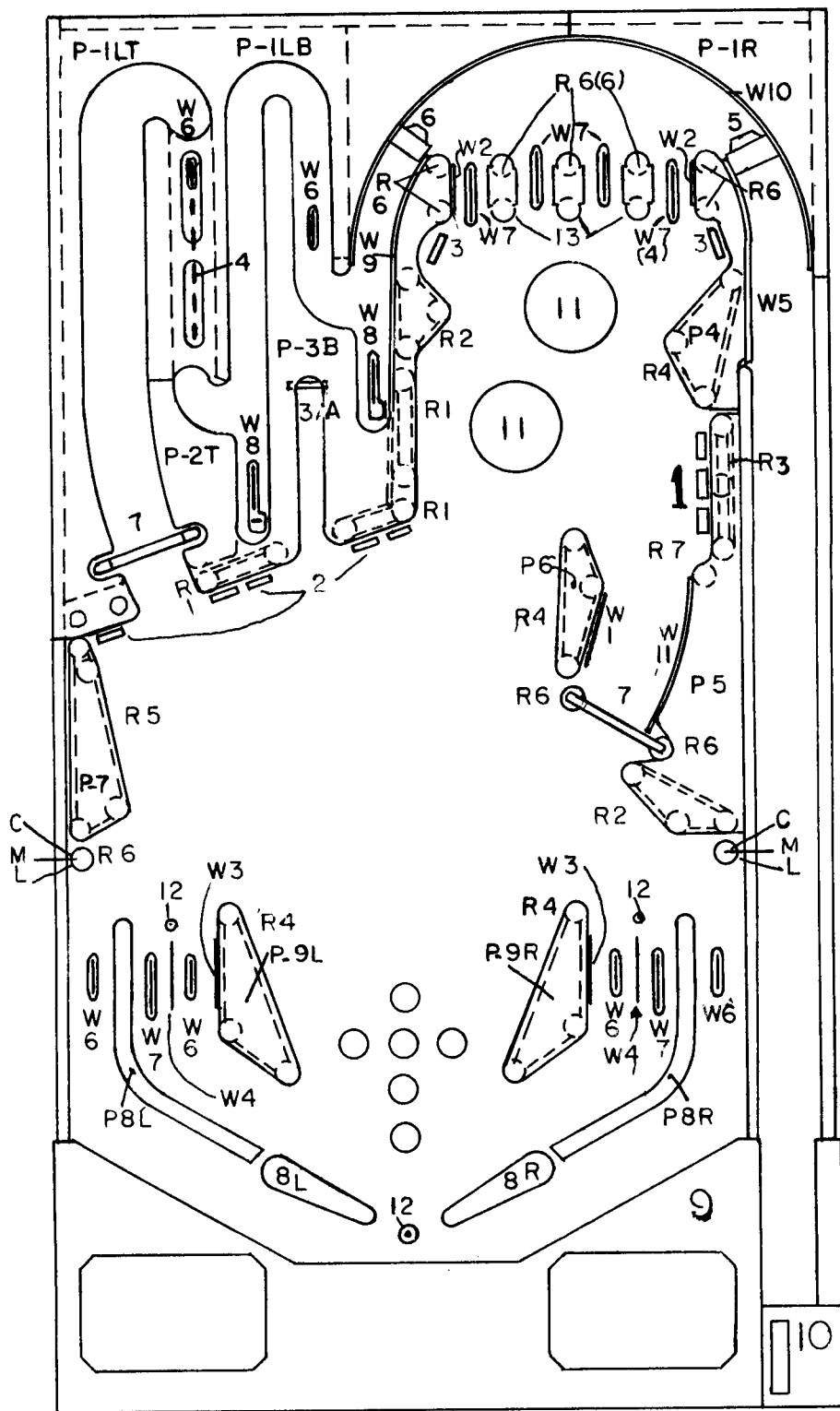
Solder Lugs 3 & 5
Together

240V
Solder Heavy Yellow
Wire To Lug 7

220V
Solder Heavy Yellow
Wire To Lug 12



PLAYFIELD CHART FLIGHT 2000



POST ADJUSTMENT

C-CONSERVATIVE

M-MEDIUM

L-LIBERAL

RUBBER RINGS

R1-7A-120-125
R2-7A-120-150
R3-7A-120-200
R4-7A-120-250
R5-7A-120-300
R6-7A-135

BALL GUIDES & ROLL-OVERS

W1-6A-101-F	W6-A-149
W2-6A-101-G	W7-A-383
W3-6A-101-O	W8-A-581
W4-6A-101-Q	W9-B-743
W5-6A-270	W10-B-744
	W11-A-745

PLAYFIELD PLASTIC SHIELDS

TOP ARCH SET:

13D-128-1LT - (Left Top)
13D-128-1LB - (Left Bottom)
13B-128-1R - (Right)
13D-128-2T - (Top)
13C-128-3B - (Bottom)

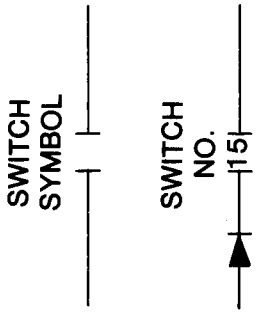
PLAYFIELD SET:

13A-128-4 to 9 (P4 to P9)

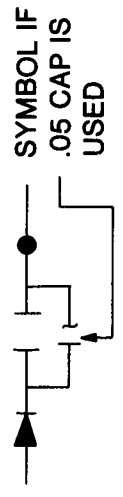
OTHER PARTS & ASSEMBLIES

- 3-Bank Drop Target D-580-3-I (Targets alone 13A-9-2)
- 5-Bank Drop Target D-548-9A (Targets alone 13A-35-1 to -5)
- Target Assembly A-721-L-1
- 3A. Target Assembly A-721-L-3
- Ball Launcher Assembly B-758
- Ball Gate Assembly A-611-R
- Ball Gate Assembly A-611-L
- Spin Target Assembly A-563-15 (Target & Wire Only 14A-7-14)
- Flipper Assembly B-634-R-Y and B-634-L-Y (Right & Left) (Rubber Ring 7-A-121-Y)
- Instruction Plate 14B-5-2
- Shooter Gauge 14A-2-9
- Thumper Cap 13A-41
- Ball Guide Post 2A-200 (Rubber Ring 7A-125)
- Ball Guide Rail 4A-110-RT

FLIGHT 2000
SWITCH I.D.



SWS. #1, 2, & 3 NO DIODE
ALL OTHER SWITCHES USE
DIODE IN4004



SWITCH NO.	WIRE COLOR	JACK NO.	DESCRIPTION
1	BLU	J3-9	CHUTE (LEFT)
2	BRN-W	J3-10	CHUTE (CENTER)
3	R-W	J3-11	CHUTE (RIGHT)
4	W-B	J2-12	SPIN TARGET (L)
5	W-G	J2-12	SPIN TARGET (F)
6	BLU-W	J3-14	CREDIT BUTTON
7	BLU-O	J3-15	TILTS
8	-Y-	J3-16	SLAM & VIB. TILTS
9	BRN	J2-8	LEFT TOP SLINGSHOT
10	GREY	J2-9	RIGHT TOP SLINGSHOT
11	W-O	J2-10	LEFT BOTTOM SLINGSHOT
12	W-G	J2-11	RIGHT BOTTOM SLINGSHOT
13	W-BRN	J2-12	THUMPER (TOP)
14	BRN	J2-13	THUMPER (BOTTOM)
15	-O-	J2-14	LEFT KICKOUT
16	-O-	J2-15	RIGHT KICKOUT

"B" SW #17
1) ROLL-OVER SW
2) TOP STAND-UP TARGETS

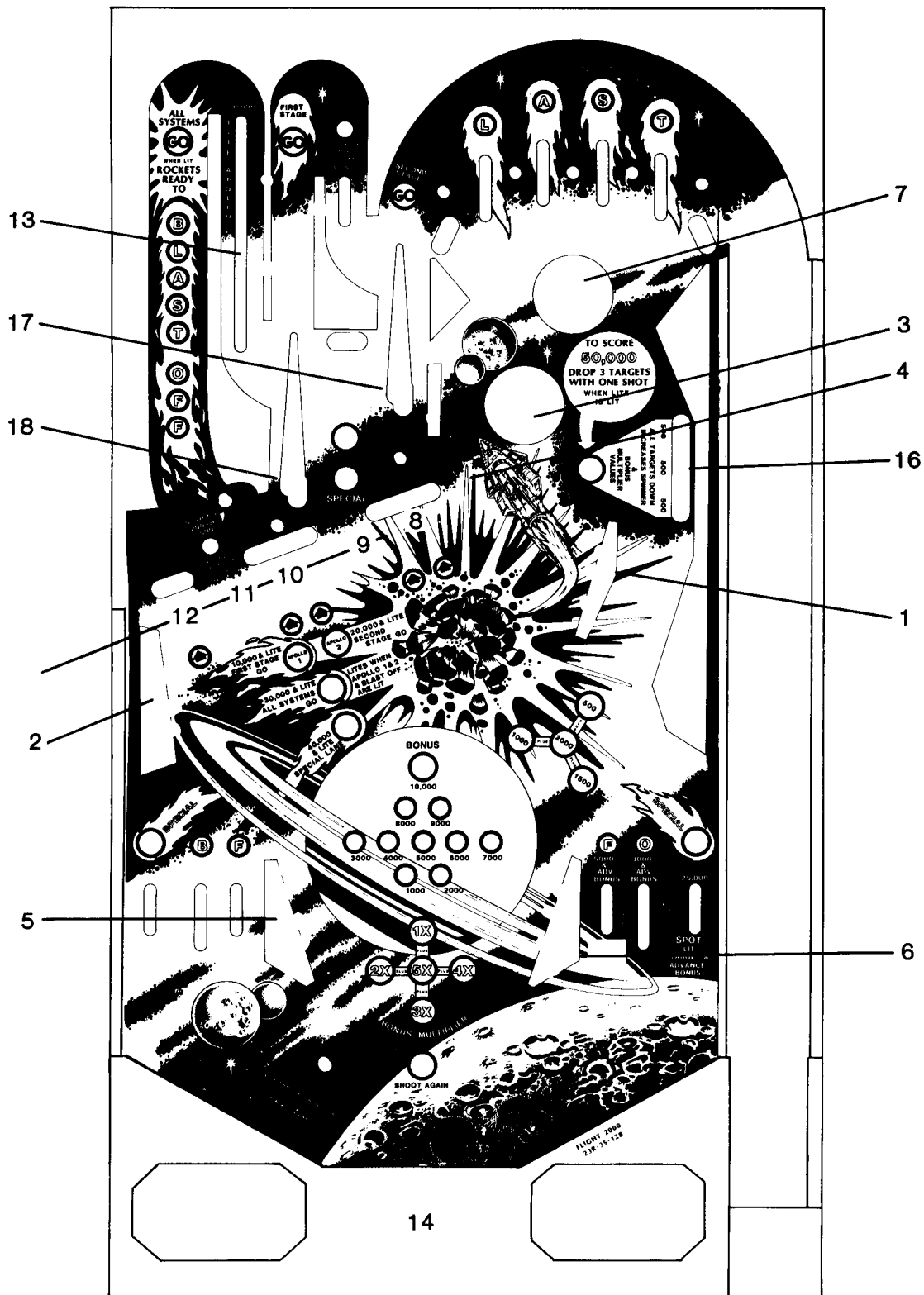
SWITCH NO.	WIRE COLOR	JACK NO.	DESCRIPTION
17	BRN	J2-8	"B"
18	GREY	J2-9	"L"
19	W-O	J2-10	"A"
20	W-B	J2-11	"S"
21	W-G	J2-12	"T"
22	W-BRN	J2-13	"O"
23	BRN-Y	J2-14	"F"
24	-O-	J2-15	"F"
25	BRN	J2-8	TOP
26	GREY	J2-9	MID.
27	W-O	J2-10	BOT.
28	W-B	J2-11	#1
29	W-G	J2-12	#2
30	W-BRN	J2-13	#3
31	BRN-Y	J2-14	#4
32	-O-	J2-15	#5
33	BRN	J2-8	OUT HOLE (RIGHT)
34	GREY	J2-9	OUT HOLE (CENTER)
35	W-O	J2-10	OUT HOLE (LEFT)
36	W-B	J2-11	LEFT OUT LANE
37	W-G	J2-12	RIGHT OUT LANE
38	W-BRN	J2-13	SPOT "BLAST"
39	BRN-Y	J2-14	BALL LAUNCHER
40	-O-	J2-15	RELEASE NEXT ROCKET

FLIGHT 2000 SOLENOID

I.D. NUMBER	TRANS. NUMBER	JACK	WIRE COLOR	DESCRIPTION
1	Q1.....	J2-9	G-O	TOP RIGHT SLINGSHOT
2	Q2	J2-4	G-BLU	TOP LEFT SLINGSHOT
3	Q3	J2-5	G-B	BOTTOM THUMPER BUMPER
4	Q4.....	J1-5	B-BLU	LEFT DROP TARGET RESET
5	Q5	J2-10	G-Y	BOTTOM LEFT SLINGSHOT
6	Q6	J2-11	G-P	BOTTOM RIGHT SLINGSHOT
7	Q7	J2-12	R-Y	TOP THUMPER BUMPER
8	Q8	J5-10	B-O	# 5 DROP TARGET
9	Q9	J5-9	R-BLU	# 4 DROP TARGET
10	Q10	J5-15	O-W	# 3 DROP TARGET
11	Q11	J5-14	O-B	# 2 DROP TARGET
12	Q12	J5-13	O-G	# 1 DROP TARGET
13	Q13	J5-12	B-Y	BALL LAUNCHER
14	Q14	J5-11	B-G	OUTHOLE
15	Q15	J3-5	Y-W	FLIPPER ENABLE RELAY
16	Q16	J5-8	G-W	RIGHT DROP TARGET RESET
17	Q17	J5-7	O-R	RIGHT TOP KICKER
18	Q18	J5-3	R-W	LEFT TOP KICKER
19	Q19	J2-8	Y-W	COIN LOCKOUT
20 thru 29				ELECTRONIC SOUND

NOTE: When in "Solenoid Test" - Audio (talking) portion will coincide with first eight (8) solenoids.

FLIGHT 2000 SOLENOIDS



SOLENOIDS NOT ON PLAYFIELD
 15 - FLIPPER ENABLE REPLAY
 19 - COIN LOCK OUT

MPU-200 JUMPER COMBINATIONS

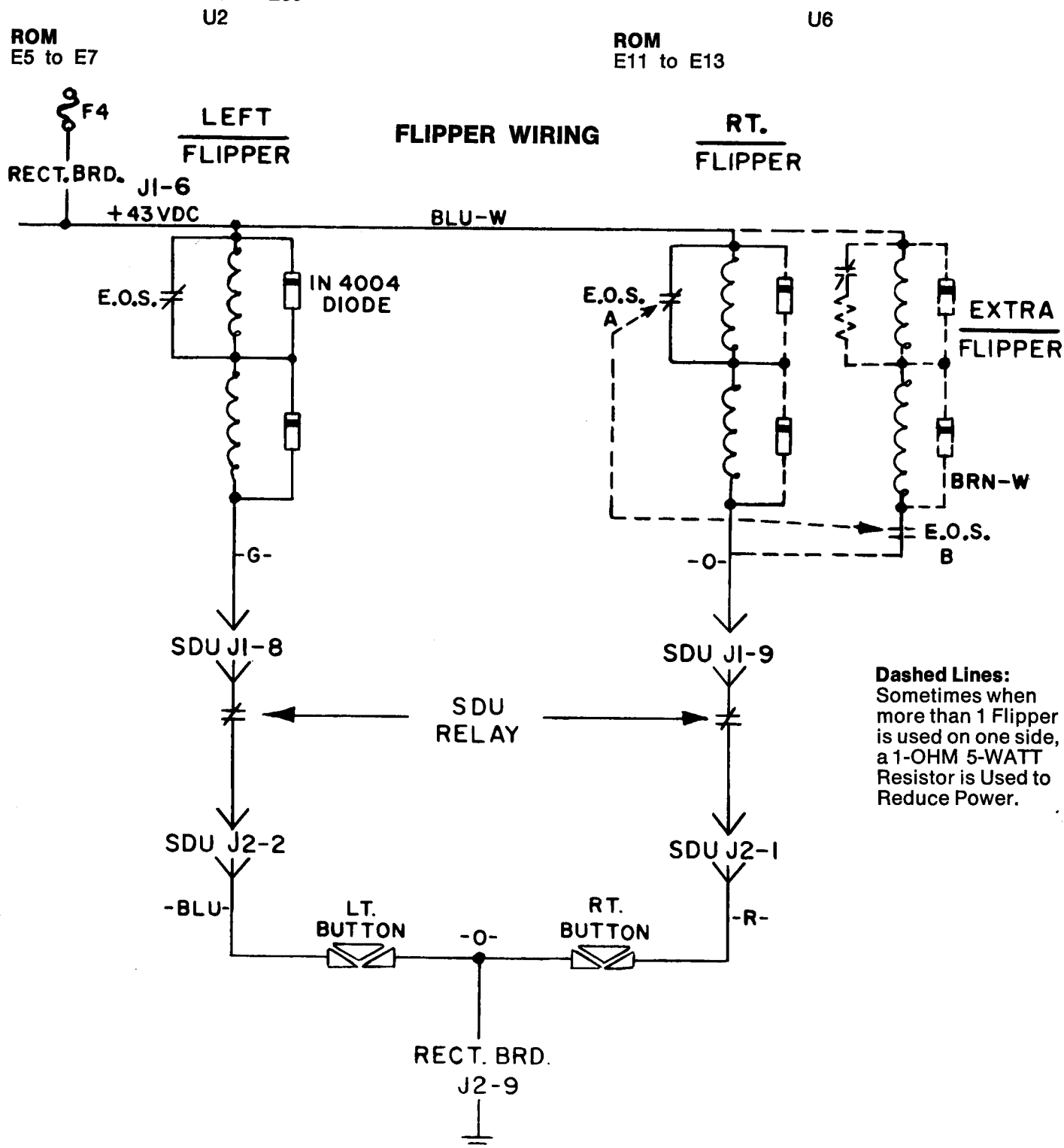
The MPU-200 can be converted to use 25A Roms or E-Proms or any combination of Roms or E-Proms. Below are listed the jumpers needed for each memory chip.

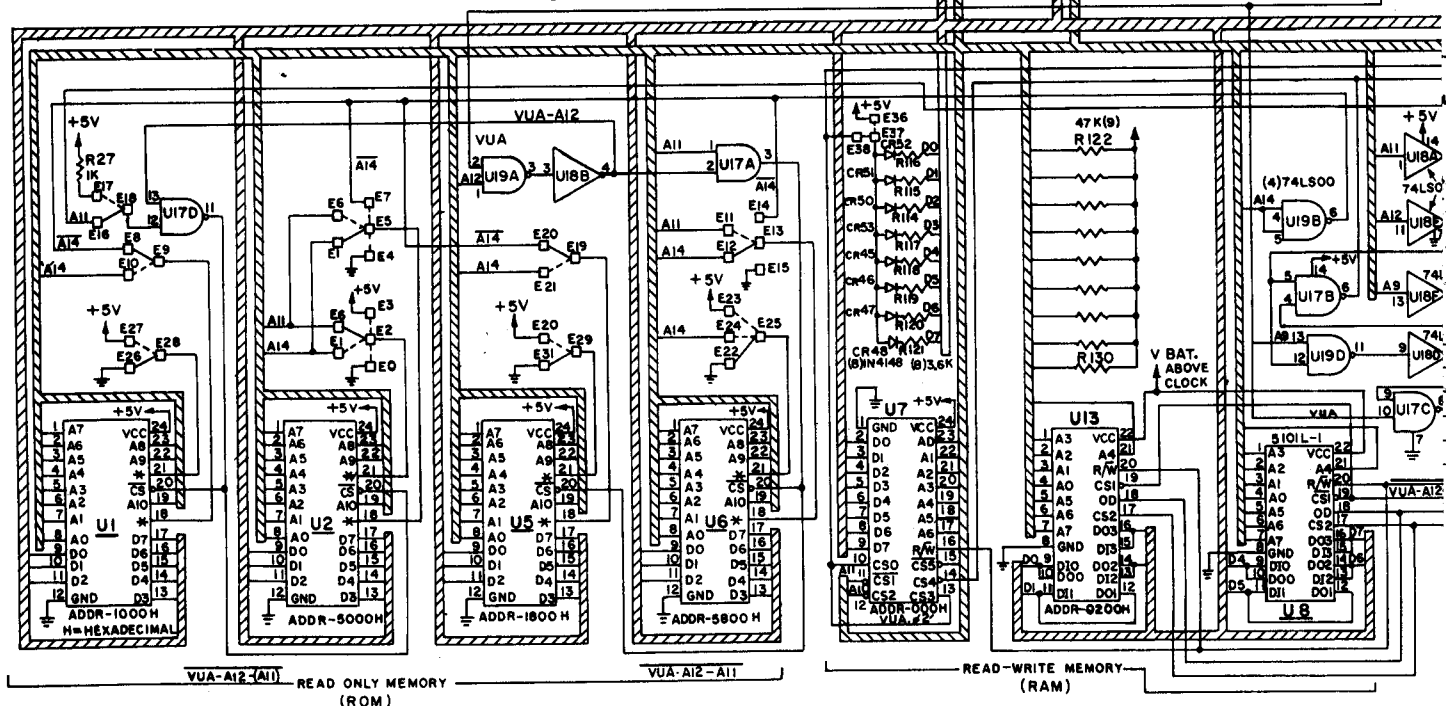
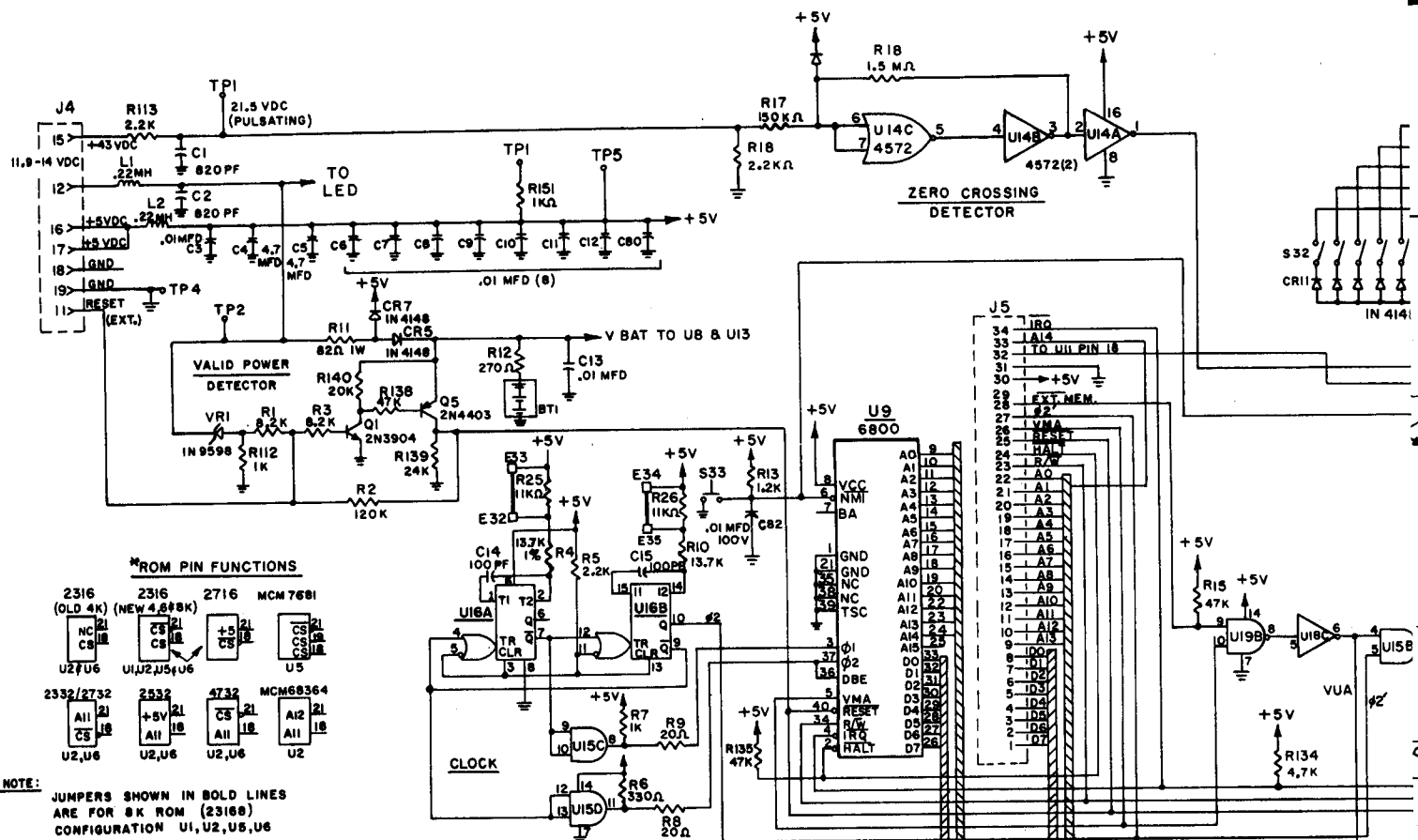
U1	
ROM Stern #25A-	E-PROMS (paper on top)
E9 to E8	E9 to E10
E28 to E26	E28 to E27
U2	
ROM	E-PROM
E5 to E1	E5 to E7
E2 to E6	E2 to E3

U5	
ROM	E-PROM
E19 to E20	E19 to E21
E29 to E31	E29 to E30
U6	
ROM	E-PROM
E13 to E12	E13 to E14
E25 to E22	E25 to E23

The MPU-200 can be down graded to act as a MPU-100 (Rom's Only) following are jumper modifications:

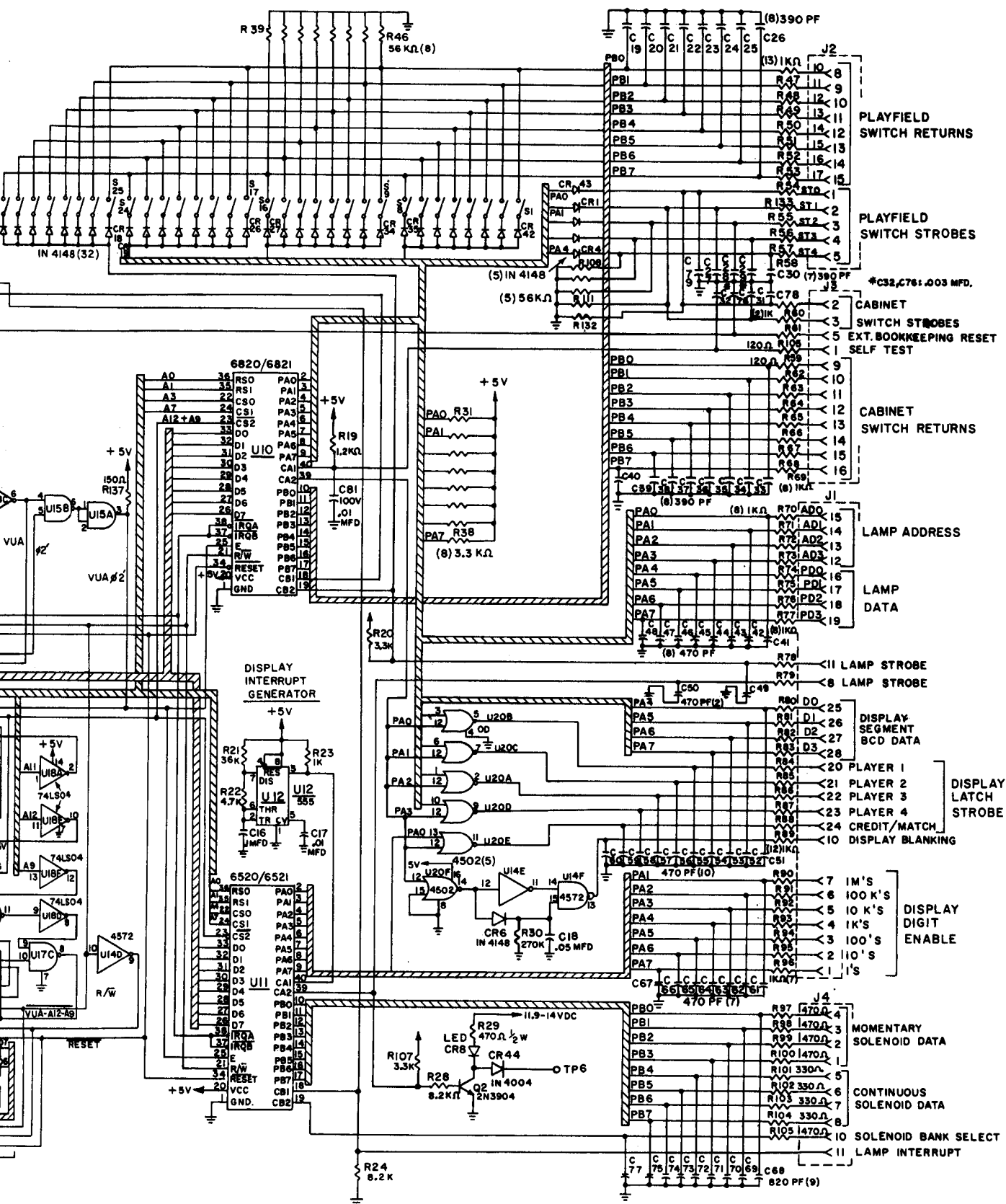
Remove - E32 - E33
Remove - E34 - E35



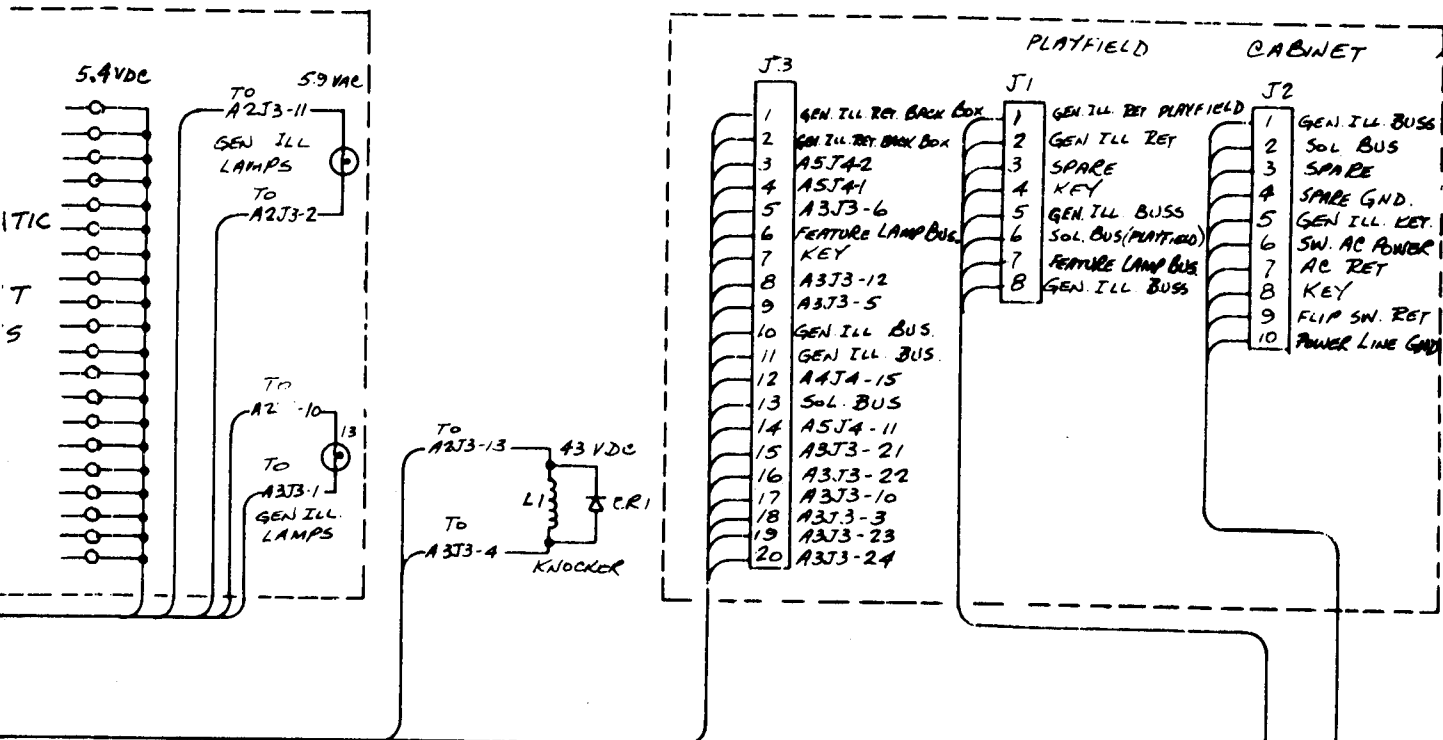


8K E-PROM 2716 (INTEL)
JUMPER COMBINATIONS:-

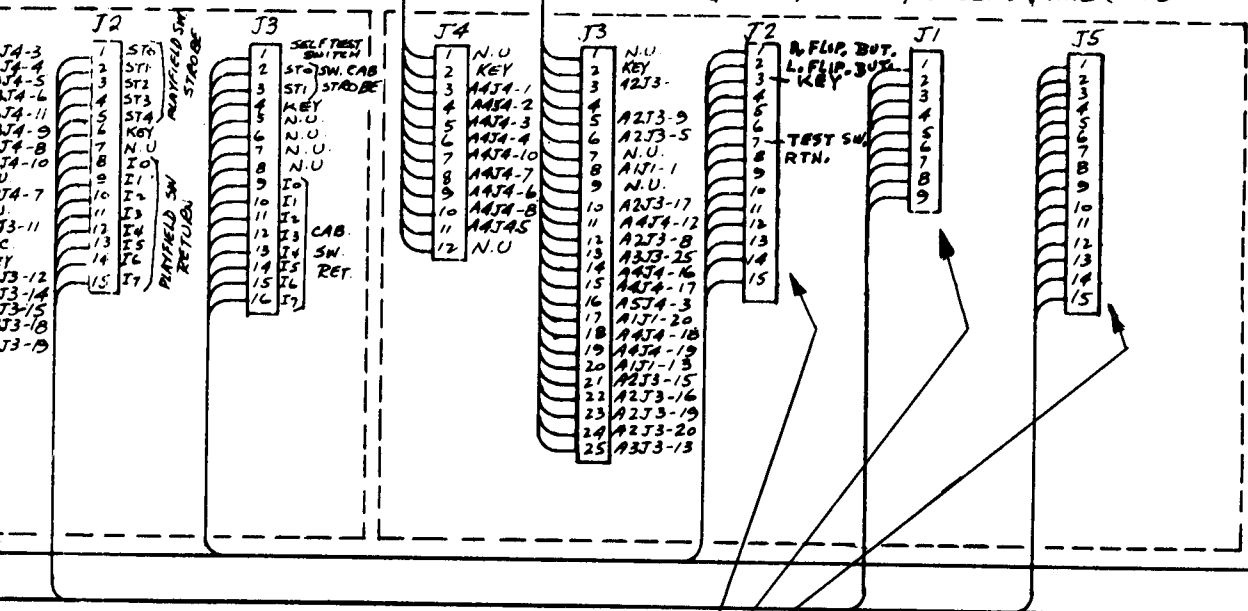
E2-E3	E23-E25
E5-E7	E27-E28
E9-E10	E29-E30
E13-E14	E32-E33
E16-E18	E34-E35
E19-E21	



A2 TRANSFORMER



A4.



DRAWINGS FOR WIRE COLORS.

SEE SDU SCHEMATIC
FOR SOLENOID PIN OUTS.

STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

WIRING DIAGRAM

FOR SOLID STATE

DRN. CW.

DATE

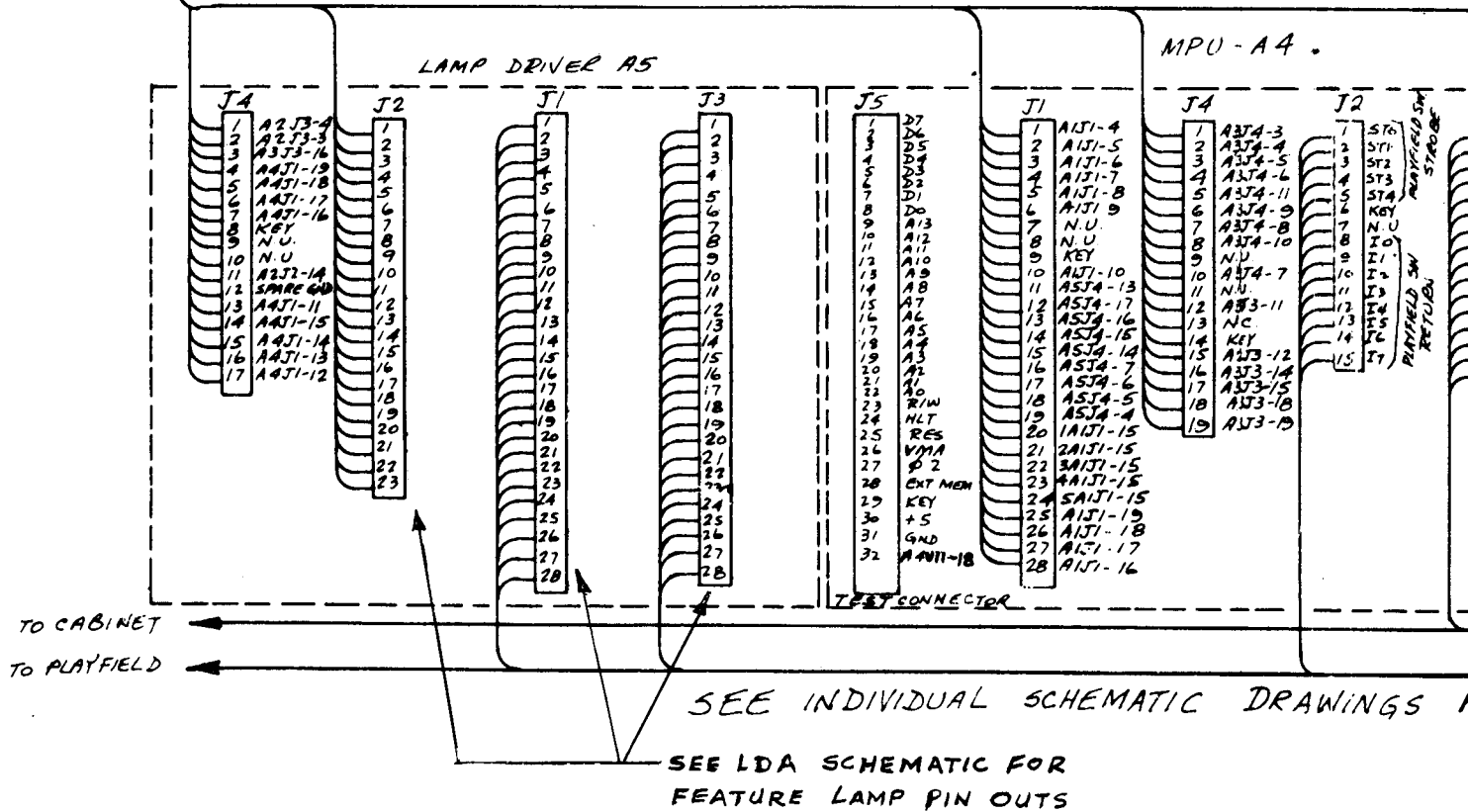
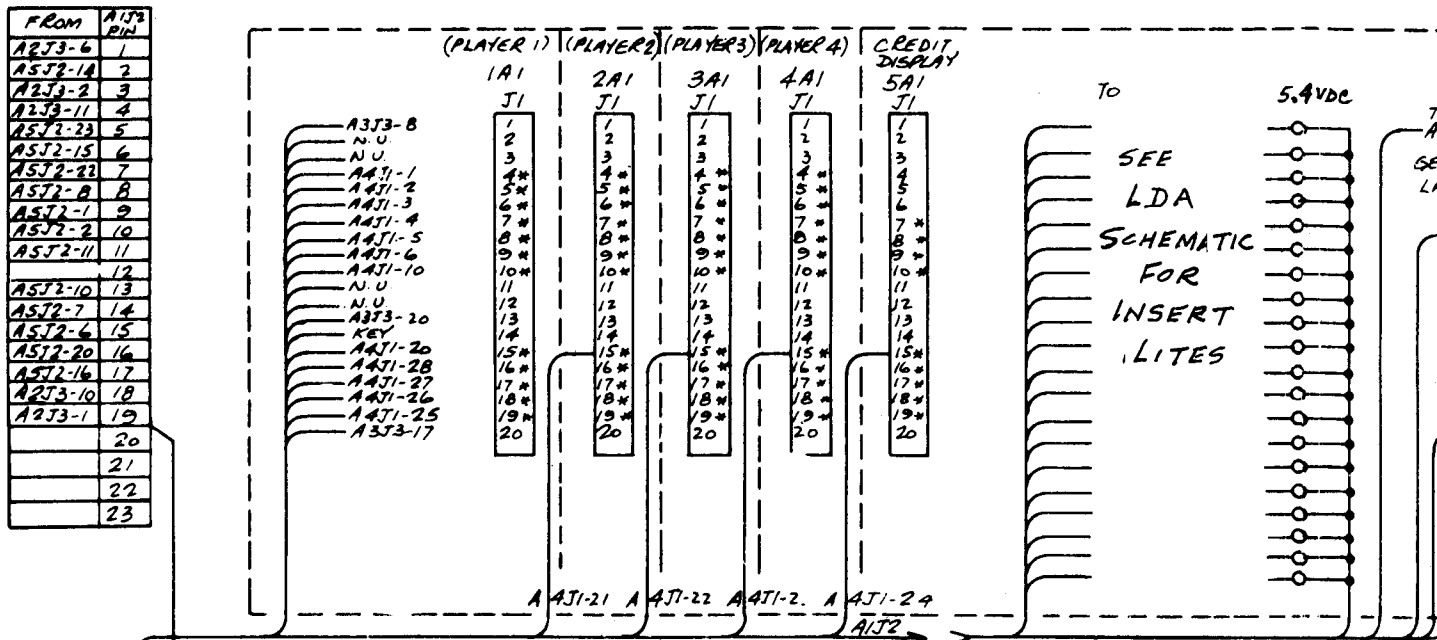
AM'T

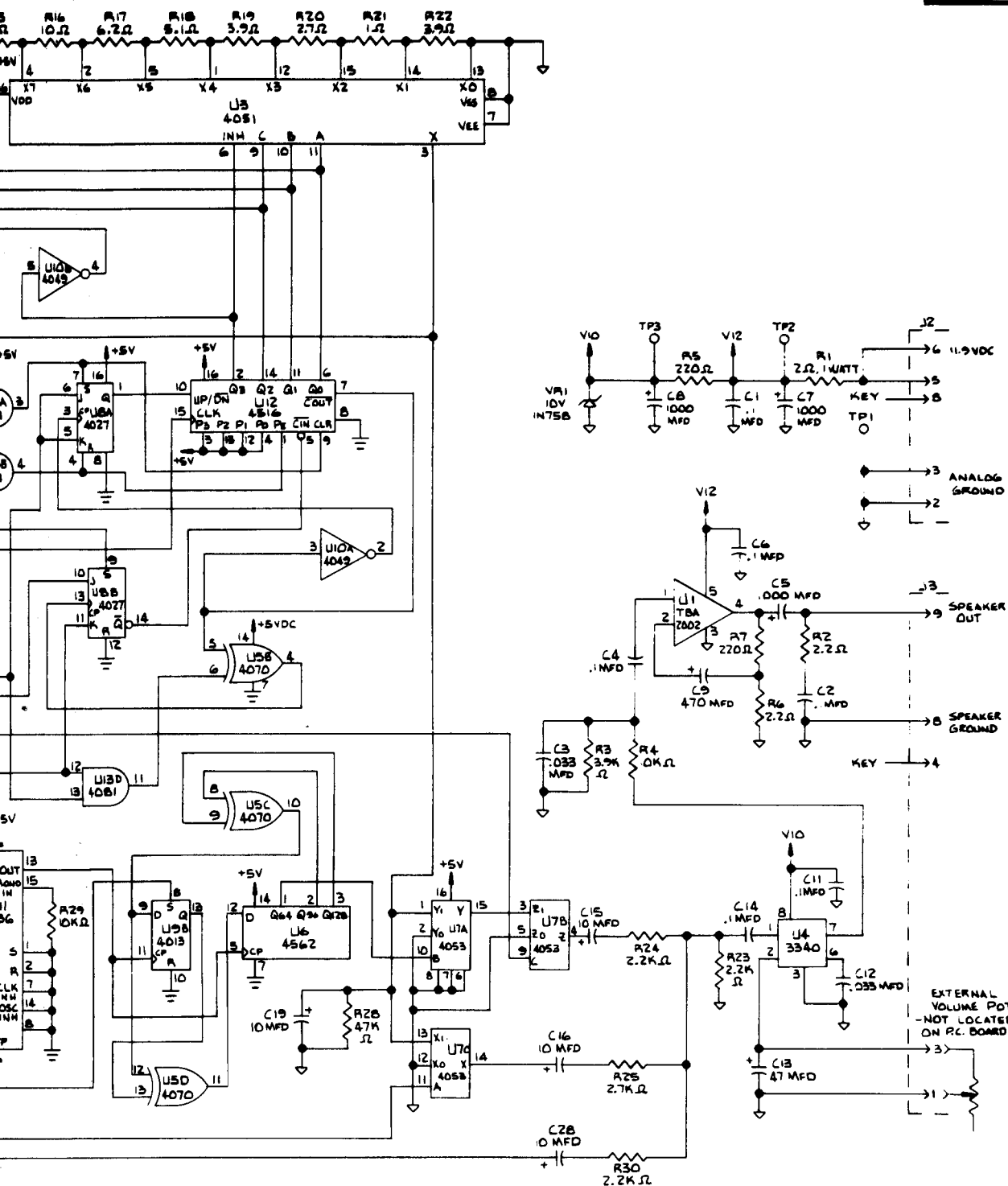
MAT

FIN.

APPR.

AI INSERT





STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

SCHEMATIC, ELECTRONIC SOUNDS

FOR SOLID STATE

DRN. 2W.

DATE 8-21-79

AM'T

MAT

FIN.

APPR.

SCALE:

PART MUST BE FREE OF BURRS

Unless otherwise specified, all fractional dimensions carry tolerances of plus and minus .010. All decimal dimensions plus and minus .005. Exceptions: Drilled holes plus .003 minus .001. Die casting fractional plus and minus .005. Decimal plus and minus .003. Decimal dimensions on tools plus and minus .001. Angles $\pm 30^\circ$ unless otherwise specified.

DATE

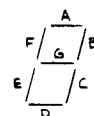
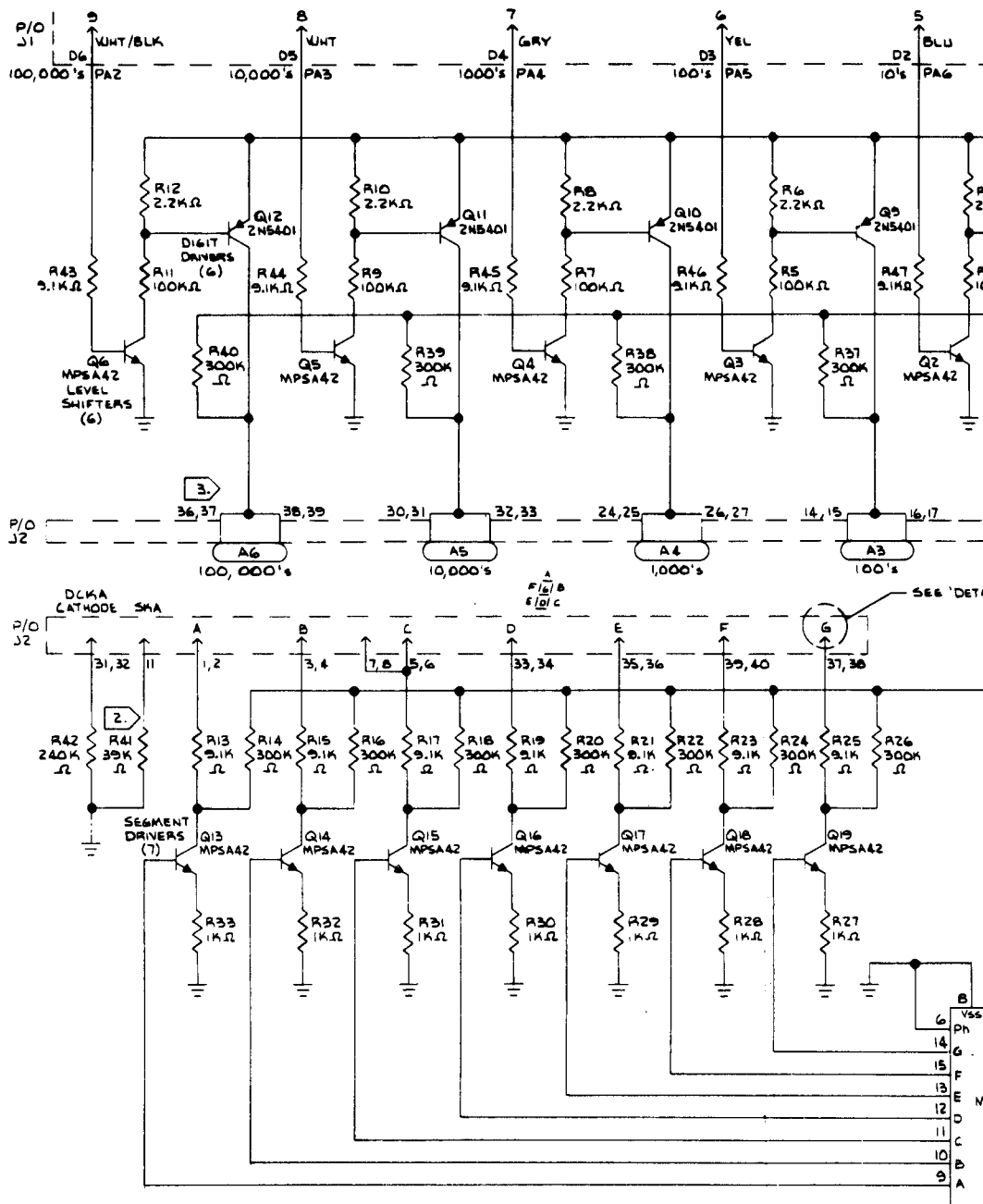
NOTES:

1	PIN'S	WIRE COLOR
PLAYER #1	BLK/WHT	
PLAYER #2	YEL/RED	
PLAYER #3	ORG/BLU	
PLAYER #4	BRN/ORG	
MATCH/BALL	RED/BLK	

2 OMIT FOR BECKMAN DISPLAYS.

3 36, 37 DENOTES

BECKMAN PANTER
DISPLAY DISPLAY
TERMINAL # TERMINAL

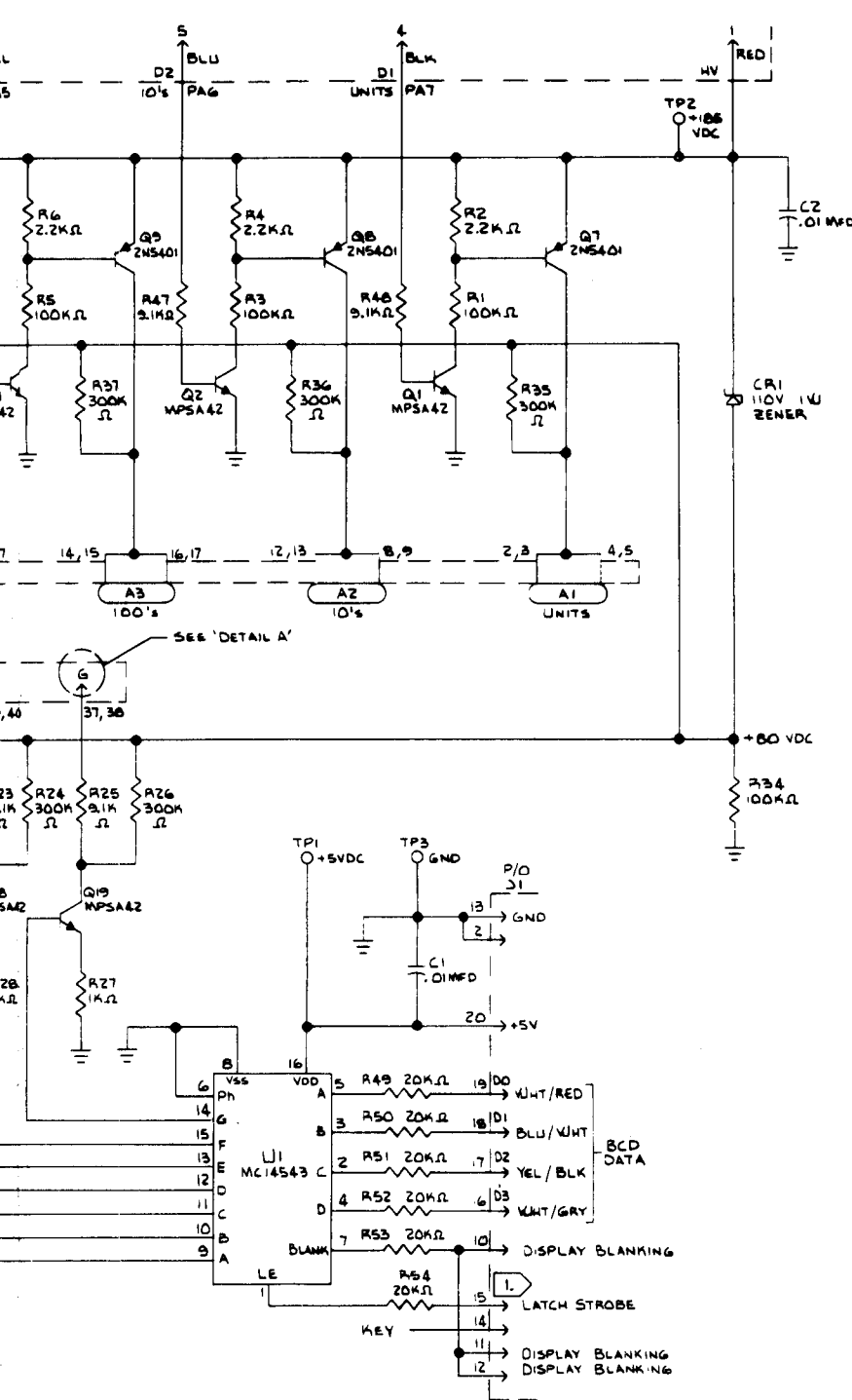


DETAIL A

ISSUE	CHANGE

NO. 12B-434-S1

DIETZEN NO. 198M AGEPROOF



STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

SCHEMATIC, DISPLAY - P.C. BOARD

FOR GEN. USE

DRN ۷۷

DATE 5-25-79

AMT ~~44~~

MAT

FIN.

APPB.

SCALE:

PART MUST BE FREE OF BURRS

Unless otherwise specified, all fractional dimensions carry tolerances of plus and minus .010: All decimal dimensions plus and minus .005. Exceptions: Drilled holes plus .003 minus .001. Die casting fractional plus and minus .005: Decimal plus and minus .003. Decimal dimensions on tools plus and minus .001. Angles $\pm 30'$ unless otherwise specified.

NOTES:

1. PIN IS WIRE COLOR

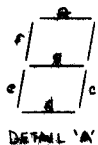
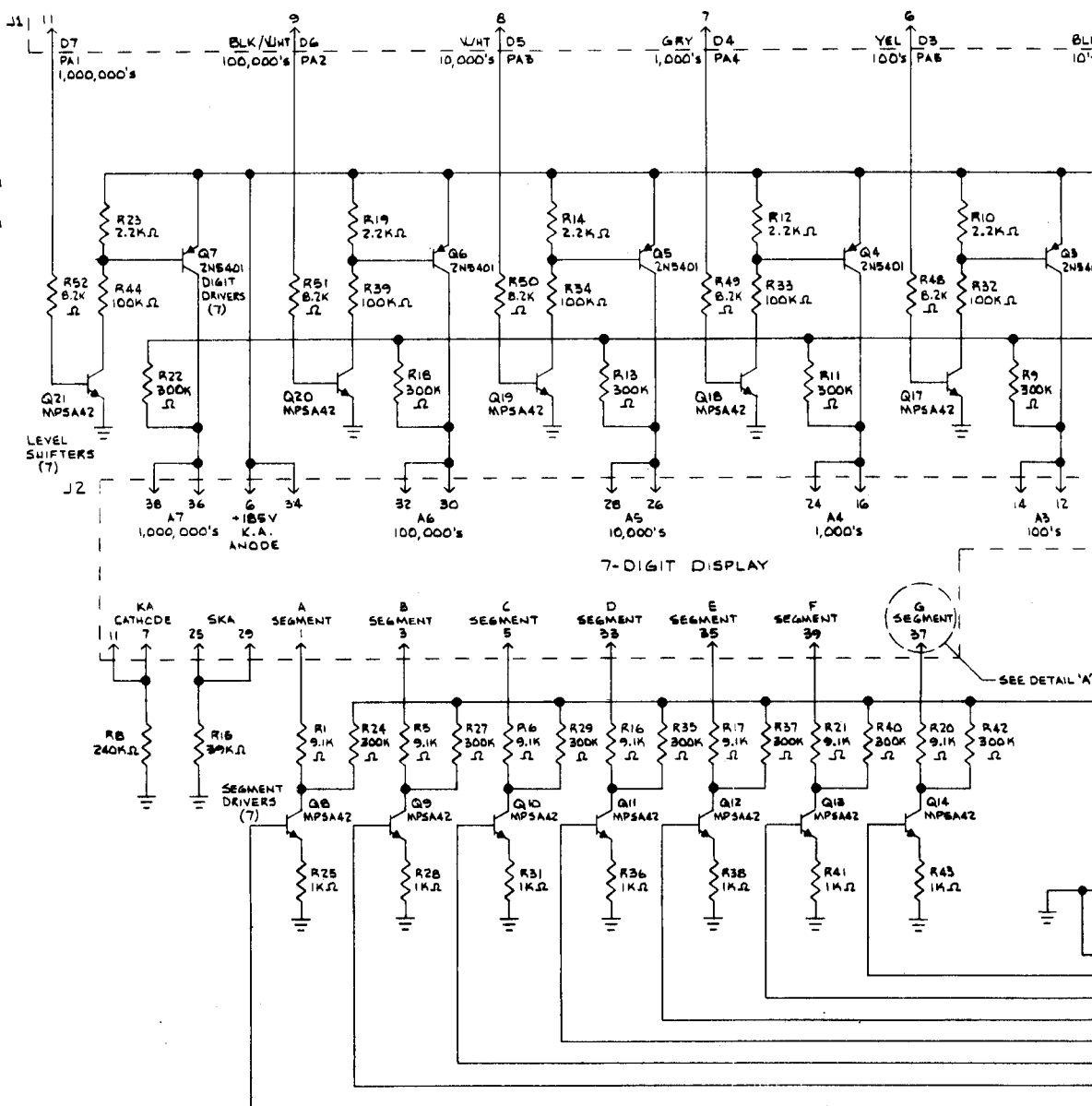
PLAYER #1 BLK/WHT
 PLAYER #2 ORG/BLU
 PLAYER #3 RED/YEL
 PLAYER #4 BRN/ORG
 MATCH/BALL RED/BLACK

2. LAST 'C' NUMBER USED C2
 LAST 'CR' NUMBER USED CR1
 LAST 'J' NUMBER USED J2
 LAST 'Q' NUMBER USED Q21
 LAST 'R' NUMBER USED R58
 LAST 'TP' NUMBER USED TP3
 LAST 'U' NUMBER USED U1

3. ON P.C. BOARD LEGEND;

NOMENCLATURE DD IS THE ABBREVIATION
 FOR DIGIT DRIVER

NOMENCLATURE LS IS THE ABBREVIATION
 FOR LEVEL SHIFTER

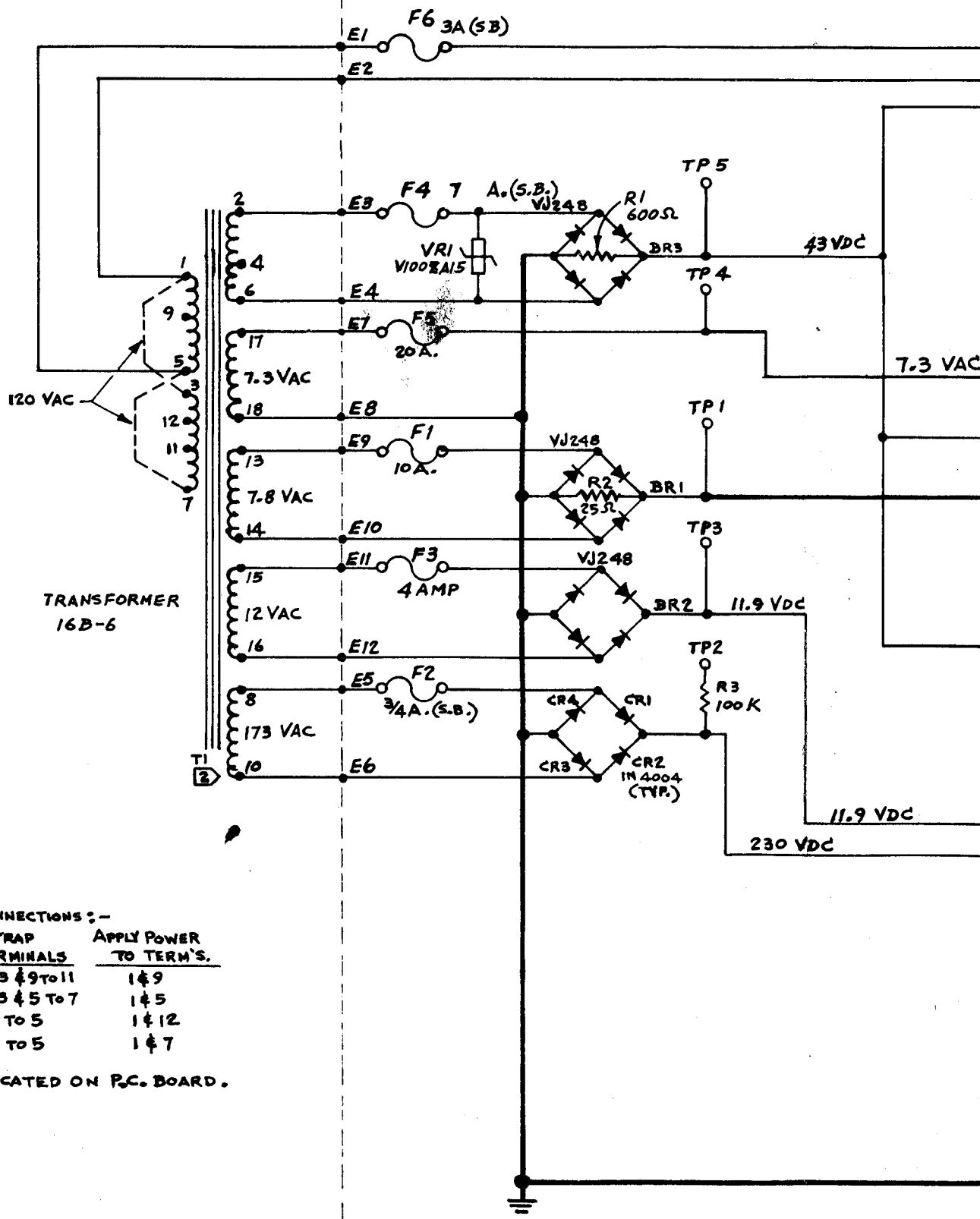


NO. 12B-645-S

DIETZEN NO. 198M AGEPROOF

ISSUE	CHANGE	DATE

TA-100
P.C. BOARD

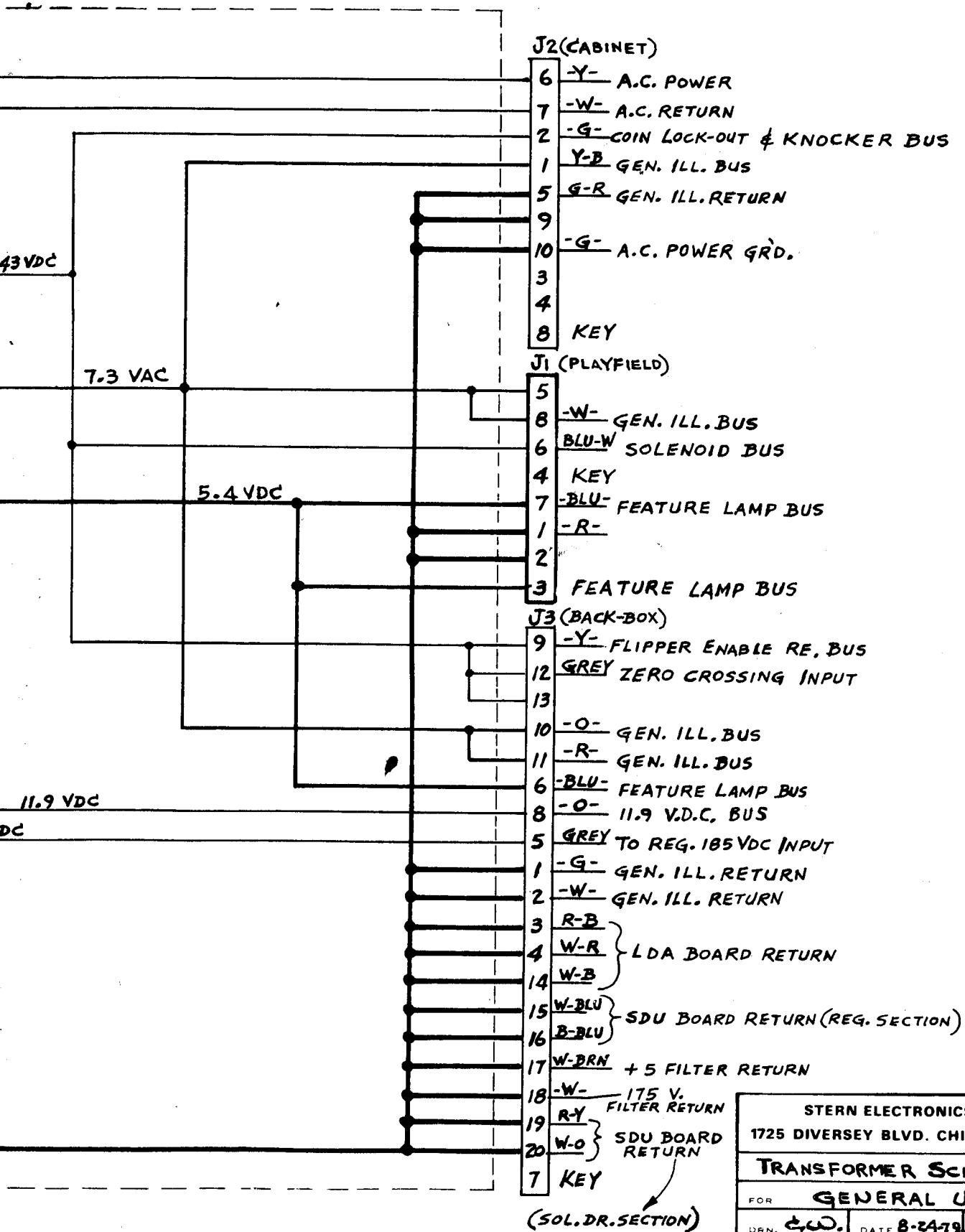


NOTES:

1. POWER LINE CONNECTIONS:-

AC LINE VOLTAGE	STRAP TERMINALS	APPLY POWER TO TERM'S.
115	1 TO 3 & 9 TO 11	1 & 9
120	1 TO 3 & 5 TO 7	1 & 5
220	3 TO 5	1 & 12
240	3 TO 5	1 & 7

2. T1 IS NOT LOCATED ON P.C. BOARD.



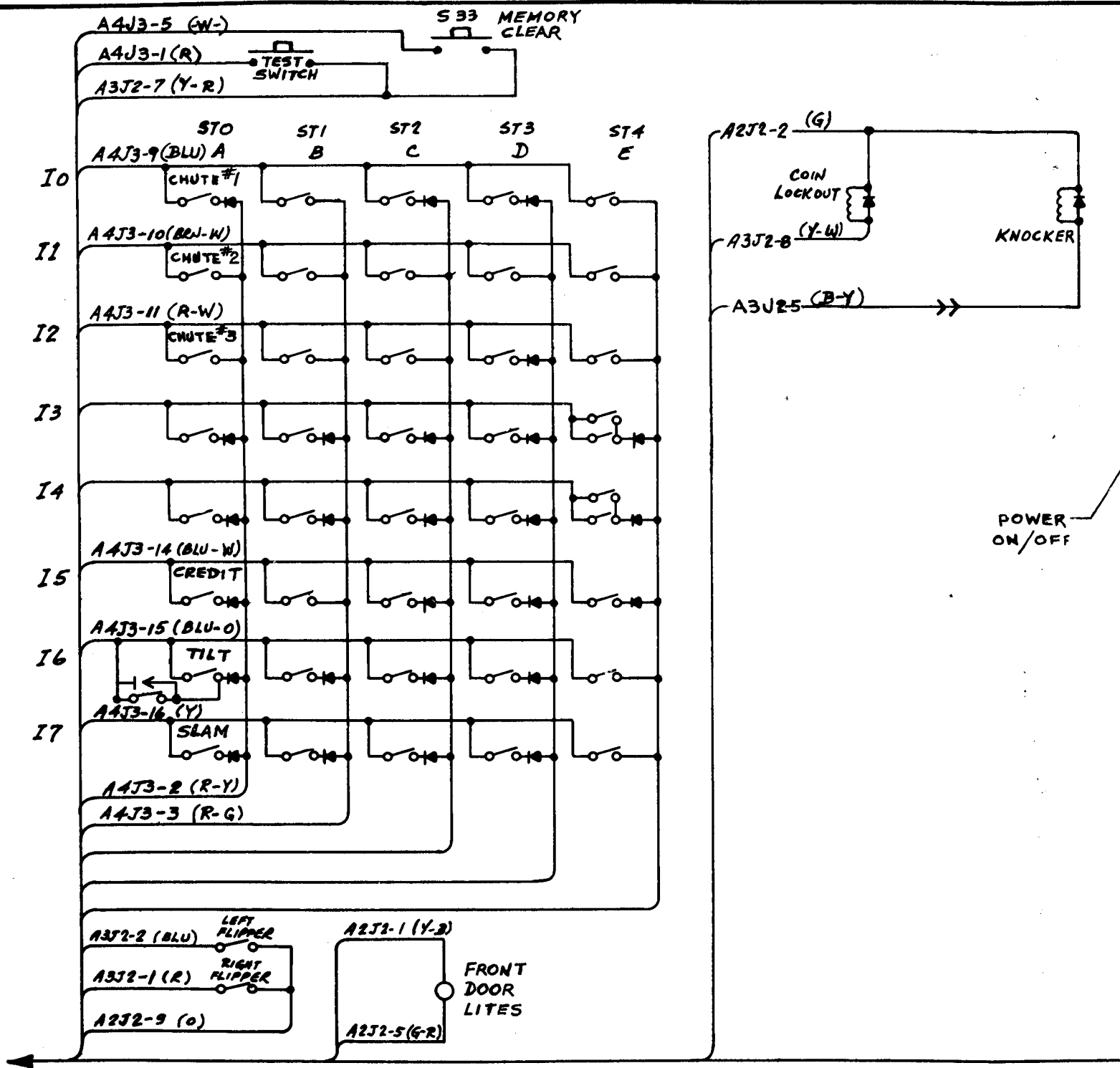
STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

TRANSFORMER SCHEMATIC

FOR GENERAL USE

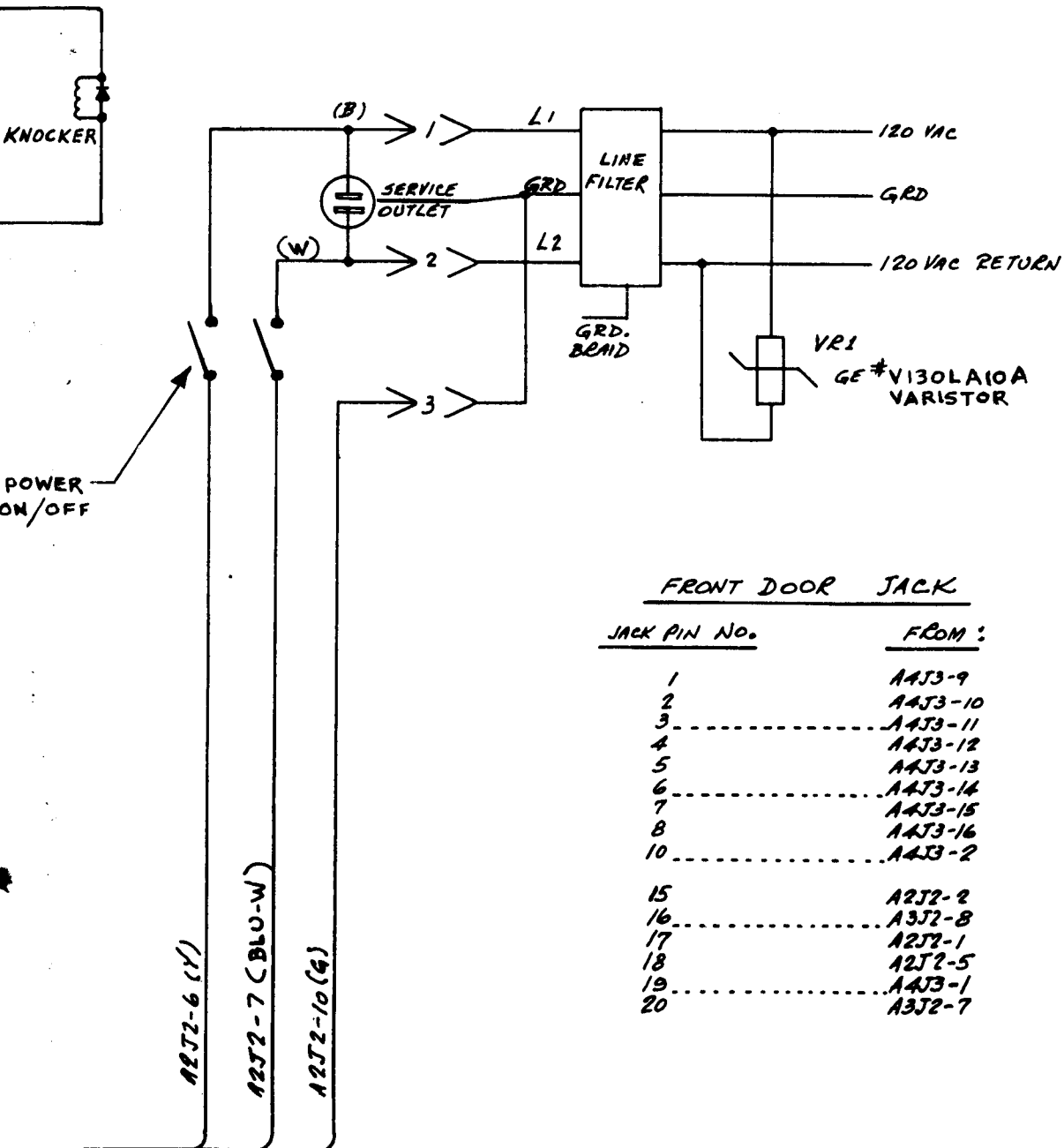
DRN.	E.W.	DATE	8-24-79	AM'T
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12B-432-S-121

DIETZEN NO. 100M AGEPROOF

ISSUE	CHANGE	DATE



FRONT DOOR JACK

JACK PIN NO.	FROM :
1	A4J3-9
2	A4J3-10
3	A4J3-11
4	A4J3-12
5	A4J3-13
6	A4J3-14
7	A4J3-15
8	A4J3-16
10	A4J3-2
15	A2J2-2
16	A3J2-8
17	A2J2-1
18	A2J2-5
19	A4J3-1
20	A3J2-7

STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

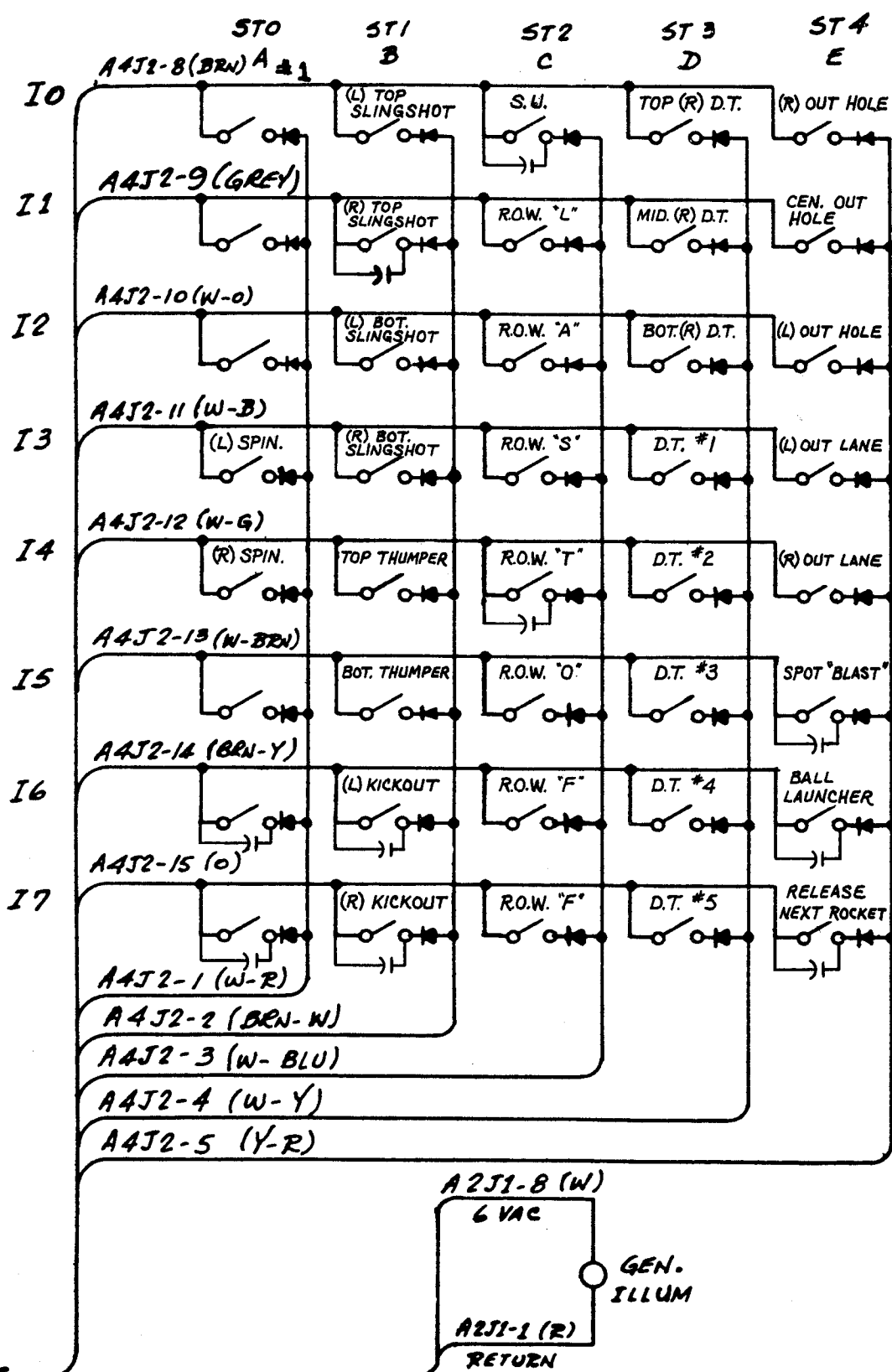
CABINET AND FRONT DOOR WIRING

FOR STANDARD

DRN. C.W. DATE 10-16-79 AM'T

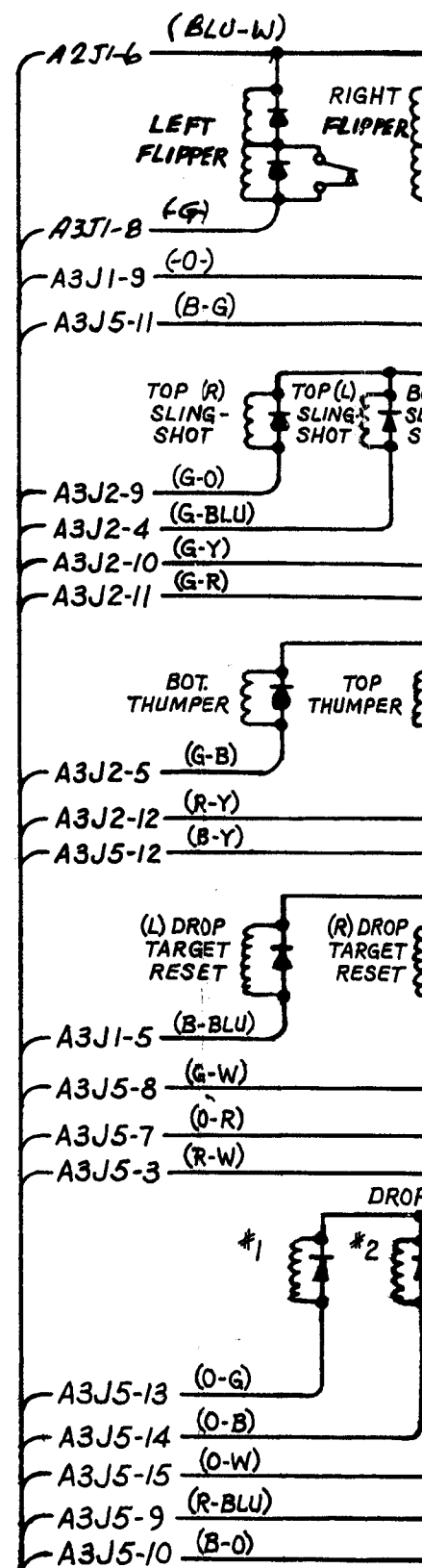
MAT PIN. APPR.

DATE

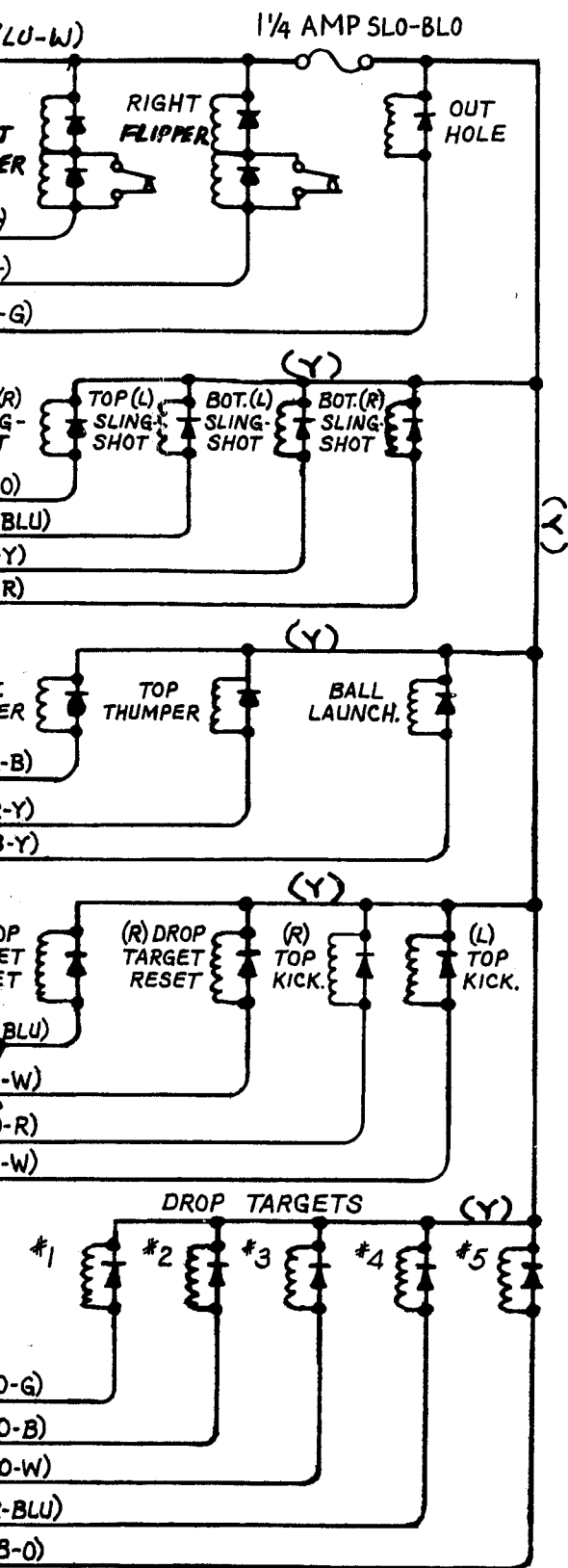


R.O.W. = ROLL-OVER WIRE FORM
S.U. = STAND-UP TARGET
D.T. = DROP TARGET

PLAYFIELD



FLIGHT

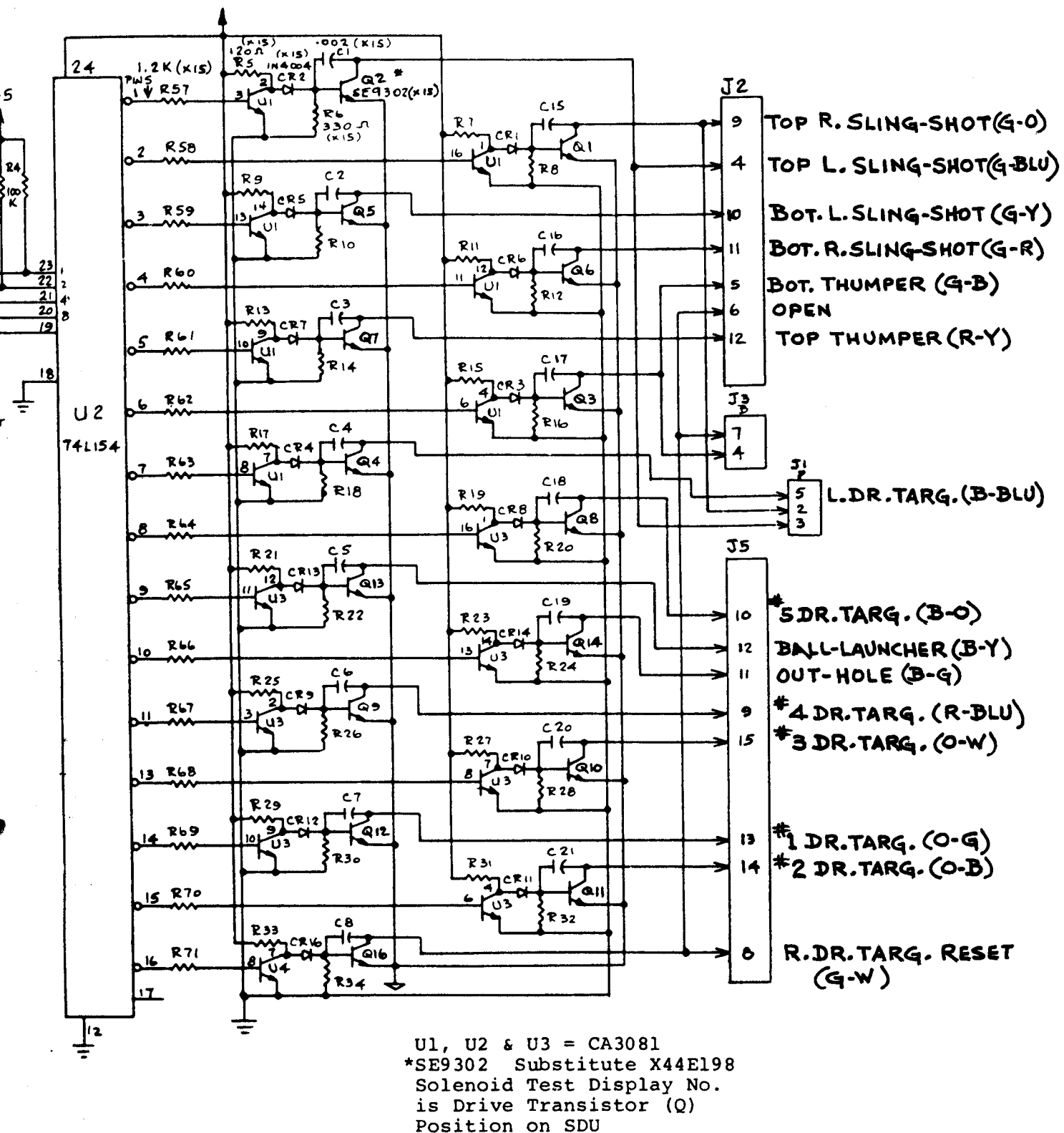


DESCRIPTION

DESCRIPTION	WIRE COLOR	JACK LDA	PIN NO.
B ROLL-OVER BOTTOM LEFT	W-BLU	J3	3
L ROLL-OVER TOP	W-GREY	J3	23
A ROLL-OVER TOP	GREY-BLU	J1	10
S ROLL-OVER TOP	GREY-Y	J1	15
T ROLL-OVER TOP	R-W	J3	4
O ROLL-OVER TOP	R-B	J3	16
F ROLL-OVER BOTTOM LEFT	GREY-O	J1	14
F ROLL-OVER BOTTOM RIGHT	PUR-W	J1	2
BONUS 1,000	BRN-B	J1	18
BONUS 2,000	BLU-R	J1	1
BONUS 3,000	BRN	J3	26
BONUS 4,000	G-R	J3	1
BONUS 5,000	GREY-G	J1	19
BONUS 6,000	GREY	J1	9
BONUS 7,000	R-Y	J3	25
BONUS 8,000	O-G	J3	12
BONUS 9,000	PUR	J1	17
BONUS 10,000	G-B	J1	8
BONUS MULTIPLIER 1X	W-B	J3	15
BONUS MULTIPLIER 2X	BLU-W	J1	23
BONUS MULTIPLIER 3X	R-G	J1	3
BONUS MULTIPLIER 4X	Y-BLU	J3	17
BONUS MULTIPLIER 5X	W	J3	11
FIRST STAGE GO LEFT	Y-BLU	J2	7
FIRST STAGE GO TOP	Y-BLU	J2	7
GAME OVER	GREY-W	J2	11
HIGH SCORE TO DATE	GREY-O	J2	22
LEFT HAND CORNER B	Y-G	J3	02
LEFT HAND CORNER L	W-BLU	J1	13
LEFT HAND CORNER A	BRN-R	J1	6
LEFT HAND CORNER S	B-W	J1	28
LEFT HAND CORNER T	R-W	J3	4
LEFT HAND CORNER O	O-W	J3	27
LEFT HAND CORNER F	Y-G	J1	7
LEFT HAND CORNER F	B	J1	16
MATCH	GREY-Y	J2	1
RELEASE NEXT ROCKET	B-R	J3	19
RIGHT BANK	BRN-BLU	J1	24
RIGHT SPINNER -500	PUR-B	J1	4
RIGHT SPINNER -1,000	R	J3	22
RIGHT SPINNER -1,500	B	J3	13
RIGHT SPINNER -2,000	W-BRN	J1	27
SECOND STAGE GO LEFT	W-BLU	J2	5
SECOND STAGE GO TOP	W-BLU	J2	5
SHOOT AGAIN (BACKBOX)	GREY-R	J2	21
SHOOT AGAIN (PLAYFIELD)	GREY-R	J1	26
SPECIAL LANE	W	J2	16
SPECIAL LANE TOP	PUR-W	J2	30
SPECIAL OUT LANE LEFT	W-G	J2	15
SPECIAL OUT LANE RIGHT	G-W	J2	14
SPOT BLAST	G-B	J3	21
TILT	GREY-B	J2	10
#1 AT 5 BANK	GREY-B	J3	10
#2 AT 5 BANK	PUR-B	J1	25
#3 AT 5 BANK	B-O	J1	11
#4 AT 5 BANK	W-O	J3	20
#5 AT 5 BANK	R-BLU	J3	18
ALL SYSTEMS GO LEFT	BLU-Y	J2	20
ALL SYSTEMS GO TOP	BRN-O	J1	12
LEFT SPINNER	BLU-O	J1	05

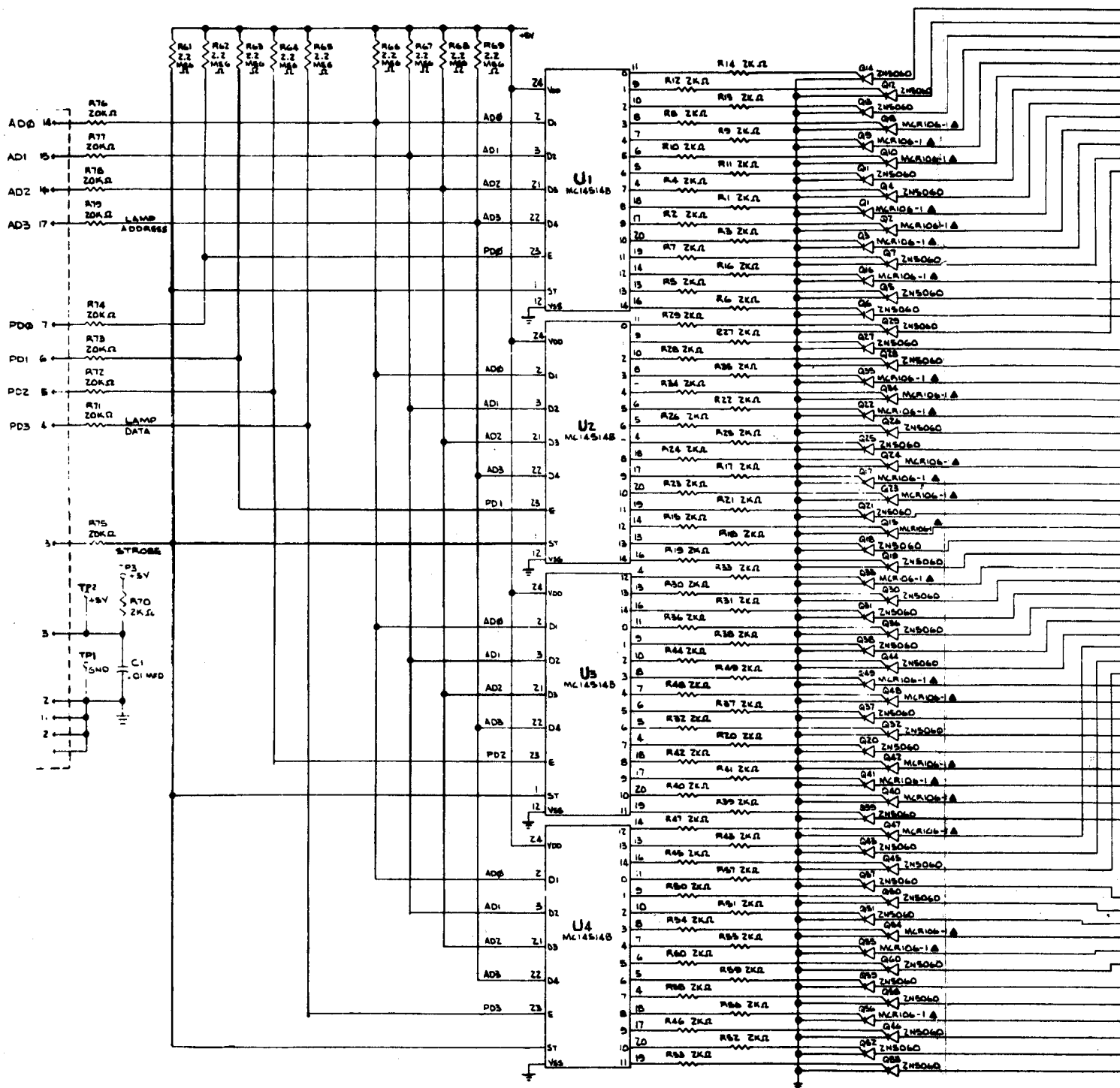
FLIGHT 2000

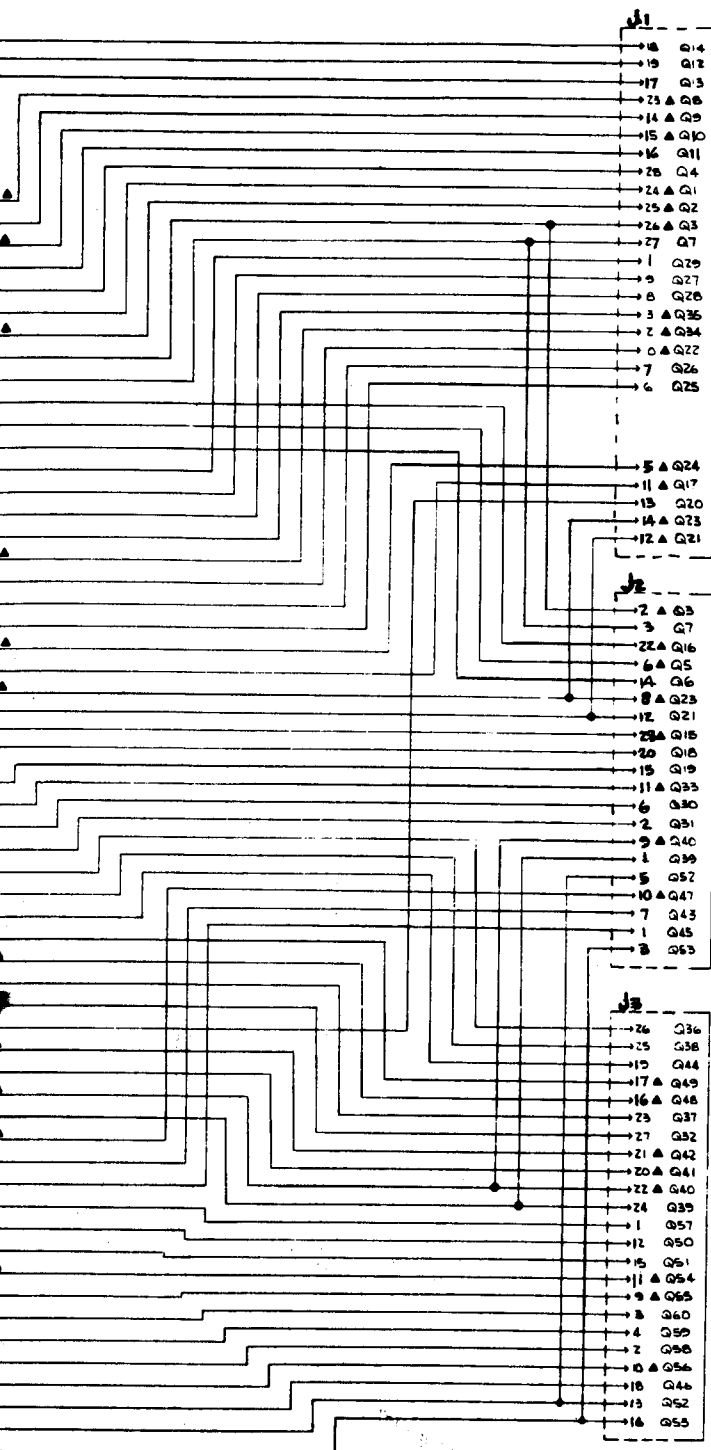
A2J5-7(BLU) FEATURE LAMP BUS
A2J5-3(BLU)



NOTES:

1. ▲ INDICATES MC106-1 TRANSISTOR.
2. THIS DOCUMENT FOR LDA-100 REV. A AND
LDA-REV. B SINGLE SIDED P.C. BOARDS.





DESCRIPTION

DESCRIPTION	WIRE COLOR	JACK LDA	PIN NO.
B ROLL-OVER BOTTOM LEFT	W-BLU	J3	3
L ROLL-OVER TOP	W-GREY	J3	23
A ROLL-OVER TOP	GREY-BLU	J1	10
S ROLL-OVER TOP	GREY-Y	J1	15
T ROLL-OVER TOP	R-W	J3	4
O ROLL-OVER TOP	R-B	J3	16
F ROLL-OVER BOTTOM LEFT	GREY-O	J1	14
F ROLL-OVER BOTTOM RIGHT	PUR-W	J1	2
BONUS 1,000	BRN-B	J1	18
BONUS 2,000	BLU-R	J1	1
BONUS 3,000	BRN	J3	26
BONUS 4,000	G-R	J3	1
BONUS 5,000	GREY-G	J1	19
BONUS 6,000	GREY	J1	9
BONUS 7,000	R-Y	J3	25
BONUS 8,000	O-G	J3	12
BONUS 9,000	PUR	J1	17
BONUS 10,000	G-B	J1	8
BONUS MULTIPLIER 1X	W-B	J3	15
BONUS MULTIPLIER 2X	BLU-W	J1	23
BONUS MULTIPLIER 3X	R-G	J1	3
BONUS MULTIPLIER 4X	Y-BLU	J3	17
BONUS MULTIPLIER 5X	W	J3	11
FIRST STAGE GO LEFT	Y-BLU	J2	7
FIRST STAGE GO TOP	Y-BLU	J2	7
GAME OVER	GREY-W	J2	11
HIGH SCORE TO DATE	GREY-O	J2	22
LEFT HAND CORNER B	Y-G	J3	02
LEFT HAND CORNER L	W-BLU	J1	13
LEFT HAND CORNER A	BRN-R	J1	6
LEFT HAND CORNER S	B-W	J1	28
LEFT HAND CORNER T	R-W	J3	4
LEFT HAND CORNER O	O-W	J3	27
LEFT HAND CORNER F	Y-G	J1	7
LEFT HAND CORNER F	B	J1	16
MATCH	GREY-Y	J2	1
RELEASE NEXT ROCKET	B-R	J3	19
RIGHT BANK	BRN-BLU	J1	24
RIGHT SPINNER -500	PUR-B	J1	4
RIGHT SPINNER -1,000	R	J3	22
RIGHT SPINNER -1,500	B	J3	13
RIGHT SPINNER -2,000	W-BRN	J1	27
SECOND STAGE GO LEFT	W-BLU	J2	5
SECOND STAGE GO TOP	W-BLU	J2	5
SHOOT AGAIN (BACKBOX)	GREY-R	J2	21
SHOOT AGAIN (PLAYFIELD)	GREY-R	J1	26
SPECIAL LANE	W	J2	16
SPECIAL LANE TOP	PUR-W	J2	30
SPECIAL OUT LANE LEFT	W-G	J2	15
SPECIAL OUT LANE RIGHT	G-W	J2	14
SPOT BLAST	G-B	J3	21
TILT	GREY-B	J2	10
#1 AT 5 BANK	GREY-B	J3	10
#2 AT 5 BANK	PUR-B	J1	25
#3 AT 5 BANK	B-O	J1	11
#4 AT 5 BANK	W-O	J3	20
#5 AT 5 BANK	R-BLU	J3	18
ALL SYSTEMS GO LEFT	BLU-Y	J2	20
ALL SYSTEMS GO TOP	BRN-O	J1	12
LEFT SPINNER	BLU-O	J1	05

STERN ELECTRONICS INC.

1725 DIVERSEY BLVD. CHICAGO 60614

LAMP DRIVER SCHEMATIC

FOR FLIGHT 2000

URN. B.A.

DATE

AM'T

MAT

FIN.

APPR.

SCALE:

PART MUST BE FREE OF BURRS

Unless otherwise specified, all fractional dimensions carry tolerances of plus and minus .010. All decimal dimensions plus and minus .005. Exceptions: Drilled holes plus .003 minus .001. Die casting fractional plus and minus .005. Decimal plus and minus .003. Decimal dimensions on tools plus and minus .001. Angles $\pm 30^\circ$ unless otherwise specified.

DATE



ELECTRONICS, INC.

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