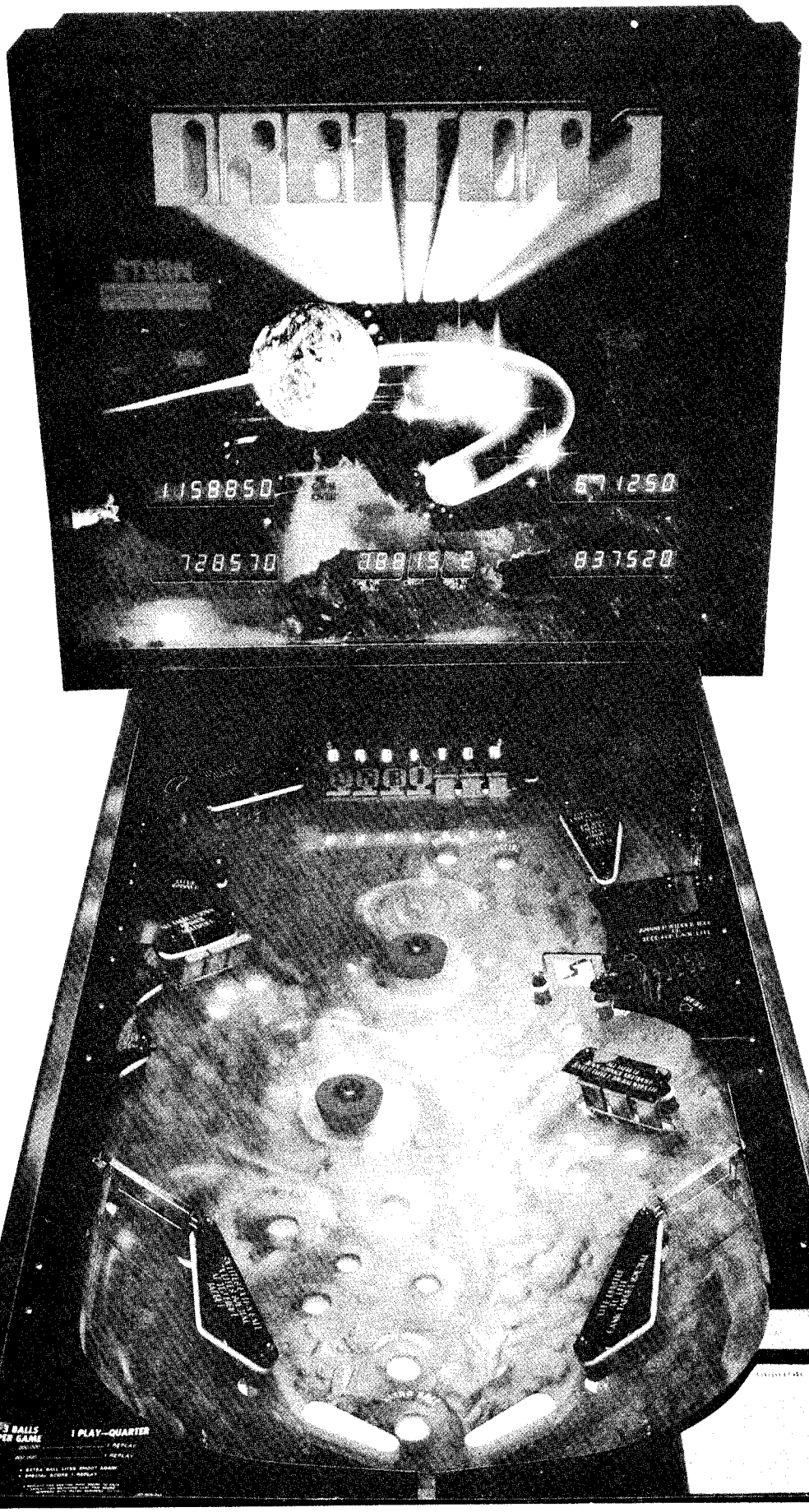

STERN®

ELECTRONICS, INC.

1725 Diversey Parkway, Chicago, Illinois 60614
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Toll Free Service Assistance (800) 621-6424
Illinois only (800) 572-1948

Orbitor I — Patents Pending

WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. AS TEMPORARILY PERMITTED BY REGULATION IT HAS NOT BEEN TESTED FOR COMPLIANCE WITH THE LIMITS FOR CLASS A COMPUTING DEVICES PURSUANT 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.

SECTION 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 that wiring of transformer corresponds 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 (normally open) tilt switch:

1. Plumb bob tilt on left side of cabinet near front door.

STATIC DISCHARGE CAUTION

Integrated circuit chips can be damaged by static discharge from the body. Before touching chips, discharge body by touching any ground path.

SECTION 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 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 tone (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 Buttons 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. Note: On this game, when in switch test, rotor wheel is energized. To check rotor wheel switch closure, momentary stop wheel.
6. GAME LEVELS AND BOOKKEEPING FUNCTIONS: - Pressing the Self-Test button seventeen 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.

PLAYFIELD SWITCH ADJUSTMENTS

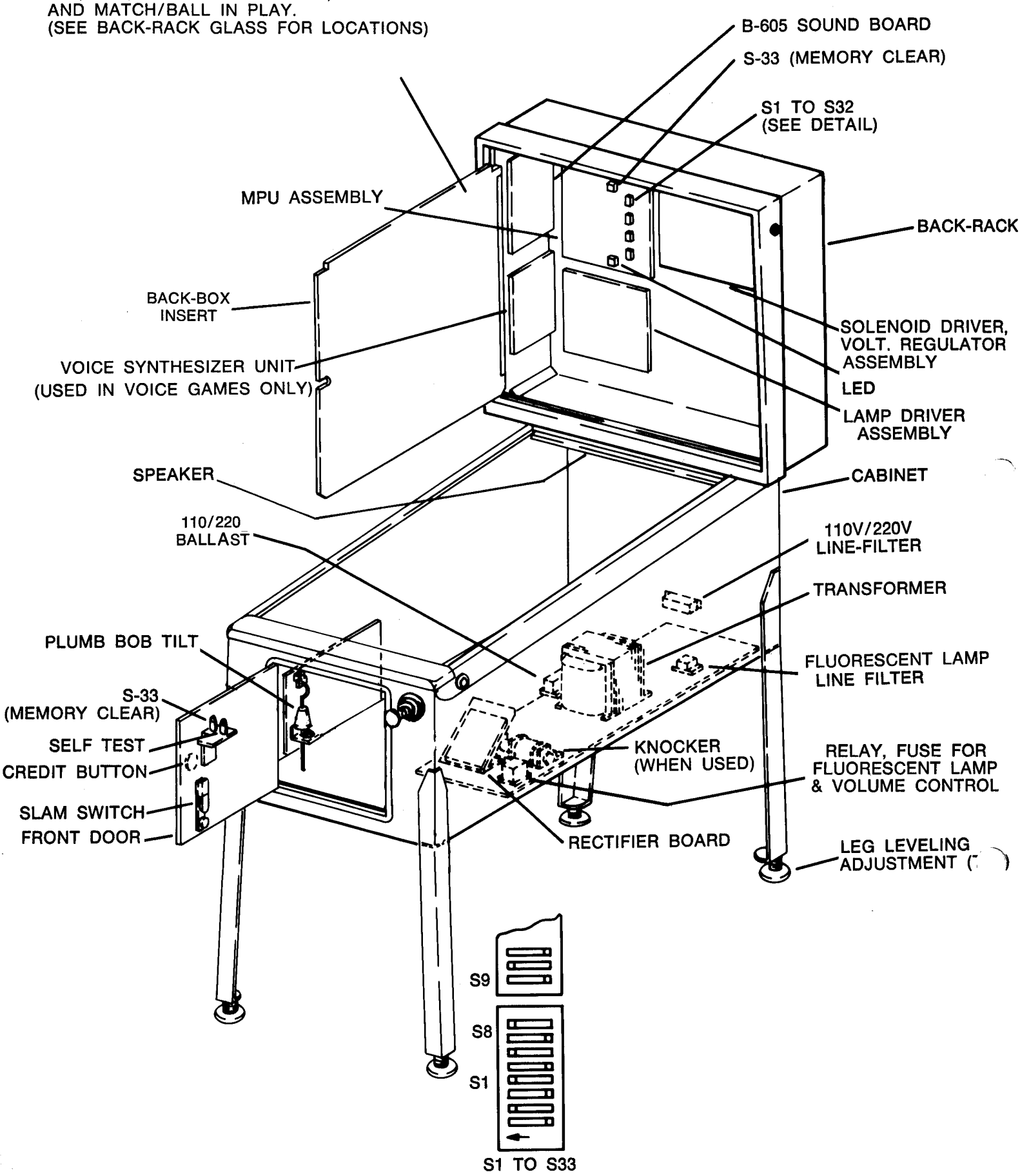
All contact switches should be adjusted to have a gap 1/16" in the open position, and have .010" overtravel closed. All contact switches (except for flipper buttons & flipper end of stroke switches) are gold plated to resist corrosion and, **SHOULD NOT BE FILED OR BURNISHED.** If contacts have dirt or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

CLEAN AND WAX THE 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.

DISPLAY DRIVER ASSEMBLIES
1ST, 2ND, 3RD & 4TH PLAYERS, CREDITS
AND MATCH/BALL IN PLAY.
(SEE BACK-RACK GLASS FOR LOCATIONS)



ELECTRONIC PIN BALL GAME

SECTION III. GENERAL GAME OPERATION

PLACE BALL INTO PLAYFIELD BY OUTHOLE:

COIN GAME. 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 lamps will flash in a programmed attract mode, "HIGH SCORE" lamp is lit, player displays flash high score to date, "HIGH SCORE" lite goes off & previous played scores are flashed. 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 inoperative 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), or minimum adjusted time is played. At this time the "Game Over" lamp becomes lit. A random "Match" number appears and the "Match" lamp 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 Score" is flashed on all players' scores. If the "High Score" 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 go "dead". Bonus score is not added. Note: the spinner motors remain active until the ball drains in the outhole. 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 lamps go out and the game becomes "dead" through a built-in delay circuit. The purpose of the time delay circuit is to discourage abuse of the machine. After the delay, the "Game Over" lamp lights, and the game is ready for play. The time delay occurs any time 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 0.
See back box adjustments.

SECTION IV. SELF TEST AND BOOKKEEPING FUNCTIONS

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

TABLE 4-1. SELF TEST FUNCTIONS

1st	Burn in test - all outputs tested.
2nd	Lamp test - all feature lamps on and off.
3rd	Display test - all digits display 0000000 thru 9999999 then an 8 shifts from left to right.
4th	Solenoid test - continuous sequence of solenoids pulsed with solenoid driver transistor, "Q" number displayed.
5th	Switch test - switch I.D. number appears on display when it is manually closed. (Flashing O if all cabinet switches are open and all balls moved from the outhole to the shooter position.)

TABLE 4-2. BOOKKEEPING FUNCTIONS

TEST SWITCH PUSH NUMBER	BALL/MATCH DISPLAY	DESCRIPTION	DISPLAYS
6th	01	1st Level (High Score)	
7th	02	2nd Level (High Score)	
8th	03	3rd Level (High Score)	
9th	04	Current High Game Threshold	
10th	05	Current Credits	00 to 99
11th	06	Total Plays	00 to 9999999
12th	07	Total Replays	00 to 9999999
13th	08	Total times high score is passed	00 to 9999999
14th	09	Number of coins thru Chute No. 3	00 to 9999999
15th	10	Number of coins thru Chute No. 2	00 to 9999999
16th	11	Number of coins thru Chute No. 1	00 to 9999999
17th	12	Total balls played	00 to 9999999
18th	13	Total Extra Balls Awarded	00 to 9999999
19th	14	Total Playfield Special Awards	00 to 9999999
20th	15	Total Level 1 Passed	00 to 9999999
21st	16	Total Level 2 Passed	00 to 9999999
22nd	17	Most time on Ball	00 to 9999999

SECTION V. FRONT DOOR GAME ADJUSTMENTS:

HIGH SCORE FEATURE ADJUSTMENTS:

This game is designed to award an (Optional) Extra Ball or "Free Game" at the set score level.

Any level from 10,000 to 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), by pressing S33 on the MPU assembly in the back box or the memory clear switch on the front door and then hold the credit button in. Release the credit button when the desired score appears. Note that the level changes 10,000 points at a time. If the number (00) is left on the displays, the 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.

RECOMMENDED SETTING

ORBITOR

3 BALLS

1ST LEVEL PASSED	600,000	1 CREDIT
2ND LEVEL PASSED	1,100,000	1 CREDIT
3RD LEVEL PASSED		
4TH LEVEL PASSED	1,500,000	HIGH SCORE TO DATE

5 BALLS

1ST LEVEL PASSED	1,500,000	1 CREDIT
2ND LEVEL PASSED	2,000,000	1 CREDIT
3RD LEVEL PASSED		
4TH LEVEL PASSED	2,500,000	HIGH SCORE TO DATE

GAME ADJUSTMENTS

A. Back Box Game Adjustments:

Each game has thirty-two switches located on the MPU module, located in the back box, that allows game 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, time per game, 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.

TABLE 7-2. MPU SWITCH/GAME ADJUSTMENTS

			ON	OFF
32	Special Award	NONE: OFF OFF; X BALL: ON OFF; 100K: OFF ON; REPLAY: ON ON	←	←
31			←	←
30	Special Limit		1/Game	1/Ball
29	Reset the Multiplier Lights		YES	NO
28	Coin Chute #3		See Catalog Or Label On Side Of Cabinet	
27				
26				
25				
24	Extra Ball		YES	NO
23	Add-A-Ball		ON	OFF
22	Add-A-Ball Limit		5	3
21	Match Feature		ON	OFF
20	Display Credits		ON	OFF
19	Awarded Maximum Credit	10: OFF OFF; 15: OFF ON; 25: ON OFF; 40: ON ON; CREDITS	←	←
18			←	←
17	Talking		YES	NO
16	High Game To Date	0: OFF OFF; 1: OFF ON; 2: ON OFF; 3: ON ON	←	←
15			←	←
14	Green Timing Special (Sec.)	90: OFF OFF; 120: OFF ON; 150: ON OFF; 180: ON ON; SECOND	←	←
13			←	←
12	Coin Chute #2		See Catalog Or Label On Side Of Cabinet	
11				
10				
9				
8	Background Sound		ON	OFF
7	Balls Per Game		5	3
6	High Score Feature		Replay	X-Ball
5	100th Game: Free Credit		YES	NO
4	Coin Chute #1		See Catalog Or Label On Side Of Cabinet	
3				
2				
1				

SECTION VII. CREDIT/COIN AND GAME ADJUSTMENTS

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:

TABLE 7-1. CREDITS/COIN ADJUSTMENTS

	MPU SWITCHES					
	4	3	2	1		
CHUTE No. 1 (BLU) (NEXT TO HINGE)	12	11	10	9		
CHUTE No. 2 (BRN-WHITE) (CENTER)	28	27	26	25		
CHUTE No. 3 (RED-WHITE) (NEXT TO LOCK)					CREDITS	COIN
	OFF	OFF	OFF	OFF	1	Per 1
	OFF	OFF	OFF	ON	2	
	OFF	OFF	ON	OFF	3	
	OFF	OFF	ON	ON	4	
	OFF	ON	OFF	OFF	5	
	OFF	ON	OFF	ON	6	
	OFF	ON	ON	OFF	7	
	OFF	ON	ON	ON	10	
	ON	OFF	OFF	OFF	14	

MPU SWITCHES				CREDITS	COINS	SEQUENCE OF CREDITS PER COIN 1ST 2ND 3RD 4TH
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

DIP SWITCH CONTROLLED

TOP SPECIAL

Lights when 7X Bonus Multiplier is achieved. To collect, ball must go through spinner and light second "R" in ORBITOR in the same shot.

EXTRA BALL

Lights when 5X Bonus Multiplier is achieved. To collect, ball must go through spinner and light "T" in ORBITOR in the same shot.

100th QUARTER FEATURE (OPTIONAL)

Awards free game on every 100th game.

TIME ON ONE BALL

Display on Match/Credit, shows time on one ball and high time to date. Beating high time awards Special.

RIGHT BANK SPECIAL

Light Orbitor to light special then hit middle drop target to collect.

NOT DIP SWITCH CONTROLLED

MULTI-BALL

Releases ball when 7 top drop targets are down.

LEFT AND RIGHT SIDE GATES

Side gates will drop Orbitor drop target in order.

ADVANCE BONUS MULTIPLIER

* —By dropping top 7 drop target bank
—By lighting "O", "B", "T" and "R"
—By lighting "R", "I" and "O"
—By dropping left or right drop target bank

SPINNER

Scores 1,000 pts. advance to 3,000, 6,000, 9,000 pts. by upper left target on playfield, or lighting all drop targets lights.

ROTOR WHEEL

Scores 1,000 pts. when hit.

MINIMUM GAME FEATURE

Awards free ball until minimum time of game is used up.

BALLS FOR GAME:

NO. OF BALLS PER GAME	MPU SWITCH 7
3	OFF
5	ON

ADD-A-BALL (Memory):

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

ADD-A-BALL (Memory):	MPU SWITCH 22
3	ON
5	OFF

CREDIT DISPLAY:

CREDIT DISPLAY	MPU SWITCH 20
YES	ON
NO	OFF

AWARDED MAXIMUM CREDITS:

In answer to public demand, we at "STERN" are trying to give the players what they want—MORE playfield excitement. In order to do this, additional features are NEEDED.

In an effort to do so, we have added a coil on the playfield and eliminated the "COIN LOCK OUT COIL."

This Stern game has a new feature not used in any previous Stern pinball: Coins will be accepted and credit for the amount of coins inserted.

There are no MPU switches to limit the amount of credits given as in older Stern pinballs (it is even possible to attain 99 credits). There are, however, two (2) MPU SWITCHES THAT WILL LIMIT THE AMOUNT OF REPLAYS AWARDED. These two switches can be set for a limit of 10, 15, 25, and 40 replays. If the amount of credits shown in the credit/match window is greater than the MPU switches are set for, no replay credit will be awarded.

AWARDED MAXIMUM CREDITS	MPU SWITCHES	
	18	19
10	OFF	OFF
15	ON	OFF
25	OFF	ON
40	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" for setting levels.)

AWARD	MPU SWITCH 6
Extra Ball	OFF
Replay	ON

EXTRA BALL: LITES AT 5X

EXTRA BALL	MPU SWITCH 24
YES	ON
NO	OFF

SPECIAL AWARD:

TOP SPECIAL, RT. BANK & HIGH TIME	MPU SWITCHES 31	32
No Award	OFF	OFF
Extra Ball	OFF	ON
100,000 Points	ON	OFF
Replay	ON	ON

GREEN SHOOT AGAIN TIME:

This feature assures the player of a minimum playing time.

SPECIAL	MPU SWITCHES 13	14
90 Seconds	OFF	OFF
120 Seconds	ON	OFF
150 Seconds	OFF	ON
180 Seconds	ON	ON

RESET THE MULTIPLIER LIGHTS TO 1X:

On advancing to the next ball number.

	MPU SWITCH 29
YES	ON
NO	OFF

SPECIAL LIMIT:

	MPU SWITCH 30
1/Game	ON
1/Ball	OFF

HIGH GAME TO DATE FEATURE:

The game is designed to award up to 3 free games when "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 15	16
No Free Game	OFF	OFF
1 Free Game	ON	OFF
2 Free Games	OFF	ON
3 Free Games	ON	ON

MATCH FEATURE:

When the "Match Feature" is ON, a random number appears in the ten's digit of the "Match/Ball in Play" window and the word "Match" is illuminated. If the number matches the ten's digit in a player's score, a free game is awarded. The "Match Feature" creates an incentive to play.

MATCH	MPU SWITCH 21
ON	ON
OFF	OFF

100th GAME FREE CREDIT:

Every 100th game the game will award one free game.

AWARD	MPU SWITCH 5
YES	ON
NO	OFF

ADD-A-BALL:

	MPU SWITCH 23
ON	ON
OFF	OFF

TALKING:

	MPU SWITCH 17
YES	ON
NO	OFF

PARTS LIST
ORBITOR

MISCELLANEOUS	PART NUMBER
Transformer (Domestic or Export)	16B-6
Transformer & Rectifier Board	B438-4
Bulbs, #44	8A-101
U1	E165-U1 OR 25
U2	E165-U2 OR 25
U5	E165-U5 OR 25
U6	E165-U6 OR 25
U9 Voice E-Prom	E165-U9
U10 Voice E-Prom	E165-U10

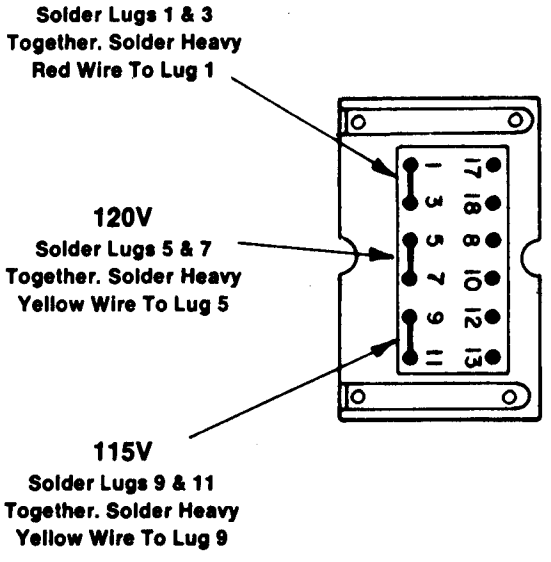
ASSEMBLY COILS	
Drop Target Bank (1)	B-24-1600
3 Drop Target Bank (2)	B-27-2300
Flippers (2)	J-25-475/34-4500
Ball Ejector Release (1)	J-28-2300
Ball Trap (1)	N-26-1200
Knocker (1)	N-26-1200
Drop Target (7)	C1-31-1600

MODULES	
Optic Bds. (2)	A-2119
Lamp Driver	B-431
Display Driver	A-645
Match, Ball in Play Display & Playfield Bonus Timer	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

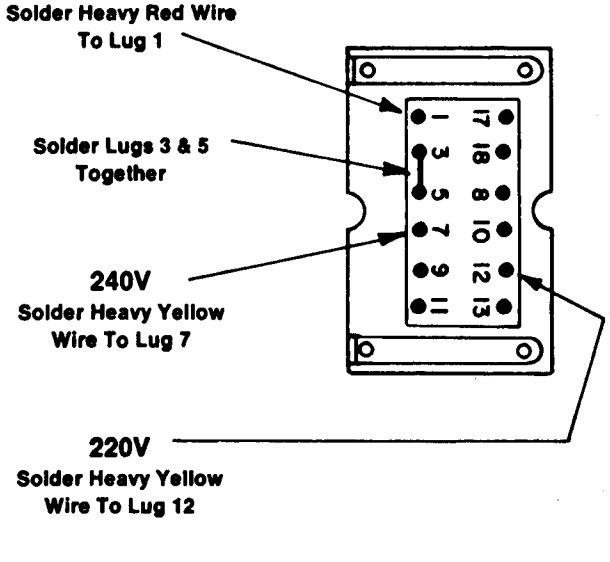
PLAYFIELD PARTS — SEE PLAYFIELD DIAGRAM

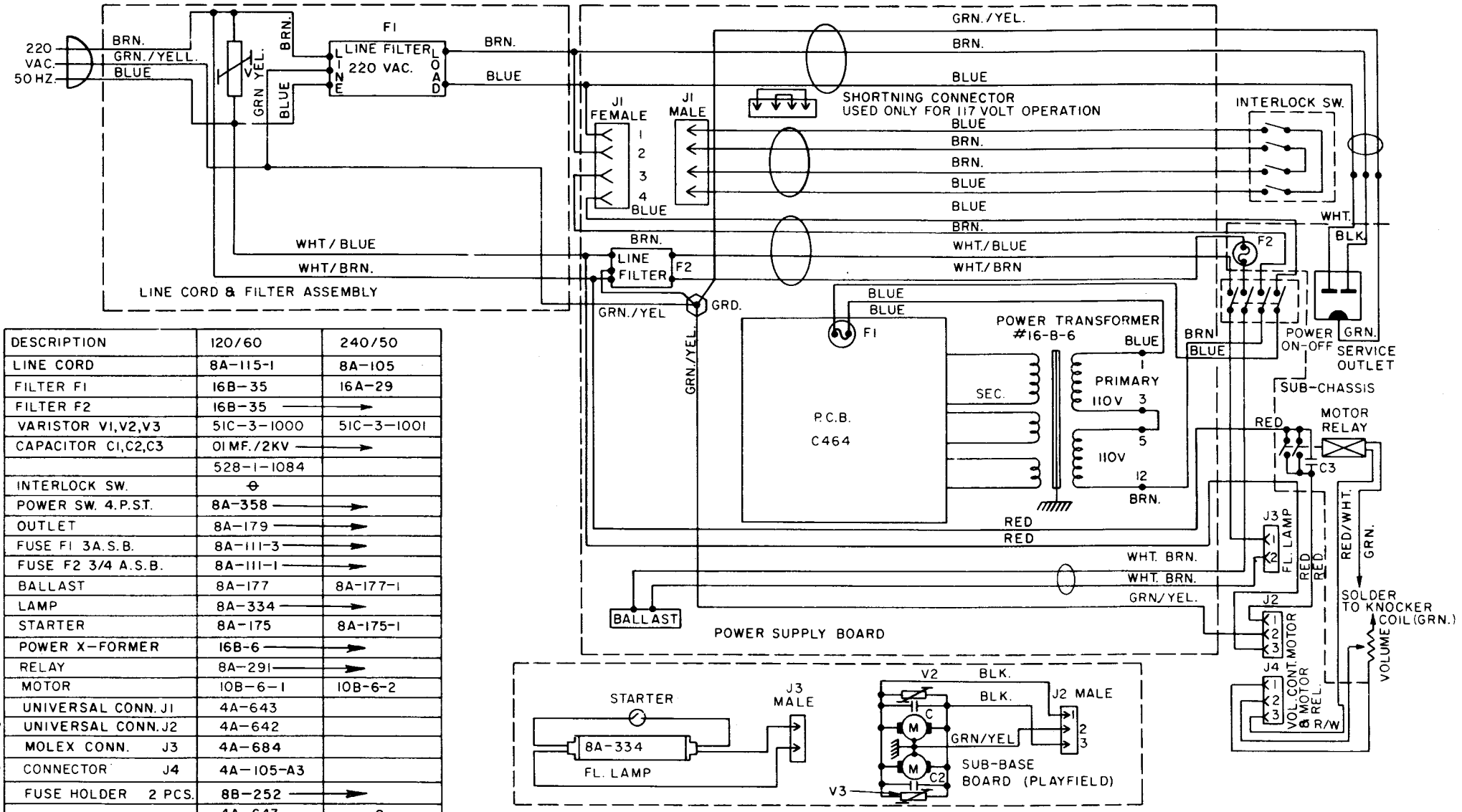
FIGURE 8-1. STERN 16B-6 TRANSFORMER WIRING CONNECTION INSTRUCTIONS

115/120V., 50/60 Cycle Input.
Varistor - Soldered to Line Filter on Back of Cabinet
Must Be Stern Part No. 25A-18-1.

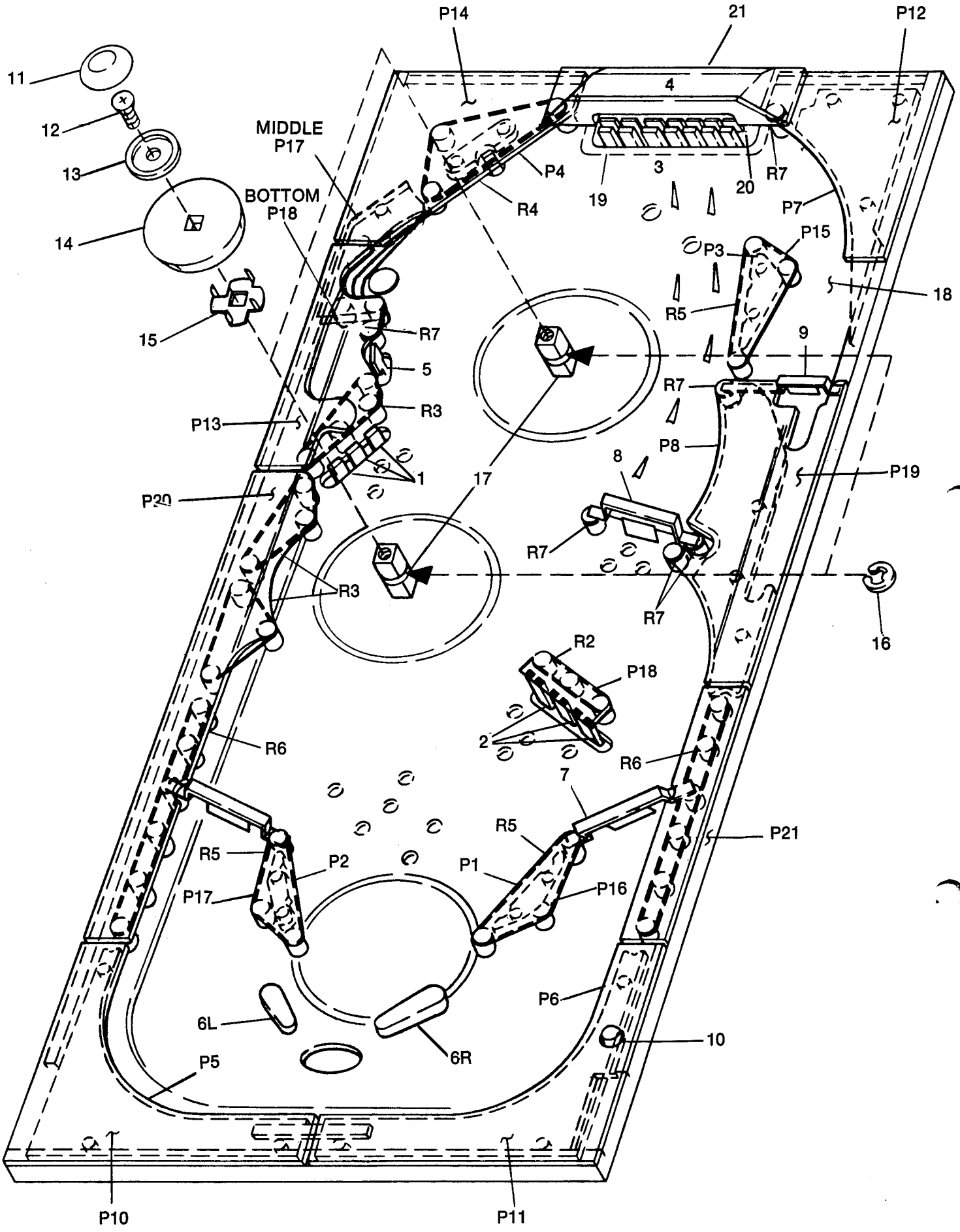


220/240V., 50/60 Cycle Input.
Varistor - Soldered to Line Filter on Back of Cabinet
Must be Stern Part No. 25A-18-2.





DESCRIPTION	120/60	240/50
LINE CORD	8A-115-1	8A-105
FILTER F1	16B-35	16A-29
FILTER F2	16B-35 →	
VARISTOR V1,V2,V3	51C-3-1000	51C-3-1001
CAPACITOR C1,C2,C3	01 MF./2KV →	
	528-1-1084	
INTERLOCK SW.	⊖	
POWER SW. 4.P.S.T.	8A-358 →	
OUTLET	8A-179 →	
FUSE F1 3A.S.B.	8A-111-3 →	
FUSE F2 3/4 A.S.B.	8A-111-1 →	
BALLAST	8A-177	8A-177-1
LAMP	8A-334 →	
STARTER	8A-175	8A-175-1
POWER X-FORMER	16B-6 →	
RELAY	8A-291 →	
MOTOR	10B-6-1	10B-6-2
AMP. UNIVERSAL CONN. J1	4A-643	
AMP. UNIVERSAL CONN. J2	4A-642	
MOLEX CONN. J3	4A-684	
AMP. CONNECTOR J4	4A-105-A3	
FUSE HOLDER 2 PCS.	8B-252 →	
	4A-643	⊖
INSULATING SLEEVE	4A-725 →	


P14
21
P12
11
12
13
14
15
MIDDLE
P17
BOTTOM
P18
4
3
19
20
R7
P4
R4
P7
P15
P3
18
R5
9
R7
5
R3
P13
P8
8
P19
1
17
P20
R7
R3
R7
16
R2
P18
2
R6
R6
7
R5
P21
R5
P2
P1
P16
P17
P6
6L
6R
10
P5
P10
P11

ORBITOR
PLAYFIELD PARTS LIST

RUBBER RINGS

R1-7A-120-175
R2-7A-120-200
R3-7A-120-250
R4-7A-120-300
R5-7A-120-500
R6-7A-135

PLAYFIELD PLASTIC ASSEMBLIES

A-2161 THRU A-2164
(P1 THRU P4)
C-2156 AND C-2157
(P5 AND P6)
C-2159 AND C-2160
(P7 AND P8)

PLAYFIELD PLASTIC SHIELDS

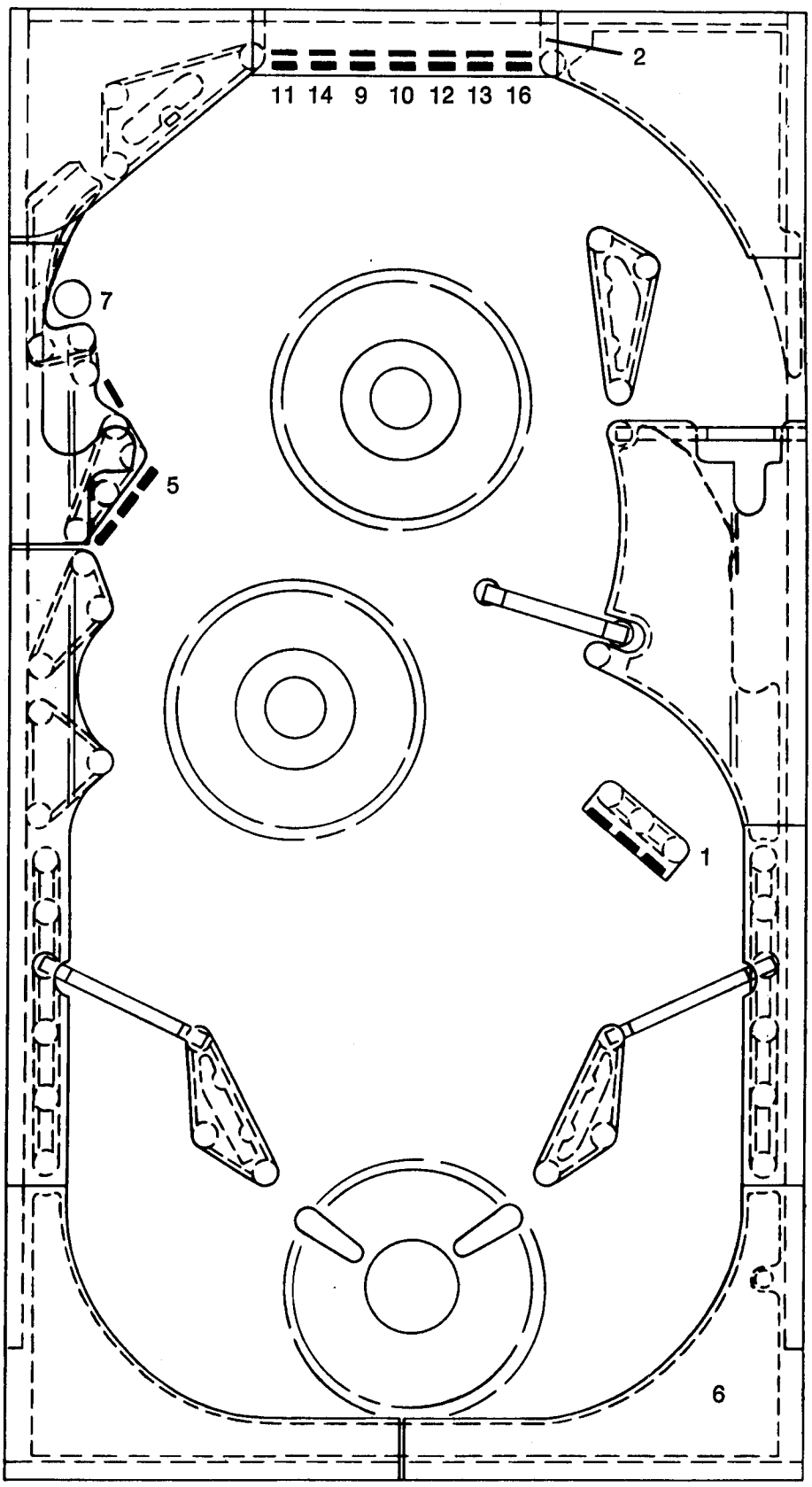
13C-165-1 THRU -4
(P10 THRU P13)
13C-165-9 THRU 18
(P14 THRU P21)

OTHER PARTS AND ASSEMBLIES

1. 3-Bank Drop Target
   D-2140-3-A1 (Left)
2. 3-Bank Drop Targets
   D-2140-3-B1 (Right)
   4B-195-3Y (Targets Only)
3. 7-Bank Drop Target
   D-2184-7A (Top)
   4B-195-3B (Targets Only)
4. Stand-up Target Assembly B-2186
5. Stand-up Target Assembly B-2192
6. Flipper Assemblies
   B-634-5LY and B-634-5RY
   (Lt. and Rt.)
7. Lane Gate Assembly A-2181
8. Spin Target Assembly A-563-4
9. Up-ramp Gate Assembly A-2216
10. Ball Shooter Light Indicator
    A-890
11. Screw Cap 4A-463
12. ¼ - 20x½" Flat Hd. Screw
    31B-249
13. Screw Cap Washer 3A-213
14. Motor Wheel 7A-147
15. Drive Cleat 1A-2098
16. Retaining Ring 17A-104-37
17. Motor Assemblies C-2152
    (Clockwise) or C-2153
    (Counterclockwise)
18. Clear Playfield 4D-440
19. Sub-strate 4D-441
20. Marquee 13C-54
21. Light Housing B-2182

ORBITOR

SOLENOIDS

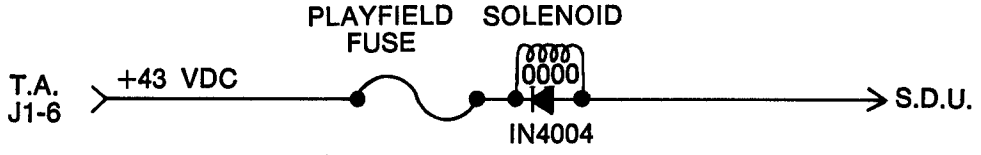


SOLENOID NOT ON PLAYFIELD

3. KNOCKER
15. FLIPPER ENABLE RELAY
18. ROTOR WHEEL ENABLE RELAY ON LOWER BOARD

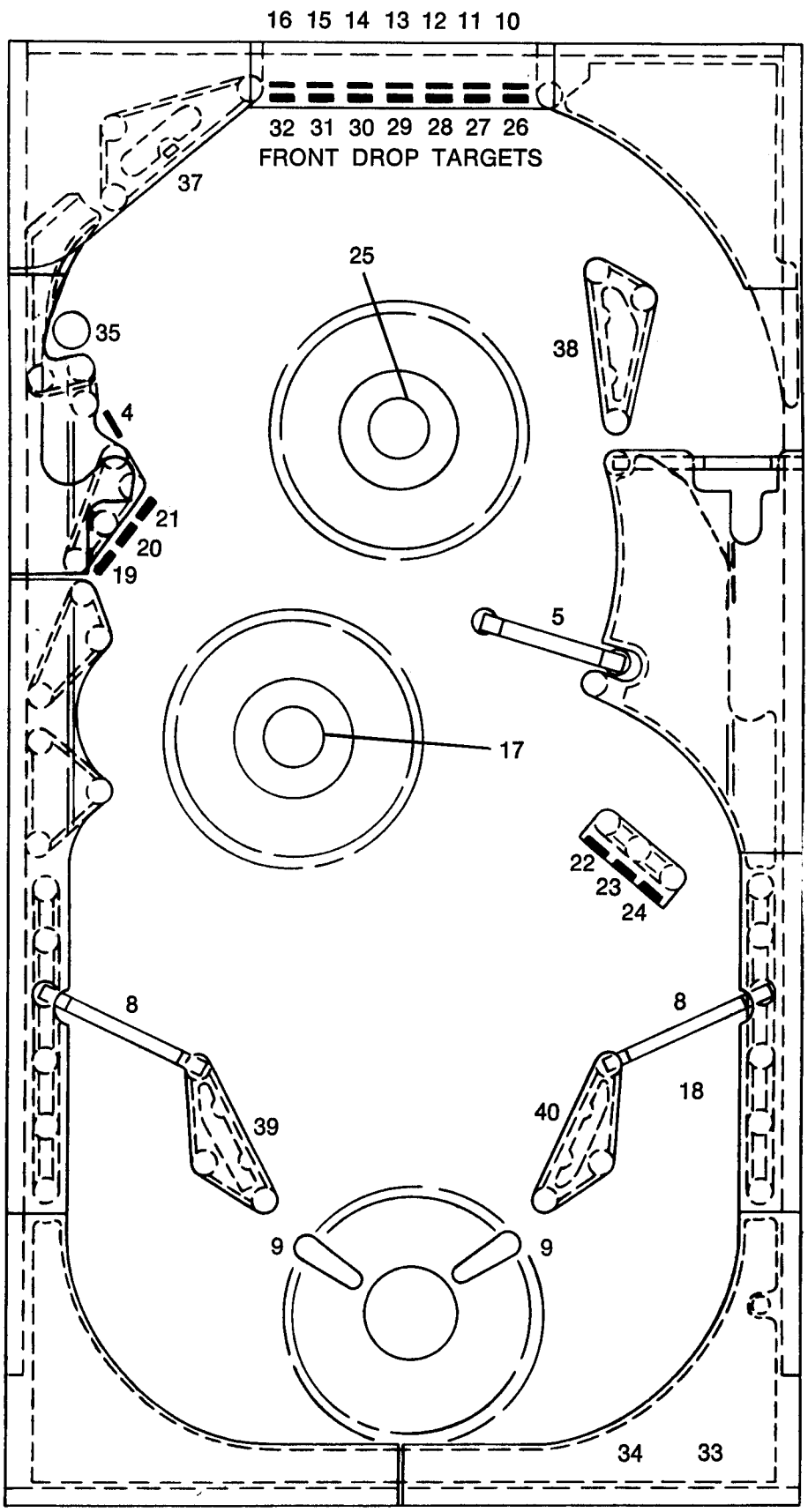
TABLE 8-3. ORBITOR SOLENOID IDENTIFICATION

I.D. NUMBER	TRANS. NUMBER	SDU JACK	WIRE COLOR	DESCRIPTION
1	Q1	J2-9	G-O	Right Drop Target
2	Q2	J2-4	G-BLU	Top Drop Target
3	Q3	J2-5	G-B	Knocker
4	Q4	J1-5	N/U	N/U
5	Q5	J2-10	G-Y	Left Drop Target
6	Q6	J2-11	G-R	Outhole
7	Q7	J2-12	R-Y	Multi-Ball Holder
8	Q8	J5-10	N/U	N/U
9	Q9	J5-9	R-BLU	Drop Target "B"
10	Q10	J5-15	O-W	Drop Target "I"
11	Q11	J5-14	O-B	Drop Target "O_2"
12	Q12	J5-13	O-G	Drop Target "T"
13	Q13	J5-12	B-Y	Drop Target "O_1"
14	Q14	J5-11	B-G	Drop Target "R_1"
15	Q15	J1-8, 9	8G, 9-0	Flipper Enable Relay
16	Q16	J5-8	G-W	Drop Target "R_2"
17	Q17	N/U	N/U	N/U
18	Q18	J2-15	R-W	Rotor Wheel Enable Relay
19	Q19	J2-8	N/U	N/U



ORBITOR

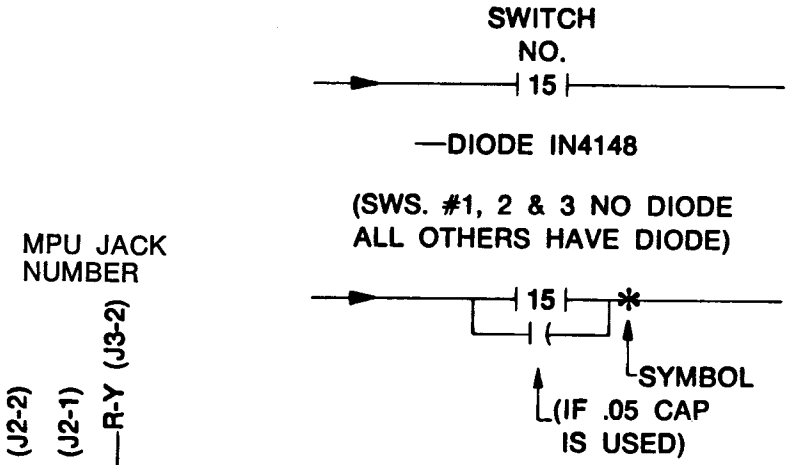
SWITCHES



SWITCHES NOT ON PLAYFIELD

1. LEFT COIN CHUTE
2. CENTER COIN CHUTE
3. RIGHT COIN CHUTE
6. CREDIT BUTTON
7. TILT

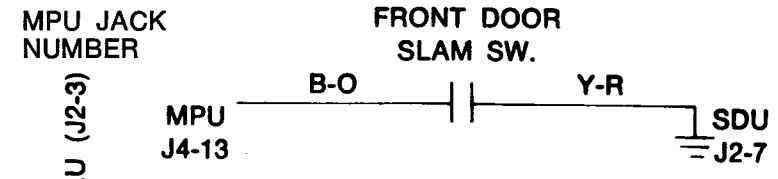
TABLE 8-2. ORBITOR SWITCH IDENTIFICATION



MPU JACK NUMBER

BRN-W (J2-2) · W-R (J2-1) · R-Y (J3-2)

SWITCH NO.		WIRE COLOR	JACK NO.	DESCRIPTION
1		BLU	J3-9	Coin Chute #1
2		BRN-W	J3-10	Coin Chute #2
3		R-W	J3-11	Coin Chute #3
4	*	W-B	J2-11	Incr. Spinner Value
5		W-G	J2-12	Spinner
6		BLU-W	J3-14	Credit Button
7		BLU-O	J3-15	Tilt
8	*	-O-	J2-15	Left & Right Bottom Gate
9		BRN	J2-8	Flipper Time Check
10	*	GREY	J2-9	Stand Up Target "R_2"
11	*	W-O	J2-10	Stand Up Target "O_1"
12	*	W-B	J2-11	Stand Up Target "T"
13	*	W-G	J2-12	Stand Up Target "I"
14	*	W-BRN	J2-13	Stand Up Target "B"
15	*	BRN-Y	J2-14	Stand Up Target "R_2"
16	*	-O-	J2-15	Stand Up Target "O_1"



Y-R (J2-5) · W-Y (J2-4) · W-BLU (J2-3)

SWITCH NO.		WIRE COLOR	JACK NO.	DESCRIPTION
17		BRN	J2-8	Lower Rotor
18	*	GREY	J2-9	Ball Lane
19		W-O	J2-10	L. Bank Left
20		W-B	J2-11	L. Bank Mid.
21		W-G	J2-12	L. Bank Right
22		W-BRN	J2-13	R. Bank Left
23		BRN-Y	J2-14	R. Bank Mid.
24		-O-	J2-15	R. Bank Right
25		BRN	J2-8	Upper Rotor
26		GREY	J2-9	Drop Target "R_2"
27		W-O	J2-10	Drop Target "O_1"
28		W-B	J2-11	Drop Target "T"
29		W-G	J2-12	Drop Target "I"
30		W-BRN	J2-13	Drop Target "B"
31		BRN-Y	J2-14	Drop Target "R_2"
32		-O-	J2-15	Drop Target "O_1"
33		BRN	J2-8	Out Hole Right
34		GREY	J2-9	Out Hole Left
35		W-O	J2-10	Ball Holder
36		W-B	J2-11	N/U
37	*	W-G	J2-12	Top Left Bumper
38	*	W-BRN	J2-13	Top Right Bumper
39	*	BRN-Y	J2-14	Bottom Left Bumper
40	*	-O-	J2-15	Bottom Right Bumper

TABLE 8-4. 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		U5	
ROM Stern #25A-	**E-PROMS** (paper on top)	**ROM**	**E-PROM**
E9 to E8	E9 to E10	E19 to E20	E19 to E21
E28 to E26	E28 to E27	E29 to E31	E29 to E30
U2		**U6**	
ROM	**E-PROM**	**ROM**	**E-PROM**
E5 to E1	E5 to E7	E13 to E12	E13 to E14
E2 to E6	E2 to E3	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:

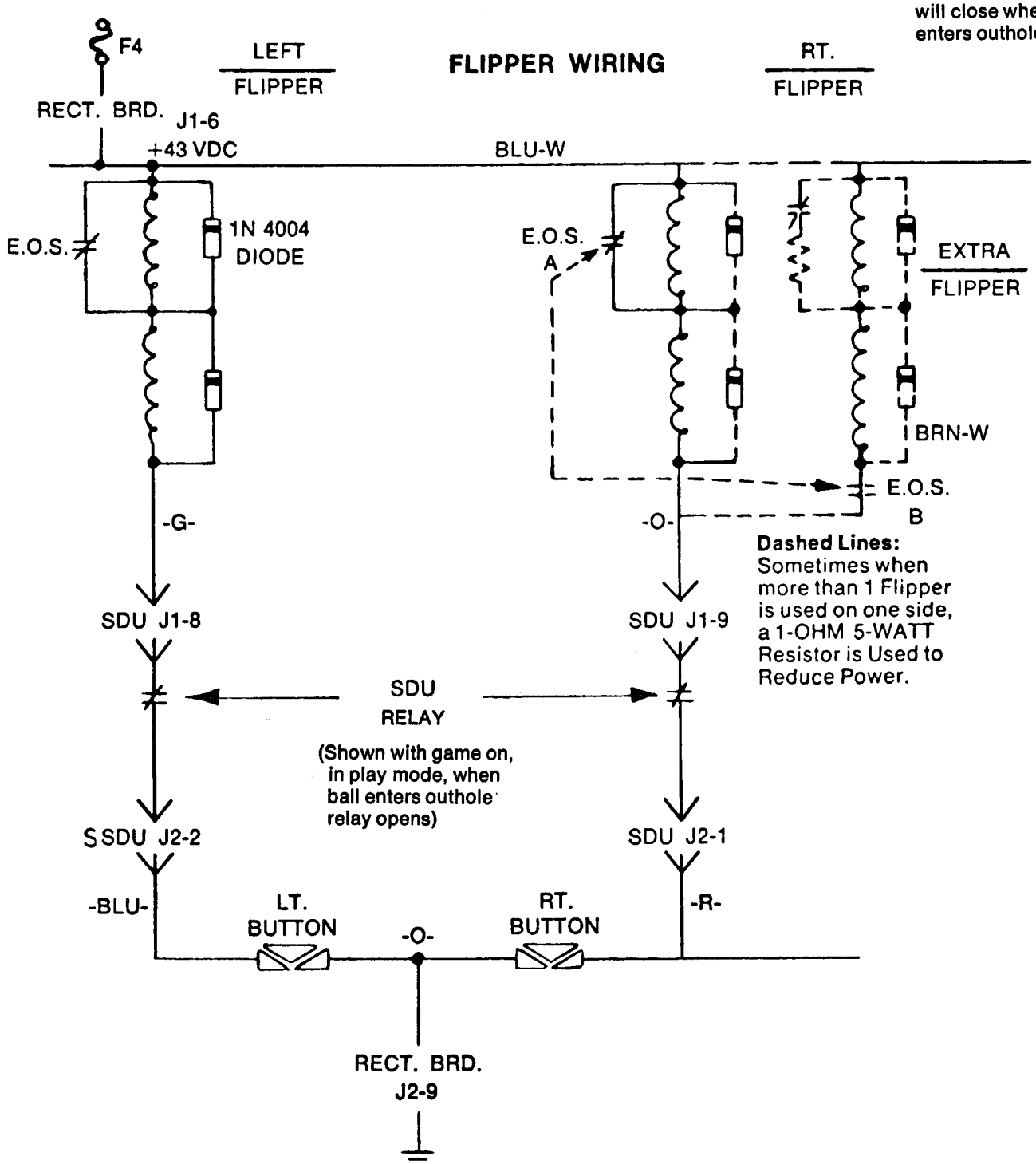
Remove - E32 - E33
Remove - E34 - E35

U2

ROM
E5 to E7

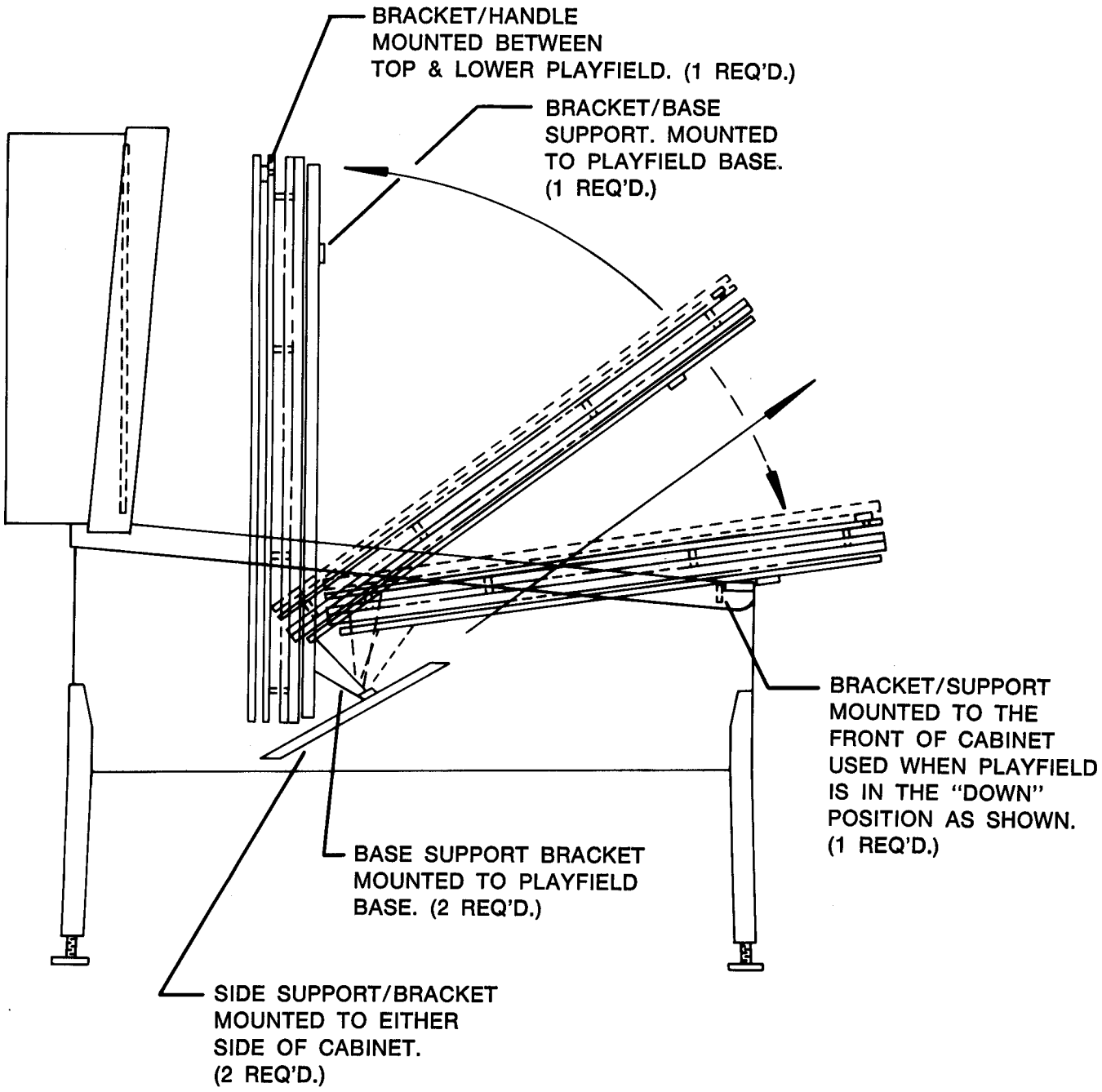
ROM
E11 to E13

U6 (With game on, in play mode-relay located in backbox above flipper will close when ball enters outhole)

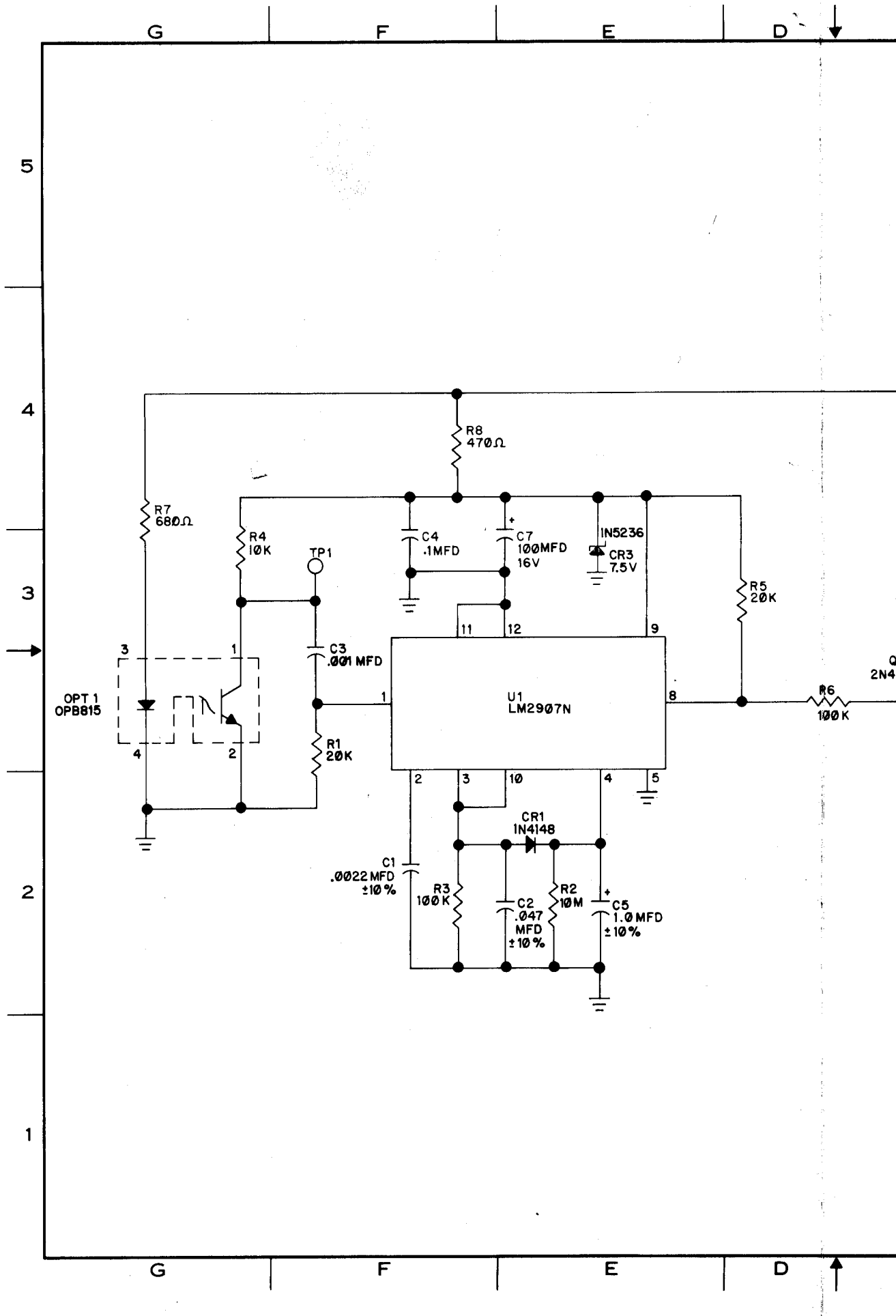


Dashed Lines: Sometimes when more than 1 Flipper is used on one side, a 1-OHM 5-WATT Resistor is Used to Reduce Power.

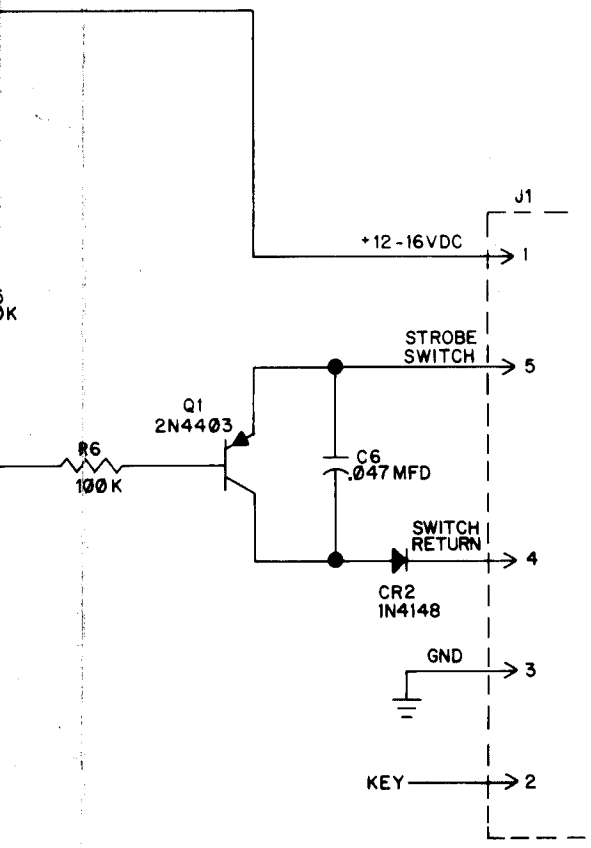
FIGURE 8-4. ADDITIONAL FLIPPER WIRING



SOLID ARROW SHOWS PLAYFIELD IN "UP" POSITION.
DOTTED ARROW SHOWS PLAYFIELD IN "DOWN" POSITION.
DIRECTION ARROW INDICATES HOW PLAYFIELD IS PULLED OUT OF CABINET FOR SERVICE EITHER UP OR DOWN.


G
F
E
D
5
4
3
2
1
R8
470Ω
R7
680Ω
R4
10K
TP1
C4
.1MFD
C7
100MFD
16V
1N5236
CR3
7.5V
R5
20K
C3
.001 MFD
OPT 1
OPB815
U1
LM2907N
R6
100K
R1
20K
CR1
1N4148
C1
.0022MFD
±10%
R3
100K
C2
.047
MFD
±10%
R2
10M
C5
1.0MFD
±10%

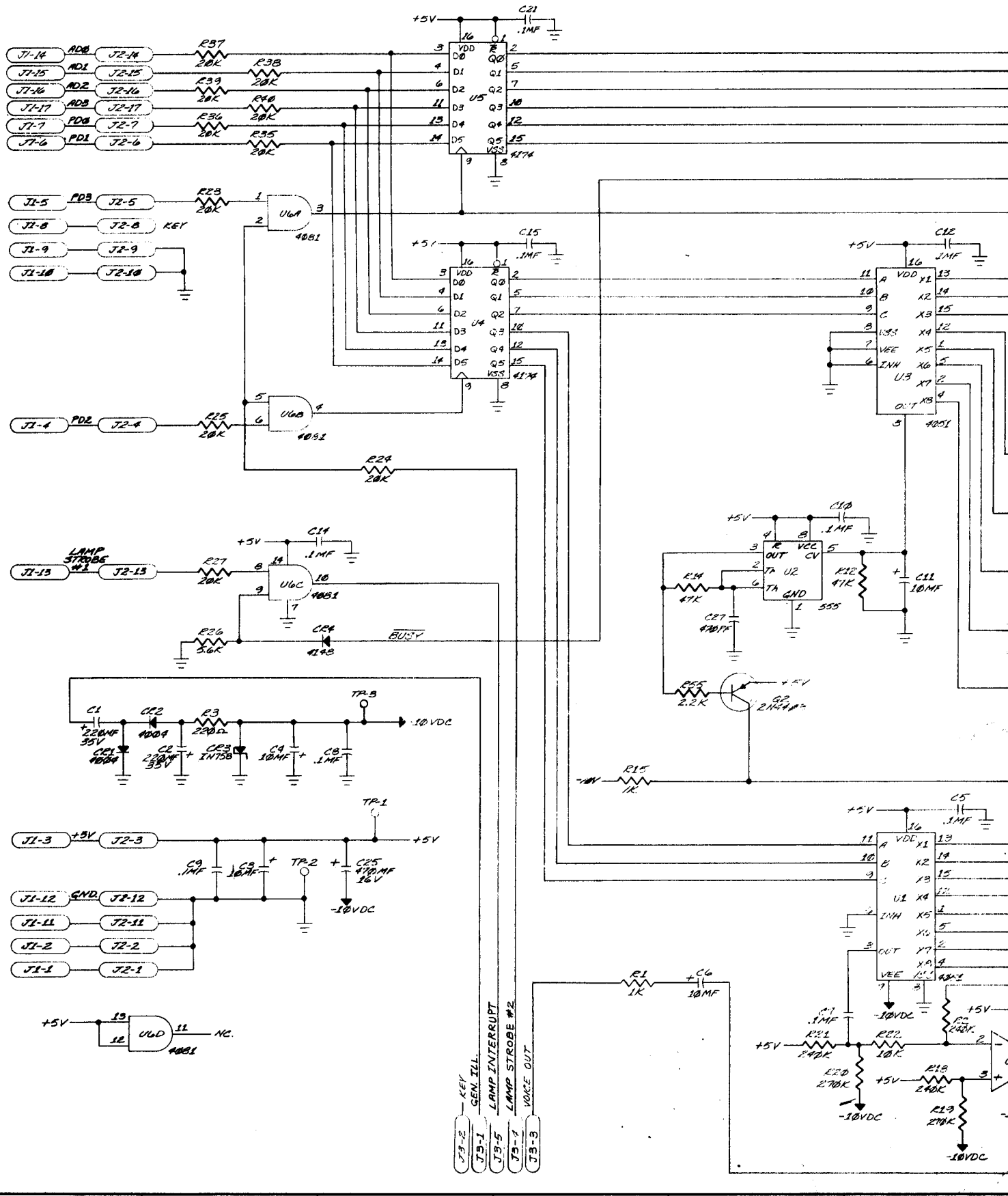
REVISIONS				
SYM	DESCRIPTION	DR'T DATE	CHK DATE	APPD DATE
A	TO ISSUE E.I. 01434	PMS 1-4-82		
B	CR3 ADDED, 2917 CHANGED TO 2907, TO INCORPORATE LATEST DESIGN CHANGES. E.I.01565	PMS 2-21-82		

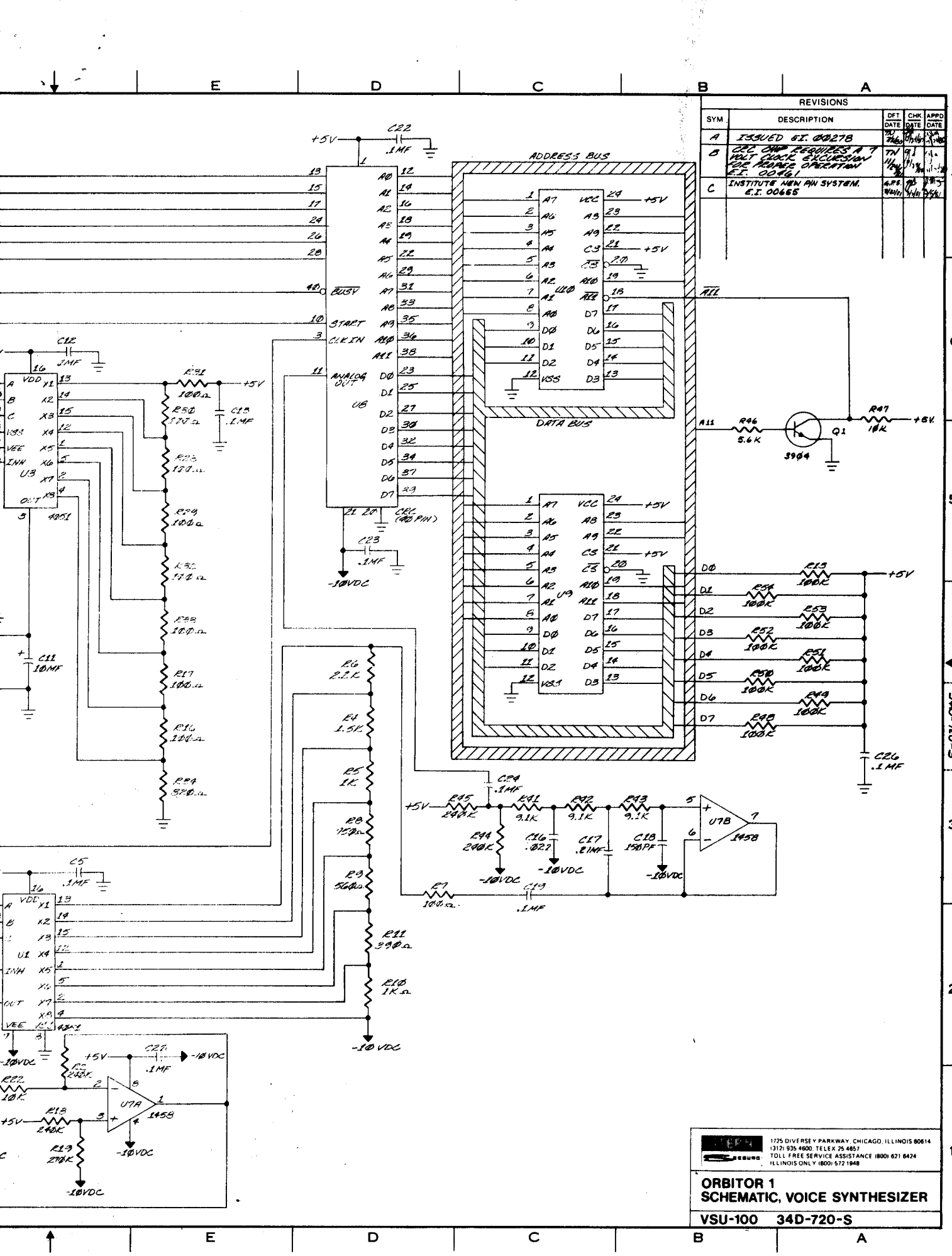


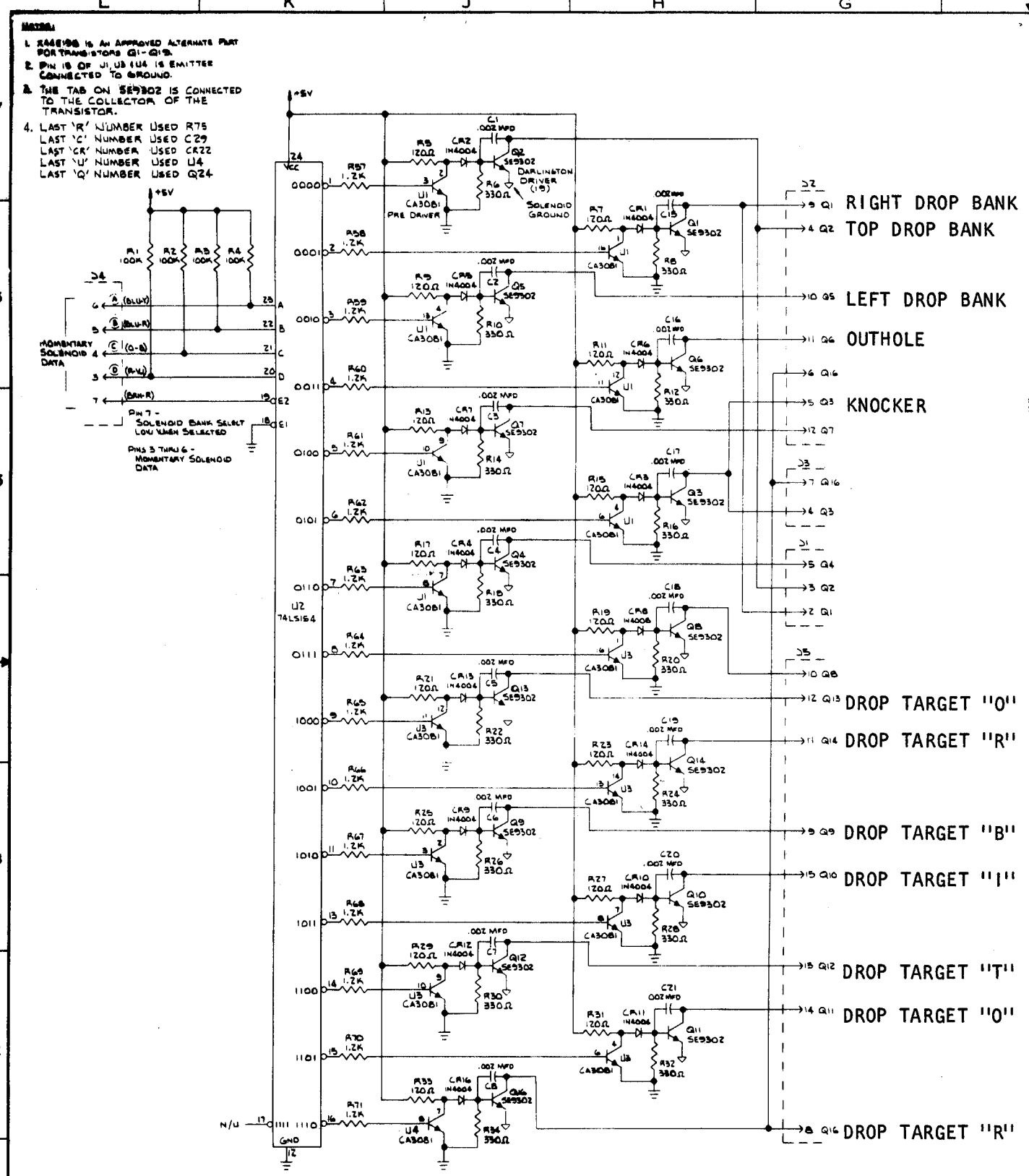
SH 1 OF 1
34C-2119-S

STERN SEEBURG
1725 DIVERSEY PARKWAY, CHICAGO, ILLINOIS 60614
(312) 935-4600, TELEX 25-4657
TOLL FREE SERVICE ASSISTANCE (800) 621-6424
ILLINOIS ONLY (800) 572-1948

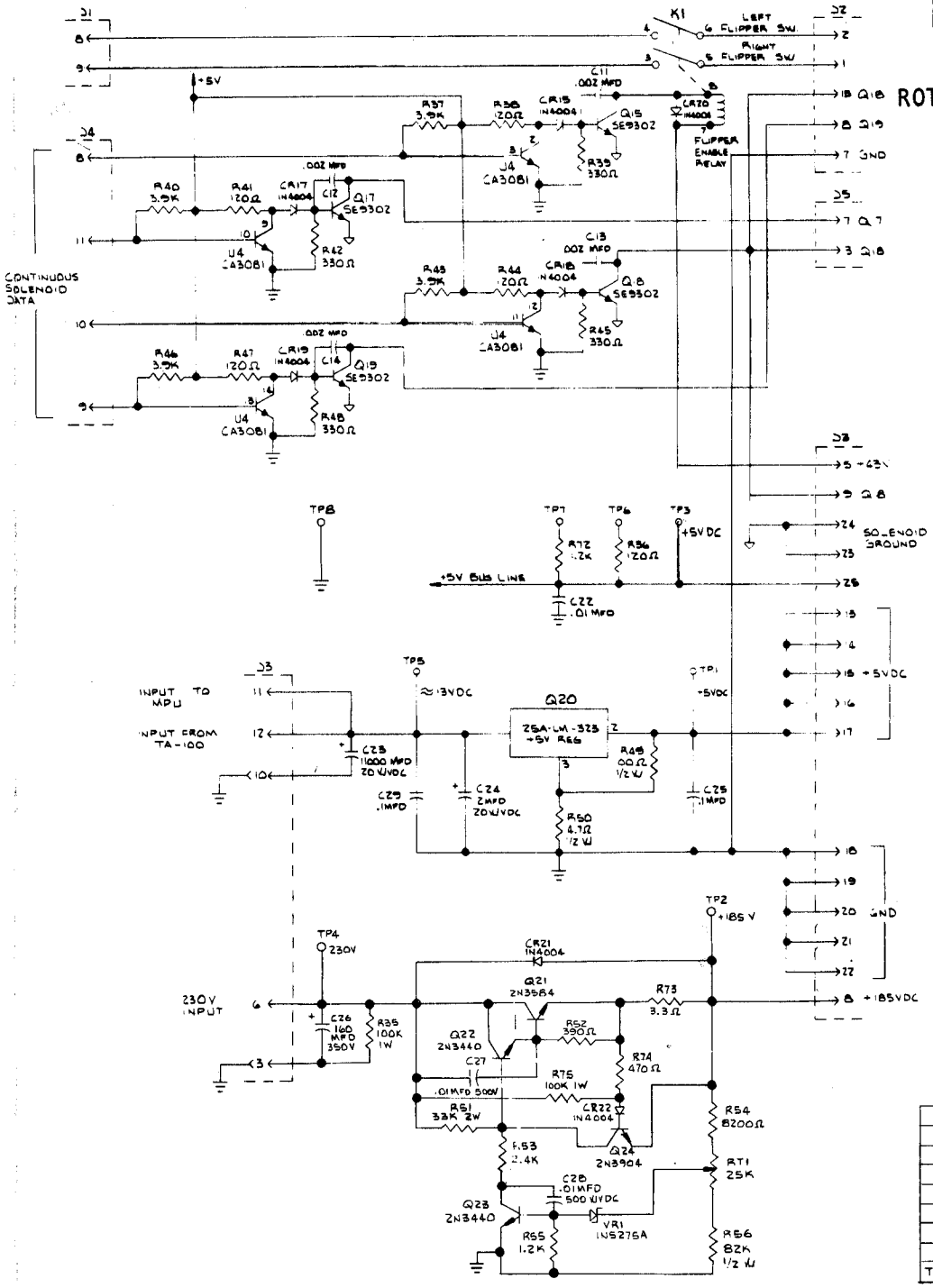
ORBITOR 1
SCHEMATIC, ROTOR SENSOR P.C. BOARD
RS-100 34C-2119-S


J1-14 AD0 J2-14
J1-15 AD1 J2-15
J1-16 AD2 J2-16
J1-17 AD3 J2-17
J1-7 PD0 J2-7
J1-6 PD1 J2-6
R37 20K
R38 20K
R39 20K
R40 20K
R36 20K
R35 20K
+5V
C21 .1MF
U5
4174
J1-5 PD3 J2-5
J1-8 J2-8 KEY
J1-9 J2-9
J1-10 J2-10
R23 20K
U6A
4081
C15 .1MF
U4
J1-4 PD2 J2-4
R25 20K
U6B
4081
R24 20K
C12 .1MF
U3
4051
J1-13 LAMP STROBE #2 J2-13
R27 20K
C11 .1MF
U6C
4081
R26 5.6K
CR4 4148
BUSY
C10 .1MF
U2
555
R14 47K
R12 47K
C11 10MF
C27 470PF
R55 2.2K
Q2 2N4401
-10V
R15 1K
TP-3
C1 220MF 35V
CR2 4004
R3 220Ω
CR1 4004
C2 220MF 35V
CR3 IN758
C4 10MF
C8 .1MF
+10VDC
TP-1
J1-3 +5V J2-3
+5V
C9 .1MF
C3 10MF
TP-2
C25 470MF 16V
-10VDC
J1-12 GND J2-12
J1-11 J2-11
J1-2 J2-2
J1-1 J2-1
C5 .1MF
U1
R1 1K
C6 10MF
C7 .1MF
R21 240K
R22 10K
R20 270K
R18 240K
R19 270K
J3-2 KEY
J3-1 GEN. ILL.
J3-5 LAMP INTERRUPT
J3-4 LAMP STROBE #2
J3-3 VOICE OUT
U6D
4081
NC.


REVISIONS
SYM
DESCRIPTION
DFT DATE
CHK DATE
APPD DATE
A
ISSUED E.I. 00278
B
CRL CHIP REQUIRES A 1 VOLT CLOCK EXCLUSION FOR REFRESH OPERATION E.I. 00416
C
INSTITUTE NEW P/N SYSTEM. E.I. 00665
ADDRESS BUS
DATA BUS
+5V
-10VDC
U3
U8
U9
U7A
U7B
1458
4051
3904
Q1
C22 .1MF
C12 .1MF
C13 .1MF
C23 .1MF
C11 10MF
C5 .1MF
C24 .1MF
C26 .1MF
C27 .1MF
C19 .1MF
C16 .022
C17 .2MF
C18 150PF
R31 100Ω
R30 330Ω
R29 100Ω
R28 330Ω
R27 100Ω
R26 100Ω
R25 330Ω
R6 2.2K
R4 1.5K
R5 1K
R8 150Ω
R9 560Ω
R11 390Ω
R10 1KΩ
R45 240K
R41 9.1K
R42 9.1K
R43 9.1K
R44 240K
R7 100Ω
R22 10K
R18 240K
R19 270K
R46 5.6K
R47 10K
R13 100K
R14 100K
R15 100K
R16 100K
R17 100K
R48 100K
CRC (40 PIN)
1725 DIVERSEY PARKWAY, CHICAGO, ILLINOIS 60614
(312) 935 4600. TELEX 25 4657
TOLL FREE SERVICE ASSISTANCE (800) 621 8424
ILLINOIS ONLY (800) 572 1948
ORBITOR 1
SCHEMATIC, VOICE SYNTHESIZER
VSU-100 34D-720-S
34D-720-S


NOTES:
1. RA4198 IS AN APPROVED ALTERNATE PART FOR TRANSISTORS Q1-Q15.
2. PIN 16 OF U1, U3 & U4 IS EMITTER CONNECTED TO GROUND.
3. THE TAB ON SE9302 IS CONNECTED TO THE COLLECTOR OF THE TRANSISTOR.
4. LAST 'R' NUMBER USED R75
LAST 'C' NUMBER USED C29
LAST 'CR' NUMBER USED CR22
LAST 'U' NUMBER USED U4
LAST 'Q' NUMBER USED Q24
+5V
R1 100K
R2 100K
R3 100K
R4 100K
J4
MOMENTARY SOLENOID DATA
PIN 7 - SOLENOID BANK SELECT LOW WHEN SELECTED
PINS 3 THRU 6 - MOMENTARY SOLENOID DATA
U2 74LS164
U1 CA3081 PRE DRIVER
DARLINGTON DRIVER (19)
SOLENOID GROUND
RIGHT DROP BANK
TOP DROP BANK
LEFT DROP BANK
OUTHOLE
KNOCKER
DROP TARGET "O"
DROP TARGET "R"
DROP TARGET "B"
DROP TARGET "I"
DROP TARGET "T"
DROP TARGET "O"
DROP TARGET "R"
CONTINUOUS SOLENOID DATA

REVISIONS				
SYM	DESCRIPTION	E.I. DATE	ENGR DATE	APPD DATE
A	ISSUED, E.C.R A-009	2-5		
B	DWG. CHG E.I. 00110	5.		
C	INSTITUTE NEW P/N SYSTEM. E.I. 00655	6-8		



TP8	GROUND
TP7	PRE DRIVER BASE PROBE
TP6	DARLINGTON BASE PROBE
TP5	+13V DC Q20 UNREGULATED INPUT
TP4	+230V DC Q21 UNREGULATED INPUT
TP3	+5V DC BUS LINE
TP2	+18.5V DC Q21 REGULATOR OUTPUT
TP1	+5V DC Q20 REGULATOR OUTPUT
TEST POINT	CONNECTION

STERN SLEBURG
1725 DIVERSEY PARKWAY, CHICAGO, ILLINOIS 60614
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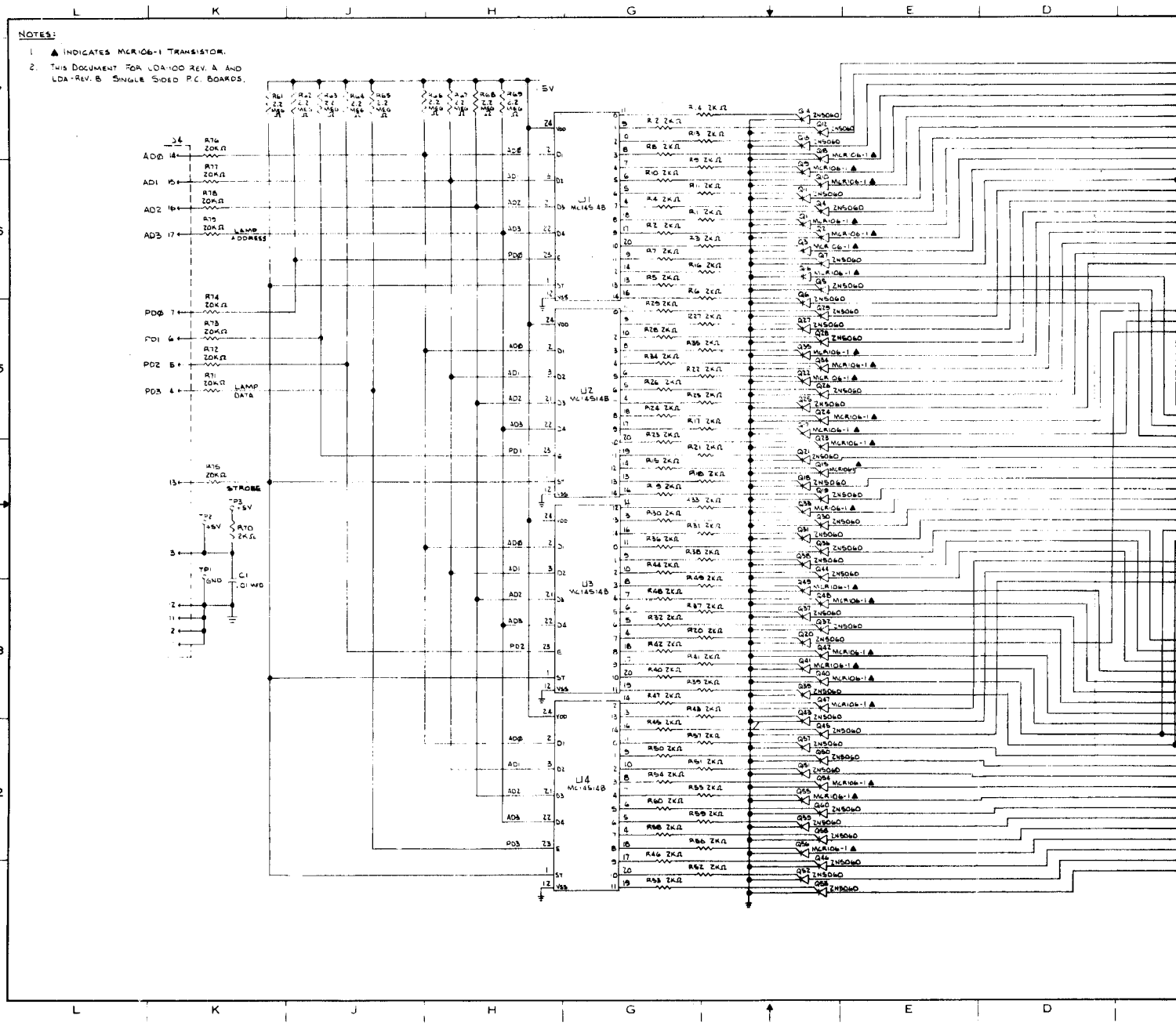
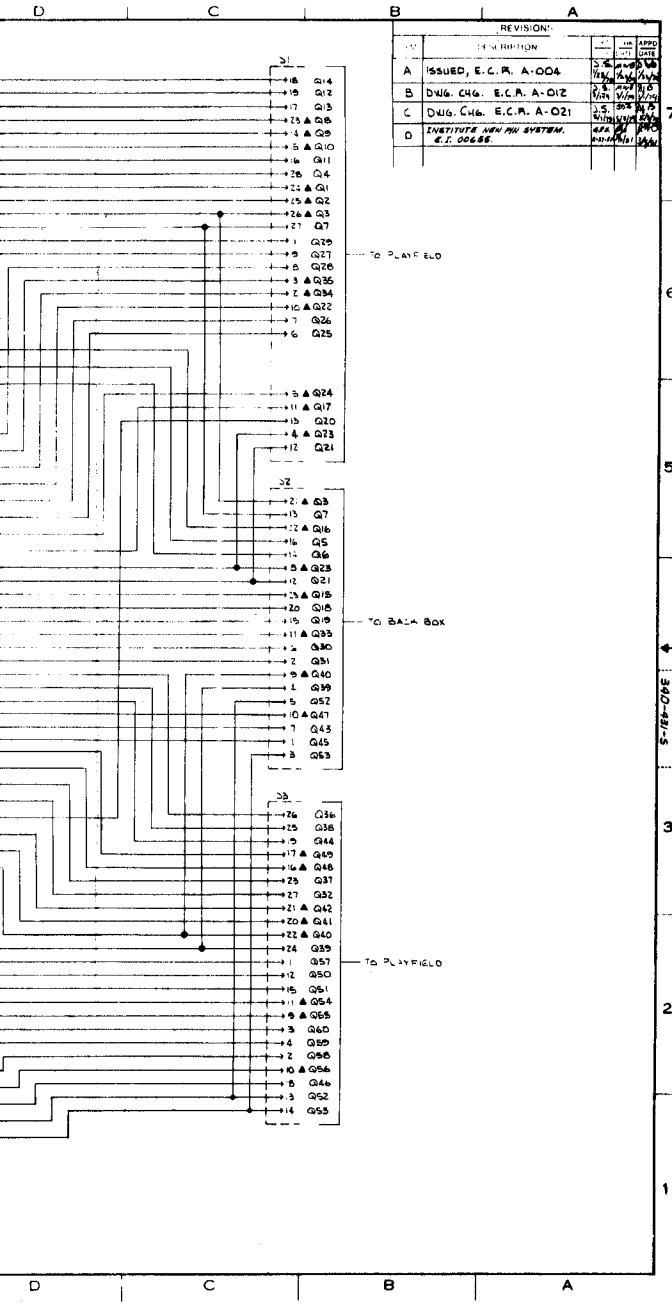
ILLINOIS ONLY (800) 572-1948

ORBITOR 1
SCHEMATIC, SOLENOID DRIVER P.C. BOARD
SPU-100 34D-432-S

34D-432-S


NOTES:
1. ▲ INDICATES MCR106-1 TRANSISTOR.
2. THIS DOCUMENT FOR LDA-100 REV. A AND LDA-REV. B SINGLE SIDED P.C. BOARDS.
LAMP ADDRESS
LAMP DATA
STROBE
U1 MC14514B
U2 MC14514B
U3 MC14514B
U4 MC14514B

ORBITOR 1



DESCRIPTION	WIRE COLOR	JACK LDA	PIN NO.	TRANSISTOR	I.C.	PIN	CODE
S.U. TARGET "O"	BLU-R	J1	18	Q14	U1	11	0000
S.U. TARGET "R"	O-R	J1	1	Q29	U2	11	0000
S.U. TARGET "B"	BLU-Y	J3	26	Q36	U3	11	0000
S.U. TARGET "I"	W-BLU	J3	1	Q57	U4	11	0000
S.U. TARGET "O"	GREY-B	J1	9	Q27	U2	9	0001
S.U. TARGET "R"	R-Y	J3	25	Q38	U3	9	0001
RIGHT BANK L. DROP TARGET	BLU-W	J3	12	Q50	U4	9	0001
RIGHT BANK MID. DROP TARGET	G-R	J1	17	Q13	U1	10	0010
RIGHT BANK R. DROP TARGET	B-G	J1	8	Q28	U2	10	0010
LEFT BANK L. DROP TARGET	BLU-O	J3	19	Q44	U3	10	0010
LEFT BANK MID. DROP TARGET	W-B	J3	15	Q51	U4	10	0010
LEFT BANK R. DROP BANK	BRN-BLU	J1	23	Q8	U1	8	0011
LEFT SPECIAL BY RIGHT DROP BANK	R-G	J1	14	Q9	U1	7	0100
GREEN SHOOT AGAIN	Y-BLU	J1	2	Q34	U2	7	0100
SPECIAL DROP TARGET	O	J3	3	Q60	U4	6	0101
S.U. TARGET "T"	O-W	J1	19	Q12	U1	9	0001
SHOOT AGAIN (BACK BOX)	BRN-B	J2	23	Q15	U2	14	1100
3000/SPIN BY SPINNER	BRN-B	J1	24	Q1	U1	18	1000
3000/SPIN BY SPINNER	PUR-W	J1	5	Q24	U2	18	1000
3000/SPIN BY SPINNER	G-B	J3	21	Q42	U3	18	1000
MULTIPLIER 1X	O-B	J3	10	Q56	U4	18	1000
MULTIPLIER 2X	B-BLU	J1	25	Q2	U1	17	1001
MULTIPLIER 3X	B-O	J1	11	Q17	U2	17	1001
MULTIPLIER 4X	W-O	J3	20	Q41	U3	17	1001
MULTIPLIER 5X	R-BLU	J3	18	Q46	U4	17	1001
SHOOT AGAIN	GREY-R	J1	26	Q3	U1	20	1010
EXTRA BALL	GREY-R	J2	21	Q3	U1	20	1010
HIGH SCORE TO DATE	GREY-O	J2	22	Q16	U1	14	1100
GAME OVER & HIGH GAME TO DATE	GREY-W	J2	11	Q33	U3	14	1100
TILT	GREY-B	J2	10	Q47	U4	14	1100
100th GAME	O	J2	20	Q18	U2	13	1100
100th GAME	Y	J2	6	Q30	U3	13	1100
EXTRA BALL SPECIAL	R-W	J2	14	Q6	U1	16	1110
MATCH	GREY-Y	J2	1	Q45	U4	16	1110

R 1

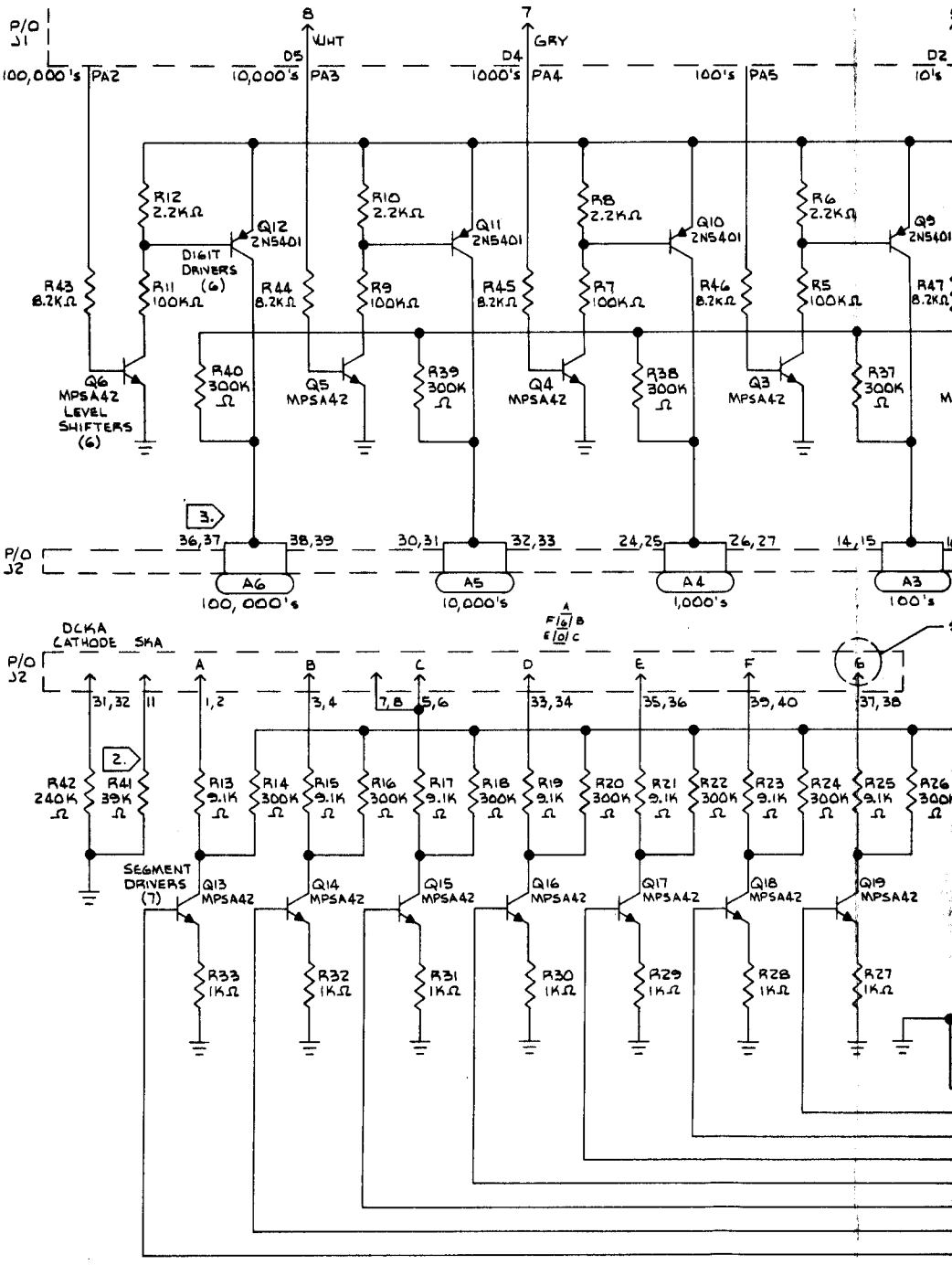
NOTES:

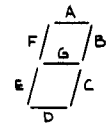
1. | PIN 15 | WIRE COLOR |
|---|---|
| PLAYER # 1 | BLK / WHT |
| PLAYER # 2 | ORG / BLU |
| PLAYER # 3 | RED / YEL |
| PLAYER # 4 | BRN / ORG |
| MATCH / BALL | RED / BLK |

2. OMIT FOR BECKMAN DISPLAYS.

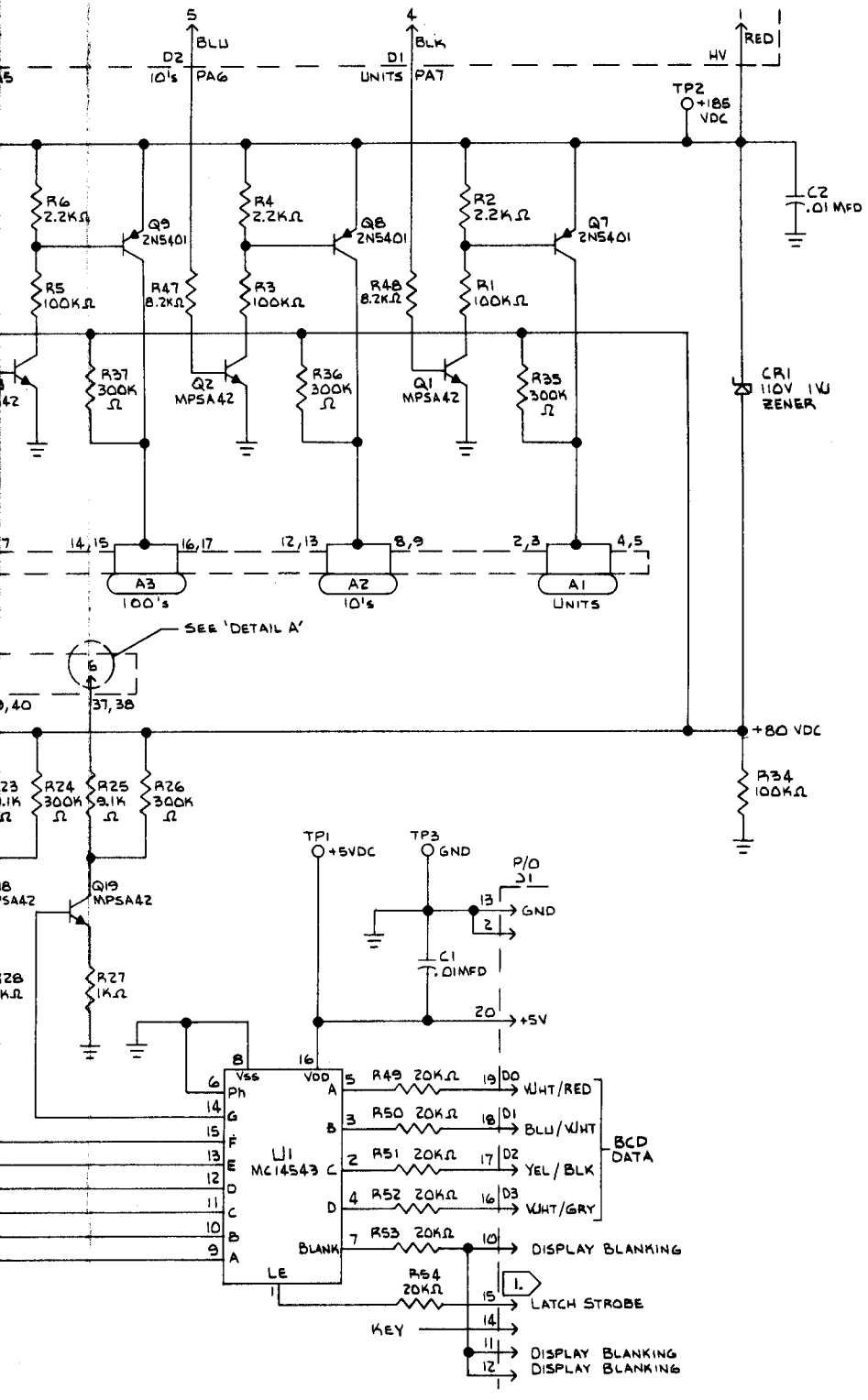
3. 36, 37 DENOTES

BECKMAN DISPLAY TERMINAL*	PANTEK DISPLAY TERMINAL





DETAIL A



REVISIONS				
SYM	DESCRIPTION	DFT DATE	CHK DATE	APPD DATE
A	ISSUED, E.C.R. A-008			
B	DWG. CHG., E.C.R. A-011			
C	DWG. CHG. E.I. 00116			
D	INSTITUTE NEW P/N SYSTEM. E.I. 00685			

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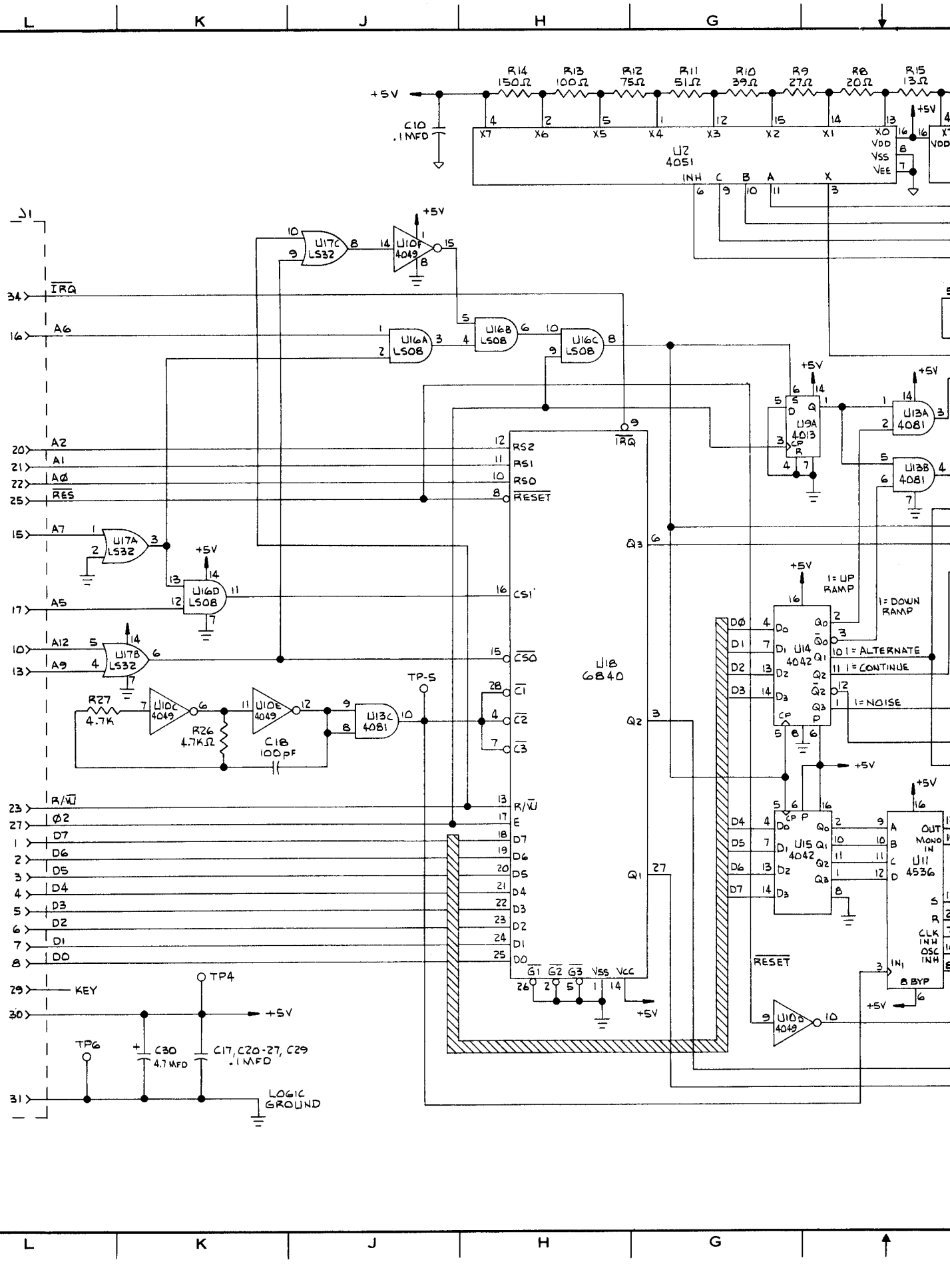
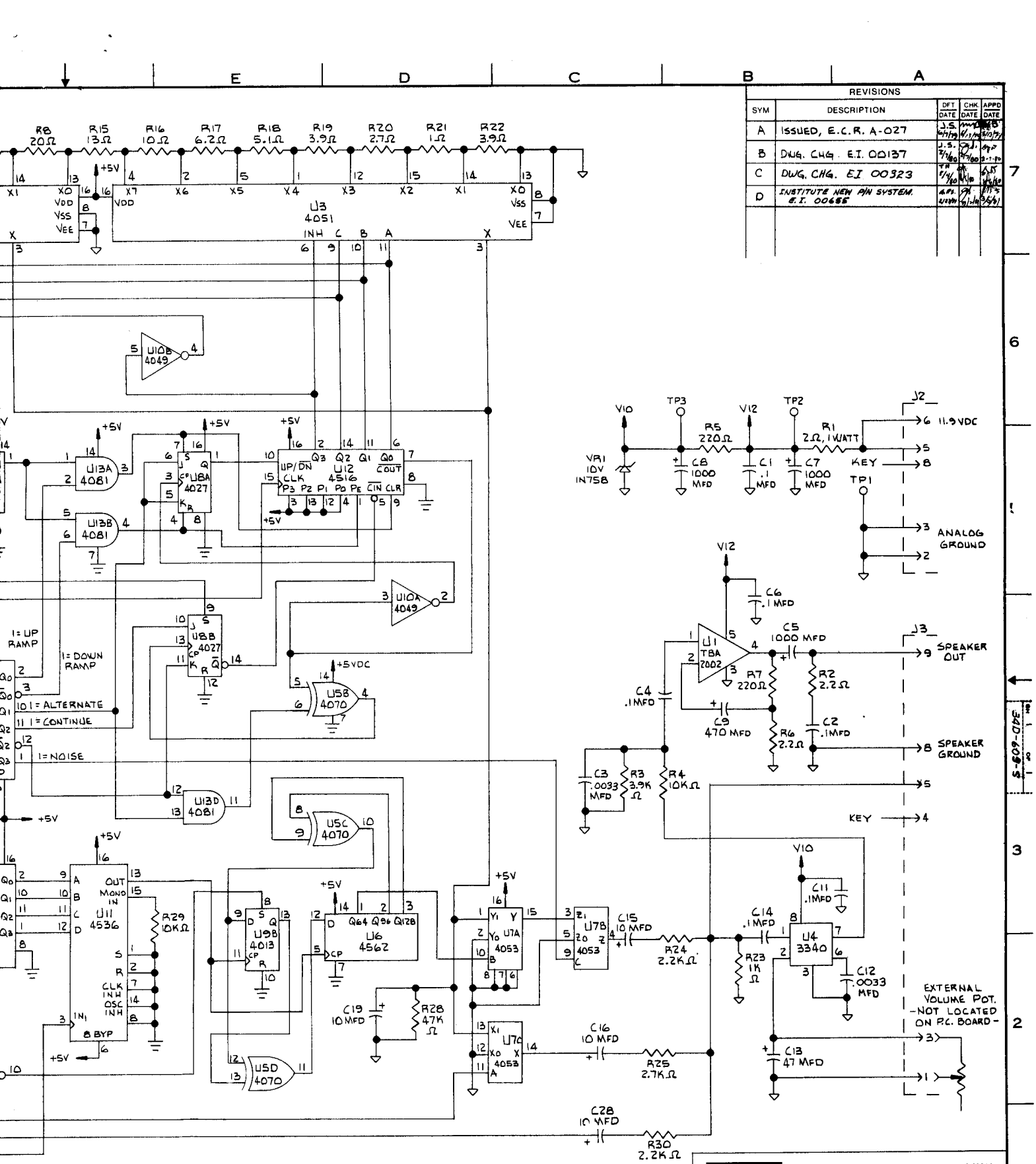
ORBITOR 1
SCHEMATIC, DISPLAY P.C. BOARD

DA-100 34D-434-S


R14 150Ω
R13 100Ω
R12 75Ω
R11 51Ω
R10 39Ω
R9 27Ω
R8 20Ω
R15 13Ω
+5V
C10 .1MFD
U2 4051
INH C B A X
VDD VSS VEE
J1
IRQ
A6
A2
A1
A0
RES
A7
A5
A12
A9
R/W
Ø2
D7
D6
D5
D4
D3
D2
D1
D0
KEY
TP4
TP6
C30 4.7 MFD
C17, C20-27, C29 .1MFD
LOGIC GROUND
U17C LS32
U10F 4049
U16A LS08
U16B LS08
U16C LS08
U17A LS32
U16D LS08
U17B LS32
U10C 4049
U10E 4049
U13C 4081
R27 4.7K
R26 4.7KΩ
C18 100pF
TP-5
U18 6840
RS2
RS1
RS0
RESET
CS1
CS0
C1
C2
C3
E
G1 G2 G3 VSS VCC
U9A 4013
U13A 4081
U13B 4081
1= UP RAMP
1= DOWN RAMP
U14 4042
10 1 = ALTERNATE
11 1 = CONTINUE
1 = NOISE
U15 4042
U11 4536
OUT MONO IN
B BYP
U10D 4049



REVISIONS				
SYM	DESCRIPTION	DFT DATE	CHK DATE	APPD DATE
A	ISSUED, E.C.R. A-027	J.S. 2/4/79		
B	DWG. CHG. E.I. 00137	J.S. 2/4/80		
C	DWG. CHG. EI 00323	1/4/80		
D	INSTITUTE NEW P/N SYSTEM. E.I. 00655	4/21/81		

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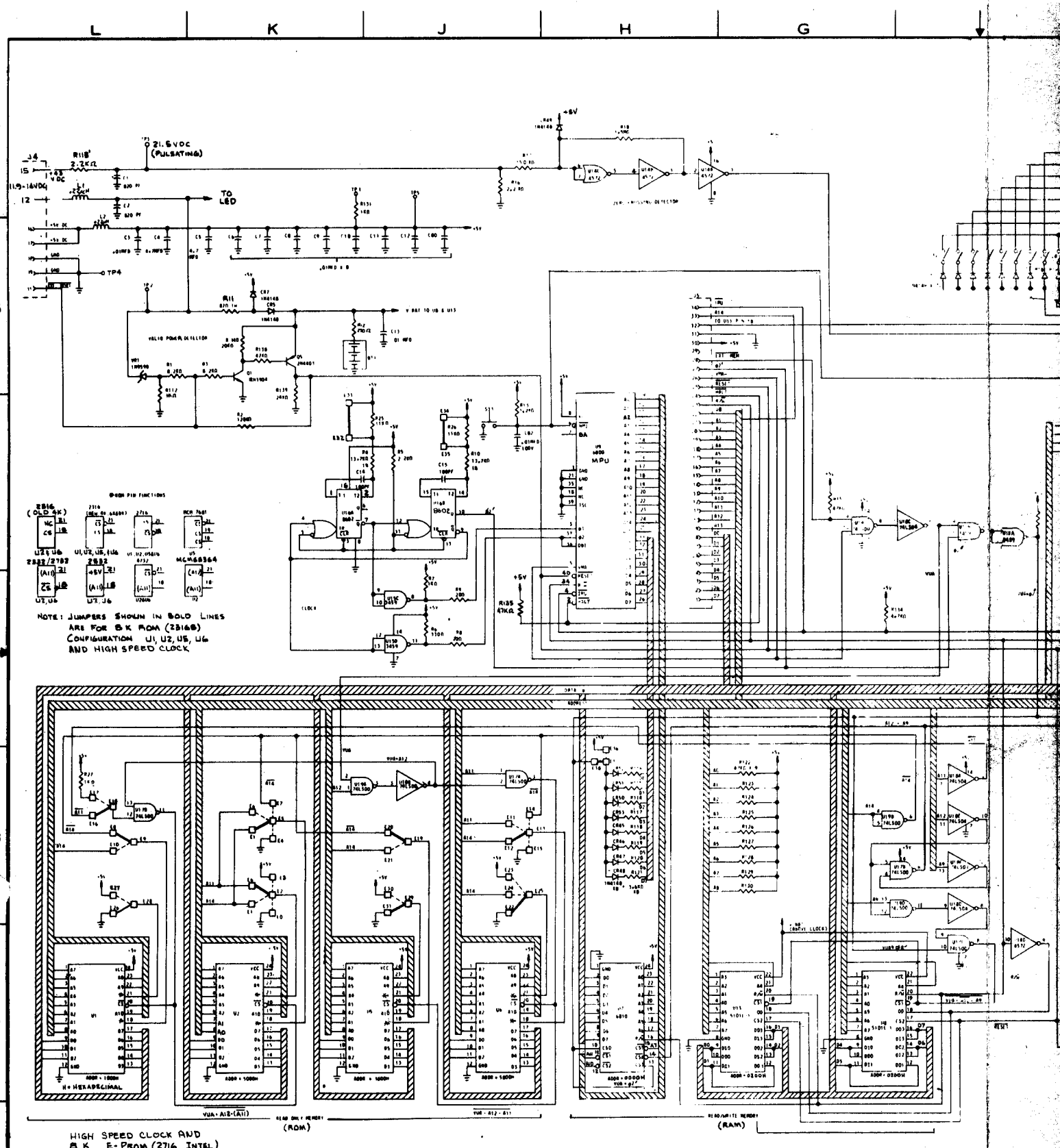
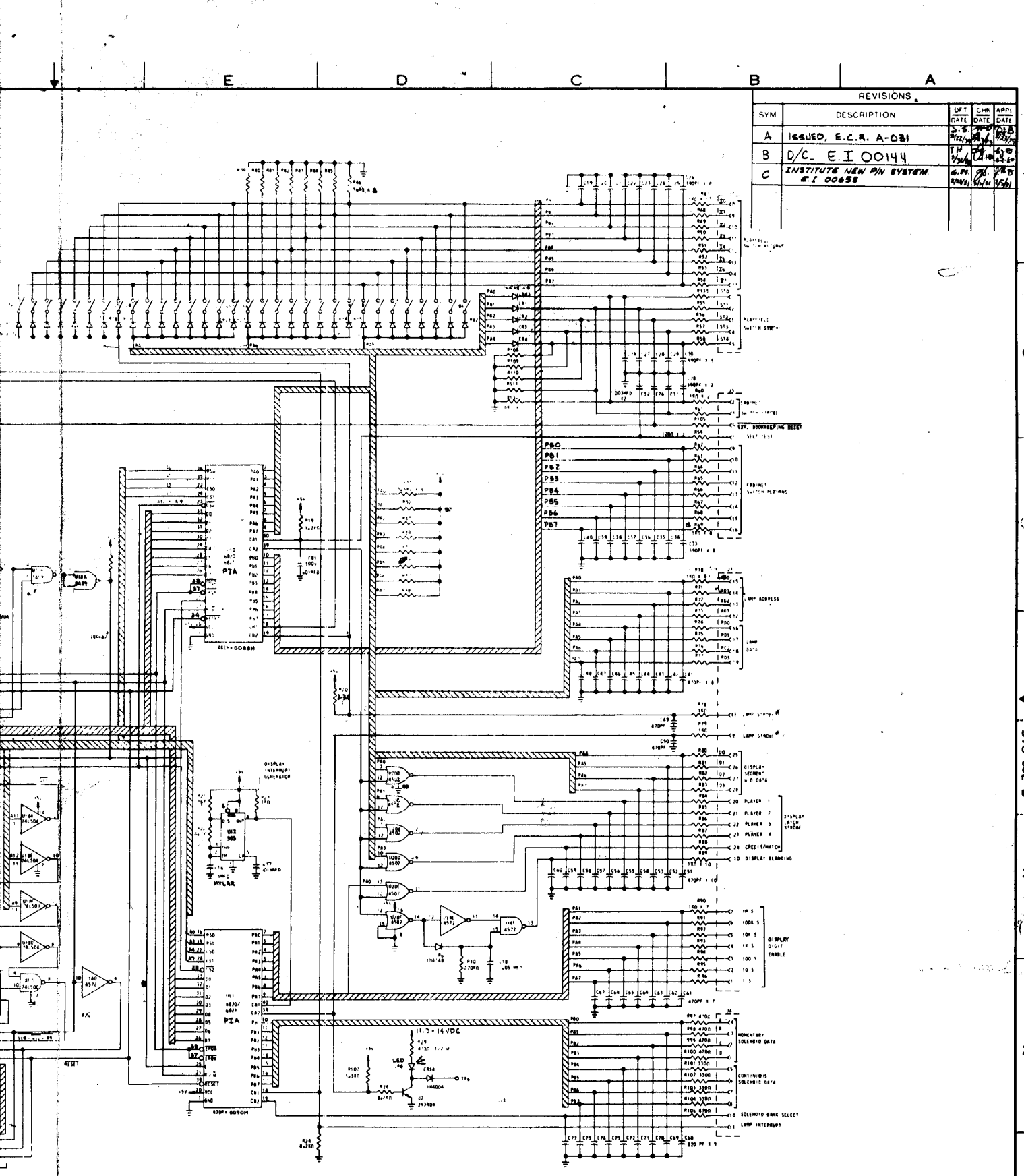
ORBITOR 1 SCHEMATIC, ELECTRONIC SOUNDS

SB-300 34D-605-S


21.6VDC (PULSATING)
11.9-16VDC
TO LED
TP4
MPU
6800
NOTE: JUMPERS SHOWN IN BOLD LINES ARE FOR 8K ROM (2316B) CONFIGURATION U1, U2, U5, U6 AND HIGH SPEED CLOCK
HIGH SPEED CLOCK AND 8K E-PROM (2716 INTEL) JUMPER COMBINATIONS
E2 - E3
E5 - E7
E9 - E10
E13 - E14
E16 - E18
E19 - E21
E23 - E25
E27 - E28
E29 - E30
E32 - E33
E34 - E35
(ROM)
(RAM)



REVISIONS				
SYM	DESCRIPTION	DFT DATE	CHK DATE	APP'D DATE
A	ISSUED, E.C.R. A-031	[illegible]	[illegible]	[illegible]
B	D/C E.I 00144	[illegible]	[illegible]	[illegible]
C	INSTITUTE NEW P/N SYSTEM. E.I 00655	[illegible]	[illegible]	[illegible]

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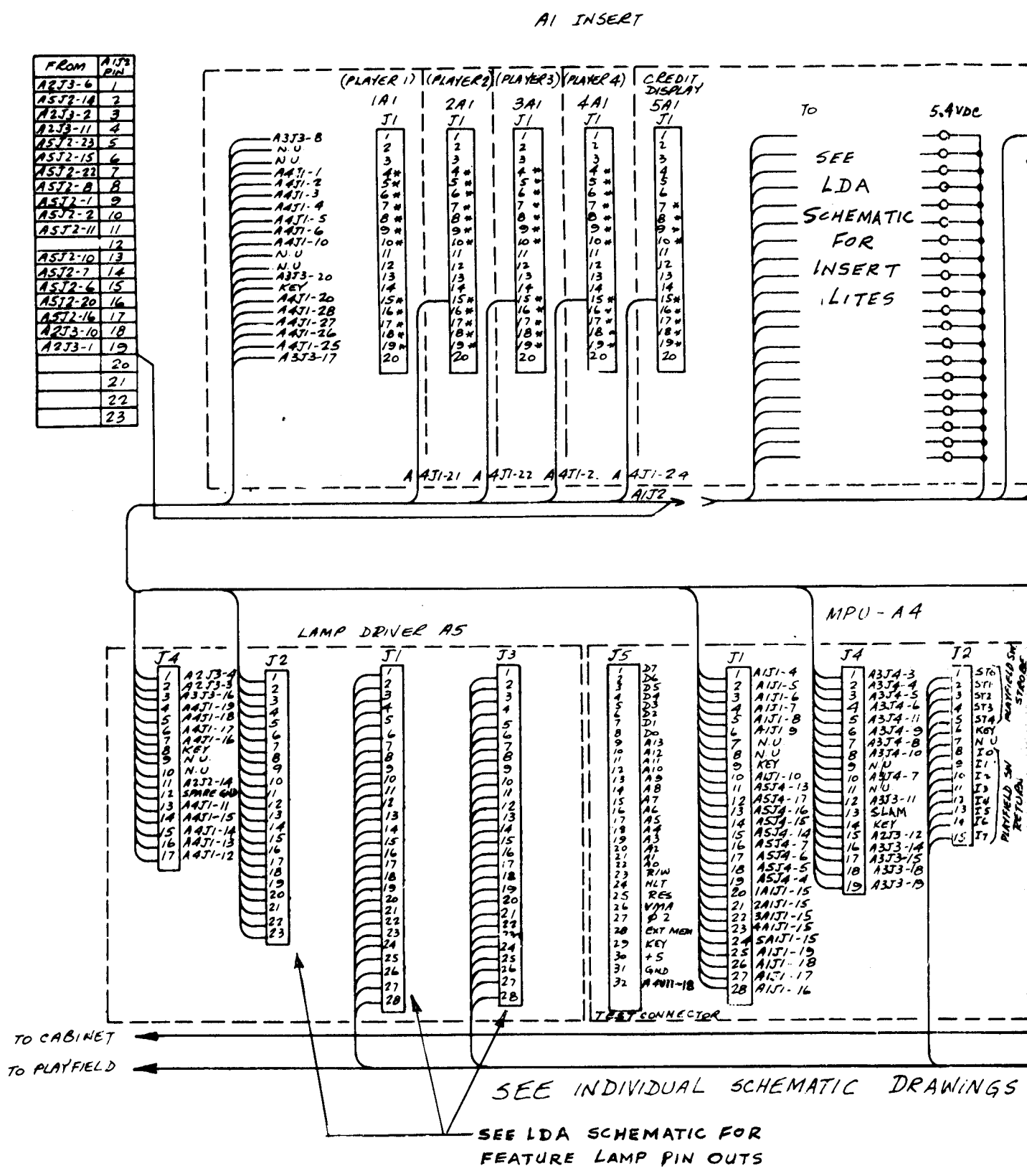
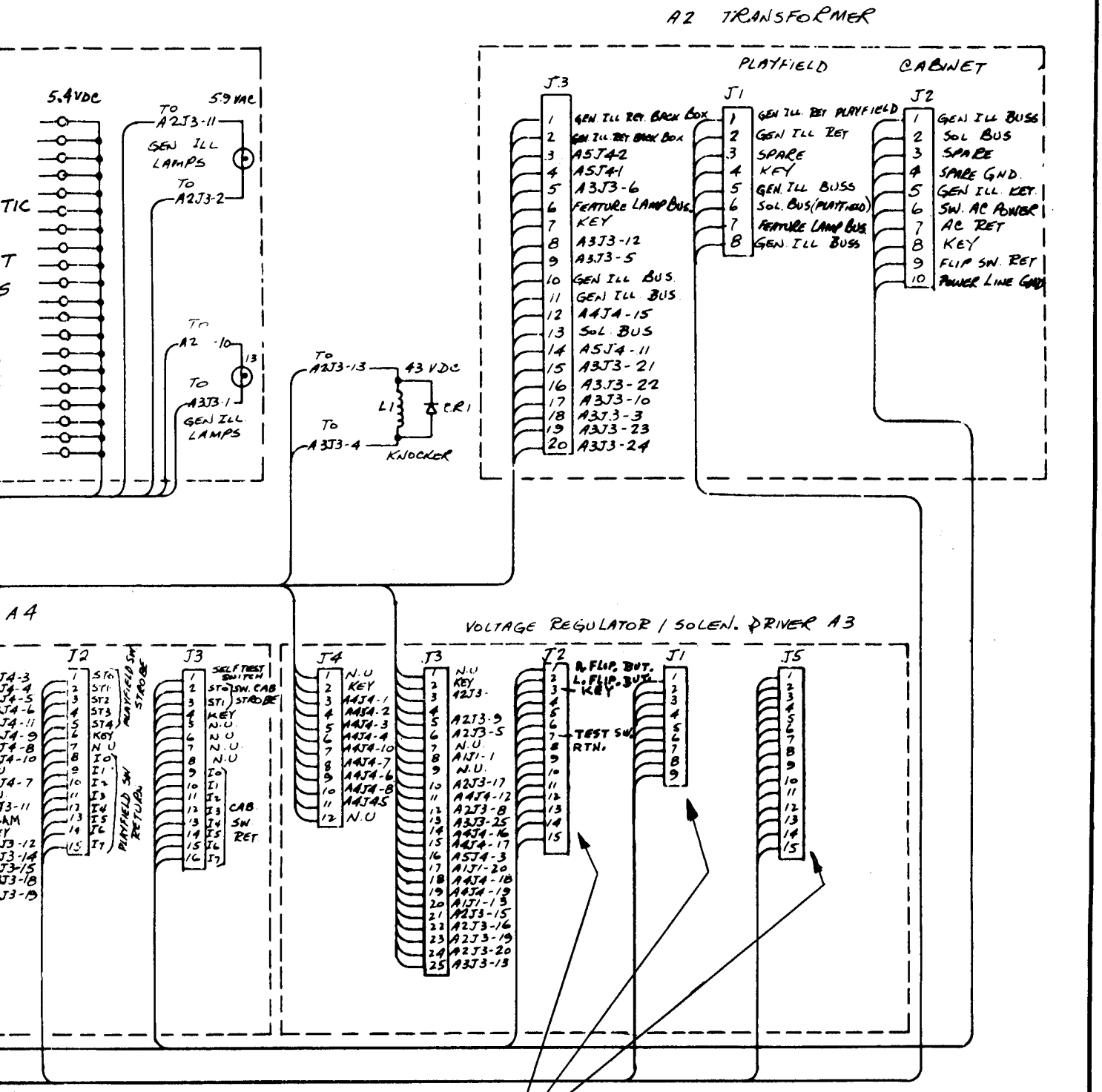
ORBITOR 1
SCHEMATIC, MPU BOARD

SB-300 34D-605-S

34D-602-S


A1 INSERT
FROM
A1J3 PIN
A2J3-6 1
A5J2-14 2
A2J3-2 3
A2J3-11 4
A5J2-23 5
A5J2-15 6
A5J2-22 7
A5J2-8 8
A5J2-1 9
A5J2-2 10
A5J2-11 11
12
A5J2-10 13
A5J2-7 14
A5J2-6 15
A5J2-20 16
A5J2-16 17
A2J3-10 18
A2J3-1 19
20
21
22
23
(PLAYER 1)
1A1 J1
(PLAYER 2)
2A1 J1
(PLAYER 3)
3A1 J1
(PLAYER 4)
4A1 J1
CREDIT DISPLAY
5A1 J1
A3J3-8
N.U
N.U
A4J1-1
A4J1-2
A4J1-3
A4J1-4
A4J1-5
A4J1-6
A4J1-10
N.U
N.U
A3J3-20
KEY
A4J1-20
A4J1-28
A4J1-27
A4J1-26
A4J1-25
A3J3-17
To
5.4Vdc
SEE LDA SCHEMATIC FOR INSERT LITES
A4J1-21
A4J1-22
A4J1-2.
A4J1-24
A1J2
LAMP DRIVER A5
MPU - A4
J4
J2
J1
J3
J5
A2J3-4
A2J3-5
A3J3-16
A4J1-19
A4J1-18
A4J1-17
A4J1-16
KEY
N.U.
N.U
A2J2-1A
SPARE GND
A4J1-11
A4J1-15
A4J1-14
A4J1-13
A4J1-12
D7
D6
D5
D4
D3
D2
D1
D0
A13
A12
A11
A10
A9
A8
A7
A6
A5
A4
A3
A2
A1
A0
R/W
NLT
RES
VMA
Φ 2
EXT MEM
KEY
+5
GND
A4J1-18
TEST CONNECTOR
A1J1-4
A1J1-5
A1J1-6
A1J1-7
A1J1-8
A1J1 9
N.U
N.U
KEY
A1J1-10
A5J4-13
A5J4-17
A5J4-16
A5J4-15
A5J4-14
A5J4-7
A5J4-6
A5J4-5
A5J4-4
1A1J1-15
2A1J1-15
3A1J1-15
4A1J1-15
5A1J1-15
A1J1-19
A1J1-18
A1J1-17
A1J1-16
A3J4-3
A3J4-4
A3J4-5
A3J4-6
A3J4-11
A3J4-9
A3J4-8
A3J4-10
N.U
A3J4-7
N.U
A3J3-11
SLAM
KEY
A2J3-12
A3J3-14
A3J3-15
A3J3-18
A3J3-19
S70
S71
S72
S73
S74
KEY
N.U
I0
I1
I2
I3
I4
I5
I6
I7
PLAYFIELD SW STROBE
PLAYFIELD SW RETURN
TO CABINET
TO PLAYFIELD
SEE INDIVIDUAL SCHEMATIC DRAWINGS
SEE LDA SCHEMATIC FOR FEATURE LAMP PIN OUTS



DRAWINGS FOR WIRE COLORS.

SEE SDU SCHEMATIC FOR SOLENOID PIN OUTS.

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ORBITOR 1
WIRING DIAGRAM

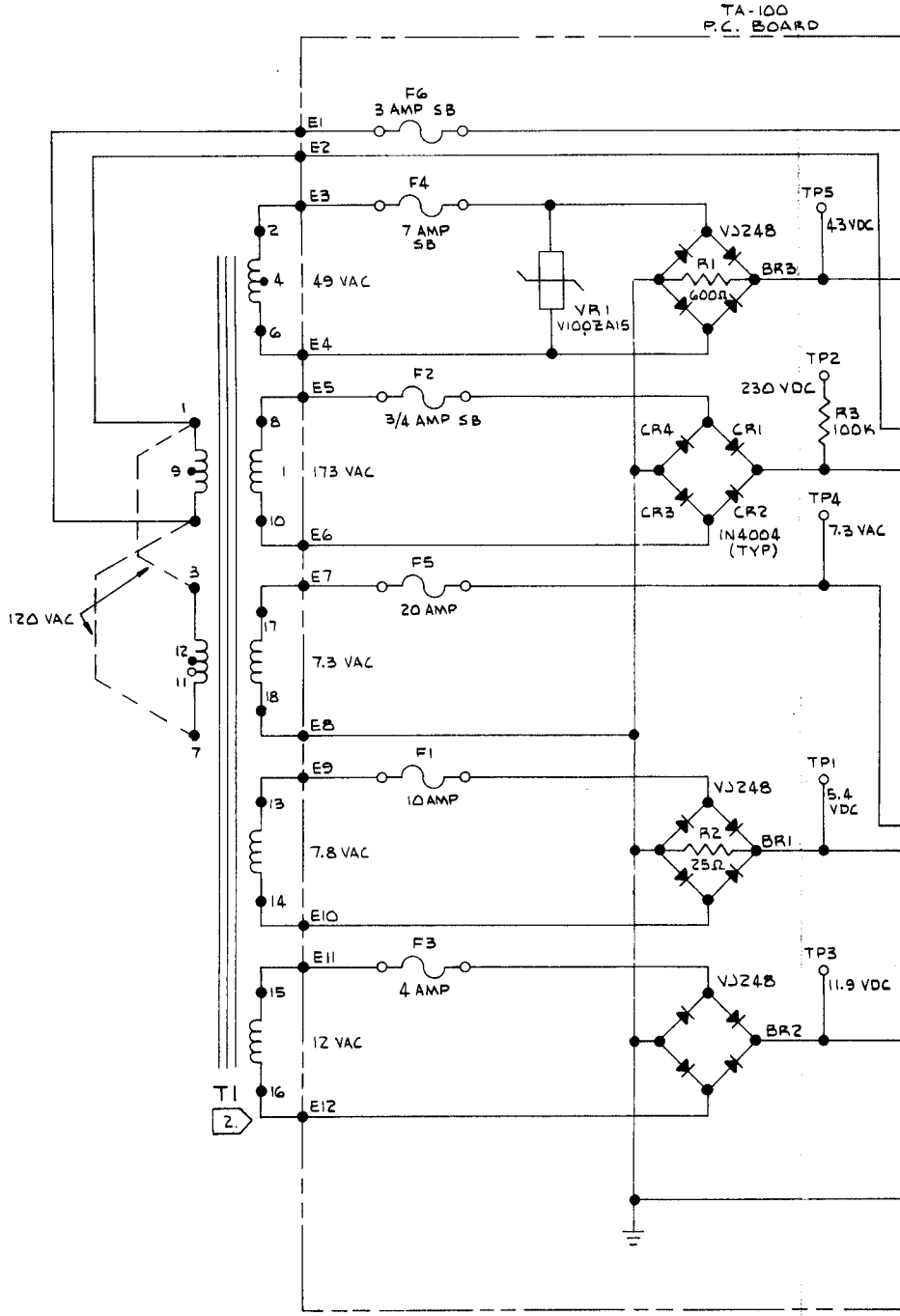
SOLID STATE

NOTES:

1. POWER LINE CONNECTIONS:

AC LINE VOLTAGE	STRAP TERMINALS	APPLY POWER TO TERMINALS
115	1 TO 3 AND 9 TO 11	1 AND 9
120	1 TO 3 AND 5 TO 7	1 AND 5
220	3 TO 5	1 AND 12
240	3 TO 5	1 AND 7

2. T1 IS NOT LOCATED ON PRINTED CIRCUIT BOARD.



REVISIONS				
SYM	DESCRIPTION	DFT DATE	CHK DATE	APPD DATE
B	ISSUED, E.C.R. A-015	J.S. 3/16/80	[illegible] 3/17/80	[illegible] 3/20/80
C	ADDED JUMPER BETWEEN J1 PIN 3 & 7 E.I. 00164	T.H. 3/31/80	[illegible] 4/1/80	[illegible] 4/1/80
D	F4 WAS 5 AMP, CHANGED TO 7 AMP PER E.I. 00188	J.S. 4/14/80	[illegible] 4/14/80	[illegible] 4/15/80
E	INSTITUTE NEW PIN SYSTEM. E.I. 00655	G.P.D. 8/19/81	[illegible] 9/1/81	[illegible] 9/5/81

TA-100
P.C. BOARD

J1
PLAYFIELD

- 1 GENERAL ILLUMINATION RETURN
- 7 FEATURE LAMP BUS
- 8 GENERAL ILLUMINATION BUS
- 6 SOLENOID BUS
- 4 KEY
- 3 FEATURE LAMP BUS
- 5 GENERAL ILLUMINATION BUS
- 2 GENERAL ILLUMINATION RETURN

J2
CABINET

- 6 A.C. POWER
- 7 A.C. RETURN
- 2 SOLENOID BUS
- 1 GENERAL ILLUMINATION BUS
- 5 GENERAL ILLUMINATION RETURN
- 9 FLIPPER SW. RETURN
- 10 POWER LINE GROUND
- 3 SPARE
- 4 SPARE
- 8 KEY

J3
BACK BOX

- 9 RELAY
- 12 ZERO CROSSING INPUT A4J4-15
- 13 SOLENOID BUS
- 5 TO REGULATED (17S) INPUT
- 11 GENERAL ILLUMINATION BUS
- 6 FEATURE LAMP BUS
- 8 TO REGULATED +5 INPUT
- 2 GENERAL ILLUMINATION RETURN
- 3 FEATURE LAMP RETURN
- 4 FEATURE LAMP RETURN
- 14 FEATURE LAMP RETURN
- 15 TO REGULATED +5 RETURN
- 16 TO REGULATED 17S RETURN
- 17 TO REGULATED +5 RETURN
- 18 TO REGULATED 17S RETURN
- 19 SOLENOID RETURN BUS
- 20 SOLENOID RETURN BUS
- 10 GENERAL ILLUMINATION BUS
- 7 KEY
- 1 GENERAL ILLUMINATION RETURN

TP5 43 VDC
VJ248
BR3
TP2 230 VDC
R3 100K
CR1
CR2 IN4004 (TYP)
TP4 7.3 VAC
TP1 5.4 VDC
VJ248
BR1
TP3 11.9 VDC
VJ248
BR2

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ORBITOR 1
SCHEMATIC, POWER TRANSFORMER
TA-100 34D-964-S

NOTES:

1.

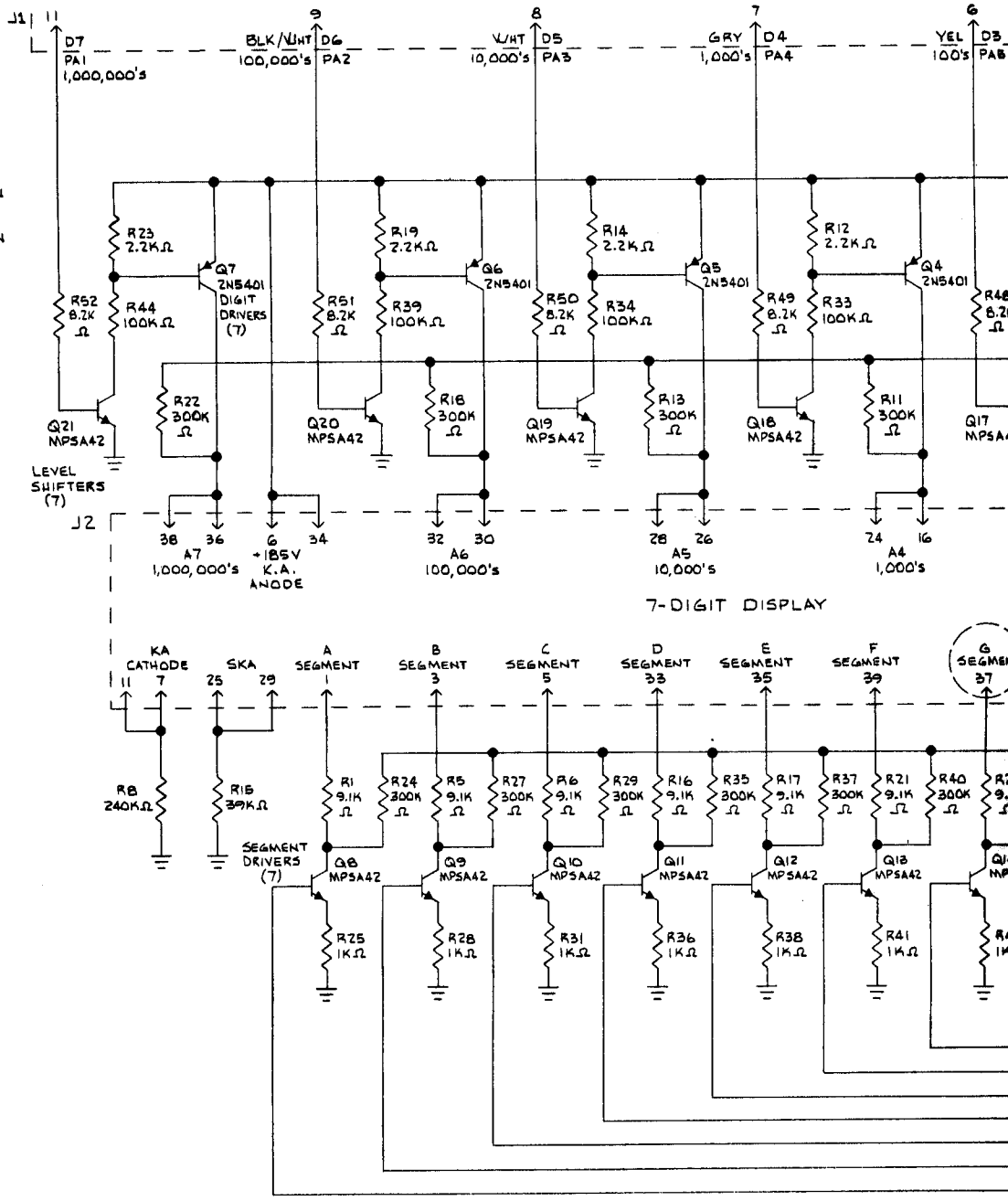
PIN IS	WIRE COLOR
PLAYER # 1	BLK/WHT
PLAYER # 2	ORG/BLU
PLAYER # 3	RED/YEL
PLAYER # 4	BRN/ORG
MATCH/BALL	RED/BLACK

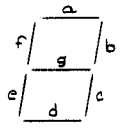
2. LAST 'C' NUMBER USED C2
   LAST 'CR' NUMBER USED CR1
   LAST 'J' NUMBER USED J2
   LAST 'Q' NUMBER USED Q21
   LAST 'R' NUMBER USED R58
   LAST 'TP' NUMBER USED TP3
   LAST 'U' NUMBER USED U1

3. ON P.C. BOARD LEGEND;

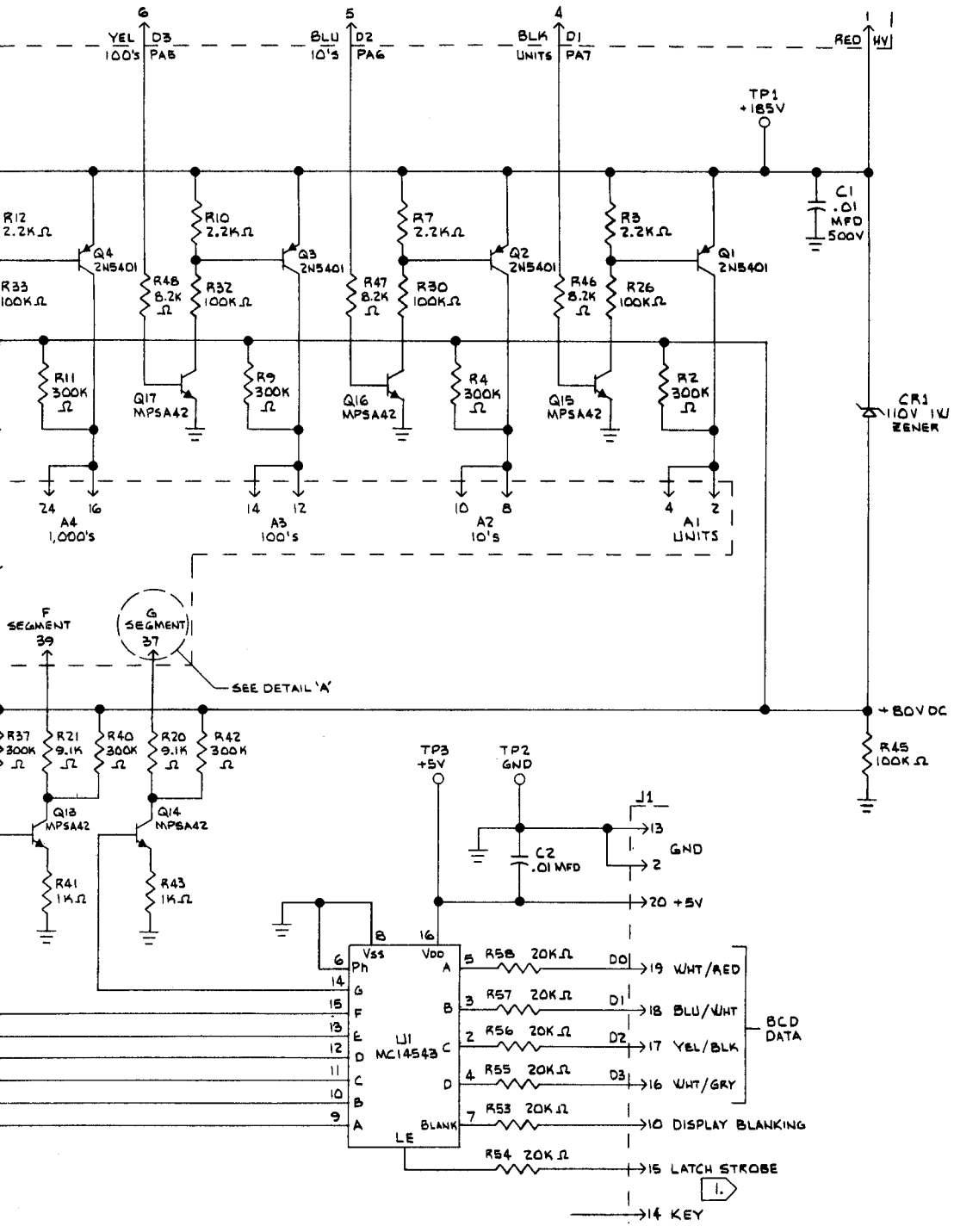
   NOMENCLATURE DD IS THE ABBREVIATION FOR DIGIT DRIVER.

   NOMENCLATURE LS IS THE ABBREVIATION FOR LEVEL SHIFTER.





DETAIL 'A'



REVISIONS				
SYM	DESCRIPTION	DFT DATE	CHK DATE	APPD DATE
A	ISSUED, E.I. 00111			
B	DWG. CHANGE E.I. 00123			
C	INSTITUTE NEW P/N SYSTEM. E.I. 00655			

CYBERNETRONICS
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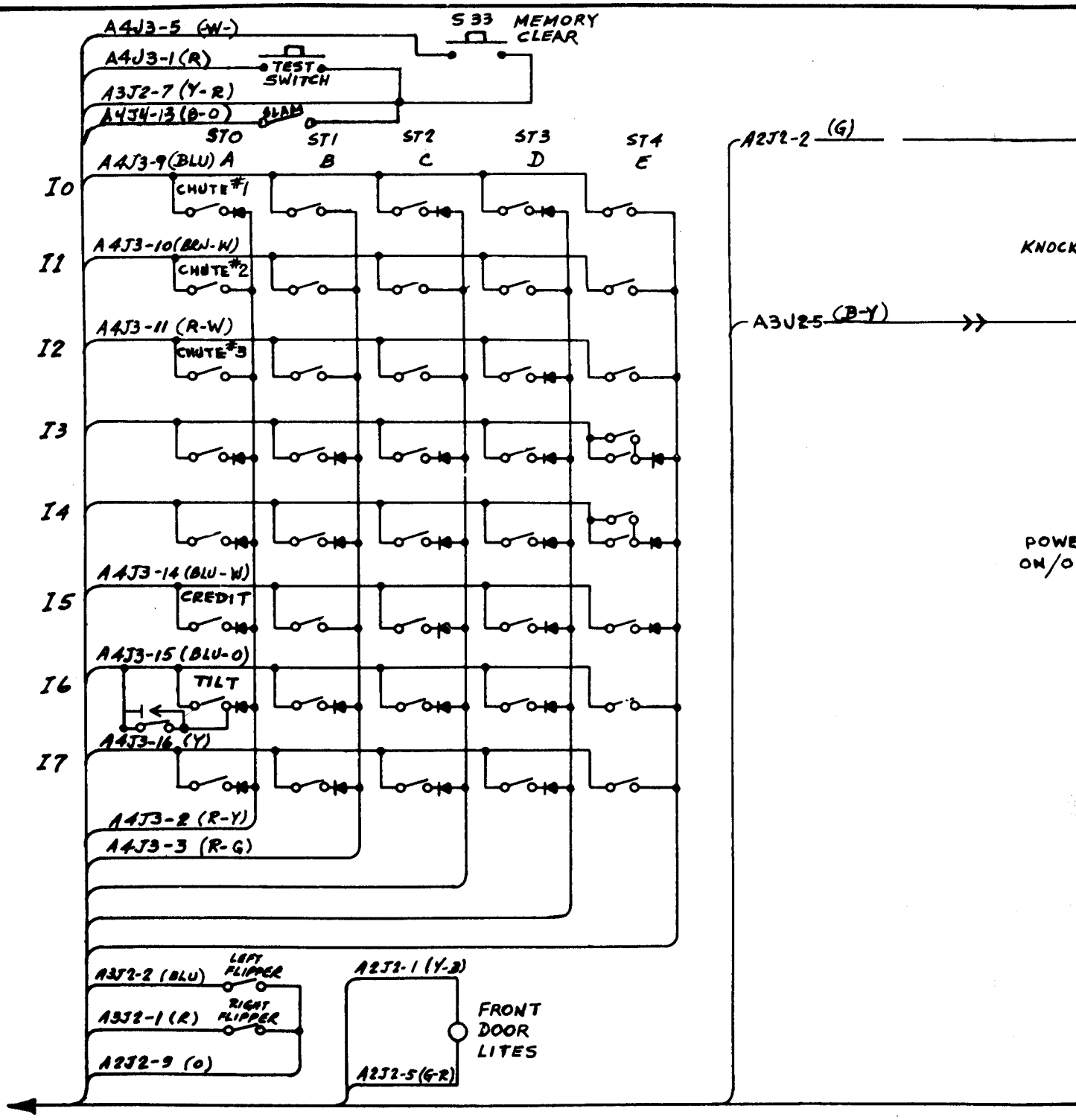
ORBITOR 1
SCHEMATIC, 7-DIGIT DISPLAY
P.C. BOARD
DA-300 34D-645-S

34D-645-S



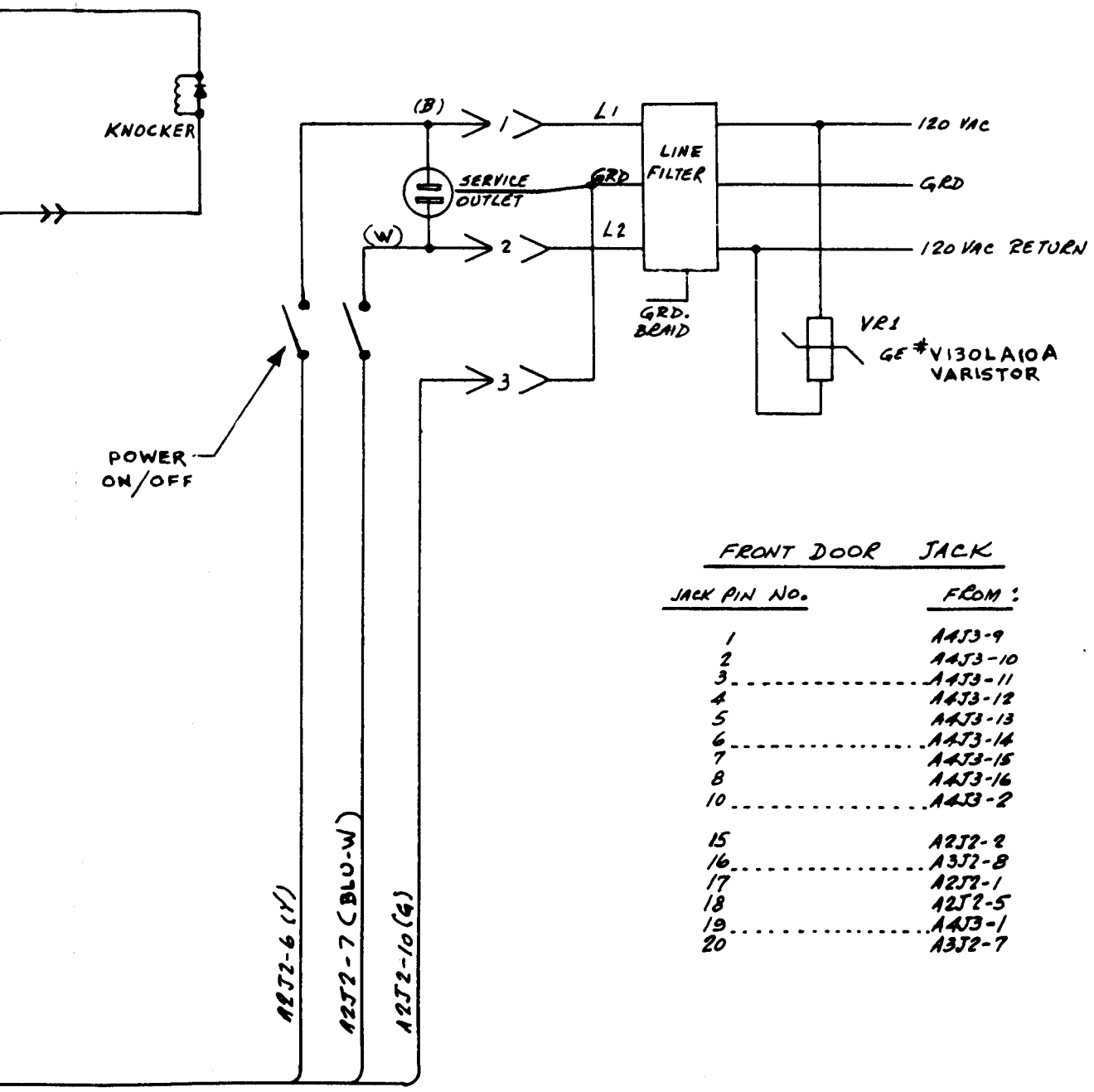
ORBITO

N/U = NOT USED
ALL DIODES ARE IN-4004

ISSUE	CHANGE

12B-452-121-1

12B-432-5-121-1



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

BITOR 1

NGE	DATE

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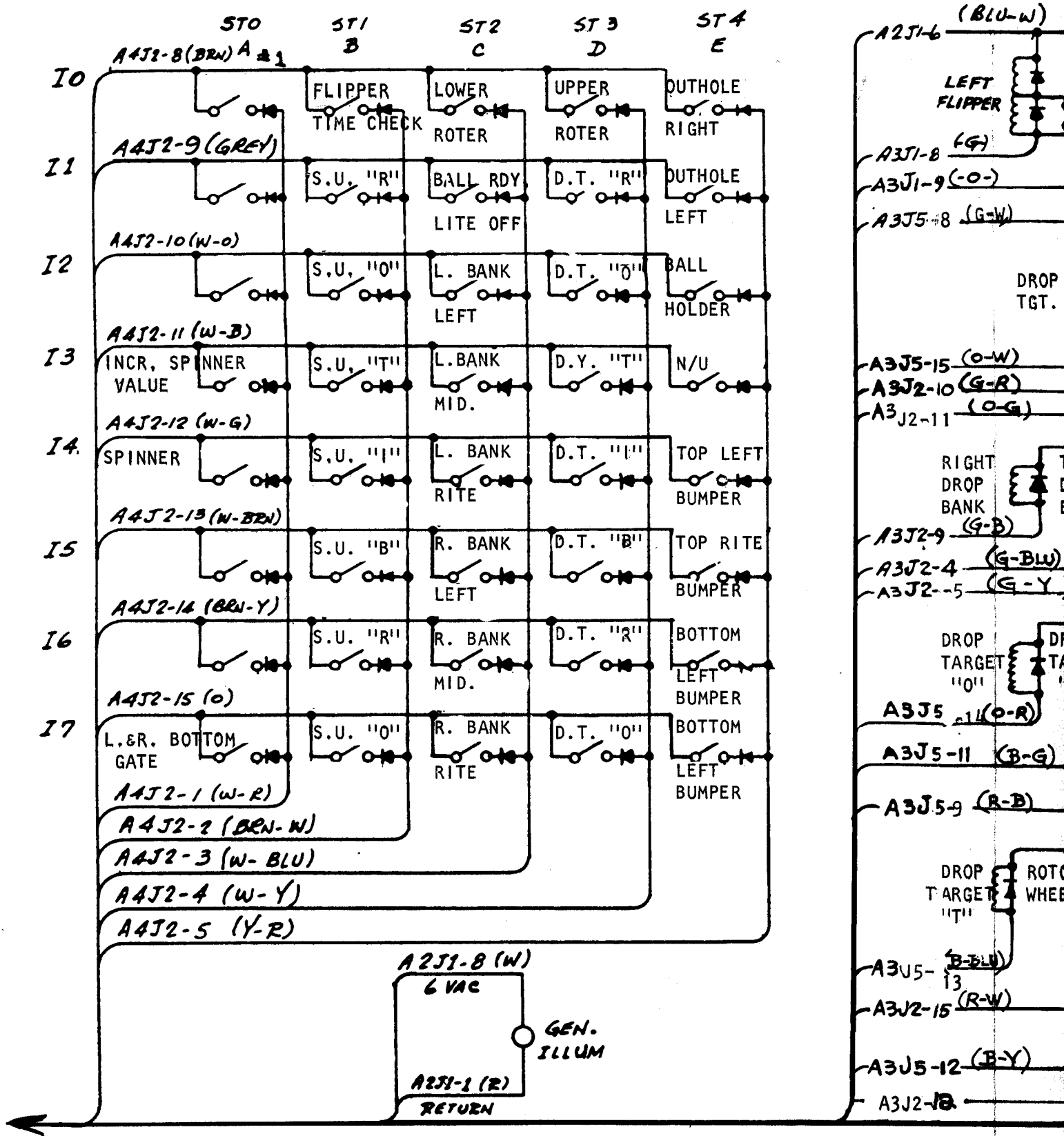
ORBITOR 1
CABINET AND FRONT DOOR WIRING
STANDARD



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

PLAYFIELD

ORBITOR 1

(BLU-W)

LEFT FLIPPER

RIGHT FLIPPER

(G)

(-O-)

1-AMP SLO-BLO

DROP TARGET "R"

(G-W)

(Y)

DROP TGT. "I"

LEFT DROP BANK

OUTHOLE

(O-W)

(G-R)

(O-G)

(Y)

RIGHT DROP BANK

TOP DROP BANK

KNOCKER

(G-B)

(G-BLU)

(G-Y)

(Y)

DROP TARGET "O"

DROP TARGET "R"

DROP TARGET "B"

(O-R)

(B-G)

(R-B)

(Y)

DROP TARGET "T"

ROTO WHEEL

DROP TARGET "O"

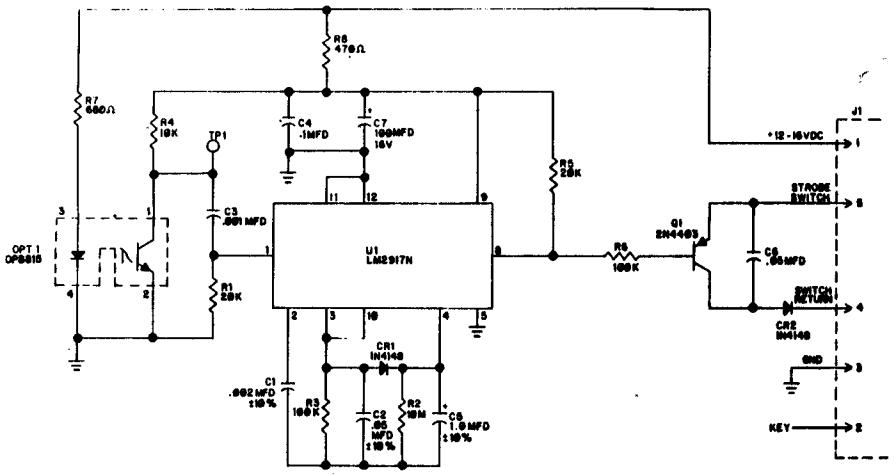
MULTI BALL HOLDER

(B-BLU)

(R-W)

(B-Y)

ROTOR SENSOR



A2J5-7(BLU) FEATURE LAMP BUS

A2J5-3 (BLU)

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