



STERN

CREDIT



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WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE 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 two (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.

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 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.

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

B-605 SOUND BOARD
 S-33 (MEMORY CLEAR)

S1 TO S32
 (SEE DETAIL)

MPU ASSY.

BACK-RACK

BACK-RACK INSERT

SOLENOID DRIVER
 VOLT. REGULATOF
 ASSEM.

VOICE SYNTHESIZER UNIT
 (USED IN VOICE GAMES ONLY)

LED
 LAMP DRIVER ASS

CABINET

TRANSFORMER ASSEM

PLUMB BOB TILT
 SPEAKER

S-33
 (MEMORY CLEAR)

KNOCKER
 (WHEN USED)

SELF TEST

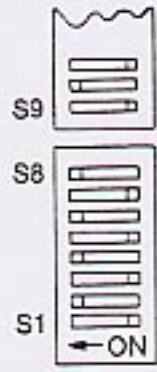
CREDIT BUTTON

RECTIFIER BOARD
 VOLUME CONTROL

SLAM SWITCH

FRONT DOOR

LEG LEVELING
 ADJUSTMENT (T)



DETAIL S1-S32
 MPU ASS'Y

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, 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" 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 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 lamps 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" lamp lights, "Shoot Again" 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 0.

** See back box adjustments. ***

VIPER OPERATION

Viper is a multi-ball game for 1-4 players. The object of the game is to keep each ball in play for as long as possible, scoring as many points as possible.

Each player gets 3 or 5 balls per game (option). An extra ball when the same amber lights on the upper right and left drop targets are lit and then the middle drop target in the right back is hit with the amber light on.

There are 3 red specials. Top special target will light when all the arrows are lit. Top left special drop target light lights on even number bonus scores after 20,000 bonus points have been scored. Spinner special will award special when red light is flashing and spinner is hit.

All points given to player are multiplied by bonus multiplier.

When number 1, 2 and 3 lights by ball walker are lit and all 3 balls are caught in the ball walker all 3 balls will release.

ROTO-SHOOTER FEATURE:

Roto-shooter will rotate clock-wise only when ball is caught in it. To reverse rotation use the red button by the left flipper button. To shoot ball use the red button by right flipper button.

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 000000 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 | Flashing O if all cabinet switches are open and all balls moved from the outhole to the shooter position. | Switch test - switch I.D. Number appears on display when it is manually closed. |

TABLE 4-2. 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 99 |
| 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 | Total Level 1 Passed | 00 to 999999 |
| 21st | 16 | Total Level 2 Passed | 00 to 999999 |
| 22nd | 17 | Total Level 3 Passed | 00 to 999999 |

SECTION V. FRONT DOOR GAME ADJUSTMENTS:

HIGH SCORE FEATURE ADJUSTMENTS:

The game is designed to award an "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

VIPER

3 BALLS

| | |
|---------------------|--------------------|
| 1ST LEVEL PAST----- | 1 CREDIT |
| 2ND LEVEL PAST----- | 1 CREDIT |
| 3RD LEVEL PAST----- | _____ |
| 4TH LEVEL PAST----- | HIGH SCORE TO DATE |

5 BALLS

| | |
|---------------------|--------------------|
| 1ST LEVEL PAST----- | 1 CREDIT |
| 2ND LEVEL PAST----- | 1 CREDIT |
| 3RD LEVEL PAST----- | _____ |
| 4TH LEVEL PAST----- | HIGH SCORE TO DATE |

GAME ADJUSTMENTS

A. PLAYFIELD POST ADJUSTMENTS:

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

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.**

VIPER SWITCH ASSIGNMENTS

| | | | | | | ON | OFF |
|----|-----------------------|------|--------|------|--------|--|--------|
| 32 | Red Special Award | NONE | X BALL | 100K | REPLAY | ← | ← |
| 31 | | OFF | ON | OFF | ON | ← | ← |
| 30 | Special Feature | OFF | OFF | ON | ON | 1/ball | 1/game |
| 29 | Not Used | OFF | OFF | ON | ON | | |
| 28 | Coin Chute #1 | | | | | See Catalog Or Label On Side Of Cabinet | |
| 27 | | | | | | | |
| 26 | | | | | | | |
| 25 | | | | | | | |
| 24 | Not Used | | | | | | |
| 23 | Extra Ball | | | | | 1/ball | 1/game |
| 22 | Extra Ball Feature | | | | | ON | OFF |
| 21 | Match | | | | | ON | OFF |
| 20 | Display Credits | | | | | ON | OFF |
| 19 | Maximum Credit | 10 | 15 | 25 | 40 | ← | ← |
| 18 | | OFF | OFF | ON | ON | ← | ← |
| 17 | Not Used | OFF | ON | OFF | ON | | |
| 16 | High Score Feature | 0 | 1 | 2 | 3 | ← | ← |
| 15 | | OFF | OFF | ON | ON | ← | ← |
| 14 | Add-A-Ball (Memory) | | | | | ON | OFF |
| 13 | Level Pass Add-A-Ball | | | | | 5 | 3 |
| 12 | Coin Chute #3 | | | | | See Catalog Or Label On Side Of Cabinet | |
| 11 | | | | | | | |
| 10 | | | | | | | |
| 9 | | | | | | | |
| 8 | Back Ground Sound | | | | | ON | OFF |
| 7 | Ball Per Game | | | | | 5 | 3 |
| 6 | Level Pass | | | | | Replay | X-Ball |
| 5 | Not Used | | | | | | |
| 4 | Coin Chute #2 | | | | | 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

| | 28 | 27 | 26 | 25 | | | | | | |
|--|-----|-----|-----|-----|----------------|--------------|-------------------------------------|-------------|---|---|
| SWITCH No. 1 (BLU) (NEXT TO HINGE) | | | | | | | | | | |
| SWITCH No. 2 (BRN-WHITE) (CENTER) | | | | | | | | | | |
| SWITCH 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 | | | | | |
| | | | | | 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

BALLS PER GAME:

| |
|------------------------------|
| NO. OF BALLS PER GAME |
| 3 |
| 5 |

| |
|---------------------|
| MPU SWITCH 7 |
| OFF |
| ON |

ADD-A-BALL (MEMORY):

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

| |
|-------------------|
| ADD-A-BALL |
| 3 |
| 5 |

| |
|----------------------|
| MPU SWITCH 13 |
| OFF |
| ON |

CREDIT DISPLAY:

| |
|-----------------------|
| CREDIT DISPLAY |
| YES |
| NO |

| |
|----------------------|
| MPU SWITCH 20 |
| ON |
| 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" (often called a nuisance by operators).

This Stern game has a new feature not used in any previous Stern pinball:

Coins will be accepted and credit given 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 |
| Extra Ball |
| Replay |

| |
|---------------------|
| MPU SWITCH 6 |
| OFF |
| ON |

ADD-A-BALL

| |
|-----|
| ON |
| OFF |

| |
|----------------------|
| MPU SWITCH 14 |
| ON |
| OFF |

BACKGROUND SOUND

| |
|-----|
| ON |
| OFF |

| |
|---------------------|
| MPU SWITCH 8 |
| ON |
| 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 tens digit number appears in the "Match/Ball in Play" window and the word "Match" is illuminated. If the number matches the ten 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 |

EXTRA BALL:

| | MPU SWITCH 23 |
|------------|---------------|
| 1 Per Ball | ON |
| 1 Per Game | OFF |

EXTRA BALL:

| | MPU SWITCH 22 |
|-----|---------------|
| ON | ON |
| OFF | OFF |

RED SPECIAL FEATURE:

| SPECIALS | MPU SWITCH 30 |
|------------|---------------|
| 1 Per Ball | ON |
| 1 Per Game | OFF |

RED SPECIAL AWARD:

| SPECIAL AWARD | MPU SWITCHES | |
|------------------|--------------|-----|
| | 31 | 32 |
| No Award | OFF | OFF |
| Extra Ball | OFF | ON |
| 100,000 Points | ON | OFF |
| Replay | ON | ON |

NOTE:

Playfield and bonus points are multiplied by bonus multiplier.

OUTHOLE REFLEX (Pl. Sw. No. 8)

Collects bonus points times bonus multiplier and advances the ball to the outhole runway switches.

SPINNER (Pl. Sw. No. 5)

Points to be awarded will be shown by flashing bulb by spinner.

ROLLOVER 1 (Pl. Sw. No. 36)

Lites #1's, scores 100 points, advances bonus and scores 1,000 points when lit.

ROLLOVER 2 (Pl. Sw. No. 37)

Lites #2's, scores 100 points, advances bonus and scores 1,000 points when lit.

ROLLOVER 3 (Pl. Sw. No. 9)

Lites #3's, scores 100 points, advances bonus and scores 1,000 points when lit.

LEFT OUT LANE (Pl. Sw. No. 12)

Scores 5,000 points.

RIGHT OUT LANE (Pl. Sw. No. 9)

Scores 100 points, 1,000 points when #3 light is lit.

STAND UP TARGETS (Pl. Sw. No. 17 thru 24)

Lites arrows, scores 100 points, advances bonus multiplier and scores 1,000 points when lit.

LEFT & RIGHT SLINGSHOT (Pl. Sw. No. 15 & 16)

Scores 10 points.

LEFT & RIGHT THUMPER BUMPER (Pl. Sw. No. 13 & 14)

Scores 1,000 points.

BALL WALKER LANE (Pls. Sw. No. 11)

Scores 7,000 points.

LEFT & RIGHT DROP TARGETS (Pl. Sw. No. 25 thru 30)

Scores 100 points and 1,000 points when lit.

EXTRA BALL DROP TARGET (Pl. Sw. No. 26)

Scores extra ball when lit.

RED SPECIAL FEATURE (Pl. Sw. 5, 24 & 29)

Scores special when lit.

ROTO-SHOOTER STAND UP TARGET (Pl. Sw. No. 9 thru 12)

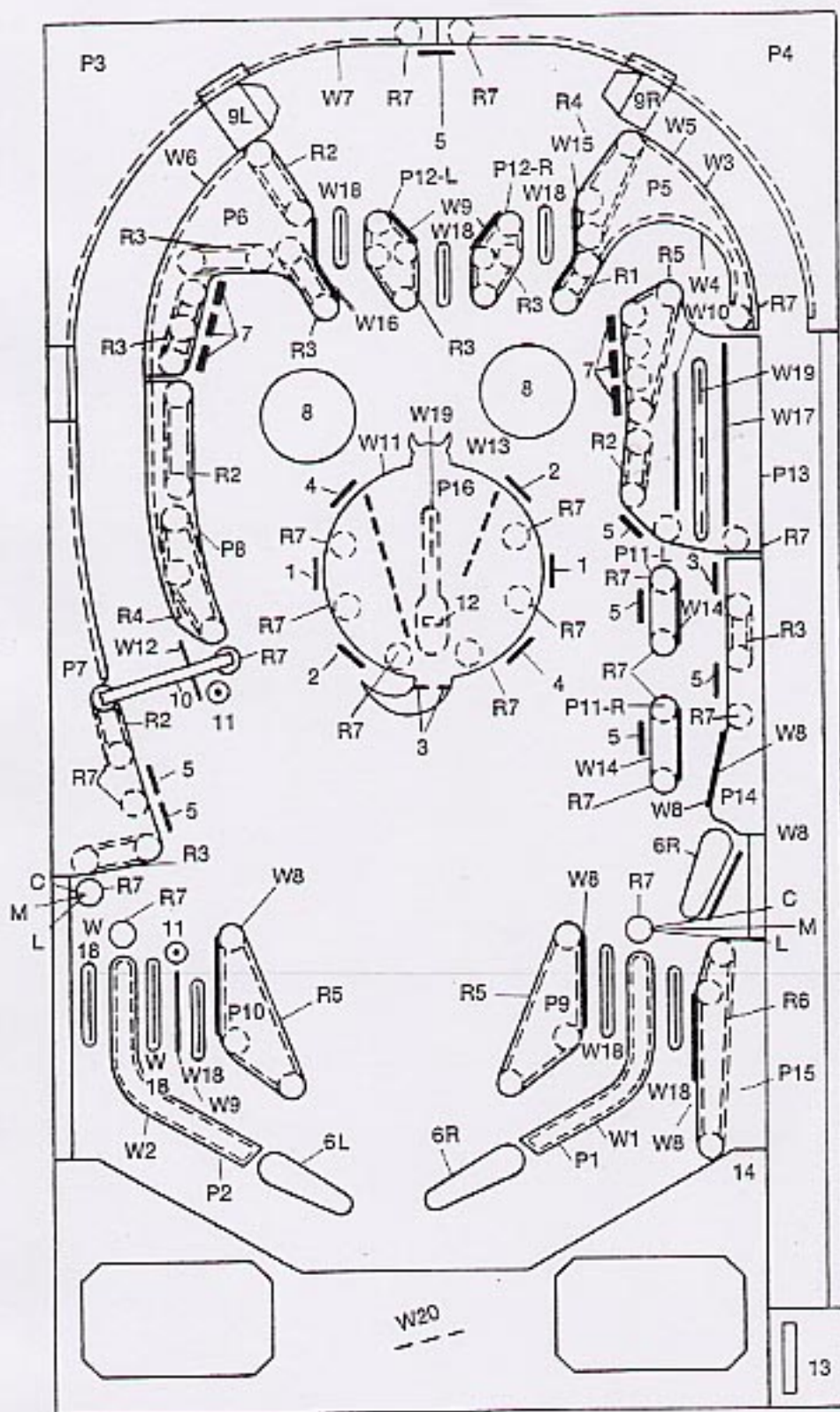
Red Sw. 38 lights #1, scores 100 points, when lit will score 1,000 points and advances bonus.

Blue Sw. 31 lights #2, scores 100 points, when lit will score 1,000 points and advance bonus.

White Sw. 32 lights #3, scores 100 points, when lit will score 1,000 points and advance bonus.

Yellow Sw. 39 lights #4, scores 100 points, when lit will score 1,000 points and advance bonus.

VIPER PLAYFIELD PARTS



RUBBER RINGS

| | |
|---------------|---------------|
| R1-7A-120-100 | R5-7A-120-250 |
| R2-7A-120-125 | R6-7A-120-275 |
| R3-7A-120-150 | R7-7A-135 |
| R4-7A-120-200 | |

BALL GUIDES & ROLL OVERS

| | |
|--------------|--------------|
| W1-A-959 | W11-6A-101-L |
| W2-A-960 | W12-6A-101-N |
| W3-A-961 | W13-6A-101-O |
| W4-A-962 | W14-6A-101-Q |
| W5-B-963 | W15-6A-304 |
| W6-B-964 | W16-6A-305 |
| W7-C-965 | W17-6A-306 |
| W8-6A-101 | W18-A-149 |
| W9-6A-101-G | W19-A-858 |
| W10-6A-101-I | W20-A-860 |

PLASTIC ASSEMBLIES

P1-A-957
P2-A-958

PLASTIC SHIELDS

13C-148-1 thru -8
(P3 thru P10)
13C-148-11 thru -16
(P11 thru 16)

MISC. PARTS & ASSEMBLIES

1. (2) Stand-Up Targets A-722-R-1
2. (2) Stand-Up Targets A-722-R-2
3. (2) Stand-Up Target A-722-R-3
4. (2) Stand-Up Target A-722-R-4
5. (7) Stand-Up Targets A-722-L-3
6. Flipper Assemblies B-634-L1-Y and B-634-R1-Y
7. 3 Bank Drop Targets O-823-3H A-992 (Target only)
8. Thumper Cap 4A-317-B
9. Ball Gate Assemblies A-877-L and A-877-R
10. Spin Target Assembly A-563-4
11. Ball Guide Post 2A-200 (Rubber Ring 7A-125)
12. Kicker A-201-1
13. Shooter Gauge 14A-2-15
14. Instruction Plate 14B-34-1

GAME ADJUSTMENTS

C - CONSERVATIVE
M - MEDIUM
L - LIBERAL

PARTS LIST VIPER

| MISCELLANEOUS | PART NUMBER |
|--|--------------|
| Transformer (Domestic or Export) | 16B-6 |
| Transformer & Rectifier Board | B438-4 |
| Bulbs, #44 | |
| U1 | E-148-U1-VP2 |
| U2 | E-148-U2-VP2 |
| U5 | E-148-U5-VP2 |
| U6 | E-148-U6-VP2 |

ASSEMBLY COILS (Diodes are 1N-4004 on coils)

| | |
|------------------------------|------------------|
| Motor (Rotor-Shooter) | 10B-5 |
| 3 Drop Target Bank (2) | B-27-2300 |
| Flippers (3) | J-25-475/34-4500 |
| Bottom Slingshot (2) | J-26-1500 |
| Ball Ejector | J-28-2300 |
| Ball Ejector Release | J28-2300 |
| Rotor-Shooter | J-26-1200 |
| Knocker | N-26-1200 |
| Thumper Bumper (2) | J-26-1200 |
| Ball Walker | J-28-2300 |

MODULES

| | |
|---|-------|
| Lamp Driver | B-431 |
| Display Driver | A-645 |
| Match and 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

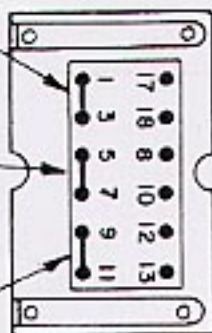
FIGURE 8-1. STERN 16B-6 TRANSFORMER WIRING CONNECTION INSTRUCTIONS

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



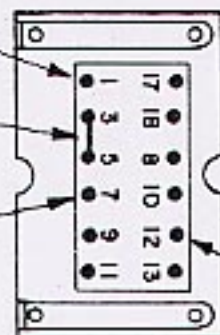
220/240V., 50/60 Cycle Input.
Varistor - Soldered to Line Filter on Left Side of Cabinet
Must be Stern Part No. 25A-18-2.

Solder Heavy Red Wire
To Lug 1

Solder Lugs 3 & 5
Together

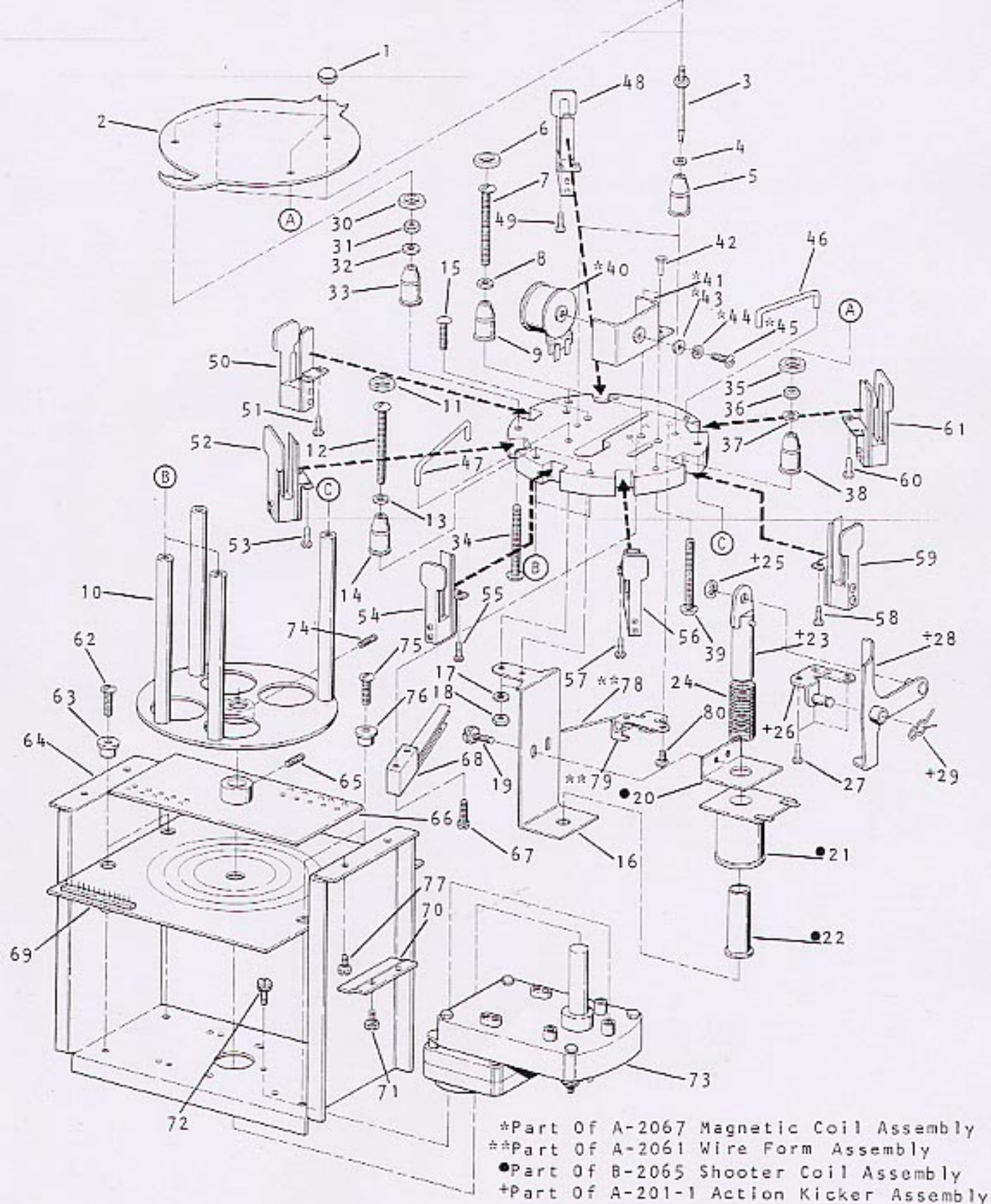
240V
Solder Heavy Yellow
Wire To Lug 7

220V
Solder Heavy Yellow
Wire To Lug 12



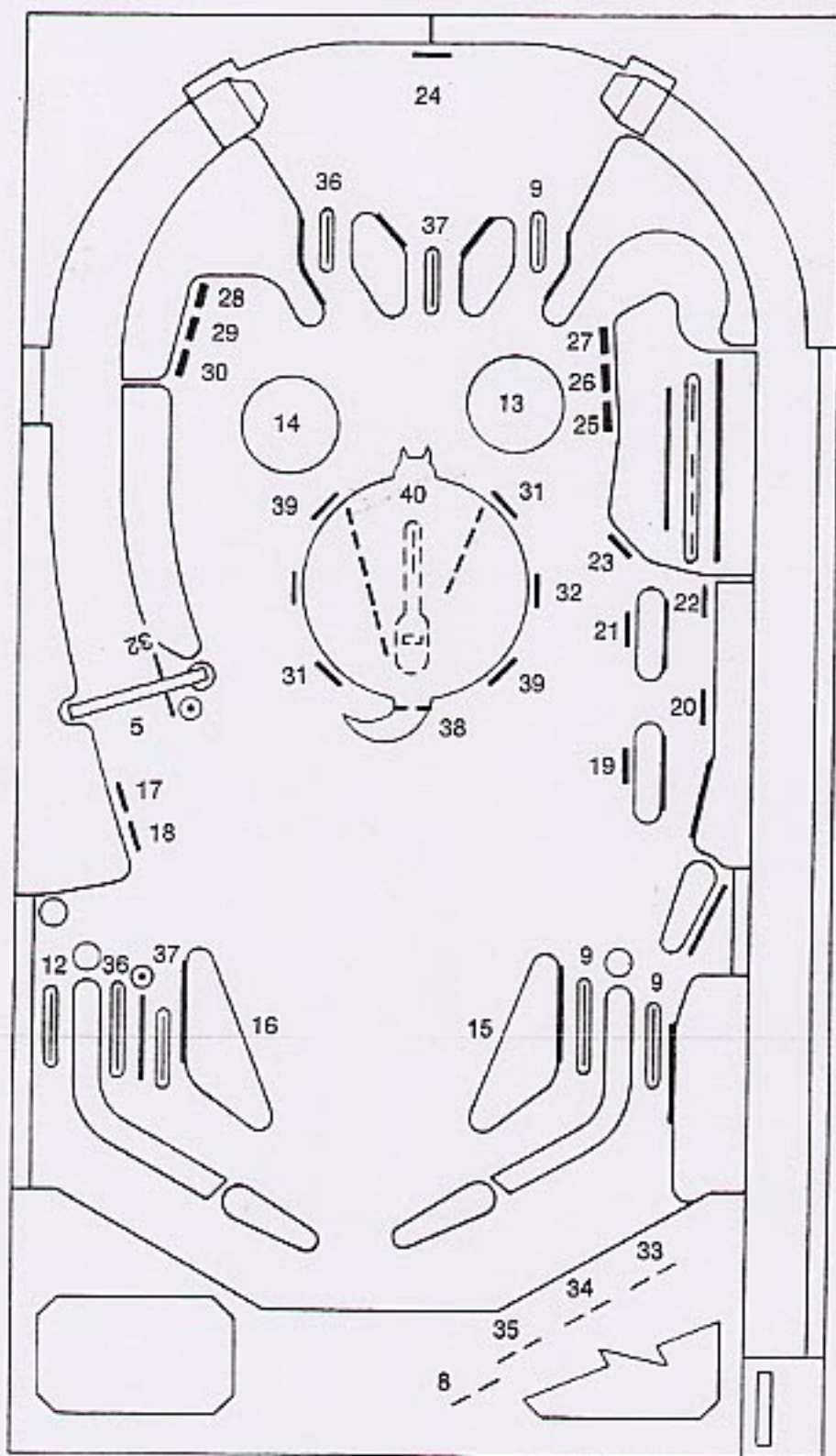
PARTS LIST FOR
ROTO SHOOTER ASSEMBLY C-2077

| STERN PART NO. | DESCRIPTION | REFERENCE/ DESIGNATION |
|----------------|---|--------------------------------|
| 17A-166-632 | Acorn Pal Nut | 1 |
| 13C-148-16 | Playfield Plastic | 2 |
| 2A-184-6 | Lite Shield Post | 3 |
| 3A-134 | #6 Split Type Lock Washer | 4,8,13,17,32,37 |
| 4A-281-R | Plastic Post | 5,9,14,37 |
| 7A-135 | Rubber Ring | 6,11,30,35 |
| 31B-266 | #6-32x2" LG. R. HD. M. S. | 7,12 |
| B-2050 | Bottom Plate Assembly | 10 |
| 31A-250 | #6-32x3/4" LG. Carriage Bolt | 15 |
| A-2064 | Coil Mounting Bracket Assembly | 16 |
| 32A-121 | #6-32 Hex Nut | 18 |
| | #6-32x1/4" LG. S. R. HD. EXT. L/W Sems. | 19 |
| 1A-271 | Coil Support Bracket | 20 |
| J-26-1200 | Coil | 21 |
| 4A-152 | Solenoid Tubing | 22 |
| A-145 | Plunger And Link Assembly | 23 |
| 5A-175 | Spring | 24 |
| 17A-104-x21 | Ring Retainer | 25 |
| A-143 | Kicker Arm Bracket | 26 |
| 31A-826 | #6x1/2 LG. Hex HD. S. M. Screw | 27,42,49,51,53,55 57,58,60. |
| A-157-1 | Kicker Arm Assembly | 28 |
| 6A-199 | Spring Clip | 29 |
| 32A-123 | #6-32 Hex. Nut | 31,36 |
| 4A-281-R | Plastic Post | 9,14,33,38 |
| 31B-268 | #6-32x21/8" Carriage Bolt | 34,39 |
| C-36-5300 | Coil | 40 |
| A-2066 | Magnetic Coil Mtg. Bracket Assembly | 41 |
| 3A-110 | Flat Washer | 43 |
| 3A-135 | #6 Split Type Lock Washer | 44 |
| 31B-295 | #8-32x3/8 LG. Brass S. R. H. D. M. S. | 45 |
| 6A-101-0 | Wire Form | 46 |
| 6A-101-6 | Wire Form | 47 |
| A-722-R-4 | SQ Stand-Up Target Switch | 48,56 |
| A-722-R-1 | SQ Stand-Up Target Switch | 50,59 |
| A-722-R-2 | SQ Stand-Up Target Switch | 52,61 |
| A-722-R-3 | SQ Stand-Up Target Switch | 54 |
| 31A-525 | #10-32x1/2" LG. W. H. S. | 62,75 |
| 4A-130 | Snap Bushing | 63,76 |
| 1C-2024 | Main Support | 64 |
| 17A-189 | #10-32x3/8" LG. Socket Set Screw | 65,74 |
| A-2049 | Wiper Finger Assembly | 66 |
| 31A-810 | #4x1" LG. P. R. HD. SMS. Type A | 67 |
| SW-458-6 | Switch | 68 |
| C-2052 | Roto Shooter P. C. Board | 69 |
| 1A-2021 | Support Bracket | 70 |
| 31A-857 | #8x1/2" LG. S. I. H. W. SMS. Type A | 71,77 |
| 31B-280 | #8-32x5/16 LG. Sems. S. I. H. W. H. M. S. | 72 |
| 10D-5 | Motor | 73 |
| 6A-277-1 | Roll-Over Wire Form | 78 |
| 1A-214 | Roll-Over Magnet Bracket | 79 |
| 31A-822 | #6x3/8" LG. P. R. HD. S. M. S. | 80 |



ROTO SHOOTER ASSEMBLY C-2077

**VIPER
SWITCHES**

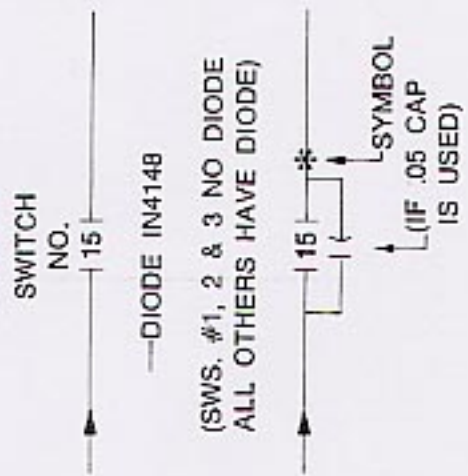


SWITCHES NOT ON PLAYFIELD

- | | |
|------------------|------------------|
| 1. *LEFT CHUTE | 6. CREDIT BUTTON |
| 2. *CENTER CHUTE | 7. TILT |
| 3. *RIGHT CHUTE | |

*SEE DRAWG. ON SWITCH IDENTIFICATION PAGE

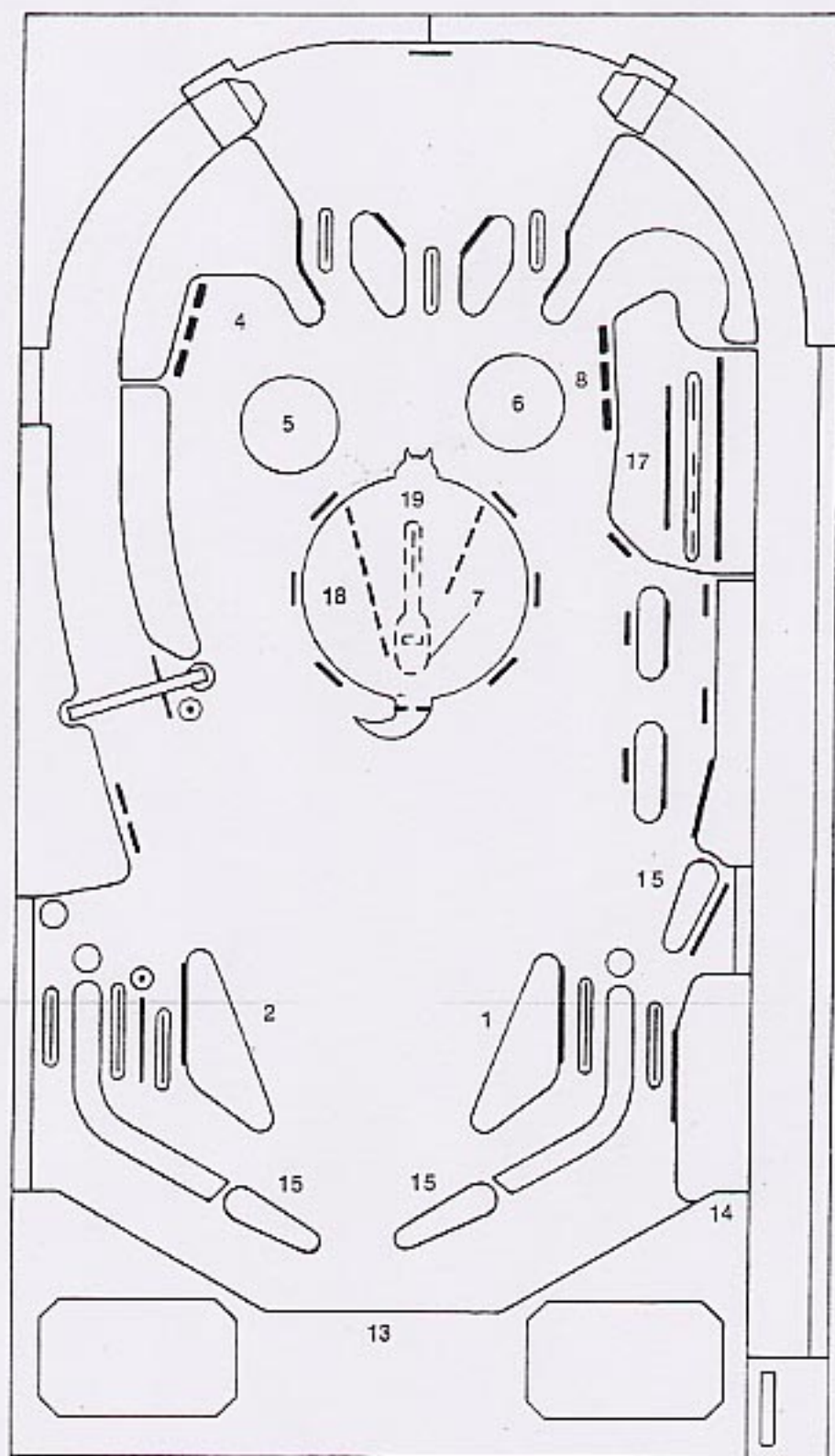
SWITCH IDENTIFICATION



| SWITCH NO. | WIRE COLOR | JACK NO. | DESCRIPTION |
|------------|------------|----------|-------------------------|
| 17 | BRN | J2-8 | TARGET 8 |
| 18 | GREY | J2-9 | TARGET 7 |
| 19 | W-O | J2-10 | TARGET 6 |
| 20 | W-B | J2-11 | TARGET 5 |
| 21 | W-G | J2-12 | TARGET 4 |
| 22 | W-BRN | J2-13 | TARGET 3 |
| 23 | BRN-Y | J2-14 | TARGET 2 |
| 24 | -O- | J2-15 | TARGET 1 |
| 25 | BRN | J2-8 | RIGHT DROP BANK (RIGHT) |
| 26 | GREY | J2-9 | RIGHT DROP BANK (MID.) |
| 27 | W-O | J2-10 | RIGHT DROP BANK (LEFT) |
| 28 | W-B | J2-11 | LEFT DROP BANK (RIGHT) |
| 29 | W-G | J2-12 | LEFT DROP BANK (MID.) |
| 30 | W-BRN | J2-13 | LEFT DROP BANK (LEFT) |
| 31 | BRN-Y | J2-14 | ROTOR TARGET (BLUE) |
| 32 | -O- | J2-15 | ROTOR TARGET (WHITE) |
| 33 | BRN | J2-8 | RIGHT OUTHOLE |
| 34 | GREY | J2-9 | MIDDLE OUTHOLE |
| 35 | W-O | J2-10 | LEFT OUTHOLE |
| 36 | W-B | J2-11 | ROLL OVER LEFT (1) |
| 37 | W-G | J2-12 | ROLL OVER MIDDLE (2) |
| 38 | W-BRN | J2-13 | ROTOR TARGET (RED) |
| 39 | BRN-Y | J2-14 | ROTOR TARGET (YELLOW) |
| 40 | -O- | J2-15 | ROTOR CATCH |

| 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 | ROTOR FIRE |
| 5 | W-G | J2-12 | SPINNER |
| 6 | BLU-W | J3-14 | CREDIT (START) BUTTON |
| 7 | BLU-O | J3-15 | TILT |
| 8 | -Y- | J3-16 | OUTHOLE REFLEX |
| 9 | BRN | J2-8 | RIGHT ROLL OVER (3) |
| 10 | | J2-9 | N/U |
| 11 | W-O | J2-10 | BALL WALKER SW. |
| 12 | W-B | J2-11 | LEFT OUT LANE |
| 13 | W-G | J2-12 | RIGHT THUMPER BUMPER |
| 14 | W-BRN | J2-13 | LEFT THUMPER |
| 15 | BRN-Y | J2-14 | RIGHT SLINGSHOT |
| 16 | -O- | J2-15 | LEFT SLINGSHOT |

VIPER
SOLENOIDS



SOLENOID NOT ON PLAYFIELD
3. KNOCKER

TABLE 8-3. VIPER SOLENOID IDENTIFICATION

| I.D. NUMBER | TRANS. NUMBER | JACK | WIRE COLOR | DESCRIPTION |
|------------------------|--------------------------|-------------|-----------------------|----------------------|
| 1 | Q1 | J2-9 | G-O | RIGHT SLINGSHOT |
| 2 | Q2 | J2-4 | G-BLU | LEFT SLINGSHOT |
| 3 | Q3 | J2-5 | G-B | KNOCKER |
| 4 | Q4 | J1-5 | B-BLU | LEFT DROP BANK |
| 5 | Q5 | J2-10 | G-Y | LEFT THUMPER BUMPER |
| 6 | Q6 | J2-11 | G-R | RIGHT THUMPER BUMPER |
| 7 | Q7 | J2-12 | R-Y | FIRE MISSILE |
| 8 | Q8 | J5-10 | B-O | RIGHT DROP BANK |
| 9 | Q9 | J5-9 | N/U | N/U |
| 10 | Q10 | J5-15 | N/U | N/U |
| 11 | Q11 | N/U | N/U | N/U |
| 12 | Q12 | N/U | N/U | N/U |
| 13 | Q13 | J5-12 | B-Y | OUTHOLE REFLEX |
| 14 | Q14 | J5-11 | B-G | OUTHOLE TURNSTYLE |
| 15 | Q15 | J1-8, 9 | 8-G, 9-O | FLIPPER ENABLE RELAY |
| 16 | Q16 | N/U | N/U | N/U |
| 17 | Q17 | J5-7 | O-R | BALL WALKER |
| 18 | Q18 | J5-3 | R-W | ROTOR RELAY (ON/OFF) |
| 19 | Q19 | J2-8 | B-W | ROTOR BALL HOLDER |

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

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

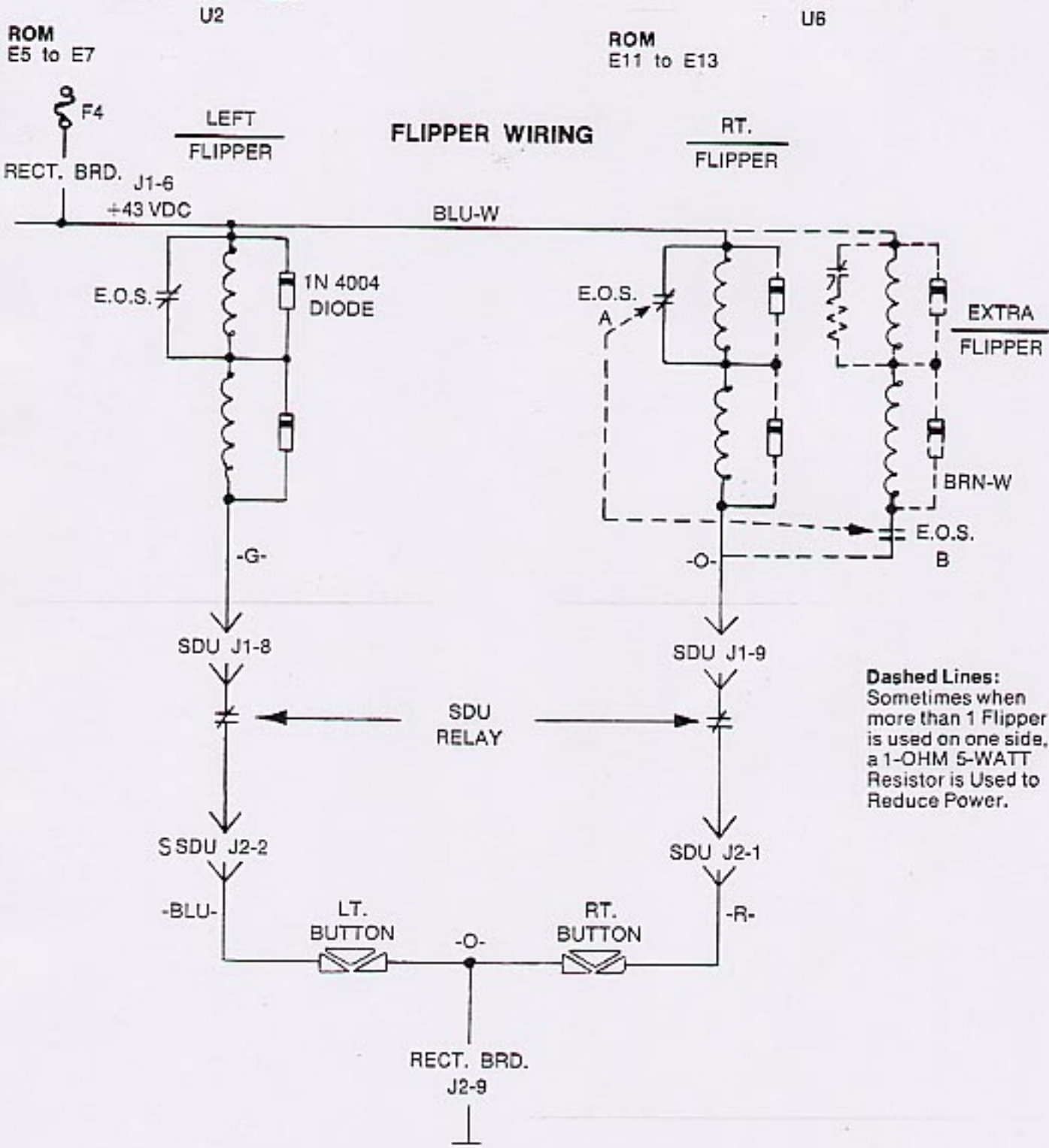
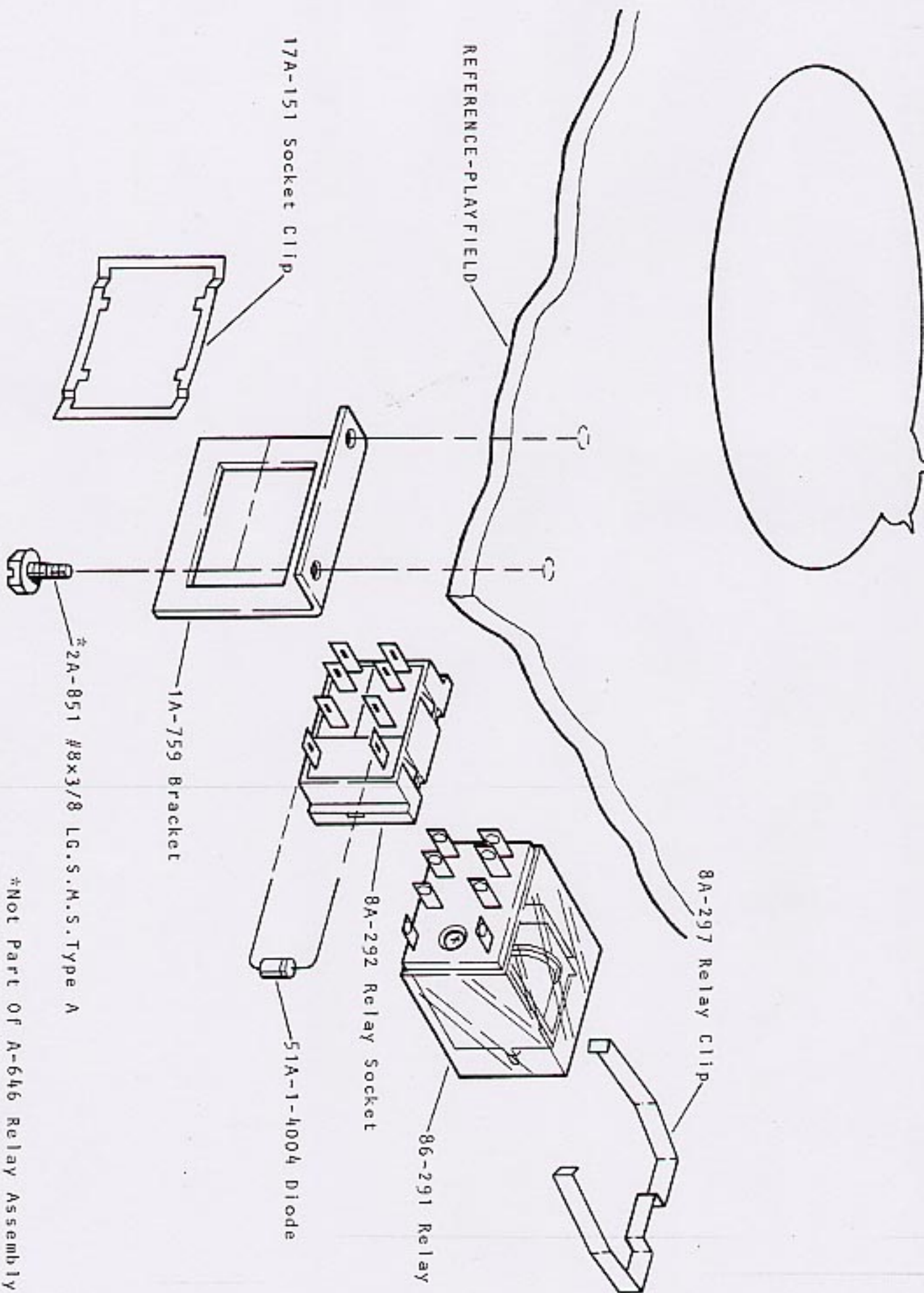


FIGURE 8-4. ADDITIONAL FLIPPER WIRING



*Not Part Of A-646 Relay Assembly

ROTO SHOOTER RELAY ASSEMBLY A-646



1725 Diversy Parkway, Chicago, Illinois 60614
(312) 935-4800, Telex 25-4857
Toll Free Service Assistance (800) 821-6424