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 display. 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 ASSEMBLY
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. Regulator
Assem.

Voice Synthesizer Unit
(USED IN VOICE GAMES ONLY)

LED
Lamp Driver Assem.

Cabinet

Transformer Assem.

Inclined Tilt
Plumb Bob Tilt
Speaker
S-33
(MEMORY CLEAR)

Self Test
Credit Button

Slam Switch
Front Door

Rectifier Board

Knocker
(WHEN USED)

Volume Control

Leg Leveling
Adjustment (Typ)

S9

S8

S1

ON

Detail S1-S32
MPU Ass'y

Electronic Pinball 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 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 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   | Flashing 0 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

<table>
<thead>
<tr>
<th>TEST SWITCH PUSH NUMBER</th>
<th>BALL/MATCH DISPLAY</th>
<th>DESCRIPTION</th>
<th>DISPLAYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th</td>
<td>01</td>
<td>1st Threshold (Bonus Time)</td>
<td>00 to 99</td>
</tr>
<tr>
<td>7th</td>
<td>02</td>
<td>2nd Threshold (High Score)</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>8th</td>
<td>03</td>
<td>3rd Threshold (High Score)</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>9th</td>
<td>04</td>
<td>Current High Game Threshold</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>10th</td>
<td>05</td>
<td>Current Credits</td>
<td>00 to 99</td>
</tr>
<tr>
<td>11th</td>
<td>06</td>
<td>Total Plays</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>12th</td>
<td>07</td>
<td>Total Replays</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>13th</td>
<td>08</td>
<td>Total times high score is passed</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>14th</td>
<td>09</td>
<td>Number of coins thru Chute No. 2</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>15th</td>
<td>10</td>
<td>Number of coins thru Chute No. 1</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>16th</td>
<td>11</td>
<td>Number of coins thru Chute No. 3</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>17th</td>
<td>12</td>
<td>Total balls played</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>18th</td>
<td>13</td>
<td>Total Extra Balls Awarded</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>19th</td>
<td>14</td>
<td>Total Playfield Special Awards</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>20th</td>
<td>15</td>
<td>N/U</td>
<td>00</td>
</tr>
<tr>
<td>21st</td>
<td>16</td>
<td>Total level 1 passed</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>22nd</td>
<td>17</td>
<td>Total level 2 passed</td>
<td>00 to 99999</td>
</tr>
<tr>
<td>23rd</td>
<td>18</td>
<td>Total level 3 passed</td>
<td>00 to 99999</td>
</tr>
</tbody>
</table>
SECTION V. FRONT DOOR GAME ADJUSTMENTS:

HIGH SCORE FEATURE ADJUSTMENTS:
This game is designed to award Optional Bonus Time, or Extra Ball/Free Game at the first score level. It will only give extra ball or free game at the 2nd and 3rd score levels.
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', 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.
2a. Bonus Time Feature for 1st score level — PMU Switch #5 On.
2b. Extra Ball or Free Game Option for 1st level — MPU Switch #5 Off.
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

LIGHTING

3 BALLS

1ST LEVEL PAST---------------------- 200,000---------------------- 30 SECONDS BONUS TIME
2ND LEVEL PAST---------------------- 660,000---------------------- 1 CREDIT
3RD LEVEL PAST---------------------- 1,700,000---------------------- 1 CREDIT
4TH LEVEL PAST---------------------- 2,500,000---------------------- HIGH SCORE TO DATE

5 BALLS

1ST LEVEL PAST---------------------- 250,000---------------------- 30 SECONDS BONUS TIME
2ND LEVEL PAST---------------------- 460,000---------------------- 1 CREDIT
3RD LEVEL PAST---------------------- 800,000---------------------- 1 CREDIT
4TH LEVEL PAST---------------------- 1,260,000---------------------- HIGH SCORE TO DATE
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 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.

TABLE 7-2. MPU SWITCH/GAME ADJUSTMENTS

<table>
<thead>
<tr>
<th>Switch</th>
<th>Description</th>
<th>ON Values</th>
<th>OFF Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>Red Special Award</td>
<td>ON</td>
<td>OFF</td>
</tr>
<tr>
<td>31</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>30</td>
<td>Green Special Award</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>29</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>28</td>
<td>Coin Chute #3</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>25</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>24</td>
<td>Red Special Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>23</td>
<td>Extra Ball Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>22</td>
<td>Extra Ball Option</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>21</td>
<td>Match Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>20</td>
<td>Display Credits</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>19</td>
<td>Maximum Credit</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>17</td>
<td>Green Special Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>16</td>
<td>High Score</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>15</td>
<td>Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>14</td>
<td>Add-A-Ball Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>13</td>
<td>Add-A-Ball Option</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>12</td>
<td>Coin Chute #2</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>9</td>
<td>Background Sound</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>8</td>
<td>Ball Per Game</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>7</td>
<td>High Score Feature</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>6</td>
<td>Extra Time Option</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>4</td>
<td>Coin Chute #1</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td>1</td>
<td>Red Special Option</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>When 5X is Reached</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>Green Special Option</td>
<td>OFF</td>
<td>ON</td>
</tr>
<tr>
<td></td>
<td>When 1-2-3 is Lit 2nd Time</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>
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**

<table>
<thead>
<tr>
<th>MPU SWITCHES</th>
<th>28</th>
<th>27</th>
<th>26</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>SWITCH No. 1 (BLU) (NEXT TO HINGE)</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>SWITCH No. 2 (BRN-WHITE) (CENTER)</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>SWITCH No. 3 (RED-WHITE) (NEXT TO LOCK)</td>
<td>OFF OFF OFF OFF</td>
<td>OFF OFF OFF OFF</td>
<td>OFF OFF ON ON</td>
<td>PER 1 ON ON ON ON</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CREDITS</th>
<th>COINS</th>
<th>SEQUENCE OF CREDITS PER COIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON OFF OFF ON</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ON OFF ON OFF</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>ON ON OFF OFF</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>ON ON OFF ON</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ON ON ON OFF</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>ON ON ON ON</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>NO. OF BALLS PER GAME</th>
<th>MPU SWITCH 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
</tr>
</tbody>
</table>

ADD-A-BALL (MEMORY):
This adjustment can store in memory 3 or 5 “Add-A-Balls.”

<table>
<thead>
<tr>
<th>ADD-A-BALL (MEMORY)</th>
<th>MPU SWITCH 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>OFF</td>
</tr>
<tr>
<td>5</td>
<td>ON</td>
</tr>
</tbody>
</table>

CREDIT DISPLAY:

<table>
<thead>
<tr>
<th>CREDIT DISPLAY</th>
<th>MPU SWITCH 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>ON</td>
</tr>
<tr>
<td>NO</td>
<td>OFF</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>AWARDED MAXIMUM CREDITS</th>
<th>MPU SWITCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>18 OFF</td>
</tr>
<tr>
<td>15</td>
<td>19 OFF</td>
</tr>
<tr>
<td>25</td>
<td>ON OFF</td>
</tr>
<tr>
<td>40</td>
<td>ON ON</td>
</tr>
</tbody>
</table>

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.)

<table>
<thead>
<tr>
<th>AWARD</th>
<th>MPU SWITCH 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra Ball</td>
<td>OFF</td>
</tr>
<tr>
<td>Replay</td>
<td>ON</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>AWARD</th>
<th>MPU SWITCHES</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Free Game</td>
<td>15 OFF 16 OFF</td>
</tr>
<tr>
<td>1 Free Game</td>
<td>15 ON 16 OFF</td>
</tr>
<tr>
<td>2 Free Games</td>
<td>15 OFF 16 ON</td>
</tr>
<tr>
<td>3 Free Games</td>
<td>15 ON 16 ON</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>MATCH</th>
<th>MPU SWITCH 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON</td>
<td>21 ON</td>
</tr>
<tr>
<td>OFF</td>
<td>21 OFF</td>
</tr>
</tbody>
</table>

Knocking down the 1-2-3 drop target banks in order awards red special.
Knocking down the 1-2-3 drop target banks in order a second time awards green special.
Knocking down drop target banks in order spots one (1) red arrow.
Lighting all red arrows on playfield gives multi-ball feature.
During multi-ball, blue arrows light to advance playfield multiplier, by going through hoop.
Lighting the 4 yellow arrows on the playfield, lights the yellow X's which advance bonus multiplier by going through hoop. When you have 5x bonus lit, and you lose the ball in play, after bonus score is awarded the bonus multiplier will reset back to 2x for your next ball.
GREEN SPECIAL FEATURE:

SPECIALS
1 Per Ball
1 Per Game

MPU SWITCH 17
ON
OFF

GREEN SPECIAL AWARD:

MPU SWITCHES
29 30
OFF OFF
OFF ON
ON OFF
ON ON

SPECIAL AWARD
No Award
Extra Ball
100,000 Points
Replay

RED SPECIAL FEATURE:

MPU SWITCH 24
ON
OFF

SPECIALS
1 Per Ball
1 Per Game

RED SPECIAL AWARD:

MPU SWITCHES
31 32
OFF OFF
OFF ON
ON OFF
ON ON

SPECIAL AWARD
No Award
Extra Ball
100,000 Points
Replay

BONUS TIME AWARD:
This Feature gives a Replay or Bonus Time for passing the 1st score level. Bonus Time gives 30 seconds extra playing time after losing the ball in play.

MPU SWITCH 5
ON
OFF

Bonus Time
Replay
# Parts List

## Lightning

### Miscellaneous
- Transformer (Domestic or Export) ................................................................. 16B-6
- Transformer & Rectifier Board ................................................................. B438-4
- Bulbs, #44 ................................................................................................. 8A-101
- U1 ............................................................................................................... E126-U1C14
- U2 ............................................................................................................... E126-U2C14
- U5 ............................................................................................................... E126-U5C14
- U6 ............................................................................................................... E126-U6C14
- U9 Voice E-Prom ..................................................................................... E126-U9VO
- U10 Voice E-Prom .................................................................................. E126-U10VO

### Assembly Coils
- 3 Drop Target Bank (3) ........................................................................ B-27-2300
- Flippers ................................................................................................. J-25-475/34-4500
- Top Slingshot (2) .................................................................................. J-26-1600
- Bottom Slingshot (2) ........................................................................... J-26-1500
- Ball Ejector ............................................................................................ J-28-2300
- Ball Ejector Release ............................................................................. J-28-2300
- Ball Trap (2) ........................................................................................... J-28-2300
- Knocker .................................................................................................. N-26-1200

### Modules
- Lamp Driver ............................................................................................. B-431
- Display Driver ......................................................................................... A-645
- Match, Ball in Play Display & Playfield Bonus Timer ................................ A-434
- Bonus Timer Interface Board .................................................................... A-866
- 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

**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.

**120V**

- Solder Lugs 1 & 3 Together, Solder Heavy Red Wire To Lug 1

**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.

**240V**

- Solder Heavy Yellow Wire To Lug 7

**220V**

- Solder Heavy Yellow Wire To Lug 12
LIGHITNG
PLAYFIELD PARTS

RUBBER RINGS
R1-7A-120-100   R5-7A-120-250
R2-7A-120-150   R6-7A-120-275
R3-7A-120-200   R7-7A-135
R4-7A-120-225

BALL GUIDES & ROLL-OVERS
W1-A-149        W8-B-873
W2-A-867        W9-1A-945
W3-A-868        W10-6A-101
W4-A-869        W11-6A-101-G
W5-A-870        W12-6A-279
W6-B-871        (L & R)
W7-B-872        W13-6A-297
W8-B-873        W14-A-860

PLASTIC SHIELDS
13C-126-1 to -15
(P1 to P15)

MISC. PARTS & ASSEMBLIES
1. 3-Bank Drop Target
   D-823-3C (Targets Alone
   13A-20-4)
2. Spin Target Assembly
   A-563-4
3. Lane Gate Assembly A-879
4. Anti-Return Gate
   A-471-1 (RT)-2 (LT)
5. Left Ramp 1B-954
6. Right Ramp 1A-953
7. (7) Stand-Up Targets
   A-722-L-2
8. (2) Stand-Up Targets
   A-722-R-2
   (Rubber Ring 7A-125)
10. Flipper Assembly (Upper)
    B-634-2-L & -R
11. Flipper Assembly (Lower)
    B-634-1-LY & -RY
12. Ball Lift Ramp 1B-955
13. Ball Deflector 1A-762
14. Ball Gate Assembly A-877
15. Instruction Plate
    14B-17-1
16. Shooter Gauge 14A-2-12
17. Display Window 4A-377
18. Mylar Protector 4A-382
19. Switch, Plate and Wireform
    Assembly B-881
    (3) Wire Forms 6A-290-2

GAME ADJUSTMENT
C-CONSERVATIVE
M-MEDIUM
L-LIBERAL
SWITCHES NOT ON PLAYFIELD

1. *LEFT CHUTE
2. *CENTER CHUTE
3. *RIGHT CHUTE
4. 6. CREDIT BUTTON
5. 7. TILT

* SEE DRAWG. ON SWITCH IDENTIFICATION PAGE
### TABLE 8-3. LIGHTNING SOLENOID IDENTIFICATION

<table>
<thead>
<tr>
<th>I.D. NUMBER</th>
<th>TRANS. NUMBER</th>
<th>JACK</th>
<th>WIRE COLOR</th>
<th>DESCRIPTION SLINGSHOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Q1</td>
<td>J2-9</td>
<td>G-O</td>
<td>RIGHT SLINGSHOT (BOTTOM)</td>
</tr>
<tr>
<td>2</td>
<td>Q2</td>
<td>J2-4</td>
<td>G-BLU</td>
<td>RIGHT SLINGSHOT (TOP)</td>
</tr>
<tr>
<td>3</td>
<td>Q3</td>
<td>J2-5</td>
<td>G-B</td>
<td>KNOCKER</td>
</tr>
<tr>
<td>4</td>
<td>Q4</td>
<td>J1-5</td>
<td>B-BLU</td>
<td>OUTHOLE REFLEX</td>
</tr>
<tr>
<td>5</td>
<td>Q5</td>
<td>J2-10</td>
<td>G-Y</td>
<td>LEFT SLINGSHOT (TOP)</td>
</tr>
<tr>
<td>6</td>
<td>Q6</td>
<td>J2-11</td>
<td>G-R</td>
<td>LEFT SLINGSHOT (BOTTOM)</td>
</tr>
<tr>
<td>7</td>
<td>Q7</td>
<td>J2-12</td>
<td>R-Y</td>
<td>TOP DROP BANK</td>
</tr>
<tr>
<td>8</td>
<td>Q8</td>
<td>J5-10</td>
<td>B-O</td>
<td>TURN STYLE</td>
</tr>
<tr>
<td>9</td>
<td>Q9</td>
<td>J5-9</td>
<td>R-BLU</td>
<td>TRAP LEFT</td>
</tr>
<tr>
<td>10</td>
<td>Q10</td>
<td>J5-15</td>
<td>O-W</td>
<td>TRAP RIGHT</td>
</tr>
<tr>
<td>11</td>
<td>Q11</td>
<td>N/U</td>
<td>N/U</td>
<td>N/U</td>
</tr>
<tr>
<td>12</td>
<td>Q12</td>
<td>N/U</td>
<td>N/U</td>
<td>N/U</td>
</tr>
<tr>
<td>13</td>
<td>Q13</td>
<td>J5-12</td>
<td>B-Y</td>
<td>MID DROP TANK</td>
</tr>
<tr>
<td>14</td>
<td>Q14</td>
<td>J5-11</td>
<td>B-G</td>
<td>LEFT DROP TANK</td>
</tr>
<tr>
<td>15</td>
<td>Q15</td>
<td>J1-8,9</td>
<td>8-G, 9-O</td>
<td>FLIPPER ENABLE RELAY</td>
</tr>
<tr>
<td>16</td>
<td>Q16</td>
<td>N/U</td>
<td>N/U</td>
<td>N/U</td>
</tr>
<tr>
<td>17</td>
<td>Q17</td>
<td>N/U</td>
<td>N/U</td>
<td>N/U</td>
</tr>
<tr>
<td>18</td>
<td>Q18</td>
<td>J2-15</td>
<td>R-W</td>
<td>BONUS BOARD</td>
</tr>
<tr>
<td>19</td>
<td>Q19</td>
<td>N/U</td>
<td>N/U</td>
<td>N/U</td>
</tr>
</tbody>
</table>
Solenoid Not On Playfield

3. Knocker
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.

ROM | E-PROMS (paper on top) | ROM | E-PROM | U5 | E-PROM | U6 | E-PROM
---|------------------------|---|--------|---|--------|---|--------
Stern #25A- | E9 to E8 | E9 to E10 | E19 to E20 | U2 | E28 to E26 | E28 to E27 | E29 to E31 | U6 | E13 to E12 | E13 to E14 | E25 to E22 | E25 to E23
E5 to E1 | E5 to E7 | E6 | E3

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
---|--------|---|--------|---

**Figure 8-4. ADDITIONAL FLIPPER WIRING**

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