WARNING: THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND IF NOT INSTALLED AND USED IN ACCORDANCE WITH THE INSTRUCTIONS MANUAL, MAY CAUSE INTERFERENCE TO RADIO COMMUNICATIONS. AS TEMPORARILY PERMITTED BY REGULATION IT HAS NOT BEEN TESTED FOR COMPLIANCE TO SUBPART J OF PART 15 OF FCC RULES; WHICH ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINST SUCH INTERFERENCE. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE INTERFERENCE IN WHICH CASE THE USER AT HIS OWN EXPENSE WILL BE REQUIRED TO TAKE WHATEVER MEASURES MAY BE REQUIRED TO CORRECT THE INTERFERENCE.
# Installation and General Game Operation Instructions

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</tr>
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</table>
I. INSTALLATION

Assemble the game as follows:

Bolt legs to cabinet. Bolt back box to cabinet. Use flat washers under bolt heads. Gently feed cable connectors and ground braid through cable port in back box. Screw ground braid to hinge in back box. Carefully and fully insert connectors on printed circuit assemblies.

On all games there are certain items that should be checked after shipment. These are visual inspections which may avoid time consuming service work later. Minor troubles caused by abusive handling in shipment are unavoidable. Cable connectors may be loosened, switches (especially slam switches) may go out of adjustment.

Visual inspections before plugging in line cord:

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

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

1. Panel slam on bottom of playfield panel.
2. Ball slam on side of cabinet. Insert the smaller ball (15/16” dia.) into the ball slam assembly, and adjust the bracket so the ball will roll free to contact the switch blade, if front of cabinet is raised.

TRANSFORMER CONNECTION INSTRUCTIONS
REFER TO POWER SUPPLY SCHEMATIC IN GAME MANUAL FOR TABLE “A”

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 VAC, 2-8, 3-6, 7-10</td>
<td></td>
</tr>
<tr>
<td>120 VAC, 2-8, 4-6, 7-11</td>
<td></td>
</tr>
<tr>
<td>220 VAC, 4-8, 7-9</td>
<td></td>
</tr>
<tr>
<td>240 VAC, 4-8, 7-11</td>
<td></td>
</tr>
</tbody>
</table>

A20 AUX POWER MODULE AS-3200
SEE W 1186-19

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 VAC, J1-1 &amp; J1-4</td>
<td></td>
</tr>
<tr>
<td>115 VAC, J1-1 &amp; J1-5</td>
<td></td>
</tr>
<tr>
<td>120 VAC, J1-1 &amp; J1-6</td>
<td></td>
</tr>
<tr>
<td>220 VAC, J1-1 &amp; J1-7</td>
<td></td>
</tr>
<tr>
<td>240 VAC, J1-1 &amp; J1-8</td>
<td></td>
</tr>
</tbody>
</table>

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

Place balls in lower playfield.

Coin game. Coin should be rejected. Plug in line cord. Move power ON-OFF master switch at the bottom right front corner of the cabinet to "ON" position. The game will play a power-up sound to announce game readiness. Scores are set to zero, alternating with the high to date and the game is ready for play. Coin game. The game should accept the coin and post credits for coins accepted (adjustable). Pressing the credit button on the door will enter one player into play. One player is posted each additional time the credit button is pressed.

Pressing the credit button initiates play.

The game awards all points earned by the player.

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

Slamming the game results in loss of the game. All feature lights go out, the game goes dead and a time delay occurs. The purpose of the time delay is to discourage unnecessary abuse of the machine. After the delay, the power up tune is played.

The time delay occurs anytime one of the slam switches is made to contact. There are two factory installed slam switches, on the front door, and one on left side of cabinet. (Any number of slam switches could be installed by the operator, to meet his individual requirement.) The switch should be adjusted to have approximately 1/16” gap between the contacts. The weighted blade should be adjusted to attain the desired sensitivity. Decreasing the gap between contacts will make the switch more sensitive. Opening the gap will reduce sensitivity.

Some tunes and features can be disabled by operator if so desired. See Back Box Adjustments.

NOTE: Scoring and feature units will differ from game to game.
III. BOOKKEEPING FUNCTIONS

The game is designed to help the operator perform certain accounting functions. The game can display the number of total plays. It can display the number of coins dropped down each coin chute. The bookkeeping functions are displayed on all player score displays simultaneously. An identification number, 05 to 15, appears on the Bases/Ball in Play window as follows:

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

The game displays the first bookkeeping entry if the Self-Test button (See Fig. III) on the inside of the front door is pressed ten times. Alternately push and release the Self-Test button at one second intervals. The number 05 appears in the ‘Bases/Ball in Play’ window. Current credits appear on the player score displays. Each additional press of the button causes the next entry to be displayed.

After the data in each bookkeeping register (positions 05 thru 15) is recorded, it can be set to zero simply by pressing switch button S33, located on A4, the MPU module in the back box (See Fig. III), or by pressing the Coin Chute #3 switch. Any or all registers can be cleared by alternating between the Self-Test button and the switch button S33 on the MPU module or Coin Chute #3 switch. The operator is given this option as a possible convenience and can elect to use or not use it as his needs direct.

Pressing the button 5 more times causes the game to play the power-up tune and game comes to Game Over position.

Service credits are designed to allow the serviceman to test the game under actual play conditions without disturbing the bookkeeping records that reside at identification numbers 06, 07, 10, 11 and 12.

To obtain Service Credits, push and release the Self-Test switch until identification number 05 appears in the ‘Base/Ball in Play’ window. Hold in the Credit button until the desired number of Service Credits (up to five) appears on the player score displays.

NOTE: If, upon accessing identification number 05, a number of credits greater than five is displayed, pressing the credit button has no effect.

Identification number 15 is reserved as a record of the number of Service Credits used.

*The 10,000 level is pre-set at the factory; can be set to zero, initially, if desired.
**If Coin Chute is not used in game, number displayed (if other than 00) on Player Score displays has no significance.

NOTE: If “Total Play” register is reset to zeroes then “Total Replays” register should also be reset to zeroes to maintain the game percentage value.
#1282 RAPID FIRE

FEATURE OPERATION & SCORING

INVADER FEATURE (RED)
The Invader Feature consists of two groups of twenty four (24) lights and eight targets.
The lights will be identified in the following manner. Column number first then row; example 1.1, 4.6 etc.
The idea of this feature is for the “Invaders” to load their “Ships.” This is accomplished by the lights
descending to their two “Ships.” Four entries into a “Ship” will activate that ship to fire upon your “Base
Station.” A shot which gets past your “Force Field” will destroy your “Base Station.”
The player would ward off the attack by shooting the “Invader” targets which would kill an “Invader” in
that column. As a wave is killed the following wave starts at a faster rate.
Any “Invaders” that make it to the “Ships” would restart at the top of its column except flashing. It will
wait there until all other Invaders are killed. At that time the Flashing Invaders will come down in a fast
side to side descending pattern.

SNEAK ATTACK FEATURE (GREEN)
This feature consists of one target and eight (8) lights down the center of the playfield. The attack starts
at the top of the playfield and descends at a very fast rate.
A shot at its target only stops the attack, it does not destroy the attack. The missile is destroyed by
pushing back the attack out the back of the playfield, this is accomplished by multiple shots, each shot
moving the attack back on position.
If the attack is not destroyed it will restart at its present position.

TANK FEATURE (BLUE)
This feature consists of two separate attacks, the left tanks and the right tank. The tanks start at the top
of the game and descend automatically when they reach their bottom position they fire at the Base
Station. A shot which gets past your Force Field destroys your Base Station.
Shots from your Base Station will move the Tanks back one position. A shot from a Laser Cannon will
destroy that tank.

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

START OF GAME SETTINGS

<table>
<thead>
<tr>
<th>SW. #6</th>
<th>SW. #7</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON 2 Panic Buttons</td>
<td>ON 4 Laser Cannons</td>
</tr>
<tr>
<td>OFF 1 Panic Button</td>
<td>OFF 2 Laser Cannons</td>
</tr>
</tbody>
</table>

Threshold Laser Cannon Awards

<table>
<thead>
<tr>
<th>SW. #14 &amp; #15</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF OFF 1 Laser Cannon</td>
</tr>
<tr>
<td>ON OFF 2 Laser Cannons</td>
</tr>
<tr>
<td>OFF ON 3 Laser Cannons</td>
</tr>
<tr>
<td>ON ON 4 Laser Cannons</td>
</tr>
</tbody>
</table>

Forcefield Laser Cannon Switch

<table>
<thead>
<tr>
<th>#8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ON Stops Shot</td>
</tr>
<tr>
<td>OFF Stops shot player loses 1 laser cannon</td>
</tr>
</tbody>
</table>
V. GAME ADJUSTMENTS

A. Back Box Game Adjustments:
Each game has thirty-two switches located on A4, the MPU module, located in the back box, that allow play to be customized to the location. Credits per coin, credit display, and baser per game, are selectable by means of the switches. The switches are contained in four-sixteen lead packages numbered S1-8, S9-16, S17-24, and S25-32 for easy identification. The “ON” toggle position is marked on the assembly. **Turn off power before making adjustments.**

Credits/Coin Adjustments:
The credits per coin are selectable by means of S17-S20 for coin chute #2 (Center). The switch settings and resultant credits/coin are as follows:

<table>
<thead>
<tr>
<th>S20</th>
<th>S19</th>
<th>S18</th>
<th>S17</th>
<th>Credits/Coin</th>
<th>S20</th>
<th>S19</th>
<th>S18</th>
<th>S17</th>
<th>Credits/Coin</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>Same as Coin Chute #1 Settings</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>8/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>1/1 Coin</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>9/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>2/1 Coin</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>10/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>3/1 Coin</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>11/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>OFF</td>
<td>4/1 Coin</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>12/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>5/1 Coin</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>13/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>6/1 Coin</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>14/1 Coin</td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>7/1 Coin</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>15/1 Coin</td>
</tr>
</tbody>
</table>

The credits given are selectable by means of switches 1-5 incl., for coin chute #1 and switches 9-13 incl., for coin chute #3. Thirty-one different credit ratios are available for each coin chute. The switch settings and resultant credits/coin are listed below.

### CREDITS/COIN ADJUSTMENTS

<table>
<thead>
<tr>
<th>COIN CHUTE</th>
<th>SWITCHES</th>
<th>CREDITS</th>
<th>CREDITS</th>
<th>CREDITS</th>
<th>CREDITS</th>
<th>CREDITS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 (HINGE SIDE)</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td>CREDITS/COINS</td>
</tr>
<tr>
<td>OR #3 (RIGHT SIDE)</td>
<td>13</td>
<td>12</td>
<td>11</td>
<td>10</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>1/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>2/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>3/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>4/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>5/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>6/1 Coin</td>
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</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>7/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>8/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>9/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
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<td>10/1 Coin</td>
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</tr>
<tr>
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<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>11/1 Coin</td>
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</tr>
<tr>
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<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>12/1 Coin</td>
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</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>13/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>14/1 Coin</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>15/2 Coins*</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>ON</td>
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</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>OFF</td>
<td>15/2 Coins*</td>
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</tr>
<tr>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
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<td>ON</td>
<td>15/2 Coins*</td>
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</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
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<td>OFF</td>
<td>OFF</td>
<td>14/2 Coins*</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
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<td>ON</td>
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<td>14/2 Coins*</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>0/1st Coin**</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>0/1st Coin**</td>
<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
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<td></td>
</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>0/1st Coin**</td>
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<td>0/1st Coin**</td>
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<td>OFF</td>
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<td>ON</td>
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<td>0/1st Coin**</td>
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</tr>
<tr>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>ON</td>
<td>0/1st Coin**</td>
<td></td>
</tr>
</tbody>
</table>

*No Credits until 2nd coin is dropped.
**No Credits until 4th coin is dropped.
***No Credits until 3rd coin is dropped.
****No Credits until 5th coin is dropped.
MAXIMUM CREDITS: 15 NONADJUSTABLE
BASES PER GAME:  
# BASES/GAME    SWITCHES
   4            32   ON
   3            31   ON
   2            ON   OFF
   1            OFF  ON

CREDIT DISPLAY:  
CREDITS DISPLAYED  SWITCH 27
YES               ON
NO                OFF

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

HIGH SCORE TO DATE OR OVER 10,000,000 SCORE FEATURE:
The game is designed to show the high score to date only. Each time this happens, the winning score becomes the new high score to beat. This score is displayed on 2 player score displays at the end of each game as an incentive to play.

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

Panic button display adjustment:
Liberal       SW. 6 ON   2 at start of game.
Conservative  SW. 6 OFF  1 at start of game.

Laser cannon force field orange burst lites adjustment:
Liberal       SW. 7 ON   2 left and right burst lites will be on at start of game.
Conservative  SW. 7 OFF  Only 2 left burst lites will be on at start of game.

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

Laser cannon threshold score adjustment:
Liberal       SW. 14, 15 ON  Adds 4 orange burst lites.
Medium        SW. 14 OFF, 15 ON  Adds 3 orange burst lites.
Semi-Medium   SW. 14 ON, 15 OFF  Adds 2 orange burst lites.
Conservative  SW. 14, 15 OFF  Adds 1 orange burst lite.

Set of 4 Invaders recall adjustment:
Liberal       SW. 16 ON   Knocking out sets of Invaders will recall each set knocked out for next base.
Conservative  SW. 16 OFF  Knocking out sets of Invaders will not recall for next base.
FRONT DOOR GAME ADJUSTMENTS

High Score Feature Adjustments:
The game is designed to award Laser Cannons Panic Buttons and Base Stations at each of three score levels. The recommended levels are on the score card in the game.
Any level from 50,000 to 9,950,000 can be set as desired. It is also possible to reset (00) any or all of the levels, if desired.

1. Push and release self test button (See Figure 111) at one second intervals approximately six times or until identification number 01 appears on the Base display.

2. The number on the Player Score Displays is the score level. *It can be increased, if desired, by holding the credit button in. To decrease the score level, hold the credit button in and depress and release the Self Test Button. Release the credit button when the desired number appears. Note that the level changes 50,000 points at a time. If the number "00" is left on the displays, the high score feature is eliminated.

Setting the first level automatically sets the second and third.

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

1. Control Panel Assy.          ASE-3199
2. Rail (L & R)                CA-1208-146
3. Top Target Assy.            ASE-3188
4. Single Target Assy. (L)     ASE-3188-1
5. Single Target Assy. (R)     ASE-3188-2
6. Screened Panel Overlay      M-1767-52
7. Left Cannons                M-1629-3
8. Top Cover                   M-1639-4
9. Right Cannons               M-1639-5
10. Playfield Plexiglass       M-1960-1
11. Gun Assembly               ASE-3190
RECOMMENDED
Instruction, Score Cards to be used on RAPID FIRE #1282

BASE STATIONS

<table>
<thead>
<tr>
<th>2 Laser Cannons every</th>
<th>350,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Panic button every</td>
<td>700,000</td>
</tr>
<tr>
<td>1 Base station every</td>
<td>1,050,000</td>
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ADDITIONAL CARDS

<table>
<thead>
<tr>
<th>1 LASER</th>
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<th>BASE</th>
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<tbody>
<tr>
<td>CANNON</td>
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<td>STATION</td>
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<tr>
<td>M-1508-106-E</td>
<td>200,000</td>
<td>400,000</td>
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<tr>
<td>M-1508-106-F</td>
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<td>M-1508-106-G</td>
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<tr>
<td>M-1508-106-H</td>
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<td>M-1508-106-I</td>
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<tr>
<td>M-1508-106-J</td>
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<tr>
<td>M-1508-106-K</td>
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<td>M-1508-106-L</td>
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<table>
<thead>
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<table>
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RECOMMENDED GAME SETTING FOR:

<table>
<thead>
<tr>
<th>PANIC BUTTON DISPLAY 1 OR 2</th>
<th>SWITCH</th>
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<tbody>
<tr>
<td>LASER CANNON ORANGE BURST LITES 2 OR 4</td>
<td>SW. 6 ON</td>
</tr>
<tr>
<td>LASER CANNON ORANGE BURST LITES SHOTS</td>
<td>SW. 7 ON</td>
</tr>
<tr>
<td>LASER CANNON ORANGE BURST LITES SHOTS</td>
<td>SW. 8 ON</td>
</tr>
<tr>
<td>LASER CANNON THRESHOLD SCORE ADDED BURST LITES</td>
<td>SW. 14 ON</td>
</tr>
<tr>
<td>LASER CANNON THRESHOLD SCORE ADDED BURST LITES</td>
<td>SW. 15 OFF</td>
</tr>
<tr>
<td>SET OF 4 INVADERS RECALL</td>
<td>SW. 16 ON</td>
</tr>
<tr>
<td>BASES PER GAME</td>
<td>SW. 31 OFF</td>
</tr>
<tr>
<td>BASES PER GAME</td>
<td>SW. 32 OFF</td>
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</table>
VIII. ROUTINE MAINTENANCE ON LOCATION:

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

It is recommended that these tests be used several times a week to check out the games before play. If faults are discovered, they may be corrected on location if the operator has a stock of replacement modules. See "Trouble Shooting on Location."

MPU Module Self-Test:

At power on, the LED on the MPU module flashes once. (Flicker-Flash). After a pause, it flashes six more times and goes out. A power-up tune is played to announce game readiness. This indicates proper MPU operating condition and successful completion of the power-up test.

Game Self-Diagnostic Tests:

1. Pressing the Self-Test button inside the door initiates the Self-Test routine. All switched lamps flash off and on continuously.

2. Pressing the Self-Test button again causes each digit on each display to cycle from 0 thru 9, and repeat continuously.

3. Pressing Self-Test button again causes the sound module to play the "Game Over" tune repeatedly.

4. Pressing the Self-Test button again causes the MPU to search each switch assembly for stuck contacts. If any are found, the number of the first set encountered is flashed on the Player Score displays. The number remains until the fault is cleared. See Page 17 for help in Stuck Switch Identification. Other numbers may follow if more stuck contacts are present. If there are no stuck switches, the Match/Ball in Play display flashes '0.'

5. Pressing the Self-Test button 22 more times causes the MPU to step thru the threshold and bookkeeping functions described previously and finally to repeat the power-up test. For more rapid exit to power-up, turn the game off, then on. The game is now ready to play.

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

IX. TROUBLESHOOTING ON LOCATION

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

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

ROUTINE MAINTENANCE CHECK

POWER-UP: TURN OFF POWER TURN ON POWER

LED ON MODULE A4 FLASHES 7X

YES

NO SEE SYMPTOM #1. PAGE 15

PRESS SELF-TEST BUTTON ON INSIDE OF FRONT DOOR TO ENTER LAMP DRIVER MODULE TEST

YES

(1)

ALL FEATURE LAMPS LIGHT, FLASH ON AND OFF?

NO SEE SYMPTOM #2. PAGE 15

PRESS SELF-TEST BUTTON (AGAIN) TO ENTER DISPLAY DRIVER MODULE TEST

YES

(2)

ALL DISPLAYS COUNT 0000000 to 9999999

NO SEE SYMPTOM #3. PAGE 15

PRESS SELF-TEST BUTTON (AGAIN) TO ENTER SOUND MODULE TEST

YES

(3)

SOUND MODULE PLAYS "GAME OVER" TUNE

NO SEE SYMPTOM #5. PAGE 16

PRESS SELF-TEST BUTTON (AGAIN) TO ENTER STUCK-SWITCH TEST

YES

(5)

ALL SWITCHES OPEN?

NO SEE SYMPTOM #6. PAGE 16

PRESS SELF-TEST BUTTON 22X OR TURN POWER OFF AND THEN ON. GAME READY TO PLAY. REPEAT ENTIRE TEST IF REPAIR WAS MADE.

STUCK-SWITCH NUMBER IS FLASHED ON PLAYER SCORE DISPLAY AS AN AID IN TROUBLESHOOTING.

See page 17.
1A) SYMPTOM: Game does not play power-up tune when power is turned on. General illumination is present.

ACTION:  A) Turn power OFF. Open back box. Locate light emitting diode (LED) on MPU module A4.
B) Turn Power ON. LED must flash 7X to indicate that module A4 is good. Correct flash sequence is flicker/flash-pause-and then six more flashes and LED goes out.
C) If LED does not come on, or does not flash, or flashes, but less than 7X, turn off power. Replace MPU module A4.

CAUTION: Replacement MPU Module must have same Part Number or incorrect operation will result! See Parts List for MPU Module Part Number.
Turn power ON.

D) If game is correct, it is now ready for play. If game is not correct, refer to Module Replacement procedure. (See Parts List.)

2A) SYMPTOM: Not all feature lamps light during game play.

ACTION:  A) With power ON, open front door. Press button (Self-Test switch) once. If the game is correct, all feature lamps flash ON and OFF.
B) Carefully raise playfield or open back box to gain access to lamps.
C) Replace bulbs that do not flash.
D) If game is correct, it is now ready for play.
E) If game is not correct, turn power OFF. Replace Lamp Driver Module A5. Turn power ON and repeat A.
F) If game is correct, if is now ready for play.*
G) If game is not correct, turn power OFF. Replace MPU module A4. See CAUTION, 1C. Turn power ON and repeat A.
H) If game is correct, it is now ready for play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)

2B) SYMPTOM: One or some switched lamps always ON.

ACTION: Repeat 2AA, AB, AE, and AF and, if necessary AG & AH.

3A) SYMPTOM: Display digits improper on one or several, but less than all Display Driver module(s). A1. Improper: One or several segments always OFF, digits mottled or several segments or digit(s) always ON.

ACTION:  A) With power ON, open front door. Press button (Self-Test switch) twice. If the game is correct, each digit on each Display Driver Module A1 (5 used/game) displays the count 1-9 and 0 continuously in all 6 digit positions. Note defective Display Driver modules.
B) Turn power OFF.

C) Replace Display Driver module(s) A1. Turn power ON. Repeat A.
D) If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)

3B) SYMPTOM: All displays improper (all five display Driver modules). Improper: Digit(s) always on or off/segment(s) always on or off, all displays.

ACTION:  A) Repeat 3AA, and AB.
B) Replace MPU module A4. See CAUTION NOTE, 1C. Turn power ON. Repeat A.
C) If game is correct, it is now ready to play.* If game is not correct, refer to Module Replacement procedure. (See Parts List.)

3C) SYMPTOM: One or several displays always off.
ACTION: 
A) Do 3AA, AB, AC, and AD.
B) Repeat 3BB and BC, if necessary.

4A) SYMPTOM: Solenoid(s) do(es) not pull-in during course of game.
ACTION: 
A) Carefully lift the playfield (or open the back box) to gain access to the solenoid. Turn power OFF. Inspect the solenoid.
B) If a lead is broken off, repair. Repeat A & B. If game is correct, it is now ready for Play.* If solenoid wiring was correct, turn power OFF.
C) Replace Solenoid Driver/Voltage Regulator module A3. See CAUTION NOTE 3AB.
D) Replace Sound Module A8.
E) Replace MPU module A4. See CAUTION NOTE 1C.

4B) SYMPTOM: Solenoid(s) always energized—Note: if impulse solenoids (gun strobe lights, etc.) are energized continuously, they are subject to damage. Limit troubleshooting to one minute with power ON, followed by five minutes with power OFF. Repeat as necessary. Replace damaged solenoids.
ACTION: 
Do 4AA, AB, AE, AF, AG, AH and if necessary, A1 and AJ.

5) SYMPTOM: No Sound.
ACTION: 
A) With Power ON, open front door, press Self-Test switch four times.
B) If correct, sound will be heard. If incorrect, try seating speaker lead connector (J2) and input connector (J1).
C) If correct, sound will be heard. If incorrect, refer to Module Replacement procedure.

6) SYMPTOM: Feature (Targets, etc.) does not score.
ACTION: 
A) With power ON, open front door. Press button (Self-Test switch) five times.
B) If the game is correct, Base in Play display would flash ‘0’. If a number appears on the Player Score displays, see Switch Assembly Identification Table, Page 17 and Figure V.
C) Carefully lift the playfield. Locate the switch assembly identified from the number. Visually inspect the switch assembly. If the contacts are ‘stuck,’ regap them to 1/16". See section under ADJUSTMENTS. Repeat A & B. If the game is correct, it is now ready to play.* If game is not correct, turn the power OFF.
D) Replace MPU module A4. See CAUTION NOTE 1, C.
E) Repeat A & B. If the game is correct, it is now ready to play.* If the game is not correct, refer to Module Replacement Procedure. (See Parts List).

7) SYMPTOM: Game blows fuse(s) repeatedly.
ACTION: 
See Module Replacement Procedure. F.O. 560-3.

*Turn power On-Off switch OFF and then ON.
### GAME #1282 RAPID
#### SWITCH IDENTIFICATION TABLE

<table>
<thead>
<tr>
<th>Self Test #</th>
<th>DESCRIPTION</th>
<th>Self Test #</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>FIRE LEFT GUN</td>
<td>21</td>
<td>LEFT #1 TANK (TOP)</td>
</tr>
<tr>
<td>02</td>
<td>FIRE RIGHT GUN</td>
<td>22</td>
<td>LEFT #2 TANK</td>
</tr>
<tr>
<td>03</td>
<td>GUN LEFT MOVE BUTTON</td>
<td>23</td>
<td>LEFT #3 TANK</td>
</tr>
<tr>
<td>04</td>
<td>GUN RIGHT MOVE BUTTON</td>
<td>24</td>
<td>LEFT #4 TANK (BOTTOM)</td>
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<td>05</td>
<td>LASER BUTTON (RIGHT)</td>
<td>25</td>
<td>TOP #1 FLAP (RIGHT SIDE)</td>
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<td>06</td>
<td>CREDIT BUTTON (ON DOOR)</td>
<td>26</td>
<td>TOP #2 FLAP</td>
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<tr>
<td>07</td>
<td>PANIC BUTTON (LEFT)</td>
<td>27</td>
<td>TOP #3 FLAP</td>
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<td>08</td>
<td>SPECIAL CREDIT BUTTON (ON CABINET)</td>
<td>28</td>
<td>TOP #4 FLAP</td>
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<tr>
<td>09</td>
<td>COIN III (RIGHT)</td>
<td>29</td>
<td>TOP #5 FLAP</td>
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<td>10</td>
<td>COIN I (LEFT)</td>
<td>30</td>
<td>TOP #6 FLAP</td>
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<tr>
<td>11</td>
<td>COIN II (MIDDLE)</td>
<td>31</td>
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<td>32</td>
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<td>SLAM (3)</td>
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<td>RIGHT #1 TANK (TOP)</td>
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<td>20</td>
<td>RIGHT #4 TANK (BOTTOM)</td>
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#1282 RAPID FIRE

SWITCH ASSEMBLY IDENTIFICATION NUMBERS

NOTE: CABINET: 08, 16
DOOR: 06, 09, 10, 11, 16
CONTROL PANEL: 01, 02, 03, 04, 05, 07

FIGURE V
ASSEMBLY ADJUSTMENTS:

GENERAL:
All switch assemblies consist of leaf springs, contacts, separators, plastic tubing and screws to hold them to the mounting surface. Before attempting to adjust a switch assembly, make sure that these screws are tight. If not, tighten screw closest to the contact end of the leaf spring first. This will prevent the assembly from being secured in such a manner that the leaf springs tend to fan out. In general, all leaf springs are adjusted for a 1/16” gap in the open position and .010” overtravel or wipe in the closed position. All contacts should be in good condition. Unless otherwise instructed, they should be dry or non-lubricated. All contacts should be free of dust and dirt. Contacts are plated to resist corrosion. Filing or burnishing breaks the finish and encourages corrosion. Clean by closing the contacts over a clean piece of paper (e.g. a business card) and wiping gently until the contacts are clean.

X. SERVICE PARTS:
A parts catalogue is available upon request. The catalogue is illustrated and lists all replacement parts for each game manufactured by Bally. Requests should be addressed to:

BALLY MANUFACTURING CORPORATION
2640 WEST BELMONT AVENUE
CHICAGO, ILLINOIS 60618
ATTN: PARTS DEPARTMENT
XI. PARTS LIST
#1282 RAPID FIRE

<table>
<thead>
<tr>
<th>MISCELLANEOUS</th>
<th>PART NUMBER</th>
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<tbody>
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<td>E-122-142</td>
</tr>
<tr>
<td>Bulbs, #555</td>
<td>E-125-73</td>
</tr>
</tbody>
</table>

| ASSEMBLY COILS                             |             |
| Goin Lockout                               | FO-36-7000  |
| Gun                                        | N-23-1110   |

| MOTORS                                     |             |
| Agitator                                   | E-119-506   |
| Ball Filler                                | E-119-505   |
| Fan Motor                                  | E-119-508   |

| PLAYFIELD PARTS                            |             |
| See Figure II                              |             |

| MODULES                                    |             |
| Lamp Driver A5 (2 used)                    | AS-2518-23  |
| Display Driver A1 (1 used)                 | AS-2518-21  |
| Display Driver A1 (2 used)                 | AS-2518-58  |
| Solenoid Drive/Voltage Regulator A3        | AS-2518-22  |
| MPU A4                                     | AS-2962-34  |
| Transformer & Rectifier A2                 | AS-2877-6   |
| Rectifier Board (Part of A2)               | AS-2518-54  |
| Squawk & Talk                              | AS-3107-11  |
| Optical Switch                             | AS-2518-95  |
| Single Target Optical Switch               | AS-2518-100 |
| Single Target Optical Switch               | AS-2518-101 |
| Ball Delivery Sensor & Motor Control       | AS-2518-102 |
| Ball Delivery (LED) Control                | AS-2518-103 |

| REPAIRS PROCEDURES/AIDS                    |             |
| Module & Component Replacement             | FO. 560-3   |
| AID (Assistance in Diagnostics)            |             |
| Kit, used with F.O. 560-3                  | Kit #485-1  |

| MODULE COMPONENTS                           |             |
| SEE MODULE PARTS LIST                       |             |

| MODULE COMPONENT STARTER KITS               |             |
| (Each kit contains an assortment of the most needed electronic parts for use in Module repair.) | |
| Kit #558 — For Rectifier Board (Part of A2) |             |
| Kit #503 — For MPU Board A4 (less Memory U1-U6) |             |
| Kit #492 — For Solenoid Driver/Voltage Regulator A3 |             |
| Kit #492 — For Display Driver A1 |             |
| Kit #494 — For Lamp Driver A5 |             |
## A4: MPU MODULE
**COMPONENT PARTS LIST**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>REFERENCE DESIGNATION</th>
<th>BALLY PART #</th>
<th>DESCRIPTION</th>
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<tr>
<td>1</td>
<td>A4 (see note 1)</td>
<td>AS-2962-34</td>
<td>MPU Module Complete.</td>
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<td>2</td>
<td>A4 (see note 2)</td>
<td>AS-2518-35</td>
<td>MPU Module less Program Memory, U1-6 incl.</td>
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<tr>
<td>3-32</td>
<td>See Schematic</td>
<td></td>
<td>Resistors, See schematic for value</td>
</tr>
<tr>
<td>33</td>
<td>C14, C15</td>
<td>E-00586-0087</td>
<td>Capacitor, 470 PFD, 1kv</td>
</tr>
<tr>
<td>34</td>
<td>C18</td>
<td>E-00586-0088</td>
<td>Capacitor, 0.05 MFD, 16V</td>
</tr>
<tr>
<td>35</td>
<td>C16</td>
<td>E-00586-0081</td>
<td>Capacitor, 1 MFD, 100V</td>
</tr>
<tr>
<td>36</td>
<td>C4, C5</td>
<td>E-00586-0073</td>
<td>Capacitor, 4.5 MFD, 25V</td>
</tr>
<tr>
<td>37</td>
<td>C3, C6-C13, C17, C81</td>
<td>E-00586-0085</td>
<td>Capacitor, 01 MFD, 25V</td>
</tr>
<tr>
<td>38</td>
<td>C79, C41-C67</td>
<td>E-00586-0083</td>
<td>Capacitor, 470 PFD, 50V</td>
</tr>
<tr>
<td>39</td>
<td>C19-C31, C78, C33-C40</td>
<td>E-00586-0082</td>
<td>Capacitor, 390 PFD, 50V</td>
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<td>C1, C2, C68-C77</td>
<td>E-00586-0084</td>
<td>Capacitor, 820 PFD, 50V</td>
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<td>Capacitor, 3000 PF, 1kv</td>
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<td>43</td>
<td>Q5</td>
<td>E-00585-0023</td>
<td>Transistor PNP (MPS-3702)</td>
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<td>Q1, Q2</td>
<td>E-00585-0031</td>
<td>Transistor (2N3904)</td>
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<td>47</td>
<td>CR44</td>
<td>E-00587-0006</td>
<td>Diode (IN4004)</td>
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<td>49</td>
<td>CR8</td>
<td>E-00679</td>
<td>LED (Green)</td>
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<td>50</td>
<td>VR1</td>
<td>E-00598-0008</td>
<td>Diode Zener (8.2V, IN9598)</td>
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<td>52</td>
<td>L1, L2</td>
<td>E-00604-0003</td>
<td>Inductor, 22 Micro Hy.</td>
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<td>53</td>
<td>U12</td>
<td>E-00620-0004</td>
<td>Timer (555)</td>
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<td>54</td>
<td>U19</td>
<td>E-00620-0005</td>
<td>Quad 2 Input (4011)</td>
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<tr>
<td>55</td>
<td>U9</td>
<td>E-00620-0028</td>
<td>MPU I.C. (6800)</td>
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<td>U10, U11</td>
<td>E-00620-0029</td>
<td>PIA I.C. (6820)</td>
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<td>U7</td>
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<td>RAM I.C. (6810)</td>
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<td>U20</td>
<td>E-00620-0032</td>
<td>HEX Buffer I.C. (14502B)</td>
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<td>E-00620-0033</td>
<td>HEX Inverter (4049B)</td>
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<td>61</td>
<td>U15</td>
<td>E-00620-0034</td>
<td>Quad Memory Drive (MC3459L)</td>
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<td>U16</td>
<td>E-00620-0035</td>
<td>Dual Monostable (9602)</td>
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<tr>
<td>64</td>
<td>U17</td>
<td>E-00620-0041</td>
<td>Quad 2 Inputs (74L00N)</td>
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<tr>
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<td>U8</td>
<td>E-00620-0042</td>
<td>RAM (C MOS, P5101L-3)</td>
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<tr>
<td>68</td>
<td>BT1, BT2, BT3</td>
<td>E-00628-0003</td>
<td>Battery</td>
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<td>70</td>
<td>S33</td>
<td>E-00658-0001</td>
<td>Push Button Switch</td>
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<tr>
<td>71</td>
<td>S1-S8, S9-S16, S17-S24, S25-S32</td>
<td>E-00677</td>
<td>DIP Switch</td>
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<td>73</td>
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<td>E-00712</td>
<td>24 Pin Socket</td>
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<td>E-00712-0001</td>
<td>40 Pin Socket</td>
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<td>E-00712-0003</td>
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<td>J2</td>
<td>E-00715</td>
<td>15 Pin Wafer Connector</td>
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<td>78</td>
<td>J1</td>
<td>E-00715-0004</td>
<td>28 Pin Wafer Connector</td>
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<tr>
<td>79</td>
<td>J3, J5</td>
<td>E-00715-0017</td>
<td>16 Pin Wafer Connector</td>
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<td>80</td>
<td>J4</td>
<td>E-00715-0018</td>
<td>19 Pin Wafer Connector</td>
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<td>81</td>
<td>J5</td>
<td>E-00715-0024</td>
<td>17 Pin Wafer Connector</td>
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**NOTE 2:** Order replacement memory chips U1-U6, specifying game, socket and part number stamped on chip.
# A5: LAMP DRIVER MODULE
## COMPONENT PARTS LIST

<table>
<thead>
<tr>
<th>ITEM</th>
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<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1</td>
<td>A5</td>
<td>AS-2518-23</td>
<td>Lamp Driver Module, Complete</td>
</tr>
<tr>
<td>2</td>
<td>R71-R79</td>
<td>E-00105-242</td>
<td>Resistor, 20kΩ, 5%, 1/4 W</td>
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<tr>
<td>3</td>
<td>R1-R60, R70</td>
<td>E-00105-0237</td>
<td>Resistor, 2kΩ, 5%, 1/4 W</td>
</tr>
<tr>
<td>4</td>
<td>R61-R69</td>
<td>E-00105-0256</td>
<td>Resistor, 2.2MΩ, 1/4 W</td>
</tr>
<tr>
<td>5</td>
<td>C1</td>
<td>E-00586-0065</td>
<td>Capacitor, 0.1 MFD, 500V</td>
</tr>
<tr>
<td>6</td>
<td>Q4-Q7, Q11-Q14, Q18-Q21, Q25-Q32, Q36-Q39, Q43-Q46, Q50-Q53, Q57-Q60</td>
<td>E-00585-0014</td>
<td>SCR, 2N5060</td>
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<tr>
<td>7</td>
<td>Q1-Q3, Q8-Q10, Q15-Q17, Q22-Q24, Q33-Q35, Q40-Q42, Q47-Q49, Q54-Q56</td>
<td>E-00585-0029</td>
<td>SCR, MCR106-1</td>
</tr>
<tr>
<td>8</td>
<td>U1-U4</td>
<td>E-00620-0037</td>
<td>I.C., Decoder, 14514B</td>
</tr>
<tr>
<td>9</td>
<td>J1, J3</td>
<td>E-00715-0004</td>
<td>28 Pin Wafer Connector</td>
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<tr>
<td>10</td>
<td>J4</td>
<td>E-00715-0024</td>
<td>17 Pin Wafer Connector</td>
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<td>11</td>
<td>J2</td>
<td>E-00715-0014</td>
<td>23 Pin Wafer Connector</td>
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<tr>
<td>12</td>
<td>TP1, TP2, TP3</td>
<td>P-05399</td>
<td>Test Clip</td>
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### AS-2518-21 CREDIT DISPLAY DRIVER MODULE

#### A1: 6 DIGIT DISPLAY DRIVER MODULE

**COMPONENT PARTS LIST**

<table>
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<th>ITEM</th>
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<th>BALLY PART #</th>
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<tbody>
<tr>
<td>1</td>
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<td>A1</td>
<td>AS-2518-21</td>
<td>6 Digit Display Driver, Complete</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>R1, R3, R5, R7, R9, R11, R34</td>
<td>E-105-331</td>
<td>Resistor, 100K Ω</td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40</td>
<td>E-105-227</td>
<td>Resistor, 500K Ω</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>R43, R44, R45, R46, R47, R48</td>
<td>E-105-228</td>
<td>Resistor, 9.1K Ω</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>R13, R15, R17, R19, R21, R23, R25</td>
<td>E-105-229</td>
<td>Resistor, 1.5K Ω</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>R27, R28, R29, R30, R31, R32, R33</td>
<td>E-105-222</td>
<td>Resistor, 1.2K Ω</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>R41</td>
<td>E-105-231</td>
<td>Resistor, 39K Ω</td>
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<tr>
<td>9</td>
<td>1</td>
<td>R42</td>
<td>E-105-271</td>
<td>Resistor, 240K Ω</td>
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<tr>
<td>10</td>
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<td>C2</td>
<td>E-586-65</td>
<td>Capacitor, .01 MFD, 500V</td>
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<td>13</td>
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<td>Q7, Q8, Q9, Q10, Q11, Q12</td>
<td>E-585-32</td>
<td>Transistor (2N5401)</td>
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<tr>
<td>14</td>
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<td>Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19</td>
<td>E-585-33</td>
<td>Transistor (MPS-A42)</td>
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<td>VR1</td>
<td>E-598-7</td>
<td>Zener Diode, 110V</td>
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<td>U1</td>
<td>E-620-38</td>
<td>I.C. Decoder</td>
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<td>18</td>
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<td>DS1</td>
<td>E-715-34</td>
<td>10 Pin Wafer Pin Connector</td>
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<td>19</td>
<td>2</td>
<td>J1</td>
<td>E-680</td>
<td>Digital Display Panel</td>
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<td>2</td>
<td>M-1836</td>
<td>Hi-Lo Screw, W/H</td>
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<td>22</td>
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<td>P-2399</td>
<td>Display Mounting (Top)</td>
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<td>23</td>
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<td>P-2399-1</td>
<td>Display Mounting (Bottom)</td>
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<td>24</td>
<td>6</td>
<td>R2, R4, R6, R8, R10, R12</td>
<td>E-105-287</td>
<td>Resistor, 2.2K Ω</td>
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<td>R49, R50, R51, R52, R53, R54</td>
<td>E-105-242</td>
<td>Resistor, 20K Ω</td>
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<td>28</td>
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<td>As Req'd</td>
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<td>Wire Jumper</td>
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<tr>
<td>29</td>
<td>1</td>
<td>C1</td>
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<td>Capacitor, .01 MFD, 25V</td>
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**NOTE:** INTERCHANGEABLE WITH AS-2518-15

---

24
## A3: SOLENOID DRIVER/VOLTAGE REGULATOR MODULE
### COMPONENT PARTS LIST

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<thead>
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<td>A3</td>
<td>AS-2518-22</td>
<td>Solenoid Driver/Voltage Regulator Module, Complete Resistor, See Schematic for value.</td>
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<tr>
<td>3-14</td>
<td>Resistors</td>
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</tr>
<tr>
<td>15</td>
<td>RT1</td>
<td>E-00599-0014</td>
<td>Pot. (Linear) 25K</td>
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<tr>
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<td>C25, 29</td>
<td>E-00586-0014</td>
<td>Capacitor, .1 MFD, 20V</td>
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<tr>
<td>18</td>
<td>C26</td>
<td>E-00586-0059</td>
<td>Capacitor, 160 MFD, 350V</td>
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<tr>
<td>19</td>
<td>C24</td>
<td>E-00586-0063</td>
<td>Capacitor, 2 MFD @ 25V</td>
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<tr>
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<td>C23</td>
<td>E-00586-0062</td>
<td>Capacitor, 11700 MFD, 20V</td>
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<td>C1-C8, C11-C21</td>
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<td>Capacitor, .002 MFD, 1kV</td>
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<td>K1</td>
<td>E-00146-0795</td>
<td>Relay, Printed Circuit</td>
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<td>25</td>
<td>Q1-Q19</td>
<td>E-00585-0034</td>
<td>Transistor, SE9302</td>
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<td>Q22, Q23</td>
<td>E-00585-0041</td>
<td>Transistor, 2N3440</td>
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<td>Q21</td>
<td>E-00585-0042</td>
<td>Transistor, 2N3584</td>
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<td>Q20</td>
<td>E-00710</td>
<td>+5V Regulator, LAS1405 or 78H05KC or LM323K</td>
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<td>CR1-CR21</td>
<td>E-00587-0015</td>
<td>Diode (IN4004)</td>
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<td>VR1</td>
<td>E-00598-0010</td>
<td>Diode, Zener 140V, IN5275A</td>
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<td>U1, U3, U4</td>
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<td>I.C. Transistor Array, CA3081</td>
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<td>U2</td>
<td>E-00620-0039</td>
<td>I.C. Binary to 1/16 Decoder, 74L154</td>
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<td>Relay Socket</td>
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<td>Shield-Plexiglass</td>
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<td>E-00148-0021</td>
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<td>Fuse Clips</td>
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<td>F1</td>
<td>E-00133-0029</td>
<td>Fuse 8 AG-3/16 Amp.</td>
</tr>
<tr>
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<td>C22</td>
<td>E-00586-0085</td>
<td>Capacitor, .01 MFD, 25V</td>
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*USED WITH ITEM 24, E-00146-0791, PLUG IN RELAY ONLY*
# A2: Power Transformer Module

## Component Parts List

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<tr>
<th>ITEM</th>
<th>Reference Designation</th>
<th>Bally Part #</th>
<th>Description</th>
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<tr>
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<td>A2</td>
<td>AS-2877-6</td>
<td>Power Transformer Module, Complete</td>
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<tr>
<td>1</td>
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<td>AS-3071-2</td>
<td>Transformer</td>
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<tr>
<td>2</td>
<td></td>
<td>E-148-25</td>
<td>Fuse Holder</td>
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AS-2518-54 RECTIFIER BOARD ASSEMBLY

(Part of) A2: POWER TRANSFORMER MODULE
COMPONENT PARTS LIST

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NOTE 1—All games with 4 or more flippers use 6A
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<td>Resistor, ¼W, 5%, 2.4K</td>
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JUMPERS—SEE NOTES
OPTICAL SWITCH (ASSEMBLY)

AS-2518-95

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<td>300KΩ, ¼ W, 5% Resistor</td>
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<td>15 Pin KK100 Connector</td>
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SINGLE TARGET OPTICAL SWITCH
AS-2518-100

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## A1: 7 Digit Display Driver Module

### Components Parts List

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<td>Resistor, 9.1K Ω</td>
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<td>Resistor, 1.5K Ω</td>
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34
### SINGLE TARGET OPTICAL SWITCH

**AS-2518-101**

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<td>Resistor, 300KΩ, 1/4 W, 5%</td>
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<td>5 Pin KK100, Connector</td>
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<td>Used With 4 G.I. CNY 36 Only</td>
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<td>Spacer</td>
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**6 REMOVE PIN #2 FOR KEY**
BALL DELIVERY (LED)  
CONTROL BD. (ASSEMBLY)  
AS-2518-103

REVISION A  
AS2518 103  
P2948-515

REMOVES PIN 3 FOR KEY

HAND SOLDER

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NOTE:
K1 ON DURING GAME UP OPERATION.
Q1 MOTOR TRIAC OPERATES DURING GAME UP
WHEN BALLS ARE NOT BLOCKING SENSORS
LOCATED ON BALL FEED HOUSING TO FEED GUN.
NOTES:
1. UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE ±5%, 1%.
2. PARTS ALL REFERENCE DESG. WITH ASSEMBLY REFERENCE DESG. "A".

# INDICATES "BO" TEST POINT.