Sigma
SG-150B Slot
Operators Manual
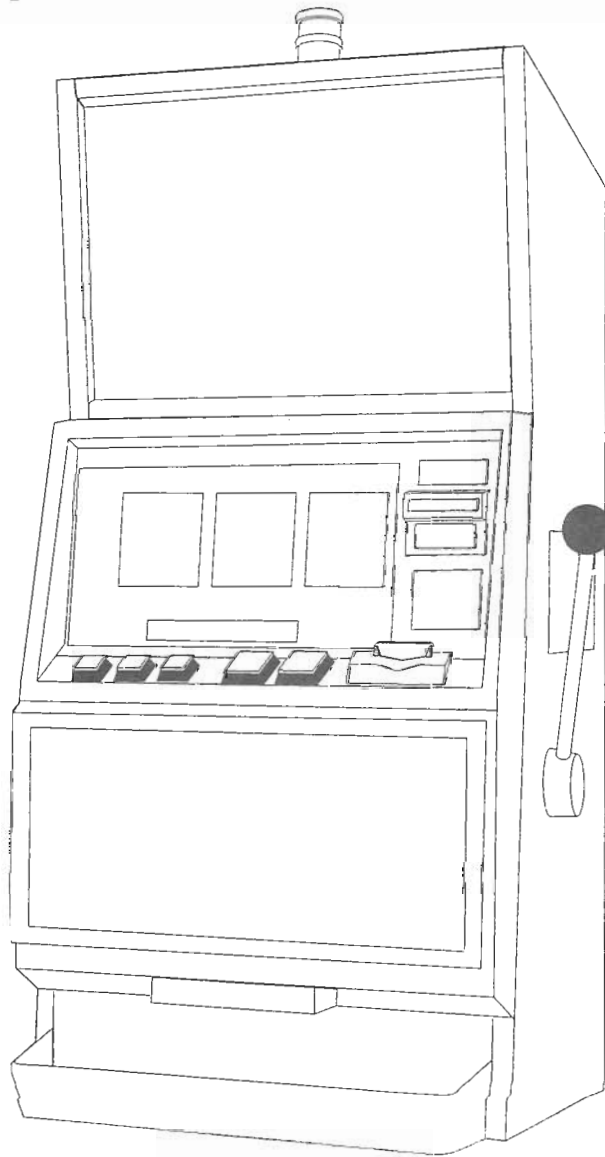
SG-150B Table of Contents

Int Introduction

Installation

2   Metering & Game Operations

3   Testing / Troubleshooting

4 Parts Disassembly & Maintenance

Appendices

I   Game Information Sheet

II   Flammable Materials Machine Weight Distribution

G   Glossary

I   Index

List of Figures

Chapter 1

Chapter 2

Chapter 3

Chapter 4

Introduction

Overview

This Operators Manual has been designed as a comprehensive guideline for setup and maintenance of the Sigma SG-150B.

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Manual Organization

The manual is organized in the following sequential order:

Table of Contents

Introduction

Chapter 1   Installation

Chapter 2   Machine Operations

Chapter 3   Troubleshooting

Chapter 4   Parts Disassembly and Maintenance

Chapter 5   PCB Board Overall Wiring Diagram

Appendices

Glossary

Index

Things You Should Know

This manual has been designed for ease of use and understanding. There are a number of topics that have been highlighted for quick reference through the use of shading, italics, bold letters, etc. See the list below for these topics and an example of how each one is formatted.

Deck Button References

All deck button names are in capital letters. For example: MAX BET START.

Caution Statements

This manual has a number of important "Caution" statements that inform the Operator if a condition exists that is potentially dangerous or could damage system components. To ensure safe operating conditions, and to prevent injury to the Operator or Player, these statements should be noted and complied with. All caution statements will be in the format below:

<div align="center">

--- CAUTION ---
This is a sample caution statement.

</div>

Illustrations

If an illustration is referenced within a sentence, the reference will be in bold letters. All illustrations will be referred to as figures. For example: See **Figure 1-2**.

Instructions

Any instructions will be numbered 1, 2, 3, etc. For example:

1. Unlock and open the main door.

2. Turn power off.

LED Message Center

LED Message Center refers to the eleven character / sixteen segment LED display located on the machine's front deck. The message center displays general game and machine information. The Winner Paid, Credit and Coins-in Meters are also part of the LED Message Center.

All LED messages are in caps and italics. For example: *M-DOOR OPEN*

Chapter & Section References

If a chapter or section within a chapter is referred to within a sentence, the chapter title or section will be initial caps and bold. For example: "Further information on mechanical meters can be found in the **Game Operations** chapter under the **Mechanical Meters** section".

Game Features

The SG-150B has many exciting features including:

- Advanced Sound Package;

- Optional Industry Standard JCM™ Bill Validator;

- Patented Bill Box Extractor Security System;

- Easy to Understand Graphics;

- Industry Proven Performance and Reliability;

- Designed for Quick and Easy Maintenance;

- Innovative and Unique Game Programs;

- Wide Reels for Increased Player Appeal;

- Compact Design for Quick Access to Most Parts.

Installation

1-1

Machine Specifications

This section details SG-150B machine specifications. Also included are the required environmental parameters for machine operation.

Electrical Requirements: 115v VAC +15% -15% 60Hz
                                220v VAC 50Hz

Power Consumption   Idle: 150w
                         Hopper On: 420w
                         Average: 200w

Weight: 215 lbs (97.5 kg) (This weight can vary depending on options.)

Dimensions:
Height: 46"   (116.64 cm)

Depth: 16"   (40.54 cm)   Cabinet only
           21"   (53.34 cm)   Cabinet with coin tray

Width: 21.25 (54.356 cm)   Without handle
           24.75 (62.865 cm)   With handle

Environment: Temperature -
                    32°   (0°C)
                    104°   (40°C)

Spacing: 7"   (18 cm) (Minimum spacing between machines.)

Note: See Appendix II for Machine/Weight Distribution of flammable materials.
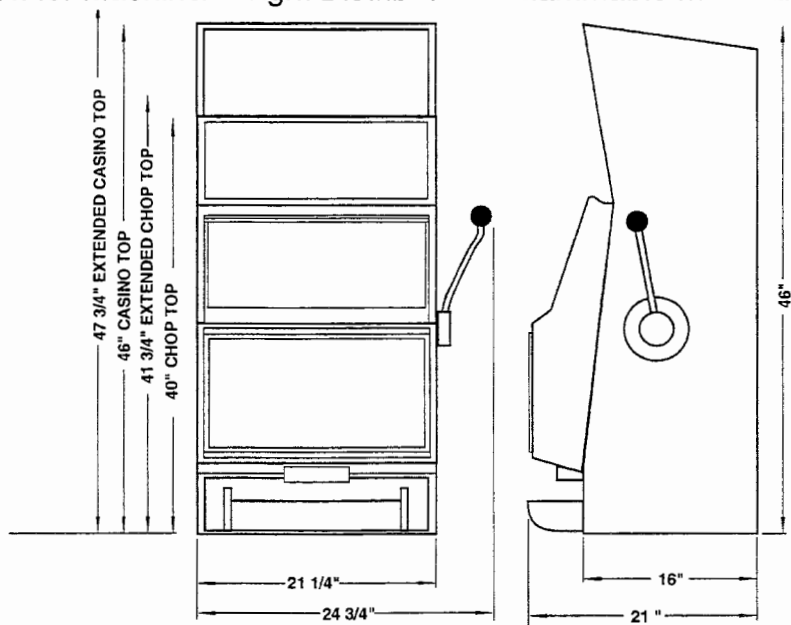
Fig. 1-1 SG-150B Machine Dimensions

Interior View

Use this illustration as a reference for locating the main parts of the SG-150B.
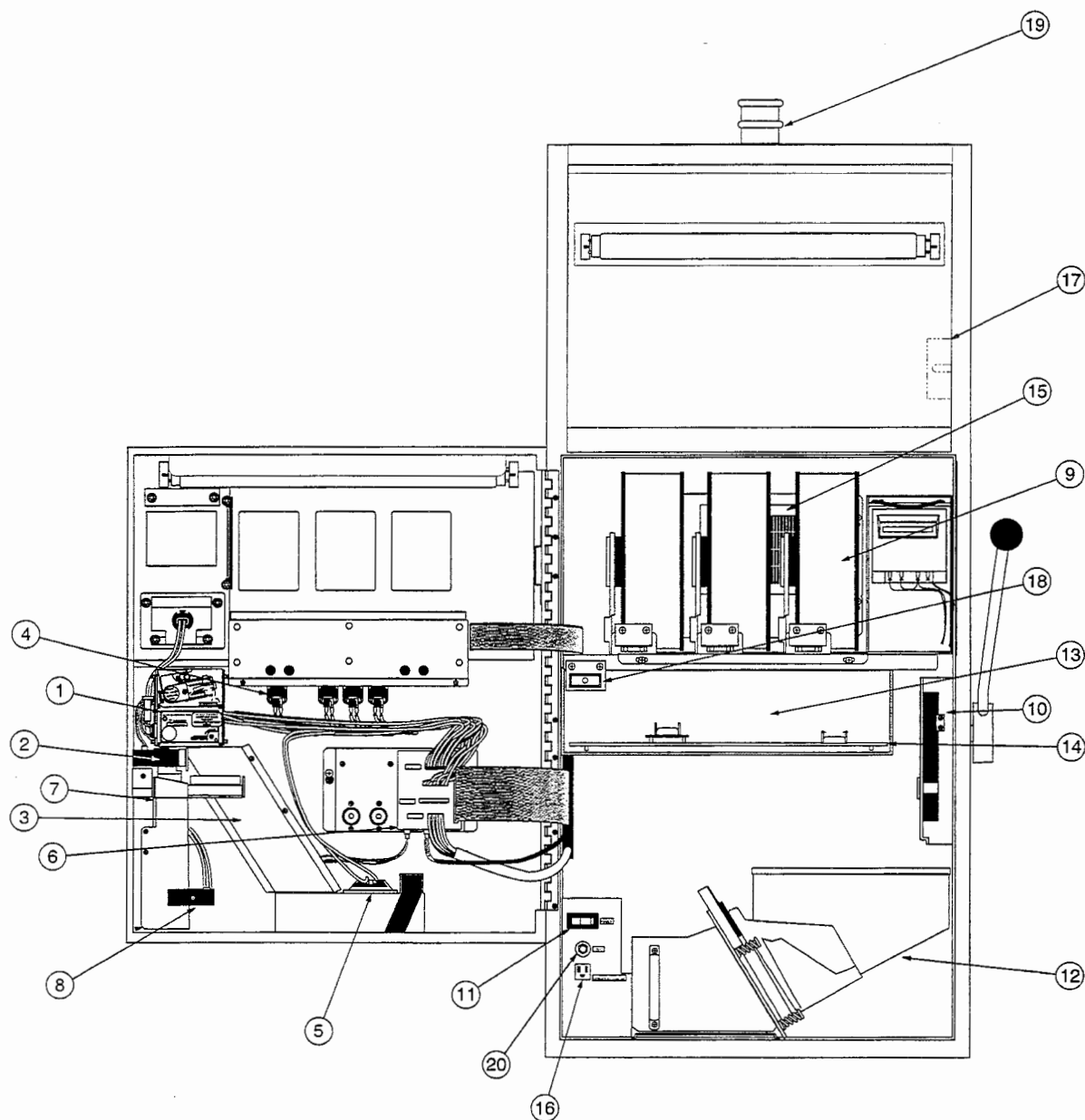
Fig. 1-2 SG-150B Interior Parts Reference

1. Coin Comparitor	7. Drop Chute	13. CPU Compartment	19. Tower
2. Coin-in Optic	8. Drop Optic	14. CPU Board	20. Test Button
3. Coin Chute	9. Reel Assembly	15. Power Supply	
4. Deck Button	10. Handle Mechanism	16. Service Outlet	
5. Speaker	11. Power Switch	17. Meter Assembly	
6. Door Distribution Bd.	12. Hopper	18. Door Switch	

Machine Identification

Sigma uses a combination of letters and numbers to identify machine cabinets, types and features.

All machines built into upright cabinets are referred to as **SG-x** models. All bar drop-in units, or any machine built into a slant-top cabinet, are referred to as **PT-x** models. The x represents a specific number used to identify the game as a video or reel model.

For the SG series, the numbers 32 and 50 identify slot models. The numbers 1 and 112 identify video models. For example: SG-50 is an upright slot model and SG-112 is an upright video model.

For the PT series a *slightly different* system is used. There are specific identifying numbers for **both** slant tops and bar drop-ins. The numbers 2 (video) and 4 (slot) are used for the slant top. The numbers 3 (bar-video) and 5 (bar-slot) are used for bar top models. For example, a PT-2 is a slant top stand alone and a PT-3 is a bar slant drop-in video.

A B after the number means the machine is bill validator equipped. For example: SG-150B.

Model Identification Plate

Each machine built by Sigma has a Model Identification Plate. This plate is located on the lower right side of the cabinet for upright models, the front right side behind the armrest for slant top models and on the upper front corner directly beneath the deck for bar top models. Information on this plate includes the Model Name, Model Number and the Serial Number. See **Figure 1-5** for a sample Model Identification Plate.

The *Model Name* is the type of machine. For example; Upright Reel Slot.

The *Model Number* is a combination of numbers and letters identifying the machine type, and the features included with the machine. See the table on the next page detailing the letter and number identifiers.

The *Serial Number* is a machine tracking and accounting number assigned by Sigma.

MODEL NAME	W/B REEL
MODEL NO.	SG-150B
SERIAL NO.	

sigma game inc.
North Las Vegas, Nevada, U.S.A.
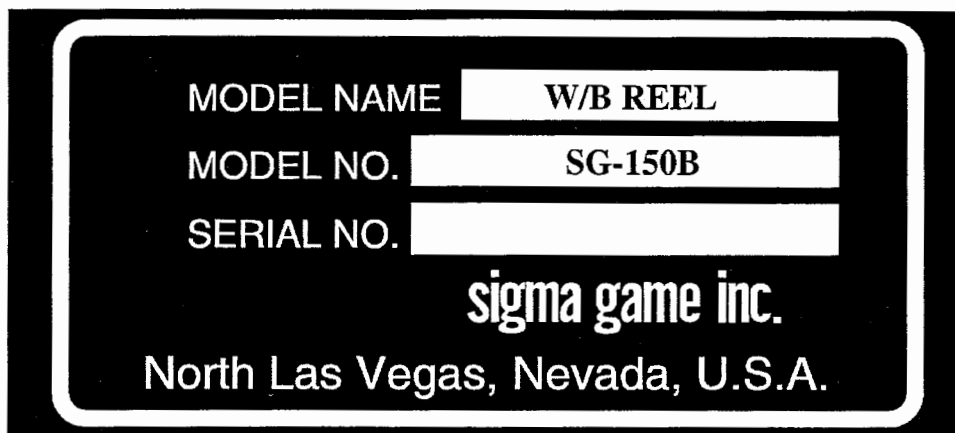
Fig. 1-3 Model Identification Plate

Machine Identification (cont.)

This table defines the letter and number designations on the Model Identification Plate
(see previous page). Note the number and letter designations below PT-5 in the table. These
are additional codes used to identify unique machine features; K for Keno as an example.

MACHINE MODEL LETTER/NUMBER DEFINITIONS	
Letter or Number	**Definition**
SG	Upright Model See designations below.
SG-32, SG-50 & SG-150	Upright Reel Slot machines.
SG-1 or SG-112	Upright Video Machines
PT	Designates either Slant Top Cabinet or Bar Drop-in Unit. See designations below.
PT-2	Slant Top Video Model
PT-3	Bar Drop-in Video
PT-4	Slant Top Reel Slot Model
PT-5	Bar Drop-in Reel Slot
Miscellaneous	These alphanumeric characters are used at the end of each machine number to identify specific machine options or characteristics. For example: PT-2B. The B means the machine is equipped with a bill validator.
F	Flat Top Model
-1	Bill Validator ready, but not equipped.
B	Bill Validator equipped. For example: SG-150BB.
C	Canada (Canadian Standards Association Approved.)
D	Domestic
K	Keno
L	Lottery
MC	Special Designator / Property Specific.
R	Roundtop
RX	Extended Roundtop

Game Information Sheet   1-5

The Game Description Sheet is included in each machine shipped. The sample sheet on the next page is for reference only and does not represent an actual game. The sheet contains information concerning the game type, paytable and other related material. See Appendix II **Reading the Game Information Sheet** for further information.

SIGMA R-SLOT SERIES
Game Information Sheet

Game Type   : 3 Reel 3 Coin Car Game (Grand Prize)
Game No.   : 5105
Game Code   : 3R3M024
Description   : Wild, S-7-5-3-2-1 Bar, and ANY BAR pay.
Rom No.   : B321102-00X
Reel Stops   : 155/155/155

Pay Table (Standard Type)

Combinations	1st	2nd	3rd
WILD :WILD :WILD	2000	5000	10000
S BAR:S BAR:S BAR	1000	2000	3000
7 BAR: 7BAR: 7BAR:	250	500	750
5 BAR:5 BAR:5 BAR	100	200	300
3 BAR:3 BAR:3 BAR	60	120	180
2 BAR:2 BAR:2 BAR	40	80	120
1 BAR:1 BAR:1 BAR	10	20	30
A BAR:A BAR:A BAR	5	10	15

Jackpot Available

Type	Jackpot	1st	2nd	3rd
A				
B				
B				

Payout % Available

J.P Type	SD	A	B	C	Min.	Hit Freq. (%)		Game	Jackpot
P/O No.	Max payout ratio (%)				P/O(%)	1st	Max.	Freq.	Weight
1	86.53				89.45	14.74	14.74	6.73	1/2048383
2	88.47				86.41	15.25	15.25	6.41	1/2048383

Note: 0 Optional progressive is "WD-WD-WD on max coin play.

   o Pay Examples on 3 coin play

       "WD   - S BAR - WD"   = 3000 Coins

       "3 BAR - 7 BAR - 1 BAR" = 15 Coins

Key-Switches

Throughout this manual, there are a number of references to "Key-switches". This term refers to three switches located in a horizontal row on the middle right side of the cabinet that are activated by inserting and turning keys. The three Key-switches from left-to-right are:

RESET

The RESET Key-switch is used to "reset" the machine in the event of a jackpot, credit lockup, or game program swap. When the machine enters a reset condition, a new game cannot be played until the RESET Key-switch is turned ON/OFF.

METER

This Key-switch is used to access the various accounting and machine meters that record information ranging from coins-in, to the number of times various doors have been opened. These meters are 'soft' meters that can be cleared by the Operator, as compared to the 'hard' or mechanical meters which cannot be cleared.

LAST

This Key-switch activates the Last Game Recall feature.

Machine Unpacking, Inspection & Setup

This section covers machine inspection and installation.

--- CAUTION ---
**Do not take 'shortcuts' during the installation procedure. The
procedures in this section should be followed in exact order, to
ensure proper machine installation.**

Machine Unpacking and Inspection

Carefully follow these instructions to unpack the machine:

1. Remove the machine from the shipping container.

2. Open the machine's main door and carefully remove any shipping materials (paper, cardboard, etc).

3. If not installed, carefully remove and unpack the tower. It is usually packed in the cabinet.

4. Inspect the machine cabinet and all components for obvious damage.

5. Verify that all plugs, connections and boards are firmly seated into their connectors.

Note: Do not force plugs into connectors. All plugs and connectors are keyed to ensure quick and easy connection. If the plug will not fit, it is not being plugged properly, or it is not being fitted to the correct connector.

6. Verify the power cord is plugged into the EMI (Electro Magnetic Interference) filter attached to the lower back inside cabinet wall.

7. Check reels to confirm they are spinning freely. If not, check for packing materials or other obstructions.

8. Confirm that the handle is not loose, bent, or otherwise damaged.

--- CAUTION ---
**If the handle is bent, cracked or otherwise damaged, do not use the
machine until the handle is replaced. Injuries could result from
machine operations with a damaged handle.**

9. Note any damages and **immediately** contact the shipper, or your Sigma distributor, depending on the warranty terms of the sales contract.

Drilling Stand Holes

Each machine is placed on a stand that requires holes for the power cord, drop chute, and the bolts used to secure the machine to the stand. When placed on the stand, the machine's center line should align exactly with the stand's center line. The back machine edge should align with the back edge of the stand. **Figure 1-4** measurements are based on this concept. The illustrations can be used for any size stand because the measurements are based on aligning the **machine's** center line with the **stand's** center line. Note the hole locations for the machine's center line. They are based on a number of common stand sizes and on the cabinet footprint of the SG-150B.

If holes have been previously drilled, refer to the next section **Placing and Securing the Machine to a Stand**. If holes have not been drilled, follow the steps below:

1. Measure and mark the center line of the stand.

2. Measuring from the **stand's** center line, use the dimensions in **Figure 1-4** to find and mark drill hole locations. Remember, measurements are based on the machine's center line aligning with the cabinets center line.

3. After measuring, drill holes for the power cord, drop and anchor bolts. The slot cabinet holes are pre-drilled at the factory.

Note: When drilling the drop chute hole, make sure that it is slightly larger than the opening at the end of the drop chute assembly (metal piece that fits over the stand hole).
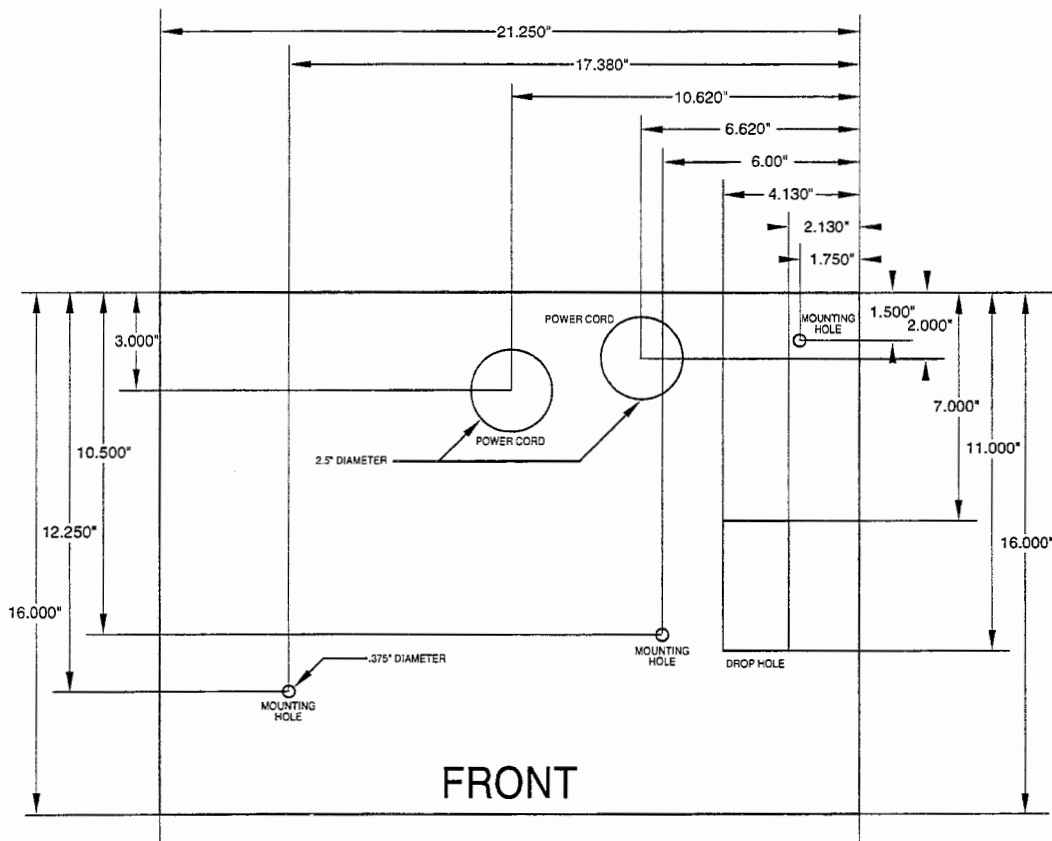
Fig. 1-4 SG-150B Stand Drill Guide

Placing and Securing the Machine to a Stand

Follow these procedures to place and secure a machine on the stand:

--- CAUTION ---
**This machine weighs approximately 210 pounds. If a lifting device
is not used, precautions should be taken *before* lifting the machine
to prevent injuries, or machine damage.**

1. Using a lifting device, place the machine on the stand, lining up the machine's center line with the stand's center line. There should be a minimum distance of 7" between machines.
2. Remove the hopper by pulling it forward until it slides out of the machine.
3. Confirm the cabinet floor holes align with the pre-drilled stand holes.
4. Thread the power cord out of the machine, through the holes provided on the top and back of the drop stand.
5. If not previously installed, add the tower by following these procedures. Refer to **Figure 1-5**.
a. Remove the upper feature glass. See instructions in Chapter 4.
b. Insert the bottom of the tower into the hole on the top of the machine.
c. Turn the tower clockwise until the two tapping screws are in position and the tower is firmly in place, then tighten the screws.
d. Plug the tower connector into the keyed plug located inside the cabinet.
6. Secure the machine to the stand with three 3" by 1/4" bolts.
7. Re-install the hopper and confirm that the handle is working properly.

--- CAUTION ---
**Do not allow machine operation if the handle is bent, cracked, or
damaged. Injuries could occur if the machine is played in this
condition.**

8. Install any necessary locks. See the next section of this chapter for lock installation instructions.
9. After installing locks, confirm that all wires and cables are not pinched, or obstructing door open/close operations.
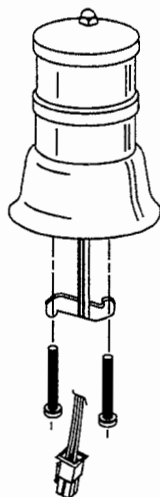
Fig. 1-5 Tower Installation

Installing Locks

The Sigma SG-150B utilizes the same size and lock type for the Main, Validator and PCB doors. The validator and PCB doors are shipped with generic locks. The main door is not shipped with a lock. For increased security to avoid lock duplication, it is recommended that new locks are purchased and installed by the Operator for the main and validator doors.

Note: The main door lock can be either a long (1") or short (5/8") barrel configuration. Locks with the 1" barrel include a 1/2" Beauty Ring/Spacer that's inserted between the lock head and machine. A lock cam is attached to the button harness in the machine.

Main Door Lock Installation

Follow the procedures below for door lock installation:

1. If attached, remove all washers, nuts and cams from the new lock. Note the position of each item for new lock installation. Refer to **Figure 1-7** to confirm part locations.
2. *3/4" Barrel Lock* - Insert the lock into the hole provided on the lower right front of the cabinet. *1" Barrel Lock* - Slip the 1/2" beauty ring/spacer over the inner lock barrel until the spacer is flush with the end of the lock. From outside the machine, slide the lock and spacer into the hole provided.
3. Screw on and tighten the locking washer.
4. Slip on the interrupter cam, star washer and regular washer.
5. Slip the locking cam over the end bolt extending from the bottom of the barrel lock.
6. Secure the locking cam with the 5/16" nut.
7. Insert and turn the lock key to confirm lock operation. If the lock does not turn, the locking cam is usually out of position.
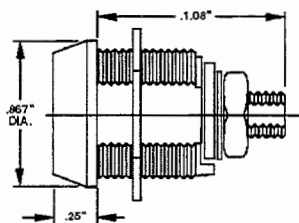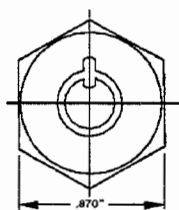
Fig. 1-6 Lock Dimensions
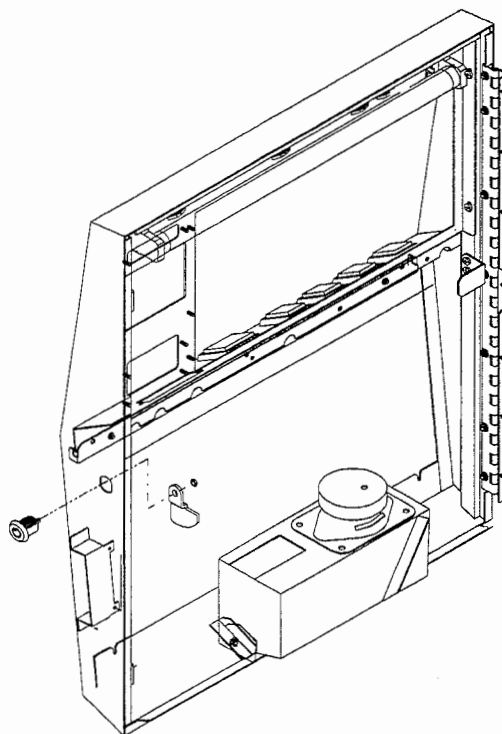
Fig. 1-7 Main Door Lock Installation

Installing Locks (cont.)

Bill Validator Door Lock

Note: Because of internal space limitations, this lock must be installed so the key will only turn to the right during the locking operation. The lock should be the short (5/8") barrel style.

The bill validator door is equipped with a shipping lock which should be removed and replaced with a new lock, as a security measure. The parts for these two locks are exactly the same with the exception of the lock barrel and key. Save the cam from the shipping lock as a spare part.

Follow the procedures below for removing the shipping lock, and simply reverse them for installing the new lock. Refer to **Figure 1-8** for this procedure.

1. Remove the 5/16" nut securing the cam to the shipping lock.
2. Remove the locking cam, and interrupter cam from the barrel assembly.
3. Unscrew the locking washer, and remove the lock from the game.
4. To install the new lock, slip it into the hole provided on the door.
5. Re-install all parts, reversing the removal order. Refer to the previous instructions on installing the main door lock for assistance. The lock installation procedure for both doors is exactly the same, with the exception noted below.

Note: The door cam for the validator door should be installed in the horizontal position. This ensures that the key will turn to the right when the door is opened.

6. Insert and turn the lock key to confirm lock operation. If the lock does not turn, the locking cam is usually out of position.
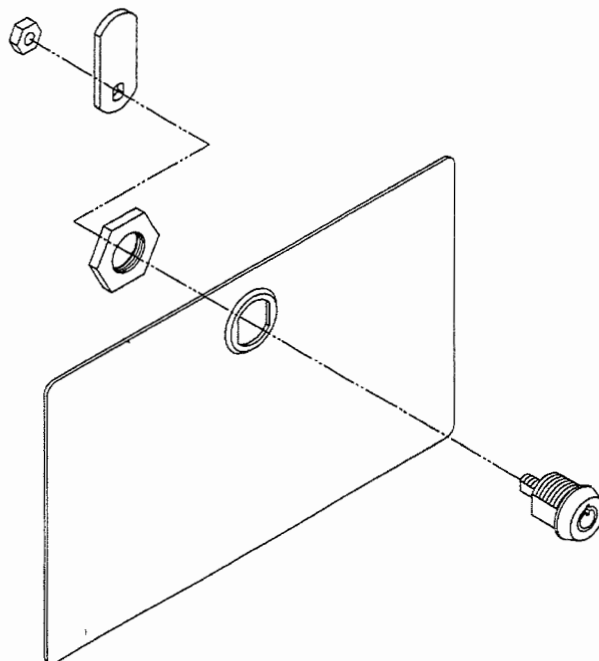
Fig. 1-8 Installing the Bill Validator Door Lock

Installing Locks (cont.)

Bill Box Extractor Lock Installation

The Bill Box Extractor is a device used to remove the container that stores bills after being accepted by the validator. For further information, see **Removing Bills** in the **Bill Validator** section later in this chapter.

The extractor box is shipped without a lock. For increased security to avoid lock duplication, it is recommended that this lock is purchased and installed by the Operator. The lock is a standard 5/8" short barrel. Follow the steps below and refer to **Figure 1-9** for installation:

1. Insert the barrel lock into the hole provided on the Extractor Box. The keyhole should be aligned to the right. This means that when the key is inserted, turning it counter-clockwise will release the lock. See illustration.
2. While holding the lock, screw on and tighten the locking washer.
3. Slip the cam lock interrupter into position. The interrupter should be flat on to the surface of the inner lock barrel.
4. Slip the lock cam into position with the large rounded end of the cam pointed towards the release spring. See illustration.
5. Slip the washer into position over the lock cam.
6. Secure the the two cams and the washer with the 3/4" nut provided with the lock.
7. Insert and turn the lock key to confirm lock operation. If the lock does not turn, the interrupter cam is usually out of position.
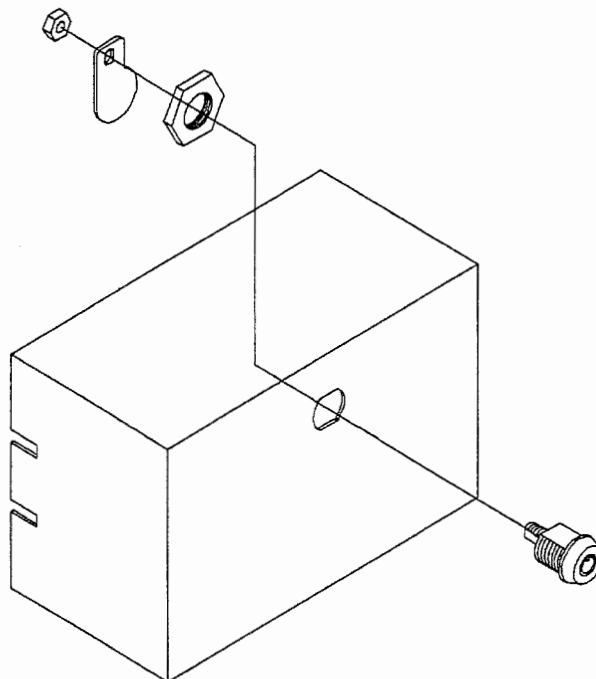
Fig. 1-9 Installing the Bill Extractor Box Lock

Power-Up

Follow these steps to power-up the machine.

1. Plug the machine into a grounded power source.
2. Open the main door and turn power on. The power switch is located on a metal plate directly below the reels. Close the door. The following events will occur:
a. The machine will go through a self-test to determine software functionality. If successful, the bill validator will initialize confirming it is operational and will accept currency.
b. Any wins paid from the previous game will display in the LED Message Center, under **Winner Paid**.
c. A 0 will display under **Credits**.
d. The amount of coins played in the last game will display under **Coins Paid**.
e. The message *Insert Coin or Bill* will display to the right of the LED Message Center.

Self Test Error Detected

If the self-test detects a problem, memory error, or software change since the last power-up, one or more messages will display in the LED Message Center. (*See table on next page*).

--- CAUTION ---
Some error messages require clearing of machine's RAM (Random Access Memory). RAM stores all game optioning and software meter information. All metering information should be recorded prior to any RAM clearing. See definitions below for RAM and ROM.

RAM - Random Access Memory.
This is stored machine data that can be changed by the Operator.

ROM - Read Only Memory.
This is stored machine data and programming information that cannot be changed by the Operator unless the entire program is changed.

Both RAM and ROM are stored in programming CHIPS on the PCB board.

Power-up Messages

One or more of these messages could display during the power-up cycle. This table details the message, its definition, and suggested procedures for correcting the condition that caused the message. The message definition is in *italics* for easy reference.

MESSAGE	*DEFINITION* / TROUBLESHOOTING PROCEDURE
ROMS WRONG	*The program ROM(s) is malfunctioning.* If the socket is not broken, replace ROM. See the **Troubleshooting** chapter later in this manual.
RAMS WRONG	*Data stored in RAM(s) is not correct. Battery or battery circuits have malfunctioned.* If data is not correct, reset RAM. Insert a key into the RESET key switch located on the upper right side of the cabinet, turn clockwise, then release. If the battery or it's circuit(s) has malfunctioned, replacement will be necessary. See the **Maintenance** section later in this manual.
DATA WRONG	*New ROM with a different ROM number or version number has replaced the previous version from the last power-up.* This message will sometimes display if ROM has been replaced. The message can be cleared by turning the RESET key switch ON, then OFF.
JUMPR CHANG or DIPSW CHANG	*DIP switches or jumpers status has been changed.* Turn the RESET key switch ON, then OFF. The new game feature(s) will activate.
OPT 1 WRONG OPT 2 WRONG OPT 12 WRONG OPT 3 WRONG	*One of the coin detect optical circuits (coin-in or drop detect) is broken or dirty. OPT 1 is one of the two coin optics. OPT 2 is the second coin optic. OPT 12 Wrong means that a malfunction has been detected for both coin optics. OPT 3 is the drop optic.* Replace or clean the sensor(s). Check sensor wiring.
METER CUT CHECK WIRE	*One or more of the Magnetic (Mechanical) Meters has been disconnected, or is not functioning.* Confirm wire is connected and no shorts have occurred from it being frayed or broken.
JUMPR ERROR	*A jumper error has occurred. The jumper selection for payback percentage is incorrect.* Check jumper setting.

Power-Up (cont.)

Coin Comparitor Checking & Adjustments

The Coin Comparitor is a device that analyzes coins paid into the machine. Its function is to accept or reject coins by matching the paid coin with a sample coin contained within the comparitor. If a difference in thickness, diameter, or materials is detected between the two when the comparison is made, the inserted coin is rejected.

The comparitor is pre-adjusted at the factory before the machine is shipped. However, after power-up, this device should be checked to confirm that coins are being accepted. If coins are continuously rejected, the comparitor probably needs adjustment. Follow the steps below and reference **Figure 1-10** to check the comparitor.

1. Insert a sample coin (quarter in a 25¢ denomination machine for example) into the sensor coil assembly by sliding the assembly back, slipping in the coin, and releasing the assembly. The assembly will spring back into position.

2. Drop a number of coins (ten is a good sample) into the machine to confirm comparitor operation. If the comparitor is working, go to the next section **Adjusting Sound**. If it is not working, go to step 3.

3. The comparitor's sensitivity can be adjusted by turning the potentiometer knob located on the lower right corner of the comparitor. A small screwdriver is needed for this task. Slowly turn the potentiometer knob while feeding coins into the comparitor until a coin is accepted by the machine.

4. If the comparitor is still malfunctioning, replace it.
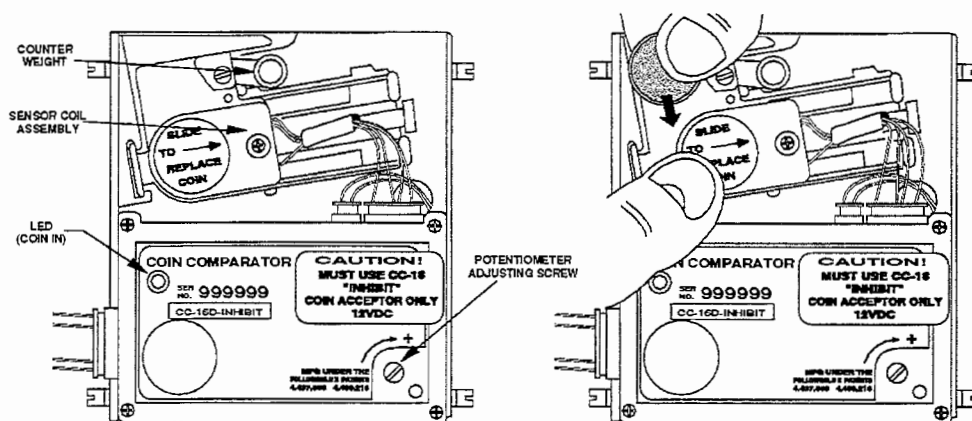
Fig. 1-10 Comparitor Adjusting

Adjusting Game Volume

Game volume is adjusted from a control located at VR1 on the right front of the PCB board. A volume setting of 4 (one tic mark after the 3 on the control) is recommended as a standard configuration. Note that there is not a 4 on the volume control. Follow these procedures for adjusting sound:

1. Turn power off and discharge body static.

2. Remove the PC Board located in a compartment below the reels.

3. The volume control is a blue notched knob, inset in a gray case. The case has tick marks to indicate volume intensity. Insert a small screwdriver into the notch and rotate the volume control counter-clockwise until it stops. At this point, the top of the notch will be at approximately the 12:30 position. **See Figure 1-11**.

4. Now rotate the control clockwise, until the top of the notch on the volume control has reached the 4:00 position. This completes volume adjustment.

Note: The volume level is a suggested value only and can be changed depending on customer preference.
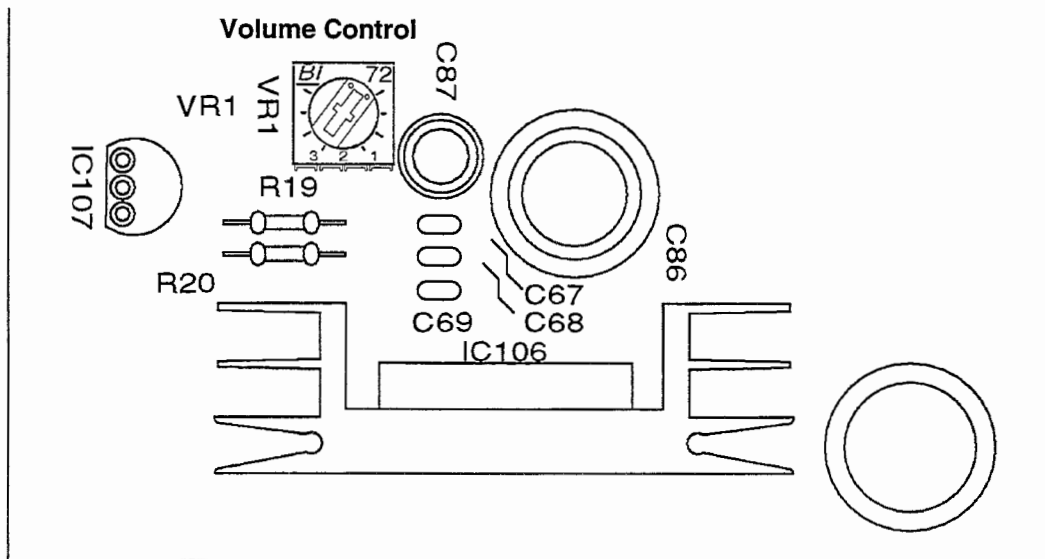
Fig. 1-11 Game Volume Control Location

Hopper Adjustments

Hopper Probe Circuit Adjustments

The hopper probe circuit is a device that detects the approximate number of coins in the hopper bowl. The circuit consists of two stationary probes that are inserted into holes pre-drilled through the back and front walls of the hopper bowl. The Operator inserts one probe in the front hole and one probe in the matching back hole.

When coins reach the level of either probe, the circuit is activated and a signal is sent to the hopper control board that the hopper is full. In turn, the board signals the CPU, which signals and activates the diverter. Coins are sent to the drop until enough coins are paid from the hopper to deactivate the probe circuit, which cancels the signal to the CPU, and closes the diverter. A number of different probe levels can be set depending on Operator requirements for hopper bowl fills. Follow the steps below to adjust the probes:

1. Use a Phillips screwdriver to remove the hopper probes. **See Figure 1-12**.
2. Insert the probes into the desired hole locations. They should be at approximately the same height. There is a table on the next page that shows each probe setting, and the number of coins (approximate) that will activate the probe.
3. Fill the hopper to the desired level.
4. Power up the game and confirm probe operations by adding coins to the bowl until one comes in contact with either of the probes. Then play a game and after a win, cash out to confirm the diverter is operating.

Note: The coin levels within the table on the next page are very close approximations based on extensive testing with actual coinage and tokens. Levels may vary depending on coin distribution positions within the hopper bowl.
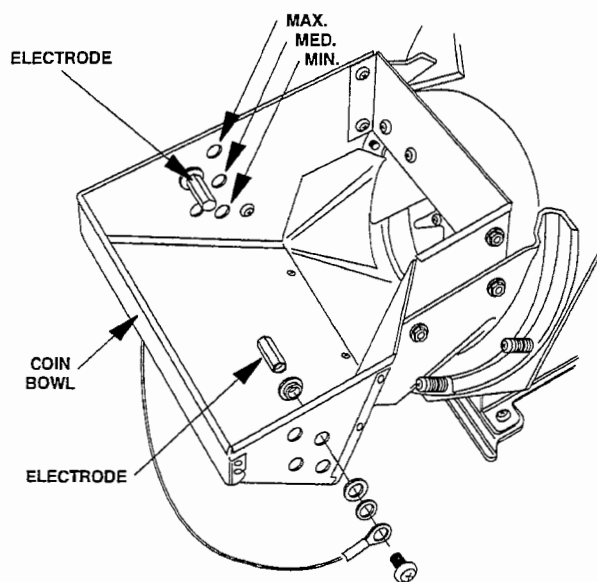
Fig. 1-12 Hopper Probe Location and Insertion

Hopper Probe Levels

This table details the approximate amount of coins needed to activate hopper probes. The table is broken down by denomination, probe level and coins needed for activation.

For example: The 1-1765 under the Hopper Probe Level table's nickel column means that approximately 1765 coins will activate the probe if it's set at the lowest level, (1).

HOPPER PROBE LEVEL / COIN LEVELS BY DENOMINATION					
Probe Level (1-7) and Approximate Coin Count					
Nickel	Dime	Quarter	Half Dollar	Dollar	Five Dollar
1 1765	1 4315	1 1375	1 530	1 240	1 125
2 2290	2 5595	2 1780	2 690	2 305	2 160
3 2715	3 6640	3 2115	3 820	3 365	3 190
4 3355	4 8205	4 2610	4 1010	4 450	4 236
5 3870	5 9470	5 3015	5 1170	5 520	5 275
6 4400	6 10,760	6 3425	6 1330	6 590	6 310
7 5035	7 12,315	7 3920	7 1520	7 680	7 355

Hopper Adjustments (cont.)

Hoppers are pre-adjusted at the factory. However, during the service life of the hopper, some adjustments may be needed, mainly for the microswitch and knife. This section has been included within the installation chapter because on rare occasions, the hopper may need adjustments before the machine is played for the first time.

Adjusting the Hopper Knife

The hopper knife is located directly above the agitator. If properly adjusted, the tip of the knife should be resting on the shelf wheel. Follow the steps below and refer to **Figure 1-13** for knife adjusting:

1. Loosen **but do not remove** the two screws that secure the knife to the mounting plate.
2. Press the knife down until it is touching the shelf wheel.
3. Tighten the two screws until the knife cannot be moved. This completes the adjustment.

Adjusting the Hopper Microswitch

The microswitch is activated by a metal contact strip that is pushed downward by the roller count arm, on to the micro-switch. Occasionally the microswitch will shift, and the roller count arm will not come in contact with the metal strip. Follow the steps below and refer to **Figure 1-14** to adjust the switch:

1. Loosen **but do not remove** the two screws that secure the switch to the coin switch bracket.
2. Move the switch to approximately the 10:00 position.
3. Hold the switch in place, and depress the roller count arm to confirm that it is depressing the metal contact strip.
4. Tighten the screws to secure the microswitch. This completes the adjustment.
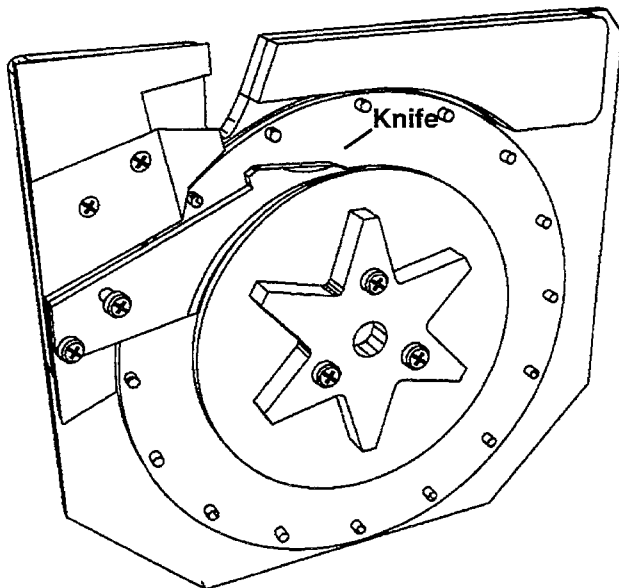
Figure 1-13 Adjusting the Hopper Knife   *Fig. 1-14 Adjusting the Hopper Microswitch*
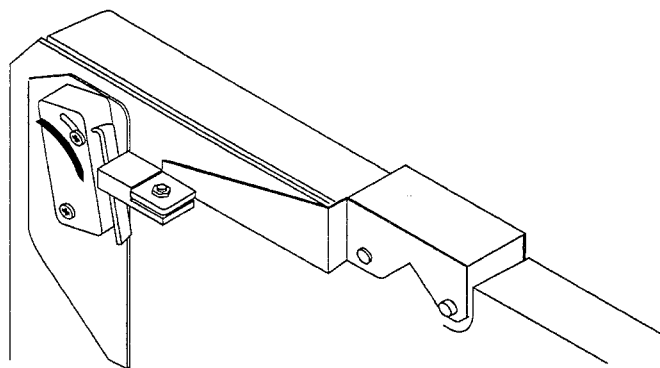
Bill Validator

The SG-150B can be equipped with the JCM Bill Validator which when optioned, will accept denominations of $1.00, $5.00, $10.00, and $20.00. Optional settings include $50.00 and $100.00 denominations. See the section later in this chapter for setting denominations.

Bills will be accepted if inserted horizontally and face up. Bills are converted to credits which display under the **Credits** heading in the LED Message Center. **Bills will be accepted until 100 or more credits accumulate on the Credit Meter**. At this point, the validator is deactivated until the meter drops below 100.

Note: For any penny denomination game, the $100 option is no longer available. It has been replaced by the 1¢ option. Because of this, $50.00 and $100.00 bills **will not** be accepted for **any** penny game. $1.00, $5.00, $10.00 and $20.00 bills will be accepted.

Also, bills will be accepted until 500 credits accumulate on the credit Meter. At this point, the validator is deactivated until the meter drops below 500. For all other denominations, the meter limit remains at 100 (see the paragraph above that references 100 or more credits).

Validator Initialization Procedure for Reel Slots

The validator must be initialized before it can be used. Follow these steps to initialize:

1. Turn power on.
2. After power-up press the test button twice.
3. Press the START button twice. At this point, the LED Message Center should read *"B_VALI_-OFF"*.
4. Press the BET ONE button. The message will change to *B_VALI_ON* and the validator will go through a power initialization cycle.
5. Press START until TEST / FINISH displays on the message center.
6. Press TEST to return to game play mode.

Bill Validator (cont.)

Removing the Bill Validator Head

Validator denomination settings are configured with DIP switches located in a compartment on the bottom of the Validator Head. Refer to **Figure 1-15** and follow these steps to remove the Validator Head:

Note: For perspective, **Figure 1-15** shows the entire Validator Assembly removed. The assembly does not have to be removed to take off the Validator Head.

1. Open the main door, discharge body static and turn power OFF.

2. Unplug the three connectors plugged into the Bill Validator Board. The board is attached to the lower left side of the Validator Head.

3. Unplug the white, two pin connector directly under the Validator Head.

4. There is a spring loaded locking pin on the bottom of the module. Grasp the module, pull the pin down, and gently slide the module forward to the length of the remaining cable, which is plugged into the right (non PCB) side of the module.

5   Unplug the remaining connector and remove the module.

6. Reverse the above steps to re-install. Before sliding the module into place, re-plug the right side connector. After completing the installation, confirm the module has latched into place and the release bar is secure.

See the next page for instructions on setting denominations.
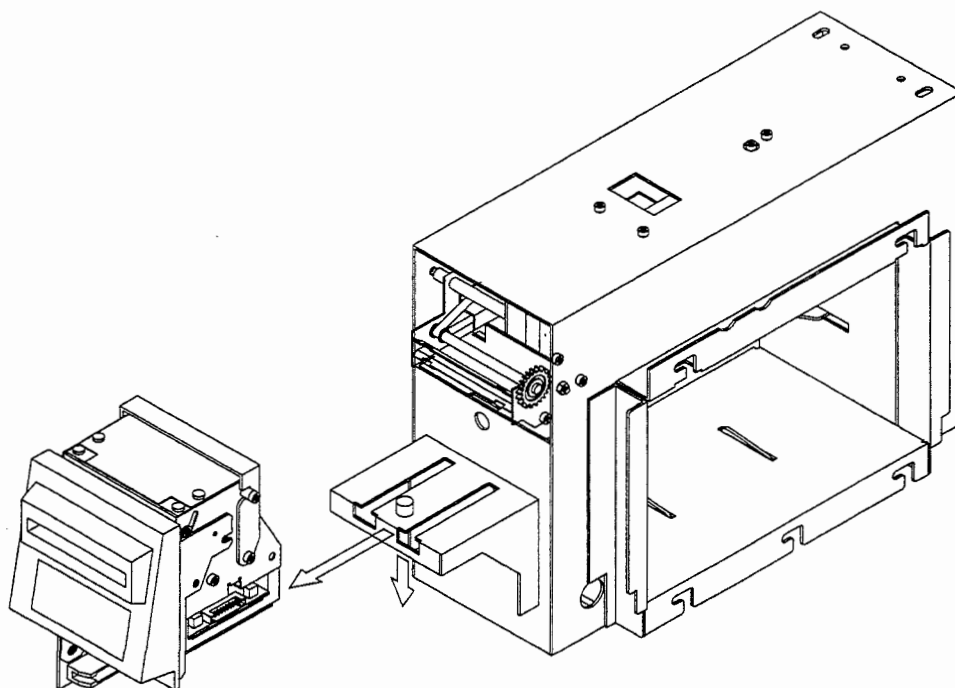
Fig. 1-15 Removing the SG-150B Validator Assembly

Bill Validator (cont.)

Optioning the Bill Validator

The validator must be optioned to accept different bill denominations. Denominations are set with DIP switches located in a compartment on the bottom of the Validator Head which is the device within the validator that accepts bills. The Validator Head must be removed to access the switches (see instructions on previous page) The switches are pre-set at the factory, but these instructions have been included in the event changes are required.

1. Open the main door, turn power off and **discharge body static**.
2. Unplug all easily accessible connectors leading into the Validator Head, then remove it. See the previous page for removal instructions.

Note: The JCM DBV-145 has two DIP switch packs. One pack has two switches and one has eight switches. The two switch pack was added for configuration of $50.00 and $100.00 bills. $50.00 and $100 bills will only be accepted in machines equipped with the DV-145 or a software modified DBV-45 validators. The DBV-35 will not accept these denominations.

3. Switches 1-4 (eight switch pack) are used to configure acceptance or rejection of $1.00, $5.00, $10.00 and $20.00 bills.
   Switches 1-2 (two switch pack) have the same function for $50 and $100 bills.
   Switches 5-7 are **always** set to *OFF* and are currently not used.
   Switch 8 is **always** set to *ON*.
   See the table below for acceptance and rejection switch settings.
   Use a small screwdriver or similar tool for setting switches. **Do not** use any device that could break and clog the DIP switches such as a pencil.
4. After setting switches, re-install the Validator Head and power up the machine.

Bill Validator DIP Switch Settings (Switch Pack One - Switches 1-8) JCM DBV-35, -45 & -145		
Denom	**Switch Setting for Bill Acceptance**	**Switch Setting for Bill Rejection**
$1.00	SW 1 / OFF	SW 1 / ON
$5.00	SW 2 / OFF	SW 2 / ON
$10.00	SW 3 / OFF	SW 3 / ON
$20.00	SW 4 / OFF	SW 4 / ON
Bill Validator DIP Switch Settings (Switch Pack Two - Switches 1-2) JCM DBV-145 Only		
$50.00	SW 1 / OFF	SW 1 / ON
$100.00	SW 2 / OFF	SW 2 / ON

Bill Validator (cont.)

Removing Bills

Accepted bills are stored in a patented security device called a "Bill Box". The box has a maximum capacity of 600 bills. The bill box cannot be removed by simply pulling it out, instead, a device called an "Extractor Box" is used. Follow the procedures below and refer to **Figure 1-16** for extraction instructions:

1. Unlock and open the bill access door located on the right side of the cabinet.

2. Grasp the handle of the extractor box and slide the box into the open space behind the door, until it clicks on to and secures the bill box. Note the handle and lock locations on the illustration. The extractor box will not work if this is reversed (handle on top and lock in bottom position).

3. Pull out the extractor box along with the bill box. The extractor box should be taken to a secure area, and unlocked by an authorized employee who will remove the bill box. This prevents unauthorized bill box access. See **Figure 1-16** which shows the cash box being removed from a free standing validator.

4. Slide a new bill box into place. The extractor box is not needed for this task.

5. Close and lock the bill access door.
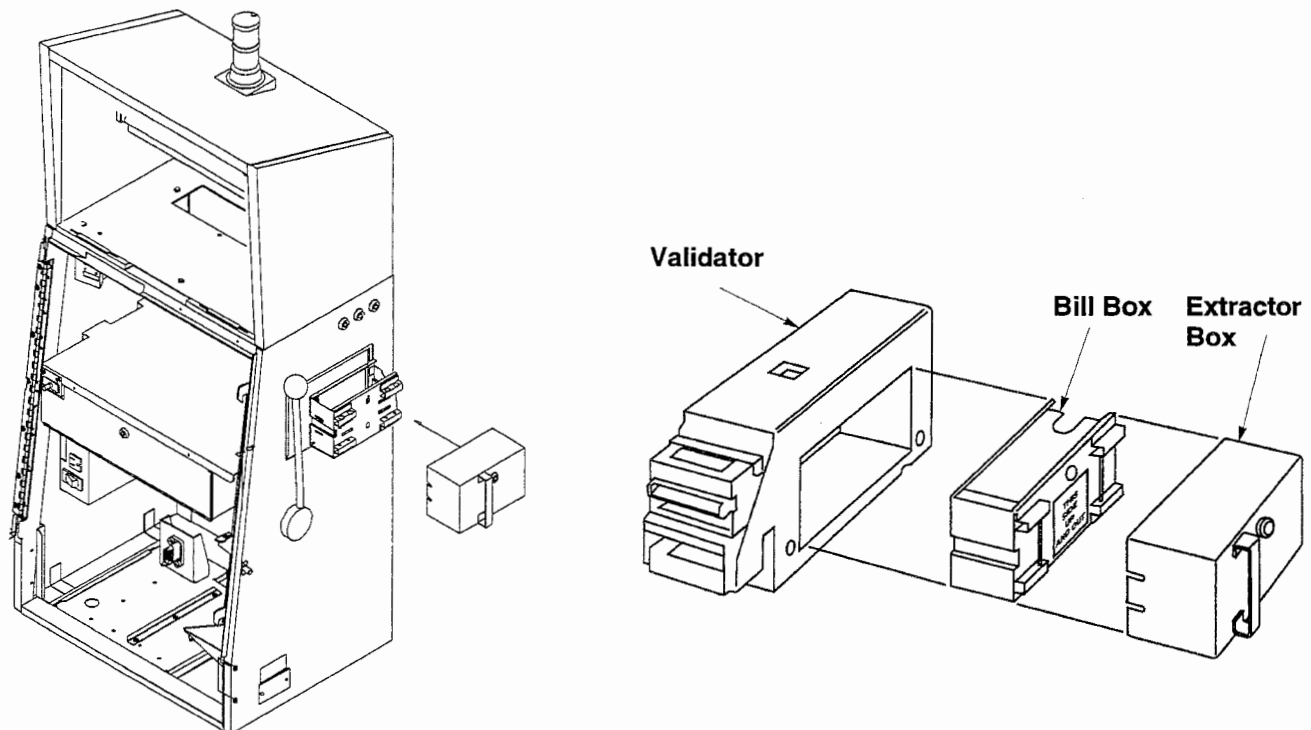
Fig. 1-16 Removing the Bill Box

Game Optioning

1-25

All game options are preset at the factory through hard switch settings at locations SW1 and JW1 on the solder side of the CPU board.

SW1 option settings are detailed below. On previous Sigma machines, there was a DIP Switch Pack at location SW1 on the CPU board. The 'switch positions' referred to below reference the hard wiring setting on the solder side of the board.

SW1 Option Settings

- **Switch Position 1   Attendant Pay Sound Cutoff Option**

The machine will make a sound when Attendant assistance is required.
ON   Attendant sound will continue until Reset Key-switch is turned ON/OFF.
OFF   Attendant sound will stop automatically.

- **Switch Position 2   Progressive Option ON/OFF Selection**

Note: This option is linked to Switch Position 6, Progressive Controller Selection.

Switch position 2 determines if progressive signals are activated.
ON   Progressive signals on
OFF   Progressive signals off.

- **Switch Positions 3 & 4   Hopper Pay Amount Selection**

Positions 3 and 4 determine the maximum amount of coins the hopper will dispense during a payout. See the table below for switch settings, max pay amounts and denominations.

HOPPER PAY AMOUNT SWITCH SETTINGS			
Position 3	**Position 4**	**Max Pay**	**Denomination**
OFF	OFF	2400*	1¢, 5¢, 10¢, 25¢, 50¢, $1.00
ON	OFF	200	5¢, 10¢, 25¢, 50¢, $1.00, $5.00
OFF	ON	400	5¢, 10¢, 25¢, 50¢, $1.00
ON	ON	1000	5¢, 10¢, 25¢, 50¢, $1.00
If switch positions 3 and 4 are set to the OFF position, the max pay amount for a 50¢ denomination machine is 2399. For $1.00 denomination 1199. For $5.00 denomination 100.			

Game Optioning (cont.)

SW1 Option Settings (cont.)

• Switch Position 5   Play Mode

Switch position 5 determines if the game is Credit Only, or Player Selectable.
A Player/Selectable game allows the customer to use the PAYOUT button as a toggle switch
to select credit **or** cash play.
ON   Credit Only
OFF   Player Selectable (Coin/Credit)

• Switch Position 6   Progressive Controller Selection

Note: Switch position 2 must be ON for this option to function.

This option determines the Progressive Controller type.
ON   Mikohn Super Controller type progressive.
OFF   Mikohn CON1 type progressive.

• Switch Position 7   Attendant Pay Option

On a payout over maximum hopper pay limit, this option determines if the Attendant pays the
entire win, or the win is partially paid from the hopper, with the remaining balance paid
by the Attendant.
ON   Attendant pay only.
OFF   A set limit is paid from the hopper (see the table on the previous page).
            The Attendant pays the balance due after the hopper payout.

Game Optioning (cont.)

SW1 Option Settings (cont.)

• Switch Positions 8, 9 & 10   Game Denomination Selection

This option sets the machine denomination. There are two tables for setting denominations which cover software versions before and after the 091 series designation.

DENOMINATION SWITCH SETTINGS (Software versions 091 & Before)			
Sw. Position 8	**Sw. Position 9**	**Sw. Position 10**	**Game Denomination**
OFF	OFF	OFF	5¢
ON	OFF	OFF	25¢
OFF	ON	OFF	50¢
ON	ON	OFF	$1.00
OFF	OFF	ON	$5.00
ON	OFF	ON	$25.00
OFF	ON	ON	$50.00
ON	ON	ON	$100.00

DENOMINATION SWITCH SETTINGS (Software versions 092 & Later)			
Sw. Position 8	**Sw. Position 9**	**Sw. Position 10**	**Game Denomination**
OFF	OFF	OFF	5¢
OFF	ON	ON	10¢
ON	OFF	OFF	25¢
OFF	ON	OFF	50¢
ON	ON	OFF	$1.00
OFF	OFF	ON	$5.00
ON	OFF	ON	$25.00
ON	ON	ON	$100.00

Clearing Accounting & Security Software Meters

Before putting the machine into game play for the **first** time, electronic software meters should be cleared. These meters track game, accounting, and machine malfunction information. They display on the LED Message Center when the METER Key-switch is turned.

Clearing meters assures accurate totals when the machine is brought on-line game play. The time and date of the clear should be recorded for updating records.

Note: See the next chapter **Metering and Game Play** for further meter information.

Follow these procedures for clearing meters:

1. Turn power on.
2. Insert keys into the METER and LAST key-switches. From left-to-right, these are the last two switches on the upper right of the cabinet.
3. Activate the METER Key-switch.
4. Activate the LAST Key-switch. The message center will display *UNTIL CLR* *.
   The * represents the beginning of a numerical countdown of 9, 8, 7, 6, 5. During this countdown, the validator's meters are being cleared. The countdown for the validator clear will display **even if the validator option has been disabled**.
   At the end of the first five count (5), the message *BV METER CLR* will display followed by another countdown of 4, 3, 2, 1. The second countdown clears all other software meters. At the completion of both countdowns, the message *METER CLEAR* will display. This completes the clearing process.
5. Turn the LAST and METER Key-switches to the OFF position. The game will return to game play mode.

Final Checklist

Use this checklist as a quick guide to confirm installation has been completed.

Before Power-Up

Confirm these items before power-up:

❑ All cabinet floor holes align with their corresponding stand holes.

❑ Machine is secure on the stand.

❑ Machine drop chute aligns with hole provided on stand.

❑ Machine glass paytables match the Game Description Sheet.

❑ All plugs and connectors are properly seated.

❑ All locks are installed and functioning.

❑ Reels spin freely.

After Power-Up

Confirm these items after power-up:

❑ Machine powers-up when switch is turned on.

❑ No error messages are displaying.

❑ RAM has been cleared.

❑ All buttons function.

❑ Tower functions.

❑ If equipped, Bill Validator functions.

❑ Coin Comparitor functions.

❑ All other components, (reels, hopper, etc.) functioning.

❑ Sound volume adjusted.

❑ Hopper Probe Circuit is functioning.

Metering & Game Operations

Machine Metering

The SG-150B has three sets of meters for accounting and game play information. The meters are Mechanical, Software Accounting and Software Maintenance/Security.

Mechanical Meters

Mechanical Meters are located inside the machine attached to a bracket on the upper right side of the cabinet. These meters track totals for Coin-in, Coin-out, Coin-dropped and Attendant Pays. They can be viewed from the outside of the cabinet. See the definitions below and see **Figure 2-1** for the meter display layout.

Coin-in Meter
Increments by one for each coin inserted and accepted, once for each credit bet from wins, and once for each credit bet from accepted bills.

Coin-out Meter
Increments once for each coin paid from the hopper and once for each credit bet from wins. The meter **will not** increment for credits bet, or hopper coin-outs from bills accepted.

Drop Coin Meter
Increments once for each coin diverted to the 'drop'.

Attendant Pay Meter
Increments once for each credit paid by attendant.

*Drop is a term for the process that occurs when the hopper has reached it's fill limit and will no longer accept coins. When this occurs, a signal is sent and coins are diverted into a container located in the stand, usually a bucket or similar collection device.

The drop condition will continue until enough coins have been paid from the hopper to cancel the drop and return the hopper to coin accepting mode.

```
        COIN IN
      6 5 4 2 7 1

        COIN OUT
      9 7 2 8 8 9

        DROP COIN
      5 3 2 1 7 0

     ATTENDANT PAY
      6 6 7 7 8 8
```
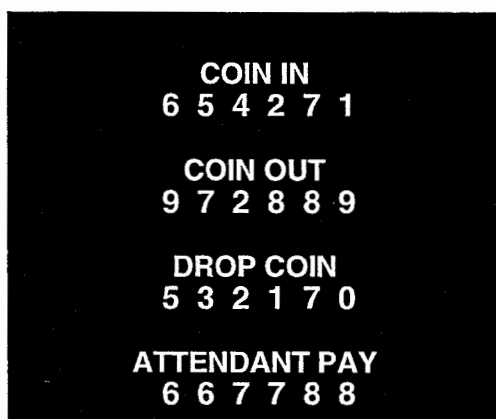
Figure 2-1 SG-150B Mechanical Meters

Software Accounting Meters

Software Accounting Meters track accounting and game information. These meters display in the LED message center when the METER Key-switch on the upper right side of the cabinet is activated. Follow the steps below to view these meters:

Note: The main door must be closed to read Software Accounting meters.

1. Activate the METER Key-switch. The message LEVER / START will display on the LED message center. This tells the Operator that meters can be viewed by either pulling the slot handle, **or** pressing START. This example will assume the START button is being used.

2. Push the START button. LEVER / START will be replaced with a message that details the machines EPROM number and version. The game description sheet that accompanies each machine can be used to confirm that the version is correct.

3. Press START again. The message P / O ****% will display. This is the machine's **theoretical** payout percentage. **** represents the actual number.
For example 95_08%.

4. Press START again. If the machine is validator enabled, the message B_VALIDATOR will display. From this point, the actual meter categories and totals will display each time the START button is pushed. See the table on the next page for the meter categories and definitions.

5. Meters can be exited at any time by turning the METER Key-switch OFF.

Software Accounting Meters (cont.)

If the machine is validator equipped, B_Validator is the first meter to display. If the machine is not validator equipped, the first meter to display is **IN**.

SOFTWARE ACCOUNTING METERS & DEFINITIONS	
Meter Name	**Definition**
B_VALIDATOR	**This is not a meter.** Indicates start of validator meters. To view press START. The first bill denomination and the number of times it was accepted will display. For example 1 65 meaning sixty-five $1.00 bills have been accepted. Continue pressing START to see all bill denomination totals. The next meter (TBILL) will display after the last denomination.
TBILL*	Total number of bills accepted for all denominations.
TCRDT*	Total number of credits awarded for **all** bills accepted.
B-DOOR*	Number of times Bill Validator Door (located on right side) has been opened.
B_VALI_END	This **is not** a meter. Indicates end of bill validator meters.
*TBILL, TCRDT and B-DOOR are validator meter categories.	
IN	The total number of coins **inserted** into and **accepted by** the machine.
OUT	The total number of coins paid from the hopper.
ATP	The total number of credits paid for all attendant pays.
DRP	Number of coins diverted to the drop.
NJI	Total coin-in based on: Coins bet + Credits bet.
NJO	Total number of coins paid from the hopper based on: Coins paid from hopper + Credits bet from wins.
BET	Total number of coins bet **and** credits bet.
WON	The total number of coins won.
GAME	The total number of games played.
HIT	The total number of games won. This meter has sub-meters based on the number of games won with one coin bet, two coins bet etc. Pressing START will display 1CP **. This indicates the total number of games won with one coin played. ** represent games won. Continue pressing START to display total games won with 2 coins played, etc., up to the game's coin play limit.
M-DOR	Number of times main door has been opened.
D-DOR	Number of times drop door has been opened.
ADC	Number of games played after a machine, validator, or drop door was closed.
POWER	Number of times machine lost power.
APO	Number of games played after last power-up.
RESET	Number of times machine has been reset using the RESET Key-switch or RESET button.
J-POT	Number of jackpots won (top awards only).
ATTEN	Number of attendant pays: Defined as number of times machine is reset after an attendant pay.
D0001100000	Indicates SW1 hard wired option settings. 1=ON 0=OFF In this example, reading from left to right, options 4 and 5 have been set to the ON position. All other options are OFF.

Game Specific Software Accounting Meters

Sigma has developed a number of unique game themes. These games have features that require additional Software Accounting Meters, not listed within the table on the previous page. The access procedure remains the same. For all three games within this table (Bonus Run, Bonus Scramble & Nine Line), the game specific meters listed all follow the HIT meter (see previous page). The table below lists the game theme, meter name and definition.

Note: Sigma Engineering Information Bulletins have been released for the games detailed in the table below. For further information on these games, refer to the following: EIB 95016 (Bonus Run), EIB 95017 (Bonus Scramble), EIB96001 (Nine Line).

<table>
<tr><td colspan="2" align="center">GAME SPECIFIC SOFTWARE ACCOUNTING METERS & DEFINITIONS</td></tr>
<tr><td colspan="2">Note: Bonus Run and Bonus Scramble have meters with the exact same names. For both games, the B HIT meter has the same definition. However, the P SND meter is not the same.</td></tr>
<tr><td colspan="2" align="center">BONUS RUN GAME</td></tr>
<tr><td align="center">Meter Name</td><td align="center">Definition</td></tr>
<tr><td>B HIT</td><td>Total bonus won. If machines are linked, this is a combined bonuses won total for all machines.</td></tr>
<tr><td>P SND</td><td>Total points sent to the Supercontroller (All machines, stand-alone and linked).</td></tr>
<tr><td colspan="2" align="center">BONUS SCRAMBLE GAME</td></tr>
<tr><td align="center">Meter Name</td><td align="center">Definition</td></tr>
<tr><td>B HIT</td><td>Total bonus won. If machines are linked, this is a combined bonuses won total for all machines. A bonus is won each time five events within a "Bonus Group" are won.</td></tr>
<tr><td>P SND</td><td>Total number of "Events" (Letters) won on the machine being accessed. This is not a linked meter. It records totals only for the machine being accessed.</td></tr>
<tr><td colspan="2" align="center">NINE LINE GAME</td></tr>
<tr><td align="center">Meter Name</td><td align="center">Definition</td></tr>
<tr><td>10UP</td><td>Each time ten or more coins are played, this meter increments once.</td></tr>
<tr><td>CAT1-CAT5</td><td>These meters record the following:
CAT1 - Number of times 1-9 coins have been wagered.
CAT2 - Number of times 10-18 coins have been wagered.
CAT3 - Number of times 19-27 coins have been wagered.
CAT4 - Number of times 28-36 coins have been wagered.
CAT5 - Number of times 37-45 coins have been wagered.
The 10UP meter total should always match the combined meter totals of CAT2-CAT5.</td></tr>
</table>

Software Malfunction & Security Meters

These meters record the number of specific incidents that could be considered to be a machine malfunction, or security issue. Follow these steps to access the meters:

1. Turn ON/OFF the METER Key-switch.
2. **Immediately** press the START button one time to access these meters. The message NO PULSE will display. This is the first meter. See the table below for meters display order and definitions.

MALFUNCTION & SECURITY METERS & DEFINITIONS	
Meter Name	**Definition**
NO PULSE	Number of coin-ins without a comparitor pulse (signal from comparitor) being detected.
TIME-OUT	Number of coin-in time outs, coin jams ect. Signal is sent from Coin Drop Optic.
REVERSE	Number of coin reverses. A coin is detected moving in reverse sequence. Signal is sent from the Coin-in Optic.
DROPOUT	Number of coin drop time outs. Signal is sent from the Coin Drop Optic.
HPR JAM	Number of hopper jams.
HPR EMP	Number of times hopper has been empty.
OVERPAY	Number of hopper overpays. This is not the same has a hopper runaway (see below). A hopper overpay occurs if after a payout is completed, the hopper continues to pay from one to five more coins. The Overpay message tells how many coins were overpaid. For example: *Overpay 4* means four extra coins were paid.
RUNAWAY	Number of hopper runaways. A runaway is one of two conditions. **1.** After a normal hopper payout, an overpay of six or more coins occurs. Any overpay will be indicated within the message. **2.** The hopper is activated for any other reason besides a payout.
NO SPIN *	Indicates that a reel or reels did not spin during a game. The * represents the number of spin errors detected.
RAM ERR	An error has been detected within the game memory.
M_LIMIT	The machine has reached the soft and hard meters game count limit of 999,999 games played. When this occurs, the message M_LIMIT 1 will display meaning one million games have been played. The attendant must RESET the machine using the RESET Key-switch. The counter will reset to zero and again begin to increment up to the 999,999 limit.
B_V_ERR	An error has occurred at the validator. This usually indicates a jammed bill.
TOTAL	Combined total of all malfunctions detailed above.
J-P H M	Time in hours and minutes that last jackpot was hit.
MCL H M	Time in hours and minutes that last reset of soft meters occurred.
MAL H M	Time in hours and minutes that last malfunction of any type occurred.
MDR H M	Time in hours and minutes of last main door opening.
DDR H M	Time in hours and minutes of last drop door opening.
PWR H M	Time in hours and minutes of the last RAM replace, or RAM's wrong occurrence.
RST H M	Time in hours and minutes of last machine reset.
READ END	This **is not** a meter. This message signals the end of the meter sequence.

Game Recall Records

Turning the LAST Key-switch will access records of the last two games played. They are referred to as the Last and Previous games. The records that can be viewed are the last five bills accepted, coins played, coins won, credits remaining and coins paid from hopper. These records will display on the LED message center.

Last Game Recall

1. Insert a key into the LAST Key-switch and turn the switch clockwise to the ON position. The following sequence of events will occur:
a. The reels will spin, then stop in the position they were in at the end of the last game played.
b. The LED message center will alternate messages. The first message will be *Last Game*. The second message will display the coins played, coins won, and credits remaining at the end of the last game (if any).
2. Press START. The message *C PAID* ** will display. This is the number of coins paid from the hopper (if any) after the last game was completed. The ** represents coins paid.
3. To exit back to game operations, turn the LAST Key-switch OFF at any time.

Previous Game Recall

The game played before the last game is referred to as the Previous Game. Follow these steps to access previous game recall records:

1. Follow the steps in the section above and access last game recall.
2. When *LAST GAME* displays on the LED message center, press the START button **one** time if the machine is not validator equipped. If validator equipped, press it **five** times. The message *PREV GAME* will display. The same alternating message sequence utilized for Last Game recall (steps 2 and 3 above) will then display.
3. To exit back to normal game operations, turn the LAST Key-switch OFF.

Note: See the **Machine Error Recall Indicators** section on the next page if 1's display within various LED 'windows'. This is an indication that an error occurred during the last or previous game.

Last Five Bills Accepted Recall

Follow these steps to access records of the last five bill denominations accepted:

1. Access last game recall by following the steps detailed in the first section of this page.
2. When the message *LAST GAME* displays, press START. The message *LAST 5 BILL* will display.
3. Press START again. The message *LB 1* **** will display. *LB 1* represents the last bill accepted by the validator. The **** represents the bill denomination. For example: *LB 1 5_00* means a $5.00 bill was the last bill accepted. Continue pressing START to view bill acceptance records for the last five bills accepted.
4. To exit back to game play status, turn the LAST Key-switch OFF.

Last Game Recall (cont.)
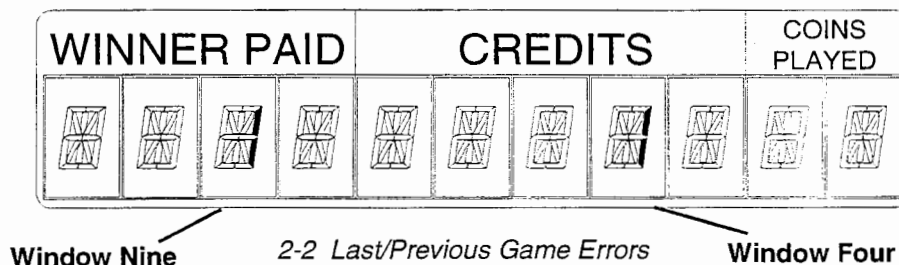
Machine Error Recall Indicators

The SG-150B records totals for a number of machine error conditions. These 'records' are stored for the last and previous games played. An error is indicated by a 1 displaying within one or more of the individual LED 'windows' on the message center. To access this feature, follow the steps below:

1. Insert a key into the LAST Key-switch and turn the switch clockwise to the ON position. The following sequence of events will occur:

a. The reels will spin until they assume the position they were in at the end of the last game played.

b. The LED message center will alternate messages. The first message is *LAST GAME*. The second message will display the number of coins won (if any), the number of credits remaining at the end of the last game (if any) and the number of coins bet. The third message will display any of the errors listed below, represented by a 1 in the respective LED 'window'. For example: In **Figure 2-2** note the 1's displaying in windows four and nine. This would indicate that during the last game played, a "Reel No Spin" and a "Hopper Time-out" occurred. The windows are read in **descending** order from left-to-right. This means that window 11 is the first window on the left.

- Second Window   *METER LIMIT*
- Third Window   *RAM CORRUPTED*
- Fourth Window   *REEL NO SPIN*
- Fifth Window   *COIN-IN DROP TIME OUT*
- Sixth Window   *COIN-IN NO PULSE TIME OUT*
- Seventh Window   *COIN-IN REVERSE*
- Eighth Window   *HOPPER EMPTY*
- Ninth Window   *HOPPER TIME OUT*
- Tenth Window   *HOPPER OVERPAY*
- Eleventh Window   *HOPPER RUNAWAY*

2. To exit back to normal game operations, turn the LAST Key-switch OFF.

Note: If any of the errors listed above occurred within the previous game (game before last game) follow the steps earlier in this chapter for accessing Previous Game Recall.

WINNER PAID	CREDITS	COINS PLAYED

Window Nine   *2-2 Last/Previous Game Errors*   **Window Four**

Game Specific Error Recall

Bonus Run Recall Meters & Error Recall

Sigma has developed a number of unique game themes. Note the section on the previous page on Machine Error Recall Indicators. Bonus Run has **additional** error recall indicators that confirm board communication errors. Also, two meters have been added that are accessed through Last Game Recall. The meters and the additional error recall indicators are accessed by turning the LAST Key-switch followed by pressing the START button. Follow the steps below to access these recall indicators:

1. Insert a key into the LAST Key-switch and turn the switch clockwise to the ON position. The following sequence of events will occur:
a. The reels will spin, then stop, in the position they were in at the end of the last game.
b. The LED message center will alternate messages. The first message is *LAST GAME*. The second message will display coins played, coins won and credits remaining at the end of the last game (if any).
2. Press START or SPIN REELS. The message *C PAID* ** will display indicating the number of coins paid from the hopper (if any) after the last game was completed. ** represent coins paid.
3. Press START or SPIN REELS again. B CNT will display. This is a meter that records total points accumulated on each machine. It indicates the "Current Count" at the end of the last game, and is not updated until a game has been completed.
4. Press START or SPIN REELS again. C CNT will display. This is a meter that records the total points accumulated for all linked machines. This meter is continuously updated by the Supercontroller, when machines are idle. However, in Stand-alone mode, this meter updates after the game is completed.

Note: B CNT and C NT meters should always have the same totals in Stand-alone mode because both meters are updated after a game has been completed.

5. Press START or SPIN REELS again. *DB-00000000* will display. This is the additional Bonus Run board communication error indicator. See the next page for a detailed explanation of this display.

Game Specific Error Recall (cont.)

Bonus Run Last Game Error Recall

DB-00000000 is the board communication error check. If a 1 displays in place of a 0, an error has occurred. The message displays Error Types (first three zeroes) and Error Modes (last five zeroes). See below for definitions of these two error codes. In **Figure 2-3**, note the location of the 1. This indicates a Line Verify Error. DB indicates a Bonus Run game.

Error Types

DB-10000000   **Time Out Error**
This error occurs if the game does not receive an "Acknowledge" or "Error" response from the display board within a specified time limit.

DB-01000000   **Line Verify Error**
This error occurs if the game is unable to verify that both the Acknowledge and Error line signals were 'high' within a specified time limit.

DB-00100000   **Line Error**
This error occurs if the game detects an "Error" response from the display board. This usually indicates that previously sent data was invalid or corrupt.

Error Modes

DB-00001000   **Lamp Test**
An error occurred during the Lamp Test.

DB-00000000   **Not Used**

DB-00000000   **Not Used**

DB-00000001   **Bonus Run**
An error occurred during an attempt to send current Bonus Run count data to the Display Board. If this error occurs, a single attempt is made to reset the Display Board, followed by re-sending current Bonus Run data .
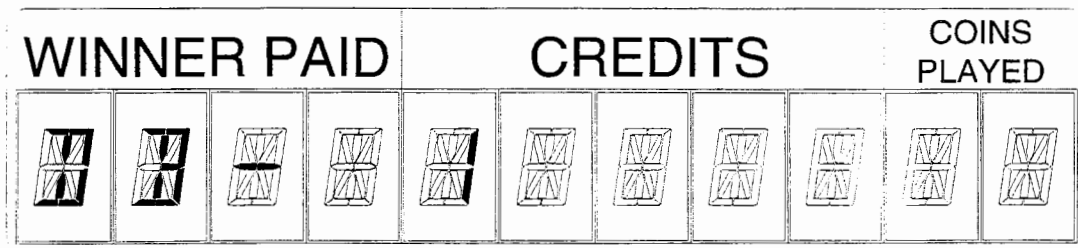

Fig. 2-3 Bonus Run Error Code Indicator

Game Specific Error Recall (cont.)

Nine Line Game Error Recall

Nine Line games have software that checks for board communication errors.
Follow the steps below to access this feature:

1. Insert a key into the LAST Key-switch and turn the switch clockwise to the ON position.
   The reels will spin, then stop, in the position they were in at the end of the last game.
   The LED message center will alternate messages. The first message is *LAST GAME*.
   The second message will display coins played, coins won (if any) and credits remaining
   at the end of the last game (if any).

2. Press START or SPIN REELS. The message *C PAID* ** will display indicating the
   number of coins paid from the hopper (if any) after the last game was completed.
   ** represent coins paid.

3. Press START or SPIN REELS again. *9L-00000000* will display. This is the error recall
   feature for board communications. If a 1 displays in place of a 0, an error has occurred.
   The message displays Error Types (first three zeroes) and Error Modes (last five
   zeroes)

See the next page for definitions of Error Types and Error Modes.

Game Specific Error Recall (cont.)

Nine Line Game Error Recall (cont.)

As stated on the previous page, *9L-00000000* is the board communication error check. If a 1 displays in place of a 0, an error has occurred. The message displays Error Types (first three zeroes 9L-**000**00000) and Error Modes (last five zeroes 9L-000**00000**). See below for definitions of these two error codes. In **Figure 2-4**, note the location of the 1. This indicates a Line Verify Error. 9L indicates a Nine Line game. Note Figure 2-3 below. The highlighted 1 indicates a Line Verify Error occurred in the previous game.

Error Types

9L-10000000 **Time Out Error**
This error occurs if the game does not receive an "Acknowledge" or "Error" response from the display board within a specified time limit.
9L-01000000 **Line Verify Error**
This error occurs if the game is unable to verify that both the Acknowledge and Error line signals were 'high' within a specified time limit.
9L-00100000 **Line Error**
This error occurs if the game detects an "Error" response from the display board. This usually indicates that previously sent data was invalid or corrupt.

Error Modes

9L-00010000 **Board Reset Mode Error**
An unsuccessful attempt was made to reset the Display Board.

DB-00001000 **Lamp Test Mode Error**
An unsuccessful attempt was made to send Lamp Test Op-code to the Display Board.

DB-00000100 **Attract Mode Error**
An unsuccessful attempt was made to send Attract Mode Op-code to the display board.

DB-00000010 **Win Info Mode Error**
An unsuccessful attempt was made to send winning payline data to the display board.

DB-00000001 **Coin-in Mode Error**
Sent coin-in data cannot be read by the Display Board. If this error occurs, a single attempt is made to reset the Display Board, followed by re-sending current Bonus Run data.
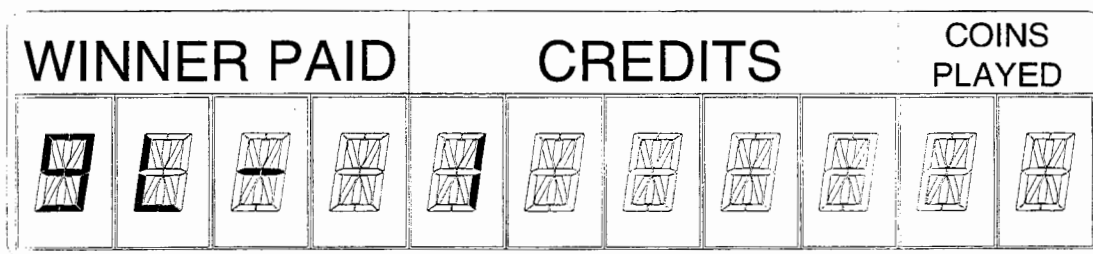
Fig. 2-4 Nine Line Error Code Indicator

Tower Lamp Indicators

The two tier tower lamp is used as a 'message center' for a number of game conditions.
See the table below for conditions that will cause the top tier, bottom tier, or both tiers to illuminate.

MACHINE CONDITION	TOWER LAMP INDICATOR
CHANGE BUTTON PRESSED	Top light illuminates.
DOOR OPEN	Bottom light illuminates.
JACKPOT/ATTENDANT PAY	Top and bottom lights illuminate.
POWER UP	Bottom light flashing.
TILT	Top light flashing.

Game Play

Before Game Play

The LED message center displays totals for Winner Paid, Credits and Coins Played. If the machine is turned OFF/ON, any information from the last game played relating to these three categories will display in the LED message center.

Door Open, Power Up and Bill Validator ON/OFF Indicators

There are eleven display "windows" within the LED message center. Each window contains sixteen LED segments. For reference, these 'windows' are read from left to right in descending order. This means that the first window on the left is window eleven.
When the machine is first powered-up, the tenth window (second from left) may have one or more of the individual segments illuminated. An illuminated segment alerts the Operator to one or more of the following conditions:

1. Main Door Closed
2. Drop or Bill Door Closed
3. Main Door Open
4. Power-Up
5. Drop Door Open
6. Bill Validator Off

Window 10
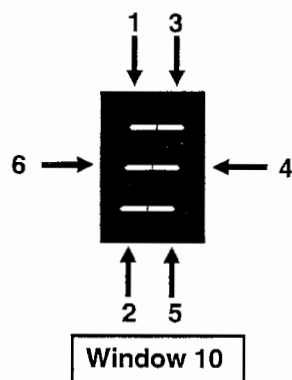
Note the numerical order of the list above. Use this order and reference the illustration on the right to match the machine condition to the designated segment.

Game Play

Game play begins when coins or bills are accepted by the machine. After making a wager, press START, or pull the handle, to play the game. If there is a win, coins will be paid into the coin tray, or to the credit meter if the game has been optioned for credit play.

Credit Play

A machine can be optioned to convert bills into credits displayed on the Credit Meter located in the middle of the LED message center (under the **CREDITS** heading).
For example: A $10.00 bill inserted into a 25¢ credit machine will be converted into forty credits. The number 40 will display under **CREDITS**. The meter limit is based on the IRS rule (see next page). Follow these steps to play a credit machine:

1. Insert coins and play a game, or insert a bill and play a game from accumulated credits. Any wins will be credited to the credit meter. Credits can be accumulated up to the machine's credit limit.

Note: Bills will be accepted until **100 credits** accumulate on the credit meter. At this point, the validator is deactivated until the meter drops below 100. For penny machines only, bills will be accepted until **500 credits** accumulate on the meter.

2. Press MAX BET START to play a game with the maximum wager, without using the handle. If MAX BET START is pressed with less credits available than programmed maximum, all remaining credits will be wagered. For example: A machine is programmed for a five coin maximum bet. There are four credits accumulated. Pressing MAX BET wagers the four credits. A coin or coins can be inserted at any time before beginning a game to bring the bet up to the maximum limit.

3. To wager less than maximum, Press 1 BET until the desired bet has been played, then press START, or pull the handle.

4. Press PAYOUT to convert credits to coins which will be paid into the coin tray. The game must be over to collect credits.

Coin/Credit Games

The customer has the option of playing this type of machine in either cash or credit mode. Any game optioned for this feature will have a CREDIT PLAY / PAYOUT COINS button instead of a PAYOUT button. The CREDIT PLAY / PAYOUT COINS button acts as a toggle switch between cash and credit play. When the button is lit, the game is in cash mode. Pressing the button will change the game to credit mode. In this condition, the button will not be lit and a zero will display on the LED Message center under **Credits**. Pressing the button again will illuminate it and return the game to cash play mode. If the machine is in credit mode with no credits, and is not played for approximately two minutes, the machine will automatically return to cash mode. Depending on the choice made, all wins will be paid to the coin tray, or the credit meter. Collect credits at any time by pressing CREDIT PLAY / PAYOUT COINS. All credits will be converted to paid out coins and the machine will return to cash mode.

Note: Validator equipped machines will automatically enter credit mode if a bill is accepted. The machine remains in this mode until the customer plays all credits, or cashes out.

Payout Limits

IRS Rule

The IRS rule states that any **single** win on a slot or video poker machine that exceeds $1199 will be considered taxable income. On Sigma machines this rule is taken into consideration when setting credit meter limits (see next category.)

Credit Meter Limits

Credit meter limits for Sigma reel slots are based on the IRS rule. This limit is based on the the number of credits needed to reach $1200, minus one credit.
For example:
The credit meter limit on a dollar machine is 1199 coins or tokens.
On a 25¢ denomination machine the limit is 4799.
For dime and nickel machines, the limit is 9999 credits which is the character limit of the meter.

Hopper Pay Limits

Sigma reel slot machines can be optioned to pay a maximum amount from the hopper on a **single** payout. This option can affect both single win and credit meter payouts (credits on the meter collected by the customer).
If a payout exceeds the hopper pay limit, the Attendant Pay Option setting will be activated.
See the section later in this chapter for a detailed explanation of this option.
This option is set at switch positions 3 and 4.
The table below details hopper payout limits by denomination.

HOPPER PAY AMOUNT SWITCH SETTINGS			
Position 3	**Position 4**	**Max Pay**	**Denomination**
OFF	OFF	2400*	1¢, 5¢, 10¢, 25¢, 50¢, $1.00
ON	OFF	200	5¢, 10¢, 25¢, 50¢, $1.00, $5.00
OFF	ON	400	5¢, 10¢, 25¢, 50¢, $1.00
ON	ON	1000	5¢, 10¢, 25¢, 50¢, $1.00
*If switch positions 3 and 4 are set to the OFF position, the max pay amount for a 50¢ denomination machine is 2400. For $1.00 denomination 1199. For $5.00 denomination 100.			

Attendant Hand Pays

Attendant Pay Option

The Attendant Pay Option selection determines if payouts that exceed the hopper pay limit are paid entirely by the attendant, or the hopper pays up to a set limit, with the remaining payout balance being paid by the attendant.

Full Attendant Pay

If the Attendant Pay Option is set to All Attendant Pay, the following events will occur for any payout that exceeds the Hopper Pay Limit setting:

1. The machine will lockup.
2. No coins will be paid from the hopper.
3. The machine will generate an attendant pay sound.
4. The upper and lower tower lamps will illuminate.
5. The LED message center will display the amount to be paid by the attendant.

Partial Attendant Pay

If the Attendant Pay Option is set to Partial Attendant Pay, the following events will occur for any payout that exceeds the Hopper Pay Limit setting:

1. Coins will be paid from the hopper, up to the hopper payout limits (see Hopper Pay Limits section earlier in this bulletin).
2. The machine will lockup.
3. The machine will generate an attendant pay sound.
4. The upper and lower tower lamps will illuminate.
5. The LED message center will display the number of credits remaining which will be paid by the attendant.

For both types of attendant handpays, the machine must be reset with the RESET Key-switch after the payout is completed.

After the reset, the machine will return to normal game play mode and the Attendant Pay mechanical meter will increment for each credit paid by the attendant.

Note: Progressive Jackpots paid by the attendant, **do not** increment the Attendant Pay mechanical meter.

If a jackpot is won, the attendant will pay either the entire jackpot, or the remaining jackpot balance after a partial hopper payout. This is determined by the Attendant Pay Option being set to either ON or OFF.

Attendant Assisted Payouts

If the credit meter limit is reached, the hopper empties, or there is a machine malfunction, attendant assistance could be required to **complete** a payout. This is not the same as an attendant hand pay (see previous page).

Hopper Empty

If the hopper empties, the following events occur:

1. The message *HPR EMPTY* ***** will display on the LED message center.
   The asterisks represent the remaining balance owed to the player.

2. The attendant refills the hopper and closes the main door.

3. The attendant resets the machine by turning the RESET Key-switch ON/OFF. The remaining balance is paid from the hopper. The credit meter will not change. If the machine is in credit mode, the customer can cash out remaining credits, or continue playing.

Machine Malfunction Attendant Pay

This type of payout would occur on a credit machine only if there are credits accumulated, and the machine malfunctions.

1. The machine will lockup. This could be caused by any number of conditions. The *ATTEND* message will display on the LED message center.

2. If the machine cannot be fixed, the attendant will pay any accumulated credits.

Testing / Troubleshooting

Machine Tests

The SG-150B has tests programmed into the software that allow the Operator to quickly troubleshoot most common problems. There are two types of tests which are: *Power-up Self Tests* and *Test Button Activated*.

Power-up Self Tests run automatically when the machine is turned on. *Test Button Activated* refers to tests the Operator can access after pressing the TEST button located inside the machine above the power switch.

Power-up Self Tests

When the machine powers-up, a number of tests automatically run to confirm operations and programming. If the self-testing cycle is successful, the following events will occur:

a. The reels will move slightly.

b. The validator (if equipped) will initialize, confirming readiness to accept bills.

c. The message *INSERT COIN OR BILL* will continuously flash to the right of the LED message center.

Self Test Error Detected

If the self-testing phase detects a problem, memory error, or software change since the last power-up, one or more messages will display. (See Chapter 1 **Power-up Messages**).

--- CAUTION ---
**Some error messages require clearing of machine's RAM (Random
Access Memory). RAM stores all game optioning and software
meter information. All metering information should be recorded
prior to clearing RAM.**

I/O Tests (Test Button Activated)

The Operator can confirm a number of Input / Output functions by pressing the TEST button. located directly below the power switch.

When accessed, all tests will display on the LED message center. Reference the next page for tests display order and descriptions. Follow these steps to access I/O tests:

1. Open the main door and press the TEST button twice. The message *LEVER / START* will display. This tells the Operator that tests can be viewed by either pulling the slot handle, or pressing START. For this example, we will assume the START button is being used.
2. Press START. The message *16 SEG TEST* will display. This is the first I/O test.
3. Continue pressing START to access each test in the order displaying on the table below.
4. I/O tests can be exited by either:
a. Turning power OFF/ON at any time during testing.
b. Pressing START until the message TEST / FINISH displays. After this message displays, press the TEST button to exit.

Note: The I/O test messages will display the input that needs to be activated, followed by the output signal that will be sent. For example: One of the tests is *DROP/SOUND*. In this example, activating the drop optic switch (input) will begin the machine sound test (output).

I/O Tests (cont.)

Reference the table below for I/O tests display order, descriptions and activation procedure.

I/O TEST TABLE	
TEST MESSAGE	**DESCRIPTION**
LEVER / START	**Not a test.** Tells Operator to pull the handle, or press the START button to activate I/O tests.
16 SEG TEST	When accessed, this test will display all of the characters that can be generated on the LED message center which are 0-9, A-Z and *.
B_VALI_ - - ON (or OFF)	This test uses the 1 BET button to turn ON/OFF the validator.
SW 1 / JACKPOT	When the first optic switch is activated, *JACKPOT* will flash for approximately seven seconds. This confirms the jackpot signal.
SW 2 / LOCKOUT	When the second optic switch is activated, *LOCKOUT* will flash. This confirms the lockout signal to the coin comparitor.
DRP / SOUND	When the Drop Optic is activated, all machine programmed sounds will play in sequence. This is a combination sound test and drop optic function test.
WEIGHT / DIVID	This test confirms diverter functionality. Shorting the hopper coin level probe to the hopper bucket will cause the diverter to release.
M - DOR / SOUND	Same as DRP/SOUND test above, except activated by **main** door switch.
B - DOR / SOUND	Same as DRP/SOUND test above, except activated by **validator** door switch.
D - DOR / BELL	Not applicable. Currently not used.
LAST / REEL	If the LAST Key-switch is activated, reel testing can be conducted. See the next page for instructions on running this test.
MTR / SIGNALS	Activate the METER Key-switch. *MTR* on the LED message center will flash, indicating the METER Key-Switch is functioning.
RST / HOPPER	Each time the RESET Key-switch is turned ON/OFF, ten coins are paid from the hopper.
CHANG / TILT " " INSERT " " ACCEPT " " LO TWR " " PAT LP " " UPR TWR	This test activates, in order, the tilt lamp, insert lamp, coin accept lamp, lower tower lamp and upper tower lamp. Once activated, the lamps will continue to illuminate until the START button is pressed, or testing is exited. This test also activates the attendant bell (if equipped) when the message *PAT LP* displays.
PAY / LAMP ON	Press PAYOUT. The button will illuminate and *PAY* will flash on the message center.
BET / LAMP ON	Press 1 BET. The button will illuminate and *BET* will flash on the message center.
MAX / LAMP ON	Press MAXBET/START. The button will illuminate and *MAXBET* will flash on the message center.
TEST / FINISH	**Not a test.** Indicates end of I/O tests.

I/O Tests (cont.)

Reel Testing

This test confirms the following:

a. There are a number of places in this manual that refer to "Reel Stops". When a game is played, all three reels will spin for a designated period, then stop. The stopping point is a programmed **reel stop position**. The Game Description Sheet (GDS) details the number of programmed stops for each reel.

   This test also confirms reel strip **symbols** aligning with the payline, correspond to designated reel stop positions according to the GDS. For example: The GDS states that reel one will have a cherry symbol display on the center payline if the reel stops at position 85.

b. A slot machine win is based on two factors; The number of coins wagered and symbol combinations that align on the payline when the game is complete. Depending on the game, a win can result from a single symbol (a cherry for example) aligning on the payline, or a combination of symbols (three cherries for example). These are just examples because winning symbol combinations vary by game.
   The reel test is used to confirm each possible win (symbols on payline) based on coins bet. For example: If 7 7 7 aligns on the payline with one coin bet, the Player wins 500 coins. Two coins in with three sevens will win 1000, etc.

See the next page for detailed descriptions of these tests.

I/O Tests (cont.)

Reel Stops Test

The reel stop test confirms each reel stop position (see reel stop definition on previous page). For this test, the LED message center displays the following information in the following locations:

- The reel being tested will be represented by a number displaying in the first LED window. Note the *1* in the first window on **Figure 3-1** which indicates reel one (first reel on the left) is being tested.

- The reel stop position will display in the last three windows of the LED message center under **Coins Played**. The *127* in **Figure 3-1** represents the 127th reel stop.

- If a reel symbol should be aligned with the payline, a description of the symbol will display between the reel number and the reel stop number. In **Figure 3-1** the message *3 BAR* represents a triple bar.

Accessing the Reel Stop Test

Follow these steps to access this test:

1. Press the TEST button located inside the machine twice, then press the START button until *LAST / REEL* displays. The TEST button located directly below the Power Switch.
2. Activate the LAST Key-switch. The message *LAST / REEL* will be replaced with *REEL _ _ TEST*. All reels will spin, then stop, at last reel combination. See the Game Description Sheet for this combination.
3. Turn the LAST Key-switch OFF. This begins the Reel Stops Test for the **first** reel. The reel will spin to its **last reel stop** position. The reel will remain in this position for approximately two seconds, then it will move to the **first reel stop** position. At this point, the reel stop counter (below **Coins Played** on the LED message center) will begin to increment. Each counter advance represents one reel stop. However, the reel **will not move** until the program indicates that the next reel stop requires a symbol.

1 - : Indicates First Reel   3 Bar: Indicates Triple Bar Reel Symbol
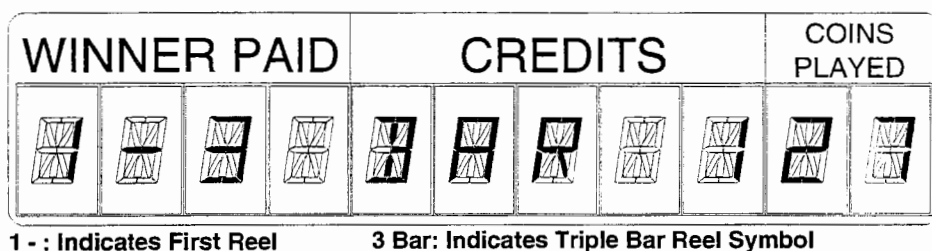
Figure 3-1 Reel Test First LED Message

I/O Tests (cont.)

Reel Stops Test (cont.)

For example: The first ten stops on reel strip one are blank symbols that will not display on the payline. Stop 11 has been programmed for a cherry on the payline. In this scenario, the following events will occur:

- The word *BLANK* will display in the LED message center until the reel stop counter reaches *10*. *BLANK* indicates that no symbol should be displaying for the current reel stop.

- When the reel stop counter reaches 11, the reel will advance until the required symbol (for this example a cherry) displays on the payline. Remember, up to this point, the reel **has not** moved because the first ten stops did not require a symbol on the payline. Note **Figure 3-2**. The reel stop counter (under **Coins Played**) is at 11 and the reel strip symbol is represented by *CHERRY* on the message center.

- After the symbol is aligned, the counter under **Coins Played** will again begin to increment for confirmation of reel stops, but the reel will not advance until another symbol is required. Immediately after the counter begins to increment, the LED message center will display either *BLANK*, or the reel will again move, a symbol will align on the payline, and a description of the symbol will display within the message center.

- The reel stop counter (under **Coins Played**) will continue to increment until the Operator turns OFF the LAST Key-switch.

4. This test can be exited by pressing START until *TEST / FINISH* displays. At this point, press TEST to resume normal game operations.
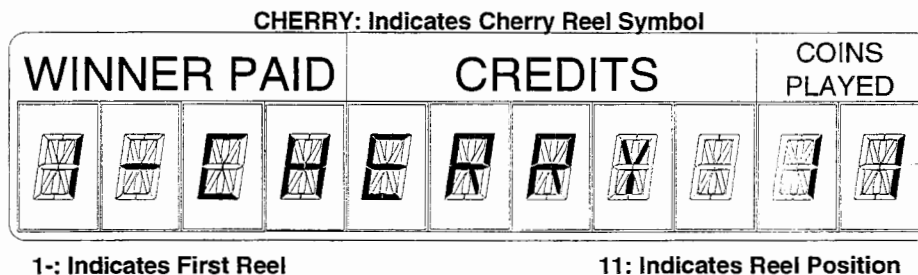
CHERRY: Indicates Cherry Reel Symbol

WINNER PAID	CREDITS	COINS PLAYED

1-: Indicates First Reel   **11: Indicates Reel Position**

Figure 3-2 Reel Stop Test

Reel Symbols Win Verification

The Reel Stops test is also used to confirm that winning symbol combinations match the Game Description Sheet. This section covers win verification for a single reel and symbol, and for multiple reels and symbols. Follow the directions below to access this test:

1. Press the TEST button located inside the machine directly below the Power Switch twice, then press START, until *LAST / REEL* displays.
2. Activate the LAST Key-switch. The message *LAST / REEL* will be replaced with *REEL _ _ TEST*. The reels will spin and stop at the last reel stop combination. See the Game Description Sheet for this information.
3. The first reel will begin to advance. When the reel has advanced to the desired stop on the payline, **immediately** turn the LAST Key-switch OFF/ON. This must be done quickly, because the reel will advance rapidly.
4. If desired, once again turn the LAST Key-switch OFF/ON to align a symbol or blank on the second reel. Repeat this step for reel three. After freezing the third reel, the following events will occur:
a. The number of coins that can be won with one coin bet for the reels/symbol combination on the payline will display under the **Credits** heading.
b. *1* will display under **Coins Played** meaning a one coin bet.
c. After a **brief** interval, the same sequence will be repeated for two coins played, three coins played, etc.
d. When all coin-in/win totals have displayed for the selected reels/symbol combination, all reels will return to the position they were in **prior** to beginning the win verification test. The message *REEL _ _ TEST* will display in the LED message center. At this point, the Operator can repeat steps 2-3 to confirm other win combinations of reels and symbols.
5. This test can be exited at any time by turning the LAST Key-switch ON/OFF three times, followed by pressing the START button until *TEST / FINISH* displays. At this point, press the TEST button. The machine will return to normal game operations.

Note: Each time a reels/symbol combination is checked, the program will automatically return to the *REEL_ _TEST* option under the I/O test menu after the check is completed. This means that the test must be re-started for each win verification.

Win Verification for Progressive Jackpots

If the machine is linked to a progressive jackpot, follow the steps above to confirm the winning reel combination for the top prize. When all three symbols are aligned (for example 7 7 7) the LED message center will display the number of coins that can be won with one coin bet, two coins bet etc. For example *800 1* means that 800 coins can be won with one coin bet. However, when the max coin bet is reached, the message *JACKPOT* will display instead of numerical value. This occurs because the top prize is not a set value, but instead increases as wagers are made.

Error / Security & Information Messages

These are the messages that display on the LED message center that could require Operator assistance. The error definition is in *italics* for easy reference. This table is continued on the next page.

MESSAGE	DEFINITION & TROUBLESHOOTING PROCEDURE
BV ERR / PW B	*There was a power failure during the bill accepting process.* Turn the RESET Key-Switch ON/OFF. The validator will cycle and the bill will be rejected or stacked, however no credits will be issued.
BV ERR / NO V	*Bill Validator Error.* This error occurs for the following reasons: The validator lost power but not the machine. The bill was not read by validator optics. There was a communication error between the validator and game programs. Turn the RESET Key-switch ON/OFF, the error message will clear and no credits will be issued.
B_VAL ERROR	*The cash box is full, or a bill is jammed in the stacker.* Clear the problem, then turn the RESET key switch ON/OFF. If the cash box was full, credits are issued. No credits are given for a bill jam.
CALL ATTENDANT	Displays when an attendant is needed for machine reset, repair, or customer payment.
DRP TIMEOUT	*Coins are not passing through the Coin Drop Sensor properly.* This could be coin-jam, or a substance blocking the sensor such as dirt, or paper.
CIN NOPULSE	A coin has passed through the Coin-in Sensor, but a valid coin pulse has not been received from the Coin Comparitor. Check wiring to the comparitor. Confirm proper coin counter-weights. Check the main PCB circuits and check for a Reset error.
CIN REVERSE	The Coin-in Optic has detected a coin moving in reverse sequence. This is usually an indication of stringing.
CIN TIMEOUT	Coins are not passing through the Coin-in Sensor within the specified time limit. Look for a coin-jam, slug, or a substance blocking the sensor.
COMM ERR RX COMM ERR TX	*Progressive Communication Errors.* Refer to the Sigma Progressive Hookup manuals for error indications and troubleshooting.
DOOR OPEN	Indicates that either the validator, drop or main door is open. Check the **LED Display Indicators** section of this manual.
HPR EMPTY	*No coins have passed through the hopper Coin-out Sensor or switch for approximately 10 seconds.* Check for an empty hopper, or a hopper coin jam.
HPR TIMEOUT	*The Hopper or Coin-out Switch has been active for a longer period than allowed by game programming.* Check for coin jam, or switch malfunction.
NO SPIN #	*A reel did not spin correctly. The # refers to the particular reel.* Check for obstructions confirm wiring connections. If necessary, replace the reels or Main PCB.

Error / Security & Information Messages (cont.)

This is a continuation of the table on the previous page.

MESSAGE	DEFINITION & TROUBLESHOOTING PROCEDURE
OVERPAID #	There has been a hopper overpay. **This is not the same has a hopper runaway (see below).** A hopper overpay occurs if after a completed payout, the hopper continues to pay from 1 to 4 more coins. The Overpaid # message tells how many coins were overpaid. For example: *Overpaid 4* means four extra coins were paid.
RAMS CORRUPT	There has been a memory (RAM) corruption during game operations. The cause is either from a program glitch or RAM circuitry malfunction. Turn the RESET Key-switch ON/OFF to clear the message. Change the main PCB if problem continues.
RUNAWAY #	The hopper has malfunctioned causing a 'hopper runaway'. A runaway is one of two conditions. **1.** After a normal hopper payout, an overpay of six or more coins occurs. **2.** The hopper is activated for any other reason besides a payout. The *Runaway #* message tells the number of coins overpaid. For example: *Runaway 10* means ten extra coins paid.

Troubleshooting

Hopper Troubleshooting

Sigma hoppers are designed for many years of trouble free service. However, this is a complicated piece of equipment that can have occasional problems. If a hopper malfunction occurs, a message will display on the LED message center. See the **Error and Security Messages** section earlier in this chapter for hopper related messages. See the table below for common problems and possible troubleshooting procedures.

HOPPER TROUBLESHOOTING TABLE	
Problem	**Troubleshooting Procedure**
Hopper Jams	Hopper jams can be caused by stuck coins under the knife, coins jammed between the hopper plate/shim and coin shield, or bent coins that stick under the wiper. If a coin jam occurs, open the main door and remove the coin that is causing the jam.
Hopper Empty	This condition can exist if the hopper is empty, or if a jam has occurred resulting in a condition that does not allow coins to be dispensed. To correct this problem fill the hopper if needed, or correct the jam condition. After correcting the problem, turn the RESET Key-switch ON/OFF. The hopper will complete the payout.
Hopper is not functioning.	Check for frayed wires or obviously malfunctioning components. Confirm that the back hopper plug is firmly seated in its connector. Confirm motor is functioning.
Hopper Overpay	Confirm that the knife and microswitch are adjusted correctly.

Troubleshooting (cont.)

Power Supply Malfunctions

When troubleshooting power related problems it should be noted that the machines utilize a switching regulator type power supply. When the output is shorted, and excessive current is attempted to be drawn from the supply, it will shut itself down. When the game is missing the 12 Volts, for example, use the following steps to isolate the problem:

1. Turn power OFF.

2. Disconnect all major assemblies that use 12 Volts: Hopper, coin in assembly, reel mechanism, tower assembly, and the alphanumeric display.

3. Turn power back ON, if the power supply is functioning turn it back OFF.

4. Connect one of the assemblies and turn power back ON. If the supply is functioning, turn it OFF, and connect the next assembly. Continue the Connect / ON/OFF process until the power supply fails. The last assembly connected has the short.

--- CAUTION ---
Never connect assemblies with power ON. If the machine is not
receiving power, it does not necessarily mean the power supply has
failed. See the list below for other options.

No Shorts Found

The following is a list of troubleshooting procedures that should be attempted before accessing and testing the power supply.

1. Confirm that power switch cables are plugged in and functioning.

2. Confirm that the machine is plugged into an active outlet.

3. Check for any loose or frayed cables that could be causing either shorts, or no power input.

4. Check all power supply connections.

5. If needed, test the power supply for functionality (see above) If it is not working, replace it.

Troubleshooting (cont.)

Coin Comparitor Malfunctions

The SG-150B is equipped with a Coin Mechanisms© CC-16D-INHIBIT Coin Comparitor. The comparitor compares a sample coin with the coin that has been inserted into the machine by the player. If the coin tolerances do not match, the coin is rejected. Most problems for this device are related to coins jamming because they are bent, or because of fast-feeding. This is a term that describes inserting coins into the machine at an extremely high rate of speed which can occasionally cause jams, or a missed coin pulse resulting in coin rejections. If these problems occur, follow the procedures detailed below to troubleshoot the device:

1. If there is a coin jam, open the door, turn power off and remove the comparitor. See the **Parts Disassembly and Maintenance** chapter for instructions on comparitor removal. Coins should be carefully extracted using a small screwdriver.

2. If there are continuous coin rejections, confirm that the potentiometer is adjusted correctly. Also, confirm the coin optic switch is clean and free of debris. See the first chapter for instructions on adjusting the potentiometer.

3. There is a small red LED on the comparitor case that illuminates when power is on. If the LED is dark, confirm that all cables are connected and firmly seated.

4. If needed, change out the comparitor module.

Reel Malfunctions

The reels on a Sigma machine are designed for many years of trouble free service. However, occasional problems can arise. These include a reel or reels not turning, a reel bouncing excessively after stopping, or symbols not aligning correctly. See the table below for possible troubleshooting procedures.

REEL TROUBLESHOOTING TABLE	
Problem	**Troubleshooting Procedure**
Reel Will Not Turn	The message *NO SPIN* * will display on the LED message center. The * represents the reel number. For example: *NO SPIN 1* indicates that the first reel will not spin. The message will not clear until the error condition is corrected, and the machine is reset. After the reset, the interrupted game will continue to completion. To repair, confirm that no debris is blocking the reel. Confirm motor functionality. Confirm that all cables are plugged in and operational. If necessary, the reel motor may have to be replaced.
Reel Bouncing	Each reel is secured to the reel motor with a retaining clip, which in turn secures a washer and tension spring. Confirm that these items are in place, and secure. A loose clip or missing washer could cause severe reel bounce. Check spring tension.
Symbols Not Aligning on Payline.	Check for slipped or loose reel tapes. Confirm that the common retaining bracket (behind the reels) is firmly secured. Make sure the reel is turning freely.

Parts Disassembly & Maintenance

Overview

If properly maintained, the SG-150B has been designed for many years of trouble free play without costly repairs, or replacement of major components. However, on occasion, a part will have to be replaced or repaired. This section covers removal and maintenance (if needed) for the following parts:

- Bill Validator
- Card Reader Panel
- Coin Comparitor and Bracket
- Coin and Drop Optics
- CPU Board
- Deck Buttons
- Deck Button Bulbs
- Feature, Reel and Belly Glass
- Fluorescent Lamps
- Hopper
- Mechanical Meters
- Power Supply
- Reels (Individual)
- Reel Mechanism Assembly
- Tower Bulbs

General Exterior Maintenance

The outer cabinet, chrome, and buttons, should be cleaned with a non-abrasive, water based cleaning solution. Glass can be cleaned with any commercial glass cleaner.

General Interior Maintenance

After turning power off, the interior should be cleaned with a cloth and if extremely dusty, a vacuum. **Do not** use paper towels or similar materials. Be careful with the vacuum in sensitive areas, in particular around PCB boards, to prevent damages.

Coin Comparitor Removal

Removing the Coin Comparitor

The Coin Comparitor is housed in a metal bracket. Follow the steps below and refer to **Figure 4-1** for comparitor removal:

1. Open the door and turn power off.
2. Unplug the six pin connector plugged into the left side of the comparitor.
3. The comparitor has four pins which slide into grooved openings on the bracket. The upper pins are secured with spring loaded retaining clips. Lift the clips up, then pull forward and upwards on the comparitor to remove it.
4. Reverse the above steps to re-install or replace the comparitor.

Comparitor Maintenance

The comparitor is manufactured by Coin Mechanisms, Inc.® If the comparitor fails, the unit should be replaced. There is not a recommended maintenance procedure for this product.
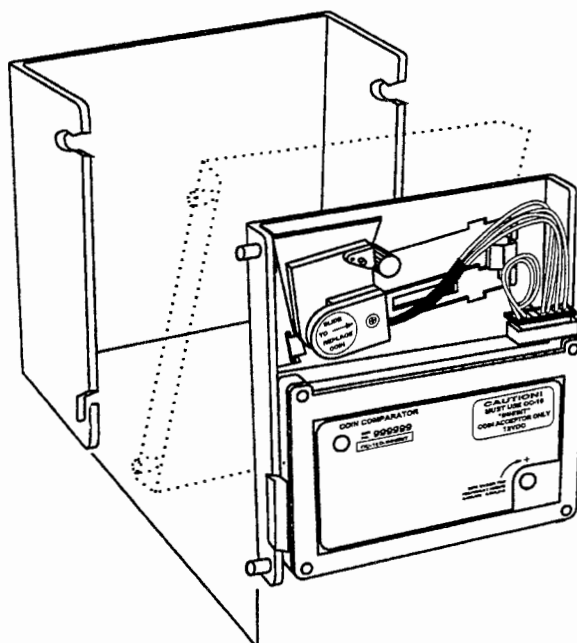
Fig. 4-1 Removing the Coin Comparitor

Removing the Reel Assembly

The Reel Assembly consists of the reels and reel motors, attached to a removable metal plate. Follow the steps below and refer to **Figure 4-2** for removing the assembly.

1. Open the door and turn power off.
2. There are ribbon cables plugged into sockets in front of each reel. Unplug these cables.
3. Remove the two screws securing the reel assembly to the machine, and pull it out.
4. Reverse the above steps to re-install.

Removing Individual Reels

Each reel is secured within a separate reel bracket. The three reel brackets are secured with a common retaining strip. Follow these steps and refer to **Figure 4-3** to remove one reel:

1. The common retaining strip is a thin piece of metal located behind the reels. It is secured with three screws. Remove the screws and lift off the bracket.
2. Each reel bracket is secured to the assembly by two screws, one in front and one in back. Remove these screws and lift the reel and bracket from the plate.
3. Each reel is secured to the reel motor with a retaining clip, which in turn, secures a washer and tension spring. Using a small flat-head screwdriver, secure the clip with one finger and use the screwdriver to remove it. Securing the clip prevents the spring and washer from flying off. After removing the clip, spring and washer, lift the reel from the motor.
4. Reverse the above steps to re-install.

Reel Maintenance

Reels should be cleaned on a periodic basis to avoid dirt and static electricity build-up. Clean them with a wet sponge or cloth. If there are extremely dirty or greasy areas, a light cleaning solution should be used. After rinsing, dry them with a clean, static free, cloth. Reels are fragile and should be handled carefully to avoid splitting or cracking.
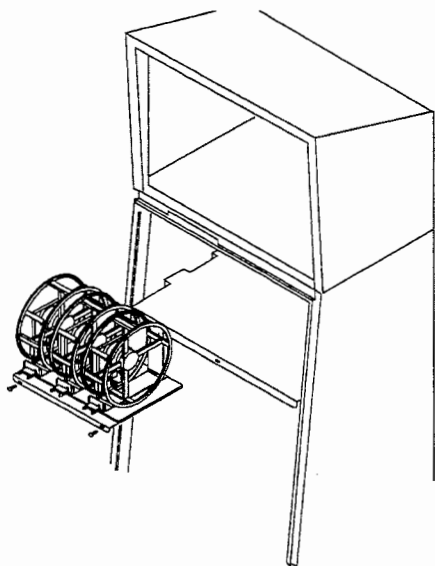
Fig. 4-2 Removing the Reel Assembly   Figure 4-3 Removing Individual Reels
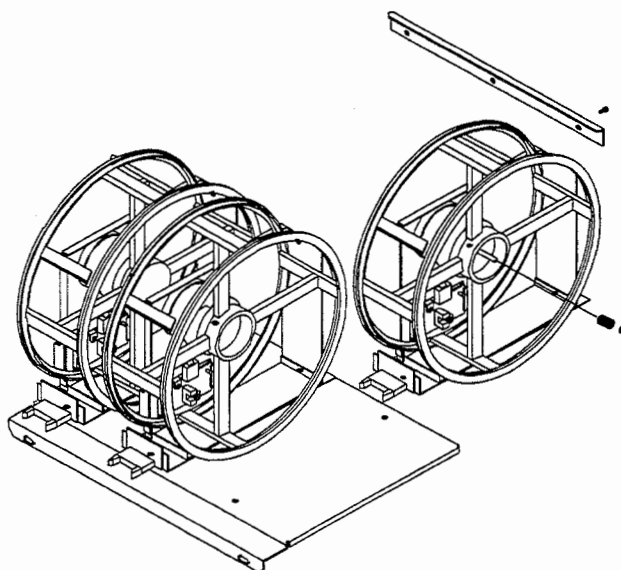
Removing and Replacing Reel Strips

Reel strips are secured to the reel with double-sided adhesive tape. Follow the steps below to remove and re-install a reel tape.

1. To remove the tape, locate the seam on the reel where the two ends of the reel tape have been secured with double-backed tape. Pull the ends apart and remove the reel tape.

2. To install a new reel tape, stick a section of tape on to the upper side of the adjustable plastic tab that is located between two of the reel braces. **See Figure 4-4**.

3. Note that one end of the reel tape has a part number and copyright message. On the other end there is no message or copyright. Stick a piece of double sided tape on the bottom side of the **non-copyright** edge. **See Figure 4-5**.

4. Take the end of the reel tape that does not have the adhesive, and press it to the outer surface of the reel, approximately 3/4" below the adjustable plastic tab detailed in step 2. Press down firmly on the tape until it secures to the double backed-tape on the adjustable tab. **See Figure 4-6**.

5. Wrap the rest of the reel tape around the reel, confirming that it is straight and within the reel channels. The non copyright end of the reel tape should overlap the copyright end.

6. Firmly press the overlapping ends together. **See Figure 4-7**.
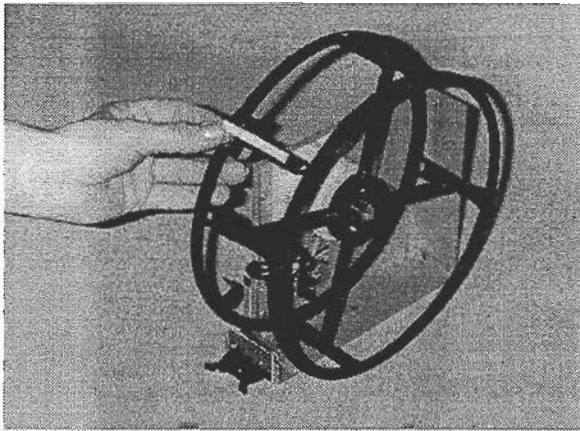
Figure 4-4 Reel Brace Taping
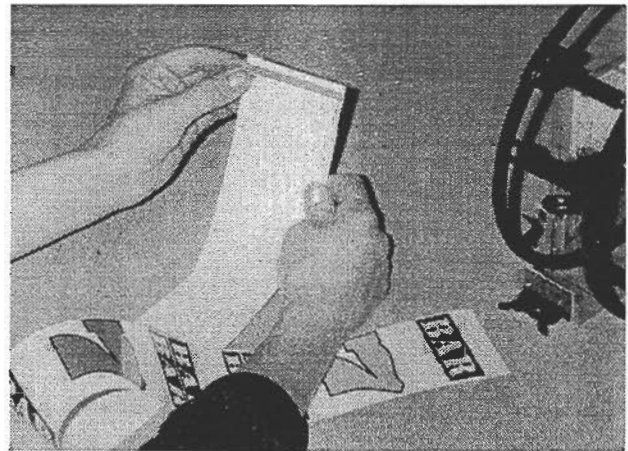
Figure 4-5 Reel Tape Adhesive Location
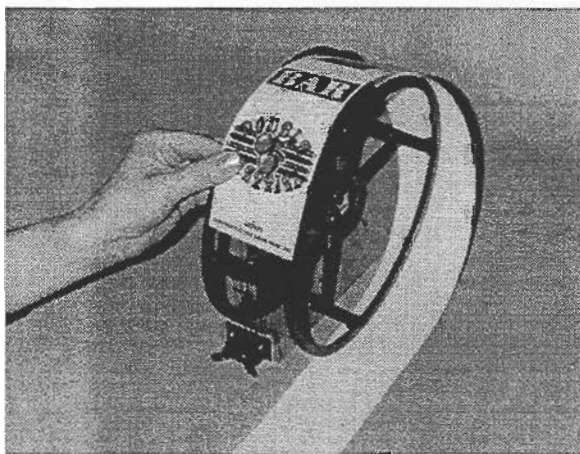
Figure 4-6 Wrapping the Reel Tape
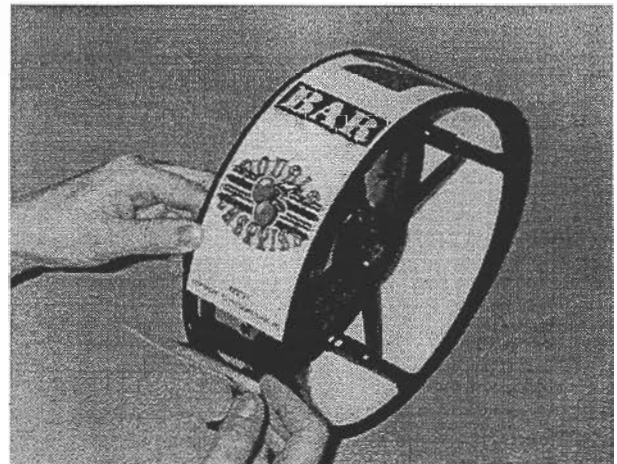
Figure 4-7 Securing the Reel Tape

Removing the Coin Head Assembly

The Coin Head Assembly consists of the Coin Head and a Backplate. The Backplate must be removed before removal of the Coin Head. Refer to **Figure 4-8** and follow the steps below for removal of these two items:

Removing the Backplate

1. The Backplate is secured by two screws located directly below two half moon openings cut into the door frame. Remove these screws and push the Backplate up and out of the machine.

Removing the Coin Head

1. The Coin Head is secured by four screws. Two screws are located directly below the screws referred to in step one. The other two screws are on each side of the Coin Head, secured to the machine deck. Remove these four screws and pull the Coin Head up and out of the machine. The Backplate is secured to the Coin Head. Unless previously detached, the Backplate will be removed when the Coin Head is pulled out of the machine.

2. Reverse the above steps to re-install or replace.
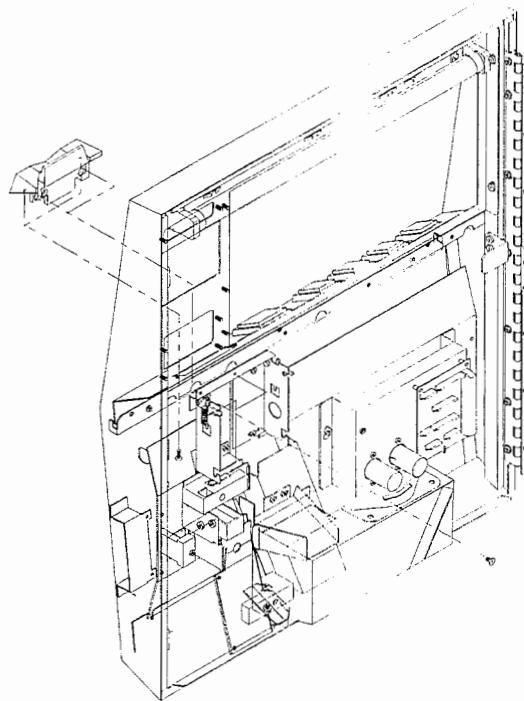
Figure 4-8 Removing the Coin Head

Removing and Cleaning Optic Switches

There are two optic assemblies; Coin-in and Coin-Drop, in the SG-150B. This section details removing and cleaning of these assemblies. Refer to **Figure 4-9** and follow the steps below to remove and clean these parts:

Removing and Cleaning the Coin Optic Assembly

1. Open the door and turn power off.
2. Unplug the four pin connector plugged into the Optic Assembly.
3. The assembly consists of a Coin Optic bracket and the optic itself, which is secured to the bracket with one screw. Remove the screw and lift the optic from the assembly.
4. Clean the optic with a soft non-abrasive cloth, or a blast of compressed air.
5. Reverse the above steps to re-install or replace.

Removing and Cleaning the Drop Optic Assembly

1. Open the door and turn power off.
2. Unplug the four pin connector plugged into the Drop Optic assembly.
3. The assembly is secured to the bottom of the Coin Chute with a small screw. Remove this screw and lift the assembly from the chute.
4. Clean the optic with a soft non-abrasive cloth, or a blast of compressed air.
5. Reverse the above steps to re-install or replace.

Coin Optic
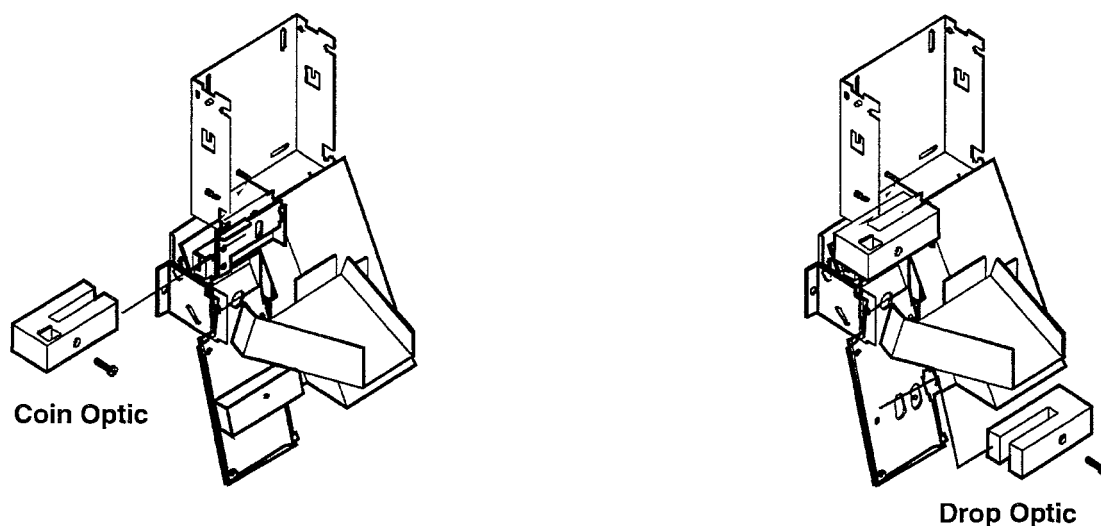
Drop Optic

Fig. 4-9 Removing the Coin & Drop Optic Assembly

Removing Deck Buttons & Microswitches

Deck buttons and microswitches have been designed for easy removal and replacement. If a button is sticking, disassemble it and clean the parts surfaces. If not, refer to **Figure 4-10** and follow the steps below to replace it:

Removing Deck Buttons

1. Open the door and turn power off.
2. Unplug the cables from the terminals on the selected button. All cables are color coded to the terminal they were unplugged from. Cables should be plugged back into the same terminal they were removed from to prevent deck button malfunction.
3. Unscrew the black plastic retaining nut under the deck that secures the button assembly to the machine.
4. Pull the button assembly up and out of the machine.
5. Reverse the above steps to replace or re-install. **See note below.**

Note: The locking nut for the Deck Button Assembly should be tightened by hand. **Do not over tighten**.

Removing and Replacing Deck Button Microswitches

If a microswitch fails, refer to **Figure 4-11** and follow the steps below to replace it:

1. Open the door and turn power off.
2. Unplug the terminal connectors on the selected microswitch (see step two in previous procedure). The switch is located at the bottom of the Deck Button Assembly within a retaining bracket which also holds the switch bulb.
3. Note the white "arm" on the retaining bracket. The arm has a pin that inserts into the microswitch to hold the switch in place. Simultaneously pry the arm sideways while gently pulling down on the microswitch, until the pin clears the arm and the switch pops out of the bracket.
4. Reverse the above steps to replace or re-install. When installing, the bottom terminal on the switch should be pointing towards the machine front.
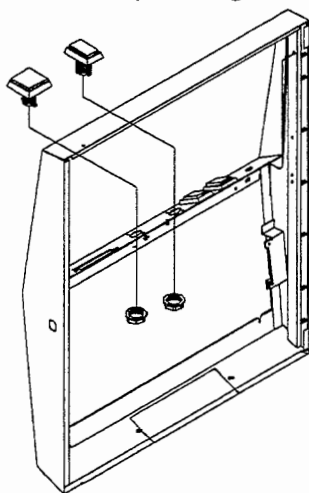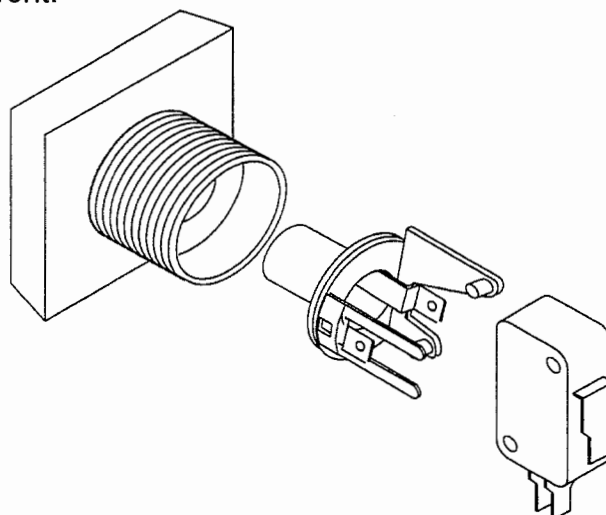

Fig. 4-10 Removing Deck Buttons

Fig. 4-11 Removing Deck Button Micro-switches

Removing PCB Boards

The SG-150B has five PCB boards which are: CPU, Door Distribution, Toggle Switch, Hopper, and SDS (optional). This section covers removal, maintenance and replacement of these boards.

For maintenance, the boards should be occasionally cleaned with a blast of air, or vacuumed, to keep them free of dust and other debris.

Removing the CPU Board

The CPU Board is located in a locked compartment directly below the reels. It is secured to a metal tray which slides out of the compartment. The board and tray is the CPU Assembly. The board should be removed only for reconfiguration, or board repair. For removal, refer to **Figure 4-12** and follow the steps below:

1. Open the door, turn power off and **discharge body static**.
2. Unlock and open the CPU door.
3. Unplug all cables connected to the board.
4. Slide the assembly out of the compartment. If the board needs to be replaced, or options need to be changed, see step five. These two steps require board removal from the tray. If the assembly has been pulled for maintenance or to replace a program, accomplish the desired task and go to step six. The board does not have to be removed from the tray to accomplish these tasks.
5. The CPU board is mounted on six white plastic stand-offs. Select one of the stand-offs and using a pair of needle nosed pliers gently squeeze its tip while pulling on the corner of the board until it releases from the stand-off. Repeat this procedure until the board is freed from the stand-offs.
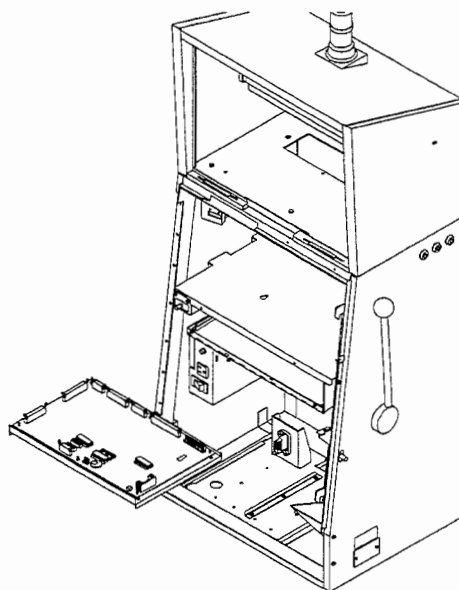6. Reverse the above steps to replace the board or re-install the assembly.

Fig. 4-12 Removing the CPU Board Assembly

Removing PCB Boards (cont.)

Removing the Door Distribution Board

The door distribution board is attached to a metal box located directly to the right of the coin chute. The board is mounted on four white plastic stand-offs. The cables for deck buttons, hard meters, the coin comparitor and the I/O cable from the CPU, are plugged into this board. Refer to **Figure 4-13** and follow these steps to remove it:

1. Open the door, turn power off and **discharge body static.**
2. Unplug all cables connected to the board.
3. Select one of the stand-offs and using a pair of needle nosed pliers gently squeeze its tip while pulling on the corner of the board until it releases from the stand-off.
4. Repeat step 3 on each stand-off until the board comes free.
5. To re-install, align the board holes on the stand-offs and press firmly until the board clicks into place. Re-plug all cables.

Removing the PCB Toggle Switch Board

The PCB Toggle Switch board is 'piggy-backed' on to the Door Distribution Board. When the CHANGE button is pressed, this board routes the signal to the Tower Lamp. The Tower Lamp receives the signal and illuminates, to indicate change or service is needed. The board has two five pin connectors that plug into CN27 and CN29. Follow these steps and refer to **Figure 4-14** to replace the board:

1. Unplug the four pin connector (routes from main cabinet cable) on the right side of the board.
2. Pull upward to remove the board from the Door Distribution Board.
3. To re-install, plug the board back into position. Confirm that all pins are correctly aligned with the respective connectors. Re-plug the four pin connector referred to in step 1.
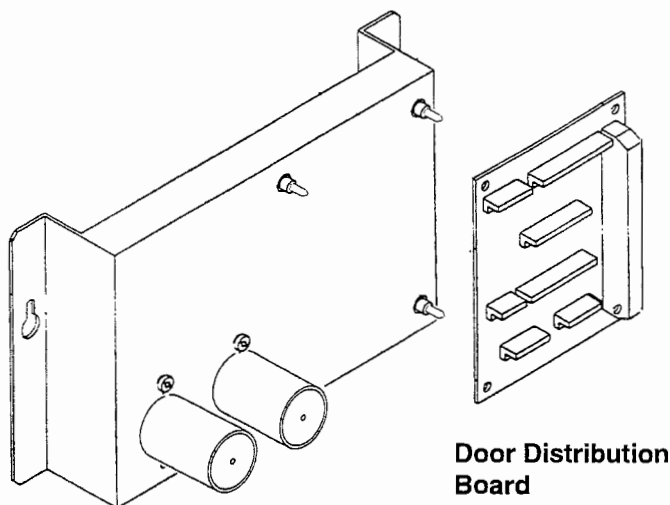

Door Distribution Board

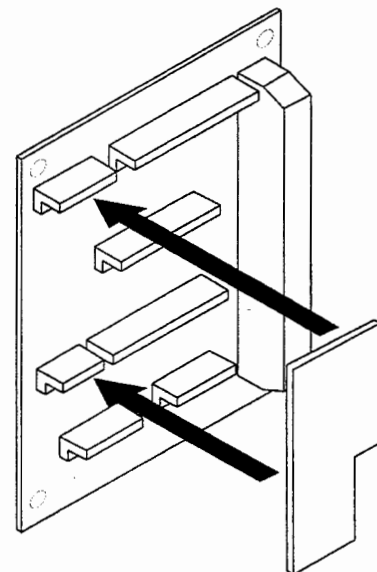*Fig. 4-13 Removing the Door Distribution Board*

Fig. 4-14 Removing the Toggle Switch Board

Removing the Hopper and SIS Boards

Removing the Hopper Board

The hopper board is in a metal compartment secured to the inside left back cabinet wall and floor. The power switch and convenience outlet are also secured to this compartment. Refer to **Figure 4-15** and follow the steps below to access and remove the board:

1. Open the door, turn power off and **discharge body static.**
2. Remove the coin tray and hopper.
3. The SIS and Super Controller boards could be secured to the outside of the compartment that contains the power switch. If these boards are present, unplug any connectors. If not, go to step four.
4. The compartment is secured to the left back cabinet wall with keyhole mounted bolts. Loosen **but do not remove** the bolts.
5. The compartment is secured to the cabinet floor with three screws. Remove these screws.
6. Lift up on the compartment until it clears the keyhole mounted bolts, then pull it forwards and sideways to remove it.
7. The hopper board has three connectors plugged into it and is secured to the front inner wall of the compartment with four plastic stand-offs. Unplug all cables connected to the board.
8. Select one of the stand-offs and using a pair of needle nosed pliers gently squeeze its tip, while pulling on that area of the board until it releases from the stand-off.
9. Repeat step five on the other corners of the board until it releases from the stand-offs.
10. To re-install, align the board holes on the stand-offs and press firmly until the board clicks into place. Re-plug all cables and secure the compartment to the inside cabinet wall.

Removing the SIS Board

The SIS board is located on the <u>outside</u> of the compartment detailed above. Refer to **Figure 4-16** and follow the stand-off instructions (4-6) from the above procedure to remove this board.
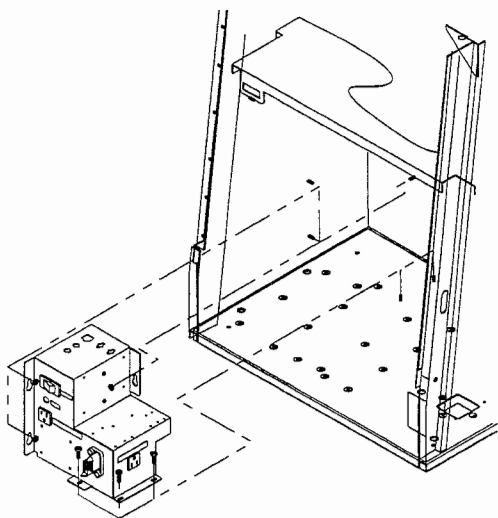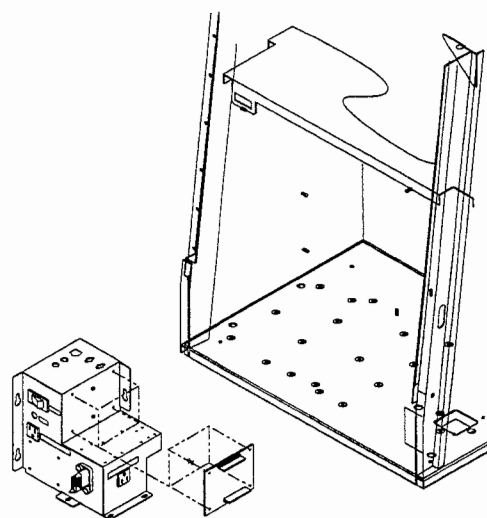

Fig. 4-15 Removing the Hopper Board   Figure 4-16 Removing the SIS Board

Sigma Game Inc.

Removing the Coin Handling Bottom Panel

The coin handling bottom panel is inside the main door, directly below the deck button microswitches. Refer to **Figure 4-17** and follow the steps below to remove it:

1. Open the door and turn power off.
2. Remove the coin comparitor. See the instructions earlier in this chapter.
3. Remove the three screws that secure the Coin Comparitor Bracket to the Coin Handling Bottom Panel.
4. Unplug all connectors plugged into the door distribution board, noting their exact locations for re-plugging.
5. Directly to the left of the Coin Comparitor Bracket are two screws that secure the Coin Handling Bottom Panel to the door. Remove these screws.
6. On the right side of the Coin Handling Bottom Panel are two metal tabs that slide into openings on a bracket secured to the machine door. Slide the panel sideways until the tabs clear the openings, then lower the panel to the length of the Deck Button Cable. Be careful during removal to avoid breaking the fluorescent lamp on the front side of the panel that illuminates the belly glass.
7. If the panel needs to be totally removed, unplug all connectors from the metal box that the Door Distribution Board is mounted to. **Without unplugging the cables**, remove the Microswitches from the deck buttons. See the instructions earlier in this chapter for this procedure. By following this procedure, the Coin Handling Bottom Panel can be removed without taking off the Main Cabinet Harness.
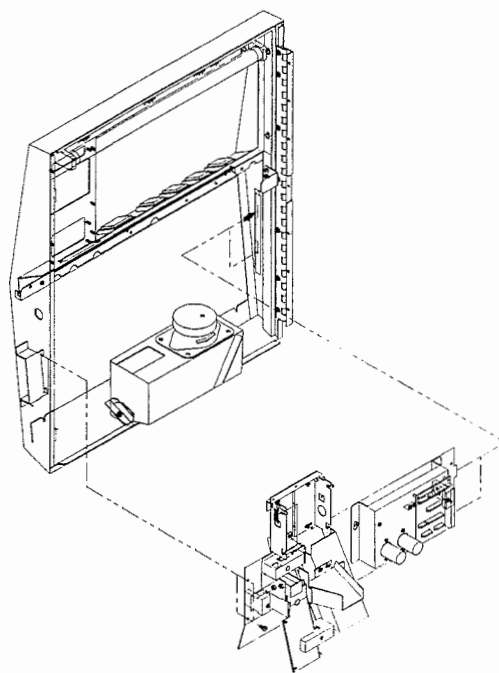8. Reverse the above steps to re-install.

Fig. 4-17 Removing the Coin Handling Bottom Panel

Removing Glass

The SG-150B has three pieces of glass that can be removed which are belly, reel and upper feature. Refer to **Figure 4-18** and follow the steps below to remove the belly glass:

Removing Belly Glass

Belly glass is set in a frame attached to the front of the main door. The frame can be removed for easy access to the glass. Follow these steps to remove the frame and glass:

1. Remove the three screws located directly above the coin handling bottom panel. The screws are in a bracket secured to the front door.

2. Loosen the two screws located in the door directly below and on each side of the coin handling bottom panel. Note that the screw holes are slotted. Loosening these screws will release the bottom of the glass frame from the door. The frame will be hanging on two hooks attached to the door frame below the deck buttons.

3. Lift up the frame until it clears the hooks.

4. The glass is secured to the frame by two brackets (upper and lower). The brackets are secured with screws. Remove the screws and lift out the brackets.

5. Carefully lift out the glass.

6. Reverse the above steps to re-install.

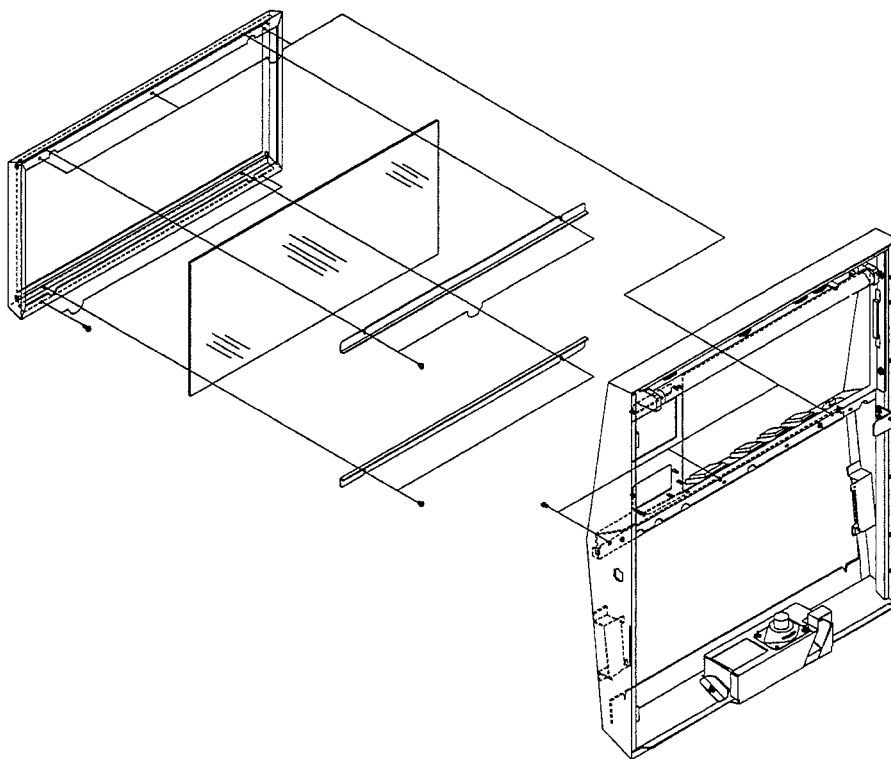*Note:* To avoid breaking glass when re-installing the brackets, **do not** over-tighten the screws.

Fig. 4-18 Removing the Belly Glass

Removing Glass (cont.)

Removing Reel Glass

The reel glass is located in the upper section of the main door. Refer to **Figure 4-19** and follow these steps to remove this glass:

1. Loosen, **but do not remove**, the two screws securing the LED Assembly to the door. Lift off the assembly, exposing the lower bracket reel glass.

2. Remove the reel glass fluorescent lamp.

3. Unplug the cable leading to the Fluorescent Lamp Assembly.

4. Remove the Fluorescent Lamp Assembly. It is secured to the upper door frame with three bolts, located on the bottom side of the assembly.

5. Carefully lift up and out on the glass to remove it.

6. Reverse the above steps to re-install.
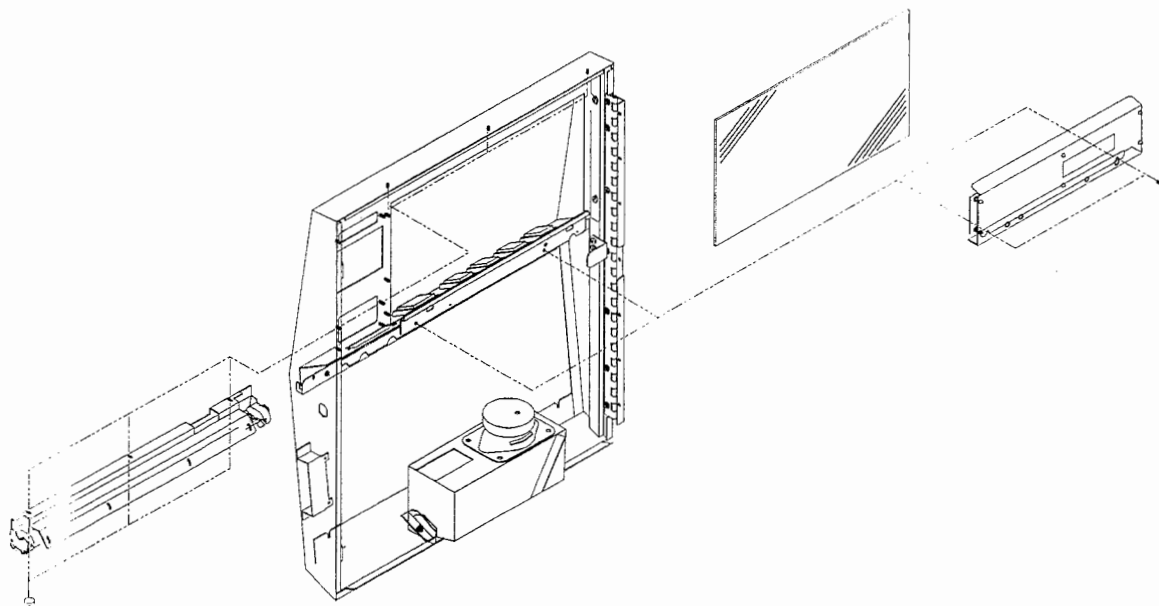
4-19 Removing Reel Glass

Removing Glass (cont.)

Removing Upper Feature Glass

The upper feature glass is located above the door and displays the game's paytable.
Refer to **Figure 4-20** and follow these steps to remove it:

1. Open the machine front door. There is an unsecured metal card reader panel directly below the glass. This panel is used for mounting SDS card readers. If the machine is not SDS equipped, lift up and out on the panel to remove it. If the machine is SDS equipped, pull off the Card Panel to the length of attached cables. Unplug all attached cables, noting their exact locations for re-plugging, then remove the Card Panel.

2. The bottom edge of the glass rests within two metal retaining brackets (see note below) that are attached to each side of the cabinet frame. To remove the glass, reach underneath the bottom edge and push the glass upwards until it clears the brackets. After clearing the brackets, slide the glass down, forward and out. Note the glass could be wedged fairly tightly and may require a firm shove upwards to dislodge it. **Be careful during this procedure to avoid breaking the glass.**

Note: In some models of the SG-150B (Roundtop for example), the retaining brackets are hinged. In these models, push the glass upwards, then push the hinged brackets into the machine. After moving the hinges, slide the glass down, forward and out.
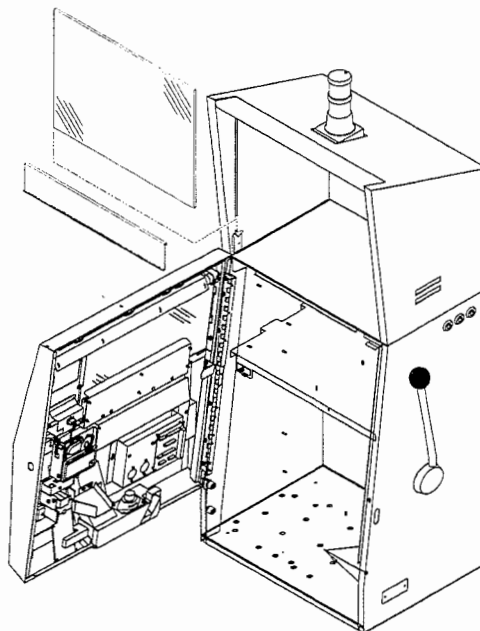
3. Reverse the above steps to re-install or replace.

Fig. 4-20 Removing the Upper Feature Glass

Removing & Replacing Lamps & Bulbs

The SG-150B uses a combination of fluorescent lamps and light bulbs to illuminate various machine areas. This section details removal and replacement of these lamps and bulbs.

Removing the Upper Feature Glass Fluorescent Lamp

This lamp is located behind the upper feature glass. Refer to **Figure 4-21** and follow the steps below to remove this lamp:

1. Open the main door and turn power off.
2. Remove the Upper Feature Glass. Follow the instructions earlier in this chapter.

<div align="center">

--- CAUTION ---
There is danger of electric shock when removing fluorescent lamps.
Make sure hands are dry and avoid contact with the lamp terminals
during removal.

</div>

3. Grasp the center of the lamp and twist forward gently until it releases from the lamp sockets.
4. Replace the lamp by sliding each end back into their respective sockets, and then twisting upwards until it locks into place within the sockets.
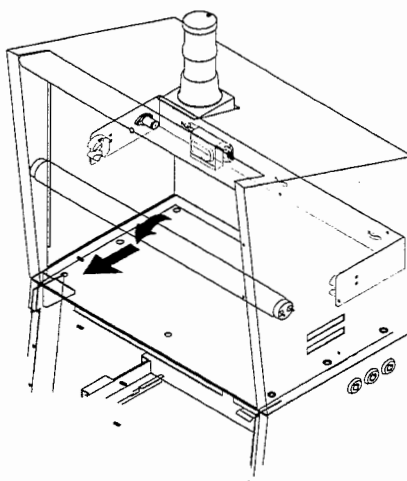5. Re-install the Upper Feature Glass and Card Reader Panel.

Fig. 4-21 Removing the Feature Glass Fluorescent Lamp

Removing Lamps (cont.)

Removing the Belly Glass Fluorescent Lamp

This lamp is located behind the belly glass frame. Refer to **Figure 4-22** and follow these steps to remove this lamp:

1. Open the main door and turn power off.
2. Remove the belly glass. See the procedure earlier in this chapter.

--- CAUTION ---
There is danger of electric shock when removing fluorescent lamps.
Make sure hands are dry and avoid contact with the lamp terminals
during removal.

3. Grasp the center of the lamp and twist forward gently until it releases from the lamp sockets.
4. Replace the lamp by sliding it back into the sockets, followed by twisting upwards until the lamp locks into place.
5. Re-install the Belly Glass.

Removing the Reel Glass Fluorescent Lamp

The Reel Glass Fluorescent is located within a bracket directly above the reel glass. Open the front door and follow steps 3-4 above to remove and replace this lamp.
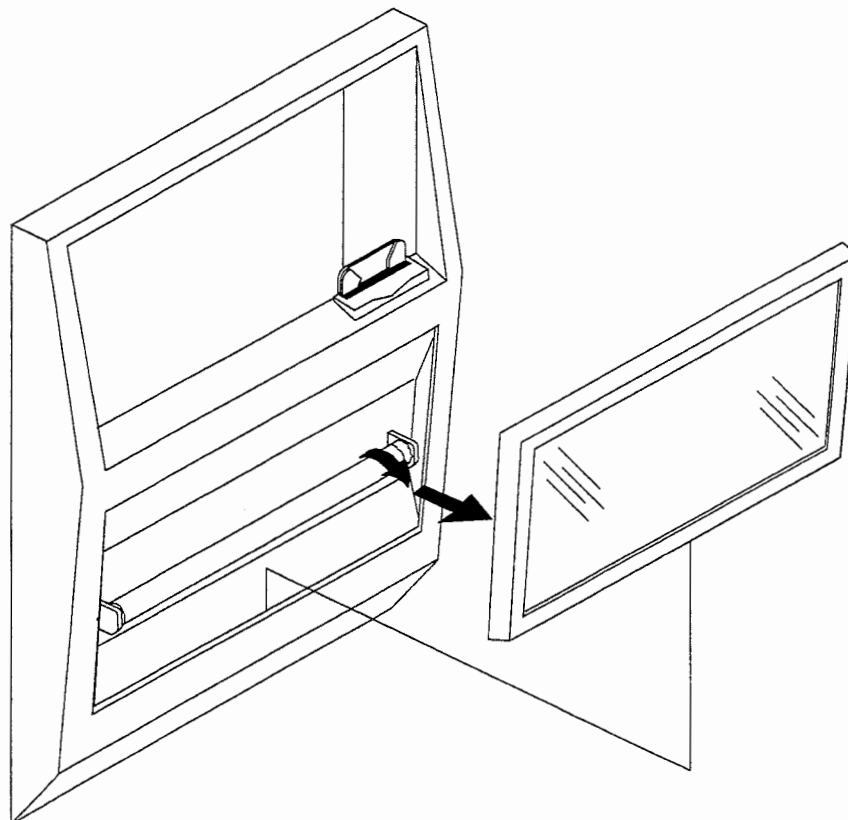

Figure 4-22 Removing the Belly Glass Fluorescent Lamp

Removing & Replacing Lamps & Bulbs (cont.)

Removing and Replacing Deck Button Bulbs

Refer to **Figure 4-23** and follow the steps below to remove deck button bulbs:

1. Open the main door and turn power off.
2. Firmly grasp the white lamp bracket that contains the micro-switch.
3. Simultaneously wiggle and pull on the bracket until it releases from the button assembly. The bracket may require a hard pull or tug to release it.
4. The bulb has a wedge base. Pull straight upwards on the bulb to remove it.
5. Replace the bulb by sliding it into the socket until it is firmly seated.
6. Re-install the bracket by re-seating it into the button assembly and pushing upwards until it locks into place. The bracket should be installed with the "arm" on the right side.

Removing and Replacing Tower Lamp Bulbs

Refer to **Figure 4-24** and follow the steps below to remove tower bulbs:

1. Open the main door and turn power off.
2. Unscrew the cap nut on top of the tower.
3. The tower has two sections and each one has a bulb. The sections can be removed by sliding them straight up until they clear the screw and rod assembly.
4. The bulbs are housed in a spring loaded socket. To remove a bulb, simultaneously push down and turn it clockwise, until it releases from the socket.
5. Reverse the above steps to install a new bulb and reassemble the tower.
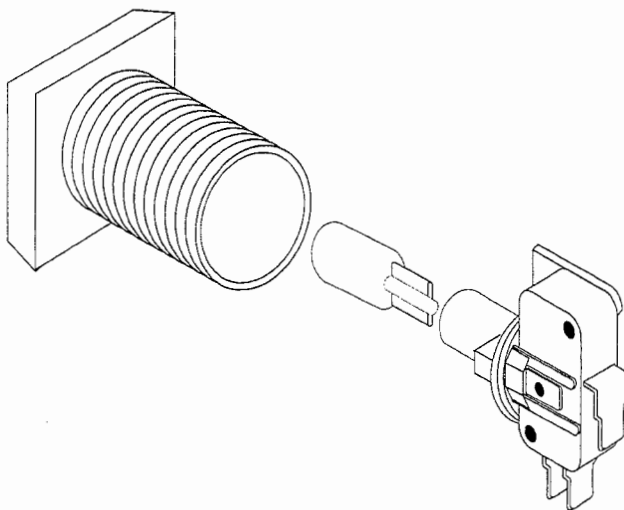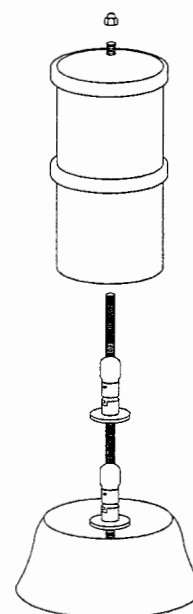

Fig. 4-23 Removing Deck Button Bulbs   *Fig. 4-24 Removing Tower Bulbs*

Removing & Replacing Lamps & Bulbs (cont.)

Removing the Denomination Light Housing Assembly

Directly behind the Coin Head is an illuminated piece of plexiglass that displays the machine's denomination. This area of the machine is illuminated by a single wedge socket bulb enclosed within a molded plastic "Shadow Box". The combination of bulb and box is the Denomination Light Housing Assembly. Follow these steps and refer to **Figure 4-25** to remove the Shadow Box and replace the bulb:

1. The "Shadow Box" is secured with two nuts. Remove these nuts and lift the box from the machine.
2. The bulb has a wedge base. Pull straight upwards on the bulb to remove it.
3. Replace the bulb by sliding it into the socket until it is firmly seated.
4. Reverse the above steps to re-install the Denomination Light Housing Assembly.
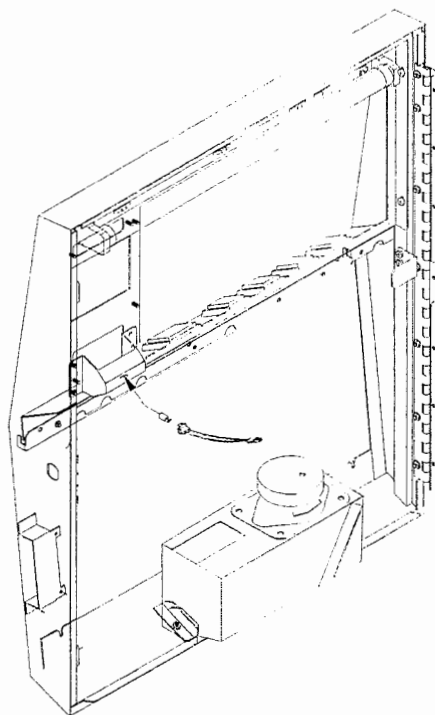

Fig. 4-25 Removing the Denomination Light Housing

Removing and Replacing the Mechanical Meter Assembly

There are four mechanical meters attached to the inside right wall of the cabinet within an open compartment behind the Feature Glass. If one fails, it is recommended that all four meters are replaced as a unit, because all meters have approximately the same average failure rate.
Refer to **Figure 4-26** and follow the steps below to remove these meters:

1. Open the door and turn power off.

2. Remove the Upper Feature Glass. See the procedure earlier in this chapter.

3. Remove the two nuts that secure the Meter Assembly to the side of the cabinet and take off the assembly.
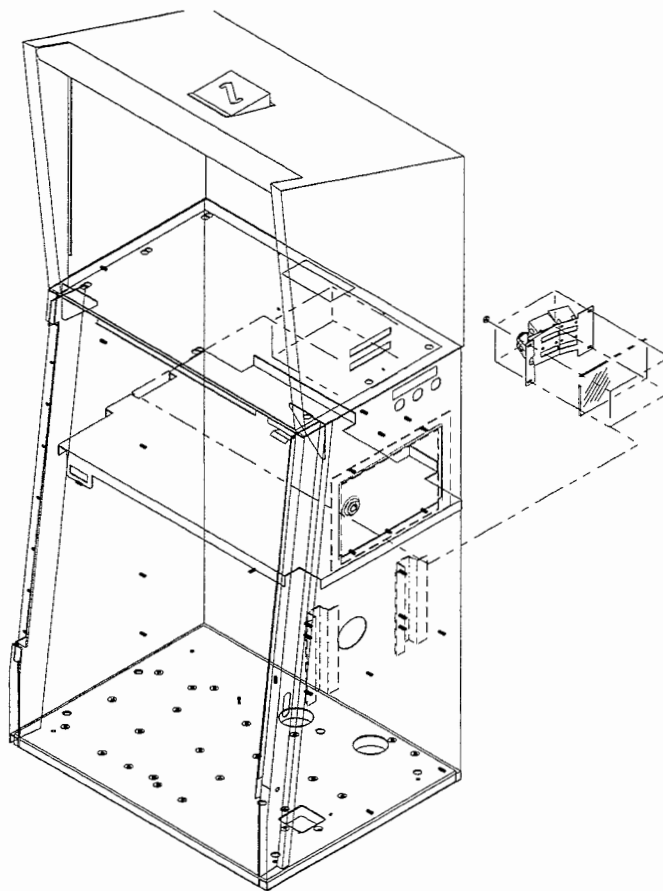
4   Reverse the above steps to install a new assembly.

Fig. 4-26 Removing the Mechanical Meter Assembly

Bill Validator Head Removal

The Bill Validator Head (validator part that accepts bills) should be removed on a periodic basis for cleaning. Follow the steps below and refer to **Figures 4-27A** and **B** for removing and servicing of the Validator Head:

Note: For further information on this procedure, refer to the SGI Bill Validator System Manual.

1. Unplug the three connectors plugged into the bill validator board. The board is attached to the lower left side of the Validator Head. Unplug the white, two pin connector directly under the Validator Head.

2. There is a spring loaded locking pin on the bottom of the module. Grasp the module, pull the pin down, and gently slide the module forward to the length of the remaining cable, which is plugged into the right (non PCB) side of the module.

3. Unplug the remaining connector and remove the module. **See figure on left below.**

4. The top of the module is hinged to allow maintenance access. Note the bar on top of the module. Push the bar back and pull the module top up and forward to expose the magnetic and optic sensors (located on the bottom of the hinged cover), bill transport belts and bill rollers. **See figure on right below.**

5. Remove all debris from the rollers and belts. Use a cotton swab or soft non-abrasive cloth to clean the optic and magnetic sensors.

6. Reverse the above steps to re-install. Before sliding the module into place, re-plug the right side connector. After completing the installation, confirm the module has latched into place and the release bar is secure.
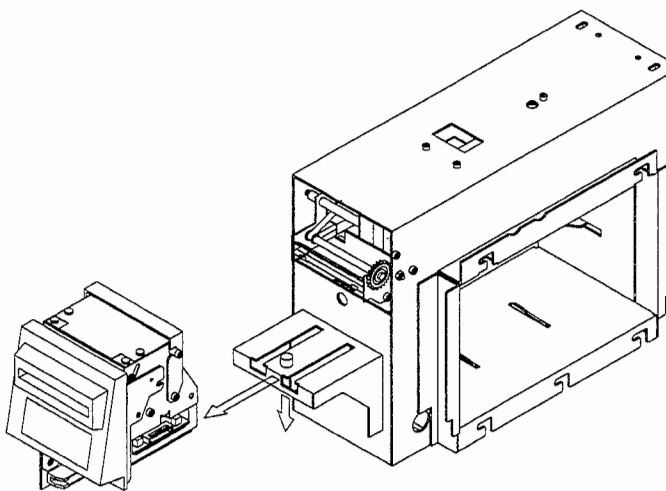

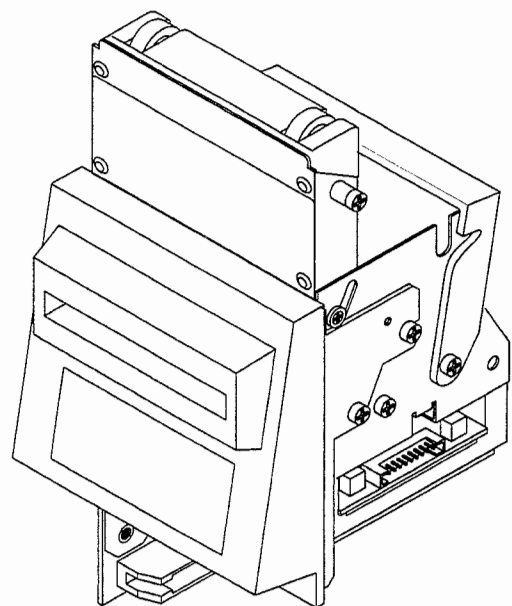*Fig. 4-27A Removing the Bill Validator Head*

Fig. 4-27B Accessing Validator Head Components

Removing the Bill Validator Assembly

Follow these instructions to remove the Bill Validator Assembly:

1. Remove the Reel Assembly. See the instructions earlier in this chapter.

2. Unplug all cables plugged into the Bill Validator Assembly, with the exception of the eleven pin connector on the right (non PCB) side of the Validator Head. For convenience, it is much easier to reach this cable when the assembly has been partially pulled from the machine (refer to step 4).

3. Remove the Bill Box.

4. The assembly is secured to the machine with four bolts. Three of the bolts can be accessed through half moon shaped openings located on the bottom left side of the assembly. The fourth bolt secures the assembly to a Security Bracket located towards the back of the assembly. Refer to **Figure 4-28** for bolt locations. Loosen the three 'half moon' accessed bolts. Remove the bolt from the security bracket and slide the assembly from the machine, unplugging the eleven pin connector referenced in step 2.
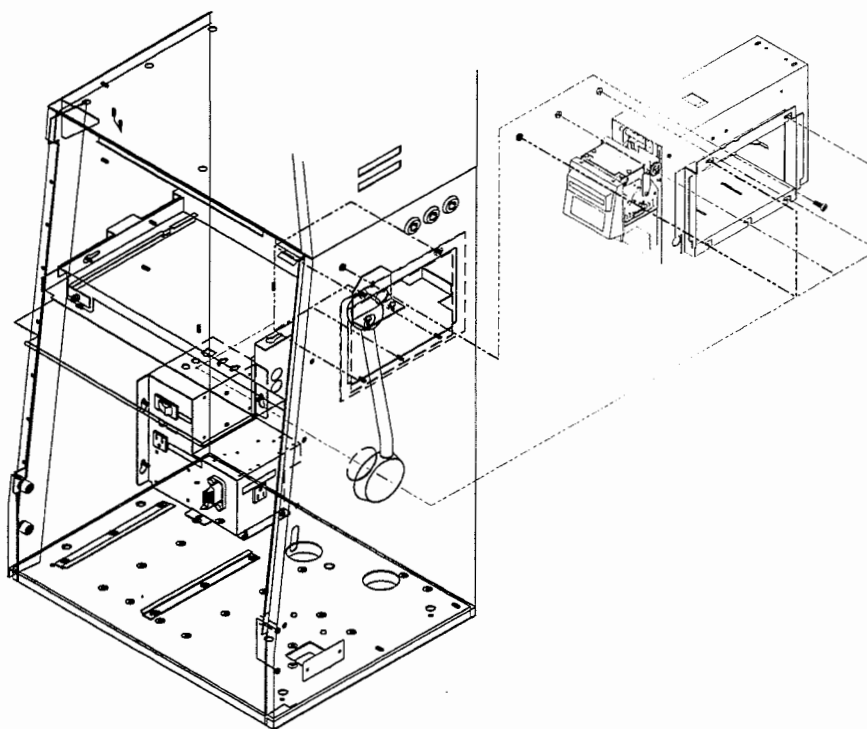
5. Reverse the above steps to re-install.

Fig. 4-28 Removing the Bill Validator Assembly

Removing the Power Supply Assembly

The Power Supply Assembly is attached to the upper back wall, behind the Reel Assembly. Refer to **Figure 4-29** and follow these steps to remove the assembly:

--- CAUTION ---
The power supply and transformer can contain residual high voltage. These items should be serviced only by qualified personnel, trained in power supply troubleshooting.
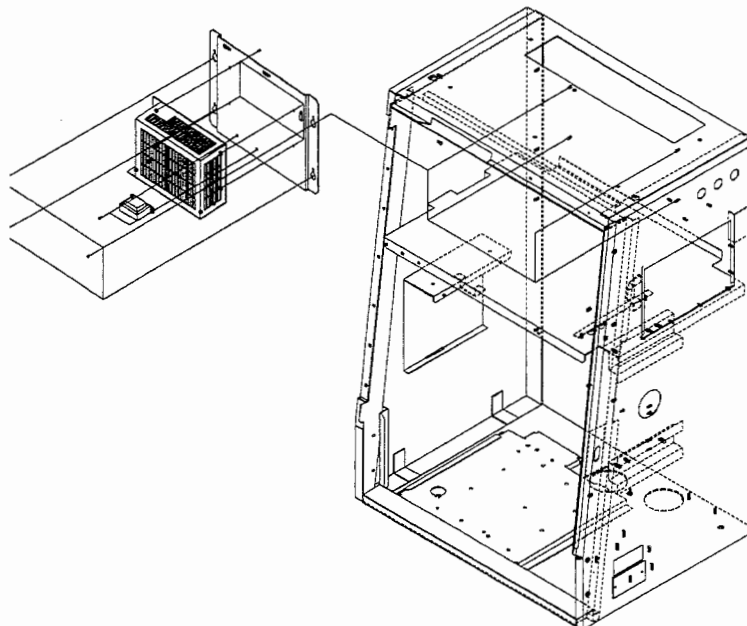
Removing the Power Supply

1. Open the main door and turn power off. Unplug the machine.
2. Remove the Reel Assembly, see the instructions earlier in this section.
3. Unplug all connectors plugged into the supply.
4. Unplug the terminal connectors leading to the transformer.
5. Loosen, but do not remove the four nuts securing the Power Assembly bracket. Lift off the bracket and remove it from the machine.
6. Remove the two screws securing the Power Supply to the bracket.
7. Reverse the above steps to re-install or replace the assembly.

Removing the 100V Transformer

The transformer is secured to the front of the power supply assembly with two screws. Follow these directions to remove it:

1. Remove the Reel Assembly, see the instructions earlier in this section.
2. Unplug all terminals plugged into the transformer.
3. Remove the two screws securing the transformer.

4-29 Removing the Power Supply & Transformer

Removing the Hopper

The hopper has two metal railings that slide into position under metal runners on the floor of the cabinet. The runners also hold the hopper in place. Follow these steps to remove it:

1. Open the door and turn power off.
2. Grasp the hopper handle and pull forward until it slides of the machine.
3. When re-installing, slide the hopper back into the machine until the back plug on the hopper is firmly seated in the matching connector located on a bracket behind the runners.

Hopper Maintenance

These are the recommended maintenance procedures for the hopper:

1. Occasionally wipe down all surfaces that come in contact with coins.
2. Periodically inspect the hopper knife and rubber agitator for deterioration.
3. If a coin shim has been installed under the knife spacer, periodically check it to confirm that it has not bent or been damaged.
4. Periodically touch a coin to each of the hopper probes to confirm functionality.

Removing and Replacing the Door Speaker

The SG-150B is equipped with an 8 ohm speaker attached to the coin chute casing. If the speaker fails, refer to **Figure 4-30** and follow these steps to replace it.

1. Open the main door and turn power off.
2. The speaker is located directly to the right of the coin chute. Note the two wires that end in fast-on terminal connectors. Remove the connectors. Mark the connector locations for re-install. The ground wire, which is usually gray, should be connected to the right terminal.
3. Disconnect the speaker cable.
4. Remove the four nuts securing the speaker to the door, and lift off the speaker.
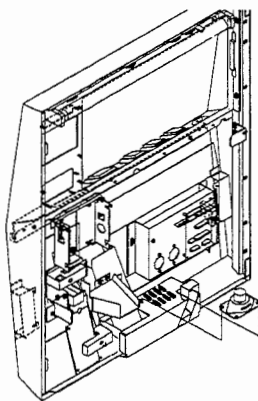5. Reverse the above steps to install a new speaker.

Fig. 4-30 Removing the Door Speaker

Appendix I
Game Information Sheet

Overview

The Game Information Sheet (GIS) confirms reel symbol win combinations, reel stops, game percentages, program version and game type. This sheet is included with each machine shipped. There is a sample GIS on the next page with boxed text used to define and clarify each section. The following page gives detailed definitions of each category on the GIS.

Note: Some programs have a "multiple jackpot" feature that allows the Operator to change the jackpot award and winning reel combinations by resetting hard wired switches. If the program has this capability, the information can be found on a table directly below the paytable on the GIS. The sample GIS on the next page has a section for the multiple jackpot.

Included with the GIS is a Mechanical Slot Switch Selection Sheet that details the available option settings located at SW1 on the CPU board. For further information on these settings, see **Game Optioning** in Chapter 1 of this manual.

Also, there is a Jumper Switch Sheet that provides information for the hard wired payout percentages located at JW1 on the CPU board.

All of the sample sheets included in this appendix are for reference only and do not represent an actual game. These sheets will vary depending on game type.

SIGMA R-SLOT SERIES
Game Information Sheet

Game Type   : 3 Reel 3 Coin Car Game (Grand Prize)
Game No.   : 5105
Game Code   : 3R3M024
Description   : Wild, S-7-5-3-2-1 Bar, and ANY BAR pay.
Rom No.   : B321102-00X
Reel Stops   : 155/155/155

General Game Information

Pay Table (Standard Type)

Combinations	1st	2nd	3rd
WILD :WILD :WILD	2000	5000	8000
S BAR:S BAR:S BAR	1000	2000	3000
7 BAR: 7BAR: 7BAR:	250	500	750
5 BAR:5 BAR:5 BAR	100	200	300
3 BAR:3 BAR:3 BAR	60	120	180
2 BAR:2 BAR:2 BAR	40	80	120
1 BAR:1 BAR:1 BAR	10	20	30
A BAR:A BAR:A BAR	5	10	15

Paytable

Jackpot Available

Type	Jackpot	1st	2nd	3rd
A	S BAR: WILD :S BAR	1500	3000	4500
B				
C				

Alternate Jackpots that are available if a jumper is changed. Any alternate jackpots will be detailed on the Jumper Sheet that accompanies the Game Information Sheet.

Payout % Available

J.P Type	SD	A	B	C	Min.	Hit Freq. (%)		Game	Jackpot
P/O No.	Max payout ratio (%)				P/O(%)	1st	Max.	Freq.	Weight
1	86.53				89.45	14.74	14.74	6.73	1/2048383
2	88.47				86.41	15.25	15.25	6.41	1/2048383

Payout Percentage & Hit Frequency

Note: 0 Optional progressive is "WD-WD-WD on max coin play.

o Pay Examples on 3 coin play.

"WD   - S BAR - WD"   = 3000 Coins

"3 BAR - 7 BAR - 1 BAR" = 15 Coins

Examples of possible pay combinations and win amounts.

Reading the Game Information Sheet

The Game Information Sheet has three main sections with a number of different categories. Refer to the illustration on page two and see the definitions below for the categories within each section.

General Game Information

This section of the Game Information Sheet contains the following information.

- Game Type   The game type, name, and number of coins that can be played.

- Game No.   A number assigned by Sigma for game identification.

- Game Code   Game type and reel combination.

- Description   Game description.

- ROM No.   The game program number. Also, the software version. Slot Machine EPROM numbers always begin with a B, followed by the software version. For example: On this sample sheet, B3211 with B represented a slot machine and 3211 the program version number.

- Reel Stops   The number of pre-programmed reel stops for each reel (from left-to-right).

Paytable

The Paytable details winning reel symbol combinations and the amount paid for each win.

- Combinations   The winning reel symbol combinations.

- 1st, 2nd, etc. The amount that can be won for each combination with one coin bet, two coins bet, etc.

Jackpot Available

Some programs can be optioned for different winning jackpot reel combinations, and top awards by changing a jumper setting. This section of the GIS lists the available jackpot options based on winning reel combinations and amounts.

Winning Combination Examples

This section of the GIS contains examples of winning reel combinations and payouts. It is simply an aid to the customer.

MECH-SLOT SWITCH SELECTIONS
092

1. *DIP SWITCH*

#1 Attendant Pay Sound.   (SW - ON   - New Jersey)
                                  (SW - OFF) - Nevada)

#2 Progressive Option.   (SW - ON   - Progressive)
                                 (SW - OFF - No Progressive)

#3 Max Hopper Pay (Fig 1).
#4 Max Hopper Pay (Fig 1).

#5 Play Mode.   (SW - ON   - Credit)
                                 (SW - OFF - Coin/Credit)

> SW1 Switch
> Option Settings.

#6 Mikohn's Controller.   (SW - ON   - Super controller)
                                 (SW - OFF - CON1 type controller)

#7 Attendant Pay   (SW - ON   - ATTENDANT PAY ONLY)
                                (SW - OFF - HOPPER PAY & ATTENDANT PAY)

#8   Coinage (I.R.S. #1200 rule) (Fig. 2).
#9   Coinage (I.R.S. #1200 rule) (Fig. 2).
#10 Coinage (I.R.S. #1200 rule) (Fig. 2).

Dip SW #3	Dip SW #4	Max. Pay	Coinage in use
OFF	OFF	2600	5c, 10c, 25c, 50c, $1 $5
ON	OFF	300	5c, 10c, 25c, 50c, $1 $5
OFF	ON	400	5c, 10c, 25c, 50c
ON	ON	1000	5c, 10c, 25c, 50c

> Hopper Pay
> Switch Settings.

Max Pay is 100 for $5 coinage with this setting.

< Fig 1>

Dip SW #8	Dip SW #9	Dip SW #10	Coinage in use
OFF	OFF	OFF	5c
ON	OFF	OFF	25c
OFF	ON	OFF	50c
ON	ON	OFF	$ 1
ON	ON	ON	$ 5
ON	ON	ON	$ 25
ON	ON	ON	10c
ON	ON	ON	$100

> Maximum Pay
> Switch Settings.

< Fig 2>

2. Jumper Switch

#1 Payout Percent (Fig 3)
#2 Payout Percent (Fig 3)
#3 Payout Percent (Fig 3)
#4 Payout Percent (Fig 3)
#5 Payout Percent (Fig 3)
#6 Payout Percent (Fig 3)

Switch Numbers

	SW #1	SW #2	SW #4	Payout %
1	OFF	OFF	OFF	86%
2	ON	OFF	OFF	88%
3	OFF	ON	OFF	90%
4	ON	ON	OFF	92%
5	ON	ON	ON	94%
6	ON	ON	ON	96%
7	ON	ON	ON	98%
8	ON	ON	ON	91%
9	OFF	OFF	OFF	97%
10	ON	OFF	OFF	87%
11	OFF	ON	OFF	95%
12	ON	ON	OFF	89%
13	ON	ON	ON	93%
14	ON	ON	ON	85%
15	ON	ON	ON	84%
15	ON	ON	ON	83%

Switch Settings for Payout Percentages

< Fig 3 >

SW #5	SW #6	Type of Top Award
OFF	OFF	STANDARD
ON	OFF	A TYPE
OFF	ON	B TYPE
ON	ON	C TYPE

Alternate Jackpot Switch Settings.

< Fig 4 >

Appendix II Machine Weight Distribution

Overview

Machine Weight Distribution refers to the amount of flammable and non-flammable material (by pounds) contained within each machine and stand in Sigma's product line.

Sigma Game Inc. Machine Weight Distribution Flammable / Non-Flammable			
Product	**Materials**	**Weight (In Lbs.)**	**Flammable Weight (In Lbs.)**
SG-50 Wide Body Slots SG-32 Intermediate Body Slots **The SG-50, and SG-32 have approximately the same total weight of flammable materials.**	Steel	210 lbs.	8.52 lbs.
	Wood	0 lbs.	0 lbs.
	Total	**210 lbs.**	**8.52 lbs.**
SG-150 / Chop Top Slot	Steel	210 lbs.	8.52 lbs.
	Wood	2.5 lbs.	2.5 lbs.
	Total	**212.5 lbs.**	**10.57 lbs.**
SG-150 / Standard Top Slot	Steel	210 lbs.	8.52 lbs.
	Wood	3 lbs.	3 lbs.
	Total	**213 lbs.**	**11.52 lbs.**
SG-150 / Extended Top Slot	Steel	210 lbs.	8.52 lbs.
	Wood	6 lbs.	6 lbs.
	Total	**216 lbs.**	**14.52 lbs.**
PT-4B / Standard Slant Top	Steel	153 lbs.	8.11 lbs.
	Wood	75 lbs.	75 lbs.
	Total	**228 lbs.**	**83.11 lbs.**
SG-112B / Upright Video	Steel	180 lbs.	8.83 lbs.
	Wood	4 lbs.	4 lbs.
	Total	**184 lbs.**	**12.83 lbs.**
Stand	Wood	48	48 lbs.
	Steel	2 lbs.	0 lbs.
	Total	**50 lbs.**	**48 lbs.**
Seat	Not Applicable	50 lbs (Total)	**20 lbs.**
Note: Wiring insulation is included in flammable weights.			

Glossary

This glossary contains definitions for SG-150B machine parts, and the unique terms that are used in the gaming industry. Many of these items are defined in various locations throughout the manual, but the purpose of this glossary is to provide clear and concise definitions, that can be quickly accessed in the event that a term is unfamiliar, or simply forgotten.

B

Belly Glass
The glass on the bottom front of the main door, directly below the deck buttons. This glass usually displays the name and theme of the game, or has a paytable.

Bill Box
Located within the Bill Validator, the box that bills are stored in after being accepted by the device.

Bill Box Extractor
A device that is used to remove the Bill Box from the machine, without allowing access to the currency within the box.

Bill Validator Head
The device within the Bill Validator assembly that accepts or rejects paper currency.

Bill Validator
A device that verifies and rejects, or accepts, currency for conversion into credits, coins, or tokens.

C

Coin Chute
The Coin Chute is located on the inside of the main door. When a coin is inserted into the machine, the coin chute routes it to either the hopper or the drop.

Coin Comparitor
A device that analyzes, then rejects or accepts, coins for game play. When a coin is inserted into the machine, the comparitor compares it to a sample coin. If the tolerances for the inserted coin do not match the tolerances of the sample coin, it is rejected.

Coin Handling Bottom Panel
A metal panel on the inside of the machine door that secures the coin handling devices, and lower fluorescent assembly.

Coin Head
A molded piece of metal on the front of the machine that coins or tokens are inserted into.

Coin Optic
An optical circuit that detects when a coin has passed through the Coin Comparitor. The main purpose of this device is to send a coin-in signal to the CPU when a coin has been 'reversed' through the optic.

Convenience Outlet
A 110V outlet located inside the machine that can be used by service technicians.

CPU Board
The main PCB board that contains all of the game and sound programs. The machine's volume control knob is also located on this board.

D

Deck Buttons
The buttons on the front of the machine that are used to play the game, collect winnings, or signal for an attendant.

Denomination Light Housing Assembly
On upright slot models, directly behind the Coin Head, is an illuminated piece of plexiglass that displays the machine's denomination. This area of the machine is illuminated by a single wedge socket bulb enclosed within a molded plastic "Shadow Box". The combination of bulb and box is the Denomination Light Housing Assembly.

Diverter
A metal flap on the coin chute, activated by a solenoid, which controls the flow of coins to either the hopper or the drop container. The flap is usually positioned to allow coins to be routed directly to the hopper. When activated, the flap closes and forces coins to the drop container. The diverter is activated when the hopper is full and will remain on until enough coins are paid from the hopper. See *Drop*.

Diverter Solenoid
The electronic device that activates the diverter.

Door Distribution Board
A PCB board on the door that controls signals and provides cable connections for the deck buttons, deck button bulbs and coin handling devices.

Drop
An industry standard term describing the process that occurs when the hopper has reached its fill limit and will no longer accept coins. When this happens, a signal is sent to the CPU board. In turn, the CPU signals the diverter and coins are no longer sent to the hopper. Instead, the diverter routes coins into a container located in the stand, usually a bucket or similar collection device. The drop condition will continue until enough coins have been paid from the hopper to cancel the drop and return the hopper to coin accepting mode. See *Diverter*.

Drop Box
A generic term that descibes the container used to collect money in the drop. It is usually a bucket or metal box. See *Drop*.

Drop Optic
An optical sensor that counts and records the number of coins diverted into the 'drop'.

E

EMI Filter
Electric Magnetic Interference Filter located on the lower left back wall, inside the machine cabinet.

F

Feature Glass
The upper glass on the main door. This glass usually has the game's paytable or theme.

Front Deck
The section of the main door containing game play buttons and the coin head.

G

Game
The actual game determined by the program software. For example: Blast of Bucks.

Game Description Sheet
The Game Description Sheet (GDS) provides information on reel symbol win combinations, reel stops, game percentages, program version and game type. This sheet is included with each machine shipped.

H

Handle
A device on the right side of the machine that when pulled activates the reel mechanism. On the SG-150B the handle is also used to activate various I/O tests.

Handle Mechanism
The electro-mechanical mechanism that controls the handle. When the handle is pulled, a signal is transmitted to the PCB board to start the game.

Hopper
A device that dispense coins/tokens after a win or payout. Coins/tokens are stored in the hopper until the Hopper PCB Board receives a signal to activate the hopper.

Hopper Knife
A device that guides coins or tokens into the opening on the hopper that coins are dispensed from.

Hopper Switch
A microswitch that turns the hopper ON/OFF.

I

Interface Board
A PCB Board that is used to link different devices, or other PCB boards.

I/O
Short for Input/Output.

K

Key-switch
A 'switch' that is actuated by inserting and turning a key.

Last Key-Switch
One of three Key-switches located in a horizontal row on the upper right of the cabinet. This Key-switch is used to access various test and information screens.

L

LED Message Center
An 11 character LED read-out on the front of the machine that displays game and meter information.

LED Segment
Each LED window (see next definition) is composed of sixteen 'segments'. Individual segments illuminate depending on the required display character such as an M compared to a 6.

LED Window
The LED Message Center displays characters in individual windows. Each window has sixteen segments (see above definition).

M

Machine
The hardware assembly (cabinet, reel mechanism, hopper, etc.) that contains the game software.

Machine Stand
A specially designed stand that the machine is placed on. The stand has holes for power cords and the drop chute.

Meter Key-Switch
One of three Key-switches located in a horizontal row on the upper right side of the cabinet used to access various accounting and machine meters that record information ranging from coins-in, to door opens.

P

Payline
A 'line' on the glass, that reel symbols align with for a win.

Paytable
A win on a slot machine depends on designated reel symbols aligning on one or more paylines. Depending on the game type, there can be any number of winning reel combinations. The paytable details all winning combinations, and how much can be won for each combination, based on the amount wagered. For example: How much can be won if three cherries align on the payline with one coin bet, two coins bet etc.

Player Selectable
A machine that allows the player to select between cash or credit play.

Progressive Controller
A device that tracks and controls progressive signals from machines that have been configured for progressive jackpot play. The controller detects how many machines are linked to the progressive, the wagers from each machine per game, and which machine, or machines, eventually win the jackpot.

Progressive Jackpot
A jackpot that progressively increases as wagers are bet. The progressive jackpot can be based on a number of linked machines, or a stand alone machine that has been programmed for progressive play.

R

Reel Assembly
The reel assembly consists of the reels, reel cables, reel motors, reel shelf, etc.

Reel Motor
Each reel has an individual stepper motor that is used to spin and stop the reel.

Reset Key-Switch
One of three Key-switches located in a horizontal row on the upper right of the cabinet. The RESET Key-switch is used to "reset" the machine in the event of a jackpot, credit lockup, or change in the game program. When the machine enters a reset condition, a new game cannot be played until the RESET Key-switch is turned ON/OFF.

S

Shipping Lock
A temporary lock, or locks, that are used to secure various machine doors. The locks are removed and replaced with permanent locks by the Operator.

SIS
Slot Information System. An industry standard term used to describe **any** independent system that when interfaced with either a video or slot machine, tracks machine data for accounting, security, game play and player tracking. There are a number of manufacturers that manufacture these systems.

SIS Board
The PCB Interface board that links the SIS system to the machine.

Solenoid
A device consisting of a coiled wire that becomes magnetized when electricity is passed through it, so it can draw a core of iron or steel into itself. In the SG-50, a solenoid is used to control the diverter.

T

Tower
A cylinder shaped device on top of a poker or slot machine that illuminates when certain events (a jackpot for example) occur.

Toggle Switch
A switch that when alternately pressed, changes a machine function.

Toggle Switch Board
The Toggle Switch board is 'piggy-backed' on to the Door Distribution Board. When the CHANGE button is pressed, this board routes the signal to the Tower Lamp.

Transformer
A device for converting a varying current from one voltage to another. A step-up transformer converts voltage to a higher value, while a step down transformer has the opposite affect.

U

Upper Fluorescent Assembly
The assembly containing the fluorescent lamp that illuminates the feature glass.

Index

sigma® game inc.

SG-150 *PLUS*

SIGMA GAME INC.

Title	SG-150B, SG88M PCB. WIRING DIAGRAM		Rev.
Size D	310113		
Date 7/12/1996	Drawn By P.MORRIS		
FileName 16085M883.SCH	Sheet 1 of 1		

PAY OUT JACK POT

SLOT PCB P/N SG88M

BILL VALIDATOR

DBV J/F PCB P/N 340169

SDS J/F PCB P/N 340113

REELS 7 7 7

V.F.D. DISPLAY

L.E.D. DISPLAY

SOUND

DISTRIBUTION PCB P/N 340168

POWER SUPPLY PANEL

POWER CONTROL PANEL

DOOR FL. DISTRIBUTION BOX

LINE FILTER

TRANSFORMER

HOPPER PCB P/N 340008

HOPPER

LEVEL OPTIC

MOTOR

COIN COMPARATOR

SPEAKER

DIVERTER COIL

OPTIC SENSORS

MECHANICAL METERS

DENOMINATION LAMP

MAX BET/SPIN
REPEAT BET/SPIN
BET 1
CASH OUT
SERVICE SW.

CN 1 · CN 2 · CN 3 · CN 4 · CN 6 · CN 7 · CN 13 · CN 15 · CN 17 · CN 18 · CN 21 · CN 22 · CN 23 · CN 24 · CN 25 · CN 26

HANDLE SW. · SIDE KEY SW. · LAST KEY SW. · METER KEY SW. · RESET KEY SW. · MAIN DOOR SW. · DROP DOOR SW. · T. TOWER LIGHT · B. TOWER LIGHT · TOWER LIGHT · D.B.V. LIGHT

J.P. BELL · LEVEL SW. · COUNT SW. · HOPPER EN. · TEST SW.

POWER ON-OFF · AUX. 110VAC · TOP LAMP · BALLAST · SERVICE