bowlingo Junior/III Owner's Manual

bowlingo Junior Wood Lanes
Package types BJ-0170 and BJ-0171

bowlingo Junior Glow-in-the-Dark Lanes
Package types BJ-0180 and BJ-0181

bowlingo III Wood Lanes
Package types BJ-0270 and BJ-0271

bowlingo III Glow-in-the-Dark Lanes
Package types BJ-0280 and BJ-0281

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bowlingo®
A MENDES DIVISION

SERVICE CALL
USA: 1-800-462-1022
CANADA: 1-800-561-0644
WORLDWIDE: 1-418-650-6022

MENDES 2425 Watt, Sainte-Foy, QC, Canada, G1P 3X2

Before using this information and the product it supports, be sure to read the general information under “Product Warranties and Notices” on page 133.

The following paragraph does not apply to any country, state, or province where such provisions are inconsistent with local law.

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This publication assumes that the Mendes equipment and / or software has been installed according to the instructions contained herein and is functional in every aspect. Should you encounter problems in operating the equipment, follow the instructions in this publication before contacting Mendes for service under warranty.

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Introduction to bowlingo Junior/III

The structure of the bowlingo Junior/III system is based on a wooden cabinet structure with prefabricated lanes. The lane surface is of a hard-wearing synthetic material, designed to withstand the most extreme operating conditions and providing the operator with the minimum amount of maintenance.

Located at the rear of the unit is the ME-98 pinsetter which functions in conjunction with the coin mechanism activated by the introduction of the correct amount of money.

Note The pinsetters are supplied to operate on 240 volts, 50/60 cycles, single phase. The electrical supply lines must conform to all electrical codes and it is the responsibility of the proprietor to supply power to all the electrical components necessary for the normal function of the pinsetters.

Warning High voltage is present in the pinsetter power box. The main circuit breakers must always be shut off or the twist lock plug disconnected prior to removing the power box cover.

Understanding how the system works

When the unit is turned on, the pins are set on the lane and the pinsetter is placed in a ball one situation. The bowler rolls the ball, which passes through the ball detector's infrared beam of light, thus sending a signal to the electronics. The ball knocks down some pins.

Each pin has a string attached to its head that activates its pin detection wheel when the pin is knocked down. The pin detection wheel in turn, advises the electronics that the pin has been knocked down. The electronics then sends a signal to the scoring display module in order to update the score sheet.

This procedure is then repeated for each and every ball delivery.

Understanding how the game is played

bowlingo is a coin-operated bowling system, developed to appeal to families, novices and experienced players alike. Special footwear is not required and the coin operation ensures a steady flow of players.

A game of bowlingo is made up of ten frames. At the beginning of each frame, ten pins are set in a triangular form at the far end of the bowlingo lane, and the bowler rolls a maximum of two balls per frame at the pins trying to knock down as many as possible. If all the pins are knocked down with the first ball it is called a strike. The ball is returned to the bowler and ten pins are then set up for the next frame.

If the first ball does not knock down all the pins, the ball is returned to the bowler and the standing pins are left for the bowler's second roll of the frame. The deadwood is removed from the playing area so as not to interfere with the game. The bowler then rolls the ball a second time in order to attempt to knock down the remaining pins. Regardless of the number of pins left standing after the delivery of the second ball, the ball is returned to the bowler and ten pins are set up for the next frame.

Understanding how bowlingo keeps score

bowlingo uses the same scoring method as regular bowling except for the manner in which the actual score is displayed. Conventional bowling waits for bonus balls to be rolled prior to attributing the score for a frame while bowlingo Junior/III attributes the total pinfall in each frame as the actual score. For example, if you roll a strike in the first frame, bowlingo Junior/III immediately puts 10 as the score in the first frame. Bonus balls are calculated in the frame in which they are bowled.

A game of bowlingo consists of 10 frames. A maximum of 2 deliveries is made in each frame except the 10th. In the 10th frame, if a strike is rolled, two bonus balls are awarded. So it is possible to roll 3 strikes in the 10th frame. If a spare is rolled in the 10th frame, one bonus ball is awarded.

Strike. If a bowler knocks down all 10 pins with his first ball, it is a strike and is marked with an X. The next ball delivered begins a new frame. When a bowler rolls a strike, he is credited with a count of 10 in that frame plus the total pinfall on his next two deliveries.

Spare. If a bowler knocks down all the pins with 2 deliveries in a frame, he has a spare. A spare is marked with a /. When a bowler makes a spare he is credited with a count of 10 in that frame plus the total pinfall on his next delivery.

About this Book

Thank you for selecting bowlingo Junior/III for your fun and entertainment. Your bowlingo Junior/III incorporates many of the latest advances in technology and is very easy to maintain for many years of enjoyment and profit.

This publication helps you become familiar with your bowlingo Junior/III equipment and its many features. It describes how to install, configure, operate, and maintain your machine. In the unlikely event you experience problems, you can also find helpful troubleshooting information as well as instructions for obtaining service and parts.

This book is organized as follows:

- Chapter 1, “Installing Your bowlingo Junior/III,” provides instructions for the proper physical installation of your equipment using factory drawings and step-by-step procedures.
- Chapter 2, “Setting Up/Operating Your bowlingo Junior/III,” provides step-by-step instructions for setting up and configuring your equipment in order to meet your needs and requirements along with instructions for the day-to-day use and management of your equipment.
- Chapter 3, “Taking Care of Your bowlingo Junior/III,” contains information about the proper handling and care of your equipment.
- Chapter 4, “Solving Problems,” contains information that will help you identify and correct problems that might arise as you use your equipment. A description of the wide variety of resources available from Mendes to assist you in the use of your equipment is also included along with instructions on how to obtain additional information about Mendes products.
- Chapter 5, “Wiring Diagrams,” provides you with all necessary wiring and electronic information in easy to comprehend diagrams for your reordering and servicing convenience.
- Chapter 6, “bowlingo Junior/III Parts Catalog,” provides you with a complete breakdown of all your equipment’s parts in exploded views for your reordering and servicing convenience.
- Equipment warranty information, trademark acknowledgements, electronic emission notices, and other legal and general notices for your equipment may be found in Appendix A.
- Finally, Appendix B contains a form for recording information about your equipment, which can be helpful if you decide to install any additional options, or if you ever need to have your equipment serviced.

Safety Information

Use of common sense and industry experience are key factors which one should utilize whenever operating electromechanical equipment. As with all machinery, there is an element of risk if the rules of safety are disregarded. Training in the operation of this equipment is available. Schools in the equipment's use and operation are held on a regular basis. It is the responsibility of the attendant to provide his or her own travel, lodging and school expenses. Anyone interested in attending a factory training school should contact their local Mendes sales or service representative.

1. **Always open the circuit breaker or disconnect the power plug from the electrical box before looking for, and clearing, any problem.**
2. **Always reach over and around the equipment assemblies, never through or between the components.**
3. **Avoid the use of cleaners that are toxic.**
4. **Immediately wipe up any oil or liquids that have spilled to prevent slipping.**
5. **Store oily rags and any other combustibles in a fireproof container.**
6. **The mechanic / maintenance person must teach all personnel who will work on the equipment enough about the equipment to prevent accidents through ignorance.**
7. **Under no circumstances allow an unqualified person to work on the equipment.**
8. **Use the right tool for each job to prevent injury to yourself and to the equipment. Remove all tools from the equipment before turning it on.**
9. **Wear the proper clothing when working on the equipment. Do not wear neckties or loose clothing that may be caught by the equipment. Wear trousers without cuffs to prevent tripping. Wear shoes with safety, non-slip soles.**
10. **When more than one person is working on the equipment, never turn on the equipment without checking to see if everyone is clear of the equipment.**
11. **When the safety guards are removed from the equipment, be extra cautious when the equipment is turned on. Replace the guards immediately when the work is completed.**

Chapter 1
Installing Your bowlingo Junior/III

Chapter Overview

This chapter provides instructions for the proper physical installation of your equipment using factory drawings and step-by-step procedures.

Important Notice Concerning Operating Voltage

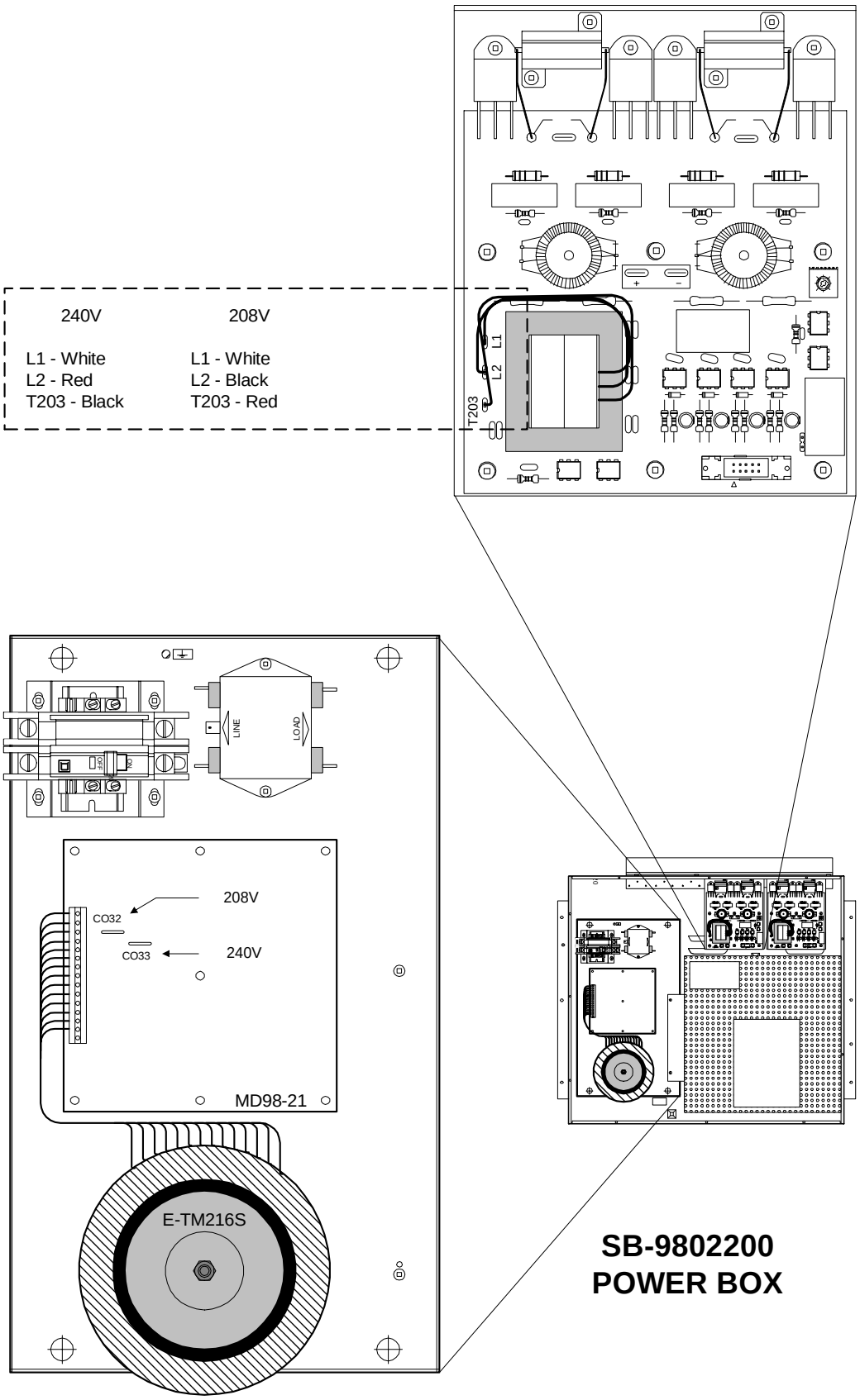
Mendes sets all bowlingo Junior/III machines at the factory to operate on 240VAC.

If your installation site provides 208VAC, you must have an accredited electrician modify the power box wiring in order to have the equipment function properly and to maintain the equipment's warranty.

Procedure 1.1 Converting the power box to 208VAC (optional)

	Do this	*Comments*
1.	Turn OFF main breaker located on power box.	
2.	Remove the power box cover.	
3.	On the E-MD98-21 PCB, disconnect the wire from CO33 and reconnect it on CO32.	Refer to Figure 1.1 for location of the PCB.
4.	On the left E-MD92-43-98 PCB, invert connections L2 and T203.	Refer to Figure 1.1 for location of the PCB.
5.	On the right E-MD92-43-98 PCB, invert connections L2 and T203.	Refer to Figure 1.1 for location of the PCB.
6.	Replace the power box cover.	
7.	Turn ON main breaker located on power box.	

Figure 1.1 Power Box 208VAC Connections



Installation Preliminaries

Your bowlingo Junior/III machine is shipped in two crates, the main casing and the lane section. If you have ordered the lane extension kit, it is delivered in a separate third crate.

- Each unit may be moved in a vertical or a horizontal position. In each instance, respect the “THIS SIDE UP” indications on both crates.
- Crates are to be moved by the base plate and only with a dolly or pallet truck.

Note

When determining the final location of your machines, the following items should be taken into consideration:

- A minimum service space is required at the rear of the machines. Refer to Figure 1.3.
- Machine number 1 can operate alone.
- Machine number 2 must always be installed to the immediate right of machine number 1.
- Machine number 2 cables are connected to the machine number 1 power box

Tools

The following tools are required in order to complete the installation of your machine(s):

- Robertson #1 and #2 screwdrivers (included in hardware kit);
- Flat screwdriver;
- Carpenter’s level;
- Wrenches: 1/2” [13mm], 3/8” [10mm], 9/16” [14mm], and 3/4” [19mm];
- Knife;
- Dolly or pallet truck.

Figure 1.2 Package Specifications

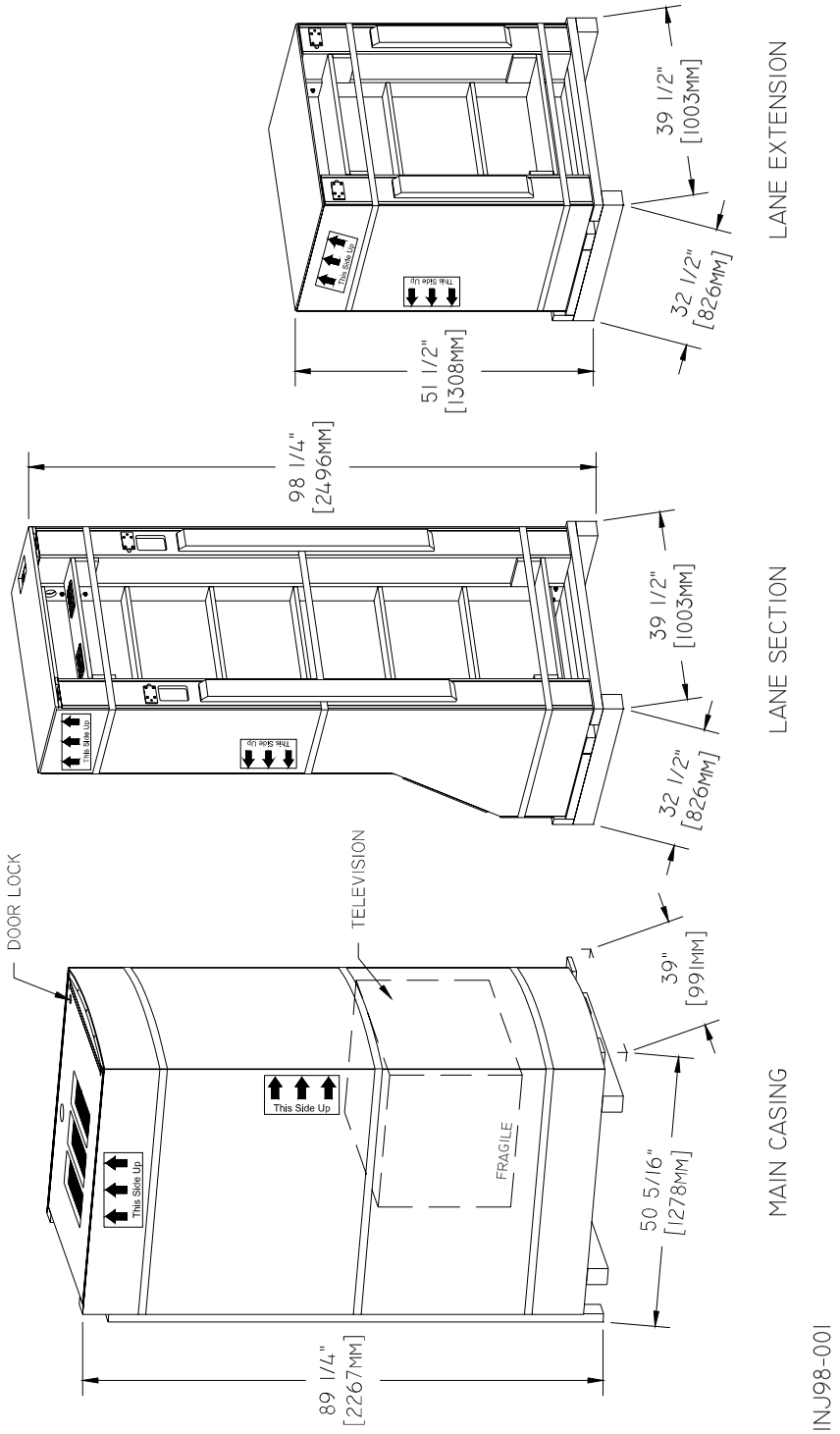
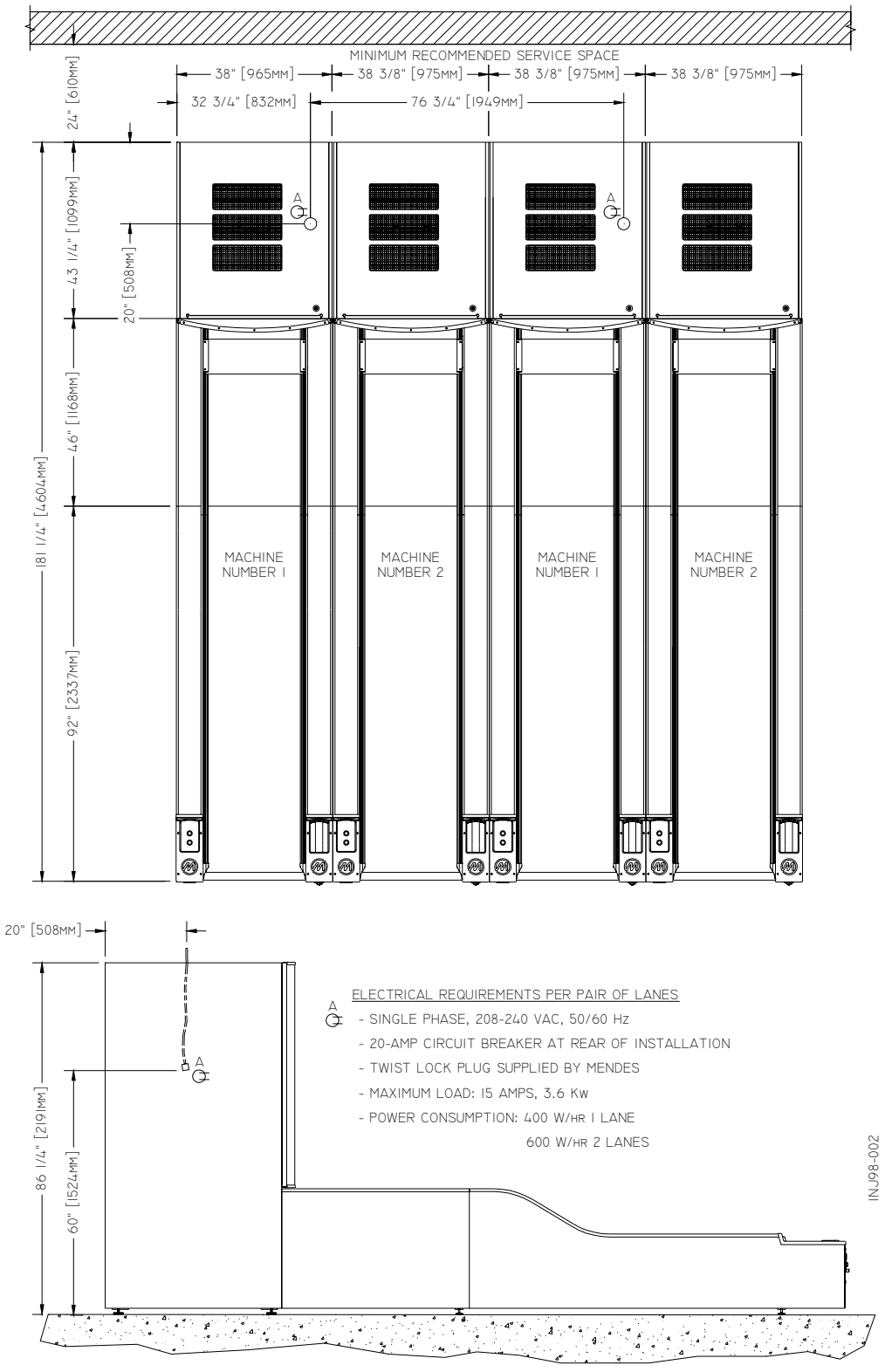


Figure 1.3 Typical Layout for 4 Lanes

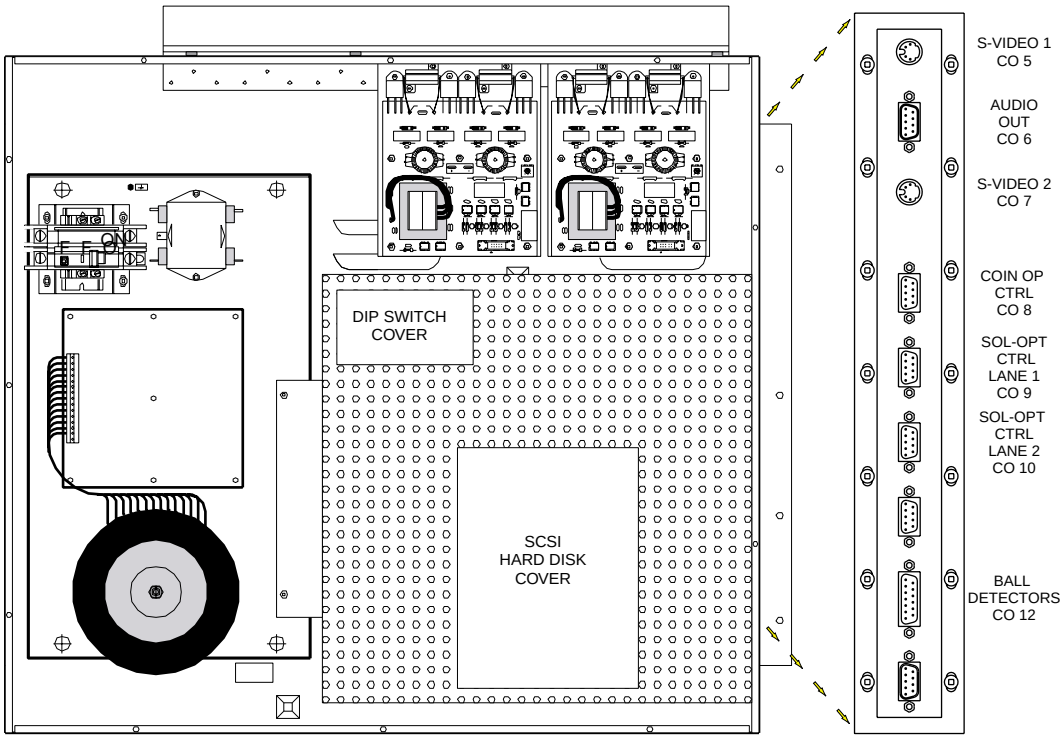


Assembling your Machine

Procedure 1.2 Assembling the main casing

	Do this	*Comments*
1.	Remove the shipping material used to wrap the crate.	**DO NOT** remove the rear and bottom wood supports.
2.	Remove the hardware kit from the main casing.	HK-BJ-0171
3.	Open the main casing's front door and remove the television.	Use one of the two keys found in the hardware kit to unlock the door. Refer to Figure 1.2 on page 21 for location of door lock.
4.	Lay the main casing on its rear wood supports.	**CAUTION:** the main casing is very heavy.
5.	With the casing laying on its back, remove the bolts which attach the casing to the shipping base and then install the 4 levelling legs.	The leveling legs are shipped in the hardware kit mentioned in step 2.
6.	Replace the main casing in its upright position.	**CAUTION:** the main casing is very heavy.
7.	Remove the 2 rear wood supports.	Use the Robertson #2 screwdriver found in the hardware kit.
8.	Place the machine in its predetermined final installation position.	Sufficient space must be left behind for service. Refer to Figure 1.3 on page 22.
9.	Remove the bowlingo pins from their shipping location, untangle the strings if necessary, and place the pins on the playing surface.	
10.	Level the main casing with its leveling legs.	**IMPORTANT:** Verify with a carpenter's level and then block the leveling legs with their nuts.
11.	Remove the television from its package and place it in its final resting place.	Plug the television's power cord into the power bar supplied which is then plugged into the power box providing a properly grounded electrical outlet.
12.	Plug the television's video cable into its corresponding socket on the machine's power box.	Refer to Figure 1.4 on page 24 for the location of the socket.

Figure 1.4 Identifying the Power Box Panels and Sockets



Note Due to its fragile nature, your SCSI hard disk used in the machine has been packaged in own shock resistant box. Use care when handling the disk.

Procedure 1.3 Installing the hard disk

	Do this	*Comments*
1.	Open back door.	Use the appropriate key.
2.	Remove the power box cover using a Robertson #2 screwdriver.	Part number 9802204.
3.	Remove the screws for the SCSI hard disk cover using a Robertson #2 screw-driver.	Refer to Figure 1.4.
4.	Remove the disk from its package.	
5.	Plug the flat cable and power supply cable from the power box to the disk.	
6.	Using the screws removed in step 3, attach the disk to the power box.	The disk has been factory mounted to the SCSI hard disk cover.
7.	Replace the power box cover removed in step 2.	

Note **Procedure 1.4 Assembling the lane extension (optional)**

	Do this	*Comments*
1.	Remove the shipping material used to wrap the crate including the rear wood supports.	The term “rear wood supports” assumes that the lane extension is standing vertically as pictured in Figure 1.2 on page 21.
2.	Attach the levelling legs to the underside of the lane extension.	The leveling legs are shipped in the hardware kit. Refer to Figure 1.5 on page 26 for their location.
3.	Place the lane extension in its horizontal position.	
4.	Remove the bolts which attach the lane extension to the shipping base.	
5.	Slide out the plastic access panels on each side of the lane.	Refer to Figure 1.6 on page 26.
6.	Place the lane extension in its predetermined final installation position and temporarily bolt it to the main casing.	**DO NOT** tighten the coupling bolts just yet.
7.	Adjust the lane extension’s leveling legs to obtain a level playing surface.	Block the leveling legs with their nuts once correct height is obtained.
8.	Tighten the coupling bolts which join the lane extension to the main casing.	

Note Leave all plastic access panels open. You will need to gain access to the different components inside when performing “Assembling the lane section” on page 27.

Figure 1.5 Levelling Legs

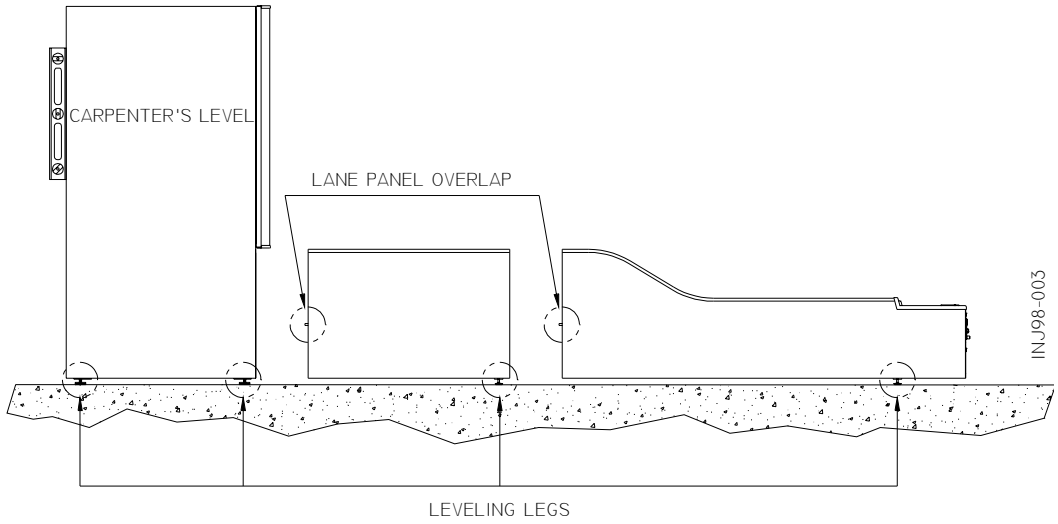
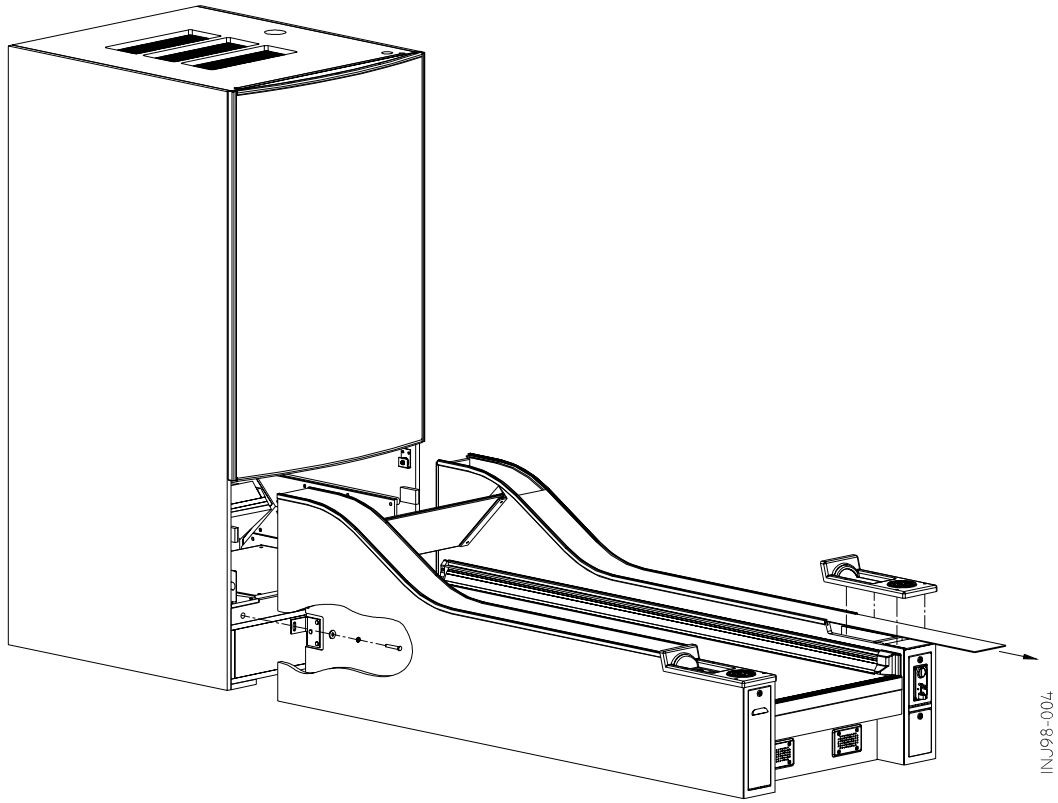


Figure 1.6 Removing the Access Panels

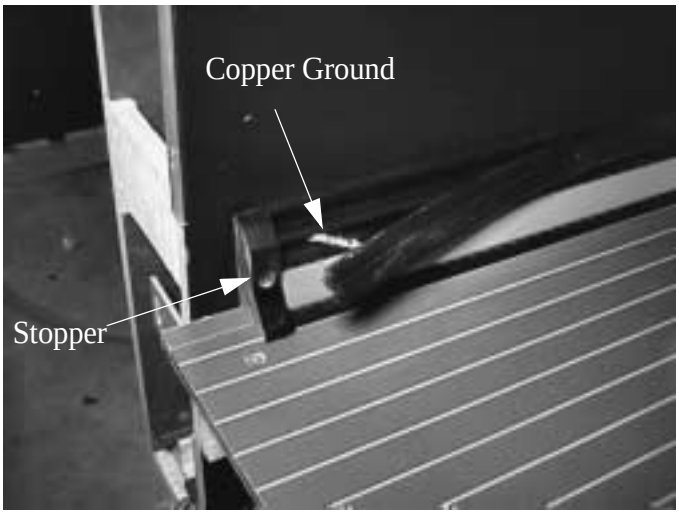


Procedure 1.5 Assembling the lane section

	Do this	*Comments*
1.	Remove the shipping material used to wrap the crate including the rear wood supports.	The term “rear wood supports” assumes that the lane section is standing vertically as pictured in Figure 1.2 on page 21.
2.	Attach the levelling legs to the under-side of the lane section.	Refer to Figure 1.5 on page 26 for their location.
3.	Place the lane section in its horizontal position.	
4.	Remove the bolts which attach the lane section to the shipping base.	
5.	Remove the ball return cover and the selection buttons cover, then slide out the access panels on each side of the lane.	Refer to Figure 1.6 on page 26.
6.	Place the lane section in its predeter-mined final installation position and temporarily bolt it to the main casing or lane extension, whichever your case may be.	**DO NOT** tighten the coupling bolts just yet.
7.	Adjust the lane section’s leveling legs to obtain a level playing surface.	Block the leveling legs with their nuts and then tighten the coupling bolts.
8.	*If you have a lane extension*, remove the shield from the lane section and install it on the lane extension.	The lane extension is delivered with pre-drilled holes for the shield. Sim-ply remove the finishing bolts which are in the holes and attach the shield in its place. Plug the holes in the lane section with the finishing bolts. If you need help with the parts of the shield, refer to page 86 for details.
9.	*If you have a lane extension*, detach the track bumper and re-fasten it in conjunction with the lane section’s track bumper.	The track bumper is fastened to the lane extension for shipping purposes only. **It must be moved.** Refer to Figure 1.7 on page 28 for details on this step.
10.	Run the string used for the ball return’s spoon from the main casing through the channel to the lane section.	Refer to Figure 1.11 on page 33.

Note Leave all plastic access panels, covers and panels open. You will need to gain access to the different components inside when performing “Starting and testing the machine” on page 32.

Figure 1.7 Lane Section's Track Bumper



To move the lane extension's track bumper, follow these steps.

1. **Using a screw driver or similar tool, pry up the track bumper's moulding as shown in Figure 1.7. This will expose the copper ground.**
2. **Remove the stopper from the lane section.**
3. **Loosen the screw which holds the copper ground in its place. Pivot the copper ground so as to have it ready to attach to the the lane extension's track bumper.**
4. **Pry up the lane extension's track bumper's moulding in order to expose the screws which hold the track bumper in place.**
5. **Detach the lane extension's track bumper and move it forward to join the lane section's track bumper.**
6. **Re-fasten the lane extension's in its new position. Make sure you attach the copper ground to the first screw.**
7. **Replace all mouldings.**
8. **Re-fasten the stopper in its new position at the end of the track bumper.**

Procedure 1.6 Assembling the lane chaser lights (optional)

	Do this	*Comments*
1.	Make sure the main electrical supply source is turned **OFF**.	
2.	Open the redemption ticket dispenser and the coin mechanism's door.	Item A in Figure 1.8. Use the keys supplied.
3.	Remove the adaptor blocks, the decorative strips and the stoppers from both sides of the lane.	Items D and E in Figure 1.8. If the covers and access panels are not already removed, remove them also (items B and C).
4.	Loosen the bumper tracks on the **lane extension** in order to facilitate the LED insertion.	
5.	Open your Chaser Light Kit and insert the stopper blocks in the tracks on each side of the lane. If you have a lane extension, you will have 2 Chaser Light Kits.	Item H in Figure 1.8. For illustrative purposes only, Figure 1.8 on page 30 shows the rear of the lane section. You will normally insert the stopper blocks and circuit boards from the front of the machine.
6.	Insert the LED circuit boards into the bumper tracks on each side of the lane.	Make sure you insert the smallest of the circuit boards first (item G in Figure 1.8) with the prongs facing the front of the machine. Each LED circuit board is numbered with a small sticker on the rear. The boards should be inserted in sequential order from 1 through 6 (1 through 9 if you have the lane extension).
7.	Retighten the lane extension's bumper tracks which were loosened in Step 4.	
8.	Connect the LED power supply cable to the assembly.	The red line must line up with Point 1 as indicated in Figure 1.9 on page 30.
9.	Insert the LED shields into the bumper tracks on each side of the lane.	Items K and L in Figure 1.8. Make sure you insert the smallest of the shields first (to the rear).
10.	Install the Chaser Lights Control Box and connect all necessary cabling.	Item J in Figure 1.9 on page 30. Refer to Figure 5.5 on page 79 and Figure 5.6 on page 81 for cabling connections on lanes 1 and 2 respectively.
11.	Replace the items which were removed in steps 3.	

Figure 1.8 Installing the Chaser Lights

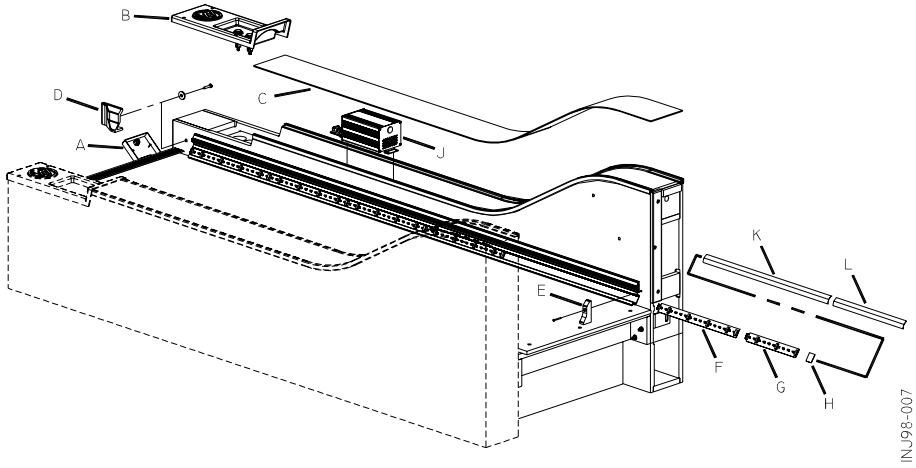
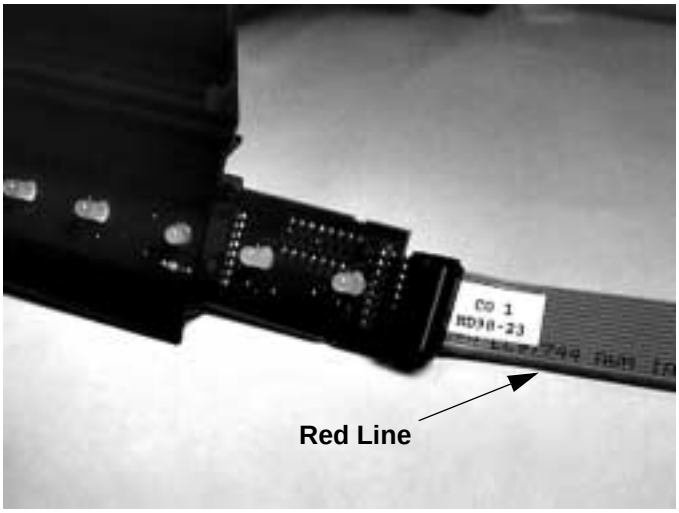


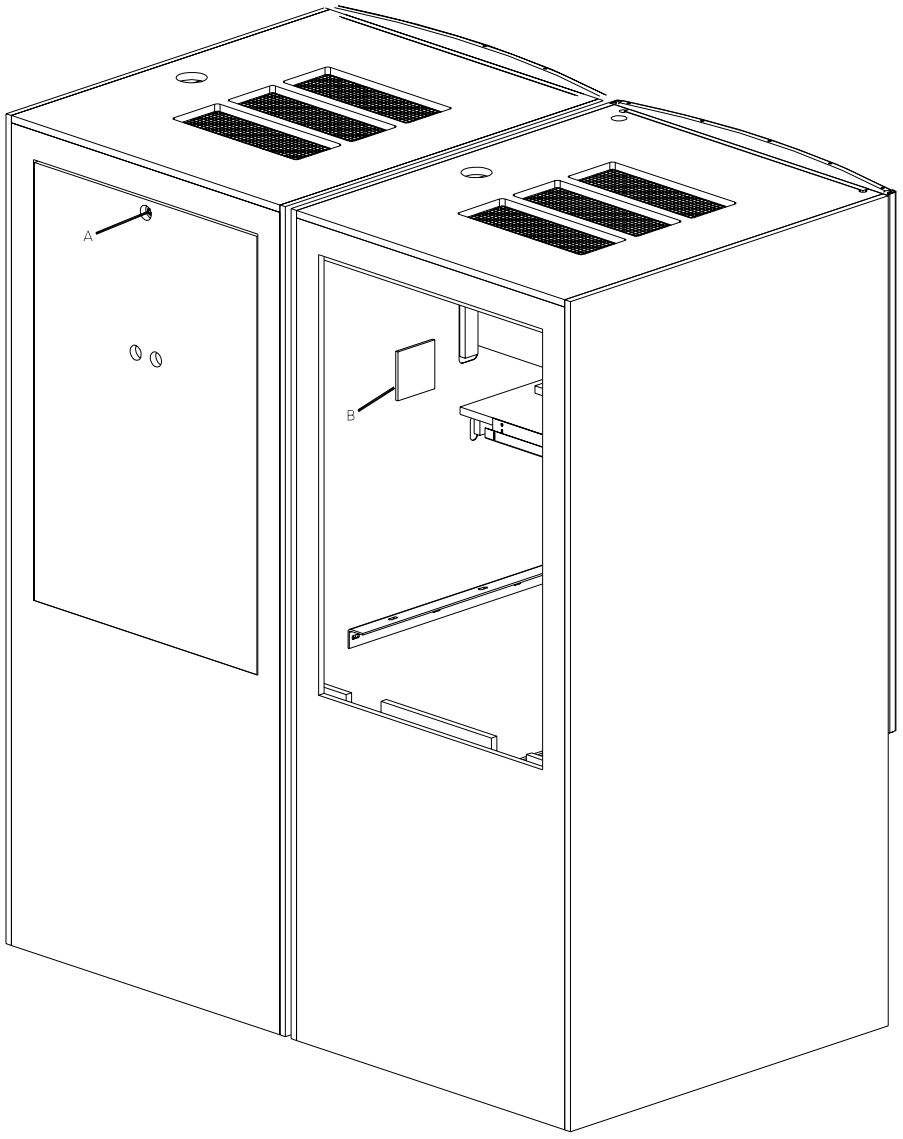
Figure 1.9 Connecting the LED circuit boards

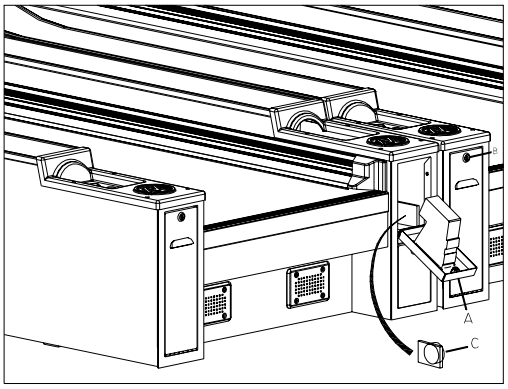


Procedure 1.7 Electrical connections

	Do this	*Comments*
1.	If you have more than one bowlingo machine and they are being installed side-by-side, remove the circular plug(s) on the side(s) of the machine(s) as indicated in Figure 1.10 on page 31.	A pair of machines shares electronic components. This hole allows you to connect together the different components from both machines.
2.	Make all necessary cabling connections.	Refer to Figure 5.1 on page 71.
3.	Plug the bowlingo machine's power cord into a properly grounded electrical outlet.	Mendes supplies an appropriate electrical outlet and recommends that this outlet be installed by an accredited electrician.

Figure 1.10 Removing the Side-by-Side Plugs





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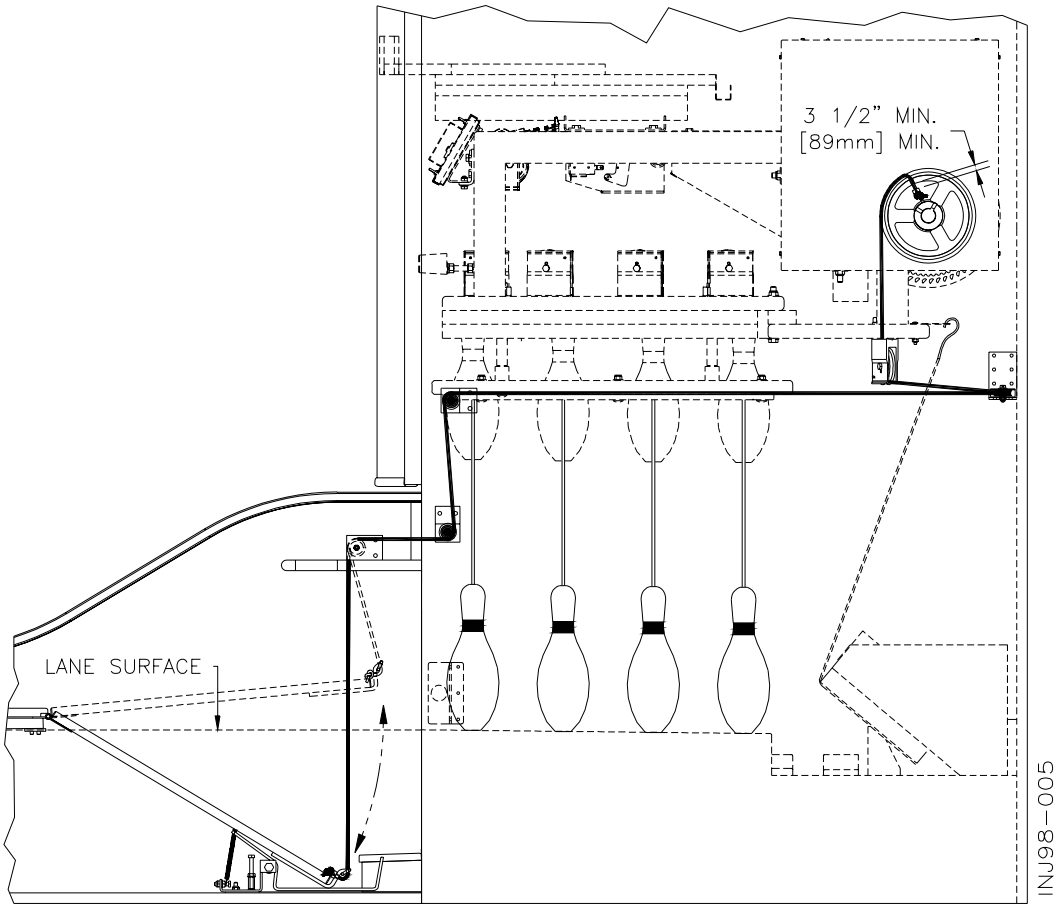
Procedure 1.8 Starting and testing the machine

Prior to commencing this procedure, you **MUST** perform Procedure 3.2, “Pinsetter Calibration,” on page 55. This procedure is the installation’s most critical step. Failure to perform this procedure **NOW** could cause permanent damage to your machine.

	Do this	*Comments*
1.	Once the machine has been calibrated correctly, power should be present at all components. If not, verify the specific components wiring and/or connections.	Take the time to verify that all electrical components have power. Are the Chaser Lights flashing? Are the ball detectors LED’s ON? Are the fluorescent lights ON?
2.	Power on the television and activate its video signal.	Consult the television’s manual shipped in its box for instructions on how to set it to video mode.
3.	Perform a machine cycle by activating the *Part Set* button.	Refer to Figure 2.5, “Pinsetter Function Buttons,” on page 45 for the location of the *Part Set* button.
4.	Install and adjust the nylon string used to activate the ball return’s trap door.	Refer to Figure 1.11 on page 33 and make sure you allow for a slack in the string as indicated.
5.	Roll 2 balls down the lane and then test the trap door by activating the “Part Set” button.	
6.	Cycle the pin setting machine once more and verify if all pins hit the playing surface at the same time.	If they don’t, you must perform Procedure 3.2, “Pinsetter Calibration,” on page 55 once again.
7.	Replace all access panels.	

Figure 1.11 Installing the Trap Door's String



Chapter 2
Setting Up/Operating Your bowlingo Junior/III

Chapter Overview

This chapter provides step-by-step instructions for setting up and configuring your equipment in order to meet your needs and requirements along with instructions for the day-to-day use and management of your equipment.

Procedure 2.1 Game Setup

	Do this	*Comments*
1.	Set up and plug in TV set as outlined in Chapter 1, “Installing Your bowlingo Junior/III,”.	Make sure the main breaker located on power box is ON.
2.	If not already done, use remote control and set TV to video mode.	Consult the television’s manual shipped in its box for instructions on how to set it to video mode.
3.	Open the redemption ticket dispenser with the key supplied and push the WHITE button to activate the system configuration menu.	Refer to Figure 2.1 on page 37.
4.	Use the BLUE and GREEN buttons located above the redemption ticket dispenser to access the on-screen menu and set the desired parameters.	Coins per game (1-9). Ticket at every (1-300) points. **Note:** the estimated average score is 200. Consecutive strikes for ticket (2-12, OFF). Time allowed per player (1-15, OFF) minutes. Time allowed per throw (15-300, OFF) seconds. Time between games (20-60) seconds.
5.	Once parameters are set, push the WHITE button on the redemption ticket dispenser again.	This saves the new parameters and reboots the system

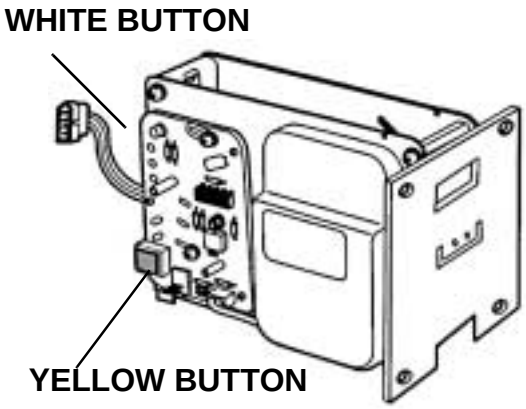
Coin-in / Ticket-out counters

Located just below the redemption ticket dispenser are two non-resettable counters. The first one counts the number of coins inserted into the coin-op mechanism while the second one counts the number of tickets dispensed by the redemption ticket dispenser. Refer to the electrical drawing on page 79 for more details.

Procedure 2.2 Ticket Dispenser Setup

	Do this	*Comments*
1.	Install your redemption tickets in storage bin.	
2.	Insert tickets in automatic feeder mechanism and push YELLOW button to ease ticket loading.	

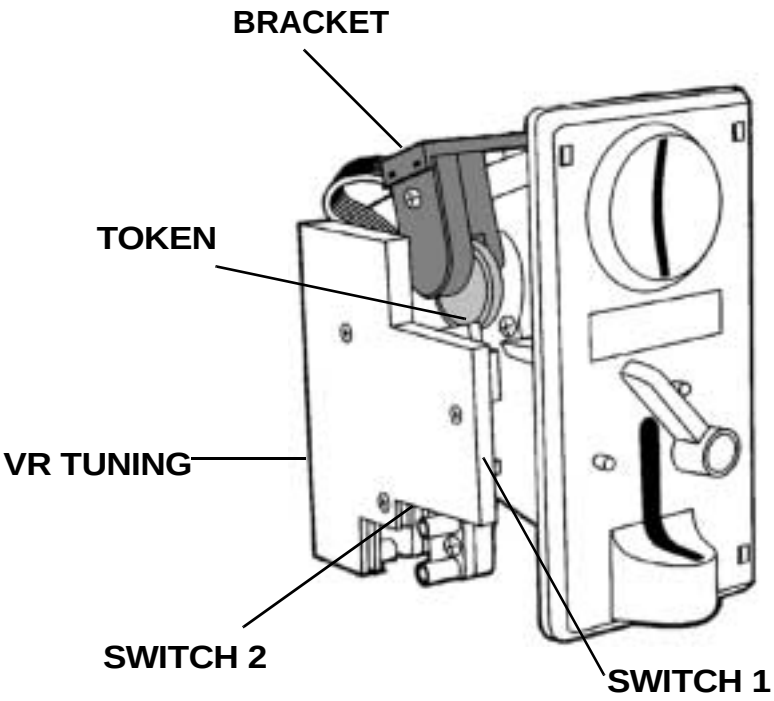
Figure 2.1 Redemption ticket dispenser



Procedure 2.3 Coin-op Mechanism Setup

	Do this	*Comments*
1.	Remove the factory installed plastic token from the coin sampling clamp.	Refer to Figure 2.2 on page 38.
2.	Slide the coin clamp backward and insert a right coin into the clamp slot then pinch the coin.	The mechanism will accept only that coin.
3.	Adjust the insert opening size to fit your coin's diameter. Do this by loosening the screw in the back side of the front panel.	This will prevent bigger, invalid coins from being inserted.
4.	Close and lock the cash drawer.	You may want to install a padlock on cash box for extra security.

Figure 2.2 Coin Mechanism



Coin Mechanism Specifications

- Voltage: DC 12V ± 20%
- Coin Diameter: 18mm - 31mm
- Coin thickness: 1.2mm - 3.0mm
- Temperature: -15°C - +75°C

- Pulse width – 100ms (SW2) – preset at factory
- Pulse mode – N.O. (SW1) – preset at factory
- Sensitivity – adjustable (VR tuning) – Turn clockwise (+) for slack coin selection and turn counter-clockwise (-) for strict coin selection.

DIP switch settings

Located on the main circuit board inside the machine's power box, are four separate DIP switch banks which allow for different configurations of your bowlingo game. Remember that the electronics control a pair of machines, thus the DIP switches must be able to configure each machine separately for certain options and globally for others.

The tables which follow describe the various DIP switch functions. The shaded areas indicate the preset factory settings.

SW101	Comprised of 8 different switches, this bank is used to configure lane 1 (left lane) and its different options.	
	ON	**OFF**
1.	Crank function disabled.	Crank function enabled.
2.	FACTORY SET DIP SWITCH - DO NOT CHANGE POSITION	
3.	NOT IN USE	
4.	NOT IN USE	
5.	NOT IN USE	
6.	Used to configure the pin brakes time delay in milliseconds. The three switches combine for a total of 8 different possible settings. See "Pin Brakes Time Delay Table" on page 40.	
7.		
8.		

SW102	Comprised of 8 different switches, this bank is used to configure lane 2 (right lane) and its different options.	
	ON	**OFF**
1.	Crank function disabled.	Crank function enabled.
2.	FACTORY SET DIP SWITCH - DO NOT CHANGE POSITION	
3.	NOT IN USE	
4.	NOT IN USE	
5.	NOT IN USE	
6.	Used to configure the pin brakes time delay in milliseconds. The three switches combine for a total of 8 different possible settings. See "Pin Brakes Time Delay Table" on page 40.	
7.		
8.		

Pin Brakes Time Delay Table

SW101-6, SW101-7, SW101-8
SW102-6, SW102-7, SW-102-8

Dip 6	Dip 7	Dip 8	Delay
OFF	OFF	OFF	500 ms[a]
OFF	OFF	ON	450 ms
OFF	ON	OFF	400 ms
OFF	ON	ON	350 ms
ON	OFF	OFF	300 ms
ON	OFF	ON	250 ms
ON	ON	OFF	200 ms
ON	ON	ON	150 ms[b]

a. Pins lowest possible position

b. Pins highest possible position

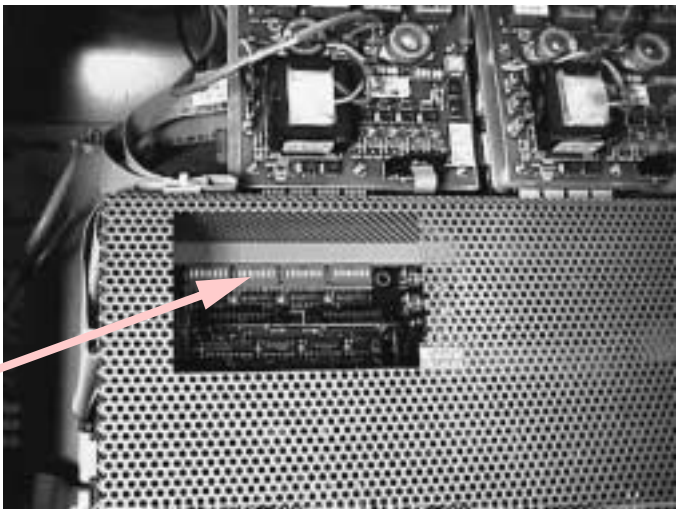
SW103	Comprised of 8 different switches, this bank is used to configure options which are shared by both lanes.	
	ON	**OFF**
1.	NOT IN USE	
2.	Hard disk configuration is disregarded with respect to DIP switch settings.	Uses the hard disk configuration to override DIP switches SW101-2, SW102-2, and SW103-3.
3.	Two (2) machines are installed on electronics.	One (1) machine is installed on electronics.
4.	NOT IN USE	
5.	NOT IN USE	
6.	NOT IN USE	
7.	NOT IN USE	
8.	NOT IN USE	

SW104	Comprised of 8 different switches, this bank is used to configure options which are shared by both lanes.	
	ON	**OFF**
1.	Ball remains inside machine at the end of a game.	Ball returns to the front at the end of a game.
2.	NOT IN USE	
3.	NOT IN USE	
4.	NOT IN USE	
5.	NOT IN USE	
6.	NOT IN USE	
7.	NOT IN USE	
8.	NOT IN USE	

Procedure 2.4 Changing DIP Switch Settings

	Do this	*Comments*
1.	Open back door.	Use the appropriate key.
2.	Turn power OFF on machine.	
3.	Remove the power box cover using a Robertson #2 screwdriver.	Part number 9802204.
4.	Remove the DIP switch cover using a Robertson #2 screwdriver.	Part number 9802216.
5.	Change the desired DIP switches settings.	
6.	Replace covers removed in steps 3 and 4.	
7.	Turn power back ON.	Machine will reboot and calibrate.
8.	Close and lock back door.	

Figure 2.3 Accessing the Machine's DIP Switches

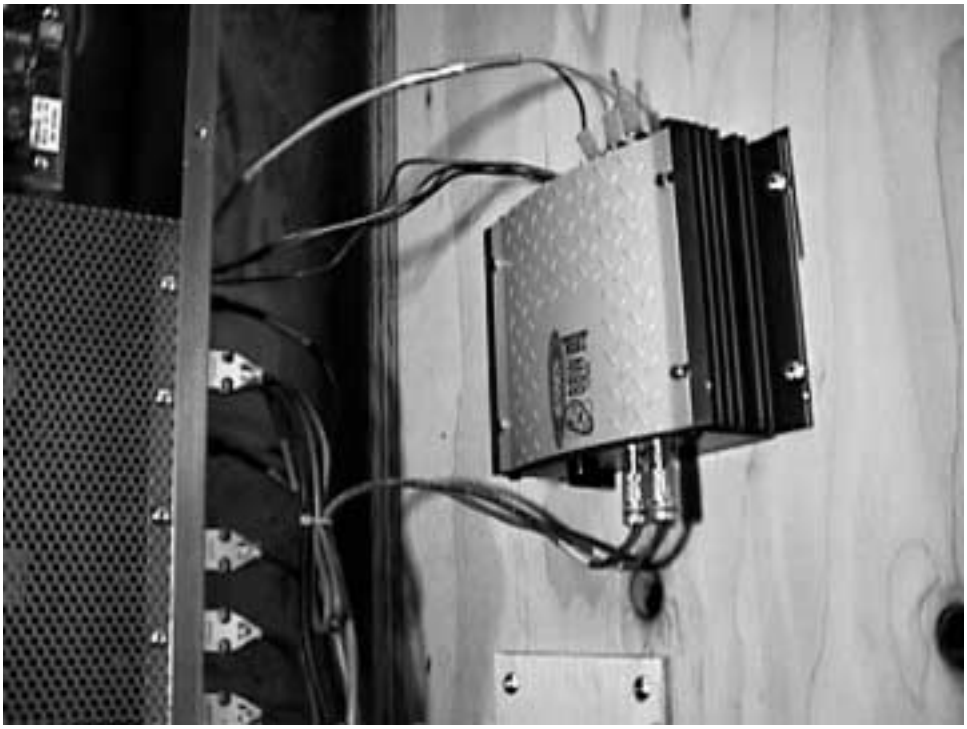


Procedure 2.5 Adjusting the Audio Volume

Your bowlingo machine's volume level has been set at the factory to a normal setting. Depending on the location of your machine and the ambient noise, you may wish to adjust the volume level.

The amplifier is accessible by opening the back panel. It is positioned on the side wall near the power box as displayed below.

Figure 2.4 Amplifier Location



Playing the Game

Procedure 2.6 Bowl

	Do this	*Comments*
1.	Insert appropriate number of coins.	
2.	Press the BLUE button to set the appropriate number of games and bowlers.	According to the number of coins inserted the video display scrolls through the possibilities accordingly. For example: 2 credits could be for one player / 2 games or 2 players / 1 game.
3.	Press the GREEN button to start the game.	
4.	ENJOY!	

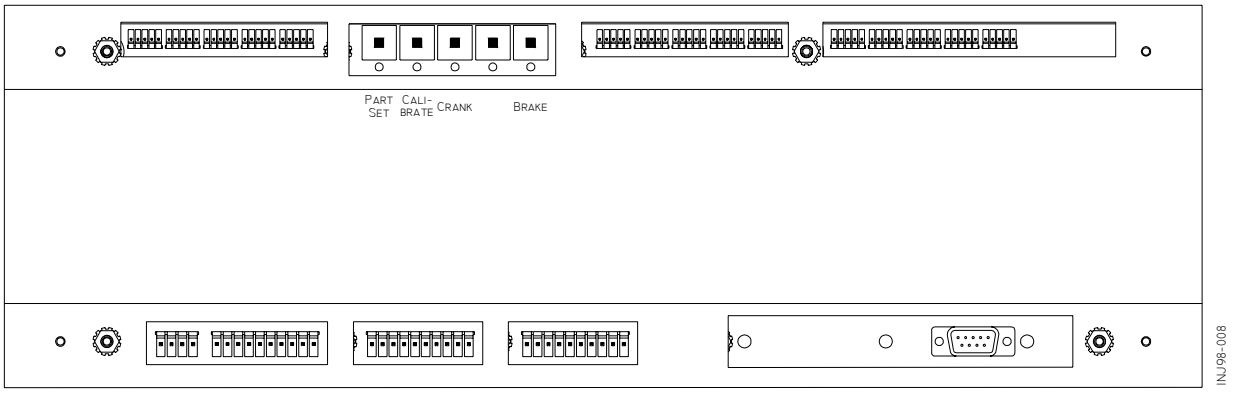
Note *During the course of play, if no ball is present when there is one needed, press the GREEN button in order to have the machine cycle and activate the trap door mechanism.*

Pinsetter function buttons

Located on the front of the pinsetter and accessible by the front panel are 5 buttons which perform different functions on the pinsetting machine. The machine must be turned ON and functioning normally in order for these buttons to perform their actions. From left to right, these buttons and their respective functions are:

PART SET	Performs a cycle on the pinsetting machine which results in the bowling pins being re-spotted and the ball return's trap door being activated.
CALIBRATE	Performs a pinsetter calibration which in essence puts every mechanical part in sync with its counterparts. **Note:** A calibration is performed automatically whenever the computer system is re-booted.
CRANK	Used to simulate an end of game pinsetter cycle which allows the user to test the ball return trap door setting (see "SW104" on page 41) and that the pins are set correctly on the playing surface.
4	NOT IN USE
BRAKE	Used to activate the pin brakes for adjustment purposes. Refer to page 58 for the adjustment procedure.

Figure 2.5 Pinsetter Function Buttons



Chapter 3
Taking Care of Your bowlingo Junior/III

Chapter Overview

This chapter contains information about the proper handling and care of your equipment.

Preventive Maintenance Basics

Here are some basic points about keeping your equipment functioning properly.

- Machines must be kept free of dirt, dust and excess of oil. A well cared for machine is a clean machine. A clean machine performs much better and reduces the chance of electronic problems.
- Do not place items on top of electronic components or cover any of their vents. These vents provide airflow to keep your electronics from overheating.
- Keep food and drinks away from electronic components. Food particles and spills might make the electronics sticky and unusable.
- Do not get the power switches or other components wet. Moisture can damage these parts and cause an electrical hazard.
- Always disconnect a power cord by grasping the plug, not the cord.
- Machines are subject to constant vibration and must be checked frequently for loose nuts and bolts. All bolts on the machines and accessories must be tightened with a torque wrench. Over tightening bolts will simply cause them to break and depending on the function of the bolt, may cause operating headaches. Also, check and tighten any loose screws on the pinsetters, especially the setscrews, as well as any loose bolts at regular intervals.
- Setup and maintain a preventive maintenance program as outlined in this chapter.

Manufacturer's recommendations

- Always use original Mendes parts with your equipment.
- The detailed part listings in this publication make it easy to locate parts for reordering purposes. Always order parts by the part number and its description, not by index and / or page numbers because this information is subject to change.
- Always supply your equipment serial number when placing an order.

Important note for European installations Mendes ground wires may be colored green instead of the standard European green and yellow.

Setting Up A Preventive Maintenance Program

The simplicity of Mendes equipment being its main characteristic, it is very easy to understand its concept. At the same time, it must be understood that equipment of any kind requires a minimum of maintenance and should operate according to standards. Regular, scheduled maintenance is very important in order to keep your equipment in excellent condition.

Getting organized

The Preventive Maintenance Work Schedule is an organized schedule of routine preventive maintenance that must be performed on all machines over a four-week period.

The preventive maintenance is divided into five areas, according to time. There are services that must be performed daily, weekly, monthly, and quarterly.

Mendes strongly suggests that you make copies of the Preventive Maintenance Work Schedule and set up your own maintenance program as detailed on the pages in this section.

Preventive Maintenance Work Schedule

4-week period ending : _____

Daily Service	Assign	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Check stop sheets																													
Check and repair strings																													
Calibration Procedure																													
Wipe ball detectors and reflectors																													
Clean all lane surfaces																													
Weekly Service	Assign	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Clean all optical sensors																													
Verify all pin brakes																													
Wipe all stabilizers																													
Vacuum pit area																													
Wipe bowlingo balls																													
Monthly Service	Assign	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Ball detector alignment																													
Clean all pin detector wheels																													
Quarterly Service	Assign	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
Tighten bolts & screws																													
Annual Service	Assign	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S

Remarks :

Daily maintenance schedule

Let's look at the daily maintenance required of all machines each and every day.

- Everyday, all the machines must be checked for stop sheets. These are pieces of paper that are put on the back of the machine to indicate if something went wrong with it the night before. A qualified maintenance technician should immediately correct the malfunction;
- Pin strings should be inspected daily and if showing evidence of wear, they should be shortened and refastened and the machine re-calibrated to compensate for the shortened string. If a proper program of string maintenance and inspection is set up, you will never experience a broken string during normal play. Put very simply, there is no excuse for strings breaking in play other than careless string maintenance;
- Each machine must be calibrated using the correct procedure as outlined on page 55. Doing so will ensure smoother sailing for the busy day ahead.
- Wipe the ball detectors and reflectors with a damp cloth;
- Clean all lane surfaces and surrounding areas with "DBA Phosphate-Free Lane Cleaner" (part number Q82-0070) or similar. **DO NOT** use in concentrated form, use in accordance with the manufacturers instructions. Always use a hand spray applicator.

Weekly maintenance schedule

Following the daily maintenance of the machines there is also scheduled maintenance that needs to be performed weekly. Most of the weekly maintenance is simply cleaning which requires wiping off the major assemblies. All assemblies should be wiped clean with a dry cloth. Sometimes oil or grease may accumulate on these surfaces and a dry cloth will not remove them. When this happens, it makes sense to moisten the cloth with “DBA General Purpose Machine Cleaner” (part number Q82-0055), or similar.

Weekly cleaning The cleaning simply involves wiping the various components indicated with a dry cloth. The pit area is best cleaned by vacuuming the dust that accumulates. Dust also accumulates inside the various optical reading devices located on the machine. This dust is best removed by using compressed air prior to vacuuming.

- Clean all optical sensors with compressed air;
- Remove all dust deposits which have accumulated on the pin tables and pin stabilizer boards;
- Vacuum the pit area;
- Wipe the bowlingo balls.

Weekly adjustments Pin brakes should be inspected weekly and if necessary, adjusted. As illustrated in Figure 3.5, the solenoid (**A**) pulls the cam (**B**) which jams the string on the brake plate (**C**). If a pin is lowered to the lane when it should stay up or if a pin stays up when it should be lowered to the lane, the pin brakes need adjusting.

Monthly maintenance schedule

Moving on to items performed monthly, we see that the first area is to inspect and correct is the ball detector alignment. Although the ball detector is not a mechanical part of the drive train, it is a critical component to the machine's mechanics since all commands to and from the machine start with the detection of a ball.

Once the ball detectors have all been verified, clean all pin detector wheels with compressed air if available.

Quarterly maintenance schedule

Although the quarterly servicing of machines is not done as frequently as the other services, it is just as important. Much of the quarterly service involves tightening the bolts and screws of the various assemblies. Loose bolts and screws may result in premature failure of the machine and may even result in serious damage to the machine or an operator.

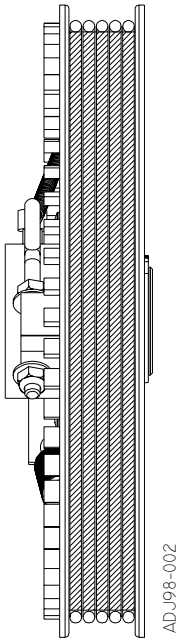
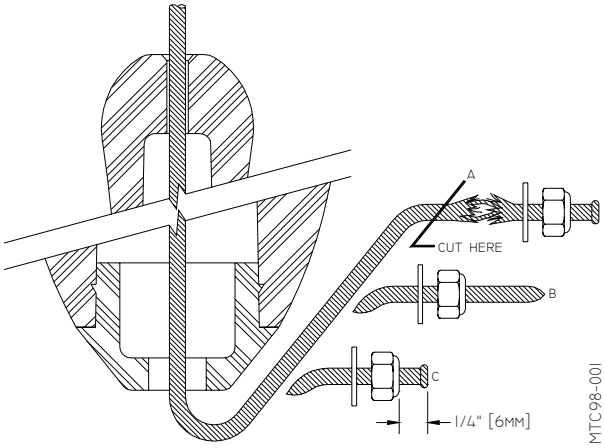
Nuts and bolts Machines are subject to constant vibration and must be checked for loose nuts and bolts. All bolts on the machines and accessories must be tightened with a torque wrench as indicated in the table below. Over tightening bolts will simply cause them to break and depending on the function of the bolt, may cause operating headaches.

The vibro-insulators and base plate spacer bolts located on the stabilizers are subject to continual violent shock and extreme vibration. They should be checked frequently for tightness

BOLT SIZE	AMERICAN	NEWTON
1/4"	15 FT. LB.	67 N/M
5/16"	19 FT. LB.	85 N/M
3/8"	25 FT. LB.	112 N/M
1/2"	29 FT. LB.	130 N/M

Tightening loose bolts and screws should not be limited to quarterly service however. Any time you come across a loose bolt or screw, it should be corrected immediately.

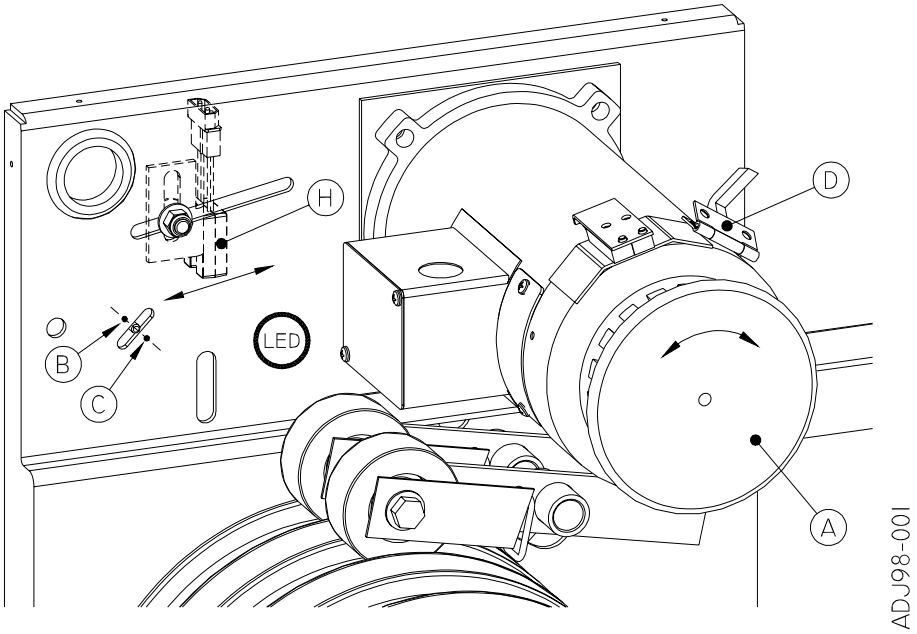
Procedure 3.1 String Maintenance

	Do this	Comments and illustrations
1.	Remove rear panel.	
2.	Turn OFF main breaker located on power box.	
3.	Verify that strings are well aligned in their storage reels as illustrated in Figure 3.1. Look for visual signs of wear on strings. Any strings which are frayed or worn should be repaired or replaced as outlined in steps 4 through 6.	*Figure 3.1 String Storage Reel* 
4.	Slide the string down through the pin and cut the worn out section as illustrated with **A** in Figure 3.2.	*Figure 3.2 Cut-away Section of bowlingo Pin* 
5.	Burn the string tip using a match or cigarette lighter. Use a rotating motion with a rag to create a point on the string. Place a new washer and crimp a new nylon lock nut on the string (**B**). Use the swaging tool (Z-001) supplied with your spare parts kit to crimp the nut on the string.	
6.	Cut the end of the string ¼-inch (6mm) from the crimped nut (**C**). Burn the string tip to shape a lump under the nut. Slide the pin along the string and check that it turns freely.	Once all strings have been verified and corrected, you may proceed with the "Pinsetter Calibration" or turn the machine's power back ON.

Procedure 3.2 Pinsetter Calibration

	Do this	*Comments*
1.	Remove rear panel.	
2.	Turn OFF DC motor's drive breaker (white button located on power box).	
3.	Raise the pins by turning the plastic wheel (**A**) located at the end of the motor.	

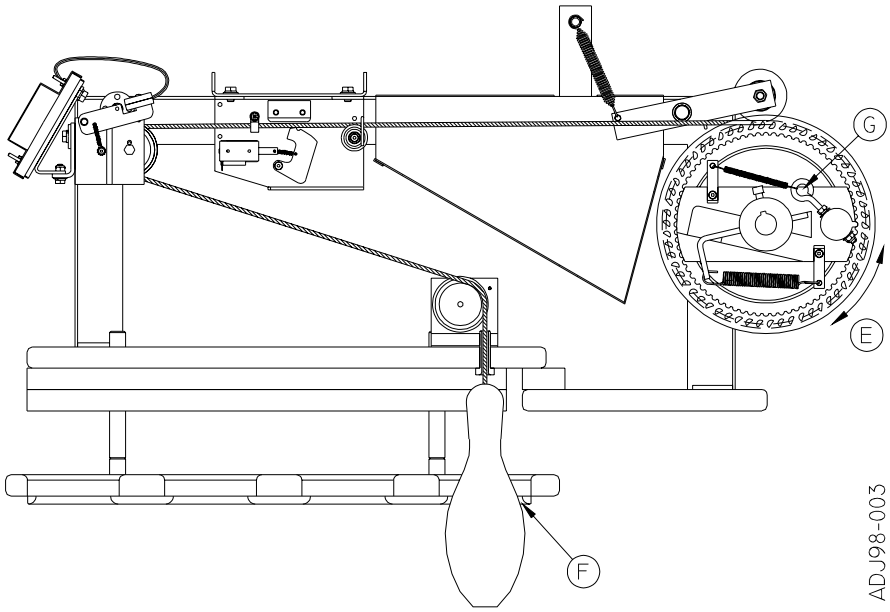
Figure 3.3 Machine Synchronization



4.	The reference point on the synchronization wheel must appear in the slot in a straight line with the alignment dots (**B** and **C**) on the machine's frame. If your machine is equipped with a LED adjustment detector, stop turning when the device turns OFF.	
5.	Once the synchronization wheel has been aligned, block the motor with its latch (**D**).	
6.	Use the string adjustment tool (part number Z-BJ0001) supplied in your spare parts kit to pull the eyebolt (**G**), then turn the wheels (**E**) to shorten or extend each string individually. Release the eyebolt (**G**) when the pin touches the stabilizer (**F**).	Rotate counter-clockwise to reduce string tension / lower pins. Rotate clockwise to increase tension / raise pins.

Do this	Comments

Figure 3.4 Adjusting the String Length



7. Remove motor latch engaged in step 5.
8. Manually lower the pins to the lane. Use the plastic wheel (**A**) located at the end of the motor.
9. Turn the DC motor's drive breaker back ON. The machine's electronics will complete the calibration by performing a full cycle, during which it will take new readings.
10. Open the front panel of main cabinet and perform a calibration by pressing the "CALIBRATE" button.
11. Press the "PART SET" button and check the normal operation. Pins should touch the deck gently when deposited.
12. Replace the rear panel.

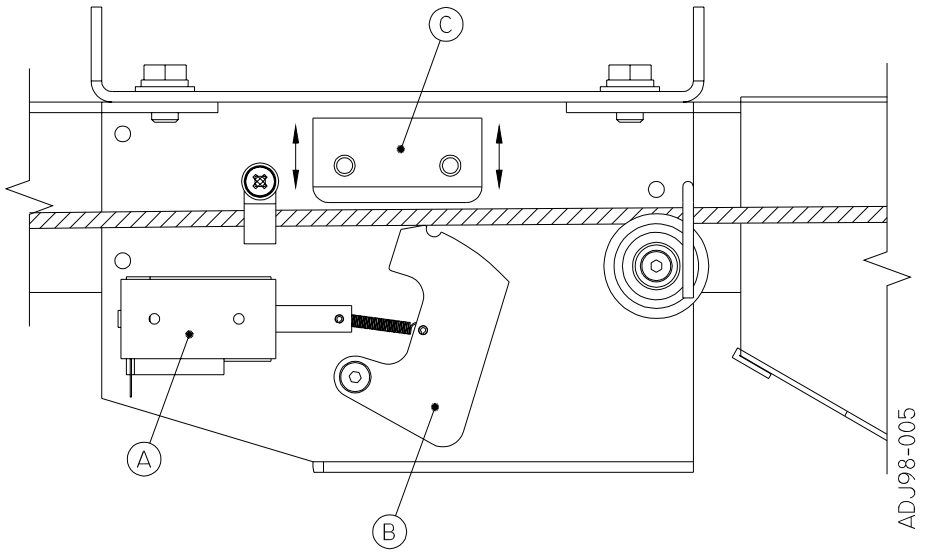
Procedure 3.3 Pin Pause Adjustment

	Do this	*Comments*
1.	Perform the “Pinsetter Calibration”.	
2.	Adjust the optical sensor (**H** in Figure 3.3) to the proper position.	Move toward the front of the equipment if the pins slow down and accelerate before hitting the pin-deck. Move toward the rear of the equipment if the pins go all the way down without decelerating before hitting the pin deck.
3.	Perform the “Pinsetter Calibration”.	
4.	Check for normal operation.	Restart the complete operation if the equipment performs inadequately.

Procedure 3.4 Adjusting the Pin Brakes

	Do this	*Comments*
1.	Press and hold down the "BRAKE" button on the front of the pinsetter. After a brief moment, the pin brakes will be activated. Release the button at this point.	Refer to Figure 2.5 on page 45 for the location of the "BRAKE" button.
2.	Verify that each pin brake retains its string adequately.	If not, adjust as described in next step.
3.	To adjust any given brake, slightly loosen the bolts which hold the brake plate (**C**) in place. Move the brake plate in the necessary direction (UP or DOWN).	The brake plate may be moved in the direction shown by the arrows in Figure 3.5. Raise the brake plate to loosen the pin's string or lower the brake plate to tighten the pin's string.
4.	Press and hold down the "BRAKE" button to reestablish normal functions.	

Figure 3.5 Pin Brakes



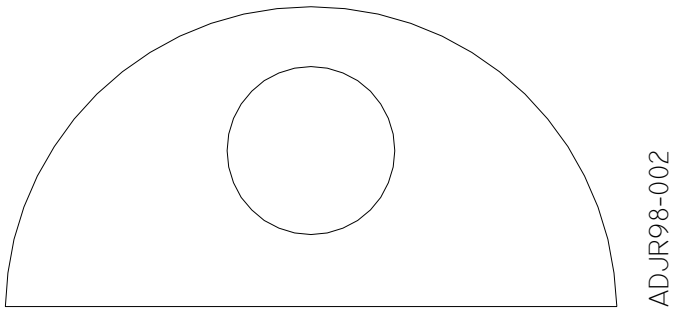
*Pin brakes should be inspected weekly and if necessary, adjusted. The solenoid (**A**) pulls the cam (**B**) which jams the string on the brake plate (**C**). If a pin is lowered to the lane when it should stay up or if a pin stays up when it should be lowered to the lane, the pin brakes need adjusting. Follow the procedures above to adjust your pin brakes.*

Procedure 3.5 Adjusting the Ball Detector

The ball detector is a simple, very reliable stand alone device but may become misaligned once in a while due to the constant vibration caused by the balls rolling down the lane. Each ball detector has two LED's that simplify the adjustment of the unit. The green LED signifies that the unit is perfectly aligned with the reflector while the red LED indicates that the alignment is borderline (usually requiring you to adjust it until the green LED turns on). If neither of the two LED's are visible on a ball detector, one of four things is possible. The ball detector is completely misaligned, it is defective, the reflector on the opposite side of the lane is soiled or has fallen, or the cable which supplies the necessary voltage to the unit has been cut or disconnected.

	Do this	***Comments***
1.	Make a copy of the adjustment template illudtrated in Figure 3.6. Cut out the template and place it over the reflector.	This will ensure that you align the detector's infrared beam with the center of the reflector.
2.	Loosen the screws which hold the ball detector transmitter assembly (SB-1500-31-JR) in place.	Refer to page 88 for a diagram of the detector and its screws.
3.	Move the detector assembly up, down, right or left until the green LED appears on the ball detector.	
4.	Re-tighten the screws.	

Figure 3.6 Ball Detector Adjustment template



Chapter 4
Solving Problems

Chapter Overview

This chapter contains information that will help you identify and correct problems that might arise as you use your equipment. A description of the wide variety of resources available from Mendes to assist you in the use of your equipment is also included along with instructions on how to obtain additional information about Mendes products.

Services available and telephone numbers listed are subject to change without notice.

If you have a problem with your bowlingo unit, always verify the following points before replacing system components as indicated in this chapter.

- Check that you have electrical power to the system; a glance at the fuse box could save you a lot of precious time.
- Make sure that the LED on the ball detector is green.
- Simulate a power failure.
- Check that all cabling assemblies are well connected.

Hint on cabling problems

There are only two possible solutions to cabling problems. First, any one of the connectors used with the cable assembly may have become loose due to the constant vibration generated from play. Secondly, a cable may be cut or have been pinched by a foreign object. The solutions are simple, ensure that all connectors are well positioned and push down on each one to ensure its proper contact. If this fails to resolve your problem, use a multi-meter to verify the cable assembly's continuity.

- Verify the relative humidity in your center. When humidity levels get too low, static electricity transported by people can build up to enormous levels. These levels can be so large that even good grounds will not stop the destruction of these static discharges. Be advised that the recommended relative humidity level for a bowling center is between 40 and 50 percent.
- Retrace the ground wire installed with your equipment all the way to the building's main ground. Never depend upon the ground installed with your outlets, since many electricians do not reliably install these grounds. If your equipment is not properly grounded the CPU's can literally blow their electronic chips when they receive a static electricity discharge, be it from the players or a defective part.
- Check the fuse or the transformer's reset in the power box.

Using the Television's Diagnostic Menu

Your bowlingo machine keeps a log of all problems encountered in chronological order. You may view this log at any time on the television monitor. The log is reset (erased) every time the computer system reboots.

Note *Once in the diagnostic view mode, make sure that you note all pertinent information required. Upon exiting this mode, the computer system will reboot thus erasing the log as explained above.*

Procedure 4.1 Accessing the Diagnostic Menu

	Do this	*Comments*
1.	Use the remote control and set TV to video mode.	Consult the television's manual shipped in its box for instructions on how to set it to video mode.
2.	Open the redemption ticket dispenser and push the WHITE button to activate the system configuration menu.	Refer to Figure 2.1 on page 37.
3.	Use the BLUE and GREEN buttons located above redemption ticket dispenser to access the "Diagnostic Menu.".	
4.	Select "Pinsetter Diagnostic".	The "Trouble Journal" will appear on screen.
5.	Note any or all information required.	See "Displayed problems and their solutions" on page 64. for an alphabetical listing of possible log messages.
6.	Press START (green) button to return to previous menu.	
7.	Press the WHITE button on redemption ticket dispenser again.	This reboots the system.
8.	Close and lock all drawers.	

Displayed problems and their solutions

Displayed problem	Cause	Possible solutions
Ball detect dead	There is no response from the ball detector	• Adjust the ball detector, page 59. • Ball detector is defective, replace it; • Cable which supplies the necessary voltage to the unit has been cut or disconnected. Repair or replace the cable.
Ball detect stick	The ball detector's signal is obstructed.	• Reflector on the opposite side of the lane is soiled or has fallen.
Ball detect unknown	Unknown problem with the ball detector.	• Adjust the ball detector, page 59. • Reflector on the opposite side of the lane is soiled or has fallen; • Ball detector is defective, replace it; • Cable which supplies the necessary voltage to the unit has been cut or disconnected. Repair or replace the cable.
Communication error	Communication between the pinsetter and other components has been disrupted.	• Simulate a power failure on the machine. This will reset all the electronic components. • Check cabling between all components for disconnects or cuts.
Drive dead	There is no response from the pinsetter's drive PCB.	• Check cabling between all components for disconnects or cuts. • Drive PCB is defective, replace it.
Drive unknown	Unknown problem with the pinsetter's drive PCB.	• Contact the Mendes Help Center.
Interrupt stick	2 lines are sharing an interrupt switch.	• Simulate a power failure on the machine. This will reset all the electronic components. • Drive PCB is defective, replace it. • Ball detector is defective, replace it;
Not specified	Unknown problem	• Contact the Mendes Help Center.

Displayed problem	Cause	Possible solutions
Pinsetter no answer	There is no response from the pinsetter's drive PCB.	• Check cabling between all components for disconnects or cuts. • Drive PCB is defective, replace it. • Contact the Mendes Help Center.
Pinsetter not calibrated	If the pinsetter is not calibrated, no other motion or operation may be performed except for a calibration.	• Activate the *Calibrate* button on the front of the pinsetter. See "Pinsetter function buttons" on page 45.
Pinsetter out of range	The electronics are unable to determine the correct location of all moving parts.	• Check the motor encoder's optical sensor. • Check that all optical sensors are aligned and are not defective. • Check timing belts to ensure that they are not loose or broken.
Pinsetter jam	The pinsetter's tangle routine failed to sort the strings and put the machine back into play.	• Manually untangle all strings. • Press the Part Set button.
Pinsetter power fail	No electrical power is present.	• Check the motor breaker. • Check the overloads on front of the power box.
Read Pins Time out	The pin count signal was not received by the computer after the pins were knocked down.	• Check cabling.
Unknown pinsetter error	Unknown problem with the pinsetter.	• Contact the Mendes Help Center.

Getting Help, Service, and Information

Service support

With the original purchase of a Mendes product, you have access to extensive support coverage. During the Mendes product warranty period, you may call the Mendes Help Center for product assistance covered under the terms of the"Mendes Statement of Limited Warranty". For telephone numbers to call, See "Getting help by telephone" on page 67.

The following services are available during the warranty period:

- Problem determination : Trained personnel are available to assist you with determining what type of problem you have and deciding what action is necessary to fix the problem.
- Mendes equipment repair : If the problem is determined to be caused by Mendes equipment under warranty, trained service personnel are available to provide the applicable level of service.
- Engineering change management : Occasionally, there might be changes that are required after a product has been sold. Mendes or your distributor, if authorized by Mendes, will make engineering changes (EC's) available that apply to your equipment.

Please have the following information ready when you call:

- Equipment type and model
- Serial numbers of your Mendes equipment
- Description of the problem
- Exact wording of any error messages

Refer to the "Mendes Statement of Limited Warranty" on page 134 *for a full explanation of the Mendes warranty terms.*

Before you call for service

Many problems can be solved without outside assistance, by using the on-line or printed documentation that comes with your equipment. Also, if applicable, be sure to read the information in any README files that come with your software.

Most Mendes equipment comes with documentation that contains troubleshooting procedures and explanations of error messages.

Getting customer support and service

Purchasing a Mendes product entitles you to standard help and support during the warranty period. If you need additional support and services, a wide variety of extended services are available for purchase that address almost any need.

Getting help on-line On-line help is a remote communication service that allows a Mendes technical-support representative to access your PC by modem. Many problems can be remotely diagnosed and corrected quickly and easily. In addition to a modem, a remote-access application program is required. There might be a charge for this service depending on the request.

For more information about configuring your PC for on-line help, contact the Mendes Help Center.

Getting help by telephone During the warranty period, you can get help and information by telephone through the Mendes Help Center. Expert technical-support representatives are available to assist you with questions you might have on the following:

- Setting up your equipment and configuring it to your needs;
- Installing and setting up Mendes options purchased from Mendes or a Mendes distributor;
- Arranging for service (on-site or ship-in);
- Arranging for overnight shipment of customer-replaceable parts.

It is important to remember that response time will vary depending on the number and complexity of incoming calls.

USA: 1-800-462-1022

CANADA: 1-800-561-0644

WORLDWIDE: 1-418-650-2425

Telephone numbers listed are subject to change without notice.

Purchasing additional services

During and after the warranty period, you can purchase additional services, such as support for computer hardware, Mendes application programs, upgraded or extended product repair services, and custom installations. Service availability and name might vary by country. For more information or to purchase these services, contact the Mendes Help Center.

Warranty and repair services

You can extend your standard product warranty service beyond the warranty period. Warranty and repair services offer a variety of post-warranty maintenance options. Availability of the services varies by product. For more information about warranty extensions, contact the Mendes Help Center.

Ordering publications

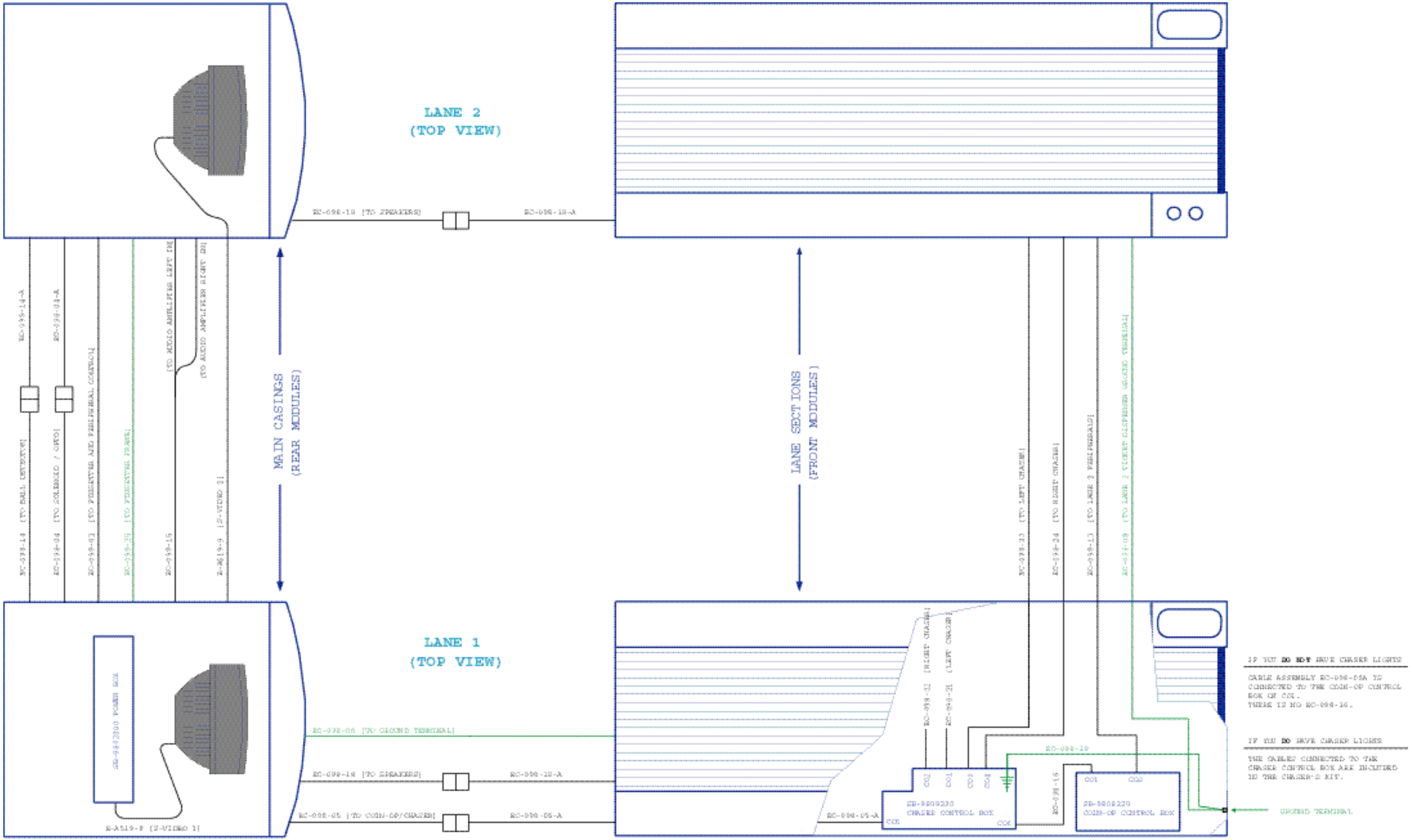
Additional publications are available for purchase from Mendes. For a list of publications available in your country, contact the Mendes Help Center.

Chapter 5
Wiring Diagrams

Chapter Overview

This chapter provides you with all necessary wiring and electronic information in easy to comprehend diagrams for your reordering and servicing convenience.

Figure 5.1 bowlingo Junior/III Component Interconnections



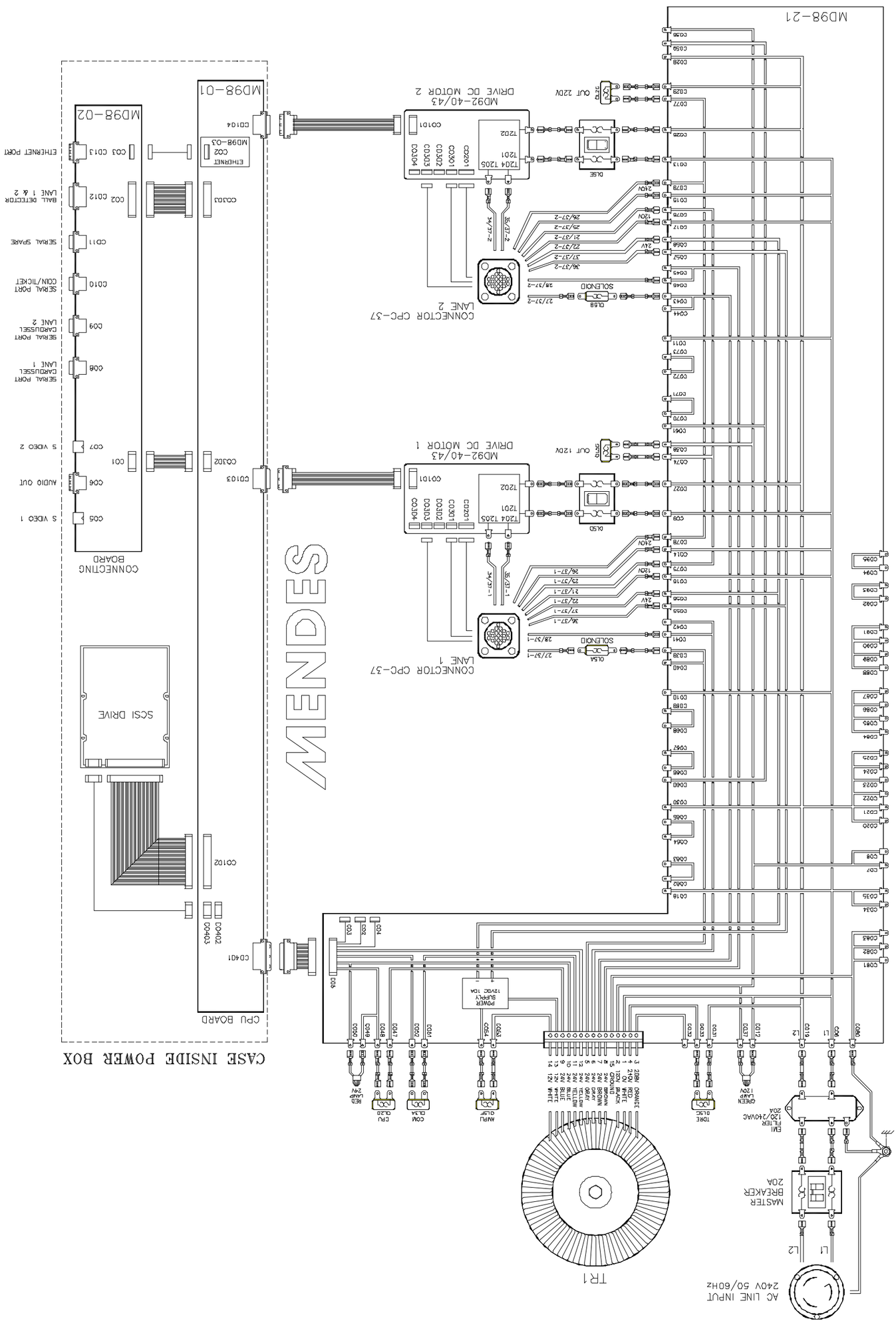


Figure 5.2 Power Box Wiring Block Diagram

Figure 5.3 Power Box Connections

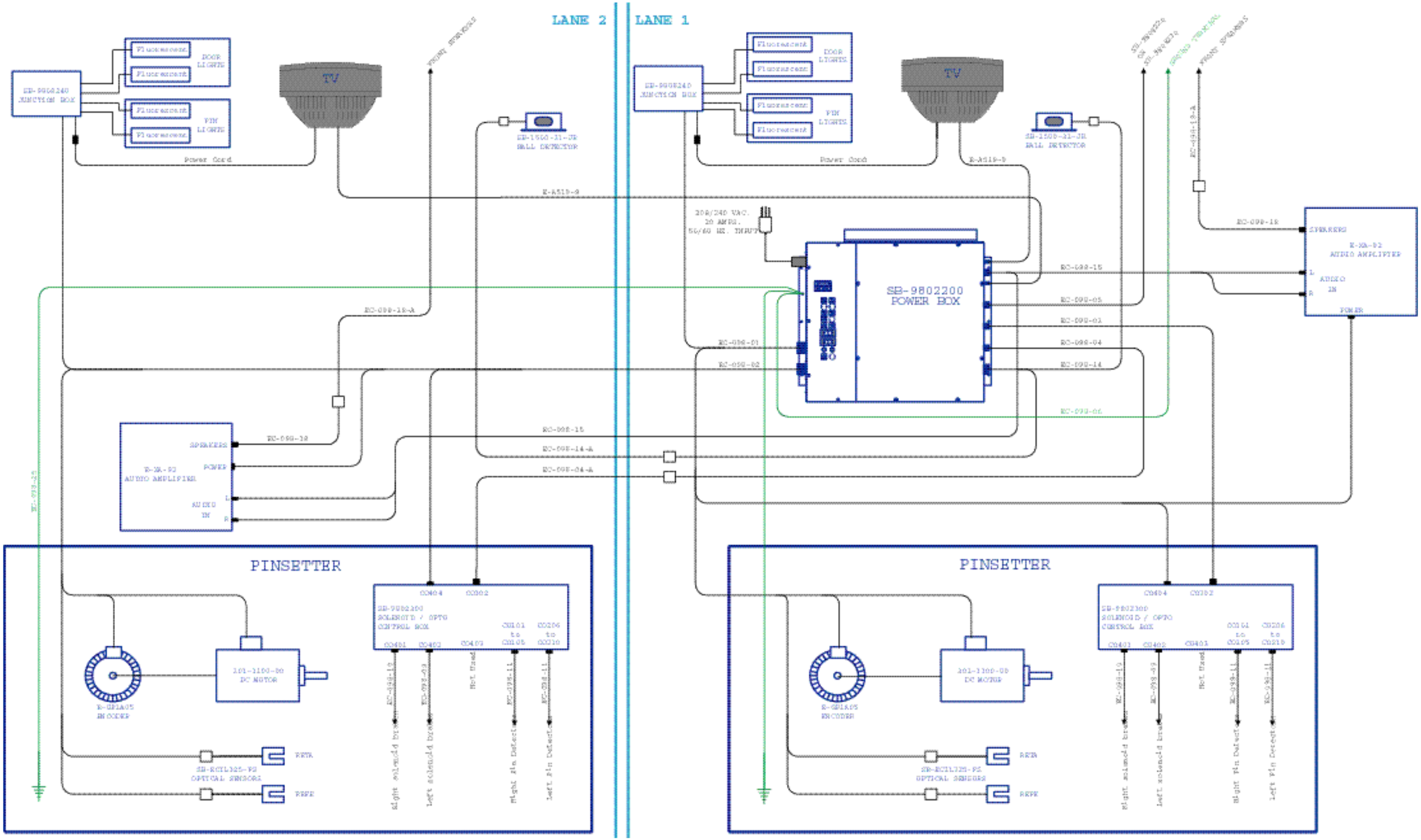
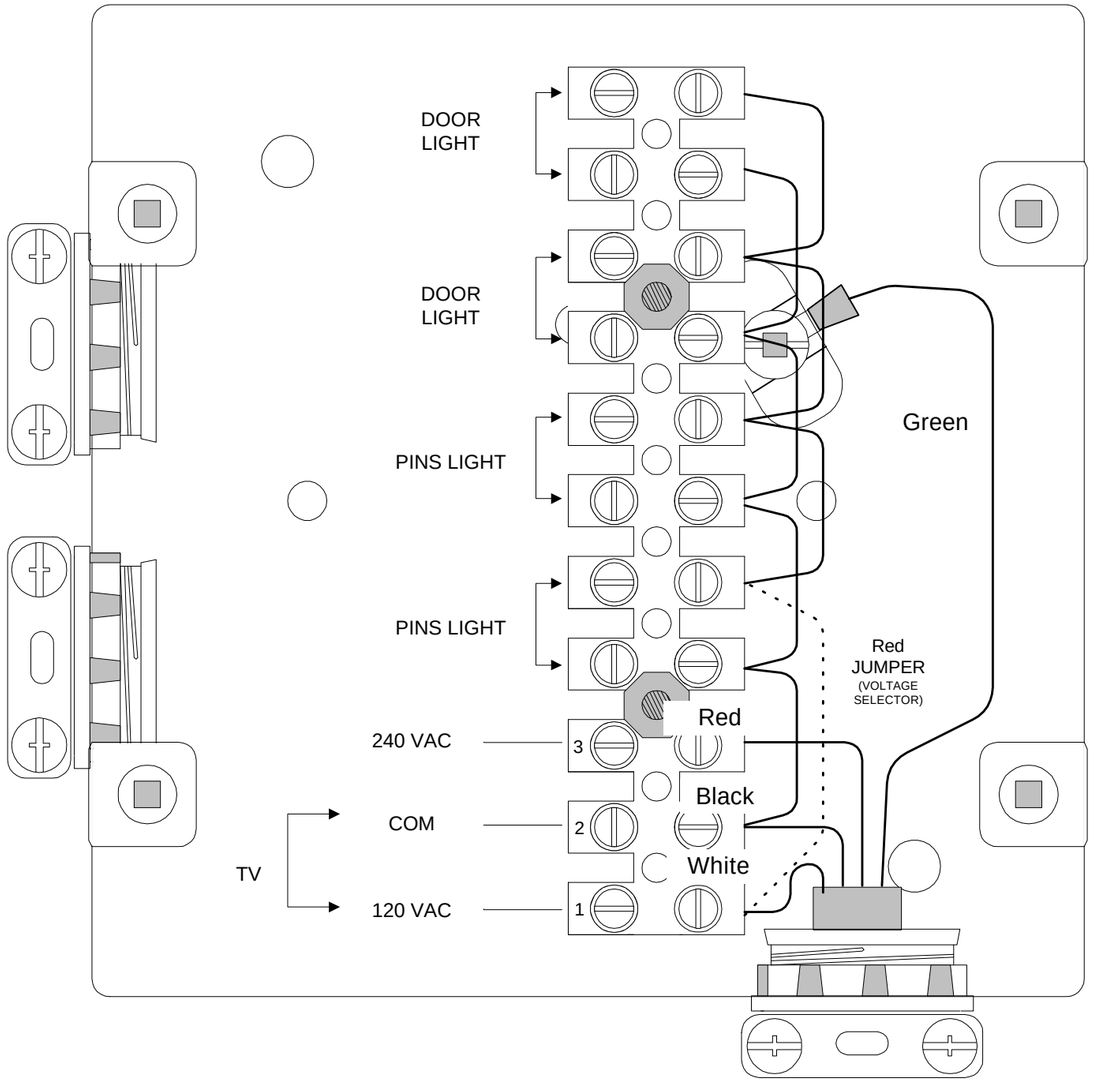
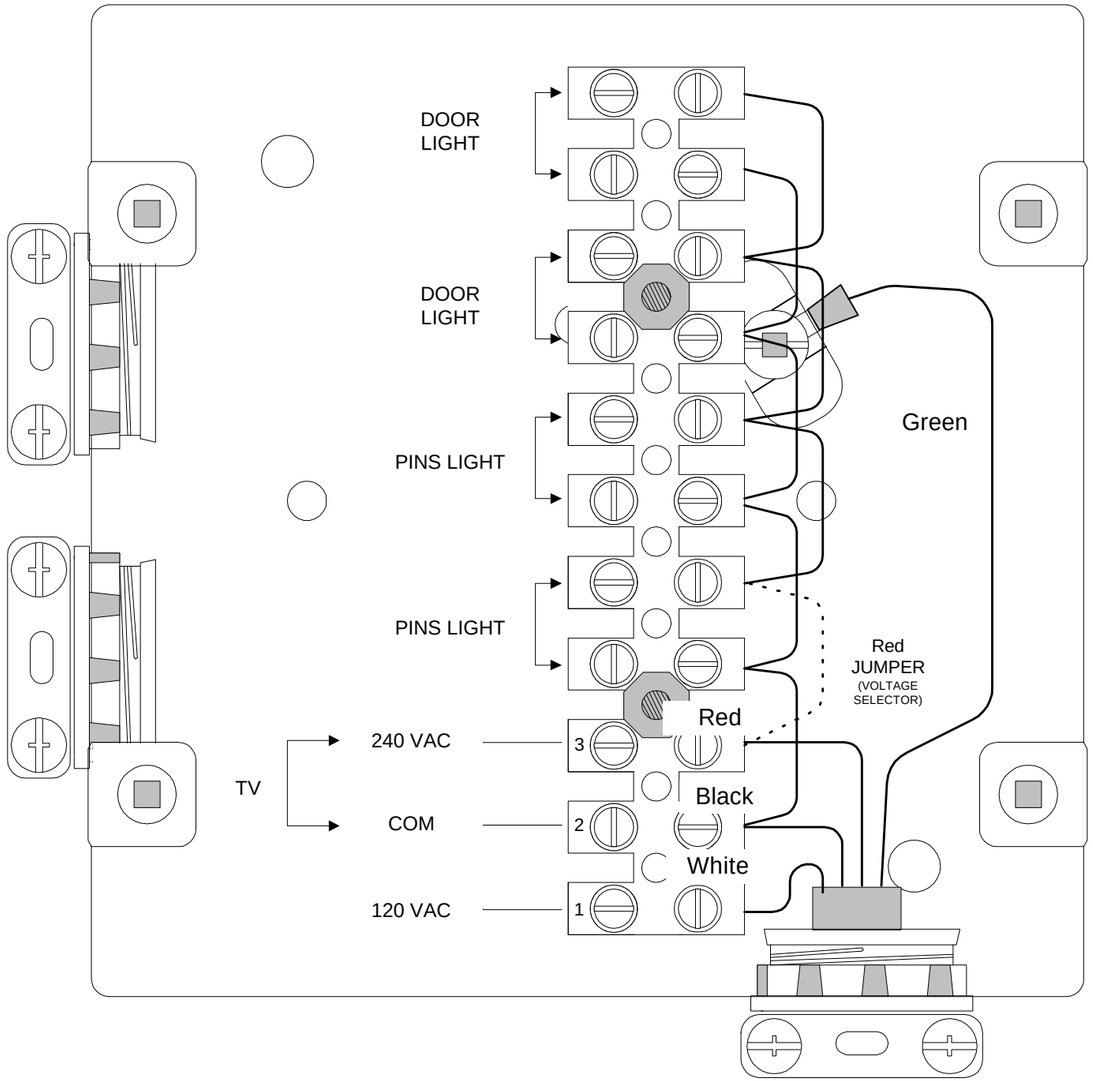


Figure 5.4 Fluorescent Lighting Junction Box (SB-9808240)



120 VAC 60Hz FLUORESCENT LIGHTS



240 VAC 50Hz FLUORESCENT LIGHTS

Figure 5.5 Front End Connections, Machine 1

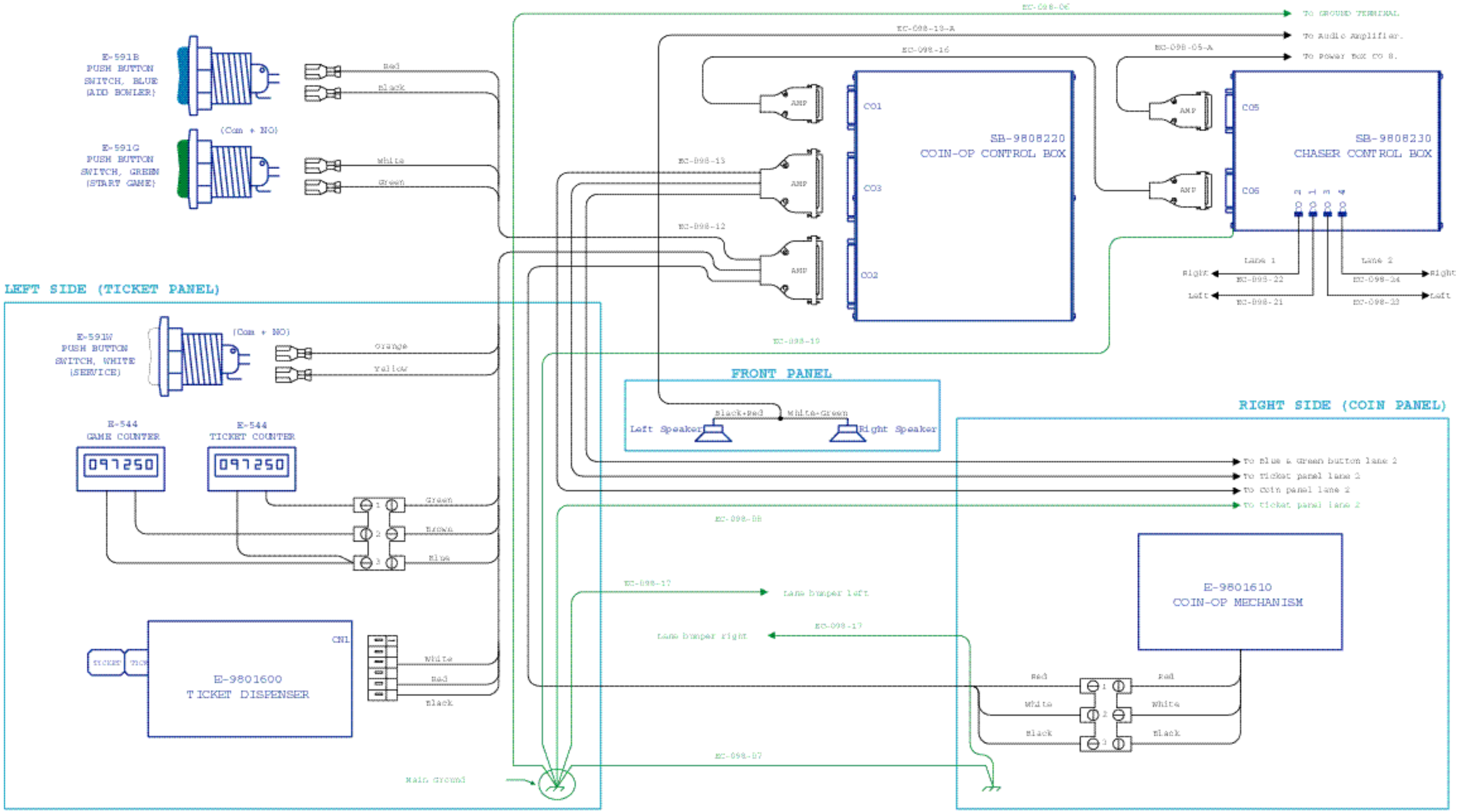
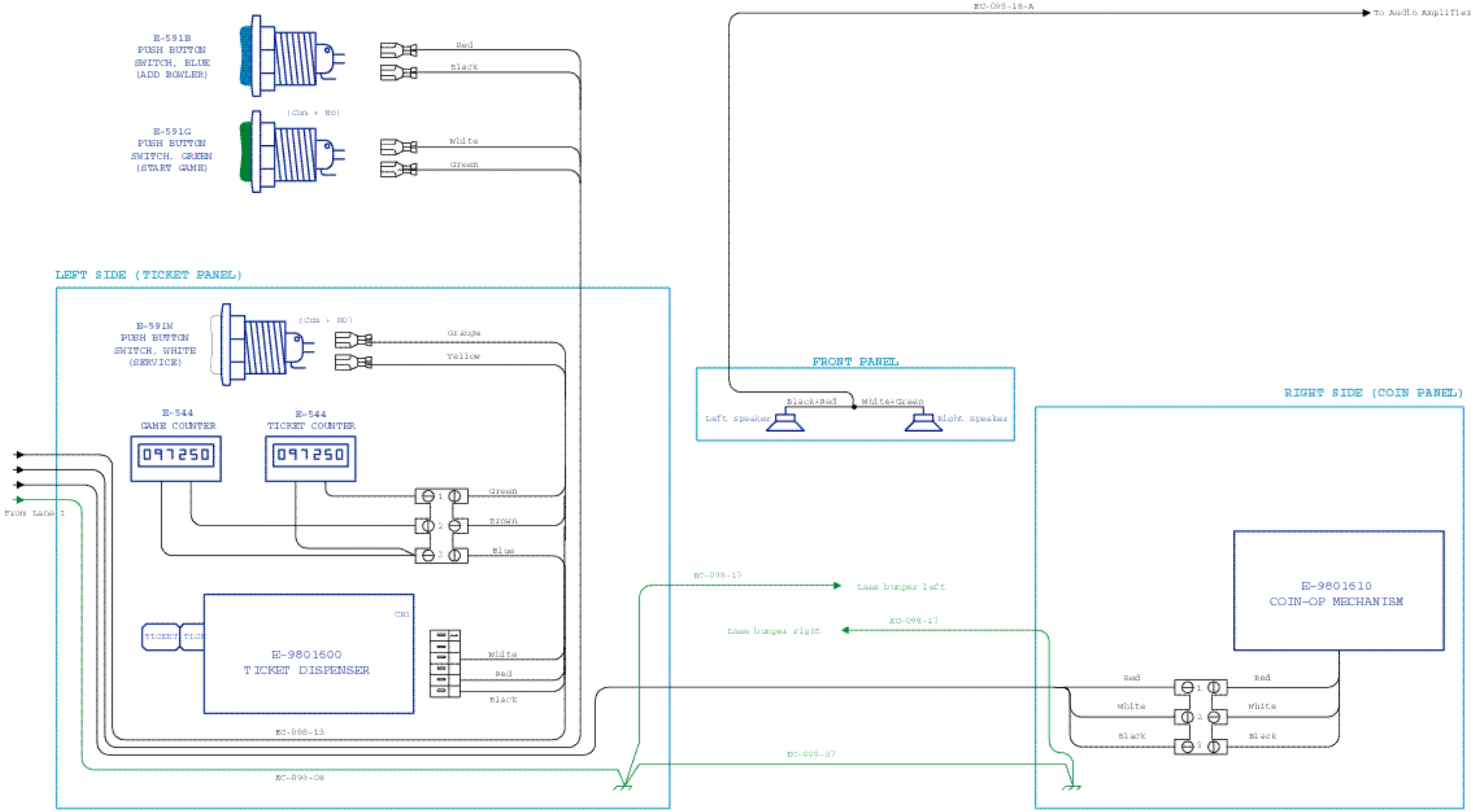


Figure 5.6 Front End Connections, Machine 2



Chapter 6
bowlingo Junior/III Parts Catalog

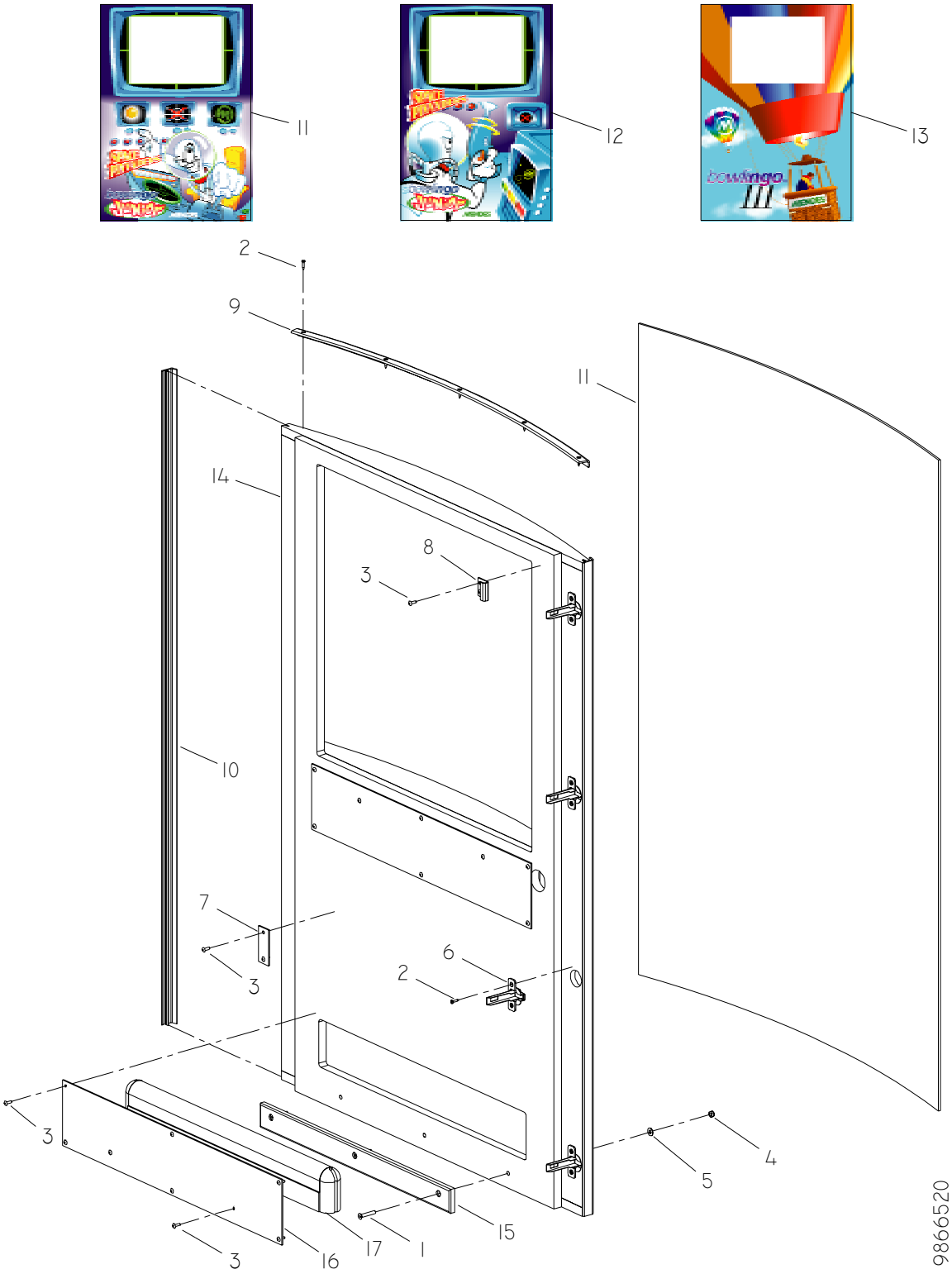
Chapter Overview

This chapter provides you with a complete breakdown of all your equipment's parts in exploded views for your reordering and servicing convenience.

Front Door

	Part No.	Description	Qty
1	7016-312520-150	FLAT HEAD MACHINE SREW {1/4"-20 x 1 1/2"}	3
2	7022-310600-075	FLAT SOCKET HEAD WOOD SCREW {#6 x 3/4"}	18
3	7024-710800-075	TRUSS SOCKET HEAD METAL SCREW {#8 x 3/4"}	20
4	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	3
5	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	3
6	9802510	HINGE	4
7	9802515	PLATE FOR MAGNET	1
8	9802521	LOCK CATCH	1
9	9803520	TOP & BOTTOM MOULDING	2
10	9803530	PANEL MOULDING {SIDE}	2
11	9803621	SPACE PINVADERS PANEL {LANE 1}	1
12	9803622	SPACE PINVADERS PANEL {LANE 2}	1
13	9803623	BOWLINGO III PANEL	1
14	9806520	FRONT DOOR	1
15	9806520-06	DOOR PROTECTOR	1
16	9806525	FLUORESCENT BACK PANEL	2
17	F-24	FLUORESCENT {24"}	2

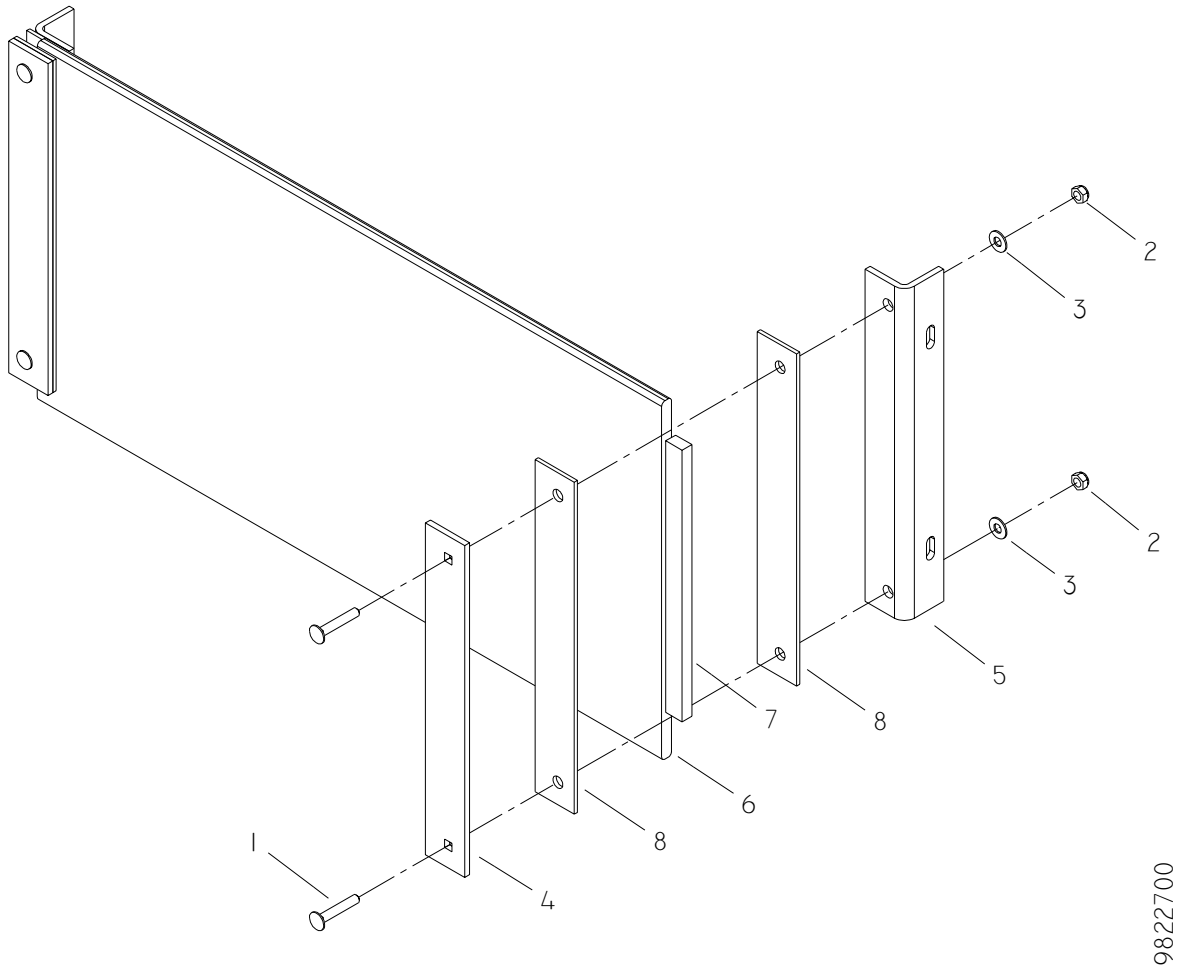
Figure 6.1 Front Door



Shield Assembly

	Part No.	Description	Qty
1	7012-002520-150	CARRIAGE BOLT {1/4"-20 x 1 1/2"}	4
2	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	4
3	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	4
4	9802700	SHEILD SUPPORT	2
5	9802705	SHEILD SUPPORT ANGLE	2
6	9803700	SHEILD	1
7	9803705	SHEILD SPACER	2
8	9804700	SHEILD ABSORBER	4

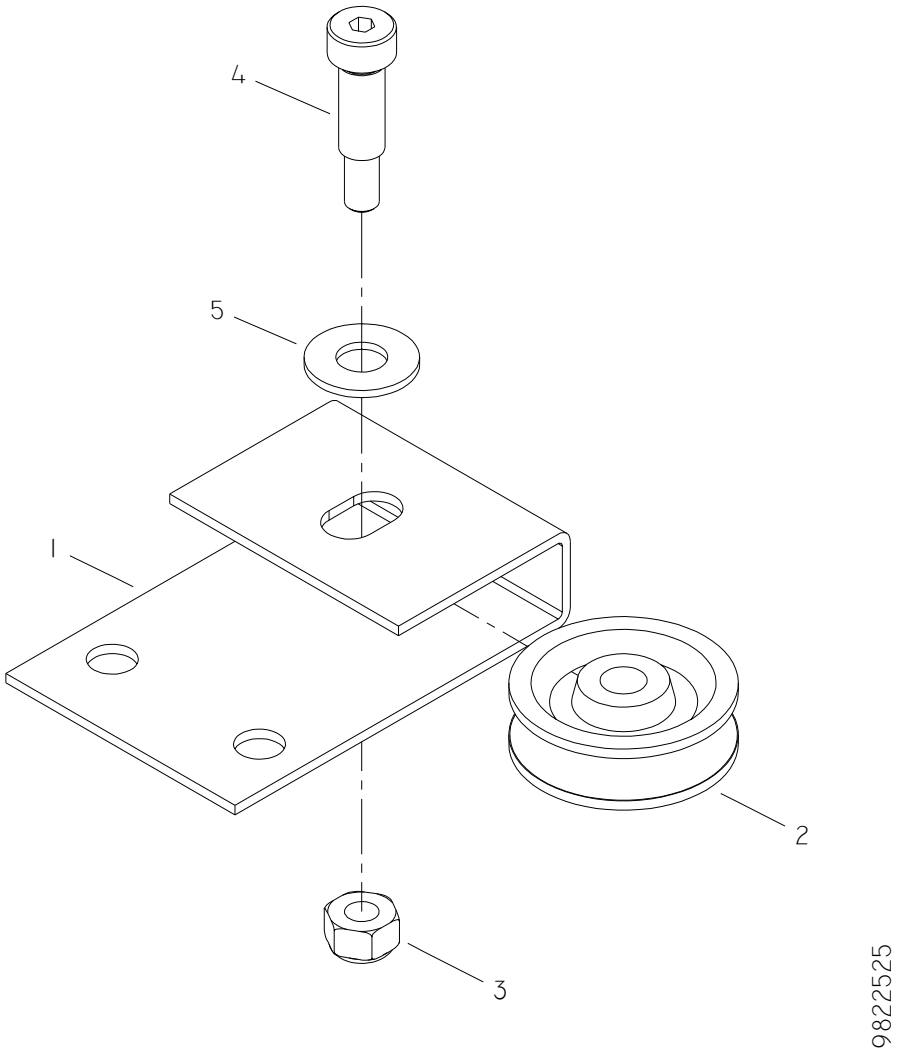
Figure 6.2 Shield Assembly



Pulley Assembly

	Part No.	Description	Qty
1	9802525	PULLEY SHEAF	1
2	9103072	GUIDE WHEEL	1
3	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	1
4	7020-002500-062	HEXAGON SOCKET HEAD SHOULDER SCREW {1/4" x 5/8"}	1
5	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	1

Figure 6.3 Pulley Assembly



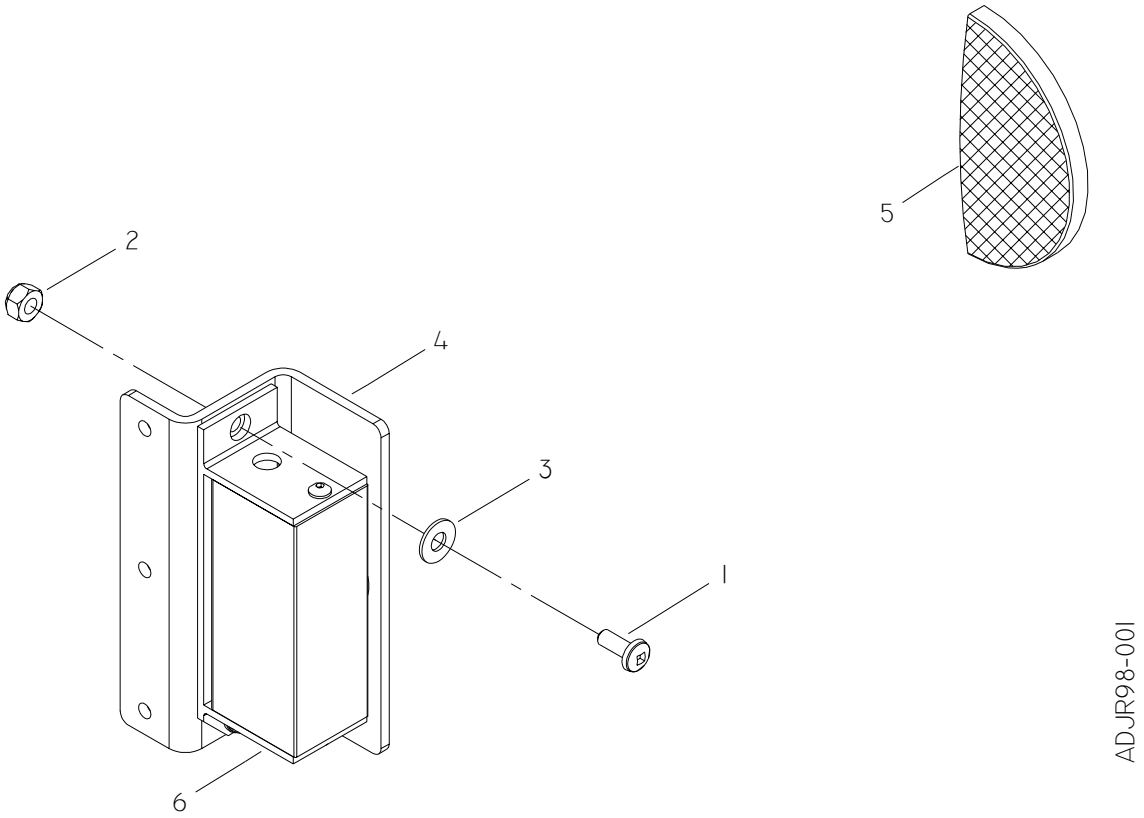
Ball Detector Assembly

	Part No.	Description	Qty
1	7016-411032-050	ROUND HEAD MACHINE SCREW {#10-32 x 1/2"}	2
2	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	2
3	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	2
4	9802545	BRACKET	1
5	E-FE-RR1	REFLECTOR	1
6	SB-1500-31-JR	BALL DETECTOR TRANSMITTER	1

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

7	EC-098-14	BALL DETECTOR CABLE ASSEMBLY	1
8	EC-098-14-A	BALL DETECTOR CABLE ASSEMBLY EXTENSION	1

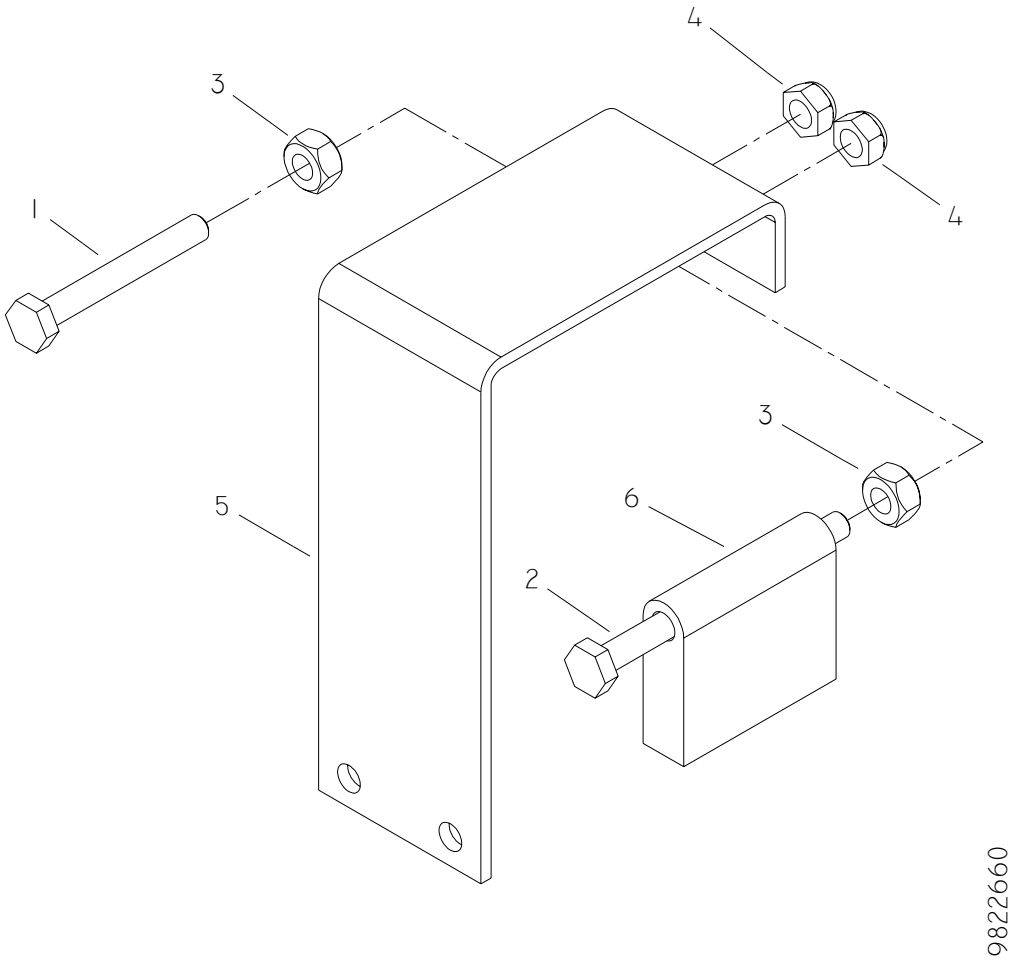
Figure 6.4 Ball Detector Assembly



Ball Stopper Assembly

	Part No.	Description	Qty
1	7010-002520-200	HEXAGON CAP SCREW {1/4"-20 x 2"}	1
2	7010-002520-300	HEXAGON CAP SCREW {1/4"-20 x 3"}	1
3	7034-002520-000	HEXAGON NUT {1/4"-20}	2
4	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	2
5	9802660	BALL STOPPER	1
6	9803660	BALL STOPPER	1

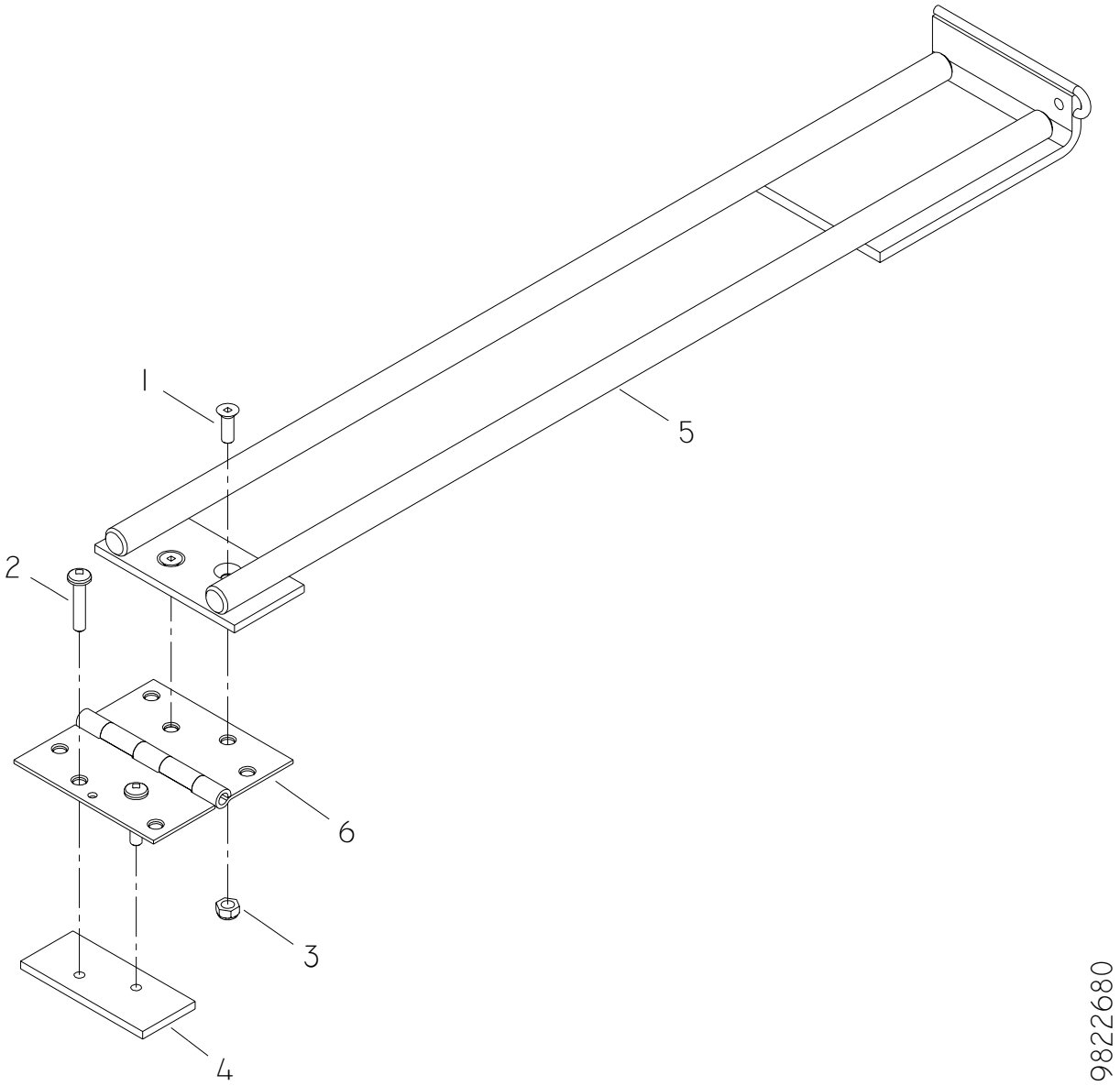
Figure 6.5 Ball Stopper Assembly



Ball Lift Assembly

	Part No.	Description	Qty
1	7016-312520-075	FLAT HEAD MACHINE SCREW {1/4"-20 x 3/4"}	2
2	7016-412520-125	ROUND HEAD MACHINE SCREW {1/4"-20 x 1 1/4"}	2
3	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	2
4	9802655	MOUNTING PLATE	1
5	9802680	BALL LIFT	1
6	9802681	BALL LIFT HINGE	1

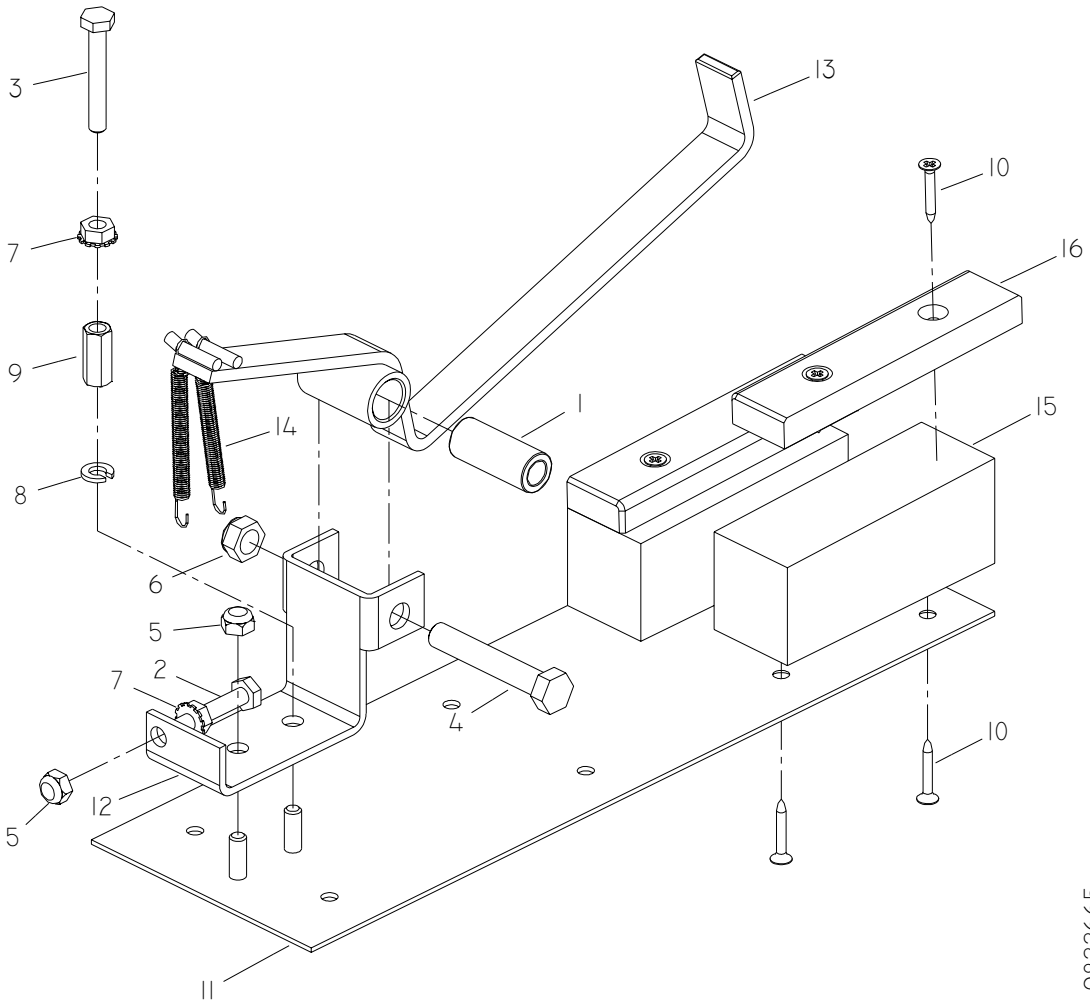
Figure 6.6 Ball Lift Assembly



Ball Gate Assembly

	Part No.	Description	Qty
1	303-5520-00	GUIDE ROLLER	1
2	7010-002520-150	HEXAGON CAP SCREW {1/4"-20 x 1 1/2"}	1
3	7010-002520-175	HEXAGON CAP SCREW {1/4"-20 x 1 3/4"}	1
4	7010-003716-225	HEXAGON CAP SCREW {3/8"-16 x 2 1/4"}	1
5	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	2
6	7036-003716-000	HEXAGON NYLON INSERT LOCKNUT {3/8"-16}	1
7	7038-002520-000	HEXAGON LOCKNUT {1/4"-20}	2
8	7060-025046-006	LOCK WASHER {1/4"}	1
9	7064-002520-087	HEXAGON COUPLING NUT {1/4"-20 x 7/8"}	1
10	7424-340600-100	FLAT HEAD DRYWALL SCREW {#6 x 1"}	8
11	9802665	MOUNTING PLATE	1
12	9802675	BALL GATE SUPPORT	1
13	9802685	BALL GATE	1
14	9805050	TENSION SPRING	2
15	9806665	TRACK SUPPORT	2
16	9806675	BALL GATE TRACK	2

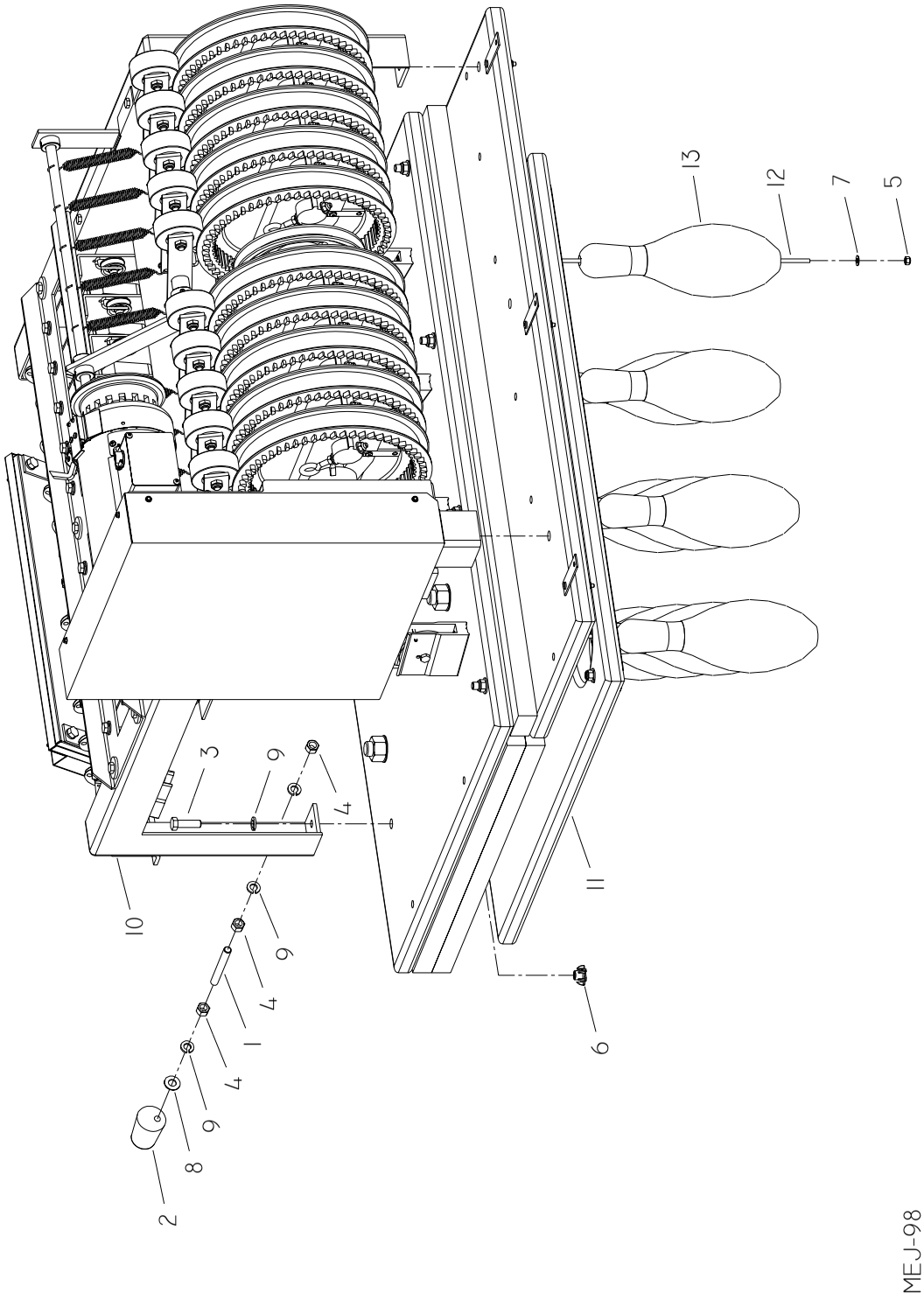
Figure 6.7 Ball Gate Assembly



MEJ-98 Pinsetter

	Part No.	Description	Qty
1	302-5260-00	THREAD ROD	1
2	303-5260-00	ECCENTRIC MAGNET	1
3	7010-003716-125	HEXAGON CAP SCREW {3/8"-16 x 1 1/4"}	4
4	7034-003716-000	HEXAGON NUT {3/8"-16}	3
5	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	10
6	7045-003716-043	TEE NUT {3/8"-16}	4
7	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	10
8	7050-040081-006	FLAT WASHER {13/32" x 13/16" x 1/16"}	1
9	7060-037067-010	LOCK WASHER {3/8"}	7
10	9822000	“Pinsetter Frame and Main Components”	1
11	9866000	“Pin Stabilizer”	1
12	I-022A	PIN STRING	10
13	Q72-0241-50	BOWLINGO JUNIOR PIN	10

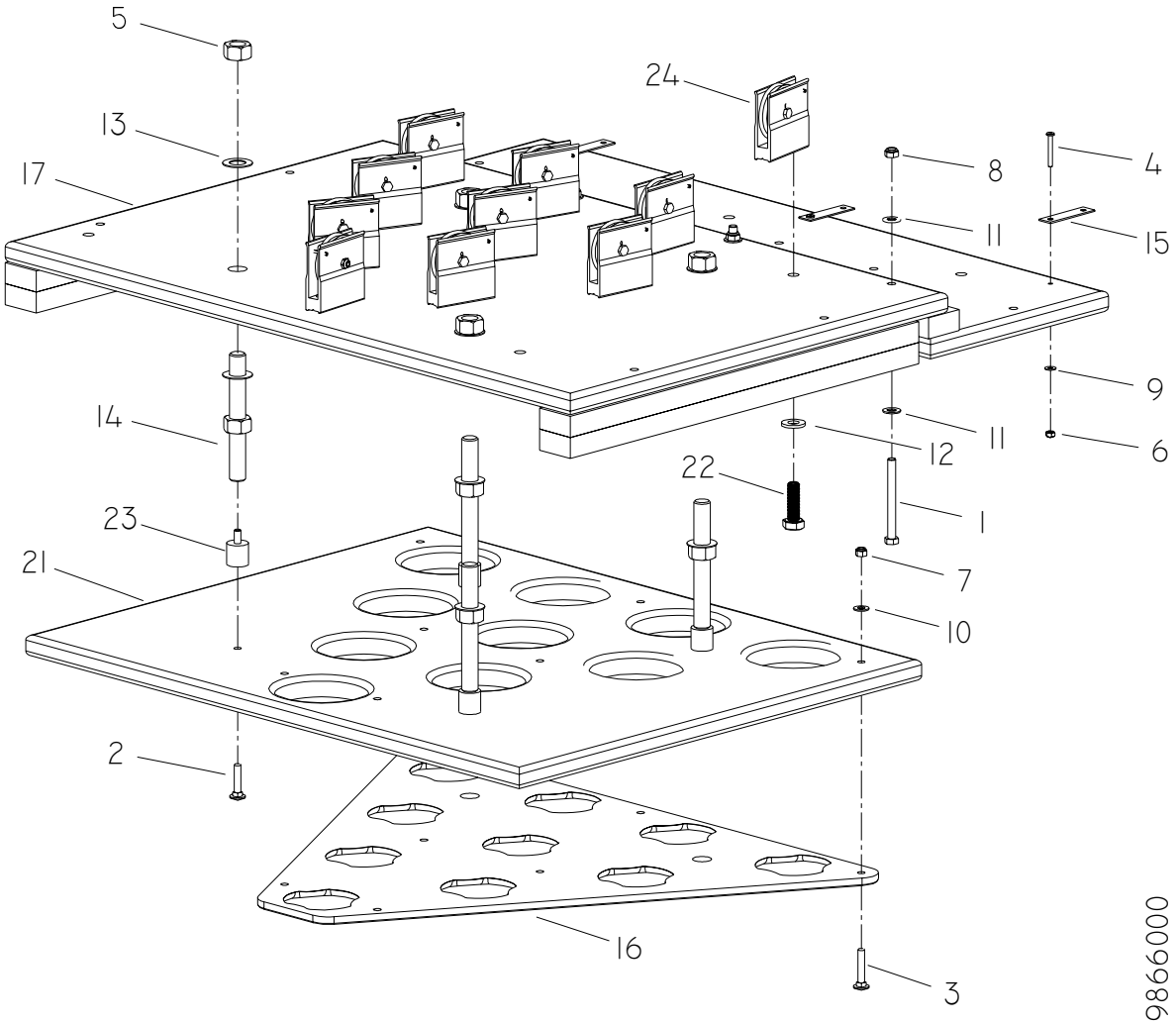
Figure 6.8 MEJ-98 Pinsetter



Pin Stabilizer

	Part No.	Description	Qty
1	7010-003716-375	HEXAGON CAP SCREW {3/8"-16 x 3 3/4"}	4
2	7012-003118-150	CARRIAGE BOLT {5/16"-18 x 1 1/2"}	4
3	7012-003118-175	CARRIAGE BOLT {5/16"-18 x 1 3/4"}	7
4	7016-411032-150	ROUND HEAD MACHINE SCREW {#10-32 x 1 1/2"}	3
5	7034-007510-000	HEXAGON NUT {3/4"-10}	8
6	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	3
7	7036-003118-000	HEXAGON NYLON INSERT LOCKNUT {5/16"-18}	7
8	7036-003716-000	HEXAGON NYLON INSERT LOCKNUT {3/8"-16}	4
9	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	3
10	7050-034068-006	FLAT WASHER {11/32" x 11/16" x 1/16"}	7
11	7050-040081-006	FLAT WASHER {13/32" x 13/16" x 1/16"}	8
12	7050-056137-012	FLAT WASHER {9/16" x 1 3/8" x 1/8"}	11
13	7052-075137-004	SPACER WASHER {3/4" x 1 3/8" x 3/64"}	8
14	9802025	SPACER ROD	4
15	9802740	APRON SUPPORT BRACKET	3
16	9803000	PIN CENTERING PLATE {JUNIOR}	1
17	9806000-1	TOP TABLE	1
18	9806000-2	REAR TOP TABLE	1
19	9806000-3	SPACER {SHORT}	4
20	9806000-4	SPACER {LONG}	1
21	9806005	STABILIZER BASE PLATE {JUNIOR}	1
22	M-0041	SPECIAL SCREW	11
23	R-014	BUMPER PAD	4
24	SB-043-1	“Sheave pulley assembly”	11

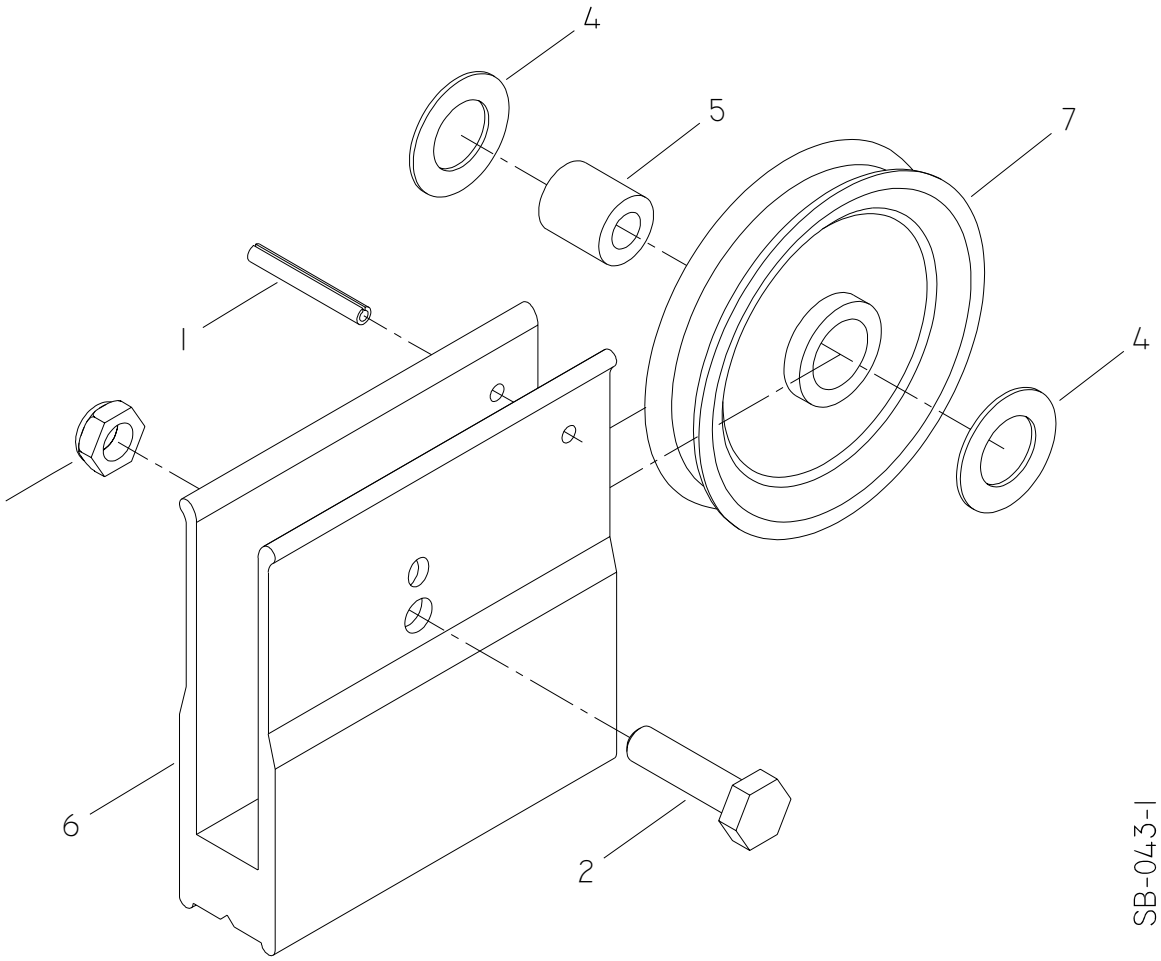
Figure 6.9 Pin Stabilizer



Sheave pulley assembly

	Part No.	Description	Qty
1	7006-001200-100	SPRING PIN {1/8"x1"}	1
2	7010-002520-100	HEXAGON CAP SCREW {1/4"-20 x 1"}	1
3	7044-002520-000	HEXAGON THIN NYLON INSERT LOCKNUT {1/4"-20}	1
4	7052-050087-003	SPACER WASHER {1/2" x 7/8" x 1/32"}	2
5	M-0100-B	BUSHING	1
6	M-043-1	SHEAVE	1
7	P-016-A	PULLEY	1

Figure 6.10 Sheave Pulley Assembly



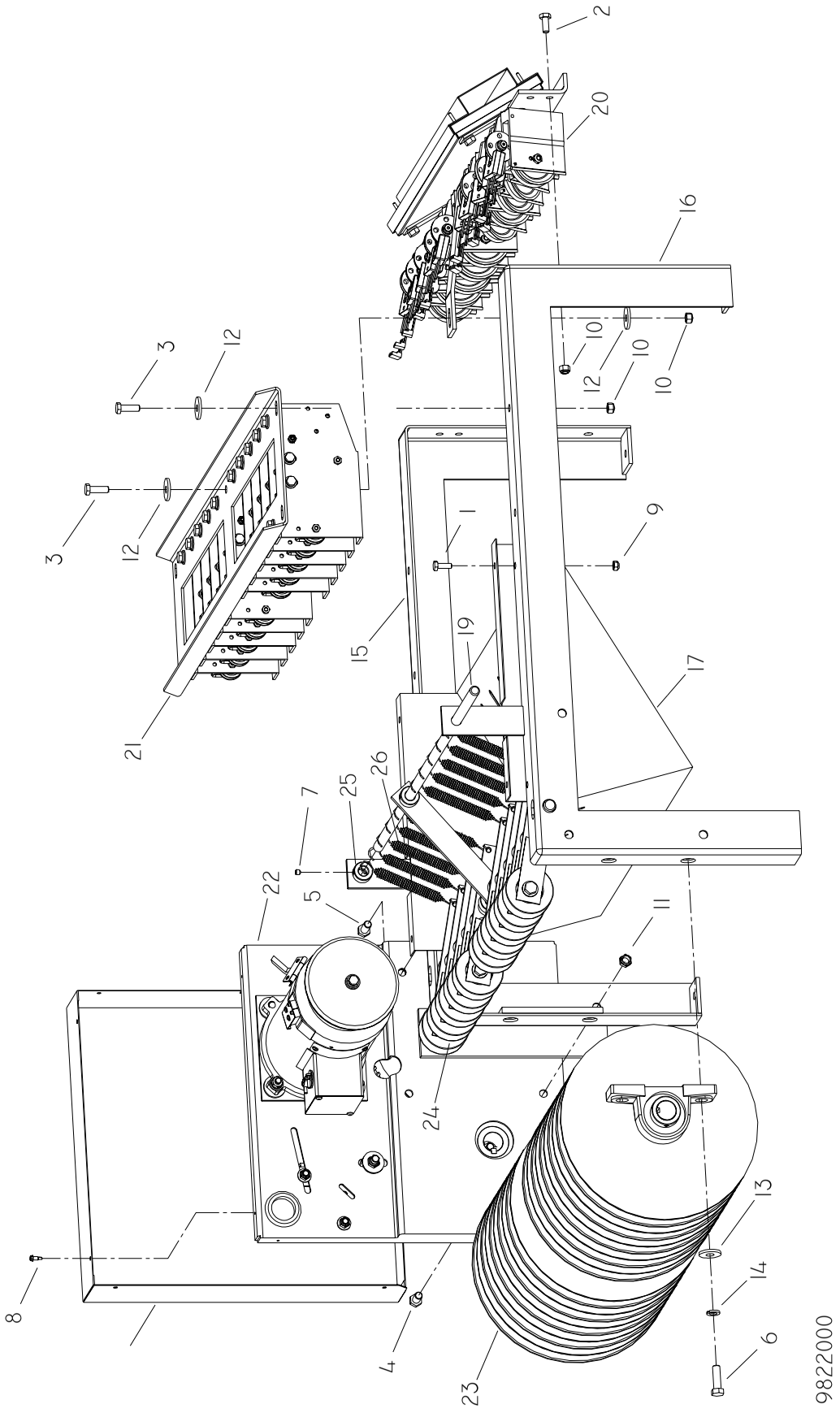
Pinsetter Frame and Main Components

	Part No.	Description	Qty
1	7010-002520-075	HEXAGON CAP SCREW {1/4"-20 x 3/4"}	4
2	7010-003118-075	HEXAGON CAP SCREW {5/16"-18 x 3/4"}	4
3	7010-003118-100	HEXAGON CAP SCREW {5/16"-18 x 1"}	5
4	7010-003716-075	HEXAGON CAP SCREW {3/8"-16 x 3/4"}	2
5	7010-003716-100	HEXAGON CAP SCREW {3/8"-16 x 1"}	1
6	7010-003716-125	HEXAGON CAP SCREW {3/8"-16 x 1 1/4"}	4
7	7014-002520-025	HEXAGON SOCKET SET SCREW - CUP POINT {1/4"-20 x 1/4"}	4
8	7027-200818-050	HEXAGON FLANGE SOCKET HEAD TAP SCREW {#8 x 1/2"}	6
9	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	4
10	7036-003118-000	HEXAGON NYLON INSERT LOCKNUT {5/16"-18}	9
11	7036-003716-000	HEXAGON NYLON INSERT LOCKNUT {3/8"-16}	3
12	7050-034100-012	FLAT WASHER {11/32" x 1" x 1/8"}	6
13	7050-040112-012	FLAT WASHER {13/32" x 1 1/8" x 1/8"}	4
14	7060-037067-010	LOCK WASHER {3/8"}	4
15	9802000	MAIN FRAME {RIGHT}	1
16	9802005	MAIN FRAME {LEFT}	1
17	9802020	BOTTOM FRAME PLATE	1
18	9802035	GEAR BOX PANEL	1
19	9802110	SPRING SUPPORT ROD {1/2"}	1
20	9822010	“Pin detection mounting plate assembly”	1
21	9822015	“Pin brake mounting plate assembly”	1
22	9822030	“Drive train mounting plate assembly”	1
23	9822070	“Main shaft assembly”	1
24	9822115	“String tension shaft assembly”	1
25	M-0194	STEEL COLLAR {1/2"}	4
26	S-071	TENSION SPRING	10

associated cables (not illustrated – refer to Chapter 5 of the Owner’s Manual)

27	EC-098-20	MACHINE 1 GROUND CABLE	1
28	EC-098-25	MACHINE 2 GROUND CABLE	1

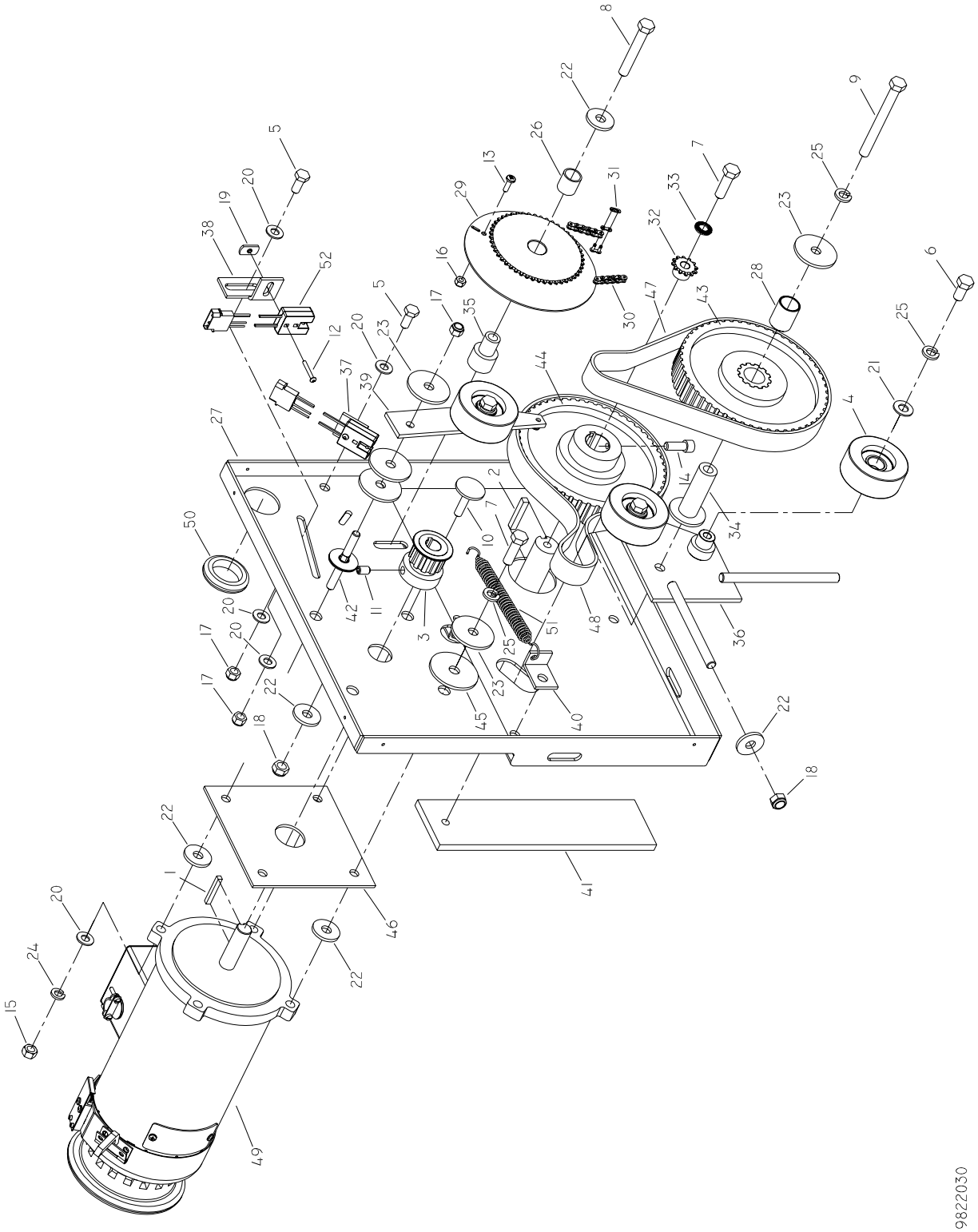
Figure 6.11 Pinsetter Frame and Main Components



Drive train mounting plate assembly

	Part No.	Description	Qty
1	302-2430-00	MACHINE KEY {3/16"x1 3/8"}	1
2	302-2470-00	MACHINE KEY {1/4"x1 1/2"}	1
3	302-3120-00	TIMING GEAR {12L075}	1
4	303-2340-00	FLAT ROLLER	3
5	7010-003118-075	HEXAGON CAP SCREW {5/16"-18 x 3/4"}	2
6	7010-003716-075	HEXAGON CAP SCREW {3/8"-16 x 3/4"}	3
7	7010-003716-125	HEXAGON CAP SCREW {3/8"-16 x 1 1/4"}	3
8	7010-003716-250	HEXAGON CAP SCREW {3/8"-16 x 2 1/2"}	1
9	7010-003716-375	HEXAGON CAP SCREW {3/8"-16 x 3 3/4"}	1
10	7013-003118-150	ELEVATOR BOLT {5/16"-18 x 1 1/2"}	1
11	7014-003118-050	HEXAGON SOCKET SET SCREW - CUP POINT {5/16"-18 x 1/2"}	2
12	7016-410632-100	ROUND HEAD MACHINE SCREW {#6-32 x 1"}	2
13	7016-411032-062	ROUND HEAD MACHINE SCREW {#10-32 x 5/8"}	1
14	7018-002520-087	HEXAGON SOCKET HEAD CAP SCREW {1/4"-20 x 7/8"}	2
15	7034-003118-000	HEXAGON NUT {5/16"-18}	2
16	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	1
17	7036-003118-000	HEXAGON NYLON INSERT LOCKNUT {5/16"-18}	3
18	7036-003716-000	HEXAGON NYLON INSERT LOCKNUT {3/8"-16}	3
19	7046-000632-006	WELD NUT {#6-32}	2
20	7050-034068-006	FLAT WASHER {11/32" x 11/16" x 1/16"}	6
21	7050-040081-006	FLAT WASHER {13/32" x 13/16" x 1/16"}	3
22	7050-040112-012	FLAT WASHER {13/32" x 1 1/8" x 1/8"}	9
23	7050-040175-012	FLAT WASHER {13/32" x 1 3/4" x 1/8"}	5
24	7060-031057-009	LOCK WASHER {5/16"}	2
25	7060-037067-010	LOCK WASHER {3/8"}	6
26	9102014-5	OILITE BEARING	1
27	9802030	GEAR BOX MOUNTING PLATE	1
28	9802031	SLEEVE BEARING	2
29	9802040	TIMING SPROCKET	1
30	9802041	TIMING CHAIN	1
31	9802042	TIMING CHAIN COUPLING	1
32	9802045	SPROCKET 25B12	1
33	9802050	SPECIAL LOCK WASHER	1
34	9802055	BUSHING	1
35	9802060	BUSHING	1
36	9802065	TIMING BELT TENSIONNER	1
37	9802075	OPTO BRACKET	1
38	9802080	OPTO BRACKET	1
39	9802170	TIMING BELT TENSIONNER	1
40	9802175	BENDER BRACKET	1
41	9802180	REINFORCEMENT PLATE	1
42	9802190	SPECIAL STUD	1
43	9803031	DOUBLE TIMING GEAR	1
44	9803050	TIMING GEAR	1
45	9804030	MOTOR INSULATOR SHIM	2
46	9804035	MOTOR INSULATOR SHIM	1
47	9804050	TIMING BELT {255L}	1
48	9804060	TIMING BELT {270L}	1
49	9822140	“Motor assembly”	1
50	R-015-10	RUBBER GRUMMET	1
51	S-071	TENSION SPRING	1
52	SB-ECIL-325-FS	OPTICAL SENSOR ASSEMBLY	2

Figure 6.12 Drive Train Mounting Plate Assembly



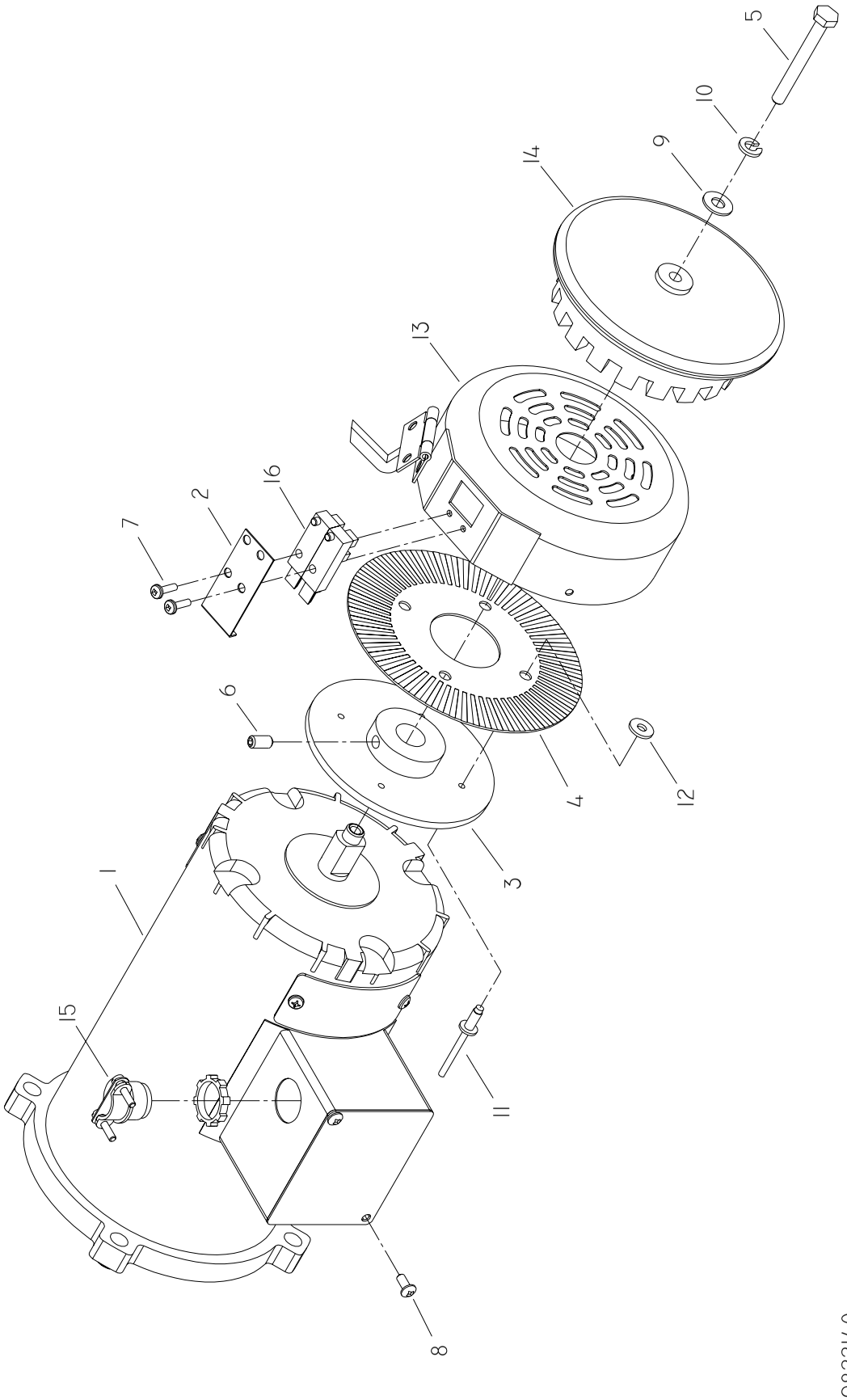
Motor assembly

	Part No.	Description	Qty
1	301-1100-00	MOTOR {180 VDC, 3/4 HP}	1
2	302-2200-00	CONNECTION RETAINER	1
3	302-2220-00	ENCODER PLATE	1
4	303-2200-00	MOTOR ENCODER	1
5	7010-002520-225	HEXAGON CAP SCREW {1/4"-20 x 2 1/4"}	1
6	7014-002520-050	HEXAGON SOCKET SET SCREW - CUP POINT {1/4"-20 x 1/2"}	1
7	7016-410632-050	ROUND HEAD MACHINE SCREW {#6-32 x 1/2"}	2
8	7016-410832-037	ROUND HEAD MACHINE SCREW {#8-32 x 3/8"}	2
9	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	1
10	7060-025046-006	LOCK WASHER {1/4"}	1
11	7108-401800-050	ALUMINUM ROUND HEAD POP RIVET {3/16" x 1/2"}	4
12	7150-019050-004	ALUMINUM FLAT WASHER {3/16" x 1/2" x 3/64"}	4
13	9802140	MOTOR COVER	1
14	9803140	MOTOR HANDLE	1
15	E-564	BX CONNECTOR {3/8"}	1
16	E-GP1A05	ENCODER OPTICAL SENSOR	2

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

17	EC-098-01	MACHINE 1 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1
18	EC-098-02	MACHINE 2 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1

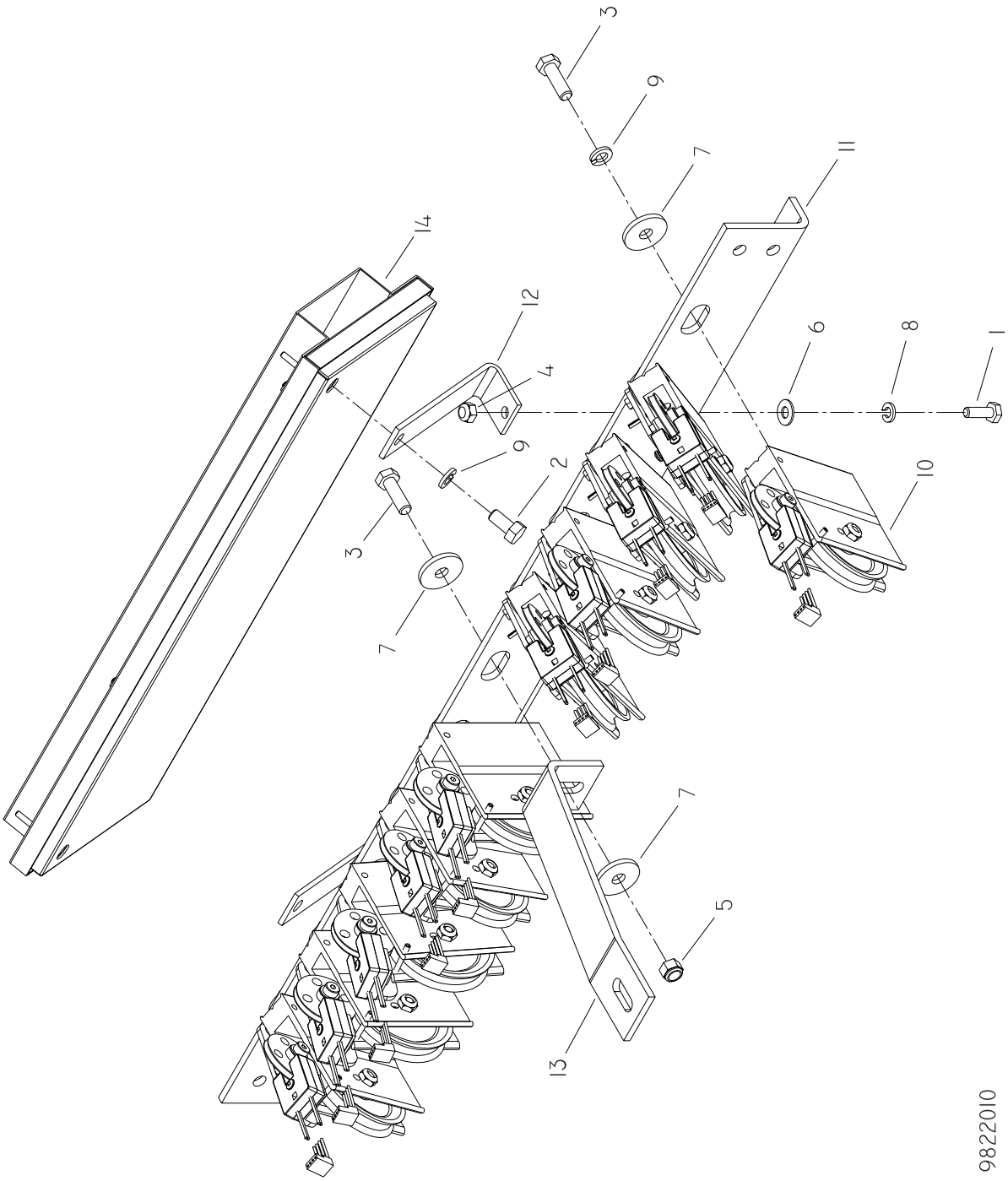
Figure 6.13 Motor Assembly



Pin detection mounting plate assembly

	Part No.	Description	Qty
1	7010-002520-075	HEXAGON CAP SCREW {1/4"-20 x 3/4"}	2
2	7010-003118-062	HEXAGON CAP SCREW {5/16"-18 x 5/8"}	2
3	7010-003118-100	HEXAGON CAP SCREW {5/16"-18 x 1"}	11
4	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	2
5	7036-003118-000	HEXAGON NYLON INSERT LOCKNUT {5/16"-18}	1
6	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	2
7	7050-034100-012	FLAT WASHER {11/32" x 1" x 1/8"}	12
8	7060-025046-006	LOCK WASHER {1/4"}	2
9	7060-031057-009	LOCK WASHER {5/16"}	12
10	9122057	“Pin detection assembly”	10
11	9802010	PIN DETECTION SUPPORT	1
12	9802085	PIN DETECTION SUPPORT	2
13	9802095	FRONT BRACE	1
14	SB-9802300	“Solenoid/Opto control box”	1

Figure 6.14 Pin Detection Mounting Plate Assembly



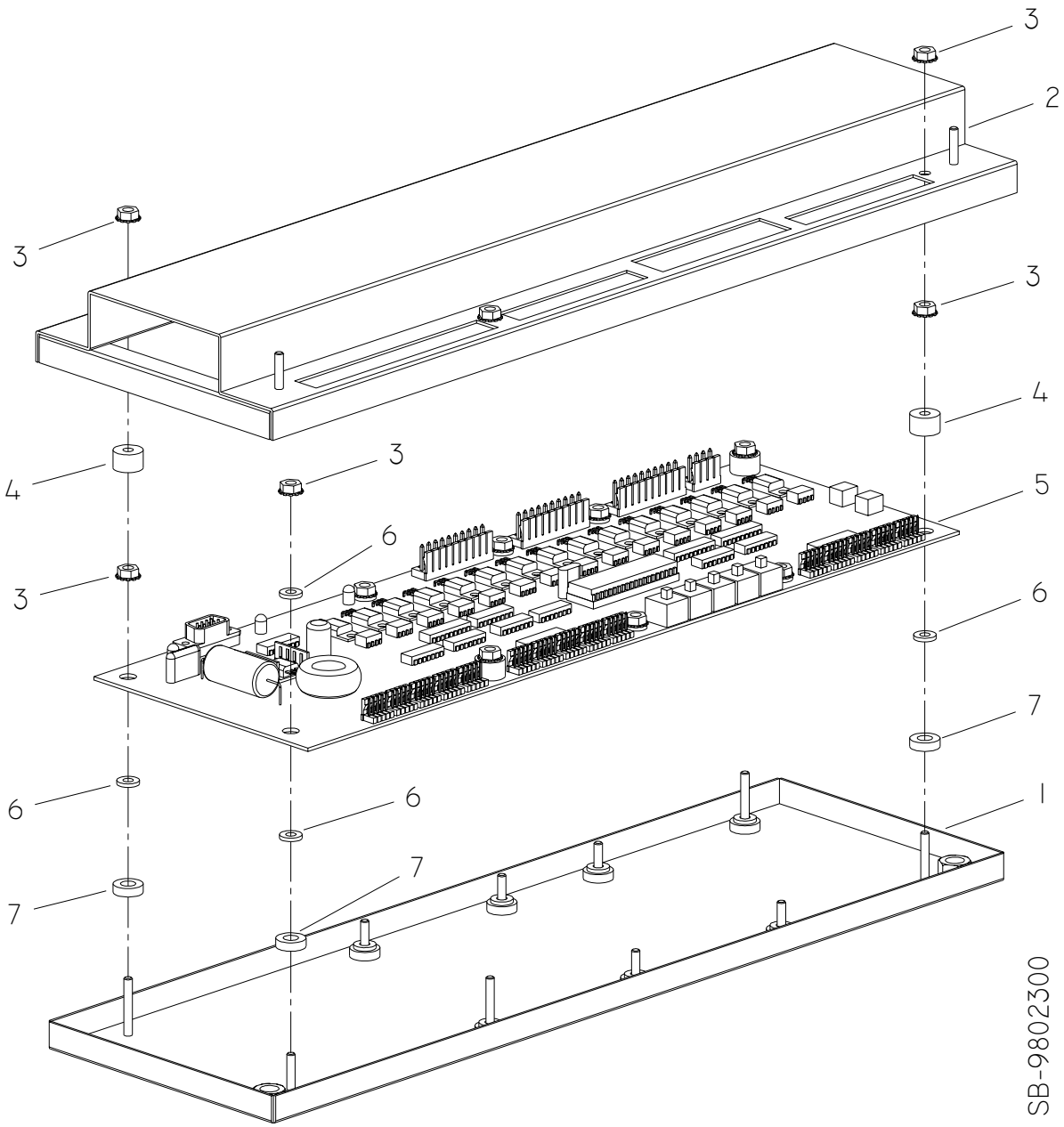
Solenoid/Opto control box

	Part No.	Description	Qty
1	302-7100-00	PCB BASE	1
2	302-7110-00	PCB COVER	1
3	7038-000632-000	HEXAGON LOCKNUT {#6-32}	14
4	E-219	NYLON SPACER {11/64" x 1/2" x 5/16"}	4
5	E-MD98-81	PIN DETECTOR CONTROLLER PCB	1
6	E-W3751	NYLON SPACER {3/16" x 3/8" x 1/16"}	16
7	E-W5007	NYLON SPACER {1/4" x 1/2" x 5/32"}	10

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

8	EC-098-01	MACHINE 1 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1
9	EC-098-02	MACHINE 2 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1
10	EC-098-03	MACHINE 1 SOLENOID/OPTO CABLE ASSEMBLY	1
11	EC-098-04-A	SOLENOID/OPTO CABLE ASSEMBLY EXTENSION	1
12	EC-098-09	SOLENOIDS CABLE ASSEMBLY {LEFT}	1
13	EC-098-10	SOLENOIDS CABLE ASSEMBLY {RIGHT}	1
14	EC-098-11	PIN OPTOS CABLE ASSEMBLY	2

Figure 6.15 Solenoid/Opto Control Box



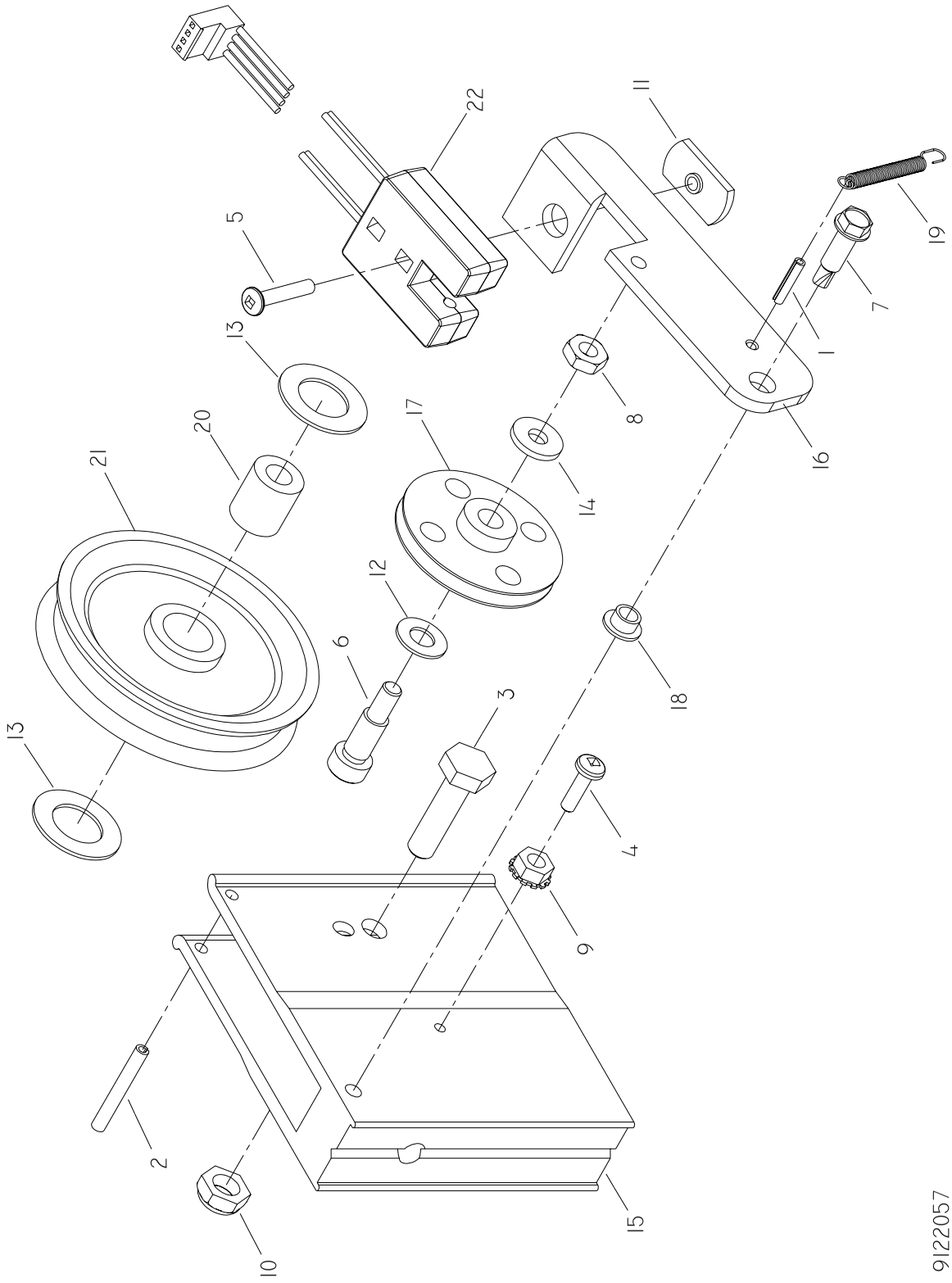
Pin detection assembly

	Part No.	Description	Qty
1	7006-000900-050	SPRING PIN {3/32"x1/2"}	1
2	7006-001200-100	SPRING PIN {1/8"x1"}	1
3	7010-002520-100	HEXAGON CAP SCREW {1/4"-20 x 1"}	1
4	7016-410632-050	ROUND HEAD MACHINE SCREW {#6-32 x 1/2"}	1
5	7016-410632-075	ROUND HEAD MACHINE SCREW {#6-32 x 3/4"}	1
6	7020-002500-050	HEXAGON SOCKET HEAD SHOULDER SCREW {1/4" x 1/2"}	1
7	7027-201016-075	HEXAGON FLANGE SOCKET HEAD TAP SCREW {#10 x 3/4"}	1
8	7034-001024-000	HEXAGON NUT {#10-24}	1
9	7038-000632-000	HEXAGON LOCKNUT {#6-32}	1
10	7044-002520-000	HEXAGON THIN NYLON INSERT LOCKNUT {1/4"-20}	1
11	7046-000632-006	WELD NUT {#6-32}	1
12	7052-025050-003	SPACER WASHER {1/4" x 1/2" x 1/32"}	1
13	7052-050087-003	SPACER WASHER {1/2" x 7/8" x 1/32"}	2
14	7150-019050-004	ALUMINUM FLAT WASHER {3/16" x 1/2" x 3/64"}	1
15	9102057	SENSOR SHEAVE	1
16	9102058	SUPPORT BRACKET	1
17	9103058	DETECTION WHEEL	1
18	9103059	NYLON SHOULDER WASHER	1
19	9105070	SPRING	1
20	M-0100-B	BUSHING	1
21	P-016-A	PULLEY	1
22	SB-ECIL-325-PD	OPTICAL SENSOR ASSEMBLY	1

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

23	EC-098-11	PIN OPTOS CABLE ASSEMBLY	1

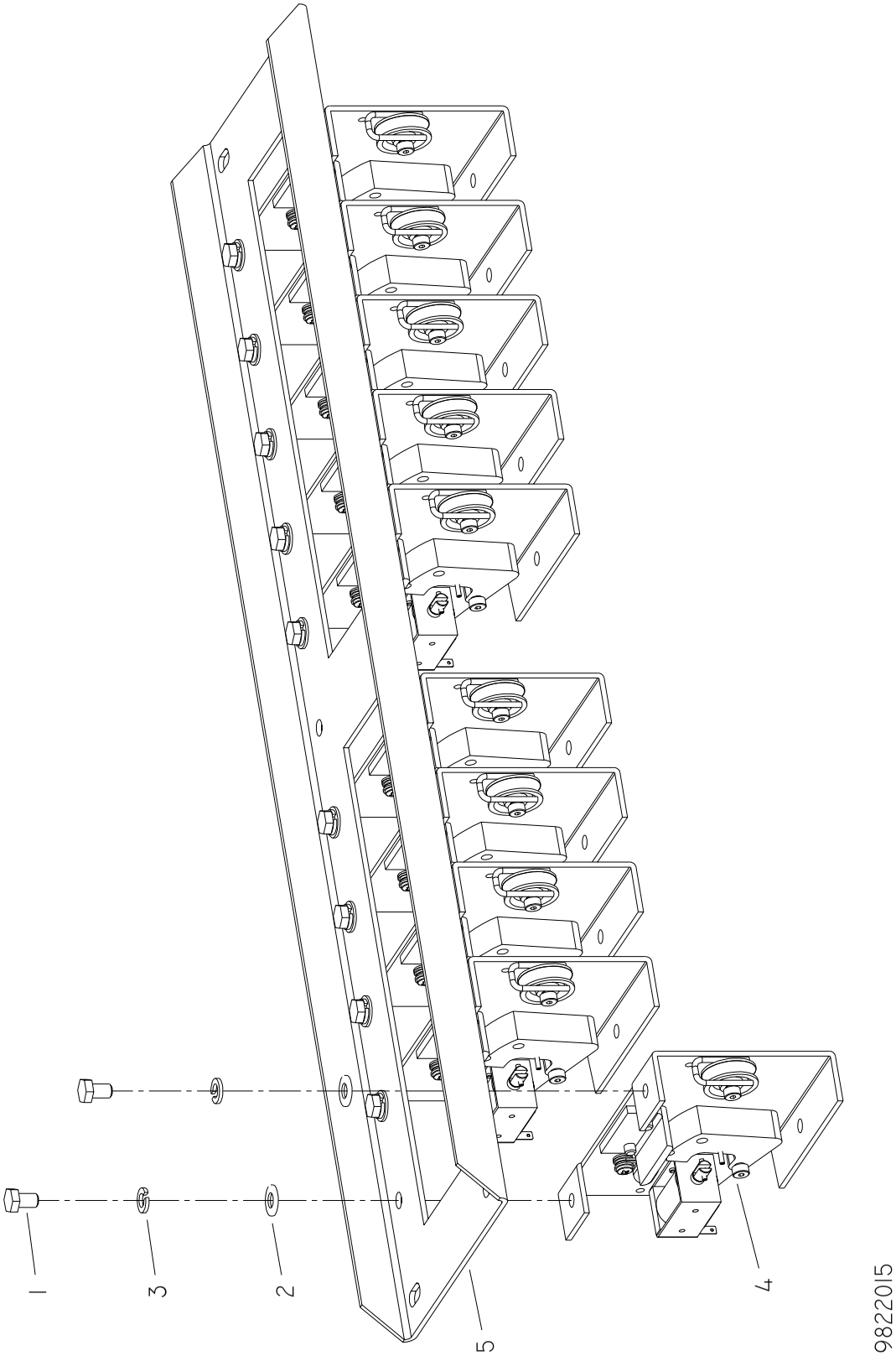
Figure 6.16 Pin Detection Assembly



Pin brake mounting plate assembly

	Part No.	Description	Qty
1	7010-003118-050	HEXAGON CAP SCREW {5/16"-18 x 1/2"}	20
2	7050-034068-006	FLAT WASHER {11/32" x 11/16" x 1/16"}	20
3	7060-031057-009	LOCK WASHER {5/16"}	20
4	9122070	“Pin brake assembly”	10
5	9802015	PIN BRAKE SUPPORT	1

Figure 6.17 Pin Brake Mounting Plate Assembly



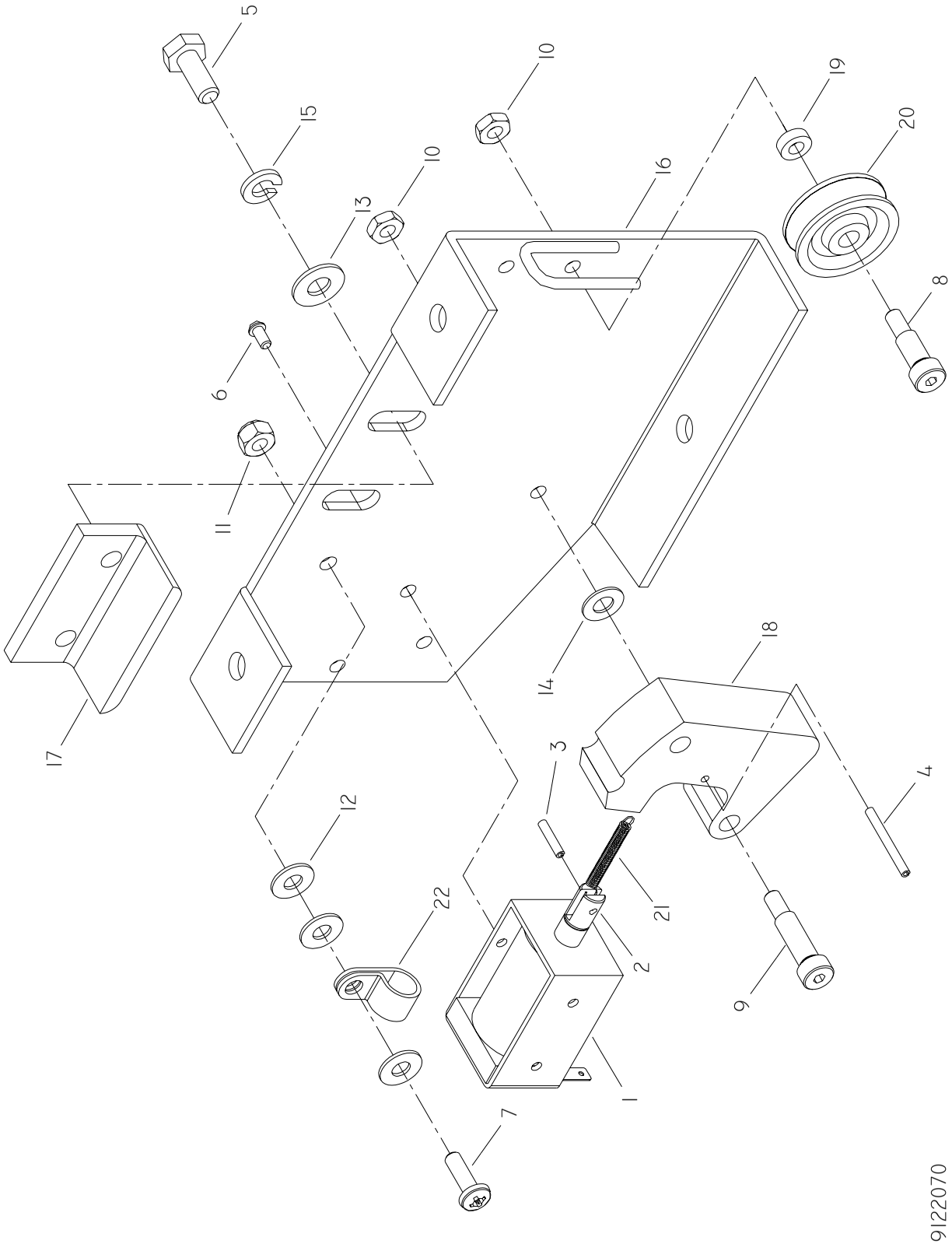
Pin brake assembly

	Part No.	Description	Qty
1	301-5170-00	SOLENOID {24VAC}	1
2	302-5270-00	SOLENOID SHAFT	1
3	7006-000900-050	SPRING PIN {3/32"x1/2"}	1
4	7006-000900-100	SPRING PIN {3/32"x1"}	1
5	7010-002528-062	HEXAGON CAP SCREW {1/4"-28 x 5/8"}	2
6	7016-410632-025	ROUND HEAD MACHINE SCREW {#6-32 x 1/4"}	2
7	7016-411032-062	ROUND HEAD MACHINE SCREW {#10-32 x 5/8"}	1
8	7020-002500-050	HEXAGON SOCKET HEAD SHOULDER SCREW {1/4" x 1/2"}	1
9	7020-002500-075	HEXAGON SOCKET HEAD SHOULDER SCREW {1/4" x 3/4"}	1
10	7034-001024-000	HEXAGON NUT {#10-24}	2
11	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	1
12	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	3
13	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	2
14	7052-025050-003	SPACER WASHER {1/4" x 1/2" x 1/32"}	1
15	7060-025046-006	LOCK WASHER {1/4"}	2
16	9102070	BRAKE PLATE	1
17	9102071	BRAKE ANGLE PLATE	1
18	9103070	BRAKE CAM	1
19	9103071	NYLON SPACER	1
20	9103072	GUIDE WHEEL	1
21	9105070	SPRING	1
22	E-660-09	CABLE CLAMP	1

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

23	EC-098-09	SOLENOIDS CABLE ASSEMBLY {LEFT}	1
24	EC-098-10	SOLENOIDS CABLE ASSEMBLY {RIGHT}	1

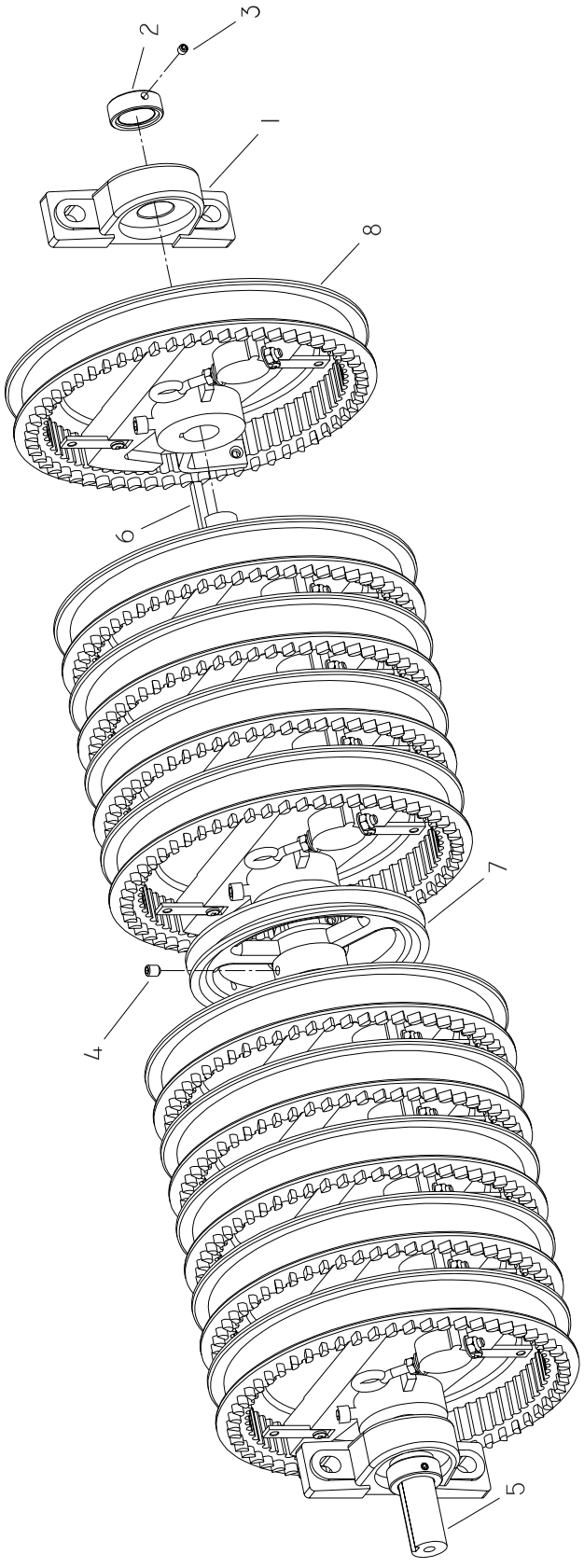
Figure 6.18 Pin Brake Assembly



Main shaft assembly

	Part No.	Description	Qty
1	302-6216-00	PILLOW BLOCK {1"}	2
2	302-6217-00	ECCENTRIC LOCKING COLLAR {1"}	2
3	7014-002520-025	HEXAGON SOCKET SET SCREW - CUP POINT {1/4"-20 x 1/4"}	2
4	7014-003118-037	HEXAGON SOCKET SET SCREW - CUP POINT {5/16"-18 x 3/8"}	2
5	9802070	MAIN SHAFT	1
6	9802090	MAIN SHAFT KEY	1
7	9802130	BALL LIFT PULLEY	1
8	9833100	“String storage reel assembly”	10

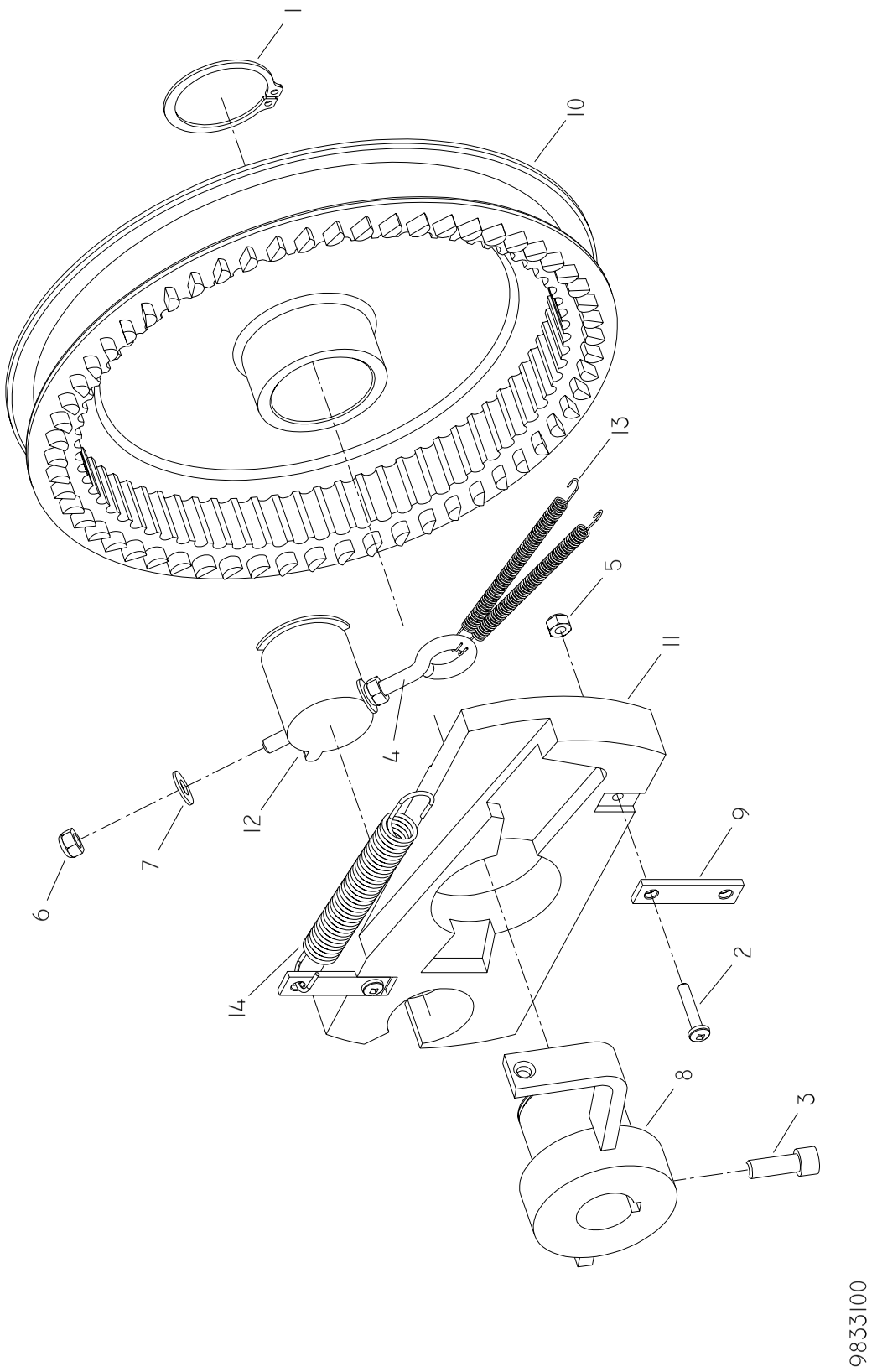
Figure 6.19 Main Shaft Assembly



String storage reel assembly

	Part No.	Description	Qty
1	7002-310000-175	EXTERNAL RETAINING RING {1 3/4"}	1
2	7016-411032-100	ROUND HEAD MACHINE SCREW {#10-32 x 1"}	2
3	7018-002520-087	HEXAGON SOCKET HEAD CAP SCREW {1/4"-20 x 7/8"}	1
4	7032-002520-400	EYE BOLT {1/4"-20 x 4"}	1
5	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	2
6	7036-002520-000	HEXAGON NYLON INSERT LOCKNUT {1/4"-20}	2
7	7050-028062-006	FLAT WASHER {9/32" x 5/8" x 1/16"}	2
8	9802100	HUB ASSEMBLY	1
9	9802105	SPRING ATTACHMENT PLATE	2
10	9803100	STRING WHEEL	1
11	9803105	STRING WHEEL CENTER	1
12	9803110	STRING WHEEL LOCK	1
13	9805050	WHEEL TENSION SPRING	2
14	9805051	WHEEL TENSION SPRING	1

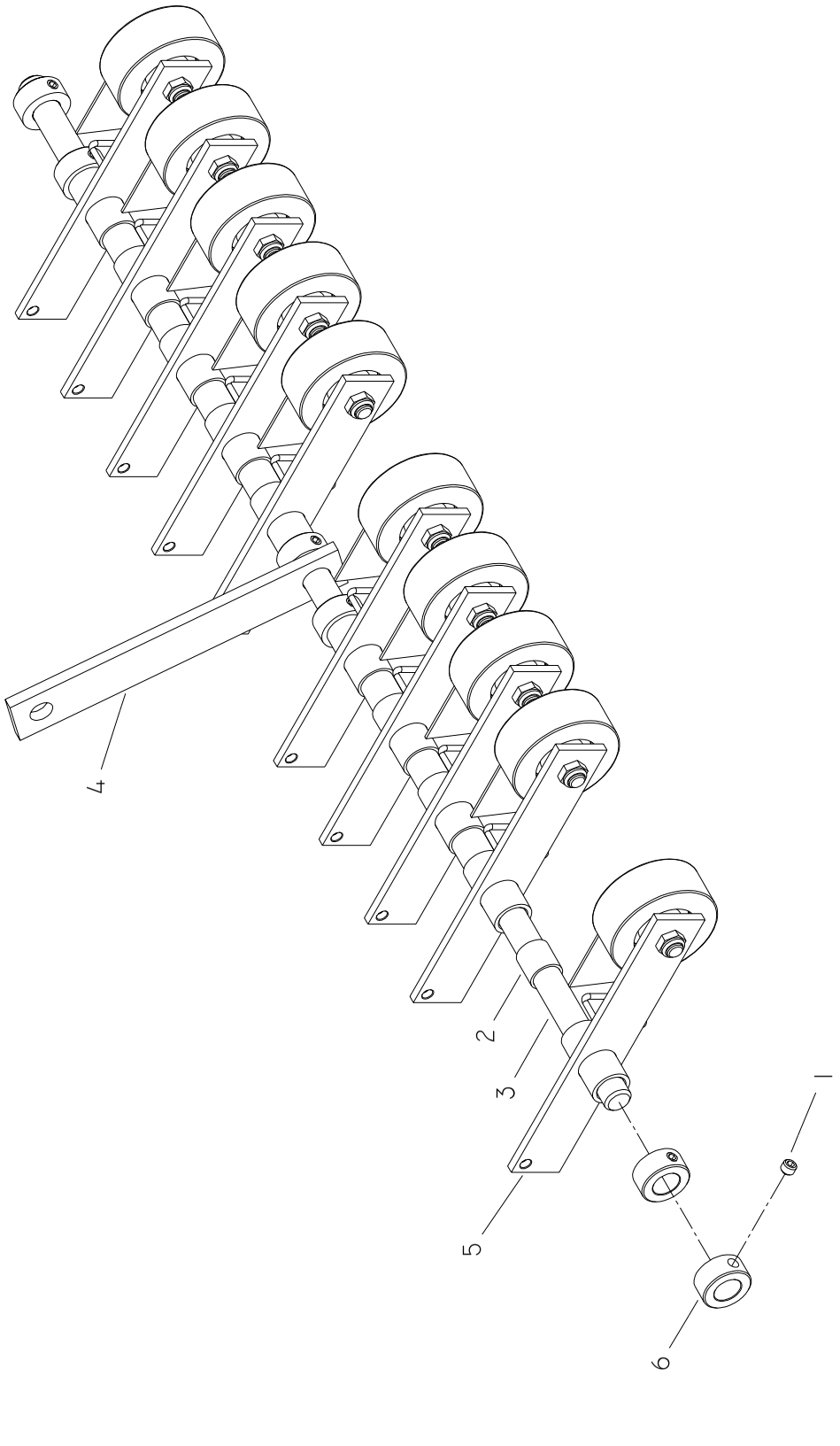
Figure 6.20 String Storage Reel Assembly



String tension shaft assembly

	Part No.	Description	Qty
1	7014-003118-025	HEXAGON SOCKET SET SCREW - CUP POINT {5/16"-18 x 1/4"}	6
2	9102014-5	OILITE BEARING	8
3	9802115	STRING TENSION SHAFT {5/8"}	1
4	9802120	SHAFT BRACKET	1
5	9822125	“String tension wheel assembly”	10
6	M-0190	STEEL COLLAR {5/8"}	6

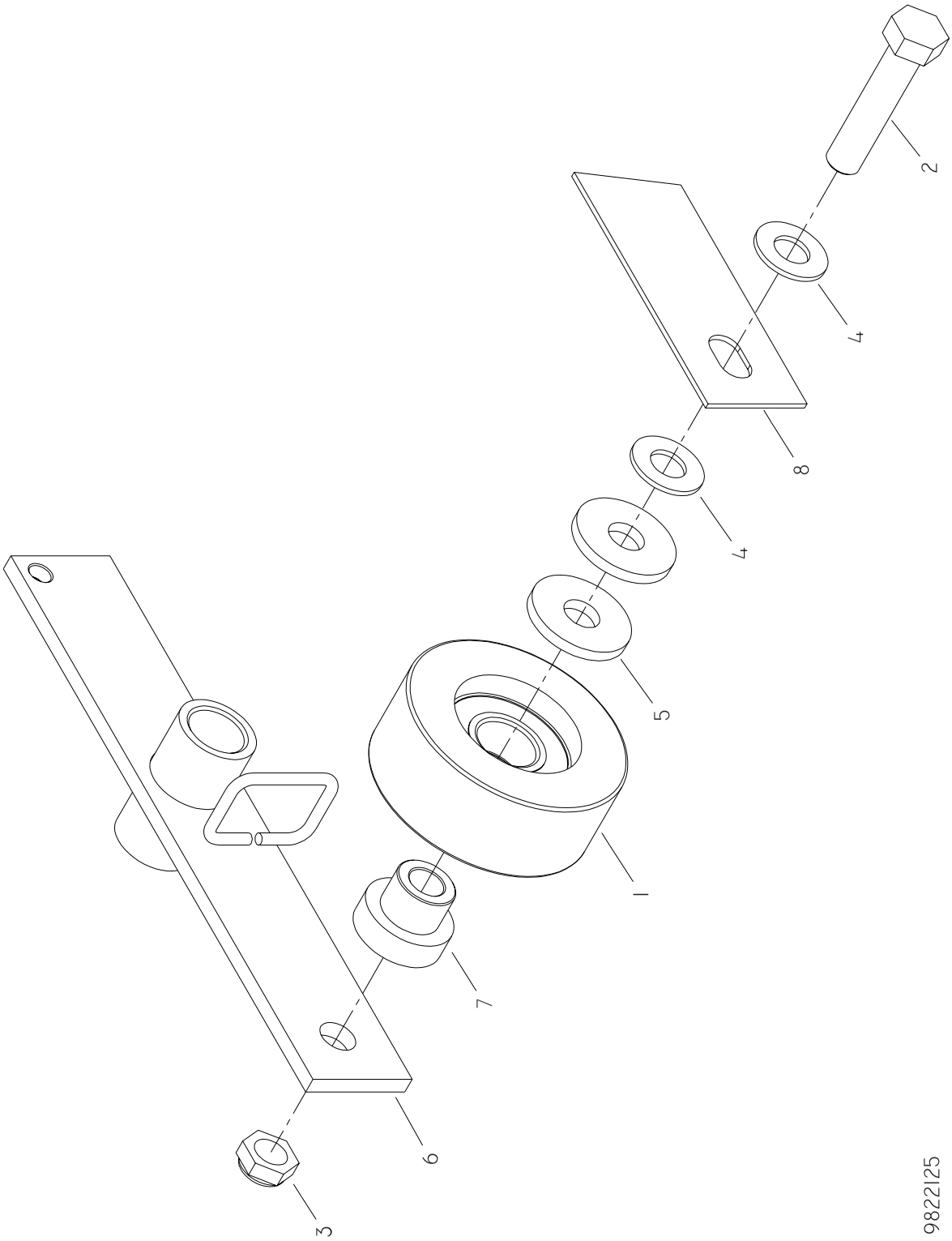
Figure 6.21 String Tension Shaft Assembly



String tension wheel assembly

	Part No.	Description	Qty
1	303-2340-00	FLAT ROLLER	1
2	7010-003716-175	HEXAGON CAP SCREW {3/8"-16 x 1 3/4"}	1
3	7044-003716-000	HEXAGON THIN NYLON INSERT LOCKNUT {3/8"-16}	1
4	7050-040081-006	FLAT WASHER {13/32" x 13/16" x 1/16"}	2
5	7050-040112-012	FLAT WASHER {13/32" x 1 1/8" x 1/8"}	2
6	9802125	STRING TENSIONNER ARM	1
7	9802126	BUSHING	1
8	9803125	STRING DEFLECTOR	1

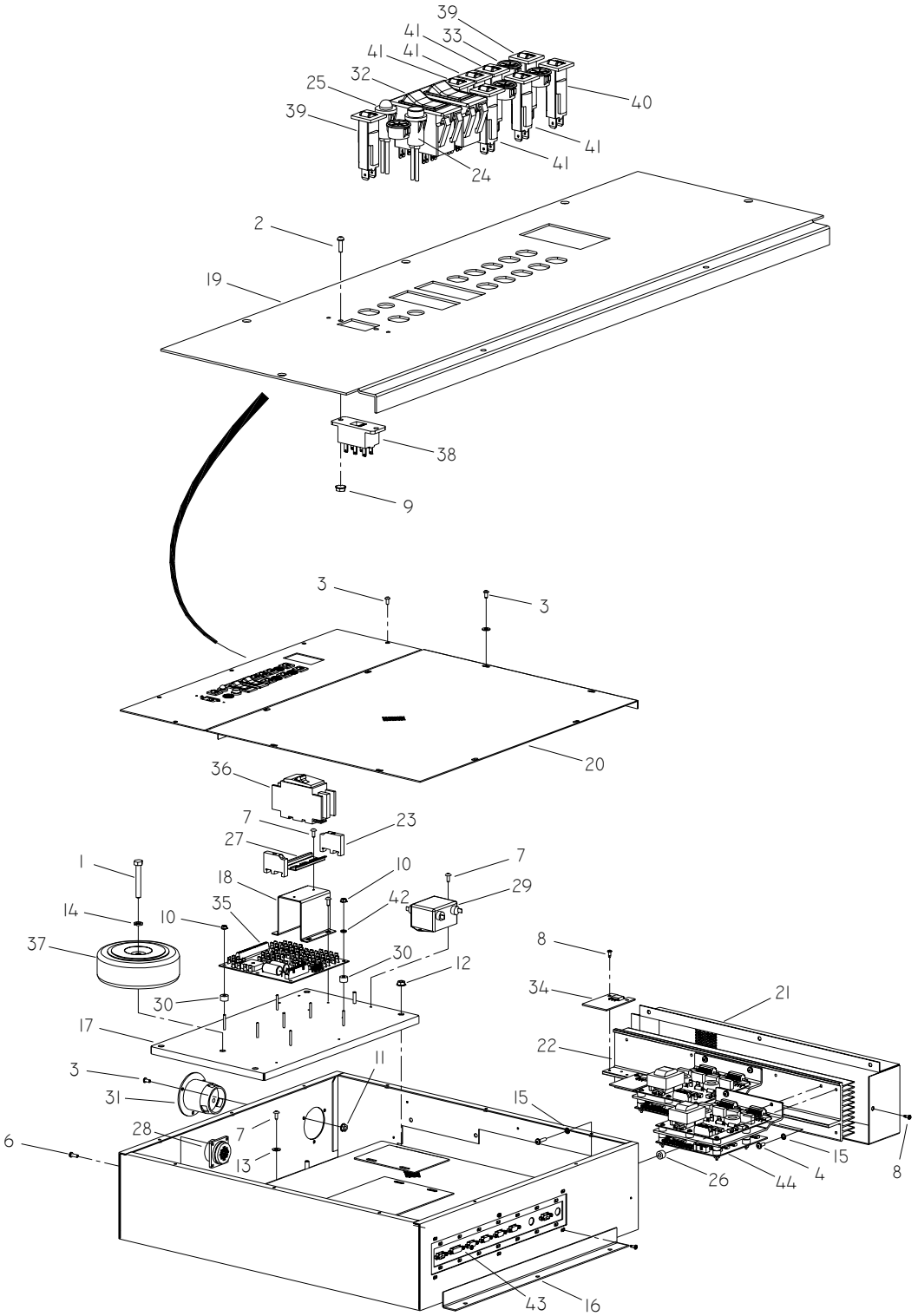
Figure 6.22 String Tension Wheel Assembly



Electronic Power Box

	Part No.	Description	Qty
1	7010-003118-225	HEXAGON CAP SCREW {5/16"-18 x 2 1/4"}	1
2	7016-410440-037	ROUND HEAD MACHINE SCREW {#4-40 x 3/8"}	2
3	7016-410832-037	ROUND HEAD MACHINE SCREW {#8-32 x 3/8"}	16
4	7016-411032-050	ROUND HEAD MACHINE SCREW {#10-32 x 1/2"}	4
5	7016-411032-075	ROUND HEAD MACHINE SCREW {#10-32 x 3/4"}	6
6	7024-640800-050	PAN SOCKET HEAD METAL SCREW {#8 x 1/2"}	8
7	7024-710800-050	TRUSS SOCKET HEAD METAL SCREW {#8 x 1/2"}	10
8	7025-610600-037	PAN SOCKET HEAD TAP SCREW {#6 x 3/8"}	20
9	7038-000440-000	HEXAGON LOCKNUT {#4-40}	2
10	7038-000632-000	HEXAGON LOCKNUT {#6-32}	7
11	7038-000832-000	HEXAGON LOCKNUT {#8-32}	3
12	7038-002520-000	HEXAGON LOCKNUT {1/4"-20}	4
13	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	10
14	7060-031057-009	LOCK WASHER {5/16"}	1
15	7062-010038-002	INTERNAL TOOTH LOCK WASHER {#10}	10
16	9802200	ELECTRONIC POWER BOX CHASSIS	1
17	9802201	MOUNTING PLATE	1
18	9802202	BREAKER SUPPORT	1
19	9802203	CIRCUIT BREAKER COVER	1
20	9802204	VENTILLATION COVER	1
21	9802205	GRILL COVER	1
22	9808200	ELECTRONIC POWER BOX GRILL	1
23	E-103002-26	TERMINAL STRIP STOPPER	2
24	E-1052C5-115	GREEN PILOT LAMP, 115 VAC	1
25	E-1090C1-28	RED PILOT LAMP, 28 VAC	1
26	E-13SP222	NYLON SPACER {1/2" x 1/4" x 5/16"}	6
27	E-164800-3	ELECTRIC TERMINAL RAIL, 3”	1
28	E-206306-1	FEMALE CONNECTOR, CPC-37	2
29	E-20DKBG5	EMI FILTER {20A}	1
30	E-219	NYLON SPACER {11/64" x 1/2" x 5/16"}	7
31	E-2325	CONNECTOR, 20A 250VAC	1
32	E-3120-F321	THERMAL CIRCUIT BREAKER	2
33	E-315-751	SNAP-IN PLUG	4
34	E-MD92-01	AC DRIVE PCB	3
35	E-MD98-21	POWER CONNECTION PCB	1
36	E-QUO220	CIRCUIT BREAKER, 20 AMP	1
37	E-TM216S	TOROIDAL TRANSFORMER	1
38	E-V80212	LINE VOLTAGE SWITCH	1
39	E-W28XQ1A-2	CIRCUIT OVERLOAD, 2 AMP	2
40	E-W28XQ1A-3	CIRCUIT OVERLOAD, 3 AMP	1
41	E-W28XQ1A-5	CIRCUIT OVERLOAD, 5 AMP	5
42	E-W3751	NYLON SPACER {3/16" x 3/8" x 1/16"}	6
43	SB-9802210	“Central Processing Unit (CPU) control box”	1
44	SB-9808210	DC DRIVE ASSEMBLY	2
		associated cables (not illustrated – refer to Chapter 5 of the Owner’s Manual)	
45	EC-098-01	MACHINE 1 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1
46	EC-098-02	MACHINE 2 AND PERIPHERAL CONTROL CABLE ASSEMBLY	1
47	EC-098-03	MACHINE 1 SOLENOID/OPTO CABLE ASSEMBLY	1
48	EC-098-04	MACHINE 2 SOLENOID/OPTO CABLE ASSEMBLY	1
49	EC-098-05	COIN-OP / CHASER CABLE ASSEMBLY	1
50	EC-098-06	PINSETTER CONTROL BOX GROUND CABLE	1

Figure 6.23 Power Box

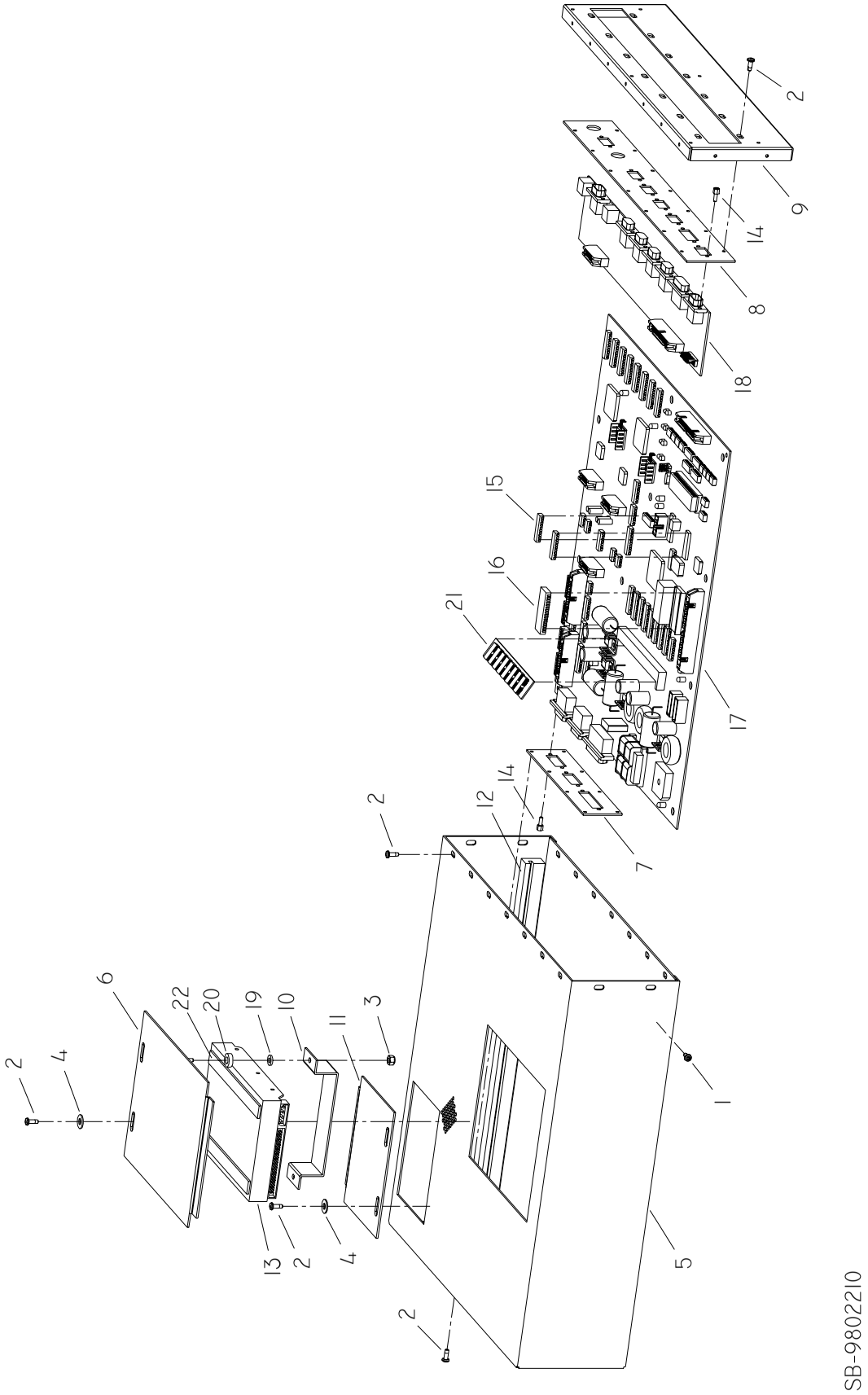


SB-9802200

Central Processing Unit (CPU) control box

	Part No.	Description	Qty
1	7022-410600-037	ROUND SOCKET HEAD METAL SCREW {#6 x 3/8"}	6
2	7025-610600-037	PAN SOCKET HEAD TAP SCREW {#6 x 3/8"}	44
3	7036-000632-000	HEXAGON NYLON INSERT LOCKNUT {#6-32}	2
4	7050-021050-006	FLAT WASHER {7/32" x 1/2" x 1/16"}	4
5	9802210	VIDEO CONTROLER BOX	1
6	9802211	HARD DISK COVER	1
7	9802212	CONNECTOR PLATE	1
8	9802213	CONNECTOR PLATE	1
9	9802214	VIDEO CONTROLER COVER	1
10	9802215	HARD DISK BRACKET	1
11	9802216	DIP SWITCH COVER	1
12	9803210	P.C.B. GUIDE	2
13	E-102-5170-JR	HARD DISK DRIVE {SCSI}	1
14	E-205817-1	FEMALE SCREWLOCK {0.312"}	20
15	EE-16V8C-5LP	EPROM	2
16	EE-27C040	EPROM	1
17	E-MD98-01	CPU CONTROLLER PCB	1
18	E-MD98-02	CONNECTOR PANEL PCB	1
19	E-W3751	NYLON SPACER {3/16" x 3/8" x 1/16"}	2
20	E-W5007	NYLON SPACER {1/4" x 1/2" x 5/32"}	2
21	IF-72PIN-16MEG	MEMORY SIMM {16 MEG}	1
22	MPD-098	FOAM ADHESIVE STRIP {5 1/2"}	2

Figure 6.24 CPU Control Box



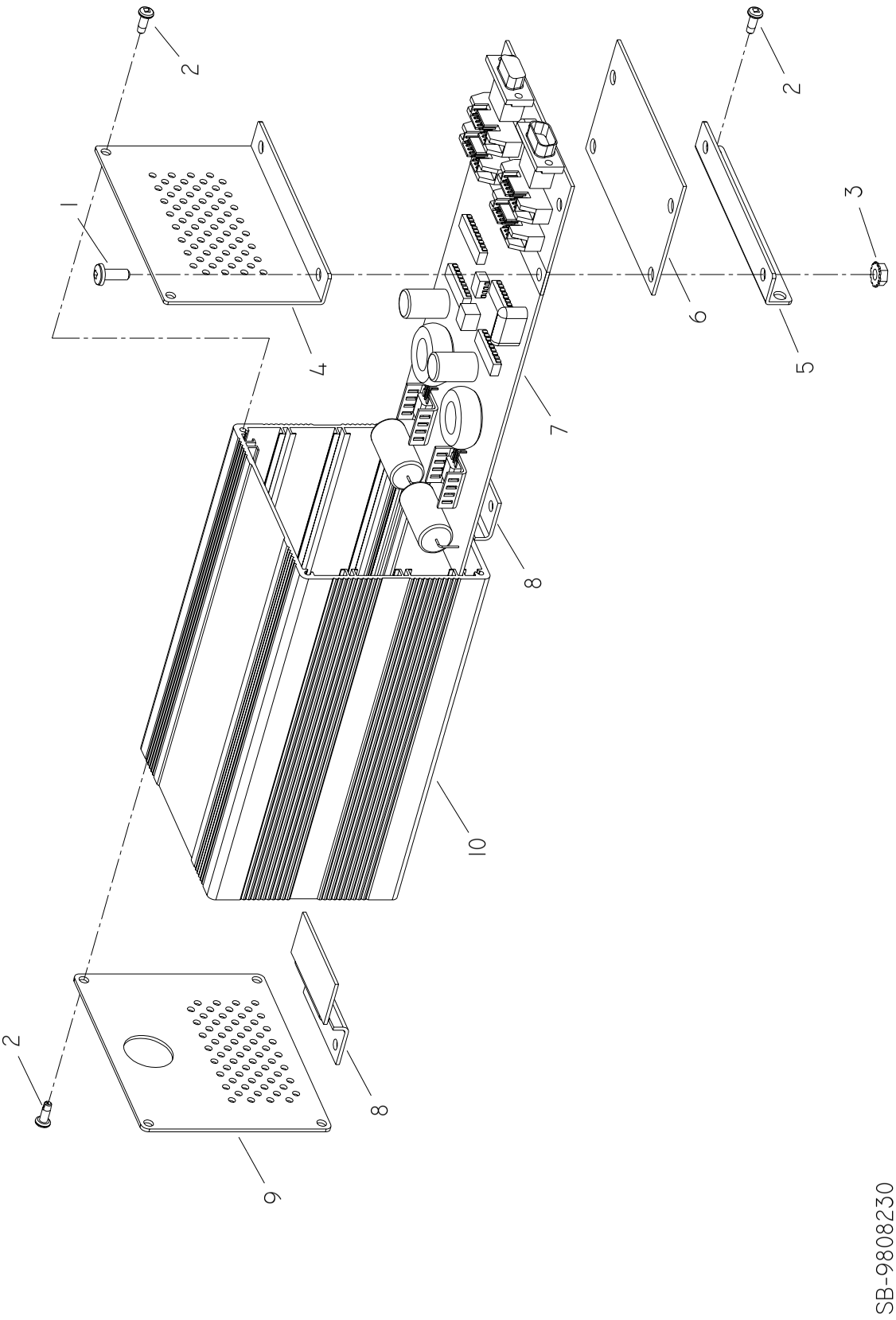
Chaser Control Box

	Part No.	Description	Qty
1	7016-411032-050	ROUND HEAD MACHINE SCREW {#10-32 x 1/2"}	2
2	7025-610600-037	PAN SOCKET HEAD TAP SCREW {#6 x 3/8"}	8
3	7038-001032-000	HEXAGON LOCKNUT {#10-32}	2
4	9802230	FRONT COVER {TOP}	1
5	9802240	FRONT COVER {BOTTOM}	1
6	9803230	P.C.B. PROTECTOR	1
7	E-MD98-22	CHASER CONTROLLER PCB	1
8	M-6420-20	FIXATION BRACKET	2
9	M-6420-21	BOX COVER	1
10	M-6420-35	CONTROLLER BOX	1

associated cables (not illustrated – refer to Chapter 5 of the Owner's Manual)

11	EC-098-05-A	COIN-OP / CHASER CABLE ASSEMBLY EXTENSION	1
12	EC-098-16	CHASER CONTROL TO COIN-OP CONTROL CABLE ASSEMBLY	1
13	EC-098-19	CHASER CONTROL BOX GROUND CABLE	1
14	EC-098-21	MACHINE 1 CHASER LED CABLE ASSEMBLY {LEFT}	1
15	EC-098-22	MACHINE 1 CHASER LED CABLE ASSEMBLY {RIGHT}	1
16	EC-098-23	MACHINE 2 CHASER LED CABLE ASSEMBLY {LEFT}	1
17	EC-098-24	MACHINE 2 CHASER LED CABLE ASSEMBLY {RIGHT}	1

Figure 6.25 Chaser Control Box



Non-Illustrated Components, Options and Accessories

Game add-on lanes

The following are comprised of one lane with a single television display and necessary playing accessories. These packages do not include the electronics necessary to function as a single lane. The packages below are exclusively for addition to an existing single-lane installation.

	Part No.	Description
1	BJ-0172	SPACE PINVADERS WOOD LANE ADD-ON W/O ELECTRONICS
2	BJ-0182	SPACE PINVADERS BLACK LANE ADD-ON W/O ELECTRONICS
3	BJ-0272	BOWLINGO III WOOD LANE ADD-ON W/O ELECTRONICS
4	BJ-0282	BOWLINGO III BLACK LANE ADD-ON W/O ELECTRONICS

Lane extension kits

The following kits contain everything required to add 46” [1170mm] of lane playing surface to an existing installation. One kit is required for each lane.

	Part No.	Description
1	BJ-0173	SPACE PINVADERS WOOD LANE EXTENSION KIT
2	BJ-0183	SPACE PINVADERS BLACK LANE EXTENSION KIT
3	BJ-0273	BOWLINGO III WOOD LANE EXTENSION KIT
4	BJ-0283	BOWLINGO III BLACK LANE EXTENSION KIT

Lane chaser light kits

The following kits contain everything required to add light chasers to an existing installation. One specific kit is required for each individual lane and an additional kit is required for installations equipped with lane extensions.

	Part No.	Description
1	BJ-OP01	LANE CHASER LIGHT KIT, LANE 1
2	BJ-OP02	LANE CHASER LIGHT KIT, LANE 2
3	BJ-OP03	LANE EXTENSION CHASER LIGHT KIT

Electronic accessories

Refer to Chapter 5 “Wiring Diagrams” of the Owner’s Manual for more information on these parts.

	Part No.	Description
1	101-1027-01	27” TELEVISION
2	E-544	6-DIGIT METER W/BRACKET, 24VAC
3	E-591B	PUSH BUTTON SWITCH, BLUE
4	E-591G	PUSH BUTTON SWITCH, GREEN
5	E-591W	PUSH BUTTON SWITCH, WHITE
6	E-9801600	TICKET DISPENSER
7	E-9801610	COIN-OP MECHANISM
8	E-XA-92	AUDIO AMPLIFIER
9	SB-9808220	COIN-OP CONTROL BOX
10	SB-9808240	JUNCTION BOX

Cable assemblies

Refer to Chapter 5 “Wiring Diagrams” of the Owner’s Manual for more information on these parts.

	Part No.	Description
1	E-A519-9	S-VIDEO CABLE ASSEMBLY
2	EC-098-07	COIN-OP GROUND CABLE
3	EC-098-08	TICKET DISPENSER GROUND CABLE
4	EC-098-12	LANE 1 COIN-OP CONTROL CABLE ASSEMBLY
5	EC-098-13	LANE 2 COIN-OP CONTROL CABLE ASSEMBLY
6	EC-098-15	AUDIO “IN” CABLE ASSEMBLY
7	EC-098-18	AUDIO “OUT” CABLE ASSEMBLY
8	EC-098-18-A	SPEAKER CABLE ASSEMBLY
9	EC-098-17	CHASER GROUND CABLE

Playing accessories

	Part No.	Description
1	Q01-0040	BOWLINGO BALL, 4-INCH DIAMETER

Maintenance products and accessories

	Part No.	Description
1	Q82-0055	DBA GENERAL PURPOSE MACHINE CLEANER
2	Q82-0070	DBA PHOSPHATE-FREE LANE CLEANER
3	Z-001	SWAGING TOOL
4	Z-BJ0001	STRING ADJUSTMENT TOOL
5	Z-BJSM	BOWLINGO JUNIOR / III OWNER’S MANUAL

KIT-MEJ99L LARGE SPARE PARTS KIT Recommended for installations with more than 12 lanes; the kit is comprised of the following parts:

	Part No.	Description	Qty.
1	9122057	PIN DETECTION ASSEMBLY	2
2	9805527	ADJUSTABLE SPRING	1
3	301-1100-00	MOTOR {180 VDC, 3/4 HP}	2
4	301-5170-00	SOLENOID {24VAC}	2
5	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	200
6	9103070	BRAKE CAM	4
7	9105070	SPRING	10
8	9802070	MAIN SHAFT	2
9	9802100	HUB ASSEMBLY	4
10	9803031	DOUBLE TIMING GEAR	2
11	9803100	STRING WHEEL	5
12	9803105	STRING WHEEL CENTER	2
13	9803110	STRING WHEEL LOCK	2
14	9803125	STRING DEFLECTOR	10
15	9803140	MOTOR HANDLE	2
16	9804050	TIMING BELT {255L}	2
17	9805050	TENSION SPRING	10
18	9805051	WHEEL TENSION SPRING	10
19	E-9801600	TICKET DISPENSER	2
20	E-9801610	COIN-OP MECHANISM	1
21	E-GP1A05	ENCODER OPTICAL SENSOR	4
22	I-022A	PIN STRING	20
23	E-102-5170-00	HARD DISK DRIVE {SCSI}	3
24	Q72-0241-50	BOWLINGO JUNIOR PIN	2
25	Q81-1050	NYLON STRING, 50M ROLL	3
26	S-071	TENSION SPRING	4
27	SB-1500-31-JR	BALL DETECTOR TRANSMITTER	6
28	SB-9802300	SOLENOID/OPTO CONTROL BOX	3
29	SB-9808210	DC DRIVE ASSEMBLY	1
30	SB-9808220	COIN-OP CONTROL BOX	2
31	SB-9808230	CHASER CONTROL BOX	1
32	SB-ECIL-325-FS	OPTICAL SENSOR ASSEMBLY	4
33	SB-ECIL-325-PD	OPTICAL SENSOR ASSEMBLY	4
34	Z-001	SWAGING TOOL	1

KIT-MEJ99M MEDIUM SPARE PARTS KIT Recommended for installations with 6 to 12 lanes; the kit is comprised of the following parts:

	Part No.	Description	Qty.
1	9122057	PIN DETECTION ASSEMBLY	1
2	9805527	ADJUSTABLE SPRING	1
3	301-1100-00	MOTOR {180 VDC, 3/4 HP}	1
4	301-5170-00	SOLENOID {24VAC}	1
5	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	0
6	9103070	BRAKE CAM	2
7	9105070	SPRING	5
8	9804050	TIMING BELT {255L}	1
9	9805050	TENSION SPRING	5
10	9805051	WHEEL TENSION SPRING	5
11	E-GP1A05	ENCODER OPTICAL SENSOR	2
12	I-022A	PIN STRING	40
13	E-102-5170-00	HARD DISK DRIVE {SCSI}	1
14	Q72-0241-50	BOWLINGO JUNIOR PIN	1
15	S-071	TENSION SPRING	2
16	SB-1500-31-JR	BALL DETECTOR TRANSMITTER	3
17	SB-9802300	SOLENOID/OPTO CONTROL BOX	1
18	SB-9808210	DC DRIVE ASSEMBLY	1
19	SB-9808220	COIN-OP CONTROL BOX	1
20	SB-ECIL-325-FS	OPTICAL SENSOR ASSEMBLY	2
21	SB-ECIL-325-PD	OPTICAL SENSOR ASSEMBLY	2

KIT-MEJ99S SMALL SPARE PARTS KIT Recommended for installations with less than 6 lanes; the kit is comprised of the following parts:

	Part No.	Description	Qty.
1	9122057	PIN DETECTION ASSEMBLY	1
2	9805527	ADJUSTABLE SPRING	1
3	301-5170-00	SOLENOID {24VAC}	1
4	7036-001032-000	HEXAGON NYLON INSERT LOCKNUT {#10-32}	0
5	9103070	BRAKE CAM	2
6	9105070	SPRING	5
7	9804050	TIMING BELT {255L}	1
8	9805050	TENSION SPRING	5
9	9805051	WHEEL TENSION SPRING	5
10	E-GP1A05	ENCODER OPTICAL SENSOR	2
11	I-022A	PIN STRING	20
12	Q72-0241-50	BOWLINGO JUNIOR PIN	1
13	S-071	TENSION SPRING	2
14	SB-1500-31-JR	BALL DETECTOR TRANSMITTER	1
15	SB-9808210	DC DRIVE ASSEMBLY	1
16	SB-9808220	COIN-OP CONTROL BOX	1
17	SB-ECIL-325-FS	OPTICAL SENSOR ASSEMBLY	2
18	SB-ECIL-325-PD	OPTICAL SENSOR ASSEMBLY	2

Appendix A
Product Warranties and Notices

Mendes Statement of Limited Warranty

Warranties covering the construction and equipment order

NEW ITEMS. Mendes warrants that all new Mendes equipment will be free from defects in material and workmanship for one year. The warranty period shall commence upon completion of installation. Should any defect appear during the first three-months of the warranty period, the defect will be repaired or replaced at Mendes' option without charge to the Customer. Any defect, which occurs thereafter during the warranty period, will be repaired or replaced at Mendes' option, without charge to the Customer for parts, provided Customer immediately pays all other costs involved in making such repair or replacement.

Normal maintenance procedures and adjustments are the responsibility of the Customer and are not covered under the terms of this warranty.

Mendes reserves the right to change the design of any product, but assumes no responsibility to incorporate such design changes on products already sold.

The above warranties are in lieu of all other warranties, express or implied. Repair or replacement as provided above shall be the Customer's sole remedy under this limited warranty. Under no circumstances shall Mendes be liable for loss of profits or other direct or indirect costs, expenses, losses or damages arising out of defects in or failures of pinsetters, parts or other goods purchased hereunder. Mendes' warranties apply only to items installed by Mendes or a Mendes authorized representative. If repairs, replacements, or modifications are made by anyone not approved in advance by Mendes, Mendes shall have no liability whatever under this limited warranty. The costs of any service calls made by Mendes during the initial 90 day warranty period for new equipment and reconditioned pinsetters which result from the inability of the Customer's mechanic to perform required adjustments, maintenance, or replacement of parts, shall be charged to the Customer and be payable to Mendes immediately. The limited warranty contained herein does not cover any damage to the electronic components resulting from Customer's failure to fulfill the electrical requirements as specified in the Mendes pre-installation specifications. Further, the relative humidity must be maintained between 35% and 45% to allow the electronic components to perform adequately. Mendes shall not be responsible for any changes that may take place after the delivery or installation due to atmospheric conditions or moisture in the premises or developing from causes over which it has no control. Mendes makes no assurances, representation or warranties to the Customer that Mendes supplied pinsetters or bowling lanes will operate without noise or vibration. Nor does Mendes agree to eliminate or reduce any noise or vibration, which may result from the operation of the pinsetters or bowling lanes. Any verbal or written statement made by any agent or sales representative of Mendes contrary to the provision of this warranty is wholly unauthorized and of no force and effect.

OBTAINING WARRANTY SERVICE. In order to obtain warranty service for defective parts, Customer must return the defective part to Mendes, freight prepaid. Upon determination that the returned part is defective, Mendes will repair or replace the part and then return it to the Customer. You may REQUEST INFORMATION

on how to obtain service under this warranty by contacting the Mendes subsidiary office in your country, or by contacting Mendes Incorporated at the address printed below.

DO NOT SEND PRODUCTS TO THIS ADDRESS WITHOUT PRIOR AUTHORIZATION. TO RETURN PRODUCTS, CONTACT THE MENDES HELP CENTER FOR AN R.MA. NUMBER AND SHIPPING INSTRUCTIONS.

Mendes Inc., 2425 Watt Street • Sainte-Foy, Quebec • Canada G1P 3X2

Notices

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Class A Electronic Emission Notices

Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Mendes is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

Appendix B
Equipment Records

Use the form on the next page to record and retain the following information:

- Product names
- Models and types
- Serial numbers
- Any other information which might be useful such as the lane number or location where the equipment/component is installed

Product Serial Numbers

Product/component	*Model/type*	*Serial number*	*Notes*

bowlingo Junior/III
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