Signature Series

System Installation Manual

Issued: 11/01/01 **P/N: 400-286-008 Rev New**

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TRADEMARK NOTICES

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How To Use This Manual

This Installation Manual contains information needed to properly install the BOSS Scoring System. If any terms, concepts, or installations contained in this manual are not clear to you, consult an experienced professional or AMF Technical Support.

Introduction

Before you begin the installation, check your shipment against the packing list on the next page to ensure that all parts have been included. Report missing items to AMF at 1.800.843.0682 between the hours of 8:00 a.m. and 5:00 p.m. Eastern Time. After 5:00 p.m., you can leave a message on the voice mail system. The 24-hour fax line is 1.804.730.4390. Address all faxes to AMF Technical Support.

WARNING! Read This BEFORE Proceeding.

TO AVOID INJURY:

Read these safety precautions before attempting to install or modify any AMF equipment.

Failure to follow these procedures may result in severe personal injury, fire, or permanent damage to property.

- **When you see this symbol associated with an instruction,**

a possible hazard is indicated. Follow these instructions carefully.

- **Before installing, removing, or replacing electronic equipment, be certain that the supply power to the unit has been turned OFF at the main circuit breaker box.**

- **Before applying power to a Bowler Terminals, be sure that all cables have been connected properly — especially the main power cables.**

Installation Tools

The following is a list of tools needed for the installation of the Boss Scoring bowler terminal consoles. Other tools may be required depending on whether you are installing the bowler terminals in a new or existing bowling center.

Tape Measure	Drill
3/8” Drive Ratchet	12-Inch, 3/8”-Drive Extension
Pencil / Marker	7/16”, 1/2”, & 12mm Sockets
Drill	#2 Phillips Screwdriver
Vacuum cleaner	5/16” Masonry (carbide tipped) Bit

GENERAL INFORMATION

The BOSS™ Scoring system provides computer control of scoring functions and many advanced features for the Bowler and Center operator. The following sections are included in this installation procedure:

SECTION 1

1.1 REFERENCES

NOTE: Review Sheet 1 of Drawing 286-001-125 to find the configuration you purchased. This will determine which sheet will be used for your specific install.

Document Numbers

286-002-136 Sht 1 thru Sht 15	Final Installation Options/Signature Series
400-286-026	BOSS Scoring Pre-installation Requirements

1.2 LIST OF ILLUSTRATIONS

1.3 PRECAUTIONS

1. Dedicated distribution panel breakers must be open, locked and tagged during installation.

2. Power and motor plugs to pinspotters must be disconnected during installation if machine is entered during installation.

3. Scaffolding must be used and two installers must be present to assist with lifting and securing the overhead monitor and support housing.

4. After monitor adjustments, return control board with the wire bundle dressed and secured with cable ties. Segregate and route from other wiring to the middle area of the base plate.

1.4 PREREQUISITES

1. Before installation, bowling center proprietor must provide a completed Static Load Requirements for Overhead Displays & Curtain Wall Structures Certificate, located in the Pre-Installation Requirements (P/N: 400286026)
2. All Conduits must meet the specifications set forth in the Pre-Installation Requirements Guide.
3. All 115/230 VAC Power systems should be in place before installing components, to permit component testing during installation.

1.5 PARTS LISTS AND TOOLS REQUIRED

NOTE: When tools are required for installing more than one component, they are only listed once. Part numbers are for reference only, and are subject to change.

For a complete list of the parts included with each of the following kits, please refer to Drawing 286-002-136. The following parts lists are available:

1.6 ABBREVIATIONS

AWG	American Wire Gage (gauge)
CATV	Cable Television
CRT	Cathode Ray Tube
CPU	Central Processing Unit
CW	Clockwise
CCW	Counter Clockwise
CDI	Control Desk Interface
LOM	Lower Overhead Monitor
MI	Machine Interface
OD	Outside Diameter
OHM	Overhead Monitor
VOM	Volt Ohmmeter

1.7 GLOSSARY

AWG	Unit of measurement relating to diameter of wire or cable.
Megohm Meter	Used for earth ground conductivity measurements.
VOM	Used to measure resistance, current and voltage.
Up-lane	Direction from the pin deck towards the approach
Lane deck	Surface of bowling lane
Ground Buss	An electrical conductor that connects a number of points to one or more grounding electrodes.

1.8 NOMENCLATURE

Common Name	Official Nomenclature
Anchor Bolt	Taper Bolt
Megger	Megohm Meter

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SECTION 2

2.1 GENERAL

1. All 115/230 VAC power lines are installed by the bowling center. Low voltage (18 VAC) cables and video and audio cables for communication between system units are installed by AMF.

2.2 WIRE AND CABLE REQUIREMENTS

1. The bowling center is responsible for the materials and installation of all power source and grounding requirements and for ensuring that electrical installations conform to all codes, statutes, or standards as defined by local and state codes and/or inspectors.

2. AMF control and signaling wire conducts only low voltage "Class 2" signals and conforms to UL-CL-2 fire rating. If local codes require conduit for AMF control/signal wiring, the bowling center is responsible for providing these conduit runs.

2.3 GROUND WIRE REQUIREMENTS

NOTE: See Pre-Installation Requirements document for grounding diagram and cable wire size.

1. VERIFY a separate insulated stranded green ground wire is provided by the bowling center, as a machine static ground to the main building ground.

2. VERIFY the continuous No. 6 AWG (16 mm^2) wire that extends across the curtain wall is spliced to a No. 8 AWG (10 mm^2) wire and connected to bare metal on each pinspotter.

2.4 DISTRIBUTION PANEL REQUIREMENTS

1. ENSURE neutral and ground are not shorted together in the BOSS™ Scoring distribution panel.

2. ENSURE hot and neutral leads come from the main panel or the main subpanel and the third wire ground comes directly from the service entrance earth ground.

3. ENSURE proper circuits are available for AMF equipment:

   a. A dedicated distribution panel, which is powered by the main panel, or a main subpanel.
   b. Isolated third wire (green or green with yellow stripe) equipment ground tie down wire.
   c. Do not share a distribution panel that is or will be used as a power source for any device other than AMF BOSS™ Scoring equipment. (Pinspotters, ball returns, etc. must not share this panel.)

2.5 SURGE SUPRESSOR INSTALLATION

1. VERIFY the surge suppressors provided with the BOSS™ Scoring system have been installed. (Please refer to the Pre-Installation Requirements for installation procedure)

2.6 MONITOR POWER SPECIFICATION

1. Refer to “Power Requirements” in the Front End Section of the Pre-Installation Requirements, to ensure the monitor power requirements have been met.

2.7 AUDIO/VIDEO EQUIPMENT CABLES

1. Please refer to Drawings 286-001-125 Sheets 1-14 for detailed cabling installation procedures.

CAUTION: Care should be taken not to place excessive strain on cables, which become twisted or caught, or cable damage may result. Cables routed through ball returns must be placed so that they will not be run over by balls or caught in moving parts.

2.8 MEASUREMENT OF SYSTEM GROUNDS

1. VERIFY the insulated (green or green with yellow stripe) equipment ground wires are connected to the neutral (white or blue) wires only at the building incoming power grounds.

2. CHECK and TIGHTEN all electrical connections to wire strips, water pipes, busses, etc.

3. Before any equipment is plugged into the new wiring, MEASURE the isolation of ground vs. neutral:

   a. REMOVE main power from the dedicated electrical panel.
   b. OPEN all circuit breakers.
   c. Individually DISCONNECT each of the neutral (white or blue) wires.
   d. Using a volt-ohmmeter, MEASURE the resistance to the isolated ground bus (green or green with yellow stripe) wires in the panel.

4. Is the resistance to ground at least 100K ohms?

   YES - GO TO next step.
   NO - Neutral is shorted at some point and must be repaired.

5. Are monitors to be connected to cable TV?

   YES - GO TO next step.
   NO - Grounding measurements are completed.

NOTE: The CATV cable must be grounded where it enters the building. The CATV cable has 2.7 ohms resistance per 1000 ft (305m). The isolated system ground wire from building power entry panel has 1.2 ohms resistance per 1000 ft (305 m) of run.

6. Using the VOM, MEASURE the CATV cable shield resistance vs. an isolated ground from one of the audio/video equipment dedicated outlets.

7. DETERMINE whether the CATV cable is properly grounded as specified.

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SECTION 3 INSTALLING DUAL OVERHEAD MONITORS

3.1 GENERAL

1. The installation of the overhead monitors consists of preparing the overhead structure, mounting the monitors to the overhead structure, connecting the monitors and the CPU cables, mounting the CPU onto the curtain wall or inside the overhead structure.

3.2 PREPARING OVERHEAD STRUCTURE FOR MONITORS

WARNING: Installation of overhead components must be conducted from scaffolding with a safety rail, using at least two installers, or injury to installers may result.

1. ERECT scaffolding in place under area where monitors are to be mounted.

2. Drill holes in proper location of ceiling to allow chains to hang down from support structure.

3. Using rapid link, ATTACH chain to support structure. (See Figure 3-1)

4. ATTACH turnbuckle to the chain

5. CUT chain at point below the turnbuckle

6. REPEAT steps 2 - 5 for second chain and turnbuckle.

7. Using a rapid link, ATTACH bottom of turnbuckle to one side of monitor housing.

8. Using a rapid link, ATTACH bottom of second turnbuckle to other side of monitor housing.

9. Using rapid links, ATTACH bottom links of both chains to monitor housing.

3.2 PREPARING OVERHEAD STRUCTURE FOR MONITORS (continued)

10. ADJUST turnbuckles until bottom of overhead frame assembly is level and a minimum of approximately 8' above approach area.

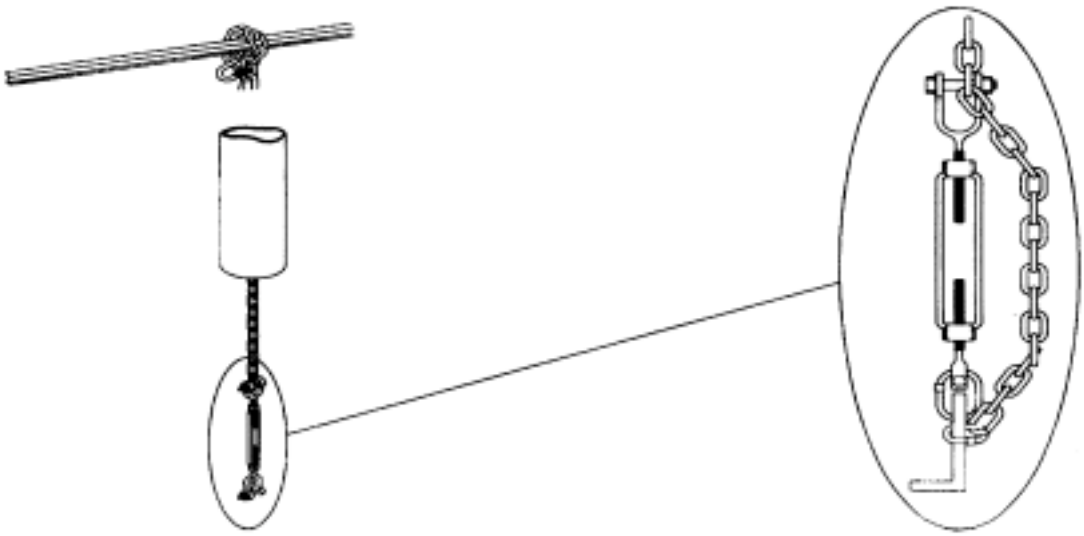

Figure 3-1 Mounting Chain and Turnbuckle

3.3 MOUNTING MONITORS ONTO OVERHEAD STRUCTURE

CAUTION: Monitors must be installed from a scaffold and two or more installers must be used to lift and hold the monitor while attaching them to the overhead frame assembly. Failure to do so may result in injury or damage to the equipment.

1. LIFT and ALIGN the first monitor onto the overhead frame assembly until monitor slides into place on the frame assembly.

2. INSERT and TIGHTEN two 1/4 - 20 bolts to SECURE the monitor to the monitor frame assembly.

3. Repeat Steps 1-2 for all remaining monitors.

4. After monitor or monitors are burned in and testing is completed, install the monitor covers and secure with hardware provided.

3.4 MOUNTING THE CPU ON THE CURTAIN WALL

1. It is up to the discretion of the Installer as to where the CPU should be mounted on the Curtain Wall. However, all of the CPUs should be mounted at approximately the same height across the lanes. (See the Pre-Installation Requirements Guide for suggested layouts)

2. Once the mounting location of the CPU is determined, verify it is level and then secure it in place with four 5/16 sheet metal screws.

3. Secure the cables away from the pinspotter, ensuring the weight of the cables is distributed evenly.

3.5 CONNECTING MONITOR AND CPU CABLES

1. At the rear of the monitors and CPU (see Figure 3-2), CONNECT cables required for operation:

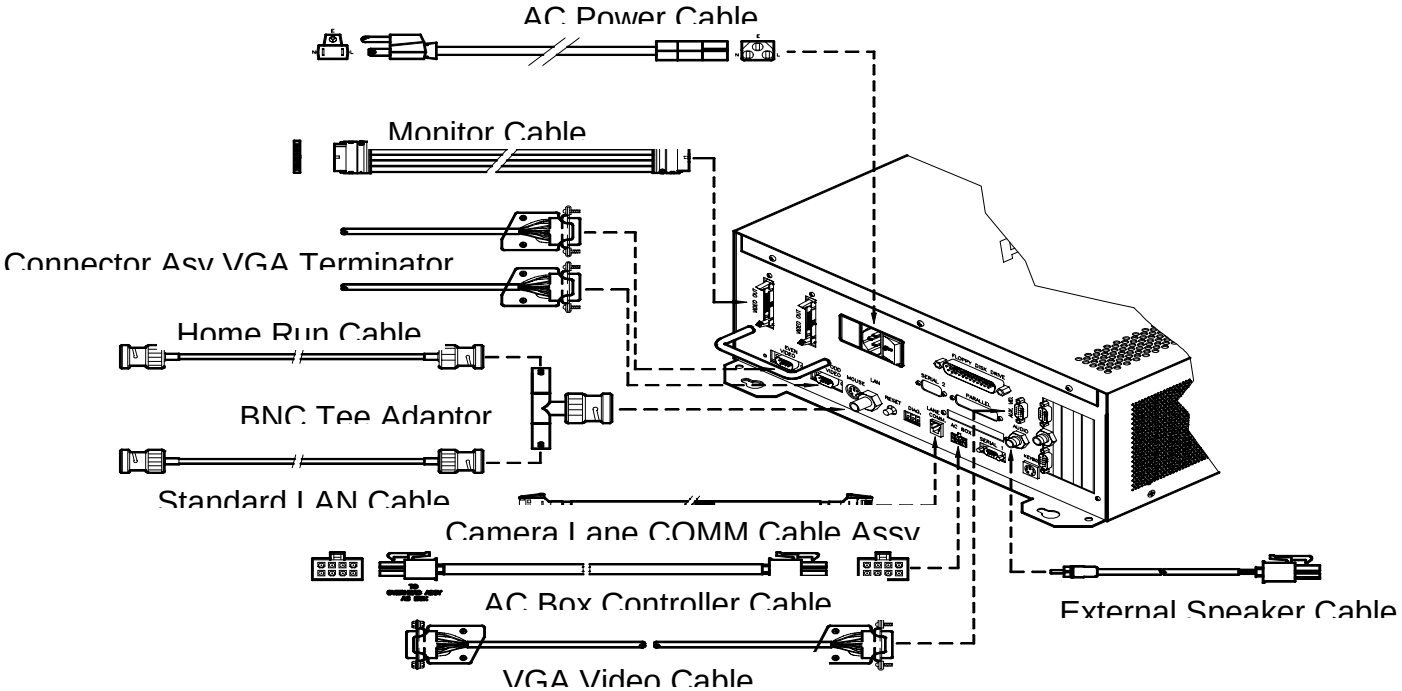

Figure 3-2 CPU Cable Connections

3.6 FINAL STEPS IN MONITOR INSTALLATION

1. COMPLETE Section covering “System Operating Check” before continuing with following steps.

2. SLIDE monitor rear cover assembly onto monitor and TIGHTEN knob securely.

3. REPEAT step 2 for the second monitor.

SECTION 4

4.1 Standard Bowler Terminal Console Installation

The installation for standard bowler terminal is easy and simple to perform. Figure 4-1 shows one way to position the bowler terminal in relation to the ball return. Install the bowler terminal according to the following procedure:

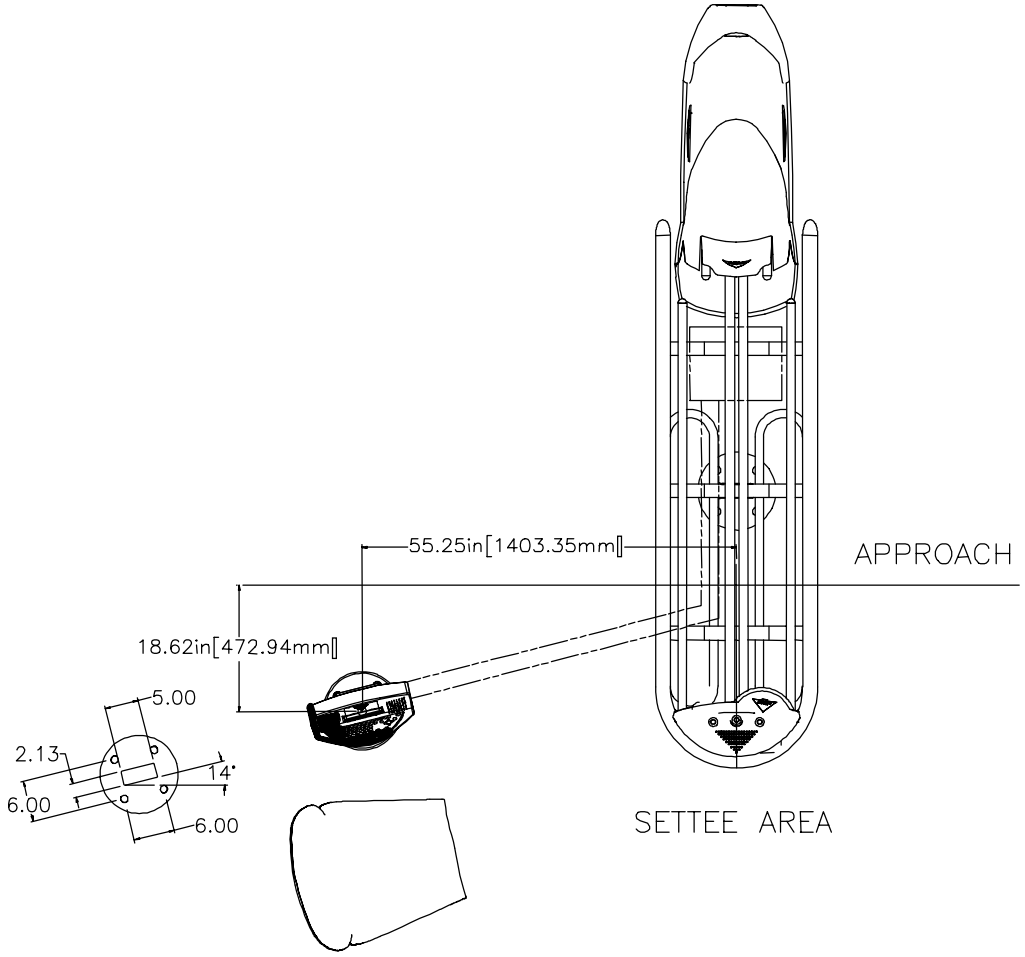

Figure 4-1. Example Placement For Standard Bowler Terminal

1. Position and align standard the bowler terminal so that the rear edge of the bowler terminal is facing the lanes and the bowler terminal is placed over the cable conduit approximately 9.75 inches (24.76 cm) from the ball return.

2. Drill four mounting holes to secure the bowler terminal base to the floor.

3. Vacuum and remove debris from around drilled holes.

4. Verify that the power cable from the AC power supply to the bowler terminal is NOT connected at this time.

5. Route and attach J1 and J2 cables from the floor outlets to the bowler terminal board located in the bowler terminal console.

6. Ensure that the bowler terminal is mounted flush to the floor underneath. Insert and tighten four 8mm x 75 mm hex head screw bolts (709-013-059) to base of bowler terminal.

7. Place the four plug buttons (248-001-509) on top of the base of the pedestal to cover 8mm x 75 mm hex head screw bolts (709-013-059).

8. Set the switches on the bowler terminal board by using the switch configuration label settings (286-001-074) located on the pedestal assembly (286-002-056). For proper configuration, refer to the section called Switch Configuration Settings.

4.2 Standard Bowler Terminal Console (with Intercom Upgrade)

This section describes the procedures necessary to upgrade the standard bowler terminal when the intercom feature has been purchased. You will be performing some soldering tasks during this procedure so please have a soldering iron, solder, wire strippers, wire cutters, and the basic knowledge for soldering devices. See Figure 4-2 and Figure 4-3 displays the necessary information to assist you in soldering the assembly.

WARNING

Do NOT enter the bowler terminal until all power to the unit is turned off at the main breaker box or serious injury could result.

1. Verify that the power to the unit is turned OFF at the main circuit breaker.

2. Open front cover on bowler terminal and remove four #4-40 hex nuts (843-121-002) and faston tabs (760-022-262) from keyboard plate (286-002-037).

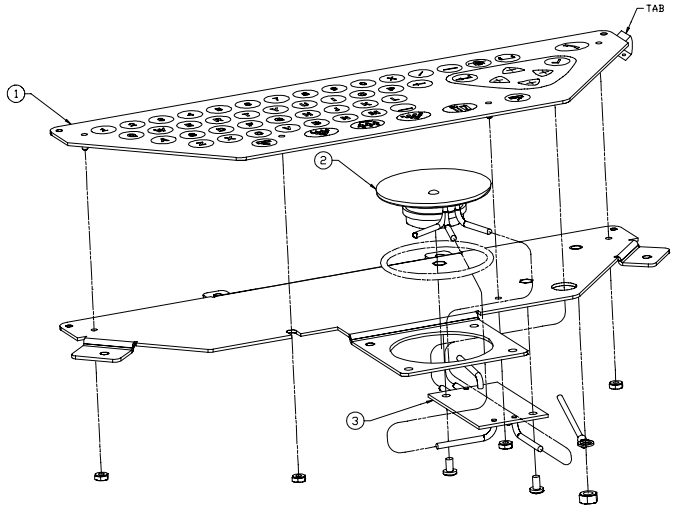

Figure 4-2. Removing Icon Keyboard From Keyboard Plate

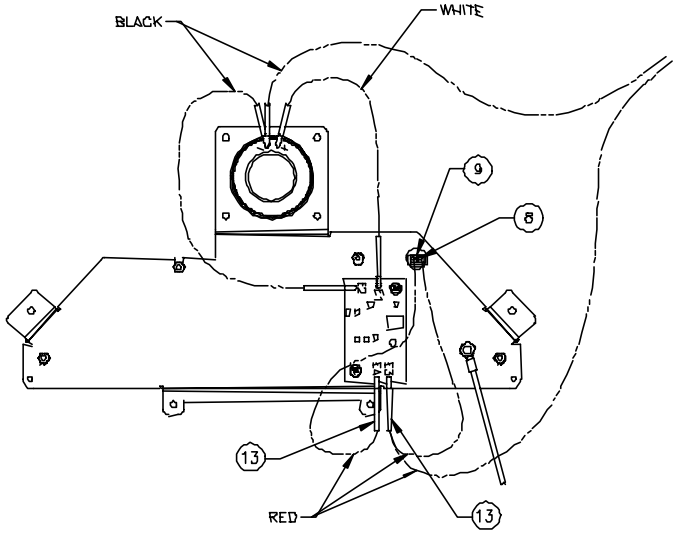

Figure 4-3. Attaching and Soldering Wires

3. Remove the icon keyboard (286-001-089) from the keyboard plate (286-002-037).

4. Solder 2.5 feet (76.20 cm) of #18 AWG stranded black wire (010-100-100) to 2 ¼ -inch intercom/BT speaker (770-047-175) marked by the negative (-) sign.

5. Solder 5 feet (152 cm) of #18 AWG stranded white wire (010-100-109) to 2 ¼ -inch intercom/BT speaker (770-047-175) marked by the positive (+) sign.

6. Locate and route the intercom PCB (286-001-066) through the speaker hole on the keyboard plate (286-002-037).

7. Solder 2.5 feet (76.20 cm) of #18 AWG stranded red wire (010-100-102) one end to E4 connector located on the intercom PCB and the other end attach to molex connector located on the keyboard plate (286-002-037).

8. Solder 2.5 feet (76.20 cm) of #18 AWG stranded red wire (010-100-102) one end to E3 connector located on the intercom PCB and the other end attach to molex connector located on the keyboard plate (286-002-037).

9. Place the o-ring (919-100-001) onto the speaker mounting hole. This will hold the speaker in place snuggly.

10. Route the #18 AWG stranded black wire (010-100-100) already attached to the other end of the 2 ¼ -inch intercom/BT speaker (770-047-175) through the speaker hole and solder to the E2 connector located on the intercom PCB.

11. Route the #18 AWG stranded white wire (010-100-109) already attached to the other end of the 2 ¼ -inch intercom/BT speaker (770-047-175) through the speaker hole and solder to the E1 connector located on the intercom PCB.

12. Mount the intercom PCB (286-001-066) to the keyboard plate (286-002-037) using two #6-32 x ¼ phillips pan head screw (818-227-042).

13. Replace icon keyboard (286-001-089) from keyboard plate (286-002-037).

14. Replace the four #4-40 hex nuts (843-121-002) and faston tabs (760-022-262) from keyboard plate (286-002-037) and close front cover on bowler terminal.

15. Set the switches on the bowler terminal board by using the switch configuration label settings (286-001-074) located on the pedestal assembly (286-002-056). For proper configuration, refer to the section called Switch Configuration Settings.

16. Vacuum and remove debris from around the bowler terminal area after performing the intercom upgrade.

17. Turn power on and verify that everything is working correctly.

4.3 Standard Bowler Terminal Console (with LCD Display Upgrade)

This section describes the procedures necessary to upgrade the standard bowler terminal when the LCD Display feature has been purchased. You will be installing the LCD-to-BT board cable assembly, a speaker, a LCD mount bracket and a LCD display in this procedure. Figure 4-4 displays the necessary information to assist you in your installation.

WARNING

Do NOT enter the bowler terminal until all power to the unit is turned off at the main breaker box or serious injury could result.

1. Verify that the power to the unit is turned OFF at the main circuit breaker.
2. Open front cover on bowler terminal and remove four #4-40 hex nuts (843-121-002) and faston tabs (760-022-262) from keyboard plate (286-002-037).

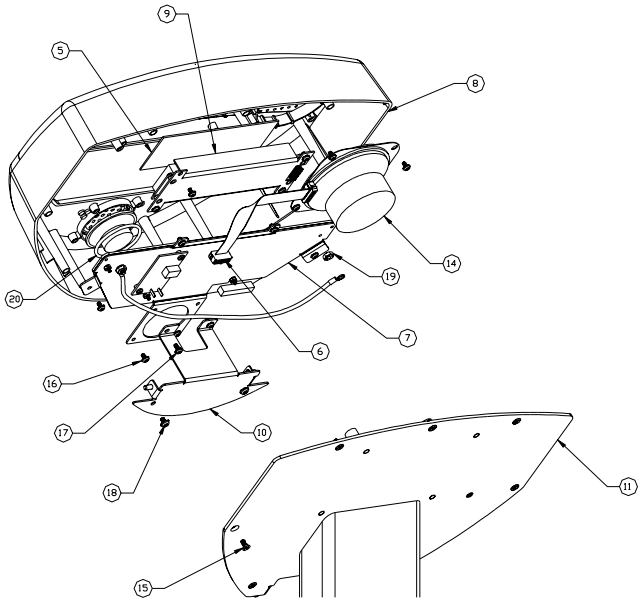

Figure 4-4. Front Cover Of Bowler Terminal Exposing Parts To Be Installed

3. Install LCD mounting bracket (286-002-057) to the LCD display using four #4-4 pan head phillips sems (817-921-032).

4. Attach and secure the 4-inch round speaker (770-064-240) to the front cover (286-002-052) of the bowler terminal using four #6-32 x ¼ phillips pan head sems (818-227-042).

5. Attach the LCD-to-BT board cable assembly (286-002-016) to the 4-inch round speaker (770-064-240) on one end and attach the other end to the LCD final assembly (286-002-053).

6. Set the switches on the bowler terminal board by using the switch configuration label settings (286-001-074) located on the pedestal assembly (286-002-056). For proper configuration, refer to the section called Switch Configuration Settings.

7. Vacuum and remove debris from around the bowler terminal area after performing the LCD Display upgrade.

8. Turn power on and verify that everything is working correctly.

4.4 Lower Monitor Bowler Terminal Console Installation

The installation for the lower monitor bowler terminal is more difficult to perform. Figure 4-5 displays one way to position the bowler terminal in relation to the ball return. Install the bowler terminal according to the following procedure:

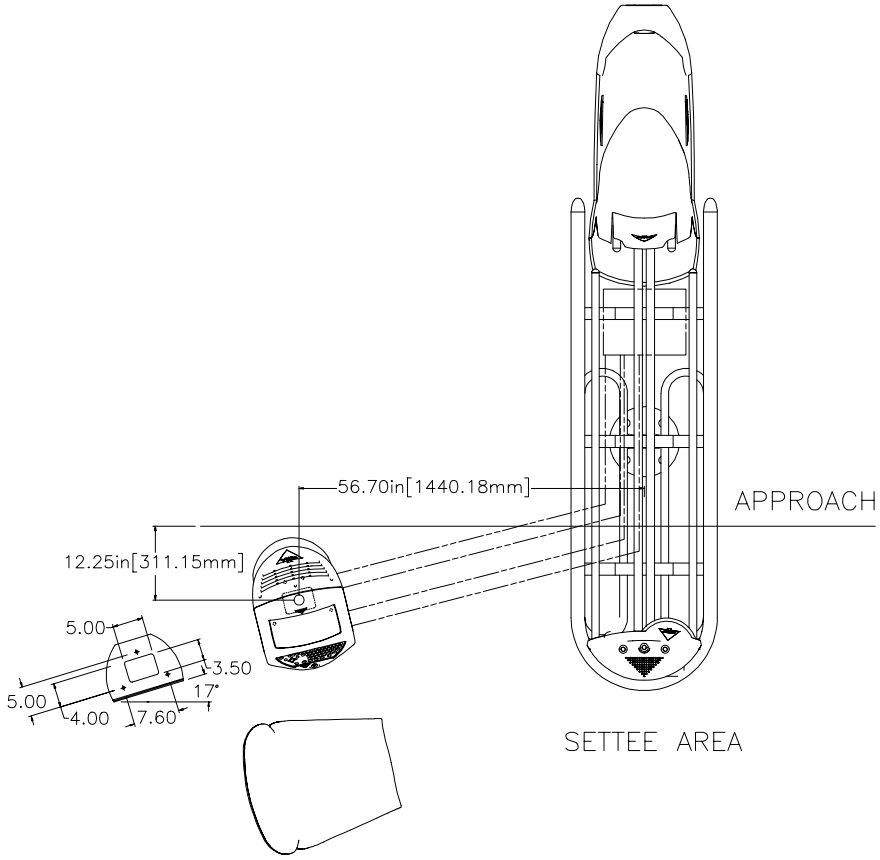

Figure 4-5. Example Placement For Lower Monitor Bowler Terminal

1. Remove the four #10-24x3/4 phillips head sems screws (818-239-122) from the bowler terminal back cover (286-002-026) and pull the back cover off slowly. Be very careful not to extend the cables that are attached.

2. Remove the two #10-24x3/4 phillips head sems screws (818-239-122) from the bowler terminal front cover assembly (286-002-040).

3. Remove and discard the four shipping bolts from the base of pedestal (286-002-030).

4. Lift and remove the bowler terminal from the shipping container.

5. Position and align the lower monitor bowler terminal so that the rear edge of the bowler terminal pedestal is facing the lanes and the bowler terminal is placed over the cable conduit approximately 9.75 inches (24.76 cm) from the ball return.

6. Drill four mounting holes to secure the bowler terminal base to the floor.

7. Vacuum and remove debris from around drilled holes.

8. Verify that the power cable from the AC power supply to the bowler terminal is NOT connected at this time.

9. Route and attach J1 and J2 cables from floor outlets to the bowler terminal board located in the bowler terminal console.

10. Route the AC power cord (232-007-088), signal cables, communication cables through the hole in the pedestal.

11. Ensure that the bowler terminal is mounted flush to the floor underneath. Insert and tighten four 8mm x 75 mm hex head screw bolts (709-013-059) to base of bowler terminal.

12. Set the switches on the bowler terminal board by using the switch configuration label settings (286-001-074) located on the pedestal assembly (286-002-056). For proper configuration, refer to the section called Switch Configuration Settings.

13. Replace the front cover assembly (286-002-040) onto the bowler terminal and insert two #10-24x3/4 phillips head sems screws (818-239-122).

14. Ensure that all cables are connected properly and replace the back cover (286-002-026) onto the bowler terminal console.

15. Insert the four #10-24x3/4 phillips head sems screws (818-239-122) into the bowler terminal back cover (286-002-026).

4.5 Switch Configuration Settings

The bowler terminal installation is not complete unless the switch settings have been configured properly on the bowler terminal PCB. The bowler terminal PCB is shipped with default settings. The following procedures are necessary when making adjustments on the bowler terminal PCB. Figure 4-6 is a sample copy of the switch settings. Select the switch settings that best suit your bowling center needs. Configure the settings for the appropriate pinspotter type and bowling format pins.

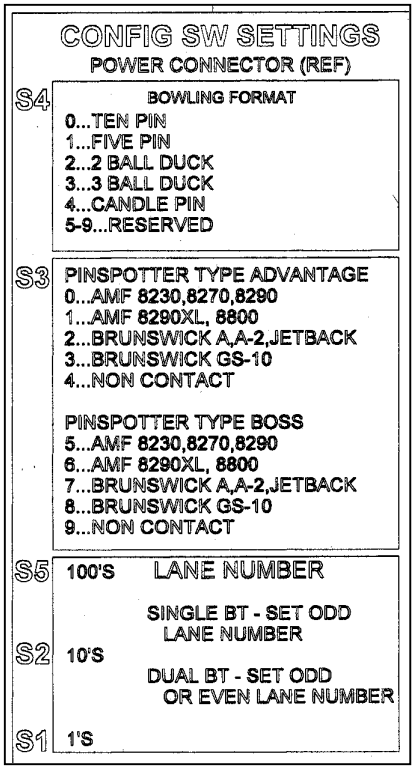

Figure 4-6. Sample Copy Of The Switch Configuration Label

Look on the bowler terminal PCB and notice the switch settings. Figure 4-7 depicts the switches that are located on the board.

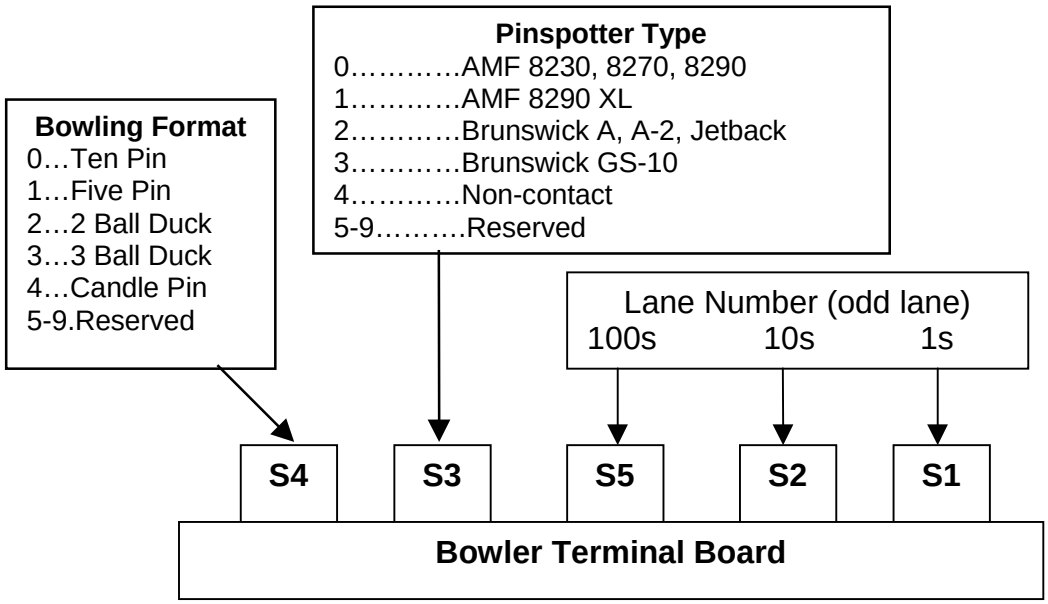

Figure 4-7. BOSS Scoring Bowler Terminal PCB Switch Configuration Settings

4.6 Setup and Testing

After completing the installation, perform the following steps to ensure proper operation.

1. Turn on BOSS Front Desk System so that to check software operation.

2. Turn on power at the main circuit breaker, turn on the associated pinspotters, and verify that the bowler terminals operate properly.

3. Turn on the standard bowler terminal and verify that the keyboard works properly.

4. Type in your name on the bowler terminal keyboard. Wait to see if the system responds correctly and display you name on the score grid of the overhead monitor assembly.

5. If you purchased the intercom upgrade, test the system by pressing the intercom button. Wait to hear a sound from the speaker.

6. If you purchased the LCD display, test the system by typing any message on the screen. Check to see if the message is displayed correctly.

7. Turn on the lower monitor bowler terminal and that the keyboard works properly.

8. Verify that the monitors do not need to be adjusted.

9. If lower monitor adjustments are required, ensure that back cover is off the rear of the bowler terminal.

10. To adjust the Horizontal alignment, look for the "H" on the control board and turn the controls in a direction such that the horizontal alignment is set correctly.

11. To adjust the Vertical alignment, look for the "V" on the control board and turn it in a direction such that the vertical alignment is set correctly. After the necessary adjustment has been made, replace back cover on the bowler terminal and began to bowl again.

12. After all tests have been performed satisfactory, place the standard and the lower monitor bowler terminal in service for operation in the bowling center.

SECTION 5 MOUNTING THE ACCUCAM PINSENSE SYSTEM

5.1 GENERAL

1. The pinsensor is mounted on the underlane capping, forward of the sweep home position. The underlying structure must be rigid so as to prevent movement of the AccuCam. The pinsensor is placed so as to capture pins left standing on either of two adjacent (even and odd) lanes after a ball trigger. If underlane capping is made of steel, mount the cameras on insulating strips to prevent the camera from shorting out when mounted directly to the underlane capping.

2. If underlane capping is plastic or made of a thin wood, reinforce with plywood. Take the capping off, attach the plywood, replace the capping and then mount he camera on the capping.

5.2 MOUNTING THE PINSENSOR

1. **MEASURE the distance between the inside edges of two adjacent (even/odd) lanes where the gutter begins. This is distance "A" as shown in Figure 5-1.**

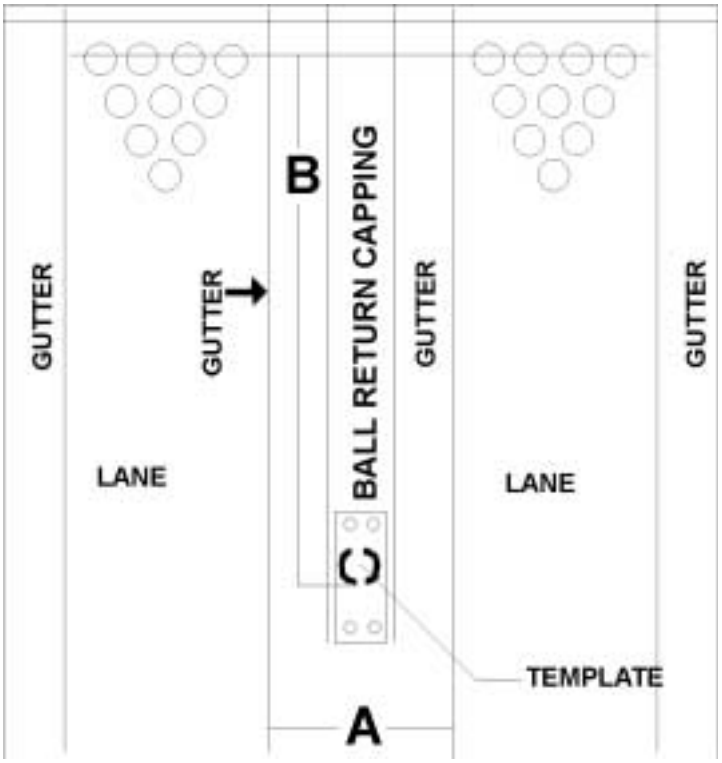

Figure 5-1 Pinsensor Mounting Location

5.2 MOUNTING THE PINSENSOR (continued)

2. From Table 5-2, FIND the range that corresponds to distance "A" of Figure 5-1. SELECT the corresponding distance "B", which is the distance from the center of the 7 - 10 pin line to the back of the pinsensor.

Table 5-2 Pinsensor Location Table

"A" distance	"B" distance
28" - 29"	157" - 157.5"
29.5" - 30"	158" - 158.5"
30.5" - 31"	159" - 159.5"
31.5" - 32"	161" - 161.5"

3. MARK the capping at distance "B".

4. CENTER the drill template on the ball return capping so that the back of the pinsensor is at distance "B".

NOTE: For standard ball return capping material, the #31 drill bit and #10 sheet metal screws should be used. For thinner wood or metal capping, #10 machine screws or bolts should be used.

5. Using the drill template, DRILL four pilot holes in the ball return capping for the pinsensor chassis and four holes for the cover.

6. Using #10-32 mounting screws and washers, SECURE pinsensor to the capping.

7. ATTACH the power cable assembly from the Machine Interface to the AccuCam and the camera interface.

8. ATTACH the internal communication cable to the interface board and to the AccuCam.

9. ATTACH the camera lane communication cable from the Machine Interface to the communication port on the camera.

5.3 HEIGHT ADJUSTMENT AND ALLIGNMENT

1. ASSEMBLE height gage and alignment targets as shown in Figure 5-2.

2. REMOVE the cover from the pinsensor and LOOSEN the two height adjustment locking screws (A-1 and A-2) shown in Figure 5-3.

3. POSITION height gauge across ball return capping so that legs of gauge rest on lanes just outside of gutters.

4. RAISE pinsensor head above height bar, and SLIDE the flat edge of the bar under the lower front lip of the pinsensor head assembly so that head is supported by the bar.

5. READ bubble level on the head. Does bubble indicate camera is level?

   YES - TIGHTEN height adjustment locking screws and GO TO step 7.
   NO - VERIFY pinsensor base is in center of capping and no obstructions are present, then GO TO next step.

6. Without changing height, LEVEL pinsensor head and SECURE it with locking screws.

7. MEASURE center of lens and VERIFY it is approximately 9 5/8" above the lane deck.

5.4 HORIZONTAL AND VERTICAL ALLIGNMENT

NOTE: While making adjustments, pit lights must be on, and installer should be positioned on a lane behind the pinsensor, not on ball return capping.

1. LOOSEN horizontal locking screws on pinsensor (Figure 5-3, item B), so that the screw heads are just making contact.

2. LOOSEN two top thumb nuts (Figure 5-3, item C), so there is approximately 1/4" clearance to the washers beneath.

3. ADJUST two bottom thumb nuts (Figure 5-3, item D), so that the front lips of pinsensor head are approximately 1/4" apart and parallel.

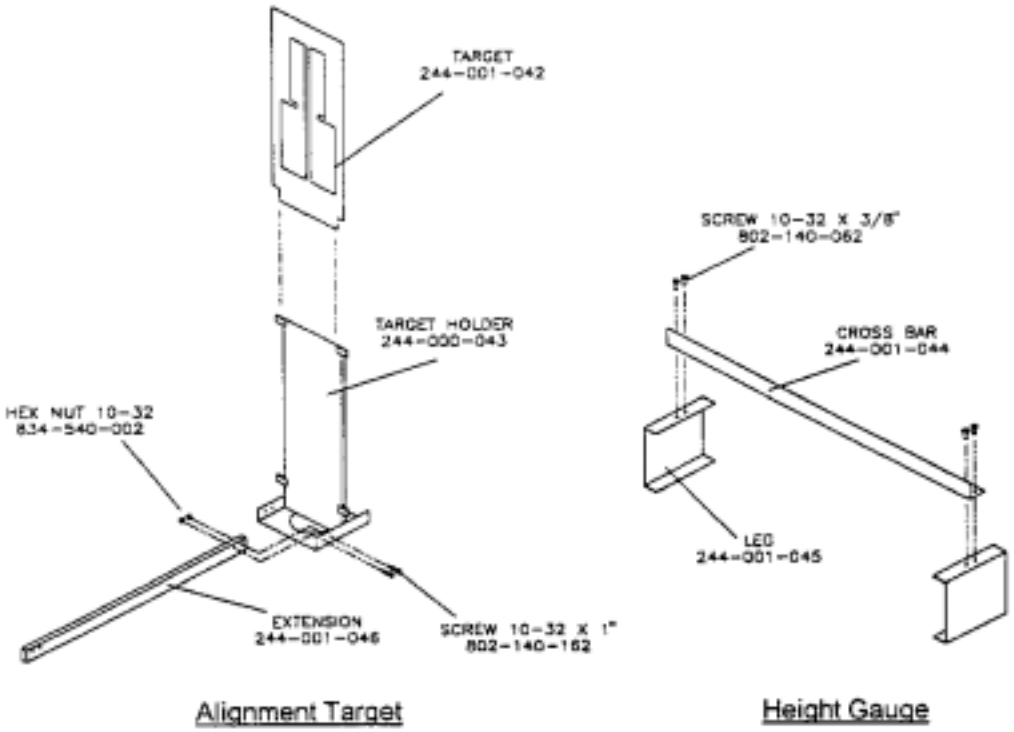

Figure 5-2 Height Gauge and Alignment Targets

5.4 HORIZONTAL AND VERTICAL ALIGNMENT (continued)

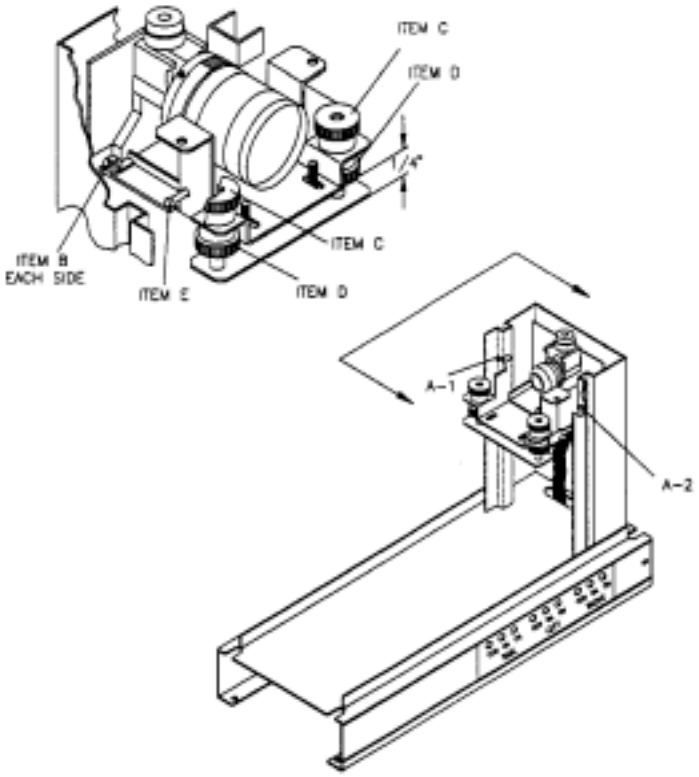

Figure 5-3 Horizontal and Vertical Adjustment Screws

4. INSTALL extension arms on the target holders.

5. Using the guides, INSTALL alignment targets on the target supports.
   ENSURE:
   a. Target is flat.
   b. Target bottom edge rests on the base.
   c. Targets are clean.

NOTE: If pinsensor is to serve one lane only, the seven pin and ten pin spots on a single lane should be used.

6. With targets facing bowler approach (up-lane), PLACE one target directly on the center of the seven pin spot on the left lane, and the other target directly on the center of the ten pin spot on the right lane.

5.4 HORIZONTAL AND VERTICAL ALIGNMENT (continued)

7. APPLY power to the pinsensor, and SET switch on rear of unit to the ALIGN position (opposite RUN).

8. Using left and right bottom thumb nuts (Figure 5-3, item D), ADJUST pinsensor head until the bubble is level.

NOTE: Left side of pinsensor ("LEFT" LED's) senses apparent vertical position of right target, and is adjusted with the bottom left thumb nut.

Right side of pinsensor ("RIGHT" LED's) senses apparent vertical position of left target, and is adjusted with the bottom right thumb nut.

Horizontal position of pinsensor ("SIDE" LED's) indicates left to right centering, and is adjusted with the horizontal adjustment screw.

CW or CCW LED's when lit indicate direction in which to turn adjustment screw or nut.

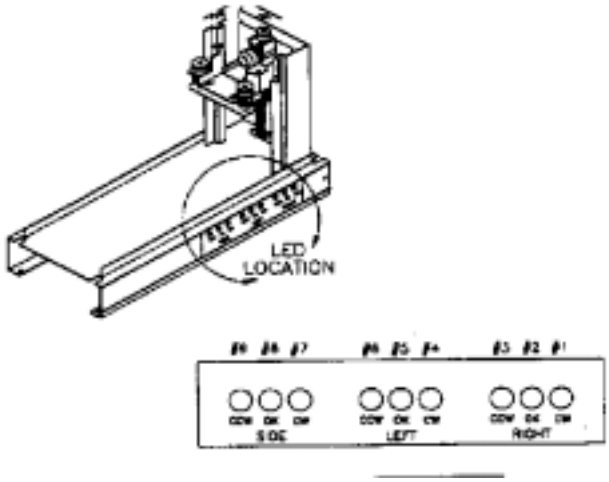

Figure 5-4 AccuCam LED Display

9. REFER TO Figure 5-4 for the layouts of the LED's on the pinsetter chassis.

5.4 HORIZONTAL AND VERTICAL ALIGNMENT (continued)

10. POSITION the horizontal adjustment screw (Figure 5-3, item E) so that the pinsensor is mid-range of the acceptable position:

    a. TURN screw until "OK" LED is lit.
    b. SLOWLY TURN screw CCW until CW LED lights.
    c. SLOWLY TURN screw CW until CCW LED lights.
    d. SLOWLY TURN screw CCW approximately half of the last turn.
    e. VERIFY "OK" LED is lit.

NOTE: LEFT and RIGHT adjustments are interactive and should be adjusted alternately 1/3 turn at a time.

11. POSITION the bottom left and bottom right thumb screws alternately so that pinsensor is in an acceptable vertical position:

    a. TURN bottom left thumb screw 1/3 turn in direction indicated (CW or CCW) by lit LEFT LED.
    b. TURN bottom right thumb screw 1/3 turn in direction indicated (CW or CCW) by lit RIGHT LED.
    c. REPEAT steps a. and b. until "OK" light is lit for both LEFT and RIGHT LED's.

12. REPEAT step 10. to re-verify the horizontal adjustment is correct.

13. While observing the LED's, SLOWLY TIGHTEN the two horizontal locking screws.

14. If pinsensor goes out of vertical adjustment, SLIGHTLY LOOSEN two horizontal locking screws and REPEAT step 11.

15. REPEAT steps 13 and 14 if necessary.

16. TIGHTEN upper thumb nuts securely to lock pinsensor in place.

17. RETURN toggle switch on rear of unit to "RUN".

18. Carefully PLACE cover over pinsensor and LOCK under screws.

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SECTION 6 INSTALLING THE MACHINE INTERFACE (MI) BOX (except for 8290XL and 8800 Gold Pinspotters)

6.1 GENERAL

1. The Machine Interface (MI) Box mounting surface consists of a minimum ½" thick sheet of plywood 2' x 2' square which is mounted during the Pre-Installation. The MI Box contains connections between the pinspotter and the CPU. Communication cables must be run between the MI Box and the camera, Bowler Terminal, and CPU.

6.2 MACHINE INTERFACE BOX MOUNTING

1. ENSURE the plywood mounting surface is centered between the pair of lanes.

2. Using wood screws, ATTACH the MI Box to the plywood mounting panel provided by the Bowling Center during Pre-Installation.

3. CONNECT cables to MI Box: (see Figure 6-1)

   a. Power cable
   b. Camera power cable
   c. Camera Lane communication cable
   d. Bowler Terminal Com. cable

6.2 MACHINE INTERFACE BOX MOUNTING (continued)

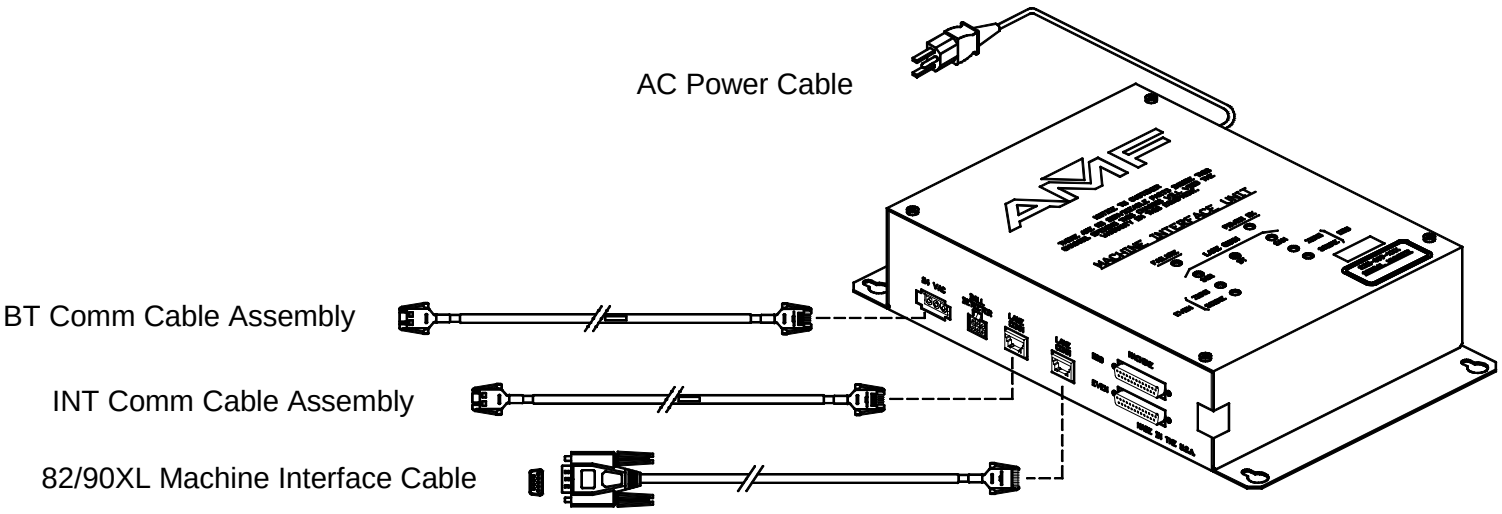


Figure 6-1 Connections to Machine Interface

6.3 CONNECTING AMF BALL DETECTOR TO PINSPOTTER

WARNING: Power, and motor plugs, to pinspotter and power to the ball detector must be removed before making pinspotter connections or serious injury may result.

1. DISCONNECT power chassis from AC power.

2. DISCONNECT power and motor plugs to pinspotter machine.

SECTION 7 INSTALLING CLUSTER SWITCH (for use with Brunswick Pinspotters)

7.1 INSTALLING CLUSTER SWITCH

WARNING:The pinsetter contains moving parts in which loose clothing or jewelry may become entangled. Installer must stand clear of the pinsetter when it is in motion and use caution when working around the machine, or injury may result.

1. ZERO the Brunswick pinsetter.

2. PRE-ADJUST cluster switch zero setting:

   a. LOOSEN two screws on zero degree (single) microswitch.
   b. MOVE switch until lower cam lobe activates microswitch (click is heard).
   c. TIGHTEN two screws on zero microswitch.

3. SET cluster switch gear to known zero.

4. MOUNT cluster switch assembly on Brunswick pinsetter motion detector.

5. GO TO second ball on pinsetter.

6. ADVANCE pinsetter until 4 to 1 arm reaches the tip of the rake lever.

7. ADJUST cluster switch 44/144 setting:

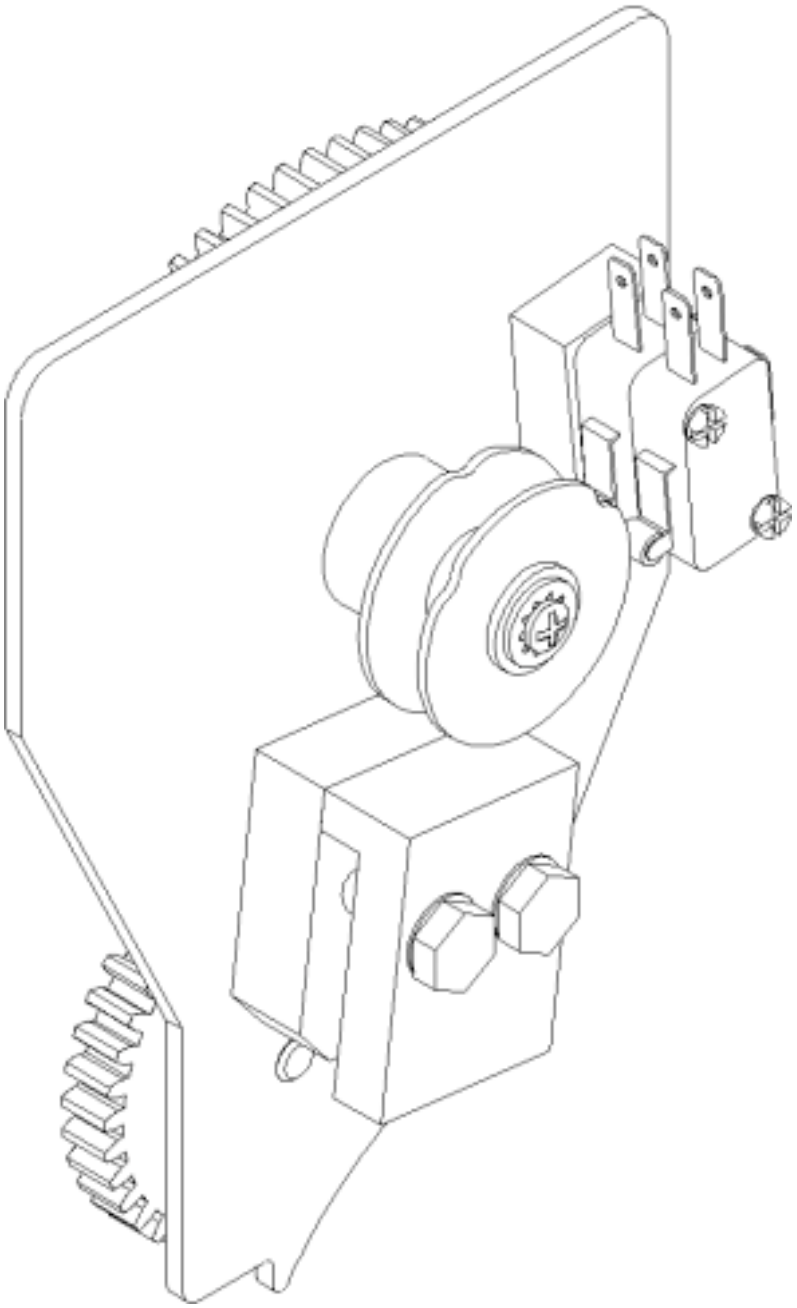
   a. LOOSEN two screws on 44/144 degree (upper) microswitch.
   b. MOVE switch until upper cam lobe activates microswitch (click is heard).
   c. TIGHTEN two screws on 44/144 microswitch.

8. ACTIVATE pinsetter and ENSURE:

   a. Zero microswitch is activated when pinsetter is at zero degrees and is not activated when it is off zero degrees.
   b. 44/144 microswitch is activated when pinsetter is at 44/144 degrees and is not activated when it is off 44/144 degrees.

7.1 INSTALLING CLUSTER SWITCH (continued)

9. ATTACH cable assembly (P/N 232-008-243) to cluster switch and MI Box.



7-1 Cluster Switch

SECTION 8 INSTALLATION CHECK LIST

8.1 GENERAL

1. This check list is to be used by the installer to ensure correct operation of the system components.

2. Installer must initial each item on the list, complete all items, and sign and date the check list upon completion.

3. If any test does not apply, note "Not Applicable" under comments.

4. Leave one copy of the completed checklist in the Bowling Center Troubleshooting Manual.

5. Send copies to AMF Service Manager and Tech Support.

8.2 BOSS™ SCORING SYSTEM TESTS

Initial	Test	Lanes	Comments
	Score 1st Ball	1-___	
	Score 2nd Ball	1-___	
	Score 1st Ball Foul	1-___	
	Score 2nd Ball Foul	1-___	
	RPO from Console	1-___	
	RPO from Mechanics Button	1-___	
	Turn Machines ON/OFF from Computer	1-___	
	Turn ON Instructomat from Computer if applicable	1-___	
	Bowler Console Functional	1-___	
	Control Scorers from Computer	1-___	
	Monitors Adjusted for Score Grid	1-___	
	Television Video Adjusted	1-___	

8.3 FRONT DESK AND BACK OFFICE TESTS

Initial	Test	Comments
	Ticket Printer	
	Front Desk Terminal (s)	
	Back Office Printer	
	Back Office Monitor and Keyboard	
	Modem#_____	
	Cash Drawers	
	Pole Display (s)	
	Additional Back Office Terminals	
	Receipt Printer (s)	

8.4 SYSTEM LAYOUT

1. Diagram Ethernet cable runs. Show repeater locations, if used.

2. Diagram video system cable run.

8.4 SYSTEM LAYOUT (continued)

3. If Encore is installed, list lane numbers:

_____

4. List locations of Auxiliary overhead monitors, and CPU to which it is attached:

Monitor between lanes:	CPU	Monitor between lanes:	CPU
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

5. Record additional information on layouts, unusual conditions, etc.

_____

_____

_____

_____

By _____ Installer

Date complete _____

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