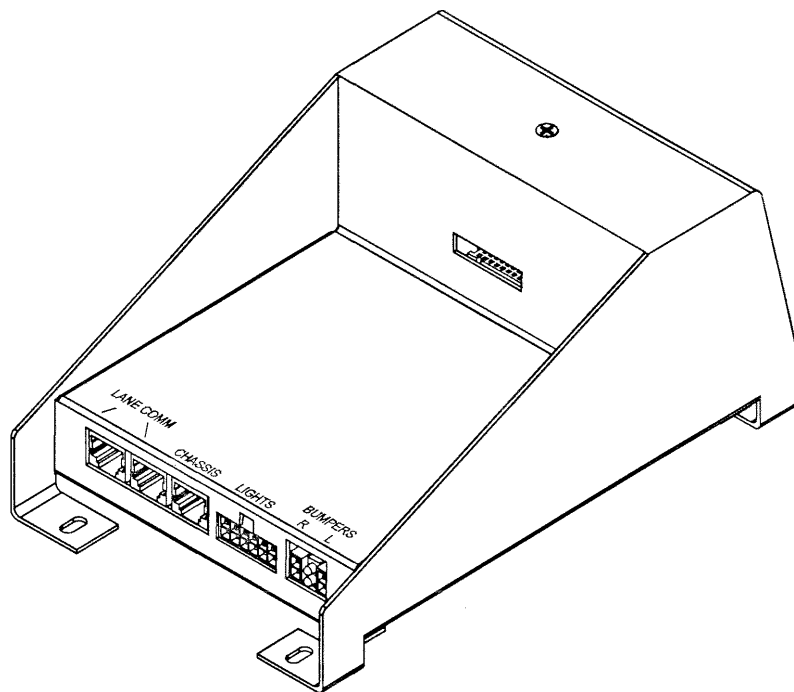




# ***AccuCam 3000***

## ***Installation, Operation and Parts Manual***



**UPDATED: 04/03/02**

**P/N:400-286-002 REV. B**



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## 1.0 HOW TO USE THIS MANUAL

This manual contains information needed to properly install, operate, and maintain the AccuCam 3000 camera. If any terms, concepts, or operations contained in this manual are not clear to you, consult an experienced professional or AMF Technical Support.

### 1.1 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 your local AMF representative. The 24-hour fax line is 1.804.730.4390. Address all faxes to AMF Technical Support.

	<b>WARNING!</b> Read This <b><u>BEFORE</u></b> Proceeding.
<b>TO AVOID INJURY:</b>  Read these safety precautions before attempting to install or modify any AMF equipment. Failure to follow these procedures may result in severe personnel injury and property damage.	

- ◆ 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 an AccuCam camera, be sure that all cables have been connected properly — especially the main power cables.



## Introduction

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### 1.2 PACKING LISTS AND TOOLS

Now that you have received your new camera, the first thing that you should do is to verify that you have received all of the correct parts. Refer to the appropriate list below.

If installing an OVERLANE return camera, you should receive the following parts:

<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>
400-286-002	Installation, Operation, Service, and Parts Manual	1
232-009-510	Accucam 3000 Camera	1
244-001-177	Tunnel Bracket Overlane Return Pinsensor	1
821-438-162	#10 x 1" hex head slotted screw	8

If installing an UNDERLANE return camera, you should receive the following parts:

<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>
400-286-002	Installation, Operation, Service, and Parts Manual	1
232-009-510	AccuCam 3000 Camera	1
244-001-176	Camera Protective Hood, Back	1
821-438-162	#10 x 1" hex head slotted screw	8

### 1.3 Installation Tools

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

25 ft Tape Measure	Pencil / Marker
5/16" Nut Driver	Vacuum cleaner
Hand Drill	Drill bits Spec size #19 or 11/64"





## 2.0 STANDARD CAMERA INSTALLATION

The optical camera is designed to be mounted on the ball return capping at a position where it can properly view the two adjacent pin decks. Because of the variations of ball return cappings and distances between adjacent lanes, mounting positions can vary. This procedure describes the installation required for proper operation.

The method of mounting the camera will be dependent upon the type of capping, but in all cases, some sort of standard fasteners should be appropriate.

### 2.1 METHODOLOGY

The positioning of the camera on the ball return capping is determined by the distance between the lanes. The system will accommodate lane separations between 27" and 33", typical of most installations. The wider the separation between lanes, the greater the distance between the camera and the pin deck. The proper mounting location for various lane separations, given in a table, provide the optimum separation of the pins as viewed by the camera.

### 2.2 CAMERA MOUNTING

The distance between adjacent lanes is first measured. The points at which the measurement should be taken are the inside edge of each lane where the gutter begins. This distance is then used to determine the correct distance from the camera mounting to the pin deck. The line of reference on the pin deck is the last row of pins (7 - 10). The mounting holes are then drilled and the camera is securely fastened. It is extremely important that the capping in this region be rigidly mounted. Failure to do this will result in scoring errors.

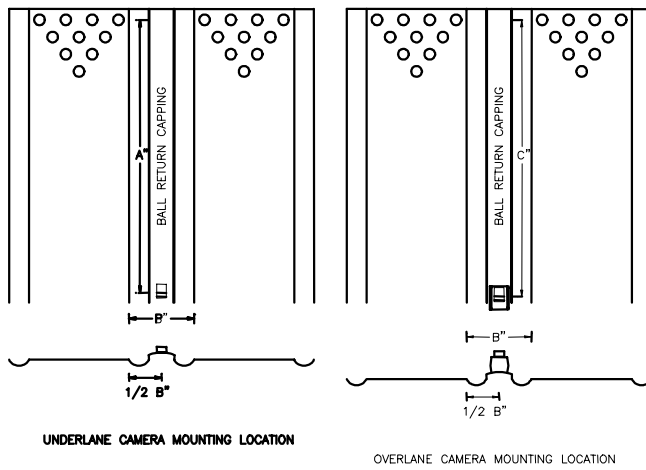
#### NOTE

The capping on which the camera is to be mounted must be securely fastened to the structure below. A rigid capping is required for proper camera performance.

#### NOTE

The final size of the hole depends upon the capping construction and the type of fasteners selected. The recommended drill size is adequate for the #10 sheet metal screw furnished for typical wood cappings. For thin wood or metal cappings, #10 machine screws and bolts are recommended (not furnished).

# Installation



**Pinsensor Location Table**

B Distance	A Underlane Ball Return	C Overlane Ball Return
28" – 29"	157"	159"
29.5" – 30"	158"	160"
30.5" – 31"	159"	161"
31.5" – 32"	161"	163"

**Figure 2.1. Camera Mounting Location**

**2.2.1** Refer to Figure 2.1. Measure the distance between the inside edges of the two lanes to nearest 1/2". Consult the table in Figure 2.1 for the distance measurements from the 7-10 pin line.

## **2.2.2 Underlane Ball Return Camera Mount**

2.2.2.1 Position the camera with its rear two retaining holes at the distance determined from figure 2.1, Pinsensor Location Table, Column A and centered laterally on the capping.

2.2.2.2 Mark and drill the four mounting hole locations using the drill bit specified in the tools list (#19 or 11/64"). Make any required cable connections to the camera front and pre-route the cables beneath the camera before securing it to the capping. Secure the camera using the supplied #10 screws. Connect the camera power cable.

2.2.2.3 Position the Camera Ball Deflector (244-001-176) 1/4" behind the camera. Mark and drill the four mounting hole locations using the drill bit specified in the tools list (#19 or 11/64"). Secure the deflector using the supplied #10 screws.

**2.2.3 Overlane Ball Return Camera Mount** using a new Tunnel Bracket, (244-001-177).

2.2.3.1 The mounting distance for the Overlane Tunnel Bracket is two inches greater than the Underlane camera mounting distance.



2.2.3.2 Position the Tunnel Bracket (244-001-177) with its rear two mounting holes at the distance derived from figure 2.1, Pinsensor Location Table, Column C and centered laterally on the capping.

2.2.3.3 Mark and drill the four mounting hole locations using a #19 or 11/64" drill bit. Secure the bracket to the capping using the supplied #10 screws.

2.2.3.4 Make any required cable connections to the camera front and pre-route the cables beneath the camera before securing it to the tunnel bracket. Mount the camera to the bracket using the supplied hardware. Connect the camera power cable.

**2.2.4 Overlane Ball Return Camera Mount** using an existing Tunnel Bracket, (244-001-091)

Remove the existing scoring camera from the tunnel bracket. Retain the mounting hardware for re-use.

Position the AccuCam 3000 onto the bracket. The camera should be centered laterally on the bracket and as close to the pinspotter end of the bracket, as possible. Mark the four camera mounting holes on the tunnel bracket. Using a drill bit sized to give clearance for the retained hardware, drill the four camera mounting holes into the tunnel bracket. Make any required cable connections to the camera front and pre-route the cables beneath the camera before securing it to the tunnel bracket. Mount the camera onto the tunnel bracket using the hardware retained previously and from the adapter kit. Connect the camera power cable.

Relocate the tunnel bracket so that the AccuCam 3000 camera will be positioned correctly onto the tunnel bracket. Remove and retain the four screws currently securing the tunnel bracket.

Move the camera/tunnel bracket assembly along the ball return until the two rear mounting holes of the AccuCam 3000, (**DO NOT** use the rear two holes of the tunnel bracket), are the distance determined from the table in figure 2-1. Pinsensor Location Table, Column A. Center the bracket laterally onto the ball return.

Mark and drill the four mounting hole locations using a #19 or 11/64" drill bit. Secure the camera/tunnel bracket assembly to the ball return re-using the four screws.

Connect the camera power cable.



# Installation

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## 2.3 ACCUCAM 3000 RETROFIT KIT INSTALLATION

The materials needed to refit one lane pair are provided in the following kits:

244-001-178 Adapter Kit, Accuscore XL/BOSS to AccuCam 3000

244-001-179 Adapter Kit, Accuscore Plus to AccuCam 3000

### **2.3.1 Adapter Mounting**

#### **2.3.1.1 Underlane Ball Return**

1. Position the adapter assembly onto the capping behind the camera. The adapter should be placed to fit fully under the Camera Protective Hood, (244-001-175). Verify that the placement of the adapter will not interfere with the connection of the camera power cable and that all other cables can be connected to the adapter with ample clearance from the camera body and the protective hood.
2. Mark and drill the two mounting hole locations using the drill bit specified in the tools list (#19 or 11/64"). Secure the adapter assembly to the capping using the supplied #10 screws.

#### **2.3.1.2 Overlane Ball Return**

1. Remove the adapter PCB assembly from the mounting plate. Retain the four screws for re-use later in this section.

##### **2.3.1.2.1 Using a new tunnel bracket**

1. If a new Tunnel Bracket (244-001-177), is being used, the adapter PCB assembly is mounted to the tunnel bracket behind the camera using the existing holes in the bracket.
2. Place the spacers on the topside of the tunnel bracket and secure with screws from the bracket bottom side. Place the adapter PCB assembly on the spacers and secure with the existing screws.



### **2.3.1.2.2 Using an existing tunnel bracket**

1. If an existing tunnel bracket is being used, position the adapter PCB assembly onto the tunnel bracket behind the AccuCam 3000. Verify that the placement of the adapter will not interfere with the connection of the camera power cable and that the other cables can be connected to the adapter with ample clearance from the camera body.
2. Mark the four adapter PCB assembly mounting holes. Using a drill bit sized to give clearance for the provided screws, drill the four PCB mounting holes into the tunnel bracket.
3. Place the spacers on the topside of the tunnel bracket and secure them with screws from the bottom side of bracket. Place the adapter PCB assembly onto the spacers and secure them with the screws.

### **2.3.2 Electrical Connections**

#### **2.3.2.1 BOSS/XL Scoring Equipment**

1. Connect the cable from the AccuCam 3000 to **J1** - CAMERA of the adapter PCB.
2. Connect the cable from the pinspotter to **J2** - PINSPOTTER.
3. Connect the lane communications cables to **J3 & J4** - LANE COMM.

#### **2.3.2.2 Plus Scoring Equipment**

1. Connect the cable from the AccuCam 3000 to **J1** - CAMERA of the adapter PCB.
2. Connect the cable from the pinspotter to **J2** - PINSPOTTER.



## Installation

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### 2.4 DUAL CAMERA INSTALLATION

Refer to drawing 244-001-182 DUAL CAMERA INSTALLATION, ACCUCAM 3000.

Mount each camera as described in Section 2.2. The measurement used should be derived from Fig. 2.1, Pinsensor Location Table, "B" Distance – 28-29 inches.

Mount item 1 (Adapter Box Assembly, 244-001-030) and item 11 (Dual Camera Interface Assembly, 244-001-184) approximately as depicted on drawing 244-001-182).

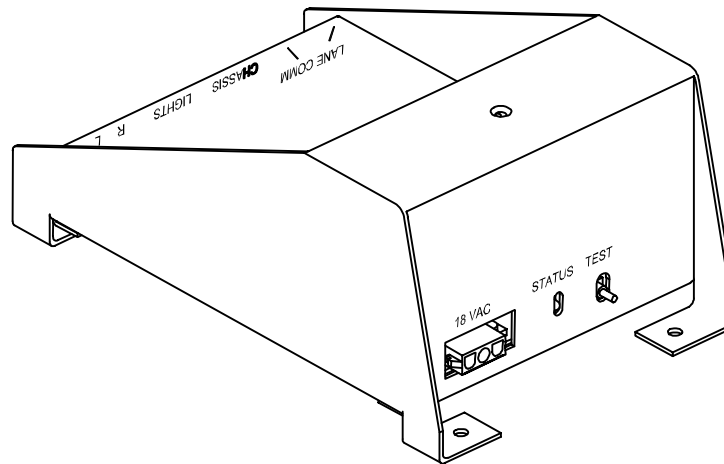
Mount item 13 (Transformer, 232-009-116) on curtain wall.

Identify, install and connect all electrical cables as diagrammed on drawing 244-001-182.



### 3.0 MODE SELECTING THE ACCUCAM 3000 OPTICAL PINSENSOR

Located on the rear of the pinsensor, to the right of the 18 volt power connector, are a single white push- button marked “Test” and a green indicator marked “status”. The Status indicator is used to determine the operating mode and condition of the pinsensor and the white push-button is used to set the operating mode. Refer to Figure 3.1.



**Figure 3.1 Rear of Camera showing LED**

The green status indicator exhibits the following attributes in the following order:

- 1) When power is first applied (or the pinsensor initializes itself after a reset condition) the indicator will be lit solid for approximately 5 seconds after which it will go dark for approximately one second.
- 2) From 0 (zero) to 5 (five) “blinks” will occur at the end of the dark portion of the reset cycle.
- 3) About one second after step 2, the pinsensor will begin a rhythmic blink at a rate of approximately one blink per second to indicate it is functioning correctly.

To turn a mode on or off is simple:

- a) Press and hold the test button until the status light goes dark (about 5 seconds) and then release the button.



## Installation

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- b) Modes TOGGLE. If on, selecting a mode will turn it off. If off, selecting a mode will turn it on. Quickly press the test button ONCE briefly to turn mode one (1) on or off.

OR...

Quickly press the test button TWICE briefly to turn mode two (2) on or off

OR...

Quickly press the test button THREE TIMES briefly to turn mode 3 on or off.

OR...

Quickly press the test button FIVE TIMES briefly to turn mode 5 on or off.

- c) Allow the pinsensor to restart itself after the button presses. This will take about 5 seconds.
- d) The pinsensor will indicate the new operating mode(s) as it finishes the reset process. You can confirm the mode setting by following the numbered steps above.

The AccuCam 3000 Pinsensor has multiple operating modes. The appropriate operating mode is selected by pressing the white test button on located on the rear of the camera.

To observe the current operating mode, simply unplug the power connector and plug it back in, to start the status indicator at step 1 shown above, or hold the test button in for at least 5 seconds, until the status light goes dark. Releasing the button will then start the status indication cycle. The operating mode(s) will be displayed as described in step 2.

If the camera indicator goes from solid on (reset in progress) to the rhythmic, 1 blink per second "heartbeat", there are no modes selected. No mode selected indicates the camera is programmed to operate with a XL class pinspotter chassis only.

If you observe a one (1) blink between reset and the heartbeat, then mode 1 is turned on. Mode 1 programs the camera communications with AMF XL or BOSS scoring.

If you observe two (2) blinks between reset and the heartbeat, then mode 2 is turned on. Mode 2 should be selected for only for dual camera operation where the separation between lanes requires 2 cameras for the lane pair.

If you observe three (3) blinks between reset and the heartbeat, then mode 3 is turned on. Mode 3 should be selected to add a scoring delay between the ball triggering the machine and the camera scoring pin-fall. This delay is only used for AccuScore Plus Scoring models. Neither XL nor BOSS needs this delay.





Note that more than one mode may be turned on at the same time. You may need dual cameras on a split lane with AccuScore Plus Scoring, where both modes 2 and 3 are required.

There is currently no 4 blink mode.

There is a 5 blink mode that is for factory test only. It should remain off at all times.

The indicator will show all modes that are currently turned on, during the mode display period between reset and the heartbeat. You could observe the reset period, two blinks, three blinks and the heartbeat. This would indicate both modes two and three are on.

Turn each mode on or off independently. Repeat the above steps for each mode you wish to change. The pinsensor will remember the selected operating mode(s) until it is changed. Removing and reapplying power doesn't affect the remembered setup.

## 3.1 MODES OF OPERATION

Refer to the LED on the rear of the camera when powering up the camera to observe the mode of operation.

**Table 3.1 Modes of Operation**

<b>Mode</b>	<b>Mode Description</b>	<b>Scoring Type/Camera Type/Time Delay/Test Mode</b>
0	No Mode Selected	All modes off; camera must be set
1	Scoring Type	* <b>ON</b> - BOSS/XL/ Signature Scoring <b>OFF</b> – AccuScore Plus/No Scoring
2	Camera Type (Pass Thru Operation)	<b>ON</b> - Dual Camera (2 per pair) * <b>OFF</b> – Single Camera (1 per pair)
3	Time Delay	<b>ON</b> - 2 Second Delay (AccuScore Plus Scoring) * <b>OFF</b> – No Time Delay
4	Not Used	<b>ON</b> – N/A * <b>OFF</b> – N/A
5	Test Mode	<b>ON</b> - Test mode * <b>OFF</b> – Normal operation

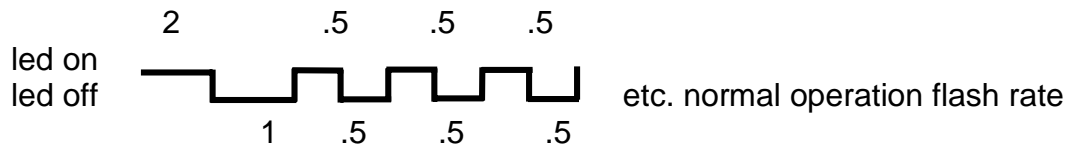
\*Factory Default Settings: 1 – ON      3 – OFF      5 - OFF  
   2 – OFF      4 – OFF

some example power up sequences: the numbers indicate seconds

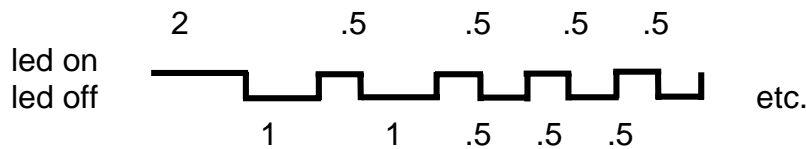


# Installation

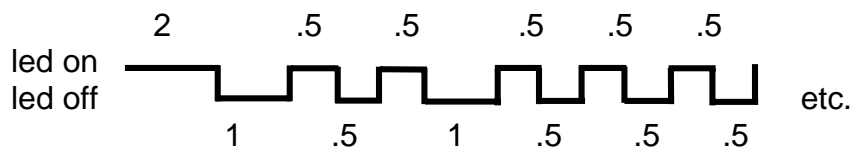
## no modes selected



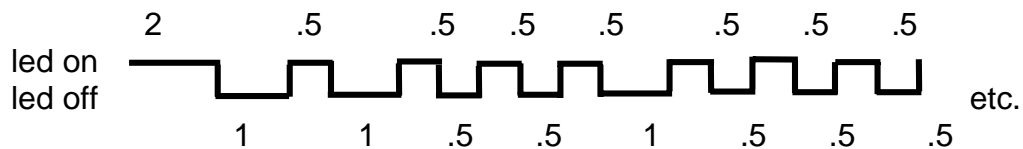
## mode 1 selected



## mode 2 selected



## modes 1 & 3 selected



and so on.....

## 3.2 Dual Camera Operating Mode Settings

Refer to previous sections of this chapter for instructions on the method of selecting operational modes.

Disable Mode 1 on both cameras. This returns cameras to Mode 0 (No Mode Selected).

Enable mode 2 on the ODD lane camera. DO NOT enable mode 2 on the EVEN lane camera. The EVEN lane camera should be left in Mode 0 (No Mode Selected).



Overlane & Underlane  
Ball Return Cameras  
Drawing & Parts List

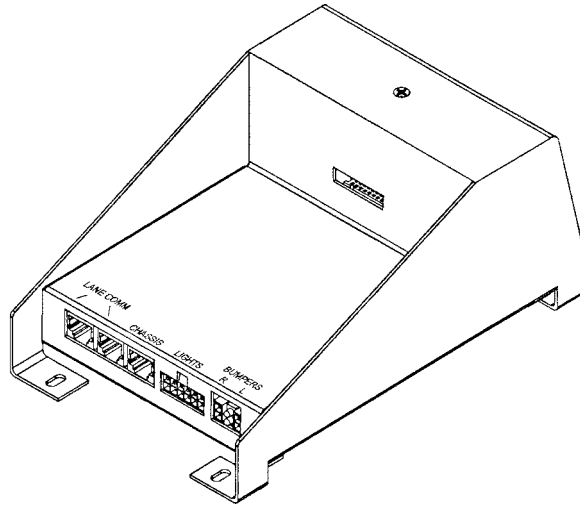


## Parts

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**232-009-510**

### **Overlane/Underlane Return Camera Assembly**



**232-009-510**

### **Overlane/Underlane Camera Assembly**

Part No.	Description	Qty
1	232-009-510 AccuCam 3000 Camera Assembly	1