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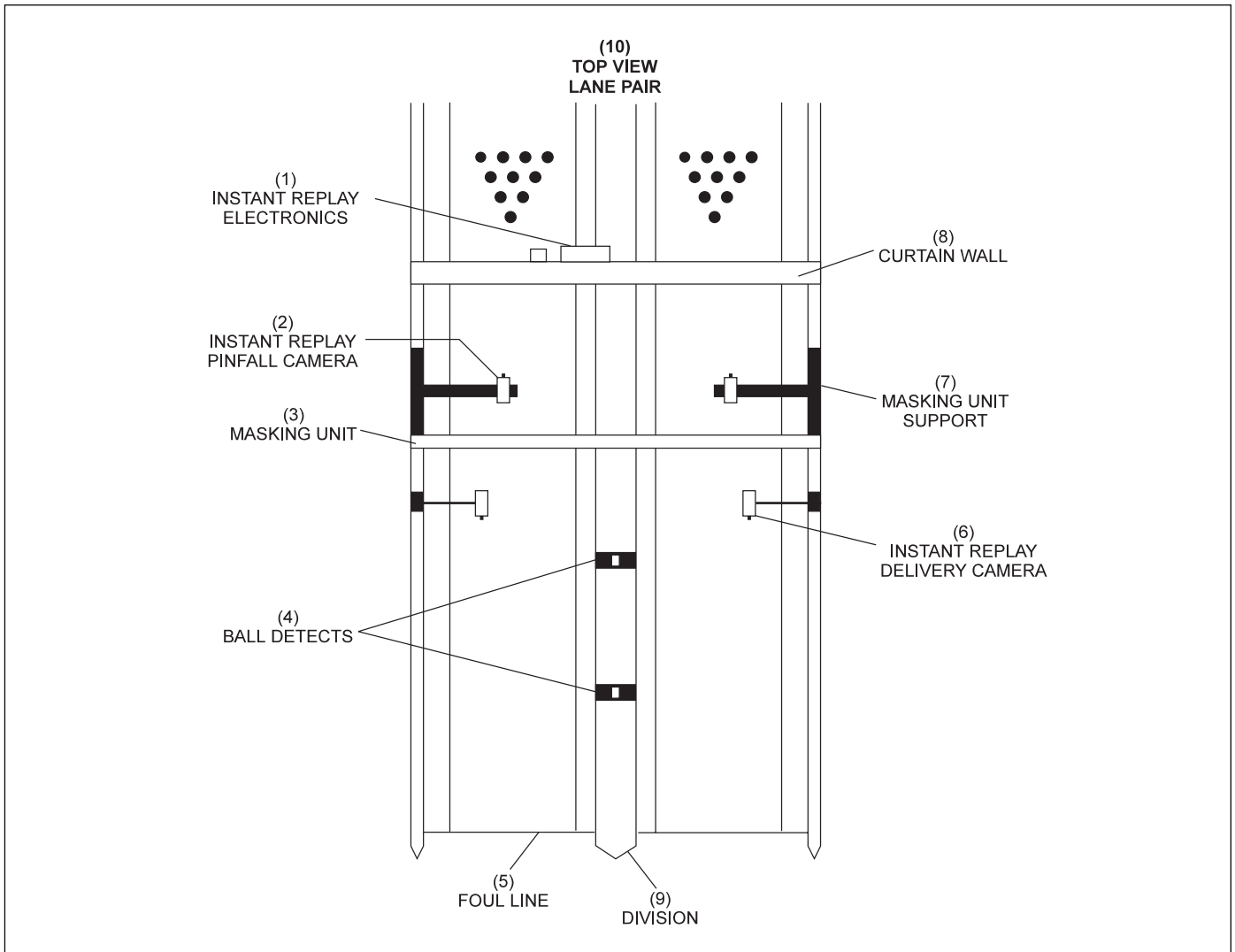
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General Description

The Instant Replay system records live images of a bowler's approach and delivery, as well as the pin action as the ball hits the pins. The video is live while the bowler is bowling and is then automatically replayed when the bowler is finished bowling that ball. The video is then available for replay upon request. An additional option allows the video to be recorded to tape.

The basic replay system consists of three sensors, two cameras and an Instant Replay Processor. Refer to the figure titled *Instant Replay System*.



Instant Replay System

- | | | |
|--------------------------------|------------------------------------|------------------------------------|
| (1) INSTANT REPLAY ELECTRONICS | (2) INSTANT REPLAY PIN FALL CAMERA | (3) MASKING UNIT |
| (4) BALL DETECTS | (5) FOUL LINE | (6) INSTANT REPLAY DELIVERY CAMERA |
| (7) MASKING UNIT SUPPORT | (8) CURTAIN WALL | (9) DIVISION |
| (10) TOP VIEW LANE PAIR | | |

The sensors provide the input needed by the processor to determine which camera's video to record, when to record it, and when to switch the overhead monitors to the appropriate camera. The system operates as follows:

1. The approach sensor, mounted to the ball rack, triggers as a bowler enters the approach area.
2. The Instant Replay Processor switches the overhead monitor to a live video display of the approach area (from the delivery camera) and it begins saving the video frames to a hard drive located in the processor box. The processor saves ten seconds of video to the hard drive. Once ten seconds has been recorded, the processor continues saving new frames recording over the old video. As long as the bowler remains in the approach area, the processor will continue recording 10 seconds worth of video. (If the bowler leaves the approach area without throwing a ball, the processor will stop saving frames and the overhead will return to the scoresheet video.)
3. After the ball is delivered, the delivery sensor triggers, causing the Instant Replay Processor to stop saving the delivery camera video. (The processor now has between 1-10 seconds of the bowler's approach and delivery stored on the hard drive). The overhead monitor switches from the delivery camera video to a live video coming from the pinfall camera.
4. The pinfall detector triggers, causing the Instant Replay Processor to save approximately two seconds of the video coming from the Pinfall camera. If the pinfall sensor does not trigger within five seconds after the delivery sensor is triggered, the system will assume a failure has occurred, and the overhead will return to the scoresheet.
5. The overhead changes back to the scoresheet for approximately three seconds to allow the score to be shown and allow the bowler time to return to the overhead area to view the replay.
6. The processor switches the overhead from the scoresheet to a slow motion replay of the delivery sequence followed by a slow motion replay of the pin action.

NOTE: *The automatic replay of the video can be disabled from the CMS system to allow for faster bowling. When disabled, the Instant Replay system still records thrown balls but does not replay the recorded sequence. The bowler can recall the last ball thrown at any time. The system will replay the last ball thrown and resume normally from that point on. If the system has the optional frame control feature, the bowler can abort the automatic replay using the STOP softkey.*

7. The overhead returns to the scoresheet.

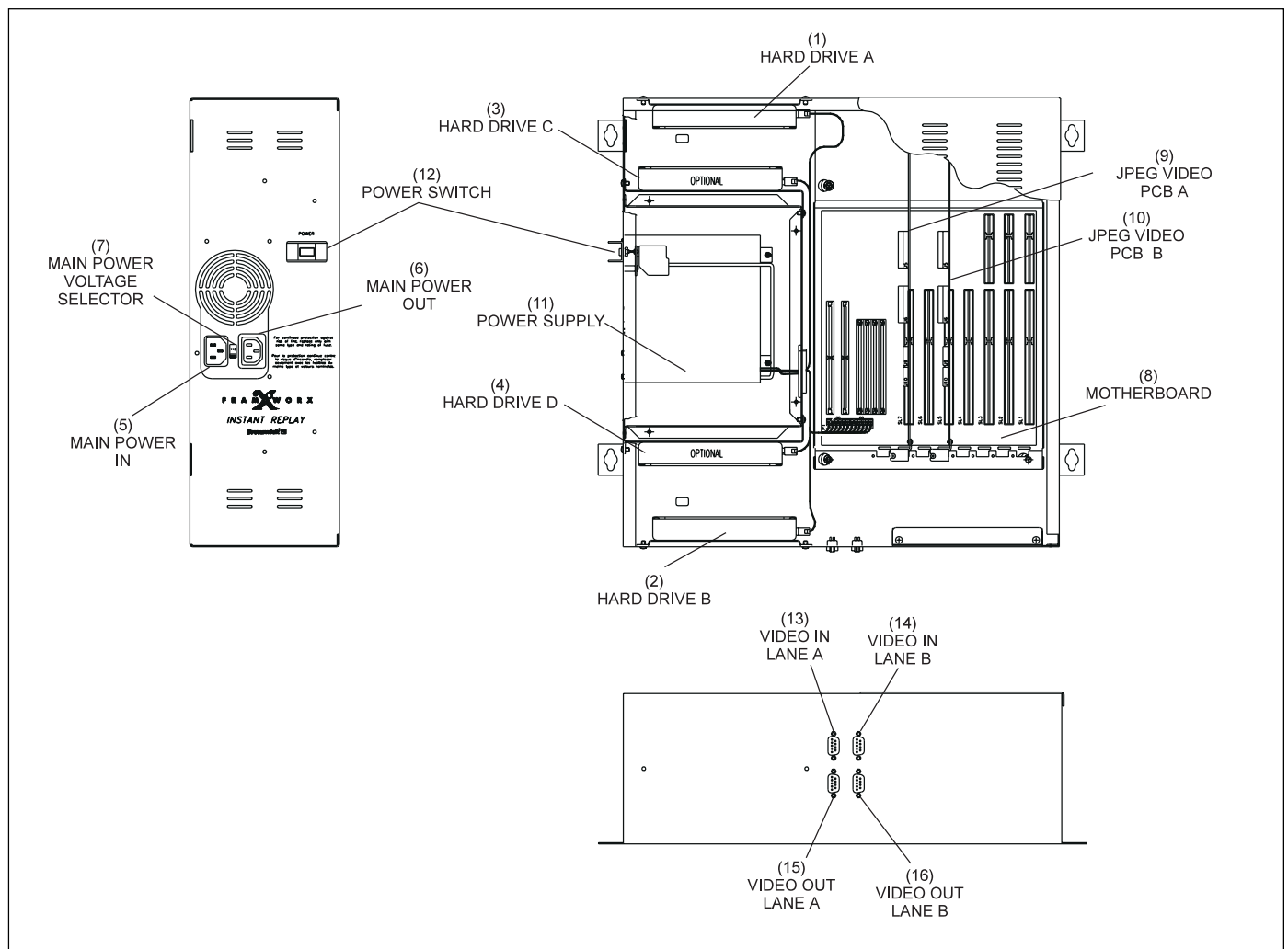
NOTE: *If at any time during the replay, the approach sensor detects another bowler in the approach area, the system will react in one of two ways. If the frame control option is installed, the system will continue to show the replay normally. At the end of the replay (or if the STOP softkey is pressed) the overhead will switch to the scoresheet for three seconds and then to the live video of the approach area. (Refer to Step 2). If the system does not have frame control capabilities, the system will automatically abort the replay process and begin saving the delivery video for the new bowler. The overhead will switch directly to the live video of the approach area. (Refer to Step 2).*

Instant Replay Processor

General Description

The Instant Replay Processor contains the circuit boards and components needed to record the video images for the bowler and switch the overhead monitors to the desired video display. The Instant Replay Processor is located on the curtain wall between a pair of pinsetters.

The printed circuit boards and components housed in the Instant Replay Processor include: the Motherboard, two Video JPEG PCBs, a standard computer power supply, and up to four hard drives. Signals to the box and internal boards include: the delivery video camera, pinfall video camera, delivery sensor, approach sensor, pinfall sensor, scorer video in, overhead video out, LLAN In, and LLAN out. Refer to the figure titled *Frameworkx Instant Replay Processor (Part No. 57-3000525-4XX)*.



Frameworkx Instant Replay Processor (Part No. 57-3000525-4XX)

The functions of the circuit boards and the components in the Instant Replay Processor are:

- (1) **Hard Drive A** - The component used to store the program for the Instant Replay Processor and the video images for the left (odd numbered) lane.
- (2) **Hard Drive B** - The component used to store the video images for the right (even numbered) lane. This drive also contains a copy of the program for the Instant Replay Processor.
- (3) **Hard Drive C (Optional)** - This hard drive is used to store the additional video images for the left (odd numbered) lane that are needed for the optional record-to-tape feature. This drive also contains a copy of the program for the Instant Replay Processor.
- (4) **Hard Drive D (Optional)** - The hard drive used to store the additional video images for the right (even numbered) lane that are needed for the optional record-to-tape feature. This drive also contains a copy of the program for the Instant Replay Processor.
- (5) **Main Power In** - Main power input for the Instant Replay Processor. 120VAC or 240VAC enters the Processor here. Refer to (7) *Main Power Voltage Selector*.
- (6) **Main Power Out** - Not used.
- (7) **Main Power Voltage Selector** - Selector switch that allows the user to change the input voltage to the processor between 120VAC and 240VAC.
- (8) **Motherboard** - The PCB that contains the working memory and performs the majority of the processing for the lane pair.
- (9) **JPEG Video PCB A** - The PCB that is responsible for converting the video coming from the cameras to a digital signal that can be stored on the hard drive. It also converts the signal from the hard drive so that it can be shown on the overhead monitor. Board A is used to convert the video for the left (odd numbered) lane.
- (10) **JPEG Video PCB B** - The PCB that is responsible for converting the video coming from the cameras to a digital signal that can be stored on the hard drive. It also converts the signal from the hard drive so that it can be shown on the overhead monitor. Board B is used to convert the video for the right (even numbered) lane.

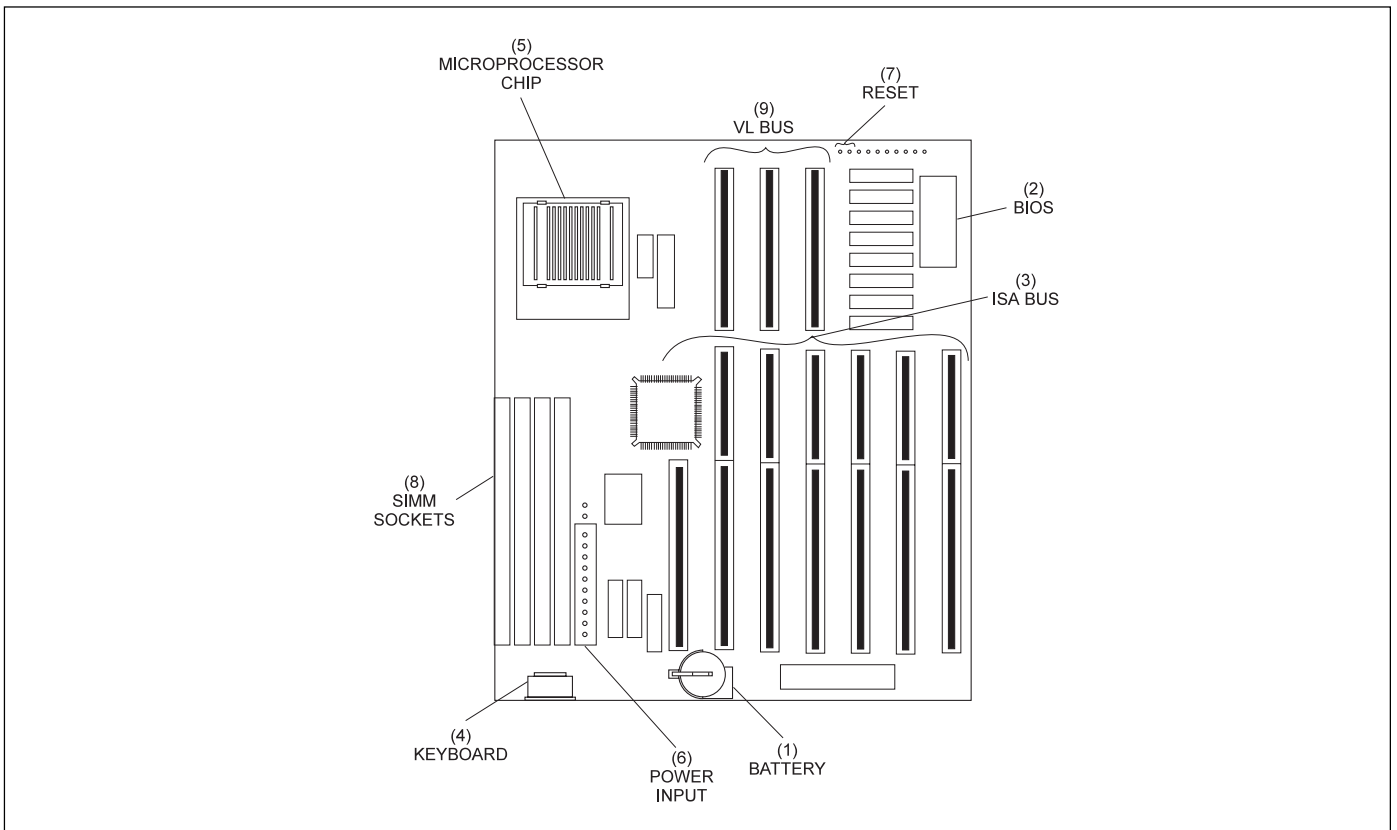
- (11) **Power Supply** - An electrical assembly that provides the circuits in the Instant Replay Processor and the video cameras with DC power. Input to the power supply can be 120VAC or 240VAC, output is 5VDC and 12VDC.
- (12) **Power Switch** - Main power on/off switch for the processor.
- (13) **Video In Lane A** - Input for the video coming from the LGP Remote Video PCB for the left (odd numbered) overhead monitor. This connection allows the processor to put the scorer video on the overhead when needed.
- (14) **Video In Lane B** - Input for the video coming from the LGP Remote Video PCB for the right (even numbered) overhead monitor. This connection allows the processor to put the scorer video on the overhead when needed.
- (15) **Video Out Lane A** - Output for the video going to the left (odd numbered) lane overhead monitor. This video can be either the scorer video that originates at the LGP Remote Video PCB or the captured video images from the replay cameras. Refer to (13) *Video In Lane A*.
- (16) **Video Out Lane B** - Output for the video going to the right (even numbered) lane overhead monitor. This video can be either the scorer video that originates at the LGP Remote Video PCB or the captured video images from the replay cameras. Refer to (14) *Video In Lane B*.

Motherboard

One of the most important circuit boards in the Instant Replay Processor is the Motherboard. It is referred to as the Motherboard because all of the other circuit boards within the processor connect to it. It is responsible for processing all information and making all calculations for the boards that connect to it. Two Motherboards are currently used in the Instant Replay System. Both contain a 486DX2 66 MHz microprocessor. (Refer to computer concepts in the *Introduction* section of this manual for more information about microprocessors.)

Also included on the Motherboard are four megabytes of RAM housed on a single circuit board called a SIMM. Refer to the figures titled *Motherboard B* and *Motherboard C*.

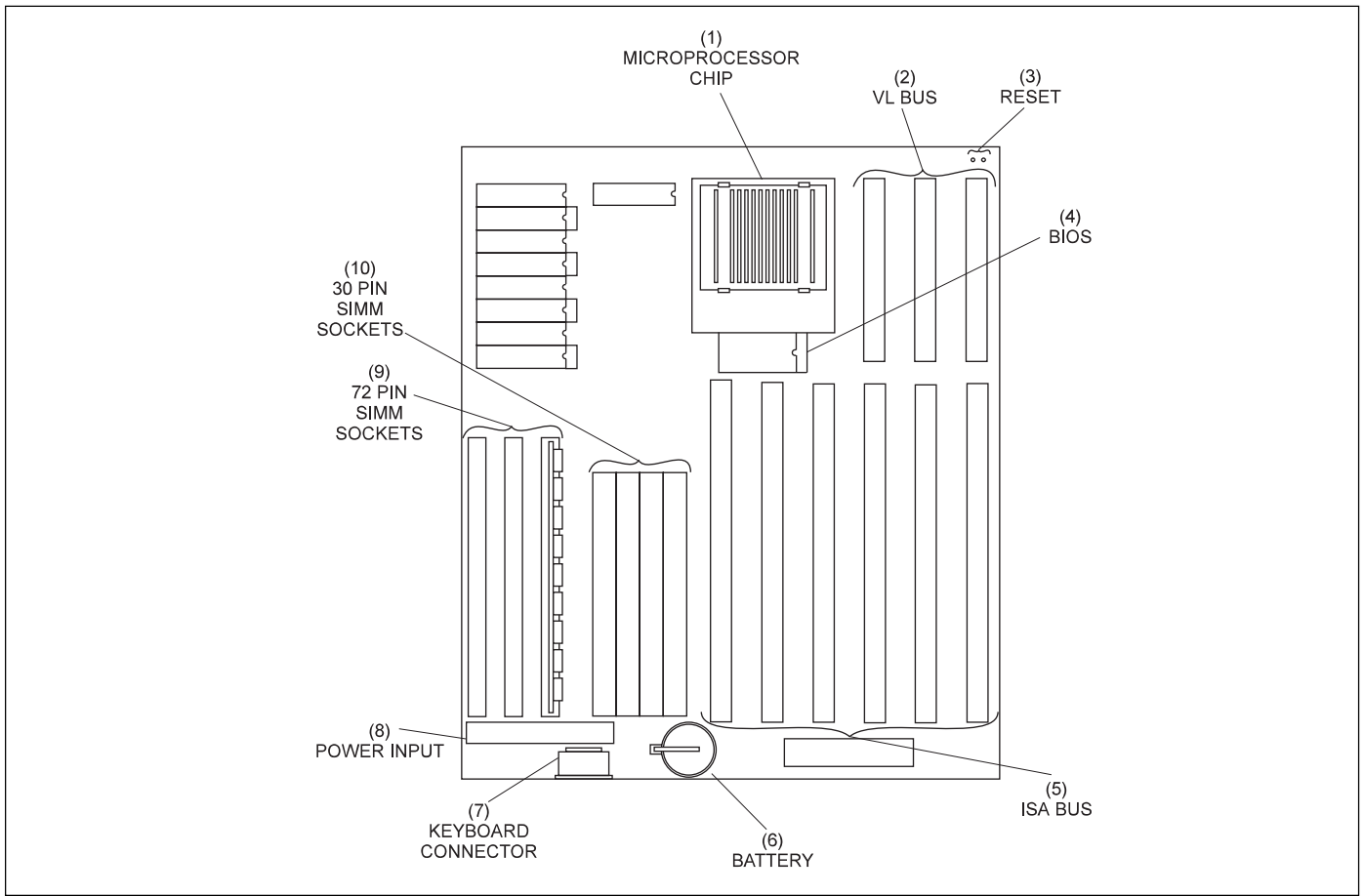
NOTE: Whenever the Motherboard is replaced, the setup information stored in the Motherboard's CMOS RAM must be reprogrammed. Failure to program this information will result in an inoperative Instant Replay System. Refer to the CMOS RAM Setup Procedure for more information.



Motherboard B

The function of the connectors and components of the Motherboard A are:

- (1) **Battery** - The battery provides backup power for the Motherboard setup information stored in CMOS so that it is retained in case of a power outage.
- (2) **BIOS (Basic Input/Output System)** - A program that provides the computer with a guideline for all processing functions. This program, stored in a ROM chip located on the Motherboard, controls how information is transferred between the components and PCBs inside a computer. The program allows the hardware to function properly.
- (3) **ISA Bus (Industry Standard Architecture BUS)** - A design or protocol used in most computers that defines how circuit boards connect to one another. This term typically refers to a group of connectors located on the Motherboard which the other circuit boards connect to. These connectors provide the other boards with access to data and memory, the microprocessor, and to each other.
- (4) **Keyboard Connector (JP47)** - Connector used for a computer-style keyboard used during troubleshooting and Motherboard setup.
- (5) **Microprocessor Chip** - The chip responsible for processing all information for the lane pair. Currently an Intel or A.M.D. 486DX2-66MHz processor is used.
- (6) **Power Input (PL1)** - Connector for the +5VDC, +12VDC, and -12VDC coming from the power supply located in the processor.
- (7) **Reset** - Not Used.
- (8) **SIMM Sockets (Single In-line Memory Module)** - Connectors where the RAM is installed. The SIMMs used on this Motherboard are 72 pin, 4 MEG, 70 nanosecond (ns). Since only a single SIMM is required, only one of four slots will be utilized. The slot labeled 0 MUST be the one used.
- (9) **VL Bus (Vesa Logic Bus)** - Not used.



Motherboard C

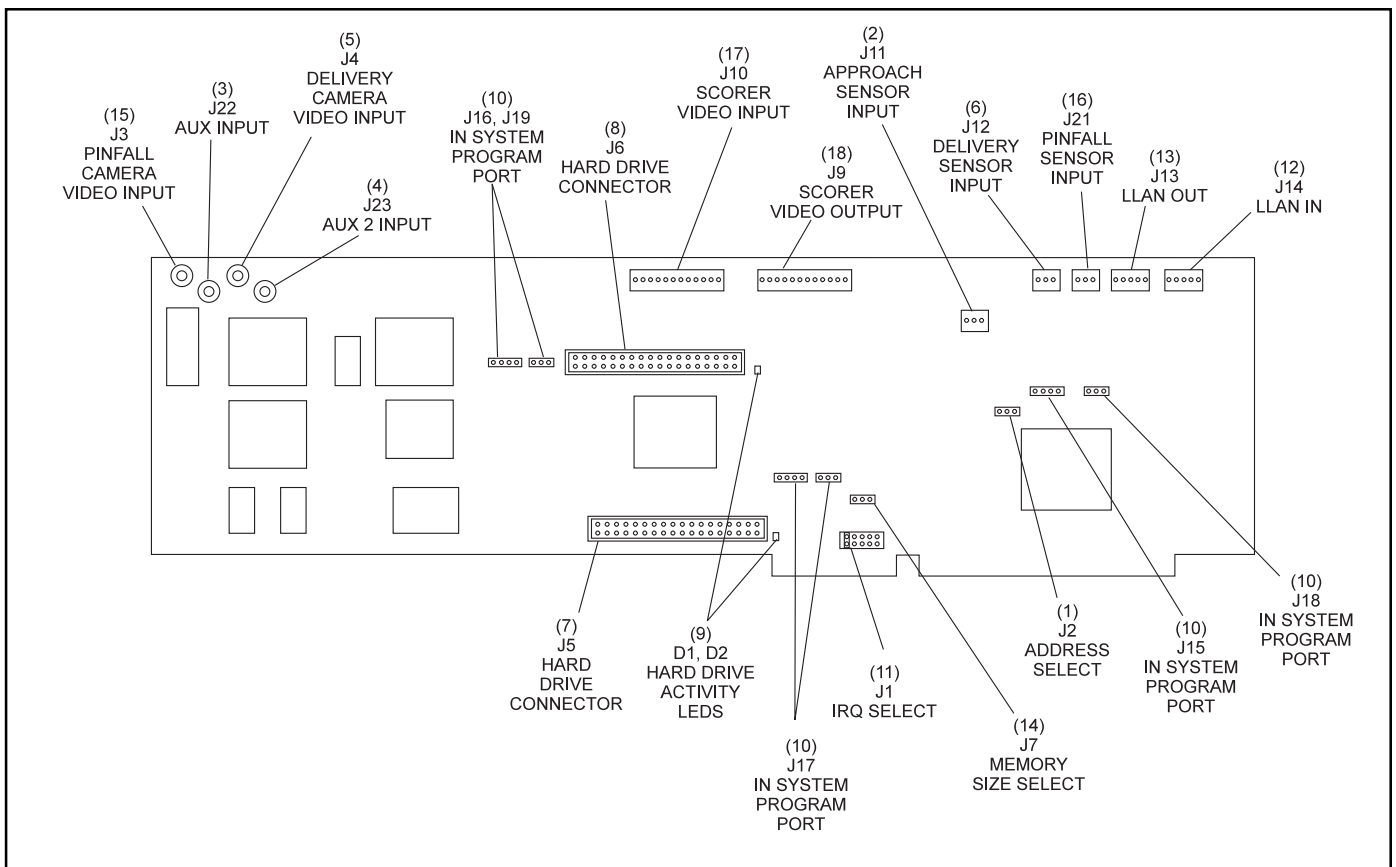
The function of the components on Motherboard C are:

- (1) **Microprocessor Chip** - The chip responsible for processing all information for the lane pair.
- (2) **VL BUS (Vesa Logic Bus)** - Not used.
- (3) **Reset** - Connection to J8 of the I/O PCB that allows remote reset of the Motherboard.
- (4) **BIOS (Basic Input/Output System)** - A program that provides the computer with a guideline for all processing functions. This program, stored in a ROM chip located on the Motherboard, controls how information is transferred between the components and PCBs inside a computer. The program allows the hardware to function properly.

- (5) **ISA BUS (Industry Standard Architecture BUS)** - A design or protocol used in most computers that defines how circuit boards connect to one another. This term typically refers to a group of connectors located on the Motherboard where the other circuit boards plug into. These connectors provide the other boards with access to data and memory, the microprocessor, and to each other.
- (6) **Battery** - Provides battery backup for the Motherboard setup information stored in CMOS so that it is retained in case of a power outage.
- (7) **Keyboard Connector** - Connector used for a computer-style keyboard used during troubleshooting or console setup.
- (8) **Power Input** - Connector for the +5VDC, +12VDC, and -12VDC coming from the power supply located in the LGP.
- (9) **72 Pin SIMM Sockets (Single Inline Memory Module)** - Connectors where the RAM is installed. The SIMMs used in the Framework Scoring System are 4 Meg, 72 Pin, 70 ns.
- (10) **30 Pin SIMM Sockets (Single Inline Memory Module)** - Connectors where the RAM is installed. Not used. (Refer to 72 pin SIMM sockets).



JPEG Video PCB

The JPEG Video PCBs provide the conversion and switching circuits needed to store the video received from the cameras and later retrieve the video for display on the overhead monitors. The PCB contains special circuits with analog-to-digital converters that accept the analog video obtained from the cameras and change it to a digital format that can be manipulated by the Motherboard and stored on the hard drives. When the replay video is requested by the system, the JPEG PCB retrieves it from the hard drive and converts it back to an analog signal, using a Digital-to-Analog Converter. This signal is then converted so that it can be sent to the overhead monitors in the RGBS format. A switching circuit allows the processor to interrupt the scorer video being sent to the overhead and replace it with the replay video. The two JPEG PCBs provided in the Instant Replay Processor are identical and are interchangeable. Board A is used for the left (odd numbered) lane while board B is used for the right (even numbered) lane. Refer to the figure titled *Frameworkx Instant Replay JPEG Video PCB*.

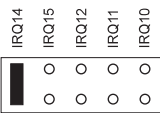



Frameworkx Instant Replay JPEG Video PCB


- (1) **Address Select** - Jumper used to set the memory area that the board will use. Set the jumper according to the following chart.

JPEG Board	Jumper Setting
Board A	Jumper set at 300 
Board B	Jumper set at 340 

- (2) **Approach Sensor Input (J11)** - This connection provides the input for the approach sensor. When the PCB receives this signal it switches the overhead to the delivery camera video and begins saving the video to disk.
- (3) **Aux Input (J22)** - Not Used.
- (4) **Aux 2 Input (J23)** - Not Used.
- (5) **Delivery Camera Video Input (J4)** - Input connector for the video coming from the delivery camera.
- (6) **Delivery Sensor Input (J12)** - This connection provides the input for the delivery sensor. When the PCB receives this signal, it stops saving the delivery camera video and switches the overhead monitor to a live image coming from the pinfall camera.
- (7) **Hard Drive Connector (J5)** - This connection allows the PCB access to the programs installed on the hard drive. It is also used to transmit video images to and from the hard drive.
- (8) **Hard Drive Connector (J6)** - This connection is used for transmitting video images to and from an additional optional hard drive.
- (9) **Hard Drive Activity LEDs (D1, D2)** - This LED flashes whenever information is being transmitted between the hard drive and the PCB. LED D2 is used for the standard hard drive, while LED D1 is used for the optional hard drive that is installed with the record-to-tape feature.
- (10) **In System Program Ports (J15 - J19)** - Not Used.
- (11) **IRQ Select (J11)** - Jumper used to select the interrupt line (IRQ) that the PCB will use to request the Motherboard CPU time. The PCB used for the left lane (Lane A) is set to an IRQ of 14, while the PCB for the right lane (Lane B) is set to IRQ 15. Set the jumper according to the following chart.

JPEG Board	Jumper Setting
Board A	Jumper Set at IRQ 14 
Board B	Jumper Set at IRQ 15 

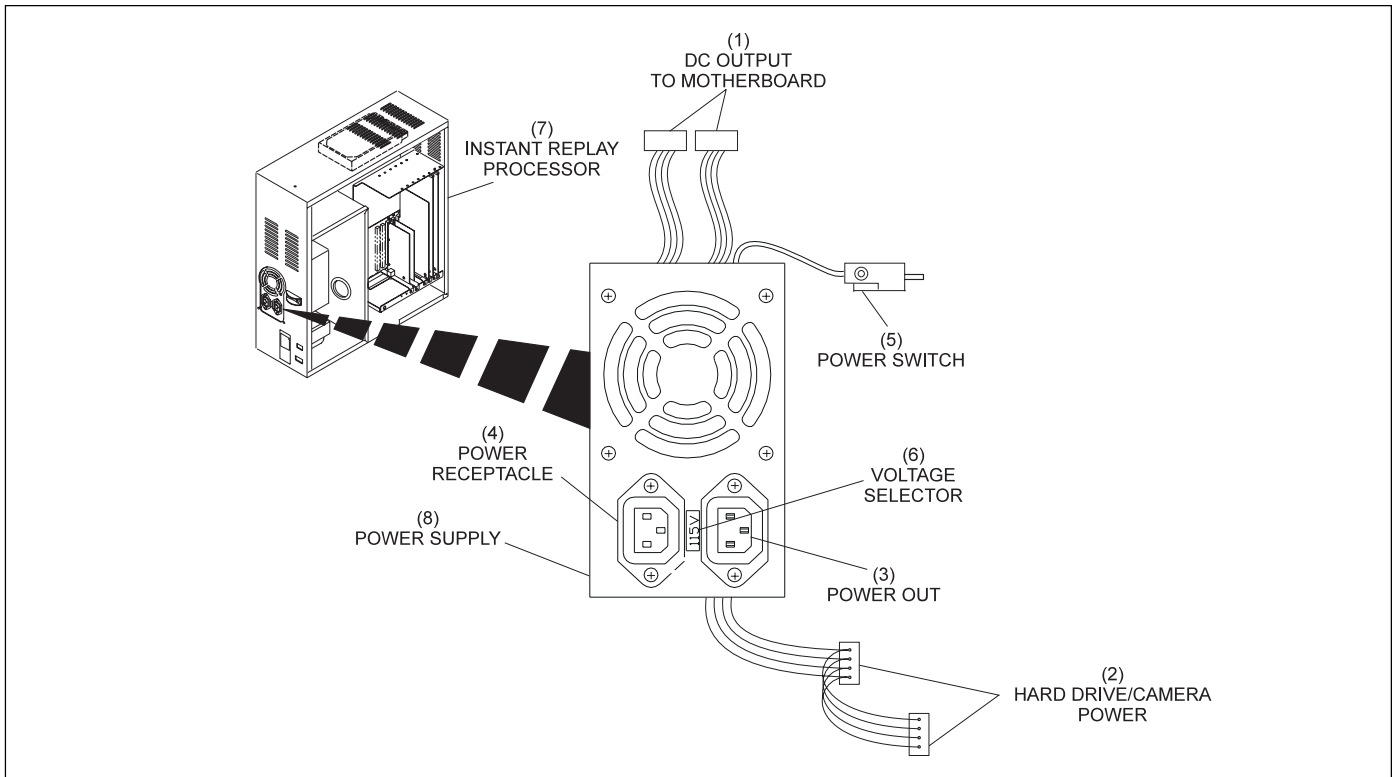
- (12) **LLAN In (J14)** - Connection for the LLAN cable originating at J2 of the LGP I/O PCB. The scorers can control the operation of the Instant Replay system through this cable. (Refer to *LLAN Out (J13)*).
- (13) **LLAN Out (J13)** - Connection for the LLAN cable to the Pinsetter Interface Box. (J3 on the Pinsetter Controller PCB). This connection allows the continuation of the LLAN signal to other devices on the lane pair that require it. Currently the LLAN continues to the Pinsetter Interface Box and then to the TV-Only monitors if needed.
- (14) **Memory Size Select (J7)** - Jumper used to select the amount of RAM installed on the PCB. All boards must be set to the 64K position. Set the jumper according to the following chart.

JPEG Board	Jumper Setting
All Boards	Pins 2 and 3 

- (15) **Pinfall Camera Video Input (J3)** - Input connection for the video coming from the pinfall camera.
- (16) **Pinfall Sensor Input (J21)** - This connection provides the input for the pinfall sensor. When the PCB receives this input, it begins saving two seconds of the pinfall camera video.
- (17) **Scorer Video Input (J10)** - Input for the video coming from the LGP Remote Video PCB. This connection allows the scorer video to be interrupted and replaced with the replay video. Refer to *Scorer Video Output (J9)*.
- (18) **Scorer Video Output (J9)** - Output for the video for overhead monitors. The PCB will send either the scoresheet video or the replay video to the overhead through the cable attached to this connector.

Power Supply

The power supply in the Instant Replay Processor is a universal input device that supplies DC voltage to the processor's circuit boards and to the delivery and pinfall cameras. Input to the power supply can be 120VAC or 240VAC and is selectable by a slide selector located near the power receptacle. The output of the supply is +5VDC and +/-12VDC. Refer to the figure titled *Power Supply (Part No. 57-300268-000)*.



Power Supply (Part No. 57-300268-000)

- | | | |
|------------------------------|-----------------------------|----------------------|
| (1) DC OUTPUT TO MOTHERBOARD | (2) HARD DRIVE/CAMERA POWER | (3) POWER OUT |
| (4) POWER RECEPTACLE | (5) POWER SWITCH | (6) VOLTAGE SELECTOR |
| (7) INSTANT REPLAY PROCESSOR | (8) POWER SUPPLY | |

Functions of the components and connectors on the power supply are:

- (1) **DC Output** - Connectors that supply +5VDC, 12VDC and -12VDC to the Motherboard and other ISA Bus Boards. This connector plugs into the Motherboard.

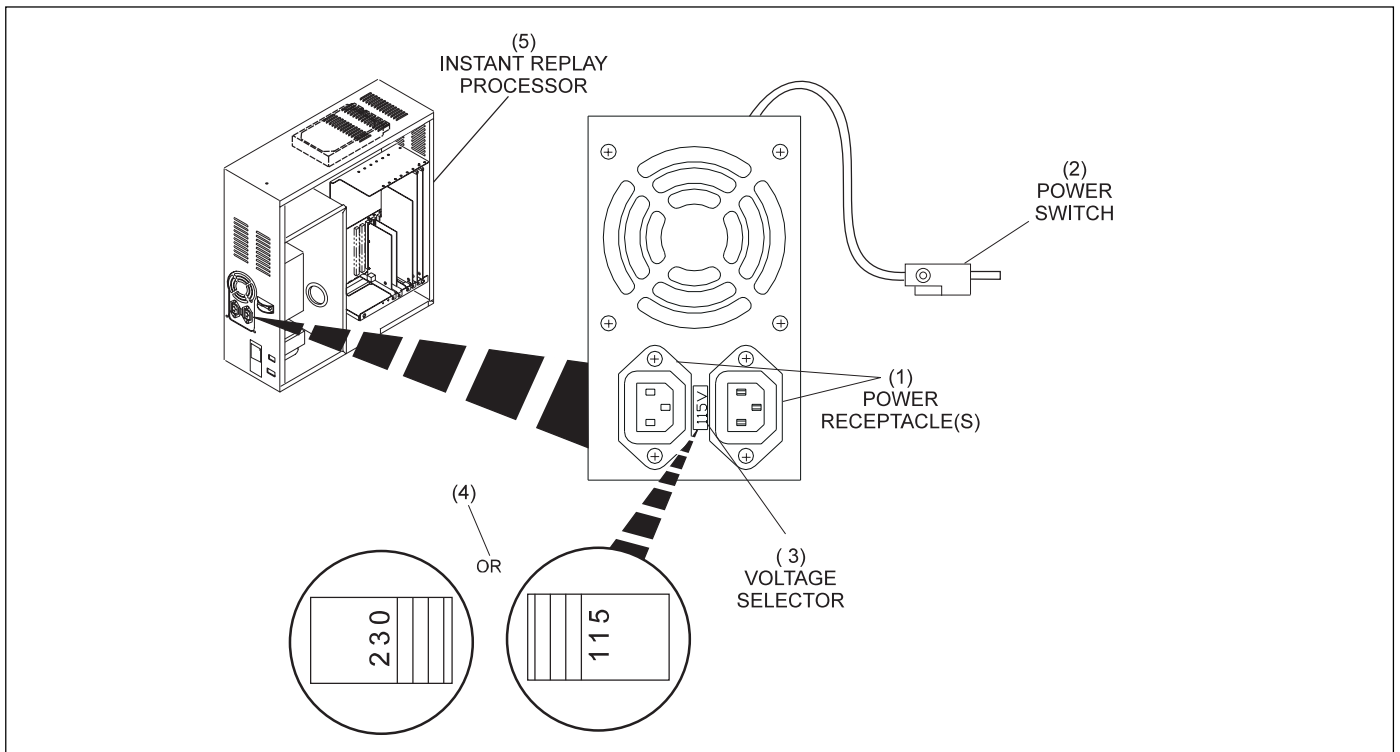
CAUTION: When connecting the DC connectors to the Motherboard, make sure that the two black wires on the connectors are positioned toward the middle of the plug. If connected properly there should be four black wires at the center of the Motherboard plug. Failure to plug the cables in properly will damage the Motherboard.

- (2) **Hard Drive/Camera Power** - Connections used to supply the hard drives and the delivery and pinfall cameras with D/C voltage.
- (3) **Power Out** - Connector for the Auxiliary Transformer located in the lower right corner of the Primary Console.
- (4) **Power Receptacle** - Connector for main power into the supply.
- (5) **Power Switch** - Switch used to control on/off of the LGP.
- (6) **Voltage Selector** - This selector is used to change the input requirements of the supply between 120VAC and 240VAC. Refer to the section *Selecting Input Voltage for Power Supply*.

Selecting Input Voltage for Power Supply

To select the desired input voltage for the power supply, do the following:

1. Turn the Instant Replay power switch off.
2. Disconnect the main power input cable from the power supply.
3. Place the voltage selector switch, located between the power receptacles of the power supply, so it displays the desired voltage. Refer to the figure titled *Voltage Selection for Power Supply*.



Voltage Selection for Power Supply

(1) POWER RECEPTACLE(S)
(4) OR

(2) POWER SWITCH
(5) INSTANT REPLAY PROCESSOR

(3) VOLTAGE SELECTOR

4. Reconnect the power cables to the power supply.
5. Turn the Instant Replay power switch on.

Hard Drives

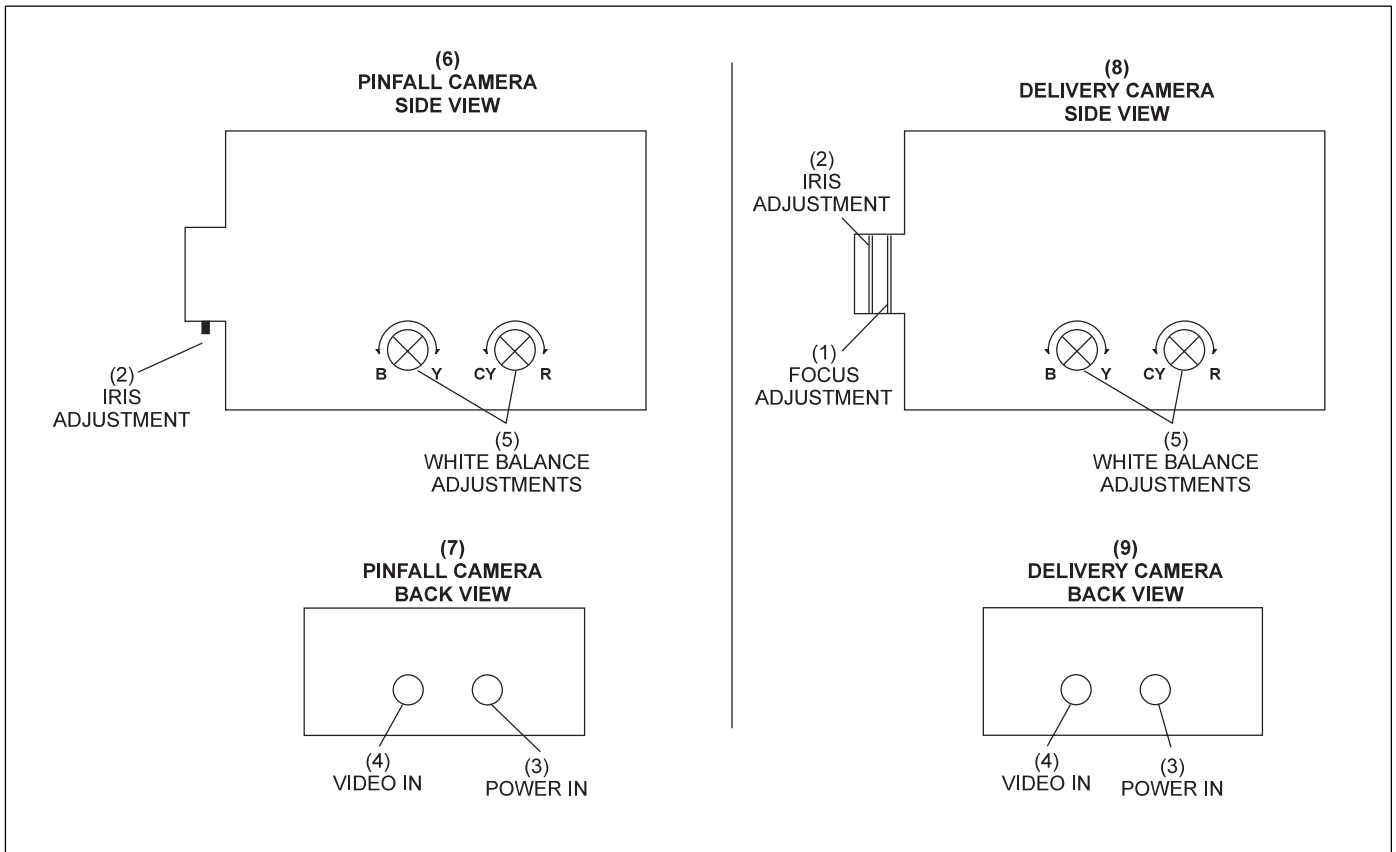
The Instant Replay Processor is designed to handle up to four hard drives. In the standard configuration, two drives are included. The drives store the images obtained from the delivery and pinfall cameras, as well as the program needed to run the Instant Replay system. Drive A is used for the left (odd numbered) lane while Drive B is used for the right (even numbered) lane.

When the system includes options like the record-to-tape feature, two additional images are needed for advanced options. Like the standard supplied drives, these drives are each dedicated to a specific lane.

NOTE: *Whenever a hard drive is replaced with one of a different memory size (or configuration), the setup information stored in the Motherboard's CMOS RAM must be reprogrammed. Failure to program this information will result in an inoperative or partially operative Instant Replay system. Refer to the CMOS RAM Setup procedure for more information.*

Video Cameras

Four video cameras are used to obtain all video images required for instant replay on both lanes. Each lane is equipped with a delivery camera which is mounted approximately 120" from the center of the back row of pins and is positioned so that it looks at the approach and delivery area. Two pinfall cameras are mounted to brackets located near the pinsetter and the masking unit so that they can be centered over the lane looking down over the pins. The only adjustments required to the cameras are to position them so that they look at the area desired, adjust the iris for proper lighting, and focus the lens of the delivery camera on the image in the approach (delivery camera only). Refer to the figure titled *Instant Replay Cameras*.



Instant Replay Cameras

- (1) FOCUS ADJUSTMENT
- (4) VIDEO IN
- (7) PINFALL CAMERA BACK VIEW

- (2) IRIS ADJUSTMENT
- (5) WHITE BALANCE ADJUSTMENTS
- (8) DELIVERY CAMERA SIDE VIEW

- (3) POWER IN
- (6) PINFALL CAMERA SIDE VIEW
- (9) DELIVERY CAMERA BACK VIEW

The function of the controls and connections for the delivery and pinfall cameras are:

- (1) **Focus Adjustment** - This adjustment allows the user to sharpen or soften the picture. The adjustment is only present on the camera used for the approach (delivery camera).
- (2) **Iris Adjustment** - This adjustment allows the user to control the amount of light entering the camera which allows the user to adjust the camera for different light conditions in which the camera may be used.
- (3) **Power In** - Main power input for the camera.
- (4) **Video In** - Input for the video going to the Instant Replay JPEG Video Board (J3 or J4).
- (5) **White Balance Adjustments** - This adjustment allows the user to control the amount of color in the picture. The blue/yellow adjustment allows the user to control the blue to yellow tint. The cyan/red adjustment allows the user to control the cyan to red tint.

Camera Adjustment

Positioning the cameras properly requires the use of a small monitor supplied with the Instant Replay system. This monitor connects directly to the delivery or pinfall camera, allowing the technician to view the live images from the camera.

Adjustments on the camera mounting brackets allow positioning of the camera for optimum alignment. Perform the following steps to align the camera.

Camera Iris and Focus Adjustment

1. Disconnect the video out cable attached to the camera and connect the alignment monitor to the camera. Apply power to the monitor.
2. Loosen the camera mounting bracket and position the camera so that the image of the desired area can be viewed in the monitor.
3. Tighten the camera mounting bracket.
4. Turn the iris adjustment so that the brightness of the picture on the monitor is at an acceptable level.
5. If the camera contains a focus adjustment (delivery camera), turn the control to obtain a focused image.

6. Disconnect the alignment monitor from the camera and connect the Instant Replay video cable to the camera.
7. Verify proper operation and video quality of the Instant Replay System.

Camera White Balance Adjustment

***NOTE:** The white balance adjustment is set during installation and normally does not need readjusting unless the camera has been replaced, moved to a different location, or the lighting conditions have changed radically.*

To adjust the white balance, perform the following steps:

1. Disconnect the video out cable attached to the camera and connect the alignment monitor to the camera. Apply power to the monitor.
2. Position the controls to their center position by aligning the indicator on the control with the black lines above the controls. (At the small detent or notch it can be felt when the control is centered.)
3. Examine the picture and decide if the video image is acceptable - or if it contains too much or not enough of a color. If it is acceptable, skip to Step 5.
4. Adjust the white balance controls individually until the desired color is achieved.

***NOTE:** The left control adjusts the blue to yellow hues, while the right control adjusts the cyan to red hues.*

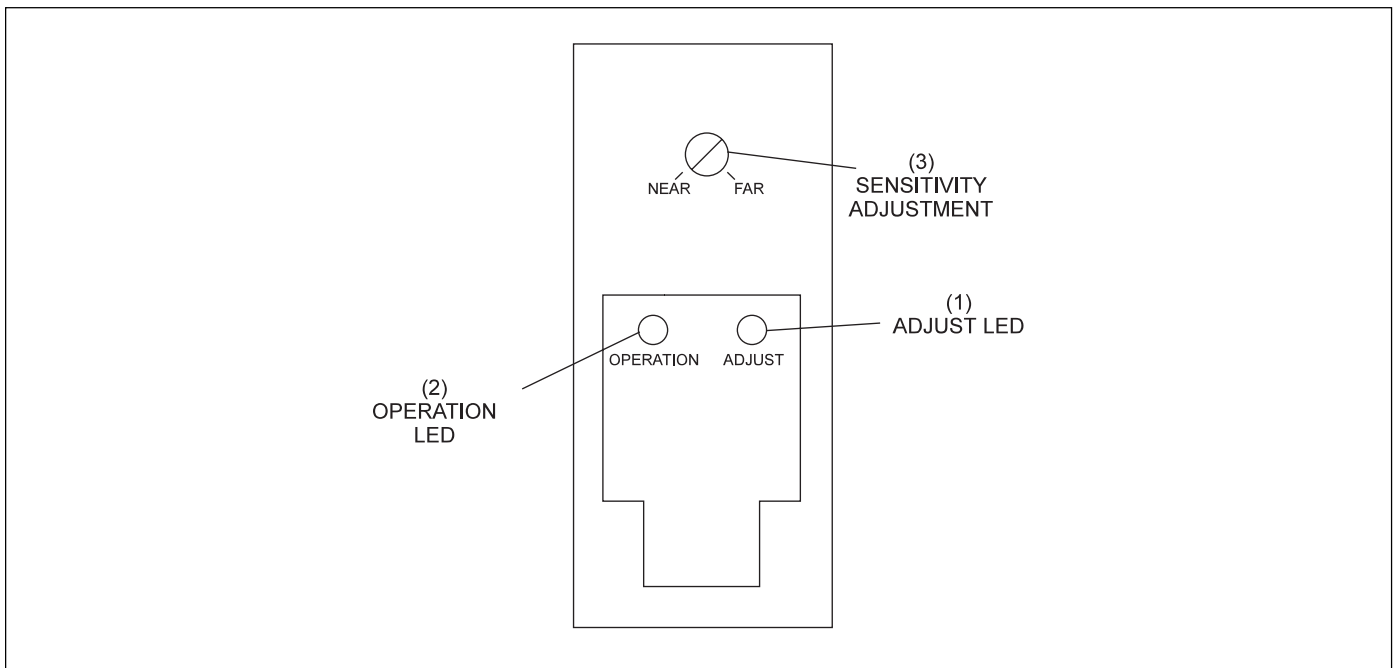
5. Test the adjustment by placing a white piece of paper in front of the camera lens so that it can be viewed on the alignment monitor.
6. Examine the image of paper as shown on the monitor and decide if it is acceptable. If the alignment is acceptable, skip to Step 8.
7. Adjust both controls together simultaneously until a desired image is achieved.

***NOTE:** The controls must be adjusted equally in the same direction. DO NOT ADJUST THE CONTROLS SEPARATELY. Doing so will alter the setting achieved in Step 4.*

8. Disconnect the alignment monitor from the camera and connect the Instant Replay video cable to the camera.
9. Verify proper operation and video quality of the Instant Replay System.

Approach Sensor

The approach sensor is an adjustable proximity sensor that is triggered when someone walks into the approach area of the lane. The signal from the sensor causes the monitor, for that lane, to switch to a live video coming from the delivery camera. Internally, the Instant Replay Processor begins saving the delivery camera video to a disk. This can then be recalled at a later time. The sensor is mounted near the back of the ball return and positioned so that it faces the approach. An adjustment is provided to control the distance it can detect. The sensor is powered by 120VAC. Refer to the figure titled *Approach Sensor*.



Approach Sensor

The functions of the controls on the approach sensor are:

- (1) **Adjust LED** - Indicator used during the sensitivity adjustment procedure. This LED lights whenever an object (or person) is sensed by the sensor.
- (2) **Operation LED** - Light used to indicate when the unit has power.
- (3) **Sensitivity Adjustment** - Turn this adjustment to increase or decrease the sensing range of the sensor.

Adjusting the Approach Sensor

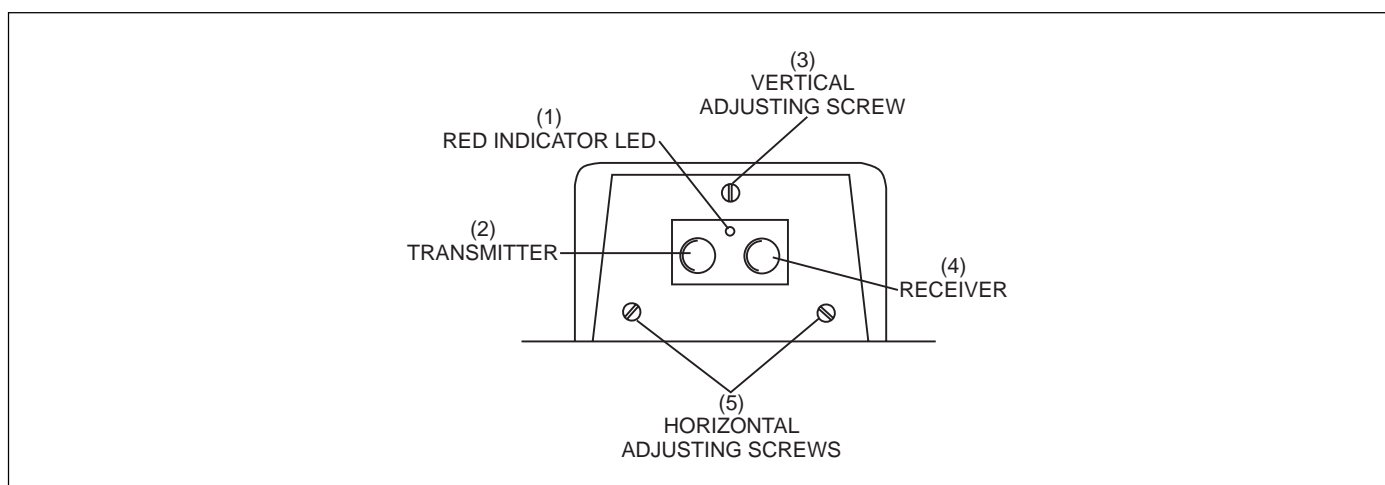
Perform the following steps to adjust the approach sensor.

1. Turn the sensitivity control completely clockwise (to the far setting).
2. Turn the control counterclockwise until the Operation LED goes out. Note the position of the adjustment control.
3. Turn the sensitivity control completely counterclockwise (to the Near setting).
4. Place an object on the approach at the maximum distance that the sensor should detect.
5. Slowly adjust the sensitivity control clockwise until the Operation LED turns “on.” **Do not turn the control past the position noted in Step 2.**
6. Bowl on the lane to verify proper operation of the Instant Replay System.

Delivery/Pinfall Sensors

The delivery and pinfall sensors are identical to each other. The delivery sensor is positioned on the ball return capping approximately 15 feet (701 mm) from the foul line. This sensor causes the Instant Replay Processor to stop saving images from the delivery camera and change the overhead monitor to live video from the pinfall camera.

The pinfall sensor is positioned approximately 38 feet (1795 mm) from the foul line. This sensor causes the Instant Replay Processor to begin saving video images from the pinfall camera to disk.



Delivery/Pinfall Sensor

(1) RED INDICATOR LIGHT-EMITTING DIODE
(4) RECEIVER

(2) TRANSMITTER
(5) HORIZONTAL ADJUSTING SCREWS

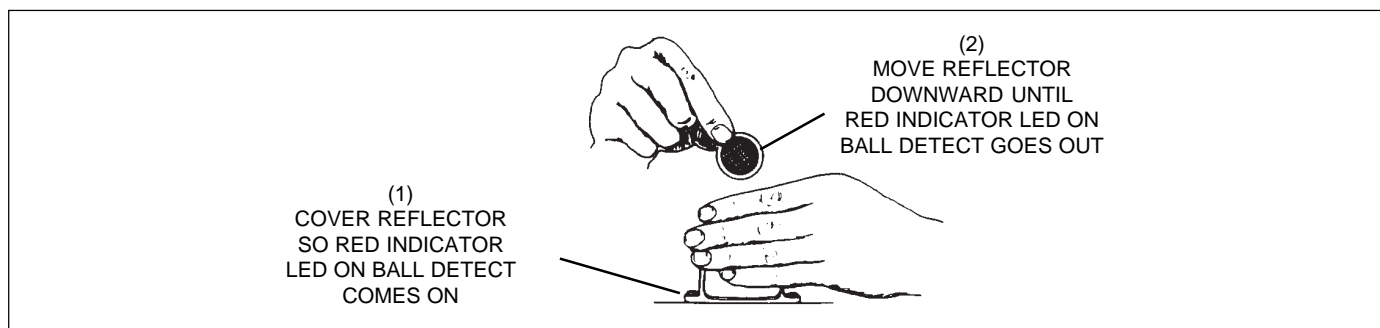
(3) VERTICAL ADJUSTING SCREW

Delivery/Pinfall Detector Adjustments

The ball detector assembly uses an infrared light which cannot be seen without an optical aid. Therefore, it has a red indicator light on the face of the unit that will light when insufficient infrared light is reflected back to it. Refer to the figure titled *Delivery/Pinfall Sensor*.

To center the infrared beam on the reflector, use the following steps:

1. With power on to the Instant Replay Processor, cover the reflector so the red indicator light on the ball detector unit comes on.
2. Using another reflector, start above the covered reflector and slowly move the second reflector down toward the first while holding it square to the ball detector unit. Continue to move it downward until the red light goes out. Note the position of the second reflector. Refer to the figure titled *Adjusting Reflector*.



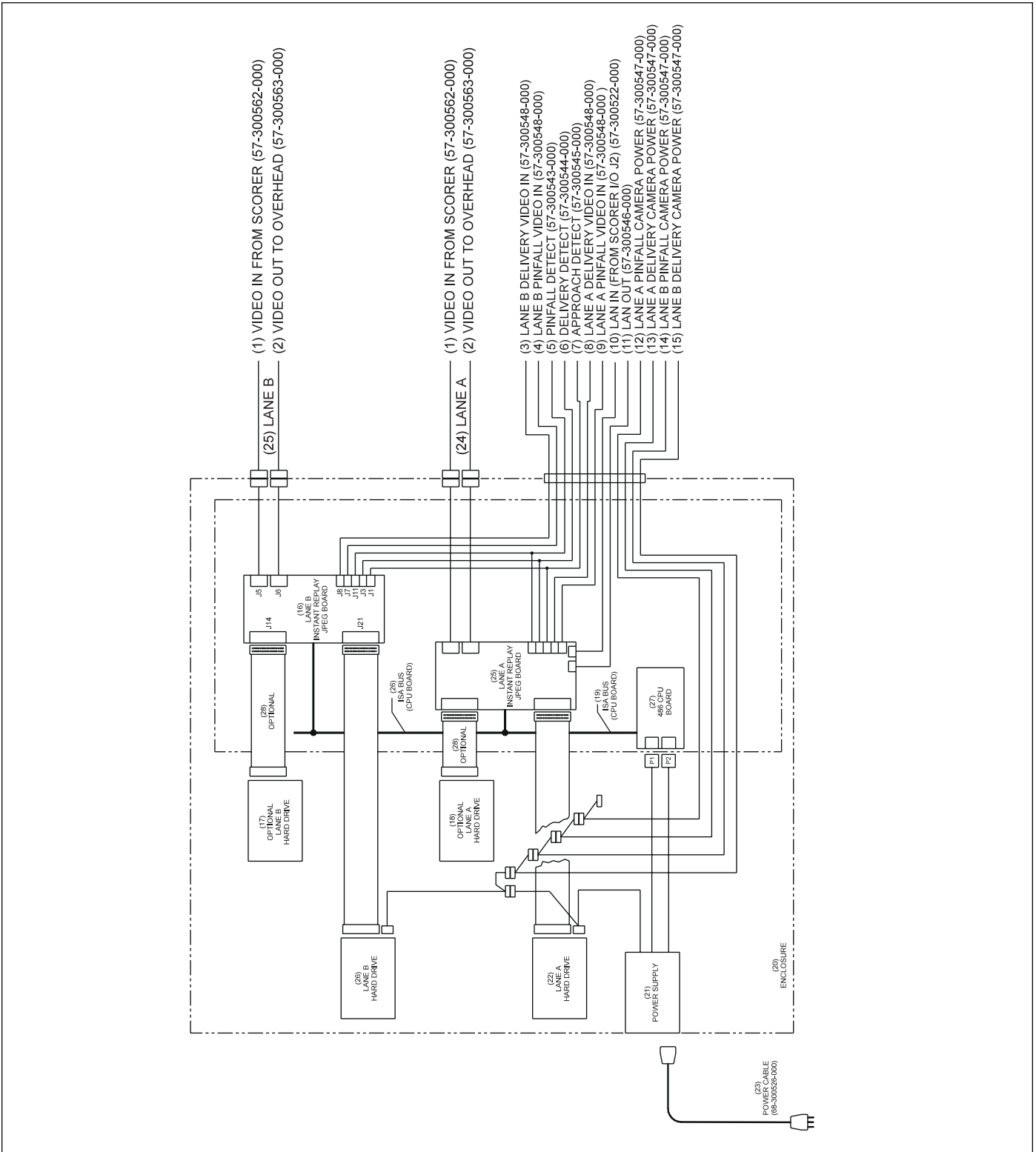
Adjusting Reflector

(1) COVER REFLECTOR SO RED INDICATOR LIGHT-EMITTING DIODE ON BALL DETECTOR COMES ON

(2) MOVE REFLECTOR DOWNWARD UNTIL RED INDICATOR LIGHT-EMITTING DIODE ON BALL DETECTOR GOES OUT

3. Repeat the same procedure but start below the covered reflector (in the ball gutter) and move up until the light goes off. Note that position.
4. Repeat the same procedure starting from the left of the covered reflector and then from the right until you have located the relative position of the infrared beam.
5. If the beam is not centered on the covered reflector, it can be adjusted with the three adjustment screws on the face of the unit. Refer to the figure titled *Delivery/Pinfall Sensor*. The top screw moves the beam up and down. A clockwise turn moves the beam down, while a counterclockwise turn will move it up. The side screws will move the beam left to right.
6. After each adjustment, recheck the beam's location with the second reflector and procedure detailed above.

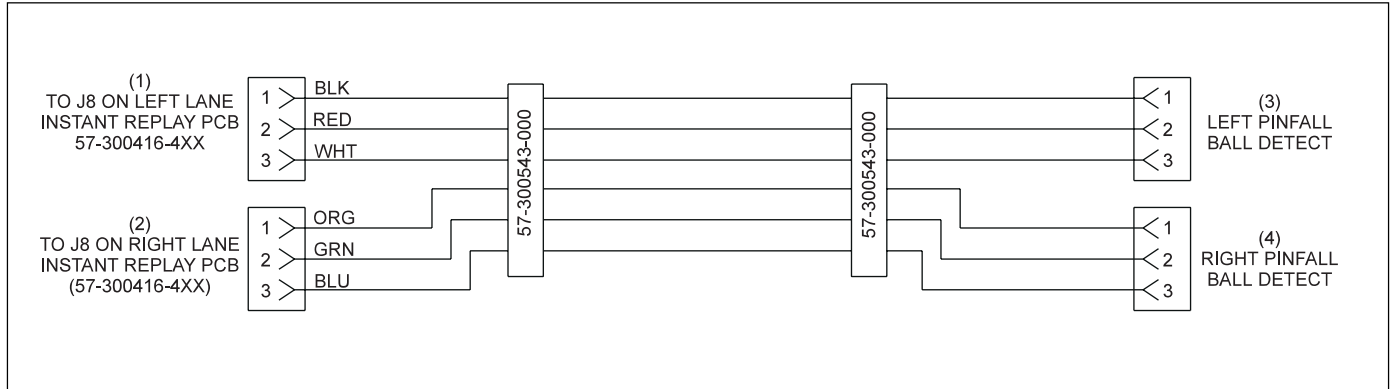
Cable Diagrams



BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

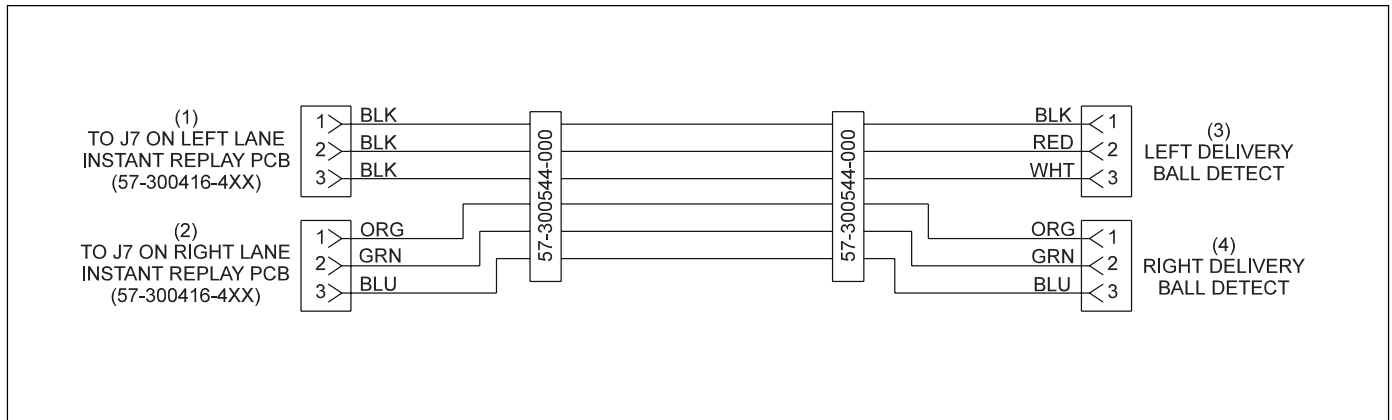
Frameworkx Instant Replay Processor Assembly (57-300525-4xx)

- | | | |
|---|--|---|
| (1) VIDEO IN FROM SCORER (57-300562-000) | (2) VIDEO OUT TO OVERHEAD (57-300563-000) | (3) LANE B DELIVERY VIDEO IN (57-300548-000) |
| (4) LANE B PINFALL VIDEO IN (57-300548-000) | (5) PINFALL DETECT (57-300543-000) | (6) DELIVERY DETECT (57-300544-000) |
| (7) APPROACH DETECT (57-300545-000) | (8) LANE A DELIVERY VIDEO IN (57-300548-000) | (9) LANE A PINFALL VIDEO IN (57-300548-000) |
| (10) LOCAL AREA NETWORK IN (FROM SCORER I/O J2) (57-300522-000) | (11) LOCAL AREA NETWORK OUT (57-300546-000) | (12) LANE A PINFALL CAMERA POWER (57-300547-000) |
| (13) LANE A DELIVERY CAMERA POWER (57-300547-000) | (14) LANE B PINFALL CAMERA POWER (57-300547-000) | (15) LANE B DELIVERY CAMERA POWER (57-300547-000) |
| (16) LANE B INSTANT REPLAY JPEG BOARD | (17) OPTIONAL LANE B HARD DRIVE | (18) OPTIONAL LANE A HARD DRIVE |
| (19) ISA BUS (CPU BOARD) | (20) ENCLOSURE | (21) POWER SUPPLY |
| (22) LANE A HARD DRIVE | (23) POWER CABLE (68-300526-000) | (24) LANE A |
| (25) LANE B | (26) ISA BUS (CPU BOARD) | (27) 486 CPU BOARD |



Pinfall Ball Detect Cable Assembly (Part No. 57-300543-000)

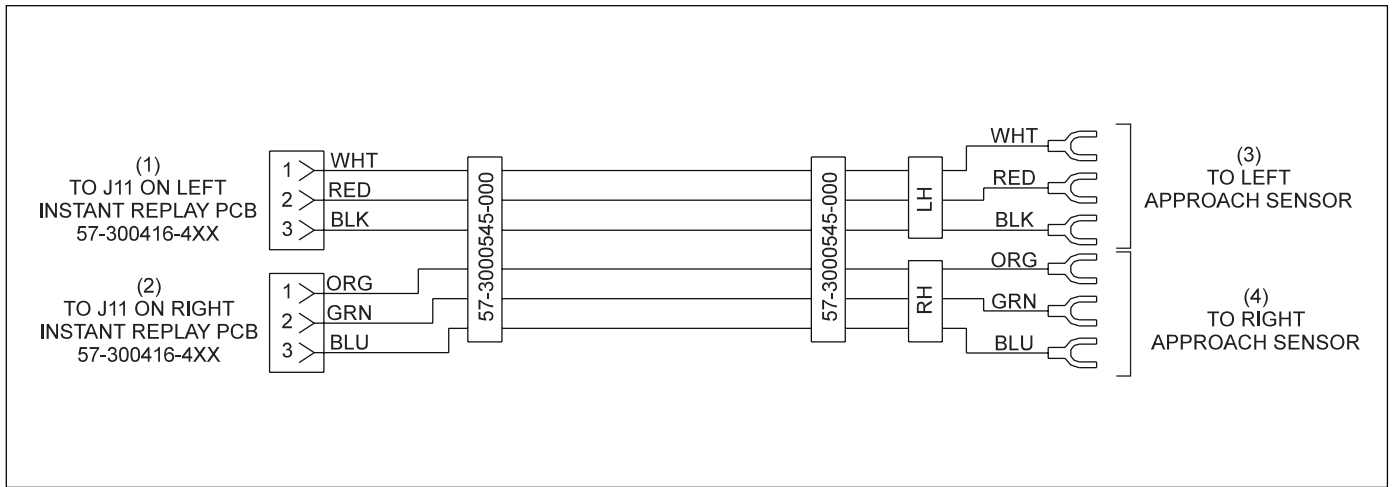
- | | | |
|--|---|------------------------------|
| (1) TO J8 ON LEFT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (2) TO J8 ON RIGHT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (3) LEFT PINFALL BALL DETECT |
| (4) RIGHT PINFALL BALL DETECTOR | | |



Delivery Ball Detect Cable Assembly (Part No. 57-300544-000)

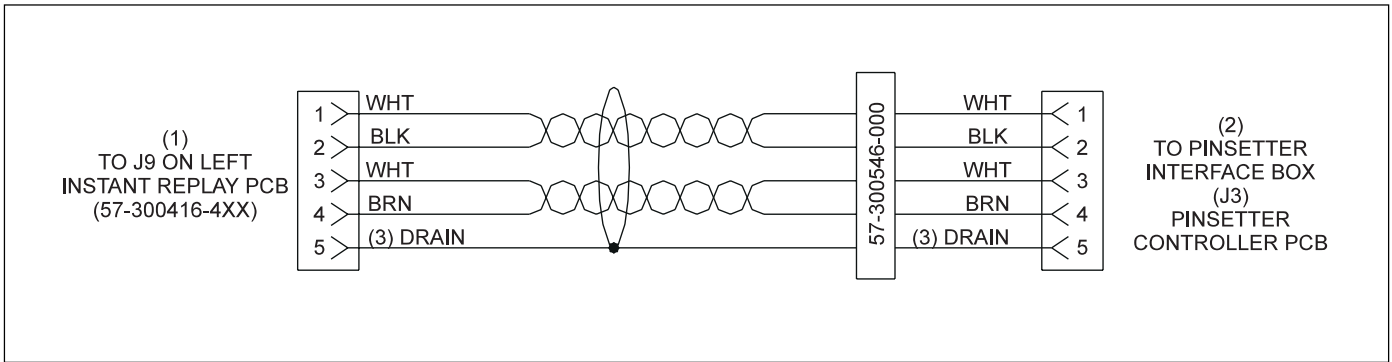
- | | | |
|--|---|---------------------------------|
| (1) TO J7 ON LEFT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (2) TO J7 ON RIGHT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (3) LEFT DELIVERY BALL DETECTOR |
| (4) RIGHT DELIVERY BALL DETECTOR | | |

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



Approach Sensor Cable Assembly (Part No. 57-300545-000)

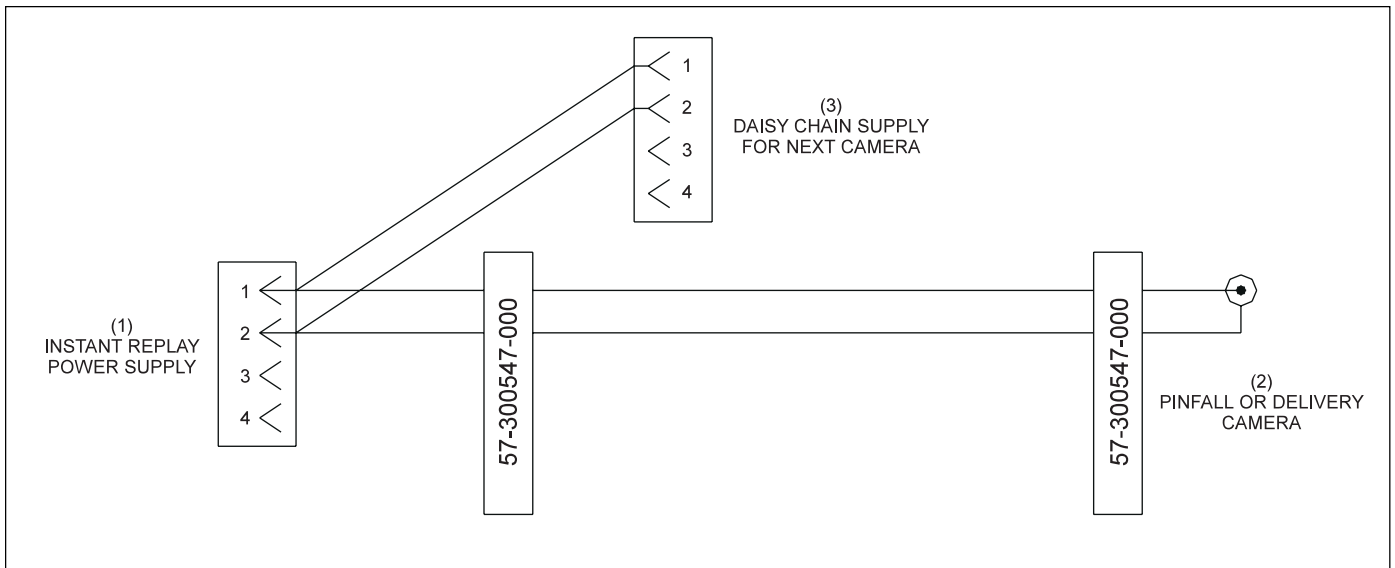
- | | | |
|---|--|-----------------------------|
| (1) TO J11 ON LEFT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (2) TO J11 ON RIGHT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (3) TO LEFT APPROACH SENSOR |
| (4) TO RIGHT APPROACH SENSOR | | |



Local LAN Cable Assembly (Part No. 57-300546-000)

- | | | |
|--|--|-----------|
| (1) TO J9 ON LEFT LANE INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300416-4XX) | (2) TO PINSETTER INTERFACE BOX (J3) PINSETTER CONTROLLER PRINTED CIRCUIT BOARD | (3) DRAIN |
|--|--|-----------|

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE

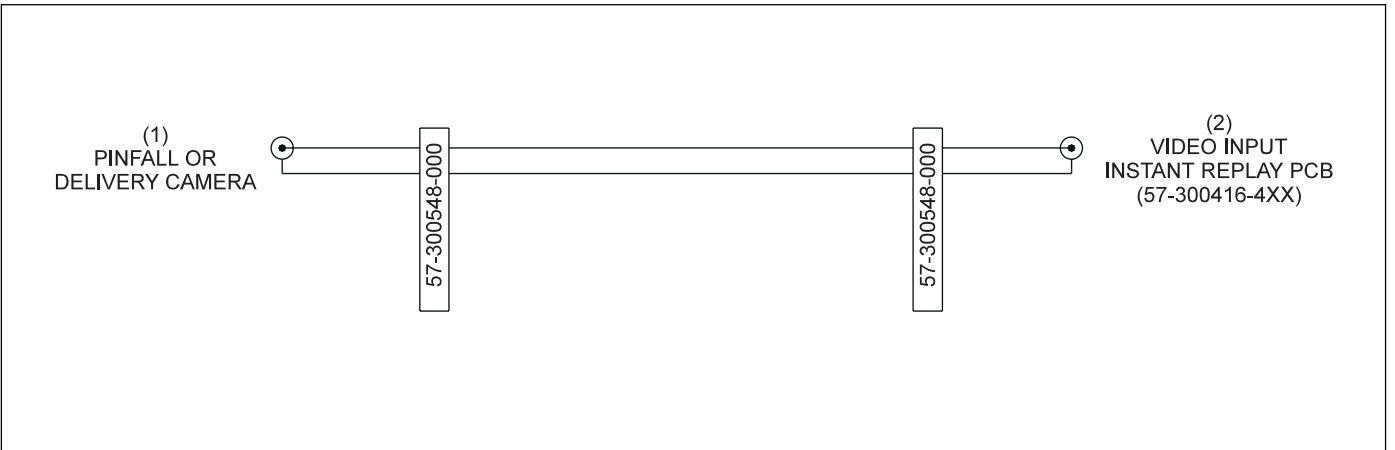


Camera Power Cable Assembly (Part No. 57-300547-000)

(1) INSTANT REPLAY POWER SUPPLY

(2) PINFALL OR DELIVERY CAMERA

(3) DAISY CHAIN SUPPLY FOR NEXT CAMERA

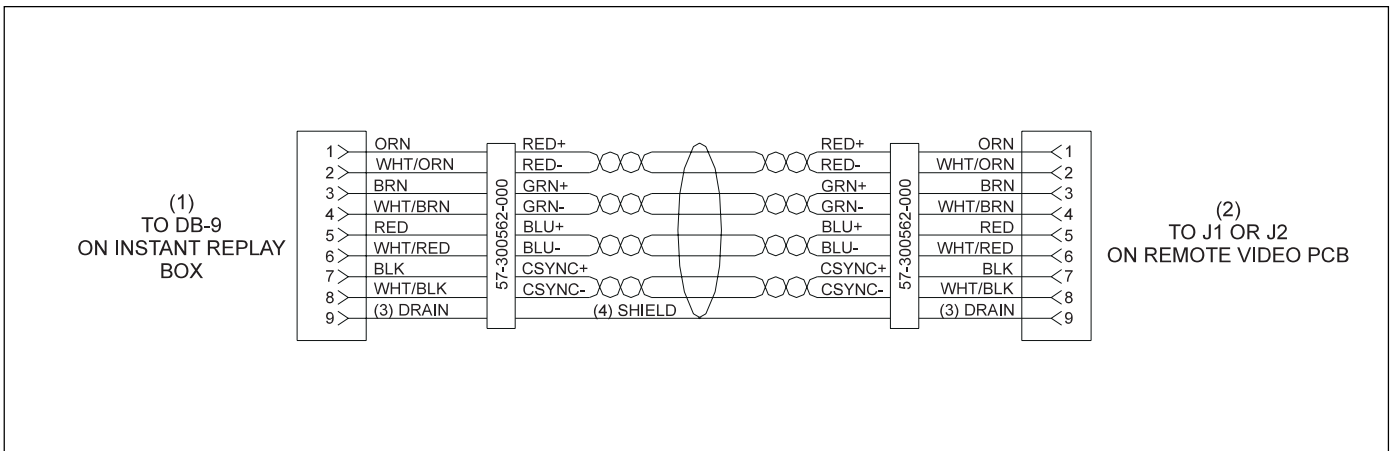


Video Input to Camera Cable Assembly (Part No. 57-300548-000)

(1) PINFALL OR DELIVERY CAMERA

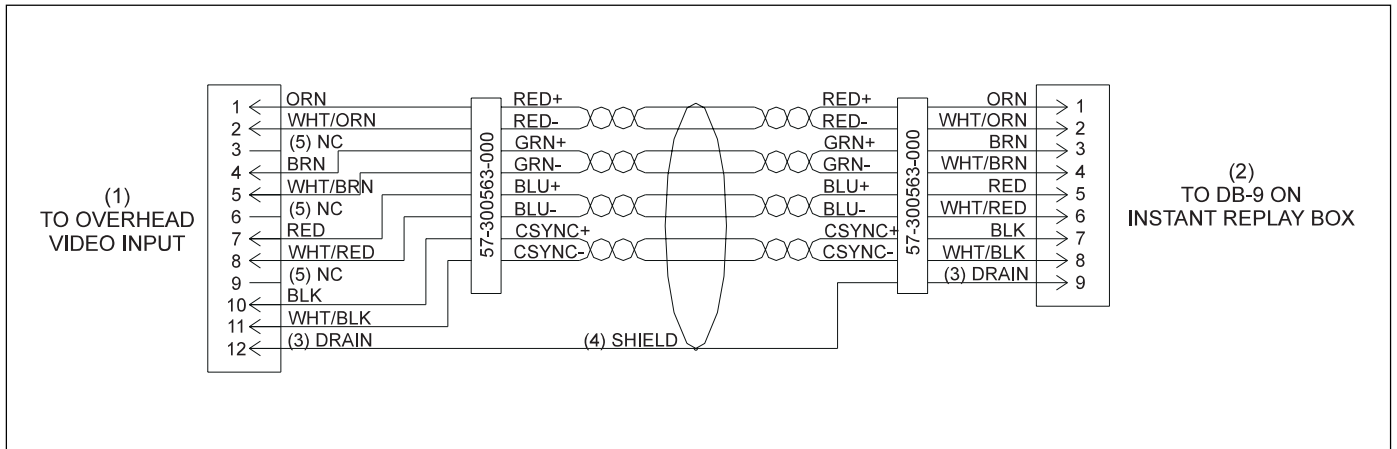
(2) VIDEO INPUT INSTANT REPLAY PRINTED CIRCUIT BOARD (PART NO. 57-300548-000)

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



Video Instant Replay Cable Assembly (Part No. 57-300562-000)

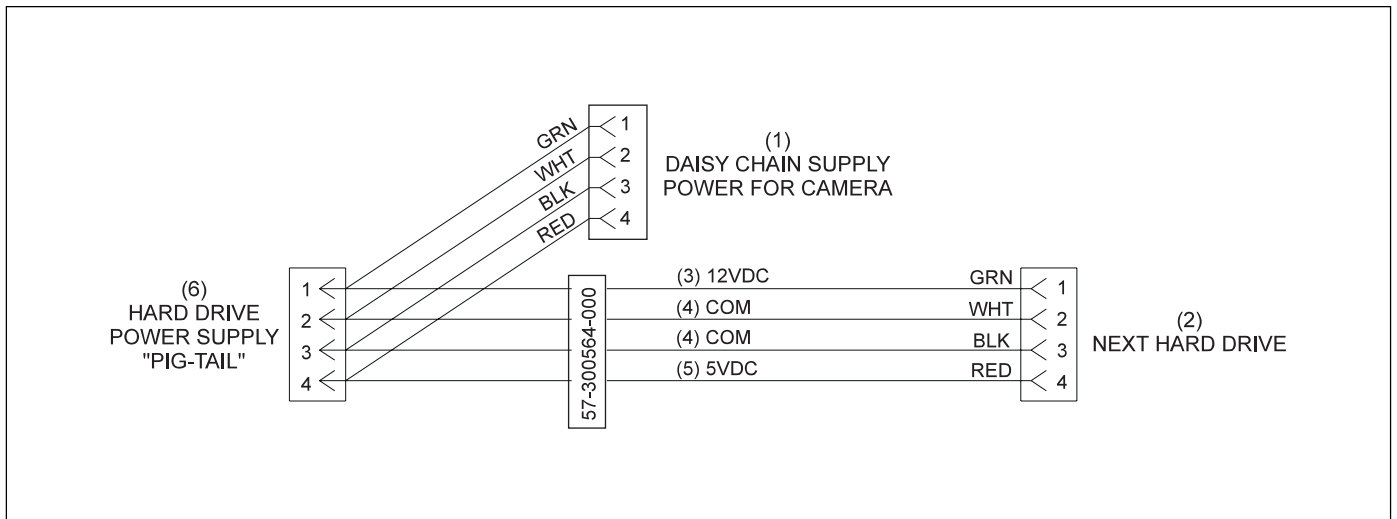
- (1) TO DB-9 ON INSTANT REPLAY BOX
- (2) TO J1 OR J2 ON REMOTE VIDEO PRINTED CIRCUIT BOARD
- (3) DRAIN
- (4) SHIELD



Video Out Instant Replay Cable Assembly (Part No. 57-300563-000)

- (1) TO OVERHEAD VIDEO INPUT
- (2) TO DB-9 ON INSTANT REPLAY BOX
- (3) DRAIN
- (4) SHIELD
- (5) NO CONNECTION

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE



Hard Drive Daisy Chain (Part No. 57-3000564-000)

- | | | |
|---|----------------------------|--|
| (1) DAISY CHAIN SUPPLY POWER FOR CAMERA | (2) NEXT HARD DRIVE | (3) 12 VOLTS DIRECT CURRENT |
| (4) COMMON | (5) 5 VOLTS DIRECT CURRENT | (6) HARD DRIVE POWER SUPPLY "PIG TAIL" |

BRN=BROWN, BLK=BLACK, RED=RED, ORN=ORANGE, YEL=YELLOW, GRN=GREEN, BLU=BLUE, VIO=VIOLET, GRY=GREY, WHT=WHITE