instruction manual

AXB-PT10/15/30

PosiTrack Camera Controllers

Camera Controllers

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Introduction

The AXB-PT10 PosiTrack 10, AXB-PT15 PosiTrack 15, and AXB-PT30 PosiTrack 30 Camera Controllers (FIG. 1) are camera/lens controllers used for precise camera-positioning applications. Each PosiTrack unit supports both AXlink and RS-232 control protocols and connects directly to an AXlink network. All controllers contain on-board intelligence for consistent motion and lens control. The AXB-PT10 and AXB-PT15 Camera Controllers use identical connectors and camera mounts but support different camera/lens weights (refer to the *Specifications* section for more detailed information).

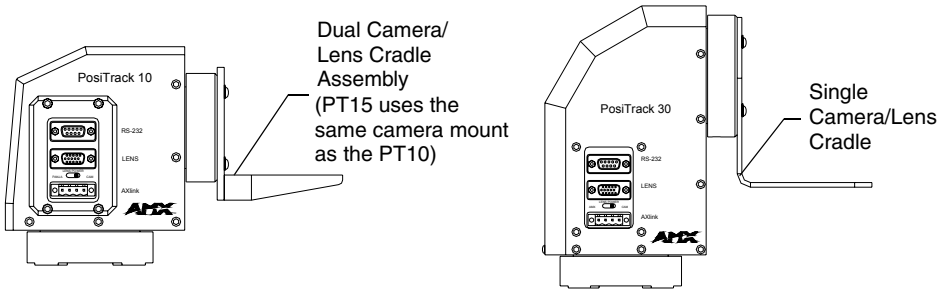


FIG. 1 AXB-PT10 and AXB-PT30 PosiTrack Camera Controllers (side views)

The following table shows the PosiTrack unit lens compatibility.

PosiTrack Unit Lens Compatibility	
Fujinon Lenses	**Canon Lenses**
MD	KTSA
BMD	RGE PZF
AMSR	R
MPX	REA
SNPY	REA-IA
MDM	REA-IA PZF
SNDS	RGE

Specifications

The following table lists the specifications for all PosiTrack units.

Specifications	
Dimensions (HWD):	
AXB-PT10	Camera controller: 5.85" x 5.20" x 4.92" (14.86 cm x 13.22 cm x 14.70 cm) Camera mount: 0.65" x 2.26" x 3.23" (1.75 cm x 5.74 cm x 8.21 cm) Cradle support bracket: 3.64" x 5.50" x 0.20" (9.25 cm x 13.97 cm x 0.51 cm)
Dimensions (HWD):	
AXB-PT15	Camera controller: 6.43" x 5.61" x 5.38" (16.32 cm x 14.25 cm x 13.67 cm) Camera mount: 0.65" x 2.26" x 3.23" (1.75 cm x 5.74 cm x 8.21 cm) Cradle support bracket: 3.64" x 5.50" x 0.20" (9.25 cm x 13.97 cm x 0.51 cm)
Dimensions (HWD)	
AXB-PT30	Camera Controller: 7.10" x 5.70" x 4.65" (18.03 cm x 14.49 cm x 11.81 cm) Camera Cradle: 4.75" x 3.75" x 6.25" (120.67 mm x 95.28 mm x 158.75 mm)
Power Consumption:	
AXB-PT10	2.6 A max @ 12 VDC
AXB-PT15	4 A max @ 12 VDC
AXB-PT30	6 A max @ 12 VDC
Weight:	
AXB-PT10	8.00 lbs. (3.63 kg)
AXB-PT15	10.51 lbs. (4.77 kg)
AXB-PT30	13.05 lbs. (5.92 kg)
Angular Travel:	Pan ± 179° (358° total) Tilt ± 90° (180° total)
Maximum Speed:	
AXB-PT10	• Pan 45°/sec. • Tilt 45°/sec.
AXB-PT15	• Pan 55°/sec. • Tilt 55°/sec.
AXB-PT30	• Pan 35°/sec. • Tilt 35°/sec.
Weight Capacity:	
AXB-PT10	10 lbs. (4.54 kg) balanced lens/camera weight (maximum)
AXB-PT15	15 lbs. (6.80 kg) balanced lens/camera weight (maximum)
AXB-PT30	30 lbs. (13.6 kg) balanced lens/camera weight (maximum)
Repeatability:	
AXB-PT10	± 5 arc minutes
AXB-PT15	± 3 arc minutes
AXB-PT30	± 5 arc minutes

Specifications (Cont.)	
DIP Switches:	• (S2) - RS-232 communication (baud rate) • (S5) - AXlink communication (device #)
Presets:	Stores up to 255 presets for pan, tilt, zoom, focus, and iris operations; 127 of those presets return a status when queried.
Relays:	Solid-state relays for servomotor lens mode control (zoom/focus speed/position and iris local/auto)
Optical Centerline:	Optical centerline is between 1/2" and 5" above the mounting plane of the camera/lens (this allows the mounting of the camera/lens so that the tilt axis is capable of going through the optical axis of the camera)
Environmental Parameters:	32° F to 120° F (0° C to 48.8° C) ambient temperature range
Enclosure:	Metal with enamel and anodized matte finish
Control Panel:	• RS-232 DB-9 connector (300 baud - 38.4 KB communication for camera control) • DB-15 high density connector (lens control) • Lens power switch (powers or isolates the camera lens) • AXlink 4-pin connector (provides AXlink, RS-232 stand-alone communication, and power connection points)
Battery:	Lithium battery to protect preset memory (up to 10 years)
Connectors:	• 4-pin captive wire (AXlink) • DB-15 HD 15-pin high-density (female) for lens control • DB-9 9-pin D-sub (male) for RS-232 camera control
Optional Accessories:	• CC-CAM lens control cable (specify make and model) • CC-CAM RS-232 camera control cable (specify make and model) • Pedestal mount (PM-CAM, PosiTrack Pedestal Mount) • PSN2.8 Power Supply (for use with the PT10 Camera Controller) • PSN6.5 Power Supply (for use with the PT10/15/30 Camera Controllers) - **This power supply can be used with ALL PosiTrack units** • Tripod mount (TM-CAM, PosiTrack Tripod Mount Adapter) • Wall-mount bracket (WM-CAM, PosiTrack Wall Mount)

Lens Control Modes

The Servomotor and Motor modes are two Analog Voltage Control methods available on the PosiTrack units.

Servomotor Mode

This method is generally used in broadcast or videoconference-style lenses. The voltage range used for servomotor style lenses is +2.5 to +7.5 VDC. These lenses can be controlled in two different modes: *positional mode* and *speed mode*.

- **Positional mode** is the most common Servomotor mode. When voltage changes, the lens moves and remains still until the voltage changes again. For example, if a lens receives a voltage of +3 VDC, the lens moves to the corresponding position and stays there as long as the voltage remains at +3 VDC. The movement speed of the lens motor is a function of the PosiTrack unit's analog output. The lens servomotor receives the preset voltage when a preset is recalled in the positional mode.

- **Speed mode** moves the lens when the voltage deviates from the center point of its range. The farther the voltage moves away from the center point of reference, the faster the lens motor moves. The lens must have POT outputs when recalling a preset in this mode,. The outputs pass to the PosiTrack unit, and when the received voltage level matches the level stored in the preset, the voltage returns to zero. Servomotor speed mode lenses not having POT outputs do *not* have preset recall capability.

Motor Mode

Motor mode is used when the lens requires the motors be directly driven from an external source. The standard voltage ranges are ± 6 VDC or ± 12 VDC with a center (no motion) of 0 VDC. Unlike servomotor lenses, these only operate in speed mode.

The lens moves in relation to the voltage offset from zero. The farther the voltage moves away from the center point, the faster the lens motor moves. The lens must have POT outputs when recalling a preset in this mode, these outputs are then passed to the PosiTrack unit. When the received voltage level matches the level stored in the preset, the voltage returns to zero. Motor mode lenses not having POT outputs do *not* have preset recall capability.

Pan and Tilt Control

Presets and travel limit stops are based on encoder counts from a *home* position index, located at the center of each axis' range of motion.

Zoom, Focus, and Iris Control

Each PosiTrack unit delivers a low voltage pulse-width-modulated output for zoom, focus, and iris functions for motor mode lenses. These units are also capable of receiving reference voltage *rails* and sending zoom, focus, and iris control signals in response to these rails. In this setting (slide-switch configured), no *active* control signals will reach the lens before power (+ 12 VDC and GND) is supplied to the lens. This motor mode applies to the control of the Fujinon and Canon teleconferencing lenses. During preset recall operation, these outputs are synchronized with the pan and tilt motions. Refer to the PosiTrack Unit Lens Compatibility table on page 1. Four solid state relays are also provided to control the zoom, focus, and iris speed/position mode selection and iris local/auto selection on the Fujinon MD series and Canon KTSA series lenses.

Sample Product Application

FIG. 2 shows a sample camera control application using the AXB-PT10.

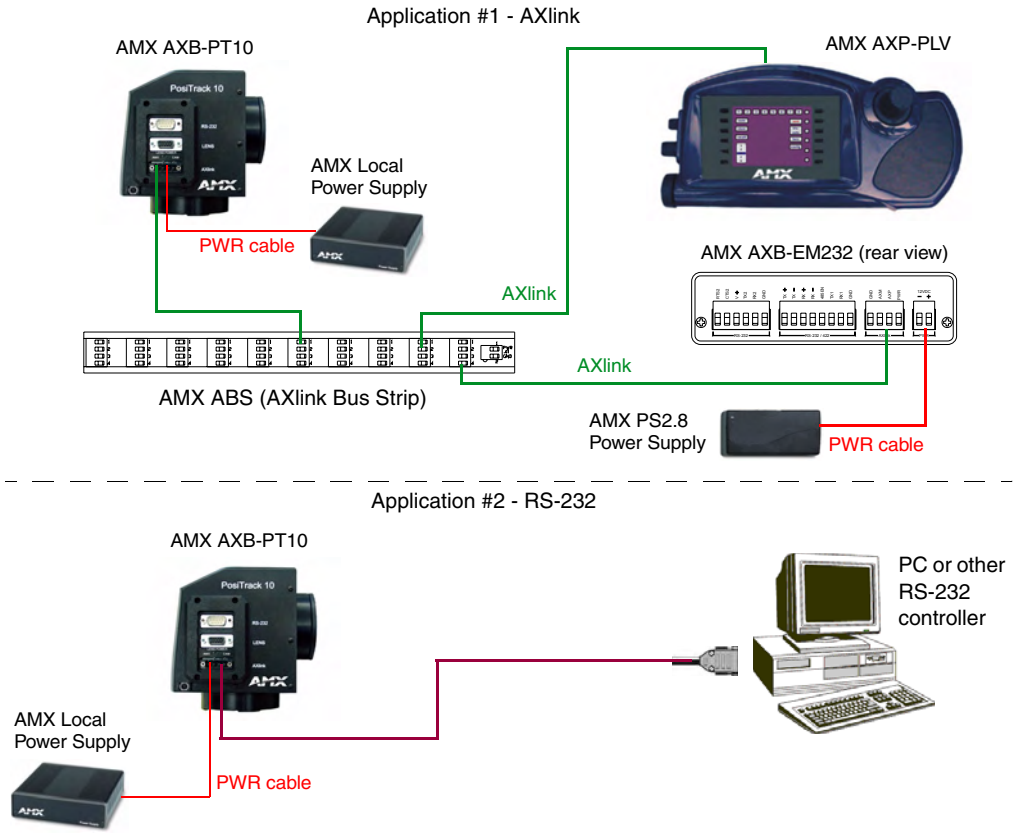


FIG. 2 Sample AXB-PT10 camera product application

NOTE

Use a separate power supply to power each PosiTrack unit. Power to the PosiTrack unit is supplied from the external power supply to the unused power pin on the PosiTrack unit's AXlink connector.
The AXB-PT10 unit requires a PSN2.8 or PSN6.5 power supply.
The AXB-PT15 and AXB-PT30 units require a PSN6.5 power supply.

Pre-Installation

There are four SPDT slide switches in the lens control section (FIG. 3). Three of the switches toggle the lens control selection between servomotor or motor mode hardware for control of zoom, focus, and iris. The fourth selects between ± 6 VDC and ± 12 VDC control for motor mode lens functions.

NOTE

An SPDT switch is a Single Pole-Double Throw switch. This switch is completed at both positions. An example is the Volt switch that is active in both the 6 and 12 positions.

Each PosiTrack unit consists of two main Printed Circuit Boards (PCBs):

- **PosiTrack Processor PCB** (PosiTrack Mother Board) contains the main processor, 2MB FlashROM, and 2MB SRAM.
- **PosiTrack Power Management PCB** (PosiTrack Daughter Board) contains power conditioning circuitry, control outputs/inputs to the pan/tilt drives, and zoom/focus/iris outputs, and inputs to the lenses.

The following table shows the necessary tools when working on the PosiTracks.

Necessary Tools			
AXB-PT10/15		**AXB-PT30**	
3/32 HEX KEY	Anti-Rotation Pin	5/64 HEX KEY	Cover Screws
3/16 HEX KEY	Camera Mount Screw	1/16 HEX KEY	Bezel and Connector Screws
1/16 HEX KEY	Cover Screws and Connector Bezel	3/32 HEX KEY	Camera Mount ADJ. Screws
5/64 HEX KEY	Tilt Arm Screws	5/64 HEX KEY	Tilt Arm Screws
3/32 HEX KEY	Camera Mount ADJ. Screws	3/32 HEX KEY	Camera Mount ADJ. Screws

Configuration Settings

Both PosiTrack units contain switches for setting the control mode, lens control voltage, RS-232 baud rate, and AXlink address. Before installing the PosiTrack unit, you must set the DIP switches, lens control mode switches, and lens control voltage switch.

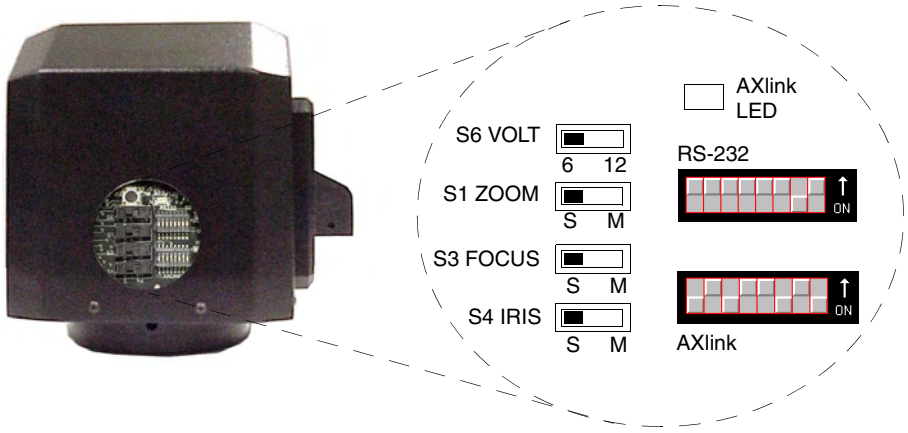


FIG. 3 Lens control section (back panel)

Setting zoom, focus, and iris switches to servomotor or motor mode

Both PosiTrack units support servomotor (+2.5 to +7.5 VDC operating range) and direct-drive motor (± 6 VDC or ± 12 VDC operating range) lens control. The table below shows how to set the switches for servomotor mode (S) or motor mode (M). If you are using a direct-drive lens, refer to the manufacturer's literature to set the VOLT switch for ± 6 or ± 12 VDC control.

Servomotor and Motor Voltage Switch Settings

Servomotor mode	**Motor mode (± 6 VDC)**	**Motor mode (± 12 VDC)**
VOLT 6 12	VOLT 6 12	VOLT 6 12
ZOOM S M	ZOOM S M	ZOOM S M
FOCUS S M	FOCUS S M	FOCUS S M
IRIS S M	IRIS S M	IRIS S M

Setting the RS-232 DIP switch (S2)

The RS-232 DIP switch (S2) positions 1 and 2 set the stop and data bits, positions 3 through 5 set the parity, and positions 6 through 8 set the baud rate. FIG. 4 shows the RS-232 DIP switch.

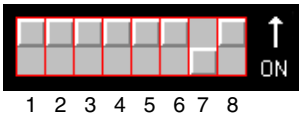


FIG. 4 RS-232 communications parameters DIP switch (S2) (default setting)

The PosiTrack units contain one EIA RS-232C standard port for equipment that requires RS-232 control. The following communication protocols are supported:

- 300, 600, 1200, 2400, 4800, 9600, 19200, and 38400 baud
- 7, 8, or 9 Data bits
- 1 or 2 Stop bits
- Even, Odd, and None parity settings

The RS-232 factory default communications settings are: **9600 baud, No Parity, 8 bits, and 1 stop bit**. The following table lists the RS-232 Port DB-9 (male) pinouts.

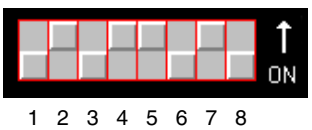
RS-232 Port DB-9 (male) Pinouts		
Pin	**Signal**	**Function**
1	N/A	N/A
2	RXD	RXD
3	TXD	TXD
4	N/A	N/A
5	GND	GND
6	N/A	N/A
7	RTS	RTS
8	CTS	CTS
9	N/A	N/A

The following table lists the RS-232 DIP switch settings.

RS-232 DIP Switch (S2) Settings								
Position	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Function	**Stop Bits**	**Data Bits**		**Parity**			**Baud Rates**	
	Off 2 bits	Off 7 bits	Off	Off Unused	Off	Off	Off 300	Off
	On 1 bit	On 8 bits	On	Off Unused	Off	On	Off 600	Off
			Off	On Unused	Off	Off	On 1,200	Off
			On	On Unused	Off	On	On 2,400	Off
			Off	Off Unused	On	Off	Off 4,800	On
			On	Off Even	On	On	Off 9,600	On
			Off	On Odd	On	Off	On 19,200	On
			On	On None	On	On	On 38,400	On

Setting the AXlink Device DIP switch (S5)

The eight-position Device DIP switch (S5), shown in FIG. 5, must match the number assigned in the Axcess software program. The Device DIP switch example is set to 90 (2 + 8 + 16 + 64 = 90), the factory default setting.



AXlink
DIP switch
(S5)

FIG. 5 AXlink device DIP switch (S5) (default value of 90)

The AXlink device number range is 1-255. The Device DIP switch positions determines their values, based on the following table:

Device DIP Switch (S5) Settings and Values								
Position	1	2	3	4	5	6	7	8
Value	1	2	4	8	16	32	64	128

After setting the AXlink device number, remove and reconnect the AXlink connector on the PosiTrack unit to save the new number.

Accessing the AXB-PT10 and AXB-PT15 Internal Jumpers

Jumpers J6 through J8, located on the circuit board inside the PT10 and PT15, set the communication mode to AXlink (factory default) or RS-232.

You need a 5/64" (1.98 mm) and 1/16" (1.59 mm) Allen wrench to open the unit, and a pair of non-conducting pliers to set the jumpers using the following steps.

CAUTION

Remove the control panel before you remove the cover, in order to avoid any damage to the unit.

1. Discharge any accumulated static electricity from your body before removing the enclosure. Remove the static electricity by touching a grounded metal object.
2. Unplug all connectors from the rear panel of the PosiTrack unit.
3. Remove the four screws, located around the connector panel (FIG. 6), by using the 1/16" Allen wrench. *BHSC is the abbreviation for the Button Head Socket Cap screws.*

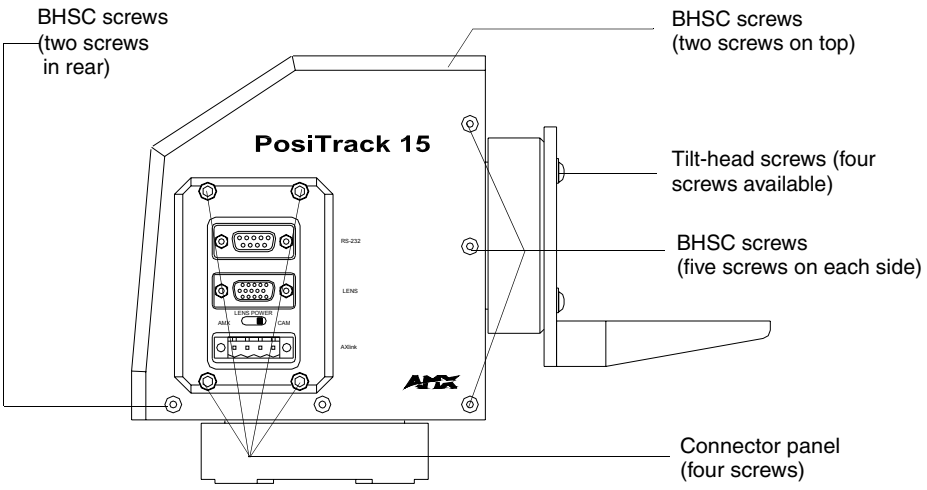


FIG. 6 Pan-head screw locations

4. Carefully pull the connector panel away from the main unit until the bottom edge of the cover clears the connector panel. Be careful not to damage the pins attached to the connector panel. FIG. 7 illustrates how to remove the control panel.
5. Using the 1/16" Allen wrench, remove the 14 BHSC screws, from the left, right, top, and back sides of the PosiTrack unit.

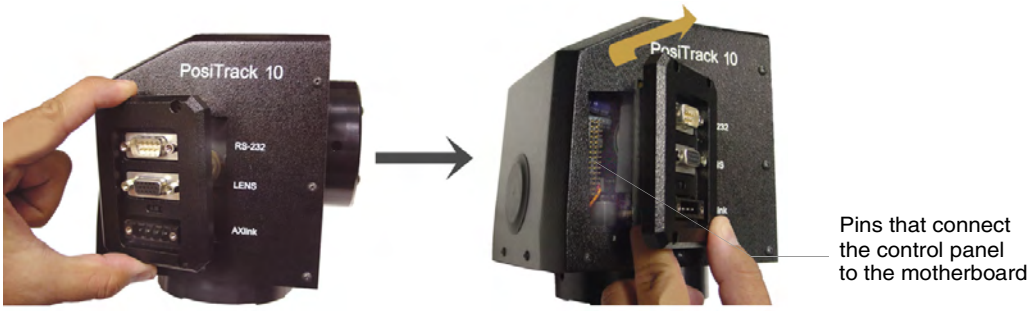


FIG. 7 Control panel removal for PT10 and PT15

6. Carefully pull the cover straight up from the main unit, until the bottom edge of the cover clears the connector panel and then slide it backwards (as seen in FIG. 8).

FIG. 8 Removing cover on the PT10 and PT15

Accessing the AXB-PT30 Internal Jumpers

Jumpers J6 - J8, located on the circuit board inside the AXB-PT30, set the communication mode to AXlink (factory default) or RS-232.

You need a 5/64" (1.98 mm) and 1/16" (1.59 mm) Allen wrench to open the unit, and a pair of non-conducting pliers to set the jumpers using the following steps.

1. Discharge any accumulated static electricity from your body before removing the enclosure. Remove the static electricity by touching a grounded metal object.
2. Unplug all connectors from the rear panel of the AXB-PT30.
3. Using the 1/16" Allen wrench, remove the four #4-40 socket head screws located around the connector panel (FIG. 9), by using.
4. Remove the 16 BHSC screws, using the 5/64" Allen wrench, from the left, right, top, and back sides of the AXB-PT30. A sample view of the screw locations is shown in FIG. 9.
5. Carefully pull the cover straight up from the main unit, until the bottom edge of the cover clears the connector panel, and place the cover aside (see FIG. 8).

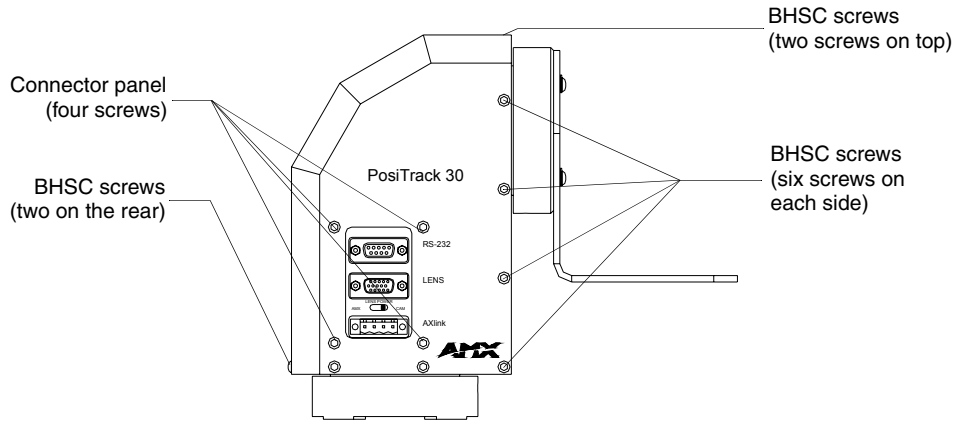


FIG. 9 Pan-head screw locations

Setting the Internal Jumper Communication Mode

1. Locate jumpers J6, J7, and J8 communication mode jumpers on the Mother PCB (FIG. 10). The connectors and the main board are mounted onto the pan base.
2. Set the jumpers for either AXlink or RS-232 communication.

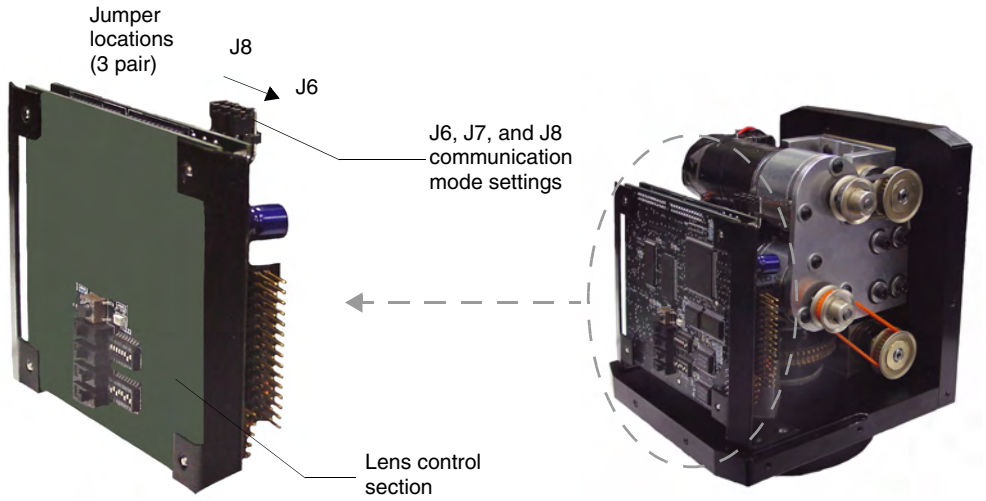
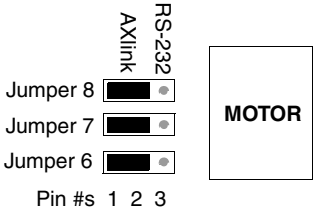
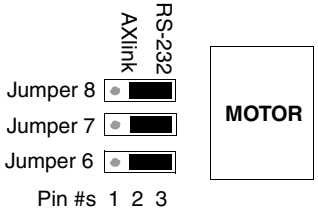


FIG. 10 Communication mode jumpers J6, J7, and J8 (factory default set to AXlink)

3. Set the jumpers for either AXlink or RS-232 communication.

Jumper Settings (top view)	
AXlink (pins 1 & 2)	**RS-232 (pins 2 & 3)**
	

NOTE

For RS232 stand-alone mode, the 8-position AXlink Device DIP switch must be set to ***all off*** *(down position).*

4. Carefully place the cover back onto the main unit by sliding it over the internal gears and motherboard.
5. Align the Control panel screw holes. Make sure the cables are not pinched in the back panel or drive gears.
6. Insert the 14 BHSC screws and tighten securely using the 1/16" Allen wrench.

NOTE

Steps 6 and 7 apply to the AXB-PT10/PT15 units where the removal of the Control Panel differs from the PT30.

7. Carefully insert the connector panel, on the PT10/15, into the opening on the side of the unit and connect it to the motherboard located inside the unit.
8. Firmly secure the control panel to the motherboard.
9. Using the 1/16" Allen wrench, insert the four BHSC screws, located around the connector panel.
10. Use the wire tie-mount to secure connector cables.

Configuring An External Camera/Lens Power Supply

The camera/lens power switch, located between the AXlink and DB-15 connectors, regulates the power to the camera/lens from the PosiTrack unit. The power switch, seen in FIG. 6 and FIG. 9, Opens (turns Off) or Closes (turns On) the circuit feeding power to the camera/lens assembly. Refer to the *Wiring the Connectors* section on page 20 for more information about the control panel.

- Flip the Lens Power switch to the left if you are only providing power to the camera/lens assembly through the PosiTrack unit.
- Flip the Lens Power switch to the right if you are providing external power to the camera/lens assembly. By turning the switch Off, the dedicated +12 VDC stops providing additional power to the camera/lens; preventing damage to power supplies and *noise* in the video cables.

Installation

CAUTION

IMPORTANT! READ THIS DOCUMENT BEFORE MOUNTING CAMERA.

Proper balance of the camera mount (with camera/lens/cradle) will result in optimal performance. Follow these balancing instructions prior to operation. Failure to balance the camera mount can result in poor performance.

The PosiTrack units enable pan and tilt functionality for mounted camera/lens assemblies and provides lens control functions for teleconferencing lenses. Digital encoders are installed on both the pan and tilt drives, allowing positional feedback for presets, and to provide accurate speed control. Software adjustable stop limits are used on the pan and tilt drives to limit the range of motion.

CAUTION

Do not mount a PosiTrack unit in any location where the motion of the camera/lens is obstructed by any object.

Mounting the PT10, PT15, and PT30

Mount the PosiTrack units to a flat horizontal surface, either upright or inverted.

1. Select a surface that can support the combined weight of the PT10/ PT15/PT30, the camera/lens, and control cables. Some support surfaces include the WM-CAM, PM-CAM, and TM-CAM mounts available for use with these units.
2. Locate the external white position markers located on the pan and tilt axis. The position markers must align with the pan and tilt axis in order to be considered in the home position. FIG. 11 shows the camera cradle attachment in the center position.

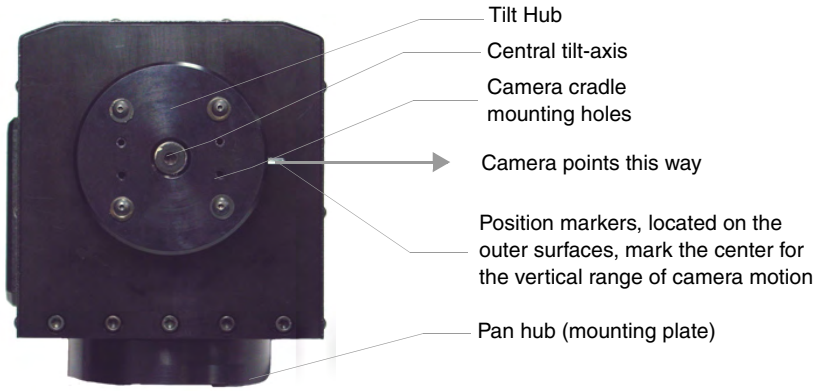


FIG. 11 Center position for the camera cradle attachment

3. Mount the PosiTrack unit to a flat surface by drilling four holes, according to the mounting-plate dimensions shown in FIG. 12. Secure the unit to the surface using four 1/4" x 20 machine bolts and lock washers. **Ensure that the external white position marker, on the pan drive hub, is inside the desired camera rotation range.**

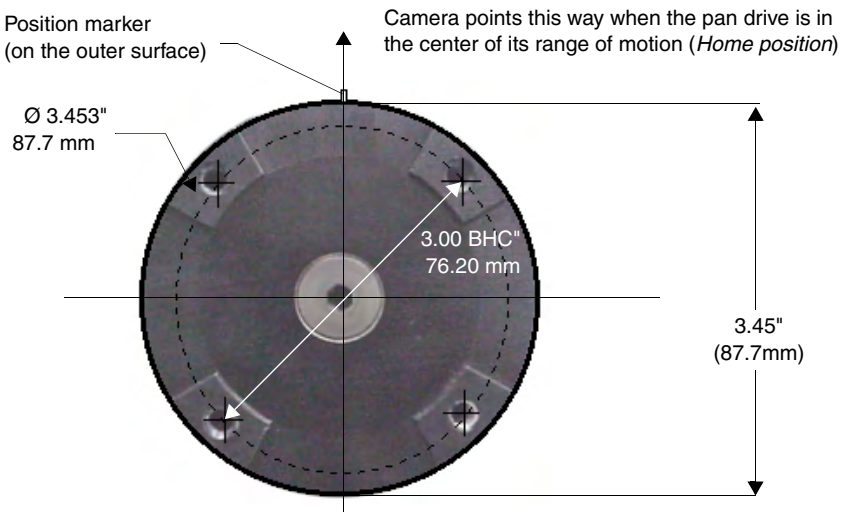


FIG. 12 Tilt Hub (Mounting plate) dimensions

Each PosiTrack unit can be mounted to camera mounts such as the TM-CAM, WM-CAM, and PM-CAM as shown in FIG. 13.

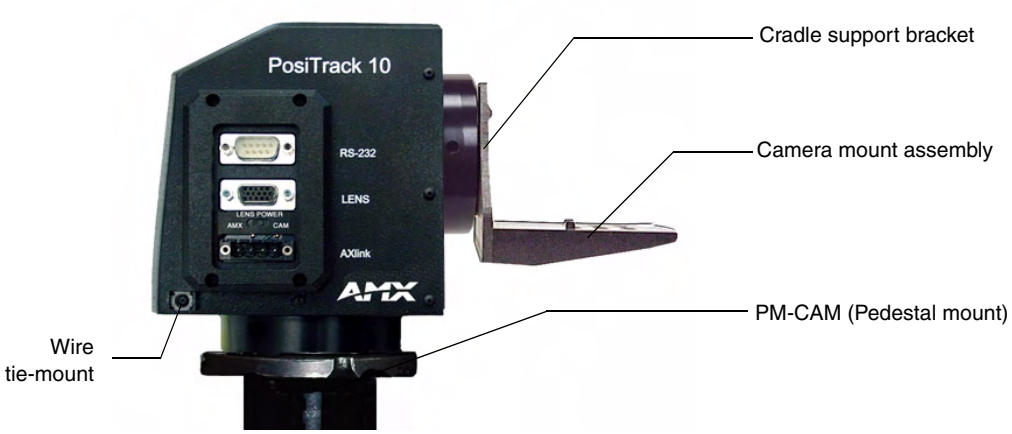


FIG. 13 Pedestal mount

NOTE

The camera/lens cradle can be mounted on either side of the cradle support bracket.

PT10 and PT15 Camera/Lens Mounting and Balancing

The camera/lens assembly should be mounted so the tilt axis is capable of going through the optical axis of the camera, assuming the optical centerline is between 1/2" (12.70 mm) and 5" (127.00 mm) above the mounting plane of the camera lens. The mounting platform (camera cradle) allows the camera/lens to be mounted with its center of gravity on the tilt axis. The maximum weight of the camera/lens assemblies on the PT10 is 10 lbs. (4.54 kg) and on the PT15 is 15 lbs. (6.80 kg). The camera cradle is mounted to the Tilt Hub (FIG. 14).

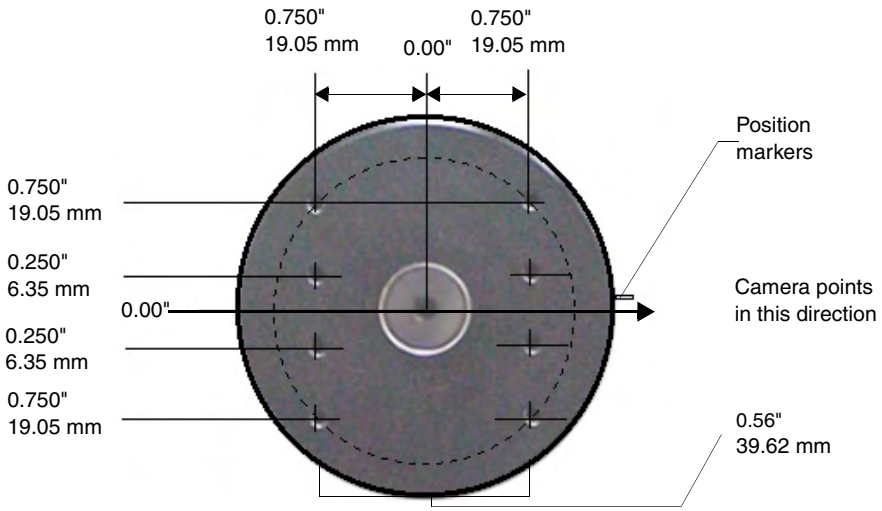


FIG. 14 Tilt Hub dimensions for the PT10/15 units

CAUTION

Do not lift the PosiTrack unit by the Camera/Lens cradle as this procedure could damage internal components.

To mount and balance the camera/lens:

1. Separate the camera mount and the cradle support bracket by removing the two 1/2" screws on the underside of the assembly (see FIG. 15) using a 3/32" Allen wrench.
2. Install the camera alignment peg to the mount at the position that best fits the camera/lens.
3. Secure the camera/lens to the mount (at the camera alignment peg) with the 1/2" screw and 1/10" thick washer supplied (see FIG. 15).

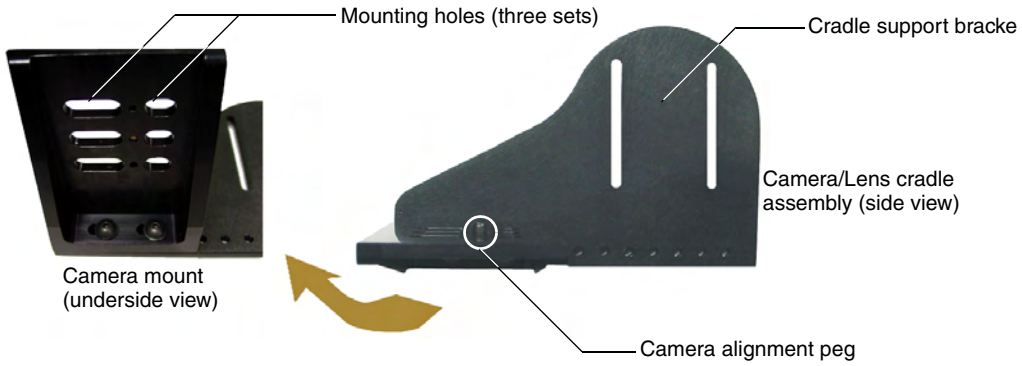


FIG. 15 Camera bracket assembly

4. Place the assembly on a balancing beam and while maintaining the cradle centered on the pipe, slide the camera along the cradle's groves until the camera and cradle remain balanced on the beam (see FIG. 16). Verify balance with a spirit level.
5. Mount the camera as close to the Tilt Hub as possible to obtain a true center of gravity. The center of gravity is the location on the long axis of the camera/lens assembly around which the camera and mount balances.

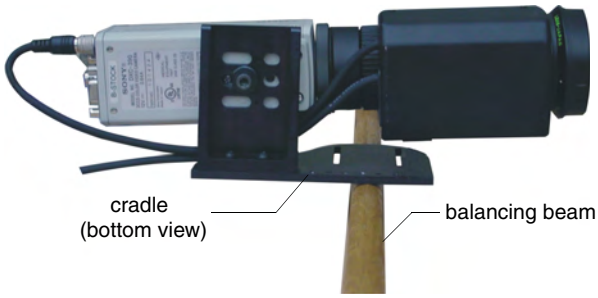


FIG. 16 Balancing the camera/lens cradle assembly

6. Re-attach the camera mount (with camera/lens) to the cradle support bracket using the two 1/2" screws.
7. Take the entire camera/mount and cradle assembly and align the lens with the Tilt Hub so that the vertical-axis intersects the center of the camera's iris, as shown in FIG. 17.

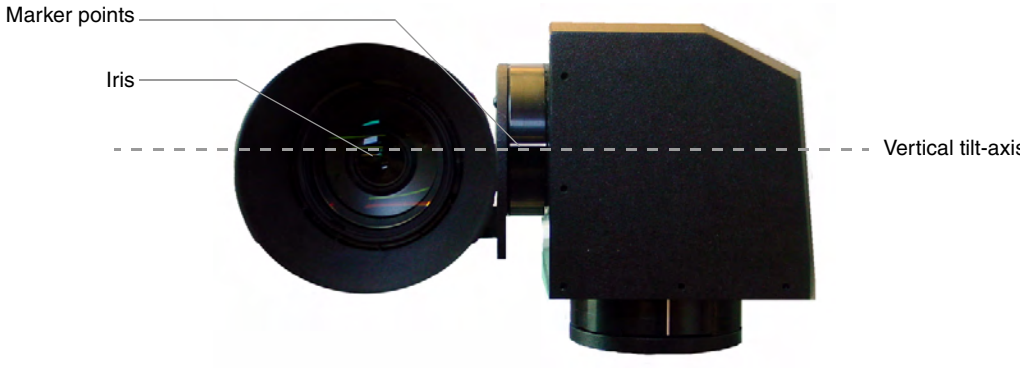


FIG. 17 Iris alignment with vertical tilt-axis

8. Mark the position of the cradle support bracket on the Tilt Hub (for later attachment).
9. Remove the camera/lens and mount piece from the support bracket by unscrewing the two 1/2" screws on the underside of the camera mount.
10. Secure the support bracket to the Tilt Hub (at the same position marked for the iris alignment) on the PosiTrack unit with some or all of the four 1/2" screws and washers.
11. Secure the camera/mount to the support bracket by using the two 1/2" screws.
12. Support the weight of the camera cables with a wire tie attached to the wire tie mount on the lower corner of the face of the PosiTrack unit (FIG. 13).

NOTE

The camera/lens cradle can be mounted on either side of the cradle support bracket.

CAUTION

IMPORTANT! READ THIS DOCUMENT BEFORE MOUNTING CAMERA.

Proper balance of the camera mount (with camera/lens/cradle) will result in optimal performance. Follow these balancing instructions prior to operation. Failure to balance the camera mount can result in poor performance.

PT30 Camera/Lens Mounting and Balancing

The camera/lens assembly should be mounted so the tilt axis is capable of going through the optical axis of the camera, assuming the optical centerline is between 1/2" (12.70 mm) and 5" (127.00 mm) above the mounting plane of the camera lens. The mounting platform (camera cradle) allows the camera/lens to be mounted with its center of gravity on the tilt axis. The maximum camera/lens weight supported is 30 lbs. (13.6 kg). The camera cradle is mounted to the Tilt Hub (FIG. 18).

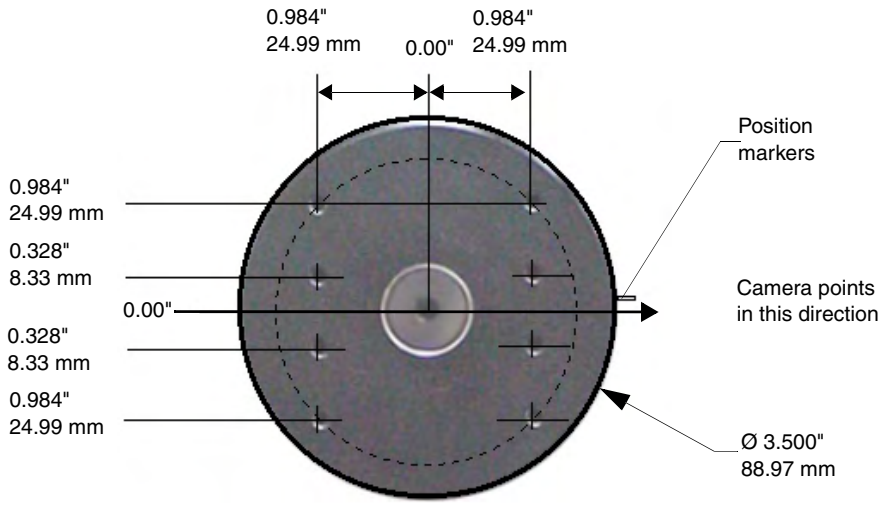


FIG. 18 Tilt Hub dimensions for the PT30

CAUTION

Do not lift the PT30 by the Camera/lens cradle as this procedure could damage internal components.

To mount and balance the assembly:

1. Remove the four 1/2" screws and washers securing the camera cradle to the pan/tilt head.
2. Obtain a camera and a balancing beam, such as a pipe. The pipe is used to balance the camera/lens on the cradle assembly.
3. Mount the camera to the camera/lens cradle assembly (FIG. 19).
4. Attach the camera/lens to the cradle with a fastener recommended by the camera manufacturer. Allow the camera to slide along the horizontal grooves without sliding off.
5. Place the assembly on the balancing beam and while maintaining the cradle centered on the pipe, slide the camera along the cradle's grooves until the camera and cradle remain balanced on the beam (FIG. 20). Verify the balance with a spirit level.
6. Mount the camera as close to the Tilt Hub as possible to obtain a true center of gravity. The center of gravity is the location on the long axis of the camera/lens assembly around which the camera and mount balances.

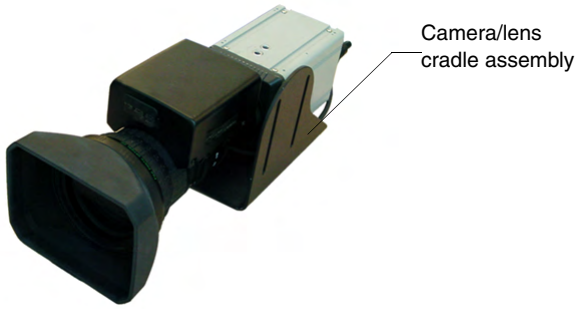


FIG. 19 Camera/lens cradle assembly mounting

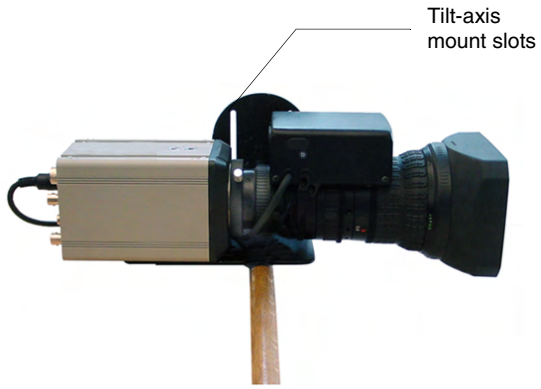


FIG. 20 Balancing the camera/lens cradle assembly

7. Secure both the camera mounting and tilt-axis screws.
8. Take the entire camera/lens assembly and slide it along the Tilt Hub until the vertical-axis of the PT30 intersects the center of the camera's iris. Refer to the *PT10 and PT15 Camera/Lens Mounting and Balancing* section on page 16 for more information on alignment.
9. Mark the position of the white tilt-axis marker on the camera/lens cradle (use this position for later attachment of the camera/lens assembly to the Tilt Hub).
10. Remove the camera/lens from the cradle.
11. Secure the camera/lens assembly to the Tilt Hub by using the lens centerline markings for the camera as a reference (see previous step) with the eight 32x 3/4" screws and washers removed in step 1.
12. Re-attach the camera to its previous position on the cradle.

Wiring the Connectors

Each PosiTrack Controller has an RS-232 DB-9 connector, lens control DB-15 high-density connector, and an AXlink 4-pin connector. Always provide enough cable to accommodate the desired range of motion for the PosiTrack units and their camera/lenses. The Lens Power switch on the control panel, removes any power noise on the incoming video by turning power On/Off to Pin 1 of the DB-15 lens control connector.

NOTE

The LENS POWER switch can turn power Off to the DB-15 pin 1 when the camera/lens is powered from a separate supply.

FIG. 21 shows the location of each connector on the AXB-PT10/15.

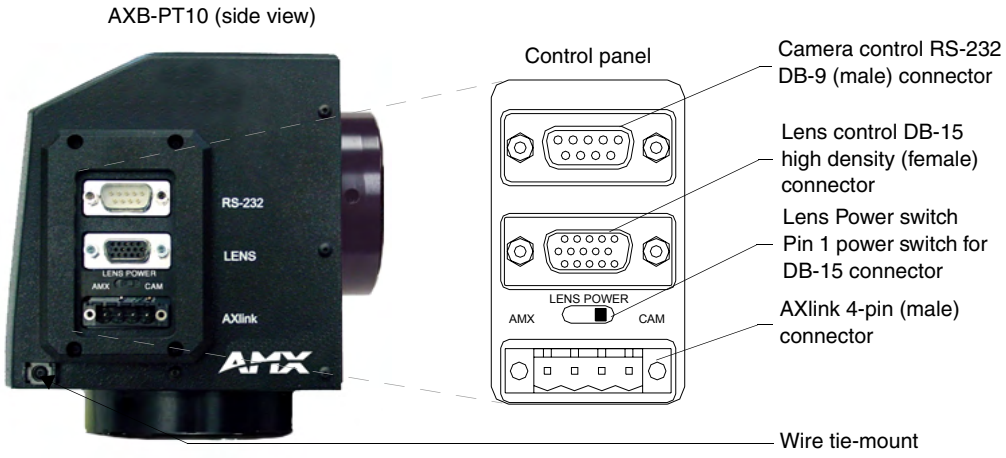


FIG. 21 Control panel location on the AXB-PT10/15

The PosiTrack Controller receives all power from the +12 VDC and GND connections on the four-pin AXlink connector.

CAUTION

When applying power to the AXB-PT10/15, adjust the soft-set pan/tilt limit stops to a safe position to prevent camera or PosiTrack damage.

Wiring Guidelines

In most installations, the PosiTrack Controllers require local +12 VDC power to operate properly. The maximum wiring distance between the power supply and the PosiTrack Controller is determined by power consumption, supplied voltage, and the wire gauge used for the cable. The following wiring table lists wire sizes and the maximum lengths allowable between the PosiTrack units and the power supply. The maximum wiring lengths are based on a minimum of 13.5 VDC, available at the power supply output.

NOTE

The AXB-PT10 power rating is 2.6 A @ 12 VDC.
The AXB-PT15 power rating is 4 A @ 12 VDC.
The AXB-PT30 power rating is 6 A @ 12 VDC.

To reduce the possible effects of ground loop noise in the video, use a single-source power supply mounted within distances specified in the following table.

Wiring Guidelines - PT10, PT15, PT30 (Based on a +12VDC Power Supply)

Wiring Guidelines - PT10 (2.6 A)		Wiring Guidelines - PT15 (4 A)		Wiring Guidelines - PT30 (6 A)	
Wire size	**Max. wiring length**	**Wire size**	**Max. wiring length**	**Wire size**	**Max. wiring length**
18 AWG	45.14 ft (13.76 m)	18 AWG	29.34 ft (8.94 m)	18 AWG	19.56 ft (5.96 m)
20 AWG	28.56 ft (8.71 m)	20 AWG	18.56 ft (5.66 m)	20 AWG	12.38 ft (3.77 m)
22 AWG	17.80 ft (5.43 m)	22 AWG	11.57 ft (3.53 m)	22 AWG	7.72 ft (2.35 m)
24 AWG	11.22 ft (3.42 m)	24 AWG	7.30 ft (2.22 m)	24 AWG	4.86 ft (1.48 m)

Preparing captive wires

You will need a wire stripper and flat-blade screwdriver (approximately 1/8") to prepare and connect the captive wires.

WARNING

Never pre-tin wires for compression-type connections.

1. Strip 0.25 inch (6.35 mm) of insulation off all wires.
2. Insert each wire into the appropriate opening on the connector, according to the wiring diagrams and connector types described in this section.
3. Turn the screws clockwise to secure the wire in the connector. Do not tighten the screws excessively; doing so may strip the threads and damage the connector.

Using the AXlink connector for data and power

To use the AXlink 4-pin connector for data communication with the Central Controller and power transfer from the local power supply (**PSN**), the incoming PWR and GND cable from the local power supply must be connected to the AXlink cable connector going to the PosiTrack Controller. FIG. 22 shows how the power cable from the local power supply is used to power the PosiTrack Controller and the GND cable is connected onto the existing GND cable on the AXlink cable coming from the Central Controller. Always use a local power supply to power the PosiTrack unit.

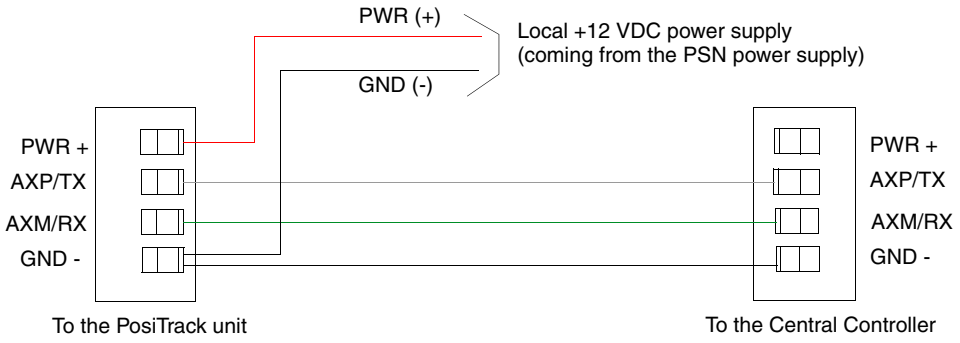


FIG. 22 AXlink connector and local +12 VDC power supply wiring diagram

WARNING

Do not connect the wire from the PWR terminal on the Central Controller to the PWR terminal on the PosiTrack unit when you connect an external power supply. Make sure to connect only the AXM, AXP, and GND wires on the PosiTrack unit's Axlink connector when using a local power supply.

1. Unscrew the PWR and GND wires on the terminal end of the PSN's 2-pin cable.
2. Pair the GND wires from the PSN and the Central Controller AXlink connectors together and insert them into the clamp position for GND on the PosiTrack unit's AXlink connector.
3. Tighten the clamp to secure the two GND wires.
4. Place the PWR wire from the PSN into the open clamp position for PWR on the PosiTrack unit's AXlink connector.
5. Tighten the clamp to secure the PWR wire.

Using the AXlink connector with an external RS-232 control device or PC (Stand-Alone only)

To use the AXlink 4-pin connector with a PC or other RS-232 controller, wire the AXlink connector to a DB-9 female connector, as shown in FIG. 23. Connector pins 2, 3, and 5 are used for data and ground. For some applications requiring hardware handshaking, it may be necessary to strap pins 7 (request to send) and 8 (clear to send) together.

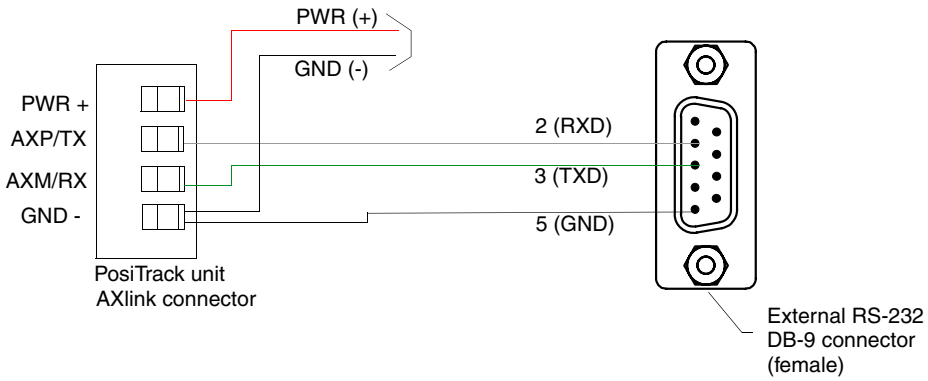


FIG. 23 External RS-232 control device or PC wiring diagram

NOTE

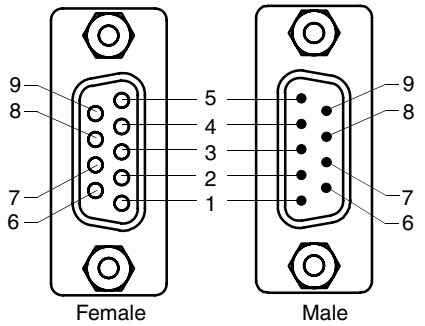
For RS232 stand-alone mode, the 8-position AXlink Device DIP switch (S5) positions 1 thru 8 must all be set to Off (all down) and the internal communication jumpers must be set to RS232 mode. For more information, refer to the Jumper Settings (top view) table on page 12.

Using the RS-232 DB-9 connector

The RS-232 DB-9 (male) connector on the PosiTrack units connect to the camera head's RS-232 connector. The following table shows the (DB-9) RS-232 connector wiring diagram.

(DB-9) RS-232 Connector Pinouts

Pin	Signal	Function
1	N/A	Not used
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready (not used)
5	GND	Signal ground
6	DSR	Data set ready (not used)
7	RTS	Request to send (not used)
8	CTS	Clear to send (not used)
9	N/A	Not used



Preparing the PosiTrack Controllers for communication

The AXlink Device DIP switch is located beneath the round cover on the back of the PT10, PT15 and PT30. Set these switches to the desired device value based on the number of PosiTrack units being used in a particular system. The initial unit is defaulted with a device number of #90. Any additional units must have values that do not conflict with other PosiTrack units being used. Refer to the *Setting the AXlink Device DIP switch (S5)* section on page 9 for more information.

Using the lens control DB-15 HD (high density) connector

The PosiTrack Controllers are designed to control servomotor and motor mode camera lenses. See the *Pre-Installation* section on page 7 to set the lens switches for servomotor or motor mode. FIG. 24 shows the DB-15 HD connector pin numbers.

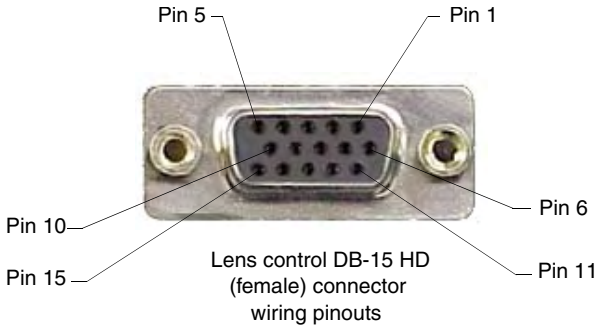


FIG. 24 Lens control DB-15 HD connector (female) wiring pinouts

CAUTION

DO NOT connect the motor-mode outputs to servo-mode lenses. This can result in lens damage.

The following table lists the pinouts for motor mode lenses. Pin1 provides lens power from the PosiTrack's own power supply when the lens power switch is set to AMX (left).

Lens Control DB-15 HD Connector Pinouts for Motor Mode			
Pin	**PosiTrack DB-15 HD connector functions**	**Direction**	**Lens function**
1	+12 VDC	Output	Motor Power
2	GND	Output	Lens common
3	Zoom-drive	Output	Zoom motor
4	Focus-drive	Output	Focus motor
5	Iris-drive	Output	Iris motor
12	POT-REF+ (+5 VDC)	Output	POT-high side
13	POT-REF - (GND)	Output	POT-low side
14	Zoom-wiper	Input	Zoom-POT wiper
15	Focus-wiper	Input	Focus-POT wiper

Motor driven outputs are intended to drive conventional motors. These outputs can deliver up to 100 mA of current. The outputs use Pulse Width Modulation (PWM) for speed control. The output voltage values are ± 6 VDC or ±12 VDC. Speed is controlled by varying the duty cycle of the output.

Lens Control DB-15 HD Connector Pinouts for Servomotor Mode			
Pin	**PosiTrack DB-15 HD connector functions**	**Direction**	**Lens function**
1	+12 VDC	Output	Motor Power (see following note)
2	GND	Output	Lens common
3	Zoom-drive	Output	Zoom motor
4	Focus-drive	Output	Focus motor
5	Iris-drive	Output	Iris motor

Lens Control DB-15 HD Connector Pinouts for Servomotor Mode (Cont.)			
Pin	**PosiTrack DB-15 HD connector functions**	**Direction**	**Lens function**
6	Zoom-speed/position	Output	Zoom-positional/speed mode
7	Focus-speed/position	Output	Focus-positional/speed mode
8	Iris-local/auto	Output	Iris-local/auto select
9	Iris-speed/position	Output	Iris-positional/speed mode
10	VREF-A (+7.5V)	Input	VREF-A (+7.5 V). *The reference voltage must be present to operate correctly in servomotor mode.*
11	VREF-B (+2.5 V)	Input	VREF-B (+2.5 V). *The reference voltage must be present to operate correctly in servomotor mode.*
12	POT-REF+ (+5 VDC)	Output	POT-high side
13	POT-REF- (GND)	Output	POT-low side
14	Zoom-wiper (0-5 VDC)	Input	Zoom-POT wiper
15	Focus-wiper (0-5 VDC)	Input	Focus-POT wiper

NOTE

Pin 1 is not required if the lens is powered independently. This feature is controlled by the AMX/CAM switch on the connector panel. Pins 12-15 are required for Speed mode but are not required for Positional mode.

Servomotor driven outputs are intended to drive servo-type motors only. The outputs have very low current (milliampere range) capability. *DO NOT* attempt to drive conventional motors with these outputs or you may damage the output drivers. If you are not sure about the motor type, refer to the *Specifications* section on page 2 for more information.

Pan Characteristics

The pan drive has a maximum pan range of ± 179° (358° total). Pan travel is capable of being limited to a restricted range around the center of pan travel by software limits adjustable by the programmer/end user. Pan limits refer to the horizontal range of motion available to the PosiTrack unit. These limits are set via the Axcess program. The center position marks the center of the range.

Setting the adjustable pan-limit stops

The Central Controller should be programmed by an AMX Axcess programmer before beginning. Refer to the *Specifications* section on page 2 for more information on programming devices. To set the adjustable pan-limit stops:

1. Ensure that there is enough slack in the lens, camera, and PosiTrack units' AXlink cables to accommodate the full range of pan motion.
2. Confirm that the necessary programming has been done to the system before beginning the installation process.
3. Mount the camera controller to the desired horizontal surface.
4. Pan the unit as far to the left as desired and enter this position into the Axcess program as the left pan-limit stop. **The LEFT limit stop MUST be set left of the Home position**.
5. Pan the unit as far to the right as desired and enter this position into the Axcess program as the right pan-limit stop. **The Right limit stop MUST be set right of the Home position**.
6. Pan to both programmed stop positions and ensure the pan-limit stops are set correctly.

Tilt Characteristics

The tilt drive is factory set to a maximum tilt range of ± 90° (for a total of 180°). Tilt limit stops refer to the vertical range of motion available to the PosiTrack unit and are set via the Axcess program. The center position marks the center of the range.

Setting the adjustable tilt-limit stops

The Central Controller should be programmed before beginning. Refer to the *Specifications* section on page 2 for more information on programming devices. To set the adjustable tilt-limit stops:

1. Ensure that there is enough slack in the lens, camera, and PosiTrack controller AXlink cables to accommodate the full range of tilt motion.
2. Mount the PosiTrack Controller to the desired surface.
3. Tilt the unit as far up as desired and enter this position into the Axcess program as the upper tilt-limit stop. **The UP limit stop MUST be set above the Home position**.
4. Tilt the unit as far down as desired and enter this position into the Axcess program as the lower tilt-limit stop. **The DOWN limit stop MUST be set below the Home position**.
5. Tilt to both stop positions and ensure the tilt-limit stops are set correctly.

If you have problems setting the range of motion on either PosiTrack units, you may be setting both limits on the same side of the Home position. You may need to set a new Home position before proceeding.

See the Configuration Commands table on page 28 for details on the SET HOME command.

Programming

The AXB-PT10, AXB-PT15, and AXB-PT30 control capabilities for camera functions include:

- Pan
- Tilt
- Zoom (servomotor; positional)
- Zoom (servomotor; speed)
- Zoom (motor drive)
- Focus (servomotor; positional)
- Focus (servomotor; speed)
- Focus (motor drive)
- Iris (servomotor; positional)
- Iris (servomotor; speed)
- Iris (motor drive)

The PosiTrack Controllers are controlled with device-specific channel settings and Axcess Send_Commands. You create the software programs with the Axcess programming software. Use the programming information in this section, with the *Axcess Programming Guide* to create a program to control the PosiTrack Camera Controllers. The program resides in the Axcess or NetLinx Central Controller.

CAUTION

The commands for ZOOM, FOCUS, and IRIS output to servomotor or motor mode MUST be configured to match the switch settings.

Configuration Commands

The following table lists in detail the different variables used in the Configuration Commands. These variables consist of parameters which the commands must adhere to.

Variables for the Configuration Commands

Parameters	Description
Outputs	1—PAN 2—TILT 3—ZOOM 4—FOCUS 5—IRIS
Level	0 (lowest) to 255 (highest) or 0% to 100% On pan, tilt, and PWM drives for zoom, focus, and iris, level 128 will be OFF. Level 129 and above are for the forward direction. Level 127 and below are for the reverse direction.
Time (optional)	If specified, 0 to 255 in tenths of a seconds; if not specified, at current rate.
Position	0 to 255; value of POT input. Corresponds to a position of the unit. 0 is one end of the POT and 255 is the other end. Not directly related to an output level voltage.

Variables for the Configuration Commands (Cont.)	
Parameters	**Description**
Speed	0 to 127; where 0 is the slowest and 127 is the fastest (default).
Deviation	0 to 127; where 0 is most accurate but can have some jitter. Default is 2, meaning the position can be within ± 2 from the specified position.
Distance	0 to 127; distance from the specified position.
Ramp Time	1 to 255; time in 10ms increments it takes the motor drives to ramp up to speed.

All presets are cleared when any limits are set.

Configuration commands configure the manner in which the PosiTrack operates.

Configuration Commands	
ACCEL CONTROL=ON Enables acceleration control for pan/tilt (default).	Syntax: `SEND_COMMAND CAM,"'ACCEL CONTROL=ON'"` Pan/Tilt movement speeds up and slows down based on PANACC, TILTACC, and PRESET ACCEL values. This affects all pan/tilt movements and results in smoother, dampened operation.
ACCEL CONTROL=OFF Disables acceleration control for pan/tilt.	Syntax: `SEND_COMMAND CAM,"'ACCEL CONTROL=OFF'"` Pan/Tilt movement start and stop immediately. This results in more responsive operation, although changes in speed may result in rough movements.
BUTTON PRESS Executes a series of preset 10-degree movements for both directions of pan/tilt.	Syntax: `SEND_COMMAND CAM,"'BUTTON PRESS'"` The PosiTrack moves up, home (stops), left, then stops at home. This is designed to test the functionality of the PosiTrack's field of movement.
CHAN PRESET=ON Enables preset recalls by turning ON the preset channels 101-228.	Syntax: `SEND_COMMAND CAM,"'CHAN PRESET=ON'"` The default mode of operation for these channels is feedback ONLY.
CHAN PRESET=OFF Switches back channels 101-228 to feedback only mode. (default).	Syntax: `SEND_COMMAND CAM,"'CHAN PRESET=OFF'"`
CLEAR ERRORS Clears all of the error messages obtained by using the `DEVICE STATUS` command in the Terminal Emulator mode.	Syntax: `SEND_COMMAND CAM,"'CLEAR ERRORS'"` Refer to the *Diagnostic error values* section on page 41 for detailed information.

Configuration Commands (Cont.)	
CLEAR HOME Clears the current home position and goes to the default setting and clears presets.	Syntax: `SEND_COMMAND CAM,"'CLEAR HOME'"` This command also clears all presets.
CLEAR LIMIT ALL Clears all of the limits.	Syntax: `SEND_COMMAND CAM,"'CLEAR LIMIT ALL'"`
CLEAR LIMIT DOWN Clears the tilt-down limit.	Syntax: `SEND_COMMAND CAM,"'CLEAR LIMIT DOWN'"`
CLEAR LIMIT LEFT Clears the pan-left limit.	Syntax: `SEND_COMMAND CAM,"'CLEAR LIMIT LEFT'"`
CLEAR LIMIT RIGHT Clears the pan-right limit.	Syntax: `SEND_COMMAND CAM,"'CLEAR LIMIT RIGHT'"`
CLEAR LIMIT UP Clears the tilt-up limit .	Syntax: `SEND_COMMAND CAM,"'CLEAR LIMIT UP'"`
CURRENT SPEED PRIORITY=CHANNEL Changes the operational mode of channels 31, 32, 35, and 36.	Syntax: `SEND_COMMAND CAM,"'CURRENT SPEED PRORITY=CHANNEL'"` Does NOT allow pan/tilt movement from levels until channels 31, 32, 35 and 36 are turned Off. Setting this priority puts the unit in CaMatrix compatible mode. The CaMatrix is a third-party RS232 control program that runs on a PC.
CURRENT SPEED PRIORITY=LEVEL Changes the operational mode of channels 31, 32, 35, and 36.	Syntax: `SEND_COMMAND CAM,"'CURRENT SPEED PRORITY=LEVEL'"` Allows pan/tilt movement from levels even if these channels are still On. Setting this priority makes the move at current speed channels operate like the other axis movement channels.
DEFAULT ACCEL Sets the Pan and Tilt acceleration to the default value of 90 degrees/(second squared).	Syntax: `SEND_COMMAND CAM,"'DEFAULT ACCEL'"`
FIND HOME Runs a series of pan/tilt movements to recalibrate its mechanical home.	Syntax: `SEND_COMMAND CAM,"'FIND HOME'"` After the mechanical recalibration, the unit moves to the location set via the "SET HOME" command (if applicable).
FOCUS PRESET=POS Sets the FOCUS voltage output to recall positional presets (default).	This is applicable only if the FOCUS SIGNAL=S command is in effect, and the FOCUS switch is set to the S position (servomotor mode). Syntax: `SEND_COMMAND CAM,"'FOCUS PRESET=POS'"` The command for FOCUS output to servomotor mode or motor mode MUST be configured to match the switch settings.

Configuration Commands (Cont.)	
FOCUS PRESET=SPEED Sets the FOCUS voltage output to recall speed presets.	This is applicable only if the FOCUS SIGNAL=S command is in effect, and the FOCUS switch is set to the S position (servomotor mode). Syntax: `SEND_COMMAND CAM,"'FOCUS PRESET=SPEED'"` The command for FOCUS output to servomotor mode or motor mode MUST be configured to match the switch settings.
FOCUS SIGNAL=M Sets the FOCUS output to be a motor output.	This setting corresponds to the M position (motor mode) setting on the FOCUS switch. Syntax: `SEND_COMMAND CAM,"'FOCUS SIGNAL=M'"` The command for FOCUS signal *must* be configured to match the switch settings.
FOCUS SIGNAL=S Sets the Focus output to be a servomotor output.	This setting corresponds to the FOCUS switch in the S position. Syntax: `SEND_COMMAND CAM,"'FOCUS SIGNAL=S'"` The command for FOCUS signal *must* be configured to match the switch settings.
FP Sets the lens' Focus mode to *positional* (default).	Syntax: `SEND_COMMAND CAM,"'FP'"` *This command can be used only for servomotor mode.* It causes a logic high (VREF-A) on Pin 7 of the lens control connector. This puts a servomotor lens into positional focus mode.
FS Sets the lens' Focus mode to *speed*.	Syntax: `SEND_COMMAND CAM,"'FS'"` *This command can be used only for servomotor mode.* It causes a logic low (0 V) on Pin 7 of the lens control connector. This puts a servomotor lens into speed focus mode.
GET STATUS (version 3.00 or higher) Displays the current firmware version (Boot and Download) on the terminal along with additional status information.	The returned boot version is determined by checking the version in flash memory. Syntax: `SEND_COMMAND CAM,"'GET STATUS'"` This command is issued from Terminal Emulator mode. When using a NetLinx master, the 'MSG ON' command must first be issued to see the status. Besides the boot and download versions, it also displays the following information: • Presets - predifined camera positions • Channel preset - On or Off. • Current speed - pan, tilt, zoom, focus, and iris speeds • Current acceleration - a value between 0-255 on an acceleration curve applied to the movement of the unit from one position to another. • Acceleration control - On or Off. • Mode - settings for the camera (servomotor or motor modes) • Deviation - numeric value corresponding to how far-off from the center point of your preset you want the camera to be when it finally stops on that preset. • Speed Priority - level or channel

Configuration Commands (Cont.)	
GET VERSION (version 3.00 or higher) Displays the current firmware version (Boot and Download) on the terminal.	The Boot version sent back is determined by checking the version in flash memory. Syntax: `SEND_COMMAND CAM,"'GET VERSION'"` This command is issued from Terminal Emulator mode. When using a NetLinx master, the 'MSG ON' command must first be issued to see the status.
HOME Goes to the location set previously via the SET HOME command.	If there is no user-defined HOME position, then the PosiTrack goes to the mechanical home position. Syntax: `SEND_COMMAND CAM,"'HOME'"` This differs from the FIND HOME command in that HOME does not involve a re-calibration of the PosiTrack's mechanical position.
IA Sets the lens' Iris mode to *auto* (default).	Syntax: `SEND_COMMAND CAM,"'IA'"` This command causes pin 8 of the lens connector to float open. A Servomotor lens will internally pull this signal high. In this mode, the iris signal from the PosiTrack (pin 5) will be ignored. Instead, the camera has full control of the lens iris, typically used for Auto Iris mode (if the camera supports it).
IL Sets the lens' Iris mode to *local.*	Syntax: `SEND_COMMAND CAM,"'IL'"` This command applies Ground (0 V) to pin 8 of the lens connector. It allows iris control from the PosiTrack.
IP Sets the lens' Iris mode to positional (default).	Syntax: `SEND_COMMAND CAM,"'IP'"` *This command can be used only for servomotor mode.* This command causes a logic high (VREF-A) on pin 9 of the lens control connector. This puts the servomotor lens into Positional Iris mode.
IRIS PRESET=POS Sets the Iris voltage output to recall positional presets (default).	This is only applicable if the IRIS SIGNAL=S command is in effect, and the IRIS switch is set to the S position (servomotor mode). Syntax: `SEND_COMMAND CAM,"'IRIS PRESET=POS'"` The command for IRIS output to servomotor mode or motor mode MUST be configured to match the switch settings.
IRIS PRESET=SPEED Sets the Iris voltage output to recall speed presets.	This is applicable only if the IRIS SIGNAL=S command is in effect, and the IRIS switch is set to the S position (servomotor mode). Syntax: `SEND_COMMAND CAM,"'IRIS PRESET=SPEED'"` The command for IRIS output to servomotor mode or motor mode MUST be configured to match the switch settings.
IRIS SIGNAL=M Sets the Iris output to be a motor output.	This setting corresponds to the M position (motor mode) setting on the IRIS switch. Syntax: `SEND_COMMAND CAM,"'IRIS SIGNAL=M'"` The command for IRIS output to servomotor mode or motor mode MUST be configured to match the switch settings.

Configuration Commands (Cont.)	
IRIS SIGNAL=S Sets the Iris output to be a servomotor output.	This setting corresponds to the S position (servomotor mode) setting on the IRIS switch. Syntax: `SEND_COMMAND CAM,"'IRIS SIGNAL=S'"` The command for IRIS output to servomotor mode or motor mode MUST be configured to match the switch settings.
IS Sets the lens' Iris mode to *speed*.	Syntax: `SEND_COMMAND CAM,"'IS'"` *This command can be used only for servomotor mode.* This command causes a logic low (0 V) on pin 9 of the lens control connector. This puts the servomotor lens into Speed Iris mode.
LENS=SERVO Sets the lens settings to *servomotor mode* style.	Syntax: `SEND_COMMAND CAM,"'LENS=SERVO'"` This macro command sends the ZP, FP, IP, ZOOM PRESET=POS, ZOOM SIGNAL=S, FOCUS PRESET= POS, FOCUS SIGNAL=S, IRIS PRESET=POS, IRIS SIGNAL=S commands at one time.
LENS=STANDARD Sets the lens settings to standard *motor mode* style.	Syntax: `SEND_COMMAND CAM,"'LENS=STANDARD'"` This macro command sends the ZS, FS, IS, ZOOM PRESET=SPEED, ZOOM SIGNAL=M, FOCUS PRESET= SPEED, FOCUS SIGNAL=M, IRIS PRESET=SPEED, IRIS SIGNAL=M commands at one time.

PANACC
Sets the acceleration rate of the pan axis, for manual movements.
	Syntax:
	`"'PANACC <acceleration rate 0-127>'"`
	Examples:
	`SEND_COMMAND CAM,"'PANACC22'"`
	A value of zero sets acceleration to 2.25 degrees per second squared and 127 sets acceleration to 135 degrees per second squared. There is a linear relationship for values between 0 and 127. The command DEFAULT ACCEL sets both the pan and tilt acceleration to the default value of 90 degrees/(second squared).

POWER UP HOME=ON Enables the unit to re-establish the mechanical HOME position position at each power-up (default).	Syntax: `SEND_COMMAND CAM,"'POWER UP HOME=ON'"` The unit performs a mechanical "homing" calibration on power-up. This process takes approximately 30 seconds to complete.
POWER UP HOME=OFF Prevents the mechanical HOME process at power-up.	Syntax: `SEND_COMMAND CAM,"'POWER UP HOME=OFF'"` During the power-up process, the unit stays in the same position it was before it lost power. It is immediately ready for use in this mode. In order to force a recalibration and homing sequence, use the FIND HOME command.

PRESET ACCEL
Sets the acceleration rate of the pan and tilt axes for preset recall movements.
	Syntax:
	`SEND_COMMAND CAM,"'PRESET ACCEL <acceleration rate 0-127>'"`
	Examples:
	`SEND_COMMAND CAM,"'PRESET ACCEL 22'"`
	A value of zero sets acceleration to 2.25 degrees per second squared and 127 sets acceleration to 135 degrees per second squared. There is a linear relationship for values between 0 and 127.

Configuration Commands (Cont.)	
READ ALL	Forces the device to read and update levels to the Central Controller. Syntax: `SEND_COMMAND CAM,"'READ ALL'"`
RUN TESTS	Runs and checks error values 244 and 245 to see if the gears are properly aligned to their respective grooves. Syntax: `SEND_COMMAND CAM,"'RUN TESTS'"` Refer to the *Diagnostic error values* section on page 41 for more detailed information. Make sure there are no obstructions while the PosiTrack performs the full range of the following movements: Up, Down, Home, Left, Home.
SET HOME Sets a new home position.	Syntax: `SEND_COMMAND CAM,"'SET HOME'"` **Warning! This command clears all presets.**
SET LIMIT DOWN Sets the down tilt limit value given.	Syntax: `SEND_COMMAND CAM,"'SET LIMIT DOWN'"` **Warning! This command clears all presets.**
SET LIMIT LEFT Sets the left pan limit value given.	Syntax: `SEND_COMMAND CAM,"'SET LIMIT LEFT'"` **Warning! This command clears all presets.**
SET LIMIT RIGHT Sets the right pan limit value given.	Syntax: `SEND_COMMAND CAM,"'SET LIMIT RIGHT'"` **Warning! This command clears all presets.**
SET LIMIT UP Sets the up tilt limit value given.	Syntax: `SEND_COMMAND CAM,"'SET LIMIT UP'"` **Warning! This command clears all presets.**

TILTACC
Sets the acceleration rate of the tilt axis, for manual movements.
	Syntax:
	`"'TILTACC <acceleration rate 0-127>'"`
	Examples:
	`SEND_COMMAND CAM,"'TILTACC103'"`
	A value of zero sets acceleration to 2.25 degrees per second squared and 127 sets acceleration to 135 degrees per second squared. There is a linear relationship for values between 0 and 127. The command DEFAULT ACCEL sets both the pan and tilt acceleration to the default value of 90 degrees/(second squared).

TILT CURVE= NORMAL Adjusts Tilt Up/Down speed curves for normal mounting position.	Syntax: `SEND_COMMAND CAM,"'TILT CURVE=NORMAL'"` This keeps the up and down tilts moving at the same rate for a given speed. (Added v1.10) Sets the tilt curve to normal, for normal installation position. This command DOES NOT reverse the direction of the pan/tilt motors.
TILT CURVE= INVERT Adjusts Tilt Up/Down speed curves for inverted mounting position.	Syntax: `SEND_COMMAND CAM,"'TILT CURVE=INVERT'"` This keeps the up and down tilts moving at the same rate for a given speed. (Added v1.10) Sets the tilt curve to inverted, for inverted installation position. This command reverses the direction of the tilt motor.

Configuration Commands (Cont.)	
ZAP! Initializes all memory in the unit.	Syntax: `SEND_COMMAND CAM,"'ZAP!'"` This includes speed settings, deviation settings, configuration settings, and all presets. **Warning! This command clears all user-defined settings.**
ZOOM PRESET=POS Sets the Zoom voltage output to recall positional presets (default).	Syntax: `SEND_COMMAND CAM,"'ZOOM PRESET=POS'"` This is applicable only if the ZOOM SIGNAL=S command is in effect, and the ZOOM switch is set to the S position (servomotor mode). The command for ZOOM output to servomotor mode or motor mode MUST be configured to match the switch settings.
ZOOM PRESET=SPEED Sets the Zoom voltage output to recall speed presets.	Syntax: `SEND_COMMAND CAM,"'ZOOM PRESET=SPEED'"` This is applicable only if the ZOOM SIGNAL=S command is in effect, and the ZOOM switch is set to the S position (servomotor mode). The command for ZOOM output to servomotor mode or motor mode MUST be configured to match the switch settings.
ZOOM SIGNAL=S Sets the Zoom output to be a servomotor output.	Syntax: `SEND_COMMAND CAM,"'ZOOM SIGNAL=S'"` This setting corresponds to the S position (servomotor mode) setting on the ZOOM switch. The command for ZOOM output to servomotor mode or motor mode MUST be configured to match the switch settings.
ZOOM SIGNAL=M Sets the Zoom output to be a motor output.	Syntax: `SEND_COMMAND CAM,"'ZOOM SIGNAL=M'"` This setting corresponds to the M position (motor mode) setting on the ZOOM switch. The command for ZOOM output to servomotor mode or motor mode MUST be configured to match the switch settings.
ZP Sets the lens' Zoom mode to *positional* (default).	Syntax: `SEND_COMMAND CAM,"'ZP'"` This command can be used only for servomotor mode. This command causes a logic high (VREF-A) on pin 6 of the lens control connector. This puts the servomotor lens into Positional Zoom mode.
ZS Sets the lens' Zoom mode to *speed*.	Syntax: `SEND_COMMAND CAM,"'ZS'"` This command can be used only for servomotor mode. This command causes a logic low (0 V) on pin 6 of the lens control connector. This puts the servomotor lens into Speed Zoom mode.

Channel Commands

Use channel commands to program pan/tilt, servomotor positional, servomotor speed, and motor mode functions.

Pan/tilt functions

Pan/Tilt Functions		
Channel	**State**	**Function**
31	On	Pan right at current speed
32	On	Tilt down at current speed
35	On	Pan left at current speed
36	On	Tilt up at current speed
40	On	Pan right at maximum speed (100%)
41	On	Pan left at maximum speed (100%)
42	On	Tilt down at maximum speed (100%)
43	On	Tilt up at maximum speed (100%)
44	On	Pan right at medium speed (50%)
45	On	Pan left at medium speed (50%)
46	On	Tilt down at medium speed (50%)
47	On	Tilt up at medium speed (50%)

Servomotor mode lens functions

Servomotor Mode Lens Functions		
Channel	**State**	**Function**
1	On	Iris (+) at current rate
3	On	Zoom (+) at current rate (increases output voltage)
4	On	Focus (+) at current rate
5	On	Iris (-) at current rate
7	On	Zoom (-) at current rate (decreases output voltage)
8	On	Focus (-) at current rate
10	On	Iris (+) at maximum speed
12	On	Zoom (+) at maximum speed (output minimum voltage)
13	On	Focus (+) at maximum speed
14	On	Iris (-) at maximum speed
16	On	Zoom (-) at maximum speed (output maximum voltage)
17	On	Focus (-) at maximum speed
18	On	Iris (+) at 50% speed
20	On	Zoom (+) at 50% speed
21	On	Focus (+) at 50% speed
22	On	Iris (-) at 50% speed
24	On	Zoom (-) at 50% speed
25	On	Focus (-) at 50% speed

Motor mode lens functions

Motor Mode Lens Functions		
Channel	**State**	**Function**
1	On	Iris (+) at current speed
3	On	Zoom (+) at current speed (increases output voltage)
4	On	Focus (+) at current speed
5	On	Iris (-) at current speed
7	On	Zoom (-) at current speed (decreases output voltage)
8	On	Focus (-) at current speed
10	On	Iris (+) at maximum speed
12	On	Zoom (+) at maximum speed (output minimum voltage)
13	On	Focus (+) at maximum speed
14	On	Iris (-) at maximum speed
16	On	Zoom (-) at maximum speed (output maximum voltage)
17	On	Focus (-) at maximum speed
18	On	Iris (+) at 50% speed
20	On	Zoom (+) at 50% speed (half speed)
21	On	Focus (+) at 50% speed
22	On	Iris (-) at 50% speed
24	On	Zoom (-) at 50% speed
25	On	Focus (-) at 50% speed

Preset functions

Preset Functions		
Channel	**State**	**Function**
50	On	Pan is seeking POT (Encoder) preset (status only)
51	On	Tilt is seeking POT (Encoder) preset (status only)
52	On	Zoom is seeking POT preset (status only)
53	On	Focus is seeking POT preset (status only)
101-227	On	Recall preset 1–127 or currently at preset 1–127. The unit supports presets 1–255 but only presets 1–127 can be recalled using channel On commands. Presets 128–255 must be recalled with Send_Command `"RP"`. There are no feedback channels for presets 128-255. CHAN PRESET=ON Send_Command MUST be issued to enable this feature (see page 28).

Status Channels		
Channel	**State**	**Function**
29	On	Unit is panning
30	On	Unit is tilting
95	On	Unit has found its max pan left limit
96	On	Unit has found its max pan right limit
97	On	Unit has found its max tilt up limit
98	On	Unit has found its max tilt down limit
228	On	Unit has found its HOME position
248	On	Unit is finding HOME position

The following is an example of how to use the above functions to obtain a visual status of the movement of the PosiTrack without being in visual contact.

Example:

In the `DEFINE_VARIABLE` section of the Axcess program enter:

```
FLASH
```

In the `DEFINE_PROGRAM` section of the Axcess program type:

```
wait 5 Flash=!Flash
```

The 5 represents 1/2 a second. This causes the feedback button to blink (Flash) once every 1/2 second. FIG. 25 represents a sample command that creates a movement status button on the touch panel.

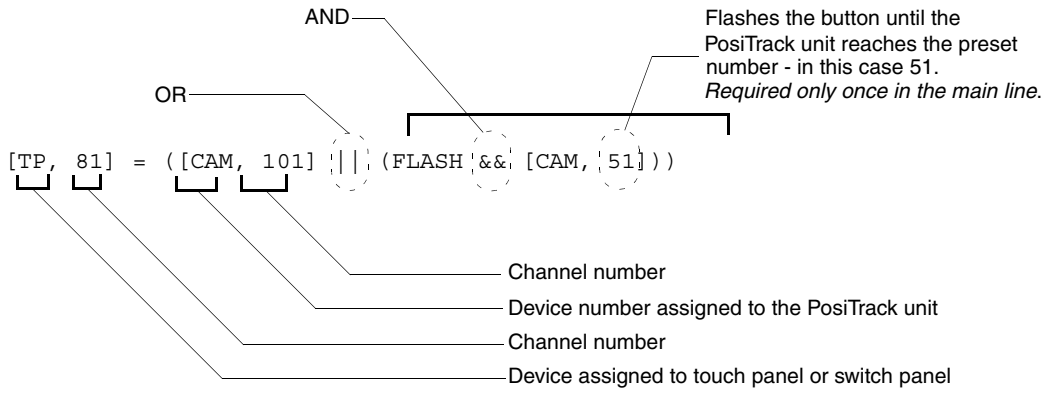


FIG. 25 Send_Command for a status movement button

Levels

The following table lists the Axcess/NetLinx levels.

Levels			
Level values	**Axcess/NetLinx level**	**Range**	**Direction**
1	Pan	0 - 255	To PT
2	Tilt	0 - 255	To PT
3	Zoom	0 - 255	To PT
4	Focus	0 - 255	To PT
5	Pan Feedback	0 - 65535	From PT
6	Tilt Feedback	0 - 65535	From PT
7	Zoom POT Feedback	0 - 65535	From PT
8	Focus POT Feedback	0 - 65535	From PT

Example of sending levels:

```
SEND_LEVEL 90,1,200
90=DEVICE
1=FUNCTION (PAN, TILT, ZOOM, FOCUS)
200=LEVEL
```

Level applications

- Touch panel joystick application: PosiTrack Levels 1 and 2 are speed type levels for both pan and tilt. Sending a value of 0 (zero) moves the axis full speed in one direction; while a value of 255 moves it at full speed in the opposite direction. Sending a 127 value, stops the units' movement.
- Pan/Tilt feedback application: PosiTrack Levels 5 and 6 are positional levels with a value range of 0 - 65535. These two levels can be used in Axcess code to monitor the actual pan/tilt positions or store additional presets. To recall presets in this manner, use the 'GxLxxxx' Send Command with the values stored previously from level 5 or 6. Refer to the Positional Commands table on page 39 for more information.

Send_Commands

The following table lists parameters for the PosiTrack Camera Controllers Positional Send_Commands.

Parameters - Send_Commands	
Parameters	**Description**
Outputs	1—PAN 2—TILT 3—ZOOM 4—FOCUS 5—IRIS
Level	0 (lowest) to 255 (highest) or 0% to 100% On pan, tilt, and PWM drives for zoom, focus, and iris, level 128 will be OFF. Level 129 and above are for the forward direction. Level 127 and below are for the reverse direction.

Parameters - Send_Commands (Cont.)	
Parameters	**Description**
Time (optional)	If specified, 0 to 255 in tenths of a seconds; if not specified, at current rate.
Position	0 to 255; value of POT input. Corresponds to a position of the unit. 0 is one end of the POT and 255 is the other end. Not directly related to an output level voltage. 0 to 65535 when using the 'AD MODE x 10' command, or for pan/tilt commands. Corresponds to a position of the unit. 0 is one end of the POT and 65,535 is the other end. Not directly related to an output level voltage.
Speed	0 to 127; where 0 is slowest and 127 is fastest (default).
Deviation	0 to 127; where 0 is most accurate but can have some jitter. Default is 2, which means the position can be within +/- 2 from the specified position.
Distance	0 to 127; distance from the specified position.
Ramp Time	1 to 255; time in 10ms increments that it takes the motor drives to ramp up to speed.

The following table lists parameters for the PosiTrack Camera Controllers Positional Commands.

Positional Commands	

GAS
Sets the output to slow down within the specified distance of the specified position for future 'GxLxxx' commands.
	This command can be used for motor mode and servomotor speed modes.
	Syntax:
	`"'G<output>A<distance>S<speed>'"`
	Variables (See *Parameters - Send_Commands* section on page 38):
	G - output = 1 - 4
	A - distance = 0 - 127
	S - speed = 0 - 127
	Example:
	`SEND_COMMAND CAM,"'G1A5S20'"`
	Sets PAN to speed 20 when within 5 of the specified position for future 'G1Lxxx' commands.

GD
Sets the current maximum position deviation for future position ('GxLxxx') commands.
	This command can be used for motor mode and servomotor speed/positional modes.
	Syntax:
	`"'G<output>D<deviation>'"`
	Variables (See *Parameters - Send_Commands* section on page 38):
	G - output = 1 - 4
	D - deviation = 0 - 127
	Example:
	`SEND_COMMAND CAM,"'G1D4'"`
	Sets PAN deviation to 4 for future 'G1Lxxx' commands. Output will stop when it is within 4 of the specified position.

Positional Commands (Cont.)	
GL Turns on the specified output at the current speed until the specified position (as read by the Pan or Tilt encoder) is reached.	This command can be used for all modes. Syntax: "'G<output>L<position>'" Command forces output to go to a preset position using the POT input as a reference. Variables (See *Parameters - Send_Commands* section on page 38): G - output = 1 - 2 L - position = 0 - 65535 Example: SEND_COMMAND CAM,"'G1L32000'" Sets PAN to search for position 32000 as referenced by the Pan or Tilt encoder.
GL Turns on the specified output at the current speed until the specified position as read by the POT input is reached.	This command can be used for motor mode and servomotor speed modes. Syntax: "'G<output>L<position>'" Command forces output to go to a preset position using the POT input as a reference. Variables (See *Parameters - Send_Commands* section on page 38): G - output = 3 - 4 L - position = 0 - 65535 Example: SEND_COMMAND CAM,"'G3L10000'" Sets ZOOM to search for position 10000 as referenced by the ZOOM POT input.
GS Sets the current speed for future and current Send_Commands and channel commands.	This command is used for motor mode and servomotor speed mode applications. Syntax: "'G<output>S<speed>'" Variables (See *Parameters - Send_Commands* section on page 38): G - output = 1 - 5 S - speed = 0 - 127 Example: SEND_COMMAND CAM, "'G1S64'" Sets PAN to speed 64 (50%) for current and future commands. The G1 and G2 commands are used for all modes. The G3, G4, and G5 commands are for the Motor and Servomotor Speed modes only.
PLT Ramps specified output voltage from current level to a specified level or percentage at the current rate or optionally in a specified amount of time.	This command can be used only for servomotor positional mode applications. Syntax: "'P<output>L<level >[T<time >]'" Variables (See *Parameters - Send_Commands* section on page 38): P - output = 3 - 5 L - level = 0 - 255 or 1 - 100% T - time = 0 - 255 (in tenths of a second) Example: SEND_COMMAND CAM,"'P3L50%'" Ramps zoom output to 50% (mid-voltage) at current rate. SEND_COMMAND CAM,"'P4L255T30'" Ramps FOCUS output to 255 in 3 seconds.

Positional Commands (Cont.)	

PR
Sets the ramp rate of the specified output voltage where time is the time to ramp the full range both *down to up* and *up to down* or optionally just *down to up* or *up to down*.
	This command can be used for servomotor positional mode applications.
	Syntax:
	`"'P<output>R<time>[U|D]'"`
	Variables (See *Parameters - Send_Commands* section on page 38):
	P - output = 3 - 5
	R - time = 0 - 255
	U\D = Up or Down
	Example:
	`SEND_COMMAND CAM,"'P3R50'"`
	Sets zoom ramp rate to 5 seconds full range for “down to up” and “up to down.”
	`"'P4R75U'"`
	Sets the Focus ramp rate to 7.5 seconds full range for *Down to up*. This command can be used for motor and servomotor positional mode applications.
	`"'P5R25D'"`
	Sets the Iris ramp rate to 2.5 seconds full range for *up to down* only.

Diagnostic error values

In the Terminal Emulator of the AxcessX or NetLinx Studio program, you can use the `Device Status` command to diagnose any problems with the PosiTrack Controller. The following is an example of how to diagnose problems using the `DEVICE STATUS` and `CLEAR ERRORS` commands to obtain error values that can help you better track any problems.

1. Turn the PosiTrack Controller On and make sure the proper connections are plugged into the unit. Open Terminal Emulator.
2. Type ***DEVICE STATUS 90*** in the Terminal Emulator. The 90 used in this example is the Device Number assigned to the PosiTrack.
3. Give the Emulator at least 5 seconds to respond with an error value, if any exists.
4. If there is an error present, the emulator displays the number 230 and other values, listed in the Error Values and Descriptions table on page 42, that correspond to particular problems encountered during the diagnostic cycle.
5. Type ***SEND_COMMAND 90, "'CLEAR ERRORS'"*** to clear the errors in the PosiTrack unit after the problem is resolved. This command clears all the error messages that may have appeared while you were diagnosing problems.
6. Turn the PosiTrack Controller Off and fix the problem.
7. Turn the unit On once the problem has been fixed.
8. Repeat steps 3 through 7 until the problem no longer exists.

When using version 2.04 firmware or higher, the PosiTrack stops all pan and tilt operations if an error is found. Correct the source of the error and cycle power on the unit to resume operation. The error channels remain On until a CLEAR ERRORS or ZAP! command is sent.

The following table lists the error values you can get when diagnosing any problem.

Error Values and Descriptions	
Error	**Description**
230	Shows there is an error on the system. This value always appears in conjunction with another number. It acts as a precursor to any other error messages, as an announcement that an error has been found and the following values are the errors found.
240	Shows that there is a problem with the Pan Encoder on the PosiTrack. The encoder is a device that counts the revolutions of the pan motor.
241	Shows that there is a problem with the Tilt Encoder on the PosiTrack. The encoder is a device that counts the revolutions of the tilt motor.
242	Shows that there is a problem with the Pan Optical reader on the PosiTrack. The reader is a device that detects the home position of the pan gear.
243	Shows that there is a problem with the Tilt Optical reader on the PosiTrack. The reader is a device that detects the home position of the tilt gear.
244	Shows that there is a Worm Eccentric error (pan) on the system. This error occurs when the worm gear is not fitting properly along the pan's gears.
245	Shows that there is a Worm Eccentric error (tilt) on the system. This error occurs when the worm gear is not fitting properly along the tilt's gears.
246	Shows that the pan stalled. Occurs when the pan motor locks up for more than 5 seconds.
247	Shows that the tilt stalled. Occurs when the tilt motor locks up for more than 5 seconds.

If there are any errors found, the `230` error value displays that there is an error, and is then followed by another number to indicate the precise problem. For example, a problem with the Pan Encoder will return the message: `230, 240`.

Preset parameters and commands

The following table lists the preset parameters.

Preset Parameters	
Preset	**1-255**
`TIME`**: (Optional)**	If specified, 0 to 255 in tenth seconds. If not specified, at current rate. Used for voltage outputs. Used only for Recall Preset.
`SPEED`**: (Optional)**	0 to 127. 0 is slowest and 127 if fastest. If not specified, at current speed. Used only for Recall Preset.

The following table lists preset commands.

Preset Commands	
CANCEL PRESET Immediately stops any active preset recall in motion.	Examples: `SEND_COMMAND CAM, "'CANCEL PRESET'"`

CP
Clears a preset from memory.
	Syntax:
	`"'CP<preset>'"`
	Variables:
	preset = 1 - 255
	Examples:
	`SEND_COMMAND CAM, "'CP1'"`
	Clears Preset 1.
	`SEND_COMMAND CAM, "'CP100'"`
	Clears Preset 100.

RP
Recalls a stored preset.
	Optional parameters include ramp time for servomotor positional presets, motor mode, servomotor speed mode, and inclusion (+ default) or exclusion (-) of iris in preset.
	Syntax:
	`"'RP<preset>[T<time>][S<speed>][I<- or +>]'"`
	Variables:
	RP - preset = 1 - 255
	T - time = 0 -255 (in tenths of a second)
	S - speed = 0 - 127
	I - iris = "-" to exclude, "+" to include
	Examples:
	`SEND_COMMAND CAM,"'RP1'"`
	Recalls preset 1. Same as turning on channel 101. If any are in servomotor positional mode, the current voltages for zoom, focus, and/or iris will be ramped to the preset voltages at the current speed. If any are in servomotor speed mode, the motor drive outputs for zoom and/or focus outputs will run at their preset-defined speeds until the preset positions are reached on the POTs. Regardless of the preset type used, the pan/tilt drives will run at their current speeds until the proper positions are reached on their POTs. Channel 101 is turned On.
	`SEND_COMMAND CAM,"'RP1I-'"`
	Recalls preset 1. Same as turning on channel 101. If any are in servomotor positional mode, the current voltages for zoom, and /or focus iris will be ramped to the preset voltages at the current speed. If any are in speed mode, the motor drive outputs for zoom and/or focus outputs will run at their preset-defined speeds until the preset positions are reached on the POTs.
	Regardless of the preset type used, the pan/tilt drives will run at their current speeds until the proper positions are reached on their POTs. Channel 101 is turned on.
	The iris signal will be excluded from the preset recall and will not be included in displaying feedback as to whether the preset has been completed.
	`SEND_COMMAND CAM,"'RP10T100'"`
	Recalls preset 10. If any are in positional mode, voltage outputs for zoom, focus, and/or iris will ramp to position in 10 seconds. If any are in speed mode, the motor drive outputs for zoom and/or focus outputs will run at their preset-defined speeds until the preset positions are reached on the POTs. Pan/tilt outputs use current speed. Turns on channel 110 when preset 10 is reached.

Preset Commands (Cont.)	
	SEND_COMMAND CAM,"'RP10S64'" Recalls preset 10. If any are in positional mode, the current voltages for zoom, focus, and/or iris will be ramped to the preset voltages at the current speed. If any are in speed mode, the motor drive outputs for zoom and/or focus will move at half speed (64). Pan/tilt outputs will move at half speed. Turns on channel 110 when preset 10 is reached. SEND_COMMAND CAM,"'RP10T100S64'" Recalls preset 10. If any are in positional mode, voltage outputs for zoom, focus, and/or iris will ramp to position in 10 seconds. If any are in speed mode, the motor drive outputs for zoom and/or focus will move at half speed (64). Pan/tilt outputs will use current speed. Turns on channel 110 when preset 10 is reached.
SP Store preset.	Syntax: "'SP<preset>'" Variables: SP- preset = 1 - 255 Example: SEND_COMMAND CAM,"'SP1'" Stores current values to Preset 1.

RS-232 commands

The following table lists the RS-232 commands.

RS-232 Commands	
B9MON Enables the special 9 data bits with 1 stop bit mode, and overrides the DIP switch settings for data, stop, and parity bits.	The baud rate is locked on at the current DIP switch setting upon issuance of this command. Syntax: "'B9MON'" Example: SEND_COMMAND CAM,"'B9MON'" Sets the special 9 bits with 1 stop bit mode, and overrides the DIP switch settings on the device.
B9MOFF Sets data bits mode to normal with DIP switch setting (default).	Syntax: "'B9MOFF'" Example: SEND_COMMAND CAM,"'B9MOFF'" Resets the data bits mode back to the DIP switch settings on the device.
CHARD Sets the delay time between all transmitted characters to the device.	Syntax: "'CHARD-<time>'" Variables: time = 0 - 255 in 100 microsecond increments Example: SEND_COMMAND CAM,"'CHARD-10'" Sets 1 ms delay between all transmitted characters.

RS-232 Commands (Cont.)	
CTSPSH Enables pushes, releases, and status information on channel 255 for CTS hardware handshake input.	Syntax: "'CTSPSH'" If CTS is high, channel 255 is On. Example: SEND_COMMAND CAM,"'CTSPSH'"
HSOFF Disables hardware handshaking (default).	Syntax: "'HSOFF'" Example: SEND_COMMAND CAM,"'HSOFF'"
HSON Enables hardware handshaking.	Syntax: "'HSON'" Example: SEND_COMMAND CAM,"'HSON'"
RXCLR Clears characters waiting in the receive buffer pending transmission to the Central Controller.	Syntax: "'RXCLR'" Example: SEND_COMMAND CAM,"'RXCLR'"
RXOFF Disables the device from passing received characters to the Central Controller (default).	Syntax: "'RXOFF'" Example: SEND_COMMAND CAM,"'RXOFF'"
RXON Enables the device to send incoming (received) characters to the Central Controller.	Syntax: "'RXON'" This command is automatically sent by the master when a 'CREATE_BUFFER' program instruction is executed. Example: SEND_COMMAND CAM,"'RXON'"
TXCLR Clears characters waiting in the transmit-out buffer, and stop transmissions.	Syntax: "'TXCLR'" Example: SEND_COMMAND CAM,"'TXCLR'"
XOFF Disables software handshaking (default).	Syntax: "'XOFF'" Example: SEND_COMMAND CAM,"'XOFF'"
XON Enables software handshaking.	Syntax: "'XON'" Example: SEND_COMMAND CAM,"'XON'"

RS-232 Send_Strings

PosiTracks have special Send_String escape sequences. If any of the three-character combinations listed below are found anywhere within a Send_String program instruction, they are treated as a command and not the literal characters.

RS-232 Send_Strings	
"'27,18,0'"	Clears the ninth data bit to 0 for all subsequent characters to be transmitted. It is used in conjunction with the 'B9MON' command.
"'27,18,1'"	Sets the ninth bit to 1 for all subsequent characters to be transmitted. It is used in conjunction with the 'B9MON' command.
"'27,19,<time>'"	Inserts a delay before the next character to be transmitted. Variable: time = 1 - 255 in 1 millisecond increments
"'27,20,0'"	De-asserts RTS hardware handshake output high.
"'27,20,1'"	Asserts an RTS hardware handshake output low.

In 485 mode, if the delay escape code characters are the last in the Tx buffer, the 485 Tx output will tri-state at the beginning of the delay.

If you need to send a string containing sequences "27,17," "27,18," "27,19," or "27,20," use two Send_String commands. The first containing characters up to and including "27", the second beginning with "17", "18", "19", or "20", and all subsequent characters.

To send the string `"$1B,'C',0,27,17,13"`, use:

```
{
SEND_STRING <dev>,'"$1B,'C',0,27"'
SEND_STRING <dev>,'"17,13"'
}
```

Stand-Alone RS-232 Protocol

The stand-alone RS-232 protocol (in the General Format table) is used when the PosiTrack is configured for external stand-alone RS-232 mode. See the Pre-Installation and Installation sections for details on setting internal jumpers, device number DIP switch, and RS-232 wiring.

General Format			
Byte No.	**Type**		
1	Attention Byte		
2	Command #		
3	Data		
Last	Checksum, sum of all bytes Mod 256		
RS-232 Levels	**Level**	**Range**	**Direction**
0	PAN	0-255	To PT
1	TILT	0-255	To PT
2	ZOOM	0-255	To PT
3	FOCUS	0-255	To PT

General Format (Cont.)			
Byte No.	**Type**	**Range**	**Direction**
4	Pan Feedback	0-65535	From PT
5	Tilt Feedback	0-65535	From PT
6	Zoom Pot Feedback	0-65535	From PT
7	Focus Pot Feedback	0-65535	From PT

RS-232 Levels that are valid <LEVEL NO> are 0-7.

The following table lists the request functions sent to PosiTrack units.

Request Functions Sent to the PosiTrack Unit	
Functions	**Syntax**
Channel On/Off	'*' <1> <0> <CHANNEL> <STATUS> <CHECKSUM> Status 1 -> turn on channel status 0 -> turn off channel
Set level (byte)	'*' <3> <0> <LEVEL NO(0-3 valid)><LEVEL> <CHECKSUM>
Send string	'*' <4> <0> <# BYTES> <STRING> <CHECKSUM>
Send command	'*' <5> <0> <# BYTES> <STRING> <CHECKSUM>
Get channel status	'*' <6> <0> <STATUS CHANNELS> <CHECKSUM>
Get level status	'*' <7> <0> <LEVEL, (4-7 valid)> <CHECKSUM>
Get bus status	'*' <8> <CHECKSUM>
Get device(s)	'*' <9> <CHECKSUM>
Set response mask	'*' <10> <MASK1> <MASK2> <CHECKSUM>
Send all on channels	'*' <11> <0> <CHECKSUM>
Send all levels	'*' <12> <0> <CHECKSUM>
Set level (word)	'*' <13> <0> <LEVEL NO><LEVEL_H><LEVEL_L><CHECKSUM>
Stand alone baud rate	'*' <14> <0 or 1> <CHECKSUM> A value of 0 sets the rate to 9600. A value of 1 enters a baud rate of 38.4 KB.

This table lists the return/response strings from the PosiTrack units.

Return/Respond Strings from the PosiTrack Units	
Function	**Syntax**
Channel status	'&' <1> <0> <CHANNEL> <STATUS> <CHECKSUM> Status 1 = Turn on channel Status 0 = Turn off channel
Change level (byte)	'&' <2> <0> <LEVEL NO> <LEVEL> <CHECKSUM>
Receive string	'&' <3> <0> <# BYTES> <STRING> <CHECKSUM>
Receive command	'&' <4> <0> <# BYTES> <STRING> <CHECKSUM>
Bus led status	'&' <5> <STATUS> <CHECKSUM>
Bus status	'&' <6> <STATUS> <CHECKSUM> When AXlink is reset, BUS STATUS is sent without being queried. When AXlink goes back online, BUS STATUS is sent again.
Device list	'&' <7> <# DEVICES> <DEVICES> <CHECKSUM>
Change level (word)	'&' <8> <0> <LEVEL NO> <LEVEL_H> <LEVEL_L> <CHECKSUM>

Response mask

Data is automatically sent if the PosiTrack units receive a change request. The response mask should be disabled if the change request data is not used. Bits in the response mask (the Return/Respond Strings from the PosiTrack Units table) turn data off.

```
(1=ON)    DATA SENT
(0=OFF)   DATA NOT SENT
```

Response Mask		
Bit	**Data Controlled**	**Default**
First byte (MASK1)		
7 (msb)	RECEIVE STRING	1
6	RECEIVE COMMAND	1
5	CHANNEL CHANGE	1
4	LEVEL CHANGE	1
3	BUS LED	0
2	(future)	0
1	(future)	0
0 (lsb)	(future)	0
Second byte (MASK2)		
7 (msb)	(future)	0
6	(future)	0
5	(future)	0
4	(future)	0
3	(future)	0
2	(future)	0
1	(future)	0
0 (lsb)	(future)	0

Upgrading the Firmware

Upgrading the Firmware Using NetLinx Studio

NOTE

The NetLinx Studio application can perform firmware upgrades for both Axcess and NetLinx devices using the options in the NetLinx Studio Firmware sub-menu.

Upgrading Firmware on Axcess Systems

1. Choose **Tools** > **Firmware** > **Download to Axcess Device** to open the Axcess Firmware Download dialog.

NOTE

The default Baud Rate for Axcess is 38400 baud and for NetLinx is 38400 baud.

2. Adjust the Comm Settings, if necessary:
   a. Click **Settings** to open the Communication Setting dialog and set the properties for the desired platform.
   b. Select the **Communications Port** and **Baud Rate** (FIG. 26).

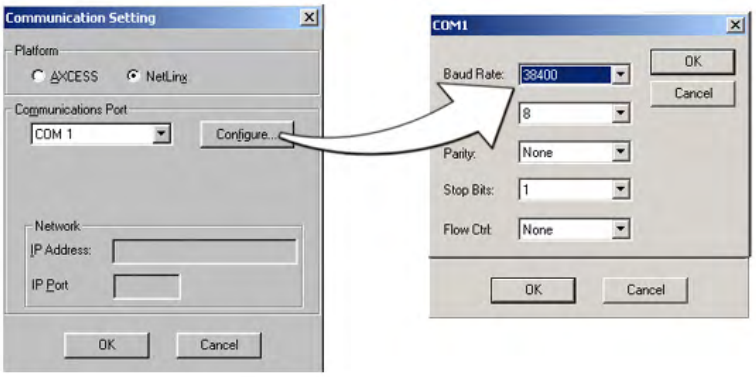


FIG. 26 Setting Comm Settings and Baud Rates

   c. Click **OK** to accept the changes and return to the Axcess Firmware Download dialog.
3. Click **Browse** to navigate to the directory containing the firmware files. Once a directory containing one or more .TSK files is specified, a list of available .TSK files is displayed in the upper table in this dialog.
4. Click **Query Online Devices** to populate the on-line device list.
5. Select the desired .TSK file from the list of available files.
6. Select the target AXlink device from the list of online devices in the lower-left table.
7. Click **Download** to open the Confirm Communication Settings dialog, where you can review and confirm your Comm Settings and Target Device information before the download begins.
   - Click **Cancel** to return to the Select Axcess Firmware File dialog, to edit these settings (if necessary).

- Click **OK** to confirm the Comm Settings and Target Device information, and download the selected .TSK file to the specified device using the selected communications port.

8. The File Transfer dialog shows the progress of the download. Click **Cancel** to cancel the download.

CAUTION

Canceling the firmware download in mid-progress can damage the on-board firmware.

9. Once the .TSK file has been downloaded, the device AXlink LED will begin to flash repeatedly for about 6 seconds while the on-board firmware is stored and updated. Afterwards, the AXlink LED blinks once per second (to indicate proper communication) and the unit runs a self-calibration routine.

Upgrading the Firmware Using SOFTROM

NOTE

The 16-bit Softrom application is only used when working with Axcess masters.

Your PC must be connected to the PROGRAM DB-9 connector on the Axcess Controller using a Programming Cable in order to upgrade the firmware in the panel.

If power is lost during the download process, the unit powers up with the same set of code it had prior to the download. There is a small window during which a loss of power can be catastrophic. If power is lost between the erase of flash memory and the completion of copying the new boot code from RAM to flash memory, the unit will not operate at all when power returns.

If you have not already installed the SOFTROM program, do so by following the steps contained on the AMX Control Disc.

Configuration

To configure the communication setting for the SOFTROM program:

1. Press F1, the Configuration screen appears.
2. Using the up/down arrow keys, select the communications port you are using to interface with the controller and press ENTER.
3. Using the right arrow key, move to the BAUD RATE column. Then, use the up/down arrow keys to select the interface communications speed and press ENTER. Be sure the BAUD RATE selections match the setting on the Controller.
4. Press F10 to save the communication settings and to exit the CONFIGURE screen.

Downloading the Firmware

To download the firmware:

1. Press F5 to acquire the list of online programmable devices.
2. Using the up/down arrow keys, select your firmware versions listed in the Firmware column of the screen, and press ENTER.
3. Using the Tab key, switch to the ONLINE MASTERS list.

4. Using the up/down arrow keys, select the device to be programmed.
5. Press ENTER for each device as it is selected
6. Press F4 to program the selected device; a loading message appears.
7. Once the .TSK file has been downloaded, the device AXlink LED will begin to flash repeatedly for about 6 seconds while the on-board firmware is stored and updated.
   After wards, the AXlink LED blinks once (to indicate proper communication) and the unit runs a self-calibration routine.
8. Press F5 to refresh the screen. Verify that the selected device has the correct firmware version. If any devices still appear with an old firmware version, repeat steps 3 - 5 until it appears with the correct version.

Firmware can be downloaded to multiple device numbers automatically. If multiple devices are selected, the bottom half of the loading bar indicates the percentage complete for the selected devices.

9. Press F10 to exit the SOFTROM program.

AMX reserves the right to alter specifications without notice at any time.

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