

OPERATIONS MANUAL

for a

Model 180 DIGITAL CONTROLLER

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Table of Contents

1. DESCRIPTION	4
2. PAN/TILT CONTROLLER SPECIFICATIONS:.....	5
3. INSTALLATION	6
3.1.1 <i>Tools and Equipment Required:</i>	6
3.1.2 <i>RS-422 Cable Installation.....</i>	6
3.1.3 <i>LDCC Cable</i>	7
3.1.4 <i>Ground Wire, Console Only</i>	7
3.1.5 <i>Power Module.....</i>	7
3.1.6 <i>Power “ON” Indicator Test.....</i>	7
3.1.7 <i>Analog Control Calibration.....</i>	7
4. FRONT PANEL-CONTROLS AND INDICATORS.....	8
4.1.1 <i>Power Switch</i>	9
4.1.2 <i>Power Indicator.....</i>	9
4.1.3 <i>Page Switch and Indicator.....</i>	9
4.1.4 <i>Program Switch and Indicator</i>	9
4.1.5 <i>Camera Select Switch and Indicator</i>	9
4.1.6 <i>Auxiliary 1 Switch and Indicator</i>	9
4.1.7 <i>Auxiliary 2 Switch and Indicator</i>	9
4.1.8 <i>Preset Switches and Indicators.....</i>	10
4.1.9 <i>Zoom & Focus - Seesaws Controls.....</i>	10
4.1.10 <i>Joystick.....</i>	10
5. REAR PANEL-CONNECTORS AND SWITCHES.....	11
5.1.1 <i>RS232 / LLDC Connector</i>	11
5.1.2 <i>Camera 1 - 4 Connectors.....</i>	11
5.1.3 <i>Ground Screw</i>	11
5.1.4 <i>DC Jack, Power Requirements</i>	11
5.1.5 <i>Rear Panel DIP Switches.....</i>	12
5.1.6 <i>RS-422 Connectors</i>	14
6.1.1 <i>Internal Jumpers</i>	14
7. OPERATION.....	15
7.1.1 <i>Power On.....</i>	15
7.1.2 <i>Manual Operation.....</i>	15
7.1.3 <i>Programming a Preset Location.....</i>	15
7.1.4 <i>To Go To a Preset Location:</i>	15
7.1.5 <i>LDCC Mode.....</i>	15

7.1.6	<i>To Reverse Manual Control Functions</i>	16
7.1.7	<i>To Set the Speed Range</i>	16
7.1.8	<i>Cable Drawings</i>	16
8.	TROUBLE SHOOTING	19
8.1	<i>Pan & Tilt</i>	19
8.2	<i>LDCC</i>	19
8.3	<i>Technical Support</i>	19

1. DESCRIPTION

Functional Description

The ESI PAN/TILT Controller Digital Control System is designed to meet the demanding challenges of remote motion control. The PAN/TILT Controller provides a simple four wire RS-422 interface to each DPT 115 and is ideal for applications such as Teleconferencing, Distance Learning, Tele-medicine, and Theater Instrumentation. The PAN/TILT Controller can provide pan & tilt and lens control for up to 4 remote camera sites. Sixteen presets per camera site may be selected from the PAN/TILT Controller. The digital design of the PAN/TILT Controller allows custom controls to be included for unique customer requirements. These control functions may be activated via the 2 auxiliary switches located on the PAN/TILT Controller front panel. The pan and tilt control is provided by a proportional deflection joystick. Control of the zoom and focus is accomplished with proportional deflection “Seesaw” controls. The proportional controls allow a slow movement when the control is only slightly depressed increasing to a faster response when the control is fully depressed. The versatile digital interface of the PAN/TILT Controller to the DPT 115 allows a variety of camera/lens combinations to be controlled by a single PAN/TILT Controller at extremely long distances.

Physical Description.

The PAN/TILT Controller table top version features a sloped front panel for ready access to all of the PAN/TILT Controller controls. Four RS-422 connectors are located on the rear of the unit to interface to each of the 4 remote camera sites. A 15 Pin D female connector located on the rear of the PAN/TILT Controller, this connector provides the interface to the RM-LP55 remote control unit(CCU). Input power to the PAN/TILT Controller is provided by a wall mounted power supply which is provided with the unit.

2. PAN/TILT CONTROLLER SPECIFICATIONS:

Operating Environment: Indoor; contact factory for outdoor requirements

Temperature: 40 to 104 degrees F. (0 to 40 degrees C.)

Control Characteristics:

Power Rocker Switch, with LED indicator

Pan/Tilt Joystick, proportional deflection

Focus Seesaw control, proportional deflection

Zoom Seesaw control, proportional deflection

Presets 16 per camera station

Number of Stations 4

Max. distance between controller & p/t head 2000 feet

Physical Characteristics:

Size (surface mount) 9.75 (W) X 7.25 (D) inches; sloped chassis

Weight 4 Pounds

Mounting Table top, rack mount or special

Power Input Requirements:

Voltage 12 VDC

Current 0.3 Amperes

Wall Mount Power Supply Provided with Controller

Output Connector 4 conductor RJ-11 Jacks

3. INSTALLATION

Installation of the PAN/TILT Controller console version consists of merely attaching interface cables and power module. The mounting hardware is the responsibility of the installer and is not provided with the controller.

3.1.1 Tools and Equipment Required:

There are only two tools required to install the controller, they are: 1/8 inch flat blade screwdriver for the 15 pin LDCC “D” connector on the rear panel of the unit. This connector is only attached in the event the LDCC option is included, and a #1 Phillips screwdriver for attaching the ground wire to metal chassis in the event it is required.

3.1.2 RS-422 Cable Installation.

This interface is the normal connection between ESI controllers and the pan and tilt heads. The figure below illustrates a typical RS-422 interface cable. These cables are terminated with conventional telephone type modular six position four contact connectors. Each camera station in the system must be connected to the controller via a RS-422 cable. Connect one end of RS-422 to the connector on the rear of the controller. Connect the other end of the cable to the connector on the pan and tilt head labeled “RS422”. Note: pins 1 and 6 are not used.

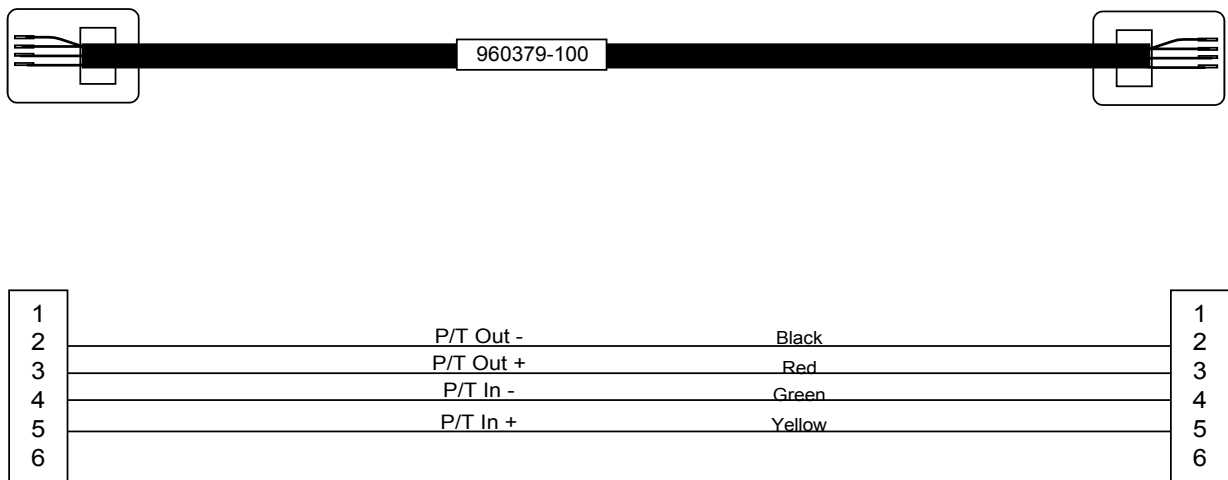


Figure 3-1: Typical RS-422 Cable

3.1.3 LDCC Cable

If the Long Distance Camera Control (LDCC) option is included in the Pan/Tilt Controller the same RS232 connector provides the interface for the Remote Control Unit (RCU) unit which is supplied by JVC. To install the controller portion of the LDCC option connect the plug (male) end of RCU adapter cable (ACA96052100) to the fifteen pin “D” connector on the rear panel of controller. Connect the six pin mini-DIN end of the cable to the cable on the RM-PL55 RCU unit.

3.1.4 Ground Wire, Console Only

The console versions of the Pan/Tilt Controller is equipped with the provision for attaching a chassis ground to the metal controller console. This ground helps eliminate static electricity problems and provides a hard earth ground if required. A single 4-40 stainless steel screw is located adjacent to the power switch on the rear panel of the console chassis. Fabricating the ground wire is the responsibility of the installer and is not provided with the controller.

3.1.5 Power Module

The power for the Pan/Tilt Controller is supplied by a single wall mount power module. The unit requires a 12 VDC @ 500 ma version power module. This power module will power the PAN/TILT Controller in its standard configuration or when configured with an LDCC option. To install the power module simply plug the unit into the AC wall outlet and plug the DC plug into the jack on the rear panel of the Pan/Tilt Controller labeled “POWER +12 VDC”. *Caution: in the event the power is supplied by the user the center pin of the plug is ground DO NOT reverse the polarity.*

3.1.6 Power “ON” Indicator Test

When the system is powered up, the green “PWR” indicator will light, and all function LED’s will sequence indicating the system is operating normally , the green power LED will remain illuminated indicating the system is on. This test also provides a lamp test function for the Pan/Tilt Controller front panel indicators. Do not activate any analog controls (pan, tilt, zoom or focus) while the system is executing the power-up sequence test. These analog pan, tilt, zoom, and focus controls are automatically calibrated during power-on test. The power on test is complete when all indicators are extinguished with the exception of the power, and the camera 1 indicator, which defaults to “ON” at the completion of the test. If the “AUXILARY 2” indicator is flashing at the completion of the power on test, depress the switch to extinguish the flashing indicator at this time. Operation of this switch will be addressed later in the operations section.

3.1.7 Analog Control Calibration

As stated previously the analog pan, tilt, zoom, and focus controls are automatically calibrated during power-on test. Do not activate any analog controls until the power on test is complete.

4. FRONT PANEL-CONTROLS AND INDICATORS.

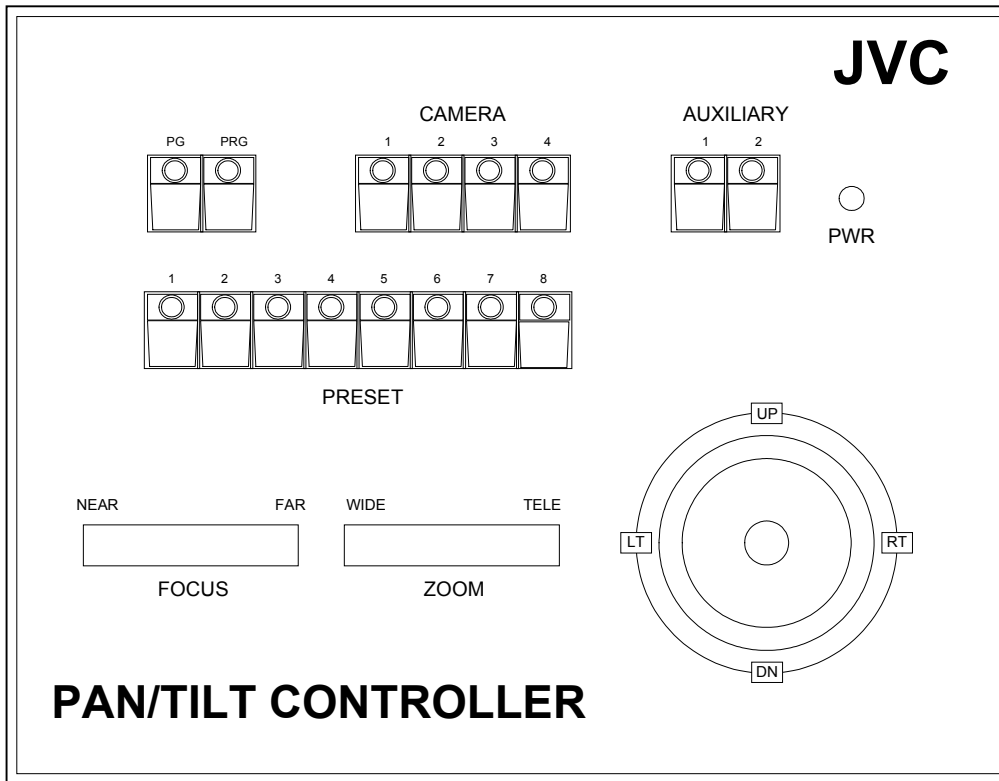
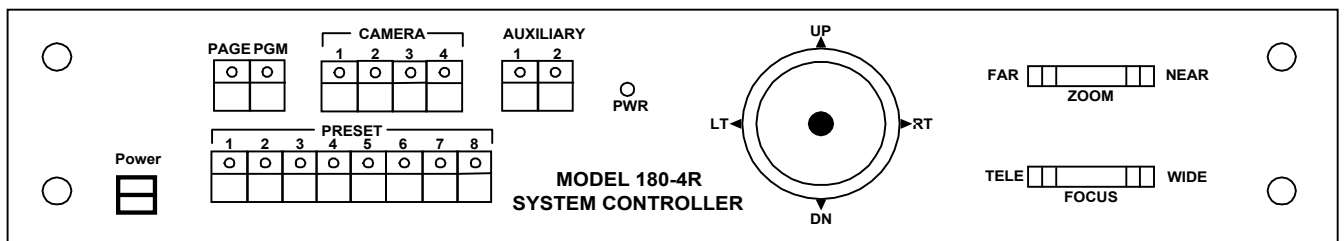


Figure 4-1: PAN/TILT Controller Console Front Panel



ESI 180-4R

Figure 4-2: PAN/TILT Controller Rack Mount Front Panel

4.1.1 Power Switch

The power switch on console versions of the Pan/Tilt Controller is located on the lower area of the controller rear panel. To apply power to the unit depress the bottom portion of the switch. The power switch on rack mount versions of the Pan/Tilt Controller is located on the lower area of the controller front panel. To apply power to the unit depress the upper portion of the switch. The front panel green power LED will illuminate indicating the power is on. Upon supplying power to the Pan/Tilt Controller, the lamp test and analog calibration self test will commence.

4.1.2 Power Indicator

The power indicator for the Pan/Tilt Controller is a green LED labeled “PWR”. This is an indication that the power supply is connected and the power switch is in the “ON” position.

4.1.3 Page Switch and Indicator

The function of the “PAGE” switch is to select preset positions one through eight, or preset positions nine through sixteen. The current page status is indicated by the illumination of the page LED located in the “PAGE” switch located on the upper left area of the front panel. Preset positions one through eight are selected if the LED is extinguished, Preset positions nine through sixteen are selected if the LED is illuminated.

4.1.4 Program Switch and Indicator

This switch and indicator is located adjacent to the “PAGE” switch on the upper left area of the front panel and can be found by the gray switch cap. This control is used to initiate the programming of one of sixteen presets.

4.1.5 Camera Select Switch and Indicator

These four switches and indicators are centrally located on the upper area of the front panel. The camera to be controlled is selected by depressing the appropriate switch. The red LED in the switch cap indicates which camera is selected. Note: Upon power up the controller will always default to camera one.

4.1.6 Auxiliary 1 Switch and Indicator

This switch and indicator is located on the upper right area of the front panel. AUXILIARY 1 switch is used in conjunction with the CAMERA SELECT and rear panel DIP switches to allow reversal of the manual control functions and to vary the speed of certain control functions. The functions of this switch will be discussed in depth in the operations section of this manual.

4.1.7 Auxiliary 2 Switch and Indicator

This switch and indicator is located adjacent to the “AUXILIARY 1” switch on the upper right area of the front panel. This switch is used to activate the LDCC Mode. To use the LDCC function, depress the Auxiliary 2 switch, the LED in the switch cap will flash and the pan & tilt controls will no longer function. To return to the normal pan & tilt control mode, depress the “AUXILIARY 2” switch again. When

the LED stops flashing, the PAN/TILT Controller is in the normal pan & tilt mode. *Caution: Aux 2 is a maintained switch, it does not change conditions unless the switch is physically depressed.*

4.1.8 Preset Switches and Indicators

There are eight preset switches with indicators located on the front panel of the Pan/Tilt Controller. These switches in conjunction with the page switch allow the user to set and go to sixteen unique preset positions for pan, tilt, zoom, and focus for each of the four (4) camera stations.

4.1.9 Zoom & Focus - Seesaws Controls

Located to the left of the pan and tilt joystick are the controls for zoom and focus. Control of the zoom and focus is accomplished with proportional deflection “Seesaw” rocker type controls. The proportional controls allow a slow movement when the control is only slightly depressed increasing to a maximum response when the control is more fully depressed. These devices are automatically calibrated during the power up of the Pan/Tilt Controller. The direction of the zoom lens motion may be reversed for the controls by using the setup switches on the Pan/Tilt Controller rear panel, this will be discussed in the operation section.

4.1.10 Joystick

Located on the lower right area of the front panel is the joystick . Control of the pan and tilt is accomplished with proportional deflection action from the joystick. The proportional control allows a slow movement when the rod is only slightly deflected with an increasing response as the control is more fully deflected. The joystick is automatically calibrated during the power up of the Pan/Tilt Controller. The direction that the joystick drives the pan and tilt may be reversed by using the setup switches on the Pan/Tilt Controller rear panel. Direction reversal will be discussed in the operation section.

5. REAR PANEL-CONNECTORS AND SWITCHES

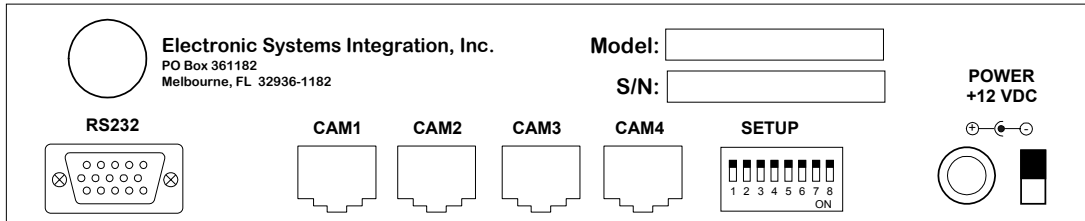


Figure 5-1: PAN/TILT Controller Rear Panel

5.1.1 RS232 / LLDC Connector

The female high density 15 pin “D” connector located in the lower left area of the rear panel is labeled “RS232/LDCC”. The LDCC mode allows a RCU provided by JVC to communicate via the Pan/Tilt Controller to the individual cameras in the system. In this mode the RM-LP55 RCU commands are sent via the Pan/Tilt Controller to the individual pan and tilt heads using their RS422 communication links. The wiring for this cable assembly is shown in the cable section.

5.1.2 Camera 1 - 4 Connectors

These four, six conductor, four contact modular telephone type plugs are used to link the pan and tilt heads to the Pan/Tilt Controller. The control data for the pan and tilt head or the camera will go out the port that is selected on the front panel by the camera select switches.

5.1.3 Ground Screw

The console version of the Pan/Tilt Controller is equipped with a grounding screw to make provisions for attaching a chassis ground wire to the metal controller console. A single 4-40 Phillips head stainless steel screw is located adjacent to the power switch on the rear panel of the Pan/Tilt Controller console chassis.

5.1.4 DC Jack, Power Requirements

The DC power connection for the Pan/Tilt Controller is the small circular 5.5 mm DC jack located on the lower right area of rear panel on the Pan/Tilt Controller. This connector accepts the power plug from the small wall mount power modules supplied with the unit. The DC plug type connector that plugs into the Pan/Tilt Controller is a Switchcraft part number S760.

5.1.5 Rear Panel DIP Switches

The function of the PAN/TILT Controller set-up switches are shown below. To activate any of these commands, put the selected command DIP switch in the DOWN position, depress the CAMERA SELECT switch and then depress and release the AUXILIARY 1 switch as described in the tilt example.

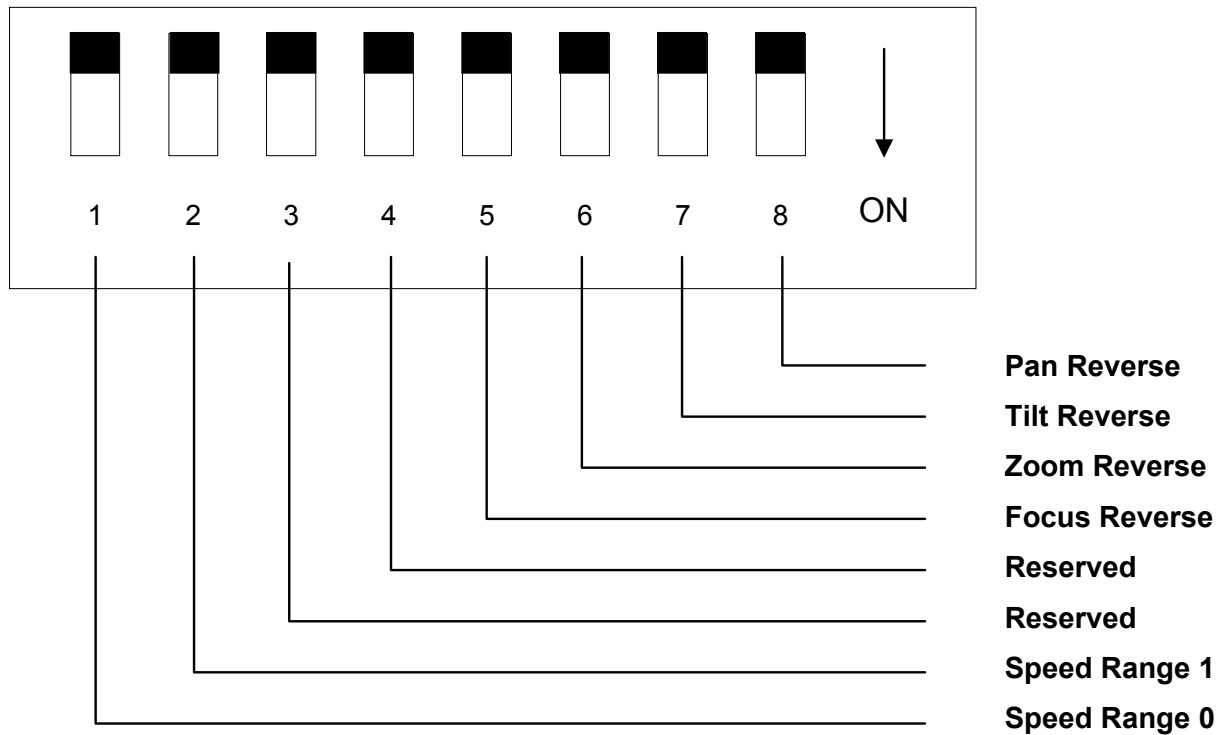


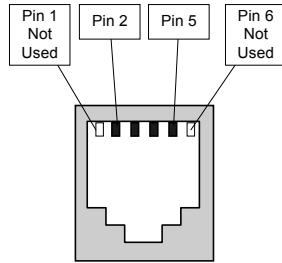
FIGURE 5.1 REAR PANEL DIP SWITCH

The Function of each of these switches is as follows:

- Pan Reverse*
 - Up: Normal pan direction, left on joystick camera pans to the left.
 - Down: Reverse pan direction, left on joystick camera pans to the right
- Tilt Reverse*
 - Up: Normal tilt direction, up on joystick camera tilts up.
 - Down: Reverse tilt direction, up on joystick camera tilts down.
- Zoom Reverse*
 - Up: Normal Zoom direction, wide on seesaw, lens goes wide.
 - Down: Reverse Zoom direction, wide on seesaw, lens goes tele photo.
- Focus Reverse*
 - Up: Normal Focus direction, near on seesaw, lens goes near.
 - Down: Reverse Zoom direction, near on seesaw, lens goes far.
- Reserved*
 - Not Currently Used
- Reserved*
 - Not currently used.
- Speed Range 1*
- Speed Range 0*
 - The Speed Range bits are used to set the vary the speed of the joystick and seesaw controls. With both switches Up the maximum speed is enabled and with both switches down the minimum speed is enabled

5.1.6 RS-422 Connectors

The four connectors labeled “CAM1”, “CAM2”, “CAM3”, and “CAM4” on the connector plate are six position, four conductor modular jack. This connector provides RS-422 level differential signals to and from the digital pan and tilt head. The RS-422 is the interface from the controller to the heads. Shown below is the pin-out for the RS-422 connector. The pin assignment for this connector follows:



The camera connector pin assignment:

Pin #	Description
2	P/T Data Out - (Data In to the Pan/Tilt Controller)
3	P/T Data Out +
4	P/T Data In - (Data Out of the Pan/Tilt Controller)
5	P/T Data In +

6.1.1 Internal Jumpers.

There are eleven, three position internal headers on the Digital Processor PWA, which is the bottom circuit card in the PAN/TILT Controller. The majority of the jumper locations are for special purposes and are not covered within the scope of this manual. These jumper posts need no jumpers (shunts). The jumper locations have 3 pins. Pin one is nearest to the edge of the board.

The jumpers which may be required are as follows:

LDCC Option:

- JVC KY-F32U and KY-F55BU Camera with RM-LP55
 - JP1-2 to JP1-3
 - JP2-1 to JP2-2

7. OPERATION

Communication Interface.

Control of the pan and tilt is accomplished by sending packets of ASCII characters to the head. The standard communications protocol is 9600 baud, eight data bits, one stop bit, and no parity. These commands tell the head and lens which direction and at what rate to move. Preset related commands are also passed over the communication link between the head and the controller. In most cases the communications link is RS-422.

7.1.1 Power On

When the system is powered up, all LED's will sequence indicating the system is operating normally. Do not activate any analog controls (pan, tilt, zoom or focus) while the system is in the power-up sequence. These analog controls are automatically calibrated during power-up.

7.1.2 Manual Operation.

Select the desired camera by depressing the appropriate CAMERA switch. The selected camera LED will be lit and the camera location will be under the control of the PAN/TILT Controller. Camera 1 is the default selection at power up. To position the selected pan & tilt head, move the joystick up, down, left and right. To change the zoom, depress the TELE or the WIDE side of the ZOOM control. To change the focus, depress the FAR or NEAR side of the FOCUS control.

7.1.3 Programming a Preset Location

To program the preset location, first depress the Program "PRG" switch and the PRG LED will be lit. Select either Page 0 (PAGE LED not lit) or Page 1 (PAGE LED lit). Then position the pan & tilt head and the lens zoom & focus to the desired positions and depress the desired preset location switch. The preset LED will then be illuminated. The current location data has now been stored in the desired preset location. The program LED will cease to be lit after the preset location is selected or when the "PRG" switch is depressed a second time.

Note: The preset storage is accomplished within the DPT-115. A "Goto" command to preset location "1" will command the DPT-115 to go to the preset location data stored in location #1.

7.1.4 To Go To a Preset Location:

Select either Page 0 (PAGE LED not lit) or Page 1 (PAGE LED lit). Depress the desired preset location and the selected camera will go to the stored pan, tilt, zoom & focus location. *Activating any manual control will interrupt the going to a preset.* When at the preset location, the preset location LED will remain lit until another preset is selected or any manual control is activated.

7.1.5 LDCC Mode

To activate the LDCC mode, depress the Auxiliary 2 switch. The LED will flash and the pan & tilt controls will no longer function. *Verify the DPT is properly configured for LDCC operation.* The system is now in the LDCC or RCU pass through mode and will transmit signals between the camera and its RM-

LP55 RCU over the same RS-422 cable as used for pan & tilt control. To return to the normal pan & tilt control mode, depress the auxiliary switch again. When the Auxiliary 2 LED is not flashing, the PAN/TILT Controller is in the normal pan & tilt mode.

7.1.6 To Reverse Manual Control Functions

To reverse the directions of the manual functions of the Pan/Tilt Controller use the DIP switches located on the rear panel of the Pan/Tilt Controller chassis. These switches used in conjunction with the CAMERA SELECT switches and the AUXILIARY 1 switch allows reversal of the pan, tilt, zoom, focus and iris (optional) manual control functions. For example, it is necessary to reverse the direction of motion of the pan & tilt head because head is mounted upside down hanging from the ceiling. To reverse the tilt function for camera 1, perform the following steps:

Put the DIP Switch #7(Tilt Reverse) in the DOWN position, depress the CAMERA SELECT 1 switch and hold it down. Depress and release the AUXILIARY 1 switch while the CAMERA SELECT 1 switch is still depressed. Release the CAMERA SELECT 1 switch. The tilt function is now reversed for camera 1 only. To reverse the tilt function of camera 2, repeat the above procedure with the CAMERA SELECT 2 switch depressed instead of the CAMERA SELECT 1 switch. To restore the normal polarity of the tilt control, simply repeat the above procedure with DIP Switch #7 in the UP position.

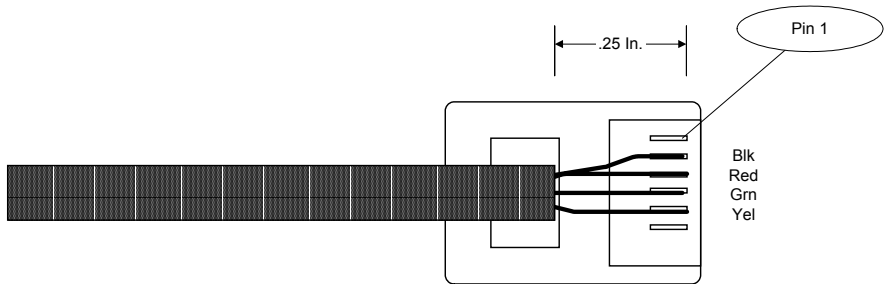
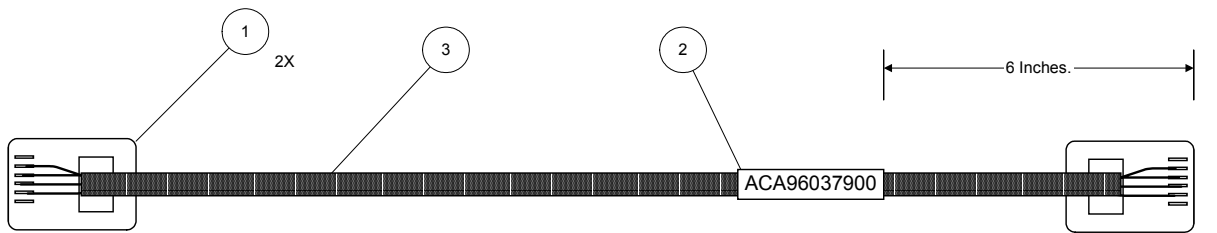
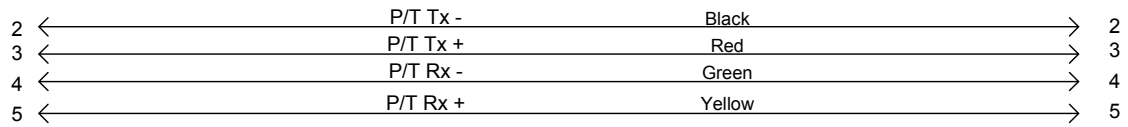
7.1.7 To Set the Speed Range

To set the speed range of the manual functions of the Pan/Tilt Controller also use the DIP switches located on the rear panel of the Pan/Tilt Controller chassis. These switches used in conjunction with the CAMERA SELECT switches and the AUXILIARY 1 switch allow setting the speed range of the joystick and seesaw manual control functions. For example, it may be necessary to slow the motion of the pan & tilt head because very smooth control is needed for “on air” moves. To change the speed range for camera 1, perform the following steps:

Put the DIP Switch #1(Speed Range bit 1) in the DOWN position, depress the CAMERA SELECT 1 switch and hold it down. Depress and release the AUXILIARY 1 switch while the CAMERA SELECT 1 switch is still depressed. Release the CAMERA SELECT 1 switch. The Speed Range has now been slowed for camera 1 only. To change the Speed Range of camera 2, repeat the above procedure with the CAMERA SELECT 2 switch depressed instead of the CAMERA SELECT 1 switch.

7.1.8 Cable Drawings

Attached are the applicable cable drawings for the Pan/Tilt Controller, these include; drawing 960379 the digital I/F cable between the Pan/Tilt Controller and the heads and drawing 970521, the RM-LP55 RCU adapter cable between the Pan/Tilt Controller the JVC remote control unit.



1. Strip jacket .375 Inches.
2. Fan and flatten to color pattern.
3. Trim straight to .250 Inches.
4. Insert in connector and crimp

FIGURE 16.1 RS-422 INTERFACE CABLE, P/N ACA96037900

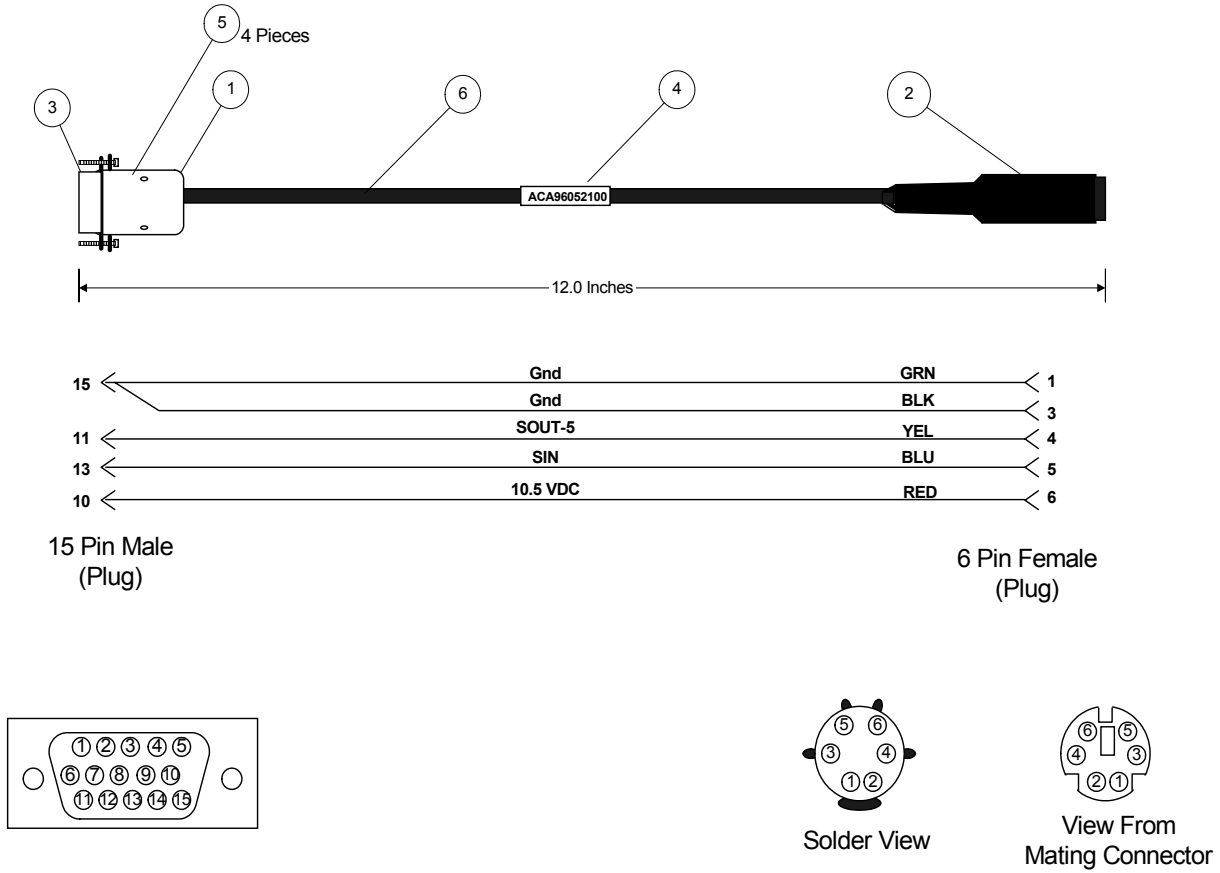


FIGURE 16.2 CONTROLLER LDCC CABLE, P/N ACA96052100

8. TROUBLE SHOOTING

8.1 Pan & Tilt

Problem: No pan/tilt or lens functions.

Verify proper power is supplied to controller.

Verify “AUX2” switch is not depressed.

8.2 LDCC

Problem: No RCU functions.

Verify RCU adapter cable is attached to rear panel of controller and RM-LP55.

Verify 6 pin mini-DIN connector on RCU adapter cable is fully mated with connector on RM-LP55 cable.

Verify “AUX2” switch is depressed.

Verify configuration of 4 conductor RS-422 interface cable to pan and tilt head. See cable drawing section.

There is several set up items on the pan and tilt head, which will also provide these symptoms, these are listed in the pan and tilt manual.

8.3 Technical Support

For technical assistance call (321) 956-0095 or go to web site at esi-inc.com. Have serial number of unit and description of camera and lens on pan and tilt head.