

OPERATIONS MANUAL

for a

JVC DV-180 CONTROLLER

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1. DESCRIPTION

1.1 FUNCTIONAL DESCRIPTION

This document describes the operation and installation of the DV-180 Digital Controller. The DV-180 is designed to meet the demanding challenges of remote motion and camera control for the JVC GY-DV300U camera. It has been specifically configured to control up to four DV-115 Digital Pan & Tilt Heads. The DV-180 Digital Controller is designed for long distance remote control requirements in applications such as worship services, teleconferencing, university distance learning, tele-medicine and theater or auditorium presentations

The DV-180 has a suite of features which enhance the video presentation. Among the features is a professional preset capability. Presets allow a predetermined pan, tilt, zoom and focus position to be stored in the DV-115 non-volatile memory. This stored position information may later recalled for accurately repeating the previously stored shot. With the resolution of the pan & tilt presets being 12 bits, the preset repeatability is 0.1 degrees in both pan & tilt. The preset data is stored within the pan and tilt head. Eight presets per camera site may be programmed from the DV-180.

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. In addition to basic pan, tilt, zoom and focus control, the DV-180 allows control of iris (automatic or manual), video tape recording controls, camera/bars selection, automatic or manual focus selection and, of course, presets.

The versatile digital interface of the DV-180 Controller will also communicate with the user’s computer system. Camera, tape, and pan and tilt commands may be routed to all the cameras on the system through the DV-180 to Computer interface.

1.2 PHYSICAL DESCRIPTION

The DV-180 Controller tabletop version features a sloped front panel for ready access to all of the DV-180 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 is located on the rear of the DV-180. This connector provides the interface to the user’s computer system for Camera Control functions. A computer program is supplied with the DV-180 which provides Gain, Shutter and White Balance control of the GY-DV300.

Input power to the DV-180 Controller is provided by a wall mounted power supply which is provided with the unit.

2. DV-180 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 8 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

Power Input Requirements:

Voltage 12 VDC

Current 0.3 Amperes

Wall Mount Power Supply Provided with Controller

Pan/Tilt Output Connector 4 conductor RJ-11 Jacks

Computer Interface Connector 15 pin D (female)

3. INSTALLATION

Installation of the DV-180 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. The interface cables consist of up to four RS-422 cables to the DV-115 pan & tilt heads and one RS-232 cable to the user's computer.

3.1 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 remote (LDCC) "D" connector on the rear panel of the unit. This connector is only attached in the event the computer based CCU option is included, and a #1 Phillips screwdriver for attaching the ground wire to metal chassis in the event it is required.

3.2 RS-422 CABLE INSTALLATION

This interface is the normal connection between DV-180 controllers and the DV-115 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.

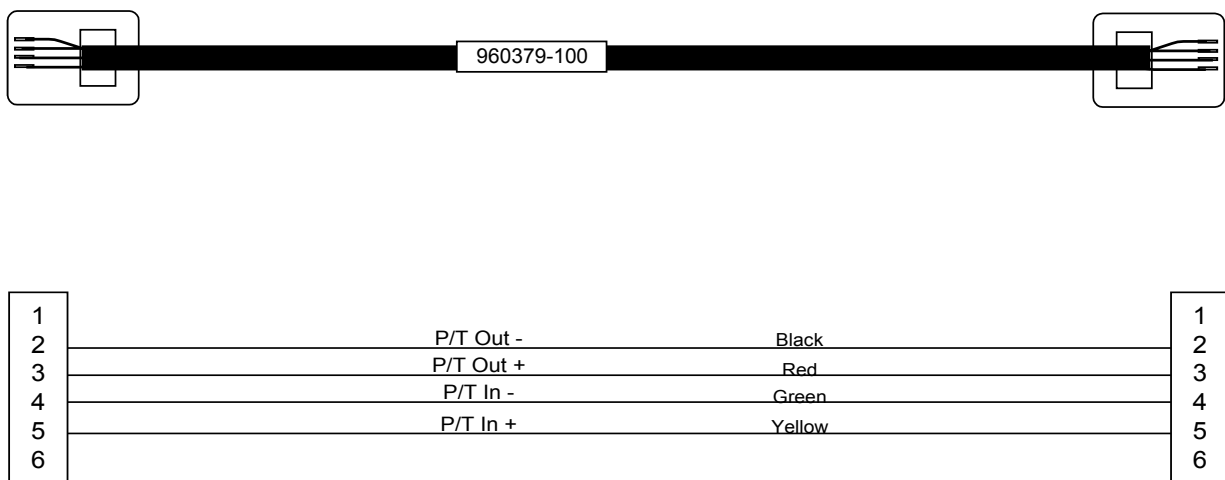


Figure 3-1: Typical RS-422 Cable

3.3 CAMERA CONTROL CABLE

If the Computer based Camera Control option is used with the DV-180, a cable is required on the 15-pin connector located on the rear panel of the controller. To install the cable, connect the 15-pin plug (male) end of cable (ACA203006600) to the rear panel of controller and connect the 9-pin end of the cable to the 9-pin serial data connector on the computer.

3.4 GROUND WIRE

The DV-180 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.

3.5 POWER MODULE

The power for the DV-180 Controller is supplied by a single wall mount power module. The unit requires a 12 VDC @ 500 ma version power module. 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 DV-180 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.*

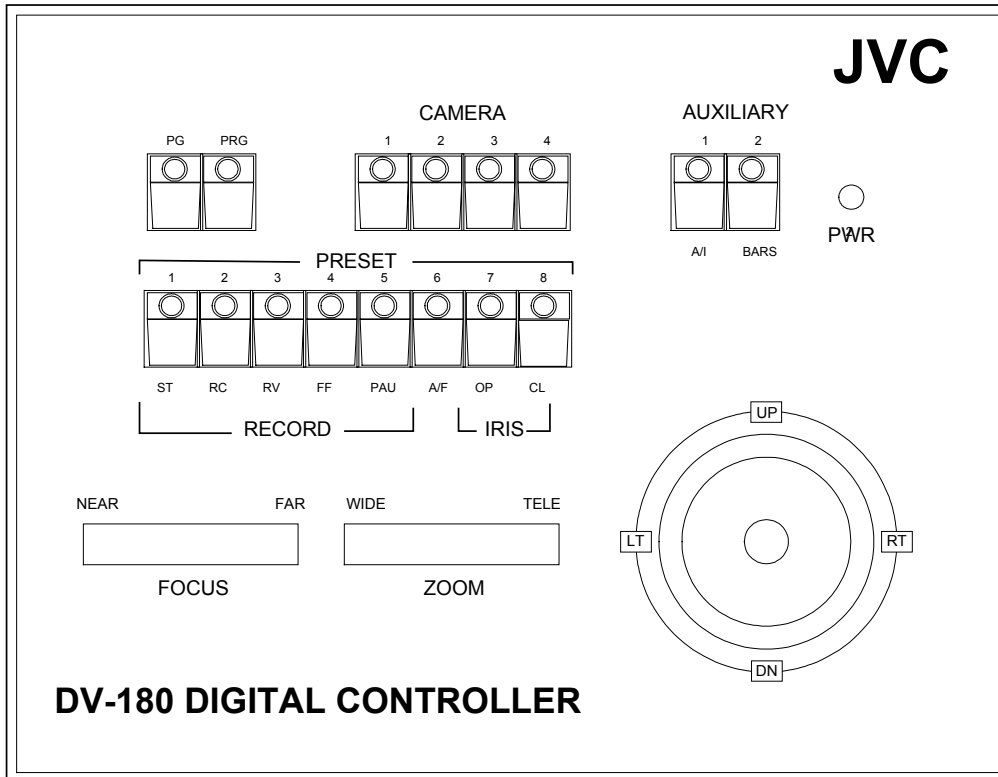
3.6 POWER "ON" INDICATOR TEST

When the system is powered on, the green "PWR" indicator will be illuminated and the function LED's will sequence from all extinguished to all illuminated. This indicates the system is operating normally. The power on test is complete when all indicators are extinguished with the exception of the green power "ON" LED, and the camera 1 LED, which defaults to illuminated at the completion of the test.

3.7 ANALOG CONTROL CALIBRATION

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.

4. FRONT PANEL-CONTROLS AND INDICATORS.



DV-180 Controller Console Front Panel

4.1 POWER SWITCH

The power switch on the DV-180 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 front panel green power LED will illuminate indicating the power is on. Upon supplying power to the DV-180 Controller, the lamp test and analog calibration self test will commence.

4.2 POWER INDICATOR

The power indicator for the DV-180 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.

4.3 PAGE SWITCH AND INDICATOR

The function of the “PAGE” switch is to select preset positions one through eight, which are indicated by the numbers over the switches, or to select recorder, auto focus, or manual iris functions, which are indicated by the letters and symbols under the switches. 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. Recorder, auto focus, or manual iris functions are enabled if the LED is illuminated.

4.4 PROGRAM SWITCH AND INDICATOR

This switch and indicator are located adjacent to the “PAGE” switch on the upper left area of the front panel and can be identified by the gray switch cap. This control is used to initiate the programming of one of the eight presets when the “PAGE” LED is extinguished. If the “Program” LED is illuminated, depressing a Preset switch will program a preset to that preset number. If the “Program” LED is extinguished, the depression of a preset switch will send the pan & tilt head to preset location corresponding to the preset switch depressed.

If the “PAGE” LED is illuminated, the “PROGRAM” switch turns the GY-DV300 Full Auto mode on or off. If the “PROGRAM” LED is extinguished, the Full Auto Mode is “OFF”. If the “PROGRAM” LED is illuminated, the Full Auto Mode is “ON”. Depressing the “PROGRAM” switch reverses the Full Auto Mode.

4.5 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 number one.

4.6 AUXILIARY 1 SWITCH AND INDICATOR

This switch and indicator are located on the upper right area of the front panel. As with the PRESET switches the AUXILLARY 1 switch performs two different functions depending on the state of the PAGE switch. If the LED in the PAGE switch is off, the AUX 1 switch controls the AUX 1 functions. If the LED in the PAGE switch is on, the AUX 1 switch controls the auto iris mode of the camera.

The AUX1 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.

The Camera Auto/Manual Iris mode is toggled by depressing the AUX 1 switch when the “PAGE” LED illuminated. The functions of this switch will also be discussed in depth in the operations section of this manual

4.7 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. The AUX2 switch is used to control the Color Bar/Camera mode when the “PAGE” LED is lit. If the LED in the PAGE switch is off, the AUX 2 has no function. If the AUX2 LED is illuminated, the Camera displays Bars. Conversely, if the AUX2 LED is extinguished, the camera is in its normal display mode.

4.8 PRESET SWITCHES AND INDICATORS

There are eight preset switches with LED indicators. They are centrally located on the front panel of the DV-180 Controller. As with the AUXILLARY 1 switch, the PRESET switches performs two different functions depending on the state of the PAGE switch. These switches, in conjunction with the PAGE switch, allow the user to set and go to eight unique preset positions for pan, tilt, zoom, and focus for each of the four (4) camera stations. In addition, it is used to control the video recorder feature of the GY-DV300U and to toggle auto focus, or to manually open or close the iris on the camera.

If the LED in the PAGE switch is off, the eight PRESET switches program and recall the eight presets for each of the cameras.

If the LED in the PAGE switch is on, the left most five PRESET switches initiate commands to GY-DV-300U video recorder. The commands are stop, record, rewind, fast forward, and pause. The sixth switch toggles the auto focus mode of the camera. Switches seven and eight open and close the iris, if the camera is in the manual iris mode.

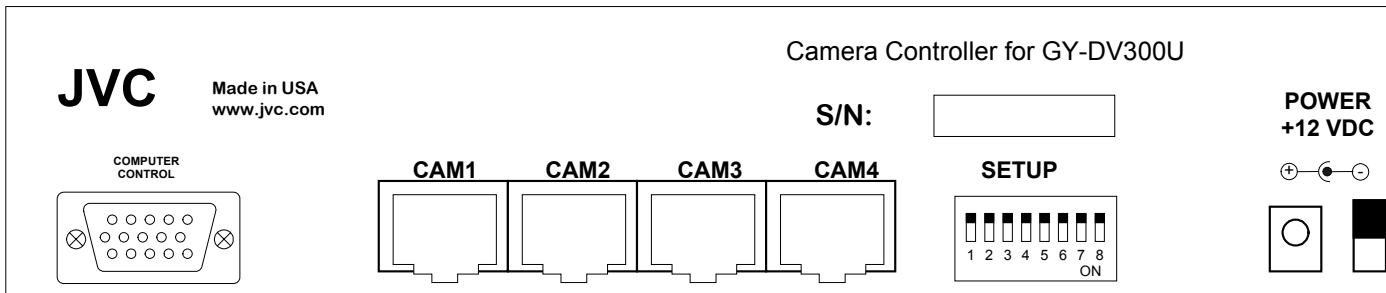
4.9 ZOOM & FOCUS - SEESAWS CONTROLS

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 DV-180 Controller.

4.10 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 slightly deflected with an increasing response as the control is more fully deflected. The joystick is automatically calibrated during the power up of the DV-180 Controller. The direction that the joystick drives the pan and tilt may be reversed by using the setup switches on the DV-180 Controller rear panel. These switches are used in conjunction with the AUX 1 switch. Direction reversal is discussed in the operations section.

5. REAR PANEL-CONNECTORS AND SWITCHES



DV-180 Controller Rear Panel

5.1 COMPUTER CONTROL CONNECTOR

The female high density 15 pin “D” connector located in the lower left area of the rear panel is labeled “COMPUTER CONTROL”. This connector accepts a cable that allows a PC based camera control program to communicate via the DV-180 Controller to individual cameras in the system. In this mode Camera Control commands are sent via the DV-180 Controller to the individual pan and tilt heads using their RS-422 communication links. The wiring for this RS-422 cable assembly is shown in the cable section.

5.2 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 DV-180 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.

5.3 GROUND SCREW

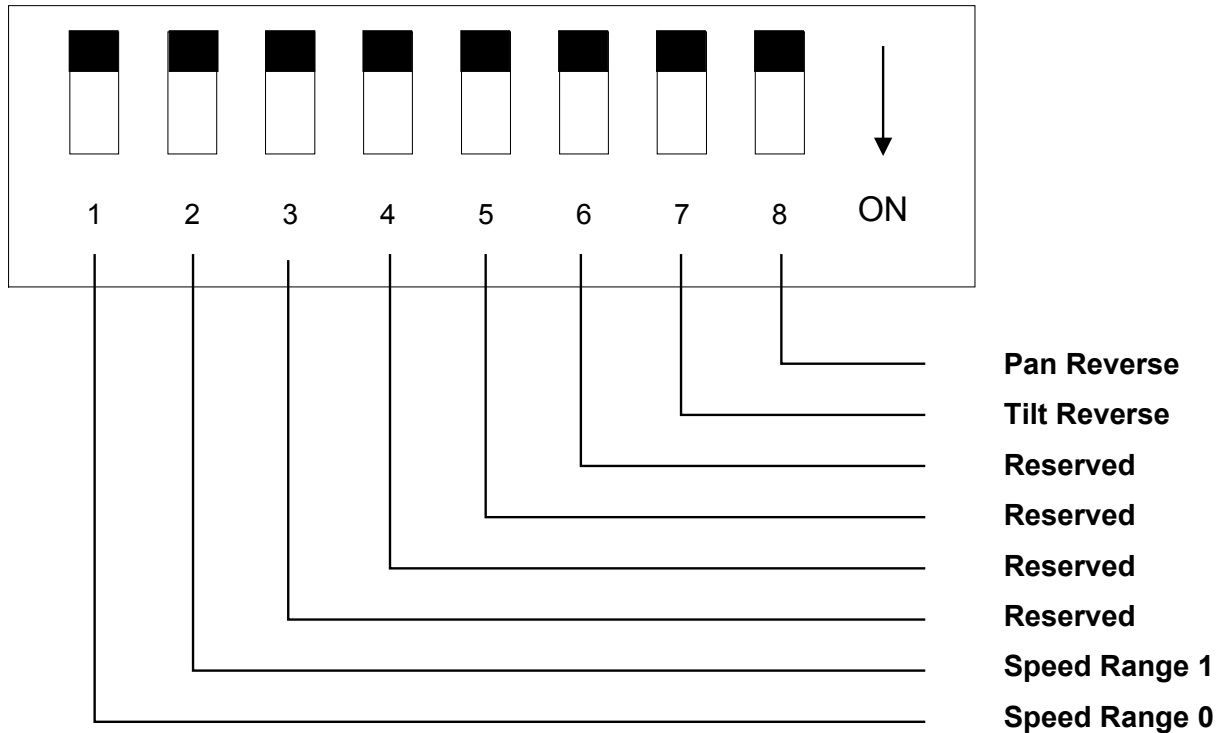
The DV-180 Controller is equipped with a grounding screw to make provision for attaching a chassis ground wire to the metal controller console. A single 4-40 Phillips head stainless steel screw is located adjacent to the power switch on the rear panel of the DV-180 Controller console chassis.

5.4 DC JACK, POWER REQUIREMENTS

The DC power connection for the DV-180 Controller is the small circular 5.5 mm DC jack located on the lower right area of rear panel on the DV-180 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 DV-180 Controller is a Switchcraft part number S760.

5.5 REAR PANEL DIP SWITCHES

The function of the DV-180 Controller set-up switches are shown below. To activate any of these commands, verify the PAGE led is not illuminated, put the desired 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. Switches 3 – 6 are unused and should remain “OFF”.



REAR PANEL DIP SWITCH

The Function of each of these switches is as follows:

SW8 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

SW7 Tilt Reverse

- Up: Normal tilt direction, up on joystick camera tilts up.
- Down: Reverse tilt direction, up on joystick camera tilts down.

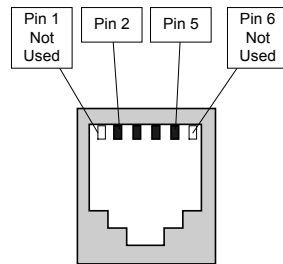
SW2 Speed Range 1

SW1 Speed Range 0

- The Speed Range bits are used to 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

5.6 RS-422 CONNECTORS

The four connectors labeled “CAM1”, “CAM2”, “CAM3”, and “CAM4” on the connector plate are six position, four conductor modular jacks. 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 pan and tilt heads. Shown below is the pin-out for the RS-422 connector. The pin assignment for this connector follows:

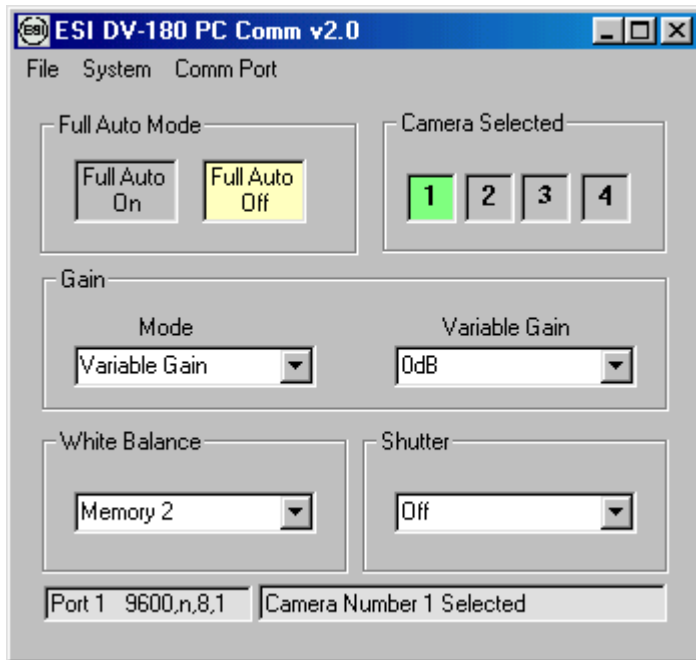


The camera connector pin assignment:

Pin #	Description
2	P/T Data Out - (Data In to the DV-180 Controller)
3	P/T Data Out +
4	P/T Data In - (Data Out of the DV-180 Controller)
5	P/T Data In +

6 DV-180 PC COMM

The DV-180 PC COMM is a software program designed to run on a Windows platform and to control select camera features. The screenshot below illustrates the DV-180 PC COMM.



The 2030066 cable provided with the system is the interface between the DV-180 and the computer. Connect the 9 pin “D” connector to the serial port on the computer and the fifteen pin “D” Sub connector on the rear of the DV-180 Controller.

To install the PC COMM Program, double click on the setup.exe program in the PC-COMM Folder. If the installation is unsuccessful, manually move the file MSCOMM32.OCX (located in the Support folder) to your Windows/System directory. Double click on the ESI DV-180 PC COMM.exe file and hopefully all is well.

When operating the PC COMM program, it will initially load its default values. Select a camera on the DV-180 Controller front panel and make sure the PAGE LED is illuminated and the PROGRAM LED is extinguished. Vary each of the PC COMM controls. This will re-synchronize the PC COMM program to the camera settings. This should be done for each camera in the system. After the initial re-synchronize, the PC COMM program will store the current values of the camera.

The PC COMM program operates much like a typical Camera Control Unit. It will only work, if it is connected to the DV-180. Special code exists in the PC COMM command structure to tell the DV-115 to switch the incoming data directly to the GY-DV300REM. Directly interfacing the PC COMM program to the camera WILL NOT WORK.

7. OPERATION

7.1 COMMUNICATION INTERFACE

Control of the pan and tilt is accomplished by sending packets of serial characters to the DV-115. Camera related commands are converted to RS-232 level and routed through the DV-115 to the camera. The standard communications protocol is 9600 baud, eight data bits, one stop bit, and no parity. These commands tell the pan and tilt head and camera which operations to perform. Preset related commands are also passed over the communication link between the head and the controller.

7.2 POWER ON

When the system is powered up, all LED's will sequence individually indicating the system is operating normally. All LED's will extinguish with the exception of CAM1. The controller defaults to camera number one at the completion of the power on sequence. 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. Camera modes setting will be the same as they were when the DV-180 controller was last powered off.

7.3 MANUAL OPERATION

Select the desired camera by depressing the appropriate CAMERA select switch. The selected camera LED will be lit and the camera location will be under the control of the DV-180 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.

7.4 PROGRAMMING A PRESET LOCATION

To program the preset location, first verify the PAGE LED is not illuminated, depress the gray "PRG" switch and the amber PRG LED will be lit. Then position the pan & tilt head and the lens zoom & focus to the desired positions and depress the desired preset location switch. Note: if the camera is in the auto focus mode the operator will have no manual control with the focus seesaw at this time. The individual preset numbered LED will then be illuminated at the point in time when the desired preset switch is depressed. 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 DV-115. A "Goto" command to preset location "1" will command the DV-115 to go to the preset location data stored in location #1.

7.5 TO GO TO A PRESET LOCATION:

Verify the LED in the “PAGE” switch is not illuminated, depress the desired preset location and the selected camera will go to the stored pan, tilt, zoom & focus location. That particular preset LED will illuminate when the switch is depressed. *Activating any manual control will interrupt the process of 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.

7.6 DV-180 PC COMM

The DV-180 PC COMM is a software program that runs on the user’s personal computer. The user’s PC must have a CD and at least one external serial port. This program performs limited camera control unit functions and communicates with the DV-180, the DV-115, and the GY-DV300 camera via a RS-232 cable interface. The part number for the cable is 2030066; the standard length for this cable is three feet. This cable is connected between the serial port on the computer and the fifteen pin “D” Sub connector on the rear of the DV-180 Controller.

Once installed on the user’s computer the DV-180 PC COMM program provides control for the GY-DV300 video gain, white balance, and shutter for each camera connected to the system. The program remembers the parameters that are set using the DV-180 PC COMM. If the controller is powered off the configuration of the camera set up is not lost. These parameters are restored for the camera when the controller is powered back on.

7.7 TO REVERSE MANUAL CONTROL FUNCTIONS

To reverse the directions of the manual functions of the DV-180 Controller use the SETUP switches located on the rear panel of the DV-180 Controller chassis. These switches used in conjunction with the CAMERA SELECT and the AUXILIARY 1 switches to allow reversal of the pan and tilt manual control functions. For example, it may be necessary to reverse the direction of motion of the tilt head because the system is being operated by an aircraft pilot. To reverse the tilt function for camera 1, perform the following steps:

Put the SETUP 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.

7.8 TO SET THE SPEED RANGE

To set the speed range of the manual functions of the DV-180 Controller also use the SETUP switches

located on the rear panel of the DV-180 Controller.

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 SETUP 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. For the highest speed operation, load with both switches in the up position. For the slowest speed operation, load with both switches in the down position.

7.9 VIDEO RECORDER CONTROLS

There are five video recorder control commands available from the front panel of the DV-180, they are: stop, record, rewind, fast-forward, and pause. These controls use the preset switches 1-5. To activate these controls, verify the PAGE LED is illuminated indicating the functions listed under the PRESET switches are enabled, and then depress desired tape command.

7.10 AUTO FOCUS

There is an auto focus command available from the front panel of the DV-180. This control use the preset switches 6. To activate auto focus, verify the PAGE LED is illuminated indicating the functions listed under the PRESET switches are enabled.

7.11 MANUAL IRIS

There is two manual iris control commands available from the front panel of the DV-180, they are: open and close. These controls use the preset switches 7 and 8. To activate these controls, verify the PAGE LED is illuminated indicating the functions listed under the PRESET switches are enabled, and then depress desired iris command.

7.12 AUTO IRIS

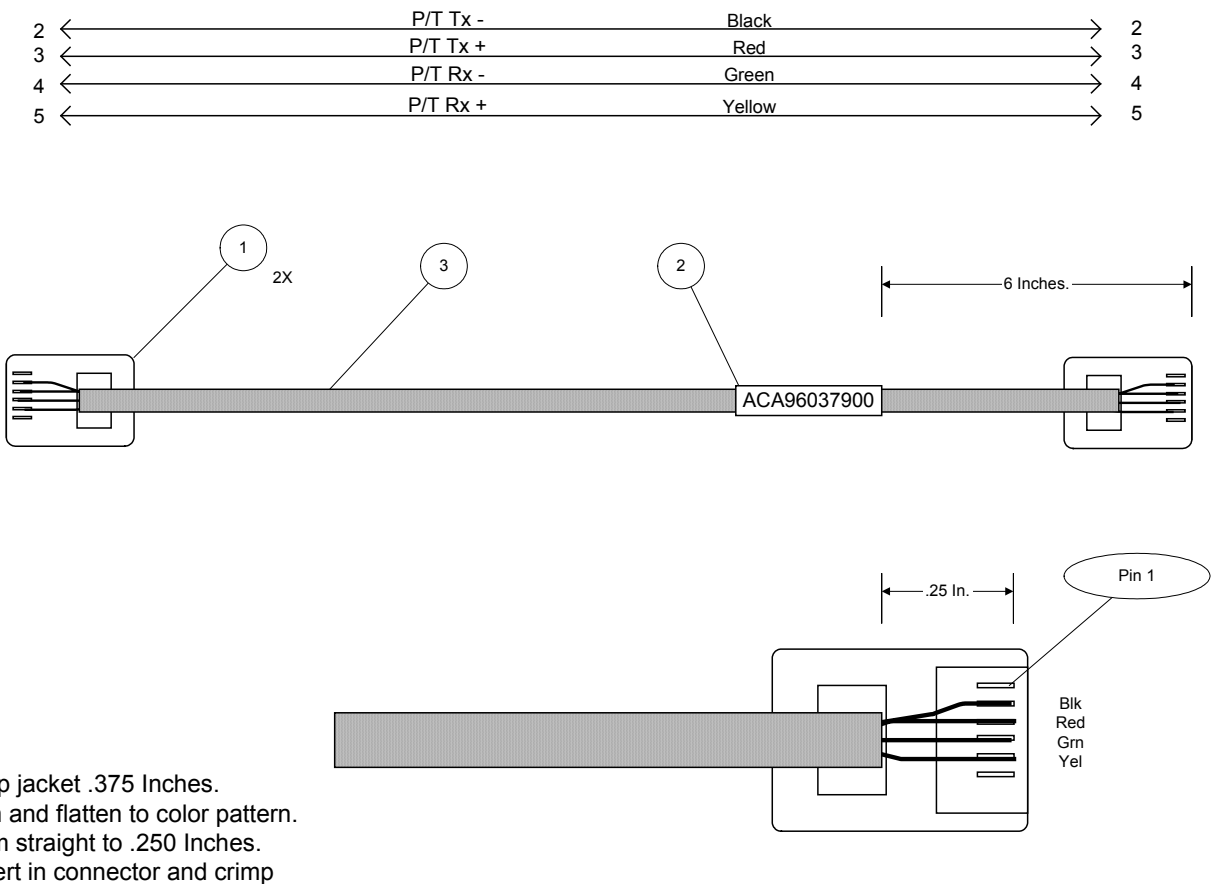
There is an auto iris control command available from the front panel of the DV-180, this function is labeled A/I. This controls uses the preset switch 6. To activate these controls, verify the PAGE LED is illuminated indicating the functions listed under the AUXILLARY 1 switch is enabled, and then depress A/I (PRESET 6) switch.

7.13 COLOR BAR GENERATION

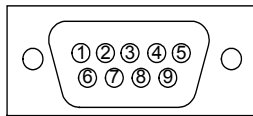
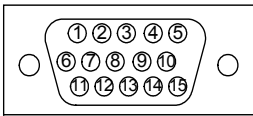
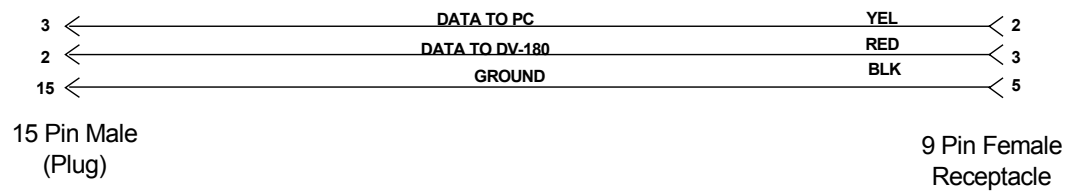
An industry standard color bar pattern can be generated from the GY-DV300U camera. To activate this control, verify the PAGE LED is illuminated indicating the functions listed under the AUILLARY 2 switch is enabled, and then depress AUILLARY 2 switch, color bars will be displayed on monitor. To disable the bars depress the switch again.

7.14 CABLE DRAWINGS

Attached are the two applicable cable drawings for the DV-180 Controller, these include; drawing 960379 the RS-422 I/F cable between the DV-180 Controller and the pan and tilt heads and drawing 2030066, the RS-232 cable between the DV-180 Controller the user's personal computer.



RS-422 INTERFACE CABLE, P/N ACA96037900



DV-180/PC COMM CABLE, P/N ACA203006600

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.

Verify the interface cable is properly installed.

8.2 DV-180 PC COMM

Problem: No CCU functions.

Verify correct Comm port is selected for your computer.

Verify configuration of 3 conductor RS-232 interface cable, P/N 2030066.

8.3 TECHNICAL SUPPORT

For technical assistance on the DV-180 call (321) 956-0095 or go to web site at esi-inc.com. Have serial number of unit and description of symptoms available.