



<https://www.rossvideo.com/support/product-documentation/pivotcam/>

PIVOT

PIVOTCam-20 User Manual

Thank You For Choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

Our mission is to:

1. Provide a Superior Customer Experience
 - offer the best product quality and support
2. Make Cool Practical Technology
 - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at solutions@rossvideo.com.



David Ross

CEO, Ross Video

dross@rossvideo.com

Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.

-
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

Document Information

- Ross Part Number: **5000DR-300-07**
- Release Date: January, 2020.

Copyright

©2020 Ross Video Limited, Ross® and any related marks are trademarks or registered trademarks of Ross Video Limited. All other trademarks are the property of their respective companies. PATENTS ISSUED and PENDING. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, photocopying, recording or otherwise, without the prior written permission of Ross Video. While every precaution has been taken in the preparation of this document, Ross Video assumes no responsibility for errors or omissions. Neither is any liability assumed for damages resulting from the use of the information contained herein.

Adobe® and Flash® are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries.

VideoLAN, VLC, VLC media player and x264 are trademarks of the videoLAN registered non-profit organization.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, refer to the “**Important Safety Instructions**” listed in the front of this manual to avoid personnel injury and to prevent product damage.

Product may require specific equipment, and/or installation procedures to be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these specific requirements.

Symbol Meanings



Protective Earth: This symbol identifies a Protective Earth (PE) terminal, which is provided for connection of the supply system's protective earth (green or green/yellow) conductor.



Important: This symbol on the equipment refers you to important operating and maintenance (servicing) instructions within the Product Manual Documentation. Failure to heed this information may present a major risk of damage or injury to persons or equipment.



Warning: The symbol with the word “Warning” within the equipment manual indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION: The symbol with the word “Caution” within the equipment manual indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.



Warning Hazardous Voltages: This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.



ESD Susceptibility: This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.

Important Safety Instructions

1. **Read Instructions** All the safety and operating instructions should be read before the product is operated.
2. **Retain Instructions** The safety and operating instructions should be retained for future reference
3. **Heed Warnings** All warnings on the product and the operating instructions should be adhered to.
4. **Follow Instructions** All operating and use instructions should be followed.
5. The camera power input range is 100-240VAC (50-60Hz). Ensure the power supply input is within this range before powering on.
6. The camera power voltage is 12VDC with a rated current of 2A. We suggest you use it with the original power supply adapter supplied by the factory.
7. Please keep the power cable, video cable, and control cable in a safe place. Protect all cables, especially the connectors.
8. Operational environment: 0°C-50°C, humidity less than 90%.
9. To avoid any danger, do not put anything inside the camera, and keep it away from corrosive liquids.
10. Avoid stress, vibration, and damp during transportation, storage, and installation.
11. Do not detach the camera housing and cover. For any service, please contact the authorized dealer.
12. RF cable and control cable should be individually shielded, and cannot be substituted with other cables.

13. Do not direct the camera lens towards a strong light source, such as the sun or an intense light.
14. Use a dry soft cloth to clean the camera housing. A neutral cleaning agent can be applied when needed. To avoid damage to the camera lens, never use strong or abrasive cleaning agents on the camera housing.
15. Do not move the camera by holding the camera head. To avoid mechanical trouble, do not rotate the camera head by hand.
16. Put the camera on a fixed, smooth desk or platform. The camera should not be leaning on anything when installed.
17. Power Supply Polarity:



Note: The video quality may be affected by specific frequencies in electromagnetic field.



CAUTION: Do NOT pick up the camera by the lens barrel. Doing so may damage the rotary mechanism and internal cables.



CAUTION: Do NOT move or rotate the lens barrel by hand. Doing so may damage the rotary mechanism as well as the rotation limiters.

Warranty and Repair Policy

Ross Video Limited (Ross) warrants its cameras and related options, to be free from defects under normal use and service for a period of ONE YEAR from the date of shipment.

Warranty repairs will be conducted at Ross, with all shipping FOB Ross dock. If repairs are conducted at the customer site, reasonable out-of-pocket charges will apply. At the discretion of Ross, and on a temporary loan basis, plug in circuit boards or other replacement parts may be supplied free of charge while defective items undergo repair. Return packing, shipping, and special handling costs are the responsibility of the customer.

This warranty is void if products are subjected to misuse, neglect, accident, improper installation or application, or unauthorized modification.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profit). Implied warranties, including that of merchantability and fitness for a particular purpose, are expressly limited to the duration of this warranty.

This warranty is TRANSFERABLE to subsequent owners, subject to Ross Video's notification of change of ownership.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.

Company Address

Ross Video Limited — 8 John Street Iroquois, Ontario, Canada, K0E 1K0

Ross Video Incorporated — P.O. Box 880, Ogdensburg, New York, USA, 13669-0880

General Business Office: (+1)613-652-4886

Fax: (+1)613-652-4425

Toll Free Technical Support (North America): 1-844-652-0645

Toll Free Technical Support (International):	+800 1005 0100
Technical Support:	(+1)613-652-4886
After Hours Emergency:	(+1)613-349-0006
E-Mail (Support):	techsupport@rossvideo.com
E-Mail (General):	solutions@rossvideo.com
Website	www.rossvideo.com

Technical Support

At Ross Video, we take pride in the quality of our products, but if a problem does occur, help is as close as the nearest telephone.

Our 24-Hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support are provided directly by Ross Video personnel. During business hours (eastern standard time), technical support personnel are available by telephone. Outside of normal business hours and on weekends, a direct emergency technical support phone line is available. If the technical support personnel who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. Our Technical support staff are available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

Supporting Documentation

Ross Video provides a wide variety of helpful documentation for the setup and support of your equipment. Most of this documentation can be found on the Ross Video website (www.rossvideo.com), or on the Ross Video Community site (discussions.rossvideo.com/)

Contents

Box Contents	10
Camera Overview	11
Cabling	12
Cabling for Control via Serial Port.....	12
DIP Switches.....	13
Remote Control	15
On-screen Menu System	17
System.....	17
Exposure.....	17
Image.....	18
Quality.....	18
PTZ.....	19
Format.....	20
Reset.....	20
INFO.....	20
Troubleshooting	21
Specifications	22
Ports	24
RS232 (VISCA IN/OUT).....	24

Box Contents

Verify the contents of the box against the packing list. If any items are missing or damaged, contact Ross Video Technical Support.

Item	Qty
PIVOTCam-20 Camera	1
Power Supply	1
Power Cord	1
Serial Control Cable (male 8-pin miniDIN to female DB9)	1
Remote Control	1
User Guide (this document)	1
Double-sided Tape	1

Camera Overview

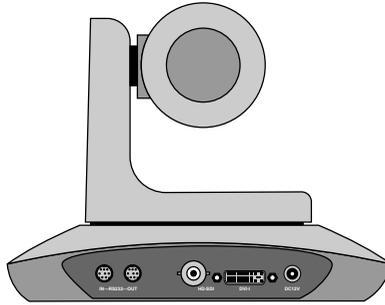


Figure 1: Rear View

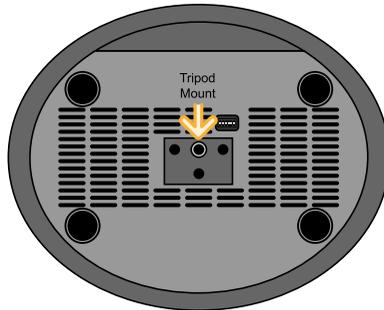


Figure 2: Bottom View

- **RS232 IN** — 8-Pin miniDIN for RS-232 or RS-485 serial VISCA IN control.
- **RS232 OUT** — 8-Pin miniDIN for RS-232 or RS-485 serial VISCA OUT control.
- **HD-SDI** — BNC for HD-SDI video output. This is the main video output of the camera.
- **DVI-I** — DVI-I port for analog (YPrPb and VGA) and digital (HDMI) video output.
- **DC12V** — 12V DC power from external brick. Use only the external power supply provided with your camera.
- **Tripod Mount** — 1/4" - 20 UNC tripod mounting hole (6.5mm depth)

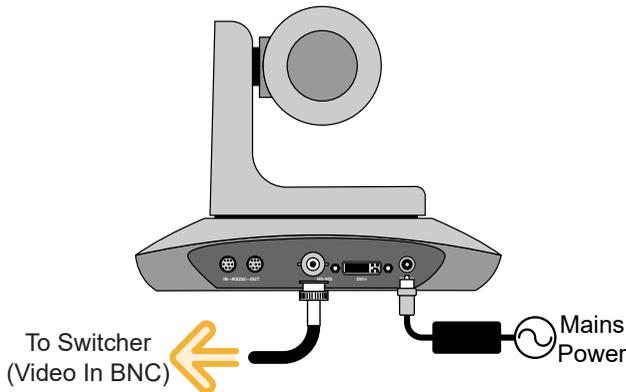
Note: If you mount the PIVOTCam-20 on a wall or the ceiling, you may notice a tilt in the image. This is due to a small amount of play in the mount connecting the lens assembly to the support arm.

Cabling

Camera cabling includes power and video cabling, and control cabling.

The camera can be controlled using the included remote control. It can also be controlled by an external device such as a production switcher or a DashBoard computer running the PIVOTCam Control Panel (.grid file).

Power and video cabling are the same regardless of the control method used.



Note: Control cabling is not required if you are controlling the camera from the remote control.

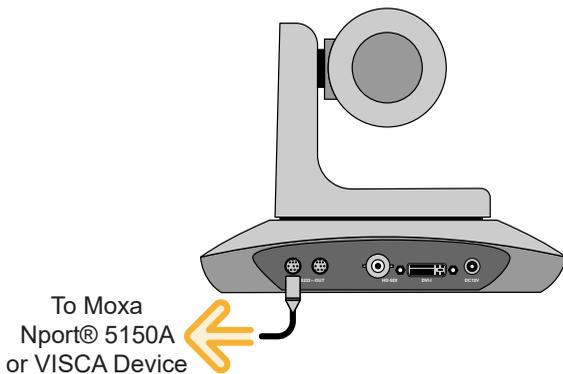
Cabling for Control via Serial Port

You can either connect directly to a device that can control the camera via serial VISCA, or add a serial-to-ethernet converter to connect to a device that can control the camera via VISCA over IP.

To connect directly, connect the Serial Control Cable (included) between the RS232 IN port and the serial VISCA device.

To use a serial-to-ethernet converter, connect the Serial Control Cable (included) between the RS232 IN port and the converter (such as the Moxa Nport[®] 5150A available from Ross[®]). Connect the converter to the same network as the device or DashBoard computer that controls the camera.

The Moxa Nport[®] 5150A is a serial to ethernet converter that allows DashBoard and the switcher to connect to a serial device over ethernet, but any serial to ethernet converter device can be used.



DIP Switches

The DIP switches on the bottom of the camera are used for diagnostics as well as turning some features on or off. The settings of the DIP switches is broken up into three pairs. Each pair of switches are used together to set the functionality and are not affected by the other two pairs.

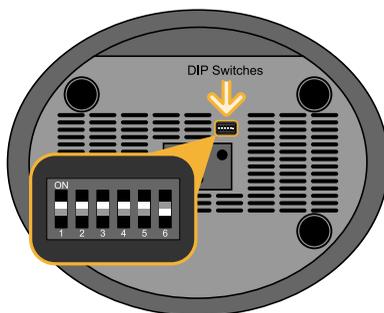


Table 1: DIP Switch Functions

SW1	SW2	SW5	SW6	Description
OFF	OFF	-	-	Updating Mode
ON	OFF	-	-	Debugging Mode
OFF	ON	-	-	n/a
ON	ON	-	-	Working Mode (default)
-	-	OFF	OFF	n/a
-	-	ON	OFF	Working Mode (default)
-	-	OFF	ON	Updating Mode

SW1	SW2	SW5	SW6	Description
-	-	ON	ON	n/a

Note: By default, DIP switches SW1-5 should be set to ON and SW6 set to OFF.

Note: DIP switches 3 and 4 are not used at this time.

Remote Control



- **POWER** — Turns the camera on or off. The camera recalls to Home position when turned on. Camera must be in Working Mode.
- **FREEZE** — Freezes or unfreezes the output video of the camera.
- **IRT** — Turns IR pass-through on or off. Signals from the remote control are passed through the serial port to other cameras or devices.
- **SET1-SET4** — Sets the address of the camera. Press and hold a button for 3 seconds to set the camera to that address. For example **SET1** corresponds to **CAM1**.
- **CAM1-4** — Selects a specific camera.
- **Numbers 0-9** — Store or recall camera presets. Press and hold a number button for 3 seconds to store the current camera setting to that preset memory. Alternatively, you can press **LEARN** and then press a number button to store a preset. To recall a preset, press and release its number button.
- **LEARN** — Used with the **LIMIT L**, **LIMIT R**, and **LMT CLR** buttons to set and clear the pan limits. Also used with the number buttons (0 to 9) to store presets.
- **CLR PRE** — Deletes a camera preset. Press **CLR PRE** and the number of the preset you want to delete. Press and hold **CLR PRE** to delete all presets.
- **FOCUS +/-** — Increase or decrease focus manually. Focus must be set to manual.
- **ZOOM +/-** — Increase or decrease zoom.
- **Navigation Buttons** — Pans and tilts the camera head or navigate the onscreen menus when the menu system is active. Camera must be in Working Mode
- **OK** — Recalls the Home position or select a menu item when the menu system is active. Camera must be in Working Mode.
- **AF** — Turns auto focus on. Manual focus is turned off.

-
- **MF** — Turns manual focus on. Auto focus is turned off.
 - **RESET** — Resets all camera settings to defaults, except Web Interface login credentials and presets. Press and hold the **RESET** button for three seconds to reset the camera.
 - **MENU** — Turns the onscreen menu system on or off.
 - **F1-F4** — These button are not used at this time.
 - **LIMIT L** — Sets the left pan limit. Press **LEARN** and then press **LIMIT L** to set the left limit.
 - **LIMIT R** — Sets the right pan limit. Press **LEARN** and then press **LIMIT R** to set the right limit.
 - **LMT CLR** — Clears both pan limits. Press **LEARN** and then press **LMT CLR** to clear the limits.
 - **SCAN** — This button is not used at this time.
 - **BLC OFF** — Turns off backlight compensation.
 - **BLC ON** — Turns on backlight compensation.
 - **BRIGHT-** — Decreases the brightness of the output video of the camera. Only available in Bright Priority Exposure Mode.
 - **BRIGHT +** — Increases the brightness of the output video of the camera. Only available in Bright Priority Exposure Mode.
 - **Video Format Buttons** — Selects a video format for the output video of the camera. Press and hold the format button for 3 seconds to select the format.

On-screen Menu System

The menu system is displayed on the video output of the camera and allows you to set up and configure various aspects of the camera. You can access the on-screen menu either within the PTZ Camera Control interface in DashBoard (**Config > Open On-Screen Menu**), or by pressing the **MENU** button on the remote control.

Within the on-screen menu, press the navigation buttons to highlight an item, and press the **OK** button to select it.

Press the **MENU** button again to go up one layer in the menu tree or exit the menu system. You are prompted to save your settings when you exit the menu system.

System

Item	Settings
PROTOCOL	VISCA (fixed)
ADDRESS (applies only for control via serial port)	1 to 7
BAUD RATE (applies only for control via serial port)	2400, 4800, 9600, 115200
PTL LOCK (protocol lock)	<ul style="list-style-type: none">• ON — protocol setting (above) is locked• OFF — protocol setting is unlocked
RS485	<ul style="list-style-type: none">• ON — serial communication set to RS-485 (2-wire only)• OFF — serial communication set to RS-232
VGA OUT	Set the VGA output format to YPbPr or a customized VGA output.
TRANSFER (IR pass-through)	<ul style="list-style-type: none">• SERIAL — signals from the remote control are passed through the serial port to other cameras or devices.• OFF — signals from the remote control are not passed through.
LANGUAGE (menu language)	— English, Chinese, Spanish, Russian

Exposure

Item	Settings
EXPOSURE MODE	Auto, Manual, Shutter, Iris, Bright

Item	Settings
SHUTTER (manual exposure mode only)	1080p 50/25Hz, 720p 50/25Hz — 1/6, 1/12, 1/25, 1/50, 1/75, 1/100, 1/120, 1/150, 1/215, 1/300, 1/425, 1/600, 1/1000, 1/1250, 1/1750, 1/2500, 1/3500, 1/6000, 1/10000
	1080p 59.94/29.97, 1080i 59.94/50, 720p 59.94/29.97 — 1/8, 1/15, 1/30, 1/60, 1/90, 1/100, 1/125, 1/180, 1/250, 1/350, 1/500, 1/725, 1/1000, 1/1500, 1/2000, 1/3000, 1/4000, 1/6000, 1/10000
IRIS (manual exposure mode only)	Closed to F1.8 (manual exposure mode only)
GAIN	0dB to +28dB (in 2dB increments)
BRIGHT (auto, iris, or shutter exposure modes only)	000 to 015
WD Mode (wide dynamic range)	<ul style="list-style-type: none"> • ON — turns on WD mode and enables the WD level. • OFF — turns off WD mode
WD Level	001 to 006 (when WD Mode is on only)
BLC	<ul style="list-style-type: none"> • ON — turns on backlight compensation • OFF — turns off backlight compensation

Image

Item	Settings
WB Mode (white balance)	ATW, Manual, Auto, Indoor, Outdoor, One Push
R GAIN (red gain)	0 to 255 (manual white balance mode only)
B GAIN (blue gain)	0 to 255 (manual white balance mode only)
FLICK (anti-flicker)	50Hz, 60Hz, OFF
FOCUS	Auto, Manual

Quality

Item	Settings
2D NR (image noise reduction)	<ul style="list-style-type: none"> • ON — turn image noise reduction on • OFF — turn image noise reduction off
3D NR (motion noise reduction)	AUTO, 2, 3, 4, 5
SHARPNESS	000 to 015

Item	Settings
CONTRAST	000 to 015
SATURATION	000 to 015
GAMMA	000 to 004
AF SENSIT (auto focus sensitivity)	NORMAL, HIGH, LOW
TRACK MODE	<ul style="list-style-type: none"> • PRECISE — precise recall of preset position, but may have lag • FLUENT — more fluid recall of preset position with no lag, but not as precise

PTZ

Item	Settings
PWR ACT	<ul style="list-style-type: none"> • OFF — no preset is recalled when the camera is powered on • PRE0 — preset 0 is recalled when the camera is powered on • PRE1 — preset 1 is recalled when the camera is powered on
SPEEDBYZ (speed by zoom)	<ul style="list-style-type: none"> • ON — proportional pan/tilt speed based on zoom level (Higher value gives slower pan/tilt speed at higher zoom levels.) • OFF — pan/tilt speed not affected by zoom level
MOUNT M (mount mode)	<ul style="list-style-type: none"> • UP — camera is mounted right-side-up • DOWN — camera is mounted upside-down and pan/tilt controls are reversed
FLIP HOR (flip horizontally)	<ul style="list-style-type: none"> • ON — flip video image horizontally • OFF — don't flip image
FLIP VER (flip vertically)	<ul style="list-style-type: none"> • ON — flip video image vertically • OFF — don't flip image
PT SPD (pan/tilt speed)	005 to 025
ZOOM SPD (zoom speed)	1 to 7
MENU MIR (menu mirroring)	<ul style="list-style-type: none"> • NORMAL — onscreen menu is displayed normally • MIRROR — onscreen menu is mirrored

Format

The video format information on this menu applies to the SDI output.

Item	Settings
Available video formats	1080P59.94, 1080P50, 1080I59.94, 1080I50, 1080P29.97, 1080P25, 720P59.94, 720P50, 720P29.97, 720P25

Reset

To reset a setting you must select **YES** for the item you want to reset and then press **OK** on the remote to commit the change.

Item	Settings
SYS RESET	Resets all properties in the SYSTEM menu to default values, except the VISCA setting
CAM RESET	Resets all properties in the Exposure , Image , Quality , and Format menus to default values. The default video format is 1080i50.
PT RESET	Resets pan and tilt to home positions. Does not affect presets.
ALL RESET	Resets all settings to factory defaults, except the SYSTEM > VISCA setting and presets.
ZOOM DISPLAY	Shows the current zoom level on the output video for 3 seconds after a zoom change or memory recall.

INFO

Item	Settings
IR ADDR	infrared control address of camera
FOCUS	focus mode
CLIENT	client protocol
MODEL NO	model number
ARM VER	ARM firmware version
FPGA VER	FPGA firmware version
CAM VER	camera version
RELEASE	firmware release date

Troubleshooting

- **Grinding noise near limits** — The camera may have lost position reference. Either power-cycle the camera or use the PT Reset function to reset the pan/tilt positioning.

Specifications

Item	PIVOTCam-20
Video Formats (SDI)	1080p 59.94/50/29.97/25Hz
	1080i 59.94/50Hz
	720p 59.94/50/30/25Hz
Video Outputs	HD-SDI: 3G SDI
	DVI-I: HDMI, YPbPr/VGA
Image Sensor	1/1.8 inch, HD CMOS
Lens	f6.7(wide), 134.5mm(tele)
	FOV: 60°(wide), -3°(tele)
	20× Optical Zoom + 12× Digital Zoom
Rotation Angle	Pan: ±170°
	Tilt: -35° to +90° (upside-down mounting supported)
Rotation Speed	Pan: 0.1° to 120°/s
	Tilt: 0.1° to 80°/s
Presets	Remote Control: first 10 presets (buttons 0-9)
	Camera Storage: 128 presets
	Preset Accuracy: 0.1°
Serial Control	RS-232, RS-485 (2-wire only)
Ethernet Control	Serial to Ethernet Converter Required
Tally	(DashBoard Tallies)
Minimum Lux	Day: 0.2
	Night: 0.01
	DSS On: 0.005
White Balance	ATW, Manual, Auto, Indoor, Outdoor, One Push
Focus	Auto/Manual
Iris	Auto/Manual
Shutter	Auto/Manual
Exposure Compensation	Supported
WDR	Supported

Item	PIVOTCam-20
BLC	Supported
2D/3D Noise Reduction	Supported
Input Voltage	12VDC Brick
Dimension	220mm × 173mm × 117mm (8.7in × 6.8in × 4.6in)
Net Weight	1.25kg (2.8lb)

Ports

RS232 (VISCA IN/OUT)

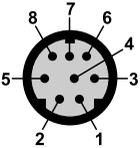


Table 2: RS232 Port Pinouts

Pin	Signal
1	DTR
2	DSR
3	TXD
4	GND
5	RXD
6	A(+)
7	IR OUT
8	B(-)