SONY

INTELLIGENT COMMUNICATION
COLOR VIDEO CAMERA

EVI-G20/G21

Command List

(Ver. 1.21) —English—

Table of Contents

Use of the RS-232C control software which is developed based upon this command list may cause malfunction or damage to hardware and software. Sony Corporation is not liable for any of such damages.

VISCA™/RS-232C CONTROL PROTOCOL

Scope

This control specification is applied to EVI series camera manufactured by Sony Corp.

NOTE : The interface board IF-51 is different in details.

The following specification covers overall control protocol for camera category. For detailed supported commands for each camera, refer to the command list of the each model.

Connection

Camera may be controlled by PCs (personal computers) or workstations by connecting as shown in **Fig. 1** or **Fig. 2**. **Fig. 1** shows one by one control using serial interface port of the PCs or workstations. By this connection, the address of the camera can be identified by the port number or the address assignable to the each camera.

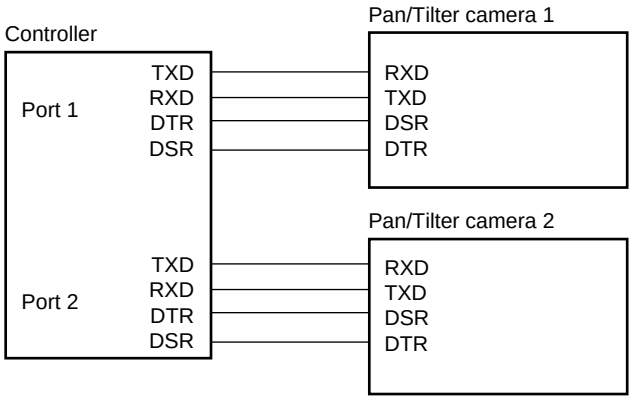


Fig. 1

Fig. 2 shows schematically connections of camera when daisy chained. For actual connection, refer to information supplied by each model. In this instance, the maximum sets on one network is seven and the address can be assigned automatically by the controller. The address of the controller is set to 0 and the camera address will be assigned from 1 to 7 (nearer, the younger address).
The interface to the controller is RS-232C, 9600 bps, 8 bits data, 1 start bit, 1 stop bit and non parity.

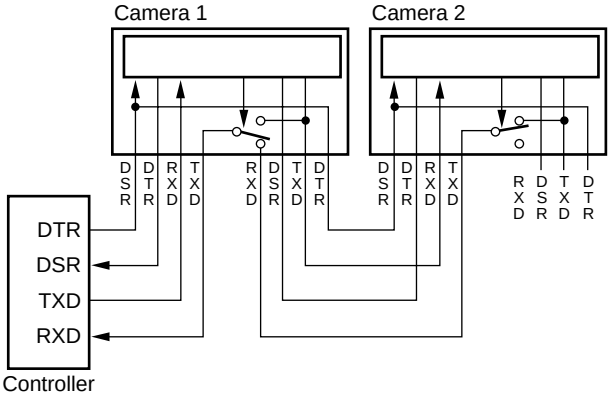


Fig. 2 Daisy chain connection

* "VISCA™" is a trademark of Sony Corporation.

Definition of Terms

- ACK message
  Signal from camera to the controller which returns acknowledge command execution, information for inquiry or error message etc..

- Address
  Address assigned automatically by address set command. Camera will be assigned from 1 to 7. The address of the controller is fixed to 0.

- Packet
  Fundamental Unit of the communication between controller and cameras. Comprised by Header (1 byte), Message (max. 14 bytes) and Terminator (1 byte; fixed FFH).

- Socket
  Command buffer memories prepared by camera to accept more than one commands. The number of the sockets are two.

Communication Specifications

◇ Communication specification (RS-232C)

- Communication speed: 9600 bps
- Start bit : 1
- Stop bit : 1
- Data bits : 8
- Parity : None
- MSB first

◇ Communication protocol

● Communication from the controller

Communication is started by header which comprises sender's address and receiver's address followed by message and ended by terminator. The message part comprises communication mode (2 bytes), category code (2 bytes) and parameters. The maximum length of the message is 14 bytes. The terminator is fixed to FFH and the controller should check the value to terminate communication. The bit 15 should be 0 in the message part.

Header	Com-mode	Category code	Message	Terminator
8x	01	rr	.. ..	FF

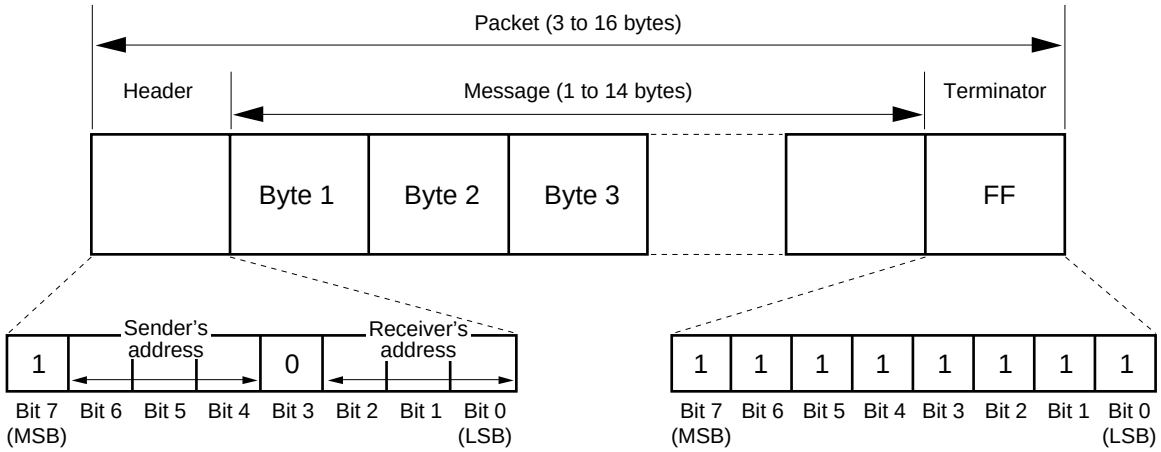


Fig. 3

Header	: Signifies the start of the communication and comprises the sender's address and receiver's address. Since the address of the controller is fixed to 0, header is 8x in which x is the receiver's address. (The value of x should be from 1 to 7) In case of broad cast, the header should be 88H.
Com-mode	: Code which specifies the category of command.
Control command	: 01H
Information request command	: 09H
Net-keeping command	: 00H
Category	: Code which roughly specifies the category the command is applicable.
Main message	: Part between header and terminator. 14 bytes maximum. Comprises command and parameter if any.
Terminator	: Code which signifies the end of communication. Fixed to FFH.

VISCA™/RS-232C CONTROL PROTOCOL

● Commands

A command which is sent from the controller to the camera is comprised in the message part of the send data. The commands are roughly classified into several functions such as to control camera, to inquire the information of the camera and the ones for various purposes. The controller commands may comprise some parameters as needed.

● ACK message

The ACK message is returned to the controller from the camera to acknowledge the command. ACK message comprises the address of the camera (expressed by z and z = address + 8), socket number (y) and terminator. Socket is the memory buffer reserved in the camera and used to store commands. Having this feature enables the camera to execute new commands during former commands being under execution.

In case of inquiry commands, the information is returned between the third byte and the terminator.

If the commands are inquiry, the camera returns information message immediately, but for the commands, the camera returns ACK message immediately and returns the command completion message when the command is actually executed.

ACK	z0 4y FF
Command completion	z0 5y FF
Information return	z0 50 .... FF

Following message is sent from the camera to the host when power ON.

Address set	z0 38 FF

● Error messages

If the command is not executable or failed to execute, the camera returns error message instead of the acknowledge message. The error message is expressed by the following codes.

syntax error	z0 60 02 FF
command buffer full	z0 60 03 FF
command cancel	z0 60 04 FF
No sockets	z0 60 05 FF
Command not executable	z0 60 41 FF

● Broadcast

Used to command all the set regardless the individual address.

In this mode of transmission, the header code is set to 88H.

● Auto address assignment

This command is only valid when the camera is connected as shown in **Fig. 2**. When the camera receives the address assignment command (88 30 01 FF), the first camera sets parameter 01 as the self address and hands over to the next camera by incrementing this parameter.

The controller can recognize how many camera cameras are connected on the network by the returned parameter.

VISCA™/RS-232C CONTROL PROTOCOL

◇ Flow of information transmission

The flow of information transmission between the controller and the camera should be one of the following examples.

● Inquiry is executed immediately

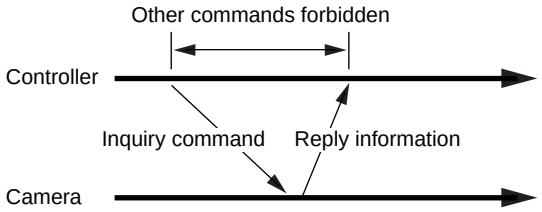


Fig. 4

● Command is stored in a socket and executed later

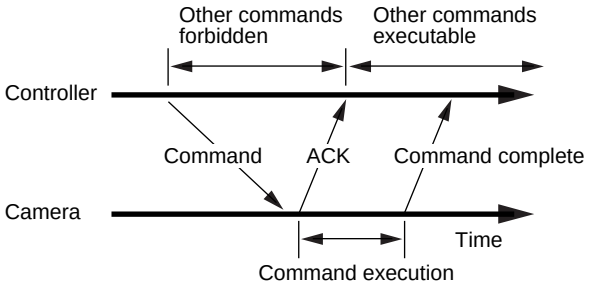


Fig. 5

● Return of error message (1)

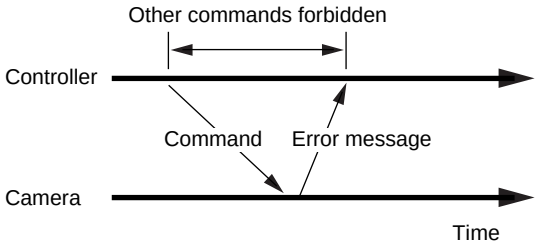


Fig. 6

● Return of error message (2)

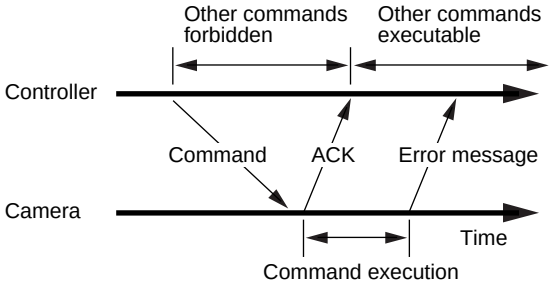


Fig. 7

● Execution of more than one commands

Fig. 8 shows the case when two commands are executed.

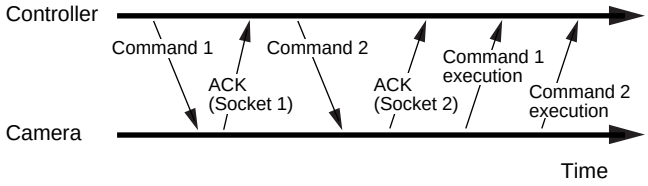


Fig. 8

● Cancel of commands (1)

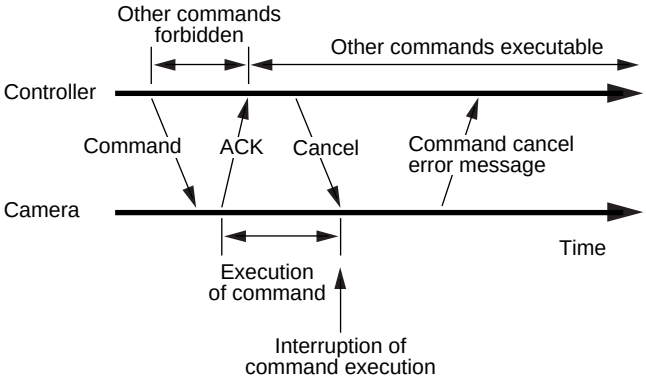


Fig. 9

● Cancel of commands (2)

Cancel is sent before command completion message is received, but the command is already executed. In this case, no socket error message is returned since the socket of the camera is cleared.

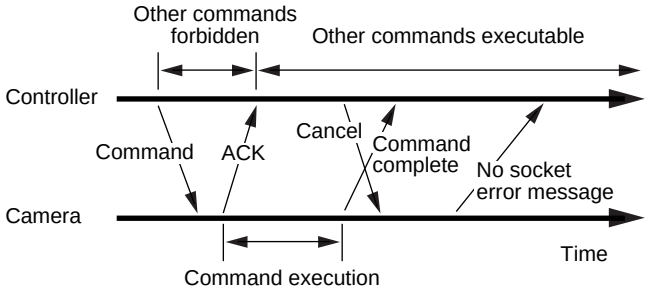


Fig. 10

● Continuous information transmission, Cancel of continuous information transmission.

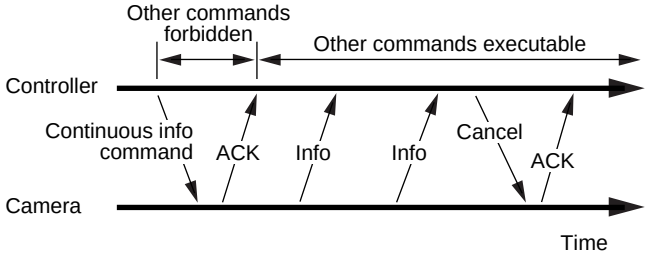


Fig. 11

COMMAND LIST

EVI-G20/G21 Command List (1/2)

Command Set	Command	VISCA™ Packet	Comments
AddressSet	broadcast	88 30 01 FF	Send Address_set command and IF_clear command before starting communication. Broadcast.
IF_Clear	broadcast	88 01 00 01 FF	
CommandCancel		8x 2Z FF	Z is a socket number. 0 or 1
CAM_Power	On	8x 01 04 00 02 FF	When Camera main power is on, camera can be changed to Power Save Mode.
	Off	8x 01 04 00 03 FF	
CAM_Zoom	Stop	8x 01 04 07 00 FF	
	Tele (Standard)	8x 01 04 07 02 FF	
	Wide (Standard)	8x 01 04 07 03 FF	
	Tele (Variable)	8x 01 04 07 2Z FF	Z is zoom speed parameter, 1 to 6
	Wide (Variable)	8x 01 04 07 3Z FF	
	Direct	8x 01 04 47 0Z 0Z 0Z 0Z FF	ZZZZ: 0000 to 4000
CAM_Focus	Stop	8x 01 04 08 00 FF	Focus control. When adjust the focus, change the mode to Manual the send Far/Near or Direct command.
	Far	8x 01 04 08 02 FF	
	Near	8x 01 04 08 03 FF	
	Auto focus on	8x 01 04 38 02 FF	
	Manual focus on	8x 01 04 38 03 FF	
	Auto/Manual	8x 01 04 38 10 FF	
	Direct	8x 01 04 48 0Z 0Z 0Z 0Z FF	ZZZZ: 0000 to 0600
CAM_WB	Auto	8x 01 04 35 00 FF	White Balance Setting. Auto: Trace the light source automatically. Indoor/Outdoor/4000K/5000K: Fixed at Factory. 4000K, 5000K is for a fluorescent light. Pull-in to White with a Trigger then hold the data until next Trigger coming. The held data is canceled after power off.
	Indoor mode	8x 01 04 35 01 FF	
	Outdoor mode	8x 01 04 35 02 FF	
	4000K	8x 01 04 35 06 FF	
	5000K	8x 01 04 35 07 FF	
	OnePush mode	8x 01 04 35 03 FF	
	OnePush trigger	8x 01 04 10 05 FF	
CAM_AE	Full Auto	8x 01 04 39 00 FF	Auto Exposure Mode Programmable AE adjusts E-shutter and AGC automatically.
	Bright mode	8x 01 04 39 0D FF	
CAM_Bright	Reset	8x 01 04 0D 00 FF	Fixed Exposure Mode. When turning on to Bright Mode, Iris, Gain and Shutter are fixed at the time then increase or decrease 3 dB/step using UP/DOWN command.
	Up	8x 01 04 0D 02 FF	
	Down	8x 01 04 0D 03 FF	
CAM_ExpCmpnst	Reset	8x 01 04 0E 00 FF	Return to the first condition when turned on Bright. To return AE, send CAM_AE command. CAM_ExpCompnst enables exposure level in AE. Adjustable 3 dB steps same as Bright. Possible to set using Direct command. ZZZZ: FFF9 to 0007 (center 0000)
	On	8x 01 04 3E 02 FF	
	Off	8x 01 04 3E 03 FF	
	Up	8x 01 04 0E 02 FF	
	Down	8x 01 04 0E 03 FF	
	Direct	8x 01 04 4E 0Z 0Z 0Z 0Z FF	
CAM_Backlight	On	8x 01 04 33 02 FF	Back light compensation Gain-up to 6 dB max.
	Off	8x 01 04 33 03 FF	
CAM_FlkrCancel	On	8x 01 04 32 02 FF	By setting shutter speed to 1/100, cancel the Signal Flicker causing a Fluorescent Light.
	Off	8x 01 04 32 03 FF	
	On/Off	8x 01 04 32 10 FF	
CAM_Memory	Reset	8x 01 04 3F 00 0Z FF	Preset memory for memorize camera condition. Z = 0 to 2, total 3 positions Reset: return to factory setting
	Set	8x 01 04 3F 01 0Z FF	
	Recall	8x 01 04 3F 02 0Z FF	

COMMAND LIST

EVI-G20/G21 Command List (2/2)

Command Set	Command	VISCA™ Packet	Comments
CAM_KeyLock	Off	8x 01 04 17 00 FF	ON: Disable RS-232C and IR commander.
	On	8x 01 04 17 02 FF	
CAM_IDWrite		8x 01 04 22 00 00 0Z 0Z FF	ZZ = 00 to FF
AddressSet	broadcast	88 30 01 FF	
		8x 30 01 FF	
Pan-tiltDrive	Up	8x 01 06 01 VV WW 03 01 FF	VV: pan speed 01 to 7F,
	Down	8x 01 06 01 VV WW 03 02 FF	WW: tilt speed 01 to 7F
	Left	8x 01 06 01 VV WW 01 03 FF	
	Right	8x 01 06 01 VV WW 02 03 FF	
	UpLeft	8x 01 06 01 VV WW 01 01 FF	
	UpRight	8x 01 06 01 VV WW 02 01 FF	
	DownLeft	8x 01 06 01 VV WW 01 02 FF	
	DownRight	8x 01 06 01 VV WW 02 02 FF	
	Stop	8x 01 06 01 VV WW 03 03 FF	
	Absolute position	8x 01 06 02 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	YYYY: pan position approx. C326 to 3CDA (center 0000) ZZZZ: tilt position approx. E193 to 1E6D (center 0000)
	Relative position	8x 01 06 03 VV WW 0Y 0Y 0Y 0Y 0Z 0Z 0Z 0Z FF	Set the relative coordinates between current position to the target position.
	Home	8x 01 06 04 FF	Drive to the Home position.
	Reset	8x 01 06 05 FF	Pan/Tilt Initialize command

COMMAND LIST

Inquiry Command

Inquiry	Packet Inq	Packet Reply	Description
CAM_PowerInq	8x 09 04 00 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_ZoomPosInq	8x 09 04 47 FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ: position
CAM_FocusAFModeInq	8x 09 04 38 FF	Y0 50 02 FF	Auto
		Y0 50 03 FF	Manual
CAM_FocusPosInq	8x 09 04 48 FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ: position
CAM_WBModeInq	8x 09 04 35 FF	Y0 50 00 FF	Auto
		Y0 50 01 FF	Indoor mode
		Y0 50 02 FF	Outdoor mode
		Y0 50 03 FF	OnePush mode
		Y0 50 06 FF	4000K
		Y0 50 07 FF	5000K
CAM_AEModeInq	8x 09 04 39 FF	Y0 50 00 FF	Full Auto
		Y0 50 0D FF	Bright mode
CAM_ShutterPosInq	8x 09 04 4A FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ: position
CAM_GainPosInq	8x 09 04 4C FF	Y0 50 0Z 0Z 0Z 0Z FF	ZZZZ: position
CAM_ECModepnst	8x 09 04 33 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_BacklightModeInq	8x 09 04 3E FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_FlkrCancelInq	8x 09 04 32 FF	Y0 50 02 FF	On
		Y0 50 03 FF	Off
CAM_MemoryInq	8x 09 04 3F FF	Y0 50 0Z FF	Z: 0 to 2
CAM_KeyLockInq	8x 09 04 17 FF	Y0 50 00 FF	Off
		Y0 50 02 FF	On
CAM_IDInq	8x 09 04 22 FF	Y0 50 0Z 0Z FF	ZZ: ID
CAM_VersionInq	8x 09 00 02 FF	Y0 50 00 01 04 03 0Z 0Z 02 FF	 ZZ: ROM version
Pan-tiltModeInq	8x 09 06 10 FF	Y0 50 ZZ ZZ FF	ZZZZ: status
Pan-tiltMaxSpeedInq	8x 09 06 11 FF	Y0 50 WW ZZ FF	WW: pan, ZZ: tilt
Pan-tiltPosInq	8x 09 06 12 FF	Y0 50 0W 0W 0W 0W 0Z 0Z 0Z 0Z FF	WWWW: pan position ZZZZ: tilt position

Shutter Speed, Gain Code List

Code	Shutter (1/X sec.)	Gain (dB)
0	60 (50)	–3
1	60	0
2	75	3
3	90	6
4	100	9
5	125	12
6	150	15
7	180	18
8	215	
9	250	
A	300	
B	350	
C	425	
D	500	
E	600	
F	725	
10	850	
11	1000	
12	1250	
13	1500	
14	1750	
15	2000	
16	2500	
17	3000	
18	3500	
19	4000	
1A	6000	
1B	10000	

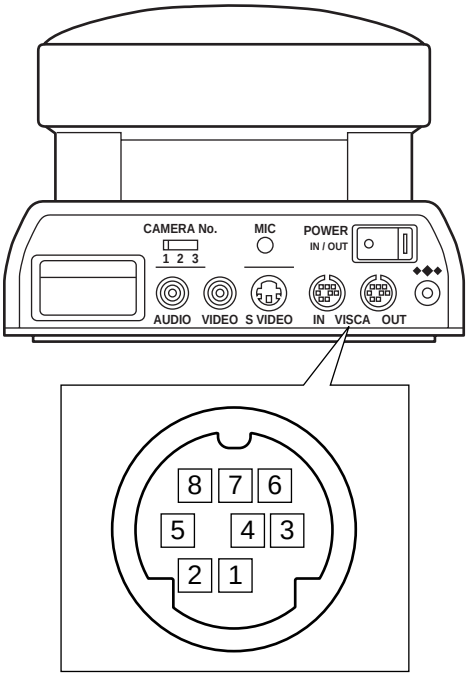
* (50) is for PAL.

Pan/Tilter Status Code List

Z	Z	Z	Z	
0 - - -	- - - -	0 - - -	- - - 1	Pan left end
0 - - -	- - - -	0 - - -	- - 1 -	Pan right end
0 - - -	- - - -	0 - - -	- 1 - -	Tilt up end
0 - - -	- - - -	0 - - -	1- - -	Tilt down end
0 - - -	- - - -	- - 0 0	- - - -	Pan normal
0 - - -	- - - -	- - 0 1	- - - -	Pan position error
0 - - -	- - - -	- - 1 0	- - - -	Pan mechanical failure
0 - - -	- - 0 0	0 - - -	- - - -	Tilt normal
0 - - -	- - 0 1	0 - - -	- - - -	Tilt position error
0 - - -	- - 1 0	0 - - -	- - - -	Tilt mechanical failure
0 - - -	0 0 - -	0 - - -	- - - -	Pan/Tilt no move
0 - - -	0 1 - -	0 - - -	- - - -	Pan/Tilt moving
0 - - -	1 0 - -	0 - - -	- - - -	Pan/Tilt moving finished
0 - - -	1 1 - -	0 - - -	- - - -	Pan/Tilt moving failed
0 - 0 0	- - - -	0 - - -	- - - -	Pan/Tilt not initialized
0 - 0 1	- - - -	0 - - -	- - - -	Pan/Tilt under initialize
0 - 1 0	- - - -	0 - - -	- - - -	Pan/Tilt initialize finished
0 - 1 1	- - - -	0 - - -	- - - -	Pan/Tilt initialize failed

COMMAND LIST

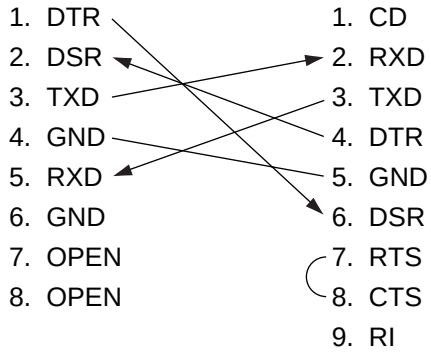
Connection



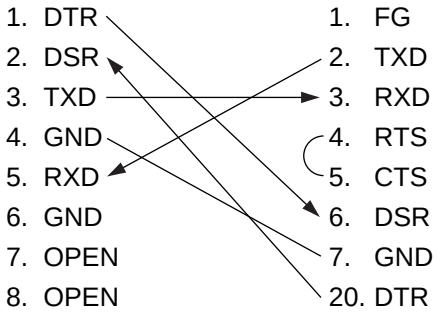
VISCA™ IN/OUT

No	Signal	Description
1	DTR	Data Transmission Ready (OUTPUT)
2	DSR	Data Set Ready (INPUT)
3	TXD	Transmit Data (OUTPUT)
4	GND	Ground
5	RXD	Receive Data (INPUT)
6	GND	Ground
7	OPEN	
8	OPEN	

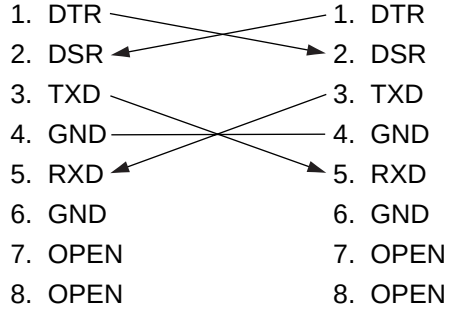
● EVI-G20/G21 Windows D-Sub 9 pin



● EVI-G20/G21 Windows D-Sub 25 pin



● EVI-G20/G21 EVI or Macintosh



EVI-G20/G21

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