XC-333/333P

# Command List

(Ver. 1.00) — English —

# -Table of Contents -

INTRODUCTION	
COMMUNICATION HARDWARE SETUP 1	
BASICS ON COMMANDS AND STATUSES	
COMMANDS	
STATUS8	
CONCRETE BY A MPLES OF COMMAND COMMUNICATION 0	

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.

## = INTRODUCTION =

This document describes communication protocol between the personal computer (PC) and the camera controller (camera) for XC-333/Pcamera system. In this document, the data sent from the PC to the camera are called "commands", whereas those returned from the camera are called "statuses".

# — COMMUNICATION HARDWARE SETUP —

Communication between the PC and the camera takes an RS-232C-conforming serial interface. Hardware setting of this serial interface shall be as follows.

baud rate
 4800/9600/19200 bps variable (by camera menu)

data lengthstop bitparitynone

handshaking
flow control by CTS / RTS

# **—BASICS ON COMMANDS AND STATUSES =**

As a rule, a command or a status consists of five bytes organized in the format below.

First Byte	Second Byte	Third Byte	Fourth Byte	Fifth Byte
Header	Sub-Header	Data (High)	Data (Low)	Command
				Code

Data assignment for the bytes are as follows.

Header
 Major classification of the body data. Header types are listed below

Code	Classification
0xD0	System command
0xD1	Global data setting
0xD2	Titler setting

Sub-Header
 Minor classification. DSP state code when DSP data are being transmitted.

Data16-bit data block

● Command Code The command code orders how the received data should be processed. Already

defined command codes are listed below.

Code	Classification
0x10	Write setup value on the camera
0x11	Read setup value on the camera

# —COMMANDS—

After a read command (of the command code 0x11) is received from the PC, the camera shall return the current set value in the data block. After a write command (of the command code 0x10) is received from the PC, the camera shall return the echo after processing that command. If the command is inexecutable because of an error or some reasons, the camera shall return an error status (of the header 0xFFFF). In either case, some status shall be returned in response to every command.

Commands are classified to DSP data setup commands, system commands, and global data setup commands. These commands are described in the following. All bit positions in the command data block that are left unassigned in the explanation shall contain zeros.

#### = COMMANDS =

## **■** System Commands

System commands are for operating the system. The following commands are available.

#### **♦** Camera Lock/Free

This command enables and disables the setup keys on the camera. After receiving the LOCK signal, the camera disables all the setup keys on it and processes commands sent from the PC until the next FREE signal is received. Usually the camera lock command is sent once at starting of a program on the PC, and the camera free command at the end of the program.

Header	Sub		Data	Command	Reference
			D0		
0xD0	0x00	D0	Mode	0x10/0x11	
			0: Free (Manupulatable)		
			1: Lock (Unmanupulatable)		

#### ◆ Write Data Into Flash Memory

This command makes the camera write the current setup into a specified flash memory area.

Header	Sub	Data	Command	Reference
		D1 D0		
0xD0	0x01	D0-D1 Memory Position	0x10/0x11	
		0: Memory #1		
		1: Memory #2		
		2: Live Memory		

To a status read command (of the command code 0x11), the camera shall return the following status carried on the data block. Control application program on the PC shall refer to this status and wait until the camera completes its processing.

Data 0x0000 : Completed

0x0001: Writing

#### ♦ Key Bind

This is a virtual key command for operating from the PC instead of using camera setup keys. The camera performs the same processing as it does when the corresponding key on the camera has been pressed. It judges that the key has been pressed when the KEY STATE is ON.

Header	Sub		Data		Command	Reference
			D7	D6 D5 D4 D3 D2 D1 D0		
		D0-D6 Key	Code			
		1	:Up Arrow	5:Center		
0xD0	0x03	2	::Down Arrow	6:Menu	0x10	
		3	:Left Arrow	7:Auto-White		
		4	:Right Arrow	8:Left+Right		
		D7 Key	State			
		0	:OFF	1:ON		

#### ◆ Menu On/Off

This command turns the menu on and off which is superimposed on camera pictures.

Header	Sub				Data	Command	Reference					
										D0		
0xD0	0x04	D0	Men	u Mode	(0: C	OFF	1: ON	1)			0x10/0x11	

#### - COMMANDS :

#### ◆ Read (Recall) Data From Flash Memory

This command makes the camera read the setup preserved in a specified flash memory area.

Header	Sub	Data	Command	Reference
		D1 D0		
		D0-D1 Memory Position		
0xD0	0x05	0: Memory #1	0x10/0x11	
		1: Memory #2		
		2: Factory Default		

To a status read command (of the command code 0x11), the camera shall return the following status carried on the data block. Control application program on the PC shall refer to this status and wait until the camera completes its processing.

Data 0x0000 : Completed

0x0001: Reading

#### ♦ Start AWB One Push Mode

This is AWB ONE PUSH command.

Header	Sub		Data												Command	Reference
0xD0	0x06	0x0000													0x10/0x11	

To a status read command (of the command code 0x11), the camera shall return the following status carried on the data block. Control application program on the PC shall refer to this status and wait until the camera completes its processing.

Data 0x0000 : Computing

0x0001: Completed

#### ◆ Start Auto Black Balance

This is AUTO BLACK BALANCE command. The camera puts the AUTO BLACK BALANCE into action.

	Header	Sub		Data												Command	Reference			
1	0xD0	0x07	0x	:000	00														0x10/0x11	

After sending this command to the camera, the PC shall read the status with the same command (command code 0x11). At this time, the camera shall return the following result to the data block. The PC shall refer to this status and wait until the camera completes its processing.

Data 0x0000 : Computing

0x0001 : Completed (OK) 0x0002 : Completed (NG)

The Application program on the PC shall not issue any command for a second after sending this command (Command Code 0x10).

#### Date Announce

If date display is set up as a global data item, which is explained later, the PC shall use this command to send current date information for monitor display.

This command is for transmission only.

Header	Sub	Data	Command	Reference
		DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0		
0xD0	0x40	D0-D4 Date (1~31)	0x10	
		D5-D8 Month (1~12)		
		D9-DF Year (1990 as 0)		

#### - COMMANDS -

#### **♦ Clock Announce**

If date display is set up as a global data item, which is explained later, the PC shall use this command to send current time information for monitor display.

This command is for transmission only.

Header	Sub	Data	Command	Reference
0xD0	0x41	DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0  D0-D7 Minute data (0~59)  D8-DF Time data (0~23)	0x10	

#### **♦** Second Announce

If date display is set up as a global data item, which is explained later, the PC shall use this command to send current time information for monitor display.

This command is for transmission only.

Header	Sub	Data	Command	Reference
0xD0	0x42	DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0  D0-D9 Millisecond data (0~999)  DA-DF Second data (0~59)	0x10	

#### **♦** Synchronize

This command is issued at every third second from the PC. Thanks to this, the camera can use this command to detect whether the PC is connected. The PC can use this command to collect camera model information and so on.

Head	der	Sub		Data													Command	Reference		
0xD	00	0xF0	0х	(000	00														0x11	

The camera shall return the response shown below.

Header	Sub	Data	Command	Reference
0xD0	0xF0	DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0  D7-D0 Model code (0x00 : DXC-LS1/P)  D8 Genlock mode  0: Without external sync  1: With external sync  DB-D9 Cable length data  0: 2M 4: 10M2  1: 3M 5: Reservation 1  2: 5M 6: Reservation 2  3: 10M1		Reference

# ■ Global Data Setup Commands-1

Commands of this category are for setting up camera parameters.

Header	Sub	Data Comi	mand Reference				
		D0					
0xD1	0x11	ALC setting 0:OFF 1:ON 0x10/	/0x11				
		D1 D0					
0xD1	0x12	WB setting 0:ATW 2:5600 0x10/	/0x11				
		1:AWB 3:3200					
		DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0					
		Shutter setting					
		DF-DE:Mode DF DE Mode					
		0 X OFF					
		1 0 Manual					
		1 1 Auto					
		DD-DC:Frame DF DC Odd/Even					
		0 X OFF					
		1 0 Even Only					
0xD1	0x13		/0x11				
		DB :Type 0:Short 1:Long					
		DA-D0:Shutter speed					
		(DB=0) 1:OFF 7:1/2K					
		2:1/100 8:1/4K					
		3:1/125 9:1/8K					
		4:1/250 10:1/10K					
		5:1/500 11:1/20K					
		6:1/1K 12:1/40K					
		(DB=1) 2~512 Fields					
		D6 D5 D4 D3 D2 D1 D0					
0xD1	0x14	Gain setting 0x10	/0x11				
					D6: Mode 0:Manual 1:AGC		
		D5-D0: Gain 0~12 steps					
		DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0					
0xD1	0x15	WB gain setting 0x10/	/0x11 Represented as a t	wos			
		DF-D8: B gain	complement (-128	8 to			
		D7-D0: R gain	+127)				
		D0					
0xD1	0x21	Flickerless 0:OFF 1:ON 0x10	/0x11				
		DF DE DD DC DB DA D9 D8 D0					
0xD1	0x22	Zooming setting 0x10/	/0x11 The magnifying por	wer			
		DF-D8: Magnification 1~172 times	is unsigned.				
		D0 : Mode 0:OFF 1:ON					
		D0					
0xD1	0x23		/0x11				
		D1 D0					
0xD1	0x24	Color bar setting 0:OFF 1:Full 0x10/	/0x11				
		2:Bottom(big) 3:Bottom(small)					
		D2 D1 D0					
0xD1	0x25	Light metering area 0:Backlight comp 1:Full 0x10/	/0x11				
		2:Center1(small) 3:Center2(big)					
		3: Slit1(small) 4:Slit2(big)					

## — COMMANDS =

# ■ Grobal Data Setup Commands-2

Header	Sub	Data	Command	Reference
0xD1	0x26	12PIN output select 0:VBS 1:Y/C	0x10/0x11	
1		D8 D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x31	SC Phase	0x10/0x11	Unsigned data
		D8 : 0:0 degree 1:180 degree D7-D0:Phase 0~255		
		D7-D0.Filase		
0xD1	0x32	Digital out 0: 4:1:1 1: 4:2:2	0x10/0x11	
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x33	H Phase 0~255	0x10/0x11	Unsigned data
1		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x34	SC Cont -128~+127   D7 D6 D5 D4 D3 D2 D1 D0	0x10/0x11	Twos complement (D7: sign)
0xD1	0x35	H Cont -128~+127	0x10/0x11	Twos complement (D7: sign)
UNDT	0,00		0.00000011	Twos complement (D7. sign)
0xD1	0x41	R Matrix 0~255	0x10/0x11	Unsigned data
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x42	B Matrix 0~255	0x10/0x11	Unsigned data
0xD1	0x43	Color Matrix	0x10/0x11	Not used
0xD1	0x50		0x10/0x11	Twos complement (D7: sign)
ONDT	0,00		0210/0211	Twos complement (D7. sign)
0xD1	0x51	V Enhancer -16~+15	0x10/0x11	Twos complement (D7: sign)
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x52	Gamma setting -16~+15	0x10/0x11	Twos complement (D7: sign)
0.54	0.50	D7 D6 D5 D4 D3 D2 D1 D0	0 40/0 44	
0xD1	0x53	Pedestal	0x10/0x11	Twos complement (D7: sign)
0xD1	0x54	Title setting 0:OFF 1:ON	0x10/0x11	
ONDI	0,04		0210/0211	
0xD1	0x55	Date indication 0:OFF 1:ON	0x10/0x11	
0xD1	0x63	Color Matrix setting 0:OFF 1:ON	0x10/0x11	
0D4	004	D7 D6 D5 D4 D3 D2 D1 D0	0-40/0-44	
0xD1	0x64	Color Matrix (RED) -60~+60	0x10/0x11	Twos complement (D7: sign)
0xD1	0x65	Color Matrix (BLUE) -60~+60	0x10/0x11	Twos complement (D7: sign)
		D7 D6 D5 D4 D3 D2 D1 D0		(= 11 - 1917)
0xD1	0x66	Color Matrix (GREEN) -60~+60	0x10/0x11	Twos complement (D7: sign)
0xD1	0x67	Color setting 0:B/W 1:Color	0x10/0x11	
0xD1	0x80	AE setting (Backlight compensation)	0x10/0x11	The AE level is
I OXD1	0,000	D7-D0: AE level (-60~+60)	0.00.00.11	represented as a twos
		( 66 166)		complement (D7: sign)
				1 2 1 ( 11 2 3 3 1 )
0xD1	0x81	AE setting (Full-Light metering)	0x10/0x11	
		D0: Light metering area 0:PEAK 1:APL		
0.04	0400	D7 D6 D5 D4 D3 D2 D1 D0	0v10/0-44	The DEAK level 's
0xD1	0x82	AE setting (Full- PEAK level) D7-D0: PEAK level (-60~+60)	0x10/0x11	The PEAK level is represented as a twos
		DI DO. I LAIRIEVEI (-00~T00)		complement (D7: sign)
		D7 D6 D5 D4 D3 D2 D1 D0		1 (
0xD1	0x83	AE setting (Full-APL level)	0x10/0x11	The APL level is
		D7-D0: APL level (-60~+60)		represented as a twos
				complement (D7: sign)

# ■ Global Data Setup Command-3

Header	Sub	Data	Command	Reference
0xD1	0x84	AE setting (Center1-light metering)	0x10/0x11	
		D0: Light metering area 0:PEAK 1:APL		
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x85	AE setting (Center1-PEAK level)	0x10/0x11	The PEAK level is
		D7-D0: PEAK level (-60~+60)		represented as a twos
				complement (D7: sign)
0xD1	0x86	AE setting (Center1-APL level)	0x10/0x11	The APL level is
		D7-D0: APL level (-60~+60)		represented as a twos
				complement (D7: sign)
		D0		
0xD1	0x87	AE setting (Center2-Light metering area)		
		D0: Light metering 0:PEAK 1:APL	0x10/0x11	
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x88	AE setting (Center2-PEAK level)	0x10/0x11	The PEAK level is
		D7-D0: PEAK level (-60~+60)		represented as a twos
				complement (D7: sign)
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x89	AE setting (Center2-APL level)	0x10/0x11	The APL level is
		D7-D0: APL level (-60~+60)		represented as a twos
				complement (D7: sign)
		D0		
0xD1	0x8A	AE setting (Slit1-Light metering)	0x10/0x11	
		D0: Light metering area 0:PEAK 1:APL		
		D7 D6 D5 D4 D3 D2 D1 D0		
0xD1	0x8B	AE setting (Slit1-PEAK level)	0x10/0x11	The PEAK level is
		D7-D0: PEAK level (-60~+60)		represented as a twos
				complement (D7: sign)
004	000	D7 D6 D5 D4 D3 D2 D1 D0	0-40/0-44	T. AB
0xD1	0x8C	AE setting (Slit1-APL level)	0x10/0x11	The APL level is
		D7-D0: APL level (-60~+60)		represented as a twos
				complement (D7: sign)
0xD1	0x8D	AE setting (Slit2-Light metering)	0x10/0x11	
UXDI	UXOD	D0: Light metering area 0:PEAK 1:APL	0 x 1 0 / 0 x 1 1	
0xD1	0x8E	AE setting (Slit2-PEAK level)	0x10/0x11	The PEAK level is
OXDI	UNUL	D7-D0: PEAK level (–60~+60)	0.00000011	represented as a twos
		D7 B0.1 E71(16V6)		complement (D7: sign)
				complement (D1. sign)
0xD1	0x8F	AE setting (Slit2-APL level)	0x10/0x11	The APL level is
OND !	O/O	D7-D0: APL level (-60~+60)	0.070,0011	represented as a twos
		( 66 .66)		complement (D7: sign)
		DF DE DD DC DB DA D9 D8 D7 D6 D5 D4 D3 D2 D1 D0		(= / . 5.9)
		Title indication character		The sub-header value
	0x00~	DF-D8: The first column (left) character code		determines the display
0xD2	0x9B	D7-D0: The second column (right) character code	0x10/0x11	position.
		( 0 /		Higher 4 bits: line (0-9)
				Lower 4 bits: column
				(0-11)
				,
0xD2	0xFF	Titler data all clear	0x10	
			-	

# -STATUS=

The camera shall return statuses according to the requests from the PC. A status is classified as either a general status or an error status.

#### **■** General Statuses

General statuses are returned in response to Read-type commands (of command code 0x01 or 0x11). The camera shall return to the PC general statuses with the current set value written in the data block.

#### **■** Error Statuses

Error statuses are for notifying the PC of an error that has been detected by the camera. Both the header and the subheader of an error status shall be 0xFF. Error codes to be written in the data block are shown below.

Header	Sub		Data												Command	Reference
													D			
0xFF	0xFF	Err	Error code(listed below)											0x00		

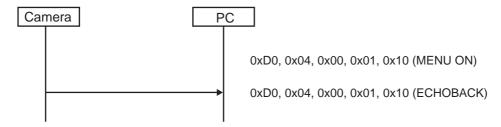
Error Code	Error Contents								
0x0000	No available program code, Down load required.								
0x0001	Illegal header received.								
0x0002	Command not accepted.								
0x0101	Parity error.								
0x0102	Framing error.								
0x0103	Communication overrun.								
0x0301	Checksum error in downloaded code.								
0x0303	Write fault in flash programming.								
0xFFFF	DSP access fault.								

# — CONCRETE EXAMPLES OF COMMAND COMMUNICATION —

Concrete examples of command Communication are given below.

## ■ An Example of General Command

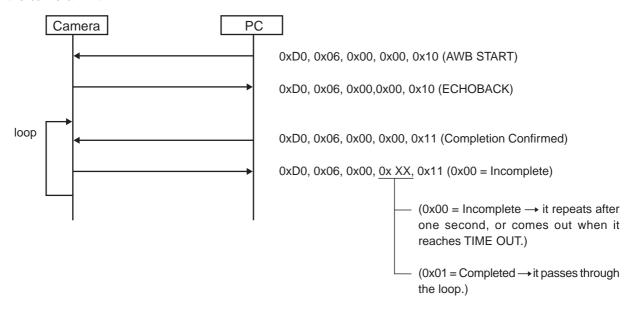
This example makes the camera monitor indicate the menu. When there is no error as in the chart below, the returned echoback shall be tested.



## ■ An Example of Command Waiting for Completion

This example is puttingAWB into action. The CCC is testing the completion of AWB by read command (0x11) after sending AWB start command and confirming its echoback. This test is repeated until it is completed or it becomes time out error.

It is advisable that the Read command for comfirming each completion be put at an interval of about one second from the camera limit.



XC-333/333P

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