HITACHI

CONTROL COMMAND
PROTOCOL
FOR

VK-S234 SERIES

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EXTERNAL CONTROL

VK-S234 Protocol

EXTERNAL CONTROL

1) Communication Protocol

Communication between the camera and the PC is available by using RS-232C protocol. The camera processor receives each control command given by the PC and echoes it back to the PC.

2) Data Connection

Baudrate:-   4800 Bps
Data Length:-   8 Bit
Stop Bit:-   1 Bit
Parity:-   Even

3) Communication Data Format

All communication data consists of eight or ten ASCII characters (8 bytes or 10 bytes). Communication data starts with the character " : " (colon). The format of the communication data is shown in Fig. 1.

a) 8 bytes format

1st byte   8th byte

:	CM	A3	A2	A1	A0	D1	D0

CM   Command as follows
        R :Read 1 byte data of processor. RAM or EEPROM
        W :Write 1 byte data of processor. RAM or EEPROM

A3-A0   Address data of processor. RAM or EEPROM (write in Hex. 0000-FFFF)
D1-D0   Data of processor. RAM or EEPROM (write in Hex. 00-FF)

b) 10 bytes format

1st byte   10th byte

:	CM	A3	A2	A1	A0	D3	D2	D1	D0

CM   Command as follows
        r :Read 2 bytes data of processor. RAM or EEPROM
        w :Write 2 bytes data of processor. RAM or EEPROM

A3-A0   Address data of processor. RAM or EEPROM (write in Hex. 0000-FFFF)
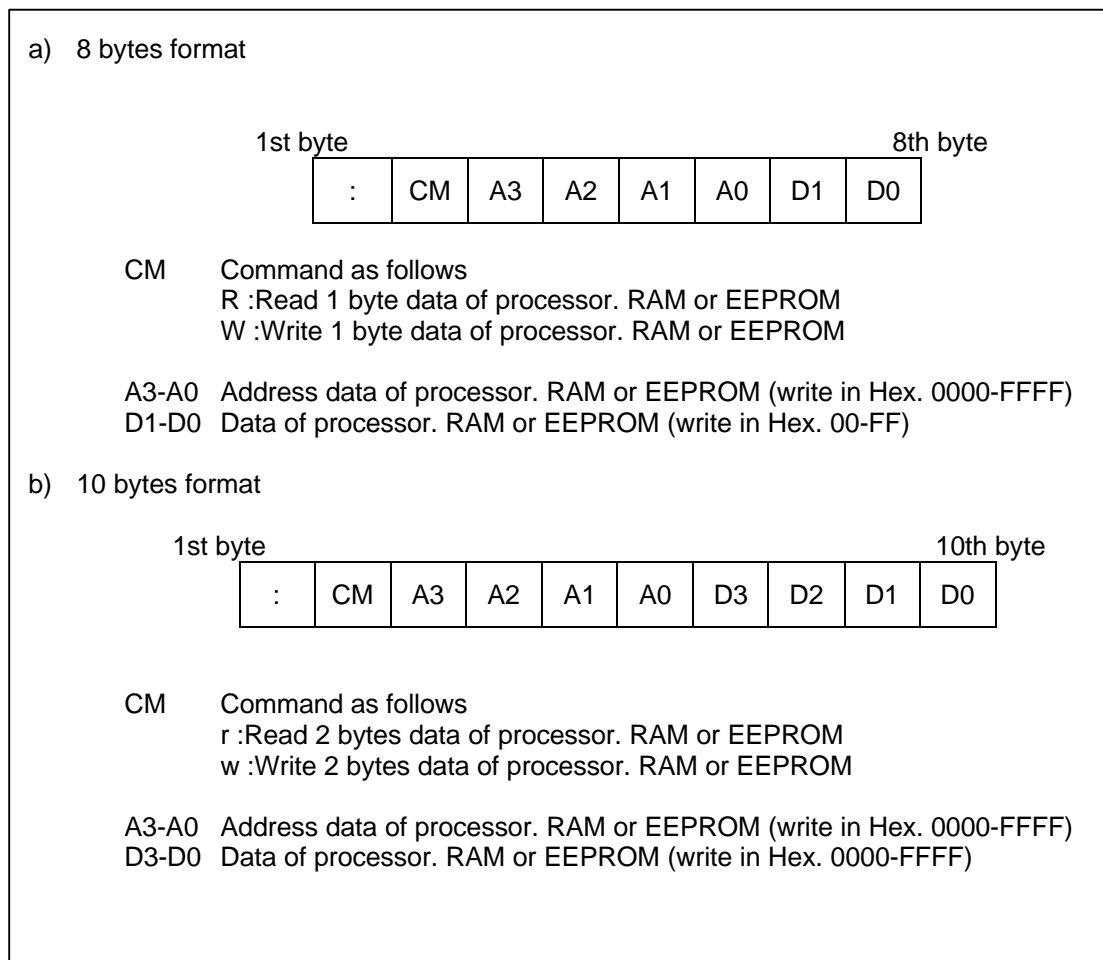D3-D0   Data of processor. RAM or EEPROM (write in Hex. 0000-FFFF)

Fig. 1 Communication data format

4) Control Commands

a) Switch the auto focus / manual focus.

      :RFF0E00
      :WFF0EX_1X_0

      bit 3 of X_1X_0 : 0-Auto 1-Manual
or
      :WFCBBA8   ;Change
      :WFCBBFE   ;Neutral

b) Move focus to FAR in manual focus mode.

      :WFCBBA9   ;Start
      :WFCBBFE   ;Stop

c) Move focus to NEAR in manual focus mode.   :WFCBBAA   ;Start
      :WFCBBFE   ;Stop

d) Move zoom to TELE.   :WFCBB99   ;Start
      :WFCBBFE   ;Stop

e) Move zoom to WIDE.   :WFCBB9B   ;Start
      :WFCBBFE   ;Stop

f) Select the zoom speed of optical zoom.

      :RFDFC00
      :WFDFCX_1X_0

Super HIGH SPEED (2.4sec) $*$;

      X_1X_0 : Set bit 3 of echo back data to "0".
              Set bit 2 of echo back data to "1".

HIGH SPEED (3.9sec);

      X_1X_0 : Set bit 3 of echo back data to "0".
              Set bit 2 of echo back data to "0".

NORMAL SPEED (6.3sec);

      X_1X_0 : Set bit 3 of echo back data to "1".
              Set bit 2 of echo back data to "0".

[Note] $*$mark : for Zoom Trace Pre-set Mode only

g) To get the status of zoom position   :RFC9100

> If echo back data is "FF", zoom position is calculated by using the following equation.
>
> zoom position = 22 x 256 ÷ (XX + 1)
> XX; echo back data
>
> If echo back data is "FF", then following commands should be sent.
>
>   :rF7200000
>
> Echo back data shows zoom position.[Please refer to the attached Table.1.]

[Table .1] Zoom position data table (Reference value)

Zoom Position	X 1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11
Echoback Data	14BA	2DDD	3A56	422D	47C7	4C15	4F96	528E	5517	575B	5953
	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓
Zoom Position	X12	X13	X14	X15	X16	X17	X18	X19	X20	X21	X22
Echoback Data	5B20	5CB1	5E18	5F4B	605D	6143	6208	62AA	6333	63A2	63A2
	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	less ↓	more ↑

h) Switch the continuous digital zoom ON/OFF   :RFCCB00
                                                        :WFCCBX_1X_0

> X_1X_0=00 ; OFF X_1X_0=01 ; ON

i) Set the maximum mag. tuning value in continuous digital zoom ON mode

>   :WFDF0X_1X_0
>
> X_1X_0 (hex) = {256−(256÷MM)} (dec)
> MM; maximum mag.
>
> [Example:mag.1; MM=1→ X_1X_0=00
>   mag.2; MM=2→ X_1X_0=80 ;max]

j) Switch the instant digital zoom ON/OFF   :RFF0F00
                                            :WFF0FX_1X_0
bit 7 of X_1X_0 : 0-OFF   1-ON

k) Set the instant mag. tuning value in instant digital zoom ON mode

>   :WFDE6X_1X_0
> X_1X_0 (hex) = IM x 10(dec)
>   IM; instant mag.
> (more than 1.0 and 0.1 step)
>
> [Example: mag.1; IM=1.0→ X_1X_0=0A
>   mag.2; IM=2.0 X_1X_0=14 ;max]

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l) Switch the auto / manual shutter speed (AE Commands)

i.) Program AE mode switch (Without DSS)

:RFCC800
:WFCC8X_1X_0 (X_1X_0 = 00)

ii.) Program AE + (Auto digital slow shutter, with DSS)

:RFCC800
:WFCC8X_1X_0 (X_1X_0 = 01) Default

iii.) Digital slow shutter status

:RFCC700
Echo back data is digital slow shutter status.

X_1X_0 (echo back data)	Shutter Speed (s)	
	NTSC / EIA	PAL / CCIR
01	- 1/60	- 1/50
02	1/60 – 1/30	1/50 – 1/25
04	1/30 – 1/15	1/25 – 1/13
08	1/15 – 1/8	1/13 – 1/6
10	1/8 – 1/4	1/6 – 1/3
20	1/4 -1/2	1/3 – 1/1.5

iv.) auto digital slow shutter limit

:R11E500
:W11E5X_1X_0

X_1X_0 (echo back data)	Shutter Speed (s)	
	NTSC / EIA	PAL / CCIR
01	1/60	1/50
02	1/30	1/25
04	1/15	1/13
08	1/8	1/6
10	1/4	1/3
20	1/2	1/1.5

m) Set the shutter speed tuning value in manual shutter mode (AE Commands)

i.) Shutter priority mode switch (Fixed Shutter)

:RFCC800
:WFCC8X_1X_0

[Note]: This command needs to be sent before the Fixed shutter can be set.

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ii.) Set the shutter speed tuning value

:RFCC900
:WFCC9X_1X_0

X_1X_0 ; tuning value

X_1X_0 (setting data)	Shutter Speed (s)	
	NTSC / EIA	PAL / CCIR
00	1/2	1/1.5
01	1/4	1/3
02	1/8	1/6
03	1/15	1/13
04	1/30	1/25
05	1/60	1/50
06	1/120	1/100
07	1/180	1/150
08	1/250	1/250
09	1/500	1/500
0A	1/1000	1/1000
0B	1/2000	1/2000
0C	1/4000	1/4000
0D	1/10000	1/10000
0E	1/30000	1/30000

n) Switch the auto/manual exposure (AE Commands)

i.) Exposure priority mode switch

:RFCC800
:WFCC8X_1X_0 (X_1X_0 = 08)

[Note]: This command needs to be sent before the Fixed shutter can be set.

ii.) Set the brighter/darker exposure tuning value

:RFCC900
:WFCC9X_1X_0 (X_1X_0 ; tuning value)

F-value	X_1X_0 (setting value)
F1.6	00
F2.2	01
F3.2	02
F4.4	03
F6.4	04
F8.8	05
F12	06
F17	07
F24	08
F34	09

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o) Switch the auto gain control (AGC) ON/OFF   :RFB7F00
                                                   :WFB7FX_1X_0

                                                    bit 7 of X_1X_0 : 0-ON   1-OFF

p) Set the fixed AGC level tuning value in AGC OFF mode

                                        :wFB38$X_3X_2X_1X_0$

                                           $X_3X_2X_1X_0$: tuning value

                                        ($X_3X_2X_1X_0$=000003C0 ; 0.03125dB/step)

                                                    [$X_3X_2X_1X_0$=0000 ; 0dB ,
                                                        $X_3X_2X_1X_0$=03C0 ; 30dB]

q) Switch the auto / manual white balance   :RFBFF00
                                                :WFBFFX_1X_0

                                                 bit 3 of X_1X_0 : 0-Auto   1-Manual

r) Set the white balance (R gain) tuning value in manual white balance mode

                                        :wFBBC$X_3X_2X_1X_0$

                                           $X_3X_2X_1X_0$: tuning value
                                           (min. H' 0080, max. H' 03FF)

s) Set the white balance (B gain) tuning value in manual white balance mode

                                        :wFBBE$X_3X_2X_1X_0$

                                           $X_3X_2X_1X_0$: tuning value
                                           (min. H' 0080, max. H' 03FF)

5) Other Commands

[Note] ✴ mark : Is available after power reset.
Default value in EEPROM area are subject to change without notice.

a) Get the camera type

[EEPROM area]

:RE1EDX_1X_0
:RE1EEX_1X_0

	Type data ($X_1X_0 =$)			
MODEL	VK-S234	VK-S234E	VK-K234	VK-K234E
FORMAT	NTSC Hi-BAND	PAL Hi-BAND	EIA Hi-BAND	CCIR Hi-BAND
EEPROM area "**E1ED**"	38	38	38	38
EEPROM area "**E1EE**"	0X_0	1X_0	2X_0	3X_0

b) Set the auto iris control level tuning value in auto exposure mode

i.) Iris offset (average) level

[RAM area]

:WFD9EX_1X_0 (X_1X_0= 00~FF ; 256 step)

ii.) Iris offset (peak) level

[RAM area]

:WFD9FX_1X_0 (X_1X_0= 00~7F ; 128 step)

c) Switch the back light compensation (BLC) ON/OFF

[RAM area]

:RFECE0
:WFECEX_1X_0
X_1X_0=00 ; OFF X_1X_0=02 ; ON

d) Set the BLC level tuning value in BLC ON mode

[RAM area]

:WFD8EX_1X_0 (X_1X_0=00~FF ; 256 step)

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e) Set the chroma suppression level tuning value in AGC range

[RAM area]

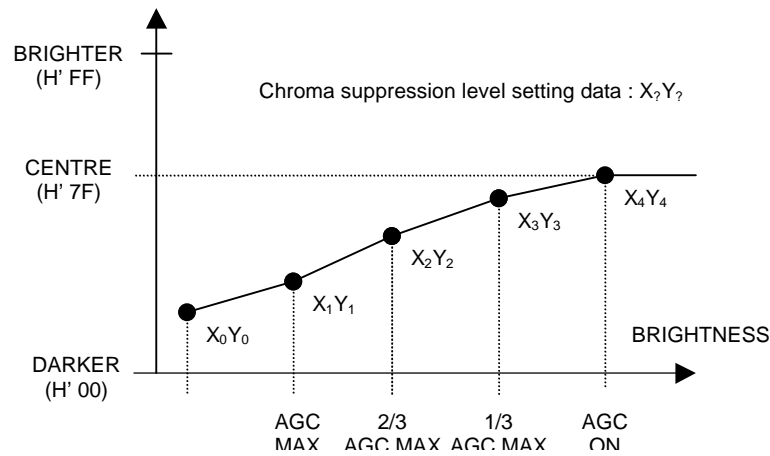| AGC gain		~	AGC ON	:WB790$X_4$$Y_4$
AGC gain	AGC ON	~	1/3 maximum AGC level	:WB791$X_3$$Y_3$
AGC gain	1/3 maximum AGC level	~	2/3 maximum AGC level	:WB792$X_2$$Y_2$
AGC gain	2/3 maximum AGC level	~	maximum AGC level	:WB793$X_1$$Y_1$
AGC gain	maximum AGC level	~		:WB794$X_0$$Y_0$
			($X_?X_?$ = 00~FF ; 256 step)	
			Darker (H' 00) < centre (H' 7F) < brighter (H 'FF)	
[Note] maximum AGC level setting at page 12 – item i)				
chroma suppression level tuning values at Fig.1 (below)				

Fig. 1 Chroma suppression level

f) Select the manual aperture mode   [RAM area]

:RFBFF00
:WFBFF$X_1$$X_0$

$X_1$$X_0$: Set bit 1 of echo back data to "1".
   [bit 1 of $X_1$$X_0$: 0-Auto   1-Manual]

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g) Set the horizontal aperture level tuning value

:WFBF6X_1X_0 (X_1X_0=00~1F ; 32 step)
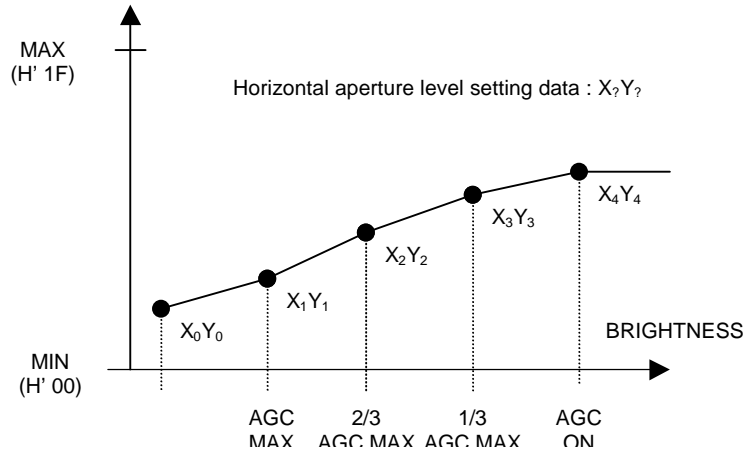

Horizontal aperture level setting data : $X_?Y_?$

Fig. 2 Horizontal aperture level

h) Set the vertical aperture level tuning value

:WFBF9X_1X_0 (X_1X_0=00~1F ; 32 step)
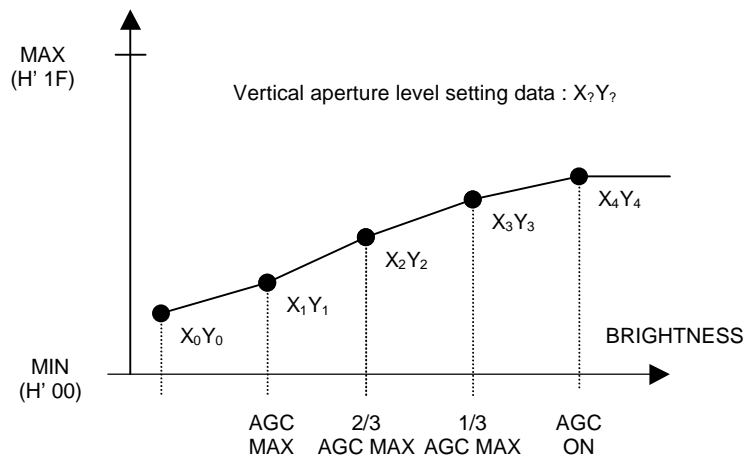

Vertical aperture level setting data : $X_?Y_?$

Fig. 3 Vertical aperture level

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i) Set the maximum AGC gain tuning value in AGC ON mode

[RAM area]

:wFD46$X_3X_2X_1X_0$
($X_3X_2X_1X_0$=0000~0500 ; 0.03125dB/step)

[$X_3X_2X_1X_0$=0000 ; 0dB , MIN
 $X_3X_2X_1X_0$=0500 ; 40dB] MAX

j) Change communication Baudrate

[EEPROM area] ＊

:WE05EX_1X_0
(X_1X_0=80 or 00;
            4800 bps , even Parity ; default
X_1X_0=B0 ; 9600 bps , even Parity
X_1X_0=C0 ; 4800 bps , non Parity
X_1X_0=F0 ; 9600 bps , non Parity)

k) Set RAM initialise

RAM area]

:WFF0A00
:WFCAC00

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