CONTROL COMMAND FOR VK-S454 SERIES

[REV. 2.0]

This manual applies following models:
<NTSC> VK-S454
<PAL> VK-S454E

CONTENTS

[Note]

§¤§ is difference of data between VK-S234 series and VK-S454 series.

§¤§ Functions newly added to this command list version 2.0 (marked with [#]) will be applicable to the VK-S454 series models with the following required conditions while other functions without the [#] marking will be applicable to all VK-S454 series models.

< Required condition for the functions marked with [#] >
a) Serial Number
b) EEPROM data version (Refer to page - 15)
c) Microprocessor / EEPROM version

Model	Serial Number	EEPROM data Ver.	Micro. Firmware Ver.
VK-S454	After 21032359	Ver. 6 and above	Ver. 2.34 and above
VK-S454E	After 21121809	Ver. 5 and above	Ver. 2.34 and above

¤ To confirm the version number for the microprocessor firmware:
:r01060000 → echo back data ; H'XXYY [Ver. XX.YY]
< ex. > :r01060000 → echo back data ; H'0234 [Ver. 02.34]

§¤§ EEPROM data version code # and Microprocessor Firmware version # may be changed without notice.

PART
ONE

- SPECIFICATION

1. Communication protocol

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

2. Connect condition

Data length	8 bit
Stop bit	1 bit
Parity	even / non
Baudrate	4800 / 9600 bps

3. Communication data format
All communication data consist of eight or ten ASCII characters (8 bytes or 10 bytes).
The format of the communication data is shown in Fig.1.

a) Normal command
Communication data start with the character ":"(colon).

b) Special command
Communication data start with the character "/"(slash).

(a) 8 bytes format [Normal command]

1st byte							8th byte
:	CM	A3	A2	A1	A0	D1	D0

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

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

(b) 10 bytes format [Normal command]

1st byte									10th byte
:	CM	A3	A2	A1	A0	D3	D2	D1	D0

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

A3-A0 Address data of micro-Com. RAM or EEPROM (write in hex. 0000-FFFF)
D3-D0 Data of micro-Com. RAM or EEPROM (write in hex. 0000-FFFF)

(c) 8 bytes format [Special command]

1st byte							8th byte
/	CM	D5	D4	D3	D2	D1	D0

CM Command as follows
M : <Privacy mask> DEGREE WRITE command

D5-D0 Data of micro-Com. RAM or EEPROM (write in hex. 000000-FFFFFF)

Fig. 1 Communication data format

4. Command timing
   a) Timing table program AE command
      [Please attached Fig. 2]

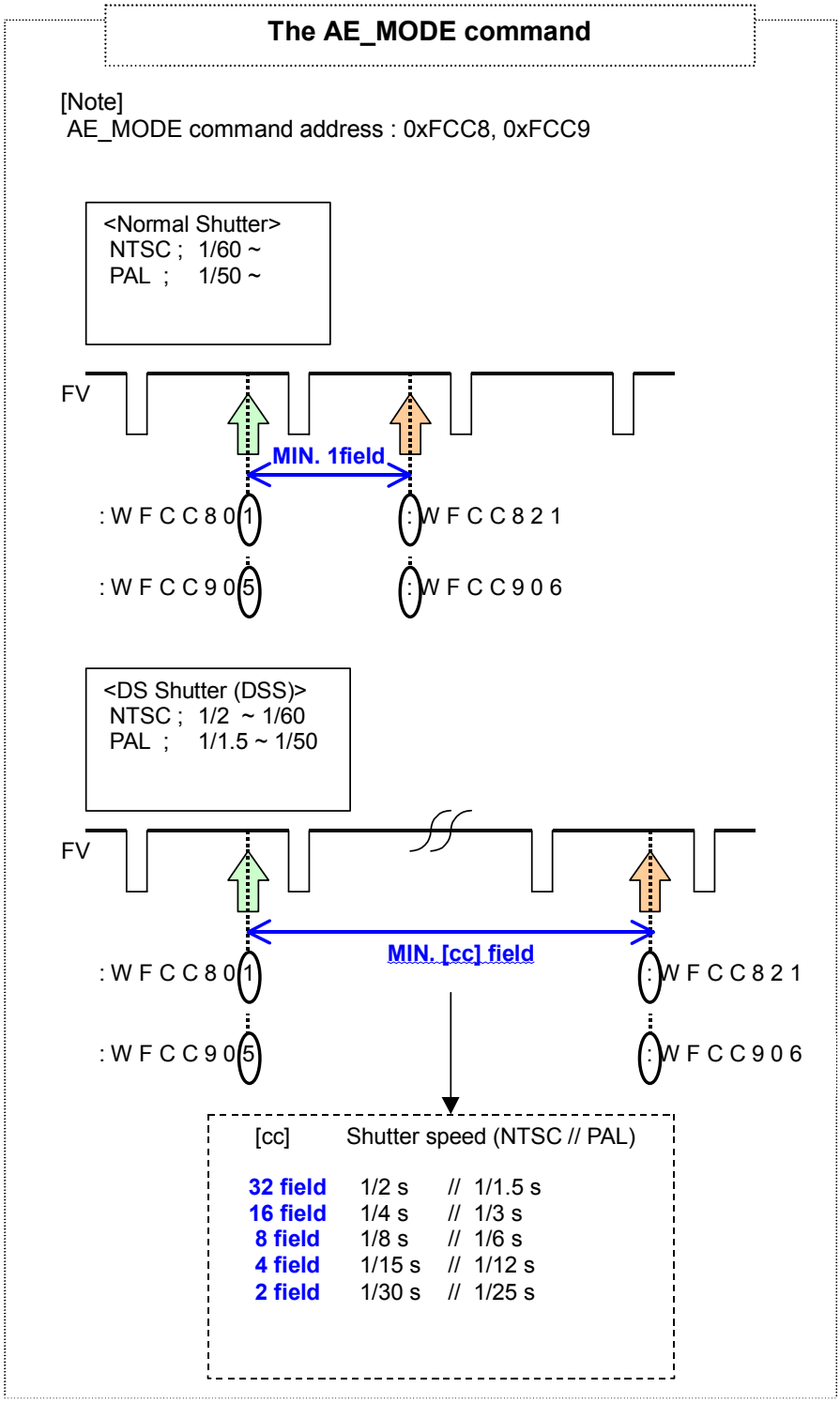


Fig. 2 Changing AE_MODE - timing

b) Timing table after ZOOM commands (DSS mode only)
[Please attached Fig. 3]

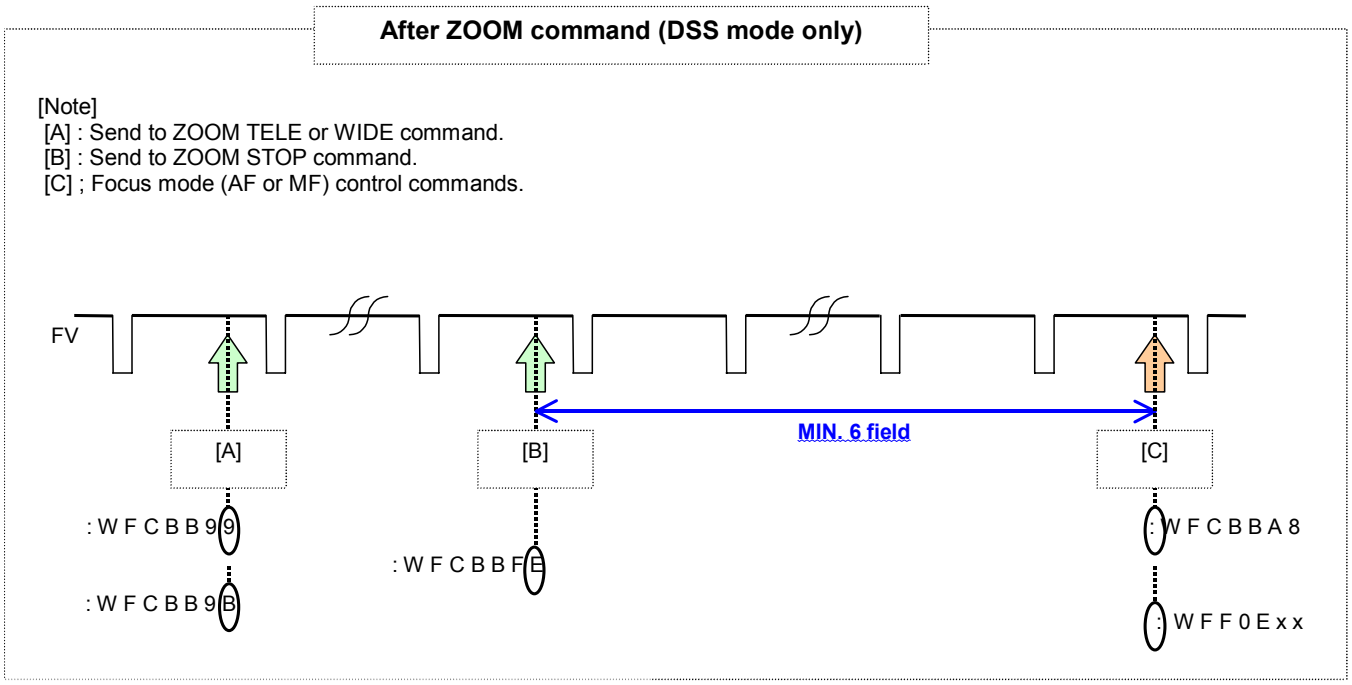


Fig. 3 After ZOOM commands - timing

c) Timing table other commands
[Please attached Fig. 4]

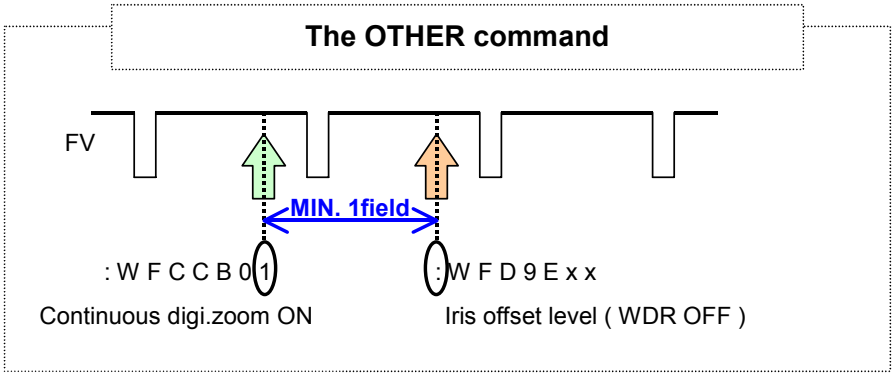


Fig. 4 Changing other commands - timing

PART
TWO

- EXTERNAL CONTROL

1. 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 (2.9 s) * ;
X_1X_0 : Set bit 3 of echo back data to “0”.
Set bit 2 of echo back data to “1”.

HIGH SPEED (4.2 s);
X_1X_0 : Set bit 3 of echo back data to “0”.
Set bit 2 of echo back data to “0”.

NORMAL SPEED (5.8 s);
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 Preset Mode”** only

g) Get the status of zoom position

:RFC9100

If echo back data is not “FF”, zoom position is calculated by following equation.

zoom position = 23 * 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	x1	x2	x3	x4	x5	x6	x7	x8
Echoback data	182A less	2F13 less	3AE2 less	427C Less	47F3 less	4C29 less	4F9B less	528F less
Zoom position	x9	x10	x11	x12	x13	x14	x15	x16
Echoback data	5512 less	5742 less	5948 less	5B18 less	5C9E less	5E0A less	5F3E less	6048 less
Zoom position	x17	x18	x19	x20	x21	x22	x23	
Echoback data	6136 less	61FA less	62A2 less	632E less	639E Less	63D6 less	63D6 more	

h) Switch the continuous digi. 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 digi. zoom ON mode

:WFDF0X_1X_0

X_1X_0 (hex) = {256 - (256 / MM)} (dec)

MM; maximum mag.

[EX. mag.1; MM=1 -> X_1X_0=00

mag.2; MM=2 -> X_1X_0=80

mag.10; MM=10 -> X_1X_0=E7 max.]

j) Switch the instant digi. 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 digi. zoom ON mode

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

l) Switch the auto / manual shutter speed

Please see the attached Program AE command sheet.

m) Set the shutter speed tuning value in manual shutter mode

Please see the attached Program AE command sheet.

n) Switch the auto / manual exposure

Please see the attached Program AE command sheet.

o) Set the brighter exposure tuning value in manual exposure mode

Please see the attached Program AE command sheet.

p) Set the darker exposure tuning value in manual exposure mode

Please see the attached Program AE command sheet.

q) Switch the auto gain control (AGC) ON/OFF

Please see the attached Program AE command sheet.

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

Please see the attached Program AE command sheet.

s) Switch the auto / manual white balance

:RFBFF00
:WFBFFX_1X_0
bit 3 of X_1X_0 : 0-Auto 1-Manual

t) 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)
data range: H'0080 - H'00FF
H'0180 - H'01FF
H'0280 - H'02FF
H'0380 - H'03FF

u) 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)
data range: H'0080 - H'00FF
H'0180 - H'01FF
H'0280 - H'02FF
H'0380 - H'03FF

v) Switch the Reverse ON/OFF

:RFF3000
:WFF30X_1X_0
X_1X_0=00 ; OFF X_1X_0=01 ; ON

w) Switch the instant fade(black) ON/OFF

:RFA2100
:WFA21X_1X_0
X_1X_0=00 ; OFF X_1X_0=01 ; ON

x) Switch the Image Freeze ON/OFF

:RFF3300
:WFF33X_1X_0
X_1X_0=00 ; OFF X_1X_0=01 ; ON

2. Others

[Note] * mark : It 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-S454	VK-S454E				
TYPE	Hi-BAND	Hi-BAND				
FORMAT	NTSC	PAL				
EEPROM area "E1ED"	**B1**	**B1**				
EEPROM area "E1EE"	**0X_0**	**1X_0**				

[Note] X_0 is version number.

b) Set the minimum focus length tuning value in zoom-wide

[EEPROM area]*
:WE139X_1X_0
(X_1X_0=00 ; 1cm (approx.) ; default
X_1X_0=F9 ; 10cm (approx.)
X_1X_0=F8 ; 30cm (approx.)
X_1X_0=F7 ; 1m (approx.) ; max.)

c) Set the focus speed in Manual focus mode

[RAM area]
:WF8A0X_1X_0 (X_1X_0=01 – 1F ; 31 step)

[EEPROM area]*
:W1337X_1X_0 (X_1X_0=01 – 1F ; 31 step)

	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "**1337**"	**0F**	**10**				

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

i) Iris offset (average) level (**WDR OFF**)

[RAM area]
:WFD9EX_1X_0 (X_1X_0=00 - FF ; 256 step)

[EEPROM area]*
:WE09EX_1X_0 (X_1X_0=00 - FF ; 256 step)

	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "E09E"	**5B**	**54**				

ii) Iris offset (average) level (WDR ON)

[RAM area]
:W**FD90**X_1X_0 (X_1X_0=00 - FF ; 256 step)

[EEPROM area]*
:W**13CE**X_1X_0 (X_1X_0=00 - FF ; 256 step)

	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "13CE"	**70**	**70**				

iii) Iris offset (peak) level (**WDR OFF**)

[RAM area]
:WFD9FX_1X_0 (X_1X_0=00 - 7F ; 128 step)

[EEPROM area]*
:WE09FX_1X_0 (X_1X_0=00 - 7F ; 128 step)

	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "E09F"	**10**	**10**				

iv) Iris offset (peak) level (WDR ON)

[EEPROM area]*
:W13CFX_1X_0 (X_1X_0=00 - 7F ; 128 step)

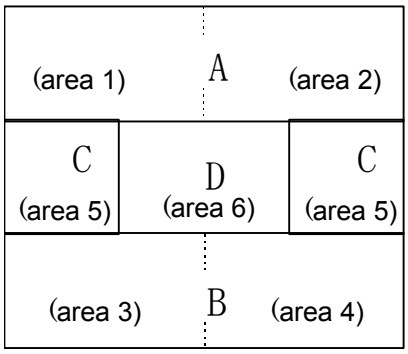
	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "13CE"	**10**	**10**				

e) Get the luminance data for the 6 screen areas

[RAM area]
area 1 :RFAE0000000 ; data length 3Byte
area 2 :RFAE3000000 ; data length 3Byte
area 3 :RFAE6000000 ; data length 3Byte
area 4 :RFAE9000000 ; data length 3Byte
area 5 :RFAEC000000 ; data length 3Byte
area 6 :RFAEF000000 ; data length 3Byte

[Note] This is the average data per one field.

< screen areas >



< weighting areas >
A= area 1 + area 2
B= area 3 + area 4
C= area 5
D= area 6

< default weighting-ratio >
A:B:C:D = (K_a+1): (K_b+1): (K_c+1): (K_d+1)
= (**4**+1): (**6**+1): (9+1): (F+1)
= (**5**): (**7**): (10): (16)

f) Set the luminance weighting data tuning value

[RAM area]
:wFDA0$X_3X_2X_1X_0$
(X_3=X_2=X_1=X_0=0 - F ; 16 step)
(X_3 : K_a , X_2 : K_b , X_1 : K_c , X_0 : K_d)

[EEPROM area]*
:wE0A0$X_3X_2X_1X_0$
(X_3=X_2=X_1=X_0=0 - F ; 16 step)
(X_3 : K_a , X_2 : K_b , X_1 : K_c , X_0 : K_d)
[$X_3X_2X_1X_0$=**46**9F ; default]

g) Switch the back light compensation (BLC) ON/OFF **(WDR OFF ONLY)**

[RAM area]

:RFECE0

:WFECEX_1X_0

X_1X_0=00 ; OFF X_1X_0=02 ; ON

[note] BLC ON is WDR OFF mode only.

h) Set the BLC level tuning value in BLC ON mode **(WDR OFF ONLY)**

[RAM area]

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

[EEPROM area]*

:WE08EX_1X_0 (X_1X_0=00 - FF ; 256 step)

	default value (X_1X_0 =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area "E08E"	**10**	**10**				

[note] BLC ON is WDR OFF mode only.

i) Set the burst ON/OFF

[EEPROM area]*

:W**1026**X_1X_0 (X_1X_0=00 - FF ; 256 step)

:W**1027**X_1X_0 (X_1X_0=00 - FF ; 256 step)

:W**1028**X_1X_0 (X_1X_0=00 - FF ; 256 step)

:W**1029**X_1X_0 (X_1X_0=00 - FF ; 256 step)

	default value (X_1X_0=)				
MODEL	VK-S454	VK-S454E			
FORMAT	Hi-BAND	Hi-BAND			NTSC / PAL
MODE	NTSC	PAL			
EEPROM area	burst ON				OFF
"1026"	**54**	**5A**			**80**
"1027"	**80**	**9C**			**80**
"1028"	**00**	**5A**			**80**
"1029"	**00**	**9C**			**80**

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

[RAM area]

AGC gain		-	AGC ON	:WFC10X_4Y_4
AGC gain	AGC ON	-	1/3 maximum AGC level	:WFC11X_3Y_3
AGC gain	1/3 maximum AGC level	-	2/3 maximum AGC level	:WFC12X_2Y_2
AGC gain	2/3 maximum AGC level	-	maximum AGC level	:WFC13X_1Y_1
AGC gain	Maximum AGC level	-		:WFC14X_0Y_0

($X_?Y_?$=00 - FF ; 256 step)

darker (H'00) < center (H'7F) < brighter (H'FF)

[Note] maximum AGC level setting at **page 22** - item n)
chroma suppression level tuning values at Fig. 1

[EEPROM area]*

AGC gain		-	AGC ON	:W1360X_4Y_4
AGC gain	AGC ON	-	1/3 maximum AGC level	:W1361X_3Y_3
AGC gain	1/3 maximum AGC level	-	2/3 maximum AGC level	:W1362X_2Y_2
AGC gain	2/3 maximum AGC level	-	Maximum AGC level	:W1363X_1Y_1
AGC gain	maximum AGC level	-		:W1364X_0Y_0

($X_?Y_?$=00 - FF ; 256 step)

darker (H'00) < center (H'7F) < brighter (H'FF)

[Note] maximum AGC level setting at **page 22** - item n)
chroma suppression level tuning values at Fig. 1

	Default value ($X_?Y_?$ =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area						
"1360"	**7F**	**7F**				
"1361"	**8C**	**8C**				
"1362"	**7C**	**7C**				
"1363"	**6E**	**6E**				
"1364"	**32**	**32**				

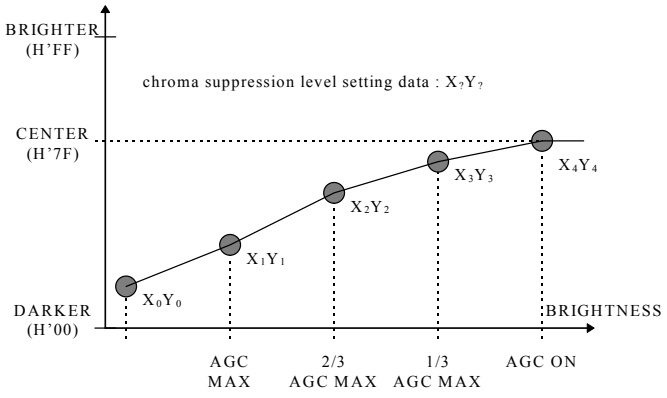


Fig. 1 Chroma suppression level

k) Select the manual aperture mode

[RAM area]
:RFBFF00
:WFBFFX_1X_0
X_1X_0 : Set bit 1 of echo back data to "1".
[bit 1 of X_1X_0 : 0-Auto 1-Manual]

l) Set the horizontal aperture level tuning value

:WFBF6X_1X_0 (X_1X_0=00 - 3F ; 64 step)

[EEPROM area]*

AGC gain		-	AGC ON	:W136AX_4Y_4
AGC gain	AGC ON	-	1/3 maximum AGC level	:W136BX_3Y_3
AGC gain	1/3 maximum AGC level	-	2/3 maximum AGC level	:W136CX_2Y_2
AGC gain	2/3 maximum AGC level	-	Maximum AGC level	:W136DX_1Y_1
AGC gain	Maximum AGC level	-		:W136EX_0Y_0

($X_?Y_?$=00 - 3F ; 64 step)

[Note] maximum AGC level setting at **page 22** - item n)
horizontal aperture level tuning values at Fig. 2

	default value ($X_?Y_?$ =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area						
"136A"	**32**	**32**				
"136B"	**2A**	**2A**				
"136C"	**14**	**14**				
"136D"	**08**	**08**				
"136E"	**06**	**06**				

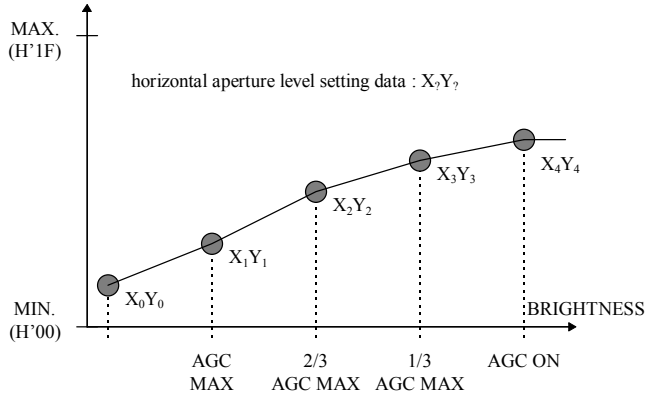


Fig. 2 horizontal aperture level

m) Set the vertical aperture level tuning value

:WFBF9X_1X_0 (X_1X_0=00 - 3F ; 64 step)

[EEPROM area]*

AGC gain		-	AGC ON	:W1374X_4Y_4
AGC gain	AGC ON	-	1/3 maximum AGC level	:W1375X_3Y_3
AGC gain	1/3 maximum AGC level	-	2/3 maximum AGC level	:W1376Y_2Y_2
AGC gain	2/3 maximum AGC level	-	Maximum AGC level	:W1377X_1Y_1
AGC gain	maximum AGC level	-		:W1378X_0Y_0

($X_?Y_?$=00 - 3F ; 64 step)

[Note] maximum AGC level setting at page 22 - item n)
vertical aperture level tuning values at Fig. 3

	default value ($X_?Y_?$ =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area						
"1374"	**28**	**28**				
"1375"	**20**	**20**				
"1376"	**12**	**12**				
"1377"	**08**	**08**				
"1378"	**06**	**06**				

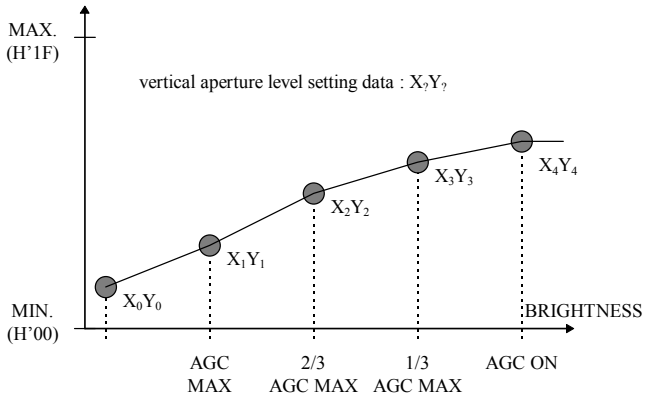


Fig. 3 vertical aperture level

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

[RAM area]
:wFD46$X_3X_2X_1X_0$
:WFA20Y_1Y_0
($X_3X_2X_1X_0$=0000 - 0500 ; 0.03125dB/step)
[Note] condition between $X_3X_2X_1X_0$ and Y_1Y_0
$Y_1Y_0 = X_3X_2X_1X_0 / 8$
[$X_3X_2X_1X_0$=0000, Y_1Y_0=00 ; 0dB ,
$X_3X_2X_1X_0$=0500, Y_1Y_0=A0; 40dB]

[EEPROM area]*
:wE046$X_3X_2X_1X_0$
:W116CY_1Y_0
($X_3X_2X_1X_0$=0000 - 0500 ; 0.03125dB/step)
[Note] condition between $X_3X_2X_1X_0$ and Y_1Y_0
$Y_1Y_0 = X_3X_2X_1X_0 / 8$
[$X_3X_2X_1X_0$=0000, Y_1Y_0=00 ; 0dB ,
$X_3X_2X_1X_0$=0500, Y_1Y_0=A0; 40dB]

	default value ($X_3X_2X_1X_0$ =)					
MODEL	VK-S454	VK-S454E				
FORMAT	Hi-BAND	Hi-BAND				
MODE	NTSC	PAL				
EEPROM area						
“E046”	**0380**	**03A0**				
“116C”	**70**	**74**				
maximum AGC Gain	**28 dB**	**29dB**				

o) 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)

p) Set RAM initialize

[RAM area]
:WFCAC00

PART
THREE

- PROGRAM AE CONTROL COMMAND
- IR REMOVE CONTROL COMMAND
- WIDE DYNAMIC RANGE COMMAND

1. Program AE mode
   The following Control Commands are Program AE added to VK-S454.

• Program AE control	Program AE	[WDR ON/OFF]
	Program AER 1 [IR Remove - 1]	[WDR ON/OFF]
	Program AER 2 [IR Remove - 2]	[WDR ON/OFF]
	Program AE+ (DSS)	[WDR ON/OFF]
	Program AER+1 (DSS) [IR Remove - 1]	[WDR ON/OFF]
	Program AER+2*(DSS) [IR Remove - 2]	[WDR ON/OFF]
	Program AER+3 (DSS) [IR Remove - 3]	[WDR ON/OFF]
	Shutter priority	
	Exposure priority	
	AGC priority	

[Note] * mark is default mode.

VK-S454 Program AE control

a) Function of program AE mode
[Please attached Table 1.]

Table. 1 Program AE mode table

Program AE mode / function	DSS	IR Remove	WDR
Program AE	X	O [Manual]	O [on/off]
Program AER1 [IR Remove – 1]	X	O [auto] : ***Hi sensitivity***	O [on/off]
Program AER2 [IR Remove – 2]	X	O [auto] : ***Mid sensitivity***	O [on/off]
Program AE+ (DSS)	O [auto]	O [Manual]	O [on/off]
Program AER+1 (DSS) [IR Remove – 1]	O [auto]	O [auto] : ***Hi sensitivity***	O [on/off]
Program AER+2 (DSS) [IR Remove – 2]	O [auto]	O [auto] : ***Mid sensitivity***	O [on/off]
Program AER+3 (DSS) [IR Remove – 3]	O [auto]	O [auto] : ***Lo sensitivity***	O [on/off]
Shutter priority	O [Manual]	O [Manual]	X
Exposure priority	X	O [Manual]	X
AGC priority	X	O [Manual]	X

b) Mode switch

:RFCC800
:WFCC8X_1X_0
[Please attached Table 2.]

Table. 2 Program AE mode data

Program AE mode	X_1X_0
Program AE	00
Program AER [IR Remove – 1]	10
Program AER [IR Remove – 2]	20
Program AE+ (DSS)	01
Program AER+ (DSS) [IR Remove – 1]	11
Program AER+ (DSS) [IR Remove – 2]	21
Program AER+ (DSS) [IR Remove – 3]	31
Shutter priority	07
Exposure priority	08
AGC priority	09

2. Digital Slow Shutter

a) Digital slow shutter status

:RFCC700

Echo back data is digital slow shutter status.
[Please attached Table 3.]

Table. 3 Digital slow shutter table

X_1X_0 (echo back data)	Shutter Speed (s)		DSS ON/OFF
	NTSC	PAL	
01	~ 1/60	~ 1/50	OFF
02	1/60 ~ 1/30	1/50 ~ 1/25	ON
04	1/30 ~ 1/15	1/25 ~ 1/12	ON
08	1/15 ~ 1/ 8	1/12 ~ 1/ 6	ON
10	1/ 8 ~ 1/ 4	1/ 6 ~ 1/ 3	ON
20	1/ 4 ~ 1/ 2	1/ 3 ~ 1/ 1.5	ON

b) Auto digital slow shutter limit

:R11E500
:W11E5X_1X_0
[Please attached Table 4.]

Table. 4 Digital slow shutter limit table

X_1X_0 (echo back data)	Shutter Speed (s)	
	NTSC	PAL
01	1/60	1/50
02	1/30	1/25
04	1/15	1/12
08	1/ 8	1/ 6
10 [default]	1/ 4	1/ 3
20	1/ 2	1/ 1.5

3. IR Remove

a) IR remove status

:RFFE700
Echo back data is IR remove status.
[Please attached Table. 5.]

Table. 5 IR remove status table

X_1X_0 (echo back data)	
00	IR cut filter OFF
01	IR cut filter ON

b) Switch the IR ON / OFF manual control

:RFFE600
:WFFE6X_1X_0
[Please attached Table. 6.]

Table. 6 IR remove status table

X_1X_0 (echo back data)	
C0	IR cut filter OFF=>ON
80	IR cut filter ON =>OFF
00	**Neutral**

[Note] This mode is Program AE and Program AE+ and priority (shutter/exposure/agc) mode only.

c) Select the color (IR OFF only)

:R11E300
:W11E3X_1X_0
bit 1 of X_1X_0 : 0-B/W [default]
1-COLOR

4. Shutter priority

a) Mode switch

:RFCC800
:WFCC8X_1X_0
X_1X_0=07

b) Set the shutter speed tuning value

:RFCC900
:WFCC9X_1X_0
X_1X_0 ; tuning value
[Please refer to the attached Table.7.]

Table. 7 Shutter speed data table in shutter priority mode

X_1X_0 (setting data)	Shutter Speed (s)	
	NTSC	PAL
00	1/2	1/1.5
01	1/4	1/3
02	1/8	1/6
03	1/15	1/12
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**

5. Exposure priority

a) Mode switch

:RFCC800
:WFCC8X_1X_0
X_1X_0=08

b) Set the exposure tuning value

:RFCC900
:WFCC9X_1X_0
X_1X_0 ; tuning value
[Please refer to the attached Table.8.]

Table. 8 Exposure data table in exposure priority mode

F-value	X_1X_0 (setting data)
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

6. AGC priority

a) Mode switch

:RFCC800
:WFCC8X_1X_0
X_1X_0=09

b) Set the AGC tuning value

:RFCC900
:WFCC9X_1X_0
X_1X_0 ; tuning value
[Please refer to the attached Table.9.]

Table. 9 AGC data table in AGC priority mode

AGC gain	X_1X_0 (setting data)
0 [dB]	00
6 [dB]	01
12 [dB]	02
18 [dB]	03
24 [dB]	04
30 [dB]	05

7. WIDE DYNAMIC RANGE

a) Mode switch

:RFF3200
:WFF32X_1X_0
X_1X_0=00 ; OFF [default]
X_1X_0=01 ; ON

b) Switch the WDR Manual mode ON / OFF

:RFF3400
:WFF34X_1X_0
X_1X_0=00 ; auto [default]
X_1X_0=01 ; manual

c) Ratio level at WDR Manual mode

:RFF3500
:WFF35X_1X_0
(X_1X_0=00 - 80 ; 128 step)

d) Hi-Speed shutter speed at WDR Manual mode

:rFF360000
:wFF36$X_3X_2X_1X_0$
($X_3X_2X_1X_0$=0000 - 0544 ; 1349 step)

e) Iris level offset data at WDR Manual mode

:rFF380000
:wFF38$X_3X_2X_1X_0$
($X_3X_2X_1X_0$=0000 - 0400 ; 1025 step)

PART
FOUR

- PRESET

1. Preset mode
   Available preset function for VK-S454 series. [Please attached Table 1.]

Table 1 VK-S454 Preset mode

Type	Zoom speed	Document
TYPE-1 [MF, No-Trace]	1.6 s	**S454_Preset_Ver_2_0.doc**
TYPE-2 [MF, Trace]	2.9 s	

PART
FIVE

- PRIVACY MASK

1. Privacy mask modes

The following chart is Privacy mask at VK-S454 series. [Please attached Table 1 and Fig.1 .]

2. Privacy mask commands

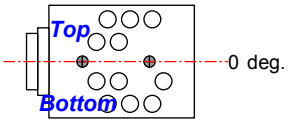
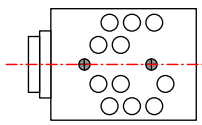
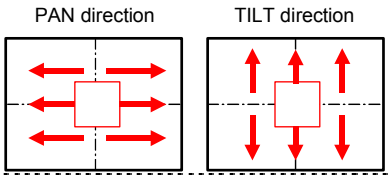
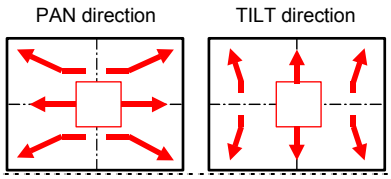
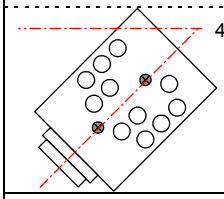
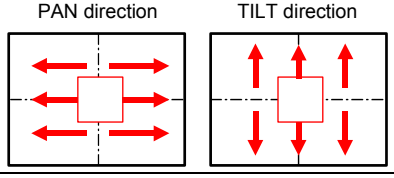
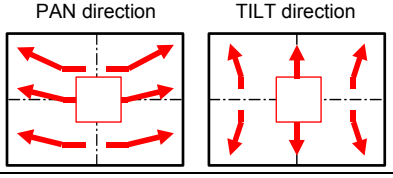
Please see annexed document "PRIVACY MASK ; S454_Pmask_E_vxx.doc".

• Privacy mask control	Privacy mask *	[Current]
	Privacy mask – 2	[New function]

[Note] * mark is default mode.

Table 1 VK-S454 Privacy mask control

Fig. 1 VK-S454 Privacy masking function comparison chart

		Privacy mask [Current]	Privacy mask – 2 [New function]
Number of masking zone		2 / 360 degrees	8 / PAN 360 degrees **[*1]** 2 / screen
Zone setting method		Set by position and size data	Same as current
Camera angle Reference position	PAN	N/A	N/A
	TILT	N/A	Set camera horizontally (0 degree tilting) = Reference position 
Zone position calculate Coordinates		Flat / Plane	Sphere
			
			
Support angle	PAN	---	0 ～ 360 degree
	TILT	---	0 ～ 45 degree

【*1】Limitation for setting position interval. Refer to " **PRIVACY MASK** " for detail.

PART
SIX

- MOTION DETECT [#]

1. Function Description:

a) Detection Area

Selectable and programmable any **8 position out of 64 (H:8 x V:8) divided block** shown the Fig.1 below

b) Detection Area/position programming:

Selectable and programmable any 8 position out of 64 (H:8 x V:8) divided block shown the Fig.1 below and this programming can be made by the control command through the RS232C.

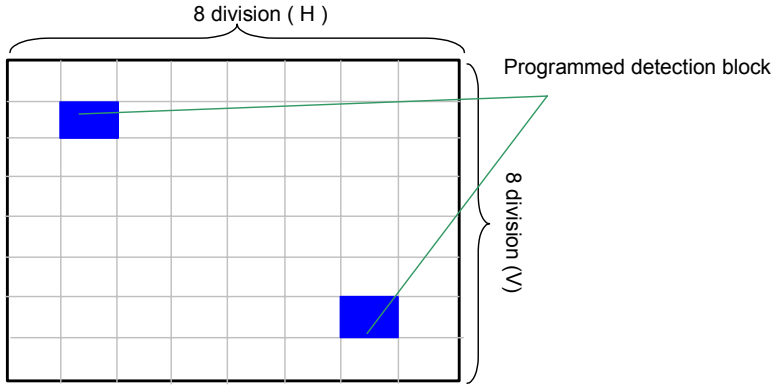


Fig.1 Block of area detection

c) Detection sensitivity:

8 different level of the detection sensitivity can be programmed for each block and this programming can be made by the control command through the RS232C.

d) Detection method / Means of detection:

i) **The histogram detection circuit**:
Detect the change of the luminance distribution of the object and the brightness.

ii) **The sharpness detection (AF detection) circuit**:
Detect the sharpness change for the edge of object.

iii) **Periodical detection**:
Read out the above data from each programmed block every 0.5sec through RS232C.

e) **Judgment method**:

Compare the current data with the last 3 data readout (at last 0.5sec/1.0sec/1.5sec) to judge the changed value is greater than the specified level or not.

f) Motion Detection ON/OFF:
Switch ON to enable the Motion Detection Function
i) Requirement to turn ON the Motion Detection:
aa) Privacy Mask OFF
bb) Zoom: Stop
cc) Continuous & Instant Digital Zoom: OFF
cc) Program AE Mode: Program AE (No DSS, No IRcf remove)

ii) Restriction/Limitation during the Motion Detection operation:
aa) Switched to MF (Manual Focus mode) automatically.
bb) No command writing other than Motion Detection command.(OK for data reading).

2. Motion detect command

Please see an annexed document "MOTION DETECT ; S454_MotDet_ E_vxx.doc".

3. Note

Please be aware of that the accuracy of the Motion Detection can not be 100% guaranteed all the time so please offer this Feature/Function to your customer accordingly.

4. Others

The motion detection may not be functioned under the following condition due to the small change in the scene to respond as histogram change.

aa) Less contrast color like Gray and White between the object and background.

bb) Less brightness and motion change under the low illumination.

cc) Small object with less edge variation.

PART
SEVEN

- INFRARED LIGHTING AT IR OFF [#]

1. IR(Infrared) illumination during IRcf(IR cut filter) out mode (B/W mode):

The sensitivity can be improved using IR illumination with IRcf OFF mode and also the focusing Including zoom tracing can be improved under the following IR wavelength illumination.
(see Fig. 1)

Fig. 1 corresponding infrared lighting

IR wavelength
IR 950nm
IR 850nm

[Note]

* Use of IR illumination other than the IR wavelength listed in Fig.1 above may cause the foc using to be performed incorrectly.

[For example] Using IR illumination 950nm: (Fig. 2)

Fig. 2 corresponding infrared lighting

IR curve position Selection	Focusing status after switching IR ON → IR OFF	Zoom tracing
Normal curve	× won't be in focused	× won't be zoom traced
IR 950nm curve	◎ will be focused	◎ will be zoom traced
IR 850nm curve	× won't be in focused	× won't be zoom traced

2. Command

a) Selection for IR curve [#]

[RAM area]
:RF8A400
:WF8A4X_1X_0
X_1X_0= H'00 ; Visible ray curve [default]
= H'C1 ; IR950nm curve
= H'C2 ; IR850nm curve

[note] 1. Do not change any data during zooming.
2. Do not change any data during IR function operation.
3. Change data after setting IRcf remove manual mode:
* IRcf remove manual modes:
Program AE, Program AE+, Priority(Shutter, Exposure, AGC) mode

[EEPROM area]
:R135600
:W1356X_1X_0
X_1X_0= H'00 ; Visible ray curve [default]
= H'C1 ; IR950nm curve
= H'C2 ; IR850nm curve
[note] Power reset to make effective new data.

Focus position will be fixed to MF position during IRcf is switching. (see Fig.3)

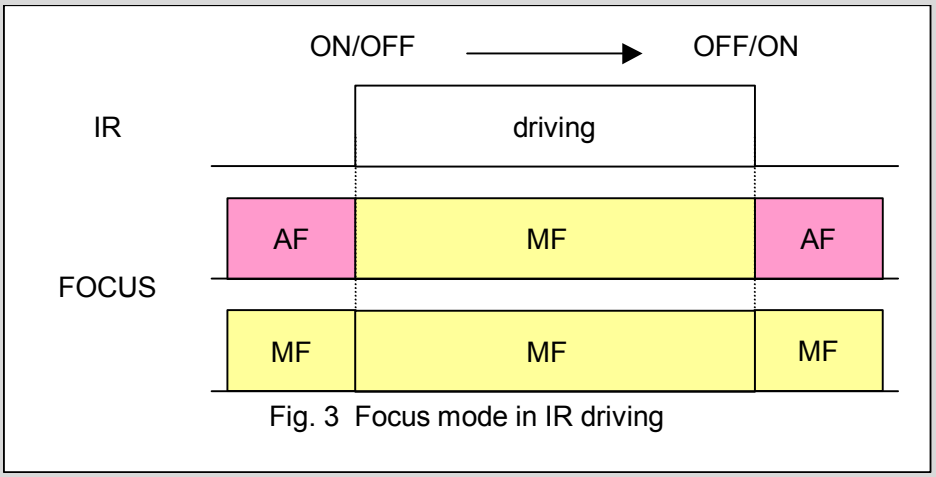


Fig. 3 Focus mode in IR driving

3. Note

Focus may not be good if the IR950nm and IR850nm trace curves are used during the following conditions:

+ In color mode, Using the pre-set IR trace data which is stored during B/W mode.
+ In B/W mode, Using the pre-set IR trace data which is stored during color mode.
+ In B/W mode, Using of IR950nm or IR850nm trace-curve under the no IR lighting.

PART
EIGHT

- FOCUS MODE IN DSS

1. Focus mode in DSS (Table 1)

Table 1

shutter speed		zoom	focus mode
NTSC/EIA	PAL/CCIR		
1/60 - 1/8	1/50 - 1/6	no	AF or MF
1/8 - 1/2	1/6 - 1/1.5	no	MF
1/60 - 1/2	1/50 - 1/1.5	yes[*1]	MF

[*1] The following fig.1 is zoom mode in DSS.

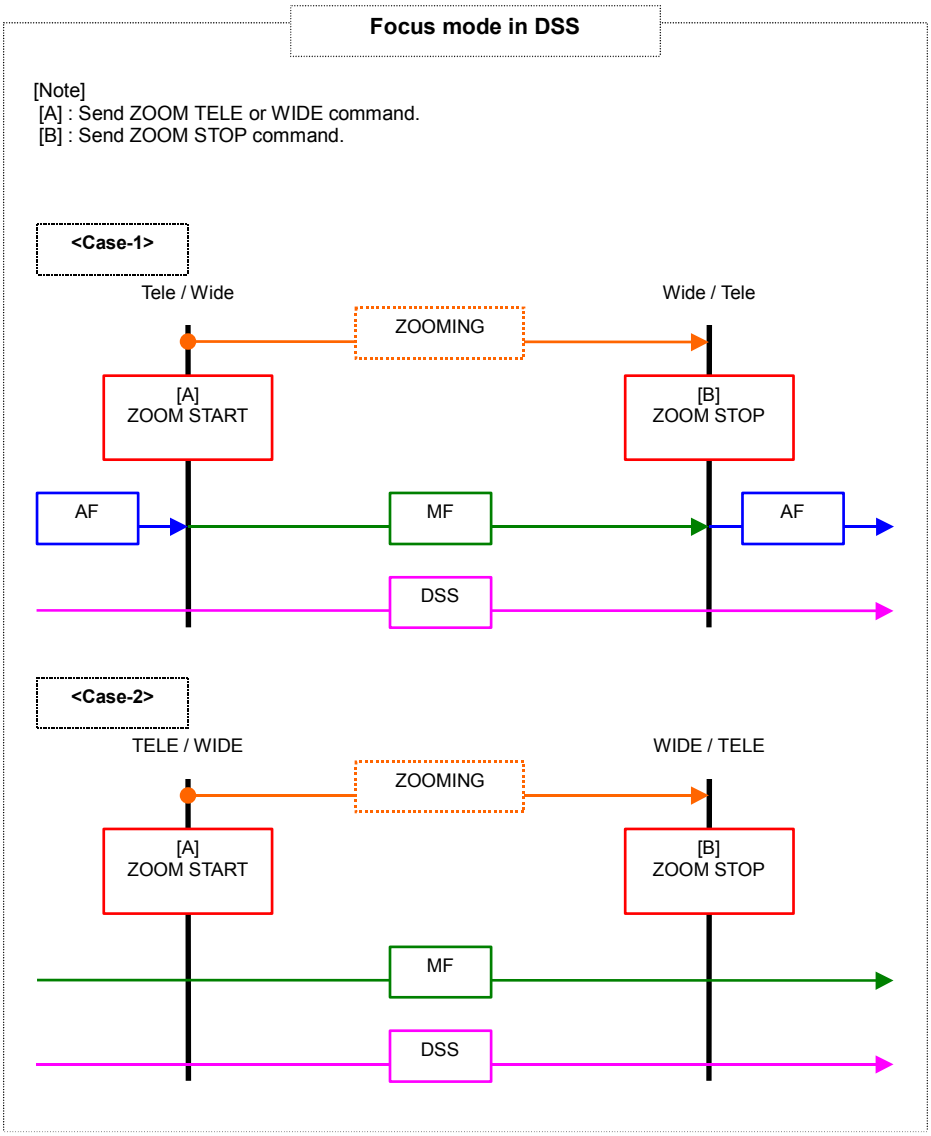


Fig. 1 Zoom mode in DSS

• APPENDIX

[REV. 1.0]
2000/12/11 * New Version (VK-S454)

[REV. 1.1]
2000/12/25 * Pre-Pro Sample Version
page - 14 : 4.x) ***<addition comment>***
Switch the Image Freeze ON/OFF
page - 19 : 5.j) ***<data mistake>***
Set the chroma suppression level tuning value in AGC range
page - 21 : 5.m) ***<data mistake>***
Set the vertical aperture level tuning value
page - 34 : 1.c:d) ***<delete>***
page - 34 : 1) ***<addition>***
Privacy mask specifications
page - 34 : 1.b) ***<address mistake>***
Privacy Mask shade setting

[REV. 1.2]
2001/01/12
page - 34 : 1.a) ***<revision : default data>***
Switch the Privacy Mask ON/OFF
H'01 → H'03

[REV. 1.3]
2001/01/15
page - 14 : 4.x) ***<revision : address>***
Switch the Image Freeze ON/OFF

[REV. 1.4]
2001/01/31 * Mass-production Version **[VK-S454]**
page - 14 : 4.x) ***<delete of NOTE (comment) >***
Switch the Image Freeze ON/OFF
page - 14 : 4.w) ***<revision : address>***
Switch the instant fade(black) ON/OFF
page - 34 : 1.a) ***<mistake : data>***
Switch the Privacy Mask ON/OFF
page - 34 : 3.a) ***<revision : address>***
Moving of mask

[REV. 1.5]
2001/02/06 * **VK-S454E (PAL) Pilot Sample**
page - 4 : Change of reference model ; VK-S354 → VK-S234

[REV. 1.6]

2001/02/20

page - 15 : 5.f) ***<revision : comment >***
Switch the back light compensation (BLC) ON/OFF

page - 15 : 5.g) ***<revision : comment >***
Set the BLC level tuning value in BLC ON mode

page - 12 : 5.c.i) **VK-S454 *<mistake : data>***
Iris offset (average) level (WDR OFF)
H'60 -> H'5B

page - 15 : 5.h) **VK-S454 *<mistake : data>***
Set the burst ON/OFF
Address :E198 H'50 → H'54

2001/02/27 * **VK-S454E (PAL) Pre-Pro Sample**

page - 12 : 5.c.i) **VK-S454E *<revision : default data>***
Iris offset (average) level (WDR OFF)
H'60 -> H'54

page - 15 : 5.h) **VK-S454E *<revision : default data>***
Set the burst ON/OFF
Address :E198 H'5D → H'54
:E199 H'99 → H'9C
:E19A H'5D → H'54
:E19B H'99 → H'9C

[REV. 1.7]

2001/03/30 * Mass-production Version **[VK-S454E]**

[REV. 1.8]

2001/06/18

page - 15 : 5.h) ***< revision : address >***
Set the burst ON/OFF
・address

after change	before change
E198	1026
E199	1027
E19A	1028
E19B	1029

・BURST OFF data
H'00 → H'80

page - 31 : 3.a) ***< addition comment >***
Moving of mask

[REV. 1.9]

2002/06/18

page - 28 : 8.c) ***< revision : address >***
Ratio level at WDR Manual mode

page - 31 : 3.a) ***< revision : address >***
Moving of mask

[REV. 2.0]
2002/10/16

* Newly added functions:

Functions newly added to this command list (version 2.0) shown below with marking [#] will be applicable to model VK-S454 series cameras with the following conditions.

< Required condition for the functions marked [#] >
a) Serial Number
b) EEPROM data version
c) Microprocessor version

Model	Serial Number	EEPROM data Version	Micro. Version
VK-S454	After 21032359	Ver. 6 and above	Ver. 2.34 and above
VK-S454E	After 21121809	Ver. 5 and above	Ver. 2.34 and above

page - 5 : **< Required conditions for the functions marked [#] >** ***Added***

* Contents structure for this command list.

part ONE >> SPECIFICATION
[Newly added]
Combined Command list Protocol and Timing
part TWO >> EXTERNAL CONTROL
page - 15 : 2.c) ***<Newly added command>***
Set the focus speed in Manual focus mode
part THREE >> PROGRAM AE CONTROL COMMAND
>> IR REMOVE CONTROL COMMAND
>> WIDE DYNAMIC RANGE COMMAND
part FOUR >> PRESET
[Contents Structure Change]
Description for the Preset Function Spec.
Refer to the separate command lists
(S454_pp1_Ver_x_x.doc, S454_zt1_Ver_x_x.doc)
part FIVE >> PRIVACY MASK [#]
[Contents Structure Change]
Description for the Privacy mask Function.
Refer to the separate command list
(S454_pmask_E_xx.doc)
part SIX >> MOTION DETECT [#]
[Function add]
Description for the Motion detect Function.
Refer to the separate command list (S454_motdet_E_xx.doc)
part SEVEN >> INFRARED LIGHTING AT IR OFF [#]
[Function add]
Description for the IR illumination with IRcf OFF
part EIGHT >> FOCUS MODE IN DSS