# CONTROL COMMAND FOR VK-S934 SERIES

*[REV. 1.1]*

*This manual applies following models:*

*<NTSC> VK-S934*

*<PAL> VK-S934E*

# CONTENTS

# PART ONE

- **EXTERNAL CONTROL**

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 |
| Baudrate | 4800 bps |

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 µCom. RAM or EEPROM
W :Write 1 byte data of µCom. RAM or EEPROM

A3-A0 Address data of µCom. RAM or EEPROM (write in hex. 0000-FFFF)
D1-D0 Data of µCom. 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 µCom. RAM or EEPROM
w :Write 2 bytes data of µCom. RAM or EEPROM

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

Fig. 1 Communication data format

[Note]: is difference of data between VK-S914 series and VK-S934.

4. Control commands

a) Switch the auto focus / manual focus

:RFF0E00
:WFF0E$X_1X_0$
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
:WFDFC$X_1X_0$
Super HIGH SPEED (1.9 sec) * ;
$X_1X_0$ : Set bit 3 of echo back data to “0”.
Set bit 2 of echo back data to “1”.
HIGH SPEED (3.6 sec);
$X_1X_0$ : Set bit 3 of echo back data to “0”.
Set bit 2 of echo back data to “0”.
NORMAL SPEED (6.0 sec);
$X_1X_0$ : Set bit 3 of echo back data to “1”.
Set bit 2 of echo back data to “0”.

*[Note]: Super HIGH SPEED (1.9sec) 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 = 16X256/(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 | X9 |
|---|---|---|---|---|---|---|---|---|---|
| Echo back data | 14C0 or less | 2EF0 or less | 3C60 or less | 44F0 or less | 4B30 or less | 4FE0 or less | 53B0 or less | 56E0 or less | 5990 or less |
| Zoom position | X10 | X11 | X12 | X13 | X14 | X15 | X16 | | |
| Echo back data | 5BF0 or less | 5DE0 or less | 5FA0 or less | 6110 or less | 6250 or less | 6360 or less | 6360 or more | | |

h) Switch the continuous digi. zoom ON/OFF

:RFCCB00

:WFCCB$X_1X_0$

$X_1X_0$=00 ; OFF $X_1X_0$=01 ; ON

Please attached Continuous digi. zoom flow chart.

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

:WFDF0$X_1X_0$

$X_1X_0$ (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 ; max. ]

j) Switch the instant digital zoom ON/OFF

:RFF0F00

:WFF0F$X_1X_0$

bit 7 of $X_1X_0$ : 0-OFF 1-ON

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

:WFDE6$X_1X_0$

$X_1X_0$ (hex) = IMX10(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 attached Program AE command sheet.

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

Please attached Program AE command sheet

n) Switch the auto / manual exposure

Please attached Program AE command sheet.

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

Please attached Program AE command sheet.

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

Please attached Program AE command sheet.

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

:RFB7F00

:WFB7F$X_1X_0$

bit 7 of $X_1X_0$ : 0-ON 1-OFF

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

:wFB38$X_3X_2X_1X_0$

$X_3X_2X_1X_0$ : tuning value

( $X_3X_2X_1X_0$=0000~03C0 ; 0.03125dB/step )

[ $X_3X_2X_1X_0$=0000 ; 0dB ,

$X_3X_2X_1X_0$=03C0 ; 30dB ]

s) Switch the auto / manual white balance

:RFBFF00

:WFBFF$X_1X_0$

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 )

$X_3X_2X_1X_0$: 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 )

$X_3X_2X_1X_0$: H'0080~H'00FF, H'0180~H'01FF, H'0280~H'02FF, H'0380~H'03FF

5. Others

[Note]: * mark : Changes are effective after power reset.
Default values in EEPROM area are subject to change without notice.

a) Get the camera type

[EEPROM area]
:RE1ED$X_1X_0$
:RE1EE$X_1X_0$ $X_0$ = Camera Version Number

| | Type data ($X_1X_0$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area "E1ED" | 30 | 30 | | | | |
| EEPROM area "E1EE" | $0X_0$ | $1X_0$ | | | | |

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

[EEPROM area] *
:WE139$X_1X_0$
( $X_1X_0$=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 auto iris control level tuning value in auto exposure mode

i) Iris offset (average) level

[RAM area]
:WFD9E$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )

[EEPROM area] *
:WE09E$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )

| | default value ($X_1X_0$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area "E09E" | 42 | 39 | | | | |

ii) Iris offset (peak) level

[RAM area]
:WFD9F$X_1X_0$ ( $X_1X_0$=00~7F ; 128 step )

[EEPROM area] *
:WE09F$X_1X_0$ ( $X_1X_0$=00~7F ; 128 step )

| | default value ($X_1X_0$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area "E09F" | 08 | 10 | | | | |

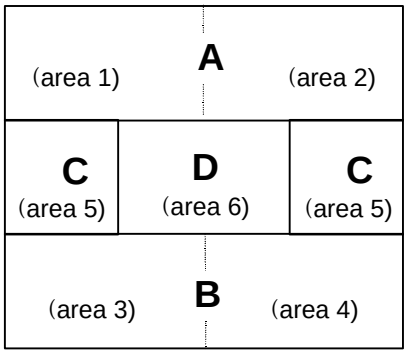
d) Get the luminance data for the 6 screen areas

[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)

e) 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 )
( $X_3$ : $K_a$ , $X_2$ : $K_b$ , $X_1$ : $K_c$ , $X_0$ : $K_d$ )
[ $X_3X_2X_1X_0$=469F ; default ]

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

[RAM area]
:RFECE0
:WFECE$X_1X_0$
$X_1X_0$=00 ; OFF $X_1X_0$=02 ; ON

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

[RAM area]
:WFD8E$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )

[EEPROM area] *
:WE08E$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )

| | default value ($X_1X_0$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area "E08E" | 10 | 10 | | | | |

h) Set the burst ON/OFF

[EEPROM area] *
:WE198$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )
:WE199$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )
:WE19A$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )
:WE19B$X_1X_0$ ( $X_1X_0$=00~FF ; 256 step )

| | default value ($X_1X_0$=) | | |
|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | NTSC / PAL |
| | burst ON | | OFF |
| EEPROM area | | | |
| "E198" | 64 | 6C | 00 |
| "E199" | 80 | 96 | 00 |
| "E19A" | 00 | 6C | 00 |
| "E19B" | 00 | 96 | 00 |

[Note] no address "E059 - E05C" on EEPROM

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

[RAM area]

| | | | | |
|---|---|---|---|---|
| AGC gain | | ~ | AGC ON | :WB790$X_4Y_4$ |
| AGC gain | AGC ON | ~ | 1/3 maximum AGC level | :WB791$X_3Y_3$ |
| AGC gain | 1/3 maximum AGC level | ~ | 2/3 maximum AGC level | :WB792$X_2Y_2$ |
| AGC gain | 2/3 maximum AGC level | ~ | maximum AGC level | :WB793$X_1Y_1$ |
| AGC gain | maximum AGC level | ~ | | :WB794$X_0Y_0$ |

( $X_?X_?$=00~FF ; 256 step )

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

[Note] maximum AGC level setting at page 15 - item m)
chroma suppression level tuning values at Fig. 1

[EEPROM area] *

| | | | | |
|---|---|---|---|---|
| AGC gain | | ~ | AGC ON | :W1340$X_4Y_4$ |
| AGC gain | AGC ON | ~ | 1/3 maximum AGC level | :W1341$X_3Y_3$ |
| AGC gain | 1/3 maximum AGC level | ~ | 2/3 maximum AGC level | :W1342$X_2Y_2$ |
| AGC gain | 2/3 maximum AGC level | ~ | maximum AGC level | :W1343$X_1Y_1$ |
| AGC gain | maximum AGC level | ~ | | :W1344$X_0Y_0$ |

( $X_?X_?$=00~FF ; 256 step )

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

[Note] maximum AGC level setting at page 15 - item m)
chroma suppression level tuning values at Fig. 1

| | default value ($X_?X_?$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area | | | | | | |
| "1340" | 7F | 7F | | | | |
| "1341" | 7F | 7F | | | | |
| "1342" | 76 | 68 | | | | |
| "1343" | 52 | 42 | | | | |
| "1344" | 40 | 40 | | | | |

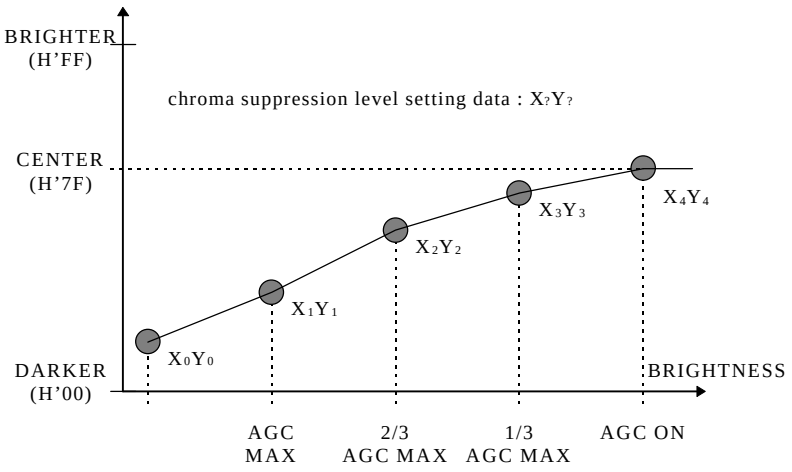



Fig. 1 Chroma suppression level

j) Select the manual aperture mode

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

k) Set the horizontal aperture level tuning value

:WFBF6$X_1X_0$ ( $X_1X_0$=00~1F ; 32 step )

[EEPROM area] *

| | | | | |
|---|---|---|---|---|
| AGC gain | | ~ | AGC ON | :W1350$X_4Y_4$ |
| AGC gain | AGC ON | ~ | 1/3 maximum AGC level | :W1351$X_3Y_3$ |
| AGC gain | 1/3 maximum AGC level | ~ | 2/3 maximum AGC level | :W1352$X_2Y_2$ |
| AGC gain | 2/3 maximum AGC level | ~ | maximum AGC level | :W1353$X_1Y_1$ |
| AGC gain | maximum AGC level | ~ | | :W1354$X_0Y_0$ |
| | | | | ( $X_?X_?$=00~1F ; 32 step ) |

[Note] maximum AGC level setting at page 15 - item m)
horizontal aperture level tuning values at Fig. 2

| | default value ($X_?X_?$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area | | | | | | |
| "1350" | 1A | 1A | | | | |
| "1351" | 18 | 18 | | | | |
| "1352" | 15 | 15 | | | | |
| "1353" | 0A | 0A | | | | |
| "1354" | 08 | 08 | | | | |

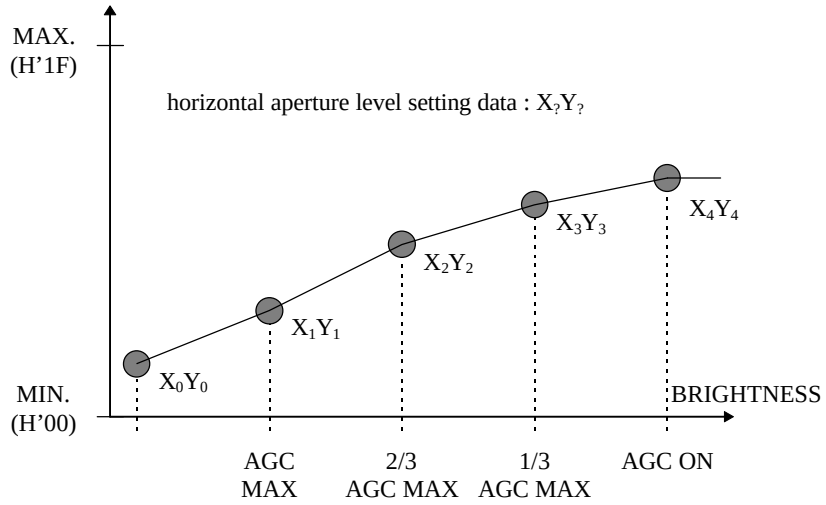



Fig. 2 horizontal aperture level

l) Set the vertical aperture level tuning value

:WFBF9$X_1X_0$ ( $X_1X_0$=00~1F ; 32 step )

[EEPROM area] *

| | | | | |
|---|---|---|---|---|
| AGC gain | | ~ | AGC ON | :W13A0$X_4Y_4$ |
| AGC gain | AGC ON | ~ | 1/3 maximum AGC level | :W13A1$X_3Y_3$ |
| AGC gain | 1/3 maximum AGC level | ~ | 2/3 maximum AGC level | :W13A2$X_2Y_2$ |
| AGC gain | 2/3 maximum AGC level | ~ | maximum AGC level | :W13A3$X_1Y_1$ |
| AGC gain | maximum AGC level | ~ | | :W13A4$X_0Y_0$ |

( $X_?X_?$=00~1F ; 32 step )

[Note] maximum AGC level setting at page 15 - item m)
vertical aperture level tuning values at Fig. 3

| | default value ($X_?X_?$ =) | | | | | |
|---|---|---|---|---|---|---|
| MODEL | VK-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area | | | | | | |
| “13A0” | 1A | 1A | | | | |
| “13A1” | 15 | 15 | | | | |
| “13A2” | 12 | 12 | | | | |
| “13A3” | 08 | 08 | | | | |
| “13A4” | 03 | 03 | | | | |

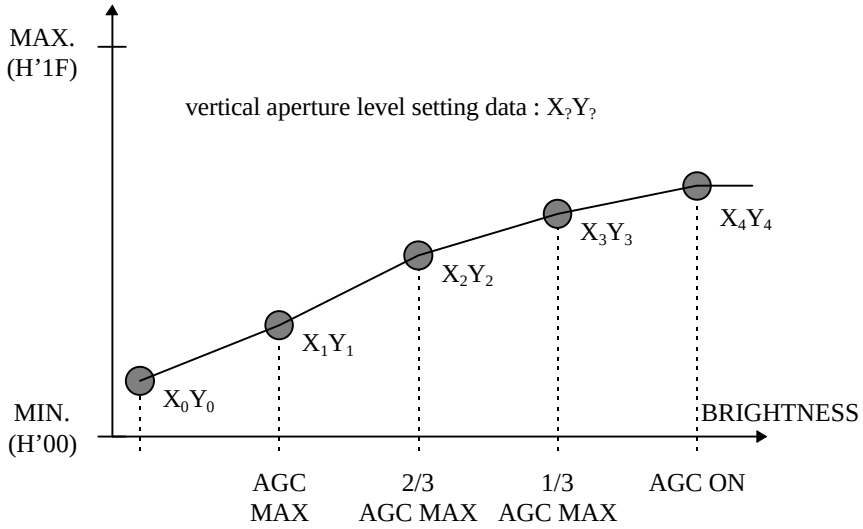



Fig. 3 vertical aperture level

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

[RAM area]
:w$FD46X_3X_2X_1X_0$
:W$B5B6Y_1Y_0$
:W$B5BCY_1Y_0$
( $X_3X_2X_1X_0$=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] *
:w$E046X_3X_2X_1X_0$
:W$1166Y_1Y_0$
:W$116CY_1Y_0$
( $X_3X_2X_1X_0$=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-S934 | VK-S934E | | | | |
| FORMAT | NTSC Hi-BAND | PAL Hi-BAND | | | | |
| EEPROM area | | | | | | |
| “E046” | 0320 | 0400 | | | | |
| “1166” | 64 | 80 | | | | |
| “116C” | 64 | 80 | | | | |
| maximum AGC Gain | 25.0dB | 32.0dB | | | | |

n) Change Communication Baudrate

[EEPROM area] *
:WE05E$X_1X_0$
( $X_1X_0$=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 )

o) Set RAM initialize

[RAM area]
:WFF0A00
:WFCAC00

6. Other useful commands

a) Preset Mode

( MF, No-Trace, Zoom Speed ; **1.6sec** )

- Preset mode - Flow chart

See an annexed document “Document 1”.

Document 1: **s934_pp1.doc**

b) Zoom Trace Preset Mode

( MF, Trace, Zoom Speed ; **1.9sec** )

- Zoom trace preset mode - Flow chart

See an annexed document “Document 2”.

Document 2: **s934_zt1.doc**

c) Program AE ( Digital Slow Shutter, Shutter / Exposure Priority )

- Digital slow shutter control command
- Shutter priority control command
- Exposure priority control command

See document “PART TWO”.
PART TWO: PROGRAM AE CONTROL COMMAND

d) Continuous Digital Zoom

- Continuous Digital Zoom Control - Flow chart

See document “PART THREE”.
PART THREE: CONTINUOUS DIGITAL ZOOM CONTROL COMMAND

e) Control Command Timing

- Control command timing

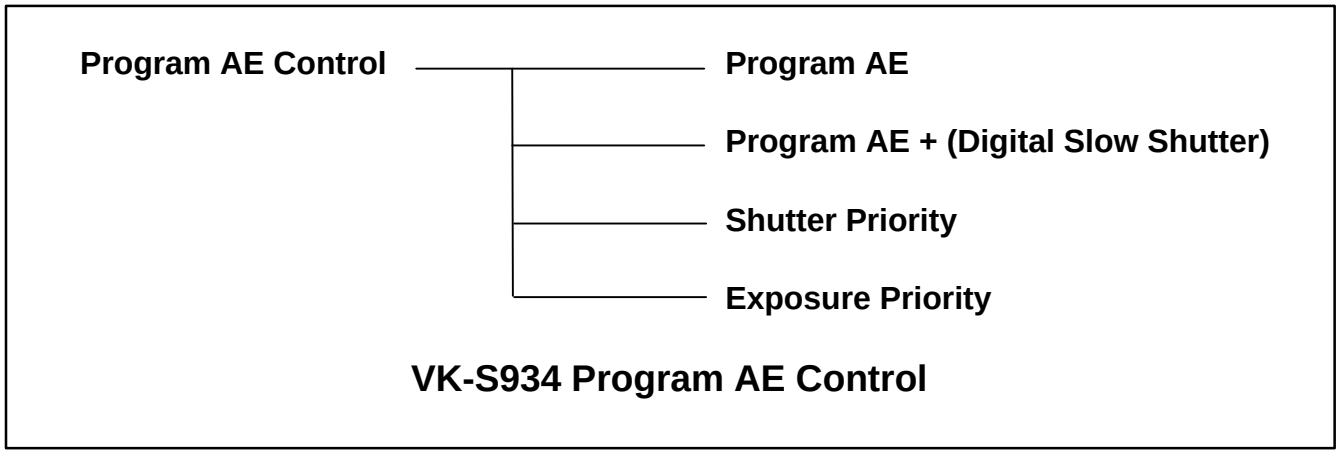
See document “PART FOUR”.
PART FOUR: CONTROL COMMAND TIMING

PART
# TWO

## • PROGRAM AE CONTROL COMMAND

1. Program AE mode

The following Control Commands are Program AE Commands added to VK-S934.



2. Program AE
   a) Mode switch

:RFCC800
:WFCC8$X_1X_0$
$X_1X_0$=00

3. Program AE + (Auto digital slow shutter)
   a) Mode switch

:RFCC800
:WFCC8$X_1X_0$
$X_1X_0$=01; [default]

   b) digital slow shutter status

:RFCC700
Echo back data is digital slow shutter status.

[Please attached Table. 1.]

Table. 1 Digital slow shutter table

| $X_1X_0$ (echo back data) | Shutter Speed (s) | |
|---|---|---|
| | NTSC | PAL |
| 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 [default] | 1/8 - 1/ 4 | 1/6 - 1/ 3 |
| 20 | 1/4 - 1/ 2 | 1/3 - 1/ 1.5 |

   c) Auto digital slow shutter limit

:R11E500
:W11E5$X_1X_0$

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

4. Shutter priority
   a) Mode switch

:RFCC800
:WFCC8$X_1X_0$
$X_1X_0$=07

   b) Set the shutter speed tuning value

:RFCC900
:WFCC9$X_1X_0$
$X_1X_0$ ; tuning value

[Please refer to the attached Table.2.]

Table. 2 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 | 1/13 |
| 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 |

5. Exposure priority

a) Mode switch

:RFCC800
:WFCC8$X_1X_0$
$X_1X_0$=08

b) Set the exposure tuning value

:RFCC900
:WFCC9$X_1X_0$
$X_1X_0$ ; tuning value

[Please refer to the attached Table.3.]

Table. 3 Exposure data table in exposure priority mode

| F-value | $X_1X_0$ (setting data) |
|---|---|
| F1.4 | 00 |
| F2.0 | 01 |
| F2.8 | 02 |
| F4.0 | 03 |
| F5.6 | 04 |
| F8.0 | 05 |
| F11 | 06 |
| F16 | 07 |
| F22 | 08 |
| F32 | 09 |

PART
# THREE

# • CONTINUOUS DIGITAL ZOOM CONTROL COMMAND

1. Continuous Digital Zoom Control

Table 1 shows the difference between the previous series and the DSS series.

Table 1

| Zoom moving area | Zoom direction | Type |
|---|---|---|
| Optical | Wide → Tele | Same as previous |
| Optical | Tele → Wide | Same as previous |
| Digital | Wide → Tele | New |
| Digital | Tele → Wide | New |

[Note]: shows the difference between the previous series and the DSS series.

**The following flow chart (Fig. 1) is Continuous Digital Zoom control.**

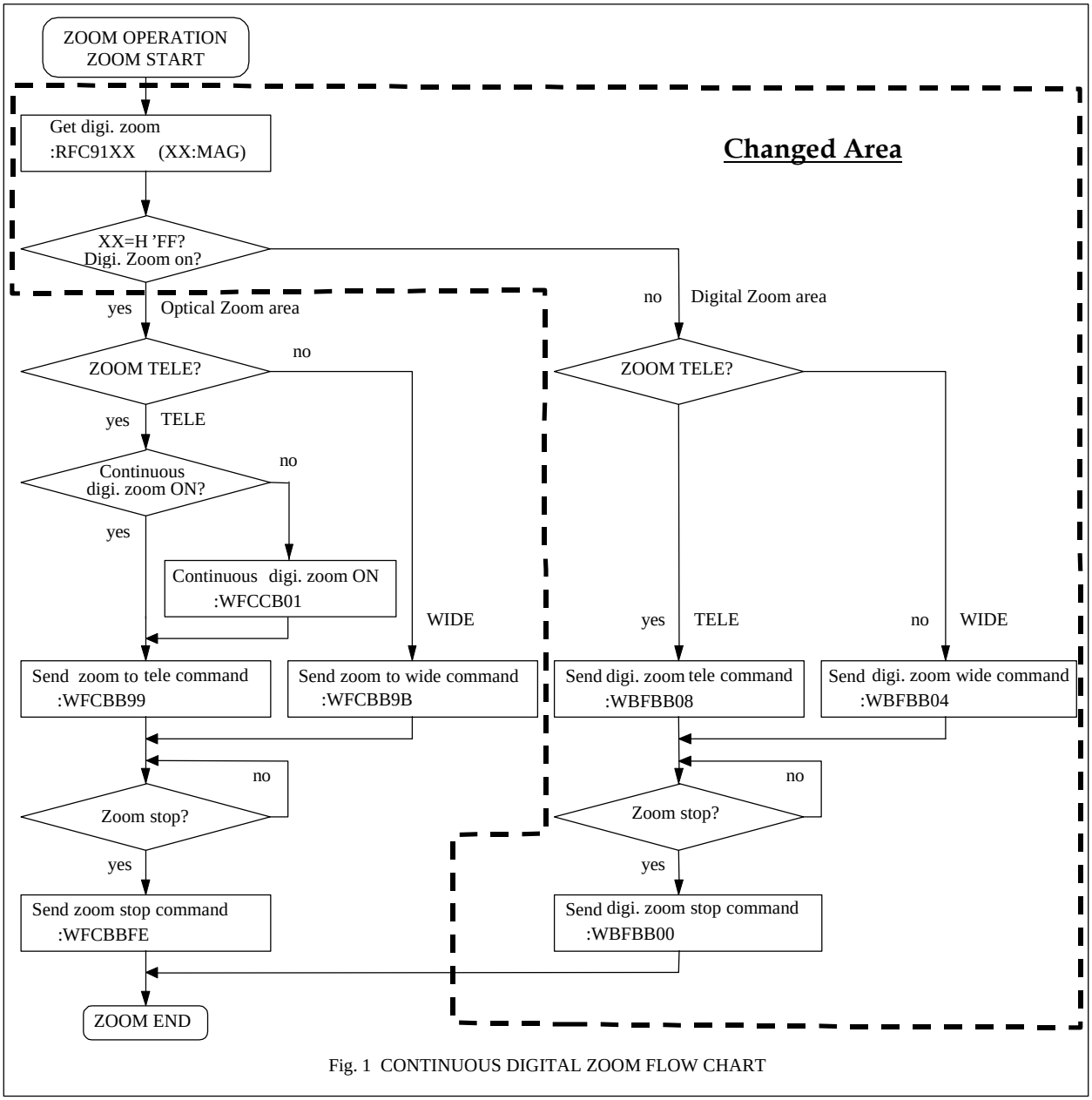



Fig. 1 CONTINUOUS DIGITAL ZOOM FLOW CHART

PART
# FOUR

- **CONTROL COMMAND TIMING**

1. Timing table - Program AE commands
   ( Fig. 1 )

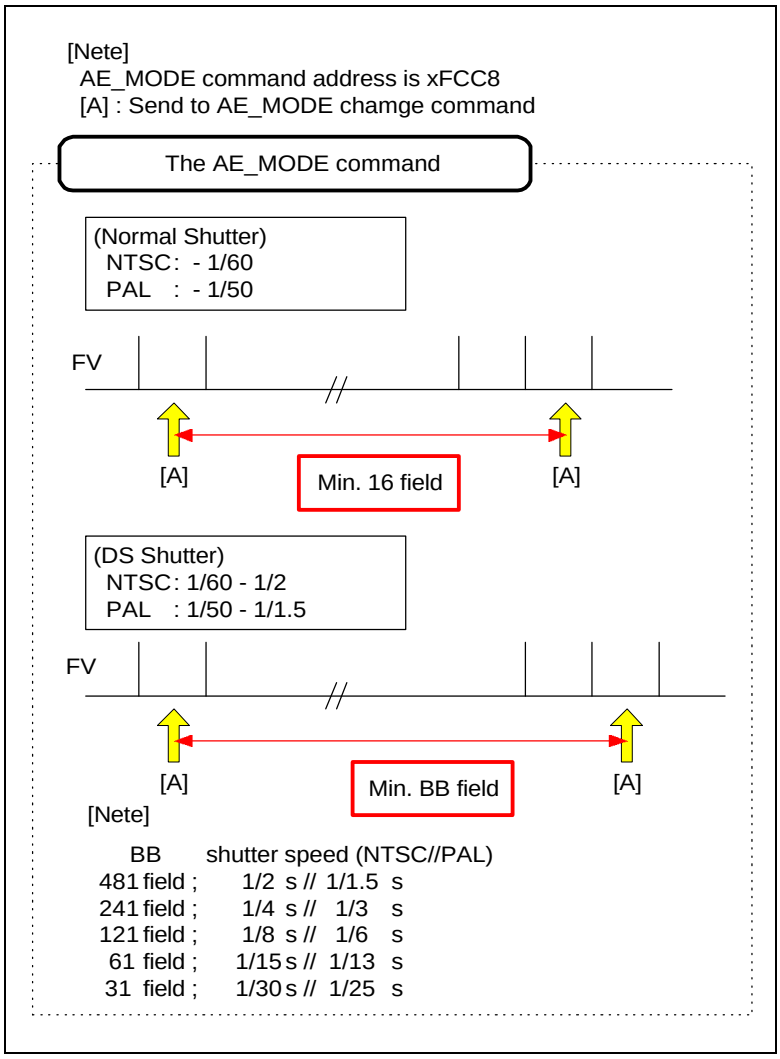



**Fig. 1 Change AE_MODE timing**

2. Timing table - After ZOOM commands (Digital Slow Shutter mode only)
**( Fig. 2 )**

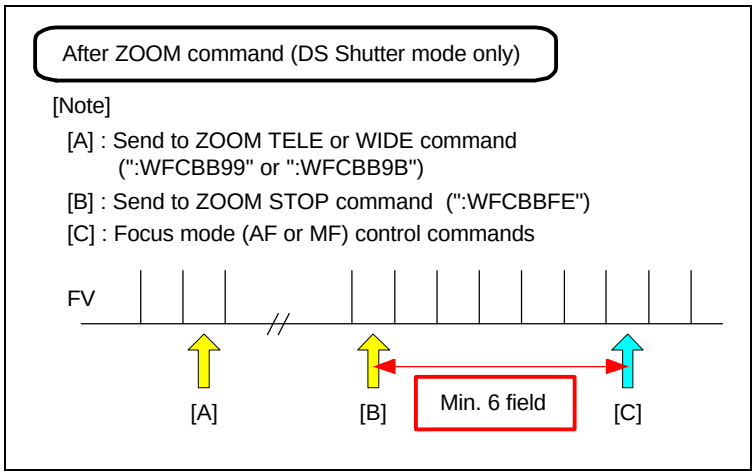



**Fig. 2 After ZOOM commands timing**

3. Timing table - Other commands
**( Fig. 3 )**

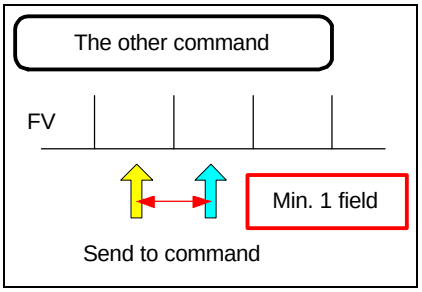



**Fig. 3 Other command timing**

PART
# FIVE

## • FOCUS MODE IN DIGITAL SLOW SHUTTER

1. Focus and Zoom modes during Digital Slow Shutter
   (Table 1)

Table 1

| Shutter Speed | | Initial Focus Mode | Focus Mode During Zooming | Focus Mode After Zooming | Case Number In Fig. 1 |
|---|---|---|---|---|---|
| NTSC/EIA | PAL/CCIR | | | | |
| 1/60 - 1/8 | 1/50 - 1/6 | AF | MF | AF | <Case 1> |
| 1/8 - 1/2 | 1/6 - 1/1.5 | MF | MF | MF | <Case 2> |
| 1/60 - 1/2 | 1/50 - 1/1.5 | AF | AF→ MF**[*1]** | MF | <Case 3> |

**[*1] Camera enters Digital Slow Shutter mode during zooming**

**The following Fig.1 is Focus mode while Zooming during Digital Slow Shutter.**

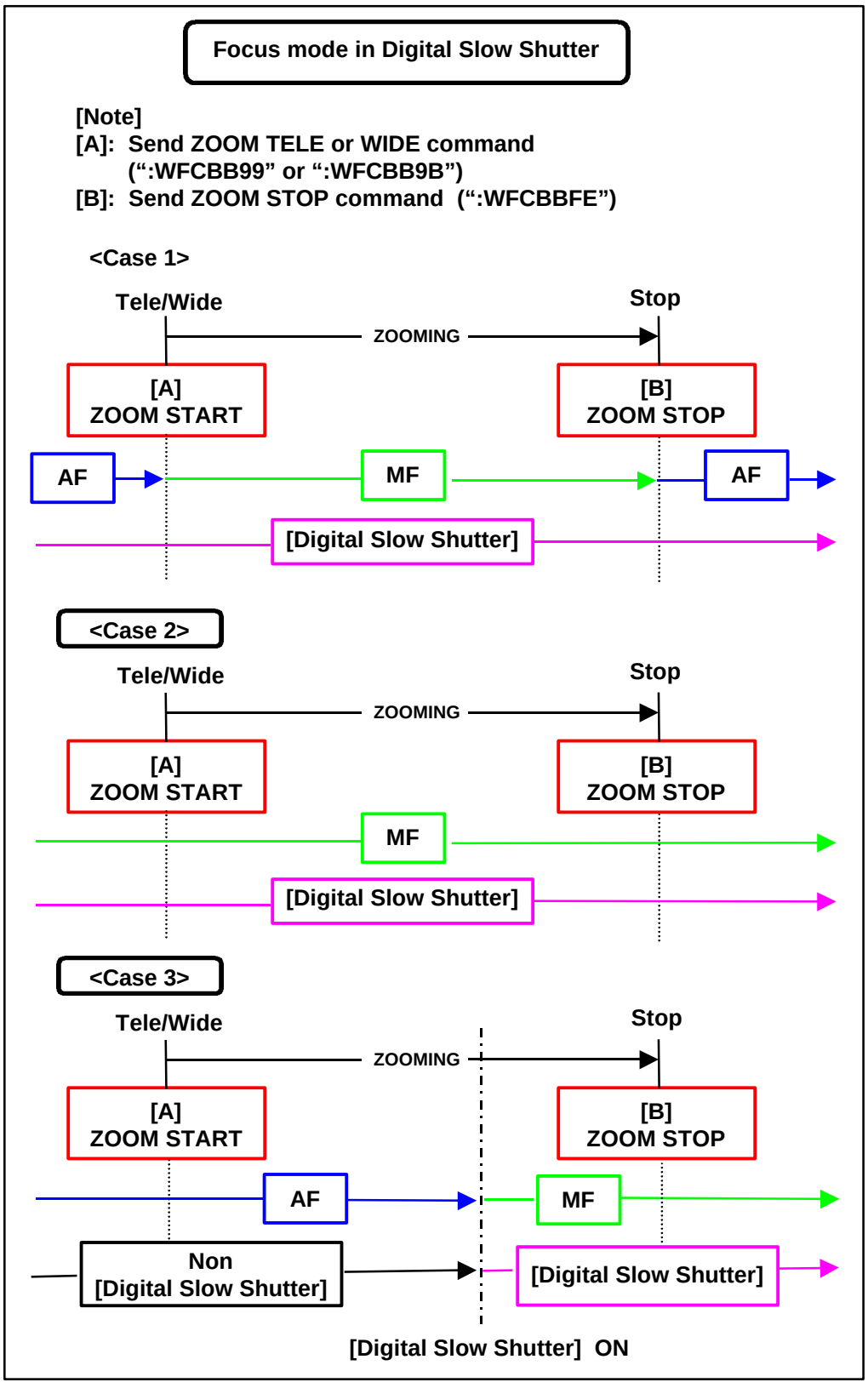



Fig. 1 Focus mode while Zooming during Digital Slow Shutter

# PART SIX

## • APPENDIX

**[REV. 1.0]**

99/09/21 * Original Version

**[REV. 1.1]**

99/11/11 * PART - 4: CONTROL COMMAND TIMING

<refine>
page 24: Timing table - Program AE commands

<addition>
page 25: Timing table - After ZOOM commands (DS Shutter mode only)

* PART - 5: FOCUS MODE IN DIGITAL SLOW SHUTTER

<addition>
pages 26-27: Focus mode in Digital Slow Shutter