



VXP4

Protocol Manual

Products covered by this manual:

Product Range
Vi-series DVRs
M-Series DVRs
R-Series DVRs
D1,D2,D3,D4 Series IR CMOR Domes
Vi-P14, Vi-Q4 Video Quad Processors

Document Reference

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1 Protocol

1.1 Information

- The full protocol is proprietary information that is not published. The information in this document is a selected sub-set for special application where remote control by third party software is required. Please contact Videoswitch if you require a facility that is not listed below.
- This protocol is subject to change.
- Not all products support all the dome commands listed in this document.

1.2 Data Format

Baud Rate: 9600
 Data Bits: 8
 Parity: None
 Stop Bits: 2

1.3 Structure

Each command is made up of the following fields:

Name	Bytes	Value of each byte	Example
Start of block	1	01 or 5B	[
C_SOURCE	2	00.. FF	7E
C_DEST	2	00.. FF	FF
C_DATA	0 to 256	00.. FF	123456
C_CODE	2	00.. FF	12
C_PARAM	2	00.. FF	34
End of block	1	04 or 5D]

With the above example values, the resultant complete ASCII command string would be:

[7EFF1234561234]

1.3.1 C_SOURCE

Device	C_SOURCE
Videoswitch DVRs	0,1,2,3 etc
Videoswitch Keyboards	80 to 9F
Vi-Connect	7E

1.3.2 C_DEST

Device	C_DEST
Vi-Series, Vi-K2	0,1,2,3 etc (FF for broadcast)
VDC,VDM, VQ, VK-2	1,2,3 etc (00 for broadcast)
Vi-Connect	7E (FF for broadcast)

1.4 Commands Generated by Vi-K1 Keys (or Keypad)

1.4.1 Key Press

Key Name	C-CODE	C_PARAM	Code/Parameter Value
FIND	C_NEXT_FIND	NULL	6700
BURN	C_INCIDENT	NULL	3800
MENU	C_MENU	NULL	0100
INFO	C_NEXT_INFO	NULL	6600
LIVE	C_LIVE	NULL	3400
+	C_PLUS_MINUS	P_ON	6101
-	C_PLUS_MINUS	P_OFF	6100
INC	C_INC_DEC	P_ON	6201
DEC	C_INC_DEC	P_OFF	6200
OK	C_OK	NULL	0200
BACK	C_BACK	NULL	0300
DEF	C_DEFAULT	NULL	0E00

FN	C_FN	NULL	6400
PSW	C_PSW	NULL	6500
UP	C_UP	NULL	0400
DOWN	C_DOWN	NULL	0500
LEFT	C_LEFT	NULL	0600
RIGHT	C_RIGHT	NULL	0700
PLAY_FRAME_BACK	C_DIG_PLAY	PL_FRAME_BCK	3C01
PLAY_BACK	C_DIG_PLAY	PL_VARI_BCK	3C12
PAUSE	C_DIG_PLAY	PL_PAUSE	3C02
PLAY_FORWARD	C_DIG_PLAY	PL_VARI_FWD	3C11
PLAY_FRAME_FORWARD	C_DIG_PLAY	PL_FRAME_FWD	3C03
QUAD	C_MODE	M_NEXT_QUAD	1011
MULTI	C_MODE	M_NEXT_MULTI	1017
1	C_ASCII	'1'	6331
2	C_ASCII	'2'	6332
3	C_ASCII	'3'	6333
4	C_ASCII	'4'	6334
5	C_ASCII	'5'	6335
6	C_ASCII	'6'	6336
7	C_ASCII	'7'	6337
8	C_ASCII	'8'	6338
9	C_ASCII	'9'	6339
0	C_ASCII	'0'	6330

1.4.2 Key Release

The following keys should produce these commands when released

Key Name	Code Name	Parameter Name	Code/Parameter Value
+	C_PLUS_MINUS_OFF	P_ON	8001
-	C_PLUS_MINUS_OFF	P_OFF	8000
BACK	C_BACK_OFF	NULL	8100
DEF	C_DEFAULT_OFF	NULL	8200
UP	C_UP_OFF	NULL	5500
DOWN	C_DOWN_OFF	NULL	5600
LEFT	C_LEFT_OFF	NULL	5700
RIGHT	C_RIGHT_OFF	NULL	5800

1.5 Miscellaneous Commands

1.5.1 Select Camera

C_CODE: C_FULL (0F)
 C_PARAM: (Zero-base monitor<<5) + Zero-based camera
 C_DATA: None

Examples:

[00FF0F00] select Camera 1 on main monitor
 [00FF0F20] select Camera 1 on spot 1 monitor

 [00FF0F0F] select Camera 16 on main monitor
 [00FF0F2F] select Camera 16 on spot 1 monitor

1.5.2 Time/Date Search (set time/date)

C_CODE: C_ACTION (42)
 C_PARAM: A_SEARCH (01)
 C_DATA: Date/Time string in this form: "17/09/05 18:45:00". Note that the dividing character between the date and time tells the DVR whether the time is in summertime or wintertime (7E for summer, 20 for winter).

Example: [7EFF31372F30392F30357E31383A34353A30304201]

1.5.3 Time/Date Search (do search)

C_CODE: C_DIG_PLAY (3C)
C_PARAM: PL_SEARCH (07)
C_DATA: None

Example: [7EFF3C07]

1.5.4 Request Alarm Status

This commands requests the current status of the alarms, activity, wireless PIR alarms and critical alerts. These reply commands are send automatically whenever an alarm state changes (Vi400/Vi600 Firmware B01 upwards) so there is no need to poll the DVR.

C_CODE: C_REQUEST (43)
C_PARAM: R_EVENTS (03)
C_DATA: None
Example: [7EFF4303]

The DVR will respond by sending the following commands: *Alarm Status*, *Activity Status*, *Wireless PIR Status* and *Critical Alert Status* as detailed below.

1.5.5 Alarm Status

This command is sent by a Vi400/Vi600 DVR when the alarm state changes

C_CODE: C_INFO (28)
C_PARAM: R_ALARMS (04)
C_DATA: 0000 to FFFF. The 16 bits represented in this 4-digit hexadecimal number indicate the state of alarms on cameras 1 to 16 (LSB is camera 1).
Example: [007E00012804]

1.5.6 Activity Status

This command is sent by a Vi400/Vi600 DVR when the activity state changes

C_CODE: C_INFO (28)
C_PARAM: R_ACTIVITY (05)
C_DATA: 0000 to FFFF. The 16 bits represented in this 4-digit hexadecimal number indicate the state of activity on cameras 1 to 16 (LSB is camera 1)
Example: [007E00012805]

1.5.7 Wireless PIR status

This command is sent by a Vi400/Vi600 DVR when the wireless PIR state changes

C_CODE: C_INFO (28)
C_PARAM: R_WIRELESS (12)
C_DATA: 0000 to FFFF. The 16 bits represented in this 4-digit hexadecimal number indicate the state of wireless PIRs on cameras 1 to 16 (LSB is camera 1)
Example: [007E00012812]

1.5.8 Critical Alert Status

This command is sent by a Vi400/Vi600 DVR when a critical alert status changes.

C_CODE: C_INFO (28)

C_PARAM: R_ALERT (06)

C_DATA: 0000 to FFFF. The 16 bits represented in this 4-digit hexadecimal number indicate the state these critical alerts:

Bit0: ALERT_DRIVE_1,
 Bit1: ALERT_DRIVE_2,
 Bit2: ALERT_DRIVE_3,
 Bit3: ALERT_FULL_1,
 Bit4: ALERT_FULL_2,
 Bit5: ALERT_FULL_3,
 Bit6: ALERT_ERR_1,
 Bit7: ALERT_ERR_2,
 Bit8: ALERT_ERR_3,
 Bit9: ALERT_SMART_1,
 Bit10: ALERT_SMART_2,
 Bit11: ALERT_SMART_3,
 Bit12: ALERT_LOSS,
 Bit13: ALERT_TEST_FAILED

Example: [007E00002806]

1.6 Telemetry

C_CODE: see below

C_PARAM: see below

C_DATA: zero-base camera number

1.6.1 C_TELEM

Description: Telemetry commands

C_CODE: 0xF8 (*)

C_PARAM: See below

Notes: This command uses the Code (high byte) and Parameter (low byte) as a 16bit value:

Bit 0: Tilt down
 Bit 1: Tilt up
 Bit 2: Pan left
 Bit 3: Tan right
 Bit 4: Zoom in
 Bit 5: Zoom out
 Bit 6: Focus near
 Bit 7: Focus far
 Bit 8: Iris open

- Bit 9: Iris close
- Bit 10: (Always on)
- Bit 11: (Always on)
- Bit 12: (Always on)
- Bit 13: (Always on)
- Bit 15: (Always on)

(*) Bits 0 – 9 unset (no telemetry on) and bits 10 – 15 set = 0xF8

1.6.2 C_GOTO_PRESET

Description: Go to preset

C_CODE: 0x0C

C_PARAM: Preset number, zero-based

1.6.3 C_RUN_TOUR

Description: Run tour

C_CODE: 0x11

C_PARAM: Tour number, zero-based

1.6.4 C_CLEAR_TOUR

Description: Clear tour

C_CODE: 0x5B

C_PARAM: Tour number, zero-based

1.6.5 C_TILT_SP

Description: Tilt speed

C_CODE: 0x16

C_PARAM: Required speed (0 – 0xFF)

1.6.6 C_PAN_SP

Description: Pan speed

C_CODE: 0x17

C_PARAM: Required speed (0 – 0xFF)

1.6.7 C_ZOOM_SP

Description: Zoom speed

C_CODE: 0x18

C_PARAM: Required speed (0 – 0xFF)

1.6.8 C_FOCUS_SP

Description: Focus speed

C_CODE: 0x19

C_PARAM: Required speed (0 – 0xFF)

1.6.9 C_IRIS_SP

Description: Iris speed

C_CODE: 0x1A

C_PARAM: Required speed (0 – 0xFF)

1.6.10 C_PRESET_PAN_SP

Description: Preset pan speed during tour

C_CODE: 0x1B

C_PARAM: Required speed (0 – 0xFF)

1.6.11 C_PRESET_DWELL_SP

Description: Preset dwell speed during tour

C_CODE: 0x1C

C_PARAM: Required speed (0 – 0xFF)

1.6.12 C_CMD

Description: Dome functions

C_CODE: 0x53

C_PARAM:

1.6.12.1 DF_AUTO_FOCUS

Turn auto-focus on and off

1.6.12.2 DF_AUTO_IRIS

Turn auto-iris on and off

1.6.12.3 DF_180

180° flip

1.6.12.4 DF_AUTO_PAN

Turn auto-pan on and off

1.6.12.5 DF_RELAY

Turn auxiliary relay on and off

1.6.12.6 DF_LAMP

Turn lamp on and off

1.6.12.7 DF_WASH_ON

Turn wash on

1.6.12.8 DF_WASH_OFF

Turn wash off

1.6.12.9 DF_CAM_PWR

Reset camera

1.6.12.10 DF_WIPE

Turn wipe on and off

1.6.12.11 DF_SETUP

Enter dome menu

1.6.12.12 DF_COLOURMODE

Switch colour mode

1.6.12.13 DF_ZEROLUX

Turn zero-lux on and off

1.6.12.14 DF_NO

VK-2 "No" or Vi-K2 "Back" button pressed

1.6.12.15 DF_NO_OFF

VK-2 "No" or Vi-K2 "Back" button released

1.6.12.16 DF_YES

VK-2 "Yes" or Vi-K2 "OK" button pressed

1.6.12.17 DF_YES_OFF

VK-2 "Yes" or Vi-K2 "OK" button released

1.6.12.18 DF_DEFAULT

VK-2 "Def" or Vi-K2 "Default" button pressed

1.6.12.19 DF_DEFAULT_OFF

VK-2 "Def" or Vi-K2 "Default" button released

1.6.12.20 DF_LEFT

VK-2 or Vi-K2 "Left" button pressed

1.6.12.21 DF_LEFT_OFF

VK-2 or Vi-K2 "Left" button released

1.6.12.22 DF_RIGHT

VK-2 or Vi-K2 "Right" button pressed

1.6.12.23 DF_RIGHT_OFF

VK-2 or Vi-K2 "Right" button released

1.6.12.24 DF_UP

VK-2 or Vi-K2 "Up" button pressed

1.6.12.25 DF_UP_OFF

VK-2 or Vi-K2 "Up" button released

1.6.12.26 DF_DOWN

VK-2 or Vi-K2 "Down" button pressed

1.6.12.27 DF_DOWN_OFF

VK-2 or Vi-K2 "Down" button released

1.6.12.28 DF_INCIDENT

Enter dome supervisor menu (Dennard only)

1.6.12.29 DF_EVENTS

Enter dome technician menu (Dennard only)

1.6.12.30 DF_SEARCH

Dome menu "Accept" (Dennard only)

2 Code Definitions

// Codes

```
#define C_NULL          (0x00)
#define C_MENU         (0x01)
#define C_YES          (0x02)
#define C_NO           (0x03)
#define C_UP           (0x04)
#define C_DOWN        (0x05)
#define C_LEFT        (0x06)
#define C_RIGHT       (0x07)
#define C_DEFAULT     (0x0E)
#define C_FULL        (0x0F)
#define C_MODE        (0x10) // see M_ parameters
#define C_LIVE        (0x34)
#define C_INCIDENT    (0x38)
#define C_DIG_PLAY    (0x3C) // see PL_ parameters
#define C_STREAM_COUNT (0x3F) // number of images to stream
#define C_STREAM_CAMERA (0x40) // camera 0..15
#define C_STREAM_MODE  (0x41) // quality or images 0,1,2,3,4
#define C_ACTION      (0x42) // see A_ parameters
#define C_REQUEST     (0x43) // see R_ parameters
#define C_REPLY       (0x44) // see R_ parameters
#define C_PASSWORD    (0x46)
#define C_CMD         (0x53) // DF_parameters
#define C_UP_OFF      (0x55)
#define C_DOWN_OFF    (0x56)
#define C_LEFT_OFF    (0x57)
#define C_RIGHT_OFF   (0x58)
#define C_PLUS_MINUS  (0x61)
#define C_INC_DEC     (0x62) // 1:INC, 0:DEC
#define C_ASCII       (0x63)
#define C_FN          (0x64)
#define C_PSW         (0x65)
#define C_NEXT_INFO   (0x66)
#define C_NEXT_FIND   (0x67)
#define C_RELAY_ON    (0x6a) // relay 0 - 254, 255 = all
#define C_RELAY_OFF   (0x6b) // relay 0 - 254, 255 = all
#define C_PANIC       (0x70) // 1:ON, 0:OFF
#define C_PLUS_MINUS_OFF (0x80) // 1:PLUS, 0:MINUS
#define C_NO_OFF      (0x81)
#define C_BACK_OFF    (0x81)
```

```
#define C_DEFAULT_OFF      (0x82)
#define C_YES_OFF         (0x85)
#define C_NEXT_CAM        (0x86)
#define C_CAMSEL          (0x8A) // param=unit, extended data[0]=camera, data[1]=monitor
#define C_TELEM           (0xF8)
#define C_GOTO_PRESET     (0x0C)
#define C_RUN_TOUR        (0x11)
#define C_CLEAR_TOUR      (0x5B)
#define C_TILT_SP         (0x16)
#define C_PAN_SP          (0x17)
#define C_ZOOM_SP         (0x18)
#define C_FOCUS_SP        (0x19)
#define C_IRIS_SP         (0x1A)
#define C_PRESET_PAN_SP   (0x1B)
#define C_PRESET_DWELL_SP (0x1C)
#define C_CMD              (0x53)

// telemetry bits
#define B_TILT_DOWN       (0x001)
#define B_TILT_UP         (0x002)
#define B_PAN_LEFT        (0x004)
#define B_PAN_RIGHT       (0x008)
#define B_ZOOM_TELE       (0x010)
#define B_ZOOM_WIDE       (0x020)
#define B_FOCUS_NEAR      (0x040)
#define B_FOCUS_FAR       (0x080)
#define B_IRIS_OPEN       (0x100)
#define B_IRIS_CLOSE      (0x200)

#define B_TILT_BITS       (B_TILT_DOWN | B_TILT_UP)
#define B_PAN_BITS        (B_PAN_LEFT | B_PAN_RIGHT)
#define B_FOCUS_BITS     (B_FOCUS_NEAR | B_FOCUS_FAR)
#define B_ZOOM_BITS       (B_ZOOM_TELE | B_ZOOM_WIDE)
#define B_IRIS_BITS       (B_IRIS_OPEN | B_IRIS_CLOSE)
#define B_LENS_BITS       (B_FOCUS_NEAR | B_FOCUS_FAR | B_IRIS_OPEN | B_IRIS_CLOSE)
#define B_ALL_BITS        (0x3ff)

// dome functions
#define DF_AUTO_FOCUS     (0x10) // auto focus
#define DF_AUTO_IRIS      (0x11) // auto iris
#define DF_180            (0x12) // 180 deg flip
#define DF_AUTO_PAN       (0x13) // auto-pan
#define DF_RELAY           (0x14) // aux relay
#define DF_LAMP           (0x15) // lamp
```

```
#define DF_WASH_ON          (0x16) // wash on
#define DF_WASH_OFF        (0x17) // wash off
#define DF_CAM_PWR         (0x18) // camera
#define DF_WIPE            (0x19) // wipe
#define DF_SETUP           (0x1a) // dome menu
#define DF_INCIDENT        (0x1b) // supervisor menu
#define DF_EVENTS          (0x1c) // technician menu
#define DF_SEARCH          (0x1d) // menu accept
#define DF_LEFT            (0x22)
#define DF_RIGHT           (0x23)
#define DF_UP              (0x24)
#define DF_DOWN            (0x25)
#define DF_LEFT_OFF        (0x26)
#define DF_RIGHT_OFF       (0x27)
#define DF_UP_OFF          (0x28)
#define DF_DOWN_OFF        (0x29)
#define DF_NO              (0x2a)
#define DF_YES             (0x2b)
#define DF_DEFAULT         (0x2c)
#define DF_NO_OFF          (0x2d)
#define DF_DEFAULT_OFF     (0x2e)
#define DF_SETUP_OFF       (0x2f)
#define DF_YES_OFF         (0x30)
#define DF_ZOOM_TELE       (0x31)
#define DF_ZOOM_WIDE       (0x32)
#define DF_ZOOM_TELE_OFF   (0x33)
#define DF_ZOOM_WIDE_OFF   (0x34)
#define DF_FOCUS_NEAR      (0x35)
#define DF_FOCUS_FAR       (0x36)
#define DF_FOCUS_NEAR_OFF  (0x37)
#define DF_FOCUS_FAR_OFF   (0x38)
#define DF_IRIS_OPEN       (0x39)
#define DF_IRIS_CLOSE      (0x3a)
#define DF_IRIS_OPEN_OFF   (0x3b)
#define DF_IRIS_CLOSE_OFF  (0x3c)
#define DF_COLOURMODE      (0x3d)
#define DF_ZEROLUX         (0x3e)
```


