

VK Series Standard Protocol (RS-485)

Release Date. 2005. 01. Dec
Release No. 0.6

0. Communication Code System

0.1 Transmit(Controller -> Camera)

| | | | | | | | | | |
|--------|---------|-------|-------|-------|-------|-------|-------|-------|-----|
| Header | Command | Data1 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|---------|-------|-------|-------|-------|-------|-------|-------|-----|

Header : 0xC5

Command : 0x10, 0x20,....

Data1 : Run Code related to Command (Refer to **Appendix A for related Codes**)

Data2 : Communication ID (1 ~ 255)

Data3~4 : Data corresponding to Run-Code

 If the data is 1byte, key on Data3

 If the data is 2byte, key the leading 8bit on Data3 and the end 8bit on Data4

Data4 : Data required by Run-Code (Brightness, WB Red/Blue setting etc..) – If it is 2byte, key the end 8bit

Data5~7 : Extra range

C·S(Check Sum) : Compensate the information of transmission data to reduce the communication error.

 Low 8bit(Hexadecimal value) in the result of Header + Command + Data1 + Data2 + Data3 + Data4 + Data5 + Data6 + Data7

 Ex) If the command is 0xC5(Header) 0x40(Command) 0x40(Data1) 0x10(Data2) 0x00(Data3) 0x00(Data4) 0x00(Data5) 0x00(Data6) 0x00(Data7), Sum is 0x0155 and **C·S** is **0x55**

0.2 Receive(Camera -> Controller)

| | | | | | | | | | |
|--------|---------|-------|-------|-------|-------|-------|-------|-------|-----|
| Header | Command | Data1 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|---------|-------|-------|-------|-------|-------|-------|-------|-----|

Header : 0xC5

Command : Command from the controller

Data1 : Run Code according to Command

Data2 : Communication ID

Data3~4 : Data corresponding to Run-Code

 If the data is 1byte, key on Data3

 If the data is 2byte, key the leading 8bit on Data3 and the end 8bit on Data4

Data5~6 : Status1~2 - Camera Status (Shutter Speed etc..) . Refer to **Appendix B for related results**

Data7 : Status3(Reserved)

C·S : Calculation by the same algorithm as Transmit

1. Camera Ready Check

1.1. Camera Ready Check : Command 0x10

Controller → Camera

| | | | | | | | | | |
|--------|------|-------|-------|-------|-------|-------|-------|-------|-----|
| Header | 0x10 | Data1 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|------|-------|-------|-------|-------|-------|-------|-------|-----|

Check the camera “Power On(Ready)”

※ Caution – It is only available that the Camera and Controller(PC, Remote Controller etc..)are on 1 to 1 connection. Used for multi communication, It can cause a malfunction.

Data1 ~ Data7 ∴ It has a dummy value as an extra range.

Camera → Controller

| | | | | | | | | | |
|--------|------|-------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x10 | Data1 | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|-------|--------|-------|-------|---------|---------|-------|-----|

Read the Setting value from Status1 and Status2 transmitted by the Camera.

※Refer to **Appendix B** for the information of Status_1 and Status_2

2. Command – ID

2.1. Camera relative to ID : Command 0x20

Controller → Camera

| | | | | | | | | | |
|--------|------|---------|-------|-------|-------|-------|-------|-------|-----|
| Header | 0x20 | Code 2x | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|------|---------|-------|-------|-------|-------|-------|-------|-----|

Code 2x(Run Code) : 0x10 – ID Read

0x11 – ID 1 Decrease(Not recommended)

0x12 – ID 1 Increase(Not recommended)

0x13 – Setting by specific ID value(range : 1 ~ 255)

※ It is recommended to change the Camera ID on OSD

2.1. Run Code : ID Read

Read the Camera ID on connection

Each camera on RS-485 communication is distinguished by the ID. So, If ID is incorrect, the communication between controller and Camera is not available.

Exceptionally, ID Read command is available without the camera ID. By using this command, the camera ID can be found.

However, It is not available on connection of more than one camera.

Controller → Camera

| | | | | | | | | | |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|
| 0xC5 | 0x20 | 0x10 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|

Data2 ~ Data7 : It has a dummy value.

Camera → Controller

| | | | | | | | | | |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x20 | 0x10 | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|

Cam_ID : Current Camera ID

Status1, Status2 : Present the status of the camera

2.2. Run Code : ID Dec, Inc

Decrease or Increase the camera ID by 1.

Controller → Camera(ID Dec)

| | | | | | | | | | |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|
| 0xC5 | 0x20 | 0x11 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|

Controller → Camera(ID Inc)

| | | | | | | | | | |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|
| 0xC5 | 0x20 | 0x12 | Data2 | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|------|------|------|-------|-------|-------|-------|-------|-------|-----|

※ Caution – It is only available that the Camera and Controller(PC, Remote Controller etc..)are on 1 to 1 connection. Used for multi communication, It can cause a malfunction.

Camera → Controller(ID Dec)

| | | | | | | | | | |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x20 | 0x11 | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|

Camera → Controller(ID Inc)

| | | | | | | | | | |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x20 | 0x12 | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|------|--------|-------|-------|---------|---------|-------|-----|

2.3. Run Code : ID Write

Controller → Camera

| | | | | | | | | | |
|------|------|------|------|------|-------|-------|-------|-------|-----|
| 0xC5 | 0x20 | 0x13 | C_ID | N_ID | Data4 | Data5 | Data6 | Data7 | C·S |
|------|------|------|------|------|-------|-------|-------|-------|-----|

Camera → Controller

| | | | | | | | | | |
|------|------|------|--------|-------|-------|---------|---------|-------|-----|
| 0xC5 | 0x20 | 0x13 | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|------|------|------|--------|-------|-------|---------|---------|-------|-----|

3. General Command – Command 0x40

3.1. General Command

Controller → Camera

| | | | | | | | | | |
|--------|------|---------|--------|-------|-------|-------|-------|-------|-----|
| Header | 0x40 | Code 4x | Cam_ID | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|------|---------|--------|-------|-------|-------|-------|-------|-----|

Code 4x : Execution Code belonging to 50 Group command. Refer to **Appendix A.4** for related Codes

Cam_ID : Camera ID which you want to control.

Data3 : Value related to Code 4x (Brightness etc..)

Data4~7 : It has a dummy value as an extra range.

Camera → Controller

| | | | | | | | | | |
|--------|------|---------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x40 | Code 4x | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|---------|--------|-------|-------|---------|---------|-------|-----|

Code 4x, Cam_ID : Command Code by the General Command and Camera ID on communication

Data3: Transmit the data related to Code 4x (Brightness etc..)

Status1~2 : Indicate the present status of the camera(AGC ON/OFF etc..) Please refer to **Appendix B** for related Status

Data4, Data7 : It has a dummy value as an extra range.

4. Special Command – Command 0x50

4.1. Special Command

Controller → Camera

| | | | | | | | | | |
|--------|------|---------|--------|-------|-------|-------|-------|-------|-----|
| Header | 0x50 | Code 5x | Cam_ID | Data3 | Data4 | Data5 | Data6 | Data7 | C·S |
|--------|------|---------|--------|-------|-------|-------|-------|-------|-----|

Code 5x : Execution Code belonging to 50 Group command. Refer to **Appendix A.4** for related Codes

Cam_ID : Camera ID which you want to control.

Data3~4 : Value related to Code 4x (Brightness etc..)

Data5~7 : It has dummy value as an extra range.

Key_Code : Assign all the command supported and not supported by OSD menu

Please refer to “**Appendix A.5**” about Key Code.

Camera → Controller

| | | | | | | | | | |
|--------|------|---------|--------|-------|-------|---------|---------|-------|-----|
| Header | 0x50 | Code 5x | Cam_ID | Data3 | Data4 | Status1 | Status2 | Data7 | C·S |
|--------|------|---------|--------|-------|-------|---------|---------|-------|-----|

Code 5x, Cam_ID : Present the camera ID on communication and Command Code by Command.

Data3~4 : Print the data related to Code 5x

Data3 has the minimum value and Data4 has maximum value regarding the command related to IRIS

Status1~2 : Indicate the present status of the camera(AGC ON/OFF etc..) Please refer to **Appendix B** for related Status

Data7 : It has dummy value as an extra range.

Appendix A.1 Table (Command 0x20) – ID Command Run Code

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|-----------------------|
| ID_Read | 0x10 | ID – Read |
| ID_Inc | 0x11 | ID – ID 1 Decrement |
| ID_Dec | 0x12 | ID – ID 1 Increment |
| ID_Write | 0x13 | ID – ID Direct Change |
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Appendix A.2 Table (Command 0x30) – Pressed Key

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|---------------------------------|
| Key_Enter | 0x10 | Key - Same as Enter Key Pressed |
| Key_Left | 0x11 | Key - Same as Left Key Pressed |
| Key_Right | 0x12 | Key - Same as Right Key Pressed |
| Key_Up | 0x13 | Key - Same as Up Key Pressed |
| Key_Down | 0x14 | Key - Same as Down Key Pressed |
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Appendix A.3 Table(Command 0x40) – Common Command Run Code

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|---|
| AGC_Off | 0x10 | AGC – Off |
| AGC_Low | 0x11 | AGC – Gain Low |
| AGC_Middle | 0x12 | AGC – Gain Middle |
| AGC_High | 0x13 | AGC – Gain High |
| AGC_User | 0x14 | AGC – User Adjust (Range 20~140, Decimal Value) |
| BLC_Off | 0x20 | BLC – Off |
| BLC_Mode1 | 0x21 | BLC – Histogram Off Mode |
| BLC_Mode2 | 0x22 | BLC – Histogram On Mode |
| | | |
| Brightness_Dec | 0x30 | Brightness – Decrement |
| Brightness_INC | 0x31 | Brightness – Increment |
| Brightness_Direct | 0x32 | Brightness – Value Direct Apply |
| | | |

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|---|
| OSD ID_On | 0x40 | OSD - Display ID Screen On |
| OSD ID_Off | 0x41 | OSD - Display ID Screen Off |
| Status_On | 0x42 | Reserved(Current Not Support) |
| Status_Off | 0x43 | Reserved(Current Not Support) |
| Zoom_On | 0x44 | Reserved(Current Not Support) |
| Zoom_Off | 0x45 | Reserved(Current Not Support) |
| | | |
| Reset_On | 0x50 | Reset - Default Value Set |
| | | |
| Shutter_Auto | 0x60 | Shutter Speed - Automatic |
| Shutter_Manual | 0x61 | Shutter Speed - Current Not Support |
| Man_Slow | 0x62 | Shutter Speed - to Slow(-> 1/60s or 1/50s) |
| Man_Fast | 0x63 | Shutter Speed - to Fast(-> 1/10000s) |
| 1/60 | 0x64 | Shutter Speed - 1/60s(NTSC System) or 1/50s(PAL System) |

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|--|
| 1/100 | 0x65 | Shutter Speed - 1/100s(NTSC System) or 1/120s(PAL System) |
| 1/250 | 0x66 | Shutter Speed - 1/250s |
| 1/500 | 0x67 | Shutter Speed - 1/500s |
| 1/1000 | 0x68 | Shutter Speed - 1/1000s |
| 1/2000 | 0x69 | Shutter Speed - 1/2000s |
| 1/4000 | 0x6A | Shutter Speed - 1/4000s |
| 1/10000 | 0x6B | Shutter Speed - 1/10000s |
| | | |
| WB_AWC | 0x70 | White Balance - AWC Mode |
| WB_ATW | 0x71 | White Balance - ATW Mode |
| WB_MAN | 0x72 | White Balance - Manual Mode |
| WB_PLock | 0x73 | White Balance - Push/Lock Mode |
| Red_Dec | 0x74 | White Balance - Red Value Adjustment(Decrement) in Manual Mode |
| Red_Inc | 0x75 | White Balance - Red Value Adjustment(Increment) in Manual Mode |

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|---|
| Red_Direct | 0x76 | White Balance - Red Value Direct Apply in Manual Mode |
| Blue_Dec | 0x77 | White Balance - Blue Value Adjustment(Decrement) in Manual Mode |
| Blue_Inc | 0x78 | White Balance - Blue Value Adjustment(Increment) in Manual Mode |
| Blue_Direct | 0x79 | White Balance - Blue Value Direct Apply in Manual Mode |
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Appendix A.4 Table(Command 0x50) – Special Command Run Code

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|---|
| | 0x1X | Reserved |
| | | |
| Day&Night Auto | 0x20 | Day & Night : Automatic |
| Day&Night Color | 0x21 | Day & Night : Forced Color |
| Day&Night B/W | 0x22 | Day & Night : Forced B/W |
| | | |
| DC | 0x30 | Lens : DC Iris |
| ELC | 0x31 | Lens : ELC |
| Video | 0x32 | Lens : Video Iirs |
| | | |
| IRIS Level | 0x40 | IRIS Level : IRIS range request |
| | 0x41 | IRIS Level : Current IRIS level request |
| | 0x42 | IRIS Level : IRIS level decrement |

| Key variable ⁽¹⁾ | Key Code | Result |
|-----------------------------|----------|--|
| | 0x43 | IRIS Level : IRIS level increment |
| | 0x44 | IRIS Level : IRIS level direct apply |
| | | |
| Phase Shift | 0x50 | Line/Lock Phase Shift : Current Value Read |
| | 0x51 | Line/Lock Phase Shift : Shift Value Dec |
| | 0x52 | Line/Lock Phase Shift : Shift Value Inc |
| | 0x53 | Line/Lock Phase Shift : Direct Apply |
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Appendix B. Status Code

Status_1

| Bit | Result | Remark |
|-----|---------------------------|---|
| 7 | Shutter | 0000 : Automatic |
| 6 | | 0001 : 1/60(NTSC), 1/50(PAL) |
| 5 | | 0010 : 1/100(NTSC),1/120(PAL) |
| 4 | | 0011 : 1/250 0100 : 1/500 0101 : 1/1000 0110 : 1/2000 0111 : 1/4000 1000 : 1/10000 |
| 3 | TV System | 0 : PAL 1 : NTSC |
| 2 | Resolution ⁽²⁾ | 0 : 250K 1 : 380K |
| 1 | Lens Type | 00 : ELC 01 : DC IRIS Lens |
| 0 | | 10 : Video Lens |

Status_2

| Bit | Result | Remark |
|-----|-------------|---|
| 7 | AGC | 00 : Off 01 : Low |
| 6 | | 10 : Middle 11 : High |
| 5 | BLC | 00 : Off 01 : Mode1 |
| 4 | | 10 : Mode2 11 : reserved |
| 3 | WhiteBalanc | 00 : ATW 01 : AWC |
| 2 | e | 10 : Manual 11 : Push Lock |
| 1 | Day&Night | 00 : Automatic 01 : Color |
| 0 | Mode | 10 : Black&White 11 : reserved |

*Caution: Protocol can be changed without any advance notice. Please check the protocol on our homepage.

Notice : 1) Key variable is only for the camera control program. It is irrelevant to protocol.

2) Effective Pixel