



# XBC-KZ30G Block Camera



Part No.  
EM13547





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# Features

*This Product is a high performance CCTV camera with built-in 30x optical zoom and 12x digital zoom technologies. This product can be applied to various fields such as security camera for surveillance (CCTV camera), data viewer, Video presenter(VP) and speed dome camera and industrial applications.*

- This camera uses a 1/1.8"3.19M Global shutter CMOS Image Sensor that supports HD (high definition) to produce high-quality images.
- Using progressive scan, images with a wide dynamic range can be obtained with the newly developed image signal processor (Wide Dynamic Range function, WDR).
- The camera is equipped with a bright zoom lens with 30× optical zoom and F1.5 aperture (optical zoom + digital zoom = 360×)
- Low-noise images can be obtained even in low-light environments using the Noise Reduction function(3DNR/2DNR/2DNR+3DNR)
- Video signals can be output as digital only. Depending on register settings, you can select from a variety of digital output methods:  
1080p/60,1080p/50,1080p/30, 1080p/25,  
720p/60,720p/50,720p/30, 720p/25, 1080i/50,  
1080i/60
- An infrared (IR) Cut-Filter can be disengaged from the image path for increased sensitivity in low light environments. The ICR will automatically engage depending on the ambient light, allowing the camera to be effective in day/night environment.
- A Privacy Zone Masking function (max. 8 blocks) is available.
- A Motion Detection function is available.
- A title composed of up to 21 lines can be set for displaying on the screen. 30 characters can be used on one line (VISCA).

- Support 256 internal zoom/focus presets.
- Digital Image Stabilizer function reduces image blurring caused by vibration.
- Output format  
LVDS/CVBS/PARALLEL
- Asynchronous Reset Function

# Precaution

*Operation is subject to the following conditions;*

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.
- A regulated DC 12V 500mA power supply is recommended for use with this camera for the best image and the most stable operation. An unregulated power supply can cause damage to the camera. When unregulated power supply is applied, product warranty will be out of subject.
- If it is used for CVBS application. It is recommended that the camera is used with a monitor that has a CCTV quality 75 Ohm video impedance level. If your monitor is switched to high impedance then please adjust accordingly.
- Do not attempt to disassemble the camera to gain access to the internal components. Refer servicing to your dealer.
- Never face the camera towards the sun or any bright or reflective light, which may cause smear on the image and possible damage to the CMOS.
- Do not remove the serial sticker for the warranty service.
- Do not drop the thing or give a strong impact to the product.
- Avoid the place where is so dusty, humid or soot-covered. It may cause electric shock or fire.
- Do not expose to an intense light source such as direct sunlight or spotlight. It may damage the CMOS.
- If the camera operates more than 24 hours, It is recommended that you execute the lens initial action or reset the camera.

## *Information may be changed without notice*

*This document provides technical information for the user. KT&C reserves the right to modify the information in this document as necessary. The customer should make sure that they have the most recent manual version.*



# Specifications

| Format / Model                    | EM13547   |  |  |  |
|-----------------------------------|---|--|--|--|
| <b>Video System</b>               |   |  |  |  |
| <b>Image Sensor</b>               | 1/1.8"3.19M Global shutter CMOS Image Sensor  |  |  |  |
| <b>Effective Pixels</b>           | 2064(H)x1544(V), Unit Cell Size(3.45μm X 3.45μm)  |  |  |  |
| <b>Output Format</b>              | LVDS/PARALLEL/CVBS : 1080p60/50/30/25, 720p60/50/30/25, 1080i60/50<br>Sensor Output : FULL/CROP<br>Video Output : FULL/CROP |  |  |  |
| <b>Sensor Operating System</b>    | Sensor Master / Sensor Slave  |  |  |  |
| <b>Sync System</b>                | Internal  |  |  |  |
| <b>CVBS scale</b>                 | 16:9 / 4:3 (CVBS 720H)  |  |  |  |
| <b>LVDS mode</b>                  | Single / Dual   |  |  |  |
| <b>Video Output</b>               | CVBS  |  |  |  |
|                                   | LVDS/ PARALLEL  |  |  |  |
| <b>Min. illumination</b>          | (Sens-up Off, AGC 28dB)   |  |  |  |
| <b>Day</b>                        | 0.1 Lux @ F1.5  |  |  |  |
| <b>Night (IR-cut filter on)</b>   | 0.08 Lux @ F1.5   |  |  |  |
| <b>S/N ratio</b>                  | More than 52 dB   |  |  |  |
| <b>Optical Lens</b>               |   |  |  |  |
| <b>Zoom Magnification</b>         | X30   |  |  |  |
| <b>Practical f-value</b>          | 6.0 to 180 mm   |  |  |  |
| <b>Practical Horizontal-Angle</b> | 61.2°(W) ~ 2.32°(T)   |  |  |  |
| <b>Practical Vertical Angle</b>   | 36.1°(W) ~ 1.31°(T)   |  |  |  |
| <b>Practical Diagonal Angle</b>   | 68.0°(W) ~ 6.7°(T)  |  |  |  |
| <b>F-value</b>                    | F1.5(W) ~ F4.3(T)   |  |  |  |
| <b>Zoom</b>                       |   |  |  |  |
| <b>Maximum Zoom Ratio</b>         | x1 ~ x360   |  |  |  |
| <b>Optical Zoom Ratio</b>         | x1 ~ x30  |  |  |  |
| <b>Digital Zoom Ratio</b>         | x1 ~ x12  |  |  |  |
| <b>Digital Pan/Tilt</b>           | -   |  |  |  |
| <b>Speed (Focus Tracking On)</b>  | 4.5 ~ 30 sec  |  |  |  |
| <b>(Focus Tracking Off)</b>       | 4.0 sec   |  |  |  |
| <b>Focus</b>                      |   |  |  |  |
| <b>Control Mode</b>               | Auto / Manual / Interval / One Shot(=Zoom Trigger, One Push)/Preset   |  |  |  |
| <b>Focal Range</b>                | Infinity~ 1.5m(T)~0.1m(W)   |  |  |  |
| <b>IR correction</b>              | Standard/IR Light/user -20~+20  |  |  |  |
| <b>Day &amp; Night</b>            |   |  |  |  |
| <b>D&amp;N mode</b>               | Auto / Day (Color) / Night (BW) / External-H / External-L   |  |  |  |
| <b>Night Color</b>                | Off/On  |  |  |  |
| <b>White Balance</b>              | Auto / ATW / Indoor / Outdoor / Push / Manual   |  |  |  |
| <b>Exposure</b>                   |   |  |  |  |
| <b>AE mode</b>                    | Auto / Shutter Priority / Iris Priority/AGC Priority/Manual   |  |  |  |
| <b>Brightness (Exp.Comp)</b>      | 0~14  |  |  |  |
| <b>AGC Limit</b>                  | 0(-3dB)~255(45dB)   |  |  |  |
| <b>Manual Shutter</b>             | 1/1,1/2,1/4,1/8,1/15(16),1/25(30)/1/50(60) ~ 1/10000  |  |  |  |
| <b>Manual AGC</b>                 | -3dB ~ 45dB   |  |  |  |
| <b>Manual Iris</b>                | F1.6 ~ F32, Close   |  |  |  |
| <b>Sens-Up</b>                    | Off ~ 32fields  |  |  |  |
| <b>ETC</b>                        | Spot AE, Slow AE response   |  |  |  |

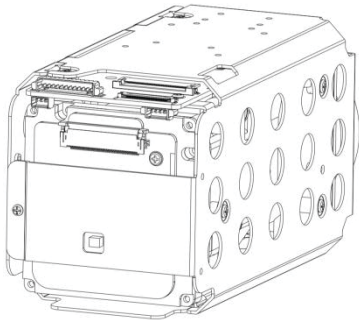
| Format / Model                      | EM13547   |   |   |   |
|-------------------------------------|---|---|---|---|
| <b>DSP functions</b>                |   |   |   |   |
| <b>Digital Slow Shutter</b>         | Max. 32 fields  |   |   |   |
| <b>Image Freeze</b>                 | Off / On  |   |   |   |
| <b>Image Reverse (E-FLIP)</b>       | Off / Horizontal(mirror) / Vertical / H+V(180° flip)  |   |   |   |
| <b>Privacy Masking</b>              | Spherical Privacy<br>- 8-zone<br>- Interlock / Non-Interlock Mask<br>- 14 mask color selectable, semi-transparency<br>- Pan(0°~360°), Tilt(+90°~-90°) |   |   |   |
| <b>Title Display</b>                | 16 characters (display position selectable)   |   |   |   |
| <b>Motion Detect</b>                | 4-Zone<br>- Alarm output : OSD / Serial Communication   |   |   |   |
| <b>D-WDR</b>                        | Off / Low/Middle/High   |   |   |   |
| <b>WDR</b>                          | Off/On, Adjustable(Level:0~29, Contrast:0~5)  |   |   |   |
| <b>BLC</b>                          | Off / On, Area selectable   |   |   |   |
| <b>HLC</b>                          | Off / On, Area selectable   |   |   |   |
| <b>AGC</b>                          | Max. 45dB   |   |   |   |
| <b>Sharpness</b>                    | Adjustable(0~15)  |   |   |   |
| <b>3DNR</b>                         | Off/On(0~4)   |   |   |   |
| <b>2DNR</b>                         | Auto/Manual(Weight High/Middle/Low)   |   |   |   |
| <b>Defog</b>                        | Off / Low / Middle / High   |   |   |   |
| <b>Gamma</b>                        | 0.40/0.45/0.50/0.55/0.60/0.70/0.80/0.90/1.00  |   |   |   |
| <b>Lens Shading</b>                 | Off /ON   |   |   |   |
| <b>Defect Detection</b>             | Support   |   |   |   |
| <b>Digital Image Stabilizer</b>     | On /Off   |   |   |   |
| <b>Picture Effect</b>               | OFF/NEGATIVE/GRAY MODE/REDDISH-1~4/BLUISH-1~4/GREENISH-1~4  |   |   |   |
| <b>Picture In Picture</b>           | 1/4,1/9,1/16,1/25   |   |   |   |
| <b>Position Preset (zoom/focus)</b> | Non-volatile 256 position(zoom/focus) presets.  |   |   |   |
| <b>Memory Preset</b>                | 16-presets & custom preset  |   |   |   |
| <b>OSD</b>                          | English   |   |   |   |
| <b>Coaxial Communication</b>        | -   | - | - | - |
| <b>Communication (UART)</b>         |   |   |   |   |
| <b>Camera ID</b>                    | 0~255   |   |   |   |
| <b>Remote Control</b>               | RS-232 TTL +5.0V (+3.3V Compatible)   |   |   |   |
| <b>Control Protocol</b>             | VISCA /Pelco-D/Pelco-P/HITACHI : automatically detection  |   |   |   |
| <b>Communication Speed</b>          | 2400/4800/9600(default)/19200/38400/57600/115200bps selectable  |   |   |   |
| <b>Power</b>                        |   |   |   |   |
| <b>Supply Voltage</b>               | DC 12V (+7.0V ~ +15V)   |   |   |   |
| <b>Supplied Current (motor on)</b>  | 290mA(420mA )   |   |   |   |
| <b>Consumption (motor on)</b>       | 3.5W(5.1W)  |   |   |   |
| <b>Physical</b>                     |   |   |   |   |
| <b>WxHxD[mm], Weight[g]</b>         |   |   |   |   |
| - Standard                          | 50.00x58.80x95.80mm, 380g   |   |   |   |
| <b>Temperature&amp; Humidity</b>    |   |   |   |   |
| <b>Operating condition</b>          | Temperature (-10°C~50 °C / 14°F~122°F), Humidity (20% ~ 80%)  |   |   |   |
| <b>Storage condition</b>            | Temperature (-20°C~60 °C / -4°F~140°F), Humidity (20% ~ 95%)  |   |   |   |



## INTERFACE SUMMARY

| Interface & Video |  | EM13547 |  |
|-------------------|--|---------|--|
| Video Output      | PARALLEL   | ⊙       |  |
|                   | CVBS   | ○       |  |
|                   | LVDS   | ⊙       |  |
| Interface         | MMCX   | ○       |  |
|                   | 32pin Micro Coaxial (USL00-30L-A, 0.4mm)                   | ⊙       |  |
|                   | 36pinFFC (FH12-36S-0.55H, 0.55mm)                          | ○       |  |
|                   | 12pin External Sync& Trigger&Strobe (SM08B-SRSS-TB, 1.0mm) | ○       |  |
|                   | 4pin CVBS&ADKey&12V (SM04B-SRSS-TB, 1.0mm)                 | ○       |  |
|                   | 3pin Exernal D&N (SM03B-SRSS-TB,1.0mm)                     | ○       |  |
|                   | 3pin RS-232TTL (SM03B-SRSS-TB,0.1mm)                       | ○       |  |

### EM13547

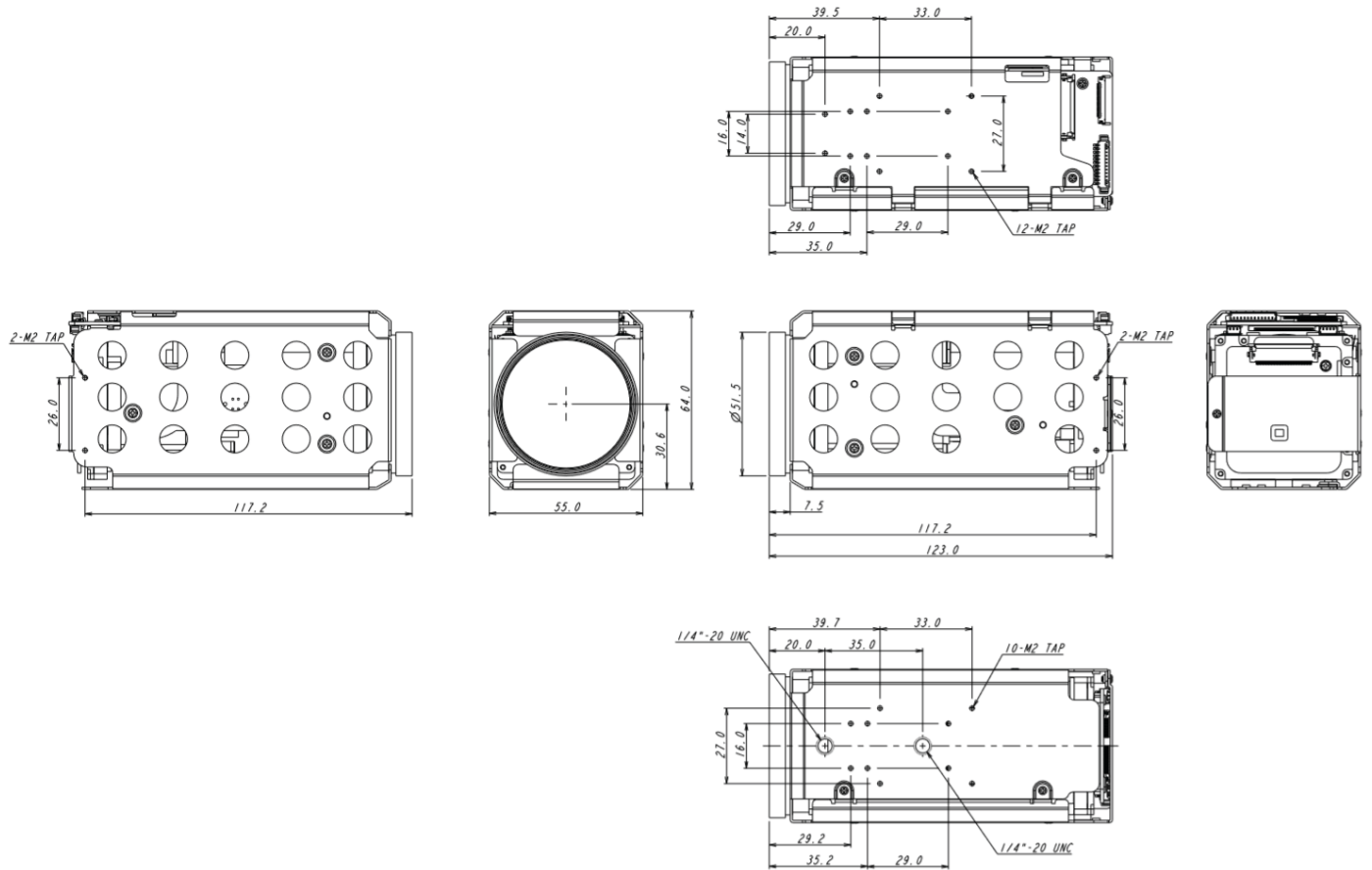




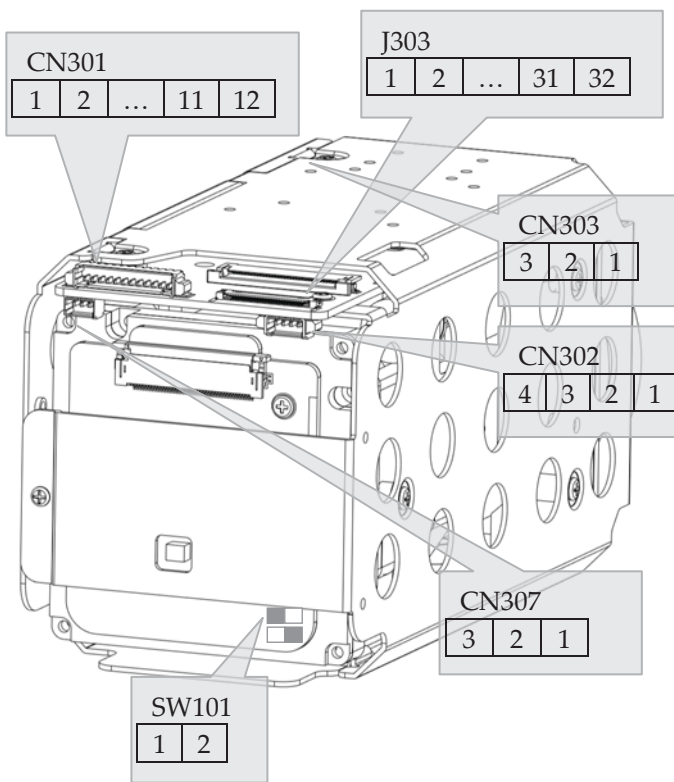
# Dimensions

## DIMENSIONS

EM13547



# Interface



## CN301/SM12B-SRSS-TB

| NO | Name        | Description |
|----|-------------|-------------|
| 1  | VS_OUT      | EXT_VS Out  |
| 2  | HS_OUT      | EXT_HS Out  |
| 3  | CLK_OUT     | EXT_CLK Out |
| 4  | GND         |             |
| 5  | VS_IN       | EXT_VS In   |
| 6  | HS_IN       | EXT_HS In   |
| 7  | CLK_IN      | EXT_CLK In  |
| 8  | GND         |             |
| 9  | TRIG_COM    |             |
| 10 | Trigger_IN  | EXT_TRIG In |
| 11 | STROMBE_COM |             |
| 12 | STROMBE_IN  | STROBE      |

## CN302(CVBS)/SM04B-SRSS-TB

| NO | Name     | Description |
|----|----------|-------------|
| 1  | +12V_IN  | +12V In     |
| 2  | GND      |             |
| 3  | CVBS_OUT | CVBS Out    |
| 4  | AD_KEY   | AD_KEY      |

## CN303/SM03B-SRSS-TB

| NO | Name   | Description            |
|----|--------|------------------------|
| 1  | EXT_DN | External D&N Input     |
| 2  | GND    |                        |
| 3  | +3.3V  | +3.3V Out (For Sensor) |

## CN307/SM03B-SRSS-TB

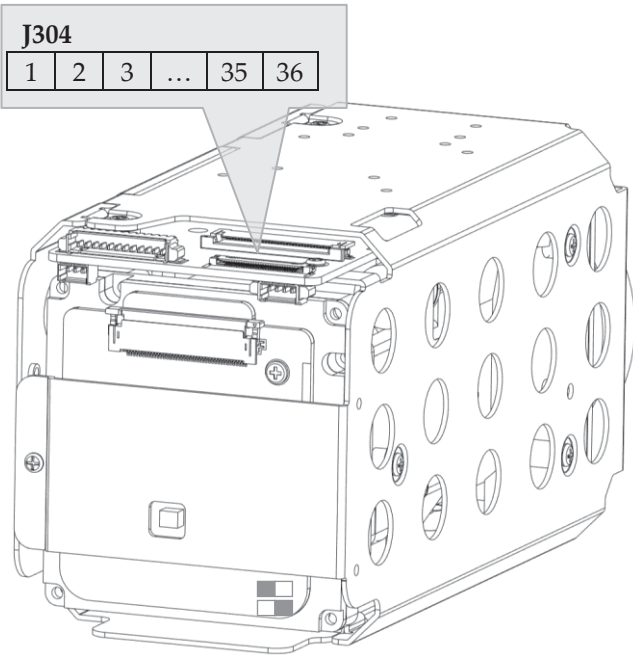
| NO | Name    | Description |
|----|---------|-------------|
| 1  | UART_TX | UART_TX     |
| 2  | UART_RX | UART_RX     |
| 3  | GND     |             |

## J303 (LVSDS)/USL00-30L-C

| NO | Name       | Description                 |
|----|------------|-----------------------------|
| 1  | TX_OUT3+   |                             |
| 2  | TX_OUT3-   |                             |
| 3  | TX_CLKOUT+ | LVDS_CLK                    |
| 4  | TX_CLKOUT- | LVDS_CLK                    |
| 5  | TX_OUT2+   |                             |
| 6  | TX_OUT2-   |                             |
| 7  | TX_OUT1+   |                             |
| 8  | TX_OUT1-   |                             |
| 9  | TX_OUT0+   |                             |
| 10 | TX_OUT0-   |                             |
| 11 | GND        |                             |
| 12 | TXD        | 5.0V (compatible 3.3V)      |
| 13 | RXD        | 5.0V (compatible 3.3V)      |
| 14 | +12V DC    |                             |
| 15 | +12V DC    |                             |
| 16 | +12V DC    |                             |
| 17 | +12V DC    |                             |
| 18 | +12V DC    |                             |
| 19 | GND        |                             |
| 20 | GND        |                             |
| 21 | TX_OUT7+   | Single out mode : open      |
| 22 | TX_OUT7-   | Single out mode : open      |
| 23 | TX_OUT6+   | Single out mode : open      |
| 24 | TX_OUT6-   | Single out mode : open      |
| 25 | NC/CVBS    | CVBS Out                    |
| 26 | RESET_IN   | Reset:Low(GND),Normal(1.8V) |
| 27 | TX_OUT5+   | Single out mode : open      |
| 28 | TX_OUT5-   | Single out mode : open      |
| 29 | TX_OUT4+   | Single out mode : open      |
| 30 | TX_OUT4-   | Single out mode : open      |
| 31 | GND        |                             |
| 32 | GND        |                             |

## SW101

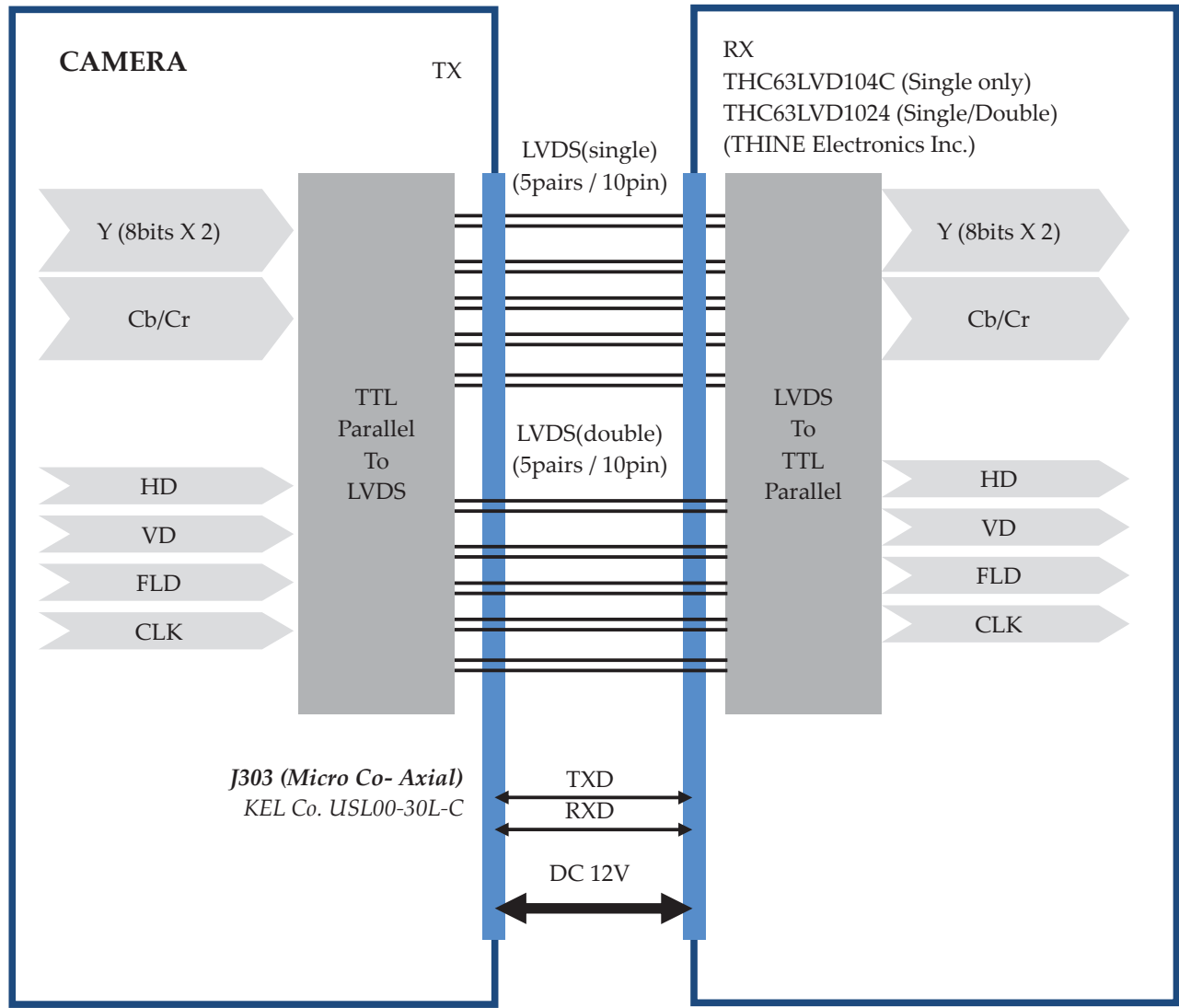
| Sensor Mode   | Switch 1 | Switch 2 |
|---------------|----------|----------|
| Sensor Master | ON       | OFF      |
| Sensor Slave  | OFF      | ON       |



**J304 (PAEALLEL)/ FH12-36S-0.55H**

| NO | Name       | Description            |
|----|------------|------------------------|
| 1  | GND        |                        |
| 2  | Y_OUT[0]   |                        |
| 3  | Y_OUT[1]   |                        |
| 4  | Y_OUT[2]   |                        |
| 5  | Y_OUT[3]   |                        |
| 6  | GND        |                        |
| 7  | Y_OUT[4]   |                        |
| 8  | Y_OUT[5]   |                        |
| 9  | Y_OUT[6]   |                        |
| 10 | Y_OUT[7]   |                        |
| 11 | GND        |                        |
| 12 | C_OUT[0]   |                        |
| 13 | C_OUT[1]   |                        |
| 14 | C_OUT[2]   |                        |
| 15 | C_OUT[3]   |                        |
| 16 | GND        |                        |
| 17 | C_OUT[4]   |                        |
| 18 | C_OUT[5]   |                        |
| 19 | C_OUT[6]   |                        |
| 20 | C_OUT[7]   |                        |
| 21 | GND        |                        |
| 22 | VSYNC      | VSYNC Out              |
| 23 | HSYNC      | HSYNC Out              |
| 24 | GND        |                        |
| 25 | DIGIAL_CLK | VCLK Out               |
| 26 | GND        |                        |
| 27 | GND        |                        |
| 28 | GND        |                        |
| 29 | GND        |                        |
| 30 | GND        |                        |
| 31 | +12V_IN    |                        |
| 32 | +12V_IN    |                        |
| 33 | +12V_IN    |                        |
| 34 | GND        |                        |
| 35 | TXD        | 5.0V (compatible 3.3V) |
| 36 | RXD        | 5.0V (compatible 3.3V) |

**LVDS interface (LVDS model only)**



HD Digital Video Sync Signal  
74.125MHz

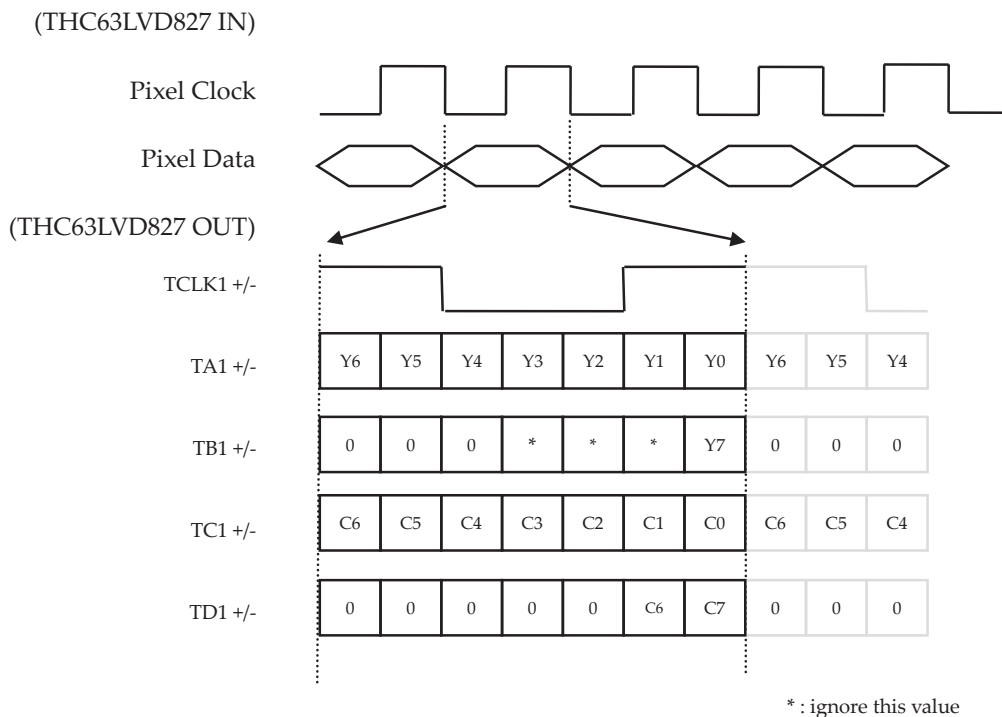
Recommended LVDS receiver IC  
(1) Single Only : THC63LVD104C  
(2) Single or Double : THC63LVD1024

Select LVDS output mode

- (1) MENU  
SPECIAL -> SYSTEM -> LVDS MODE : SINGLE/DUAL
- (2) VISCA protocol  
8x 01 04 24 74 0p 0q FF : pq=00 (single) / pq=01 (double)

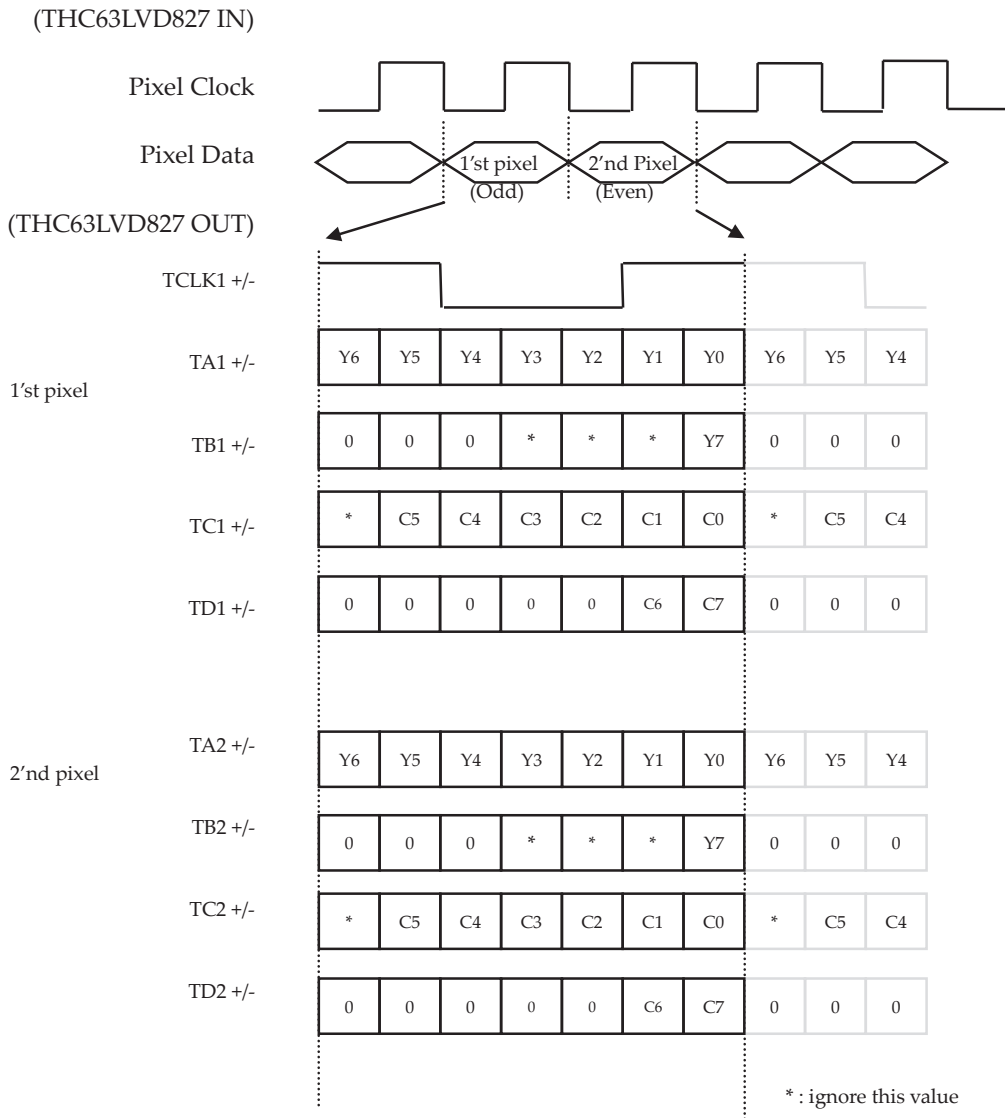
*(caution) If the frame rate is 25 fps / 30 fps, it works as SINGLE even if LVDS MODE is set to DUAL.  
However, if the frame rate is 50 fps / 60 fps, LVDS MODE must be set to DUAL to operate as DUAL.*

**Single Mode : THC63LVD827 (THINE Electronics Inc.)**



| Output Format | Pixel Clock [MHz] | TCLK+ [MHz] |
|---------------|-------------------|-------------|
| 1080p60       | 148.5             | 148.5       |
| 1080p50       | 148.5             | 148.5       |
| 1080i60       | 74.25             | 74.25       |
| 1080i50       | 74.25             | 74.25       |
| 1080p30       | 74.25             | 74.25       |
| 1080p25       | 74.25             | 74.25       |
| 720p60        | 74.25             | 74.25       |
| 720p50        | 74.25             | 74.25       |
| 720p30        | 74.25             | 74.25       |
| 720p25        | 74.25             | 74.25       |

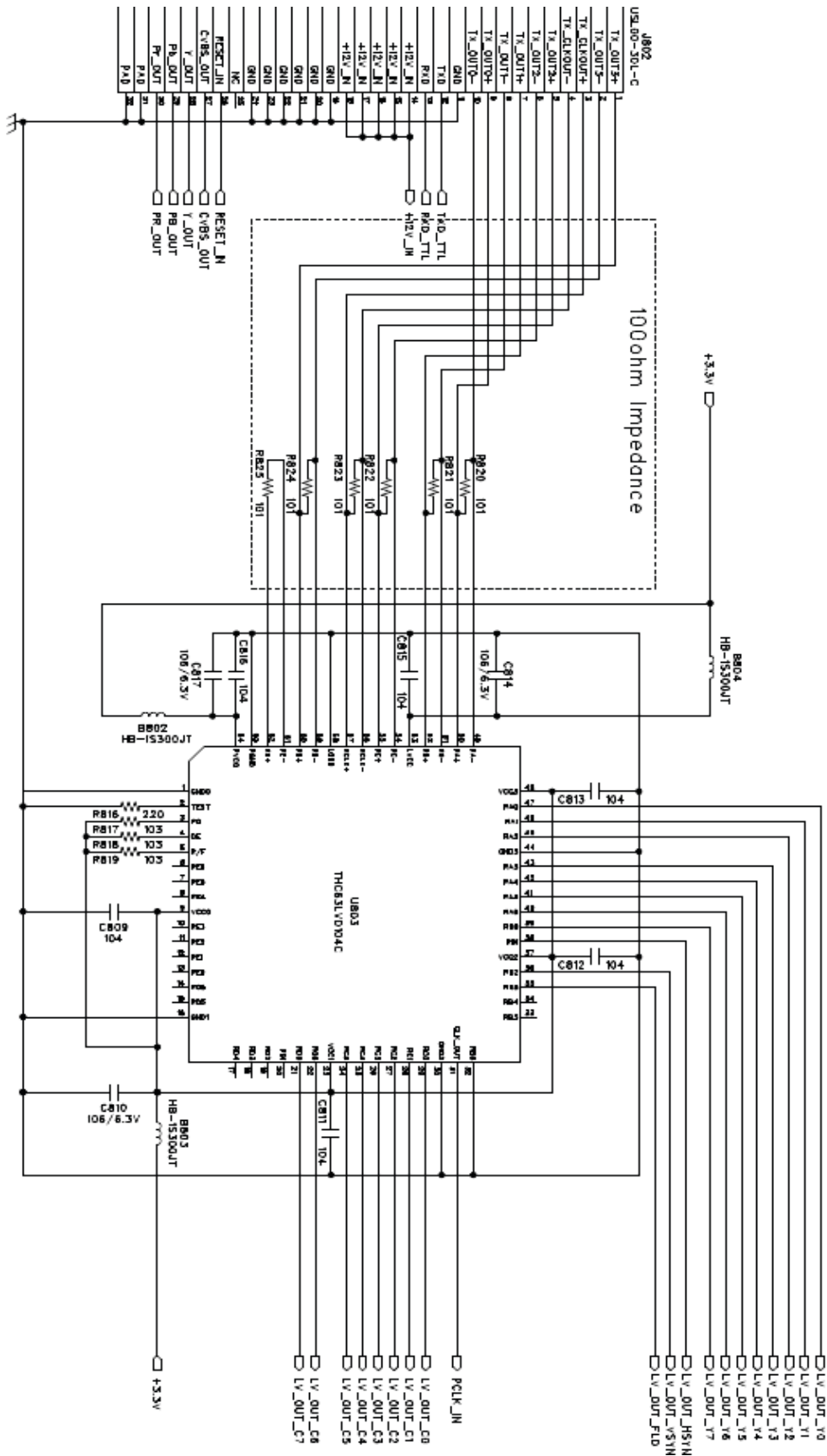
## Double Mode : THC63LVD827 (THINE Electronics Inc.)



| Output Format | Pixel Clock [MHz] | TCLK+ [MHz] |
|---------------|-------------------|-------------|
| 1080p60       | 148.5             | 74.25       |
| 1080p50       | 148.5             | 74.25       |
| 1080i60       | 74.25             | 37.125      |
| 1080i50       | 74.25             | 37.125      |
| 1080p30       | 74.25             | 37.125      |
| 1080p25       | 74.25             | 37.125      |
| 720p60        | 74.25             | 37.125      |
| 720p50        | 74.25             | 37.125      |
| 720p30        | 74.25             | 37.125      |
| 720p25        | 74.25             | 37.125      |

# LVDS Receive Circuit Example (LVDS model only)

LVDS Single Output receiver circuit example / Receiver IC : THC63LVD104C



LVDS Single Output receiver circuit example / Receiver IC Pin Assign : THC63LVD104C

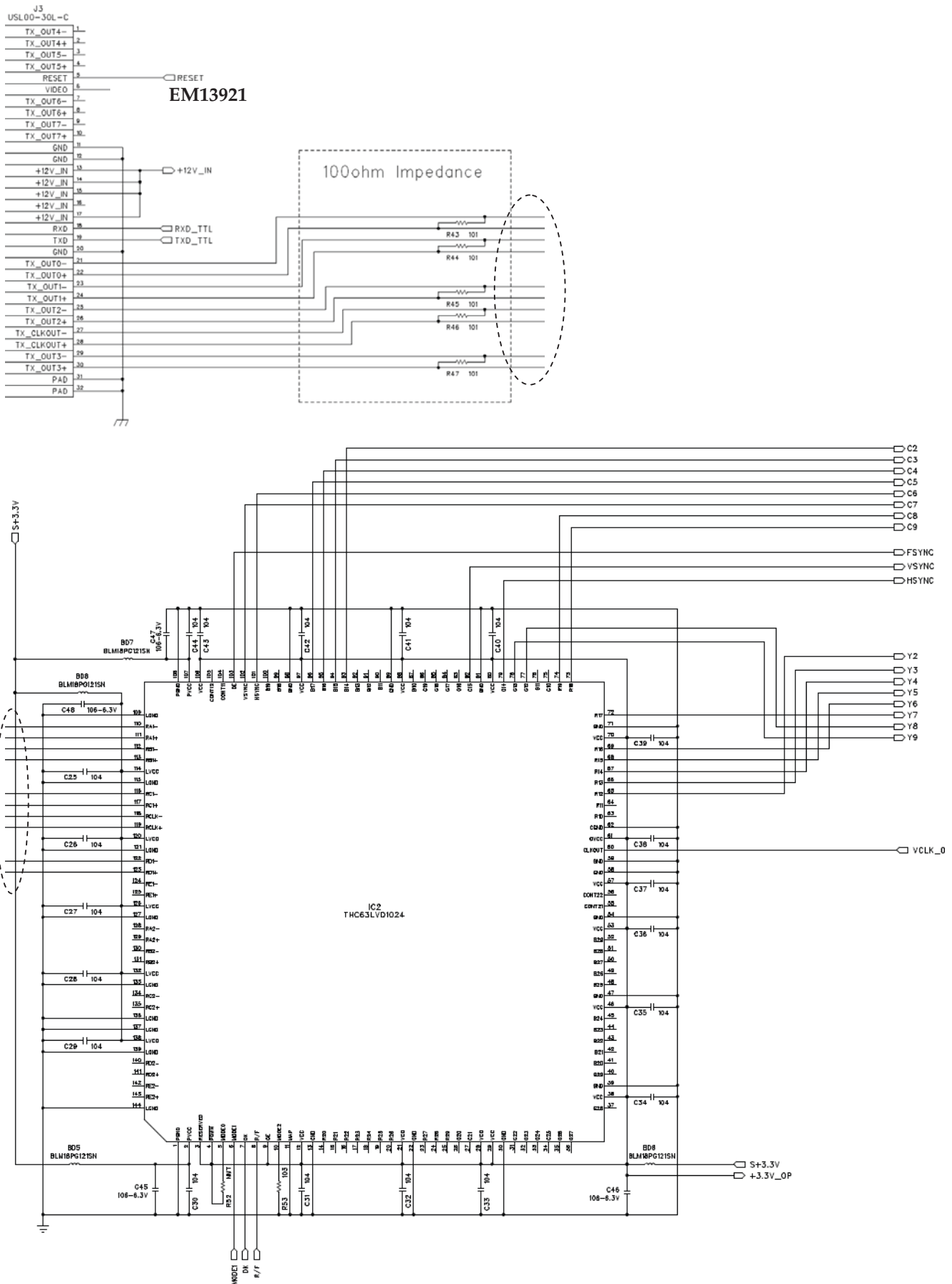
| Pin No. | Description | Signal |
|---------|-------------|--------|
| 1       | GND0        |        |
| 2       | TEST        |        |
| 3       | PD          |        |
| 4       | OE          |        |
| 5       | R/F         |        |
| 6       | RE6         |        |
| 7       | RE5         |        |
| 8       | RE4         |        |
| 9       | VCC0        |        |
| 10      | RE3         |        |
| 11      | RE2         |        |
| 12      | RE1         |        |
| 13      | RE0         |        |
| 14      | RD6         |        |
| 15      | RD5         |        |
| 16      | GND1        |        |
| 17      | RD4         |        |
| 18      | RD3         |        |
| 19      | RD2         |        |
| 20      | RD1         |        |
| 21      | RD0         | C7     |
| 22      | RC6         | C6     |
| 23      | VCC1        |        |
| 24      | RC5         | C5     |
| 25      | RC4         | C4     |
| 26      | RC3         | C3     |
| 27      | RC2         | C2     |
| 28      | RC1         | C1     |
| 29      | RC0         | C0     |
| 30      | GND2        |        |
| 31      | CLK_OUT     | PCLK   |
| 32      | RB6         |        |

| Pin No. | Description | Signal    |
|---------|-------------|-----------|
| 33      | RB5         |           |
| 34      | RB4         |           |
| 35      | RB3         | FLD       |
| 36      | RB2         | VSYNC     |
| 37      | VCC2        |           |
| 38      | RB1         | HSYNC     |
| 39      | RB0         | Y7        |
| 40      | RA6         | Y6        |
| 41      | RA5         | Y5        |
| 42      | RA4         | Y4        |
| 43      | RA3         | Y3        |
| 44      | GND3        |           |
| 45      | RA2         | Y2        |
| 46      | RA1         | Y1        |
| 47      | RA0         | Y0        |
| 48      | VCC3        |           |
| 49      | RA-         | TXOUT0-   |
| 50      | RA+         | TXOUT0+   |
| 51      | RB-         | TXOUT1-   |
| 52      | RB+         | TXOUT1+   |
| 53      | LVCC        |           |
| 54      | RC-         | TXOUT2-   |
| 55      | RC+         | TXOUT2+   |
| 56      | RCLK-       | TXCLKOUT- |
| 57      | RCLK+       | TXCLKOUT+ |
| 58      | LGND        |           |
| 59      | RD-         | TXOUT3-   |
| 60      | RD+         | TXOUT3+   |
| 61      | RE-         |           |
| 62      | RE+         |           |
| 63      | PGND        |           |
| 64      | PVCC        |           |

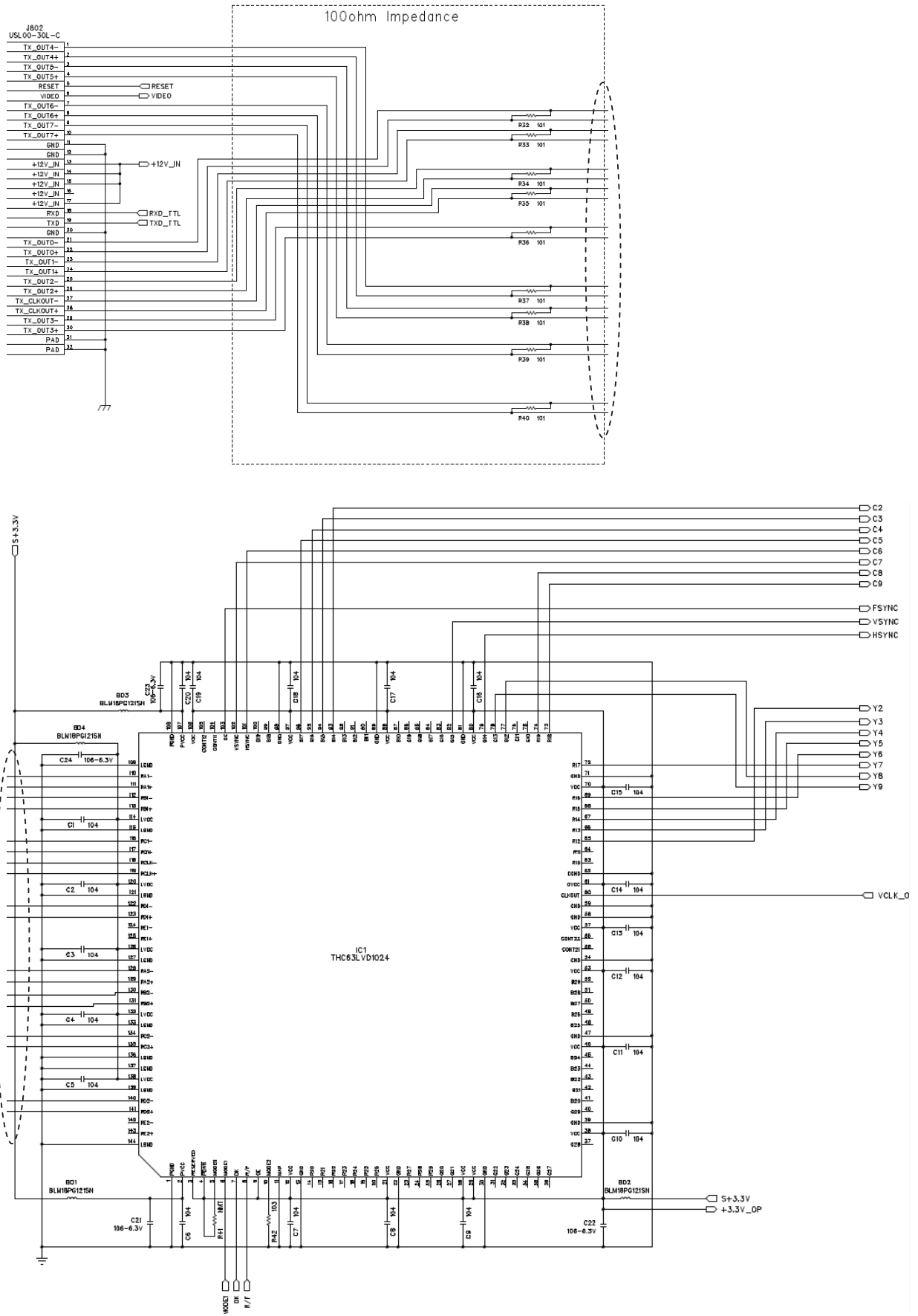




LVDS Single Output receiver circuit example / Receiver IC : THC63LVD1024



LVDS Double Output receiver circuit example / Receiver IC : THC63LVD1024



LVDS Single/Double Output receiver circuit example / Receiver IC Pin Assign : THC63LVD1024

| Pin No. | Description | Signal |
|---------|-------------|--------|
| 1       | PGND        |        |
| 2       | PVCC        |        |
| 3       | RESERVED    |        |
| 4       | PDWN        |        |
| 5       | MODE0       |        |
| 6       | MODE1       | MODE1  |
| 7       | DK          | DK     |
| 8       | R/F         | R/F    |
| 9       | OE          |        |
| 10      | MODE2       |        |
| 11      | MAP         |        |
| 12      | VCC         |        |
| 13      | GND         |        |
| 14      | R20         |        |
| 15      | R21         |        |
| 16      | R22         |        |
| 17      | R23         |        |
| 18      | R24         |        |
| 19      | R25         |        |
| 20      | R26         |        |
| 21      | VCC         |        |
| 22      | GND         |        |
| 23      | R27         |        |
| 24      | R28         |        |
| 25      | R29         |        |
| 26      | G20         |        |
| 27      | G21         |        |
| 28      | VCC         |        |
| 29      | VCC         |        |
| 30      | GND         |        |
| 31      | G22         |        |
| 32      | G23         |        |
| 33      | G24         |        |
| 34      | G25         |        |
| 35      | G26         |        |
| 36      | G27         |        |
| 37      | G28         |        |
| 38      | VCC         |        |
| 39      | GND         |        |
| 40      | G29         |        |
| 41      | B20         |        |
| 42      | B21         |        |
| 43      | B22         |        |
| 44      | B23         |        |
| 45      | B24         |        |
| 46      | VCC         |        |
| 47      | GND         |        |
| 48      | B25         |        |
| 49      | B26         |        |
| 50      | B27         |        |

| Pin No. | Description | Signal |
|---------|-------------|--------|
| 51      | B28         |        |
| 52      | B29         |        |
| 53      | VCC         |        |
| 54      | GND         |        |
| 55      | CONT21      |        |
| 56      | CONT22      |        |
| 57      | VCC         |        |
| 58      | GND         |        |
| 59      | GND         |        |
| 60      | CLKOUT      | VCLK   |
| 61      | CVCC        |        |
| 62      | CGND        |        |
| 63      | R10         |        |
| 64      | R11         |        |
| 65      | R12         | Y2     |
| 66      | R13         | Y3     |
| 67      | R14         | Y4     |
| 68      | R15         | Y5     |
| 69      | R16         | Y6     |
| 70      | VCC         |        |
| 71      | GND         |        |
| 72      | R17         | Y7     |
| 73      | R18         | C9     |
| 74      | R19         | C8     |
| 75      | G10         |        |
| 76      | G11         |        |
| 77      | G12         | Y8     |
| 78      | G13         | Y9     |
| 79      | G14         | HSYNC  |
| 80      | VCC         |        |
| 81      | GND         |        |
| 82      | G15         | VSYNC  |
| 83      | G16         |        |
| 84      | G17         |        |
| 85      | G18         |        |
| 86      | G19         |        |
| 87      | B10         |        |
| 88      | VCC         |        |
| 89      | GND         |        |
| 90      | B11         |        |
| 91      | B12         |        |
| 92      | B13         |        |
| 93      | B14         | C2     |
| 94      | B15         | C3     |
| 95      | B16         | C4     |
| 96      | B17         | C5     |
| 97      | VCC         |        |
| 98      | GND         |        |
| 99      | B18         |        |
| 100     | B19         |        |

| Pin No. | Description | Signal    |
|---------|-------------|-----------|
| 101     | HSYNC       | C6        |
| 102     | VSYNC       | C7        |
| 103     | DE          | FSYNC     |
| 104     | CONT11      |           |
| 105     | CONT12      |           |
| 106     | VCC         |           |
| 107     | PVCC        |           |
| 108     | PGND        |           |
| 109     | LGND        |           |
| 110     | RA1-        | TXOUT0-   |
| 111     | RA1+        | TXOUT0+   |
| 112     | RB1-        | TXOUT1-   |
| 113     | RB1+        | TXOUT1+   |
| 114     | LVCC        |           |
| 115     | LGND        |           |
| 116     | RC1-        | TXOUT2-   |
| 117     | RC1+        | TXOUT2+   |
| 118     | RCLK-       | TXCLKOUT- |
| 119     | RCLK+       | TXCLKOUT+ |
| 120     | LVCC        |           |
| 121     | LGND        |           |
| 122     | RD1-        | TXOUT3-   |
| 123     | RD1+        | TXOUT3+   |
| 124     | RE1-        |           |
| 125     | RE1+        |           |
| 126     | LVCC        |           |
| 127     | LGND        |           |
| 128     | RA2-        | TXOUT4-   |
| 129     | RA2+        | TXOUT4+   |
| 130     | RB2-        | TXOUT5-   |
| 131     | RB2+        | TXOUT5+   |
| 132     | LVCC        |           |
| 133     | LGND        |           |
| 134     | RC2-        | TXOUT6-   |
| 135     | RC2+        | TXOUT6+   |
| 136     | LGND        |           |
| 137     | LGND        |           |
| 138     | LVCC        |           |
| 139     | LGND        |           |
| 140     | RD2-        | TXOUT7-   |
| 141     | RD2+        | TXOUT7+   |
| 142     | RE2-        |           |
| 143     | RE2+        |           |
| 144     | LGND        |           |



# OSD & Menu

| 1'ST ITEM     | 2'ND ITEM     | 3'RD ITEM or DATA   | 4'TH ITEM or DATA | 5'TH ITEM or DATA |  |
|---------------|---------------|---|-------------------|-------------------|--|
| FOCUS         | AF MODE       | AUTO/INTERVAL/ONE PUSH/MANUAL/PRESET                      |                   |                   |  |
|               | DZOOM         | OFF/ON  |                   |                   |  |
|               | ZOOM START    | 1~30  |                   |                   |  |
|               | ZOOM STOP     | 1~360   |                   |                   |  |
|               | ZOOM SPEED    | 0~7   |                   |                   |  |
|               | FOCUS LIMIT   | 10CM/50CM/1M/1.5M/2M/3M/5M/10M/30M/60M/100M/200M/500M/INF |                   |                   |  |
|               | AF INTERVAL   | 1~255   |                   |                   |  |
|               | IR CORRECT    | STANDARD/IR LIGHT/USER -20~+20                            |                   |                   |  |
|               | PRESET MARGIN | 0~255   |                   |                   |  |
|               | POWER ON HOME | OFF/ON  |                   |                   |  |
|               | INITIAL       |   |                   |                   |  |
|               | RETURN        |   |                   |                   |  |
| EXPOSURE      | AE MODE       | AUTO/SHUT.PRI/IRIS.PRI/AGC.PRI/MANUAL                     |                   |                   |  |
|               | SHUTTER       | 1/1~1/10000   |                   |                   |  |
|               | IRIS          | CLOSE~F1.6  |                   |                   |  |
|               | AGC           | 0dB ~ 45dB  |                   |                   |  |
|               | AGC MAX       | 0~255   |                   |                   |  |
|               | SENS-UP MAX   | OFF/X2/X4/X8/X16/X32                                      |                   |                   |  |
|               | FLICKERLESS   | OFF/AUTO  |                   |                   |  |
|               | BRIGHTNESS    | 0~14  |                   |                   |  |
|               | AE RESPONSE   | 0~48  |                   |                   |  |
|               | INITIAL       |   |                   |                   |  |
|               | RETURN        |   |                   |                   |  |
| WHITE BALANCE | MODE          | AUTO/INDOOR/OUTDOOR/ONE PUSH/ATW/MANUAL                   |                   |                   |  |
|               | PUSH          | PRESS OK/WAIT   |                   |                   |  |
|               | BLUE          | 0~255   |                   |                   |  |
|               | RED           | 0~255   |                   |                   |  |
|               | SPEED         | 0~7   |                   |                   |  |
|               | OFFSET-BLUE   | 0~100   |                   |                   |  |
|               | OFFSET-RED    | 0~100   |                   |                   |  |
|               | SATURATION    | 0~20  |                   |                   |  |
|               | HUE           | 0~20  |                   |                   |  |
|               | INITIAL       |   |                   |                   |  |
|               | RETURN        |   |                   |                   |  |
| WDR/BLC       | BACKLIGHT     | OFF/BLC/HLC   |                   |                   |  |
|               | WDR           | OFF/ON  |                   |                   |  |
|               | BLC SET       | POSITION-X  |                   | 0~46              |  |
|               |               | POSITION-Y  |                   | 0~32              |  |
|               |               | SIZE-X  |                   | 0~46              |  |
|               |               | SIZE-Y  |                   | 0~32              |  |
|               |               | RETURN  |                   |                   |  |
|               | HLC SET       | POSITION-X  |                   | 0~46              |  |
|               |               | POSITION-Y  |                   | 0~32              |  |
|               |               | SIZE-X  |                   | 0~46              |  |
|               |               | SIZE-Y  |                   | 0~32              |  |
|               |               | LEVEL   |                   | 0~20              |  |
|               |               | BLACK MASK  |                   | OFF/ON            |  |
|               | RETURN        |   |                   |                   |  |
|               | WDR SET       | LEVEL   |                   | 0~29              |  |
| CONTRAST      |               |   | 0~5               |                   |  |
| BREIGHT       |               |   | 0~19              |                   |  |
| RETURN        |               |   |                   |                   |  |



|            |             |  |  |  |  |
|------------|-------------|--|--|--|--|
|            | INITIAL     |  |  |  |  |
|            | RETURN      |  |  |  |  |
| DAY&NIGHT  | MODE        | AUTO/DAY(COLOR)/NIGHT(BW)/EXT-H/EXT-L                      |  |  |  |
|            | DELAY[SEC]  | 1~60   |  |  |  |
|            | D->N LEVEL  | 0~255  |  |  |  |
|            | N->D LEVEL  | 0~255  |  |  |  |
|            | NIGHT COLOR | OFF/ON   |  |  |  |
|            | COLOR BURST | OFF/ON   |  |  |  |
|            | INITIAL     |  |  |  |  |
|            | RETURN      |  |  |  |  |
| IMAGE      | SHARPNESS   | 0~15   |  |  |  |
|            | CONTRAST    | 0~20   |  |  |  |
|            | GAMMA       | 0.4/0.45/0.5/0.55/0.6/0.7/0.8/0.9/1.0                      |  |  |  |
|            | SHADING     | OFF/ON   |  |  |  |
|            | FREEZE      | OFF/ON   |  |  |  |
|            | EFFECT      | OFF/NEGATIVE/GRAY MODE/REDDISH-1~4/BLUISH-1~4/GREENISH-1~4 |  |  |  |
|            | ROTATE      | MIRROR   | OFF/H-FLIP/V-FLIP/HV-FLIP  |  |  |
|            |             | CORRIDOR VIEW  | OFF/FULL/CROP  |  |  |
|            |             | RETURN   |  |  |  |
|            | DNR         | MODE   | OFF/2D/3D/2D+3D  |  |  |
|            |             | LEVEL  | AUTO/LOW/MIDDLE/HIGH   |  |  |
|            |             | APERTURE   | 0~4  |  |  |
|            |             | RETURN   |  |  |  |
|            | DEFOG       | MODE   | OFF/ON/AUTO  |  |  |
|            |             | STRENGTH   | 0~16   |  |  |
|            |             | THRESHOLD  | 0~3  |  |  |
|            |             | AUTO LEVEL   | LOW/MIDDLE/HIGH  |  |  |
|            |             | RETURN   |  |  |  |
|            | DWDR        | MODE   | OFF/ON/AUTO  |  |  |
|            |             | STRENGTH   | 0~16   |  |  |
|            |             | AUTO LEVEL   | LOW/MIDDLE/HIGH  |  |  |
|            |             | RETURN   |  |  |  |
|            | DIS         | OFF/ON   |  |  |  |
|            | INITIAL     |  |  |  |  |
|            | RETURN      |  |  |  |  |
|            | SPECIAL     | TITLE  | EDIT PANEL   |  |  |
|            |             |  | <div style="border: 1px solid black; padding: 5px; width: fit-content;"> ↓<br/> - - - - -<br/> A B C D E F G H I J K L M N<br/> O P Q R S T U V W X Y Z ! ?<br/> 0 1 2 3 4 5 6 7 8 9 ~ ( ) ^<br/> SP&gt; &lt;BK </div> |  |  |
| DISPLAY    |             |  | OFF/ON   |  |  |
| POSITION   |             |  | [POSITION EDIT]  |  |  |
| TEXT COLOR |             |  | WHITE/BLACK/BLUE/GRAY/YELLOW   |  |  |
| INITIAL    |             |  |  |  |  |
| RETURN     |             |  |  |  |  |
| DISPLAY    |             | ZOOM RATIO   | OFF/ON   |  |  |
|            |             | ZOOM RATIO POS   | [POSITION EDIT]  |  |  |
|            |             | CAMERA ID  | OFF/ON   |  |  |
|            |             | CAMERA ID POS  | [POSITION EDIT]  |  |  |
|            |             | INITIAL  |  |  |  |
|            |             | RETURN   |  |  |  |
| PRIVACY    |             | MODE   | OFF/ON   |  |  |
|            |             | MASK NO  | 1~8  |  |  |
|            |             | DISPLAY  | OFF/ON   |  |  |
|            |             | PAN/TILT LOCK  | OFF/ON   |  |  |
|            | MASK COLOR  | BLACK/GRAY1~6/WHITE/GREEN/BLUE/                            |  |  |  |



|  |               |   |   |  |
|--|---------------|---|---|--|
|  |               |   | RED/CYAN/MAGENTA/YELLOW/MOSAIC          |  |
|  |               | POSITION-X                                    | 0~160                                   |  |
|  |               | POSITION-Y                                    | 0~90                                    |  |
|  |               | SIZE-X  | 1~80                                    |  |
|  |               | SIZE-Y  | 1~45                                    |  |
|  |               | MASK RESET                                    | PUSH                                    |  |
|  |               | INITIAL                                       |   |  |
|  |               | RETURN  |   |  |
|  | MOTION        | MODE  | OFF/ON                                  |  |
|  |               | AREA NO                                       | 1~4                                     |  |
|  |               | AREA ENABLE                                   | OFF/ON                                  |  |
|  |               | AREA SET                                      | POSITION-X                              |  |
|  |               |   | POSITION-Y                              |  |
|  |               |   | SIZE-X                                  |  |
|  |               |   | SIZE-Y                                  |  |
|  |               | RETURN  |   |  |
|  |               | ALARM WINDOW                                  | OFF/ON                                  |  |
|  |               | ALARM TEXT                                    | OFF/ON                                  |  |
|  |               | ALARM BLOCK                                   | OFF/ON                                  |  |
|  |               | SENSITIVITY                                   | 0~40                                    |  |
|  |               | INITIAL                                       |   |  |
|  |               | RETURN  |   |  |
|  | PIP           | MODE  | OFF/ON                                  |  |
|  |               | SIZE  | 1/4,1/9,1/16,1/25                       |  |
|  |               | POSITION-X                                    | 0~10                                    |  |
|  |               | POSITION-Y                                    | 0~10                                    |  |
|  |               | INITIAL                                       |   |  |
|  |               | RETURN  |   |  |
|  | ETC           | BINNING                                       | OFF/ON                                  |  |
|  |               | DEFECT PIXEL                                  | DEFECT PIXEL                            |  |
|  |               |   | OFF/ON/STATIC ON(FIXED)                 |  |
|  |               | STATIC PROCESS                                | PRESS OK                                |  |
|  |               | RETURN  |   |  |
|  |               | RETURN  |   |  |
|  | INITIAL       |   |   |  |
|  | RETURN        |   |   |  |
| SYSTEM<br>(* )It is not initialized by "Factory default" | OUTPUT FORMAT | 1080p25/30/50/60, 1080i50/60, 720p25/30/50/60 |   |  |
|  | APPLY         | YES / NO                                      |   |  |
|  | SERIAL        | CAM ID  | 0~255                                   |  |
|  |               | BAUDRATE                                      | 2400/4800/9600/19200/38400/57600/115200 |  |
|  |               | PARITY  | NONE/EVEN/ODD                           |  |
|  |               | PROTOCOL                                      | AUTO/VISCA/AFP                          |  |
|  |               | APPLY   | YES / NO                                |  |
|  | RETURN        |   |   |  |
|  | COLOR ADJUST  | LINE-RED                                      | 0~10                                    |  |
|  |               | LINE-GREEN                                    | 0~10                                    |  |
|  |               | LINE-BLUE                                     | 0~10                                    |  |
|  |               | COLOR AREA                                    | RED/BLUE/GREEN/CYAN/MAGENTA/YELLOW      |  |
|  |               | COLOR HUE                                     | 0~180                                   |  |
|  |               | COLOR GAIN                                    | 0~64                                    |  |
|  |               | SAVE  | PRESS OK                                |  |
|  |               | INITIAL                                       |   |  |
|  |               | RETURN  |   |  |
|  | TRIGGER&SCAN  | TRIGGER MODE                                  | ---                                     |  |
|  |               | SENSOR SCAN                                   | FULL/CROP                               |  |
|  |               | OUTPUT SCAN                                   | ---                                     |  |
|  |               | APPLY   | YES/NO                                  |  |
|  |               | RETURN  |   |  |
|  |               | STROBE SIGNAL                                 | ---                                     |  |
|  | RETURN        |   |   |  |

|               |  |                |  |                 |  |
|---------------|--|----------------|--|-----------------|--|
|               | MENU SET   | LANGUAGE       | ---  |                 |  |
|               |  | MENU POSITION  | DEFAULT/TOP-LEFT,RIGHT/BOT-LEFT,RIGHT          |                 |  |
|               |  | MENU COLOR     | TEXT COLOR                                     | WHITE/YELLOW/G  |  |
|               |  |                | TEXT(H) COLOR                                  | RAY/BLUE/BLACK/ |  |
|               |  |                | B/G COLOR                                      | BLACK OP/WHITE  |  |
|               |  |                | B/G(H) COLOR                                   | OP/NO COLOR     |  |
|               |  | RETURN         |  |                 |  |
|               |  | OSD TYPE       | NORMAL/CVBS                                    |                 |  |
|               | RETURN   |                |  |                 |  |
|               | LVDS SET<br>(*only can be used on<br>1080p50 or 1080p60. | LVDS MODE      | SINGLE/DUAL                                    |                 |  |
|               |  | APPLY          | YES/NO   |                 |  |
|               |  | RETURN         |  |                 |  |
|               | PICTURE STYLE  | PICTURE STYLE  | OFF/STANDARD/VIVID/CLEAR/<br>VIVID CLR/NEUTRAL |                 |  |
|               |  | PIC CONTRAST   | 0~6  |                 |  |
|               |  | PIC SATURATION | 0~6  |                 |  |
|               |  | PIC EDGE       | 0~6  |                 |  |
|               |  | RESET          |  |                 |  |
|               |  | RETURN         |  |                 |  |
|               | CVBS ASPECT  | 16:9, 4:3      |  |                 |  |
|               | RETURN   |                |  |                 |  |
| FACTORY RESET | YES / NO   |                |  |                 |  |
| EXIT          |  |                |  |                 |  |



# Functions

## (!!!) Memory Control Function Priority

| Function | Priority | Etc  |
|----------|----------|--|
| D-ZOOM   | 1        | Digital Zoom Function                                |
| WDR      | 2-2      | Wide Dynamic Range                                   |
| DIS      | 2-2      | Digital Image Stabilizer                             |
| PIP      | 2-3      | Picture In Picture                                   |
| COR.VIEW | 3        | Corridor View. It is not H-FILIP / V-FLIP / HV-FLIP. |

\* Digital Zoom : Highest Priority

When D-ZOOM is ON, DIS and COR.VIEW are unconditionally turned OFF.

| D-ZOOM | WDR | DIS | PIP | COR.VIEW |
|--------|-----|-----|-----|----------|
| OFF    | ○   | ○   | ○   | ○        |
| ON     | ○   | X   | ○   | X        |

\* WDR / DIS / PIP will activate the later ON function. If multiple functions are ON at the same time, it will be turned on in WDR / DIS / PIP order. However, DIS is unconditionally turned off when D-ZOOM is turned on.

| D-ZOOM | WDR | DIS    | PIP    | COR.VIEW |
|--------|-----|--------|--------|----------|
| ---    | OFF | ON/OFF | ON/OFF | ON/OFF   |
| ---    | ON  | OFF    | OFF    | OFF      |

| D-ZOOM | DIS | WDR    | PIP    | COR.VIEW |
|--------|-----|--------|--------|----------|
| ---    | OFF | ON/OFF | ON/OFF | ON/OFF   |
| ---    | ON  | OFF    | OFF    | OFF      |

| D-ZOOM | PIP | WDR    | DIS    | COR.VIEW |
|--------|-----|--------|--------|----------|
| ---    | OFF | ON/OFF | ON/OFF | ON/OFF   |
| ---    | ON  | OFF    | OFF    | OFF      |

\* Corridor VIEW can be controlled only when both D-ZOOM / WDR / DIS / PIP are OFF.

\* Corridor VIEW does not work on 1080p50 / 60.

## (!!!) Sensor Master / Slave

You can change the sensor mode using a switch.



< Slave Mode >



< Master Mode >

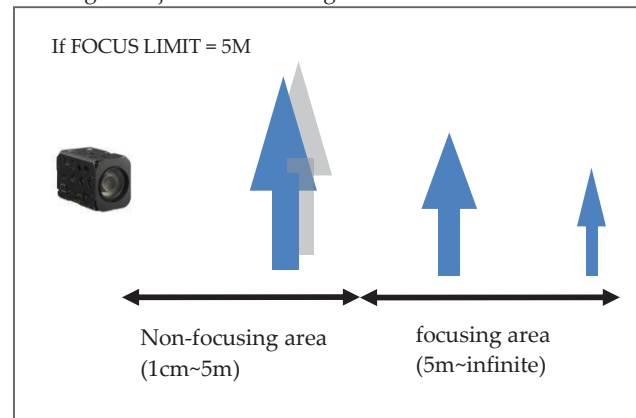
| Sensor Mode   | Switch 1 | Switch 2 |
|---------------|----------|----------|
| Sensor Master | ON       | OFF      |
| Sensor Slave  | OFF      | ON       |

(T R D)

## Auto Focus Near Limit

You can set the minimum focus distance from 1cm(or 10cm) to infinite. It is available only at high magnification zoom position.

This is called by FOCUS LIMIT or NEAR LIMIT or M.O.D (Minimum object distance). This is mostly used to avoid focusing on objects of close range.



## Auto Focus Mode

- AUTO  
When a change in the image is detected, the AF operation is automatically performed.
- INTERVAL  
It is used for AF movements carried out at particular intervals.
- MANUAL  
Adjust zoom and focus manually.
- ONESHOT  
When the zoom is changed, auto focus is executed only once.  
The AF range is from FOCUS LIMIT to infinity.  
It is called by "ONE PUSH" or "ZOOM TRIGGER" mode.

## Home Position Mode

After power on, you can choose whether to move to the last position before power off or to x1 position.

| KT_HomePowerOn | On  | 8x 01 70 24 02 FF | Moving to x1 position                   |
|----------------|-----|-------------------|---|
|                | Off | 8x 01 70 24 03 FF | Move to final position before power off |



## Automatic Exposure Mode

- Full Auto mode  
Iris, Gain, Shutter speed can be set automatically.
- Shutter Priority mode  
Variable shutter speed : 1/1(X32)-1/10000  
Auto Iris & Gain
- Iris Priority mode  
Variable Iris : F1.6 ~ Close, 14steps  
Auto Gain & Shutter
- Manual mode  
Variable Iris/Shutter/Gain
- AE Mode : AUTO/IRIS.PRI/SHUT.PRI/AGC.PRI/MANUAL

| MODE        | AUTO | IRIS.PRI | SHUT.PRI | AGC.PRI | MANUAL |
|-------------|------|----------|----------|---------|--------|
| SHUTTER     | X    | X        | O        | X       | O      |
| IRIS        | X    | O        | X        | X       | O      |
| AGC         | X    | X        | X        | O       | O      |
| AGC MAX     | O    | O        | O        | X       | X      |
| FLICKERLESS | O    | O        | X        | O       | X      |
| SENS UP MAX | O    | O        | X        | O       | X      |
| AE RESPONSE | O    | X        | X        | X       | X      |

(NOTE) See "Command Setting Values"

## Exposure Compensation

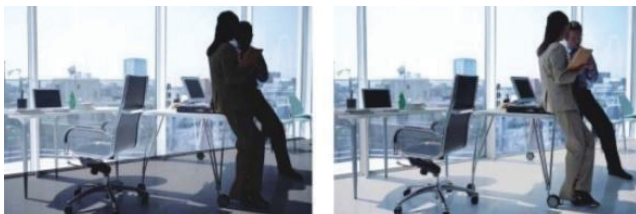
It is a function which offsets the internal reference brightness level used in the AE mode.

|             |                         |                             |
|-------------|-------------------------|-----------------------------|
| CAM_ExpComp | 8x 01 04 4E 00 00 0p 0q | pq=compensation level<br>FF |
|-------------|-------------------------|-----------------------------|

(NOTE) See "Command Setting Values"

## Wide Dynamic Range (WDR)

Images with WDR are produced by combining long-exposure signals(normal shutter) with the signal of the high-intensity portions obtained a short-exposure (high-speed shutter).

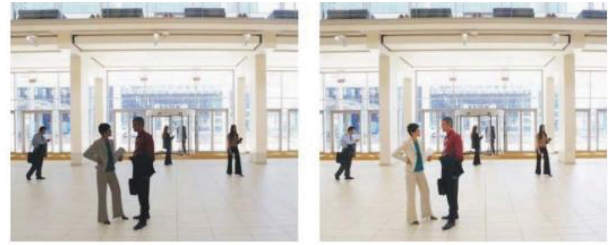


WDR OFF

WDR ON

## Back-Light Compensation(BLC)

BLC allows the camera to adjust the exposure of the entire image to properly expose the subject in the foreground.

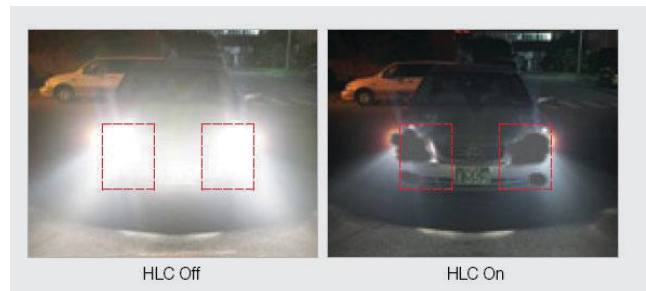


BLC OFF

BLC ON

## High-Light Compensation (HLC)

It's ability to reverse bright points in the picture to black. As an effective approach to recognize vehicle plate number at night, HLC function can detect any spotlight diffused by object-vehicle and compensate it for obtaining clearer image.



HLC Off

HLC On

## Digital WDR

Digital Wide Dynamic Range gives the camera the ability to view Dark areas of the given image as well as extremely lighted portions of the image, or areas of high contrast.

|                  |                   |                            |
|------------------|-------------------|----------------------------|
| KT_DwdrMode      | 8x 01 70 4B 0p FF | p=0(OFF)<br>1(ON), 2(AUTO) |
| KT_DwdrOnLevel   | 8x 01 70 4C 0p FF | p=0~16                     |
| KT_DwdrAutoLevel | 8x 01 70 4D 0p FF | p=0(HIGH)~2(LOW)           |

## White Balance

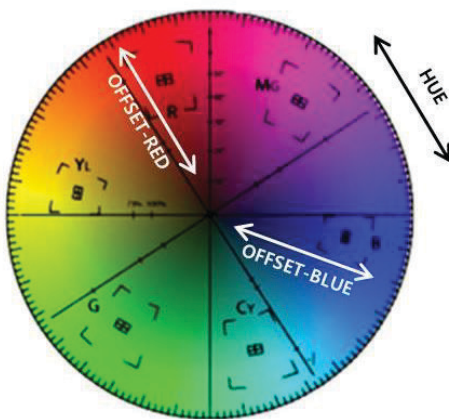
There is a difference between the colors that people perceive and the colors that the camera recognizes. White Balance is used to overcome or reduce the difference.

### ■ WD Mode

|        |           |                   |                  |
|--------|-----------|-------------------|------------------|
| CAM_WB | Auto      | 8x 01 04 35 00 FF | Normal Auto      |
|        | Indoor    | 8x 01 04 35 01 FF | Indoor mode      |
|        | Outdoor   | 8x 01 04 35 02 FF | Outdoor mode     |
|        | OnePushWB | 8x 01 04 35 03 FF | One Push WB mode |
|        | ATW       | 8x 01 04 35 04 FF | ATWmode          |
|        | Manual    | 8x 01 04 35 05 FF | Manual mode      |

### ● AUTO

Automatically adjusts color. Setting offset-blue and offset-red(0~50).



|                  |   |                   |                              |
|------------------|---|-------------------|------------------------------|
| KT_WbBluseoffset | - | 8x 01 71 51 pp FF | pp : Blue offset (0x00~0x64) |
| KT_WbBluseoffset | - | 8x 01 71 52 pp FF | pp : Red offset (0x00~0x64)  |

### ● ONE PUSH

Fix the color if pressed PUSH button

### ● INDOOR / OUTDOOR

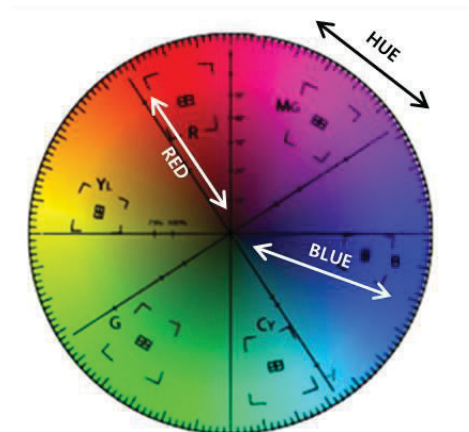
Set color temperature to be indoor/outdoor light.

### ● ATW

Auto Trace White balance

### ● MANUAL

Adjust color manually. Setting blue gain and red gain(0~255).



|           |        |                            |   |
|-----------|--------|----------------------------|---|
| CAM_RGain | Reset  | 8x 01 04 03 00 FF          | Manual Control of R Gain<br>pq: R Gain, 0x00~0xff |
|           | Up     | 8x 01 04 03 02 FF          |   |
|           | Down   | 8x 01 04 03 03 FF          |   |
|           | Direct | 8x 01 04 43 00 00 0p 0q FF |   |
| CAM_BGain | Reset  | 8x 01 04 04 00 FF          | Manual Control of B Gain<br>pq: B Gain, 0x00~0xff |
|           | Up     | 8x 01 04 04 02 FF          |   |
|           | Down   | 8x 01 04 04 03 FF          |   |
|           | Direct | 8x 01 04 44 00 00 0p 0q FF |   |

## Day & Night Setting

### Day&Night Mode

|             |                   |                                       |
|-------------|-------------------|---------------------------------------|
| CAM_ICR     | 8x 01 04 01 0p FF | p=2(ICR ON)<br>p=3(ICR OFF)           |
| CAM_AutoICR | 8x 01 04 51 0p FF | p=2(Auto ICR ON)<br>p=3(Auto ICR OFF) |

| Mode  | CAM_AutoICR | CAM_ICR    |
|-------|-------------|------------|
| Day   | OFF         | OFF        |
| Night | OFF         | ON         |
| Auto  | ON          | Don't care |

You can select D & N mode in more detail.

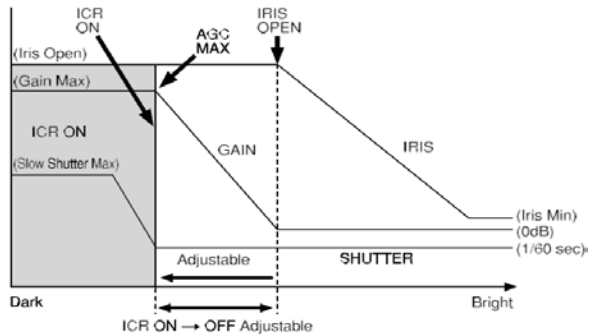
|             |                   |   |
|-------------|-------------------|---|
| CAM_ICR_Ext | 8x 01 04 01 pp FF | pp=02 : ICR ON<br>pp=03 : ICR OFF<br>pp=20 : Auto<br>pp=21 : Day<br>pp=22 : Night<br>pp=23 : Ext-H<br>pp=24 : Ext-L |
|-------------|-------------------|---|

### AUTO Mode

If the current illumination is darker than the ICR ON level, the IR cut filter is removed. If it is brighter than the ICR OFF level, the IR cut filter is enabled.

ICR ON level = Day To Night level

ICR OFF level = Night To Day level



|                       |                            |                                |
|-----------------------|----------------------------|--------------------------------|
| CAM_AutoICR_Threshold | 8x 01 04 21 00 00 0p 0q FF | pq:ICR ON->OFF threshold level |
| KT_AutoICR_Threshold  | 8x 01 04 41 00 00 0p 0q FF | pq:ICR OFF->ON threshold level |
| KT_DwellTime          | 8x 01 04 41 01 00 0p 0q FF | pq:1-60 seconds                |

### DAY Mode (=ICR OFF fixed)

It always maintains the DAY (color) state regardless of the current illumination.

### NIGHT Mode (=ICR ON fixed)

It always maintains the NIGHT (B/W) state regardless of the current illumination.

### EXT-L/H Mode

DAY / NIGHT is determined according to the external input signal.

In EXT-H mode, when the input signal level is greater than DAY TO NIGHT LEVEL, it switches to NIGHT.

In EXT-L mode, if the input signal level is lower than DAY TO NIGHT LEVEL, it switches to NIGHT.

|                     |                   |                         |
|---------------------|-------------------|-------------------------|
| KT_ExtICRthres hold | Day->Night(EXT-H) | 8x 01 70 05 10 0p 0q FF |
|                     | Night->Day(EXT-H) | 8x 01 70 05 11 0p 0q FF |
|                     | Day->Night(EXT-L) | 8x 01 70 05 20 0p 0q FF |
|                     | Night->Day(EXT-L) | 8x 01 70 05 21 0p 0q FF |

### CVBS Color Burst

Set color burst on / off of CVBS output signal.

However, it is applicable only at night.

|                   |                   |  |
|-------------------|-------------------|--|
| KT_CvbsColorBurst | 8x 01 70 13 0p FF | p=2 (color burst on at night)<br>3(color burst off at night) |
|-------------------|-------------------|--|

### Dwell Time

Set the day / night switching time. It is used for day/night switching in D & N Auto / ext-H / ext-L mode.

|              |                            |                 |
|--------------|----------------------------|-----------------|
| KT_DwellTime | 8x 01 04 41 01 00 0p 0q FF | pq:1-60 seconds |
|--------------|----------------------------|-----------------|

### Night color

In night mode, color images can be viewed instead of black and white images.

|              |                   |   |
|--------------|-------------------|---|
| KT_NightColr | 8x 01 70 A2 0p FF | p=0 : BW image @ night<br>p=1 : Color image @ night |
|--------------|-------------------|---|

## Noise Reduction

### 3D-NR, 2D-NR, 3D+2D NR

|             |                      |  |
|-------------|----------------------|--|
| CAM_NR      | 8x 01 04 53 0p FF    | p=0(off), level 1~5 (2D+3D)<br>p=6 : 2D+3DNR auto mode             |
| KT_DnrMode  | 8x 01 70 36 0p FF    | p : DNR mode<br>0(Off)/1(2D)/2(3D)/3(2D+3D)                        |
| KT_DnrLevel | 8x 01 70 39 0p 0q FF | p : DNR level<br>0(auto) 1(low)~3(high)<br>q : DNR aperture<br>0~4 |

### DNR aperture

0 : least aperture : most motion artifact

1 : less aperture : more motion artifact

2 : Normal aperture : normal motion artifact

3 : more aperture : less motion artifact

4 : most aperture : least motion artifact



## Defog

- Sharpens cloudy images such as fog.

|                   |                         |   |
|-------------------|-------------------------|---|
| CAM_Defog         | 8x 01 04 37 0p 00<br>FF | p=2(ON) / 3(OFF) /<br>4(AUTO)   |
| KT_DefogOnLevel   | 8x 01 70 3C 0p 00<br>FF | p=0~16 (defog ON mode<br>level)   |
| KT_DefogAutoLevel | 8x 01 70 3D 0p 0q<br>FF | p=0~2 (defog Auto mode<br>level)<br>q=0~3(defog Auto mode<br>threshold) |

## Spot AE

- Available in Full Auto AE mode.
- A particular section of the subject can be designated, and then that portion of the image can be weighted and a value computed so that iris and gain can be optimized to obtain an image.

|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | A | B | C | D | E | F |
| 1 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| A |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| B |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| C |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| D |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| E |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| F |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

|            |          |                            |                         |
|------------|----------|----------------------------|-------------------------|
| CAM_SpotAE | On       | 8x 01 04 59 02 FF          | Spot AE mode            |
|            | Off      | 8x 01 04 59 03 FF          |                         |
|            | Position | 8x 01 04 29 0p 0q 0r 0s FF | pq:X(0~F),<br>rs:Y(0~F) |

## Slow AE Response

The Slow AE Response function allows you to reduce the exposure response speed. (example) If the headlights of a car are caught by the camera, the camera automatically adjusts the exposure so that it can shoot a high-intensity subject. Since AE responds slowly, it can be prevent images from being shot.

|                 |                   |                            |
|-----------------|-------------------|----------------------------|
| CAM_AE_Response | 8x 01 04 5D pp FF | pp: 01 to 30<br>default 01 |
|-----------------|-------------------|----------------------------|

## Digital Image Stabilizer (DIS)

- This function reduces image blurring caused by vibration
- CVBS is turned off when DIS mode is ON.



|               |                   |                  |
|---------------|-------------------|------------------|
| CAM_Stablizer | 8x 01 04 34 0p FF | p=2 (ON), 3(OFF) |
|---------------|-------------------|------------------|

## PIP (Picture In Picture)

- Displays a small image on the image.
- CVBS is turned off when PIP mode is ON.

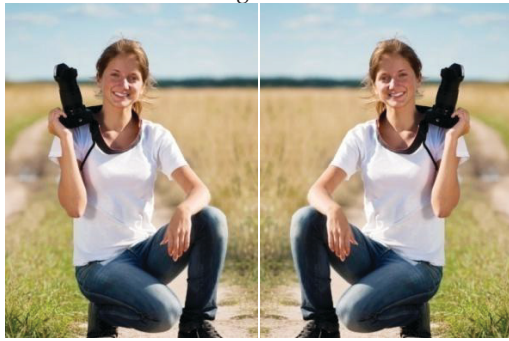


|              |  |
|--------------|--|
| KT_PipSet    | 8x 01 70 48 0p 0q 0s 0r FF<br>p=2 : PIP ON<br>p=3 : PIP OFF<br>p=F : Initialize PIP mode/size/position<br>q=0~3 : pip window size<br>0(1/4),1(1/9),2(1/16),3(1/24)<br>s=0~A : PIP window position - X<br>r=0~A : PIP window position - Y |
| KT_PipSetInq | 8x 01 70 48 FF<br>y0 50 0p 0q 0s 0r FF   |

(\*) default : p=3, q=1, s=A, r=A

## Image Mirror

This function rotates the image.



(off)

(H-flip)



(V-flip)

(H/V-flip)

|                                    |                   |                   |
|------------------------------------|-------------------|-------------------|
| CAM_PictureFlip<br>(180° rotation) | 8x 01 04 66 0p FF | p=2(ON)<br>3(OFF) |
| CAM_LR_Reverse                     | 8x 01 04 61 0p FF | p=2(ON)<br>3(OFF) |

| Mirror Mode | CAM_PictureFlip | CAM_LR_Reverse |
|-------------|-----------------|----------------|
| Off         | OFF             | OFF            |
| H-flip      | OFF             | ON             |
| V-flip      | ON              | ON             |
| H/V-flip    | ON              | OFF            |

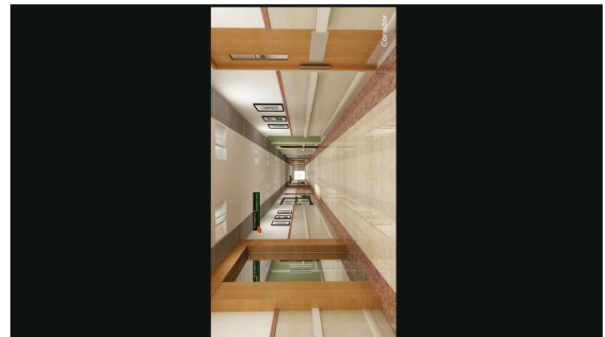
|                                       |                      |  |
|---------------------------------------|----------------------|--|
| KT_ImageRotate<br>(corridor & mirror) | 8x 01 70 4A 0p 0q FF | p=corridor mode<br>0(Off)<br>1(Full)<br>2(Crop)<br>q=mirror mode<br>0(Off)<br>1(H-flip)<br>2(V-flip)<br>3(HV-flip) |
|---------------------------------------|----------------------|--|

## Corridor View

In many surveillance situations you want to monitor an area that is more vertical than horizontal in shape. This includes staircases, hallways, aisles, roads, runways, tunnels, and many other applications. In these situations, the traditional landscape format is not the optimal solution since it creates video streams where a large part of the field of view – specifically the sides of the image – is redundant.

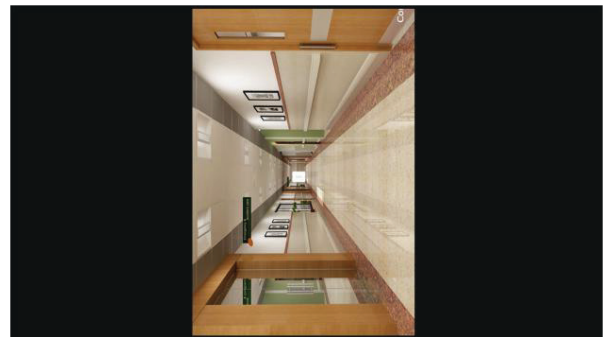


(Original Image)



(Corridor Full mode)

The original picture is output.



(Corridor Crop mode)

Corridor Crop mode is also known as 1: 1 mode.

The original picture may not be output at all.

## Freeze

This function captures an image in the field memory of the camera so that this image can be output continuously.

|            |     |                   |                    |
|------------|-----|-------------------|--------------------|
| CAM_Freeze | On  | 8x 01 04 62 02 FF | Still Image ON/OFF |
|            | Off | 8x 01 04 62 03 FF |                    |

## Memory Preset

16 sets of camera shooting conditions can be stored and recalled.

- Zoom Position
- Digital Zoom Mode
- Focus Mode
- AE mode
- Shutter control parameters
- Bright , Iris, Gain
- Exposure Compensation mode
- Exposure Level
- Backlight Compensation mode
- Auto Slow Shutter On/Off
- White Balance mode
- Red/Blue Gain
- Aperture Control
- ICR mode, Defog, WDR mode

|            |        |                      |                      |
|------------|--------|----------------------|----------------------|
| CAM_Memory | Reset  | 8x 01 04 3F 00 0p FF | p:Memory Number(0-F) |
|            | Set    | 8x 01 04 3F 01 0p FF |                      |
|            | Recall | 8x 01 04 3F 02 0p FF |                      |

(See. Custom/Memory Preset Setting Items)

## Custom Preset

As with the memory preset function, the camera shooting conditions can be saved and recalled. The settings are recalled when the power is turned on.

- The above memory preset contents
- Privacy mask, Motion detect , Title
- Flip, mirror, negative, BW, Gamma, DNR, DIS, AF controls, camera ID, HLC, ETC.

|            |          |                      |  |
|------------|----------|----------------------|--|
| CAM_Custom | Reset    | 8x 01 04 3F 00 7F FF | Starts up in this mode when the power is turned on |
|            | Set      | 8x 01 04 3F 01 7F FF |  |
|            | Recall   | 8x 01 04 3F 02 7F FF |  |
|            | Inactive | 8x 01 04 3F 10 7F FF |  |
|            | Active   | 8x 01 04 3F 11 7F FF |  |

(See. Custom/Memory Preset Setting Items)

(NOTE)

You can decide whether to use a custom preset.

When the product is shipped, custom preset is disabled(inactive mode)

To enable the custom preset, the user must send **SET/RECALL or ACTIVE** command.

To disable the custom preset, send **INACTIVE** command.

<Custom Preset Mode>

When the power is turned on,

- **Active** : starts up in the custom preset settings

- **Inactive** : starts up in the settings before the power is turned off

(factory shipment default : Inactive mode)

## User Memory Area

You can use up to 16 bytes to store data such as camera number.

## Position Preset

The current zoom / focus position can be stored in the internal memory and moved to that position if necessary. A total of 256 locations can be stored.

|                        |                        |                                  |   |
|------------------------|------------------------|----------------------------------|---|
| KT_ZoomFocus Preset    | Set                    | 8x 01 70 3F 01 0p 0q 0r FF       | pqr : preset Number (0x000-0x0FF)   |
|                        | Recall                 | 8x 01 70 3F 02 0p 0q 0r FF       |   |
|                        | Clear                  | 8x 01 70 3F 03 0p 0q 0r FF       |   |
|                        | Clear All Preset       | 8x 01 70 3F 0F 00 00 00 FF       | Clear all preset data   |
| KT_ZoomFocus PresetInq | 8x 09 703F 0n 0n 0n FF | y0 50 0v 0z 0z 0z 0z 0f 0f 0f FF | nnn: preset number (0x000-0x0FF)<br>v : 1(saved), 0(empty)<br>zzzz : zoom position<br>ffff : focus position |

## Motion Detect Function

Motion Detect functions instructs the camera to detect movement within monitoring area and then send an alarm signal automatically.

### ◇ Frame

You can set up to 4-frames

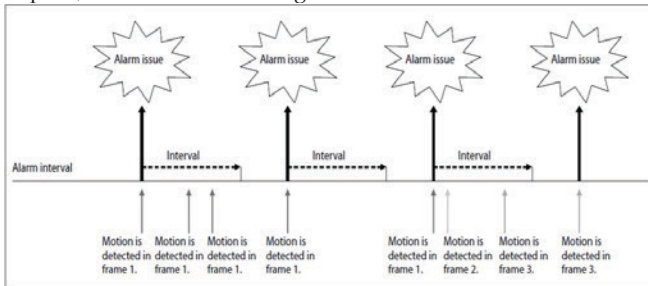
Each frame can be set up :

Using VISCA : 16 (horizontally)×8 (vertically) blocks

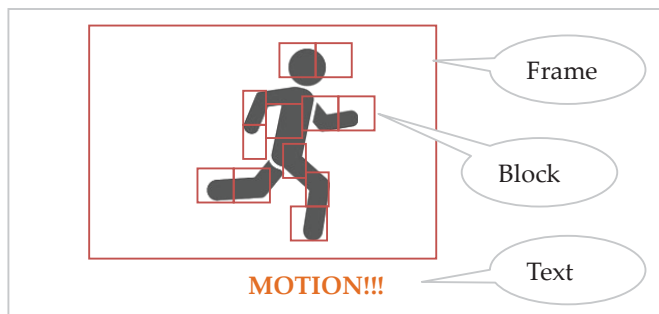
Using MENU : 60 (horizontally)×34 (vertically) blocks

### ◇ Sending Alarms

- When motion is detected, the Alarm Replay command is issued via the serial command (VISCA) communication line.
- When multiple motions are detected or motion is detected in another frame within the set interval following the original time the alarm was issued, another alarm command is not issued.
- When motion is detected after the interval time elapsed, the alarm is issued again.



|               |                                     |  |
|---------------|-------------------------------------|--|
| On            | 8x 01 04 1B 02 FF                   | Motion Detection On/Off  |
| Off           | 8x 01 04 1B 03 FF                   |  |
| Function Set  | 8x 01 04 1C 0m<br>0n 0p 0q 0r 0s FF | m: Display mode (when motion is detected)<br>bit0 : frame display<br>bit1 : block display<br>bit2 : Text display<br>n: Detection Frame Set (0 to F)<br>bit0(frame1)-bit3(frame4)<br>pq: Threshold Level (00 to FF)<br>rs: Interval Time set (00 to FF) |
| Window Set    | 8x 01 04 1D 0m<br>0p 0q 0r 0s FF    | m: Select Detection Frame (0, 1, 2, 3)<br>p: Start Horizontal Position (00 to 0F)<br>q: Start Vertical Position (00 to 07)<br>r: Stop Horizontal Position (01 to 10)<br>s: Stop Vertical Position (01 to 08)   |
| Alarm (Reply) | y0 07 04 1B 0p FF                   | p: Detection Frame Number  |



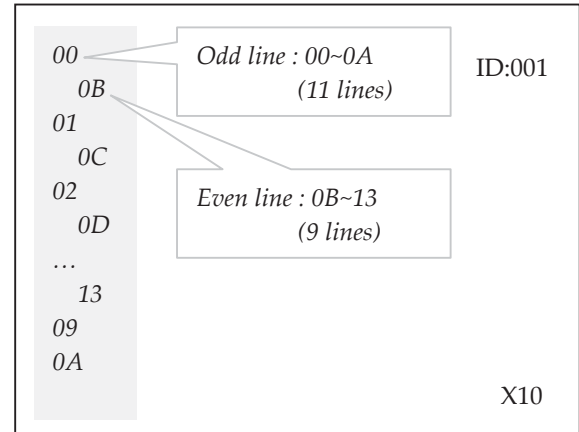
(\*) Blocks are output only within the Frame area.

## Title / Function Display

The user can output desired characters on the screen and can also choose the output font size.

See. "CAM\_Title", "CAM\_MultiLineTitle", "CAM\_EvenLineTitle"

Normal Size : 21 lines, 49 columns



## System Reset

Initialize most camera states.

Several important values are not initialized. (ex. Framerate, Baudrate, Trigger, LVDS mode, CVBS Aspect, Color Adjust Data, Picture Style, etc.)

|                   |                   |
|-------------------|-------------------|
| KT_FactoryDefault | 8x 01 70 EE EE FF |
|-------------------|-------------------|

Initializes the entire system to the factory default.

All values are initialized.

Be careful!!!

|                     |                   |
|---------------------|-------------------|
| KT_FactoryDefSystem | 8x 01 70 EF EF FF |
|---------------------|-------------------|

## Privacy Zone Masking

Privacy Zone masking protects private objects and areas such as house windows, entrances, and exits which are within the camera's range of vision but not subject to surveillance. Privacy zone masking can be masked on the monitor to protect privacy.

- Mask can be set on up to 8 places according to Pan/Tilt positions.
- Interlocking control with zooming.
- Interlocking control with Pan/Tilt.
- Non-interlocking control with Pan/Tilt.

| Command Set     | Command           | Command  | Comments  |
|-----------------|-------------------|--|---|
| CAM_PrivacyZone | SetMask           | 8x 01 04 76 mm nn<br>0r 0r 0s 0s FF                | Setting Mask(Size)<br>See "mm: Mask setting list", "nn: Setting", and "rr: w, ss: h" in "Parameters"  |
|                 | Display           | 8x 01 04 77 pp pp pp pp<br>FF                      | Setting Mask Display On/Off<br>See "pp pp pp pp: Mask bit" in "Parameters" .<br>pp pp pp pp: Mask setting (0: OFF, 1: ON)   |
|                 | SetMaskColor      | 8x 01 04 78 pp pp pp pp<br>qq rr FF                | Setting Color of Mask<br>See "pp pp pp pp: Mask bit" and "qq, rr: Color code" in "Parameters".<br>qq: Color setting when setting the Mask bit to 0<br>rr: Color setting when setting the Mask |
|                 | SetPanTiltAngle   | 8x 01 04 79 0p 0p 0p<br>0q 0q 0q FF                | Setting Pan/Tilt Angle<br>See "Setting pan/tilt angle" in "Parameters".<br>ppp: Pan angle, qq: Tilt angle   |
|                 | SetPTZMask        | 8x 01 04 7B mm<br>0p 0p 0p 0q 0q 0r 0r<br>0r 0r FF | Setting the direct position of PTZ<br>See "mm: Mask setting list" and "Setting pan/tilt angle" in "Parameters".<br>ppp: Pan , qq: Tilt , rrr: Zoom  |
|                 | Non_InterlockMask | 8x 01 04 6F mm<br>0p 0p 0q 0q 0r 0r 0s 0s FF       | Setting non-interlocking the mask to pan/tilt<br>See "mm: Mask setting list" and "pp:x,qq:y, rr:w, ss:  |

| Inquiry Command       | Command Packet    | Inquiry Packet                            | Comments  |
|-----------------------|-------------------|---|---|
| CAM_PrivacyDisplayInq | 8x 09 04 77 FF    | y0 50 pp pp pp pp FF                      | Inquiry about the status of Setting Mask Display On/ Off<br>See "pp pp pp pp: Mask bit" in "Parameters" .<br>1:On, 0:Off  |
| CAM_PrivacyPanTiltInq | 8x 09 04 79 FF    | y0 50 0p 0p 0p 0q 0q<br>0q FF             | Inquiry about the pan/tilt position currently set<br>See "Setting pan/tilt angle" in "Parameters".<br>ppp: Pan, qq: Tilt  |
| CAM_PrivacyPTZInq     | 8x 09 04 7B mm FF | y0 50 0p 0p 0p 0q 0q<br>0q 0r 0r 0r 0r FF | Inquiry about pan/tilt/zoom position at the mm Mask setting<br>See "mm: Mask setting list" and "Setting pan/tilt angle" in "Parameters".<br>ppp: Pan osition,<br>qq: Tilt Position<br>rrr: Zoom |
| CAM_PrivacyMonitorInq | 8x 09 04 6F FF    | y0 50 pp pp pp pp FF                      | Inquiry about the mask currently displayed<br>See "pp pp pp pp: Mask bit" in "Parameters".  |

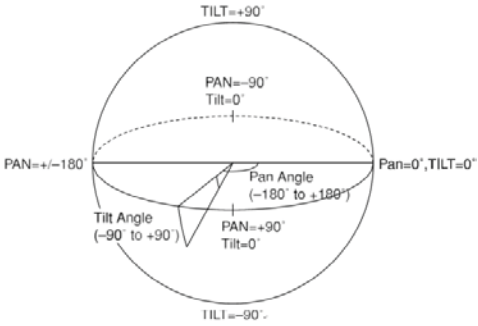
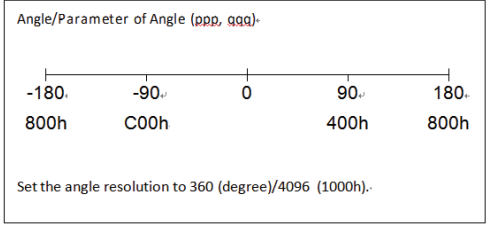
- Mask Number : A=0x00, B=0x01,...W=0x16, X=0x17 (total 24 masks)
- Mask Bit & Mask List(mm)

|          | pp pp pp pp (mask bit) or mm(Mask list) |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |    |   |   |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|----|----|---|---|----|----|----|----|----|----|
| byte     | pp                                      |   |   |   |   |   |   |   | pp |   |   |   |   |   |   |   | pp |   |   |   |   |   |   |   | pp |    |   |   |    |    |    |    |    |    |
| bit      | 7                                       | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7  | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7  | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7  | 6  | 5 | 4 | 3  | 2  | 1  | 0  |    |    |
| Mask     | -                                       | - | - | - | - | - | - | - | -  | - | - | - | - | - | - | - | -  | - | - | - | - | - | - | - | H  | G  | - | - | F  | E  | D  | C  | B  | A  |
| List(mm) |   |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   |    |   |   |   |   |   |   |   | 07 | 06 |   |   | 05 | 04 | 03 | 02 | 01 | 00 |

The priority order of the mask display is in the sequence from A (highest) to P (lowest).



● Pan/Tilt Angle

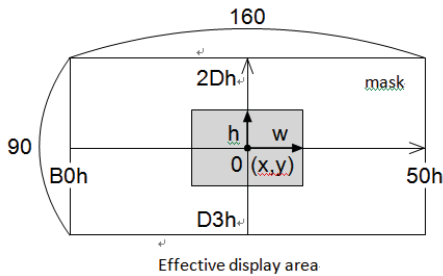


- ✓ You can use the tilt angle at which you can set the mask between -90 to +90 degrees. But the recommended tilt angle is between -70 to +70 degrees.
- ✓ It is recommended that you set the size to at least twice the size of the object (height and width).

● Mask Color (qq, rr)

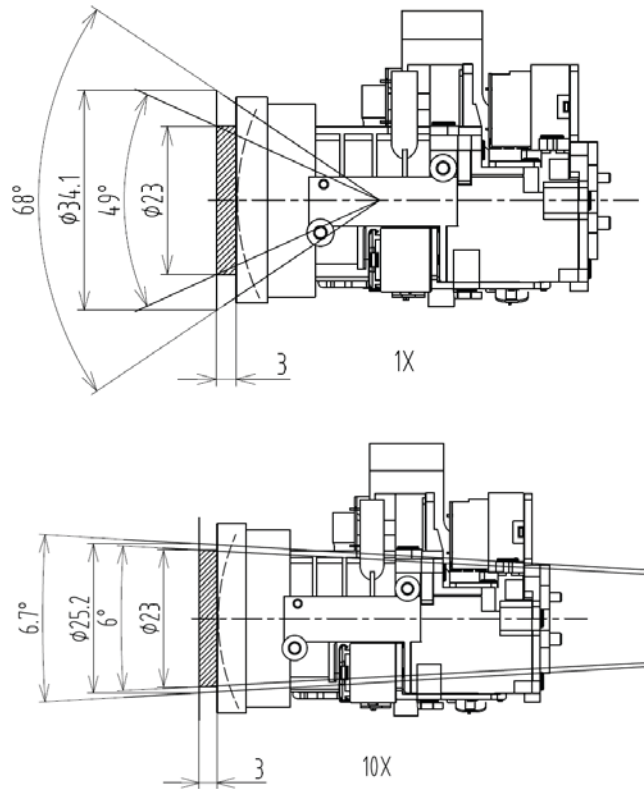
| Mask (Color) | Normal | Translucence |
|--------------|--------|--------------|
| Black        | 00h    | 10h          |
| Gray1        | 01h    | 11h          |
| Gray2        | 02h    | 12h          |
| Gray3        | 03h    | 13h          |
| Gray4        | 04h    | 14h          |
| Gray5        | 05h    | 15h          |
| Gray6        | 06h    | 16h          |
| White        | 07h    | 17h          |
| Red          | 08h    | 18h          |
| Green        | 09h    | 19h          |
| Blue         | 0Ah    | 1Ah          |
| Cyan         | 0Bh    | 1Bh          |
| Yellow       | 0Ch    | 1Ch          |
| Magenta      | 0Dh    | 1Dh          |

● Mask Size : Width/Height

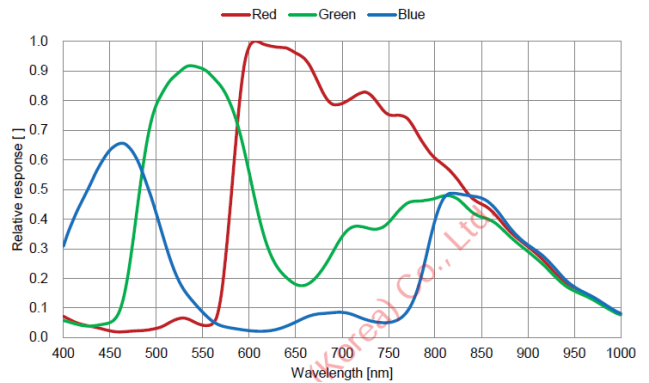


Eclipse

When designing the housing, refer to the dimensional allowance as shown in the figure below.



Spectral Sensitivity Characteristics



Use the graph as a reference value. We can not guarantee these values.



## Video Output Mode

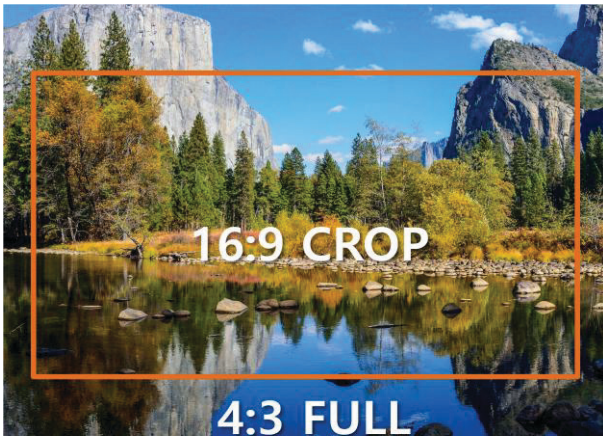
It is to set the angle of view range of the output video.

| Sensor Scan | Output Video Scan | Output image |
|-------------|-------------------|--------------|
| FULL        | FULL              | 4:3          |
| FULL        | CROP              | 16:9         |
| CROP        | -                 | 16:9         |

**The image sensor we use is a 4: 3 ratio sensor.**

**(2064(H)x1544(V))**

Camera can scan the image sensor in 4: 3 Full or 16: 9 Crop.



If the monitor to be used is a 4: 3 ratio monitor, it will show a wider angle of view when used in FULL/FULL mode.

If you use a monitor with 16: 9 ratio in FULL/FULL mode, the angle of view is not cropped, but the subject looks more fat.

In FULL/CROP or CROP/- mode, the image is narrower than the actual image captured by the image sensor. Only the 16: 9 CROP area shown in the figure above is output as the final image.

|                    |                |                  |
|--------------------|----------------|------------------|
| CAM_RegisterValue  | 8x 01 04 24 92 | pp= 00 FULL scan |
| (Sensor Scan Mode) | 0p 0p FF       | 01 CROP scan     |

- ★ It is not applied until the power is turned off and on.
- ★ To use the TRIGGER function, the sensor scan mode must be in FULL mode.
- ★ WDR can not be used in TRIGGER mode.
- ★ LVDS SET menu is only can be used on 1080p50 or 1080p60.
  
- ★ For more information, please use the reference materials.

## Global Shutter

Global shutter make images that not distorted without wobble or skewing. This shutter uses visualize that object moving high speed.

# Command List

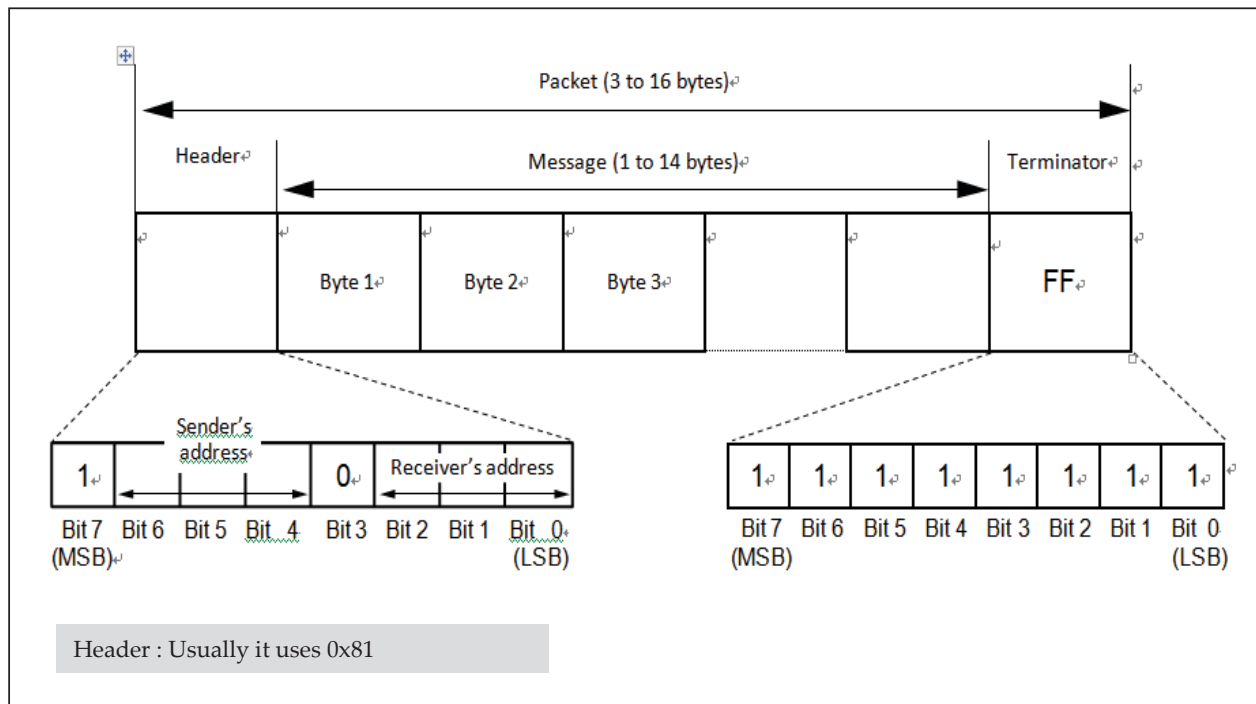
## Overview of RS232 Communication

- Communication speed :  
2400/4800/9600/19200,38400/57600/115200bps
- Data bits : 8
- Start bit : 1
- Stop bit : 1
- Non parity
- Flow control using XON/XOFF and RTS/CTS, etc., is not supported

## Command & Inquiry

- **Command**  
Sends operational commands to the camera
- **Inquiry**  
Used for inquiring about the current state of the camera

|         | Command Packet  | Note  |
|---------|-----------------|---|
| Inquiry | 8X QQ RR ... FF | QQ <sub>1</sub> ) = Command/Inquiry,<br>RR <sub>2</sub> ) = category code |
|         |                 | 1) QQ = 01 (Command), 09 (Inquiry)  |
|         |                 | 2) RR = 00 (Interface), 04 (camera 1),<br>06 (Pan/Tilter), 07 (camera 2)  |
|         |                 | X = 1 to 7 : camera address   |



## Inquiries

- **ACK message**

Returned by the camera when it receives a command. No ACK message is returned for inquiries.

- **Completion message**

Returned by the camera when execution of commands or inquiries is completed. In the case of inquiry commands, it will contain reply data for the inquiry after the 3rd byte of the packet. If the ACK message is omitted, the socket number will contain 0.

|                        | Reply Packet | Note       |
|------------------------|--------------|------------|
| Ack                    | X0 4Y FF     | Y = socket |
| Completion             | X0 5Y FF     | Y = socket |
| Completion (Inquiries) | X0 5Y ... FF | Y = socket |

X = 9 to F: camera address + 8

- **Error message**

| Error Packet | Description                      |
|--------------|----------------------------------|
| X0 6Y 01 FF  | Message length error (>14 bytes) |
| X0 6Y 02 FF  | Syntax Error                     |
| X0 6Y 03 FF  | Command Buffer Full              |
| X0 6Y 04 FF  | Command cancelled                |
| X0 6Y 05 FF  | No socket                        |
| X0 6Y 41 FF  | Command not executable           |

X = 9 to F: camera address + 8, Y = socket number

- **Cam\_VersionInq**

Returns information on the VISCA interface.

| Inquiry        | Packet            | Reply                            | Description   |
|----------------|-------------------|----------------------------------|---|
| Cam_VersionInq | 8X 09 00<br>02 FF | Y0 50 GG<br>GG HH HH<br>JJ JJ FF | GGGG=Vender ID<br>HHHH=Model ID<br>JJJJ = ROM version |

X = 1 to 7 : camera address (For inquiry packet)

X = 9 to F : camera address +8 (For reply packet)

GGGG = **0x0055** (vendor=KTNC)

HHHH : Model Code

HZ5530W : 0467 (T.B.D → It will be changed)

JJJJ : ex) 0123 = Ver1.2.3

- **Network change**

Camera automatically transmits when power is turned on.

**Packet**

Network change X0 38 FF (X=9)

## Command / ACK Example

| Command              | Command Message                | Reply Message   | Comments   |
|----------------------|--------------------------------|---|--|
| General Command      | 81 01 04 38 02 FF<br>(Example) | 90 41 FF (ACK)+90 51 FF<br>(Completion)<br>90 42 FF 90 52FF | Returns ACK when a command has been accepted, and Completion when a command has been executed. |
|                      | 81 01 04 38 FF<br>(Example)    | 90 60 02 FF (Syntax Error)                                  | Accepted a command which is not supported or a command lacking parameters.                     |
|                      | 81 01 04 08 02 FF<br>(Example) | 90 61 41 FF<br>(Command Not Executable)<br>90 62 41 FF      | Could not execute the command in the current mode.   |
| Inquiry Command      | 81 09 04 38 FF<br>(Example)    | 90 50 02 FF (Completion)                                    | ACK is not returned for the inquiry command.   |
|                      | 81 09 05 38 FF<br>(Example)    | 90 60 02 FF (Syntax Error)                                  | Accepted an incompatible command.  |
| Address Set          | 88 30 01 FF                    | 88 30 02 FF   | Returned the device address to +1.   |
| IF_Clear (Broadcast) | 88 01 00 01 FF                 | 88 01 00 01 FF  | Returned the same command.   |
| IF_Clear (For x)     | 8x 01 00 01 FF                 | z0 50 FF (Completion)                                       | ACK is not returned for this command.  |

## CAMERA COMMAND LIST

| Command Set      | Command           | Command Packet                            | Comments  |                     |
|------------------|-------------------|---|---|---------------------|
| AddressSet       | Broadcast         | 88 30 01 FF                               | Address setting   |                     |
| IF_Clear         | Broadcast         | 88 01 00 01 FF                            | I/F Clear   |                     |
| CommandCancel    | -                 | 8x 2p FF                                  | p: Socket No. (=1 or 2)   |                     |
| CAM_Power        | On                | 8x 01 04 00 02 FF                         | Power ON/OFF  |                     |
|                  | Off (Standby)     | 8x 01 04 00 03 FF                         |   |                     |
| CAM_Zoom         | Stop              | 8x 01 04 07 00 FF                         | p=0 (Low) to 7 (High)<br>pqrs: Zoom Position<br>zzzz : zoom position<br>ffff : focus position |                     |
|                  | Tele (Standard)   | 8x 01 04 07 02 FF                         |   |                     |
|                  | Wide (Standard)   | 8x 01 04 07 03 FF                         |   |                     |
|                  | Tele (Variable)   | 8x 01 04 07 2p FF                         |   |                     |
|                  | Wide (Variable)   | 8x 01 04 07 3p FF                         |   |                     |
|                  | Direct            | 8x 01 04 47 0p 0q 0r 0s FF                |   |                     |
|                  | Direct Zoom/Focus | 8x 01 04 47 0z 0z 0z 0z 0f 0f 0f 0f FF    |   |                     |
| CAM_DZoom        | On                | 8x 01 04 06 02 FF                         | Digital zoom ON/OFF   |                     |
|                  | Off               | 8x 01 04 06 03 FF                         |   |                     |
|                  | Combine Mode      | 8x 01 04 36 00 FF                         | Optical/Digital Zoom Combined   |                     |
|                  | Separate Mode     | 8x 01 04 36 01 FF                         | Optical/Digital Zoom Separate   |                     |
|                  | Stop              | 8x 01 04 06 00 FF                         |   |                     |
|                  | Tele (Variable)   | 8x 01 04 06 2p FF                         | p=0 (Low) to 7 (High)<br>* Enabled during Separate Mode                                       |                     |
|                  | Wide (Variable)   | 8x 01 04 06 3p FF                         |   |                     |
|                  | x1/Max            | 8x 01 04 06 10 FF                         | x1/MAX Magnification Switchover<br>* Enabled during Separate Mode                             |                     |
|                  | Direct            | 8x 01 04 46 00 00 0p 0q FF                | pq: D-Zoom Position<br>* Enabled during Separate Mode   |                     |
| CAM_Focus        | Stop              | 8x 01 04 08 00 FF                         | p=0 (Low) to 7 (High)<br>pqrs: Focus Position<br>AF ON/OFF                                    |                     |
|                  | Far (Standard)    | 8x 01 04 08 02 FF                         |   |                     |
|                  | Near (Standard)   | 8x 01 04 08 03 FF                         |   |                     |
|                  | Far (Variable)    | 8x 01 04 08 2p FF                         |   |                     |
|                  | Near (Variable)   | 8x 01 04 08 3p FF                         |   |                     |
|                  | Direct            | 8x 01 04 48 0p 0q 0r 0s FF                |   |                     |
|                  | Auto Focus        | 8x 01 04 38 02 FF                         |   |                     |
|                  | Manual Focus      | 8x 01 04 38 03 FF                         |   |                     |
|                  | Auto/Manual       | 8x 01 04 38 10 FF                         |   |                     |
|                  | One Push Trigger  | 8x 01 04 18 01 FF                         |   | One Push AF Trigger |
|                  | Infinity          | 8x 01 04 18 02 FF                         |   | Forced infinity     |
| AF Sensitivity   | High              | 8x 01 04 58 02 FF                         | AF Sensitivity High/Low   |                     |
|                  | Low               | 8x 01 04 58 03 FF                         |   |                     |
| CAM_AFMode       | Auto              | 8x 01 04 57 00 FF                         | AF Movement Mode  |                     |
|                  | Interval          | 8x 01 04 57 01 FF                         |   |                     |
|                  | Oneshot           | 8x 01 04 57 02 FF                         |   |                     |
|                  | Preset            | 8x 01 04 57 03 FF                         |   |                     |
| CAM_IRCorrection | Standard          | 8x 01 04 11 00 FF                         | FOCUS IR compensation data switching  |                     |
|                  | IR Light          | 8x 01 04 11 01 FF                         |   |                     |
| CAM_ZoomFocus    | Direct            | 8x 01 04 47 0p 0q 0r 0s<br>0t 0u 0v 0w FF | pqrs: Zoom Position<br>tuvw: Focus Position   |                     |
| CAM_Initialize   | Lens              | 8x 01 04 19 01 FF                         | Lens Initialization Start   |                     |
|                  | Camera            | 8x 01 04 19 03 FF                         | Camera reset  |                     |
| CAM_WB           | Auto              | 8x 01 04 35 00 FF                         | Normal Auto   |                     |
|                  | Indoor            | 8x 01 04 35 01 FF                         | Indoor mode   |                     |
|                  | Outdoor           | 8x 01 04 35 02 FF                         | Outdoor mode  |                     |
|                  | One Push WB       | 8x 01 04 35 03 FF                         | One Push WB mode  |                     |
|                  | ATW               | 8x 01 04 35 04 FF                         | Auto Tracing White Balance  |                     |
|                  | Manual            | 8x 01 04 35 05 FF                         | Manual Control mode   |                     |
|                  | One Push Trigger  | 8x 01 04 10 05 FF                         | One Push WB Trigger   |                     |
| CAM_RGain        | Reset             | 8x 01 04 03 00 FF                         | Manual Control of R Gain  |                     |
|                  | Up                | 8x 01 04 03 02 FF                         |   |                     |
|                  | Down              | 8x 01 04 03 03 FF                         |   |                     |



|                                |                  |  |   |  |
|--------------------------------|------------------|--|---|--|
|                                | Direct           | 8x 01 04 43 00 00 0p 0q FF             | pg: R Gain, 0x00-0xff   |  |
| CAM_BGain                      | Reset            | 8x 01 04 04 00 FF                      | Manual Control of B Gain  |  |
|                                | Up               | 8x 01 04 04 02 FF                      |   |  |
|                                | Down             | 8x 01 04 04 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 44 00 00 0p 0q FF             |   | pg: B Gain, 0x00-0xff                        |
| CAM_AE                         | Full Auto        | 8x 01 04 39 00 FF                      | Automatic Exposure mode   |  |
|                                | Manual           | 8x 01 04 39 03 FF                      | Manual Control mode   |  |
|                                | Shutter Priority | 8x 01 04 39 0A FF                      | Shutter Priority Automatic Exposure mode                              |  |
|                                | Iris Priority    | 8x 01 04 39 0B FF                      | Iris Priority Automatic Exposure mode                                 |  |
|                                | Bright           | 8x 01 04 39 0D FF                      | Bright Mode (Manual control)  |  |
| CAM_SlowShutter                | Auto             | 8x 01 04 5A 02 FF                      | Auto Slow Shutter ON/OFF  |  |
|                                | Manual           | 8x 01 04 5A 03 FF                      |   |  |
| CAM_Shutter                    | Reset            | 8x 01 04 0A 00 FF                      | Shutter Setting   |  |
|                                | Up               | 8x 01 04 0A 02 FF                      |   |  |
|                                | Down             | 8x 01 04 0A 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 4A 00 00 0p 0q FF             |   | pg: Shutter Position                         |
| CAM_Iris                       | Reset            | 8x 01 04 0B 00 FF                      | Iris Setting  |  |
|                                | Up               | 8x 01 04 0B 02 FF                      |   |  |
|                                | Down             | 8x 01 04 0B 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 4B 00 00 0p 0q FF             |   | pg: Iris Position                            |
| CAM_Gain                       | Reset            | 8x 01 04 0C 00 FF                      | Gain Setting  |  |
|                                | Up               | 8x 01 04 0C 02 FF                      |   |  |
|                                | Down             | 8x 01 04 0C 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 4C 00 00 0p 0q FF             |   | pg: Gain Position, 0x00-0x1E, See GAIN POS.  |
|                                | Gain Limit       | 8x 01 04 2C pp FF                      |   | pp: Gain Position, 0x00-0x1E, See GAIN LIMIT |
| CAM_Bright                     | Reset            | 8x 01 04 0D 00 FF                      | Bright Setting  |  |
|                                | Up               | 8x 01 04 0D 02 FF                      |   |  |
|                                | Down             | 8x 01 04 0D 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 4D 00 00 0p 0q FF             |   | pg: Bright Position                          |
| CAM_ExpComp                    | On               | 8x 01 04 3E 02 FF                      | Exposure Compensation ON/OFF  |  |
|                                | Off              | 8x 01 04 3E 03 FF                      |   |  |
|                                | Reset            | 8x 01 04 0E 00 FF                      | Exposure Compensation Amount Setting                                  |  |
|                                | Up               | 8x 01 04 0E 02 FF                      |   |  |
|                                | Down             | 8x 01 04 0E 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 4E 00 00 0p 0q FF             |   | pg: ExpComp Position, 0x00-0x0E              |
| CAM_BackLight                  | On               | 8x 01 04 33 02 FF                      | Back Light Compensation ON/OFF  |  |
|                                | Off              | 8x 01 04 33 03 FF                      |   |  |
| CAM_AE_Response                | Direct           | 8x 01 04 5D pp FF                      | pp: Automatic Exposure Response Setting (01 to 30), default value: 01 |  |
| CAM_WDR                        | On               | 8x 01 04 3D 02 FF                      | WDR On/Off  |  |
|                                | Off              | 8x 01 04 3D 03 FF                      |   |  |
| CAM_WDRPara                    | Direct           | 8x 01 04 2D 00 0p 0q 0r 00 00 00 00 FF |   |  |
| CAM_Aperture (sharpness level) | Reset            | 8x 01 04 02 00 FF                      | Aperture Control (sharpness)  |  |
|                                | Up               | 8x 01 04 02 02 FF                      |   |  |
|                                | Down             | 8x 01 04 02 03 FF                      |   |  |
|                                | Direct           | 8x 01 04 42 00 00 0p 0q FF             |   | pg: Aperture Gain (0x00-0x0F)                |
| CAM_HR                         | On               | 8x 01 04 52 02 FF                      | High-Resolution Mode ON/OFF   |  |
|                                | Off              | 8x 01 04 52 03 FF                      |   |  |
| CAM_NR                         | —                | 8x 01 04 53 0p FF                      | p: NR Setting (0: OFF, level 1 to 5)                                  |  |
| CAM_Gamma                      | —                | 8x 01 04 5B 0p FF                      | p: Gamma setting (0: Standard, 1 to 6)<br>See. GAMMA POSITION         |  |
| CAM_HighSensitivity            | On               | 8x 01 04 5E 02 FF                      | High Sensitivity mode ON/OFF  |  |
|                                | Off              | 8x 01 04 5E 03 FF                      |   |  |
| CAM_LR_Reverse                 | On               | 8x 01 04 61 02 FF                      | Mirror Image ON/OFF   |  |
|                                | Off              | 8x 01 04 61 03 FF                      |   |  |
| CAM_Freeze                     | On               | 8x 01 04 62 02 FF                      | Still Image ON/OFF  |  |
|                                | Off              | 8x 01 04 62 03 FF                      |   |  |
| CAM_PictureEffect              | Off              | 8x 01 04 63 00 FF                      | Picture Effect Setting  |  |
|                                | Neg.Art          | 8x 01 04 63 02 FF                      |   |  |
|                                | B&W              | 8x 01 04 63 04 FF                      |   |  |
|                                | ColorEffect      | 8x 01 04 63p FF                        |   | p=1-B : RED1~4/BLUE1~4/GREEN1~4              |
| CAM_PictureFlip                | On               | 8x 01 04 66 02 FF                      | Picture flip ON/OFF   |  |
|                                | Off              | 8x 01 04 66 03 FF                      |   |  |
| CAM_ICR                        | On               | 8x 01 04 01 02 FF                      | Infrared Mode ON(night)/OFF(day)                                      |  |
|                                | Off              | 8x 01 04 01 03 FF                      |   |  |

|   |             |   |  |
|---|-------------|---|--|
| CAM_AutoICR   | On          | 8x 01 04 51 02 FF   | Auto dark-field mode On/Off  |
|   | Off         | 8x 01 04 51 03 FF   |  |
|   | Threshold   | 8x 01 04 21 00 0p 0q FF   | pp: ICR ON → OFF Threshold Level (Night->Day)  |
|   | Threshold   | 8x 01 04 41 00 0p 0q FF   | pp: ICR OFF → ON Threshold Level (Day->Night)  |
| CAM_AutoICRAlarmReply   | On          | 8x 01 04 31 02 FF   | Auto ICR switching Alarm ON/OFF  |
|   | Off         | 8x 01 04 31 03 FF   |  |
|   | (Reply)     | y0 07 04 31 02 FF<br>y0 07 04 31 03 FF  | ICR OFF → ON (Night->Day)<br>ICR ON → OFF (Day->Night)                               |
| CAM_MemSave   | Write       | 8x 01 04 23 0X 0p 0p 0q 0q FF   | X: 00 to 07 (Address), total 16 byte<br>ppqq: 0x0000 to 0xFFFF (Data)                |
| CAM_Display   | On          | 8x 01 04 15 02 FF<br>(8x 01 06 06 02 FF)  | Display ON/OFF (function OSD display)  |
|   | Off         | 8x 01 04 15 03 FF<br>(8x 01 06 06 03 FF)  | Function OSD :   |
|   | On/Off      | 8x 01 04 15 10 FF<br>(8x 01 06 06 10 FF)  | - Display item : Zoom Ratio, Camera ID<br>Framerate, AE mode, WB mode, Exposure Data |
| CAM_Title<br><i>Total 19 lines</i><br><i>See. "Title/Function display"</i>  | Title Set1  | 8x 01 04 73 00 mm nn pp qq 00 00<br>00 00 00 00 FF  | mm : V-position(0x00-0x14) , nn:H-position (00-28)<br>pp:color, qq:blink             |
|   | Title Set2  | 8x 01 04 73 01 mm nn pp qq rr ss tt<br>uu vv ww FF  | mm-ww : setting of display characters<br>(1st to 10st)                               |
|   | Title Set3  | 8x 01 04 73 02 mm nn pp qq rr ss tt<br>uu vv ww FF  | mm-ww : setting of display characters<br>(11st to 20st)                              |
|   | Title Set4  | 8x 01 04 73 07<br>01 02 03 04 05 06 07 08 09 10 11 12<br>13 14 15 16 17 18 19 20 21 22 23 24<br>25 26 27 28 29 30 32 33 34 35 36 37<br>38 39 40 41 42 43 FF | mm-ww : setting of display characters<br>(1~ 43)                                     |
|   | Title Clear | 8x 01 04 74 00 FF   | Title Setting Clear (clear all lines)  |
|   | On          | 8x 01 04 74 02 FF   | Title Display On (display all lines)   |
|   | Off         | 8x 01 04 74 03 FF   | Title Display Off (display off all lines)  |
| CAM_MultiLineTitle<br><i>See. "Title/Function display"</i><br><br><i>(Big Font or Normal Font Odd Line)</i><br><br>L =<br>0x0 = Line 00<br>0x1 = Line 01<br>...<br>0x9 = Line 09<br>0xA = Line 0A | Title Set1  | 8x 01 04 73 1L 00 nn pp qq 00 00 00<br>00 00 00 FF  | L: Line Number (0x0-0xA)<br>nn: H-position → nn : 00-0x28<br>pp: Color, qq: Blink    |
|   | Title Set2  | 8x 01 04 73 2L mm nn pp qq rr ss tt<br>uu vv ww FF  | L: Line Number (0x0-0xA)<br>mnpqrstuvw: Setting of characters (1 to 10)              |
|   | Title Set3  | 8x 01 04 73 3L mm nn pp qq rr ss tt<br>uu vv ww FF  | L: Line Number (0x0-0xA)<br>mnpqrstuvw: Setting of characters (11 to 20)             |
|   | Title Set4  | 8x 01 04 73 7L 01 02 03 04 05 06 07<br>08 09 10 11 12 13 14 15 16 17 18 19<br>20 21 22 23 24 25 26 27 28 29 30 32<br>33 34 35 36 37 38 39 40 41 42 43 FF    | L: Line Number (0x0-0xA)<br>01-43 : Setting of characters (1 to 43)                  |
|   | Title Clear | 8x 01 04 74 1p FF   | Title Clear, Display On/Off  |
|   | On          | 8x 01 04 74 2p FF   | p:0x0-0xA, F= all lines (line 00-0A)   |
|   | Off         | 8x 01 04 74 3p FF   |  |
| CAM_EvenLineTitle<br><i>See. "Title/Function display"</i><br><br><i>(Normal Font Even Line)</i><br><br>L =<br>0x0 = Line 0B<br>0x1 = Line 0C<br>...<br>0x8 = Line 13                              | Title Set1A | 8x 01 04 73 4L 00 nn pp qq 00 00 00<br>00 00 00 FF  | L: Line Number (0x0-0x8)<br>nn: H-position → nn : 00-0x28<br>pp: Color, qq: Blink    |
|   | Title Set2A | 8x 01 04 73 5L mm nn pp qq rr ss tt<br>uu vv ww FF  | L: Line Number (0x0-0x8)<br>mnpqrstuvw: Setting of characters (1 to 10)              |
|   | Title Set3A | 8x 01 04 73 6L mm nn pp qq rr ss tt<br>uu vv ww FF  | L: Line Number (0x0-0x8)<br>mnpqrstuvw: Setting of characters (11 to 20)             |
|   | Title Set4A | 8x 01 04 73 8L 01 02 03 04 05 06 07<br>08 09 10 11 12 13 14 15 16 17 18 19<br>20 21 22 23 24 25 26 27 28 29 30 32<br>33 34 35 36 37 38 39 40 41 42 43 FF    | L: Line Number (0x0-0x8)<br>01-43 : Setting of characters (1 to 43)                  |
|   | Title Clear | 8x 01 04 74 4p FF   | Title Clear, Display On/Off  |
|   | On          | 8x 01 04 74 5p FF   | p:0x0-0x8, F= all lines (line 0B ~ 14)   |
|   | Off         | 8x 01 04 74 6p FF   |  |
| CAM_Mute  | On          | 8x 01 04 75 02 FF   | Muting ON/OFF  |
|   | Off         | 8x 01 04 75 03 FF   |  |
|   | On/Off      | 8x 01 04 75 10 FF   |  |
| CAM_PrivacyZone   | SetMask     | 8x 01 04 76 mm<br>nn 0r 0r 0s 0s FF   | mm: Mask Settings<br>nn 00: Modify, 01: New<br>rr: W, ss: H                          |
|   | Display     | 8x 01 04 77 pp pp pp pp FF  | Mask Display ON/OFF  |



|                                      |                   |   |   |
|--------------------------------------|-------------------|---|---|
|                                      |                   |   | pp pp pp pp: Mask Settings (0: OFF, 1: ON)  |
|                                      | SetMaskColor      | 8x 01 04 78 pp pp pp<br>pp qq rr FF                   | pp pp pp pp: Mask Color Settings<br>qq: Color Setting when 0 is selected<br>rr: Color Setting when 1 is selected  |
|                                      | SetPanTiltAngle   | 8x 01 04 79 0p 0p 0p<br>0q 0q 0q FF                   | Pan/Tilt Angle Settings<br>ppp: Pan<br>qqq: Tilt  |
|                                      | SetPTZMask        | 8x 01 04 7B mm 0p 0p<br>0p 0q 0q 0q 0r 0r 0r 0r<br>FF | Pan/Tilt/Zoom Settings for Mask<br>ppp: Pan, qq: Tilt, rrr: Zoom  |
|                                      | Non_InterlockMask | 8x 01 04 6F mm<br>0p 0p 0q 0q 0r 0r 0s 0s<br>FF       | mm: Non_Interlock Mask Settings<br>pp: X, q: Y, rr: W, ss: H  |
| CAM_IDWrite                          | —                 | 8x 01 04 22 0p 0q 0r 0s<br>FF                         | pqrs: Camera ID (=0000 to FFFF)   |
| CAM_MD                               | On                | 8x 01 04 1B 02 FF                                     | Motion Detection On/Off   |
|                                      | Off               | 8x 01 04 1B 03 FF                                     |   |
|                                      | Function Set      | 8x 01 04 1C 0m 0n 0p 0q<br>0r 0s FF                   | m: Display mode (when motion is detected)<br>bit0: frame display<br>bit1: block display<br>bit2: Text display<br>n: Detection Frame Set (0 to F)<br>bit0(frame1)~bit3(frame4)<br>pq: Threshold Level (00 to FF)<br>rs: Interval Time set (00 to FF) |
|                                      | Window Set        | 8x 01 04 1D 0m 0p 0q rr<br>0s FF                      | m: Select Detection Frame (0, 1, 2, 3)<br>p: Start Horizontal Position (00 to 0F)<br>q: Start Vertical Position (00 to 07)<br>r: Stop Horizontal Position (01 to 10)<br>s: Stop Vertical Position (01 to 08)  |
|                                      | Alarm (Reply)     | y0 07 04 1B 0p FF                                     | p: Detection Frame Number   |
| CAM_Continuous<br>ZoomPosReply       | On                | 8x 01 04 69 02 FF                                     | ZoomPosition data Continuous Output On/Off  |
|                                      | Off               | 8x 01 04 69 03 FF                                     |   |
|                                      | (Reply)           | y0 07 04 69 0p 0p 0q 0q<br>0q 0q FF                   | pp: D-Zoom Position<br>* 00: When Zoom Mode is Combine<br>qqqq: Zoom Position   |
| CAM_ZoomPos<br>ReplyIntervalTimeSet  | —                 | 8x 01 04 6A 00 00 0p 0p<br>FF                         | pp: Zoom Position continuous output Interval Time<br>[Vertical timing]  |
| CAM_Continuous<br>FocusPosReply      | On                | 8x 01 04 16 02 FF                                     | Focus Position data Continuous Output On/Off  |
|                                      | Off               | 8x 01 04 16 03 FF                                     |   |
|                                      | (Reply)           | y0 07 04 16 00 00 0p 0p<br>0p 0p FF                   | pppp: Focus Position  |
| CAM_FocusPos<br>ReplyIntervalTimeSet | —                 | 8x 01 04 1A 00 00 0p 0p<br>FF                         | pp: Focus Position continuous output Interval Time<br>[Vertical timing]   |
| CAM_ExtAutoICR_thresh<br>old         | ICR ON -> OFF     | 8x 01 04 1F 21 00 00 0p 0q<br>FF                      | pp: ICR ON -> OFF threshold when Auto ICR is on<br>pp = 00h ~ 1Bh (Night → Day threshold)   |
|                                      | ICR OFF -> ON     | 8x 01 04 1F 21 01 00 0p 0q<br>FF                      | pp: ICR OFF -> ON threshold when Auto ICR is on<br>pp = 01h ~ 1Ch (Day → Night threshold)   |
| CAM_RegisterValue                    | —                 | 8x 01 04 24 mm 0p 0p FF                               | mm: Register No. (=00-7F)<br>pp: Register Value (=00-7F)<br><i>See the "Register setting"</i>   |
| CAM_ColorLevel                       | Reset             | 8x 01 04 09 00 FF                                     | Color gain setting  |
|                                      | Up                | 8x 01 04 09 02 FF                                     |   |
|                                      | Down              | 8x 01 04 09 03 FF                                     |   |
| CAM_ColorPhase                       | Reset             | 8x 01 04 0F 00 FF                                     | Color hue setting   |
|                                      | Up                | 8x 01 04 0F 02 FF                                     |   |
|                                      | Down              | 8x 01 04 0F 03 FF                                     |   |
| CAM_ColorGain                        | Direct            | 8x 01 04 49 00 00 00 0p<br>FF                         | p: Color Gain setting 0h (60%) to Eh (200%)   |
| CAM_ColorHue                         | Direct            | 8x 01 04 4F 00 00 00 0p<br>FF                         | p: Color Hue setting 0h (- 14 dgees) to Eh (+14 degrees)  |
| CAM_ColorSpeed                       | -                 | 8x 01 04 56 0p FF                                     | p: Color speed set value (0-7)  |
| CAM_Stablizer                        | On                | 8x 01 04 34 02 FF                                     | Digital Image Stabilizer  |
|                                      | Off               | 8x 01 04 34 03 FF                                     |   |
| CAM_Defog                            | On                | 8x 01 04 37 02 00 FF                                  | Defog On/Off  |
|                                      | Off               | 8x 01 04 37 03 00 FF                                  |   |
| CAM_HLC                              | Parameter Set     | 8x 01 04 14 0p 0q FF                                  | p:HLC Level (0:Off, 1:On)<br>q:HLC mask level(0:Off, 1(low)-F(high)   |
| CAM_SpotAE                           | On                | 8x 01 04 59 02 FF                                     | Spot AE mode  |



|                |          |                            |   |
|----------------|----------|----------------------------|---|
|                | Off      | 8x 01 04 59 03 FF          |   |
|                | Position | 8x 01 04 29 0p 0q 0r 0s FF | pq:X(0~F), rs:Y(0~F)  |
| CAM_Memory     | Reset    | 8x 01 04 3F 00 0p FF       | p:Memory Number(0~F)  |
|                | Set      | 8x 01 04 3F 01 0p FF       | (See. Custom/Memory Preset Setting Items)   |
|                | Recall   | 8x 01 04 3F 02 0p FF       |   |
| CAM_Custom     | Reset    | 8x 01 04 3F 00 7F FF       | Starts up in this mode when the power is turned on  |
|                | Set      | 8x 01 04 3F 01 7F FF       | (*The SET command must be sent one time to activate the custom preset.                                  |
|                | Recall   | 8x 01 04 3F 02 7F FF       | (* Inactive : When the power is turned on, it starts up in the settings before the power is turned off. |
|                | Inactive | 8x 01 04 3F 10 7F FF       | (See. Custom/Memory Preset Setting Items)   |
| CAM_MinShutter | Active   | 8x 01 04 3F 11 7F FF       |   |
|                | On       | 8x 01 04 12 02 FF          | Minimum shutter enable  |
|                | Off      | 8x 01 04 12 03 FF          | Minimum shutter disable   |
|                | Limit    | 8x 01 04 13 00 0p 0q FF    | pq : minimum shtter position (05h~15h)  |

< Additional Command >

| Command Set                                 | Command           | Command Packet             | Comments   |
|---|-------------------|----------------------------|--|
| KT_KeyAct                                   | Stop              | 8x 01 70 01 00 FF          |  |
|   | Up                | 8x 01 70 01 21 FF          |  |
|   | Down              | 8x 01 70 01 22 FF          |  |
|   | Left              | 8x 01 70 01 23 FF          |  |
|   | Right             | 8x 01 70 01 24 FF          |  |
|   | Set               | 8x 01 70 01 26 FF          | Enter Key  |
|   | Menu Off          | 8x 01 70 01 27 FF          | Menu Off   |
|   | Factory Default   | 8x 01 70 01 0F FF          | Initialize Camera Data   |
|   | Auto Zoom         | 8x 01 70 01 20 FF          | Repeat TELE ~ WIDE. To stop, send the Auto Zoom command one more time                                  |
| KT_DayNightMode                             | Auto Zoom 1 time  | 8x 01 70 01 1F FF          |  |
|   | Auto              | 8x 01 70 04 00 FF          |  |
|   | Day               | 8x 01 70 04 01 FF          |  |
|   | Night             | 8x 01 70 04 02 FF          |  |
|   | External-High     | 8x 01 70 04 03 FF          | Night = Ext. input level is High   |
| KT_DayNightColor                            | External-Low      | 8x 01 70 04 04 FF          | Night = Ext. input level is Low  |
|   | -                 | 8x 01 70 A2 0p FF          | p : Night Color Mode (0:off ,1:on)   |
| KT_CvbsNgtColorBurst                        | On                | 8x 01 70 13 02 FF          | CVBS color burst night mode on   |
|   | Off               | 8x 01 70 13 03 FF          | CVBS color burst night mode off  |
| KT_AutoICRdelay                             | Delay Time        | 8x 01 04 41 01 00 0p 0q FF | pq: sec (0~60sec)  |
| KT_ExtICRthreshold<br>(Ext.H or Ext.L mode) | Day->Night(EXT-H) | 8x 01 70 05 10 0p 0q FF    | pq: ICR OFF→ON Threshold Level (Day->Night)  |
|   | Night->Day(EXT-H) | 8x 01 70 05 11 0p 0q FF    | pq: ICR ON→OFF Threshold Level (Night->Day)  |
|   | Day->Night(EXT-L) | 8x 01 70 05 20 0p 0q FF    | pq: ICR OFF→ON Threshold Level (Day->Night)  |
|   | Night->Day(EXT-L) | 8x 01 70 05 21 0p 0q FF    | pq: ICR ON→OFF Threshold Level (Night->Day)  |
| KT_AgcAutoLimit                             | -                 | 8x 01 70 34 pp FF          | pp : AGC Max Limit (0~6)   |
| KT_Sharpness                                | -                 | 8x 01 70 53 0p FF          | p:sharpness level (0x00~0x0E)  |
| KT_AgcMode                                  | -                 | 8x 01 70 5C 0p FF          | p=1(AGC On), 0(AGC Off)  |
| KT_ZoomFocusPreset                          | Set               | 8x 01 70 3F 01 0p 0q 0r FF | pqr : preset Number (0x000~0x0FF)  |
|   | Recall            | 8x 01 70 3F 02 0p 0q 0r FF | pqr : preset Number (0x000~0x0FF)  |
|   | Clear             | 8x 01 70 3F 03 0p 0q 0r FF | pqr : preset Number (0x000~0x0FF)  |
|   | Clear All Preset  | 8x 01 70 3F 0F 00 00 00 FF | Clear all preset data  |
| KT_ZmSpeed                                  | Speed             | 8x 01 70 51 0p FF          | p : Speed (0~7)  |
| KT_AE_Brightness;                           | Level             | 8x 01 70 30 00 0p FF       | p : AE Brightness Level (0x00~0x0E)  |
| KT_MaxField                                 | -                 | 8x 01 70 31 00 0p FF       | p : AE Sens up (0~5)   |
| KT_SequentialShutter                        | -                 | 8x 01 70 4E 0p FF          | p : Sequential Shutter (2 :on, 3:off)  |
|   | Set               | 8x 01 70 4E 0p qq FF       | p : Sequential Shutter set<br>1(Mode A) /2(Mode B) /3(Mode C) / 4(Mode D)<br>q : AE Shutter(0x05~0x15) |
| KT_AE_ShutterLimit                          | On                | 8x 01 70 A3 01 FF          | Minimum shutter enable   |
|   | Off               | 8x 01 70 A3 00 FF          | Minimum shutter disable  |
|   | Minimum Limit     | 8x 01 70 A4 pq FF          | pq : minimum shutter position (05h~15h)  |
|   | Maximum Limit     | 8x 01 70 A5 pq FF          | pq : maximum shutter position (05h~15h)  |
| KT_DirectShutter                            | On                | 8x 01 70 E3 01 FF          | Direct shutter on  |
|   | Off               | 8x 01 70 E3 00 FF          | Direct shutter off   |
|   | Set               | 8x 01 70 E4 0p 0q 0r 0s FF | pqrs : Position  |
| KT_WDRLevel                                 | Level             | 8x 01 70 3A pp FF          | pp : WDRLevel (0x00~0x1D)  |
| KT_DefogOnLevel;                            | Level             | 8x 01 70 3C pp 00 FF       | pp : DefogOnLevel(0x00~0x10)   |
| KT_DefogAutoLevel                           | Level             | 8x 01 70 3D 0p 0q FF       | p : DefogAutoLevel(0:high,1:mid,2:low)<br>q : DefogThreshold(0x00~0x03)                                |



|                      |       |                            |  |
|----------------------|-------|----------------------------|--|
| KT_WdrBlcAeAuto      | -     | 8x 01 70 46 0p FF          | P : 0(all AE) 1(only auto)   |
| KT_Dnr               | Mode  | 8x 01 70 36 0p FF          | p:0(off) 1(2D) 2(3D) 3(2D+3D)  |
|                      | Level | 8x 01 70 39 0p 0q FF       | p:DNR level(0:auto,1:low,2:mid,3:high)<br>q:DNR aperture(0~4)  |
| KT_WbSpeed           | -     | 8x 01 71 50 0p FF          | p : Speed (0~7)  |
| KT_WbBluseoffset     | -     | 8x 01 71 51 pp FF          | pp : Blue offset Value (0x00~0x64 )  |
| KT_WbRedoffset       | -     | 8x 01 71 52 pp FF          | pp : Red offset Value ( 0x00~0x64 )  |
| KT_WbSaturation      | -     | 8x 01 71 53 pp FF          | pp : Saturation value (0x00~0x14)  |
| KT_WbHue             | -     | 8x 01 71 54 pp FF          | pp : Hue value (0x00~0x14)   |
| KT_CcRedLine         | -     | 8x 01 71 63 0p FF          | p : Red Line Value (0~7)   |
| KT_CcGreenLine       | -     | 8x 01 71 64 0p FF          | p : Green Line Value (0~7)   |
| KT_CcBlueLine        | -     | 8x 01 71 65 0p FF          | p : Blue Line Value (0~7)  |
| KT_CcArea            | -     | 8x 01 71 66 0p qq rr FF    | p : Color Area<br>0(magenta)/1(red)/2(yellow)/3(green)/4(cyan)/5(blue)<br>qq : Color hue Value ( 0x00~0xB4)<br>rr : Color gain Value ( 0x00~0x40)  |
| KT_CcSave            | -     | 8x 01 71 67 00 FF          | Color adjust setting value save  |
| KT_PipSet            | -     | 8x 01 70 48 0p 0q 0s 0r FF | p=2 : PIP ON<br>p=3 : PIP OFF<br>p=F : Initialize PIP mode/size/position<br>q=0~3 : pip window size<br>0(1/4),1(1/9),2(1/16),3(1/24)<br>s=0~A : PIP window position – X<br>r=0~A : PIP window position – Y   |
| KT_ImageRotate       | -     | 8x 01 70 4A 0p 0q FF       | p=corridor mode<br>0(Off) / 1(Full) / 2(Crop)<br>q=mirror mode<br>0(Off) / 1(H-flip) / 2(V-flip) /3(HV-flip)   |
| KT_PwrOnLensInitSkip | -     | 8x 01 70 49 0p FF          | p : Focus reverse mode (2:on, 3:off)   |
| KT_DwdrMode          | Mode  | 8x 01 70 4B 0p FF          | p : 0(off), 1(on), 2(auto)   |
|                      | Level | 8x 01 70 4C 0p FF          | p : Dwdr on level(0x00~0x0f)   |
|                      | Level | 8x 01 70 4D 0p FF          | p : Dwdr auto level (0~2)  |
| KT_FactoryDefSystem  | -     | 8x 01 70 EF EF FF          | Initializes the entire system to the factory default.<br>Be careful!!!   |
| KT_FactoryDef        | -     | 8x 01 70 EE EE FF          | Factory default  |
| KT_FocusRevVariable  | On    | 8x 01 70 47 02 pp FF       | pp : Rversestep(0x00~0x50)   |
|                      | Off   | 8x 01 70 47 03 pp FF       |  |
| KT_Baudrate          | -     | 8x 01 70 22 0p 0q FF       | p : Baud channel (0:ch0, 1:ch1)<br>q : Parity(0:none, 1:odd, 2:even)   |
| KT_BootBaudrate      | -     | 8x 01 70 BD 0p 0q 0r FF    | p : Boot baudrate<br>0(default) / 1(2400) / 2(4800) / 3(9600) / 4(19200) /<br>5(38400) / 6(57600) / 7(115200)<br>q : Boot parity<br>0(default) / 1(even) / 2(odd)<br>r : 0(default) / 1(rs485)   |
| KT_FosdDisp          | Set   | 8x 01 70 0E pp qq FF       | Set display type<br>pp : 10 (Af Zoom Display) qq : 0(off) / 1(on)<br>pp : 11 (Af Zoom Display PosX) qq : position X (0~18)<br>pp : 12 (Af Zoom Display PosY) qq : position Y (0~18)<br>pp : 20(Cam ID Display) qq : 0(off) / 1(on)<br>pp : 21(Cam ID Display PosX) qq : position X (0~18)<br>pp : 22(Cam ID Display PosY) qq : position Y (0~18) |
| KT_AfPresetAsManual  | -     | 8x 01 70 95 0p FF          | p : AF preset mode is like AF manual<br>0(off) / 1(on)   |
| KT_AfSpeed           | -     | 8x 01 70 94 0p FF          | p : Af speed<br>0(low)/ 1(mid)/ 2(high)  |

# Inquiry Command List

| Inquiry Command         | Command Packet | Inquiry Packet                   | Comments                                |
|-------------------------|----------------|----------------------------------|---|
| CAM_PowerInq            | 8x 09 04 00 FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off (Standby)                           |
| CAM_ZoomPosInq          | 8x 09 04 47 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Zoom Position                     |
| CAM_DZoomModelInq       | 8x 09 04 06 FF | y0 50 02 FF                      | D-Zoom On                               |
|                         |                | y0 50 03 FF                      | D-Zoom Off                              |
| CAM_DZoomC/SModelInq    | 8x 09 04 36 FF | y0 50 00 FF                      | Combine Mode                            |
|                         |                | y0 50 01 FF                      | Separate Mode                           |
| CAM_DZoomPosInq         | 8x 09 04 46 FF | y0 50 00 00 0p 0q FF             | pq: D-Zoom Position                     |
| CAM_FocusModelInq       | 8x 09 04 38 FF | y0 50 02 FF                      | Auto Focus                              |
|                         |                | y0 50 03 FF                      | Manual Focus                            |
| CAM_FocusPosInq         | 8x 09 04 48 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Focus Position                    |
| CAM_FocusNearLimitInq   | 8x 09 04 28 FF | y0 50 0p 0q 0r 0s FF             | pqrs: Focus Near Limit Position         |
| CAM_AFSensitivityInq    | 8x 09 04 58 FF | y0 50 02 FF                      | AF Sensitivity Normal                   |
|                         |                | y0 50 03 FF                      | AF Sensitivity Low                      |
| CAM_AFModelInq          | 8x 09 04 57 FF | y0 50 00 FF                      | Normal AF                               |
|                         |                | y0 50 01 FF                      | Interval AF                             |
|                         |                | y0 50 02 FF                      | Zoom Trigger AF                         |
|                         |                | y0 50 03 FF                      | Preset AF                               |
| CAM_AFTimeSettingInq    | 8x 09 04 27 FF | y0 50 0p 0q 0r 0s FF             | pq: Movement Time, rs: Interval         |
| CAM_IRCorrectionInq     | 8x 09 04 11 FF | y0 50 00 FF                      | Standard                                |
|                         |                | y0 50 01 FF                      | IR Light                                |
| CAM_WBModelInq          | 8x 09 04 35 FF | y0 50 00 FF                      | Auto                                    |
|                         |                | y0 50 01 FF                      | In Door                                 |
|                         |                | y0 50 02 FF                      | Out Door                                |
|                         |                | y0 50 03 FF                      | One Push WB                             |
|                         |                | y0 50 04 FF                      | ATW                                     |
|                         |                | y0 50 05 FF                      | Manual                                  |
| CAM_RGainInq            | 8x 09 04 43 FF | y0 50 00 00 0p 0q FF             | pq: R Gain                              |
| CAM_BGainInq            | 8x 09 04 44 FF | y0 50 00 00 0p 0q FF             | pq: B Gain                              |
| CAM_AEModelInq          | 8x 09 04 39 FF | y0 50 00 FF                      | Full Auto                               |
|                         |                | y0 50 03 FF                      | Manual                                  |
|                         |                | y0 50 0A FF                      | Shutter Priority                        |
|                         |                | y0 50 0B FF                      | Iris Priority                           |
|                         |                | y0 50 0D FF                      | Bright                                  |
| CAM_SlowShutterModelInq | 8x 09 04 5A FF | y0 50 02 FF                      | Auto                                    |
|                         |                | y0 50 03 FF                      | Manual                                  |
| CAM_ShutterPosInq       | 8x 09 04 4A FF | y0 50 00 00 0p 0q FF             | pq: Shutter Position                    |
| CAM_IrisPosInq          | 8x 09 04 4B FF | y0 50 00 00 0p 0q FF             | pq: Iris Position                       |
| CAM_GainPosInq          | 8x 09 04 4C FF | y0 50 00 00 0p 0q FF             | pq: Gain Position                       |
| CAM_GainLimitInq        | 8x 09 04 2C FF | y0 50 0q FF                      | p: Gain Limit                           |
| CAM_BrightPosInq        | 8x 09 04 4D FF | y0 50 00 00 0p 0q FF             | pq: Bright Position                     |
| CAM_ExpCompModelInq     | 8x 09 04 3E FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_ExpCompPosInq       | 8x 09 04 4E FF | y0 50 00 00 0p 0q FF             | pq: ExpComp Position                    |
| CAM_BackLightModelInq   | 8x 09 04 33 FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_AE_ResponseInq      | 8x 09 04 5D FF | y0 50 pp FF                      | pp: 01 to 30 (hex)                      |
| CAM_WDModelInq          | 8x 09 04 3D FF | y0 50 02 FF                      | On Wide-D                               |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_WDParameterInq      | 8x 09 04 2D FF | y0 50 00 00 00 0s 00 00 00 00 FF | s: Blown-out highlight correction level |
| CAM_ApertureInq         | 8x 09 04 42 FF | y0 50 00 00 0p 0q FF             | pq: Aperture Gain                       |
| CAM_HRModelInq          | 8x 09 04 52 FF | y0 50 02 FF                      | On (Hi-Resolution)                      |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_NRModelInq          | 8x 09 04 53 FF | y0 50 0p FF                      | Noise Reduction p: 0 to 5               |
| CAM_GammaInq            | 8x 09 04 5B FF | y0 50 0p FF                      | Gamma p: 0 to 8                         |
| CAM_HighSensitivityInq  | 8x 09 04 5E FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_LR_ReverseModelInq  | 8x 09 04 61 FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off                                     |
| CAM_FreezeModelInq      | 8x 09 04 62 FF | y0 50 02 FF                      | On                                      |
|                         |                | y0 50 03 FF                      | Off                                     |



|                                     |                                    |                                  |   |
|-------------------------------------|------------------------------------|----------------------------------|---|
| CAM_PictureEffectModelInq           | 8x 09 04 63 FF                     | y0 50 00 FF                      | Off   |
|                                     |                                    | y0 50 02 FF                      | Neg.Art   |
|                                     |                                    | y0 50 04 FF                      | B&W   |
|                                     |                                    | y0 50 1p FF                      | p=1~B : RED1~4/BLUE1~4/GREEN1~4   |
| CAM_PictureFlipModelInq             | 8x 09 04 66 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_ICRModelInq                     | 8x 09 04 01 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_AutoICRModelInq                 | 8x 09 04 51 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_AutoICRThresholdInq             | 8x 09 04 21 FF                     | y0 50 00 00 0p 0q FF             | pq: ICR ON → OFF Threshold Level  |
| CAM_AutoICRAAlarmReplyInq           | 8x 09 04 31 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_MemSaveInq                      | 8x 09 04 23 0X FF                  | y0 50 0p 0p 0q 0q FF             | X: 00 to 07 (Address)<br>ppqq: 0x0000 to 0xFFFF (Data)  |
| CAM_DisplayModelInq                 | 8x 09 04 15 FF<br>(8x 09 06 06 FF) | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_MuteModelInq                    | 8x 09 04 75 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_PrivacyDisplayInq               | 8x 09 04 77 FF                     | y0 50 pp pp pp pp FF             | pp pp pp pp: Mask Display (0: OFF, 1: ON)   |
| CAM_PrivacyPanTiltInq               | 8x 09 04 79 FF                     | y0 50 0p 0p 0p 0q 0q 0q FF       | ppp: Pan qq: Tilt   |
| CAM_PrivacyPTZInq                   | 8x 09 04 7B mm FF                  | y0 50 0p 0p 0p 0q 0q 0q 0r 0r FF | mm: Mask Settings ppp: Pan<br>qqq: Tilt rrr: Zoom   |
| CAM_PrivacyMonitorInq               | 8x 09 04 6F FF                     | y0 50 pp pp pp pp FF             | pp pp pp pp: Mask is displayed now.   |
| CAM_IDInq                           | 8x 09 04 22 FF                     | y0 50 0p 0q 0r 0s FF             | pqrs: Camera ID   |
| CAM_VersionInq                      | 8x 09 00 02 FF                     | y0 50 00 78<br>mn pq rs tu vw FF | mnpq: Model Code (04xx)<br>rstu: ROM version<br>vw: Socket Number (=02)<br>See. "Cam_VersionInq"  |
| CAM_MDMModelInq                     | 8x 09 04 1B FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_MDFFunctionInq                  | 8x 09 04 1C FF                     | y0 50 0m 0n 0p 0q 0r 0s FF       | m: Display mode<br>n: Detection Frame Set (0 to F) pq: Threshold Level (0 to FF) rs: Interval Time set (0 to FF)  |
| CAM_MDWindowInq                     | 8x 09 04 1D 0m FF                  | y0 50 0p 0q 0r 0s FF             | m: Select Detection Frame (0, 1, 2, 3) p: Start Horizontal Position (00 to 0B) q: Start Vertical Position (00 to 07)<br>r: Stop Horizontal Position (01 to 0C) s: Stop Vertical Position (01 to 08) |
| CAM_ContinuousZoomPosReplyModelInq  | 8x 09 04 69 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_ZoomPosReplyIntervalTimeInq     | 8x 09 04 6A FF                     | y0 50 00 00 0p 0p FF             | pp: Interval Time   |
| CAM_ContinuousFocusPosReplyModelInq | 8x 09 04 16 FF                     | y0 50 02 FF                      | On  |
|                                     |                                    | y0 50 03 FF                      | Off   |
| CAM_FocusPosReplyIntervalTimeInq    | 8x 09 04 1A FF                     | y0 50 00 00 0p 0p FF             | pp: Interval Time   |
| CAM_ExAutoICRThresholdInq           | 8x 09 04 1F 21 00 FF               | y0 50 00 00 0p 0q FF             | pq : ICR ON→OFF threshold when Auto ICR is on (Night → Day)   |
| CAM_ExAutoICROnLevelInq             | 8x 09 04 1F 21 01 FF               | y0 50 00 00 0p 0q FF             | pq : ICR OFF→ON threshold when Auto ICR is on (Day → Night)   |
| CAM_RegisterValueInq                | 8x 09 04 24 mm FF                  | y0 50 0p 0p FF                   | mm: Register No. (00 to 7F) pp: Register Value (00 to FF)   |
| CAM_ColorGainInq                    | 8x 09 04 49 FF                     | y0 50 00 00 00 0p FF             | p: Color Gain setting 0h (60%) to Eh (200%)   |
| CAM_ColorHueInq                     | 8x 09 04 4F FF                     | y0 50 00 00 00 0p FF             | p: Color Hue setting 0h (- 14 degrees) to Eh (+ 14 degrees)   |
| CAM_StabilizerInq                   | 8x 09 04 34 FF                     | y0 50 02 FF                      | Stabilizer(DIS) on  |
|                                     |                                    | y0 50 03 FF                      | Stabilizer(DIS) off   |
| CAM_DefogInq                        | 8x 09 04 37 FF                     | y0 50 02 0p FF                   | Defog On  |
|                                     |                                    | y0 50 03 00 FF                   | Defog Off   |
| CAM_HLCInq                          | 8x 09 04 14 FF                     | y0 50 0p 0q FF                   | p:HLC Level (0:Off, 1:On)<br>q:HLC mask level(0:Off, 1(low)-F(high)   |
| CAM_SpotAEModeInq                   | 8x 09 04 59 FF                     | y0 50 02 FF                      | Spot AE on  |
|                                     |                                    | y0 50 03 FF                      | Spot AE Off   |
| CAM_SpotAEPoSInq                    | 8x 09 04 29 FF                     | y0 50 0p 0q 0r 0s FF             | pq:X(0-F), rs:Y(0-F)  |

|                   |                |                      |                                  |
|-------------------|----------------|----------------------|----------------------------------|
| CAM_MemoryInq     | 8x 09 04 3F FF | y0 50 pp FF          | pp : memory number recalled last |
| CAM_MinShutterInq | 8x 09 04 12 FF | y0 50 0p FF          | p : 2(on)/3(off)                 |
|                   | 8x 09 04 13 FF | y0 50 00 00 0p 0q FF | pq: min. shutter position        |

< Additional Inquiry >

| Inquiry Command         | Command Packet         | Inquiry Packet                   | Comments  |
|-------------------------|------------------------|----------------------------------|---|
| KT_MenuOnOffInq         | 8x 09 70 01 FF         | y0 50 02 FF                      | Menu on   |
|                         |                        | y0 50 03 FF                      | Menu off  |
| KT_DayNightModeInq      | 8x 09 70 04 FF         | y0 50 0p 0q FF                   | pq: day&night mode  |
| KT_CvbsNgtColorBurstInq | 8x 09 70 13 FF         | y0 50 02 FF                      | Cvbs Ngt Color Burst on   |
|                         |                        | y0 50 03 FF                      | Cvbs Ngt Color Burst off  |
| KT_ExtICRthresholdInq   | 8x 09 70 05 10 FF      | y0 50 0p 0q FF                   | pq:ext-H day->night threshold   |
|                         |                        | y0 50 0p 0q FF                   | pq:ext-H night->day threshold   |
|                         |                        | y0 50 0p 0q FF                   | pq:ext-L day->night threshold   |
|                         |                        | y0 50 0p 0q FF                   | pq:ext-L night->day threshold   |
| KT_PresetAFRangeInq     | 8x 09 70 03 FF         | y0 50 0p 0q FF                   | pq: preset AF range   |
| KT_AgcAutoLimitInq      | 8x 09 70 34 FF         | y0 50 pp FF                      | pp:AGC Max Limit (See. GAIN LIMIT table)  |
| KT_SharpnessInq         | 8x 09 70 53 FF         | y0 50 0p FF                      | p:sharpness level (0x00~0x0F)   |
| KT_ZoomFocusPresetInq   | 8x 09 703F 0n 0n 0n FF | y0 50 0v 0z 0z 0z 0f 0f 0f 0f FF | nnn: preset number(0x000~0x0FF)<br>v : 1(saved), 0(empty)<br>zzzz : zoom position<br>ffff : focus position  |
| KT_ZmSpeedInq           | 8x 09 70 51 FF         | y0 50 0p FF                      | p : Zoom speed (0~7)  |
| KT_HomePowerOnInq       | 8x 09 70 24 FF         | y0 50 0p FF                      | p:Home Position Mode, 2(ON)/3(OFF)  |
| KT_AE_BrightnessInq     | 8x 09 70 30 FF         | y0 50 00 0p FF                   | p : Brightness level (0x00~0x0E)  |
| KT_MaxFieldInq          | 8x 09 70 31 FF         | y0 50 0p FF                      | p : AE Sens up (0~5)  |
| KT_SequentialShutterInq | 8x 09 70 4E FF         | y0 50 02 FF                      | Sequential Shutter on   |
|                         |                        | y0 50 03 FF                      | Sequential Shutter off  |
| KT_AE_ShutterLimitInq   | 8x 09 70 A3 FF         | y0 50 0r FF                      | r=0(off) / 1(on)  |
|                         |                        | y0 50 pq FF                      | pq=min.shutter limit (5h~15h)   |
|                         |                        | y0 50 pq FF                      | pq=max.shutter limit (5h~15h)   |
| KT_DirectShutterInq     | 8x 09 70 E3 FF         | y0 50 00 FF                      | Direct Shutter On   |
|                         |                        | y0 50 01 FF                      | Direct Shutter Off  |
| KT_WDRLevelInq          | 8x 09 70 3A FF         | y0 50 pp FF                      | p : WDR level (0x00~0x1D)   |
| KT_DefogOnLevelInq      | 8x 09 70 3C FF         | y0 50 pp FF                      | p : Defog level (0x00~0x10)   |
| KT_DefogAutoLevelInq    | 8x 09 70 3D FF         | y0 50 0p 0q FF                   | p : Auto level (0:high, 1:mid, 2:low)<br>q : Threshold (0~3)  |
| KT_WdrBlcAeAutoInq      | 8x 09 70 46 FF         | y0 50 0p FF                      | p=0(all AE) / 1(only auto)  |
| KT_DnrInq               | 8x 09 70 36 FF         | y0 50 0p FF                      | p:0(off) 1(2D) 2(3D) 3(2D+3D)   |
|                         | 8x 09 70 39 FF         | y0 50 0p 0q FF                   | p:DNR level(0:auto,1:low,2:mid,3:high)<br>q:DNR aperture(0~4)   |
| KT_WbSpeedInq           | 8x 09 71 50 FF         | y0 50 pp FF                      | pp : Speed (0~7)  |
| KT_WbBlueoffsetInq      | 8x 09 71 51 FF         | y0 50 pp FF                      | pp : Blue offset (0x00~0x64)  |
| KT_WbRedoffsetInq       | 8x 09 71 52 FF         | y0 50 pp FF                      | pp : Red offset (0x00~0x64)   |
| KT_WbSaturationInq      | 8x 09 71 53 FF         | y0 50 pp FF                      | pp : Saturation value (0x00~0x14)   |
| KT_WbHueInq             | 8x 09 71 54 FF         | y0 50 pp FF                      | pp : Hue value (0x00~0x14)  |
| KT_CcLineRedInq         | 8x 09 71 60 FF         | y0 50 0p FF                      | p: Line Red (0~7)   |
| KT_CcLineGreenInq       | 8x 09 71 61 FF         | y0 50 0p FF                      | p : Line Green (0~7)  |
| KT_CcLineBlueInq        | 8x 09 71 62 FF         | y0 50 0p FF                      | p : Line Blue (0~7)   |
| KT_CcAreaInq            | 8x 09 71 63 0p FF      | y0 50 qq rr FF                   | p: Color Area<br>0(magenta)/1(red)/2(yellow)/3(green)<br>4(cyan)/5(blue)<br>qq : Color Hue (0x00~0xB4)<br>rr : Color Gain (0x00~0x40)                           |
| KT_PipSetInq            | 8x 09 70 48 FF         | y0 50 0p 0q 0s 0r FF             | p=2 : PIP ON<br>p=3 : PIP OFF<br>q=0~3 : pip window size<br>0(1/4),1(1/9),2(1/16),3(1/24)<br>s=0~A : PIP window position - X<br>r=0~A : PIP window position - Y |
| KT_ImageRotateInq       | 8x 09 70 4A FF         | y0 50 0p 0q FF                   | p=corridor mode<br>0(Off) / 1(Full) / 2(Crop)<br>q=mirror mode  |



|                         |                   |                      |  |
|-------------------------|-------------------|----------------------|--|
|                         |                   |                      | 0(Off) / 1(H-flip) / 2(V-flip) / 3(HV-flip)  |
| KT_PwrOnLensInitSkipInq | 8x 09 70 49 FF    | y0 50 0p FF          | p : Focus reverse mode (2:on, 3:off)   |
| KT_DwdrModeInq          | 8x 09 70 4B FF    | y0 50 0p FF          | p : 0(off), 1(on), 2(auto)   |
|                         | 8x 09 70 4C FF    | y0 50 0p FF          | p : Dwdr on level(0x00~0x0f)   |
|                         | 8x 09 70 4D FF    | y0 50 0p FF          | p : Dwdr auto level (0~2)  |
| KT_FocusRevVariableInq  | 8x 09 70 47 FF    | y0 50 02 pp FF       | Focus Reverse mode On<br>pp : Rversetep(0x00~0x50)   |
|                         |                   | y0 50 03 pp FF       | Focus Reverse mode Off<br>pp : Rversetep(0x00~0x50)  |
| KT_BaudrateInq          | 8x 0 9 70 22 FF   | y0 50 0p 0q FF       | p : Baud channel (0:ch0, 1:ch1)<br>q : Parity(0:none, 1:odd, 2:even)   |
| KT_BootBaudrateInq      | 8x 09 70 BD FF    | y0 50 0p 0q 0r 0s FF | p : BootLoader type<br>q : Boot baudrate<br>0(default) / 1(2400) / 2(4800) / 3(9600)<br>4(19200) / 5(38400) / 6(57600) / 7(115200)<br>r : Boot parity<br>0(default) / 1(even) / 2(odd)<br>s : 0(default) / 1(rs485)                          |
| KT_FosdDispInq          | 8x 09 70 0E pp FF | y0 50 qq FF          | pp : 10(AF Zoom Display)<br>11(AF Zoom Display PosX)<br>12(AF Zoom Display PosY)<br>20(Cam ID Display)<br>21(Cam ID Display posX)<br>22(Cam ID Display PosY)<br>qq : 0(off) / 1(on)<br>Position PosX,(0x00~0x12)<br>Position PosY(0x01~0x13) |
| KT_AfPresetAsManualInq  | 8x 09 70 95 FF    | y0 50 0p FF          | p : AF preset Mode is like AF manual<br>0(off) / 1(on)   |
| KT_AfSpeedInq           | 8x 09 70 94 FF    | y0 50 0p FF          | p: AF speed<br>0(low)/ 1(mid) / 2(high)  |



Lens Control System Inquiry Commands ..... Command Packet 8x097E7E00FF

| Byte | Bit | Comments            |
|------|-----|---------------------|
| 0    | 7   | Destination Address |
|      | 6   |                     |
|      | 5   |                     |
|      | 4   |                     |
|      | 3   | Source Address      |
|      | 2   |                     |
|      | 1   |                     |
|      | 0   |                     |
| 1    | 7   |                     |
|      | 6   | 1                   |
|      | 5   | 0                   |
|      | 4   | 1                   |
|      | 3   | 0                   |
|      | 2   | 0                   |
|      | 1   | 0                   |
|      | 0   | 0                   |
| 2    | 7   | 0                   |
|      | 6   | 0                   |
|      | 5   | 0                   |
|      | 4   | 0                   |
|      | 3   | Zoom Position (HH)  |
|      | 2   |                     |
| 1    |     |                     |
| 3    | 7   | 0                   |
|      | 6   | 0                   |
|      | 5   | 0                   |
|      | 4   | 0                   |
|      | 3   | Zoom Position (HL)  |
|      | 2   |                     |
| 1    |     |                     |
| 4    | 7   | 0                   |
|      | 6   | 0                   |
|      | 5   | 0                   |
|      | 4   | 0                   |
|      | 3   | Zoom Position (LH)  |
|      | 2   |                     |
| 1    |     |                     |
| 5    | 7   | 0                   |
|      | 6   | 0                   |
|      | 5   | 0                   |
|      | 4   | 0                   |
|      | 3   | Zoom Position (LL)  |
|      | 2   |                     |
| 1    |     |                     |
| 0    |     |                     |

| Byte | Bit | Comments             |
|------|-----|----------------------|
| 6    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Near Limit (H) |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |
| 7    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Near Limit (L) |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |
| 8    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Position (HH)  |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |
| 9    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Position (HL)  |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |
| 10   | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Position (LH)  |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |
| 11   | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | Focus Position (LL)  |
|      | 2   |                      |
| 1    |     |                      |
| 0    |     |                      |

| Byte | Bit                          | Comment                                  |
|------|------------------------------|--|
| 12   | 7                            | 0  |
|      | 6                            | 0  |
|      | 5                            | 0  |
|      | 4                            | 0  |
|      | 3                            | 0  |
|      | 2                            | 0  |
|      | 1                            | 0  |
|      | 0                            | 0  |
| 13   | 7                            | 0  |
|      | 6                            | 0  |
|      | 5                            | DZoomMode 0: Combine<br>1: Separate      |
|      | 4                            | 0: Normal 1: Interval<br>2: Zoom Trigger |
|      | 3                            |  |
|      | 2                            | AF Sensitivity 0:<br>Slow 1: Normal      |
| 1    | Digital Zoom 1: On 0: Off    |  |
| 0    | Focus Mode 0: Manual 1: Auto |  |
| 14   | 7                            | 0  |
|      | 6                            | 0  |
|      | 5                            | 0  |
|      | 4                            | 0  |
|      | 3                            | Low Contrast Detection 1:<br>Yes 0: No   |
|      | 2                            | Camera Memory<br>Recall 1: Executing 0:  |
|      | 1                            | Focus Command 1:<br>Executing 0: Stopped |
|      | 0                            | Zoom Command 1:<br>Executing 0: Stopped  |
| 15   | 7                            | 1 Terminator (FFh)                       |
|      | 6                            | 1  |
|      | 5                            | 1  |
|      | 4                            | 1  |
|      | 3                            | 1  |
|      | 2                            | 1  |
|      | 1                            | 1  |
|      | 0                            | 1  |



Camera Control System Inquiry Commands ..... Command Packet 8x 09 7E 7E 01 FF

| Byte | Bit | Comments             |
|------|-----|----------------------|
| 0    | 7   | Destination Address  |
|      | 6   |                      |
|      | 5   |                      |
|      | 4   |                      |
|      | 3   | Source Address       |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 1    | 7   | 0 Completion Message |
|      | 6   | 1                    |
|      | 5   | 0                    |
|      | 4   | 1                    |
|      | 3   | 0                    |
|      | 2   | 0                    |
|      | 1   | 0                    |
|      | 0   | 0                    |
| 2    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | R Gain (H)           |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 3    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | R Gain (L)           |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 4    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | B Gain (H)           |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 5    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | B Gain (L)           |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |

| Byte | Bit | Comments                           |
|------|-----|------------------------------------|
| 6    | 7   | 0                                  |
|      | 6   | 0                                  |
|      | 5   | 0                                  |
|      | 4   | 0                                  |
|      | 3   | WB Mode                            |
|      | 2   |                                    |
|      | 1   |                                    |
|      | 0   |                                    |
| 7    | 7   | 0                                  |
|      | 6   | 0                                  |
|      | 5   | 0                                  |
|      | 4   | 0                                  |
|      | 3   | Aperture Gain                      |
|      | 2   |                                    |
|      | 1   |                                    |
|      | 0   |                                    |
| 8    | 7   | 0                                  |
|      | 6   | 0                                  |
|      | 5   | 0                                  |
|      | 4   | Exposure Mode                      |
|      | 3   |                                    |
|      | 2   |                                    |
|      | 1   |                                    |
|      | 9   | 7                                  |
| 6    |     | 0                                  |
| 5    |     | High-Resolution 1: On 0: Off       |
| 4    |     | Wide-D (1: Other than Off, 0: Off) |
| 3    |     | 0                                  |
| 2    |     | Back Light 1: On 0: Off            |
| 1    |     | Exposure Comp. 1: On 0: Off        |
| 0    |     | Slow Shutter 1: Auto 0:            |
| 10   | 7   | 0                                  |
|      | 6   | 0                                  |
|      | 5   | 0                                  |
|      | 4   | Shutter Position                   |
|      | 3   |                                    |
|      | 2   |                                    |
|      | 1   |                                    |
|      | 11  | 7                                  |
| 6    |     | 0                                  |
| 5    |     | 0                                  |
| 4    |     | Iris Position                      |
| 3    |     |                                    |
| 2    |     |                                    |
| 1    |     |                                    |
| 0    |     | 0                                  |

| Byte | Bit | Comments                |
|------|-----|-------------------------|
| 12   | 7   | 0                       |
|      | 6   | 0                       |
|      | 5   | 0                       |
|      | 4   | 0                       |
|      | 3   | Gain Position           |
|      | 2   |                         |
|      | 1   |                         |
|      | 0   |                         |
| 13   | 7   | 0                       |
|      | 6   | 0                       |
|      | 5   | 0                       |
|      | 4   | Bright Position         |
|      | 3   |                         |
|      | 2   |                         |
|      | 1   |                         |
|      | 14  | 7                       |
| 6    |     | 0                       |
| 5    |     | 0                       |
| 4    |     | 0                       |
| 3    |     | Exposure Comp. Position |
| 2    |     |                         |
| 1    |     |                         |
| 0    |     |                         |
| 15   | 7   | 1 Terminator (FFh)      |
|      | 6   | 1                       |
|      | 5   | 1                       |
|      | 4   | 1                       |
|      | 3   | 1                       |
|      | 2   | 1                       |
|      | 1   | 1                       |
|      | 0   | 1                       |





Other Inquiry Commands ..... Command Packet 8x 09 7E 7E 02 FF

| Byte | Bit                | Comments                   |
|------|--------------------|----------------------------|
| 0    | 7                  | Destination Address        |
|      | 6                  |                            |
|      | 5                  |                            |
|      | 4                  |                            |
|      | 3                  | Source Address             |
|      | 2                  |                            |
|      | 1                  |                            |
|      | 0                  |                            |
| 1    | 7                  | 0 Completion Message       |
|      | 6                  | 1                          |
|      | 5                  | 0                          |
|      | 4                  | 1                          |
|      | 3                  | 0                          |
|      | 2                  | 0                          |
|      | 1                  | 0                          |
|      | 0                  | 0                          |
| 2    | 7                  | 0                          |
|      | 6                  | 0                          |
|      | 5                  | 0                          |
|      | 4                  | 0                          |
|      | 3                  | Auto ICR Alarm (1: On, 0:  |
|      | 2                  | Auto ICR 1: On 0: Off      |
|      | 1                  | 0                          |
| 0    | Power 1: On 0: Off |                            |
| 3    | 7                  | 0                          |
|      | 6                  | 0                          |
|      | 5                  | 0                          |
|      | 4                  | ICR 1: On 0: Off           |
|      | 3                  | Freeze 1: On 0: Off        |
|      | 2                  | LR Reverse 1: On 0: Off    |
|      | 1                  | 0                          |
| 0    | 0                  |                            |
| 4    | 7                  | 0                          |
|      | 6                  | 0                          |
|      | 5                  | Privacy Zone 1: On 0: Off  |
|      | 4                  | Mute 1: On 0: Off          |
|      | 3                  | Title Display 1: On 0: Off |
|      | 2                  | Display 1: On 0: Off       |
|      | 1                  | 0                          |
| 0    | 0                  |                            |
| 5    | 7                  | 0                          |
|      | 6                  | 0                          |
|      | 5                  | 0                          |
|      | 4                  | 0                          |
|      | 3                  | Picture Effect Mode        |
|      | 2                  |                            |
|      | 1                  |                            |
| 0    |                    |                            |

| Byte | Bit | Comments       |
|------|-----|----------------|
| 6    | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | 0              |
|      | 2   | 0              |
|      | 1   | 0              |
|      | 0   | 0              |
| 7    | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | 0              |
|      | 2   | 0              |
|      | 1   | 0              |
|      | 0   | 0              |
| 8    | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | Camera ID (HH) |
|      | 2   |                |
|      | 1   |                |
|      | 0   |                |
| 9    | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | Camera ID (HL) |
|      | 2   |                |
|      | 1   |                |
|      | 0   |                |
| 10   | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | Camera ID (LH) |
|      | 2   |                |
|      | 1   |                |
|      | 0   |                |
| 11   | 7   | 0              |
|      | 6   | 0              |
|      | 5   | 0              |
|      | 4   | 0              |
|      | 3   | Camera ID (LL) |
|      | 2   |                |
|      | 1   |                |
|      | 0   |                |

| Byte | Bit              | Comments                                  |
|------|------------------|---|
| 12   | 7                | 0   |
|      | 6                | 0   |
|      | 5                | 0   |
|      | 4                | Memory 1: Provided 0:<br>Not provided     |
|      | 3                | 0   |
|      | 2                | ICR 1: Provided 0:<br>Not provided        |
|      | 1                | Stabilizer<br>1:provided, 0: not provided |
|      | 0                | 1: 1/50, 1/25 0: 1/60, 1/30               |
| 13   | 7                | 0   |
|      | 6                | 0   |
|      | 5                | 0   |
|      | 4                | 0   |
|      | 3                | Day&Night Mode                            |
|      | 2                | 0:auto                                    |
|      | 1                | 1:day 2:night                             |
| 0    | 3:Ext-H, 4:Ext-L |   |
| 14   | 7                | 0   |
|      | 6                | 0   |
|      | 5                | 0   |
|      | 4                | 0   |
|      | 3                | 0   |
|      | 2                | 0   |
|      | 1                | 0   |
| 0    | 0                |   |
| 15   | 7                | 1 Terminator (FFh)                        |
|      | 6                | 1   |
|      | 5                | 1   |
|      | 4                | 1   |
|      | 3                | 1   |
|      | 2                | 1   |
|      | 1                | 1   |
| 0    | 1                |   |



Enlargement Function1 Query Command..... Command Packet 8x 09 7E 7E 03 FF

| Byte | Bit | Comments                  |
|------|-----|---------------------------|
| 0    | 7   | Destination Address       |
|      | 6   |                           |
|      | 5   |                           |
|      | 4   |                           |
|      | 3   | Source Address            |
|      | 2   |                           |
| 1    |     |                           |
| 1    | 0   | 0 Completion Message      |
|      | 7   | 1                         |
|      | 6   | 0                         |
|      | 5   | 1                         |
|      | 4   | 0                         |
|      | 3   | 0                         |
|      | 2   | 0                         |
|      | 1   | 0                         |
| 2    | 0   | 0                         |
|      | 7   | 0                         |
|      | 6   | 0                         |
|      | 5   | 0                         |
|      | 4   | 0                         |
| 3    | 3   | Digital Zoom Position (H) |
|      | 2   |                           |
|      | 1   |                           |
|      | 0   |                           |
|      | 7   |                           |
| 4    | 6   | 0                         |
|      | 5   | 0                         |
|      | 4   | 0                         |
|      | 3   | Digital Zoom Position (L) |
|      | 2   |                           |
|      | 1   |                           |
|      | 0   |                           |
|      | 5   | 7                         |
| 6    |     | 0                         |
| 5    |     | 0                         |
| 4    |     | 0                         |
| 3    |     | AF Activation Time (H)    |
| 2    |     |                           |
| 1    |     |                           |
| 0    |     |                           |
| 6    | 7   | 0                         |
|      | 6   | 0                         |
|      | 5   | 0                         |
|      | 4   | 0                         |
|      | 3   | AF Activation Time (L)    |
| 2    |     |                           |

| Byte | Bit | Comments                     |
|------|-----|------------------------------|
| 6    | 7   | 0                            |
|      | 6   | 0                            |
|      | 5   | 0                            |
|      | 4   | 0                            |
| 7    | 3   | AF Interval Time (H)         |
|      | 2   |                              |
|      | 1   |                              |
|      | 0   |                              |
|      | 7   |                              |
| 8    | 6   | 0                            |
|      | 5   | 0                            |
|      | 4   | 0                            |
|      | 3   | AF Interval Time (L)         |
|      | 2   |                              |
|      | 1   |                              |
|      | 0   |                              |
| 9    | 7   | 0                            |
|      | 6   | 0                            |
|      | 5   | 0                            |
|      | 4   | 0                            |
|      | 3   | 0                            |
|      | 2   |                              |
|      | 1   |                              |
|      | 0   |                              |
| 10   | 7   | 0                            |
|      | 6   | 0                            |
|      | 5   | 0                            |
|      | 4   | 0                            |
|      | 3   | 0                            |
|      | 2   | MD (1: On, 0: Off)           |
|      | 1   | Reserved                     |
|      | 0   | Picture flip (1: On, 0: Off) |

| Byte | Bit | Comments  |                                       |
|------|-----|---|---------------------------------------|
| 11   | 7   | 0   |                                       |
|      | 6   | Color Gain (0h (60%) to Eh (200%))              |                                       |
|      | 5   |   |                                       |
|      | 4   |   |                                       |
|      | 3   | Advanced Privacy (1: Provided, 0: Not provided) |                                       |
|      | 2   |   |                                       |
| 1    |     |   |                                       |
| 12   | 0   | Alarm (1: Provided, 0: Not provided)            |                                       |
|      | 7   | 0   |                                       |
|      | 6   | 0   |                                       |
|      | 5   | 0   |                                       |
|      | 4   | Picture flip (1: Provided, 0: Not provided)     |                                       |
| 3    |     |   |                                       |
| 2    |     |   |                                       |
| 13   | 1   | 0   |                                       |
|      | 0   |   |                                       |
|      | 7   |   | 0                                     |
|      | 6   |   | Gamma                                 |
|      | 5   |   |                                       |
|      | 4   |   |                                       |
|      | 14  | 3   | High Sensitivity mode (1: ON, 0: OFF) |
| 2    |     | NR Level  |                                       |
| 1    |     |   |                                       |
| 0    |     |   |                                       |
| 15   | 7   | 0   |                                       |
|      | 6   | 0   |                                       |
|      | 5   |   |                                       |
|      | 4   |   |                                       |
|      | 3   | Gain Limit                                      |                                       |
|      | 2   |   |                                       |
| 1    |     |   |                                       |
| 16   | 0   | 1 Terminator (FFh)                              |                                       |
|      | 7   | 1   |                                       |
|      | 6   | 1   |                                       |
|      | 5   | 1   |                                       |
|      | 4   | 1   |                                       |
|      | 3   | 1   |                                       |
|      | 2   | 1   |                                       |
|      | 1   | 1   |                                       |
| 0    | 1   |   |                                       |



Enlargement Function2 Query Command..... Command Packet 8x 09 7E 7E 04 FF

| Byte | Bit | Comm                            |
|------|-----|---------------------------------|
| 0    | 7   | Destination Address             |
|      | 6   |                                 |
|      | 5   |                                 |
|      | 4   |                                 |
|      | 3   | Source Address                  |
|      | 2   |                                 |
|      | 1   |                                 |
|      | 0   |                                 |
| 1    | 7   | 0 Completion Message            |
|      | 6   | 1                               |
|      | 5   | 0                               |
|      | 4   | 1                               |
|      | 3   | 0                               |
|      | 2   | 0                               |
|      | 1   | 0                               |
|      | 0   | 0                               |
| 2    | 7   | 0                               |
|      | 6   | 0                               |
|      | 5   | 0                               |
|      | 4   | 0                               |
|      | 3   | 0                               |
|      | 2   | WideD mode (0: OFF, 1: ON)      |
| 1    |     |                                 |
| 0    |     |                                 |
| 3    | 7   | 0                               |
|      | 6   | 0                               |
|      | 5   | 0                               |
|      | 4   | 0                               |
|      | 3   | 0                               |
|      | 2   |                                 |
|      | 1   |                                 |
|      | 0   |                                 |
| 4    | 7   | 0                               |
|      | 6   | 0                               |
|      | 5   | 0                               |
|      | 4   | 0                               |
|      | 3   | 0                               |
|      | 2   |                                 |
|      | 1   | WideD blown-out highlight       |
|      | 0   | correction level 0: L 1: M 2: H |
| 5    | 7   | 0                               |
|      | 6   | 0                               |
|      | 5   | 0                               |
|      | 4   | 0                               |
|      | 3   | 0                               |
|      | 2   |                                 |
| 1    |     |                                 |
| 0    |     |                                 |

| Byte | Bit | Comments               |
|------|-----|------------------------|
| 6    | 7   | 0                      |
|      | 6   | 0                      |
|      | 5   | 0                      |
|      | 4   | 0                      |
|      | 3   |                        |
|      | 2   | 0                      |
|      | 1   |                        |
|      | 0   |                        |
| 7    | 7   | 0                      |
|      | 6   | 0                      |
|      | 5   | 0                      |
|      | 4   | 0                      |
|      | 3   | 0                      |
|      | 2   | 0                      |
|      | 1   | 0                      |
|      | 0   | Defog Mode(1:on,0:off) |
| 8    | 7   | 0                      |
|      | 6   | 0                      |
|      | 5   | 0                      |
|      | 4   | 0                      |
|      | 3   | 0                      |
|      | 2   | 0                      |
|      | 1   | 0                      |
|      | 0   | 0                      |
| 9    | 7   | 0                      |
|      | 6   | 0                      |
|      | 5   | 0                      |
|      | 4   | 0                      |
|      | 3   | 0                      |
|      | 2   | 0                      |
|      | 1   | 0                      |
|      | 0   | 0                      |
| 10   | 7   | 0                      |
|      | 6   | 0                      |
|      | 5   | 0                      |
|      | 4   | 0                      |
|      | 3   | 0                      |
|      | 2   | 0                      |
|      | 1   | 0                      |
|      | 0   | 0                      |

| Byte | Bit | Comments           |
|------|-----|--------------------|
| 11   | 7   | 0                  |
|      | 6   | 0                  |
|      | 5   | 0                  |
|      | 4   | 0                  |
|      | 3   | 0                  |
|      | 2   | 0                  |
|      | 1   | 0                  |
|      | 0   | 0                  |
| 12   | 7   | 0                  |
|      | 6   | 0                  |
|      | 5   | 0                  |
|      | 4   | 0                  |
|      | 3   | 0                  |
|      | 2   | 0                  |
|      | 1   | 0                  |
|      | 0   | 0                  |
| 13   | 7   | 0                  |
|      | 6   | 0                  |
|      | 5   | 0                  |
|      | 4   | 0                  |
|      | 3   | 0                  |
|      | 2   | 0                  |
|      | 1   | 0                  |
|      | 0   | 0                  |
| 14   | 7   | 0                  |
|      | 6   | 0                  |
|      | 5   | 0                  |
|      | 4   | 0                  |
|      | 3   | 0                  |
|      | 2   | 0                  |
|      | 1   | 0                  |
|      | 0   | 0                  |
| 15   | 7   | 1 Terminator (FFh) |
|      | 6   | 1                  |
|      | 5   | 1                  |
|      | 4   | 1                  |
|      | 3   | 1                  |
|      | 2   | 1                  |
|      | 1   | 1                  |
|      | 0   | 1                  |



Enlargement Function3 Query Command..... Command Packet 8x 09 7E 7E 05 FF

| Byte | Bit | Comments             |
|------|-----|----------------------|
| 0    | 7   | Destination Address  |
|      | 6   |                      |
|      | 5   |                      |
|      | 4   |                      |
|      | 3   | Source Address       |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 1    | 7   | 0 Completion Message |
|      | 6   | 1                    |
|      | 5   | 0                    |
|      | 4   | 1                    |
|      | 3   | 0                    |
|      | 2   | 0                    |
|      | 1   | 0                    |
|      | 0   | 0                    |
| 2    | 7   | 0                    |
|      | 6   | 0                    |
|      | 5   | 0                    |
|      | 4   | 0                    |
|      | 3   | 0                    |
| 3    | 7   | 0                    |
|      | 6   | Reserved             |
|      | 5   |                      |
|      | 4   |                      |
|      | 3   |                      |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 4    | 7   | 0                    |
|      | 6   | Reserved             |
|      | 5   |                      |
|      | 4   |                      |
|      | 3   |                      |
|      | 2   |                      |
|      | 1   |                      |
|      | 0   |                      |
| 5    | 7   | 0                    |
|      | 6   | Reserved             |
|      | 5   |                      |
|      | 4   |                      |
|      | 3   |                      |
|      | 2   |                      |
|      | 1   |                      |
| 0    |     |                      |

| Byte | Bit | Comme   |
|------|-----|---------|
| 6    | 7   | 0       |
|      | 6   | Reserve |
|      | 5   |         |
|      | 4   |         |
|      | 3   |         |
|      | 2   |         |
|      | 1   |         |
|      | 0   |         |
| 7    | 7   | 0       |
|      | 6   | Reserve |
|      | 5   |         |
|      | 4   |         |
|      | 3   |         |
|      | 2   |         |
|      | 1   |         |
|      | 0   |         |
| 8    | 7   | 0       |
|      | 6   | Reserve |
|      | 5   |         |
|      | 4   |         |
|      | 3   |         |
|      | 2   |         |
| 9    | 7   | 0       |
|      | 6   | Reserve |
|      | 5   |         |
|      | 4   |         |
|      | 3   |         |
|      | 2   |         |
| 10   | 7   | 0       |
|      | 6   | Reserve |
|      | 5   |         |
|      | 4   |         |
|      | 3   |         |
|      | 2   |         |
|      | 1   |         |
|      | 0   |         |

| Byte | Bit | Comments           |
|------|-----|--------------------|
| 11   | 7   | 0                  |
|      | 6   | Reserved           |
|      | 5   |                    |
|      | 4   |                    |
|      | 3   |                    |
|      | 2   |                    |
|      | 1   |                    |
|      | 0   |                    |
| 12   | 7   | 0                  |
|      | 6   | Reserved           |
|      | 5   |                    |
|      | 4   |                    |
|      | 3   |                    |
|      | 2   |                    |
|      | 1   |                    |
|      | 0   |                    |
| 13   | 7   | 0                  |
|      | 6   | Reserved           |
|      | 5   |                    |
|      | 4   |                    |
|      | 3   |                    |
|      | 2   |                    |
| 14   | 7   | 0                  |
|      | 6   | Reserved           |
|      | 5   |                    |
|      | 4   |                    |
|      | 3   |                    |
|      | 2   |                    |
|      | 1   |                    |
|      | 0   |                    |
| 15   | 7   | 1 Terminator (FFh) |
|      | 6   | 1                  |
|      | 5   | 1                  |
|      | 4   | 1                  |
|      | 3   | 1                  |
|      | 2   | 1                  |
|      | 1   | 1                  |
|      | 0   | 1                  |



# Command Setting Values

## SHUTTER SPEED

| Index | 60/30 mode | 50/25 mode |
|-------|------------|------------|
| 15    | 1/10000    | 1/10000    |
| 14    | 1/6000     | 1/6000     |
| 13    | 1/4000     | 1/3500     |
| 12    | 1/3000     | 1/2500     |
| 11    | 1/2000     | 1/1750     |
| 10    | 1/1500     | 1/1250     |
| 0F    | 1/1000     | 1/1000     |
| 0E    | 1/725      | 1/600      |
| 0D    | 1/500      | 1/425      |
| 0C    | 1/350      | 1/300      |
| 0B    | 1/250      | 1/215      |
| 0A    | 1/180      | 1/150      |
| 09    | 1/125      | 1/120      |
| 08    | 1/100      | 1/100      |
| 07    | 1/90       | 1/75       |
| 06    | 1/60       | 1/50       |
| 05    | 1/30       | 1/25       |
| 04    | 1/15       | 1/12       |
| 03    | 1/8        | 1/6        |
| 02    | 1/4        | 1/3        |
| 01    | 1/2        | 1/2        |
| 00    | 1/1        | 1/1        |

## IRIS

| Index | Iris  |
|-------|-------|
| 11    | F1.6  |
| 10    | F2.0  |
| 0F    | F2.4  |
| 0E    | F2.8  |
| 0D    | F3.4  |
| 0C    | F4.0  |
| 0B    | F4.8  |
| 0A    | F5.6  |
| 09    | F6.8  |
| 08    | F8    |
| 07    | F9.6  |
| 06    | F11   |
| 05    | F14   |
| 04    | F16   |
| 03    | F19   |
| 02    | F22   |
| 01    | F32   |
| 00    | CLOSE |

## GAIN LIMIT & GAIN POSITION

| Index | Gain |
|-------|------|
| 14    | 45dB |
| 13    | 42dB |
| 12    | 39dB |
| 11    | 36dB |
| 10    | 33dB |
| 0F    | 30dB |
| 0E    | 28dB |
| 0D    | 26dB |
| 0C    | 24dB |
| 0B    | 22dB |
| 0A    | 20dB |
| 09    | 18dB |
| 08    | 16dB |
| 07    | 14dB |
| 06    | 12dB |
| 05    | 10dB |
| 04    | 8dB  |
| 03    | 6dB  |
| 02    | 4dB  |
| 01    | 2dB  |
| 00    | 0dB  |

## EXPOSURE COMPENSTAION(bright)

| Index | Iris | Gain     |
|-------|------|----------|
| 0E    | +7   | +10.5 dB |
| 0D    | +6   | +9 dB    |
| 0C    | +5   | +7.5 dB  |
| 0B    | +4   | +6 dB    |
| 0A    | +3   | +4.5 dB  |
| 09    | +2   | +3 dB    |
| 08    | +1   | +1.5 dB  |
| 07    | 0    | 0 dB     |
| 06    | -1   | -1.5 dB  |
| 05    | -2   | -3 dB    |
| 04    | -3   | -4.5 dB  |
| 03    | -4   | -6 dB    |
| 02    | -5   | -7.5 dB  |
| 01    | -6   | -9 dB    |
| 00    | -7   | -10.5 dB |

## Aperture (=sharpness)

| Index | Level |
|-------|-------|
| 0F    | Sharp |
| ...   |       |
| 00    | Dull  |

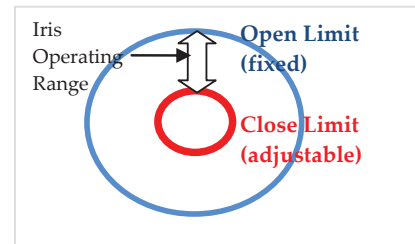
Red/Blue Manual Gain  
0x00 ~ 0xFF

## AE BRIGHT MODE LEVEL (T.B.D)

| Index | Iris  | Gain  |
|-------|-------|-------|
| 1F    | F1.6  | 28 dB |
| 1E    | F1.6  | 26 dB |
| 1D    | F1.6  | 24 dB |
| 1C    | F1.6  | 22 dB |
| 1B    | F1.6  | 20 dB |
| 1A    | F1.6  | 18 dB |
| 19    | F1.6  | 16 dB |
| 18    | F1.6  | 14 dB |
| 17    | F1.6  | 12 dB |
| 16    | F1.6  | 10 dB |
| 15    | F1.6  | 8 dB  |
| 14    | F1.6  | 6 dB  |
| 13    | F1.6  | 4 dB  |
| 12    | F1.6  | 2 dB  |
| 11    | F1.6  | 0 dB  |
| 10    | F2.0  | 0 dB  |
| 0F    | F2.4  | 0 dB  |
| 0E    | F2.8  | 0 dB  |
| 0D    | F3.4  | 0 dB  |
| 0C    | F4.0  | 0 dB  |
| 0B    | F4.8  | 0 dB  |
| 0A    | F5.6  | 0 dB  |
| 09    | F6.8  | 0 dB  |
| 08    | F8.0  | 0 dB  |
| 07    | F9.6  | 0 dB  |
| 06    | F11   | 0 dB  |
| 05    | F14   | 0 dB  |
| 00    | CLOSE | 0 dB  |

## IRIS CLOSE LIMIT

| Index | Open Level |
|-------|------------|
| A0    | More Open  |
| ...   |            |
| 60    | default    |
| ...   |            |
| 10    | More Close |



### Lens Control

|                  |  |   |                         |
|------------------|--|---|-------------------------|
| Zoom Position    | 0000 ~ 4000  | Wide end ~ Optical Tele end   | 7AC0 ~ Digital Tele end |
| Focus Position   | 1000 ~ F000  | Far end ~ Near end  |                         |
| Focus Near Limit | 1000 // inf<br>1100 //500m<br>1300 //200m<br>1500 //100m<br>2000 //60m<br>2500 // 30m<br>3000 // 10m<br>5000 // 5m<br>7000 // 3m<br>9000 // 2m<br>A000 // 1.5m<br>C000 // 1m<br>D000 // 50cm<br>F000 // 10cm | The Lower 1 byte is fixed to 00<br><br>(* ) As the distance on the left will differ due to temperature or any other conditions. |                         |

### Optical Zoom Position

| Zoom Ratio | Optical Zoom Position |
|------------|-----------------------|
| X1         | 0000                  |
| X2         | 16AF                  |
| X3         | 207D                  |
| X4         | 2643                  |
| X5         | 2A38                  |
| X6         | 2D1A                  |
| X7         | 2F80                  |
| X8         | 3176                  |
| X9         | 3316                  |
| X10        | 3490                  |
| X11        | 35FC                  |
| X12        | 3712                  |
| X13        | 3827                  |
| X14        | 3924                  |
| X15        | 3A0B                  |
| X16        | 3AE2                  |
| X17        | 3BA3                  |
| X18        | 3C84                  |
| X19        | 3CE0                  |
| X20        | 3D64                  |
| X21        | 3DD5                  |
| X22        | 3E40                  |
| X23        | 3E92                  |
| X24        | 3EE0                  |
| X25        | 3F1F                  |
| X26        | 3F58                  |
| X27        | 3F8A                  |
| X28        | 3FC4                  |
| X29        | 3FDD                  |
| X30        | 4000                  |

### Digital Zoom Position

| Digital Zoom Ratio | Combine Mode | Separate Mode |
|--------------------|--------------|---------------|
| X1                 | 4000         | 00            |
| X2                 | 6000         | 80            |
| X3                 | 6A80         | AA            |
| X4                 | 7000         | C0            |
| X5                 | 7300         | CC            |
| X6                 | 7540         | D5            |
| X7                 | 76C0         | DB            |
| X8                 | 7800         | E0            |
| X9                 | 78C0         | E3            |
| X10                | 7980         | E6            |
| X11                | 7A00         | E8            |
| X12                | 7AC0         | EB            |

### Tele/Wide Limit Setting

| 00 | 0000 | 1    | 4000 | 10   |
|----|------|------|------|------|
| 10 | 00F4 | 1.02 | 3F0B | 9.61 |
| 20 | 01E9 | 1.04 | 3E16 | 9.25 |
| 30 | 02DD | 1.07 | 3D22 | 8.92 |
| 40 | 03D2 | 1.10 | 3C2D | 8.60 |
| 50 | 04C6 | 1.13 | 3B39 | 8.31 |
| 60 | 05BB | 1.15 | 3A44 | 8.01 |
| 70 | 06B0 | 1.18 | 394F | 7.73 |
| 80 | 07A4 | 1.22 | 385B | 7.46 |
| 90 | 0899 | 1.25 | 3766 | 7.19 |
| A0 | 098D | 1.28 | 3672 | 6.92 |
| B0 | 0A82 | 1.32 | 357D | 6.66 |
| C0 | 0B77 | 1.35 | 3488 | 6.41 |
| D0 | 0C6B | 1.39 | 3394 | 6.16 |
| E0 | 0D60 | 1.43 | 329F | 5.92 |
| F0 | 0E54 | 1.47 | 31AB | 5.68 |
| FF | 0F3A | 1.51 | 30C5 | 5.47 |

### GAMMA POSITION

| Index | Gamma |
|-------|-------|
| 0     | 0.40  |
| 1     | 0.45  |
| 2     | 0.50  |
| 3     | 0.55  |
| 4     | 0.60  |
| 5     | 0.70  |
| 6     | 0.80  |
| 7     | 0.90  |
| 8     | 1.00  |



## Title Setting

|             |                    |        |
|-------------|--------------------|--------|
| Line number | 00 to 14h          |        |
| H-position  | 00 to 28h          |        |
| Blink       | 00: Dose not blink |        |
|             | 01: Blinks         |        |
| Color       | 00                 | White  |
|             | 01                 | Yellow |
|             | 02                 | Violet |
|             | 03                 | Red    |
|             | 04~06              | White  |

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| A  | B  | C  | D  | E  | F  | G  | H  |
| 08 | 09 | 0a | 0b | 0c | 0d | 0e | 0f |
| I  | J  | K  | L  | M  | N  | O  | P  |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| Q  | R  | S  | T  | U  | V  | W  | X  |
| 18 | 19 | 1a | 1b | 1c | 1d | 1e | 1f |
| Y  | Z  | &  |    | ?  | !  | 1  | 2  |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 3  | 4  | 5  | 6  | 7  | 8  | 9  | 0  |
| 28 | 29 | 2a | 2b | 2c | 2d | 2e | 2f |
| À  | È  | Ì  | Ò  | Ù  | Á  | É  | Í  |
| 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| Ó  | Ú  | Â  | Ê  | Ô  | Æ  |    | Ã  |
| 38 | 39 | 3a | 3b | 3c | 3d | 3e | 3f |
| Û  | Ñ  | Ç  | ß  | Ä  | Ï  | Ö  | Ü  |
| 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| À  | \$ |    | ¥  |    | £  | ı  | ı  |
| 48 | 49 | 4a | 4b | 4c | 4d | 4e | 4f |
| ø  | “  | :  | ’  | .  | ,  | /  | -  |
| 50 |    |    |    |    |    |    |    |
| →  |    |    |    |    |    |    |    |

## Custom/Memory Preset Setting Items

| Item                  | Custom Preset | Memory Preset |
|-----------------------|---------------|---------------|
| Zoom Position         | O             | O             |
| Digital Zoom On/Off   | O             | O             |
| Digital Zoom Position | O             | X             |
| Zoom Start Position   | O             | X             |
| Zoom Stop Position    | O             | X             |
| Zoom Speed            | O             | X             |
| AF Home Position      | O             | X             |
| AF Limited Range      | O             | X             |
| Focus Position        | O             | O             |
| Focus Mode            | O             | O             |
| Near Limit Setting    | O             | X             |
| AF Sensitivity        | O             | X             |
| AF Mode               | O             | O             |
| AF Run Time           | O             | X             |
| AF Interval Time      | O             | X             |
| WB Mode               | O             | O             |

|                                  |   |   |
|----------------------------------|---|---|
| WB Data(Rgain,Bgain)             | O | O |
| COLOR Gain                       | O | X |
| AE Mode                          | O | O |
| AE Response                      | O | X |
| AE Slow Shutter                  | O | O |
| Shutter Position                 | O | O |
| Iris Position                    | O | O |
| Gain Position                    | O | O |
| Gain Limit                       | O | O |
| Bright Position                  | O | O |
| Exposure Compensation Mode       | O | O |
| Exposure Compensation Amount     | O | O |
| High Sens                        | O | X |
| Flickerless                      | O | X |
| Aperture Level                   | O | O |
| Gamma                            | O | X |
| High Resolution                  | O | X |
| LR Reverse                       | O | X |
| Picture Flip                     | O | X |
| Freeze                           | O | X |
| Picture Effect                   | O | X |
| D-WDR                            | O | X |
| Defog                            | O | O |
| Defog Level                      | O | X |
| 3DNR Mode                        | O | O |
| 3DNR Level                       | O | X |
| 2DNR Mode                        | O | X |
| 2DNR Weight                      | O | X |
| Digital Image Stabilizer On/Off  | O | X |
| Digital Image Stabilizer Setting | O | X |
| BackLight On/Off                 | O | O |
| BLC Setting                      | O | X |
| WDR On/Off                       | O | O |
| HLC On/off                       | O | X |
| HLC Setting                      | O | X |
| ICR On/Off                       | O | O |
| Auto ICR On/Off                  | O | O |
| Auto ICR Threshlod Level         | O | X |
| ICR Alarm Setting                | O | X |
| Day&Night Dwell Time             | O | X |
| Day->Night AGC level             | O | X |
| Night->Day AGC level             | O | X |
| Day->Night EXT-H level           | O | X |
| Night -> Day EXT-H level         | O | X |
| Day->Night EXT-L level           | O | X |
| Night -> Day EXT-L level         | O | X |
| Privacy Mask On/Off              | O | X |
| Privacy Mask Display             | O | X |
| Privacy Mask Setting             | O | X |
| Motion On/Off                    | O | X |
| Motion Display                   | O | X |
| Motion Setting                   | O | X |
| Mute                             | O | X |
| Title Display On/Off             | O | X |
| Title Setting                    | O | X |
| Display On/Off                   | O | X |
| ETC                              | X | X |



## Register Setting

|                   |                            |  |
|-------------------|----------------------------|--|
| CAM_RegisterValue | 8x 01 04 24<br>mm 0p 0p FF | mm: Register No. (=00-7F)<br>pp: Register Value (=00-7F) |
|-------------------|----------------------------|--|

| command                | Register (mm) | Value (pp)            | contents                                       |
|------------------------|---------------|-----------------------|--|
| VISCA Baud Rate        | 00            | 00<br>(Default)       | 9600 bps                                       |
|                        |               | 01                    | 19200 bps                                      |
|                        |               | 02                    | 38400 bps                                      |
|                        |               | 03                    | 115200bps                                      |
|                        |               | 04                    | 57600 bps                                      |
|                        |               | 05                    | 2400 bps                                       |
|                        |               | 06                    | 4800 bps                                       |
| Monitoring Mode        | 72            | 01                    | 1080i/60                                       |
|                        |               | 02                    | 1080i/60                                       |
|                        |               | 04                    | 1080i/50                                       |
|                        |               | 06                    | 1080p/30                                       |
|                        |               | 07                    | 1080p/30                                       |
|                        |               | 08                    | 1080p/25                                       |
|                        |               | 09                    | 720p/60  |
|                        |               | 0A                    | 720p/60  |
|                        |               | 0C                    | 720p/50  |
|                        |               | 0E                    | 720p/30  |
|                        |               | 0F                    | 720p/30  |
|                        |               | 11                    | 720p/25  |
|                        |               | 13                    | 1080p/60                                       |
|                        |               | 14                    | 1080p/50                                       |
|                        |               | 15                    | 1080p/60                                       |
| LVDS mode              | 74            | 00<br>(Default)       | Single output                                  |
|                        |               | 01                    | Dual output                                    |
| Zoom Limit             | 50            | 00-FF<br>(default:00) | Wide Limit                                     |
|                        | 51            | 00-FF<br>(default:00) | Tele Limit                                     |
| E-Zoom Max             | 52            | 00-FF<br>(Default:EB) | Max. digital zoom ratio =<br>256 ÷ (256-Value) |
| FocusOffset @DomeCover | 55            | 00-FF<br>(Default:00) | 00: None<br>FF: Max.                           |
| Sens-Up                | 59            | 01                    | OFF  |
|                        |               | 02                    | X2   |
|                        |               | 03                    | X4   |
|                        |               | 04                    | X8   |
|                        |               | 05                    | X16  |
|                        |               | 06                    | X32  |
| Day&Night              | 5F            | 00                    | Day  |
|                        |               | 08                    | Auto   |
| Language               | 60            | 00                    | 00:English                                     |
| CVBS scale             | 7C            | 00                    | 4:3  |
|                        |               | 01                    | 16:9   |

|                  |    |                |  |
|------------------|----|----------------|--|
| RS232 Parity Bit | 91 | 00<br>01<br>02 | None parity<br>Odd parity<br>Even parity |
| Sensor Scan Mode | 92 | 00<br>01       | Full<br>Crop                             |



## PELCO-D protocol for RS-485/RS-232

| Command             | Output : PELCO-D     | Description   |
|---------------------|----------------------|---|
| Zoom Tele           | FF 01 00 20 00 00 CS |   |
| Zoom Wide           | FF 01 00 40 00 00 CS |   |
| Focus Near          | FF 01 01 00 00 00 CS |   |
| Focus Far           | FF 01 00 80 00 00 CS |   |
| Iris Open           | FF 01 02 00 00 00 CS | Menu command  |
| Iris Close          | FF 01 04 00 00 00 CS | Menu command  |
| Stop                | FF 01 00 00 00 00 CS |   |
|                     |                      |   |
| Menu                | FF 01 40 00 00 00 CS | Menu on   |
| Up                  | FF 01 00 08 00 00 CS | Key action Up   |
| Down                | FF 01 00 14 00 00 CS | Key action Down   |
| Left                | FF 01 00 04 00 00 CS | Key action Left   |
| Right               | FF 01 00 02 00 00 CS | Key action Right  |
| Default             | FF 01 00 29 00 00 CS | Key action Default  |
| Cam on              | FF 01 88 00 00 00 CS |   |
| Cam off             | FF 01 08 00 00 00 CS |   |
|                     |                      |   |
| Clear Preset        | FF 01 00 05 00 zz CS | zz : preset no (00~FF)  |
| Flip(180 rotate)    | FF 01 00 07 00 21 CS |   |
| Menu or SET         | FF 01 00 07 00 5F CS | Menu command  |
| Menu or SET         | FF 01 00 07 00 60 CS | Menu command  |
| Menu or SET         | FF 01 00 03 00 62 CS | Menu command  |
| Zoom speed          | FF 01 00 25 00 zz CS | zz = 00(speed 1)/ 01(speed 4)/ 02(speed 6)/ 03(speed 7)                                 |
| AF Mode             | FF 01 00 2B 00 zz CS | zz : set AF mode<br>00(auto)/ 01(1 push)/ 02(one shot)/ 03(manual)/04(preset)           |
| BLC Mode            | FF 01 00 31 00 zz CS | zz : set BLC mode<br>01(BLC on)/ 02(BLC off)/ 03(HLC on)                                |
| WB Mode             | FF 01 00 33 00 zz CS | zz : set WB mode<br>02(manual)/ 03(atw)/ 04(push)/ 05(indoor)/ 06(outdoor)/others(auto) |
| Shutter             | FF 01 00 37 00 zz CS | zz : shutter (see. shutter table)   |
| Get Pan Position    | FF 01 00 51 00 00 CS | Pan position transmit request   |
| Get Tilt Position   | FF 01 00 53 00 00 CS | Tilt position transmit request  |
| Query Pan Position  | FF 01 00 59 zz zz CS | Response to Pan position input on the host<br>zzzz : position                           |
| Query Tilt Position | FF 01 00 5B zz zz CS | Response to Tilt position input on the host<br>zzzz : position                          |
|                     |                      |   |
| KT_Reset            | FF 01 70 00 00 00 CS | Set value reset   |
| KT_ResetEep         | FF 01 7E EE 00 00 CS | Reset all system EEPROM, Reset to FACTORY DEFAULT status                                |



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