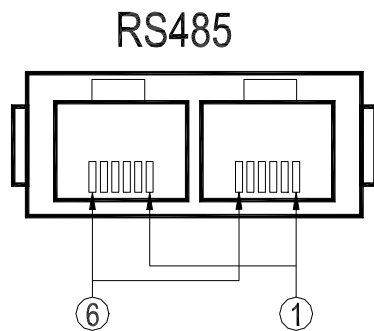


Surveillance Control Protocol (DSCP)

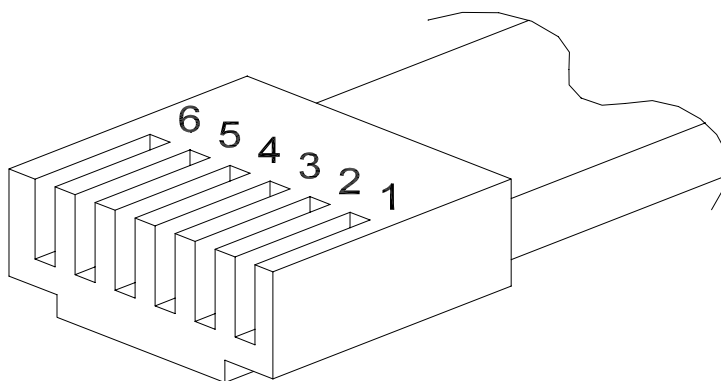
V2.9

1. Connector Type

The default RS485 port connector is RJ11 6P6C connector:



RJ11 Cable 6P6C pin definition:



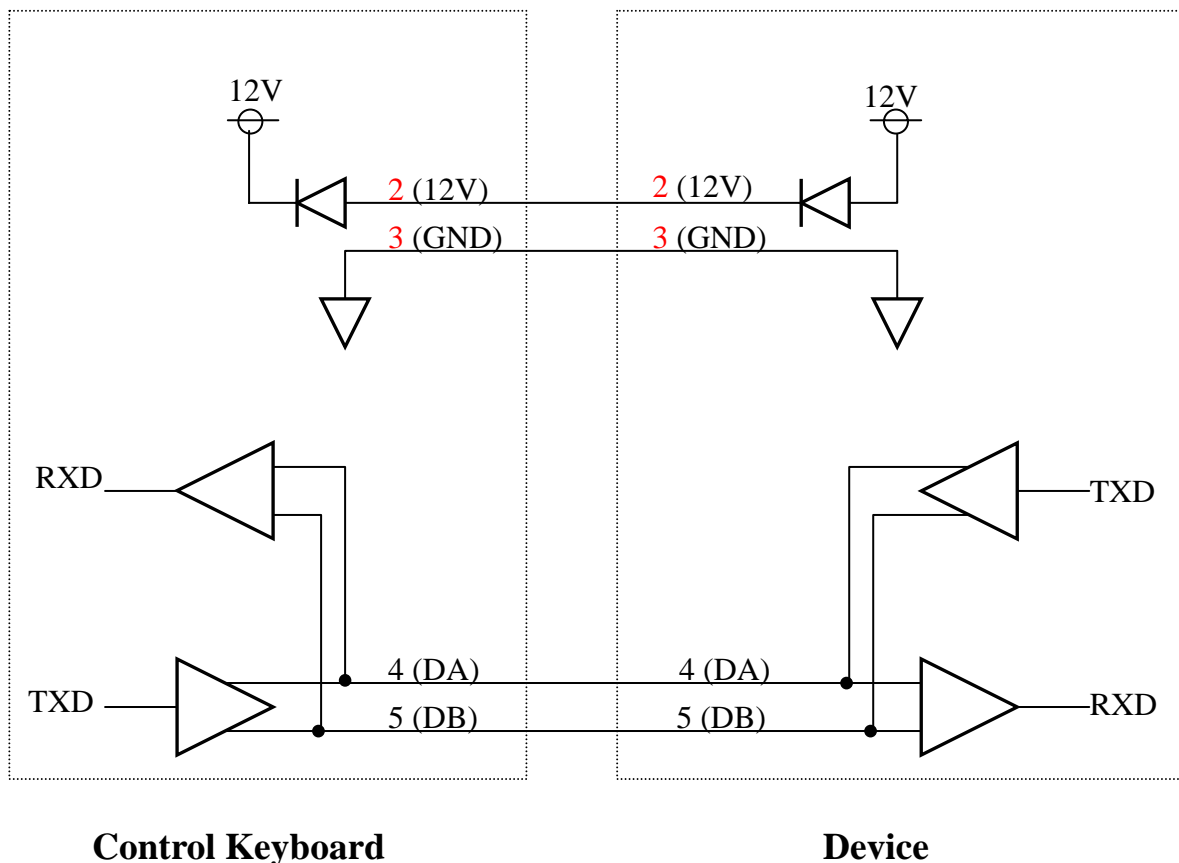
2. Pin Name and definition

| Pin No. | Definition | Direction |
|---------|------------|-----------|
| 1 | - | - |
| 2 | +12V | Power |
| 3 | GND | Ground |
| 4 | DA (D +) | I/O |
| 5 | DB (D -) | I/O |
| 6 | - | - |

The system is operated in half duplex mode, at least three wires are necessary for RS485 communication: GND (pin3, ground), DA (pin4) and DB (pin5).

Pin 2(+12V) is auxiliary pin to provide DC power from Device (Multiplexer and Dome Camera) to the Control Keyboard. If the device is located far away from the keyboard, it's better to use a DC adapter to provide power to the keyboard.

Pin 1 and Pin 6 are reserved for future applications.



3. UART Protocol

Baud rate: 9600
Start bit: 1
Data bit: 8
Parity: None
Stop bit: 1

4. Command Packet:

Every command is composed of six bytes; the packet format is described as below. **The time delay between each byte must be smaller than 2 ms. Device response time must be less than 100ms, and Host commands' gap time must be more than 100ms.**

| | | | | | |
|-------------|----------------|---------|--------|--------|-----------|
| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte5 | Byte 6 |
| Receiver ID | Transmitter ID | OP Code | Data 0 | Data 1 | Check Sum |

The first byte is the Receiver or 'Destination' device ID.

The second byte is the Transmitter or 'Source' device ID.

The third byte is the OP code or 'command' byte.

The fourth and fifth bytes are the data byte.

The sixth byte is the check sum of this command packet.

Checksum = Byte1 XOR Byte2 XOR Byte3 XOR Byte4 XOR Byte5 (XOR= exclusive or)

Note:

5. ID Address Allocation

| Item | ID (hex) | ID (decimal) | Device name | Remark |
|------|----------|--------------|------------------|----------------------|
| 1 | 00H | 0 | Host controller | Keyboard or computer |
| 2 | 01H-DFH | 1~223 | Speed dome | Maximum 223 Dome |
| 3 | E0H-EFH | 224~239 | Multiplexer | 224~239 = Mpx1-Mpx16 |
| 4 | F0H-FEH | 240~254 | Control keyboard | Keyboard or computer |
| 5 | FFH | 255 | Matrix | |

In our security system, the Dome Cameras are mapping to each channel of the multiplexer (MPX). For example, Dome 1 is mapped to channel 1 of MPX 1, Dome 2 is mapped to channel 2 of MPX 2... and so on. If you are using D731X as a system controller, please set up each device's ID according to the following table:

| MPX NO | MPX ID | Camera ID | Remark |
|--------|----------|--------------------|------------------------------|
| 1 | E0H, 224 | 01H – 10H, 1~16 | Channel 1~16 of MPX #1 |
| 2 | E1H, 225 | 11H – 20H, 17~32 | |
| 3 | E2H, 226 | 21H – 30H, 33~48 | |
| 4 | E3H, 227 | 31H – 40H, 49~64 | |
| 5 | E4H, 228 | 41H – 50H, 65~80 | |
| 6 | E5H, 229 | 51H – 60H, 81~96 | |
| 7 | E6H, 230 | 61H – 70H, 97~112 | |
| 8 | E7H, 231 | 71H – 80H, 113~128 | |
| 9 | E8H, 232 | 81H – 90H, 129~144 | |
| 10 | E9H, 233 | 91H – A0H, 145~160 | |
| 11 | EAH, 234 | A1H – B0H, 161~176 | |
| 12 | EBH, 235 | B1H – C0H, 177~192 | |
| 13 | ECH, 236 | C1H – D0H, 193~208 | |
| 14 | EDH, 237 | D0H – DFH, 209~223 | Only 15 Dome can be connect |
| 15 | EEH, 238 | None | Can connect to normal camera |
| 16 | EFH, 239 | None | Can connect to normal camera |

6. Command sets

6.1. Command Packets for SpeedDome

The digits in the following table are hexadecimal format.

■ Camera Related Command Packets

IRIS Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 23h | Data0 | 00h |

Data0 = 02h : IRIS Open.
03h : IRIS Close.
04h : Auto IRIS.
05h : IRIS Stop.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 23h | Data0 | 00h |

Zoom Wide/Tele/Stop Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | Data0 | 00h |

Data0 = 00h : Wide.
01h : Tele.
04h : Stop.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | Data0 | 00h |

Zoom Speed Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | 03h | Data1 |

Data1 = Zoom speed (00h ~ 03h, 00h is slow and 03h is fast).

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | 03h | Data1 |

Read Zoom Speed Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | 05h | 00h |

Set Zoom adjust Speed (00h ~ 03h, 00h is slow and 03h is fast).

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 24h | 05h | Spd |

Focus Near/Far/Stop Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 25h | Data0 | Data1 |

Data0 = 00h : Near (Data1 = 00h : low speed , 01h : high speed).
01h : Far (Data1 = 00h : low speed , 01h : high speed).
04h : Stop (Data1 = 00h).

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 25h | Data0 | Data1 |

Focus Speed Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 25h | 03h | Data1 |

Data1 = 00h ~03h (00h is slow, 03h is fast)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 25h | 03h | Data1 |

Auto Focus Key Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 26h | Data0 | 00h |

Data0 = 00h : Key On
01h : Key Off
02h : Focus from table

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 26h | 00h | 00h |

Camera Display Control Packet

| OP_code | Data 0 | Data 1 |
|---------|---------------------|-------------------|
| 4Ch | 00h=ID 01h=title | 00h=off 01h=on |

Camera Display Status Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 4Dh | 00h | 00h |

Status1.b0=ID: =0 OFF /=1 ON.

Status1.b1=Title: =0 OFF /=1 ON.

Status1.b2~b7 and Status2 are reserved.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|---------------------|-------------------|
| 4Ch | 00h=ID 01h=title | 00h=off 01h=on |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|---------|---------|
| 4Dh | Status1 | Status2 |

Request Zoom lens camera status Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 20h | 00h | 00h |
| 20h | 01h | 00h |
| 20h | 02h | 00h |
| 20h | 03h | 00h |

Status1:

- Bit 7 (MSB)= 1: Focus Manual; 0: Auto
- Bit 6= 1: ID display on; 0: off
- Bit 5= 1: White Balance Push-Auto on; 0: off
- Bit 4= 1: BLC on; 0: off
- Bit 3= 1; Flickerless on, 0: off
- Bit 2= 1: Focus Push-auto; 0: Auto/Manual
- Bit 1= 1: DigiZoom on; 0: off
- Bit 0 (LSB)= 1: Menu Initial on, 0: off

Status2:

- Bit 7 (MSB)= TBD
- Bit 6= TBD
- Bit 5= TBD
- Bit 4= TBD
- Bit 3= TBD
- Bit 2= 1: Focus Push-auto; 0: Auto/Manual
- Bit 1= 1: DigiZoom on; 0: off
- Bit 0 (LSB)= 1: Auto BLC on; 0: off

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------------------------|----------------|
| 20h | Status1 | Status2 |
| 20h | Zoom AddrL | Zoom AddrH |
| 20h | Focus AddrL | Focus AddrH |
| 20h | Digital Zoom Value | Status2 |

Set Digital Zoom Max Power Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Eh | 00h | 00h |
| 2Eh | 01h | Data1 |

Data0 : 01=Digital Zoom On (initial) , 00=Digital Zoom Off

Data1 : 2~8, Digital Zoom max power (2X-8X)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Eh | 00h | 00h |
| 2Eh | 01h | Data1 |

Read Digital Zoom Max Power Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Eh | 03h | 00h |

Data1. b0 : Digital Zoom off

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Eh | 03h | Data1 |

b2-8 : Digital Zoom max power (2X-8X)

Line-lock Timing Inc(delay)/Dec & Read Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Fh | 00h | 00h |
| 2Fh | 01h | 00h |
| 2Fh | 02h | 00h |

Data0 : 00= Timing Increase
 01= Timing Decrease
 02= Read
 CT is Current Timing Counter.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Fh | 00h | 00h |
| 2Fh | 01h | 00h |
| 2Fh | 02h | CT |

■ Pan/Tilt Related Command Packets

Manual Control Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 18h | Data0 | Data1 |

Data0 = 00h : Pan right (Data1 : Pan speed is 00h ~ 0Fh)
 01h : Pan Left (Data1 : Pan speed is 00h ~ 0Fh)
 02h : Tilt Up (Data1 : Tilt speed is 00h~ 0F h)
 03h : Tilt Down (Data1 : Tilt speed id 00h ~ 0Fh)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 18h | Data0 | Data1 |

Pan/Tilt Degree Adjustment Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 4Eh | Data0 | Data1 |

Data0 = 00h : Pan right (Data1 : Pan right degree is 00h ~ 0Fh, 0~15°)
 01h : Pan Left (Data1 : Pan left degree is 00h ~ 0Fh, 0~15°)
 02h : Tilt Up (Data1 : Tilt up degree is 00h~ 0F h, 0~15°)
 03h : Tilt Down (Data1 : Tilt down degree 00h ~ 0Fh, 0~15°)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 4Eh | Data0 | Data1 |

Pan Stop Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 13h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 13h | 00h | 00h |

Tilt Stop Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 14h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 14h | 00h | 00h |

Go to Pan Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 07h | Low | High |

Absolute Address for Pan
 (HiResolution=01h~640h , 1600 steps , LowResolution = 01h~300h , 768 steps)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 07h | Low | High |

Go to Tilt Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 08h | Low | High |

Absolute Address for Tilt
 (HiResolution=01h~1F4h , 500 steps , LowResolution = 01h~F0h , 240 steps)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 08h | Low | High |

Request Pan Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 09h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 09h | Low | High |

Absolute Address for Pan
 (HiResolution=01h~640h ,1600 steps , LowResolution = 01h~300h , 768 steps)

Request Tilt Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Ah | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Ah | Low | High |

Absolute Address for Tilt
 (HiResolution=01h~1F4h ,500 steps , LowResolution = 01h~F0h , 240 steps)

Set Joystick Control Mode

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 41h | Data0 | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 41h | Data0 | 00 |

Data0=0 : Turn off joystick control speed with zoom ratio

Data0=1 : Turn on joystick control speed with zoom ratio

Read Joystick Control Mode

| | Data 0 | Data 1 |
|-----|--------|--------|
| 44h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 44h | Data0 | 00 |

Data0=0 : Turn off joystick control speed with zoom ratio

Data0=1 : Turn on joystick control speed with zoom ratio

■ Main Function Related Command Packets

Tour Function Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 11h | Data0 | N |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 11h | Data0 | N |

Data0 = 00h : Go to Preset N (N : 0 ~ 127)
 01h : Run Sequence N (N : 00h ~ 03h)
 02h : Run Cruise (AutoPan : N=00h)
 (Cruise : N=01h)
 03h : Go to Preset N with Max. Speed.

Tour Stop Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 12h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 12h | 00h | 00h |

Stop Pan/Tilt/Zoom/IRIS

Set PAN Speed Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Bh | Speed | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Bh | Speed | 00h |

PAN speed = 0~15

Set TILT Speed Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Ch | Speed | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 0Ch | Speed | 00h |

TILT speed = 0~15

■ Preset Related Command Packets

Preset Set Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Dh | Data0 | N |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1D | Data0 | N |

Data0 = 00h : Set Preset N (N : 0 ~ 127)

01h : Clear Preset N (N : 0 ~ 127)

■ Sequence Related Command Packets

Fill Preset into Sequence Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 19h | Data0 | N |

Data0 = MSB 3bits = sequence no. 0~7 total 8 sequence available.

LSB 5bits = sequence point 0~31 total 32 points.

Data1 = N : Preset Position N (N : 0 ~ 127)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 19h | Data0 | N |

Set Sequence Dwell Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Ah | Data0 | N |

Data0 = MSB 3bits = sequence no. 0~7 total 8 sequence available.

LSB 5bits = sequence point 0~31 total 32 points.

Data1 = Dwell Time. N=0~255 . Maximum time is 128 seconds. (unit = 0.5 sec.)

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Ah | Data0 | N |

Set Sequence Speed Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Bh | Data0 | N |

Data0 = MSB 3bits = sequence no. 0~7 total 8 sequence available.

LSB 5bits = sequence point 0~31 total 32 points.

Data1 = Speed. N=0~14 . Maximum speed is 15.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Bh | Data0 | N |

**The speed range is 00h – 0Eh(14). But the old speed range is 00~08h for old speeddome (shipped before 1999 NOV).

Set Cruise Data Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 40h | Data0 | 00h |

Data0=0 : Set Cruise start memorize

Data0=1 : Set Cruise stop memorize

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 40h | Data0 | 00h |

■ Auto-Pan Related Command Packets

Set Auto-Pan Parameter Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Ch | Data0 | N |

Data0 = 00h : Set Start Point for AutoPan.

01h : Set End Point for AutoPan.

02h : Set rotational direction for AutoPan.

03h : Set Speed for AutoPan.

12h : Read rotational direction for AutoPan.

13h : Read Speed for AutoPan.

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 1Ch | Data0 | N |

(N = 00h)

(N = 00h)

(N = 00 turn right, N = 01 turn left.)

(N = 00~03 speed)

(N = 00h)

(N = 00h)

■ Setup Related Command Packets

AutoFlip On/Off Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 18h | 04h | Data1 |

Data1 = 00h : Off

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 18h | 04h | Data1 |

01h : On

Remote Reset Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 15h | AAh | 55h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 15h | AAh | 55h |

Go to Home Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 02h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 02h | 00h |

Set Preset to Home Position Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 03h | N |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 03h | N |

Data1 = N : Preset Position for Home position

Read Home Position Setting Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 00h | Status |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | N | Status |

N : Preset Point

Status : MSB=1 : Home function is on. MSB=0 : Home function is off

Bit0~Bit6 : Delay Time 1 ~ 127 (Unit is Minutes)

Set Home Position Parameter Command Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 01h | Status |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 49h | 01h | Status |

Status : MSB=1 : Home function is on. MSB=0 : Home function is off

Bit0~Bit6 : Delay Time 1 ~ 127 (Unit is Minutes)

Line-Lock Timing Adjustment Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Fh | Data0 | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 2Fh | Data0 | Data1 |

Data0 = 00h : Timing Increase

01h : Timing Decrease

02h : Read CT (Data1 : Current Timing Counter)

■ Alarm Related Command Packets

Set Alarm Point Packet

| OP_code | Data 0 | Data 1 |
|---------|--------------|------------|
| 0Fh | Alarm status | Preset no. |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------------|------------|
| 0Fh | Alarm status | Preset no. |

Alarm status: Bit 7: 0:off/ 1:on

Bit 6: 0:NO/ 1: NC (NO: normal open; NC: normal close)

Bit 0~5: Alarm No.

Goto Alarm Point Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|-----------|
| 10h | 00h | Alarm no. |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|-----------|
| 10h | 00h | Alarm no. |

Read Alarm Preset no./status Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|-----------|
| 10h | 02h | Alarm no. |
| 10h | 03h | Alarm |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|------------|
| 10h | 02h | Preset no. |
| 10h | 03h | Status |

| | | |
|--|--|-----|
| | | no. |
|--|--|-----|

Set Alarm Preset remain-time Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|-------------|
| 10h | 04h | Remain time |

Read Alarm Preset remain-time Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 10h | 06h | 00h |

Remain-time is 1~255 seconds.

Set Alarm Preset release-time Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------------|
| 10h | 05h | Release time |

Read Alarm Preset release-time Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 10h | 07h | 00h |

Release-time is 1~255 seconds.

PS. Description of Alarm Remain and Release time

| | | |
|--|--|--|
| | | |
|--|--|--|

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|-------------|
| 10h | 04h | Remain time |

Response Packet

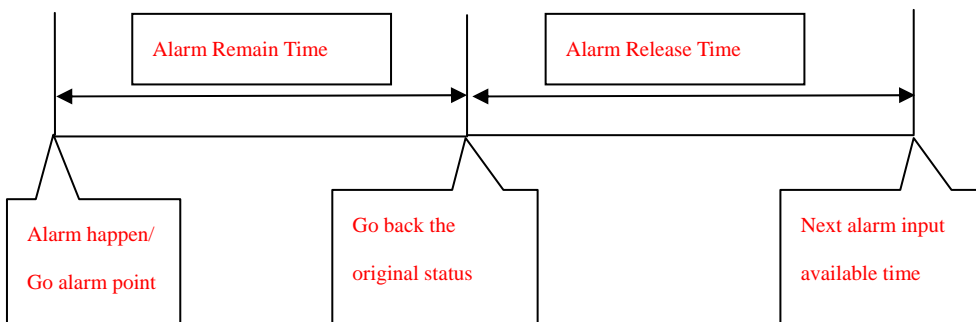
| OP_code | Data 0 | Data 1 |
|---------|--------|-------------|
| 10h | 06h | Remain time |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------------|
| 10h | 05h | Release time |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------------|
| 10h | 07h | Release time |



■ System Related Command Packets

Establish Linkage Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 00h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|-------------|------------|
| 00h | Device type | Model type |

| | | | | | | |
|-------------|-----|--------------------|-----|-------------|-----|--------|
| Device type | 00h | Dome/Camera | 01h | Multiplexer | 02h | DVR |
| Model type | 01h | D7710 | 00h | D7260 | 00 | D7963B |
| | 02h | D7720-LG | 01h | D7290 | 01 | D7993B |
| | 03h | D7720-Hitachi | 02h | D7210 | 02 | D7913 |
| | 20h | All-in-one LG | | | 10 | D7966 |
| | 21h | All-in-one Hitachi | 10h | D7261 | | |
| | | | 11h | D7291 | | |
| | | | 12h | D7241 | | |
| | 30h | OSD | | | | |
| | 50h | Receiver | | | | |

Request Dome Status Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 01h | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|----------------|----------------|
| 01h | Device status1 | Device status2 |

DEVICE_STATUS ; Speed Dome Device Status
 Bit 0 :DEV_PBUSY_F ; PAN busy; 0 = free / 1 = busy
 Bit 1 :DEV_TBUSY_F ; TILT busy; 0 = free / 1 = busy
 Bit 2-4 : N/A
 Bit 5 : Pan_Direction_F ; Pan Direction 0=clockwise / 1=Reverse
 Bit 6 : Tilt_Direction_F ; Tilt Direction 0=0°→90° / 1=90°→0°

DEVICE_STATUS2 ; Speed Dome Device Status2
 Bit 0 :OSD_Menu ; OSD menu, 0=OFF / 1=ON
 Bit 1 :Auto_Focus ; Auto focus, 0=Manual / 1=Auto
 Bit 2-7 : N/A

Request Device Capability Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 4Ah | 00h | 00h |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|-------------|-------------|
| 4Ah | Device CAP1 | Device CAP2 |

| | | | |
|-------------|------|-----------------|--------------------------------|
| Device CAP1 | Bit0 | Cruise Function | 0: non-supported; 1: supported |
| | Bit1 | Pan/Tilt | 0: supported; 1: non-supported |
| | Bit2 | Zoom | 0: supported; 1: non-supported |
| | Bit3 | OSD Menu | 0: supported; 1: non-supported |
| | Bit4 | Device Lock | 0: non-supported; 1: supported |
| | Bit5 | Home Function | 0: non-supported; 1: supported |
| | Bit6 | (reserved) | |
| | Bit7 | (reserved) | |

Device CAP2 (reserved)

If response op_code is not 4Ah, it means that device doesn't support this command.

Receiver Related Command Packets

AUX Setting/Status Read Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 48h | Data0 | Data1 |

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 48h | Data0 | Data1 |

Data0=00h Set AUX terminal ON, Data1=0-7 AUX number

Data0=01h Set AUX terminal OFF, Data1=0-7 AUX number

Data0=02h Read AUX terminal status, Data1=0-7 AUX number

Reply Data0=AUX number, Data1=Status; =0 OFF; =1 ON

IR Function Sent Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 48H | 00H | 00H |
| | 01H | 00H |
| | 02H | 00H |
| | 03H | 00H |
| | 10H | 00H |

Data0 :

00H = IR Color Mode.

01H= IR Mono Mode.

02H= IR Switch Auto.

03H= IR Switch On.

10H= Read IR Switch Status

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 48H | 00H | 00H |
| | 01H | 00H |
| | 02H | 00H |
| | 03H | 00H |
| | ACK | 00H |
| | FFH | FFH |

ACK

00H = IR Mono Mode and IR Switch Auto.

01H = IR Color Mode and IR Switch Auto

02H = IR Mono Mode and IR Switch On.

03H = IR Color Mode and IR Switch On

Data0 = Data1 = FFH Camera doesn't support.

■ PAN location (Step of Degree)

| Op_code | Data0 | Data1 | | Op_code | Data0 | Data1 |
|---------|-------|-------|----------|---------|-------|-------|
| 09h | 00h | 00h | Response | 09h | low | high |
| | 01h | 00h | | | 0xh | Yyh |

Data0 = 00 : PAN absolute address 0 - ??? (0 - 360 degree)

Data0 = 01 : Pan absolute degree

0xyyh = 0000~0E10h (0~3600 step, 1 step = 0.1 degree)

■ Request TILT location (Step or Degree)

| Op_code | Data0 | Data1 | | Op_code | Data0 | Data1 |
|---------|-------|-------|----------|---------|-------|-------|
| 0Ah | 00h | 00h | Response | 0Ah | low | High |
| | 01h | 00h | | | 0xh | Yyh |

Data0 = 00: TILT absolute address 0 - ??? (0 - 90 degree)

Data0 = 01: Tilt absolute degree

0xyyh = 0000~0384h (0~900 step, 1 step = 0.1 degree)

■ Go to Pan Absolute Position (Degree)

| Op_code | Data0 | Data1 | | Op_code | Data0 | Data1 |
|---------|-------|-------|----------|---------|-------|-------|
| 29h | 0Xh | YYh | Response | 29h | 0Xh | YYh |

0XYY=0000H ~ 0E10H (0~3600 step, 1 step= 0.1 degree)

■ Go to Tilt Absolute Position (Degree)

| Op_code | Data0 | Data1 | | Op_code | Data0 | Data1 |
|---------|-------|-------|----------|---------|-------|-------|
| 2Ah | 0Xh | YYh | Response | 2Ah | 0Xh | YYh |

0XYY=0000H ~ 0384H (0~900 step, 1 step= 0.1 degree)

■ Read ZOOM LENS CAMERA RAM

| Op_code | Data0 | Data1 | | Op_code | Data0 | Data1 |
|---------|-------|-------|-------------|---------|-------|-------|
| 21h | 00 | 00h | Response | 21h | xxh | yyh |
| | 01 | xxh | No Response | | | |
| | 02 | 00h | Response | 21h | 00h | xxh |
| | 03 | xxh | No Response | | | |

Data0 = 00 : Request maximum capability of optical and digital zoom of camera
 xxh : optical zoom yyh: digitl zoom

Data0 = 01 : Go to zoom position (x1 ~ x8)
 xxh : 01h~08h.
 This command will not response any packet.

Data0 = 02 : Request zoom position of camera
 xxh : It is zoom ratio which is product of optical and digital zoom.

Data0 = 03 : Go to zoom position. (optical*digital)
 xxh : It is the zoom position what you want to go to.
 This command will not response any packet.

The S model dome camera doesn't support this function.

6.2. Multiplexer Commands

The texts of Data 0, 1 is in **ASCII** code format

| Command | OP_code | Data 0,1 | Note | |
|--------------------|---------|-----------|--------------|---|
| Channel select | A0 | "01"~"0G" | Channel 1~16 | |
| Screen mode select | | Right | "MR" | Detail setting must reference User's manual |
| | | Left | "ML" | |
| Sequence | | "S1"~"S3" | Sequence 1~3 | |
| Up key | | "DU" | | |
| Down key | | "DD" | | |
| Left key | | "DL" | | |
| Right key | | "DR" | | |
| Zoom/Enter | | "DZ" | | |
| Live/VCR | | "KV" | | |
| Freeze | | "KA" | | |
| Set | | "KS" | | |
| ESC | | "KE" | | |
| List | | "KL" | | |
| Buzzer | | "SB" | | |
| Date/Time | | "SD" | | |
| Title | | "ST" | | |
| PROG (Menu) | | "SP" | | |
| Key Lock | | "SK" | | |
| Universal End | | "UE" | | |

Example:

If the Keyboard ID is 00H, the Multiplexer ID is E0H.

If you want to select camera 1 on the main monitor, you can use '01' command.

(The ASCII Code of '01' is 30 & 31H.)

| Byte 1 | Byte 2 | Byte 3 | Byte 4 | Byte 5 | Byte 6 |
|-------------|----------------|---------|--------|--------|----------|
| Receiver ID | Transmitter ID | OP Code | Data0 | Data1 | Checksum |
| E0H | 00H | A0H | 30H | 31H | 41H |

6.3. ROBOT CLONE MUX : SEND KEYCODE FROM HOST/KEYBOARD

| Op_code | Data0 | Data1 |
|---------|-------|-------|
| A9h | BYTE1 | BYTE2 |
| Aah | BYTE3 | BYTE4 |

6.3.1 ROBOT CLONE MUX : REPLY LED STATUS BY MUX ITSELF

| | Op_code | Data0 | Data1 |
|----------|---------|-------|-------|
| Response | ABh | BYTE1 | BYTE2 |
| | ACh | BYTE3 | BYTE4 |

KEYCODE:

| | DATA0 | | | | | | | | DATA1 | | | | | | | |
|-----|-------|------|------|------|--------|------|------|------|-------|--------|------|------|------|------|------|------|
| | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| A9h | Call | up | 8 | 16 | Freeze | Zoom | 7 | 15 | Seq. | Verify | 6 | 14 | Tape | ---- | 5 | 13 |
| AAh | Live | ---- | 4 | 12 | right | ---- | 3 | 11 | left | ---- | 2 | 10 | down | ---- | 1 | 9 |

LED STATUS:

| | DATA0 | | | | | | | | DATA1 | | | | | | | |
|-----|-------|------|------|------|--------|------|------|------|-------|--------|------|------|------|------|------|------|
| | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| ABh | Call | up | 8 | 16 | Freeze | Zoom | 7 | 15 | Seq. | Verify | 6 | 14 | Tape | ---- | 5 | 13 |
| ACh | Live | ---- | 4 | 12 | right | ---- | 3 | 11 | left | ---- | 2 | 10 | down | ---- | 1 | 9 |

6.3.2. LINKAGE:

6.3.2.1. Host PC or Keyboard have to send two-packet commands ,A9h/AAh, to MUX to keep their linkage; otherwise, MUX would be off-line, that means that no Host PC or Keyboard could control it anymore. For example, Host PC sends "E0 00 A9 00 00 49" and "E0 00 AA 00 00 A9" two commands every 10 seconds.

6.3.2.2. When MUX received A9h/AAh command or LED status has been changed, MUX would send two-packet reply by itself, ABh/ACH, to everyone(ID=00h); for example, MUX send the following two packets, "00 E0 AB 01 00 4A" and "00 E0 AC 00 00 4C", that means only "15" LED will be turned on.

6.4. OSD Camera Commands

| Command | OP_code | Data 0 | Data 1 | Note |
|-----------|---------|--------|--------|------|
| Up key | 28 | 00 | 00 | |
| Down key | 28 | 01 | 00 | |
| Left key | 28 | 02 | 00 | |
| Right key | 28 | 03 | 00 | |
| Enter key | 28 | 04 | 00 | Menu |
| Key stop | 28 | FF | 00 | |

6.5. System Commands

Command Acknowledge Enable/Disable Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 84h | Data0 | 00 |

Data0 = 00h : Enable (Default)
 01h : Disable

Response Packet

| OP_code | Data 0 | Data 1 |
|---------|--------|--------|
| 84h | Data0 | 00 |