**PROBE**

PNP2
PROBE Network Protocol

Basic Network Protocol for Edge Devices PNP2

Ver.1.24e

Probe Inc.

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Orders

Document History

Date	Note	Author	Revision
2010-09-14	-Initial Version	Lee Sang Min	1.0.0
2010-10-09	-Updated with "FPS" (Encoder Setup) Command	Kim Myeong Seong	1.0.1
2010-10-11	- Updated with "RSD" Command Structure	Lee Sang Min	1.0.2
2010-10-16	-Updated with "FSR", "FPS" commands.	Lee Sang Min	1.0.3
2010-11-1	-Updated the Resolution Byte of RSD command	Lee Sang Min	1.0.4
2010-11-18	- Added the speed setting in PTZ direction key	Lee Sang Min	1.0.5
2010-11-19	-Updated with FSP Parameter	Lee Sang Min	1.0.6
2010-11-23	-Updated with FUP, FUR,FUS Parameter -Updated with LGS, LGW	Lee Sang Min	1.0.7
2010-11-30	- Added with FUP Status (610~690)	Lee Sang Min	1.0.8
2011-01-13	-Updated the figure in "2.3 Firmware Upload & Update 2"	Lee Sang Min	1.0.9
2011-01-17	-Added the semi-auto in PTZ Focus Mode	Lee Sang Min	1.1.0
2011-01-31	-Updated in the connection flow	Lee Sang Min	1.1.2
2011-02-01	-Described the use of Motion Area Map -Resolution Value correction	Lee Sang Min	1.1.3
2011-03-11	-Remove unused command (RST, STM, SDC, SDS, RSS) -Update in Audio (Receive, Transmit) -Add the interval check time in "STA" -Add AGN Command -Update FSR.	Lee Sang Min	1.1.4
2011-03-14	-Remove all unused command and setting	Alex Oh	1.1.5
2011-04-25	-Add the additional function of PTZ	Lee Jung Min	1.1.6

2011-05-30	-Add new Op code of PTZ (Advanced Zoom)
	   since firmware version 0.9.23_20110530 (PTI-H2100)
	   since firmware version 0.9.67_20110530 (PMI-H2000/PMI-H2000s)
		Lee Jung Min	1.1.7

2011-07-05	-Modify incorrect sample codes	Ko Sung Jin	1.1.8
2011-08-04	-Modify incorrectted "FSR" Parameter	Ko Sung Jin	1.1.9
2011-11-17	-Modify incorrected audio protocols	Ko Sung Jin	1.2.0
2011-11-21	-Modify incorrected "NVS" parameter size	Ko Sung Jin	1.2.1.
2011-12-14	-Modify Audio transmit server protocol -Details of Motion detection message	Ko Sung Jin	1.2.2
2011-12-15	-Add the details of Motion Area information	Ko Sung Jin	1.2.3

2011-12-29	-Add new audio codec type (4-2)	Ko Sung Jin	1.2.4

1. Overview

1-1. Description for PNP2 (Probe Network Protocol –second version)

1-1-1. PNP2

➢ To receive the video and audio stream, the Viewer application needs to connect to the Edge device equipped with PNP2. PNP2 is 2nd generation of probe-designed protocol and all IP-product in PROBE follows this protocol specification. PNP2 In this manual, TCP/IP based streaming protocol will be explained even though there are more streaming protocol such as UDP, RTP and etc.
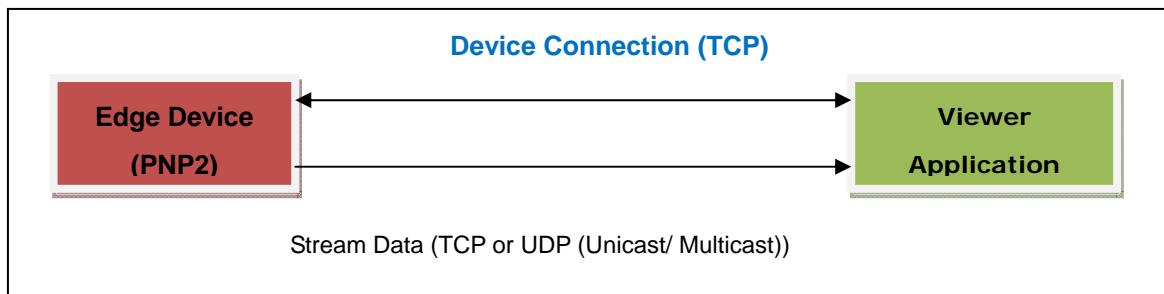
*PNP2: Interoperability protocol newly defined by PROBE camera (version of H.264) : Based-platform: TI DM365

*PNP1: Previous Interoperability protocol defined and used by PROBE Camera: Based-Platform: PENTA MICRO

*Viewer Application: External Software or Application connected to PROBE camera. It can be CMS (Central Management Software) or VMS (Video Management Software) or NVR (Network Video Recording) SW.

1-1-2. the sort of Product line

➢ Fundamentally, one PROBE SDK can be applicable all the IP products but there are small difference in the group of products with different parameter setting. To make it be clear with clarification. Below we are listing the group of sort according to the models which should be checked during the integration.

Group of Model	Product Model	Description
HD-1	PMI-H2000 PMI-H2000s PTI-H2100	High-definition PTZ
SD-1	PMI-400	Mini-PTZ with x10
SD-2	PTI-400~403 PTI-500~503	High-zoom PTZ with x33~39

*HD: High-Definition, SD: Standard-Definition

1-2. Connection to the PNP2 device (Camera)

1-2-1. Connecting PNP2

➤ There are 5 sorts of server in PNP2 protocol with different port i.e. (**1.Control, 2.Video, 3.Audio Transmit, 4.Audio Receive, 5.Web Server.**)

➤ A Windows application doesn't need to use the Web server among 5 servers. Accordingly, 4 servers (control, video, audio transmit and audio receive) are used in our SDK. A random number (*authorization number assigned by Servers*) is obtained after connecting each server.

➤ This authorization number is used as key for further connections such as user Authentication, Video, Audio.
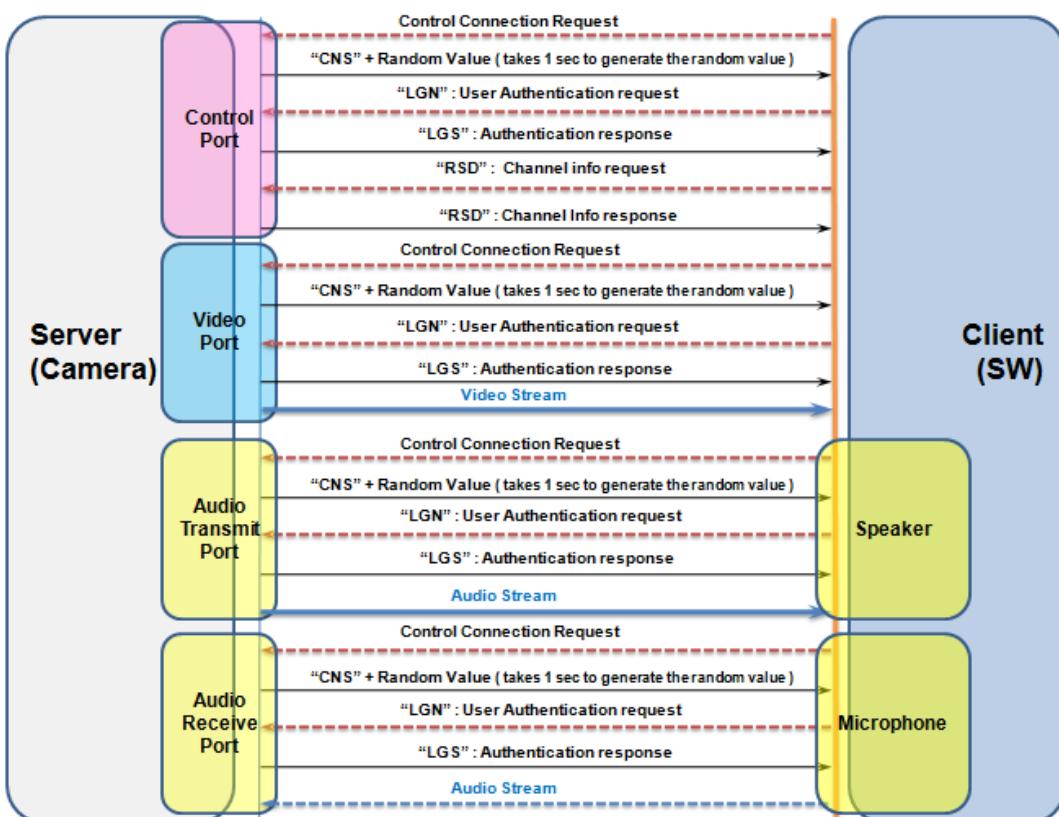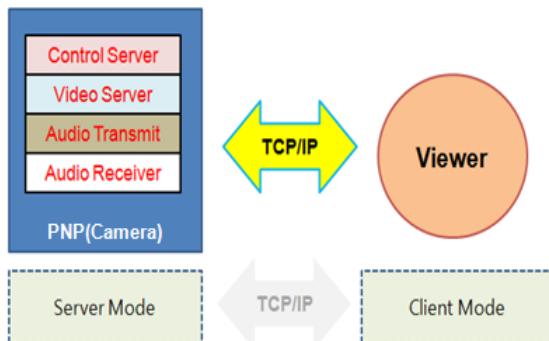
✓ Control Server (Port) can be connected only if the connection request is succeed with 'LGS' (=Authentication success).

✓   Video and Audio Server (Port) can be connected only if respond will be 'LGS' (=Authentication success)

✓   Audio Receive Port(Microphone use from SW Client) case is same flow with "Audio Transmit Port"

➢ Connection status between servers in camera (PNP2) and Viewer (=External Application) can be checked by the "STA" message every 5sec.
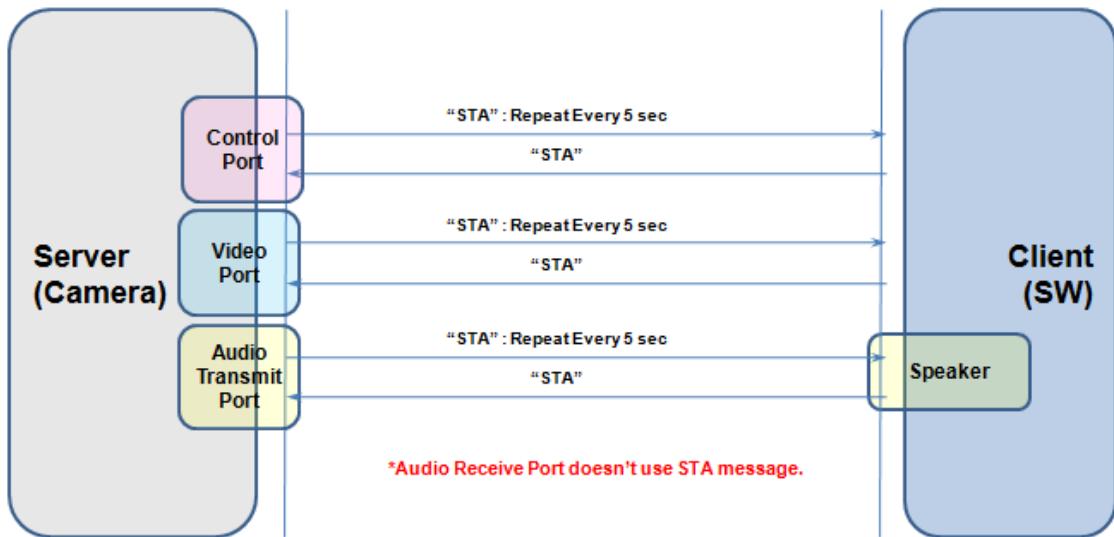
➢ If detected any disconnection from any servers in Camera, it is highly recommended to disconnect all severs and restart the connection from the beginning to get the key.

1-3. Protocol Structure

1-3-1. Term definition used in Protocol Message

Name	Term	Size(Byte)	Description
Start Code	SC	5	Packet Starting code ("STRT")
Packet Size	PS	4	Size in byte (CTR+CMD +PARAM DATA)
Control Byte	CTR	1	Determine: Stream and Control Data 0: Control Data 1: Stream Data
Command	CMD	4	Command Code
Parameters	PARAM DATA	Var.	Parameters for Command
Stream data	STREAM DATA	Var.	Stream Data
End Code	EC	5	Packet Ending Code ("_END")

1-3-2. Protocol Structures

■ **Control Server** Protocol

SC	PS	CMD	PARAM DATA	EC

■ **Video Server** Protocol

* Data Transfer from Client to Server

SC	PS	CTR	STREAM DATA	EC

* Data Transfer from Server to Client

- Control data (CTR = 0))

SC	PS	CTR	CMD	PARAM DATA	EC

- Stream data (CTR = 1)

SC	PS	CTR	STREAM DATA	EC

✪ When data transfer from Server to Client, a control byte (CTR) is added to determine whether data is Stream or Control.

■ **Audio Transmit Server** Protocol

* Data Transfer from Client to Server

SC	PS	CTR	CMD	PARAM DATA	EC

* Data Transfer from Server to Client

- Control data (CTR = 0)

SC	PS	CTR	CMD	PARAM DATA	EC

- Stream data (CTR = 1)

SC	PS	CTR	STREAM DATA	EC

■ **Audio Receive server** protocol

* Data Transfer from Client to Server

- Control data (CTR = 0)

SC	PS	CTR	CMD	PARAM DATA	EC

- Stream data (CTR = 1)

SC	PS	CTR	STREAM DATA	EC

* Data Transfer from Server to Client

- Control data (CTR = 0)

SC	PS	CTR	CMD	PARAM DATA	EC

> **Usage**

1." PACKET SIZE" and "COMMAND" is composed with ASCII character.

Example #1) COMMAND "LGN" stands for the login

#2) In "PACK SIZE:0012" stands for the length of 18 byte

2. In the case when "PACKET SIZE" includes "CRT bit", then it represents the size from CTR-CMS-PARAM DATA, otherwise it does for the size of CMD-PARAM DATA only.

> **Clarification**

Response in the Command/Message: "Response" can be initialized by Server (=PNP2) even there is no "Request" from external viewer. This case is when there is the first connection request from viewer during login process. Server sends the defined responding once login is authorized. This is reason why there is command/message which is defined with only "Response" from chapter 2 below.

Notify in the Command/Message: "Notify" stands for the periodic update from Server (PNP2) even there is no certain request from viewer side. It can be kind of information like Time or connection status.

2. Control Server Protocol

The protocol for Control Server
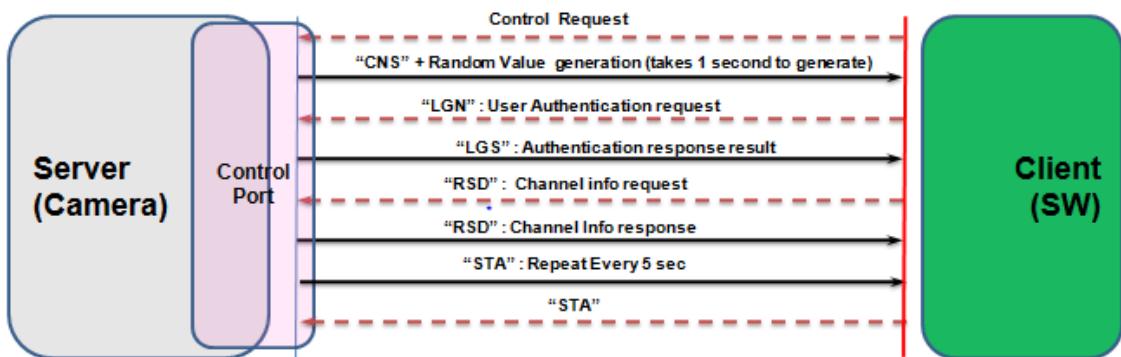
2-1. Connection Command

2-1-1. [CNS]

Command Definition: Response to Connection Request from client

■ Request (Client -> Server) to connect to the server

■ Response (Server -> Client) for the Connection Request

"STRT"	*P.S*	*"CNS"*	*RANDOM CONST*	*"_END"*

➢ 'CNS' message is required before User Authentication

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'C'	'N'	'S'	0	RANDOM CONST (4Byte)
'_'	'E'	'N'	'D'	0									

■ Notify (Server -> Client)

➢ is not used in this command

■ Notify Response (Client -> Server) for the Notify.

➢ is not used in this command

2-1-2. [LGN],[LGS],[LGW]

Command Definition: User Authentication (Request)

■ Request

"STRT"	*P.S*	*"LGN"*	*RANDOM CONST*	*USER ID + PW*	*"_END"*

➢ ID: 20byte,

➢ PW: 20byte

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'2'	'C'	'L'	'G'	'N'	0	RANDOM CONST (4Byte)
ID (20byte)								Password (20byte)					
'_'	'E'	'N'	'D'	0									

■   Response

"STRT"	P.S	"LGS"	NULL	"_END"

> Authentication Success Message

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'L'	'G'	'S'	0	'_'	'E'	'N'	'D'	0

"STRT"	P.S	"LGW"	NULL	"_END"

> Authentication Failure Message

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'L'	'G'	'W'	0	'_'	'E'	'N'	'D'	0

■   Notify

> is not used in this command

■   Notify Response

> is not used in this command

2-1-4. [STA]

Command Definition: Connection status (check) message.

■   Request

> is not used in this command

■   Response

> is not used in this command

■   Notify

"STRT"	P.S	"STA"	NULL	"_END"

> Check message for the connection status (every 5 seconds)

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'S'	'T'	'S'	0	'_'	'E'	'N'	'D'	0

■   Notify Response

"STRT"	PS	"STA"	NULL	"_END"

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'S'	'T'	'A'	'_'	'E'	'N'	'D'	0

2-2. Common Command

2-2-1. [RSU]

Command Definition: User Type define (Response)

■ Request

➢ is not used in this command

■ Response

"STRT"	P.S	"RSU"	PARAMETER	"_END"

➢ None(0),   Administrator(1), Guest(2)

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'5'	'R'	'S'	'U'	0	Param (1Byte)

'_'	'E'	'N'	'D'	0

■ Notify

➢ is not used in this command

■ Notify Response

➢ is not used in this command

2-2-2. [RUC]

Command Definition: Number of user connected now

■ Request

➢ is not used in this command

■ Response

"STRT"	P.S	"RUC"	PARAM	"_END"

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'5'	'R'	'U'	'C'	0	Param (1Byte)

'_'	'E'	'N'	'D'	0

■ Notify

➢ is not used in this command

■ Notify Response

➢ is not used in this command

2-2-3. [RSD]

Command Definition : **Stream Channel Setup**

■   Request

"STRT"	P.S	"RSD"	PARAM	"_END"

➢ Parameter = Channel Number (2Byte Integer)

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'7'	'R'	'S'	'D'	0	Channel(1Byte)	0
'_'	'E'	'N'	'D'	0										

■   Response

"STRT"	P.S	"RSD"	PARAM	"_END"

➢ Parameter = (OP CODE + DATA)

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'2'	'0'	'R'	'S'	'D'	0	Param (46Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

1	1	2	1	1	1	1	1	1	1	1	16	18
A	B	C	D	E	F	G	H	I	J	K	L	M

MSB   LSB

Para	*Description*	*Range*
A	Streaming Channel	0~4
B	Video Type (0:NTSC, 1:PAL)	0/1
C	CBR value	
D	<table><tr><td>Video type(2bit)</td><td>Resolution (6bit)</td></tr></table> - Video Type (1:NTSC, 2:PAL) -Resolution <table><tr><td>8</td><td>1080p (1920 x 1080)</td></tr><tr><td>9</td><td>720P(1280X720)</td></tr><tr><td>10</td><td>D1_PAL(720X576)</td></tr><tr><td>11</td><td>D1_NTSC(720X480)</td></tr><tr><td>12</td><td>HALF_D1_PAL(720X288)</td></tr><tr><td>13</td><td>HALF_D1_NTSC(720X240)</td></tr><tr><td>14</td><td>4CIF_PAL(704X576)</td></tr><tr><td>15</td><td>4CIF_NTSC(704X480)</td></tr><tr><td>16</td><td>HALF_4CIF_PAL(704X288)</td></tr></table>	Video Type(1~2) Resolution (8~24)

	17	HALF_4CIF_NTSC(704X240)	
	18	VGA(640X480)	
	19	CIF_PAL(352X288)	
	20	CIF_NTSC(352X240)	
	21	QVGA(320x240)	
	22	QCIF_PAL(176X144)	
	23	QCIF_NTSC(176X120)	
	24	QQVGA(160X120)	
E	Quality		1~10
F	Encode mode (0: CBR, 1: VBR)		0/1
G	Compress mode (0: MJPEG (PNP1), 1: MPEG4 (PNP2) 2: MPEG4 (PNP2), 3: H264 (PNP2), 4: MJPEG (PNP2))		0~4
H	Frame rate		1~30
I	Camera Mount type (0 : normal, 1: flip)		0/1
J	PTZ direction (0: normal, 1: reverse)		0/1
K	image control (0 : play, 1 : stop)		
L	String Camera Name		16chr
M	String Camera Mac Address		18chr

■　Notify

➢ is not used in this command

■　Notify Response

➢ is not used in this command

2-2-4. [NVS]

Command Definition: **Server sends the notification whenever its status is changed.**
■　Request
➢ is not used in this command
■　Response
➢ is not used in this command
■　Notify

."STRT"	*P.S*	*"NVS"*	*PARAM*	*"_END"*

➢ Motion Tracking & Detect Status & Video Format & Focus Mode & IRIS Mode & Flip On/Off

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'C'	'N'	'V'	'S'	0	Param (1Byte)

'_'	'E'	'N'	'D'	0

> **Structure of Parameter (Unit: byte)**

1	1	1	2	1	1	1
Focus Mode	IRIS Mode	Flip On/Off	Reserved	Video Format	Motion Tracking	Motion Detect

MSB   **LSB**

- Focus : 0(AUTO), 1(MANUAL, SEMIAUTO)

- IRIS : 0(AUTO,SHUTTER,BRIGHT), 1(IRIS, MANUAL)

■   Notify Response

> is not used in this command

2-2-5. [SDM, RSM]

Command Definition: **Motion Detection Setup**

■   Request

"STRT"	*P.S*	*"SDM"*	*PARAM*	*_END"*

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'6'	'S'	'D'	'M'	0	Param (2Byte)

'_'	'E'	'N'	'D'	0

■   Response

"STRT"	*P.S*	*"RSM"*	*P RAM*	*"_END"*

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'6'	'R'	'S'	'M'	0	Param (2Byte)

'_'	'E'	'N'	'D'	0

> **Structure of Parameter (Unit: byte)**

OP CODE	*Data*	*Size Of Data*
0x40	0 : Off, 1 : Detect On, 2 : Tracking On	Motion Detect/Tracking On/Off(1)
0x41	0 ~ 255	Detect area map(54) : PENTA
0x42	0 ~ 7	Sensitivity(1)
0x43	1 ~ 63	Pixel difference threshold(1)
0x44	1 ~ 127	Different pixel count threshold(1)
0x45	1 ~ 255	Motion MB count threshold(1)
0x46	1 ~ 255	Motionless frame count threshold(1)
0x47	0 : normal, 1 : skip	Motionless record mode(1)

0x48	0 : none, 1 : Sensor out, 2 : Alert Sound, 3 : Both	Motion detect Action(1)
0x4A	0 ~ 255	Detect area map(72) PNP2

[Detect area map(72) PNP2] – 4(32bit)Byte * 18(Column)

Resolution	Block Count	Mount Type	Width(SD) -Pixel	Height(SD) -Pixel	Width(HD) -Pixel	Height(HD) –Pixel
1080i(1920*1080)	20*16				96	67
720p(1280*720)	16*9				80	80
D1(720*576) 4CIF(704*576)	9*6	PAL	80	96	80	96
D1(720*480) 4CIF(704*480)	9*6	NTSC	80	80	80	80
CIF(352*288)	4*3	PAL	88	96	88	96
CIF(352*240)	4*3	NTSC	88	80	88	80

➢ On/Off status of Motion Detect should be referred the command "NVS"

Parameter	*Higher*	*High*	*Normal*	*Low*	*Lower*
Sensitivity	1	2	3	4	5
Pixel Difference threshold	8	12	16	20	24
Different Pixel Count threshold	4	12	20	28	36
Motion MB Count threshold	1	1	2	3	4
Motionless Frame Count threshold	5	5	5	5	5

■ Notify

➢ is not used in this command

■ Notify Response

➢ is not used in this command

2-2-6. [RMT]

Command Definition: Video Setup information (Response)

■ Request

➢ is not used in this command

■ Response

"STRT"	*P.S*	*"RMT"*	*PARAM*	*"_END"*

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'1'	'E'	'R'	'M'	'T'	0	Param (26Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

2	2	22
a	b	c

MSB   LSB

➢ **Structure of Parameter (Unit: byte)**

Para	*Description*	*Range*
a	Horizon Width	
b	Vertical Height	
c	Reserved	

■   Notify

➢ is not used in this command

■   Notify Response

➢ is not used in this command

2-2-7. [PTZ], [SCF]

Command Definition: PTZ and IO Control Command

■   Request

"STRT"	*P.S*	*"PTZ"*	*OP CODE*	*PARAM*	*"_END"*

➢ Structure of Parameter is depending on OP code for PTZ, IO, Function

Operation	Code	Operation	Code	Operation	Code
Pan/Tilt		Focus		PTZ Position	
*Tilt Up	20	Focus Far	26	*Set Pan Position	125
*Tilt Down	21	Focus Near	27	*Set Tilt Position	126
*Pan Left	22	Focus Stop	47	*Set Zoom Position	127
*Pan Right	23	Iris		*Set PTZ Position	37
*Pan Right, Tilt Up	33	Iris Open	28	Get Pan Position	100
*Pan Right, Tilt Down	34	Iris Close	29	Get Tilt Position	101
*Pan Left, Tilt Down	35	Function		Get Zoom Position	128

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*Pan Left, Tilt Up	36	*Preset Save	74	Get PTZ Position	130
Pan/Tilt Stop	41	*Preset Delete	104	Alarm I/O	
*Set Pan/Tilt Speed	105	*Preset Run	75	*Set Output	106
Zoom		*Pattern Run	71	Get Input Status	102
Zoom In (Tele)	24	*Scan Run	79	Get Output Status	103
Zoom Out (Wide)	25	*Group Run	80	OSD Menu	
Zoom Stop	45			OSD Menu On/Off	108
Additional Function for HD-1					
*Pattern Save	70	*Pattern Delete	72	Load All Pattern	73
*Scan Save	67	*Scan Delete	68	Load All Scan	69
*Group Save	82	*Group Delete	83	Load All Group	84
				Load All Preset	76
*Set Zoom Advanced	120	Get Zoom Advanced	121		
*Set PTZ Advanced	122	Get PTZ Advanced	123		

"*" marked Operations in the table needs to refer the following Parameter definition

➢ Parameter Format: LSB(1Byte) + MSB(1Byte)

➢ Number of Alarm In/Out and Preset, Pattern, Scan, Group is depending on Edge device model.

	HD-1	SD-1	SD-2
MAX_PRESET	1024	255	255
MAX_PATTERN	128	4	4
MAX_SCAN	128	8	8
MAX_GROUP	128	8	8
ALARM INPUT	2	2	8
ALARM OUTPUT	1	1	4

➢ in the case of PROBE model of HD-1, it can request the current setting(=saved) of Preset, Pattern, Scan and Group using the Load Function(Op code 76, 73, 69, 84) and respective request can be responded from each Save Command.

➢ Advanced Zoom Command (OP code 120, 121, 122, 123) works from firmware version v0.9.23_20110530(PTI-H2100), v0.9.67_20110530(PMI-H2000, PMI-H2000s).

➢ Structure of Parameter is depending on OP code

Operation	*OP Code*	*Parameters (bytes)*

Tilt Up	20	SPEED(2) *SPEED* *1 ~ 1000*
Tilt Down	21	
Pan Left	22	
Pan Right	23	
Pan Right, Tilt Up	33	
Pan Right, Tilt Down	34	
Pan Left, Tilt Down	35	
Pan Left, Tilt Up	36	
Set Pan/Tilt Speed	105	
Preset Save	74	INDEX(2) *INDEX* *1 ~ MAX_PRESET*
Preset Run	75	
Preset Delete	104	
Pattern Save	70	**(HD-1 Only)** Example of pattern drawing: ※ in the case of pattern drawing like above example, it has 6 SUB_POINTs and its starting point will be SUB_POINT_1. ※ The number of created SUB_POINT cannot exceed more than 55. INDEX(2)+SUB_POINT_NUM(1)+SUB_POINT_1_PAN(2)+SUB_POINT_1_TILT(2)+SUB_POINT_1_ZOOM(2)+SUB_POINT_1_SPEED(2)+SUB_POINT_1_DIR(1)+SUB_POINT_2_PAN(2)+…+SUB_POINT_n_PAN(2)+SUB_POINT_n_TILT(2)+SUB_POINT_n_ZOOM(2)+SUB_POINT_n_SPEED(2)+SUB_POINT_n_DIR(1)+LABEL(10)
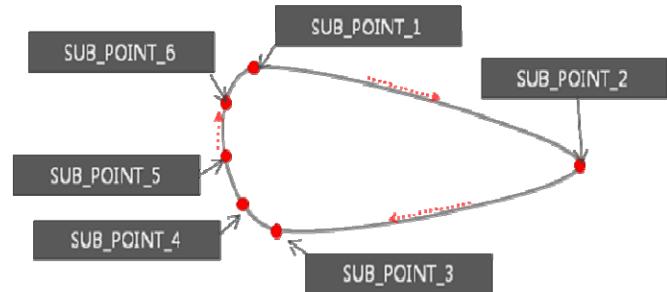
		INDEX *//pattern number,1 ~ MAX_PATTERN* *SUB_POINT_NUM* *//total number of created SUB_POINT_n in one pattern (n)* *SUB_POINT_n_PAN* *//PAN location of SUB_POINT_n, 0 ~ 36000* *SUB_POINT_n_TILT* *//TILT location of SUB_POINT_n 0 ~ 9000* *SUB_POINT_n_ZOOM* *//Zoom ratio of SUB_POINT_n, 1 ~ MAX ZOOM* *SUB_POINT_n_SPEED* *//Moving speed to SUB_POINT_n* *3 : Very Slow* *7 : Slow* *11 : Middle* *15 : Fast* *300 : Skip* *SUB_POINT_n_DIR* *.//moving direction of SUB_POINT_n* *0 : shortest path, 1 : clock-wise, 2 : anti-clockwise* *LABEL* *//name of Pattern created*
Pattern Run	71	INDEX(2)
Pattern Delete	72	*INDEX* *1 ~ MAX_PATTERN*
Scan Save	67	**(HD-1 Only)** INDEX(2)+1ST_POS(2)+2ND_POS_NUM(2)+SPEED(2)+ LABEL(10) *INDEX* *//1 ~ MAX_SCAN* *1ST_POS* *//1st Preset Number, 1 ~ MAX_PRESET* *2ND_POS* *//2nd Preset Number,1 ~ MAX_PRESET* *SPEED* *// moving speed between 1st – 2nd Presets,1 ~ 360* *SCAN_LABEL* *//Scan Name*
Scan Run	79	INDEX(2)
Scan Delete	68	*INDEX* *1 ~ MAX_SCAN*
Group Save	82	**(HD-1 Only)** One Group can be consisted with maximum 10 Sub Index. INDEX(2)+SUB_1_ACTIOIN(1)+SUB_1_ACTION_IDX(2)+ SUB_1_DWELL(2)+SUB_1_OPT(2)+SUB_2_ACTION(1)+ …+SUB_20_OPT(2)+LABEL(10) *INDEX* *//Group number, 1 ~ MAX_GROUP*

		SUB_n_ACTION (n = 1 ~ 20)
		  // Sub Index Action (Nth)
		  //0 : None, 1 : Preset, 2 : Pattern, 3 : Scan
		SUB_n_ACTION_IDX (n = 1 ~ 20)
		  //Function Index of Sub Index(Nth),1 ~ MAX_FUNCTION
		SUB_n_DWELL (n = 1 ~ 20)
		  //Waiting time for Sub Index(Nth),3 sec ~ 240 sec
		SUB_n_OPT (n = 1 ~ 20)
		  //Sub Index Option(Nth), Moving speed or repeat count
		  //if required Action is Preset, then this parameter stands for moving speed
		  //if required Action is Pattern or Scan, then it stands for repeat count. 1 ~ 360
		LABEL
		  //Group Name

Group Run	80	INDEX(2) *INDEX* *1 ~ MAX_GROUP*
Set Pan Position	125	PAN_POS(2) *PAN_POS* *0 ~ 36000*

Set Tilt Posi ion	126	TILT_POS(2)
		
		TILT_POS
		  0 ~ 9000, when model is PMI-H2000
		  0 ~ 18000

Set Zoom Position	127	ZOOM_POS(2) *ZOOM_POS* *1 ~ MAX_ZOOM*

Set PTZ Position	37	PAN_POS(2)+TILT_POS(2)+ZOOM_POS(2)
		
		PAN_POS
		  0 ~ 36000
		TILT_POS
		  0 ~ 18000
		  0 ~ 9000, when model is PMI-H2000
		ZOOM_POS
		  1 ~ MAX_ZOOM

Set Output	106	INDEX(1)+ STATUS(1)
		
		INDEX (BitMask)
		  1 : Output-1, 2 : Output-2, 4 : Output-3, 8 : Output-4
		STATUS
		  0 : off, 1 : On

OSD Menu	108	**(SD-1, SD-2 Only)**
		
		MENU_MODE(1)
		  MENU_MODE
		  0 : off, 1 : On
		
		(Reference)
		*Arrow moving in MENU→ LEFT/RIGHT/UP/DOWN + STOP
		*MENU ENTER→ FOCUS_NEAR + FOCUS_STOP
		MENU CANCEL→ FOCUS_FAR + FOCUS_STOP

Set Zoom Advanced	120	**(HD-1 Only)**
		
		ZOOM_POS(2)
		  ZOOM_POS
		  100 ~ MAX_ZOOM*100

Set PTZ Advanced	122	**(HD-1 Only)**

		PAN_POS(2)+TILT_POS(2)+ZOOM_POS(2)
		PAN_POS *0 ~ 36000* *TILT_POS* *0 ~ 18000* *0 ~ 9000, when model is PMI-H2000* *ZOOM_POS* *100 ~ MAX_ZOOM*100*

➢ OP code for Zoom Camera Control **(HD-1 Only)**

Operation	Code	Operation	Code	Operation	Code
White Balance		Auto Exposure		Etc.	
*Set WB Mode	1 1	*Set AE Mode	157	*Set Day & Night Mode	170
*Set R-Gain	153	*Set Shutter	160	*Set Focus Mode	172
*Set B-Gain	154	*Set Iris	161	*Set Backlight	155
Set One Push Trigger	152	*Set Gain	162	*Set Digital Zoom	150
Get WB Mode	181	*Set Bright	163	Get Day & Night Mode	200
Get R-Gain	183	Get AE Mode	187	Get Focus Mode	202
Get B-Gain	184	Get Shutter	190	Get Backlight	185
		Get Iris	191	Get Digital Zoom	180
		Get Gain	192		
		Get Bright	193		

➢ Structure of Parameter is depending on OP code **(HD-1 Only)**

Operation	OP Code	Parameters (bytes)
WB Mode	151	MODE(1) *MODE* *1:Auto, 2:Indoor, 3:Outdoor, 4:One-Push, 5:Manual*
R-Gain	153	MODE(1)+VALUE(1) *MODE* *2:Up, 3:Down, 4:Direct* *VALUE* *0 ~ 255, when Mode is Direct.*
B-Gain	154	MODE(1)+VALUE(1) *MODE* *2:Up, 3:Down, 4:Direct* *VALUE* *0 ~ 255, when Mode is Direct.*
AE Mode	157	MODE(1) *MODE* *1:Full Auto, 2:Manual, 3:Shutter Priority, 4:Iris Priority,* *5:Bright, 6:Spotlight*
Shutter	160	MODE(1)+VALUE(1) *MODE* *2:Up, 3:Down, 4:Direct*

Operation	OP Code	Parameters (bytes)
		VALUE *1 ~ 21, when Mode is Direct.*

Iris	161	MODE(1)+VALUE(1)
		MODE
		  2:Up, 3:Down, 4:Direct
		VALUE
		  0 ~ 17, when Mode is Direct.

Gain	162	MODE(1)+VALUE(1)
		MODE
		  2:Up, 3:Down, 4:Direct
		VALUE
		  0 ~ 7, when Mode is Direct.

Bright	163	MODE(1)+VALUE(1)
		MODE
		  2:Up, 3:Down, 4:Direct
		VALUE
		  0 ~ 23, when Mode is Direct.

Day & Night Mode	170	MODE(1) *MODE* *1:Day, 2:Night, 3:Auto*
Focus Mode	172	MODE(1) *MODE* *1:Auto, 2:Manual, 3:Semi- Auto*
Backlight	155	MODE(1) *MODE* *1:On, 2:Off*
Digital Zoom	150	MODE(1) *MODE* *1:On, 2:Off*

■ Response

"STRT"	P.S	"SCF"	OP CODE	PARAM	"_END"

➤ Structure of Parameter

Operation	*OP Code*	*Parameters (bytes)*

Preset Save	74	**(HD-1 Only)**
		
		INDEX(2)+PAN(2)+TILT(2)+ZOOM(2)+LABEL(10)
		  INDEX
		    1 ~ MAX_PRESET
		  PAN
		    0 ~ 360000
		  TILT
		    0 ~ 180000
		  ZOOM
		    1 ~ MAX_ZOOM
		  LABEL
		    Preset Name, String

Preset Delete	104	**(HD-1 Only)**
		
		INDEX(2)
		  INDEX
		    1 ~ MAX_PRESET

Pattern Save	70	**(HD-1 Only)**
		
		This is operation for HD-1 type of camera to the respond to the Pattern Save and Load All Pattern.
		
		INDEX(2)+SUB_POINT_NUM(1)+SUB_POINT_1_PAN(2)+ SUB_POINT_1_TILT(2)+SUB_POINT_1_ZOOM(2)+ SUB_POINT_1_SPEED(2)+SUB_POINT_1_DIR(1)+SUB_ POINT_2_PAN(2)+…+SUB_POINT_n_PAN(2)+SUB_POI NT_n_TILT(2)+SUB_POINT_n_ZOOM(2)+SUB_POINT_n_ SPEED(2)+SUB_POINT_n_DIR(1)+LABEL(10)
		
		INDEX
		  //Pattern Number,1 ~ MAX_PATTERN
		SUB_POINT_NUM
		  //total number of created SUB_POINT_n in one pattern (n)
		SUB_POINT_n_PAN
		  //PAN location of SUB_POINT_n, 0 ~ 36000
		SUB_POINT_n_TILT
		  //TILT location of SUB_POINT_n 0 ~ 9000
		SUB_POINT_n_ZOOMz
		  //Zoom ratio of SUB_POINT_n, 1 ~ MAX ZOOM
		SUB_POINT_n_SPEED
		  //Moving speed to SUB_POINT_n
		  3 : Very Slow
		  7 : Slow
		  11 : Middle
		  15 : Fast
		  300 : Skip
		SUB_POINT_n_DIR
		  //Moving direction to SUB_POINT_n
		  0 : shortest 1 : clock-wise, 2 : anti-clockwise
		LABEL
		  //Pattern Name

Patter Delete	72	(HD-1 Only)
		
		INDEX(2)
		  INDEX
		  //1 ~ MAX_PATTERN

Scan Save	67	(HD-1 Only)
		
		Responding to Scan Save / Load All Scan
		
		INDEX(2)+1ST_POS(2)+2ND_POS_NUM(2)+SPEED(2)+ LABEL(10)
		
		INDEX
		  //1 ~ MAX_SCAN
		1ST_POS
		  //1st Preset Number ,1 ~ MAX_PRESET
		2ND_POS
		  //2nd Preset Number,1 ~ MAX_PRESET

		SPEED
		   //Moving speed between 1st – 2nd Preset
		   1 ~ 360
		   SCAN_LABEL
		      Scan Name

Scan Delete	68	(HD-1 Only) INDEX(2) *INDEX* *1 ~ MAX_SCAN*

Group Save	82	(HD-1 Only)
		
		Responding to the Group Save / Load All Group
		
		INDEX(2)+SUB_1_ACTIOIN(1)+SUB_1_ACTION_IDX(2)+
		SUB_1_DWELL(2)+SUB_1_OPT(2)+SUB_2_ACTION(1)+
		…+SUB_20_OPT(2)+LABEL(10)
		
		   INDEX
		      //Grouop Number,1 ~ MAX_GROUP
		   SUB_n_ACTION (n = 1 ~ 20)
		      //Action of SUB_INDEC_n
		      0 : None, 1 : Preset, 2 : Pattern, 3 : Scan
		   SUB_n_ACTION_IDX (n = 1 ~ 20)
		      //Function Index of SUB_INDEX_n,1 ~ MAX_FUNCTION
		   SUB_n_DWELL (n = 1 ~ 20)
		      //Holding time for SUB_INDEX_n,3 sec ~ 240 sec
		   SUB_n_OPT (n = 1 ~ 20)
		      //Optioon(moving speed or repeat count) of SUB_INDEC_n)
		      //if required Action is Preset, then this parameter stands for
		        moving speed
		      //if required Action is Pattern or Scan, then it stands for
		        repeat count. 1 ~ 360
		   LABEL
		      //Group Name

Group Delete	83	(HD-1 Only) INDEX(2) *// INDEX,1 ~ MAX_GROUP*

Get Pan Position	100	PAN_POS(2)
		   PAN_POS
		      0 ~ 36000

Get Tilt Position	10	TILT_POS(2)
		   TILT_POS
		      0 ~ 18000

Get Zoom Position	128	ZOOM_POS(2)
		   ZOOM_POS
		      1 ~ MAX_ZOOM

Get PTZ Position	130	PAN_POS(2)+TILT_POS(2)+ZOOM_POS(2)
		   PAN_POS
		      0 ~ 36000
		   TILT_POS
		      0 ~ 18000
		   ZOOM_POS

Operation	OP Code	Parameters (bytes)
Get Input Status	102	INPUT_NUM(2) *INPUT_NUM* *1 : Input-1, 2 : Input-2, 4 : Input-3, 8 : Input-4* *(Reference)* *1. When Alarm Input generated, the command of "Get Input Status" will be delivered periodically, Once the alarm input will be off(event off), then no more command will be delivered* *2. If both off "Input one" and " Input two" are generated at the same time, each and respective command will be delivered*
Get Output Staus	103	OUTPUT_NUM(2) *OUTPUT_NUM (BitMask)* *1 : Output-1, 2 : Output-2, 4 : Output-3, 8 : Output-4*
Get Zoom Advanced	121	ZOOM_POS(2) *ZOOM_POS* *100 ~ MAX_ZOOM*100*
Get PTZ Advanced	123	PAN_POS(2)+TILT_POS(2)+ZOOM_POS(2) *PAN_POS* *0 ~ 36000* *TILT_POS* *0 ~ 18000* *ZOOM_POS* *100 ~ MAX_ZOOM*100*

The first row of the table shows: *1 ~ MAX_ZOOM*

➤ Structure of Parameter is depending on OP code. (HD-1 Only)

Operation	OP Code	Parameters (bytes)
WB Mode	181	MODE(1) *1:Auto, 2:Indoor, 3:Outdoor, 4:One-Push, 5:Manual*
R-Gain	183	GAIN(1) *0 ~ 255*
B-Gain	184	GAIN(1) *0 ~ 255*
AE Mode	187	MODE(1) *1:Full Auto, 2:Manual, 3:Shutter Priority, 4:Iris Priority, 5:Bright, 6:Spotlight*
Shutter	190	VALUE(1) *1 ~ 21*
Iris	191	VALUE(1) *0 ~ 17*
Gain	192	VALUE(1) *0 ~ 7*
Bright	193	VALUE(1) *0 ~ 23*
Day & Night Mode	200	MODE(1) *1:Day, 2:Night. 3:Auto*
Focus Mode	202	MODE(1) *1:Auto, 2:Manual, 3:Semi-Auto*

Backlight	185	MODE(1)
		1:On, 2:Off
Digital Zoom	180	MODE(1)
		1:On, 2:Off

■   Notify

➢ is not used in this command

■   Notify Response

➢ is not used in this command

2-2-8. [FSR]

Command Definition: Encoder Setup

■   Request

"STRT"	*P.S*	*"FSR"*	*PARAM*	*"_END"*

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'1'	'F'	'S'	'R'	0	Param (1Byte)
'_'	'E'	'N'	'D'	0									

➢ Param : Channel Number (0 ~ 4)

■   Response

"STRT"	*P.S*	*"FSR"*	*PARAM*	*"_END"*

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'8'	'9'	'F'	'S'	'R'	0	Param (137Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

1	4	4	4	4	4	4	4	4	4	4	32	32	32
a	b	c	d	e	F	g	h	i	j	k	l	m	n

MSB   LSB

Para	*Description*	*Range*
a	Setup Channel Number	0~4
b	Codec Type(0:None, 1:H264, 2:MPEG4, 3:MJPEG)	0~3
	ch1/ch2 : Fixed	
	ch3/ch4/ch5 : Variable	
c	Frame rate(NTSC:1~30, PAL:1~25)	1~25
		1~30

d	Max Frame rate(NTSC:30, PAL:25)	30/25
e	Bit Rate Mode(0:VBR, 1:CBR)	0/1
f	Bit Rate(1~5Mbps)	1~5
g	Quality(1:best ~ 5:worst)	1~5
h	Resolution(0:1080i, 1:720p, 2:D1,4CIF, 3:CIF, 4:QCIF)	0~4
i	Gop Interval(1~30, default:15)	1~30
j	Priority(Not yet)	0~10
k	Quantizer(Not yet)	0~10
l	Video Name	32chr
m	Codec Name	32chr
n	Reserved	32chr

■   Notify

➢ is not used in this command

■   Notify Response

➢ is not used in this command

2-2-9. [FSP]

Command Definition: Encoder Setup

■   Request

"STRT"	*P.S*	*"FSP"*	*PARAM*	*"_END"*

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'8'	'9'	'F'	'S'	'P'	0	Param (137Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

1	4	4	4	4	4	4	4	4	4	4	32	32	32
a	b	c	d	e	F	g	h	i	j	k	l	m	n

MSB   LSB

Para	*Description*	*Range*
a	Setup Channel Number	0~4
b	Codec Type(0:None, 1:H264, 2:MPEG4, 3:MJPEG) ch1/ch2 : Fixed ch3/ch4/ch5 : Variable	0~3
c	Frame rate(NTSC:1~30, PAL:1~25)	1~25

			1~30
d	Max Frame rate(NTSC:30, PAL:25)		30/25
e	Bit Rate Mode(0:VBR, 1:CBR)		0/1
f	Bit Rate(1~5Mbps)		1~5
g	Quality(1:best ~ 5:worst)		1~5
h	Resolution (0:1080i, 1:720p, 2:D1,4CIF, 3:CIF, 4:QCIF)		0~4
i	Gop Interval(1~30, default:15)		1~30
j	Priority(Not yet)		0~10
k	Quantizer(Not yet)		0~10
l	Video Name		32chr
m	Codec Name		32chr
n	Reserved		32chr

■ Response

"STRT"	P.S	"FSP"	PARAM	"_END"

➢ Sample Code (Unit : Byte)

➢ Param : Success("OK"), Fail("FAIL")

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'F'	'S'	'P'	0	Param (5Byte)
'_'	'E'	'N'	'D'	0									

■ Notify

➢ is not used in this command

■ Notify Response

➢ is not used in this command

2-2-10. [AGN]

Command Definition : **Get Alarm I/O Number Command**
■ Request
<table><tr><td>"STRT"</td><td>P.S</td><td>"AGN"</td><td>PARAM</td><td>"_END"</td></tr></table>
➢ Sample Code (Unit : Byte)
<table><tr><td>'S'</td><td>'T'</td><td>'R'</td><td>'T'</td><td>0</td><td>'0'</td><td>'0'</td><td>'8'</td><td>'D'</td><td>'A'</td><td>'G'</td><td>'N'</td><td>0</td><td>Param (0Byte)</td></tr><tr><td>'_'</td><td>'E'</td><td>'N'</td><td>'D'</td><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
■ Response
<table><tr><td>"STRT"</td><td>P.S</td><td>"AGN"</td><td>PARAM</td><td>"_END"</td></tr></table>
➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'9'	'A'	'G'	'N'	0	Param (2Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

1	1
a	b

MSB LSB

Para	**Description**	**Range**
a	Alarm In Number	0~255
b	Alarm Out Number	0~255

■ Notify

➢ is not used in this command

■ Notify Response

➢ is not used in this command

2-3. Firmware Upload & Update
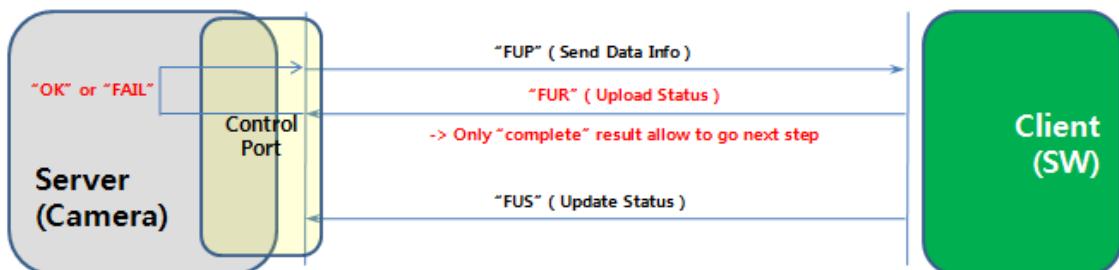
2-3-1 [FUP, FUR]

Command Definition: Upload Request Command

■ Request

"STRT"	*P.S*	*"FUP"*	*PARAM*	*"_END"*

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'5'	'7'	'C'	'F'	'U'	'P'	0	Param (1400Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

4	4	4	2	2	4	size
a	b	c	d	e	f	g

MSB		LSB	
Para	**Description**		**Range**
a	File Type (Not yet).		
b	Total size		
c	CRC for the file to be upgraded		
d	Slice Number (starting from "0")		
e	Slice Size		
f	Slice CRC		
G	Slice Data At least same with "1400 – (A+B+C+D+E+F)" or less.		

■   Response

"STRT"	P.S	"FUR"	PARAM	"_END"

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'C'	'F'	'U'	'R'	0	Param (13Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

variable	1	4
a	b	c

LSB   MSB

Para	**Description**	**Range**
a	Success - "OK" (2byte) Fail - "FAIL" (4byte) Complete - "COMPLETE" (8byte)	
b	\n	
c	Receive File Size	

■   Notify

➢ is not used in this command

■   Notify Response

➢ is not used in this command

2-3-2 [FUS]

Command Definition: Upload Status Command

■ Request

➢ is not used in this command

■ Response

➢ is not used in this command

■ Notify

"STRT"	P.S	"FUS"	PARAM	"_END"

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'C'	'F'	'U'	'S'	0	Param (8Byte)
'_'	'E'	'N'	'D'	0									

➢ **Structure of Parameter (Unit: byte)**

4	4
a	b

MSB   LSB

Para	Description	Range

A	Result Code
	
	// Boot Status 110 ~ 190
	
	110: complete.
	
	➔ Upgrade Complete
	
	120: error.
	
	➔ Upgrade Error
	
	130: ready.
	
	➔ Upgrade Ready
	
	140: progress.
	
	➔ Upgrade in Progress
	
	150: start.
	
	➔ Verify & Loading.
	
	// Kernel Status 210 ~ 290
	
	210: complete.
	
	220: error.
	
	230: ready.
	
	240: progress.
	
	250: start.
	
	// Root1 Status 310 ~ 390	

		310: complete.	
		320: error.	
		330: ready.	
		340: progress.	
		350: start.	
		// Root2 Status 410 ~ 490	
		410: complete.	
		420: error.	
		430: ready.	
		440: progress.	
		450: start.	
		// Config Status 510 ~ 590	
		510: complete.	
		520: error.	
		530: ready.	
		540: progress.	
		550: start.	
		// Status 610 ~ 690	
		640: File Break.	
		650: System Rebooting.	
		// Internal Analog(Micom) Status 710 ~790	
		710: complete.	
		720: error.(Upgrade Fail)	
		730: ready.	
		740: progress.	
		750: start.	
		760: Different File (detecting the incorrect file in updating)	
		770: Old(=previous) file is not exited after Upgrade fail.	
		780: Old((=Previsous) file is fall-backed successfully after Upgrade fail.	
		790: Fall-back failure after upgrade fail	
	B	Result Param	
		Code [progress] -> percentage of progress	

■ Notify Response

➢ is not used in this command

2-4. Usage Reference

2-4-1. Relay setting setup

■ Server

➢ Alarm or Motion Detection → Alarm Out initialized (Motion is handled by 'Action')

  → Relay becomes "ON" automatically

■ Client

➢ Relay Event generated by Client manually to turn on/off of "Relay".

➢ Relay On (OP_CODE:106, Param1:1, Param2:1) – Relay (#1) becomes "ON"

➢ Relay Off (OP_CODE:106, Param1:1, Param2:0) – Relay (#1) becomes "OFF"

➢ Relay On / Off

OP_CODE	PARAM 1	PARAM 2
106	Relay No (Bit Mask) Out1 : 1 Out2 : 2 Out3 : 4 Out4 : 8	On/Off On : 1 Off : 0

2-4-2. Alarm Input Setting

■ **Alarm Input (1 / 2)**

➢ Select the setting which alarm(sensor) input is

■ **Input Device Setup (Off / N.O / N.C)**

➢ Setup the type of alarm input.

➢Available to setup for alarm sensor type ("don't use sensor event" / "normal open type"/ "normal close type")

■ **Activation Time (Always / Only Scheduled Time)**

➢ Set up the Activation Time (Check it always / Check it only scheduled day/time)

■ **Action (Alarm Output / Output Duration / Alarm Image Transfer / Camera Action)**

➢ Generating alarm output (when alarm happened) as following the configured duration for alarm output

➢If "Alarm Image Transfer" is "ON", then stored image from alarm will be sent via configured Transfer mode (FTP or Email).however Image cannot be sent without setting of   Admin in FTP' and SMTP even though 'Alarm Image Transfer' set 'On'

➢Available to set up the motion of Camera when alarm generate.

3. Video Server Protocol

This is protocol for Video Server.
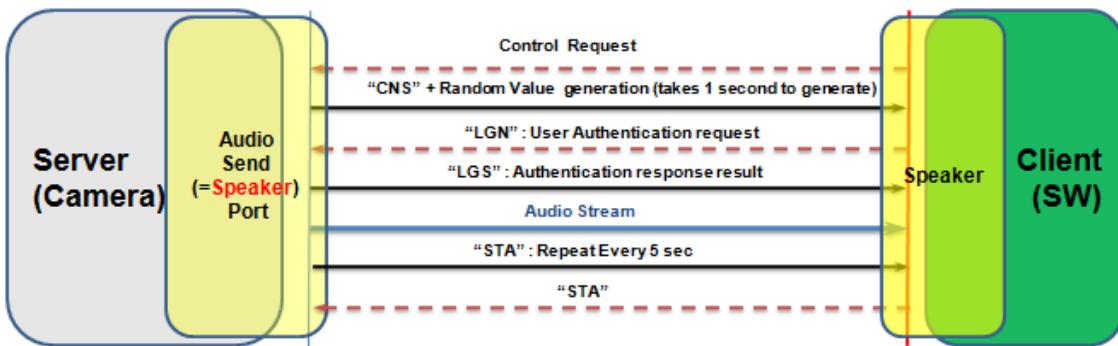
✓ Video Port(Channel) can be connected only if it is 'LGS'

✓ Random Value in "CNS" response take 1 second to be created inside Camera

3-1. Connection Command

3-1-1. [CNS]

Command Definition: Response to Connection Request from client

■ Request (Client -> Server) to connect to the server

■ Response (Server -> Client) for the Connection Request

"STRT"	*P.S*	*CTR*	*"CNS"*	*NULL*	*"_END"*

➢"CNS" message is required before Authorization.

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'C'	'N'	'S'	0
'_'	'E'	'N'	'D'	0									

■ Notify (Server -> Client)

➢ is not used in this command

■ Notify Response (Client -> Server)

➢ is not used in this command

3-1-2. [LGN]

Command Definition: User Authentication (Request)

■ Request

"STRT"	*P.S*	*"LGN"*	*RANDOM CONST*	*USER ID + PW*	*"_END*

➢ ID: 20byte,

➢ PW: 20byte

➢ RANDOM CONST : use RAMDOM CONST parameter received from control connection

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'2'	'C'	'L'	'G'	'N'	0	RANDOM CONST (4Byte)

ID (20byte)					Password (20byte)
'_'	'E'	'N'	'D'	0	

- ■ Response
- ➢ is not used in this command
- ■ Notify
- ➢ is not used in this command.
- ■ Notify Response
- ➢ is not used in this command

3-1-3. [LGS], [LGW]

Command Definition: User Authentication Message(Response)

- ■ Request
- ➢ is not used in this command
- ■ Response

"STRT"	P.S	CTR	"LGS"	NULL	"_END"

➢ Authorization Success Message

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'		0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'S'	0	'_'	'E'	'N'	'D'	0

"STRT"	P.S	CTR	"LGW	NULL	"_END"

➢ User Authorization Failure Message.

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'W'	0	'_'	'E'	'N'	'D'	0

- ■ Notify
- ➢ is not used in this command
- ■ Notify Response
- ➢ is not used in this command

3-1-4. [STA]

Command Definition: Connection status (check) message.

- ■ Request
- ➢ is not used in this command
- ■ Response
- ➢ is not used in this command
- ■ Notify

"STRT"	P.S	CTR	"STA"	NULL	"_END"

> Check message for the connection status (every 10 seconds)

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'S'	'T'	'A'	0	'_'	'E'	'N'	'D'	0

■   Notify Response

"STRT"	*P.S*	*"STA"*	*NULL*	*_END*

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'S'	'T'	'A'	0	'_'	'E'	'N'	'D'	0

3-2. Transmitting Stream Data

Motion Detection Info (72Byte)	*STREAM DATA*

> Both of "I-Frame" and "P- Frame" are set with 72Byte.

> Default value for "I-Frame" is "0".

> Initial "I-Frame" includes the VOL Header after 72Byte set. .

> Structure of Stream Data

Type	*Name*	*Description*
unsigned char	start_code[5]	Start Code ("STRT")
unsigned char	packetsize[4]	Packet size
unsigned char	isStream	Packet Type ('1')
unsigned char	isCompMode	Compression Mode
unsigned long	frame_num	frame number
unsigned long	frame_size	frame size
unsigned short	slice_num	Slice Number of Current Packet
unsigned short	slice_size	Slice Size of Current Packet
unsigned char	channel_info	Channel Index
unsigned char	mountType, resolution	(see below)

1	1	1	1	1	1	1	1
MountType		Resolution					

(MSB)   (LSB)

bit7~6

Description	Value
NONE	00
NTSC	01
PAL	10

		bit5 ~ 0	
		Description	Value
		1920*1080	01000
		1280*720	01001
		720*576	01010
		720*480	01011
		720*288	01100
		720*240	01101
		704*576	01110
		704*480	01111
		704*288	10000
		704*240	10001
		640*480	10010
		352*288	10011
		352*240	10100
		320*240	10101
		176*144	10110
		176*128	10111
		160*120	11000
unsigned long	date_time	Date time (UTC time)	
unsigned short	frame_gop_num	gop number	
unsigned short	frame_type		
unsigned char	frame_data[1400]	Payload (Stream Data)	
unsigned char	end_code[5]	Ending Code ("_END")	

4. Audio Receive Server Protocol (Audio from Microphone in Client)

The protocol for Audio Receive Server.
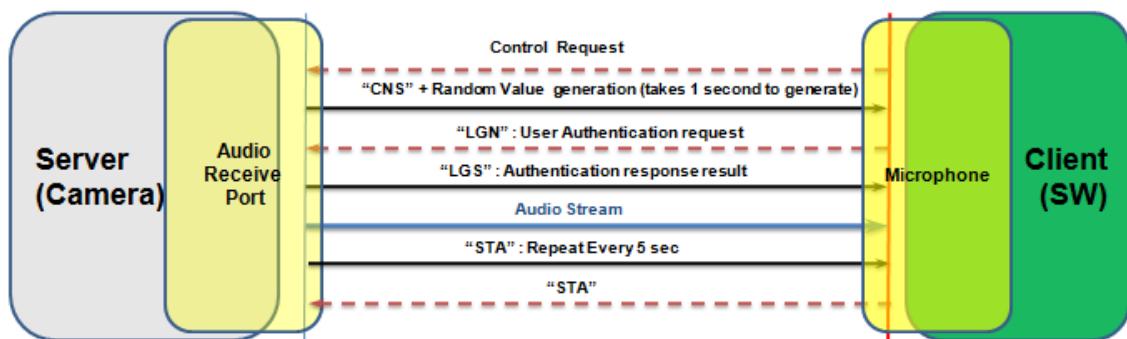
✓ Audio Port(Channel) can be connected only if it is 'LGS'

✓ Random Value in "CNS" response take 1 second to be created inside Camera

4-1. Connection Command

4-1-1. [CNS]

Command Definition: Response to Connection Request from client

■ Request (Client -> Server) to connect to the server

■ Response (Server -> Client) for the Connection Request

"STRT"	P.S	CTR	"CNS"	NULL	"_END"

➢ "CNS" message is required before Authorization.

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'C'	'N'	'S'	0
'_'	'E'	'N'	'D'	0									

■ Notify (Server -> Client)

➢ is not used in this command

■ Notify Response (Client -> Server)

➢ is not used in this command

4-1-2. [LGN]

Command Definition: User Authentication (Request)

.

■ Request

"STRT"	P.S	"LGN"	RANDOM CONST	USER ID + PW	"_END"

➢ ID: 20byte,

- PW: 20byte

- RANDOM CONST : use RAMDOM CONST parameter received from control connection

- Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'2'	'C'	'L'	'G'	'N'	0	RANDOM CONST (4Byte)
ID (20byte)								Password (20byte)					
'_'	'E'	'N'	'D'	0									

- ■ Response

- is not used in this command

- ■ Notify

- is not used in this command

- ■ Notify Response

- is not used in this command

4-1-3. [LGS], [LGW]

Command Definition: User Authentication Message(Response)

- ■ Request

- is not used in this command

- ■ Response

"STRT"	*P.S*	*CTR*	*"LGS"*	*NULL*	*"_END"*

- Authentication Success Message

- Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'		0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'S'	0	'_'	'E'	'N'	'D'	0

"STRT"	*P.S*	*CTR*	*"LGW"*	*NULL*	*"_END"*

- Authentication Failure Message

- Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'W'	0	'_'	'E'	'N'	'D'	0

- ■ Notify

- is not used in this command

- ■ Notify Response

- is not used in this command

4-1-4. [STA]

Command Definition: Connection status (check) message.

- ■ Request

- is not used in this command

■   Response

➢ is not used in this command

■   Notify

"STRT"	P.S	CTR	"STA"	NULL	"_END"

➢ Check message for the connection status (every 10 seconds)

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'S'	'T'	'A'	0	'_'	'E'	'N'	'D'	0

■   Notify Response

"STRT"	P.S	"STA"	NULL	"_END"

➢ Sample Code (Unit : Byte)

| 'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'S'	'T'	'A'	0	'_'	'E'	'N'	'D'	0

4-2. Receiving Stream Data

STREAM DATA

➢ Structure of Stream Data

Type	Name	Description
unsigned char	start_code[5]	Start Code ("STRT")
unsigned char	packetsize[4]	Packet size
unsigned char	isStream	Packet Type ('1')
unsigned char	isCompMode	0x31 = g.711(8bit, mono, 16000 samplerate) 0x11 = g.711(8bit, mono, 8000 samplerate)
unsigned long	frame_num	frame number
unsigned long	frame_size	frame size
unsigned short	slice_num	Slice Number of Current Packet
unsigned short	slice_size	Slice Size of Current Packet
***unsigned char**	channel_info	unuse
***unsigned char**	resolution	unuse
unsigned long	date_time	Date time (UTC time)
***unsigned short**	frame_gop_num	unuse
***unsigned short**	frame_type	unuse
unsigned char	frame_data[1400]	Payload (Stream Data)
unsigned char	end_code[5]	Ending Code ("_END")

➢ Signed items are not used in Audio Receiver Server

5. Audio Transmit Server Protocol (Audio from MIC in PNP2/Camera)

The protocol for Audio Transmit Server.
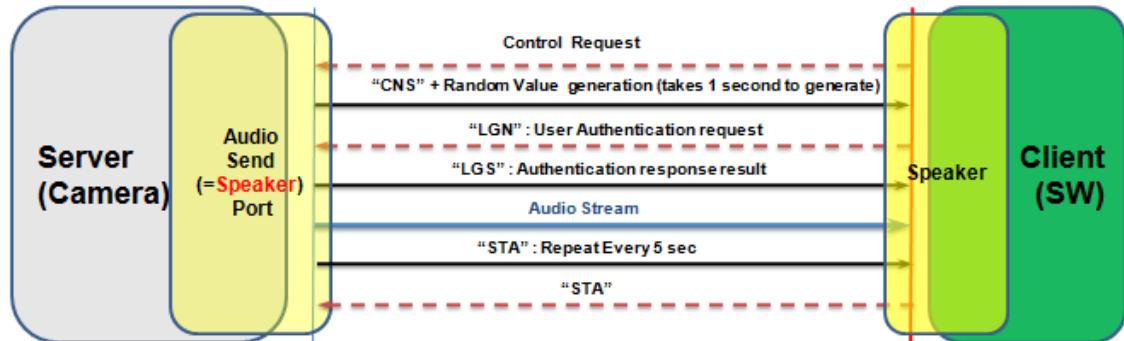
✓ Audio Port(Channel) can be connected only if it is 'LGS'

✓ Random Value in "CNS" response take 1 second to be created inside Camera

5-1. Connection Command

5-1-1. [CNS]

Command Definition: Response to Connection Request from client

■ Request (Client -> Server) to connect to the server

■ Response (Server -> Client) for the Connection Request

"STRT"	P.S	CTR	"CNS"	NULL	"_END"

➢"CNS" message is required before Authorization.

➢ Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'		'0'	'0'	'0'	'4'	'C'	'N'	'S'	0
'_'	'E'	'N'	'D'	0								

■ Notify (Server -> Client)

➢ is not used in this command

■ Notify Response (Client -> Server) for the Notify.

➢ is not used in this command

5-1-2. [LGN]

Command Definition: User Authentication (Request)

■ Request

"STRT"	P.S	CTR	"LGN"	RANDOM CONST	USER ID + PW	"_END"

➢ ID: 20byte,

➢ PW: 20byte

➢ RANDOM CONST : use RAMDOM CONST parameter received from control connection

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'2'	'D'	'0'	'L'	'G'	'N'	0	RANDOM CONST (4Byte)

ID (20byte)					Password (20byte)				

'_'	'E'	'N'	'D'	0	

■ Response

> is not used in this command

■ Notify

> is not used in this command

■ Notify Response

> is not used in this command

5-1-3. [LGS], [LGW]

Command Definition: User Authentication Message(Response)

■ Request

> is not used in this command

■ Response

"STRT"	*P.S*	*CTR*	*"LGS"*	*NULL*		*"_END"*

> Authentication Success Message.

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'		0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'S'	0	'_'	'E'	'N'	'D'	0

"STRT"	*P.S*	*CTR*	*"LGW"*		*NULL*		*"_END"*

> Authentication Failure Message

> Sample Code (Unit : Byte)

'S'	'T'	'R'	'T'	0	'0'	'0'	'0'	'4'	'0'	'L'	'G'	'W'	0	'_'	'E'	'N'	'D'	0

■ Notify

> is not used in this command

■ Notify Response > is not used in this command

5-2. Transmit Stream Data

STREAM DATA

>

Structure of Stream Data

> **Structure of Stream Data**

Type	*Name*	*Description*

unsigned char	start_code[5]	Start Code ("STRT")
unsigned char	packetsize[4]	Packet size
unsigned char	isStream	Packet Type ('1')
unsigned char	isCompMode	unuse
unsigned long	frame_num	frame number
unsigned long	frame_size	frame size
unsigned short	slice_num	Slice Number of Current Packet
unsigned short	slice_size	Slice Size of Current Packet
***unsigned char**	channel_info	unuse
***unsigned char**	resolution	unuse
***unsigned long**	date_time	unuse
***unsigned short**	frame_gop_num	unuse
***unsigned short**	frame_type	unuse
unsigned char	frame_data[1400]	Payload (Stream Data)
unsigned char	end_code[5]	Ending Code ("_END")

Appendix #1 details of Motion Area information

-The motion area information should be defined in the length of **72Bytes**.

-below information should be applicable with "Detect area map" in 2-2-5 [SDM,RSM] and "Motion Detection info" in 3-2 [Transmitting Stream Data]

-Motion area can be composed with **4Byte (cross) * 18Bytes(down)** which is total 72Bytes.

-4Byte of cross information can process with "bit" basis, so it can include 32 of row information

-block number of motion are information will be depending to the video resolution. (refer below table)

-each motion block has a value of "0" or 1""

-when the value is "1", it stands for the status of motion detection

[Motion area information as per respective resolution]

-The resolution of **1920 X 1080** will have motion size of **cross 20 blocks x down 20 blocks**

-One motion area block of 1920 X 1080 will have the size of "**96 x 67 pixel**".

'1 byte								' 1 byte	1 byte	1 byte
1	2	3	4	5	6	7	8			
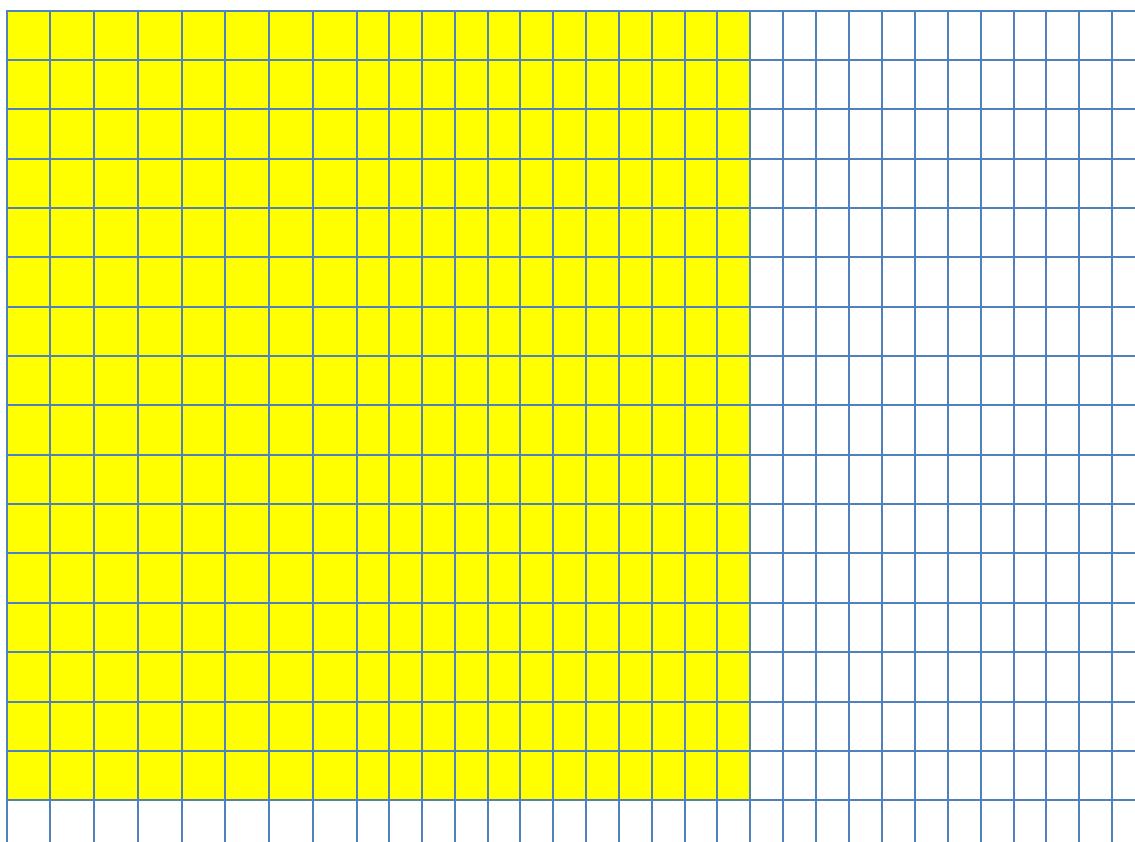
-The resolution of <mark>1280 X 720</mark> will have motion size of **cross 16 blocks x down 9 blocks**

-One motion area block of 1280 X 720 will have the size of "**80 x 80 pixel**".

'1 byte								' 1 byte	1 byte	1 byte
1	2	3	4	5	6	7	8			
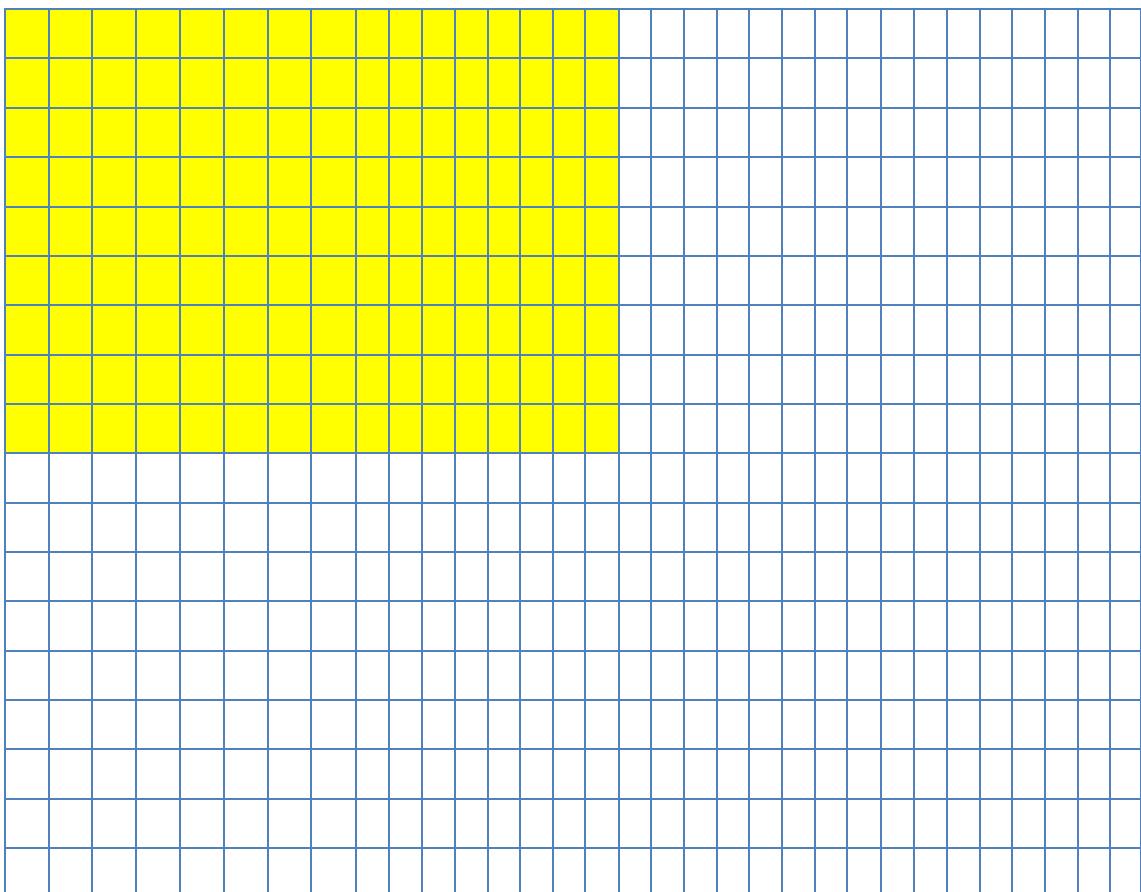
- The resolution of <mark>D1(4CIF)</mark> will have motion size of **cross 9 blocks x down 6 blocks**

- One motion area block of 1280 X 720 will have the size of "**80 x 80 pixel**" (NTSC format)

'1 byte								' 1 byte	1 byte	1 byte
1	2	3	4	5	6	7	8			
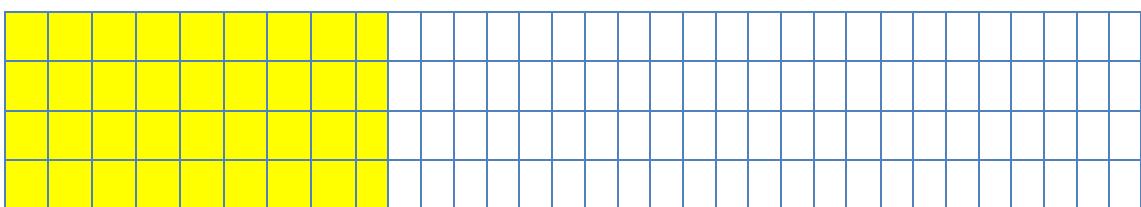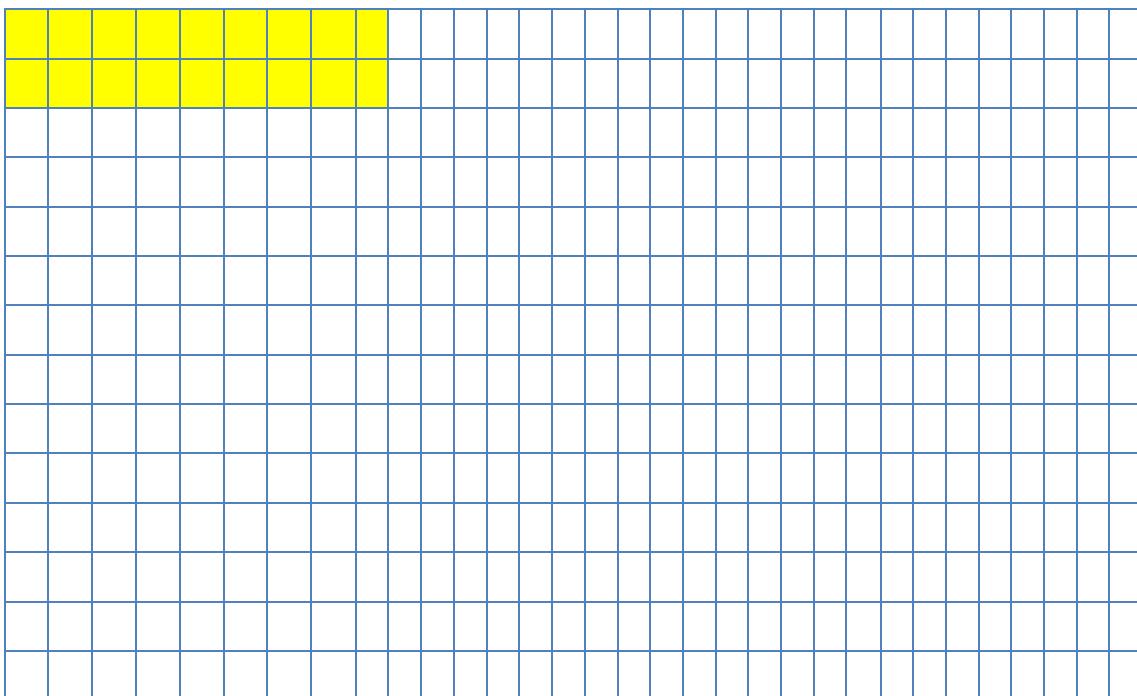
- The resolution of CIF) will have motion size of **cross 4 blocks x down 3 blocks**

- One motion area block of 1280 X 720 will have the size of "**80 x 80 pixel**" (NTSC format)

'1 byte								' 1 byte	1 byte	1 byte
1	2	3	4	5	6	7	8			
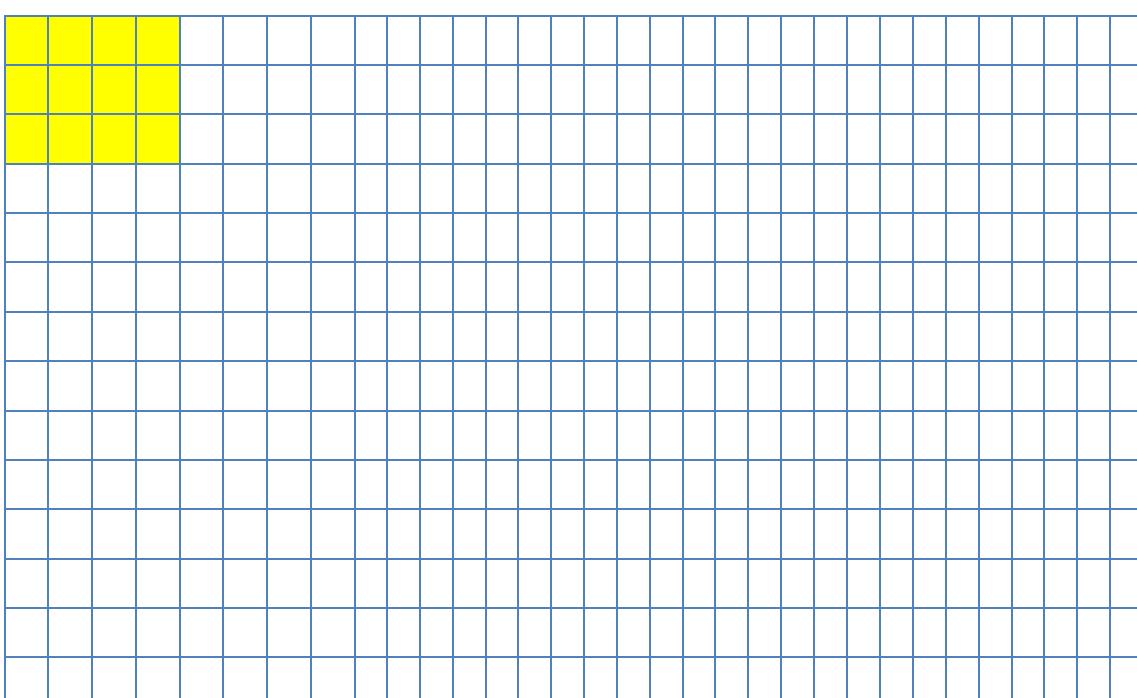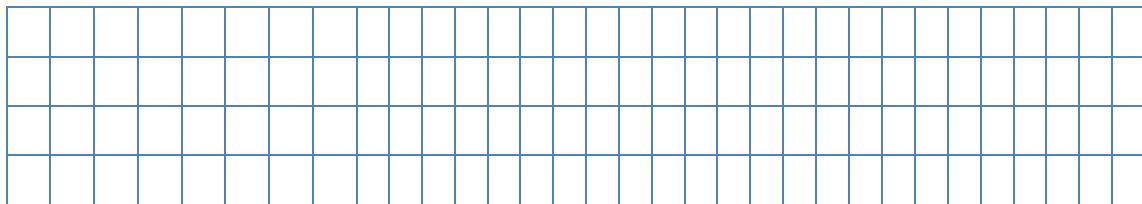
[summary of motion size based on Resolution]

Resolution	Block Count	Mount Type	Width(SD) -Pixel	Height(SD) -Pixel	Width(HD) -Pixel	Height(HD) –Pixel
1080i(1920*1080)	20*16				96	67
720p(1280*720)	16*9				80	80
D1(720*576) 4CIF(704*576)	9*6	PAL	80	96	80	96
D1(720*480) 4CIF(704*480)	9*6	NTSC	80	80	80	80
CIF(352*288)	4*3	PAL	88	96	88	96
CIF(352*240)	4*3	NTSC	88	80	88	80

Appendix #2 structure of UDP Multicasting message

-Below message structure is for the searching the IP camera in the network, this structure is the basis of PROBE IP searching program which is provided as default.

```
typedef struct __QUERY_TYPE__ {
 unsigned long query_flag;
 unsigned long reply_flag;
 unsigned long net_type;
 unsigned char product_type[24];
 unsigned char mac_addr[24];
 unsigned char ip_addr[4];
 unsigned char net_mask[4];
 unsigned char gw_addr[4];
 unsigned char dns[4];
 unsigned char web_port[2];
 unsigned char control_sock[2];
 unsigned char stream_sock[2];
 unsigned char vcrecv_sock[2];
 unsigned char vcsend_sock[2];
 unsigned char https[1];
 unsigned char reserved[47];
}PM_QUERY_TYPE, *PPM_QUERY_TYPE;
-------------------------------------------------------------------------------------------------
#define UDP_PORT_SEND  40011
#define UDP_PORT_READ  40012
#define PM_QUERY_FLAG  1L
#define PM_SETTING_FLAG  2L


[ Send ]
1. m_pSendSocket->Create(UDP_PORT_SEND, SOCK_DGRAM);
2. m_pSendSocket->SetSockOpt(SO_BROADCAST, &query_type, sizeof(PM_QUERY_TYPE));
3. m_pSendSocket->SendTo(&query_type, sizeof(PM_QUERY_TYPE), UDP_PORT_SEND,
"255.255.255.255");


[ Receive ]
LONG CSearchTestDlg::OnReceive(WPARAM wParam, LPARAM lParam)
```

```
{
int   flag;
PM_QUERY_TYPE recv_data;
unsigned int port;
CString   addr;
flag = m_pSocket->ReceiveFrom(&recv_data, sizeof(PM_QUERY_TYPE), addr, port);
switch(flag)
{
case 0:
 m_pSocket->Close();
 AfxMessageBox("recevie error!!! [Clsoe Socket]");
 break;
case SOCKET_ERROR:
 m_pSocket->Close();
 AfxMessageBox("recevie error!!! [Clsoe Socket]");
 break;
default:
 {
 if(recv_data.query_flag == PM_QUERY_FLAG)
 {
  TRACE("PM_QUERY_FLAG\n");

   m_ServerInfoList.AddTail(recv_data);    // actual data to use
   InsertItem(recv_data);
 }
 else if(recv_data.query_flag == PM_SETTING_FLAG)
 {
 }
 }
 break;
}

 return 0L;
}
```

− ***End of Documentation-***