External Control for LCD8205

Revision	Date	History
Ver. 1.0	Dec.9.2008	The first edition.

1. Application

- This document defines the communications method for control of the LCD8205 monitor.

2. Connectors and Writing

Connector : D-Sub 9-pin
Cable : Cross (reversed) cable or null modem cable
(please refer to LCD 8205 User's Manual)

3. Communication Parameter

Item	Setting
Baud Rate	9600bps
Data Bit	8bit
Stop Bit	1bit
Parity Bit	None
Stream Control	None

3.1. Communication timing

- The controller should wait for a packet interval before next command is sent. The packet interval needs to be longer than 600msec for the LCD monitor

4. Command List

4.1. Basic Command List

4.1.1. VCP Command

Command	Page	Communication Format
Picture Mode	p.12-p.16	Basic (p.5)
Brightness	p.12-p.16	
Contrast	p.12-p.16	
Color	p.12-p.16	
Tint	p.12-p.16	
Sharpness	p.12-p.16	
Color Temp (R/G/B)	p.12-p.16	
Size	p.12-p.16	
Auto in progress	p.12-p.16	
Volume	p.12-p.16	
Balance	p.12-p.16	
Language	p.12-p.16	
OSD Tone	p.12-p.16	
BG Gray	p.12-p.16	
Fan Control	p.12-p.16	
Input	p.12-p.16	
Mute	p.12-p.16	
Cooling Fan Status	p.12-p.16	
Read Out Temperature	p.12-p.16	
Hours Running On Time	p.12-p.16	
Display Device On Time	p.12-p.16	

4.1.2. Power Command

Command	Page	Communication Format
Power Mode	p.17	Basic (p.5)
POWER On/Off	p.18	

4.2. Optional Command List

Command	Page	Communication Format
LANGUAGE	p.24	Optional (p.20)
CURRENTSOURCE	p.25	
PC_PICTUREMODE	p.26	
COLORTEMP	p.27	
CONTRAST	p.28	
BRIGHTNESS	p.29	
SHARPNESS	p.30	
RF_PICTUREMODE	p.31	
RF_COLORTONE	p.32	
RF_CONTRAST	p.33	
RF_BRIGHTNESS	p.34	
RF_COLOR	p.35	
NTSC_TINT	p.36	
RF_SHARPNESS	p.37	
SCALEMODE	p.38	
USERRED	p.39	
USERGREEN	p.40	
USERBLUE	p.41	
MUTE	p.42	
SOUNDSTD	p.43	
AUTOVOLUME	p.44	
VOLUME	p.45	
BALANCE	p.46	
Equalizer	p.47	
ONHOUR	p.48	
ONMINUTE	p.49	
ONTIMEONOFF	p.50	
ONTIMEVOL	p.51	
OFFHOUR	p.52	
OFFMINUTE	p.53	
OFFTIMEONOFF	p.54	
HALFTONE	p.55	
BLUESCREEN	p.56	
PIXELSHIFT_EN	p.57	
WIPER_EN	p.58	
BGGRAY	p.59	
POWER(read only)	p.60	
CURHOUR	p.61	
CURMINUTE	p.62	
MAX_ILLUMINANCE	p.64	
MIN_ILLUMINANCE	p.65	
AUTO_DIM	p.66	
CURTEMP_MAIN	p.68	
CURTEMP_AUX	p.68	
TEMP_THRESHOLD	p.69	
TEMP_HYSTERESIS	p.70	
FAN_CONTROL	p.71	
SETX	p.74	
SETY	p.75	
SETXMAX	p.76	
SETYMAX	p.77	
SETXGAP	p.78	
SETYGAP	p.79	

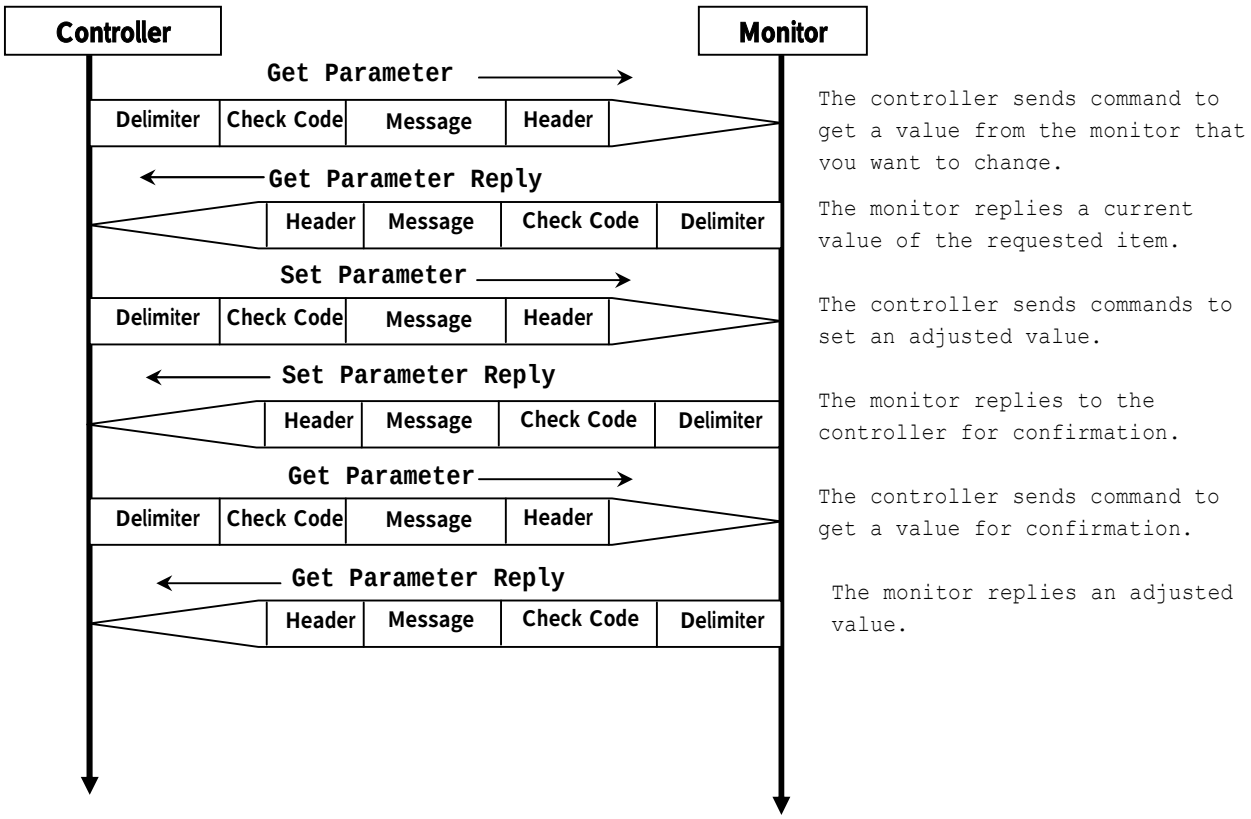
5. Basic Commands

5.1. Communication Format (for Basic Commands)

Header	Message	Check Code	Delimiter

The command packet consists of four parts, Header, Message, Check code and Delimiter.

Sequence of a typical procedure to control a monitor is as follows,
[A controller and a monitor, two-way communication composition figure]



5.1.1. Header block format (fixed length)

Header	Message	Check code	Delimiter

SOH	Reserved '0'	Destination	Source	Message Type	Message Length
1st	2nd	3rd	4th	5th	6th -7th

1stbyte) SOH: Start of Header

ASCII SOH (01h)

2ndbyte) Reserved: Reserved for future extensions.
On this monitor, it must be ASCII '0'(30h).

3rdbyte) Destination: Destination equipment ID. (Receiver)
Specify a commands receiver's address.
This value must match the "Monitor ID No." set in the OSD.

"Monitor ID" to "Destination Address" conversion table is as follows,

Monitor ID	Destination Address (ASCII)	Monitor ID	Destination Address (ASCII)
1	'A' (41h)	14	'N' (4Eh)
2	'B' (42h)	15	'O' (4Fh)
3	'C' (43h)	16	'P' (50h)
4	'D' (44h)	17	'Q' (51h)
5	'E' (45h)	18	'R' (52h)
6	'F' (46h)	19	'S' (53h)
7	'G' (47h)	20	'T' (54h)
8	'H' (48h)	21	'U' (55h)
9	'I' (49h)	22	'V' (56h)
10	'J' (4Ah)	23	'W' (57h)
11	'K' (4Bh)	24	'X' (58h)
12	'L' (4Ch)	25	'Y' (59h)
13	'M' (4Dh)	26	'Z' (5Ah)
ALL	'*' (2Ah)		

Ex.) If you want to control a monitor that has the "ID No." as '1', specify a destination address 'A'(41h). If you want to control all of the monitors which are connected by a daisy chain, specify a destination address '*'(2Ah).

4th byte) Source: Source equipment ID. (Sender)
Specify a sender address.
The controller must be '0' (30h).

5th byte) Message Type: (Case sensitive.)
Refer to section 5.1.2. "Message block format" for more details.
ASCII 'A' (41h): Command.
ASCII 'B' (42h): Command reply.
ASCII 'C' (43h): Get current parameter from a monitor.
ASCII 'D' (44h): "Get parameter" reply.
ASCII 'E' (45h): Set parameter.
ASCII 'F' (46h): "Set parameter" reply.

6th -7th bytes) Message Length:
Specify the length of the message (that follows the header) from STX to ETX.
This length includes STX and ETX.
The byte data must be encoded to ASCII characters.
Ex.) The byte data 3Ah must be encoded to ASCII characters '3' and 'A' (33h and 41h).
The byte data 0Bh must be encoded to ASCII characters '0' and 'B' (30h and 42h).

5.1.2. Message block format

Header	**Message**	Check code	Delimiter

"Message block format" is allied to the "Message Type" in the "Header".

Refer to the section 5.2. "Message type" for more detail.

1) Get current parameter
The controller sends this message when you want to get the status of the monitor.
For the status that you want to get, specify the "OP code page" and "OP code",
refer to 5.3.1. "VCP (OP code page/OP code) List".
"Message type" of the "Get current parameter" is as follows,

STX	OP code page		OP code		ETX
	Hi	Lo	Hi	Lo	

<< Refer to section 5.2.1. "Get current parameter from a monitor." for more details.>>

2) Get Parameter reply

The monitor will reply with the status of the requested item specified by the controller
in the “Get parameter message”.

“Message type” of the “Get parameter reply” is as follows,

STX	Result		OP code page		OP code		Type		Max value				Current Value				ETX
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	MSB			LSB	MSB			LSB	

<< Refer to section 5.2.2. “Get parameter reply” for more details. >>

3) Set parameter

The controller sends this message to change a setting of the monitor.

Message type of the “Set parameter” is as follows,

STX	OP code page		OP code		Set Value				ETX
	Hi	Lo	Hi	Lo	MSB			LSB	

<< Refer to section 5.2.3. “Set parameter” for more details.>>

4) Set Parameter reply

The monitor replies with this message for a confirmation of the “Set parameter message”.

Message type of the “Set parameter reply” is as follows,

STX	Result		OP code page		OP code		Type		Max value				Requested setting Value				ETX
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	MSB			LSB	MSB			LSB	

<< Refer to section 5.2.4. “Set parameter reply” for more details. >>

5) Command

“Command message” format depends on each command.
Usually, this “command message” is used for some non-slider controls and some special operations, such as “power control”, etc. Refer to section 5. 4 . “Commands message” for more details.

6) Command reply

The monitor replies to a query from the controller.
“Command reply message” format depends on each command.
Refer to section 5.4. “Commands message” for more details.

5.1.3. Check code

Header	Message	**Check code**	Delimiter

Check code is the Block Check Code (BCC) between the Header and the End of Message except SOH.

		2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
SOH	D_0								
Reserved	D_1								
Destination	D_2								
Source	D_3								
Type	D_4								
Length	D_5								
	D_6								
STX	D_7								
Data	D_8								
|	|								
|	|								
ETX	D_n								
Check code	D_{n+1}	P	P	P	P	P	P	P	P

$D_{n+1} = D_1$ XOR D_2 XOR D_3 XOR ,,, D_n
XOR: Exclusive OR

Following is an example of a Check code (BCC) calculation.

Header							Message										Check code (BCC)	Delimiter
SOH	Reserved	Destination Address	Source Address	Message type	Message length		STX	OP code page		OP code		Set Value				ETX		
01	30	41	30	45	30	41	02	30	30	31	30	30	30	36	34	03	77	0D
D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	D_8	D_9	D_{10}	D_{11}	D_{12}	D_{13}	D_{14}	D_{15}	D_{16}	D_{17}	D_{18}

Check code (BCC) $D_{17} = D_1$ xor D_2 xor D_3 xor … xor D_{14} xor D_{15} xor D_{16}
= 30h xor 41h xor 30h xor 45h xor 30h xor 41h
xor 02h xor 30h xor 30h xor 31h xor 30h xor 30h
xor 30h xor 36h xor 34h xor 03h
= 77h

5.1.4. Delimiter

Header	Message	Check code	**Delimiter**

Packet delimiter code; ASCII CR(**0Dh**).

5.2. Message type

5.2.1. Get current Parameter from a monitor.

STX	OP code page		OP code		ETX
	Hi	Lo	Hi	Lo	
1st	2nd-3rd		4th–5th		6th

Send this message when you want to get the status of a monitor.
For the status that you want to get, specify the "OP code page" the "OP code", refer to 5.3.1. "VCP (OP code page/OP code) List".

1st byte) STX: Start of Message
ASCII STX (02h)

2nd-3rd bytes) OP code page: Operation code page.
Specify the "OP code page" for the control which you want to get the status.
Refer to 5.3.1. "VCP (OP code page/OP code) List" for each item.
OP code page data must be encoded to ASCII characters.
Ex.) The byte data 02h must be encoded to ASCII characters '0' and '2' (30h and 32h).
OP code page 02h -> OP code page (Hi) = ASCII '0' (30h)
OP code page (Lo) = ASCII '2' (32h)
Refer to 5.3.1. "VCP (OP code page/OP code) List".

4th–5th bytes) OP code: Operation code
Refer to 5.3.1. "VCP (OP code page/OP code) List" for each item.
OP code data must be encoded to ASCII characters.
Ex.) The byte data 3Ah must be encoded to ASCII characters '3' and 'A' (33h and 41h).
OP code 3Ah -> OP code (Hi) = ASCII '3' (33h)
OP code (Lo) = ASCII 'A' (41h)
Refer to 5.3.1. "VCP (OP code page/OP code) List".

6th byte) ETX: End of Message
ASCII ETX (03h)

5.2.2. "Get parameter" reply

STX	Result		OP code page		OP code		Type		Max value				Current Value				ETX
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	MSB			LSB	MSB			LSB	
1st	2nd-3rd		4th–5th		6th –7th		8th -9th		10th -13th				14th -17th				18th

The monitor replies with a current value and the status of the requested item (operation code).

1st byte) STX: Start of Message
ASCII STX (02h)

2nd-3rd bytes) Result code.
These bytes indicate a result of the requested commands as follows,
00h: No Error.
01h: Unsupported operation with this monitor or unsupported operation under current condition.
This result code from the monitor is encoded to ASCII characters.
Ex.) The byte data 01h is encoded to ASCII character '0' and '1' (30h and 31h).

4th-5th bytes) OP code page: Operation code page.
These bytes indicate a replying item's OP code page.
This returned value from the monitor is encoded to ASCII characters.
Ex.) The byte data 02h is encoded to ASCII character '0' and '2' (30h and 32h).
Refer to 5.3.1. "VCP (OP code page/OP code) List".

6th -7th bytes) OP code: Operation code
These bytes indicate a replying item's OP code.
This returned value from the monitor is encoded to ASCII characters.
Refer to 5.3.1. "VCP (OP code page/OP code) List".
Ex.) The byte data 1Ah is encoded to ASCII character '1' and 'A' (31h and 41h).

8th -9thbytes) Type: Operation type code
00h: Set parameter
01h: Momentary
Like the Auto Setup function which automatically changes the parameter.
This returned value from the monitor is encoded to ASCII characters.
Ex.) The byte data 01h is encoded to ASCII character '0' and '1' (30h and 31h).

10th-13thbytes) Max. value: Maximum value which monitor can accept. (16bits)
This returned value from the monitor is encoded to ASCII characters.
Ex.) '0','1','2' and '3' means 0123h (291)

14th -17thbytes) Current Value: (16bits)
This returned value from the monitor is encoded to ASCII characters.
Ex.) '0','1','2' and '3' means 0123h (291)

18thbyte) ETX: End of Message
ASCII ETX (03h)

5.2.3. Set parameter

STX	OP code page		OP code		Set Value				ETX
	Hi	Lo	Hi	Lo	MSB			LSB	
1st	2nd-3rd		4th-5th		6th-9th				10th

Send this message to change monitor's adjustment and so on.
The controller requests a monitor to change value.

1stbyte) STX: Start of Message
ASCII STX (02h)

2nd-3rdbytes) OP code page: Operation code page
This OP code page data must be encoded to ASCII characters.
Ex.) The byte data 02h must be encoded to ASCII '0' and '2' (30h and 32h).
Refer to 5.3.1. "VCP (OP code page/OP code) List".

4th-5thbytes) OP code: Operation code
This OP code data must be encoded to ASCII characters.
Ex.) OP code 1Ah ->OP code (Hi) = ASCII '1' (31h)
OP code (Lo) = ASCII 'A' (41h)
Refer to 5.3.1. "VCP (OP code page/OP code) List".

6th-9thbytes) Set value:(16bit)
This data must be encoded to ASCII characters.
Ex.) 0123h -> 1st(MSB) = ASCII '0' (30h)
2nd = ASCII '1' (31h)
3rd = ASCII '2' (32h)
4th(LSB) = ASCII '3' (33h)

10thbyte) ETX: End of Message
ASCII ETX (03h)

5.2.4. "Set parameter" reply

STX	Result		OP code page		OP code		Type		Max value				Requested setting Value				ETX
	Hi	Lo	Hi	Lo	Hi	Lo	Hi	Lo	MSB			LSB	MSB			LSB	
1st	2nd-3rd		4th-5th		6th-7th		8th-9th		10th-13th				14th -17th				18th

<< The Monitor echoes back the parameter and status of the requested operation code.>>

1stbyte) STX: Start of Message
ASCII STX (02h)

2nd-3rdbytes) Result code
ASCII '0''0' (30h, 30h): No Error.
ASCII '0''1' (30h, 31h): Unsupported operation with this monitor or unsupported operation under current condition.

4th-5thbytes) OP code page: Echoes back the Operation code page for confirmation.
Reply data from the monitor is encoded to ASCII characters.
Ex.) OP code page 02h -> OP code page = ASCII '0' and '2' (30h and 32h)
Refer to 5.3.1. "VCP (OP code page/OP code) List".

6th-7thbytes) OP code: Echoes back the Operation code for confirmation.
Reply data from the monitor is encoded to ASCII characters.
Ex.) OP code 1Ah ->OP code (Hi) = ASCII '1' (31h)
OP code (Lo) = ASCII 'A' (41h)
Refer to 5.3.1. "VCP (OP code page/OP code) List".

8th-9thbytes) Type: Operation type code
ASCII '0''0' (30h, 30h): Set parameter
ASCII '0''1' (30h, 31h): Momentary
Like Auto Setup function, that automatically changes the parameter.

10th-13thbytes) Max. value: Maximum value that monitor can accept. (16bits)
Reply data from the monitor is encoded to ASCII characters.
Ex.) '0''1''2''3' means 0123h (291)

14th -17thbytes) Requested setting Value: Echoes back the parameter for confirmation. (16bits)
Reply data from the monitor is encoded to ASCII characters.
Ex.) '0''1''2''3' means 0123h (291)

18thbyte) ETX: End of Message
ASCII ETX (03h)

5.3. VCP Command

5.3.1. VCP (OP code page/OP code) List

	Item	OP code page	OP code	Parameter	Remarks
PICTURE	Picture Mode	02h	1Ah	0: User 1: Dynamic 2: Standard 3: Movie 4: Mild	
	Brightness	00h	10h	0: dark | 100: bright	User only
	Contrast	00h	12h	0: low | 100: high	User only
	Color	02h	1Fh	0: pale | 100: deep	User only
	Tint	00h	90h	0: | 100:	User only
	Sharpness	00h	8Ch/87h	0: dull | 100: sharp	User only
	Color Temp	NA	NA	User Normal Cool1 Cool2 Warm1 Warm2	NA
	R	00h	16h	0 | 100	User only
	G	00h	18h	0 | 100	User only
	B	00h	1Ah	0 | 100	User only
	Size	02h	70h	1: Normal 2: Full 3: Wide 4: Zoom	?
	Auto in progress	00h	1Eh	1: Execute	Only PC mode
SOUND	Volume	00h	62h	0: whisper | 100: loud	
	Balance	00h	93h	O: Left | 50:(Center) | 100: Right	
SET UP	Language	00h	68h	0: NOP 1: English 2: German 3: French 4: Spanish 12: Portuguese	OSD Language

	OSD Tone	02h	B8h	0: None 1: Off(Opaque) 2: ON	
	BG Gray	02h	DFh	0: black / Max:white	
	Fan Control	02h	7Dh	0: None 1: Auto 2: Always On	Fan control not used the 'off' command.
ETC	Input	00h	60h	0: NOP 1: PC 3: DVI 4: HDMI 5: AV1 6: AV2 7: S-VIDEO 12: Component	
	Mute	00h	8Dh	0,2: UNMUTE 1: MUTE	
	Cooling Fan Status	02h	7Bh	0:off 1:on	Get only
	Read Out Temparature	02h	79h	Get only	Get current temperature of main sensor.(only get)
	Hours Running On Time	00h	FAh	Only read	1 count/30 minute
	Display Device On Time	00h	FF	Only read	1 count/30 minute

5.3.2. How to change the “Brightness” setting.

The following is a sample of procedures to control the monitor, these are examples of "Get parameter", "Set parameter" and "Save current settings".

Step 1. The controller requests the Monitor to reply with the current brightness setting and capability to support this operation. (Get parameter)

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'C'-'0'-'6'	STX-'0'-'0'-'1'-'0'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
Monitor ID: Specify the Monitor ID from which you want to get a value.
Ex.) If Monitor ID is '1', specify 'A'.
'0' (30h): Message sender is the controller.
'C' (43h): Message type is "Get parameter command".
'0'-'6' (30h, 36h): Message length is 6 bytes.

Message
STX (02h): Start of Message
'0'-'0' (30h, 30h): Operation code page number is 0.
'1'-'0' (31h, 30h): Operation code is 10h (in the OP code page 0).
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

Step 2. The monitor replies with current Brightness setting and capability to support this operation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'D'-'1'-'2'	STX-'0'-'0'-'0'-'0'-'1'-'0'-'0'-'0'-'0'-'0'-'6'-'4'-'0'-'0'-'3'-'2'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
'0' (30h): Message receiver is the controller.
Monitor ID: Indicate a replying Monitor ID.
Ex.) When this byte is set to 'A', the replying Monitor ID is '1'.
'D' (44h): Message Type is "Get parameter reply".
'1'-'2' (31h, 32h): Message length is 18 bytes.

Message
STX (02h): Start of Message
'0'-'0' (30h, 30h): Result code. No error.
'0'-'0' (30h, 30h): Operation code page number is 0.
'1'-'0' (31h, 30h): Operation code is 10h (in the page 0).
'0'-'0' (30h, 30h): This operation is "Set parameter" type.
'0'-'0'-'6'-'4' (30h, 30h, 36h, 34h): Brightness max value is 100(0064h).
'0'-'0'-'3'-'2' (30h, 30h, 33h, 32h): Current Brightness setting is 50(0032h) .
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

Step 3. The controller request the monitor to change the Brightness setting

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'E'-'0'-'A'	STX-'0'-'0'-'1'-'0'-'0'-'0'-'5'-'0'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
Monitor ID: Specify the Monitor ID of which you want to change a setting.
Ex.) If Monitor ID is '1', specify 'A'.
'0' (30h): Message sender is the controller .
'E' (45h): Message Type is "Set parameter command".
'0'-'A' (30h, 41h): Message length is 10 bytes.

Message
STX (02h): Start of Message
'0'-'0' (30h, 30h): Operation code page number is 0.
'1'-'0' (31h, 30h): Operation code is 10h (in the page 0).
'0'-'0'-'5'-'0' (30h, 30h, 35h, 30h): Set Brightness setting 80(0050h).
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

Step 4. The monitor replies with a message for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'- Monitor ID -'F'-'1'-'2'	STX-'0'-'0'-'0'-'0'-'1'-'0'—'0'-'0'-'0'-'0'-'6'-'4'-'0'-'0'-'5'-'0'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
'0' (30h): Message receiver is the controller.
Monitor ID: Indicate a replying Monitor ID.
Ex.) When this byte is set to 'A', the replying Monitor ID is '1'.
'F' (46h): Message Type is "Set parameter reply".
'1'-'2' (31h, 32h): Message length is 18 bytes.

Message
STX (02h): Start of Message
'0'-'0' (30h, 30h): Result code. No error.
'0'-'0' (30h, 30h): Operation code page number is 0.
'1'-'0' (31h, 30h): Operation code is 10h (in the page 0).
'0'-'0' (30h, 30h): This operation is "Set parameter" type.
'0'-'0'-'6'-'4' (30h, 30h, 36h, 34h): Brightness max value is 100(0064h).
'0'-'0'-'5'-'0' (30h, 30h, 35h, 30h): Received a Brightness setting was 80(0050h) .
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

- Repeat Step 1 and Step 2, if you need to check the Brightness setting. (Recommended)

Step 5. Request the monitor to store the Brightness setting. (Save Current Settings Command)

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'4'	STX-'0-'C'-ETX	BCC	CR

Header

```
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID which you want to store the setting.
              Ex.) If Monitor ID is '1', specify 'A'.
   '0' (30h): Message sender is the controller.
   'A' (41h): Message type is "Command".
   '0'-'4' (30h, 34h): Message length is 4 bytes.

Message
  STX (02h): Start of Message
  '0'-'C' (30h, 43h): Command code is 0Ch as "Save current settings".
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 5.1.3. “Check code” for a BCC calculation.

Delimiter
   CR (0Dh): End of packet
```

5.4. Commands message

5.4.1. Power Command

Power control procedure	Power Mode (Power status read)	01h	D6h	1: ON 2: Standby 4: OFF	Get only
	POWER On/Off (Power control)	C2h,03h	D6h	1: ON 4: OFF	Set only

5.4.2. Power status read

1) The controller requests the monitor to reply a current power status.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'6'	STX-'0'-'1'-'D'-'6'-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID from which you want to get status.
              Ex.) If Monitor ID is '1', specify 'A'.
   '0' (30h): Message sender is the controller.
   'A' (41h): Message Type is "Command".
   '0'-'6' (30h, 36h): Message length is 6 bytes.

Message
  STX (02h): Start of Message
   '0'-'1'-'D'-'6': Get power status command.
   ETX (03h): End of Message

Check code
   BCC: Block Check Code
        Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor returns with the current power status.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'2'	STX-'0'-'2'-'0'-'0'-'D'-'6'-'0'-'0'- '0'-'0'-'0'-'4'-'0'-'0'-'0'-'1'-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  '0' (30h): Message receiver is the controller.
  Monitor ID: Indicate a replying Monitor ID.
              Ex.) When this byte is set to 'A', the replying Monitor ID is '1'.
   'B' (42h): Message Type is "Command reply".
   '1'-'2' (31h, 32h): Message length is 18 bytes.

Message
   STX(02h):Start of Message
   '0'-'2' (30h, 32h): Reserved data
   '0'-'0' (30h, 30h): Result code
                       00: No Error.
                       01: Unsupported.
   'D'-'6'(44h, 36h): Display power mode code
   '0'-'0' (30h, 30h): Parameter type code is "Set parameter".

'0'-'0'-'0'-'4' (30h, 30h, 30h, 34h): Power mode is 4 types.
'0'-'0'-'0'-'1' (30h, 30h, 30h, 31h): Current power mode
<Status>
0001: ON
0002: Stand-by (power save)
0003: Suspend (power save)
0004: OFF (same as IR power off)
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

5.4.3. Power control

1) The controller requests the monitor to control monitor power.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'C'	STX-'C'-'2'-'0'-'3'-'D'-'6'-'0'-'0'-'0'-'1'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
Monitor ID: Specify the Monitor ID which you want to change a setting.
Ex.) If Monitor ID is '1', specify 'A'.
'0' (30h): Message sender is the controller.
'A' (41h): Message type is "Command".
'0'-'C (30h, 43h): Message length is 12 bytes.

Message
STX (02h): Start of Message
'C'-'2'-'0'-'3'-'D'-'6' (43h, 32h, 30h, 33h, 44h, 36h): power control command
'0'-'0'-'0'-'1' (30h, 30h, 30h, 31h): Power mode
0001: ON
0002, 0003: Do not set.
0004: OFF (same as the power off by IR)
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

2) The monitor replies a data for confirmation.

Header	Message	Check ode	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'0'-'E'	STX-'0'-'0'-'C'-'2'-'0'-'3'-'D'-'6'-'0'-'0'-'0'-'1'-ETX	BCC	CR

Header
SOH (01h): Start Of Header
'0' (30h): Reserved
'0' (30h): Message receiver is the controller.
Monitor ID: Indicate a replying Monitor ID.
Ex.) When this byte is set to 'A', the replying Monitor ID is '1'.
'B' (42h): Message type is "Command reply".
'N'-'N': Message length

Note.) The maximum data length that can be written to the monitor at a time is 32bytes.
Ex.) The byte data 20h is encoded as ASCII characters '2' and '0' (32h and 30h).

Message
STX (02h): Start of Message
'0'-'0' (30h, 30h): Result code. No error.
'C'-'2','0'-'3'-'D'-'6' (43h, 32h, 30h, 33h, 44h, 36h): power control reply command
- The monitor replies same as power control command to the controller.

'0'-'0'-'0'-'1' (30h, 30h, 30h, 31h): Power mode
0001: ON
0002, 0003: Do not set.
0004: OFF (same as the power off by IR)

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 5.1.3. "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

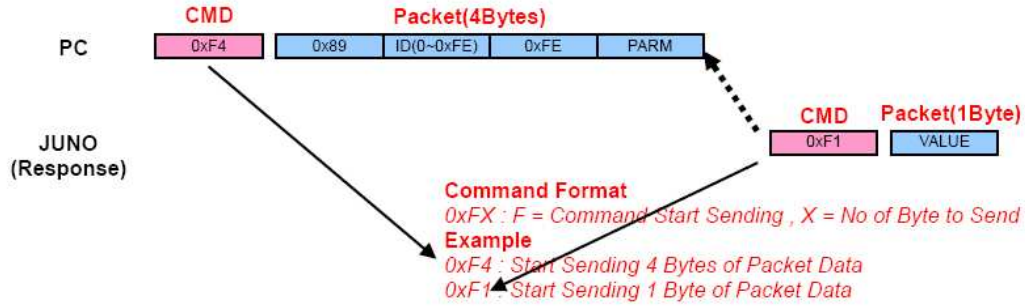
6. Optional Commands

6.1. Communication Format (for Optional Commands)

6.1.1. Virtual Remote Control

6.1.2. Setting Parameters to Juno

6.1.3. Read Parameters from Juno



6.2. Control Command Packet

6.2.1. System Parameter Direct Settings/Read Packet

CMD	Data1	Data2	Data3	Data4	Data5	Description	Range	
Command	Target	ID	CMD	Param	Value		Min	Max
0xF5 (Start Set) 0xF4 (Start Get)	0x88(Set) 0x89(Get)	0x00	0xFE Set /Get Param.	0x00	0x00~0xFF (By Min-Max) Not Send in Get Mode	LANGUAGE	0	5
				0x01		CURRENTSOURCE(1)	0	10
				0x02		PC_PICTUREMODE	0	4
				0x03		COLORTEMP	0	5
				0x04		CONTRAST	0	100
				0x05		BRIGHTNESS	0	100
				0X06		SHARPNESS	0	100
				0x07		RF_PICTUREMODE	0	4
				0x08		RF_COLORTONE	1	5
				0x09		RF_CONTRAST	0	100
				0x0A		RF_BRIGHTNESS	0	100
				0x0B		RF_COLOR	0	100
				0x0C		NTSC_TINT	0	100
				0x0D		RF_SHARPNESS	0	100
				0x0E		SCALEMODE	0	-
				0x0F		USERRED	0	100
				0x10		USERGREEN	0	100
				0x11		USERBLUE	0	100
				0x16		MUTE	0	1
				0x17		SOUNDSTD	0	4
				0x18		AUTOVOLUME	0	1
				0x1A		VOLUME	0	100
				0x1C		BALANCE	0	100
				0x1D		EQ100HZ	0	20
				0x1E		EQ300HZ	0	20
				0x1F		EQ1KHZ	0	20
				0x20		EQ3KHZ	0	20
				0x21		EQ10KHZ	0	20
				0x22		ONHOUR	0	23
				0x23		ONMINUTE	0	59
				0x24		ONTIMEONOFF	0	1
				0x25		ONTIMEVOL	0	100
				0x26		OFFHOUR	0	23
				0x27		OFFMINUTE	0	59
				0x28		OFFTIMEONOFF	0	1
				0x2A		HALFTONE	0	1
				0x2B		BLUESCREEN	0	1
				0x2C		PIXELSHIFT_EN	0	1
				0x2D		WIPER_EN	0	1
				0x2E		BGGRAY	0	7
				0x2F		POWER(read only)	0	1
				0x30		CURHOUR	0	23
				0x31		CURMINUTE	0	59

				0x33		MAX_ILLUMINANCE[2]	0	200
				0x34		MIN_ILLUMINANCE[3]	0	200
				0x35		AUTO_DIM	0	1
				0x37		CURTEMP_MAIN	0	-
				0x38		CURTEMP_AUX	0	-
				0x39		TEMP_THRESHOLD[4]	60	200
				0x3A		TEMP_HYSTERESIS[5]	2	20
				0x3B		FAN_CONTROL	1	2
				0x3C		FAN_ACTIVE(only read)	0	1
				0x3D		SETX	0	2
				0x3E		SETY	0	2
				0x3F		SETXMAX	1	3
				0x40		SETYMAX	1	3
				0x41		SETXGAP	0	200
				0x42		SETYGAP	0	200

Notice

(1) CURSOURCE Setting Value
AV1:0, AV2:1, AV3:2, COMP1:6, DVI:9, DSUB:10

(2) MAX_ILLUMINANCE Settings
Setting Value = Ambient Level (by LUX) / 100
Ex) Desired Ambient is 10000 Lux, Setting is 100 (= 10000 / 100)

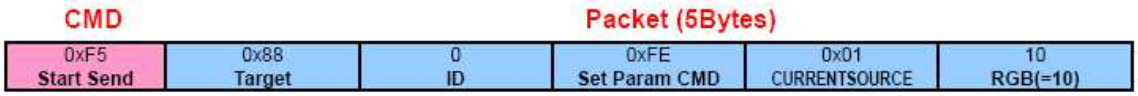
(3) MIN_ILLUMINACE Settings
Setting Value = Ambient Level (by LUX) / 10
Ex) Desired Ambient is 200 Lux, Setting is 20 (= 200 / 10)

(4) TEMP_THRESHOLD Settings
Setting Value = Desired temperture(by Celsius) x 2 + 60
Ex) Desired temperature is 60**℃**, Setting is 180 (= 60 x 2 + 60)

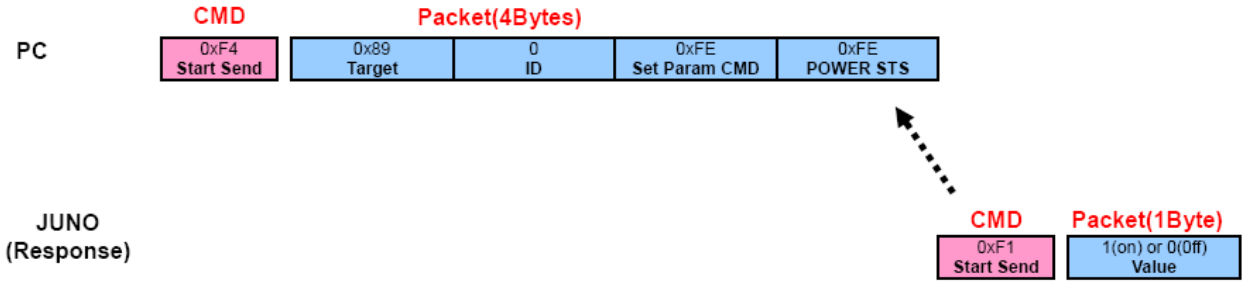
(5) TEMP_HYSTERESIS Settings
Setting Value = Desired Hysteresis(by Celsius) x 2
Ex) Desired Hysteresis is 2**℃**, Setting is 4 (= 2 x 2)

6.3. Control Examples at Master PC

6.3.1. Set Input Source to RGB Input



6.3.2. Read Power State



7. Typical procedure example

The following is a sample of procedures to control the monitor, these are examples of " Set parameter" , " Get parameter".

7.1. " Language " Control procedure

7.1.1. Language Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x00)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x00) : 'Language' parameter
Value : Data value
0 : English
1 : Spanish
2 : Portuges
3 : German
4 : French

7.1.2. Language state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x00) : 'Language' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Language getting value
0 : English
1 : Spanish
2 : Portuges
3 : German
4 : French

7.2. “CURRENTSOURCE” Control procedure

7.2.1. Current Source Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x01)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x01) : ‘ Current Source ’ parameter
Value : Data value
0 : AV1
1 : AV2
2 : AV3
6 : COMPONENT
9 : DVI
10 : DSUB

7.2.2. Current Source state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x01)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x01) : ‘Current Source’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Source getting value
0 : AV1
1 : AV2
2 : AV3
6 : COMPONENT
9 : DVI
10 : DSUB

7.3. “PC_PICTUREMODE” Control procedure

7.3.1. Picture Control (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x02)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x02) : ‘ PC_PICTUREMODE ’ parameter
Value : Data value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.3.2. Current Picture state read (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x02)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x02) : ‘PC_PICTUREMODE’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current PC mode PICTURE getting value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.4. “COLORTEMP” Control procedure

7.4.1. color temperature Control (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x03)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x03) : ‘ COLORTEMP ’ parameter
Value : Data value
0 : User
1 : cool2
2 : cool1
3 : normal
4 : warm1
5 : warm2

7.4.2. Current Color temperature state read (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x03)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x03) : ‘COLORTEMP’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current color temperature getting value
0 : User
1 : cool2
2 : cool1
3 : normal
4 : warm1
5 : warm2

7.5. “CONTRAST” Control procedure

7.5.1. Contrast Control (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x04)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x04) : ‘ CONTRAST ’ parameter
Value: 0 ~ 100 (range)

7.5.2. Current Contrast state read(PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x04)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x04) : ‘ CONTRAST ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current CONTRAST getting value
0 ~ 100 (range)

7.6. “BRIGHTNESS” Control procedure

7.6.1. Brightness Control (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x05)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x05) : ‘ BRIGHTNESS ’ parameter
Value: Data value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.6.2. Current Brightness state read(PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x05)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x05) : ‘ BRIGHTNESS ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current BRIGHTNESS getting value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.7. “SHARPNESS” Control procedure

7.7.1. Sharpness Control (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x06)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x06) : ‘ SHARPNESS ’ parameter
Value: 0 ~ 100 / step 5 (range)

7.7.2. Current Sharpness state read (PC, Digital video mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x06)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x06) : ‘SHARPNESS ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SHARPNESS getting value
0 ~ 100 / step5 (range)

7.8. “RF_PICTUREMODE” Control procedure

7.8.1. Picture Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x07)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x07) : ‘ PICTUREMODE ’ parameter
Value : Data value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.8.2. Current Picture state read (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x07)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x07) : ‘RF_PICTURE ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Picture getting value
0 : User
1 : dynamic
2 : standard
3 : movie
4 : mild

7.9. " RF_COLORTONE " Control procedure

7.9.1. Color temperature Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x08)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x08) : ' RF_COLORTONE ' parameter
Value : Data value
1 : cool2
2 : cool1
3 : normal
4 : warm1
5 : warm2

7.9.2. Current RF_COLORTONE state read (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x08)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x08) : ' RF_COLORTONE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current RF_COLORTONE getting value
1 : cool2
2 : cool1
3 : normal
4 : warm1
5 : warm2

7.10. " RF_CONTRAST " Control procedure

7.10.1. Contrast Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x09)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x09) : ' RF_CONTRAST ' parameter
Value: 0 ~ 100 (range)

7.10.2. Current Contrast state read(AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x09)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x09) : ' RF_CONTRAST ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current RF_CONTRAST getting value
0 ~ 100 (range)

7.11. " RF_BRIGHTNESS " Control procedure

7.11.1. Brightness Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0A)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0A) : ' RF_BRIGHTNESS ' parameter
Value: 0 ~ 100 (range)

7.11.2. Current Brightness state read(AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0A)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0A) : ' RF_BRIGHTNESS ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current RF_BRIGHTNESS getting value
0 ~ 100 (range)

7.12. " RF_COLOR " Control procedure

7.12.1. Color Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0B)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0B) : ' RF_COLOR ' parameter
Value: 0 ~ 100 (range)

7.12.2. Current Color state read(AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0B)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0B) : ' RF_COLOR ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current RF_COLOR getting value
0 ~ 100 (range)

7.13. " NTSC_TINT " Control procedure

7.13.1. TINT Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0C)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0C) : ' NTSC_TINT ' parameter
Value: 0 ~ 100 (range)

7.13.2. Current TINT state read(AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0C)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0C) : ' NTSC_TINT ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current NTSC_TINT getting value
0 ~ 100 (range)

7.14. " RF_SHARPNESS " Control procedure

7.14.1. Sharpness Control (AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0D)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0D) : ' RF_SHARPNESS ' parameter
Value: 0 ~ 100 (range)

7.14.2. Current Sharpness state read(AV , S-video , Component mode)

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0D)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0D) : 'RF_SHARPNESS ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current RF_SHARPNESS getting value
0 ~ 100 (range)

7.15. “SCALEMODE” Control procedure

7.15.1. Current Scale mode Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0E)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0E) : ‘ SCALEMODE ’ parameter
Value : Data value

1 : Full Scn
2 : Panorama
3 : Zoom1
4 : Zoom2
5 : 4:3
6 : 14:9

→ **AV , S-video , Component mode**

7 : 4:3
8 : Full Scn
9 : 1:1

→ **PC, Digital video mode**

7.15.2. Current Scale mode state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0E)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0E) : ‘SCALEMODE’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Source getting value

1 : Full Scn
2 : Panorama
3 : Zoom1
4 : Zoom2
5 : 4:3
6 : 14:9

→ **AV , S-video , Component mode**

7 : 4:3
8 : Full Scn
9 : 1:1

→ **PC, Digital video mode**

7.16. " USERRED " Control procedure

7.16.1. USERRED Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0F)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x0F) : ' USERRED ' parameter
Value: 0 ~ 100 (range)

7.16.2. Current USERRED state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x0F)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x0F) : 'USERRED ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current USERRED getting value
0 ~ 100 (range)

7.17. " USERGREEN " Control procedure

7.17.1. USERGREEN Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x10)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x10) : ' USERGREEN ' parameter
Value: 0 ~ 100 (range)

7.17.2. Current USERGREEN state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x10)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x10) : 'USERGREEN' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current USERGREEN getting value
0 ~ 100 (range)

7.18. " USERBLUE " Control procedure

7.18.1. USERBLUE Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x11)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x11) : ' USERBLUE ' parameter
Value: 0 ~ 100 (range)

7.18.2. Current USERGREEN state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x11)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x11) : 'USERBLUE' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current USERBLUE getting value
0 ~ 100 (range)

7.19. “MUTE” Control procedure

7.19.1. Mute Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x16)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x16) : ‘ MUTE ’ parameter
Value: Data value
0 : Mute Off
1 : Mute On

7.19.2. Current Mute state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x16)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x16) : ‘ MUTE ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current MUTE getting value
0 : Mute Off
1 : Mute On

7.20. “SOUNDSTD” Control procedure

7.20.1. Sound STD Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x17)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x17) : ‘ SOUNDSTD ’ parameter
Value: Data value
0 : User
1 : Standard
2 : Music
3 : Movie
4 : Speech

7.20.2. Current SOUNDSTD state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x17)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x17) : ‘ SOUNDSTD ’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SOUNDSTD getting value
0 : User
1 : Standard
2 : Music
3 : Movie
4 : Speech

7.21. " AUTOVOLUME " Control procedure

7.21.1. Auto Volume Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x18)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x18) : ' AUTOVOLUME ' parameter
Value: Data value
0 : Off
1 : On

7.21.2. Current AUTOVOLUME state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x18)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x18) : ' AUTOVOLUME ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current AUTOVOLUME getting value
0 : Off
1 : On

7.22. " VOLUME " Control procedure

7.22.1. VOLUME Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x1A)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x1A) : ' VOLUME ' parameter
Value: 0 ~ 100 (range)

7.22.2. Current VOLUME state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x1A)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x1A) : 'VOLUME' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current VOLUME getting value
0 ~ 100 (range)

7.23. " BALANCE " Control procedure

7.23.1. BALANCE Control (sound L+R balance)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x1C)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x1C) : ' BALANCE ' parameter
Value: 0 ~ 100 (range)

7.23.2. Current BALANCE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x1C)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x1C) : ' BALANCE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current BALANCE getting value
0 ~ 100 (range)

7.24. " Equalizer " Control procedure

7.24.1. Equalizer Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter
0x1D : EQ 100Hz
0x1E : EQ 300Hz
0x1F : EQ 1KHz
0x20 : EQ 3KHz
0x21 : EQ 10KHz

Value: 0 ~ 20 (range)

7.24.2. Current BALANCE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter
0x1D : EQ 100Hz
0x1E : EQ 300Hz
0x1F : EQ 1KHz
0x20 : EQ 3KHz
0x21 : EQ 10KHz

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Equalizer getting value
0 ~ 20 (range)

7.25. " ONHOUR " Control procedure

7.25.1. ONHOUR Control (Power on time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x22)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x22) : ' ONHOUR ' parameter
Value: 0 ~ 23 (range)

7.25.2. Current ONHOUR state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x22)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x22) : ' ONHOUR ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current ONHOUR getting value
0 ~ 23 (range)

7.26. " ONMINUTE " Control procedure

7.26.1. ONMINUTE Control (Power on time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x23)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x23) : ' ONMINUTE ' parameter
Value: 0 ~ 59 (range)

7.26.2. Current ONMINUTE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x23)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x23) : ' ONMINUTE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current ONMINUTE getting value
0 ~ 59 (range)

7.27. " ONTIMEONOFF " Control procedure

7.27.1. ONTIMEONOFF Control (Power ON time control)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x24)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x24) : ' ONTIMEONOFF ' parameter
Value: Data value
0 : Disable
1 : Enable

7.27.2. Current ONTIMEONOFF state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x24)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x24) : ' ONTIMEONOFF ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current ONTIMEONOFF getting value
0 : Disable
1 : Enable

7.28. " ONTIMEVOL " Control procedure

7.28.1. ONTIMEVOL Control (Power ON Volume)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x25)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x25) : ' ONTIMEVOL ' parameter
Value: 0 ~ 100 (range)

7.28.2. Current ONTIMEVOL state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x25)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x25) : ' ONTIMEVOL ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current ONTIMEVOL getting value
0 ~ 100 (range)

7.29. " OFFHOUR " Control procedure

7.29.1. OFFHOUR Control (Power OFF time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x26)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x26) : ' OFFHOUR ' parameter
Value: 0 ~ 23 (range)

7.29.2. Current OFFHOUR state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x26)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x26) : ' OFFHOUR ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current OFFHOUR getting value
0 ~ 23 (range)

7.30. " OFFMINUTE " Control procedure

7.30.1. OFFMINUTE Control (Power OFF time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x27)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x27) : ' OFFMINUTE ' parameter
Value: 0 ~ 59 (range)

7.30.2. Current OFFMINUTE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x27)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x27) : ' OFFMINUTE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current OFFMINUTE getting value
0 ~ 59 (range)

7.31. " OFFTIMEONOFF " Control procedure

7.31.1. OFFTIMEONOFF Control (Power OFF time control)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x28)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x28) : ' OFFTIMEONOFF ' parameter
Value: Data value
0 : Disable
1 : Enable

7.31.2. Current OFFTIMEONOFF state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x26)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x26) : ' OFFTIMEONOFF ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current OFFTIMEONOFF getting value
0 : Disable
1 : Enable

7.32. " HALFTONE " Control procedure

7.32.1. HALFTONE Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2A)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x2A) : ' HALFTONE ' parameter
Value: Data value
0 : Disable
1 : Enable

7.32.2. Current HALFTONE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2A)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2A) : 'HALFTONE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current HALFTONE getting value
0 : Disable
1 : Enable

7.33. " BLUESCREEN " Control procedure

7.33.1. BLUESCREEN Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2B)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x2B) : ' BLUESCREEN ' parameter
Value: Data value
0 : Disable
1 : Enable

7.33.2. Current BLUESCREEN state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2B)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2B) : ' BLUESCREEN ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current BLUESCREEN getting value
0 : Disable
1 : Enable

7.34. " PIXELSHIFT_EN " Control procedure

7.34.1. PIXELSHIFT_EN Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2C)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x2C) : ' PIXELSHIF_EN ' parameter
Value: Data value
0 : Disable
1 : Enable

7.34.2. Current PIXELSHIFT_EN state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2C)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2C) : ' PIXELSHIFT ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current PIXELSHIFT getting value
0 : Disable
1 : Enable

7.35. " WIPER_EN " Control procedure

7.35.1. WIPER Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2D)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x2D) : ' WIPER ' parameter
Value: Data value
0 : Disable
1 : Enable

7.35.2. Current WIPER state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2D)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2D) : 'WIPER ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current WIPER getting value
0 : Disable
1 : Enable

7.36. " BGGRAY " Control procedure

7.36.1. BGGRAY Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2E)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x2E) : ' BGGRAY ' parameter
Value: 0~7 (range)

7.36.2. Current BGGRAY state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2E)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2A) : 'BGGRAY ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current BGGRAY getting value
0~7 (range)

7.37. " POWER "(read only) Control procedure

7.37.1. Current Power state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x2F)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x2F) : 'POWER ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Power state getting value
0 : Power off
1 : Power on

7.38. " CURHOUR " Control procedure

7.38.1. CURHOUR Control (Current time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x30)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x30) : ' CURHOUR ' parameter
Value: 0 ~ 23 (range)

7.28.2. Current CURHOUR state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x30)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x30) : ' CURHOUR ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current HOUR getting value
0 ~ 23 (range)

7.39. " CURMINUTE " Control procedure

7.39.1. CURMINUTE Control (Current time)

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x31)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x31) : ' CURMINUTE ' parameter
Value: 0 ~ 59 (range)

7.39.2. Current CURMINUTE state read

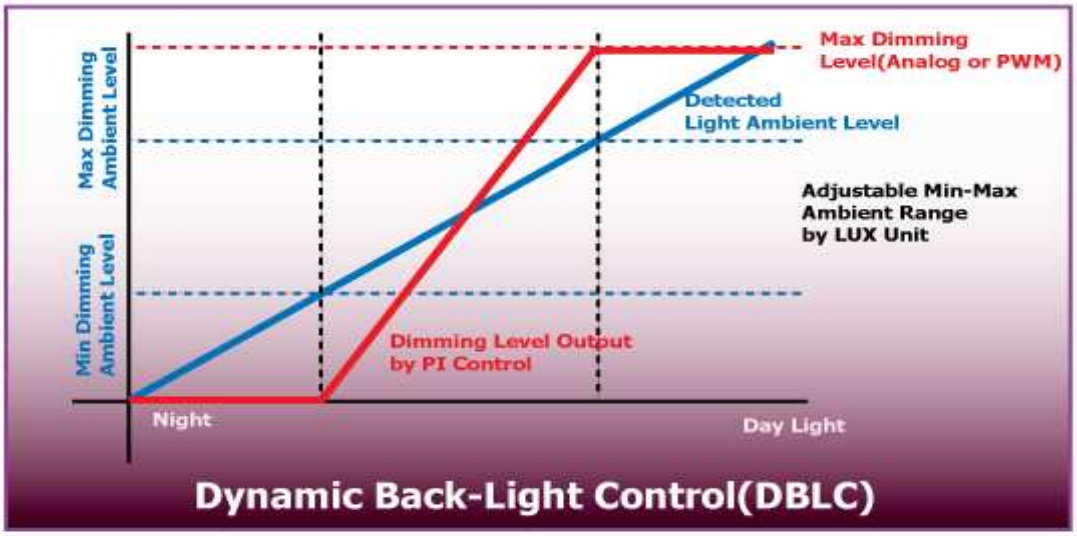
CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x31)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x31) : ' CURMINUTE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current MINUTE getting value
0 ~ 59 (range)

Dimming Control (7.40 ~ 7.42)		
Auto dimming control mode. Refer to diagram of DBLC		
On : Dimming varies by light ambient level		
Off : Dimming varies by brightness of image settings		
MAX_ILLUMINANCE	Max dimming ambient level	Setting Value = Ambient Level (by LUX) / 100
MIN_ILLUMINANCE	Min dimming ambient level	Setting Value = Ambient Level (by LUX) / 10
AUTO_DIM	Apply auto dimming	0 : off, 1: on



7.40. " MAX_ILLUMINANCE " Control procedure

7.40.1. MAX_ILLUMINANCE Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x33)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x33) : ' MAX_ILLUMINANCE ' parameter
Value: 0 ~ 200 (range)

7.40.2.Current MAX_ILLUMINANCE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x33)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x33) : 'MAX_ILLUMINANCE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current MAX_ILLUMINANCE getting value
0 ~ 200 (range)

7.41. " MIN_ILLUMINANCE " Control procedure

7.41.1. MIN_ILLUMINANCE Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x34)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x34) : ' MIN_ILLUMINANCE ' parameter
Value: 0 ~ 200 (range)

7.41.2. Current MIN_ILLUMINANCE state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x34)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x34) : 'MIN_ILLUMINANCE ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current MIN_ILLUMINANCE getting value
0 ~ 200 (range)

7.42. “ AUTO_DIM ” Control procedure

7.42.1. AUTO_DIM Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x35)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x35) : ‘ AUTO_DIM ’ parameter
Value: Data value
0 : off
1 : on

7.42.2. Current AUTO_DIM state read

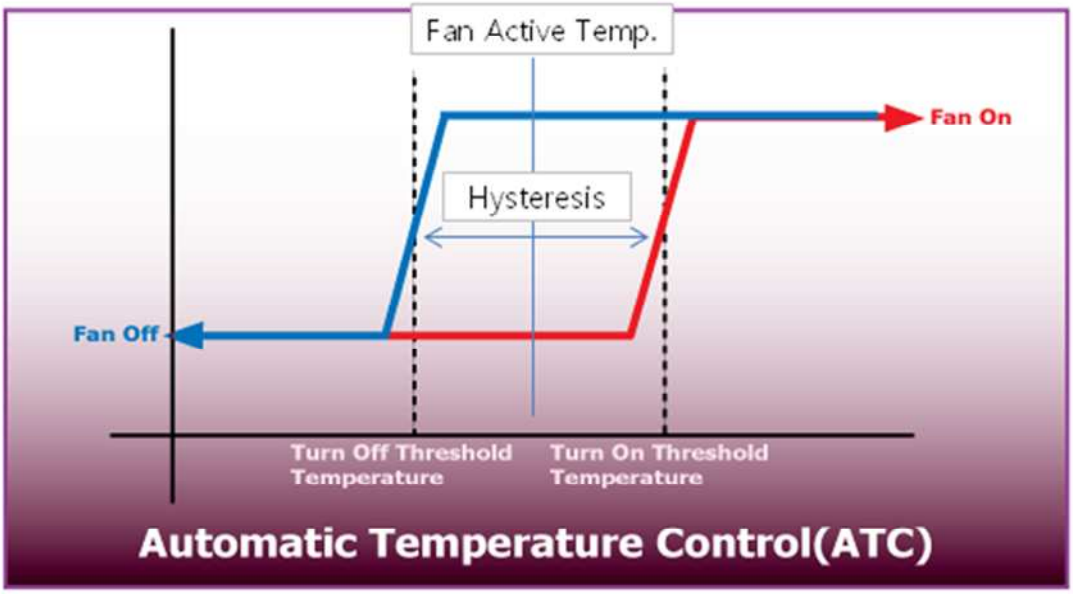
CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x35)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x35) : ‘AUTO_DIM’ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current AUTO_DIM getting value
0 : off
1 : on

Fan Control (7.43 ~ 7.47)		
There are three kind of fan control mode as below; Please refer to diagram of ATC		
On : Always activates fan		
Auto : Automatic activates/deactivates fans by temperature variation.		
CURTEMP_MAIN	Get current temperature of main sensor	Reversed equation of TEMP_THRESHOLD to get real temperature
CURTEMP_AUX	Get current temperature of aux sensor	Reversed equation of TEMP_THRESHOLD to get real temperature
TEMP_THRESHOLD	Fan activation temperature	Setting Value = Desired temperture(by Celsius) x 2 + 60
TEMP_HYSTERESIS	Fan activation hysteresis temperature	Setting Value = Desired Hysteresis(by Celsius) x 2
FAN_CONTROL	Set fan control mode	1:on, 2: auto



7.43. " CURTEMP_MAIN " Control procedure

7.43.1. Current main Temperature state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x37)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x37) : 'CURTEMP_MAIN ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Temperature getting value

7.44. " CURTEMP_AUX " Control procedure

7.44.1. Current aux Temperature state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x38)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x38) : 'CURTEMP_AUX ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current Temperature getting value

7.45. " TEMP_THRESHOLD " Control procedure

7.45.1. TEMP_THRESHOLD Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x39)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x39) : ' TEMP_THRESHOLD ' parameter
Value: 60 ~ 200 (range)

7.45.2. Current TEMP_THRESHOLD state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x39)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x39) : 'TEMP_THRESHOLD ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current TEMP_THRESHOLD getting value
60 ~ 200 (range)

7.46. " TEMP_HYSTERESIS " Control procedure

7.46.1. TEMP_ HYSTERESIS Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3A)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x3A) : ' TEMP_HYSTERESIS ' parameter
Value: 2 ~ 20 (range)

7.46.2. Current TEMP_ HYSTERESIS state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3A)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x3A) : 'TEMP_ HYSTERESIS ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current TEMP_ HYSTERESIS getting value
2 ~ 20 (range)

7.47. “ FAN_CONTROL ” Control procedure

7.47.1. FAN_CONTROL Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3B)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x3B) : ‘ FAN_CONTROL ’ parameter
Value: Data value
1 : on
2 : auto

7.47.2. Current FAN_CONTROL state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3B)

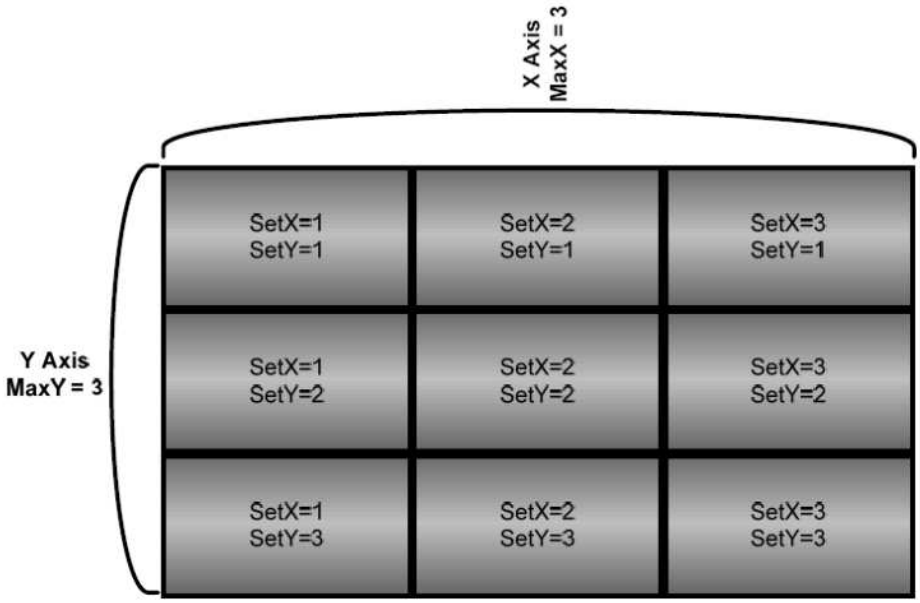
Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x3B) : ‘FAN_CONTROL ‘ parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current FAN_CONTROL getting value
1 : on
2 : auto

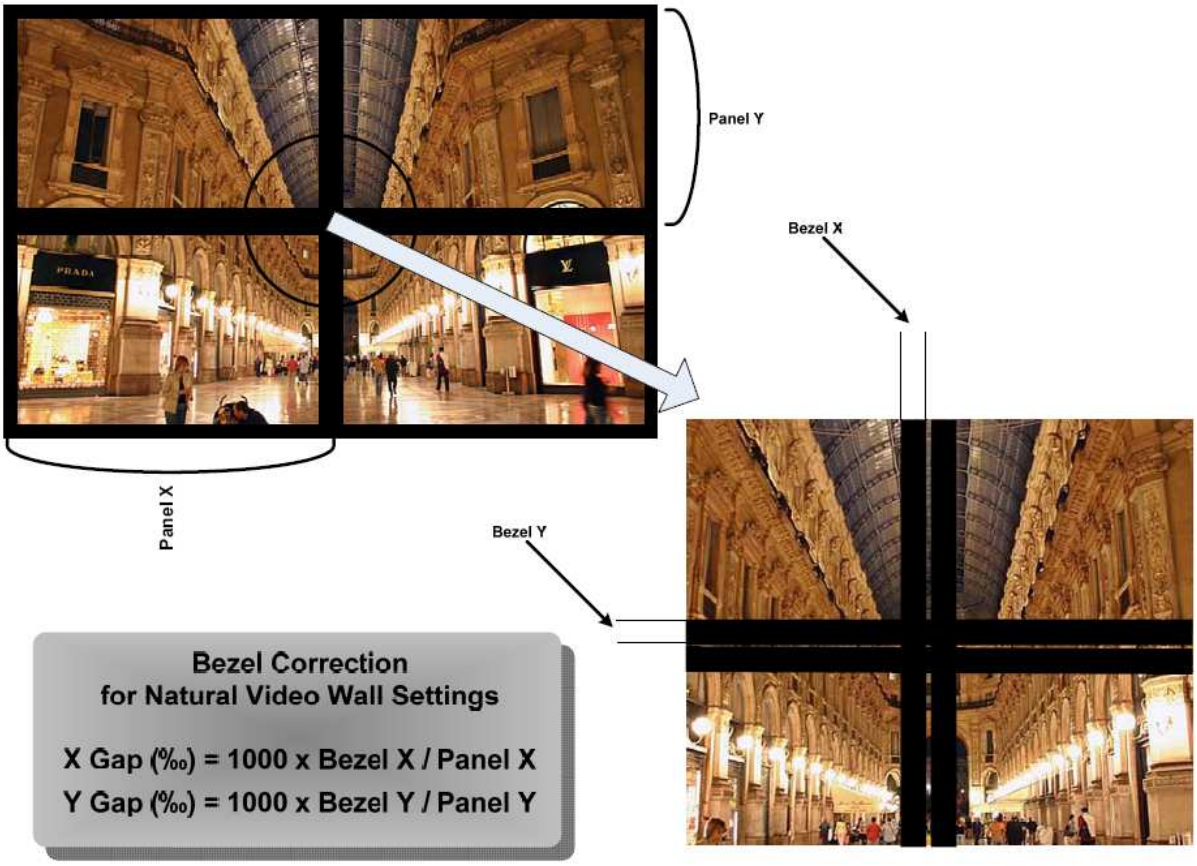
(5.48 ~ 5.53)

- **Video Wall Layout Settings**



X Max : Maximum number of column tiles to divide video image.
Y Max : Maximum number of row tiles to divide video image.
Set X : Coordinate of video image's column position.
Set Y : Coordinate of video image's row position.

- **Setting the Bezel Corrections for Natural Tiled Image**



X Gap : Proportional Value of Vertical Bezel to Panel size by Per-mil unit.
Y Gap : Proportional Value of Horizontal Bezel to Panel size by Per-mil unit.

7.48. " SETX " Control procedure

7.48.1. SETX Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3D)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x3D) : ' SETX ' parameter
Value: 0 ~ 2 (range)

7.48.2. Current SETX state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3D)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x3D) : 'SETX ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETX getting value
0 ~ 2 (range)

7.49. " SETY " Control procedure

7.49.1. SETY Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3E)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x3E) : ' SETY ' parameter
Value: 0 ~ 2 (range)

7.49.2. Current SETY state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3E)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x3E) : 'SETY ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETY getting value
0 ~ 2 (range)

7.50. " SETXMAX " Control procedure

7.50.1. SETXMAX Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3F)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x3F) : ' SETXMAX ' parameter
Value: 1 ~ 3 (range)

7.50.2. Current SETXMAX state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x3F)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x3F) : 'SETXMAX ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETXMAX getting value
1 ~ 3 (range)

7.51. " SETYMAX " Control procedure

7.51.1. SETYMAX Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x40)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x40) : ' SETYMAX ' parameter
Value: 1 ~ 3 (range)

7.51.2.Current SETYMAX state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x40)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x40) : 'SETYMAX ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETYMAX getting value
1 ~ 3 (range)

7.52. " SETXGAP " Control procedure

7.52.1. SETXGAP Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x41)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x41) : ' SETXGAP ' parameter
Value: 0 ~ 200 (range)

7.52.2.Current SETXGAP state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x41)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x41) : 'SETXGAP ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETXGAP getting value
0 ~ 200 (range)

7.53. " SETYGAP " Control procedure

7.53.1. SETYGAP Control

CMD	Data1	Data2	Data3	Data4	Data5
Command (0xF5)	Target (0x88)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x42)	Value

Command (0xF5) : Start bit
Target (0x88) : Set bit
Monitor ID (0x00) : Default value -> 0x00
CMD (0xFE) : command data
Parameter(0x40) : ' SETYGAP ' parameter
Value: 0 ~ 200 (range)

7.53.2.Current SETYGAP state read

CMD	Data1	Data2	Data3	Data4
Command (0xF4)	Target (0x89)	Monitor ID (0x00)	CMD (0xFE)	Parameter (0x42)

Command (0xF4) : Start bit
Target (0x89) : Get bit
Monitor ID (0x00) : Default value -> 0x00
CMD(0xFE) : command data
Parameter (0x42) : 'SETYGAP ' parameter

CMD	**Data1**
Command (0xF1)	**Value**

Command (0xF1) : Start send bit
Value : Current SETYGAP getting value
0 ~ 200 (range)