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I. Application

This document defines the communications method for control of the NEC LCD monitor, MultiSync P402 /P462 /P552 /P702 /V422 /V462 /V551 /V651 /V322 /V652 /V552 /X461S /X551S /X401S /X463UN /X551UN /V463 /V423 /X462S /X552S /X462UNV /V801 /V323 /V801-TM /V552-TM /V323-2 when using an external controller.

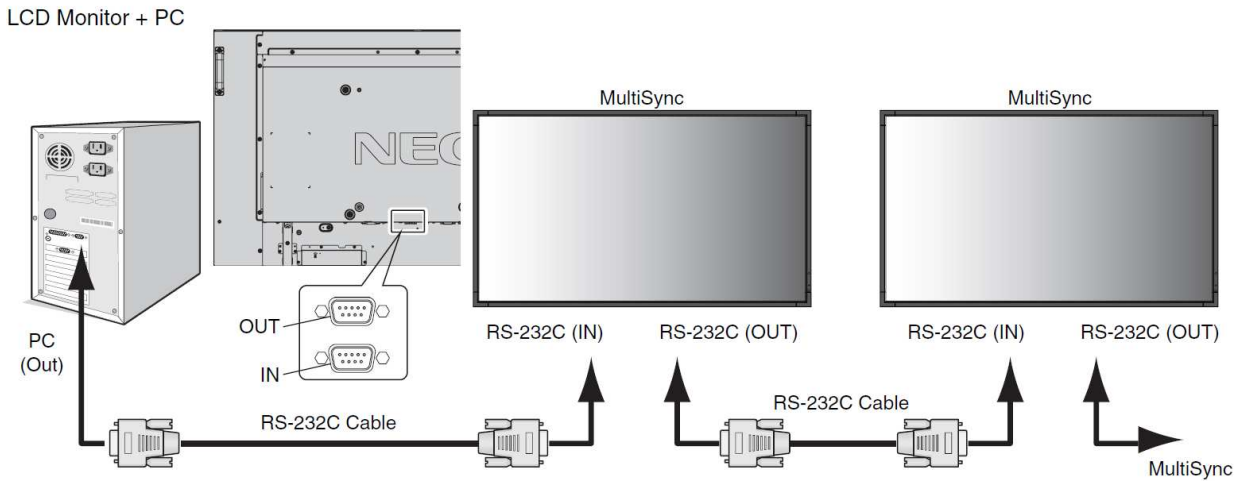
II. Preparation

2. Connectors and wiring

2.1 RS-232C Remote control

Connector: 9-pin D-Sub
Cable: Cross (reversed) cable or null modem cable

Connection

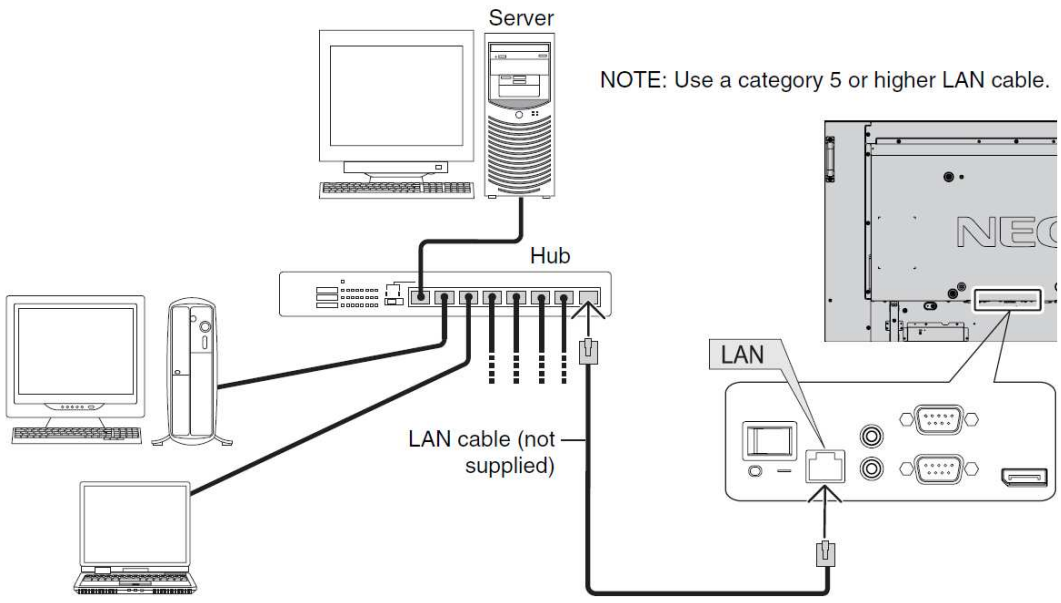


(Please refer "Controlling the LCD monitor via RS-232C Remote control" on User's manual.)

2.2 LAN control

Connector: RJ-45 10/100 BASE-T
Cable: Category 5 or higher LAN cable

Example of LAN connection:



(Please refer "Controlling the LCD monitor via LAN control" on User's manual.)

III. Communication specification

3. Communication Parameter

3.1 RS-232C Remote control

(1) Communication system	Asynchronous
(2) Interface	RS-232C
(3) Baud rate	9600bps
(4) Data length	8bits
(5) Parity	None
(6) Stop bit	1 bit
(7) Communication code	ASCII

3.2 LAN control

(1) Communication system	TCP/IP (Internet protocol suite)
(2) Interface	Ethernet (CSMA/CD)
(3) Communication layer	Transport layer (TCP) * Using the payload of TCP segment.
(4) IP address	(Default) 192.168.0.10 * If you need to change, Please refer "Network settings" on User's manual.
(5) Port No.	7142 (Fixed)

(Note)
The monitor will disconnect the connection if no packet data is received for 15 minutes.
And the controller (PC) has to re-connect to control the monitor again, after 15 minutes or more.

3.3 Communication timing

The controller should wait for a reply packet before the next command is sent.
(Note)
When the following commands are sent, a controller should wait for specified period after receiving the reply command before sending the next command.

- Power On, Power Off: 15 seconds
- Input, PIP Input, Auto Setup, Factory Reset: 10 seconds

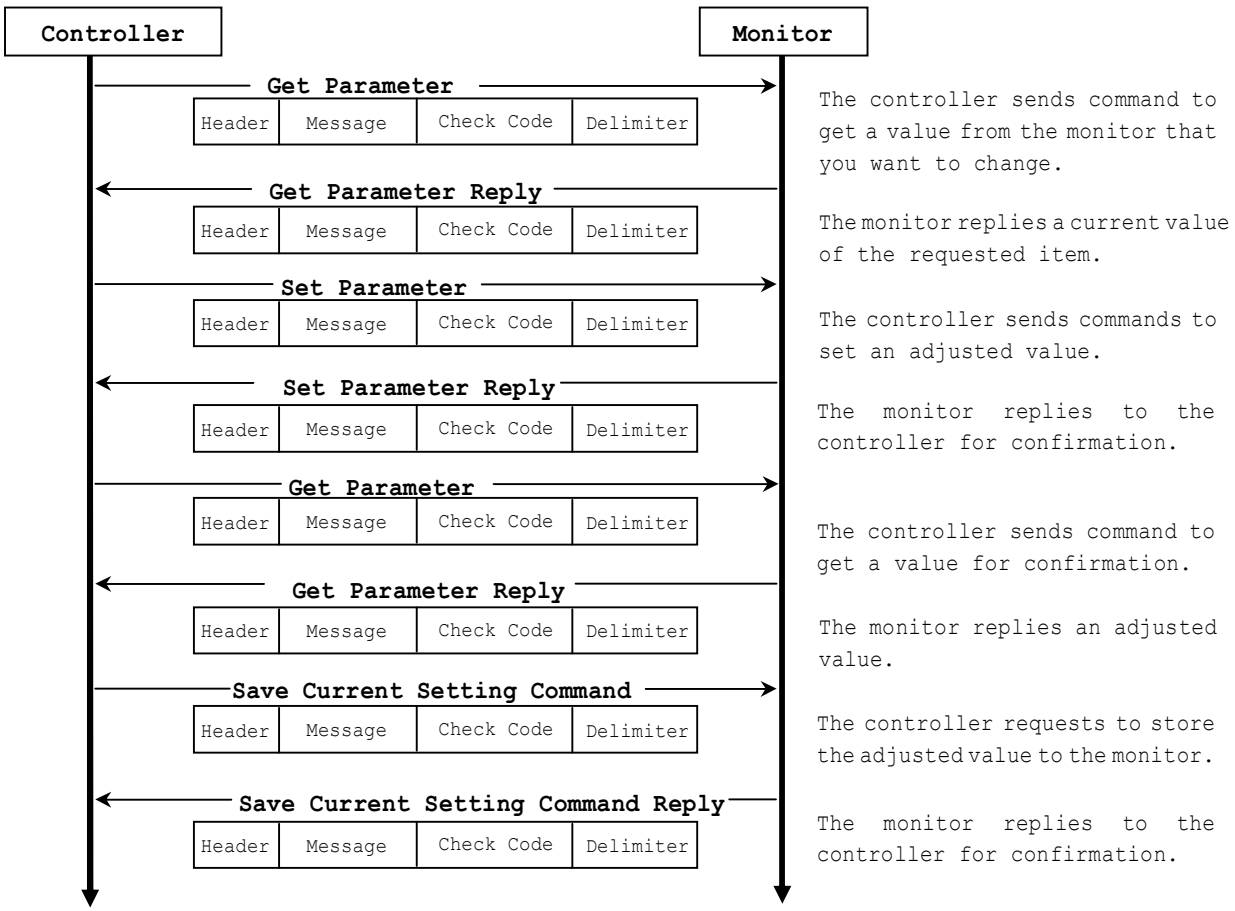
4. Communication Format

Header	Message	Check Code	Delimiter

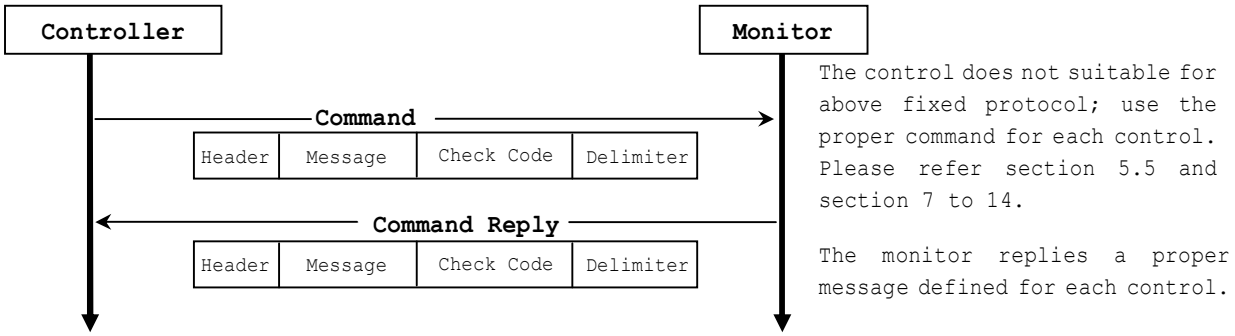
The command packet consists of four parts, Header, Message, Check code and Delimiter.

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

■ For the general command (see the part "6.3. Operation Code (OP code) Table")



■ For the special command (see the part 7 to 14. and 5.5.2)



4.1 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

1st byte) SOH: Start of Header
ASCII SOH (01h)

2nd byte) Reserved: Reserved for future extensions.

On this monitor, it must be ASCII '0'(30h).

3rd byte) Destination: Destination equipment ID. (Receiver)

Specify a commands receiver's address.

The controller sets the "MONITOR ID" or "GROUP ID" of the monitor controlled in here.

On the reply, the monitor sets '0' (30h), always.

"MONITOR ID", "GROUP ID" to "Destination Address" conversion table is as follows,

Monitor ID	Destination Address	Monitor ID	Destination Address	Monitor ID	Destination Address	Monitor ID	Destination Address
1	41h('A')	26	5Ah('Z')	51	73h	76	8Ch
2	42h('B')	27	5Bh	52	74h	77	8Dh
3	43h('C')	28	5Ch	53	75h	78	8Eh
4	44h('D')	29	5Dh	54	76h	79	8Fh
5	45h('E')	30	5Eh	55	77h	80	90h
6	46h('F')	31	5Fh	56	78h	81	91h
7	47h('G')	32	60h	57	79h	82	92h
8	48h('H')	33	61h	58	7Ah	83	93h
9	49h('I')	34	62h	59	7Bh	84	94h
10	4Ah('J')	35	63h	60	7Ch	85	95h
11	4Bh('K')	36	64h	61	7Dh	86	96h
12	4Ch('L')	37	65h	62	7Eh	87	97h
13	4Dh('M')	38	66h	63	7Fh	88	98h
14	4Eh('N')	39	67h	64	80h	89	99h
15	4Fh('O')	40	68h	65	81h	90	9Ah
16	50h('P')	41	69h	66	82h	91	9Bh
17	51h('Q')	42	6Ah	67	83h	92	9Ch
18	52h('R')	43	6Bh	68	84h	93	9Dh
19	53h('S')	44	6Ch	69	85h	94	9Eh
20	54h('T')	45	6Dh	70	86h	95	9Fh
21	55h('U')	46	6Eh	71	87h	96	A0h
22	56h('V')	47	6Fh	72	88h	97	A1h
23	57h('W')	48	70h	73	89h	98	A2h
24	58h('X')	49	71h	74	8Ah	99	A3h
25	59h('Y')	50	72h	75	8Bh	100	A4h
ALL	2Ah('*')						

Group ID	Destination Address	Group ID	Destination Address	Group ID	Destination Address	Group ID	Destination Address
A	31h('1')	D	34h('4')	G	37h('7')	J	3Ah(':')
B	32h('2')	E	35h('5')	H	38h('8')		
C	33h('3')	F	36h('6')	I	39h('9')		

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).

On the reply, the monitor sets the own MONITOR ID in here.

5th byte) Message Type: (Case sensitive.)

Refer to section 4.2 "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).

4.2 Message block format

Header	**Message**	Check code	Delimiter

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

Refer to the section 4.1 "Header block format" 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 "6.3 Operation code table".

"Message format" of the "Get current parameter" is as follows,

STX	OP code page		OP code		ETX
	Hi	Lo	Hi	Lo	

- Refer to section 5.1 "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 format" 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 "Get parameter reply" for more details.

3) Set parameter

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

Message format 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 5.3 "Set parameter" for more details.

4) Set Parameter reply

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

Message format 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 5.4 "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 "Save current settings", "Get timing report", "power control", "Schedule", etc. Refer to

section 5.5 “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 5.5 “Commands message” for more details.

4.3 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(H)	D_5								
Length(L)	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

4.4 Delimiter

Header	Message	Check code	**Delimiter**

Packet delimiter code; ASCII CR(0Dh).

5. Message type

5.1 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 "6.3 Operation code table".

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 "6.3 Operation code table" 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 Operation code table. (6.3)

4th-5th bytes) OP code: Operation code

Refer to "6.3 Operation code table" 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 Operation code table.

6th byte) ETX: End of Message

ASCII ETX (03h)

5.2 "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 the operation code table.

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 the operation code table.

Ex.) The byte data 1Ah is encoded to ASCII character '1' and 'A' (31h and 41h).

8th -9th bytes) 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-13th bytes) 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 -17th bytes) Current Value: (16bits)

This returned value from the monitor is encoded to ASCII characters.

Ex.) '0','1','2' and '3' means 0123h (291)

18th byte) ETX: End of Message

ASCII ETX (03h)

5.3 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.

1st byte) STX: Start of Message

ASCII STX (02h)

2nd-3rd bytes) 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 the Operation code table.

4th-5th bytes) 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 the Operation code table.

6th-9th bytes) 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)

10th byte) ETX: End of Message

ASCII ETX (03h)

5.4 "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.

1st byte) STX: Start of Message

ASCII STX (02h)

2nd-3rd bytes) 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-5th bytes) 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 Operation code table.

6th-7th bytes) 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 Operation code table

8th-9th bytes) 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-13th bytes) 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 -17th bytes) 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)

18th byte) ETX: End of Message

ASCII ETX (03h)

5.5 Commands

"Command message format" depends on each command. Some commands are shown with usage. Refer to section 7 to 13.

5.5.1 Save Current Settings.

The controller requests for the monitor to store the adjusted value.

STX	Command code		ETX
	'0'	'C'	

- Send "OC"(30h, 43h) as Save current settings command.
- Complete "Save Current setting" command packet as follows;

ASCII: 01h-30h-41h-30h-41h-30h-34h-02h-30h-43h-03h-CHK-0Dh

SOH-'0'-'A'-'0'-'A'-'0'-'4'-STX-'0'-'C'-ETX-CHK- CR

The monitor replies the packet for confirmation as follows;

SOH-'0'-'0'-'A'-'B'-'0'-'6'-STX-'0'-'0'-'0'-'C'-ETX-CHK- CR

5.5.2 Get Timing Report and Timing reply.

The controller requests the monitor to report the displayed image timing.

STX	Command code		ETX
	'0'	'7'	

- Send "07"(30h, 37h) as Get Timing Report command.
- Complete "Get Timing Report" command packet as follows;

ASCII: 01h-30h-41h-30h-41h-30h-34h-02h-30h-37h-03h-CHK-0Dh

SOH-'0'-'A'-'0'-'A'-'0'-'4'-STX-'0'-'7'-ETX-CHK- CR

The monitor replies status as the following format;

STX	Command		SS		H Freq.				V Freq.				ETX
	'4'	'E'	Hi	Lo	MSB			LSB	MSB			LSB	

- SS: Timing status byte

  Bit 7 = 1: Sync Frequency is out of range.
  Bit 6 = 1: Unstable count
  Bit 5-2 Reserved (Don't care)
  Bit 1 1:Positive Horizontal sync polarity.
  0:Negative Horizontal sync polarity.
  Bit 0 1:Positive Vertical sync polarity.
  0:Negative Vertical sync polarity.

- H Freq: Horizontal Frequency in unit 0.01kHz
- V Freq: Vertical Frequency in unit 0.01Hz

  Ex.) When H Freq is '1''2''A''9' (31h, 32h, 41h, 39h), it means 47.77kHz.

5.5.3 NULL Message

STX	Command code		ETX
	'B'	'E'	

The NULL message returned from the monitor is used in the following cases;

- To tell the controller that the monitor does not have any answer to give to the host (not ready or not expected)
- Complete "NULL Message" command packet as follows;

  01h-30h-30h-41h-42h-30h-34h-02h-42h-45h-03h-CHK-0Dh

  SOH-'0'-'0'-'A'-'B'-'0'-'4'-STX-'B'-'E'-ETX-CHK- CR

IV. Control Commands

6. Typical procedure example

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

6.1. How to change the “Backlight” setting.

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 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

Step 2. The monitor replies with current Backlight 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): Backlight max value is 100(0064h).
  '0'-'0'-'3'-'2' (30h, 30h, 33h, 32h): Current Backlight setting is 50(0032h) .
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter

CR (0Dh): End of packet

Step 3. The controller request the monitor to change the Backlight 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 Backlight setting 80(0050h).
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “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): Backlight max value is 100(0064h).
'0'-'0'-'5'-'0' (30h, 30h, 35h, 30h): Received a Backlight setting was 80(0050h) .
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

➢ Repeat Step 1 and Step 2, if you need to check the Backlight setting. (Recommended)
Step 5. Request the monitor to store the Backlight 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 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

6.2. How to read the measurement value of the built-in temperature sensors.

MultiSync P402 /P462 /P552 /P702 /V422 /V462 /V551 /V651 /V322 /V652 /V552 /X461S /X551S /X401S /X463UN /X551UN /V463 /V423 /X462S /X552S /X462UNV /V801 /V323 /V801-TM /V552-TM /V323-2 have three built-in temperature sensors.

The controller can monitor inside temperatures by using those sensors with external control.

The following shows the procedure for reading the temperatures from the sensors.

Step 1. Select a temperature sensor which you want to read.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'E'-'0'-'A'	STX-'0'-'2'-'7'-'8'-'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 get a value.
            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'-'2' (30h, 32h): Operation code page number is 2.
  '7'-'8' (37h, 38h): Operation code is 78h (on page 2).
  '0'-'0'-'0'-'1' (30h, 30h, 30h, 31h): Select the temperature sensor #1 (01h).
          00h: No meaning
          01h: Sensor #1
          02h: Sensor #2
          03h: Sensor #3
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

Step 2. The monitor replies for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'F'-'1'-'2'	STX-'0'-'0'-'0'-'2'-'7'-'8'-'0'-'0'-'0'-'0'-'0'-'3'-'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: Indicates 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'-'2' (30h, 32h): Operation code page number is 2.

'7'-'8' (37h, 38h): Operation code is 78h (in the page 2).
'0'-'0' (30h, 30h): This operation is "Set parameter" type.
'0'-'0'-'0'-'3' (30h, 30h, 30h, 33h): Number of temperature sensors are 3 (0003h).
'0'-'0'-'0'-'1' (30h, 30h, 30h, 31h): temperature sensor is #1.
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

Step 3. The controller requests the monitor to send the temperature from the selected sensor.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'C'-'0'-'6'	STX-'0'-'2'-'7'-'9'-ETX	BCC	CR

Header
SOH (01h): Start of Header
'0' (30h): Reserved
Monitor ID: Specify the Monitor ID 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".
'0'-'6' (30h, 36h): Message length is 6 bytes.

Message
STX (02h): Start of Message
'0'-'2' (30h, 32h): Operation code page number is 2.
'7'-'9' (37h, 39h): Operation code is 79h (in the page 2).
ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

Step 4. The monitor replies a temperature of selected sensor.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'D'-'1'-'2'	STX-'0'-'0'-'0'-'2'-'7'-'9'-'0'-'0' -'F'-'F'-'F'-'F'-'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'-'2' (30h, 32h): Operation code page number is 2.
'7'-'9' (37h, 39h): Operation code is 79h (in the page 2).
'0'-'0' (30h, 30h): This operation is "Set parameter" type.
'F'-'F'-'F'-'F' (46h, 46h, 46h, 46h): Maximum value.
'0'-'0'-'3'-'2' (30h, 30h, 33h, 32h): The temperature is 25 degrees Celsius.

Readout value is 2's complement.

Temperature[Celsius]	Readout value	
	Binary	Hexadecimal
+125.0	0000 0000 1111 1010	00FAh
+ 25.0	0000 0000 0011 0010	0032h
+ 0.5	0000 0000 0000 0001	0001h
0	0000 0000 0000 0000	0000h
- 0.5	1111 1111 1111 1111	FFFFh
- 25.0	1111 1111 1100 1110	FFCEh
- 55.0	1111 1111 1001 0010	FF92h

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

6.3. Operation Code (OP code) Table

	Item		OP code page	OP code	Parameter	Remarks
PICTURE	Backlight		00h	10h	0: dark | 100(64h): bright	
	Contrast		00h	12h	0: low | 100(64h): high	
	Sharpness		00h	8Ch	0: dull | 24(18h): sharp	
	Brightness		00h	92h	0: dark | 100(64h): bright	
	Hue		00h	90h	0: purplish | 100(64h): greenish	
	Color		02h	1Fh	0: pale | 100(64h): deep	
	Color Temperature		00h	54h	0:2600K | 74(4Ah):10000K	100K/step
	Color control		00h	Red: 9Bh Yellow: 9Ch Green: 9Dh Cyan: 9Eh Blue: 9Fh Magenta: A0h	0: | 100(64h):(center) | 200(C8h):	
	Gamma Correction		02h	68h	Gamma Table Selection 1: Native Gamma 4: Gamma=2.2 8: Gamma=2.4 7: S Gamma 5: DICOM SIM. 6: Programmable	
	Movie Settings	Adaptive Contrast	02h	8Dh	0: None 1: Off 2: Low 3: Middle 4: High	
		Noise Reduction	02h	26h	0: Off | 5: High	Page02-20 also works as same.
		Telecine	02h	23h	1: Off 2: Auto	
	Picture mode		02h	1Ah	1: sRGB 3: Hi-Bright 4: Standard 5: Cinema 6: ISF-Day 7: ISF-Night 11(0Bh): Ambient-1 12(0Ch): Ambient-2	sRGB: PC mode only Cinema: A/V mode only ISF-Day: ISF-Night: Each needs an adjustment by ISF.

	Item		OP code page	OP code	Parameter	Remarks
	Ambient	Ambient Brightness Low	10h	33h	0: dark | 100(64h): bright	
		Ambient Brightness High	10h	34h	0: dark | 100(64h): bright	
		Get Current Illuminance	02h	B4h	0: | Max.	Read only
		Bright Sensor Read	02h	B5h	0: | 255(FFh)	Read only
	Menu tree reset (Picture)		02h	CBh	0: None 2: Reset Picture category	Momentary
ADJUST	Auto Setup		00h	1Eh	1: Execute	Momentary
	Auto Adjust				N/A	
	H Position		00h	20h	0: Left side | Max.: Right side	Depends on a display timing
	V Position		00h	30h	0: Bottom side | Max.: Top side	Depends on a display timing
	Clock		00h	0Eh	0: | Max. :	
	Phase		00h	3Eh	0: | Max. :	
	H Resolution		02h	50h	0: Low | Max. : High	
	V Resolution		02h	51h	0: Low | Max.: High	

	Item		OP code page	OP code	Parameter	Remarks
	Input Resolution		02h	DAh	Input Resolution select 0:no mean 1:Item 1(always Auto) 2:Item 2 3:Item 3 4:Item 4 5:Item 5 Over5:Ignore Ex) Item 1= AUTO Item 2= -- / 1024x768 / 1400x1050 / 800x600 / 1280x960 Item 3= -- / 1280x768 / 1680x1050 / 1024x576 / 1600x900 / Item 4= -- / 1360x768 / -- / -- / -- Item 5= -- / 1366x768 -- / -- / --	
	Aspect		02h	70h	0: No operate 1: Normal 2: Full 3: Wide 4: Zoom 5: (reserved) 6: Dynamic 7: Off (dot by dot)	Wide: Dynamic A/V mode only
	Zoom Control	Zoom	02h	6Fh	1:100% 2:101% | 201:300%	
		Zoom H-Expansion	02h	6Ch	1:100% 2:101% | 201:300%	
		Zoom V-Expansion	02h	6Dh	1:100% 2:101% | 201:300%	
		Zoom H-Position	02h	CCh	0: Left side | Max.: Right side	
		Zoom V-Position	02h	CDh	0: Down side | Max.: Up side	
	Menu tree reset (Adjust)		02h	CBh	0: None 3: Reset Adjust category	Momentary

	Item	OP code page	OP code	Parameter	Remarks
AUDIO	Volume	00h	62h	0: whisper | 100: loud	00h
	Balance	00h	93h	O: Left | 30:(Center) | 60: Right	Not available on X463UN,X551UN
	Treble	00h	8Fh	O: Min. | 6:(Center) | 12: Max.	Not available on X463UN,X551UN
	Bass	00h	91h	0: Min. | 6:(Center) | 12: Max.	Not available on X463UN,X551UN
	PIP Audio	10h	80h	0: No operate 1: Main 2: Sub	
	Line out	10h	81h	0: No operate 1: Fixed 2: Variable	
	SURROUND	02h	34h	1: Off 2: Low (or On) 3: High (or On)	Not available on X463UN,X551UN
	Audio Input	02h	2Eh	1: Audio 1(PC) 2: Audio 2 3: Audio 3 4: HDMI 6: TV/Option 7: Display Port	
	Audio Delay	10h	CAh	1: Off 2: On	
	Delay Time	10h	CBh	0: Min. | 100: Max.	
	Menu tree reset (Audio)	02h	CBh	0: None 4: Reset Audio category	Momentary
SCHDULE	Off Timer	02h	2Bh	0: Off 1: 1 hour | 24: 24 hours	1 hour/step
	Enable Schedule	02h	E5h	0: No Mean 1: No.1 Enable | 7: No.7 Enable	
	Disable Schedule	02h	E6h	0: No Mean 1: No.1 Disable | 7: No.7 Disable	
	Menu tree reset (Schedule)	02h	CBh	0: None 5: Reset Schedule category	Momentary

	Item		OP code page	OP code	Parameter	Remarks
PIP	Keep PIP Mode		10h	82h	0: No operate 1: Off 2: On	
	PIP Mode		02h	72h	1: Off 2: PIP 3: POP 4: Still 5: Side by side (aspect) 6: Side by side (Full) 7: (reserved) 8: (reserved)	
	PIP Size		02h	71h	1: Small 2: Middle 3: Large	
	PIP H Position		02h	74h	0: left | 100(64h): right	
	PIP V Position		02h	75h	0: top | 100(64h): bottom	
	Aspect		10h	83h	0: No operate 1: Normal 2: Full 3: Wide 4: (reserved) 5: (reserved)	
	Text Ticker	Mode	10h	08h	0: None 1: Off 2: Horizontal 3: Vertical	
		Position	10h	09h	0: Top/Left | 100: Bottom/Right	
		Size	10h	0Ah	0-1: Do not set. 2: Narrow(2/24) | 8: Wide(8/24)	
		Blend	10h	0Bh	1: 10% | 10: 100%	
		Detect	10h	0Ch	0: None 1: Auto 2: Off	
		Fade In	10h	0Dh	0: None 1: On 2: Off	
	PIP Input(Sub input)		02h	73h	0: No mean 1: VGA 2: RGB/HV 3: DVI 4: HDMI (Set only) 5: Video1 6: Video2 7: S-Video 12(0Ch): DVD/HD1 13(0Dh): Option 14(0Eh): DVD/HD2 15(0Fh): Display Port 17(11h): HDMI	This operation has limitation of selection. Please refer to the monitor instruction manual.

	Item		OP code page	OP code	Parameter	Remarks
	Menu tree reset (PIP)		02h	CBh	0: None 6: Reset PIP category	Momentary
OSD	Language		00h	68h	1: English 2: German 3: French 4: Spanish 5: Japanese 6: Italian 7: Swedish 9: Russian 14(0Eh): Chinese	OSD Language
	Menu Display Time		00h	FCh	0-1: Do not set. 2: 10s 3: 15s | 48: 240s	5sec/step
	OSD Position	H Position	02h	38h	0: Left | MAX.: Right	
		V Position	02h	39h	0: Down | MAX.: Up	
	Information OSD		02h	3Dh	0:Disable information OSD 3-10: OSD timer [seconds]	
	OSD Transparency		02h	B8h	0: None 1: Off(Opaque) 2: On(Translucent) 3: (reserved)	
	OSD Rotation		02h	41h	0: Normal 1: Rotated	
	Closed Caption		10h	84h	0: No operate 1: Off 2: CC1 3: CC2 4: CC3 5: CC4 6: TT1 7: TT2 8: TT3 9: TT4	
	Menu tree reset (OSD)		02h	CBh	0: None 7: Reset OSD category	Momentary
MULTI DISPLAY	Monitor ID		02h	3Eh	1-100:ID	
	Group ID		10h	7Fh	0: No assignment 1: Group A 2: Group B 3: Group AB 4: Group C 5: Group AC | 1023:Group ABCDEFGHIJ	Bit0:Group A Bit1:Group B Bit2:Group C Bit3:Group D Bit4:Group E Bit5:Group F Bit6:Group G Bit7:Group H Bit8:Group I Bit9:Group J
	IR Control		02h	3Fh	1: Normal 2: Primary 3: Secondary 4: Lock (Off)	

	Item		OP code page	OP code	Parameter	Remarks
	IR Lock Settings	Mode Select	10h	D4h	1: Unlock 2: All Lock 3: Custom Lock	
		Power	10h	D5h	1: Unlock 2: Lock	
		Volume	10h	D6h	1: Unlock 2: Lock	
		Min Vol.	10h	D7h	0: whisper | 100: loud	
		Max Vol.	10h	D8h	0: whisper | 100: loud	
		Input	10h	D9h	1: Unlock 2: Lock	
		Unlock Select	10h	DAh	0: No mean 1: VGA 2: RGB/HV 3: DVI 4: HDMI (Set only) 5: Video1 6: Video2 7: S-Video 12(0Ch): DVD/HD1 13(0Dh): Option 14(0Eh): DVD/HD2 15(0Fh): Display Port 17(11h): HDMI	
			10h	DBh		
			10h	DCh		
	Tile Matrix	H monitor	02h	D0h	1 | 10	Number of H-division
		V monitor	02h	D1h	1 | 10	Number of V-division
		Position	02h	D2h	1: Upper left | MAX.: Lower right	
		Tile comp	02h	D5h	1: Disable (Off) 2: Enable (On)	
		Mode	02h	D3h	1: Disable (Off) and display frame 2: Enable (On) 3: Disable (Off) and erase frame (Set only)	
	Tile Matrix Mem		10h	4Ah	0: None 1: Common(default) 2: Each Input	
	Power On Delay		02h	D8h	0: Off (0sec) | 50:50sec	
	Power Indicator		02h	BEh	0: None 1: On 2: Off	
	External control	Control	10h	3Eh	0: No mean 1: RS-232C 2: LAN	
		ID=All Reply	10h	85h	0: No operate 1: On 2: Off	
	Setting copy				N/A	

	Item		OP code page	OP code	Parameter	Remarks
	Menu tree reset (Multi Display)		02h	CBh	0: None 8: Reset Multi Display category	Momentary
DISPLAY PROTECTION	Power Save		00h	E1h	0: Off 1: On	
	Video Power Save		02h	D6h	0: No mean 1: Off 2: On	
	Fan Control		02h	7Dh	0: None 1: Auto(No offset) 2: Forced ON 3: Auto(offset -2) 4: Auto(offset -4) 5: Auto(offset -6) 6: Auto(offset -8) 7: Auto(offset -10)	Offset affects to a selected sensor.
	Fan Speed		10h	3Fh	0: None 1: High 2: Low	
	Screen Saver	Gamma	02h	DBh	1: normal 2:screen saving gamma	
		Brightness	02h	DCh	1:normal 2:decrease brightness	
		Motion	02h	DDh	0: 0s(Off) | 90: 900s	10s/step
	Side Border Color		02h	DFh	0: Black | 100: White	
	Auto Brightness		02h	2Dh	0: Off 1: On	
	Alert Mail		10h	8Bh	0: No mean 1: Off 2: On	
	Menu tree reset (Display Protection)		02h	CBh	0: None 9: Reset Display Protection category	Momentary
Advanced Option	Input Detect		02h	40h	0: First detect 1: Last detect 2: None 3: VIDEO detect 4: Custom detect	
	Custom Detect	Priority1	10h	2Eh	0: No mean 1: VGA 2: RGB/HV 3: DVI 4: HDMI (Set only) 5: Video1 6: Video2 7: S-Video 12(0Ch): DVD/HD1 13(0Dh): Option 14(0Eh): DVD/HD2 15(0Fh): Display Port 17(11h): HDMI	
		Priority2	10h	2Fh		
		Priority3	10h	30h		
		Priority4	10h	31h		
		Priority5	10h	32h		
	Input change		10h	86h	0: No operate 1: Normal 2: Quick	

	Item		OP code page	OP code	Parameter	Remarks
	Terminal Setting	DVI Mode	02h	CFh	1: DVI-PC 2: DVI-HD	
		BNC Mode	10h	7Eh	0: No operate 1: RGB 2: Component 3: Video 4: SCART 5: S-Video(※)	Not available on except X461S/X401S/X551S/ V322/V463/V423. ※Only V652/V552
		D-sub Mode	10h	8Eh	0: No operate 1: RGB 2: Component 3: Video 4: SCART 5: S-Video	Only X461S/X401S/X551S/ V322/V463/V423
		HDMI Signal	10h	40h	0: None 1: Expand 2: Raw	
	Deinterlace		02h	25h	1: Off(INTERLACE) 2: Enable (IP ON/PROGRESSIVE)	
	Color System		02h	21h	1: NTSC 2: PAL 3: SECAM 4: Auto 5: 4.43NTSC 6: PAL-60	
	Over Scan		02h	E3h	1: Off 2: On	
	Option Setting Audio		10h	B0h	0: No operate 1: analog 2: digital	
	Motion Compensation(120Hz)		10h	87h	0: No operate 1: On 2: Off	Not available on V322/X401S/V652/V552/V463/V423.
	TOUCH PANEL				N/A	
	Menu tree reset (Advanced Option)		02h	CBh	0: None 10: Reset Advanced option category	Momentary
	Menu tree reset (Factory reset)		02h	CBh	0: None 1: Factory Reset	Momentary
	Input		00h	60h	0: No mean 1: VGA 2: RGB/HV 3: DVI 4: HDMI (Set only) 5: Video1 6: Video2 7: S-Video 12(0Ch): DVD/HD1 13(0Dh): Option 14(0Eh): DVD/HD2 15(0Fh): Display Port 17(11h): HDMI	
	Audio Input		02h	2Eh	1: Audio 1(PC) 2: Audio 2 3: Audio 3 4: HDMI 6: TV/Option 7: Display Port	

	Item	OP code page	OP code	Parameter	Remarks
	Volume UP/Down	00h	62h	0: whisper | 100: loud	
	Mute	00h	8Dh	0: UNMUTE(Set only) 1: MUTE 2: UNMUTE	
	SCREEN MUTE	10h	B6h	0: None 1: SCREEN MUTE ON 2: SCREEN MUTE OFF	
	MTS	02h	2Ch	0: None 1: Main 2: Sub 3: Main + Sub	This operation requires supported option TV tuner.
	Sound	02h	34h	1: Off 2: Low (or On) 3: High (or On)	Same as 'SURROUND'
	Picture Mode	02h	1Ah	1: sRGB 3: Hi-Bright 4: Standard 5: Cinema 6: ISF-Day 7: ISF-Night 11(0Bh): Ambient-1 12(0Ch): Ambient-2	sRGB: PC mode only Cinema: A/V mode only ISF-Day: ISF-Night: Each needs an adjustment by ISF.
	Aspect	02h	70h	0: No operate 1: Normal 2: Full 3: Wide 4: Zoom 5: (reserved) 6: Dynamic 7: Off (dot by dot)	Wide: A/V mode only
	PIP ON/OFF Still ON/OFF	02h	72h	1: Off 2: PIP 3: POP 4: Still 5:Side by side (aspect) 6: Side by side (Full)	
	PIP Input	02h	73h	0: No mean 1: VGA 2: RGB/HV 3: DVI 4: HDMI (Set only) 5: Video1 6: Video2 7: S-Video 12(0Ch): DVD/HD1 13(0Dh): Option 14(0Eh): DVD/HD2 15(0Fh): Display Port 17(11h): HDMI	This operation has limitation of selection. Please refer to the monitor instruction manual.
	Still Capture	02h	76h	0: Off 1: Capture	Momentary
	Signal Information	02h	EAh	0: No Action 1: Off (No indication) 2: On (Indication)	
	Auto Setup	00h	1Eh	1: Execute	Momentary

	Item	OP code page	OP code	Parameter	Remarks
	TV-Channel UP/DOWN	00h	8Bh	0: No Action 1: Up 2: Down	This operation requires supported option TV tuner.
Temperature sensor	Select Temperature sensor	02h	78h	1: Sensor #1 2: Sensor #2 3: Sensor #3	
	Readout a temperature	02h	79h	Returned value is 2's complement. Refer to section 6.2	Read only
Carbon footprint	Readout carbon footprint (g)	10h	10h	0: | 999:	Read only
	Readout carbon footprint (kg)	10h	11h	0: | 65535:	Read only
	Readout carbon Usage (g)	10h	26h	0: | 999:	Read only
	Readout carbon Usage (kg)	10h	27h	0: | 65535:	Read only

7. Power control procedure

7.1 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 4.3 "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 4.3 "Check code" for a BCC calculation.

Delimiter
```

CR (0Dh): End of packet

7.2 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 4.3 "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 4.3 "Check code" for a BCC calculation.
```

Delimiter
  CR (0Dh): End of packet

8. Asset Data read and write

MultiSync P402 /P462 /P552 /P702 /V422 /V462 /V551 /V651 /V322 /V652 /V552 /X461S /X551S /X401S /X463UN /X551UN /V463 /V423 /X462S /X552S /X462UNV /V801 /V323 /V801-TM /V552-TM /V323-2 have the area for to store user's asset data of up to 64bytes.

8.1 Asset Data Read Request and reply

This command is used in order to read Asset Data.

1) The controller requests the monitor to reply with Asset data.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'A'	STX-'C'-'0'-'0'-'B'-'0'-'0'-'2'-'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 data.
              Ex.) If Monitor ID is '1', specify 'A'.
  '0' (30h): Message sender is the controller.
  'A' (41h): Message type is "Command".
  '0'-'A' (30h, 41h): Message length is 10 bytes.

Message
  STX (02h): Start of Message
  'C'-'0'-'0'-'B' (43h, 30h, 30h, 42h): Asset read request command.
  '0'-'0' (30h, 30h): Offset data from top of the Asset data.
    At first set 00h: Read data from the top of Asset data area.
  '2'-'0' (32h, 30h): Read out data length is 32bytes.
    Secondly set 20h: Read data from the 32bytes offset point in the Asset data area.
                      Maximum readout length is 32bytes at a time.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies Asset data to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-N-N	STX-'C'-'1'-'0'-'B'- Data(0)-Data(1)---Data(N)-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
              Ex.) The byte data 20h is encoded to ASCII characters '2' and '0' (32h and 30h).
              Note.) This length includes STX and ETX.

Message
  STX (02h): Start of Message
  'C'-'1'-'0'-'B' (43h, 31h, 30h, 42h): Asset read reply command
  Data(0) - Data(N): Retuned Asset data
  ETX (03h): End of Message

Check code
  BCC: Block Check Code

Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

8.2 Asset Data write

This command is used in order to write Asset Data.

1) The controller requests the monitor to write Asset data.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-N-N	STX-'C'-'0'-'0'-'E'-'0'-'0'- Data(0)-Data(1)---Data(N)-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID in which you want to write data.
              Ex.) If Monitor ID is '1', specify 'A'.
  '0' (30h): Message sender is the controller.
  'A' (41h): Message type is "Command".
  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
  'C'-'0'-'0'-'E' (43h, 30h, 30h, 45h): Asset Data writes command
  '0'-'0'(30h, 30h): Offset address from top of Asset data.
     00h : Write data from top of the Asset data area.
  Data(0) -- Data(N): Asset data. The data must be ASCII characters strings.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-N-N	STX-'0'-'0'-'C'-'0'-'0'-'E'-'0'-'0'- Data(0)-Data(1)---Data(N)-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' (34h and 30h).

Message
  STX (02h): Start of Message
  '0'-'0': Result code. No error.
  'C'-'0'-'0'-'E' (43h, 30h, 30h, 45h): Asset Data write command
  '0'-'0'(30h, 30h): Offset address from top of Asset data.
     00h : Write data into from top of the Asset data area.
  Data(0) -- Data(N): Asset data. The data must be ASCII characters strings.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter

CR (0Dh): End of packet

9. Date & Time read and write

9.1 Date & Time Read

This command is used in order to read the setting of Date & Time.

1) The controller requests the monitor to reply with the Date & Time.

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

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID of 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

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'1' (43h, 32h, 31h, 31h): Date & time read request command.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies Date & Time to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'4'	STX-'C'-'3'-'1'-'1'-YY-MM-DD-WW-HH-MN-DS-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'-'4'(31h, 34h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'1'-'1' (43h, 33h, 31h, 31h): Date & Time read reply command
  'YY'-'MM'-'DD'-'WW'-'HH'-'MN'-'DS': Date & Time data
        YY: Year (offset 2000)
            '0'-'0'(30h, 30h): 2000
                |
            '6'-'3'(36h, 33h): 2099 (99 = 63h)

        MM: Month
             '0'-'1'(30h, 31h): January
                |
             '0'-'C'(30h, 43h): December

        DD: Day
             '0'-'1'(30h, 31h): 1
                |
             '1'-'E'(31h, 45h): 30(=1Eh)
             '1'-'F'(31h, 46h): 31(=1Fh)

```
        WW: weekdays
             '0'-'0'(30h, 30h): Sunday
             '0'-'1'(30h, 31h): Monday
             '0'-'2'(30h, 32h): Tuesday
             '0'-'3'(30h, 33h): Wednesday
             '0'-'4'(30h, 34h): Thursday
             '0'-'5'(30h, 35h): Friday
             '0'-'6'(30h, 36h): Saturday

        HH: Hours
              '0'-'0'(30h, 30h): 0
                 |
             '1'-'7'(31h, 37h): 23 (=17h)

       MN: Minutes
             '0'-'0'(30h, 30h): 0
                |
             '3'-'B' (33h, 42h): 59 (=3Bh)

        DS: Daylight saving (Summer time)
             '0'-'0'(30h, 30h): NO
             '0'-'1'(30h, 31h): YES

  ETX (03h): End of Message

 Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

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

9.2 Date & Time Write

This command is used in order to write the setting of the Date & Time.

1) The controller requests the monitor to write Date & Time.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'1'-'2'	STX-'C'-'2'-'1'-'2'-YY-MM-DD-WW-HH-MN-DS-ETX	BCC	CR

```
Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID of which you want to change the setting.
              Ex.) If Monitor ID is '1', specify 'A'.
   '0' (30h): Message sender is the controller.
   'A' (41h): Message type is "Command".
   '1'-'2'(31h, 32h): Message length

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'2'  (43h, 32h, 31h, 32h): Date & Time write command
   'YY'-'MM'-'DD'-'WW'-'HH'-'MN'-'DS': Date & Time data
        YY: Year (offset 2000)
            '0'-'0'(30h, 30h): 2000
               |
            '6'-'3'(36h, 33h): 2099 (99 = 63h)

        MM: Month
             '0'-'1'(30h, 31h): January
                |
             '0'-'C'(30h, 43h): December

        DD: Day
             '0'-'1'(30h, 31h): 1
                |
             '1'-'E'(31h, 45h): 30(=1Eh)
             '1'-'F'(31h, 46h): 31(=1Fh)

        WW: weekdays
             '0'-'0'(30h, 30h): Sunday
             '0'-'1'(30h, 31h): Monday
             '0'-'2'(30h, 32h): Tuesday
             '0'-'3'(30h, 33h): Wednesday
             '0'-'4'(30h, 34h): Thursday
             '0'-'5'(30h, 35h): Friday
             '0'-'6'(30h, 36h): Saturday

        HH: Hours
             '0'-'0'(30h, 30h): 0
                |
             '1'-'7'(31h, 37h): 23 (=17h)

        MN: Minutes
             '0'-'0'(30h, 30h): 0
                |
             '3'-'B' (33h, 42h): 59 (=3Bh)

        DS: Daylight saving (Summer time)
             '0'-'0'(30h, 30h): NO
             '0'-'1'(30h, 31h): YES

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.
```

Delimiter
  CR (0Dh): End of packet

2) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'6'	STX-'C'-'3'-'1'-'2'-ST-YY-MM-DD-WW-HH-MN-DS-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'-'6'(31h, 36h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'1'-'2' (43h, 33h, 31h, 32h): Date & Time write reply command
  ST: Date & Time Status command
        '0'-'0'(30h, 30h): No error
        '0'-'1'(30h, 31h): Error
  'YY'-'MM'-'DD'-'WW'-'HH'-'MN'-'DS': Date & Time data
        YY: Year (offset 2000)
           '0'-'0'(30h, 30h): 2000
              |
           '6'-'3'(36h, 33h): 2099 (99 = 63h)

        MM: Month
             '0'-'1'(30h, 31h): January
                |
             '0'-'C'(30h, 43h): December

        DD: Day
             '0'-'1'(30h, 31h): 1
                |
             '1'-'E'(31h, 45h): 30(=1Eh)
             '1'-'F'(31h, 46h): 31(=1Fh)

        WW: weekdays
             '0'-'0'(30h, 30h): Sunday
             '0'-'1'(30h, 31h): Monday
             '0'-'2'(30h, 32h): Tuesday
             '0'-'3'(30h, 33h): Wednesday
             '0'-'4'(30h, 34h): Thursday
             '0'-'5'(30h, 35h): Friday
             '0'-'6'(30h, 36h): Saturday

        HH: Hours
             '0'-'0'(30h, 30h): 0
                |
             '1'-'7'(31h, 37h): 23 (=17h)

        MN: Minutes
             '0'-'0'(30h, 30h): 0
                |
             '3'-'B' (33h, 42h): 59 (=3Bh)

        DS: Daylight saving (Summer time)
             '0'-'0'(30h, 30h): NO
             '0'-'1'(30h, 31h): YES

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

10. Schedule read and write

10.1 Schedule Read

This command is used in order to read the setting of the Schedule.

1) The controller requests the monitor to read Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'8'	STX-'C'-'2'-'2'-'1'-PG-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID of 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'-'8'(30h, 38h): Message length

Message
  STX (02h): Start of Message
  'C'-'2'-'2'-'1' (43h, 32h, 32h, 31h): Schedule read request command.
  PG: Program No.
  - The data must be ASCII characters strings.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
  Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies Schedule to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'2'-'6'	STX-'C'-'3'-'2'-'1'-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-P MODE-EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7-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".
  '2'-'6'(32h, 36h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'2'-'1' (43h, 33h, 32h, 31h): Schedule read reply command
  PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL-P MODE-
  EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7: Schedule data
  PG: Program No.
  '0'-'0'(30h, 30h): Program No.1
  |
  '0'-'6'(30h, 36h): Program No.7

  ON_HOUR: Turn on time (hour)
  '0'-'0'(30h, 30h): 00
  |
  '1'-'7'(31h, 37h): 23 (=17h)
  '1'-'8'(31h, 38h): ON timer isn't set.

  ON_MIN: Turn on time (minute)
  '0'-'0'(30h, 30h): 0

```
       |
     '3'-'B'(33h, 42h): 59
     '3'-'C'(33h, 43h): On timer isn't set.

OFF_HOUR: Turn off time (hour)
     '0'-'0'(30h, 30h): 00
       |
     '1'-'7'(31h, 37h): 23 (=17h)
     '1'-'8'(31h, 38h): Off timer isn't set.

OFF_MIN:  Turn off time (minute)
     '0'-'0'(30h, 30h): 0
       |
     '3'-'B'(33h, 42h): 59 (=3Bh)
     '3'-'C'(33h, 43h): Off timer isn't set.

INPUT: Timer input
     '0'-'0'(30h,30h): No mean (works on last memory)
     '0'-'1'(30h,31h): VGA
     '0'-'2'(30h,32h): RGB/HV
     '0'-'3'(30h,33h): DVI
     '0'-'5'(30h,35h): Video1
     '0'-'6'(30h,36h): Video2
     '0'-'7'(30h,37h): S-Video
     '0'-'A'(30h,41h): TV
     '0'-'C'(30h,43h): DVD/HD1
     '0'-'D'(30h,44h): Option
     '0'-'E'(30h,45h): DVD/HD2
     '0'-'F'(30h,46h): Display Port
     '1'-'1'(31h,31h): HDMI

WD: Week setting
     bit 0: Monday
     bit 1: Tuesday
     bit 2: Wednesday
     bit 3: Thursday
     bit 4: Friday
     bit 5: Saturday
     bit 6: Sunday

     EX.
     '0'-'1'(30h, 31h): Monday
     '0'-'4'(30h, 34h): Wednesday
     '0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
     '7'-'F'(37h, 46h): Monday to Sunday

FL: Option
     bit 0: 0:once 1:Everyday
     bit 1: 0:once 1:Every week
     bit 2: 0:Disable 1:Enable

     EX.
     '0'-'1'(30h, 31h): Disable, Everyday
     '0'-'4'(30h, 34h): Enable, once

P MODE: Picture mode
     '0'-'0'(30h,30h): No mean (works on last memory)
     '0'-'1'(30h,31h): sRGB
     '0'-'3'(30h,33h): Hi-Bright
     '0'-'4'(30h,34h): Standard
     '0'-'5'(30h,34h): Cinema
     '0'-'6'(30h,36h): ISF-Day
     '0'-'7'(30h,37h): ISF-Night
     '0'-'B'(30h,42h): Ambient-1
     '0'-'C'(30h,43h): Ambient-2

EXT1: Extension1
     '0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT2: Extension 2
```

'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT3: Extension 3
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT4: Extension 4
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT5: Extension 5
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT6: Extension 6
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT7: Extension 7
'0'-'0'(30h,30h): (On this monitor, it is always '00')

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

*****Following command also can be used for to keep backward compatibility, in order to read the setting of the Schedule.**

1) The controller requests the monitor to read Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'8'	STX-'C'-'2'-'1'-'3'-PG-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID of 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'-'8'(30h, 38h): Message length

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'3' (43h, 32h, 31h, 33h): Schedule read request command.
  PG: Program No.
  - The data must be ASCII characters strings.

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
  Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies Schedule to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'6'	STX-'C'-'3'-'1'-'3'-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-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'-'6'(31h, 36h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'1'-'3' (43h, 33h, 31h, 33h): Schedule read reply command
  PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL: Schedule data
  PG: Program No.
  '0'-'0'(30h, 30h): Program No.1
  |
  '0'-'6'(30h, 36h): Program No.7

  ON_HOUR: Turn on time (hour)
  '0'-'0'(30h, 30h): 00
  |
  '1'-'7'(31h, 37h): 23 (=17h)
  '1'-'8'(31h, 38h): ON timer isn't set.

  ON_MIN: Turn on time (minute)
  '0'-'0'(30h, 30h): 0
  |
  '3'-'B'(33h, 42h): 59
  '3'-'C'(33h, 43h): On timer isn't set.

```
        OFF_HOUR: Turn off time (hour)
             '0'-'0'(30h, 30h): 00
                |
             '1'-'7'(31h, 37h): 23 (=17h)
             '1'-'8'(31h, 38h): Off timer isn't set.

        OFF_MIN:  Turn off time (minute)
             '0'-'0'(30h, 30h): 0
                |
             '3'-'B'(33h, 42h): 59 (=3Bh)
             '3'-'C'(33h, 43h): Off timer isn’t set.

        INPUT: Timer input
             '0'-'0'(30h, 30h): DVI
             '0'-'1'(30h, 31h): VGA
             '0'-'2'(30h, 32h): RGB/HV
             '0'-'3'(30h, 33h): DVD/HD1
             '0'-'4'(30h, 34h): VIDEO
             '0'-'5'(30h, 35h): S-VIDEO
             '0'-'7'(30h,30h): No mean (Works on last memory)


        WD: Week setting
             bit 0: Monday
             bit 1: Tuesday
             bit 2: Wednesday
             bit 3: Thursday
             bit 4: Friday
             bit 5: Saturday
             bit 6: Sunday

             EX.
             '0'-'1'(30h, 31h): Monday
             '0'-'4'(30h, 34h): Wednesday
             '0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
             '7'-'F'(37h, 46h): Monday to Sunday

        FL: Option
             bit 0: 0:once 1:Everyday
             bit 1: 0:once 1:Every week
             bit 2: 0:Disable 1:Enable

             EX.
             '0'-'1'(30h, 31h): Disable, Everyday
             '0'-'4'(30h, 34h): Enable, once

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

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

10.2 Schedule Write

This command is used in order to write the setting of the Schedule.

1) The controller requests the monitor to write Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'2'-'6'	STX-'C'-'2'-'2'-'2'-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-P MODE-EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7-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.
  'A' (41h): Message type is "Command".
  '2'-'6'(32h, 36h): Message length.

Message
  STX (02h): Start of Message
  'C'-'2'-'2'-'2'  (43h, 32h, 32h, 32h): Schedule writes command
  PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL-P MODE
  EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7: Schedule data
        PG: Program No.
            '0'-'0'(30h, 30h): Program No.1
              |
            '0'-'6'(30h, 36h): Program No.7

        ON_HOUR: Turn on time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): ON timer isn't set.

        ON_MIN:  Turn on time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59
            '3'-'C'(33h, 43h): On timer isn’t set.

        OFF_HOUR: Turn off time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): Off timer isn't set.

        OFF_MIN:  Turn off time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59 (=3Bh)
            '3'-'C'(33h, 43h): Off timer isn’t set.

        INPUT: Timer input
            '0'-'0'(30h,30h): No mean (works on last memory)
            '0'-'1'(30h,31h): VGA
            '0'-'2'(30h,32h): RGB/HV
            '0'-'3'(30h,33h): DVI
            '0'-'4'(30h,34h): HDMI (Set only)
            '0'-'5'(30h,35h): Video1
            '0'-'6'(30h,36h): Video2
            '0'-'7'(30h,37h): S-Video
            '0'-'A'(30h,41h): TV
            '0'-'C'(30h,43h): DVD/HD1
            '0'-'D'(30h,44h): Option
            '0'-'E'(30h,45h): DVD/HD2
            '0'-'F'(30h,46h): Display Port
```

'1'-'1'(31h,31h): HDMI
* Please select active input on your system (setting).
* If you select inactive input here, the input change execution will be ignored.

WD: Week setting
bit 0: Monday
bit 1: Tuesday
bit 2: Wednesday
bit 3: Thursday
bit 4: Friday
bit 5: Saturday
bit 6: Sunday

EX.
'0'-'1'(30h, 31h): Monday
'0'-'4'(30h, 34h): Wednesday
'0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
'7'-'F'(37h, 46h): Monday to Sunday

FL: Option
bit 0: 0:once 1:Everyday
bit 1: 0:once 1:Every week
bit 2: 0:Disable 1:Enable
* When bit 0 and bit 1 are '1', it behaves as Everyday.

EX.
'0'-'1'(30h, 31h): Disable, Everyday
'0'-'4'(30h, 34h): Enable, once

P MODE: Picture mode
'0'-'0'(30h,30h): No mean (Works on last memory)
'0'-'1'(30h,31h): sRGB
'0'-'3'(30h,33h): Hi-Bright
'0'-'4'(30h,34h): Standard
'0'-'5'(30h,34h): Cinema
'0'-'6'(30h,36h): ISF-Day
'0'-'7'(30h,37h): ISF-Night
'0'-'B'(30h,42h): Ambient-1
'0'-'C'(30h,43h): Ambient-2
* Please select active picture mode on your system (setting).
* If you select inactive picture mode here, the input change execution will be ignored.

EXT1: Extension1
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT2: Extension 2
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT3: Extension 3
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT4: Extension 4
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT5: Extension 5
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT6: Extension 6
'0'-'0'(30h,30h): (On this monitor, it is always '00')

EXT7: Extension 7
'0'-'0'(30h,30h): (On this monitor, it is always '00')

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'2'-'8'	STX-'C'-'3'-'2'-'2'-ST-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-P MODE-EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7-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".
  '2'-'8'(32h, 38h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'2'-'2' (43h, 33h, 32h, 32h): Schedule writes reply command
  ST: Schedule Status command
        '0'-'0'(30h, 30h): No error
        '0'-'1'(30h, 31h): Error
  PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL-P MODE
  EXT1-EXT2-EXT3-EXT4-EXT5-EXT6-EXT7: Schedule data
        PG: Program No.
            '0'-'0'(30h, 30h): Program No.1
              |
            '0'-'6'(30h, 36h): Program No.7

        ON_HOUR: Turn on time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): ON timer isn't set.

        ON_MIN: Turn on time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59
            '3'-'C'(33h, 43h): On timer isn’t set.

        OFF_HOUR: Turn off time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): Off timer isn't set.

        OFF_MIN: Turn off time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59 (=3Bh)
            '3'-'C'(33h, 43h): Off timer isn’t set.

        INPUT: Timer input
            '0'-'0'(30h,30h): No mean (works on last memory)
            '0'-'1'(30h,31h): VGA
            '0'-'2'(30h,32h): RGB/HV
            '0'-'3'(30h,33h): DVI
            '0'-'5'(30h,35h): Video1
            '0'-'6'(30h,36h): Video2
            '0'-'7'(30h,37h): S-Video
            '0'-'A'(30h,41h): TV
            '0'-'C'(30h,43h): DVD/HD1
            '0'-'D'(30h,44h): Option
            '0'-'E'(30h,45h): DVD/HD2
            '0'-'F'(30h,46h): Display Port
            '1'-'1'(31h,31h): HDMI

```
        WD: Week setting
             bit 0: Monday
             bit 1: Tuesday
             bit 2: Wednesday
             bit 3: Thursday
             bit 4: Friday
             bit 5: Saturday
             bit 6: Sunday

             EX.
             '0'-'1'(30h, 31h): Monday
             '0'-'4'(30h, 34h): Wednesday
             '0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
             '7'-'F'(37h, 46h): Monday to Sunday

        FL: Option
             bit 0: 0:once 1:Everyday
             bit 1: 0:once 1:Every week
             bit 2: 0:Disable 1:Enable
             * When bit 0 and bit 1 are '1', it behaves as Everyday.

             EX.
             '0'-'1'(30h, 31h): Disable, Everyday
             '0'-'4'(30h, 34h): Enable, once

        P MODE: Picture mode
             '0'-'0'(30h,30h): No mean (works on last memory)
             '0'-'1'(30h,31h): sRGB
             '0'-'3'(30h,33h): Hi-Bright
             '0'-'4'(30h,34h): Standard
             '0'-'5'(30h,34h): Cinema
             '0'-'6'(30h,36h): ISF-Day
             '0'-'7'(30h,37h): ISF-Night
             '0'-'B'(30h,42h): Ambient-1
             '0'-'C'(30h,43h): Ambient-2

        EXT1: Extension1
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT2: Extension 2
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT3: Extension 3
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT4: Extension 4
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT5: Extension 5
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT6: Extension 6
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

        EXT7: Extension 7
             '0'-'0'(30h,30h): (On this monitor, it is always ‘00’)

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

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

3) The controller requests the monitor to write Enable/Disable Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'A'	STX-'C'-'2'-'1'-'5'-PG-EN-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.
  'A' (41h): Message type is "Command".
  '0'-'A'(30h, 41h): Message length

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'5' (43h, 32h, 31h, 35h): Enable/Disable Schedule writes command
  PG-EN: Enable/Disable Schedule data
        PG: Program No.
             '0'-'0'(30h, 30h): Program No.1
                |
             '0'-'6'(30h, 36h): Program No.7

        EN: Enable /Disable
             '0'-'0'(30h, 30h): Disable
             '0'-'1'(30h, 31h): Enable

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

4) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'0'-'C'	STX-'C'-'3'-'1'-'5'-ST-PG-EN-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".
  '0'-'C' (30h, 43h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'1'-'5' (43h, 33h, 31h, 35h): Enable/Disable Schedule writes reply command
  ST: Enable/Disable Schedule Status command
        '0'-'0'(30h, 30h): No error
        '0'-'1'(30h, 31h): Error
  PG-EN: Enable/Disable Schedule data
        PG: Program No.
             '0'-'0'(30h, 30h): Program No.1
                |
             '0'-'6'(30h, 36h): Program No.7

  EN: Enable /Disable
             '0'-'0'(30h, 30h): Disable
             '0'-'1'(30h, 31h): Enable

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

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

*****Following command also can be used for to keep backward compatibility, in order to write the setting of the Schedule.**

1) The controller requests the monitor to write Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'1'-'6'	STX-'C'-'2'-'1'-'4'-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-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.
  'A' (41h): Message type is "Command".
  '1'-'6'(31h, 36h): Message length.

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'4'  (43h, 32h, 31h, 34h): Schedule writes command
  PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL: Schedule data
        PG: Program No.
            '0'-'0'(30h, 30h): Program No.1
              |
            '0'-'6'(30h, 36h): Program No.7

        ON_HOUR: Turn on time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): ON timer isn't set.

        ON_MIN:  Turn on time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59
            '3'-'C'(33h, 43h): On timer isn’t set.

        OFF_HOUR: Turn off time (hour)
            '0'-'0'(30h, 30h): 00
              |
            '1'-'7'(31h, 37h): 23 (=17h)
            '1'-'8'(31h, 38h): Off timer isn't set.

        OFF_MIN:  Turn off time (minute)
            '0'-'0'(30h, 30h): 0
              |
            '3'-'B'(33h, 42h): 59 (=3Bh)
            '3'-'C'(33h, 43h): Off timer isn’t set.

        INPUT: Timer input
            '0'-'0'(30h, 30h): DVI
            '0'-'1'(30h, 31h): VGA
            '0'-'2'(30h, 32h): RGB/HV
            '0'-'3'(30h, 33h): DVD/HD1
            '0'-'4'(30h, 34h): VIDEO
            '0'-'5'(30h, 35h): S-VIDEO
            '0'-'7'(30h, 37h): (Works on last memory)
            * Please select active input on your system (setting).
            * If you select inactive input here, the input change execution will be ignored.

        WD: Week setting
            bit 0: Monday
            bit 1: Tuesday
            bit 2: Wednesday
```

bit 3: Thursday
bit 4: Friday
bit 5: Saturday
bit 6: Sunday

EX.
'0'-'1'(30h, 31h): Monday
'0'-'4'(30h, 34h): Wednesday
'0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
'7'-'F'(37h, 46h): Monday to Sunday

FL: Option
bit 0: 0:once 1:Everyday
bit 1: 0:once 1:Every week
bit 2: 0:Disable 1:Enable
* When bit 0 and bit 1 are '1', it behaves as Everyday.

EX.
'0'-'1'(30h, 31h): Disable, Everyday
'0'-'4'(30h, 34h): Enable, once

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

2) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'8'	STX-'C'-'3'-'1'-'4'-ST-PG-ON HOUR-ON MIN-OFF HOUR-OFF MIN-INPUT-WD-FL-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'-'8'(31h, 38h): Message length

Message
STX (02h): Start of Message
'C'-'3'-'1'-'4' (43h, 33h, 31h, 34h): Schedule writes reply command
ST: Schedule Status command
'0'-'0'(30h, 30h): No error
'0'-'1'(30h, 31h): Error
PG-ON HOURS-ON MIN-OFF HOURS-OFF MIN-INPUT-WD-FL: Schedule data
PG: Program No.
'0'-'0'(30h, 30h): Program No.1
|
'0'-'6'(30h, 36h): Program No.7

ON_HOUR: Turn on time (hour)
'0'-'0'(30h, 30h): 00
|
'1'-'7'(31h, 37h): 23 (=17h)
'1'-'8'(31h, 38h): ON timer isn't set.

ON_MIN: Turn on time (minute)
'0'-'0'(30h, 30h): 0
|
'3'-'B'(33h, 42h): 59
'3'-'C'(33h, 43h): On timer isn’t set.

OFF_HOUR: Turn off time (hour)

'0'-'0'(30h, 30h): 00
|
'1'-'7'(31h, 37h): 23 (=17h)
'1'-'8'(31h, 38h): Off timer isn't set.

OFF_MIN: Turn off time (minute)
'0'-'0'(30h, 30h): 0
|
'3'-'B'(33h, 42h): 59 (=3Bh)
'3'-'C'(33h, 43h): Off timer isn't set.

INPUT: Timer input
'0'-'0'(30h, 30h): DVI
'0'-'1'(30h, 31h): VGA
'0'-'2'(30h, 32h): RGB/HV
'0'-'3'(30h, 33h): DVD/HD1
'0'-'4'(30h, 34h): VIDEO
'0'-'5'(30h, 35h): S-VIDEO
'0'-'7'(30h,30h): No mean (Works on last memory)

WD: Week setting
bit 0: Monday
bit 1: Tuesday
bit 2: Wednesday
bit 3: Thursday
bit 4: Friday
bit 5: Saturday
bit 6: Sunday

EX.
'0'-'1'(30h, 31h): Monday
'0'-'4'(30h, 34h): Wednesday
'0'-'F'(30h, 46h): Monday, Tuesday, Wednesday and Thursday
'7'-'F'(37h, 46h): Monday to Sunday

FL: Option
bit 0: 0:once 1:Everyday
bit 1: 0:once 1:Every week
bit 2: 0:Disable 1:Enable
* When bit 0 and bit 1 are '1', it behaves as Everyday.

EX.
'0'-'1'(30h, 31h): Disable, Everyday
'0'-'4'(30h, 34h): Enable, once

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
CR (0Dh): End of packet

3) The controller requests the monitor to write Enable/Disable Schedule.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'A'	STX-'C'-'2'-'1'-'5'-PG-EN-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.
'A' (41h): Message type is "Command".
'0'-'A'(30h, 41h): Message length

Message
STX (02h): Start of Message

'C'-'2'-'1'-'5' (43h, 32h, 31h, 35h): Enable/Disable Schedule writes command
PG-EN: Enable/Disable Schedule data
PG: Program No.
'0'-'0'(30h, 30h): Program No.1
|
'0'-'6'(30h, 36h): Program No.7

EN: Enable /Disable
'0'-'0'(30h, 30h): Disable
'0'-'1'(30h, 31h): Enable

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

4) The monitor replies a data for confirmation.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'0'-'C'	STX-'C'-'3'-'1'-'5'-ST-PG-EN-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".
'0'-'C' (30h, 43h): Message length

Message
STX (02h): Start of Message
'C'-'3'-'1'-'5' (43h, 33h, 31h, 35h): Enable/Disable Schedule writes reply command
ST: Enable/Disable Schedule Status command
'0'-'0'(30h, 30h): No error
'0'-'1'(30h, 31h): Error
PG-EN: Enable/Disable Schedule data
PG: Program No.
'0'-'0'(30h, 30h): Program No.1
|
'0'-'6'(30h, 36h): Program No.7

EN: Enable /Disable
'0'-'0'(30h, 30h): Disable
'0'-'1'(30h, 31h): Enable

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

11. Self diagnosis

11.1 Self-diagnosis status read

This command is used in order to read the Self-diagnosis status.

1) The controller requests the monitor to read Self-diagnosis status.

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

Header
  SOH (01h): Start of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID 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'-'4'(30h, 34h): Message length

Message
  STX (02h): Start of Message
  'B'-'1' (42h, 31h): Self-diagnosis command
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies a result of the self-diagnosis.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-N-N	STX-'A'-'1'- ST(0)-ST(1) --------ST(n)-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' (34h and 30h).

Message
  STX (02h): Start of Message
  'A'-'1' (41h, 31h): Application Test Report reply command
  ST: Result of self-tests
        '0'-'0'(30h, 30h):00: Normal
        '7'-'0'(37h, 30h):70: Standby-power +3.3V abnormality
        '7'-'1'(37h, 31h):71: Standby-power +5V abnormality
        '7'-'2'(37h, 32h):72: Panel-power +12V abnormality
        '7'-'8'(37h, 38h):78: Inverter power/Option slot2 power +24V Abnormality
        '8'-'0'(38h, 30h):80: Cooling fan-1 abnormality
        '8'-'1'(38h, 31h):81: Cooling fan-2 abnormality
         ('8'-'2'(38h, 32h):82: Cooling fan-3 abnormality)
        '9'-'0'(39h, 30h):90: Inverter abnormality
        '9'-'1'(39h, 31h):91: LED Backlight abnormality
        'A'-'0'(41h, 30h):A0: Temperature abnormality – shutdown
        'A'-'1'(41h, 31h):A1: Temperature abnormality – half brightness
        'A'-'2'(41h, 32h):A2: SENSOR reached at the temperature that the user had specified.
        'B'-'0'(42h, 30h):B0: No signal
        'C'-'0'(43h, 30h):C0: Option board abnormality

ETX (03h): End of Message

Check code
BCC: Block Check Code
Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

12. Serial No. & Model Name Read

12.1 Serial No. Read

This command is used in order to read a serial number.

1) The controller requests the monitor to read a serial number.

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

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID which you want to get serial number.
              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

Message
  STX (02h): Start of Message
    'C'-'2'-'1'-'6' (43h, 32h, 31h, 36h): Serial No. command
ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies the serial No. data to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-N-N	STX-'C'-'3'-'1'-'6'- Data(0)-Data(1)---Data(n)-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 returned from 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
  'C'-'3'-'1'-'6' (41h, 33h, 31h, 36h): Serial No. reply command
  Data(0)-Data(1)----Data(n):Serial Number
    ➢ These data are encoded to ASCII characters strings.
ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

12.2 Model Name Read

This command is used in order to read the Model Name.

1) The controller requests the monitor to read Model Name.

Header	Message	Check code	Delimiter
SOH-'0'-Monitor ID-'0'-'A'-'0'-'6'	STX-'C'-'2'-'1'-'7'-ETX	BCC	CR

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID which you want to get Model Name.
  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

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'7' (43h, 32h, 31h, 37h): Model Name command
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
  Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

2) The monitor replies the model name data to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-N-N	STX-'C'-'3'-'1'-'7'-Data(0) -Data(1)---- -Data(n)-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 returned from 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
  'C'-'3'-'1'-'7' (43h, 33h, 31h, 37h): Model Name reply Command
  Data(0) -Data(1)----Data(n):Model name
  - These data are encoded to ASCII characters strings.
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
  Refer to the section 4.3 "Check code" for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

13. Security Lock

13.1 Security Lock Control

This command sets the condition of security lock function to "LOCK" or "UNLOCK".

If security pass codes 1st to 4th are matched with monitor resisted pass codes, then this command is executed, and reply no error status and a new condition.
If codes aren't matched with them then setting isn't changed, and reply error status and a current condition.
If the monitor receives this command while waiting for Pass codes inputs, then it only checks Pass cords (and releases image muting if Pass codes are OK) and doesn't apply "EN" parameter.

1) The controller requests the monitor to set the condition of security lock.

Header	Message	Check code	Delimiter
SOH-'0'-MonitorID-'0'-'A'-'1'-'0'	STX-'C'-'2'-'1'-'D'-EN-P1-P2-P3-P4-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.
  'A' (41h): Message type is "Command".
  '1'-'0'(31h, 30h): Message length

Message
  STX (02h): Start of Message
  'C'-'2'-'1'-'D'  (43h, 32h, 31h, 44h): Security Lock Control command
  EN-P1-P2-P3-P4: Lock condition control data
        EN: Enable /Disable
             '0'-'0'(30h, 30h): Disable
             '0'-'1'(30h, 31h): Enable

        P1: Security Pass code 1st
             '0'-'0'(30h, 30h): "0"
                |
             '0'-'9'(30h, 39h): "9"

        P2: Security Pass code 2nd
             '0'-'0'(30h, 30h): "0"
                |
             '0'-'9'(30h, 39h): "9"

        P3: Security Pass code 3rd
             '0'-'0'(30h, 30h): "0"
                |
             '0'-'9'(30h, 39h): "9"

        P4: Security Pass code 4th
             '0'-'0'(30h, 30h): "0"
                |
             '0'-'9'(30h, 39h): "9"

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

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

2) The monitor replies the result to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'0'-'A'	STX-'C'-'3'-'1'-'D'-ST-EN-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".
  '0'-'A'(30h, 41h): Message length

Message
  STX (02h): Start of Message
  'C'-'3'-'1'-'D' (43h, 33h, 31h, 44h): Security Lock Control reply command
  ST-EN: Lock condition result data
        ST: Status
             '0'-'0'(30h, 30h): No error
             '0'-'1'(30h, 31h): Error

        EN: Enable /Disable (Current condition)
             '0'-'0'(30h, 30h): Disable
             '0'-'1'(30h, 31h): Start-Up Lock (Enable)
             '0'-'2'(30h, 32h): Control Lock
             '0'-'0'(30h, 30h): Both Lock

  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

14. Direct TV Chanel Read & Write

When DTV unit (Option unit) is installed, channel settings is read and write directly.

14.1 Direct TV Chanel Read & Reply

1) The controller requests the monitor to read channel information.

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

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID which you want to get Model Name.
              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

Message
  STX (02h): Start of Message
    'C'-'2'-'2'-'C' (43h, 32h, 32h, 43h): Direct TV Channel Read command
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

2) The monitor replies the result to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'2'	STX-'C'-'3'-'2'-'C'-MajorCH-MinorCH-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 = 18bytes

Message
  STX (02h): Start of Message
  'C'-'3'-'2'-'C' (43h, 33h, 32h, 43h): Direct TV Channel read reply command
  MajorCH: Major Channel (00000000h – FFFFFFFFh),
           '0'-'0'-'0'-'0'-'0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'-'F'-'F'-'F'-'F'
  MinorCH: Minor Channel (0000h – FFFFh),
           '0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

14.2 Direct TV Chanel Write & Reply

1) The controller requests the monitor to write channel information.

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

Header
  SOH (01h): Start Of Header
  '0' (30h): Reserved
  Monitor ID: Specify the Monitor ID which you want to get Model Name.
              Ex.) If Monitor ID is '1', specify 'A'.
  '0' (30h): Message sender is the controller.
  'A' (41h): Message type is "Command".
  '1'-'2'(31h, 32h): Message length = 18bytes

Message
  STX (02h): Start of Message
     'C'-'2'-'2'-'D' (43h, 32h, 32h, 44h): Direct TV Channel write command
  MajorCH: Major Channel (00000000h ~ FFFFFFFFh),
            '0'-'0'-'0'-'0'-'0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'-'F'-'F'-'F'-'F'
  MinorCH: Minor Channel (0000h ~ FFFFh),
            '0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
CR (0Dh): End of packet

2) The monitor replies the result to the controller.

Header	Message	Check code	Delimiter
SOH-'0'-'0'-Monitor ID-'B'-'1'-'2'	STX-'C'-'3'-'2'-'D'-MajorCH-MinorCH-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 = 18bytes

Message
  STX (02h): Start of Message
  'C'-'3'-'2'-'D' (43h, 33h, 32h, 43h): Direct TV Channel write reply command
  MajorCH: Major Channel (00000000h ~ FFFFFFFFh),
            '0'-'0'-'0'-'0'-'0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'-'F'-'F'-'F'-'F'
  MinorCH: Minor Channel (0000h ~ FFFFh),
            '0'-'0'-'0'-'0' ~ 'F'-'F'-'F'-'F'
  ETX (03h): End of Message

Check code
  BCC: Block Check Code
       Refer to the section 4.3 “Check code” for a BCC calculation.

Delimiter
  CR (0Dh): End of packet

All data are subject to change without notice.

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