External Control

Large Format Display

E series

Rev.1.0

E988

External Control

1. Application

This document defines the communications method for control of the NEC LCD monitor, when using an external controller.

2. Connectors and wiring

2.1. RS-232C Remote control

```
(1) Connector          9-pin D-Sub
(2) Cable              Cross (reversed) cable or null modem cable
```
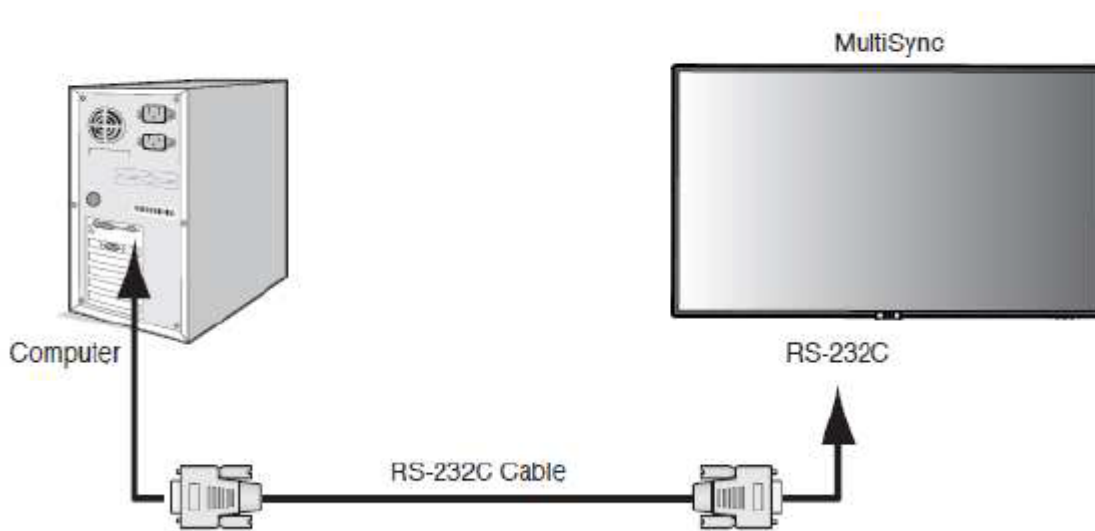

(Please refer "Controlling the LCD monitor via RS-232C Remote control" on User's manual.)

2.2. LAN control

(1) Connector	RJ-45 10/100 BASE-T
(2) Cable	Category 5 or higher LAN cable

Server

NOTE: Use a category 5 or higher LAN cable.

Hub

LAN cable
(not supplied)

LAN1

LAN2
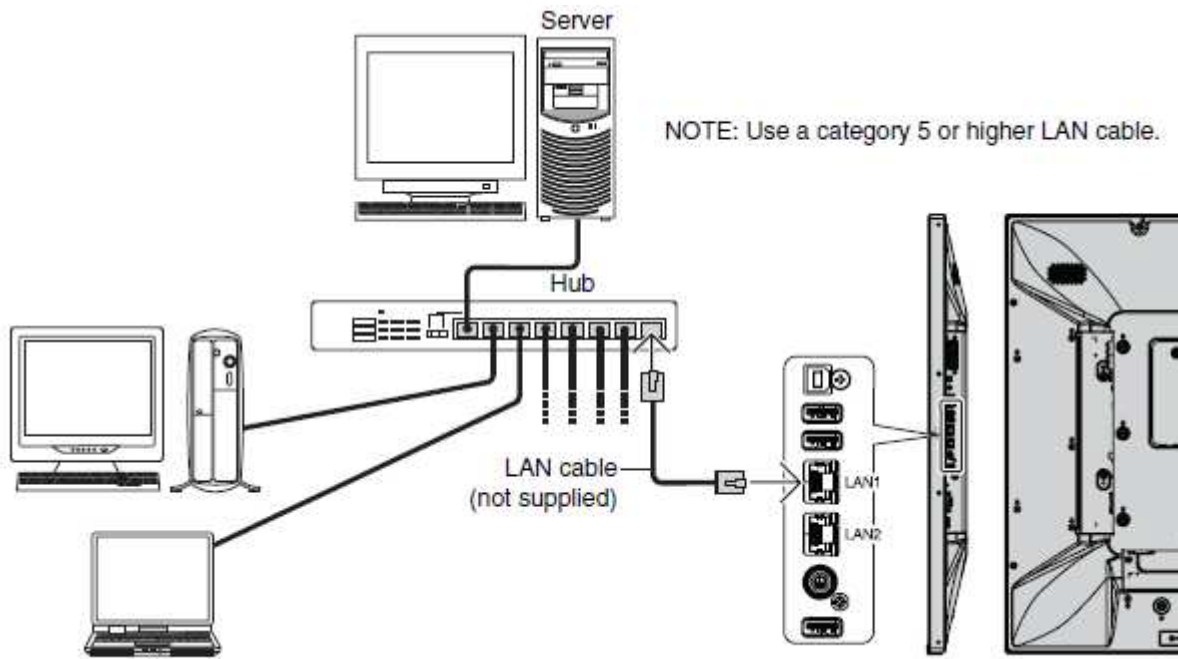
(Please refer "Controlling the LCD monitor via LAN control" on User's manual.)

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
```

3.1.1. 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
```

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) DHCP:On
                            * 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.
```

3.2.1. 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

There are two types of external control commands: VCP and CTL.

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

The contents of Message vary depending on the type of command.

Header	Message	Check Code	Delimiter
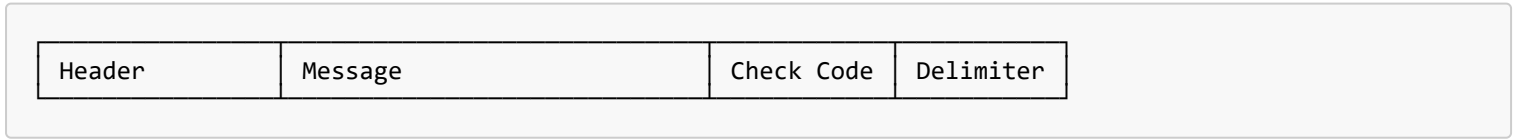
Follow the instructions below for more information on each.

Messages and other common components of the VCP command are described in this chapter.

■ Detailed description of message for VCP command

- See the part 4.2. Message block format

■ Detailed description of message for CTL command

- See the part 7. CTL commands

4.1. Header block format (fixed length)

| **Header** | Message | Check Code | Delimiter |

4.1.1. Header format

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

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

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

3rd) Destination: Destination equipment ID. (Receiver)
    Specify a commands receiver's address.
    This value must match the "MONITOR ID" set in the OSD.
    On the reply, the monitor sets '0' (30h), always.

4th) 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) 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) 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).
```

"MONITOR 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('*')						

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.

4.2.1. 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 chapter 8.
"Message format" of the "Get current parameter" is as follows.

4.2.1.1. Get current parameter format

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.

4.2.2. 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.

4.2.2.1. Get Parameter reply format

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.

4.2.3. Set parameter

The controller sends this message to change a setting of the monitor.
Message format of the "Set parameter" is as follows.

4.2.3.1. Set parameter format

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.

4.2.4. 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.

4.2.4.1. Set parameter reply format

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.

4.2.5. 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.

4.2.6. 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 |

4.3.1. Formatted and calculate.

Use the figure below to learn how check code is formatted and calculated.
First, place the check code format after ETX in the command.
Therefore, place the Check code at the position of 'D9' in the figure below.

Header						Message					
SOH	Resv.	Dest	Src	Type	Length	STX	Data	-	-	ETX	Check code
D0	D1	D2	D3	D4	D5	D6	D7	-	-	D8	D9

Next, as an example of calculating Check code, sum the values listed above each column from 'D1' to 'D16' in the figure below.
Therefore, we calculate the total value from '30' (30h) to '03' (03h) in the figure below.
As a result of the calculation, the check code of the command in the figure below is '77'(77h), so set it to Check code.

※ Check code may be described as Block Check Code (BCC) in the command details described below.

Header						Message										Check code	Delimiter
SOH	Resv.	Dest	Src	Type	Length	STX	OP Code Page	OP Code	Set Value						ETX	(BCC)	
01h	30h	41h	30h	45h	30h	41h	02h	30h	30h	31h	30h	30h	30h	36h	34h	03h	77h	0Dh
D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18

```
Check code (BCC) D17 = D1 xor D2 xor D3 xor … xor D14 xor D15 xor D16
                     = 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** |

Delimiter does not have the formats and calculations described so far.
Specify 'CR'(0Dh) in ASCII for the Command Delimiter.

5. Message type

5.1. Get current Parameter from a monitor

5.1.1. Get current parameter format

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 chapter 8.

```
* 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 chapter 8 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 chapter 8.

* 4th-5th bytes) OP code: Operation code
    Refer to "VcpTable" 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 chapter 8.

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

5.2. "Get parameter" reply

5.2.1. Get parameter reply format

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: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 "VcpTable".

* 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 "VcpTable".
  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

5.3.1. Set parameter format

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 "VcpTable".

* 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 "VcpTable".

* 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

5.4.1. Set parameter reply format

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 "VcpTable".

* 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 "VcpTable".

* 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.

5.5.1. Save Current Settings

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

5.5.1.1. Format

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

5.5.3.1. Format

STX	Command Code		ETX
	'B'	'E'	

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

```
* A timeout error has occurred. (The default timeout is 10sec.)
* The monitor receives an unsupported message type.
* The monitor detects a packet BCC (Block Check Code) error.
* To tell the controller that the monitor does not have any answer to give to the host
  (not ready or not expected)
* Following operations need a certain time for to execute,
  so the monitor will return this message when another message is received during execution.
    - Power ON, Power OFF, Auto Setup, Input, PIP Input, Auto Setup and Factory reset.
* 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
```

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.

6.1.1. Step 1. The controller requests the Monitor to reply with the current backlight 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

```
'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
```

6.1.2. 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

```
'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
```

6.1.3. 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

```
'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
```

6.1.4. 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

```
'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)
              : Current Backlight setting is 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)

6.1.5. 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

```
'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.

If the display has a built-in temperature sensor, the controller uses these sensors through external control.
You can monitor the internal temperature.
The temperature read procedure is shown below as an example of how to use it.

6.2.1. 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

```
'0'-'2'(30h, 32h) : Operation code page number is 2.
'7'-'8'(37h, 38h) : Operation code is 78h (in the page 2).
'0'-'0'-'0'-'1'(30h, 30h, 30h, 31h)
              : Select the temperature sensor #1 (01h).
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
```

6.2.2. 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

```
'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
```

6.2.3. 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

```
'0'-'2'(30h, 32h) : Operation code page number is 2.
'7'-'9'(37h, 39h) : Operation code is 79h (in the OP code 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
```

6.2.4. 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

```
'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.
ETX (03h)         : End of Message

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

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. CTL commands

System Command

CTL-0C. Save Current Settings

【 Function 】

```
This command is used in order to store the adjusted value.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'4'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 34H 02H (D01~02) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~02            Message
                     "0C"(30H 43H) : Save Current Settings
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'6'-STX "Data  " 03H BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 36H 02H (D01~04) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~04            Message
                     "000C"(30H 30H 30H 43H) : Save Current Settings
```

【 Note 】

CTL-07. Get Timing Report and Timing reply

【 Function 】

```
This command is used in order to report the displayed image timing.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'4'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 34H 02H (D01~02) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------
D01~02             Message
                      "07"(30H 37H) : Get Timing Report command.
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'E'-STX "Data                          " 03H BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 45H 02H (D01~02 D03~04 D05~08 D09~12) 03H BCC 0DH

Data               Contents
------------------------------------------------------------------
D01~02             Message
                      "4E"(34H 45H) : Command
D03~04             SS
                      Bit 7 = 1: Sync Frequency is out of range. (or No signal.)
                      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.
D05~08             H Freq: Horizontal Frequency in unit 0.01kHz
D09~12             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.
```

【 Note 】

Power control procedure

CTL-01D6. Power status read

【 Function 】

```
This command is used in order to read a current power status.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'6'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 36H 02H (D01~04) 03H BCC 0DH

Data                Contents
---------------------------------------------------------------------------
D01~04              Message
                        "01D6"(30H,31H,44H,36H) : Get power status command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'1'-'2'-STX "Data                                   " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 31H 32H 02H (D01~02 D03~04 D05~06 D07~08 D09~12 D13~16) 03H BCC 0DH

Data                Contents
---------------------------------------------------------------------------
D01~02              Reserved data
                        "02"(30H,32H)
D03~04              Result code
                        "00"(30H,30H) : No Error
                        "01"(30H,31H) : Unsupported
D05~06              Display power mode code
                        "D6"(44H,36H) :
D07~08              Parameter type
                        "00"(30H,30H): Set parameter
D09~12              Max
                        "0004"(30H,30H,30H,34H) : Power mode is 4 types.
D13~16              Current power mode
                        "0001"(30H,30H,30H,31H) : ON
                        "0002"(30H,30H,30H,32H) : Stand-by (power save)
                        "0003"(30H,30H,30H,33H) : Reserved
                        "0004"(30H,30H,30H,34H) : OFF (same as IR power off)
```

【 Note 】

CTL-C203-D6. Power control

【 Function 】

```
This command is used in order to control monitor power.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'C'-STX "Data           " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 43H 02H (D01~06) (D07~10) 03H BCC 0DH

Data              Contents
------------------------------------------------------------------------
D01~06            Message
                      "C203D6"(43H 32H 30H 33H 44H 36H) : power control command
D07~10            Power mode
                      "0001"(30H 30H 30H 31H) : ON
                      "0002"(30H 30H 30H 32H) : Do not set
                      "0003"(30H 30H 30H 33H) : Do not set
                      "0004"(30H 30H 30H 34H) : OFF (same as IR power off)
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'E'-STX "Data                " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 45H 02H (D01~02) (D03~08) (D09~12) 03H BCC 0DH

Data              Contents
------------------------------------------------------------------------
D01~02            Result code
                      "00"(30H 30H) : No Error
D03~08            Message
                      "C203D6"(43H 32H 30H 33H 44H 36H) : power control reply command
D09~12            Power mode
                      "0001"(30H 30H 30H 31H) : ON
                      "0002"(30H 30H 30H 32H) : Do not set
                      "0003"(30H 30H 30H 33H) : Do not set
                      "0004"(30H 30H 30H 34H) : OFF (same as IR power off)
```

【 Note 】

Date & Time read and write

CTL-C211. Date & Time Read

【 Function 】

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

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'6'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 36H 02H (D01~04) 03H BCC 0DH

Data                Contents
--------------------------------------------------------------------------
D01~04              Message
                         "C211"(43H 32H 31H 31H) : Date & time read request command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'1'-'4'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 31H 34H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) 03H BCC 0DH

Data                Contents
--------------------------------------------------------------------------
D01~04              Message
                         "C311"(43H 33H 31H 31H) : Date & time read reply command
D05~06              Year (offset 2000)
                         "00"(30H 30H) : 2000 ～
                         "63"(36H 33H) : 2099(63H=99)
D07~08              Month
                         "01"(30H 31H) : 1 ～
                         "0C"(30H 43H) : 12
D09~10              Day
                         "01"(30H 31H) : 1 ～
                         "1F"(31H 46H) : 31
D11~12              weekdays
                         "00"(30H 30H) : Sunday
                         "01"(30H 31H) : Monday
                         "02"(30H 32H) : Tuesday
                         "03"(30H 33H) : Wednesday
                         "04"(30H 34H) : Thursday
                         "05"(30H 35H) : Friday
                         "06"(30H 36H) : Saturday
D13~14              Hours
                         "00"(30H 30H) : 0 ～
                         "17"(31H 37H) : 23
D15~16              Minutes
                         "00"(30H 30H) : 0 ～
                         "3B"(33H 42H) : 59
D17~18              Reserved
                         "00"(30H 30H)
```

【 Note 】

CTL-C212. Date & Time Write

【 Function 】

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

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'1'-'4'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 31H 34H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) 03H BCC 0DH

Data                Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C212"(43H 32H 31H 32H) : Date & time read write command
D05~06              Year (offset 2000)
                        "00"(30H 30H) : 2000 ～
                        "63"(36H 33H) : 2099(63H=99)
D07~08              Month
                        "01"(30H 31H) : 1 ～
                        "0C"(30H 43H) : 12
D09~10              Day
                        "01"(30H 31H) : 1 ～
                        "1F"(31H 46H) : 31
D11~12              weekdays
                        "00"(30H 30H) : Sunday
                        "01"(30H 31H) : Monday
                        "02"(30H 32H) : Tuesday
                        "03"(30H 33H) : Wednesday
                        "04"(30H 34H) : Thursday
                        "05"(30H 35H) : Friday
                        "06"(30H 36H) : Saturday
D13~14              Hours
                        "00"(30H 30H) : 0 ～
                        "17"(31H 37H) : 23
D15~16              Minutes
                        "00"(30H 30H) : 0 ～
                        "3B"(33H 42H) : 59
D17~18              Reserved
                        "00"(30H 30H)
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'1'-'6'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 31H 36H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) (D19~20) 03H BCC 0DH

Data                Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C312"(43H 33H 31H 32H) : Date & Time write reply command
D05~06              Result code
                        "00"(30H 30H)[00H] : No Error
                        "01"(30H 31H)[01H] : Error
D07~08              Year (offset 2000)
                        "00"(30H 30H) : 2000 ～
                        "63"(36H 33H) : 2099(63H=99)
D09~10              Month
                        "01"(30H 31H) : 1 ～
                        "0C"(30H 43H) : 12
D11~12              Day
                        "01"(30H 31H) : 1 ～
```

```
                                    "1F"(31H 46H) : 31
D13~14                weekdays
                                    "00"(30H 30H) : Sunday
                                    "01"(30H 31H) : Monday
                                    "02"(30H 32H) : Tuesday
                                    "03"(30H 33H) : Wednesday
                                    "04"(30H 34H) : Thursday
                                    "05"(30H 35H) : Friday
                                    "06"(30H 36H) : Saturday
D15~16                Hours
                                    "00"(30H 30H) : 0 ～
                                    "17"(31H 37H) : 23
D17~18                Minutes
                                    "00"(30H 30H) : 0 ～
                                    "3B"(33H 42H) : 59
D19~20                Reserved
                                    "00"(30H 30H)
```

【 Note 】

CTL-C221. Schedule Read

【 Function 】

```
Schedule Read
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'8'-STX "Data            " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 36H 02H (D01~04) (D05~06) 03H BCC 0DH

Data              Contents
------------------------------------------------------------------------
D01~04            Message
                      "C221"(43H 32H 32H 31H) : Schedule read request command
D05~06            Program No.
                      "00"(30H 30H) : Program No.1 ～
                      "06"(30H 36H) : Program No.7
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'2'-'6'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 32H 36H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) (D19~20) (D21~22) (D23~24) (D25~26) (D27~28) (D29~30) (D31~32) (D33~34) (D35~36) 03H BCC 0DH

Data              Contents
------------------------------------------------------------------------
D01~04            Message
                      "C313"(43H 33H 31H 33H) : Schedule read reply command
D05~06            Program No.
                      "00"(30H 30H) : Program No.1 ～
                      "06"(30H 36H) : Program No.7
D07~08            Turn on time (hour)
                      "00"(30H 30H) : 0 ～
                      "17"(31H 37H) : 23
D09~10            Turn on time (minute)
                      "00"(30H 30H) : 0 ～
                      "3B"(33H 42H) : 59
D11~12            Turn off time (hour)
                      "00"(30H 30H) : 0 ～
                      "17"(31H 37H) : 23
D13~14            Turn off time (minute)
                      "00"(30H 30H) : 0 ～
                      "3B"(33H 42H) : 59
D15~16            Timer input
                      "00"(30H 30H) : No mean (works on last memory)
D17~18            Week setting(※1)
                          bit 0 : Sunday
                          bit 1 : Monday
                          bit 2 : Tuesday
                          bit 3 : Wednesday
                          bit 4 : Thursday
                          bit 5 : Friday
                          bit 6 : Saturday
D19~20            Option(※2)
                          bit 0 : 0=once/1=Everyday
                          bit 1 : 0=once/1=Every week
                          bit 2 : 0=Disable/1=Enable
D21~22            Picture mode
                      "00"(30H 30H) : No mean (works on last memory)
                      "01"(30H 31H) : sRGB
                      "02"(30H 32H) :
                      "03"(30H 33H) : Hi-Bright
                      "04"(30H 34H) : Standard
```

```
                      "05"(30H 35H) : Cinema
                      "06"(30H 36H) : ISF-Day
                      "07"(30H 37H) : ISF-Night
                      "08"(30H 38H) : CUSTOM1
                      "09"(30H 39H) : CUSTOM2
                      "0A"(30H 41H) :
                      "0B"(30H 42H) : Ambient-1
                      "0C"(30H 43H) : Ambient-2
                      "0D"(30H 44H) : SVE-1
                      "0E"(30H 45H) : SVE-2
                      "0F"(30H 46H) : SVE-3
                      "10"(31H 30H) : SVE-4
                      "11"(31H 31H) : SVE-5
D23~24        Extension1  "00"(30H 30H) : Fixed
D25~26        Extension2  "00"(30H 30H) : Fixed
D27~28        Extension3  "00"(30H 30H) : Fixed
D29~30        Extension4  "00"(30H 30H) : Fixed
D31~32        Extension5  "00"(30H 30H) : Fixed
D33~34        Extension6  "00"(30H 30H) : Fixed
D35~36        Extension7  "00"(30H 30H) : Fixed
```

【 Note 】

```
(※1)Bit Pattern
  30H 31H("01") : Monday
  30H 32H("02") : Tuesday
  30H 33H("03") : Monday、Tuesday
  30H 34H("04") : Wednesday
  30H 35H("05") : Monday、Wednesday
  30H 36H("06") : Tuesday、Wednesday
  30H 37H("07") : Monday、Tuesday、Wednesday
  30H 38H("08") : Thursday
  30H 39H("09") : Monday、Thursday
  30H 41H("0A") : Tuesday、Thursday
  30H 42H("0B") : Monday、Tuesday、Thursday
  30H 43H("0C") : Wednesday、Thursday
  30H 44H("0D") : Monday、Wednesday、Thursday
  30H 45H("0E") : Tuesday、Wednesday、Thursday
  30H 46H("0F") : Monday、Tuesday、Wednesday、Thursday
  31H 30H("10") : Friday
  31H 31H("11") : Monday、Friday
  31H 32H("12") : Tuesday、Friday
  31H 33H("13") : Monday、Tuesday、Friday
  31H 34H("14") : Wednesday、Friday
  31H 35H("15") : Monday、Wednesday、Friday
  31H 36H("16") : Tuesday、Wednesday、Friday
  31H 37H("17") : Monday、Tuesday、Wednesday、Friday
  31H 38H("18") : Thursday、Friday
  31H 39H("19") : Monday、Thursday、Friday
  31H 39H("1A") : Tuesday、Thursday、Friday
  31H 39H("1B") : Monday、Tuesday、Thursday、Friday
  31H 39H("1C") : Wednesday、Thursday、Friday
  31H 39H("1D") : Monday、Wednesday、Thursday、Friday
  31H 39H("1E") : Tuesday、Wednesday、Thursday、Friday
  31H 39H("1F") : Monday、Tuesday、Wednesday、Thursday、Friday
  32H 30H("20") : Saturday
  32H 31H("21") : Monday、Saturday
  32H 32H("22") : Tuesday、Saturday
  32H 33H("23") : Monday、Tuesday、Saturday
  32H 34H("24") : Wednesday、Saturday
  32H 35H("25") : Monday、Wednesday、Saturday
  32H 36H("26") : Tuesday、Wednesday、Saturday
  32H 37H("27") : Monday、Tuesday、Wednesday、Saturday
  32H 38H("28") : Thursday、Saturday
  32H 39H("29") : Monday、Thursday、Saturday
  32H 39H("2A") : Tuesday、Thursday、Saturday
  32H 39H("2B") : Monday、Tuesday、Thursday、Saturday
  32H 39H("2C") : Wednesday、Thursday、Saturday
  32H 39H("2D") : Monday、Wednesday、Thursday、Saturday
  32H 39H("2E") : Tuesday、Wednesday、Thursday、Saturday
  32H 39H("2F") : Monday、Tuesday、Wednesday、Thursday、Saturday
  33H 30H("30") : Friday、Saturday
  33H 31H("31") : Monday、Friday、Saturday
```

```
33H 32H("32") : Tuesday、Friday、Saturday
33H 33H("33") : Monday、Tuesday、Friday、Saturday
33H 34H("34") : Wednesday、Friday、Saturday
33H 35H("35") : Monday、Wednesday、Friday、Saturday
33H 36H("36") : Tuesday、Wednesday、Friday、Saturday
33H 37H("37") : Monday、Tuesday、Wednesday、Friday、Saturday
33H 38H("38") : Thursday、Friday、Saturday
33H 39H("39") : Monday、Thursday、Friday、Saturday
33H 39H("3A") : Tuesday、Thursday、Friday、Saturday
33H 39H("3B") : Monday、Tuesday、Thursday、Friday、Saturday
33H 39H("3C") : Wednesday、Thursday、Friday、Saturday
33H 39H("3D") : Monday、Wednesday、Thursday、Friday、Saturday
33H 39H("3E") : Tuesday、Wednesday、Thursday、Friday、Saturday
33H 39H("3F") : Monday、Tuesday、Wednesday、Thursday、Friday、Saturday
34H 30H("40") : Sunday
34H 31H("41") : Monday、Sunday
34H 32H("42") : Tuesday、Sunday
34H 33H("43") : Monday、Tuesday、Sunday
34H 34H("44") : Wednesday、Sunday
34H 35H("45") : Monday、Wednesday、Sunday
34H 36H("46") : Tuesday、Wednesday、Sunday
34H 37H("47") : Monday、Tuesday、Wednesday、Sunday
34H 38H("48") : Thursday、Sunday
34H 39H("49") : Monday、Thursday、Sunday
34H 39H("4A") : Tuesday、Thursday、Sunday
34H 39H("4B") : Monday、Tuesday、Thursday、Sunday
34H 39H("4C") : Wednesday、Thursday、Sunday
34H 39H("4D") : Monday、Wednesday、Thursday、Sunday
34H 39H("4E") : Tuesday、Wednesday、Thursday、Sunday
34H 39H("4F") : Monday、Tuesday、Wednesday、Thursday、Sunday
35H 30H("50") : Friday、Sunday
35H 31H("51") : Monday、Friday、Sunday
35H 32H("52") : Tuesday、Friday、Sunday
35H 33H("53") : Monday、Tuesday、Friday、Sunday
35H 34H("54") : Wednesday、Friday、Sunday
35H 35H("55") : Monday、Wednesday、Friday、Sunday
35H 36H("56") : Tuesday、Wednesday、Friday、Sunday
35H 37H("57") : Monday、Tuesday、Wednesday、Friday、Sunday
35H 38H("58") : Thursday、Friday、Sunday
35H 39H("59") : Monday、Thursday、Friday、Sunday
35H 39H("5A") : Tuesday、Thursday、Friday、Sunday
35H 39H("5B") : Monday、Tuesday、Thursday、Friday、Sunday
35H 39H("5C") : Wednesday、Thursday、Friday、Sunday
35H 39H("5D") : Monday、Wednesday、Thursday、Friday、Sunday
35H 39H("5E") : Tuesday、Wednesday、Thursday、Friday、Sunday
35H 39H("5F") : Monday、Tuesday、Wednesday、Thursday、Friday、Sunday
36H 30H("60") : Saturday、Sunday
36H 31H("61") : Monday、Saturday、Sunday
36H 32H("62") : Tuesday、Saturday、Sunday
36H 33H("63") : Monday、Tuesday、Saturday、Sunday
36H 34H("64") : Wednesday、Saturday、Sunday
36H 35H("65") : Monday、Wednesday、Saturday、Sunday
36H 36H("66") : Tuesday、Wednesday、Saturday、Sunday
36H 37H("67") : Monday、Tuesday、Wednesday、Saturday、Sunday
36H 38H("68") : Thursday、Saturday、Sunday
36H 39H("69") : Monday、Thursday、Saturday、Sunday
36H 39H("6A") : Tuesday、Thursday、Saturday、Sunday
36H 39H("6B") : Monday、Tuesday、Thursday、Saturday、Sunday
36H 39H("6C") : Wednesday、Thursday、Saturday、Sunday
36H 39H("6D") : Monday、Wednesday、Thursday、Saturday、Sunday
36H 39H("6E") : Tuesday、Wednesday、Thursday、Saturday、Sunday
36H 39H("6F") : Monday、Tuesday、Wednesday、Thursday、Saturday、Sunday
37H 30H("70") : Friday、Saturday、Sunday
37H 31H("71") : Monday、Friday、Saturday、Sunday
37H 32H("72") : Tuesday、Friday、Saturday、Sunday
37H 33H("73") : Monday、Tuesday、Friday、Saturday、Sunday
37H 34H("74") : Wednesday、Friday、Saturday、Sunday
37H 35H("75") : Monday、Wednesday、Friday、Saturday、Sunday
37H 36H("76") : Tuesday、Wednesday、Friday、Saturday、Sunday
37H 37H("77") : Monday、Tuesday、Wednesday、Friday、Saturday、Sunday
37H 38H("78") : Thursday、Friday、Saturday、Sunday
37H 39H("79") : Monday、Thursday、Friday、Saturday、Sunday
37H 39H("7A") : Tuesday、Thursday、Friday、Saturday、Sunday
37H 39H("7B") : Monday、Tuesday、Thursday、Friday、Saturday、Sunday
37H 39H("7C") : Wednesday、Thursday、Friday、Saturday、Sunday
37H 39H("7D") : Monday、Wednesday、Thursday、Friday、Saturday、Sunday
```

```
37H 39H("7E") : Tuesday、Wednesday、Thursday、Friday、Saturday、Sunday
37H 39H("7F") : Monday、Tuesday、Wednesday、Thursday、Friday、Saturday、Sunday


(※2)Bit pattern
  30H 31H("01") : Disable、Everyday、once
  30H 32H("02") : Disable、once、Every week
  30H 33H("03") : Disable、Everyday、Every week
  30H 34H("04") : Enable、once、once
  30H 35H("05") : Enable、Everyday、once
  30H 36H("06") : Enable、once、Every week
  30H 37H("07") : Enable、Everyday、Every week
```

CTL-C222. Schedule Write

【 Function 】

```
Schedule Write
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'1'-'6'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 31H 36H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) (D19~20) (D21~22) (D23~24) (D25~26) (D27~28) (D29~30) (D31~32) (D33~34) (D35~36) 03H BCC 0DH

Data                Contents
------------------------------------------------------------------------
D01~04              Message
                        "C214"(43H 32H 31H 34H) : Schedule writes command
D05~06              Program No.
                        "00"(30H 30H) : Program No.1 ～
                        "06"(30H 36H) : Program No.7
D07~08              Turn on time (hour)
                        "00"(30H 30H) : 0 ～
                        "17"(31H 37H) : 23
D09~10              Turn on time (minute)
                        "00"(30H 30H) : 0 ～
                        "3B"(33H 42H) : 59
D11~12              Turn off time (hour)
                        "00"(30H 30H) : 0 ～
                        "17"(31H 37H) : 23
D13~14              Turn off time (minute)
                        "00"(30H 30H) : 0 ～
                        "3B"(33H 42H) : 59
D15~16              Timer input
                        "00"(30H 30H) : No mean (works on last memory)
D17~18              Week setting(※1)
                        bit 0 : Sunday
                        bit 1 : Monday
                        bit 2 : Tuesday
                        bit 3 : Wednesday
                        bit 4 : Thursday
                        bit 5 : Friday
                        bit 6 : Saturday
D19~20              Option(※2)
                        bit 0 : 0=once/1=Everyday
                        bit 1 : 0=once/1=Every week
                        bit 2 : 0=Disable/1=Enable
D21~22              Picture mode
                        "00"(30H 30H) : No mean (works on last memory)
                        "01"(30H 31H) : sRGB
                        "02"(30H 32H) :
                        "03"(30H 33H) : Hi-Bright
                        "04"(30H 34H) : Standard
                        "05"(30H 35H) : Cinema
                        "06"(30H 36H) : ISF-Day
                        "07"(30H 37H) : ISF-Night
                        "08"(30H 38H) : CUSTOM1
                        "09"(30H 39H) : CUSTOM2
                        "0A"(30H 41H) :
                        "0B"(30H 42H) : Ambient-1
                        "0C"(30H 43H) : Ambient-2
                        "0D"(30H 44H) : SVE-1
                        "0E"(30H 45H) : SVE-2
                        "0F"(30H 46H) : SVE-3
                        "10"(31H 30H) : SVE-4
                        "11"(31H 31H) : SVE-5
D23~24              Extension1  "00"(30H 30H): Fixed
D25~26              Extension2  "00"(30H 30H): Fixed
D27~28              Extension3  "00"(30H 30H): Fixed
```

```
D29~30          Extension4   "00"(30H 30H): Fixed
D31~32          Extension5   "00"(30H 30H): Fixed
D33~34          Extension6   "00"(30H 30H): Fixed
D35~36          Extension7   "00"(30H 30H): Fixed
```

【ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'1'-'8'-STX "Data
" ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 31H 38H 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~12) (D13~14) (D15~16)
(D17~18) (D19~20) (D21~22) (D23~24) (D25~26) (D27~28) (D29~30) (D31~32) (D33~34) (D35~36) (D37~38)
03H BCC 0DH

Data             Contents
---------------------------------------------------------------------------
D01~04          Message
                    "C314"(43H 33H 31H 34H) : Schedule writes reply command
D05~06          Result code
                    "00"(30H 30H) : No Error
                    "01"(30H 31H) : Error
D07~08          Program No.
                    "00"(30H 30H) : Program No.1 ～
                    "06"(30H 36H) : Program No.7
D09~10          Turn on time (hour)
                    "00"(30H 30H) : 0 ～
                    "17"(31H 37H) : 23
                    "18"(31H 38H) : ON (No Stting Time.)
D11~12          Turn on time (minute)
                    "00"(30H 30H) : 0 ～
                    "3B"(33H 42H) : 59
                    "3C"(33H 43H) : ON (No Stting Time.)
D13~14          Turn off time (hour)
                    "00"(30H 30H) : 0 ～
                    "17"(31H 37H) : 23
                    "18"(31H 38H) : OFF (No Stting Time.)
D15~16          Turn off time (minute)
                    "00"(30H 30H) : 0 ～
                    "3B"(33H 42H) : 59
                    "3C"(33H 43H) : OFF (No Stting Time.)
D17~18          Timer input
                    "00"(30H 30H) : No mean (works on last memory)
                    "01"(30H 31H) : VGA
                    "02"(30H 32H) : RGB/HV
                    "03"(30H 33H) : DVI
                    "04"(30H 34H) :
                    "05"(30H 35H) : Video1
                    "06"(30H 36H) : Video2
                    "07"(30H 37H) : S-Video
                    "08"(30H 38H) :
                    "09"(30H 39H) :
                    "0A"(30H 41H) : TV
                    "0B"(30H 42H) :
                    "0C"(30H 43H) : DVD/HD1
                    "0D"(30H 44H) : Option
                    "0E"(30H 45H) : DVD/HD2
                    "0F"(30H 46H) : DisplayPort
                    "10"(31H 30H) : DisplayPort2
                    "11"(31H 31H) : HDMI
                    "12"(31H 32H) : HDMI2
                    "80"(38H 30H) : DisplayPort3
                    "82"(38H 32H) : HDMI3
                    "83"(38H 33H) : HDMI4
                    "84"(38H 34H) : PRESET1
                    "85"(38H 34H) : PRESET2
                    "86"(38H 34H) : PRESET3
                    "87"(38H 37H) : MP
                    "88"(38H 38H) : COMPUTE MODULE
D19~20          Week setting(※1)
                    bit 0 : Sunday
                    bit 1 : Monday
                    bit 2 : Tuesday
                    bit 3 : Wednesday
                    bit 4 : Thursday
```

```
                               bit 5 : Friday
                               bit 6 : Saturday
D21~22              Option(※2)
                         bit 0 : 0=once/1=Everyday
                         bit 1 : 0=once/1=Every week
                         bit 2 : 0=Disable/1=Enable
D23~24              Picture mode
                         "00"(30H 30H) : No mean (works on last memory)
                         "01"(30H 31H) : sRGB
                         "02"(30H 32H) :
                         "03"(30H 33H) : Hi-Bright
                         "04"(30H 34H) : Standard
                         "05"(30H 35H) : Cinema
                         "06"(30H 36H) : ISF-Day
                         "07"(30H 37H) : ISF-Night
                         "08"(30H 38H) : CUSTOM1
                         "09"(30H 39H) : CUSTOM2
                         "0A"(30H 41H) :
                         "0B"(30H 42H) : Ambient-1
                         "0C"(30H 43H) : Ambient-2
                         "0D"(30H 44H) : SVE-1
                         "0E"(30H 45H) : SVE-2
                         "0F"(30H 46H) : SVE-3
                         "10"(31H 30H) : SVE-4
                         "11"(31H 31H) : SVE-5
D25~26              Extension1  "00"(30H 30H) : Fixed
D27~28              Extension2  "00"(30H 30H) : Fixed
D29~30              Extension3  "00"(30H 30H) : Fixed
D31~32              Extension4  "00"(30H 30H) : Fixed
D33~34              Extension5  "00"(30H 30H) : Fixed
D35~36              Extension6  "00"(30H 30H) : Fixed
D37~38              Extension7  "00"(30H 30H) : Fixed
```

【 Note 】

Serial No. & Model Name Read

CTL-C216. Serial No. Read

【 Function 】

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

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'6'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 36H 02H (D01~04) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~04            Message
                      "C216"(43H 32H 31H 36H) : Serial No. command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'- N - N -STX "Data            " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H LEN LEN 02H (D01~04) (D05~XX) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~04            Message
                      "C316"(43H 33H 31H 36H) : Serial No. reply command
D05~XX            Serial Number(XX Max=30)
                      * The byte data 20h is encoded as ASCII characters '2' and '0' (32h and 30h).
                       Ex.) For example when receiving Serial Number data
                              33h 31h 33h 32h 33h 33h 33h 34h
                          Step1: Serial Number data is encoded as character string.
                              Example:
                              33h 31h 33h 32h 33h 33h 33h 34h
                          -> '3','1','3','2','3','3','3','4'
                          Step2: Decode pairs of ASCII characters to hexadecimal values.
                              Example:
                              '3','1','3','2','3','3','3','4'
                          ->   31h  ,  32h  ,  33h  ,  34h
                          Step3: Byte data represents the ASCII string data.
                              Example:
                              31h 32h 33h 34h
                          -> "1234"
                          Result: Serial Number is "1234".
                          Note: No null termination character is sent.
```

【 Note 】

CTL-C217. Model Name Read

【 Function 】

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

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'6'-STX "Data  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 36H 02H (D01~04) 03H BCC 0DH

Data                Contents
--------------------------------------------------------------------
D01~04              Message
                        "C217"(43H 32H 31H 37H) : Model Name command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'- N - N -STX "Data           " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H LEN LEN 02H (D01~04) (D05~XX) 03H BCC 0DH

Data                Contents
--------------------------------------------------------------------
D01~04              Message
                        "C317"(43H 33H 31H 37H) : Model Name reply Command
D05~XX              Model name(XX Max=36)
                        * The byte data 20h is encoded as
                          ASCII characters '2' and '0' (32h and 30h).
                          Ex.) For example when receiving Model Name data
                                35h 30h 33h 34h 33h 30h 33h 33h
                                Step1: Model Name data is encoded character string.
                                        Example:
                                        35h 30h 33h 34h 33h 30h 33h 33h
                                    -> '5','0','3','4','3','0','3','3'
                                Step2: Decode pairs of ASCII characters to hexadecimal values.
                                        Example:
                                        '5','0','3','4','3','0','3','3'
                                    ->   50h  ,  34h  ,  30h  ,  33h
                                Step3: Byte data represents the ASCII string data.
                                        Example:
                                        50h 34h 30h 33h
                                    -> "P403"
                                Result: Model Name is "P403".
                                Note: No null termination character is sent.
```

【 Note 】

MAC Address Read Request & Reply

CTL-C220. MAC Address Read Request

【 Function 】

```
This command is used in order to read the MAC Address.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'8'-STX "Data           " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 31H 30H 02H (D01~04) (D05~06) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~04               Message
                        "C220"(43H 32H 32H 40H) : MAC Address Read Request command
D05~06               Select device
                        "00"(30H 30H) :fixed
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'- N - N -STX "Data                " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H LEN LEN 02H (D01~04) (D05~06) (D07~XX) 03H BCC 0DH

Data              Contents
----------------------------------------------------------------------
D01~04               Message
                        "C320"(43H 33H 32H 30H) : MAC Address Read Request reply command
D05~06               Select device
                        "00"(30H 30H) :fixed
D07~XX               MAC Address(XX Max=12)
```

【 Note 】

Remote Control Data Code sending format via RS-232C

CTL-C210. Remote Control Data Code sending format via RS-232C

【 Function 】

```
This command is used in order to send the Remote Control Data Code.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'C'-STX "Data                          " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 43H 02H (D01~04) (D05~06) (D07~08) (D09~10) 03H BCC 0DH

Data            Contents
--------------------------------------------------------------------------
D01~04             Message
                      "C210"(43H 32H 31H 30H) : Remote Control Data Code command
D05~06             remote control data code upper byte(High)
                      "00"(30H 30H)
D07~08             remote control data code upper byte(Low)
                      "1D"(31H 44H) : PICTURE
                      "29"(32H 39H) : ASPECT
                      "43"(34H 33H) : SOUND
                      "08"(30H 38H) : 1
                      "09"(30H 39H) : 2
                      "0A"(30H 41H) : 3
                      "0B"(30H 42H) : 4
                      "0C"(30H 43H) : 5
                      "0D"(30H 44H) : 6
                      "0E"(30H 45H) : 7
                      "0F"(30H 46H) : 8
                      "10"(31H 30H) : 9
                      "44"(34H 34H) : DASH
                      "12"(31H 32H) : 0
                      "19"(31H 39H) : INFO
                      "20"(32H 30H) : MENU
                      "1F"(31H 46H) : EXIT
                      "15"(31H 35H) : UP
                      "14"(31H 34H) : DOWN
                      "21"(32H 31H) : LEFT
                      "22"(32H 32H) : RIGHT
                      "23"(32H 33H) : OK
                      "17"(31H 37H) : VOL +
                      "16"(31H 36H) : VOL -
                      "33"(33H 33H) : CH +
                      "32"(33H 32H) : CH -
                      "1B"(31H 42H) : MUTE
                      "27"(32H 37H) : FREEZE
                      "2C"(32H 43H) : CC
                      "1A"(31H 41H) : MTS
                      "57"(35H 37H) : Image Rotation
D09~10          repeat times(HL)
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'A'-STX "Data                    " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 38H 02H (D01~04) (D05~06) (D07~08) 03H BCC 0DH

Data            Contents
--------------------------------------------------------------------------
D01~04             Message
                      "C310"(43H 33H 31H 30H) : Remote Control Data Code reply command
D05~06             remote control data code upper byte(High)
```

	"00"(30H 30H)
D07~08	remote control data code upper byte(Low) Omitted because it is the same as the transmitted data.

【 Note 】

Firmware Version Command

CTL-CA02. Firmware Version Read Request

【 Function 】

```
This command is used in order to read Firmware Version.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'8'-STX "Data           " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 38H 02H (D01~04) (D05~06) 03H BCC 0DH

Data                Contents
----------------------------------------------------------------------
D01~04              Message
                        "CA02"(43H 41H 30H 32H) : Firmware Version Read Command
D05~06              Firmware Type
                        "00"(30H 30H) : F/W Revision
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'1'-'2'-STX "Data                            " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 31H 32H 02H (D01~04) (D05~06) (D07~08) (D09~16) 03H BCC 0DH

Data                Contents
----------------------------------------------------------------------
D01~04              Message
                        "CB02"(43H 42H 30H 31H) : Firmware Version Read reply command
D05~06              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
D07~08              Firmware Type
                        "00"(30H 30H) : Firmware revision
D09~16              Firmware Version String
                        D09     : R
                        D10     : Major Version
                                    "0"(30H) ~ "9"(39H)
                        D11     : Period
                                    2EH (fixed)
                        D12     : Minor (Basic) Version1
                                    "0"(30H) ~ "9"(39H)
                        D13     : Minor (Basic) Version2
                                    "0"(30H) ~ "9"(39H)
                        D14     : Minor (Basic) Version3
                                    "0"(30H) ~ "9"(39H)
                        D15     : Branch Version1
                                    "A"(41H) ~ "Z"(5AH)
                        D16     : Branch Version2
                                    "A"(41H) ~ "Z"(5AH)
```

【 Note 】

```
The version information section is an ASCII character string.
```

CTL-CA04-03. Input Name of Designated Terminal Read Request

【 Function 】

```
This command is used in order to read Input Name of Designated Terminal.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'A'-STX "Data                  " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 41H 02H (D01~04) (D05~06) (D07~08) 03H BCC 0DH

Data               Contents
------------------------------------------------------------------------
D01~04             Message
                       "CA04"(43H 41H 30H 34H) : Input Name command
D05~06             Index
                       "03"(30H 33H) : Designated Terminal Read
D07~08             Input Terminal
                       "00"(30H 30H) : No mean
                       "01"(30H 31H) : VGA(RGB)
                       "05"(30H 35H) : AV
                       "0C"(30H 43H) : VGA(YPbPr)
                       "11"(31H 31H) : HDMI1
                       "12"(31H 32H) : HDMI2
                       "82"(38H 32H) : HDMI3
                       "87"(38H 37H) : MP(Media player)
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'- N - N -STX "Data                            " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H LEN LEN 02H (D01~04) (D05~06) (D07~08) (D09~10) (D11~XX) 03H BCC 0DH

Data               Contents
------------------------------------------------------------------------
D01~04             Message
                       "CB04"(43H 42H 30H 34H) : Input Name reply command
D05~06             Index
                       "03"(30H 33H) : Designated Terminal Read
D07~08             Result code
                       "00"(30H 30H) : No Error
                       "01"(30H 31H) : Error
D09~10             Input Terminal
                       Omitted because it is the same as the transmitted data.
D11~XX             Input Name
                       XX = Max 39
                       Max length of actual Input Name 14 characters
```

【 Note 】

CTL-CA04-04. Input Name of Designated Terminal Write Request

【 Function 】

```
This command is used in order to write Input Name of Designated Terminal.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'- N - N -STX "Data                          " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H LEN LEN 02H (D01~04) (D05~06) (D07~08) (D09~XX) 03H BCC 0DH

Data            Contents
-----------------------------------------------------------------------
D01~04            Message
                    "CA04"(43H 41H 30H 34H) : Input Name command
D05~06            Index
                    "04"(30H 34H) : Designated Terminal Write
D07~08            Input Terminal
                    "00"(30H 30H) : No mean
                    "01"(30H 31H) : VGA(RGB)
                    "05"(30H 35H) : AV
                    "0C"(30H 43H) : VGA(YPbPr)
                    "11"(31H 31H) : HDMI1
                    "12"(31H 32H) : HDMI2
                    "82"(38H 32H) : HDMI3
                    "87"(38H 37H) : MP(Media player)
D09~XX            Input Name
                    XX = Max 37
                    Max length of actual Input Name 14 characters
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'A'-STX "Data                  " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 41H 02H (D01~04) (D05~06) (D07~08) 03H BCC 0DH

Data            Contents
-----------------------------------------------------------------------
D01~04            Message
                    "CB04"(43H 42H 30H 34H) : Input Name reply command
D05~06            Index
                    "04"(30H 34H) : Designated Terminal Write
D07~08            Result code
                    "00"(30H 30H) : No Error
                    "01"(30H 31H) : Error
```

【 Note 】

CTL-CA04-05. Input Name of Designated Terminal Reset Request

【 Function 】

```
This command is used in order to reset Input Name of Designated Terminal.
```

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'0'-'A'-STX "Data                    " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 30H 41H 02H (D01~04) (D05~06) (D07~08) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04             Message
                       "CA04"(43H 41H 30H 34H) : Input Name command
D05~06             Index
                       "05"(30H 35H) : Designated Terminal Reset
D07~08             Input Terminal
                       "00"(30H 30H) : ALL Terminal
                       "00"(30H 30H) : No mean
                       "01"(30H 31H) : VGA(RGB)
                       "05"(30H 35H) : AV
                       "0C"(30H 43H) : VGA(YPbPr)
                       "11"(31H 31H) : HDMI1
                       "12"(31H 32H) : HDMI2
                       "82"(38H 32H) : HDMI3
                       "87"(38H 37H) : MP(Media player)
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'A'-STX "Data                   " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 41H 02H (D01~04) (D05~06) (D07~08) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04             Message
                       "CB04"(43H 42H 30H 34H) : Input Name reply
D05~06             Index
                       "05"(30H 35H) : Designated Terminal Reset
D07~08             Result code
                       "00"(30H 30H) : No Error
                       "01"(30H 31H) : Error
```

【 Note 】

8. OSD menu and contrast table for each command

A table of settings that exist in the OSD menu of the monitor versus each command.

Some commands that do not exist in the OSD menu are listed in the "Other" section of the comparison table.

【VCP command format】

```
VCP - "OP code page" - "OP code"

Ex.) VCP-00-60
     OP code page: 00
     OP code: 60
```

OSD				Command	Parameter
Video	Picture Mode			VCP-02-1A	
	Advanced Video	Aspect Ratio		VCP-02-70	0001H : NORMAL 0002H : FULL 0004H : ZOOM 0007H : 1:1
		Overscan		VCP-02-E3	0001H : Off 0002H : On 0003H : Auto
		Dimming Setting		VCP-11-4E	0001H : OFF 0002H : Dynamic Backlight 0003H : Local Dimming
		Color Temperature	Color Temperature	VCP-00-0C VCP-00-14	VCP-00-0C 0023H : Warm 003FH : Normal 005AH : Cool VCP-00-14 0002H : Native 000BH : Custom
			Custom R	VCP-00-16	0000H - 00FFH (Dark) - (Bright)
			Custom G	VCP-00-18	0000H - 00FFH (Dark) - (Bright)
			Custom B	VCP-00-1A	0000H - 00FFH (Dark) - (Bright)
		Noise Reduction		VCP-02-20 VCP-02-26	VCP-02-20 0000H : OFF 0001H : Low 0002H : Mid

			0003H : High
			VCP-02-26
			0000H : OFF
			0001H : Low
			0002H : Mid
			0003H : High
	Adaptive Contrast	VCP-02-8D	0001H : Off
			0002H : Low
			0003H : Mid
			0004H : High
	Gamma	VCP-02-68	0001H : Native
			0004H : 2.2
			0008H : 2.4
			0010H : HDR-Hybrid Log
			0011H : HDR-ST2084(PQ)
	Ambient Light Sensing	VCP-10-C8	0001H : Off
			0002H : On
	Color Enhance	VCP-11-EC	0001H : Off
			0002H : Vivid
			0003H : Wide
	HDR Mode	VCP-11-E5	0004H : Low
			0005H : Mid
			0006H : High
Backlight / Brightness		VCP-00-10	0000H - 0064H (Dark) - (Bright)
Contrast		VCP-00-12	0000H - 0064H (Low) - (High)
Video Black Level		VCP-00-92	0000H - 0064H (To Dark) - (To Bright)
Sharpness		VCP-00-87 VCP-00-8C	VCP-00-87 0000H - 0064H (Dull) - (Sharp) VCP-00-8C 0000H - 0064H (Dull) - (Sharp)
Color		VCP-00-8A VCP-02-1F	VCP-00-8A 0000H - 0064H (Pale) - (To Deep) VCP-02-1F

			0000H - 0064H (Pale) - (To Deep)
	Tint	VCP-00-90	0000H - 0064H (To Purplish) - (To Greenish)
	Reset Video Settings	VCP-02-CB	0001H : All(=Factory Reset) 0002H : Picture 0003H : Adjust 0004H : Audio 0010H : Network
Audio	Sound Mode	Sound Mode	VCP-10-B2	0001H : Standard 0002H : Movie 0003H : Music 0005H : Custom
		120Hz	N/A	---
		500Hz	N/A	---
		1.5kHz	N/A	---
		5kHz	N/A	---
		10kHz	N/A	---
	Balance	VCP-00-93	0000H - 0064H (To Left) - (To Right)
	Surround	VCP-02-34	0001H : Off 0002H : On
	Internal Speakers	VCP-11-BA	0000H : No mean 0001H : Off 0002H : On 0003H : Auto
	Digital Output	N/A	---
	Audio Input	VCP-02-2E	0001H : Audio1 (Audio In) 0002H : Audio2 (AV) 0004H : HDMI1 000AH : HDMI2 000BH : HDMI3 000DH : MP
	Audio Delay	VCP-10-CB	0000H - 0064H (Small) - (Large)
	Reset Audio Settings	VCP-02-31 VCP-02-CB	VCP-02-31 0001H : Reset VCP-02-CB 0001H : All(=Factory Reset)

				0002H : Picture
				0003H : Adjust
				0004H : Audio
				0010H : Network
Setup	OSD Settings	Language	VCP-00-68	0001H : English 0002H : Deutsch 0003H : Français 0004H : Español 0005H : 日本語 0006H : Italiano 0009H : Русский 000EH : 繁體中文 000FH : Čeština
		Transparency	VCP-02-B8	0001H : Off 0002H : 30% 0003H : 50% 0004H : 70%
		Information OSD	VCP-02-3D	0000H : Off 0005H : On
	Closed Caption(*1)	Caption Display	VCP-10-84	0000H : No mean 0001H : Off 0002H : CC1 0003H : CC2 0004H : CC3 0005H : CC4 0006H : Text1 0007H : Text2 0008H : Text3 0009H : Text4
		Analog Captions	VCP-10-84	0000H : No mean 0001H : Off 0002H : CC1 0003H : CC2 0004H : CC3 0005H : CC4 0006H : Text1 0007H : Text2 0008H : Text3 0009H : Text4
	Power save settings	Energy Mode	N/A	---
		Power Save	N/A	---
		Quick Start	VCP-11-EA	0001H : Off 0002H : On

			Auto Power Down	N/A	---
	VGA Options		Auto Input Change	VCP-02-40	0000H : First 0002H : None 0004H : Custom
			Input 1	VCP-10-2E	0001H : VGA 0005H : Video1(AV) 000CH : DVD/HD1(VGA(YPbPr)) 0011H : HDMI1 0012H : HDMI2 0082H : HDMI3
	Auto Input Change		Input 2	VCP-10-2F	0001H : VGA 0005H : Video1(AV) 000CH : DVD/HD1(VGA(YPbPr)) 0011H : HDMI1 0012H : HDMI2 0082H : HDMI3
			Input 3	VCP-10-30	0001H : VGA 0005H : Video1(AV) 000CH : DVD/HD1(VGA(YPbPr)) 0011H : HDMI1 0012H : HDMI2 0082H : HDMI3
	HDMI Settings	CEC	CEC	VCP-11-76	0001H : Off 0002H : On
			Auto Turn Off	VCP-11-77	0001H : Disable 0002H : Enable
			Audio Receiver	VCP-11-78	0001H : Disable 0002H : Enable
			Device list	VCP-11-79	0001H : NO 0002H : YES
		EDID		VCP-10-AA	0001H : Mode 0 0002H : Mode 1 0003H : Mode 2
		Video Range		VCP-10-40	0001H : Expanded Signal 0002H : Raw Signal 0003H : Auto
		HPD Delay		N/A	---
	VGA Options	VGA Mode		VCP-10-8E	0001H : RGB 0002H : YPbPr
		Auto Adjust		VCP-00-1E	0001H : Execute
		H.Position		VCP-00-20	0000H - 0064H

				(Left Side) - (Right Side)
		V.Position	VCP-00-30	0000H - 0064H (Bottom Side) - (Top Side)
		Clock	VCP-00-0E	0000H - 0064H
		Phase	VCP-00-3E	0000H - 0064H
		H.Resolution	VCP-02-50	0000H - FFFFH (Low) - (High)
		V.Resolution	VCP-02-51	0000H - FFFFH (Low) - (High)
		Reset VGA Options	VCP-02-CB	0001H : All(=Factory Reset) 0002H : Picture 0003H : Adjust 0004H : Audio 0010H : Network
	Other settings	Input Labels	CTL-CA04-03 CTL-CA04-04 CTL-CA04-05	Refer to section 7
		Key Lock Settings	VCP-00-FB	0000H : Off 0001H : Mode2 0002H : Mode1
		IR Lock Settings	VCP-02-3F	0001H : Off 0004H : Mode2 0005H : Mode1
		Power supply	VCP-11-75	0001H : ON 0003H : OFF
		LED Indicator	VCP-02-BE	0001H : ON 0002H : OFF
		Mute Settings	VCP-11-E9	0001H : Audio 0002H : Video 0003H : Audio & Video
		Image Rotation	VCP-02-D7	0001H : OFF 0004H : ON
		Thermal Management	Warning Message	VCP-11-ED	0000H : No mean 0001H : Off 0002H : On
			Shutdown	VCP-10-8A	0001H : Off 0002H : On
		Signal Information	N/A	---
	Monitor Information		CTL-C217	Refer to section 7

			CTL-CA02 CTL-C216 VCP-02-78 VCP-02-79	
	Factory Reset		VCP-02-CB	0001H : All(=Factory Reset) 0002H : Picture 0003H : Adjust 0004H : Audio 0010H : Network
Control Settings	Control Interface		VCP-10-3E	0001H : RS-232C 0002H : LAN
	Network Settings	DHCP	N/A	---
		IP ADDRESS:	N/A	---
		SUBNET MASK:	N/A	---
		DEFAULT GATEWAY:	N/A	---
		DNS PRIMARY:	N/A	---
		DNS SECONDARY:	N/A	---
		MAC ADDRESS:	N/A	---
		SAVE	N/A	---
	Monitor ID		VCP-02-3E	0001H - 0064H
	Reset Network Settings		VCP-02-CB	0001H : All(=Factory Reset) 0002H : Picture 0003H : Adjust 0004H : Audio 0010H : Network
Media Player	USB Demo Mode		N/A	---
	UnPlug USB Device		N/A	---
	Caution Window		N/A	---
Schedule	Sleep Timer		N/A	---
	Current Time settings		N/A	---
	Schedule settings	Power On	N/A	---
		Power Off	N/A	---
Input Source	HDMI1		VCP-00-60	0000H : No mean 0001H : VGA(RGB) 0005H : Video1(AV) 000CH : DVD/HD1 (VGA(YPbPr)) 0011H : HDMI1 0012H : HDMI2
	HDMI2			
	HDMI3			
	VGA(RGB)			

	VGA(YPbPr)		0082H : HDMI3
	AV		0087H : MP(Media Player)
	Media Player		
HotKey	SOURCE	CTL-C210	Refer to section 7
	MUTE		
	Digit 0~9/DASH		
	矢印キー		
	SOUND		
	PICTURE		
	UP/DOWN/LEFT/RIGHT/OK		
	VOL+/-		
	CH+/-		
	MENU		
	EXIT		
	EPG		
	INFO		
	FREEZE		
	MTS		
	CH.LIST		
	FAV		
	ASPECT		
	CC		
	PLAY		
	PAUSE		
	STOP		
	ROTATE		
	PREVIOUS		
	NEXT		
	FAST_BACKWARD		
	FAST_FORWARD		
	POWER		

(*1) Only US models are suppoted