External Control

OPERATION MANUAL for N-Format command

PN-LA862/PN-LA752/PN-LA652

External Control

1. Application

This document defines the communications method for control of the SHARP 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                   Straight cable
```

2.2. LAN control

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

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: 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
(5) Port No.                7142 (Non Secure)
                            10022 (Secure)
```

【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: 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.
    The monitor ID has a fixed value of "1", so specify "A(41h)" here.
    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).
```

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 Attachment VCP Table.
“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”, 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			Check code (BCC)
SOH	Resv.	Dest	Src	Type	Length	STX	Data	ETX	
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 (BCC)	Delimiter
SOH	Resv.	Dest	Src	Type	Length		STX	OP Code Page		OP Code		Set Value			ETX		
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 Attachment VCP 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 Attachment VCP 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 Attachment VCP Table.

* 4th-5th bytes) OP code: Operation code
    Refer to Attachment VCP 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 Attachment VCP Table.

* 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 Attachment VCP 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 Attachment VCP 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

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 Attachment VCP 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 Attachment VCP 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

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 Attachment VCP 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 Attachment VCP 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.

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 asks the monitor to report the timing of the displayed image, but the unit returns a NULL message.

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, Input.
* 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 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.

6.1.1. 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
```

6.1.2. 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
```

6.1.3. 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
```

6.1.4. 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

7.1. System Command

7.1.1. 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 】

7.1.2. 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.
```

【 Reply 】

```
NULL Message
```

【 Note 】

7.2. Power control procedure

7.2.1. 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) : Input signal waiting mode
                        "0003"(30H,30H,30H,33H) : Reserved
                        "0004"(30H,30H,30H,34H) : OFF (same as IR power off)
```

【 Note 】

7.2.2. 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 】

7.3. Date & Time read and write

7.3.1. 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)
                        "17"(31H 37H) : 2023 ~
                        "25"(32H 35H) : 2037(25H=37)
D07~08              Month
                        "01"(30H 31H) : 1 ~
                        "0C"(30H 43H) : 12
D09~10              Day
                        "01"(30H 31H) : 1 ~
                        "1F"(31H 46H) : 31
D11~12              Reserved
                        "00"(30H 30H)
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 】

7.3.2. 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)
                        "17"(31H 37H) : 2023 ~
                        "25"(32H 35H) : 2037(25H=37)
D07~08              Month
                        "01"(30H 31H) : 1 ~
                        "0C"(30H 43H) : 12
D09~10              Day
                        "01"(30H 31H) : 1 ~
                        "1F"(31H 46H) : 31
D11~12              Reserved
                        "00"(30H 30H)
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) : No Error
                        "01"(30H 31H) : Error
D07~08              Year (offset 2000)
                        "17"(31H 37H) : 2023 ~
                        "25"(32H 35H) : 2037(25H=37)
D09~10              Month
                        "01"(30H 31H) : 1 ~
                        "0C"(30H 43H) : 12
D11~12              Day
                        "01"(30H 31H) : 1 ~
                        "1F"(31H 46H) : 31
D13~14              Reserved
                        "00"(30H 30H)
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 】

7.3.3. CTL-C230. Time Zone Read

【 Function 】

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

【 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
                        "C230"(43H 32H 33H 30H) : Time Zone read request command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'8'-STX "Data           " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 38H 02H (D01~04) (D05~06) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C330"(43H 33H 33H 30H) : Time Zone read reply command
D05~06              Time Zone
                        "00"(30H 30H) : UTC -12:00
                        "01"(30H 31H) : UTC -11:30
                        "02"(30H 32H) : UTC -11:00
                        "03"(30H 33H) : UTC -10:30
                        "04"(30H 34H) : UTC -10:00
                        "05"(30H 35H) : UTC -09:30
                        "06"(30H 36H) : UTC -09:00
                        "07"(30H 37H) : UTC -08:30
                        "08"(30H 38H) : UTC -08:00
                        "09"(30H 39H) : UTC -07:30
                        "0A"(30H 41H) : UTC -07:00
                        "0B"(30H 42H) : UTC -06:30
                        "0C"(30H 43H) : UTC -06:00
                        "0D"(30H 44H) : UTC -05:30
                        "0E"(30H 45H) : UTC -05:00
                        "0F"(30H 46H) : UTC -04:30
                        "10"(31H 30H) : UTC -04:00
                        "11"(31H 31H) : UTC -03:30
                        "12"(31H 32H) : UTC -03:00
                        "13"(31H 33H) : UTC -02:30
                        "14"(31H 34H) : UTC -02:00
                        "15"(31H 35H) : UTC -01:30
                        "16"(31H 36H) : UTC -01:00
                        "17"(31H 37H) : UTC -00:30
                        "18"(31H 38H) : UTC +00:00
                        "19"(31H 39H) : UTC +00:30
                        "1A"(31H 41H) : UTC +01:00
                        "1B"(31H 42H) : UTC +01:30
                        "1C"(31H 43H) : UTC +02:00
                        "1D"(31H 44H) : UTC +02:30
                        "1E"(31H 45H) : UTC +03:00
                        "1F"(31H 46H) : UTC +03:30
                        "20"(32H 30H) : UTC +04:00
                        "21"(32H 31H) : UTC +04:30
                        "22"(32H 32H) : UTC +05:00
                        "23"(32H 33H) : UTC +05:30
                        "24"(32H 34H) : UTC +06:00
```

```
                        "25"(32H 35H) : UTC +06:30
                        "26"(32H 36H) : UTC +07:00
                        "27"(32H 37H) : UTC +07:30
                        "28"(32H 38H) : UTC +08:00
                        "29"(32H 39H) : UTC +08:30
                        "2A"(32H 41H) : UTC +09:00
                        "2B"(32H 42H) : UTC +09:30
                        "2C"(32H 43H) : UTC +10:00
                        "2D"(32H 44H) : UTC +10:30
                        "2E"(32H 45H) : UTC +11:00
                        "2F"(32H 46H) : UTC +11:30
                        "30"(33H 30H) : UTC +12:00
```

【 Note 】

7.3.4. CTL-C231. Time Zone Write

【 Function 】

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

【 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
                        "C231"(43H 32H 33H 31H) : Time Zone write command
D05~06              Time Zone
                        "00"(30H 30H) : UTC -12:00
                        "01"(30H 31H) : UTC -11:30
                        "02"(30H 32H) : UTC -11:00
                        "03"(30H 33H) : UTC -10:30
                        "04"(30H 34H) : UTC -10:00
                        "05"(30H 35H) : UTC -09:30
                        "06"(30H 36H) : UTC -09:00
                        "07"(30H 37H) : UTC -08:30
                        "08"(30H 38H) : UTC -08:00
                        "09"(30H 39H) : UTC -07:30
                        "0A"(30H 41H) : UTC -07:00
                        "0B"(30H 42H) : UTC -06:30
                        "0C"(30H 43H) : UTC -06:00
                        "0D"(30H 44H) : UTC -05:30
                        "0E"(30H 45H) : UTC -05:00
                        "0F"(30H 46H) : UTC -04:30
                        "10"(31H 30H) : UTC -04:00
                        "11"(31H 31H) : UTC -03:30
                        "12"(31H 32H) : UTC -03:00
                        "13"(31H 33H) : UTC -02:30
                        "14"(31H 34H) : UTC -02:00
                        "15"(31H 35H) : UTC -01:30
                        "16"(31H 36H) : UTC -01:00
                        "17"(31H 37H) : UTC -00:30
                        "18"(31H 38H) : UTC +00:00
                        "19"(31H 39H) : UTC +00:30
                        "1A"(31H 41H) : UTC +01:00
                        "1B"(31H 42H) : UTC +01:30
                        "1C"(31H 43H) : UTC +02:00
                        "1D"(31H 44H) : UTC +02:30
                        "1E"(31H 45H) : UTC +03:00
                        "1F"(31H 46H) : UTC +03:30
                        "20"(32H 30H) : UTC +04:00
                        "21"(32H 31H) : UTC +04:30
                        "22"(32H 32H) : UTC +05:00
                        "23"(32H 33H) : UTC +05:30
                        "24"(32H 34H) : UTC +06:00
                        "25"(32H 35H) : UTC +06:30
                        "26"(32H 36H) : UTC +07:00
                        "27"(32H 37H) : UTC +07:30
                        "28"(32H 38H) : UTC +08:00
                        "29"(32H 39H) : UTC +08:30
                        "2A"(32H 41H) : UTC +09:00
                        "2B"(32H 42H) : UTC +09:30
                        "2C"(32H 43H) : UTC +10:00
                        "2D"(32H 44H) : UTC +10:30
                        "2E"(32H 45H) : UTC +11:00
                        "2F"(32H 46H) : UTC +11:30
                        "30"(33H 30H) : UTC +12:00
```

【 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
                        "C331"(43H 33H 33H 31H) : Time Zone write reply command
D05~06              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
D07~08              Time Zone
                        "00"(30H 30H) : UTC -12:00
                        "01"(30H 31H) : UTC -11:30
                        "02"(30H 32H) : UTC -11:00
                        "03"(30H 33H) : UTC -10:30
                        "04"(30H 34H) : UTC -10:00
                        "05"(30H 35H) : UTC -09:30
                        "06"(30H 36H) : UTC -09:00
                        "07"(30H 37H) : UTC -08:30
                        "08"(30H 38H) : UTC -08:00
                        "09"(30H 39H) : UTC -07:30
                        "0A"(30H 41H) : UTC -07:00
                        "0B"(30H 42H) : UTC -06:30
                        "0C"(30H 43H) : UTC -06:00
                        "0D"(30H 44H) : UTC -05:30
                        "0E"(30H 45H) : UTC -05:00
                        "0F"(30H 46H) : UTC -04:30
                        "10"(31H 30H) : UTC -04:00
                        "11"(31H 31H) : UTC -03:30
                        "12"(31H 32H) : UTC -03:00
                        "13"(31H 33H) : UTC -02:30
                        "14"(31H 34H) : UTC -02:00
                        "15"(31H 35H) : UTC -01:30
                        "16"(31H 36H) : UTC -01:00
                        "17"(31H 37H) : UTC -00:30
                        "18"(31H 38H) : UTC +00:00
                        "19"(31H 39H) : UTC +00:30
                        "1A"(31H 41H) : UTC +01:00
                        "1B"(31H 42H) : UTC +01:30
                        "1C"(31H 43H) : UTC +02:00
                        "1D"(31H 44H) : UTC +02:30
                        "1E"(31H 45H) : UTC +03:00
                        "1F"(31H 46H) : UTC +03:30
                        "20"(32H 30H) : UTC +04:00
                        "21"(32H 31H) : UTC +04:30
                        "22"(32H 32H) : UTC +05:00
                        "23"(32H 33H) : UTC +05:30
                        "24"(32H 34H) : UTC +06:00
                        "25"(32H 35H) : UTC +06:30
                        "26"(32H 36H) : UTC +07:00
                        "27"(32H 37H) : UTC +07:30
                        "28"(32H 38H) : UTC +08:00
                        "29"(32H 39H) : UTC +08:30
                        "2A"(32H 41H) : UTC +09:00
                        "2B"(32H 42H) : UTC +09:30
                        "2C"(32H 43H) : UTC +10:00
                        "2D"(32H 44H) : UTC +10:30
                        "2E"(32H 45H) : UTC +11:00
                        "2F"(32H 46H) : UTC +11:30
                        "30"(33H 30H) : UTC +12:00
```

【 Note 】

7.4. Time server read and write

7.4.1. CTL-C21A. Time Server Read

【 Function 】

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

【 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
                        "C21A"(43H 32H 31H 41H) : Time server read request command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'4'-'8'-STX "Data                    " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 34H 38H 02H (D01~04) (D05~06) (D07~70) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C31A"(43H 33H 31H 41H) : Time server read reply command
D05~06              Time Server
                        "00"(30H 30H) : Off
                        "01"(30H 31H) : On
D07~74              Time Server Name
                        Max length of actual Time Server Name 32 characters.
```

【 Note 】

7.4.2. CTL-C21B. Time Server Write

【 Function 】

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

【 Command 】

```
[ASC]SOH-'0'-ID-'0'-'A'-'4'-'8'-STX "Data                    " ETX BCC 0DH
[HEX]01H 30H ID 30H 41H 34H 38H 02H (D01~04) (D05~06) (D07~70) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C21B"(43H 32H 31H 42H) : Time server write command
D05~06              Time Server
                        "00"(30H 30H) : Off
                        "01"(30H 31H) : On
D07~74              Time Server Name
                        Max length of actual Time Server Name 32 characters.
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'8'-STX "Data           " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 38H 02H (D01~04) (D05~06) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04              Message
                        "C31B"(43H 33H 31H 42H) : Time Server write reply command
D05~06              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
```

【 Note 】

7.5. Self diagnosis

7.5.1. CTL-B1. Self-diagnosis status read

【 Function 】

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

【 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
                        "B1"(42H 31H) : Self-diagnosis command
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-LEN-LEN-STX "Data           " 03H BCC 0DH
[HEX]01H 30H 30H ID 42H LEN LEN 02H (D01~02) (D03~XX) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~02              Message
                        "A1"(41H 31H) : Application Test Report reply command
D03~XX              Result of self-tests(XX Max=34)
                        "00"(30H 30H) : Normal
                        "71"(37H 31H) : Main-power +5V abnormality
                        "72"(37H 32H) : Panel-power/FAN-power +12V abnormality
                        "78"(37H 38H) : Audio-power/Converter-power +24V abnormality
                        "90"(39H 30H) : LED Backlight abnormality (CON ERR1)*short open detection
                        "A0"(41H 30H) : Temperature abnormality shutdown
                        "A1"(41H 31H) : Temperature abnormality half brightness
                        "A2"(41H 32H) : SENSOR reached at the temperature that the user had
```

【 Note 】

7.6. Serial No. & Model Name Read

7.6.1. 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'-LEN-LEN-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 】

7.6.2. 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'-LEN-LEN-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 】

7.6.3. CTL-CA01-02. Daylight Saving ON/OFF Read

【 Function 】

```
This command is used in order to read Daylight Saving ON/OFF Setting.
```

【 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
                        "CA01"(43H 41H 30H 31H) : Daylight Saving Command
D05~06              Index
                        "02"(30H 32H) : ON/OFF Read
```

【 ACK 】

```
[DAT]SOH-'0'-'0'-ID-'B'-'0'-'C'-STX "Data                              " ETX BCC 0DH
[HEX]01H 30H 30H ID 42H 30H 43H 02H (D01~04) (D05~06) (D07~08) (D09~10) 03H BCC 0DH

Data               Contents
-------------------------------------------------------------------------
D01~04              Message
                        "CB01"(43H 42H 30H 31H) : Daylight Saving reply command
D05~06              Index
                        "02"(30H 32H) : ON/OFF Read
D07~08              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
D09~10              Daylight Saving Value
                        "00"(30H 30H) : OFF
                        "01"(30H 31H) : ON
```

【 Note 】

7.6.4. CTL-CA01-03. Daylight Saving ON/OFF Write

【 Function 】

```
This command is used in order to write Daylight Saving ON/OFF Setting.
```

【 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
                        "CA01"(43H 41H 30H 31H) : Daylight Saving Setting Command
D05~06              Index
                        "03"(30H 33H) : ON/OFF Write
D07~08              Daylight Saving Value
                        "00"(30H 30H) : OFF
                        "01"(30H 31H) : ON
```

【 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
                        "CB01"(43H 42H 30H 31H) : Daylight Saving Setting reply command
D05~06              Index
                        "03"(30H 33H) : ON/OFF Write
D07~08              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
```

【 Note 】

7.7. Firmware Version Command

7.7.1. 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 32H) : 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.
```

7.8. Power Management Command

7.8.1. CTL-CA0B-00. Power Management Read Request

【 Function 】

```
This command is used in order to read Power Management.
```

【 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
                        "CA0B"(43H 41H 30H 42H) : Power Management command
D05~06              Index
                        "00"(30H 30H) : Read
```

【 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
                        "CB0B"(43H 42H 30H 42H) : Power Management reply command
D05~06              Index
                        "00"(30H 30H) : Read
D07~08              POWER SAVE MODE
                        "00"(30H 30H) : ON
                        "02"(30H 32H) : OFF
```

【 Note 】

7.8.2. CTL-CA0B-01. Power Management Write Request

【 Function 】

```
This command is used in order to write Power Management.
```

【 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
                        "CA0B"(43H 41H 30H 42H) : Power Management command
D05~06              Index
                        "01"(30H 31H) : Write
D07~08              POWER SAVE MODE
                        "00"(30H 30H) : ON
                        "02"(30H 32H) : OFF
```

【 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
                        "CB0B"(43H 42H 30H 42H) : Power Management reply command
D05~06              Index
                        "01"(30H 31H)[01H] : Write
D07~08              Result code
                        "00"(30H 30H) : No Error
                        "01"(30H 31H) : Error
```

【 Note 】

Appendix. VCP Table

Page	No.	Op Code Name	Function	Value
00	60	Input Source Select	Allows the host to set (write) one and only one input as 'the source' and identify (read) the current input setting.	000DH : OPTION 000FH : DisplayPort1 0011H : HDMI1 0012H : HDMI2 0089H : USB-C1
00	62	Audio Speaker Volume	Allows the volume to be adjusted.	0000H - 001FH (Whisper) - (Loud)
00	68	OSD LANGUAGE SELECT	Allows the language to be selected.	0001H : English 0002H : German 0003H : French 0004H : Spanish 0005H : Japanese 0006H : Italian 000EH : Chinese
00	8D	Audio Mute	Provides for the audio to be muted or un-muted.	0000H : Unmute the audio(Set only) 0001H : Mute the audio 0002H : Unmute the audio
00	94	Audio: stereo mode	This control allows one of several audio stereo modes to be selected.	0001H : Monaural(Both display audio channels use the left audio channel.) 0002H : Stereo(Incoming left and right audio channels feed separate display output audio channel.)
00	FA	Hours Running On	Total Moniotor on time including power save status	Total operate Time - "ON" + "OFF" Time (Unit : 30min.----need to transfer to 30min.step value)
00	FF	Display Device On Time	Display Device On Time (Device On = Backlight On)	"ON" Time (Unit : 30min.----need to transfer to 30min.step value)
02	3E	Monitor ID	Select the Monitor ID	0001H - 0064H
02	40	Input Detect	Select the Input Detect function	0001H : LAST DETECT 0002H : NONE
02	50	INPUT H RESOLUTION	Increasing (decreasing) this value will increase (decrease) the adjustment of horizontal resolution. In case of Digital input terminal, this VCP return H resolution of current input signal. (Read only)	0000H - FFFFH (Low) - (High)
02	51	INPUT V RESOLUTION	Increasing (decreasing) this value will increase (decrease) the adjustment of vertical resolution. In case of Digital input terminal, this VCP return V resolution of current input signal. (Read only)	0000H - FFFFH (Low) - (High)
02	68	Gamma Select	Select Gamma table.	0001H : NATIVE 0004H : 2.2 0005H : DICOM SIM. 0008H : 2.4
02	70	MAIN PICTURE SIZE	Select MAIN PICTURE SIZE.	0001H : NORMAL 0003H : WIDE 0004H : ZOOM 0007H : OFF(dot by dot)
02	74	SUB PICTURE H-POSITION	Increasing (decreasing) this value will increase (decrease) the sub picture horizontal position.	0000H - 0064H (To Left) - (To Right)
02	75	SUB PICTURE V-POSITION	Increasing (decreasing) this value will increase (decrease) the sub picture vertical position.	0000H - 0064H (To Top) - (To Bottom)
02	76	STILL (CAPTURE)	Execute Still (Capture) function.	0000H : Off 0001H : Capture
02	78	Select Temperature Sensor	Select Temperature Sensor.	0001H : Sensor#1 0002H : Sensor#2 (not support for Michigan4) 0003H : Sensor#3 (not support for Michigan4)
02	79	Temp. sensor(Celsius)	Get Temp.sensor data. (Celsius)	0000H - FFFFH
02	B4	Get Current Status Ambient Light	Read Current Status Ambient Light. (Read Only)	0000H - FFFFH
02	BE	LED Brightness	Adjust LED Brightness.	0001H : ON 0002H : OFF
02	CB	Menu Tree Reset	Reset parameter of the specified Menu Tree.	0002H : Picture 0004H : Audio
10	33	Ambient Bright Low	Minimum Display Bright setting value in ambient mode. Not supported in cases other than Ambient.	0000H - 001FH
10	34	Ambient Brigh High	Maximum Display Bright setting value in ambient mode. Not supported in cases other than Ambient.	0000H - 001FH
10	75	Motion Sensor	Select Motion Sensor function after Motion detect lost.	0001H : DISABLE 0002H : AUTO OFF
10	78	Motion Sensor Waiting Time	Adjust Motion Sensor function start time. 1step: 1sec.	0E10H : 1H 1C20H : 2H 2A30H : 3H 3840H : 4H
10	C1	OPTION SETTING – AUTO DISPLAY OFF	Set whether the monitor is put to sleep when OPTION goes to sleep or shutdown	0001H : Option Slot does not shutdown with Monitor 0002H : Option Slot shutdown with Monitor
10	C3	OPTION SETTING – FORCE QUIT	Function to forcibly turn off when Int.PC stalls	0001H : Execute

Page	No.	Op Code Name	Function	Value
10	C8	AMBIENT LIGHT SENSING MODE	Switching the AMBIENT LIGHT SENSING MODE	0001H : OFF 0002H : ON (MODE1)
11	0B	TARGET: SOUND / INPUT SEL.	Select the position which is the target of audio source and input switching	0001H : POSITION1 0002H : POSITION2 0003H : POSITION3 0004H : POSITION4
11	4E	Backlight Dimming	Turn on/off the local demming (partial light off) function of the panel backlight.	0001H : OFF 0002H : ON (LOW)
11	63	Option Board Output Channel Select	Get/Set the output channel type setting value from the option board	0001H : TMDS 0002H : DPORT 0003H : AUTO
11	68	HDMI Mode setting	HDMI Mode setting	0001H : Mode1(2.0) 0002H : Mode2(1.4)
11	85	TOUCH INPUT SELECT setting	Enable or disable the USB output terminal.	0001H : Disable(off) 0002H : Enable(on)
11	CF	Enable/Disable Display Control LAN Port	Enable/Disable the LAN port for display control.	0001H : Disable 0002H : Enable
11	DB	SLOT Option Soft Power Button	Soft Power Button	0001H : Execute
11	DE	SLOT Option Auto Shut Down	Set whether OPTION is turned off when the monitor goes into standby.	0001H : Disable 0002H : Enable
11	EA	QUICK START	QUICK START	0001H : Disable 0002H : Enable
11	EB	PIP MODE SELECT	Select PIP mode.	0001H : Off 0002H : PIP 0003H : PbyP
11	F0	Network Port Switch HTTP Server	Enables/disables the HTTP server port.	0001H : OFF 0002H : ON
11	F5	Ambient Illuminance Low	Setting value for ILLUMINANCE of Minimum for AMBIENT LIGHT SENSING	0000H - 0064H (Step 5)
11	F6	Ambient Illuminance High	Setting value for ILLUMINANCE of Maximum for AMBIENT LIGHT SENSING	0000H - 0064H (Step 5)
11	FA	Hours Running “TOTAL” 64bit Ver. (upper)	Upper 2 bytes of Hours Running “TOTAL”64bit version (32bit version is "VCP-00-FA. Hours Running On")	0000H - FFFFH
11	FB	Hours Running “TOTAL” 64bit Ver. (lower)	Lower 2 bytes of Hours Running “TOTAL”64bit version (32bit version is "VCP-00-FA. Hours Running On")	0000H - FFFFH
11	FC	Get Status Display Bright	Read Status Display Bright (support only when Ambient Light Sensing is ON). (Read Only)	0000H - FFFFH
11	FD	HDR Setting	Select HDR	0001H : Disable 0002H : Enable
11	FE	Display Device On Time 64bit Ver. (upper)	Upper 2 bytes of Display Device On Time 64bit version (32bit version is "VCP-00-FF. Display Device On Time")	0000H - FFFFH
11	FF	Display Device On Time 64bit Ver. (lower)	Lower 2 bytes of Display Device On Time 64bit version (32bit version is "VCP-00-FF. Display Device On Time")	0000H - FFFFH