Serial Communication Control Interface User's Manual

Edition 1.0, September 2015

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For the following products:
MD-219 Series
MD-224 Series
MD-226 Series
MPC-2190 Series
MPC-2197 Series
MPC-2240 Series
MPC-2247 Series
MPC-2260 Series
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MOXA®

Serial Communication Control Interface User's Manual

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Display Control Interface

Moxa's MD and MPC products include a UART interface that provides system designers a convenient method for developing custom software controls for the display panel. In this chapter, we describe the UART control interface and the format of the available commands.

The following topics are covered in this chapter:

❑ **Connecting to the UART Control Interface**

❑ **UART Command Format**

> ➢ Command Description

❑ **Downloading RGB Files**

> ➢ VGA

> ➢ DVI

Connecting to the UART Control Interface

You can use a terminal program (for example, Moxa's PComm terminal emulator or PuTTY) to access the control interface of the MD display (through the RS-232/RS-422/RS-485 serial port) or the MPC panel computer (through the RS-232 serial port).

Before you can connect to the MD or MPC product using a terminal emulator, you must configure the connection settings. The following procedure shows you the configuration steps using Moxa's PComm terminal emulator. The connection settings are listed in Step 2.

1. Open the Moxa's PComm Terminal Emulator application and select **Port Manager → Open**.
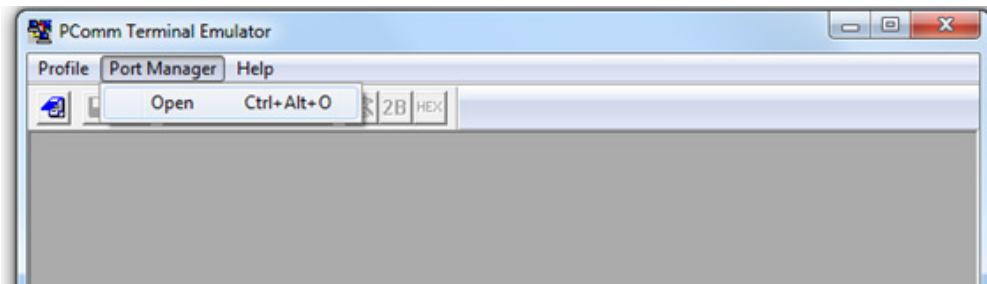
2. Configure the connection settings as shown. Click **OK**.

Protocol: Serial

Serial Parameters:

COM# (the actual number depends on the computer)

Baud rate: 9600

Data bits: 8

Parity: None

Stop bits: 1

RTS state: ON

DTR state: ON
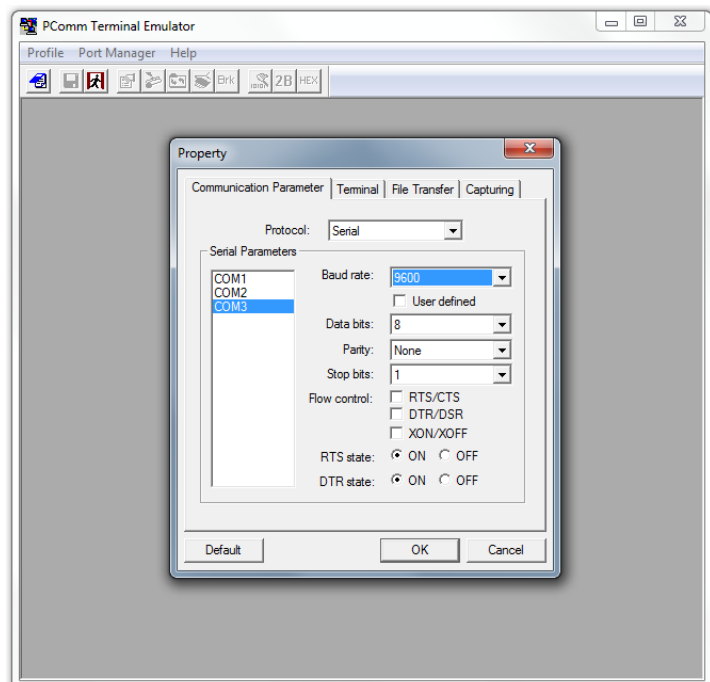
3. After you connect to the MD or MPC product, click the **Send pattern** icon.
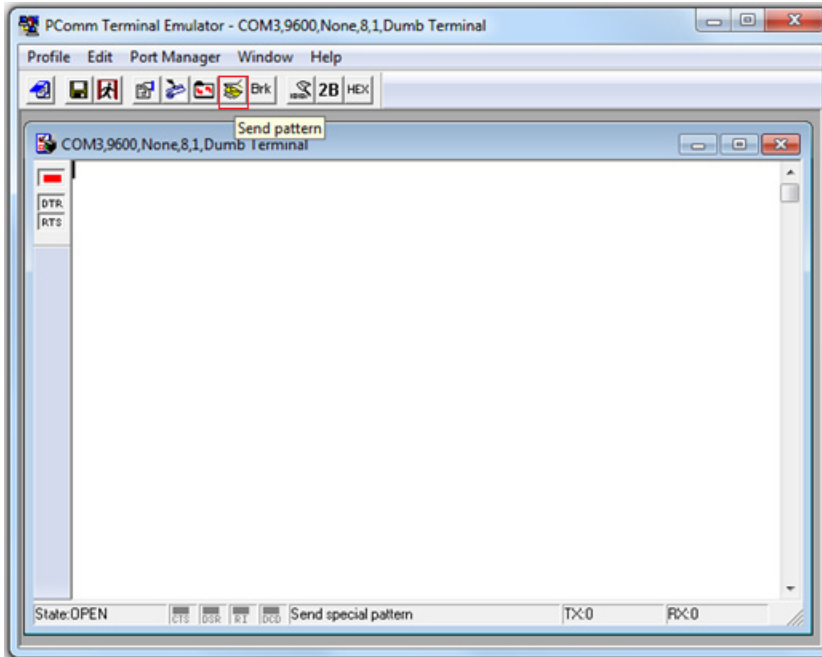
4. In the Send Pattern dialog box, you can enter a command in the **HEX** field and click **Start Send** to send the command.
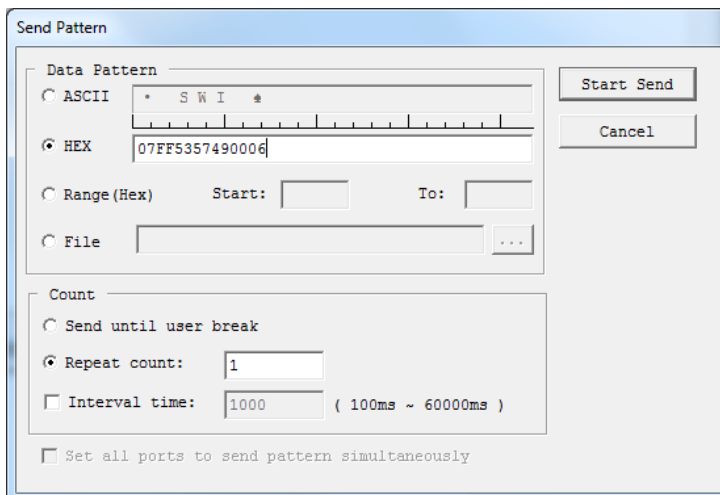
The following example queries the firmware version on the scalar board.

Example: Querying the firmware version

0x07	0xFF	0x53	0x57	0x49	0x00	0x06

In this example, the screen displays the scalar firmware version 1.0 as indicated in the figure below.

NOTE   This example applies to MPC-2000 series products. For MD-200 series products, the second byte (byte 1) will vary, depending on the address of the unit.
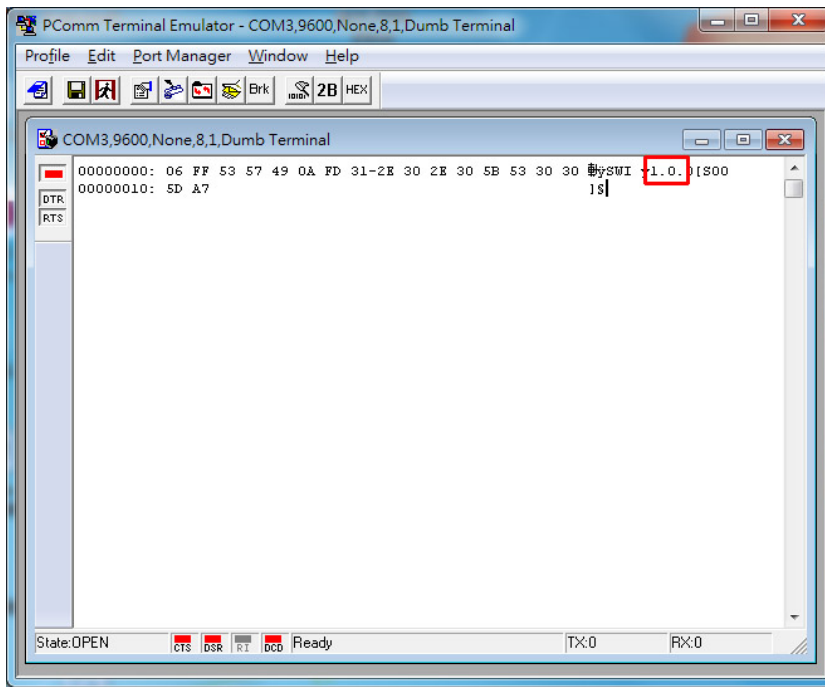
NOTE	For detailed command information, see the **Display UART Control Commands** chapter.

UART Command Format

The following table shows the UART command message format. The minimum message size is seven bytes and the maximum size is 82 bytes.

Byte #	0	1	2,3,4	5	6	7 to [7+(LEN-1)]	7+LEN
	ATTN	ADDR	CMD	LEN	IHCHK	DATA	IDCHK

Command Description

This section includes detailed descriptions of each byte in a UART command message.

ATTN (Attention)

This byte is used to identify the start of a message. The following table shows the possible values for this byte.

ATTN	Description
0x07	Command (ASCII BELL) packet.
0x06	Acknowledge (ASCII ACK) packet.
0x15	Negative ACK (ASCII NAK) packet.

For example, if a computer sends a command with the 0x07 attention code to the MD or MPC product, the MD or MPC product will respond with either an ACK (if the command is completed successfully) or a NAK (if the command failed).

ADDR (Address)

This byte is used to specify the address where a command will be sent.

ADDR	Description
0xFF	Broadcast the command to all units.
0x00 to 0x0F	Address of a specific unit: 0 to 15 (the maximum is 16 units).

CMD (Message Commands and Queries)

The following table lists the possible values for the command portion. For detailed information, see the **Display UART Control Commands** chapter.

CMD 0	CMD 1	CMD 2	ASCII	Description
0x42	0x52	0x49	"BRI"	Brightness Minimum Value
0x42	0x52	0x4C	"BRL"	Set LED Brightness of Touch Keypad
0x42	0x52	0x4D	"BRM"	Brightness Maximum Value
0x42	0x52	0x54	"BRT"	User Brightness Control
0x42	0x52	0x55	"BRU"	Glass Display Control - Brilliance Button
0x42	0x5A	0x5A	"BZZ"	Buzzer Control
0x44	0x4C	0x4E	"DLN"	Download ECDIS RGB package
0x44	0x4C	0x3F	"DL?"	ECDIS RGB package Query
0x44	0x32	0x4E	"D2N"	Download ECDIS RGB package(Second)
0x44	0x32	0x3F	"D2?"	ECDIS RGB package Query(Second)
0x45	0x54	0x43	"ETC"	Elapsed Time Counter Query
0x47	0x4D	0x42	"GMB"	Glass Display Control - Minimum Brightness
0x50	0x4F	0x54	"POT"	Potentiometer Control
0x53	0x4E	0x42	"SNB"	Serial Number Query
0x53	0x57	0x49	"SWI"	Scalar Firmware Version Query
0x53	0x57	0x4B	"SWK"	Touch Keypad Firmware Version Query
0x54	0x59	0x50	"TYP"	Model Name Query
0x4D	0x41	0x4E	"MAN"	Manufacturer ID
0x41	0x44	0x46	"ADF"	AC Input Power Detect Function
0x41	0x44	0x3F	"AD?"	Query AC Input Power Detect Function Status
0x44	0x44	0x46	"DDF"	DC Input Power Detect Function
0x44	0x44	0x3F	"DD?"	Query DC Input Power Detect Function Status
0x42	0x4C	0x49	"BLI"	Brightness Control
0x44	0x55	0x46	"DUF"	Disable UART Command Function
0x45	0x4D	0x53	"EMS"	ECDIS Mode Select
0x43	0x54	0x3F	"CT?"	Current Temperature Query
0x53	0x53	0x3F	"SS?"	System Status Query
0x4D	0x43	0x43	"MCC"	OSD Control Command

LEN (Data Length)

This byte defines the data length (in bytes) of the message. The maximum value for this field is 74 bytes and the minimum value is 0.

IHCHK (Inverse Header Checksum)

This is a simple 8-bit checksum of the first six bytes of the packet (bytes 0 to 5) after a bitwise inversion has been performed on them. This means the 8-bit sum (without carrying) of bytes 0, 1, 2, 3, 4, 5, and 6 is **0xFF**.

```
IHCHK = 0xFF – [the sum of bits 0, 1, 2, 3, 4, 5]
```

DATA (Data Field)

The data field must have a LEN (data length) larger than 0. Some commands do not have any data, so this field is left blank.

IDCHK (Inverse Data Checksum)

This is a simple 8-bit checksum of the data field, message bytes 7 to 7+(LEN-1) after a bit-wise inversion has been performed on each bit. This means that the 8-bit sum of DATA bytes and IDCHK byte is equal to 0xFF; the sum of all data bits is:

```
IDCHK = 0xFF – [the sum of bits 7 to 7+[LEN-1]]
```

If the message carries no data, then this checksum is not transmitted.

Downloading RGB Files

This feature returns the ECDIS RGB file that is currently saved to the EEPROM; thus, it is only available for type-approved ECDIS models.

VGA

Use the following commands for downloading RGB files from a VGA input source.

Command	Description
DL?	Data: none (0 byte)
	ACK: Total packet numbers (1 byte)
DLN	Data: Appointed packet (1 byte)
	ACK: File content (30 bytes maximum, except for the last packet)

The command **DL?** sends a request to the micro controller and queries the number packets that need to be downloaded. The reply from the microcontroller should be used when using the command DLN to download specific packets.

Refer to the following section for detailed descriptions of the **DL?** and **DLN** commands.

Query the RGB File Size (in packets): DL? Command

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Hex	0x7	0xFF	0x44	0x4C	0x3F	0x0	0x2A
ASCII			D	L	?		

Download the RGB File: DLN Command

	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Hex	0x7	0xFF	0x44	0x4C	0x4E	0x1	0x1A	appointed packet	0xAF
ASCII			D	L	N				

The following shows a sample command to read and return packet 0 of an RGB file.

0x07	0xFF	0x44	0x4C	0x4E	0x01	0x1A	0x00	0xFF

This is the ACK packet that is returned, with data packet 0 located in the **Data** section.

0x06	0xFF	0x44	0x4C	0x4E	0x20	0xFC	0x00	-	Data	IDCHK

In this example, the result shows the actual value of RGB file package 0. The results vary depending on the computer.

NOTE	This example applies to MPC-2000 series products. For MD-200 series products, the second byte (byte 1) will vary, depending on the address of the unit.

DVI

Use the following commands to download RGB files from the DVI input source:

Command	Description
D2?	Data: none (0 byte)
	ACK: Total packet numbers (1 byte)
D2N	Data: Appointed packet (1 byte)
	ACK: File content (30 bytes maximum, except for the last packet)

The command **D2?** sends a request to the microcontroller and queries the number packets that need to be downloaded. The reply from the microcontroller should be used when using the command **D2N** to download specific packets.

Refer to the following section for detailed descriptions of the **D2?** and **D2N** commands.

Query the RGB File Size (in packets): D2? Command

	Byte 0	**Byte 1**	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**
Hex	0x7	0xFF	0x44	0x32	0x3F	0x0	0x2A
ASCII			D	2	?		

Download the RGB File: D2N Command

	Byte 0	**Byte 1**	**Byte 2**	**Byte 3**	**Byte 4**	**Byte 5**	**Byte 6**	**Byte 7**	**Byte 8**
Hex	0x7	0xFF	0x44	0x32	0x4E	0x1	0x1A	Appointed packet	0xAF
ASCII			D	2	N				

The following shows a sample command to read and return packet 0 of an RGB file.

0x07	0xFF	0x44	0x32	0x4E	0x01	0x1A	0x00	0xFF

This is the ACK packet that is returned, with data packet 0 located in the **Data** section.

0x06	0xFF	0x44	0x32	0x4E	0x20	0xFC	0x00	-	Data	IDCHK

In this example, the result shows the actual value of RGB file package 0. The results vary depending on the computer.

NOTE	This example applies to MPC-2000 series products. For MD-200 series products, the second byte (byte 1) will vary, depending on the address of the unit.

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Display UART Control Commands

The following topics are covered in this chapter:

❐ **BRI (Brightness Minimum Value)**
❐ **BRL (Set LED Brightness of Touch Keypad)**
❐ **BRM (Brightness Maximum Value)**
❐ **BRT (User Brightness Control)**
❐ **BRU (Glass Display Control-Brightness Button)**
❐ **BZZ (Buzzer Control)**
❐ **DLN (Download ECDIS RGB Package)**
❐ **DL? (ECDIS RGB Package Query)**
❐ **D2N (Download ECDIS RGB Package (Second))**
❐ **D2? (ECDIS RGB Package Query (Second))**
❐ **ETC (Elapsed Time Counter Query)**
❐ **GMB (Glass Display Control - Minimum Brightness)**
❐ **POT (Potentiometer Control)**
❐ **SNB (Serial Number Query)**
❐ **SWI (Scalar Firmware Version Query)**
❐ **SWK (Touch Keypad Firmware Version Query)**
❐ **TYP (Model Name Query)**
❐ **MAN (Manufacturer ID)**
❐ **ADF (AC Input Power Detection Function)**
❐ **AD? (Query AC Input Power Detection Function Status)**
❐ **DDF (DC Input Power Detection Function)**
❐ **DD? (Query DC Input Power Detect Function Status)**
❐ **BLI (Brightness Control)**
❐ **DUF (Disable UART Command Function)**
❐ **EMS (ECDIS Mode Select)**
❐ **CT? (Current Temperature Query)**
❐ **SS? (System Status Query)**
❐ **MCC (OSD Control Command)**

BRI (Brightness Minimum Value)

This command sets the minimum brightness value. The value ranges from 0x00 to 0x31 (0% - 100%).

LEN (data length) = one data byte.

Example:

The following command sets the brightness to 30%.

0x07	0xFF	0x42	0x52	0x49	0x01	0x1B	0x10	0xEF

BRL (Set LED Brightness of Touch Keypad)

This command sets the brightness of the touch keypad. The value ranges from 0x00 to 0x31 (0% - 100%).The default brightness value of the touch keypad will be changed in the ratio of the panel backlight brightness. You can send a **?** to query command to query the current value of the brightness value.

LEN = one data byte.

Example:

The following command sets the brightness of the touch keypad to 100%.

0x07	0xFF	0x42	0x52	0x4C	0x01	0x18	0x31	0xCE

BRM (Brightness Maximum Value)

This command sets the maximum brightness value. The value ranges from 0x00 to 0xFF (0% - 100%).

LEN = one data byte.

Example:

The following command sets the maximum brightness to 88%.

0x07	0xFF	0x42	0x52	0x4D	0x01	0x17	0xE0	0x1F

BRT (User Brightness Control)

This command sets the maximum brightness value of the display panel. The value ranges from 0x00 to 0xFF (0% - 100%). The default value is **0xFF**.

Note that every time you restart the MD-200 series display, the BRT value is reset to 100%. If you change the BRT value (for example, the BRT value is not equal to 0xff), the ECDIS function is not supported and the ECDIS function keys will be disabled and turned off.

If the data and data checksum are incorrect, the reply data field is the current BRT value.

LEN = one data byte.

Examples:

The following command sets the brightness to 40%.

0x07	0xFF	0x42	0x52	0x54	0x01	0x10	0x66	0x99

ACK sets the brightness to 40%.

0x06	0xFF	0x42	0x52	0x54	0x01	0x11	0x66	0x99

NAK sets the brightness value the default value of 100%.

0x15	0xFF	0x42	0x52	0x54	0x01	0x02	0xFF	0x00

BRU (Glass Display Control-Brightness Button)

This command sets the LED brightness value of the touch keypad. The value ranges from 0x00 to 0xFF (0% - 100%). The default brightness value of the touch keypad will be changed in the ratio of the panel backlight brightness.

You can send a **?** to query the current LED brightness value.

LEN = one data byte.

Example:

This command sets the brightness to 100%.

0x07	0xFF	0x42	0x52	0x55	0x01	0x0F	0xFF	0x00

BZZ (Buzzer Control)

The default value for the buzzer is **OFF**. You can send this command to the MD or MPC product to activate or deactivate the buzzer.

If the data and data checksum are incorrect, the reply data field is the current buzzer status.

LEN = one byte.

0x00	Turn the buzzer OFF
0xFF	Turn the buzzer ON
0x3F	Query the current status

Examples:

The following command turns the buzzer **ON**.

0x07	0xFF	0x42	0x5A	0x5A	0x01	0x02	0xFF	0x00

ACK

0x06	0xFF	0x42	0x5A	0x5A	0x01	0x03	0xFF	0x00

This command queries the current buzzer status.

0x07	0xFF	0x42	0x5A	0x5A	0x01	0x02	0x3F	0xC0

In the ACK message, the current status of the buzzer is **ON**

0x06	0xFF	0x42	0x5A	0x5A	0x01	0x03	0xFF	0x00

DLN (Download ECDIS RGB Package)

Before sending this command, use DL? to determine how many available packets are in each ECDIS table. This command cannot be used if the MD or MPC product has not been calibrated. Every packet has a head (Byte 7 and Byte 8); Byte 7 is the packet number and Byte 8 is the ASCII code for "-"; the remaining bytes are the data. If the packet is full the data is in Byte 9 to Byte 38.

LEN = one data byte.

Data length is 32. The first byte is package num., the second byte is "-" and the other 30 bytes are data.

Examples:

Command to read package 0.

0x07	0xFF	0x44	0x4C	0x4E	0x01	0x1A	0x00	0xFF		

ACK package 0 of the first RGB file

0x06	0xFF	0x44	0x4C	0x4E	0x20	0xFC	0x00	0x2D	Data	IDCHK

DL? (ECDIS RGB Package Query)

Use **DL?** to determine how many available packets are in each ECDIS table. This command cannot be used if the unit has not been calibrated. Total package num = Size of ECDIS RGB file/30 bytes per package.

Total package number = Size of ECDIS RGB file/30 bytes per package.

Examples:

Send a **DL?** command to query the total package number of the first RGB file.

0x07	0xFF	0x44	0x4C	0x3F	0x00	0x2A

ACK 255 packages

0x06	0xFF	0x44	0x4C	0x3F	0x01	0x2A	0xFF	0x00

D2N (Download ECDIS RGB Package (Second))

Before sending this command, use **D2?** to determine how many available packets are in each ECDIS table. This command cannot be used if the unit has not been calibrated. Every packet has a head (Byte 7 and Byte 8); Byte 7 is this packet number and Byte 8 is the ASCII code for "-"; the remaining bytes are the data. If the packet is full the data is in Byte 9 to Byte 38.

LEN = one data byte.

Data length is 32. The first byte is package num., the second byte is "-" and the other 30 bytes are data.

This command is only for Display MD-200 Series

Examples:

Command to read package 0.

0x07	0xFF	0x44	0x32	0x4E	0x01	0x34	0x00	0xFF

ACK the package 0 of the first RGB file

0x06	0xFF	0x44	0x32	0x4E	0x20	0x16	0x00	0x2D	Data	IDCHK

D2? (ECDIS RGB Package Query (Second))

Every package contains 32 bytes of data; the first byte is the package number, the second byte is "-", and data is stored in the other 30 bytes.

This command is only for the MD-200 Series Displays

Example:

A **D2?** command is sent to query the total package number of the first RGB file.

0x07	0xFF	0x44	0x32	0x3F	0x00	0x44

The ACK message contains the package number (255).

0x06	0xFF	0x44	0x32	0x3F	0x01	0x44	0xFF	0x00

ETC (Elapsed Time Counter Query)

This command queries the elapsed time that the unit has been operating. No data will be sent with this command. The unit will reply to this command with an ACK attention code.

For MPC-2000 series Panel Computers, the DATA field will be set to a 5 byte string, where the first byte to fifth bytes are all hours.

The maximum indicator for this function is 99999 hours (defined into 5 bytes, numbers 0 to 9 each), equivalent to 11 years. If this number is reached, the ETC will stop counting, and the ETC command will always reply with maximum number of hours (99999).

For MD-200 series Displays, the DATA field will be set to a 4 byte string, where the first byte is Year, the second and third are Hour and the forth is Minute.

Examples:

The following **ETC** command queries the elapsed time.

0x07	0xFF	0x45	0x54	0x43	0x00	0x1D

For MPC-2000 Series Panel Computers

ACK 99999 hours

0x06	0xFF	0x45	0x54	0x43	0x05	0x19	0x39	0x39	0x39	0x39	0x39	0xE2

For MD-200 Series Displays

ACK Year, Hour, Minute

0x06	0xFF	0x45	0x54	0x43	0x04	0x1A	Year	Hour(H)	Hour(L)	Minute	IDCHK

GMB (Glass Display Control - Minimum Brightness)

This command sets the minimum value that you can set for the brightness of the touch keypad LED. Make sure that you specify a minimum value that ensures that the LED indicators are still visible if the brightness is reduced to this value. The value ranges from 0x00 to 0x31 (0% - 100%).

LEN = one date byte.

Example:

The following command sets the minimum brightness to 30%.

0x07	0xFF	0x47	0x4D	0x42	0x01	0x22	0x10	0xEF

POT (Potentiometer Control)

By default, the BR+ and BR- keys are set to **Enable**. You can send this command to disable or enable the BR+ and BR- keys. If the data and data checksum are incorrect, the reply data field is the current control status.

LEN = one data byte.

0x00	Brightness +/Brightness - Key Disable
0xFF	Brightness +/Brightness - Key Enable

Examples:

This command disables the BR+ and BR- keys.

0x07	0xFF	0x50	0x4F	0x54	0x01	0x05	0x00	0xFF

The following shows the ACK message.

0x06	0xFF	0x50	0x4F	0x54	0x01	0x06	0x00	0xFF

SNB (Serial Number Query)

This command queries the unit serial number.

Example:

Query the unit serial number

0x07	0xFF	0x53	0x4E	0x42	0x00	0x16

SWI (Scalar Firmware Version Query)

This command queries the scalar firmware version.

Example:

The following command queries the scalar firmware version.

0x07	0xFF	0x53	0x57	0x49	0x00	0x06

SWK (Touch Keypad Firmware Version Query)

This command queries the touch keypad firmware version.

Example:

The following command queries the touch keypad firmware version.

0x07	0xFF	0x53	0x57	0x4B	0x00	0x04

TYP (Model Name Query)

This command queries model name.

Example:

Query model name

0x07	0xFF	0x54	0x59	0x50	0x00	0xFC

MAN (Manufacturer ID)

This command queries Manufacturer ID

Examples:

Query model name

0x07	0xFF	0x4D	0x41	0x4E	0x00	0x1D

It replies the text string "MOXA" at DATA fields.

0x06	0xFF	0x4D	0x41	0x4E	0x04	0x1A	0x4D	0x4F	0x58	0x41	0xCA

ADF (AC Input Power Detection Function)

The default value of this function is OFF. If the unit supports an AC power input, you can turn on this function to detect the AC input power when the unit has connected to the AC power.

LEN = one data byte.

0x00	AC input power detection function is off.
0xFF	AC input power detection function is on.

Examples:

The following command sets the AC input power detection function to OFF.

0x07	0xFF	0x41	0x44	0x46	0x01	0x2D	0x00	0xFF

The following is the ACK message.

0x06	0xFF	0x41	0x44	0x46	0x01	0x2E	0x00	0xFF

AD? (Query AC Input Power Detection Function Status)

If the MD or MPC product supports an AC power input, you can use this command to query the status of the AC input power detection function.

0x00	AC input power detection function is off.
0xFF	AC input power detection function is on.

Examples:

The following is an **AD?** command that queries the status of the AC input power detection function.

0x07	0xFF	0x41	0x44	0x3F	0x00	0x35

The following is the ACK message with the status information.

0x06	0xFF	0x41	0x44	0x3F	0x01	0x35	0x00	0xFF

DDF (DC Input Power Detection Function)

Use the **DDF** command to enable DC input power detection when the unit supports and is connected to a DC power source. The default setting is off.

LEN = one data byte.

0x00	DC input power detection function is off.
0xFF	DC input power detection function is on.

Examples:

The following command sets the DC input power detection function to off.

0x07	0xFF	0x44	0x44	0x46	0x01	0x2A	0x00	0xFF

The following is the ACK message.

0x06	0xFF	0x44	0x44	0x46	0x01	0x2B	0x00	0xFF

DD? (Query DC Input Power Detect Function Status)

Use this command to query the status of the DC input power detection function.

0x00	DC input power detection function is off.
0xFF	DC input power detection function is on.

Examples:

The following is a **DD?** command that queries the status of the DC input power detection function.

0x07	0xFF	0x44	0x44	0x3F	0x00	0x32

The following is the ACK message with the status information.

0x06	0xFF	0x44	0x44	0x3F	0x01	0x32	0x00	0xFF

BLI (Brightness Control)

Use this command to set the panel brightness value. The value ranges from 0x00 to 0xFF. The default value is 160. LEN = one data byte.

Examples:

The following command sets the panel brightness to 255 (0xFF).

0x07	0xFF	0x42	0x4C	0x49	0x01	0x21	0xFF	0x00

The following shows the ACK message.

0x06	0xFF	0x42	0x4C	0x49	0x01	0x22	0xFF	0x00

The following command queries the current brightness value.

0x07	0xFF	0x42	0x4C	0x49	0x00	0x22

The following ACK message includes the current brightness value.

0x06	0xFF	0x42	0x4C	0x49	0x01	0x22	0xFF	0x00

DUF (Disable UART Command Function)

Use this command to disable UART command controls. LEN = one data byte.

DATA	IDCHK	Function description
0x00	0xFF	Disable all command control.
0x01	0xFE	Disable BRI control.
0x02	0xFD	Disable BRL control.
0x04	0xFB	Disable BRM control.
0x08	0xF7	Disable BZZ control.
0x10	0xEF	Reserved.
0x20	0xDF	Disable GMB control.
0x40	0xBF	Disable POT control.

Examples:

The following command disables all command controls

0x07	0xFF	0x44	0x55	0x46	0x01	0x19	0x00	0xFF

The following is the ACK message.

0x06	0xFF	0x44	0x55	0x46	0x01	0x1A	0x00	0xFF

The following is the NAK message.

0x15	0xFF	0x44	0x55	0x46	0x01	0x0B	0x00	0xFF

EMS (ECDIS Mode Select)

For ECDIS models, you can use this command to switch between DAY, DUSK, and NIGHT modes.

LEN = one data byte.

	DATA	IDCHK
DAY	0x00	0xFF
DUSK	0x01	0xFE
NIGHT	0x02	0xFD
QUERY	0x3F	0xC0
	ACK = 0x00 (DAY Mode)	
	ACK = 0x01 (DUSK Mode)	
	ACK = 0x02 (NIGHT Mode)	
	ACK = 0x03 (Not at DAY, DUSK and NIGHT Mode)	

Examples:

The following command sets the EDCIS mode to DUSK.

0x07	0xFF	0x45	0x4D	0x53	0x01	0x13	0x01	0xFE

The following is the ACK message.

0x06	0xFF	0x45	0x4D	0x53	0x01	0x14	0x01	0xFE

The following is the NAK message.

0x15	0xFF	0x45	0x4D	0x53	0x01	0x0B	0x01	0xFE

The following command queries the current ECDIS mode.

0x07	0xFF	0x45	0x4D	0x53	0x01	0x13	0x3F	0xC0

The following ACK message shows the mode information: 0x01 (DUSK mode).

0x06	0xFF	0x45	0x4D	0x53	0x01	0x14	0x01	0xFE

CT? (Current Temperature Query)

Use this command to query the current temperature.

DATA	Return current temperature.

This command is only for MD-200 Series Displays

Examples:

The following shows a **CT?** command example.

0x07	0xFF	0x43	0x54	0x3F	0x00	0x23

The following shows the ACK message.

0x06	0xFF	0x43	0x54	0x3F	0x01	0x23	DATA	IDCHK

The following ACK message indicates that the current temperature is 0 degree Celsius (-64 to + 127).

0x06	0xFF	0x43	0x54	0x3F	0x01	0x23	0x00	0xBF

The following ACK message indicates that the current temperature is -128 degree Celsius (not within the normal operating temperature range).

0x06	0xFF	0x43	0x54	0x3F	0x01	0x23	0x80	0x7F

SS? (System Status Query)

Send this command to Query System Status information (INFO button item)

MD-200 Series

DATA	Return Current Status
Bit0	1: AC Input Power is **N/A**, 0: AC Input Power is **Pass**
Bit1	1: DC Input Power is **N/A**, 0: DC Input Power is **Pass**
Bit2-7	Reserved

MPC-2000 Series

DATA	Return Current Status
Bit0	1: AC Input Power is **Error**, 0: AC Input Power is **Pass**
Bit1	1: MB_3V_5V Power is **Error**, 0: MB_3V_5V Power is **Pass**
Bit2	1: CPU is **Error**, 0: CPU is **Pass**
Bit3	1: Memory is **Error**, 0: Memory is **Pass**
Bit4	1: Chipset is **Error**, 0: Chipset is **Pass**
Bit5	1: VGA is **Error**, 0: VGA is **Pass**
Bit6	1: DC Input Power is **Error**, 0: DC Input Power is **Pass**
Bit7	Reserved

Examples:

The following shows an **SS?** command example.

0x07	0xFF	0x53	0x53	0x3F	0x00	0x14		

The following ACK message includes the system status.

0x06	0xFF	0x53	0x53	0x3F	0x01	0x14	DATA	IDCHK

MCC (OSD Control Command)

Use this command to enable remote access to the OSD menu settings on the unit. The command control information is stored in the DATA field.

NOTE	Support for MCC commands depends on the firmware version. Not all MCC command controls described in this section are supported on your unit.

If the checksum is valid, the unit will reply to this command with an ACK message, where the data field contains the original MCC command followed by acknowledge from the controller. If the checksum is invalid and the message was not broadcasted, the unit will reply to this command with a NAK message, where the data field contains the original command or the status of some functions.

NOTE	The MCC command is not supported on MOXA Panel Computer units, as these do not have a OSD menu.

We assume that you already know how to send, receive, and interpret the commands after having studied the examples before to the "MCC" command table below. The list below is a compressed version of the HEX values you need to send and will apply to all units (ADDR set as "FF"). For readability, the prefix "0x" has been removed from the table and is shown as a complete HEX string with values from 00 to FF (2 by 2 letters). Every command will contain the "MCC" (0x4D, 0x43, 0x43) ASCII letters as a default indicator.

The functional byte positions in the table below are indicated in red. The values (xx,yy) should always be sent in HEX format (not decimal format). For example, if you would like to enter the number 64 (in decimal format), you should enter the HEX equivalent, which is 0x40. The single byte that represents the MCC Command ID is shown in green. The checksum is shown in blue. The other byte positions in black are defined as in the "Message Format" shown at the beginning of this document.

NOTE	Due to firmware revisions, some commands listed below will not be supported by earlier units.

MCC Command	Syntax and Functionality	Details and Values
Brightness Control	Syntax: 07 FF 4D 43 43 03 23 81 xx yy zz Function Examples: Example "255": 07 FF 4D 43 43 03 23 81 46 46 F2 Query "?": 07 FF 4D 43 43 02 24 81 3F 3F Reset "R": 07 FF 4D 43 43 02 24 81 52 2C Reset "r": 07 FF 4D 43 43 02 24 81 72 0C Increase "+": 07 FF 4D 43 43 02 24 81 2B 53 Decrease "-": 07 FF 4D 43 43 02 24 81 2D 51	Where xx = "0" to "F" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "F" "F" Default: "A" "0" (160)
Contrast Control	Syntax: 07 FF 4D 43 43 04 22 82 ww xx yy zz Function Examples: Example "A00": 07 FF 4D 43 43 04 22 82 41 30 30 DC Example "a00": 07 FF 4D 43 43 04 22 82 61 30 30 BC Query "?": 07 FF 4D 43 43 02 24 82 3F 3E Reset "R": 07 FF 4D 43 43 02 24 82 52 2B Reset "r": 07 FF 4D 43 43 02 24 82 72 0B Increase "+": 07 FF 4D 43 43 02 24 82 2B 52 Decrease "-": 07 FF 4D 43 43 02 24 82 2D 50	Where ww = "a" to "A" Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "0" "0"
Manual Clock Control	Syntax: 07 FF 4D 43 43 02 24 85 xx zz Function Examples: Increase "+": 07 FF 4D 43 43 02 24 85 2B 4F Decrease "-": 07 FF 4D 43 43 02 24 85 2D 4D	For VGA Mode only
Image Horizontal Position	Syntax: 07 FF 4D 43 43 02 24 86 xx zz Function Examples: Increase "+": 07 FF 4D 43 43 02 24 86 2B 4E Decrease "-": 07 FF 4D 43 43 02 24 86 2D 4C	For VGA Mode only
Image Vertical Position	Syntax: 07 FF 4D 43 43 02 24 87 xx zz Function Examples: Increase "+": 07 FF 4D 43 43 02 24 87 2B 4D Decrease "-": 07 FF 4D 43 43 02 24 87 2D 4B	For VGA Mode only
Auto Source	Syntax: 07 FF 4D 43 43 02 24 88 xx zz Function Examples: Example "1": 07 FF 4D 43 43 02 24 88 31 46 Query "?": 07 FF 4D 43 43 02 24 88 3F 38 Reset "R": 07 FF 4D 43 43 02 24 88 52 25 Reset "r": 07 FF 4D 43 43 02 24 88 72 05	Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = Disble "1" = Enable
OSD Lock Mode	Syntax: 07 FF 4D 43 43 02 24 8D xx zz Function Examples: Example "1": 07 FF 4D 43 43 02 24 8D 31 41 Query "?": 07 FF 4D 43 43 02 24 8D 3F 33 Reset "R": 07 FF 4D 43 43 02 24 8D 52 20 Reset "r": 07 FF 4D 43 43 02 24 8D 72 00 Set "999": 07 FF 4D 43 43 05 21 8D 53 39 39 39 74	Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = Normal (default) "1" = Menu Protection "S" = Set password (default is "321")
Auto Adjustment	Syntax: 07 FF 4D 43 43 02 24 8F xx zz Function Examples: Example "1": 07 FF 4D 43 43 02 24 8F 31 3F Query "?": 07 FF 4D 43 43 02 24 8F 3F 31	For VGA Mode only Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = Off (default) "1" = On (do auto adjustment) Note: Auto adjustment will be executed when the previous auto adjusting operation is complete.

MCC Command	Syntax and Functionality	Details and Values
OSD Horizontal Position	Syntax: 07 FF 4D 43 43 03 23 90 xx yy zz Function Examples: Example "50": 07 FF 4D 43 43 03 23 90 35 30 0A Query "?": 07 FF 4D 43 43 02 24 90 3F 30 Reset "R": 07 FF 4D 43 43 02 24 90 52 1D Reset "r": 07 FF 4D 43 43 02 24 90 72 FD Increase "+": 07 FF 4D 43 43 02 24 90 2B 44 Decrease "-": 07 FF 4D 43 43 02 24 90 2D 42	Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "6" "4" (100) Note: If Value > 100 then Value=100.
OSD Vertical Position	Syntax: 07 FF 4D 43 43 03 23 91 xx yy zz Function Examples: Example "50": 07 FF 4D 43 43 03 23 91 35 30 09 Query "?": 07 FF 4D 43 43 02 24 91 3F 2F Reset "R": 07 FF 4D 43 43 02 24 91 52 1C Reset "r": 07 FF 4D 43 43 02 24 91 72 FC Increase "+": 07 FF 4D 43 43 02 24 91 2B 43 Decrease "-": 07 FF 4D 43 43 02 24 91 2D 41	Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "6" "4" (100) Note: If Value > 100 then Value=100.
Select OSD Language	Syntax: 07 FF 4D 43 43 02 24 95 xx zz Function Examples: Example "0": 07 FF 4D 43 43 02 24 95 30 3A Query "?": 07 FF 4D 43 43 02 24 95 3F 2B Reset "R": 07 FF 4D 43 43 02 24 95 52 18 Reset "r": 07 FF 4D 43 43 02 24 95 72 F8	Where xx = "0" Where zz = Calculated Checksum Available function: "0" = English (default) Note: Currently only supports English
Main Input Select	Syntax: 07 FF 4D 43 43 02 24 98 xx zz Function Examples: Example "0": 07 FF 4D 43 43 02 24 98 30 37 Query "?": 07 FF 4D 43 43 02 24 98 3F 28 Reset "R": 07 FF 4D 43 43 02 24 98 52 15 Reset "r": 07 FF 4D 43 43 02 24 98 72 F5	Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = DVI (default) "1" = VGA
Communication Mode	Syntax: 07 FF 4D 43 43 02 24 99 xx zz Function Examples: Example "0": 07 FF 4D 43 43 02 24 99 30 36 Query "?": 07 FF 4D 43 43 02 24 99 3F 27 Reset "R": 07 FF 4D 43 43 02 24 99 52 14 Reset "r": 07 FF 4D 43 43 02 24 99 72 F4	Where xx = "0" to "5" Where zz = Calculated Checksum Available function: "0" = DB9_RS232 "1" = TB_RS4852W "2" = TB_RS422 Note: DB9=DB9 connector TB=Terminal block connector
Power Down/Up Display	Syntax: 07 FF 4D 43 43 02 24 9F xx zz Function Examples: Example "1": 07 FF 4D 43 43 02 24 9F 31 2F Query "?": 07 FF 4D 43 43 02 24 9F 3F 21 Reset "R": 07 FF 4D 43 43 02 24 9F 52 0E Reset "r": 07 FF 4D 43 43 02 24 9F 72 EE	Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = Power Off "1" = Power On (default)
Color Temperature Select	Syntax: 07 FF 4D 43 43 02 24 B3 xx zz Function Examples: Example "2": 07 FF 4D 43 43 02 24 B3 32 1A Query "?": 07 FF 4D 43 43 02 24 B3 3F 0D Reset "R": 07 FF 4D 43 43 02 24 B3 52 FA Reset "r": 07 FF 4D 43 43 02 24 B3 72 DA	Where xx = "0" to "2" Where zz = Calculated Checksum Available function: "0" = 9300K "1" = 7500K "2" = 6500K (default)

MCC Command	Syntax and Functionality	Details and Values
Red Level for Selected Color	Syntax: 07 FF 4D 43 43 03 23 B4 xx yy zz Function Examples: Example "50": 07 FF 4D 43 43 03 23 B4 35 30 E6 Query "?": 07 FF 4D 43 43 02 24 B4 3F 0C Reset "R": 07 FF 4D 43 43 02 24 B4 52 F9 Reset "r": 07 FF 4D 43 43 02 24 B4 72 D9 Increase "+": 07 FF 4D 43 43 02 24 B4 2B 20 Decrease "-": 07 FF 4D 43 43 02 24 B4 2D 1E	Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "6" "4" (100)
Green Level for Selected Color	Syntax: 07 FF 4D 43 43 03 23 B5 xx yy zz Function Examples: Example "50": 07 FF 4D 43 43 03 23 B5 35 30 E5 Query "?": 07 FF 4D 43 43 02 24 B5 3F 0B Reset "R": 07 FF 4D 43 43 02 24 B5 52 F8 Reset "r": 07 FF 4D 43 43 02 24 B5 72 D8 Increase "+": 07 FF 4D 43 43 02 24 B5 2B 1F Decrease "-": 07 FF 4D 43 43 02 24 B5 2D 1D	Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "6" "4" (100)
Blue Level for Selected Color	Syntax: 07 FF 4D 43 43 03 23 B6 xx yy zz Function Examples: Example "50": 07 FF 4D 43 43 03 23 B6 35 30 E4 Query "?": 07 FF 4D 43 43 02 24 B6 3F 0A Reset "R": 07 FF 4D 43 43 02 24 B6 52 F7 Reset "r": 07 FF 4D 43 43 02 24 B6 72 D7 Increase "+": 07 FF 4D 43 43 02 24 B6 2B 1E Decrease "-": 07 FF 4D 43 43 02 24 B6 2D 1C	Where xx = "0" to "6" Where yy = "0" to "F" Where zz = Calculated Checksum Max Range: "0" "0" to "6" "4" Default: "6" "4" (100)
Graphic Horizontal Resolution Query	Send only: 07 FF 4D 43 43 01 25 B7 48	Available response status: "xxx" = where xxx is a 3-digit HEX number indicating resolution. Example: "0780" = 1920 in decimal
Graphic Vertical Resolution Query	Send only: 07 FF 4D 43 43 01 25 B8 47	Available response status: "xxx" = where xxx is a 3-digit HEX number indicating resolution. Example: "0480" = 1200 in decimal
Graphic Horizontal Sync. Frequency	Send only: 07 FF 4D 43 43 01 25 B9 46	Available response status: "xxx" = where xxx is a 3-digit HEX number indicating frequency in units of 100Hz. Example: "2A3" = 675 or 67.5 kHz decimal
Graphic Vertical Sync. Frequency	Send only: 07 FF 4D 43 43 01 25 BA 45	Available response status: "xxx" = where xxx is a 3-digit HEX number indicating frequency in units of 0.1Hz + 1 character indicating field mode as: "i" = Interlaced "p" = Progressive Example: "258p" = 600 (60 Hz), progressive fields

MCC Command	Syntax and Functionality	Details and Values
Set Address RS/Serial	Syntax: 07 FF 4D 43 43 02 24 BB xx zz <u>Function Example:</u> Example "9": 07 FF 4D 43 43 02 24 BB 39 0B Query "?": 07 FF 4D 43 43 02 24 BB 3F 05 Reset "R": 07 FF 4D 43 43 02 24 BB 52 F2 Reset "r": 07 FF 4D 43 43 02 24 BB 72 D2	Where xx = "0" to "F" Where zz = Calculated Checksum Default and reset value are "0"
Test Pattern	Syntax: 07 FF 4D 43 43 02 24 CD xx zz <u>Function Examples:</u> Example "1": 07 FF 4D 43 43 02 24 CD 31 01	Where xx = "0" to "1" Where zz = Calculated Checksum Available function: "0" = Normal Display "1" = Display burn-in Test Pattern
Reset Factory Default	Send only: 07 FF 4D 43 43 01 25 CE 31	Available response status: "0" = fail "1" = successful
Menu Button	Send only: 07 FF 4D 43 43 01 25 F7 08	Physical Button press equivalent
Down Button	Send only: 07 FF 4D 43 43 01 25 FA 05	Physical Button press equivalent
Up Button	Send only: 07 FF 4D 43 43 01 25 FB 04	Physical Button press equivalent
ECDIS Button	Send only: 07 FF 4D 43 43 01 25 FC 03	Physical Button press equivalent
INFO Button	Send only: 07 FF 4D 43 43 01 25 FD 02	Physical Button press equivalent