

COEX

Central Control Protocol



Instructions

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1 Applicable Products

Product Type	Product Model	Version
LED display controller	Single-card controllers: MX40 Pro, MX30, MX20, KU20, CX40 Pro Card-based controllers: MX6000 Pro, MX2000 Pro	V1.5.0
Software	VMP	V1.5.0

2 Communication Protocols

2.1 RS232 Serial Communication Protocol

The PC and controller are connected using a straight-through RS232 serial cable. The default serial port settings are a baud rate of 115200, 8 data bits, no parity, 1 stop bit, and hexadecimal data flow.

Product Type	Version
Baud Rate	115200
Data Bits	8
Parity	None
Stop Bits	1
Data Flow	Hexadecimal

2.2 TCP Communication Protocol

The PC and controller are connected via Ethernet. The PC sends TCP packets to port 5200 on the controller.

2.3 UDP Communication Protocol

The PC and controller are connected via Ethernet. The PC sends UDP packets to port 5201 on the controller.

3 Protocol Description

3.1 Basic Protocol Format

A. Protocol Field Descriptions:

The protocol is structured as follows: [Packet Header][Protocol Content][Checksum]

Protocol	Parameter
0x00 – 0x01	Packet header

Protocol	Parameter
0x02	ACK
0x03	Label
0x04	Source address
0x05	Destination address
0x06	Device type
0x07	Ethernet port
0x08 - 0x09	Broadcast address
0x0a	Code
0x0b	Packet type
0x0c - 0x0f	Register address
0x10 - 0x11	Data length
0x12	Data
0x13 - 0x14	Checksum

B. Data Format:

Example for adjusting brightness to 0: 55 aa 00 00 fe ff 01 ff ff ff 01 00 01 00 00 02 01 00 00 55 5a

Little-endian register address (0x0c - 0x0f): 01 00 00 02

Register address: 0x02000001

C. Checksum:

Two-byte hexadecimal checksum calculation: Protocol content + 0x5555.

Example for adjusting brightness to 0: 55 aa 00 00 fe ff 01 ff ff ff 01 00 01 00 00 02 01 00 00 55 5a

Protocol content: 00 00 fe ff 01 ff ff ff 01 00 01 00 00 02 01 00 00

Checksum: 00 + 00 + fe + ff + 01 + ff + ff + ff + 01 + 00 + 01 + 00 + 00 + 02 + 01 + 00 + 00 + 0x5555 = 5a 55

Little-endian: 55 5a

D. Response packet:

After sending data, a response packet can confirm success.

Example: Switching to send-only controller mode

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 f2 ff 08 00 01 00 00 4b 5c

Response: aa 55 00 00 ff fe 01 ff ff ff 01 00 f2 ff 08 00 00 00 49 5d

3.2 Display Control

Display control includes adjusting brightness, handling receiving card blackouts, freezing, and normal display modes.

3.2.1 Protocol Content

The protocol content is 21 bytes long. The first 16 bytes are for operation type (fixed values). Bytes 17–18 indicate data length, and byte 19 is the data content.

Example for adjusting brightness to 0: 55 aa 00 00 fe ff 01 ff ff ff 01 00 01 00 00 02 01 00 00 55 5a

Protocol address: 01 00 00 02 (little-endian)

Brightness: 00 (0%)

Brightness: FF (100%) (Brightness ratio = Brightness value / FF)

Brightness range: 0 to FF

Checksum: $00 + 00 + fe + ff + 01 + ff + ff + ff + 01 + 00 + 01 + 00 + 00 + 02 + 01 + 00 + 00 + 0x5555 = 5a\ 55$

Little-endian: 55 5a

3.2.2 Adjusting Brightness

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 01 00 00 02 01 00 00 55 5a

Protocol	Data	Description
0x00 – 0x0b	Fixed data	
0x0c – 0x0f	01 00 00 02	Protocol address 0x02000010
0x10 – 0x11	01 00	Data length
0x12	00	Brightness value 00
0x13 – 0x14	55 5a	Checksum

3.2.3 Setting Receiving Card to Black Screen

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 00 01 00 02 01 00 ff 54 5b

Protocol	Data	Description
0x00 – 0x0b	Fixed data	
0x0c – 0x0f	00 01 00 02	Protocol address 0x02001000
0x10 – 0x11	01 00	Data length
0x12	ff	Blackout
0x13 – 0x14	54 5b	Checksum

3.2.4 Setting Receiving Card to Freeze

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 02 01 00 02 01 00 ff 56 5b

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	02 01 00 02	Protocol address 0x02001002
0x10 - 0x11	01 00	Data length
0x12	ff	Freeze
0x13 - 0x14	56 5b	Checksum

3.2.5 Setting Receiving Card to Unfreeze

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 02 01 00 02 01 00 00 57 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	02 01 00 02	Protocol address 0x02001002
0x10 - 0x11	01 00	Data length
0x12	00	Unfreeze
0x13 - 0x14	57 5a	Checksum

3.2.6 Setting Receiving Card to Normal Display

Data sent: 5 aa 00 00 fe ff 01 ff ff ff 01 00 00 01 00 02 01 00 00 55 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	00 01 00 02	Protocol address 0x02001000
0x10 - 0x11	01 00	Data length
0x12	00	Normal display
0x13 - 0x14	55 5a	Checksum

3.3 Switch Preset

3.3.1 Protocol Content

A. The protocol content is 17 bytes long. The first 16 bytes represent the operation type (fixed values), and the 17th byte indicates which preset to switch to.

55 aa 00 00 fe ff 01 ff ff ff 01 00 02 00 00 0a 01 00 01 5f 5a

Example:

Preset 1: 01

Preset 2: 02

...

Preset 25: 19

Preset 26: 1A

B. The checksum is calculated as: Protocol Content + 0x5555

Example for switching to preset 1: 55 aa 00 00 fe ff 01 ff ff ff 01 00 02 00 00 0a 01 00 01 5f 5a

Protocol content: 00 00 fe ff 01 ff ff ff 01 00 02 00 00 0a 01 00 01

Checksum: $00 + 00 + fe + ff + 01 + ff + ff + ff + 01 + 00 + 02 + 00 + 00 + 0a + 01 + 00 + 01 + 01 + 0x5555$
= 5a 5f

Little-endian: 5f 5a

3.3.2 Switch to Preset 1

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 02 00 00 0a 01 00 01 5f 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	02 00 00 0a	Protocol address 0x0a000002
0x10 - 0x11	01 00	Data length
0x12	01	Switch to preset 1
0x13 - 0x14	5f 5a	Checksum

3.3.3 Switch to Preset 2

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 02 00 00 0a 01 00 02 60 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	02 00 00 0a	Protocol address 0x0a000002
0x10 - 0x11	01 00	Data length
0x12	02	Switch to preset 2
0x13 - 0x14	60 5a	Checksum

3.4 Output

3.4.1 Protocol Content

The protocol content is 21 bytes long. The first 16 bytes are for operation type (fixed values). Bytes 17-18 indicate data length, and byte 19 is the data content.

Example: Enable low latency

Fixed data: 55 aa 00 00 fe ff 01 ff ff ff 01 00

Protocol address: 11 01 00 10

Data length: 01 00

Data content: 01

Checksum: 75 5A

3.4.2 Enable Low Latency

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 11 01 00 10 01 00 01 75 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	11 01 00 10	Protocol address 0x01000111
0x10 - 0x11	01 00	Data length
0x12	01	Enable Low Latency
0x13 - 0x14	75 5A	Checksum

3.4.3 Disable Low Latency

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 11 01 00 10 01 00 00 74 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	11 01 00 10	Protocol address 0x01000111
0x10 - 0x11	01 00	Data length
0x12	00	Disable Low Latency
0x13 - 0x14	74 5A	Checksum

3.4.4 Enable 3D

Data sent: 55 AA 00 00 FE FF 01 FF FF FF 01 00 16 01 00 10 01 00 01 7A 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	16 01 00 10	Protocol address 0x01000116
0x10 - 0x11	01 00	Data length
0x12	01	Enable 3D
0x13 - 0x14	7A 5A	Checksum

3.4.5 Disable 3D

Data sent: 55 AA 00 00 FE FF 01 FF FF FF 01 00 16 01 00 10 01 00 00 79 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	16 01 00 10	Protocol address 0x01000116
0x10 - 0x11	01 00	Data length
0x12	00	Disable 3D
0x13 - 0x14	79 5A	Checksum

3.4.6 3D Right Eye

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 18 11 00 10 01 00 00 8b 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	18 11 00 10	Protocol address 0x01001118
0x10 - 0x11	01 00	Data length
0x12	00	3D right eye
0x13 - 0x14	8B 5A	Checksum

3.4.7 3D Left Eye

Data sent: 5 aa 00 00 fe ff 01 ff ff ff 01 00 18 11 00 10 01 00 01 8c 5a

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	18 11 00 10	Protocol address 0x01001118
0x10 - 0x11	01 00	Data length
0x12	01	3D left eye

Protocol	Data	Description
0x13 - 0x14	8C 5A	Checksum

3.4.8 Switch to All-in-One Controller Mode

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 f2 ff 08 00 01 00 01 4c 5c

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	f2 ff 08 00	Protocol address 0x0008fff2
0x10 - 0x11	01 00	Data length
0x12	01	Switch to All-in-one controller mode
0x13 - 0x14	4C 5C	Checksum

3.4.9 Switch to Send-Only Controller Mode

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 f2 ff 08 00 01 00 00 4b 5c

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	f2 ff 08 00	Protocol address 0x0008fff2
0x10 - 0x11	01 00	Data length
0x12	00	Switch to send-only controller mode
0x13 - 0x14	4B 5C	Checksum

3.5 Sending Card Display Control

3.5.1 Protocol Content

The protocol content is 18 bytes long. The first 16 bytes are for operation type (fixed values). The 17th byte specifies the card number, and the 18th byte indicates the display control mode (black screen, freeze, normal display).

Example: Set output card 6 to black screen: 55 aa 00 00 fe ff 01 ff ff ff 01 00 00 01 00 10 02 00 06 01 6B 5A

Protocol address: 00 01 00 10 (little-endian)

Output card number: 6 (output card numbers start from 1; FF controls all cards on the controller)

Mode: 00 - Normal, 01 - Black Screen, 02 - Freeze

Checksum: $00 + 00 + fe + ff + 01 + ff + ff + ff + 01 + 00 + 00 + 01 + 00 + 10 + 02 + 00 + 06 + 01 + 0x5555 = 5a\ 6b$

Little-endian: $6b\ 5a$

Note: For single-card controllers, use FF to control the display of the output card directly.

3.5.2 Controller-Level Sending Card Black Screen Mode

Data sent: $55\ aa\ 00\ 00\ fe\ ff\ 01\ ff\ ff\ ff\ 01\ 00\ 00\ 01\ 00\ 10\ 02\ 00\ ff\ 01\ 64\ 5b$

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	00 01 00 10	Protocol address 0x10000100
0x10 - 0x11	02 00	Data length
0x12	ff	All output cards
0x13	01	Black screen
0x14 - 0x15	6B 5A	Checksum

3.5.3 Output Card Based Sending Card Black Screen Mode

Data sent: $55\ aa\ 00\ 00\ fe\ ff\ 01\ ff\ ff\ ff\ 01\ 00\ 00\ 01\ 00\ 10\ 02\ 00\ 06\ 01\ 6B\ 5A$

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	00 01 00 10	Protocol address 0x10000100
0x10 - 0x11	02 00	Data length
0x12	06	Output card number
0x13	01	Black screen
0x14 - 0x15	6B 5A	Checksum

3.5.4 Output Card Based Sending Card Freeze Mode

Data sent: $55\ aa\ 00\ 00\ fe\ ff\ 01\ ff\ ff\ ff\ 01\ 00\ 00\ 01\ 00\ 10\ 02\ 00\ 06\ 02\ 6C\ 5A$

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	00 01 00 10	Protocol address 0x10000100
0x10 - 0x11	02 00	Data length
0x12	06	Output card number
0x13	02	Freeze
0x14 - 0x15	6C 5A	Checksum

3.5.5 Output Card Based Sending Card Normal Display Mode

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 00 01 00 10 02 00 06 00 6A 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	00 01 00 10	Protocol address 0x10000100
0x10 - 0x11	02 00	Data length
0x12	06	Output card number
0x13	00	Normal Display Mode
0x14 - 0x15	6A 5A	Checksum

3.6 Switching Layer Source

3.6.1 Protocol Content

The protocol content is 23 bytes long. The first 16 bytes are for operation type (fixed values). Bytes 17-18 indicate data length, the 19th byte is for the layer number, the 20th byte specifies the input card number (starting from 0), and the 21st byte is for the input interface number (starting from 0).

Example: Switching Layer 1 to the first source on IN2 for a card-based controller.

Fixed data: 55 aa 00 00 fe ff 01 ff ff ff 01 00

Protocol address: 03 00 00 0a

Data length: 03 00

Layer number: 01

Input card number: 01

Input card interface number: 00

Checksum: 63 5A

3.6.2 Switching Layer Source

Data sent: 55 aa 00 00 fe ff 01 ff ff ff 01 00 03 00 00 0a 03 00 01 01 00 63 5A

Protocol	Data	Description
0x00 - 0x0b	Fixed data	
0x0c - 0x0f	03 00 00 0a	Protocol address 0x0a000003
0x10 - 0x11	03 00	Data length
0x12	01	Layer number
0x13	01	Input card number
0x14	00	Input card interface number

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