Technical Reference

020-102458-02

E500 LED Display Controller

Serial Commands

CHRISTIE

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Content

Introduction

This document provides information and procedures for using serial commands (ASCII text messages) to control the product.

RS232 communication parameters

The RS232 IN port has several communication parameters.

Parameter	Value
Default baud rate	
Parity	None
Data bits	8
Stop bits	1
Flow control	

Connecting to the RS232 port

Use an RS232 connection to remotely access display controls and image setups, issue commands or queries, and receive replies.

1. Connect one end of a null standard 9-pin female to female modem cable to the projector RS232 port.
2. Connect the other end of the null standard 9-pin female to female modem cable to a computer.

Setting up terminal programs

Learn how to configure terminal programs for proper echoing.

Configure the settings for your terminal program.

- **TeraTerm**
  Select **Setup** > **Terminal** and set:
  - Local echo: checked
  - Transmit: CR+LF
- **HyperTerm**
  Select **File** > **Properties** > **ASCII setup** and set:

- Send line ends with line feeds: checked
- Echo typed characters locally: checked

Data package formats for commands

Learn the format for request and acknowledge data packages.

Request data package

Byte definition

No.	1	2	3	4	5
Byte counts	2	1	1	1	1
Content	Head	ACK	Serial number	Source address	Destination address

No.	6	7	8	
Length (byte)	1	1	2	
Content	Device type	Port address	Board address [7:0]	Board address [15:8]

No.	9	10	11	
Length (byte)	1	1	4	
Content	Code	Reserved	Register unit address [7:0]	Register unit address [15:8]

No.			12
Length (byte)			2
Content	Register unit address [23:16]	Register unit address [31:24]	Valid data length [7:0]

No.		13	14	
Length (byte)		N	2	
Content	Valid data length [15:8]	Write data [0:N]	Checkout [7:0]	Checkout [15:8]

Notation

No.	Content	Meaning	Remark
1	Head	Data package head	55H, AAH
2	ACK	Not used for the Request command	00H

No.	Content	Meaning		Remark
3	Serial number	Serial number of a command. Should not be used again before the command with this serial number has been finished.		
4	Source Address	Address of the computer or sending card that generates and starts the command.		The computer address is set to FEH.
5	Destination address	Address of the computer or sending card that the command is to be sent to. The computer address is set to FEH. The first device connected to the COM port with COM port properties has the address of 0, the second device has the address of 1, and so on.		Devices connected in a daisy chain to a computer serial port should be of the same type.
6	Device type	00H	Devices with control port properties, like sending cards, TV cards.	
		01H	Receiving card	
7	Port address	RJ45 output port address of the sending card. SDI output port address set as 00.		[0,1,2,3]
8	Board address [7:0]	Low 8 bits of the address of a device connected in daisy chain on a CAT5 data cable or SDI cable.		The first device connected on the cable has the address of 0, the second device has the address of 1, and so on. Note that different types of devices are assigned address respectively.
	Board address [15:8]	High 8 bits of the address of a device connected in daisy chain on a CAT5 data cable or SDI cable.		
9	Code	00H	Read data package (command)	Both read and write are defined by the device that starts the command.
		01H	Write data package (command)	
		02H-FFH	Reserved	
10	Reserved	Reserved		
11	Register unit address [7:0]	The first byte (low) of the address of the register unit on a device.		The registered unit address is four bytes long. Low at the front and high at the end.
	Register unit address [15:8]	The second byte of the address of the register unit on a device.		
	Register unit address [23:16]	The third byte of the address of the register unit on a device.		
	Register unit address [31:24]	The fourth byte (high) of the address of the register unit on a device.		

No.	Content	Meaning	Remark
12	Valid data length [7:0]	Low 8 bits of the length of valid data.	When Code is 01H, this is the length of the data to be written to the destination device. When Code is 00H, this is the length of the data to be read from the destination device.
	Valid data length [15:8]	High 8 bits of the length of valid data.	
13	Write data [0:N]	Data to be written to the destination device. The length N is given by Valid Data Length.	When Code is 01H, this is the section the data is written to. When Code is 00H, this section does not exist.
14	Checkout [7:0]	Low 8 bits of the checksum.	The sum of all data in byte except the packet head and then plus 0x5555.
	Checkout [15:8]	High 8 bits of the checksum.	

Example

Valid data package command

55 AA 00 32 FE 00 01 00 00 00 00 00 00 00 00 0A 00 01 61 59 0D 0A

1 2 3 4 5 6 7 8 9 10 11 12 14

- The numbers under the command correspond to the table above.
- There is no number 13 because the Code is 0, and the write data does not exist.
- Checksum = 32 + FE + 01 + 0A + 01 + 5555 = 5961, so checkout[7:0]=61, checkout[15:8]=59

Acknowledge data package

Byte definition

No.	1	2	3	4	5
Byte counts	2	1	1	1	1
Content	Head	ACK	Serial number	Source address	Destination address

No.	6	7	8	
Length (byte)	1	1	2	
Content	Device type	Port address	Board address [7:0]	Board address [15:8]

No.	9	10	11	
Length (byte)	1	1	4	
Content	Code	Reserved	Register unit address [7:0]	Register unit address [15:8]

No.			12
Length (byte)			2
Content	Register unit address [23:16]	Register unit address [31:24]	Valid data length [7:0]

No.		13	14	
Length (byte)		N	2	
Content	Valid data length [15:8]	Write data [0:N]	Checkout [7:0]	Checkout [15:8]

Notation

No.	Content	Meaning		Remark
1	Head	Data package head		55H, AAH
2	ACK	00H	Command succeeded	Different ACK values indicates different result.
		01H	Command failed due to time out trying to access devices connected to a sending card.	
		02H	Command failed due to check error on request data package.	
		03H	Command failed due to check error on acknowledge data package.	
		04H	Command failed due to invalid command.	
		05H	Reserved	
		06H-FFH	Reserved	
3	Serial number	Serial number of a command. Should not be used again before the command with this serial number has been finished.		
4	Source Address	Address of the computer or sending card that generates and starts the command.		This address for a computer is set to FEH.
5	Destination address	Address of the computer or sending card that the command is to be sent to. The computer address is set to FEH. The first device connected to the COM port with COM port properties has the address of 0, the second device has the address of 1, and so on.		Devices connected in a daisy chain to a computer serial port should be of the same type.
6	Device type	00H	Devices with control port properties, like sending cards, TV cards.	

No.	Content	Meaning		Remark
		01H	Receiving card	
		02H	Function card	
7	Port address	RJ45 output port address of the sending card. SDI output port address set as 00.		[0,1,2,3]
8	Board address [7:0]	Low 8 bits of the address of a device connected in daisy chain on a CAT5 data cable or SDI cable.		The first device connected on the cable has the address of 0, the second device has the address of 1, and so on. Note that different types of devices are assigned address respectively.
	Board address [15:8]	High 8 bits of the address of a device connected in daisy chain on a CAT5 data cable or SDI cable.		
9	Code	00H	Read data package (command)	Both read and write are defined by device that starts the command.
		01H	Write data package (command)	
		02H-FFH	Reserved	
10	Reserved	Reserved		
11	Register unit address [7:0]	The first byte (low) of the address of the register unit on a device.		The register unit address is four bytes long. Low at the front and high at the end.
	Register unit address [15:8]	The second byte of the address of the register unit on a device.		
	Register unit address [23:16]	The third byte of the address of the register unit on a device.		
	Register unit address [31:24]	The fourth byte (high) of the address of the register unit on a device.		
12	Valid data length [7:0]	Low 8 bits of the length of valid data.		When Code is 00H, this is the length of the data to be read from the destination device. When Code is 01H, this will be zero.
	Valid data length [15:8]	High 8 bits of the length of valid data.		
13	Write data [0:N]	Data to be written to the destination device. The length N is given by Valid Data Length.		When Code is 00H, this is the section the data is written to. When Code is 01H, this section does not exist.
14	Checkout [7:0]	Low 8 bits of the checksum.		The sum of all data in byte except the packet head and then plus 0x5555.
	Checkout [15:8]	High 8 bits of the checksum.		

Example

Data package received from the Com port

AA 55 00 5D 00 FE 00 00 00 00 01 00 10 00 00 05 00 00 C6 56 0D 0A

1 2 3 4 5 6 7 8 9 10 11 12 14

- The numbers under the command correspond to the table above.
- There is no number 13 because the Code is 01, and the write data does not exist.
- Checksum = 5D + FE + 01 +10 + 05 + 5555 = 56C6, so checkout[7:0]=C6, checkout[15:8]=56

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Serial API commands

The E500 LED Display Controller commands can be used to modify product settings.

Set the display to black

Change the display to black to simulate a power off command.

Set the display to black. Request Command: `55 AA 00 80 FE 00 01 00 FF FF 01 00 00 01 00 02 01 00 FF D6 59 0D 0A`
Set the back to normal. Request Command: `55 AA 00 80 FE 00 01 00 FF FF 01 00 00 01 00 02 01 00 00 D7 58 0D 0A`

Choosing the output mode

Select whether the output mode is Ethernet or SerDes.

Parameters

- **Device:** Sending card
- **Base address:** 02000000 H
- **Data length:** 8H

Commands

Offset	Name	Attribute	Description
4C	SerDes or Ethernet	Read/Write	0x00 Ethernet mode 0x01 SerDes mode (Default)

Examples

Set the output mode to Ethernet. Request Command: `55 AA 00 8F FE 00 00 00 00 00 00 00 4C 00 00 02 01 00 00 32 57 0D 0A`
Set the output mode to SerDes. Request Command: `55 AA 00 8F FE 00 00 00 00 00 00 00 4C 00 00 02 01 00 01 33 57 0D 0A`

Monitoring data

Monitor card or smart module may be required for some of the data.

The data is only valid when a monitor card or smart module is connected to the control system. When the data is retrieved, the first step is to check whether the monitor card or smart module exists by analyzing data at 0x000020.

If the monitor card or smart module does not exist, do not acquire the monitoring data.

Parameters

- **Device:** Receiving card
- **Base address:** 0a000000 H
- **Data length:** 100H

All values are read-only.

Commands

Offset	Name	Description	Remark
0x000000	TempValidOfScanCard	Temperature of the receiving card. The highest bit indicates valid temperature data. • 0—Invalid data • 1—Valid data The lowest bit is for negative or positive temperature. • 0—Positive • 1—Negative	—
0x000001	TempOfScanCard	Temperature output of the sensor on the receiving card, in Celsius.	—
0x000002	HumiOfScanCard	Humidity measured by sensor on the receiving card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the humidity value. Value range: 0~100 %RH	No humidity sensor on all receiving card at this moment.
0x000003	VoltageOfScanCard	Power supply voltage of the receiving card.	—

Offset	Name	Description	Remark
		The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value. Value range: 0~127 V	
0x000004 ... 0x00001f	Reserved	Reserved	—
0x000020	AttachedMonitorCardExist	Indicates whether the monitor card exists. 0xff—Monitor card is present Any other value—Monitor card is not present	—
0x000021 0x000022	AttachedMonitorCardModle	Module information of the monitor card.	—
0x000023 0x000024 0x000025 0x000026	AttachedMonitorCardProgramVersion	Firmware version of the monitor card.	—
0x000027	TempValidOfMonitorCard	Temperature sensor on the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the humidity value. The lowest bit is for negative or positive temperature. • 0—Positive • 1—Negative	—
0x000028	Reserved	Reserved	—
0x000029	HumiOfMonitorCard	The humidity measured by the sensor on the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data	—

Offset	Name	Description	Remark
		The other seven bits are for the humidity value, ranging from 0~100 %RH	
0x00002a		The smoke sensor on the monitor card. The lowest bit is used to indicate whether smoke is detected. • 0—No smoke detected • 1—Smoke detected.	—
0x00002b	FanSpeed0OfMonitorCard	The speed of Fan 1 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the speed, ranging from 0 to 127 RPM.	—
0x00002c	FanSpeed1OfMonitorCard	The speed of Fan 2 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the speed, ranging from 0 to 127 RPM.	—
0x00002d	FanSpeed2OfMonitorCard	The speed of Fan 3 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the speed, ranging from 0 to 127 rpm.	—
0x00002e	FanSpeed3OfMonitorCard	The speed of Fan 4 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data	—

Offset	Name	Description	Remark
		The other seven bits are for the speed, ranging from 0 to 127 rpm.	
0x00002f	Voltage0OfMonitorCard	The voltage of power supply 1 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000030	Voltage1OfMonitorCard	The voltage of power supply 2 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000031	Voltage2OfMonitorCard	The voltage of power supply 1 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000032	Voltage3OfMonitorCard	The voltage of power supply 2 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000033	Voltage4OfMonitorCard	The voltage of power supply 3 as monitored by the monitor card. The highest bit is for data validation.	—

Offset	Name	Description	Remark
		• 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	
0x000034	Voltage5OfMonitorCard	The voltage of power supply 4 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000035	Voltage6OfMonitorCard	The voltage of power supply 5 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000036	Voltage7OfMonitorCard	The voltage of power supply 6 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000037	Voltage8OfMonitorCard	The voltage of power supply 7 as monitored by the monitor card. The highest bit is for data validation. • 0—Invalid data • 1—Valid data The other seven bits are for the voltage value, ranging from 0 to 127 V.	—
0x000038	Reserved	Reserved	—

Offset	Name	Description	Remark
... 0x000040			
0x000041	GeneralStatusOfMonitorCard	Reports whether the cabinet doors are open. Bit0—First cabinet Bit1—Second cabinet. • 0—Closed • 1—Open	—
0x000042 ... 0x0000ff	Reserved	Reserved	—

Examples

Acquire monitoring data for the first receiving card Request command: 55 AA 00 32 FE 00 01 00 00 00 00 00 00 00 00 0A 00 01 91 56 0D 0A Acknowledge data package: AA 55 00 32 00 FE 01 00 00 00 00 00 00 00 00 0A 00 01 80 36 00 B1 00 00 00 00 00 00 00 08 01 04 04 05 00 10 32 54 76 00 00 00 00 E4 00 00 00 00 00 FF 01 00 04 00 00 00 00 00 B2 80 80 80 80 80 B1 80 80 80 80 80 80 80 00 00 00 00 00 00 00 00 00 03 FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 D8 72
Acquire temperature data for the first receiving card Request command: 55 AA 00 32 FE 00 01 00 00 00 00 00 00 00 00 0A 02 00 92 56 0D 0A Acknowledge data package: AA 55 00 32 00 FE 01 00 00 00 00 00 00 00 00 0A 02 00 80 56 68 57 80—means the data is valid 56—means the temperature is 43°C
Acquire voltage data for the first receiving card Request command: 55 AA 00 32 FE 00 01 00 00 00 00 00 03 00 00 0A 01 00 94 56 0D 0A Acknowledge data package: AA 55 00 32 00 FE 01 00 00 00 00 00 03 00 00 0A 01 00 A9 3D 57 A9—MSB is 1, meaning the data is valid; the low seven bit value is 29, meaning the voltage is 4.1 V.

Source signal state

Identify whether the signal is being received.

Parameters

- **Device:** Sending card
- **Base address:** 02000000 H
- **Data length:** 8H

Commands

Offset	Attribute	Description
004D	Read/Write	1bit shows the signal state 1'b0—no signal 1'b1—signal exists Values: • bit[0]:SDI • bit[1]:HDMI • bit[2]:DVI Other bits are reserved.

Examples

Read the source signal state request command.

Request Command:

```
55 AA 00 E1 FE 00 00 00 00 00 00 00 4D 00 00 02 01 00 83 57 0D 0A
```

Acknowledge Data Package :

```
AA 55 00 E0 00 FE 00 00 00 00 00 00 4D 00 00 02 01 00 02 85 57
```

"01" means the SDI source signal is effective. "02" means the HDMI source signal is effective. "04" means the DVI source signal is effective.

Setting the video source input

Review and change the input video source

Parameters

- **Device:** Sending card
- **Base address:** 02200000 H
- **Data length:** 8H

Commands

Offset	Name	Attribute	Description	Realize status	Remark
0022	Input video source	Read/Write	Read—Display the current input video source. Write—Switch the input video source. • 0x1A:SDI • 0x1B:HDMI • 0x1C:DVI	—	—

Power supply control (Ethernet mode)

Turn the power supply switch on and off.

Parameters

- **Device:** Function card
- **Base address:** 05000000 H
- **Data length:** 1H

All values are read/write.

Commands

Offset	Name	Description	Values
0x000010H	PowerPortCtrl1	Status of the first power supply switch.	0—On 1—Off
0x000011H	PowerPortCtrl2	Status of the second power supply switch.	0—On 1—Off
0x000012H	PowerPortCtrl3	Status of the third power supply switch.	0—On 1—Off
0x000013H	PowerPortCtrl4	Status of the fourth power supply switch.	0—On 1—Off
0x000014H	PowerPortCtrl5	Status of the fifth power supply switch.	0—On 1—Off
0x000015H	PowerPortCtrl6	Status of the sixth power supply switch.	0—On 1—Off
0x000016H	PowerPortCtrl7	Status of the seventh power supply switch.	0—On 1—Off
0x000017H	PowerPortCtrl8	Status of the eighth power supply switch.	0—On

Offset	Name	Description	Values
			1—Off

Examples

Turn on the first power supply. Request Command: `55 AA 00 5D FE 00 00 00 00 00 01 00 10 00 00 05 01 00 00 C7 56 0D 0A` Acknowledge Data Package: `AA 55 00 5D 00 FE 00 00 00 00 01 00 10 00 00 05 00 00 C6 56` The 10H means the offset address of the first power supply switch, the 11H means the second, the 12H means the third and so on. The No.13 means the status of the power supply switch, "00" means on and "01" means off.

Brightness adjustments

Adjust the overall brightness, as well as the brightness of each color component.

Parameters

- **Device:** Receiving card
- **Base address:** 02000000 H
- **Data length:** 5H

All values are read/write.

Commands

Offset	Name	Description	Values
0x000001	Global Brightness	The overall brightness	0 - 255 0—minimum brightness 255—maximum brightness
0x000002	Red Brightness	Brightness of the red component	
0x000003	Green Brightness	Brightness of the green component	
0x000004	Blue Brightness	Brightness of the blue component	
0x000005	V Red Brightness	Brightness of the virtual red component	

Examples

Read the brightness of the first receiving card. Request Command: `55 AA 00 14 FE 00 01 00 00 00 00 00 01 00 00 02 05 00 70 56 0D 0A` Acknowledge Data Package: `AA 55 00 14 00 FE 01 00 00 00 00 00 01 00 00 02 05 00 FF FF FF FF FF 6B 5B`
Set the overall brightness, and brightness of all five components as 128.

Request Command: `55 AA 00 15 FE 00 01 00 00 00 01 00 01 00 00 02 05 00 80 80 80 80 80 F2 58 0D 0A` Acknowledge Data Package: `AA 55 00 15 00 FE 01 00 00 00 01 00 01 00 00 02 00 00 6D 56`
Set the overall brightness of one component as 128. Request Command: `55 AA 00 15 FE 00 01 00 00 00 01 00 01 00 00 02 01 00 80 EE 56 0D 0A` Acknowledge Data Package: `AA 55 00 15 00 FE 01 00 00 00 01 00 01 00 00 02 00 00 6D 56`
Set all receiving cards on the same Ethernet port overall brightness and brightness of all five components as 128. Request Command: `55 AA 00 15 FE 00 01 00 FF FF 01 00 01 00 00 02 05 00 80 80 80 80 80 F0 5A 0D 0A` Acknowledge Data Package: `AA 55 00 15 00 FE 01 00 FF FF 01 00 01 00 00 02 00 00 6B 58` When broadcasting the commands on one Ethernet port, set the response device's number as FF. Setting the scan board address as FF FF causes all the receiving cards connected on the same Ethernet port to receive the write data command.
Set all receiving cards on all Ethernet ports overall brightness and brightness of all five components as 128. Request Command: `55 AA 00 15 FE 00 01 FF FF FF 01 00 01 00 00 02 05 00 80 80 80 80 80 EF 5B 0D 0A` Acknowledge Data Package: `AA 55 00 15 00 FE 01 FF FF FF 01 00 01 00 00 02 00 00 6A 59`

Related information

Parameter store (on page 31)

Reset sending cards and controllers to factory settings

All sending cards and controllers are reset to the original setting.

Parameters

- **Device:** Sending card
- **Base address:** 0100_0000H
- **Data length:** 1H

Commands

Offset	Bits	Default (H)
02H	8	00

Offset	Bits	Default (H)
		Writing any value to this register activates the operation resetting all sending cards / controllers to factory settings except 00H.

Examples

Request Command: `55 AA 00 32 FE 00 00 00 00 00 01 00 02 00 00 01 01 00 01 8B 56 0D 0A`

Acknowledge Data Package:

`AA 55 00 32 00 FE 00 00 00 00 01 00 02 00 00 01 00 00 89 56`

Gamma value

The Gamma value is one of the parameters in the gamma transform equation. It is stored in the receiving card.

In the gamma transform equation:

- y—Output value of gamma transform
- m—Data width of output value
- x—Input value of gray scale
- n—Data width of input value. Normally n=8

Parameters

- **Device:** Receiving card
- **Base Address:** 02000000 H
- **Data length:** 1H

Commands

Offset	Name	Attribute	Description
0x000000	Gamma	Read/Write	Gamma values

Examples

Request Command: `55 AA 00 15 FE 00 01 00 00 00 00 00 00 00 00 02 01 00 6C 56 0D 0A`

Acknowledge Data Package:

`AA 55 00 15 00 FE 01 00 00 00 00 00 00 00 00 02 01 00 1C 88 56`

1C=the gamma value is 2.8

Gamma table

Gamma table is used for data transform, based on the look-up table method.

When the receiving card receives the video data from sending card, it finishes the transformation through look-up table method. Parameters must be stored into the flash.

Offset addresses 0x000100~0x0003ff are reserved.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0500_0000H
- **Data length:** 400H

Commands

Command	Name	Bits	Attribute
0x000000 … 0x0003ff	GammaTable	16	Read/Write

Related information

Parameter store (on page 31)

Sending cards and control firmware version

Read the firmware version of the sending cards.

Parameters

- **Device:** Sending card
- **Base address:** 0x0400_0000H
- **Data length:** 4H

Commands

Offset	Name	Bits	Attribute	Description
10_0004 10_0005 10_0006 10_0007	FPGA program version	8	Read/Write	The version number has four parts. Each part is represent by one byte.

Examples

Request command: 55 AA 00 15 FE 00 00 00 00 00 00 00 04 00 10 04 04 00 84 56 0D 0A

Acknowledge Data Package:

AA 55 00 15 00 FE 00 00 00 00 00 00 04 00 10 04 04 00 04 03 00 00 8B 56

04 03 00 00—the FPGA program version is 4.3.0.0

Hardware identification

Learn how to identify the receiving cards, controllers, and the function cards.

Receiving card ID

Identify the receiving card model.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0200_0200H
- **Data length:** 2H

Model IDs

Device type	Model ID (High byte)	Model ID (Low byte)
CBR300	42	81
XC200	41	82

Examples

Request Command:

55 AA 00 32 FE 00 01 00 00 00 00 00 00 02 00 02 02 00 8C 56 0D 0A

Acknowledge Data Package :

AA 55 00 32 00 FE 01 00 00 00 00 00 00 02 00 02 02 00 81 42 4F 57

The Model ID of CBR300 is 81 42H.

Sending card ID

Identify the sending card model.

Parameters

- **Device:** Sending card
- **Base address:** 0x0000_0000H

- **Data length:** 2H

Model IDs

Device type	Model ID (High byte)	Model ID (Low byte)
E500	0x11	0x02

Commands

Offset (H)	Name	Bits	Attribute	Description
2H	Controller/Sender Model ID	8	R	Low byte of the controller model ID
3H				High byte of the controller model ID

Examples

Request Command: `55 AA 00 32 FE 00 00 00 00 00 00 00 02 00 00 00 02 00 87 56 0D 0A`

Acknowledge Data Package:

`AA 55 02 32 00 FE 00 00 00 00 00 00 02 00 00 00 02 00 11 02 9E 56`

Function card ID

Identify the function card model.

Parameters

- **Device:** Function card
- **Base address:** 0x0000_0000H
- **Data length:** 2H

Model IDs

Device type	Model ID (High byte)	Model ID (Low byte)
MFN300	0x81	0x01

Commands

Offset (H)	Name	Attribute	Description
2H	FuncCardModle ID	Read-only	Low byte of the controller model ID
3H			High byte of the controller model ID

Examples

Request Command: `55 AA 00 32 FE 00 02 00 00 00 00 00 02 00 00 00 02 00 8B 56 0D 0A`

Acknowledge Data Package:

```
AA 55 00 32 00 FE 02 00 00 00 00 00 02 00 00 00 02 00 01 81 0D 57
```

Receiving card working status

Read the model ID of the receiving card to determine the status of the card.

If the ID can be read, the receiving card is working normally. Otherwise, the receiving card might not work.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0200_0200H
- **Data length:** 2H

Commands

Offset	Name	Attribute	Description
0x000000 0x000001	ScanCardModle	R	A valid Model ID is a value other than 00.

Examples

Request command:

```
55 AA 00 15 FE 00 01 00 00 00 00 00 00 00 00 00 02 00 6B 56 0D 0A
```

Acknowledge Data Package:

```
AA 55 01 15 00 FE 01 00 00 00 00 00 00 00 00 00 02 00 81 42 2F 57
```

The feedback ID is 81 42, meaning the receiving card CBR300 works normally.

Sending card resolution setting

To set the resolution and refresh rate of sending card, write the specified content into EDID register.

The EDID space address is 0x0800_0000H –0x0800_00FFH. For EDID structure 1.3, 128 bytes data should be written into specified address.

This document describes the basic 128-byte data structure in EDID 1.3. To obtain the latest standard and any support documentation, contact VESA.

Parameters

- **Device:** Sending card
- **Base address:** 0x0800_0000H
- **Data length:** 1H

Commands

Offset (H)	Bits	Attribute	Description
0x00	8	Read/Write	EDID Register0
…	…	…	…
0x7F	8	Read/Write	EDID Register127

Examples

Set the resolution as 1440×900 @60Hz, the EDID content of 128 Bytes.

```
00 FF FF FF FF FF FF 00 39 F6 05 04 13 06 28 00
10 17 01 03 81 1E 17 B4 EA C1 E5 A3 57 4E 9C 23
1D 50 54 21 08 00 01 01 01 01 01 01 01 01 01 01
01 01 01 01 01 01 10 23 A0 A0 50 84 23 30 30 20
36 00 CB 28 11 00 00 1E 00 00 00 FF 00 4E 4F 56
41 53 54 41 52 4D 33 00 00 00 00 00 00 FC 00 4D
41 52 53 A3 44 49 53 50 4C 41 59 00 00 00 00 FD
00 30 7B 1C C8 11 00 0A 20 20 20 20 20 20 00 E9 0D 0A
```

Set the resolution as 1920×1080 @60Hz, the EDID content of 128 Bytes.

```
00 FF FF FF FF FF FF 00 39 F6 05 04 13 06 28 00
10 17 01 03 81 1E 17 B4 EA C1 E5 A3 57 4E 9C 23
1D 50 54 21 08 00 01 01 01 01 01 01 01 01 01 01
01 01 01 01 01 01 5B 36 80 A0 70 38 23 40 30 20
36 00 CB 28 11 00 00 1E 00 00 00 FF 00 4E 4F 56
41 53 54 41 52 4D 33 00 00 00 00 00 00 FC 00 4D
41 52 53 A3 44 49 53 50 4C 41 59 00 00 00 00 FD
00 30 7B 1C C8 11 00 0A 20 20 20 20 20 20 00 C7 0D 0A
```

Display control register setting

Display colors and patterns on the screen.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0200_0000H
- **Data length:** 1H

Commands

Offset (H)	Name	Bits	Attribute	Description
0x000101	SelfTestMode	8	Read/Write	The value of each function refers to the Receiving card display function table. Default value—0x00

Receiving card display function

Register value	Description
0x00	Reserved
0x01	Reserved
0x02	Red
0x03	Green
0x04	Blue
0x05	White
0x06	Horizon line
0x07	Vertical line
0x08	Incline line
0x09	Auto Grayscale Increasing (256 Grade)
0x0a	Aging (Loop all kinds of test mode above)

Examples

Display a blue image on the first receiving card.

Request Command : `55 AA 00 80 FE 00 01 00 00 00 01 00 01 01 00 02 01 00 04 DE 56 0D 0A`

Acknowledge Data Package:

`AA 55 00 80 00 FE 01 00 00 00 01 00 01 01 00 02 00 00 D7 58`

Display a red image on all receiving cards on the same sending card Ethernet port.

Request Command : `55 AA 00 80 FE 00 01 00 FF FF 01 00 01 01 00 02 01 00 02 DA 58 0D 0A`

Acknowledge Data Package:

`AA 55 00 80 00 FE 01 00 FF FF 01 00 01 01 00 02 00 00 D7 58`

Display a horizon line for all receiving cards on the same sending card Ethernet port.

Request Command : `55 AA 00 80 FE 00 01 00 FF FF 01 00 01 01 00 02 01 00 06 DE 58 0D 0A`

Acknowledge Data Package:

`AA 55 00 80 00 FE 01 00 FF FF 01 00 01 01 00 02 00 00 D7 58`

Recover the video image setting for the first receiving card.

Request Command : `55 AA 00 80 FE 00 01 00 00 00 01 00 01 01 00 02 01 00 00 DA 56 0D 0A`

Acknowledge Data Package: AA 55 00 80 00 FE 01 00 00 00 01 00 01 01 00 02 00 00 D9 56
Recover video image setting for all receiving cards on the same sending card Ethernet port. Request Command : 55 AA 00 80 FE 00 01 00 FF FF 01 00 01 01 00 02 01 00 00 D8 58 0D 0A Acknowledge Data Package: AA 55 00 80 00 FE 01 00 FF FF 01 00 01 01 00 02 00 00 D7 58

Display mode setting

Kill or lock the image settings for the receiver cards.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0200_0000H
- **Data length:** 1H

Commands

Offset (H)	Name	Bits	Attribute	Description
0x000101	KillMode	8	Read/Write	0xff—Black display 0x00—Normal display
0x000102	LockMode	8	Read/Write	0xff—Lock display 0x00—Normal display

Examples

Kill the image setting for the first receiving card. Request Command : 55 AA 00 80 FE 00 01 00 00 00 01 00 00 01 00 02 01 00 FF D8 57 0D 0A Acknowledge Data Package: AA 55 00 80 00 FE 01 00 00 00 01 00 00 01 00 02 00 00 D8 56
Kill the image setting for all receiving cards on the same sending card Ethernet port. Request Command : 55 AA 00 80 FE 00 01 00 FF FF 01 00 00 01 00 02 01 00 FF D6 59 0D 0A Acknowledge Data Package: AA 55 00 80 00 FE 01 00 FF FF 01 00 00 01 00 02 00 00 D6 58
Lock the image setting for the first receiving card. Request Command : 55 AA 00 80 FE 00 01 00 00 00 01 00 02 01 00 02 01 00 FF DA 57 0D 0A Acknowledge Data Package: AA 55 00 80 00 FE 01 00 00 00 01 00 02 01 00 02 00 00 DA 56
Lock the image setting for all receiving cards on the same sending card Ethernet port. Request Command : 55 AA 00 80 FE 00 01 00 FF FF 01 00 02 01 00 02 01 00 FF D8 59 0D 0A

Acknowledge Data Package:

```
AA 55 00 80 00 FE 01 00 FF FF 01 00 02 01 00 02 00 00 D8 58
```

Calibration control

Calibrate the displays.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0200_0000H
- **Data length:** 1H

Commands

Offset (H)	Name	Bits	Attribute	Description
0x000051	CorrectionOn	8	Read/Write	Bit[0]: calibration on/off • 0—Calibration off • 1—Calibration on Bit[1]: calibration type • 0—Color calibration • 1—Brightness calibration Bit[7:2]: Reserved, "000000" Examples: • 0x00—calibration off • 0x03—brightness calibration on • 0x01—color calibration on

Examples

Turn off calibration.

```
55 AA 00 7F FE 00 01 00 FF FF 01 00 51 00 00 02 01 00 00 26 59 0D 0A
```

Reconnect sending card or receiving card

Determine if the sending or receiver card is connected.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0000_0000H

- **Data length:** 2H

Commands

Offset (H)	Name	Bits	Attribute	Description	Default (H)
2H	Controller/Sender Model ID	8	Read	Low byte of the controller model ID	Any result other than 00 indicates the card is connected.
3H		8	Read	High byte of the controller model ID	

Examples

Request Command : `55 AA 00 AA FE 00 00 00 00 00 00 00 02 00 00 00 02 00 01 57 0D 0A`

Acknowledge Data Package:

`AA 55 00 AA 00 FE 00 00 00 00 00 00 02 00 00 00 02 00 01 00 02 57`

Parameter store

Write any parameter into the flash.

Parameters

- **Device:** Receiving card
- **Base address:** 0x0100_0000H
- **Data length:** 1H

Commands

Command	Name	Bits	Attribute
11H	Parameter store	8	Write

Examples

Set all receiving cards on all Ethernet ports overall brightness and brightness of all five components as 128, 0, 128, 128.

Request Command : `55 AA 00 15 FE 00 01 FF FF FF 01 00 01 00 00 02 05 00 80 00 80 80 80 6F 5B 0D 0A`

Acknowledge Data Package:

`AA 55 00 15 00 FE 01 FF FF FF 01 00 01 00 00 02 00 00 6A 59`

Set the brightness on all receiving cards to recover the last value when the screen powers off and on.

Request Command : `55 AA 00 15 FE 00 01 FF FF FF 01 00 11 00 00 01 01 00 11 8B 59 0D 0A`

Acknowledge Data Package:

```
AA 55 00 15 00 FE 01 FF FF FF 01 00 11 00 00 01 00 00 79 59
```

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