RTL8238B

POWER OVER ETHERNET CONTROLLER

Host Command Guide

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USING THIS DOCUMENT

This document is intended for use by the system engineer when integrating with Realtek switch products. Though every effort has been made to assure that this document is current and accurate, more information may have become available subsequent to the production of this guide. In that event, please contact your Realtek representative for additional information that may help in the development process.

Revision	Release Date	Summary
0.1	2020/07/29	Initial
0.2	2020/09/09	Add Firmware download commands
0.3	2020/12/30	Update hostcmd description for 0x48
0.4	2021/01/14	Modify port mapping command descriptions, add 0x11 command
0.5	2021/02/01	Correct typo errors
0.6	2021/07/30	Add CMD scope, modify description for 0x01/0x05/0x49/0x41/0x47/0xC0/0xC4
0.7	2022/02/24	Abandon CMD-0xA; Modify CMD-0xB; Add CMD-0x18
0.8	2022/03/15	Add System Chip Type Information Get CMD 0x50.
0.9	2022/04/12	Add I2C host command interface description
1.0	2022/05/12	CMD-0x40 add new mcu type
1.1	2022/08/17	Modify description for CMD-0x4/0x10/0x12/0x41/0x4B, update command list
1.2	2022/08/18	Added description of unused byte defaults in configuration set commands
1.3	2022/10/18	Modify description for CMD-0xC/0x18
1.4	2022/11/17	1 CMD-0x9 & CMD-0xB add note for Sifos testing 2 Remove the bit0,3,4 description of CMD-0x16 3 Add the description of CMD-0x13/14' max power
1.5	2022/12/19	1. Modify Figure 2 1 Suggested sending and receiving CMD Flow 2. Add note of system configuration for port mapping CMD-0x5 3. Add note of sifos test for CMD-0xC Port Inrush Mode Set CMD and CMD-0xD Port Force Inrush Set CMD 4. Add note of port turn off behavior for CMD-0xF Port Disconnect Type Set CMD
1.6	2022/01/06	1. CMD-0xF add delay enabling MPS function description 2. Modify the description of CMD-0x40 Byte[9]
1.7	2022/03/16	1. Add note of CMD-0xC0-80~83 2. Modify the description of CMD-0x2 3. Modify the description of CMD-0x40 Byte[9]

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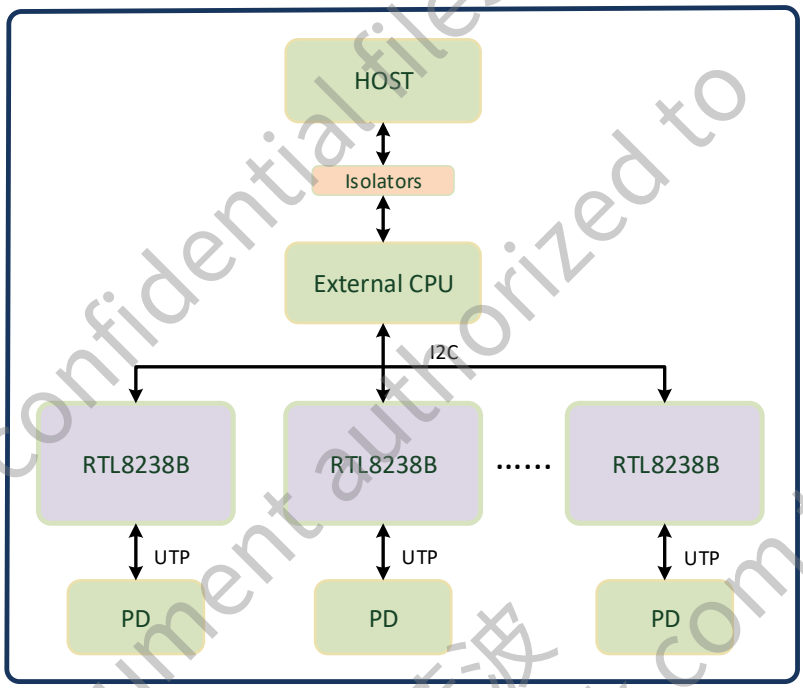
1 Overview

We support the N*8-port management PSE application solution, the block diagram is as Figure1-1. The host CPU (switch CPU) can communicate with the external CPU using UART or I2C interface. And the external CPU can control one or more RTL8238B PoE chips by the I2C interface.

Figure 1-1 N*8-port Management PSE Application Solution



2 Communication Protocol

2.1 UART Interface

The following settings should be set correctly before the host CPU and external CPU can communicate with each other successfully. Normal commands will response within 50ms, but command 0x0 and 0x5 will need more time.

Table 2-1 UART settings

Type	Value
Baud Rate	115200
Stop bits	1
Parity	None
Flow Control	None
Inter Frame Gap	>20ms
Timeout	>50ms
Gap Between Bytes in the packet	<2ms

2.2 I2C Interface

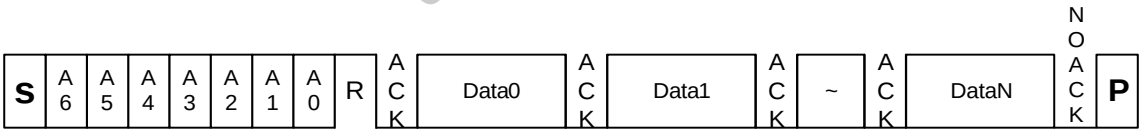
A typical protocol should be implemented if I2C interface is used for hostcmd communication. The maximum I2C rate is 1MHz.

Request Format

Figure 2-1 I2C hostcmd Request format(sequential write)

Response Format

Figure 2-2 I2C hostcmd Response format(sequential read)



The 7-Bit device address of slave MCU shown in Figure 2-1 and Figure 2-2 is the i2c interface address, the fixed value is 0x20. Both request and response frame are limited in 12-Byte payload format for App commands, but for <App Download CMD>, the maxlength of request payload is 36-Byte. The detail of the payload is explained in 2.3. In order to get effective response, it is necessary to leave enough time between request and response frame. For most commands, the Inter Frame Gap between Request

frame and response frame is recommended greater than 20ms, but command 0x0 and 0x5 will need more time.

2.3 Protocol

The typical communication protocol is a Request<->Response sequence. The host CPU issues the request and waits for the external CPU's response within the predefined time. The typical request frame and response frame format is as follows. For most type of commands, the length is 12 bytes.

Table 2-2 Typical Request Frame Format

Byte Offset	Byte0	Byte1	Byte2 – Byte10	Byte11
Description	Command ID	Sequence Number	<=====Data====>	Checksum

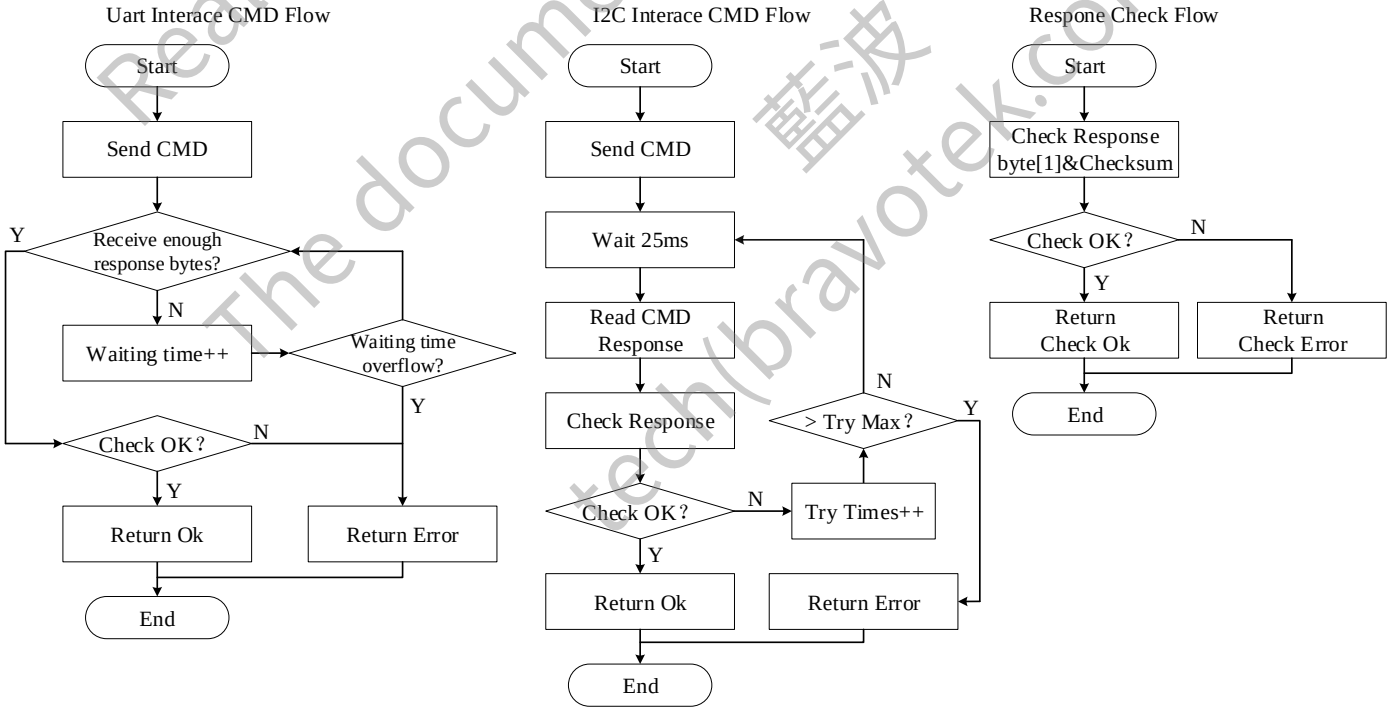
Table 2-3 Typical Response Frame Format

Byte Offset	Byte0	Byte1	Byte2 – Byte10	Byte11
Description	Response ID	Sequence Number	<=====Data====>	Checksum

The checksum algorithm is just cumulating all the bytes from offset 0 to length of packet -1 not considering the carry bit.

Checksum = Byte0 + Byte1 + …. + Byte(len-1).

Figure 2-1 Suggested sending and receiving CMD Flow



3 Command List

The commands we supports can be classified into four types:

- Configuration Set Commands
- Configuration & Status Get Commands
- Miscellaneous Commands
- Debug Commands

The whole command sets list is as follows.

Table 3-1 Host Command List

Commands	ID	Description	Scope
Configuration Set Commands			
Global Enable Set CMD	0x00	Enable/disable all the ports.	App
Port Enable Set CMD	0x01	Enable/disable the specified port.	App
Global Reset Set CMD	0x02	Reset all the ports.	App
Port Reset Set CMD	0x03	Reset the specified port.	App
Global Power Source Set CMD	0x04	Set the power budget.	App
Port Mapping Enable Set CMD	0x05	Enable/disable the port mapping.	App
Port Pair Mapping Set CMD	0x06	Set the port mapping relationship.	App
Reserve	0x07	Reserve	
Port Function Mode Set CMD	0x08	Select the port function mode.	App
Port Detection Type Set CMD	0x09	Set the port detection type.	App
Port Detection Trigger Set CMD(Abandon)	0x0A	Force the port to do the detection one time.	App
Port Class Trigger Set CMD	0x0B	Force the port to do the classification once.	App
Port Inrush Mode Set CMD	0x0C	Set the port inrush limit.	App
Port Force Inrush Set CMD	0x0D	Another way to set the inrush/power on limit.	App
Global Parameters Set CMD	0x0E	Set the UVLO/OVLO theshold.	App
Port Disconnect Type Set CMD	0x0F	Set disconnect type with delay or not.	App
Global Power Management Mode Set CMD	0x10	Set the power management mode.	App
Global Power Management Mode Extended Set CMD	0x11	Set system pre-allocated function.	App
Port Max Power Type Set CMD	0x12	Set the port max power theshold type.	App
Port Max Power Value Set CMD	0x13	Set the port max power theshold value in the unit of 0.2W/LSB.	App

Port Max Power Value Extended Set CMD	0x14	Set the port max power theshold value in the unit of 0.4W/LSB.	App
Port Priority Set CMD	0x15	Set the port priority.	App
Global Port Event Mask Set CMD	0x16	Set the port event mask.	App
Port Trigger Det CLS PWR CMD	0x18	Force port det, class, power on in manual mode	App
Configuration and Status Get Commands			
Global Status Get CMD	0x40	Get the global status.	App
Global Power Status Get CMD	0x41	Get the power status.	App
Port Status Get CMD	0x42	Get the detailed status for the specified port.	App
Port Group Status Get CMD	0x43	Get the basic status for the port group.	App
Port Measurement Get CMD	0x44	Get the port voltage/current/temp status.	App
Port Mib Counter Get CMD	0x45	Get the port mib counter information.	App
Port Event Status Get CMD	0x46	Get the port event status.	App
Global Reset Reason Get CMD	0x47	Get the global reset reason.	App
Port Basic Configuration Get CMD	0x48	Get the port basic information(auto/semi,etc).	App
Port Extended Configuration Get CMD	0x49	Get the port extended information.	App
Global Parameters Get CMD	0x4A	Get the global parameters.	App
Global PM Configuration Get CMD	0x4B	Get the power management configuration.	App
Global Device Address Get CMD	0x4C	Get the device address.	App
System Chip Type Information Get CMD	0x50	Get all the PSE chip type informations of PoE subsystem	App
Miscellaneous Commands			
Jump To Loader CMD	0xC0	Sub command(00)	App
Configuration Information Save CMD	0xC0	Sub command(01)	App
Configuration Information Clear CMD	0xC0	Sub command(02)	App
Configuration Version Save CMD	0xC0	Sub command(03)	App
Configuration Version Get CMD	0xC0	Sub command(04)	App
Configuration Information Reset CMD	0xC0	Sub command(05)	App
Configuration Information Save CMD	0xC0	Sub command(06)	App
App Download CMD	0xC0	Sub command(0x80-83), only used in loader	***Loader***
Jump To App CMD	0xC0	Sub command(0x40), only used in loader	***Loader***
Firmware Download CMD	0xCA	Downloader firmware to extern flash	***Loader***
Debug Commands			
Chip Register Set CMD	0xF0	Set the specified register directly.	App
Chip Register Get CMD	0xF1	Get the specified register directly.	App

4 Configuration Set Commands

4.1 Global Enable Set CMD(CMD ID=0x0)

(☑App ☐Loader)

Brief Description

Enable or disable all the ports.

If set to disable, all the ports will remain the idle state without detection & classification, and if set to enable, all the ports will do the detection & classification normally, and the ports will have the chance to power up. The response will be within one second. Before the response, no command should be sent.

Request Format

The request format of <Global Enable Set CMD> is as follows.

Table 4-1 <Global Enable Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	RSVD								CHKSM

Field	Description
VAL	0x0: Disable all the ports function 0x1: Enable all the ports function 0x2-0xff: RSVD

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Enable Set CMD> is as follows.

Table 4-2 <Global Enable Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.2 Port Enable Set CMD(0x1)

(☑App ☐Loader)

Brief Description

Enable or disable single port .

If set to disable, the port will remain the idle state without detection & classification, and if set to enable, the port will do the detection & classification normally, and the port will have the chance to power up.

Request Format

The request format of <Port Enable Set CMD> is as follows.

Table 4-3 <Port Enable Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Disable the port function 0x1: Enable the port function 0x2: Force the port power up in semi-auto mode 0x3-0xff: RSVD

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Enable Set CMD> is as follows.

Table 4-4 <Port Enable Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS	0x0: Request success 0x1: Request failed

4.3 Global Reset Set CMD(0x2)

(☑App ☐Loader)

Brief Description

This Command will reset the whole PoE subsystem.

Request Format

The request format of <Global Reset Set CMD> is as follows.

Table 4-5 <Global Reset Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	RSVD								CHKSM

Field	Description
VAL	0x0: Not to reset PoE system 0x1: Reset whole PoE system

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Reset Set CMD> is as follows.

Table 4-6 <Global Reset Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.4 Port Reset Set CMD(0x3)

(☑App ☐Loader)

Brief Description

Reset port state machine to idle and configuration value to default.

Request Format

The request format of <Port Reset Set CMD> is as follows.

Table 4-7 <Port Reset Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x00: Not to reset port 0x01: Reset port

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Reset Set CMD> is as follows.

Table 4-8 <Port Reset Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.5 Global Power Source Set CMD(0x4)

(☑App ☐Loader)

Brief Description

Set system total power value and reserved power value of the specific bank id.

Reserved Power must be less than Total Power.

Request Format

The request format of <Global Power Source Set CMD> is as follows.

Table 4-9 <Global Power Source Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Bank ID	TotalPower		Reserved Power		RSVD				CHKSM

Field	Description
Bank ID	0x00-0x07: Valid bank id 0x08-0xff: Request failed
Total Power	Total Power 0.1W/LSB
Reserved Power	Reserved Power 0.1W/LSB

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Power Source Set CMD> is as follows.

Table 4-10 <Global Power Source Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Bank ID	STS	RSVD							CHKSM

Field	Description
Bank ID	0x00-0x07: Valid bank ID 0x08-0xff: Request failed
STS	0x0: Request success 0x1: Request failed

4.6 Port Mapping Enable Set CMD(0x5)

(☑App ☐Loader)

Brief Description

Set system logical to physical port mapping enable status. Before and after port mapping, this command should be issued first. The response will be within two seconds. Before the response, no command should be sent.

Request Format

The request format of <Port Mapping Enable Set CMD> command is as follows.

Table 4-11 <Port Mapping Enable Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	MaxPort	RSVD							CHKSM

Field	Description
VAL	0x0: Disable port mapping, port mapping start. 0x1: Enable port mapping, port mapping stop.
MaxPort	8*chipnum (chipnum <=6)

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Port mapping will **restore the poe configuration to the default value** and so the configuration before port mapping will be **effective**.

Response Format

The response format of <Port Mapping Enable Set CMD> is as follows.

Table 4-12 <Port Mapping Enable Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	MaxPort STS	RSVD							CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed
MaxPortSTS	**0x0: Request success** **0x1: Request failed**

4.7 Port Pair Mapping Set CMD(0x6)

(☑App ☐Loader)

Brief Description

Configure device index and channel index for the specific logical port. All the chip I2C addresses should be in the range from 0x20 to 0x3E and the value is an even number. If board I2C address starts from 0x20 and all the addresses are contiguous, byte[10] should be set to 0xFF and chip index is equal to (chip I2C address – 0x20) / 2. If board address doesn't start from 0x20 or addresses are discontinuous, byte[10] should be set to chip I2C address and chip index is suggested to set a smaller value for the smaller I2C address.

Request Format

The request format of <Port Pair Mapping Set CMD> is as follows.

Table 4-13 <Port Pair Mapping Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	0	Chip Index	Channel ID	RSVD				Addr	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
Chip Index	0x0-0xe
Channel ID	Local port , range 0x0-0x7
Addr	Chip I2C address(only used when board address doesn't start from 0x20 or addresses are discontinuous; In other cases, this byte should be set to 0xFF)

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Pair Mapping Set CMD> is as follows.

Table 4-14 <Port Pair Mapping Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	0	Chip ID	Channel ID	RSVD				Addr	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Chip ID STS	0x00: Request success 0x01: Request failed
Channel ID STS	0x00: Request success 0x01: Request failed
Addr	board address doesn't start from 0x20 or addresses are discontinuous 0x00: Request success 0xff: Request failed board I2C address starts from 0x20 and all the addresses are contiguous 0xff: not care

4.8 Port Function Mode Set CMD(0x8)

(☑App ☐Loader)

Brief Description

The PSE function mode could be: **semi-auto, auto and manual mode**.

Semi-auto mode means the specific port will do detection, classification automatically, but finally host CPU will inform the PoE controller whether the PD can be powered on or return to IDLE according to the calculation.

Auto mode means the specific port will do detection, classification automatically, and the PoE controller can decide whether to power on this port or return to IDLE according to predetermined rules.

Manual mode means that the port can be be triggered to do detection, classification and power up through CMD-0x18 <Port Trigger Det CLS PWR CMD>.

Request Format

The request format of <Port Function Mode Set CMD> is as follows.

Table 4-15 <Port Function Mode Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Auto mode 0x1: Semi-auto mode 0x2: Manual mode

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Function Mode Set CMD> is as follows.

Table 4-16 <Port Function Mode Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.9 Port Detection Type Set CMD(0x9)

(☑App ☐Loader)

Brief Description

This command decides whether to do classification for Legacy PD and whether the classification failed PD can be powered on.

Request Format

The request format of <Port Detection Type Set CMD> is as follows.

Table 4-17 <Port Detection Type Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0, 0x2, 0x4: Do classification for standard but not for Legacy PD, the classification failed PD can not be powered on. 0x1, 0x3, 0x5: Do classification for standard and Legacy PD, the classification failed PD can not be powered on. 0x6: Do classification for standard and Legacy PD, the classification failed PD can be powered on.

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

When testing Sifos, please set VAL to **0x0, 0x2 or 0x4**. Other values will cause **det_range failure**

Response Format

The response format of <Port Detection Type Set CMD> is as follows.

Table 4-18 <Port Detection Type Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.10 Port Detection Trigger Set CMD(0xA-Abandon)(Only manual mode)

(☑App ☐Loader)

Brief Description

Force the specific port to do detection in manual mode and get detection PD type.

Request Format

The request format of <Port Detection Trigger Set CMD> is as follows.

Table 4-19 <Port Detection Trigger Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
SEQ	0x0: Set command 0x1: Get command
VAL	Set command： 0x0: Not trigger 0x1: Trigger Get command： Set to 0xff

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Detection Trriger Set CMD> is as follows.

Table 4-20 <Port Detection Trriger Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	Set command：

	0x0: Request success 0x1: Request failed Get command： 0x0: Valid PD detected 0x1: Invalid PD detected

4.11 Port Class Trigger Set CMD(0xB)

(☑App ☐Loader)

Brief Description

Force the specific port to do classification in auto mode and semi-auto mode.

Request Format

The request format of <Port Class Trigger Set CMD> is as follows.

Table 4-21 <Port Class Trigger Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: None 0x1: Force class enable

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

This CMD will cause **Sifos det_range fail**, please do not use it when testing Sifos

Response Format

The response format of <Port Class Trigger Set CMD> is as follows.

Table 4-22 <Port Class Trigger Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.12 Port Inrush Mode Set CMD(0xC)

(☑App ☐Loader)

Brief Description

Set inrush current limit and power on current limit of the specific port or multiple ports. The final inrush current limit depends on this command and <Port Force Inrush Set CMD>.

Request Format

The request format of <Port Inrush Mode Set CMD> is as follows.

Table 4-23 <Port Inrush Mode Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: IEEE 802.3af mode (Inrush limit 425mA, Power on limit 425mA) 0x1: IEEE 802.3af High Inrush mode (Inrush limit 850mA, Power on limit 850mA) 0x2: Pre-IEEE802.3at mode (Inrush limit 425mA, Power on limit 850mA) 0x3: IEEE 802.3at mode (Inrush limit 425mA, Power on limit 850mA)

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

When test AF/AT sifos, the inrush mode should to be set to 0x0: IEEE 802.3af mode or 0x3: IEEE 802.3at mode.

Response Format

The response format of <Port Inrush Mode Set CMD> is as follows.

Table 4-24 <Port Inrush Mode Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.13 Port Force Inrush Set CMD(0xD)

(☑App ☐Loader)

Brief Description

Set inrush current limit of the specific port or multiple ports. The final inrush current limit depends on this command and <Port Inrush Mode Set CMD>.

Request Format

The request format of <Port Force Inrush Set CMD> is as follows.

Table 4-25 <Port Force Inrush Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Force Inrush Disable (Inrush limit 425mA) 0x1: Force Inrush Enable (Inrush limit 850mA)

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

When testing Sifos, please set VAL to **0x0: Force Inrush Disable**.

Response Format

The response format of <Port Force Inrush Set CMD> is as follows.

Table 4-26 <Port Force Inrush Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.14 Global Parameters Set CMD(0xE)

(☑App ☐Loader)

Brief Description

Set system parameters of PoE subsystem. The information includes UVLO threshold and OVLO threshold.

Request Format

The request format of <Global Parameters Set CMD> is as follows.

Table 4-27 <Global Parameters Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	UVLO	RSVD	OVLO	RSVD						CHKSM

Field	Description
UVLO	33V + UVLO * 64.45mV/LSB.
OVLO	57V + OVLO *64.45mV/LSB.

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Parameters Set CMD> is as follows.

Table 4-28 <Global Parameters Set CMD > Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.15 Port Disconnect Type Set CMD(0xF)

(☑App ☐Loader)

Brief Description

Set disconnect type of the specific port or multiple ports.

Request Format

The request format of <Port Disconnect Type Set CMD> is as follows.

Table 4-29 <Port Disconnect Type Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Disable MPS ability. 0x1: Reserved. 0x2: Enable MPS ability 0x3: Enable MPS ability(**mps function will be enabled after 700ms of pwrup**)

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

When disconnect type set set to val **0x0: Disable MPS ability, port will not turn off due to low current.**

Response Format

The response format of <Port Disconnect Type Set CMD> is as follows.

Table 4-30 <Port Disconnect Type Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.16 Global Power Management Mode Set CMD(0x10)

(☑App ☐Loader)

Brief Description

Set global power management mode of PoE subsystem.

In **static mode**, the system performs power management based on port class power consumption

In **dynamic mode**, the system performs power management based on the actual power consumption of the port.

In **priority mode**, high-priority ports can preempt low-priority ports to complete power-on, and there is no preemption relationship with the same priority.

Port priority is set by CMD-0x15.

Request Format

The request format of <Global Power Management Mode Set CMD> is as follows.

Table 4-31 <Global Power Management Mode Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	RSVD								CHKSM

Field	Description
VAL	0x0: None 0x1: Static mode with priority 0x2: Dynamic mode with priority 0x3: Static mode without priority 0x4: Dynamic mode without priority

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Power Management Mode Set CMD> is as follows.

Table 4-32 <Global Power Management Mode Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.17 Global Power Management Mode Extended Set CMD(0x11)

(☑App ☐Loader)

Brief Description

Set extended global power management mode of PoE subsystem. This includes system pre-allocated function. When this function is enabled, if specific port can be powered up, system remain power must be larger than port request power. When this function is disabled, port request power will not be necessary to power up this port.

Request Format

The request format of <Global Power Management Mode Extended Set CMD> is as follows.

Table 4-33 <Global Power Management Mode Extended Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	RSVD								CHKSM

Field	Description
VAL	0x0: Enable system pre-allocated function 0x1-0xff: Disable system pre-allocated function

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Power Management Mode Extended Set CMD> is as follows.

Table 4-34 <Global Power Management Mode Extended Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.18 Port Max Power Type Set CMD(0x12)

(☑App ☐Loader)

Brief Description

Set single-port or multi-port maximum power type

Class based means that the maximum power of the port is set according to the class level

User defined means that the maximum power of the port is set by CMD-0x13 < Port Max Power Value Set CMD >.or CMD-0x14 < Port Max Power Value Extended Set CMD >

Request Format

The request format of <Port Max Power Type Set CMD> is as follows.

Table 4-35 <Port Max Power Type Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Reserved 0x1: Class based 0x2: User defined

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Max Power Type Set CMD> is as follows.

Table 4-36 <Port Max Power Type Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.19 Port Max Power Value Set CMD(0x13 Max 51W)

(☑App ☐Loader)

Brief Description

Set max power value of the specific port or multiple ports. The maximum value is 0.2W*255.

Request Format

The request format of <Port Max Power Value Set CMD> is as follows.

Table 4-37 <Port Max Power Value Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0.2W/LSB

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Max Power Value Set CMD> is as follows.

Table 4-38 <Port Max Power Value Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS	0x0: Request success 0x1: Request failed

4.20 Port Max Power Value Extended Set CMD(0x14 Max 102W)

(☑App ☐Loader)

Brief Description

Set max power value of the specific port or multiple ports. The maximum value is 0.4W*255.

Request Format

The request format of <Port Max Power Value Extended Set CMD> is as follows.

Table 4-39 <Port Max Power Value Extended Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0.4W/LSB

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Max Power Value Extended Set CMD> is as follows.

Table 4-40 <Port Max Power Value Extended Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS	0x0: Request success 0x1: Request failed

4.21 Port Priority Set CMD(0x15)

(☑App ☐Loader)

Brief Description

Set assign priority of the specific port or multiple ports.

Request Format

The request format of <Port Priority Set CMD> is as follows.

Table 4-41 <Port Priority Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Low 0x1: Medium 0x2: High 0x3: Critical

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Priority Set CMD> is as follows.

Table 4-42 <Port Priority Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS	0x0: Request success 0x1: Request failed

4.22 Global Port Event Mask Set CMD(0x16)

(☑App ☐Loader)

Brief Description

Set several kinds of global port event mask, before event status can be recorded and interrupt pulse can be transmitted to host, the corresponding mask must be set.

Request Format

The request format of <Global Port Event Mask Set CMD> is as follows.

Table 4-43 <Global Port Event Mask Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	VAL	RSVD								CHKSM

Field	Description
VAL	BIT0: Reserved BIT1: Disconnect events mask(0: DISABLE 1: ENABLE) BIT2: Fault events mask(0: DISABLE 1: ENABLE) BIT3-7: Reserved

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Global Port Event Mask Set CMD> is as follows.

Table 4-44 <Global Port Event Mask Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

4.23 Port Trigger Det CLS PWR CMD(0x18)(Only manual mode)

(☑App ☐Loader)

Brief Description

Force the specific port to do detection, classification or power in manual mode.

Request Format

The request format of <Port Trigger Det CLS PWR CMD> is as follows.

Table 4-45 <Port Trigger Det CLS PWR CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Port Reset 0x1: Force detecion enable 0x2: Force class enable 0x3: Force power enable

Note:

The default value of unused bytes in CMD used in **APP** needs to be **0xFF**

Response Format

The response format of <Port Trigger Det CLS PWR CMD> is as follows.

Table 4-46 <Port Trigger Det CLS PWR CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS	Port	STS	Port	STS	Port	STS	RSVD	CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

5 Configuration and Status Get Commands

5.1 Global Status Get CMD(CMD ID=0x40)

(☑App ☐Loader)

Brief Description

Get basic system status of PoE subsystem.

This command can get basic information of the PoE subsystem. The information includes PoE mode, communication interface, max ports, port map, device ID, software version, MCU type, configuration status and extended version.

Request Format

The request format of <Global Status Get CMD> is as follows.

Table 5-1 <Global Status Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	RSVD									CHKSM

Response Format

The response format of <Global Status Get CMD> is as follows.

Table 5-2 <Global Status Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	RSVD	Max Ports	Port Map En	Device ID		SW Ver	MCU Type	Config Status	Ext.Ver	CHKSM

Field	Description
Max Ports	The Max Ports in PoE system
Port Map En	System port enable status, 0x00: Disable 0x01: Enable
Device ID	16-bit Device ID, 0x0138 for RTL8238B
SW Ver	8-bit Software Version BIT7-4: Major Number BIT3-0: Minor Number

MCU Type	8-bit valid MCU Type 0x00: GigaDevice GD32F310XXXX Microcontroller 0x01: GigaDevice GD32E230XXXX Microcontroller 0x02: GigaDevice GD32F303XXXX Microcontroller 0x03: GigaDevice GD32F103XXXX Microcontroller 0x04: GigaDevice GD32E103XXXX Microcontroller 0x10: Nuvoton M0516XXXX Microcontroller 0x11: Nuvoton M0564XXXX Microcontroller 0x12: Nuvoton NUC029XXXX Microcontroller
Config Status	BIT0: Configuration Status bit 0x0: Configuration is dirty 0x1: Configuration is saved BIT1: System Reset bit 0x0: NO System Reset happened 0x1: System Reset happened BIT2: Global Disable Pin Indication 0x0: Global Disable Pin is low 0x1: Global Disable Pin is high
Ext.Ver	8-bit Extender Software Version BIT7-4: Major Number BIT3-0: Minor Number

5.2 Global Power Status Get CMD(0x41)

(☑App ☐Loader)

Brief Description

This command can get system allocated power , system available power, power bank id and system current power.

In **static mode**, the system available power is equal to the system total power minus the system allocated power

In **dynamic mode**, the system available power is equal to the system total power minus the system current power

Request Format

The request format of <Global Power Status Get CMD> is as follows.

Table 5-3 <Global Power Status Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	RSVD									CHKSM

Response Format

The response format of <Global Power Status Get CMD> is as follows.

Table 5-4 <Global Power Status Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	System Allocated Power		System Available Power		Bank ID	System Current Power		RSVD		CHKSM

Field	Description
System Allocated Power	System total power allocated by port class level (0.1W/LSB)
System Available Power	System available power of the current bank id (0.1W/LSB) Static Mode: System Available Power = System Total Power – System Allocated Power Dynamic Mode: System Available Power = System Total Power – System Current Power
Bank ID	Bank ID used by the system
System Current Power	System total power actually consumed by port (0.1W/LSB)

5.3 Port Status Get CMD(0x42)

(☑App ☐Loader)

Brief Description

Get port status of PoE subsystem.

This command can get basic information of the specified port. The information includes power state, fault status, detection result, classification result and PD type.

Request Format

The request format of <Port Status Get CMD> is as follows.

Table 5-5 <Port Status Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	RSVD								CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Response Format

The response format of <Port Status Get CMD> is as follows.

Table 5-6 <Port Status Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS1	STS2	STS3	STS4	STS5	STS6	STS7	STS8	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS1	Port power status or fault status 0x0: Disabled 0x1: Searching 0x2: Delivering Power 0x3: RSVD 0x4: Fault 0x5: RSVD 0x6: Requesting Power
STS2	If <STS1> shows Fault or Other Fault, <STS2> shows Error Types: 0x0: OVLO 0x1: MPS Absent 0x2: Short 0x3: Overload 0x4: Power Denied 0x5: Thermal Shutdown 0x7: UVLO Else <STS2> shows Detection and Classification result: BIT7-4: Classification result 0x0-0x8: PD class numbers 0x9-0xB: Reserved 0xC: PD treated as Class 0 0xD: RSVD 0xE: Class Mismatch 0xF: Class over Current BIT3-0: Detection Result 0x0: Unknown 0x1: Short Circuit 0x2: High Cap 0x3: Rlow 0x4: Valid PD 0x5: Rhigh 0x6: Open Circuit 0x7: FET Failure 0x8-0xF: Reserved
STS3	Classification result of the PD
STS4	RSVD
STS5	RSVD
STS6	RSVD
STS7	RSVD
STS8	RSVD

Note1: The field STS2 will indicate the fault types instead of detection and classification result if port status (STS1) is fault status.

5.4 Port Group Status Get CMD(0x43)

(☑App ☐Loader)

Brief Description

Get one group ports status of PoE subsystem.

This command could get one group of ports status at one time. All ports in the system are split into serval port groups. Each group contains 4 ports. For example, there are 2 groups in a 8 ports POE system: Group 0: port 0, 1, 2, and 3. Group 1: port 4, 5, 6, and 7. The information includes power state, fault status, detection result, classification result and PD type.

Request Format

The request format of <Port Group Status Get CMD> is as follows.

Table 5-7 <Port Group Status Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Group	RSVD								CHKSM

Field	Description
Group	0x0-0xB: Valid group index(0-11). 0xC-0xff: Invalid group index.

Response Format

The response format of <Port Group Status Get CMD> is as follows.

Table 5-8 <Port Group Status Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Group	STS1	STS2	STS3	STS4	STS5	STS6	STS7	STS8	CHKSM

Field	Description
Group	0x0-0xB: Valid group index(0-11). 0xC-0xff : Invalid group index.
STS1/ STS3/ STS5/ STS7	BIT7-4: Detection Result 0x0: Unknown 0x1: Short Circuit 0x2: High Cap 0x3: Rlow 0x4: Valid PD 0x5: Rhigh 0x6: Open Circuit 0x7: FET Failure 0x8-0xF: Reserved

	BIT3-0: Port power status or fault status 0x0: Disabled 0x1: Searching 0x2: Delivering Power 0x3: RSVD 0x4: Fault 0x5: RSVD 0x6: Requesting Power
STS2/ STS4/ STS6/ STS8	BIT7-4: Error Types: 0x0: OVLO 0x1: MPS Absent 0x2: Short 0x3: Overload 0x4: Power Denied 0x5: Thermal Shutdown 0x7: UVLO BIT3-0: Classification result 0x0-0x8: PD class numbers 0x9-0xB: Reserved 0xC: PD treated as Class 0 0xD: RSVD 0xE: Class Mismatch 0xF: Class over Current

5.5 Port Measurement Get CMD(0x44)

(☑App ☐Loader)

Brief Description

Get the specified port measurements.

The measurements includes port voltage, current, temperature, and actual consumption power.

Request Format

The request format of <Port Measurement Get CMD> is as follows.

Table 5-9 <Port Measurement Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	RSVD								CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Response Format

The response format of <Port Measurement Get CMD> is as follows.

Table 5-10 <Port Measurement Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	Voltage		Current		Temperature		Power		CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
Voltage	Port Voltage (64.45mV/LSB)
Current	Port Current (1mA/LSB)
Temperature	Port Temperature in Centigrade = (Temperature - 120)*(-1.25) + 125
Power	Port Actual Consumption Power (0.1W/LSB)

5.6 Port Mib Counter Get CMD(0x45)

(☑App ☐Loader)

Brief Description

Get port mib counters of the specified port.

The mib counters includes MPS absent Counter, Overload Counter, Short Counter, Power Denied Counter and Invalid Signature Counter.

Request Format

The request format of <Port Mib Counter Get CMD> is as follows.

Table 5-11 <Port Mib Counter Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	Reset Flag	RSVD							CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
Reset Flag	0x0: Don't reset mib counter after read 0x1: Reset mib counter after read

Response Format

The response format of <Port Mib Counter Get CMD> is as follows.

Table 5-12 <Port Mib Counter Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	STS1	STS2	STS3	STS4	STS5	RSVD			CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
STS1	MPS absent Counter
STS2	Overload Counter
STS3	Short Counter
STS4	Power Denied Counter
STS5	Invalid Signature Counter

5.7 Port Event Status Get CMD(0x46)

(☑App ☐Loader)

Brief Description

Get all ports event status of PoE subsystem.

This command can get event status of all ports. The information includes event mask configuration, system event status and all ports event status.

Request Format

The request format of <Port Event Status Get CMD> is as follows.

Table 5-13 <Port Event Status Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Clear Flag	RSVD								CHKSM

Field	Description
Clear Flag	0x0: Don't clear port event status after read 0x1: Clear port event status after read

Response Format

The response format of <Port Event Status Get CMD> is as follows.

Table 5-14 <Port Event Status Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Event Mask	Event Status	STS1 [7-0]	STS2 [15-8]	STS3 [23-16]	STS4 [31-24]	STS5 [39-32]	STS6 [47-40]	RSVD	CHKSM

Field	Description
Event Mask	Global mask for several kinds of events, before event status can be recorded and interrupt pulse can be transmitted to Host, the corresponding mask must be set; BIT0: RSVD BIT1: Disconnect events mask(0: DISABLE 1: ENABLE) BIT2: Fault events mask(0: DISABLE 1: ENABLE) BIT3-7: Reserved
Event Status	For each global event status, if this kind event status of any port happended, the corresponding bit will be set; BIT0: RSVD BIT1: Disconnect events status (0: not happened 1: happened) BIT2: Fault events status (0: not happened 1: happened) BIT3-7: Reserved
STS1 [7-0]	STS1[7-0] shows event status of port7 to port0, similarly STS1[15-8] shows event status of port15 to port 8; STS1[0] shows port0 event status, if any kind of port0 event status is recorded, STS1[0] will be set; ..... STS1[7] shows port7 event status

5.8 Global Reset Reason Get CMD(0x47)

(☑App ☐Loader)

Brief Description

Get system reset reason.

This command can get the I2C address of reset or abnormal chip .

Request Format

The request format of <Global Reset Reason Get CMD> is as follows.

Table 5-15 <Global Reset Reason Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Clear Flag	RSVD								CHKSM

Field	Description
Clear Flag	0x0: Don't clear Reset reason after read 0x1-0xFF: Clear Reset reason after read

Response Format

The response format of <Global Reset Reason Get CMD> is as follows.

Table 5-16 <Global Reset Reason Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Reset Flag	Error Addr	Reset reason	Error Addr 0 1	Error Addr 2 3	Error Addr 4 5	Error Addr 6 7	Error Addr 8 9	Error Addr 10 11	CHKSM

Field	Description
Reset Flag	If all chip I2C interfaces are ok, this byte will be set to 0x0, else bit[5-0] will be set to the first I2C address, bit[6] reflects chip reset status.
Error Addr	If all chip I2C interfaces are ok, this byte will be set to 0xff, else this byte reflects the I2C firt address error.
Reset reason	0x01 - power on reset 0x02 - nRST reset 0x03 - software reset 0x04 - other error reset
Error Addr 0 1	BIT7-4: chip0 access error flag 0xF: chip0 access normally 0x0-0xE: equivalent value of chip0 I2C address(chip0 I2C address = equivalent value * 2 + 0x20) BIT3-0: chip1 access error flag 0xF: chip1 access normally 0x0-0xE: equivalent value of chip1 I2C address(chip1 I2C address = equivalent value * 2 + 0x20) Error Addr 2 3 and others are similar to this one

5.9 Port Basic Configuration Get CMD(0x48)

(☑App ☐Loader)

Brief Description

Get basic configuration of the specified port.

The basic configuration includes enable status, function mode, detection type, classification type, disconnect type, and pair type.

Request Format

The request format of <Port Basic Configuration Get CMD> is as follows.

Table 5-17 <Port Basic Configuration Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11

CMD	SEQ	Port	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Response Format

The response format of <Port Basic Configuration Get CMD> is as follows.

Table 5-18 <Port Basic Configuration Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	Enable Status	Function Mode	Det Type	Cls Type	DISCXNT Type	Pair Type	RSVD		CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
Enable Status	Port enable status 0x0: Disabled 0x1: Enabled
Function Mode	Port function mode 0x0: Auto mode 0x1: Semi-auto mode 0x2: Manual mode
Det Type	Detection Type 0x0/2/4: do class for std PD 0x1/3/5 do class for std and legacy PD 0x6 do class for overCurrent PD
Cls Type	RSVD
Disconnect Type	disconnect type: 0x0: Disable MPS ability. 0x1: Reserved. 0x2: Enable MPS ability 0x3: Enable MPS ability(**mps function will be enabled after 700ms of pwrup**)
Pair Type	Port pair configuration 0x0: Alternative A 0x1: Alternative B

5.10 Port Extended Configuration Get CMD(0x49)

(☑App ☐Loader)

Brief Description

Get extended configuration of the specified port.

The extended configuration includes PD inrush mode, power limit mode, power threshold, priority and port map array.

Request Format

The request format of <Port Extended Configuration Get CMD> is as follows.

Table 5-19 <Port Extended Configuration Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	RSVD								CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Response Format

The response format of <Port Extended Configuration Get CMD> is as follows.

Table 5-20 <Port Extended Configuration Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	Inrush Mode	Limit Type	Max Power	Priority	ChipAddr	Chnl	RSVD		CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
Inrush Mode	Port inrush mode 0x0: IEEE 802.3af 0x1: IEEE 802.3af high inrush 0x2: IEEE 802.3at compatible 0x3: IEEE 802.3at
Limit Type	Port power limit type 0x1: Class based 0x2: User defined
Max Power	Port power max threshold(0.2W/LSB)
Priority	Port assign priority 0x0: Low 0x1: Medium 0x2: High 0x3: Critical
ChipAddr	Chip I2C address
Chnl	Local channel

5.11 Global Parameters Get CMD(0x4A)

(☑App ☐Loader)

Brief Description

Get extended system configuration.

The extended system configuration includes UVLO threshold, pre-allocated status, power up mode, disconnect behavior, detection flag, OVLO threshold and PSE chip number.

Request Format

The request format of <Global Parameters Get CMD> is as follows.

Table 5-21 <Global Parameters Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	RSVD									CHKSM

Response Format

The response format of <Global Parameters Get CMD> is as follows.

Table 5-22 <Global Parameters Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	UVLO	Pre-alloc	RSVD	RSVD	RSVD	OVLO	Chip Number	RSVD		CHKSM

Field	Description
UVLO	UVLO thresholde: 33V + UVLO * 64.45mV
Pre-alloc	System Pre-allocated enable status 0x0: Disable 0x1: Enable
OVLO	OVLO thresholde: 57V + OVLO * 64.45mV
Chip Number	Number of PSE chips detected

5.12 Global PM Configuration Get CMD(0x4B)

(☑App ☐Loader)

Brief Description

Get system power management mode and power bank configuration of PoE subsystem.

Request Format

The request format of <Global PM Configuration Get CMD> is as follows.

Table 5-23 <Global PM Configuration Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	Bank ID	RSVD									CHKSM

Field	Description
Bank ID	0x00-0x07: Valid bank ID 0x08-0xff: Request failed

Response Format

The response format of <Global PM Configuration Get CMD> is as follows.

Table 5-24 <Global PM Configuration Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	Bank ID	PM Mode	Bank ID Total Power		Bank ID Reserved Power		Bank ID +1 Total Power		Bank ID +1 Reserved Power		CHKSM

Field	Description
Bank ID	0x00-0x07: Valid bank ID 0x08-0xff: Request failed
PM Mode	Power Management mode 0x0: None 0x1: Static mode with priority 0x2: Dynamic mode 0x3: Static mode without priority 0x4: Dynamic mode without priority
Bank ID Total Power	Total power of Bank ID (0.1W/LSB)
Bank ID Reserved Power	Reserved power of Bank ID (0.1W/LSB)

5.13 Global Device Address Get CMD(0x4C)

(☑App ☐Loader)

Brief Description

Get I2C address of PSE chips identified by PoE controller.

Request Format

The request format of <Global Device Address Get CMD> is as follows.

Table 5-25 <Global Device Address Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Offset	RSVD								CHKSM

Field	Description
Offset	0x0-0xB: Offset in valid device address list generated by PoE controller

Response Format

The response format of <Global Device Address Get CMD> is as follows.

Table 5-26 <Global Device Address Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Offset	Offset +0	Offset +1	Offset +2	Offset +3	Offset +4	Offset +5	RSVD		CHKSM

Field	Description
Offset	0x0-0xB: Offset in valid device address list generated by PoE controller
Offset+0	I2C address with an offset of Offset+0, similarly Offset+5 shows I2C address with an offset of Offset+5. If there is no device present in the specified offset+X, the device address will be filled with 0xFF.

5.14 Port Function Mode Get CMD(0x4D)

(☑App ☐Loader)

Brief Description

Get PSE port function mode.

The PSE function mode could be: **semi-auto, auto and manual mode**.

Semi-auto mode means the specific port will do detection, classification automatically, but finally host CPU will inform the PoE controller whether the PD can be powered on or return to IDLE according to the calculation.

Auto mode means the specific port will do detection, classification automatically, and the PoE controller can decide whether to power on this port or return to IDLE according to predetermined rules.

Manual mode means that the port needs to be triggered by host CPU step by step to do detection, classification and power up.

Request Format

The request format of <Port Function Mode Get CMD> is as follows.

Table 5-27 <Port Function Mode Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	RSVD	Port	RSVD	Port	RSVD	Port	RSVD	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.

Response Format

The response format of <Port Function Mode Set CMD> is as follows.

Table 5-28 <Port Function Mode Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	Port	VAL	Port	VAL	Port	VAL	Port	VAL	RSVD	CHKSM

Field	Description
Port	0x00-0x2f: Valid logical port index(0-47). 0x30-0xff: Invalid logical port index.
VAL	0x0: Auto mode 0x1: Semi-auto mode 0x2: Manual mode

5.15 System Chip Type Information Get CMD(0x50)

(☑App ☐Loader)

Brief Description

Get all the PSE chip type informations of PoE subsystem.

Request Format

The request format of <System Chip Type Information Get CMD> is as follows.

Table 5-29 <System Chip Type Information Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	RSVD									CHKSM

Response Format

The response format of <System Chip Type Information Get CMD> is as follows.

Table 5-30 <System Chip Type Information Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	STS1	STS2	STS3	STS4	STS5	STS6	RSVD			CHKSM

Field	Description
STS1	BIT7-4: PSE type of chip0 0x1: 8 channel bt chip 0x2: 8 channel at chip 0xE: Information get failure 0xF: Reserved BIT3-0: PSE type of chip1 0x1: 8 channel bt chip 0x2: 8 channel at chip 0xE: Information get failure 0xF: Reserved
STS2-STS6	Just like STS1, BIT7-4 of STS2 show PSE type of chip2 and BIT3-0 of STS2 show PSE type of chip3. The format is the same for STS1-STS6. This command can display PSE chip type informations for up to 12 chips.

6 Miscellaneous Commands

6.1 Jump To Loader CMD(CMD-SUB ID=0xC0-00)

(☑App ☐Loader)

Brief Description

Jump to Loader area from App area.

For firmware upgrades, this command will make pointers jump to Loader area from App area. Firmware information on flash memory will be eraserd simultaneously. The information includes App image length and checksum.

After this command is responded, it should wait for a certain period of time (2s) before sending the next command.

Request Format

The request format of <Jump To Loader CMD> is as follows.

Table 6-1 <Jump To Loader CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x00).

Response Format

The response format of <Jump To Loader CMD> is as follows.

Table 6-2 <Jump To Loader CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.2 Configuration Information Save CMD(0xC0-01)

(☑App ☐Loader)

Brief Description

Save configuration information to flash.

This command will save configuration information to flash. The information includes system and per-port parameters. The saved configuration may affect next startup items.

Request Format

The request format of <Configuration Information Save CMD> is as follows.

Table 6-3 <Configuration Information Save CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x01).

Response Format

The response format of <Configuration Information Save CMD> is as follows.

Table 6-4 <Configuration Information Save CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.3 Configuration Information Clear CMD(0xC0-02)

(☑App ☐Loader)

Brief Description

Clear configuration information from flash.

Request Format

The request format of <Configuration Information Clear CMD> is as follows.

Table 6-5 <Configuration Information Clear CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x02).

Response Format

The response format of <Configuration Information Clear CMD> is as follows.

Table 6-6 <Configuration Information Clear CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.4 Configuration Version Save CMD(0xC0-03)

(☑App ☐Loader)

Brief Description

Save configuration version information to ram and flash.

This command will save configuration information to ram and flash. The information includes date and version of configuration.

Request Format

The request format of <Configuration Version Save CMD> is as follows.

Table 6-7 <Configuration Version Save CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	Year	Month	Day	High Version	Low Version	RSVD				CHKSM

Field	Description
SUB	Sub command(0x03).
Year	The year of configuration
Month	The month of configuration
Day	The day of configuration
High Version	The high version of configuration
Low Version	The low version of configuration

Response Format

The response format of <Configuration Version Save CMD> is as follows.

Table 6-8 <Configuration Version Save CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.5 Configuration Version Get CMD(0xC0-04)

(☑App ☐Loader)

Brief Description

Get configuration version information.

The information includes date and version of configuration.

Request Format

The request format of <Configuration Version Get CMD> is as follows.

Table 6-9 <Configuration Version Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x04).

Response Format

The response format of <Configuration Version Get CMD> is as follows.

Table 6-10 <Configuration Version Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	Year	Month	Day	High Version	Low Version	RSVD				CHKSM

Field	Description
SUB	Sub command(0x04).
Year	The year of configuration
Month	The month of configuration
Day	The day of configuration
High Version	The high version of configuration
Low Version	The low version of configuration

6.6 Configuration Information Reset CMD(0xC0-05)

(☑App ☐Loader)

Brief Description

Reset configuration information to default settings.

Request Format

The request format of <Configuration Information Reset CMD> is as follows.

Table 6-11 <Configuration Information Reset CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x05).

Response Format

The response format of <Configuration Information Reset CMD> is as follows.

Table 6-12 <Configuration Information Reset CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.7 Configuration Information Initial CMD(0xC0-06)

(☑App ☐Loader)

Brief Description

Check effectiveness of configuration information, determine whether configuration information reset is required.

Request Format

The request format of <Configuration Information Initial CMD> is as follows.

Table 6-13 <Configuration Information Initial CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x06).

Response Format

The response format of <Configuration Information Initial CMD> is as follows.

Table 6-14 <Configuration Information Initial CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.8 App Download CMD(CMD-SUB ID=0xC0-80 ~ 83)

(☐App ☑Loader)

Brief Description

The Application Image can be directly downloaded to the PoE Controller MCU from the host CPU. This command is supported only when the PoE Controller is running in bootloader.

Request Format

The request format of <App Download CMD> is as follows.

Table 6-15 <App Download CMD> Request

0	1	2	3	4	5	6	7	8	9	...	35
CMD	SUB	Image Offset		Data N							Data31

Field	Description
SUB	Sub command(0x80) 0 ~ 64K image block Sub command(0x81) 64K ~ 128K image block Sub command(0x82) 128K ~ 192K image block Sub command(0x83) 192K ~ 256K image block
Image Offset	0x0000-0xFFFF(Up to 64KB), show the offset of this frame in the application image.
Data	Image data(4 ~ 32bytes/frame, 4-Byte aligned)

Note:

The **last CMD** only sends the **remaining bytes** of the **firmware**, and it is **forbidden** to **fill the fixed length**

Response Format

The response format of <App Download CMD> is as follows.

Table 6-16 <App Download CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	Image Offset									CHKSM

Field	Description
SUB	Sub command(0x80) 0 ~ 64K image block Sub command(0x81) 64K ~ 128K image block Sub command(0x82) 128K ~ 192K image block Sub command(0x83) 192K ~ 256K image block
Image Offset	0x0000-0xFFFF(Up to 64KB), show the offset of this frame in the application image.

6.9 Jump To App CMD(CMD-SUB ID=0xC0-40)

(☐App ☑Loader)

Brief Description

Jump to App area from Loader area.

This command is used to execute CheckSum routine after app image downloading. If the result of check is passed. PoE controller will automatically jump to app.

This commond will be responded within one second. Before the response, no command should be sent.

Request Format

The request format of <Jump To App CMD> is as follows.

Table 6-17 <Jump To App CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	RSVD									CHKSM

Field	Description
SUB	Sub command(0x40).

Response Format

The response format of <Jump To App CMD> is as follows.

Table 6-18 <Jump To App CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SUB	STS	RSVD								CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

6.10 Firmware Download CMD(CMD ID=0xCA)

(☐App ☑Loader)

Brief Description

The Firmware Image can be directly downloaded to the external SPI Flash. This command is supported only when the PoE Controller is running in bootloader.

Request Format

The request format of <Firmware download CMD> is as follows.

Table 6-19 <Firmware Download CMD> Request

0	1	2	3	4	5	6	7	8	9	···	35
CMD	Seq	Image Offset		Data N							Data31

Field	Description
Image Offset	0x0000-0xFFFF(Up to 64KB), show the offset of this frame in the application image.
Data	Image data(12 ~ 32bytes/frame, 4-Byte aligned)

Response Format

The response format of < Firmware download CMD> is as follows.

Table 6-20 <Firmware download CMD> Response

0	1	2	3
CMD	Seq	Image Offset	

Field	Description
Image Offset	0x0000-0xFFFF(Up to 64KB), show the offset of this frame in the application image.

7 Debug Commands

7.1 Chip Register Set CMD(CMD ID=0xF0)

(☑App ☐Loader)

Brief Description

Set a register value of a PoE chip.

Request Format

The request format of <Chip Register Set CMD> is as follows.

Table 7-1 <Chip Register Set CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	ChipAddr	Register Address				Register Value				CHKSM

Field	Description
ChipAddr	0x20 – 0x37: Valid chip I2C address.
Register Address	32bits register address.
Register Value	32bits register value.

Response Format

The response format of <Chip Register Set CMD> is as follows.

Table 7-2 <Chip Register Set CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	ChipAddr	Register Address				STS	RSVD			CHKSM

Field	Description
STS	0x0: Request success 0x1: Request failed

7.2 Chip Register Get CMD(0xF1)

(☑App ☐Loader)

Brief Description

Get a register value of a PoE chip.

Request Format

The request format of <Chip Register Get CMD> is as follows.

Table 7-3 <Chip Register Get CMD> Request

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	ChipAddr	Register Address				RSVD				CHKSM

Field	Description
ChipAddr	0x20 – 0x37: Valid chip I2C address.
Register Address	32bits register address.

Response Format

The response format of <Chip Register Get CMD> is as follows.

Table 7-4 <Chip Register Get CMD> Response

0	1	2	3	4	5	6	7	8	9	10	11
CMD	SEQ	ChipAddr	Register Address				Register Value				CHKSM

Field	Description
Register Value	32bits register value.