PD69200
Serial Communication Protocol
User Guide

Revision 1.11
Catalog Number: PD69200_UG_COMM_PROT

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1 General

This document describes the communication protocol developed by Microsemi™ for its Power over Ethernet (PoE) integrated solution, serving modules and PoE devices. This protocol facilitates serial communications between a Host CPU (meaning a PoE-enabled, Layer 2 Ethernet switch or power source equipment/PSE) and the PoE controller. By using the communication protocol, the programmer can write control commands to power ports, read their status and manage PoE parameters. The protocol supports systems having up to 48 logical ports (2-Pair and 4-Pair).

This document describes PD69200 only. Almost all commands are backwards compatible.
For backwards compatibility check, please refer to “Backwards compatibility table” in the appendix section 8.3.

Possible PoE devices:

- **IEEE802.3AF/AT/PoH standards**: PD6920x

2 Basic Communication Information

The communication protocol is a bi-directional Master/Slave protocol type. The Master is the Ethernet PSE Host CPU and the Slave is the PoE unit controller (see Figure 1). Figure 2 illustrates a simplified representation of the protocol. The Host CPU can utilize a TTL-leveled asynchronous serial communication (UART) or I^2C protocol. The PoE controller communicates with PoE devices via an SPI bus. The slave will reply with 15-byte message to any 15-byte transaction from the host or when it is out of reset. In all other cases the slave will not generate communication messages.

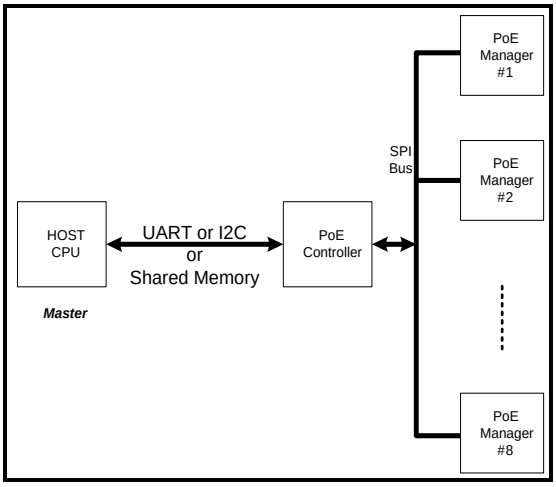


Figure 1: Basic Communication Diagram

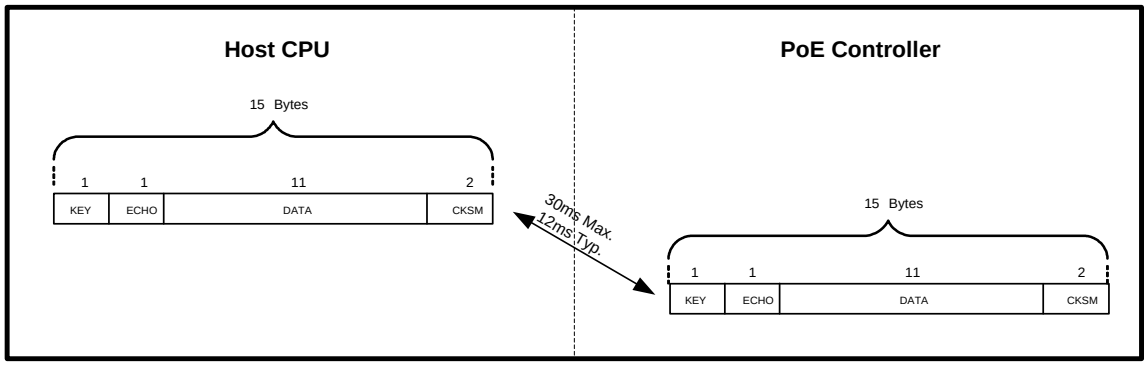


Figure 2: Protocol Representation

Communication parameters are transferred in Big-endian format (MSB is transmitted first).
Table 1 lists the communication options.

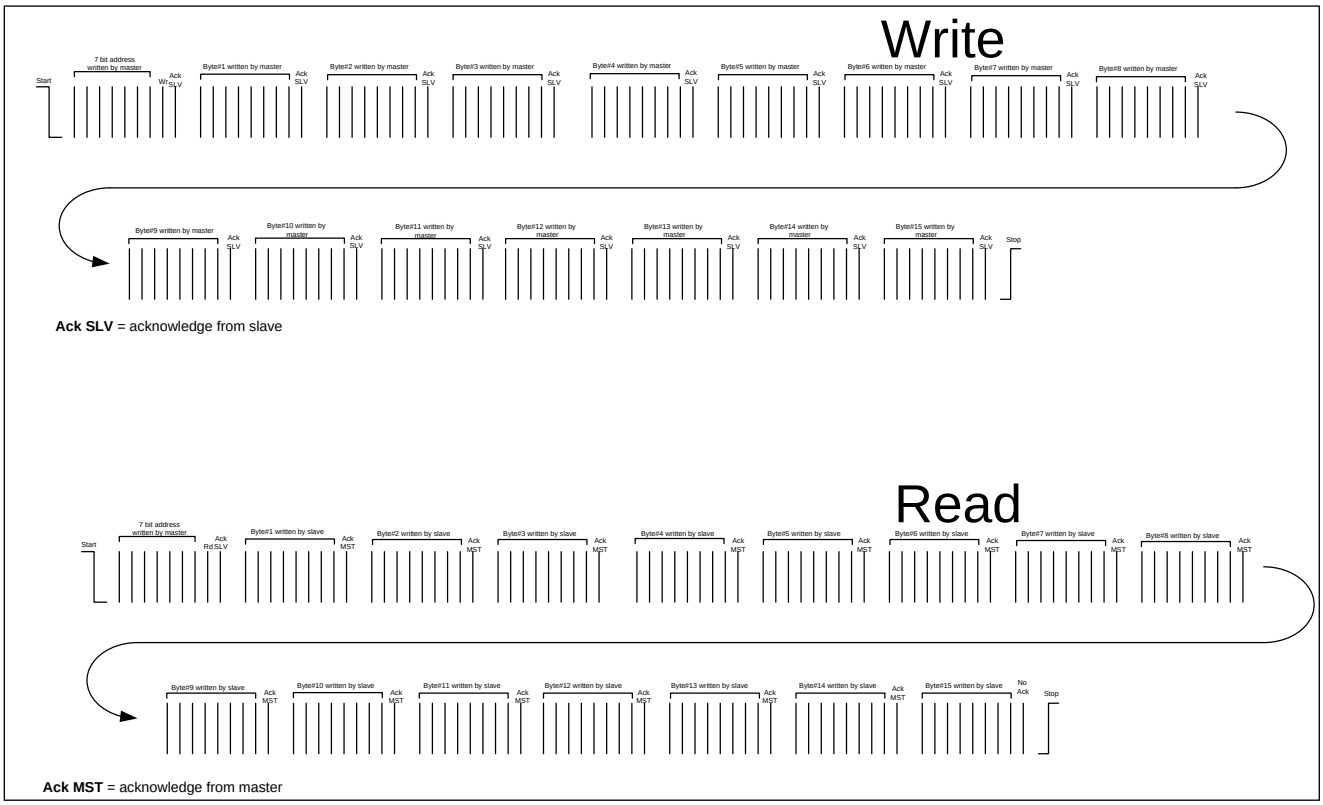
Table 1: Communication Options

RS-232/UART	I^2C	Shared Memory
Bits per second: 19,200 bps	Speed: 400 kHz (max)	Special memory based physical layer, which can share full message structure between the Host and the PoE controller. Used in PD69200M
Data bits: 8	7-bit address	
Parity: None	I^2C Address range is defined in AN-211	
Stop bits: 1		
Flow control: None		
	Clock Stretching : Yes	

Note:

1. When I^2C is being used, clock stretching must be supported by the Host CPU.
2. Shared memory physical layer requires special host device.
   Refer to PD69200M documentation explaining the architecture and the physical layer message transfer.
3. All protocol commands are supported by shared memory architecture except **"Save System Settings"** (section 4.1.3), **"Restore Factory Default"** (section 4.1.2) and **"Software Download"** (section 5).
   For more details refer to PD69200M documentation.

Time Criteria	Description	Value
Read back time	Minimum waiting time since last 15-bytes transmission and before reading back the telemetry/report from the PoE controller	30ms Exceptions: Save = 50mSec Restore = 100mSec
Read back time using message ready I/O.	When using I^2C it is recommended to use the "Message_Ready" I/O for faster response time. The Host should poll this I/O, before reading back the telemetry, instead of waiting 30mSec. To activate message ready I/O see mask 0x1E at section 8.2.	11ms to 30ms Average = 12mSec
Time between commands	Minimum waiting time since last telemetry and before sending a new command to the PoE controller	30ms
I2C buffer clear timeout	Time limit for clearing the PoE controller's internal I^2C receive buffer, if it doesn't contain 15 bytes.	500ms
Shared memory messages	1. Message transport timing between command and reply. 2. Time between commands.	11ms to 30ms Average = 12mSec



Note: The 15 byte message in I^2C can be sent as (15 x single) data bytes transactions.

3 Messages Structure

The following sections detail the message structure. The message length is constant 15-Byte using 1-Byte key header and 2 Bytes of message checksum at the end.

3.1 Definitions

The message key types are:

- **Command and Program**: Transmitted by the Host to configure the PoE unit. No data is required in response, except a success/failure report.
- **Report**: Transmitted back from the PoE controller in response to commands and programs.
- **Request**: Transmitted by the Host as a request for information from the PoE unit. Telemetry is sent back in response. In case of message error, detected by the PoE controller, a failure report will be sent back instead of telemetry.
- **Telemetry**: Transmitted back from the controller in response to Host requests or when PoE unit is out of reset.

Note:

1. **Numeric Base**: Unless otherwise specified, all numeric parameters are in HEX-base format. If a decimal value is expected (for example power level), the user should convert bases before or after sending/retrieving data.

Table 2 shows the packet structure for messages **sent** from the Host CPU to the PoE controller.

Table 2: Example of packet structure of messages sent from the Host

[0] KEY	[1] ECHO	[2] Subject	[3] Subject1	[4] Subject2	[5] DATA	[6] DATA	[7] DATA
Command/ Program/ Request							
[8] DATA	**[9] DATA**	**[10] DATA**	**[11] DATA**	**[12] DATA**	**[13] CSumH**	**[14] CSumL**	

Table 3 shows the packet structure for messages **received** by the Host CPU from the PoE controller.

Table 3: Example of packet structure of messages received by the Host

[0] KEY	[1] ECHO	[2] Subject	[3] Subject1	[4] Subject2	[5] DATA	[6] DATA	[7] DATA
Telemetry/ Report							
[8] DATA	**[9] DATA**	**[10] DATA**	**[11] DATA**	**[12] DATA**	**[13] CSumH**	**[14] CSumL**	

3.1.1 Byte 1: KEY

The KEY field defines the type of message sent or received. When the Host CPU transmits a message, the PoE controller acknowledges it by sending a response or telemetry, according to the sent KEY type or detected error.

KEY (hex)	Description	Traffic Flow
0x00	Command	Host CPU → PoE controller
0x01	Program	Host CPU → PoE controller
0x02	Request	Host CPU → PoE controller
0x03	Telemetry	PoE controller → Host CPU
0x52	Report	PoE controller → Host CPU

Note: Upon any PoE out of reset, the Host CPU receives a System Status *Telemetry* Packet, sent by the PoE controller. When using I^2C interface, a read transaction message must be performed by the Host.

3.1.2 Byte 2: ECHO

The ECHO field should be used by the Host to synchronize the sent and received messages. The Host inserts a number between 0x00 to 0xFE and the corresponding response echoes this number. The Host can use any sequence, as long as two consecutive messages do not use the same ECHO number.

Note: Using the same ECHO number for two consecutive messages can cause a communication loss.

3.1.3 Byte 3 to 5: SUBJECT, SUBJECT1, SUBJECT2

The SUBJECT fields are utilized to define the sent message character. The actual values are specific to each message and are detailed at each command.

Note: SUBJECT2 can sometimes serve as a DATA field.

3.1.4 Byte 6 to 13: DATA

The DATA fields hold the data transmitted / received by the Host.
The actual values are specific to each message and are detailed at each command.

3.1.5 Byte 14 to 15: CHECKSUM

The CHECKSUM data confirms message integrity and it is part of each message, regardless of the message type. The CHECKSUM is a 16-bit word, containing the arithmetic sum of the first 13 message bytes (without checksum bytes). The Host CPU has to calculate this sum before sending it as part of the message. The PoE controller performs the same calculation for the data received and compares the result with the received checksum. If the received data does not match the CHECKSUM sent, the PoE controller will send a Report message containing a CHECKSUM error indication. It is the Host responsibility to decide how to act in case of an error.

Note: In the detailed protocol description the CHECKSUM fields will not be shown.

3.2 Port Number Identification

When creating messages, it is sometimes necessary to identify one or more port numbers. This is especially true when setting various parameters (***Set*** commands) or when requesting a port status (***Get*** or ***Request*** commands):

PoE Devices	System	Port Number
Up to 12 PoE devices	Up to 48 logical Ports. Up to 96 physical Ports.	• [0x00 – 0x2F] for individual logical ports. • [0x00 – 0x5F] for physical matrix ports. • [0x80] for all ports

4 Protocol messages description

The various protocol messages are described below:

4.1 System messages

4.1.1 Reset Command

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x55	0x00	0x55	0x00	0x55	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Reset		Reset		Reset	N	N	N	N	N

This command resets the PoE Controller. Due to this reset, the PoE devices will reset themselves as well. All ports will shut down and the PoE controller will reboot.
As part of rebooting, a System Status Telemetry message will be transmitted back to the Host within $*T_{WAKEUP}$ (refer to **Get System Status** command for more details). If communication between the PoE Controller and the Host CPU is I^2C bus, then the Host CPU must read this status telemetry. The self-telemetry message echo number is 0xFF for easy Host recognition.

Note: The PoE controller performs reset only when all 15-byte response messages were transmitted out from the communication buffer.

$*T_{WAKEUP}$ = 300msec typical depending on system architecture.

4.1.2 Restore Factory Default

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x01	##	0x2D	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Program		RestoreFact	N	N	N	N	N	N	N	N	N	N

This command restores modified values to factory default values that are part of the firmware release version. Ports will shut down after sending this command.

Note:

1. After sending this command, the host must not access the MCU controller using I^2C or UART for at least 100ms. After the 100mSec wait, the command response must be read back (when I^2C is being used).
2. A restore action will be performed automatically if after reset, corrupted information is detected.
3. This command is not supported by PD69200M.

System status telemetry <u>will not be</u> sent back by the PoE MCU, after restore operation ends.

4.1.3 Save System Settings

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x01	##	0x06	0x0F	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Program		E2	SaveConfig	N	N	N	N	N	N	N	N	N

This command saves the current user values into the non-volatile memory and these user values become the defaults after any reset.
To change the default back to the initial factory values, use the **Restore Factory Defaults** command.

Example: If the Host set the Power Limit to '400' and this value is to be a default value, then 'save' must be carried out.

Note:
1. After sending this command, the host must not access the MCU controller using I^2C or UART for at least 50ms. After the 50mSec wait, the command response must be read back (When I^2C is being used).
2. This command is not supported by PD69200M.

4.1.4 Set User Byte to Save

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x01	##	0x41	0x00 to 0xFE	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Program		UserByte	UserVal	N	N	N	N	N	N	N	N	N

This command assists in verifying that a restore factory default has occurred. The Host can set the User-Byte and then save this value as part of the new defaults, by using the **Save System Setting** command (refer to Save System Settings command, Section 4.1.3).
If the defaults where restored back to factory defaults for any reason, the User-Byte value will become 0xFF. To read the User-Byte value, refer to **Get System Status** request (Section 4.1.6).
UserVal: Use any value between 0x00 to 0xFE.

Note:
1. This command is not practical to use at PD69200M, since save operation is not supported by PD69200M.

4.1.5 Set System Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x3D	0x01 to 0xFF	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	SystemStatus	Private Label	N	N	N	N	N	N	N	N

This command assists in verifying that a reset has occurred.
Private label: The private label value is 0x00 after reset. It is recommended that any value higher than 0x00 will be used when host wants to use this field.
The Private Label value can be read by using **Get System Status** Request (Section 4.1.6).

4.1.6 Get System Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x3D	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	System Status	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	
Telemetry		CPU Status1	CPU Status2	Factory Default	GIE	Private Label	User Byte	Device Fail	Temp Disco	Temp Alarm	Interrupt Register	

This telemetry indicates the actual system status information of the PoE Controller.
This response is the only response initiated by the MCU, regardless of a request after start-up or after reset.

- **CPU status1:**
  Bit0 = '1' indicates PoE controller error.
  Bit1 = '1' indicates that firmware download is required. (Telemetry structure change 4.1.6.3)
- **CPU status2:**
  Bit0 = '1' indicates PoE controller memory error.
  Bit1 = '1' indicates error (if there are less than eight PoE devices in the system, then **Bit1=** '1').
- **Factory default:**
  Bit0 = '1' indicates that factory default parameters are currently set.
- **GIE (General Internal Error)**: When different from 0x00, it indicates a general internal error.
- **Private Label**: Saved in the RAM. Equals 0x00 after reset. Refer to **Set System Status** command (Section 4.1.5).
- **User Byte:** Saved in nonvolatile memory. Equals 0xFF, once set to factory default.
- **Device Fail:** (1)Bits 0 to 7 indicate a failed PoE device(s).
  '1' = Failed or missing PoE Device, '0' = PoE Device is OK.
- **Temperature disconnect:** Bits 0 to 7 indicate overheated PoE device(s).

This over-heating causes disconnection of all ports.

'1' = This PoE device caused disconnection due to high temperature, '0' = Temperature is OK.

- **Temperature alarm:** Bits 0 to 7 indicate over-heated PoE device(s) [0 to 7].

  If temperature exceeds a pre-defined user limit, then the relative bit changes to '1'.

  '1' = Device temperature is above alarm limit, '0' = Temperature is OK.

  To set the alarm limit, refer to **Set PoE Device Parameter** command (Section 4.2.1).

Note:

The reported telemetry can only support up to 8 PoE devices.

The device order is based on device address from lowest to highest.

(Bit 0 is corresponding to the lowest device address assuming the device SPI address was set by hardware to '0000'b).

- **Interrupt register:** latches a transition when an event occurs.
  The transition might be one or more of several port status changes, PoE device status event/s or system event/s, depending on event definition.

4.1.6.1 Interrupt Register

The structure of the Interrupt register is described below:

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Per system event: Each bit represents a system event. Bit = '1' means a system event occurred and an interrupt event is generated on the PD69200 pin.				**Per PoE device event**: Each bit represents a PoE device event. Bit = '1' means a PoE device event occurred, and an interrupt event is generated on the PD69200 pin.				**Per port event**: Each bit represents a port event. If the bit is '1', then a port event occurred, and an interrupt event is generated on the PD69200 pin.							

Event	Bit	Description
Port turned on	0	When any port turns on (its status changes to 0x00, 0x01, 0x02, 0x03, 0x04, 0x2B), this bit is set to '1'.
Port turned off	1	When any port turns off (its status changes from 0x00, 0x01, 0x02, 0x03, 0x04, 0x2B), this bit is set to '1'.
Detection unsuccessful	2	When any port failed in capacitor and resistor detection, (its status changes to 0x1C or 0x25), this bit is set to '1'.
Port fault	3	When any port turns off due to over-load, short circuit or port thermal protection (its status changes to 0x1F, 0x31, 0x34, 0x35, 0x36, 0x38 or 0x39), this bit is set to '1'.
Port was in under-load	4	When any port turns off due to under-load (its status changes to 0x1E), this bit is set to '1'.
Port was in overload	5	When any port is overloaded (its status changes to 0x1F or 0x31), this bit is set to '1'.

Event	Bit	Description
Port was in PM	6	When any port turns off due to power management (its status changes to 0x20, 0x32, 0x3C, 0x3E), this bit is set to '1'.
Port spare event	7	Future use
Disconnection temperature	8	When all ports turn off due to high temperature (its status changes to 0x36 or 0x3A), this bit is set to '1'. The overheated PoE device can be identified by reading the Temperature Disconnect byte #9.
User defined temperature	9	When any PoE device exceeded the predefined user temperature limit, this bit is set to '1'. The overheated PoE device can be identified by reading the Temperature Alarm byte #10.
PoE device fault	10	When any PoE device is faulty, this bit is set to '1'. The faulty PoE device can be identified by reading the Device Fail byte #8.
PoE device spare event	11	Future use
No more connect	12	When consumed/calculated power is within the Guard Band range (Power limit – Guard Band), this bit is set to '1'. If consumed power is still in the GB range and the interrupt is cleared, this bit remains '0'.
Vmain fault	13	When Vmain is out of range, ports will be disconnected (its status changes to 0x06, 0x07, 0x2D or 0x2E), this bit is set to '1' when Vmain is out of range. This bit will return to be 1 after clear on read as long as Vmain remain out of range.
System spare event	14, 15	Future use

An interrupt mask register can be found in section 4.1.8

4.1.6.2 Recommended Interrupt Operations

When Host receives an interrupt, the following operations are recommended:

- Upon receiving the interrupt, the Host CPU should send the **Get System Status** command or **Get Port Event Cause** command immediately.
- The Host CPU reads the interrupt register.
- The Host CPU determines the next step to be performed, according to the interrupt event.
  - When Detection is unsuccessful, under load, overload or PM events occur (bit 2, 4, 5, 6), the Host CPU should send the **Get Global Port Counters**, using the relevant counter (refer to Section 4.3.28) or **Get Extended Port Status** (refer to Section 4.3.23).
  - When other interrupt events occur, the Host CPU should read all ports statuses.
  - When a PoE device event occurs the appropriate information is within the **Get System Status** command itself.
  - The Host CPU can issue a request for Vmain or power telemetries.

Notes:
1. The interrupt register bits are clear on read. If the reported situation continues to exist after the clear, the corresponding bit will be set again. For example: If Vmain continues to be out of range, Vmain Fault (bit 13), will be set to '1' again. (The bit clear operation in this case will not be noticed).

2. Based on new individual mask 0x46, the user will be able to request only single port event interrupt due to consecutive detection failure events at the same port.
For example if port was at "Detection in progress – 0x1B", moved to "Detection Fail – 0x1C or 0x25" and from this point the port detection will continue failing, only single interrupt will be generated.

4.1.6.3 Telemetry at Boot Up Error

When CPU_Status1 reports on firmware error (bit 1 = '1'), the telemetry structure changes to the following:

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x03	0xFF	Val	0x4E	0x4E	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		CPU Status1	N	N	GIE	Private Label	User Byte	N	N	N	N	N

Following are the fields description table in case of an error:

Name	GIE value	Private Label Value	User Byte value
Need Download	'N' (0x4E)	'N' (0x4E)	'N' (0x4E)
HW error	2	'N' (0x4E)	'N' (0x4E)
Sys Type error	3	Boot Sys Type	App Sys Type

HW_error is reported when Boot CPU type (Internal parameter) and Application CPU type (Internal parameter), are not matched.

Sys Type Error is reported when Boot Sys Type and Application Sys type, are not matched.

Sys Type values are:

System type	Product	Value
PD69200	Enhanced PD69208	0x40
PD69200M	Enhanced PD69208	0x45

In case of boot-up error, the system will keep sending this message every second and will only enable initiation of software download protocol as described in Section 5.2.

4.1.7 Get System Status2

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x84	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	System Status2	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	0x00	0x00	0x00	0x00	0x00	Val	Val	
Telemetry		SRS	GIE1	Reset Info	Rsrvd	Rsrvd	Rsrvd	Rsrvd	Rsrvd	Save Command Counter	0x0000	

SRS - System Reset Status:
The byte is formatted from KL15 reset causes register to be protocol backwards compatible.
Bit 0 – Always '0'
Bit 1 - LVD - Low Voltage Detect – (Not supported at this point in time)
The CPU supply drops below the LVD trip voltage and LVD reset occurs.
1 = Reset caused by LVD trip or POR.
0 = Reset not caused by LVD trip or POR.
Bit 2 – Reserved for internal use.
Bit 3 – Lockup - Unrecoverable exception.
Bit 4 – ILOP – Illegal Opcode
Reset was caused by an attempt to execute an unimplemented or illegal opcode.
1 = Reset caused by an illegal opcode.
0 = Reset not caused by an illegal opcode.
Bit 5 – COP – Computer Operation Properly (COP) Watchdog
Reset was caused by the COP watchdog timer timing out.
1 = Reset caused by COP timeout.
0 = Reset not caused by COP timeout.
Bit 6 – PIN – External Reset Pin
Reset was caused by an active-low level on the external reset pin.
1 = Reset caused from external reset pin.
0 = Reset not caused by external reset pin.

Bit 7 - POR – Power On Reset
Reset was caused by the power-on detection logic because the internal supply voltage was ramping up at the time. If supported, the low-voltage reset (LVD) status bit is also set to indicate that the reset occurred while the internal supply was below the LVD threshold.
1 = POR caused reset.
0 = Reset not caused by POR.

GIE1 - General Internal Error 1:
When different than 0x00, it indicates a general internal error.
The flags are cleared after read or power up.
The flags will retain their status after a reset that is not caused by power-up.

Bit 0 - Clock Loss IRQ occurred.
Bit 1 - UART IRQ occurred at I2C mode.
Bit 2 - Unauthorized IRQ Occurred.
Bit 3 - I2C Arbitration loss occurred.
Bit 4 - External clock recovery failed (Not supported MCU runs on Internal clock only).
Bit 5 - POE Vmain out of range flag.
Bit 6 - CPU voltage warning flag. (Not supported CPU can operate from 2v).
Bit 7 – UART error IRQ Occurred.

Reset Info
This byte indicates information about the reason for software reset.
The flags are cleared after read or power up.
The flags will retain their status after reset that is not caused by power_up.

Bit 0 – If '1', the software reset occurred due to communication reset command
Bit 1 – If '1', the software reset occurred due to clock recovery failure for more than 5 sec. (Not supported MCU runs on Internal clock only).
Bit 2 – If '1', the software reset occurred due to PoE Device failure.
Bit 3 – If '1', I^2C module was restarted.
Bit 4 – If '1', the software reset occurred due to self-reset.
Bit 5-7 – Always '0'

Save Command counter
This byte indicates the number of times the **Save** command was used. It is a one-byte cyclic counter.

4.1.8 Set Interrupt Mask

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x63	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	IRQMask	Mask Register		N	N	N	N	N	N	N

This command sets the interrupt mask which enables/disables interrupt function events.

Each **Mask register** bit defines whether an event, represented in its corresponding bit of the Interrupt register, is to be masked or unmasked. This masking affects the Interrupt pin output and does not affect the Interrupt register itself.

(0= masked, 1 = unmasked)

For more details concerning the Interrupt function, refer to the **Get System Status** command (Section 4.1.6.1).

Example: If = 1111 1111 1111 0111 b:

Then the event of bit #3 *(port fault)* is masked. If overload occurs, bit #3 of the Interrupt Register changes to '1', but the Interrupt pin voltage level remains 'high' since this event is masked.

If bit #3 of the Mask Register had been '1' (mask register = 0xFFFF), then Interrupt pin will generate indication.

4.1.9 Get Interrupt Mask

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x63	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	IRQMask	N	N	N	N	N	N	N	N	N
0x03	##	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Mask Register		N	N	N	N	N	N	N	N	N

This command retrieves the register mask value that enables each event of the interrupt function.

The **Mask Register** bits define either masked or unmasked for the Interrupt Register (0 = masked, 1 = unmasked).

For detailed bits description, refer to the **Get System Status** command, (Section 4.1.6.1).

4.1.10 Set Individual Mask

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x56	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Individual_ Mask	Mask Key Number	En/Dis	N	N	N	N	N	N	N

This command sets the individual mask bits. Each mask determines different aspects of the PoE system behavior. The masks are ordered according to Mask Key Numbers from low to high. The list can be found in Appendix 8.2.

4.1.11 Get Individual Mask

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x56	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Individual_ Mask	Mask Key Number	N	N	N	N	N	N	N	N
0x03	##	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		En/Dis	N	N	N	N	N	N	N	N	N	N

Telemetry of “Individual_Mask” value settings.
Refer to section 8.2.

4.1.12 Set System OK LED Mask Registers

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0xA1	Val		Val		0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	SystemOK Mask	Blink Register		Light Register		N	N	N	N	N

This command is relevant when the system OK pin is configured as IRQ reflection.

System OK pin will function as IRQ reflection, only if individual mask 0x28 value = 0x03 (refer to section 8.2).

If the System OK pin is connected to a LED, it can indicate the system overall status. Each one of the following register bits corresponds to the relevant Interrupt Register bits.

For more details related to the Interrupt function, refer to **Get System Status** command (Section 4.1.6.1).

The system OK pin functions are:

- If both 'n' bits in the **Blink Register** and in the Interrupt Register are '1' then the System OK LED blinks.
- If both 'n' bits in the **Light Register** and in the Interrupt register are '1' then the System OK LED illuminates continuously. The light is turned-off, once the host MCU reads the Interrupt Register.

The blink register priority is higher than the light register.

The blink rate is 0.5Hz: 1 second ON, 1 second OFF.

4.1.13 Get System OK LED Mask Registers

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xA1	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	SystemOK Mask	N	N	N	N	N	N	N	N	N
0x03	##	Val		Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Blink Register		Light Register		N	N	N	N	N	N	N

The telemetry of this request reflects the above "Set System OK LED Mask Registers" settings 4.1.12.

4.1.14 Set Power Indication LED

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x05	Val	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Power Indication	% Indication ON	% Indication OFF	Indication ON	Indication OFF	N	N	N	N	N

This command sets the percentage levels or watt levels for indicating that the power consumption is getting closer to the limit.

Percentage use %:

%IndicationOn – Any value from 10 to 100. If the system power consumption is greater than this (% * Budget), the LED indication will be on.

%IndicationOff – Any value from 10 to 100 (< %IndicationOn). If the system power consumption is below this (% * Budget), the LED indication will be off.

The difference between the %IndicationOn and the %IndicationOff will be used as hysteresis.
This indication will be assigned to the System_OK pin when individual mask 0x28 value = 2.
(Appendix 8.2)

Limitations for %:
Any value below 10 will be considered as 10% and any value greater than 100 will be considered as 100%
The command assumes that On% > Off%. Otherwise the maximum between the values will be treated as On% and the minimum will be considered as Off%.

Watts use:

IndicationOn – Any value between 0x00 to 0xFF, in watts. If the system power consumption is greater than this (PowerBudget – IndicationOn), the LED indication will be on.

IndicationOff – Any value between 0x00 to 0xFF, in watts (> IndicationOn). If the system power consumption is below this (PowerBudget – IndicationOff), the LED indication will be off.

The difference between the IndicationOn and the IndicationOff will be used as hysteresis.
This indication will be assigned to the System_OK pin when individual mask 0x28 value = 4 (Appendix 8.2).

Limitations for watts:
1. IndicationOn/Off will be used instead of %IndicationOn/Off only if both %IndicationOn & %IndicationOff are set to 0xFF.
2. If the user will set both IndicationOn, IndicationOff fields to 0x00, the new value is ignored.
3. The command assumes that On < Off. Otherwise the maximum between the values will be treated as Off and the minimum will be considered as On.

4.1.15 Get Power Indication LED

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x05	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Power Indication	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		% Indication ON	% Indication OFF	*LED Indication Status*	Indication ON	Indication OFF	N	N	N	N	N	N

Telemetry for power indication LED

%IndicationOn – Any value from 10 to 100. If the system power consumption is greater than this (% * Budget), the LED indication will be on.

%IndicationOff – Any value from 10 to 100 (< %IndicationOn). If the system power consumption is below this (% * Budget), the LED indication will be off.

LED Indication Status – The status that will be indicated at the LED output.
'0' – LED indication Off
'1' – LED indication On

IndicationOn – Any value from 0x00 to 0xFF, in watts. If the system power consumption is greater than this (PowerBudget – IndicationOn), the LED indication will be on.

IndicationOff – Any value from 0x00 to 0xFF, in watts (> IndicationOn). If the system power consumption is below this (PowerBudget – IndicationOff), the LED indication will be off.

4.1.16 Set System Masks

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x2B	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Maskz	Mask	N	N	N	N	N	N	N	N

The system masks control the following:

- Power Management disconnection method.
- Capacitor Detection enable / disable.

Mask: Only the first two bits are used (MaskBit0 and MaskBit1):

- **MaskBit0** (Ignore Higher Priority):
  - **0**: If higher priority port powers up and its power exceeds power limit, a lowest priority port will be disconnected instead.
  - **1**: If power is not available for powering up any port, any new connected port power up will be denied, regardless of its priority.

- **MaskBit1** (Legacy Detection): Bit1 handles the proprietary Microsemi Capacitor Detection method.
  - 0 = RES mode. Reduced Capacitor Detection is disabled; only Resistor Detection range will be checked.
  - 1 = RES + Legacy mode. Resistor Detection wave form is implemented and only if measured range fails, the Reduced Capacitor Detection range will be checked as well.
  - This MaskBit is the same as Individual Mask 0x01.

All other bits [7..2] are ignored.

4.1.17 Get Masks Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x2B	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Maskz	N	N	N	N	N	N	N	N	N
0x03	##	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Mask	N	N	N	N	N	N	N	N	N	N

The telemetry of this request reflects the above mask settings.

4.1.18 Get Software Version

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x1E	0x21	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Versionz	SW Version	N	N	N	N	N	N	N	N
0x03	##	Val	0x4E	Val	Val		Val	Val	Val		Val	
Telemetry		HW Version	N	Prod#	SW_Version		Param#	Build#	Internal SW#		0x0000	

This command is used to retrieve the PoE controller hardware and software versions.

- **H.W. Version**: Identifies the PCB version according to Microsemi's internal conversion table (usually 0x00 is return).
- **Prod #**: Product Number representing the product that this firmware is aimed for. 22d for PD69200 PoE Controller.
- **S.W. Version**: Identifies the software version by a decimal representation value and extracting the digits as follows: **Ma** (4,3 Digits) **Mi** (2nd Digit) **Pa** (1st Digit).

  Ma = SW_Version / 100
  Mi = (SW_Version / 10) Modulu 10
  Pa = (SW_Version) Modulu 10

- Ma: Major revision, Mi: Minor revision, Pa: Patch revision.
- **Param #**: Parameters code number. 0x00 means that the default factory parameters are as published in this document. Any other number represents other factory defaults.

  Available:
  - 00 = Resistor and Legacy.
  - 01 = Reserved. (Old Products).
  - 02 = Reserved. (Old Products).
  - 03 = Resistor detection, no Legacy.
  - 04 = Reserved. (Old Products).
  - 05 and up = customized.
- **Build Num**: Incremental number.
- **Internal SW #**: Operation number used for production line.

  Note: The Internal_SW# and the Build# together are unique.
- **Example**: SW Ver = 0410d -> Ma =04, Mi =1, Pa =0

  Software version = 04.1.0

  Full Software version is: Prod#. SW Version. Build#. Param#

  Example: 22.0410.03

4.2 PoE Device messages

4.2.1 Set PoE Device Parameters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x87	Val	0x4E	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Device Params	CSNum	N	TSH	N	N	N	N	N	N

- **CS-Num**: PoE device address number can be 0x00 to 0x0B, according to PoE devices address settings.
- **TSH** (Temperature Alarm): The upper temperature alarm limit per PoE device.

Whenever the PoE device temperature exceeds the TSH limit, an interrupt is indicated in the user defined temperature event (bit 9 of the Event register).

4.2.2 Get PoE Device Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x87	Val	0x00	0x00	0x00	0x00	0x00	0x00	0x00	0x00
Request		Global	Device Params	CSNum								
0x03	##	Val	Val		Val	Val	Val	Val	Val	Val	Val	Val
Telemetry		CSNum	PoE Device – Version		ASIC status	IC-Exp	IC-HW	IC - ports	Temperature	TSH	0x15	0x00

The Auto PoE device detection procedure is executed during the system initialization stage, when the PoE Controller is reset or powered-up. The purpose of this procedure is to assign port numbers per PoE device without any interference from the Host side. It is essential to maintain port numbering even if one or more PoE devices do not operate or do not communicate.

- **CS-Num**: PoE device number can be 0x00 to 0x0B, according to PoE devices address settings.
- **PoE Device Version –** PoE device revision received from PoE device internal register. If the device does not respond 0xFFFF will be returned. The PoE Device Version fields are for internal usage.
- **ASIC Status**: The value is determined according to the following table:

ASIC Status	Status Description
0x00	None – no PoE device
0x01	OK – expected PoE device detection
0x02	ASIC is currently refreshed
0x04	ASIC error

- **IC-Exp:** For future use, currently returns the same value of IC-HW.
- **IC-HW**: Number of ports verified by the internal communication. Whenever the PoE Controller is initialized (reset or powered-up), it communicates with all PoE devices to detect their types:
  - **0** = Invalid/non-existing PoE device
  - **4** = 4-port PoE device.
  - **8** = 8-port PoE device.
- **IC-Ports**: For future use, currently returns the same value of IC-HW.
- **Temperature**: Temperature telemetry measured by the PoE device. If PoE device doesn't exist, the response is 0xFF. Units are in Celsius.
- **TSH -** Temperature Switch High is the upper temperature limit per PoE device. Whenever the PoE device temperature exceeds the TSH limit, an interrupt is indicated in the user defined temperature event (bit9 of the Event Register).

4.2.3 Set PoE Device Register

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x04	0x53	Val		Val		Val	0x4E	0x4E	0x4E	0x4E
Command		Test	WriteRons	Register Address		Register Data		Device #	N	N	N	N

This command writes a value to a specific register inside selected PoE device chip.

Register Address – A 16-bit register address based on PoE device register map.

Register Data – The data to be set for the selected register, based on register fields.

Device # - The device number to access, starts from 0x00 up to 0x0B, depending on the amount of devices in the system.

4.2.4 Get PoE Device Register

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x04	0x52	Val		Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Test	ReadsRon	Register Address		Device #	N	N	N	N	N	N
0x03	##	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Register Data		N	N	N	N	N	N	N	N	N

This command returns a value from a specific register inside selected PoE device chip.

Register Address – A 16-bit register address based on PoE device register map.

Register Data – The data to be set for the selected register, based on register fields.

Device # - The device number to access, starts from 0x00 up to 0x0B, depending on the amount of devices in the system.

4.3 PoE Port messages

4.3.1 Set Temporary Matrix

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x43	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	TmpMatrix	CH Num	Physical Number A	Physical Number B	N	N	N	N	N	N

This command sets values in the port conversion matrix. Programming this matrix sets the internal port numbering arrangement with respect to the Host system port numbering. This matrix feature gives the designer flexibility in laying out PCB traces.

The command supports a mix of 4-Pair / 2-Pair configurations.

The command supports up to 48 logical ports (0 to 47) and up to 96 physical ports (0 to 95).

Port count starts from 0 in system and in device.

Device numbering is based on SPI address settings. (The lowest address that responds to MCU messaging is treated as the 1st device). The automatic device search is performed after any MCU Reset.

Physical port numbering should be calculated based on the number of valid PoE device addressing and the number of supported ports on each device.

In a system that is structured from devices of 8 ports (Device ports 0 to 7),

Physical port#11 = 2nd device port #3 (Device port is counted from 0, n=3).

Equation: Physical port # = ((Device - 1) x 8) + n

For example, if Ethernet 4-Pair PSE port, logical number 5 is connected to 2nd PoE device port#0 (Alt-A) and port#1 (ALT-B), then CH Num 5 should be programmed to Physical Number A: 8, Physical Number B: 9.

If Ethernet 2-Pair PSE port, logical number 5 is connected to 3rd PoE device port#0, then CH Num 5 should be programmed to Physical Number A: 16, Physical Number B: 255.

When Physical Number B = 255 (0xFF). It means that port B is undefined.

Steps for configuring a 4-pair matrix:

1. Mask 0x34 - Matrix4PairCommandEnable, must be set to 1.
2. Configure the temporary matrix using **"Set Temporary Matrix"** command.
3. Physical Number B cannot be configured if physical Number A does not contain a valid number.
4. Once all ports have been set on the temporary matrix, the **"Program Global Matrix"** command must be sent to activate the new Matrix. During the activation the new matrix is validated. Only the valid matrix will be activated. If validation fails an error message will be reported and the old matrix will be used. If validation passes, a successful message will be reported and the new matrix will be used.

5. After all those steps were done, ports must be 4-pair enable, using **"Set Enable/Disable 4-pair for channels"** command (section 4.3.19).

If physical port A and physical port B were both allocated to a logical port, but the 4-pair enabled option for the logical port is '0', only port A is used as 2-pair.

When 4-pair option is enabled for the logical port:

1. If port A is defined and port B is undefined (0xFF), the logical port will be treated as 2-Pair port.
2. If port A is configured and not found, the logical port status will return 0x37 (Unknown device, refer to section 8.1). The port will not be functional.

If the user wants to have the new matrix as a default, a **Save System Settings** command must be sent (section 4.1.3).

- **CH Num**: The logical port number, as referred to by the Host CPU and shown on the PSE's front panel. Refer to Section 3.2.
- **Physical Number A**: The 1st physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 2-pair or 4-pair.
- **Physical Number B**: The 2nd physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 4-pair only.
  This value will be checked only if individual mask 0x34 is set to '1'.

4.3.2 Get Physical Port Number from Temporary Matrix

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x43	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	TmpMatrix	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val or 0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Physical Number A	Physical Number B OR 'N'	N	N	N	N	N	N	N	N	N

Telemetry for temporary matrix data.

- **CH Num**: The logical port number, as referred to by the Host CPU and shown on the PSE's front panel. Refer to Section 3.2.
- **Physical Number A**: The 1st physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 2-pair or 4-pair.
- **Physical Number B**: The 2nd physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 4-pair only.
  The configured value will be returned if individual mask 0x34 is set to '1'.
  0x4E will be returned if individual mask 0x34 is set to '0'.

4.3.3 Program Global Matrix

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x43	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	TmpMatrix	N	N	N	N	N	N	N	N	N

This command causes temporary matrix values to be copied into the active working matrix. Upon completion of this command, and successful matrix validation, the active matrix is updated, PD69200 software is restarted and the status of PoE ports is refreshed according to the new matrix. During this flow ports will be disconnected.

4.3.4 Get Physical Port Number from Active Matrix

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x44	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	ChannelMatrix	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val or 0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Physical Number A	Physical Number B OR 'N'	N	N	N	N	N	N	N	N	N

Telemetry for active matrix data.

- **CH Num**: The logical port number, as referred to by the Host CPU and shown on the PSE's front panel. Refer to Section 3.2.
- **Physical Number A**: The 1st physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 2-pair or 4-pair.
- **Physical Number B**: The 2nd physical port number, according to the output pins of the integrated solution (e.g.: PD69208/PD69204 device), Supporting 4-pair only.

  The configured value will be returned if individual mask 0x34 is set to '1'.

  0x4E will be returned if individual mask 0x34 is set to '0'.

4.3.5 Set Enable/Disable Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x0C	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	EnDis	CH Num	Cmd	Port Type	N	N	N	N	N	N

Sets individual port Enable (Delivering power enable) or Disable (Delivering power disable).

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **Cmd**: This field is used to enable/disable the channel, and to disable/enable cap detection per channel:
  The Cmd field is divided to 2 nibbles: The 1st nibble is the Command nibble (consisting of bits 0:3); the 2nd nibble (consisting of bits 4:7) is the Mask nibble.
  Setting this field to 'N' (0x4E) will leave the channel with its current configuration.

  The Mask nibble (bits[7..4]) chooses which feature to disable or enable:
  - Setting this nibble to 0x0 will configure only the Enable/Disable feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x1 will configure only the Disable Capacitor Per Port feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x2 will configure Icut disable Per Port feature, according to the corresponding value in the Command nibble.
  - Set this nibble to 0xF will configure all features, according to the corresponding value in the command nibble.
  - All others values are reserved and should not be used by the user.

  The Command nibble (bits[3..0]) disable or enable the feature:
  - Bit0: This bit enables or disables the channel: '0' - Disable; '1' (default) – Enable.
  - Bit1: This bit disables cap support per channel: When this bit is set to '0' (default), the cap detection per the specific channel is according to individual mask 0x01. When Bit1 is set to '1' – the cap detection per the specific channel is disabled.
  - Bit2: This bit disables Icut protection per channel: When this bit is set to '0' (default), the Icut protection is active per the specific channel. When this bit is set to '1' – the Icut protection is disabled, allowing the port current to go up to Ilim.
    Notes:
    - Upon configuring this bit, the port will stop delivering power and the detection sequence will be initiated.
    - This feature is operational only if PM2 is set to Max (2).
    - ICUT cannot be disabled on AF port.
  - Bits 3 – This bit is reserved and should be set to '0'**.**
  - For Forced-on and Disable conflict, refer to the note mentioned in the **Set Force Power** command (Section 4.3.7).
  - If a port is disabled, the controller does not perform the detection function.

Example: To disable ICUT, The Mask nibble should be set to 0x2 and the command nibble bit 2 should be set to '1'. This results a Cmd value of 0x24.

Note: Any value that is not define according to the above will be ignored.

- **Port Type**

  0 – IEEE802.3AF operation;
  1 – IEEE802.3AF/AT operation;
  2 – POH operation.
  Note:
  Setting this field to a value that is greater than 2 (POH) will leave the channel with the last configured mode.
  When changing the Port Type of a delivering power port, the port will turn off and restart its operation.
  When setting the same value to this field while the port is delivering power, the port will continue its regular operation.

4.3.6 Get All Ports Enable/Disable

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0C	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	EnDis	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	0x00	Val	Val	Val	0x00	0x4E	0x4E	0x4E
Telemetry		En/Dis 0-7	En/Dis 8-15	En/Dis 16-23		En/Dis 24-31	En/Dis 32-39	En/Dis 40-47		N	N	N

Telemetry of all system ports, indicating their Enable/Disable configuration.

'0' - Disable

'1' - Enable

4.3.7 Set Force Power

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x51	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Force Power	CH Num	Cmd	N	N	N	N	N	N	N

This command forces ports to deliver power, regardless of the line detection results.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **Cmd**: 1 - Force connection; 0 (default) - Normal operation.

Note:

Take extra care when using this mode, since no PD detection is performed and power is automatically injected. Use this mode only after you have made sure that either the PoE unit is connected to a valid PD capable of receiving PoE power, or during the manufacturers testing. Disabling the port will cancel Force power.

4.3.8 Set Port Parameters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x4A	Val	Val	Val		Val	0x4E	0x4E	0x4E	0x4E
Command		Channel	PortFullinit	CH Num	Cmd	PPL		Priority#	N	N	N	N

This command can set various configuration parameters of a single port or apply the configuration to all system ports.
The command can enable/disable port operation, disable legacy capacitor support, set the power limit or set the priority.

There are three separate commands for each parameter. Refer to the **Set Enable/Disable Channels**, **Set Power Limit for Channels** and **Set Port Priority** commands, in the previous section.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **Cmd**: This field is used to enable/disable the channel, and to disable/enable cap detection per channel:
  The Cmd field is divided to 2 nibbles: The 1st nibble is the Command nibble (consisting of bits 0:3); the 2nd nibble (consisting of bits 4:7) is the Mask nibble.
  Setting this field to 'N' (0x4E) will leave the channel with its current configuration.

  The Mask nibble (bits[7..4]) chooses which feature to disable or enable:
  - Setting this nibble to 0x0 will configure only the Enable/Disable feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x1 will configure only the Disable Capacitor Per Port feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x2 will configure Icut disable Per Port feature, according to the corresponding value in the Command nibble.
  - Set this nibble to 0xF will configure all features, according to the corresponding value in the command nibble.
  - All others values are reserved and should not be used by the user.

  The Command nibble (bits[3..0]) disable or enable the feature:
  - Bit0: This bit enables or disables the channel: '0' - Disable; '1' (default) – Enable.
  - Bit1: This bit disables cap support per channel: When this bit is set to '0' (default), the cap detection per the specific channel is according to individual mask 0x01. When Bit1 is set to '1' – the cap detection per the specific channel is disabled.
  - Bit2: This bit disables Icut protection per channel: When this bit is set to '0' (default), the Icut protection is active per the specific channel. When this bit is set to '1' – the Icut protection is disabled, allowing the port current to go up to Ilim.
    Notes:
    - Upon configuring this bit, the port will stop delivering power and the detection sequence will be initiated.
    - This feature is operational only if PM2 is set to Max (2).
    - ICUT cannot be disabled on AF port.

- Bits 3 – This bit is reserved and should be set to '0'**.**
- For Forced-on and Disable conflict, refer to the note mentioned in the **Set Force Power** command (Section 4.3.7).
- If a port is disabled, the controller does not perform the detection function.

Example: To disable ICUT, The Mask nibble should be set to 0x2 and the command nibble bit 2 should be set to '1'. This results in a Cmd value of 0x24.

Note: Any value that is not define according to the above will be ignored.

- **PPL (Pre-defined Power Limit)**: This power is used for calculations before port will power up. In addition, this value will be copied to TPPL when a power management operation is configured for the PPL limit and whenever the host will configure this field during port delivering power. The values are in mW.

  Note: When setting the value to 0xFFFF, this field will be ignored, maintaining the previous settings.

To read the PPL value, refer to **Get Port Power Limit** request (Section 4.3.11).

- **Priority#**: Critical – 1; high – 2; low – 3.
  For ports with the same priority, the PoE Controller sets the sub-priority according to the logic port number. (Lower number gets higher priority).

  Note: setting other values will be ignored.

  Port priority affects:

  1. **Power-up order**: After a reset, the ports are powered up according to their priority, highest to lowest, highest priority will power up first.
  2. **Shutdown order**: When exceeding the power budget, lowest priority ports will turn off first.

To read the port priority, refer to **Get Port Priority** request (Section 4.3.18).

4.3.9 Set Power Limit for Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x0B	Val	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Supply	CH Num	PPL		N	N	N	N	N	N

This command sets the maximum power per single port. If a port exceeds its power limit, the PoE system shuts down that port.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **PPL (Pre-defined Power Limit)**: This power is used for calculations before port will power up. In addition, this value will be copied to TPPL when a power management operation is configured for the PPL limit and whenever the host will configure this field during port delivering power. The values are in mW.

  Note: When setting the value to 0xFFFF, this field will be ignored, maintaining the previous settings.

To read the PPL value, refer to **Get Port Power Limit** request, (Section 4.3.11).

4.3.10 Set Temporary Power Limit for Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xA2	Val	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Temporary Supply	CH Num	TPPL		N	N	N	N	N	N

This command sets the maximum power value per single active port. This value will be the port's new power limit only when the port is delivering power. When the port is not delivering power, its TPPL value equals 0. If a port exceeds its power limit, the PoE system shuts down the appropriate port.

- **CH Num**: The logical port number, as referred to by the Host CPU and is usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **TPPL (Temporary Port Power Limit)**: The power limit of a working port referring to a specific PD, during ongoing power delivery. If port power exceeds the TPPL level, the port may be disconnected (Depending on port power limit configuration). The values are in mW.
  In addition, the TPPL value is used for the power management function when PM1 is not configured as full dynamic. (Section 4.4.1)

When a port operates in the Layer 2 mode, this value overwrites the TPPL value determined by the Layer 2. When this port stops functioning as Layer 2, the TPPL value returns to its initial state. It is not recommended to use this command with a port operating in Layer 2.

To read the TPPL value, refer to **Get Port Power Limit** request (Section 4.3.11).

4.3.11 Get Port Power Limit

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x0B	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Supply	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		PPL		TPPL		N	N	N	N	N	N	N

Telemetry for port's pre-defined power limit and temporary power limit.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. Refer to Section 3.2 (the 'All_Ports' option is not applicable).
- **PPL (Pre-defined Power Limit)**: This power is used for calculations before the port will power up. In addition, this value will be copied to TPPL when power management operation is configured for PPL limit and whenever the host will configure this field during port delivering power. The values are in mW.

- **TPPL (Temporary Port Power Limit)**: The power limit of a working port referring to a specific PD, during ongoing power delivery. If port power exceeds the TPPL level, the port may be disconnected (Depending on port power limit configuration). The results are indicated in mW.

4.3.12 Set 4-Pair Port Parameters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xAF	Val	Val	Val		Val	Val	Val	Val	0x4E
Command		Channel	PortFullInit 4Pair	CH Num	Cmd	PPL4Pair		Priority#	Port Type	Sum_ as_TPPL	PortPM2	N

This command can set various configuration parameters of a single port or apply the configuration to all system ports.
The command can enable/disable port operation, disable legacy capacitor support, set the power limit or set the priority.

There are three separate commands for each parameter. Refer to the **Set Enable/Disable Channels**, **Set Power Limits for 4-Pair Channels** and **Set Port Priority** commands, in previous section.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **Cmd**: This field is used to enable/disable the channel, and to disable/enable cap detection per channel:
  The Cmd field is divided to 2 nibbles: The 1st nibble is the Command nibble (consisting of bits 0:3); the 2nd nibble (consisting of bits 4:7) is the Mask nibble.
  Setting this field to 'N' (0x4E) will leave the channel with its current configuration.

  The Mask nibble (bits[7..4]) chooses which feature to disable or enable:
  - Setting this nibble to 0x0 will configure only the Enable/Disable feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x1 will configure only the Disable Capacitor Per Port feature, according to the corresponding value in the Command nibble.
  - Setting this nibble to 0x2 will configure Icut disable Per Port feature, according to the corresponding value in the Command nibble.
  - Set this nibble to 0xF will configure all features, according to the corresponding value in the command nibble.
  - All others values are reserved and should not be used by the user.

  The Command nibble (bits[3..0]) disable or enable the feature:
  - Bit0: This bit enables or disables the channel: '0' - Disable; '1' (default) – Enable.
  - Bit1: This bit disables cap support per channel: When this bit is set to '0' (default), the cap detection per the specific channel is according to individual mask 0x01. When Bit1 is set to '1' – the cap detection per the specific channel is disabled.
  - Bit2: This bit disables Icut protection per channel: When this bit is set to '0' (default), the Icut protection is active per the specific channel. When this bit is set to '1' – the Icut protection is disabled, allowing the port current to go up to Ilim.
    Notes:
    - Upon configuring this bit, the port will stop delivering power and the detection sequence will be initiated.
    - This feature is operational only if PM2 is set to Max (2).
    - ICUT cannot be disabled on AF port.

- Bits 3 – This bit is reserved and should be set to '0'**.**
- For Forced-on and Disable conflict, refer to the note mentioned in the **Set Force Power** command (Section 4.3.7)
- If a port is disabled, the controller does not perform the detection function.

Example: To disable ICUT, the Mask nibble should be set to 0x2 and the command nibble bit 2 should be set to '1'. This results in a Cmd value of 0x24.
Note: Any value that is not define according to the above will be ignored.

- **PPL4Pair (Pre-defined Power Limit for 4-Pair)**: This power is used for calculations before port will power up. In addition, this value will be copied to TPPL when a power management operation is configured for PPL limit and whenever the host will configure this field during port delivering power. Power can be set in steps of 5 mW.

  Note: When setting the value to 0xFFFF, this field will be ignored, maintaining the previous settings.

To read the PPL4Pair value, refer to **Get 4PairPort Power Limit** request (Section 4.3.16).

- **Priority#**: Critical – 1; high – 2; low – 3.
  For ports with the same priority, the PoE Controller sets the sub-priority according to the logic port number. (Lower number gets higher priority).
  Note: setting other values will be ignored.

  Port priority affects:

  3. **Power-up order**: After a reset, the ports are powered up according to their priority, highest to lowest, highest priority will power up first.
  4. **Shutdown order**: When exceeding the power budget, lowest priority ports will turn off first.

To read the port priority, refer to **Get 4-Pair Port Parameters** (Section 4.3.13) or **Get Port Priority** request (Section 4.3.18).

- **Port Type**

  0 – IEEE802.3AF operation;
  1 – IEEE802.3AF/AT operation,
  2 – POH operation.
  Note:
  Setting this field to a value that is greater than 2 (POH) will leave the channel with the last configured mode.
  When changing the Port Type of a delivering power port, the port will turn off and restart its operation.
  When setting the same value to this field while the port is delivering power, the port will continue its regular operation.

- **Sum_as_TPPL**

  0 – The port power that will be used for power management purposes is dynamic (Iport x Vmain).
  1 – The port power that will be used for power management purposes is port TPPL.
  Note: This field is operational only if PM1 was set to 0x80 (User defined mode).

- **PortPM2**
  This field sets PM2 per port according to the following table.

PortPM2 Port Power Limit, Per port definition	0 - Table set by the user (PPL) 1 - Class power Limit – (*) Port Behavior Equal AF: Class 1 power = 5w Class 2 power = 8w Class 0,3,4 power = 16.4w Port Behavior Equal AT: Class 0 to 4 power = 33w Port Behavior Equal POH: Class 0 to 4 power = 48.7w Note: 1. In 4-pair delivering port, the above power values are doubled. 2 – ICUT Max (According to port behavior) – (*) AF - 375mA AT – 644mA POH – 995mA Note: (*). In 4-pair delivering port, the above power values are doubled.

Note: This field is operational only if PM2 was set to 0x80 (User defined mode).

4.3.13 Get 4-Pair Port Parameters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xAF	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	PortFullInit 4Pair	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val		Val	Val	Val	Val	Val		0x4E	0x4E
Telemetry		PortCfg	PPL4Pair		Priority#	Port Type	Sum_ as_TPPL Report	PortPM2 Report	TPPL4Pair		N	N

This request report telemetry of various port configurations.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **PortCfg**: This field reports the port configuration that was set by the user.

- Bit0: '0' – Port Disabled; '1' – Port Enabled.
- Bit1: This bit indicates Legacy/cap support per channel:
  When this bit is set to '0', the cap detection per the specific channel is according to individual mask 0x01. When Bit1 is set to '1' – the cap detection per the specific channel is disabled.
- Bit2: This bit indicates Icut protection per channel: When this bit is set to '0', the Icut protection is active per the specific channel. When this bit is set to '1' – the Icut protection is disabled, allowing the port current to go up to Ilim.
  Notes:
- Bits 3 to 7 – Reserved, return '0'**.**

- **PPL4Pair (Pre-defined Power Limit for 4-Pair)**: This field returns the power that is used for calculations before port will power up. Power resolution is in steps of 5 mW.

- **Priority#**: Critical – 1; high – 2; low – 3.

- **Port Type**

  0 – IEEE802.3AF operation;
  1 – IEEE802.3AF/AT operation,
  2 – POH operation.

- **Sum_as_TPPL_Report**
  This field is structured from 2 nibbles:
  The 1st nibble (bits [3:0]) returns the user configuration that was set.
  The 2nd nibble (bits [7:4) returns the actual decided configuration.
  The 2nd nibble is relevant only when the port is delivering power.

  1st nibble:

  bit 0: '0' – PM algorithm configure to use the actual port consumption power dynamic (Iport x Vmain).
  '1' – PM algorithm configure to use the static port power (TPPL).
  bit 3:1 – reserved (return 0).

  2nd nibble:

  bit 4: '0' – PM algorithm is using the actual port consumption power dynamic (Iport x Vmain).
  '1' – PM algorithm is using the static port power (TPPL).
  bit 7:5 – reserved (return 0).

PortPM2Report
This field is structured from 2 nibbles:
The 1st nibble (bits [3:0]) returns the user configuration that was set.
The 2nd nibble (bits [7:4) returns the actual decided configuration.

1st nibble:

Value 0 – PortPM2 is configured to be in PPL.
Value 1 – PortPM2 is configured to be is class mode, using class power, based on the table provided in the set command.
Value 2 - PortPM2 is configured to be is maximum current mode, based on the table provided in the set command.

2nd nibble:

Value 0 – PortPM2 is according to PPL.
Value 1 – PortPM2 is according to class mode, using class power, based on the table provided in the set command.
Value 2 - PortPM2 is according to maximum current mode, based on the table provided in the set command.

TPPL4Pair (Temporary Port Power Limit for 4-Pair): The power limit of a working port referring to a specific PD, during ongoing power delivery. If port power exceeds the TPPL level, the port may be disconnected (Depending on port power limit configuration). The values are in 5mW.

4.3.14 Set Power Limits for 4-Pair Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xAD	Val	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Supply4Pair	CH Num	PPL4Pair		N	N	N	N	N	N

This command sets the maximum power per single port. If a port exceeds its power limit, the PoE system shuts down that port.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **PPL4Pair (Pre-defined Power Limit for 4-Pair)**: This power is used for calculations before port will power up. In addition, this value will be copied to TPPL when a power management operation is configured for PPL limit and whenever the host will configure this field during port delivering power. Power can be set in steps of 5 mW.

  Note: When setting the value to 0xFFFF, this field will be ignored, maintaining the previous settings.

To read the PPL4Pair value, refer to **Get 4Pair Port Power Limit** command.

4.3.15 Set Temporary Power Limits for 4-Pair Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xAE	Val	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Temporary Supply4Pair	CH Num	TPPL4Pair		N	N	N	N	N	N

This command sets the maximum power value per single active port. This value will be the port's new power limit only when the port is delivering power. When the port is not delivering power, its TPPL value equals 0. If a port exceeds its power limit, the PoE system shuts down the appropriate port.

- **CH Num**: The logical port number, as referred to by the Host CPU and is usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **TPPL4Pair (Temporary Port Power Limit for 4-Pair)**: The power limit of a working port referring to a specific PD, during ongoing power delivery. If port power exceeds the TPPL level, the port may be disconnected (Depending on port power limit configuration). The values are in 5mW. In addition, the TPPL value is used for power management function when PM1 is not configured as fully dynamic. (Section 4.4.1 and 4.3.12)

When a port operates in the Layer 2 mode, this value overwrites the TPPL4Pair value determined by the Layer 2. When this port stops functioning as Layer 2, the TPPL value returns to its initial state. It is not recommended to use this command with a port operating in Layer 2.

To read the TPPL4Pair value, refer to **Get 4Pair Port Power Limit** request (Section 4.3.16).

4.3.16 Get 4-Pair Port Power Limit

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xAD	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Supply4Pair	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		PPL4Pair		TPPL4Pair		N	N	N	N	N	N	N

Telemetry for port's pre-defined power limit and temporary power limit.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **PPL4Pair(Pre-defined Power Limit for 4-Pair)**: This power is used for calculations before the port will power up. In addition, this value will be copied to TPPL when power management operation is configured for PPL limit and whenever the host will configure this field during port delivering power. Power can be set in steps of 5 mW.

- **TPPL4Pair (Temporary Port Power Limit for 4-Pair)**: The power limit of a working port referring to a specific PD, during ongoing power delivery. If port power exceeds the TPPL level, the port may be disconnected (Depending on port power limit configuration). The values are in 5mW.

4.3.17 Set Port Priority

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x0A	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	Priority	CH Num	Priority#	N	N	N	N	N	N	N

This command sets the priority value of a port.

Port priority affects:

1. **Power-up order**: After a reset, the ports are powered up according to their priority, highest to lowest, highest priority will power up first.
2. **Shutdown order**: When exceeding the power budget, lowest priority ports will turn off first.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel.
- **Priority#**: Critical – 1; high – 2; low – 3
  For ports with the same priority, the PoE Controller sets the sub-priority according to the logic port number. (Lower number gets higher priority).

Note: Setting different values will cause error telemetry.

To read the port priority, refer to **Get Port Priority** request (Section 4.3.18).

4.3.18 Get Port Priority

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x0A	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Priority	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Priority#	N	N	N	N	N	N	N	N	N	N

Telemetry retrieving a single port priority**:**

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel.

- **Priority#**: Critical – 1; high – 2; low – 3
  For ports with the same priority, the PoE Controller sets the sub-priority according to the logic port number. (Lower number gets higher priority).

4.3.19 Set Enable/Disable 4-Pair for Channels

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0x02	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	EnDis4pair	CH Num	Cmd	N	N	N	N	N	N	N

This command enables 4-pair functionality for a single logical port.

When 4-pair functionality is enabled for a port, the port is treated as a 4-pair port, assuming that the matrix was configured to support 4-pair for this port, as well.

If 4-pair functionality is disabled for a port, it is treated as a regular port. The matrix is treated as two pair for the selected logical port and the ALTB on the matrix settings is ignored.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F, '*AllChannels*'=0x80).
- **Cmd**: 0 - Disables 4-pair functionality.
  1 - Enables 4-pair functionality.

4.3.20 Get All Ports Enable/Disable 4-Pair Mode

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x02	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	EnDis4pair	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	0x00	Val	Val	Val	0x00	0x4E	0x4E	0x4E
Telemetry		En/Dis4P 0-7	En/Dis4P 8-15	En/Dis4P 16-23		En/Dis4P 24-31	En/Dis4P 32-39	En/Dis4P 40-47		N	N	N

Telemetry for all 48 logical ports about their 4PairEnable/Disable configuration.

- Bit per port. In each Byte, the lowest port number starts from LSB;
  1 = Enable; 0 = Disable.

4.3.21 Get Single Port Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x0E	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	PortStatus	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	0x00	Val	Val	Val	0x00	0x4E	0x4E	0x4E
Telemetry		En/Dis	Port Status#	Force PowerEn	Latch	Class	N	*N*	*N*	AF/AT/POH	4PairEn	N

This telemetry indicates the port status as follows:

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **En/Dis**: This field indicates whether the channel is Enabled or Disabled, and whether the cap detection per the specific channel is enabled:
  - Bit 0: Indicates whether the port is enabled (1) or disabled (0).
  - Bit 1: Indicates whether the legacy detection per the specific channel is according to Individual mask 0x01 (Section 8.2).
    If the bit value is 0 – legacy detection operation is according to the mask value.
    If the bit value is 1 – legacy detection operation is disabled on this port.
  - Bit 2: Indicates whether the Icut protection per the specific channel is disabled (1) or enabled (0).
- **Port Status#**: Indicates the actual port status as defined in Table 4 (section 8.1)
- **ForcePowerEn:** Channel's force power configuration: 1 = enabled, 0 = disabled.
- **Latch**: (Port latch) Indicates that certain events have occurred. The latches are of the Clear-On-Read type.
  - *bit0* = 1 indicates an Underload latch condition
  - *bit1* = 1 indicates an Overload latch condition
  - *bit2* = 1 indicates a Force On current condition
  - *bit3, bit4* = indicate Underload (UDL) sticky counter
  - *bit5* =1 indicates short circuit condition
  - *Bit6, 7* = indicate detection failure sticky counter

- **Class**: The classification number that is being used according to 802.3at definitions.

Class Type	Value
Class 0	0
Class 1	1
Class 2	2
Class 3	3
Class 4	4 (AT / POH)
Class Error	5

- Note: When a port is not delivering power (Idle, Searching), the class returns to 0, as defined in the IEEE802.3at state diagram.

- **AF/AT/POH: 0** – IEEE802.3AF operation; 1 - IEEE802.3AF/AT operation; 2 – POH operation
- **4PairEn:** 1 – 4 pair operation is enabled; 0 – 4 pair operation is disabled, the port behaves like a 2-pair port.

4.3.22 Get All Ports Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x31 0x32 0x33 0x47 0x48	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	PortsStatus1 to Port Status5	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val
Telemetry For PortStatus1		Port 0 Status	Port 1 Status	Port 2 Status	Port 3 Status	Port 4 Status	Port 5 Status	Port 6 Status	Port 7 Status	Port 8 Status	Port 9 Status	Port 10 Status
Telemetry For PortStatus2		Port 11 Status	Port 12 Status	Port 13 Status	Port 14 Status	Port 15 Status	Port 16 Status	Port 17 Status	Port 18 Status	Port 19 Status	Port 20 Status	Port 21 Status
Telemetry For PortStatus3		Port 22 Status	Port 23 Status	Reserved	Reserved	Reserved	Port 24 Status	Port 25 Status	N	N	N	N
Telemetry For PortStatus4		Port 26 Status	Port 27 Status	Port 28 Status	Port 29 Status	Port 30 Status	Port 31 Status	Port 32 Status	Port 33 Status	Port 34 Status	Port 35 Status	Port 36 Status
Telemetry For PortStatus5		Port 37 Status	Port 38 Status	Port 39 Status	Port 40 Status	Port 41 Status	Port 42 Status	Port 43 Status	Port 44 Status	Port 45 Status	Port 46 Status	Port 47 Status

The above telemetries show the logical port status of ports 0 to 47. To accommodate all ports, the requests are divided into five different requests, as established by the Subject1 field. This field can

receive one of the following parameters: *PortsStatus1* through *PortsStatus5;* a different telemetry is retrieved for each parameter, as specified above. The value returned for the Port Status is described in Table 4.

4.3.23 Get Extended Port Status

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xB0	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	New Port Status	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	0x4E	0x4E
Telemetry		Defined Port Config	Actual Port Config	Port Status#	Class	UDL count	OVL count	SC count	Invalid Signature count	Power Denied count	N	N

This telemetry returns several types of port parameters for easy RFC3623 MIB implementation by the Host:

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **Defined Port Configuration*:***
  - Bit 7 – Reserved
  - Bit 6 – Icut is disabled.
  - Bit 5 – Legacy detection is Disabled
  - Bit 4 – Port enabled
  - Bit 3 – Port 4-pair enable
  - Bit 2 – Port force power enable
  - Bit 0:1 - Port standard configuration (AF/AT/PoH)
- **Actual Port Configuration**
  - Bit 7:5 – Reserved
  - Bit 4 – Layer2 function is enabled on this port.
  - Bit 3 – Port 4-pair behavior
  - Bit 2 – Port force power behavior
- Bit 0:1 – Port standard behavior (AF/AT/PoH), relevant only if the port is delivering power.**Port Status#**: Indicates the actual port status as defined in Table 4 (section 8.1).
- **Class**: The classification number that is being used according to 802.3at definitions.

Class Type	Value
Class 0	0
Class 1	1
Class 2	2
Class 3	3
Class 4	4 (AT / POH)
Class Error	5

Note: When port is not delivering power (Idle, Searching), the class returns to 0, as defined in the IEEE802.3at state diagram.

- **Port Counters:** Five counters based on IEEE802.3at. Each counter can count up to 255 events. The counters are clear on read. The Host should advance its own internal counters with the reported values.

  Counters are cleared on read also when using the: "Get* Single *Port Status" request and "Get Global Port Counters" request.

4.3.24 Get Internal Port Status (For Debug usage)

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x04	0x0E	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Test	PortStatus	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val	0x00	Val	Val	Val	Val	0x00	0x4E	0x4E	0x4E
Telemetry		En/Dis	Internal Port Status#		Latch	Class	AF/AT/POH	*N*	*N*	*N*	*N*	N

This telemetry indicates the port status as follows:

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **En/Dis**: This field indicates whether the channel is Enabled or Disabled, and whether the cap detection per the specific channel is enabled:
  - Bit 0: Indicates whether the port is enabled (1) or disabled (0).
  - Bit 1: Indicates whether the legacy detection per the specific channel is according to Individual mask 0x01 (Section 8.2).
    If the bit value is 0 – legacy detection operation is according to the mask value.
    If the bit value is 1 – legacy detection operation is disabled on this port.
  - Bit 2: Indicates whether the Icut protection per the specific channel is disabled (1) or enabled (0).
- **Internal Port Status#**: Indicates the PD69200 internal software port status for debug usage
- **Latch**: (Port latch) Indicates that certain events have occurred. The latches are of the Clear-On-Read type.
  - *bit0* = 1 indicates an Underload latch condition
  - *bit1* = 1 indicates an Overload latch condition
  - *bit2* = 1 indicates a Force On current condition
  - *bit3, bit4* = indicate Underload (UDL) sticky counter
  - *bit5* =1 indicates short circuit condition
  - *Bit6, 7* = indicate detection failure sticky counter

- **Class**: The classification number that is being used according to 802.3at definitions.

Class Type	Value
Class 0	0
Class 1	1
Class 2	2
Class 3	3
Class 4	4 (AT / POH)
Class Error	5

- Note: When port is not delivering power, the class returns to 0, as defined in the IEEE802.3at state diagram

- **AF/AT/POH: 0** – IEEE802.3AF operation; 1 - IEEE802.3AF/AT operation; 2 – POH operation

4PairEn: 1 – 4 pair operation is enabled; 0 – 4 pair operation is disabled, the port behaves like a 2-pair port.

4.3.25 Get UDL Counters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	**0x07**	**0x59, 0x5A**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**
Request		**Global**	**UDL Counter1, UDL Counter2**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**	**N**
0x03	##	**Val**	**Val**	**Val**	**Val**	**Val**	**Val**	**0x4E**	**0x4E**	**0x4E**	**0x4E**	**0x4E**
Telemetry For UDL Counter1		**Ports 0 to 3**	**Ports 4 to 7**	**Ports 8 to 11**	**Ports 12 to 15**	**Ports 16 to 19**	**Ports 20 to 23**	**N**	**N**	**N**	**N**	**N**
Telemetry For UDL Counter2		**Ports 24 to 27**	**Ports 28 to 31**	**Ports 32 to 35**	**Ports 36 to 39**	**Ports 40 to 43**	**Ports 44 to 47**	**N**	**N**	**N**	**N**	**N**

The above Request retrieves under load counters state, for logical ports 0 through 47. To accommodate all ports, the commands are divided into 2 different requests, as established by the Subject1 field. This field can receive one of the following parameters: UDLCounter1 or UDLCounter2. A different telemetry is retrieved for each parameter, as specified above.

These commands are related to the **"Get Single Port Status"** requests shown previously, via the sticky counter status, bits 3 and 4 of the port latch.

Remarks

- The user should advance its 32-bit UDL counter **only** according to changes in the sticky counter. Implementing this sticky counter reduces communication periods to one every four seconds. As for the rest of the MIB counters, the user can utilize the port status reports.
- In each byte, the lowest channel number is represented by the LSB bits; the highest channel number is represented by the MSB bits.
- The counter is 2-bit wide per port. The counter will count up to three and get stuck until one of the counter read requests will be received and performed. The read action clears the counter.

Note: For new designs it is recommended to use **"Get Extended Port Status"** request, to reduce the amount of telemetry requests and processing.

4.3.26 Get Detection Failure Counters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x85, 0x86	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	DetCnt1, DetCnt2	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry For DetCnt1		Ports 0 to 3	Ports 4 to 7	Ports 8 to 11	Ports 12 to 15	Ports 16 to 19	Ports 20 to 23	N	N	N	N	N
Telemetry For DetCnt2		Ports 24 to 27	Ports 28 to 31	Ports 32 to 35	Ports 36 to 39	Ports 40 to 43	Ports 44 to 47	N	N	N	N	N

The above Request retrieves under load counters state for logical ports 0 through 47. To accommodate all ports, the commands are divided into two different requests, as established by the Subject1 field. This field can receive one of the following parameters: DetCnt1 or DetCnt2. A different telemetry is retrieved for each parameter, as specified above.

These commands are related to the **"Get Single Port Status"** requests above, via the sticky counter status, bits 6 and 7 of the port latch.

Remarks

- The user should advance its 32-bit Invalid Signature counter **only** according to changes in the sticky counter. Implementing this sticky counter reduces communication periods to one every four seconds. As for the rest of the MIB counters, the user can utilize the port status reports.
- In each byte, the lowest channel number is represented by the LSB bits; the highest channel number is represented by the MSB bits.
- The counter is 2-bit wide per port. The counter will count up to three and get stuck until one of the counter read requests will be received and performed. The read action clears the counter.

Note: For new designs it is recommended to use **"Get Extended Port Status"** request, to reduce the amount of telemetry requests and processing.

4.3.27 Get Latches (Old Request to support backwards compatibility)

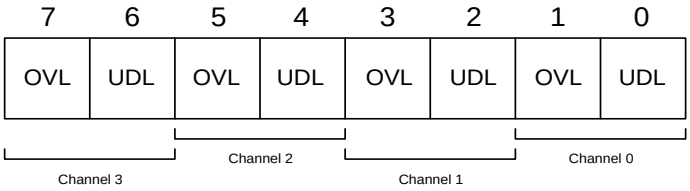
[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x3A, 0x49	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Latches, Latches2	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry For Latches		Ports 0 to 3	Ports 4 to 7	Ports 8 to 11	Ports 12 to 15	Ports 16 to 19	Ports 20 to 23	N	N	N	N	N
Telemetry For Latches2		Ports 24 to 27	Ports 28 to 31	Ports 32 to 35	Ports 36 to 39	Ports 40 to 43	Ports 44 to 47	N	N	N	N	N

The above commands retrieve status of latches for logical ports 0 through 47. To accommodate all ports, the commands are divided into four different requests, as established by the Subject1 field. This field can receive one of the following parameters: Latches or Latches 2. A different telemetry is retrieved for each parameter, as specified above.

Port Latch: Each byte covers four ports indicating that certain events occurred:

For example, Ports0-3 byte:

- *bit 0*, 2, 4, 6 = 1 indicates an under load (UDL) latch condition in the corresponding channel (0, 1, 2, 3).
- *bit 1, 3, 5, 7* = 1 indicates an overload (OVL) latch condition in the corresponding channel (0, 1, 2, 3)
- The latches are clear on read.



Note: For new designs it is recommended to use **"Get Extended Port Status"** request, to reduce the amount of telemetry requests and processing.

4.3.28 Get Global Port Counters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x04	0x00 to 0x04	0x00 to 0x04	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Port Counters	Counter kind	Ports Group Number	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val
Telemetry For Group #0		Port 0 Counter	Port 1 Counter	Port 2 Counter	Port 3 Counter	Port 4 Counter	Port 5 Counter	Port 6 Counter	Port 7 Counter	Port 8 Counter	Port 9 Counter	Port 10 Counter
Telemetry For Group #1		Port 11 Counter	Port 12 Counter	Port 13 Counter	Port 14 Counter	Port 15 Counter	Port 16 Counter	Port 17 Counter	Port 18 Counter	Port 19 Counter	Port 20 Counter	Port 21 Counter
Telemetry For Group #2		Port 22 Counter	Port 23 Counter	Port 24 Counter	Port 25 Counter	Port 26 Counter	Port 27 Counter	Port 28 Counter	Port 29 Counter	Port 30 Counter	Port 31 Counter	Port 32 Counter
Telemetry For Group #3		Port 33 Counter	Port 34 Counter	Port 35 Counter	Port 36 Counter	Port 37 Status	Port 38 Status	Port 39 Status	Port 40 Status	Port 41 Status	Port 42 Status	Port 43 Status
Telemetry For Group #4		Port 44 Status	Port 45 Status	Port 46 Status	Port 47 Status	N	N	N	N	N	N	N

This request reports the five counters based on IEEE802.3at. Each counter can count up to 255 events.

The counters are clear on read. The Host should advance its own internal counters with the reported values.

The return counter type is selected by the "Counter kind" field:

Invalid Signature Counter = 0,

Power Denied Counter = 1,

OVL Counter = 2,

UDL Counter = 3,
Short Circuit Counter = 4.

Counters are cleared on read.

4.3.29 Get All Ports Class

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x61	0x00 to 0x02	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	AllPortClass	Group	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val
Telemetry For Group #0		Group = 0	Ports 0,1 Class	Ports 2,3 Class	Ports 4,5 Class	Ports 6,7 Class	Ports 8,9 Class	Ports 10,11 Class	Ports 12,13 Class	Ports 14,15 class	N	N
Telemetry For Group #1		Group = 1	Ports 16,17 Class	Ports 18,19 Class	Ports 20,21 Class	Ports 22,23 Class	Ports 24,25 Class	Ports 26,27 Class	Ports 28,29 Class	Ports 30,31 class	N	N
Telemetry For Group #2		Group = 2	Ports 32,33 Class	Ports 34,35 Class	Ports 36,37 Class	Ports 38,39 Class	Ports 40,41 Class	Ports 42,43 Class	Ports 44,45 Class	Ports 46,47 class	N	N

The above commands retrieve the class for ports 0 through 47. To accommodate all ports, the commands are divided into three different requests, as established by the Group field. This field can receive one of the following 0 to 2 values. A different telemetry is retrieved for each parameter, as specified above. The Group selection value is reported back for easy data synchronization.

In each class data byte, the LSB is the lower port class and the MSB is the higher port class.

Bits[7..4]	Bits[3..0]
Port2	Port1

For example: if DATA[7] in the controller response for class group #0 reports 0x23, then port # 8 is class “3” and port #9 is class ”2”.

4.3.30 Get All Ports delivering power state

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xC0	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	AllPorts Delivering	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Ports [7..0]	Ports[15..8]	Ports [23..16]	Ports [31..24]	Ports [39..32]	Ports [47..40]	N	N	N	N	N

The above commands retrieve bit value of '1' for each logical port that delivers power and the same bit value '0' for each logical port that is not delivering power. Each byte is structured from MSB (High port count) to LSB (Low port count). The command supports up to 48 logical ports.

4.3.31 Get Port Event Cause

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xC1	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Event	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val		0x4E	0x4E	0x4E
Telemetry		Port Cause Event bits [7..0]	Port Cause Event bits [15..8]	Port Cause Event bits [23..16]	Port Cause Event bits [31..24]	Port Cause Event bits [39..32]	Port Cause Event bits [47..40]	Interrupt Register		System OkReg	N	N

This command retrieves the following information:

1. Port cause event bits – 48 per port event bits telemetry, indicating that an event happened on a port (Will be set only if one of the bits 0 to 7 in the interrupt register was set). An event on a port means that the port status was changed. To understand what the event type was, the host is required to read the relative port information, by reading port status. It is recommended to use "Get Extended Port Status" telemetry information to analyze the exact port event.
   The event bits are clear on read.

2. Interrupt Register – Will show the latest events. The structure of the Interrupt register is described below (It is the same structure as in 4.1.6.1):

Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	Per system event: Each bit represents a system event. Bit = '1' means a system event occurred and an interrupt event is generated on the PD69200 pin.				**Per PoE device event**: Each bit represents a PoE device event. Bit = '1' means a PoE device event occurred, and an interrupt event is generated on the PD69200 pin.				**Per port event**: Each bit represents a port event. If the bit is '1', then a port event occurred, and an interrupt event is generated on the PD69200 pin.							

Event	Bit	Description
Port turned on	0	When any port turns on (its status changes to 0x00, 0x01, 0x02, 0x03, 0x04, 0x2B), this bit is set to '1'.
Port turned off	1	When any port turns off (its status changes from 0x00, 0x01, 0x02, 0x03, 0x04, 0x2B), this bit is set to '1'.
Detection unsuccessful	2	When any port failed in capacitor and resistor detection, (its status changes to 0x1C or 0x25), this bit is set to '1'.
Port fault	3	When any port turns off due to over-load, short circuit or port thermal protection (its status changes to 0x1F, 0x31, 0x34, 0x35, 0x36, 0x38 or 0x39), this bit is set to '1'.
Port was in under-load	4	When any port turns off due to under-load (its status changes to 0x1E), this bit is set to '1'.
Port was in overload	5	When any port is overloaded (its status changes to 0x1F or 0x31), this bit is set to '1'.
Port was in PM	6	When any port turns off due to power management (its status changes to 0x20, 0x32, 0x3C, 0x3E), this bit is set to '1'.
Port spare event	7	Future use
Disconnection temperature	8	When all ports turn off due to high temperature (its status changes to 0x36 or 0x3A), this bit is set to '1'. The overheated PoE device can be identified by reading the Temperature Disconnect byte #9.
User defined temperature	9	When any PoE device exceeded the predefined user temperature limit, this bit is set to '1'. The overheated PoE device can be identified by reading the Temperature Alarm byte #10.
PoE device fault	10	When any PoE device is faulty, this bit is set to '1'. The faulty PoE device can be identified by reading the Device Fail byte #8.
PoE device spare event	11	Future use
No more connect	12	When consumed/calculated power is within the Guard Band range (Power limit – Guard Band), this bit is set to '1'. If consumed power is still in the GB range and the interrupt is cleared, this bit remains '0'.
Vmain fault	13	When Vmain is out of range, ports will be disconnected (its status changes to 0x06, 0x07, 0x2D or 0x2E), this bit is set to '1' when Vmain is out of range. This bit will return to be 1 after clear on read as long as Vmain remain out of range.
System spare event	14, 15	Future use

An interrupt mask register can be found in (section 4.1.8)

Notes:
1. The interrupt register bits are clear on read. If the reported situation continues to exist after the clear, the corresponding bit will be set again. For example: If Vmain continues to be out of range, Vmain Fault (bit 13), will be set to '1' again. (The bit clear operation in this case will not be noticed).

2. Based on new individual mask 0x46, the user will be able to request only single port event interrupt due to consecutive detection failure events at the same port.
For example if port was at "Detection in progress – 0x1B", moved to "Detection Fail – 0x1C or 0x25" and from this point the port detection will continue failing, only single interrupt will be generated.

3. SystemOkReg – New register reflecting system OK bits for host usage, instead of using the xSystem OK Pin.
   bit0 – Vmain is in range:
      1 = Vmain is in the defined PoE operational voltage range.
      0 = Vmain is outside from the defined PoE operational voltage range.
   bit1 – Over power indication in % (Based on 4.1.14 settings):
      1 = If the system power is above the % value that was defined in the "% Indication ON", set in 4.1.14.
      0 = If the system power is below the % value that was defined in the "% Indication OFF", set in 4.1.14 or if the indication is not operational.
   bit2 – Over power indication in watts (Based on 4.1.14 settings):
      1 = If the system power is above the watt value that was defined in the "Indication ON", set in 4.1.14.
      0 = If the system power is below the watt value that was defined in the "Indication OFF", set in 4.1.14 or if the indication is not operational.

4.4 Power Management Related Messages

4.4.1 Set PM Method

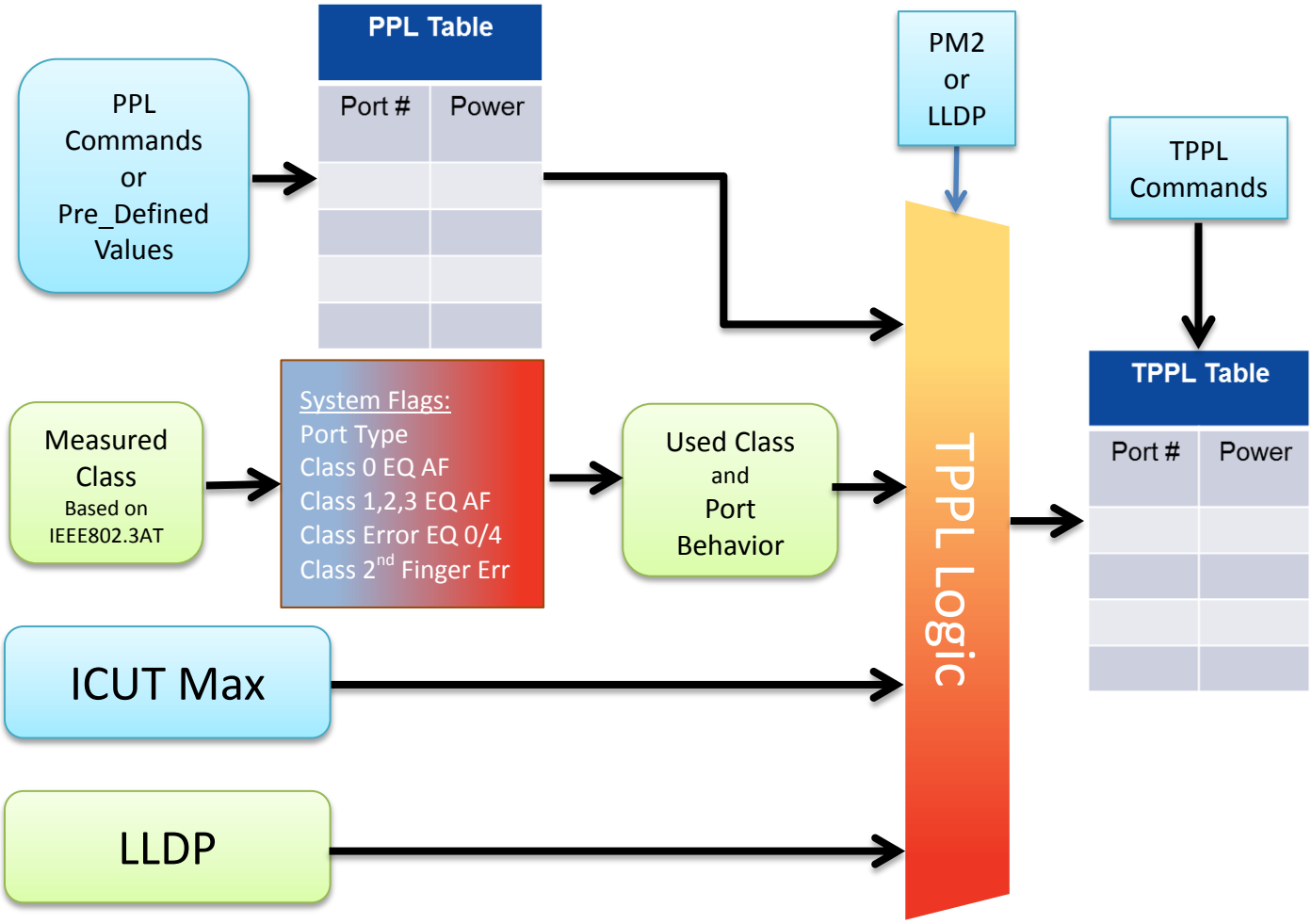
[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x0B	0x5F	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global (0x07)	Supply	Power Manage Mode	PM1	PM2	PM3	N	N	N	N	N

This command sets the Power Management mode of operation.

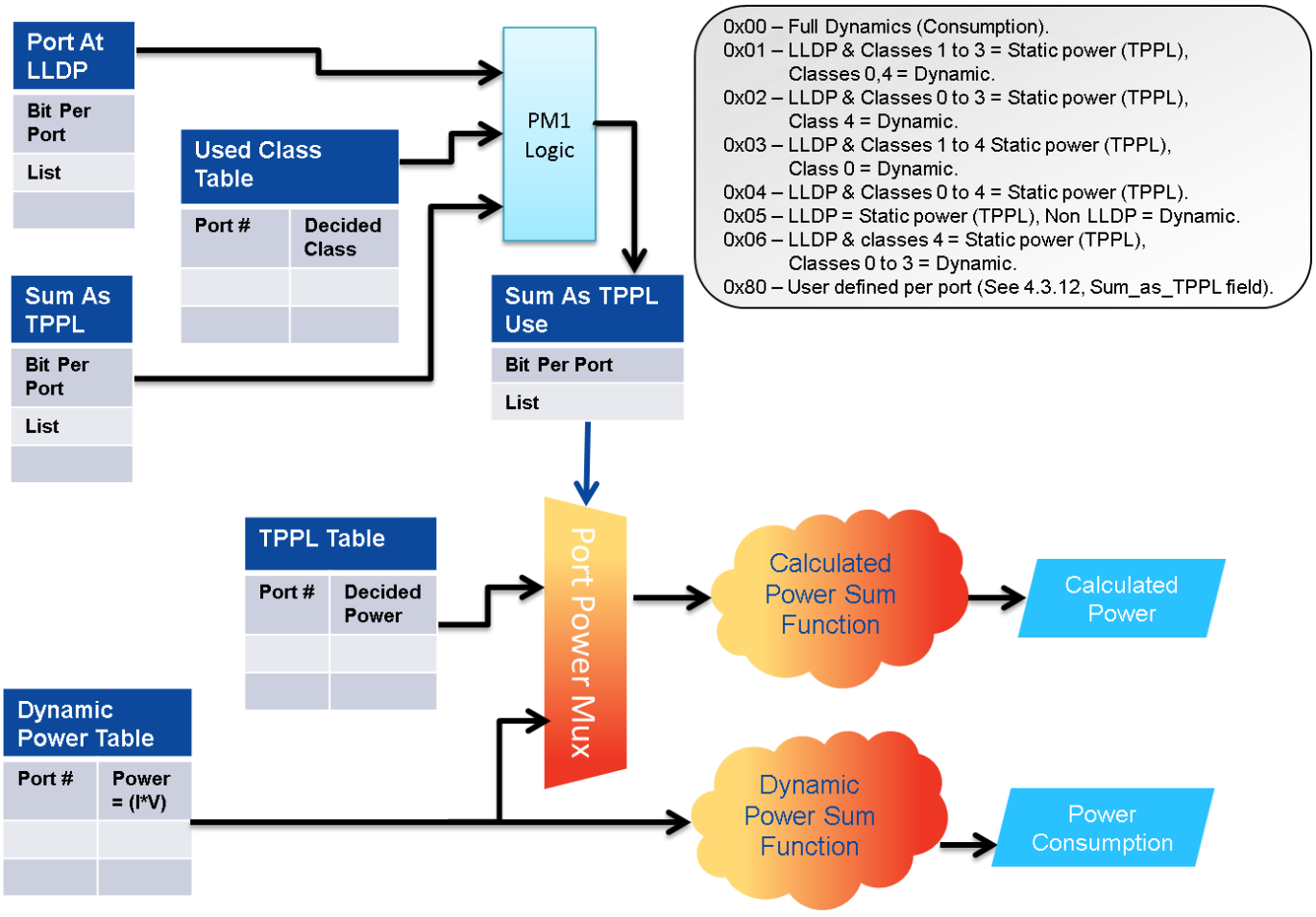
- **PM1**: Selects the total allocated power and Flexible Guard Band.
- **PM2**: Selects the power limit at the port (maximum or according to class or predefined).
- **PM3**: Selects the start condition. (Not recommended for new designs, keep 0x00).

PM Description	PM Value
PM-1 How to calculate system power	0x00 – Full Dynamics (Consumption). 0x01 – LLDP & Classes 1 to 3 = Static power (TPPL), Classes 0,4 = Dynamic. 0x02 – LLDP & Classes 0 to 3 = Static power (TPPL), Class 4 = Dynamic. 0x03 – LLDP & Classes 1 to 4 Static power (TPPL), Class 0 = Dynamic. 0x04 – LLDP & Classes 0 to 4 = Static power (TPPL). 0x05 – LLDP = Static power (TPPL), Non LLDP = Dynamic. 0x06 – LLDP & classes 4 = Static power (TPPL), Classes 0 to 3 = Dynamic. 0x80 – User defined per port (See 4.3.12, Sum_as_TPPL field).
PM-2 Port Power Limit	0 - Table set by the user (PPL) 1 - Class power Limit – Port Behavior Equal AF: Class 1 power = 5w Class 2 power = 8w Class 0,3,4 power = 16.4w Port Behavior Equal AT: Class 0 to 4 power = 33w Port Behavior Equal POH: Class 0 to 4 power = 48.7w Note: In 4-pair delivering port, the above power values are doubled. 2 – ICUT Max (According to port behavior) – AF - 375mA AT – 644mA POH – 995mA Note: In 4-pair delivering port, the above power values are doubled.

	0x80 – User defined per port (See 4.3.12, PortPM2 field)
PM-3 Start up conditions: The port will not start up in case detected class power is higher than PPL Value	0 - No Condition 1 - Condition on Classes 1 to 3 2 - Condition on Classes 0 to 3 3 - Condition on Classes 1 to 4 4 - Condition on Classes 0 to 4



Calculated power consumption function is influenced by PM1 settings, PD class and Port power definitions, based on the following logic description:



Based on the above settings, the PD69200 software decides how much power the port will reflect to the power consumption calculations.

Dynamic port power = Actual port power consumption from Main power supply = (Measured_Vmain * Measured_Iport).

Static port power = The logical port power value located in the TPPL table.

System Calculated power consumption = Sum of logical ports reflected power

System Dynamic power consumption = Sum of logical ports measured dynamic power

4.4.2 Get PM Method

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0B	0x5F	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Supply	Power Manage Mode	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		PM1	PM2	PM3	N	N	N	N	N	N	N	N

This telemetry indicates power management mode of an operation that was set.

4.4.3 Get Total Power

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0B	0x60	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Supply	Total Power	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val		Val		Val	0x4E	0x4E
Telemetry		Power Consumption		Calculated Power		Available Power		Power Limit		Power Bank	N	N

This telemetry indicates system power condition.

Power Consumption The sum of measured consumed power (Iport x Vmain), from all logical ports that are delivering power.
If the value will exceed Power Budget limit, ports will be disconnected.

Calculated Power The sum of all logical ports reflected power, that are delivering power, based on the PM1 and PM2 settings. (Combination of TPPL values and measured port power).

- If PM1 = 0, the Calculated Power = Power Consumption.
- If PM1 != 0, the Calculated Power may be != Power Consumption.
- Guard Band area results are only compared to the Calculated Power value.

If the value will exceed Power Budget limit, ports will be disconnected.

Available Power How much calculated power is still available in the system till it will reach to the power limit.
Available Power = (Power Limit – Calculated power consumption).
The units are in Watts.

Power Limit The disconnection power level of a specific power bank. If system power consumption exceeds this value and the power bank is active, ports will be disconnected due to over power. The disconnection is priority based. These values are to be set from 0 to 6000 watts depending on the capability of the power supply. If power consumption exceeds this level, lowest priority ports will be disconnected. The power units in this field are in Watts.
Example: 380 W = 380 = 0x17C

Power Bank The current active Power Bank that was read from the 1st PD69208 device.

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4.4.4 Set Power Banks

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x0B	0x57	0x00 to 0x0F	Val		Val		Val		Val
Command		Global	Supply	Power Budget	Bank	Power Limit		Max Shutdown Voltage		Min Shutdown Voltage		Guard Band

This command sets the power limits to be used by the Power Management function.
The power budget value is the maximum total power consumption permitted before port disconnection due to system over power consumption.
The power management function purpose is to protect the system main power supply from reaching power levels that will cause it to crash.
Disconnection of ports due to overpower, starts from the lowest priority port.

Bank

Specifies the power bank number to be configured (0x00 to 0x0F).

- In case of configuring a temporary power bank,
  Bank = 0x80 + bank number.
- In case of sending "Activate" command,
  Bank = 0xFF
  (other parameters in the command are ignored).
- When using a single power supply, use the **Get Power Supply Parameters** command, Section 4.4.6, to identify the bank number and then set the required power limit for the relevant bank/s.
- When utilizing more than a single power supply, verify which power supply corresponds to each bank and then utilize the Set Power Bank command to set the power limit per each bank.

Power Limit

The disconnection power level of a specific power bank. If system power consumption exceeds this value and the power bank is active, ports will be disconnected due to over power. The disconnection is priority based. These values are to be set from 0 to 6000 watts depending on the capability of the power supply. If power consumption exceeds this level, lowest priority ports will be disconnected. The power units in this field are in Watts.
Example: 380 W = 380 = 0x17C

Max Shutdown Voltage

Maximum voltage level: If Vmain is above this level, all PoE ports will shut down. The voltage units in this field are in 0.1v step.
Example: 58.5 v = 585 = 0x249

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Min Shutdown Voltage

Minimum voltage level: If Vmain is above this level, all PoE ports will shut down. The voltage units in this field are in 0.1v step.
Example: 48.2 v = 482 = 0x1E2

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Guard Band

A power area defined below the power limit, to prevent a situation of alternate port between power up and disconnect due to over power.
If the system power consumption reaches to the level of:
Port Power Limit – Guard Band
and Mask 0x00 = '1' (Ignore high Priority), additional connected ports will not power up.
The allowed value range is 0x01 to 0xFF

Value = 0x00: No GB.

Value = 0x01: Indicates that the PoE controller should utilize a dynamic Guard Band, based on PM2 settings and the classification result. (TPPL value is used in this case). The GB will be set according to TPPL value of the port that is going to be powered up (under the assumption that it can power up). After this is set the system power consumption will be checked. If it is in the GB range the port power up will be denied.

Value = 0x02 to 0xFE : Indicates the amount of power in Watts.

Value = 0xFF : Indicates no GB change. The last defined value will be used.

Selecting power banks:

- The power good pins are selecting the Power Bank. There are four power good pins, located in the PD69208. The pins state of the 1st PD69208 device is being read through internal communication by the PD69200 software. The read value is used for Active bank definition and report.
  To have a proper power bank operation, all power good lines of the PD69208 devices in the system must be connected together or set by hardware with the same configuration. The four power good lines are utilized (PG3, PG2, PG1, PG0).

Power Banks Definition – PD69200 & PD69208

Power Bank #	Power Good pins Settings at PD69208 devices				Power bank set values in PD69200			
	PG3	PG2	PG1	PG0	Power Limit	Max Shut down Voltage	Min Shut down Voltage	Guard Band
PB0	0	0	0	0				
PB1	0	0	0	1				
PB2	0	0	1	0				
PB3	0	0	1	1				
PB4	0	1	0	0				
PB5	0	1	0	1				
PB6	0	1	1	0				
PB7	0	1	1	1				
PB8	1	0	0	0				
PB9	1	0	0	1				
PB10	1	0	1	0				
PB11	1	0	1	1				
PB12	1	1	0	0				
PB13	1	1	0	1				
PB14	1	1	1	0				
PB15	1	1	1	1				

To make the above parameters as reset default, use **Save System Settings** command. (Refer to **Save System Settings** command, Section 4.1.3)
To read the power management parameters and status, refer to **Get Power Banks** command in the next section.

4.4.5 Get Power Banks

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0B	0x57	0x00 to 0x0F	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Supply	Power Budget	Bank	N	N	N	N	N	N	N
0x03	##	Val		Val		Val		Val	Val	0x4E	0x4E	0x4E
Telemetry		Power Limit		Max Shutdown Voltage		Min Shutdown Voltage		Guard Band	Source Type	N	N	N

This telemetry indicates power bank settings, to be used by power management functions.

Bank

Specifies the power bank number to be configured (0x00 to 0x0F).

- In case of configuring a temporary power bank,
  Bank = 0x80 + bank number.
- In case of sending "Activate" command,
  Bank = 0xFF
  (other parameters in the command are ignored).
- When using a single power supply, use the **Get Power Supply Parameters** command, Section 4.4.6, to identify the bank number and then set the required power limit for the relevant banks.
- When utilizing more than a single power supply, verify which power supply corresponds to each bank and then utilize the Set Power Bank command to set the power limit per each bank.

Power Limit

The disconnection power level of a specific power bank. If system power consumption exceeds this value and the power bank is active, ports will be disconnected due to over power. The disconnection is priority based. These values are to be set from 0 to 6000 watts depending on the power supplies capability. If power consumption exceeds this level, lowest priority ports will be disconnected. The power units in this field are in watts.
Example: 380 W = 380 = 0x17C

Max Shutdown Voltage

Maximum voltage level: If Vmain is above this level, all PoE ports will shut down. The voltage units in this field are in 0.1v step.
Example: 58.5 v = 585 = 0x249

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Min Shutdown Voltage

Minimum voltage level: If Vmain is above this level, all PoE ports will shut down.
The voltage units in this field are in 0.1v step.
Example: 48.2 v = 482 = 0x1E2

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Guard Band

A power area defined below the power limit, to prevent a situation of alternating port between power-up and disconnect due to over power.
If the system power consumption reaches to the level of:
Port Power Limit – Guard Band
and Mask 0x00 = '1' (Ignore high Priority), additional connected ports will not power up.
The allowed value range is 0x01 to 0xFF

Value = 0x00: No GB.

Value = 0x01: Indicates that the PoE controller should utilize a dynamic Guard Band, based on PM2 settings and the classification result. (TPPL value is used in this case). The GB will be set according to TPPL value of the port that is going to be powered up (under the assumption that it can power up). After this is set the system power consumption will be checked. If it is in the GB range the port power up will be denied.

Value = 0x02 to 0xFE : Indicates the amount of power in watts.

Value = 0xFF : Indicates no GB change. The last defined value will be used.

Source Type

Power Bank Source Type consists of two bit information per bank, used for LLDP information. Refer to the **Set Power Bank Power Source Type** command, Section 4.6.3.

1, 1 = Reserved
1, 0 = Backup source
0, 1 = Primary power source
0, 0 = Unknown

Only the two LSB bits are used; other bits are reserved for future use and should be set to '0'.

4.4.6 Get Power Supply Parameters

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0B	0x17	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Supply	Main	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val		0x4E	Val	0x4E	0x4E	0x4E
Telemetry		Power Consumption		Max Shutdown Voltage		Min Shutdown Voltage		N	Power Bank	Power Limit		N

Telemetry for main power supply parameters (within the active power budget):

Power Consumption The sum of measured consumed power, from all logical ports that are delivering power. (In watts).

Max Shutdown Voltage Maximum voltage level: If Vmain is above this level, all PoE ports will shut down. The voltage units in this field are in 0.1v step.
Example: 58.5 v = 585 = 0x249

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Min Shutdown Voltage Minimum voltage level: If Vmain is above this level, all PoE ports will shut down. The voltage units in this field are in 0.1v step.
Example: 48.2 v = 482 = 0x1E2

Note:
Max shutdown voltage value must be greater by 3v from Min shutdown voltage value, otherwise the command values are ignored and a communication error will be reported.
(**Max Shutdown Voltage > Min Shutdown Voltage + 0x1E**)

Power Bank The current active Power Bank that was read from the 1st PD69208 device.

Power Limit The disconnection power level of a specific power bank. If system power consumption exceeds this value and the power bank is active, ports will be disconnected due to over power. The disconnection is priority based. These values are to be set from 0 to 6000 watts depending on the power supplies capability. If power consumption exceeds this level, lowest priority ports will be disconnected. The power units in this field are in watts.
Example: 380 W = 380 = 0x17C

4.4.7 Get Power Supply Voltage

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x0B	0x1A	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Supply	Measurementz	N	N	N	N	N	N	N	N
0x03	##	Val		0x4E	0x4E	0x4E	Val		0x4E	0x4E	0x4E	0x4E
Telemetry		Vmain Voltage		N	N	N	Imain Current		N	N	N	N

Telemetry of the main power supply voltage.

- **Vmain Voltage**: Actual momentary measured system main voltage in 0.1v step.
- **Imain current:** Actual momentary current in milliamps.

4.4.8 Get All Ports Power

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0x4B 0x4C 0x4D 0x4F 0x50	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Ports Power1/ Power2/ Power3/ Power4/ Power5	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val
Telemetry For Ports Power1		Port 0 Power	Port 1 Power	Port 2 Power	Port 3 Power	Port 4 Power	Port 5 Power	Port 6 Power	Port 7 Power	Port 8 Power	Port 9 Power	Port 10 Power
Telemetry For Ports Power2		Port 11 Power	Port 12 Power	Port 13 Power	Port 14 Power	Port 15 Power	Port 16 Power	Port 17 Power	Port 18 Power	Port 19 Power	Port 20 Power	Port 21 Power
Telemetry For Ports Power3		Port 22 Power	Port 23 Power	Vmain Voltage		Power Consumption		Max Power Available		Port 24 Power	Port 25 Power	N
Telemetry For Ports Power4		Port 26 Power	Port 27 Power	Port 28 Power	Port 29 Power	Port 30 Power	Port 31 Power	Port 32 Power	Port 33 Power	Port 34 Power	Port 35 Power	Port 36 Power
Telemetry For Ports Power5		Port 37 Power	Port 38 Power	Port 39 Power	Port 40 Power	Port 41 Power	Port 42 Power	Port 43 Power	Port 44 Power	Port 45 Power	Port 46 Power	Port 47 Power

The above telemetries indicate power consumption of logical ports 0 through 47. The results are indicated in deciwatts (0.1w for each step). If a port power exceeds the maximum value of 25.5 W, the data byte shows the maximum value (25.5W).

Subject1 field can receive one of the following parameters: PortsPower1 through PortsPower5. For each parameter, a different telemetry is retrieved, as specified in the above description.

- **Vmain Voltage**: Actual momentary measured system main voltage in 0.1v step.
- **Power Consumption**: The sum of measured consumed power, from all logical ports that are delivering power. (The value represents watts).
- **Max Power Available:** The Power Limit according to the current active Power Bank.

4.4.9 Get All 4-Pair Ports Power

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xB0 0xB1 0xB2 0xB3 0xB4	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Ports4Pair Power1/ Power2/ Power3/ Power4/ Power5	N	N	N	N	N	N	N	N	N
0x03	##	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val	Val
Telemetry For Ports Power1		Port 0 Power	Port 1 Power	Port 2 Power	Port 3 Power	Port 4 Power	Port 5 Power	Port 6 Power	Port 7 Power	Port 8 Power	Port 9 Power	Port 10 Power
Telemetry For Ports Power2		Port 11 Power	Port 12 Power	Port 13 Power	Port 14 Power	Port 15 Power	Port 16 Power	Port 17 Power	Port 18 Power	Port 19 Power	Port 20 Power	Port 21 Power
Telemetry For Ports Power3		Port 22 Power	Port 23 Power	Vmain Voltage		Power Consumption		Max Power Available		Port 24 Power	Port 25 Power	N
Telemetry For Ports Power4		Port 26 Power	Port 27 Power	Port 28 Power	Port 29 Power	Port 30 Power	Port 31 Power	Port 32 Power	Port 33 Power	Port 34 Power	Port 35 Power	Port 36 Power
Telemetry For Ports Power5		Port 37 Power	Port 38 Power	Port 39 Power	Port 40 Power	Port 41 Power	Port 42 Power	Port 43 Power	Port 44 Power	Port 45 Power	Port 46 Power	Port 47 Power

The above telemetries indicate power consumption of logical ports 0 through 47. The results are indicated in 0.5 watt for each step. The maximum value that can be represented is 127.5w.

It is recommended to use this telemetry request instead of "Get All Ports Power", when logical port power may exceed 25.5w.

Subject1 field can receive one of the following parameters: Ports4PairPower1 through Ports4PairPower5. For each parameter, a different telemetry is retrieved, as specified in the above description.

- **Vmain Voltage**: Actual momentary measured system main voltage in 0.1v steps.
- **Power Consumption**: The sum of measured consumed power, from all logical ports that are delivering power. (The value represents watts).
- **Max Power Available:** The Power Limit according to the current active Power Bank.

4.4.10 Get All HIP Ports Power

This telemetry request description was removed. Please use the "Get All 4-Pair Ports Power " instead or look for the description in PD69100 communication protocol.

4.4.11 Get Port Measurements

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x25	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Paramz	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val		0x4E	Val		0x4E	0x4E
Telemetry		Vmain Voltage		Calculated Current		Port Power Consumption		N	Port Voltage		N	N

Telemetry for momentary port electrical parameters.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **Vmain Voltage**: Actual momentary measured system main voltage in 0.1v step.
- **Calculated Current**: Port momentary calculated current (in milliamps) = Port Power Consumption/Vmain.
- **Port Power Consumption**: Actual momentary measured power consumption of a logical port, in milliwatts.
- **Port Voltage**: Actual momentary voltage on the port, in 0.1v steps.

4.4.12 Get 4-Pair Port Measurements

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0x01	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Paramz4Pair	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val		0x4E	Val		0x4E	0x4E
Telemetry		Vmain Voltage		Calculated Current		Port Power Consumption 4Pair		N	Port Voltage		N	N

Telemetry for momentary port electrical parameters.

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. (Value range 0x00 to 0x2F).
- **Vmain Voltage**: Actual momentary measured system main voltage in 0.1v step.
- **Calculated Current**: Port momentary calculated current (in milliamps) = Port Power Consumption 4Pair/Vmain.
- **Port Power Consumption**: Actual momentary measured power consumption of a logical port, in 5 milliwatts.
- **Port Voltage**: Actual momentary voltage on the port, in 0.1v steps.

4.5 Power Derating, Related Messages

Purpose:
The purpose of this feature is to add the capability to protect or warn the user when the air temperature enters to the power supply, reached to a level that can harm the power supply or may cause the power supply to shut down due to its internal protection.
This feature is operational only if mask 0x32 is set to '1' (See section 8.2).

4.5.1 Set Derating Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0xBA	0x57	Val	Val		Val	Val	Val		0x4E
Command		Global	Derating	Power Budget	Bank	Max PS Power		Tstart	Tshutdown	Derating Delta Power		N

This command sets the Power Derating parameters. The power derating function will reduce or enlarge the system power limits, based on power supply defined parameters and system temperature.

- **Max PS Power**: The maximum power supply capability, at normal temperature, according to the power supply datasheets (value in watts).
- **Tstart**: Temperature derating start point. This parameter is part of the derating curve definition. If the temperature is above this level, the actual available budget is changed according to the derating curve settings (DegC).
- **Tshutdown**: Temperature derating end point. This parameter is part of the derating curve definitions. (DegC).
- **Derating Delta Power**: This parameter defines how much power needs to be reduced between the two temperature points (Tstart, Tshutdown). The derating curve slope is calculated as dP/(Tstart-Tshutdown) (value in watts).
- **Bank:** Specifies the power bank number to be configured from 0 to 15.

  When using a single power supply, use the **Get Power Supply Parameters** command, Section 4.4.6, to identify the bank number and then set the required power limit for the relevant bank(s).

When utilizing more than a single power supply, verify which power supply corresponds to each bank and then utilize the Set Power Bank command to set the power limit per each bank.

4.5.2 Get Derating Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xBA	0x57	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Derating	Power Budget	Bank	N	N	N	N	N	N	N
0x03	##	Val		Val	Val	Val		0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		Max PS Power		Tstart	Tshutdown	Derating Delta Power		N	N	N	N	N

This request retrieves Power Derating Banks settings:

- **Max PS Power**: The maximum power supply power capability, at normal temperature conditions, according to the power supply datasheets (value in watts).
- **T_{start}**: Temperature derating start point. This parameter is part of the derating curve definition. If the temperature is above this level, the actual available budget is changed according to the derating curve settings. (DegC)
- **$T_{shutdown}$**: Temperature derating end point. This parameter is part of the derating curve definitions. (DegC)
- **Derating Delta Power**: This parameter defines how much power needs to be reduced between the two temperature points (T_{start}, $T_{shutdown}$). The derating curve slope is calculated as dP/(Tstart-Tshutdown) (value in watts).

4.5.3 Set Derating User Temperature

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0xBA	0x00	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global	Derating	Derating User Temp	Temperature		N	N	N	N	N	N

This command enables the user to configure the derating temperature.

Temperature: Write the temperature in DeciCelsius (0.1 lsb), or write 0x7FFF to disable user temperature and enable reading from temperature sensor. (The temperature sensor type is NTC, for Microsemi internal use).

For example: To set 40 degree Celsius the set value should be 400 (0x190).

4.5.4 Get Derating User Temperature

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xBA	0x00	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Derating	Derating User Temp	N	N	N	N	N	N	N	N
0x03	##	Val		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		User Temperature		N	N	N	N	N	N	N	N	N

This command returns the user temperature that was set by the Host. The value is in DeciCelsius units.

4.5.5 Get System Measurments

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x07	0xBA	0x00	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Global	Derating	Derating User Temp	N	N	N	N	N	N	N	N
0x03	##	Val	Val		Val		Val	Val		0x4E	0x4E	0x4E
Telemetry		Power Budget Index	Power Budget		Actual Budget (After temperature derating delta calculation)		Temperature zone	Derating Temperature		N	N	N

This command Retrieves actual power derating information. The purpose of this request is to enable the host to read power information related to each budget when the derating function is active.

- **Power_Budget Index**: The current active Power Bank.
- **Power Budget**: The current user-defined budget (related to the Power Bank setting)
- **Actual Budget**: Actual budget used by power management (calculated using a combination of user-defined budget and derating temperature algorithm)
- **Temperature zone:** This parameter is used to give the host a fast view for derating problems.
  The first 3 bits are zone numbers, arranged according to severity 1 through 4 (Highest severity):
  1 - Measured temperature < T_{start}
  2 - T_{start} < Measured temperature < $T_{shutdown}$
  3 - $T_{shutdown}$ < Measured temperature < ($T_{shutdown}$ + 20 degree Celsius)
  4 - Measured temperature > ($T_{shutdown}$ + 20 degree Celsius)
  Bit7: This bit is set whenever the system's power consumption passes the user's defined budget (it can happen only when derating temperature feature is enabled).
- **Derating Temperature:** The temperature that was used for derating calculations (measured by an external temperature sensor or set by Host) in DeciCelsius units.

4.6 Laye2 Related Messages

For Layer2 commands to be supported, **Mask 0x2E** must be at enable state (See section 8.2). To set this mask, command **Set Individual Mask** should be used (section 4.1.10).

4.6.1 Set Port Layer2 LLDP PD Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xA6	Val	Val	Val		Val		Val	Val	0x4E
Command		Channel	Layer2 LLDP_PD	CH Num	Type	PD Request Power		PSE Allocated Power		Cable Length	Execute LLDP	N

This command supports LLDP information configuration, based on the information that the Host was receiving from PD advertisement message and other host information. Part of the information is structured the same as LLDP TLV for easy host operation**.**

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel (see Section 3.2).
- **Type**: Layer 2 PD type as specified in the IEEE802.3at.

Bits 7:6	Power type	1, 1 = Type 1 PD. 0, 1 = Type 2 PD
Bits 5:4	Power source	1, 1 = PSE and Local 1, 0 = Local 0, 1 = PSE 0, 0 = Unknown
Bits 3:2	Reserved	
Bits 1:0	Power priority	1, 1 = Low 1, 0 = High 0, 1 = Critical 0, 0 = Unknown (default)

When 'Layer 2 (LLDP)' mask is set and 'Port priority defined by PD' mask is set (Mask 0x2F, See section 8.2) and the received priority is different from unknown, the port priority is updated according to the received information. Refer to **Set Individual Command** (Section 4.1.10).
If these conditions are not met, the received priority information is ignored.

- **PD Request Power**: PD requested power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges are:
  - 2-pair: from 1 to 255
  - 4-pair: from 1 to 720
- **PSE Allocated Power**: PSE allocated power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges like PD Request Power.
- **Cable Length**: This value is used to calculate the cable resistance.
  The length value is given in meters; the initial value is 100 meters and the corresponding resistance for 100 meters is 12.5 Ohm for 2-pair, 6.25 Ohm for 4-pair. (The TPPL value is updated according to the cable length to compensate on the power losses).
- **Execute LLDP**: This field defines how LLDP will be executed.
  Bit 0:
  This parameter is used to synchronize the execution of the LLDP function, after receiving single

PD request, or several PD requests. The synchronization is required to eliminate the possibility that PSE advertisements will not be synchronized to the PD requests, thus, generating wrong power allocations.

Using this parameter, the Host can determine whether to synchronize the execution of the LLDP function at each PD request, or to store as many PD requests as possible and execute all of them at once. Execute as many requests as possible to maintain allocation according to priority.

- Execute LLDP bit 0 = '0' – LLDP is not executed.
- Execute LLDP bit 0 = '1' – LLDP is executed on all RAM stored LLDP information.

Note: After synchronization, it is highly recommended to wait one second before reading the PSE allocations.

Bit 1:
This parameter is used to disable the LLDP functionality of a selected channel, returning it's power allocation to default, without disturbing port power delivery (Like there was no LLDP). This bit should be used by the host when LLDP messages from a specific PD are timed out.

The port will go from regular operation to LLDP functional only if **Set Port Layer2 LLDP PD Data** was received and this bit stays clear ('0').

LLDP functionality on specific port is not functional after port power up, as long as **Set Port Layer2 LLDP PD Data** was not received with this bit at clear ('0').

LLDP functionality on a specific port is automatically disabled when port stops delivering power for any reason.

Layer2 functionality operation state can be viewed by sending a **Get Extended Port Status** request on **Actual Port Configuration** byte, Bit 4 (section 4.3.23).

Bits [7..2]:
Reserved bits for future use. Should be set to '0'.

4.6.2 Get Port Layer2 LLDP PSE Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xA8	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Layer2 LLDP_PSE	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val	Val	Val	Val	Val	Val	
Telemetry		PSE Allocated Power		PD Requested Power		PSE Power Type	Power Class	PSE Power Pair	MDI Power Status	Cable Length	Port indication + Power Consumption	

This request returns the port Layer 2 data.

Refer to **Set Port Layer2 LLDP PD Data**, Section 4.6.1 and **Set Power Bank Power Source Type**, Section 4.6.3.

- **CH Num:** The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. Refer to Section 3.2.
- **PSE Allocated Power:** PSE allocated power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges from 1 to 650 ('0' means inactive port).
- **PD Request Power:** PD requested power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges from 1 to 650 ('0' means inactive port).
- **PSE Power Type:** Layer 2 PSE type as specified in the IEEE802.3at standard.
  - bits 7:6: Power type
    - 1, 0 = Type 1 PSE.
    - 0, 0 = Type 2 PSE.
  - bits 5:4: Power source
    - 1, 1 = Reserved
    - 1, 0 = Backup source
    - 0, 1 = Primary power source
    - 0, 0 = Unknown

    These bits are defined according to the 'power good' pins' status and power bank definitions.
  - bits 3:2: Reserved
  - bits 1:0: Power priority
    - 1, 1 = Low
    - 1, 0 = High
    - 0, 1 = Critical
- **Power Class**: The classification value that was detected by the PSE. Class 0 detection returns '1' value, Class 1 detection returns '2' value and so on.
- **PSE Power Pair:** Data Pair – Returns '1' value.

  Spare Pair – Returns '0' value.
- **MDI Power Status**:
  - bit 7:4 = "0000"
  - bit 3 = '0' – Pairs control capability. Host needs to perform OR function for this bit with '0' / '1' according to system capabilities.

- bit 2 = Port En/Dis.
- bit 1 = '1' (Support PoE).
- bit 0 = '1' (PSE).

- **Power Consumption**:
  - Bit 15 – Reserved.
  - Bit 14 – Layer2 request Pending:
    '1' - The layer 2 request is in process, the reported information should be ignored by the Host.
    '0' – The layer 2 request was executed, the reported information can be used.
  - Bit 12:13 – 00 = Port is off
    01 = Port is On
    10 = Port is On CDP
    11 = Port is On LLDP
  - Bit 11:0 – Port Power Consumption. Power = 0.1 x (Decimal value)

4.6.3 Set Power Bank Power Source Type

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x07	0x0B	0xA7	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Global (0x07)	Supply (0x0B)	Power Budget Source Type (0xA7)	Bank	Source Type	N	N	N	N	N	N

Definition of PSE power source type for each power bank. Two bit per bank as specified in the IEEE802.3at standard. To get the Bank source type, refer to **Get Power Banks**, Section 4.4.5.

The source type settings will be reported back as part of the LLDP information based on the active bank information.

- **Bank**: Specifies the power bank number to be configured (0 to 15).
- **Source Type**: Power Bank Source Type comprises two bit information per bank.
  - 1, 1 = Reserved
  - 1, 0 = Backup source
  - 0, 1 = Primary power source
  - 0, 0 = Unknown

Only the two LSB bits are used; other bits are reserved for future use and should be set to '0'.

4.6.4 Set Port PowerUp ALT-B

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xA9	Val	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Command		Channel	PowerUp ALT-B	CH Num	PuP CFG	PuP CMD	N	N	N	N	N	N

This command enables the user to configure the port behavior, according to Host definitions. The command is built from configuration register field that enable Host power up sequence behavior and a command byte to request ALT_B power up.
Port in PowerUp ALT-B mode returns different port status compared to regular ports, for easy Host monitoring.
Before enabling PowerUp ALT-B the port must be configured to 4-Pair with valid matrix.

- **CH Num:** The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. Refer to Section 3.2.
- **PuP CFG:** This is a bit field byte that defines the port PowerUp ALT-B behavior. The configuration bits cannot be saved or pre-defined. If all bits are 0 (Default), PowerUp ALT-B sequence is not functioning and the port will behave regularly. Configuration takes place only when the port is not delivering power.

  "bit 0" – PuP_CFG_EN: When this bit is set ('1'), PowerUp ALT-B sequence is enabled.
  All port alternatives will perform detection and only ALT-A will perform classification. The result of both pairs will be kept in memory, but only ALT_A will power up, based on successful detection of both alternatives and successful class on ALT-A.
  ALT_B will power up based on successful detection and specific later request by the Host.

  "bits [7:1]" – reserved and should be set to '0'.
- **PuP CMD:** This is the command field that is used to power up ALT_B. For Host power up request the value of 0x01 must be sent. ALT_B can only turn on by this command, after the port status is reported as 2P_ALT_B_Wait. Host cannot turn off only ALT_B.

Notes:
1. PowerUp ALT-B commands are relevant for 4-pair port only.

4.6.5 Get Port PowerUp ALT-B

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xA9	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	PowerUp ALT-B	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Telemetry		PuP CFG	PuP CMD	N	N	N	N	N	N	N	N	N

This request returns the port PowerUp ALT-B settings.

Refer to **Set Port PowerUp ALT-B**, for **"PuP CFG"** and **"PuP CMD"** description.

4.6.6 Set Port Layer2 CDP PD Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x00	##	0x05	0xAA	Val	Val	Val	Val	Val	Val	Val	Val	0x4E
Command		Channel	Layer2 CDP_PD	CH Num	Type	PD Request Power0	PD Request Power1	PD Request Power2	PD Request Power3	Cable Length	Execute CDP	N

This command supports LLDP information configuration, based on the information that the Host was receiving from PD advertisement message and other host information. Part of the information is structured the same as LLDP TLV for easy host operation**.**

- **CH Num**: The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel (see Section 3.2).
- **Type**: Layer 2 PD type as specified in the IEEE802.3at.

Bits 7:6	Power type	1, 1 = Type 1 PD. 0, 1 = Type 2 PD
Bits 5:4	Power source	1, 1 = PSE and Local 1, 0 = Local 0, 1 = PSE 0, 0 = Unknown
Bits 3:2	Reserved	
Bits 1:0	Power priority	1, 1 = Low 1, 0 = High 0, 1 = Critical 0, 0 = Unknown (default)

When 'Layer 2 (LLDP)' mask is set and 'Port priority defined by PD' mask is set (Mask 0x2F, See section 8.2) and the received priority is different from unknown, the port priority is updated according to the received information. Refer to **Set Individual Mask Command** (Section 4.1.10).
If these conditions are not met, the received priority information is ignored.

- **PD Request Power0,1,2,3**: 4 options for PD requested power values at the PD input.
  Power = 0.5 x (Decimal value) watts. Value ranges are:
  - 2-pair: from 1 to 60 (Equal to 30w maximum).
  - 4-pair: from 1 to 144 (Equal to 72w maximum).
- **Cable Length**: This value is used to calculate the cable resistance.
  The length value is given in meters; the initial value is 100 meters and the corresponding resistance for 100 meters is 12.5 Ohm for 2-pair, 6.25 Ohm for 4-pair. (The TPPL value is updated according to the cable length to compensate on the power losses).
- **Execute CDP**: This field defines how CDP will be executed.
  Bit 0:
  This parameter is used to synchronize the execution of the CDP function, after receiving single PD request, or several PD requests. The synchronization is required to eliminate the possibility that PSE advertisements will not be synchronized to the PD requests, thus, generating wrong power allocations.

Using this parameter, the Host can determine whether to synchronize the execution of the CDP function at each PD request, or to store as many PD requests as possible and execute all of them at once. Execute as many requests as possible to maintain allocation according to priority.

- Execute CDP bit 0 = '0' – CDP is not executed.
- Execute CDP bit 0 = '1' – CDP is executed on all RAM stored CDP information.

Note: After synchronization, it is highly recommended to wait one second before reading the PSE allocations.

Bit 1:
This parameter is used to disable the CDP functionality of a selected channel, returning it's power allocation to default, without disturbing port power delivery (Like there was no CDP).
This bit should be used by the host when CDP messages from a specific PD are timed out.

The port will go from regular operation to CDP functional only if **Set Port Layer2 CDP PD Data** was received and this bit stays clear ('0').

CDP functionality on specific port is not functional after port power up, as long as **Set Port Layer2 CDP PD Data** was not received with this bit at clear ('0').

CDP functionality on a specific port is automatically disabled when port stops delivering power for any reason.

CDP functionality operation state can be viewed by sending a **Get Extended Port Status** request on **Actual Port Configuration** byte, Bit 4 (section 4.3.23).

Bits [7..2]:
Reserved bits for future use. Should be set to '0'.

4.6.7 Get Port Layer2 CDP PSE Data

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x02	##	0x05	0xAB	Val	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Request		Channel	Layer2 CDP_PSE	CH Num	N	N	N	N	N	N	N	N
0x03	##	Val		Val		Val	Val	Val	Val	Val	Val	
Telemetry		PSE Allocated Power		PD Requested Power		PSE Power Type	Power Class	PSE Power Pair	MDI Power Status	Cable Length	Port indication + Power Consumption	

This request returns the port Layer 2 CDP data.

Refer to **Set Port Layer2 CDP PD Data**, Section4.6.6 and **Set Power Bank Power Source Type**, Section 4.6.3.

- **CH Num:** The logical port number, as referred to by the Host CPU and usually shown on the PSE front panel. Refer to Section 3.2.
- **PSE Allocated Power:** PSE allocated power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges from 1 to 650 ('0' means inactive port).
- **PD Request Power:** PD requested power value at the PD input. Power = 0.1 x (Decimal value) watts. Value ranges from 1 to 650 ('0' means inactive port).
- **PSE Power Type:** Layer 2 PSE type as specified in the IEEE802.3at standard.
  - bits 7:6: Power type
    - 1, 0 = Type 1 PSE.
    - 0, 0 = Type 2 PSE.
  - bits 5:4: Power source
    - 1, 1 = Reserved
    - 1, 0 = Backup source
    - 0, 1 = Primary power source
    - 0, 0 = Unknown

    These bits are defined according to the 'power good' pins' status and power bank definitions.
  - bits 3:2: Reserved
  - bits 1:0: Power priority
    - 1, 1 = Low
    - 1, 0 = High
    - 0, 1 = Critical
- **Power Class**: The classification value that was detected by the PSE. Class 0 detection returns '1' value, Class 1 detection returns '2' value and so on.
- **PSE Power Pair:** Data Pair – Returns '1' value.

  Spare Pair – Returns '0' value.
- **MDI Power Status**:
  - bit 7:4 = "0000"

- bit 3 = '0' – Pairs control capability. Host needs to perform OR function for this bit with '0' / '1' according to system capabilities.
- bit 2 = Port En/Dis.
- bit 1 = '1' (Support PoE).
- bit 0 = '1' (PSE).

- **Power Consumption**:
  - Bit 15 – Reserved.
  - Bit 14 – Layer2 request Pending:
    '1' - The layer 2 request is in process, the reported information should be ignored by the Host.
    '0' – The layer 2 request was executed, the reported information can be used.
  - Bit 12:13 – 00 = Port is off
    01 = Port is On
    10 = Port is On CDP
    11 = Port is On LLDP
  - Bit 11:0 – Port Power Consumption. Power = 0.1 x (Decimal value)

4.7 Report Key

Each message containing a **Command** or **Program Key** transmitted from the Host to the PoE controller is followed by a **Report Message** sent back from the PoE controller within 400 ms.

4.7.1 Command Received/Correctly Executed

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x52	##	0x00	0x00	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Report				N	N	N	N	N	N	N	N	N

This report indicates that the PoE controller received the command/program message and that it was properly executed.

4.7.2 Command Received/Wrong Checksum

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x52	##	0xFF	0xFF	0xFF	0xFF	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Report						N	N	N	N	N	N	N

This report indicates that the controller received the command/program message, but its checksum was incorrect; therefore, the command/program is not executed.

4.7.3 Failed Execution/Conflict in Subject Bytes

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x52	##	0x0001-0x7FFF		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Report				N	N	N	N	N	N	N	N	N

This report indicates that the controller received the command/program message but the subject fields did not match; therefore the command/program is not executed. Any value between 0x0001-0x7FFF in bytes 3 and 4 indicates this type of error.

4.7.4 Failed Execution/Wrong Data Byte Value

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x52	##	0x8001-0x8FFF		0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Report				N	N	N	N	N	N	N	N	N

This report indicates that the controller received the command/program message, but the data fields did not match; therefore, the command/program is not executed. Any value between 0x8001-0x8FFF in bytes 3 and 4 indicates this type of error.

4.7.5 Failed Execution/Undefined Key Value

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x52	##	0xFF	0xFF	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E	0x4E
Report				N	N	N	N	N	N	N	N	N

This report indicates that the controller received the command/program message, but the KEY fields did not match; therefore the command/program is not executed.

5 Software Download

Note:
A PD69200 **controller** only accepts the PD69200 firmware. If other firmware types such as PD69100 or PD69000 are downloaded, the controller will not run and an error will be reported after reset.

It is the user / host responsibility to use the correct file.

There are two methods to initiate a new firmware download:

- From an external PC, by implementing a "software bridge" on the Host and using a windows application on the PC. This option is explained in *Microsemi's Application Note 126, Software Download for PoE Units.*
- Directly from the Host CPU, utilizing a series of protocol commands, detailed in Sections 5.1 and 5.2. When utilizing the I^2C communication for the download process, refer to section 5.4 below.

5.1 Download Process (Valid Firmware Exists)

The following process specifies the download process for a Controller which has valid firmware.

In case of an "empty" Controller or invalid firmware, use the process as described in Section 5.2.

All letters signed with "" should be sent as characters or strings (ASCII value). "\r" and "\n" represent "carriage return" and "new line" ASCII codes.

Step	Action	Host Command	Controller Response		Comment
			OK	Error	
1	Enter program mode	Send the "Download" command (Section 5.1.1).	OK report	Error report	Immediate response. Report types show in Section 4.7
2	Await for boot section response		"TPE\r\n"	-	Response within 100 ms.
3	Erase memory	"E"	"TOE\r\n"	None	Response within 100 ms.
4	Wait for erasure	-	"TE\r\n" and then "TPE\r\n" (Within 100 ms).	"TNE\r\n" or "TNV\r\n" or none.	Erasure may last up to 5 seconds.
5	Program memory	"P"	"TOP\r\n"	None	Response within 100 ms.
6	Send all lines of S19 file.	Send S19 lines, one by one, till EOF. Lines begin with "S0" should not be read.	"T*\r\n"	"TNP\r\n" or "TNV\r\n" or none.	Response within 100 ms per line.
7	End of file	-	"TP\r\n"	None	Response within 100 ms.
8	Await	-	-	-	Wait at least 400 ms.
9	Reset Controller	"RST"	System status telemetry	-	Response within 10 s.

5.1.1 Download Command

[0] KEY	[1] ECHO	[2] SUB	[3] SUB1	[4] SUB2	[5] DATA	[6] DATA	[7] DATA	[8] DATA	[9] DATA	[10] DATA	[11] DATA	[12] DATA
0x01	##	0xFF	0x99	0x15	0x16	0x16	0x99	0x4E	0x4E	0x4E	0x4E	0x4E
Program		Flash						N	N	N	N	N

This command initiates the download process. Once the process is initiated, the above steps need to be accomplished.

5.2 Download Process (Invalid or Non-existing Firmware)

When the Controller is “empty” (was not burnt in factory), or its firmware is invalid (for example: after a download process interrupted in the middle), follow the same process as in Section 5.1, except for Step 1. Substitute this step with the following entry.

Step	Action	Host Command	Controller Response		Comment
			OK	Error	
1	Enter program mode	**“E”, “N”, “T”, “R”**	“TPE\r\n”	None	Keep at least 10 ms delay between each transmitted character. Response within 100 ms (max)

Note:

Invalid or none-existing firmware can be monitored by a continuous System Status telemetry (refer to **Get System Status** command, Section 4.1.6) with Byte 3 bit 1 set to ‘1’ (Programming required), in less than 5 seconds.

5.3 Download File: S19

The “*.S19” is the download file containing data in lines beginning with “S”.

- Lines beginning with “S0” are remarks and should not be written to the controller.
- Lines beginning with "S3" contain the data to be sent.
- "S7" designates the last line.

S19 File Example

```
S0  Power Over Ethernet
S0  Product Number: 22
S0  Software Number: 0163
S0  Param Number:  03
S0  Build:  079
S0  File Name - 22016303_0800_079.s19
S0  Based On File - FSL_2015_06_16_09_37.elf
S0  Time 09:37:09  Date Jun 16 2015
S0
S02C000050443639323030202020202020202020202020203031363332323031363330335F3038303
05F3037391D
S31900001400E01B002009AE000025AA00002DAA0000000000005A
S319000014140000000000000000000000000000000000000000BE
S319000014280000000035AA000000000000000000003DAA0000E4
.
.
S3190000F3D4FAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFA97
S3190000F3E8FAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFAFA83
S3090000F3FC98427E8A25
S70500000000FA
```

5.4 I²C Download Process

When utilizing the I²C communication for the download process, data is transmitted and received as single bytes.

Single byte includes: start bit, address, R/W bit, data byte, stop bit.

Perform the following:

- Send 'Get System Status' message (in single byte) to check firmware validity (CPU status-1 Bit 1 = 1 indicates invalid firmware).
  - If valid firmware is detected, perform the downloading process as described in Section 5.1.
  - If invalid firmware is detected, perform the downloading process as described in Section 5.2.

Note:

For more details on I²C firmware download, see Technical Note TN-140, Catalogue Number 06-0024-081.

5.5 Shared Memory Download Process

PD69200M download process is completely different from the above, due to shared memory system structure. Refer to PD69200M documentation.

6 Synchronization during Communication Loss

As described in Section 2, each communication ***Command*** or ***Request*** is echoed to the Host with a ***Report*** or ***Telemetry***, respectively. The echo packet is designed to be transmitted back typically within 15ms from the original packet sent from the Host (55mSec max). It is recommended that the Host receive the echo packet and use it as a command acknowledgement, or as verification for the communication feedback.
It is recommended that the Host timeout will be configured to 100mSec

In cases where the echo packet was not received by the Host within 100ms from the last transmitted packet, it is recommended that the Host communication be set to follow the command flow shown in Figure 3.

- If a "System Status" packet or other echo packet is correctly received during each one of the flow stages, the Host assumes a communication re-sync and return to normal operation.
- 15-byte packet Host transmission time should not exceed 20ms. (From 1st byte to last byte)

Note: The actual bytes transaction time need to be added to the above timing.
For example in UART (19200 bps) it will take 15.6125mSec minimum for TX/RX transmition.
[1/(19200*10*15)sec]*2

I2C communication is in use

Host steps	PoE Response
Reply Timeout (100mSec)	No Response (any)
Retransmit with different Echo number	
	No Response (any)
Reply Timeout (100mSec)	
wait 10sec for arbitration loss recovery and retransmit	I2C reinit peripherial module or WD after 2.5 sec
Wait for reply	No Response (any)
Reply Timeout (100mSec)	
Reset PoE	
	System status

Non I2C communication is in use

Host steps	PoE Response
Reply Timeout (100mSec)	No Response (any)
Retransmit with different Echo number	
	No Response (any)
Reply Timeout (100mSec)	
wait 2.5sec for PoE watch dog function	WD reset
Retransmit with different Echo number	No Response (any)
Reply Timeout (100mSec)	
Reset PoE	
	System status

Note: The host must handle unexpected system status reply, indicating PoE out of reset

Figure 3: Host Communication During Sync Loss

7 Communication Example

A typical example of a message sent by the Host CPU (PSE side) to the Controller is provided in Figure 4. This message turns off Port 7. This figure describes the transmission from the Host and from the CPU.

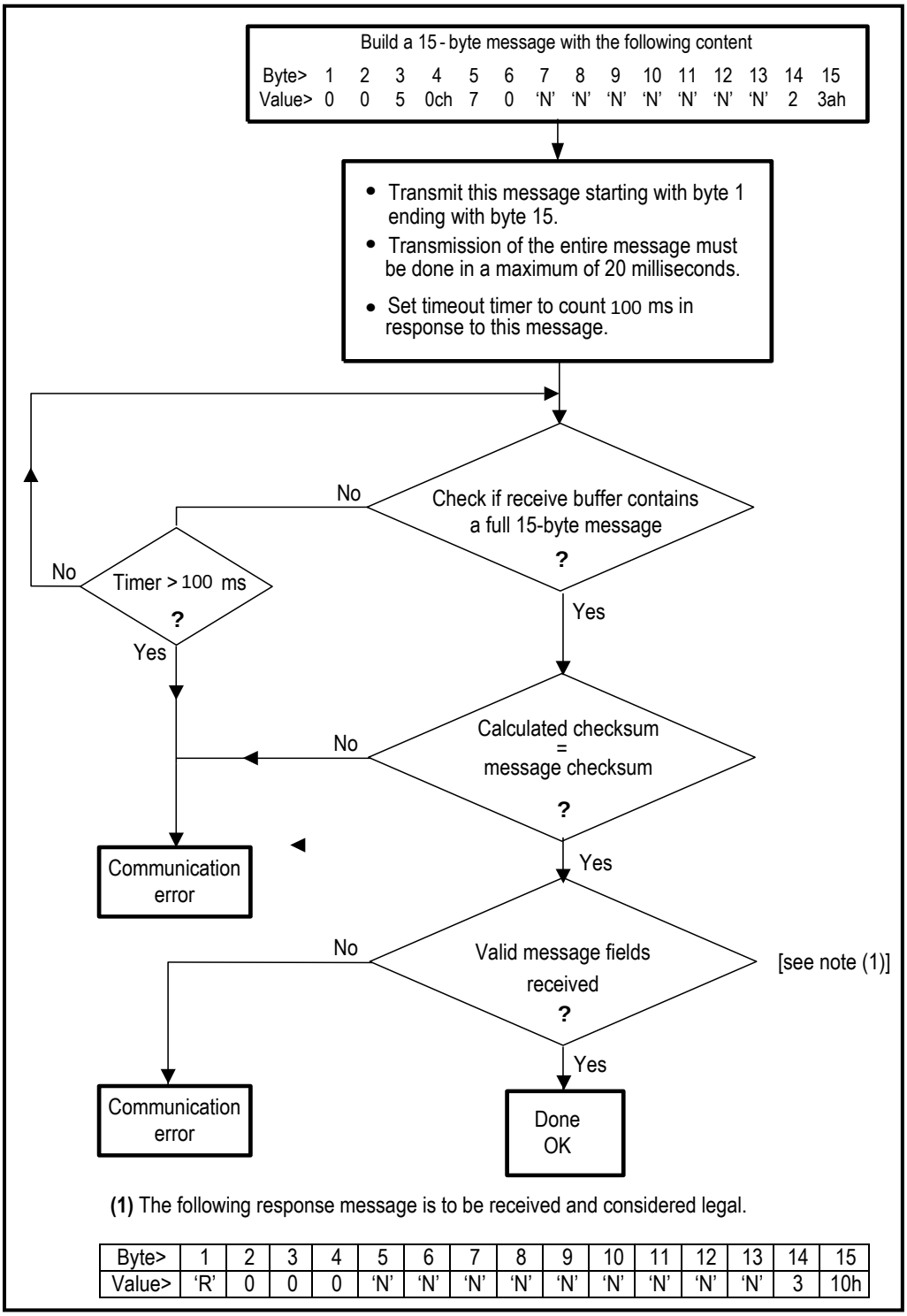


Figure 4: Typical Communication Flow

8 Appendix

This appendix contains port statuses table and Mask registers list.

8.1 Port statuses

This table describes the port statuses list the user will receive as telemetry:

Table 4: Actual Port Status

Value	Status	Comments
0x00	Port is on: Valid capacitor detected.	Legacy PD was detected.
0x01	Port is on: Valid resistor detected.	802.3AF-compliant PD was detected.
0x02	Port is on: 4-pair.	802.3AF/AT-compliant PD is powered on 4-pair lines.
0x03	Port is on: 2-pair Power Sequence.	PD is powered as ALT_A in CDP mode. ALT_B is waiting for turn on command.
0x04	Port is on: 4-pair Power Sequence.	ALT_A and ALT_B are powered in CDP Mode.
0x06	Port is off: Main supply voltage is high.	Mains voltage is higher than Max Voltage limit.
0x07	Port is off: Main supply voltage is low.	Mains voltage is lower than Min Voltage limit.
0x08	Port is off: 'Disable all ports' pin is active.	Hardware pin disables all ports.
0x0C	Port is off: Non-existing port number.	Fewer ports are available than the maximum number of ports that the Controller can support. Unavailable ports are considered 'off'.
0x11	Port is yet undefined.	Getting this status means software problem.
0x12	Port is off: Internal hardware fault.	Port does not respond, hardware fault, or system initialization.
0x1A	Port is off: User setting.	User command set port to off.
0x1B	Port is off: Detection is in process.	Interim state during line detection. Status will change after detection process is completed.
0x1C	Port is off: Non-802.3AF/AT powered device.	Non-standard PD connected.
0x1D	Port is off: Overload and Underload states.	Succession of Underload and Overload states caused port shutdown. May also be caused by a PD's DC/DC fault.
0x1E	Port is off: Underload state.	Underload state according to 802.3AF/AT (current is below Imin).
0x1F	Port is off: Overload state	Overload state according to 802.3AF/AT (current is above Icut). OR (PM3 != 0 and (PD class report > user predefined power value)).

Table 4: Actual Port Status

Value	Status	Comments
0x20	Port is off: Power budget exceeded.	Power Management function shuts down port, due to lack of power. Port is shut down or remains off.
0x21	Port is off: Internal hardware fault	Hardware problems preventing port operation.
0x24	Port is off: Voltage injection into the port.	Port fails due to voltage being applied to the port from external source.
0x25	Port is off: Improper Capacitor Detection results or Detection values indicating short	Fail due to out-of-range capacitor value or Fail due to detected short value (When mask 0x04 is set).
0x26	Port is off: Discharged load.	Port fails due to system voltage supply through other port. Check other port for status 0x24. This error is linked with mask 0x1F enable.
0x2B	Port is on: Detection regardless (Force On).	Port is forced to turn on, unless system error occurs.
0x2C	Undefined error during Force On.	This error is reported when force power issue occurred and it is not covered by other related force power errors in this table.
0x2D	Supply voltage higher than settings.	These errors appear only after port is in Force On.
0x2E	Supply voltage lower than settings.	
0x2F	Disable PDU flag raised during Force On.	
0x30	Port is forced on, then disabled.	Disabling is performed by the “Set Enable/Disable” command.
0x31	Port is off: Forced power error due to Overload.	Overload condition according to 802.3AF/AT during Force On.
0x32	Port is off: “Out of power budget” during Force On.	The port is not ON in spite of Force On activation since the maximal power level has been crossed or there is not sufficient power.
0x33	Communication error with PoE devices after Force On.	This error appears only after port is forced on.
0x34	Port is off: Short condition.	Short condition was detected.
0x35	Port is off: Over temperature at the port.	Port temperature protection mechanism was activated.
0x36	Port is off: Device is too hot.	The die temperature is above safe operating value.
0x37	Unknown device port status.	The device returns an unknown port status for the software.
0x38	Force Power Error Short Circuit.	Short condition during Force On.
0x39	Force Power Error Channel Over Temperature.	Channel over temperature during Force On.
0x3A	Force Power Error Chip Over Temperature.	Device over temperature during Force On.
0x3C	Power Management-Static.	Calculated power > power limit.
0x3E	Force Power Error Management Static.	Calculated power > power limit during Force On.

Table 4: Actual Port Status

Value	Status	Comments
0x43	Port is off: Class Error	Illegal class

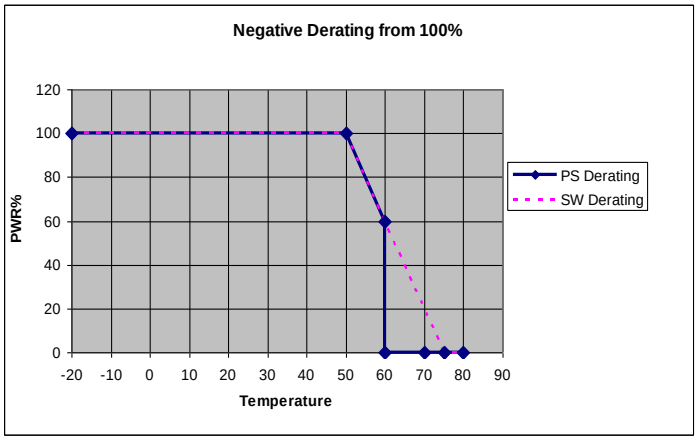
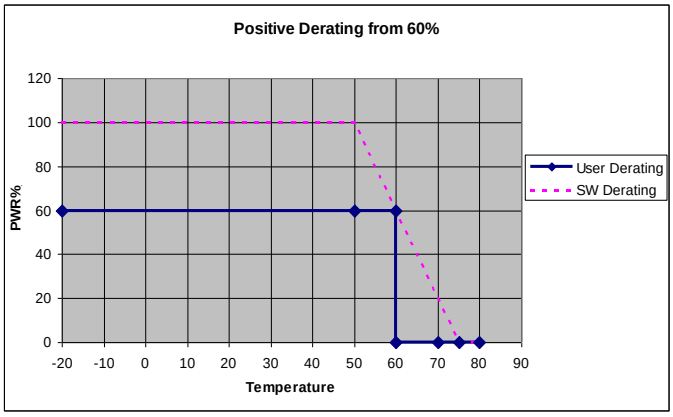
8.2 MASK Registers list

This list describes the individual mask registers that can be used in the PD69200 product.

Num	Name	Val	Description
0x00	Ignore higher priority	'0'	If higher priority port powers up and its power exceeds power limit, a lowest priority port will be disconnected instead.
		'1'	If power is not available for powering up any port, any new connected port power up will be denied, regardless of its priority.
0x01	Supports Legacy detection	'0'	Don't support legacy detection.
		'1'	Support legacy detection.
0x04	ResDetectShort	0	In case of short condition on the port, regular detection failure will be reported. (Status 0x1C)
		1	In case of short condition on the port, short detection failure will be reported. (Status 0x25)
0x0A	IgnoreClassre4Pair	'0'	Classification behavior at 4-pair system is regular.
		'1'	In a 4-pair system if the port was detected as 4-pair, class results will be ignored and set as default to class4.
0x0C	Ignore higher priority grouping (Can be used only when Ignore higher priority = '0')	'0'	Ports are grouped according to "critical", "high", and "low" priorities and the port numbering of each group. (lower numbering = higher priority in a group)
		'1'	Ports are grouped according to "critical", "high", and "low" priorities 1. Delivering power ports at "low" priority will be turned off to free power budget for "critical" or "high" priority non-delivering power port that is requesting power for startup. 2. Delivering power ports at "high" priority will be turned off to free power budget for "critical" priority non-delivering power port that is requesting power for startup. 3. Delivering power ports at the same priority as non-delivering power port will not be turned off to free power budget.
0x11	Supports backoff	'0'	Alternative A – Backoff is disabled (endspan).
		'1'	Alternative B – Backoff is enabled (Midspan or Endspan that utilizes Alternative B pairs as specified in the IEEE 802.3AF/AT standard).

Num	Name	Val	Description
0x13	Support 12.5K detection		No longer supported. Can be supported by using legacy support (mask 0x01).
0x14	Hardware reset on ASIC error	'0'	If ASIC fails (stops functioning) mark it as 'disabled' and continue working with other ASICs.
		'1'	If ASIC fails perform HW reset.
0x15	Calculated power disconnect flag	'0'	Calculated power will not be used to disconnect ports.
		'1'	Enables ports disconnection using the calculated power.
0x16	LED stream type	0	LED stream disabled.
		1	LED stream supports unicolor 2-Pair system
		2	LED stream supports Bicolor 2-Pair system
		3	LED stream supports Bicolor 4-Pair system
		4	For Microsemi internal use only, Direct LED from PD69208.
		5	Direct led function, like Bicolor 4-Pair system (For 1port Midspan).
0x18	LED reverse	NA	Not implemented feature (Reserved Mask).
0x19	LED stream negative	0	Value of '1' in the stream indicates that the port is delivering power.
		1	Value of '0' in the stream indicates that the port is delivering power.
0x1B	I^2C restart enable	'0'	Don't initialize the I^2C module in case of inactivity.
		'1'	Initializes the I^2C module system after 10 seconds of inactivity.
0x1E	Message ready notify	'0'	Disables notification.
		'1'	MESSAGE_READY pin, can be used to notify the host that a reply message is ready. Refer to PD69200 datasheet or PD69200M shared memory documentation.
0x1F	PSE powering PSE checking	'0'	PSE powering PSE condition will not deny powering new valid ports.
		'1'	In case PSE powering PSE condition occurs, no additional ports will be powered up, until this problem will be resolved.
0x28	xSystem OK pin behavior	0	Pin indicates if Vmain is in valid range or out of range. Refer to PD69200 datasheet.
		1	Midspan main LED behavior (Microsemi internal usage).

Num	Name	Val	Description
		2	Pin behavior is according to power indication in % (See section 4.1.14).
		3	Interrupt reflection (See section 4.1.12).
		4	Pin behavior is according to power indication in Watt (See section 4.1.14).
0x29	Ignore high priority at flexible guard band	'0'	Upon port startup when using a Dynamic Guard Band, priority is considered. This means port will not be powered up, if higher priority port has PM status.
		'1'	Upon port startup when using a Dynamic Guard Band, priority is ignored. If a higher priority port works under the PM mode, a lower priority port will be turned on, if it is within the Guard Band limits.
0x2A	Enable ASIC Refresh	'0'	If ASIC fails, do not try to refresh it and proceed according to mask 0x14 (Hardware reset on ASIC error).
		'1'	If ASIC fails, try to refresh. If refresh operation fails, proceed according to mask 0x14 (Hardware reset on ASIC error).
0x2B	Check inrush	'0'	Skip AF Inrush sequence.
		'1'	Normal IEEE802.3at operation.
0x2E	Layer2 (LLDP) enable	'0'	Layer 2 PD commands will be Ignored and Layer 2 PSE requests will return with zero allocation.
		'1'	Layer 2 operation is enabled. Layer 2 commands are processed.
0x2F	Layer2 priority by PD	'0'	Priority information received from LLDP/CDP PD message is ignored. (Mask 0x2E must be '1').
		'1'	Port Priority can be defined by PD. (Mask 0x2E must be '1').
0x30	Extra power enable		No longer supported.
0x32	Temperature Derating enable	'0'	Feature is disabled.
		'1'	Feature is enabled.

Num	Name	Val	Description
0x33	Temperature Derating Negative Delta	'0'	Negative delta calculation. Negative derating: power will be reduced from the operational budget when temperature rise. In this mode, power consumption cannot get above the initial settings. 
0x33	Temperature Derating Positive Delta	'1'	Positive delta calculation. Positive derating: Power will be added to the operational budget when temperature is reduced. In this mode, power consumption can get above the initial settings. If the temperature is low enough, additional power is added to the user budget settings, up to the power supply limit. When the actual consumption gets above the user settings, the user will get a warning bit. 
0x34	Use new matrix command (4-pair)	'0'	Uses old matrix command (2-pair).
		'1'	Uses new 4-pair matrix commands.
0x37	System support reduced cap		No longer supported. Support legacy can be enable/disable by using mask 0x01.
0x38	Class 0 equal AF	'0'	Port that was detected as class 0 will behave based on port type configuration (see section 4.3.5 field 6).

Num	Name	Val	Description
		'1'	Class 0 will make the port behaves as AF, regardless of configured port type.
0x39	Class 1,2,3 equal AF	'0'	Port that was detected as class 1/2/3 will behave based on port type configuration (see section 4.3.5 field 6).
		'1'	Class 1/2/3 will make the port behave as AF, regardless of configured port type.
0x3A	Class bypass 2nd finger error	'0'	Class error will be reported in any case of different class fingers results.
		'1'	Ignore the case of first finger = class 4 and second finger is not class 4.
0x3B	Class error equal 0	'0'	Treat class error on physical port (Class Over Current) as is.
		'1'	Treat class error on physical port as class 0.
0x3C	Class error equal 4	'0'	Treat class error on physical port (Class Over Current) as is.
		'1'	Treat class error on physical port as class 4.
0x3D	System POH enable		No longer supported. POH can be enabled per port by using "**Set Enable/Disable Channels**" command section 4.3.5.
0x43	Power forwarding	'0'	In case of no available power, a higher priority port will be powered up, causing the system to enter power management situation that will cause low priority ports disconnection. (This mask will operate only if mask 0x00 is set to '0').
		'1'	In case of no available power, disconnect low priority ports before starting up higher priority ports. (This mask will operate only if mask 0x00 is set to '0').
0x44	Support 4-pair AF	'0'	AF port will power up 2-pair only, even if the logical port is configured to support 4-pair.
		'1'	AF port configured as 4-pair port will power up all 4-pairs.
0x45	Max power check	'0'	Don't monitor each port power for 97.5W threshold.
		'1'	Monitor each port power for 97.5W threshold. Above this threshold, the port will be disconnected.
0x46	SingleDetectionFaileEvent	0	When port detection constantly fails, Detection unsuccessful event (bit 2) in the interrupt register will be set on each failure.
		1	When port detection constantly fails, Detection unsuccessful event (bit 2) in the interrupt register will be set only at the 1st failure.

8.3 Backwards Compatibility table

The following table describes the commands that are not supported by PD69200 and their unsupported level.

Command Name	Exist in	Supported in PD69100	Unsupported level in PD69200
Set Extended PoE Device Parameters	PD63000 / PD69000	No	Removed - Error message will be reported.
Set BPM Private Label	PD69100	Yes	Removed - Error message will be reported.
Set Class Power	PD69100 PD69200	Yes	Not recommended for new designs. (Not documented anymore). The command information is ignored. No error will be reported.
Get PoE Device Version	PD63000 / PD69000 / PD69100 /	Yes	Not recommended for new designs. (Not documented anymore).
Get All HIP Ports Power	PD69000 / PD69100 / PD69200	Yes	Not recommended for new designs. (Not documented anymore).
Get Extended PoE Device Parameters	PD63000 / PD69000	No	Removed - Error message will be reported.
Get BPM Data	PD69100	Yes	Removed - Error message will be reported.
Get BPM Request Data	PD69100	Yes	Removed - Error message will be reported.
Get Class Power	PD69100 PD69200 (ver1.6x)	Yes	Not recommended for new designs. (Not documented anymore). The telemetry information will be constant.
Mask Registers 0x13, 0x30, 0x37, 0x3D For detailed explanation see “MASK Registers list” section 8.2	PD69100	Yes	Mask information is ignored; No error will be reported when set.

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Revision History

Revision	Description	Date
Beta 1.0	Initial document	20/FEB/2015
Beta 1.01	Add revision history table. Updated commands with LLDP new function bits. Update internal link references. Update table of contents.	22/FEB/2015
Beta 1.02	Update with team remarks. (LLDP description is not yet checked). Reference to PD69200M document was added.	23/FEB/2015
Beta 1.03	Backwards compatibility table creation Get PoE Device Status description updates. LLDP description was checked, missing information is marked in yellow.	25/FEB/2015
Beta 1.04	Updated document with technical writer remarks. ADD CDP commands and new port status.	01/JUNE/2015
Beta 1.05	Updated document with technical writer remarks all bugzilla remarks.	14/JULY/2015
Rel 1.06	Updated with all remarks from technical writer. Updated catalog number, logo, header and footer.	28/JULY/2015
Rel 1.07	Update Mask table with Direct LED support (Mask 0x16)	29/JULY/2015
Rel 1.08	Adding new CDP commands and update LLDP commands	13/AUG/2015
Rel 1.09	Adding new commands to support port power management and port event telemetry. In addition, report on detected short and single interrupt option in case of constant short on a port. Reported errors on older document versions where fixed as well.	11/JAN/2016
Rel 1.10	Adding new telemetry requests and fix document bugs from bugzilla	11/FEB/2016
Rel 1.11	Fix document bugs from bugzilla	09/MAR/2016

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