AAEON IPC EC Command Set User Guide

Most Confidential	
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Revision History

Revision	Description	Date	Editor
0.1(draft)	Initial Release	2020/04/08	Ayers_Deng

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1.1 Principle

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Host side OS utility/application can use IO port 0x584(DAT port) and 0x585(CMD port) to access/communicate with EC FW.

2.1 I/O Command Set

CMD	Function	Description/Usage

0x85	Get Panel brightness	Send Byte0:
		  Panel index (follow motherboard printing number)
		
		Received Byte0:
		  Brightness percentage level 0 to 10(100%)

0x86	Set Panel brightness	Byte0:
		  Panel index (follow motherboard printing number)
		Byte1:
		  Brightness percentage level 0 to 10(100%)

0x8E	Read MISC function	Send Byte0: Index number (refer to "CMD 8Eh/9Eh Index Table")

0x8F	Read HW ID	Send Byte0:
		  0x00 - Board ID
		  0x01 - Panel ID
		
		Received Byte0:
		  HW ID value

0x97	Read FAN RPM	Send Byte0:
		<table><tr><th>High nibble[7:4] - Type</th><th>Low nibble[3:0] - Number</th></tr><tr><td>0 - CPU</td><td>x - refer Note</td></tr><tr><td>1 - System</td><td>x - refer Note</td></tr><tr><td>2 - Chassis</td><td>x - refer Note</td></tr><tr><td>3 - Power Supply</td><td>x - refer Note</td></tr><tr><td colspan="2">Note:
		  Number follow motherboard printing number, or zero as default(if exist)</td></tr></table>
		Received
		  Byte0: High Byte
		  Byte1: Low Byte

0x9E	Write MISC function	Byte0:
		  Index number (refer to "CMD 8Eh/9Eh Index Table")
		Byte1:
		  Write Data

0xAA	Read I2C/SMBus	Todo (ARStmp)
0xAB	Write I2C/SMBus	Todo (ARStmp)

0xBB	Read EC FW version	Received		
			Case 1 - Standard Platform EC	Byte0: 0x09 (return total bytes, included Byte0) Byte1: S - Standard platform EC Byte2: I/A - Intel/AMD chipset Byte3/4/5: Platform name Byte6: F/H/T - EC kernel version type (Formal/Hot Fix/Test) Byte7/8: version number Example: SICMLFxx = Standard Intel CometLake Formal EC kernel FW

			Case2 - for Project / Customize dedicated EC	Byte0: 0x13 (return total bytes, included Byte0)
				
				(part1)
				    Byte1: P/C - Project/Customize dedicated EC
				    Byte2: I/A - Intel/AMD chipset
				    Byte3/4/5: Platform name
				    Byte6: F/H/T - EC kernel version type (Formal/Hot Fix/Test)
				    Byte7/8: version number
				    Byte9: '.' - ASCII code 0x2E
				
				(part2)
				    Byte 10 to 14: PROJECT_TAG
				    Byte15: '.' - ASCII code 0x2E
				
				(part3)
				    Byte16: F/T - FW version type (Formal/Test)
				    Byte17/18: version number
				
				Example:
				    PICMLT01.SMH41.T01 =
				        part1 - Project Intel CML Test EC kernel FW
				        part2 - for project SMS-H410
				        part3 - first Test version

0xC6	Get Watchdog status	Type	Value

		WDT status	Send Byte0:
			  0x00
			
			Received Byte0:
			  0 - Inactive/Stop
			  1 - Activating

		Second/Minute mode	Send Byte0:
			  0x01
			
			Received Byte0:
			  0 - Second
			  1 - Minute

		Countdown value or Current remaining value	Send
			  Byte0: 0x02
			  Byte1:
			    0 - Countdown value
			    1 - Current remaining value
			
			Received
			  Byte0: second
			  Byte1: minute (for Minute mode only)
			
			Note: EC base on Second/Minute mode to report the value

		WDT expired	Send Byte0:
			  0x03
			
			Received Byte0:
			  0 - not expired
			  1 - expired (EC also set "WDT set(expired) LED" if the project supported the feature)

0xC7	Set Watchdog			
		Type		**Value**
		WDT Stop/Resume		Byte0: 0x00 Byte1: 0 - Stop WDT (EC will stop WDT counter and record remaining Countdown value. Turn off "WDT active LED", if the project supported WDT LED feature) 1 - Resume WDT (EC will restore previous remaining Countdown value. Turn on "WDT active LED", if the project supported WDT LED feature)
		Second/Minute mode		Byte0: 0x01 Byte1: 0 - Second (Default) 1 - Minute Note: must set "WDT Stop/Resume" or "Countdown value" value to 0 to Stop/Inactive WDT first
		Countdown value		Byte0: 0x02 Byte1: Value (Second mode: 1 ~ 255 sec., Minute mode: 1 ~ 30 min.) Note: 1. Set value as 0 - clear countdown value and inactive WDT function 2. Set valid value - active WDT function 3. Follow "WDT Stop/Resume" LED behavior
		Reload/Retrigger WDT countdown value		Byte0: 0x03 Note: 1. Reload previous Second/Minute mode and Countdown value 2. Start WDT function
0xCC	Read thermal related	Send Byte0: Index number (refer to "CMD CCh/CDh Index Table")		
0xCD	Write thermal related	Byte0: Index number (refer to "CMD CCh/CDh Index Table") Byte1: Write Data		

0xD0	Get DIO pin status	Send Byte0: DIO pin index (follow motherboard printing number)

Received Byte0:

High nibble[7:4] - Type	Low nibble[3:0] - Value
0 - Output	0 - Low 1 - High
1 - Input	0 - Low 1 - High

0xD1	Set DIO pin	Byte0: DIO pin index (follow motherboard printing number) Byte1:

High nibble[7:4] - Type	Low nibble[3:0] - Value
0 - Output	0 - Low 1 - High
1 - Input	0

0xD2	Get LED status	Send Byte0:

Send Byte0:

High nibble[7:4] - Type	Low nibble[3:0] - Number
0 - Power LED	0 - Power on LED (S0) 1 - AC IN LED 2 - Reserved 3 - Sleep LED (S3) 4 - Hibernate LED (S4) 5 - Soft off LED (S5)
1 - Battery LED	x - refer Note
2 - Watchdog LED	0 - WDT active LED 1 - WDT set(expired) LED
3 - Cap Lock LED	0
4 - Wireless LED	0
5 - Temperature Alert LED	x - refer Note
6 - FAN Alert LED	x - refer Note
7 - HDD Alarm LED	x - refer Note
8 - Debug LED	0
Note: Number follow motherboard printing number, or zero as default(if exist)	

Received Byte0:

LED type	Value
General purpose LED	0 - LED not active 1 - LED active 2 - Toggle LED On/Off status (only for CMD 0xD3 Set LED Byte1)
Debug LED status	HW Error: 0x11 - Power failure 0x12 - System unable to power on 0x13 - Processor not installed 0x14 - New Processor 0x15 - Memory not installed 0x16 - Memory error 0x17 - CPU temperature abnormal 0x18 - FAN speed fault 0x19 - Case open 0x1A - Storage not found SW Error: 0x40 - POST fail 0x41 - Pre-video memory error 0x42 - Pre-video graphics error 0x43 - Bootable volume not found 0x44 - ROM checksum not valid

0xD3	Set LED	Byte0: Definition the same as CMD 0xD2 "Send Byte0" Byte1: Definition the same as CMD 0xD2 "Received Byte0"

Index	Function	Description/Usage

0xD4	Get Voltage	Send Byte0:
		    0x00 - VCORE
		    0x01 - VCOREREFIN
		    0x02 - +12V
		    0x03 - +5V
		    0x04 - 5VSB
		    0x05 - 5VDUAL
		    0x06 - +3.3V
		    0x07 - 3VSB
		    0x08 - +1.8V
		    0x09 - VMEM
		    0x0A - RTC
		    0x0B - VBAT
		
		Received
		    Byte0: High Byte
		    Byte1: Middle Byte
		    Byte2: Low Byte

2.2 CMD 8Eh/9Eh Index Table

The index table intend for miscellaneous functions which access by CMD 0x8E, 0x9E.

Index	Function	Description/Usage

0x40	Get FAN mode	Send Byte1:
		    Definition the same as CMD 0x97 "Send Byte0"
		
		Received Byte0:
		    0x00 - Auto (default)
		    0x01 - Silent
		    0x02 - Performance
		    0x03 - Full speed
		    0x10 - Manual (Get only. Through Index 0x43 "Set FAN duty" of the 8Eh/9Eh index table to set value will automatically change FAN mode to Manual mode)
		    0xFF - Disable

0x41	Set FAN mode	Byte1:
		    Definition the same as CMD 0x97 "Send Byte0"
		Byte2:
		    Definition the same as Index 0x40 - Get FAN mode "Received Byte0"

0x42	Get FAN duty	Send Byte1:
		    Definition the same as CMD 0x97 "Send Byte0"
		
		Received Byte0:
		    Duty cycle value 0 to 255

0x43	Set FAN duty	Byte1: Definition the same as CMD 0x97 "Send Byte0" Byte2: Duty cycle value 0 to 255
0x44	Get FAN Alert RPM	Send Byte1: Definition the same as CMD 0x97 "Send Byte0" Received Byte0: High Byte Byte1: Low Byte
0x45	Set FAN Alert RPM	Byte1: Definition the same as CMD 0x97 "Send Byte0" Byte2: High Byte Byte3: Low Byte

2.3 CMD CCh/CDh Index Table

The index table functions intend for thermal related which access by CMD 0xCC, 0xCD.

Index	Function	Description/Usage
0x00	Read Temperature	Send Byte1: (Temperature Source) 0x00 - PECI 0x10 - Thermal Sensor: CPU 0x11 - Thermal Sensor: VCORE 0x12 - Thermal Sensor: Memory 0x13 - Thermal Sensor: PCIe Graphic 0x14 - Thermal Sensor: PCH 0x15 - Thermal Sensor: Ambient Received Byte0: Temperature value (degree C)
0x02	Get Sensor Alert Temperature	Send Byte1: Definition the same as Index 0x00 "Send Byte1" Received Byte0: Temperature value (degree C)
0x03	Set Sensor Alert Temperature	Byte1: Definition the same as Index 0x00 "Send Byte1" Byte2: Temperature value (degree C)