



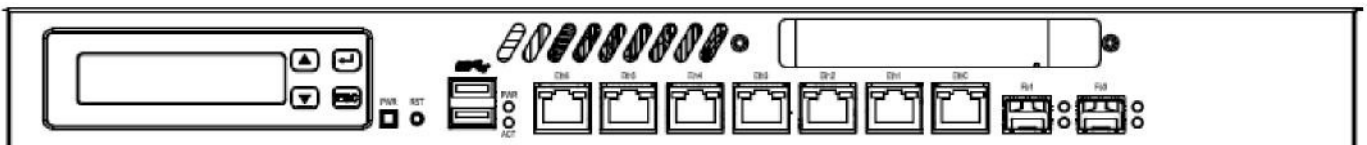
**FW9000 Hardware Engineering User Guide**

**FW9000**  
**Engineering User Guide**



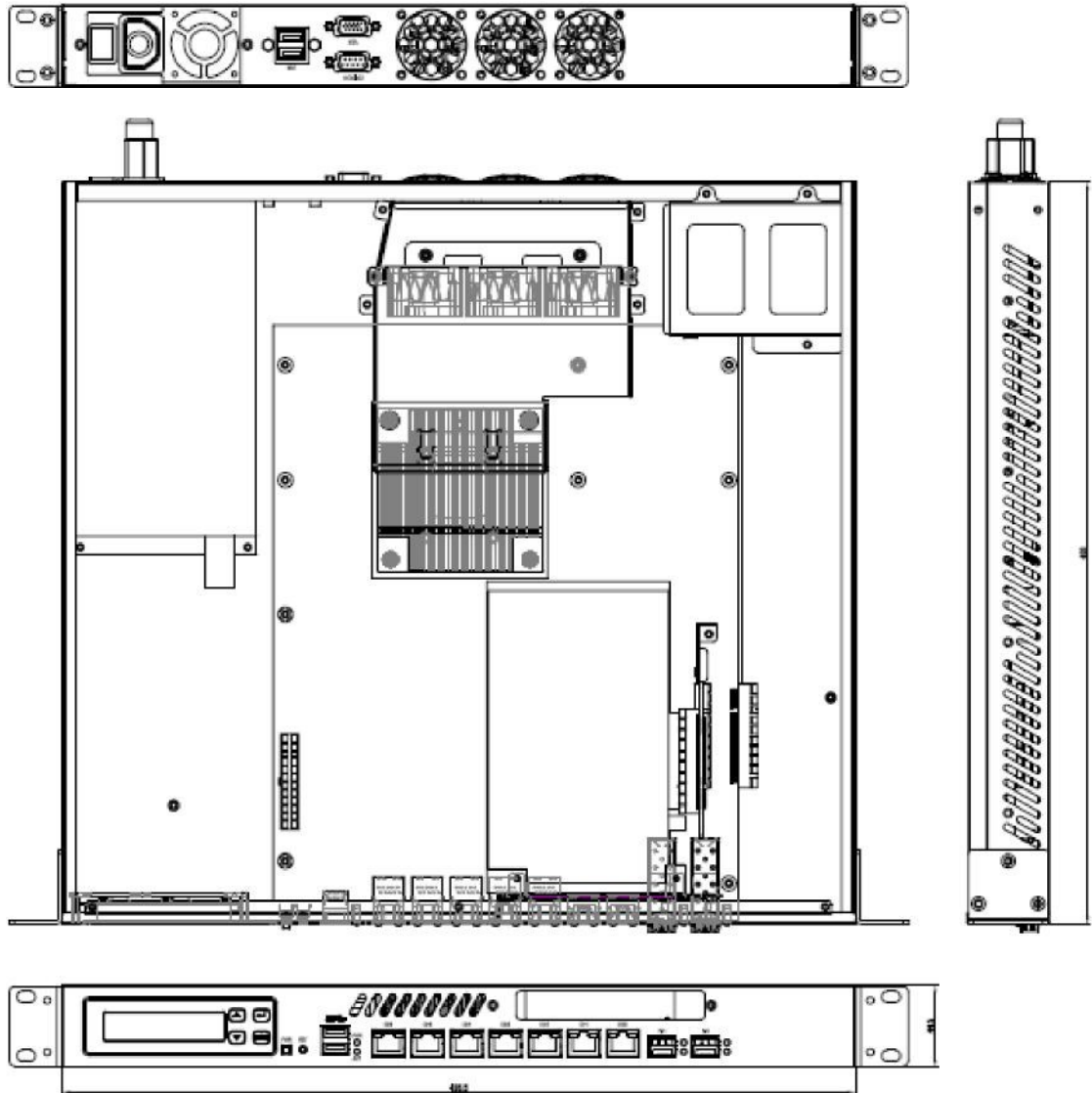
## 1. System Feature

Processor	Support Intel Core i3/i5/i7/Xeon processors in LGA1156 package. Intel Xeon 3400 series Intel Core i7-800 series Intel Core i5-700 and 600 series Intel Core i3-500 series Intel Pentium Dual Core
Memory Support	Dual channel DDR3 1066/1333 technology Up to 16GB with 4 DIMM sockets
Storage	Compact Flash Card: 1x Type II CF card socket support up to 64GB SATA: Support 2x 2.5" SATA HDD. Support Intel IAA RAID
Expansion slots	1x PCIe x8 Gen.2 slot for expansion cards 1x PCIe x8 for Dual SFP module card (FG11000 option)
Onboard LAN	2 1000Mbps Fiber Channel LAN 7 10/100/1000Mbps LAN Eth0 and Eth1 support LAN Bypass
Front Panel I/O	Power Button Reset Button Power LED Storage Activity LED Dual port USB 3.0 A-Type connector (Optional) 2 SFP Fiber Channel Module Connector 7 GbE LAN RJ45 connector
Back Panel I/O	Dual port 2.0 A-Type Connector VGA DB15 Connector Serial Console DB9 Connector
System FAN	3x 40x40x28mm, 9200rpm system FAN
Power Supply	350W, 1U Form factor, 100V~240V AC, 50Hz~60Hz, Auto Switch
System Chassis Dimension	426.5(W)x400.0(D)x44.5(H)mm, for 1U Rackmount

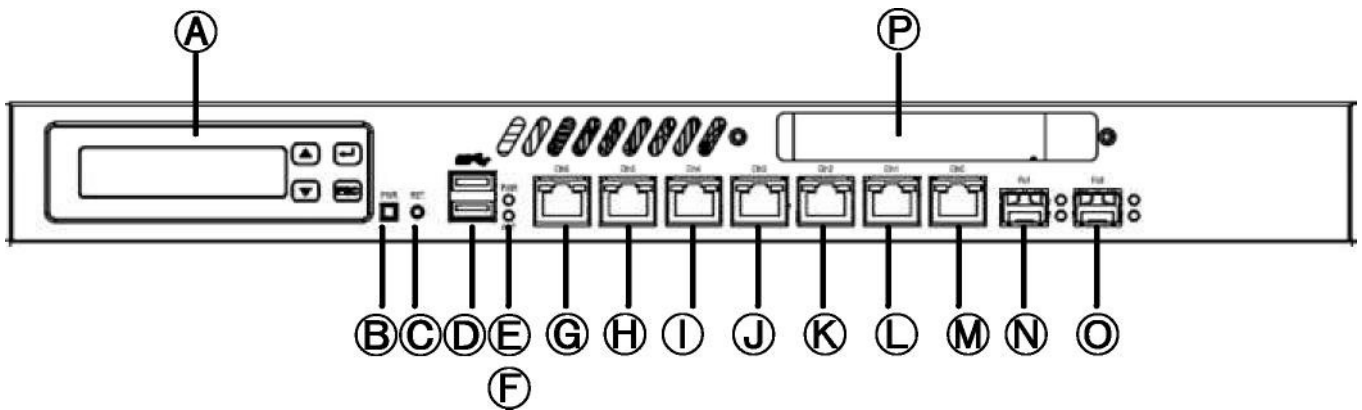




## System Overview



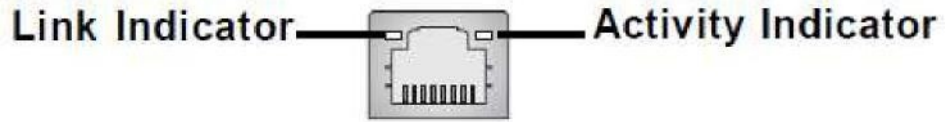
## 2. Front Panel I/O



Item	Description
•	LCM Module
•	Power Button
•	Reset Button
•	USB 3.0 Ports (Optional)
•	System Power LED
•	Storage Activity LED
•	Eth6, 10/100/1000Mbps Ethernet
•	Eth5, 10/100/1000Mbps Ethernet
•	Eth4, 10/100/1000Mbps Ethernet
•	Eth3, 10/100/1000Mbps Ethernet
•	Eth2, 10/100/1000Mbps Ethernet
•	Eth1, 10/100/1000Mbps Ethernet (Support LAN Bypass)
•	Eth0, 10/100/1000Mbps Ethernet (Support LAN Bypass)
•	Fb1, 1000Mbps SFP Fiber Channel
•	Fb0, 1000Mbps SFP Fiber Channel
•	PCIe Bracket Fixture (reserved for customer PCIe x8 extension cards)



2.1 RJ45 (Eth00~Eth6) LED Indicator Definition:



LED	Color	LED Status	Condition
Link Indicator	Orange	On	1000Mbps Link
		Off	10Mbps Link
	Green	On	100Mbps Link
Activity Indicator	Green	On	Link established
		Off	No Link
		Blink	LAN Activity present

2.2 SFP Fiber Channel (Fb0 and FB1) Indicator Definition:

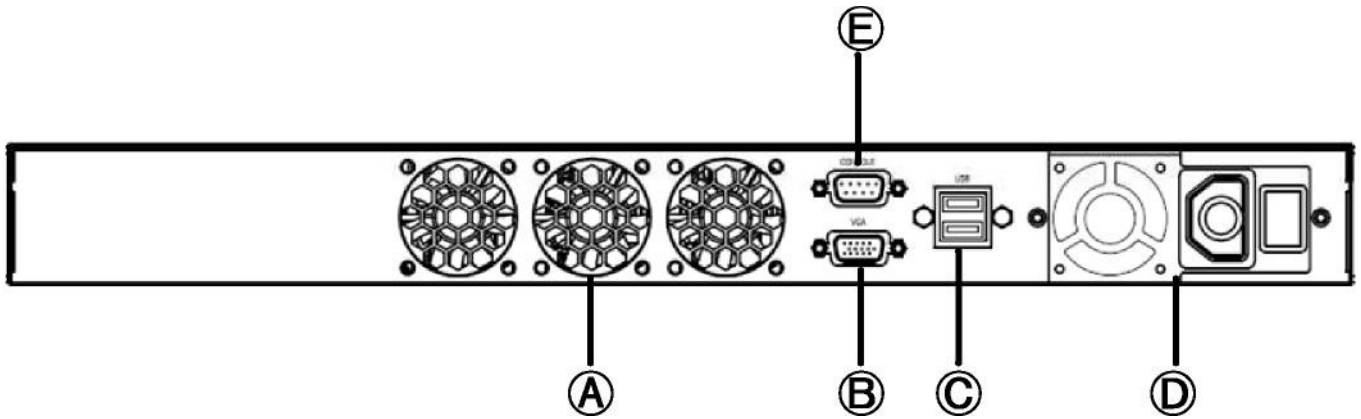


LED	Color	LED Status	Condition
Fault Indicator	Green	On	Fiber Channel Error
		Off	Fiber Channel Functional
Link Indicator	Orange	On	SFP Module Present
		Blink	SFP Module not present

2.3 Power and HDD Storage LED Definition:

LED	Color	LED Status	Condition
Power	Blue	On	System power on
		Off	System power off
Storage Activity	Green	On	Storage acting
		Blink	Storage no activity

### 3. Back Panel

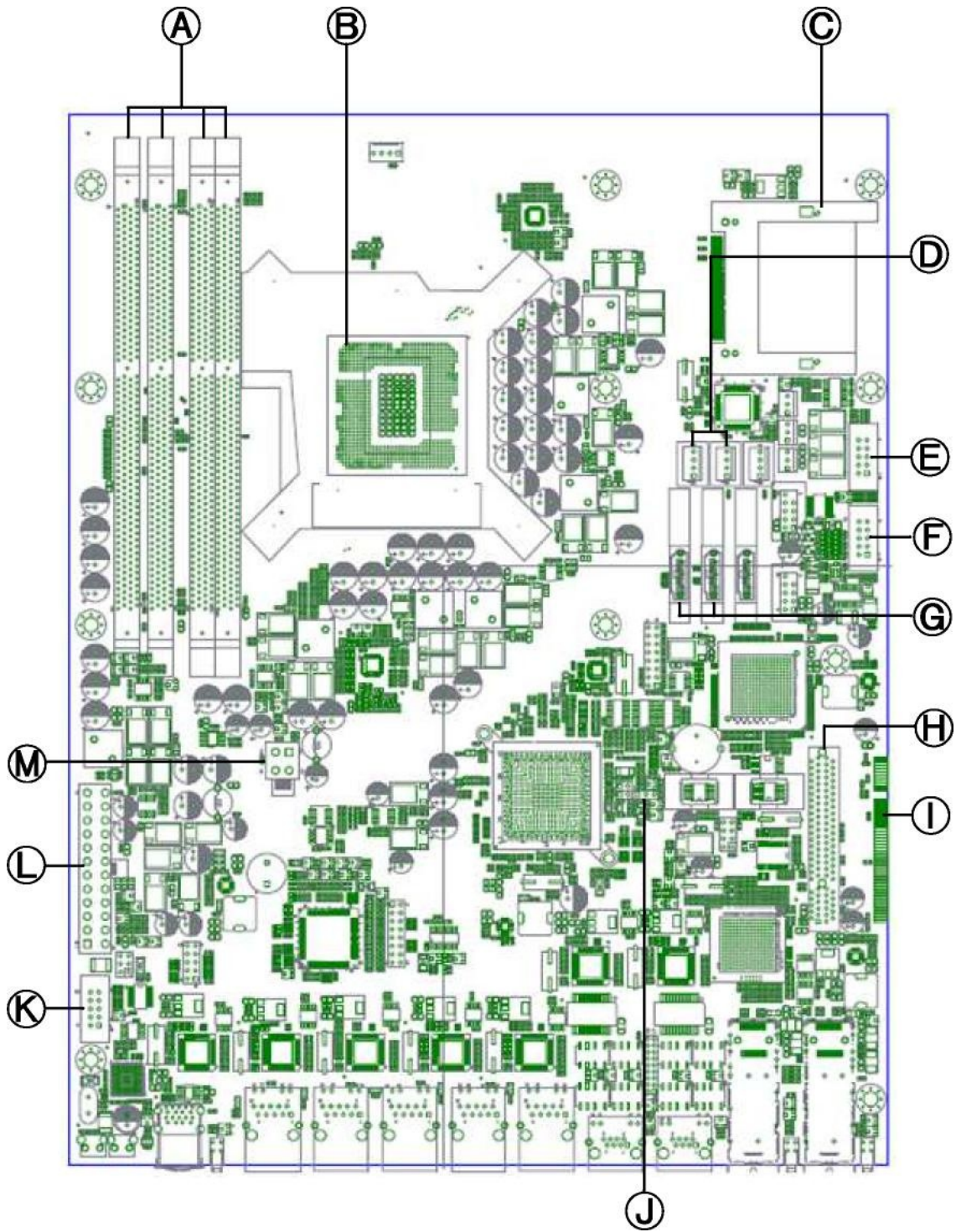


Item	Description
•	System Fans
•	VGA DB15 Connector
•	USB 2.0 Ports
•	Power Supply Unit
•	Serial Console DB9 Connector





#### 4. Onboard Connectors, Pin Headers and Jumper Setting:





Item	Description
•	240pin DDR3 DIMM Sockets
•	LGA1156 CPU Socket
•	Type II Compact Flash (CF) Card Socket
•	ATX4PS2 and ATX4PS1. Providing 12Vdc and 5Vdc for SATA devices
•	COM1. 2x5 pin boxed header for COM1 cable.
* •	J5. 2x5 pin boxed header for internal graphics output from CPU.
•	SATA3 and SATA4. Providing SATA signal connection for SATA devices
•	PCIe x8 Expansion slot. For attaching PCIe x8 riser cards.
•	PCIe x8 Gold Finger. For upgrading system to FG11000.
•	CCMOS1. Clear CMOS Jumper.
•	COM2. 2x5 pin boxed header for LCM module.
•	ATXPWR2. 24pin EATX power connector.
•	ATXPWR1. 4pin EATX 12V power connector.

\*: Intel LGA1156 Processors with internal graphics:

Core i3-500 Series, Core i5-600 Series, Intel Pentium Dual Core in LGA1156 package.

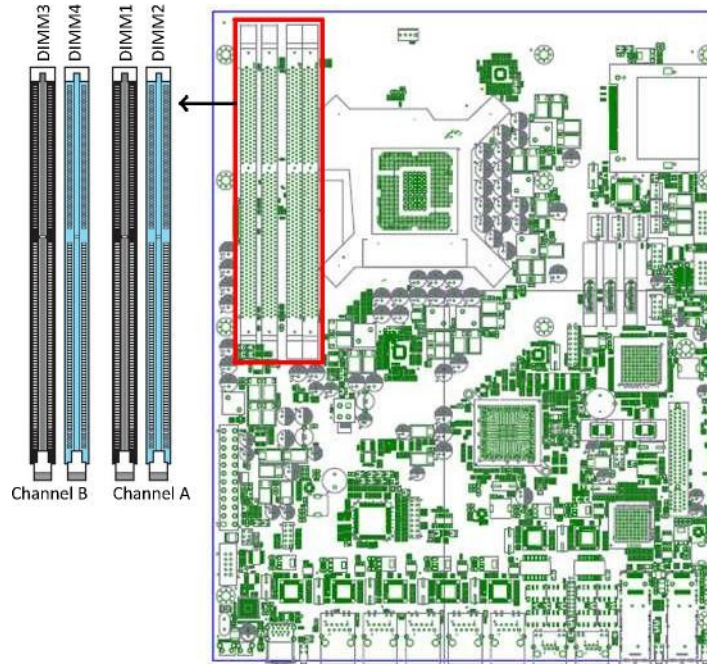


## 4.1 System Memory:

### 4.1.1 Overview:

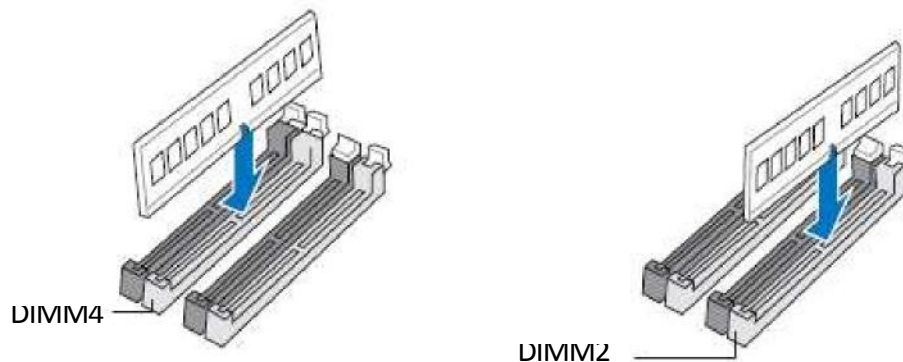
FW9000 supports DDR3 memory. The DDR3 memory has the same physical dimension as DDR2, but is notched differently preventing installing DDR2 memory modules to DDR3 DIMM sockets.

FW9000 supports dual channel DDR3 memory technology, this figure demonstrates placement of channels of FW9000 DDR3 DIMM sockets:

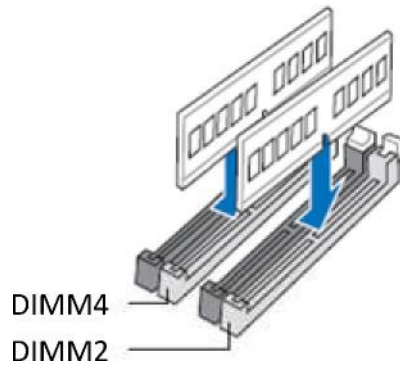


### 4.1.2 Recommended Configuration:

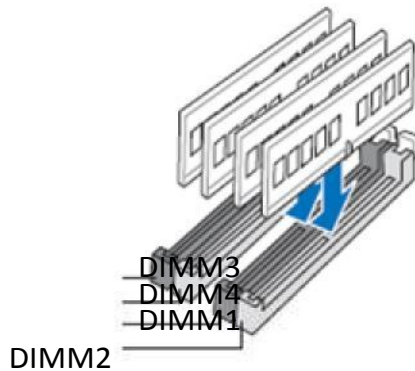
**One memory module:** install on DIMM2 or DIMM4 as single channel operation.



**Two memory modules:** install on DIMM2 and DIMM4 to take advantage of dual channel operation.



**Four memory modules:** install all memory modules to every DIMM sockets to. System operates as dual channel mode..

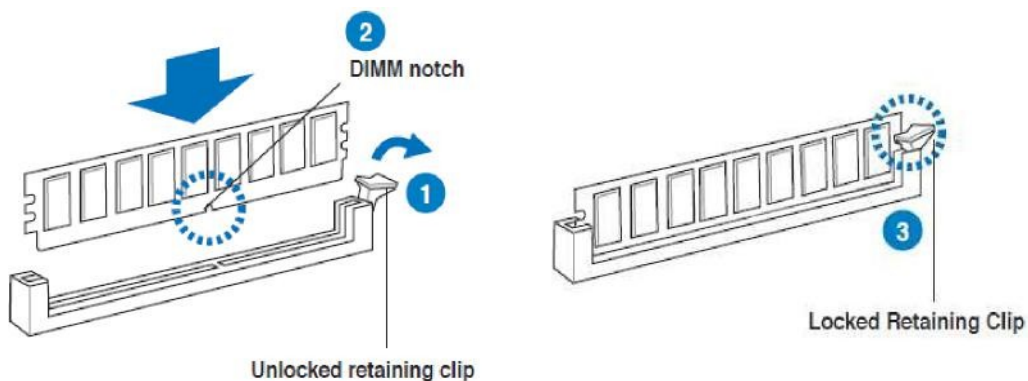


### 4.1.3 Installing Memory Module:

4.1.3.1 Unlock a DDR3 DIMM socket by pressing the retaining clips outward.

4.1.3.2 Align a DDR3 memory module so that the notch on the module matches the break-on key on the DIMM socket.

4.1.3.3 Firmly insert the memory module into the socket until the retaining clip snap back in place.



## 4.2 CPU (Central Processing Unit):

### 4.2.1 Overview:

FW9000 supports Intel processors in LGA1156 package, specifying as following series:

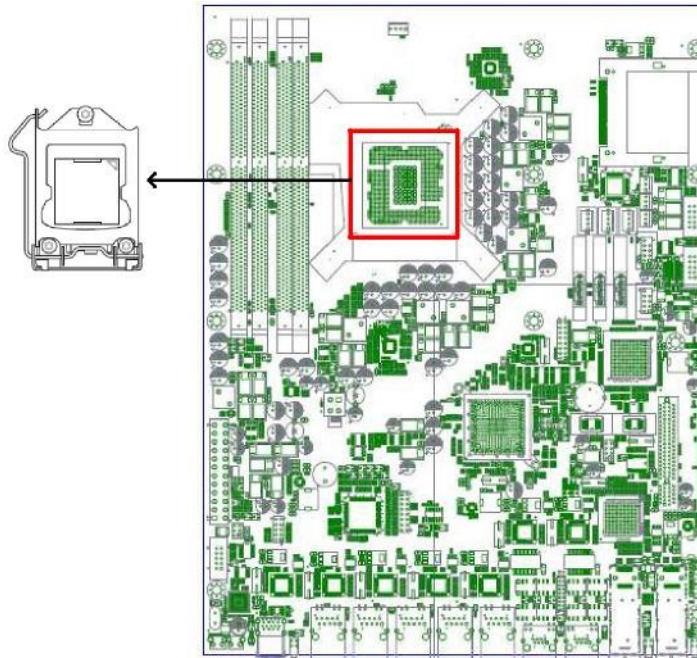
Intel Xeon 3400 series

Intel Core i7-800 series

Intel Core i5-700 and 600 series

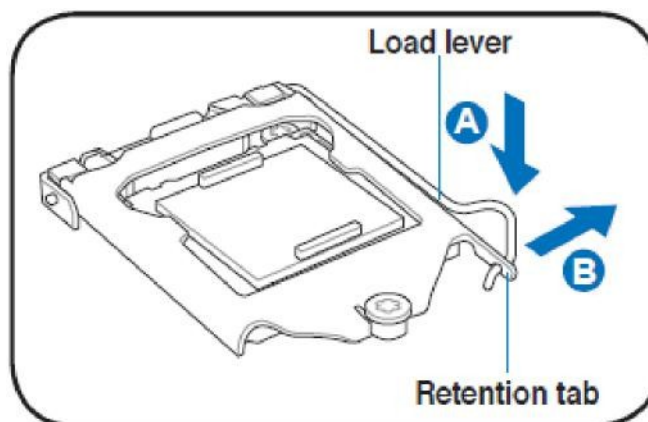
Intel Core i3-500 series

Intel Pentium Dual Core



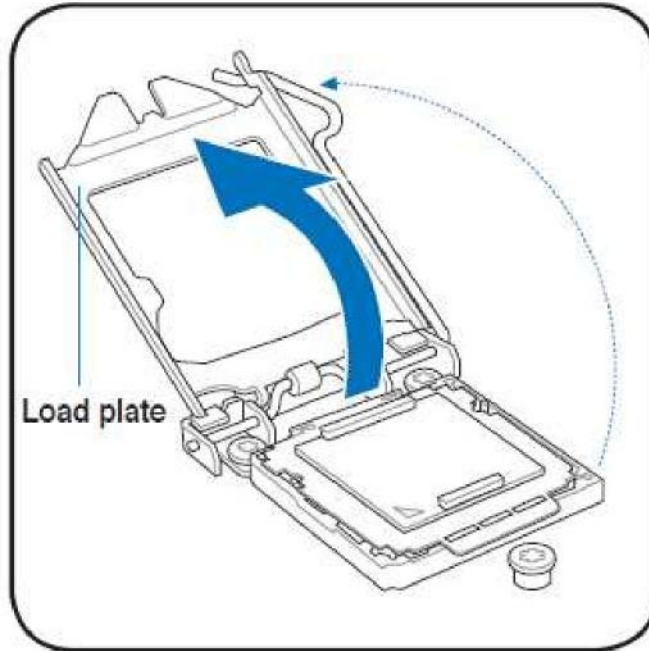
### 4.2.2. Installing CPU:

4.2.2.1 Press the load lever with your thumb (A), and then move it to the right (B) until it is released from the retention tab.

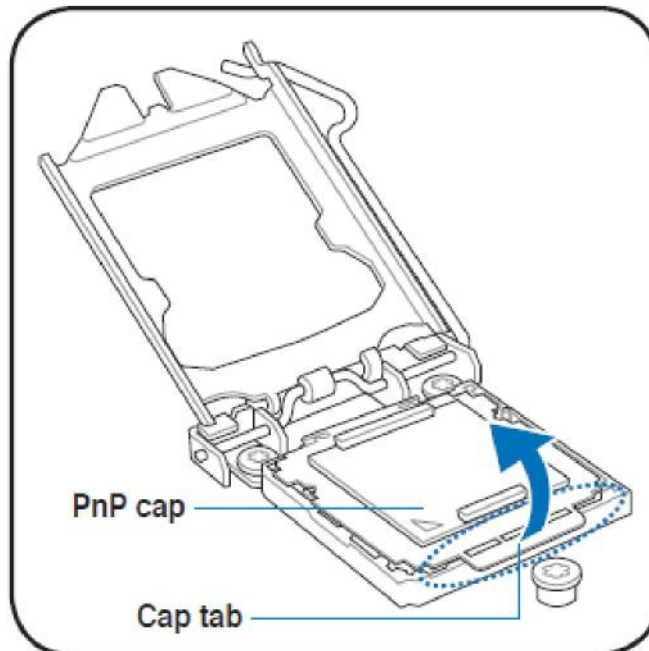


To prevent from damaging to socket pin, do not remove the PnP cap unless you are installing a CPU.

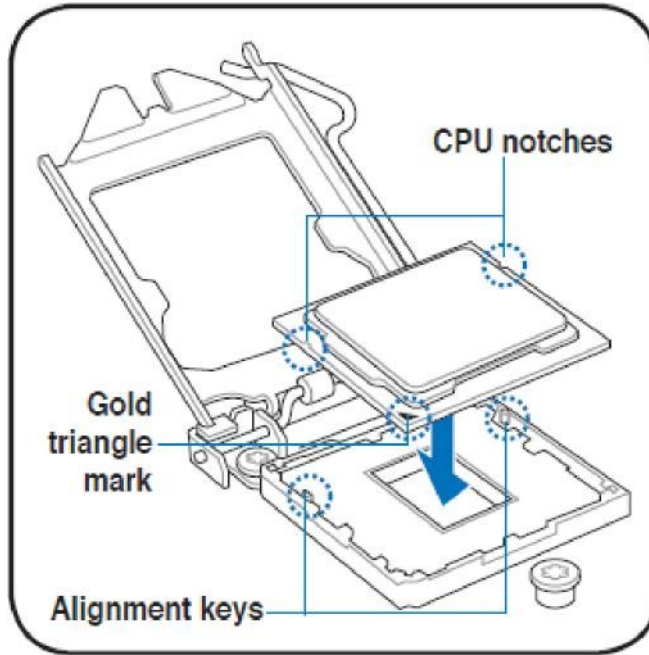
4.2.2.2 Lift the load lever in the direction of the arrow until load plate is completely lifted.



4.2.2.3 Remove the PnP cap from the CPU socket by lifting the tab only.

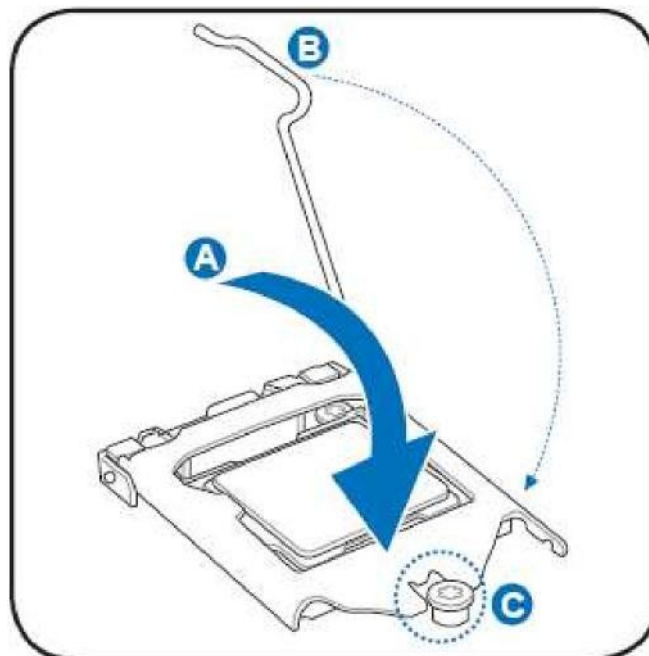


4.2.2.4 Position the CPU over the socket, ensuring that the gold triangle is on the bottom-left corner of the socket, and then fit the socket alignment keys into the CPU notches.



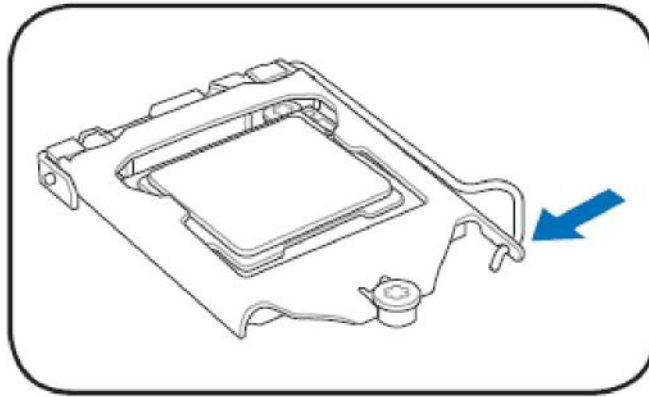
The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU!

4.2.2.5 Close the load plate (A), and then push down the load lever (B), ensuring that the front edge of the load plate slides under the retention knob (C).

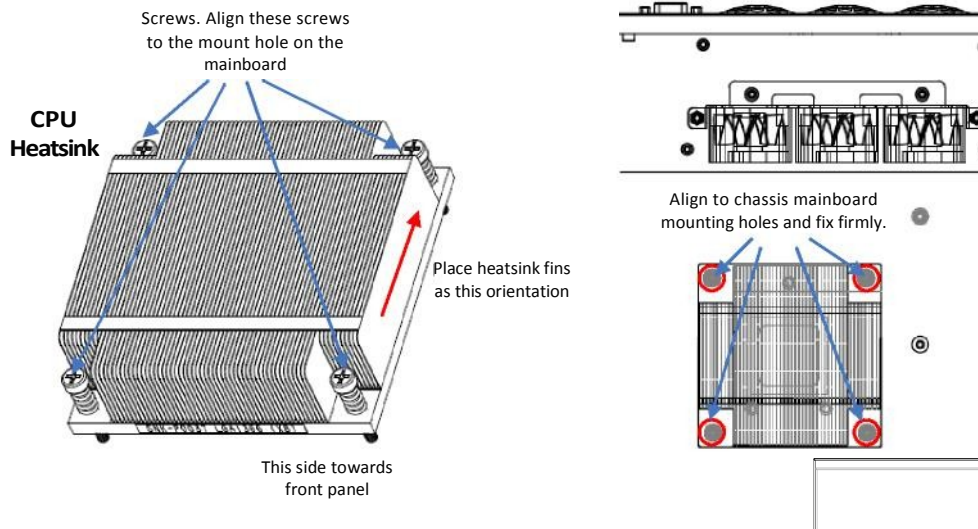




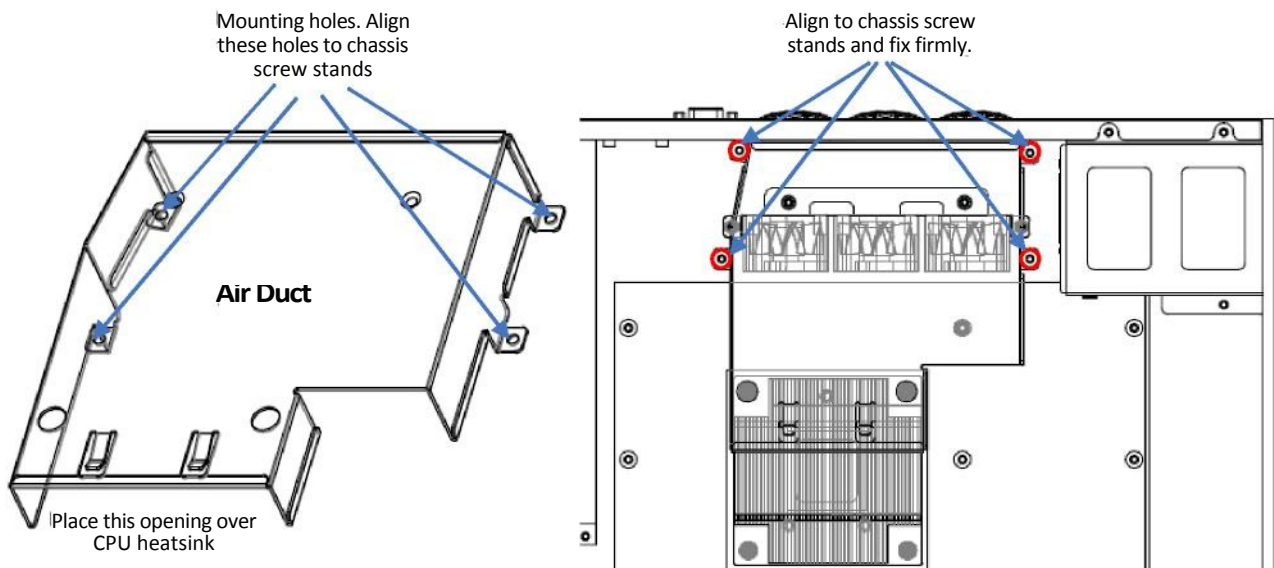
4.2.2.6 Insert the load lever under the retention tab.



4.2.2.7 Installing CPU heatsink. Align 4 screws to heatsink fixture on the main board, make sure that heatsink fins are parallel to memory modules to maximize overall system thermal efficiency.

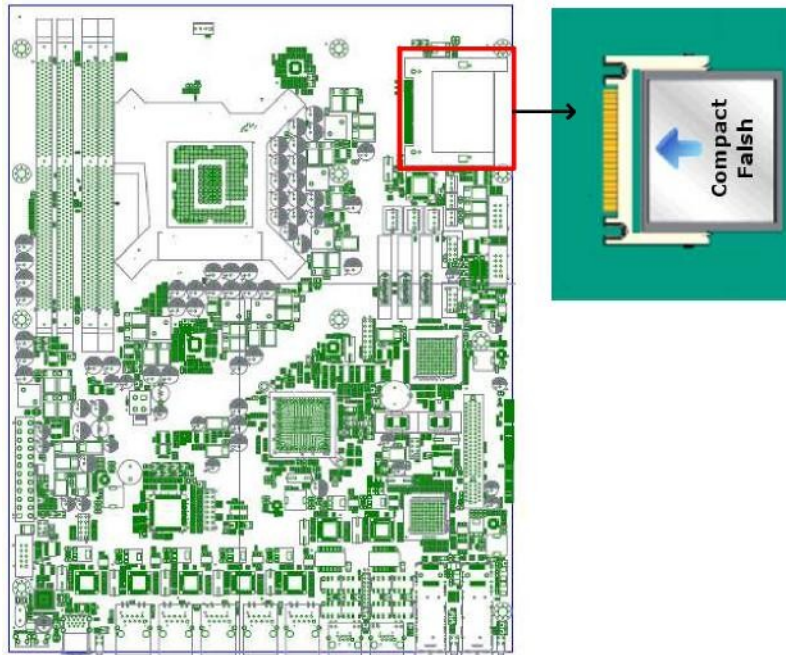


4.2.2.8 Installing CPU cooling air duct. Align 4 mounting holes on the air duct to the screw stands on the chassis. Then fix air duct to the chassis firmly.



### 4.2.3. Compact Flash (CF) card socket

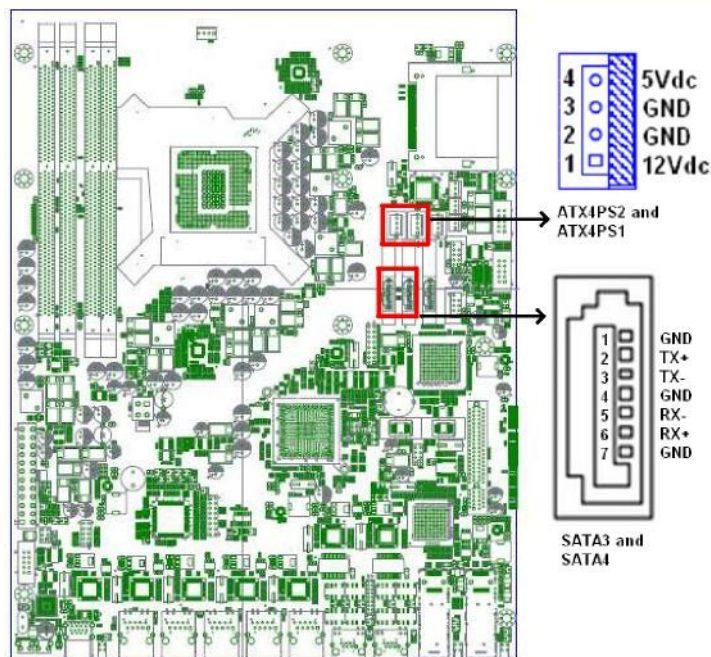
FW9000 supports Compact Flash (CF) card. Please refer following figure to install CF card.



### 4.2.3. SATA power (ATX4PS2, ATX4PS1) and signal (SATA3, SATA4) connectors:

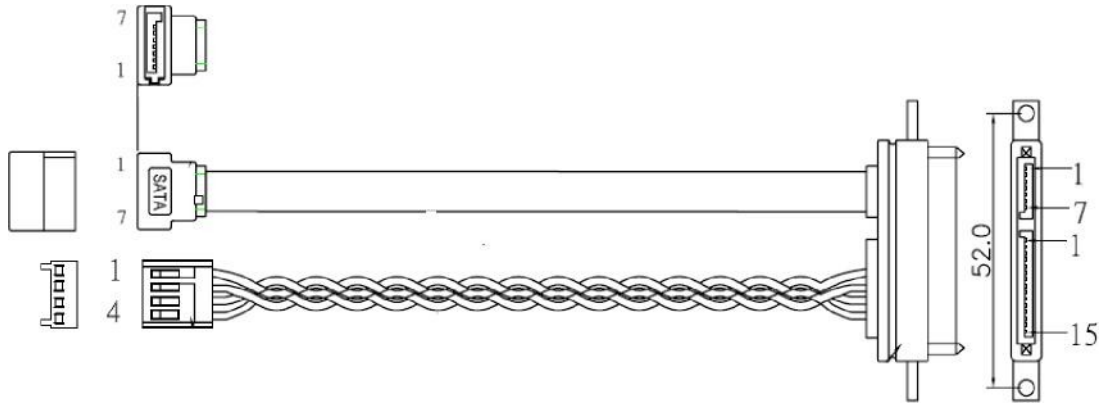
FW9000 can accommodate 2x 2.5" SATA HDD. ATX4PS2 and ATX4PS1 provide 12Vdc and 5Vdc to 2.5" SATA HDD. SATA3 and SATA4 are standard 7-pin SATA signal connectors.

The following figures illustrate location and pin-out assignment of ATX4PS2, ATX4PS1, SATA3 and SATA4.



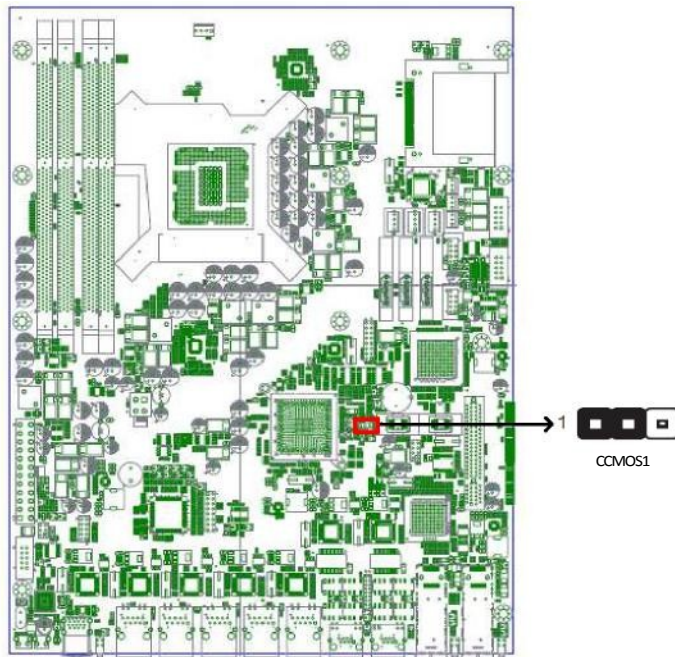


The accessory kit comes with STAT power/signal cable assembly, please use these cable assemblies when installing 2.5" SATA HDDS.






## 4.4 Default Jumper Settings:

### 4.4.1 Clear CMOS, CCMOS1



Disable: 1-2 pin short (default)

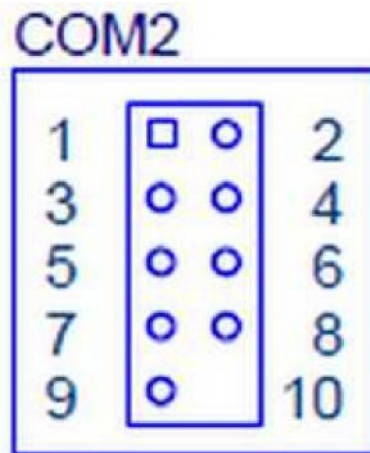
Clear CMOS: 2-3 pin short

CCMOS1	Jumper Position	Description
1 	1 	Disable (Default)
	1 	Clear CMOS

## 5. LCM Programming Instruction Set

FW9000 has a LCM display that communicates with FW9000 main board via Serial (RS232) interface. In the front panel, there are 4 buttons (up, down, enter and escape) that can control the uP of LCM module to display or configured customer desired information of FW9000.

### 5.1 Connector (COM2) Pin-Out Definition:



Pin #	Definition
1	DCD#
2	DSR#
3	RXD (Serial input from host system)
4	RTS#
5	TXD (Serial output to host system)
6	CTS#
7	DTR#
8	+5V
9	Ground
10	No Pin

### 5.2 Serial Interface Protocol:

Universal Asynchronous Receiver Transmitter

Baud Rate: 9600 bps

Data: 8 bit

Parity Check: No

Stop Bit: 1



### 5.3 LCM Initial Setting

5.3.1 16 character, 2 lines. Character format is: 5x7+cursor

5.3.2 Cursor display means shift right 1 character

5.3.3 When character reads in to LCM display, position address adds 1bit and cursor shifts to right 1 character automatically.

### 5.4 Instruction Set:

#### Clear Display

Direction	Host to LCM
Command	0x10, 0x01
Explain	Clears all currently displayed characters
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)

#### Return Home

Direction	Host to LCM
Command	0x10, 0x02
Explain	Returns cursor display to character 1 of line 1
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)

#### Display On/Off

Direction	Host to LCM
Command	0x10, 0x08(entire display off) 0x10, 0x0C(entire display on & cursor off) 0x10, 0x0E(entire display & cursor on)
Explain	Setting LCM to show cursor or not Setting LCM display area all On or all Off
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)



## Turn On/Off Backlight

Direction	Host to LCM
Command	0x10, 0x38 (turn off backlight) 0x10, 0x39 (turn on backlight)
Explain	Turn on or turn off backlight
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)

## Set Display Character Position Address

Direction	Host to LCM
Command	0x10, 0x80~0x8F (Line 1, character 1~16) 0x10, 0xC0~0xCF (Line 2, character 1~16)
Explain	Set character display position
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)

## Write Display Data into Position Address

Direction	Host to LCM
Command	0x12, 0x00~0xFF (ASCII code and extension ROM code)
Explain	Display character on the position address. Position address will automatically add 1 bit after data written in Position address available: 0x80~0x8F, 0xC0~0xCF
Response	LCM to Host
Command	0x11(Acknowledge OK) 0x14(Acknowledge Fail and no action executed)



Button Return Values



Direction	LCM to Host
Command	0x15, Up
	0x16, Down
	0x17, Enter
	0x18, Escape

---

Explain LCM will return the corresponded value to Host when key pressed





## Appendix:

### A. ASCII Code

Char	Hex	Char	Hex	Char	Hex	Char	Hex
(nul)	0x00	(sp)	0x20	@	0x40	`	0x60
(soh)	0x01	!	0x21	A	0x41	a	0x61
(stx)	0x02	"	0x22	B	0x42	b	0x62
(etx)	0x03	#	0x23	C	0x43	c	0x63
(eot)	0x04	\$	0x24	D	0x44	d	0x64
(enq)	0x05	%	0x25	E	0x45	e	0x65
(ack)	0x06	&	0x26	F	0x46	f	0x66
(bel)	0x07	'	0x27	G	0x47	g	0x67
(bs)	0x08	(	0x28	H	0x48	h	0x68
(ht)	0x09	)	0x29	I	0x49	i	0x69
(nl)	0x0a	*	0x2a	J	0x4a	j	0x6a
(vt)	0x0b	+	0x2b	K	0x4b	k	0x6b
(np)	0x0c	,	0x2c	L	0x4c	l	0x6c
(cr)	0x0d	-	0x2d	M	0x4d	m	0x6d
(so)	0x0e	.	0x2e	N	0x4e	n	0x6e
(si)	0x0f	/	0x2f	O	0x4f	o	0x6f
(dle)	0x10	0	0x30	P	0x50	p	0x70
(dc1)	0x11	1	0x31	Q	0x51	q	0x71
(dc2)	0x12	2	0x32	R	0x52	r	0x72
(dc3)	0x13	3	0x33	S	0x53	s	0x73
(dc4)	0x14	4	0x34	T	0x54	t	0x74
(nak)	0x15	5	0x35	U	0x55	u	0x75
(syn)	0x16	6	0x36	V	0x56	v	0x76
(etb)	0x17	7	0x37	W	0x57	w	0x77
(can)	0x18	8	0x38	X	0x58	x	0x78
(em)	0x19	9	0x39	Y	0x59	y	0x79
(sub)	0x1a	:	0x3a	Z	0x5a	z	0x7a
(esc)	0x1b	;	0x3b	[	0x5b	{	0x7b
(fs)	0x1c	<	0x3c	\	0x5c		0x7c
(gs)	0x1d	=	0x3d	]	0x5d	}	0x7d
(rs)	0x1e	>	0x3e	^	0x5e	~	0x7e
(us)	0x1f	?	0x3f	_	0x5f	(del)	0x7f