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Delta MH1 User Guide

*We reserve the right to change the information in this manual without prior notice.





Preface

Thank you for purchasing this product. This user guide provides information about the MH1 Series motion control PAC.

This user guide includes:

- Product inspection and model explanation
- Specifications and product interface
- Installation
- Description of BIOS setting
- System operation and setting
- EcNavi software installation and application
- EzDMC operating instructions

Product features:

MH1 Series motion control PAC supports DMCNET (Delta Motion Control Network) or EtherCAT (Ethernet Control Automation Technology) control interface to fulfill users' requirements. DMCNET offers high-performance multi-axis expansion capability to simultaneously control 12 axes of motion control in 1 ms and supports a variety of motion control modules, such as linear interpolation, arc interpolation, spiral interpolation, and continuous interpolation. Delta's EtherCAT motion control solution supports all EtherCAT master functions, and is capable of controlling up to 100 slave stations within 1 ms cycle time. It also supports 35 homing modes, point-to-point position control, speed control, and torque control; 2 groups of linear interpolation, 3 groups of arc, 2D, and helical interpolation are also provided.

The complete motion control functions of the MH1 Series will be able to meet the needs of the diverse industry. This product is the optimal integration platform for multi-axis synchronous control. It is easy to assemble with better stability and scalability. This is the one and only choice for industrial upgrading.

How to use this user guide:

This user guide can be used as a reference while applying the MH1 Series motion control PAC, which contains information regarding product installation, setting, as well as instructions on how to use and maintain this product.

DELTA technical services:

Please consult your DELTA equipment distributor or DELTA Customer Service Center if you encounter any problems.

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Product Inspection and Model Explanation

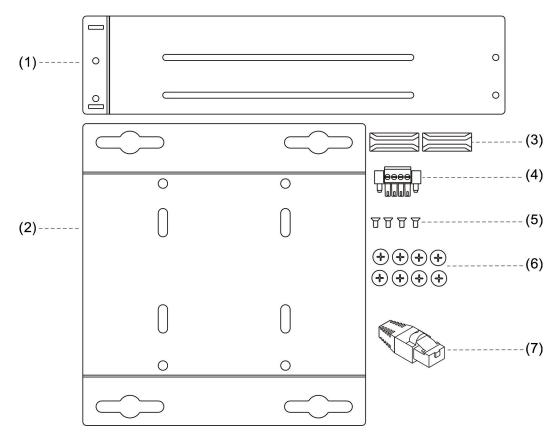
This chapter introduces the MH1 series regarding its product inspection, product model explanation, and safety precautions. Please read through this chapter before using the product.

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1.1 Product inspection

Please check the following once you receive the product:

- 1. Packaging: Make sure the product's packaging is intact.
- 2. Bubble wrap: For protection of the product; make sure the stickers are securely attached to the bubble wrap.
- 3. PAC: Check if the appearance is intact and all accessories are included.
- 4. Product installation instructions: Check if an instruction sheet is included.



No.		Quantity	
(1)	Metal she	1	
(2)		1	
(3)	Plastic compo	onent for securing the PCI / PCIe card	2
(4)		Power connector	1
(5)		Small black screw	4
(6)		Large flat head screw	8
		MH1 - A12/C50/C70 D Series	1
(7)	Terminal resistor	MH1 - A12/C50/C70 E Series	0
(7)		MH1 - A12/C50/C70 N Series	0
		MH1 - S30D	2

1.2 Product model explanation

<u>MH1</u>	- <u>A12</u>	D	- <u>A</u>	0	1	<u>D</u>	G
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

(1)	Product type	MH1 = N	lotion control PAC	(1 st generation)		
(2)	Processor	A12 = Intel Atom E3845 Quad Core 1.91 GHz C50 = Intel Core i5-3610ME Dual Core 2.7 GHz C70 = Intel Core i7-3612QE Quad Core 2.1 GHz S30 = VIA Nano X2 Dual Core 1.2 GHz				
(3)	Expansion interface	D = DMC	N = None D = DMCNET E = EtherCAT			
(4)	Expansion card slot	N = None A = Two PCI slots B = Two PCIe slots (x1+x1) C = Two PCIe slots (x4+x1)				
			DRAM	□micro-SD		
(5)	Internal memory & memory space	0	4 GB	-		
		3	4 GB + 4 GB			
	CFast card & SSD		CFast	SSD		
		0	-	-		
		1	16 GB	-		
(6)		3	32 GB	-		
		4	-	64 GB	-	
		5	-	128 GB		
(7)	Customer code	D = DEL	TA standard versio	า		
(8)	Operation system and software	0 = non-OS D = w/ Windows XP Embedded E = w/ Windows XP Embedded + RTX OS + EtherCAT Master F = w/ Windows 7 Embedded (32-bit) + RTX OS + EtherCAT Master G = w/ Windows 7 Embedded (32-bit) H = w/ Windows 7 Embedded (64-bit) M = w/ Windows 7 Embedded (64-bit) + IMP				

1.3 Safety precautions

- To avoid severe damage caused by possible electric shock, please unplug the power supply connector of the PAC before moving the PAC.
- Before connecting or disconnecting any signal cables from the PAC, please make sure all power cables are unplugged.
- Please make sure the voltage power supply unit is adjusted to the standard level used in the country/region where the PAC is installed. If you are unsure of the supplying voltage of the given area, please contact the local power company for more information.
- If the power supply unit is damaged, do not repair it by yourself. Please contact Delta's technicians or local distributors for assistance.
- How to force shutdown the PAC?
 - Press and hold the power button for 5 seconds to force a shutdown; wait for at least 5 seconds before pressing the power button again to restart the PAC.
 - (2) You may not be able to press the power button to restart the PAC if failing to follow the procedure above. In this case, you will need to force shutdown again by following the above instructions. (That is, press and hold the power button for 5 seconds and wait for another 5 seconds before pressing the power button again.)
- It is recommended to install this product in a case with proper protection.
- This product is designed for industrial automation equipment and applications. To avoid danger, please read this user guide carefully and follow the instructions for installation.
- Failure to operate this product in accordance with the instructions provided in this user guide may result in damage to the equipment or malfunction.

Specifications and Product Interface

This chapter includes the product specifications and product interface. Please refer to this chapter if disassembling the removable components is needed.

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Electrical specifications 2.1

Ite	m	MH1-A12 D/E/N	MH1-C50 D/E/N	MH1-C70 D/E/N
	Processor	Intel Atom E3845 Quad Core 1.91 GHz	Intel Core i5-3610ME Dual Core 2.7 GHz	Intel Core i7-3612QE Quad Core 2.1 GHz
	System chipset	N/A	Intel C	QM77
Processor system	BIOS	AMI BIOS AMI BIOS		
	Memory	DDR3L-13332 x DDR3-1600Default 4 GB,Default 4 GB,support ECCMax 16 GB, support ECC		4 GB,
	Non-volatile memory	128 KB MRAM	128 KB	MRAM
Expansio	n display	2560x1600 / 60Hz	2048x153	6 / 75 Hz
	Network interface	2 x IEEE	802.3/802.3u/802.3al	b 1 Gbps
	BUS communication interface	2 x EtherCAT -	s) - (A12D/C50D/C70 (A12E/C50E/C70E S V/C50N/C70N Series	eries products)
	USB		4 x USB 2.0	
	Serial communication port	1 x RS-232 ((Supports hardware f	low control)
	Digital input	1-CH isolated, Sink type, 24 V _{DC} (5 mA/CH) - (A12D/C50D/C70D Series products)		
Output / input connector	Digital output	1-CH isolated, Sink type, 24 V _{DC} (10 mA/CH) - (A12D/C50D/C70D Series products)		
	Encoder input	2-CH isolated, EA± / EB± - (A12D/C50D/C70D Series products)		
	Compare output	2-CH isolated, CMP	2± - (A12D/C50D/C70	D Series product
	Expansion interface ¹	2 x PCI slot or 1 x PCIe x4 slot + 1 x PCIe x1 slot (C50/C70 Series products) 2 x PCI slot or 1 x PCIe x1 slot + 1 x PCIe x1 slot (A12E/N Series products) 2 x PCI slot (A12D Series products)		
<u>.</u>	CFast card	1 x	CFast card (Optiona	al)
Storage device	SSD ¹	1 x 2	.5" SATA SSD (Optio	nal)
Power supply	Input voltage type		15 ~ 30 V _{DC}	
requirement	Power consumption ²	24V / 1A / 24W	24V / 1.25A / 30W	24V / 1.42A / 34
	Mounting		Desk / wall mounting	_
Mechanism	Weight	3.4 Kg	3.9 Kg	3.9 Kg
	Dimensions		175 x 250 mm (W x H	-
	Operation temperature	121 X	0°C ~ 50°C	
	Storage temperature		-30°C ~ 85°C	
	Relative humidity	0% ~ 90% RH (non-condensing)		
Environment	Pollution degree	Pollution degree 2		
Environment	Vibration test	2 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr / axis		
	Shock test			
		75 G, IEC 60068-2-27, half-sine wave, 11 ms duration		
Supported software	Safety approval Microsoft Windows	Window 7.0, Window 7	CE Window 7.0, Windo Window 7 I	

Note:

Max. power limit: PCIe x4 slot is 25W, PCIe x1 slot is 10W, PCI slot is 10W, SSD is 5W. When CPU is running at full capacity, excluding external storage device (CFast card / SSD) and expansion interface 1. 2. (PCI / PCIe card).

Ite	m	MH1-S30D	
	Processor	VIA Nano X2 Dual Core 1.2 GHz	
	System chipset	VIA VX900	
Processor system	BIOS	AMI BIOS	
	Memory	1xDDR3-1066, Default 4 GB, Max 8 GB	
	Non-volatile memory	128 KB MRAM	
Expansio	n display	VGA 2048x1536 / 75 Hz	
	Network interface	2 x IEEE 802.3/802.3u/802.3ab 1 Gbps	
	BUS communication interface	DMCNET (2 x 6-axis)	
Output / input connector	USB	4 x USB 2.0	
	Serial communication port	1 x RS-232 (Supports hardware flow control)	
	Expansion interface ¹	2 x PCI slot or 1 x PCIe x1 slot + 1 x PCIe x1 slot	
	CFast card	1 x CFast card (Optional)	
Storage device	SSD ¹	1 x 2.5" SATA SSD (Optional)	
	Micro-SD card	1 x Micro-SD card (Optional)	
Power supply	Input voltage type	12 ~ 30 V _{DC}	
requirement	Power consumption ²	24V / 1.5A / 36W	
	Mounting	Desk / wall mounting	
Mechanism	Weight	3.9 Kg	
	Dimensions	127 x 175 x 250 mm (W x H x D)	
	Operation temperature	0 °C ~ 50 °C	
	Storage temperature	-30 °C ~ 85 °C	
	Relative humidity	0% ~ 90% RH (non-condensing)	
Environment	Pollution degree	Pollution degree 2	
	Vibration test	2 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr / axis	
	Shock test	75 G \cdot IEC 60068-2-27, half-sine wave, 11 ms duration	
	Safety approval	CE	
Supported software	Microsoft Windows	Window 7.0, Window XP Embedded, Window 7 Embedded	

Note:

Max. power limit: PCIe x1 slot is 10W, PCI slot is 10W, SSD is 5W. When CPU is running at full capacity, excluding external storage device (CFast card / SSD) and expansion interface (PCI / PCIe card). 1. 2.

2.2 Dimensions

Dimensions of MH1 Series PAC: 230 mm(L) x 127 mm(W) x 175 mm(H)

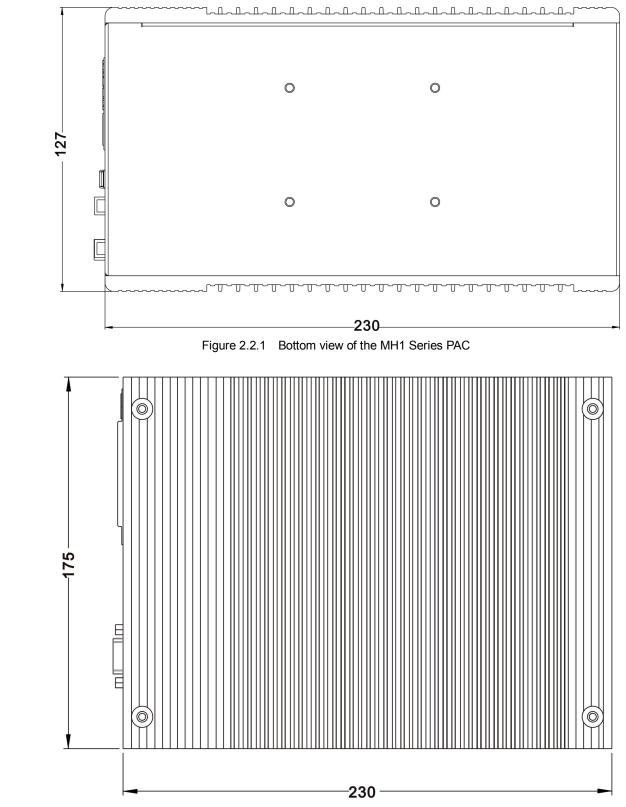


Figure 2.2.2 Side view of the MH1 Series PAC

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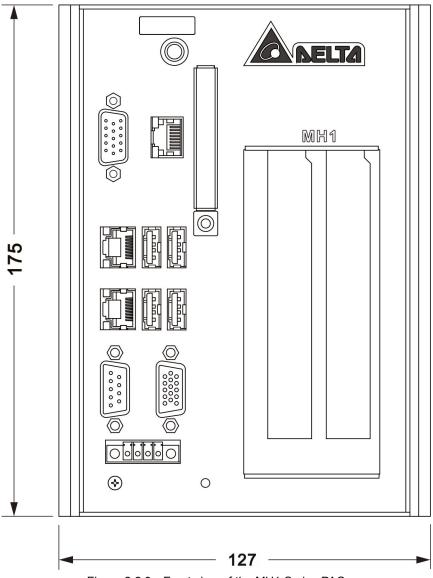
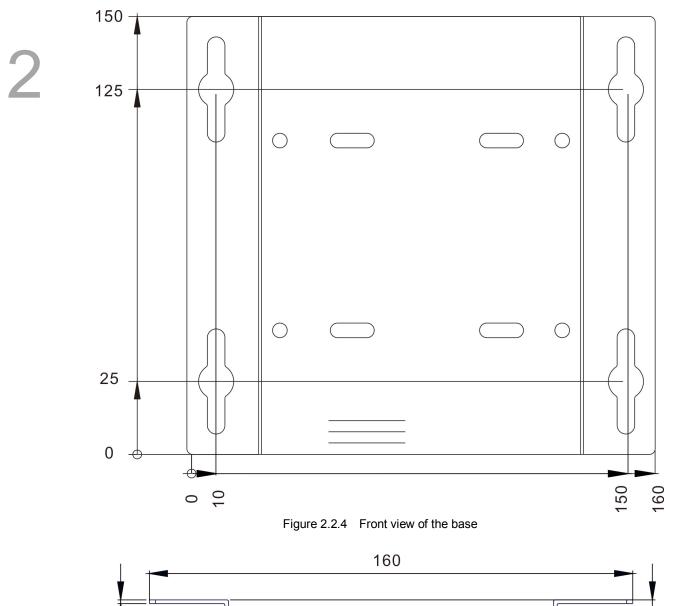
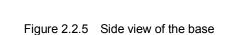


Figure 2.2.3 Front view of the MH1 Series PAC







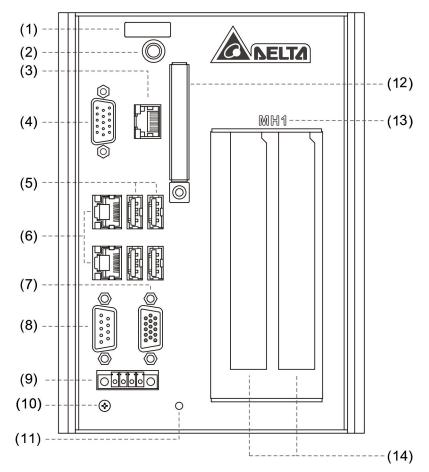
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1.2

2.3 Product interface

2.3.1 MH1 - A12/C50/C70 D Series

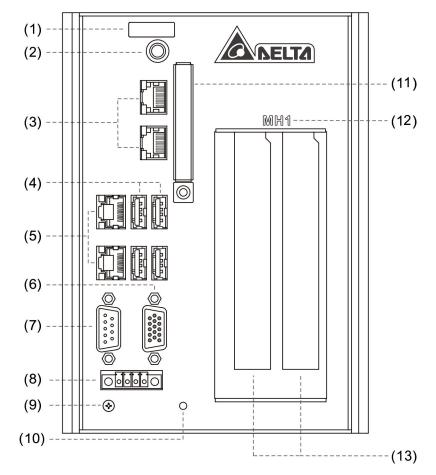
The figure below shows the product interface of MH1 - A12/C50/C70 D Series PAC.



No.	Description	No.	Description
(1)	LED indicator	(8)	RS-232 serial port
(2)	Power On / Off switch	(9)	Power supply connector
(3)	DMCNET connector	(10)	GND screw
(4)	GPIO connector	(11)	Reset switch
(5)	USB 2.0 port	(12)	CFast card slot
(6)	Gigabit LAN port	(13)	Product name
(7)	VGA port	(14)	PCI / PCIe expansion slots

2.3.2 MH1 - A12/C50/C70 E Series

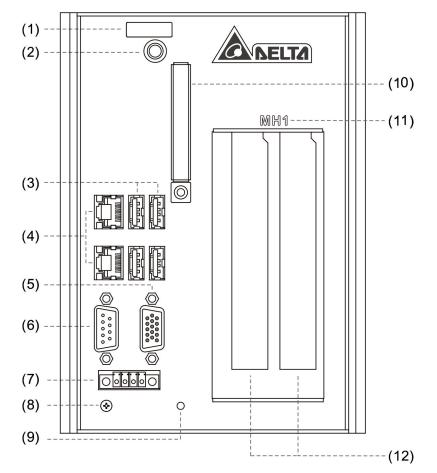
The figure below shows the product interface of MH1 - A12/C50/C70 E Series PAC.



No.	Description	No.	Description
(1)	LED indicator	(8)	Power supply connector
(2)	Power On / Off switch	(9)	GND screw
(3)	EtherCAT connector	(10)	Reset switch
(4)	USB 2.0 port	(11)	CFast card slot
(5)	Gigabit LAN port	(12)	Product name
(6)	VGA port	(13)	PCI / PCIe expansion slots
(7)	RS-232 serial port		

2.3.3 MH1 - A12/C50/C70 N Series

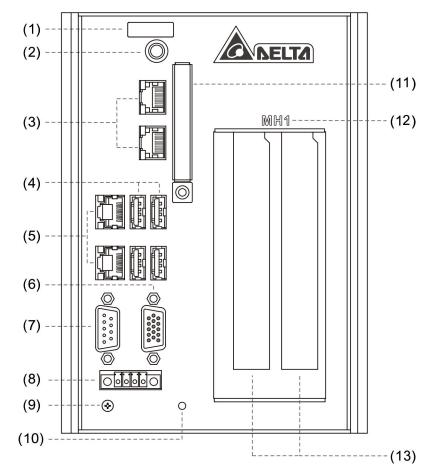
The figure below shows the product interface of MH1 - A12/C50/C70 N Series PAC.



No.	Description	No.	Description
(1)	LED indicator	(7)	Power supply connector
(2)	Power On / Off switch	(8)	GND screw
(3)	USB 2.0 port	(9)	Reset switch
(4)	Gigabit LAN port	(10)	CFast card slot
(5)	VGA port	(11)	Product name
(6)	RS-232 serial port	(12)	PCI / PCIe expansion slots

2.3.4 MH1 - S30D

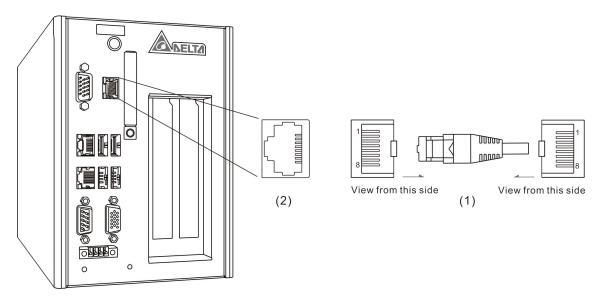
The figure below shows the product interface of MH1 - S30D PAC.



No.	Description	No.	Description
(1)	LED indicator	(8)	Power supply connector
(2)	Power On / Off switch	(9)	GND screw
(3)	DMCNET port	(10)	Reset switch
(4)	USB 2.0 port	(11)	CFast card slot
(5)	Gigabit LAN port	(12)	Product name
(6)	VGA port	(13)	PCI / PCIe expansion slots
(7)	RS-232 serial port	-	-

2.3.5 Motion control fieldbus communication interface (connector)

MH1-D Series: The following shows the detail of the DMCNET connector and its pin assignment.



(1) DMCNET connector (male) (2) DMCNET connector (female)

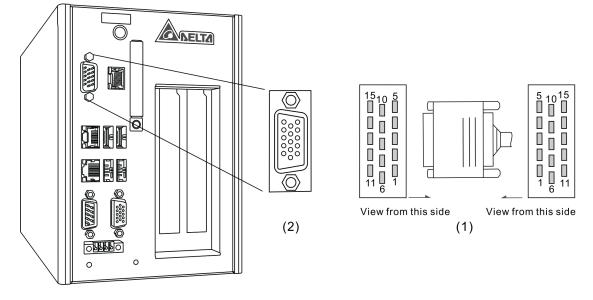
Pin assignment of DMCNET connector is as follows:

PIN	Description
1	1 st RS485 transmission signal (+)
2	1 st RS485 transmission signal (-)
3	2 nd RS485 transmission signal (+)
4	NC
5	NC
6	2 nd RS485 transmission signal (-)
7	External GND
8	External GND

Indicator description of DMCNET port:

	Indicator display	Description
LED (right)	Yellow	DMCNET enabled
LED (left)	Green	DMCNET power indicator

MH1-D Series: The following shows the detail of the GPIO connector and its pin assignment.

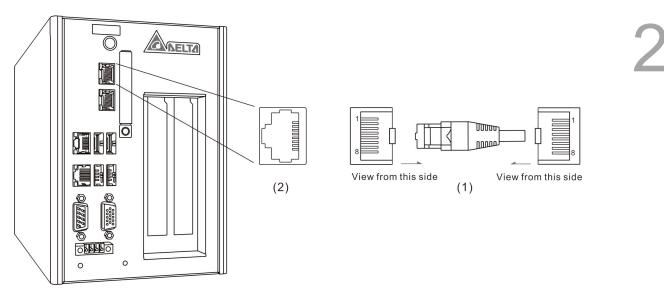


(1) GPIO connector (male) (2) GPIO connector (female)

Pin assignment of GPIO connector is as follows:

PIN	Description
1	QEP_A_1-
2	QEP_B_1-
3	QEP_A_2-
4	QEP_B_2-
5	External GND
6	QEP_A_1+
7	QEP_B_1+
8	QEP_A_2+
9	QEP_B_2+
10	GPIO_IN
11	QEP_CMP_1+
12	QEP_CMP_1-
13	QEP_CMP_2+
14	QEP_CMP_2-
15	GPIO_OUT

MH1-E Series: The following shows the detail of the EtherCAT connector and its pin assignment.



(1) EtherCAT connector (male) (2) EtherCAT connector (female)

Pin assignment of EtherCAT connector is as follows:

PIN	Description
1	TX+
2	TX-
3	RX+
4	NC
5	NC
6	RX-
7	NC
8	NC

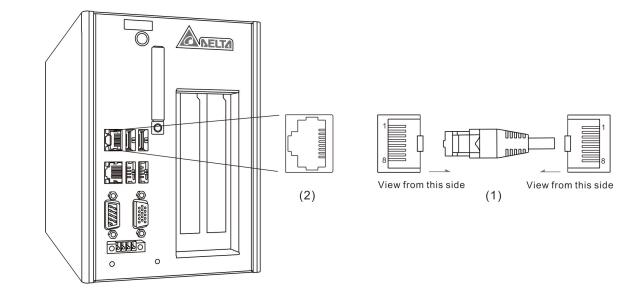
Indicator description of EtherCAT connector:

	Indicator display	Description
LED (left)	Non-flashing (Green)	Network connected
	Flashing (Green)	Transmission in progress

2

2.3.6 Ethernet connector

The following shows the detail of the Gigabit LAN connector and its pin assignment.



(1) Gigabit LAN connector (male) (2) Gigabit LAN connector (female)

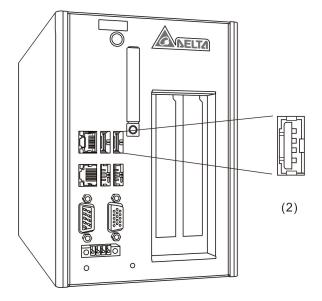
PIN	Description
1	TX+_1
2	TX1
3	TX+_2
4	TX+_3
5	TX3
6	TX2
7	TX+_4
8	TX4

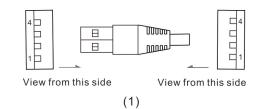
Indicator description of Ethernet connector:

	Indicator display	Description
	Non-flashing (Green)	Network connected
LED (left)	Flashing (Green)	Transmission in progress
LED (right)	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

2.3.7 USB connector

The following shows the detail of the USB 2.0 connector and its pin assignment.





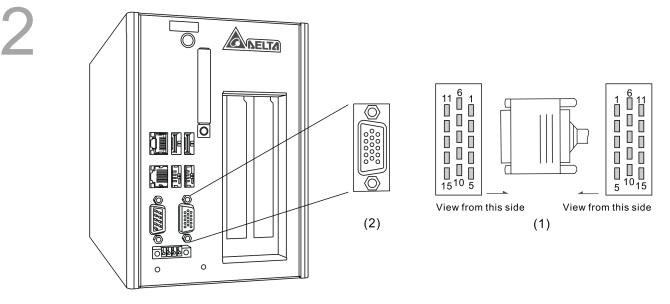
(1) USB 2.0 connector (male) (2) USB 2.0 connector (female)

Pin assignment of the USB 2.0 connector is as follows:

PIN	Description
1	Power supply (+5V)
2	D-
3	D+
4	GND

2.3.8 VGA connector

■ The following shows the detail of the VGA connector and its pin assignment.



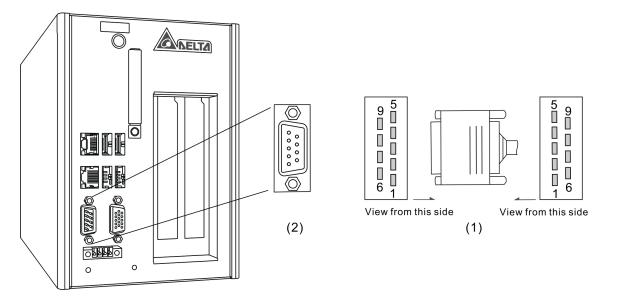
(1) VGA connector (male) (2) VGA connector (female)

Pin assignment of the VGA connector is as follows:

PIN	Description	PIN	Description
1	Red	9	+5V
2	Green	10	GND
3	Blue	12	SDA
5	GND	13	H-Sync
6	GND	14	V-Sync
7	GND	15	SCL
8	GND	Others	NC

2.3.9 RS-232 Serial communication port

The following shows the detail of the RS-232 connector and its pin assignment.



(1) RS-232 serial connector (male) (2) RS-232 serial connector (female)

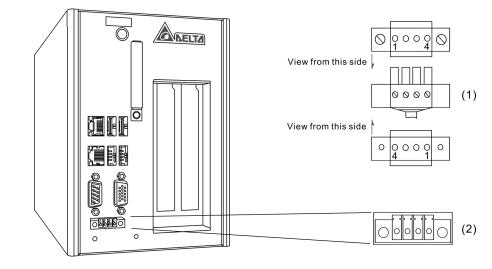
Pin assignment of the RS-232 connector is as follows:

PIN	Description
1	NC
2	RX
3	ТХ
4	NC
5	GND
7	RTS
8	CTS
9	NC

2

2.3.10 Power connector

The following shows the detail of the power connector and its pin assignment.



(1) Power connector (male) (2) Power connector (female)

Description of the power connector is as follows:

PIN	Description
1	Main power supply (+24V)
2	GND
3	GND (FG)
4	UPS reset signal (S)

2.4 Description of internal connectors

There are three types of converter board available, which are:

- 1. PCI & PCI (two PCI slots) as shown in Figure 2.4.1.
- 2. PCIe x 4 & PCIe x 1 (one PCIe x 4 slots, one PCIe x 1 slot) as shown in Figure 2.4.2.
- 3. PCIe x 1 & PCIe x 1 (two PCIe x 1 slots) as shown in Figure 2.4.3.

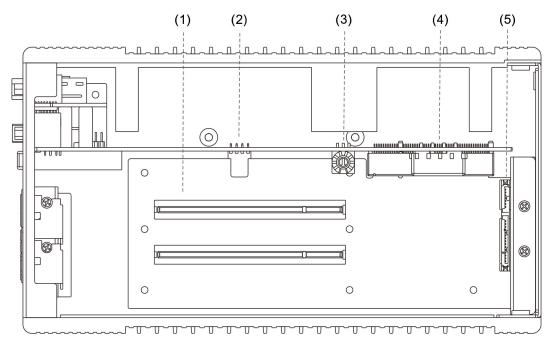


Figure 2.4.1 Top view of the internal of MH1 Series (two PCI slots)

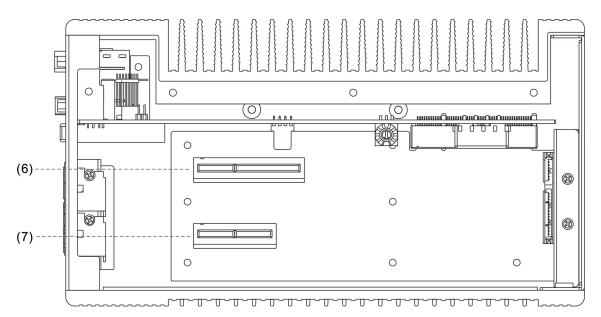


Figure 2.4.2 Top view of the internal of MH1 Series (one PCIe x4 slot + one PCIe x1 slot)

2

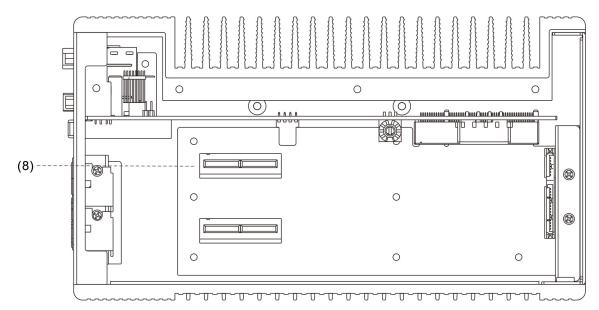
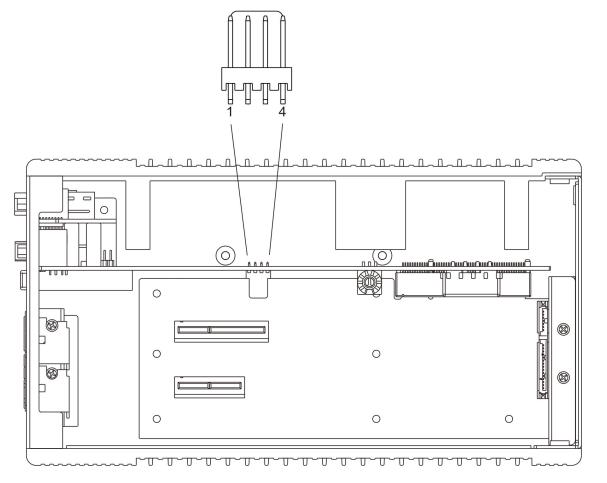


Figure 2.4.3 Top view of the internal of MH1 Series (two PCIe x1 slots)

No.	Description
(1)	PCI card slot
(2)	Compare connector
(3)	Station knob
(4)	12V power supply connector
(5)	SSD card slot
(6)	PCIe x4 card slot
(7)	PCIe x1 card slot
(8)	PCIe x1 card slot

2.4.1 Compare connector



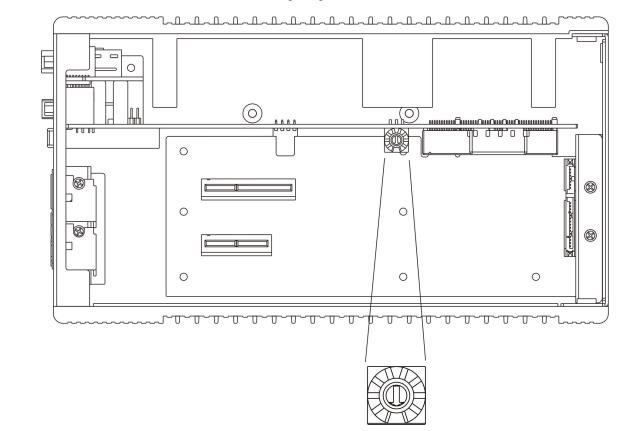
Pin assignment of Compare connector is as follows:

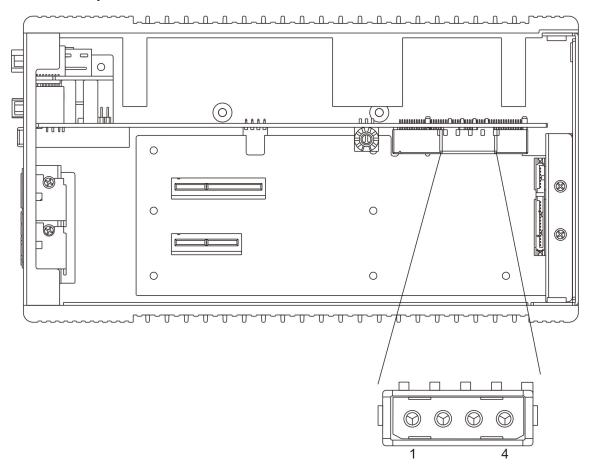
PIN	Description
1	Single Compare Out
2	GND
3	Differential Compare Out +
4	Differential Compare Out -

2

2.4.2 DMC Series Card ID

Card ID is selected via the knob. Its setting range is $0 \sim 15$.





2.4.3 12V power connector

Pin assignment of 12V power connector is as follows:

PIN	Description
1	Power supply (+12V) (Max. supply current 7A)
2	GND
3	GND
4	N/A

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2

Installation

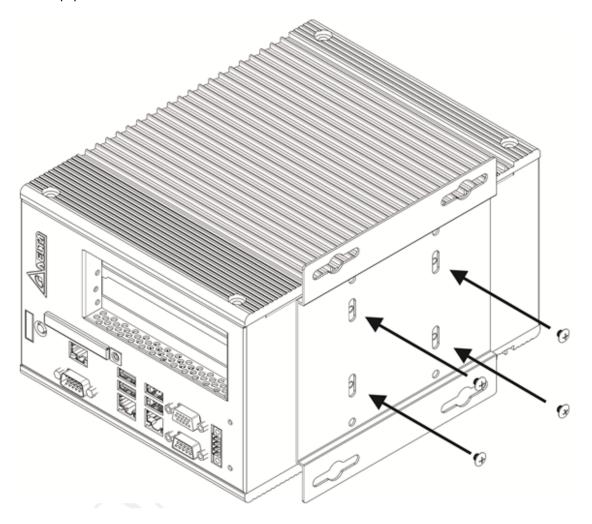
3

This chapter introduces how to install the MH1 series PAC, including vertical and wall mounting methods. Installations for PCI / PCIe, CFast card, and SSD are also included.

3.1	Vertical mounting	3-2
3.2	Wall mounting ·····	3-3
3.3	Installation of PCI / PCIe card	3-4
3.4	Installation of CFast card	3-5
3.5	Installation of SATA SSD ·····	3-6

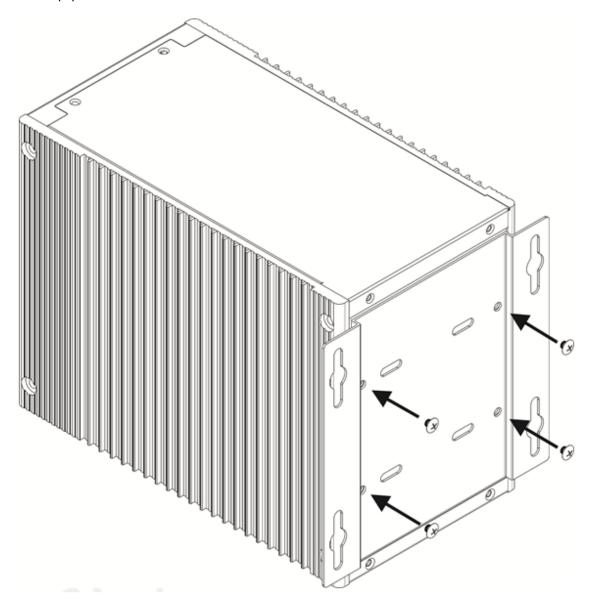
3.1 Vertical mounting

As shown in the figure below, place the PAC in this direction, so you can see the bottom. Fix the 4 large flat head screws to secure the base onto the PAC. Then, use the other four large flat head screws to secure both sides of the base onto the sheet metal of the equipment.



3.2 Wall mounting

As shown in the figure below, place the PAC in this direction, so you can see the back. Fix the 4 large flat head screws to secure the base onto the PAC. Then, use the other four large flat head screws to secure both sides of the base onto the sheet metal of the equipment.

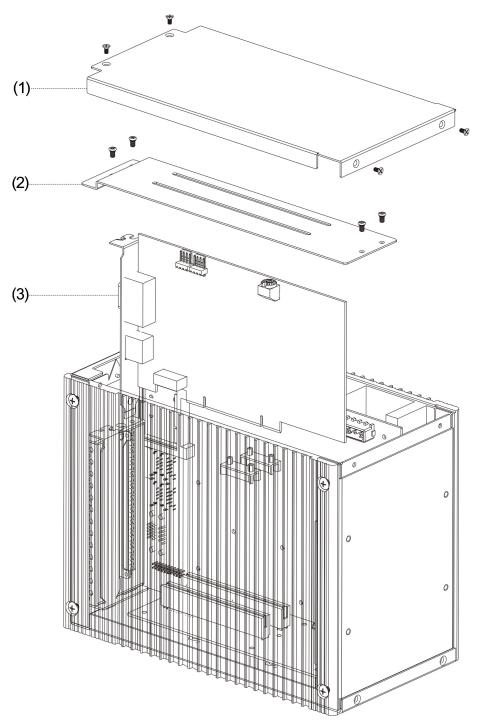


3.3 Installation of PCI / PCIe card

- Insert the PCI card (3) into the PCI slot from the top to bottom and make sure it fits firmly.
- Place the securing metal sheet (2) in the direction as shown in the figure below.

Then, fix the 4 screws to secure the PCI / PCIe card.

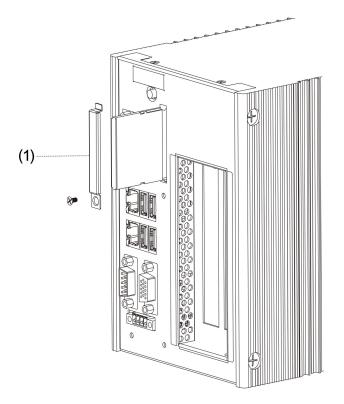
Put on the top cover (1) and tighten the 4 screws to secure the cover.



No.	Description
(1)	Top cover
(2)	Securing metal sheet
(3)	PCI card

3.4 Installation of CFast card

- Remove the screws from the protection cover (1) for the CFast card and then remove the cover. See Figure 3.4.1.
- Insert the CFast card into the slot.
- Put the protection cover back and fix the screws. See Figure 3.4.2.



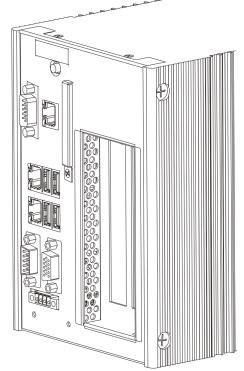


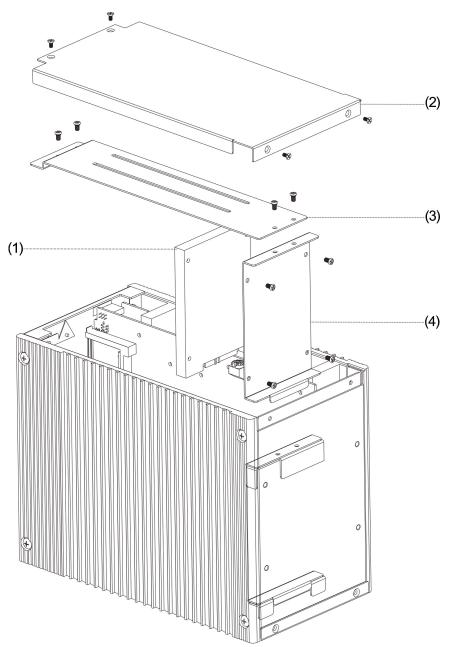
Figure 3.4.1 Remove screws from the protection cover

Figure 3.4.2 Installation completed

No.	Description
(1)	Protection cover

3.5 Installation of SATA SSD

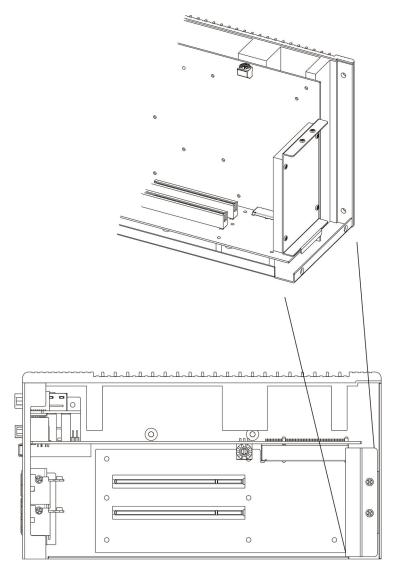
- Place the SSD (1) with the metal sheet for securing the SSD (4) together and tighten with 4 screws.
- Install the metal sheet for securing the SSD (4) into the slot as shown in the figure below.
- Place the securing metal sheet (3) in the direction as shown in the figure below.
 Then, fix the 4 screws to secure the components.
- Put on the top cover (2) and tighten the 4 screws to secure the cover.



No.	Description
(1)	SSD
(2)	Top cover
(3)	Securing metal sheet
(4)	Metal sheet for securing the SSD

SSD installation scheme

The illustration below shows the side view and top view when the installation of SSD is completed.



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3

BIOS



This chapter provides BIOS related settings and instructions for MH1-A12/C50/C70/S30.

4.1 MH	1-A12 Series BIOS operation and setting ······4-2
4.1.1	Main 4-3
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4.1.3	Chipset ····· 4-5
4.1.4	Security 4-10
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4.1.6	Save & Exit 4-12
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4.3.2	Advanced 4-28
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4.3.4	Boot 4-38
4.3.5	Security 4-39
4.3.6	Save & Exit

4.1 MH1-A12 Series BIOS operation and setting

When the screen displays "Press or <F2> to enter setup" when the PAC is booted, press **Del** or **F2** to enter the BIOS setting screen.

1. Functions of each key

Key	Function	Key	Function
$\uparrow \downarrow \leftarrow \rightarrow$	Navigate between items	F1	Help
Enter	Enter or select current item	F2	Restore to previous settings
+ , -	Adjust value	F3	Restore to default settings
Esc	Exit	F4	Save all current settings

2. Overview of the main menu

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc. Main Advanced Chipset Boot Security Save & Exit



Menu option	Function	Menu option	Function
Main	Basic system settings	Boot	Boot settings
Advanced	Advanced function settings	Security	Security settings
Chipset	Chipset settings	Save & Exit	Save options and exit

(Use \leftarrow , \rightarrow to navigate between menu options)

4.1.1 Main

Main options include Total Memory, System Language, etc. as shown below:

Aptio Setup Utility Main Advanced Chipset Security	– Copyright (C) 2015 American Boot Save & Exit	Megatrends, Inc.
BIOS Information BIOS Vendor Core Version Compliancy Project Version Build Date and Time	American Megatrends 5.010 UEFI 2.4; PI 1.3 P04 09/17/2015 22:43:05	Choose the system default language
CPU Configuration Microcode Patch BayTrail SoC	901 DO Stepping	
KSC Information KSC Version	N/A	→+: Select Screen
Memory Information Total Memory	2048 MB (DDR3U)	†↓: Select Item Enter: Select +/−: Change Opt.
GOP Information Intel(R) GOP Driver	[N/A]	F1: General Help F2: Previous Values F3: Optimized Defaults
TXE Information		F4: Save & Exit
Sec RC Version	00.05.00.00	ESC: Exit
TXE FW Version	01.00.02.1060	
System Language	[English]	
Version 2.17.1246.	Copyright (C) 2015 American M	legatrends, Inc.

Item	Default
System Language	English
System Date	N/A
System Time	N/A

4.1.2 Advanced

Advanced options include NCT5577D SIO Configuration, HW Monitor, etc. as shown below:

 NCT5577D Super IO Configuration H/W Monitor IDE Configuration Miscellaneous Configuration LPSS & SCC Configuration SDIO Configuration USB Configuration Platform Trust Technology Security Configuration 	System Super IO Chip Parameters.
	<pre> ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Item	Default
NCT5577D Super IO Configuration	N/A
H/W Monitor	N/A
IDE Configuration	N/A
Miscellaneous Configuration	N/A
LPSS & SCC Configuration	N/A
SDIO Configuration	N/A
USB Configuration	N/A
Platform Trust Configuration	N/A
Security Configuration	N/A

4.1.3 Chipset

Chipset options include North Bridge, South Bridge, etc. as shown below:

Main Adv	Aptio Setup Utility – Copyright (C) 2015 A Anced Chipset Security Boot Save & Exit	merican Megatrends, Inc.
▶ North Brid ▶ South Brid	Ige	North Bridge Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.17.1246. Copyright (C) 2015 Ame	rıcan Megatrends, Inc.
	Item	Default
	North Bridge	N/A
	South Bridge	N/A

North Bridge

Max TOLUD

North Bridge options include Intel IGD Configuration, Max TOLUD, etc. as shown below:

▶ Intel IGD Configuration			Config Intel IGD Setting
Memory Information			
Total Memory	2048	MB (DDR3U)	
Memory SlotO Memory Slot2		4B (DDR3U) ∩esent	
Max TOLUD	[2.5	GB]	
			<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version	2.17.1246. Copyrigh	t (C) 2015 American Me	gatrends, Inc.
Item	Default		Description

2.5 GB

TOLUD settings

South Bridge options include USB Configuration and others as shown below:

	Aptio Setup Chipset	Utility -	Copyright	(C) 2015 American	n Megatrends,	Inc.
Azalia HC USB Conf:					Azalia HD A	udio Options
-	cision Timer AC Power Loss		[Enabled] [Power On			
Serial IF	RQ Mode		[Quiet]			
Global SM BIOS Read	4I Lock d∕Write Protectio	n	[Enabled] [Enabled]			
					++: Select fl: Select Enter: Sele +/-: Change F1: General F2: Previou F3: Optimiz F4: Save & ESC: Exit	Item ct Opt. Help s Values ed Defaults
	Version 2.	17.1246. Co	pyright (C	:) 2015 American M	legatrends, I	nc.
		Ite	m		Defa	ult
		Azalia H	D Audio		N//	4
		USB Con	figuration		N//	4
	ŀ	High Preci	sion Time	r	Enab	led
	Re	estore AC	Power Lo	SS	Power	r On
		Serial IR	Q Mode		Qui	et
		Global S	MI Lock		Enab	led
	BIO	S Read/W	rite Protec	ction	Enab	led

Auto boot when power is applied

To enable or disable auto boot function when power is applied, please follow the steps as follows:

- 1. On the Chipset screen, select **South Bridge** as shown in Figure 4.1.3.1.
- 2. Select **Restore AC Power Loss** and set to **Power On** or **Power Off** as shown in

Figure 4.1.3.2:

Power On: Once power is applied, the PAC will automatically boot; no need to press Start button.

Power Off: Once power is applied, press Start button to boot the PAC.

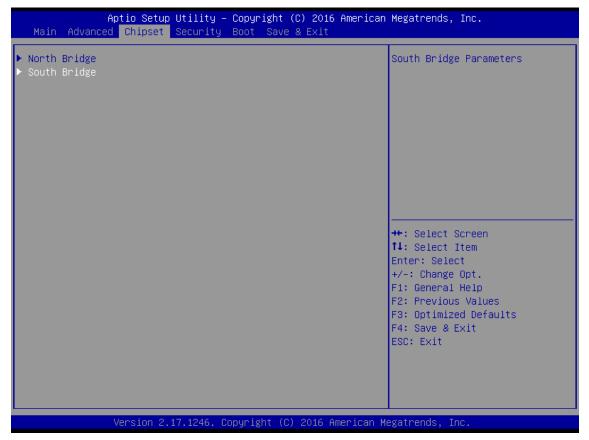


Figure 4.1.3.1

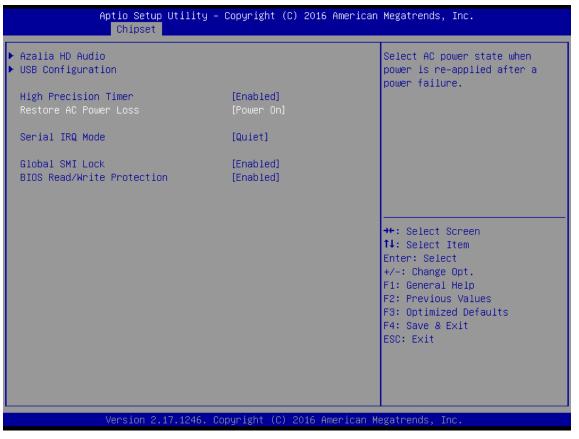


Figure 4.1.3.2

4.1.4 Security

Security options include Administrator Password, User Password, etc. as shown below:

If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range: Minimum length 3 Maximum length 20 ++: Select Screen 11: Select Item Administrator Password User Password User Password Secure Boot menu Secure Boot menu Secure Boot menu	Password Description		Set Administrator Password
Administrator Password Enter: Select User Password +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit	If ONLY the Administrator's p then this only limits access only asked for when entering If ONLY the User's password and mu boot or enter Setup. In Setup have Administrator rights. The password length must be in the following range: Minimum length Maximum length Administrator Password User Password	o Setup and is etup. set, then this t be entered to the User will 3	
			Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Item Default Description			

	20101011	2 000p.to
Administrator Password	N/A	Set / change system administrator password
User Password	N/A	Set / change user password
Secure Boot menu	N/A	-

4.1.5 Boot

Boot options include Setup Prompt Timeout, Bootup NumLock State, etc. as shown below:

Boot Configuration Setup Prompt Timeout	1	Number of seconds to wait for setup activation key.
Bootup NumLock State	[0n]	65535(0xFFFF) means indefinit waiting.
Quiet Boot	[Disabled]	
Fast Boot	[Disabled]	
Boot Option Priorities		
Boot Option #1	[UEFI: SMI USB DISK]
Boot Option #2	[SMI USB DISK 1100]	
Boot Option #3	[UEFI: Built-in EFI]
Hard Drive BBS Priorities		↔+: Select Screen
		↑↓: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F2: Previous Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: Exit

Item	Default	Description
Setup Prompt Timeout	1	-
Bootup NumLock State	On	-
Quiet Boot	Disabled	-
Boot Option Priorities	N/A	-
Hard Drive BBS Priorities	N/A	Hard drive boot priorities

4.1.6 Save & Exit

Save & Exit options include Save Changes and Exit, Discard Changes and Exit, etc. as shown below:

Main Advanced Chipset Security Boo	oyright (C) 2015 Ameri ot Save & Exit	
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset		Exit system setup after saving the changes.
Save Options Save Changes Discard Changes		
Restore Defaults Save as User Defaults Restore User Defaults		
Boot Override UEFI: Built-in EFI Shell UEFI: SMI USB DISK 1100 SMI USB DISK 1100 Launch EFI Shell from filesystem device ▶ Reset System with ME disable ModeMEUD00		<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.17.1246. Copyr	right (C) 2015 America	
Version 2.17.1246. Copyr Item	right (C) 2015 America	
		n Megatrends, Inc.
Item	Default	n Megatrends, Inc.
Item Save Changes and Exit	Default N/A	n Megatrends, Inc.
Item Save Changes and Exit Discard Changes and Exit	Default N/A N/A	n Megatrends, Inc.
Item Save Changes and Exit Discard Changes and Exit Save Changes and Reset	Default N/A N/A N/A	n Megatrends, Inc.
Item Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset	Default N/A N/A N/A N/A	n Megatrends, Inc.
ItemSave Changes and ExitDiscard Changes and ExitSave Changes and ResetDiscard Changes and ResetSave Changes and ResetSave Changes	Default N/A N/A N/A N/A N/A N/A N/A N/A	n Megatrends, Inc.
ItemSave Changes and ExitDiscard Changes and ExitSave Changes and ResetDiscard Changes and ResetSave ChangesDiscard ChangesDiscard Changes	Default N/A	n Megatrends, Inc.
ItemSave Changes and ExitDiscard Changes and ExitSave Changes and ResetDiscard Changes and ResetSave ChangesDiscard ChangesRestore Defaults	Default N/A	n Megatrends, Inc.

4.2 MH1-C50/C70 Series BIOS operation and setting

When the screen displays "Press or <F2> to enter setup" when the PAC is booted, press **Del** or **F2** to enter the BIOS setting screen.

1. Functions of each key

Кеу	Function	Key	Function
$\uparrow\downarrow \leftarrow \rightarrow$	Navigate between items	F1	Help
Enter	Enter or select current item	F2	Restore to previous settings
+ , -	Adjust value	F3	Restore to default settings
Esc	Exit	F4	Save all current settings

2. Overview of the main menu

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc. Main Advanced Chipset Boot Security Save & Exit



Menu option	Function	Menu option	Function
Main	Basic system settings	Boot	Boot settings
Advanced	Advanced function settings	Security	Security settings
Chipset	Chipset settings	Save & Exit	Save options and exit

(Use \leftarrow , \rightarrow to navigate between menu options)

4.2.1 Main

Main options include Total Memory, System Language, etc. as shown below:

Aptio Setup Utility Main Advanced Chipset Boot Se	– Copyright (C) 2012 Ame ecurity Save & Exit	rican Megatrends, Inc.
IGFX VBIOS Version Memory RC Version Total Memory Memory Frequency	2153 1.8.0.0 4096 MB (DDR3) 1333 Mhz	▲ Set the Time. Use Tab to switch between Time elements.
PCH Information Name Stepping LAN PHY Revision	PantherPoint O4/C1 N∕A	
ME FW Version ME Firmware SKU	8.0.20.1513 1.5MB	
SPI Clock Frequency DOFR Support Read Status Clock Frequency Write Status Clock Frequency Fast Read Status Clock Frequency	Unsupported 33 MHz 33 MHz 33 MHz	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values</pre>
System Language	[English]	F3: Optimized Defaults F4: Save & Exit
System Date System Time	[Thu 01/01/2009] [00:00:47]	ESC: Exit
Access Level	Administrator	•
Version 2.15.1236.	Copyright (C) 2012 Ameri	.can Megatrends, Inc.

Default
English
N/A
N/A

BIOS

4.2.2 Advanced

Advanced options include PCI Subsystem Settings, HW Monitor, etc. as shown below:

Aptio Setup Utility – Copyright (C) 2012 Am Main <mark>Advanced</mark> Chipset Boot Security Save & Exit	merican Megatrends, Inc.
 PCI Subsystem Settings ACPI Settings CPU Configuration SATA Configuration Thermal Configuration DPTF Configuration Intel(R) Rapid Start Technology PCH-FW Configuration USB Configuration H/W Monitor Super IO Configuration Serial Port Console Redirection Network Stack Configuration Intel RC Drivers Version Detail CPU PPM Configuration Sandybridge DTS Configuration 	<pre>PCI, PCI-X and PCI Express Settings. ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Item	Default
PCI Subsystem Settings	N/A
ACPI Settings	N/A
CPU Configuration	N/A
SATA Configuration	N/A
Thermal Configuration	N/A
DPTF Configuration	N/A
Intel® Rapid Start Technology	N/A
PCH-FW Configuration	N/A
USB Configuration	N/A
H/W Monitor	N/A
Super IO Configuration	N/A
Serial Port Console Redirection	N/A
Network Stack Configuration	N/A
Intel RC Drivers Version Detail	N/A
CPU PPM Configuration	N/A
Sandybridge DTS Configuration	N/A

■ Enable HT (Hyper Thread)

To enable or disable HT (Hyper Thread), please follow the steps as follows:

- 1. On the Advanced screen, select **CPU Configuration** as shown in Figure 4.2.2.1.
- 2. Select Hyper-Threading and set to Enable or Disable as shown in Figure 4.2.2.2.

Aptio Setup Utility – Copyright (C) 20 Main Advanced Chipset Boot Security Save & Ex.	
 PCI Subsystem Settings ACPI Settings CPU Configuration SATA Configuration Thermal Configuration DPTF Configuration Intel(R) Rapid Start Technology PCH-FW Configuration USB Configuration H/W Monitor Super IO Configuration Serial Port Console Redirection Network Stack Configuration 	CPU Configuration Parameters
 Intel RC Drivers Version Detail CPU PPM Configuration Sandybridge DTS Configuration 	<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.15.1236. Copyright (C) 2012	2 American Megatrends, Inc.

Figure 4.2.2.1

Aptio Setup Utility - Advanced	- Copyright (C) 2012	American Megatrends, Inc.
CPU Configuration		▲ Enabled for Windows XP and
Intel(R) Core(TM) i5–3610ME CPU @ :	2 70047	Linux (OS optimized for Hyper-Threading Technology)
CPU Signature	306a9	and Disabled for other OS (OS
Microcode Patch	19	not optimized for
Max CPU Speed	2700 MHz	Hyper-Threading Technology).
Min CPU Speed	1200 MHz	When Disabled only one thread
CPU Speed	2700 MHz	per enabled core is enabled.
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	
64-bit	Supported	
		↔+: Select Screen
L1 Data Cache	32 kB x 2	↑↓: Select Item
L1 Code Cache	32 kB x 2	Enter: Select
L2 Cache	256 kB x 2	+/-: Change Opt.
L3 Cache	3072 kB	F1: General Help
		F2: Previous Values
Hyper-threading	[Enabled]	F3: Optimized Defaults
Active Processor Cores	[A11]	F4: Save & Exit
Limit CPUID Maximum	[Disabled]	ESC: Exit
Execute Disable Bit	[Disabled]	
Intel Virtualization Technology	[Disabled]	
Hardware Prefetcher	[Enabled]	•
Version 2,15,1236	Copyright (C) 2012 A	merican Megatrends, Inc.

Figure 4.2.2.2

4.2.3 Chipset

Chipset options include PCH-IO Configuration, System Agent (SA) Configuration, etc. as shown below:

Main Advanc	Aptio Setup Utili ed Chipset Boot			Megatrends, Inc.
▶ PCH-IO Config				PCH Parameters ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	Version 2.15.123	5. Copyright (C)	2012 American M	egatrends, Inc.

Item	Default
PCH-IO Configuration	N/A
System Agent (SA) Configuration	N/A

■ PCH-IO Configuration

PCH-IO Configuration options include PCI Express Configuration, USB Configuration, etc. as shown below:

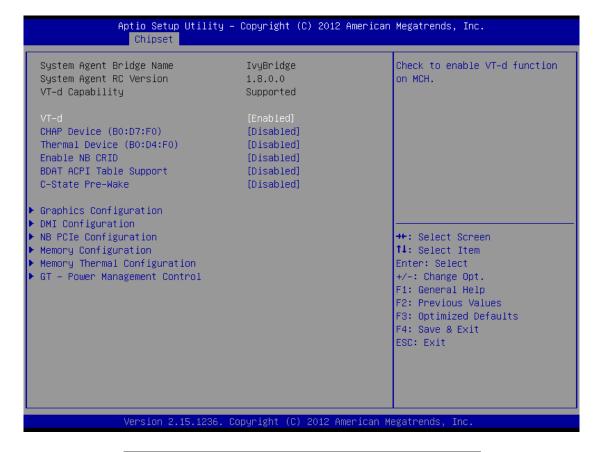
Aptio Setup Utility – Chipset	Copyright (C) 2012 American	Megatrends, Inc.
Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID	1.8.0.1 QM77 04/C1	PCI Express Configuration settings
 PCI Express Configuration USB Configuration PCH Azalia Configuration BIOS Security Configuration 		
Board Capability Display Logic CLKRUN# Logic SB CRID	[SUS_PWR_DN_ACK] [Enabled] [Enabled] [Disabled]	
High Precision Event Timer Configura High Precision Timer	tion [Enabled]	<pre>++: Select Screen \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$</pre>
SLP_S4 Assertion Width Restore AC Power Loss	[4–5 Seconds] [Power On]	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Co	pyright (C) 2012 American Mu	egatrends, Inc.

Item	Default
PCI Express Configuration	N/A
USB Configuration	N/A
PCH Azalia Configuration	N/A
BIOS Security Configuration	N/A
Board Capability	SUS_PWR_DN_ACK
Display Logic	Enabled
CLKRUN# Logic	Enabled
SB CRID	Disabled
High Precision Timer	Enabled
SLP_S4 Assertion Width	4-5 Seconds
Restore AC Power Loss	Power On

System Agent (SA) Configuration

System Agent (SA) Configuration options include VT-d, CHAP Device (B0:D7:F0), etc.

as shown below:



Item	Default
VT-d	Enabled
CHAP Device (B0:D7:F0)	Disabled
Thermal Device (B0:D4:F0)	Disabled
Enable NB CRID	Disabled
BDAT ACPI Table Support	Disabled
C-State Pre-Wake	Disabled
Graphics Configuration	N/A
DMI Configuration	N/A
NB PCIe Configuration	N/A
Memory Configuration	N/A
Memory Thermal Configuration	N/A
GT – Power Management Control	N/A

Auto boot when power is applied

To enable or disable auto boot function when power is applied, please follow the steps as follows:

- 1. On the Chipset screen, select **PCH-IO Configuration** as shown in Figure 4.2.3.1.
- 2. Select Restore AC Power Loss and set to Power On or Power Off as shown in

Figure 4.2.3.2:

Power On: Once power is applied, the PAC will automatically boot; no need to press Start button.

Power Off: Once power is applied, press Start button to boot the PAC.

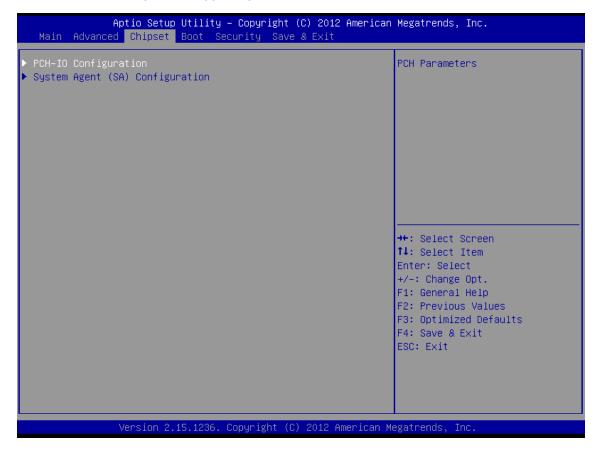


Figure 4.2.3.1

Intel PCH RC Version Intel PCH SKU Name Intel PCH Rev ID	1.8.0.1 QM77 04/C1	Select AC power state when power is re-applied after a power failure.
PCI Express Configuration USB Configuration PCH Azalia Configuration BIOS Security Configuration		
Board Capability Display Logic CLKRUN# Logic SB CRID	[SUS_PWR_DN_ACK] [Enabled] [Enabled] [Disabled]	
High Precision Event Timer C High Precision Timer	onfiguration [Enabled]	<pre>++: Select Screen 1↓: Select Item Enter: Select +/-: Change Opt.</pre>
SLP_S4 Assertion Width Restore AC Power Loss	[4–5 Seconds] [Power On]	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Figure 4.2.3.2

4.2.4 Boot

Boot options include Setup Prompt Timeout, Bootup NumLock State, etc. as shown below:

Aptio Setup Utility – Main Advanced Chipset Boot Sec		American Megatrends, Inc.
Boot Configuration Setup Prompt Timeout Bootup NumLock State Quiet Boot Boot Option Priorities Boot Option #1 Boot Option #2 Hard Drive BBS Priorities CSM16 Parameters CSM parameters	1 [On] [Enabled] [hp v155w 1100] [UEFI: hp v155w 110	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting. ++: Select Screen 11: Select Item Enter: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. C	opyright (C) 2012 Am	erican Megatrends, Inc.
Item	Default	Description
Setup Prompt Timeout	1	-
Bootup NumLock State	On	-
Quiet Boot	Enabled	-

N/A

N/A

-

Hard drive boot priorities

Boot Option Priorities

Hard Drive BBS Priorities

4.2.5 Security

Security options include Administrator Password, User Password, etc. as shown below:

Aptio Setup Utility – Copyright (C) 2012 Amer Main Advanced Chipset Boot <mark>Security</mark> Save & Exit	ican Megatrends, Inc.
Main Advanced Chipset BootSecuritySave & ExitPassword DescriptionIf ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.If ONLY the User's password is set, then this is a power on password and must be entered to 	Set Administrator Password ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 America	an Megatrends, Inc.

Item	Default	Description
Administrator Password	N/A	Set / change system administrator password
User Password	N/A	Set / change user password
Secure Boot menu	N/A	-

4.2.6 Save & Exit

Save & Exit options include Save Changes and Exit, Discard Changes and Exit, etc. as shown below:

Aptio Setup Utility – Copyright (C) 2012 American Main Advanced Chipset Boot Security <mark>Save & Exit</mark>	Megatrends, Inc.
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset	Exit system setup after saving the changes.
Save Options Save Changes Discard Changes	
Restore Defaults Save as User Defaults Restore User Defaults	
Boot Override hp v155w 1100 UEFI: hp v155w 1100	↔: Select Screen tl: Select Item Enter: Select +/-: Change Opt.
Launch EFI Shell from filesystem device	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.15.1236. Copyright (C) 2012 American M	legatrends, Inc.

Item	Default	Description
Save Changes and Exit	N/A	-
Discard Changes and Exit	N/A	-
Save Changes and Reset	N/A	-
Discard Changes and Reset	N/A	-
Save Changes	N/A	-
Discard Changes	N/A	-
Restore Defaults	N/A	-
Save as User Defaults	N/A	-
Restore User Defaults	N/A	-
Boot Override	N/A	Force boot option

4.3 MH1-S30D BIOS operation and setting

When the screen displays "Press or <F2> to enter setup" when the PAC is booted, press **Del** or **F2** to enter the BIOS setting screen.

1. Functions of each key

Key	Function	Function Key	
$\uparrow\downarrow \leftarrow \rightarrow$	Navigate between items	Navigate between items F1	
Enter	Enter or select current item	F2	Restore to previous settings
+ , -	-,- Adjust value		Restore to default settings
Esc	Exit	F4	Save all current settings

2. Overview of the main menu



Menu option	Function	Menu option	Function
Main	Main Basic system settings		Boot settings
Advanced Advanced function settings		Security	Security settings
Chipset Chipset settings		Save & Exit	Save options and exit

(Use \leftarrow , \rightarrow to navigate between menu options)

4.3.1 Main

Main options include Total Memory, System Language, etc. as shown below:

	ptio Setup Utility – Chipset Boot Secu	Copyright (C) 2011 America rity Save & Exit	n Megatrends, Inc.	
BIOS Informatio BIOS Vendor Core Version Compliancy Project Version Build Date and Memory Informat Total Memory System Language System Date System Time Access Level	Time	American Megatrends 4.6.4.0 UEFI 2.0 1APBN 0.06 x64 02/25/2014 10:39:52 4096 MB (DDR3) [English] [Tue 03/04/2014] [10:37:12] Administrator	Choose the system language ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Valuu F3: Optimized Def: F4: Save & Exit ESC: Exit	ES
	Version 2.13.1216. Co	pyright (C) 2011 American	Megatrends, Inc.	
		Item	Default	
	Systen	n Language	English	

System Language	English
System Date	N/A
System Time	N/A

4.3.2 Advanced

Advanced options include Launch PXE OpROM, Launch Storage OpROM, etc. as shown below:

Legacy OpROM Support Launch PXE OpROM Launch Storage OpROM	[Disabled] [Enabled]	PCI, PCI-X and PCI Express Settings.
PCI Subsystem Settings ACPI Settings CPU Configuration IDE Configuration Other Setting USB Configuration Clock Generator Configurat.	lon	
Demo Board		++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Item	Default
Launch PXE OpROM	Disabled
Launch Storage OpROM	Enabled
PCI Subsystem Settings	N/A
ACPI Settings	N/A
CPU Configuration	N/A
IDE Configuration	N/A
Other Setting	N/A
USB Configuration	N/A
Clock Generator Configuration	N/A
Demo Board	N/A

BIOS

4.3.3 Chipset

Chipset options include North Bridge, South Bridge, etc. as shown below:

South Bridge

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc. Main Advanced <mark>Chipset</mark> Boot Security Save & Exit		
▶ North Bridge ▶ South Bridge	North Bridge Parameters ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.13.1216. Copyright (C) 2011 Amer.	ican Megatrends, Inc.	
Item	Default	
North Bridge	N/A	

N/A

North Bridge

North Bridge options include DRAM Configuration, PCIe Configuration, etc. as shown below:

	Aptio Setup Utility - Chipset	- Copyright (C) 3	2011 American	Megatrends, Inc.	
VX900 S/P/E Sa Generic Debug DRAM Configrat Video Configra PCIE Configura V-Link Configr	Enable tion ation ation	[E->P->S] [Disabled]		Note. Choose [Mar NB functions S/P/ setting.	
				++: Select Screer ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Valu F3: Optimized Def F4: Save & Exit ESC: Exit	ies
	Version 2.13.1216. (Copyright (C) 20:	11 American M	egatrends, Inc.	
·		Item		Default	
	VX900 S	S/P/E Setting		E->P->S	
	Generic [Debug Enable		Disabled	
	DRAM C	Configuration		N/A	

Video Configuration

PCIe Configuration

V-Link Configuration

N/A

N/A

N/A

DRAM Configuration

DRAM Configuration options include DRAM Clock and others as shown below:

Aptio Setup Utility - Chipset	Copyright (C) 2011 American	Megatrends, Inc.
Memory Information Current FSB Frequency Current DRAM Frequency Total Memory Memory Slot0 Memory Slot1 DRAM Configration DRAM Clock DRAM Timing SDRAM CAS Latency [DDR2/DDR3] Bank Interleave	1066 MHz 1066 MHz 4096 MB (DDR3) 4096 MB (DDR3) Not Present [By SPD] [Auto by SPD] [TT/8T] [SPD]	Select DRAM frequency.
Prechange to Active(Trp)[DDR2/DDR3 Active to Prechange(Tras)[DDR2/DDR Active to CMD(Trcd)[DDR2/DDR3] REF to ACT/REF(Trfc) ACT(0) to ACT(1) (Trrd) Read to Prechange (Trtp)[DDR2/DDR3 Write to Read CMD (Tutr) Write Recovery Time (Twr)[DDR2/DDR DDR3 CAS Write Latency Tfaw - 4*Trrd	(9T/9T) (6T/8T) [11T] [15T]	<pre>++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Output Impedance Control Memory Chip ODT[DDR2/DDR3]	[Normal] [Auto] ▼	

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Item	Default
DRAM Clock	By SPD
DRAM Timing	Auto by SPD
SDRAM CAS Latency	7T/8T
Bank Interleave	SPD
Precharge to Active (Trp)	9T/11T
Active to Precharge (Tras)	20T/30T
Active to CMD (Trcd)	9T/11T
REF to ACT/REF (Tric)	10T/156T
ACT(0) to ACT(1) (Trrd)	9T/9T
Read to Precharge (Trtp)	5T/6T
Write to Read CMD (Twtr)	9T/9T
Write Recovery Time (Twr)	6T/8T
DDR3 CAS Write Latency	11T
Tfaw – 4*Trrd	15T

Aptio Setup Utility - Chipset	Copyright (C) 2011 American	Megatrends, Inc.
Read to Precharge (Trtp)[DDR2/DDR3 White to Read CMD (Twtr) White Recovery Time (Twr)[DDR2/DDR DDR3 CAS White Latency Tfaw - 4*Trrd Output Impedance Control Memory Chip ODT[DDR2/DDR3] DDR3 Dynamic ODT BAO SEL BA1 SEL BA2 SEL VR Interleave Address Bit 0 VR Interleave Address Bit 1 Virtual Rank Interleave BA Scramble DRDY Timing VGA Share Memory (Frame Buffer) Internal VGA DVO Support Dram init Method Remap Function Control CPU Direct Access Frame Buffer DRAM Self Refresh Dynamic CKE	[ST/6T] [9T/9T] [6T/8T] [11T] [1ST] [Auto] [Auto] [Auto] [A13] [A14] [A15] [A14] [A15] [A17] [A16] [Enabled] [Default] [S12 M8] [Disabled] [] [Enabled] [Enabled] [Enabled] [Enabled]		Dynamic CKE ++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

Item	Default
Output Impedance Control	Normal
Memory Chip ODT	Auto
DDR3 Dynamic ODT	Auto
BA0 SEL	A13
BA1 SEL	A14
BA2 SEL	A15
VR Interleave Address Bit 0	A17
VR Interleave Address Bit 1	A16
Virtual Rank Interleave	Auto
BA Scramble	Enabled
DRDY Timing	Default
VGA Share Memory (Frame Buffer)	512 MB
Internal VGA DV0 Support	Disabled
Dram init Method	N/A
Remap Function Control	Enabled
CPU Direct Access Frame Buffer	Disabled
DRAM Self Refresh	Enabled
Dynamic CKE	Enabled
VR Interleave Address Bit 1 Virtual Rank Interleave BA Scramble DRDY Timing VGA Share Memory (Frame Buffer) Internal VGA DV0 Support Dram init Method Remap Function Control CPU Direct Access Frame Buffer DRAM Self Refresh	A16 Auto Enabled Default 512 MB Disabled N/A Enabled Disabled Enabled

Video Configuration

Video Configuration options include UMA Enable and others as shown below:

Aptio Setup Utility Chipset	– Copyright (C) 2011 Ameri	ican Megatrends, Inc.
Video Configration		UMA Enable/Disable.
UMA Enable Select Display Device Control Select Display Device 1 Select Display Device 2 Panel Type Panel Type2 TV H/W Layout TV Type TV Output Connector HDTV Type Select HDTV Output Connector Enging Clock Control ECLK Frequency SSC On/Off SSC Path Selection SSC Original/FiFo Mode Display Clock SSC Linux Video IP Enablement	[Enabled] [MANUAL] [LCD] [CRT] 9 2 [Default] [NTSC] [CVBS (Composite)] [HDTV 720P] [R/G/B] [Disabled] 250 [Enabled] [External] [Original] [Mode 1 (8X)] [Enable all]	<pre>++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

Version 2.13.1216. Copyright (C) 2011 American Megatrends, Inc.

Item	Default
UMA Enable	Enabled
Select Display Device Control	MANUAL
Select Display Device 1	LCD
Select Display Device 2	CRT
Panel Type	9
Panel Type2	2
TV H/W Layout	Default
ТV Туре	NTSC
TV output Connector	CVBS (Composite)
HDTV Type	HDTV 720P
Select HDTV Output Connector	R/G/B
Engine Clock Control	Disabled
SSC On/Off	Enabled
SSC Path Selection	External
SSC Original/FiFo Mode	Original
Display Clock SSC	Mode 1 (8X)
Linux Video IP Enablement	Enabled all

PCle Configuration

PCIe Configuration options include PCIe PE0 Control and others as shown below:

Aptio Setup Uti Chipset	ility – Copyright (C) 2011 Am	erican Megatrends, Inc.	
PCIE Configuration Maximum Payload Size Reset PCIe When Link Fail Reset PEO When Link Fail Reset PE1 When Link Fail Reset PE2 When Link Fail ASPM Support PCIE Target Link Speed PCIE Root Port PCIE PEO Control PCIE PE1-3 Control	[Auto] [Enabled] [Enabled] [Enabled] [Enabled] [Auto] [Auto] [Enabled] [Enabled] [Enabled]	Select Maximum Payloa ++: Select Screen 1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Default F4: Save & Exit ESC: Exit	
Version 2.13.1	1216. Copyright (C) 2011 Amer	ican Megatrends, Inc.	
Version 2.13.1	1216. Copyright (C) 2011 Amer Item	ican Megatrends, Inc.	
Max	Item	Default	
Max Reset	Item imum Payload Size	Default Auto	
Max Reset Reset	Item imum Payload Size PCIe When Link Fail	Default Auto Enabled	
Max Reset Reset Reset	Item imum Payload Size : PCIe When Link Fail t PE0 When Link Fail	Default Auto Enabled Enabled	
Max Reset Reset Reset Reset	Item timum Payload Size : PCIe When Link Fail t PE0 When Link Fail t PE1 When Link Fail	DefaultAutoEnabledEnabledEnabledEnabled	
Max Reset Reset Reset Reset Reset	Item timum Payload Size PCIe When Link Fail t PE0 When Link Fail t PE1 When Link Fail t PE2 When Link Fail	DefaultAutoEnabledEnabledEnabledEnabledEnabledEnabled	
Max Reset Reset Reset Reset	Item timum Payload Size PCIe When Link Fail t PE0 When Link Fail t PE1 When Link Fail t PE2 When Link Fail t PE3 When Link Fail	DefaultAutoEnabledEnabledEnabledEnabledEnabledEnabledEnabled	
Max Reset Reset Reset Reset Reset	Item timum Payload Size PCIe When Link Fail t PE0 When Link Fail t PE1 When Link Fail t PE2 When Link Fail t PE3 When Link Fail ASPM Support	DefaultAutoEnabledEnabledEnabledEnabledEnabledEnabledAuto	
Max Reset Reset Reset Reset Reset	Item imum Payload Size PCIe When Link Fail PE0 When Link Fail PE1 When Link Fail PE2 When Link Fail PE3 When Link Fail ASPM Support e Target Link Speed	DefaultAutoEnabledEnabledEnabledEnabledEnabledEnabledAutoAuto	

South Bridge

South Bridge options include VX900 S/P/E Setting, High Speed Support, etc. as shown below:

Aptio Setup Utility - Chipset	Copyright (C) 2011 American) Megatrends, Inc.
		Note. Choose [Manual] for each
VX900 S/P/E Setting	[E->P->S]	SB functions S/P/E independent setting.
SDIO / Card Reader Configuration		
SDIO Host controller	[Enabled]	
Voltage Support 1.8v	[Disabled]	
High Speed Support Base Clock Frequency For SD Clock	[Enabled] [48MHz]	
Timeout Clock Frequency	[48MHz]	
SDIO PAD Slew Rate Control	[3.3V/3ns]	
Card Reader Host Controller	[Enabled]	
SD/MMC Card Control by	[SDIO Controller]	
Audio Configuration		↔+: Select Screen
OnChip HDAC Device	[Enabled]	†↓: Select Item
HD Audio FIFO 256 Bytes Supported	[Enabled]	Enter: Select
USB Configuration		+/−: Change Opt. F1: General Help
OnChip UHCI 1 Device	[Enabled]	F2: Previous Values
OnChip UHCI 2 Device	[Enabled]	F3: Optimized Defaults
OnChip UHCI 3 Device	[Enabled]	F4: Save & Exit
OnChip UHCI 4 Device	[Enabled]	ESC: Exit
OnChip EHCI 1 Device	[Enabled]	
USBD Configuration		

Version 2.13.1216. Copyright (C) 2011 American Megatrends, Inc.

Item	Default
VX900 S/P/E Setting	E->P->S
SDIO Host controller	Enabled
Voltage Support 1.8v	Disabled
High Speed Support	Enabled
Base Clock Frequency For SD Clock	48MHz
Timeout Clock Frequency	48MHz
SDIO PAD Slew Rate Control	3.3V/3ns
Card Reader Host Controller	Enabled
SD/MMC Card Control by	SDIO Controller
OnChip HDAC Device	Enabled
HD Audio FIFO 256 Bytes Supported	Enabled
OnChip UHCI 1 Device	Enabled
OnChip UHCI 2 Device	Enabled
OnChip UHCI 3 Device	Enabled
OnChip UHCI 4 Device	Enabled
OnChip EHCI 1 Device	Enabled

Chipset		ican Megatrends, Inc.
USB Device Mode Control	[Disabled]	SMBus Clock Control
CEC Configuration OnChip CEC Device	[Disabled]	
SNMI Configuration APIC Cycle Control PCICFG Cycle Control	[CCA] [BLOCK]	
High Precision Event Timer Configu High Precision Timer	uration [Enabled]	
SB Other Configuration WATCHDOG Timer Enable WATCHDOG Timer RUN/STOP WATCHDOG Timer ACTION WATCHDOG Timer COUNT PCI Delay Transaction	[Enabled] [Stop] [Power Off] [1023SEC] [Enabled]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
Restore AC Power Loss PCI to PCI Bridge Keyboard/Mouse Wakeup Control SMBus Device Switch SMBus Clock Switch	[Power On] [Enabled] [Enabled] [New SMBus Device] [128K Clock]	F3: Optimized Defaults F4: Save & Exit ESC: Exit

Item	Default
USB Device Mode Control	Disabled
OnChip CEC Device	Disabled
APIC Cycle Control	CCA
PCICFG Cycle Control	BLOCK
High Precision Timer	Enabled
WATCHDOG Timer Enable	Enabled
WATCHDOG Timer RUN/STOP	Stop
WATCHDOG Timer ACTION	Power Off
WATCHDOG Timer COUNT	1023SEC
PCI Delay Transaction	Enabled
Restore AC Power Loss	Power On
PCI to PCI Bridge	Enabled
Keyboard/Mouse Wakeup Control	Enabled
SMBus Device Switch	New SMBus Device
SMBus Clock Switch	128K Clock

Aptio Setup Utility - Chipset	Copyright (C) 2011 Americar) Megatrends, Inc.
PCICFG Cycle Control	[BLOCK]	DVP or VCP Pad Switch
High Precision Event Timer Configura High Precision Timer	ation [Enabled]	
SB Other Configuration WATCHDOG Timer Enable WATCHDOG Timer RUN/STOP WATCHDOG Timer ACTION WATCHDOG Timer COUNT PCI Delay Transaction	[Enabled] [Stop] [Power Off] [1023SEC] [Enabled]	
Restore AC Power Loss PCI to PCI Bridge Keyboard/Mouse Wakeup Control SMBus Device Switch SMBus Clock Switch	[Last State] [Enabled] [Enabled] [New SMBus Device] [128K Clock]	<pre>++: Select Screen +↓: Select Item Enter: Select +/-: Change Opt. F1: General Help</pre>
Peripheral Configuration OnBoard LAN Enable	[OnBoard PCIE Lan E]	F2: Previous Values F3: Optimized Defaults F4: Save & Exit
UART Configuration OnChip UART Mode IRQ3/4 Used by Legacy UART DVP or VCP Pad	[LEGACY] [UARTO/1(GFX)] [VCP]	ESC: Exit
Version 2.13.1216. Co	opyright (C) 2011American M	legatrends, Inc.

Item	Default
OnBoard LAN Enable	OnBoard PCIe LAN Enabled
OnChip UART Mode	LEGACY
IRQ3/4 Used by Legacy UART	UART0/1(GFX)
DVP or VCP Pad	VCP

4.3.4 Boot

Boot options include Setup Prompt Timeout, Bootup NumLock State, etc. as shown below:

3 [0n]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite
[Disabled]	waiting.
07.69	
[Upon Request] [Force BIOS] [Immediate] [Enabled] [Disabled]	
() 1000 1000,	++: Select Screen
[SATA PS: CFast 3M]	Enter: Select +/-: Change Opt.
	F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
	[On] [Disabled] 07.69 [Upon Request] [Force BIOS] [Immediate] [Enabled] [Disabled]

Item	Default	Description
Setup Prompt Timeout	3	-
Bootup NumLock State	On	-
Quiet Boot	Disabled	-
GateA20 Active	Upon Request	-
Option ROM Messages	Force BIOS	-
INT19 Trap Response	Immediate	-
CSM Support	Enabled	-
UEFI Boot	Disabled	-
Boot Option Priorities	N/A	-
Hard Drive BBS Priorities	N/A	Hard drive boot priorities

BIOS

Security options include Administrator Password, User Password, etc. as shown below:

Aptio Setup Utili Main Advanced Chipset Boot	ty – Copyright (C) 2011 A Security Save & Exit	merican Megatrends, Inc.
Password Description If ONLY the Administrator's pas then this only limits access to only asked for when entering Se If ONLY the User's password is is a power on password and must boot or enter Setup. In Setup t have Administrator rights. The password must be 3 to 20 ch	Setup and is tup. set, then this be entered to he User will	Set Setup Administrator Password
Administrator Password User Password HDD Security Configuration: HDD 0:CFast 3ME		<pre>++: Select Screen 11: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>
Version 2.13.121	6. Copyright (C) 2011 Ame	rican Megatrends, Inc.
Item	Default	Description

Item	Default	Description
Administrator Password	N/A	Set / change system administrator password
User Password	N/A	Set / change user password
HDD Security Configuration	N/A	Configuration of hard drive security

4.3.6 Save & Exit

Save & Exit options include Save Changes and Exit, Discard Changes and Exit, etc. as shown below:

Aptio Setup Utility – Co Main Advanced Chipset Boot Secur		. American Megatrends, Inc.
Save Changes and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset		Attempts to Launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices
Save Options Save Changes Discard Changes		
Restore Defaults Save as User Defaults Restore User Defaults		
Boot Override SATA PS: CFast 3ME		++: Select Screen ↑↓: Select Item
Launch EFI Shell from filesystem devi		Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.13.1216. Cop	yright (C) 2011 f	imerican Megatrends, Inc.
Item	Default	Description
Save Changes and Exit	N/A	-
Discard Changes and Exit	N/A	-
Save Changes and Reset	N/A	-
Discard Changes and Reset	N/A	-
Save Changes	N/A	-
Discard Changes	N/A	-
Restore Defaults	N/A	-
Save as User Defaults	N/A	-
Restore User Defaults	N/A	-
Boot Override	N/A	Force boot option

System Operation and Setting

This chapter introduces the operation and settings of the system, which are the basic operations of the non-programming function. Users can learn how to set up the system write-protect (EWF) function, security function, create system backup image file, and restore system with the image file.

5.1	Desc	cription of system environment
0.1	2000	
5.2	Write	e-protect (EWF) function settings······5-3
5	.2.1	How to set EWF by EWFSwitch
5	.2.2	How to check current EWF status
5	.2.3	How to enable EWF ····· 5-4
5	.2.4	How to disable EWF
5	.2.5	How to save changes when EWF is enabled $\cdots 5-5$
5	.2.6	How to fix EWF
5.3	Secu	urity setting ····· 5-8
5.4	Syst	em restore ····· 5-8
5	.4.1	How to create a bootable USB flash drive5-8
5	.4.2	How to create an image backup
5	.4.3	How to backup license file before restoring with image file 5-13
5	.4.4	How to restore with image file

5.1 Description of system environment



- Windows OS: Microsoft Windows Embedded Standard operating system.
- IntervalZeroRTX: Real-time operating system (optional); EtherCAT must be used with RTX environment.
- DMCNET: DMCNET operating interface (EzDMC) provided.
- EtherCAT: EtherCAT operating interface (EcNavi) provided; must be used with RTX environment.

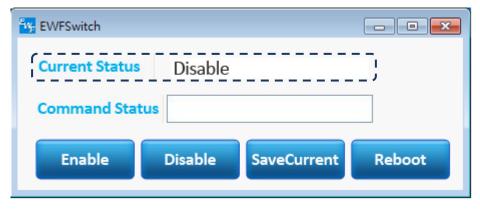
5.2 Write-protect (EWF) function settings5.2.1 How to set EWF by EWFSwitch

The purpose of the EWF function is to control whether changes can be made to the C Drive (hard drive). When EWF is enabled, the writing to the C Drive will only exist in the memory; once the system is rebooted, the changed data will not be saved as to protect the C Drive. Execute EWFSwitch.exe on the desktop.



5.2.2 How to check current EWF status

When EWFSwitch is executed, check Current Status. As shown below, Disable indicates that EWF is currently disabled and the changes will be saved after rebooting.



As shown below, Enable indicates that EWF is currently enabled and the changes will not be saved after rebooting.

EWFSwitch			- • •
Current Status	Enable		3
Command Stat	us		
Enable	Disable	SaveCurrent	Reboot

5.2.3 How to enable EWF

■ Click **Enable**, then click **Reboot** to enable EWF function.

WFSwitch		- • •
Current Status	Disable	
Command Status	Need To Reboot	
Enable	Disable SaveCurrent	Reboot

5.2.4 How to disable EWF

■ Click **Disable**, then click **Reboot** to disable EWF function.



5.2.5 How to save changes when EWF is enabled

Click SaveCurrent, then click Reboot to save current changes when write-protection is enabled.

EWFSwitch			
Current Status	Enable		
Command Status	Need To	Reboot	
Enable	Disable	SaveCurrent	Reboot
		·	'

5.2.6 How to fix EWF

Current Status shows Need Fix as shown below when executing EWFSwitch.

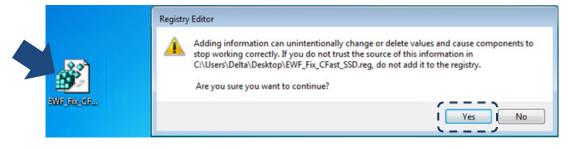
This situation may occur after cloning the hard drive with Ghost.

WFSwitch		
Current Status	Need Fix]
Command Stat	us	
Enable	Disable	aveCurrent Reboot

Please follow the steps below to fix EWF

Execute Step (1) only if the PAC is configured with CFast (system) and SSD (drive). If only configured with CFast, skip to Step (2).

(1) As shown below, execute EWF_Fix_CFast_SSD.reg on the desktop of the PAC operating system. Execution of EWF_Fix_CFast_SSD.reg is to modify the system registry; thus, when executing EWF_Fix_CFast_SSD.reg, a warning will pop-up to confirm if users trust the source of this registry file. Click **Yes** to confirm.



(2) Click **Start**, type "ewf", then press **Enter** to open the command window. Enter "5" in the command window and press **Enter**.

	Programs (1) Image: See more results Image: See more results Image: See more results	
Failed ge Incorrect 1. Enab 2. Disa 3. Save 4. EWF 5. Fix 6. Enab 7. Disa	atting protected volume configuration with error 1. function. EVF manager ====================================	

(3) After the above steps are completed, please reboot.

5.3 Security setting

Please refer to the Security section in the DMC_Programming_Guide Manual.

5.4 System restore

After installing the required software, create an image backup. Then, whenever users need to restore the system, you may use the image backup file to restore. The following steps will demonstrate how to create a bootable USB flash drive, and use this flash drive to create an image backup. Then, you may use this image backup to restore the system when needed.

5.4.1 How to create a bootable USB flash drive

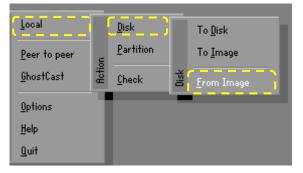
Please follow the instructions below to create a bootable USB flash drive:

- (1) Prepare a blank USB flash drive.
- (2) Download BootUSB.gho. This is the image file for the bootable USB flash drive and it is available on Delta's website.

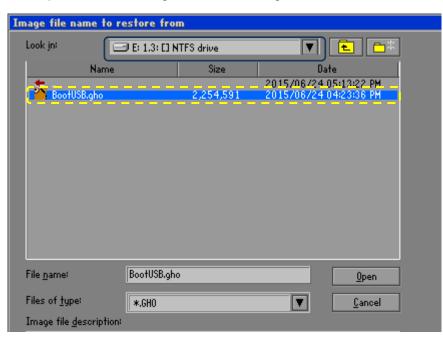
Download link:

http://www.deltaww.com/services/DownloadCenter2.aspx?secID=8&pid=2&tid=0&CID=06 &itemID=060203&typeID=1&downloadID=,&title=--%20Select%20Product%20Series%20--&dataType=8;&check=1&hl=en-US

- (3) Download Ghost32.exe. This program is to create the bootable flash drive, which is available from third parties instead of Delta.
- (4) Execute Ghost32.exe, select Local > Disk > From Image. This will restore the image file to the flash drive. Please see below for details:



(5) Select and open the source image file of BootUSB.gho.



(6) Select the USB flash drive as the destination that the image file will restore to.

elect local destination drive by clicking on the drive number								
Drive	Location	Model	Size(MB)	Туре	Cylinders	Heads	Sectors	
1_	Local	ST350041885	476938	Basic	60801	255	63	
2	Local	TOSHIBA TransMemoru 1.0	14800	Basic	1886	255	63 63	
30	Local	0S Volumes	491725	Basic	62686	255	63	
		<u> </u>						
		<u>_</u>						
					_			
		ŪK		<u>C</u> ancel				
)rive 12	Prive Location 1 Local 2 Local	Irive Location Model 1 Local ST35004188S 2 Local TOSHIBA TransMemoru 1.0	Drive Location Model Size(MB) 1 Local ST35004188S 476938 2 Local T0SHIBA TransMemoru 1.0 14800 0 Local 03 Volumes 491725	Drive Location Model Size(MB) Type 1 Local ST3500418AS 476938 Basic 2 Local T0SHIBA TransMemoru 1.0 14800 Basic 0 Local OS Volumes 491725 Basic	Drive Location Model Size(MB) Type Cylinders 1 Local ST35004188S 476938 Basic 60801 2 Local TOSHIBA TransMemoru 1.0 14800 Basic 1886 0 Local OS Volumes 491725 Basic 62686	Drive Location Model Size(MB) Type Cylinders Heads 1 Local ST35004188S 476938 Basic 60801 255 2 Local T0SHIBR TransMemoru 1.0 14800 Basic 1886 255 0 Local 0S Volumes 491725 Basic 62686 255	

(7) No need to re-size. Click **OK**.

De	stinati	on Drive I	Details						
	Part	Type	Letter	ID	Description	Label	Netu Size	Old Size	Data Size
	1	Primary	G:	0c	Fat32	TOSHIBA	14794	14799	16
	_				Free	5	0		
					Total	14800	14800	16	
				١					
						_		_	
				<u>0</u> K			<u>C</u> ancel		

(8) Click **Yes** to proceed.

Question	n: (1822)
?	Proceed with disk restore? Destination drive will be permanently overwritten. Yes <u>N</u> o

(9) Wait for the restore to complete. When the following window appears, select **Continue**.

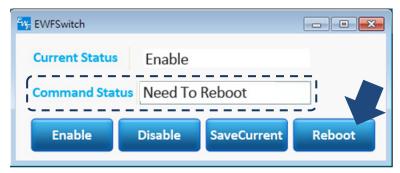
Clone	Complete (1912)	
8	Clone Completed Successfully	
	<u>C</u> ontinue	<u>B</u> eset Computer

(10) Select Quit and click Yes to exit the program. Then the bootable USB flash drive is created.



5.4.2 How to create an image backup

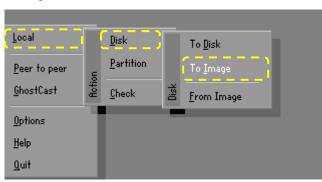
(1) Launch the system to be backed up and check the system status. Execute EWFSwitch.exe, click **Disable**, then click **Reboot** to disable EWF function. If the system has RTX software installed, please proceed to Step (2), otherwise skip to Step (3) after rebooting.



- (2) Please open Programs > IntervalZero > RTX 201X > RTX Properties. In the RTX Properties menu, select System, and confirm the Startup Type is Manual to prevent the backup system from opening the RTX automatically.
- (3) Insert the USB flash drive created by following the instructions in Section 5.4.1.
- (4) Enter BIOS, then select Hard Drive BBS Priorities to change the boot sequence priority to boot from USB flash drive, and press F4 to save the settings.

- Aptio Setup Utility Main Advanced Chipset Boot Sec	• Copyright (C) 2011 America curity Save & Exit	n Megatrends, Inc.
Boot Configuration Setup Prompt Timeout Bootup NumLock State	8 [On]	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Quiet Boot	[Disabled]	waiting.
CSM16 Module Version	07.69	
GateA20 Active Option ROM Messages INT19 Trap Response CSM Support UEFI Boot Boot Option Priorities Boot Option #1 Hard Drive BBS Priorities	[Upon Request] [Force BIOS] [Immediate] [Enabled] [Disabled] [SATA PS: CFast 3M]	++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
L	opyright (C) 2011 American	Megatrends, Inc.

(5) In the Ghost window, select Local > Disk > To Image to backup the current data in the CFast card to the image file.



(6) Select CFast card as the source to backup.

elect lo	cal source d	rive by clicking on the dr	ive number				
Drive	Location	Model	Size(MB)	Туре	Cylinders	Heads	Sectors
1	Local	ST350041885	476938	Basic	60801	255	63
2	Local	CFast 3ME	15272	Basic	1946	255	63
80	Local	05 Volumes	492195	Basic	62746	255	63
		<u>0</u> K		<u>C</u> ancel			

(7) Specify the image file name and choose to save the image file to the flash drive.

			Indicate the root dire the selected file	e
<mark>le name to co</mark> Look <u>i</u> n:	<pre></pre>	DSHIBA] FAT drive		
	Name	Size	Date	
			Selected file	ן
			Selected file	
File <u>n</u> ame:	Backup.gh		Save	
File <u>n</u> ame: Files of <u>typ</u> e:		d	Save	

(8) Select **High** and click **Yes** to start creating the image file. Wait for the image file to be created, then reboot.

Compress Image (1916)	
Compress image file?	
<u>N</u> o <u>F</u> ast	High
Question: (1832)	
Proceed with Image File Creation?	No

(9) Save the backup image file for restoring when needed.

5.4.3 How to backup license file before restoring with image file

If the PAC has RTX installed, users need to backup two license files before restoring. They are:

(1) Path to RTX license file---RTX2012.lic:

WINXP C:\Documents and Settings\All users\Application Data\IntervalZero

WIN7 C:\ProgramData\IntervalZero

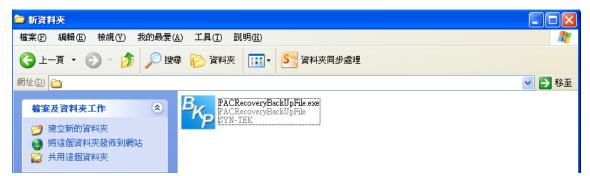
(2) Path to Security authentication file---S3503539980063603: C:\Windows If the PAC is still able to boot normally, you may use PACRecoveryBackUpFile.exe to backup these two files.

Download link:

http://www.deltaww.com/services/DownloadCenter2.aspx?secID=8&pid=2&tid=0&CID=06 &itemID=060203&typeID=1&downloadID=EtherCAT,&title=EtherCAT&dataType=8;&check =1&hl=en-US

If the PAC cannot boot normally, users may use the tool to read the CFast card to backup these two files from their respective path:

(1) Execute PACRecoveryBackUpFile.exe in the flash drive that will be created into the backup flash drive.



(2) When backing up, a folder will be generated in the same path as

PACRecoveryBackUpFile.exe to save the backup files. Specify the folder name in the FolderName field, or the default is BackUpFolder. The RTX license file in XP and WIN7 are in different path locations, so the OS selection needs to be specified.

🖁 PACReciveryBackUpFile 📃 🗖 🔀	🔛 PACReciveryBackUpFile 📃 🗖 🗙
BackUpFile File will backup in current dir folder FolderName OS WIN7 VIN7	BackUpFile File will backup in current dir folder FolderName OS WIN7 WIN7
Status	Status
BackUpFile RecoverFile	BackUpFile RecoverFile

(3) Click **BackUpFile** to start backup. After the backup is complete, Status will display OK, then a folder is generated in the flash drive to save the backup files.

PACReciveryBac	ekUpFile 📃 🗖 🔀
BackUpFile File will backu FolderName OS	Dep in current dir folder BackUpFolder WIN7
Status OK BackUpFile	RecoverFile
4) 工具(T) 說明(H)	
ま 🌔 資料夾 🛛 🎹 🕇 🧏 資	料夾同步處理
PACRecoveryBackUpFile. PACRecoveryBackUpFile. SYN-TEK	exe BackUpFolder

5.4.4 How to restore with image file

- (1) Insert the bootable USB flash drive containing the backup image.
- (2) Enter BIOS > Hard Drive BBS Priorities to change the boot sequence priority to boot from USB flash drive, and press F4 to save the settings.
- (3) In the Ghost window, select Local > Disk > From Image. This will restore the image file to the CFast card.

Local		<u>D</u> isk	Γ	To <u>D</u> isk
<u>P</u> eer to peer	E	<u>P</u> artition		To <u>I</u> mage
<u>G</u> hostCast	Action	<u>C</u> heck	Disk	<u>F</u> rom Image
<u>O</u> ptions				
Help				
<u>Q</u> uit				

(4) Select the source image file.

Look jn:	9 G: 3.1: ETOSI	(IBA) FAT drive		E 🗅
Name Backuo.6HI		Size 86.113	0a 2012/07/231	
ile <u>n</u> ame:				<u>O</u> pen
Files of <u>typ</u> e:	*.GHO		V	Cancel
mage file description:				

(5) Select the CFast card as the destination that the image file will restore to.

Drive	Location	Model	Size(MB)	Type	Cylinders	Heads	Sectors
1	Local	ST3500418AS	476938	Basic	60801	255	63
- 2	Local	CFast 3ME	15272	Basic	1946	255	63
3	Local	TOSHIBA TransMemory 1.0	14800	Basic	1886	255	63
80.	Local	US Volumes	506995	Dasic	64632	255	63
		<u>Q</u> K		<u>C</u> ancel			

(6) Re-size each disk. If not needed, click **OK**.

Part	Type	Letter	ID	Description	Label	Netu Size	Old Size	👘 Data Size
1	Primary	J:	07	NTFS	WES2009	7640	7640	727
2	Primary	K	07	NTFS	Data	7624	7624	40
				Free	7	7		
				Total	15272	15272	768	
		$\overline{}$	1					
			0K			Cancel		

(7) Click **Yes** to restore the image file to the CFast card. Wait for the restore to complete, then reboot.

Question	n: (1822)	
?	Proceed with disk restore Destination drive will be p	
	<u>Y</u> es	<u>N</u> ₀

(8) If RTX is included, users need to place the backup RTX license and Security authentication file in the corresponding path, then you can use PACRecoveryBackUpFile.exe to restore the system.

Download link:

http://www.deltaww.com/services/DownloadCenter2.aspx?secID=8&pid=2&tid=0&CID=06& itemID=060203&typeID=1&downloadID=EtherCAT,&title=EtherCAT&dataType=8;&check=1 &hl=en-US

Execute PACRecoveryBackUpFile.exe and specify the folder name of the backup folder.

Specify the OS selection, then click RecoverFile to restore the files in the specified

FolderName to	b the	corresponding	path
---------------	-------	---------------	------

🛃 PACReciveryBackUpFile 📃 🗖 🔀	🔜 PACReciveryBackUpFile
BackUpFile File will backup in current dir folder FolderName BackUpFolder	BackUpFile File will backup in current dir folder FolderName BackUpFolder OS
Status	Status OK
BackUpFile RecoverFile	BackUpFile RecoverFile

EcNavi Software Installation and Application 6

This chapter introduces how to install and uninstall the software driver as well as its features. EcNavi software needs to be installed on Windows® operating systems, and it is developed for users to control and monitor a variety of modules and servo drives.

6.	1 Driv	er installation and uninstallation
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6.1 Driver installation and uninstallation

Please refer to the following screenshots and steps to install or uninstall the driver:

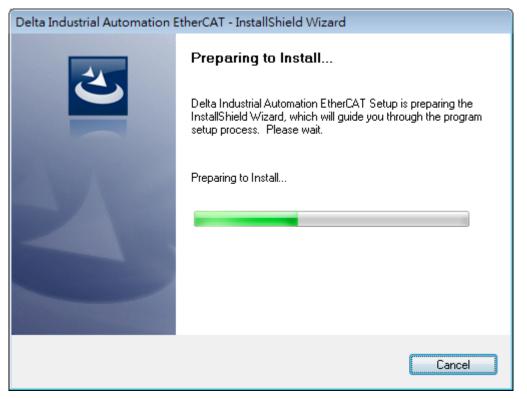
(1) Open the content folder of the disc, select, and execute "setup.exe" in the EtherCATDisk folder.

C→ → → C→ → → C→ → →	畠 ▶ EtherCATDi	sk_(V1013)Buli	d20150318 🕨		- - i i j	Search Ether		- • • ×
Organize 🔻 🖬 Open	New folder						- 1	· 🔟 🔞
☆ Favorites ■ Desktop ₩ Downloads ₩ Recent Places	ISSetupPrer equisites	program files	System32	Windows	WinRoot	0x0409	Autorun	gdiplus.dll
 □ Libraries □ Documents ↓ Music □ Pictures ☑ Videos 	instmsiw	ISSetup.dll	setup	I Setup	setup.isn	SYN-TEK EtherCAT		

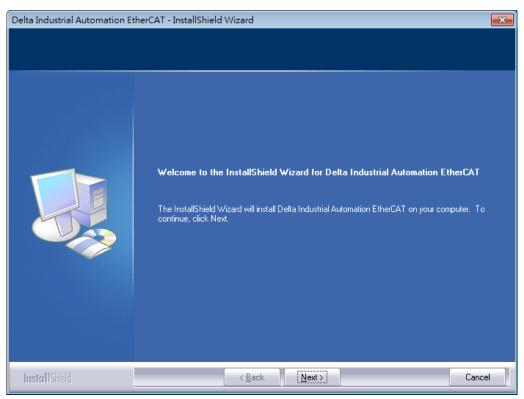
(2) If there are required packages that are missing, the InstallShield Wizard will pop-up with the required packages for installation, then press **Install**.

Delta In	dustrial Automation EtherCAT - InstallShield Wizard
ځ	Delta Industrial Automation EtherCAT requires the following items to be installed on your computer. Click Install to begin installing these requirements.
Status	Requirement
Pendir	ng Microsoft Visual C++ 2010 Redistributable Package (x86)
	Install Cancel

(3) The InstallShield Wizard will check the system and prepare for installation.



(4) Once the system check is complete, start the software installation procedure.Click Next to continue.



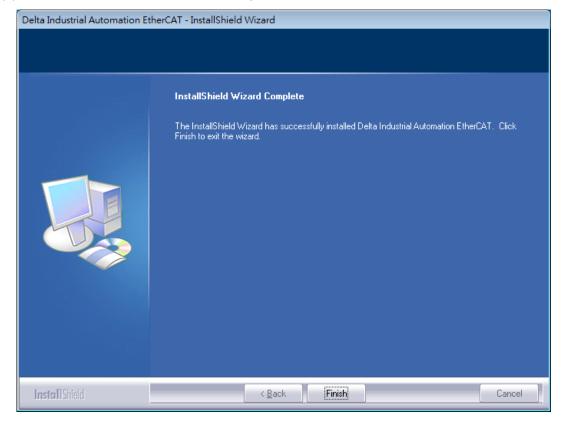
(5) Select the destination folder for the software to be installed (default folder is recommended), click **Next** to continue.

Delta Industrial Automation Eth	nerCAT - InstallShield Wizard	×
Choose Destination Location Select folder where setup will in:		
	Setup will install Delta Industrial Automation EtherCAT in the following folder. To install to this folder, click Next. To install to a different folder, click Browse and select and folder. Destination Folder- C:\Program Files\Delta Industrial Automation\EtherCAT\ Browse	her
InstallShield	< <u>B</u> ack <u>Next</u> >	ncel

(6) When the software installation is in progress, please do not interrupt the process.

Delta Industrial Automation Ethe	erCAT - InstallShield Wizard	×
Setup Status		
	Delta Industrial Automation EtherCAT is configuring your new software installation.	
	Copying new files	
InstallShield	Can	cel

(7) Once the software installation is complete, click **Finish** to exit the InstallShield Wizard.



6.2 Application features

EcNavi is compatible with all MH1 Series.

6.2.1 EcNavi software interface

EcNavi is a software designed for users to control and monitor a variety of EtherCAT modules and servo drives. This section introduces the basic functions of EcNavi. For more details, please refer to the EcNavi User Guide.

Navi							
Advance	d Hardware	0ption	Simulation	About	Initial		
me: 0	DCStatus: Fail	Connec	tState: Pre-Initial	Abnorma	: ок		

Figure 6.2.1.1

6.2.2 Advanced

Click Advanced as shown in Figure 6.2.1.1 and the following options will be available:

Read AutoConfig (Read module and DC data from the file)

To activate this function, specify the setting file during initialization (*Activate prior to initialization). Click **Set** and select the file path, then click **Finish Setting**.

Au	utoconfig Read File	2	×
	Master ID	Path	
	16		
		Finish Setting	

Set Master DC Time

To activate this function, select the DC Time during initialization (*XActivate prior to initialization*). After selecting the DC Time, click **Finish Setting**.

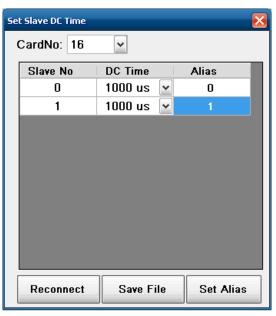
M	aster DC Time		×			
	Master ID	DC Time				
	16	1000 us	~			
Finish Setting						

Set Slave DC Time

Reconnect: After selecting the DC Time for each slave, click this button to reconnect with the new parameters.

Save File: Save selected settings.

Set Alias: Set the station number of each slave.



Enable Alias

If this is enabled, you will be asked if user-defined station numbers are needed when initializing. Note: Activate prior to initialization.

If the Alias option is checked, it indicates that users will define the station numbers.

En	able Alia	35		×
	Maste	er ID 🔝	Alias	
		16		
		Finish	Setting	

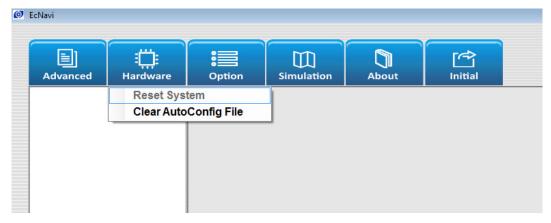
6.2.3 Hardware

Reset System

Disconnect the connection from all slaves and disable the connection of EtherCAT.

Clear AutoConfig File

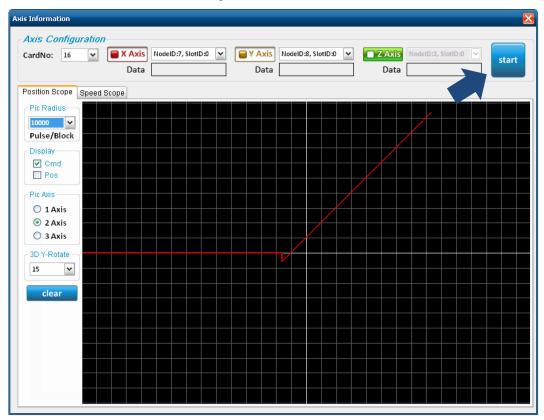
If reading the AutoConfig file fails, use this button to reset.



6.2.4 Simulation

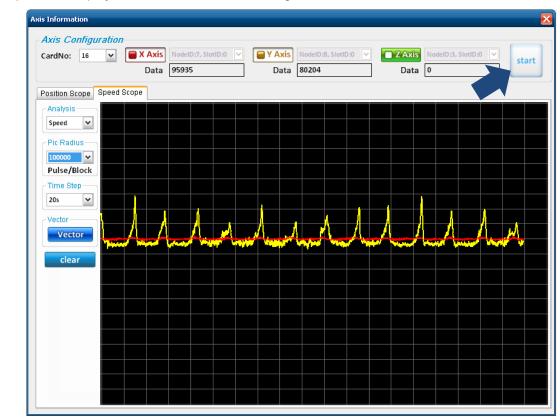
Position Scope

Use this window to monitor the position of each axis. Select the specified axis and monitoring condition. Click **Start** to start monitoring.



Speed Scope

Use this window to monitor the speed curve of each axis. Select the specified axis and curve options to display. Click **Start** to start monitoring.



6.2.5 Option

Error Code

When an error message window pops up, you may use this function to find out the meaning of each error code. Select the error code from the drop-down list. Then, the corresponding descriptions about the error code will be displayed on the right.

ErrorCod	eTable		<u> </u>
	Error Code		Symbol Name
🗹 Hex	0x0	~	ERR_ECAT_NO_ERROR

Power Consumption Calculation

This function can be used to calculate the current value of each module. Enter the module number and the system will automatically calculate the required current value so that users could know if additional power expansion module is needed.

R1-EC5500 Power Calculate						
Module	Number	Used Elec	tricity:			
R1-EC5621	0	0	mA			
R1-EC60X2	0	0	mA			
R1-EC7062	0	0	mA			
R1-EC8124	0	0	mA			
R1-EC9144	0	0	mA			
Used Electricity: 0 mA						

6.2.6 ESIC

This function can be used to define the OD Code corresponded by each module. **Load Information:** The system will read the corresponding XML file from the C:\EtherCAT\ESI folder and regard its value as default. Then users can define the OD Code for this module. Find the OD Code from the left column (ALL OD Code) and double click to add the OD Code to the right column (Choose OD Code). To remove an OD Code, double click the OD Code in the right column.

Reset Setting: Reset the OD Code items to the default value in the XML file.

Insert OD Code: Click this button when the setting is complete, and the settings of this page will be temporarily saved.

Save Dat File: Save the set OD Code options.

Save ESIC File: Save the settings of the current page. Users may save multiple sets of settings and switch easily. To access a saved setting, select the profile by the ReadESICFile option in the Module Name drop-down list.

VendorID:	0x1DD	ProductCode	:	0x10305070	RevisionNo:	0x204060
Slave Tx ○ Slave Rx 0x1A00						
Step2. S	etup PDO (DD Code				
	ode			Choose O	D Code	
Index:	SubIndex:	BitSize:	-	Index:	SubIndex:	BitSize:
0x0	0x0	0x8		0x6064	0x0	0x20
0x2000	0x0	0x10		0x606C	0x0	0x20
0x2001	0x0	0x10		0x6041	0x0	0x10
0x2002	0x0	0x10		0x6077	0x0	0x10
0x2003	0x0	0x10		0x6061	0x0	0x8
0x2004	0x0	0x20				
0x2005	0x0	0x20				
0x2006	0x0	0x20	~			
012000						

6.2.7 CANopen

- This function can be used to monitor and control the corresponding Slave SDO and PDO.
- CANopen SDO

Users can enter the specified SDO address in the Index and SubIndex fields and set the content of DataSize and Send Data. Click **Send** to set the value of the specified address and the setting result will be displayed in the RTCode column. Set the corresponding value in the fields, then press **Read** to read the value of the current address, and the value will be displayed in the Read Data column.

ondor Ox1DD Nopen S	0x10305	0x204060	B Hex			
Index	SubIndex	n PDO Tx CANope DataSize	Send Data		Send	RTCode
1000	0	4 Byte 🗸	0	S	end	
1000	0	4 Byte 🖌	0	S	end	
1000	0	4 Byte 🗸	0	5	iend	
Index	SubIndex	DataSize	Read Data	Read	DataType	RTCode
1000	0	4 Byte 🖌	0	Read	Signed 🖌	
1000	0	4 Byte 🗸	0	Read	Signed 🗸	
1000	0	4 Byte 🖌	0	Read	Signed 🗸	

CANopen PDO Tx

This window displays the current status of the Tx OD Code specified by Slave. Users may also enter values in the Send Data column, then click **Send** to set the corresponding values of the Tx OD Code.

Ox1DD	DO CANope	0x204060		ALL		
Index	SubIndex	DataSize	Send Data	Send	Read Data	DataType
607A	0	4 Byte	0	Send	0x0	Signed
60B0	0	4 Byte	0	Send	0x0	Signed
60B1	0	4 Byte	0	Send	0x0	Signed
60FF	0	4 Byte	0	Send	0x0	Signed
6040	0	2 Byte	0	Send	0x0	Signed
6071	0	2 Byte	0	Send	0x0	Signed
60B2	0	2 Byte	0	Send	0x0	Signed
6060	0	1 Byte	0	Send	0x6	Signed

CANopen PDO Rx

This window displays the current status of the Rx OD Code specified by Slave.

ANopen S	DO CANope	n PDO Tx CANope	en PDO Rx	
Index	SubIndex	DataSize	Read Data	DataType
6064	0	4 Byte	0x164CD	Signed
606C	0	4 Byte	0xFFFFFF1	Signed
6041	0	2 Byte	0x650	Signed
6077	0	2 Byte	0x0	Signed
6061	0	1 Byte	0x6	Signed

6.2.8 Security

Set the verify key and user password.

5ecurity							×
CardN 16	~						
Check	Verifykey-		Veri	fykey			
1:	0	2:	0	3:	0	4:	0
5:	0	6:	0	7:	0	8:	0
Check Verifykey Status Check-Out							
Login			Passv	vord			
1:	*	2:	*	3:	*	4:	*
5:	*	6:	*	7:	*	8:	*
	Login				Status Succ	ess	
Change Password Password							
1:	*	2:	*	3:	*	4:	*
5:	*	6:	*	7:	*	8:	*
•		•.	Confir		n		
1:	*	2:	*	3:	*	4:	*
5:	*	6:	*	7:	*	8:	*
	Write Passw	ord			Status Succ	ess	
Write	Verifykey		Veri	fykey			
1:	0	2:	0	3:	0	4:	0
5:	0	6:	0	7:	0	8:	0
	Write Verify	key			Status Succ	ess	

Check Verifykey: Confirm that the verification key of the motion card is correct.

Login: Enter the user password to login. Change Password and Write Verifykey options will become available after login.

Change Password: Change user password.

Write Verifykey: Change verification key.

There are four kinds of Status:

Check-Out: Status unconfirmed.

Busy: Check if password is correct.

Fail: Verification key / password incorrect.

Success: Verification key / password correct.

6.2.9 About

This window displays the current EtherCAT_DLL.dll path and version.

About 🔀					
CDLL Inform	nation	1			
DLL Path	C:\WINDOWS\system32\Et herCAT_DLL.dll	Exit			
DLL Version	1, 0, 1, 0				

6.2.10 Initial

Activate motion card and initialize connection.

Initialing Dialog		
CardNo: 16 🗸	Exit	0
DC Status: 🛛 🔘	Adjustment DC	
Connect Status:	OP	
Initial Done: 🛛 🔘	Pre Initial	

6.2.11 Find Slave

Click Find Slave to start searching for connected modules and the result will be listed in the left column.

Advanced	Hardware	Option	Simulation	About	Initial	C Find Slave	- <u>o</u>
🍠 MasterID	: 16						
RIEC 0 H	ub						
Click 0 H 5500 0 H 6022 1 D 6116 2 D 7062 3 P 5500 4 H 6124 5 A 8124 5 A 9144 6 D	I						
RIEC 2 D	0						
R1EC 3 P	ulse Out						
R1EC 4 H	ub						
R1EC 5 A	D						
R1EC 6 D	A						
— 💣 7 а	2E						
💣 8 A	2E						

6.2.12 Multiple Axes

■ 9 kinds of multi-axis synchronous modes are provided for multiple axis motion control.



- (1) **Operate Mode:** Moving mode selection. When each mode applies different number of axes, the available parameters and number of axes in the window will also change accordingly.
- (2) Velocity Profile: Parameter settings for each mode.
- (3) **Operate Moving:** Motion control.

	Move in reverse direction	Repeat	Move back and forth between current position and target position
*	Move in forward direction	SCurve	S-curve acceleration and deceleration
SD STOP	Decelerate to stop	ABS	Move in absolute motion
EMG STOP	Emergency stop		

(4) Information Slave:

Command: Specified pulse numbers sent by users.

Position: Current feedback pulse number from servo drive.

Speed: Current moving speed of servo drive.

Torque: Current torque of servo drive.

Buffer: Current amount of command that has not been executed by the system.

Status: Current status of servo drive.

Servo OFF	Click this button, servo drive will switch to On; click this button again, servo drive will switch to Off.
RALM	Clear current alarm.
C Reset Position	Reset currently recorded moving pulse number.

(5) IO Status: Current status of servo drive. It uses icons to display the Status of the Information Slave.

6.2.13 Delta Servo

Servo Capture Compare

This is used to test the Capture and Compare functions of Delta's servo drive.

Driver Capture And Compare CardNo: 16 SlaveNo: 0	
Capture And Compare	
(P5-10) Max Data Number 800	
(P5-36) Data Array Start From 0 (P5-56) Data Array Start From	n 0
(P5-38) Capture Number 0 (P5-58) Compare Number	0
(P5-39) Capture from Pulse Cmd 🗌 Start (P5-59) Compare from Pulse	Cmd 🗌 Start
(P5-12) Read Data Compare Start From	0 Pulse * 128
Index: Data Interval	0 Pulse * 128
Trigger Time	1 ms

After setting the start address of data array, Capture / Compare amount, interval, and other parameters, check the **Start** box to enter Capture / Compare mode. Then, the servo drive will start moving and trigger Capture and Compare functions.

- (P5-10) Max Data Number: Maximum amount of data.
- (P5-36) Data Array Start From: Set the capturing start address of data array.
- (P5-38) Capture Number: Number of capturing times.
- (P5-39) Capture from Pulse Cmd: Enable Capture function.
- (P5-56) Data Array Start From: Set the comparing start address of data array.
- (P5-58) Compare Number: Number of comparing times.
- (P5-59) Compare from Pulse Cmd: Enable Compare function.

(P5-12) Read Data: Click this button to read and display the data array of the drive.

Compare Start From: Initial pulse position specified for Compare function.

Interval: Pulse number between Compare intervals.

Trigger Time: Duration of a trigger.

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EzDMC Operating Instructions

7

EzDMC is a serial control tool to test the functionality of the serial connection. When EzDMC is operating, the system monitors and automatically categorizes connected expansion modules. Users may use the listed modules to determine if the serial control modules are functioning properly and select each expansion module for functional testing. The following introduces how to operate the functions of EzDMC.

7.1	Introduction to EzDMC functions 7-2
7.2	EzDMC connection procedure 7-3
7.3	Find PCI-DMC card 7-3
7.4	Find connected expansion modules 7-4
7.5	EzDMC status display 7-5
7.6	Single-axis control interface 7-6
7.7	Multi-axis control interface 7-8
7.8	Master Security control interface 7-10
7.9	Card reset 7-13
7.10	Parameter save function 7-14

7.1 Introduction to EzDMC functions

■ EzDMC is compatible with MH1-A12D / C50D / C70D.

Once EzDMC is launched, the program screen as shown below will appear on the computer

	(1)	
EzDMC File(F) HardWare(H) Option(O) Site		
Initialize		(4)
	(3)	
	·	
(5)		

No.	Item	Description
(1)	Function menu	Select functions
(2)	Tool bar	Operate basic functions
(3)	Main controller system and expansion module list	Area for displaying main controller system and expansion module list
(4)	Message display area	Area for displaying basic messages of expansion functions and operation control
(5)	Program status display area	Displays connection status of the system

7.2 EzDMC connection procedure

When the PCI-DMC card and connection modules (e.g. drive and motor) are set up,

please follow the testing procedures below to use EzDMC to test the serial connection:

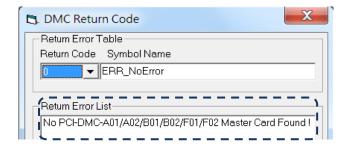
- (1) Open EzDMC.
- (2) Find PCI-DMC card. (Refer to Section 7.3)
- (3) Find connected expansion modules. (Refer to Section 7.4)
- (4) Connect the expansion module to the single-axis and multi-axis serial motion control functions. (Refer to Section 7.6 and Section 7.7)
- (5) Finish expansion module control.
- (6) Reset PCI-DMC card. (Refer to Section 7.9)
- (7) Exit EzDMC.

7.3 Find PCI-DMC card

To find the PCI-DMC card, click **Initialize** in the tool bar as shown below. This defines the amount and configuration status of all PCI cards in the current host system. When the search is complete, the device list will display the status of all found cards as well as the amount and configuration of the master cards.

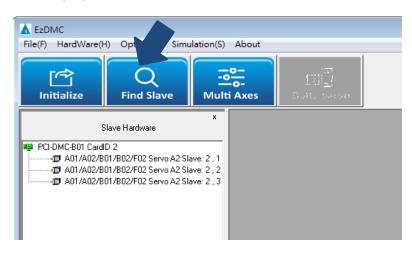


If no PCI-DMC cards are found after the search, an error message "No PCI_DMC Card Found!" will pop-up as shown below. Please check if the PCI-DMC card is properly installed in the host system. Or, turn off the power and remove the card, then follow the steps in Section 3.3 Installation of PCI / PCIe card to re-install the PCI-DMC card into a vacant PCI slot before finding the PCI-DMC card again.



7.4 Find connected expansion modules

When the PCI-DMC card is found and defined, the serial communication connection is also established. Next, scan to see how many connected modules are linked in series on the same Ring. Click **Find Slave** in the tool bar as shown below to find available and working modules on the Ring as well as the properties of these connected modules.

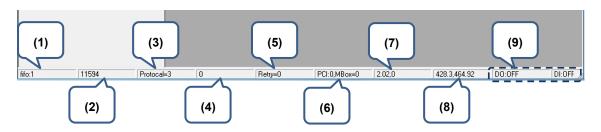


If no expansion modules are found to connect to after the search, an error message "No slave found!" will pop-up as shown below. Please check if the expansion modules are connected properly, and the power output is normal.

🖪 DMC Return Code
Return Error Table Return Code Symbol Name
Return Error List
Save Error Log

7.5 EzDMC status display

The status display at the bottom of EzDMC shows information about the current status of the PCI-DMC card and DSP.



- (1) FIFO length.
- (2) Task time used.
- (3) Connection status of master card and expansion modules.
- (4) Master card connection error.
- (5) Times of SDO re-issuing.
- (6) Times of Mailbox delivery failure.
- (7) DSP interrupt signal count value 1.
- (8) DSP interrupt signal count value 2.
- (9) DI/O status of the cards.

7.6 Single-axis control interface for serial communication

When the connected expansion module is linked for serial communication, the next step is to test the expansion module operations. As shown in the figure below, you may click on any expansion module in the left column, then the display area on the right will pop-up a window with the single-axis control interface for the operation of that module.

EzDMC File(F) HardWare(H) Option(O) Simulation(S) A	bout
(1) Find Slave	
Slave Hardware PCI-DMC801 CardD 2 A01/A02/801/802/F02 Servo A2 Slave: 2, 1 A01/A02/801/802/F02 Servo A2 Slave: 2, 3 (2)	Postion Postion Pulse Pulse Model Model PeedBack 67 57 Stat Vel PPS Model Model <td< th=""></td<>
fifo:1 117451 Protocel=3 0	Rety=0 PCI:0,MBox=0 0.52,0 298.6,310.54 D0:0FF DI:0FF A

- (1) Left display area;
- (2) List of expansion modules;
- (3) Single-axis control interface.

(4) 🖆 ASD-A2F Servo PCI_Card No: 2 Slave No: 1 × Position Velocity Profile 10 Status (1) Command Ō Distance Mode0 0 Pulse (5) FeedBack -67 Start Vel Mode1 0 PPS SpeedPPS Max Vel Mode2 0 0 PPS Torque TAcc Mode3 -1 0 sec Buffer TDec DI3 0 (6) 0 sec WR Operate Mode Reset Sync DR P to P Homing Velocity C 🔽 IP Mod ΤG C Continue C Torque (2) Operate Moving Svon (7) Motion IO DriverErr Reset Servo 0n ALM. Target STOP Home Offset Version Error N/A 🗖 Repeat 🗖 S Curve 🥅 Abs 1746 0 1 MDS0 0 MDS1 (3) Monitor CardNo PEL CMD ID | 0 Set 0 2 USE MEL **0xFFFFFBD** Node DI 0x2 1 DO 0x17 0

The following will introduce the functions and purpose of each block in the single-axis control interface.

- (1) Display count values of motion status, including position, speed, torque, position reset function, and number of buffered commands.
- (2) Execute motion commands such as clockwise rotation, counterclockwise rotation, and stop.
 - Check the Repeat box to repeatedly execute clockwise and counterclockwise motions.
 - Check the S Curve box to set acceleration / deceleration as S-curve; otherwise, T-curve will be used.
 - Check the **Abs** box to use absolute motion; otherwise, relative motion will be used.
- (3) Set CANopen commands. The module's CANopen commands can be read / sent here.
- (4) Set motion commands, including motion distance, starting velocity, maximum velocity, and acceleration / deceleration time.
- (5) Display status of the connected expansion module using ON/OFF status signal.
- (6) Set motion operation mode, including point to point, homing, and constant velocity.
 - Check the IP Mode box to use PDO service for motion control; otherwise SDO service will be used.
- (7) Enable motor, set motion status display, and reset servo alarm message.

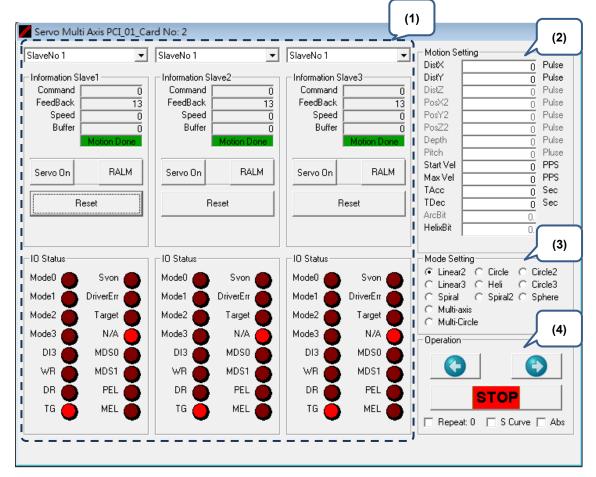
7.7 Multi-axis control interface for serial communication

When the connected expansion module is linked for serial communication, select **Multi Axes** in the tool bar of EzDMC to execute multi-axis control, then the display area on the right will pop-up a window with the multi-axis control interface of that module as shown in the figure below.

LEZDMC		
File(F) HardWare(H) Option(O) Simulation(S	About	
Initialize Find Slave Mul	o- o- i Axes Delta Servo (2)	
Slave Hardwar	Servo Multi Axis PCI_01_Card No: 2	
PCI-DMC-B01 CardID 2 (1)	SlaveNo 1 V SlaveNo 1 V	Motion Setting DistX0 Pulse
A01/A02/B01/B02/F02 Servo A2 Slave: 2, 2 A01/A02/B01/B02/F02 Servo A2 Slave: 2, 3	Command 0 Command 0 Command 0	DistY 0 Pulse DistZ 0 Pulse
	FeedBack 13 FeedBack 13 FeedBack 13	PosX2 0 Pulse
	Speed 0 Speed 0 Speed 0 Buffer 0 Buffer 0 Buffer 0	PosY2 0 Pulse PosZ2 0 Pulse
	Motion Done Motion Done Motion Done	Depth 0 Pulse
		Pitch 0 Pluse Start Vel 0 PPS
	Servo On RALM Servo On RALM Servo On RALM	MaxVel 0 PPS
	Reset Reset	TAcc 0 Sec TDec 0 Sec
		ArcBit 0
		HelixBit 0.
	IO Status IO Status IO Status	Mode Setting
	Mode0 Svon Mode0 Svon Mode0 Svon	
	Mode1 DriverErr	C Spiral C Spiral2 C Sphere
	Mode2 Target Mode2 Target Mode2 Target	C Multi-axis C Multi-Circle
	Mode3 🧑 N/A 🍎 Mode3 🍎 N/A 🍎 Mode3 🍎 N/A 🍎	Operation
	📗 DI3 🍎 MDS0 🍎 DI3 🍎 MDS0 🍎 DI3 🍎 MDS0 🍎	
	WR 🍎 MDS1 🍎 WR 🍎 MDS1 🍎 WR 🍎 MDS1 🍎	
	DR 🍎 PEL 🍎 DR 🍎 PEL 🍎 DR 🍎 PEL 🍎	STOP
	TG 🍎 MEL 🍎 TG 🍎 MEL 🍎 TG 🍎 MEL 🍎	
		🔲 Repeat: 0 📄 S Curve 📄 Abs
fifo:1 214652 Protocal=3	0 Retry=0 PCI:0,MBox=0 0.56,0 297.22.258.02 D0:0FF	DI:OFF

- (1) Multi Axis Control;
- (2) Multi-axis control interface window.

The following will introduce the functions and purpose of the four blocks in the multi-axis control interface.

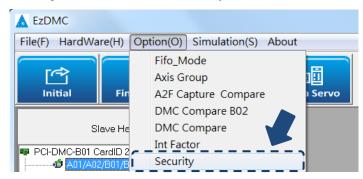


- (1) Display motion status of the selected axis, position reset, and motor activation function.
- (2) Motion Setting: Required motion parameter settings for motion control. These parameter settings are linked to the selections in block (3) Mode Setting. For example, if Linear2 is selected in Mode Setting, the Motion Setting will include DistX and DistY; if Linear3 is selected, then DistX, DistY, and DistZ will be included.
- (3) Mode Setting: Set motion operation mode. The 6 multi-axis motion control commands available include 2-axis linear interpolation, 3-axis linear interpolation, 2-axis arc interpolation, and 3-axis spiral, etc.
- (4) Operation: Execute motion commands such as clockwise rotation, counterclockwise rotation, and stop.
 - Check the **Repeat** box to repeatedly execute clockwise and counterclockwise motions.
 - Check the S Curve box to set acceleration / deceleration as S-curve; otherwise, T-curve will be used.
 - Check the **Abs** box to use absolute motion; otherwise, relative motion will be used.

7.8 Master Security control interface

The following will introduce the steps for setting up Master Security.

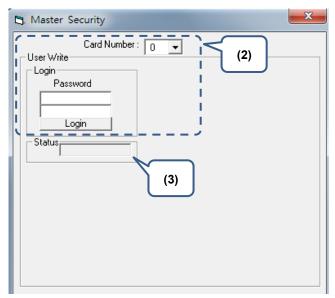
(1) Click **Option > Security** to enter the Master Security control interface.



(2) Select Card ID. of the PCI-DMC card, then login with the default password. The above input fields are all $1 \sim 8$ digits and the range is hexadecimal values between $0 \sim F$.

Default password		
Password1	FFFFFFF	
Password2	FFFFFFF	

(3) If login is successful, the status will display "Pass" and access to the functions in blocks (3),
(5), and (6) will be granted as shown in Figure 7.8.1; if not, the status will display "Failed" and users must re-login.



Master Security function description:

		Master Security		(1)	X
(2		Card Nu	mber: 2 💌		í Constante da la constante da
		User Write — — — — — — — — — — — — — — — — — — —	Change P	assword	(6)
		Password		Pass	word
				Confirm	lation
	(3)	Status Pass.		Wri	te
		Generate Verification	Key		
		Serial No.	Input User Key		Verify Key
				I -	
			I		
		Read	Generate		
(!)	<u> </u>			Write
		Read/Write Data			
		Page: (0~9)) Read	Write	Sync
	\neg				
(4)	Status :	Read Only	🗆 Wr	ite Enable
		Confirmation	Key		
		I		1	1
			Verify the K	ey	

Figure 7.8.1 Master Security function description

The above input fields are all $1 \sim 8$ digits and the range is hexadecimal values between $0 \sim F$.

- (1) Card Number: Select Card No. of the DMCNET motion card.
- (2) Login & Status: User login and status display field.
- (3) Generate Verification Key: Generate verification key.

Click Read to read the motion card serial number, then users will be given two sets of

1 ~ 8-digit values made up of hexadecimal values between 0 ~ F.

Enter a user-defined User Key, then click **Generate** to generate a verification key. The input and output values are all $1 \sim 8$ digits and the range is hexadecimal values between $0 \sim F$. Click **Write** to write the generated Verification Key. If writing the key is successful, the status in block (2) will display "Done"; if not, the status will display "Failed".

- (4) Verification confirmation field and status display. Enter the 4 sets of Verification Key generated in the previous steps into the 4 fields, then click Verify the Key. If the verification is successful, then the status bar below will display "Pass"; if not, the status bar will display "Failed".
- (5) Data read and write area. (Please refer to Figure 7.8.2 for details)
- (6) Change password.

Enter two new passwords in the "Password" fields. Each is $1 \sim 8$ digits and the range is hexadecimal values between $0 \sim F$.

Re-enter the same passwords from the "Password" fields to the "Confirmation" fields for verification.

If the two passwords in "Password" and "Confirmation" match, the passwords will change by clicking **Write**. If the passwords don't match, then the status will display an error message "Confirmation Error", and you will need to retry changing the password.

Below is a more detailed description of block (5) in Figure 7.8.1.

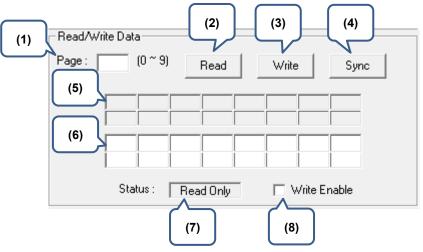


Figure 7.8.2 Master Security block (5) function

- (1) Page: Enter the page $(0 \sim 9)$ to read from or write to.
- (2) Read: Read data from specified page.

(If read successful, then block (5) will display 16 sets of binary hexadecimal values between $0 \sim F$)

(3) Write: Write data to specified page.

In Figure 7.8.2 block (6), enter the desired 16 sets of binary hexadecimal values between $0 \sim F$.

Check the **Write Enable** box, then the (7) status bar will display "Write/Read". Click **Write** to write data.

- (4) Sync: Copy data from block (5) to block (6).
- (5) Display data when Read function is executed.
- (6) Fields for entering the data when Write function is executed.
- (7) Status: Display read / write status as either Read Only or Write/Read.
- (8) Write Enable: Change status to Write Enable.

7.9 Card reset

When the serial motion control is finished and prior to exiting the EzDMC program, please click **HardWare > PCI_Card Reset** to reset the PCI-DMC card. Activate the PCI-DMC card again the next time you wish to test / use the card to ensure the stability of data transmission / reception and the validity of test data. As shown in the figure below, click this option to reset the card. The card will be re-activated next time when **Search Card** is executed.

EzDMC File(F) HardWare(H) Option(O) Simulation(S) PCI_Card Reset(R) Device Compare Device Status Mult		
x Slave Hardware	Servo Multi Axis PCI_01_Card No: 2	
PCI-DMC-801 CardID 2 d1 A01/A02/801/802/F02 Servo A2 Slave: 2 , 1 d1 A01/A02/801/802/F02 Servo A2 Slave: 2 , 2 d1 A01/A02/801/802/F02 Servo A2 Slave: 2 , 3	Information Slave2 Information S	veNo 1 Motion Setting formation Slave3 DistY 0 Pulse command 0 DistY 0 Pulse cedBack 14 PosY2 0 Pulse Buffer 0 PosY2 0 Pulse Motion Dense PosY2 0 Pulse Notion Dense Poste 0 Poste Statt Vel 0 PPS 0
	Reset Reset	HALM Max Vel 0 PPS Reset TAcc 0 Sec ArcBit 0 HeixBit 0
		Status Mode Setting de0 Svon Circle
	Mode1 DriverErr Mode1 DriverErr Mode1 Mode2 Target Mode2 Mode2	ade1 DriverErr C Lincle3 DriverErr C Spiral C Spiral C Sphere C Multi-axis C Multi-Circle
		Dia N/A Operation
		TG MEL KEL Repeat 0 SCurve Abs

7.10 Parameter save function

Select **File** > **Save Configuration DMC** from the function menu to save the motion control parameters. Next time you open EzDMC, select **Load Configuration** from the function menu to load the previously set motion control parameters into EzDMC to begin motion control right away.

LEZDMC		
File(F) HardWare(H) Option(O) Simulation(S)	About	
Save Configuration_DMC(S)		
Load Configuration_DMC(L)		
Load Default Configuration_DMC(
	Axes Delta Servo	
Save Configuration_M324		
Load Configuration_M324	Servo Multi Axis PCI_01_Card No: 2	×
Load Default Configuration_M324	SlaveNo 1 V SlaveNo 1 V	SlaveNo 1 Motion Setting
AUT/AU2/BUT/BU2/FU2 Servo A2 Slave: 2 , 1	Information Slave1	Information Slave3 DistY DistY O Pulse
A01/A02/B01/B02/F02 Servo A2 Slave: 2, 2 A01/A02/B01/B02/F02 Servo A2 Slave: 2, 3	Command 0 Command 0	Information Slave3 DistY 0 Pulse Command 0 DistZ 0 Pulse
AUT/AUZ/BUT/BUZ/FUZ SELVU AZ SIAVE. 2 , 3	FeedBack 15 FeedBack 15	FeedBack 15 PosX2 0 Pulse
	Speed 0 Speed 0	Speed 0 PosY2 0 Pulse
	Buffer 0 Buffer 0	Buffer 0 PosZ2 0 Pulse
	Motion Done Motion Done	Motion Done Depth O Pulse Pitch Pitse
		Start Vel o PPS
	Servo On RALM Servo On RALM	Servo On RALM Max Vel 0 PPS
		TAcc 0 Sec
	Reset Reset	Reset TDec 0 Sec
		ArcBit 0.
		HelixBit O.
	IO Status	ID Status Mode Setting
-	Mode0 🔴 Svon 🌑 Mode0 🔵 Svon 🌑	Mode0 Svon Clinear3 C Heli C Circle 3
	Mode1 🍝 DriverErr 🍝 Mode1 🍝 DriverErr 🍝	Mode1 🧴 DriverErr 🍝 🔿 Spiral 🔿 Spiral2 🔿 Sphere
	Mode2 Target Mode2 Target	Mode2 Target Multi-axis
	Mode3 N/A Mode3 N/A	Mode3 N/A
	DI3 🌰 MDS0 🌰 🛛 DI3 🌰 MDS0 🔴	
	WR 🌰 MDS1 🌰 🛛 WR 🌰 MDS1 🌰	WR 🎽 MDS1 🎽 🛛 🔇
	DR 🎽 PEL 🎽 DR 🍎 PEL 🍎	
	TG 🥁 MEL 👗 TG 🎽 MEL 🎽	
		Repeat: 0 S Curve Abs
fifo:1 1248684 Protocal=3	D Retry=0 PCI:0,MBox=0 0.8,0	296.98,257.78 D0:0FF DI:0FF

Revision History

Release date	Version	Chapter	Revision contents
June, 2017	V1.0 (First edition)		

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