

M2I Corporation



Industrial PC based BOX-HMI MPC-B1500A(D)

Hardware Manual

Thank you for purchasing the Industrial PC based BOX-HMI(BOX-PC).

Please read this manual carefully to know installing, wiring, operating this equipment for safe use of this product.





Index

Index	2
Chapter 1 Safety Precautions.....	3
Chapter 2 Overview	5
2.1 Introduction of Products.....	5
2.2 Package Contents.....	5
2.3 Explanation of Model Name	5
Chapter 3 General Specifications	6
3.1 Power Specifications	6
3.2 System Specifications	6
3.3 Ethernet Specifications.....	6
3.4 Audio Specifications.....	6
3.5 Display Output Specifications.....	6
3.6 USB Specifications.....	6
3.7 Other Specifications	6
3.8 Option Specifications.....	7
3.9 Environment Specifications.....	7
3.10 Structure Specifications.....	7
Chapter 4 Part Names and General Specifications.....	8
4.1 MPC-B1500A.....	8
4.2 MPC-B1500D.....	9
4.3 Part Names and General Specifications.....	10
Chapter 5 Installation.....	11
5.1 Installation Requirement	11
5.2 Attachment with MDP Series	11
Chapter 6 Interface with other Devices	11
6.1 Serial Communication Mode Setting and Specifications	11
6.2 Ethernet Setting and Specifications.....	13
6.3 USB Specifications.....	14
Chapter 7 Wiring.....	15
7.1 Power Cable Wiring.....	15
7.2 Ground Wiring	16
Chapter 8 System Utility.....	16
8.1 System Restore Solution	16
Chapter 9 Maintenance	17
9.1 Cleaning the Display	17
9.2 Periodic Check Points.....	17
9.3 Problems with the Device.....	18
Chapter 10 Product Label.....	18
10.1 MPC-B1500A.....	18
10.2 MPC-B1500D.....	19









Chapter 1 Safety Precautions

■ Before using the product





To use the product safely and effectively, please read the contents of this manual thoroughly before use. Please keep to the safety precaution, for it is to prevent accidents and potential danger from occurring. Safety precaution is classified into 'Warning' and 'Caution' and their meanings are as follows. Also the indicated illustrations on the product and in the manual have the following meanings.

 Warning	Violating the instruction may result in serious personal injury or death.
 Caution	Violating the instruction may result in slight personal injury or product damage.
	Be cautious, for danger may be present.
	Be cautious, for there is a possibility of an electric shock.





■ General Precautions **Caution**

-  Do not press the screen with a hard or sharp object (awl, screwdriver, pen) with too strong a force.
It may cause malfunction of touch due to damage of the front sheet.
-  Do not use or store in an environment with high vibration.
-  Do not allow foreign objects such as water, liquids, or metal powders to enter the product. This may cause breakage or electric shock.
-  Use the radio or mobile phone at least 30cm away from the main unit.
-  Do not touch the adaptor or power cord with wet hand. This may cause an electric shock.
-  Do not use the product in explosive environment with flammable liquid, gas, or dust.
-  During the product is stored in long-term without use, avoid a direct sunlight and keep dry condition.
-  Be cautious that continuous operation can make the product hot.

■ Design Precautions **Warning**

-  For protecting whole control system from outer power input or malfunction of product, protection circuit must be installed outside of product.
-  Physical protection devices as emergency switch, limit switch, or motion interlock circuit and others to prevent a critical damage of whole system's safety and human accident from the product's malfunction.
-  When computers or other outer devices control (operation mode change) the product, set interlock in sequence program to protect from any communication errors
-  Input/output signals or communication cables must have at least 100mm(3.94inch) distance from power cable or high-tension wire. Especially communication cables must be set apart from power cables.

■ Wiring Precautions **Warning**

-  Be sure the wiring is done correctly by checking the product's rated voltage and the terminal layout.
Incorrect wiring could result in fire, damage or malfunctions.
-  Tighten the terminal screw with the specified torque. If the screws of terminal are loose, it could result in short circuit, fire, malfunctions.
-  FG Terminal must be used a dedicated ground. Not doing so could result in malfunctions.
-  Grounding should be the Class 3 grounding. The cable for grounding should be more than 2mm².

⚠ Grounding point be closed to the products and make short the distance to the ground cable if possible.

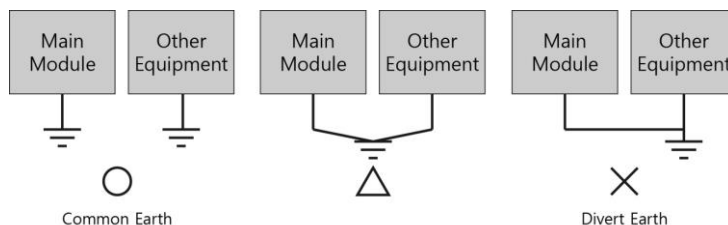


Fig. Grounding Example Diagram

■ Installation Precautions ⚠ Caution

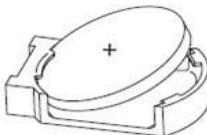
- ⊘ Do not install the location which exceeds allowed temperature. Product can be damaged or shorten the life. Especially Install environment as below should be avoided.
- ⊘ Do not Install product to the place which the ambient temperature is out of limits, from 0°C to 60°C or on the surface of control board which high pressure equipment is installed.
- ⊘ Do not install to the place where strong shock or vibration continuously have impacted on product.
- ⊘ Use the product indoors only.
- ⊘ Use the product under 2000M altitude.

■ Disposal Precautions ⚠ Caution

When you dispose of product and battery, please treat it as industrial waste. It can create poisonous substances or explosion.

■ Internal Battery Specifications ⚠ Caution

When "CMOS CHECKSUM ERROR" is occurred during a booting, change the coin battery inside of product as this error occurs from fail of protect a BIOS setting by CMOS battery. This battery is inserted on side cover, printing as 'CR2032'.

Contents	Specifications
Voltage and Capacity	DC 3.0V, 225mAh
Model and Manufacturer	CR2032 (Lithium Battery), Panasonic
Lifetime	About 3years(Operating Temperature 25°C)
Battery Shape	

*It can be changed per model.

- All field-wiring connections to this unit shall be from Limited Voltage / Limited Current, below 24Vdc isolated secondary source with an output fuse, or Class 2.

*It is for MPC-B1500D only.

Chapter 2 Overview

2.1 Introduction of Products

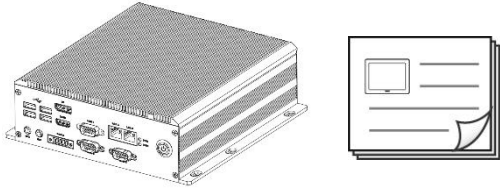
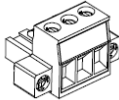
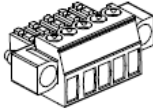

This is an industrial BOX-PC, which is a device based on RS-232C and RS-422/485, Ethernet which is used for the basic purpose of communication with another device (PLC), and this can monitor and control by connecting outer display device.

2.2 Package Contents

The components of the product are as follows.

Before using the product, please check that all of the following components are included.

Below figures are for your understanding, and it can be different from a real product.

Item	Figure	Quantity
Product / Manual		1 Each
Power Connector		1
Terminal Block 5P Connector		1
Accessories (Sold separate)	 USB Memory	User Options

2.3 Explanation of Model Name

2.3.1 Basic Model Name

Base Unit	Certifications	Power
MPC-	B1500: Intel 8th Core-i5	A: AC/DC Integrated SMPS D: DC Adaptor Input

Chapter 3 General Specifications

3.1 Power Specifications

Input Voltage	MPC-B1500A	AC 110V or 220V, 50/60Hz (*Voltage Selector Slide Switch)
	MPC-B1500D	DC 12V~24V, DC Jack
Voltage endurance	MPC-B1500A	AC 220V, within 10ms
	MPC-B1500D	DC 12V, within 10ms
Consumption Power	100W or less	
Insulation Resistance	500V DC, 10 MΩ	

3.2 System Specifications

Item	Description
CPU	Intel® Core-i5™ Processor 8365UE
Basic@ Burst frequency / TDP	1.6@4.1GHz / 15W
System Memory	DDR4 SO-DIMM 8GB (Max. Capacity 32GB)
Main Disk	2.5" SSD 256GB (*Default Option)

3.3 Ethernet Specifications

Item	Description
Speed	10M / 100M / 1000M bps
Connector	RJ-45 x 2

3.4 Audio Specifications

Item	Description
Audio Codec	Realtek ALC888S
Connector	SPK, MIC

3.5 Display Output Specifications

Item	Description
Graphic Controller	Intel UHD Gfx 620
HDMI	HDMI v1.4 up to 4096 x 2160@30/24Hz
DP	DP v1.2 up to 4096 x 2306@60Hz
Multi-Display	DP + HDMI

3.6 USB Specifications

Item	Description
Front	USB 3.1 x 4

3.7 Other Specifications

Model	Description	Etc.
MPC-B1500A	AC/DC Integrated SMPS	Default Options
MPC-B1500D	*Outer Adaptor required	100W or more recommended

*When using an outer adaptor with MPC-1500D, please check output voltage and current. Product can be damaged.

3.8 Option Specifications

Item	Windows O/S Options	Etc.
*O/S	Windows 10 IoT 1809 LTSC 64bit KOR/ENG	Common
TOPVIEW License USB	**Integrated USB Dongle	

* Windows 10 only. Win 7/8/8.1 are not supported.

** It does not use outside USB port as it is connected to internal USB port.

3.9 Environment Specifications

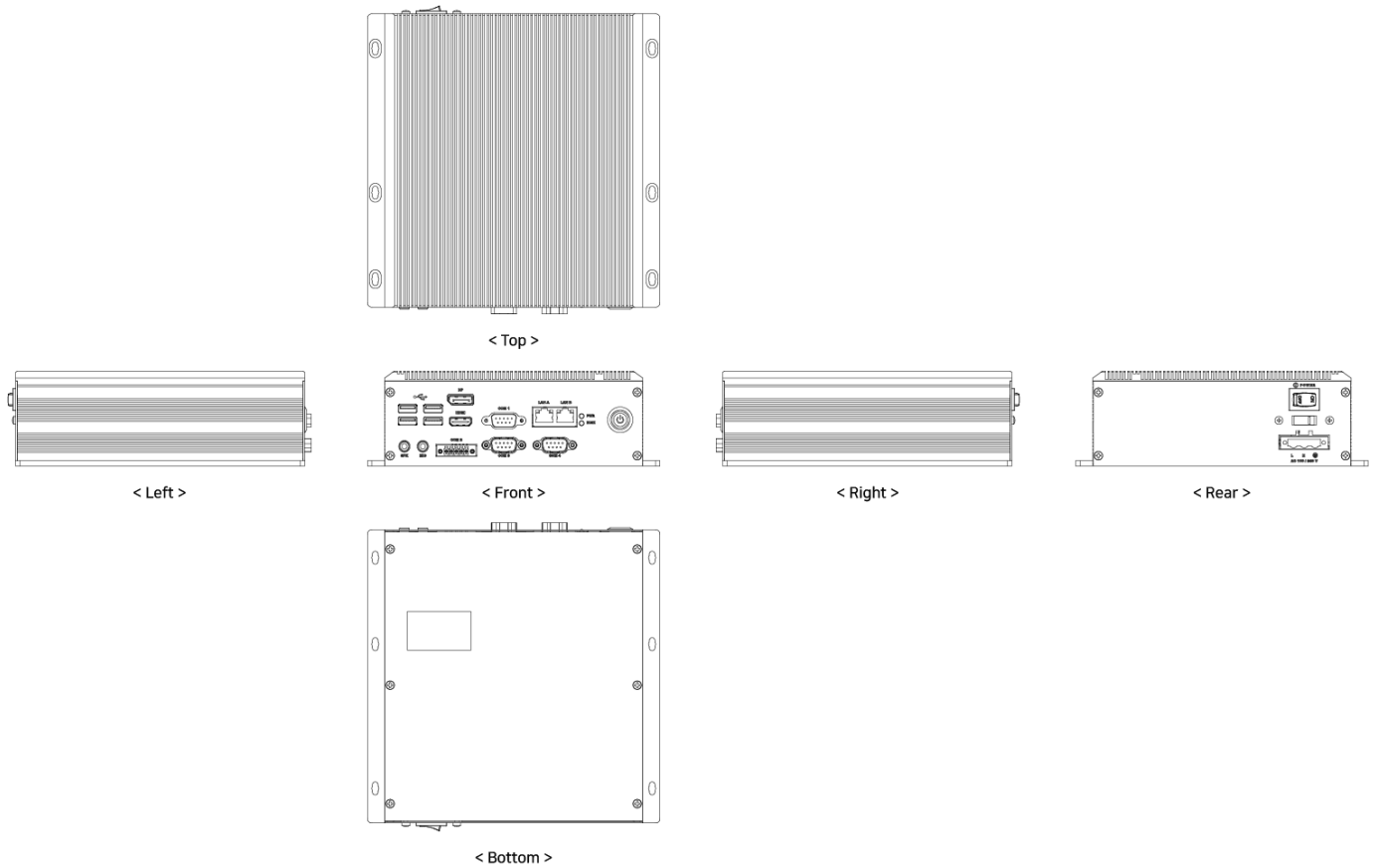
Operation Temperature (°C)	Humid 0%	0 ~+60°C
	Humid 95%	0~+40°C(No dew)
Storage Temperature (°C)	-20°C ~ +60°C	
Atmosphere	No corrosive gas	
Vibration Endurance	Amplitude: 10≤F < 25 Hz(2G) X,Y,Z each direction(for 30 minutes)	
Noise Immunity	1000Vp-p(Pulse width 1 μs)	
Static Electricity Discharge	Connective discharge from EN61000-4-2: ±4 kV	
Shock Endurance	10G X,Y,Z each direction(for 3 times)	
Surge Voltage	500V (Line-Line)	
Ground Connection	Class 3(100Ω or less)	
Protection Classification	IP2X	

3.10 Structure Specifications

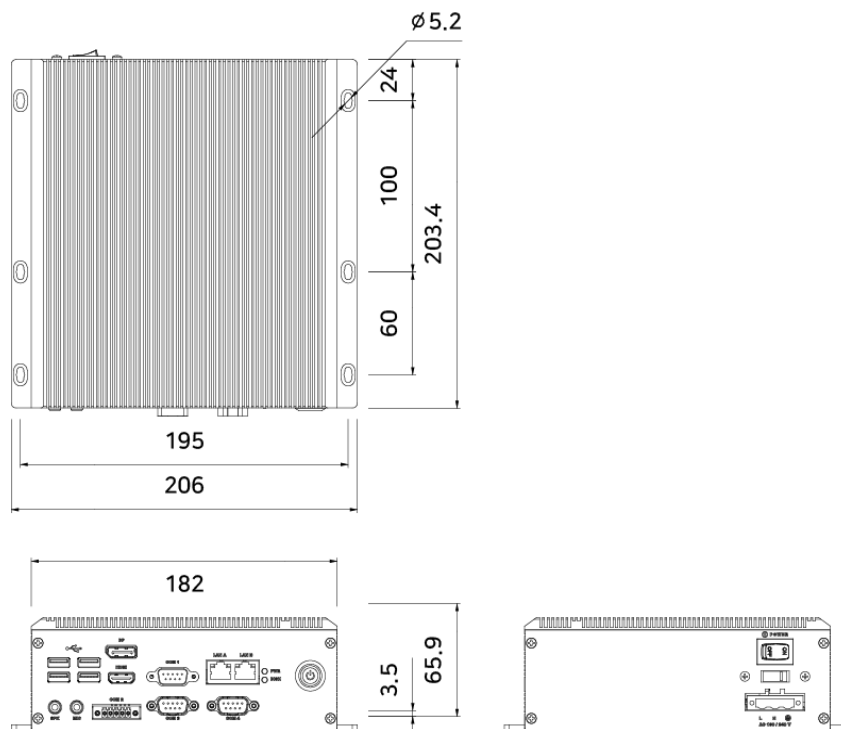
Item	Model	Description
Weight (Kg)	MPC-B1500A	2.7
	MPC-B1500D	1.6
Cooling System	Natural Air Circulation	
Installation Method	Floor hold / Fixing halls	
Case Material	AL(Aluminum)	

Chapter 4 Part Names and General Specifications

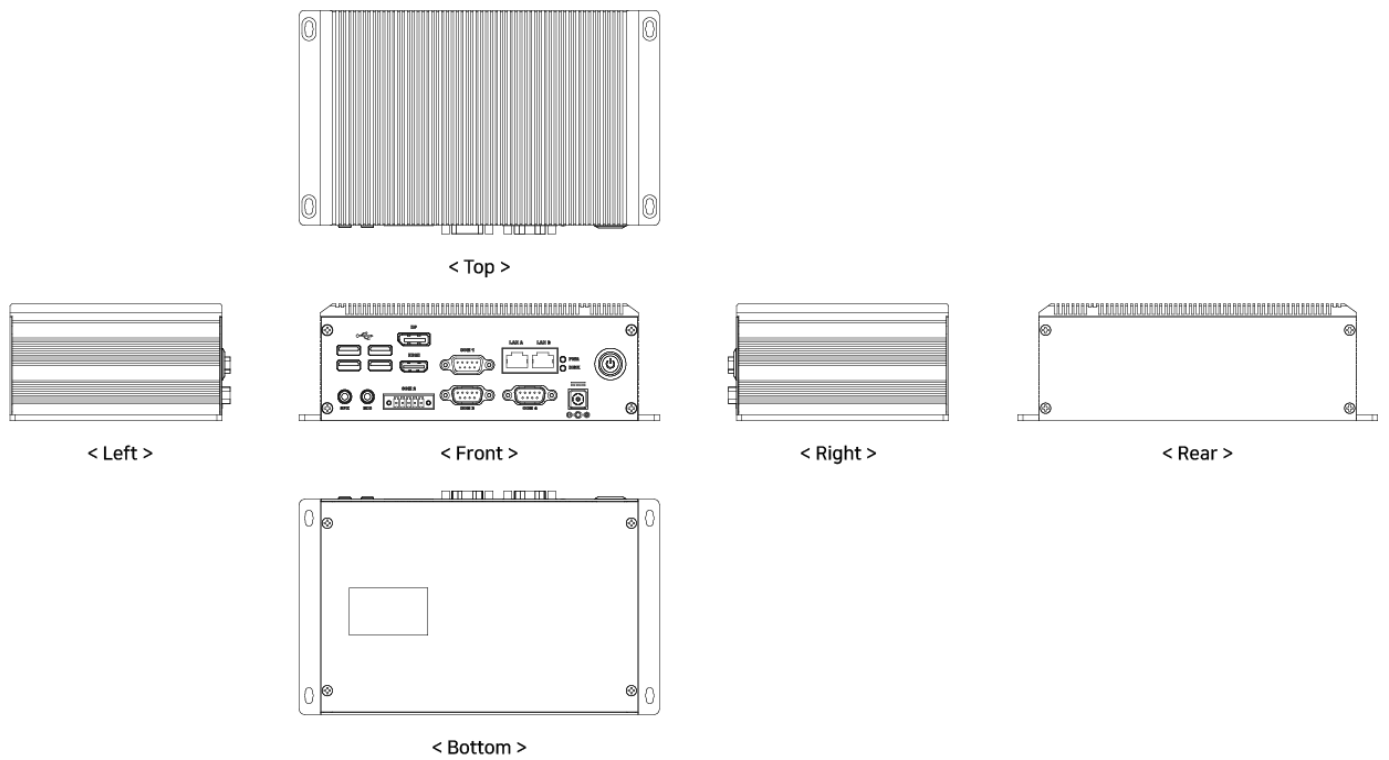
4.1 MPC-B1500A



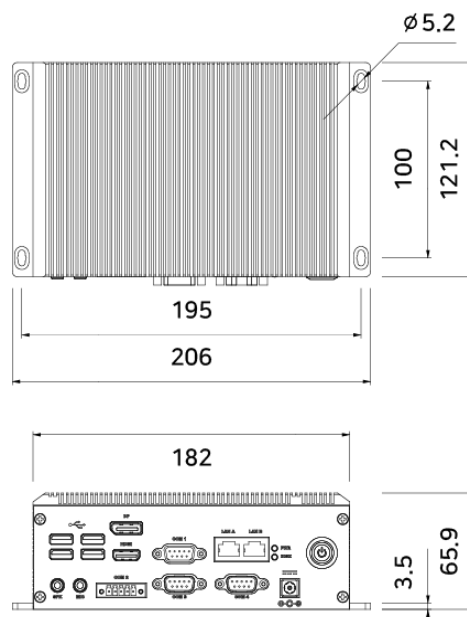
4.1.1 Product Dimension



4.2 MPC-B1500D

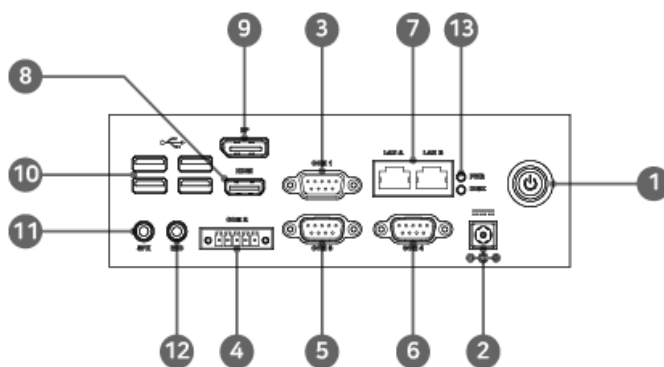


4.2.1 Product Dimension

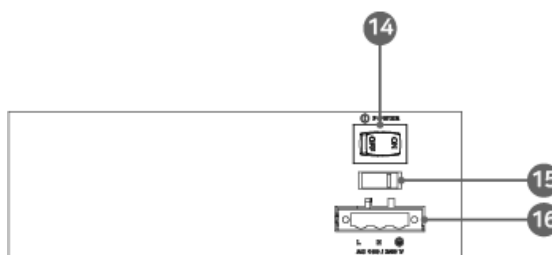


4.3 Part Names and General Specifications

4.3.1 Front Part



4.3.2 Rear Part



No.	Part	Form	Description	Model
1	System Power Switch	Push Switch	System Power Switch	Common
2	Power Input	DC Jack Plug	Power Input	MPC-B1500D
3	COM1	DSUB-9(Male)	RS-232C/422/485 Comm. Port	Common
4	COM2	Terminal Block-5P(3.50mm)	RS-232C/422/485 Comm. Port	Common
5	COM3	DSUB-9(Male)	RS-232C Comm. Port	Common
6	COM4	DSUB-9(Male)	RS-232C Comm. Port	Common
7	LAN Port #1, #2	RJ-45 2Ch	Ethernet Port, Independent IP Supported	Common
8	HDMI	HDMI Port	Connecting Display Monitor	Common
9	DP	DP Port	Connecting Display Monitor	Common
10	USB	USB 4Ch	USB Port	Common
11	SPK	Audio Jack(3.5Pi)	Speaker Output	Common
12	MIC	Audio Jack(3.5Pi)	Mic Input	Common
13	Status LED	LED	Operation Status of Power and Disk	Common
14	Power Switch	Rocker Switch-2P	Main Unit's Power Switch	MPC-B1500A
15	Voltage Switch	Slide Switch-2P	Input Voltage Selection Switch	MPC-B1500A
16	Power Input	Terminal Block-3P(7.62mm)	AC Power Input	MPC-B1500A

Chapter 5 Installation Warning

5.1 Installation Requirement

- (1) For your safe use, keep the product out least 100mm from other device and remove all of mechanical dangers around the product.
- (2) Install in a condition of 0~60°C(Humid 0%) or 0~40°C(Humid 95%(without dew)).
- (3) Install a cooling fan if you install the product in sealed space.
- (4) Power cables and communication cables should be separated. It can cause a malfunction of noise.
- (5) Keep the product away from noise cause like power cable, and wiring length should be short as possible.

5.2 Attachment with MDP Series

This product can be attached to MDP (made by M2I Corporation) Series' rear fixing halls.

Chapter 6 Interface with other Devices

Please refer to below explanations to communicate with other devices.

6.1 Serial Communication Mode Setting and Specifications

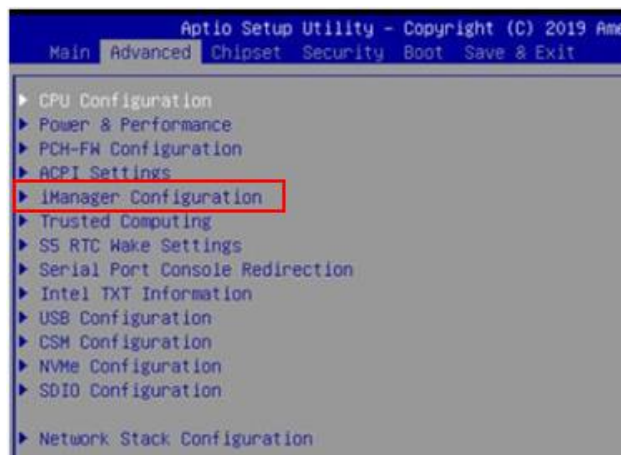
6.1.1 Set serial communication mode

After boot, Press or <ESC> key to set the communication mode can be changed in CMOS.

- Location of BIOS Communication Mode Change

Advanced -> iManager Configuration -> Serial Port Select -> [Serial Port] Mode

Choose one from [RS-232 Mode], [RS-422 Mode], [RS-485 Mode].



6.1.2 Supported Communication Mode as Port

You can select from COM1 ~ COM4. Please check below table for setting.

Serial Port	COM1	COM2	COM3	COM4
Factory Default	RS-232C	RS-232C	RS-232C	RS-232C
Select	RS-422	RS-422	Unavailable	Unavailable
	RS-485	RS-485		

6.1.3 Serial Communication Specifications

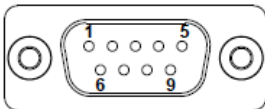
(1) RS-232C

Item	Description	
Protocol	Full Duplex	
Synch.	Asynchronous	
Communication Distance	About 15m	
Type of connection	1:1	
Control Code	ASCII Code or HEXA Code	
Baud Rate	Max. 115,200 bps	
Data Type	Data Bit	7, 8 bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2 bit
Connector Type	DSUB 9pin(Male), Terminal Block 5P(3.50mm)	

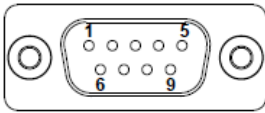
(2) RS-422/485

Item	Description	
Protocol	Full Duplex, Half Duplex	
Synch.	Asynchronous	
Communication Distance	About 500m	
Type of connection	1:N (N ≤ 31)	
Control Code	ASCII Code or HEXA Code	
Baud Rate	Max. 115,200 bps	
Data Type	Data Bit	7, 8 bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2 bit
Connector Type	DSUB 9pin(Male), Terminal Block 5P(3.50mm)	


(3) Pin Number and Signals for DSUB-9 (RS-232C Only): [COM3], [COM4]

Type	Pin No.	Signal	Direction	Meaning
9Pin male 	1	DCD	Input	Data Carrier Detect
	2	RXD	Input	RS-232C Receive Data
	3	TXD	Output	RS-232C Transmit Data
	4	DTR	Output	Data Terminal Ready
	5	SG	-	Signal Ground
	6	DSR	Output	Data Set Ready
	7	RTS	Output	Request to Send
	8	CTS	Input	Clear to Send
	9	RI	Input	Ringing Indicator

(4) Pin Number and Signals for DSUB-9 (RS-232C/422/485): [COM1]

Type	Pin No.	Signal	Direction	Meaning
 <p>9Pin male</p>	1	TXD(-) TRX(-)	Input/Output	422: TXD(-) 485: TRX(-)
	2	TXD(+) TRX(+) RXD	Input/Output	422: TXD(+) 485: TRX(+) 232C: RX
	3	RXD(+) TXD	Input/Output	422: RXD(+) 232C: TX
	4	RXD(-)	Input	422: RXD(-)
	5	SG	-	Signal Ground
	6	DSR	Output	Data Set Ready
	7	RTS	Output	Request to Send
	8	CTS	Input	Clear to Send
	9	RI	Input	Ringing Indicator

(5) Pin Number and Signals for Terminal Block-5P (RS-232C/422/485): [COM2]

Type	Pin No.	Signal	Direction	Meaning
	1	TXD(+) TRX(+) RXD	Input/Output	422: TXD(+) 485: TRX(+), 232C: RX
	2	TXD(-) TRX(-)	Output	422: TXD(-) 485: TRX(-)
	3	SG	-	Signal Ground
	4	RXD(+) TXD	Input/Output	422: RXD(+) 232C: TX
	5	RXD(-)	Input	422: RXD(-)

* SG must be connected directly.

* For Serial Interface with RS-422/485, Twisted Pair Cable must be used to communication cable corresponding to each Signal Pins such as [TXD+, TXD-], [RXD+, RXD-] and [TRX+, TRX-].

* The shield cable of communication should not be used to signal ground. It may cause failure of communication.

* Serial port is not isolated.

* If you are connecting external devices SG careful not to have a short circuit.

6.2 Ethernet Setting and Specifications

(1) Ethernet Specification

Item	Description
IEEE Compliant	IEEE 802.3, IEEE 802.3u, IEEE 802.3z, IEEE 802.ab, 10BaseT/100BaseT/1000BaseT
Speed	10M / 100M / 1000M bps
Communication Method	Base Band
Switch Method	AUTO MDIX
Max. Segment Length	100M(Between Hub)
Communication Cable	UTP(Unshielded Twisted Pair)
Modular Jack	RJ-45 x 2Ch

(2) RJ45 Pin Map

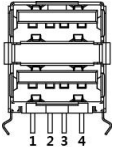
Type	Pin No.	color	Signal
 <p>The diagram shows an RJ45 connector with 8 pins. Pin 1 is on the right and pin 8 is on the left. The colors for each pin are: 1 (Orange/White), 2 (Orange), 3 (Green/White), 4 (Blue), 5 (Blue/White), 6 (Green), 7 (Brown/White), and 8 (Brown).</p>	1	Orange/White	TX+(10/100M), BI_DA+(GHz)
	2	Orange	TX-(10/100M), BI_DA-(GHz)
	3	Green/White	RX+(10/100M), BI_DB+(GHz)
	4	Blue	BI_DC+(GHz)
	5	Blue/White	BI_DC-(GHz)
	6	Green	RX-(10/100M), BI_DB-(GHz)
	7	Brown/White	BI_DD+(GHz)
	8	Brown	BI_DD-(GHz)

* IP configuration when connecting separated by internal / external network, you must enter each separate IP.

* For using a 1Gbps, UTP cable is required. Standard Cat 5e or CAT 6 confirmation.


* UTP Cable Compare	Cat 5e	Cat 6
Speed	MAX. 1Gbps	1Gbps or more
Band width	100Mhz	250Mhz
Data Loss	100M Increase data loss	No data loss over 100m intervals

6.3 USB Specifications

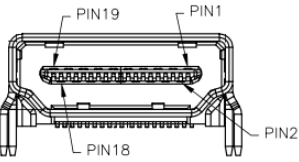
Type	Item	Description
 <p>The diagram shows a USB Type A connector with pins 1, 2, 3, and 4 labeled.</p>	USB Interface	USB 3.1/3.0/2.0/1.1
	Speed	Max. 5Gb/s
	Current Consumption	Max. 5.0V@900mA
	Connector type	Type A(2ch)

* To use USB 3.0, your device must also support USB 3.0 specification.

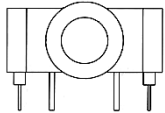
6.4 HDMI Specifications

Type	Item	Description
 <p>HDMI (FEMALE)</p>	HDMI Version	HDMI v1.4
	Resolution	Max. 4096x2160@30/24Hz
	Connector Type	HDMI Type A, 1 Port

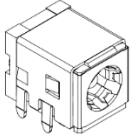
6.5 DP Specifications

Type	Item	Description
 <p>The diagram shows a DisplayPort connector with pins PIN1, PIN18, PIN19, and PIN2 labeled.</p>	DP Version	DP V1.2
	Resolution	Max. 4096x2306@60Hz
	Connector Type	Standard DisplayPort, 1 Port

6.6 AUDIO Specifications

Type	Item	Description
	Type	3.5mm AUDIO Plug
	Supported Source	SPK, MIC
	Connector Type	AUDIO Jack-Stereo

6.7 DC Jack Specifications


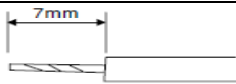
Type	Item	Description
	Type	5.5 Pi DC Jack
	Available Current	10A
	Connecting Plug	Within Outer 5.5 Pi, Inner 2.5 Pi, Depth 8.23mm

* MPC-B1500D Only.

Chapter 7 Wiring Warning

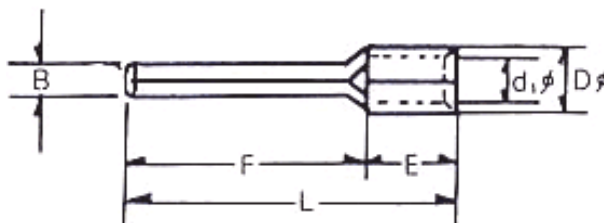
7.1 Power Cable Wiring

(1) The Power of MPC-B1500A cable should have the following specification.


Power Cable Specification	0.75~2.5mm ² (18~12AWG)
FG Cable Specification	2mm ² (14AWG) or more
Conductor type	Simple or Stranded wire(Copper only)
Bolt tightening force	≥ 0.4N.m 
Conductor length	
Temp. for wiring of Conductor	65°C or under

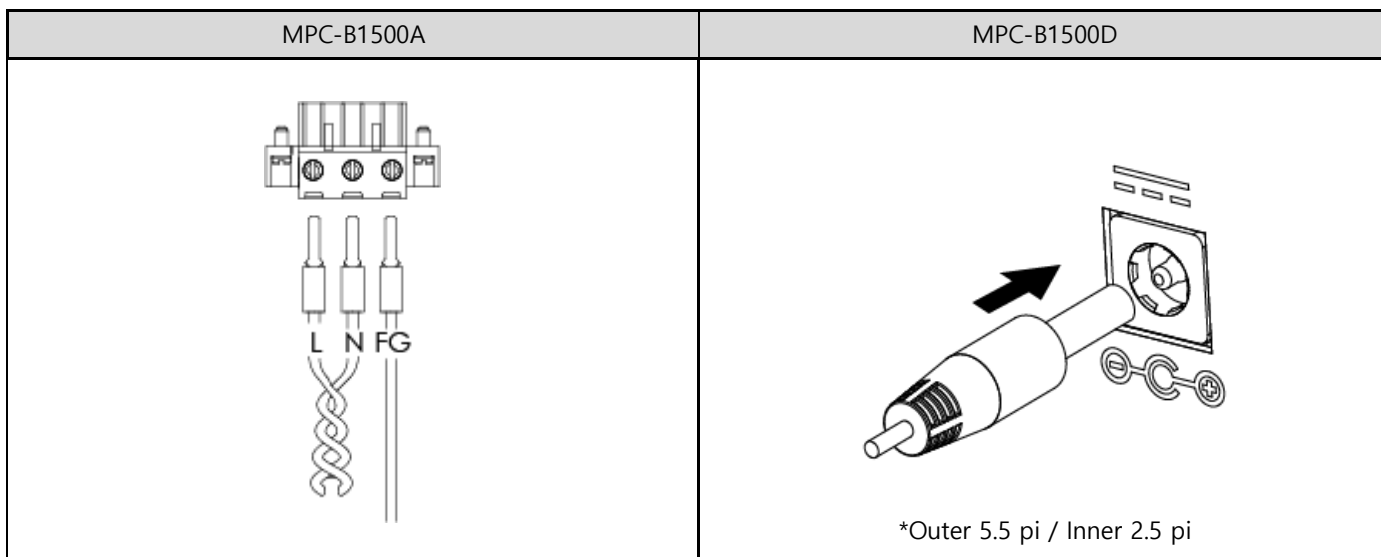
(2) Pin Terminal

Caution: Use of Pin Terminal for Power Cable and Ground Cable is very important to maintain a product. It can cause an electronic shock if you do not use Pin Terminal as below specifications. Thus, users must be aware of below Pin Terminal guide.



B	L	F	E	D	d
1.8~2.0	22~18	12~14	5	3.3~3.8	2~2.5

(3) Please insert the power cable as below pictures.  **Warning**

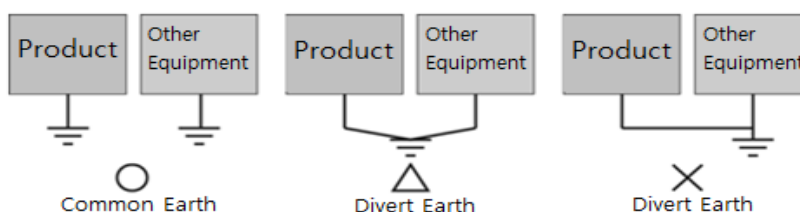


7.2 Ground Wiring **Warning**

(1) The Product has enough anti-noise measure, so except that there are many noises specially, the ground is not needed. When doing ground, please refer to the followings.

(2) The ground should be the exclusive ground. The ground should be type 3 ground. (Ground resistor is less than 100Ω.)

(3) When not doing the exclusive ground, do common ground like figure.



(4) Use the cable more than 2mm². Put the point of the ground near product and shorten ground line.

(5) When an adaptor is used, it must have a ground cable.

Chapter 8 System Utility **Warning**

8.1 System Restore Solution

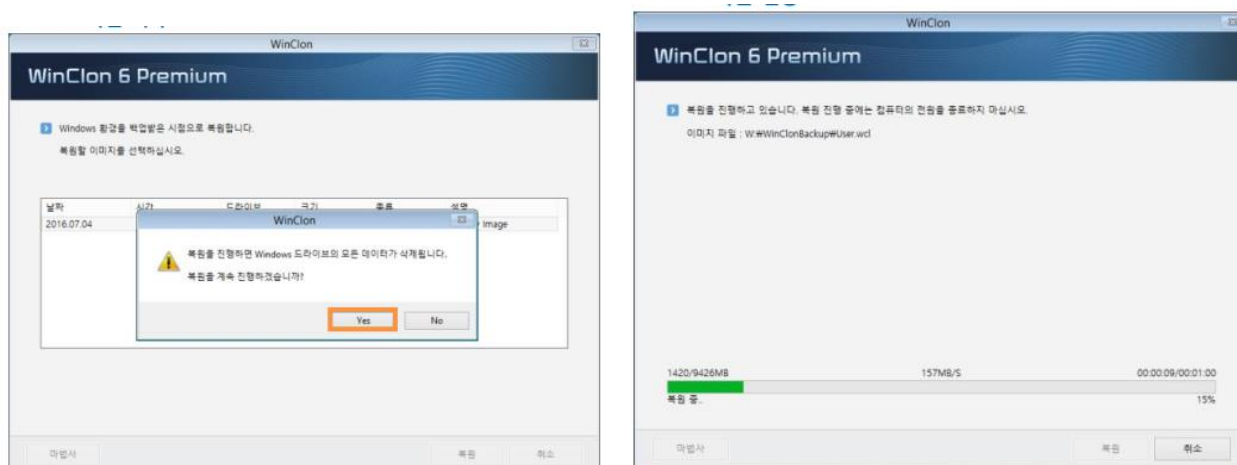
When user error or virus, warm a system file is corrupted, you can recover to the factory default state.

Although the recovery program is built into the body, it is recommended to produce a recovery USB memory stick.

After post process (Self Diagnosis) during boot, press F11 button to start recovery program. You can make a factory reset as below process. It will take about 10 minutes. All saved data will be deleted by recovery, so use this function very carefully.



If you touch 'Factory Reset' button, it will start the recovery.



Chapter 9 Maintenance Warning

9.1 Cleaning the Display

When the surface or frame of the display become dirty, spray the cleaning solution onto a soft cloth and wipe the device. Do not spray the cleaning solution directly onto the device.

9.2 Periodic Check Points

Check the followings periodically for best condition of the device.

(1) Environment

- Is the operating temperature within the allowable range?
- Is the operating humidity within the allowable range?
- Is there any corrosive gas around?

(2) Power

- Is the input power in right range?
- Check the power switch's surface about damage, scratch, pollution.

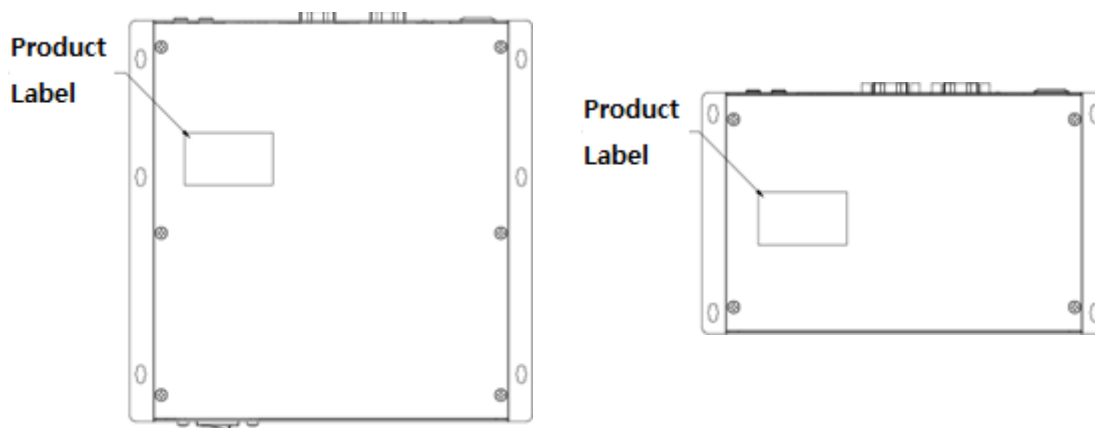
(3) Related Items

- Check about any pollutions or foreign substances on all of contact points.

9.3 Problems with the Device Warning

- (1) If there is a problem during operation, stop using it and contact the A/S department of M2I, which is indicated on the product label.
- (2) Only the authorized worker from M2I can check and repair problems related to malfunction of the machine.
- (3) If the problem cannot be solved at the installation site, the equipment can be collected and moved to M2I.
- (4) The manufacturer, M2I, is not responsible for damage or malfunction of the equipment caused by the use conditions of the user beyond the installation and use standards described in the manual.
- (5) If there is a high electromagnetic noise, put ferrite core on main power cable and field cable. The noise of power cable and communication cables can be high under the installation circumstances.
- (6) Recommend to use industrial display device if operation environment has many noises.
- (7) Put ferrite core on each end side of cable if there is any defected operation of HDMI or USB device.

Chapter 10 Product Label



10.1 MPC-B1500A



Manufacturer (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do 14055, Korea

Tel: 82-31-465-3366

Product Type: Industrial BOX-PC

Model Name: MPC-B1500A

Operation Temperature: $0\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$ (No humidity) / $+40\text{ }^{\circ}\text{C}$ (RH 95%)

Power Spec.: 110Vac/220Vac, 50/60 Hz, 100W or less

KC Certificate No:

Model No:

10.2 MPC-B1500D



Manufacturer (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do 14055, Korea

Tel: 82-31-465-3366

Product Type: Industrial BOX-PC

Model Name: MPC-B1500D

Operation Temperature: $0\text{ }^{\circ}\text{C} \leq T_a \leq +60\text{ }^{\circ}\text{C}$ (No humidity) / $+40\text{ }^{\circ}\text{C}$ (RH 95%)

Power Spec.: 12V~24Vdc, 100W or less, Class 2 power only.

KC Certificate No:

Model No:

Copyright: M2I Corporation 2023.09

www.m2i.co.kr

- Please read related contents in this manual when you use M2I product, and operate the product staying safe with appropriate handling.

- This manual should be stored in secured and appointed place so that it can be read in any needs.

User Guide
This product has Relevant Assessments for business environment. If this product is used in home environment, there can be an interference.