

# MPC-122-K Hardware User's Manual

---

Second Edition, June 2011

[www.moxa.com/product](http://www.moxa.com/product)

**MOXA**<sup>®</sup>

© 2011 Moxa Inc. All rights reserved.

# MPC-122-K Hardware User's Manual

The software described in this manual is furnished under a license agreement and may be used only in accordance with the terms of that agreement.

## Copyright Notice

© 2011 Moxa Inc. All rights reserved.

## Trademarks

The MOXA logo is a registered trademark of Moxa Inc.  
All other trademarks or registered marks in this manual belong to their respective manufacturers.

## Disclaimer

Information in this document is subject to change without notice and does not represent a commitment on the part of Moxa.

Moxa provides this document as is, without warranty of any kind, either expressed or implied, including, but not limited to, its particular purpose. Moxa reserves the right to make improvements and/or changes to this manual, or to the products and/or the programs described in this manual, at any time.

Information provided in this manual is intended to be accurate and reliable. However, Moxa assumes no responsibility for its use, or for any infringements on the rights of third parties that may result from its use.

This product might include unintentional technical or typographical errors. Changes are periodically made to the information herein to correct such errors, and these changes are incorporated into new editions of the publication.

## Technical Support Contact Information

[www.moxa.com/support](http://www.moxa.com/support)

### Moxa Americas

Toll-free: 1-888-669-2872  
Tel: +1-714-528-6777  
Fax: +1-714-528-6778

### Moxa Europe

Tel: +49-89-3 70 03 99-0  
Fax: +49-89-3 70 03 99-99

### Moxa China (Shanghai office)

Toll-free: 800-820-5036  
Tel: +86-21-5258-9955  
Fax: +86-21-5258-5505

### Moxa Asia-Pacific

Tel: +886-2-8919-1230  
Fax: +886-2-8919-1231

# Table of Contents

<b>1. Introduction</b>	<b>1-1</b>
Overview	1-2
Package Checklist	1-2
Product Features	1-2
MPC-122-K Hardware Specifications	1-3
Hardware Block Diagram	1-5
<b>2. Hardware Introduction</b>	<b>2-1</b>
Appearance	2-2
Computer	2-2
Panel	2-2
Dimensions	2-3
LED Indicators	2-3
Real Time Clock	2-3
<b>3. Hardware Connection Description</b>	<b>3-1</b>
Installing the MPC-122-K	3-2
Wiring Requirements	3-2
Connecting the Power	3-3
Grounding the MPC-122-K	3-3
Connecting Data Transmission Cables	3-4
Connecting to the Network	3-4
Connecting to a Serial Device	3-4
Installing a CompactFlash Card	3-5
Connecting a PS/2 Keyboard and Mouse	3-6
Connecting to USB Devices	3-7
Connecting to a Speaker or a Headphone	3-7
Upgrading the Memory Module	3-8
Installing a SATA Hard Disk	3-10
Installing the Hard Disk on the First HDD Bracket	3-11
Installing the Hard Disk on the Second HDD Bracket	3-13
<b>4. BIOS Setup</b>	<b>4-1</b>
Entering the BIOS Setup Utility	4-2
Modifying the BIOS Main Settings	4-2
Basic Configuration	4-2
System Security	4-3
Advanced Settings	4-3
Hard Disk Boot Priority	4-4
Advanced BIOS Features	4-4
CPU Features	4-4
C1E Function	4-4
Quick Power On Self Test	4-4
Summary Screen Show	4-4
Advanced Chipset Settings	4-5
On-chip Frame Buffer Size	4-5
DVMT Mode	4-5
Total GFX Memory	4-5
Boot Display	4-5
Peripherals	4-6
OnChip IDE Device	4-6
SATA Mode	4-6
Legacy Mode Support	4-6
Onboard Device	4-7
Onboard LAN Boot ROM	4-7
Super I/O Device	4-7
Debug Port	4-7
Power on After Power Fail	4-7
Power	4-8
Wake Up Control	4-8
Hardware Monitor	4-8
Load Defaults	4-9
Exiting the BIOS Setup	4-10
Upgrading the BIOS	4-10
<b>A. Regulatory Approval Statement</b>	<b>A-1</b>
<b>B. On Screen Display Configuration</b>	<b>B-1</b>
Opening the Configuration Screen	B-2
Main Menu	B-2
Brightness	B-2

Back Light .....	B-3
Color Temperature .....	B-3
Language .....	B-3
OSD Settings .....	B-3
Information .....	B-4
System Power.....	B-4
Reset to Default .....	B-4
Exit .....	B-4
<b>C. ECDIS Library and API Development.....</b>	<b>C-1</b>
Installation .....	C-2
Source Tree .....	C-2
ECDIS Library .....	C-2
Backlight Function .....	C-2
mpc122k_set_backlight function.....	C-2
ECDIS RGB Data Structure .....	C-2
ECDIS RGB Functions .....	C-3
mxecdis_rgb_read_tables function .....	C-3
mxecdis_rgb_last_error function.....	C-3

# Introduction

---

The MPC-122-K marine panel computer features a 2.26 GHz Intel Core 2 Duo processor with up to 4 GB of system memory to deliver a reliable high performance platform for marine system operations. Two RS-232/422/485 optically-isolated serial ports and two Gigabit LAN ports provide reliable serial communications and high speed Ethernet transmissions with network redundancy.

The panel is outfitted with a range of industrial features, such as optional optical bonding, wide view angles, and full range dimming. The panel is designed to modularly integrate with the computer to reduce system integration costs and reduce your time-to-market. Full support is provided for a wide range of panel resolutions in order to meet the specific requirements of many different marine applications.

The MPC-122-K marine panel computers are compliant with many different industrial marine standards, such as IEC 60945, DNV, and IACS-E10, to verify their resilience in maritime operations. The IP67 rated enclosure provides additional protection against harsh marine environments.

Also available are ECDIS-approved models that offer the optimal solution for computers that meet the ECDIS requirements.

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Package Checklist**
- ❑ **Product Features**
- ❑ **MPC-122-K Hardware Specifications**
- ❑ **Hardware Block Diagram**

## Overview

The MPC-122-K computer is based on the Intel Core 2 Duo mobile processor and comes with 2 optically isolated RS-232/422/485 serial ports, 2 Gigabit Ethernet ports, 7 USB 2.0 ports, and a CompactFlash socket, offering high performance and versatile peripherals for marine, railway, power, and other industrial applications.

Users can easily install Windows 7 or Windows XP SP3 to provide a flexible and friendly environment for system development and application implementation.

## Package Checklist

The MPC-122-K Series includes the following model:

**MPC-122X-K:** Intel Core 2 Duo 2.26 GHz panel computer with 22" screen, full-dimming, tape bonding glass

**MPC-122Y-K:** Intel Core 2 Duo 2.26 GHz panel computer with 22" screen, full-dimming, optical bonding glass

**MPC-122X-K-ECDIS:** Intel Core 2 Duo 2.26 GHz panel computer with 22" screen, full-dimming, tape bonding glass, ECDIS

**MPC-122Y-K-ECDIS:** Intel Core 2 Duo 2.26 GHz panel computer with 22" screen, full-dimming, optical bonding glass, ECDIS

Each model is shipped with the following items:

- MPC-122-K panel computer
- PS/2 to KB/MS Y-type cable
- 2 sets of hard drive cables and 1 set of SATA disk power cable
- Rubber water proofing cushion
- Hard drive ground sticker
- Documentation & software CD
- Quick installation guide (printed)
- Warranty card

**NOTE** Please notify your sales representative if any of the above items are missing or damaged.

## Product Features

The MPC-122-K panel computer has the following features:

- 22" wide viewable image size with 16:10 aspect ratio and 1680 x 1050 pixel resolution
- High performance Intel Core 2 Duo 2.26 GHz processor, 6 MB L2 cache
- Built-in 2 GB DDR3 memory, supporting up to 4 GB
- Full range dimming, optical bonding (optional), and wide angle view (178 x 178)
- Dual independent displays (VGA + DVI-D)
- Water and dust proof IP67-rated enclosure (flush mounting)
- 2 Gigabit Ethernet ports for network redundancy
- 2 optically-isolated RS-232/422/485 serial ports
- Onboard mini-PCIe slot for future expansions and upgrades
- 7 USB 2.0 ports for connecting peripheral devices
- CompactFlash card socket and optional hard disk drive support for storage expansion
- 2 SATA connectors for storage expansion
- Fanless and compact design

- Low power consumption
- Supports Windows 7, and Windows XP SP3
- ECDIS-compliant models available

## MPC-122-K Hardware Specifications

### Computer

**CPU:** Intel Core 2 Duo SP9300 2.26 GHz, 6 MB for L2 cache

**OS:** Windows 7, Windows XP SP3 (must be installed by the user)

**System Chipset:** Intel GS45 + ICH9M

**BIOS:** 8 Mbit Flash BIOS SPI type, ACPI function supported

**FSB:** 1066 MHz

**System Memory:** 2 GB DDR3 SDRAM onboard (supports DDR3 up to 4 GB)

**Graphics Controller:** Intel GS45 built-in

**Video Output:** DVI-D x 1, VGA x 1 (female)

**Expansion Bus:** Mini-PCIe onboard

**USB:** USB 2.0 ports x 7, type A connectors, supporting system boot up (6 ports on the computer, 1 port on the panel)

### Storage

**Storage Expansion:** CompactFlash socket

**SATA Storage Support:** (must be installed by the user)

- 2.5-inch SSD
- 2.5-inch HDD

### Other Peripherals

**KB/MS:** 1 PS/2 interface supporting standard PS/2 keyboard and mouse through Y-type cable

**Audio:** Line-in and line-out interface, with 3.5 mm mini jack

### Display

**Panel Size:** 22" wide viewable image size

**Panel Type:** MVA

**Aspect Ratio:** 16:10

**Pixels:** 1680 x 1050 (WSXGA+)

**Pixel Pitch (RGB):** 0.282 (H) x 0.282 (V) mm

**Response Time:** 8 ms (gray to gray)

**Contrast Ratio:** 1000:1

**Light Intensity:** 300 cd/m<sup>2</sup>

**Viewing Angles:** 178/178

**Active Display Area:** 473.76 (H) x 296.1 (V) mm

**Max Colors:** 16.7M (8 bits/color)

**Resolution:**

- VGA: 640 x 480
- SVGA: 800 x 600
- XGA: 1024 x 768
- SXGA: 1280 x 1024
- WSXGA+: 1680 x 1050 (optimal setting)

### Ethernet Interface

**LAN:** 2 auto-sensing 10/100/1000 Mbps ports (RJ45)

**Magnetic Isolation Protection:** 1.5 KV built-in

### Serial Interface

**Serial Standards:** 2 RS-232/422/485 ports, software-selectable (DB9 male)

**Optical Isolation Protection:** 4 KV

### Serial Communication Parameters

**Data Bits:** 5, 6, 7, 8

**Stop Bits:** 1, 1.5, 2

**Parity:** None, Even, Odd, Space, Mark

**Flow Control:** RTS/CTS, XON/XOFF, ADDC® (automatic data direction control) for RS-485

**Baudrate:** 50 bps to 921.6 Kbps (supports non-standard baudrates; see user's manual for details)

### Serial Signals

**RS-232:** TxD, RxD, DTR, DSR, RTS, CTS, DCD, GND

**RS-422:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-4w:** TxD+, TxD-, RxD+, RxD-, GND

**RS-485-2w:** Data+, Data-, GND

### LEDs

**System:** Storage, Power

**LAN:** 100M/Link x 2, 1000M/Link x 2 (on connector)

### Front Panel

**LED:** Storage, Power

**OSD:** 1 x OSD control

**USB:** 1 USB 2.0 host

**Potentiometer:** For brightness control

### Physical Characteristics

**Housing:** Aluminum sheet metal

**Weight:** 15.1 kg

**Dimensions:** 124 x 560 x 420 mm (4.88 x 22.05 x 16.54 in)

**Mounting:** Flush mounting

### Environmental Limits

**Operating Temperature:** -15 to 55°C (5 to 131°F)

**Storage Temperature:** -20 to 60°C (-4 to 140°F)

**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Anti-Vibration:**

- IEC 60945
- DNV 2.4, Class A/Class C

### Power Requirements

**Input Voltage:** 24 VDC (18 to 36 VDC), screw-type terminal block

**Power Consumption:** 112 W

- 6.21 A @ 18 VDC
- 4.55 A @ 24 VDC
- 2.95 A @ 36 VDC

### Standards and Certifications

**Safety:** UL/cUL, CCC

**EMC:** EN 55022 Class B, EN 55024-4-2, EN 55024-4-3, EN 55024-4-4, FCC Part 15 Subpart B Class A

**Marine:** IEC 60945 4th. (Pending), DNV (Pending), IACS-E10 (Pending)

**Green Product:** RoHS, cRoHS, WEEE

### Reliability

**Automatic Reboot Trigger:** Built-in WDT (watchdog timer) supporting 1-255 levels for time interval system reset, software programmable

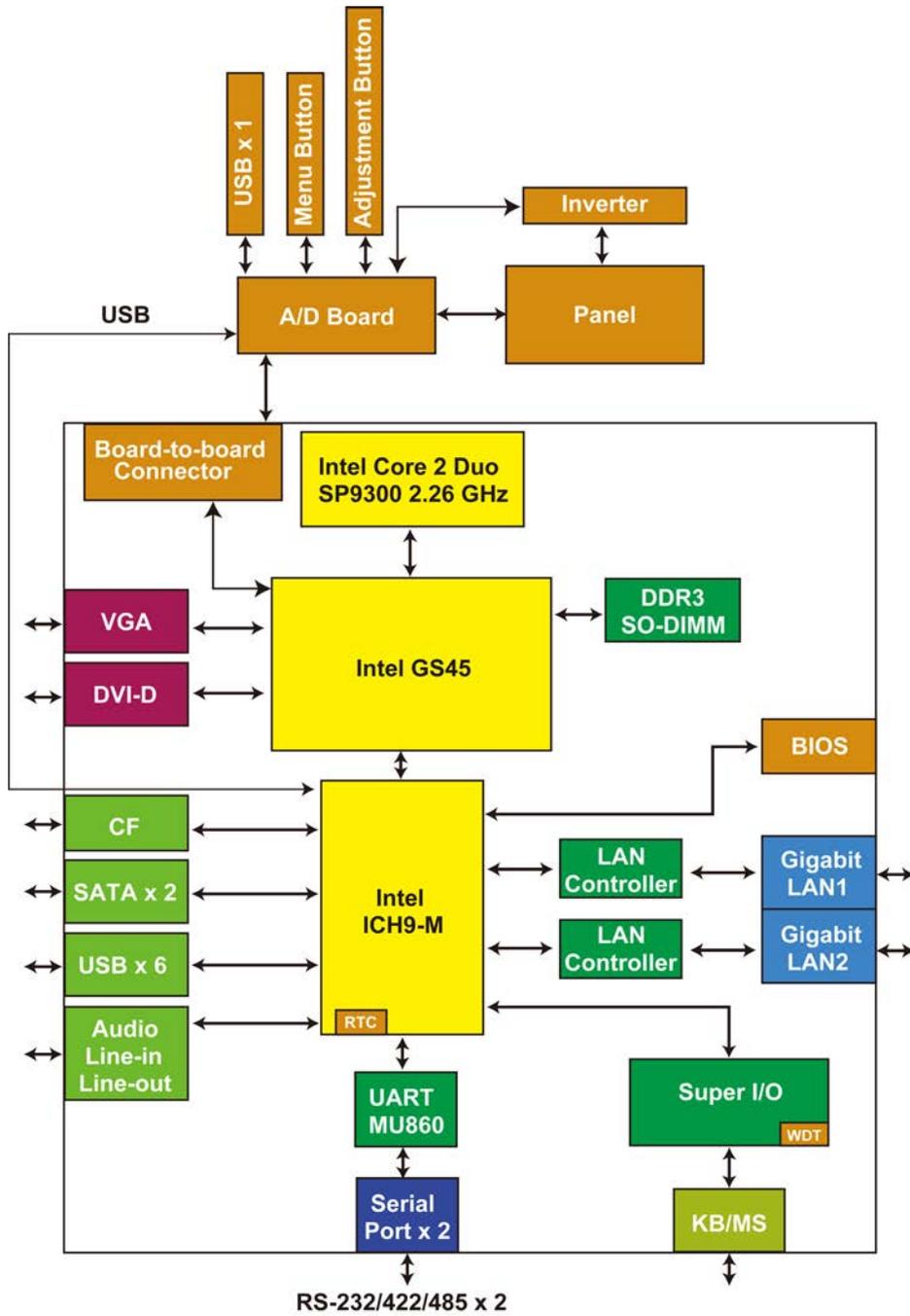
**MTBF (mean time between failures):** 39,675 hrs

### Warranty

**Warranty Period:** 1 year

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

# Hardware Block Diagram



## Hardware Introduction

---

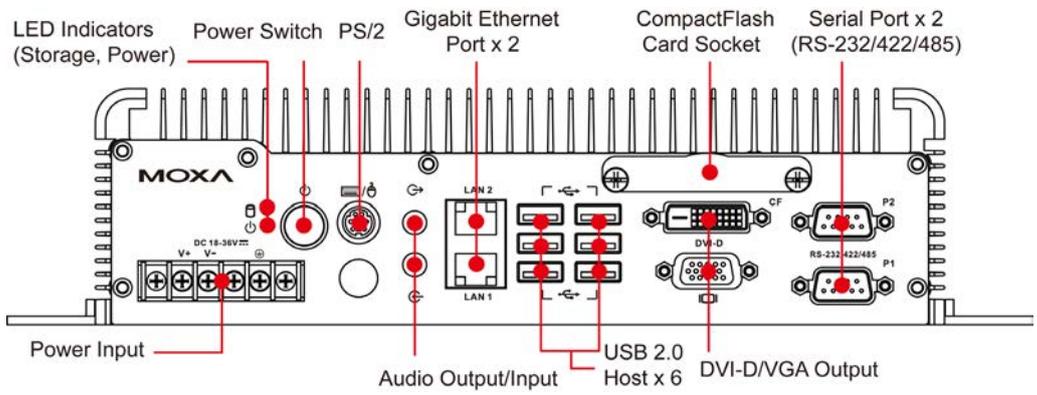
The MPC-122-K computer is compact, well-designed, and rugged enough for marine applications. LED indicators help you monitor performance and identify trouble spots, multiple serial ports allow you to connect different devices for wireless operation, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

The following topics are covered in this chapter:

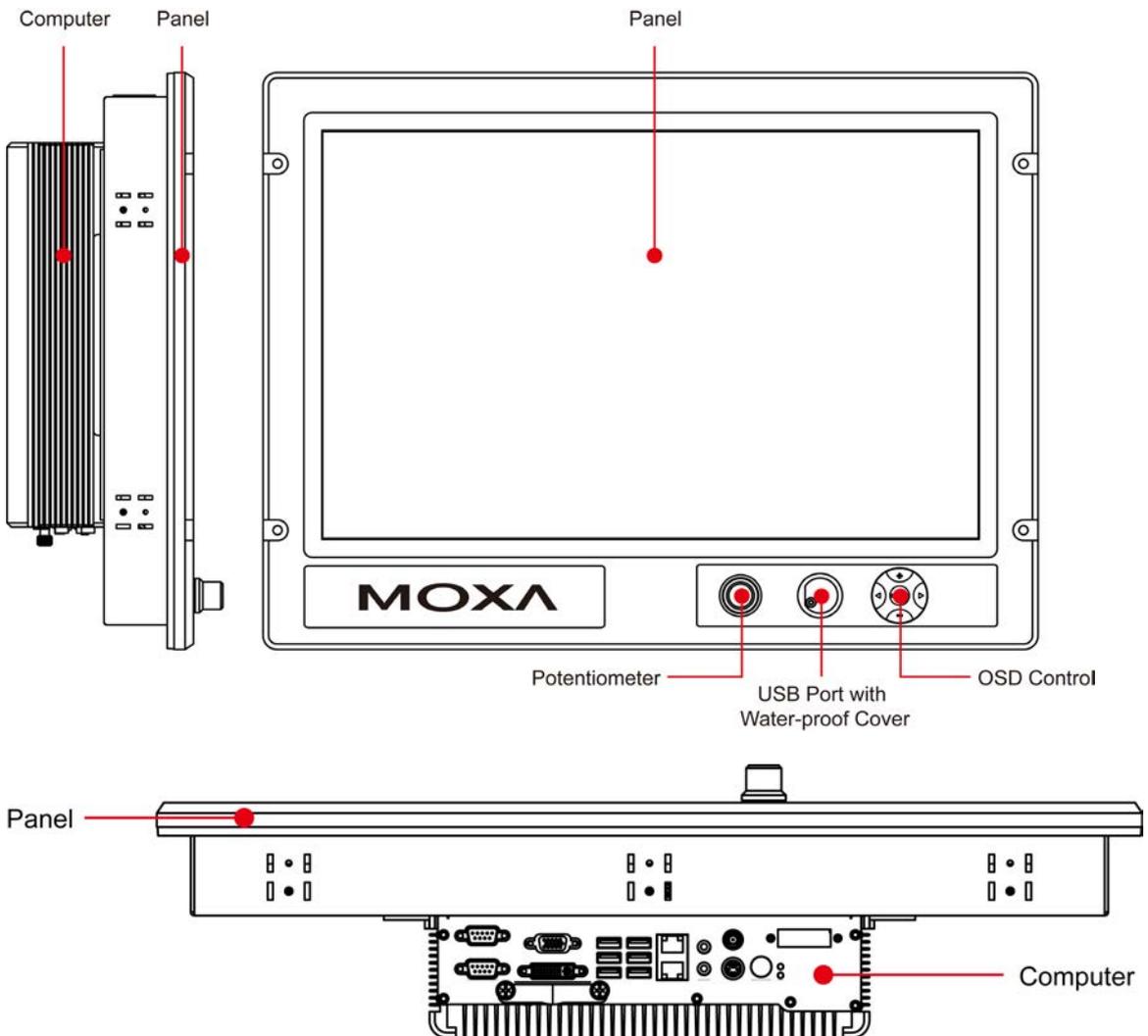
- ❑ **Appearance**
  - Computer
  - Panel
- ❑ **Dimensions**
- ❑ **LED Indicators**
- ❑ **Real Time Clock**

# Appearance

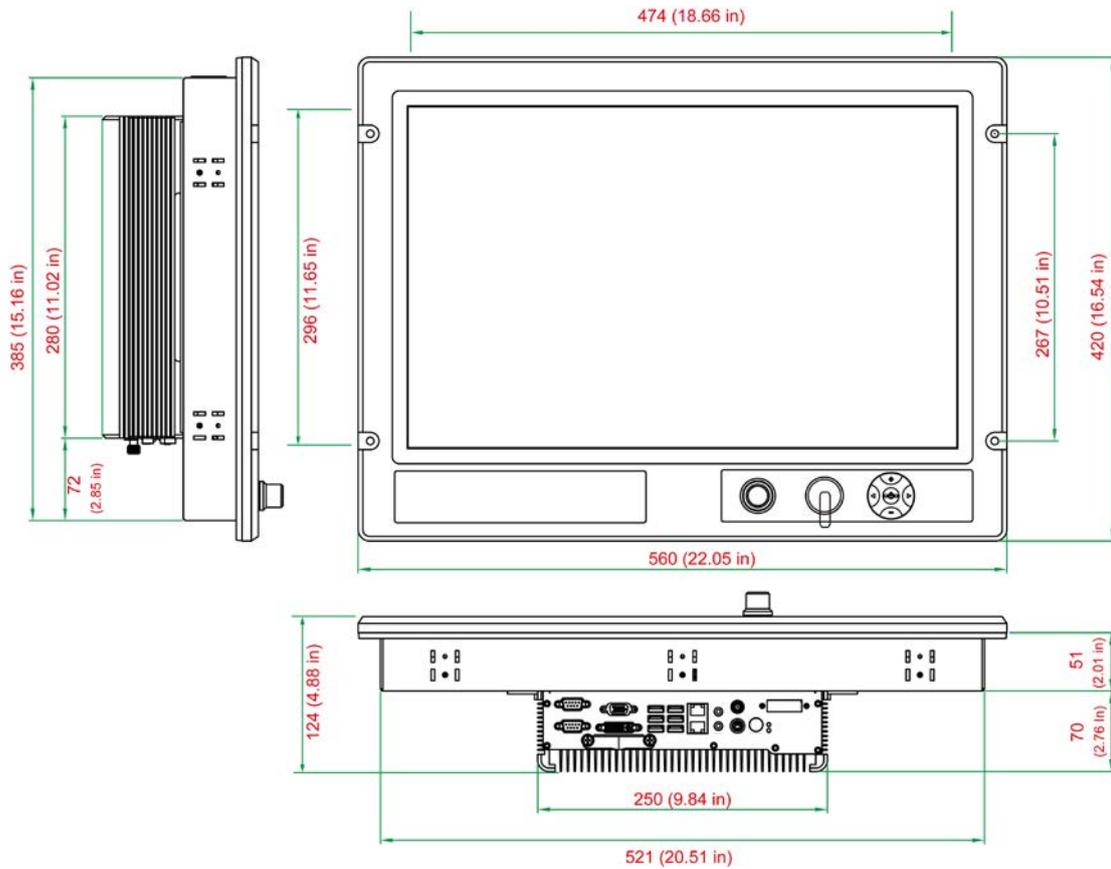
## Computer



## Panel



# Dimensions



# LED Indicators

LED Name	LED Color	LED Function
Power	Green	Power is on and functioning normally
	Off	Power is off or a power error exists
Storage	Yellow (on)	CF card is inserted and detected
	Yellow (blinking)	CF card or HDD is reading/writing
	Off	No activity
LAN	Green	100 Mbps Ethernet mode
	Yellow	1000 Mbps (Gigabit) Ethernet mode
	Off	No activity or 10 Mbps Ethernet mode

# Real Time Clock

The embedded computer's real-time clock is powered by a lithium battery. We strongly recommend that you **NOT** replace the lithium battery on your own. If the battery needs to be changed, please contact the Moxa RMA service team.

**ATTENTION**

There is a risk of explosion if the wrong type of battery is used. To avoid this potential danger, always be sure to use the correct type of battery. Contact the Moxa RMA service team if you need to replace your battery.

**Caution**

There is a risk of explosion if the battery is replaced by an incorrect type. Dispose of used batteries according to the instructions on the battery.

## Hardware Connection Description

---

In this chapter, we show how to connect the embedded computers to the network and to various devices.

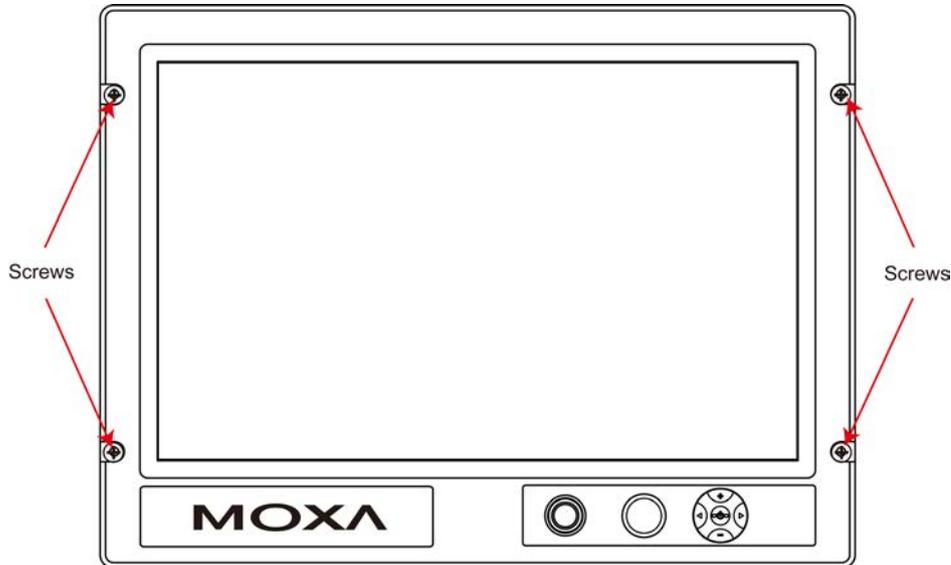
The following topics are covered in this chapter:

- ❑ **Installing the MPC-122-K**
- ❑ **Wiring Requirements**
- ❑ **Connecting the Power**
- ❑ **Grounding the MPC-122-K**
- ❑ **Connecting Data Transmission Cables**
  - Connecting to the Network
  - Connecting to a Serial Device
- ❑ **Installing a CompactFlash Card**
- ❑ **Connecting a PS/2 Keyboard and Mouse**
- ❑ **Connecting to USB Devices**
- ❑ **Connecting to a Speaker or a Headphone**
- ❑ **Upgrading the Memory Module**
- ❑ **Installing a SATA Hard Disk**
  - Installing the Hard Disk on the First HDD Bracket
  - Installing the Hard Disk on the Second HDD Bracket

# Installing the MPC-122-K

## Wall or Cabinet Mounting

There are a total of four screw holes on the panel, two on the left and two on the right. Use two screws per side to attach the MPC-122-K to a wall or cabinet.



For safety reasons, it is important to ensure that the four corners and four sides of the panel are firmly attached to the cabinet, so that the cabinet is completely stabilized.



### **ATTENTION**

Clean the monitor using a soft material such as microfiber cloth. You may also use LCD cleaning liquid to clean the monitor.

Avoid using coarse or rough material to clean the monitor as they may damage the optical bonding.

## Wiring Requirements

This section describes how to connect serial devices to the embedded computer.

You should read and follow these common safety precautions before proceeding with the installation of any electronic device:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

**NOTE** Do not run signal or communication wiring together with power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- It is advisable to label the wiring to all devices in the system.



**ATTENTION**

**Safety First!**

Be sure to disconnect the power cord before installing and/or wiring your MPC-122-K.

**Wiring Caution!**

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

**Temperature Caution!**

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

## Connecting the Power

The MPC-122-K offers 18 to 36 VDC power input with the terminal block. If the power is supplied properly, the Power LED will light up. The OS is ready when the Ready LED glows a solid green.

For safety reasons, please use cables with the following specifications:

**Wire range 14-22 AWG, torque 7 lb**

## Grounding the MPC-122-K

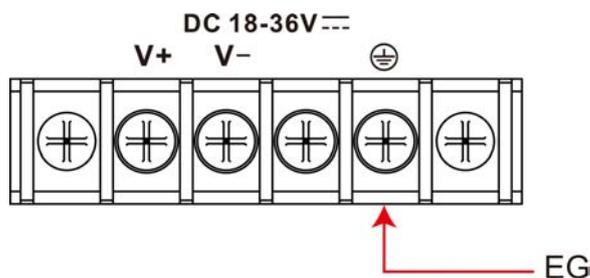
Grounding and wire routing help limit the effects of noise due to electromagnetic interference (EMI). Run the ground connection from the ground screw to the grounding surface prior to connecting the power.



**ATTENTION**

This product is intended to be mounted to a well-grounded mounting surface, such as a metal panel.

EG: See the figure shown below for the location of the Earth Ground on the terminal block power connector. Connect the EG wire to an appropriate grounded metal surface.



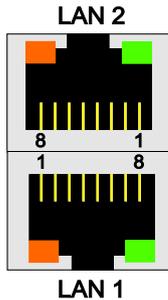
# Connecting Data Transmission Cables

This section describes how to connect the MPC-122-K computer to the network and serial devices.

## Connecting to the Network

Plug your network cable into the embedded computer's Ethernet port. The other end of the cable should be plugged into your Ethernet network. When the cable is properly connected, the LEDs on the embedded computer's Ethernet port will glow to indicate a valid connection.

The 10/100/1000 Mbps Ethernet LAN port uses 8-pin RJ45 connectors. The following diagram shows the pinouts for these ports.



The LED indicators on the right top and right bottom corners glow a solid green color when the cable is properly connected to a 100 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.

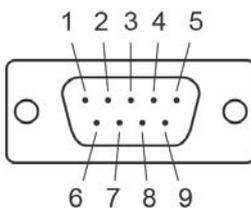
The LED indicators on the left top and left bottom corners glow a solid yellow color when the cable is properly connected to a 1000 Mbps Ethernet network. The LED will flash on and off when Ethernet packets are being transmitted or received.

Pin	10/100 Mbps	1000 Mbps
1	ETx+	TRD(0)+
2	ETx-	TRD(0)-
3	ERx+	TRD(1)+
4	–	TRD(2)+
5	–	TRD(2)-
6	ERx-	TRD(1)-
7	–	TRD(3)+
8	–	TRD(3)-

## Connecting to a Serial Device

Use a serial cable to plug your serial device into the embedded computer's serial port. Serial ports 1 and 2 have male DB9 connectors and can be configured for RS-232, RS-422, or RS-485 communication by software. The pin assignments are shown in the following table:

DB9 Male Port



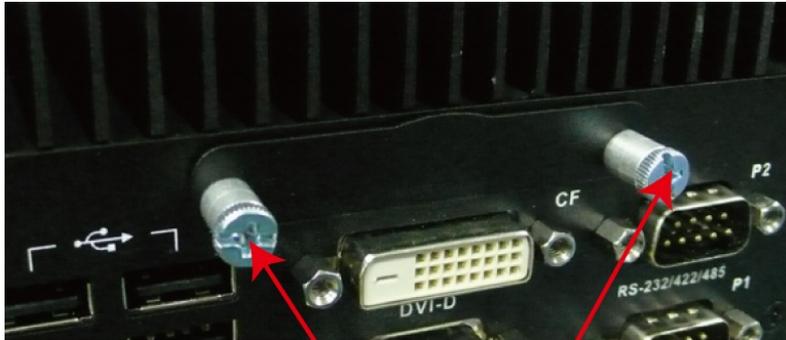
RS-232/422/485 Pinouts

Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DCD	TxDA(-)	TxDA(-)	–
2	RxD	TxDB(+)	TxDB(+)	–
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	–	–	–
7	RTS	–	–	–
8	CTS	–	–	–

# Installing a CompactFlash Card

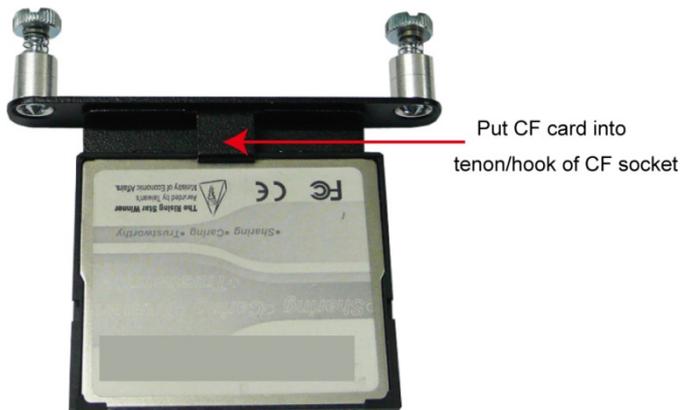
The MPC-122-K computer comes with a CompactFlash socket. To insert a CompactFlash card, follow these instructions:

1. Disconnect the MPC-122-K from its power source.
2. The CompactFlash socket is located on the right side of the front panel. Unscrew the CompactFlash socket cover.



Screws

3. There is a tenon/hook on the cover of the CF socket. Turn the CompactFlash card over and then insert the CompactFlash card into the tenon/hook of the CF socket cover.



## ATTENTION

Be careful of how you orient the CompactFlash card. You should turn the CF card bottom side up, in order to hook CF card into the CF socket cover.

4. Gently insert the CompactFlash card into the CF socket, making sure that the card is oriented correctly.



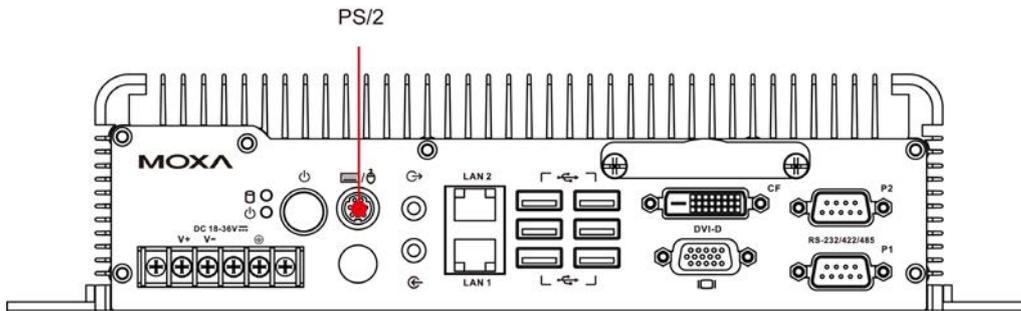


**ATTENTION**

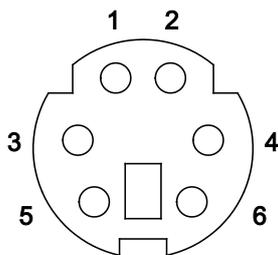
The MPC-122-K embedded computer does not support the CompactFlash hot swap and PnP (Plug and Play) functions. It is necessary to remove power source first before inserting or removing the CompactFlash card.

## Connecting a PS/2 Keyboard and Mouse

Your MPC-122-K computer comes with a PS/2 mini-DIN connector to connect to a PS/2 keyboard and PS/2 mouse. This 6-pin mini-DIN connector has the pin assignments shown below.



**PS/2 Connector**



Pin No.	Signal Definition
1	PS/2 Keyboard Data
2	PS/2 Mouse Data
3	GND
4	VCC
5	PS/2 Keyboard Clock
6	PS/2 Mouse Clock

Use the Y-type cable to convert the mini-DIN connector into two 6-pin mini-DIN connectors to connect both PS/2 keyboard and PS/2 mouse at the same time. You may also use the USB ports to connect your USB-based keyboard and mouse.

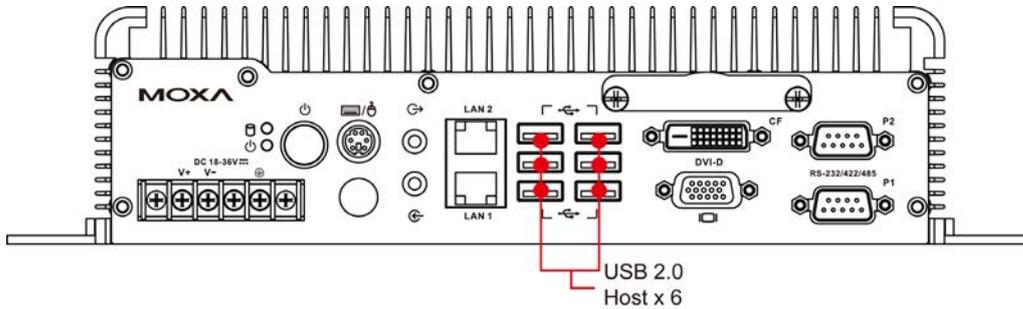


**ATTENTION**

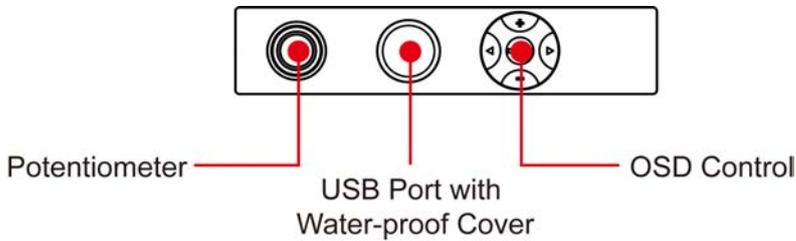
Please note that without a Y-type cable, the PS/2 connector on the MPC-122-K can only work with a PS/2 keyboard. A PS/2 mouse will not function when directly connected to the PS/2 connector on the MPC-122-K computer.

## Connecting to USB Devices

The MPC-122-K comes with 6 USB 2.0 ports on the computer. The ports can be used for an external flash disk or hard drive for storing large amounts of data. You can also use these USB ports to connect to a keyboard or a mouse.

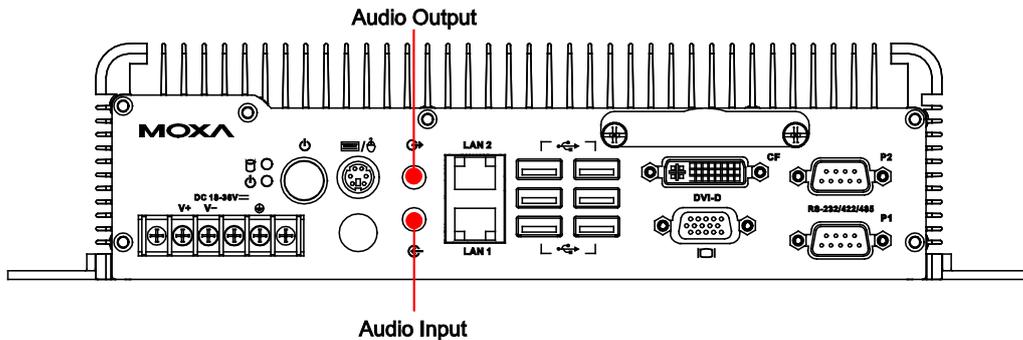


An additional USB port with a water-proof cover can be found on the front panel. To use, simply remove the cover and connect to a USB supported device of your choice, such as a keyboard, mouse or storage disk.



## Connecting to a Speaker or a Headphone

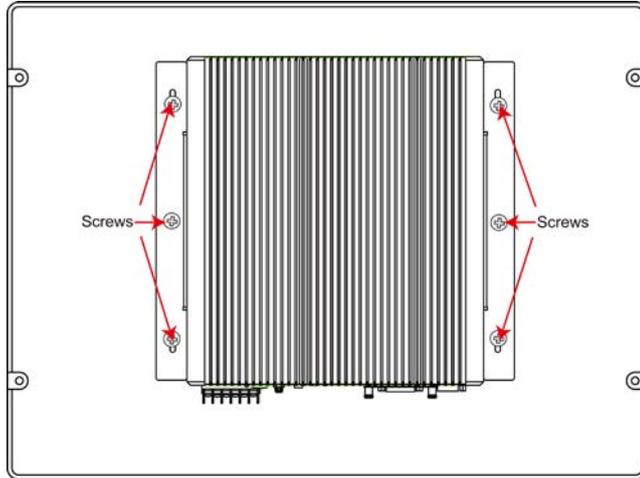
The MPC-122-K comes with audio input and output interfaces for connecting a microphone and speaker or headphones. See the following figure for details.



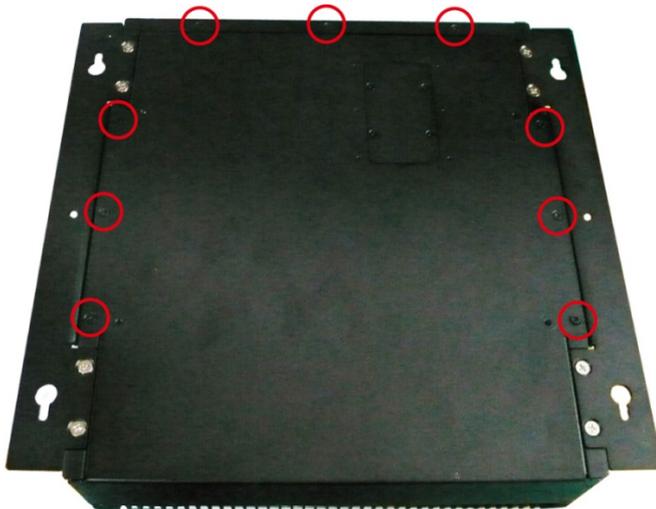
# Upgrading the Memory Module

The MPC-122-K computer supports two memory sockets that have been installed with 2 GB DDR2 SDRAM modules (1 GB for each socket). To upgrade the DDR3 SDRAM memory module, follow these instructions:

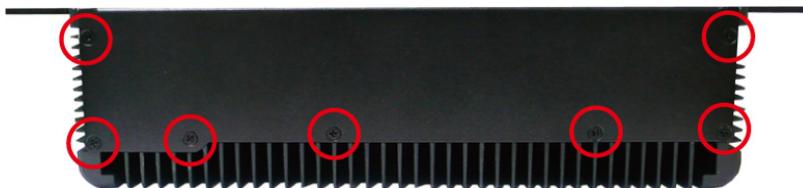
1. Disconnect the MPC-122-K from the power source.
2. Remove the six screws as illustrated below.



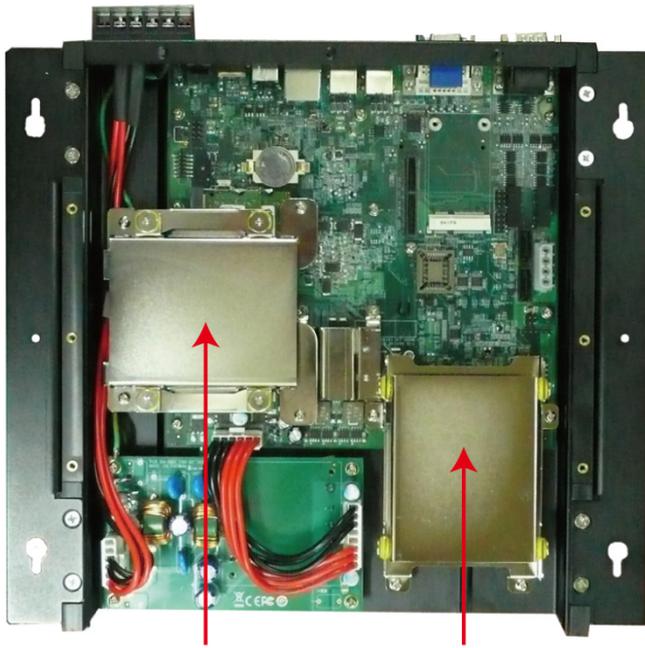
3. Remove the nine screws on the back cover. See the following figure for detailed location.



4. Then remove seven screws on the rear cover.



5. Remove the back cover of the computer. You will see two HDD brackets inside. The memory module is located below the first HDD bracket.

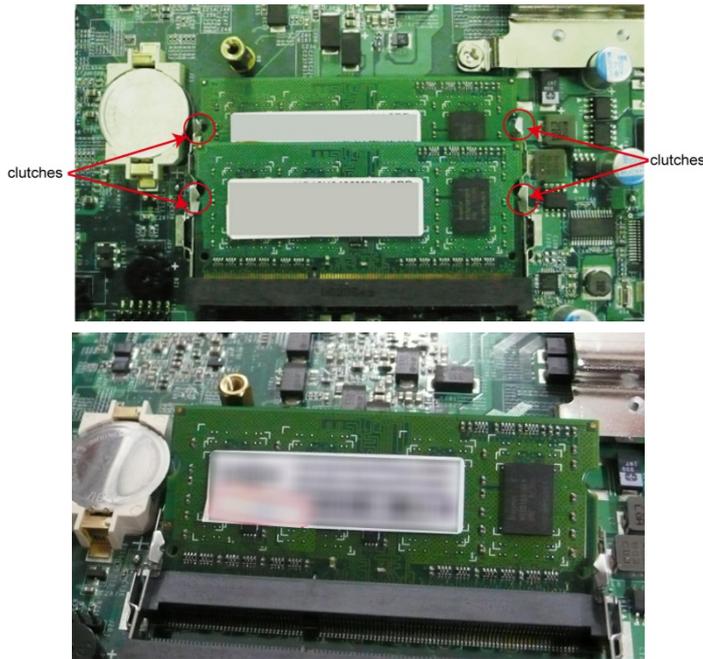


First HDD Bracket    Second HDD Bracket

6. Remove the four screws of the first HDD bracket. See the following figure for the specific location of the screws.



7. After the first HDD bracket has been removed, you can find two memory modules. Carefully remove the module by clicking the clutches at both sides of the module, and then replace the new module. Be sure to orient the module correctly.

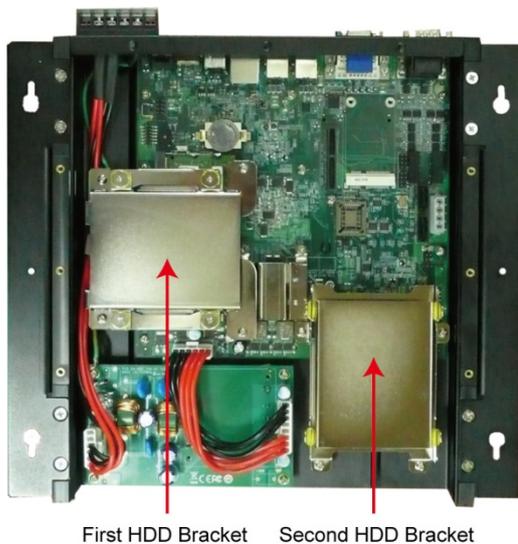


8. When finished, replace the first HDD bracket and the back cover of the computer.

## Installing a SATA Hard Disk

The MPC-122-K has two SATA connectors for installing two SATA hard disks. To install the 2.5-inch SATA hard disks, follow these instructions.

After removing the back cover of the computer, find the HDD brackets in the following figure. Please note that you can install your hard disk onto either HDD bracket. However, if you would like to install an SSD type disk, we suggest you have it installed on the second HDD bracket.



## Installing the Hard Disk on the First HDD Bracket

1. Remove the four screws on the first HDD bracket.



2. Remove two black screws on each side of the bracket, and then take off the cover.



3. Place the hard disk on the bracket. Use the four screws to fasten the hard disk at both sides of the bracket.



- When finished, place the bracket on the computer, and use four screws to fasten the bracket. Next, find the location of the power connect and the SATA connectors. There is one power connector which can be used by two SATA hard disks, and there are two SATA connectors for connecting two SATA disks.



- Connect the power cable to the power connector and the SATA cable to the SATA connector.



- When finished, use the ground sticker to attach the hard drive disk and the bracket. Make sure that the metal parts of the hard drive disk and the bracket have been attached. If you are using a solid state drive (SSD), you don't need to attach this sticker.



## Installing the Hard Disk on the Second HDD Bracket

1. Remove the four screws on the second HDD bracket.



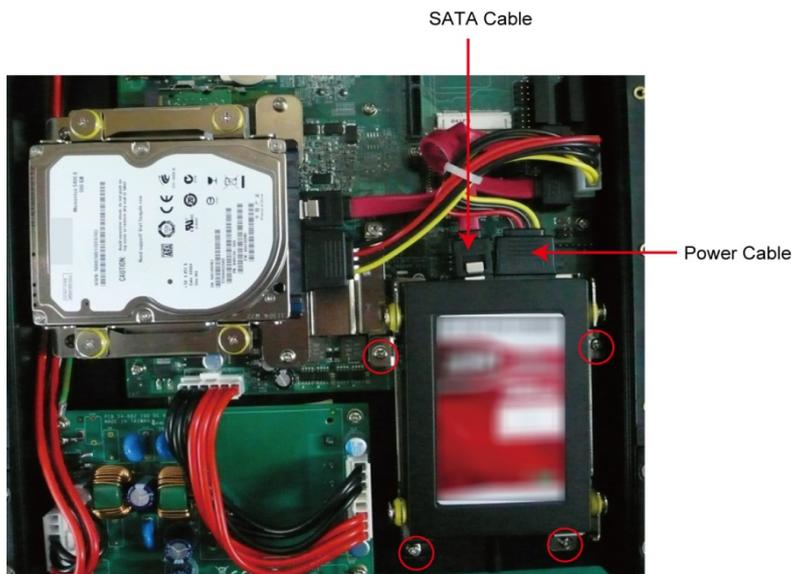
2. Remove two black screws on each side of the bracket, and then take off the cover.



3. Place the hard disk on the bracket. Use the four screws to fasten the hard disk at both sides of the bracket.



- When finished, place the bracket on the computer, and use four screws to fasten the bracket. Next, connect the SATA cable to the SATA connector, and the power cable to the power connector.



- When you finish installing two hard disks on the computer, replace the back cover of the computer, and fasten the screws.
- When finished, use the ground sticker to attach the hard drive disk and the bracket. Make sure that the metal parts of the hard drive disk and the bracket have been attached. If you are using a solid state drive (SSD), you don't need to attach this sticker.



This chapter describes the BIOS settings of the MPC-122-K computer. The BIOS is a set of input/output control routines for peripherals. The BIOS is used to initialize basic peripherals and helps boot the operating system before the operating system is loaded. The BIOS setup allows the user to modify the system configurations of these basic input/output peripherals. All of the configurations will be stored in the battery backed up CMOS RAM, which retains the system information after system reboots or the power is removed.

The following topics are covered in this chapter:

- ❑ **Entering the BIOS Setup Utility**
- ❑ **Modifying the BIOS Main Settings**
  - Basic Configuration
  - System Security
- ❑ **Advanced Settings**
  - Hard Disk Boot Priority
  - Advanced BIOS Features
  - CPU Features
  - Advanced Chipset Settings
- ❑ **Peripherals**
  - OnChip IDE Device
  - Onboard Device
  - Super I/O Device
- ❑ **Power**
- ❑ **Wake Up Control**
- ❑ **Hardware Monitor**
- ❑ **Load Defaults**
- ❑ **Exiting the BIOS Setup**
- ❑ **Upgrading the BIOS**

# Entering the BIOS Setup Utility

To enter the BIOS setup utility, press the “Del” key while the system is booting up. The main BIOS Setup screen will appear.

A basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to scroll about the screen, how to select by pressing “Enter,” and how to use the other hot keys listed below.

**F1: General Help**

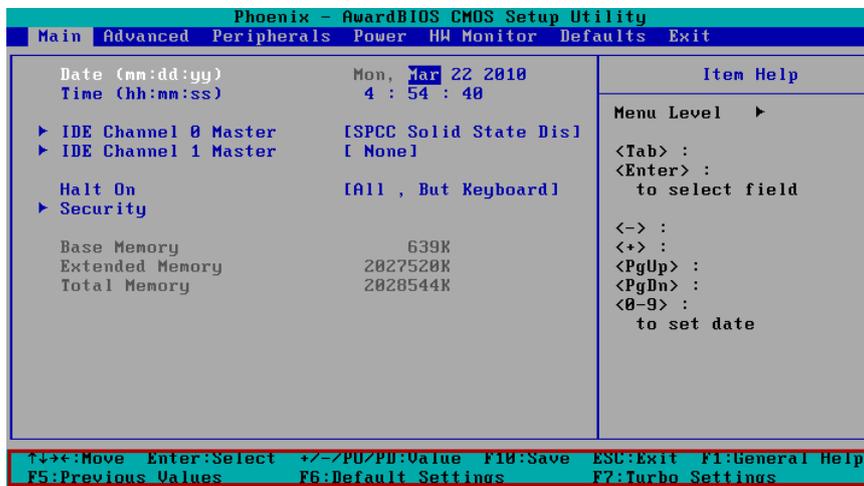
**F5: Previous Value**

**F6: Default Settings**

**F7: Turbo Settings**

**F10: Save**

**ESC: Exit**



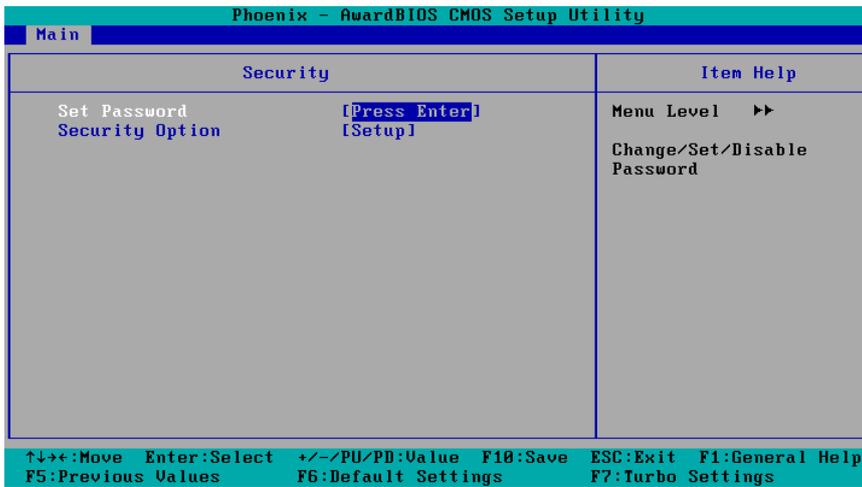
# Modifying the BIOS Main Settings

## Basic Configuration

After entering the BIOS Setup, or choosing the “Main” option, the BIOS main menu will be displayed. Use this menu to check the basic system information such as memory and IDE hard drive. You can also use the menu for configuring basic system parameters, such as date, time, hard drive, display, and system security.

## System Security

To set up system security, select the "Security" option under "Main" to bring up the following screen.



This menu includes two options: "Set Password" and "Security Option."

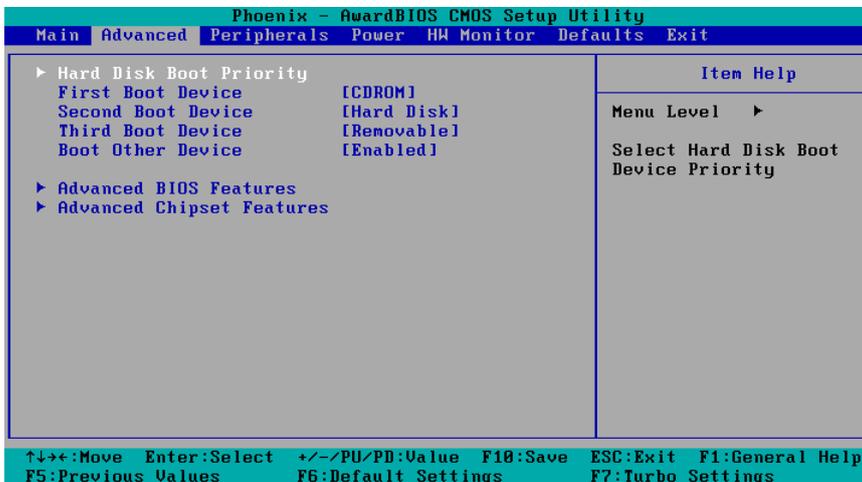
When you select the Set Password option, a pop-up "Enter Password:" window will appear on the screen. The password that you type will replace the password stored in the CMOS memory. You will be required to confirm the new password. Just re-type the password and then press <Enter>. You may also press <Enter> to abort the selection and not enter a password.

To clear an existing password, just press <Enter> when you are prompted to enter the password. A message will show up confirming that the password will be disabled. Once the password is disabled, the system will boot and you can enter the "BIOS Setup Menu" without entering a password.

Once a password has been set, you will be prompted to enter the password each time you enter Setup. This prevents unauthorized persons from changing any part of your system configuration. In addition, when a password setting is enabled, you can set up the BIOS to request a password each time the system is booted up. The "Security Option" setting determines when a password prompt is required. If the "Security Option" is set to "System," the password must be entered both at boot up and when entering the BIOS Setup Menu. If the password is set for "Setup," the password prompt only occurs when you enter the "BIOS Setup Menu."

## Advanced Settings

The "Advanced Features" screen will appear when choosing the "Advanced" item from the main menu.



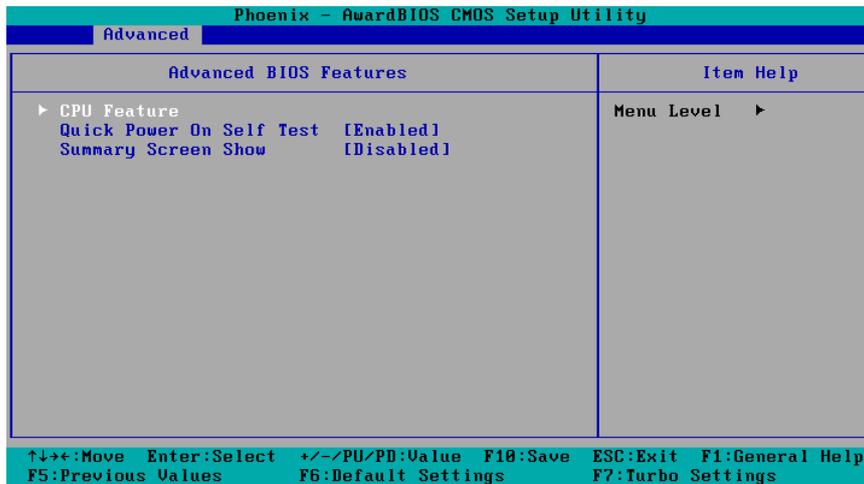
## Hard Disk Boot Priority

### First/Second/Third Boot Device

This option allows users to select or change the device boot priority. You may set 3 levels of priority to determine the boot up sequence for different bootable devices, such as a hard drive, CD-ROM, and removable devices. Select the order in which devices will be searched in order to find a boot device. The available options are "CDROM (default for first boot device)," "Removable" (default for third boot device), "Hard Disk" (default for second boot device) and "Disabled."

## Advanced BIOS Features

When you select the "Advanced BIOS Features" option under the "Advanced" menu, the following configuration menu will appear.



## CPU Features

### C1E Function

This item allows you to configure the power-saving mode when the CPU is in C1 status.

Options: Auto (default), Disabled

### Quick Power On Self Test

This setting allows the system to skip certain tests while the system boots up. Enable this feature to speed up the boot up process.

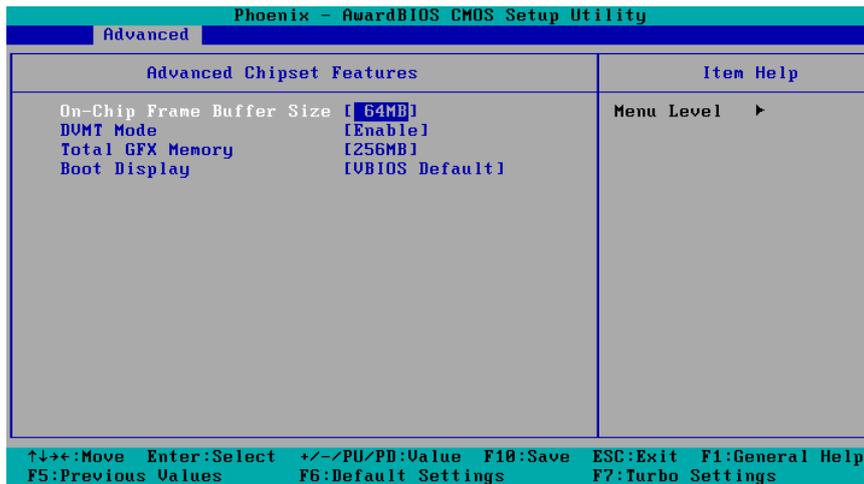
Options: Enabled (default), Disabled

### Summary Screen Show

The summary screen displays system information, including CPU, memory, disk drive, and PCI devices. The default value is disabled. You may choose "Enabled" to display this screen when the system is booting up.

Options: Disabled (default), Enabled

## Advanced Chipset Settings



### On-chip Frame Buffer Size

This item determines the frame buffer size for the VGA function, and will share the system memory.

Options: 32MB, 64MB (default), 128MB

### DVMT Mode

When the Dynamic Video Memory Technology (DVMT) operating mode is set to "Fixed," the graphics driver will reserve a fixed portion of the system memory as graphics memory. When set to "DVMT," the graphics driver will dynamically allocate system memory as graphics memory, according to system and graphics requirements. When set to "BOTH," the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

Options: Enable (default), Disable

### Total GFX Memory

The GFX sets the maximum amount of system memory that can be allocated as graphics memory.

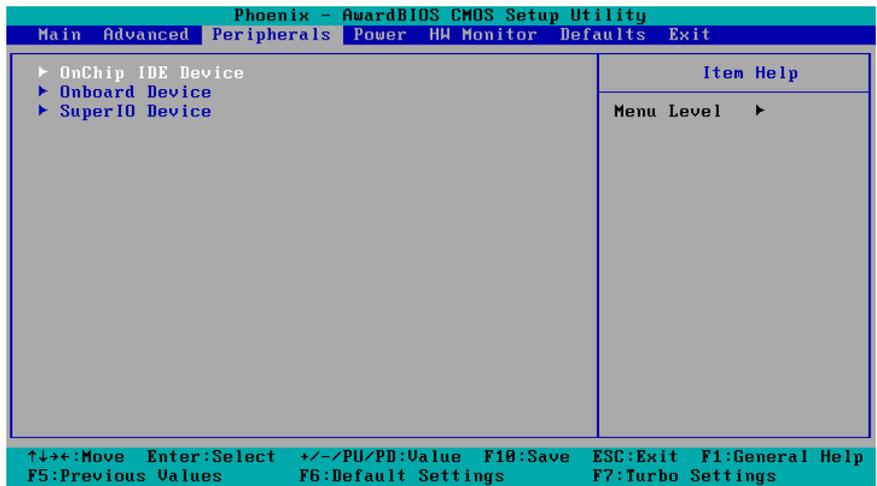
Options: 128 MB, 256 MB (default), MAX.

### Boot Display

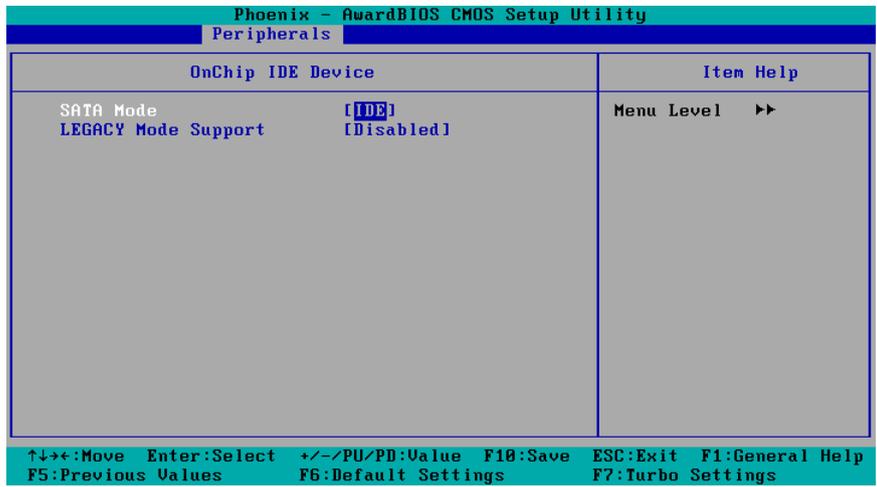
This item allows you to choose which display interface will be shown when system is booting up. Due to the display limitation, two displays at most can be shown when booting up. If you select the default option, "VBIOS Default", the displays that have been connected will be used as the default displays.

Options: VBIOS Default (default), CRT, EFP1, EFP2, CRT+EFP1, CRT+EFP2

# Peripherals



## OnChip IDE Device



### SATA Mode

This item allows you to select the IDE mode or AHCI mode for your SATA hard disk..

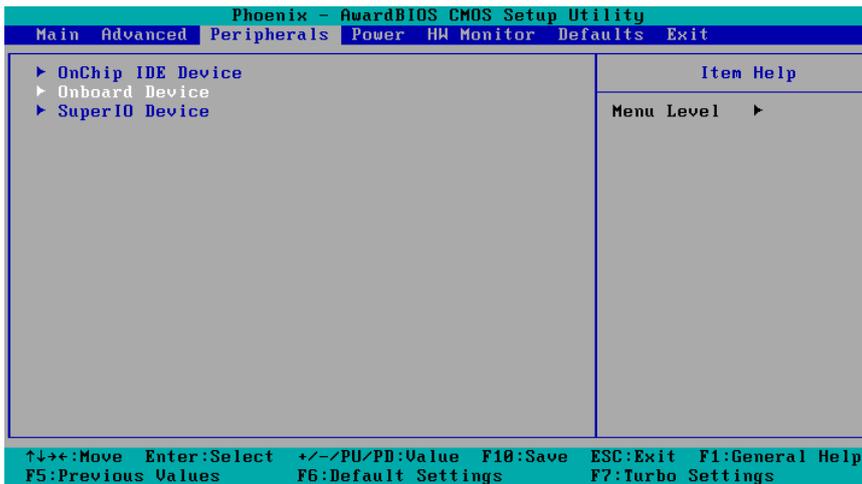
Options: IDE (default), AHCI

### Legacy Mode Support

This item allows you to enable or disable the legacy USB device.

Options: Disabled (default), Enabled

## Onboard Device



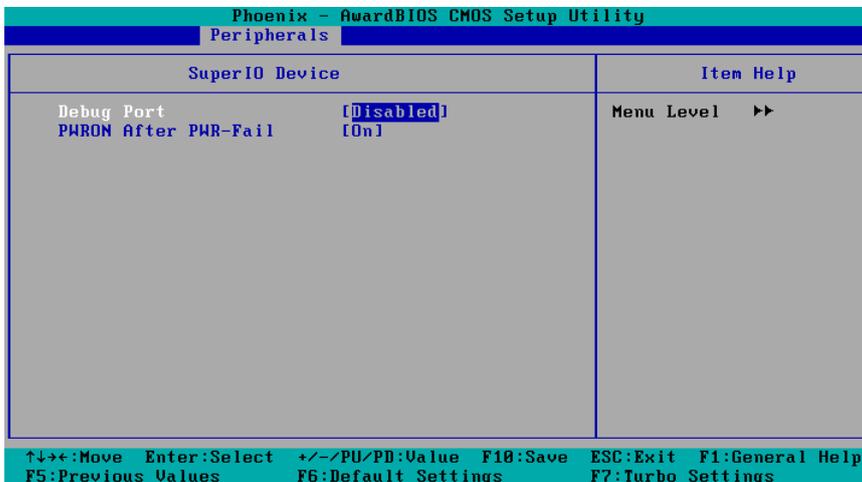
### Onboard LAN Boot ROM

Decide whether to invoke the boot ROM of the onboard LAN chip.

Options: Enabled, Disabled (default)

## Super I/O Device

### Debug Port



This function allows you to enable/disable the debug port communication. This port is only for engineers who are debugging program.

Options: Disabled (default), Enabled

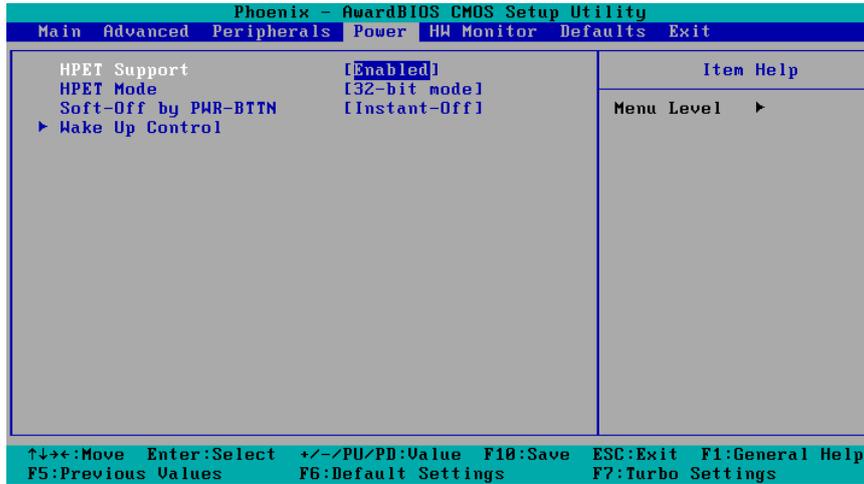
### Power on After Power Fail

This item allows you to configure the power on after power fail function.

Options: Off, On (default), Former-Sts

# Power

The Power Setup Menu allows you to configure your system power-up/ power-down options.



## HPET Support

This item allows you to enable/disable the HPET (High Precision Event Timer) function.

Option: Enabled (default), Disabled

## HPET Mode

This item allows you to select the HPET mode.

Option: 32-bit mode (default), 64-bit mode

## Soft-Off by PWR-BTTN

This item determines the delay to stop the software when pushing the power button.

Options: Instant-Off (default), Delay 4 Sec.

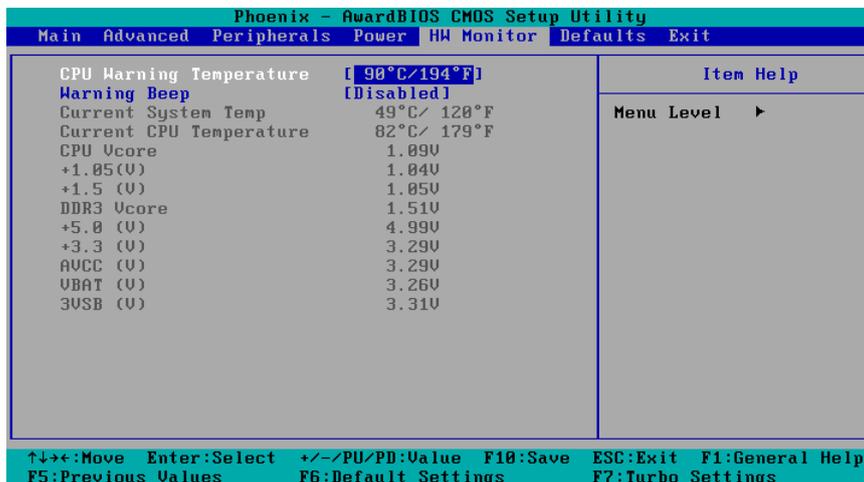
# Wake Up Control

## RTC Wake Up

This item allows you to enable/disable the RTC wake up function.

Options: Disabled (default), Enabled

# Hardware Monitor



This item helps monitor the status of the system, including CPU temperature and the voltage of the CPU, SDRAM and battery.

### CPU Warning Temperature

This item allows you to configure what temperature will trigger a high temperature warning.

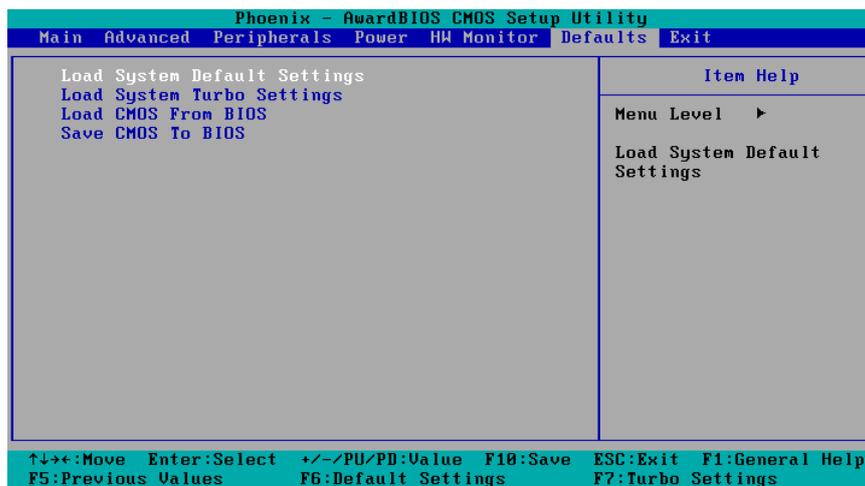
Options: 80°C/176°F, 90°C/194°F (default), 100°C/212°F, Disabled

### Warning Beep

This item allows you to enable/disable the warning beep.

Options: Disabled (default), Enabled

## Load Defaults



### Load System Default Settings

Use this option to load system factory default settings instead of the current BIOS settings. This option is useful for when the system is unstable. Users do not need to remember what settings were active before the system fails.

### Load System Turbo Settings

Use this option to load system optimized settings. If the system is not stable, please load the system default settings.

### Load CMOS from BIOS

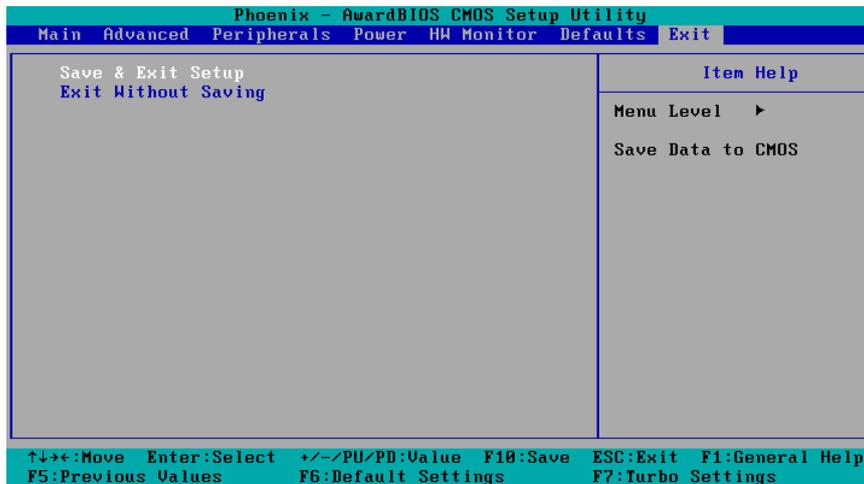
Use this option to load BIOS settings from flash ROM to CMOS.

### Save CMOS to BIOS

Use this option to save the BIOS settings from the CMOS to flash ROM.

## Exiting the BIOS Setup

To exit the BIOS setup utility, choose "Exit." Pressing <ESC> will achieve the same result.



### Save & Exit Setup

Save all configuration changes to CMOS (memory) and exit setup. A confirmation message will be displayed before proceeding.

### Exit Without Saving

Abandon all changes made during the current session and exit setup. A confirmation message will be displayed before proceeding.

## Upgrading the BIOS

This section describes how to upgrade the BIOS. However, please note that upgrading the BIOS involves high risk of damage to your computer. We strongly recommend that you contact Moxa's TS staff for assistance and obtain all necessary tools and files before attempting to upgrade.

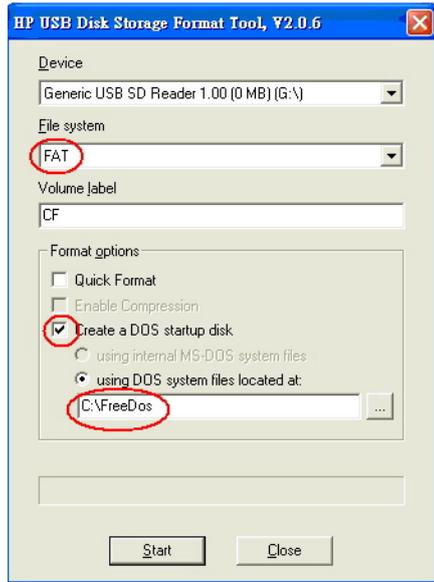
### Step 1: Create a Bootable USB Disk.

We suggest you use the HP USB Disk Format Tool to create a bootable USB disk. You may download this tool from the Internet. Search the Internet using the phrase "HP USB Disk Storage Format Tool", and then download the tool from one of the listed websites.

You will also need to download the FreeDOS system files **kernel.sys** and **command.com** from <http://www.freedos.org/kernel/>.

1. Copy DOS system files **kernel.sys** and **command.com** to a specified directory (**C:\FreeDOS** in this example).
2. Start the HP USB Disk Storage Format Tool and select the USB device that you want to use as a bootable disk in the **Device** drop down box.
3. Select **FAT** in the **File system** drop down box.
4. Type the disk name in the **Volume label** field.
5. Check the option **Create a DOS startup disk** under format options.
6. Specify the directory of the system files (for example, **C:\FreeDOS**).

- Click **Start** to format and create the USB disk.



**ATTENTION**

We suggest you use a USB drive with under 2 GB in disk space, as larger USB drives may not support FAT file format and consequently fail to boot.

**Step 2: Prepare the Upgrade Tool and BIOS Binary File.**

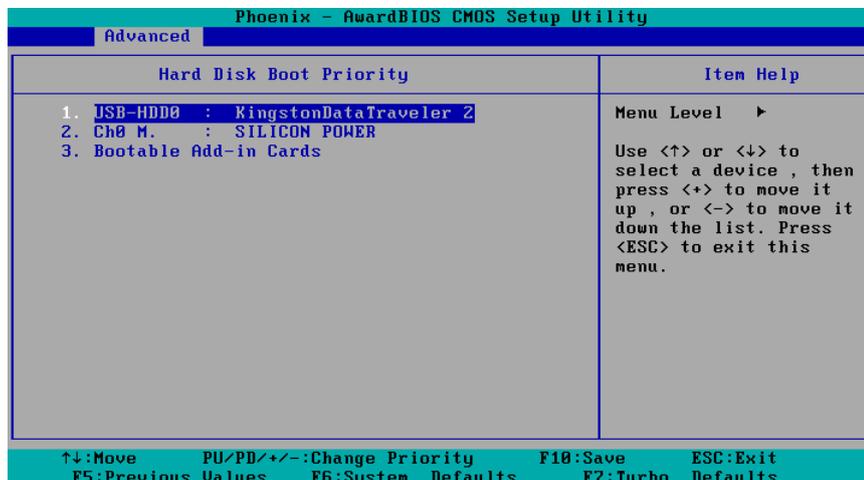
You must use the BIOS upgrade installation file to upgrade the BIOS. You can download it from the Moxa Download Center at:

[http://web4.moxa.com/support/download\\_center.asp](http://web4.moxa.com/support/download_center.asp)

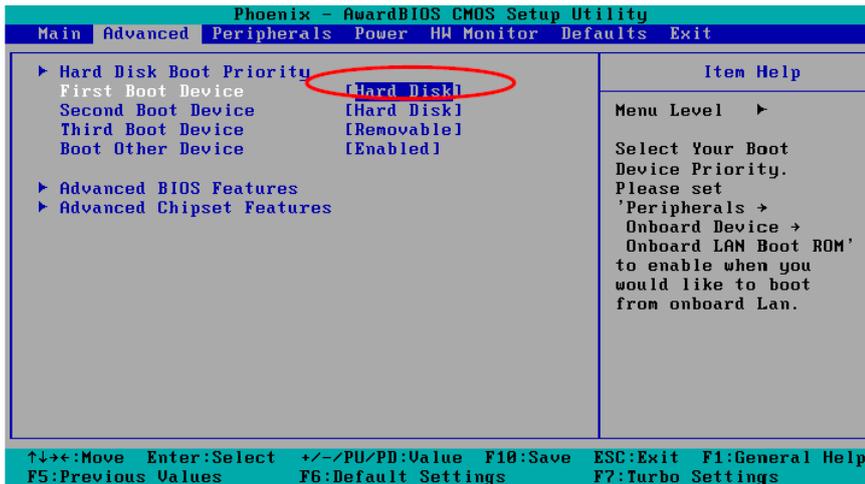
- Get the BIOS upgrade installation file. The file name should have following format: **451010.s02**.
- Copy the file to the Bootable USB Disk.
- Double click to extract the BIOS update installation file. The file includes a binary file in the form **s451010.s02** and the upgrade utility named **awdf flash.exe**.

**Step 3: Set up the BIOS to Boot from the USB Disk.**

- Insert the USB disk.
- Power on and press **DEL** to enter the BIOS Setup menu.
- Select **Advanced** → **Hard Disk Boot Priority** and then press **Enter**.
- From the Setup menu, use “↑” or “↓” to select the USB device.



5. Press “+” to move it up to the first priority, and press “Esc” to exit the setup menu.
6. Make sure the first boot device is **Hard Disk**. If isn't, press **Enter** to change it.



7. Select **Exit → Save & Exit Setup** and then press **Enter**.
8. Choose **Y** to save to the CMOS and then exit.

**Step 4: Run awdf flash.exe to upgrade the BIOS.**

1. While in the BIOS Setup menu and before upgrading the BIOS, you may choose to save the old BIOS files to a specific location. Type **Y** to do so, or **N** to begin the upgrade.
2. If the BIOS Setup is correct, it will restart and boot from the USB disk.
3. Run **awdf flash 451010.s02** from the command line to upgrade the BIOS. Replace xxxxxxx.Sxx with the BIOS binary file name discussed in Step 2.
4. Press **F1** to reset the system after the bios update is complete. The system should reboot at this time.



5. Please note that once the BIOS is successfully upgraded, the default BIOS values will be automatically loaded. However, if you wish to re-configure the BIOS settings, press **DEL** while booting.



**ATTENTION**

Do NOT switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.

# A

## Regulatory Approval Statement

---



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A : FCC Warning! This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.



European Community

**Warning:**

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

# B

## On Screen Display Configuration

---

This chapter discusses how to use the On Screen Display (OSD) button to configure the panel settings.

The following topics are covered in this appendix:

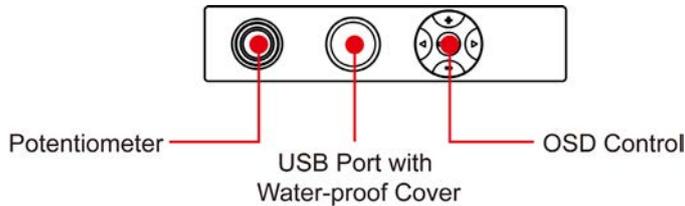
### ▣ Opening the Configuration Screen

#### ▣ Main Menu

- Brightness
- Back Light
- Color Temperature
- Language
- OSD Settings
- Information
- System Power
- Reset to Default
- Exit

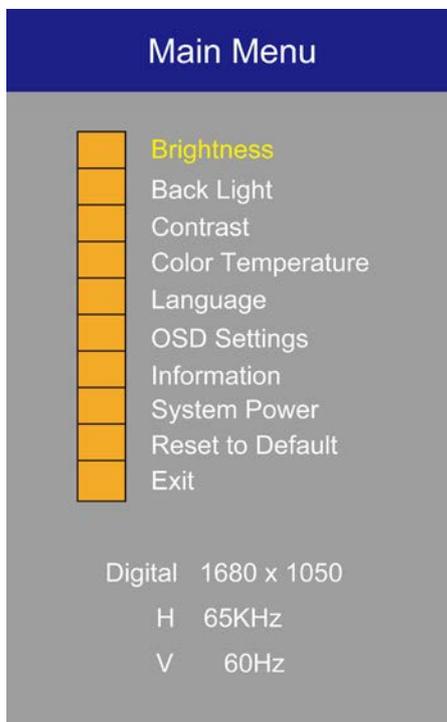
## Opening the Configuration Screen

To configure the panel settings, press the **OSD Control** button and then enter the configuration screen. Alternatively, you may also press **Potentiometer button** to start the configuration.



## Main Menu

In the Main Menu, you can see the configurations items on the upper part of the screen and the current settings on the lower part. Use the up arrow or down arrow to select the item you would like to configure. You may also turn the Potentiometer button rightward or leftward to select.



## Brightness

This item allows you to configure two settings: **Brightness** and **Back Light**.

**Brightness:** Press **OSD Control** button, and then select **Brightness** item. Use the right/up arrows to increase the brightness of the panel; use the left/down arrows to decrease the brightness of the panel. You may also turn the **Potentiometer Button** rightward to increase the brightness or leftward to decrease the brightness.

**Back Light:** Press **OSD Control** button, and then select the **Back Light** item. Use the right/up arrows to increase the brightness of the panel; use the left/down arrows to decrease the brightness of the panel. You may also turn the **Potentiometer Button** rightward to increase the brightness or leftward to decrease the brightness.

**Exit:** Select **Exit** to leave this configuration.

## Back Light

This item allows you to configure the back light.

**Back Light:** Press **OSD Control** button, and then select **Back Light** item. Use the right/up arrows to increase the back light of the panel; use the left/down arrows to decrease the back light of the panel. You may also turn the **Potentiometer Button** rightward to increase the back light or leftward to decrease the back light.

## Color Temperature

This item allows you to configure the color temperature of the panel.

**Color Temp:** Press **OSD Control** button, and then select **Cold Temp** item. You may select either **9300K**, **7500K**, or **6500K** for the color temperature of the panel.

You may also select **User Color** if you would like to configure the detailed settings for each color. Select **Red**, **Green** and **Blue** to configure the settings respectively. Use the right/up arrows to increase the user color of the panel; use the left/down arrows to decrease the user color of the panel. You may also turn the **Potentiometer Button** rightward to increase the user color or leftward to decrease the user color.

Exit: Select **Exit** to leave this configuration.

## Language

This item allows you to select the language interface you would like. MPC-122-K offers eight languages, including English, French, German, Spanish, Traditional Chinese, Simplified Chinese, Norwegian, and Japanese.

**Language:** Press **OSD Control** button, and then select **Language** item. Use the up/down arrows to select the language. You may also turn the **Potentiometer Button** rightward/leftward to select the language.

## OSD Settings

This item allows you to configure five settings: **OSD Horizontal Position**, **OSD Vertical Position**, **OSD Timer**, **OSD Transparency**, and **OSD Lock**.

**OSD H. Position:** Press **OSD Control** button, and then select **OSD H. Pos.** item. Use the right/up arrows, or the left/down arrows to adjust the horizontal position of the panel. You may also turn the **Potentiometer Button** rightward or leftward to adjust the horizontal position.

**OSD V. Position:** Press **OSD Control** button, and then select **OSD V. Pos.** item. Use the right/up arrows, or the left/down arrows to adjust the vertical position of the panel. You may also turn the **Potentiometer Button** rightward or leftward to adjust the vertical position.

**OSD Timer:** Press **OSD Control** button, and then select **OSD Timer** item. Use the right/up arrows, or the left/down arrows to adjust how long the OSD screen will show on the screen. You may also turn the **Potentiometer Button** rightward or leftward to adjust.

**OSD Transparency:** Press **OSD Control** button, and then select **OSD Transparency** item. Use the right/up arrows, or the left/down arrows to adjust the transparency degree of the OSD screen. You may also turn the **Potentiometer Button** rightward or leftward to adjust.

**OSD Lock:** Press **OSD Control** button, and then select **OSD Lock** item. Use the right/up arrows, or the left/down arrows to select ON if you would like to lock the OSD screen, or select OFF if you would not.. You may also turn the **Potentiometer Button** rightward or leftward to select.

**OSD Password:** Press **OSD Control** button, and then select **OSD Password** item. Enter the password, and then select **Save & Exit** to finish the configuration.

Exit: Select **Exit** to leave this configuration.

## Information

This item allows you to view the current resolution and the recommended resolution of the panel. Meanwhile, you can also view the firmware version in this item. Press **OSD Control** button, and then select **Information** item to view the information of the panel.

## System Power

This item allows you to shutdown the system power. Press **OSD Control** button, and then select **System Power** item. Select **System POW OFF**, the system power will off. Select **Exit** to leave this configuration.

## Reset to Default

This item allows you to reset to default value. Press **OSD Control** button, and then select **Reset to Default** item. All settings will be restored to its factory default values.

## Exit

This item allows you to leave the OSD configuration. Press **OSD Control** button, and then select **Exit** item to finish the configuration.

# ECDIS Library and API Development

---

The MPC-122-K-ECDIS is approved for ECDIS. To receive ECDIS approval, each individual computer must be measured, with the measurements stored individually in each computer. Each computer will have its own RGB table consisting of the colors and backlight values required by the customer's ECDIS application. Note that you should NOT disconnect the computer from the panel of the MPC-122-K. If the computer and panel are disconnected, the ECDIS API Library will not work.

This appendix explains how to install the ECDIS API and the contents of the ECDIS API. The following topics are covered:

- ❑ **Installation**
- ❑ **Source Tree**
- ❑ **ECDIS Library**
  - Backlight Function
  - ECDIS RGB Data Structure
  - ECDIS RGB Functions

# Installation

The ECDIS API is included on the CD ROM. Copy the file to your development machine and use the appropriate Windows tool to extract the zip file to your target folder. Note that the ECDIS API is only for Windows systems.

## Source Tree

The following files will be extracted from the zip file.

mxecdms	Working Directories
MXECSRGB.sys	driver for retrieving the RGB table
mxecdms.dll	ECDIS DLL
mxecdms.lib	ECDIS API LIB
MXECDISRGB.h	API header file for retrieving the RGB table
MXMPC122K.h	backlight API header file
sample	ECDIS API demo program source folder

You can refer to files in the sample directory to help using the ECDIS API in your own programs.

## ECDIS Library

Programming functions for backlight settings and RGB table retrieval are introduced in this section.

### Backlight Function

In an ECDIS system, each color table (DAY, DUSK, or NIGHT) has its own backlight value. This section describes how to use the function to set the backlight.

#### mpc122k\_set\_backlight function

This function is used to configure the backlight of the MPC-122-K-ECDIS.

<b>int mpc122k_set_backlight(int backlight);</b>	
Inputs	
<i>backlight</i>	Specifies the backlight value ranged from 0 ~ 100.
Return Value	
Returns 0, if successful;	
Returns -1 in case of error	

### ECDIS RGB Data Structure

ECDIS RGB functions provide the method used to retrieve the RGB tables from an MPC-122-K-ECDIS computer. This data structure defines the RGB tables and backlight values for DAY, DUSK, and NIGHT.

```
#define MAX_COLOR_TOKEN    63
typedef struct _ECDIS_RGB
{
    unsigned char    DATE_TIME[12]; /* YYYYmddHHMM, ASCII, 24h */
    unsigned char    RGB_TB_DAY[MAX_COLOR_TOKEN][3];
    unsigned char    RGB_TB_DUSK[MAX_COLOR_TOKEN][3];
    unsigned char    RGB_TB_NIGHT[MAX_COLOR_TOKEN][3];
    unsigned char    RGB_BKL[3];
} ECDIS_RGB, *PECDIS_RGB;
```

*MAX\_COLOR\_TOKEN* indicates the maximum number of colors in one color table. This parameter is defined according to IHO-S52 Specifications.

<*DATE\_TIME*> Specifies the calibration time of this computer

<*RGB\_TB\_DAY*> Specifies the DAY color table; (*RGB\_TB\_DAY*[*n*][0], *RGB\_TB\_DAY*[*n*][1], *RGB\_TB\_DAY*[*n*][2]) indicates the color of R, G, and B.

<*RGB\_TB\_DUSK*> Specifies the DUSK color table

<*RGB\_TB\_NIGHT*> Specifies the NIGHT color table

<*RGB\_BKL*> Specifies the backlight values; *RGB\_BKL*[0] is for DAY, *RGB\_BKL*[1] is for DUSK, and *RGB\_BKL*[2] is for NIGHT.

## ECDIS RGB Functions

### mxecdis\_rgb\_read\_tables function

This function reads the color tables from the MPC-122-K-ECDIS.

<b>int mxecdis_rgb_read_tables(PECDIS_RGB rgb_data);</b>	
Inputs	
<i>rgb_data</i>	Specifies the pointer of the RGB data structure.
Return Value	
Returns 0, if successful;	
Returns -1 in case of error	

### mxecdis\_rgb\_last\_error function

This function returns the last error code for read RGB error.

<b>unsigned long mxecdis_rgb_last_error();</b>	
Inputs	
None.	
Return Value	
Returns the last error of the read RGB operation	