

Rugged Workstation

RK15

User's Guide



Revision History

Revision	Date	Changes	Author
1.0.4	2024/04/03	Update Multi Battery Charger (MCRK) info.	Annabelle Wu
1.0.3	2024/01/25	Update Appearance Overview info.: Add Right and Bottom Side info. Update Operating Information: Replacing Modules Update Battery info.: Battery Duration Update Specifications info.: Dimension and Weight	Annabelle Wu
1.0.2	2023/10/20	Update BIOS Setup: VMD Setup Menu Sub-Menu info.	Annabelle Wu
1.0.1	2023/10/13	Update FCC, CE, UKCA, RCM info.	Annabelle Wu
1.0.0	2023/09/28	Initial Release	Annabelle Wu

Notice



Important:

- *Please read the entire User's Guide before using the device.*
- *Please pay more attention when you see these notices:*
 - **Warning:** *Failure to follow instruction may cause in personal injury or death.*
 - **Caution:** *Failure to follow instruction may cause damage to device or equipment.*
 - **Note:** *It reminds the user on certain instruction.*

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FCC (Federal Communication Commission Interference 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.

FCC 47 CFR Part 15 Subpart B
FCC 47 CFR Part 15 Subpart C
FCC 47 CFR Part 15 Subpart E
FCC§2.1093 (SAR)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution:

To assure continued compliance, any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. (Example - use only shielded interface cables when connecting to workstation or peripheral devices).

FCC Radiation Exposure Statement

This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.



The device is hereby confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to the Electromagnetic Compatibility Directive (2014/30/EU), Radio Equipment Directive (2014/53/EU), and Low Voltage Directive (2014/35/EU), if used for its intended use and that the following standards have been applied:

1. Safety

Applied Standard(s):

EN 62368-1: 2020+A11:2020

2. Health

Applied Standard(s):

EN 62311 : 2020

EN 50332-2: 2013

3. Radio Frequency Spectrum Usage

Applied Standard(s):

EN 300 328 V2.2.2 (2019-07)

EN 301 893 V2.1.1 (2017-05)

EN 303 413 V1.2.1 (2021-04)

4. Electromagnetic Compatibility Directive

Applied Standard(s):

EN 55032: 2015+A11:2020 Class B

EN 61000-3-2: 2018+A1:2020

EN 61000-3-3: 2013+A1:2017

EN 55035: 2017+A11:2020

ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-17 V3.2.4 (2020-09)

ETSI EN 301 489-19 V2.2.1 (2022-09)



The device is hereby confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive 2016, Radio Equipment Directive 2017, and UKCA-Electrical Equipment (Safety) Regulation 2016, if used for its intended use and that the following standards have been applied:

1. Safety

Applied Standard(s):

BS EN 62368-1: 2020+A11:2020

2. Health

Applied Standard(s):

BS EN 62311 : 2020

3. Radio Frequency Spectrum Usage

Applied Standard(s):

ETSI EN 300 328 V2.2.2 (2019-07)

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ETSI EN 301 489-1 V2.2.3 (2019-11)

ETSI EN 301 489-17 V3.2.4 (2020-09)

ETSI EN 301 489-19 V2.2.1 (2022-09)



The device is hereby confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive 2015, Radio Equipment Directive 2017, and RCM(C-tick)-Electrical Equipment (Safety) Regulation 2018, if used for its intended use and that the following standards have been applied:

1. Safety

Applied Standard(s):

AS/NZS 62368-1:2022

2. Health

Applied Standard(s):

AS/NZS 2772.2: 2016+A1:2018 (SAR)

3. Radio Frequency Spectrum Usage

Applied Standard(s):

AS/NZS 4268: 2017+A1:2021

4. Electromagnetic Compatibility Directive

Applied Standard(s):

AS/NZS CISPR 32: 2015+A1:2020

Power Conservation

This workstation consumes less power compared to conventional consumer computers. The power consumption may be further reduced by properly configuring the Power Management Setup.

It is recommended that the power saving features be enabled even when not running on battery power. Power Management features can conserve power without degrading system performance.

Power Safety



Warning:

- To avoid injury, read **Power Safety** and **Battery Precautions** before using the device.
- Before any upgrade procedures, make sure to turn off the power and disconnect all cables (including telephone lines). Also, it is recommended that you remove the battery to prevent accidentally turning on the device.

There are specific power requirements for your device:

- Only use an approved AC Adapter designed for this device.
- There is a 3-prong grounded plug for the AC Adapter. The 3rd prong is an important mechanism for ensuring product safety. Please do not neglect the importance of this mechanism. If you are unable to access a compatible electrical outlet, please hire a qualified electrician for the outlet installation.
- When unplugging the AC power cord, please make sure to disconnect the cord by pulling from the plug head instead of pulling the cable to prevent wire damage.
- Make sure the power outlet and any other extension cord(s) you use can support the total current load of all the connected devices.
- Before cleaning the device, please make sure it is disconnected from any external power source.

Battery Precautions

- Only use batteries designed for this device. Using incompatible battery types may cause explosion, leakage, or damage to the device.
- Do not remove the battery while the device is powered on.
- Do not continuously use a battery that has been dropped, or that appears damaged (e.g., bent or twisted) in any way. Even if the device is able to continuously work with a damaged battery, the circuit damage may occur and possibly cause a fire.
- Always use the charger designed for this device to recharge the battery. Incorrect recharging may cause the battery to explode.
- Do not attempt to service a battery by yourself. For battery service or replacement, please contact your service representatives.
- Please dispose of the damaged battery promptly and carefully. Explosion or leakage may occur, if the battery is exposed to fire, improperly handled, or discarded.

Note:

- *For safety purpose, charging will stop if the internal temperature of the battery is out of range (<10°C; >45°C). Please note that charging could have stopped before the ambient temperature reaching these boundaries because the internal temperature of the battery does not equal to the ambient temperature.*

Water Resistance

RK15 has a standard rating of IP65 under IEC standard 60529 (maximum depth of 1 meters up to 30 minutes) and was tested under controlled laboratory conditions. Although it has excellent protection, please do not use it as a diving equipment. Splash, water, and dust resistance are not permanent conditions when using the product continuously in extreme environments and resistance might decrease as a result of normal wear. Also, please do not disassemble any part of your device because it might damage the resistance of your device.

Environmental Information, Material Safety & Recycling

All materials used in the manufacturing of this equipment are recyclable or environmentally friendly. Please recycle the packing materials in accordance with local regulations at the end of the product's service life.

Notice:

- The equipment may contain an insignificant amount of hazardous substances to health and the environment below the control level.
- To avoid releasing such substances into the ecosystem and to minimize the pressure on the natural environment, reuse or recycle most of the materials in a safe way after the product's service life is encouraged.
- For more information on the collection, reuse and recycle of materials, please consult local or regional waste administrations. You can also contact your dealer for more information on the environmental details of the equipment.
- The crossed-out wheeled bin symbol indicates that the product (electrical and electronic equipment) should not be treated as a municipal waste. Please refer to local regulations for the disposal instructions.



Note:

- *This product contains battery. At the end of the product's service life, the device and battery should be disposed separately from household waste. The disposal should be in accordance with the local environmental laws and guidelines.*

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Chapter One – Getting Started

Unpacking



Caution:

- *Fully charge the battery before using it for the first time.*

The following components come with your workstation. If there is any missing or damaged, please notify the dealer immediately.

- Workstation Unit
- AC Adapter
- AC Power Cord
- Quick Guide



Quick
Guide

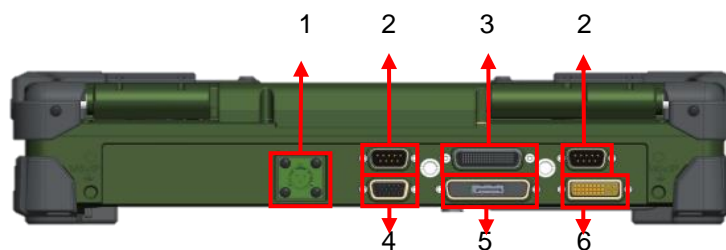
Appearance Overview

Display and Base



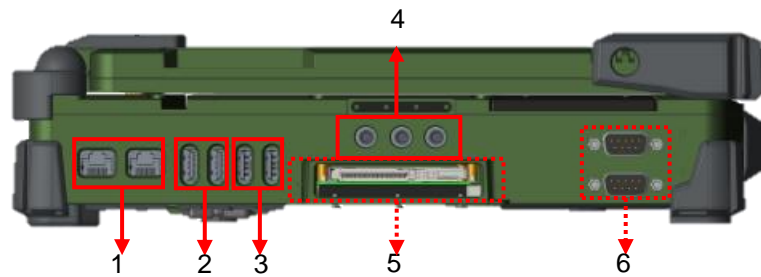
1. Optional Embedded Antennas:
-WLAN Aux., Bluetooth®, GNSS
2. Optional Embedded Antennas:
-WLAN Main
3. LED Indicators
4. Power Button (Gray)
5. Touchpad
6. Left-click and Right-click

Rear



1. DC-In Conn. x 1
 - a. Standard: DC-In 2 pin
 - b. Optional: Military 3 pin
2. Serial Port DB9 x 2 (COM1 & COM2)
3. Docking Connector x 1
4. VGA Port x 1
5. Display Port x 1
6. DVI Port x 1

Left

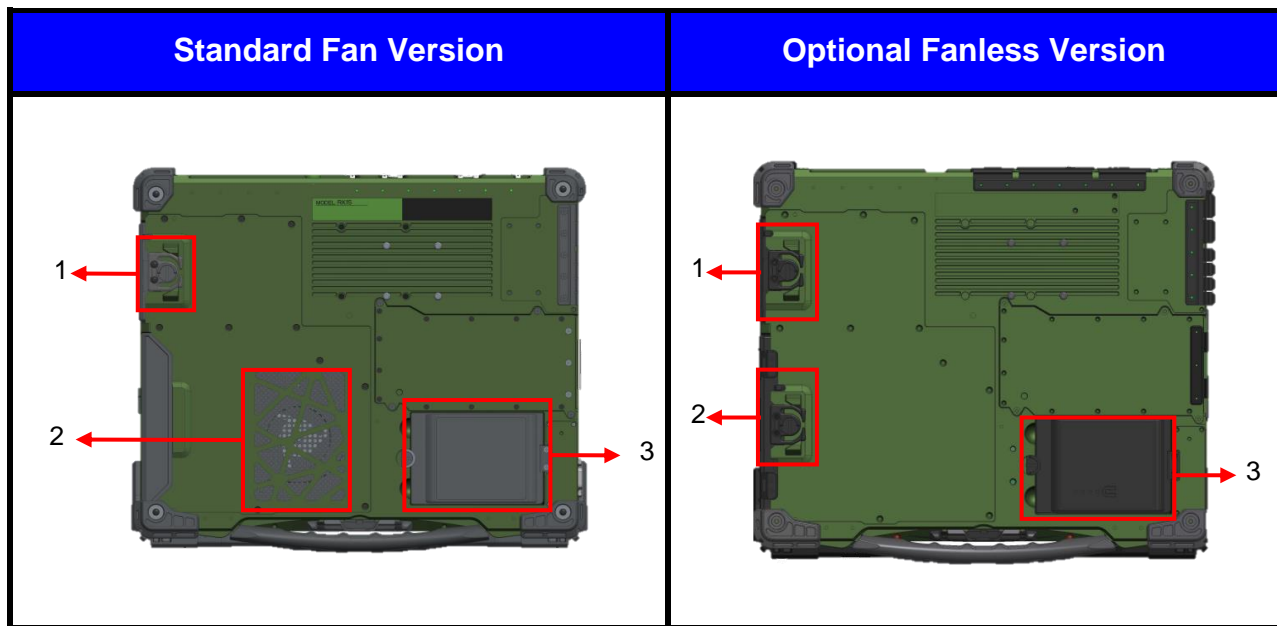


1. 2.5G LAN RJ45 x 2
2. USB 3.2 Gen. 2 x 2
3. USB 2.0 x 2
4. Audio Jack x 3 (Line-In/Microphone/Headphone)
5. Optional Express Card Slot x 1
6. Optional Serial DB9 x 2 (Default: COM3 & COM4)

Right

Standard Fan Version	Optional Fanless Version
A top-down view of the right side of the device with a fan. Red boxes and arrows highlight: 1 (Smart Card Reader), 2 (Fan Module), 3 (Sealed SSD Housing), and 4 (Kensington Lock Slot).	A top-down view of the right side of the device without a fan. Red boxes and arrows highlight: 1 (Smart Card Reader), 2 (Flexbay), 3 (Sealed SSD Housing), and 4 (Kensington Lock Slot).

1. Optional Smart Card Reader x 1
2. Std.: Fan Module
Optional: Flexbay (Removable SATAIII ODD)*
*Trade-off with optional 2nd Battery
3. Sealed SSD Housing (Configured w/ max. of 2 pcs SSD)
Std.: M.2 PCIe 3.0 SSD x 1
Optional: M.2 PCIe 3.0 SSD x 1
4. Kensington Lock Slot

Bottom

1. SSD Latch
2. Std.: Fan Module
Optional: Flexbay
3. Battery

Quick Operation

- Connect the AC Adapter to the workstation and start charging the battery. Fully charge the battery before using it for the first time
- Turn ON the workstation by pressing the power button.

AC Adapter

Connecting the AC Adapter:

- Plug the DC jack into the charging port of the workstation firmly.
- Plug the female end of the AC cord into the AC adapter and the male end into the electrical outlet.
- The charge indicator lights orange when charging and turns off when fully charged.



AC Adapter Indicator

The green LED indicates that AC power is ready.

Note:

- To ensure system stability, please connect your workstation to an external power source when operating at -20°C ambient temperature.

Working with Power Button

The following is a list of functions associated with the workstation's power button:

Item	Operating Information
Boot up the system	Press the power button.
Sleep/Hibernate (Dependent on OS settings)	Press the power button.
Force shut down	Press and hold the power button for approximately 4 seconds under OS. The system will shut down immediately without saving any data or parameters.

Note:

- There is a "Beep" sound when turning on the workstation via power button, but no "Beep" sound when turning on via AC In Boot On.

Chapter Two – Operating Information

Workplace

A clean and moisture-free environment is preferred. Make room for air circulation. Remember to avoid areas from:

- Sudden or extreme changes in temperature.
- Extreme heat.
- Strong electromagnetic fields (near a television set, motor rotation area, etc.).
- Dust or high humidity.

If it is necessary to work in a hostile environment, please regularly maintain your workstation by cleaning dust, water, etc. to keep it in optimal condition.

Ruggedness

This workstation is designed with rugged features such as vibration, shock, dust, and rain/water protection. However, appropriate protection is still necessary while operating in harsh environments.

The workstation is also designed to withstand rainfall from top with mild wind blowing only. Please keep the keyboard facing up, i.e. normal operating direction, to maintain water resistance. NEVER immerse the unit in water, or spray water at an upside-down system. Doing so may cause permanent damage.

The D-sub connector caps on the rear of the workstation are for dust and shock protection. The connectors are sealed internally. Other I/O ports and devices on the left or right must have caps tightly closed or cable inlets sealed while being exposed to water or dust.

There are optional gaskets for DB-9 connectors. You may install them to improve rain/dust/moisture resistance on your commercial type cable. Insert the packing into the male connector (with pins) and fasten the screws.

All connectors could be corroded if being exposed to water or moisture. Corrosion is accelerated if the power is ON. Please take proper water-resistant measures for cable connections. The DC jack and cables are sealed and may be operated with water splashing while attached. All port covers should be in place when no cable is attached.

Installing Operating System

Your workstation is designed to operate with Microsoft Windows 10/ Windows 11 64-bit Operating System. Please connect your workstation with an external USB-interface drive, such as a USB thumb drive, and start the OS installation.

Note

- *A USB external device may be required during installation. As the System USB port may not supply enough power, please attach the USB hub with an extra power supply to complete the installation.*
- *Though Intel IOTG has not yet announced to support Windows 11 LTSC, in-house Windows 11 tests have been done and confirmed passed.*

Boot Up and POST

The standard operating procedure to turn on your device is via the power button. Press the power button until the power indicator lights green or the display lights up. The device will boot up and start with the Operating System (OS).

Boot up

After pressing the power button, the device will turn on and load the Operating System (OS) into the system memory. This start-up procedure called as “boot up”.

ROM BIOS Power on Self-Test (POST)

Each time the workstation powers on, the BIOS will automatically perform a self-test of its memory and hardware devices.

Shut down



Caution:

- *Before shutting down, remember to save any unfinished works and close the applications to prevent your SSD from suffering possible data loss or damage.*

Shut Down

Shutting down will turn OFF the power of the device. If you wish to turn on the device again, you are required to press the power button. Under Windows 10/ Windows 11, please shut down directly by


Click  (Start) → Click  (Power) → Click  (Shut down)

Force Shut Down

In the event that your workstation hangs or stops responding, you can perform a force shut down by pressing and holding the power button for 4~5 seconds. Please note that any unsaved work or data will be lost this way.


Sleep and Hibernate

Sleep

Under  mode, the system will temporarily save your work into RAM. If you wish to start your workstation again, please press the power button to resume. Under Windows 10/ Windows 11, please enter this mode directly by

Click  (Start) → Click  (Power) → Click  (Sleep)

Hibernate

Under  mode, the system will save your work into SSD. If you wish to start your device again, please press the power button to resume. Under Windows 10/ Windows 11, please enter this mode directly by

Click  (Start) → Click  (Power) → Click  (Hibernate)

Touchpad

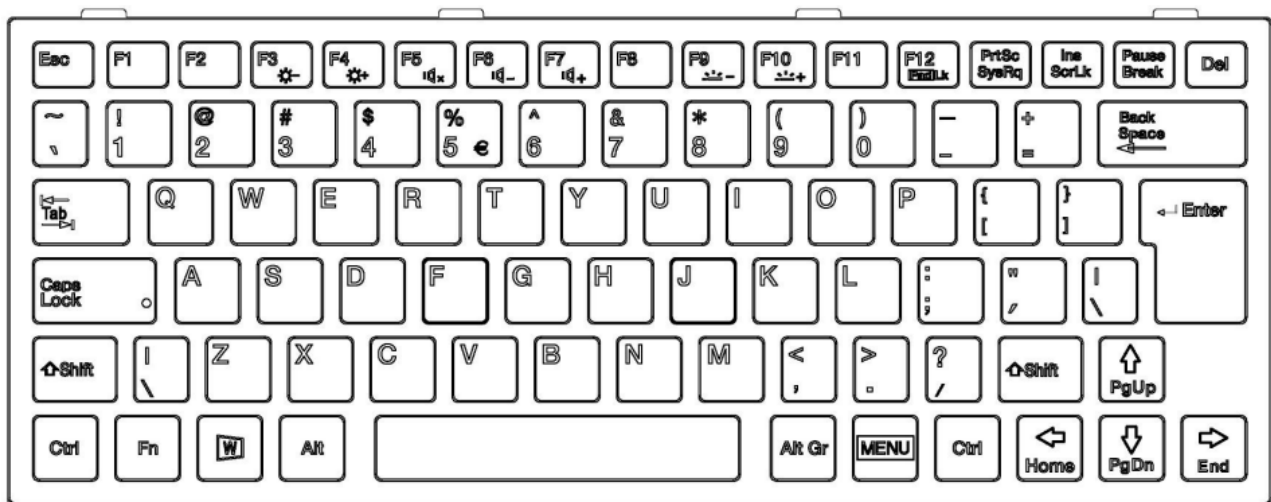
The touchpad can be enabled/ disabled by pressing **[Fn] + [F12]**. For more details, please refer the following table.



No.	Item	Function
1.	Touchpad	Single-Touch
2.	Left-click button	Function as LEFT button of mouse
3.	Right-click button	Function as RIGHT button of mouse

Keyboard

The keyboard is functionally equivalent to a full size desktop keyboard. A sample layout is shown below.









Function Key Combinations

Key	Description
[Fn] + [F3]	Decrease LCD brightness
[Fn] + [F4]	Increase LCD brightness
[Fn] + [F5]	Mute
[Fn] + [F6]	Volume down
[Fn] + [F7]	Volume up
[Fn] + [F9]	Decrease keyboard LED Backlight brightness
[Fn] + [F10]	Increase keyboard LED Backlight brightness
[Fn] + [F12]	Touchpad Lock/Unlock

LED Indicators

Your Workstation is designed with LED indicators to show the workstation status. The description of LED indicators are for your operational reference.

LED Indicator	Description
	Bluetooth® / WLAN / GNSS Blue
	Keyboard Caps Lock Green
	SSD in Use Flashing Green
	Secondary Battery Charge Indicator Charging (Orange) / Low Battery (Flashing Orange) *Only available in FANLESS version.
	Primary Battery Charge Indicator Charging (Orange) / Low Battery (Flashing Orange)
	Power / S3 Indicator Green / Breathing Green

Solid State Drive (SSD) Housing



Caution:

- *NEVER drop your SSD or expose them to high temperature, high humidity, or any hazardous environment.*
- *The SSD Housing is fully sealed and NEVER attempt to disassemble or repair it by yourself.*
- *Remove the SSD only when the laptop is powered OFF.*

Your workstation is designed with a sealed SSD housing, which is equipped with up to 2 pieces of PCIe 3.0 SSD, for data storage. The SSD housing is user-removable, which provides convenience and security.

SSD RAID

Intel® Volume Management Device (Intel® VMD) technology is the new way to configure platform for Intel® RST management of RAID and Intel® Optane™ memory volumes. Please load the VMD driver manually during the Windows OS installation process.

For the settings of RAID, please use the Intel® RST (Rapid Storage Technology) to lay your system foundation on RAID 0, 1 configurations.

To set up RAID in BIOS

1. Insert the required number of SSDs for RAID 0, 1, respectively.
2. Power on the workstation, and press [F2] to enter BIOS.
3. Select **Chipsets** → **VMD Configuration** → **Enable VMD Controller**.
4. Reset the workstation, and press [F2] to enter BIOS.
5. Select **Advanced menu** → **Intel Rapid Storage Technology** → **Create RAID Volume**
6. Setup RAID configuration accordingly to the on-screen instructions. Or, you can refer to the
7. Insert the USB device under the latest driver. The driver is available on Mildef Crete website (www.mildefcrete.com)
8. During the Windows OS installation process, click **Load Driver** and select VMD driver folder **f6vmdflpy-x64**.
9. Complete the OS installation process.

Note:

- *It is recommended to use the same brand/size SSD to configure the RAID volume.*
- *For more information, please refer to the User Guide of Intel® Rapid Storage Technology on the Intel® official website.*

Optional Express Cards

The workstation supports 54 mm or 34 mm wide ExpressCard. You can insert an ExpressCard while the workstation is running. The workstation will automatically detect the card.

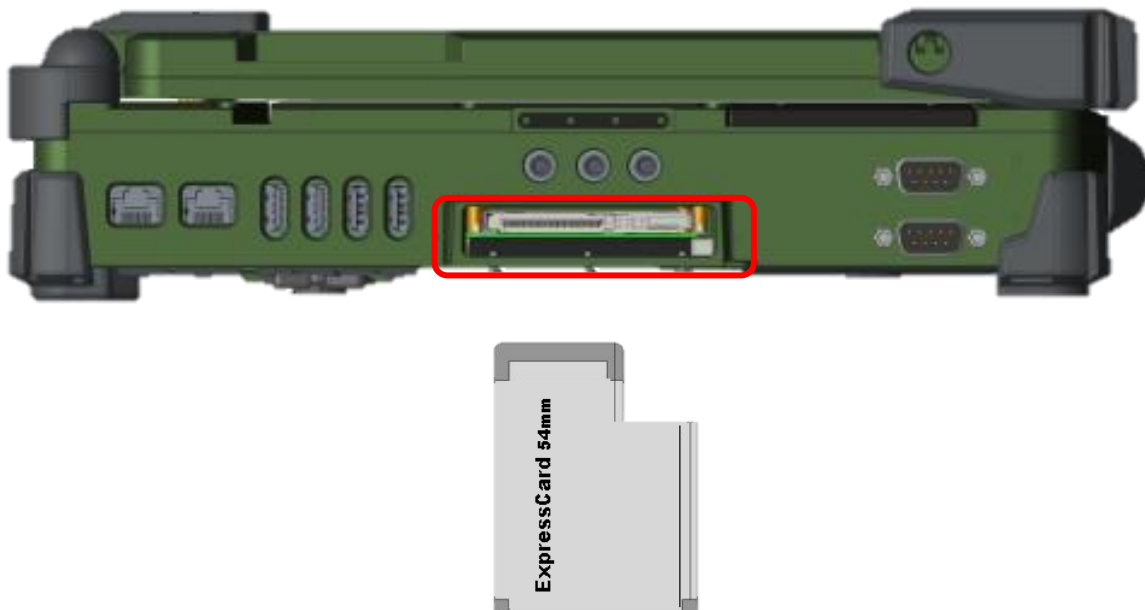
To insert an ExpressCard:

- Hold the card upward accordingly to the icon.
- Insert the card into the slot until it is completely attached with the connector.

To remove an ExpressCard:

Press the card and remove the card gently.

The following illustration shows the insertion of ExpressCard 54mm:



Real Time Clock (RTC)

Battery backed up Real Time Clock/ Calendar (RTC) is built in an on-board Complementary Metal Oxide Semiconductor (CMOS) chip. The RTC keeps track of the time and date while the workstation is off. The CMOS chip also stores system setup information.

Replacing Modules

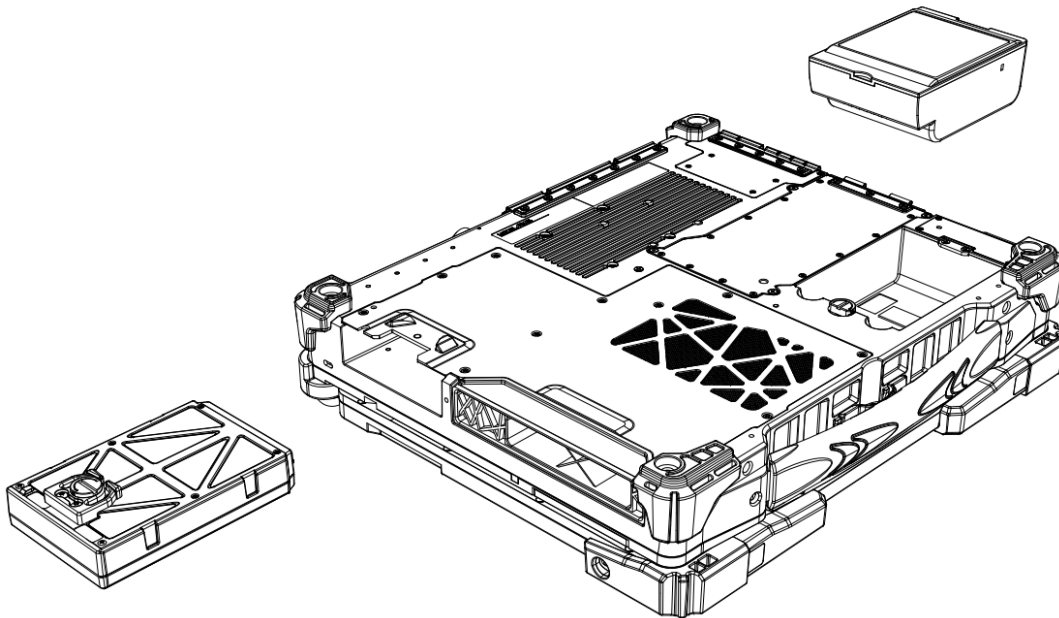


Caution:

- Please power OFF the workstation before replacing the module.

To remove the modules

1. Turn OFF the workstation.
2. Disconnect all cables from the workstation.
3. Loosen the screws on the battery, SSD housing modules, or Flexbay.
4. Remove the battery from the compartment.
5. Pull the SSD housing outward.



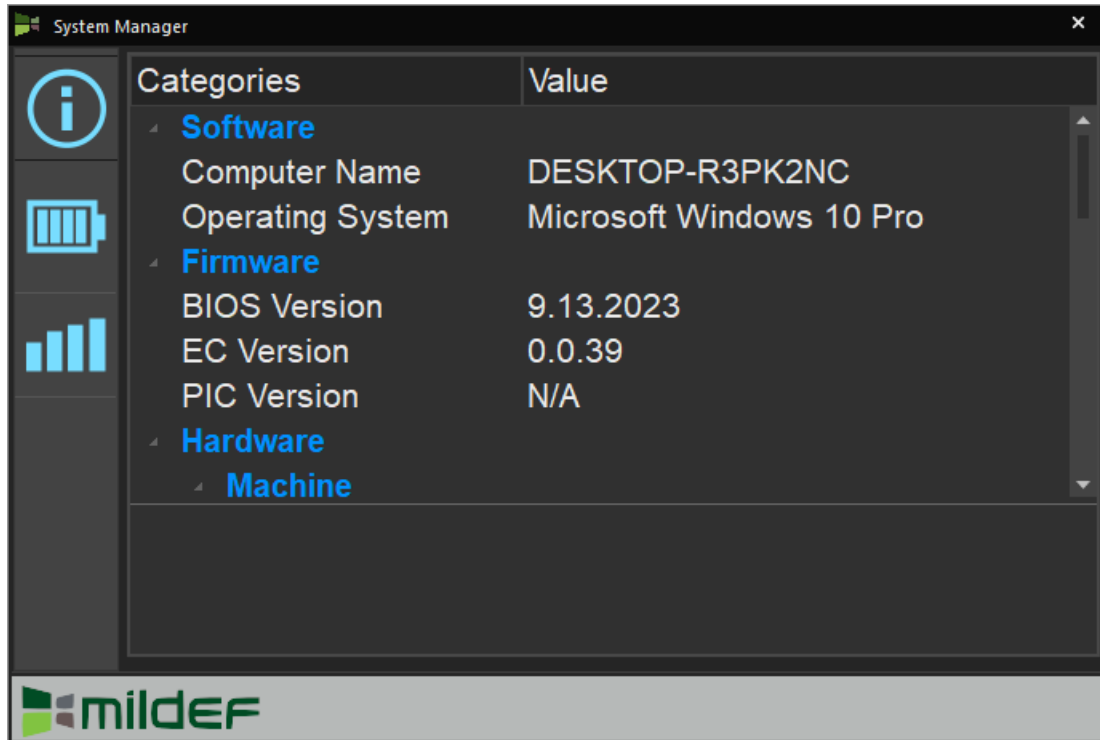
To re-install the modules

Gently push the module into its slot. Fasten the screw to fix the module.

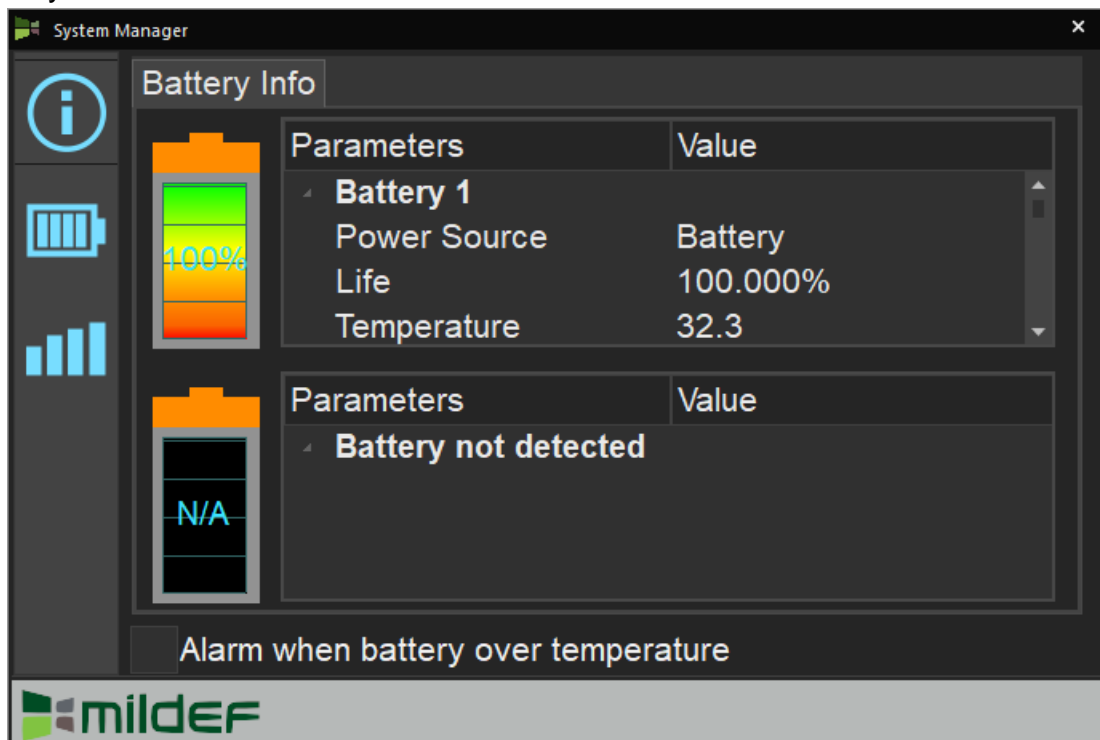
System Manager

System Manager is an application which allows users to access information (System, battery), and set RF device.

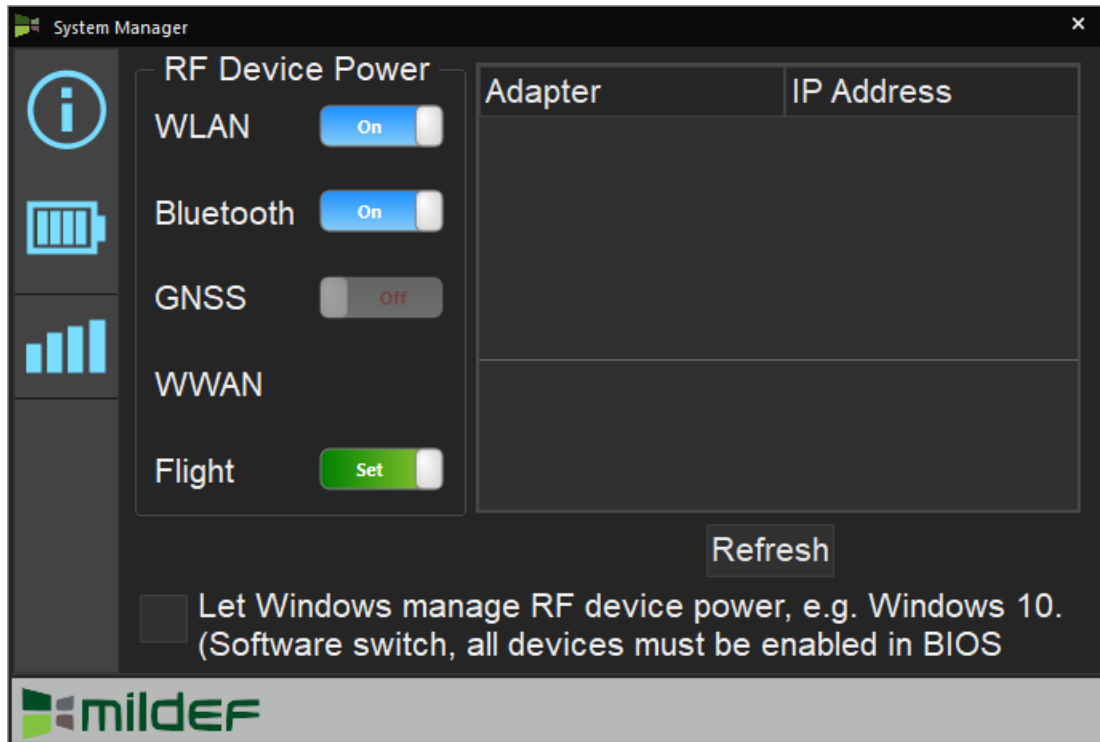
1. System Information



2. Battery Information



3. RF Device Control Panel





Note:

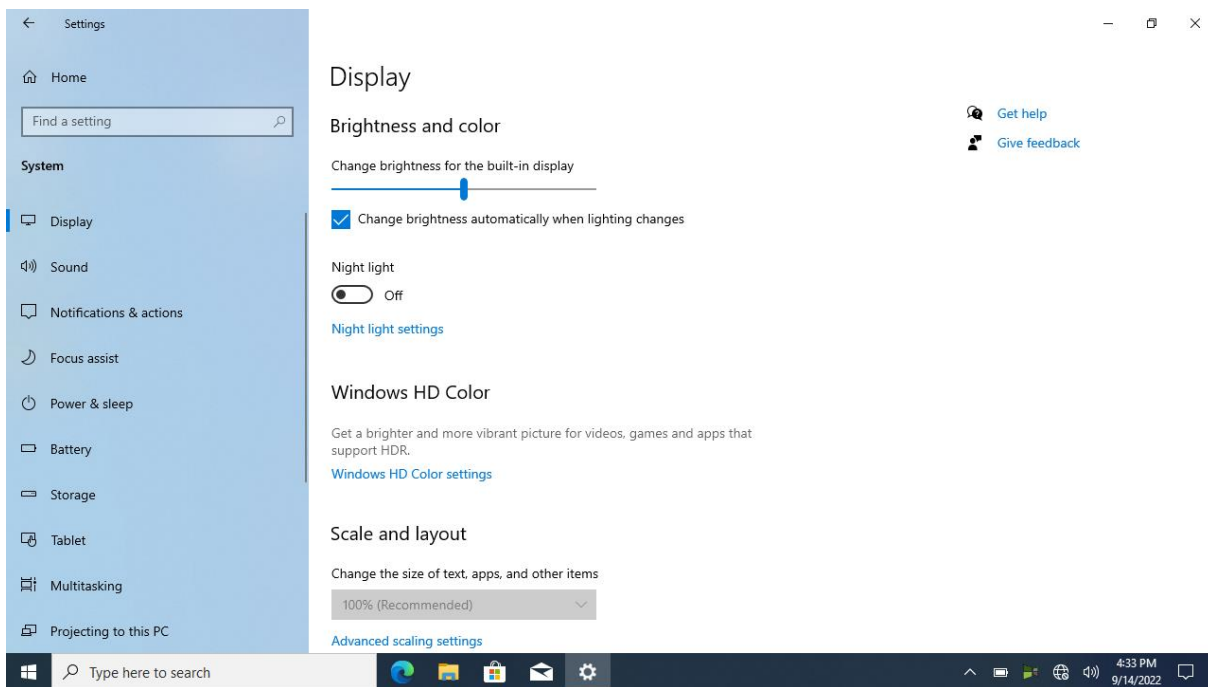
- “System Manager” is a universal app, the contents may vary depending on the system configurations.

Adaptive Brightness

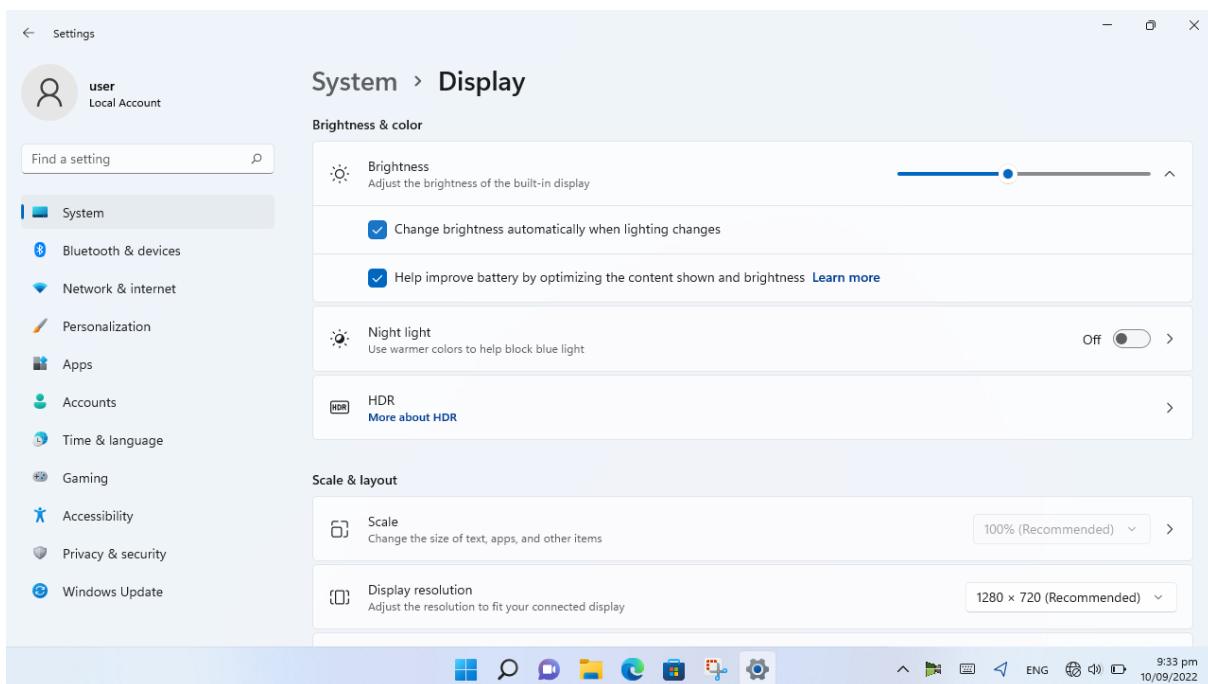
Light sensor mainly is to modify the display backlight by dynamically monitoring the brightness of the environment. Under Windows 10/ Windows 11, you can enable/disable light sensor directly by

Click  (Start) → Click  (Settings) → Click  (System) → Click  (Display) → Click "Change brightness automatically when light changes"

Windows 10



Windows 11



Using Kensington Lock Slot



Kensington Lock Slot

Loop the lock cable around a stationary object such as a table and plug the Kensington Lock into the slot to lock it.

Note:

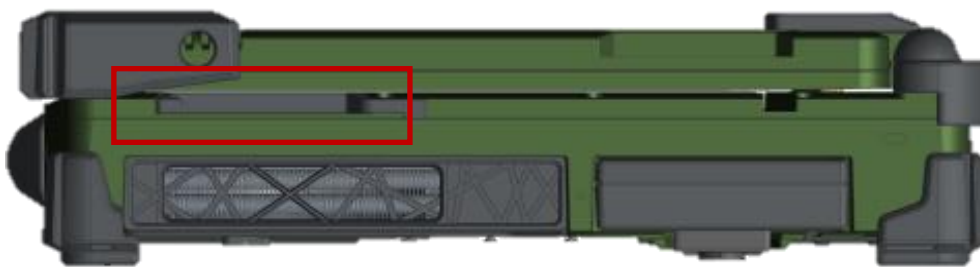
- *Kensington Lock is a widely available 3rd party product.*

Installing Smart Card Reader

RK15 has an optional smart card slot, with an embedded microcontroller, smart cards have the unique ability to store large amounts of data, carry out their own on-card functions (e.g., encryption and mutual authentication), and interact intelligently with a smart card reader.

To insert a smart card:

1. Locate the smart card slot on the right side of the workstation and open the protective cover.



2. Insert the smart card, with its label and embedded chip facing up into the slot.
3. When a new card is inserted, the workstation automatically detects the card. Use the third-party smart card software to allow your workstation to read it.

To remove a smart card:

1. Make sure that the third-party smart card software is not accessing the smart card.
2. Pull the card out of the slot.
3. Close the cover.

Chapter Three – Managing Power

AC Adapter

The AC Adapter automatically detects the AC line voltage (100V or 240V) and adjusts accordingly. It serves to power the device from an external AC source and charges the mounted battery.

Recommendations for the AC Adapter

- Use a properly grounded AC outlet.
- Use one AC outlet exclusively for the device. Having other appliances on the same line may cause interference.
- Use a power strip with built-in surge protection.

Battery

Battery Duration

Device	Battery Life
When power is ON	<ul style="list-style-type: none"> ● Approximately 8 hours (Fan Version) and 7.5 hours (Fan Version) with a 100% battery (BRKF3A) equipped. ● The operating time depends on how and where the device is applied. Playing multimedia, setting backlight brightness high, and utilizing the device in a low temperature environment may be considerably power-consuming.
When power is OFF	<ul style="list-style-type: none"> ● Approximately 180 days with 100% battery equipped. ● Though Shutdown Mode is designed, It is still suggested that the battery be charged every 3 months so to avoid over discharging.

Battery Percentage & Level


The power source will automatically switch to battery when the external power source is disconnected. You may check battery status from Windows or via the LED indicators on the battery. Each indicator corresponds to 25% battery level.

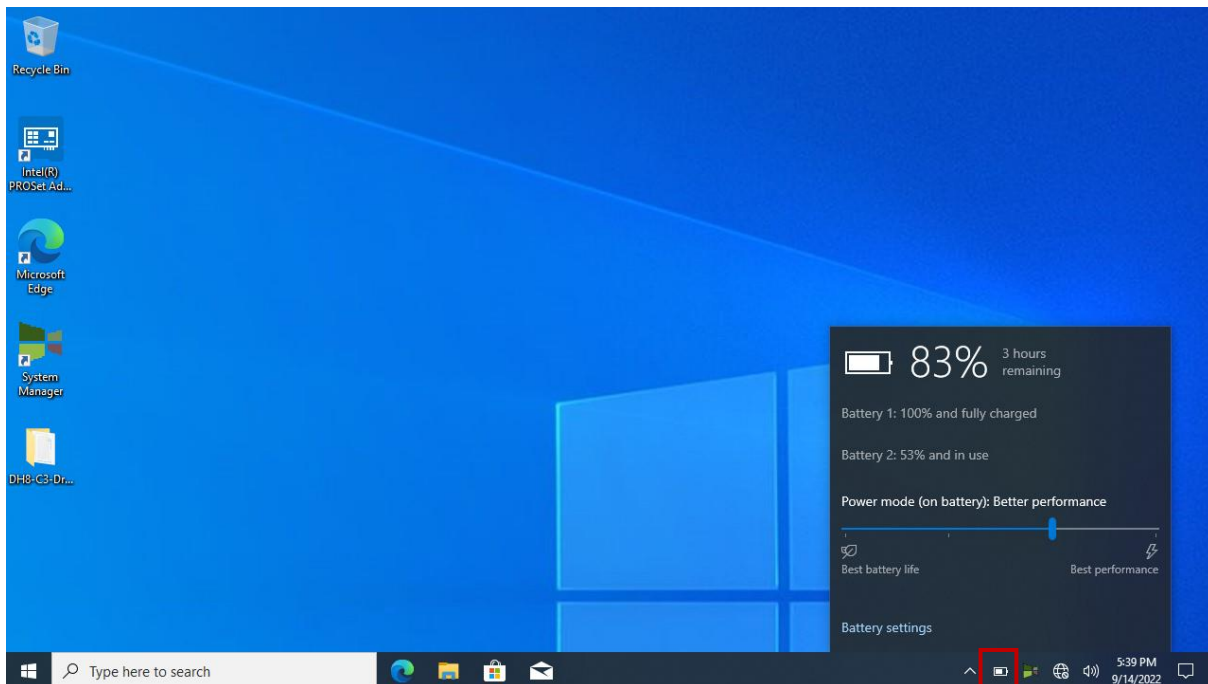
● LED Indicator on Battery

Indicator (From Right to Left)	Battery Percentage
1	<25%
2	25% ~ 50%
3	50% ~ 75%
4	>75%

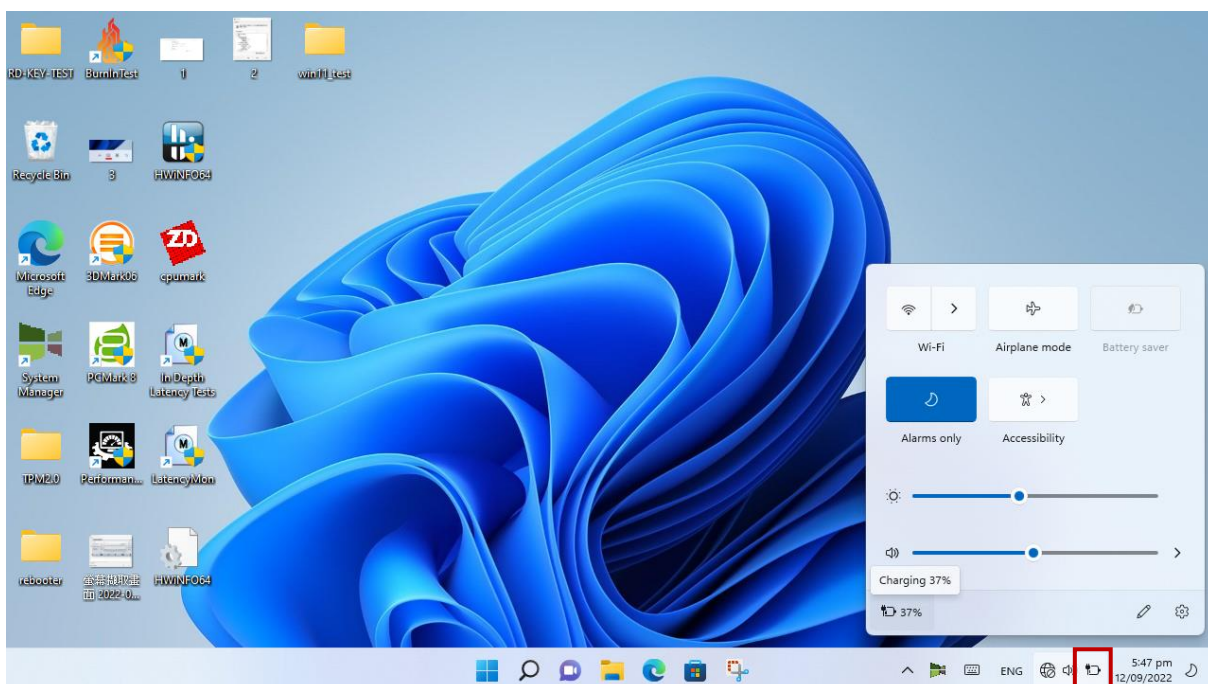


Note

- Press the  to show the battery indicator.
- The battery gauge is for reference only. Please do not expect it to show the exact amount of the power remaining. There is no memory effect on Lithium-Ion battery cells. However, discharge the battery to nearly empty every month will help to calibrate the internal gauge.

Windows 10

- **Windows 11**



Power Conservation

This workstation consumes much less power than conventional computers. However, power consumption may be reduced by configuring the Power Management Setup properly.

It is recommended the power saving functions to be enabled even when not running on battery power. Power Management will not degrade performance while saving power.

Power Saving Tips

This workstation comes with an intelligent power-saving feature. You may extend the battery life by:

- Set up power saving functions in Operating System Power Management options (e.g., Windows Power Options).
- Lower the intensity of the display in brightness control.
- Turn the workstation into standby (by Sleep or Power button) when it is temporarily not in use.
- Shut down the workstation when it will not be used for a period of time.

Battery Low



Caution:

- *When the battery is drained, your device will shut down automatically and any unsaved data might be lost.*
- *Please make sure to save all unsaved files before swapping the battery to prevent any data loss.*
- *Always remember to turn OFF the power before replacing the battery.*

When the battery is nearly exhausted, the workstation gives the following “Battery Low” warnings:

- Windows battery low warning.
- The battery charge indicator LED flashes orange.

Once “Battery Low” warnings occurs, please follow the instructions below to avoid data loss.

- Save and close the files you are currently working on.
- Plug in the AC Adapter to charge the battery.
- Replace the battery with a fully charged one.

Battery Charging & Discharging

Connect to the AC Adapter to start the battery charging. The charge indicator lights orange when charging. When the battery charging is completed, the indicator will automatically light OFF, and the sense circuitry will stop high current charge within several minutes.

Battery Charging Time

Charging Time		BRKF3A	Primary (BRKF3A) + 2 nd Battery (BRKF3C) Only available in FANLESS Version
AC Adapter	System ON	3~5 hours	3~5 hours
	System OFF		
Vehicle Adapter	System ON	3~5 hours	3~5 hours
	System OFF		

Note:

- Use only the AC adapter designed for the device.
- For safety purpose, charging will stop if the internal temperature of the battery is out of range (<10°C; >45°C). Please note that charging could have stopped before the ambient temperature reaching these boundaries because the internal temperature of the battery does not equal to the ambient temperature.

Optional Multi Battery Charger (MCRK)

A Multi Battery Charger is designed for the battery of RK15, that is able to charge 2 batteries at once.

Battery Recalibration

Battery recalibration allows a user to calibrate the GAUGE IC parameter of the battery pack.

When the battery stays fully charged or in a low charge state for a long period of time, it causes the battery gauge to have some minor discrepancies. Therefore, users are recommended to carry out battery recalibration to ensure the accuracy of battery GAUGE IC. To perform battery recalibration, please follow the steps below:

1. Update BIOS & EC to the latest version.
2. Mount the battery to the device, and connect it to the AC Adapter.
3. Enter the BIOS → Choose “Advanced menu” → Choose “Battery Recalibration” → Press “Enter”.
4. When the “Start Battery Recalibration” pop-up appears, press “Yes” to continue.
5. The recalibration is now processing. You can see the following recalibration status on the screen:
 - Calibration Frequency: How many times the calibration is processed
 - Battery Capacity: Current battery capacity
 - Battery Charge Mode: Charge/ Discharge
 - Battery Learning Mode: Normal (charge)/ Learn (discharge)
6. A pop-up appears when the calibration has completed. Then, click “OK”.
7. Press “Yes” to reboot the device when “Reset Without Saving” pop-up appears.

Note

- *Neither turn off the LCD nor the remove AC adapter during the calibration.*
- *Each cycle of recalibration process indicates “Charge to Full → Start Learn Mode → Discharge → Complete Learn Mode → Charge to Full”. It will take approx. eight hours to complete a cycle.*
- *It requires five cycles to complete the battery recalibration. Then the recalibration will stop automatically.*
- *If you want to terminate the calibration, simply shut down the device by pressing the Power Button; or, restart the device via the external keyboard by pressing “CTRL+ALT+DEL”.*

Battery Shut Down Mode

The battery is designed with Shutdown Mode and it will automatically enter this mode to prolong its storage time and to avoid itself from over-discharging. Shutdown Mode will be activated under the below two situations.

- When the battery itself is not in use for over 15 days
- When the device with batteries is OFF.

The battery in Shutdown Mode may sustain for approximately 180 days. To deactivate Shutdown Mode, please connect battery to the device and then to the AC Adapter. The charge indicator lights orange means the deactivation of Shutdown Mode has completed.

Battery Storage Recommendations

Battery power will decrease gradually in storage. Self-discharge rate of rechargeable batteries is approximately 1% per day; however, this rate may vary according to the storage environment. High humidity and high temperature accelerate discharge, while very low temperature may “freeze” the battery chemicals thus decrease the capacity. The following are guidelines for battery maintenance:

- The battery should be removed if the device will not be used for a long period of time (approximately one month).
- The battery should have 50% charge remaining before it is removed from the device and be stored separately.

The battery should be recharged to 50% according to the different storage temperatures below so to prevent from damages because of over-discharging.

Storage Temperature	Battery Charging Frequency
-20°C ~ +20°C	Every 6 months
-20°C ~ +45°C	Every 3 months
-20°C ~ +60°C	Every month

- The battery without using for more than 2 years may result in battery aging and it is not recommended to use.



Caution:

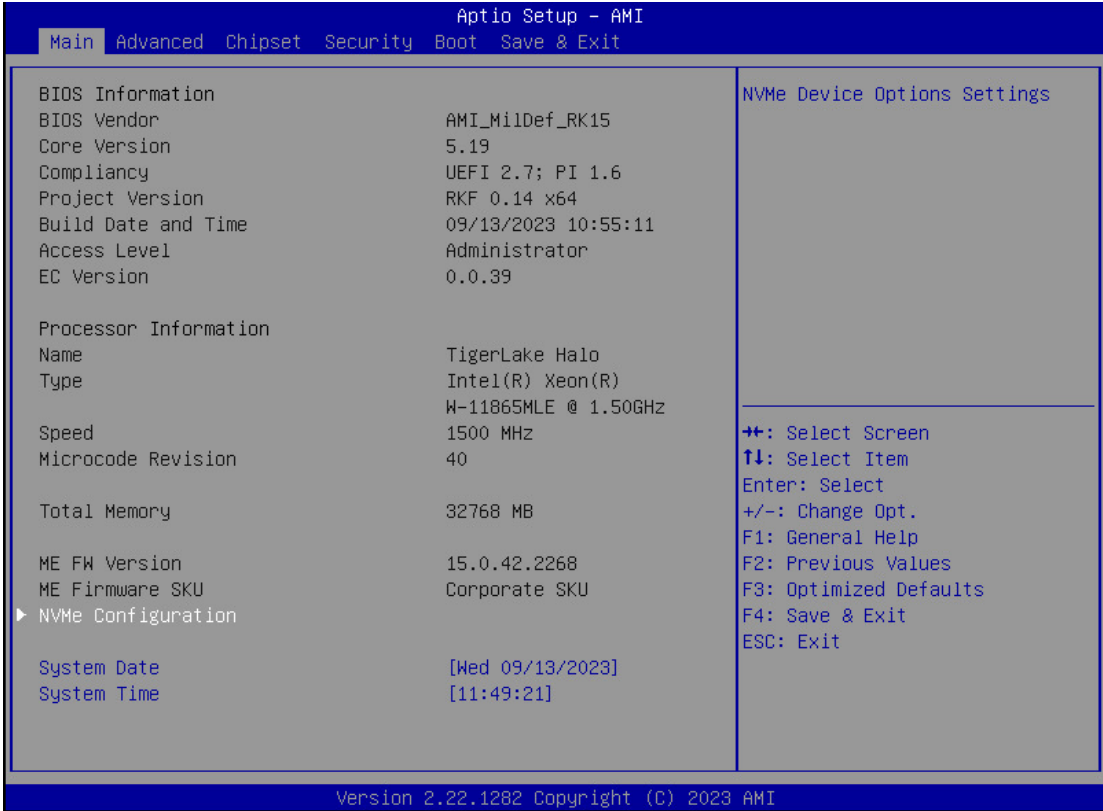
- *Incorrect settings may cause system malfunction. To correct it, restore the Optimized Defaults with F3.*

Note:

- *The contents may vary depending on configurations.*

Press **[F2]** at boot up to enter BIOS setup. Use arrow keys to select options and **[+/-]** to modify them. When finished, move to “**Exit**” and press **[Enter]** then confirm save by pressing **[Y]**.

Main Menu



Advanced Menu

Aptio Setup - AMI					
Main	Advanced	Chipset	Security	Boot	Save & Exit
<ul style="list-style-type: none"> ▶ CPU Configuration ▶ PCH-FW Configuration ▶ Trusted Computing ▶ RF Device Control ▶ AC In Boot Control ▶ Battery calibration ▶ IT8786 Super IO Configuration ▶ Intel TXT Information ▶ Network Stack Configuration ▶ Intel(R) Rapid Storage Technology ▶ Intel(R) Ethernet Controller (3) I225-LM - 00:A0:C9:00:00:00 ▶ Intel(R) Ethernet Controller (3) I225-LM - 00:A0:C9:00:00:00 		<p>This formset allows the user to manage RAID volumes on the Intel(R) RAID Controller</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>			
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CPU Configuration Sub-Menu

Aptio Setup - AMI	
Advanced	
CPU Configuration	
Intel (VMX) Virtualization Technology	[Enabled]
Hyper-Threading	[Enabled]
Intel Trusted Execution Technology	[Disabled]
VT-d	[Enabled]
Turbo Mode	[Enabled]
<p>When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>	
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PCH-FW Configuration Sub-Menu

Aptio Setup - AMI		
Advanced		
ME Firmware Version	15.0.42.2268	When disabled AMT BIOS Features are no longer supported and user is no longer able to access MEBx Setup.
ME Firmware Mode	Normal Mode	
ME Firmware SKU	Corporate SKU	
AMT BIOS Features	[Disabled]	Note: This option does not disable Manageability Features in FW.
▶ AMT Configuration ▶ Firmware Update Configuration		
		⇐+: Select Screen ⇐↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Firmware Update Configuration Sub-Menu

Aptio Setup - AMI		
Advanced		
Me FW Image Re-Flash	[Disabled]	Enable/Disable Me FW Image Re-Flash function.
		⇐+: Select Screen ⇐↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Trusted Computing Sub-Menu

Aptio Setup - AMI		
Advanced		
TPM 2.0 Device Found		Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version:	13.11	
Vendor:	IFX	
Security Device Support	[Enable]	
Pending operation	[None]	
PH Randomization	[Enabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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RF Device Control Configuration Sub-Menu

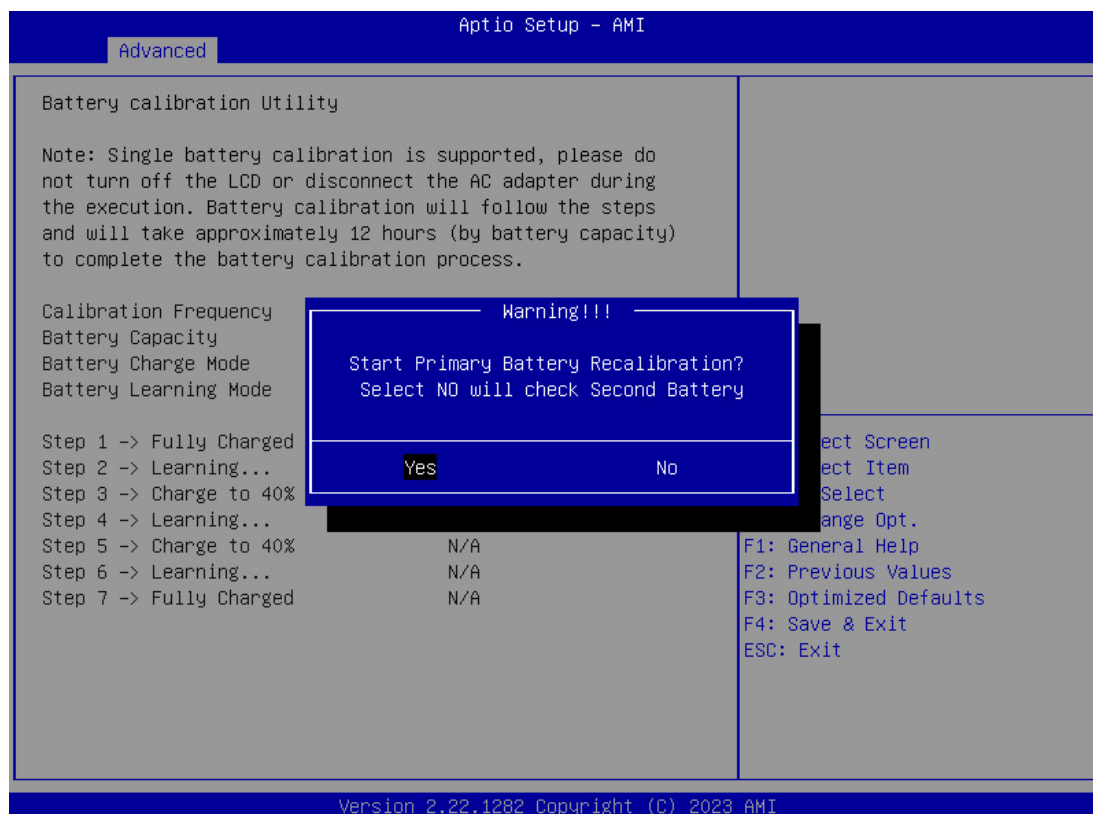
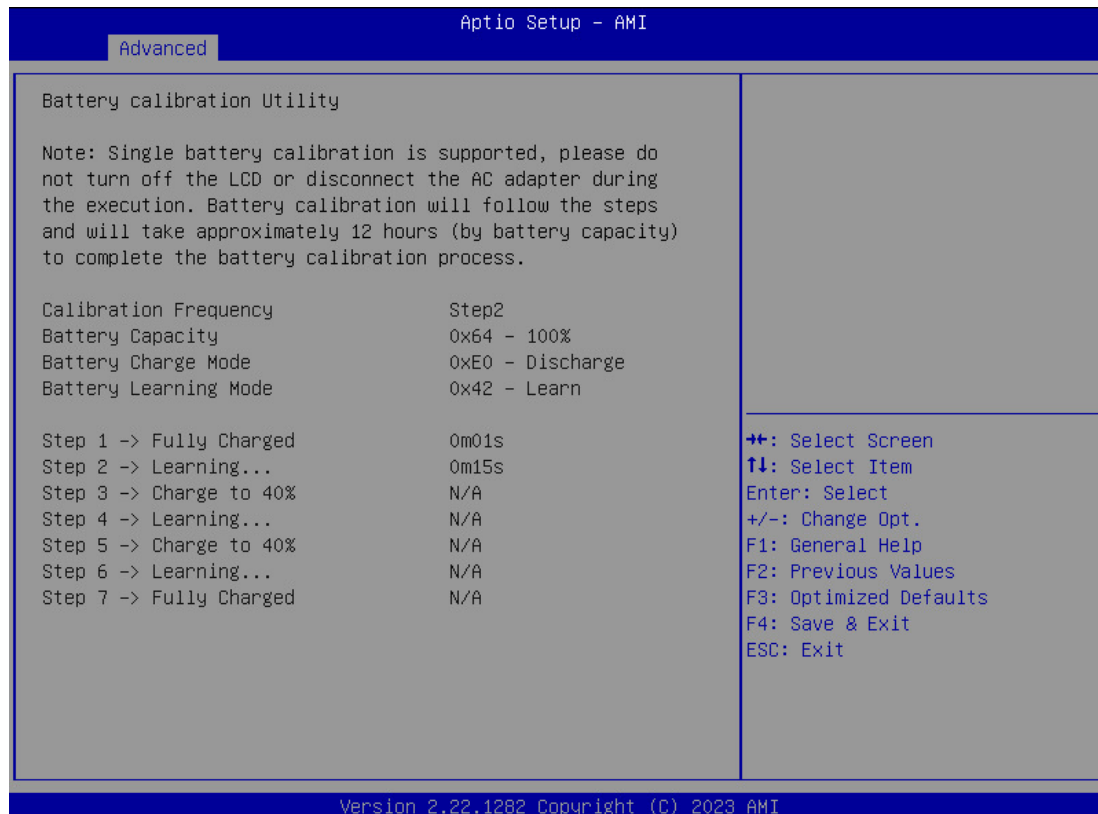
Aptio Setup - AMI		
Advanced		
RF Device Control		RF Device Control Setting
GSM Status	Not Present	
GNSS Status	Present	
GNSS	[Disabled]	
BT Status	Present	
BT	[Enabled]	
WLAN Status	Present	
WLAN	[Enabled]	
		++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1282 Copyright (C) 2023 AMI		

AC In Boot Control-Sub Menu

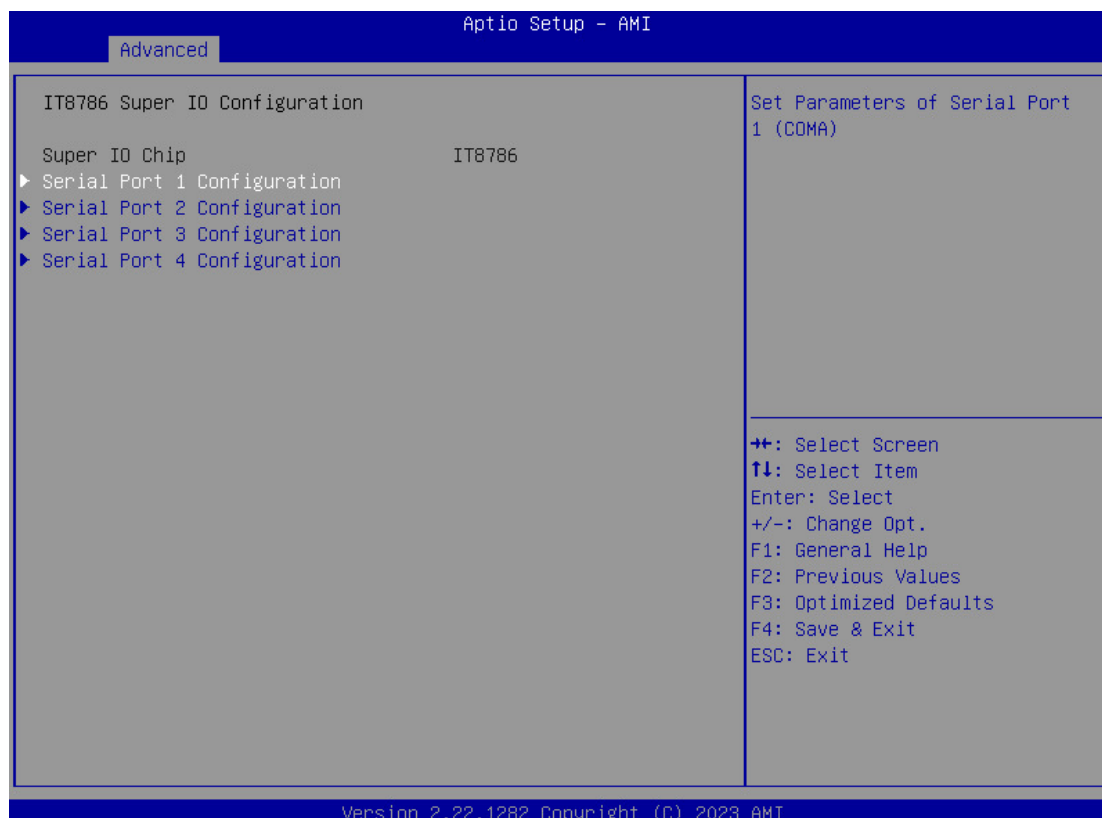
**Note:**

- There is a “Beep” sound when turning on the workstation via power button, but no “Beep” sound when turning on via AC In Boot On.

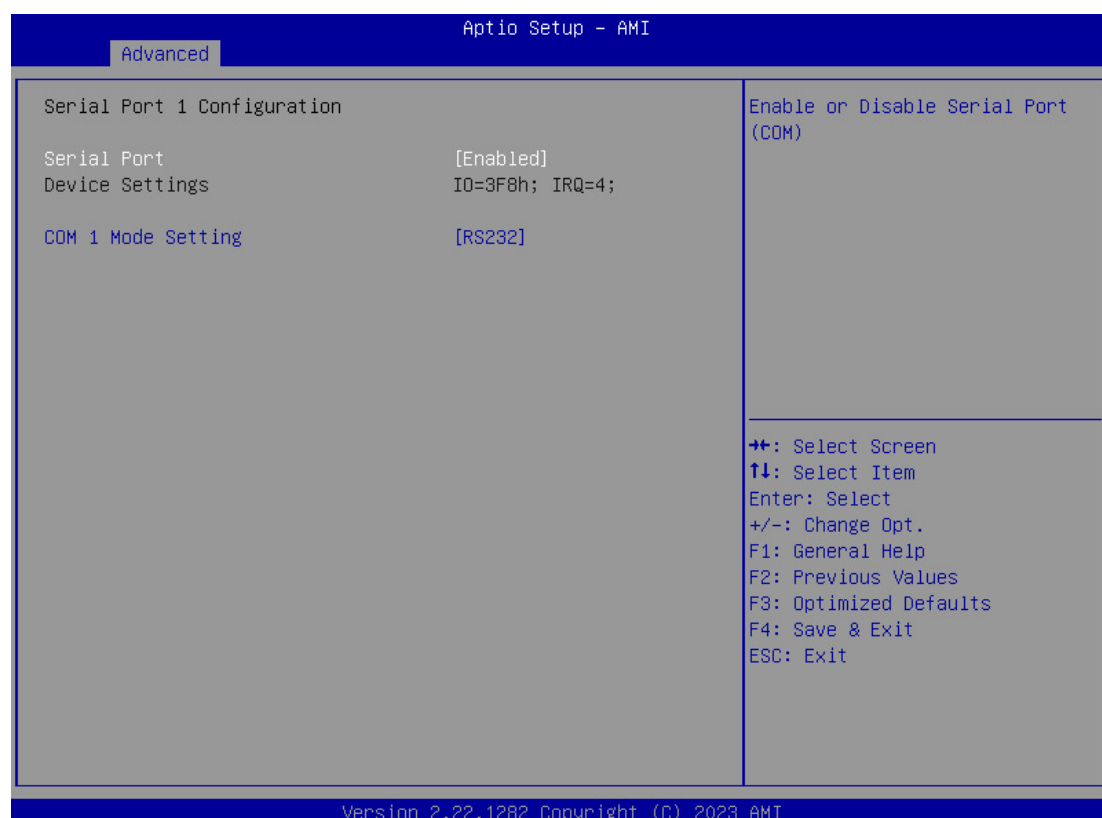
Battery Calibration Sub-Menu



IT8786 Super IO Configuration Sub-Menu



Serial Port 1 Configuration Sub-Menu



Serial Port 2 Configuration Sub-Menu

Aptio Setup - AMI	
Advanced	
Serial Port 2 Configuration	
Serial Port	[Enabled]
Device Settings	IO=2F8h; IRQ=3;
COM 2 Mode Setting	[RS232]
Enable or Disable Serial Port (COM)	
 ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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Serial Port 3 Configuration Sub-Menu

Aptio Setup - AMI	
Advanced	
Serial Port 3 Configuration	
Serial Port	[Enabled]
Device Settings	IO=3E8h; IRQ=10;
COM 3 Mode Setting	[RS232]
Enable or Disable Serial Port (COM)	
 ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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Serial Port 4 Configuration Sub-Menu

Aptio Setup - AMI	
Advanced	
Serial Port 4 Configuration	
Serial Port	[Enabled]
Device Settings	IO=2E8h; IRQ=5;
COM 4 Mode Setting	[RS232]
Enable or Disable Serial Port (COM)	
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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Intel TXT Information Sub-Menu

Aptio Setup - AMI	
Advanced	
Intel TXT Information	
Chipset	Production Fused
BiosAcm	Production Fused
Chipset Txt	Supported
Cpu Txt	Supported
Error Code	None
Class Code	None
Major Code	None
Minor Code	None
++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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Network Stack Configuration Sub-Menu

Aptio Setup - AMI		
Advanced		
Network Stack	[Enabled]	Enable/Disable UEFI Network Stack
IPv4 PXE Support	[Disabled]	
IPv4 HTTP Support	[Disabled]	
IPv6 PXE Support	[Disabled]	
IPv6 HTTP Support	[Disabled]	
PXE boot wait time	0	
Media detect count	1	
		⇐: Select Screen ⇕: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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Intel (R) Ethernet Controller (3) I225-LM Sub-Menu

Aptio Setup - AMI		
Advanced		
UEFI Driver	Intel(R) Gigabit 0.9.03	
Device Name	Intel(R) Ethernet Controller (3) I225-LM	
PCI Device ID	15F2	
Link Status	[Disconnected]	
MAC Address	00:16:3F:62:3D:E0	
		⇐: Select Screen ⇕: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Version 2.22.1282 Copyright (C) 2023 AMI		

Intel (R) Ethernet Controller (3) I225-LM Sub-Menu

Aptio Setup - AMI	
Advanced	
UEFI Driver	Intel(R) Gigabit 0.9.03
Device Name	Intel(R) Ethernet
PCI Device ID	Controller (3) I225-LM 15F2
Link Status	[Disconnected]
MAC Address	00:16:3F:62:3D:E1
<div>++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</div>	
Version 2.22.1282 Copyright (C) 2023 AMI	

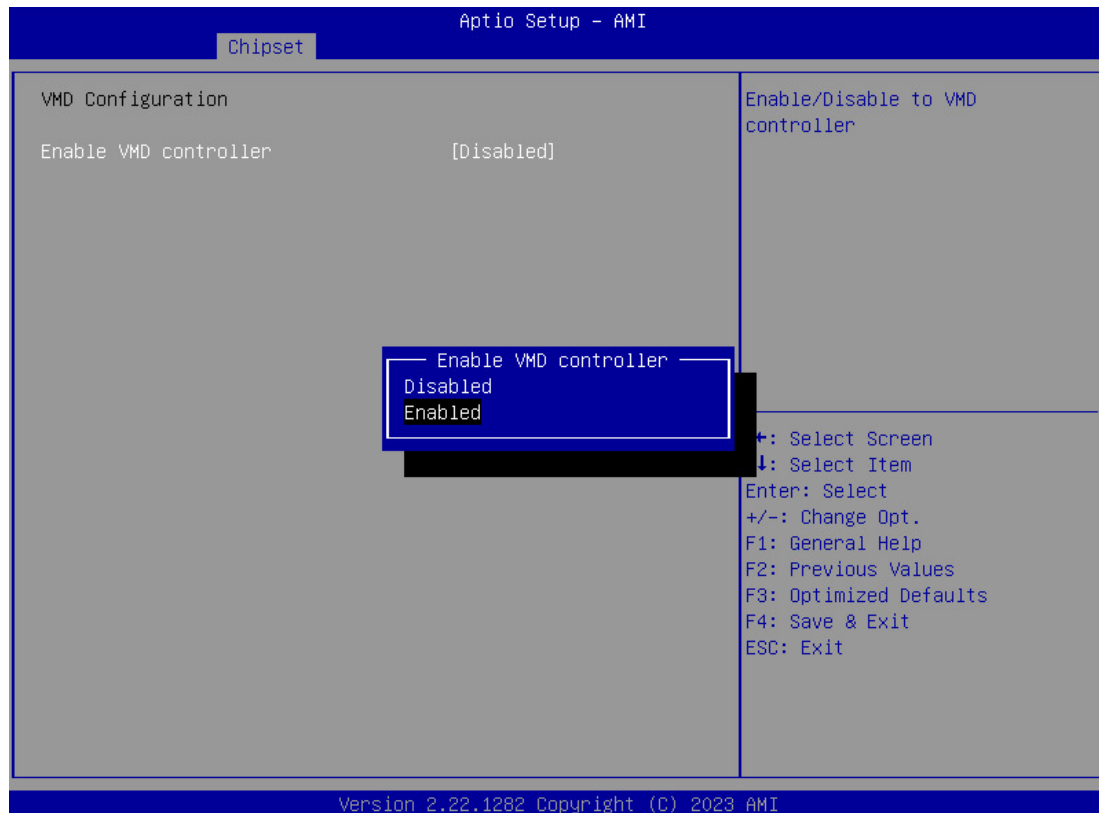
Chipsets Menu



VMD Setup Menu Sub-Menu

Note:

- User should [Enabled] VMD controller and reset the workstation to enter the RAID configuration setup.
- For more information, please refer to Chapter Two - [Solid State Drive \(SSD\) Housing](#)



Aptio Setup - AMI	
Advanced	
<p>Intel(R) RST 18.1.1.5201 RST VMD Driver</p> <p>► Create RAID Volume</p> <p>Non-RAID Physical Disks:</p> <p>► PCIe 1.0, TS128GMTE662TI-CRE G985800028, 119.2GB</p> <p>► PCIe 2.0, TS128GMTE662TI-CRE G985800087, 119.2GB</p>	<p>This page allows you to create a RAID volume</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
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Aptio Setup - AMI	
Advanced	
<p>Create RAID Volume</p> <p>Name: Volume1</p> <p>RAID Level: [RAID0 (Stripe)]</p> <p>Select Disks:</p> <p>PCIe 1.0, TS128GMTE662TI-CRE []</p> <p>G985800028, 119.2GB</p> <p>PCIe 2.0, TS128GMTE662TI-CRE []</p> <p>G985800087, 119.2GB</p> <p>Strip Size: [16KB]</p> <p>Capacity (MB): 0</p> <p>► Create Volume</p> <p>Select at least two disks</p>	<p>Select RAID Level</p> <hr/> <p> ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit </p>
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PCH-IO Configuration (HD Audio Configuration) Sub-Menu



HD Audio Subsystem Configuration Settings Sub-Menu



Security Menu

Aptio Setup - AMI	
Main Advanced Chipset Security Boot Save & Exit	
<p>Password Description</p> <p>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>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.</p> <p>The password length must be in the following range:</p> <p>Minimum length 3</p> <p>Maximum length 20</p> <p>Administrator Password</p> <p>User Password</p> <p>HDD Security Configuration:</p> <p>TS256GE805I-CRE</p> <p>► Secure Boot</p>	<p>Set Administrator Password</p> <hr/> <p>↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
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HDD Security Configuration Sub-Menu

Aptio Setup - AMI	
Security	
<p>HDD Password Description :</p> <p>Allows Access to Set, Modify and Clear Hard Disk User Password and Master Password.</p> <p>User Password is mandatory to Enable HDD Security.</p> <p>If Master password is installed (optional), it can also be used to unlock the HDD.</p> <p>If the 'Set User Password' option is hidden, do power cycle to enable the option again.</p> <p>HDD PASSWORD CONFIGURATION:</p> <p>Security Supported : Yes</p> <p>Security Enabled : No</p> <p>Security Locked : No</p> <p>Security Frozen : No</p> <p>HDD User Pwd Status: NOT INSTALLED</p> <p>HDD Master Pwd Status : INSTALLED</p> <p>Set User Password</p> <p>Set Master Password</p>	<p>Set HDD User Password.</p> <p>*** Advisable to Power Cycle System after Setting Hard Disk Passwords ***.</p> <p>Discard or Save changes option in setup does not have any impact on HDD when password is set or removed. If the 'Set HDD User Password' option is hidden, do power cycle to enable the option again</p> <hr/> <p>↔: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</p>
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Setting Password



Caution:

- *The Master Password must be set in advance than the User Password.*
- *If the user does not set a Master Password, they will be unable to access the system if they forget their User Password.*
- *Clearing the Master Password in the BIOS setup clears the current User Password simultaneously.*

1. Once the HDD Password is successfully set, you may enter the User Password to boot up the system.
2. The Master Password is a backup key, it's not recommended to change it frequently.
3. The Master password provides an alternative entry in case of losing the User Password.
4. Set the Master Password and User Password with a length between 1 and 32 characters.
5. If you wish to clear current password, leave it blank when creating a new password.
6. When the password settings are completed, the "Pwd Status" will change from "NOT INSTALLED" to "INSTALLED" and the "security enabled" status will change to "YES".
7. The setting will take effect when rebooting the system.

Resetting Password

1. A pop-up notification will appear when typing an invalid user password for three times. The notification will show "HDD is locked". Press "Enter" to leave the notification.
2. Press "F2" immediately to enter the BIOS setup to clear the lost User Password via the Master Password.
3. When the HDD is locked, only the Master Password is able to access the system, the User Password has no right to access the system.
4. A warm boot will cause HDD Security Frozen in the selection. Only a cold boot can lift the HDD Security frozen and allow further operations in the BIOS setup. (After a cold boot, users can try to enter again with the correct user password or just reset it with the master password).

Security Boot Sub-Menu

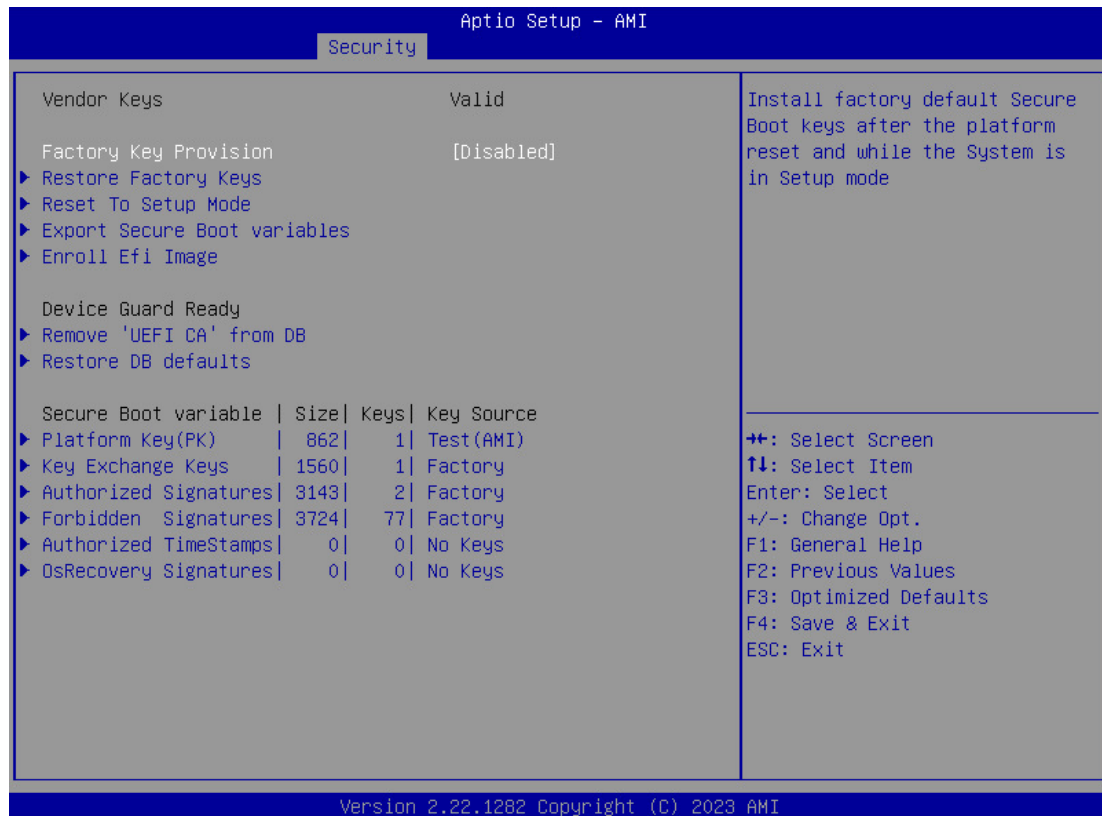


Caution:

- *Restore Factory Keys: Install factory default security boot keys.*
- *Reset to setup mode: Delete all security boot keys.*
- *Key Management: Set up of preference security boot keys.*

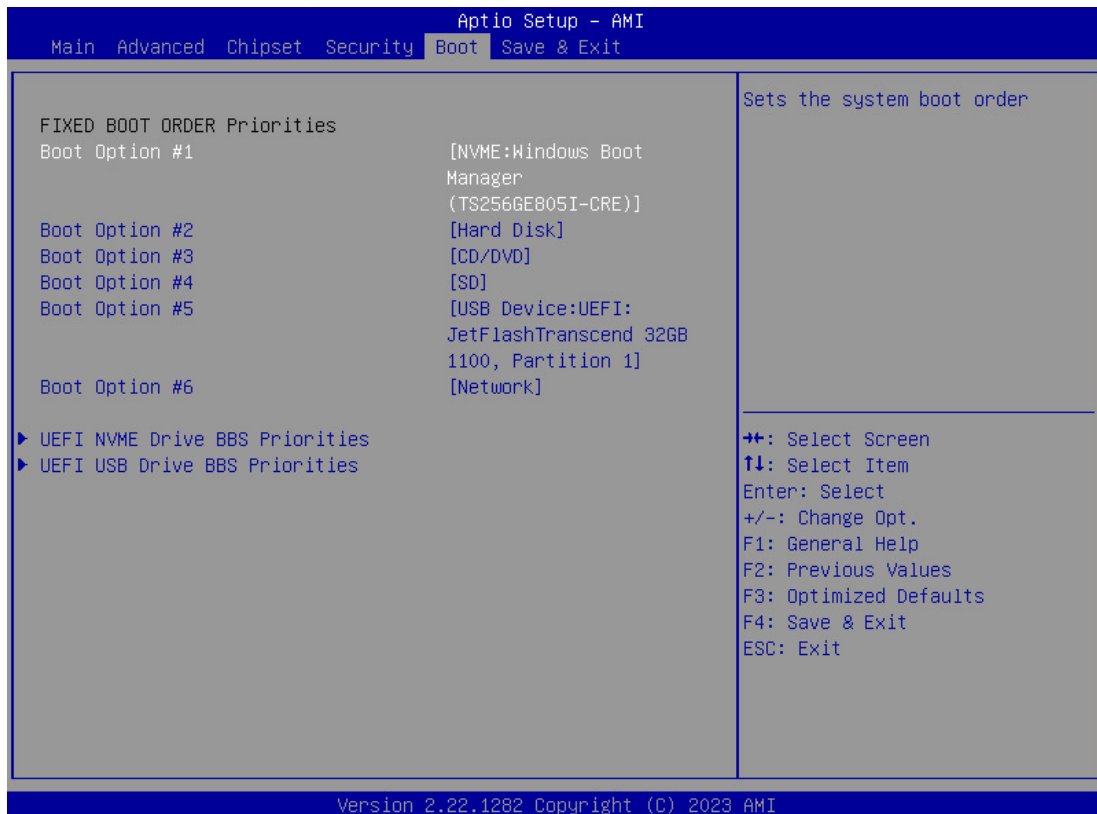


Key Management Sub-Menu



Boot Menu

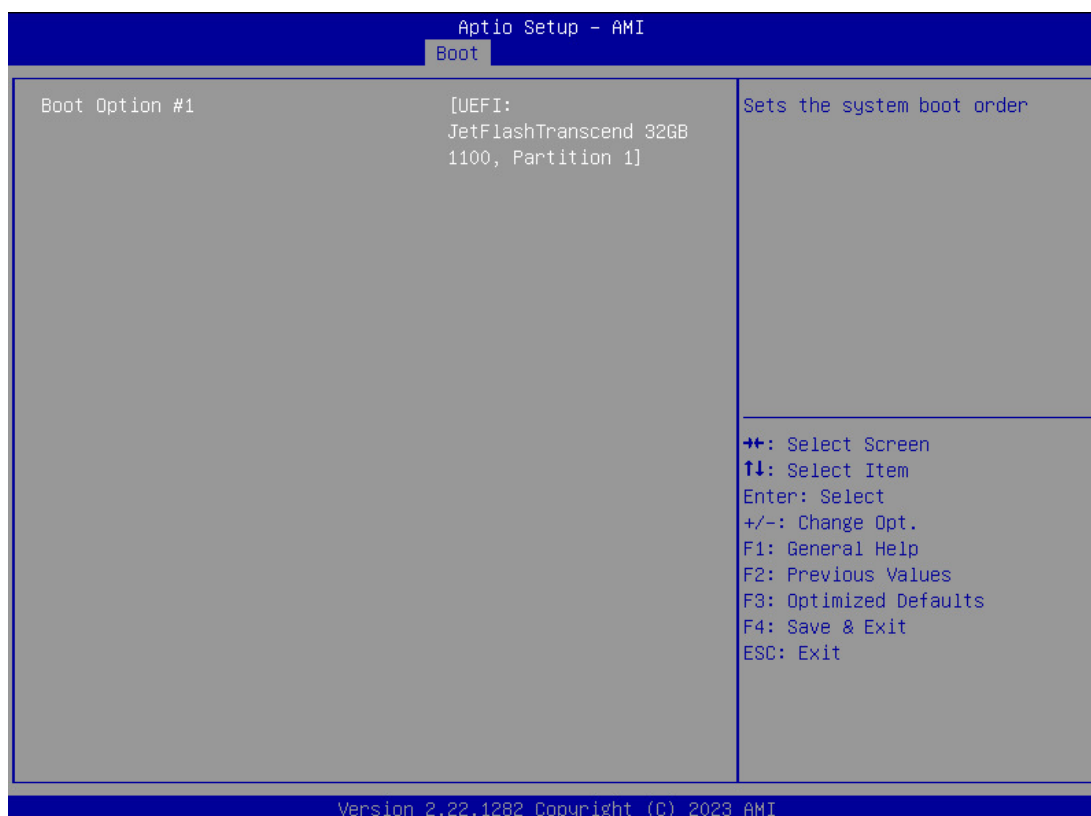
The system will boot accordingly to the option sequences. If there is more than one device in each option category, the boot up priority will be the first option in sub-menu.



UEFI NVME Drive BBS Priorities Sub-Menu



UEFI USB Drive BBS Priorities Sub-Menu



Save & Exit Menu

Aptio Setup - AMI	
Main Advanced Chipset Security Boot Save & Exit	
<p>Save Options</p> <p>Save Changes and Reset</p> <p>Discard Changes and Reset</p> <p>Default Options</p> <p>Restore Defaults</p> <p>Boot Override</p> <p>Windows Boot Manager (TS256GE805I-CRE)</p> <p>UEFI: JetFlashTranscend 32GB 1100, Partition 1 (JetFlashTranscend 32GB 1100)</p> <p>Launch EFI Shell from filesystem device</p>	<p>Reset the system after saving the changes.</p> <hr/> <p>↔: Select Screen</p> <p>↑↓: Select Item</p> <p>Enter: Select</p> <p>+/-: Change Opt.</p> <p>F1: General Help</p> <p>F2: Previous Values</p> <p>F3: Optimized Defaults</p> <p>F4: Save & Exit</p> <p>ESC: Exit</p>
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Chapter Five – Drivers and Applications

The latest drivers and utilities will be available on MilDef Crete's website. To download the drivers and utilities, please follow the instructions below by

Visit MilDef Crete's website www.mildefcrete.com → Partner Access → SERVICE/SUPPORT menu → Drivers & Utilities

**Caution:**

- Please install the chipset driver first.

Via Device Manager in Windows, you may perform "Driver Update" and check if there are drivers needed to be installed for your device. If any driver is missing, please consult your dealer.

Note

- If the system requests for a reboot after installing drivers, please reboot accordingly before installing other drivers.

Chapter Six – Specifications

Platform

Intel® Tiger Lake-H Platform

Processor

Intel® Xeon® W-11865MLE

- 8 Cores, 16 Threads
- Base Frequency: 1.50 GHz
- Max Turbo Frequency: 4.50 GHz
- 24MB Intel® Smart Cache
- TDP 25W

Chipset

Mobile Intel® RM590E Chipset

- Bus Speed: 8GT/s
- PCI Express Revision 3.0
- USB Revision 3.2/2.0
- Intel® ME Firmware Version 15
- Intel® HD Audio Technology
- TDP 3.4W

Memory

- 260 pin DDR4 SO-DIMM x 2
- 8GB/16GB/32GB/64GB DDR4-3200 (ECC/non ECC)
- Industrial-Grade memory module

Storage

- Std.: M.2 PCIe 3.0 SSD x 1
- Optional: M.2 PCIe 3.0 SSD x 1

Note:

- Sealed SSD Housing with up to 2 x SSD (each from 256GB to 1TB)
- Factory default, non-user disassembly.
- Storage capacity needs to be configured by order in advance.

Graphics

Intel® UHD Graphics

- Processor Graphics : Intel® UHD Graphics for 11th Gen Intel® Processors
- Base Frequency : 350 MHz
- Max Dynamic Frequency : 1.35 GHz
- DirectX® Support : 12.1
- OpenGL® Support : 4.6
- OpenCL® Support : 3.0

Display

Standard:

- 15" UXGA LCD
- Optical Bonding
- Resolution : 1600 x 1200 pixels
- Viewing area : 304.8 mm (H) x 228.6 mm (V)
- Dot size : 0.297 mm (H) x 0.297 mm (W)
- Contrast ratio : 1000
- Brightness(Min. ~ Typ.) : 700~900 nits
- Viewing angle : Vertical top 70°, bottom 70°
Horizontal left 80°, right 80°
- Color : 16.2M
- Backlight : LED

Note:

- *Brightness varies from the LCD combinations.*

Sensor

- Ambient light sensor

Audio

- HD Audio
- Stereo Speaker

Trust Platform Module (TPM2.0)

There is an Trust Platform Module (TPM2.0) equipped with this workstation for users to strengthen the security. The TPM module can support to -20°C environment of operating temperature.

With TPM, users are able to encrypt the folders and files directly and make the important file be more secure and be with an additional protection. In other words, your TPM-encrypted files are basically protected with two layers. Even if your TPM-encrypted files are hacked, the files can not to be read without passwords and TPM chipset.

Keyboard

- 83-key with backlight
- Caps lock LED indicator (Green).

Touchpad

- Resistive type
- Interface : USB

Ethernet (Gigabit LAN)

Intel® I225LM (Foxville)

- 2.5G base-T Ethernet
- Host Interface : PCIe

Button

Top

- Power button (Gray)

I/O Ports

Right

- Optional Smart Card Reader x 1
- Sealed SSD Housing
 - Std: M.2 PCIe 3.0 SSD x 1
 - Optional: M.2 PCIe 3.0 SSD x 1

Left

- 2.5G LAN RJ45 x 2
- USB 3.2 Gen. 2 x 2
- USB 2.0 x 2
- Audio Jack x 3 (Line-in/Microphone/Headphone)
- Optional Express Card Slot x 1
- Optional Serial Port DB9 x 2 (Default: COM3, COM4)

Rear

- DC-In Conn. x 1
 - Std. DC-In 2 pin
 - Optional Military 3 pin
- Serial Port DB9 x 2 (Default: COM1, COM2)
- Docking Connector x 1
- VGA Port x 1
- Display Port x 1
- DVI Port x 1

Bottom

- Primary Battery x 1

Power

90W AC Adapter

- AC Input : 100 - 240 V
- Frequency : 50/60 Hz
- Maximum Power : 90 Watts Max. Output
- Dimension : 151mm (L) x 64mm (D) x 36mm (H)
- Weight : 460 g

Primary Battery (BRKF3A)

- Lithium-Ion Rechargeable Battery
- Rating Capacity : 8700 mAh/93.96Wh
- Typical Capacity : 8940 mAh/96.552Wh
- Nominal Voltage Output : 10.8 V
- Maximum Charge Voltage : 12.6 V
- Voltage at End Discharge : 9.0 V
- Suggestion Charge Current : 3.0 A
- Suggest Continuous Discharge Current : 1.65 A
- Suggestion Maximum Discharge Current : 6.5 A
- End of charge condition : 233 mA
- Operating Temperature : (Charge) 10 ~ 45°C
:(Discharge) -20 ~ 60°C
- Dimension (L x D x H) : 103 x 73 x 39 mm
- Weight : approximately 488 g

Case

- Magnesium/Aluminum
- Black/NATO Green

Environmental Specifications

- Operating Temperature : Std.: -20°C ~ +55°C
: Optional : -30°C ~ +55°C
- Storage Temperature : - 40°C ~ +70°C

Certifications

CE, FCC, UKCA, RCM, WEEE, REACH, RoHS2.0, IP65, MIL-STD-810H, Optional MIL-STD-461G (G.N.), Optional MIL-STD-461G (G.A.)

Dimension and Weight

- Dimension (mm) : 353 (L) x 301 (W) x 79 (H) (with bumper)
- Weight : Fan Version 6kg
Fanless Version 6.3kg

Note:

➤ *Dimension and weight vary from system configurations and optional accessories.*

Materials and Recycling

Plastic case	: Recyclable UL grade PC+ABS GE C6200 or TN-3813BW
Metal case	: Aluminum Alloy ADC-12, Magnesium Alloy AZ91D
Bracket	: Aluminum 5052
Button	: Rubber
Bumper	: Silicone Rubber, TPU
PCB	: FR-4, UL 94V0
Battery	: Rechargeable Lithium Ion, 9 Cells per Pack (Electrochemistry system: $\text{LiCoO}_2 + \text{C} = \text{Li}_1\text{-XCoO}_2 + \text{CLiX}$)
Packing	: Carton - Recycled/Recyclable Paper (Unbleached) Carrying Bag - Recyclable PE Fiber Quick Guide - Recycled/Recyclable Paper

Please recycle the parts according to local regulations.

Chapter Seven – Optional Devices

Bluetooth® / WLAN

Intel® Wi-Fi 6E AX210

- Board Form Factor : M.2 2230
- Wi-Fi Certified : Wi-Fi 6E (802.11ax)
- Bluetooth® Version : 5.3
- Interface : PCIe (Wi-Fi)/USB (Bluetooth®)

GNSS

Ublox Neo-M9N

- Interface : USB
- Support GPS/GLONASS/Galileo/Beidou

Touch Screen

- Resistive Single-Touch Screen
- Interface : USB

Surge Protector/BVA Module

BVA & Surge Protector Module is designed for all equipment to directly connect with the vehicle power system. Containing the reverse polarity protection and the breaking of high voltage input, the module is able to be against high 100V at 50ms surge.

- Input Voltage: DC +12V~+32V
- Output Current: 4A max.
- Output Voltage: 19V
- Efficiency: >90%
- Reverse Voltage Protection
- Complying with MIL-STD-461G
- Complying with MIL-STD-1275D

Note:

- *If you'd like to use DC-in 12V, please make sure the DC-in conn. is more than 12V, and the DC cable should withstand more than 8A.*

Smart Card Reader

Accept a smart card for additional security feature.

Express Card Slot

Accept a 54 mm or 34 mm wide Express Card.

COM1~COM4 Serial Ports

COM1~COM4 supports RS232, RS422, and RS485 signals, which are selectable in the BIOS menu. Please follow the instructions below to select the signal:

Select **Advanced** → **IT8786 Super IO Configuration** → **Serial Port 1 Configuration** →>
COM 1 Mode Setting → **RS232/ RS422/ RS485**

Select **Advanced** → **IT8786 Super IO Configuration** → **Serial Port 2 Configuration** →>
COM 2 Mode Setting → **RS232/ RS422/ RS485**

Select **Advanced** → **IT8786 Super IO Configuration** → **Serial Port 3 Configuration** →>
COM 3 Mode Setting → **RS232/ RS422/ RS485**

Select **Advanced** → **IT8786 Super IO Configuration** → **Serial Port 4 Configuration** →>
COM 4 Mode Setting → **RS232/ RS422/ RS485**

Note:

- For more information, please refer to Chapter Four – BIOS Setup ([IT8786 Super IO Configuration Sub-Menu](#)).

Vehicle Adapter

- **EVA1275 External Vehicle Adapter**
 - DC Input Range: 12 ~ 32 V
 - DC Output Voltage: 19 V
 - Output Current: 5 A (at 28 V Input Voltage)
 - Ripple Voltage: 200 mA
 - Input Reverse Voltage Protection
 - Output Overvoltage Protection
 - Short-Circuit Protection and Current Limit
 - Complying with MIL-STD-461F
 - Complying with MIL-STD-1275D
- **EVA19040 External Vehicle Adapter**
 - DC Input Range: 12 ~ 32 V
 - DC Output Voltage: 19 V
 - Output Current: 4 A (at 28 V Input Voltage)
 - Ripple Voltage: 200 mA
 - Output Overvoltage Protection
 - Short-Circuit Protection and Current Limit
 - Complying with MIL-STD-461F

Multi Battery Charger (MCRK)

Multi Battery Charger MCRK is designed for charging 2 batteries (primary and secondary), independently.

**Electronic characteristics**

- DC Input Range: 12 ~ 32V with BVA
- DC-in Conn:
 - Std. 2 pin Mil Conn.
 - Optional 3 pin Mil Conn.
- Charging Time: 5 hours (Each slot is independent, charging time won't accumulate.)
- CE/FCC Certified

LED Indicators

- Power indicator: Green (When attaching 90W AC Adapter)
- Charge indicator: Orange (charging)/ OFF (Completed)

Physical Characteristics

- Dimensions (mm) : 194 (L) x 151 (W) x 86 (H)
- Weight: 355 g

Environmental Ratings

- Operating Temperature : 10 ~ 45°C
- Storage Temperature : -40 ~ 70°C

Chapter Eight – Maintenance and Service

Cleaning

**Caution:**

- *ALWAYS turn OFF the power, unplug the power cord and remove the battery before cleaning.*

The exterior of the system and display may be wiped with a clean, soft, and lint-free cloth. If there is difficulty removing dirt, apply non-ammonia, or non-alcohol-based glass cleaner to the cloth and wipe.

An air gun is recommended for cleaning water and dust. For salty water, please clean with fresh water then blow-dry with an air gun.

Troubleshooting

Should the device fail to function properly, follow the troubleshooting steps below.

- Check AC/vehicle Adapter, battery, and the power source.
- Minimize the configuration, i.e. remove extra peripherals and devices.
- Remove the modules one by one (SSD, Battery, etc.).
- Remove the software suspected.
- Set BIOS fail-safe default.
- Re-install operating system and application software.

RMA & E-RMA Service

If troubleshooting solutions are unsuccessful, consult your dealer for RMA.

Shipping instructions

1. Remove any personal add-on devices or other media.
2. Use the original shipping container and packing materials, if possible.
3. If the original packing materials are not available, wrap the equipment with soft material (e.g., PU/PE form) then put the wrapped equipment into a hard cardboard shipping box.
4. Include a sheet with the following information: (Note: Please keep a copy of this sheet for your records.)
 - Name
 - Address
 - Unit serial number
 - Place and date of purchase or the original invoice number
 - Date of failure
 - A DETAILED description of the problems you have encountered including: The operating system, the add-on device installed (if any), the application software, the failure phenomenon, etc.
 - A list of the hardware/software configuration, if applicable.
5. Clearly mark the outside of the shipping box with the RMA #. If an RMA # is not present on the shipping box, receiving will be unable to identify it and it might be returned.
6. Unless prior arrangements have been made, the customer is responsible for all shipping costs. Unauthorized use of the company's shipping accounts is not permitted.

E-RMA

Instructions

1. Contact your dealer and provide users' names and passwords for authorization to E-RMA service.
2. Login E-RMA service platform

Instructions: **Crete's website** www.mildefcrete.com → **SERVICE/SUPPORT** menu → **E-RMA**

3. Fill out the RMA Request Form to apply for an RMA number.
*Please follow the instruction below for RMA Form Example:
SERVICE/SUPPORT menu => E-RMA => Category => RMA Form Example
4. Check the status on the website after you receive the issued number.

Status descriptions

Status	Description
Approved	RMA number has been issued.
RCV	The device is received.
CHK	The device is in check.
REP	The device is in repair.
RPD	The device has been repaired.
FQC	The device is in function testing.
SHP	The device has been shipped.