CIARA

User Guide

KRONOS 540-G4 Workstation

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ABOUT THIS GUIDE

Please read this User's Guide before using your CIARA KRONOS 540-G4 workstation.

This User's Guide is divided into four chapters that provide information on Installation, trouble shooting, certification, detailed description and a Glossary. Please remember to fill out the Equipment Log and keep a copy in a safe place.

With proper care and operating procedures your CIARA KRONOS 540-G4 will give you many years of service and high-performance computing.

1.0 Installing and upgrading your system

1.1 Unpacking your workstation

Your workstation is packed with ecologic moulded bottom and top fillers to keep it in place during transit.

The keyboard is on the top pad of the box as well as other accessories. Carefully unpack your workstation and be sure to save the bottom and top fillers as well as the top pad for future shipping and transportation.

To repack the workstation, simply proceed in a reverse fashion of the packing solution below.

1.2 Choosing a site for the system

All CIARA workstations operate reliably in a typical office or home environment. Choose a location that is readily accessible and meets the following requirements :

- Is near a grounded, three pronged power outlet.
- The socket-outlet shall be installed near the equipment and shall be easily accessible.
- Is clean and dust free.
- Is well-ventilated and lighted and away from sources of heat.
- Is isolated from strong electromagnetic fields produced by electrical devices.
  (I.e. air conditioners, large fans, large electric motors, radio and TV transmitters)
- Has an appropriate table or desk that will allow you to work without physical discomfort and strain.

The power supply input should be 120 V, 10 A and 60 Hz.

A few general precautions should always be observed :

- Never connect any peripheral such as a monitor to the system unit if the power is turned "ON". Always shut down the system first.

- Never remove any internal adapter cards in the system unit if the power is turned "ON" as this will ruin the Card/Workstation and Void the Warranty.

- Never install and connect more peripherals than available power supply plugs to avoid exceeding the maximum power of the system.

NOTE The KRONOS 540-G4 model comes either with or without a power supply On/OFF switch. For those systems that do not have a switch, make sure to shut down the system through Windows before proceeding to any repair or replacement work inside the system.

1.3 Using the workstation

1.3.1 Recovery from CIARA Windows 11 Pro

Before you start this procedure, please back up all your important information, the recovery media will erase all data on HDD before installation.

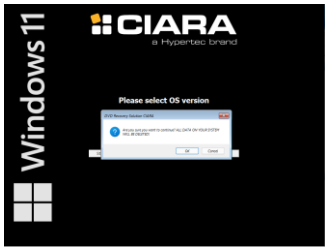
Insert the Windows 11 Pro Recovery DVD and restart the system.

1- When prompted, press any key to boot from the DVD.
The recovery image will then start.

2- Accept the EULA and press on Continue.

3- Select the OS version and press Start System Recovery

4- A pop up will then open warning you that all the data will be lost.
If all your files are already saved, press OK.



5- The recovery will take around 30 minutes to complete. A window will show you the process of the recovery, once completed Eject the DVD then press OK. The system will then reboot.

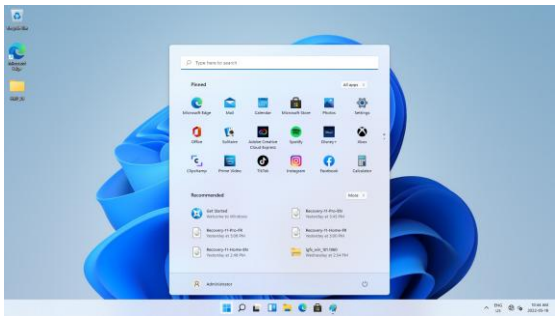
NOTE: All drivers required for your system will be already installed except for components that were not part of your original purchase

1.3.2 Windows 11 Recovery from Startup Settings

With the Windows Startup Settings screen (formerly advanced boot options) you can start Windows in different advanced troubleshooting modes so you can find and fix problems on your PC. In previous versions of Windows, you could get to this screen by pressing F8 before Windows started up. Windows 11 PCs start up quickly so there's not enough time to press F8.

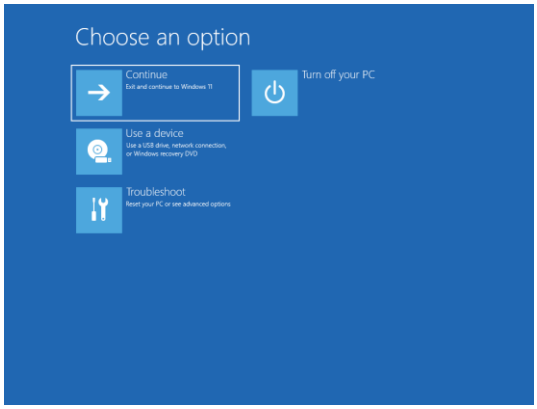
There are two ways to get to the Windows Startup Settings screen in Windows 11:

- If you're not signed into Windows, tap or click the power icon from the sign-in screen, hold **Shift**, and then tap or click **Restart.**

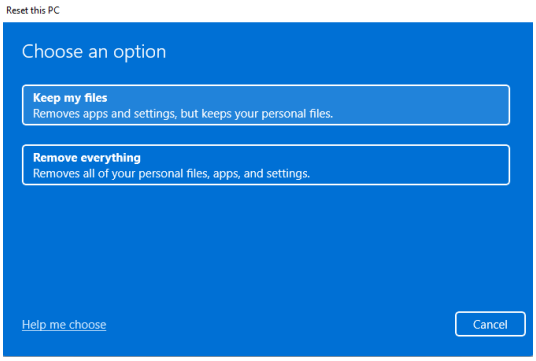


- Or, if you're already signed in:
  1. Click on the windows logo button, select **Settings**, and then select **System**.
  2. From the **Right side pane** select **Recovery**.
  3. Under **Recovery Options**, tap or click **Reset PC**.
  4. On the **pop-up screen**, tap or click **Remove Everything** then press **Next**.
  5. Select **Advanced Settings**, and then press **Change Settings**, then clean data to **Yes**, press **Confirm**.
  6. Tap or click **Restart**.
  7. Windows will restart and reset your PC to its initial state.
  8. Follow instructions at the Startup Settings screen and choose the startup setting you want.
  9. Sign into your PC with a user account that has administrator rights.

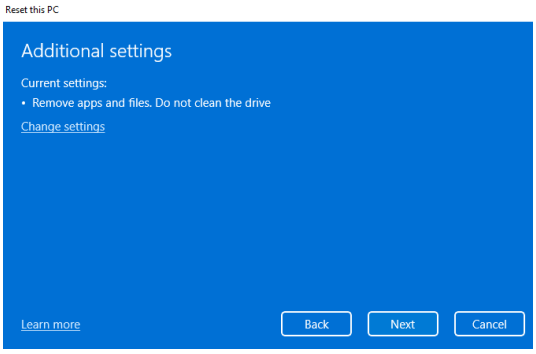
  Choose **Continue**



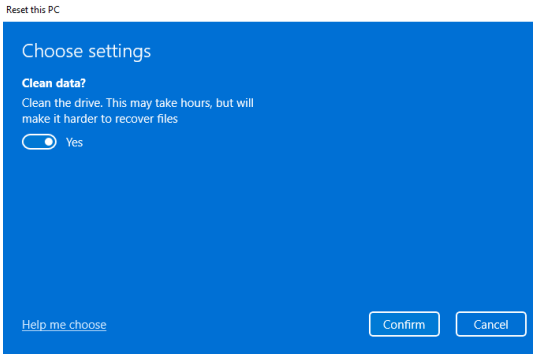
Choose **Remove everything**



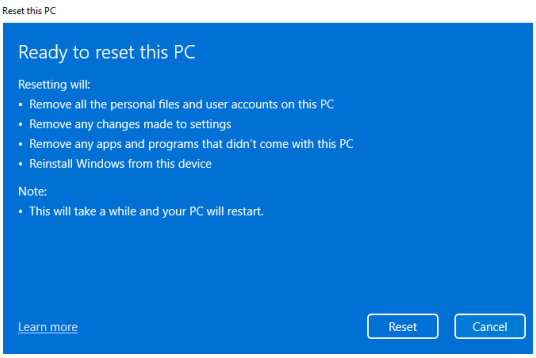
Press **Next**



Set **Clean data** to **Yes** and press **Confirm**



Press **Reset**



Then follow the regular Windows 11 Installation process.

1.3.3 Corrupted BIOS recovery

The ASUS CrashFree BIOS 3 is an auto recovery tool that allows you to restore the BIOS file when it fails or gets corrupted during the updating process. You can restore a corrupted BIOS file using the motherboard support DVD or a USB flash drive that contains the updated BIOS file.

NOTE: Before using this utility, rename the BIOS file in the removable device into **B850.CAP**

Download the latest BIOS file from the ASUS website at https://www.asus.com/ca-en/motherboards-components/motherboards/prime/prime-b850-plus-wifi/helpdesk_download?model2Name=PRIME-B850-PLUS-WIFI .

Recovering the BIOS
To recover the BIOS :

1. Turn on the system.

2. Insert the support DVD to the optical drive or the USB flash drive that contains the BIOS file to the USB port.

3. The utility automatically checks the devices for the BIOS file. When found, the utility reads the BIOS file and enters ASUS EZ Flash 3 utility automatically.

4. The system requires you to enter BIOS Setup to recover BIOS settings. To ensure system compatibility and stability, we recommend that you press <F5> to load default BIOS values.

DO NOT shut down or reset the system while updating the BIOS! Doing so can cause system boot failure.

1.3.4 System maintenance

Read and follow carefully all the instructions and warnings in this manual and on these products!
Only use a damp cloth to clean your system unit and monitor case. Do not use detergents!
Position your system unit, monitor and cables/wires away from direct sunlight, moisture, dust, oil, and thoroughfares.
Ensure that all ventilation outlets are always free from obstruction.
In the event of mechanical/power failure or damage, do not attempt to repair the system unit, monitors, cables /wires. Refer all such problems to experienced service personnel.
Ensure that the back of the system unit is at least 6" away from anything that might obstruct the ventilation outlets and cause overheating.
Ensure that the power source is grounded correctly. This product is equipped with a 3-wire grounding-type plug. This plug will only fit into a grounded power outlet.

1.3.5 Using the CIARA KRONOS 540-G4

1.3.5.1 Introduction

The CIARA KRONOS 540-G4 is a powerful workstation that has the ability to run a variety of operating systems. Unless you have specified something different, your system comes configured with a Windows operating system pre-loaded onto the hard drive. Each operating system comes with its own user manuals, and you should refer to these for information specific to your system.

1.3.5.2 A caution about viruses

Due to the prevalence of computer viruses, we strongly recommend that you take precautions to protect your workstation from them. Purchase and use a reputable virus-checking program. Ensure that the program is kept up to date by registering the program, and installing updates as they become available. Please be aware, however, that even the best virus checking programs cannot be regarded as the perfect solution. It is possible for even the best program to fail, particularly if it is not updated. Please contact your CIARA account representative for more information.

1.3.5.3 Windows

Windows is a Graphical User Interface (GUI) that provides a screen composed of icons. You select or “click” on the icons to run programs. As noted above, Windows has been installed on your workstation. For further information about using Windows, please consult the appropriate Microsoft software manual provided with your CIARA KRONOS 540-G4.

1.3.5.4 Windows Server 2022, Windows Server 2025 and Linux

Windows Server 2022, Windows Server 2025 and Linux are operating systems that provide sophisticated networking capabilities to Windows based computers. The onboard Network Interface Card (NIC) in the workstation allows the user to connect the CIARA KRONOS 540-G2 to a network server computer running Windows Server 2022, Windows Server 2025 or Linux.

Microsoft and Linux provide workstations on the network with access to files and applications stored on the file server (a dedicated computer running the Windows Server 2022, Windows Server 2025 or Linux operating systems), as well as access to shared printers on the network. Sophisticated tools are built into the Windows Server 2022, Windows Server 2025 and Linux operating systems to manage the network, and to restrict access to resources on the file server.

For further information about Windows Server 2022, Windows Server 2025 or Linux, please consult the manuals provided with the network operating system (NOS), or speak to your service representative.

1.4 Troubleshooting your system after first install

1.4.1 Helpful hints

If you encounter some minor problems with the workstation, monitor, or software, see the following list of general suggestions before taking further action:

- Check that the workstation and monitor are plugged into a working electrical outlet.
- When available check to see if power supply button is switched on.
- Check to see that the workstation is turned on and the power light is on.
- Check to see that the monitor is turned on and the monitor light is on.
- Turn up the brightness and contrast controls of the monitor if the monitor is dim.
- Press and hold any key. If the system beeps, then the keyboard should be operating correctly.
- Check all cable connections for loose connections or incorrect connections.
- Wake the workstation by pressing any key on the keyboard or pressing the power button. If the system remains in suspend mode, shut down the workstation by pressing and holding the power button for at least four seconds then press the power button again to restart the workstation. If the system will not shut down, unplug the power cord, wait a few seconds, and then plug it in again. The workstation will restart if automatic start on power loss is set in the BIOS. If it does not restart, press the power button to start the workstation.
- Be sure that all the needed device drivers have been installed. For example, if you are using a printer, you need a driver for that model of printer.
- If you have installed an operating system other than the factory-installed operating system, check to be sure that it is supported on the system.
- The system has multiple video sources, the monitor must be plugged into the HDMI 2.1 or one of the three DisplayPort video connectors of the system. Your system can support four independent monitors using any of the four available video connectors. This type of configuration will require adjustments to the BIOS parameters.

1.5 Solving general problems

You should be able to easily resolve the general problems described in this section. If a problem persists and you are unable to resolve it, or if you feel uncomfortable about performing the operation, contact CIARA at 1-877-242-7272 and ask for the Customer Service department.

Solving general problems		
Problem	Cause	Solution
Workstation appears locked up and will not turn off when the power button is pressed.	Software control of the power switch is not functional.	Press and hold the power button for at least four seconds until the workstation turns off.
Workstation will not respond to USB keyboard or mouse.	Workstation is in Last State mode.	Press the power button to resume from Last State mode.
CAUTION : When attempting to resume from Last State mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Workstation date and time display is incorrect.	RTC (real-time clock) battery may need to be replaced. ► Connecting the workstation to a live AC outlet prolongs the life of the RTC battery.	Reset the date and time under Control Panel (Workstation Setup can also be used to update the RTC date and time). If the problem persists, replace the RTC battery.
Cursor will not move using the arrow keys on the keypad.	The Num Lock key may be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys.
Poor performance is experienced.	Processor is hot.	1. Make sure the airflow to the workstation is not blocked. 2. Make sure the fans are connected and working properly (some fans only operate when needed) 3. Make sure the processor heat sink is installed properly. 4. The system might be infected with a virus and that it would need to be cleaned with an antivirus software.
	Hard drive is full.	Transfer data from the hard drive to create more space on the hard drive.

1.5.1 Solving power supply problems

Solving power supply problems		
Problem	Cause	Solution
Power supply shuts down intermittently.	Power supply will not turn on because of internal power supply fault.	Contact CIARA for the replacement of the power supply.
Workstation powered off automatically and the Power LED flashes two times, once every second, followed by a two second pause.	Processor thermal protection activated : A fan may be blocked or not turning. OR The heat sink/fan assembly is not properly attached to the processor.	Ensure that the workstation air vents are not blocked and the processor-cooling fan is running. Open hood, press the power button, and see if the processor fan spins. If the processor fan is not spinning, make sure the fan's cable is plugged onto the system board header. Ensure the fan is fully/properly seated or installed. If fan is plugged in and seated properly, but is not spinning, then replace the processor fan. (See article 1.6.3 of this Guide) Reseat processor heat sink and verify that the fan assembly is properly attached.
Power LED flashes, once every two seconds. OR Power LED flashes four times, once every second, followed by a two second pause.	Power failure (power supply is overloaded)	Check the power supply voltage. Proper voltage setting depends on your region. (See section 1.2) Open the hood (See article 1.6.2) and ensure the 4-wire power supply cable is seated into the connector on the system board. Check if a device is causing the problem by removing ALL attached devices (such as hard or optical drives, and expansion cards). Power on the system. If the system enters the POST, then power off and replace one device at a time and repeat this procedure until failure occurs. Replace the device that is causing the failure. Continue adding devices one at a time to ensure all devices are functioning properly. If the problem persists, contact CIARA since the problem may necessitate the replacement of the power supply or the motherboard.
System does not power on and LEDs are not flashing.	The system is unable to power on.	Press and hold the power button for more than 4 seconds. If the hard drive LED turns on, check if the voltage selector located on the rear of the power supply, is set to the appropriate voltage. Proper voltage setting depends on your region. OR Press and hold the power button for less than 4 seconds. If the hard drive LED does not turn on then : 1. Check that the unit is plugged into a working AC outlet. 2. Open hood and check that the power button harness is properly connected to the system board. 3. Check that both power supply cables are properly connected to the system board. 4. Ensure the 4-wire power supply cable is seated into the connector on the system board. 5. If the problem persists, contact CIARA since the problem may necessitate the replacement of the power supply or the motherboard.

1.5.2 Solving hard drive problems

Solving hard drive problems		
Problem	Cause	Solution
Hard drive error occurs.	Hard disk has bad sectors or has failed.	Use a utility to locate and block usage of bad sectors. If necessary, reformat the hard disk.
Disk transaction problem.	Either the directory structure is bad or there is a problem with a file.	In Windows, right-click Start, click Explore, and select a drive. Select File > Properties > Tools. Under Error-checking, click Check Now.
Drive not found.	Cable could be loose.	Check cable connections.
Workstation seems to be locked up.	Program in use has stopped responding to commands.	Attempt the normal Windows “Shut Down” procedure. If this fails, press the power button for four or more seconds to turn off the power. To restart the workstation, press the power button again.

1.5.3 Solving display problems

Solving display problems		
Problem	Cause	Solution
Blank screen (no video).	Monitor is not turned on and the monitor light is not on.	Turn on the monitor and check that the monitor light is on.
	The cable connections are not correct.	Check the cable connection from the monitor to the workstation and to the electrical outlet. See section 1.3.
	You may have a screen blanking utility installed or energy saver features are enabled.	Press any key or click the mouse button and, if set, type your password.
	You are using a fixed-sync monitor and it will not sync at the resolution chosen.	Be sure that the monitor can accept the same horizontal scan rate as the resolution chosen.
	Workstation is in Last State mode.	Press the power button to resume from Last State mode.
CAUTION : When attempting to resume from Last State mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Power LED flashes six times, once every second, followed by a two second pause, and the workstation beeps six times.	Pre-video graphics error.	For systems with a graphics card : 1. Reseat the graphics card. Power on the system. 2. If the problem persists, contact CIARA since the problem may necessitate the replacement of the graphics card or the motherboard.
Dim characters.	The brightness and contrast controls are not set properly.	Adjust the monitor brightness and contrast controls.
	Cables are not properly connected.	Check that the graphics cable is securely connected to the graphics card and the monitor. See section 1.3

Blurry video or requested resolution cannot be set.	If the graphics controller was upgraded, the correct graphics drivers may not be loaded.	Install the video drivers included in the upgrade kit.
	Monitor is not capable of displaying requested resolution.	Change requested resolution.
The picture is broken up, or it rolls, jitters, or flashes.	The monitor connections may be incomplete or the monitor may be incorrectly adjusted.	1. Be sure the monitor cable is securely connected to the workstation. See section 1.3 2. In a two-monitor system or if another monitor is in close proximity, be sure the monitors are not interfering with each other's electromagnetic field by moving them apart. 3. 3. Fluorescent lights or fans may be too close to the monitor.
High-pitched noise coming from inside a flat panel monitor.	Brightness and/or contrast settings are too high.	Lower brightness and/or contrast settings.

1.5.4 Solving audio problems

Solving audio problems		
Problem	Cause	Solution
Sound does not come out of the speaker or headphones.	Software volume control is turned down.	Double-click the Speaker icon on the taskbar, and then make sure that Mute is not selected and use the volume slider to adjust the volume.
	The external speakers are not turned on.	Turn on the external speakers.
	External speakers plugged into the wrong audio jack.	Only one of the three audio ports is reserved for speakers.
	Workstation is in Last State mode.	Press the power button to resume from Last State mode.
CAUTION : When attempting to resume from Last State mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Sound cuts in and out.	Processor resources are being used by other open applications.	Shut down all open processor-intensive applications.
Workstation appears to be locked up while recording audio.	The hard disk may be full.	Before recording, make sure there is enough free space on the hard disk. You can also try recording the audio file in a compressed format.

1.5.5 Solving printer problems

Printer prints garbled information.	The correct printer driver for the application is not installed.	Install the correct printer driver for the application.
	The cables may not be connected properly.	Reconnect all cables.
	Printer memory may be overloaded.	Reset the printer by turning it off for one minute and then turn it back on.
Printer is offline.	The printer may be out of paper.	Check the paper tray and refill it if it is empty. Select online.
Printer will not print.	Printer is not turned on and online.	Turn the printer on and make sure it is online.
	The correct printer drivers for the application are not installed.	Install the correct printer driver for the application.
	If you are on a network, you may not have made the connection to the printer.	Make the proper network connections to the printer.
	Printer may have failed.	Run printer self-test.
Printer will not turn on.	The cables may not be connected properly.	Reconnect all cables and check the power cord and electrical outlet.

1.5.6 Solving keyboard and mouse problems

Solving keyboard and mouse problems		
Problem	Cause	Solution
The workstation does not recognize keyboard commands and typing.	Keyboard connector is not properly connected.	Connect keyboard correctly.
	Keyboard needs repairs.	Contact CIARA so that we may proceed to repairs.
	Workstation is in Last State mode.	Press the power button to resume from Last State mode.
CAUTION : When attempting to resume from Last State mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		
Cursor will not move using the arrow keys on the keypad.	The Num Lock key may be on.	Press the Num Lock key. The Num Lock light should not be on if you want to use the arrow keys.
Mouse does not respond to movement or is too slow.	Mouse connector is not properly plugged into the back of the workstation.	Connect mouse properly.
	Mouse needs repairs.	Contact CIARA so that we may proceed to repairs.
	Workstation is in Last State mode.	Press the power button to resume from Last State mode.
CAUTION : When attempting to resume from Last State mode, do not hold down the power button for more than four seconds. Otherwise, the workstation will shut down and you will lose your data.		

1.5.7 Solving hardware installation problems

Solving hardware installation problems		
Problem	Cause	Solution
A new device is not recognized as part of the system.	Device is not seated or connected properly.	Ensure that the device is properly and securely connected and that pins in the connector are not bent down.
	Cable(s) of new external device are loose or power cables are unplugged.	Ensure that all cables are properly and securely connected and that pins in the cable or connector are not bent down.
	Power switch of new external device is not turned on.	Turn off the workstation, turn on the external device and then turn on the workstation to integrate the device with the workstation system.
	When the system advised you of changes to the configuration, you did not accept them.	Reboot the workstation and follow the instructions for accepting the changes.
Workstation will not start.	Wrong memory modules were used in the upgrade or memory modules were installed in the wrong location.	See Sections 1.6.4 of the present Guide to verify if you have installed memory modules compatible to your system and if they were installed correctly. If the problem persists, Contact CIARA.
Power LED flashes five times, once every second, followed by a two second pause, and the workstation beeps five times.	Memory is installed incorrectly or is bad.	1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. 3. If a faulty module is found, Contact CIARA for the replacement of the module. 4. 4. If the problem persists, Contact CIARA for this may necessitate the replacement of the motherboard.
Power LED flashes six times, once every second, followed by a two second pause, and the workstation beeps six times.	Video card is not seated properly or is bad, or system board is bad.	For systems with a graphics card : 1. Reseat the graphics card. Power on the system. 2. If the problem persists, Contact CIARA for this may necessitate the replacement of the video card or the motherboard.

1.5.8 Solving memory problems

Solving memory problems		
Problem	Cause	Solution
System will not boot or does not function properly after installing additional memory modules.	Memory module is not the correct type or speed grade for the system or the new memory module is not seated properly.	Replace memory module with a module approved for your system. See Section 1.6.4 of the present Guide to verify if you have installed memory modules compatible to your system and if they were installed correctly.
Out of memory error.	You have run out of memory to run the application.	Check the application documentation to determine the memory requirements.
Insufficient memory error during operation.	Too many programs are being used.	Close any programs that you do not need.
	You have run out of memory for the application.	Check the memory requirements for the application or add more memory to the workstation.
Power LED flashes five times, once every second, followed by a two second pause, and the workstation beeps three times.	Memory is installed incorrectly or is bad.	1. Reseat DIMMs. Power on the system. 2. Replace DIMMs one at a time to isolate the faulty module. 3. If a faulty module is found, Contact CIARA for the replacement of the module. 4. 4. If the problem persists, Contact CIARA for this may necessitate the replacement of the motherboard.

1.5.9 Solving processor problems

Solving processor problems		
Problem	Cause	Solution
Poor performance is experienced.	Processor is hot.	1. Make sure the airflow to the workstation is not blocked. 2. Make sure the fans are connected and working properly (some fans only operate when needed) 3. Make sure the processor heatsink is installed properly. 4. Make sure the processor fan connector is properly connected to the CPU_FAN header on the motherboard. 5. Make sure sufficient thermal compound has been applied on the processor before the heat sink is put in place. This ensures that heat is drawn away from the processor to the heat sink. 6. 6. Replace the heat sink with more efficient model.
Power LED is always on OR Power LED flashes three times, once every second, followed by a two second pause.	Processor is not seated properly or not installed.	1. Check to see that the processor is present. 2. Reseat the processor. See section 1.6.3 of the present Guide for more information.
Workstation does not start.	4-pin ATX12V power connector is not connected to the motherboard.	Connect the 4-pin ATX12V power connector to the motherboard.
	Power supply does not meet the power requirements of the processor.	Replace power supply with a compatible model that meets or exceeds the power requirements of the processor.

1.5.10 Solving optical drive problems

In this User Guide, an optical drive is defined as a DVD-ROM or a DVD-R/RW.

Solving optical drive problems		
Problem	Cause	Solution
System will not boot from an optical drive.	Non-bootable CD or DVD in drive.	Try a bootable CD or DVD in the drive.
Optical drive is not detected by the system.	Drive is not connected properly or not properly configured.	Verify if the drive is correctly seated in the chassis. Verify if all cables have been correctly connected.
Movie will not play in the DVD drive.	Decoder software is not installed.	Install decoder software. Note : All CIARA systems equipped with a DVD drive at plant assembly include the necessary Decoder software.
Cannot eject disc from tray.	Disc not properly seated in the drive.	Turn off the workstation and insert a thin metal rod into the emergency eject hole and push firmly. Slowly pull the tray out from the drive until the tray is fully extended, then remove the disc.
The optical drive cannot read a disc or takes too long to start.	CD or DVD has been inserted upside down.	Re-insert the CD or DVD with the label facing up.
	The DVD drive takes longer to start because it has to determine the type of media played, such as audio or video.	Wait at least 30 seconds to let the DVD drive determine the type of media being played such as audio or video.
	CD or DVD disc is dirty.	Clean CD or DVD with a CD cleaning kit, available from most workstation stores.
Recording audio CDs is difficult or impossible.	Wrong or poor quality media type.	1. Try using a slower speed when recording. 2. Verify that you are using the correct media for the drive. 3. Try a different brand of media. Quality varies widely between manufacturers.

1.6 Component installation guide

1.6.1 Precautions against static electricity

ATTENTION: Components such as processors and memory may be permanently damaged by shocks arising from static electricity. It is hence important to wear antistatic, smock, gloves, shoes and ankle during the installation process. Here are a few examples of protective equipment.

Typical antistatic foot ground device.

Antistatic shoes with foot ground device.
Note that the floor surface is also antistatic.

Antistatic smock and gloves.
Note that the table surface is also antistatic.

1.6.2 Opening and accessing the chassis.

1.6.2.1 Opening and accessing the KRONOS chassis

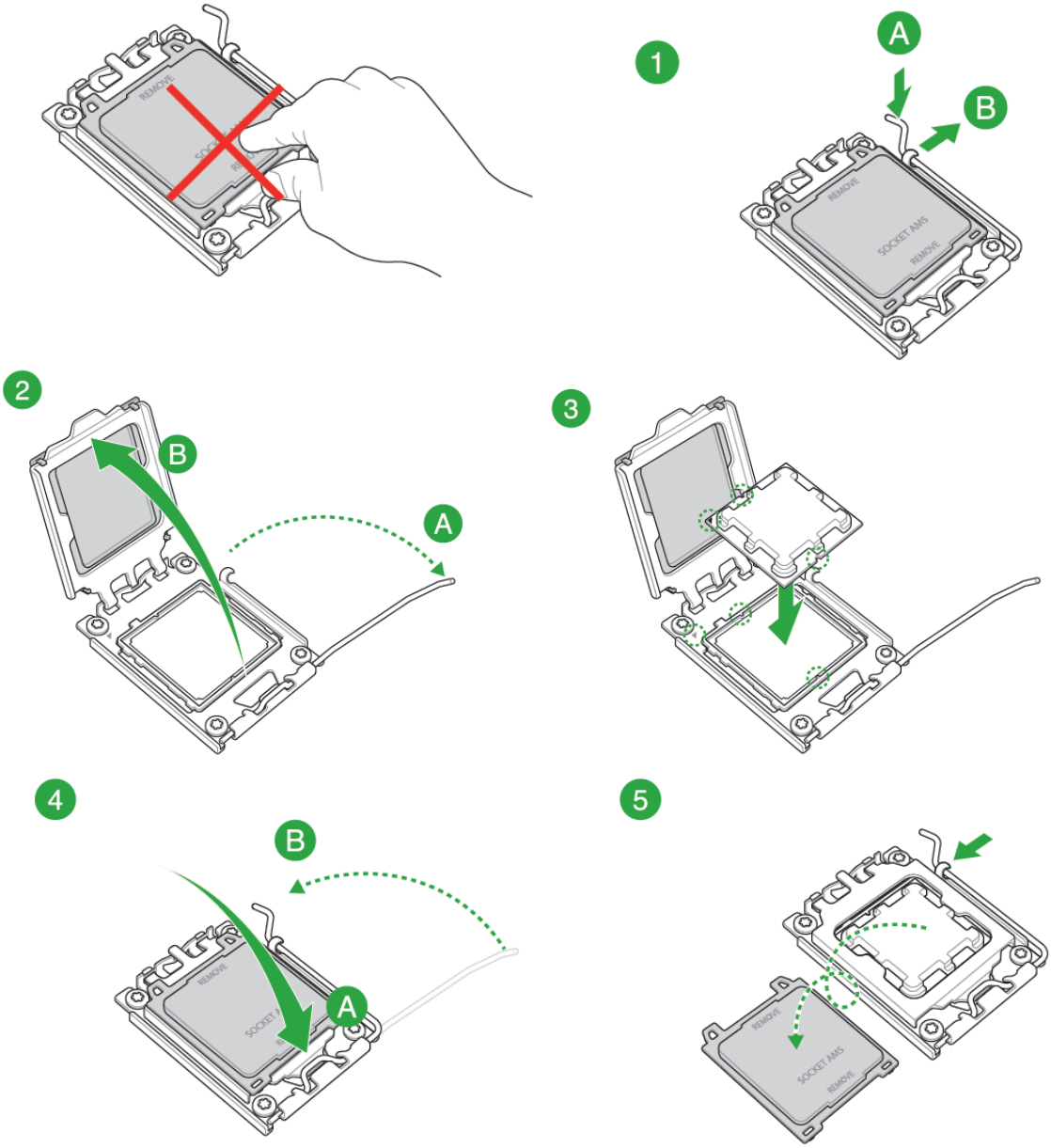
To open the side panel, unscrew the 2 thumb screws, then pull the panel backward and remove it.

The side panel is then removed from the chassis allowing for modular installation and chassis preparations.

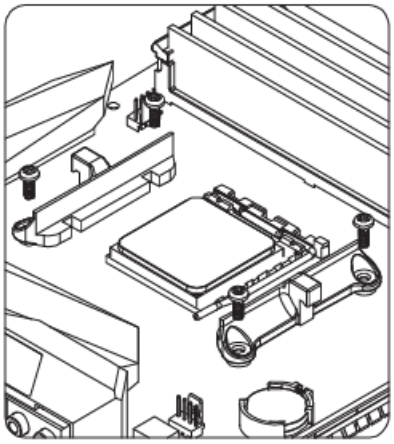
1.6.3 Insertion of the processor

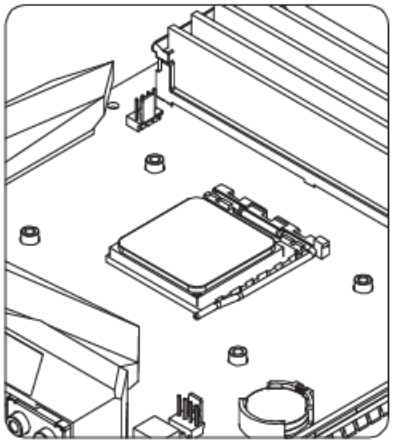
ATTENTION : Components such as the processor may be permanently damaged by shocks arising from static electricity. It is hence important to wear an antistatic bracelet during the installation process.

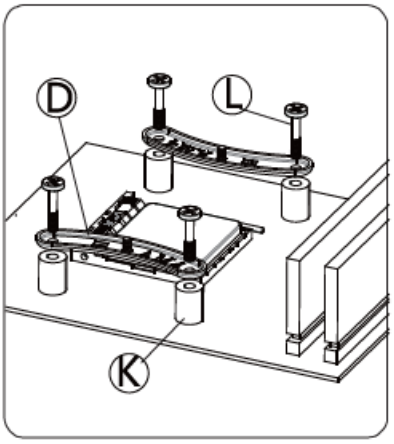
- Ensure that you install the correct CPU designed for Socket AM5 only.
- The CPU fits in only one correct orientation. DO NOT force the CPU into the socket to prevent bending the connectors on the socket and damaging the CPU.
- Ensure that all power cables are unplugged before installing the CPU.



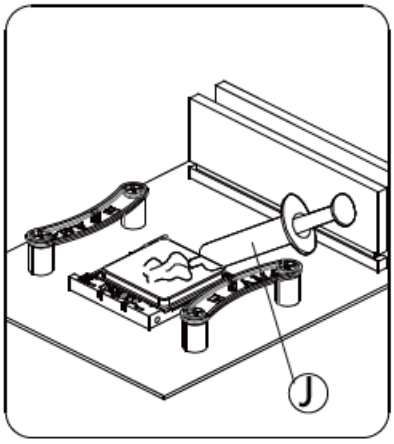
Install the processor cooling system.

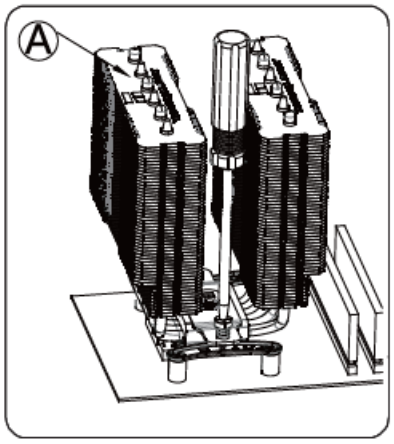


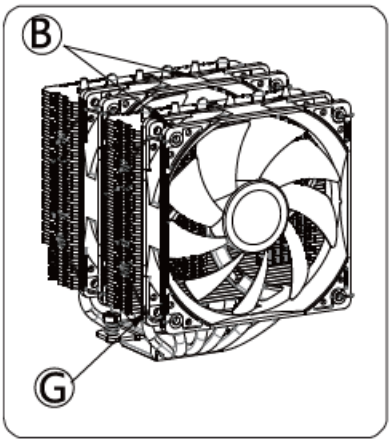




Remove AMD AM5 plastic brackets, keep the back plate, install AM5 metal brackets with AM5 screws and AMD plastic standoffs.







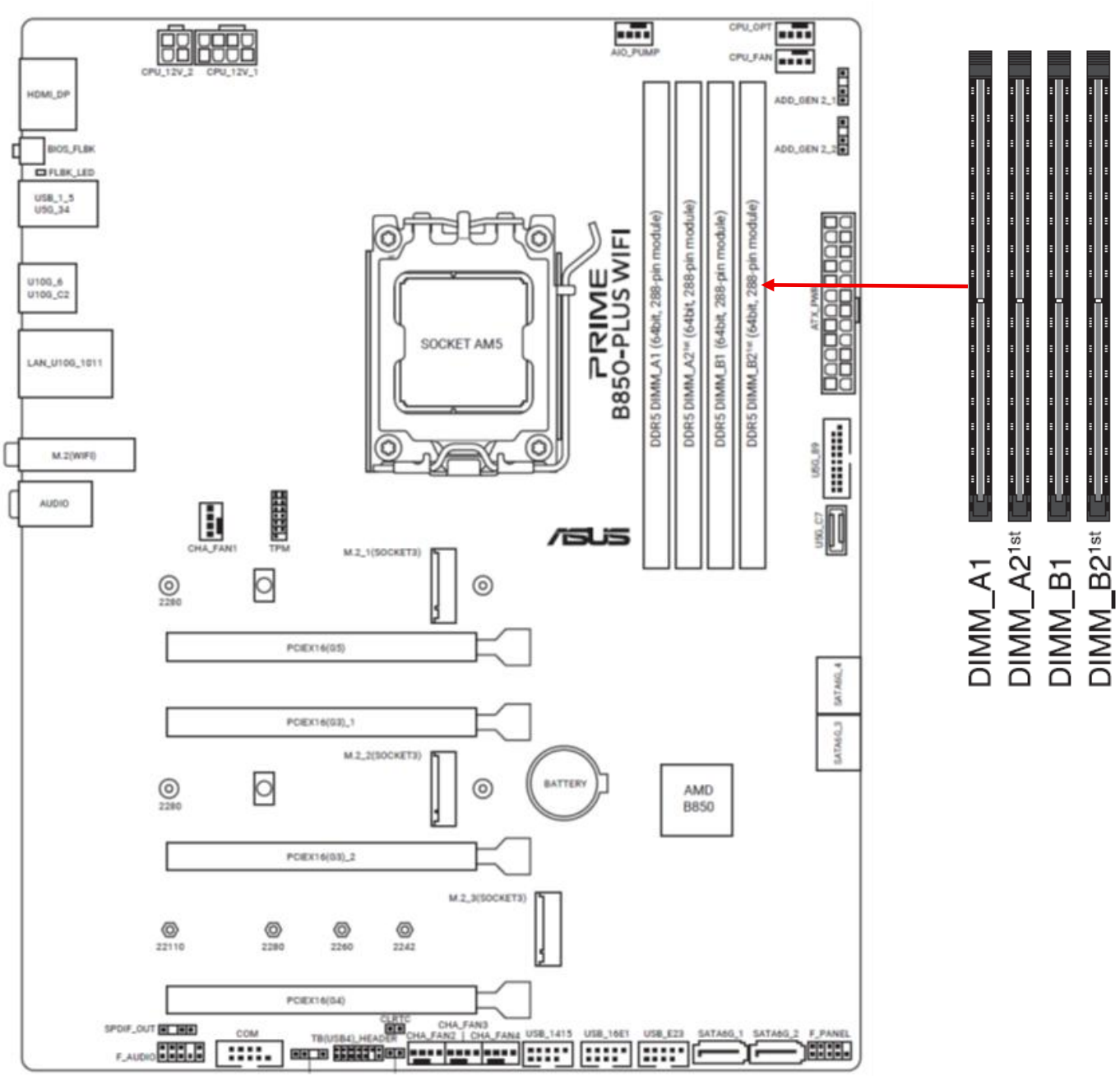
Apply thermal grease on CPU, install the heatsink with a screwdriver and install fans on heatsink with fan clips.

1.6.4 Installation of the memory modules

Increasing the computer's memory capacity is the most common intervention carried out on a CIARA computer. This involves adding DDR5-type SDRAM (Synchronous Dynamic Random Access Memory) main memory. Please note that this memory is incompatible with the previous 184-slot DDR memory technologies, DDR2, DDR3 and DDR4.

You can install DDR5 CCE register memory modules in DDR5 slots.
These memory modules are inserted into slots called memory slots on the motherboard. CIARA's KRONOS 540-G4 workstation is equipped with eight memory slots.

NOTE
If you are planning to increase your workstation's memory please contact us to ensure that you select the memory that meets our specifications, otherwise errors could result.



Memory configurations				
	DIMM			
	A1	A2 1st	B1	B2 1st
1 DIMM		✓		
2 DIMMs		✓		✓
4 DIMMs	✓	✓	✓	✓

You may install ECC and Non-ECC DDR5 DIMMs into the DIMM sockets.

NOTE:

- The default memory operation frequency is dependent on its Serial Presence Detect (SPD), which is the standard way of accessing information from a memory module. Under the default state, some memory modules for overclocking may operate at a lower frequency than the vendor-marked value.
- For system stability, use a more efficient memory cooling system to support a full memory load or overclocking condition.
- Always install the DIMMs with the same CAS Latency. For an optimum compatibility, we recommend that you install memory modules of the same version or data code (D/C) from the same vendor. Check with CIARA to get the correct memory modules.

The CIARA KRONOS 540-G4 workstation supports the following types of memory configurations :

• Dual channel (Interleaved) mode. This mode is equivalent to dual channel bandwidth operation real world applications. Dual channel mode is enabled when the installed memory capacities of both DIMM channels are equal. Technology and device width can vary from one channel to the other but the installed memory capacity for each channel must be equal. If different speeds DIMMs are used between channels, the slowest memory timing will be used.

• Single channel (Asymmetric) mode. This mode is equivalent to single channel bandwidth operation for real world applications. This mode is used when only a single DIMM is installed or the memory capacities are unequal. Technology and device width can vary from one channel to the other. If different speeds DIMMs are used between channels, the slowest memory timing will be used.

Minimum memory configuration for the system is 16 GB. The maximum memory configuration is 256 GB.

Install a DIMM module into a memory socket on the system main board, as follows :

First, make sure the power is turned Off and the power cord is unplugged. Then remove the case cover.

Align the module so that the pin 1 marking on the module corresponds to the DIMM socket pin 1 marking. The module can only fit in the socket in one way ; you cannot insert the DIMM incorrectly.

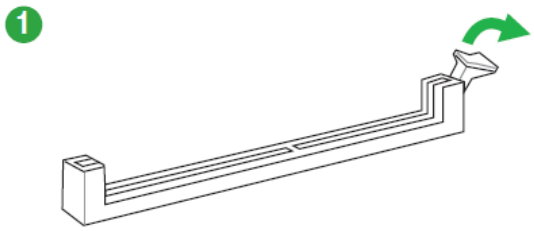
Slide the module into the socket at a 90-degree angle to the main board. (See figure below)

After inserting the DIMM module completely into the socket, push up on the socket latches securing the DIMM into place.

NOTE
To release the memory module, push both latches down and carefully rock the module away from the main board. You should then be able to pull the module up and out of the socket.

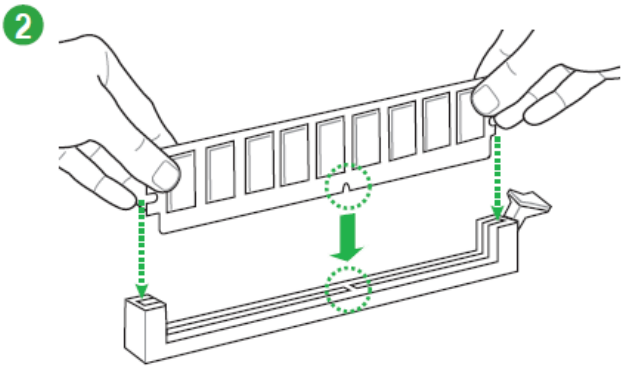
ATTENTION : Components such as memory may be permanently damaged by shocks arising from static electricity. It is hence important to wear an antistatic bracelet during the installation process.

1- To install a memory module, you need to push the latch aside.

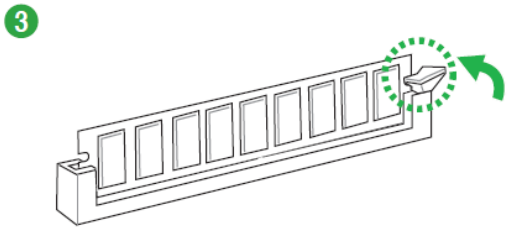


Next, align the memory module with the memory slot so that the pin sets on the module match the connector sets on the slot. The memory module can only be inserted into the slot one way. It is not possible to insert it incorrectly.

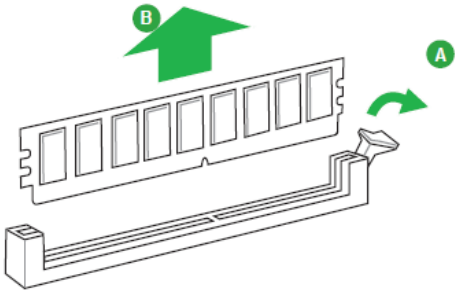
2- Slide the memory module into the memory slot at a 90-degree angle to the motherboard.



3. When you gently press down on the memory module, you'll clearly hear the sound the safety latch makes as it snaps shut to secure your new memory module in place.



4. To remove a memory module, press the safety latch and slowly pull the module upward. You should now be able to remove the memory module.



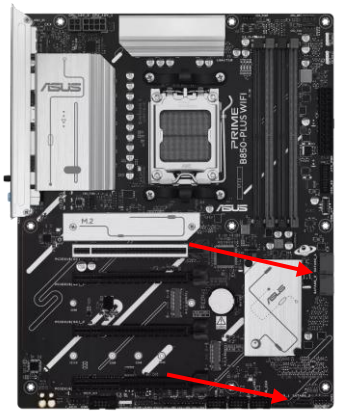
1.6.5 Installation of the optical drive module

The optical drive is removed or inserted into the front end of the chassis.

To remove the drive, unscrew the two thumb screws. To secure the drive, screw them.

Connect the power and SATA cables to the drive and motherboard.

The SATA cable must be connected to one of the four SATA ports.



1.6.6 M.2 device installation

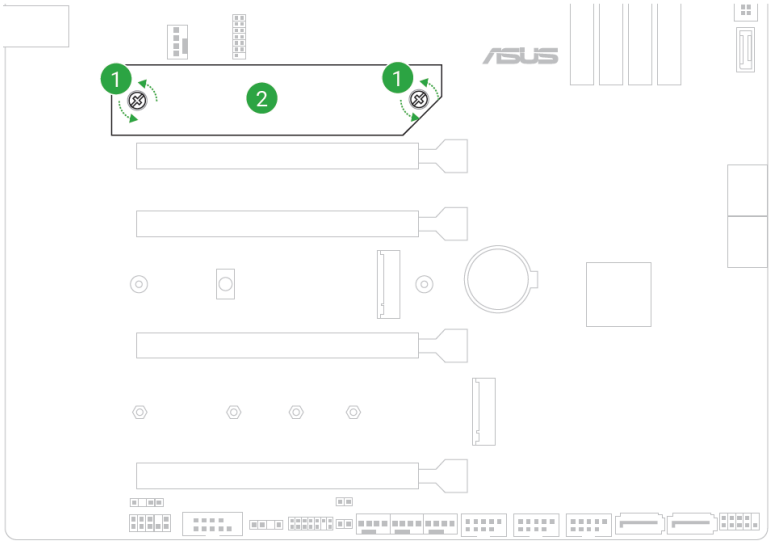
NOTE :

- The illustrations only show the installation steps for selected M.2 slots, the steps are the same for the other M.2 slots.
- Use a Phillips screwdriver when removing or installing the screws or screw stands mentioned in this section.
- If the thermal pad on the M.2 heatsink becomes damaged, we recommend replacing it with a thermal pad with a thickness of 1.25mm.
- Supported M.2 type varies per motherboard.

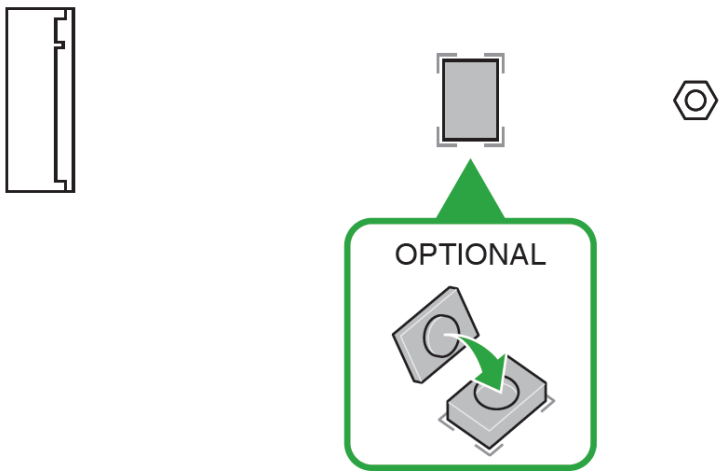
Installing an M.2 module to the M.2_1 / M.2_2 slot

1. Loosen the screws from the M.2 heatsink.
2. Lift and remove the heatsink.

NOTE : Only follow the steps above if a heatsink is pre-installed.

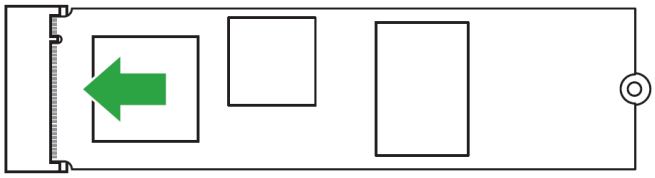


3. (optional) Install the bundled M.2 rubber if you are installing a single sided M.2 module. DO NOT install the bundled M.2 rubber when installing a double-sided M.2 module.



4. Install your M.2 module to the M.2 slot.

IMPORTANT! Ensure that there is nothing obstructing your M.2 module when installing the M.2 module to the M.2 slot.

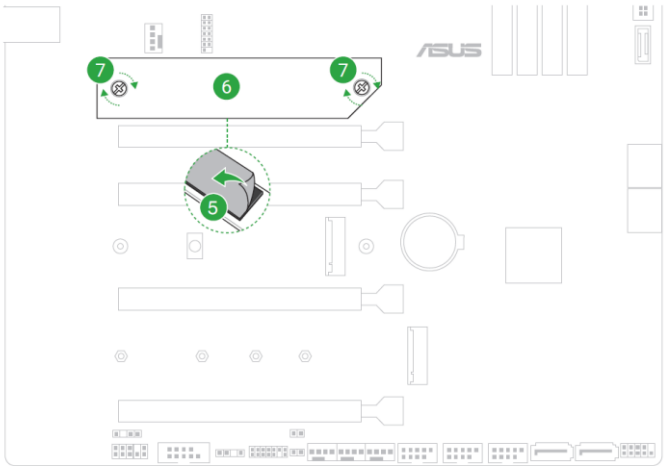


5. Remove the plastic film from the thermal pads on the bottom of the heatsink.

NOTE : If the thermal pad on the M.2 heatsink becomes damaged, we recommend replacing it with a thermal pad with a thickness of 1.25mm.

6. Replace the heatsink.

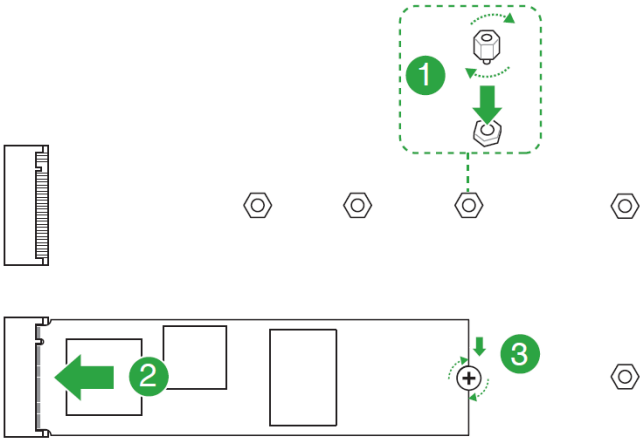
7. Secure the heatsink using the screws on the heatsink.



NOTE : The flexible M.2 heatsink can be installed on either M.2_1 slot or M.2_2 slot.

<u>Installing an M.2 module to the M.2_3 slot</u>

1. Install the bundled screw stand to the M.2 length screw hole you wish to install your M.2 module to.
2. Install your M.2 module to the M.2 slot.
3. Secure your M.2 module using the bundled screw stand's screw.



1.6.7 Chassis Characteristics

Tower Specifications	
Motherboard Type :	ATX (305 x 244 mm) (12"x 9.6")
Drive Bay Space :	Ext. 3 x 5.25" Int. 3 x 3.5" and 2 x 2.5"
Power Source :	1250 W (80 PLUS® Platinum)
Expansion slots	4 PCIe slots
Dimensions :	528 mm H x 205 mm W x 500 mm D (54.12 L)
Casing fan :	1 x 120 mm rear / 1 x 120 mm front
Security :	Kensington slot and intrusion detector
Metal thickness :	0,7 mm

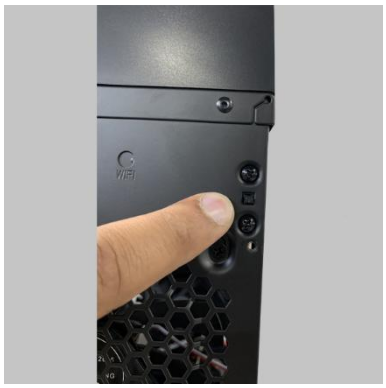
Front

Rear

Open side

Kensington slot

Intrusion detector



Drive bays

2.0 Certification and declaration

All CIARA KRONOS 540-G4 models run the following operating systems software :

- Microsoft® Windows 11.
- RedHat® Linux

CIARA KRONOS 540-G4 models will operate on Windows Server 2022, Windows Server 2025 and all Linux based networks, provided that appropriate network adapter cards and application software have been installed.

CIARA is licensed to supply the Windows 11 operating systems software with its CIARA KRONOS 540-G4 workstations. A package of the latest version of Windows software and a manual is included with the CIARA KRONOS 540-G4.

If you have purchased a Windows license with your CIARA KRONOS 540-G4 system, please abide by the Copyright and License terms and conditions that are enclosed with this software package. These require that the Windows software may only be used and installed on the CIARA KRONOS 540-G4 workstation with which they were purchased.

You may make copies of this Windows software solely for your own back-up purposes.

All CIARA KRONOS 540-G4 series workstations are certified by Intertek Canada and United States and meet or exceed the Class B limitations for Radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of Industry Canada.

2.1 Radio interference precautions

To minimize the likelihood of interference being caused to any radio or TV equipment, CIARA recommends that shielded cables with metal RFI/EMI connector hoods be used to connect all peripheral devices to the CIARA KRONOS 540-G4 workstation.

In the event that perceptible interference occurs, then please ensure that a ground connection is made from any peripheral devices to the workstation chassis. However, a separate ground connection is not necessary if a shielded cable is used to connect the workstation with any peripheral device.

Very often, simply moving the workstation equipment to another location a few feet away will remove any signs of interference to television reception.

Under no circumstances should any "radio-type" modems be attached to the workstation, unless a license has been obtained from the appropriate regulatory authorities (in Canada - the Department of Communications of Industry Canada, and in the U.S.A. - the Federal Communications Commission).

2.2 Declaration of conformity

We, Manufacturer/Importer

CIARA
9300 Trans-Canada Highway
Montreal, Quebec H4S 1K5
Tel : (514) 798-8880
Fax : (514) 798-8889

Declare that the product

Workstation System
CIARA KRONOS 540-G4

Is in conformity with the ICES-003 Canadian Standard and Part 15 of the FCC Rules.

Simon Ahdoot, President
CIARA

2.3 FCC Information to User

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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 instruction guide, may cause harmful interference to radio communications. However, there are no guarantees that radio 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 or more of the following measures:

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

Warning

Changes or modifications not expressly approved by CIARA could void the user's authority to operate the equipment.
This equipment is equipped with a shielded 3-wire power cord and plug. Use this power cord in conjunction with a properly grounded electrical outlet to avoid electrical shock and to reduce radio frequency interference that may emanate from the power cord.
We recommend you use shielded remote I/O cables, with properly grounded shields and metal connectors in order to reduce radio frequency interference, which may emanate from these cables.

2.4 ENERGY STAR®

CIARA KRONOS 540-G4 workstations are ENERGY STAR® 9.0 qualified.
ENERGY STAR® is the trusted, government-backed symbol for energy efficiency helping us all save money and protect the environment through energy-efficient products and practices. Get more information at :
http://www.energystar.gov/
The ENERGY STAR® label was established to :

- Reduce greenhouse gas emissions and other pollutants caused by the inefficient use of energy ; and
- Make it easy for consumers to identify and purchase energy-efficient products that offer savings on energy bills without sacrificing performance, features, and comfort.
  To earn the ENERGY STAR® label CIARA KRONOS 540-G4 workstations meet the energy efficiency requirements set forth in ENERGY STAR® product specifications. EPA establishes these specifications based on the following set of key guiding principles :
- The CIARA KRONOS 540-G4 workstations contribute significant energy savings nationwide.
- The CIARA KRONOS 540-G4 workstations deliver the features and performance demanded by consumers, in addition to increased energy efficiency.
- If the CIARA KRONOS 540-G4 workstations cost more than a conventional, less-efficient workstation, purchasers will recover their investment in increased energy efficiency through utility bill savings, within a reasonable period of time.
- Energy efficiency can be achieved through broadly available, non-proprietary technologies offered by more than one manufacturer.
- Product energy consumption and performance can be measured and verified with testing.
- Labeling would effectively differentiate CIARA KRONOS 540-G4 workstations and be visible for purchasers.

NOTE : The default power management settings have been selected for compliance with ENERGY STAR® (within 10 minutes of user inactivity for the display, within 30 minutes of user inactivity for the workstation) and are recommended by the ENERGY STAR® program for optimal energy savings.

3.0 ONE YEAR LIMITED WARRANTY

CIARA customarily provides a one (1) year, 100% parts and labour non-transferable and limited warranty to all Original Purchasers of its KRONOS 540-G4 series workstations. The warranty terms are normally Return-to-Depot. This one-year limited warranty starts on the "Date of Delivery". The warranty covers any optional product(s) manufactured and sold by CIARA and installed by CIARA in a KRONOS 540-G4 series System Unit. This one-year limited warranty, however, does not apply to any other item not internally installed in the system unit by CIARA, or to any subsequent owners.

All CIARA customers may elect to purchase an extended three-year warranty additional to the standard one year warranty. If you are interested in purchasing a warranty extension, please contact your CIARA representative within one month of receipt of your system. If you have purchased a different type of warranty, or an extension to the standard warranty, you will need to provide the CIARA Service Contract Number to the Customer Support representative when placing a call for service or support. It is advisable to affix this Contract Number to the machine in the event that service is required.
In lieu of either the On-Site or Return-to-Depot portions of the warranty, CIARA reserves the right to directly ship certain customer replaceable components as replacement products for failed components. When this option is invoked, the customer will be asked to replace the component(s) and return the original failed component to CIARA within five (5) working days.

3.1 Procedures to be followed for service during the warranty period :

Refer to the back of the casing and record the model number and serial number from the Machine Identification Label.

Make sure that you know the name and version number of the operating system that you are using, what accessory expansion cards you have installed in your system, and that you have the system Owner's and User's Guides ready at hand.

Call CIARA Support Centre at 877-242-7272.

Provide the workstation system's model number and serial number. If you have purchased an extended warranty, please provide the Service Contract number as well. The Customer Service Representative will verify your warranty status immediately, and then pass the call to the dedicated PC Support Group for further action.

Answer any questions from the support personnel to the best of your ability : The support group may ask you to provide additional information, run specific commands, change or verify parameter settings, etc.

The service support personnel may be able to rectify the problem over the telephone, at which time you should ask for and record the unique call number for your own records. If the support group is unable to resolve the problem remotely, an On-Site call may be generated or additional information will be provided to you to obtain a Returned Merchandise Authorization Number (RMA), depending upon the type and current status of your warranty.

Make a back-up copy of all of the files on your hard disk before returning your workstation for service. CIARA is not responsible for the loss or damage of any data on the returned system. In some cases, hard disks may need to reformatted or replaced. It is the responsibility of the user to ensure data is backed up prior to shipment to CIARA.

Use the original box with its foam protective inserts whenever you return your workstation to us for service. CIARA is not responsible for shipping damage due to poor packaging. Include your phone number and a list of times when you may be contacted.

If you have any questions please contact us using our web site at :
http://www.ciaratech.com

3.2 Limited Warranty

CIARA warrants the product ("Product") you have purchased from CIARA or from an authorized CIARA reseller to be free from defects in materials and/or workmanship under normal use during the warranty period applicable to the product as defined by the standard warranty purchased with the Product, or any additional warranties and/or warranty extensions purchased through CIARA or an authorized CIARA reseller. The warranty period commences on the date of delivery. This warranty extends only to you, the original Purchaser. It is not transferable to anyone who subsequently purchases leases or otherwise obtains the Product from you. It excludes expendable (consumable) parts.

During the warranty period, CIARA will, at no additional charge, repair or replace defective parts with new or serviceable used parts that are equivalent to new parts in performance, form, fit and function. All exchanged parts and Products replaced under this warranty will become the property of CIARA. If after repeated efforts, CIARA is unable to restore the Product to good working order, you may claim the purchase price of the Product. This Limited Warranty also does not extend to any Product that has been damaged or rendered defective (i) as a result of the use of the Product other than for its intended use, failure to use the Product in accordance with the User's Guide which accompanies the Product or other misuse, abuse or negligence to the Product ; (ii) by the use of parts not manufactured or sold by CIARA ; (iii) by modification of the Product ; (iv) as a result of service by anyone other than CIARA or an Authorized CIARA Service Provider ; or (v) improper transportation or packaging when returning the Product to CIARA or an authorized CIARA Service Provider.

This Limited Warranty does not extend to expendable (consumable) parts. Expendable parts are those items that during the normal course of product usage will require periodic replacement, e.g., printer cartridges, batteries, diskette/tape head cleaning kits, etc.

Regarding any CIARA supplied software which accompanies the Product, CIARA warrants the media (e.g., hard disk, CD ROM) upon which this software is delivered to be free from defects in material and/or workmanship for a period of ninety (90) days from the date of purchase by the end-user. In the event of defective media, as your exclusive remedy and the sole liability of CIARA, CIARA will replace the defective media at no charge to you if you return the defective media, with prepaid shipping, to CIARA within the warranty period.

Except for this media warranty, this software is provided "As is" and CIARA disclaims any and all warranties, express or implied, including but not limited to any implied warranty of non-infringement of third party rights, merchantability or fitness for a particular purpose. CIARA does not warrant that the operation of this software will be uninterrupted or error free or that this software will meet your requirements.
CIARA is not responsible for damage to or loss of any programs, data, or removable storage media. You are responsible for saving (backing up) any programs, data or removable storage media.

EXCEPT FOR THE WARRANTIES SET FORTH HEREIN, CIARA DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED OR STATUTORY, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY IMPLIED WARRANTIES THAT MAY BE IMPOSED BY APPLICABLE LAW ARE LIMITED TO THE TERMS OF THIS LIMITED WARRANTY. IN NO EVENT SHALL CIARA BE LIABLE FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF BUSINESS, PROFITS, DATA OR USE, WHETHER IN AN ACTION IN CONTRACT OR TORT OR BASED ON A WARRANTY, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THE PRODUCT OR ANY CIARA SUPPLIED SOFTWARE WHICH ACCOMPANIES THE PRODUCT, EVEN IF CIARA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. YOU AGREE THAT REPAIR, REPLACEMENT OR REFUND, AS APPLICABLE, UNDER THE WARRANTY SERVICES DESCRIBED HEREIN ARE YOUR SOLE AND EXCLUSIVE REMEDIES WITH RESPECT TO ANY BREACH OF THE CIARA LIMITED WARRANTY SET FORTH HEREIN.

Some provinces (or states) do not allow the exclusion or limitation of incidental or consequential damages for consumer products, and some provinces (or states) do not allow limitations on how long an implied warranty lasts. In such provinces (or states), the exclusions or limitations of this Limited Warranty may not apply to you.

This Limited Warranty gives you specific legal rights. You may also have other rights that vary from province to province and state to state. You are advised to consult applicable provincial or state laws for a full determination of your rights.

3.3 Documenting your workstation

CIARA recommends that you record the information about your workstation and keep a copy of this in a safe but readily accessible location.

Please keep your equipment log up to date and include a copy of it whenever your equipment is returned to **CIARA** for servicing.

The equipment log is also helpful if your **CIARA** workstation is lost, stolen, or damaged. It can serve as your record of when the equipment was placed in service, and the dates of all equipment upgrades and configuration changes.

Record the model and serial numbers of the system components, dates of component removal and/or replacement. Be sure to include the same information for any components added to the system, such as fixed disk, add-in boards, or printers. Record the model and serial numbers of the **CIARA** System. The model and serial numbers of the System Unit are recorded on the label attached to the rear cover.

The location of serial numbers on add-in boards, fixed and floppy disk drives, and external equipment, such as video displays or printers, varies from one manufacturer to another, but should be easily recognizable.

3.3.1 Base System Details

Component	Purchase date	Model	Serial number
System Unit			
Motherboard			
Memory			
Processor			
Video Card			
Sound Card			
LAN Card			
Hard Drive			
DVD-ROM Drive			
DVD-Writer			
Mouse			
Keyboard			
Monitor			
Power supply			
Chassis fan(s)			

4.0 Technical product specification CIARA KRONOS 540-G4

This is the User's Guide for the CIARA KRONOS 540-G4 family of workstations. The KRONOS 540-G4 is a series PCI Express bus workstations that use AMD Ryzen™ 9000 & 8000 & 7000 Series Desktop Processors, socket AM5.

View all compatible AMD processors at : https://www.asus.com/ca-en/motherboards-components/motherboards/prime/prime-b850-plus-wifi/helpdesk_knowledge?model2Name=PRIME-B850-PLUS-WIFI .

All versions utilize essentially the same Set-Up and configuration procedures and the same Asus BIOS.

Other processors may be supported in the future. This board is designed to support processors with a maximum wattage of 350 W. The processors listed are only supported when falling within the wattage requirements of the PRIME B850-PLUS WIFI board.

With care and proper operating procedure, all CIARA KRONOS 540-G4 workstations will give many years of trouble-free service. The CIARA KRONOS 540-G4 can be configured for a wide range of special purpose, business, industrial and scientific applications.

The information provided in this guide is all that you should need to set up and use your CIARA KRONOS 540-G4 workstation. We offer Technical Reference Manuals for sale to knowledgeable users.

Please note that any modifications or additions not made by CIARA or our authorized personnel, to any CIARA KRONOS 540-G4 that is under Warranty, such as your insertion or removal of adapter cards not supplied and installed by CIARA could cause damage and may void the Warranty.

Please do not experiment if you are unsure and remember we are ready to answer your questions. Please call us first.

Processor :	AMD Ryzen™ 9000, 8000 or 7000 Series , socket AM5. View all compatible Intel® processors https://www.asus.com/ca-en/motherboards-components/motherboards/prime/prime-b850-plus-wifi/helpdesk_qvl_cpu?model2Name=PRIME-B850-PLUS-WIFI
System Board :	Asus® PRIME B850-PLUS WIFI, ATX form factor main board uses AMD B850 chipset
BIOS :	Asus Flash BIOS standard, with ACPI, APM, ENERGY STAR®, DMI, Plug & Play and SMBIOS features.
RAM :	DDR5 288 pin up to 6400 MT/s, non-ECC or ECC Up to 256 GB, 4 DIMM
Expansion slots :	1 PCIe 5.0 x16 slot (full x16 mode) if you're using an AMD Ryzen 9000 or 7000 series processor. OR 1 PCIe 4.0 x16 slot (throttled to x8 or x4 mode depending on the model) if you're using an AMD Ryzen 8000 series processor. 1 PCIe 4.0 x16 slot (which operates in x4 mode via electrical wiring). 2 PCIe 3.0 x16 slots (which operate in x1 mode via electrical wiring)
Top I/O ports :	1 USB 3.2 5 Gb/s Type C® ports 2 USB 3.2 5 Gb/s Type A ports 1 USB 2.0 Type A port 2 audio jacks
Rear I/O ports :	1 USB 10 Gb/s Type-C® port 3 USB 10 Gb/s Type-A ports 2 USB 5 Gb/s Type-A ports 2 USB 2.0 Type-A ports 1 network ports (RJ45) 3 audio jacks 1 HDMI port, 1 DisplayPort 2 WiFi 6E antenna ports
Internal headers :	1 Thunderbolt™ (USB4®) header 5 USB 2.0 ports 4 SATA 6 Gb/s ports 1 TPM header 1 serial port header
Storage :	Total supports 3 M.2 slots : 1 M.2 slot (Key M), type 2280 (PCIe 5.0 x4 mode) (7000 and 9000 series) or 1 M.2 slot (Key M), type 2280 (PCIe 4.0 x4/x2 mode) (8000 series) 1 M.2 slot (Key M), type 2280 (PCIe4.0 x4 mode) 1 M.2 slot (Key M), type 2242/2260/2280/22110 (PCIe 4.0 x2 mode) 4 SATA 6 Gb/s ports - RAID 0, 1, 5, 10 (9000 series) / RAID 0, 1 (8000 series) / RAID 0, 1, 10 (7000 sries)
Drives :	Vast choice of optical drives. SATA hard disk and SSD drives ; M.2 or U.2 SSD drive.
Casing :	Tower, 1250 W 80 PLUS Platinum power supply ; three external 5 ¼” bays ; three internal 3.5” + two 2.5” bays.
Video :	AMD Radeon™ graphic engine Supports up to 2 displays simultaneously (1 HDMI 2.1 and 1 DisplayPort 1.4) 1 PCI Express 5.0 or 4.0 x16 slot for discrete add-on controller
Audio :	Realtek® 8-channel high definition audio codec. Built-in speaker for the recreation of Windows generated sound events
Network :	1 Realtek® Ethernet 2.5 Gb/s that support Wake-On-LAN and PXE Boot
Wireless and Bluetooth :	2x2 Wi-Fi 6E (802.11ax) and Bluetooth 5.3 with external antenna
Certification :	CSA, FCC Class B, Microsoft® Windows® 11 WHQL, EPEAT Gold, compliant with ENERGY STAR® 9.0 guidelines for energy efficiency.

4.1 Upgrading

As the purchaser of a powerful state of the art CIARA KRONOS 540-G4 workstation you have no doubt decided on the features and upgrade capabilities that you might wish to add to your workstation. There are many exciting possibilities for upgrading your CIARA KRONOS 540-G4. CIARA has extensively tested a range of potential upgrade and enhancement options that range from hard disks to various optical drives. Some of these work much better than others and we are able to recommend the ones that work best with your CIARA KRONOS 540-G4 workstation.

CIARA will be pleased to help you choose the most reliable and compatible system components when the time comes to upgrade and enhance your CIARA KRONOS 540-G4 workstation in a manner that will preserve the Warranty. Table below summarizes the general features of the various types of upgrades and enhancements that may be added to any CIARA KRONOS 540-G4.

UPGRADES AVAILABLE	CIARA KRONOS 540-G4
Serial ATA Hard Disk Drives 6 Gb/s	Several hard disks ranging from 1 to 24 TB
Solid State Disk Drives (SSD)	Several SATA 6 Gb/s SSD disks ranging from 250 GB to 8 TB
M.2 Solid Stat Drives	Several SATA 6 Gb/s SSD disks ranging from 250 GB to 8 TB
Optical Drives	Internal & external Blu-ray drives, Blu-ray writers, DVD drives and DVD writers may be added.
PCI Express x16 Video Controller	Video controllers compliant with the PCI Express x16 standard, Gen 2, 3, 4 and 5
System Memory	Up to 256 GB DDR5, ECC or non-ECC, 288 pin, up to 6400 MT/s, 4 slots
Disk Controllers	Four SATA 6 Gb/s ports. Two SlimSAS slots supports PCIe 4.0 x4 mode NVMe device RAID 0, 1, 5, 10 (9000 series) / RAID 0, 1 (8000 series) RAID 0, 1, 10 (7000 series) Several PCI Express bus RAID adapter cards are available.
Hi Res. Monitors	24 to 48 inches LCD monitors with LED backlighting.
Network Adapters	Several PCI Express bus network adapter cards for Ethernet transmission media are available.

4.2 Networking

Among the more exciting applications for extending the power and utility of CIARA KRONOS 540-G4 workstations is to connect them (using communication links and adapter cards) with other workstation systems to form workstation / communication networks in order to share software resources (such as databases) and hardware resources (such as printers and scanners). This is referred to as Local Area Networking (LAN) and Wide Area Networking (WAN).

All CIARA KRONOS 540-G4 workstations can be networked running the Microsoft Windows and Linux Operating Systems.

CIARA System Integration and Networks Group would be pleased to provide you with turnkey solutions for all your Windows Server 2022, Windows Server 2025 and Linux networking needs. We have trained and certified experts on staff to help you.

4.3 The CIARA KRONOS 540-G4 BIOS

4.3.1 BIOS configuration and installation

The purpose of this section is to describe the procedures to set up the BIOS configuration options of your CIARA KRONOS 540-G4 workstation. All this work is done for you at the CIARA factory enabling the system to be ready to start on Power on. However, we are describing this procedure as a means of transparency.

Every CIARA KRONOS 540-G4 is now delivered with the latest version of the Asus BIOS (as of the manufacturing date). The Asus BIOS is a set of permanently recorded software that gives the CIARA KRONOS 540-G4 its fundamental operational characteristics.

The Asus BIOS is made up of code that provides the device-level control for the major I/O devices in the CIARA KRONOS 540-G4 workstation system. It contains a set of routines (called POST, for Power-On Self-Test) that tests your CIARA KRONOS 540-G4 system when you turn it on.

It will be necessary to run the Set-Up program if you do any of the following:

- Replace the battery,
- Replace the processor,

In any of these cases you must use the Set-Up program to modify the system parameters to reflect the options actually installed in your system.

To use the Set-Up program proceed as follows:

Turn on or re-boot (press simultaneously <Ctrl>, <Alt>, <Del>) your CIARA KRONOS 540-G4 system. After the Asus BIOS performs a series of diagnostic checks, the following message appears:

Press <Del> to enter Set-Up.

Once in Bios Menu choose a Set-Up option with the arrow keys and press < ↵ > to select.

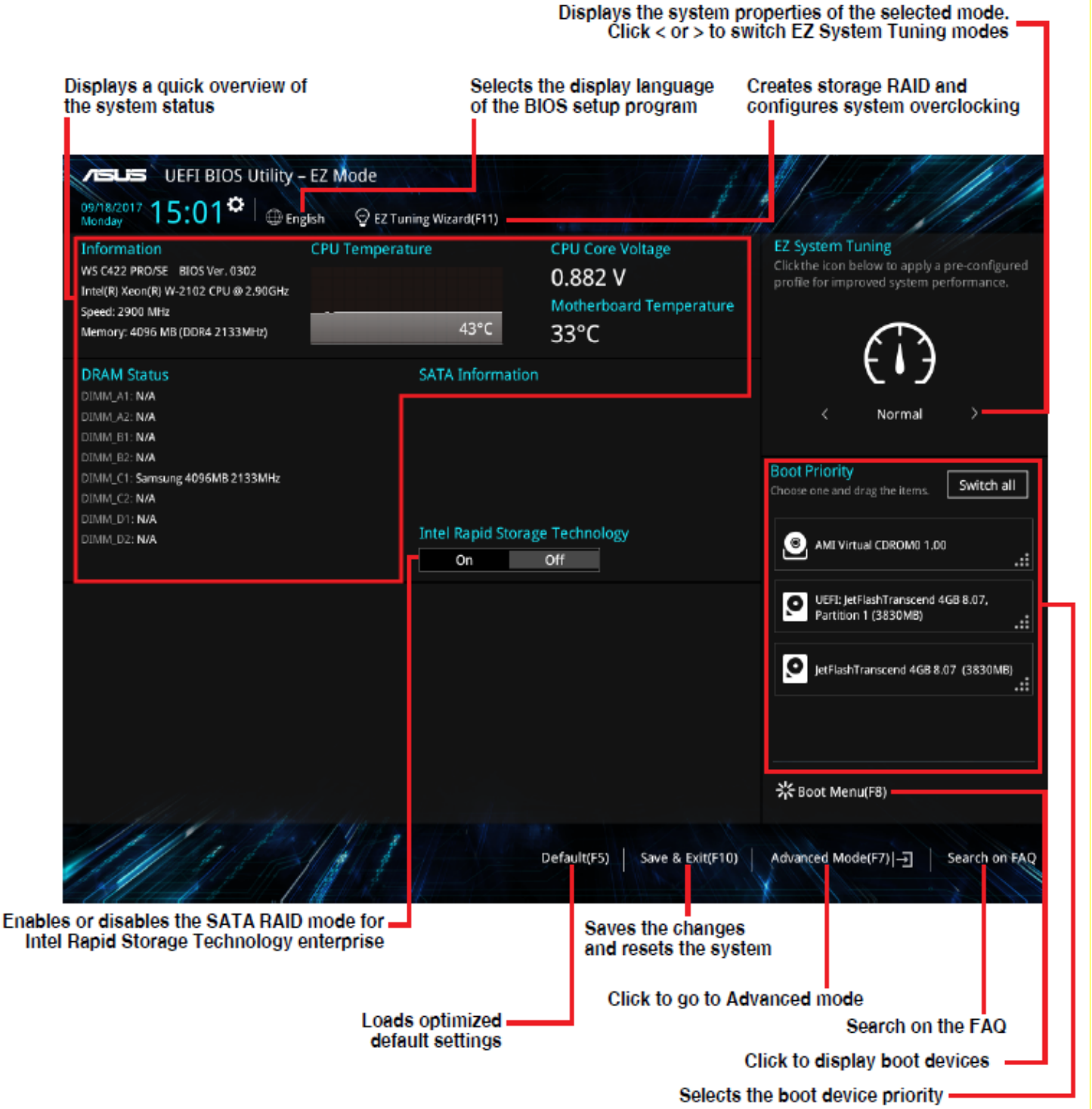
4.3.2 BIOS set-up program menu bar

My Favorites	For saving the frequently-used system settings and configuration.
Main	For changing the basic system configuration
Advanced	For changing the advanced system settings
Boot	For changing the system boot configuration
Tool	For configuring options for special functions
Exit	For selecting the exit options and loading default settings
Server Mgmt	For changing the server mgmt settings

4.3.3 BIOS menu screen

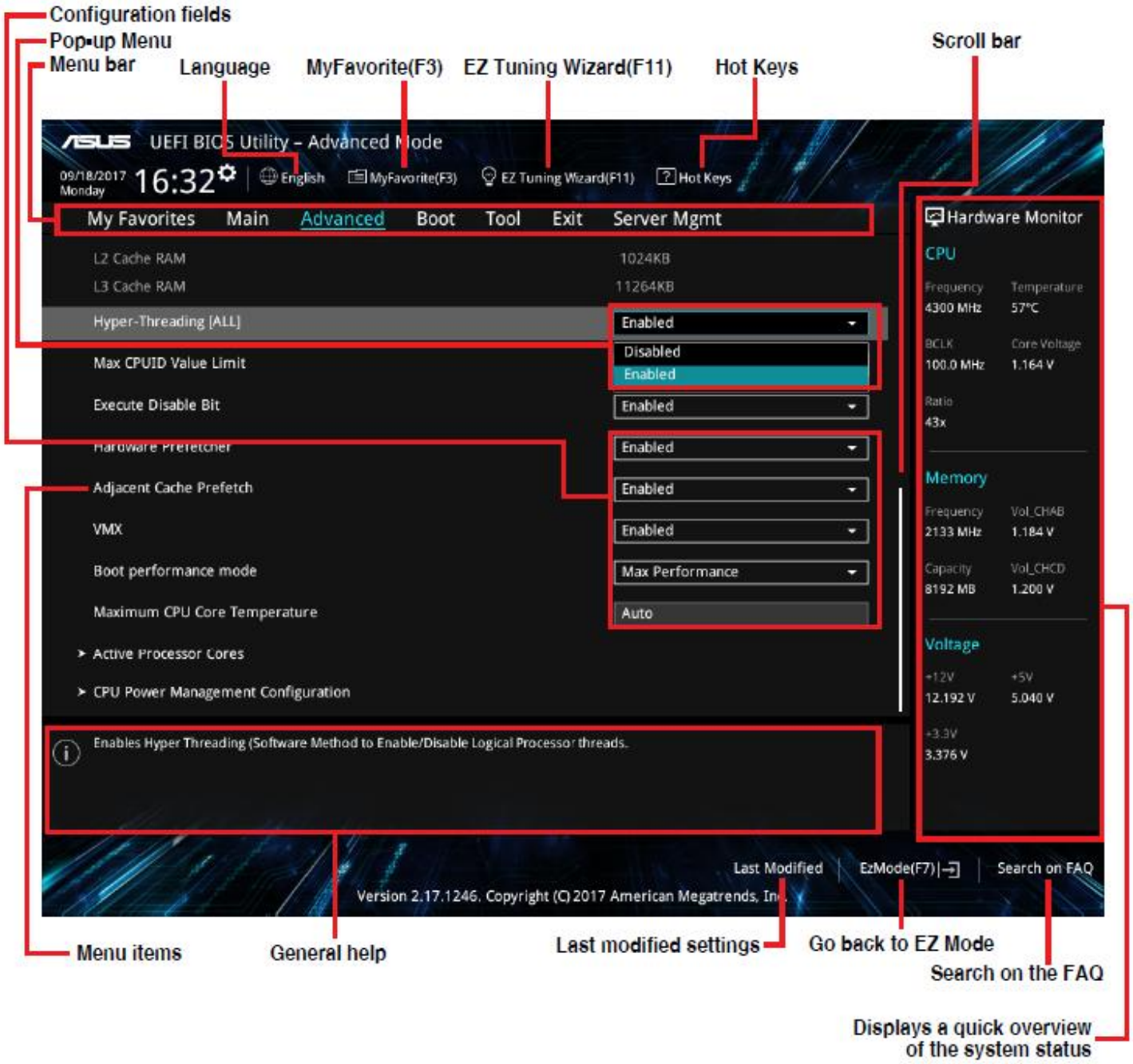
The BIOS Setup program can be used under two modes: **EZ Mode** and **Advanced Mode**. You can change modes from **Setup Mode** in **Boot menu** or by pressing the <F7> hotkey.

4.3.3.1 EZ Mode



4.3.3.2 Advanced Mode

The Advanced Mode provides advanced options for experienced end-users to configure the BIOS settings. The figure below shows an example of the Advanced Mode. Refer to the following sections for the detailed configurations.



4.3.4 PCI auto configuration

The BIOS can automatically configure PCI devices. PCI devices may be onboard or add-in cards. Auto configuration lets a user insert or remove PCI cards without having to configure the system. When a user turns on the system after adding a PCI card, the BIOS automatically configures interrupts, the I/O space, and other system resources. Any interrupts set to Available in Setup are considered to be available for use by the add-in card.

4.3.5 Legacy USB support

Legacy USB support enables USB devices to be used even when the operating system's USB drivers are not yet available. Legacy USB support is used to access the BIOS Setup program, and to install an operating system that supports USB. By default, Legacy USB support is set to Enabled.

Legacy USB support operates as follows :

1. When you apply power to the workstation, legacy support is disabled.
2. POST begins.
3. Legacy USB support is enabled by the BIOS allowing you to use a USB keyboard to enter and configure the BIOS Setup program and the maintenance menu.
4. POST completes.
5. The operating system loads. While the operating system is loading, USB keyboards and mice are recognized and may be used to configure the operating system. (Keyboards and mice are not recognized during this period if Legacy USB support was set to Disabled in the BIOS Setup program.)
6. After the operating system loads the USB drivers, all legacy and non-legacy USB devices are recognized by the operating system, and Legacy USB support from the BIOS is no longer used.

To install an operating system that supports USB, verify that Legacy USB support in the BIOS Setup program is set to Enabled and follow the operating system's installation instructions.

NOTE
It is recommended to connect USB keyboard and mouse devices to USB 2.0 ports (black) as the operating system installation may be interrupted if keyboard and mouse devices are connected to the Super Speed USB 3.0 ports (blue) due to the lack of native USB 3.0 driver support from the operating system. The device driver for the USB 3.0 host controller is installed separately and is required to be operational in the operating system.

4.3.6 BIOS updates

The BIOS can be updated using either of the following utilities :

- The ASUS BIOS Updater allows you to update BIOS in a DOS environment. This utility also allows you to copy the current BIOS file that you can use as a backup when the BIOS fails or gets corrupted during the updating process.

- The ASUS EZ Flash 3 feature allows you to update the BIOS without using an OS-based utility

NOTE
Review the instructions distributed with the upgrade utility before attempting a BIOS update.

4.3.7 Language support

The BIOS setup program and help messages are supported in English, French, Deutsch, Spanish and more.

4.3.8 BIOS recovery

It is unlikely that anything will interrupt a BIOS update; however, if an interruption occurs, the BIOS could be damaged. The following table lists the drives and media types that can and cannot be used for BIOS recovery. The BIOS recovery media does not need to be made bootable.

Acceptable Drives/Media Types for BIOS Recovery	
Media Type	Can be used for BIOS recovery?
DVD-ROM drive connected to the Serial ATA interface	Yes
USB removable drive (a USB Flash Drive, for example)	Yes
USB diskette drive (with a 1.44 MB diskette)	No
USB hard disk drive	No
Legacy diskette drive (with a 1.44 MB diskette) connected to the legacy diskette drive interface	No

4.3.9 Boot options

In the BIOS Setup program, the user can choose to boot from a SATA optical drive, hard drive, USB drive, USB flash drive, USB Floppy drive, or the network. The default setting is for the SATA optical drive to be the first boot device, the hard drive second, and a removable drive third (such as USB drive, USB flash or USB floppy drive) and the network last.
NOTE
Optical devices, USB devices and network will only appear in the boot menu if they are enabled.

4.3.9.1 SATA optical drive boot

Booting from optical drive is supported in compliance to the El Torito bootable CD/DVD format specification. Under the Boot menu in the BIOS Setup program, a SATA optical drive is listed as a boot device. Boot devices are defined in priority order. Accordingly, if there is no bootable CD or DVD in the optical drive, the system will attempt to boot from the next defined drive.

4.3.9.2 Network boot

The network can be selected as a boot device. This selection allows booting from the onboard LAN or a network add-in card with a remote boot ROM installed. Pressing the <F12> key during POST automatically forces booting from the LAN. To use this key during POST with a user password set, the User Access Level in the BIOS Setup program's Security menu must be set to Full Access and the boot to Network option in the BIOS Setup program’s Boot menu must be enabled.

4.3.9.3 Booting without attached devices

For use in embedded applications, the BIOS has been designed so that after passing the POST, the operating system loader is invoked even if the following devices are not present:

- Video adapter
- Keyboard
- Mouse

4.3.9.4 Changing the default boot device during POST

Pressing the <F8> key during POST causes a boot device menu to be displayed. This menu displays the list of available boot devices (as set in the BIOS setup program’s Boot Device Priority Submenu). The following table lists the boot device menu options.

NOTE
All boot devices such as Optical, Removable and network will always appear in the <F8> boot menu unless an administrator password has been set, even if Boot to Optical Devices, Boot to Removable Devices and Boot to Network have been disabled in the BIOS Setup program's Boot menu.

Boot Device Menu Function Keys	Description
<↑> or <↓>	Selects a default boot device.
< ↵ >	Exits the menu and boots from the selected device.
<Esc>	Exits the menu without saving changes.

4.3.10 Adjusting boot speed

This factor affects system boot speed
• Selecting and configuring peripherals properly

4.3.10.1 Peripheral selection and configuration

The following techniques help improve system boot speed:

- Select an optical drive with a fast initialization rate. This rate can influence POST execution time.
- Eliminate unnecessary add-in adapter features, such as logo displays, screen repaints, or mode changes in POST. These features may add time to the boot process.
- Try different monitors. Some monitors initialize and communicate with the BIOS more quickly, which enables the system to boot more quickly.

4.3.10.2 BIOS boot optimizations

Use of the following BIOS setup program settings reduces the POST execution time.

- In the Boot Menu, set the hard disk drive as the first boot device. As a result, the POST does not first seek an optical drive, which saves about one second from the POST execution time.

- In the Peripheral Configuration submenu, disable the LAN device if it will not be used. This can reduce up to four seconds of option ROM boot time.

4.3.11 BIOS security features

4.3.11.1 NIST compliance

The PRO WS WRX90E-SAGE SE motherboard has a secure UEFI which is NIST SP 800-147 compliant.

4.3.11.2 Verifying BIOS integrity and authenticity of BIOS updates :

a) Asus implements signed BIOS updates for its professional and workstation boards. This ensures that the BIOS update images are verified to be authentic and have not been tampered with. The digital signature on the BIOS image guarantees that only authorized updates are applied.

b) The BIOS is password protected, and there are features like BIOS Flashback that allow updating the BIOS via an internal USB stick in a secure manner. This helps prevent unauthorized individuals from flashing the BIOS unless they have the correct credentials or access to the system.

c) TPM Support: PRO WS WRX90E-SAGE SE motherboard supports TPM 2.0, which is used to securely store cryptographic keys. When TPM is enabled, it can be used to validate the digital signature of the BIOS update before allowing it to be applied. This ensures that only valid, signed BIOS images are used in the update process

d) Digital signature and TPM support: The PRO WS WRX90E-SAGE SE motherboard supports TPM (specifically TPM 2.0 in compliance with modern security standards), which means the system can verify the authenticity of the BIOS update before applying it, using the TPM's secure key storage for signature validation.

e) IT administrative control over updates: The PRO WS WRX90E-SAGE SE is designed with administrative controls in mind, allowing system administrators to manage BIOS updates and restrict access to unauthorized users. The password Protection ensures that only users with the appropriate administrative privileges can update the BIOS or access critical settings.

f) ISO/IEC 19678:2015 compliance: This particular standard is adhered to by Asus for security of the BIOS and firmware updates.

4.3.11.3 Embedded UEFI secure data isolation

Through the integration of TPM 2.0, embedded encryption, and BIOS-level security features, these mechanisms ensure that sensitive data, such as encryption keys and other authentication information, are securely stored and isolated from unauthorized access or tampering.

4.3.11.4 “Self-healing” UEFI

The Self-healing UEFI process enables the system to detect BIOS corruption and automatically recover from a secure backup copy of the BIOS stored in a separate, protected location. This feature helps ensure that the system remains operational even after a BIOS corruption or tampering event, providing automatic recovery with minimal downtime. Additionally, the system provides notifications of BIOS corruption, ensuring administrators can quickly address any issues.

4.3.11.5 Pre-boot and multi-factor authentication set up

Asus motherboards supports pre-boot authentication and can be configured with multi-factor authentication (MFA). This includes integration with Windows Hello for biometric authentication, smart cards, and TPM-based solutions like BitLocker for full disk encryption. The system allows for a secure boot process and provides flexible options for IT administrators to enforce multi-factor authentication before the operating system loads, ensuring a robust security setup.

4.3.11.6 Encrypted containment of multi-factor credential data to facilitate single pre-boot authentication log in

Asus motherboards support encrypted containment of multi-factor credential data, ensuring that pre-boot authentication is both secure and efficient. By leveraging TPM 2.0, Windows Hello for Business, BitLocker, and smart card authentication, the system securely stores and manages MFA credentials for a single pre-boot authentication login. These credentials are encrypted and isolated, providing robust protection against unauthorized access while maintaining a seamless login experience.

4.3.11.7 BIOS security passwords

The BIOS includes security features that restrict access to the BIOS Setup program and who can boot the workstation. A supervisor password and a user password can be set for the BIOS Setup program and for booting the workstation, with the following restrictions :

- The supervisor password gives unrestricted access to view and change all the Setup options in the BIOS Setup program. This is the supervisor mode.
- The user password gives restricted access to view and change Setup options in the BIOS Setup program. This is the user mode.
- If only the supervisor password is set, pressing the <Enter> key at the password prompt of the BIOS Setup program allows the user restricted access to Setup.
- If both the supervisor and user passwords are set, users can enter either the supervisor password or the user password to access Setup. Users have access to Setup respective to which password is entered.
- Setting the user password restricts who can boot the workstation. The password prompt will be displayed before the workstation is booted. If only the supervisor password is set, the workstation boots without asking for a password. If both passwords are set, the user can enter either password to boot the workstation.
- For enhanced security, use different passwords for the supervisor and user passwords.
- Valid password characters are A-Z, a-z, and 0-9. Passwords may be up to 16 characters in length.

The following table shows the effects of setting the administrator password and user password. This table is for reference only and is not displayed on the screen.

Administrator and User Password Functions					
Password Set	**Administrator Mode**	**User Mode**	**Setup Options**	**Password to Enter Setup**	**Password During Boot**
Neither	Can change all options (note)	Can change all options (note)	None	None	None
Administrator only	Can change all options	Can change a limited number of options	Administrator Password	Administrator	None
User only	N/A	Can change all options	• Enter Password • Clear User Paswword	User	User
Administrator and User	Can change all options	Can change a limited number of options	• Administrator Password • Entrer Password	Administrator or User	Administrator or User

Note : If no password is set, *any user can change all Setup options.*

4.4 Motherboard configuration & layout – KRONOS 540-G4 main board

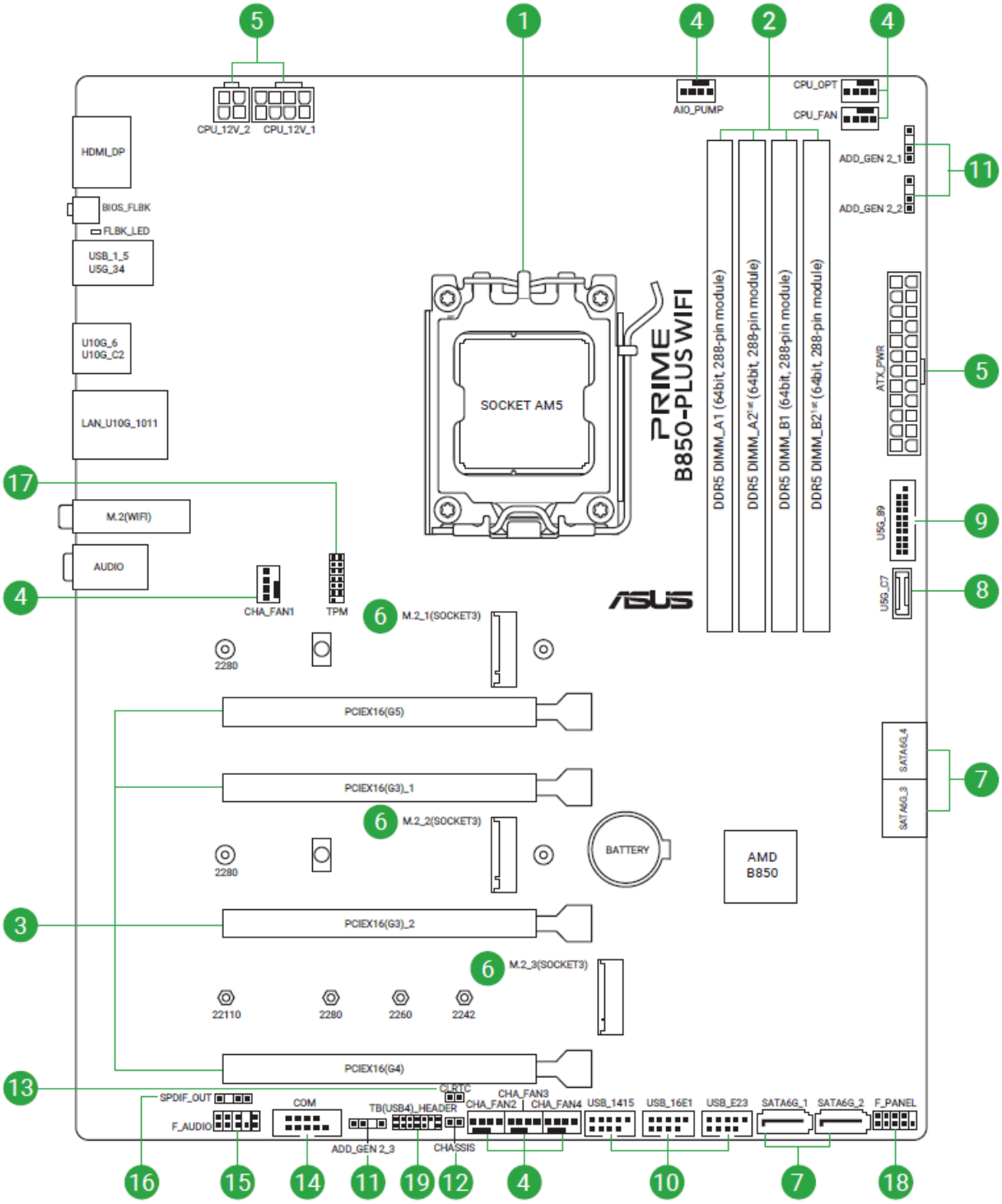
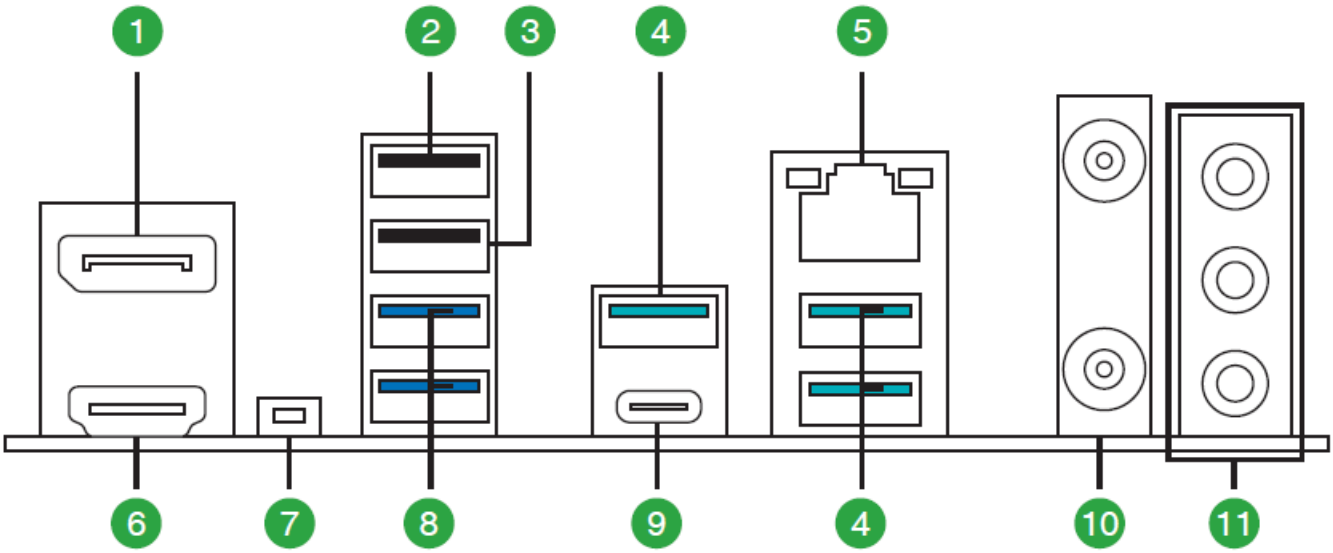


Figure 4.4 Major board components

1	CPU socket
2	DIMM slots
3	Expansion slots
4	Fan and Pump headers
5	Power connectors
6	M.2 slots
7	SATA 6 Gb/s connectors
8	USB 5 Gbps Type-C® Front Panel connectors
9	USB 5Gbps header
10	USB 2.0 header
11	Addressable RGB Gen 2 header
12	Chassis Intrusion header
13	Clear CMOS header
14	COM Port connector
15	Front Panel Audio header
16	S/PDIF Out header
17	TPM header
18	Front Panel System header
19	Thunderbolt™ (USB4®) header

4.4.1 Back panel connectors



Rear panel connectors	
1.	DisplayPort
2.	USB 2.0 port 1
3.	USB 2.0 port 5 with BIOS FlashBack™ feature
4.	USB 10Gbps (Teal blue) Type-A ports 6, 10, and 11
5.	Realtek 2.5Gb Ethernet port*
6.	HDMI™ port
7.	BIOS FlashBack™ button
8.	USB 5Gbps Type-A ports 3 and 4
9.	USB 10Gbps (Type-C®) port C2
10.	Wi-Fi module
11.	Audio jacks**

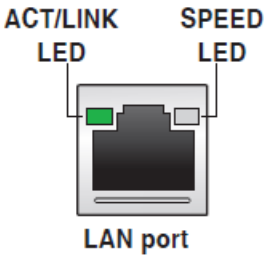
*** and **: Refer to the tables under LAN port LEDs, and Audio I/O connections sections.**

NOTE: We strongly recommend that you connect your devices to ports with matching data transfer rate. For example connecting your USB 5 Gb/s devices to USB 5 Gb/s ports for faster and better performance for your devices.

Realtek 2.5Gb Ethernet port LED indications

Activity Link LED	
Status	**Description**
OFF	No link
GREEN	Linked
BLINKING	Data activity

Speed LED	
Status	**Description**
OFF	No link
GREEN	2.5 Gbps connection
ORANGE	1 Gbps / 100 Mbps / 10 Mbps connection

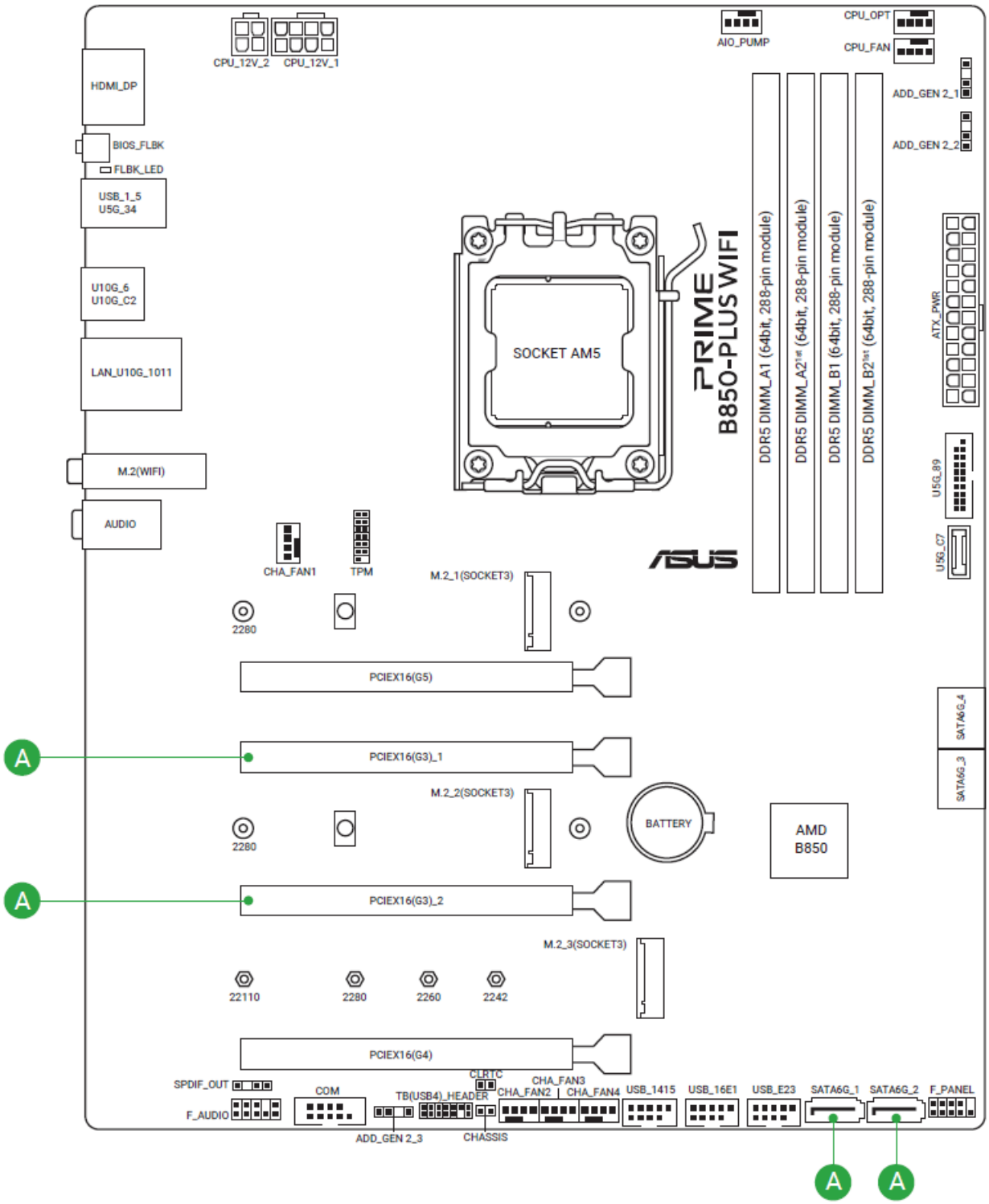


Audio 2, 4, 5.1 or 7.1-channel configuration

Port	2-channel	4-channel	5.1-channel	7.1-channel
Rear panel				
LINE IN	-	Rear Speaker Out	Rear Speaker Out	Rear Speaker Out
LINE OUT	Front Speaker Out	Front Speaker Out	Front Speaker Out	Front Speaker Out
MIC IN	-	-	Center/ Subwoofer	Center/ Subwoofer
Front panel				
HEADPHONE (Lime)	-	-	-	Side Speaker Out
MIC IN (Pink)	-	-	-	-

4.5 The PCI Express bus

The board has the following add-in card connectors :

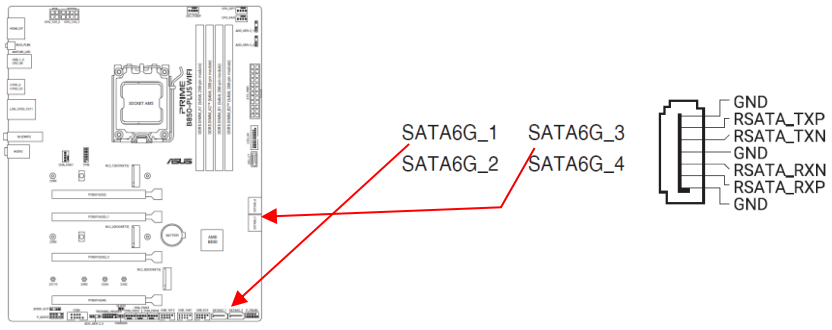


PCIEX16(G3)_1/2 share bandwidth with SATA6G_1/2.
SATA6G_1/2 will be disabled when either PCIEX16(G3)_1 or PCIEX16(G3)_2 runs.

4.6 Storage

4.6.1 SATA 6Gb/s ports

The SATA 6Gb/s ports allow you to connect SATA devices such as optical disc drives and hard disk drives via a SATA cable.



- If you installed SATA storage devices to the **SATA6G_1-4** ports, you can create RAID configurations through the onboard AMD B850 chipset.
- Using either PCIEX16(G3)_1 or PCIEX16(G3)_2 slot disables both SATA6G_1 and SATA6G_2 connectors due to shared bandwidth.

*** Specifications vary by CPU types.**

AMD RAIDXpert2 Technology

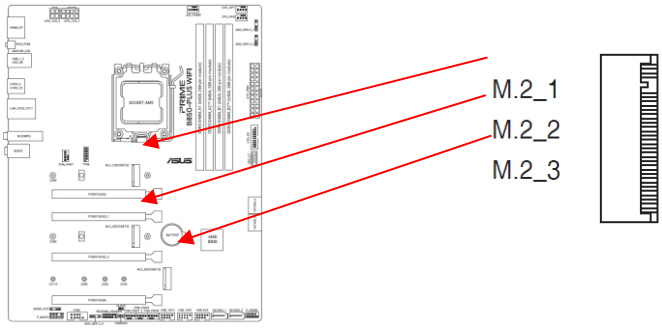
Ryzen™ 9000 Series Processors: RAID 0/1/5/10

Ryzen™ 8000 Series Processors: RAID 0/1

Ryzen™ 7000 Series Processors: RAID 0/1/10

4.6.2 M.2 slots

The M.2 slot allows you to install M.2 devices such as M.2 SSD modules.



NOTE: **• AMD Ryzen™ 9000 & 7000 Series Desktop Processors:**
M.2_1 slot (Key M), type 2280 (supports PCIe 5.0 x4 mode)
M.2_2 slot (Key M), type 2280 (supports PCIe 4.0 x4 mode)
• AMD Ryzen™ 8000 Series Desktop Processors:
M.2_1 slot (Key M), type 2280 (supports PCIe 4.0 x4 mode)
M.2_2 slot (Key M), type 2280 (supports PCIe 4.0 x4/x2 mode)*
• AMD B850 Chipset:
M.2_3 slot (Key M), type 2242/2260/2280/22110 (supports PCIe 4.0 x2 mode)
* Specifications vary by CPU types.
• AMD RAIDXpert2 Technology:
Ryzen™ 9000 Series Processors: RAID 0/1/5/10
Ryzen™ 8000 Series Processors: RAID 0/1
Ryzen™ 7000 Series Processors: RAID 0/1/10

4.6.4 Optical drives

The CIARA KRONOS 540-G4 may be supplied with a SATA DVD drive. The DVD drive is a half-height 5-¼ inch wide storage device, capable of holding 4.7 to 8.5 Gbytes of data. The system may be equipped with either a DVD-ROM drive, a DVD writer, a Blu-ray drive or Blu-ray writer.

4.7 Keyboard

Your keyboard has a set of function keys, cursor keys and a numeric keypad. The figure below shows a typical keyboard. Under the rear of the keyboard are two small legs that can be pulled out or pushed in to change the keyboard angles.

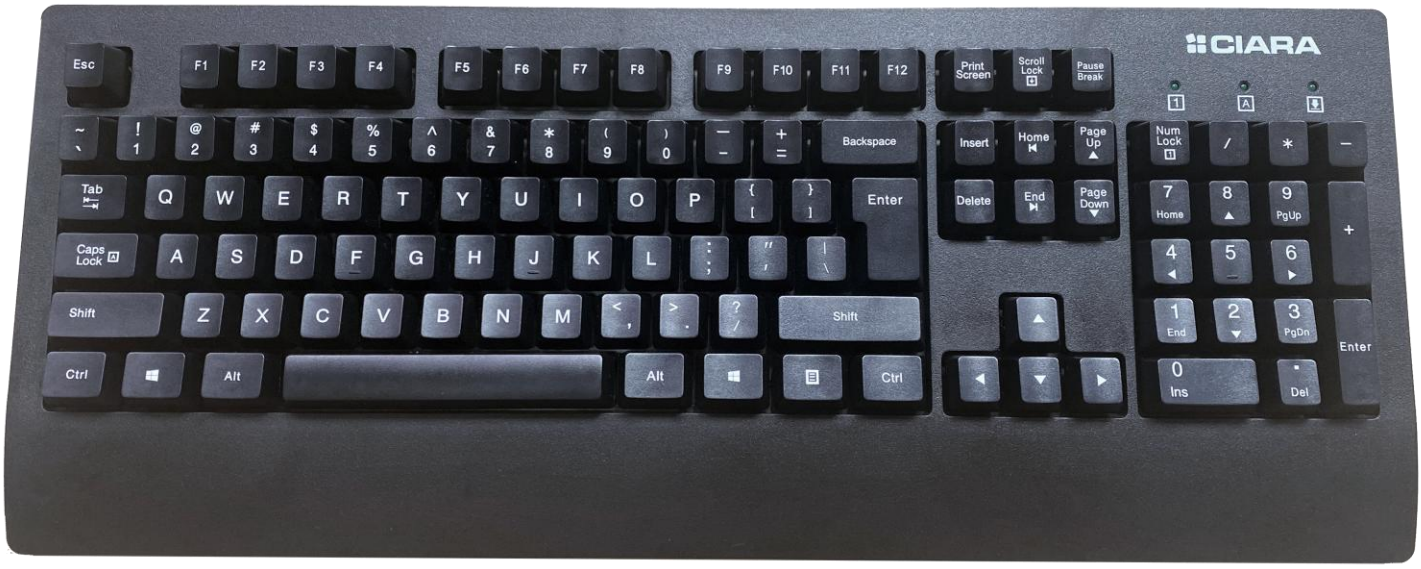


Figure 4.6 : Typical keyboard layout

4.8 Graphics subsystem

The CIARA KRONOS 540-G4 workstation board features two PCIe 5.0 x16 slots (supports x16 or x8/x8) and one PCIe 4.0 x16 slot (supports x4).

4.8.1 PCI Express 5.0 x16 128 bits graphics card

The CIARA KRONOS 540-G4 workstation may be equipped with a GeForce® RTX5060 graphics card with 8 GB of GDDR7 video memory or better.

4.8.2 HDMI 2.1b port

Maximum resolution : 4K @ 480 Hz or 8K @ 120 Hz with DSC.

4.8.3 DisplayPort 2.1b

This port is for a DisplayPort-compatible devices.
Maximum resolution : 4K @ 480 Hz or 8K @ 165 Hz with DSC.

4.9 Audio subsystem

The CIARA KRONOS 540-G4 workstation supports Intel High Definition Audio through a Realtek® audio codec.
The Realtek® based audio subsystem provides the following features :

- Power pre-regulator reduces power input noise to ensure consistent performance
- Separate layer for left and right track, ensuring both sound deliver equal quality
- Impedance sense for front and rear headphone outputs
- Audio shielding ensures precise analog/digital separation and greatly reduced multi-lateral interference
- Internal audio Amplifier to enhance the highest quality sound for headphone and speakers
- Unique de-pop circuit to reduce start-up popping noise to audio outputs
- Premium Japan-made audio capacitors provides warm, natural, and immersive sound with exceptional clarity and fidelity
- High quality 120dB SNR stereo playback output (Line-out@back) & 113dB SNR recording input (Line-in) support
- Supports up to 32-Bit/192kHz playback*
- DTS® Headphone:X
- DTS® Connect
- Supports jack-detection, multi-streaming, front panel jack-retasking (MIC)
- Optical S/PDIF out port at back I/O

*** Due to limitations in HDA bandwidth, 32-Bit/192kHz is not supported for 8-Channel audio.**

Audio software and drivers are available from :
https://www.asus.com/ca-en/motherboards-components/motherboards/prime/prime-b850-plus-wifi/helpdesk_download?model2Name=PRIME-B850-PLUS-WIFI or from your private CIARA Website.

4.10 I/O Ports

Each CIARA KRONOS 540-G4 workstation system includes built-in multi-I/O capabilities. These provide your workstation with :

Top I/O Ports
1 USB 5 Gb/s type C port
2 USB 5 Gb/s type A ports
1 USB 2.0 type A port
2 audio jacks
Rear I/O Ports
1 USB 10 Gb/s Type-C® port
3 USB 10 Gb/s Type-A ports
2 USB 5 Gb/s Type-A ports
2 USB 2.0 Type-A ports
1 network ports (RJ45)
3 audio jacks
1 HDMI port, 1 DisplayPort
2 WiFi 6E antenna ports
Internal headers
1 Thunderbolt™ (USB4®) header
5 USB 2.0 ports
4 SATA 6 Gb/s ports
1 TPM header
1 serial port header

To configure these I/O ports use the BIOS configuration screens. Please refer to the paragraphs in section 4.3.1, "BIOS Configuration and installation" for more information on this subject.

NOTE
All USB ports along with serial port can be enabled or disabled in the BIOS.

4.11 Trusted Platform Module (TPM)

The Asus® TPM module version 2.0 component is FIPS140-2 certified and specifically designed to enhance platform security above-and-beyond the capabilities of today's software by providing a protected space for key operations and other security critical tasks. Using both hardware and software, the TPM protects encryption and signature keys at their most vulnerable stages—operations when the keys are being used unencrypted in plain-text form. The TPM shields unencrypted keys and platform authentication information from software-based attacks.

NOTE
The Intel® TPM uses the onboard coin-cell battery (CR2032) to maintain its monotonic counters. One major function of the monotonic counters is for anti-replay protection of the internal Intel® TPM data. If the battery is removed or exhausted, the Intel® TPM data will be deleted in accordance with Trusted Computing Group guidelines. Please back-up TPM keys and data before removing the battery.

4.12 Intrusion detector

Each CIARA KRONOS 540-G4 workstation system includes a casing intrusion detector. When the casing is opened, the DASH or DMI agent receives a casing intrusion alert. If the customer installs in our system a Landesk, Unicenter or equivalent type agent, our system will report a configuration modification, including memory capacity or number of memory cards change, hard disk drive change, optical device or processor change. These changes will also generate a configuration change signal, transmitted to the DASH or DMI agent.

4.13 Replacing the system battery

In all CIARA KRONOS 540-G4 workstations the battery is a standard 3.3 V Lithium battery model CR-2032. This type of battery should last at least 3 years, if the system is not in use. When the workstation is plugged in, the standby current from the power supply extends the life of the battery. If the battery wears out, your system will no longer retain BIOS information when turned off. For example, you

will get a message stating that the time and date are invalid. If this happens, you should replace the battery, or call your CIARA service representative.

CAUTION :
There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same type as recommended by CIARA. The disposal of used batteries is subject to environment issues and we recommend that this work be done by a qualified CIARA technician who will dispose safely of the used battery.

NOTE
The Intel TPM uses the onboard coin-cell battery (CR2032) to maintain its monotonic counters. One major function of the monotonic counters is for anti-replay protection of the internal Intel TPM data. If the battery is removed or exhausted, the Intel TPM data will be deleted in accordance with Trusted Computing Group guidelines. Please back-up TPM keys and data before removing the battery.

To replace the battery, follow these steps :

1. Observe the precautions.
2. Turn off all peripheral devices connected to the workstation. Disconnect the workstation's power cord from the AC power source (wall outlet or power adapter).
3. Remove the workstation cover.
4. Locate the battery on the board.
5. With a medium flat-bladed screwdriver, gently pry the battery free from its connector. Note the orientation of the < **+** > and < **-** > on the battery.
6. Install the new battery in the connector, orienting the < **+** > and < **-** > correctly.
7. Replace the workstation cover.

4.14 Installing an upgrade CPU

All CIARA KRONOS 540-G4 models may be enhanced by the installation of a higher performing CPU. Since this upgrade necessitates a lot of care and attention, it should be carried out by a CIARA authorized service centre. Please take a note that the CIARA KRONOS 540-G4 models use exclusively LGA2066 processor technologies and are not compatible with other types of processors.

4.15 Clear CMOS header

4.15.1 Clear CMOS header location

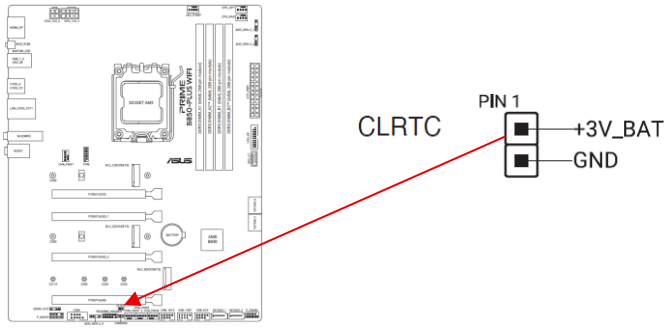


Figure shows the location of the Clear CMOS header.

If the system fails to boot after changing any BIOS setting, try to clear the CMOS and reset the motherboard to the default value.

4.15.2 Clearing or changing passwords

Clear RTC RAM
The Clear CMOS button allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which include system setup information such as system passwords.

To erase the RTC RAM:
1. Turn OFF the computer and unplug the power cord.
2. Short-circuit pin 1-2 with a metal object or jumper cap for about 5-10 seconds.
3. Plug the power cord and turn ON the computer.
4. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

CAUTION! DO NOT short-circuit the pins except when clearing the RTC RAM. Short-circuiting or placing a jumper cap will cause system boot failure!

4.16 Installing an upgrade flash BIOS

Before any new BIOS is programmed into the system, be very careful to ensure that the BIOS is intended for use with your specific system board. If not, you may completely disable your system, and require CIARA service assistance to restore the system to working order.

You may obtain the latest BIOS revision for your CIARA KRONOS 540-G4 system on Asus web site at https://www.asus.com/ca-en/motherboards-components/motherboards/prime/prime-b850-plus-wifi/helpdesk_bios?model2Name=PRIME-B850-PLUS-WIFI .

Several methods exist to update the BIOS of your CIARA KRONOS 540-G4 system, and they are as follows :

- Recovery BIOS Update - A .CAP file to be used for BIOS recovery process, regardless of operating system. In the unlikely event that a BIOS update is interrupted, it is possible the BIOS may be left in an unusable state. Use the Recovery BIOS update to recover from this condition. It requires a blank CD and a read/writeable CD drive or a USB flash device.

- The ASUS EZ Flash 3 feature allows you to update the BIOS without using an OS-based utility. This function supports USB flash disks formatted using FAT32/16 on a single partition only.

- Bupdater.exe BIOS Update / Integrator Toolkit BIOS ZIP Files - A DOS-based utility to update the BIOS regardless of operating system. It requires a CD and a read/writeable CD drive or a USB flash device.

Make sure to download the appropriate BIOS update file, and follow the installation instructions found in the readme file for the BIOS update. It is also recommended to read the release notes file for the BIOS update to know the changes that have been made in the version of the BIOS.

4.17 Spare parts

Spare parts for the Kronos 540-G4 are available as follows:

1. Casing
2. Power supply
3. Motherboard
4. Processor
5. Liquid cooling solution
6. Memory
7. SSD drive
8. Video controller

These spare parts will either correspond to the components in your system or will be a replacement equivalent or better than what you had in your system. You can procure these spare parts at any time by contacting CIARA at http://www.ciaratech.com or by phone at 1-877-242-7272.

4.18 Media sanitization software

You can download a media sanitization software from the web at the following URL: http://killdisk.com/downloads/KillDisk-Freeware-Setup.exe

This tool is an easy-to use and compact utility that allows to sanitize storage media with the One Pass Zeros data sanitizing standard. It permanently erases all data on Hard Disks, Solid State Drives, Memory Cards & USB drives, SCSI storage & RAID disk arrays and even two disks in parallel.

4.19 Latest version

To download the latest version of this User Guide, please go to http://ciaratech.com/download/25276/?tmstv=1784344152

GLOSSARY

32-Bit -- In computer architecture, 32-bit integers, memory addresses, or other data units are those that are at most 32 bits (4 octets) wide. Also, 32-bit CPU and ALU architectures are those that are based on registers, address buses, or data buses of that size. 32-bit is also a term given to a generation of computers in which 32-bit processors were the norm.
The range of integer values that can be stored in 32 bits is 0 through 4,294,967,295 or -2,147,483,648 through 2,147,483,647 using two's complement encoding. Hence, a processor with 32-bit memory addresses can directly access 4 GB of byte-addressable memory. The external address and data buses are often wider than 32 bits but both of these are stored and manipulated internally in the processor as 32-bit quantities.
64-Bit -- In computer architecture, 64-bit integers, memory addresses, or other data units are those that are at most 64 bits (8 octets) wide. Also, 64-bit CPU and ALU architectures are those that are based on registers, address buses, or data buses of that size. 64-bit is also a term given to a generation of computers in which 64-bit processors were the norm.
Without further qualification, a 64-bit computer architecture generally has integer and addressing registers that are 64 bits wide, allowing direct support for 64-bit data types and addresses. However, a CPU might have external data buses or address buses with different sizes than the registers, even larger (the 32-bit Pentium had a 64-bit data bus, for instance). The term may also refer to the size of low-level data types, such as 64-bit floating-point numbers.

Adapter card -- A printed circuit board that gives your computer some added capability, such as more memory, or control of a new device. A card plugs into an expansion slot on the system board.

Analog monitor -- A type of video display that uses a continuously variable analog voltage to display a large number of colours at resolutions up to 1024 x 768 and beyond. The voltage levels on the red, green and blue lines on the VGA connector determine colours.

Auto switching -- The ability of a video display to detect the video display mode for a given application program and automatically switch to that mode.

BIOS -- Basic Input Output System. Programs permanently stored in the system board's ROM chips that provide the fundamental processes or functions of the system, such as the Power On Self Test (POST). The VGA circuitry has its own video BIOS. See also ROM.

Bit -- A bit is the basic unit of information in computing and telecommunications ; it is the amount of information that can be stored by a digital device or other physical system that can normally exist in only two distinct states. In computing, a bit can also be defined as a variable or computed quantity that can have only two possible values. These two values are often interpreted as binary digits and are usually denoted by the Arabic numerical digits 0 and 1. Indeed, the term "bit" is a contraction of binary digit. The two values can also be interpreted as logical values (true/false, yes/no). algebraic signs (+/−), activation states (on/off), or any other two-valued attribute. In several popular programming languages, numeric 0 is equivalent (or convertible) to logical false, and 1 to true. The correspondence between these values and the physical states of the underlying storage or device is a matter of convention, and different assignments may be used even within the same device or program.

Bus -- A set of address or data lines used to transfer information between different components within a computer (such as memory, the microprocessor, and slots).

Cache -- A device that contains high-speed memory and permits higher speed accesses than general-purpose memory.

Cache hit rate -- The percentage of time data is delivered from the cache rather than from main memory.

Central processing unit (CPU) -- An integrated circuit chip that performs the actual computing functions of the computer. Other chips perform support functions like storing data and controlling peripherals. See also microprocessor.
Chip -- An electronic device that combines thousands of transistors on a small sliver of silicon. See also integrated circuit.

Chip set -- The logic devices on the motherboard that connects the microprocessor and other board functions.

Clock -- A circuit that sends a consistent, periodic signal that is used to step logic information through a computer circuit.

CMOS RAM -- Complementary Metal Oxide Semiconductor. CMOS RAM stores basic configuration information about your computer.

Colour display -- A video display capable of displaying colours based on the RGB (Red, Green, and Blue) colour-mixing scheme.

Configuration -- The way in which a computer and peripheral equipment (such as printers and display monitors) are interconnected and programmed to operate as a system.

Default -- The initial setting when the system left the factory.

Digital monitor -- A type of monitor in which display colour is controlled by digital colour control lines that switch on and off ; the number of colours that can be displayed depends on the selected display mode.

DIMM -- Dual In-Line Memory Module. RAM chips installed on a small circuit board module, having a single row of connectors (240 pins) on the bottom of the module where it is plugged into the main system board.

DisplayPort -- A digital display interface standard put forth by the Video Electronics Standards Association (VESA) since 2006. It defines a new royalty-free, digital audio/video interconnect, intended to be used primarily between a computer and its display monitor, or a computer and a home-theater system.

DMA (Direct Memory Address) -- A method for transferring data directly to and from system memory, bypassing the microprocessor.

DVI-D and DVI-I -- (Digital Visual Interface- integrated) is the connection, or interface used between monitors and computers or home theatre systems. DVI-I is used to interface with an LCD monitor display for digital video output. DVI-I supports both digital and analog. However, it will not use both at the same time. DVI-I detects and chooses digital or analog depending on the connected display. Contrast with DVI-D, which is a digital-only interface and DVI-A which is an analog-only interface.

Driver -- A utility program accompanying the motherboard that permits application programs to use the extended resolutions of the VGA circuitry.

eSATA -- Standardized in 2004, eSATA (e=external) provides a variant of SATA meant for external connectivity. It has revised electrical requirements in addition to incompatible cables and connectors : Minimum transmit potential increased : Range is 500–600 mV instead of 400–600 mV. Minimum receive potential decreased : Range is 240–600 mV instead of 325–600 mV. Identical protocol and logical signaling (link/transport-layer and above), allowing native SATA devices to be deployed in external enclosures with minimal modification. Maximum cable length of 2 metres (6.6 ft).

Expansion slot -- A connector on the motherboard for holding an adapter card.

Gigahertz (GHz) -- A frequency of 1 billion cycles per second.

HDMI -- (High-Definition Multimedia Interface) is a compact audio/video interface for transmitting uncompressed digital data. It represents a digital alternative to consumer analog standards, such as radio frequency (RF) coaxial cable, composite video, S-Video, component video, or VGA. HDMI connects digital audio/video sources—such as upconvert DVD players, HD DVD players, Blu-ray Disc players, personal computers (PCs), video game consoles and AV receivers—to compatible digital audio devices, computer monitors, and digital televisions.

Hertz (Hz) -- A unit of frequency equal to one cycle per second.

Horizontal frequency -- The rate, at which monitor displays each scan line, usually measured in kilohertz (kHz).

I/O -- An abbreviation for "input/output", a generic term that refers to the devices and processes involved in the computer's reading and writing data.

Integrated circuit -- An electronic device that combines thousands of transistors on a small chip of silicon. Such devices are the building blocks of computers.

Interleaving -- A technique for improving the performance of system memory by splitting the memory into two or four sections that alternately process information. While one memory section goes through a refresh cycle, the microprocessor sends information to another section for processing.

Jumper -- On a printed circuit board, a patch connector, wire, or cable used to establish a circuit.

LCD -- A liquid crystal display (LCD) is a thin, flat electronic visual display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly. As LCD panels produce no light of their own, they require an external lighting mechanism to be easily visible. On most displays, this consists of a cold cathode fluorescent lamp that is situated behind the LCD panel. Passive-matrix displays are usually not backlit, but active-matrix displays almost always are. Recently, two types of LED backlit LCD displays have appeared in some screens as an alternative to conventional backlit LCDs. In one scheme, the LEDs are used to backlight the entire LCD panel. In another scheme, a set of red, green and blue LEDs is used to illuminate a small cluster of pixels, which can improve contrast and black level in some situations. For example, the LEDs in one section of the screen can be dimmed to produce a dark section of the image while the LEDs in another section are kept bright. Both schemes also allows for a slimmer panel than on conventional displays.

LED -- A light-emitting diode is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting.

Megahertz (MHz) -- A frequency of 1 million cycles per second.

Memory -- Semiconductor chips used to hold information and programs while they are being accessed by the microprocessor. See also RAM and ROM.

Microprocessor -- An integrated circuit that contains the circuits the computer needs to calculate and to communicate with the other parts of the system. See also central processing unit.

Multi-frequency monitor -- A monitor (also known by the trade names MultiSync or MultiScan) that, due to its ability to scan at various horizontal and vertical frequencies, is capable of displaying a wide variety of resolution modes.

Parity bit -- An additional non-informational bit appended to a group of bits to make the number of ones in the group of bits either an odd or even number ; an elementary mechanism for error checking.

Peripheral -- A hardware device (such as a keyboard, monitor, or printer) that connects to a computer.

Pin -- Any of the leads on a device, such as a chip, that plug into a socket and connect it to a system.

Pixel -- Short for "picture element", the smallest single dot displayable on the display.

Power-On Self Test (POST) -- Internal test procedures that the BIOS runs automatically when the system is turned on. These procedures verify that the entire computer's hardware is functioning properly. If the test detects problems, the computer displays error codes before (or instead of) starting the operating system. The error codes can help a service person determine what is wrong with your computer.

RAM -- An acronym for "random-access memory." The type of computer memory used to store information while a program is running. All data stored in RAM is lost when the computer is turned off or power is lost.

Refresh -- Periodic rewrite of system memory contents to the same memory locations by the microprocessor so that the contents do not decay beyond redemption.

Resolution -- A measure of the quality of the image that can be shown on a particular display ; usually expressed as the number of pixels that can be displayed horizontally across the display screen by the number of pixels that can be displayed vertically on the display screen.

ROM -- An acronym for "read-only memory." The type of computer memory that is used to permanently store the information vital to computer operation, including some parts of the operating system. ROM is permanent and the contents will not be lost when the computer is turned off.

SAS -- (Serial Attached SCSI) is a computer bus used to move data to and from computer storage devices such as hard drives and tape drives. SAS depends on a point-to-point serial protocol that replaces the parallel SCSI bus technology that first appeared in the mid

1980s in data centers and workstations, and it uses the standard SCSI command set. SAS offers backwards-compatibility with second-generation SATA drives. SATA 3 Gb/s drives may be connected to SAS backplanes, but SAS drives may not be connected to SATA backplanes.

SATA or Serial ATA -- Serial ATA (SATA) is a computer bus interface for connecting host bus adapters to mass storage devices such as hard disk drives and optical drives. Serial ATA was designed to replace the older ATA (AT Attachment) standard (also known as EIDE). It is able to use the same low level commands, but serial ATA host-adapters and devices communicate via a high-speed serial cable over two pairs of conductors. In contrast, the parallel ATA (the redesignation for the legacy ATA specifications) used 16 data conductors each operating at a much lower speed. First-generation SATA interfaces, now known as SATA 1.5 Gb/s, communicate at a rate of 1.5 Gb/s (150 MB/s). Second generation SATA interfaces running at 3.0 Gb/s (300 MB/s) are prevalent in all SATA disk drives and the majority of PC and server chipsets. The SATA III standard (6 Gb/s) (peak throughput about 600 MB/s) was released on May 27, 2009.

Serial interface -- An interface that transmits and receives data in a serial manner, transmitting or receiving data one bit at a time.

Set-up -- The arrangement of connections between an assembly of individual computing units, and the adjustments needed for the computer to operate.

SRAM -- Static Random Access Memory. A type of memory that does not need to be refreshed. Data stored in the SRAM remains until changed or until the computer is turned off.

System -- An assembly of components united by some form of regulated interaction to form an organized whole.

System board -- The large printed-circuit board in a computer on which most electronic devices are mounted ; the primary board in a computer. All other interfaces receive control signals or information from the system board. Also commonly referred to as a "motherboard" or "main board".

USB -- Universal Serial Bus. USB 1.1 is a hot pluggable daisy chained 1.5 or 12 Mb/s (1.5 MB/s) serial bus. USB 2.0 is a hot pluggable daisy chained 480 Mb/s (60 MB /s) serial buses. USB 3.0 is a hot pluggable daisy chained 4.8 Gb/s (600 MB /s) serial buses. USB 3.0 receptacles are electrically compatible with USB 2.0 device plugs if they can physically match. Most combinations will work, but there are a few physical incompatibilities. However, only USB 3.0 Standard-A receptacles can accept USB 3.0 Standard-A device plugs. Devices may be plugged in or out without turning off the system. USB devices include mice, scanners, keyboards, and digital cameras.

Wait states -- A delay in the computer's information processing cycle caused by a difference in speed between a faster processor and slower memory, which holds data. Zero wait states means the processor does not have to "wait" for memory, and can access data as fast as it is needed.

Word -- The set of bits comprising the largest unit that the computer can handle in a single operation.

NOTES :