

# IT Workshop GXESL 208

## Lab Worksheet

Semester 2  
Bachelor of Technology  
Electronics & Communication Engineering  
College of Engineering  
Trivandrum



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# **Experiment 1**

## **Lab Safety**

This section discusses safety in the lab. Safety guidelines help protect individuals from accidents and injury. They also help to protect equipment from damage.

### **General Safety**

Safe working conditions help prevent injury to people and damage to computer equipment. A safe workspace is clean, organized, and properly lighted. Everyone must understand and follow safety procedures.

Follow the basic safety guidelines to prevent cuts, burns, electrical shock, and damage to eyesight. As a best practice, make sure that a fire extinguisher and first-aid kit are available in case of fire or injury. Poorly placed or unsecured cables can cause tripping hazards in a network installation. Cables should be installed in conduit or cable trays to prevent hazards.

This is a partial list of basic safety precautions to use when working on a computer:

- Remove your watch and jewelry and secure loose clothing.
- Turn off the power and unplug equipment before performing service.
- Cover sharp edges inside the computer case with tape.
- Never open a power supply or a CRT monitor.
- Do not touch areas in printers that are hot or that use high voltage.
- Know where the fire extinguisher is located and how to use it.
- Keep food and drinks out of your workspace.
- Keep your workspace clean and free of clutter.
- Bend your knees when lifting heavy objects to avoid injuring your back.

## **Electrical Safety**

Follow electrical safety guidelines to prevent electrical fires, injuries, and fatalities in the home and the workplace. Power supplies and CRT monitors contain high voltage.

## **Fire Safety**

Follow fire safety guidelines to protect lives, structures, and equipment. To avoid an electrical shock and to prevent damage to the computer, turn off and unplug the computer before beginning a repair.

Fire can spread rapidly and be very costly. Proper use of a fire extinguisher can prevent a small fire from getting out of control. When working with computer components, be aware of the possibility of an accidental fire and know how to react. Be alert for odors emitting from computers and electronic devices. When electronic components overheat or short out, they emit a burning odor.

If there is a fire, follow these safety procedures:

- Never fight a fire that is out of control or not contained.
- Always have a planned fire escape route before beginning any work.
- Get out of the building quickly.
- Contact emergency services for help.
- Locate and read the instructions on the fire extinguishers in your workplace before you have to use them.

## **Experiment 2**

### **Computer Hardware Familiarization**

#### **Instructions**

1. E-resources to prepare for computer hardware familiarization session are shared on this web link <https://jim79.github.io/it-workshop/>
2. All Students should write all the questions from the worksheet in the rough record before coming to the lab.
3. Answers to the above questions are to be found out during the workshop session and written in the rough record.
4. The rough record has to be completed during the workshop session.
5. Student should get the rough record verified and signed by the faculty before leaving the lab

#### **2.1 CPU Box (Chassis)**

CPU Box is the enclosure that houses all the computer components, providing protection and structural support.

##### **Tasks:**

1. List the typical dimensions and materials used for constructing a CPU chassis.
2. Identify the types of form factors supported by different chassis.
3. List the cooling mechanisms commonly integrated into a CPU chassis.

#### **2.2 Motherboard**

A motherboard is the main circuit board in a computer system. It connects all of the internal components, like the memory, processor, graphics card and other hardware. It also provides power to each component and allows them to communicate with each

other.

### Tasks:

1. List the technical specifications of a motherboard, including form factor, chipset, and socket type.
2. Identify the types and number of RAM slots available.
3. Describe the input/output ports provided on the motherboard.
4. Identify components on the motherboard provided and draw a layout (similar to the figure given below) in your rough record.

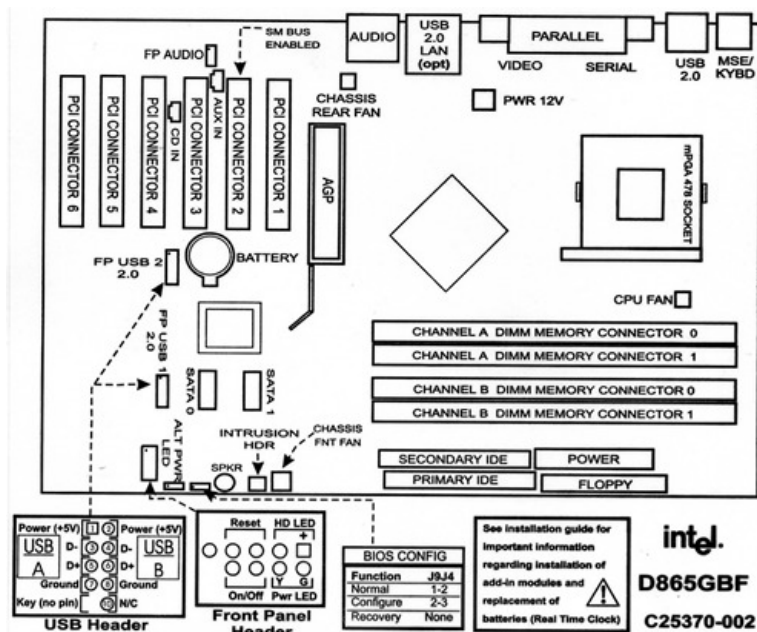


Figure 2.1:

5. Refer to the website <https://motherboarddb.com/motherboards/> choose a motherboard manufactured after the year 2010 and list the following features :
  - Manufacturer
  - Year of manufacture
  - Form factor
  - Chipset
  - Memory
  - Number and type of USB ports
  - Video outputs
  - Network ports

- Audio ports
- Audio chipset
- Expansion slots
- Power connectors

## 2.3 CPU and Chipset

The Central Processing Unit (CPU) performs most of the processing inside a computer, while the chipset manages data flow between the processor, memory, and peripherals.

### Tasks:

1. List the key specifications of a CPU, including clock speed, core count, and cache size.
2. Explain the terms power consumption and thermal design power (TDP) of a CPU.
3. Refer to the website <https://www.techpowerup.com/cpu-specs/> choose a CPU manufactured after the year 2010 and list the following features :
  - Manufacturer
  - Year of manufacture
  - Socket
  - Process Size
  - Frequency
  - Number of Cores
  - Cache
  - Memory Support
  - TDP
  - Minimum Power
  - Market
  - Production Status

## 2.4 Storage Devices

### 2.4.1 Hard Disk Drive

Hard Disk Drive (HDD) is an electro-mechanical data storage device that stores and retrieves digital data using magnetic storage with one or more rigid rapidly rotating platters coated with magnetic material. HDDs are a type of non-volatile storage, retaining stored data when powered off. Modern HDDs are typically in the form of a

small rectangular box.

**Tasks:**

1. List the technical specifications of the hard disk provided to you including storage capacity, RPM, and interface type.
2. Explain the differences between SATA, SAS, and IDE hard disks.
3. Refer to the website <https://smarthdd.com/database/> choose a Hard Disk Drive (HDD) and list the following features :
  - Manufacturer
  - Model
  - Capacity
  - Interface
  - Maximum interface speed
  - Maximum read speed

### **2.4.2 Solid State Drive**

A solid-state drive (SSD) is a type of solid-state storage device that uses integrated circuits to store data persistently.

1. Refer to the website <https://smarthdd.com/database/> choose a Solid State Drive (SSD) and list the following features :
  - Manufacturer
  - Model
  - Capacity
  - Interface
  - Maximum interface speed
  - Maximum read speed
2. Compare the features of the HDD's and SSD's.

## **2.5 Interface Cards**

Expansion cards like graphics cards, sound cards, and network cards provide additional functionalities to the computer.

**Tasks:**

1. List the technical specifications of a graphics card, including VRAM, clock speed.



2. Identify the ports available on interface cards, such as HDMI, DisplayPort, or audio jacks.
3. Describe the cooling mechanisms for interface cards.
4. Refer to the website <https://www.techpowerup.com/gpu-specs/> choose a GPU manufactured in the year 2003 and list the following features :
  - Manufacturer
  - Year of manufacture
  - GPU Name
  - GPU Clock
  - Memory Size
  - Graphics Features
  - Bus Interface
  - Production Status
5. Refer to the website <https://www.techpowerup.com/gpu-specs/> choose a GPU manufactured after the year 2020 and list the following features :
  - Manufacturer
  - Year of manufacture
  - GPU Name
  - GPU Clock
  - Memory Size
  - Graphics Features
  - Bus Interface
  - Production Status

## 2.6 Card Slots

Slots on the motherboard such as PCI and PCIe where interface cards are inserted.

### Tasks:

1. List the types of card slots available on a motherboard and their respective uses.

## 2.7 Cables

Various cables like SATA, IDE, and power cables that connect internal components and peripherals.

### Tasks:

1. Refer to the website <https://www.cablestogo.com/learning/connector-guides/internal> and list the types of cables used in a computer and their specific purposes.
2. Describe the data transfer rates of different generations of SATA cables.

## 2.8 SMPS (Switch Mode Power Supply/PSU)

Converts AC power from the mains to DC power used by the computer's internal components.

### Tasks:

1. List the power ratings and efficiency certifications of SMPS units.
2. Identify the types of connectors provided by an SMPS for various components.
3. Describe the cooling mechanisms and protections (e.g., overvoltage) in an SMPS.
4. Refer to the website <https://www.cybenetics.com/index.php?option=power-supplies> choose a Power Supply Unit (PSU) and list the following features :
  - Manufacturer
  - Form factor
  - Wattage
  - Efficiency rating

## 2.9 NIC (Network Interface Card)

Allows the computer to connect to a network and communicate with other devices.

### Tasks:

1. List the technical specifications of a NIC, including speed and connection type.
2. Describe the difference between wired and wireless NICs.
3. Refer to the website <https://www.scan.co.uk/shop/computer-hardware/network-cards-accessories/rj45-network-cards> choose a network card and list the following features :
  - Manufacturer
  - Interface
  - Supported data rates

## 2.10 Various Ports

**Description:** Includes USB, HDMI, Ethernet, and audio ports used to connect external devices.

**Tasks:**

1. Refer to the website <https://newnex.com/usb-connector-type-guide.php> and list the technical specifications of USB ports, including version and data rates.
2. Refer to the website <https://www.xenarc.com/different-types-of-monitor-ports.html> and list the common display ports in a computer and their typical applications.

## 2.11 I/O Devices

**Description:** Input devices like keyboards and mice, and output devices like monitors and printers.

**Tasks:**

1. List the specifications of common input devices, such as DPI for mice or key travel for keyboards.
2. Refer to the website <https://www.displaydb.com/brands> and list the following features of computer monitors :
  - Brand
  - Model
  - Size
  - Panel
  - Refresh rate
  - Screen aspect ratio
  - Screen resolution
3. List the connectivity options available for computer printers.

## 2.12 Buses

**Description:** Electrical pathways like data bus, address bus, and control bus that transfer data between components.

**Tasks:**

1. Explain the function of the address bus, data bus and control bus in a computer system.

## 2.13 Firmware

**Description:** Software programmed into read-only memory, providing low-level control for the device's hardware.

**Tasks:**

1. List the features of BIOS and UEFI firmware.
2. Explain how firmware updates improve hardware functionality.
3. Describe the role of firmware in initializing hardware during startup.