# Installing Ubuntu Base Image 20.04 ARM64 with Graphical User Interface on i.MX8MP Board

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➢ **NOTE: Installing Required Packages in Ubuntu:**

```
venkatesh@phytec:~$ sudo apt update
venkatesh@phytec:~$ sudo apt upgrade
venkatesh@phytec:~$ sudo apt install gparted
venkatesh@phytec:~$ sudo apt-get install qemu qemu-user-static
venkatesh@phytec:~$ sudo apt install minicom
```

# 1. Required Hardware.

- **phyCORE-i.MX8MP Board**: Main development board.
- **Minimum 1GB RAM**: Ensure the board has at least this amount of RAM.
- **Display**: HDMI or LVDS compatible display for visual output.
- **HDMI Cable**: For connecting the board to the display.
- **Power Adapter (+24V)**: To power the board.
- **MicroSD Card (16GB or larger)**: For installing the Ubuntu 20.04 base image and storing data.
- **USB Keyboard and Mouse**: For input during installation.
- **Ethernet Cable**: For network connectivity, if needed.
- **USB Cable**: For connecting to peripherals.

# 2. Downloading and preparing the SD Card Image.

➢ **NOTE: Download phytec-qt5demo-image-phyboard-pollux-imx8mp-2. sdcard image using the bellow command.**

```
venkatesh@phytec:~$ wget https://download.phytec.de/Software/Linux/BSP-Yocto-i.MX8MP/BSP-Yocto-NXP-i.MX8MP-PD22.1.0/images/ampliphy-vendor-xwayland/phyboard-pollux-imx8mp-2/phytec-qt5demo-image-phyboard-pollux-imx8mp-2.sdcard
```

- **Write the SD card image using the dd command:**
- **Insert your SD card and identify its device path (e.g., /dev/sdb).**

**venkatesh@phytec:~$** **sudo dd if=phytec-qt5demo-image-phyboard-pollux-imx8mp-2.sdcard of=/dev/sdb bs=4M status=progress && sync**

# 3. Modifying SD Card Partitions.

1. **Open GParted and locate your SD card** (**/dev/sdb**).
2. **Unmount the root partition** (**/dev/sdb2**).
3. **Delete the existing root partition** (**/dev/sdb2**).
4. **Create a new one with the following details:**
    - **Size: 14 × 1024 = 14336** MB (14 GB).
    - **File system**: **ext4.**
    - **Name**: **root.**
    - **Apply changes (✓)** and close GParted.

# 4. Mounting and Extracting Ubuntu Base Image

## 4.1. Mount the new root partition:

**venkatesh@phytec:~$** **lsblk**
**venkatesh@phytec:~$** **sudo mount /dev/sdb2 /mnt**

- **Note: Download ubuntu-base-20.04.1-base-arm64.tar.gz image using the bellow command.**

- **venkatesh@phytec:~$** **wget https://cdimage.ubuntu.com/ubuntu-base/releases/20.04/release/ubuntu-base-20.04.1-base-arm64.tar.gz**

- **Now, extract the Ubuntu base image (ubuntu-base-20.04.1-base-arm64.tar.gz) into the mounted directory (/mnt).**

```
venkatesh@phytec:~$ sudo tar -xvf ubuntu-base-20.04.1-base-arm64.tar.gz -C /mnt
```

### 4.2. Copy essential configurations:

```
venkatesh@phytec:~$ sudo cp /etc/resolv.conf /mnt/etc/resolv.conf
venkatesh@phytec:~$ sudo mount --bind /dev /mnt/dev
venkatesh@phytec:~$ sudo mount --bind /sys /mnt/sys
venkatesh@phytec:~$ sudo mount --bind /proc /mnt/proc
venkatesh@phytec:~$ sudo mount -t devpts devpts /mnt/dev/pts
```

### 4.3. Chroot into the Ubuntu environment:

- **NOTE: sudo chroot changes the root directory for the current running process and its children to /mnt.**

```
venkatesh@phytec:~$ sudo chroot /mnt
root@phytec:/#
```

## 5. Installing and configuring the Ubuntu Desktop GUI

### 5.1. Update the package lists:

```
root@phytec:/# apt update
```

### 5.2. Install the Ubuntu desktop environment:

```
root@phytec:/# apt install ubuntu-desktop
```

- **NOTE: During the installation process, you may encounter configuration prompts for graphical area, time zone, keyboard layout, and language. Here's how you would typically respond.**

## NOTE:

- ★ **Graphical Area (Region) : Select 6 for Asia.**
- ★ **Time Zone : Enter 44 for Kolkata.**
- ★ **Keyboard Layout : Choose 31 for English (US).**
- ★ **Language : Select 1 for English (US)**

### 5.3. Set up locale settings if you encounter warnings:

```
root@phytec:/# apt install locales
root@phytec:/# locale-gen en_US.UTF-8
root@phytec:/# update-locale LANG=en_US.UTF-8
root@phytec:/# locale-gen en_IN.UTF-8
```

- **NOTE: If you encounter any libc-bin related errors, run bellow command.**

```
root@phytec:/# sudo apt-get install --reinstall libc-bin
```

### 5.4. Install essential packages:

```
root@phytec:/# apt upgrade
root@phytec:/# apt install sudo
root@phytec:/# sudo apt install build-essential
root@phytec:/# sudo apt install net-tools network-manager
root@phytec:/# sudo apt install iputils-ping
root@phytec:/# sudo apt install nano
root@phytec:/# sudo apt install lightdm
```

```
root@phytec:/# sudo apt install xserver-xorg-video-fbdev xserver-xorg-video-vesa
```

# 6. Adding a New User

## 6.1. Create a new user phytec:

```
root@phytec:/# adduser phytec
Adding user `phytec' ...
Adding new group `phytec' (1000) ...
Adding new user `phytec' (1000) with group `phytec' ...
Creating home directory `/home/phytec' ...
Copying files from `/etc/skel' ...
New password:
Retype new password:
passwd: password updated successfully
Changing the user information for phytec
Enter the new value, or press ENTER for the default
Full Name []: phytec
Room Number []: phytec
Work Phone []:
Home Phone []:
Other []:
Is the information correct? [Y/n] Y
```

## 6.2. Add the user to the sudo group:

```
root@phytec:/# usermod -aG sudo phytec
```

### 6.3. Verify the group membership:

```
root@phytec:/# groups phytec
phytec : phytec sudo
root@phytec:/#
```

## 7. Assigning permissions to the above created user account:

### 7.1. Open the visudo file to grant sudo privileges:

```
root@phytec:/#  visudo
```

### 7.2. In the visudo file, find the following line:

```
root ALL=(ALL:ALL) ALL
```

### 7.3. Replace root with the username you created earlier (in this case, phytec), so it looks like this:

```
phytec ALL=(ALL:ALL) ALL
```

### 7.4. Save and exit the editor (usually by pressing Ctrl+X, then Y, and Enter).

## 8. Checking if we can perform the update:

- **Switch to the New User (phytec):**

```
root@phytec:/# su - phytec
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
phytec@phytec:~$ sudo apt update
[sudo] password for phytec:
```

```
phytec@phytec:~$ sudo apt upgrade
phytec@phytec:~$ exit
exit
root@phytec:/# exit
```

- **Unmount file systems**

```
venkatesh@phytec:~$ sudo umount /mnt/dev
venkatesh@phytec:~$ sudo umount /mnt/proc
venkatesh@phytec:~$  sudo umount /mnt/sys
venkatesh@phytec:~$  sudo umount /mnt
venkatesh@phytec:~$  sudo sync
```

- **NOTE: If target is busy use bellow commands to unmount**

```
venkatesh@phytec:~$ sudo lsof /mnt
venkatesh@phytec:~$ sudo fuser -m /mnt
venkatesh@phytec:~$ sudo fuser -k /mnt/
venkatesh@phytec:~$ sudo umount -l /mnt
```

# 9. Booting the Ubuntu Image on i.MX8MP Board

1. **Insert the SD card into the i.MX8MP board and power it on.**
2. **Use a terminal emulator like Minicom or Putty to access the terminal via UART (e.g., /dev/ttymxc0).**
3. **Log in with the username phytec and the password you created earlier.**

# 10. Configuring X11 for Display Settings

## 10.1. Edit the X11 configuration:

**phytec@phytec:~$** sudo nano /etc/X11/xorg.conf

## 10.2. Add modelines for different resolutions. Example configuration:

```
Section "Monitor"
Identifier "default"
# Add multiple Modelines for different resolutions
Modeline "1920x1080_60.00" 173.00 1920 2048 2248 2576 1080 1083 1088 1120 +hsync +vsync
Modeline "1600x900_60.00" 118.25 1600 1696 1856 2112 900 903 908 934 -hsync +vsync
Modeline "1280x1024_60.00" 108.00 1280 1328 1440 1688 1024 1025 1028 1066 -hsync +vsync
Modeline "1280x800_60.00" 83.46 1280 1352 1480 1680 800 803 809 831 +hsync -vsync
Modeline "1024x768_60.00" 65.00 1024 1048 1184 1344 768 771 777 806 -hsync -vsync

Option "PreferredMode" "1920x1080_60.00" # Set the default resolution
EndSection

Section "Device"
Identifier "MyGPU"
Driver "fbdev" # Or use "vesa" if "fbdev" doesn't work
EndSection

Section "Screen"
Identifier "Screen0"
Device "MyGPU"
Monitor "default"
DefaultDepth 24

SubSection "Display"
Depth 24
Modes "1920x1080_60.00" "1600x900_60.00" "1280x1024_60.00" "1280x800_60.00" "1024x768_60.00"
EndSubSection
EndSection
```

**10.3. Save and exit (Ctrl+X, then Y, and Enter).**

### 10.4. Restart LightDM:

- **NOTE: After making changes to the display settings or user configuration, restart the LightDM service to apply the changes.**

**phytec@localhost:~$ sudo systemctl restart lightdm**

## 10.5. Rename the Hostname

- **NOTE: Edit the hostname to customize your system's identity on the network. You can change the hostname from localhost.localdomain to your desired name (e.g., ubuntu).**

**phytec@localhost:~$ sudo nano /etc/hostname**
**Localhost.localdomain**

- **Action: Rename localhost.localdomain to ubuntu.**
- **Save and Exit:**

## 10.6. Reboot the System

**phytec@localhost:~$ sudo reboot**

## 10.7. User Login

- **Log in using your username (phytec) and the associated password.**
- **In Dispaly username (phytec) will display and login with password.**

# 11. Network Setup

## 11.1. Bring up the Ethernet interface:

```
phytec@ubuntu:~$ sudo ip link set eth1 up
```

## 11.2. Obtain an IP address:

```
phytec@ubuntu:~$ sudo dhclient eth1
```

## 11.3. Verify the network connection:

```
phytec@ubuntu:~$ ip a
phytec@ubuntu:~$ ping google.com
phytec@ubuntu:~$ ping 8.8.8.8
phytec@ubuntu:~$ sudo apt update
phytec@ubuntu:~$ sudo apt upgrade
```