1.) Download the firmware file and partition image from Debians Server

https://deb.debian.org/debian/dists/bookworm/main/installer-arm64/current/images/netboot/SD-card-images/

https://deb.debian.org/debian/dists/bookworm/main/installer-arm64/current/images/netboot/SD-card-images/firmware.none.img.gz
https://deb.debian.org/debian/dists/bookworm/main/installer-arm64/current/images/netboot/SD-card-images/partition.img.gz

2.) Merge the firmware file and partition image into bootable Debian image

zcat firmware.none.img.gz partition.img.gz > h64_debian.img

3.) Flash bootable Debian image onto SD-Card

lsblk	find device name of your SD-Card
sudo dd if=/dev/zero of=/dev/sdX bs=446 count=32770	wipe the Boot Sector of your SD-Card
sudo dd if=h64_debian.img of=/dev/sdX bs=4M conv=fsync	flash Debian image to your SD-Card

replace X with the device letter of your SD-Card

4.) Prepare the eMMC-Module for the Pine64 H64B SBC (16GB eMMC module (30310400 sectors))

sudo fdisk /dev/sdX

type **o** this will clear out any partitions on the drive
type **p** to list partitions, there should be no partitions left
type **n**, then **p** for primary, **1** for the first partition on the drive, **32768** for the first sector, and **1056767** for the last sector, then type **a**
then type **n**, then **p** for primary, **2** for the second partition on the drive, **1056768** for the first sector,and **28213246** for the last sector, then
type **n**, then **p** for primary, **3** for the third partition on the drive, **28213247** for the first sector, and **30310399** for the last sector,
then type **t**, and **3** for the third partition, and **82** for the Hex Code,
then write the partition table and exit by typing **w**

(steps above create 500M for /boot, 12.9GiB for / and 1GiB for swap)

We will format the newly created partitions later with the Debian Installer.

The 500 MiB partition format as ext2 and set Mount point to /boot and set Label to boot.
The 12.9 GiB partition format as ext4 and set Mount point to / and set Label to root.
The 1 GiB partition format as swap.

5.) Download Arm Trusted Firmware from Debians Server

https://packages.debian.org/trixie/arm64/arm-trusted-firmware/download

extract the bl31.bin file from the package,
the file is located in arm-trusted-firmware_2.10.0+dfsg-1_arm64.deb/data.tar.xz/./usr/lib/arm-trusted-firmware/sun50i_h6/

copy the bl31.bin file into the u-boot folder created at step 7.

6.) Install Cross Compiler for building U-Boot on our x86_64 Debian Host

```
sudo apt install device-tree-compiler build-essential libssl-dev python3-dev bison
sudo apt install flex libssl-dev swig gcc-aarch64-linux-gnu gcc-arm-none-eabi
sudo apt install gcc make bc git binutils-aarch64-linux-gnu
```

7.) Build U-Boot on our x86_64 Debian Host

```
cd /home/youruser/assets

git clone git://git.denx.de/u-boot.git

cd u-boot
git tag                                   remember last stable (v2023.10)
git checkout v2024.01

make CROSS_COMPILE=aarch64-linux-gnu- BL31=bl31.bin pine_h64_defconfig
make -j4 CROSS_COMPILE=aarch64-linux-gnu- BL31=bl31.bin

cp -r /home/youruser/assets/u-boot/u-boot-sunxi-with-spl.bin /home/youruser/assets/
cd ..
```

8.) Flash U-Boot (Bootloader) onto the SD-Card for the Pine64 H64B SBC

```
lsblk                                     find device name of your SD-Card

sudo dd if=u-boot-sunxi-with-spl.bin of=/dev/sdX bs=1024 seek=8 conv=notrunc
                                          replace X with the device letter of your SD-Card
                                          once finished, unmount the SD-CARD
```

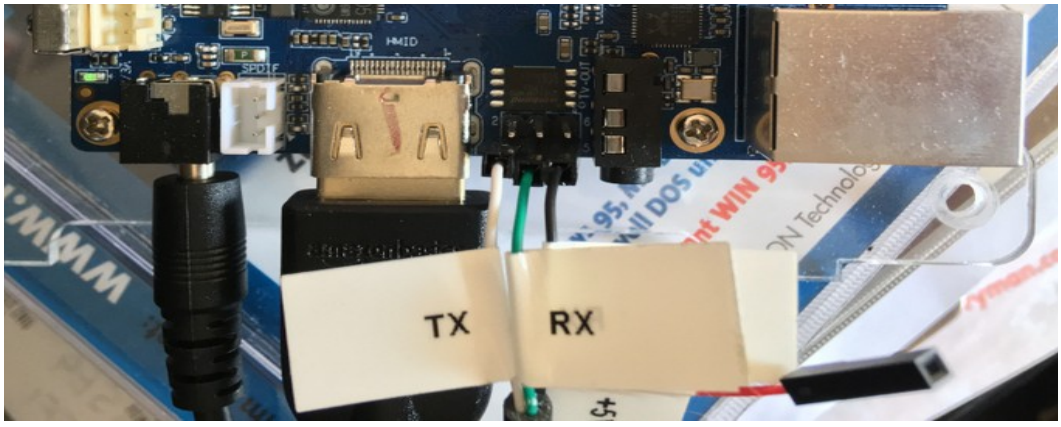
9.) Flash U-Boot (Bootloader) onto the eMMC-Module for the Pine64 H64B SBC

```
lsblk                                     find device name of your eMMC

sudo dd if=u-boot-sunxi-with-spl.bin of=/dev/sdX bs=1024 seek=8 conv=notrunc
                                          replace X with the device letter of your eMMC-Module
                                          once finished, unmount the eMMC-Module
```

10.) Install the eMMC-Module onto your Pine64 H64B SBC, insert the SD-Card, connect HDMI, Mouse and Keyboard, USB to serial (UART) adapter, USB to Ethernet adapter and power it up, now follow the Debian Installer. (build in Ethernet, WiFi and USB3 do not work during installation)

```
sudo screen /dev/ttyUSB0 115200           connects you to the serial output of the Pine64 H64B
                                          CTRL a k exits screen
```



EXT Connector:
Pin 1 –> TX
Pin 3 –> RX
Pin 5 –> Ground

Select the USB Ethernet Adapter as primary network device for the installation.

Select Manual partitioning and format the already created partitions as mentioned in Step 4.

In "Software selection" select only SSH server and standard system utilities

Ignore the "No boot loader installed" warning and <Continue>

At the "Finished the installation" prompt select <Go Back> and from the
"Debian Installer main menu" select Execute a sell and <Continue> and now continue with step 10.

11.) Create essential but yet missing files

```
chroot target
```

DTB file handling

```
mkdir /boot/dtbs
```

nano /etc/kernel/postinst.d/copy-dtbs create as below

```
#!/bin/sh

set -e
version="$1"

echo Copying current dtb files to /boot/dtbs….
cp -a /usr/lib/linux-image-${version}/. /boot/dtbs/
```

```
chmod +x /etc/kernel/postinst.d/copy-dtbs

/etc/kernel/postinst.d/copy-dtbs `uname -r`
```

Bootloader configuration

```
mkdir /boot/extlinux
```

nano /boot/extlinux/extlinux.conf create as below

```
TIMEOUT 2
DEFAULT debian

LABEL debian
        MENU LABEL Debian
        KERNEL /vmlinuz
        INITRD /initrd.img
        FDT /dtbs/allwinner/sun50i-h6-pine-h64-model-b.dtb
        APPEND console=ttyS0,115200 console=tty1 root=LABEL=root rw rootwait
```

12.) Hide kernel messages during boot

nano /etc/sysctl.conf amend as below

```
# Uncomment the following to stop low-level messages on console
kernel.printk = 3 4 1 3
```

13.) Set primary network interface back to internal Ethernet Port

nano /etc/network/interfaces amend as below

```
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

source /etc/network/interfaces.d/*

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto end0
allow-hotplug end0
iface end0 inet dhcp
```

14.) Return back to the Debian Installer

```
exit

exit
```

From the "Debian Installer main menu" select Finish the installation and <continue> and now continue with step 15.

15.) Once installation is finished, add missing WiFi/Bluetooth firmware for RTL8723BS Chipset

nano /etc/apt/sources.list amend as below

```
# deb http://deb.debian.org/debian/ bookworm main

deb http://deb.debian.org/debian/ bookworm main non-free-firmware
deb-src http://deb.debian.org/debian/ bookworm main non-free-firmware

deb http://deb.debian.org/debian-security bookworm-security main non-free-firmware
deb-src http://deb.debian.org/debian-security bookworm-security main non-free-firmware

deb http://deb.debian.org/debian/ bookworm-updates main non-free-firmware
deb-src http://deb.debian.org/debian/ bookworm-updates main non-free-firmware


apt update
apt install firmware-realtek
```

16.) Perform system update, enable filesystem check at boot, install and enable sudo for your user

```
apt update
apt upgrade
apt full-upgrade
apt autoremove
apt autoclean

tune2fs -c 1 /dev/mmcblkXp1                use lsblk to find correct block device
tune2fs -c 1 /dev/mmcblkXp2
```

```
apt install sudo

adduser youruser sudo
```

Done, enjoy your setup.