Turning Your Unused STB into a Mini-Server with Ubuntu Server.

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Turning Your Unused TV's Set Top Box Into A Home Server (with Ubuntu Server)

Akmal Pratama

Chapter A: Introduction.

What is STB?

A Set Top Box is a device that allows users to view video content from specific internet video providers via the internet. Also known as a Set Top Unit, these boxes convert a digital television signal to analog to be viewed on a conventional television set, or enable cable or satellite television to be viewed.

(Source: haivision.com)

We’re not talking about this …

But we're talking about this …

Not too expensive!

Star Bluetooth Smart TV Box Sets 2+16G 4+64G Android TV BOX 10 4K HDR 2.4G&5.8G Wifi TV Receiver

4.6 ★★★★★ | 1,4RB Ratings | 3RB Sold

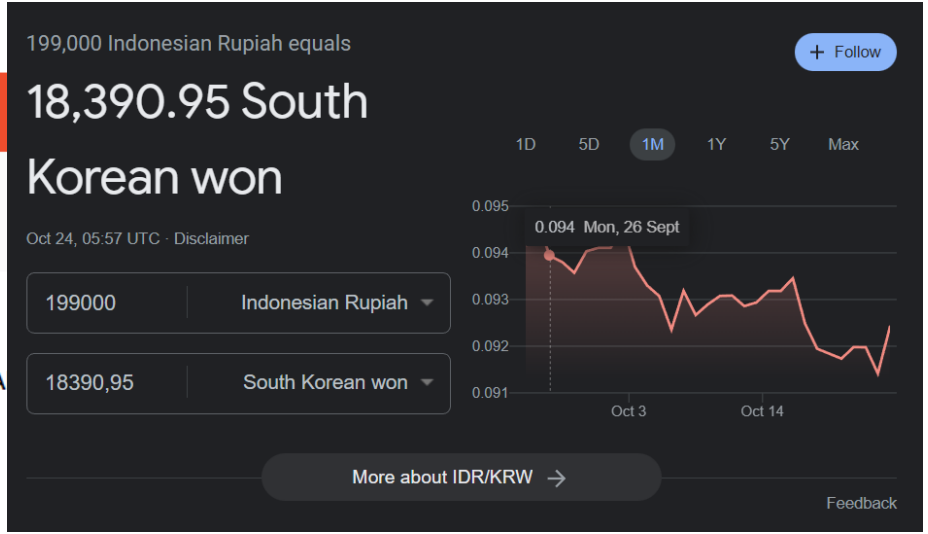
INGATKAN DISKON Special Price IDR 152,000

~~IDR 560,000~~ Rp199,000 64% OFF

Shipping Free shipping

Shipping To CENTRAL JA

Shipping Fee Rp0



Pros & Cons by using STB.

Pros

1. Way far better quality streaming compared by Antenna!.

2. More channels and features available and can be watched by the help of STB.

3. Turning your old TV into functioning like a Smart TV running Android OS.

Cons

1. Highly cost monthly fees from the cable provider. 😭

2. Requires a high-speed internet connection in order to work smoothly.

3. Offline authentication servers making it barely usable.

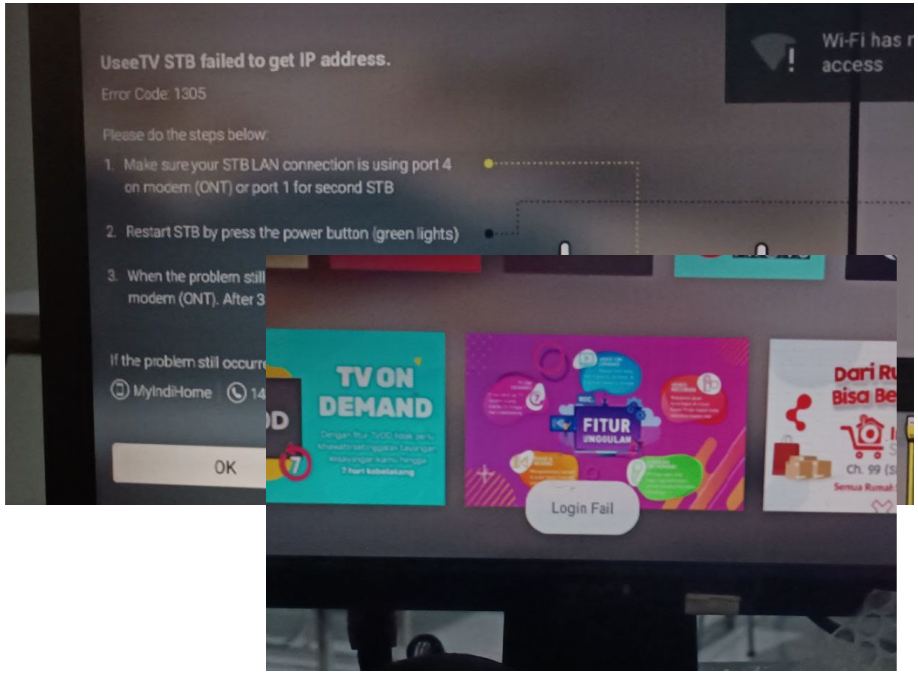
4. Locked system configurations + Offline servers = Lack of usage.

Why is it rarely used today?

1. Every TV that's made as of right now are all supporting Digital Channels.

2. Most of old subscription-based STB server are down already. Leaving the item unusable.

3. Not too customizable, due to lack of features and modifications ability.



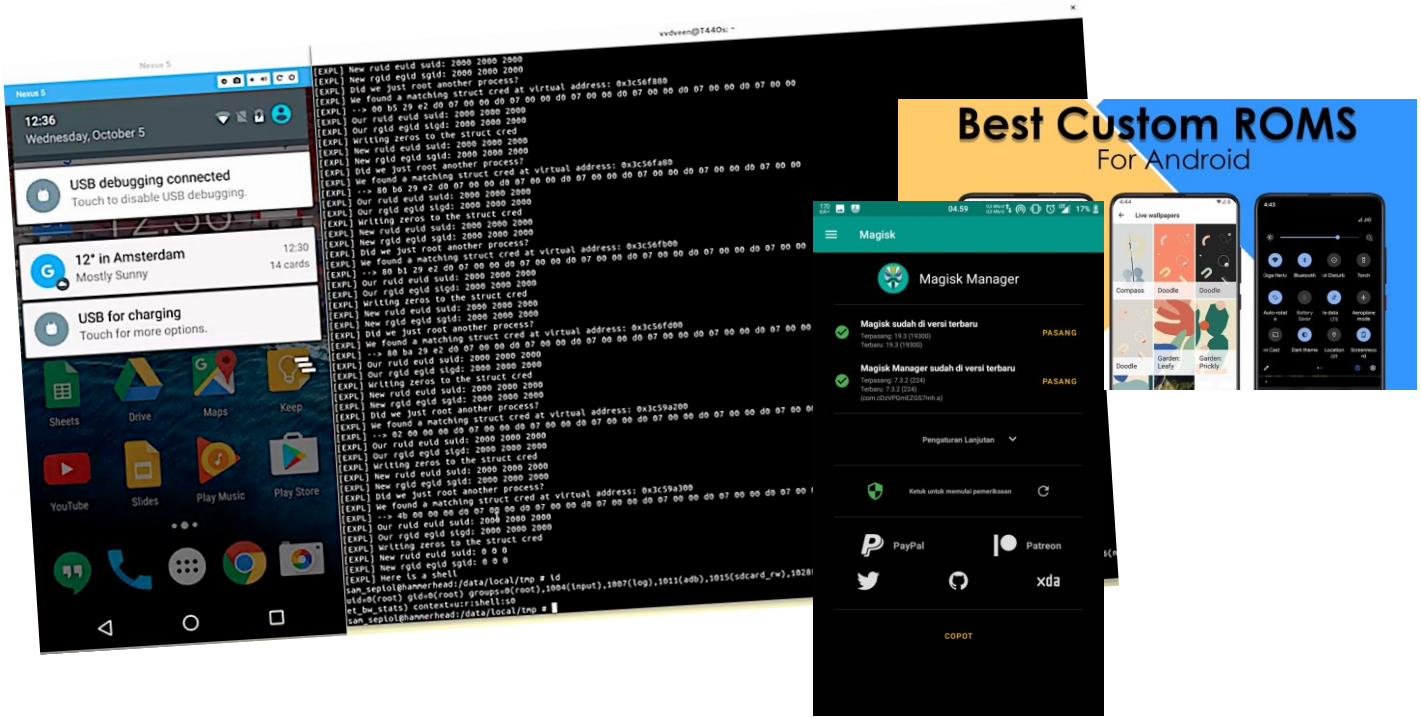
What OS does most STB runs on?

--		Android TV	-	Android Open Source Project (...	Leanback Launcher
--		Xbox OS	-	Windows 10	Xbox UI
--		Google TV	-	Android Open Source Project (...	GoogleTV Launcher
--		PlayStation OS	-	FreeBSD	PlayStation UI
--		Batocera.linux	-	Recalbox	Emulatorstation or Kodi
--		SteamOS	-	Debian	Steam Big Picture, Gnome

Android? Good news!

android

So customizable!



One of the requirements to unlock limitations of every Android device, is…

One of the requirements to unlock limitations of every Android device, is…

Chapter B: Problems

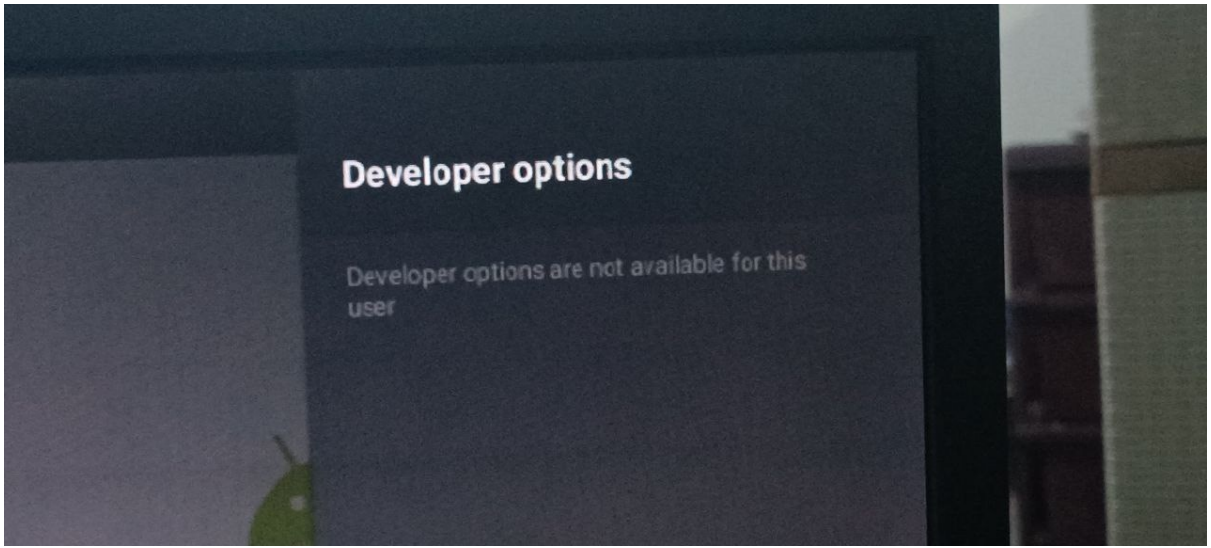
The only STB in my organization have is just this Indihome B860H V5 with a new type of board.

Bad news! We can’t directly root the device!

Why though?

Why though?

Blocked Developer Tools

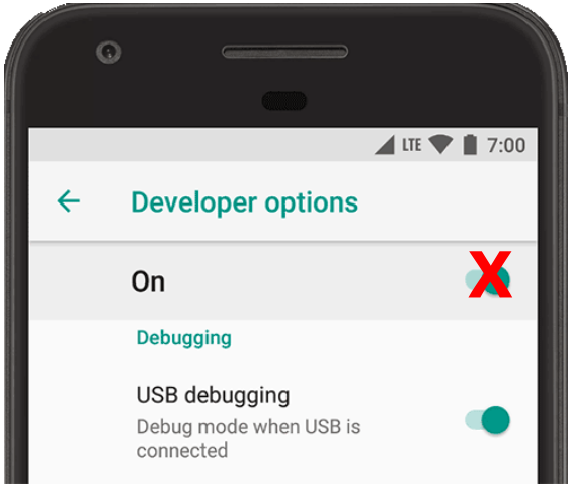


Why though?

Can’t install *.apk files.

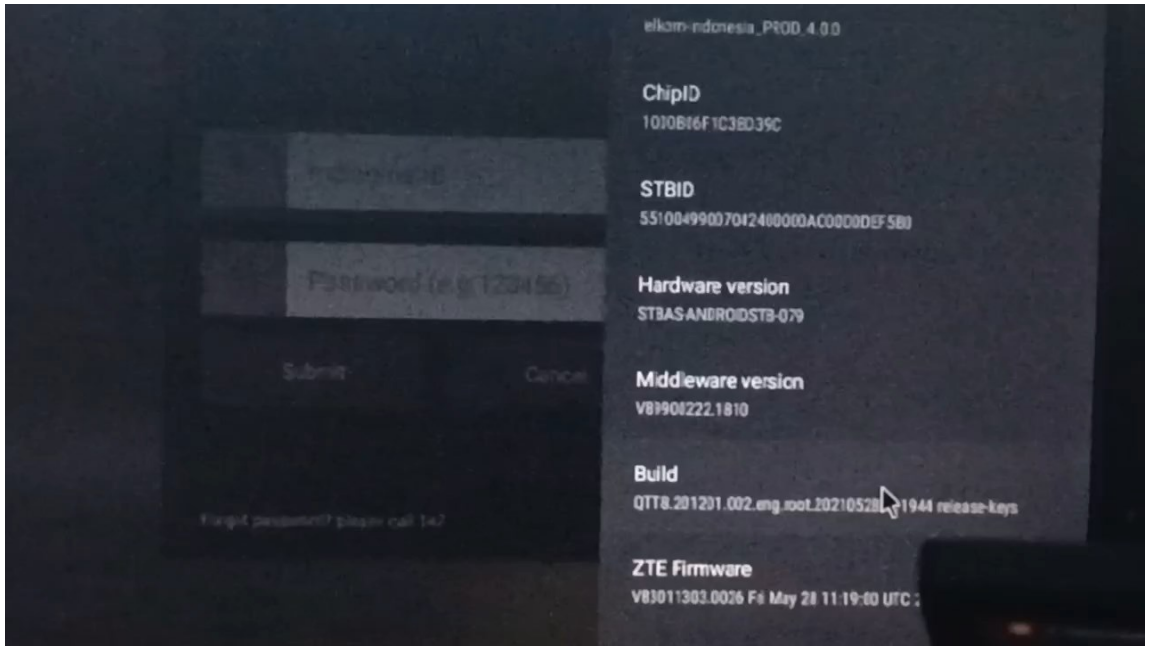
Why though?

Can’t connect to Shell.



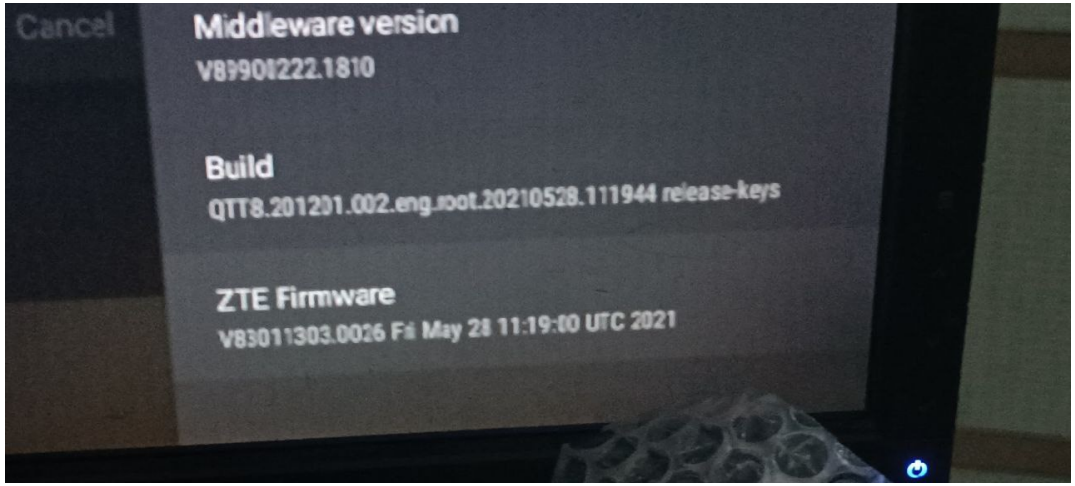
Why though?

Blocked Developer Tools



Why though?

Built-in firmware is locked totally.



Why though?

Solutions?

We’re going to replace the entire firmware of the STB.

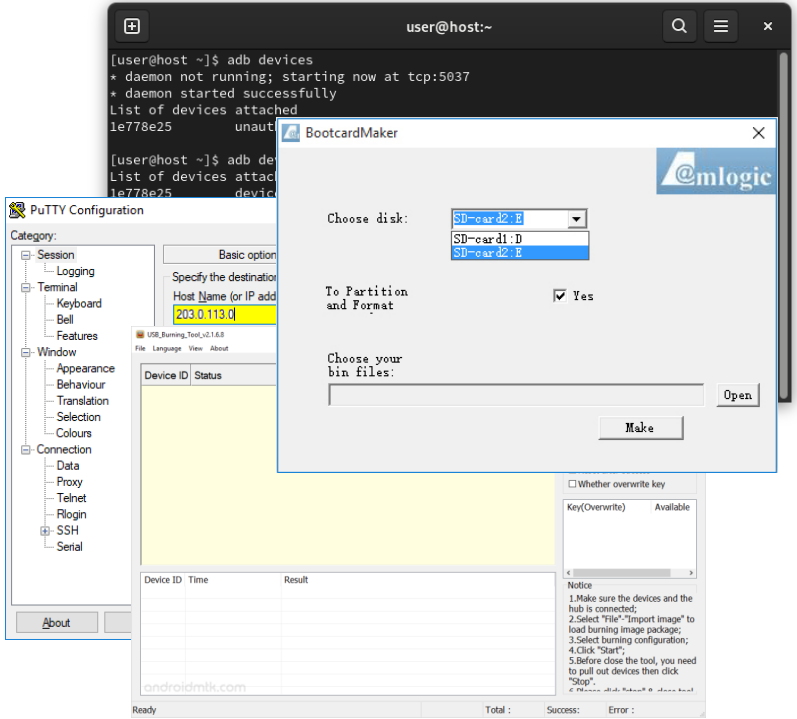
So, everything is possible!.

Chapter C:
Preparation.

Software used to flash custom firmwares?

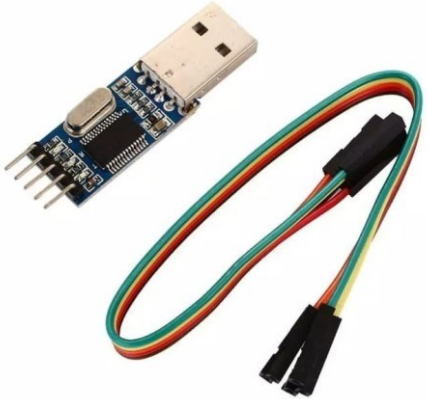
Software used to flash custom firmwares?

- ADB Utilities / Terminal.
- PUTTY
- USB Burning Tool.
- Amlogic Bootcard Maker.

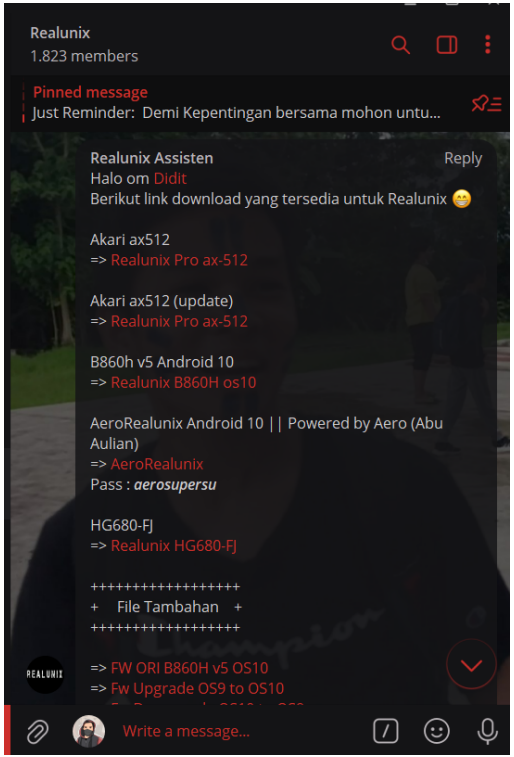


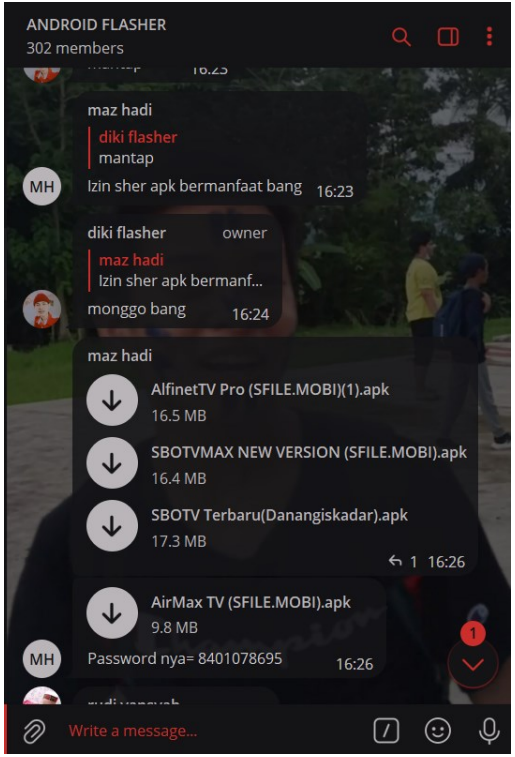
Prepare the following tools:

1. The STB (of course)
2. Female-to-Female jumper wires
3. USB-to-TTL
4. USB-to-USB
5. SD Card



Searching for Pre-Rooted Firmwares…





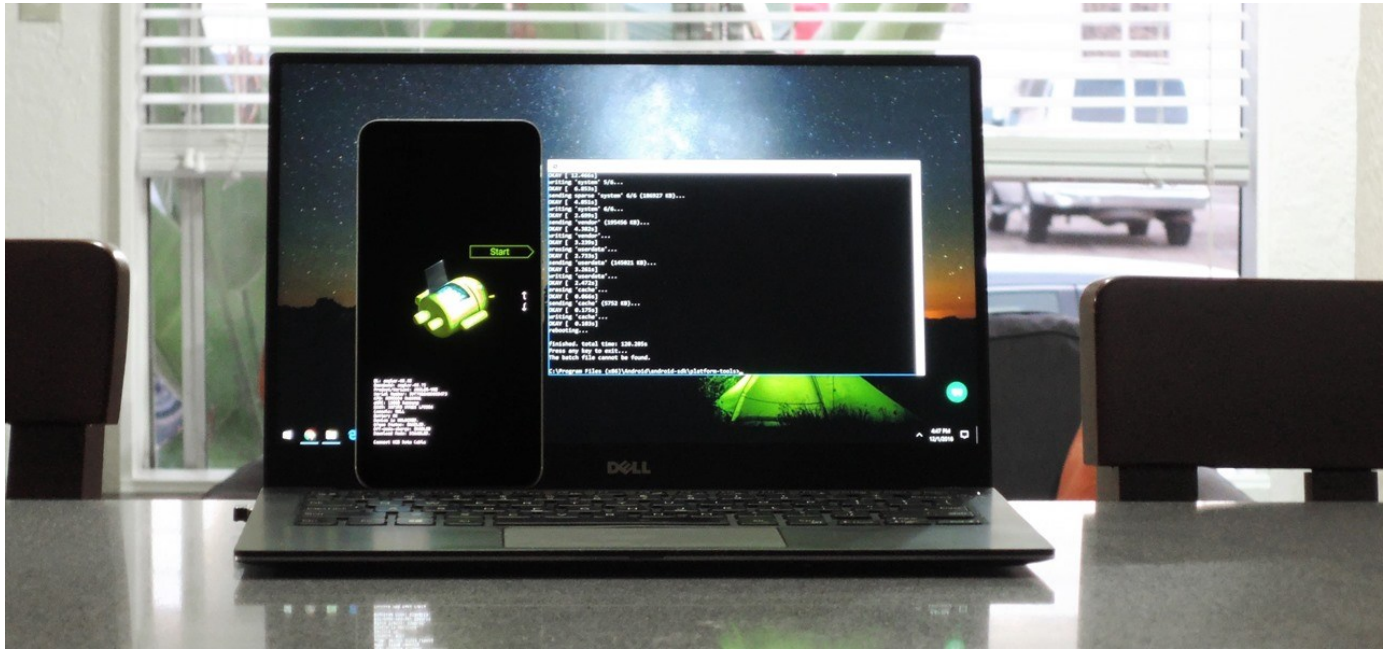
Searching for Pre-Rooted Firmwares…

Realunix: https://t.me/realunix1212
Android Flasher: https://t.me/+szzBKdQK-PI2NDE1
(INDONESIAN-SPEAKING GROUP CHAT)

Searching for Pre-Rooted Firmwares…

Once you found the perfect one, download the modified firmware. We’re going to use this in the USB Burning Tool.

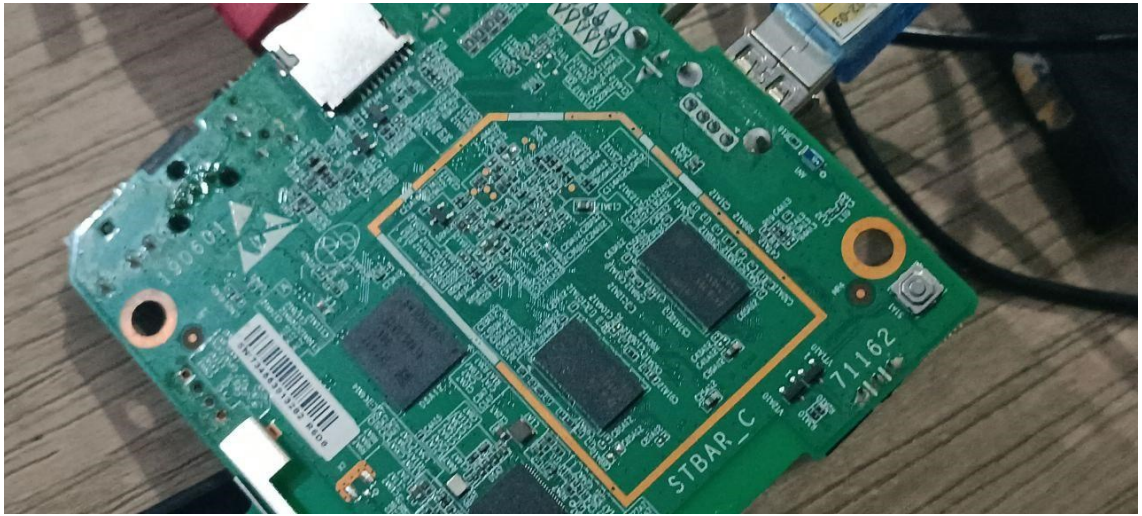
Let’s start flashing!



Chapter D:
Flashing Process.

Steps to Flash:

1. Unbox the Body of the STB so we can access the pins in the Internal board.



Steps to Flash:

2. Search for the test-point. For my model, the short-pin point is at the C71A6. You can use a screw driver or a needle to short-pin.

Steps to Flash:

3. Prepare your USB-to-TTL and Hook Clip. And search for the Hook Clip point. And check which one is the point GND, TX and RX. (i get help from community for this)

Steps to Flash:

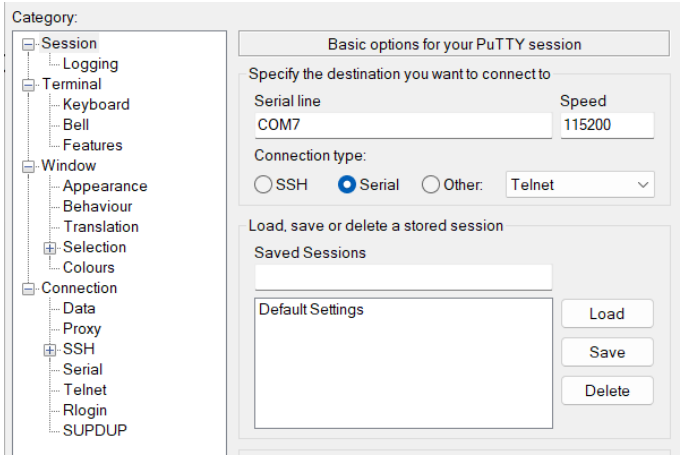
4. Connect the USB-to-USB from the STB to the computer.

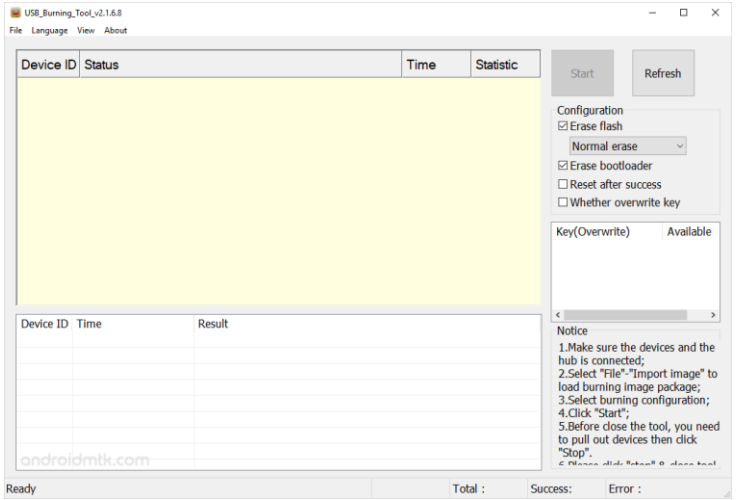
Steps to Flash:

5. Connect all the Hook Clip to the desired points, and match the female cable in the USB-to-TTL as the points detail. (RX to RX, GND to GND, TX to TX)

Steps to Flash:

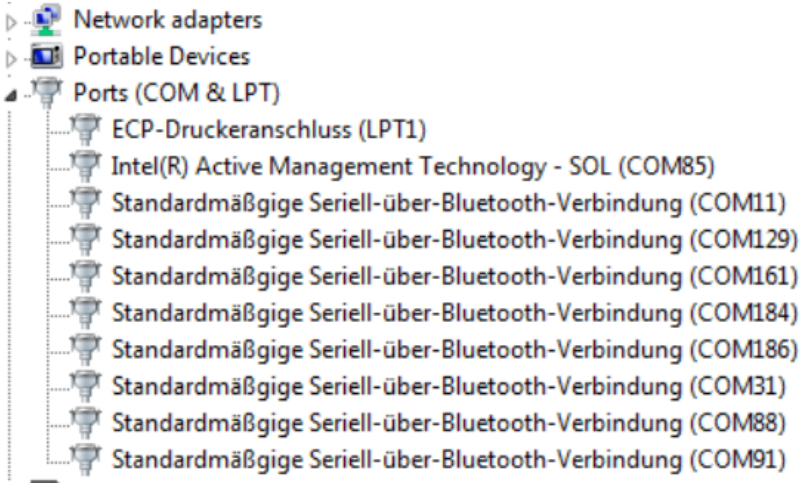
6. Once you're done, open up both PUTTY and USB Burning Tool. On PUTTY, connect to the serial line and set the speed to 115200.





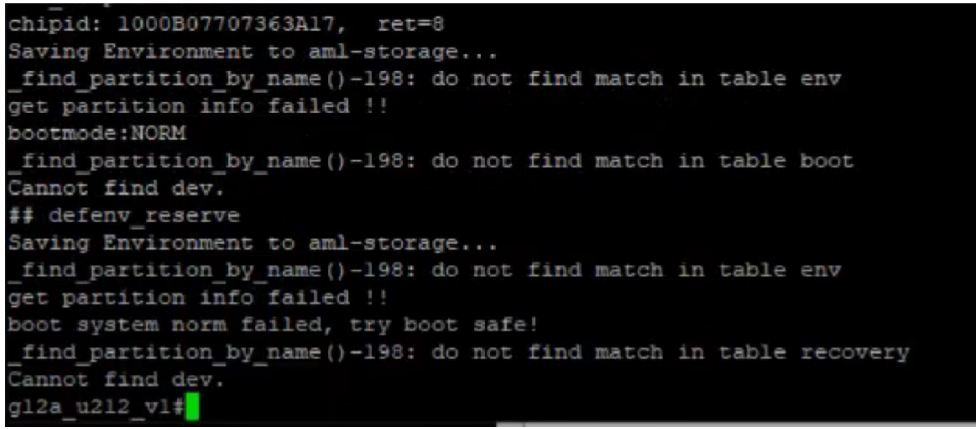
Steps to Flash:

7. If you don’t know what the COM port is, go to Device Manager and check for “Ports (COM & LPT)” dropdown. You’ll see all available ports like below.



Steps to Flash:

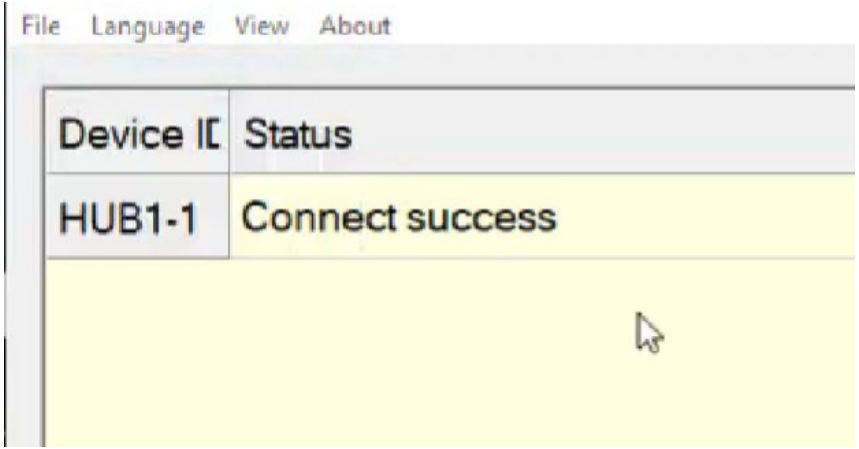
8. Now, once you connect both. Power on the STB and directly short-pin the points (C71A6). If the PUTTY outputs a shell prompt (g12a_u212_vl#) Means that it’s successful.



Steps to Flash:

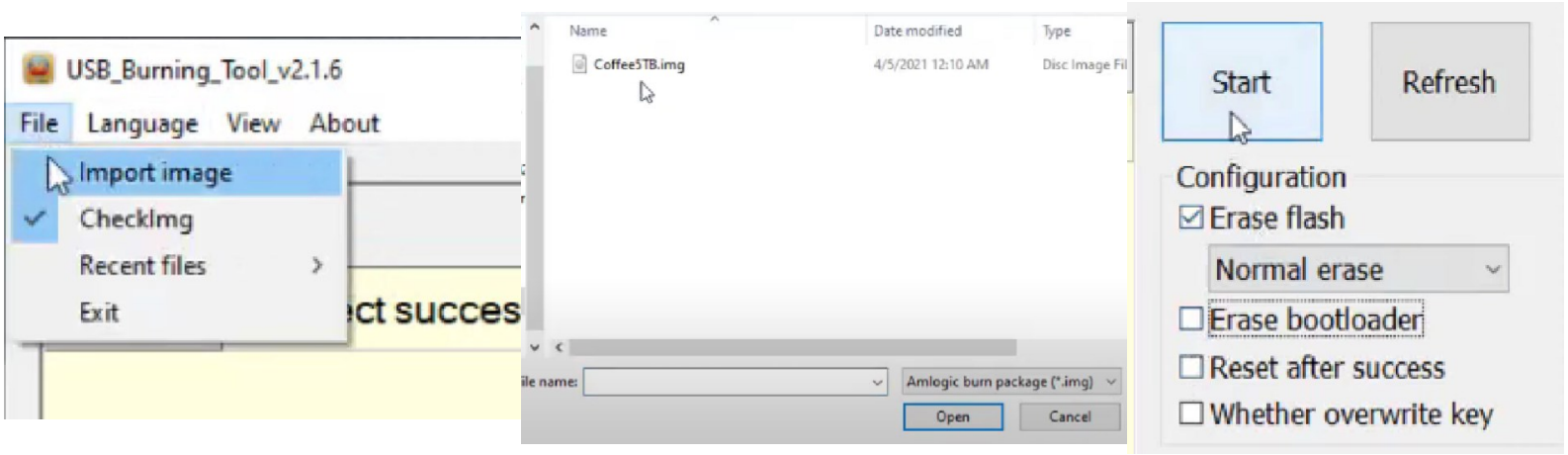
9. Now go into the Update Mode, by typing “update” in the shell prompt. The USB Burning Tool will shows a device saying “Connect success”.

```
g12a_u212_v1#update
InUsbBurn
[MSG]sof
Set Addr 12
Get DT cfg
Get DT cfg
Get DT cfg
set CFG
```



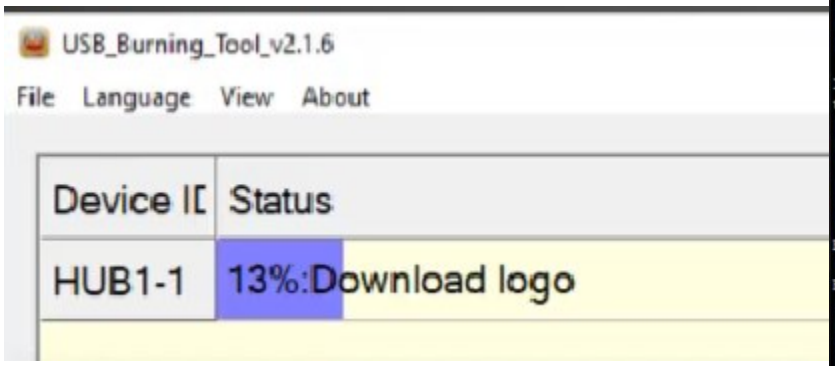
Steps to Flash:

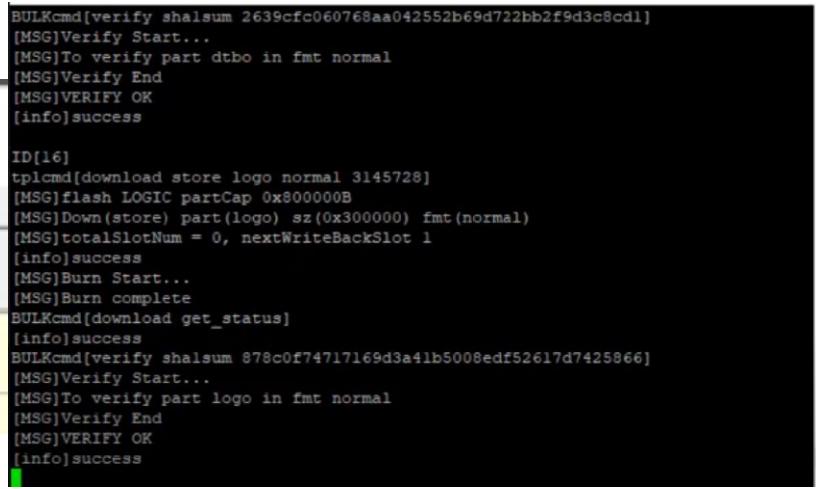
10. Once connect success, go to File > Import Image. Select the firmware image. And UNCHECK “ERASE BOOTLOADER” then Click on Start.



Steps to Flash:

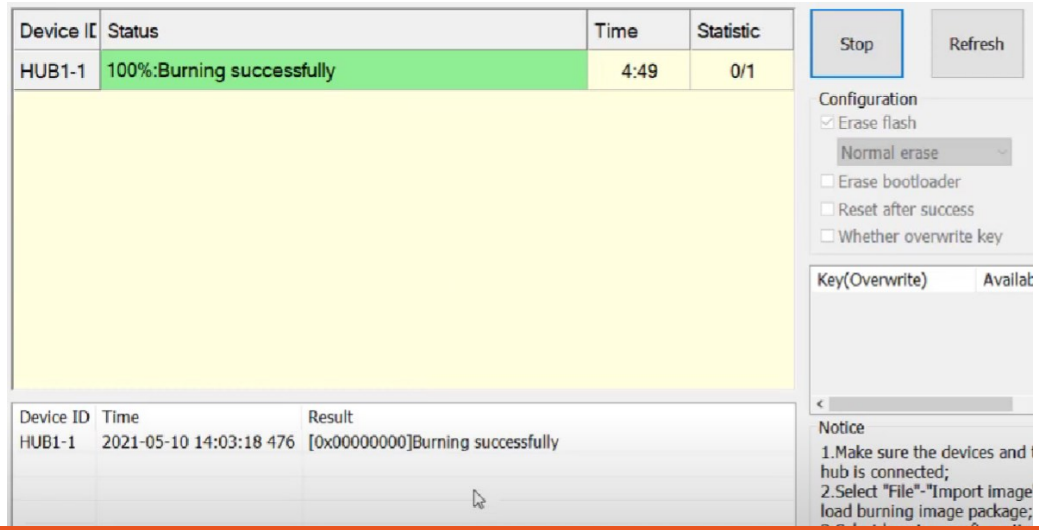
11. Now just wait until the process is finished. You can see the flashing output directly by the PUTTY console. Do not turn off or unplug any cable.





Steps to Flash:

12. If you do the steps correctly, this will shows up. The progress bar turned green and an output “Burning successfully”. Your rooted STB is ready!.



Chapter E:
Turning it to a server.

About Armbian

Armbian is a computing build framework that allows users to create ready-to-use images with working kernels in variable user space configurations for various single board computers.

It provides various pre-build images for some supported boards. These are usually Debian or Ubuntu flavored.

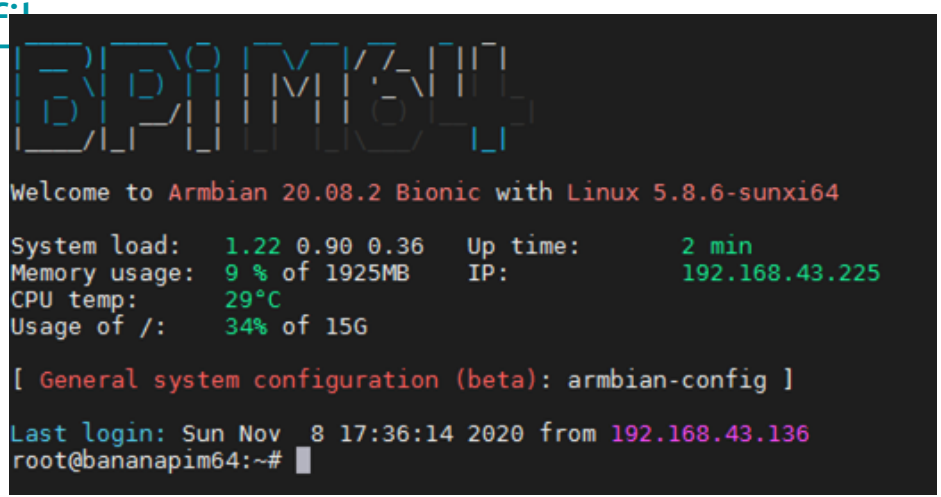
(Source: wikipedia.org)

Armbian Focal Server

The Armbian Focal is based on Ubuntu Focal (20.04)

https://www.mediafire.com/file/f4urfcvpekca216/m03l.id-armbian-focal-current-5.9.0-fullsetting-servermode.docker.inject.AP.img.xz/fi

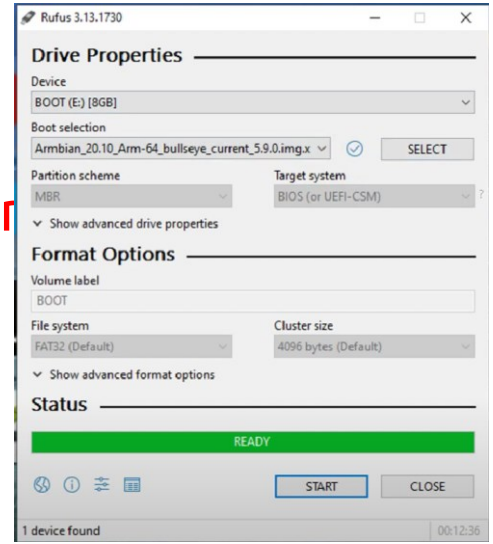
https://bit.ly/ArmbianFocalImage



Steps to Flash:

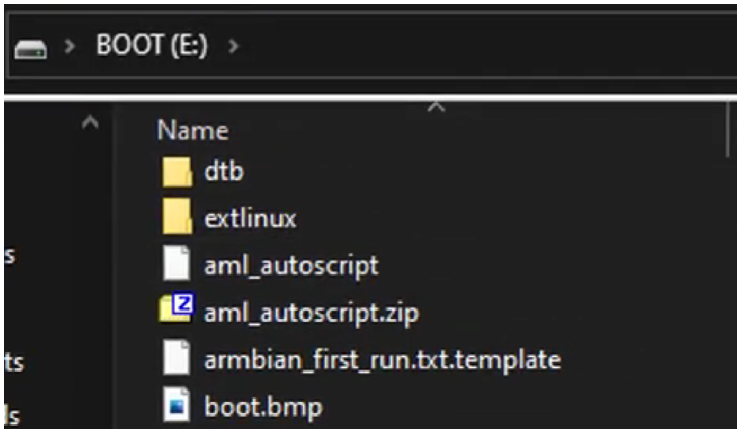
1. Prepare the SD Card and it's adapter. And open up Rufus or other image flashing softwares. Simply import the image file, and select the Device.

   (Make sure to set File System FAT32, Partition Scheme MBR, and Target Syster is BIOS)



Steps to Flash:

2. Once the file is flashed, go into the SD Card and open extlinux/extlinux.conf in your text editor. And scroll down, uncomment the second part of # aml s9xxx




```
#FDT /dtb/rockchip/rk3399-roc-pc-mezzanine.dtb
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=uart

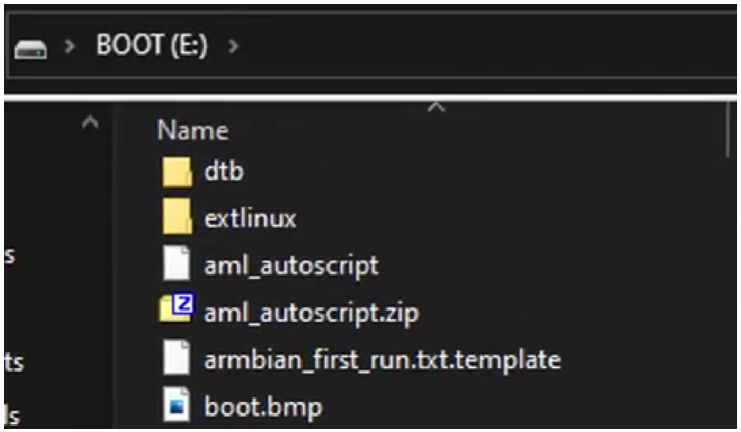
# rk-3328
#FDT /dtb/rockchip/rk3328-roc-pc.dtb
#FDT /dtb/rockchip/rk3328-box-trn9.dtb
#FDT /dtb/rockchip/rk3328-box.dtb
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=uart

# aw h6
#FDT /dtb/allwinner/sun50i-h6-tanix-tx6.dtb
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=ttyS
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=ttyS

# aml s9xxx
#FDT /dtb/amlogic/meson-gxbb-p200.dtb
FDT /dtb/amlogic/meson-gxl-s905x-p212.dtb
#FDT /dtb/amlogic/meson-gxm-q200.dtb
#FDT /dtb/amlogic/meson-g12a-x96-max.dtb
```

Steps to Flash:

2. Once the file is flashed, go into the SD Card and open extlinux/extlinux.conf in your text editor. And scroll down, uncomment the second part of # aml s9xxx

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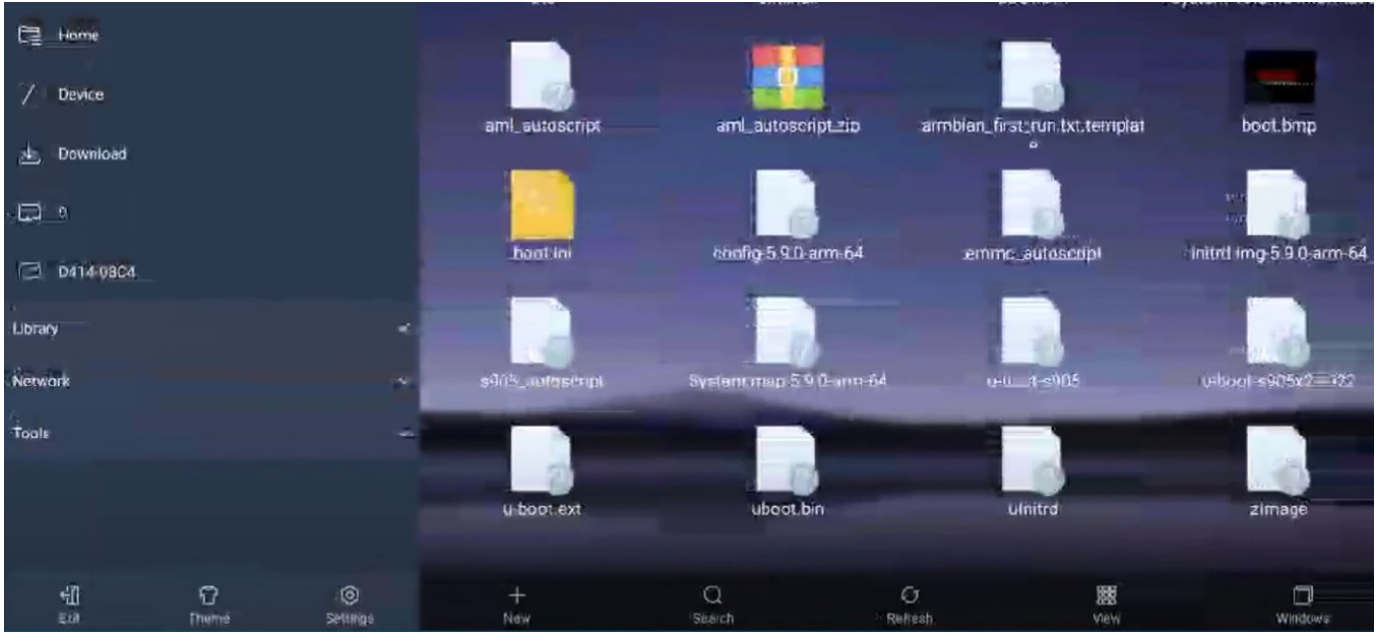
# rk-3328
#FDT /dtb/rockchip/rk3328-roc-pc.dtb
#FDT /dtb/rockchip/rk3328-box-trn9.dtb
#FDT /dtb/rockchip/rk3328-box.dtb
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=uart

# aw h6
#FDT /dtb/allwinner/sun50i-h6-tanix-tx6.dtb
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=ttyS
#APPEND root=LABEL=ROOTFS rootflags=data=writeback rw console=ttyS

# aml s9xxx
#FDT /dtb/amlogic/meson-gxbb-p200.dtb
FDT /dtb/amlogic/meson-gxl-s905x-p212.dtb
#FDT /dtb/amlogic/meson-gxm-q200.dtb
#FDT /dtb/amlogic/meson-g12a-x96-max.dtb
```

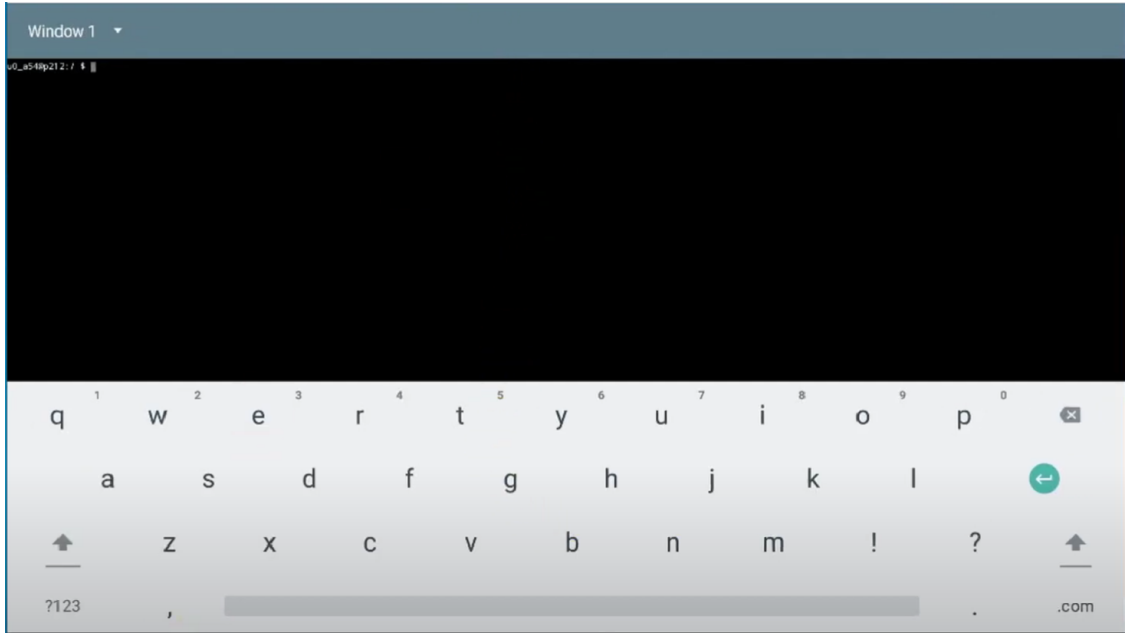
Steps to Flash:

3. Eject the SD Card from PC, and insert it to the STB.



Steps to Flash:

4. Open the Terminal App or Connect to ADB Shell.

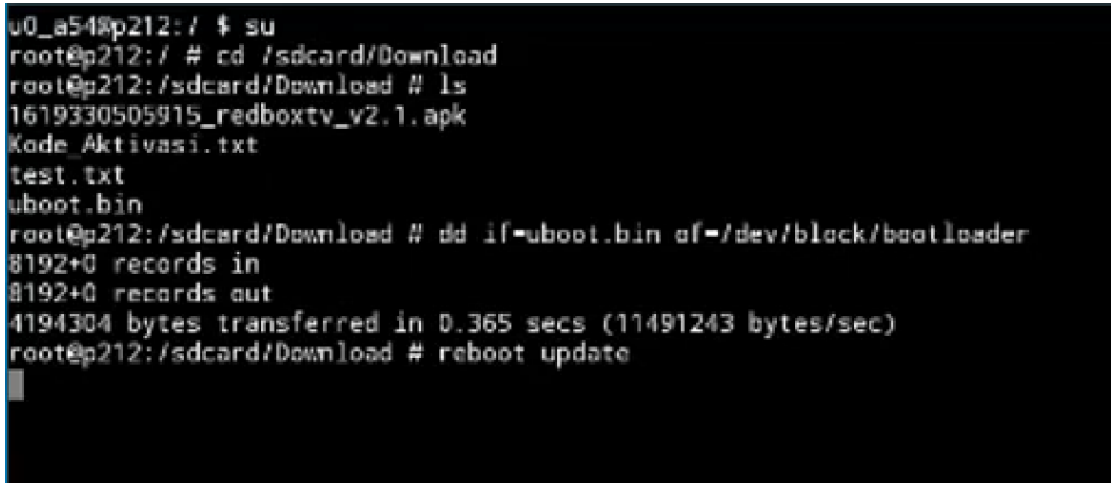


Steps to Flash:

5. Type the following command in the Terminal.

su
cd /sdcard/Download
dd if=uboot.bin
of=/dev/block/bootloader
reboot update

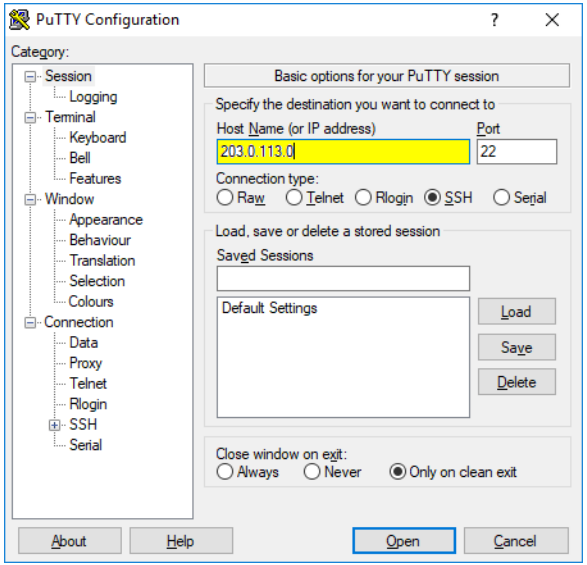
After executing, the STB screen might be frozen or even restarts. Meaning that it's booting to the server.



Chapter F:
How do we use it?

Weird thing.

After the reboot, the STB screen will gone completely black. As if it was turned off. The only was to use it, is to find out the IP Address of the STB (which should be connected to LAN) and connect to it via SSH.



How to find the IP Address?

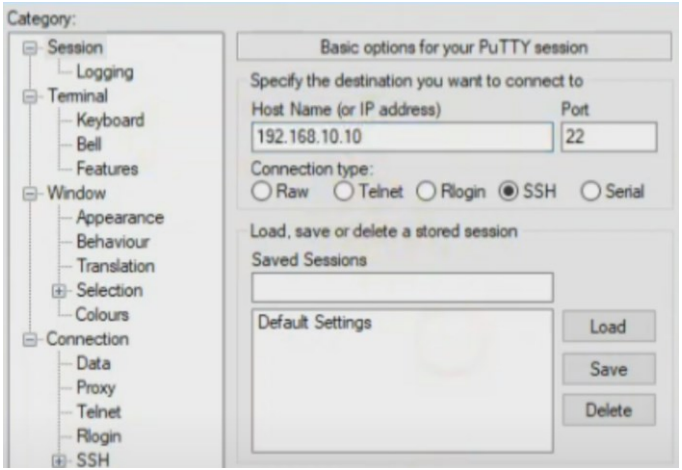
We can just search the IP via Router or IP Scanner.
And search for device called “arm-64”.

DHCP Clients List

ID	Client Name	MAC Address	Assigned IP	Lease Time
1	Galaxy-M11	96-AE-17-E4-A2-9E	192.168.0.103	01:19:45
2	E59123046	EC-9C-32-7F-D4-61	192.168.0.100	Permanent
3	OPPO-A7	D8-1E-DD-5B-DB-25	192.168.0.101	01:29:09
4	V2043	0E-B8-86-D5-3C-6C	192.168.0.104	01:32:37
5	DESKTOP-LQ8IJ26	6C-71-D9-79-D1-43	192.168.0.105	01:19:34
6	5010049900703700000585FF670F5B	58-5F-F6-70-F5-BE	192.168.0.108	01:06:39
7	5010049900703700000585FF670F5B	58-5F-F6-70-F5-BD	192.168.0.106	01:04:47
8	arm-64	46-D4-EE-98-C2-F9	192.168.0.107	01:59:30

How to find the IP Address?

Simply type in the IP Address of the STB, and use Port “22”. If prompted for a password, use “root” as username. The password is either “root” or “rootroot”.



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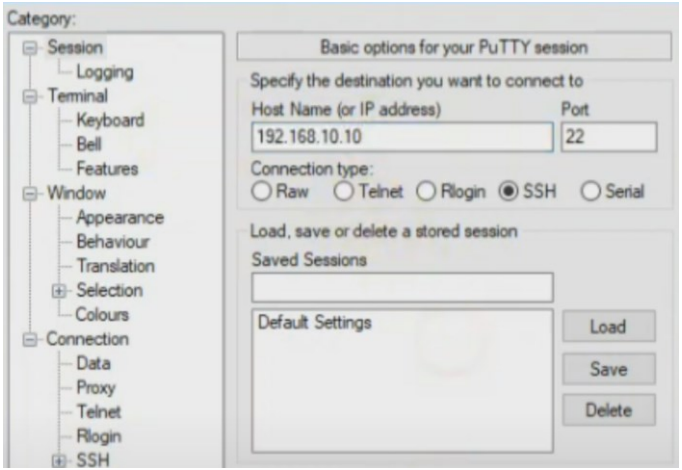

Thank you!