**Phân tích và lập kế hoạch**

1. **Các tính năng mong muốn**
2. **Nút nhấn**

- nguồn

- reset

- tăng âm lượng

- giảm âm lượng

1. **HDMI hiển thị hình ảnh lên màn hình**

- 1 HDMI

1. **Wifi, Bluetooth**

- dùng module có sẵn

1. **Các cổng usb**

- Cổng thiết bị USB

- Cổng máy chủ USB

- Cổng UART x 2 để theo dõi nhật ký với IC cầu nối USB sang UART (Đầu nối Micro USB hoặc type C)

1. **Giắc cắm nguồn điện**

- dc 12V

- hoặc nguồn điện từ pin.

1. **Âm thanh**

- mic

- loa

1. **Các chân GPIO**

- 40 chân 2,54mm x 1

1. **Camera**

- 1 camera quay phim chụp ảnh

1. **JTAG**
2. **Màn hình và cảm ứng nếu có thể**

- nếu có thể

1. **Chọn linh kiện phù hợp**
2. **SOC**

- [MediaTek Genio 350](https://www.mediatek.com/products/iot/genio-iot/genio-350)

1. **RAM**

- [Samsung K4UBE3D4AA-MGCL, 4GB, BGA200](https://shopee.vn/1-Chi%E1%BA%BFc-M%E1%BB%9Bi-K4UBE3D-K4UBE3D4AA-MGCL-LPDDR4X-BGA200-4GB-i.514161463.29171221085?sp_atk=010444f5-264d-406a-9a6e-2a430d599f83&xptdk=010444f5-264d-406a-9a6e-2a430d599f83)

1. **ROM**

- [Samsung KLMAG1JETD-B041, 16GB, BGA153](https://shopee.vn/Ch%C3%ADnh-h%C3%A3ng-KLMAG1JETD-B041-16G-5.1-phi%C3%AAn-b%E1%BA%A3n-153-b%C3%B3ng-EMMC-b%E1%BB%99-nh%E1%BB%9B-IC-chip-i.972724310.26221702547?sp_atk=0815070e-abac-42ee-abd5-1a79cd68b6ce&xptdk=0815070e-abac-42ee-abd5-1a79cd68b6ce)

1. **Nguồn**

- [MT6357ARV-A](https://www.mouser.com/ProductDetail/MediaTek/MT6357ARV-A?qs=Jm2GQyTW%2Fbim3iWdQ0ZJPw%3D%3D), [MT6357CRV](https://shopee.vn/ic-MT6357CRV-thay-th%E1%BA%BF-s%E1%BB%ADa-main-i.444828424.29866447289?xptdk=69a8f6f1-4ac5-4dfc-9df1-0d4996c58ef7)

1. **WIFI**

- [MT6631](https://shopee.vn/ic-MT6631N-ic-wifi-cho-anh-em-th%E1%BB%A3-i.444828424.24872544339?xptdk=34cd0c08-d073-4cc1-827d-5421be29deb6)

1. **GIAO TIẾP**

- Usb - uart: [CH340](https://shopee.vn/IC-Giao-Ti%E1%BA%BFp-c%E1%BB%95ng-USB-ra-UART-serial-CH340C-kh%C3%B4ng-th%E1%BA%A1ch-anh-CH340G-CH340-SOP-16-ch%C3%A2n-d%C3%A1n-SMD-i.134796651.19936107617?sp_atk=0452690c-5a28-4ccf-b0bb-72ccf2c404e5&xptdk=0452690c-5a28-4ccf-b0bb-72ccf2c404e5), …

- hdmi: [IT66121FN](https://www.lazada.vn/products/i2844461301-s13833041262.html?spm=a2o42.cart.0.0.70396f26dCpwS2&urlFlag=true)

- 40 chân gpio: [level shifter](https://shopee.vn/5-C%C3%A1i-2-Chi%E1%BA%BFc-TXB0108PWR-TXB0108-YE08-TSSOP-20-TXB0104PWR-TXB0104-YF04E-TXB0106PWR-TXB0106-YE06-TSSOP-14-IC-Chuy%E1%BB%83n-%C4%90%E1%BB%95i-M%E1%BB%A9c-%C4%90i%E1%BB%87n-%C3%81p-i.1156302552.26410593899?sp_atk=a84b923f-89e7-4dcd-b34d-990462c4a591&xptdk=a84b923f-89e7-4dcd-b34d-990462c4a591)

1. **Các đầu kết nối**

- [40 chân GPIO](https://shopee.vn/H%C3%A0ng-r%C3%A0o-%C4%91%E1%BB%B1c-2.0mm-ch%C3%A2n-c%E1%BA%AFm-ch%C3%A2n-d%C3%A1n-i.684432731.29222019538?xptdk=55f86ada-12cd-4c43-a29a-a44d65f5a776)

- [1 cổng usb type A](https://shopee.vn/C%E1%BB%95ng-USB-A-Type-B-Type-mini-USB-1-chi%E1%BA%BFc-i.85716713.2307582006?sp_atk=d8339c33-8774-467e-8263-af9f15e742fb&xptdk=d8339c33-8774-467e-8263-af9f15e742fb)

- [4 cổng micro type B](https://shopee.vn/C%E1%BB%95ng-USB-A-B-Micro-Mini-%C4%90%E1%BA%A7u-%C4%90%E1%BB%B1c-C%C3%A1i-Ch%C3%A2n-C%E1%BA%AFm-D%C3%A1n-(%C4%90%E1%BA%A7u-USB-USB-A-USB-B-USB-Micro-USB-Mini)-i.998840499.17698835680?sp_atk=c3f312b7-e65e-499d-857f-d7f2c395c6b7&xptdk=c3f312b7-e65e-499d-857f-d7f2c395c6b7)

- [1 cổng HDMI](https://shopee.vn/C%E1%BB%95ng-HDMI-C%C3%A1i-C%E1%BA%AFm-H%C3%A0n-M%E1%BA%A1ch-PCB-19P-Gi%C3%A1-R%E1%BA%BB-i.61435118.2048331431?sp_atk=888d03c0-7b83-4c57-a4c5-97afc9ef2711&xptdk=888d03c0-7b83-4c57-a4c5-97afc9ef2711)

- [2 cổng 3.5 cho âm thanh](https://shopee.vn/C%E1%BB%95ng-Jack-Audio-Stereo-PJ-320A-PJ-320D-3.5-mm-h%C3%A0n-PCB-connector-PJ320-320A-320D-i.85716713.2310653653?sp_atk=fc32fc9e-fbea-4ae6-884f-eee4a8e2d91e&xptdk=fc32fc9e-fbea-4ae6-884f-eee4a8e2d91e)

- [1 cổng kết nối camera](https://shopee.vn/Top-Connector-FPC-FFC-Connector-Lo%E1%BA%A1i-ng%C4%83n-k%C3%A9o-%C4%90%E1%BA%A7u-n%E1%BB%91i-h%C3%A0ng-%C4%91%E1%BA%A7u-0-5-1.0mm-4-5-6-7-8-10-12-14-16-20-60P-i.186656359.16826843728?xptdk=d1625b04-de06-4602-98f0-b5397f4d2d83)

- [1 cổng JTAG](https://shopee.vn/Set-10-%C4%90%E1%BA%A7u-N%E1%BB%91i-Ph%C3%ADch-C%E1%BA%AFm-DC3-2.54mm-6P-8P-10P-14P-16P-20P-26P-30P-34P-40P-50P-JTAG-Chuy%C3%AAn-D%E1%BB%A5ng-i.1005461298.23269033651?sp_atk=196d28cf-c4fb-4773-91b4-a02a29337286&xptdk=196d28cf-c4fb-4773-91b4-a02a29337286)

1. **Thiết kế sơ bộ block diagram.**

EMI

LPDDR4X

MT8365

Reset key

Vol+ key

K4UBE3D4AA-MGCL

KPCOLO

Vol- key

FCNR\_ENB

Power key

PWRKEY

MSDC0

Earphone Jack

KLMAG1JETD-B041

eMMC

MT6357

AU\_LOLN

AU\_LOLP

SYSRSTB

PWR\_SPI

PMIC

Earphone Jack

AUD

AU\_HP\_R/L

PCM

MSDC2

AU\_VIN1

BC1.1

A-MIC

AU\_VIN0

CTRL

IQ

WIFI

MT6631

DSI

DMIC0

I2C1

Camera conn

UART0

Micro USB Type B conn

USB to UART

CH340

I2C2

CSI0

UART1

Micro USB Type B conn

USB to UART

CH340

I2C3

CSI1

MSDC1

HDMI conn

I2C1

HDMI Transmitter

I2S3

DPI

IT66121FN

USB\_P1

USB Type A conn

SPDIF\_IN

USB\_P0

Micro USB Type B conn

SPDIF\_OUT

Rpi. HAT 40 pin

header

3.3v

Level

shifter

UART2

I2C2

SPI

I2C0

GPIOs

1 pin header

DC 5v

TXB0104PWR

I2C0

JTAG

GPIOs

IRRX

Boot SW

JTAG conn