SETTING UP Pi-ZERO AS CAPTUREiD-V2.0

DATE : 32-10-2019
OS : Raspbian Buster lite
HARDWARE : Pi Zero (W/O wireless)

1. MASS STORAGE + Hserial ACTIVATION PROCEDURE:

STEP-1: Install Raspbian Buster Lite in SD card.

STEP-2: Enable SSH by creating a file “SSH” (W/O file extension) in the “boot” directory.

STEP-3: Since we didn’t have any built in Ethernet hub we cannot able to ssh through network. For that we need to use the Hardware serial console for ssh (pin 8-Tx and pin 10-Rx). In order to enable the serial console,

i. Add *“console=serial0,115200 console=tty1”* in the /boot/cmdline.txt.

ii. Connect usb to uart pins (Rx,Tx,Gnd) to the pi zero’s 8,10,6 respectively.
Iii. Boot the pi now the console output should be print through usb to uart converter.

STEP-4: Enable camera and i2c through “raspi-config -> interfacing options”

STEP-5: Next, we need to enable the USB driver which provides the gadget modes, by editing two configuration files.

“sudo nano /boot/config.txt”

Scroll to the bottom and append the line below:

“dtoverlay=dwc2”
“enable_uart=1”

Press CTRL+O followed by Enter to save, and then CTRL+X to quit.

“sudo nano /etc/modules”

Append the line below, just after the i2c-dev line:

“dwc2”

Press CTRL+O followed by Enter to save, and then CTRL+X to quit.

STEP-6: The command below will create an empty 128MB space for mass storage (change the count=128 parameter if you want a different size). Please note that this will be limited by the available free space on your SD card (check the Avail column in df -h), and it may take a few minutes to complete the setup:
“sudo dd bs=1M if=/dev/zero of=/piusb.bin count=128”

We now need to format the file as a FAT32 file system so that the host can understand it. Enter the command below:

“sudo mkdosfs /piusb.bin -F 32 -I”

STEP-7: Now let's mount the container file locally so we can create some test files. First, create a folder on which we can mount the file system:

"sudo mkdir /mnt/usb_share"

Now let's add this to fstab, the configuration file that records our available disk partitions:

"sudo nano /etc/fstab"

Append the line below to the end of the file:

"/piusb.bin /mnt/usb_share vfat users,umask=000 0 2"

Press CTRL+O followed by Enter to save, and then CTRL+X to quit.
The line we added to fstab allows the USB file system to be error-checked and mounted automatically at boot time. Instead of rebooting, we can manually reload fstab with the command below:

"sudo mount -a"

now you can navigate to /mnt/usb_share dir and create a test file.

STEP-8: open up the "*cmdline.txt*". Be careful with this file, it is very picky with its formatting! Each parameter is seperated by a single space (it does not use newlines). Insert "*modules-load=dwc2,g_mass_storage quiet*" after "*rootwait*".

STEP-9: Now connect a usb cable in the port named "USB" (not in "PWR IN") with computer or any usb other master device.

STEP-10: Reboot the system.

Now the one time setup finished.

COMMANDS:

i. whenever you need to mount the storage in the master device, Execute the following command in pi zero.

"*sudo sudo modprobe g_mass_storage file=/piusb.bin removable=1 ro=0 stall=0*"

ii. whenever you need to un-mount the storage in the master device, Execute the following command in pi zero.

"*sudo modprobe -r g_mass_storage*"

iii. To change the permission of the mounting area,

"*sudo mount -o remount,rw /mnt/usb_share/*"

REFFERENCE:

1. https://magpi.raspberrypi.org/articles/pi-zero-w-smart-usb-flash-drive

2. https://gist.github.com/gbaman/50b6cca61dd1c3f88f41
3. https://github.com/Depau/python-apds9930

2. SETTING UP *APDS9930* IN PI-ZERO:

If you use pizero(w/o wireless) you have to provide any internet source for installing some python packages(pip, smbus, pathlib, pyserial) by either usb-wifi adapter of usb-ethernet adapter.

Otherwise simply put your sd card in pi 3 or pi 4 and install the following packages

NOTE:

1. If you use pi zero wireless module, you should use "**/dev/serial0**" instead of "**/dev/ttyUSB0**" (https://www.raspberrypi.org/forums/viewtopic.php?t=177426#p1383426).

modules,fstab,cmdline.txt,crontab