

Notes About Yocto



I used Ubuntu 20.04 (LTS) for this.

Getting started commands

```
cd ~

# Build prerequisites
sudo apt-get install gawk wget git diffstat unzip texinfo gcc build-essential
chrpath socat cpio python3 python3-pip python3-pexpect xz-utils debianutils
iputils-ping python3-git python3-jinja2 libegl1-mesa libsdl1.2-dev pylint3
xterm python3-subunit mesa-common-dev

# Cloning the official reference OS called Poky
git clone git://git.yoctoproject.org/poky

# Fork the current stable (hardknott)
git checkout -t origin/hardknott -b m-hardknott

# Build Poky to run on x64.
source oe-init-build-env

# Run the Poky via qemu (an emulator - it is slow).
runqemu qemux86-64 sdl
# I used the SDL graphical backend because the default backend hid the cursor.
```

Now adding the support for Raspberry Pi

```
# Clone the Raspberry Pi BSP
cd ~/poky
git clone git://git.yoctoproject.org/meta-raspberrypi

# Set MACHINE variable in build/conf/local.conf to "raspberrypi"
vim build/conf/local.conf

# Add the layer
cd build
bitbake-layers add-layer ../meta-raspberrypi/

# Build a minimal image
bitbake core-image-minimal
```

Formatting a MicroSD card

```
# Insert USB MicroSD card reader and figure out device it is.
dmesg | tail
# Make sure the device isn't mounted before continuing.
# Create partitions with parted
sudo parted /dev/sdc
    mklabel msdos
    mkpart primary fat32 1M 100M
    mkpart primary ext4 100M 100%
    quit
# Format first partition as FAT32 (vfat)
sudo mkfs.vfat /dev/sdc1
# Label the first partition B00T
sudo fatlabel /dev/sdc1 B00T
# Format second partition as ext4
sudo mkfs.ext4 /dev/sdc2
# Label the second partition R00T
sudo e2label /dev/sdc2 R00T
# Save the partition UUIDs in a text file for later
blkid | grep sdc > ~/sdcard/PARTUUID.txt
```

Mounting the MicroSD card

```
# Create subfolders for each partition
mkdir ~/sdcard/{root,boot} -p
sudo mount /dev/sdc1 ~/sdcard/boot
sudo mount /dev/sdc2 ~/sdcard/root
```

During my testing, I copied the NOOBS root file system to ~/sdcard/root, and then

- Updated ~/sdcard/boot/cmdline.txt to include the correct root partition ID.
- Updated ~/sdcard/root/etc/fstab to include the correct root and boot partition IDs.

However a better way to set the partitions is to use the MMC block device IDs like mmcblkdev0p0 and p1.

Layers required for raspberrypi BSP:

- git clone -b hardknott <http://git.yoctoproject.org/git/poky>
- git clone -b hardknott [git:git.yoctoproject.org/meta-raspberrypi](http://git.yoctoproject.org/meta-raspberrypi) * git clone -b hardknott [git:git.openembedded.org/meta-openembedded](http://git.openembedded.org/meta-openembedded)

Customizing the Poky Build

I started customizing Poky to make it what I wanted.

Adding systemd support

Edited poky/build/conf/local.conf by adding the following lines:

```
# Note the space after the quote and before systemd on the _append line
DISTRO_FEATURES_append = " systemd"
VIRTUAL-RUNTIME_init_manager = "systemd"
VIRTUAL-RUNTIME_initscripts = ""
```

Some links

- <https://github.com/torfsen/python-systemd-tutorial>
- https://lancesimms.com/RaspberryPi/HackingRaspberryPi4WithYocto_Part3.html

Waveshare 2.7inch e-Paper HAT

https://www.waveshare.com/wiki/2.7inch_e-Paper_HAT

PDF version

Requires [bcm2835](#) library.

Backup of version 1.68

Testing basic support with regular Raspberry Pi OS

First we have to install the dependencies, as specified by Waveshare

BCM2835 Library

```
wget https://www.airspayce.com/mikem/bcm2835/bcm2835-1.68.tar.gz
tar xf bcm2835-1.68.tar.gz
cd bcm2835-1.68
./configure
make
# OPTIONAL: run the tests
sudo make check
# Install
sudo make install
```

WiringPi

```
sudo apt update
```

```
sudo apt install wiringpi
```

Python libraries

```
sudo apt install python3-pip python3-pil python3-numpy
sudo pip3 install rpi.gpio spidev
```

Examples from WaveShare

```
git clone https://github.com/waveshare/e-Paper
```

References

- [Fast boot for Pi \(](#)
PDF version
)
- [UART on Raspberry Pi 3 \(not 3+\) \(](#)
PDF Version
)

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Last update: **2021/09/11 15:07**

