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## [GUIDE] How To Compile Kernel & DTBO For Redmi K20 Pro

By [acervenky](#), Recognized Contributor on 23rd September 2019, 07:48 AM

2,266 posts

Thanks: 4,881



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### Introduction :

I'm not an expert in kernel development, but would like to share the steps that I followed to build my kernel. If any of other kernel developers out there would like to add on some tips or correct something, please do!

### Pre-requisites :

- Ubuntu or any other Linux based OS
- Stable Internet Connection
- Patience

### Step 1 : Setup Build Environment

Open the terminal and enter the following :

Code:

```
sudo apt-get install git ccache automake flex lzop bison
gperf build-essential zip curl zlib1g-dev zlib1g-dev:i386
g++-multilib python-networkx libxml2-utils bzip2 libbz2-
libbz2-1.0 libglibc-bzlib-dev squashfs-tools pngcrush \
schedtool dpkg-dev liblz4-tool make optipng maven libssl1
pwgen libswitch-perl policycoreutils minicom libxml-sax-

```

### Step 2 : Download Required Files

- Download device source :

Code:

```
git clone --depth=1 https://github.com/MiCode/Xiaomi_Kerne
```

- Download a compatible GCC toolchain (Using AOSP's GCC for this guide) :

Code:

FORUMS

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```
cd raphael-p-oss
git clone https://android.googlesource.com/platform/prebuil
```

- Download a compatible CLANG toolchain (Using AOSP's CLANG for this guide) : [Download](#)  
Move the downloaded file in the raphael-p-oss folder manually and then extract using the following command :

Code:

```
tar vxzf linux-x86-android-9.0.0_r48-clang-4691093.tar.gz
```

- Download the device-tree-compiler attached below and place it in /usr/bin

### Step 3 : Make device specific changes

Make [these](#) changes in the /kernel/module.c file.

If you are not familiar with github, you can check out many github guides available on XDA, for now you can just download the module.c file attached to this thread and replace the one in /kernel folder with the downloaded one!

Now, browse back to raphael-p-oss directory, and open the raphael\_user\_defconfig located in \arch\arm64\configs

Add the following lines :

Code:

```
CONFIG_BUILD_ARM64_DT_OVERLAY=y
CONFIG_MODULE_FORCE_LOAD=y
```

WIFI & Audio won't work if you don't make these changes, apparently Xiaomi decided to skip wlan & audio drivers in pie sources.

### Step 4 : Building The Kernel

Code:

```
cd raphael-p-oss
rm -rf out
mkdir out
export ARCH=arm64
export SUBARCH=arm64
export DTC_EXT=dtc

make O=out ARCH=arm64 raphael_user_defconfig

PATH="${PWD}/bin:${PWD}/toolchain/bin:${PATH}" \
make -j$(nproc --all) O=out \
```

### Step 5 : How To Get Help If You Encounter Errors

A kernel.log file will be generated in raphael-p-oss folder, find the line which says error.

If you can't figure out the solution, attach the kernel.log in your reply to this thread.

### Step 6 : Booting The Kernel

Once you're done with Step 4, browse to /out/arch/arm64/boot & you'll find the Image-dtb file (compiled zImage)

Download the anykernel template for raphael from attachments and add your Image-dtb file to the archive.

Boot in TWRP, backup your stock kernel & flash the anykernel zip.

### References :

[Information on compiling Android kernels with Clang](#) by nathanchance

[How to compile kernel standalone](#) by Xiaomi

[Kernel Builder Virtual Machine](#) & device specific changes by mslezak

[AnyKernel3 Template](#) by osm0sis

[Wahoo Kernel Tools](#) by frap129

### 👍 MOST THANKED

#### ALL-TIME

**8** [How To Compile Custom DTBO](#) DTBO files have been used on our device ...  
[acervenky](#) [OP](#) 2019-Sep-23 2:49

**5** [Using QCom Clang To Compile Kernel](#) [Xiaomi's Guide] Step 1 : Setup ...  
[acervenky](#) [OP](#) 2019-Sep-23 2:49

**3** (quote) DTC Compile error, uninstall any pre-installed DTC and ...  
[acervenky](#) [OP](#) 2019-Sep-28 10:40

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🕒 July 18, 2020

Regards,  
acervenky

#### Attached Files

-  [module.c](#) - [\[Click for QR Code\]](#) (112.3 KB, 414 views)
-  [raphael\\_anykernel.zip](#) - [\[Click for QR Code\]](#) (1.22 MB, 248 views)
-  [device-tree-compiler.zip](#) - [\[Click for QR Code\]](#) (111.9 KB, 512 views)



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 **acervenky**  
Recognized Contributor

Thanks: 4,881



23rd September 2019, 07:49 AM | [#2](#)

### Using QCom Clang To Compile Kernel [Xiaomi's Guide]

#### Step 1 : Setup Build Environment

Open the terminal and enter the following :

Code:

```
sudo apt-get install git ccache automake flex lzop bison
gperf build-essential zip curl zlib1g-dev zlib1g-dev:i386
g++-multilib python-networkx libxml2-utils bzip2 libbz2-
libbz2-1.0 libghc-bzlib-dev squashfs-tools pngcrush \
schedtool dpkg-dev liblz4-tool make optipng maven libssl1
pwgen libswitch-perl policycoreutils minicom libxml-sax2
```

#### Step 2 : Download Required Files

- Download device source :

Code:

```
git clone --depth=1 https://github.com/MiCode/Xiaomi_Kernel
```

- Download a compatible GCC toolchain (Using AOSP's GCC for this guide) :

Code:

```
cd raphael-p-oss
git clone https://android.googlesource.com/platform/prebuil
```

- Download a Qcom CLANG : [Download](#)

Move the downloaded file in the raphael-p-oss folder manually and then extract using the following command :

Code:

```
tar vxzf snapdragon-llvm-compiler-android-linux64-609.tar.
```

- Download the device-tree-compiler attached below and place it in /usr/bin

#### Step 3 : Make device specific changes

Make [these](#) changes in the /kernel/module.c file.

If you are not familiar with github, you can check out many github guides available on XDA, for now you can just download the module.c file attached to this thread and replace the one in /kernel folder with the downloaded one!

Now, browse back to raphael-p-oss directory, and open the raphael\_user\_defconfig located in \arch\arm64\configs

Add the following lines :



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Code:

```
CONFIG_BUILD_ARM64_DT_OVERLAY=y
CONFIG_MODULE_FORCE_LOAD=y
```

WiFi & Audio won't work if you don't make these changes, apparently Xiaomi decided to skip wlan & audio drivers in pie sources.

Step 4 : Building The Kernel

Code:

```
cd raphael-p-oss
rm -rf out
mkdir out
export ARCH=arm64
export SUBARCH=arm64
export DTC_EXT=dtc
export CROSS_COMPILE=${PWD}/toolchain/bin/aarch64-linux-
```

Step 5 : How To Get Help If You Encounter Errors



A kernel.log file will be generated in raphael-p-oss folder, find the line which says error. If you can't figure out the solution, attach the kernel.log in your reply to this thread.

Step 6 : Booting The Kernel

Once you're done with Step 4, browse to /out/arch/arm64/boot & you'll find the Image-dtb file (compiled zImage)  
Download the anykernel template for raphael from attachments and add your Image-dtb file to the archive.  
Boot in TWRP, backup your stock kernel & flash the anykernel zip.


This method is mentioned in Xiaomi's Wiki, you can choose any according to your preference!

Regards,  
acervenky





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**acervenky**  
OP Recognized Contributor

Thanks: 4,881



23rd September 2019, 07:49 AM | #3

How To Compile Custom DTBO

DTBO files have been used on our device primarily to change the refresh rates.

Pre-requisites :

Compiled kernel without any errors

Step 1 : Download Required Files

Download libufdt utils from [this](#) link.  
Open the terminal in the downloaded file's location.

Code:

```
tar vxzf libufdt-master-utils.tar.gz
```

Step 2 : Compile dtbo.img

Code:

```
cd libufdt-master-utils/src
python mkdtboimg.py create /home/user/raphael-p-oss/out/
```

Step 3 : Flash The Compiled dtbo.img

The compiled dtbo.img file will be located in /raphael-p-oss/out/arch/arm64/boot/ (same output folder of zImage)

Backup your stock dtbo.img and flash the newly compiled dtbo.img

References :  
Kernel Builder by mslezak

Regards,  
acervenky

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Recognized Contributor

23rd September 2019, 07:50 AM | #4

Thanks: 4,881

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ghaf85

Senior Member

23rd September 2019, 09:51 AM | #5

Thanks: 264

Nice guide bro...

pritish sahuo

Senior Member

25th September 2019, 02:47 PM | #6

Thanks: 460

Quote:

https://forum.xda-developers.com/k20-pro/how-to/guide-how-to-compile-kernel-redmi-k20-t3971443

5/9

Originally Posted by **acervenky**

### Introduction :

I'm not an expert in kernel development, but would like to share the steps that I followed to build my kernel. If any of other kernel developers out there would like to add on some tips or correct something, please do!

Regards,  
acervenky

awesome guide bro. I will try with my free time. Thanks



**Vox Samurai**  
Member

Thanks: 13

27th September 2019, 09:39 PM | #7



Quick question, would the same procedure work for Mi 9T Pro EEA?

I'd like to take a look in that DTBO.img

The phone runs the European Rom and the device ID is the Raphael\_EEA.

Thanks in advance!!



**rituj\_b**  
Recognized Developer

Thanks: 1,495

28th September 2019, 03:27 AM | #8



Quote:

Originally Posted by **acervenky**

DTBO files have been used on our device primarily to change the refresh rates.

Pre-requisites :

Compiled kernel without any errors

Step 1 : Download Required Files

Download libufdt utils from this link.

Open the terminal in the downloaded file's location.

Step 2 : Compile dtbo.img

Step 3 : Flash The Compiled dtbo.img

The compiled dtbo.img file will be located in /raphael-p-oss/out/arch/arm64/boot/ (same output folder of zImage)



Backup your stock dtbo.img and flash the newly compiled dtbo.img


References :

Kernel Builder by mslezak

Regards,  
acervenky



Do you have any idea how the display OC mod was done? If you understand it, it would be great if you shared that information, the more people know, more chances of improving it



 **rituj\_b**  
Recognized Developer

Thanks: 1,495

28th September 2019, 09:11 AM | #9



### Build failed


Made no modification, followed your steps exactly, after about 7-10mins of compiling I got this error in terminal:



Code:


```
make[1]: Leaving directory '/home/rituj/raphael-p-oos/out'
make: *** [sub-make] Error 2
Makefile:146: recipe for target 'sub-make' failed
```

After searching "error" it only returned a couple of modules that had "error" in their names.

attached the kernel.log



**Attached Files**  
 [kernel.log](#) - [\[Click for QR Code\]](#) (163.5 KB, 24 views)



 **acervenky**  
Recognized Contributor

Thanks: 4,881

28th September 2019, 03:40 PM | #10



Quote:  
Originally Posted by **rituj\_b**

Made no modification, followed your steps exactly, after about 7-10mins of compiling I got this error in terminal:

Code:

```
make[1]: Leaving directory '/home/rituj/raphael-p-oos/out'
make: *** [sub-make] Error 2
Makefile:146: recipe for target 'sub-make' failed
```

After searching "error" it only returned a couple of modules that had "error" in their names.

attached the kernel.log


DTC Compile error, uninstall any pre-installed DTC and use the one provided in attachments!

Regards,  
acervenky





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 **pemaster**  
Junior Member

Thanks: 0

8th October 2019, 10:34 AM | #11




Quote:  
Originally Posted by **acervenky**


DTC Compile error, uninstall any pre-installed DTC and use the one provided in attachments!


Regards,  
acervenky

Replaced dtc file with attached in post. Got the same error. Kernel.log in attachment  
nevermind, changed permissions on dtc in /usr/bin  
Build finished with [this](#) log


Attached Files

 [kernel.log.zip](#) - [\[Click for QR Code\]](#) (46.8 KB, 54 views)





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