

Infineon Vanilla Kernel v6.6.15 Bring up Reference

Guide to Build, flash and configure the platform with v6.6.15 Vanilla Kernel for CYW5557x support

About this document

Scope and purpose

This document serves as a Guide to bring up with the Infineon's 802.11ax capable CYW5557x Chipset.

Intended audience

This document is primarily intended for those using Infineon Wi-Fi solutions with the Vanilla Kernel. It is recommended that the reader have prior experience with Linux kernel wireless networking.

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Building v6.6.15 Vanilla Kernel with BRCMFMAC

1 Building v6.6.15 Vanilla Kernel with BRCMFMAC

1.1 Test Environment

Our verification is tested by INTEL NUC10 platform with Fedora FC38 and use releasing to patch on Fedora source tree v6.6.15 kernel.

- Hardware equipment: INTEL NUC x86_64
- Software tool: Fedora fc38 with installing v6.6.15 kernel

1.2 Prepare INTEL NUC environment

Download and setup the fc38(Fedora-Workstation-Live-x86_64-38-1.6.iso) from https://ftp.riken.jp/Linux/fedora/releases/38/Workstation/x86_64/iso/ Also refer official document to install on desktop. URL: <https://docs.fedoraproject.org/en-US/fedora-server/installation/>

Update kernel to our supported version. Download the fedora releasing kernel and checkout to specific version v6.6.15(sha id: 9670bf06)

```
$ git clone https://gitlab.com/cki-project/kernel-ark.git
$ git checkout fedora-6.6
#or
$ git checkout 9670bf06
```

Default all questions based on the contents of your existing .config file and ask about new config symbols

```
$ make oldconfig
```

Build kernel image and modules

```
$ make bzImage
$ make modules
```

Install module and kernel

```
$ make modules_install
$ make install
```

Building v6.6.15 Vanilla Kernel with BRCMFMAC

1.3 Compilation FMAC on NUC x86_64

Download source tree from Fedora kernel and checkout the to v6.1 serious version. Our usage based on latest version is v6.6.15. (sha id: 9670bf06)

```
$ git clone https://gitlab.com/cki-project/kernel-ark.git
$ git checkout fedora-6.6
```

In Linux root folder, untar/apply releasing patches with below bash commands

```
$ tar zxvf <release patches package>.tar.gz

#apply script
for i in <release patches package>/*.patch; do patch -p1 < $i; done
```

Load the platform default configurateion.

```
$ make defconfig
```

Enable/Disable/Load module as below configuration by command “make menuconfig” or by editing the “.config” file.

```
CONFIG_CFG80211=m
CONFIG_BCMDHD=n
CONFIG_BRCMUTIL=m
CONFIG_BRCMFMAC=m
CONFIG_BRCMFMAC_SDIO=y
CONFIG_BRCMFMAC_PROTO_BCDC=y
CONFIG_BRCMFMAC_PCIE=y
CONFIG_BRCMFMAC_PROTO_MSGBUF=y
CONFIG_CFG80211_REQUIRE_SIGNED_REGDB=n
CONFIG_CFG80211_USE_KERNEL_REGDB_KEYS=n
CONFIG_ASYMMETRIC_KEY_TYPE=y
CONFIG_ASYMMETRIC_PUBLIC_KEY_SUBTYPE=y
CONFIG_X509_CERTIFICATE_PARSER=y
CONFIG_PKCS7_MESSAGE_PARSER=y
CONFIG_MMC_BUS_CLOCK_GATE=y
```

Enable below configuration when debug

```
CONFIG_BRCMDBG=y
CONFIG_BRCM_TRACING=y
```

Build kernel modules.

NOTE: To speed up compilation on multiprocessor systems, and get some improvement on single processor ones, use “-j n”, where n is the number of processors * 1.5. You can use the “nproc” cmd to see how many processors you have.

```
$ make modules
```

Building v6.6.15 Vanilla Kernel with BRCMFMAC

1.4 Copy generated modules to loading folder

Create the new folder for built modules

```
$ mkdir <Target Folder>
```

Copy the generated modules to created directory

```
$ cp drivers/mmc/core/mmc_core.ko <Target Folder>
$ cp drivers/mmc/core/mmc_block.ko <Target Folder>
$ cp drivers/mmc/host/sdhci.ko <Target Folder>
$ cp drivers/mmc/host/sdhci-pci.ko <Target Folder>
$ cp drivers/mmc/host/cqhci.ko <Target Folder>
$ cp drivers/net/wireless/broadcom/brcm80211/brcmfmac/brcmfmac.ko <Target Folder>
$ cp drivers/net/wireless/broadcom/brcm80211/brcmfmac/brcmfmac-cyw.ko <Target Folder>
$ cp drivers/net/wireless/broadcom/brcm80211/brcmutil/brcmutil.ko <Target Folder>
$ cp net/wireless/cfg80211.ko <Target Folder>
```

Bring up BRCMFMAC Host Driver & Firmware

2 Bring up BRCMFMAC Host Driver & Firmware

2.1 Load FMAC module and write Firmware

Copy Firmware (FW), CLM Blob (clmb) and NVRAM files to the expected path in filesystem

```
$ cp -a <FW/CLM BLOB/NVRAM files> /lib/firmware/cypress/<cyfmac55572-*>
```

Stop Network Manager Service, before inserting FMAC module

```
$ systemctl stop NetworkManager
```

Delete the Network Manager and Wpa_supplicant daemon, before inserting FMAC module.

```
$ killall NetworkManager  
$ killall wpa_supplicant
```

Remove inactive modules that may bring up by system after booting.

```
$ rmmod iwlmvm  
$ rmmod iwlwifi  
$ rmmod mac80211  
$ rmmod btsdio  
$ killall bluetoothd  
$ rmmod btusb  
$ rmmod bnep  
$ rmmod btbcm  
$ rmmod btintel  
$ rmmod btrtl  
$ rmmod bluetooth  
$ rmmod bcmdhd  
$ rmmod dhd  
$ rmmod brcmfmac-cyw  
$ rmmod brcmfmac  
$ rmmod brcmutil  
$ rmmod sdhci-pci  
$ rmmod sdhci  
$ rmmod cqhci  
$ rmmod mmc_block  
$ rmmod mmc_core  
$ rmmod cfg80211  
$ rmmod compat  
$ rmmod rfkill
```

Note: After v6.2 kernel, brcmfmac kernel module will recognize the vendor and bring up extra one vendor kernel module depending on brcmfmac.ko. As the example on CYW5557x, system will automatically bring up “brcmfmac-cyw.ko” after inserting brcmfmac. Therefore, **users need to remove “brcmfmac-cyw” module or brcmfmac will remove failed. Besides, user needs to put the brcmfmac-cyw under the default loading path, or system can’t find that kernel module.**

Bring up BRCMFMAC Host Driver & Firmware

Insert FMAC and related kernel modules

```
$ cd <Build Target Folder>
$ modprobe rfkill
$ sudo cp brcmfmac-cyw.ko /lib/modules/6.6.15/kernel/drivers/net/wireless/broadcom/brcm80211/brcmfmac/cyw/
$ insmod ./mmc_core.ko
$ insmod ./mmc_block.ko
$ insmod ./cqhci.ko
$ insmod ./sdhci.ko

$ insmod ./sdhci-pci.ko
$ insmod ./cfg80211.ko
$ insmod ./brcmutil.ko
$ insmod ./brcmfmac.ko
```

Revision history

Document version	Date of release	Description of changes
1.0.0	2023-12-21	Initial Revision
1.1.0	2024-04-17	Modify for supporting v6.6.15 kernel

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Email:
security.chipcard.ics@infineon.com

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