

INTERNAL USE

ICB/SW2/SS2



Outline

- OpenWrt 4100, Wi-Fi Driver 5032
 - Prepare OpenWrt and Wi-Fi Driver
 - Prepare toolchain (opt.)
 - Build U-Boot
 - Build kernel image with Wi-Fi

Prepare OpenWrt and Wi-Fi Driver

- Prepare OpenWrt and Wi-Fi Driver

```
$ ls  
mtk-openwrt-4.1.0.0-20190318-83a1c995.tar  
mtk-openwrt-4.1.0.0-WiFi-Package_Bin-20190315.tar.xz
```

- Untar SDK & Wi-Fi driver, and import Wi-Fi driver into SDK

```
tar Jxvf mtk-openwrt-4.1.0.0-20190318-83a1c995.tar  
tar Jxvf mtk-openwrt-4.1.0.0-WiFi-Package_Bin-20190315.tar.xz  
cp -rf lede/package/* mtk-openwrt-4.0.2.0/package/  
cp -rf source/* mtk-openwrt-4.0.2.0/dl/
```

Prepare Toolchain

- Untar toolchain to /opt

```
cd bootloader/toolchain  
tar jxvf buildroot-gcc492_arm.tar.bz2 -C /opt
```

Build U-Boot

- Enter menuconfig

```
cd bootloader/Uboot-arm  
make menuconfig
```

(MT7622) Chip ID

(ASIC) Chip Type

(SNAND) Flash Type

=> Change to NAND if you use Parallel NAND

[] Customize Dram Size (NEW)

=> Change size here

(GMAC1) Use GE1 or GE2

(GE_SGMII_FORCE_2500) GE1 connected to

(None) Default Behavior when Kernel Boot up Fail

- Build U-Boot, and download u-boot-mtk.bin into flash

```
make
```

OpenWrt 4100 – 7622+15

- Modify package Makefile of mt_wifi

```
cd mtk-openwrt-4.1.0.0/  
vim package/mtk/drivers/mt_wifi/Makefile  
PKG_SOURCE:=MT7622_7615_SoftAP_v5.0.3.2_17722b_20190308.tar.xz
```

- Copy .config file

```
cp autobuild/mt7622-AP-RFB1/.config .config
```

SDK Configuration

- Configure SDK

```
make menuconfig
```

SDK Configuration

- Select *Libraries*
 - Enable libmapd

```
.config - LEDE Configuration
> Libraries
Libraries
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes
features. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ]
excluded <M> module < > module capable

< > libiconv-full..... Character set conversion library
< > libid3tag..... An ID3 tag manipulation library
< > libidn..... Stringprep, Punycode and IDNA implementation
< > libimobiledevice..... A library that talks to Apple devices.
< > libinput..... a library to handle input devices
< > libintl..... Stub header for the GNU Internationalization library
< > libintl-full..... GNU Internationalization library
< > libiw..... Library for manipulating Linux Wireless Extensions
[*] libiwinfo..... Generalized Wireless Information Library (iwinfo)
< > libjpeg..... The Independent JPEG Group's JPEG runtime library
[*] libjson-c..... javascript object notation
< > libkmod..... Linux kernel module handling (library)
< > libldns..... A library to simplify DNS programming
< > libltdl..... A generic dynamic object loading library
[*] liblua..... Lua programming language (libraries)
< > liblz4..... Extremely fast compression
< > liblz0..... A real-time data compression library
< > libmad..... An high-quality MPEG audio decoding library
< > libmagic..... File type determination library
[*] libmapd..... mtk mapd library
< > libmbedtls..... Cryptographic library
< > libmicrohttpd
< > libmicrohttpd-no-ssl

<Select> < Exit > < Help > < Save > < Load >
```


SDK Configuration

- Select *MTK Properties > Applications*

- Enable 1905daemon
- Enable mapd
- Enable wapp

```
.config - LEDE Configuration
> MTK Properties > Applications

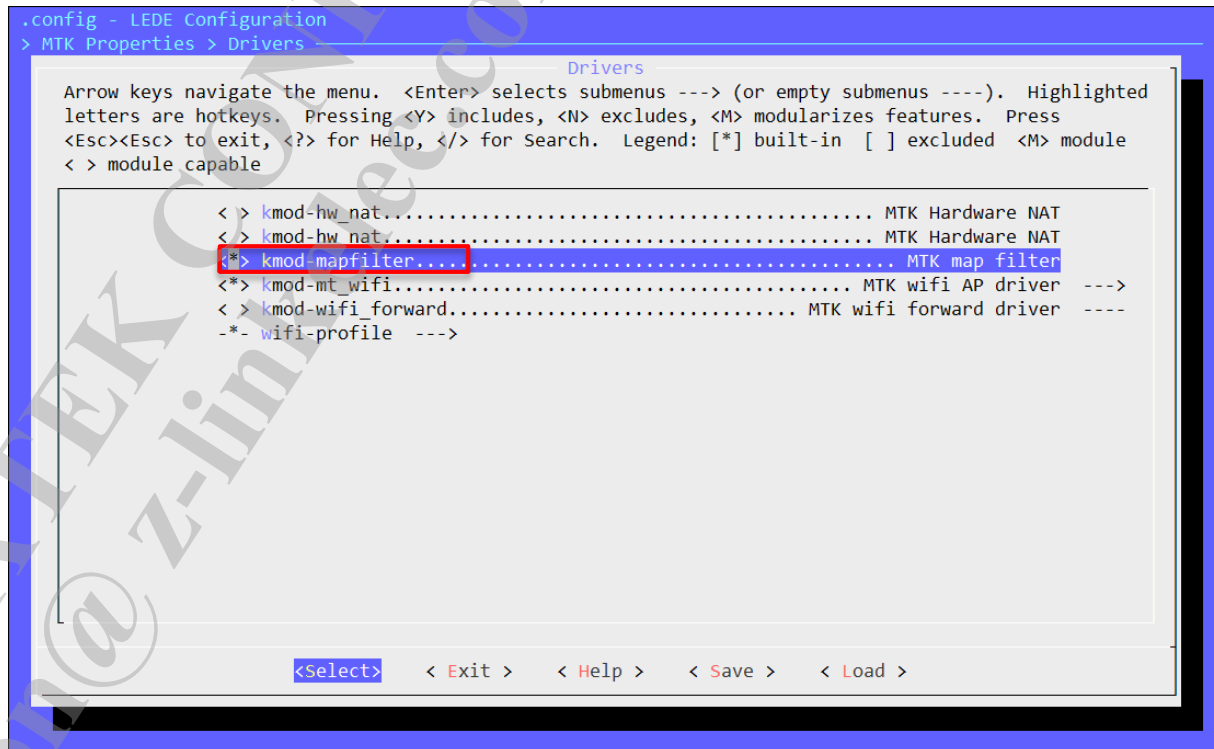
Applications
Arrow keys navigate the menu. <Enter> selects submenus ---- (or empty submenus ----).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features.
Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded
<M> module < > module capable

[*] 1905daemon..... 1905 daemon
<*> 80211d..... 802.11X Daemon
<*> ated_ext..... ated_ext
<*> flash_test..... Mediatek flash test tools/scripts
< > hostapd-2.2..... WPA hostapd V2.2
< > hostapd-2.6..... WPA hostapd V2.6
< > longloopd..... Daemon to monitor switch link for long distance(>100m)
<*> malloc_test..... malloc test Daemon
<*> mapd..... map daemon
<*> mii_mgr..... mii_mgr/mii_mgr_cl45
<*> miniupnpd..... Miniupnpd Daemon
<*> qdma..... QDMA configuration tool
<*> regs..... an program to read/write from/to a pci device from userspace.
<*> relayd..... relayd for bluetooth fw combo tool test
-*> samba4-server..... Samba Server (V4)
(-1) Maximum level of compiled-in debug messages
<*> sigma_dut..... SIGMA_DUT(WFA SIGMA DUT)
< > smart_speed..... smart speed
< > switch..... Command to config switch
-*> wapp..... wapp daemon
<*> wificonf..... Read/Write MTK WiFi profiles ---->
< > wpa_supplicant-2.0..... WPA Supplicant V2.0

<Select> < Exit > < Help > < Save > < Load >
```

SDK Configuration

- Select *MTK Properties > Drivers*
 - Enable mapfilter



```
.config - LEDE Configuration
> MTK Properties > Drivers

Drivers

Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted
letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features. Press
<Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded <M> module
< > module capable

< > kmod-hw_nat..... MTK Hardware NAT
< > kmod-hw_nat..... MTK Hardware NAT
[*] kmod-mapfilter..... MTK map filter
<*> kmod-mt_wifi..... MTK wifi AP driver ---->
< > kmod-wifi_forward..... MTK wifi forward driver ----
-*> wifi-profile ---->

<Select> < Exit > < Help > < Save > < Load >
```

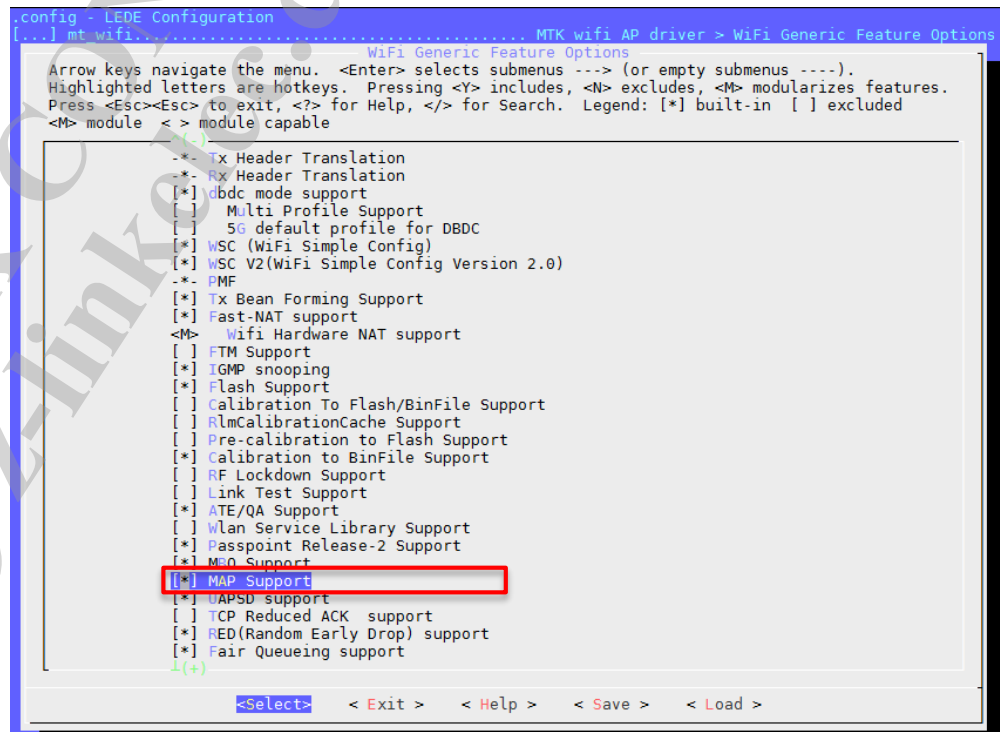
SDK Configuration

- Select *MTK Properties > Drivers > kmod-mt_wifi > WiFi Operation Modes*
 - Enable Concurrent WPS Support
 - Enable Air Monitor

```
^(-)
[ ] CFG80211
[ ] MBSS AS WDS AP Support
[ ] Dscp Qos Mapping Support
[ ] Dscp Priority Mapping Support
[ ] Minimum PHY rate support
[ ] Fast UP rate support
[*] Concurrent WPS Support
[*] User specific tx rate of mcast pkt
[*] MediaAir(VOW) support
[*] Band Steering
[ ] LED Control Support
[*] WLAN hook Support
[ ] Radius Accounting Support
[*] GreenAP Support
[ ] TxRx Stats Support
[ ] Vendor11 Feature Enable
[*] Pcie Aspm Dynamic Control Support
[ ] Coex Support
[ ] Whole Home Coverage - Easy Setup
[ ] Whole Home Coverage - Event Notifier
[*] Air Monitor
*- 802.11v WNM Support
*- 802.11u Interworking
[ ] NET TX Queue Support
[*] WPA3 Support
[*] Enhanced Open Support
[ ] Single SKU Support
```

SDK Configuration

- Select *MTK Properties* > *Drivers* > *kmod-mt_wifi* > *WiFi Generic Feature Options*
 - Enable MAP Support



```
config - LEDE Configuration
[...] mt_wifi..... MTK wifi AP driver > WiFi Generic Feature Options
WiFi Generic Feature Options
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus --->).
Highlighted letters are hotkeys. Pressing <Y> includes, <N> excludes, <M> modularizes features.
Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] built-in [ ] excluded
<M> module < > module capable

[*] Tx Header Translation
[*] Rx Header Translation
[*] dbdc mode support
[ ] Multi Profile Support
[ ] 5G default profile for DBDC
[*] WSC (WiFi Simple Config)
[*] WSC V2(WiFi Simple Config Version 2.0)
[*] PMF
[*] Tx Beam Forming Support
[*] Fast-NAT support
<M> Wifi Hardware NAT support
[ ] FTM Support
[*] IGMP snooping
[*] Flash Support
[ ] Calibration To Flash/BinFile Support
[ ] RlmCalibrationCache Support
[ ] Pre-calibration to Flash Support
[*] Calibration to BinFile Support
[ ] RF Lockdown Support
[ ] Link Test Support
[*] ATE/QA Support
[ ] Wlan Service Library Support
[*] Passpoint Release-2 Support
[*] MLO Support
[*] MAP Support
[*] APSD support
[ ] TCP Reduced ACK support
[*] RED(Random Early Drop) support
[*] Fair Queueing support

<Select> <Exit> <Help> <Save> <Load>
```

OpenWrt 4100 – 7622+15

- Default .config file

```
make defconfig
```

- Build the source code

```
make V=s
```

OpenWrt 4100 – 7622+15

- Location of image

```
cd mtk-openwrt-4.1.0.0/bin/targets/mediatek/mt7622-glibc
```

```
[mtk16968@mtkslt208 mt7622-glibc]$ls
config.seed          lede-mediatek-mt7622-MTK-AC2600-RFB1-squashfs-sysupgrade.bin  mt7622-ac4300rfb1.dtb
kernel-debug.tar.bz2 lede-mediatek-mt7622-MTK-AC4300-RFB1-squashfs-sysupgrade.bin  packages
lede-mediatek-mt7622.manifest mt7622-ac2600rfb1.dtb    sha256sums
```

Check

■ Location

```
cd mtk-openwrt-4.1.0.0/staging_dir/target-aarch64_cortex-a53+neon-vfpv4_glibc-2.24/root-mediatek/usr/lib
```

```
[mtk16968@mtkslt208 lib]$ls
iptables          libip6tc.so.0      libjson-c.so.2      libpcap.so.1        libxtables.so.12    uhttpd_ubus.so
libbtdrv.so       libip6tc.so.0.1.0  libjson-c.so.2.0.2  libucclient.so      libxtables.so.12.0.0
libip4tc.so       libiptext4.so      liblua.so.5.1.5     libuuid.so          lua
libip4tc.so.0     libiptext6.so      libmapd_interface_client.so  libuuid.so.1        pkg
libip4tc.so.0.1.0 libiptext.so       libnt-tiny.so       libuuid.so.1.3.0    os-release
libip6tc.so       libiwinfo.so       libpcap.so          libxtables.so       pppd
```

```
cd mtk-openwrt-4.1.0.0/staging_dir/target-aarch64_cortex-a53+neon-vfpv4_glibc-2.24/root-mediatek/usr/bin
```

```
[mtk16968@mtkslt208 bin]$ls
[      crontab      free      killall      mii_mgr      pl1905_managerd      scp      tee      uptime
[]      cut          fwtool     less         mii_mgr_cl45  passwd      sd_rw_test.sh  telnet    usign
8021xd  dbclient      gdbserver  logger       minsupnpd     pgrep       seq            test      wapp
ated    dirname      getrandom  lspci        mkfifo        printf      sha256sum     tftp     wappctrl
awk     dropbearkey  head       lua          mtcd_test     qdma       signify       time     wapp_openwrt.sh
basename du          hexdump    luci-bwc     nc            readlink   sort          top      wc
bunzip2 EasyMesh_7622.sh id          mapd         nohup         regs        ssh         tr          which
bzipcat env          iwinfo      mapd_cli     nslookup     relay       strings       traceroute wificonf
clear   expr        ishn        mbo_nr.sh    nvram_get     reset       switch        traceroute6 xargs
cmp     find        jsonfilter  md5sum       nvram_set     resolveip   tail         uniq     yes
```

Check

- Location

```
cd mtk-openwrt-4.1.0.0/staging_dir/target-aarch64_cortex-a53+neon-vfpv4_glibc-2.24/root-mediatek/lib/modules/4.4.146/
```

```
[mtk16968@mtkslt208 4.4.146]$ls
ahci_mtk.ko          iptable_filter.ko   mt_wnnat.ko         ohci-platform.ko   xhci-hcd.ko
arc4.ko              iptable_mangle.ko   mt_wifi.ko          ppp_async.ko       xhci-mtk.ko
authenc.ko           iptable_nat.ko      nf_conntrack_ipv4.ko ppp_generic.ko     xhci-pci.ko
crc-ccitt.ko         ip_tables.ko        nf_conntrack_ipv6.ko ppp_mppe.ko        xhci-plat-hcd.ko
cryptodev.ko         ipt_MASQUERADE.ko   nf_defrag_ipv4.ko   pppoe.ko           xt_comment.ko
ecb.ko               ipt_REJECT.ko       nf_defrag_ipv6.ko   pppox.ko           xt_conntrack.ko
ehci-hcd.ko          l2tp_core.ko        nf_log_common.ko    pptp.ko            xt_limit.ko
ehci-platform.ko     l2tp_netlink.ko     nf_log_ipv4.ko      sdhci.ko           xt_LOG.ko
gpio-button-hotplug.ko l2tp_ppp.ko         nf_log_ipv6.ko      sdhci-pltfm.ko     xt_mac.ko
gre.ko               libahci.ko          nf_nat_ipv4.ko      sha1_generic.ko    xt_mark.ko
ip6table_filter.ko   libahci_platform.ko nf_nat.ko            slhc.ko            xt_multiport.ko
ip6table_mangle.ko   libata.ko           nf_nat_masquerade_ipv4.ko udp_tunnel.ko       xt_nat.ko
ip6_tables.ko        mapfilter.ko        nf_nat_redirect.ko  usb-common.ko      xt_REDIRECT.ko
ip6t_REJECT.ko       mmc_block.ko        nf_reject_ipv4.ko   usbcore.ko         xt_state.ko
ip6_udp_tunnel.ko    mmc_core.ko         nf_reject_ipv6.ko   usb-storage.ko     xt_time.ko
ip_gre.ko            mtk-sd.ko          ohci-hcd.ko         wifi_forward.ko
```


MEDIATEK

everyday genius