Corewav

Debian OS User Guide

CONFIDENTIALITY STATEMENT

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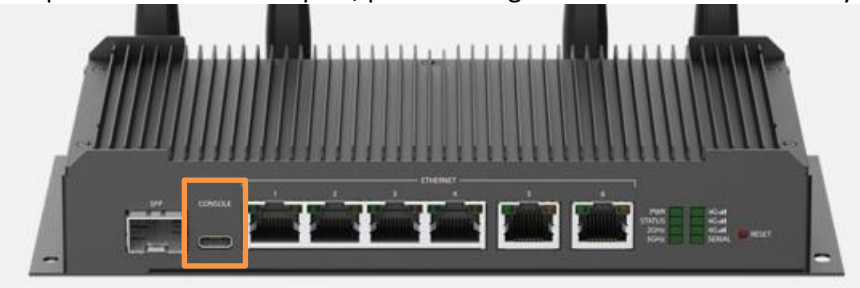
This document describes how to proceed firmware upgrade, login, system configure the Debian OS Bulleys v11.x onto Corewav EVK, a MTK MT7981 SOM based platform

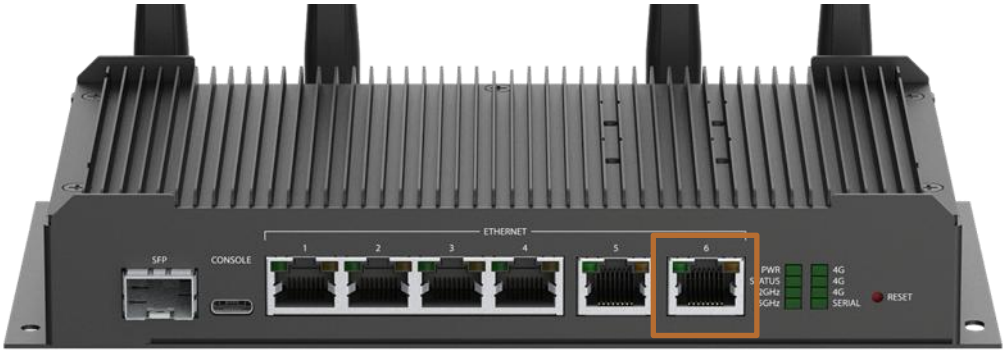
Console

Please find a generic type C cable connecting the USB-C port(the UART to USB transceiver had been integrated) with baud rate 115200.
Note: If there's no output from the console port, please change another USB cable and try again.



Firmware Upgrade

- Insert the Ethernet cable to the Port6, as below
- Connect the other side of the Ethernet cable to the PC/notebook



- Install a TFTP server on the PC, and save the compiled firmware "`sysupgrade-debian-emmc.img`" in the TFTP server folder.
- Power on the EVK, and go to U-Boot Menu, as below. Select 2 to upgrade firmware in the emmc

```
*** U-Boot Boot Menu ***

    1. Startup system (Default)
    2. Upgrade firmware (emmc)
    3. Upgrade eMMC partition table (emmc)
    4. Upgrade single image (emmc)
    5. Load image
    0. U-Boot console


Press UP/DOWN to move, ENTER to select, ESC/CTRL+C to quit
```

- Select 0 to upgrade via TFTP

```
*** Upgrading Firmware (emmc) ***

Available load methods:
    0 - TFTP client (Default)
    1 - Xmodem
    2 - Ymodem
    3 - Kermit
    4 - S-Record
    5 - RAM

Select (enter for default):
```

- Input U-Boot's IP address, which is the EVK IP address (e.g. 192.168.8.3 as below)

```
*** Upgrading Firmware (emmc) ***

Available load methods:
    0 - TFTP client (Default)
    1 - Xmodem
    2 - Ymodem
    3 - Kermit
    4 - S-Record
    5 - RAM

Select (enter for default):

Input U-Boot's IP address: 192.168.8.3
```

- Input TFTP server IP address, Subnet Mask and firmware image filename

```
*** Upgrading Firmware (emmc) ***

Available load methods:
    0 - TFTP client (Default)
    1 - Xmodem
    2 - Ymodem
    3 - Kermit
    4 - S-Record
    5 - RAM

Select (enter for default):

Input U-Boot's IP address: 192.168.8.3
Input TFTP server's IP address: 192.168.8.99
Input IP netmask: 255.255.255.0
Input file name: sysupgrade-debian-emmc.img
```


- Enter, and start firmware uploading and upgrading

```
        ########
        6.2 MiB/s
done
Bytes transferred = 607938560 (243c6800 hex)
Saving Environment to nowhere... not possible

*** Loaded 607938560 (0x243c6800) bytes at 0x46000000 ***

*** Write EMMC firmware ***
Writing from 0x46000800 to 0x880000, size 0x3c49e8 ... OK
Verifying from 0x880000 to 0xc449e7, size 0x3c49e8 ... OK
Writing from 0x463c5400 to 0x2880000, size 0x24000000 ... OK
Verifying from 0x2880000 to 0x2687ffff, size 0x24000000 ... OK

*** Firmware (emmc) upgrade completed! ***

MT7981_nor_emmc>
```

- Enter reset to restart the device

```
*** Firmware (emmc) upgrade completed! ***

MT7981_nor_emmc> reset
resetting ...

F0: 102B 0000
FA: 0000 0000
V0: 0000 0000 [0001]
00: 0000 0000
BP: 2400 0041 [0000]
G0: 1190 0000
EC: 0000 0000 [0000]
T0: 0000 0234 [010F]
Jump to BL

NOTICE:  BL2: v2.7(release):
NOTICE:  BL2: Built : 19:13:14, Jun  1 2023
NOTICE:  WDT: disabled
NOTICE:  EMI: Using DDR4 settings

dump toprgu registers data:
1001c000 | 00000000 0000ffe0 00000000 00000000
```

Login

Default user name/password: root/admin

```
        Starting OpenBSD Secure Shell server...
        Starting Permit User Sessions...
[  OK  ] Finished Permit User Sessions.
[FAILED] Failed to start Access poi…server for Wi-Fi and Ethernet.
See 'systemctl status hostapd.service' for details.
[  OK  ] Started Serial Getty on ttyS0.
[  OK  ] Reached target Login Prompts.
[  OK  ] Started OpenBSD Secure Shell server.
[  OK  ] Stopped Access point and a…server for Wi-Fi and Ethernet.
        Starting Access point and …rver for Wi-Fi and Ethernet...
[FAILED] Failed to start Access poi…server for Wi-Fi and Ethernet.
See 'systemctl status hostapd.service' for details.
[  OK  ] Started LSB: DHCP server.
[  OK  ] Reached target Multi-User System.
[  OK  ] Reached target Graphical Interface.
        Starting Update UTMP about System Runlevel Changes...
[  OK  ] Finished Update UTMP about System Runlevel Changes.

Debian GNU/Linux 11 localhost ttyS0

localhost login: [   16.564067] mtk_soc_eth 15100000.ethernet eth1: Link is Up - 1Gbps/Full - flow control rx/tx
[   16.572530] IPv6: ADDRCONF(NETDEV_CHANGE): eth1: link becomes ready

localhost login: [   26.083780] br-lan: port 7(wlan1) entered learning state
[   27.363781] br-lan: port 8(wlan0) entered learning state
root
Password:
```

Resize2fs

Command: resize2fs /dev/mmcblk0p6

```
root@localhost:~# resize2fs /dev/mmcblk0p6
resize2fs 1.46.2 (28-Feb-2021)
Filesystem at /d[  140.281595] EXT4-fs (mmcblk0p6): resizing filesystem from 147456 to 3659648 blocks
ev/mmcblk0p6 is mounted on /; on-line resizing required
old_desc_blocks = 1, new_desc_blocks = 2
[  140.443813] EXT4-fs (mmcblk0p6): resized filesystem to 3659648
The filesystem on /dev/mmcblk0p6 is now 3659648 (4k) blocks long.

root@localhost:~#
```

After resize successful, enter “reboot” to restart the device

Configuration

1 Network Configuration

Document: /etc/network/interfaces.d/xxx.conf

Restart: systemctl restart networking

Default IP:

lan: 192.168.8.1

wan: 192.168.2.55

2 WiFi Configuration

2.4GHz configuration file: /opt/wifi/wifi_24g.conf

5.8G configuration file: /opt/wifi/wifi_58g.conf

Restart: systemctl restart networking

3 Security Mode: Open

Document: /opt/wifi/wifi_58g_n0_encrypt.conf

auth_algs=1 wpa=0

4 Security Mode: WPA/WPA2 Personal

Document: /opt/wifi/wifi_58g_wpa2.conf

auth_algs=1 wpa=2

wpa_key_mgmt=WPA-PSK wpa_pairwise=CCMP TKIP wpa_passphrase=11111111

5 Security Mode: WPA3 Personal

Document: wifi_58g_wpa3_only.conf

ieee80211w=2 auth_algs=1 wpa=2

wpa_key_mgmt=SAE wpa_pairwise=CCMP wpa_passphrase=11111111

6 DHCP Configuration

Document: /etc/dhcp/dhcpd.conf

Restart: systemctl restart isc-dhcp-server.service

IPTABLE

How to verify if the iptable is enabled:

- Switch to iptables

``` shell
update-alternatives --set iptables /usr/sbin/iptables-legacy
```

- After switching

``` shell
root@localhost:~# iptables -t nat -nvL
Chain PREROUTING (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain INPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain OUTPUT (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination

Chain POSTROUTING (policy ACCEPT 0 packets, 0 bytes)
 pkts bytes target     prot opt in     out     source               destination
```

- Stop nft

``` shell
systemctl  stop nftables.service
```

``` shell
iptables -t nat -A POSTROUTING -o eth1 -j MASQUERADE
```

Firmware Upgrade VIA USB Port

1 Preparation

Requirements

- Min. 4GB USB typeA dongle/disk
- The USB dongle/disk must be formatted as Fat32
- Unzip the image file to the USB dongle, the directory should as below

```
├── boot
│   └── boot.img
├── rootfs
│   └── rootfs_p1.img
│   └── rootfs_p2.img
│   └── rootfs_p3.img
│   └── rootfs_p4.img
├── upgrade_env.txt
├── upgrade_usb.scr
```

2 Upgrade Procedure

- Insert the USB dongle to the USB port of the device
- Connect the console cable to the device console pins and the other side to the notebook/PC
- Power on device
- When the console start printing, enter ctrl+C to terminate the loader
- At command line, enter "`run usb_load_scr`"
- Wait system upgrade
- If successfully upgraded, you will see the message printed "`MT7981 Upgrade done. You could boot device by command 'bootflow scan'`"
- Enter `reset`
- Wait system to reboot
- Resize the rootfs size to the actual size (df –h), as the default rootfs ext file system is set as 2GB. (refer to resize2fs section)
- Reboot again

Note:

- The "upgrade_usb.scr" is the config file for the upgrade