

How to Change i.MX8MM evk Linux Debug UART

Biyong SUN
11, MAR 2021



EXTERNAL USE

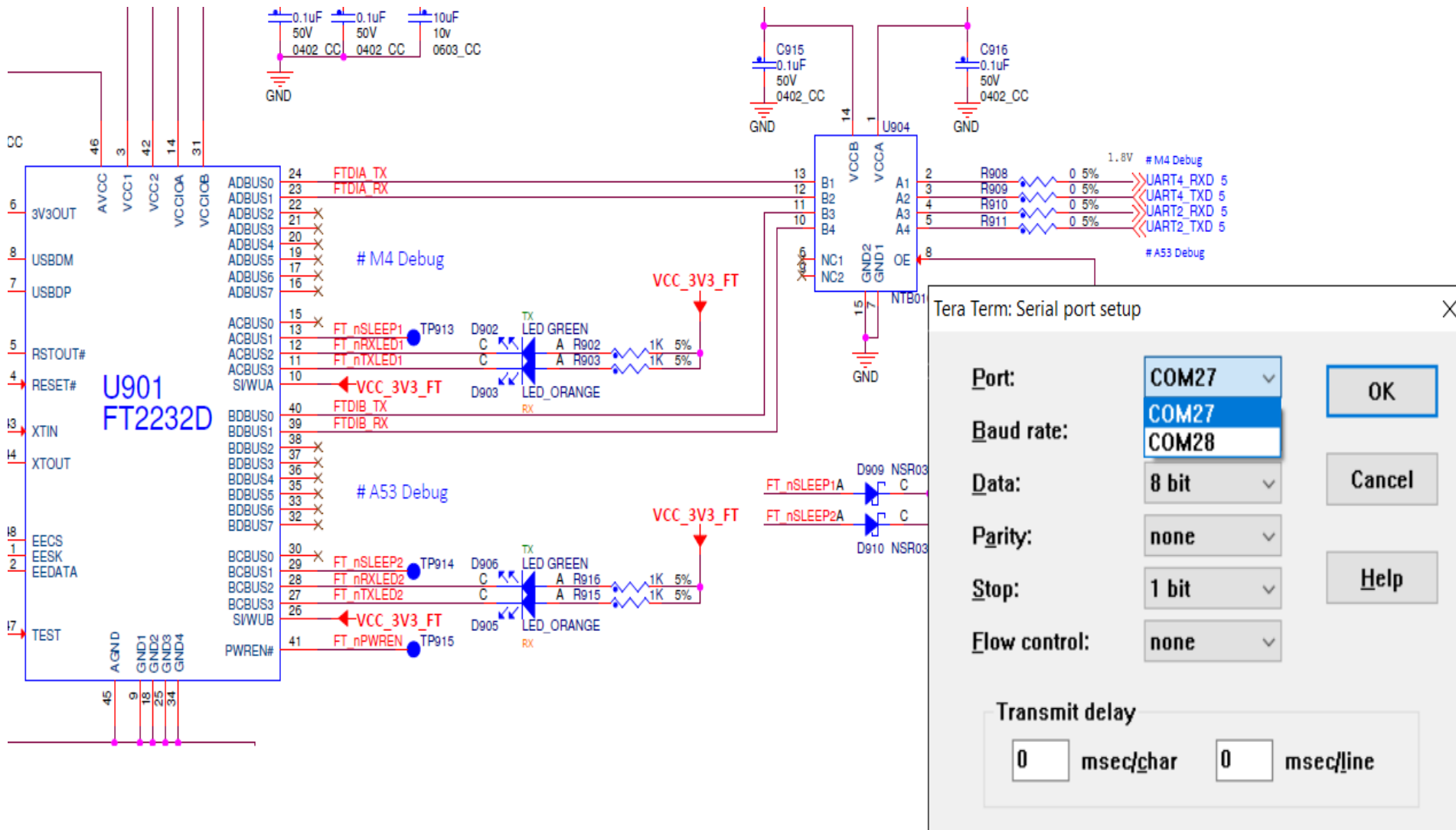


SECURE CONNECTIONS
FOR A SMARTER WORLD

Debug UART on i.MX8MM EVK board

Two debug UARTs
on i.MX8MM EVK

UART2 --- A53
UART4 --- M4



Switch Debug UART on i.MX8MM EVK board

1. You may need to switch UART4(default for M4) for A53 side to use.
2. Switch i.MX8MM debug port is not simple like i.MX6. Just change the bootargs.
3. The changes include atf(Key changes), u-boot, Linux and systemd.

Switch Debug UART on i.MX8MM EVK board(Cont.)

You may face the Linux kernel crash. When you modify the code and try to use the UART4 as A53 debug uart.

```
COM28:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
0.116403] Asymmetric key parser 'x509' registered
0.116434] Block layer SCSI generic (bsg) driver version 0.4 loaded (major 244)
0.116440] io scheduler mq-deadline registered
0.116444] io scheduler kyber registered
0.122066] EINJ: ACPI disabled.
0.130875] imx-sdma 302c0000.dma-controller: Direct firmware load for imx/sdma/sdma-imx7d.bin failed with error -2
0.130888] imx-sdma 302c0000.dma-controller: Falling back to sysfs fallback for: imx/sdma/sdma-imx7d.bin
0.138946] mxs-dma 33000000.dma-controller: initialized
0.140116] Bus freq driver module loaded
0.145397] Serial: 8250/16550 driver, 4 ports, IRQ sharing enabled
0.147630] 30860000.serial: ttyxc0 at MMIO 0x30860000 (irq = 39, base_baud = 5000000) is a IMX
0.148087] 30880000.serial: ttyxc2 at MMIO 0x30880000 (irq = 40, base_baud = 5000000) is a IMX
0.148495] 30890000.serial: ttyxc1 at MMIO 0x30890000 (irq = 41, base_baud = 1500000) is a IMX
1.133346] printk: console [ttyxc1] enabled
1.138094] Internal error: synchronous external abort: 96000210 [#1] PREEMPT SMP
1.145579] Modules linked in:
1.148642] CPU: 3 PID: 1 Comm: swapper/0 Not tainted 5.4.70-2.3.0+g4f2631b022d8 #1
1.156299] Hardware name: FSL i.MX8MM EVK board (DT)
1.161355] pstate: 60000005 (nZCv daif -PAN -UAO)
1.166155] pc : imx_uart_probe+0x268/0x718
1.170340] lr : imx_uart_probe+0x258/0x718
1.174525] sp : ffff80001003bb70
1.177842] x29: ffff80001003bb70 x28: 0000000000000000
1.183159] x27: 0000000000000000 x26: ffff000076899580
1.188475] x25: 00000000fffffffa x24: 00000000fffffffa
1.193789] x23: 000000000000002e x22: ffff00007636c010
1.199105] x21: ffff00007636c000 x20: 0000000000000000
1.204421] x19: ffff00007652b880 x18: ffff80001162ec10
1.209737] x17: 0000000000000000 x16: 0000000000000001
1.215053] x15: 0000000030a60000 x14: ffffffff00000000
1.220369] x13: 0000000000000038 x12: 0101010101010101
1.225685] x11: 0000000000000038 x10: 0101010101010101
1.231000] x9 : 0000000000000000 x8 : ffff000076899680
1.236316] x7 : 0000000000000000 x6 : 000000000000003f
1.241632] x5 : 0000000000000000 x4 : 0000000000000000
1.246948] x3 : 0000000000000000 x2 : 0000000000000000
1.252263] x1 : ffff800012430080 x0 : 0000000000000000
1.257581] Call trace:
1.260032] imx_uart_probe+0x268/0x718
1.263874] platform_drv_probe+0x50/0xa0
```

Switch Debug UART on i.MX8MM EVK board(Cont.)

The catch is because the RDC configuration in default BSP assign the UART4 to the M4 domain 1. Not the domain 0 for A53.

`imx-atf/plat/imx/imx8m/imx8mm/imx8mm_bl31_setup.c`

```
static const struct imx_rdc_cfg rdc[] = {
    /* Master domain assignment */
    RDC_MDAn(RDC_MDA_M4, DID1),

    /* peripherals domain permission */
    RDC_PDAPn(RDC_PDAP_UART4, D1R | D1W),
    RDC_PDAPn(RDC_PDAP_UART2, D0R | D0W),

    /* memory region */

    /* Sentinel */
    {0},
};
```

Assign UART4 to domain 0 as UART2 does

```
static const struct imx_rdc_cfg rdc[] = {
    /* Master domain assignment */
    RDC_MDAn(RDC_MDA_M4, DID1),

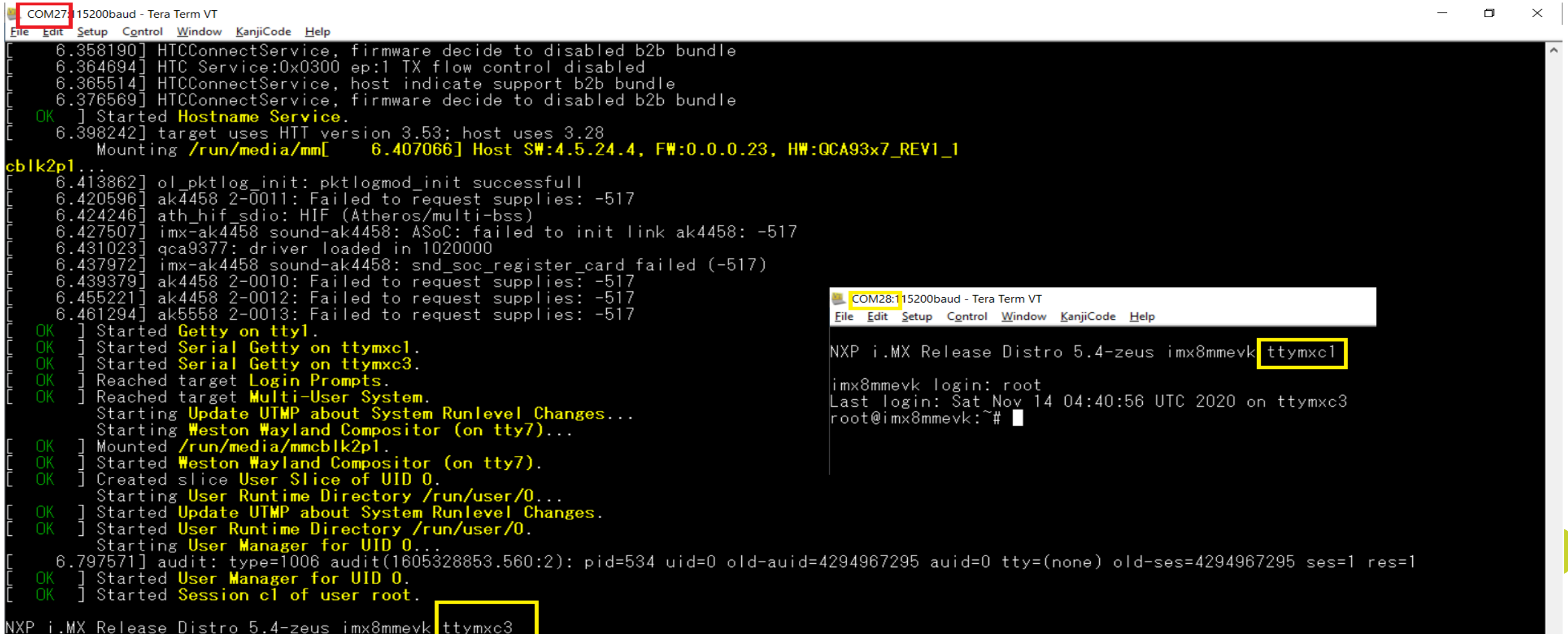
    /* peripherals domain permission */
    RDC_PDAPn(RDC_PDAP_UART4, D0R | D0W),
    RDC_PDAPn(RDC_PDAP_UART2, D0R | D0W),

    /* memory region */

    /* Sentinel */
    {0},
};
```

Test UART4(ttymxc3)

The ttymxc3 is debug uart4, so it has kernel debug output.
But ttymxc1 is not debug uart anymore, it just for user login.



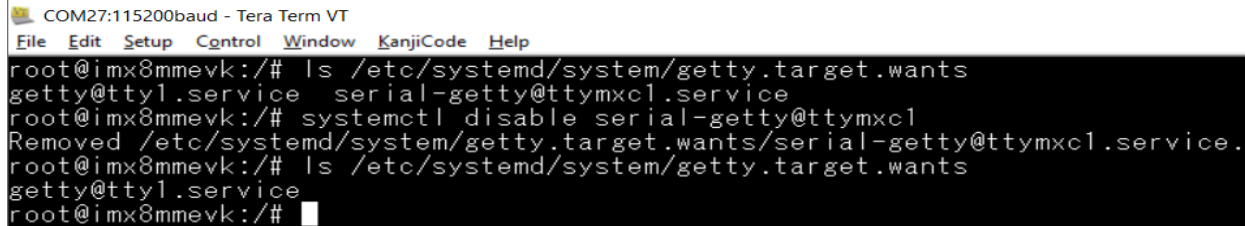
The image shows two terminal windows. The top window, titled 'COM27:115200baud - Tera Term VT', displays a detailed boot log. It shows the system starting services like Hostname Service, mounting media, and initializing various hardware components. The log ends with the system reaching the 'Multi-User System' state and starting the User Manager for UID 0. The bottom window, titled 'COM28:115200baud - Tera Term VT', shows the login prompt for 'ttymxc1'. The user 'root' logs in, and the prompt changes to 'root@imx8mmevk:~#'. The top window also shows a similar login prompt for 'ttymxc3' at the bottom.

```
COM27:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
6.358190] HTCConnectService, firmware decide to disabled b2b bundle
6.364694] HTC Service:0x0300 ep:1 TX flow control disabled
6.365514] HTCConnectService, host indicate support b2b bundle
6.376569] HTCConnectService, firmware decide to disabled b2b bundle
OK ] Started Hostname Service.
6.398242] target uses HTT version 3.53; host uses 3.28
Mounting /run/media/mm[ 6.407066] Host SW:4.5.24.4, FW:0.0.0.23, HW:QCA93x7_REV1_1
cblk2p1...
6.413862] ol_pktlog_init: pktlogmod_init successfull
6.420596] ak4458 2-0011: Failed to request supplies: -517
6.424246] ath_hif_sdio: HIF (Atheros/multi-bss)
6.427507] imx-ak4458 sound-ak4458: ASoC: failed to init link ak4458: -517
6.431023] qca9377: driver loaded in 1020000
6.437972] imx-ak4458 sound-ak4458: snd_soc_register_card failed (-517)
6.439379] ak4458 2-0010: Failed to request supplies: -517
6.455221] ak4458 2-0012: Failed to request supplies: -517
6.461294] ak5558 2-0013: Failed to request supplies: -517
OK ] Started Getty on tty1.
OK ] Started Serial Getty on ttymxc1.
OK ] Started Serial Getty on ttymxc3.
OK ] Reached target Login Prompts.
OK ] Reached target Multi-User System.
Starting Update UTMP about System Runlevel Changes...
Starting Weston Wayland Compositor (on tty7)...
OK ] Mounted /run/media/mmcbk2p1.
OK ] Started Weston Wayland Compositor (on tty7).
OK ] Created slice User Slice of UID 0.
Starting User Runtime Directory /run/user/0...
OK ] Started Update UTMP about System Runlevel Changes.
OK ] Started User Runtime Directory /run/user/0.
Starting User Manager for UID 0...
6.797571] audit: type=1006 audit(1605328853.560:2): pid=534 uid=0 old-auid=4294967295 auid=0 tty=(none) old-ses=4294967295 ses=1 res=1
OK ] Started User Manager for UID 0.
OK ] Started Session c1 of user root.
NXP i.MX Release Distro 5.4-zeus imx8mmevk ttymxc3

COM28:115200baud - Tera Term VT
File Edit Setup Control Window KanjiCode Help
NXP i.MX Release Distro 5.4-zeus imx8mmevk ttymxc1
imx8mmevk login: root
Last login: Sat Nov 14 04:40:56 UTC 2020 on ttymxc3
root@imx8mmevk:~#
```

Disable UART2(ttymxc1) for application to use

systemctl disable serial-getty@ttymxc1

A terminal window titled "COM27:115200baud - Tera Term VT" with a menu bar containing "File", "Edit", "Setup", "Control", "Window", "KanjiCode", and "Help". The terminal shows the following commands and output:

```
root@imx8mmevk:/# ls /etc/systemd/system/getty.target.wants
getty@tty1.service  serial-getty@ttymxc1.service
root@imx8mmevk:/# systemctl disable serial-getty@ttymxc1
Removed /etc/systemd/system/getty.target.wants/serial-getty@ttymxc1.service.
root@imx8mmevk:/# ls /etc/systemd/system/getty.target.wants
getty@tty1.service
root@imx8mmevk:/#
```

Miscellaneous

If you need to use optee, you may need to change the optee uart.

```
ifneq (,$(filter $(PLATFORM_FLAVOR),mx8mmevk))  
CFG_DDR_SIZE ?= 0x80000000  
#CFG_UART_BASE ?= UART2_BASE  
CFG_UART_BASE ?= UART4_BASE  
endif
```




SECURE CONNECTIONS
FOR A SMARTER WORLD