Software Integration Notes for DA9062 / i.MX 7Solo™ Demonstration Kit

Abstract

This document describes how to port and integrate the DA9062 PMIC driver with WaRP7.

Contents

1 Building the Images from Source

1.1 Downloading the Android Sources

To get the Android source code for WaRP7, follow the steps below:

NOTE
All the below steps are done in Linux Host (Ubuntu 14.04.5 LTS).

For more information see https://github.com/WaRP7/WaRP7-User-Guide/blob/Android_Dev/07-Chapter/Android.adoc.

```
$ cd ~
$ mkdir myandroid
$ mkdir bin
$ cd myandroid
$ curl http://commondatastorage.googleapis.com/git-repo-downloads/repo > ~/bin/repo
$ chmod a+x ~/bin/repo
$ ~/bin/repo init -u https://github.com/WaRP7/android_manifest.git -b
imx_L5.1.1_2.0.0_7d-beta
# this command loads most needed repos. Therefore, it can take several hours to load.
$ ~/bin/repo sync
$ cd ~/myandroid/prebuilts/gcc/linux-x86/arm
$ git clone https://android.googlesource.com/platform/prebuilts/gcc/linux-x86/arm/arm-
eabi-4.6
$ cd arm-eabi-4.6
$ git checkout android-4.4.3_r1
```

1.2 Android Filesystem Build Procedure

1. Change to the top-level build directory.

```
$ cd ~/myandroid
```

2. Set up the environment for building. This only configures the current terminal.

```
$ source build/envsetup.sh
```

3. Execute the Android lunch command.

```
$ lunch warp7-eng
```

4. Execute the make command to generate the image.

```
$ make 2>&1 | tee build-log.txt
```


1.3 Downloading and Building the Linux Kernel

The kernel for Android has special drivers such as binder and lowmemkiller which are integrated in the Android root.

1.3.1 Downloading and Setting the Toolchain Path

1. Create a folder in the user directory `/dialog/Freescale/github.com/Warp7`:

```
$ cd  /dialog/Freescale/github.com/Warp7
$ git clone https://android.googlesource.com/platform/prebuilts/gcc/linux-x86/arm/arm-eabi-4.6
```

2. Set up the toolchain path:

```
export ARCH=arm
export CROSS_COMPILE=arm-eabi-
export PATH=/dialog/Freescale/github.com/Warp7/arm-eabi-4.6/bin:$PATH
```

1.3.2 Downloading the WaRP7 Android Linux Kernel

```
$ git clone https://github.com/WaRP7/linux-fslc.git
$ cd linux-fslc
$ git checkout -b <name_your_branch> origin/linux_4.1.29
```

1.3.3 Back Porting DA9062 Drivers to the Linux Kernel

This section describes how to back port Dialog's DA9062 drivers from Linux kernel version v4.4.3 to v4.1.29 as used in WaRP7.

This driver can also be built as a module called `da9062-regulator`.

1.3.3.1 Manually Port the DA9062 MFD Driver

NOTE
Patches can be applied instead of this manual process, see Section 1.3.3.2.

Carry out the following in Linux Source Directory `<linux-fslc>` folder.

```
drivers/mfd/da9062-core.c

drivers/mfd/Makefile
       obj-$(CONFIG_MFD_DA9062)        += da9062-core.o

drivers/mfd/Kconfig
config MFD_DA9062
        tristate "Dialog Semiconductor DA9062 PMIC Support"
        select MFD_CORE
        select REGMAP_I2C
        select REGMAP_IRQ
        depends on I2C=y
        help
          Say yes here for support for the Dialog Semiconductor DA9062 PMIC.
          This includes the I2C driver and core APIs.
          Additional drivers must be enabled in order to use the functionality
          of the device.

drivers/regulator/da9062-regulator.c

drivers/regulator/Makefile
       obj-$(CONFIG_REGULATOR_DA9062)  += da9062-regulator.o
```



```
drivers/regulator/Kconfig
config REGULATOR_DA9062
        tristate "Dialog Semiconductor DA9062 regulators"
        depends on MFD_DA9062
        help
          Say y here to support the BUCKs and LDOs regulators found on
          DA9062 PMICs.
```

1.3.3.2 Applying Patches for DA9062 MFD Support

1. Copy patches from the release folder `WaRP7-DA9062/patches/linux` to the Linux Source Directory.
2. In Linux Source Directory `<linux-fslc>` folder:

```
$ patch -p1 < ../0001-Added-Dialog-da9062-regulator-Support-from-linux-v4..patch
$ patch -p1 < ../0002-Updated-with-da9062-in-warp7-dts-mfd-and-rtc-driver-.patch
```

After porting the files, changes will be reflected during commit.

```
commit 00e096f74665db436555ddf06b3df6ccb531707b
Date:   Thu Apr 19 18:29:03 2018 +0530

Updated with da9062 in warp7 dts, mfd and rtc driver porting

 arch/arm/boot/dts/imx7d-warp.dts     |   84 ++-
 drivers/mfd/da9062-core.c            |    3 +
 drivers/rtc/Kconfig                  |   10 +
 drivers/rtc/Makefile                 |    1 +
 drivers/rtc/rtc-da9062.c             |  370 ++++++++++++
 include/linux/mfd/da9062/core.h      |   50 ++
 include/linux/mfd/da9062/registers.h | 1108 ++++++++++++++++++++++++++++++++++
 7 files changed, 1583 insertions(+), 43 deletions(-)

commit 4fe68ba858ac1165acdd1eddf0712c1e238700e4
Date:   Tue Mar 27 15:23:19 2018 +0530

    Added Dialog da9062 regulator Support from linux v4.4.3 source

 arch/arm/boot/dts/imx7d-warp.dts     |  24 +-
 drivers/mfd/Kconfig                  |  13 +
 drivers/mfd/Makefile                 |   1 +
 drivers/mfd/da9062-core.c            | 533 ++++++++++++++++++++
 drivers/regulator/Kconfig            |  11 +
 drivers/regulator/Makefile           |   1 +
 drivers/regulator/da9062-regulator.c | 841 ++++++++++++++++++++++++++++++
 drivers/watchdog/Kconfig             |   9 +
 drivers/watchdog/Makefile            |   1 +
 drivers/watchdog/da9062_wdt.c        | 254 ++++++++++
 10 files changed, 1676 insertions(+), 12 deletions(-)
```


1.3.4 Enabling the DA9062 Driver in the Linux Configuration File

1.3.4.1 Manual

```
defconfig : arch/arm/configs/imx_v7_android_defconfig
make menuconfig
       CONFIG_REGULATOR_DA9062=y
       CONFIG_MFD_DA9062=y
       CONFIG_DA9062_WATCHDOG=y
       CONFIG_RTC_DRV_DA9062=m
```

1.3.4.2 Preset Configuration

```
$ cp WaRP7-DA9062/patches/linux/warp7_defconfig .config
$ make menuconfig
#Note: make sure that warp7_defconfig is taken for kernel configuration and save it as
.config
```

1.3.5 Android Filesystem Inclusion in Linux Kernel

In Linux Source Directory `<linux-fslc>` folder:

```
#Copy Android root initrd files from Android Source Build
#Correct Permission should be set before binding it with the Linux Kernel
$ cp ~/myandroid/out/target/product/warp7/root/ . -a

#Alternatively, Use the pre-built filesystem released with this document
$ tar -xzf WaRP7-DA9062/Binaries/root-android-initrd.tgz
```

To set the correct permission in the root directory for the system to boot to Android Home Screen, follow the sequence below:

```
$ cd root/
$ chmod 0755 init.rc
$ chmod 0644 default.prop init.environ.rc init.usb.rc init.freescale.rc
init.zygote32.rc init.trace.rc ueventd.rc ueventd.freescale.rc
$ chmod 0644 fstab.freescale property_contexts seapp_contexts selinux_version sepolicy
service_contexts
$ cd ..
```

The following shows the `initrd root/` files with the appropriate modes/permission for proper Android Booting.

```
ubuntu@ubuntu-VirtualBox:/dialog/Freescale/github.com/Warp7/linux-fslc$ ls -ln root
total 568
lrwxrwxrwx 1 1000 1000     13 Feb 19 20:41 charger -> /sbin/healthd
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 data
-rw-r--r-- 1 1000 1000    266 Feb 19 20:40 default.prop
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 dev
-rw-r--r-- 1 1000 1000  12513 Feb 19 20:40 file_contexts
-rw-r--r-- 1 1000 1000    891 Feb 19 20:40 fstab.freescale
-rwxr-xr-x 1 1000 1000 301492 Feb 19 20:41 init
-rw-r--r-- 1 1000 1000    944 Feb 19 20:41 init.environ.rc
-rw-r--r-- 1 1000 1000   8017 Feb 19 20:41 init.freescale.rc
-rw-r--r-- 1 1000 1000   3206 Feb 19 20:41 init.freescale.usb.rc
-rwxr-xr-x 1 1000 1000  27794 Feb 19 20:41 init.rc
-rw-r--r-- 1 1000 1000   1927 Feb 19 20:41 init.trace.rc
-rw-r--r-- 1 1000 1000   3885 Feb 19 20:41 init.usb.rc
-rw-r--r-- 1 1000 1000    301 Feb 19 20:41 init.zygote32.rc
drwxrwxr-x 3 1000 1000   4096 Feb 19 20:41 lib
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 proc
```



```
-rw-r--r-- 1 1000 1000   2771 Feb 19 20:41 property_contexts
drwxrwxr-x 3 1000 1000   4096 Feb 19 20:40 res
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 sbin
-rw-r--r-- 1 1000 1000    471 Feb 19 20:41 seapp_contexts
-rw-r--r-- 1 1000 1000     68 Feb 19 20:41 selinux_version
-rw-r--r-- 1 1000 1000 122660 Feb 19 20:41 sepolicy
-rw-r--r-- 1 1000 1000   9438 Feb 19 20:41 service_contexts
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 sys
drwxrwxr-x 2 1000 1000   4096 Feb 19 20:41 system
-rw-r--r-- 1 1000 1000   4204 Feb 19 20:41 ueventd.freescale.rc
-rw-r--r-- 1 1000 1000   4464 Feb 19 20:41 ueventd.rc
```

1.3.6 Building Linux Kernel Image

```
$ make ARCH=arm CROSS_COMPILE=arm-eabi- zImage
$ make ARCH=arm CROSS_COMPILE=arm-eabi- modules
$ make ARCH=arm CROSS_COMPILE=arm-eabi- imx7d-warp.dtb
```

NOTE
Replace the source paths with your development folder paths.

1.4 Downloading and Building the Bootloader (U-Boot)

1.4.1 Downloading the Toolchain

```
$ cd /dialog/toolchain/
$ wget https://releases.linaro.org/components/toolchain/binaries/6.4-2017.11/arm-eabi/gcc-linaro-6.4.1-2017.11-x86_64_arm-eabi.tar.xz
$ tar -xxf  gcc-linaro-6.4.1-2017.11-x86_64_arm-eabi.tar.xz
```

1.4.2 U-Boot Source Download

```
$ cd  /dialog/Freescale/github.com/
$ git clone https://github.com/Freescale/u-boot-fslc
$ git checkout -b 2018.03+fslc  origin/2018.03+fslc
```

1.4.2.1 Applying DA9062 Patch

Copy patches from the release folder `WaRP7-DA9062/patches/ u-boot-2018-03-fslc` to the U-Boot Source Directory `u-boot-fslc`.

```
$ patch -p1 < ../0001-Added-dialog-da9062-pmic-support-instead-of-pzf3000-.patch
```

Patch Output with the Commit history:

```
commit 02a1a3754bb2cc974b856f44cef2b61ee94624c3
Date:   Thu Apr 19 18:34:36 2018 +0530

 Added dialog da9062 pmic support instead of pzf3000 pmic with warp7

 board/warp7/warp7.c         |   30 +-
 include/configs/warp7.h     |   19 +
 include/power/da9062_pmic.h | 1111 ++++++++++++++++++++++++++++++++++++++++++++
 3 files changed, 1151 insertions(+), 9 deletions(-)
```

1.4.3 Building the Bootloader (U-Boot)

```
export PATH=$PATH:/dialog/toolchain/gcc-linaro-6.4.1-2017.11-x86_64_arm-eabi/bin
export CROSS_COMPILE=arm-eabi-
export ARCH=arm
make warp7_defconfig
make
```

1.5 WaRP7 Android Built Images

The Android images will be available in the following folders:

- `/dialog/Freescale/github.com/Warp7/linux-fslc` contains:

  `zImage` (Linux Image with `initrd`)
  `imx7d-warp.dtb`
  `imx7d-warp.dts`

- `/dialog/Freescale/github.com/u-boot-fslc` contains:

  `u-boot.imx-2018-03`

- `myandroid` contains the system image (Android Filesystem) :

  `myandroid/out/target/product/warp7/system.img`

2 Programming U-Boot in WaRP7 Board

2.1 Hardware and Utility Setup

1. Change the Warp7 CPU Board's BOOT MODE Switches to USB Serial Downloader Mode `BOOT_MODE[1:0] "01"`.
2. Power the WaRP7 board by connecting the CPU board OTG interface to Host, USB OTG acts as a programming interface.
3. Connect the USB serial cable between the WaRP7 IO board and the host system for serial console messages. Open a serial terminal minicom or teraterm/hyperterminal and get the u-boot console message and prompt.
4. Download and build the i.MX USB Loader using the source in the HOST system:
   ```
   $ git clone https://github.com/boundarydevices/imx_usb_loader
   $ make
   ```
5. Install **dfu-util**: http://dfu-util.sourceforge.net/releases/ (if you are in a Debian distribution then you can get it via the libdfu-dev package)
6. Install **libusb**: http://libusb.org/ (if you are in a Debian distribution then you can get it via libusb-dev and libusb-1.0-0-dev)

2.2 Programming U-Boot on the Bare Board using DFU

Load U-Boot via USB:

```
ubuntu@ubuntu-VirtualBox:~/devel/imx_usb_loader$ sudo ./imx_usb
/dialog/Freescale/github.com/u-boot-fslc/u-boot.imx

config file <.//imx_usb.conf>
vid=0x066f pid=0x3780 file_name=mx23_usb_work.conf
vid=0x15a2 pid=0x004f file_name=mx28_usb_work.conf
vid=0x15a2 pid=0x0052 file_name=mx50_usb_work.conf
vid=0x15a2 pid=0x0054 file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x0061 file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x0063 file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x0071 file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x007d file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x0080 file_name=mx6_usb_work.conf
vid=0x1fc9 pid=0x0128 file_name=mx6_usb_work.conf
vid=0x15a2 pid=0x0076 file_name=mx7_usb_work.conf
vid=0x1fc9 pid=0x0126 file_name=mx7ulp_usb_work.conf
vid=0x15a2 pid=0x0041 file_name=mx51_usb_work.conf
vid=0x15a2 pid=0x004e file_name=mx53_usb_work.conf
vid=0x15a2 pid=0x006a file_name=vybrid_usb_work.conf
vid=0x066f pid=0x37ff file_name=linux_gadget.conf
vid=0x1b67 pid=0x4fff file_name=mx6_usb_sdp_spl.conf
vid=0x0525 pid=0xb4a4 file_name=mx6_usb_sdp_spl.conf
config file <.//mx7_usb_work.conf>
parse .//mx7_usb_work.conf
Trying to open device vid=0x15a2 pid=0x0076
Interface 0 claimed
HAB security state: development mode (0x56787856)
== work item
filename /dialog/Freescale/github.com/u-boot-fslc/u-boot.imx
load_size 0 bytes
load_addr 0x00000000
dcd 1
```



```
clear_dcd 0
plug 1
jump_mode 2
jump_addr 0x00000000
== end work item
loading DCD table @0x910000

<<<468, 468 bytes>>>
succeeded (security 0x56787856, status 0x128a8a12)
clear dcd_ptr=0x877ff42c

loading binary file(/dialog/Freescale/github.com/u-boot-fslc/u-boot.imx) to 877ff400,
skip=0, fsize=61c00 type=aa

<<<400384, 400384 bytes>>>
succeeded (security 0x56787856, status 0x88888888)
jumping to 0x877ff400
```

```
U-Boot 2018.03-00528-g7155b10-dirty (Apr 12 2018 - 18:51:16 +0530)

CPU:   Freescale i.MX7S rev1.2 800 MHz (running at 792 MHz)
CPU:   Extended Commercial temperature grade (-20C to 105C) at 47C
Reset cause: POR
Board: WARP7 in non-secure mode
I2C:   ready
DRAM:  512 MiB
PMIC: DIALOG_PMIC DEV_ID=0x62 REV_ID=0x12
MMC:   FSL_SDHC: 0
Loading Environment from MMC... *** Warning - bad CRC, using default environment

Failed (-5)
In:    serial
Out:   serial
Err:   serial
Net:   usb_ether
Warning: usb_ether (eth0) using random MAC address - b2:66:a2:c7:bc:c3

Hit any key to stop autoboot:  0
```

Figure 1: U-Boot Boot Console Message

2.2.1 Upgrade U-Boot using the DFU Utility

1. Install the DFU utility on the Host System:

```
$ wget http://dfu-util.sourceforge.net/releases/dfu-util-0.9.tar.gz
$ tar -xzf dfu-util-0.9.tar.gz
$ cd dfu-util-0.9
$ ./configure
$ make
$ cd dfu-util-0.9/src
```

2. Run the DFU command on the u-boot

```
=> dfu 0 mmc 0
```

NOTE

- The above `dfu` command waits for the following `./dfu-util` command to write U-Boot to eMMC.
- The eMMC might be locked to prevent the U-Boot being overwritten, see Section 2.2.1.1 for locking and unlocking the eMMC before using the `dfu` command.

3. Transfer `u-boot.imx` from the host PC to be flashed into the eMMC:

   `$ dfu-util-0.9/src$ sudo ./dfu-util -D /dialog/Freescale/github.com/u-boot-fslc/u-boot.imx -a boot`

```
dfu-util 0.9

Copyright 2005-2009 Weston Schmidt, Harald Welte and OpenMoko Inc.
Copyright 2010-2016 Tormod Volden and Stefan Schmidt
This program is Free Software and has ABSOLUTELY NO WARRANTY
Please report bugs to http://sourceforge.net/p/dfu-util/tickets/

dfu-util: Invalid DFU suffix signature
dfu-util: A valid DFU suffix will be required in a future dfu-util release!!!
Opening DFU capable USB device...
ID 0525:a4a5
Run-time device DFU version 0110
Claiming USB DFU Interface...
Setting Alternate Setting #0 ...
Determining device status: state = dfuIDLE, status = 0
dfuIDLE, continuing
DFU mode device DFU version 0110
Device returned transfer size 4096
Copying data from PC to DFU device
Download        [=========================] 100%       400384 bytes
Download done.
state(7) = dfuMANIFEST, status(0) = No error condition is present
state(2) = dfuIDLE, status(0) = No error condition is present
Done!
ubuntu@ubuntu-VirtualBox:~/devel/dfu-util-0.9/src

The following message should be seen on the U-Boot prompt after a successful program:
#DOWNLOAD … OK Ctrl+C to exit …
```

4. Switch back the WaRP7 CPU Board's BOOT MODE Switches to default Normal Mode `BOOT_MODE[1:0] "10"` (Internal Boot) to boot from eMMC.

2.2.1.1 Lock and Unlock the Boot Partition in eMMC

It can be the case that the raw partition of your WaRP7 is unlocked. In this state, burning an image that doesn't contain U-Boot into the eMMC erases the original U-Boot.

To avoid this, the user can run the command below from the U-Boot prompt:

```
=> mmc partconf 0 1 1 0
```

This command makes the raw partition read-only and prevents U-Boot from being changed.

If you delete U-Boot by mistake and your board does not boot, please load U-Boot from your host machine using `imx_usb_loader`.

Run the command above once you get to the U-Boot prompt to prevent U-boot from being deleted again.

You can follow the steps in Section 2.2 to learn how to boot U-Boot from your host machine.

Alternatively, if your partition is locked and you would like to update U-Boot, you can unlock the raw partition using the command:

```
=> mmc partconf 0 1 0 0
```


2.3 Programming U-Boot on a Bare Board using ums U-Boot Command

1. Change the Warp7 CPU Board's BOOT MODE Switches to USB Serial Downloader Mode `BOOT_MODE[1:0] "01"`.
2. Connect both USB Serial and USB OTG cables from WaRP7 board to a Linux system.

```
$ lsusb
Note: check for the USB device id in the usb enumeration output list

$ sudo ./imx_usb /dialog/Freescale/github.com/u-boot-fslc/u-boot.imx

= > ums 0 mmc 0

$ lsusb
$ umount /media/ubuntu/<mountpoints>
Note : Unmount the automatically mounted UMS partitions if any.

$ sudo lshw –short –class disk
Note : find out the drive index X (sd<X>) from the lshw command output with UMS
disk

$ dd if=u-boot.imx bs=512 seek=2 conv=nocreat,notrunc of=/dev/sd<X>
$ sync

= > ums 0 mmc 0
CTRL + C to terminate the ums command
```

3. Switch back the WaRP7 CPU Board's BOOT MODE Switches to default Normal Mode `BOOT_MODE[1:0] "10"` (Internal Boot) to boot from eMMC.

2.4 Programming Linux Kernel to eMMC Partition

1. Power up your WaRP7, the U-Boot prompt is displayed (you can use any serial console, for example minicom).
2. Run the following command on u-boot:

```
=> ums 0 mmc 0
```

   You will be able to see eMMC as storage device on your computer.

```
$ lsusb
Bus 001 Device 002: ID 0525:a4a5 Netchip Technology, Inc. Pocketbook Pro 903
```

3. If the device is already partitioned, check for the partitions and move on to copying the image.

```
$ fdisk -lu /dev/sd<X>
```

```
# List the Partitions of WaRP7 eMMC mass storage device
$ fdisk -lu /dev/sdf

Disk /dev/sdf: 7650 MB, 7650410496 bytes
4 heads, 16 sectors/track, 233472 cylinders, total 14942208 sectors
Units = sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x00000000

   Device Boot      Start         End      Blocks   Id  System
/dev/sdf1            2048     1050623      524288    b  W95 FAT32
/dev/sdf2         1050624     2099199      524288   83  Linux
/dev/sdf3         2099200    14942207     6421504   83  Linux
```

Figure 2: Sample Listing

4. If the device is not partitioned:
   a. Use any standard utility to make partition table. (for example, gparted).
   b. Create three partitions, a 100 MB FAT32 partition, a 500 MB ext4 partition for the system image, and define the remaining space as an ext4 partition for user data.
   c. Copy `zImage` and `zImage_silent` to the FAT32 partition.
   d. Copy `imx7d-warp.dtb` to the FAT32 partition.
   e. Sync and unmount the partition.

2.5 Programming Android System Image to the eMMC Partition

1. On the Host PC, install the FS utility used for file conversion
   ```
   $ apt-get install android-tools-fsutils
   ```
2. On the board, go to the U-Boot prompt to update the eMMC image:
   ```
   => ums 0 mmc 0
   UMS: LUN 0, dev 0, hwpart 0, sector 0x0, count 0xe40000
   |/- ....
   ```
3. On the Linux host, use the following commands to list the USB device and eMMC partitions:
   ```
   $ lsusb
   $ fdisk -lu /dev/sdX

   # List mounted partition and unmount System Image partition if auto mounted.
   $ mount
   $ umount <SystemImageMountPoint>
   ```

NOTE
Remove the USB Serial Console Cable from IO board before starting `system_raw.img` flashing, else the system image update may fail.

4. Download the Android system image to eMMC partition:
   ```
   $ cd ~/myandroid/out/target/product/warp7
   $ mkdir ~/system/

   # Testing the system.img image format by mounting it

   $ sudo mount -o ro,loop system.img ~/system/
   $ ls
   ```
5. If either the `mount` or the `ls` command fails, `system.img` is in Sparse Format and needs to converted to RAW image format.
   ```
   $ umount ~/system/
   ```
   Convert `system.img` from sparse image format to RAW image format. Test and flash to eMMC partition sdX2:
   ```
   $ sudo simg2img system.img system_raw.img
   $ sudo mount -o ro,loop system_raw.img ~/system/
   $ ls ~/system/
   $ umount ~/system/
   $ sudo dd if=system_raw.img bs=512 of=/dev/sd<X>2
   $ sync
   ```


2.6 Procedure to Clean/Wipe or Update the userdata Partition Contents

NOTE
The data partition is already populated with userdata contents, so only execute the following commands if a factory reset is required.

```
=> ums 0 mmc 0

~# lsusb          # findout the USB massstorage device enumerated.
~# sudo fdisk -lu # findout the USB device partitions list.

~# mount /dev/sd<X>3 /media/userdata
~# cd /media/userdata
~# ls

Note: backup the data if needed
~# cd /media/userdata/
~# tar czf ~/userdata-backup.tgz .
~# cd /

~# rm -fr /media/userdata/*
~# mount -o loop,ro userdata-qemu.img /media/data
~# cd /media/userdata/

~# tar -xzf /home/<user>/userdata-qemu.tgz
   or
~# cp -a /media/data/* /media/userdata/.
   or
~# tar -xzf ~/data_pactron_final.tgz   # make sure all files are in base directory

~# sync
~# cd /
~# umount /media/data
~# umount /media/userdata
```

In U-boot prompt, hit **Ctrl+C** to cancel the mounted MMC. Set the boot arguments as follows:

```
= > setenv bootargs no_console_suspend console=ttymxc0,115200 init=/init
androidboot.hardware=freescale androidboot.selinux=disabled; fatload mmc 0:1
0x80800000 zImage_silent; fatload mmc 0:1 0x83000000 imx7d-warp.dtb; bootz 0x80800000
- 0x83000000;
```

Or

```
= > setenv android 'setenv bootargs console=ttymxc0,115200 init=/init
androidboot.hardware=freescale androidboot.selinux=disabled;fatload mmc 0 0x80800000
zImage_silent;fatload mmc 0 0x83000000 imx7d-warp.dtb; bootz 0x80800000 -
0x83000000;loadbootscript=fatload mmc ${mmcdev}:${mmcpart} ${loadaddr} ${script};'

= > setenv bootcmd 'run android'

= > savenv
```

Reboot your board, Android must be up and running.

3 Reference

3.1 U-Boot Console Boot Log

```
U-Boot 2018.03-00528-g7155b10-dirty (Apr 12 2018 - 18:51:16 +0530)

CPU:   Freescale i.MX7S rev1.2 800 MHz (running at 792 MHz)
CPU:   Extended Commercial temperature grade (-20C to 105C) at 47C
Reset cause: POR
Board: WARP7 in non-secure mode
I2C:   ready
DRAM:  512 MiB
PMIC: DIALOG_PMIC DEV_ID=0x62 REV_ID=0x12
MMC:   FSL_SDHC: 0
Loading Environment from MMC... *** Warning - bad CRC, using default environment

Failed (-5)
In:    serial
Out:   serial
Err:   serial
Net:   usb_ether
Warning: usb_ether (eth0) using random MAC address - b2:66:a2:c7:bc:c3

Hit any key to stop autoboot:  0
```

3.2 Linux Console Boot Log

```
=> setenv bootargs no_console_suspend console=ttymxc0,115200 init=/init
androidboot.hardware=freescale androidboot.selinux=disabled; fatload mmc 0 0x80800000
zImage_silent; fatload mmc 0:1 0x83000000 imx7d-warp.dtb; bootz 0x80800000 -
0x83000000;
7433864 bytes read in 100 ms (70.9 MiB/s)
38867 bytes read in 10 ms (3.7 MiB/s)
Kernel image @ 0x80800000 [ 0x000000 - 0x716e88 ]
## Flattened Device Tree blob at 83000000
   Booting using the fdt blob at 0x83000000
   Using Device Tree in place at 83000000, end 8300c7d2

Starting kernel ...

Booting Linux on physical CPU 0x0
Linux version 4.1.29-00016-g4fe68ba-dirty (ubuntu@ubuntu-VirtualBox) (gcc version
4.6.x-google 20120106 (prerelease) (GCC) ) #5 SMP PREEMPT Mon Apr 2 12:21:50 IST 2018
CPU: ARMv7 Processor [410fc075] revision 5 (ARMv7), cr=10c53c7d
CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction cache
Machine model: Warp i.MX7S Board
Reserved memory: created CMA memory pool at 0x8c000000, size 320 MiB
Reserved memory: initialized node linux,cma, compatible id shared-dma-pool
Memory policy: Data cache writealloc
PERCPU: Embedded 12 pages/cpu @8bb22000 s16960 r8192 d24000 u49152
Built 1 zonelists in Zone order, mobility grouping on.  Total pages: 130048
Kernel command line: no_console_suspend console=ttymxc0,115200 init=/init
androidboot.hardware=freescale androidboot.selinux=disabled
PID hash table entries: 2048 (order: 1, 8192 bytes)
Dentry cache hash table entries: 65536 (order: 6, 262144 bytes)
Inode-cache hash table entries: 32768 (order: 5, 131072 bytes)
```



```
Memory: 177876K/524288K available (8205K kernel code, 466K rwdata, 2860K rodata, 1220K
init, 542K bss, 18732K reserved, 327680K cma-reserved, 0K highmem)
Virtual kernel memory layout:
    vector  : 0xffff0000 - 0xffff1000   (   4 kB)
    fixmap  : 0xffc00000 - 0xfff00000   (3072 kB)
    vmalloc : 0xa0800000 - 0xff000000   (1512 MB)
    lowmem  : 0x80000000 - 0xa0000000   ( 512 MB)
    pkmap   : 0x7fe00000 - 0x80000000   (   2 MB)
    modules : 0x7f000000 - 0x7fe00000   (  14 MB)
      .text : 0x80008000 - 0x80ad6960   (11067 kB)
      .init : 0x80ad7000 - 0x80c08000   (1220 kB)
      .data : 0x80c08000 - 0x80c7cba0   ( 467 kB)
       .bss : 0x80c7f000 - 0x80d069ac   ( 543 kB)
SLUB: HWalign=64, Order=0-3, MinObjects=0, CPUs=2, Nodes=1
Preemptible hierarchical RCU implementation.
        Additional per-CPU info printed with stalls.
        RCU restricting CPUs from NR_CPUS=4 to nr_cpu_ids=2.
RCU: Adjusting geometry for rcu_fanout_leaf=16, nr_cpu_ids=2
NR_IRQS:16 16
Architected cp15 timer(s) running at 8.00MHz (phys).
clocksource arch_sys_counter: mask: 0xffffffffffffff max_cycles: 0x1d854df40,
max_idle_ns: 440795202120 ns
sched_clock: 56 bits at 8MHz, resolution 125ns, wraps every 2199023255500ns
Switching to timer-based delay loop, resolution 125ns
mxc_clocksource_init 3000000
Ignoring duplicate/late registration of read_current_timer delay
clocksource mxc_timer1: mask: 0xffffffff max_cycles: 0xffffffff, max_idle_ns:
637086815595 ns
Console: colour dummy device 80x30
Calibrating delay loop (skipped), value calculated using timer frequency.. 16.00
BogoMIPS (lpj=80000)
pid_max: default: 32768 minimum: 301
Mount-cache hash table entries: 1024 (order: 0, 4096 bytes)
Mountpoint-cache hash table entries: 1024 (order: 0, 4096 bytes)
CPU: Testing write buffer coherency: ok
/cpus/cpu@0 missing clock-frequency property
/cpus/cpu@1 missing clock-frequency property
CPU0: thread -1, cpu 0, socket 0, mpidr 80000000
Setting up static identity map for 0x80008280 - 0x800082d8
CPU1: failed to come online
Brought up 1 CPUs
SMP: Total of 1 processors activated (16.00 BogoMIPS).
CPU: All CPU(s) started in SVC mode.
devtmpfs: initialized
device-tree: Duplicate name in lcdif@30730000, renamed to "display#1"
VFP support v0.3: implementor 41 architecture 2 part 30 variant 7 rev 5
clocksource jiffies: mask: 0xffffffff max_cycles: 0xffffffff, max_idle_ns:
19112604462750000 ns
pinctrl core: initialized pinctrl subsystem
NET: Registered protocol family 16
DMA: preallocated 256 KiB pool for atomic coherent allocations
cpuidle: using governor ladder
cpuidle: using governor menu
DDR type is LPDDR3!
hw-breakpoint: found 5 (+1 reserved) breakpoint and 4 watchpoint registers.
hw-breakpoint: maximum watchpoint size is 8 bytes.
imx7d-pinctrl 302c0000.iomuxc-lpsr: initialized IMX pinctrl driver
imx7d-pinctrl 30330000.iomuxc: initialized IMX pinctrl driver
gpio-reset mipi-dsi-reset: reset-gpios property missing, or not a single gpio
gpio-reset: probe of mipi-dsi-reset failed with error -22
```



```
MU is ready for cross core communication!
mxs-dma 33000000.dma-apbh: initialized
SCSI subsystem initialized
usbcore: registered new interface driver usbfs
usbcore: registered new interface driver hub
usbcore: registered new device driver usb
30800000.aips-bus:usbphy_nop1 supply vcc not found, using dummy regulator
30800000.aips-bus:usbphy_nop2 supply vcc not found, using dummy regulator
i2c i2c-0: IMX I2C adapter registered
i2c i2c-0: can't use DMA
i2c i2c-1: IMX I2C adapter registered
i2c i2c-1: can't use DMA
i2c i2c-2: IMX I2C adapter registered
i2c i2c-2: can't use DMA
i2c i2c-3: IMX I2C adapter registered
i2c i2c-3: can't use DMA
Linux video capture interface: v2.00
pps_core: LinuxPPS API ver. 1 registered
pps_core: Software ver. 5.3.6 - Copyright 2005-2007 Rodolfo Giometti
<giometti@linux.it>
PTP clock support registered
MIPI CSI2 driver module loaded
Advanced Linux Sound Architecture Driver Initialized.
Bluetooth: Core ver 2.20
NET: Registered protocol family 31
Bluetooth: HCI device and connection manager initialized
Bluetooth: HCI socket layer initialized
Bluetooth: L2CAP socket layer initialized
Bluetooth: SCO socket layer initialized
Switched to clocksource arch_sys_counter
NET: Registered protocol family 2
TCP established hash table entries: 4096 (order: 2, 16384 bytes)
TCP bind hash table entries: 4096 (order: 3, 32768 bytes)
TCP: Hash tables configured (established 4096 bind 4096)
UDP hash table entries: 256 (order: 1, 8192 bytes)
UDP-Lite hash table entries: 256 (order: 1, 8192 bytes)
NET: Registered protocol family 1
RPC: Registered named UNIX socket transport module.
RPC: Registered udp transport module.
RPC: Registered tcp transport module.
RPC: Registered tcp NFSv4.1 backchannel transport module.
imx rpmsg driver is registered.
Bus freq driver module loaded
futex hash table entries: 512 (order: 3, 32768 bytes)
VFS: Disk quotas dquot_6.6.0
VFS: Dquot-cache hash table entries: 1024 (order 0, 4096 bytes)
NFS: Registering the id_resolver key type
Key type id_resolver registered
Key type id_legacy registered
jffs2: version 2.2. (NAND) Â© 2001-2006 Red Hat, Inc.
fuse init (API version 7.23)
io scheduler noop registered
io scheduler deadline registered
io scheduler cfq registered (default)
backlight supply power not found, using dummy regulator
MIPI DSI driver module loaded
mxc_mipi_dsi_samsung 30760000.mipi-dsi: no reset gpio pin available
30760000.mipi-dsi supply disp-power-on not found, using dummy regulator
mxc_mipi_dsi_samsung 30760000.mipi-dsi: i.MX MIPI DSI driver probed
MIPI DSI driver module loaded
```



```
30730000.lcdif supply lcd not found, using dummy regulator
mxc_mipi_dsi_samsung 30760000.mipi-dsi: MIPI DSI dispdrv inited!
mxsfb 30730000.lcdif: registered mxc display driver mipi_dsi_samsung
Console: switching to colour frame buffer device 40x40
mxsfb 30730000.lcdif: initialized
imx-sdma 30bd0000.sdma: no event needs to be remapped
imx-sdma 30bd0000.sdma: loaded firmware 4.2
imx-sdma 30bd0000.sdma: initialized
30860000.serial: ttymxc0 at MMIO 0x30860000 (irq = 274, base_baud = 1500000) is a IMX
console [ttymxc0] enabled
30880000.serial: ttymxc2 at MMIO 0x30880000 (irq = 275, base_baud = 5000000) is a IMX
imx sema4 driver is registered.
[drm] Initialized drm 1.1.0 20060810
[drm] Initialized vivante 1.0.0 20120216 on minor 0
brd: module loaded
loop: module loaded
input: fxos8700 as /devices/platform/soc/30800000.aips-bus/30a50000.i2c/i2c-3/3-
001e/input/input0
fxos8700 device driver probe successfully
input: fxas2100x as /devices/platform/soc/30800000.aips-bus/30a50000.i2c/i2c-3/3-
0020/input/input1
fxas2100x 3-0020: fxas2100x device driver probe successfully
*** da9062_i2c_probe : Entered ***
da9062 0-0058: Device detected (device-ID: 0x62, var-ID: 0x12)
*** da9062_i2c_probe : Success ***
CAN device driver interface
ehci_hcd: USB 2.0 'Enhanced' Host Controller (EHCI) Driver
ehci-mxc: Freescale On-Chip EHCI Host driver
usbcore: registered new interface driver usb-storage
usbcore: registered new interface driver usb_ehset_test
30b10200.usbmisc supply vbus-wakeup not found, using dummy regulator
30b20200.usbmisc supply vbus-wakeup not found, using dummy regulator
30b30200.usbmisc supply vbus-wakeup not found, using dummy regulator
mousedev: PS/2 mouse device common for all mice
input: 30370000.snvs:snvs-powerkey as /devices/platform/soc/30000000.aips-
bus/30370000.snvs/30370000.snvs:snvs-powerkey/input/input2
[HXTP] Himax 852xES touch panel driver init
[HXTP] himax852xes_init_async:Enter
input: synaptics_dsx as /devices/platform/soc/30800000.aips-bus/30a30000.i2c/i2c-1/1-
0020/input/input3
read mpl3115 chip id 0xc4
input: mpl3115 as /devices/virtual/input/input4
mpl3115 device driver probe successfully
snvs_rtc 30370000.snvs:snvs-rtc-lp: rtc core: registered 30370000.snvs:snvs- as rtc0
i2c /dev entries driver
IR NEC protocol handler initialized
IR RC5(x/sz) protocol handler initialized
IR RC6 protocol handler initialized
IR JVC protocol handler initialized
IR Sony protocol handler initialized
IR SANYO protocol handler initialized
IR Sharp protocol handler initialized
IR MCE Keyboard/mouse protocol handler initialized
IR XMP protocol handler initialized
pxp-v4l2 pxp_v4l2_out: initialized
imx2-wdt 30280000.wdog: timeout 60 sec (nowayout=0)
fwu_start_reflash: Start of reflash process
synaptics_dsx_i2c 1-0020: fwu_go_nogo: Device firmware ID = 1935790
synaptics_dsx_i2c 1-0020: fwu_go_nogo: Image firmware ID = 1935790
synaptics_dsx_i2c 1-0020: fwu_go_nogo: No need to do reflash
```



```
fwu_start_reflash: End of reflash process
Bluetooth: HCI UART driver ver 2.3
Bluetooth: HCI UART protocol H4 registered
usbcore: registered new interface driver bcm203x
sdhci: Secure Digital Host Controller Interface driver
sdhci: Copyright(c) Pierre Ossman
sdhci-pltfm: SDHCI platform and OF driver helper
/soc/aips-bus@30800000/usdhc@30b40000: voltage-ranges unspecified
sdhci-esdhc-imx 30b40000.usdhc: assigned as wifi host
sdhci-esdhc-imx 30b40000.usdhc: No vmmc regulator found
sdhci-esdhc-imx 30b40000.usdhc: No vqmmc regulator found
mmc0: SDHCI controller on 30b40000.usdhc [30b40000.usdhc] using ADMA
/soc/aips-bus@30800000/usdhc@30b60000: voltage-ranges unspecified
sdhci-esdhc-imx 30b60000.usdhc: No vmmc regulator found
sdhci-esdhc-imx 30b60000.usdhc: No vqmmc regulator found
mmc2: SDHCI controller on 30b60000.usdhc [30b60000.usdhc] using ADMA
snvs-secvio 30370000.caam-snvs: can't get snvs clock
snvs-secvio 30370000.caam-snvs: violation handlers armed - non-secure state
usbcore: registered new interface driver usbhid
usbhid: USB HID core driver
ashmem: initialized
NET: Registered protocol family 26
NET: Registered protocol family 10
sit: IPv6 over IPv4 tunneling driver
NET: Registered protocol family 17
can: controller area network core (rev 20120528 abi 9)
NET: Registered protocol family 29
can: raw protocol (rev 20120528)
can: broadcast manager protocol (rev 20120528 t)
can: netlink gateway (rev 20130117) max_hops=1
Bluetooth: RFCOMM TTY layer initialized
Bluetooth: RFCOMM socket layer initialized
Bluetooth: RFCOMM ver 1.11
Bluetooth: BNEP (Ethernet Emulation) ver 1.3
Bluetooth: BNEP filters: protocol multicast
Bluetooth: BNEP socket layer initialized
Bluetooth: HIDP (Human Interface Emulation) ver 1.2
Bluetooth: HIDP socket layer initialized
8021q: 802.1Q VLAN Support v1.8
[rfkill_bluedroid_probe] set  bt_rst_gpio: 145
rfkill-bluedroid: bluedroid initialized
[rfkill_bluedroid_set_block] set gpio 145 value 1
Key type dns_resolver registered
cpu cpu0: dev_pm_opp_get_opp_count: device OPP not found (-19)
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
backlight supply power not found, using dummy regulator
sgtl5000 3-000a: sgtl5000 revision 0x11
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
sgtl5000 3-000a: Using internal LDO instead of VDDD
asoc-simple-card sound: sgtl5000 <-> 308a0000.sai mapping ok
backlight supply power not found, using dummy regulator
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
file system registered
Mass Storage Function, version: 2009/09/11
LUN: removable file: (no medium)
Number of LUNs=1
android_usb gadget: android_usb ready
```



```
input: gpio-keys as /devices/platform/gpio-keys/input/input5
backlight supply power not found, using dummy regulator
snvs_rtc 30370000.snvs:snvs-rtc-lp: setting system clock to 1970-01-01 00:00:00 UTC
(0)
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
mmc2: MAN_BKOPS_EN bit is not set
mmc2: mmc_select_hs200 failed, error -74
: switch to mmc2 failed
wlreg_on: disabling
mmc2: new MMC card at address 0001
mmcblk2: mmc2:0001 EH8CD4 7.13 GiB
ALSA device list:
  #0: imx7s-sgtl5000
mmcblk2boot0: mmc2:0001 EH8CD4 partition 1 4.00 MiB
mmcblk2boot1: mmc2:0001 EH8CD4 partition 2 4.00 MiB
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
Warning: unable to open an initial console.
Freeing unused kernel memory: 1220K (80ad7000 - 80c08000)
mmcblk2rpmb: mmc2:0001 EH8CD4 partition 3 4.00 MiB
 mmcblk2: p1 p2 p3
backlight supply power not found, using dummy regulator
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
android_work: sent uevent USB_STATE=CONNECTED
android_work: sent uevent USB_STATE=DISCONNECTED
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
android_work: sent uevent USB_STATE=CONNECTED
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
init: Failed to read from /dev/hw_random: No such device
Console: switching to colour dummy device 80x30
init: Failed to read from /dev/hw_random: No such device
EXT4-fs (mmcblk2p2): mounted filesystem with ordered data mode. Opts: barrier=1
fs_mgr: __mount(source=/dev/block/mmcblk2p2,target=/system,type=ext4)=0
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
EXT4-fs (mmcblk2p3): Ignoring removed nomblk_io_submit option
EXT4-fs (mmcblk2p3): recovery complete
EXT4-fs (mmcblk2p3): mounted filesystem with ordered data mode. Opts:
nomblk_io_submit,noauto_da_alloc,errors=panic
fs_mgr: __mount(source=/dev/block/mmcblk2p3,target=/data,type=ext4)=0
backlight supply power not found, using dummy regulator
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
mxc_mipi-csi 30750000.mipi-csi: mipi csi v4l2 device registered
CSI: Registered sensor subdevice: mxc_mipi-csi.0
mxc_mipi-csi 30750000.mipi-csi: lanes: 1, hs_settle: 3, clk_settle: 0, wclk: 1, freq:
240000000
backlight supply power not found, using dummy regulator
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
[rfkill_bluedroid_set_block]  set gpio 145 value 0
random: init urandom read with 27 bits of entropy available
binder: 97:97 transaction failed 29189, size 0-0
init: using deprecated syntax for specifying property 'ro.serialno', use ${name}
instead
cpu cpu0: failed to scale vddarm up: -22
```



```
cpufreq: __target_index: Failed to change cpu frequency: -22
init: property 'ro.serialno' doesn't exist while expanding '$ro.serialno'
init: cannot expand '$ro.serialno' while writing to
'/sys/class/android_usb/android0/iSerial'
init: using deprecated syntax for specifying property 'ro.product.manufacturer', use
${name} instead
init: using deprecated syntax for specifying property 'ro.product.model', use ${name}
instead
init: cannot find '/system/bin/debuggerd64', disabling 'debuggerd64'
init: cannot find '/system/bin/install-recovery.sh', disabling 'flash_recovery'
init: cannot find '/system/bin/fsl_sensor_fusion', disabling 'sensor_fusion'
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
android_usb: already disabled
read descriptors
read strings
mtp_bind_config
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
root@warp7:/ # cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
logd.auditd: start
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
healthd: No charger supplies found
healthd: No battery devices found
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
echo 3 > /proc/sys/kernel/printkcpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22
cpu cpu0: failed to scale vddarm up: -22
cpufreq: __target_index: Failed to change cpu frequency: -22

127|root@warp7:/ #
```

3.3 Linux Console Debug Messages Print Stop Workaround

```
127|root@warp7:/ # echo 3 > /proc/sys/kernel/printk
127|root@warp7:/ # export PATH=$PATH:/data/bin


root@warp7:/ # cat /proc/interrupts
           CPU0
 16:          0       GIC  29 Edge      arch_timer
 17:      23183       GIC  30 Edge      arch_timer
 18:       5779     GPCV2  55 Edge      i.MX Timer Tick
 19:          0     GPCV2 112 Edge      ddrc
 21:          0     GPCV2  20 Edge      snvs-secvio
 26:          0  gpio-mxc   1 Level     synaptics_dsx
 27:          0  gpio-mxc   2 Level     da9062-irq
230:          0  gpio-mxc   1 Edge      Back
261:          0     GPCV2  78 Edge      30280000.wdog
262:          0     GPCV2  49 Edge      imx_thermal
264:          0     GPCV2  19 Edge      rtc alarm
265:          0     GPCV2   4 Edge      30370000.snvs:snvs-powerkey
270:          0     GPCV2   7 Edge      csi
271:          4     GPCV2   5 Edge      30730000.lcdif
272:          0     GPCV2  25 Edge      30750000.mipi-csi
273:         20     GPCV2  41 Edge      mipi_dsi_samsung
274:        198     GPCV2  26 Edge      30860000.serial
275:          9     GPCV2  28 Edge      30880000.serial
276:          0     GPCV2  95 Edge      sai
277:        256     GPCV2  35 Edge      30a20000.i2c
278:        658     GPCV2  36 Edge      30a30000.i2c
279:          0     GPCV2  37 Edge      30a40000.i2c
280:       7450     GPCV2  38 Edge      30a50000.i2c
281:          0     GPCV2  88 Edge      imx-mu
283:        127     GPCV2  43 Edge      30b10000.usb
284:       6731     GPCV2  22 Edge      mmc0
285:      13208     GPCV2  24 Edge      mmc2
286:        290     GPCV2   2 Edge      sdma
293:          0  da9062-irq   6 Edge      LDO_LIM
IPI0:         0  CPU wakeup interrupts
IPI1:         0  Timer broadcast interrupts
IPI2:         0  Rescheduling interrupts
IPI3:         0  Function call interrupts
IPI4:         0  Single function call interrupts
IPI5:         0  CPU stop interrupts
IPI6:         0  IRQ work interrupts
IPI7:         0  completion interrupts
Err:          0
```


3.4 Dialog DA9062 sysfs Entries

```
root@warp7:/ # find /sys -iname "*da9062*"
/sys/bus/i2c/drivers/da9062
/sys/bus/platform/devices/da9062-thermal
/sys/bus/platform/devices/da9062-regulators
/sys/bus/platform/devices/da9062-rtc
/sys/bus/platform/devices/da9062-onkey
/sys/bus/platform/devices/da9062-watchdog
/sys/bus/platform/devices/da9062-core
/sys/bus/platform/drivers/da9062-regulators
/sys/bus/platform/drivers/da9062-regulators/da9062-regulators
/sys/bus/platform/drivers/da9062-watchdog
/sys/bus/platform/drivers/da9062-watchdog/da9062-watchdog
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-thermal
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-
regulators
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-rtc
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-onkey
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-watchdog
/sys/devices/platform/soc/30800000.aips-bus/30a20000.i2c/i2c-0/0-0058/da9062-core
/sys/firmware/devicetree/base/soc/aips-bus@30800000/i2c@30a20000/da9062@58
/sys/kernel/debug/regulator/0-0058-DA9062 LDO4
/sys/kernel/debug/regulator/0-0058-DA9062 LDO3
/sys/kernel/debug/regulator/0-0058-DA9062 LDO2
/sys/kernel/debug/regulator/0-0058-DA9062 LDO1
/sys/kernel/debug/regulator/0-0058-DA9062 BUCK4
/sys/kernel/debug/regulator/0-0058-DA9062 BUCK3
/sys/kernel/debug/regulator/0-0058-DA9062 BUCK2
/sys/kernel/debug/regulator/0-0058-DA9062 BUCK1
```

```
127|root@warp7:/ # busybox uname -a
Linux localhost 4.1.29-00016-g4fe68ba-dirty #5 SMP PREEMPT Mon Apr 2 12:21:50 IST 2018
armv7l GNU/Linux
```


3.5 Android ADB Shell

```
adb shell
cd /data/boot/
cd armhftools
cmd: ./lib/arm-linux-gnueabihf/ld-2.19.so --library-path lib/arm-linux-gnueabihf/:lib
usr/sbin/i2cdetect
usr/sbin/i2cget -f -y 0 0x58 0xa
usr/sbin/i2cset -f -y 0 0x58 0xa 0x1e


tools/lib/arm-linux-gnueabihf usr/sbin/i2cdetect -y -q 0                    <
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- 08 -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- 49 -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- UU 59 -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
/arm-linux-gnueabihf:lib usr/sbin/i2cdump -f 0 0x59 b                       <
WARNING! This program can confuse your I2C bus, cause data loss and worse!
I will probe file /dev/i2c-0, address 0x59, mode byte
Continue? [Y/n] y
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f    0123456789abcdef
00: 00 XX XX XX 00 b0 24 16 1c 00 17 00 0f 60 85 c8    .XXX.?$??.?.?`??
10: 1c 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ?...............
20: 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00    .?..............
30: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 02    ...............?
40: XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX    XXXXXXXXXXXXXXXX
50: XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX    XXXXXXXXXXXXXXXX
60: XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX    XXXXXXXXXXXXXXXX
70: XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX    XXXXXXXXXXXXXXXX
80: 00 62 12 ff 70 00 00 00 00 80 00 08 00 00 00 00    .b?.p....?.?....
90: 08 00 00 00 00 00 00 3f 00 00 00 00 00 00 00 00    ?......?........
a0: 00 00 00 00 00 00 00 00 11 00 ff 12 eb 0f eb 0f    ........?..?????
b0: 00 05 05 03 00 05 00 84 83 84 00 c4 00 01 0f 1d    .???.?.???.?.???
c0: 01 1d 1f 00 00 00 40 7c 04 00 00 00 00 00 00 00    ???...@|?.......
d0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ff    ................
e0: ff 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................
f0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00    ................

Read DEVICE_ID  at (0x181)  as 0x62
Read VARIANT_ID at (0x182)  as 0x02
```

Revision History

Revision	Date	Description
1.1	01-Mar-2022	Rebranded file with new logo, copyright and disclaimer
1.0	21-Aug-2018	Initial version.

Status Definitions

Status	Definition
DRAFT	The content of this document is under review and subject to formal approval, which may result in modifications or additions.
APPROVED or unmarked	The content of this document has been approved for publication.

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