

# User Guide

## Tizen on SDTA7D

**Ver.1.0**

## Revision History

### – Release Notes

Date	Version	Release Notes
2019.03.29	Ver.1.0	First version released based on SDTA7D

### – Contact

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# 1. Build for SDTA7D

## 1.1. Source list for SDTA7D

### 1.1.1. List of sources

- u-boot
- kernel
- building-blocks
- peripheral-bus
- peripheral-io
- smarthing-plugin
- systemd
- wlandrv-plugin-tizen-ap6335
- bluetooth-firmware-bcm

### 1.1.2. Github list for each SDTA7D sources

- <https://github.com/SigmaDeltaTechnologiesInc/u-boot.git>
- <https://github.com/SigmaDeltaTechnologiesInc/linux-stable.git>
- <https://github.com/SigmaDeltaTechnologiesInc/building-blocks.git>
- <https://github.com/SigmaDeltaTechnologiesInc/peripheral-bus.git>
- <https://github.com/SigmaDeltaTechnologiesInc/peripheral-io.git>
- <https://github.com/SigmaDeltaTechnologiesInc/systemd.git>
- <https://github.com/SigmaDeltaTechnologiesInc/smarthing-plugin.git>
- <https://github.com/SigmaDeltaTechnologiesInc/wlandrv-plugin-tizen-ap6335.git>
- <https://github.com/SigmaDeltaTechnologiesInc/bluetooth-firmware-bcm.git>

## 1.2. Install packages

```
$ cd ~/Tizen-sdta7d
```

- Clone source for SDTA7D

```
$ git clone https://github.com/SigmaDeltaTechnologiesInc/u-boot.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/linux-stable.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/building-blocks.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/peripheral-bus.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/peripheral-io.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/systemd.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/smarthing-plugin.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/wlandrv-plugin-tizen-ap6335.git
$ git clone https://github.com/SigmaDeltaTechnologiesInc/bluetooth-firmware-bcm.git
```

## 1.3. GBS config file & Kickstart file

- Prepare GBS config file and Kickstart file (please request to your partner)  
.gbsSdta7d.conf  
tizen-unified\_iot-boot-armv7l-sdta7d.ks

tizen-unified\_iot-headless-2parts-armv7l-sdta7d.ks

#### 1.4. GBS build & Create image

```
$ sudo gbs -c ~/.gbsSdta7d.conf build -A armv7l --include-all
```

```
$ sudo mic cr loop tizen-unified_iot-boot-armv7l-sdta7d.ks --pack-to=tizen-unified_iot-boot-armv7l-sdta7d.tar.gz --logfile=mic_build.log -A armv7l
```

```
$ sudo mic cr loop tizen-unified_iot-headless-2parts-armv7l-sdta7d.ks --pack-to=tizen-unified_iot-headless-2parts-armv7l-sdta7d.tar.gz --logfile=mic_build.log -A armv7l
```

- the final image at ~/Tizen-sdta7d/mic-output

tizen-unified\_iot-boot-armv7l-sdta7d.tar.gz

tizen-unified\_iot-headless-2parts-armv7l-sdta7d.tar.gz

## 2. Fusing boot image (u-boot, kernel)

Fusing newly built kernel, u-boot and tizen platform image fusing (first image)

### 2.1. Fusing Bootloader

#### 2.1.1. prepare imx\_usb\_loader

```
$ cd ~/tools
$ git clone https://github.com/boundarydevices/imx_usb_loader
$ cd ~/tools/imx_usb_loader/
$ make
```

#### 2.1.2. change to USB boot mode(configure by Jump on board)

- DAP Station for SDTA7D : jumper setting
  - x00
  - x00
  - x00
  - x00

#### 2.1.3. power on board and check lusb

```
$ lsusb | grep Freescale
Bus 00x Device 00y: ID 15a2:0076 Freescale Semiconductor, Inc
```

#### 2.1.4. Load the SPL binary via USB

```
$ cd ~/Tizen-sdta7d/mic-output
$ tar zxvf tizen-unified_iot-boot-armv7l-sdta7d.tar.gz
modules.img
u-boot.img
SPL
sdta7d.dtb
zImage

$ tar zxvf tizen-unified_iot-headless-2parts-armv7l-sdta7d.tar.gz
system-data.img
rootfs.img
ramdisk.img
ramdisk-recovery.img
$ sudo ~/tools/imx_usb_loader/imx_usb SPL
```

#### 2.1.5. Load the u-boot.img binary via USB

```
$ sudo ~/tools/imx_usb_loader/imx_usb u-boot.img
```

### 2.1.6. Using any key, break into U-Boot Console

- U-Boot console  
SERIAL\_CONSOLE\_U\_BOOT  
Loading Environment from MMC... OK  
In: serial  
Out: serial  
Err: serial  
Net: FEC0  
Hit any key to stop autoboot: 0

### 2.1.7. Use the default environment variables

- U-Boot console  
=> env default -f -a  
=> saveenv

### 2.1.8. Configure mmc 0 to boot from the data partition, and disable access to boot partitions

- U-Boot console  
=> mmc partconf 0 0 7 0

### 2.1.9. Run the DFU agent so we can flash the new images using dfu-util tool

- Please refer <http://dfu-util.sourceforge.net/> to install dfu-util tool

- U-Boot console

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

- If you have error, you must create partition by (14)

- Ubuntu host machine console

```
$ cd ~/tizen-imx7/u-boot  
$ sudo dfu-util -D SPL -a spl  
$ sudo dfu-util -R -D u-boot.img -a u-boot
```

### 2.1.10. Change to EMMC boot mode (configure by Jump on board)

- DAP Station for SDTA7D : jumper setting  
X00  
00X  
X00  
X00

### 2.1.11. Reset

### 2.1.12. Change to USB Mass Storage mode

- U-Boot console  
=> ums 0 mmc 0

### 2.1.13. Verify USB Mass Storage device

- Ubuntu host machine console

```
$ cd ~/
$ lsusb | grep Netchip
```

- Bus 00x Device 00y: ID 0525:a4a5 Netchip Technology, Inc. Pocketbook Pro 903

### 2.1.14. Create first partition for DFU fail

- DFU needs a partition `table` to operate. Let's create one as a temp, just to get things loaded.
- First run on the Pico:

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

- Next, on your development machine: (replace DISK with `/dev/sdX`, look at `lsblk` and use the new driver that's the pico)

```
$ sudo dd if=/dev/zero of=${DISK} bs=1M count=10

$ sudo sfdisk ${DISK} <<-__EOF__
$ 1M,,L,*
$ __EOF__

$ sudo mkfs.ext4 -L rootfs ${DISK}1
```

- Now in u-boot kill the `ums 0 mmc 0` and rerun the `dfu 0 mmc 0`

## 2.2. Fusing Kernel

### 2.2.1. Check USB mass storage device on host ubuntu machine

- Ubuntu host machine console

```
$ lsblk
NAME        MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT
sdb          8:16  1   3.6G  0 disk
├─çwçwsdb4  8:20  1     1K  0 part
├─çwçwsdb2  8:18  1   128M  0 part
├─çwçwsdb5  8:21  1     1G  0 part
├─çwçwsdb3  8:19  1     2G  0 part
├─çwçwsdb1  8:17  1    32M  0 part
└─çwçwsdb6  8:22  1   410M  0 part
sda          8:0    0 160.1G  0 disk
├─çwçwsda2  8:2    0   4.5G  0 part
└─çwçwsda1  8:1    0 155.6G  0 part /
```

### 2.2.2. export variable

- Check version number on `config/kernel.release` : 4.20.6-0-sdta7d
- Check usb storage by `lsblk` : `/dev/sdc`

```
$ export kernel_version=4.20.6-0-sdta7d
$ export DISK=/dev/sdc
```



### 2.2.3. Erase partition

- Ubuntu host machine console

```
$ sudo dd if=/dev/zero of=${DISK} bs=1M count=10
```

### 2.2.4. Install new Bootloader

- Ubuntu host machine console

```
$ sudo dd if=SPL of=${DISK} seek=1 bs=1k  
$ sudo dd if=u-boot.img of=${DISK} seek=69 bs=1k
```

### 2.2.5. Partitioning eMMC

- Ubuntu host machine console

```
$ sudo ./mkpart.sh ${DISK}
```

- Recommend change boot partiton to FAT16 from ext4, because ext4 partion is very slow in boot time
- You can use gparted Ubuntu tool

### 2.2.6. Mount boot partition

- Ubuntu host machine console

```
$ sudo mount ${DISK}1 /media/hbahn/boot/
```

- It will be automatically mounted

### 2.2.7. Setup etlinux.conf

- Ubuntu host machine console

```
$ sudo mkdir -p /media/hbahn/boot/extlinux/  
$ sudo sh -c "echo 'label Linux ${kernel_version}' > /media/hbahn/boot/extlinux/extli-  
nux.conf"  
$ sudo sh -c "echo '      kernel /boot/vmlinuz-${kernel_version}' >> /media/hbahn/boot/ex-  
tlinux/extlinux.conf"  
$ sudo sh -c "echo '      append root=/dev/ram rw' >> /media/hbahn/boot/extlinux/extlinux.  
conf"  
$ sudo sh -c "echo '      fdt dir /boot/dtbs/${kernel_version}/' >> /media/hbahn/boot/ext-  
linux/extlinux.conf"  
$ sudo sh -c "echo '      initrd /boot/ramdisk.img' >> /media/hbahn/boot/extlinux/extli-  
nux.conf"
```

### 2.2.8. Copy Kernel Image

- Ubuntu host machine console

```
$ sudo mkdir -p /media/hbahn/boot/boot  
$ sudo cp -v zImage /media/hbahn/boot/boot/vmlinuz-${kernel_version}
```

## 2.2.9. Copy Kernel Device Tree Binaries

- Ubuntu host machine console

```
$ sudo mkdir -p /media/hbahn/boot/boot/dtbs/${kernel_version}/  
$ sudo cp sdta7d.dtb /media/hbahn/boot/boot/dtbs/${kernel_version}/
```

## 2.2.10. Copy kernel modules

- Ubuntu host machine console

```
$ sudo dd if=modules.img of=${DISK}2 bs=1M
```

### 3. Fusing Tizen platform image, install RAMDISK and install firmware

#### 3.1. Tizen platform image fusing with SDTA7D

- Ubuntu host machine console

```
$ sudo dd if=rootfs.img of=${DISK}3 bs=1M  
$ sudo dd if=system-data.img of=${DISK}5 bs=1M
```

#### 3.2. Copy ramdisk image to boot partition and set ramdisk address variable on u-boot

- Ubuntu host machine console

```
$ sudo cp ramdisk.img /media/hbahn/boot/boot
```

## 4. Testing Tizen

### 4.1. Wi-Fi test

- root:~> wifi\_manager\_test
  - 1 Wi-Fi init and set callbacks
  - 3 Activate Wi-Fi device
  - 9 Scan request
  - b Get AP list
  - c Connect

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