WaRP

Software Reference Manual

Table of Contents

Introduction
Getting Started
Configure Wifi
Toolbox for Application Developers
Toolbox for Embedded Developers
WaRP Bring Up
Configure udev
Load U-boot into memory
Flash Android image using Fastboot.
Android booting
Functional Test for key Devices.
Checking the Wifi
Checking FXOS chip (accelerometer)

WarP Software Reference Manual - This document

This work is licensed under the Creative Commons Attribution-Share Alike 4.0 License. To view a copy of this license, visit http://creativecommons.org/licenses/by-sa/4.0/ or send a letter to Creative Commons, 171 Second Street, Suite 300, San Francisco, California, 94105, USA.

All derivative works are to be attributed to Nicola La Gloria and Diego Rondini of Kynetics LLC

For more information on Creative Commons go to: http://creativecommons.org/

Introduction

WaRP is a Wearable Reference Platform, aimed at facilitating development and innovation for wearable products.

The purpose of this document is to help the user to quickly bring up the WaRP board with the available software. The software is released in source codes or binary objects. The user can build the entire stack from source or install the binary images as explained in this guide. The latter is strongly recommended before building from sources and customizing the Android Operating System.

At the time of writing some procedures described in this document are not definitive and still under development by the WaRP core team. This document will be constantly updated based on the latest software release and procedures on how to build and deploy.

Audience for this Guide

Warp is a flexible platform that can be interacted with in a variety of different ways. The current software is based on Android 4.3.1.

Android developers, although covering a wide spectrum of users, can be mainly divided in two categories, application developers and embedded system developers.
Application developers focus on app development using the Android SDK. One of the primarily goals of WaRP is to provide as many developers as possible the chance to design applications for wearable devices.
What an application developer needs to be operative is:

- A full bootable WaRP Android operating system
- All the necessary Android SDK and IDE installed in the development host
- ADB interface working to debug and deploy applications

Embedded developers are more focussed on the development of embedded systems using the WaRP based on Android or Linux (or even more on custom operating systems). Embedded developer need:

- a serial console to debug the entire boot sequence
- the proper tools to flash the various operating system images
- Android SDK installed in the host machine
- BSP and Android source code to build and customize the system images.

This guide's purpose is to provide the necessary information to both applications and embedded developers to maximize the potential of WaRP by quickly enabling board bring up.

At the time of writing we used a Linux host machine for both application and system development. Windows and MAC OS X are not supported yet in this documentation. You can easily setup a Linux virtual machine using i.e Oracle VirtualBox that is free (https://www.virtualbox.org).

Getting Started

In this section we will go through some simple steps to setup your WaRP and use the default Android 4.3 OS and example applications pre-installed.

We assume that your WaRP setup is:

- WaRP main board
- WaRP daughter board
- Touch Screen
- Battery

Refer to the Hardware Reference Manual for more information on how set up the WaRP unboxing.

When you power up your WaRP, (the first boot may take a while because the data partition is populated).
The device, out of the box, is already in developer debug mode and if the USB OTG cable is connected to the WaRP board, the OS should notify you to store the HOST computer RSA key fingerprint to enable ADB access.
From the host machine you should be able to give:

```
$ adb devices
List of devices attached
0123456789ABCDEF     device
$ adb shell
root@warp:/ #
```

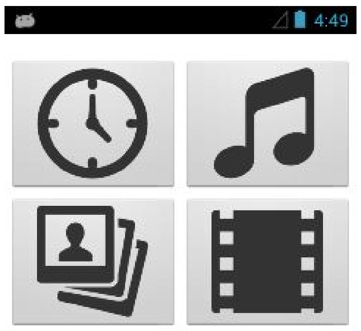
You have root access to the WaRP shell!

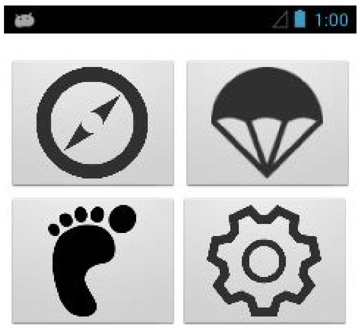
First encounter with the system

When the boot is completed the WaRP Launcher is loaded.

The two buttons in the daughter card serve as Android BACK and HOME buttons, which allow, together with the touchscreen, to interact with the system.

The launcher presents all the demo applications in a vertical scrollable list.

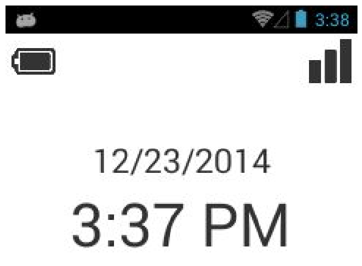




Available applications are:

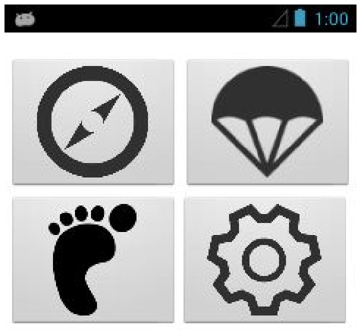
- Watch: show the time, stopwatch, program alarms
- Music: browse and play music
- Gallery: browse and show images
- Video: browse and play video
- Compass: show cardinal directions
- Freefall: detect when the board is falling (use at own risk!)
- Pedometer: displays data read from the Pedometer Daughter Board
- Warp Settings: simplified version of Android Settings. Allow to connect to Wifi, pair with Bluetooth, adjust Sound volumes, change Display settings, modify Date and time-zone.

Pressing the BACK button in the main screen brings to the status page.

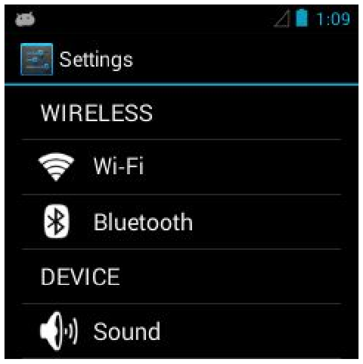


Configure Wifi

To configure wifi network go to settings pressing the gear icon in the second launcher page



In the settings page press Wi-Fi



and select your network.
If necessary input[1] the passkey based on your authentication type.
Once the connection is established you should be able to ping the outside network:

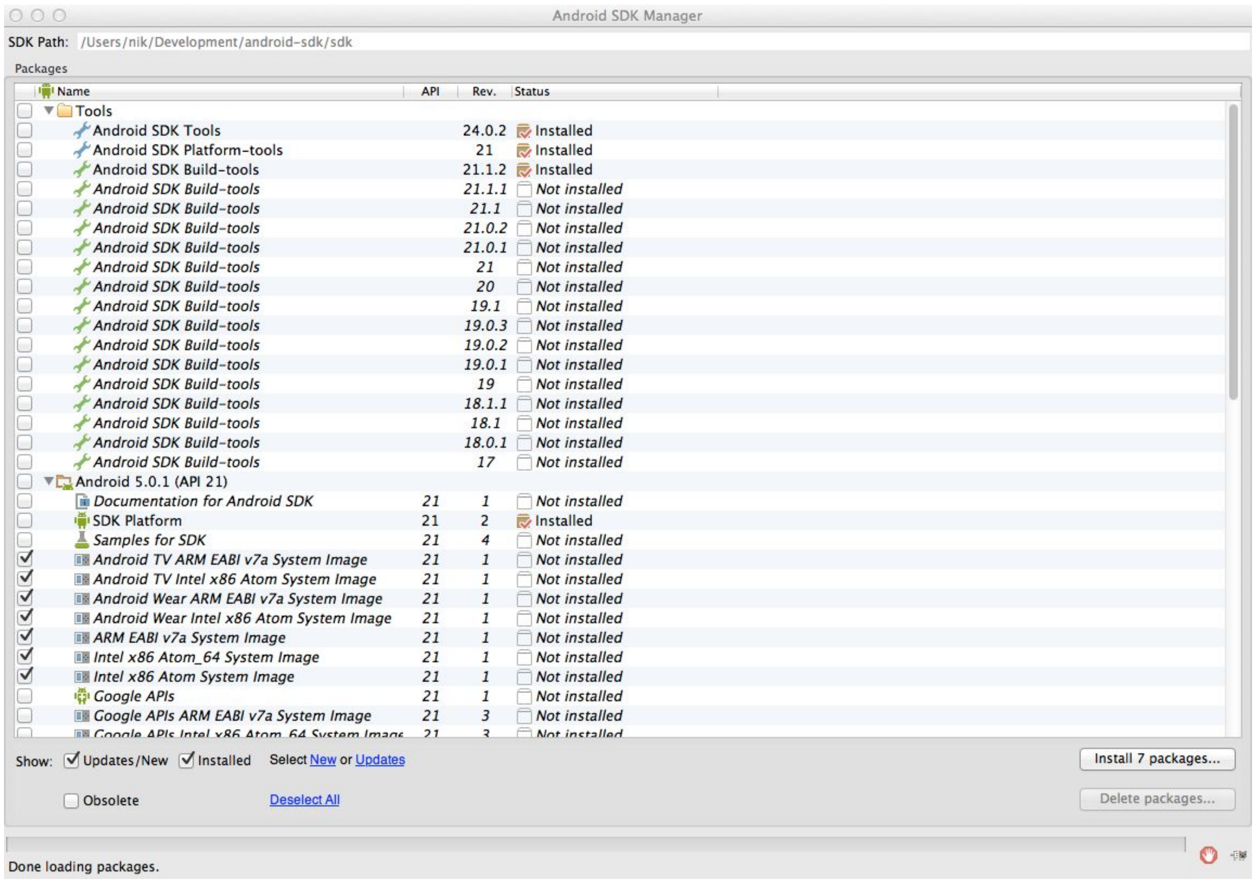
```
root@warp:/ # ping google.com
PING google.com (173.194.115.66) 56(84) bytes of data.
64 bytes from dfw06s41-in-f2.1e100.net (173.194.115.66): icmp_seq=1 ttl=53 time=72.8
ms
64 bytes from dfw06s41-in-f2.1e100.net (173.194.115.66): icmp_seq=2 ttl=53 time=76.0
ms
64 bytes from dfw06s41-in-f2.1e100.net (173.194.115.66): icmp_seq=3 ttl=53 time=74.5
ms
...
```

Toolbox for Application Developers

An application developer can quickly start working with the WarP.
The board comes with Android 4.3 operating system preinstalled and applications examples released under GPL license. It can be helpful to start from these examples and customize the code, build and deploy on the WaRP.
To develop software you can use your prefered OS. All development tools are available for all the platforms: Windows, Mac OSX, Linux.

First, download and install the Android SDK on your development host. All the information is available here: *http://developer.android.com/sdk/installing/index.html*.
To download the SDK for your platform go to:
http://developer.android.com/sdk/index.html#Other.
The Android SDK Manager (you can find the binary, named *android*, in the “tool” directory of the SDK) will provide you all the available packages:

[1] Today the standard Android keyboard is available.



Android SDK Manager

SDK Path: /Users/nik/Development/android-sdk/sdk

Packages

	Name	API	Rev.	Status
	Tools			
	Android SDK Tools		24.0.2	Installed
	Android SDK Platform-tools		21	Installed
	Android SDK Build-tools		21.1.2	Installed
	Android SDK Build-tools		21.1.1	Not installed
	Android SDK Build-tools		21.1	Not installed
	Android SDK Build-tools		21.0.2	Not installed
	Android SDK Build-tools		21.0.1	Not installed
	Android SDK Build-tools		21	Not installed
	Android SDK Build-tools		20	Not installed
	Android SDK Build-tools		19.1	Not installed
	Android SDK Build-tools		19.0.3	Not installed
	Android SDK Build-tools		19.0.2	Not installed
	Android SDK Build-tools		19.0.1	Not installed
	Android SDK Build-tools		19	Not installed
	Android SDK Build-tools		18.1.1	Not installed
	Android SDK Build-tools		18.1	Not installed
	Android SDK Build-tools		18.0.1	Not installed
	Android SDK Build-tools		17	Not installed
	Android 5.0.1 (API 21)			
	Documentation for Android SDK	21	1	Not installed
	SDK Platform	21	2	Installed
	Samples for SDK	21	4	Not installed
✓	Android TV ARM EABI v7a System Image	21	1	Not installed
✓	Android TV Intel x86 Atom System Image	21	1	Not installed
✓	Android Wear ARM EABI v7a System Image	21	1	Not installed
✓	Android Wear Intel x86 Atom System Image	21	1	Not installed
✓	ARM EABI v7a System Image	21	1	Not installed
✓	Intel x86 Atom_64 System Image	21	1	Not installed
✓	Intel x86 Atom System Image	21	1	Not installed
	Google APIs	21	1	Not installed
	Google APIs ARM EABI v7a System Image	21	3	Not installed
	Google APIs Intel x86 Atom_64 System Image	21	3	Not installed

Show: [✓ Updates/New] [✓ Installed] Select New or Updates   Install 7 packages...

Obsolete   Deselect All   Delete packages...

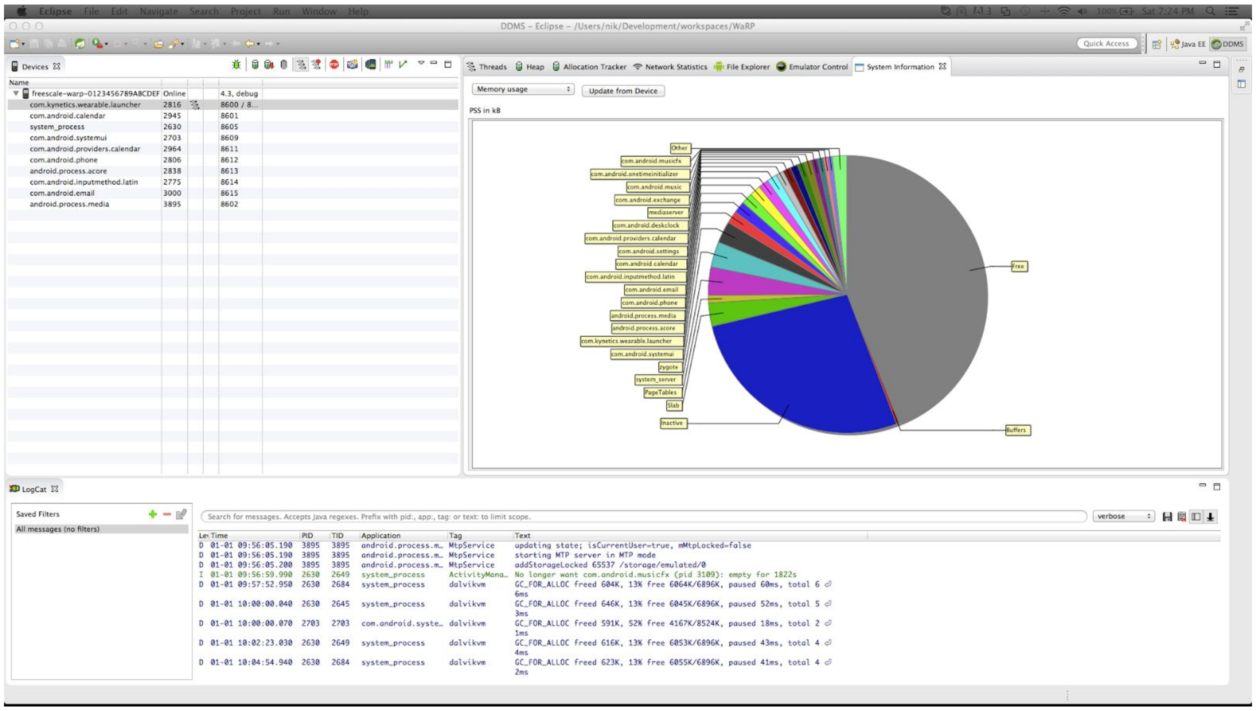
Done loading packages.

Required packages are:

- Android SDK Tools
- Android Platform Tools
- Android SDK build Tools
- Android 4.3.1 API 18

To debug the WaRP, ADB is the primary command line tool (http://developer.android.com/tools/help/adb.html). To write the WaRP software Eclipse IDE (www.eclipse.org) has been used with the ADT plugin. Eclipse is available for all platforms. Refer to the on line guide http://developer.android.com/tools/help/adt.html to install the ADT plugin.

Once you install the required packages and Eclipse + ADT, it's possible to easily debug the WaRP inside the IDE environment.



```
Name
▼ freescale-warp-0123456789ABCDEF  Online       4.3, debug
    com.kynetics.wearable.launcher  2816         8600 / 8...
    com.android.calendar            2945         8601
    system_process                  2630         8605
    com.android.systemui            2703         8609
    com.android.providers.calendar  2964         8611
    com.android.phone               2806         8612
    android.process.acore           2838         8613
    com.android.inputmethod.latin   2775         8614
    com.android.email               3000         8615
    android.process.media           3895         8602
```

```
Le Time                PID   TID   Application         Tag            Text
D  01-01 09:56:05.190  3895  3895  android.process.m…  MtpService     updating state; isCurrentUser=true, mMtpLocked=false
D  01-01 09:56:05.190  3895  3895  android.process.m…  MtpService     starting MTP server in MTP mode
D  01-01 09:56:05.200  3895  3895  android.process.m…  MtpService     addStorageLocked 65537 /storage/emulated/0
I  01-01 09:56:59.990  2630  2649  system_process      ActivityMana…  No longer want com.android.musicfx (pid 3109): empty for 1822s
D  01-01 09:57:52.950  2630  2684  system_process      dalvikvm       GC_FOR_ALLOC freed 604K, 13% free 6064K/6896K, paused 60ms, total 6
                                                                      6ms
D  01-01 10:00:00.040  2630  2645  system_process      dalvikvm       GC_FOR_ALLOC freed 646K, 13% free 6045K/6896K, paused 52ms, total 5
                                                                      3ms
D  01-01 10:00:00.070  2703  2703  com.android.syste…  dalvikvm       GC_FOR_ALLOC freed 591K, 52% free 4167K/8524K, paused 18ms, total 2
                                                                      1ms
D  01-01 10:02:23.030  2630  2649  system_process      dalvikvm       GC_FOR_ALLOC freed 616K, 13% free 6053K/6896K, paused 43ms, total 4
                                                                      4ms
D  01-01 10:04:54.940  2630  2684  system_process      dalvikvm       GC_FOR_ALLOC freed 623K, 13% free 6055K/6896K, paused 41ms, total 4
                                                                      2ms
```

The device, out of the box, is already in developer debug mode and if the USB OTG cable is connected to the WaRP board, the OS should notify you to store the HOST computer RSA key fingerprint to enable ADB access.

Using Eclipse + ADT you can deploy your application directly on the WaRP.
Another popular IDE is Android Studio:
https://developer.android.com/training/basics/firstapp/index.html.

Toolbox for Embedded Developers

WaRP uses u-boot as boot loader with fastboot support.
Embedded developer first need to have access to the device console used to debug in the early stage of the boot process.
WaRP does not come with a serial console out of the box, therefore it's necessary to have the **WaRP Interposer Board (WIP)**. This is a development and debugging board that provides all the necessary amenities to the early stage board bring up.

The WaRP Interposer Board is not currently available to the community; however it has been designed and prototyped and will be available soon. For more information go to www.revolution-robotics.com

Different programs and utilities will be part of your toolbox depending on what you are trying to accomplish, this guide provide all this information.
To start deploying existing pre-build images you need:

- linux host machine with all the build essentials installed (compiler, linker, dev libraries, etc.)
- the Android SDK and Platform tools
  http://developer.android.com/sdk/installing/index.html
- Fastboot (you can find it in the Platform Tools)
- Minicom or other terminal emulation software

You don't need to download all the SDK but just the Android SDK and Platform tools using the SDK Manager.

Update Binaries Packages

Binary images can be provided, over the time, to be flashed in the WaRP. These images may contain the latest bugfix or new features. Update the entire system is very simple and straightforward.

Any system update is provided by the following images:

1. boot.img
2. recovery.img
3. system.img

Configure udev to support fastboot by defining a rule for the device ID **18d1:0d02** Google Inc.

```
SUBSYSTEM=="usb",ATTR{idVendor}=="18d1",ATTR{idProduct}=="0d02",MODE="0640",OWNER="us
er"
```

where user is *your user* in the host machine.

Setup the WaRP for the update:

1. connect the WaRP USB cable to your host machine (this will transfer the file over fastboot)
2. connect the WIP USB cable to your host machine (this will carry the serial interface)
3. power up the WIP with 12V power supply

Power up the board and press the spacebar within 3 seconds to stop u-boot to load the operating system:

```
U-Boot 2013.04-00158-gf6b5254-dirty (Oct 13 2014 - 19:38:04)

CPU:   Freescale i.MX6SL rev1.2 at 792 MHz
CPU:   Temperature 45 C, calibration data: 0x55f4e45f
Reset cause: WDOG
Board: WaRP Board
I2C:   ready
DRAM:  512 MiB
MMC:   FSL_SDHC: 0
MMC Device 1 not found
No MMC card found
Using default environment

In:    serial
Out:   serial
Err:   serial
MMC Device 1 not found
no mmc device at slot 1
Configuring display bridge
check_and_clean: reg 0, flag_set 0
Fastboot: Normal
flash target is MMC:0
RUNNING ESDHC INIT
Setting reg 0x021940C0 to 0x00000002
Normal Boot
Hit any key to stop autoboot:  0
=>
=>
=>
```

then launch fastboot (server) from the serial console.

```
=> fastboot
fastboot is in init......USB Mini b cable Connected!
fastboot initialized
USB_SUSPEND
USB_RESET
USB_PORT_CHANGE 0x4
USB_RESET
USB_PORT_CHANGE 0x4
USB_RESET
USB_PORT_CHANGE 0x4
```

In the host machine verify the fast boot connection with:

```
$ fastboot devices
12345    fastboot
```

and then flash the three images:

```
$ fastboot flash boot boot.img
sending 'boot' (4266 KB)...
OKAY [  0.628s]
writing 'boot'...
OKAY [  0.197s]
finished. total time: 0.825s

$ fastboot flash recovery recovery.img
sending 'recovery' (4806 KB)...
OKAY [  0.708s]
writing 'recovery'...
OKAY [  0.225s]
finished. total time: 0.933s

$ fastboot flash system system.img
sending 'system' (286720 KB)...
OKAY [ 40.104s]
writing 'system'...
OKAY [ 11.470s]
finished. total time: 51.576s
```

In the meantime you will see output messages in the console that shows the writing process (that we omit here)

Now exit from fastboot mode in the host machine with[2]:

```
$ fastboot continue
resuming boot...
OKAY [  0.006s]
finished. total time: 0.007s
```

Now press the BT1 on the WIP board for 3 seconds and the system will reboot.

[2] Because in u-boot if you press 'enter' you actually *repeat* the last command you gave (i.e the fastboot command), **be aware to not press enter when in fastboot mode** or you will open another fastboot session. Here you need to give `fastboot continue` many times as you pressed enter.

WaRP Bring Up

In this section we will go through the process of flashing a pre-built Android image on the WaRP from scratch. This is a procedure that should be done in case of board bring up or severe system failure. If you are an application developer you can skip this section.

It's is assumed you know the basic of AOSP, embedded systems and at least have a good handle on how Linux works and how to interact with its command line. A serial console is required in order to go through the contents of this section. To have access to the serial console you need to have the WaRP Interposer board.

The process that we describe is useful to anyone who wants to start from scratch in case of some kind of board early stage bring up. In practice this means that when the device is powered down, u-boot must be transferred into RAM

Configure udev

There are some minor tweaks that are required in the host machine to properly configure the various USB devices.
The different USB devices you will be interacting with are:

1. ID **0403:6010** Future Technology Devices International, Ltd FT2232C Dual USB-UART/FIFO IC
2. ID **15a2:0063** Freescale Semiconductor, Inc. (USB OTG on the WaRP)
3. ID **18d1:0d02** Google Inc. (when using fastboot)
4. ID **18d1:4e42** Google Inc. (ADB interface when Android is loaded)

To operate properly (2),(3),(4) udev rules should be defined in order to have the right permission to access those devices. For this purpose a set of udev rules should be created in particular:

```
SUBSYSTEM=="usb",ATTR{idVendor}=="15a2",ATTR{idProduct}=="0063",MODE="0640",OWNER="user"
SUBSYSTEM=="usb",ATTR{idVendor}=="18d1",ATTR{idProduct}=="0d02",MODE="0640",OWNER="u
ser"
SUBSYSTEM=="usb",ATTR{idVendor}=="18d1",ATTR{idProduct}=="4e42",MODE="0640",OWNER="u
ser"
```

where *user* is the user that will interact with the system (not root)

Load U-boot into memory

To be able to manually load a prebuilt U-Boot the Interposer Board Boot mode header (jumper) should be closed: this forces the serial bootloader mode. See separate “Interposer Guide” to identify the Boot mode header on your Interposer Board.
The following procedure describes how to load into RAM a new u-boot.
For this purpose we need use imx_usb tool.
The **imx_usb** tools allows to easily load binaries in memory and start U-Boot.
To download and build imx_usb from sources:

```
$ git clone https://github.com/warpboard/imx_usb_loader.git -b warp/master
$ cd imx_usb_loader
$ make
```

You will need the libusb1 development package installed into your linux host.
Now plug the WaRP board in the WaRP Interposer Board and connect its serial (micro usb) port to the host computer. You should see

```
$ lsusb
Bus 001 Device 023: ID 15a2:0063 Freescale Semiconductor, Inc.
```

You could open your minicom pointing to the USB serial port

```
$ minicom -D /dev/ttyUSB0
```

You need now the WaRP u-boot binary (downloaded from WaRP website or built from sources) to be loaded into WaRP using imx_usb. If you place the u-boot binary in the same dir of the imx_usb binary you should give[3]

```
$ ./imx_usb uboot-2013.04-g3dd9d87_warpandroid_14-07.imx
config file <./imx_usb.conf>
config file <./mx6_usb_work.conf>
parse mx6_usb_work.conf
15a2:0063(mx6_qsb) bConfigurationValue =1
Interface 0 claimed
report 1, wrote 16 bytes, err=0
report 3, read 4 bytes, err=0
read=56 78 78 56
../uboot-2013.04-g3dd9d87_warpandroid_14-07.imx 0 0 1 0 1 2
main dcd length 280
```

[3] The u-boot binary version is only indicative.

```
sub dcd length 27c
dcd_ptr=0x877fb02c

loading binary file(../uboot-2013.04-g3dd9d87_warpandroid_14-07.imx) to
877fb000, skip=0, fsize=35164 type=aa

<<<217444, 217444 bytes>>>
jumping to 0x877fb000
$
```

In the minicom terminal you should have

```
$ U-Boot 2013.04-00152-g3dd9d87 (Jul 14 2014 - 15:17:27)

CPU:   Freescale i.MX6SL rev1.2 at 792 MHz
CPU:   Temperature 59 C, calibration data: 0x5865045f
Reset cause: POR
Board: WaRP Board
DRAM:  512 MiB
MMC:   FSL_SDHC: 0
RUNNING ESDHC INIT
Setting reg 0x021940C0 to 0x00000002
*** Warning - bad CRC, using default environment

In:    serial
Out:   serial
Err:   serial
check_and_clean: reg 0, flag_set 0
Fastboot: Normal
flash target is MMC:0
Boot from USB for mfgtools
Use default environment for mfgtools
Run bootcmd_mfg: <NULL>
=>
```

Flash Android image using Fastboot.

The u-boot release for WaRP supports fastboot to manage the Android image programming.
For more information on fastboot please refer to:
http://wiki.cyanogenmod.org/w/Doc:_fastboot_intro
Once U-Boot is loaded it is possible to enter fastboot mode:

```
=> fastboot
```

```
fastboot is in init......USB Mini b cable Connected!
fastboot initialized
USB_SUSPEND
USB_RESET
USB_PORT_CHANGE 0x4
USB_RESET
USB_PORT_CHANGE 0x4
```

U-Boot prompt will hang there and in the connected PC a device should appear[4]:

```
$ lsusb -d 18d1:
Bus 003 Device 048: ID 18d1:0d02 Google Inc.
```

On your linux host detect your connected device using the fastboot client installed as part of the Android SDK tools:

```
$ fastboot devices
12345 fastboot usb:3-2.3
```

To partition the eMMC we use a special linux image that is provided: *partitioning-boot.img.* Using fastboot client in the host Linux Machine, load this image from the current directory where the image is found

```
$ fastboot boot partitioning-boot.img
downloading 'boot.img'...
OKAY [  0.352s]
booting...
OKAY [  0.009s]
finished. total time: 0.361s
```

When the linux system is loaded, login as root (empty password) and partition the eMMC with the following command:

```
# sfdisk -L /dev/mmcblk0 < part_table
```

File `part_table` is preloaded in the Linux ramdisk.
Now three partitions need then to be formatted with:

[4] If you are running your GNU/Linux environment on a virtual machine you probably need to connect the USB device and then run `lsusb`.

```
# mkfs.ext4 -L data /dev/mmcblk0p4
# mkfs.ext4 -L cache /dev/mmcblk0p6
# mkfs.ext4 -L vendor /dev/mmcblk0p7
```

The system is now ready to be flashed with fastboot.
Download or locate in your build the following images:

- boot.img
- recovery.img
- system.img[5]

With the device in fastboot mode, from the host linux machine program the three partitions files:

```
$ fastboot flash boot boot.img
sending 'boot' (4266 KB)...
OKAY [  0.628s]
writing 'boot'...
OKAY [  0.197s]
finished. total time: 0.825s

$ fastboot flash recovery recovery.img
sending 'recovery' (4806 KB)...
OKAY [  0.708s]
writing 'recovery'...
OKAY [  0.225s]
finished. total time: 0.933s

$ fastboot flash system system.img
sending 'system' (286720 KB)...
OKAY [ 40.104s]
writing 'system'...
OKAY [ 11.470s]
finished. total time: 51.576s
```

Now exit from fastboot mode in the host machine with[6]:

```
$ fastboot continue
resuming boot...
OKAY [  0.006s]
finished. total time: 0.007s
```

[5] If the `system.img` is provided as a *.xz* archive, uncompress with the xz tool before (`xz -d` *filename*).
[6] Because in u-boot if you press 'enter' you actually *repeat* the last command you gave (i.e the fastboot command), **be aware to not press enter when in fastboot mode** or you will open another fastboot session. Here you need to give `fastboot continue` many times as you pressed enter.

Android booting

Android now can be booted from U-Boot with the command:

```
=> booti mmc0
```

and in the console terminal we should have

```
booti mmc0
kernel   @ 80808000 (4126948)
ramdisk  @ 81800000 (237385)
kernel cmdline:
        use boot.img command line:
        console=ttymxc0,115200 init=/init androidboot.console=ttymxc0
androidboot.hardware=freescale csi

Starting kernel ...

Initializing cgroup subsys cpuset
Initializing cgroup subsys cpu
Linux version 3.0.35-06447-gd615ab2 (developer@droidbake-vm) (gcc version
4.6.x-google 20120106 (prerelease)4
CPU: ARMv7 Processor [412fc09a] revision 10 (ARMv7), cr=10c53c7d
CPU: VIPT nonaliasing data cache, VIPT aliasing instruction cache
Machine: WaRP Board Wearable Reference Platform
Memory policy: ECC disabled, Data cache writeback
CPU identified as i.MX6SoloLite, silicon rev 1.2
Built 1 zonelists in Zone order, mobility grouping on.  Total pages: 117760
Kernel command line: console=ttymxc0,115200 init=/init
androidboot.console=ttymxc0 androidboot.hardware=freei
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: 464MB = 464MB total
Memory: 457316k/457316k available, 66972k reserved, 0K highmem
…
Freeing init memory: 204K
adb_open
…
root@warp:/ #
130|root@warp:/ #
```

Functional Test for key Devices.

The following section covers some functional test for key devices

This section will be updated with more test cases

Checking the Wifi

To check if wifi is functional first look to see if the interface loads correctly by command line:

```
root@warp:/ # svc wifi enable

## wifi_probe
wifi_set_power = 1
root@warp:/ # wifi_set_carddetect = 1
F1 signature read @0x18000000=0x16844330
DHD: dongle ram size is set to 294912(orig 294912)
wl_create_event_handler thr:da9 started
p2p0: P2P Interface Registered
dhd_attach thr:dae started
dhd_attach thr:daf started
dhd_attach thr:db0 started
Broadcom Dongle Host Driver: register interface [wlan0] MAC:
00:90:4c:11:22:33

Dongle Host Driver, version 5.90.195.104
Compiled in drivers/net/wireless/bcmdhd on Nov 19 2014 at 17:20:29
wifi_set_power = 0
=========== WLAN placed in RESET ========

Dongle Host Driver, version 5.90.195.104
Compiled in drivers/net/wireless/bcmdhd on Nov 19 2014 at 17:20:29
wl_android_wifi_on in
wifi_set_power = 1
=========== WLAN going back to live  ========
sdio_reset_comm():
dhdsdio_write_vars: Download, Upload and compare of NVRAM succeeded.
add wake up source irq 104
Firmware up: op_mode=4, Broadcom Dongle Host Driver mac=00:37:6d:16:82:fa
p2p0: p2p_dev_addr=02:37:6d:16:82:fa
```

Then we can check the signal strength by loading the wifi settings by command line:

```
root@warp:/ # am start -a android.intent.action.MAIN -n \
com.android.settings/.wifi.WifiSettings
```

Checking FXOS chip (accelerometer)

```
root@warp:/ # dmesg | grep fxos
```

A fxos that is functioning correctly will return:

```
root@warp:/ # dmesg | grep fxos
<4>fxos8700_device_init succ
```

A fxos that is not functioning correctly will return:

```
root@warp:/ # dmesg | grep fxos
<3>fxos 8700 read chip ID 0x0 is not equal to 0xc7 or 0xc4
<4>fxos8700: probe of spi1.0 failed with error -22
```