



GoDroid

Application Notes

Recovery Package Making

v1.0



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Preface

Overview

This manual mainly describes how to use MPTool to burn programs into the Flash. This manual is organized into the following chapters

- **Chapter 1: Installing Tools to Upgrade Package**

This chapter provides information about how to install the tools for making an upgrade package.

- **Chapter 2: Making a Full Amount Upgrade Package**

This chapter gives compact description on the structure of full amount upgrade package and how to generate it.

- **Chapter 3: Making an Incremental Upgrade Package**

This chapter discusses the structure of incremental upgrade package and how to generate it.

- **Chapter 4: Upgrade Package Version Control**

This chapter provides details on the version of system, recovery and bootloader.

- **Chapter 5: Upgrade Package Signature**

This chapter gives insight on the signature of upgrade package.

Audience

This manual is primarily written to provide complete guidance for those who wants to exploit GoWarrior TIGER Board, such as makers, tinkers, innovators, students, etc.

Applicable Products

This manual is applicable for the GoWarrior TIGER Board.

Reference Documents

N/A

Conventions

Typographical Conventions

Item	Format
codes, keyboard input commands, file names, equations, and math	<code>Courier New, Size 10.5</code>
Variables, code variables, and code comments	<i>Courier New, Size, Italic</i>
Menu item, buttons, tool names	Ebrima, Size 10.5, Bold e.g. Select USB Debugging
Screens, windows, dialog boxes, and tabs	Ebrima, Size 10.5, Bold Enclosed in double quotation marks e.g. Open the “Debug Configuration” dialog box

Table 1. Typographical Conventions

Symbol Conventions




Item	Description
 <i>Caution</i>	Indicates a potential hazard or unsafe practice that, if not avoided, could result in data loss, device performance degradation, or other unpredictable results.
 <i>Note</i>	Indicates additional and supplemental information for the main contents.
 <i>Tip</i>	Indicates a suggestion that may help you solve a problem or save your time.

Table 2. Symbol Conventions

How to Contact Us

Submit all your comments and error reports to the author at:

info@gowarriorosh.com

Tel: +886-2-8752-2000

Fax: +886-2-8751-1001

For questions regarding GoWarrior, contact our support team at the email listed below:

support@gowarriorosh.com

1 Installing Tools to Upgrade Package

1.1 Installation Environment

First of all compile the GoDroid package.

Then execute the following commands before installing the tools to make an upgrade package. Skip this step if it has been already executed.

```
$ source build/envsetup.sh
$ lunch aosp_tigerboard-eng
$ make -j8
$ build image
$ make recoveryimage
$ build image
```

1.2 Executing Command

Install tools for making an upgrade package

```
$ build otatool [KEY]
```



[KEY] is an optional item, which specifies the signing key for upgrade package and defaults to testkey.

In case if there is no specified key then the default key, testkey, will be used

to sign APK. You can also use your specified key by locating it under the following path, and confirm it before installing tools for making an upgrade package:

```
build/target/product/security/
```

1.3 Generating Tools

After executing the above commands, the OTA tools will be generated under the following path:

```
out/target/product/tigerboard/ota/
```

2 Making a Full Amount Upgrade Package

2.1 Making Environment

The following environment must be ready before making a full amount upgrade package:

- Tools used to make an upgrade package

`out/target/product/tigerboard/ota/`

`build/tools/hosttools/otatool/`

- Upgrade-related images and files

`device/gowarrior/tigerboard/image/xml/backup.xml`

`image/`

`out/target/product/tigerboard/system/`

`out/target/product/tigerboard/recovery/root/`

2.2 Executing Command

Make a full amount upgrade package.

First execute general compilation, and build image, and then execute the following command.

```
$ build fullpackage <packagename>
```



<packagename> is the specified upgrade package name, and a label number or version number is recommended.

2.3 Generating Packages

A full amount upgrade package will be generated in the following directories:

otapackage/target-packagename.zip

otapackage/full-packagename.zip

And another two zip packages will be generated simultaneously:

target-packagename.zip - The target package used for making an incremental upgrade package

full-packagename.zip -The full amount package used for upgrade

2.4 Structure of the Full Amount Upgrade Package

```
| --META-INF
|
| --com
|
|   |--android
|   |
|   |   |--metadata
|   |   |--otacert
|   |
|   |--google
|   |
|   |   |--android
|   |   |
|   |   |   |--update-binary
|   |   |   |--updater-script
|   |
|
| --CERT.RSA
|
| --CERT.SF
```

```
|--MANIFEST.MF

|--system
    //same to out/target/product/tigerboard/system

|--bootargs.img
|--bootloader.img
|--bootmedia.img
|--file_contexts
|--kernel.img
|--recovery.img
```

2.5 Customizing a Full Amount Upgrade Package

2.5.1 Partition Upgrade Type

The partition upgrade type can be divided into two types: upgrade according to file system and upgrade according to raw data.

- **Upgrade according to file system:** Upgrade data partition in unit of the file. It is suitable for file system partition such as system.
- **Upgrade according to raw data:** Use image files to upgrade data partition in the unit of partition. It is suitable for none file system partition and signing partition such as kernel.

2.5.2 Upgradable Partitions in Full Amount Upgrade Package

All the upgradable partitions must be contained in full amount upgrade package.

Please don't increase or decrease the upgradable partitions in full amount upgrade package arbitrarily. Consider the following case: there is A, B and C published versions in order. We can't make sure that the system will be upgraded from A to B and B to C version in order; it may be upgraded from

A to C version directly. If B version contains some upgrade data that C version doesn't have, this may cause some unpredictable error.

2.5.3 Customizing Full Amount Upgrade Package

The upgradable partitions contained in full amount upgrade package can be specified in the following file:

device/gowarror/tigerboard/image/fs_ubi/Ali_nand_desc_XX.xml (before compiling) or image/Ali_nand_desc.xml (after compiled)

To add partition into full amount upgrade package, you need to add some package description for the partition between <part> in the above file.

If upgrade according to raw data, your description can be as follows:

```
package="<partname>.img"
```

And if upgrade according to file system, the description can be as follows:

```
package="/<partname>"
```

```
<part_loop flash_type="nand">
  <part name="boot" file="uboot_QFP_1GB_training.abs" local="fixed" package="bootloader.img">
    <size>0x800000</size>
    <version>ALiBoot1.0.0</version>
  </part>
  <part name="bootbak" file="uboot_QFP_1GB_training.abs" local="fixed">
    <size>0x800000</size>
  </part>
  <part name="bootargs" file="bootargs.abs" local="fixed" package="bootargs.img">
    <size>0x800000</size>
  </part>
  <part name="deviceinfo" file="deviceinfo.abs" local="fixed">
    <size>0x800000</size>
  </part>
  <part name="baseparams" file="baseparams.abs" local="fixed">
    <size>0x800000</size>
  </part>
  <part name="misc" file="" level="protected" local="fixed">
    <size>0x800000</size>
  </part>
  <part name="recovery" file="recovery.ubo" local="fixed" package="recovery.img">
    <size>0x2000000</size>
    <version>ALiRecovery1.1.0</version>
  </part>
  .....
  <part name="system" file="system.img" fs_type="ubifs" fs_flag="rw" local="unfixed" package="/system">
    <size>0x1D000000</size>
    <version>ALi1.1.0</version>
  </part>
</part_loop>
```

3 Making an Incremental Upgrade Package

3.1 Making Environment

The following environment must be ready before making the incremental amount of the upgrade package:

- Tools for making an upgrade package

`out/target/product/tigerboard/ota/`

`build/tools/hosttools/otatool/`

- Two total target package

`otapackage/target-A.zip`

`otapackage/target-B.zip`

Suppose that using Label A to generate total target package: `target-A.zip`, and Label B to generate total target package: `target-B.zip`. The partition tables of the two package must be the same, otherwise the Incremental upgrade package will not be generated.

3.2 Executing Commands

Generate A->B Incremental upgrade package:

Making incremental upgrade package

```
$ build incpackage otapackage/target-A.zip  
otapackage/target-B.zip
```

3.3 Generating Package

The incremental upgrade package will be generated in the following path:

otapackage/inc_A_B.zip

3.4 Structure of an Incremental Upgrade Package

```
|--META-INF
    |--com
        |--android
            |--metadata
            |--otacert
        |--google
            |--android
                |--update-binary
                |--updater-script
    |--CERT.RSA
    |--CERT.SF
    |--MANIFEST.MF
|--patch
    |--system
        // Inside the directory stores the difference patch of system
        partition files
        |--bootloader.img
        |--bootargs.img
        |--bootmedia.img
        |--recovery.img
        |--kernel.img.p
    //some of the above documents might not exist.
```

3.5 Partitions Upgraded Through Incremental Upgrade Package

If the incremental upgrade package is opened, you will find that only kernel partition and system partition can be upgraded through incremental package. We do not make that available to every partition.

Only partition which has backup data in the backup partition can use an incremental upgrade package to upgrade, and others need to use a full amount upgrade package. This is designed to keep system safe, since there may be a case like this:

The system version is A, and upgraded to B through AB incremental upgrade package;

Then restore system version to A, while actually just some partitions restore to A version and others remain B version;

This time you upgrade system version from A to B through AB incremental upgrade package will fail.

We can constrain the partition, which can be upgraded through incremental upgrade package, according to the backup partition to avoid this case.

4 Upgrade Package Version Control

Whether install an upgrade package is determined by the software version of the platform and the upgrade package.

Recovery version determines whether or not to upgrade Recovery.

Bootloader version determines whether or not to upgrade Bootloader.

4.1 System Software Version

This means the software version. It is saved in baseparams partition. In upgrade package, it is recorded in file: *updater-script*. The result of comparing these two versions determines whether or not to install the upgrade package. The comparison of versions is completed in:

```
bootable/recovery/updater/version.c
```

System software version must be updated each time a new version is released. Please update the following file:

```
device/gowarrior/tigerboard/version.mk
```

```
ALI_BOOTLOADER_VERSION := ALiBoot1.2.0
ALI_RECOVERY_VERSION := ALiRecovery1.3.0
ALI_SYSTEM_VERSION := ALi2.0-rc1
```

ALI_SYSTEM_VERSION defines system version.

Rule of version:

x.y[.z] (Main version. Sub version [. Patch version])

You need to run the following commands after modifying system version to rebuild upgrade package

```
$ lunch aosp_tigerboard-eng
$ build image
$ build fullpackage <packagename>
```

4.2 Recovery Version

The Recovery version in platform is compiled in the Recovery code, while the version in upgrade package is recorded in the updater-script.

We will update Recovery version in the following file only when the Recovery needs to be upgraded:

device/gowarrior/tigerboard/version.mk

```
ALI_BOOTLOADER_VERSION := ALiBoot1.2.0
ALI_RECOVERY_VERSION := ALiRecovery1.3.0
ALI_SYSTEM_VERSION := ALi2.0
```

ALI_RECOVERY_VERSION defines Recovery version.

You need to run the following commands after modifying recovery version to rebuild upgrade package

```
$ lunch aosp_tigerboard-eng
$ make recoveryimage
$ build image
$ build fullpackage <packagename>
```

4.3 Bootloader Version

The Bootloader version in platform is compiled in the U-Boot code, while the version in upgrade package is recorded in the updater-script.

We will update Bootloader version in the two following files only when the Bootloader needs to be upgraded:

ALiPDK/u-boot/include/configs/Al_3921.h

The Bootloader version information is defined by macro "BOOTLOADER_VERSION" :

```
#define BOOTLOADER_VERSION "ALiBoot1.2.0"
```

Compile the U-Boot again if the Bootloader version is modified.

```
$ lunch aosp_tigerboard-eng
$ cd ALiPDK/u-boot
```

```
$ make rebuild_3921  
  
$ cp u-boot.bin ../../device/gowarrior/tigerboard/image/bin  
device/gowarrior/tigerboard/version.mk
```

The Bootloader version in upgrade package:

```
ALI_BOOTLOADER_VERSION := ALiBoot1.2.0  
ALI_RECOVERY_VERSION := ALiRecovery1.3.0  
ALI_SYSTEM_VERSION := ALi2.0
```

You need to run the following commands after modifying recovery version to rebuild upgrade package

```
$ lunch aosp_tigerboard-eng  
  
$ build fullpackage <packagename>
```

5 Upgrade Package Signature

5.1 Specifying Key

Store your specified KEY in `build/target/product/security/` and use this specified key or it will use the default `testkey`, when installing the tools for making an upgrade package.

5.2 Signing for Upgrade Package

When the full amount upgrade package or incremental upgrade package is generated, it will be signed according to the specified key.

5.3 Verifying the Upgrade Package

Recovery system will use the corresponding public key to verify the upgrade package. The public key is stored in the Recovery system, not in the upgrade package.

Revision History

Document Change History

Revision	Changes	Date
v1.0	Initial Release	September 07, 2015

Table 3. Document Change History

Software Changes

Reivision	Changes	Date
v1.0	Initial Release	September 07, 2015

Table 4. Software Change History



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