SIGMATEL
MIXED-SIGNAL SEMICONDUCTORS

Host Software

How to Update Firmware Without a Host Installer

Version 1.1
05/17/07

Table of Contents

1. Revision History

REVISION	DATE	DESCRIPTION
1.0	05/11/2007	Initial pubic release.
1.1	05/17/2007	Updated images, added dialog selection to binder, default recovery mode drivers

2. Scope

This document describes features of the Sigmatel firmware update application that allows firmware updating without the need for a host software installation package.

- A single executable image with all required resources.
- Multiple localized firmware versions to be included.
- Multiple selectable user interfaces.

3. Features

3.1. Updating Firmware Without a Host Installer

The firmware updater executable provides all required components such as recovery mode driver and firmware bound to the updater application as resources. This creates a single executable with everything it needs to update the device.

For the end consumer, there is no need to have software installed to the Program Files area of the target system other than copying the updater executable to anywhere the end user selects. The recovery mode driver is installed in the normal system location if none is currently installed. The firmware updater executable may be saved and executed from anywhere on the target system.

For example, the end user may be able to select to download the appropriate updater on the manufacturer's support page, and select **Run** to execute the update from the Temporary Internet Files folder.

3.2. Protected Firmware Files

By binding the firmware files to the updater executable, the firmware files are protected from being deleted or replaced. This ensures that the appropriate firmware is being applied by the end consumer.

3.3. Updating Options For Localized Firmware

Multiple localized versions of firmware can be bound to the updater. The updater can then select the version to update based on the locale of the system being used to perform the update.

This allows a single firmware update executable image to support multiple locales.

3.4. Multiple User Interfaces

Additional user interface dialogs can be selected to suit the user requirements. All user interfaces use the same firmware update interfaces. There is no difference in the actual update operation; only the options available and what is displayed is different.

The default interface selection is specified during the creation of the customized updater application through the Sigmatel Host Generation System (HGS). The following user interfaces are available and can be specified using command-line arguments:

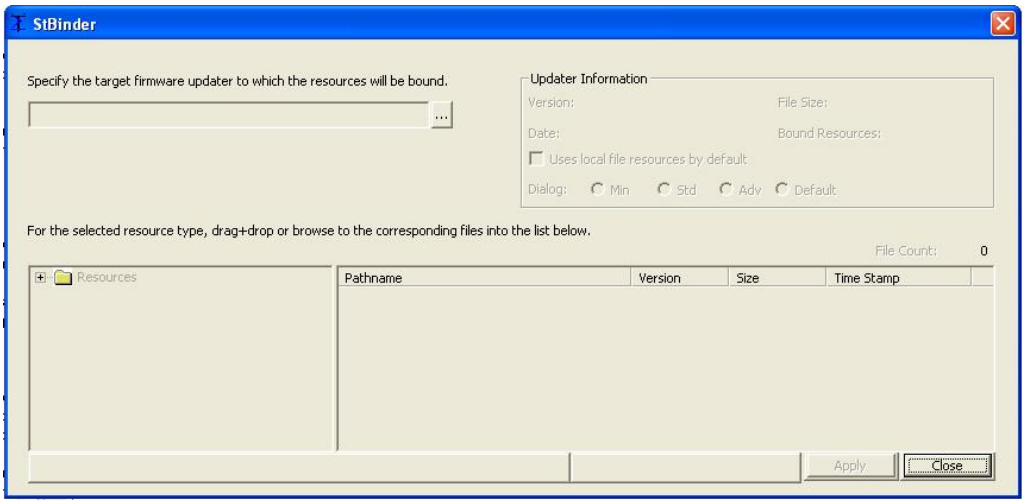
- *Minimal*—Typically, the Minimal interface is used by the end consumer for updating. This simplified interface depends on default settings with minimal user input.
- *Standard*—The Standard interface performs as it has traditionally with the user able to format the data area.
- *Advanced*—The Advanced interface is primarily used for development and troubleshooting. This interface is not typically used by the end consumer.

4. Binding Resources

Resources are bound to an existing updater application using a new utility, *StBinder*, that is available for customer download from the SigmaTel Extranet.

4.1. StBinder

This application is used to bind the customer's compiled firmware files to the customized host updater executable produced by the Sigmatel Host Generation System (HGS). It is also used to select certain execution options for the updater.



The application is not specific to the SigmaTel SDK and may be used with STMP35xx-based or STMP36xx-based firmware and host updater applications v1.750.0.000 or later.

The application is not customized for specific customers as is the normal host package.

The application is localized for the following languages:

- Chinese (Simplified)
- Chinese (Traditional)
- English
- Japanese
- Korean

NOTE: Additional languages can be supported if requested.

4.1.1. Using StBinder

4.1.1.1. Selecting The Target Executable

The targeted host update executable is specified by browsing to an existing updater executable. The executable may be renamed, but the original filename must be “stupdaterapp.exe”.

A “Browse” button next to the target specification launches an “Open File” dialog for browsing. Information about the targeted updater is displayed in the upper right corner of the dialog. Any existing resources already bound to the executable are listed in the appropriate resource group.

Once the target updater executable is specified, the resource lists are enabled, and resources may be added, replaced, or removed.

By default, the updater application selects any resources found in the folder from which it executes. This feature allows resources such as firmware files to be dropped in to replace those resources bound to the application. This feature can be disabled with the “Uses local file resources by default” checkbox. When the resources are then applied, the updater will use *only* those resources for firmware updating.

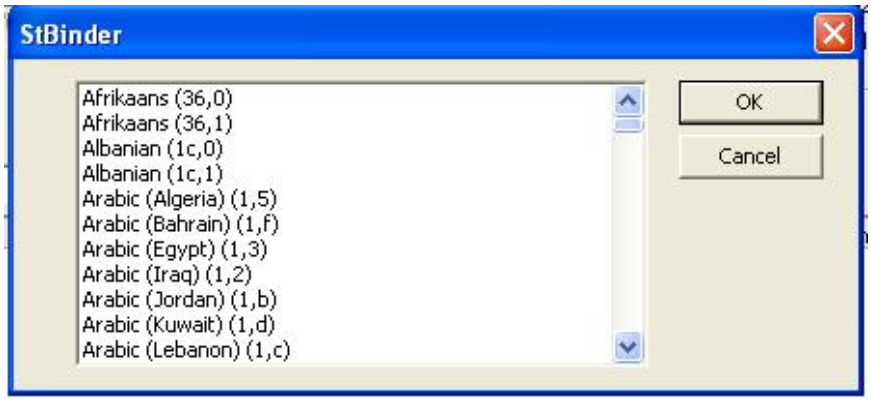
4.1.1.2. Selecting Resource Types

Resources are specified in resource types. The resource types are Recovery Mode Driver, Language Invariant, or language-specific firmware.

Several default language resources are listed. Any other supported language can be specified by selecting the “Firmware – Other” resource group.

The “Firmware – Invariant Language” type is for default firmware where the locale of the host system is not supported by the other language firmware resources, or for non-localized firmware binaries. The updater attempts to load resources from this group if no other firmware resources match the locale of the host system.

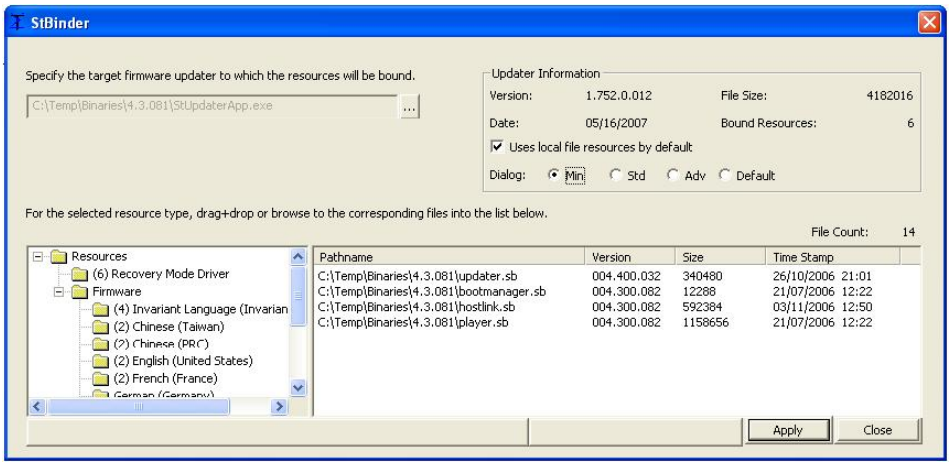
Selecting the “Firmware – Other” resource group displays an additional interface that allows the user to specify a new firmware resource group.



Selecting any language listed adds that language group to the list of resource groups. Firmware resources may then be added to the new group.

4.1.1.3. Adding Resources

StBinder supports drag and drop, as well as file browsing to include a specific resource type. The user adds as many localized firmware resources types as they wish.



The list of resources for each resource group displays the path name, version, size, and time stamp of the resources.

To browse for files to add, right-click either the resource group or in the resource list to launch the “Open File” dialog.

4.1.1.4. Existing Bound Resources

If the targeted updater has existing resources bound to it already, those resources are listed in the resource list and displayed in brackets (for example, <*resource*>) rather than a path name to indicate their presence in the executable.

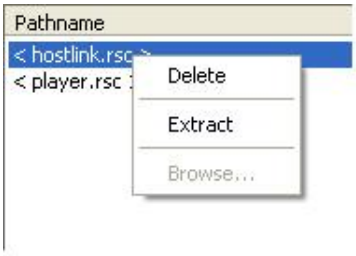
The updater application has existing Sigmatel digitally signed recovery mode drivers bound to it as resources by default. These can be replaced with drivers with the customer’s own digital signatures.

If a file that is added already has a resource in the executable, the bound resource will be marked for replacement.

4.1.1.5. Editing The Resource List

Any resource listed can be deleted from the list by selecting that item (or items), pressing the right mouse button, and selecting **Delete** (or pressing the **Del** key on the keyboard).

If that resource is already bound to the executable, it is marked for deletion when the resources are applied to the target.



4.1.1.6. Extracting Bound Resources

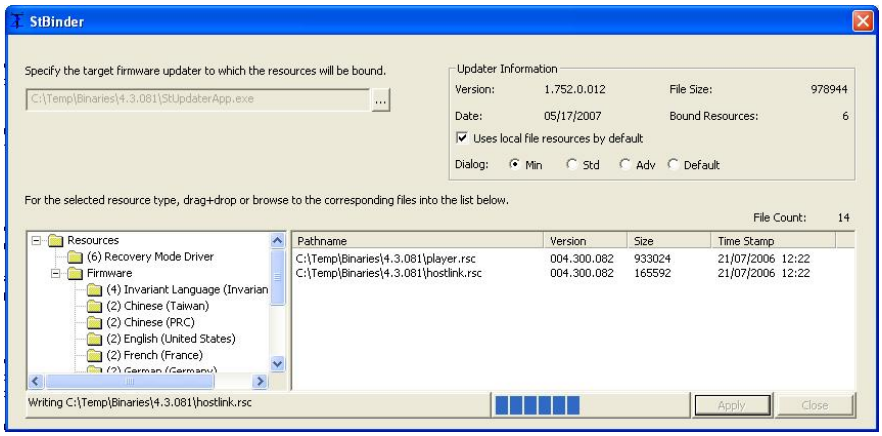
Any resource currently bound to the executable can be extracted from the executable by selecting that item (or items), pressing the right mouse button, and selecting **Extract**. The application displays the Save As dialog box in which the user specifies the location to save the extracted resources.

NOTE: Extracting a resource does not delete the resource from the executable.

4.1.1.7. Applying The Resources

No changes are made to the executable until the changes are applied by selecting the **Apply** button. If there are resources listed to be replaced or deleted, the application requests confirmation from the user before starting the binding process.

With the target executable selected and resources specified, the user selects **Apply**. The application disables the Apply button and displays a progress bar to indicate progress in applying the resources.



When complete, the Apply button is enabled. All new resources bound to the executable are denoted in the bracketed format to indicate their presence as a resource in the targeted executable.

At this point the user may continue to add, remove, or extract additional resources, or the user may close the application.

5. Using The Updater Application

By default, the updater application operates as previous versions have done when a full software installation is performed and when there are no resources bound to the updater executable.

5.1. Firmware resource selection

Firmware resource selection is made according to a specific order of precedence. The firmware updater attempts to make a best fit with the locale of the host system, but also to allow system developers to override any locale specific selections.

The firmware update application attempts to load a firmware resource in the following order:

1. **Instance of file in local directory**

   By default, a user can override the bound firmware resource by copying the firmware file into the updater's local directory. This ability can be disabled when the resources are applied by removing the check from the "Uses local resource files by default" check box in the Updater information group in the StBinder application.

2. **Language ID command-line override**

   A language-specific ID can be specified via a command-line parameter to download specific language resources.

   The language IDs are specified as a hexadecimal values in both a primary language ID and a sub-language ID. Refer to the Microsoft Windows SDK for complete language ID specification. The language option is specified as a combination of primary sub-language IDs.

   ```
   /lang primary,sub-language
   ```

   The primary language ID for English is 9, and the sub-language ID for the United States is 1. Therefore, to override the default system location, the option is:

   ```
   /lang 9,1
   ```

3. **Language ID of local host system**

   The language ID of the host system is the default resource selection method.

4. **Primary language ID of host system and sub-language ID of NEUTRAL**

   If the updater fails to find the resource in the specific language ID of the host system, it attempts to find a resource with only the primary language ID.

5. **Primary language ID of Invariant with sub-language ID of NEUTRAL**

   For all other resources, including recovery mode driver files and non-localized firmware, the updater looks for the resource using an invariant language ID.

   If the updater fails to load a resource by all of these means, an error message is displayed.

5.2. User Interface Dialogs

Although the application utilizes three different dialog displays to the user, it is important to note that the application uses the same code for the actual update operation. The difference is in the presentation.

5.2.1. Default Interface Selection

The default user interface dialog can be specified using the StBinder application. This creates a resource variable in the updater application specifying which dialog interface to use by default.

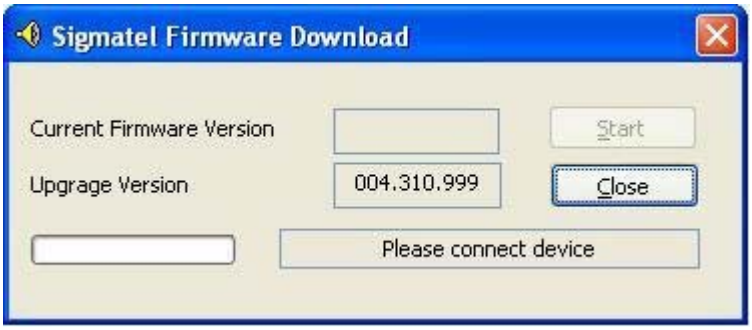
The updater application uses the selected default interface whenever there is no overriding command-line option.

The default option removes the resource variable, and the updater uses the default option it was originally built for, typically the Standard interface.

5.2.2. Minimal

To simplify the firmware update procedure for the end consumer, an additional user interface is available with minimal information and no formatting option. The dialog display current and upgrade project versions, a single progress bar, and Start and Close buttons.

The minimal dialog does not have a data drive format option. The option is set during the HGS customization.

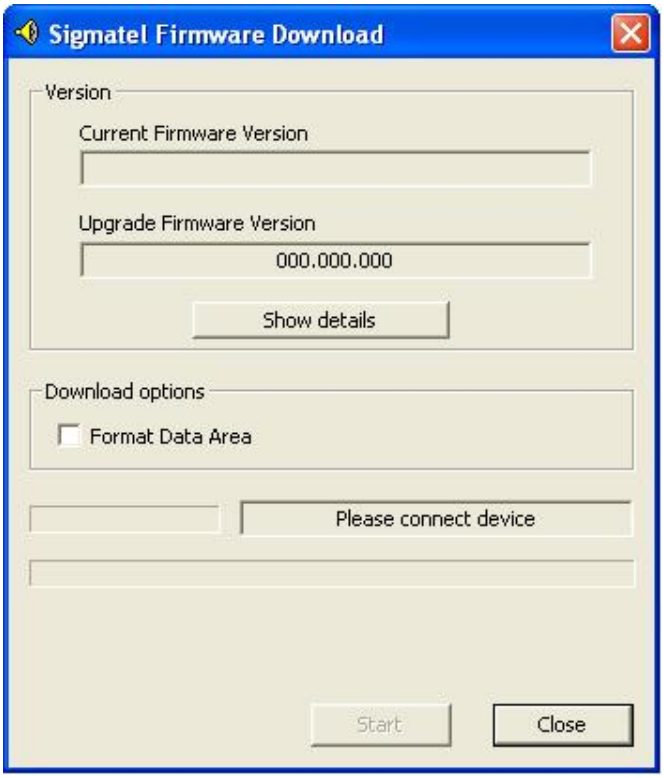


If formatting is required, but not selected by default, the user is notified that the data must be formatted in order to update the device. This is the same as the other update dialogs without the format selected.

The minimal dialog is displayed with the **/min** command-line option.

5.2.3. Standard

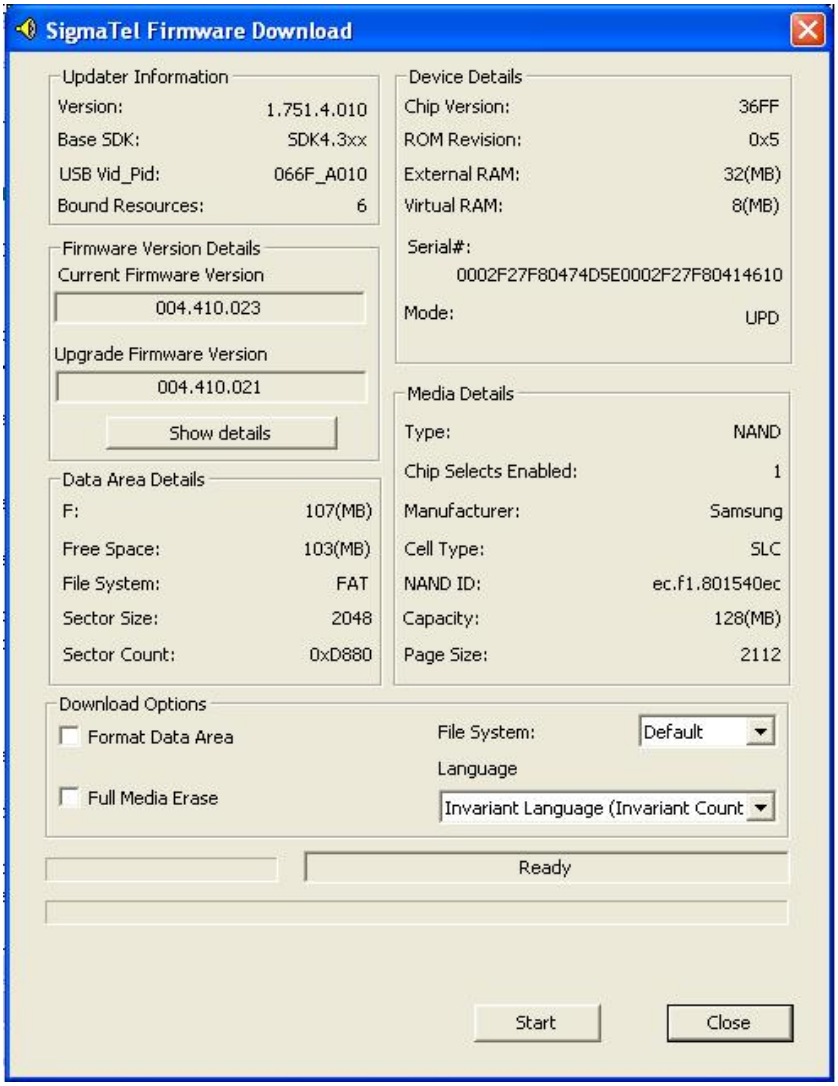
The default dialog is the standard dialog from previous versions. It is activated with the **/std** command-line option.



5.2.4. Advanced

To provide increased productivity in development and troubleshooting, an advanced interface is provided that includes more information about the device, update status, firmware resources, and download options.

This interface is activated with the **/adv** command-line option. This is the dialog box that is displayed with the **/adv** command-line option:



5.2.4.1. Detailed Information Groups

5.2.4.1.1 Updater Information

This group includes information about the firmware updater itself:

- Version of the firmware updater
- Base SDK on which this firmware updater supports
- Number of resources bound to the executable, including firmware and recovery mode driver resources

5.2.4.1.2 Firmware Version Details

This group provides firmware version information for both current and upgrade firmware. Selecting the Show Details button displays version information of the individual firmware resources.

5.2.4.1.3 Device Details

This group provides information on specific details of the STMPxxxx device itself.

Chip ID – Chip ID returned by the device (3500, 3600, etc…).

ROM Revision - Revision code of the device ROM.

External RAM Size - Build time configured size of STMPxxxx external RAM in MBytes.

Virtual RAM Size – **Amount of external RAM used by the upater.sb firmware build in MBytes**

Serial Number – STMPxxxx device serial number (matches USB enumeration in registry).

Mode - Current mode the device is executing in, one of the following:

RCV – Recovery Mode
MTP – Media Transfer Protocol
LIM – Limited Mass Storage Class
MSC – Mass Storage Class
UPD – Update mode (updater.sb enumerated)
HID – Human Interface Device (STMP37xx)

5.2.4.1.4 Media Details

This group provides information about the storage media in the device.

Type – Only NAND media type is currently supported.

NAND Fields:

Chip Selects Enabled – Number of chip selects in use and detected by updater.sb (NAND1 build detects 1 CS max, NAND2 detects 2 CS max, etc…) .

Manufacturer – Media manufacturer name.

Cell Type – Can be SLC or MLC<x> where x represents the number of bits per cell.

NAND ID - Read ID command response from the physical media. Use public STMP3xxx media supported list and media data sheets to decode.

Capacity – Total capacity of the media in MB.

Page Size – Physical size of the data page in bytes + data page Redundant Area size. (eg: 2048 byte nand data page + 64 byte RA = 2112 byte total page size.)

5.2.4.1.5 Data Area Details

This group provides information about the data drive allocation on the media.

Drive letter and total size (MB) – Drive letter and reported drive size.

Freespace – Amount of free space on the logical data drive.

File System (FAT, FAT32) – Current file system.

Sector Size – Sector size.

Sector Count – Total number of sectors comprising the data drive.

5.2.4.1.6 Download Options

Format Data Area – Format data area.

Full media erase – Erase media completely before updating.

File system – Select Default, FAT or FAT32.

Language - Specifies which firmware resources to download overriding the default system locale. If there are no bound firmware resources, this option is not displayed.