Application Note AN1903 AppLoader HA57 SDK & HA57 EVO

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Table of Contents

0 History

Date	Revision	Author	Comments
May 2019	1.0	CS	First Release

Table 1: History

0.1 Related Documents

No.	Name	Remarks
1	AN1800 HA57 EVO User Manual	Application Note 1800
2	AN1902 Description API HA57 EVO	Application Note 1902
3	AN1904 LogoLoader for Handsets	Application Note 1904

Table 2: Related Documents

1 Introduction

This is an instructions document for the Windows® program **AppLoader HA57 SDK and HA57 EVO**, which serves for uploading user applications onto the handsets of the HA57 SDK and HA57 EVO series.

This document describes the installation and the employment of the program. The AppLoader runs on MS Windows® 7 SP1 or newer.

2 Required Equipment

The following components are needed to upload an application to a handset:

- Installation file of the **AppLoader**
- Windows® PC (OS Windows® 7 SP1 or higher) with free serial COM-port
- Alternatively to the COM-Port: USB-to-RS232-Convertor
- Handset HA57 SDK or HA57 EVO
- Example code and project templates, as well as
- User documentation
- ECU (Eval Com Unit), which facilitates the connection between handset and PC and as well supplies power to the handset

Administrator permissions on your PC are necessary for the installation.

3 Prerequisites

The upload of a user application to the handset requires:

- The installation of the "**AppLoader HA57 SDK and HA57 EVO**",
- The implementation and compilation of a user application (or the example application), and
- The connection of the HA57 SDK or HA57 EVO handset to the power supply and to a serial interface of the development PC using the HA5x/HA8x Eval Com Unit (ECU) included in the Eval Kit.

4 Installation

For the installation of the AppLoader, start the **AppLoaderSetup.exe** and follow the instructions of the installation wizard.

The proper operation of the **AppLoader** requires a .NET Framework 3.5 SP1 or newer. Unless it is already available on the system, the installation wizard will automatically install it.

5 Uploading

After the start of the **AppLoader HA57 SDK and HA57 EVO**, its main window will open. Ensure that the handset is connected to the development PC.

Perform the following steps:

Step 1: Selection of a COM Port

Select the serial interface the handset is connected to. Choosing "Automatic" will trigger a scan of all COM ports for the presence of a handset as soon as you press the button "Open".

> **Note**
> If the AppLoader cannot find, at least, one serial interface when started, it will terminate immediately.

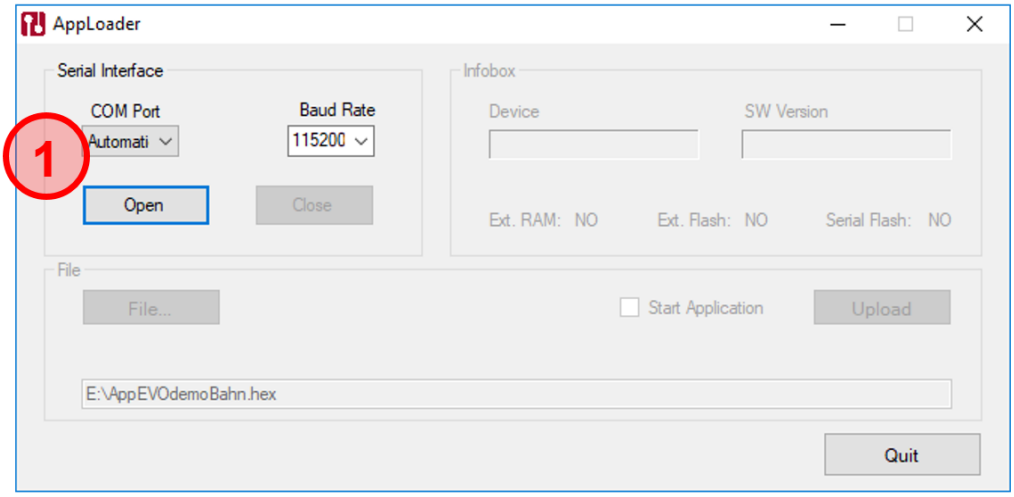


Figure 1: Step 1 – Selection of a COM Port

Step 2: Identifying the Handset

The flashing note "**Searching Device**" is displayed in the info box during the scan procedure. As soon as a handset has been found on the manually or automatically selected interface, its model and the version of its firmware will be displayed in the info box. Additionally, the detected memories will be listed: Ext. RAM, Ext. Flash, Serial Flash. Only if all memories have been detected, the upload of user applications is possible.

When the connection has been established, the display of the handset must read "**SERVICE**". The selection box "COM Port" now identifies the port, to which the handset is connected. The "Close" button will close the port and disconnect from the handset.

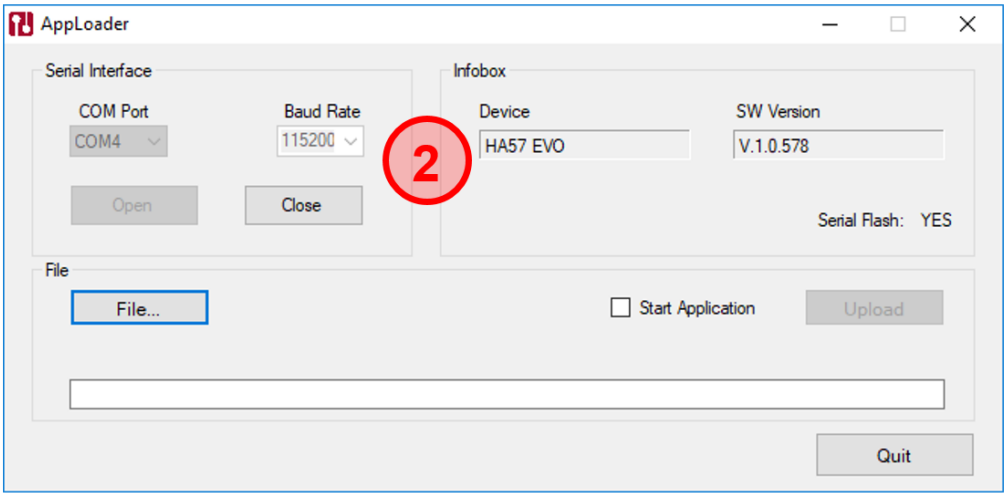


Figure 2: Step 2 – AppLoader with Handset connected to COM4

> **Note**
> Before loading an application with a non-standard (115200 Baud) baud rate, the internal emulation "pei tel HA88" or "pei tel HA400" must be activated, otherwise the handset will not be recognized by the "**AppLoader HA57 SDK and HA57 EVO**" tool. See also documentation *AN1203_HA5x_&_HA5x_SDK_User_Manual*, *AN1601_HA57_SDK_User_Manual* and *AN1800_HA57_EVO_User_Manual*, section *Emulation*.

Step 3: Selection of Application (Hex File)

Press the "File..." button to select the hex file of the application to upload. Its path and filename will be displayed beneath this button after the selection. The button "Upload" will then become enabled.

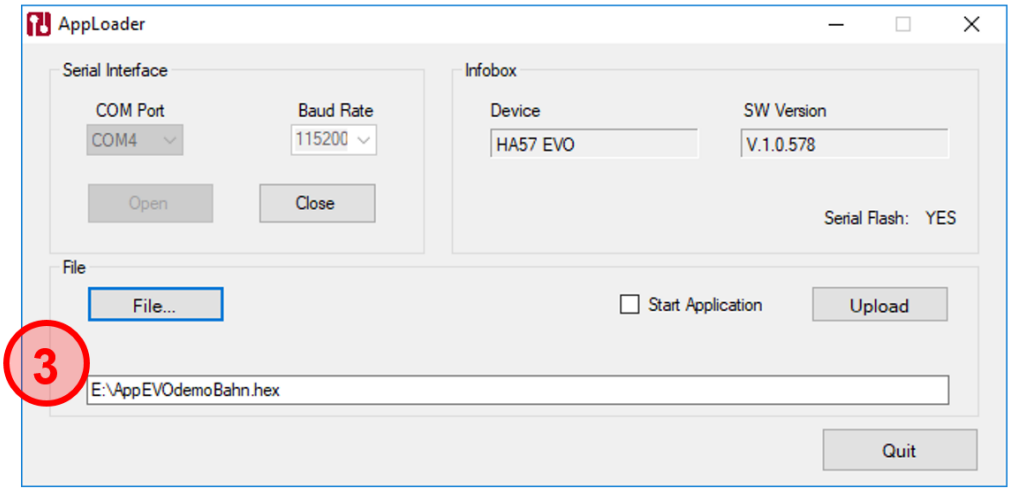


Figure 3: Step 3 – Selection of the Application Hex File

Step 4: Starting the Upload

Pressing the "Upload" button initiates the application upload. A progress bar provides feedback on this process. After the completion of the upload, the application will be registered with the runtime system of the handset. If the checkbox "Start Application" is checked, the uploaded application will be started automatically by triggering a reboot of the handset. If this checkbox is unchecked, the application can be started manually through the setup. During the upload, the AppLoader cannot be closed.

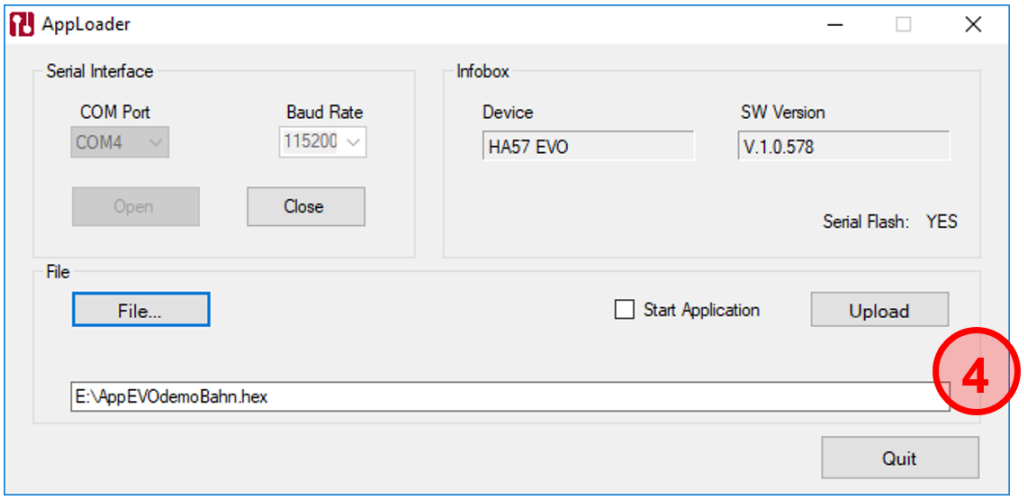


Figure 4: Step 4 – Upload of the Application

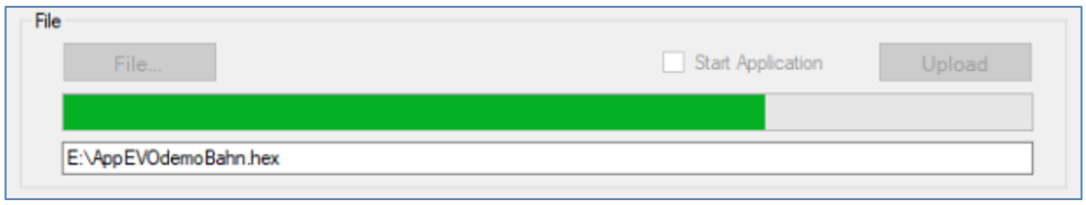


Figure 5: Step 4 – Upload Progress Bar

Step 5: Completion of the Upload

After confirming the message "Upload successful", the COM port will be closed automatically. The handset will reboot according to the option selected in its setup or will run the uploaded application. If the automatic start of the application has been selected, the firmware version it expects will be checked against the one provided by the handset device before the application actually starts. In case of a mismatch, the display will read "**Application Version Mismatch**". The application will not be started and instead be deleted from the list of available emulations in the setup. A manual start of the application is thus also not possible.

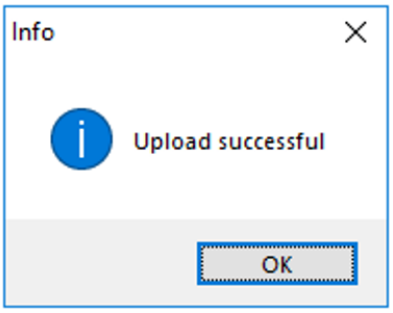


Figure 6: Step 5 – Reporting a Successful Upload

Important Notice (not for HA57 EVO):

Applications, which do not configure the UART interface of the handset for RS232 voltage or as One-Wire interface, should never be uploaded with the option "Start Application" checked. Otherwise, the UART interface may be damaged while still connected to the PC.

6 Application Loader Protocol

6.0.1 Loader Protocol and Command Description

The loader protocol describes the process of uploading applications. The information given should enable the user to create a loader program for his own purpose. Such a program could be used to upload for example applications to handsets of the HA57 SDK and HA57 EVO series from non-Windows® platforms.

6.0.2 Requirements

The handset's connector is plugged into a serial interface (RS232) of a computer. This connection must also be used to facilitate the power supply of the handset. For this purpose, we recommend using the Eval Com Unit (ECU, article number 6705-001-000-02).

6.1 Process Description

1. Switch the handset into service mode: AT+PSERVICE=1
2. Wait for a OK from the HA5x.
3. Test the external memory modules: AT*PEXTMEM
4. Evaluate the *PEXTMEM-response and wait for an OK.
5. If the external memory is not available, cancel the program.
6. Start the loader: AT*LDAPP
7. Wait for an OK.
8. Wait for the ready message. Now the memory for the application is deleted.
9. Send the first line of the HEX file.
10. Test the response for ACK, EOT or NACK.
11. If the response is NACK, read and evaluate the status byte and cancel the loading process.
12. If the response is ACK, send the next line of the HEX file.
13. If the response is EOT, finish the loading process.

Descriptions	
ACK	Acknowledgement, acknowledges received data
NACK	Negative Acknowledgement
EOT	End of Transmission

CR	Carriage Return
LF	Line Feed
External memory	Memory modules of the handset for storing applications. Handsets which contain this additional memory are labeled with "SDK".
Status byte	After a NACK, the handset sends a status byte; see also 6.2.5 Evaluation of the Status Bytes.
HEX file	File format of the application files.

Table 3: Abreviation Description

6.2 Command Description

6.2.1 Set Service Mode

The following command is used to enable and disable the service mode. The commands for loader configuration and activation are available only in service mode.

6.2.1.1 Set Command

Syntax

```
AT+SERVICE=n
```

Parameters

```
Service mode status:
    1 - enable service mode
    0 - disable service mode
```

Reply

```
Software version
Release date
Loader version
OK
```

Example

```
AT+SERVICE=1
HA57 V.0.00.05
25.07.2011 KV: 01
OK
```

6.2.1.2 Query

Syntax

```
AT+SERVICE?
```

Reply

```
+SERVICE: n
OK

// n: Service mode status
// 1: Service mode enabled
// 0: Service mode disabled
```

Example

```
AT+SERVICE?
+SERVICE: 1
OK
```

6.2.2 Load Application

This command is used to upload an application. Only one application can be loaded into the external memory. The command AT*LDAPP writes directly into the external memory. As the firmware is not modified, there is no danger to damage the HK5x's functionality, in case of the connection gets interrupted (for example for remote updates).

6.2.2.1 Action

Syntax

```
Syntax:         AT*LDAPP
```

```
Parameter:   None
```

Reply

```
OK

// The loader was started and the memory content is getting deleted
```

Example

```
AT*LDAPP
OK
```

6.2.3 External Memory Status Request

This command delivers the status of the potential external memory modules:

Serial flash, parallel flash, static RAM

6.2.3.1 Action

Syntax

```
AT*PEXTMEM
```

Parameter

None

Reply

```
*PEXTMEN: ss,sp,sr
OK

// ss: Status of the serial flash
// sp: Status of the parallel flash
// sr: RAM state
        Memory status replies:
            0: Memory not available
            1: Memory available
            2: Memory defective
```

Example

```
AT*PEXTMEM
*PEXTMEM: 1,0,0
OK

// Only the serial flash is fitted, an application cannot be loaded
```

Handset	Memory Status Reply	Description
HA57 without SDK:	1,0,0	Memory for application storage is not fitted
HA57 with SDK:	1,1,1	Memory for application storage is fitted

HA57 EVO	1,0,0	Memory for application storage is fitted

Table 4: Memory Status Reply

6.2.4 Select Application Mode

After the upload, the application can be enabled immediately. In order to disable the application, just select the standard emulation of the handset.

6.2.4.1 Action

Syntax

```
AT*PCONF=x
```

Parameter

```
x=1

// HA5x standard emulation (disables the application)

x=2

// Enables the application
```

Reply

```
OK

// The application was enabled or disabled successfully
```

Example

```
AT*PCONF=2
OK
```

6.2.5 Evaluation of the Status Bytes

After sending a NACK, the handset sends a status byte. If the response "NACK" is received by the loader program, it has to wait for the status byte and evaluate it.

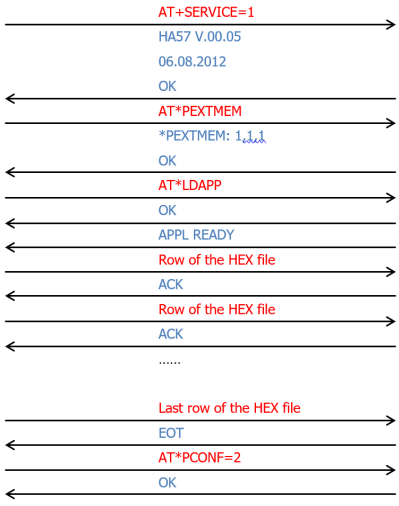
Status byte	Description
01	Check sum error
02	Error of the flash module

Table 5: Description Status Byte

6.3 Protocol Sample

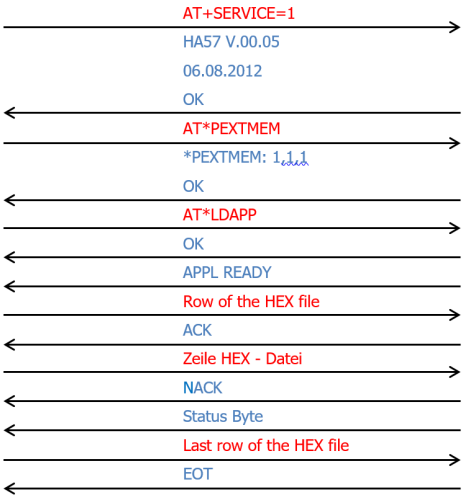
6.3.1 Process Chart – Upload OK

AppLoader HA57 SDK and HA57 EVO



6.3.2 Process Chart – Upload Faulty

AppLoader HA57 SDK and HA57 EVO



6.3.3 Upload Protocol

Upload protocol of the SDKdemo.hex file

AT+SERVICE=1<CR><LF>

HA58 V.00.05<CR><LF>

06.08.2012 KV: 01<CR><LF>

<CR><LF>OK<CR><LF>

AT*PEXTMEM<CR><LF>

<CR><LF>*PEXTMEM: 1,1,1<CR><LF>

<CR><LF>OK<CR><LF>

AT*LDAPP<CR><LF>

<CR><LF>OK<CR><LF>

APPL READY<CR><LF>

:02000004640096<CR>

<ACK>_

:1000000038B50446012000906D46802C35D00EDCBA<CR><LF>

<ACK>_

:10001000102C28D006DC012C34D0042C2ED0082C37<CR><LF>

<ACK>_

:1000200034D132E0202C1DD0402C2FD11EE0B4F56D<CR><LF>

<ACK>_

:10003000006F11D009DCB4F5807F1AD0B4F5007FD1<CR><LF>

<ACK>_

:100040000DD0B4F5806F21D111E0B4F5805F0FD0F1<CR><LF>

<ACK>_

. . .

:100D3000380000684400006850000068 2E303132EE<CR><LF>

<ACK>_

:100D400033343536373839 2A2300000000000000DC<CR><LF>

<ACK>_

:100D500000000000000000000000000000000000093<CR><LF>

<ACK>_

:040000056400000192<CR><LF>

<ACK>_

:00000001FF<CR><LF>

<EOT>_

AT*PCONF=2<CR><LF>

<CR><LF>OK<CR><LF>

END OF DOCUMENT