ATE#1 SW download specification

Subject: ATE#1 (SW download)

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1 Introduction

The purpose of this document is to describe the ATE#1 SW download station for download of the target SW into the target PCB. The document is divided into the following main sections:

- Brief description of the required hardware.
- Description of SW download procedure.

The document contains the interface specification for the target flash download solution developed by Infineon Technologies Denmark A/S. The intention is that this document should contain all information necessary to include the flash download solution in the inline tester.

The description will not focus too much on the exact implementation of the target flash download solution, as this will have minor interest in this context. The emphasis will be on the use of and interfacing to the flash download solution.

The target flash download solution will support both download during inline production, but also at repair/updating sites. The flash download solution mainly aims at inline production and will be optimized with special regard to this.
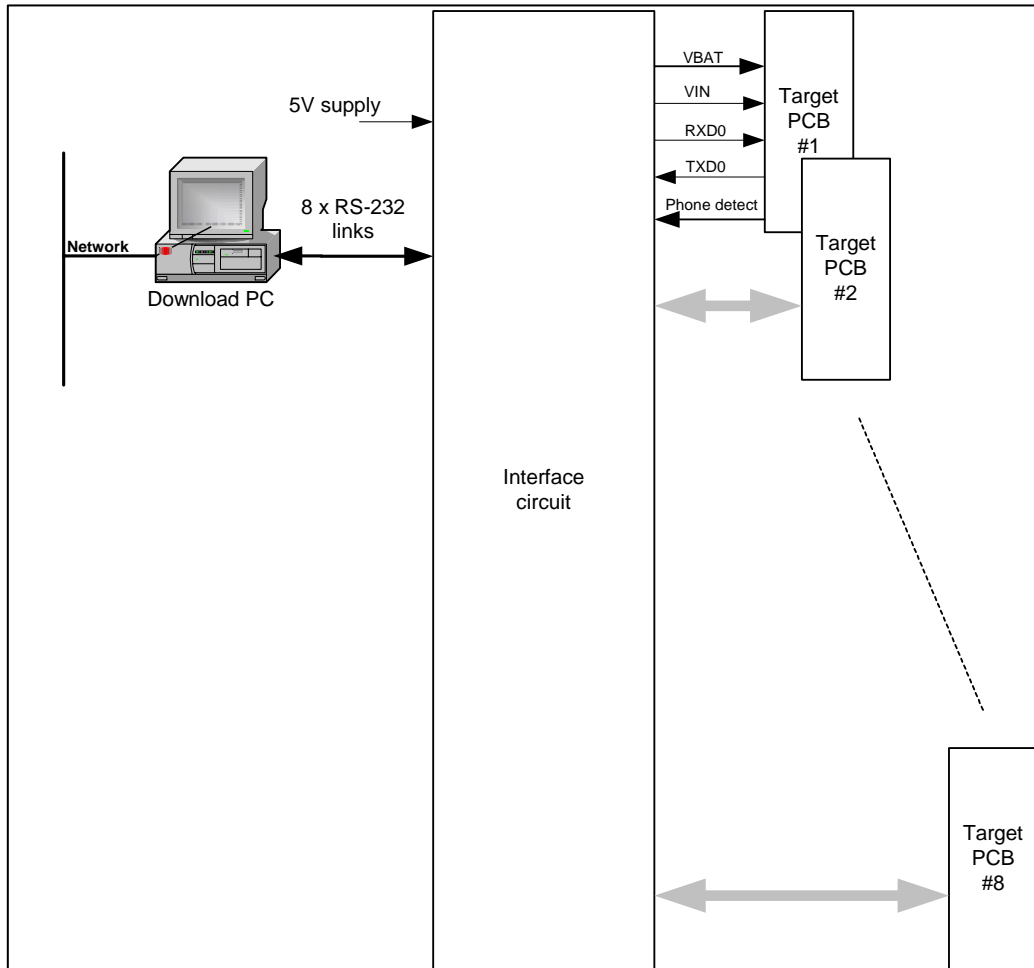
2 ATE#1 hardware description

Fig.1: System overview

2.1   Hardware description

The ATE#1 hardware setup consists of a PC, which interfaces to the target PCB via the RS-232 serial ports. The PC is equipped with a special Octal RS232 card (PCI 244H, http://www.amplicon.co.uk), i.e. 8 COM ports. Each COM port is used for communication with one PCB. A system enabling simultaneous download of up to 8 target PCB's is depicted in this specification, however any lower number will be supported.

To interface between RS-232 and the logic signal levels of serial channels of the target PCB's an interface circuit employing level shifters is used. The current implementation of FlashTool does not provide control of power supply to the phone.

As mentioned above, the target(s) will be connected to a PC, which will provide the data to be downloaded and handle the overall scheduling of the SW download task, i.e. the PC will act as master in the setup.

The implementation of the target flash download solution includes a number of requirements concerning the download setup. These are listed below.

- Possibility to handle multiple mobiles at a time via appropriate number of COM ports
- Each mobile can be switched on/off individually.
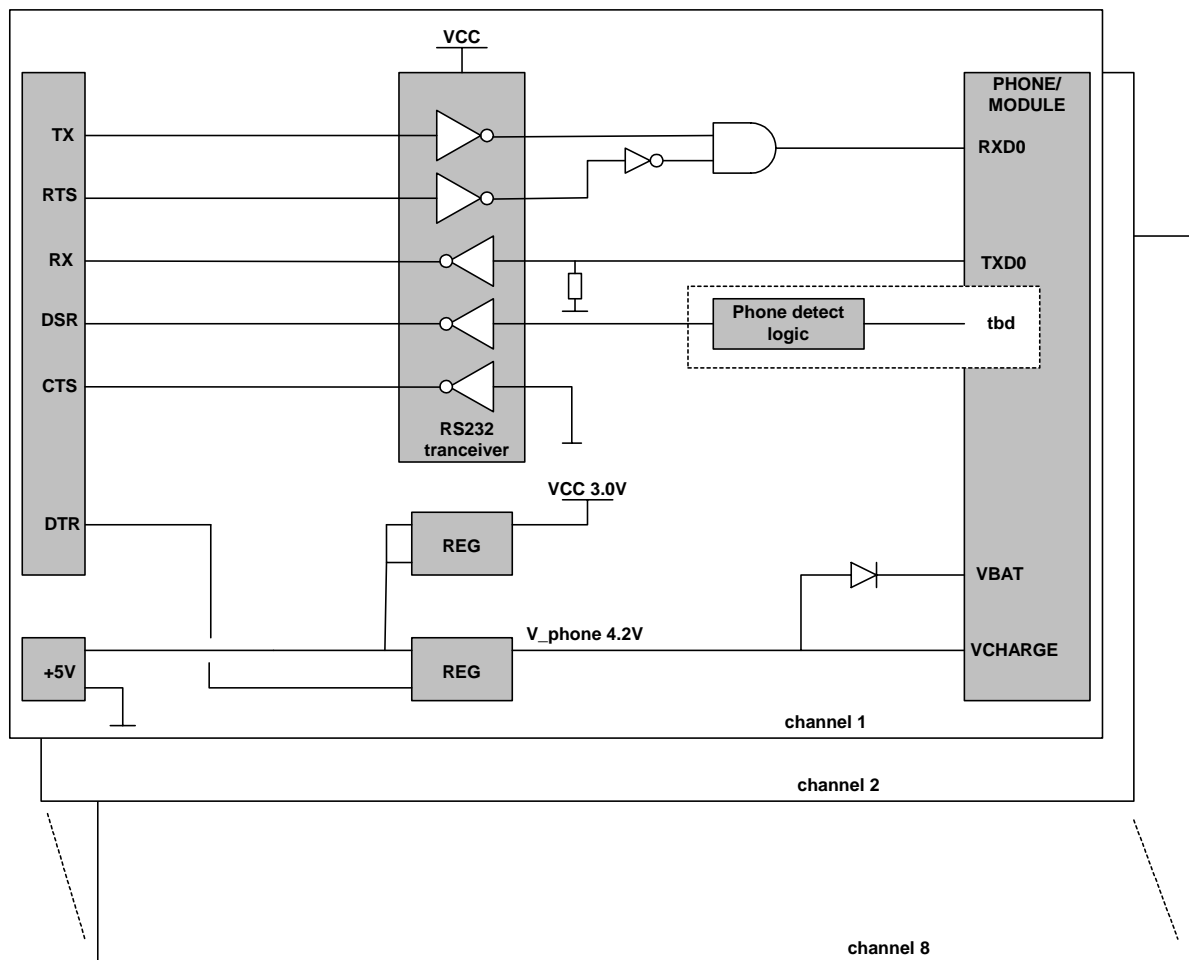- At least 500 MHz Pentium PC running Windows NT, Windows 2000, Windows 98 or Windows CE

Fig.2: Interface circuit for one PCB

The figure above depicts the interface circuit for one PCB. Of special interest is the fact that the TX and the RTS signal from the PC are combined together into the RXD0 signal of the target PCB. This is done to accommodate products, which do not feature HW flow control.

Also it must be noticed that the PC SW requires a "phone present" signal to be provided if the automatic production mode is to be used. This signal is used to indicate to the PC that a target PCB is ready, which in this respect means that all signals are connected and the PCB is powered up. This is signaled to the PC by bringing the DSR signal to asserted state (logic 0, high level on RS-232 line). The required HW to provide this function depends on the available electrical signals on the target PCB. One possible solution is to use the inverted /RESET signal connected to the RS-232 tranceiver, but also other solutions might be considered.

The CTS signal in the RS-232 interface must be asserted to allow the PC COM ports to transmit data.

2.2 Hardware specification

Parameter	Comment	Electrical spec		Unit
		min	max	
Vil, RXD0		0	0.5	**V**
Vih, RXD0		1.90	3.3	**V**
Vol, TXD0	I = 1mA		0.2	**V**
Voh, TXD0	I = 1mA	2.30	2.70	**V**
VBAT	VBAT supply voltage during programming	3.6	4.2	**V**
Iin, VBAT	Current consumption during programming	30	70	**mA**
VIN	VIN voltage for activation of target PCB	4.0		**V**
Iin, VIN			5	**mA**

3 Software

This section will only discuss the overall concept of the FlashTool system. Consult the user guides for the main program and the application modules for further informations.

3.1 Concept

The FlashTool system is designed to be modular and scalable.

By breaking the whole system into smaller parts, the benefit of reusability is obtained.

- When, for example, a platform driver for a given project is tested and found OK, it can be used with any new application without having to recompile the driver.

- On the other hand, new platform driver can be added to existing applications, as new projects are introduced.

- By isolation the methods needed to access and program the flash memories, introduction of new flash types is very safe and easy.

The system is designed to handle up to eight phones in parallel. The download process of one phone can be started totally independent of the processes on other connected phones.

Understanding the placement and the function of each module type is the key to understanding the system.

The figure below shows the module types and how they are connected.
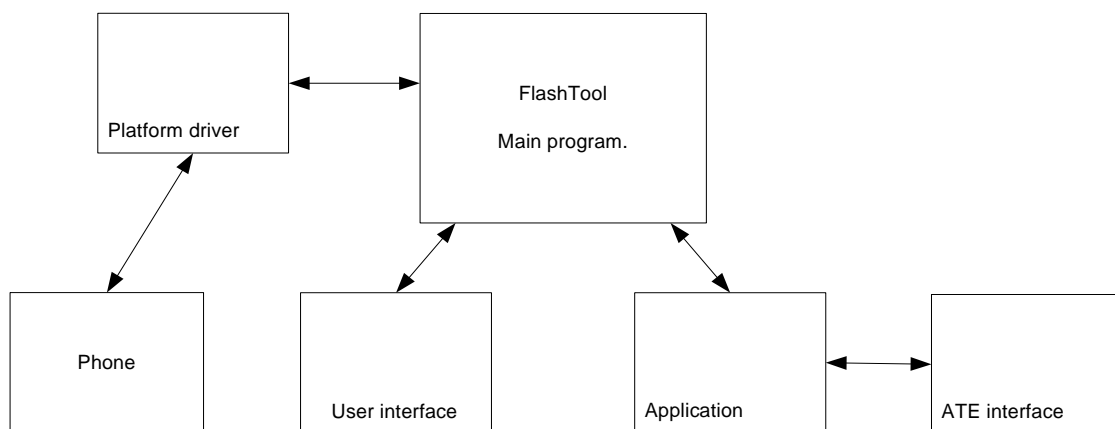
3.1.1 FlashTool main program

The main program is a relatively small program. Its function is to allow the operator to select the modules he needs for the current job. The main program loads the modules and set-up the communications between them.

See the main program user guide for a full description of the current version of the main program.

3.1.2 Platform drivers

The platform drivers handle the communication to the phones.

In order to make the applications platform independent, all the dependencies are handled by the platform driver. This is done in two ways.

- The platform specific boot programs, which are loaded into the phones RAM memory during the boot process, are embedded into the platform driver.
- The platform specific parameters, such as eeprom file names etc, are written to the registry database form where they are read and used by the applications.

3.1.3 Applications

The applications can be seen as the main module, as they provide the actual functionality. The applications communicate with the platform drivers and the user interface modules via the main program.

Furthermore, some applications, such as the "Download and Update application", use special modules in order to be able to perform special functions. The ATE interface is an example of such a special module, and is described below.

The "Download and Update application" also handles the automatic selection and loading of the flash method module. This module type is described below.

See the main application user guide for a full description of the current version of the application module.

3.1.4 User interface

The user interface handles all the visual presentations and operator inputs. It usually consists of two parts.
- One is the set-up screen in which, the operator selects the files to download, COM ports etc.
- The other is the download screen in which, the status information's during the selected operation is presented.

See the main application user guide for a full description of the current version of the User interface module.

3.1.5 ATE interface

The ATE interface modules are DLL's, which can be customized to suit any number of production set-ups. The modules contain a number of functions, which are called in turn, as the download-process is proceeding. Furthermore, they contain functions to access the uploaded eeprom image.

3.2 Software installation

The main program "FlashTool.exe" is copied to a directory of choice, along with any 3rd party packages. This directory should contain a subdirectory called "dlls".

The ATE interface modules can be placed anywhere.

All other files are copied to "dlls" subdirectory.

Note that the FlashTool main program gathers information's about the different modules by opening each one and read out their revisions etc. Therefore, renaming the modules manually will only confuse the operator.

3.3 Software updates

FlashTool is released as an Windows style installation package and is installed and uninstalled the usual way.

Multiple FlashTool installations can coexist on the same PC without any problems

4 Generation of binary files (hextofls.exe)

The program HexToFls is used to generate the downloadable files. A PRG file, generated by the MakePrg program, is needed to for this file conversion. Consult the user guides for these programs to get more information's