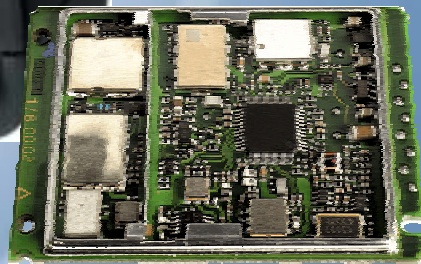# SIEMENS

TC35 / TC37
TC35 Terminal
Siemens Cellular Engines

Updating Firmware

via
Serial or SIM Interface

Version: 03.10
DocID: TC3x_AN_16_Firmware_v03.10

Wireless Modules

Document Name:	**Updating TC35 Firmware via Serial or SIM Interface**
Version: Date: Doc Id: Status:	**03.10** **03.01.2002** **TC3x_AN_16_Firmware_v03.10**

General notes

With respect to any damages arising in connection with the described product or this document, Siemens shall be liable according to the General Conditions on which the delivery of the described product and this document are based.

This product is not intended for use in life support appliances, devices or systems where a malfunction of the product can reasonably be expected to result in personal injury. Siemens AG customers using or selling this product for use in such applications do so at their own risk and agree to fully indemnify Siemens for any damages resulting from illegal use or resale.

Applications incorporating the described product must be designed to be in accordance with the technical specifications provided in these guidelines. Failure to comply with any of the required procedures can result in malfunctions or serious discrepancies in results.

Furthermore, all safety instructions regarding the use of mobile technical systems, including GSM products, which also apply to cellular phones must be followed.

Handheld applications such as mobile phones or PDAs incorporating the described product must be in accordance with the guidelines for human exposure to radio frequency energy. The Specific Absorption Rate (SAR) of the application must be evaluated and approved to be compliant with national and international safety standards or directives.

Subject to change without notice at any time.

Trademark notice

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Contents

Tables

Figures

1 Always up to date

The TC35 firmware is stored in a Flash memory. This gives you the flexibility to easily upgrade to the latest firmware releases.

The firmware is supplied as a Windows executable that can be downloaded onto the GSM engine using the serial interface of its ZIF connector or the SIM interface.

Updating the firmware over the serial interface
- The download procedure uses the TXD0, RXD0 and IGT lines of the ZIF connector and the TXD, RXD and DTR lines of the host application (MMI) or the PC's serial port.
- The approach to set up the serial link depends very much on the individual design of the host application. Chapter 2 provides basic design recommendations to help you find an appropriate solution for an application incorporating the TC35 or TC37 engine. The various options are summarized below:
  1. Download over DSB35 Support Box (evaluation kit). See Chapter 2.1.2 for details.
  2. Download over service interface and service connector with the download being controlled by firmware executable. See Chapter 2.1.3 for details.
  3. Download supported by the processor of the host application (MMI processor). See Chapter 2.1.4.
- If you are using TC35 Terminal you can skip the design considerations and proceed directly to Chapters 2.1.5 and 2.2.

Updating the firmware over the SIM interface
- This solution is recommended when your GSM application has no direct access to a serial interface. To transfer the software to the device you will need the BB35 Bootbox. It comes with a specific adapter that connects the SIM card reader of your TC3x application to your computer's serial port. Refer to Chapter 3 for details.

In either case, the firmware executable runs on any computer under Windows 98, Windows NT 4.0, Windows 2000, Windows ME, Windows XP. Windows 95 can only be used for the serial interface variant. The process of the installation is the same, regardless of the individual hardware setup. The executable comes with an easy-to-use graphic user interface that lets you select the required settings and monitor the progress of the download. Step-by-step instructions are provided in Chapter 2.2 for serial interface variant and, accordingly, Chapter 3.5 for the SIM interface variant.

1.1 Precautions

No matter what method you apply, be sure never to abort the firmware download process. In the event of failure, there would be no valid software installed. Therefore, follow these precautions when the firmware download is in progress:
- Avoid using the GSM engine, unless the new firmware is completely set up.
- Do not bend, stress or remove any cable.
- Avoid interrupting the power supply or disconnecting the serial cable especially when, during the firmware download, the flash is being erased. Failure of transferring new firmware to the flash memory may cause damage to the GSM engine.

1.2 Supported products and related documents

Supported products
- TC35 Module
- TC37 Module
- TC35 Terminal
- TC35 firmware

Related documents
[1] TC35 / TC37 Hardware Interface Description (applies to TC35 and TC37)
[2] TC3x Release Notes related to TC35 software version 03.10 (applies to TC35, TC37 and TC35T)
[3] TC3x Multiplexer User's Guide (applies to TC35, TC37 and TC35T)
[4] Application Note 16: Updating TC35 Firmware (applies to TC35, TC37 and TC35T)
[5] TC35 Terminal Hardware Interface Description (applies to TC35T)
[6] TC35 MC35 Terminal User's Guide (applies to TC35T and MC35T)
[7] Application Note 02: Audio Interface (applies to TC35, TC37 and TC35T)

Prior to using TC35 /TC37 or TC35T or upgrading to a new firmware release, be sure to carefully read and understand the latest product information provided in the Release Notes.

To visit the Siemens Website you can use the following link:
http://www.siemens.com/wm

1.3 Abbreviations

Table 1: Abbreviations

Abbreviation	Description
CMOS	Complementary Metal Oxide Semiconductor
COM	Serial (PC) Port (e.g. COM1 through COM9)
DSB	Development Support Box
DTR	Data Terminal Ready
ESD	Electrostatic Discharge
GND	Ground
HiZ	High Impedance
IGT	Ignition
MMI	Man Machine Interface
TC35 / TC37	TC35 module / TC37 module
TC35T	Throughout this document short for TC35 Terminal
TC3x	Throughout this document short for TC35, TC37 and TC35 Terminal
PD	Power Down
ZIF	Zero Insertion Force

A complete list of abbreviations is provided in [1].

2 Updating TC35 firmware over serial interface

## 2.1 Technical Requirements

Table 2: Summary of technical requirements

Firmware	*wswup32_<version no>.exe*	
	TC35, TC37 and TC35T use the *same firmware.*	
	The file can be obtained from your local dealer or distributor. For registered users, the firmware is ready for download on the Siemens Website: Click http://www.siemens.com/wm and point to the Application Support/Downloads link.	
PC	Operating systems:	Windows 9x, Windows NT 4.0 (Service Pack 6a or later), Windows 2000, Windows ME, Windows XP
	Screen resolution:	640 x 480 pixels minimum
	Color Depth:	256 colours minimum
	Minimum:	133 MHz, Pentium PC
	The TC35 firmware must be stored on a local drive	
RS-232 interface	TC35 / TC37:	Access to the serial interface must be provided by the host application or the DSB35 Support Box[1]
	TC35 Terminal:	Serial port of the Terminal directly connects to the PC's COM port
Serial cable	RS-232 cable (max. 3m in length, recommended 1.8m – 2m)	
Voltage levels	Please refer to the pin assignment and the signal levels specified in the "TC35 TC37 Hardware Interface Description".	
IMPORTANT	When your TC3x application is battery operated ensure that the battery is fully charged before you start a firmware download.	
	Be sure that no voltage is applied at the POWER lines.	
	Once the firmware download has completed, TC3x must be restarted and reinitialized. Since the AT interface is not yet accessible right after the download, you cannot yet take advantage of the AT^SMSO command. Instead, you may switch the Power Down line (PD) to ground for $\geq$3.5 seconds and then activate IGT or, alternatively, turn the power off and on again and then activate IGT. Remember that these methods are reserved for emergency and should only exceptionally be used after a firmware download.	
	Please take into account that an RS-232 interface chip inverts all signals.	

[1]If you would like to purchase the DSB35 Support Box contact your local Siemens dealer. The Siemens ordering number is L36880-N8101-A100-3.

2.1.1 Timing of the firmware download process (TC35 / TC37 modules only)

This chapter describes the timing behaviour of the TC35 / TC37 modules which the system integrator shall take into account when designing the host application. If you are using the TC35 Terminal you can skip this chapter since the terminal has been designed to include the necessary functionality.

The timing specification of the usual TC35 /TC37 startup procedure is explained in Figure 1 and, of course, in [1]. Normally, when the module is switched on, the VDD=2.9V output voltage is activated at the latest 100ms after the falling edge of the Ignition (IGT) line.
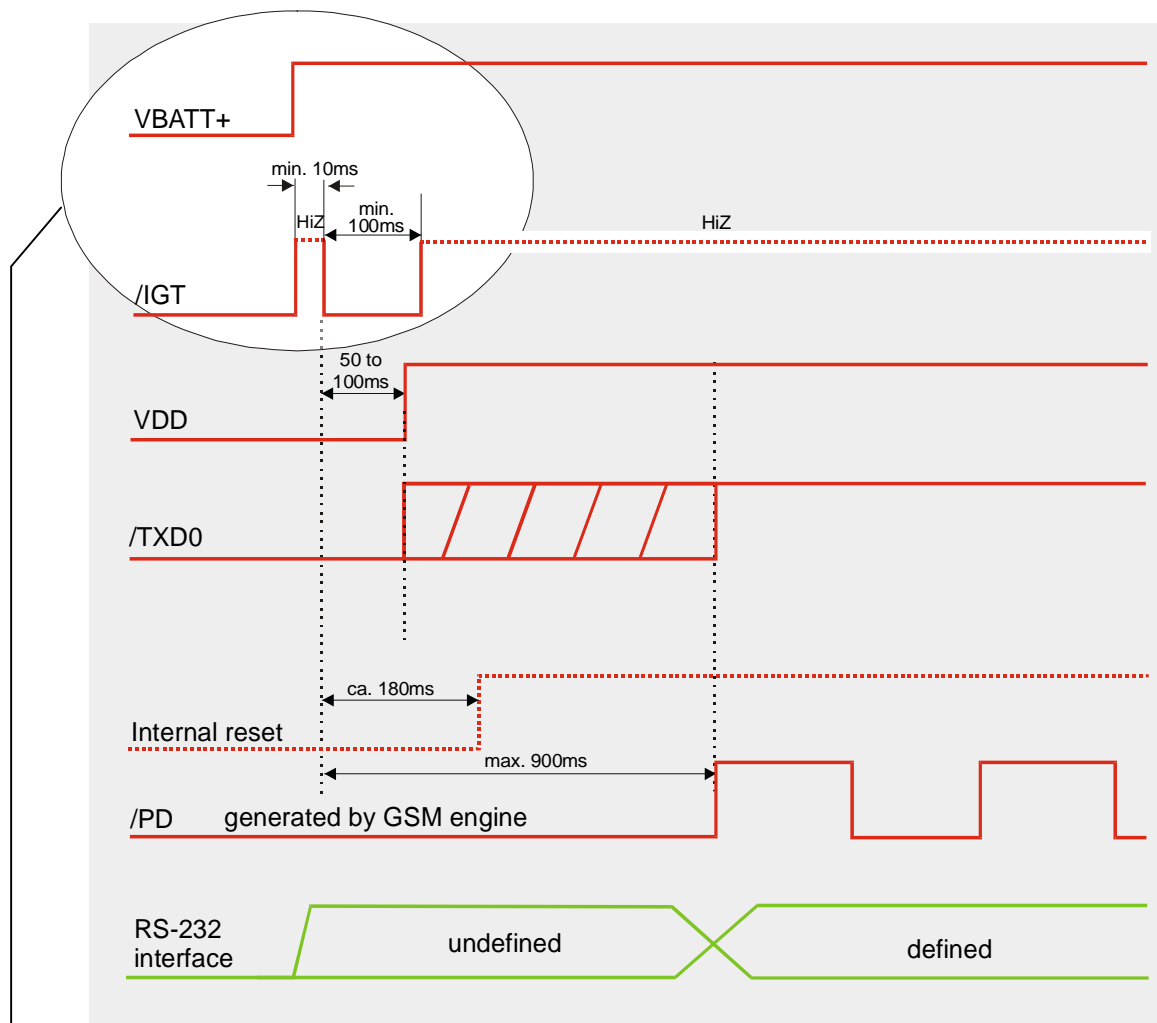
For details see Figure 2.

Figure 1: Timing of TC35 / TC37 startup procedure

In addition to the normal startup, the firmware download procedure requires the TXD0 line to be active high no later than 50ms from the rising edge of the VDD line. The timing is illustrated in Figure 2.
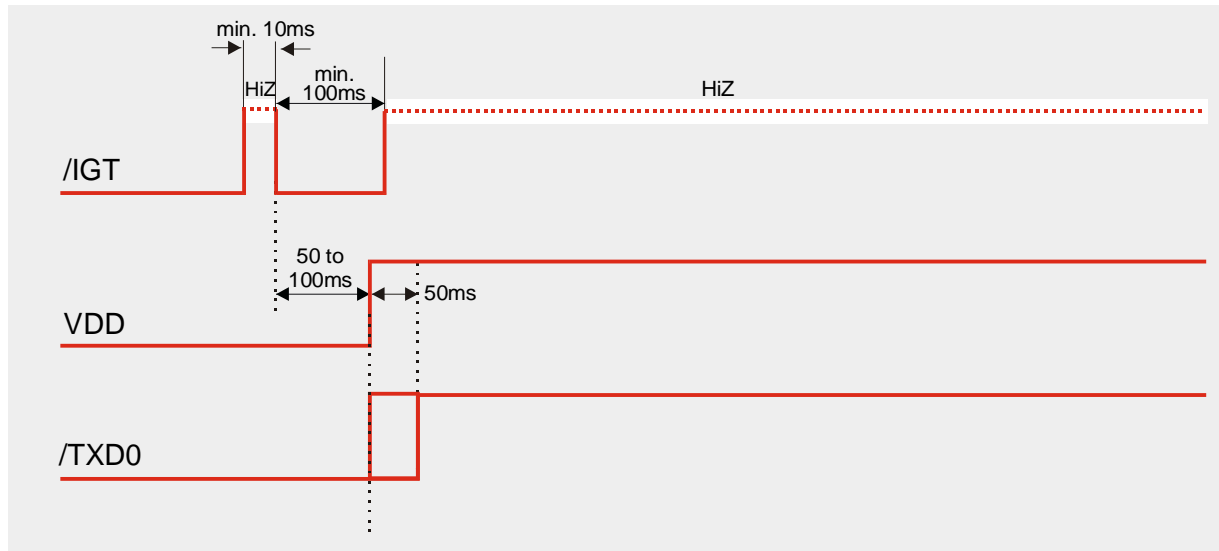
Figure 2: Ratio of IGT, VDD and TXD0 during firmware download

The above requirements must be met to enable the GSM engine and the RS-232 lines to perform the initial boot procedures. After the internal reset the firmware download can be started.

2.1.2 Download from PC over DSB35 to TC35 / TC37

If available, you can take advantage of the DSB35 Support Box. This is an evaluation kit designed to test and type approve Siemens cellular engines and provide a sample configuration for application engineering. The box can be easily plugged to the serial interface of the GSM engine and the computer and is thus ideally suited to perform the firmware update.
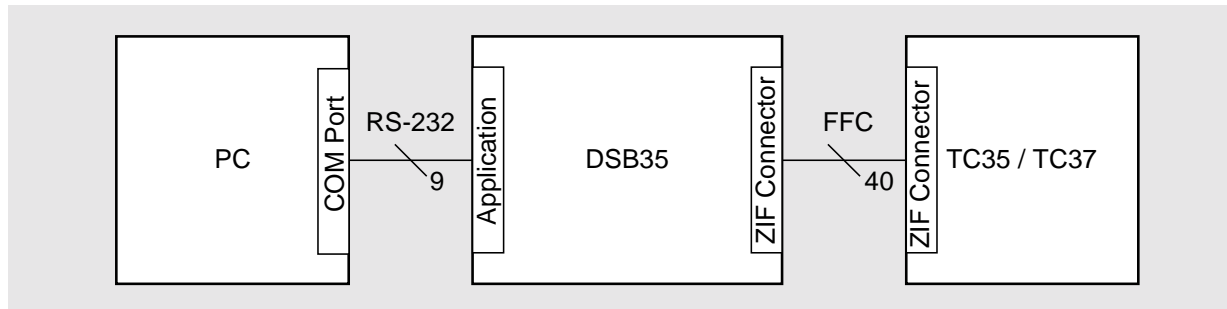
Figure 3: Firmware download over DSB35 Support Box

To perform the download be sure TC35 / TC37 connects to the ZIF connector located on the DSB35 Support Box. Use the serial cable to connect the DSB35 Support Box to the computer's COM port. The serial connector (9-pin Sub-D) is on the back of the box. Throughout the user's guide supplied with the box it is referred to as application interface. When finished, proceed to Chapter 2.2 and follow the step-by-step instructions.
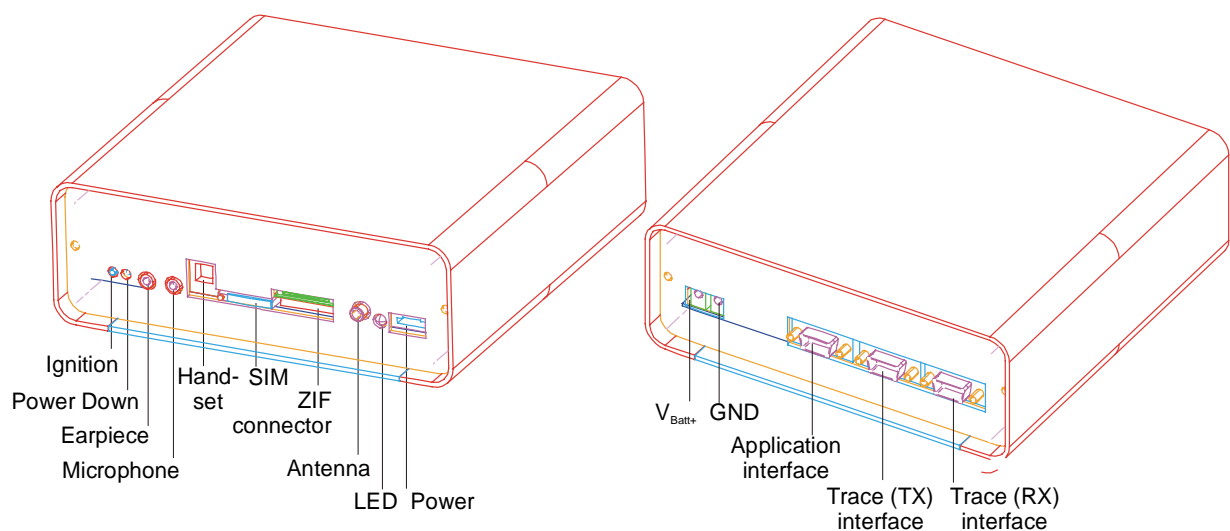
Figure 4: Front and back view of DSB35 Support Box

2.1.3 Download over service interface and service connector

The firmware can also be updated via a dedicated download interface. For this purpose, you can install an additional priority circuit and a service connector into your application.
The priority circuit should be designed to switch the *GND, IGT, RXD0, TXD0* lines of the ZIF connector to the download interface when the service connector is plugged, or accordingly, to the MMI processor when it is not plugged. The service connector is used to easily attach the RS-232 download cable (see Figure 7 for a sample circuit) that comes from the PC's COM port. Likewise, the four lines can go to test points or any other external or internal connectors.
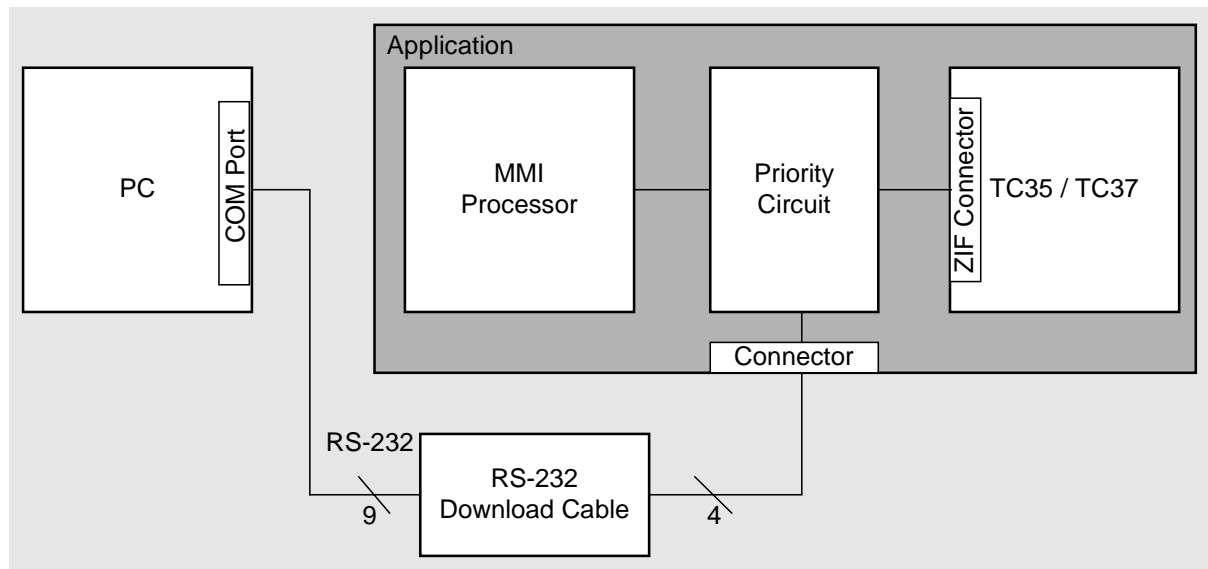
Figure 5: Firmware download over service interface and service connector

Figure 6 shows a priority circuit for the GND, IGT, RXD0, TXD0 lines, which always gives priority to the external serial connection – if present. IMPORTANT: The power supply of the module and all application components needed for the software download must be provided by the application.
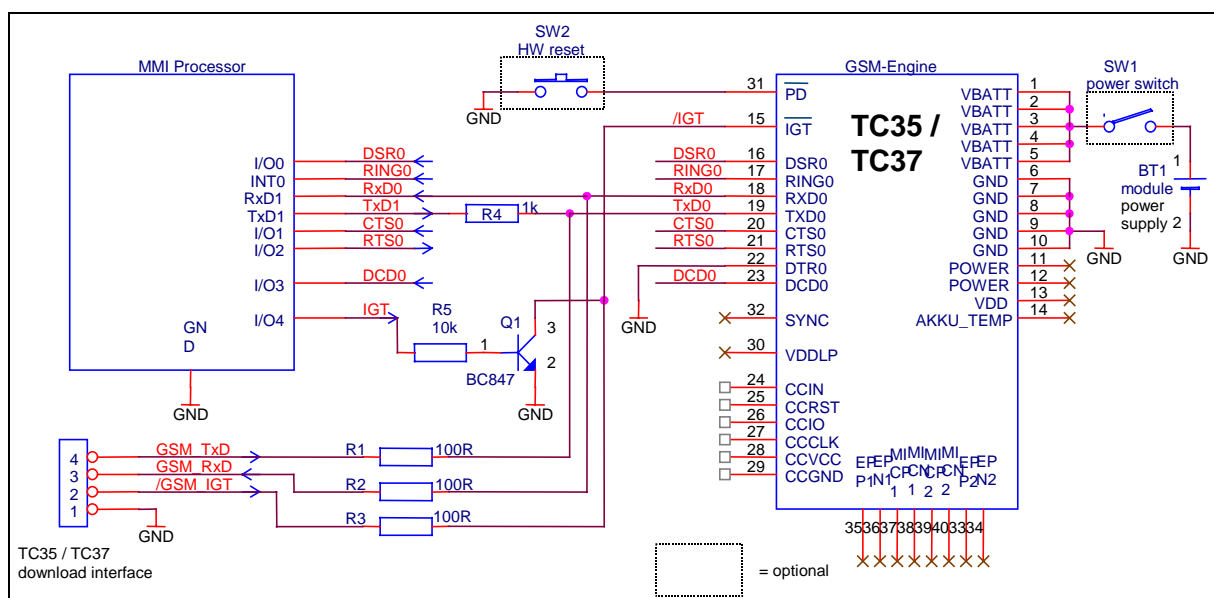
Figure 6: Sample circuit for download interface

Detailed information on the pin assignment and the signal levels of the ZIF connector is provided in [1], Chapter 3.9.

While the service connector is connected the customer's MMI software should be passive. Characters received on the RXD line of the MMI processor can be ignored. No voltage must be applied at the POWER lines, therefore keep pins 11 and 12 open.

Once the firmware update has completed, restart the module. To do so, you may either switch PD to GND for ≥ 3.5 seconds and then activate IGT, or turn the power off and on and then activate IGT.

Due to the small signal level (2.65V) the cable from the application to the RS-232 driver should be as short as possible (<400mm).

Designing a download cable
Figure 7 shows the schematic of a sample download cable. The circuit can be fed from a PC's or laptop's RS-232 interface or, alternatively, from an external DC power supply.

To feed the sample circuit from the RS-232 interface, the DTR and RTS pins must be set to high level (+5 ... +25V). In this case, the diode labeled D3 and the external DC power supply (V_{in}) can be omitted. The IGT signal must be generated from DTR.

IMPORTANT: The RS-232 interface of some PCs or laptops may not be capable of supplying sufficient voltage or current to feed the circuit of the download cable. If so, an external DC power supply (U = 5V, I_{max} = 20 mA) is mandatory. Diodes D1 and D2 can be omitted. The supply voltage V_{ext} = 5V can be directly connected to the input (pin 8) of the voltage regulator IC.
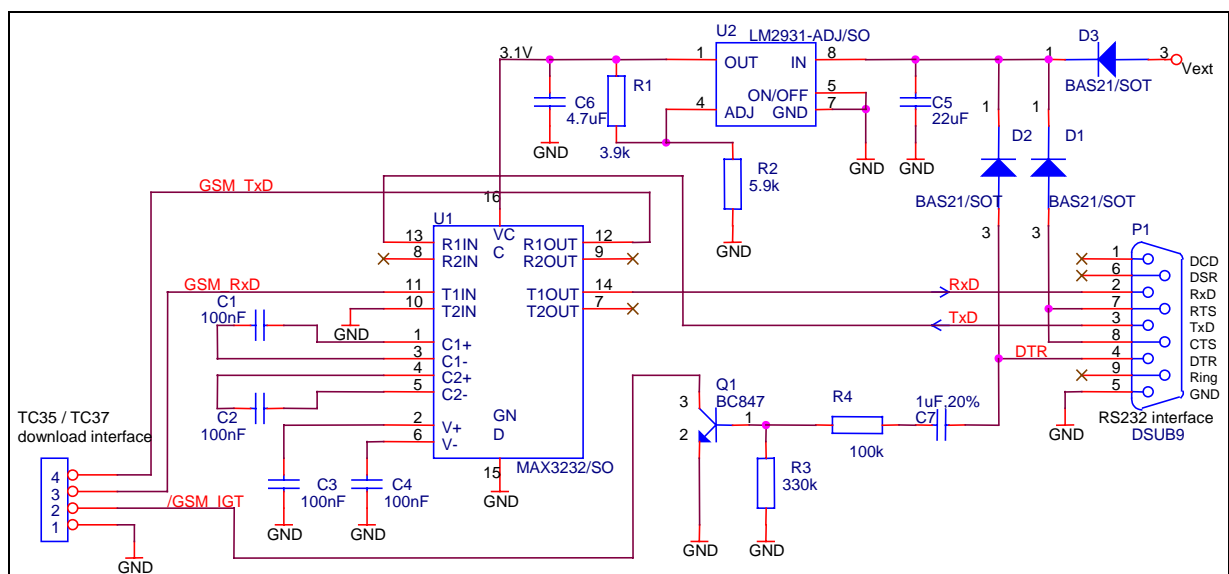
Figure 7: Sample circuit for download cable

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2.1.4 Download supported by the MMI processor

This chapter proceeds from an application design where the MMI processor has two serial interfaces and the download process shall be controlled by the MMI processor. The approach is applicable when neither the DSB35 Support Box nor an external service interface are available.
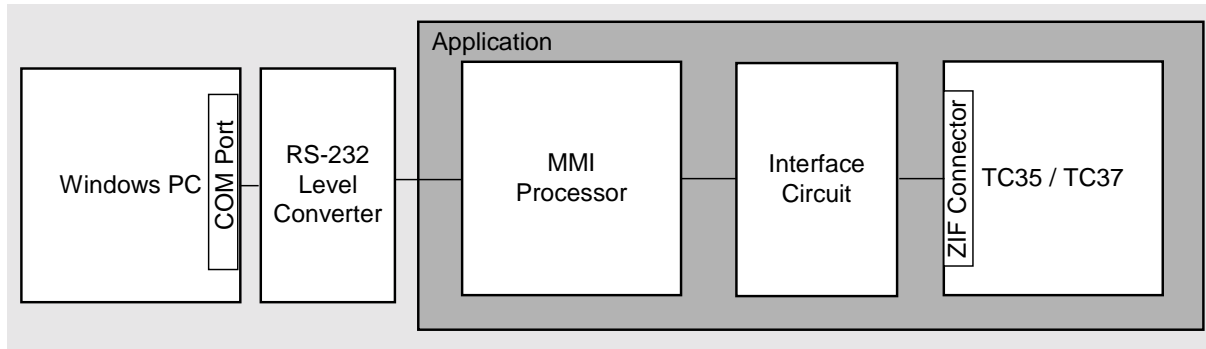
Figure 8: Firmware download controlled by MMI processor

For this solution, you are required to develop a special download utility which is running on the MMI processor. The utility must be capable of mapping the signals between the two serial interfaces of the MMI processor. Therefore, it must be active before the firmware download begins.

The circuit diagram in Figure 9 suggests a feasible configuration for this solution. IMPORTANT: The power supply of the module and all application components needed for the software download must be provided by the application.
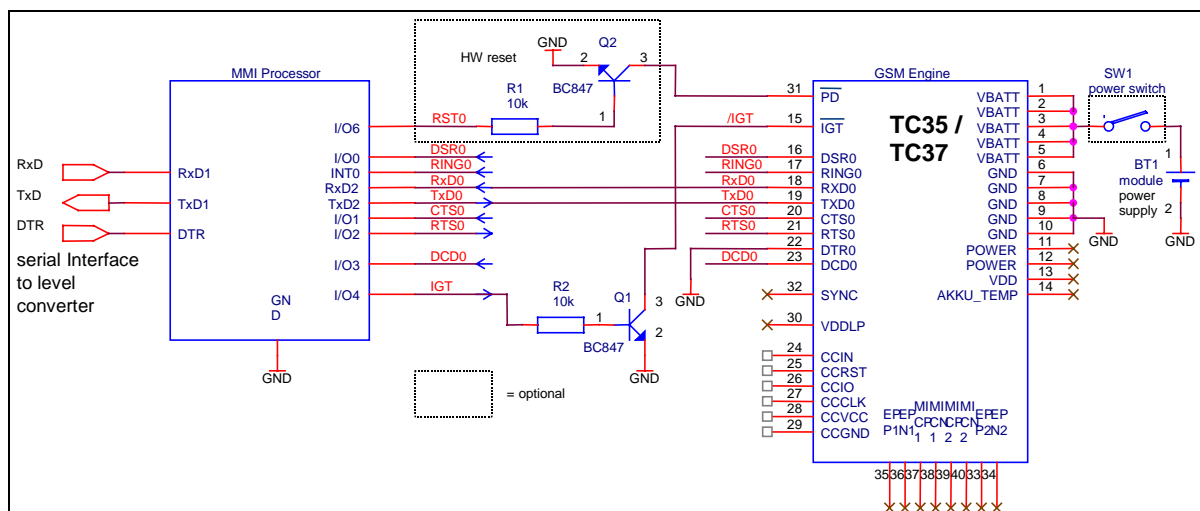

Figure 9: Application capable of FIRMWARE download through the MMI processor

The download process shall follow this sequence:
1. Power down the module using the AT^SMSO command.
2. Activate your download utility on the MMI processor.
3. Run the firmware executable (WinSwup32) from the Windows PC to begin the firmware download.
4. Once the firmware update has completed, restart the module. To do so, you may either switch PD to GND for $\geq$3.5 seconds and then activate IGT, or turn the power off and on and then activate IGT.

Tasks to be performed by the download utility:

• While WinSwup32 is executed, the download utility receives all firmware data from the PC and immediately forwards them to the module's serial interface: Each character received by RXD1 on the PC side of the MMI processor must be sent to TXD2 on the module side. Vice versa, each character received by RXD2 on the module side goes to TXD1 on the PC side.

  As this process is very time critical, the data must be forwarded as quickly as possible. Ensure that the MMI processor has enough performance to handle the process. The baud rate should be set to 57600 or 115200 baud. To avoid loss of data a buffer should be available to buffer the data sent from the PC to the module. The buffer size should be minimum 256 byte.

• The DTR signal of the PC shall be used to control the module's IGT signal. The required voltage levels are listed in the table below.

Table 3: Logical signal states of DTR and IGT

Logical state of DTR	DTR at serial interface (RS-232 levels)	DTR at serial interface (CMOS levels)	Ignition
Inactive	-3 to -25V	2.65V	HiZ
Active	+3 to +25V	0V	0V

2.1.5 Connecting TC35 Terminal to the serial interface of the PC

Be sure the TC35 Terminal is properly connected to the power supply and to the computer's COM port.

Status LED

Power supply

Audio interface   SIM card holder

RS-232 interface   Radio interface
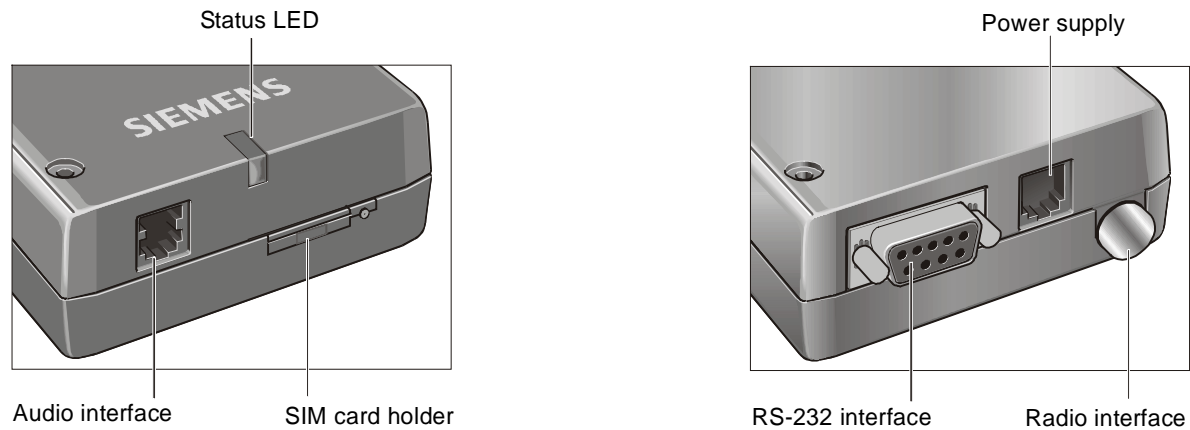
Figure 10: TC35 Terminal

2.2 Downloading firmware over serial interface

This chapter describes the WinSwup32 graphic user interface and guides you through the process of the installation.

1. The *wswup32_<version no>.exe file* should be stored on your PC/laptop.

2. Be sure TC3x are properly connected to the serial interface and to the power supply as described in Chapters 2.1.2 through 2.1.5.

3. Power down TC3x to ensure that no connection can be set up while the download is in progress.
   To set TC3x into Power Down mode enter the AT^SMSO command from a Terminal program. Important: Remember to close the Terminal program before proceeding to step 4. For more detailed information on AT commands please refer to the AT Command Set manual supplied with your GSM engine.

4. Once TC3x is in Power Down mode, you can run the *wswup32_<version number>exe* file. The WinSwup32 dialog appears.
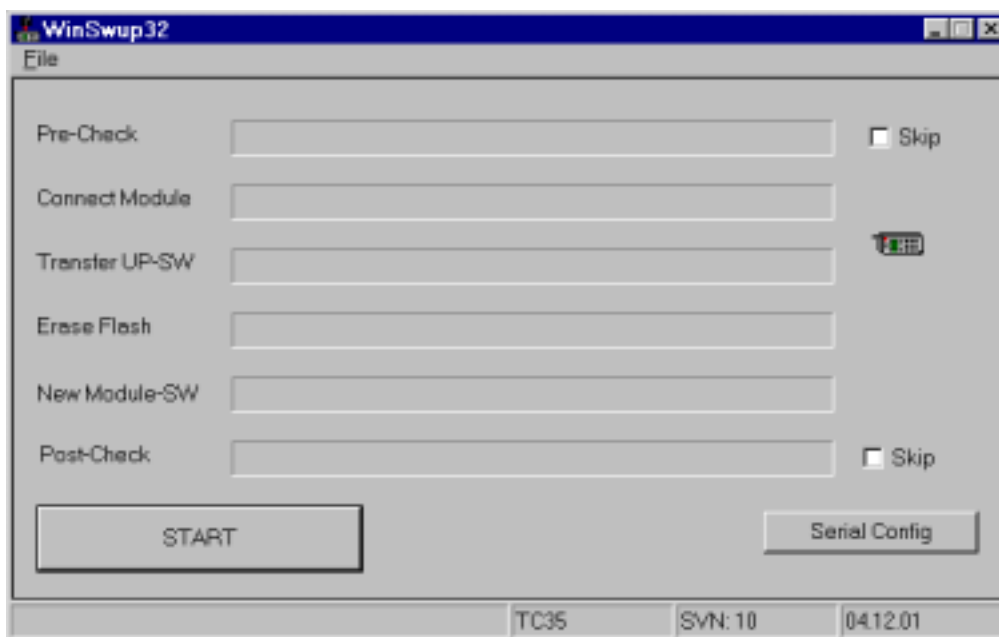
Figure 11: WinSwup32 user interface upon program start-up

5. Click the **Serial Config** button on the right bottom. Use the resulting dialog to select the used COM port and the baud rate. Normally, you can accept the default setting 115200 bps. In rare cases, it may be necessary to select 57600 bps, for example if the download onto a TC35 Terminal fails to start up. The range from 203000 to 406000 bps can only be used if supported by the computer's COM port.
    Press **OK** to return to the main dialog.
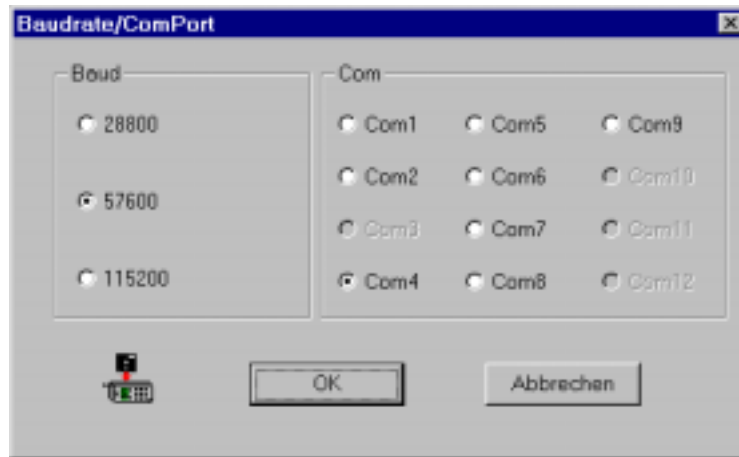
Figure 12: Selected baud rate and COM port

6. The Pre-check function of WinSwup32 (see Figure 13) is capable of checking whether your current firmware is serviceable. Since this test can only be completed if your current firmware is working, you need to
    ☑ Skip *skip this step* when TC3x is not responding (e.g. when the new firmware is needed for troubleshooting),
    ☐ Skip *run the test* if TC3x is working (e.g. when the new firmware is intended for upgrading).

7. Now you are up and ready to launch the firmware update. The process involves various steps, such as prechecking (if activated), connecting to the device, transferring the new software, erasing the current firmware, setting up the new version and finally, verifying whether the update was successful (if post-check was activated). The progress of each step is shown in a status bar.
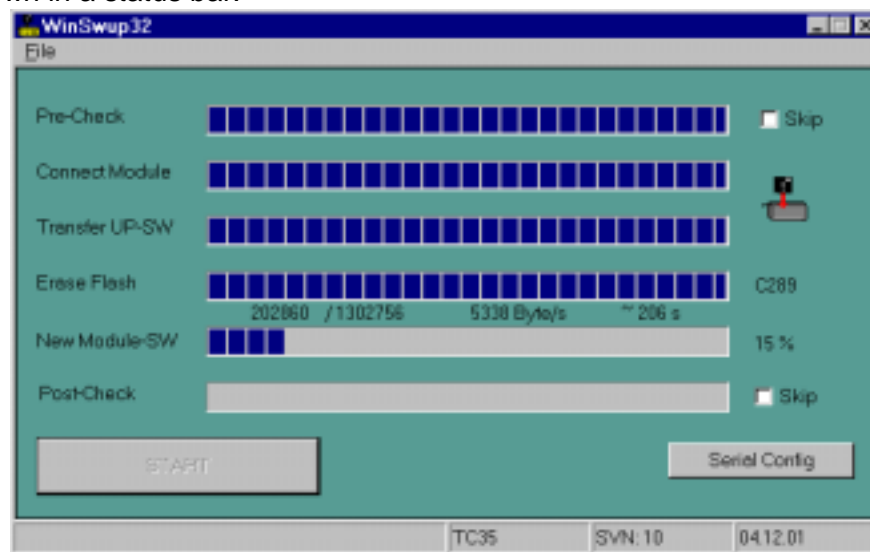
Figure 13: WinSwup32 window during download

8. Once the download has completed a confirmation message appears, stating that all data have been transferred. Choose **Quit** from the **File** menu to close the WinSwup32 application.
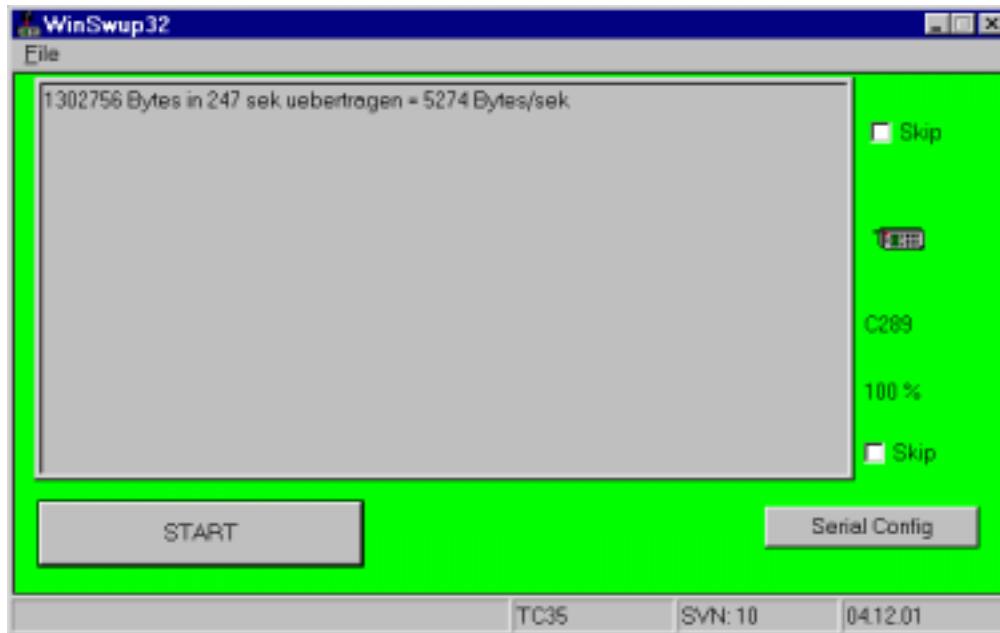
Figure 14: Download completed

9. Finally, restart TC3x. To do so, you may either switch PD to GND for $\geq$3.5 seconds and then activate IGT, or turn the power off and on and then activate IGT.

2.3 Troubleshooting (firmware update over serial interface)

Table 4: Troubleshooting

| Problems you may encounter when running WinSwup32	
Problem	The download fails to start. After pressing the START button the following message appears: Could not open Comport for BFB-Lib
Remedy	Verify that you have selected the right COM port and, if necessary, change the setting as described above. Verify that no other terminal program uses the COM port when you run WinSwup32. Probably you did not close your terminal program after powering down TC3x with AT^SMSO. Verify that the RS-232 interface is properly connected. Depending on your application design refer to Chapters 2.1.2 to 2.1.4. Check whether the start-up timing of the TC35 / TC37 module is compliant with the description in Chapter 2.1.1.
Problem	The download fails to start. After pressing the START button the following message appears. Could not switch on Module
Remedy	TC3x is still powered. Ensure to switch to the *Power Down* mode as described above. Then start up the download once again.
Problems you may encounter after firmware update	
Problem	After download failure, TC3x is not responding.
Remedy	Reinstall the firmware. Be sure to *skip* the pre-check since the device is not responding.

3   Updating TC35 firmware via SIM interface

3.1   Technical requirements

Table 5: Summary of technical requirements

Firmware	*simswup_tc35_<version no>.exe*	
	TC35, TC37 and TC35T use the *same firmware*.	
	The file can be obtained from your local dealer or distributor. For registered users, the firmware is ready for download on the Siemens Website: Click http://www.siemens.com/wm and point to the Application Support/Downloads link.	
PC	Operating systems:	Windows 98, Windows NT 4.0 (Service Pack 6a or later), Windows 2000, Windows ME, Windows XP
	Screen resolution:	640 x 480 pixels minimum
	Color Depth:	256 colours minimum
	Minimum:	133 MHz, Pentium PC
	The TC35 firmware must be stored on a local drive	
BB35 Bootbox	See chapter 3.1.1 for scope of supply	
	Siemens ordering number: L36880-N8102-A100-1	
IMPORTANT	When your TC3x application is battery operated ensure that the battery is fully charged before you start a firmware download.	
	Be sure that no voltage is applied at the POWER lines.	
	Once the firmware download has completed, TC3x must be restarted and reinitialized. Since the AT interface is not yet accessible right after the download, you cannot yet take advantage of the AT^SMSO command. Instead, you may switch the Power Down line (PD) to ground for ≥ 3.5 seconds and then activate IGT or, alternatively, turn the power off and on again and then activate IGT. Remember that these methods are reserved for emergency and should only exceptionally be used after a firmware download.	

3.1.1 BB35 Bootbox brief description

To transfer the firmware onto the module you will need the BB35 Bootbox which comprises the following components (included in the scope of delivery):

1. SIM-to-serial interface adapter (throughout this Chapter referred to as BB35 Bootbox)
2. Flat cable with a proprietary SIM card on the one end and a Sub-D 9pin connector on the other end
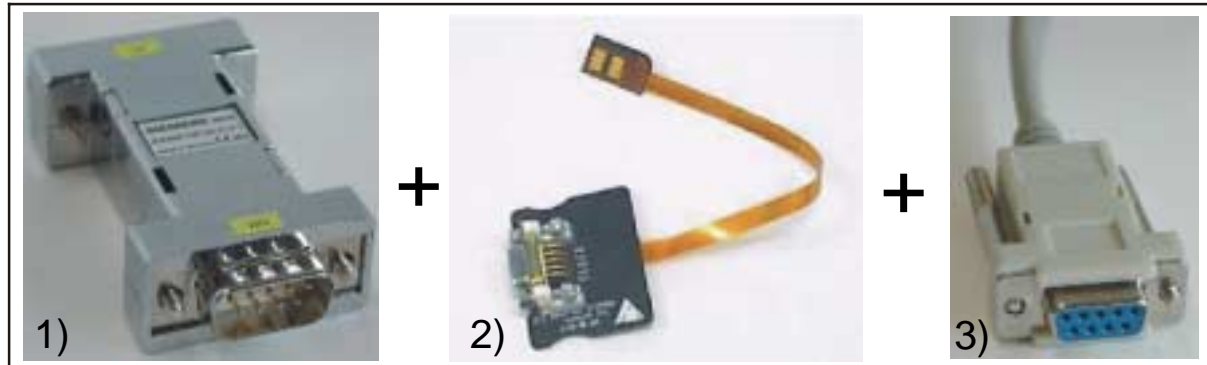3. RS-232 cable with two female connectors, 1.8 m in length

Figure 15: Scope of delivery

Figure 16: How to connect the supplied cables to the BB35 Bootbox

3.2 Precautions specific to the BB35 Bootbox

• The BB35 Bootbox is powered via the SIM interface. This requires your TC35 / TC37 application or TC35 Terminal to be properly plugged to the power supply. Yet it is important that *no voltage is applied* while you connect the BB35 Bootbox and the supplied cables to the TC35 / TC37 module or TC35T. Switch off the power first, and turn it on again right before you start up the software download as described in the following chapters.
• The SIM cable delivered with the BB35 Bootbox is not ESD protected. Therefore, do not touch the cable while there is a firmware download in progress.
• Use the Bootbox only indoors at room temperature and not near radiators or other heat sources. Avoid direct exposure to the sun.
• When you remove or insert the SIM card be sure TC3x is in Power Down mode.

3.3 Connecting the BB35 Bootbox to the TC35 Terminal

Connect the BB35 Bootbox to your TC35 Terminal as shown in Figure 17.

1. Turn the TC35 Terminal off.

2. Plug the one end of the supplied RS-232 cable to your computer's COM port. Insert the other end into the BB35 Bootbox's serial connector labeled "PC".

3. Plug the Sub-D 9pin connector of the supplied flat cable to the BB35 Bootbox's male connector marked "SIM".

4. Push the yellow pin next to the SIM card connector on the TC35 Terminal, until the card holder is ejected. Remove your present SIM card. Instead, insert the SIM card fastened to the flat cable of the BB35 Bootbox. Then push the holder back into the housing.

5. Proceed as described in Chapter 3.5.
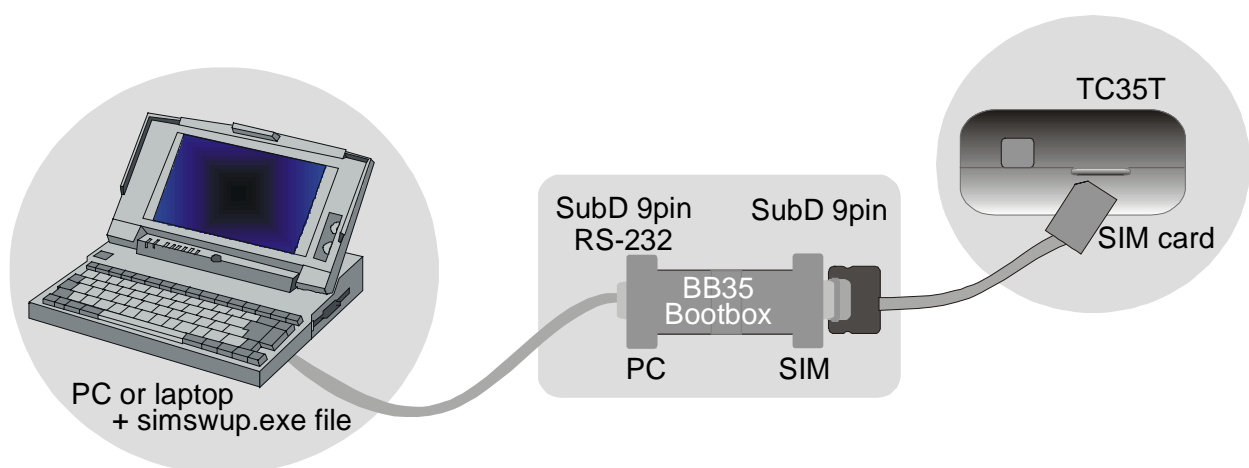
Figure 17: Connecting the BB35 Bootbox to the TC35 Terminal

3.4 Connecting the BB35 Bootbox to your TC35 /TC37 application

Connect the BB35 Bootbox to your GSM application as shown in Figure 18.

1. Be sure the TC35 / TC37 module connects to the ZIF connector located on your application platform.

2. Switch off your GSM application.

3. Plug the one end of the supplied RS-232 cable to your computer's COM port. Insert the other end into the BB35 Bootbox's serial connector labeled "PC".

4. Plug the Sub-D 9pin connector of the supplied flat cable to the BB35 Bootbox's male connector marked "SIM".

5. Remove your application's SIM card from its card holder. Instead, press the SIM card fastened on the BB35 Bootbox flat cable into the empty holder. Slide the holder back into the card reader.
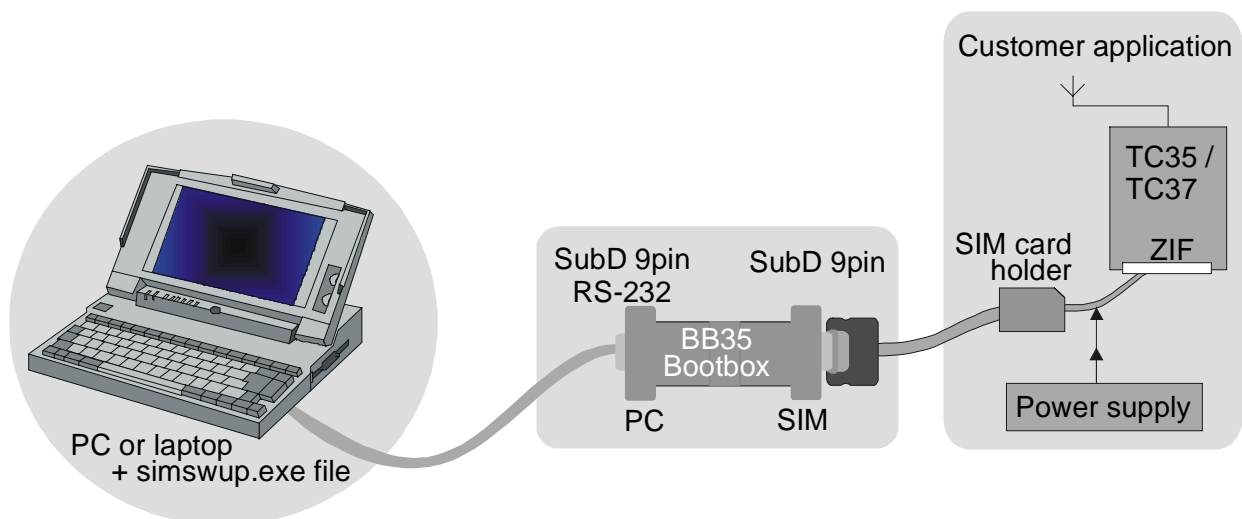
6. Proceed as described in Chapter 3.5.

Figure 18: Connecting the BB35 Bootbox to your TC35 / TC37 application platform

3.5 Downloading TC35 firmware

This chapter describes the WinSwup32 graphic user interface and guides you through the process of the installation.

1. The *simswup_tc35_<version no>.exe file* should be stored on your PC/laptop.
2. Launch the firmware update by running the *simswup_tc35_<version no>.exe* file. This causes the **SimSwup** dialog to appear. A message bar at the bottom of the dialog will display status information and brief instructions.
3. Select the **COM port** of your PC/laptop that connects to the BB35 Bootbox.
   Note: When using a COM port other than those listed in the dialog, follow the instructions provided in Chapter 3.7.
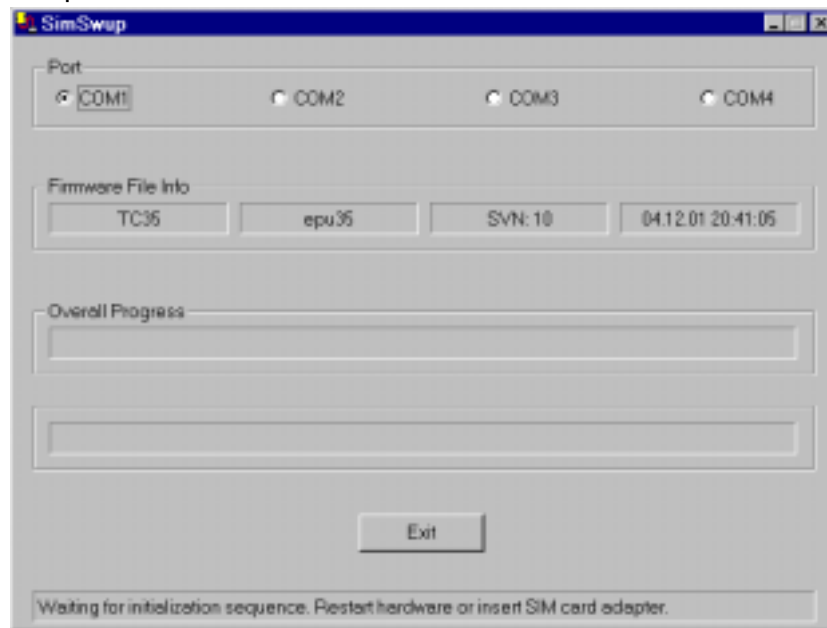
Figure 19: SimSwup window upon Program startup

4. Switch on the power supply for TC3x. Normally, the software download will launch automatically. If the download fails to start up, switch the power supply off and on.

5. The progress of each step and the seconds left (for bootstrap loading, erasing flash, installing new software) can be seen from the status bars.
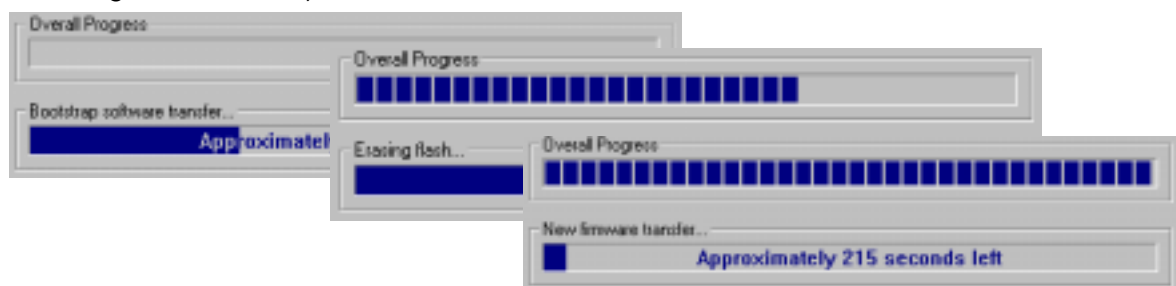
Figure 20: Progress of download

The **Exit** button is locked, while the update download is in progress. This avoids interrupting it unintentionally.
6. Once the download is complete close the SimSwup dialog. Switch off power supply and then disconnect the BB35 Bootbox. Restore all connections and insert your SIM card as usual. Then **restart** your GSM application. TC3x is fully operational.

3.6 Troubleshooting (firmware update over SIM interface)

Table 6: Troubleshooting

| **Problems you may encounter when running SimSwup**	
Problem	After startup, the SimSwup window displays the following error message: ERROR: Com port cannot be accessed!
Remedy	Verify that the serial cable of the BB35 Bootbox properly connects to the COM port.
Problem	You have double-clicked the SimSwup.exe file, but the download won't start automatically. The SimSwup message bar indicates the following line: Waiting for initialization sequence. Restart hardware or insert SIM card adapter.
Remedy	Switch the power supply off and on. The update process will start once voltage is applied again. The same message may appear when you start SimSwup while the serial cable from the BB35 Bootbox is not yet plugged to the computer's COM port.
Problem	The download won't start automatically. The SimSwup message bar indicates the following line: ERROR: Initialization sequence failed, restart module again!
Remedy	Check that the hardware is properly connected: Is your TC3x application plugged to the power supply? Is the BB35 Bootbox SIM card inserted into the SIM card holder of your application? Did you select the right COM port number? (See Chapter 3.7 for COM Port settings.)
Problems you may encounter after firmware update	
Problem	You have successfully installed another firmware version, but TC3x is not responding.
Remedy	Check that you have restored all connections of your application (BB35 Bootbox disconnected, normal SIM card inserted, power supply on)
Problem	After download failure, there is no valid software installed. TC3x is not responding. Each attempt of relaunching SimSwup lets you end up with the following message: ERROR: Initialization sequence failed,
Remedy	Reinstall the firmware *via the serial interface* rather than using the SIM interface. If no serial interface is available on your own GSM application, you will need a DSB35 Support Box. The box comes with a standard serial interface that enables you to transfer the software from your PC/laptop TC3x. Follow the steps described in Chapter 2.1.2 and 2.2. CAUTION: Be sure to *skip* the pre-check since TC3x is not responding.

3.7 Configuring COM Port

All the settings required to run a firmware update are listed in a file named *SimSwup.ini*. Note that the default settings are optimally configured and should never be changed, except for the COM port.

Since the **SimSwup** dialog lets you select only COM port 1 through 4, you can edit the number manually. To do so, navigate to the directory where the SimSwup software is located. Use a text editor to open the *SimSwup.ini* file. Point to the section named "**General**" and overwrite the **COM port** number listed.

3.8 BB35 Bootbox interfaces

3.8.1 BB35 Bootbox block diagram and pin assignment

The following figure shows the pin assignment of the connectors placed on either end of the BB35 Bootbox adapter.
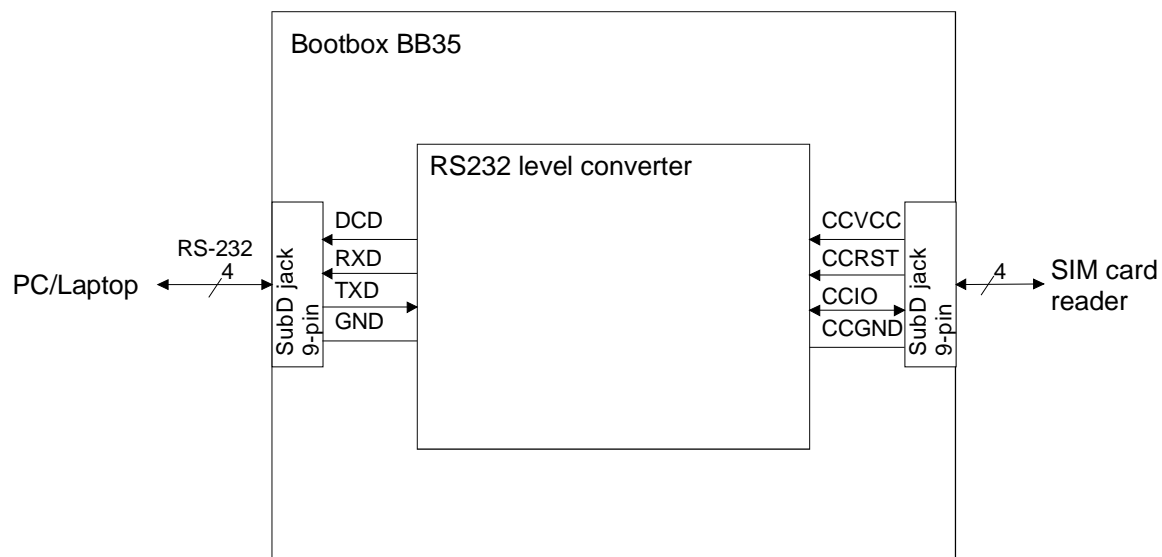

Figure 21: BB35 Bootbox – Block Diagram

3.8.2 Interface BB35 Bootbox to PC/laptop

The interface that links the BB35 Bootbox to the PC/laptop comes as an **RS-232 Sub D9 jack**, simply marked "**PC**" on the box. Pin assignment is shown in Table 7.

Table 7: Pin assignment of the interface BB35 Bootbox – PC/Laptop

Pin no.	Description	I/O	Function
1	DCD	O	Data carrier detected, reset signal of the SIM interface
2	RXD	O	Receive data
3	TXD	I	Transmit data
4	-	-	Not connected
5	GND	-	Ground
6	-	-	Not connected
7	-	-	Not connected
8	-	-	Not connected
9	-		Not connected

3.8.3 Interface BB35 Bootbox to SIM card holder

The interface that connects the Bootbox to the flat cable is designed as a **SubD9 jack**. Refer to Table 8 for pin assignment.

Caution: **The pin assignment of the SubD9 jack marked "SIM" is not compliant with a standard RS-232 interface.**

Table 8: Pin assignment of the interface BB35 Bootbox – SIM card holder

Pin no.	Description	I/O	Function
1	CCGND	I	Ground of SIM interface
2	(CCCLK)	-	Not connected
3	CCRST	I	Reset signal of the SIM interface
4	CCVCC	I	Voltage supply 2.9V (typ.) from the TC3x SIM interface
5	CCIO	I/O	Serial data from the SIM interfaces, bidirectional
6	-	-	Not connected
7	-	-	Not connected
8	-	-	Not connected
9	-		Not connected

3.8.4 SIM card reader (example)

To give an example of a typical SIM reader, Figure 1 illustrates the pins of the reader mounted onto the DSB35 Support Box. Pin assignment is detailed in Table 9.
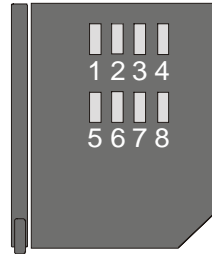

Figure 1: Pins of the SIM card reader (top view)

Table 9: Pin assignment of the SIM card reader

Pin no.	Description	I/O	Function
1	CCVCC	I	Voltage 2.9V (typ.) for SIM card, supplied by TC3x
2	CCRST	I	Chipcard reset, triggered by TC3x
3	CCCLK	I	Chipcard clock
4	CCGND	-	Ground
5	CCVPP	-	Not connected
6	CCIO	I/O	Serial data, bidirectional
7	CCDET1	-	Connects to CCVCC on the DSB35 Support Box board
8	CCDET2		Connects to the input CCIN of the TC3x ZIF interface. Used to detect whether a SIM card is inserted. Removing the SIM card under operation will instantly power down the SIM card signals in order to avoid damage.

3.8.5 BB35 Bootbox – Technical specifications at a glance

Table 10: Technical Specifications at a glance

Item / parameter	Description	min.	typ.	max.	Unit
Voltage supply	Supplied by SIM interface of the GSM engine	2.84	2.9	2.96	V
Temperature range	Operation	0	25	+70	°C
	Storage	-40	25	+85	°C
RS-232 interface	Output voltage (load resistance 3 kOhm)	±5.0	±6.0		V
	output short-circuit current		±24	±100	mA
	Input resistance	3	5	7	kOhm
	Data rate			115.2	kbps
RS-232 cable	Length		1.8		m
SIM interface cable	Length		0.16		m
SIM-to-serial interface adapter (BB35 Bootbox)	Length		63		mm
	Width		33		mm
	Height		17		mm
	Weight		26		g
RS-232 level converter (inside BB35 Bootbox)	Shifts the CMOS level of the SIM interface to the RS-232 level of the PC/Laptop and vice versa				