SIEMENS

MC35
MC35 Terminal
Siemens Cellular Engines

Updating Firmware

via Serial Interface

Version: V01.01
DocID: MC35-AN-16-Firmware-V01.01

Wireless Modules

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1 Always up to date

The MC35 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.

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 MC35 module. The various options are summarized below:

- Download over DSB35 Support Box (evaluation kit). See Chapter 2.1.2 for details.
- Download over service interface and service connector with the download being controlled by firmware executable. See Chapter 2.1.3 for details.
- Download controlled by the processor of the host application (MMI processor). See Chapter 2.1.4.

If you are using MC35 Terminal you can skip the design considerations and proceed directly to Chapters 2.1.5 and 3.

The firmware executable runs on any computer under Windows 9x, NT 4.0, 2000, ME. 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 3.

1.1 Supported product version and related documents

Please note that this hardware interface description is intended for MC35 Version V01.01.

Related documents
/1/ MC35 Hardware Interface Description
/2/ MC35 Terminal Hardware Interface Description
/3/ AT Command Set for MC35 and MC35 Terminal
/4/ Release Notes: MC35 Version 01.01
/5/ MC35 GPRS Startup User's Guide
/6/ MC35 Remote-SAT User's Guide

Prior to using the MC35 / MC35T 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://siemens.com/wm

1.2 Abbreviations

Table 1: Abbreviations

Abbreviation	Description
CMOS	Complementary Metal Oxide Semiconductor
COM	Serial (PC) Port (e.g. COM1 through COM9)
DSB	Development Support Box
ESD	Electrostatic Discharge
GND	Ground
HiZ	High Impedance
IGT	Ignition
MMI	Man Machine Interface
MC35	MC35 module
MC35T	Throughout this document short for MC35 Terminal
PD	Power Down

A complete list of abbreviations is provided in the "MC35 Hardware Interface Description".

2 Technical Requirements

Table 2: Summary of technical requirements

Firmware	*wswup32_<version no>.exe* Both MC35 and MC35T 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://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
	Screen resolution:	640 x 480 pixels minimum
	Color Depth:	256 colours minimum
	Minimum:	133 MHz, Pentium PC
	The MC35 firmware must be stored on a local drive	
RS-232 interface	MC35:	Access to the serial interface must be provided by the host application or the DSB35 Support Box[1)]
	MC35 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 "MC35 Hardware Interface Description".	
IMPORTANT	When your MC35 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, MC35 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. 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 (MC35 module only)

This chapter describes the timing behaviour of the MC35 module which the system integrator shall take into account when designing the host application. If you are using the MC35 Terminal you can skip this chapter since the terminal has been designed to include the necessary functionality.

The timing specification of the usual MC35 startup procedure is explained in Figure 1 and, of course, in the "MC35 Hardware Interface Description /1/. Normally, when MC35 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 the TXD0 line to go and remain active high an additional current of 30µA – 60µA must be supplied from the MMI processor.

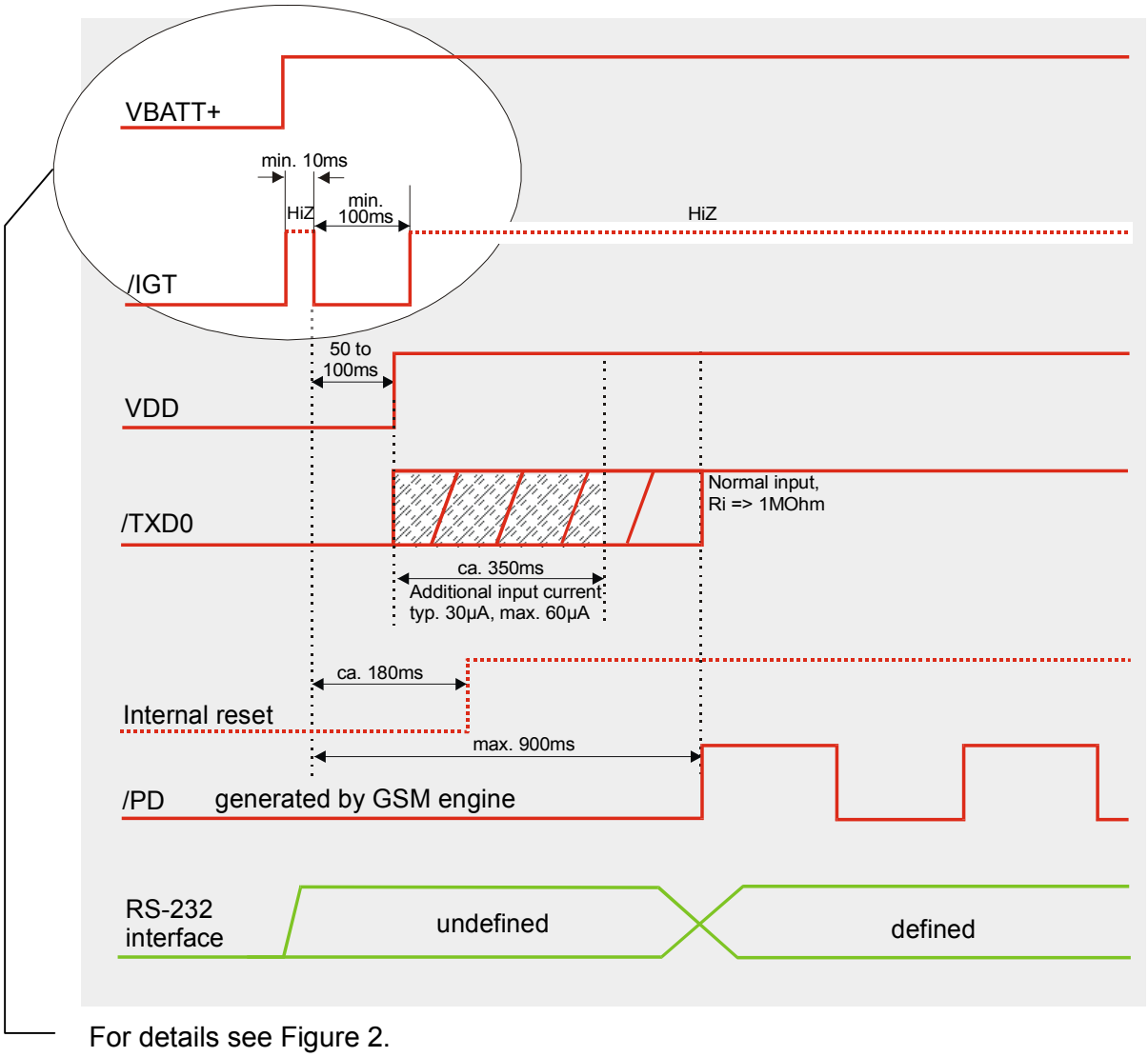


Figure 1: Timing of normal MC35 startup procedure

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.

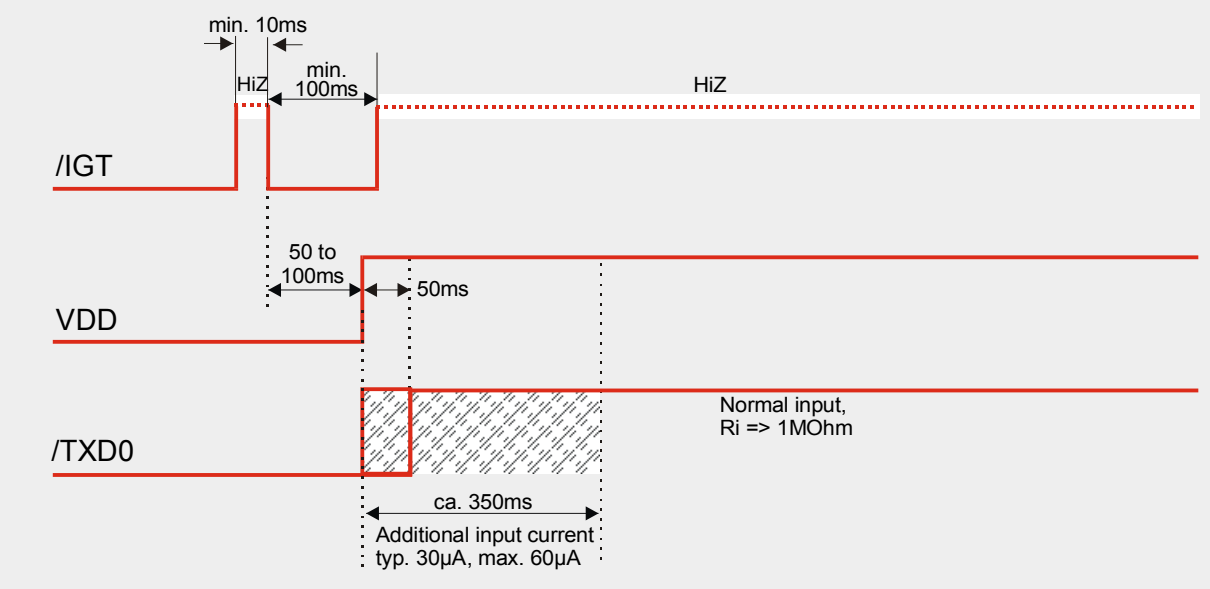


Figure 2: Ratio of IGT, VDD and TXD0 during firmware download

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 MC35

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.

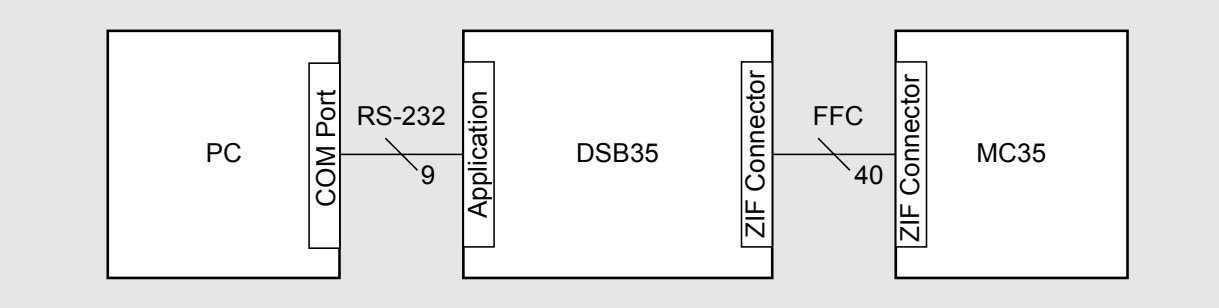


Figure 3: Firmware download over DSB35 Support Box

When connected to MC35, the DSB35 Support Box must be powered from a laboratory PSU. Furthermore, the supply voltage generated by the box must be limited. For the download procedure it is sufficient to apply the default setting of the box which is 4.2V. For more information refer to Chapter 7 in the "MC35 Hardware Interface Description" supplied with the 01.01 release of MC35.

To perform the download be sure MC35 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 3 and follow the step-by-step instructions.

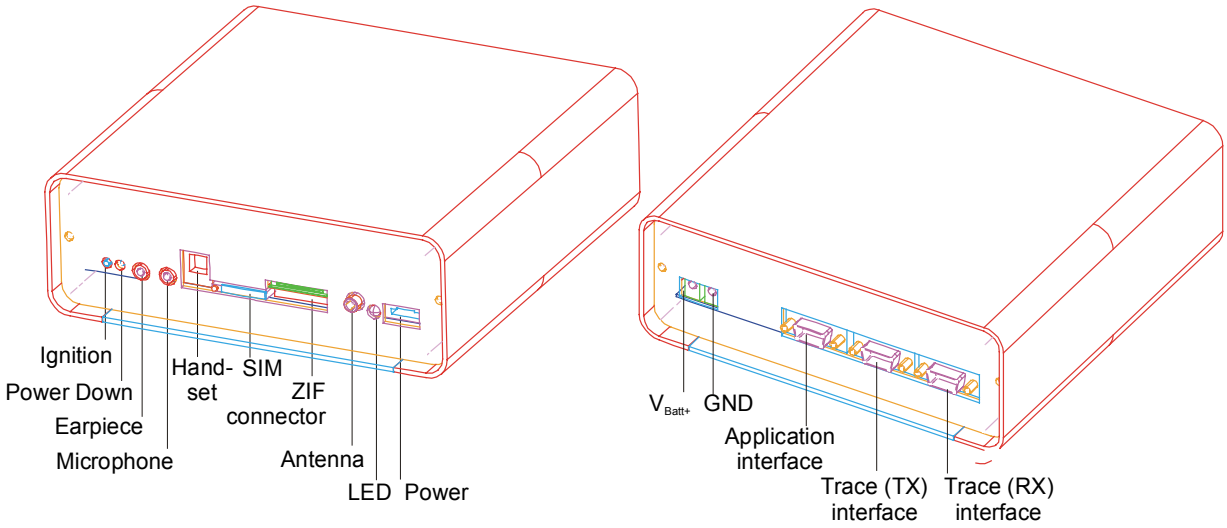


Figure 4: Front and back view of DSB35 Support Box

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.

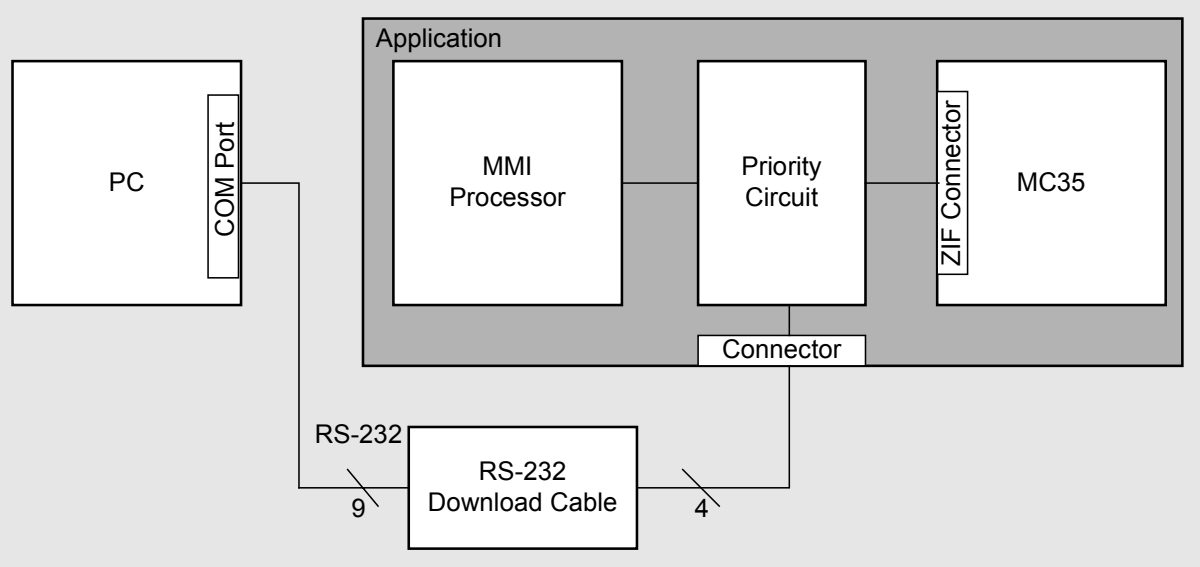


Figure 5: Firmware download over service interface and service connector

Figure 6 shows a priority circuit for the GND, IGT, RXD0, TXD0 lines, which always gives priority to the external serial connection – if present.

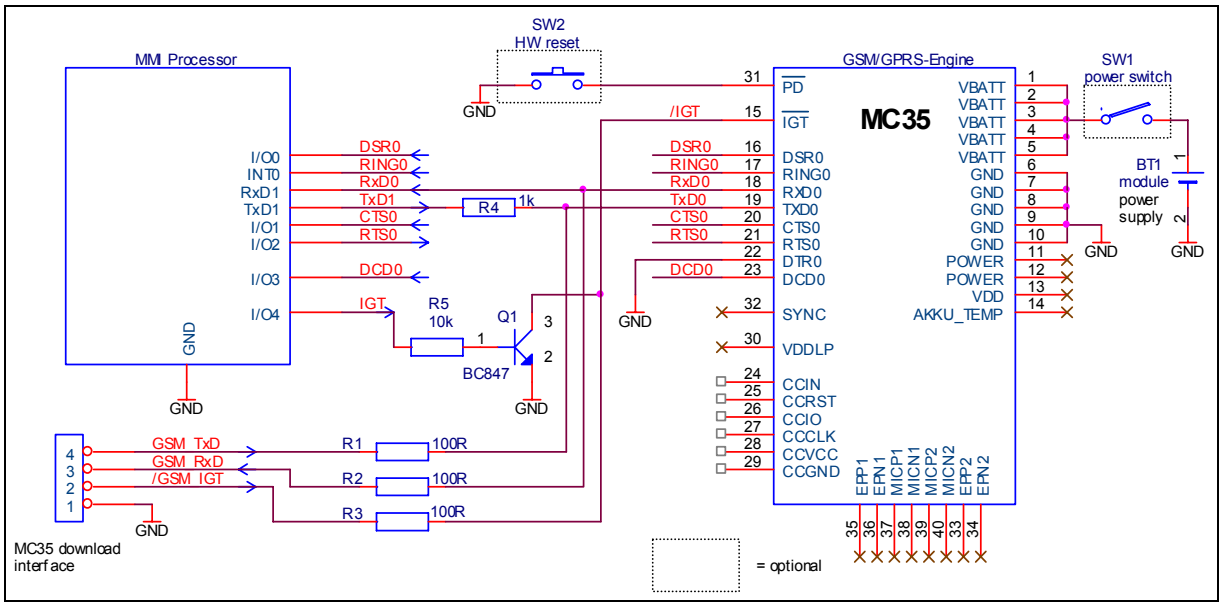


Figure 6: Sample circuit for download interface

Detailed information on the pin assignment and the signal levels of the ZIF connector is provided in the "MC35 Hardware Interface Description", Chapter 3.9.

While the service connector is connected the customer's MMI software should be inactive. 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 MC35. 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.

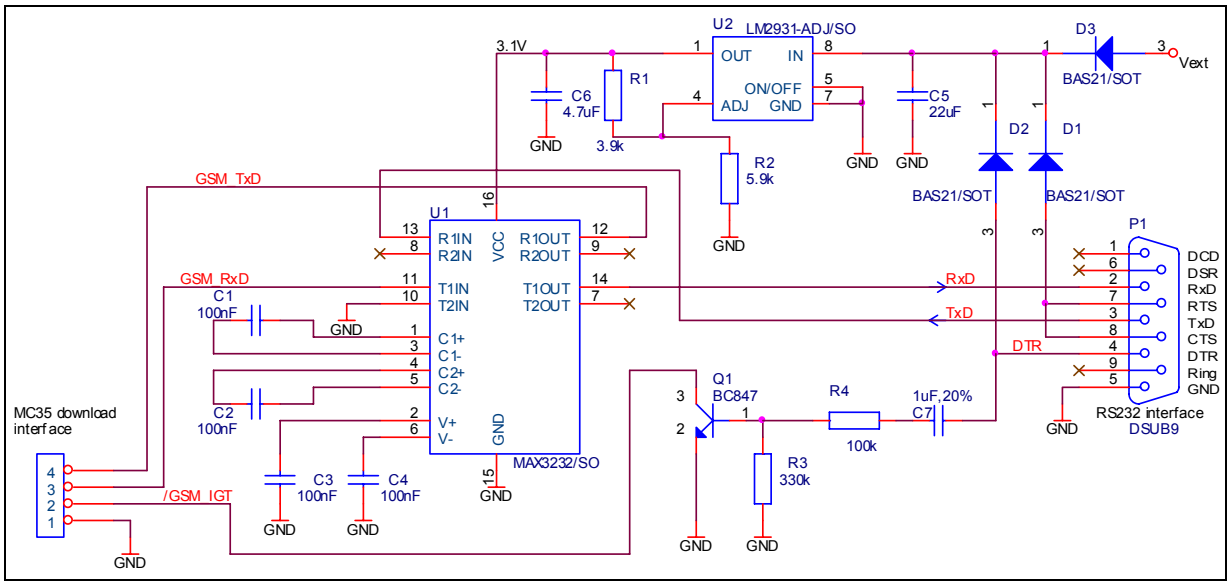


Figure 7: Sample circuit for download cable

2.1.4 Download controlled 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.

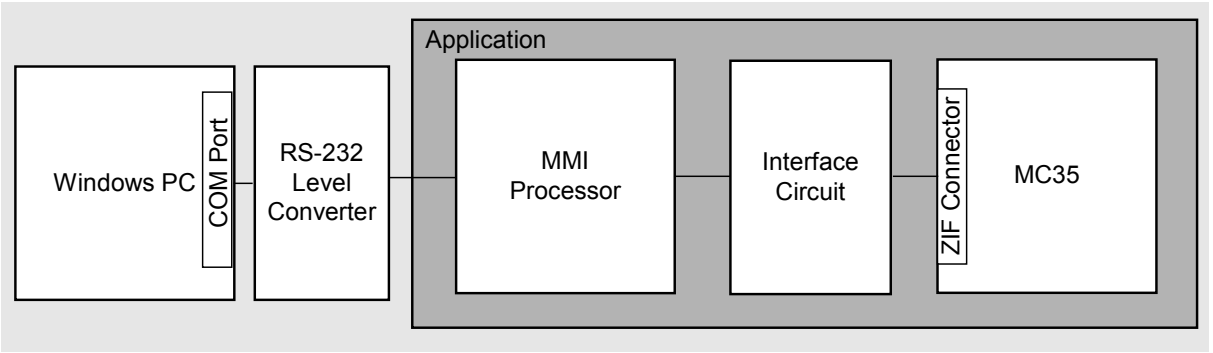


Figure 8: Firmware download controlled by MMI processor

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.

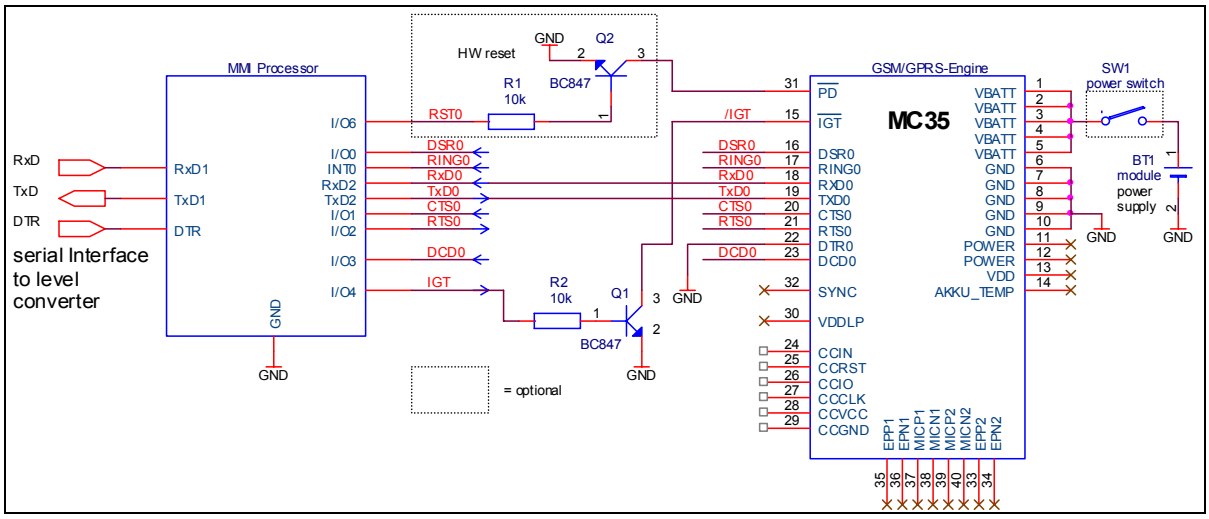


Figure 9: Application capable of FW download through the MMI processor

The download process shall follow this sequence:

1. Power down MC35 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 MC35. 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.

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 serial interface of MC35: 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.
- The DTR signal of the PC shall be used to control the IGT signal of MC35. 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 MC35 Terminal to the serial interface of the PC

Be sure the MC35 Terminal is properly connected to the power supply and to the computer's COM port.

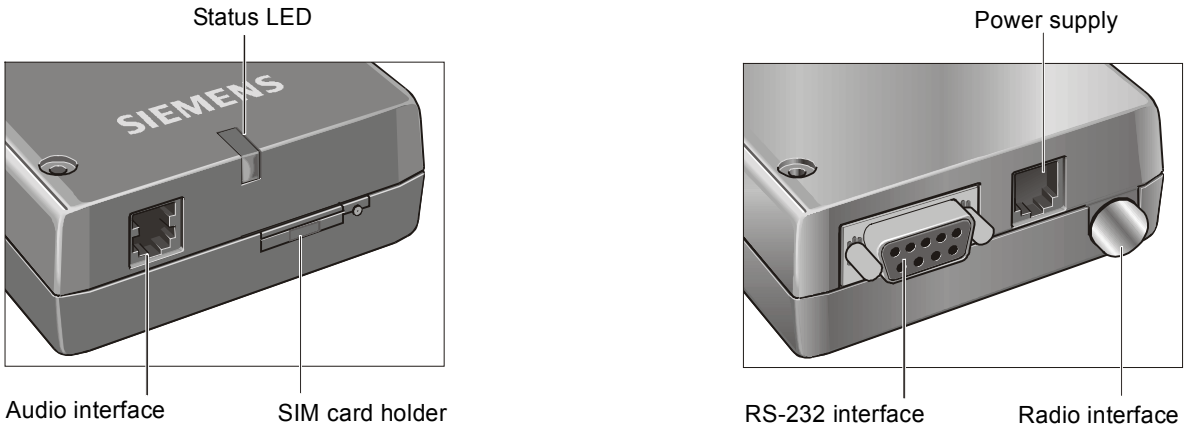


Figure 10: MC35 Terminal

3 Downloading firmware

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 MC35 / MC35T 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 MC35 / MC35T to ensure that no connection can be set up while the download is in progress.
   To set the device (MC35 and MC35T) 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 the MC35 / MC35T is in Power Down mode, you can run the *wswup32_<version number>exe* file. The WinSwup32 dialog appears.

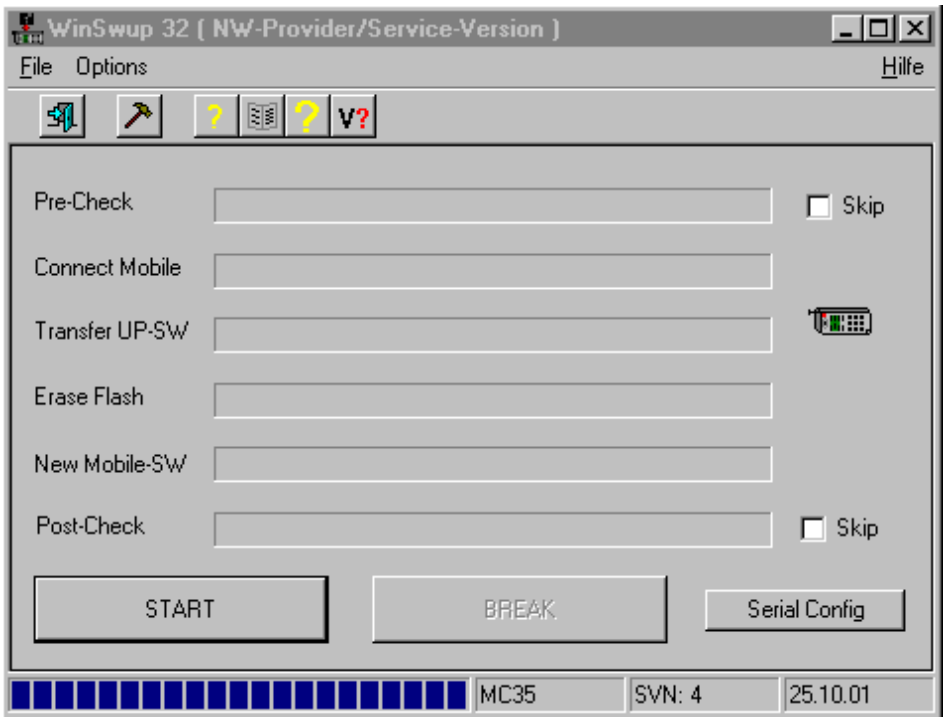


Figure 11: WinSwup32 user interface upon program start-up

5. Click the **Serial Config** button on the right bottom. Use the resulting dialog to select the used COM port (COM port 1 or 2) 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 MC35 Terminal fails to start up.
   Press **OK** to return to the main dialog.

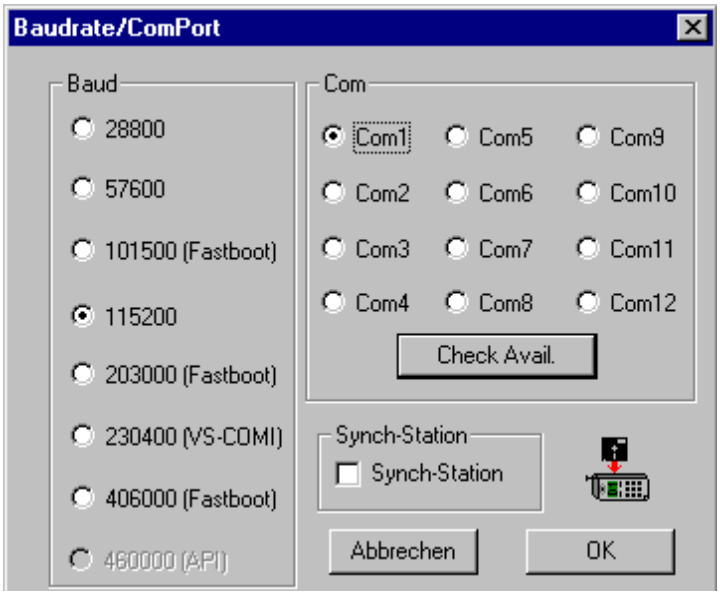


Figure 12: Selected baud rate and COM port

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 your MC35 / MC35T is not responding (e.g. when the new firmware is needed for troubleshooting),
   ☐ Skip *run the test* if your MC35 / MC35T 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.

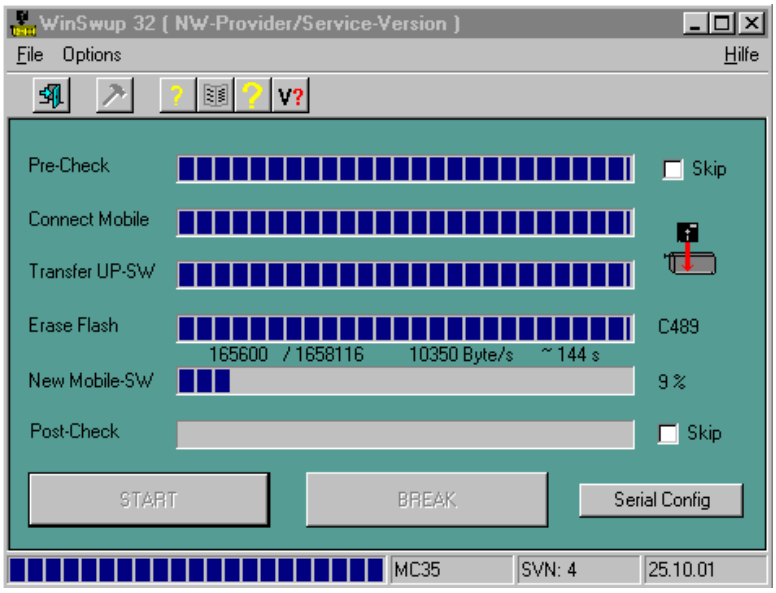


Figure 13: WinSwup32 window during download

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.

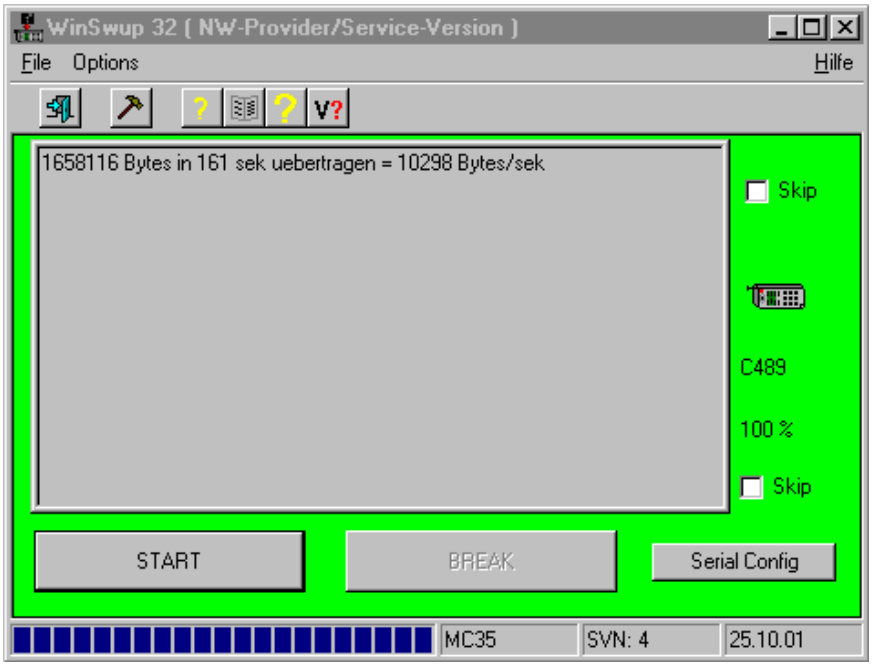
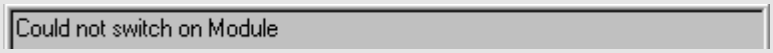


Figure 14: Download completed

9. Finally, restart MC35. 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.

3.1 Troubleshooting

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: 
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 MC35 / MC35T by 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 timing of the MC35 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. 
Remedy	MC35 / MC35T is still powered. Ensure to switch to the *Power Down* mode as described above. Then start up the download once again.
Problem after firmware update	
Problem	After download failure, MC35 / MC35T is not responding.
Remedy	Reinstall the firmware. Be sure to *skip* the pre-check since the device is not responding.