Cellular Engine TC35

The extra compact module for voice and data transmission

Application Note: Recommendations for specific AT commands

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General note

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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.

Subject to change without notice at any time.
1 Introduction

Further to the "TC35 AT Command Set" and the "TC35 Hardware Interface Description", this document provides additional instructions of how to use AT commands for controlling the TC35 GSM engine.

Specifications are subject to change without notice. This product is an original Siemens product protected by US, European and other patents.

1.1 References

"TC35 AT Command Set" (filename: TC35_AT_commands.pdf)
"TC35 Hardware Interface Description" (filename: TC35_HW_Interface_description.pdf)
2 How to avoid conflicts when using AT commands

2.1 General

AT commands and responses:

| Test command | AT+CXXX=? | The mobile equipment returns the list of parameters and value ranges set with the corresponding Write command or by internal processes. |
| Read command | AT+CXXX? | This command returns the currently set value of the parameter or parameters |
| Write command | AT+CXXX=<...> | This command sets user-definable parameter values. |
| Execution command | AT+CXXX | The execution command reads non-variable parameters affected by internal processes in the TC35. |

2.2 Combining AT commands on the same line

The table below shows the allowed combinations of AT commands on the same line. If you use other combinations, the responses may not be in the expected order.

<table>
<thead>
<tr>
<th>V.25ter commands</th>
<th>With</th>
<th>FAX commands, Prefix AT+F</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSM 7.07 commands</td>
<td>With</td>
<td>Siemens commands, Prefix AT^S</td>
</tr>
<tr>
<td>GSM 7.05 commands (SMS)</td>
<td>Used standalone</td>
<td></td>
</tr>
</tbody>
</table>

Example:

| AT Commands | at+cpbs<?,^snfi? |
| Response | +CPBS: "SM",23,125 |
| | ^SNFI: 5,32767 |
| | ^SNFI: 5,32767 |
| | OK |

Note: Generally, appending the same or mixed AT commands should be avoided. If nevertheless you need to do enter several commands on the same line, note that the number of subsequent commands is limited.
3 Avoiding stress to the CPU

The purpose of this chapter is to provide further information of how to prevent the CPU from being exposed to stress.

3.1 Flow control

Your final product application should be designed to support hardware flow control. For this purpose RTS/CTS and DCD signal lines must be present on your application platform. To control the data flow your application should include options to enable RTS/CTS handshake with the GSM engine. This is essential to prevent loss of data or unspecific errors caused to the GSM engine.

3.2 Entering successive AT commands on separate lines

When you enter a series of AT commands on separate lines leave a pause between the preceding and the following command until OK appears. This avoids sending too many AT commands at a time without waiting for a response to each.

Example:
You may want to add several entries to one of the phonebooks (e.g. SIM or ME phonebook) by using the AT+CPBW command.

<table>
<thead>
<tr>
<th>AT Command</th>
<th>AT+CPBW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response</td>
<td>+CPBW: (list of supported &lt;index&gt;s), &lt;nlength&gt;, (list of supported &lt;typ&gt;s), &lt;tlength&gt;</td>
</tr>
<tr>
<td>Example</td>
<td>AT+CPBW=1,004930111111 OK</td>
</tr>
<tr>
<td></td>
<td>AT+CPBW=2,004930111112 OK</td>
</tr>
<tr>
<td></td>
<td>AT+CPBW=3,004930111115 OK</td>
</tr>
</tbody>
</table>
4 Precautions for specific commands

4.1 AT+CFUN

| Execute command: | Parameter: | Minimum functionality in standby mode *)
|------------------|------------|---------------------------------------------------------------
| AT+CFUN=[<fun> [,<rst>]] | <fun> 0 | Full functionality (only used as placeholder for +CFUN=1,1). |
|                  | 1         |                                                               |
|                  |          |                                                               |
| Parameter:       | <rst> 0   | Do not reset ME before setting it to <fun> power level (only used as placeholder for +CFUN=0,0). |
|                  |           | Used to reset ME and restart it to full operation mode. If <rst> = 1 the first parameter <fun> has no effect **) |
|                  | 1         |                                                               |

Note:
*) When entering the AT+CFUN=0 command, do not send further characters until the device goes into sleep mode. Otherwise these characters remain in the input buffer and will delay output of an URC.

In sleep mode do not send any AT commands to the GSM engine until the device has been caused to wake up by an incoming call or a falling edge of RTS signal.

Any established connection will be terminated.

**) After restart it is necessary to enter AT+CPIN again. The GSM engine wakes up in the event of an incoming call, Real Time Clock alarm, falling edge of RTS and the appearance of an unsolicited result code (URC).
4.2 AT+IPR (autobauding)

Write command: AT+IPR=0

The serial interface of the TC3x supports autobauding. This allows the TE to detect the baud rate when receiving the strings „AT“ or „at“ (Attention). This two-character abbreviation is always used to start a command line to be sent from TE to TA.

Please follow these rules when using autobauding:

1. Only the strings „AT“ or „at“ can be detected (neither „aT“ nor „At“!).
2. The A/ (a/) command cannot be used.
3. Multiplex mode cannot be activated.
4. Autodetection works in the range from 1200 to 115200 baud.
5. The serial interface has to be used with 8 data bits, no parity and 1 stop bit.
6. ^SYSSTART will not be displayed in this mode after starting the module.

Note: If you change to autobauding mode or power the GSM engine up, you may need to enter AT<RETURN>, before sending the next to the AT interface.

4.3 AT+MUX

To view the complete set of AT commands for this purpose, please refer to "TC35_AT_commands.pdf".

Multiplex mode cannot be activated if autobauding is configured. Once multiplex mode has been activated, AT+IPR=<rate> cannot be used.

When the serial interface is in multiplex mode data calls are only possible on logical channel 1. Due to this restriction, AT commands have a different behavior on channels 2+3 compared to channel 1. Some commands are not available, other commands may have a different response.

Note: Since multiplex mode is governed by the time critical MUX protocol it is recommended to follow these rules:

- When writing or reading SM or ME phonebook entries during the multiplex mode, you need to wait a minimum of 100ms before you can read entries in the phonebook.
- Generally, multiplex mode should not be run at baud rates below 9600 bps.
- Fax applications cannot be run while multiplex mode is active.
4.4 AT^SPBG

This command is useful for searching phonebook entries by a sorted index. To view the complete set of AT commands for this purpose, please refer to "TC35_AT_commands.pdf".

Note: The sorting function does not cover all characters of the entered string.

4.5 AT^SCTM

The AT^STCM command serves to query information about the current operating temperature.

Note: The SCTM read command returns only information about the temperature directly measured on the PCB. It does not reflect the battery temperature.

4.6 AT^SMSO

To avoid loss of data in the event of switching off the GSM engine, it is essential to shut it down properly. This is accomplished by entering the AT^SMSO command. For further details on using this AT command refer to "TC35_AT_commands.pdf".

Note: Any data located temporarily in the RAM will only be saved to the SIM card and to the non-volatile memory when the GSM engine is properly shut down by AT^SMSO.

This applies to information or settings, such as
- Phone numbers stored in the LD (numbers last dialed), RC (received calls) and MC (unanswered calls) phonebooks
- Alarm time set by the AT^CALA command (see "TC35_AT_commands.pdf" for details on using this command)

5 SIM card

Before removing the SIM card be sure the GSM engine has been powered down as described in Chapter 4.6. Failure to do so would seriously affect the serviceability of your GSM application, though no damage would be caused to the SIM card itself.