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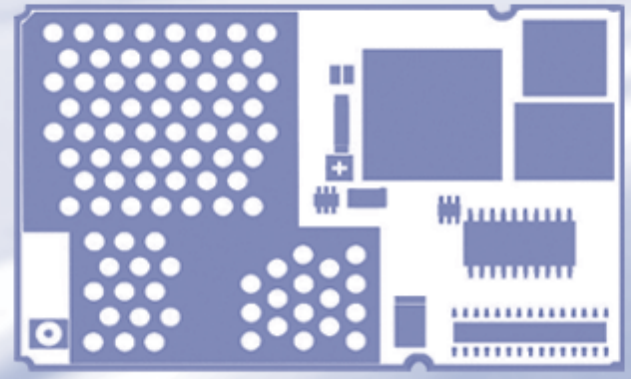

Using TTY / CTM Equipment

Version: 03
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Application Note 22

Application Note 22: **Using TTY / CTM Equipment**

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0 Document History

Preceding document: "Application Note 22: “Using TTY / CTM equipment" Version 02

New document: "Application Note 22: “Using TTY / CTM equipment" Version **03**

Chapter	What is new?
--	Deleted unnecessary related documents as well as chapter 2.4.
2.3	Added remarks on required audio modes and on using AT^SNFTTY in connecting cellular devices.

1 Introduction

This document describes the technical requirements for using a TTY device. Your GSM engine offers basic support for equipment using the CTM standard (Cellular Text Telephone Modems). TTY stands for Text Telephone and is a special device that lets people who are deaf, hard of hearing or speech-impaired use telephone systems to communicate via PSTN. A TTY is a special device that allows users to type messages back and forth to one other.

It is required at both ends of the conversation in order to communicate.

1.1 Related Documents

[1] Hardware Interface Description supplied with your GSM / GPRS engine
[2] AT Command Set supplied with your GSM / GPRS engine
[3] Release Notes supplied with your GSM / GPRS engine

To visit the Siemens Website you can use the following link:

http://www.siemens.com/wm

1.2 Terms and Abbreviations

Abbreviation	Description
CPU	Central Processing Unit
CTM	Cellular Text Telephone Modem
ETSI	European Telecommunication Standard Institute
GSM	Global Standard for Mobile Communications
PDA	Personal Digital Assistant
PSTN	Public Switched Telephone Network
TTY	Text Telephone
UART	Universal Asynchronous Receiver/Transmitter

2 Technical Requirements

2.1 Overview

Your GSM engine offers basic support for equipment using CTM standards. Text characters typed on a TTY device can be transformed into special audio burst signals for reliable transmission via the existing speech channels of a cellular phone system. During typing, the message is sent over the GSM network. The text telephone characters are transformed into audio signals. At the receiving end, the CTM signal is detected and decoded by the corresponding functions of the CTM receiver. The decoded characters are available at the CTM receiver's output.

If neither the CTM demodulator nor the CTM transmitter detect a CTM signal, the incoming signal is forwarded to the output of the CTM modem in order to support alternating between text and voice.

To use a TTY device the CTM can be:

- already implemented into your device
- a separate unit
- supported by the host application firmware (please note that Siemens wireless modules do not support this solution)

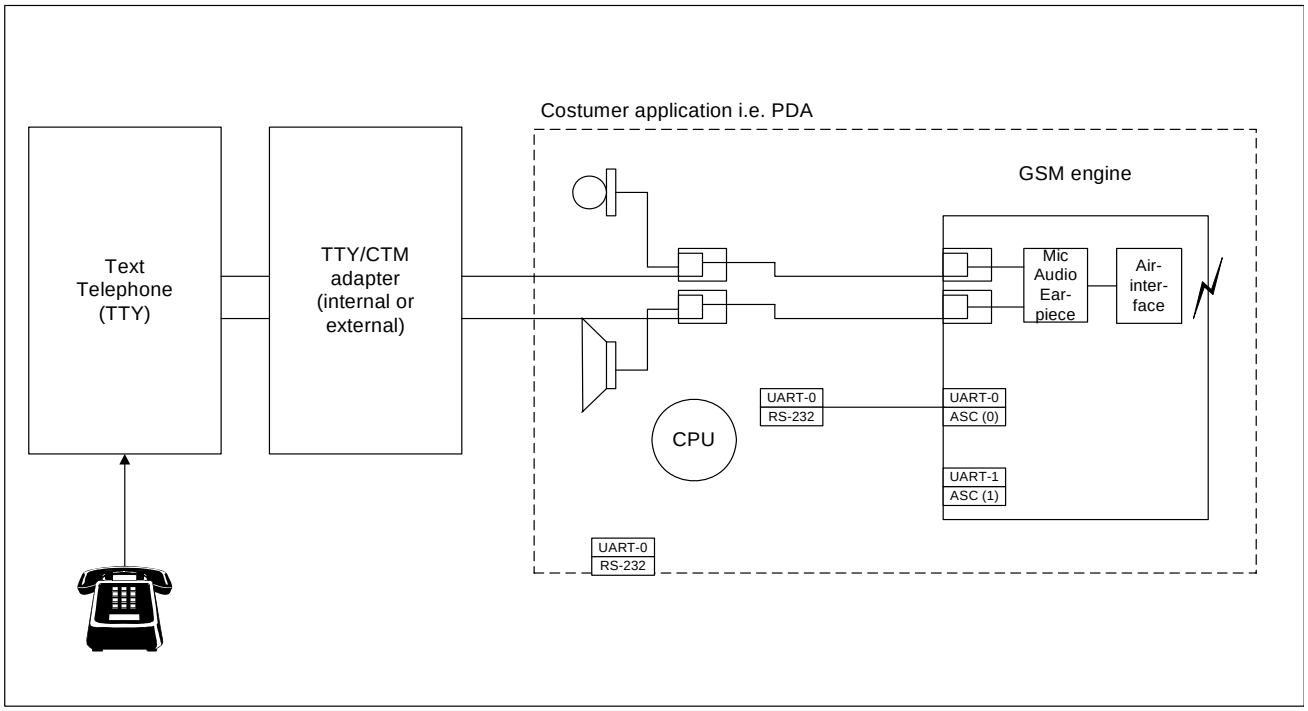

Figure 1: Reference configuration to support TTY communication

2.2 Hardware Requirements

2.2.1 Connecting TTY Equipment to a Mobile Device

To establish a reliable connection between a TTY and a mobile unit it is necessary to use a TTY/CTM conform modem. It allows a reliable transmission of text characters. The CTM performs character encoding and protection against channel influences. Additionally, the CTM signal is periodically suspended and the output is muted in order to avoid a condition where any voice activity detectors inside the cellular phone system might classify the modem signal as non-speech.

Most TTY devices do incorporate a CTM modem (internal modem). To connect the TTY device to the mobile unit (customer application) the use of a 2.5mm jack which is usually part of the TTY is recommended. If the hardware of the customer application is not suitable to connect to the TTY or an external modem must be used it is necessary to assemble a TTY-to-CTM adapter.

2.3 Software Requirements

In TTY mode data is transmitted using two tones to represent the asynchronous serial data. Characters are preceded by a start bit and followed by a stop bit.

The TTY/CTM functionality requires audio mode 5 or 6 with all audio parameters set to their factory default. Regardless to which audio interface the CTM device is connected to, you can use the AT^SNFS command to set your GSM engine to audio mode 5 or 6, for details see [2]. You may need to switch to factory default settings which can be done by using AT^SNFD. For further information refer to [2]. Please note that the factory audio mode settings are sometimes replaced by customer specific audio mode parameter sets. You should ensure that there is at least one audio mode available that corresponds to factory mode 5 or 6, i.e., a mode where any additional audio signal processing is switched off.

In case you wish more detailed information the following standards pertaining to TTY/CTM equipment might be useful

- 3GPP TS 26.226 (ETSI TS 126 226)
- 3GPP TS 26.231 (ETSI TS 126 231)

and can be retrieved from http://www.3gpp.org/specs/specs.htm

Connecting cellular devices

To connect your GSM engine to another cellular device both, the GSM engine and the mobile device need to connect to a CTM modem. The CTM modem allows a reliable transmission of text characters via the speech channel of cellular phone systems. You can call the AT^SNFTTY command to indicate that the audio path is in TTY/CTM mode (see [2]). Figure 2 shows the structure of the cellular phone connection.

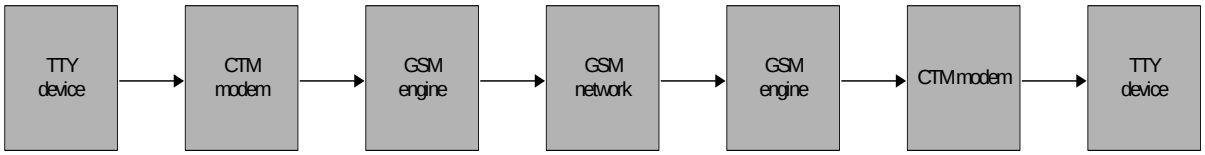

Figure 2: Cellular phone connection

Connections between GSM network and a public switched telephone network (PSTN)

To establish a TTY connection between a GSM subscriber and a PSTN subscriber the GSM network must support the TTY/CTM functionality. The CTM modem (see Figure 3) transforms the text characters into audio signals that can be transmitted via the GSM network. To receive the signals at the PSTN text telephone side these signals must be regenerated into TTY signals. To do so, enter the AT^SNFTTY command which indicates to the GSM network by setting the CTM flag that the transformation of CTM signals into TTY signals is necessary, see [2] for more detailed information.

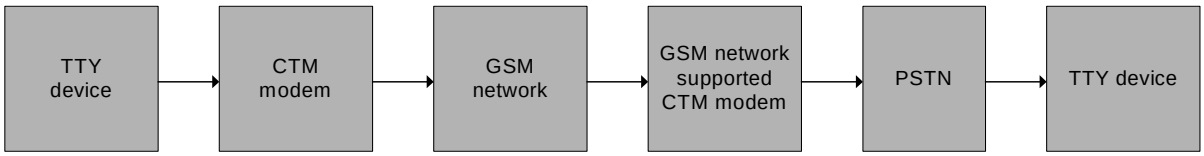

Figure 3: PSTN connection