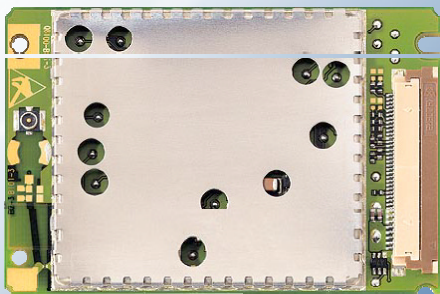# SIEMENS

MC35
Siemens Cellular Engine

GPRS
Startup
User Guide

Version: 01.01
DocId: GPRS-startup-00-V01.01

Wireless Modules

Document Name:	**GPRS Startup User Guide**
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Contents

Tables

2 Introduction

This document describes how to establish a PPP connection with Microsoft Windows NT4.0 using the prototype of the MC35 GSM/GPRS engine. Configurations and settings for other operating systems (Windows 95/98) may slightly differ, but the general proceeding is similar.

The current release of MC35 is able to connect to all networks which offer GPRS services (in Germany for example T-D1, D2, E-plus, Viag). Please note that not all of the GPRS related AT commands have been fully implemented yet.

The figures presented in this guide, show the settings required for the German network provider T-D1. Users of other networks must adapt their settings accordingly. Chapter /8.2/ references the settings for all German network providers.

2.1 References

/1/   MC35 AT Command specification   (filename: mc35_atc_01_<version number>.pdf)
/2/   Request for Comments: 1661 - The Point-to-Point Protocol (PPP)
/3/   Request for Comments: 1994 - PPP Challenge Handshake Authentication Protocol
       (CHAP)

2.2 Abbreviations

APN	Access Point Name
CHAP	Challenge Handshake Authentication Protocol
CID	Context Identity
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name Server
DSB	Developer Support Box
GPRS	General Packet Radio Service
GSM	Global System of Mobile Communication
IP	Internet Protocol
OS	Operating System
PDP	Packet Data Protocol
PIN	Personal Identification Number
PPP	Point to Point Protocol
QoS	Quality of Service
RAS	Remote Access Service
ROM	Read Only Memory
SIM	Subscriber Identity Module
TCP	Traffic Control Protocol

3 What you need

1. GPRS settings from your network provider
   Before you can set up your device to access the GPRS network, contact your network provider to obtain the following information:

   - APN (name of an access point that connects the mobile network to the Internet)
   - Primary and secondary DNS
   - Default QoS settings
   - IP header compression
   - IP address (DHCP or static)
   - User name and password (may be optional)

2. Modem installation and configuration
   You will need to set up the modem driver used for the Dial-Up connection. Follow the steps in chapter /4/.

   Note:
   Administration rights for your Operating System may be needed in order to install the modem driver. Contact your local system administrator for advice.

3. Dial-Up Network installation and configuration
   Furthermore, you will need to configure the Dial-Up Network itself. Follow the steps in chapter /5/.

4 Setting up a Windows modem driver

4.1 Adding a new modem

If no Standard 19200 bps Modem has been installed yet, add a new standard modem to the modem section of the control panel:
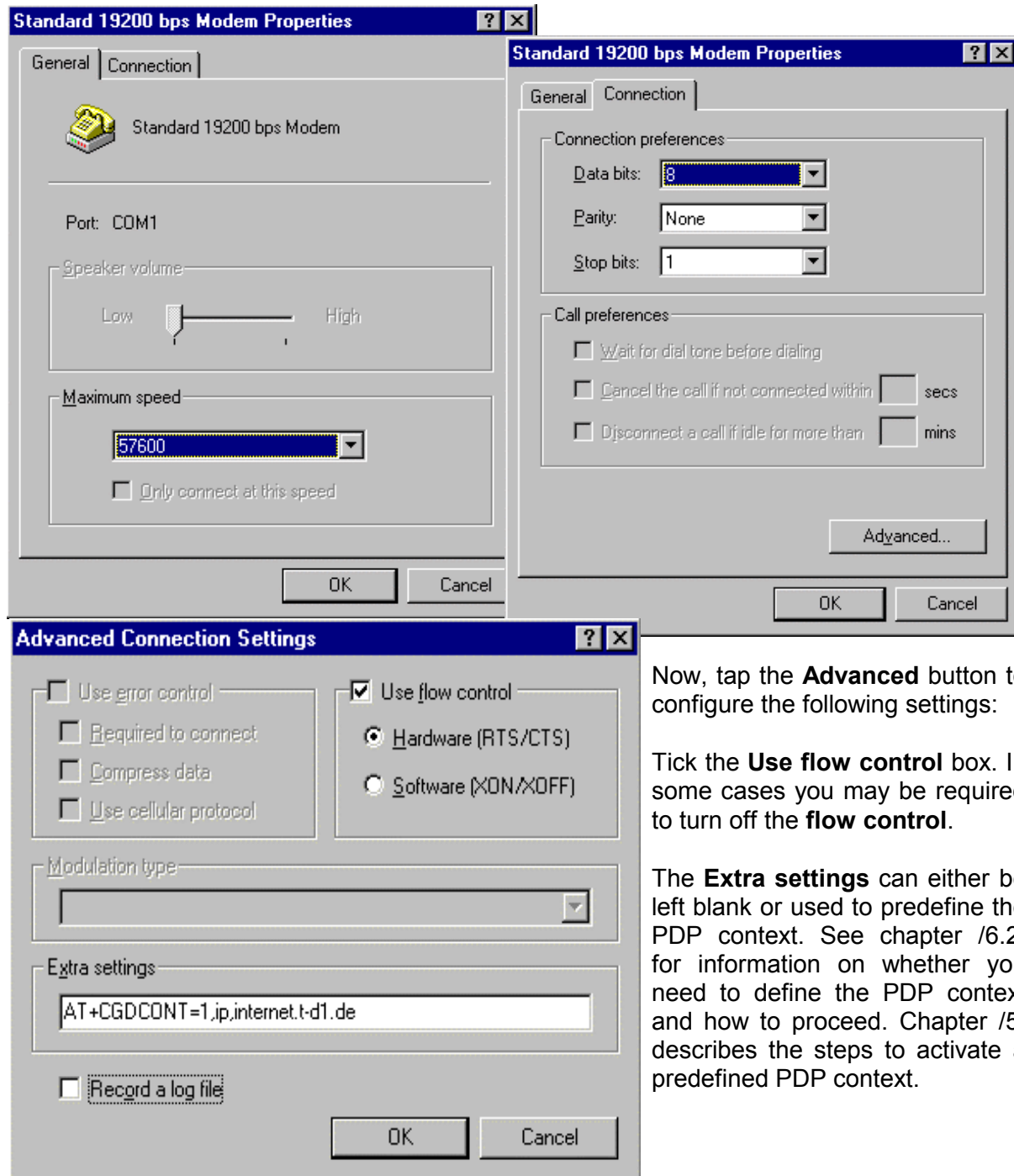Tap **Start** -> **Properties** -> **Control panel** -> **Modems**.
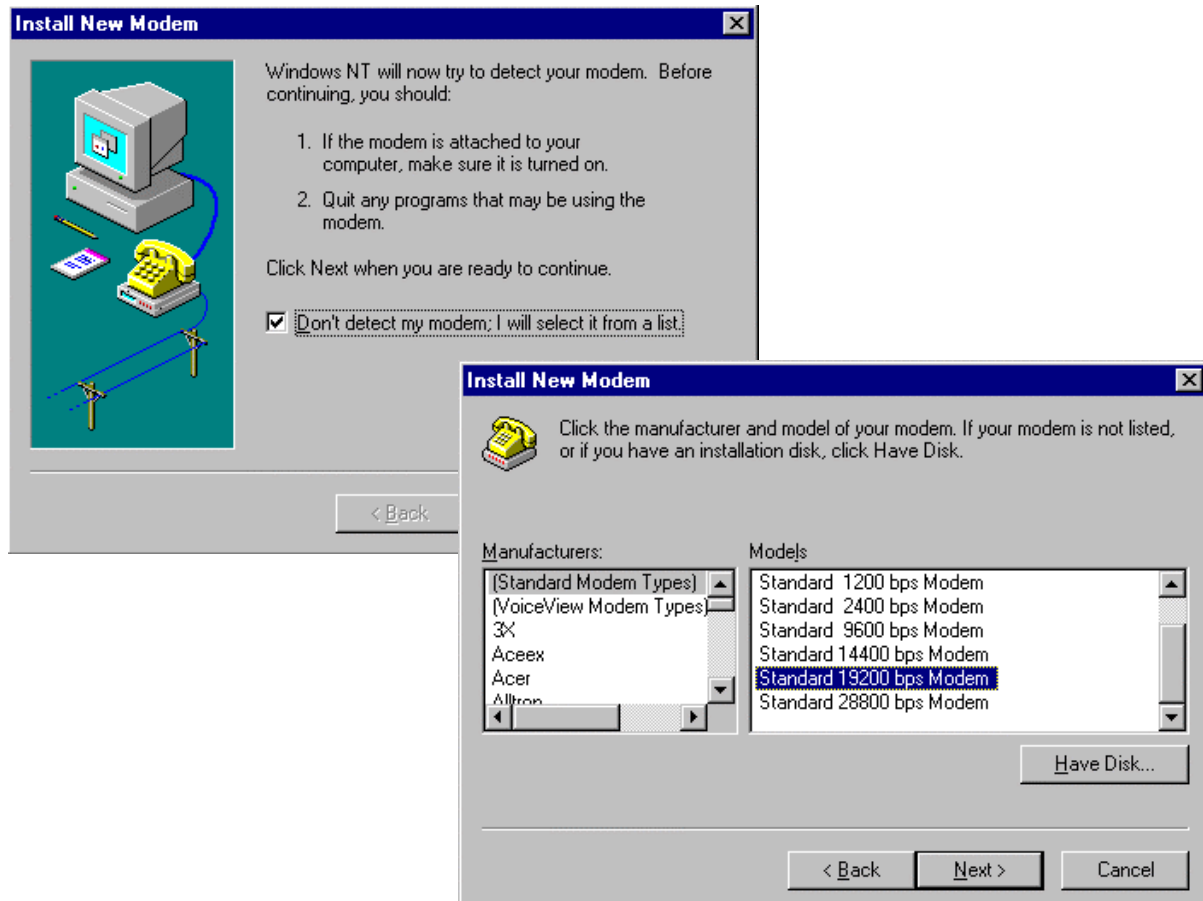
Follow the instructions on the screen and click **Next** to finish the modem installation.

4.2 Configuring the modem driver

To configure the modem driver, select the baud rate from the **Maximum speed** pull down menu (recommended: 57600) and choose the **Connection preferences** as illustrated in the figures below.

Now, tap the **Advanced** button to configure the following settings:

Tick the **Use flow control** box. In some cases you may be required to turn off the **flow control**.

The **Extra settings** can either be left blank or used to predefine the PDP context. See chapter /6.2/ for information on whether you need to define the PDP context and how to proceed. Chapter /5/ describes the steps to activate a predefined PDP context.

In the example above, the settings predefine a PDP context where CID = 1, PDP type = *ip* and APN = *internet.t-d1.de.* Note that the APN represents the German network provider T-D1 and needs to be replaced with the APN address provisioned by your operator.

4.3 Adding the modem driver to the Remote Access Service (RAS)

In some operating systems (e.g. Windows NT or Windows 2000) it is necessary to activate the modem driver by adding it to the Remote Access Service. The following figures show the Windows NT setup.
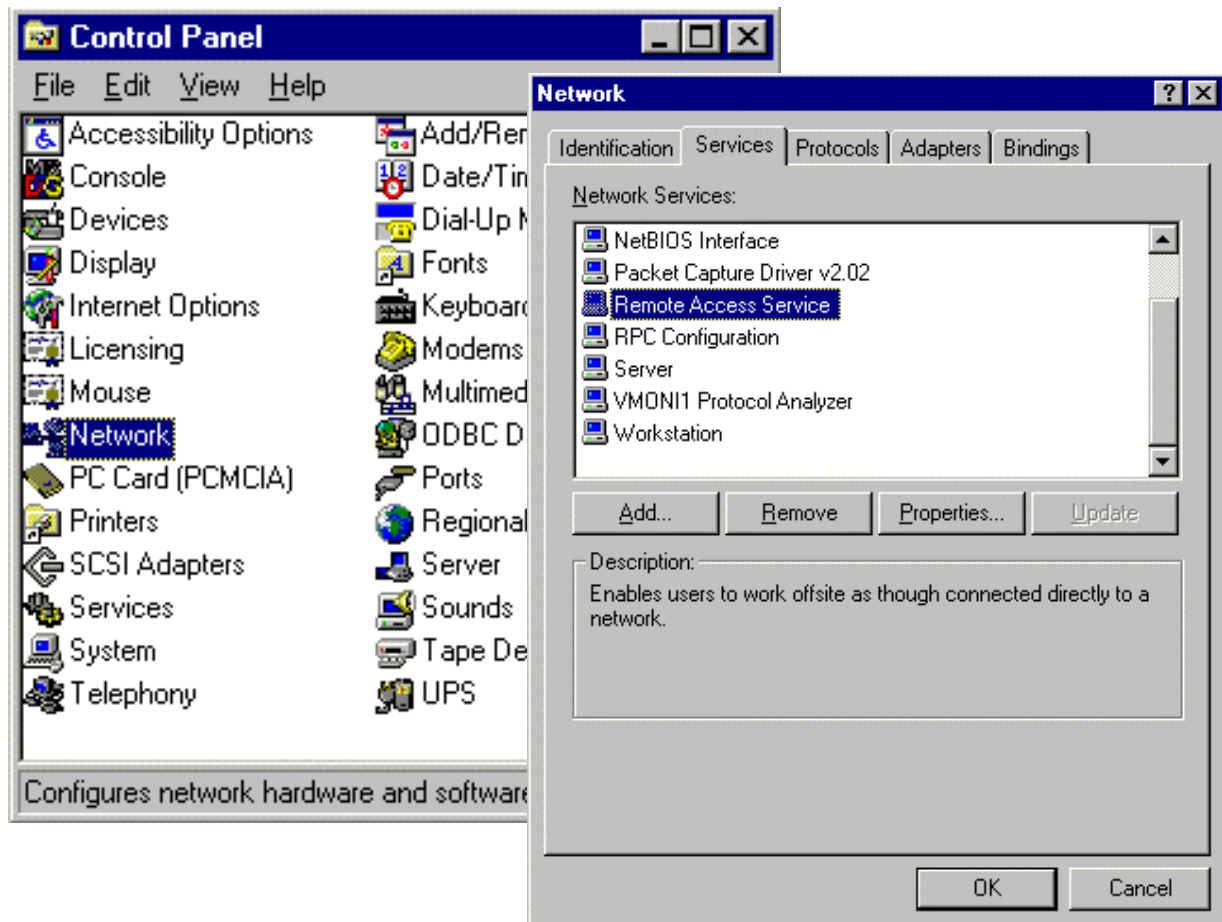
Open the **Control Panel** and tap **Network**. Choose the **Services menu** and tap **Remote Access Service**. If more than one modem driver has been installed, choose the correct one and tick the **Add** button in order to add the driver to the RAS. From now on, the chosen driver will be used when starting the dial up network.
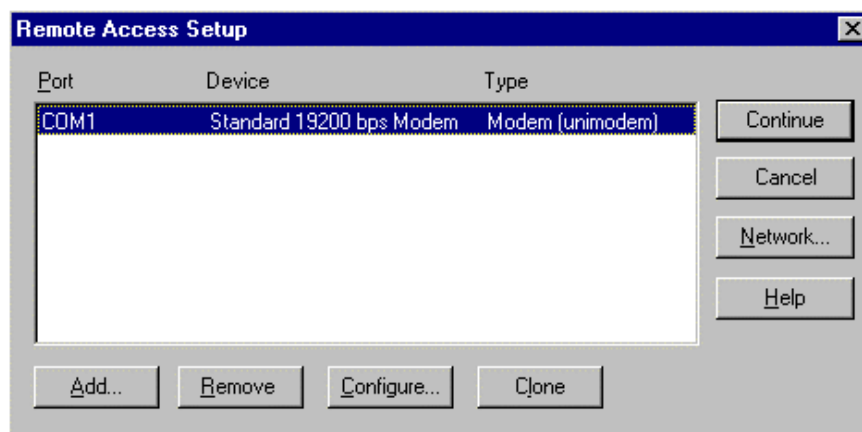
5 Setting up the Dial-up network

5.1 Adding a new phonebook entry

The **Dial-Up Network** icon is located in the **My Computer** folder on your Desktop. Select **New** to open the wizard shown below. If the Dial-Up Network has not yet been set up you can follow the resulting screens to install it.
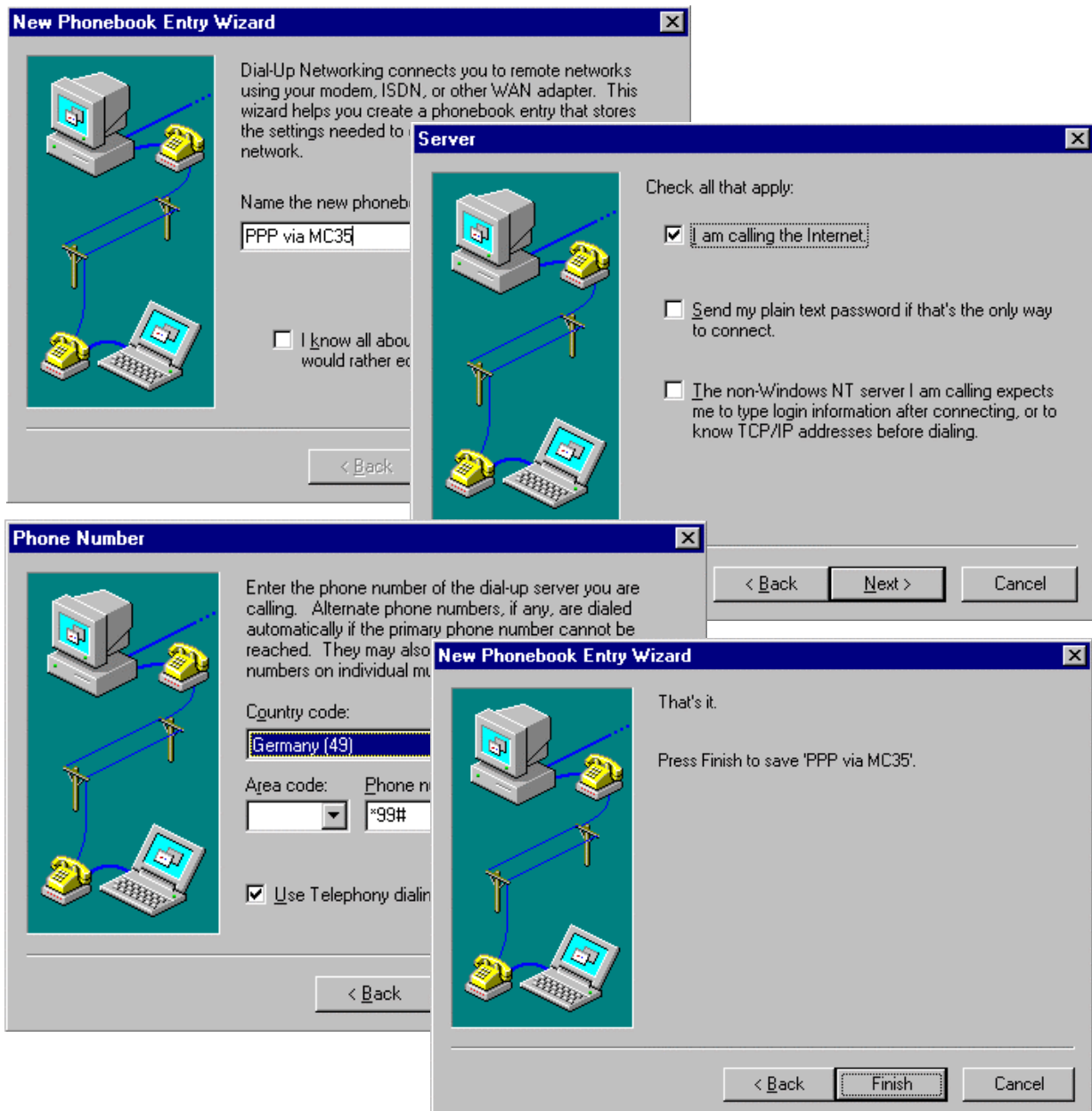
- Enter a suitable label for the phonebook entry (e.g. **PPP via MC35**) and tap **Next**.
- In the **Server** panel, select all entries which apply and tap **Next**
- Select the **Country code**. Use the **Phone number** field to enter ***99#** or ***99***1#**, depending on what approach you have chosen to handle the PDP context (see chapter /4.2/). Click **Next** and **Finish** to close the wizard.

5.2 Configuring the settings

Choose the newly created phonebook entry from the Dial-Up Network folder and enter the settings described below.
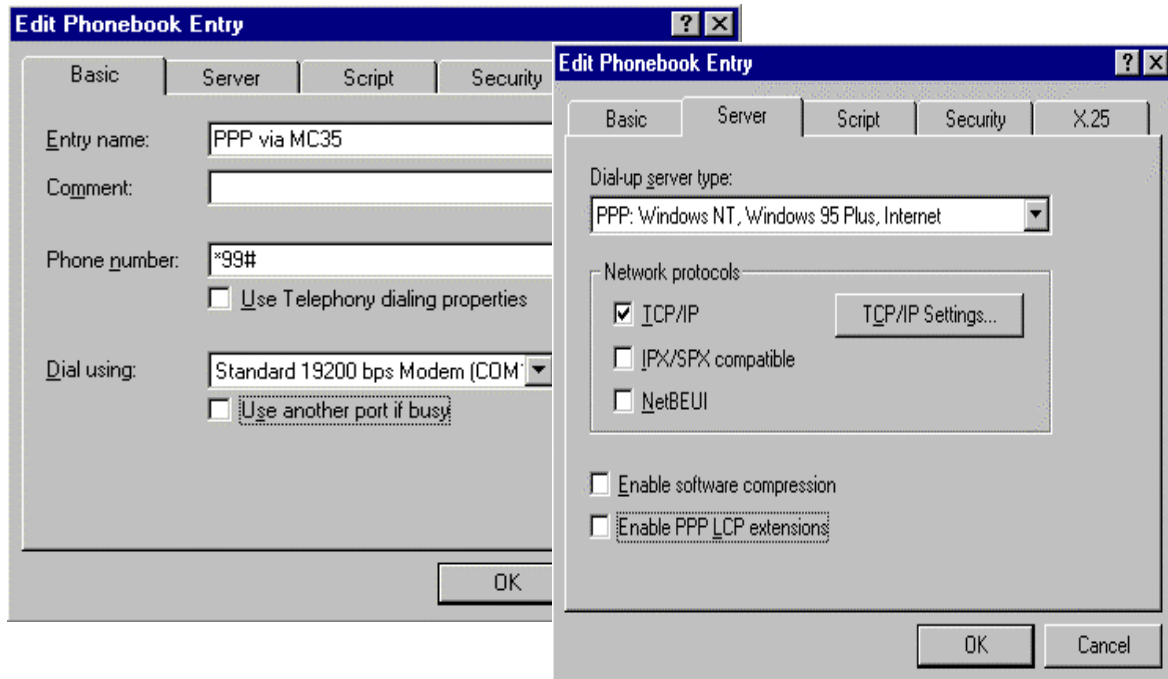
- The Entry name, the phone number and the modem type (Standard 19200 bps modem) should be those you have specified using the wizard (as described in chapter /5.1/). Whenever needed, you can use these dialog boxes to change the settings.

- The **Dial-up server type** is *PPP: Windows NT, Windows 95 Plus, Internet*. Choose *TCP/IP* to specify the allowed **Network protocol**. **Software compression** and **PPP LCP extensions** should be disabled. Tap the **TCP/IP settings...** button to proceed.

- Choose **Server assigned IP address** and enter the DNS server address used by your provider. The example shows the **primary DNS** address of the German network provider T-D1: 193.254.160.1. Settings of other providers are listed in chapter /8.2/ (only Germany) or must be requested from the local network provider. IP header compression should be disabled, but the default gateway is required.

  Note:
  The settings may vary with the local service provider. In some cases it may be necessary to tick IP header compression. This information has to be requested from the local provider.
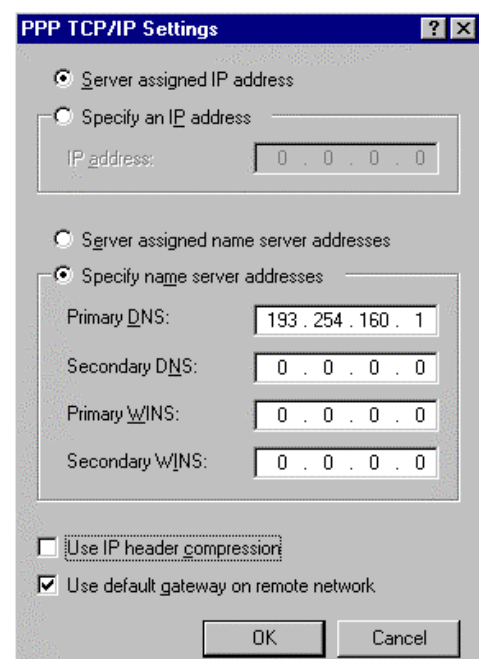
6 Getting started

Make sure the MC35 connects properly to the application platform. For testing purposes, you can use for example the evaluation kit named DSB35 Support Box.

6.1 Registering to the GSM network

To be able to attach to the GPRS services your terminal or mobile must be registered to the GSM network, i.e. PIN authentication must have been done during the current session. You have two ways to do so:

If the used SIM card is unlocked, the terminal or mobile will automatically log on to the network without requesting SIM PIN1.

If the SIM card is locked you can use any terminal program to enter the PIN. The terminal program should be properly connected to MC35 and configured for 8 Databits, No Parity, 1 Stopbit, flow control and the recommended bit rate of 57600 bps. IMPORTANT: When PIN authentication has been successful, close the terminal program to free the communication port. To enter the PIN use the AT+CPIN command (see /1/ for detailed instructions).

> *Example:*
> AT+CPIN=1234
> OK
> Now, quit the terminal program.

6.2 Defining the PDP context

In order to activate a PDP context with the dial up network, a PDP context needs to be defined before. This means, that the mobile needs to inform the network about certain parameters, so that the context will be activated correctly. The PDP context definition can be done in several ways:

- If no entry has been made in the **Extra settings** of the modem properties and the dial up network is started with the phone number ***99#**, no individual PDP context values are known. In this case the module will use default values for the connection. The default values are the ones, which had been used for the last connection.

  Note:
  In some cases it may be required to predefine a PDP context. For example, if the local network provider requests an APN. In these cases one of the two following options must be chosen.

- If the **Extra settings** of the modem properties have been filled in, the CID is known. In order to activate the PDP context with the predefined values, ***99***<cid>#** instead of ***99#** must be chosen as the phone number entry (see figure below). However, if ***99#** is chosen, the module will ignore the predefined values and activate the PDP context with the default values.
- The PDP context may also be defined manually via a terminal program (57600 Baud, 8 Databits, No Parity, 1 Stopbit, flow control). Start the terminal program. Define the PDP context using the „AT+CGDCONT" command (see also /1/ for details):

  Example: AT+CGDCONT=1,ip,internet.t-d1.de <RETURN>

Close the terminal program when finished to free the communication port.

Choose ***99***<cid>#** instead of ***99#** as the phone number entry in the dial up network, in order to activate the PDP context with the predefined values. Otherwise, the module will ignore the predefined values and activate the PDP context with the default values.
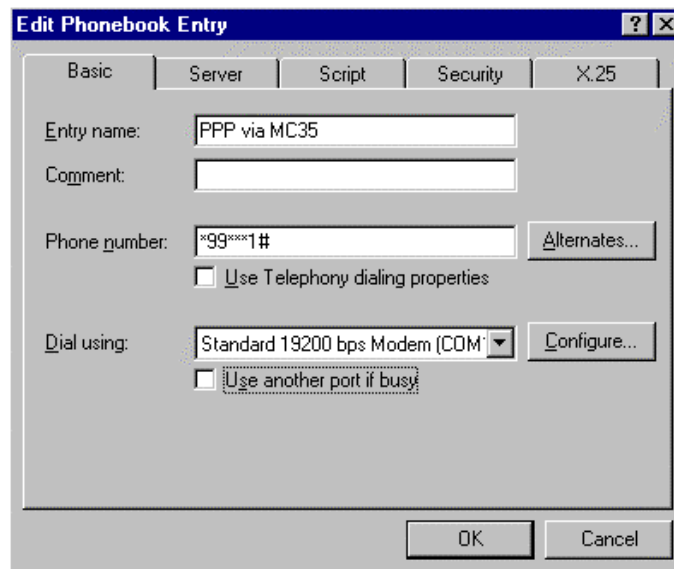
6.3 Defining the QoS profile

After the PDP context definition specific optional QoS parameters like **Delay Class** or **Mean throughput rate** can be set before activating the PDP context with the Dial-up network. This can be done via a terminal program (57600 Baud, 8 Databits, No Parity, 1 Stopbit, flow control).:

Start the terminal program. Define the Set the parameters using the „AT+CGQMIN" and/or „AT+CGQREQ" commands (see also /1/ for details). Close the terminal program when finished to free the communication port.

Example: AT+CGQREQ=<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> <RETURN>
           AT+CGQMIN=<cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> <RETURN>

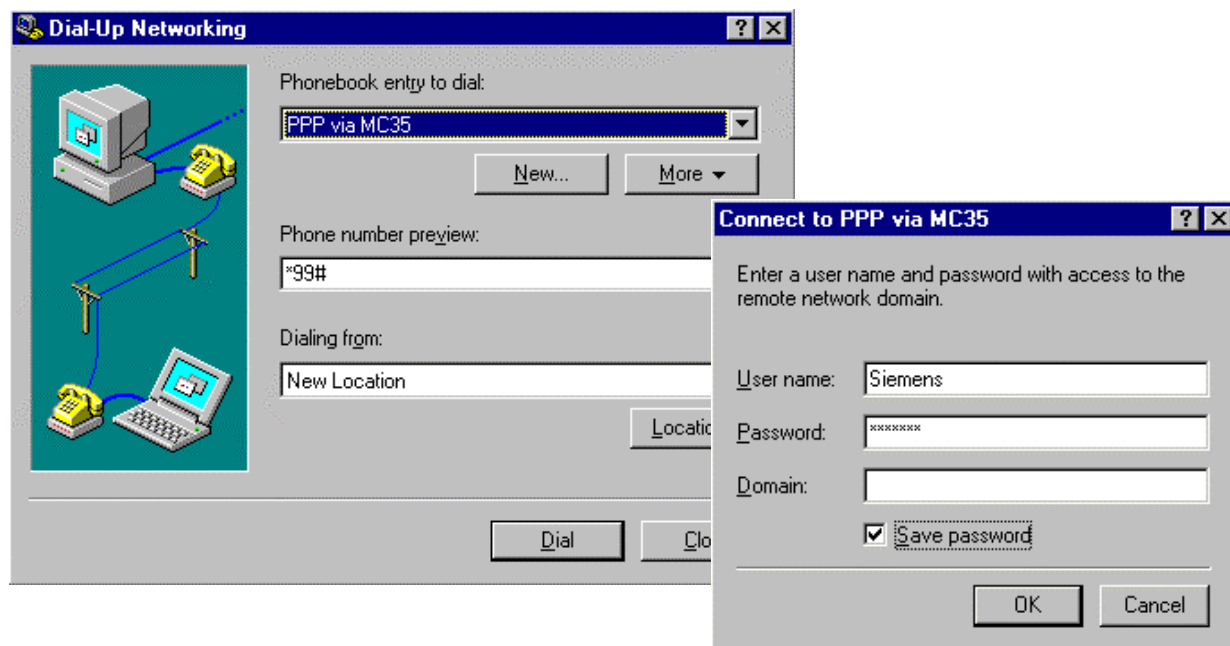**Note:**
The QoS AT commands can only be used when a PDP context has been defined! In order to activate the PDP context with the predefined QoS values, ***99***<cid>#** instead of ***99#** must be chosen as the phone number entry (see also chapter /6.2/). However, if ***99#** is chosen, the module will ignore the predefined values and activate the PDP context with the default QoS values.

6.4 Setting up a GPRS call

Go to the Dial-Up Network folder and select the connection you just created. The example illustrated below uses the phone number ***99#** to set a GPRS call. Depending on your configuration, this may need to be replaced with ***99***1#**.

Enter the **User name** and **Password** and, if dialing from a corporate network, the domain. If you tick **Save password**, no panel requesting the password will open in the future.
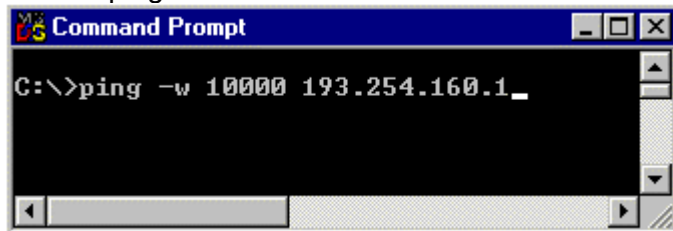

Note:

User name and password may in some cases be optional. Currently the **domain** field is ignored for GPRS network access. Address to your network operator for possible changes and more information.
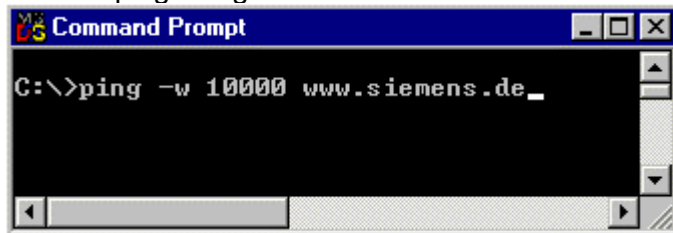
6.5 Quick test

To test the connection, simply initiate a ping at the command prompt.

1st test: ping without DNS name resolution:

```
Command Prompt
C:\>ping -w 10000 193.254.160.1_
```

2nd test: ping using DNS name resolution:

```
Command Prompt
C:\>ping -w 10000 www.siemens.de_
```

The "-w" parameter specifies the number of milliseconds to wait for the reply. To run the test type for example "ping –w 10000 www.siemens.de". The amount of time may vary with the network access. It is recommended to enter a value in the range from 10000 ms to 20000 ms.

6.6 Browser Settings

No proxy server needs to be configured in the browser.

If you have Internet Explorer installed you can select the phonebook entry created for the GPRS access as your favorite dial-up networking connection. To do so, go to the Tools menu and tap Internet Options / Connections. Select the phonebook entry and check one of the three dial-out option buttons. The sample phonebook entry used throughout this guide, would be listed as "PPP via MC35".

Please note that, currently, the GPRS service is not yet implemented to the full extent. This may slow down responses to requested URLs.

6.7 Terminating the GPRS call

For stopping a GPRS data connection, deactivating a PDP context and detaching the module, see chapter /7.4/.

7   GPRS AT commands

7.1   General

To transmit data via GPRS the application software uses a PPP stack. Most standard operating systems (e.g. Windows, Unix/Linux) use it as a part of a standard modem driver. In Windows based operating systems these drivers are part of the Dial-up network. For other operating systems these drivers must be provided by the user in order to enable TCP/IP connections.

However, application software which does not run on a standard OS platform or which does not use the Dial-up network, can establish a PDP context by executing a series of AT commands. Of course, you may also manually type these commands using any terminal program. Afterwards the PPP stack is activated.

Refer to the following chapters for instructions.

7.2   Discrete PDP context activation

- **Entering the PIN (AT+CPIN)**
  The connection of the MC35 to the terminal program and the registration to the GSM network are described in chapter /6.1/.

  Example: AT+CPIN=1234 <RETURN>
  	OK

- **Defining a PDP context (AT+CGDCONT)**
  Chapter /6.2/ describes the procedure of how to define a PDP context.

  Example: AT+CGDCONT=1,ip,internet.t-d1.de <RETURN>

- **Defining a QoS profile (AT+CGQREQ, AT+CGQMIN)**
  Chapter /6.3/ describes the procedure of how to define a QoS profile.

  Example: AT+CGQREQ=1,3,4,3,0,0 <RETURN>
  	AT+CGQMIN=1,3,3,3,0,0<RETURN>,

  where the numbers correspond to <PDP context identifier>, <Service precedence>, <delay class>, <reliability class>, <peak throughput rate>, <mean throughput rate >.

- **GPRS attach (AT+CGATT)**
  In order to use the GPRS service the MC35 must be GPRS attached. From that moment on the PLMN knows that the MC35 is GPRS capable. This means the MC35 can initiate a GPRS data call and Mobility Management routines apply.

  Example: AT+CGATT=1
  	OK

  Note: The GPRS attach may already be done before the PDP context and the QoS profile definition.

- **PDP context activation (AT+CGACT)**
  Before data can be transmitted, a PDP context must be activated. One way to do this is the CGACT command.

  Example: AT+CGACT=1,<cid>
                   OK

  Note: More than one context can be activated. If no GPRS attach has been done before, it will be done automatically by the AT+CGACT command.

- **Entering the GPRS data mode (AT+CGDATA)**
  In order to set the MC35 in the GPRS data mode and activate the PPP stack, the CGDATA command may be used.

  Example: AT+CGDATA=PPP,<cid>
                   CONNECT
                   ~ }#+!}!}#} }9}"}&} }*} } }'}"}(}"}%}&µ-г#}#}%-#}%*,~~ }#

When the MC35 has answered with CONNECT, it is in PPP mode and no further AT commands can be sent to the module until the PPP connection has terminated. The cryptic letter combination displayed after the CONNECT is the terminal interpretation of the PPP traffic. For more details about the PPP handshake see also /2/ and /3/.

Note: The activation of the drivers necessary to make a TCP/IP connection has to be initiated by the OS. It is the user's responsibility to adapt the software accordingly and provide the appropriate drivers.

7.3 Modem compatible PDP context activation

7.3.1 No preceding PDP context activation

The series of discrete AT commands can be replaced by the ATD command as described in chapter /6.4/.

  Example: ATD*99#
                   CONNECT
                   ~ }#+!}!}#} }9}"}&} }*} } }'}"}(}"}%}&µ-г#}#}%-#}%*,~~ }#

7.3.2 Preceding PDP context activation

If setting up a call with defined QoS and PDP context parameters, the following AT commands can be used as described in chapter /7.2/.

  Example: AT+CGDCONT=1,IP,volume.d2gprs.de
                   OK
                   AT+CGQREQ=1,3,4,3,0,0
                   OK
                   ATD*99***1#
                   CONNECT
                   ~ }#+!}!}#} }9}"}&} }*} } }'}"}(}"}%}&µ-г#}#}%-#}%*,~~ }#

7.4 Shutting down the connection

The GPRS data connection can be shut down in the Dial-Up Network by taping the **Hang up** button. However the PDP context is still alive. It can be stopped with the AT command AT+CGACT.

Example: AT+CGACT=0,<cid>
OK

When detaching with the AT+CGATT command, no GPRS data connection is possible before reattaching.

Example: AT+CGATT=0,<cid>
OK

Note: The CGATT command also performs a PDP context deactivation, if the context had not been deactivated before.

Another alternative is the ATH command, which closes a data connection, deactivates the PDP context and detaches the module.

Example: ATH

Note: ATH closes all ongoing voice and data connections!

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8 APPENDIX: Selected German service providers

8.1 Configuration example: D2-Vodafone

The procedure for connecting to the German D2 network is the same as described in chapter /6.4/. However, the following commands must be entered in the terminal program before a connection can be made over the dial-up network:

Example: AT+CGDCONT=1,PPP,volume.d2gprs.de <RETURN>
AT+CGQREQ=1,3,4,3,0,0 <RETURN>

Note:
Since this configuration uses a predefined context, the dialed phone number must be ***99***1#** (do not use ***99#**).
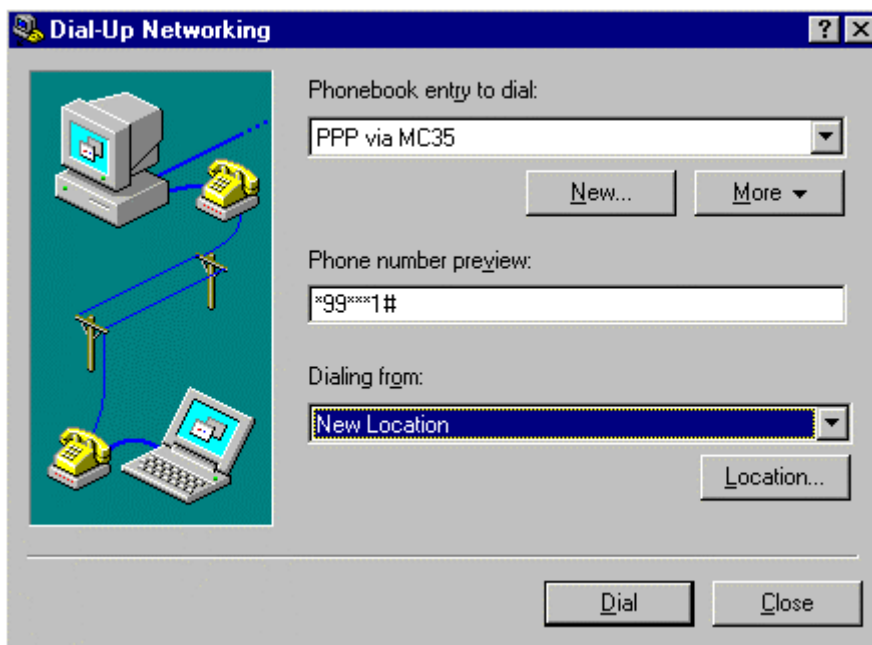
8.2 GPRS parameters of German service providers

The following table presents GPRS parameters of selected German service providers and operators.

Table 1: Service provider information, valid 16.10.2001

	T-D1	**D2 Vodafone**	**E-Plus**	**VIAG**
Primary DNS	193.254.160.1	139.7.30.125	212.23.97.2	195.182.96.28
Secondary DNS	free	139.7.30.126	212.23.97.3	195.182.96.61
IP address	Automatic	Automatic	Automatic	Automatic
APN	internet.t-d1.de	volume.d2gprs.de	internet.eplus.de	internet
IP header compression	no	no	no	no
Default QoS	Precedence 3; delay 4; reliability 3; peak 0; mean 0	Precedence 3; delay 4; reliability 3; peak 7; mean 31	Precedence 2; delay 4; reliability 3; peak 9; mean 31	Precedence 2; delay 4; reliability 3; peak 4; mean 31

Note:
These settings may be subject to regular changes by the network providers.