

ixconn

Access Software for the Mobile Internet

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0 Quick start

This chapter is significant for all those, who do not tend to get too involved in the instructions and would rather plunge into the new Software-adventure directly instead. However, please note that higher related or connection costs can occur as a result of incorrect or absent program settings – especially in cases, when dial-up is in close connection with foreign networks.

For the following step-by-step implementation, we assume that the wireless modem (e.g. wireless network card, 3G stick) along with the inserted SIM card has been deployed in the PC, and that all the drivers have already been installed rep. are integrated in Ubuntu kernel. Your user account should contain the authorization for the purpose of installing software packets.

- Download the newest **ixconn** packet "ixconn.deb".
- Start the packet per double-click mouse action and perform the installation.
- Open the Ubuntu menu and select **Applications->Internet->ixconn**
- Let **ixconn** do the standard installation.
- After the configuration program CONFIG has been started, please choose your Internet provider (at page "Global") and click on **Confirm** and **OK**.
- Start the connection: **Applications->Internet->ixconn**
- If it operates correctly and connection to the Internet has been established, then drag the program window of **ixconn** to the upper or lower border of the screen and select "Mini window" at the context menu (right-click). Another option could be minimizing the window to a panel icon. Now, click to end the program with the right mouse-click action on the mini window resp. the icon.
- **ixconn** saves this window position as the default position and is now ready for use.
- In case you want to customize **ixconn** based on your personal requirements, e.g. in order to activate the connection protocol/connection log or to activate the volume-monitoring, then use the **CONFIG** program for this purpose. This can be found under **Applications->Internet->ixconn configuration**

If an error occurred during the installation, or if you wish to know more about the other available options and functions of **ixconn** then please read ahead ...

1 Introduction

We are pleased that you would like to use **ixconn**. This is not a commercial product. The product is a result of the effort to overcome certain limitations.

The author had technical difficulties in the beginning of 2006 to initialize dial-up into the mobile Internet with the Windows programs that were available on the market and decided to develop an alternative for the same. The aim was to develop very simple software that merely initializes the wireless modem and avoids all other additional, superfluous functions. Indeed, this software has grown in the interim period and was reprogrammed for Ubuntu during 2009. Many users introduced ideas and error messages. Besides pure installation, **ixconn** now boasts of including an entire series of other functions:

- Display of speed, data volumes, online time, operating mode, signal strength, network name, Cell-ID
- Various display forms, like Tray-Icon and mini-window
- Warning in case of exceeding data-volumes- and online time
- UMTS- and GPRS-network analysis
- Connection monitoring and automatic re-establishment of connection, even after blocking
- Receiving/sending SMS, PC-remote control per SMS and call
- Detailed log functions, integrated service terminal
- Timer for program end or shutdown
- Script optimization
- Query- and recharge option for Prepaid-Tariffs

In spite of the wide range of functional capabilities that it possesses today, **ixconn** remains handy. It requires less than 0.3 MB disk space, its processor load is virtually negligible and caters to easy usage. The user can start the program via a single mouse-click and subsequently establish connection with the Internet.

System requirements

ixconn can be deployed on PCs with the operating system Ubuntu. The program has been tested with Ubuntu 9.10.

For access into the wireless network, you require a suitable wireless modem (network card or stick). You can find a list of supported modems here:

www.mwconn.info/wiki/index.php/Datenkarten

In case your wireless modem is not located in your PC, it is located in a router of type "Linksys WRT54G3G", **ixconn** cannot directly access the m. Instead it uses the HTML-Menus of the Router. The functions are then correspondingly restricted. For example, the signal strength can only be displayed in approximate levels/ranges, SMS-receipt and Prepaid-query is not possible.

Please take note that you must apply the basic settings (network selection, PIN, APN) via the HTML-Menus of the router.

ixconn does not function with PC modems only, in fact it also works in tandem with few specific mobile phones (e.g. Sony-Ericsson K610i). Unfortunately, the selection of a connection type (GPRS, UMTS) is in this case not possible per **ixconn**, as the related commands are not supported by the mobile phone-driver.

2 Modems

Please take note of the special features of specific device types:

Linksys-Router The router **Linksys WRT54G3G** must be completely configured via the HTML-Menus (inclusive of network selection, PIN and APN). The following settings/functions are unfortunately not possible via **ixconn**:

Cell-ID-display, receiving and sending SMS, audio signal for roaming, PIN, service console, Netlock-query, network analysis, APN, connection name, identification, active monitoring (only FRZ is possible), PC-remote control.

The data volume display functions only in 10-kByte-ranges.

Unknown modems If **ixconn** does not recognize your modem or phone automatically, you can enter the required settings manually. Two settings in **CONFIG** are mandatory: the command port on tab "Device" and the connection port at tab "Connection". You can find these port names in the system directories `/dev/serial` or `/dev/ttyUSB*`. If there is only one port available, the connection port, you can use this connection port as command port too (enter the port name followed by `;NONE`, e.g.: `/dev/ttyUSB0;NONE`). In this case some of **ixconn** displays do not operate during a connection.

3 Firmware-Upgrade

If you want to update the device-software of your wireless modem to a new version and therefore wish to execute a so-called Firmware-Upgrade, please use the software that has been exclusively provided by the manufacturer or supplier of your modem especially for this purpose. As Firmware-Upgrades are not risk-free, and it is thus not a rarity that the modem has thus been irreparably damaged, execute such an update as an advantage only in cases, when it is mandatorily required. Given a case, wherein you have minimal experience with the system configuration of Ubuntu, please allow an expert to execute and complete this upgrade.

4 Create dial-up connection entry

This chapter is only needed for **MWconn** and not for **ixconn**. Despite of this it has not been deleted so the chapter numbers of both manuals can stay in sync.

5 Install/uninstall ixconn

Download the **ixconn** packet `ixconn.deb` from the Internet and install it by using a double-click. You will need the administrator password in this case. The installation will be continued as soon as you start the program `ixconn` which you can find in "Internet" branch of the main menu.

Alternatively, you can install **ixconn** into a separate directory. For this, double-click the program `ixconn` and answer it questions on the screen. The administrator password will not be required in this case.

ixconn does not require any parameter to be invoked and does not have any buttons; this makes usage and operation very easy. In spite of this, the program fulfills various tasks. For purpose of fulfilling all these tasks, it orients itself based on the configuration parameters and its name. In case of the alternative installation, rename the programs or create copies, based on what is required. In our example, we have decided on four instances of the program and therewith cover the most important of its functions.



First, all program instances initialize the wireless modem at the start and then start the connection with the Internet. An exception is in the case of both the last mentioned programs that are contained in the following list. The user specifies the operating mode or function via the respective program name:

GPRS	accepts only GPRS
UMTS	accepts only UMTS
GPRSUMTS	use GPRS; UMTS only if GPRS is not available (not for all modems)
UMTSGPRS	use UMTS; GPRS only if GPRS is not available
CONN	use the default operating mode of the modem
ixconn	use the latest with ixconn selected operating mode
CONFIG	edit the configuration settings of ixconn .
CONTROL	control surface for an ixconn -Program that runs in the background.

As soon as you stop **ixconn**, the Internet-connection is stopped/disconnected as well. If you do not wish for the above, then you can define this in the configuration (per Program `CONFIG/Connection` or file `ixconn.ini/CONA=`). Further information in this regard can be found in the related sections of chapters 9 and 10. The same is valid for the case, wherein you would like to prevent the automatic establishment of the Internet-connection at program start by **ixconn**.

Only one click!

If you want to save a few clicks with the PC at a later stage, just create panel starter entries for the most frequently required instances of the **ixconn** program. In case of main menu entries you can create starter entries by clicking the right mouse key.

Auto-start on log-in

Not implemented by now.

Auto-start on machine boot-up of PCs

Not implemented by now.

You can deploy the program instance **CONTROL** in order to retrieve the status displays of **ixconn**. This program instance functions practically as a remote control for the regular **ixconn** program that runs in the background (e.g. **UMTS**). In case you would like to send commands as well to the running **ixconn** program (establishing communication, stopping communication), you must then enter an appropriate octal access mask in the file **ixconn.ini**. Example: **IPC=0666**

Note: **CONTROL** is always started in the screen position and coordinates and in the form, in which the regular **ixconn** program was last stopped.

Should your wireless modem require a longer initializing at the start of the PC, until it is ready for executing subsequent operations, it is recommended that the auto start of **ixconn** be likewise delayed. This can be accomplished via the Delay entry fields in the registered tab "Start/End" in the **CONFIG** program.

Several SIM cards or modems

If you alternate different SIM cards, because you use different mobile tariffs, you can create different profiles, configure them once, and switch easily between them using the program "PROFILE".

Most users will use only one SIM card. So, an integrated profile manager would have the disadvantage of difficult configuration for most people. Instead, **ixconn** comes with an external profile switch. To get this switch installed please follow the steps described by the next sections.

Create Profiles

Every profile needs its own configuration file, so that you can enter every setting profile specific. That applies to the device configuration as well, i.e. you can assign a unique modem device to every profile.

To get these configuration files, please create multiple copies from the standard configuration file "ixconn.ini" and give these copies specific names, e.g. "Vodafone.ini", "Swisscom.ini", "Orange.ini". It is necessary to keep the file name extension ".ini".

Create Profile Switch

ixconn contains an external profile switch, which has been integrated into the program. That means, the profile switch's executable file does not differ from the other executables. So you can create the profile switch by copying one of the other executables, e.g. "ixconn", and naming this copy "PROFILE". As you already know, every **ixconn** program copy will read its own file name at startup and then act accordingly.

Switching between Profiles

To change the profile you simply need to start "PROFILE". Every start of this program will switch to the next stored profile – in alphabetical order – and display the profile's name in a splash window.

The chosen profile applies to all **ixconn** programs, dial-in programs "GPRS", "UMTS" etc., as well as to the configuration program "CONFIG". The name of the currently active profile will be shown in the title of the program's main window.

Configure Profiles

At start all created profiles have the same content because you simply copied the standard profile "ixconn.ini". Therefore these profiles must be configured now with their specific settings by using the configuration program "CONFIG". Of course, you alternatively can edit the files directly with a text editor – just double-click them.

If you are going to use several wireless modems, that ought to stay connected to your pc, it is essential to define the particular modem ports in the configuration (per configuration program CONFIG/Device and CONFIG/Connection or the file ixconn.ini/COM= and ixconn.ini/CON=, for exact details, refer to chapter 9 or 10).

Using these Profiles

As soon as you got through with the steps described above, the profiles are ready to establish connections and can be switched by using the profile switch.

Please do not forget to insert the appropriate SIM card every time you switch to another profile. In case the wrong PIN has been sent to often to the modem, the SIM card will be locked and has to be unlocked with the

PUK (PIN unlock key). You can avoid this situation by setting the PINs of all your SIM cards to the same digit combination.

Deactivate the Profile Switch

If you plan to use only one profile and want to get rid of the profile switching mechanism, simply delete the file "profile.ini". Afterwards, only the regular configuration file "ixconn.ini" will be used. To get back to multi profile mode, start "PROFILE" again.

Separated Installation

Special demands will require separate installations of **ixconn**, in particular if you want to run different **ixconn** versions or several modems parallelly or if you need to separate SMS management. **ixconn** is small enough to be installed more than once. In these cases you cannot use the standard installation, you must choose the installation directories manually instead.

Usually, **ixconn** programs affect each other: starting GPRS will terminate UMTS, CONTROL controls a parallel-running UMTSGPRS etc. If you want to use several UMTS modems simultaneously, it is necessary to divide the programs into program groups. Each program must be supplied with the appropriate group number at start-up. Example: **INSTANCE=5**

Uninstall?

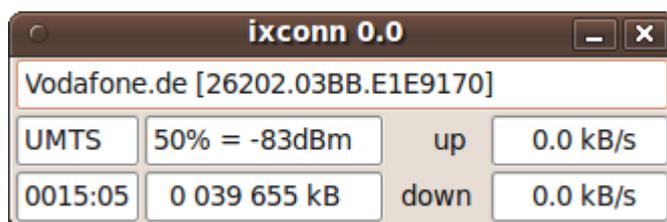
Naturally, we hope that you are satisfied with **ixconn** and would not like to discontinue usage immediately. If you do wish to discontinue usage, then in case of a previous manual installation a simple deletion of the program files is enough to do so. If you had chosen to install **ixconn** in a new, empty folder during the process of installation, then simply delete this folder. A special uninstalling program is not required.

In case you had installed **ixconn** as Debian packet (ixconn.deb), please start the Ubuntu-built-in packet manager and remove the packet.

ixconn is a very clean program. This denotes that it does not apply any changes to your system settings. It does not install any libraries in system folders, is not registered in the registry and does not install unnecessary desktop shortcuts or icons in the panel. This means that you can easily uninstall it when you wish to discontinue usage, without the program leaving any residual fragments.

6 Normal

Post starting, **ixconn** displays a window with the following information:



Top	Network name, to which you as a user are subscribed (in case of errors, ixconn will display the respective error message instead of the network name),
Centre-left	active mode of operation: GPRS, EDGE, UMTS or HSPA,
Centre	Signal strength in percentage terms and in dBm,
Down-left	Duration of online time in hours and minutes
Down-centre	Sum of the transferred data volumes in Kilobytes (in case of data transfer errors, an error information is displayed instead of the volume),
Centre-right	Speed of data transfer to the Internet in Kilobytes per seconds (Upload),
Down-right	Speed of data transfer from the Internet in Kilobytes per seconds (Download).

If your wireless modem supports this, then additional information is appended after the network name, e.g. "[26203.0001.5B51]". The five digit number stands for PLMN (Public Land Mobile Network), this is a combination of MCC (Mobile Country Code) and MNC (Mobile Network Code). The three digit MCC (in the

example "262") describes the country, the two digit MNC (in the example "03") the cellular network. The four digit hexa-decimal "0001" in the centre stands for the LAC (Location Area Code) and the latter hexa-decimal (in the example "5B51") for the Cell-ID.

The counter for the transferred data quantity and the online time that is in use, always restarts at the beginning of every program. If you wish, you can also define a specific date in the month, on which the counter is cleared. In this case, the counter is not reset at program start. For exact details, refer to chapter 9, section "Log", or chapter 10, section **DAY=**.

In chapter 10 (section **ERR=**), you can find further information pertaining to the character combinations, with which **ixconn** displays the various possible connection errors instead of the data volume when errors occur. The window then displayed, e.g. **Connection error CRC1** for "few checksum errors" to **Connection error CRC9** for "too many checksum errors".

Please note: The data volumes that are displayed or logged by **ixconn**, as well as the online time, are not a reliable basis for the monthly billing. For one thing, the possibility of errors cannot be ruled out, for another thing the Internet provider bills and does invoicing in a different manner. Often, rounding of up to a full 10 kByte is done, a few in fact round up rather generously much to the disadvantage of their clients, to the next 100 kByte. **ixconn** on the contrary calculates exactly to the tune of accuracy of up to 1 kByte. Changes that could possibly be required for the connection log that is generated by **ixconn** can be defined via the configuration (per configuration program **CONFIG/Log** or the file **ixconn.ini/RND=**, for exact details, refer to chapter 9 or 10).

The continuous display of signal strength is useful in cases, when the user does not have a permanent location (train, car) or when the user wants to identify the optimal location and the optimal direction for an external antenna.

The signal strength is displayed in percentage terms, as well as in unit dBm terms. As a rule, due to the fact that the wireless modems only distinguish between ca. 30 various types of signal strength levels/ranges, the percentage display always increases by multiple percentage points during a switch-over.

While you can access GPRS almost comprehensively across regions, the UMTS-network access is, excluding the primary service areas (areas of high population density), either impossible or only possible with extreme difficulties. Even more important in this case is a good external antenna. Please take note of the "antenna gain" during purchase of the same. This value is given in dBi terms and should lie about 10 or more dBi as far as possible. Many providers refrain from providing information regarding the antenna gain, unfortunately with good reason to do so. A few others provide exaggerated values.

Today there is a wide range of cost-effective UMTS-Antennae. We would recommend the Internet site by Ing. Friedrich Rapp: www.brennpunkt-srl.de/eshop.html

7 Minimal

Is the **ixconn** program window too big or is it coming in the way of your workspace on screen? Then simply minimize it with the minimize button. The window transforms itself into an icon and integrates itself into the status bar of the screen. You can select the type of icon yourself in the configuration (refer to chapter 9, section "Global", or chapter 10, section **ICON=**).



At present, there are two different types of icons that are available:

1 Standard icon

The signal strength is displayed in the form of one to five concatenated bars under the **ixconn**-Logo. The background color depends of the operations mode (GPRS red, EDGE yellow, UMTS blue, HSPA violet).

5 Monochrome digit icon

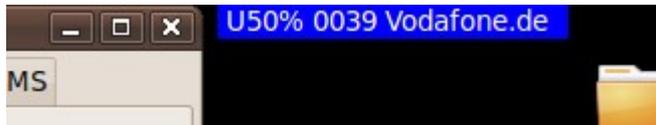
This icon contains vast information: operating mode, signal strength, receiving speed and – apart from this – the sending speed. Contrary to the other icons, both speed values are displayed numerically, to the exact degree of accuracy of up to kB/s.

In case your panel background is dark, the icon-colors can be inverted (please refer to chapter 9, section "Global", or chapter 10, section **MOD=B** for further details in this context).

In order to retrieve a detailed text display, move the mouse pointer to the signal-strength icon. A short tool tip text is displayed, which in turn displays information pertaining to the signal strength, transfer speed, network name and, if required, error messages. The format of the text corresponds to the representation in the mini window can be found in the following section.

In order to retrieve the normal program window once again, click on the icon and select "Normal window ". Select "Exit" in the menu in order to end the program.

If the simple, graphic representation is not sufficient for you or you wish to receive more exact and continuous information, then drag the program window to the screen border and change it into a mini window (right mouse key).



ixconn now always displays the current signal strength, the speed of data transfer and the network name. If the transfer speed drops to a level below 0.5 Kilobytes per seconds, then the sum of the transferred data volumes is displayed in its place (four-digit value in units of Megabyte). You can switch to the usual detailed representation via clicking per left mouse click action.

In order to drag such a title-less mini window once again, click via left mouse click action on the window surface. Subsequently, the normal window is invoked once again, which you can in turn re-set as a mini window on the screen margin. If you wish to end **ixconn** from the mini window itself, then use the right mouse click action and select "Exit" in the context menu that is invoked.

Tip: For a short-term temporary switch-over to the detailed normal window, use the left mouse click action on the mini window, and to switch-to the previous view, click on the surface of the normal window.

8 Maximal

This chapter is only needed for **MWconn** and not for **ixconn**. Despite of this it has not been deleted so the chapter numbers of both manuals can stay in sync.

9 Configuration program CONFIG

In order to customize program settings to suit your personal requirements, there is an efficient method of doing so: The program **CONFIG**. You can start it per "ixconn Configuration" from section "Internet" of the computer's main menu.

Should this program not be located on your PC, then simply copy one of the other program instances (e.g. **ixconn**) and rename it to **CONFIG**.

Starting the **CONFIG** program will invoke the program settings of **ixconn**. These sub-divide themselves into various sections, which in turn are distributed across nine registered tabs. In order to select the required section, click on the related tab (the flag on the top of the respective tab). The following sections of the chapter describe the setting options contained within each of the sections respectively.

Mouse-over action on the data entry fields while navigating through them raises a small message w.r.t., e.g. "COM=". These messages are related to the associated parameter in the file **ixconn.ini**, which will be further described in the following chapter.

[Likewise, here in the chapter, you will find references to the respective parameter in the file **ixconn.ini**. These references are represented in square brackets.]

As a rule, many of the setting options are not required for the pure purpose of establishing a connection; instead they provide the user with additional functionalities or additional comfort. The settings that are mandatorily required have been marked in **yellow** in the following sections. The settings that we recommend you to apply in addition to these have been marked in **green**.

In case you use the **Linksys-Router**, you must apply the most important settings **via the HTML-Menu of the router**. A few functions of **ixconn** are not active in this case; the related settings have been identified with "**(not for Linksys)**" and are ignored by the program. Also refer to chapter 3.

Info

You can find information pertaining to the program version and short information w.r.t. copyrights, as well as legal liability. However, please refer to the exact details explained at the end of this document.

Comment [**ixconn.ini/REM=**]

You can enter a required comment in this field. This is useful, if you use various initializing files and would thus like to identify the corresponding file.

In case of a client-specific program version, the field can be used for specific purposes. Please refer to the additional description provided by your supplier in this regard.

Global

Here, basic settings and several visual and acoustic outputs of the program can be customized.

≡- Standard settings

In case your Internet provider is listed in this box, you can load the most important parameters very easily. Afterwards, please check every of these parameters, especially the APN on tab "Network".

In case you did not find your provider on the list, try to update the list from Internet first. If this does not help, please retrieve the necessary data from the Internet site of your provider or from one of its shops. We would be very grateful if you could append these informations to the MWconn Wiki so that they will be available for other users.

≡- Termination query [**ixconn.ini/ENDM=**]

Here you can select the program's termination behaviour. Choose what the program shall do after you have clicked on the exit field **X**: terminate subsequent to an appropriate query, terminate without any query or minimize to a panel icon.

✓ - Program window always on top [**ixconn.ini/MOD=T**]

If selected, the normal program window will always be placed in foreground.

✓ Online time in mini window [**ixconn.ini/MOD=D**]

In the mini window, the online time is displayed additionally. Due to restricted space availability, this is alternatively displayed with the data volumes – in cycles of app. 5 to 10 seconds.

✓ Cell ID in mini window **(not for Linksys)** [**ixconn.ini/MOD=C**]

As long as this is supported by your wireless modem, the mini window displays the numerical code

instead of the current network name (e.g. PLMN, LAC, Cell-ID). Further details w.r.t. the numerical code can be found in chapter 6.

✓ **Green mini window if GPRS** [`ixconn.ini/MOD=O`]

You will notice the present mode of operation much better if it is not only represented by a letter, but shown by a distinct background colour. If you have checked this box, the mini window will display a green background while a GPRS connection is active. At UMTS, the usual blue background will appear.

≡- **Panel icon** [`ixconn.ini/ICON=`]

If you prefer to minimize the program window of **ixconn** as a panel icon, then you can retrieve the most important status information by moving over the icon with the mouse pointer. Depending on the selected type of icon, some of this information can also be represented graphically or numerically, directly in the icon. You can refer to a description of the icons that can be selected for this purpose in chapter 7.

✓ **Monochrome icons for black background** [`ixconn.ini/MOD=B`]

Depending on the background color in use, the standard color of black for the unicolored icons sometimes makes it difficult to identify them. In such cases, switch here to invert the icon color.

✓ **Beep at network change** [`ixconn.ini/MOD=R`]

Hereby, you activate the warning tone, which alerts you in case of network switch-over. This is particularly interesting during automatic switch-over of network selection abroad, as depending on network operator, various data transfer costs can accrue.

✓ **Beep at cell hand over** (not for Linksys) [`ixconn.ini/MOD=S`]

For test purposes, it is sometimes advantageous for the user to be informed about every cell hand over or switch-over. In case your modem supports the display and output of the Cell-ID, then, post selection of this option, the user is informed about all cell hand-overs via a short double-beep. You can thus identify the operating mode via the tone pitch: GPRS 500 Hz, UMTS 1000 Hz.

Device

The required hardware settings for your wireless modem are located in this registered tab. As an additional function for the purpose of service and analysis, there is also a small terminal that has been provided, with which you can establish a direct connection to your modem.

≡ **Device type** (not for Linksys) [`ixconn.ini/DEV=`]

In exceptional cases **ixconn** cannot determine the device type correctly. Then it is recommended to enter it manually.

Command port [`ixconn.ini/COM=`]

The command port of the wireless modem that is to be used by **ixconn** can be defined. Please only use this option, when the port cannot be automatically identified by **ixconn**, e.g. because you are using two different types of modems simultaneously. For a normal case, please do not enter the command port manually. Thus, **ixconn** detects the required information automatically from the Ubuntu device configuration at each start.

Should it still be required to manually enter the details of the port, then do take note that most modems possess multiple ports:

- For modems' type "Huawei", the "UI Interface" must be given.
- For modems' type "Novatel" either the "Primary Port" alone must be given or "Primary Port" and "Secondary Port" must be entered, separated via a semicolon.

Example: `COM=COM5 ; COM6`

- For modems' type "Option" the "Applications Port" must be given.
- For modems' type "Sierra" the "AT Command Port" must be given.
- For phones' type "Sony Ericsson" the "Device Management" must be given.

Usually, you can find the modem's command port in one of these system directories:

`/dev/serial` or `/dev/ttyUSB*`

As a rule, the correct type description of your modem can be found on the lower side of the device; the upper part mostly contains only the label or overprints of network operators.

In case your wireless modem is located in a router type Linksys WRT54G3G, then enter the text "Linksys" here instead of the command port. Should you have changed the IP or the username/password in the router due to security reasons, then append the text "Linksys" according to the following sample: Linksys 192.168.1.1 admin;admin

If you want **ixconn** to look for local devices only and not access any router, please enter "NoLinksys".

If you are using a device which provides only *one* serial port and requires to establish the data connection over this single port, you can switch **ixconn** to single-port mode: `COM= ; NONE`

Unfortunately, several displays cannot be made during this single-port connection.

In case you want to forbid **ixconn** the use of any command port completely then enter **COM=NONE**

Manual initialization commands (not for Linksys) [**ixconn.ini/DEVI=**]

If you want **ixconn** to send additional commands to the modem right after standard initialization has finished, please enter them here. Loosely followed the C notation, there may some special sequences being used: **\r** for CR, **\R** for CR with subsequently receiving the answer, **\p** for 0.5 seconds delay, **\P** for 5 seconds delay, **\x41** for a character in hex code (here the letter A as an example) and **** for a regular backslash. In case you want to suppress the standard initialization, start this line with *****

PIN for inserted SIM (required) (for Linksys only per HTML-Menu) [**ixconn.ini/PIN=**]

Enter the valid PIN for the module (SIM) that is located in your wireless modem. **ixconn** will save the PIN in masked form. This masking is only intended as a visual cover and is not an absolute protection against unauthorized decoding.

Should you not want the saving of the PIN, then leave this data field empty. **ixconn** will then consequently ask you for the PIN with every instance of modem initialization. In case the SIM card does not require a PIN at all, then likewise, no data needs to be entered here.

In order to subsequently empty this data field, you must check the "new entry" option and delete the field content thereafter.

Service terminal (not for Linksys)

You have the option to directly establish connection with your wireless modem. This is exclusively intended for the case of maintenance or technical service or for the detection of errors. Use this option only when you are well acquainted with its function and please adhere strictly to the service information of the modem manufacturer. Details can mostly be found in the Internet, if you enter the modem type and a few of the AT-commands that have been enlisted below in the search engine.

ixconn will always use the command port for the service console, which has been entered in the data field "Command port". If no data has been entered there, then **ixconn** identifies the port automatically. Commands that are supported by most modems:

AT	Test command (modem must respond with "OK")
ATI	Output pertaining to manufacturer information
AT+CGMR	Output pertaining to the firmware-Version of the modem
AT+CPIN?	Query, whether a PIN is required
AT+CPIN=1234	Enter PIN
AT+CGDCONT=1,"IP","aaa"	Enter APN "aaa"
AT+COPS?	Display selected network
AT+COPS=?	List received networks
AT+COPS=1,0,"nnn"	Select network "nnn"
AT+CSQ	Display signal strength (0-31)

Netlock? (not for Linksys)

ixconn can identify, whether your modem is linked to a specific mobile wireless network, thus, in turn, possessing a so-called Netlock. You can start the related query via clicking on this button. It may take a few seconds to fetch a result set for the query.

Please note that not all modems do accept the standard query commands. Therefore, in certain individual case, it is possible that **ixconn** has not been able to identify the existing Netlock. Likewise, due to reasons pertaining to hardware incompatibilities, the possibility of an automated query option of so-called SIM-Locks is foregone (SIM-Locks are locks, which your modem maps to the inserted SIM). In the case of certain modems, the relevant query commands subsequently demand the user to take out and re-insert the data card resp. the USB modem.

Network

This section is dedicated to network analysis, network selection and the defaulting of the APN.

Network analysis (not for Linksys) [**ixconn.ini/NET=?**]

You can start the network analysis via clicking on this button, as soon as the PIN and, if required, the command port has been correctly entered in the registered tab "Device". **ixconn** then searches for all the mobile networks currently available and displays them. The list that is thus generated is sorted per operating mode (UMTS or GPRS) and signal strength.

Please be patient when you start this function. The process duration is – depending on the wireless modem that is in use and the number of available networks – about two to 8 minutes. The reason for this has a technical basis (**ixconn** must select every network of every operating mode individually and check the signal strength accurately).

As soon as the program has generated the list, you can copy it into your clipboard via the button. Every row of the list comprises of up to five points of information:

- Operating mode (UMTS or GPRS)
- Signal strength in percentage terms ("???" for "not ascertainable")
- PLMN (refer to chapter 6 for meaning and significance or en.wikipedia.org/wiki/PLMN)
- Network name
- optional after the name: "(locked)" in case your SIM card does not have access for this network.

If you want to manually target a network from the list, then mouse click action suffices in this case. The relevant network name is thereby applied to the data field that is located under it.

✓ **GU** (not for Linksys)

Check the box **G** or the box **U** if you want to perform the network analysis for GPRS resp. UMTS networks only. **ixconn** will then be twice as fast with its network search.

Only this network (recommended) (not for Linksys) [`ixconn.ini/NET=`]

With most wireless modems, automatic network selection is a standard. Mostly, the network of your provider will be automatically selected. Should unknown or foreign networks also be available and your provider allows access of these per "Roaming", then, if req., the modem switches to this network. If you do not wish for this, e.g. because you want to avoid higher connection costs, you should enter the network manually. For this purpose, enter the name of the network that you require.

As in this case it is imperative that the exact representation is reproduced, we recommend that a network analysis be executed (see above) and the name be then selected from this list.

Automatic, show warning if not... [`ixconn.ini/NET=;`]

In case your provider allows the access of various networks, you will possibly not avail of the manual network selection option. At best, use the automatic network selection together with the warning for foreign or unknown network switch-over option. The networks that you can use in the most cost-effective manner can be listed in list form. The list is separated via semicolons. Exact written representation is important; please do not insert any *additional* empty spaces. At best, use the network analysis here also and subsequently click on the required network in the result-set list.

Automatic, all networks [`ixconn.ini/NET=`]

With this setting, your wireless modem decides for itself, with regards to which network it needs to be logged into. Depending on the network, you will have to cater to varying tariffs and thus varying costs that are incurred.

APN (required) (for Linksys only with HTML-Menu) [`ixconn.ini/APN=`]

The Access Point Name (APN) must be entered, which you have in turn received from your provider for the Internet access. If you leave this field empty, then **ixconn** tries to detect the APN itself. If this is not possible, then a list of APN that are used can be found e.g. under:

www.mwconn.info/wiki/index.php/Standard_settings

If you want to use an empty APN, enter the word NONE. In anycase, please subsequently verify the entry and in case of doubt, adhere to the information that has been provided to you by your Provider. In certain individual cases, an incorrectly selected APN can lead to higher connection costs.

SMSC (not for Linksys) [`ixconn.ini/SMSC=`]

Insert the number of your short message service center here if you plan to send SMS. Use international format, e.g.: `SMSC=+15550000`

■ **Send now specific USSD Code** (nicht bei Linksys)

USSD Codes are being used for special network operations, e.g. querying prepaid credit or selecting a specific tariff. The required codes differ from network provider to network provider but usually start with an * and end with a #. Using this button you can send any USSD code. Please consult your network provider to get a detailed description of the available codes.

Prepaid credit, query (not for Linksys) [`ixconn.ini/PPQ=`]

Here, you can define the USSD-Code for the query of the prepaid credit. Standard is `*100#`. In case your network operator uses another code, then you must enter this code here, if you wish to use the option of prepaid credit query.

Prepaid credit, load new credit (not for Linksys) [`ixconn.ini/PPC=`]

In case you want to simplify the task of loading of the prepaid credit, you can enter a template for the entry of the load or recharge code here. A defaulted "`SMS:`" initializes the request for the loading of credit per SMS. Examples (here for the provider Simyo.de):

`PPC=*104*<INPUT>#`

`PPC=SMS:74696 <INPUT>`

The text "<INPUT>" is replaced with the code that needs to be entered at a later stage via invoking of the load function from the menu.

- URL/USSD for Homezone status request** [ixconn.ini/HOMU=]

In case you use a tariff with the so-called Homezone option, then it would be interesting for you to know, whether invoicing is based on the Homezone-Tariff or not. The network operator provides options for this purpose, which allow the user to query the Homezone-Status per Internet site or USSD-Code. **ixconn** can complete this task for you. If you can identify your network in the standard settings, then select it directly. Otherwise, you will need to enter the query data in the following three data fields manually. **ixconn** always verifies the Homezone-Status at the start of the connection, and thereafter within intervals of ca. 10 minutes and subsequent to every cell hand over (as long as this is supported by the modem). The display takes place through an "H" in the info section of the panel. In case you use a volume tariff, then do take note of the fact that additional data volumes are required via the Homezone-query. However, contrary to normal surf-activities, this is considerably less or negligible. In case that you manually enter the parameters for the Homezone-query, enter the address of the related Internet site or the USSD-Code in this field.
Examples: **indikator.o2online.de *130#**
- Text pattern for "in homezone"** [ixconn.ini/HOMI=]

In order to be able to interpret the answers w.r.t. the Homezone-query, **ixconn** always searches for a specific sample text in the answer or response. The sample text for the status "within the Homezone" must be entered in this field. Please take note thereby with regards to the exact spelling and text representation and usage of HTML-codes. The latter can be retrieved by the user when they chooses to invoke and view the source text of the Internet site.
Example: **You are located within your homezone.**
- Text pattern for "not in homezone"** [ixconn.ini/HOMO=]

The same is valid for this data field, as described in the previous section. The sample that you enter here is however valid for the case that you are located outside your Homezone.
Example: **You are located outside the range of your Homezone.**
- Disconnect if located outside the Homezone** [ixconn.ini/MOD=H]

If you have activated the Homezone display (see above), you can configure via checking this option, such that the connection is automatically disconnected as soon as **ixconn** clearly detects, that you are located outside the Homezone.
Please take note that it can take a few minutes before the connection is disconnected, as the Homezone-Status is verified approximately only every 10 minutes. Due to security reasons, in the case of a disconnection, the connection will not be automatically re-established.

Connection

This registered tab contains the settings pertaining to connection and for the identification in the network.

- Automatically connect at program start** [ixconn.ini/CONA=]

If **ixconn**, post initialization of the modem, should also immediately establish connection with the Internet (Standard), then this option must be checked.
- Automatically disconnect at program end** [ixconn.ini/CONA=]

Here, the option must be checked, if the Internet connection should be immediately disconnected once the **ixconn** program has been closed (Standard).
- Avoid connection** [ixconn.ini/ENDC=]

In case you are using a tariff which charges higher costs within a specific time frame of day, you can **ixconn** have to popup a corresponding warning message. For this purpose enter start and end of this period of time. Use the 24-hour representation, e.g. "20:45". Please enter a spaciouly laid out period of time. On the one hand, your PC clock might not be adjusted exactly; on the other hand, **ixconn** will wait more than minute before it terminates a connection automatically.
For to get a warning message around midnight (e.g. in case of Dayflats from Fonic or T-Mobile), enter "23:55 to 00:05".
- Avoid connection and end the program afterwards** [ixconn.ini/ENDC=E]

If you check this box, **ixconn** will end itself after having terminated the connection. Optionally you can advice **ixconn** to shutdown the Computer (see section "Start/End").
- Connection Port** (not for Linksys) [ixconn.ini/CON=]

If you have decided to apply the connection port manually, then enter its name here. Usually, you can find the modem's connection port in one of these system directories: /dev/serial or /dev/ttyUSB*

- Identification, Name and Password** (for Linksys only with HTML-Menu) [ixconn.ini/PASS=]
If your network operator requires a specific username and password, then you must enter both of these entities here. Due to security reasons, all the characters for the name and password are displayed as masked entries with asterisk.
- ✓ **Graphics compression off, if possible** [ixconn.ini/MOD=G]
Most mobile networks compress the images that are present in the websites. This has three advantages: Firstly, there is not too much load on the network and more users can surf at the same time. Secondly, the speed at which the sites are invoked is accelerated, as less data also requires less time to get transferred. Thirdly and finally, graphics compression helps you save costs, in case you use a volume-based tariff plan.
Naturally, compression also has a disadvantage: Graphics are displayed in low quality, and in individual cases there are also functional problems with the display of websites.
Setting this option (checking this option) will switch-off the graphic compression in general. If the option has been set, **ixconn** then sends a compression deactivation packet to the compression server (IP 1.2.3.4). Please note that this general switching-off does not function with all networks.
- ✓ **Delete external initialization commands with APN** [ixconn.ini/MOD=Z]
This function is not used in **ixconn** at present.

Monitoring

ixconn can monitor the quality of your Internet connection and if necessary, it can disconnect from your Internet connection, as well as re-establish connection anew. With the help of data entry in this registered tab, you can define the type of monitoring and the error tolerance level.

- ✓ **Signal Strength, query more frequently** [ixconn.ini/MOD=F]
For special applications – especially when adjusting an antenna – it is recommended to reduce the query interval for signal strength gauge by checking this box.
- Connection monitoring by DNS ping, soft** (recommended) (not for Linksys)
[ixconn.ini/PING=999.111.0.0;999.3.0.0]
When no data is transferred, because you are e.g. looking through a single Internet page and thus have not activated any links, **ixconn** does not know, whether the lack of data transfer is a voluntary action on the user's part or whether there has been a time-out in the connection due to a data transfer error. This can be identified with the help of a so-called Ping (Test send) to a defined destination address (IP) in the Internet.
If you activate the sending of the DNS-Ping, **ixconn** then sends a test packet to the so-called Domain-Name-Server (DNS) in the case of absence of data traffic. This server is responsible for resolving of Internet addresses and as a rule always returns a reliable response.
In case the response packet is not received within a specific time frame, then **ixconn** knows that the connection is not functioning correctly and will re-establish it anew.
Please note that the active test of the connection per DNS-Ping or ICMP-Ping (also refer to the following sections) causes additional data traffic (maximum ca. 50 to 150 kBytes/hour). You should consider this against the backdrop of the selected billing tariffs. In case you are required to pay for each kByte, then it is better not to use the option of active connection monitoring.
Likewise, please note that through the option of active connection monitoring, you are naturally responsible for additional data traffic w.r.t. the selected destination address respectively, even if this data traffic is minimal. This is also valid for destination addresses that are automatically detected if required.
- Connection monitoring by DNS ping, frequently** (not for Linksys)
[ixconn.ini/PING=999.111.0.0]
This type of connection monitoring is more reliable as the previous option; it however generates more data traffic. Also, your Domain-Name-Server is subjected to more load than necessary through the frequent test packets. In case you require a very quick detection of connection errors, you can still select this type of monitoring. In addition to this, we recommend that in this case, other destination addresses are also used (refer to the next paragraph).
- Connection monitoring by ICMP ping** (recommended for Linksys) [ixconn.ini/PING=]
If you select this option, the Internet server of your choice can be used for connection monitoring. As a destination address, you should always select a reliable Internet server, which you consider as a reliable source for the return of responses for the test sendings, e.g. your Internet provider. Verify this simply per Ping command via **Application->Accessories->Terminal**, to determine whether the server you have selected sends back a response.
If you have determined multiple destination addresses that you consider reliable, enter these in the fields

"1. IP" to "3. IP". **ixconn** will then always use these destination addresses in the given sequence in order to test the connection when no data is being transferred.

Entering virtual IPs can lead to **ixconn** sending across test packets less frequently and thus can avoid heavy data traffic:

The IPs 999.1.0.0 to 999.99.0.0 signify a delay of 1 to 99 cycles per 5 to 8 seconds. For example, entering the IP 999.3.0.0 will mean that **ixconn** delays the sending of the test packets by approximately 20 seconds.

Connection error tolerance (for Linksys only FRZ-value) [`ixconn.ini/ERR=`]

Here, you can set the degree of tolerance of connection errors by **ixconn**. If one of the error types occurs frequently, and you do not want that the connection is re-established anew every time the error occurs, then increase the number of permissible times for this error type. Then, **ixconn** will wait for a little longer in order to establish the connection anew. In case you enter zero, then the related error type will not be monitored by **ixconn** anymore.

FRZ	Connection freeze (Data is sent, but no data is received)
CRC	Cyclic Redundancy Check
TME	Time-outs
ALG	Grouping error
FRM	Framing error
BUF	Buffer overflows

For the normal case we recommend that standard values be used, which can be entered at any given time frame via pressing the "Standard values" button.

≡ **Display connection errors** [`ixconn.ini/ERR=L`]

Here, you determine, from when or from what point the connection errors that occur need to be displayed. Thereby, 0 signifies "immediately", 5 "post encountering half the number of permissible errors that can be tolerated" and 9 "only shortly prior to connection abort and reconnect".

Battery energy [`ixconn.ini/BATT=`]

If the connected device has its own battery and supports the required query commands, you can decide in which case **ixconn** shall display the battery icon.

Log

You can activate a series of logging functions via this registered tab. **ixconn** differentiates between two types of logs: the connection log and the service log.

✓ **Activate connection log "connlog.txt"** (recommended) [`ixconn.ini/RND=`]

Every dial-up and every connection termination is logged in a file called `connlog.txt`. Additionally, this file also contains information regarding the accrued data volumes, as well as the online time. The current counter reading can be seen under the activate check box option for **data volumes** and **online time** respectively.

Please note that the values displayed and logged by **ixconn** are no reliable basis for invoicing or monthly billing. The network operator will always generate the invoice based on the data usage that he has determined himself and by his own calculation mechanism.

■ **Reset now**

The data volumes or the online time counter is reset to zero. You will need to use this option especially when you have decided for the continuous counting of data volumes instead of opting for a monthly resetting of the counter (see below for further explanation).

Also, when the option to set the counter reading manually has not been provided to you, this option is still available. The related description can be found at the end of chapter 10.

≡ **Reset monthly** [`ixconn.ini/DAY=`]

ixconn will always set the related counter at 00:00 hours to zero on the calendar date of the respective calendar month that has been selected here. In case you should not be online on the related date, then the counter will be reset on the next possible opportunity post this date.

This is also valid if the detected date is not present in the current calendar month, e.g. the 31st in the month of February. **ixconn** then executes the resetting on the 1st day of the following month.

The selection of the "never" option leads to continuous counting. A resetting of the counter then takes place only manually (see above). Nonetheless, there is naturally also a technical limitation: In case the counter reaches a value of 1 TByte (1000 GByte) or 10000 hours (more than one year), it automatically resets itself to zero.

- Each connection round to next...** [ixconn.ini/RND=]

Basically, **ixconn** rounds up to the next full kByte and the next full minute at the end of every connection. This is due to technical reasons – it does not however have any negative effects, as it thus corresponds with the smallest round-up value that is normal with the providers.
A few Internet providers however, round up to 10, 50 or even 100 kByte or to 10, 15 or 180 minutes. In order to consider this also in **ixconn**, you can enter the round-up value here.
- Pre-warning** [ixconn.ini/MAXV= und /MAXT=]

In case you want to be warned, if a specific data volume or online time limit has been exceeded, then enter that particular limit here. In case of exceeding this limit, **ixconn** warns you with an acoustic signal (two long tones). From this point on, you will see a coin as an additional icon on the panel.
- Warning** [ixconn.ini/MAXV= und /MAXT=]

Here, the same occurs as with pre-warning (refer to the section pertaining to this topic), however, in this case you will hear the acoustic signal three times in succession, And the coins starts flashing from this point onwards.
- Terminate connection at...** [ixconn.ini/MAXV= und /MAXT=]

If you enter a value for data volume or time here, then the connection will be automatically terminated, as soon as this limit is reached. **ixconn** will not establish a connection for as long as corresponding action pertaining to this value has been taken or the related counter has been reset.
- **Generate statistics "connlog_vol.txt", "connlog_tim.txt"**

For the data volumes that are accrued, as well as for the online time, simple graphical analyses can be generated. If you click on the respective buttons, then **ixconn** writes the related evaluation and analysis as a semi-graphic in the text file that has been given. Additionally, a CSV-file with the same name is generated (extension ".CSV"), which summarizes all the day's values in a table. You can generate further high quality graphical evaluations and analyses per table calculation program.
The image/graphic that is generated by **ixconn** directly uses a non-linear resp. a non-continuous linear scale. Six equidistant parts of the common logarithm are used for the data volumes. This means that the scaling takes place according to the sample 1 1,5 2,2 3,3 4,7 6,8 10 15 22 33 47 68 100 150 etc.
The online time is represented in a discontinuous linear scale. For times to be represented for values of up to one hour, **ixconn** uses the 5-minutes-grid, for times greater than one hour, it uses the 30-minutes-grid.
- ✓ **Write cell id to connection log** (not for Linksys) [ixconn.ini/MOD=I]

In case your modem supports the output and display of the Cell-ID, every cell hand over or switch-over to roaming is contained in the connection log (PLMN, LAC, CID, refer to chapter 6 for more details).
- ✓ **Write signal strength to connection log** [ixconn.ini/MOD=J]

Every change in the signal strength is logged in the connection log. This is – as the logging of the Cell-ID – mainly useful for test- and analytical purposes.
- ✓ **Activate service log "servilog.txt"** [ixconn.ini/MOD=P]

A service log can be activated for test and verification purposes. **ixconn** then generates a file with the name `servilog.txt`, in which all the important system steps are entered. This file provides the experienced user, as well as the developer, with valuable information in case of problems with the program or with the hardware in use.
Technical note: If the service protocol option has been switched on, then **ixconn** takes a little longer to start.
- Start/End**

You define, whether **ixconn** starts automatically with the PC-Start, the conditions that can lead to the closing of the program and what should subsequently happen.
- ≡ **At every PC start, start also...**

Here, you define, if **ixconn** should be started automatically on booting of the PC. We regret that this function has not been installed at present.
- Delay after program start** [ixconn.ini/SDLY=]

Especially when you want to start **ixconn** at a specific point of time (or allow it to auto-start), at which the wireless modem is not yet ready for use or has not yet been initialized, then it is recommended that the running of the program at start be delayed. Enter the delay in seconds in this section.

- Delay after standby** [ixconn.ini/SDLY=;]
Independent of the delay time after program start, you can specify a delay time for resuming after standby, resp. hibernating.
- Terminate program if not connected** [ixconn.ini/ERR=NOC]
In case your wireless modem does not detect any available network, then **ixconn** waits, until these networks are available and displays "Searching for networks" in the interim process while it executes its search. If you want to end the program if no network is available post a considerable time lag, then enter that time/duration here.
- ✓ **Terminate when connection error** [ixconn.ini/MOD=E]
ixconn normally disconnects an erroneous connection and re-establishes it anew. Instead of this, if you want that **ixconn** terminates itself when there is a connection error, then click on this option.
- ✓ **Terminate when PC goes standby** [ixconn.ini/END=Z]
If this box is checked, **ixconn** will terminate as soon as the computer is going to invoke standby mode.
- Countdown** [ixconn.ini/END=]
You can define, whether **ixconn** closes or ends on its own post a pre-defined time period. Thereby, you can select, whether the connection activity needs to be considered. If yes, then the program will not be closed, for as long as the connection is active. "Active" signifies that considerable data traffic is taking place (minimum 1 kByte/s). **ixconn** then waits until no connection activity takes place over the defined time period and ends thereafter.
This is especially useful, if you want to execute a large download in your absence and subsequently wish for the connection to be automatically disconnected or want the PC to shut-down on its own (see down below for automatic shut-down).
During the count-downs, you will see a small icon in the information area of the panel (down right in the screen), which continuously shows you the remaining time in minutes (or in hours, with an 'h' appended after it).
- After automatic program end** [ixconn.ini/END=]
You can define, what should happen post program end. You can configure **ixconn**, such that the PC merely shuts-down or shuts-down and subsequently restarts.
However, please take note that an auto shut-down action could result in a loss of unsaved data of other files. Therefore, always save any possibly open files beforehand.

External

You can enter external programs that need to be started by **ixconn** in this registered tab.

- ≡ **Execute subsequent to program start** [ixconn.ini/CMD1=!]
As soon as **ixconn** starts, it will execute the given command line.
- ≡ **Execute subsequent to program end** [ixconn.ini/CMD1=|]
The command line is executed, as soon as **ixconn** closes. It does not matter, whether you have closed the program yourself or whether **ixconn** has been closed on its own due to one of the pre-defined values in the configuration.
- ≡ **Execute subsequent to first connection start** [ixconn.ini/CMD1=]
The command line located here is executed, as soon as **ixconn** has established the first connection.
- ≡ **Execute subsequent to every connection start** [ixconn.ini/CMD1=,]
The command line is executed after every connection dial-up is established, i.e. also in cases when **ixconn** automatically ended the connection due to errors in transfer and has had to re-establish connection anew.
- ≡ **Execute subsequent to SMS reception** (not for Linksys) [ixconn.ini/SMS1=]
The command line entered for this following section is executed, as soon as **ixconn** has received an SMS. In case of requirement, you can restrict this to one specific SMS (see below for further details).
If you have clicked on this button, then **ixconn** knows that you want to use the remote control function and possibly cannot view details on your PC. Therefore, no SMS notification is displayed on the screen. Instead, a short acoustic signal rings respectively and the SMS is written to the SMS log (maximum character length of 160 characters).
- ≡ **Execute subsequent to incoming call (when offline)** (not for Linksys) [ixconn.ini/SMS1=,]
The same is valid as in the case of "Execute subsequent to SMS reception". However, instead of the SMS, an incoming call acts as the trigger to execute this function. This functions only as long as **ixconn**

is not online.

Take note that the recognition of an incoming call is not supported by many wireless modems. A few modems do in fact support recognition of incoming calls; however, this is then signalled without the call number of the caller. If required, inquire with the dealer prior to the purchase of a modem specifically in this regard. The same is valid while finalizing a mobile Internet contract, as incoming calls are fundamentally blocked in the case of a few providers.

Shell command [ixconn.ini/CMD1=]

The command line that is entered in this section is executed by **ixconn** – depending on the defined values (see above) – e.g. directly post the establishing of an Internet connection or post the receipt of an SMS. For example, if you want to execute an automatic start of the Internet browser, then the entry is as follows: `/usr/bin/firefox`

In case you are using the remote control function ("Execute subsequent to SMS reception" or "Execute subsequent to incoming call", see above), then there are other modified commands that are available. In addition to the normal command line options, there are also special commands that are permitted:

IXCONN_CONNECT	Establish connection
IXCONN_DISCONNECT	Disconnect connection
IXCONN_RECONNECT	End existing connection and re-connect
IXCONN_END	End ixconn program

You can combine such a special command with a command line prompt respectively, wherein the latter is inserted directly after this, e.g.: `IXCONN_CONNECT /usr/bin/testprogram`

Furthermore, you can use the following in the command line placeholders:

%0	Number of the sender, without the leading plus sign
%1	Number of the sender
%2	The SMS content; if req. the portion after the keyword (s. below)
%3	Like %2, however only characters, numbers, space character, "_" and full stop is accepted
%%	Is converted to a %-character

As compared to the placeholder %2, the placeholder %3 offers additional security, as using it prevents the transfer of any control or functional characters. Then, for example, from the command "echo %3" you do not get "echo hallo && rm /bin/file.txt", instead what we get is "echo hallo __ rm _bin_file.txt". Thus, this does not pose any uncalculated risk for your files.

■ **Browse**

Post clicking on the search button, you can navigate within the file system with mouse click supported action. Use this option to your advantage, in order to avoid errors during the entry of path and program names.

✓ **Execute hidden** [ixconn.ini/CMD1=;]

In order to configure, such that the desired program is invisible, i.e. it runs without a window and without an entry in the panel, check this option. Note: This setting does not work with Ubuntu.

Sender (not for Linksys) [ixconn.ini/SMS1=]

The command defined above is only executed, when the SMS (or the call) originates from the sender that has been defined here. Please enter the sender's number in the normal international form with the prefixed plus characters. Example: +1555111111

If you do not enter any data for this section, then anyone is accepted.

Keyword (not for Linksys) [ixconn.ini/SMS1=]

Only SMS which contain the keyword that has been defined here, will trigger the execution of the command that has been defined above. **ixconn** ignores upper-/lower-case in this context. In order to avoid problems with various SMS-character sets, only numbers and characters are best used (without country specific special characters like for e.g. ä, é, ß) for the keyword.

The usage of this option in cooperation with a defined sender number (refer to the previous paragraph) is recommended due to security reasons.

In case you do not enter anything here, then this will lead to the command execution by SMS with any kind of content.

SMS (not for Linksys)

There is a small SMS manager integrated in this tab. Switch between *Inbox* and *Outbox* by clicking the corresponding button. Selected SMS can be replied on, new SMS can be created and transmitted.

✓ **SMS reception** (recommended) (not for Linksys) [ixconn.ini/MOD=M]

If you wish to be able to invoke a display of the SMS (short messages) that have been received by your

modem on the screen, you must set this option. Precise information pertaining to the receipt of SMS can be found in chapter 14.

■ **Phone book** (not for Linksys)

ixconn can display a name left to every phone number in the list. For this, please add the appropriate entries to the phone book in file `sms_name.ini`. The easiest way to accomplish this is to write the name together with the number into addressee input field. If you want to revise the phone book (change or delete entries), open it by clicking the button **Phone book** and edit the file which will be opened afterwards.

■ **Send** (not for Linksys)

The entered text will be sent to the selected destination phone number. As long as **ixconn** is not attached to a radio network, this SMS is stored in memory and sent at next occasion the program gets a radio connection. You can identify such temporarily stored SMS by the leading plus sign in SMS outbox list.

10 Configuration file ixconn.ini

A message is invoked when **ixconn** is started for the first time, which refers to the file **ixconn.ini**. An array of information must be entered in this file. Double-clicking on the file name and update the lines in the manner described below. **ixconn** can detect some of the information on its own; you should leave the corresponding lines empty. All values that are automatically entered must be subsequently verified.

Tip: Instead of opening the **ixconn.ini** file via Text editor, you can basically use the configuration program **CONFIG** that is easy to use. When you move the mouse cursor over one of the data fields, a short text (tool tip) is displayed a few seconds later, which mentions the respective parameter name, for which you will find an exact description in this chapter. Precise description w.r.t. to working with the **CONFIG** program has however been dealt with in chapter 9.

[The location at which you find the settings that have been described here in the **CONFIG** program, can be identified here in the chapter through the information in the square brackets respectively.]

Line 01 of the file **ixconn.ini** should never be manually edited. Should it be required nevertheless under exception cases that the internal program data like window position, counter reading etc. be edited, then you can find the exact description of the contents of this line at the end of the chapter.

Important: In case of doubt of data that is to be entered, please adhere to the information provided to you by your Internet provider. In certain individual cases, it could be that higher connection costs are incurred.

If you are using the Linksys-Router, then you must apply the most important settings via the HTML-Menu of the router. A few functions of **ixconn** are not active in this case; the related settings are ignored. You can refer to further information in this context in chapter 2.

LAN= [CONFIG/Button down-left section] Here you can define, whether the program output of **ixconn** should take place in German (**LAN=Deutsch**) or English (**LAN=English**).

COM= [CONFIG/Device] The command port that is assigned to the wireless modem can be given here (e.g. **COM=/dev/ttyUSB2**). Most of the modems possess multiple ports, therefore please take note of the following:

- For modems' type "Huawei", the "UI Interface" must be given.
- For modems' type "Novatel" either the "Primary Port" alone must be given or "Primary Port" and "Secondary Port", separated via a semicolon
example: **COM=/dev/ttyUSB0;/dev/ttyUSB2**
- For modems' type "Option" the "Applications Port" must be given.
- For modems' type "Sierra" the "AT Command Port" must be given.
- For phones' type "Sony Ericsson" the "Device Management" must be given.

As a rule, the correct type description of your modem can be found on the lower side of the modem; the upper part mostly contains only the label or overprints of network operators.

In case you do not enter any data for **COM=**, then **ixconn** detects the required port name at every program start automatically from the Ubuntu Device Configuration (**recommended**).

In case your wireless modem is located in a router of type Linksys WRT54G3G, then instead of the command port, enter the text **Linksys** here. Should you have changed the IP or the username/password in the router due to security reasons, then append the text "Linksys" according to the following sample: **COM=Linksys 192.168.1.1 admin;admin**

If you are using a device which provides only *one* port and requires to establish the data connection over this single port, you can switch **ixconn** to single-port mode: **COM=;NONE**

Unfortunately, several displays cannot be made during this single-port connection. In case you want to forbid **ixconn** the use of any port completely then enter **COM=NONE**

DEV= [CONFIG/Device] In exceptional cases **ixconn** cannot determine the device type correctly. Then it is recommended to enter it manually: 1 Option, 2 Novatel, 3 Huawei, 4 Sierra, 5 Ericsson, 6 Qualcomm, 7 Samsung, 8 ZTE, 11 Sony phone, 12 LG phone.

DEVI= [CONFIG/Device] If you want **ixconn** to send additional commands to the modem right after standard initialization has finished, please enter them here. Loosely followed the C notation, there may some special sequences being used: **\r** for CR, **\R** for CR with subsequently receiving the answer, **\p** for 0.5 seconds delay, **\P** for 5 seconds delay, **\x41** for a character in hex code (here the letter A as an example) and **** for a regular backslash.

In case you want to suppress the standard initialization, start this line with *****

PIN= [CONFIG/Device] Update this line with the valid PIN for the SIM card that is located in your wireless modem. Post the next start of **ixconn**, the PIN will be automatically written to the file in masked

format (e.g. "CRYPT152637489"). This masking is only intended as a visual cover and is not an absolute protection against unauthorized decoding. If the SIM card does not require a PIN at all, then no data needs to be entered for this section.

NET= [CONFIG/Network] Enter the network, to which the user needs to be logged in to. The network name must be exact and complete in its form, e.g. **E-Plus, BASE, T-Mobile D, o2 - de, Vodafone.de**. Please note that the network names can vary depending on the network- and SIM card that is being used. Usually, it is better to enter the PLMN code for the network, e.g. **26203**. If you require an automatic network selection, then do not enter any name here. If you want to detect, which network is currently available, then insert a question mark in the line: **NET=?**. **ixconn** then searches with the next start of the program for all the networks that are currently available and writes their names to this file. Example:

```
NET=?BASE;Vodafone.de;o2 - de;T-Mobile D
```

You must subsequently correct these lines of the file, whereby you will have to delete all the unknown foreign network names, the semicolons, as well as the question mark. Example:

```
NET=o2 - de
```

[While using the CONFIG program, you only need to use the **Network analysis** button to detect networks.]

Especially in the case of automatic network selection, please always note the network name that is displayed by **ixconn**. It can especially occur in border areas, whereby you use a foreign network as an oversight and thus have to incur higher costs. Thus, it is best to opt for manual network selection or use the acoustic warning in the case of network switch-over (**MOD=R**, see below).

If your provider allows access to various networks, then the question of manual network selection possibly does not arise at all. At best, use the automatic network selection option together with the warning to alert on switch-over to foreign or unknown networks. The networks that you can use in the most cost-effective manner can be provided in list form. The list is separated via semicolons. Exact written representation is important; please do not insert any *additional* empty spaces. Example:

```
NET=;o2 - de;T-Mobile D
```

APN= [CONFIG/Network] Enter the so-called "Access Point Name" (e.g. **internet.eplus.de** or **web.vodafone.de**). You can obtain further information from your network operator. In case you do not enter anything, then **ixconn** tries to detect the APN itself at the next program start. Subsequently, verify the entry that is automatically inserted.

A list of APN that are used can be found for example here:

```
www.mwconn.info/wiki/index.php/Standard_settings
```

If you want to use an empty APN, enter the word NONE. If you are unsure, whether the APN that has been entered is correct or not, then please inquire with your network operator. An incorrect APN can lead to higher connection costs in certain individual cases.

PPQ= [CONFIG/Network]

You can define the USSD-Code for the query of the prepaid credit. Many network operators use ***100#**. In case your network operator uses another code, then you must enter this respectively, if you want to use the option of prepaid credit query.

PPC= [CONFIG/Network] In case you want to simplify the task of loading of the prepaid credit, you can enter a template for the entry of the load or recharge code here. An "**SMS:**" as a prefix initializes the request for the loading of credit per SMS. Examples:

```
PPC=*104*<INPUT>#
```

```
PPC=SMS:74696+491770610000 <INPUT>
```

The text "**<INPUT>**" is replaced with the code that needs to be entered at a later stage via invoking of the load function from the menu.

CONA= [CONFIG/Connection] Here you decide if **ixconn** connects to and disconnects from the Internet when the program is started or terminated. Enter the letters **s** and/or **E** for this purpose.

CON= [CONFIG/Connection] Normally, **ixconn** determines the connection port by itself. If you have decided to apply the connection port manually instead, then enter its name here. Usually, you can find the modem's connection port in one of these system directories: **/dev/serial** or **/dev/ttyUSB***

PASS= [CONFIG/Network] In case it is required by your network operator that you enter the username and the password for the establishment of connection, this line must be filled with corresponding data. First the username, then a semicolon and then the password. Example:

```
PASS=user;password
```

[There are separate data fields that have been provided for CONFIG.] Due to security reasons, the name and the password of **ixconn** are saved in masked form (For further information, refer to the description for **PIN=**).

- DAY=** [CONFIG/Log] If required, **ixconn** sums up not only the data volumes that have been transferred per session, in fact it is also capable of doing the same for all the Kilobytes that have been transferred for a month. The same is valid for online time. Enter the calendar days here (always 1 to 31 respectively), on which the counter must re-start respectively. Example: **DAY=27;28** In this case, the volume counter will always be reset to zero on the 27th and the online time counter will always be reset to zero on the 28th. To get a reset every day, enter: **DAY=32;32** Should it not be required that the counter be automatically reset on a monthly basis, then enter 99 instead of the calendar days. The volumes will then be counted continuously. Obviously, this is not an infinite count; the counter is reset and restarts from the beginning post 1000 GB or 10000 hours, else the numbers will then be unmanageable.
- RND=** [CONFIG/Log] You can configure **ixconn** to log every connection instance in the file with the name **connlog.txt**. For this purpose, enter the round up limits for the data volumes and the online time that need to be totaled here. kByte and Minutes are the valid units of measurement. Example:
RND= 100;15
ixconn will then round up the data volumes to the next 100 Kbytes and the online time to the next 15 minutes at the end of every connection. The number (in the example "100"), the round up value is for the number of kBytes, to which round up at the end of every connection should take place; the "15" represents Online time round up to the next full 15 minutes.
- MAXV=** [CONFIG/Log] In case you use a data volume tariff, it is then to your advantage, if **ixconn** warns you prior to exceeding the permissible data volume that is included. You can define up to three various data volume limits in this parameter line. The data represented one after another in succession refers to the pre-warn-limit, warn-limit and the limit for automatic termination of the connection. Example:
MAXV=67500k;500M;1G
 In this case, **ixconn** will execute a warning tone post usage of 67,5 MBytes (three short and one long tone) and display a corresponding icon in the panel. After 500 Mbytes, a more urgent warning is sounded (three tones and an icon with faster animation), and after 1 GByte of data volumes, the connection will be automatically terminated. It can only be re-established, when a new counter cycle begins (refer to the section on **DAY=**). If you want to establish a connection prior to this, then you must increase the limit for the automatic termination of connection (here 1 GByte).
 Please note that the details without the unit of measurement are always represented as k (kByte). Decimal commas or decimal points are not valid. Limits, the exceeding of which should not have any consequences, can be simply set by you to zero, e.g.: **MAXV=0;500M;0**
- MAXT=** [CONFIG/Log] Just as in the case of **MAXV=**, you can also define a warning prior to the exceeding of specific online time here. The provision of the three possible limits is according to the same rules as those for **MAXV=**. Valid units of measurement are minutes, hours and days (Unit descriptions are **min**, **h** and **d**). Example: **MAXT=90min;4h;1d**
- HOMU=** [CONFIG/Network] In case you use a tariff with the so-called Homezone option, then it would be interesting for you to know, whether invoicing is based on the Homezone-Tariff or not. The network operator provides options for this purpose, which allow the user to query the Homezone-Status per Internet site or USSD-Code. **ixconn** can complete this task for you. For this purpose enter the address of the related Internet site of the USSD-Code in this line. **ixconn** always verifies the Homezone-Status at the start of the connection, and thereafter within intervals of ca. 10 minutes and at every cell hand over (as long as this is supported by the modem). The display takes place through an "H" in the info section of the panel. In case you use a volume tariff, then do take note of the fact that additional data volumes are required via the Homezone-query. However, contrary to normal surf-activities, this is considerably less or negligible. Examples:
HOMU=indikator.o2online.de
HOMU=*130#
- HOMI=** [CONFIG/Network] In order to be able to interpret the answers w.r.t. the Homezone-query, **ixconn** always searches for a specific sample text in the answer or response. The sample text for the status "within the Homezone" must be entered in this field. Please take note thereby with regards to the exact spelling and text representation and usage of HTML-codes. The latter can be retrieved by the user when they choose to invoke and view the source text of the Internet site. Example:
HOMI=You are located within your homezone.
- HOMO=** [CONFIG/Network] The same is valid for this data field, as described in the previous section. The sample that you enter here is however valid for the case that you are located *outside* your Homezone. Example:
HOMI=You are located outside the range of your Homezone.
- ERR=** [CONFIG/Monitoring] As already stated in the sections above, **ixconn** automatically terminates a connection, when the connection quality falls short of a few certain basic minimal requirements. Subsequently, the connection will be re-established anew.

Via this line **ERR=** in the file **ixconn.ini**, you can define the minimum requirements for the connection quality. We recommend the standard setting, which you can also initiate at a later stage via the entry of **ERR=***.

Entering numbers after the three-character keyword, you can define the error tolerance for the respective error type. **CRC5** signifies for example that **ixconn** should re-establish the connection anew after five in succession of short intervals of error having occurred. **CRC100** increases the error tolerance of CRC errors manifold, and with **CRC0** you define that CRC errors will not lead to the re-establishment of connection anew at all. The same is valid for all other error types. Thereby, the keywords mean:

FRZ Connection freeze (Data is sent, but no data is received)
CRC Cyclic Redundancy Check
TME Time-outs
ALG Grouping error
FRM Framing error
BUF Buffer overflows

[**CONFIG**/Monitoring] With the entry of a number after the character **L** you define the time from which errors that have occurred are displayed in the program window of **ixconn**. Thereby **L0** means "immediately", **L5** means "post reaching half the number of tolerable errors" and **L9** refers to "just prior to termination of connection".

[**CONFIG**/Start/End] The number after the keyword **NOC** defines the time in minutes, for which a state without an operative or functioning connection is tolerated, before the program is closed on its own. **NOC0** refers to "no time limit" (recommended).

Example: You want that **ixconn** closes on its own, as soon as 20 minutes have passed by without a working connection having been established. For this purpose, enter **ERR=NOC20**.

PING= [**CONFIG**/Monitoring] **ixconn** monitors an active connection continuously and re-establishes it anew, if something is amiss. When no data is transferred, because you are for example looking through an Internet page and thus have not activated any links, **ixconn** does not know in this case, whether the lack of data transfer is a voluntary action on the user's part or whether there has been a time-out in the connection due to a data transfer error. This can be identified with the help of a so-called Ping (Test send) to a defined destination address (IP) in the Internet.

As a destination address, you should always select a reliable Internet server, which you are aware of and consider as a reliable source for the return of responses for the test sends. Select for example, your Internet provider. Verify this simply per Ping command via **Applications->Accessories->Terminal**, to determine whether the server you have selected sends back a response.

If you have determined multiple destination addresses that you consider reliable, enter these in semicolon separated format in the INI-file. Format-Example:

PING=0.0.0.255;255.255.255.255;0.0.255.255

ixconn will then always use these destination addresses in the given sequence in order to test the connection when no data is being transferred.

If you do not enter any data in this line, then the option of detecting connection errors works with less reliability.

You can additionally influence the active connection text with the help of virtual IPs:

999.111.0.0: Destination is the current Domain-Name-Server (DNS) respectively

999.1.0.0 to **999.99.0.0**: Delay in sending of 1 to 99 cycles (per 5 to 8s)

Please note that the active test of the connection per Ping-command causes additional data traffic (maximum ca. 50 to 150 kBytes/hour). You should consider this against the backdrop of the selected billing tariffs. In case you are required to pay for each kByte, then it is better that no data is entered for **PING=**.

SDLY= [**CONFIG**/Start/End] Enter the start delay time; unit: seconds. This is an advantage, when **ixconn** is invoked at a point of time, at which the wireless modem has not been initialized as yet or is not ready, like in the case of an auto-start of the program at PC boot-up. Separated by a semicolon, you can add a delay time for resume after computer standby.

ENDM= [**CONFIG**/Global] You can terminate **ixconn** by clicking the the exit field **X**. This configuration line decides the the program's behaviour:

ENDM=0 There will be a security query before the program ends.

ENDM=1 The program ends without any query.

ENDM=2 Instead of terminating, the program will minimize itself to a panel icon.

ENDC= [**CONFIG**/Connection] In case you are using a tariff which charges higher costs within a specific time frame of day, you can **ixconn** have to popup a corresponding warning message. Examples:

- ENDC=07:50;18:10** Display a warning message when connected within this time frame. If the user does not respond within 90 seconds, **ixconn** will terminate the connection automatically.
- ENDC=23:55;00:05E** Display a warning message when connected at midnight. If the user does not respond within 90 seconds, **ixconn** will terminate the connection automatically and end itself afterwards. Optionally you can advise **ixconn** to shutdown the Computer (see **END=S**).

Please enter a spaciouly laid out period of time. On the one hand, your PC clock might not be adjusted exactly; on the other hand, **ixconn** will wait more than minute before it terminates a connection automatically.

END= [CONFIG/Start/End] In case you want to initialize that **ixconn** closes on its own, as soon as the Internet connection remains unused for a while (Constant data transfer of less than 1 kByte/s), then you can enter the required qualifying time here.

This is especially useful, when you want to begin a download and further require that the program closes automatically post completion of the download. Example:

- END=20** Close **ixconn** post a lapse of a period of 20 minutes of inactive connection (e.g. 20 minutes post end of download).
- END=20C** Same as example above, but only the connection will be terminated, the program continues.
- END=120F** This setting defines that **ixconn** is always closed after 2 hours of uninterrupted online time, irrespective, whether data has been transferred or not.
- END=20S** (or **END=20FS**) Not only is the program closed, but the PC is also shut down.
- END=20R** (or **END=20FR**) The PC will be shut down and subsequently restarted.
- END=0S** (or **END=0R**) Only in combination with **ERR=NOC**, **ENDC=E** or **MOD=E**. Subsequent to the closing and ending of the program due to an error, the PC will be shut down.
- END=0** **ixconn** starts immediately and does not end in a time-controlled manner; instead it is ended per mouse-click action (default).
- END=Z** Terminate program as soon as the computer is going to invoke standby mode.

You will be able to view a small icon in the info section of the panel right until the end of the countdown time, which in turn displays the remaining time in minutes (or in hours with an 'h' suffix appended to it).

However, please take note that an auto shut-down action could result in a loss of unsaved data of other files. Therefore, always save any possibly open files prior to this action.

CMD1= [CONFIG/External] You can enter an OS command in this line. **ixconn** will then execute this command directly post the establishing of the Internet connection. For example, if you want to start the Internet browser automatically post connection has been established, then the data entered for the line is as follows: **CMD1=/usr/bin/firefox**

In order to configure, such that the desired program is invisible, i.e. it runs without a window and without an entry in the taskbar, then insert a semicolon as the first character after **CMD1=**. Example:

CMD1=;/usr/bin/firefox (not usable with Ubuntu)

ixconn establishes a connection anew if too many data transfer errors occur. If you want that likewise also the command should be executed anew, then insert a comma as the first character after **CMD1=**. Should this result in the command being executed while the start or the close of **ixconn**, then use an exclamation mark resp. a vertical pipe character ("|") instead of the comma. Likewise, the combination with the semicolon that has been mentioned in the previous paragraph is also possible. Example: **CMD1=,;bash**

CMD2= [CONFIG/External] In case one command line parameter does not suffice, then you have the option to insert another one.

CMD3= [CONFIG/External] And here, a third command line parameter can be entered.

SMS1= [CONFIG/External] You can remote control your PC with **ixconn**. Every SMS that is received can trigger a pre-defined command (refer to **CMD1=**). In order to achieve this, insert a semicolon in this line. The command that has been entered for **CMD1=** is subsequently not executed post establishing the connection, instead it is executed post receipt of the SMS.

To prevent the execution of the command post receipt of all SMS, you can restrict this function to a specific sender or a specific SMS-content. For this purpose, enter the telephone number of the authorized sender in international format (e.g. +1555...) before the semicolon. In case you accept commands only from SMS, which contain a specific keyword, then insert this keyword after the semicolon. For example, a combination of both is as follows:

SMS1=+15551234567;SECRETWORD

Verification of the keyword does not differentiate between upper- and lower-case. In order to avoid problems with various SMS-character sets, only numbers and letters are best used (without country

specific special characters like for e.g. ä, é, ß) for the keyword.

ixconn offers you the possibility of using of several other commands in the line **CMD1=** while using the option of remote control per SMS. In addition to the normal command line options, there are also special commands that are permitted:

IXCONN_CONNECT	Establish connection
IXCONN_DISCONNECT	Disconnect connection
IXCONN_RECONNECT	End existing connection and re-connect
IXCONN_END	End ixconn program

You can combine these special commands with a command line prompt respectively, wherein the latter is inserted directly after this, e.g.: **IXCONN_CONNECT testprogram**

Furthermore, you can use the following in the command line placeholders:

%0	Number of the SMS-sender, without the leading plus sign
%1	Number of the SMS-sender
%2	The SMS content; if req. the portion after the keyword
%3	Like %2, however only characters, numbers, space character, "_" and "."
%%	Is converted to a %-character

As soon as you enter a parameter for **SMS1=**, **ixconn** knows that you want to use the remote control function and it is quiet possible that you cannot view details on your PC. Therefore, no SMS is displayed on the screen. Instead, a short acoustic signal rings respectively and the SMS is written to the SMS-Log (**sms.txt**).

Please use the remote control function only with normal SMS (maximum character length of 160 characters).

Remote control per call: In case your modem also supports dial-up connections (e.g. Voice or CSD), you can parameterize **ixconn** in such a way that it also reacts to this functionality. For this purpose, you must insert a comma directly after the "=". The section described above is valid for the rest of this feature. Naturally, in this case, the keyword, as well as the placeholders %2 and %3, are not available.

SMS2= [CONFIG/External] Like **SMS1=**, however for the second command (**CMD2=**).

SMS3= [CONFIG/External] Like **SMS1=**, however for the third command (**CMD3=**).

SMSC= [CONFIG/Network] Insert the number of your short message service center here if you plan to send SMS. Use international format, e.g.: **SMSC=+15550000**

IPC= [not in CONFIG] For the communication with other programs ("IPC"), **ixconn** uses a shared memory amongst other features, which has the key 0x4D5741F0. This segment can be read by all programs. In case you want to write in this segment in order to transfer commands to **ixconn**, then you will have to specify the octal access mask. Example: **IPC=0666**

Further information in this context can be found in chapter 11: "Local program control per Shared Memory"

ICON= [CONFIG/Global] If you would prefer to minimize the program window of **ixconn** as a panel icon, then you can retrieve the most important status information if you move the mouse cursor over the icon (tool tip). Depending on the icon type, some of this information is also represented graphically or numerically directly in the icon. You can select the icon type via the corresponding number in the **ICON=-line**:

1: Standard-Icon, 5: Monochrome digit icon, 6: Monochrome bar icon.

You can find an exact description of the individual icons in chapter 7.

BATT= [CONFIG/Monitoring] If the connected device has its own battery and supports the required query commands, you can decide in which case **ixconn** shall display the battery icon. Example: **BATT=50;15**

At less than 50% battery power the icon is displayed. It will become red at less than 15%.

MOD= In this line, you can insert the so-called flags. These are characters which help to activate specific program functions. The combination of multiple characters is allowed.

B [CONFIG/Global] Monochrome panel icons will be optimized for black background color.

C [CONFIG/Global] For the display in the mini window, so far as your modem supports this feature, the numerical code is displayed instead of the current network name (e.g. PLMN, LAC, Cell-ID). Further information pertaining to numerical codes can be found in chapter 6.

c In the mini window the data volume is displayed permanently, i.e. it does not switch to the data transfer speed display dynamically.

d In the mini window the data transfer speed is displayed permanently, i.e. it does not switch to the data volume display dynamically.

D [CONFIG/Global] In the mini window, the online time is displayed additionally. Due to restricted space availability, this is alternatively displayed with the data volumes – in cycles of a few seconds.

- E** [**CONFIG/Start/End**] This flag will configure **ixconn**, such that the connection is not re-established anew for every major connection error, instead that it should end its own instance. Thus, for example, user-defined actions per batch job can be executed, before **ixconn** is started afresh, in order to re-establish connection. Even a controlled re-start of the PC is possible (refer to **END=0 ; OR**).
- F** [**CONFIG/Monitoring**] For special applications – especially when adjusting an antenna – it is recommended to reduce the query interval for signal strength gauge by inserting an **F** into this line.
- G** [**CONFIG/Connection**] Most mobile networks compress the images that are present in the websites. This has three advantages: Firstly, there is not too much load on the network and more users can surf at the same time. Secondly, the speed at which the sites are invoked is accelerated, as less data also requires less time to get transferred. Thirdly and finally, graphics compression helps you save on costs, in case you use a volume-based tariff plan. Naturally, compression also has a disadvantage: Graphics are displayed in low quality and in individual cases there are also functional problems with the display of websites. Setting this flag can switch-off the graphic compression in general. **ixconn** then sends a compression deactivation packet to the compression server (IP 1.2.3.4). Please note that this general switching-off does not function with all networks.
- H** [**CONFIG/Network**] If you have activated the Homezone-display (refer to **HOMU=** and **HOMO=**), you can set this flag to automatically disconnect a connection, as soon as **ixconn** clearly detects that you are located outside the Homezone. Please take note that it can take a few minutes, before the connection is disconnected, as the Homezone-Status is verified approximately only every 10 minutes. Due to security reasons, in the case of a disconnect, the connection will not automatically be re-established.
- I** [**CONFIG/Log**] In case your modem supports this feature, then with every cell hand-over or switch-over to roaming, additional information is written to the connection log (PLMN, LAC, CID, refer to chapter 6 for more details). The prerequisite is naturally that the connection log has been activated (refer to **RND=**).
- J** [**CONFIG/Log**] Every change in signal strength is written to the connection log (also refer to **RND=**).
- K** [not in **CONFIG**] If you add this letter, the PIN will not be stored. That may be useful for security reasons if the computer is used by several people who shall not all gain access to the mobile Internet.
- M** [**CONFIG/SMS**] If you want to receive the SMS (Short messages) received by your modem on your screen, then you must activate this flag. Please refer to chapter 14 for exact details pertaining to the receiving of SMS.
- N** [**CONFIG/Connection**] If your modem needs to be controlled by NDIS commands, please insert the Letter **N** into this line. Please note: This option is not used with Ubuntu.
- O** [**CONFIG/Global**] If you have primarily activated the mini window option of **ixconn**, and would like to view a colored representation of the mode of operation, then it is best that you switch on this option. In the case of GPRS, the mini window is then displayed in green instead of blue.
- P** [**CONFIG/Log**] A service log is activated for test- and verification purposes. **ixconn** then generates a file with the name **servilog.txt**, in which all the most important system steps are registered. This file provides the experienced user, as well as the developer, with valuable information in case of problems with the program or with the hardware in use. Technical note: If the service protocol option has been switched on, then **ixconn** will run slower than usual.
- R** [**CONFIG/Global**] You can activate the warning tone with this flag, which alerts you in case of network switch-over. This is particularly interesting during automatic switch-over of network selection abroad, as depending on network operator, various data transfer costs can accrue.
- S** [**CONFIG/Global**] For test purposes, it is sometimes advantageous that the user is informed about every cell hand over or switch-over. In case your modem supports the display and output of the Cell-ID, then in the case of **MOD=S**, the user is informed about all cell hand overs via a short double-beep. You can thus identify the operating mode via the tone pitch: GPRS 500 Hz, UMTS 1000 Hz.
- T** [**CONFIG/Global**] Hereby, the user forces the normal program window of **ixconn** (not the mini window) to always be placed in foreground.
- Y** [not in **CONFIG**] Perform a modem reset at every program termination.
- Z** [**CONFIG/Connection**] If you start another connection tool from time to time and if that tool changes the APN in modem initialization commands in the device configuration, use this key to

have **ixconn** automatically deleted these commands at every program start.

Please note: This option is not used with Ubuntu.

- REM=** [CONFIG/Info] You can enter the required comments in this line. This is subsequently useful, when you use various initialization data and would like to identify them correspondingly. In the case of client-specific program versions, the line can be used for special purposes. Please refer to the additional description in this context that has been provided to you by your supplier.
- DIR=** [not in CONFIG] If you want that the **ixconn** program instances (**GPRS**, **UMTS** etc) do not use their own folders for their inputs and outputs (**ixconn.ini**, **connlog.txt** etc.), but that instead they should use another folder at another location, then enter the path of the respective folder here. In case no initialization file **ixconn.ini** is located there at the start of **ixconn**, then a new file is generated; **ixconn** thereby uses the initialization file from the program folder as a sample template. Important: The **DIR=**-line must be located in the 3rd line of the initialization file.

Please note that the file **ixconn.ini** cannot be edited, for as long as **ixconn** is active. Please close the program prior to applying changes in the file.

As stated earlier on, **line 01** should not be edited, as it is used as a cache for internal program data. Nevertheless, under exceptional circumstances, should you be mandatorily required to apply changes, then the following description w.r.t. the structure of this line will help in better understanding of its contents.

01 3AA999999999-7777888822114-566666600000000000000000

- 01** line number with a subsequent space character, should not be edited
- 3** recently selected mode of operation: 1=GPRS, 2=UMTS, 3=GPRS/UMTS, 4=UMTS/GPRS, 9=none
- AA** currently not used, should not be edited
- 9999999999** total sum of data volumes in Kilobyte
- separator, should not be edited
- 77778888** x- and y-coordinates of the program window in the screen coordinates (from upper left corner)
- 2211** Date and month of the last program run (for the automatic re-setting of the counter)
- 4** window view: 1=normal, 2=mini window, 3=Mini window with two rows, 4=Icon
- separator, should not be edited
- 5** if req.: short information that is to be displayed for CONFIG
- 666666** total sum of online time in minutes
- Rest :** currently not used, must contain 10 zeroes, and should not be edited

All the numbers entered in line 01 use leading zeroes. This means that, for example, if you wish to enter an online time of 180 minutes, you must enter the number sequence 000180 after the first number post second dash of line 01. Under no circumstances should the line length be changed; it thus cannot be increased or decreased. Each one of the numbers that is to be edited must be *overwritten*.

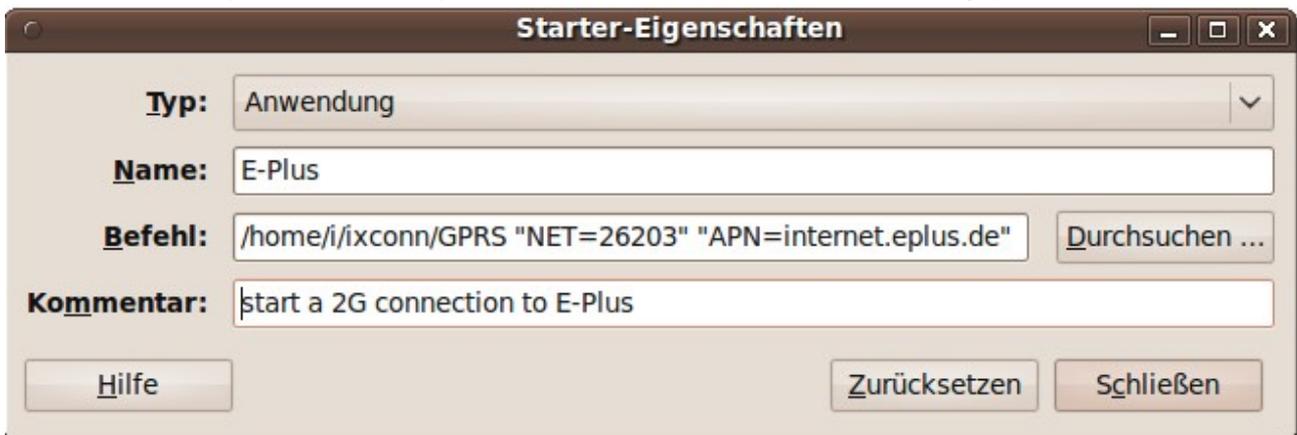
In case you inadvertently change sections of line 01 such that **ixconn** does not function in the correct manner anymore, then copy a sample installation of the program in a another/special folder. You can copy a correct version of line 01 from the newly generated "fresh" **ixconn.ini** file and insert the contents into your old initialization file.

11 Setting of parameters and program control

This chapter is specially intended for the experienced PC-users, who are confident with working with parameters.

You can apply settings for the **ixconn** program not only via the configuration program **CONFIG** or per the file **ixconn.ini**, in fact you can also parameterize via command line parameters. For this purpose, retain the original name of the program as **ixconn**, such that you can define the program function with the first parameter that you apply. The same rules are valid for this parameter as were applicable for the selection of operating mode for of the program names (e.g. **UMTS**, **UMTSGPRS** etc., refer to chapter 5).

In this manner, you can apply additional settings that are subject to frequent change directly when the program is called and as a command line (if present, after the parameter of the operating mode). The same syntax as valid for the lines of the file **ixconn.ini** (refer to chapter 10) is also applicable here. The lines that have been stated in the previous chapter must be placed within quotation marks when applied as parameters. These parameters have precedence over the lines in the file. Thereby, please take note that on



re-writing of the file, the parameters are automatically applied by **ixconn** to the file as well.

This re-writing can be forced by the parameter **INIWRITE**. **INIWRITEEXIT** results in the same, but additionally ends the program.

Example: You possess a SIM, with which you can log into both the networks of Vodafone, as well as E-Plus. You would like to use *one* initialization file **ixconn.ini**, because the data volumes are not meant to be measured for both the networks separately.

For this purpose, create a starter to the program file, whereby, you use the right mouse click action on the panel and select the **Add to Panel** option.

Now, click on the newly created shortcut using the right mouse click action and open its properties. Enter the **ixconn** program's path and append, after a space sign, the network specific settings for E-Plus, here the network name and APN (refer to chapter 10 for the exact information in this context).

Similarly, proceed in the same manner for Vodafone as well. With the help of both these starters, you can define the required network at every start of **ixconn** respectively.

Start/Stop instead of Restart

If you are starting an executable like **GPRS** or **UMTS** while another **ixconn** executable is still running, that one will be terminated and the new one will be started afterwards. Instead of this you can set **ixconn** to terminate without starting the new executable: supply the command line parameter **STARTTOGGLE**.

ixconn-Logo and Install Dialogue

In case you do not want the display of the **ixconn**-Logo at start, apply the word **NOSPLASH** as a parameter at program start. Unfortunately, this setting can however not be integrated in the **ixconn**-Configuration, because the initialization file **ixconn.ini** is interpreted only for a few seconds post program start.

If you want to install **ixconn** without any query message on the screen, apply the **SILENTINSTALL** parameter at program start (not used with Ubuntu).

You can mute the audio output of **ixconn** by clicking the appropriate function in context menu (opened with right mouse key) or supplying the program with the parameter **MUTE** at startup.

Local program control per file system

As soon as it is started, the settings that have been applied to **ixconn** cannot be edited anymore. You must first close **ixconn** and then re-start the program post editing to apply the new settings.

Nevertheless, you have the option to intervene in limited capacity during the regular program run. **ixconn** recognizes four special commands, which you can pass on to the program in the form of a correspondingly named empty file respectively: **IXCONN_CONNECT**, **IXCONN_DISCONNECT**, **IXCONN_RECONNECT** und **IXCONN_END**.

It is thus possible to control the most important functions from an external program:

Establishing connection, termination of connection and the closing of the **ixconn** program.

The rather inelegant form of entering command per file has been implemented, because it allows for easy integration in other external programs. Practically every programming language provides the possibility to generate files in a very simple manner. For example, in case you are using a Linux-Batch-File, the following line suffices:

```
echo x > ~/ixconn/IXCONN_CONNECT
```

The file that has been applied as a command is deleted by **ixconn**, as soon as the command has been recognized. In order to prevent the accidental loss of valuable data, **ixconn** does not delete files that are larger than 30 Bytes. Thus, for the purpose of program control, it is always best to generate empty or almost empty files.

Local program control per Shared Memory

In case you yourself are a software developer and would like to control **ixconn** from another program, then you can also use a direct method for this: Applying of parameters per Shared Memory. Likewise, this method also ensures that you can read all the outputs of **ixconn** (signal strength, data volumes etc.). However, substantial programming knowledge is required for this purpose. The following section represents the code structure that is required for this purpose (programming language is C).

```
typedef struct { // ixconn shared memory, key: 0x4D5741F0
    unsigned long len; // length of this structure in bytes
    unsigned short structure_version; // version of this structure: 3
    unsigned short program_version; // version of ixconn program
                                   // (main version * 256 + subversion)
    unsigned long res1[3]; // reserved
    // data for transfer direction external -> ixconn
    char command[100]; // commands to be executed by ixconn
                       // "IXCONN_CONNECT": connect to Internet
                       // "IXCONN_DISCONNECT": disconnect from Internet
                       // "IXCONN_RECONNECT": reconnect to Internet
                       // "IXCONN_END": close program
                       // ">:::ATI": AT command to be sent to device (hier "ATI");
                       // "":250:4000:ATI": same, but including delay periods:
                       //   reception starts 250ms post sending,
                       //   maximum receive time 4 seconds;
                       // "IXCONN_PATH": retrieve present program path;
    // data for transfer direction ixconn -> external
    // note: not all data modems supply all types of information;
    unsigned long process_counter; // this counter is being incremented by ixconn
    // as soon as new data has been written to shared memory;
    unsigned long volume; // cumulated data volume in kBytes
    unsigned long time; // cumulated online time in minutes
    unsigned long online_time; // actual online time in seconds; ==0: offline
    unsigned long offline_time; // actual/last offline time in seconds
    unsigned long upspeed; // actual speed of sending data, in Bytes/s
    unsigned long downspeed; // actual speed of receiving data in Bytes/s
    unsigned char opmode;
    // mode of operation; 0: unknown; 1: GPRS; 2: UMTS; 5: EDGE; 6: HSPA;
    unsigned char signal_raw; // signal strength as GSM standard value (0..31)
    unsigned char signal_percent; // signal strength in percent (0..100)
    // valid only if signal_raw>0
    signed short signal_dbm; // signal strength in dBm
    char network_name[30+1+1]; // network name
    char plmn[6+1]; // Public Land Mobile Network, containing MCC and MNC
    char lac[4+1]; // Location Area Code
};
```

```

char cid[4+1]; // Cell ID
char message[64+1]; // message text
char mini_message[48+1]; // mini message text
char error_message[32+1]; // if appl., error message text
unsigned char battery; // battery status; 0: unknown;
char rnc[4+1]; // RNC ID
unsigned char internal1[1]; // reserved
unsigned long internal2[6]; // reserved
char answer[600]; // answer to AT command or "IXCONN_PATH"
} ixcio_t;

```

You can send commands to **ixconn** per Shared Memory. A short description of the valid commands in this context can be referred to in the sample program code for the structure element "command".

Please take note that due to security reasons, **ixconn** initially grants the user read-only rights for the shared memory. If you want to write commands in this segment, then you must define the appropriate access mask (refer to section **IPC=** in chapter 10 for further details).

12 Internet Connect and Disconnect

Start the **ixconn** program. The program window with information pertaining to the current status of the initialization is displayed. As soon as the initialization has been completed, **ixconn** establishes the Internet connection (exceptions – refer to chapters 5, 9 or 10).

In order to end the Internet connection once again, it suffices that **ixconn** is merely closed. You can accomplish this via clicking on the close button (**X** top right corner of the normal program window) or via clicking the respective option in the program window or via right click mouse action in the panel status icon. Please be patient, while **ixconn** takes a few additional seconds to complete an ongoing process and thus takes a little while to end an existing connection or end the network search properly. The program in this case has registered the close option selected by you and is in the process of completing it.

13 Monitoring of the Internet Connection

ixconn continuously monitors the Internet connection that has been started by you. It verifies continuously, whether the connection is still active and exists, and re-starts it in case it has been terminated manually or due to technical reasons.

The quality of the connection is also monitored on a continuous basis. As soon as too many data transfer errors occur within a short span of time or the connection is "frozen," i.e. no data is being transferred, **ixconn** will terminate the connection and re-establish it anew. A fine tuning option w.r.t. the tolerance level can be found in chapter 9 in the section "Monitoring" or in chapter 10 in sections **ERR=** and **PING=**.

If you want that **ixconn** is automatically closed in case of absence of connectivity over a long period of time, then you can achieve this via the keyword **NOC** entered for the parameter **ERR=** (refer to chapter 10). A significantly more comfortable option is via corresponding entry in the registered tab "Start/End" of the configuration program **CONFIG**.

Likewise, the defaulting of values for a maximum online- or inactivity time is also possible. You can also configure **ixconn** such that, it not only closes on its own, but also shuts down the PC in this case. You can find further details pertaining to this option in chapters 9 and 10, in the sections "Start/End" or **END=** respectively.

Irrespective of the automatic connection monitoring feature, you can also terminate an existing connection manually, in order to be able to establish a possibly more reliable connection subsequently with the next connection that is established anew. For this purpose, use the right mouse click option to click on the program window or the icon and selection the **Reconnect** option in the context menu.

14 SMS and PC-remote control

In case your wireless modem supports the receiving of SMS (short messages), then the SMS that are received by **ixconn** can be selected and displayed on the screen. For this purpose activate SMS-receipt in the configuration (per program **CONFIG/Global** or in the file **ixconn.ini** via entering the flag **M** in the line **MOD=**). To activate transmission of SMS, enter a valid service center number (program **CONFIG/Network** resp. File **ixconn.ini**, Line **SMSC=**). For more details pertaining to configuration, refer to chapters 9 and 10.

In order to prevent that SMS-receipt stops your wireless modem's functioning due to lack of free space of the SIM, the read SMS and those with read receipts that have been marked with OK, are deleted from the SIM. In case you want to read an SMS that you have already received and read at a later stage too, then simply open the file **sms.txt**. All the SMS, together with the sender's number, date, time and time zone are saved in this file.

The last received SMS can be found in the file **sms1.txt**. Additionally, every incoming SMS is being stored as single file into the folder **sms_in**.

To administer SMS, a small SMS manager has been integrated into the configuration program **CONFIG**. There, you can scroll through all received SMS, reply or send new SMS. While **ixconn** is not attached to the radio network, outbound SMS are stored in memory. They will be sent as soon as a connection has been established. Such SMS are marked with an asterisk in SMS list.

Please note a special behaviour in case you have selected single-port mode: **ixconn** cannot send any SMS and can read the SMS that have been received only shortly after program start. This means that you will be able to retrieve a view of SMS that you have received during the course of your Internet connection only when you start **ixconn** the next time subsequently. A remote control of the PC per SMS in this case is only possible with many limitations.

Long SMS

Technically, SMS messages cannot exceed a length of 160 characters. Despite this limitation, many devices are able to send and receive longer messages, using a special procedure: Every text with more than 160 characters is split into smaller parts by the sender and reassembled to one long message by the receiver. Because the receiving device needs to know which parts belong to which long message, every message part is preceded by a header. **ixconn** will show the contents of these headers in curly brackets. For example, this is one long message which has been split-up into two smaller ones:

```
{10121}This is the first part (exactly 153 characters of text) .
{10122}This is the second (and last) part.
```

Every header consists of 7 characters. Therefore, the usable length of every text part is limited to 153 characters. This is the header format with details:

```
{lrrmi}
l lower-case letter l for "long"
rr reference number (important in case you send more than one long SMS to the same phone number)
   The reference number must be the same for each part of the same long SMS.
m total number of parts of this long SMS (at least 2)
i index number of this part (starting with 1)
```

The numbers may appear in hexadecimal representation (0..9, A..F).

ixconn does not automatically split transmitted text messages, but it can send long SMSs; if the user (or an external program) splits the long texts and supplies the text parts with headers in the format mentioned above.

Please note: Transmitting long text messages is more expensive than transmitting regular text messages. This is because Internet providers are charging each text component. For long SMSs, you need to use 7 characters of space for every header, which means this space is no longer available for the text, it is often cheaper to send several regular SMS text messages than one long message.

Sending of SMS by machine

ixconn provides other programs with the option of sending short messages. To make this process uncomplicated and also facilitate the usage of batch files, data exchange per files is used in this case. For this purpose, **ixconn** checks on a regular basis, whether a file whose name meets the format **sms_ExampleApplication_155500123.txt** exists in the folder **sms_send** in **ixconn** working directory. If yes then the text that is contained therein is sent and subsequently the file is moved to the folder **sms_out**. The destination address must be provided in international format, the plus sign is omitted in the file name. The maximum text length is 160 characters.

Example of application: In case you want to send an SMS from a new batch file (e.g. **senden.sh**), then generate this file with the name "send.sh" and the following content:

```
echo Hello, this is an automatically sent SMS. >sms_send/sms_test_155500123
```

Double-clicking on the icon of "send.sh" will send an SMS with the above-mentioned content and to the number +155500123.

Naturally, you can also write the above-mentioned echo-command directly in the Linux terminal.

In order to prevent duplication of SMS that is sent or that it is continuously sent across in the case of a program error, **ixconn** sends the consecutive SMS with the same destination and same content only post lapse of a time lag of ca. 3 minutes since the time of the last send action.

Remote control per SMS

If you want to avail of this option, then you can start user-defined commands or programs per SMS and thus remote control your PC. Ideal for this purpose is an SMS-Flat rate for the individual network.

You can thus, for example, access your PC via remote control through the Internet and post completion of the task disconnect it from the Internet once again. In fact, even remote controlled shut down of the PC is possible.

No Internet connection is required for the remote control function. It suffices if the wireless modem is attached to the mobile network.

Remote control per SMS is considered an especially secure procedure and the threat of unauthorized access or rogue attacks is very rare. Naturally, basic fundamental security rules are valid hereby as well. If, for example, you enter the command %2 and define neither a sender number nor a keyword, then any SMS-writer can execute any desired command on your computer.

It is therefore recommended that the placeholder "%2" be used only in places, where it is absolutely and mandatorily required and that the concrete startup commands are entered with the options that are available to the user. Likewise, well-defined values for the sender number and keyword should be a standard that needs to be adhered to. It is always safer to use the placeholder %3 instead of the placeholder %2. The infiltration of unwanted commands is thus prevented to a certain extent, because no special characters can be transferred in this case. You can entirely omit the usage of %2 and %3, if the program that is started per SMS, refers to the content of the last received SMS from the file **sms1.txt**.

More information pertaining to remote control per SMS can be found in the section "External" in chapter 9 and in the sections "**CMD1=**" and "**SMS1=**" in chapter 10.

Remote control per call

You can remote control your PC not only per SMS, in fact you can do this even per call. In case your wireless modem supports this, it is even possible to interpret the telephone number of the caller. Hereby, you can ensure that your PC reacts only to your call and not to the call of others, who has possibly just got the wrong number.

ixconn does recognize the call, it however does not accept it, so that as a rule you do not have to incur any costs for the call. With respect to the parameterization, the same is valid as for SMS (see above). Only the defining of a keyword, as well as the usage of the placeholders %2 and %3 is not possible.

In case you have problems with the Caller-ID recognition, please verify, whether the incoming call is identified with a number (refer to the connection log "connlog.txt"). In case of certain modems the Caller Line Identity Display ("CLIP") does not function; possibly this feature is also deactivated in your telephone network.

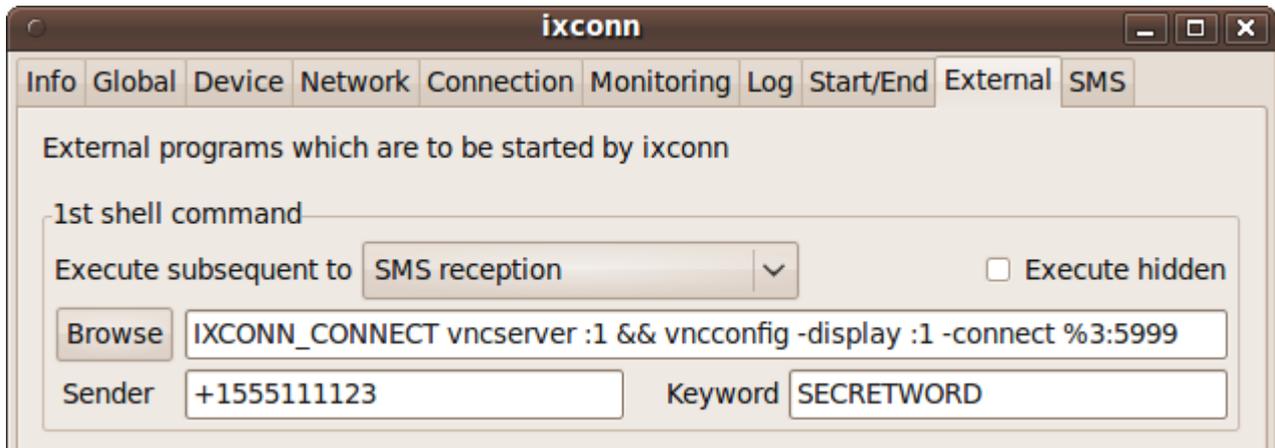
Unfortunately, not all wireless modems and not all mobile providers do support the passing through of calls. Please inquire with your supplier or your mobile telephony service provider beforehand regarding the availability of this option.

You can find more information pertaining to remote control per SMS in the section "External" in chapter 9 and in the sections "CMD1=" and "SMS1=" in chapter 10.

Example for remote control

Let us assume that your PC at home is equipped with a wireless modem, but is basically not logged onto the Internet. You are in office and have Internet access that is externally accessible too and would like for your PC at home to go online and subsequently connect to you per remote control software. For example, you have installed vnc4 from Ubuntu packet sources on both PCs.

The settings in **ixconn**:



You will naturally enter the telephone number of your wireless modem as the sender, and you can select any required keyword (secret word) that only you are aware of.

The sequence:

At the PC in office, you enter this command in a Linux terminal: `vncviewer -listen 5999`

Now, you send out an SMS with the following content to your modem at home:

SECRETWORD 110.120.130.140

"110.120.130.140" in this example refers to the current IP of your Internet access at office.

Consequently, your PC at home will dial-up and connect to the Internet and subsequently connect to you.

15 Prepaid

Naturally you can use **ixconn** also in combination with a prepaid SIM. Prepaid-volume tariffs are suited for the occasional retrieval of mails and to chat with friends or business partners.

As a rule, the current status and value of your prepaid credit can be retrieved per mobile phone with the abbreviated dialing of ***100#**. In order to save you the hassle of having to take the SIM card out of the wireless modem and inserting it into your mobile phone every time you want to merely query the credit status, **ixconn** possess a function for the very same purpose.

While attached to the network, use the right mouse click option to click on the **ixconn** program window or in the mini window or on the panel icon. Select the **Prepaid-credit?** option in the menu that is consequently invoked. The credit query is started after a short period of time. If the action has been successful, then the credit status that has been retrieved is displayed on the screen and also written to the connection log "**conlog.txt**".

In case you face difficulties with the integrated credit query, then we recommend you to execute a firmware update of your wireless modem first. If this does not help, then you can also determine the credit via the service console in **CONFIG** (registered tab "Device"):

AT+CPIN?

In case the response is "**SIM PIN**", then enter the correct PIN with the following command:

AT+CPIN=xxxx

Now wait for ca. 15 Seconds.

AT+CUUSD=1, "*100#", 15

The response from your network operator is displayed after a period of ca. 15 seconds.

Should your provider not use the code ***100#** for the prepaid query, but another code, then you can customize **ixconn** correspondingly. Further information in this context can be found in the chapters 9 and 10 (**CONFIG/Network** or **ixconn.ini/PPQ=**).

The current credit can naturally be retrieved only for prepaid cards. In case you call for your bill (so-called postpaid) as is usually the case with many mobile telephony service providers, then the prepaid query does not retrieve any result set.

Load prepaid account

Most of the mobile telephony service providers allow the loading of prepaid credit per numerical code. Such a numerical code is valid only for the purpose of loading credit once. You receive this when you purchase a recharge card or per print-out from a prepaid vending machine.

Under normal cases, the numerical code is entered per mobile phone with the help of a special key sequence. To save you the trouble of having to take out the SIM card from your wireless modem every time, **ixconn** has an individual load function feature for the prepaid account. For this purpose, use the right mouse click option on the program window and then select the **Load Prepaid** option in the menu subsequently.

Post lapse of a few seconds, a separate window is invoked, wherein you must enter the recharge-numerical code.

In case there are difficulties with this function, then likewise, as described above, you can execute this per **CONFIG**. Enter the USSD-code instead of ***100#**.

Special features in case of certain wireless modems

Unfortunately, the prepaid functions mentioned here, are not supported by certain older modems. A few other modems (types Novatel or Option Colt 129) do not allow these functions during a connection. Use the right mouse click action on the instance of **ixconn** that has been started and select **Disconnect**.

16 Problem solving

As soon as **ixconn** determines that it cannot execute its tasks, an error message is raised (red color). The following section describes the meaning and significance of the various messages.

Port not available.	Cannot connect to the wireless modem. It is possible that currently another program is accessing the modem. Check, whether the modem has been correctly inserted and then try to restart the program anew.
Read error at ...	No data could be read from the wireless modem. Check, whether the modem is correctly connected to the PC.
Modem not responding.	The wireless modem does not react correctly to the commands that have been sent. Check, whether the modem is correctly connected to the PC.
SIM not found.	Check, whether the SIM card has been correctly inserted in the wireless modem.
PIN required in file "ixconn.ini".	The SIM card in the wireless modem requires a PIN. Enter the correct PIN in the file ixconn.ini . You can easily do this via the "Device" tab in the configuration program CONFIG .
PIN is not valid in file "ixconn.ini"!	The PIN that has been registered in the file ixconn.ini is invalid. Please take this error seriously and enter the correct PIN. Else, you run the risk of blocking the SIM card.
SIM has to be unlocked with PUK!	An incorrect PIN has been entered on a frequent basis. Search for the 8-digit PUK in your documents and enter this together with the required new PIN in the file ixconn.ini . The line then displays e.g.: " PIN=12345678,1234 ".
PUK is not valid! Caution!	The entered PUK is invalid. Take note that a SIM card becomes unusable in the case of incorrect PUK being frequently entered!
Please read INI file"ixconn.ini".	Open the file ixconn.ini per double-click mouse action and follow the note in line 04 of this file.
Connection error xxx.	Error in trying to establish connection. As a rule, this is a problem with the network. ixconn will then try to re-establish connection anew on its own accord. If the problem is still not solved, then you can refer to a short description of the error numbers in the following sections.
Connection error 49.	This means "timeout error". The program tried a long time to establish a connection and gave up.
Connection error CRC.	Instead of the number as described in the previous section, ixconn can also display a combination of letters. This then points to errors that occur during a connection. In this case, ixconn terminates the connection and re-establishes it anew once again. The significance of the letters has been described in chapters 9 and 10 in the sections "Monitoring" or ERR= . There you also can find informations how to let the program ignore these errors. In case the " Connection error FRZ " occurs frequently, then this could be due to unfavorable configuration in TCP/IP-Parameters. The reason for the " FRZ " error can also be very low signal strength. Your modem then does indeed receive the signal of the base station, while on the other hand your modem's signal is too weak in order to reach the base station successfully. In this case, only a change of location or the usage of an external directional antenna helps.
No connection accomplished.	The maximum time without a functional or active connection entered for ERR=NOC in the configuration (CONFIG/Start/End or ixconn.ini/ERR=NOC) has been exceeded. Thus, ixconn is shutting down on its own.
Conflict with other ixconn.	You have started ixconn , when another program instance is still active. In this case, the previously opened instance of ixconn should close on its own. If you receive an error message, then the auto-shut down of the previous instance was not successful. Then, please end ixconn manually.

ixconn.ini gesperrt/locked.

ixconn Could not open the initialization file. Please ensure that it is not being used by another program (for example via an editor).

Volume/time warning

The data volumes or the online time warning limits that you have defined, have been exceeded.

Volume/time exceeded

The absolute limit for the data volumes or the online time that you have defined has been exceeded. **ixconn** will close the connection due to this reason. Re-establishing connection anew is only possible, when you edit the respective limits (refer to the sections "Log" or **MAXV=/MAXT=** in the chapters 9 and 10) or if you have started a new time range for the counter (refer to date entry in the section **DAY=**).

Per configuration program **CONFIG**, you have the additional option to set both the counters to NULL manually. For this purpose, select the registered tab "Log".

Shutdown error.

The shut-down action that has been defined per configuration (refer to the section "Start/End" or **END=S** of the chapter 9 and 10) could not be executed. The reason for this could be the absence of relevant authorization for the shut-down of the PC.

If none of the above-mentioned measures lead to the solving of the problem, then test, whether the problem occurs even after a machine re-boot. If the error is frequently identifiable and can be reproduced, then please activate the service log (configuration program **CONFIG**, section "Log" or configuration file **ixconn.ini**, section "**MOD=P**", refer to chapter 9 or 10) and post a short error description along with the generated log **servicelog.txt** to the MWconn forum.

A few messages that are raised in the program window of **ixconn** inform you about the current functional status (Colors are blue or violet).

Modem type: Novatel

ixconn has found a modem or a mobile phone of the defined type in the Ubuntu device configuration. In case this is not the device that you would like to use for Internet access, then you should either deactivate it, so that **ixconn** detects another connected device, or you should enter the required device in the configuration (**CONFIG/Device** or **ixconn.ini/COM=**). Further information in this context can be found in the relevant section of chapters 9 or 10.

**Network determination...
APN determination...**

ixconn is now automatically retrieving the available networks or the APN. This process can take a few seconds. Please be patient during this process.

**Network list has been entered.
APN has been entered.**

The automatically detected networks that are available or the APN have been registered in the configuration (**CONFIG/Device**, **CONFIG/Network** or **ixconn.ini**). Subsequently, please verify the entry.

**No network available.
Could not determine APN.**

Automatic detection was unsuccessful. A reason for this could be insufficient signal strength of the network. Please try to find a better location, or enter the required network or APN manually.

Already connected.

The required connection to the Internet has already been established at the start of **ixconn**. **ixconn** will then monitor this and display the signal strength continuously.

Operations mode selection failed.

The wireless modem in use has not accepted the defaulted operating mode (GPRS/UMTS). The defaulted value of the modem will be used. In case your modem categorically does not accept the operating mode, then you best start **ixconn** as **CONN**.

Operating mode: GPRS.

The given operating mode is pre-selected.

Searching for network.

The wireless modem is trying to log-in to the network with the required operating mode. Please be patient, as this process takes a few seconds.

If the network search lasts for more than 3 minutes, then there is either no reception or the entry for the manual network selection is incorrect (`CONFIG/Network` or `ixconn.ini/NET=`). Try a network analysis (Further info in this context can be found in the relevant section of chapters 9 or 10).

No Service

The required network could not be reached. A possible reason for this can be that a network has been entered via manual network selection, which in turn is locked for your SIM card.

Sending SMS.

ixconn is capable of sending a new SMS. information can be found in chapter 14.

Should the sending of SMS not be executed by you or via one of the programs configured by you to do so, then please close **ixconn** immediately. This could possibly be charged to your credit account by your provider.

Graphics compressed only.

You have switched off graphic compression in the configuration. **ixconn** has sent the deactivation-packet to the compression server (IP 1.2.3.4), but has not received any response. Either an error has occurred at the server, or your network operator uses another method for compression. In this case, switching-off of compression via **ixconn** is not possible. At best, you can deactivate this function in the configuration.

In conclusion, this chapter deals with a list of frequently asked questions. Updates will take place with each version.

How do I edit the PIN?

The PIN of the SIM card cannot be edited with **ixconn**. Should you want to change your PIN at some point of time, then insert the SIM card in a customary mobile handset and use its function to change the PIN.

In spite of correct settings in the configuration, **ixconn** does not receive any SMS.

Probably, there are too many SMS that have been stored in your SIM card. Insert the SIM in a customary mobile handset and delete all the SMS from the SIM. Subsequently, the SMS receipt function should start working.

There are other files in the same folder, in which the **ixconn** program is located – what are these other files used for?

You start the Internet connection within the domain of the respective operating mode (e.g. GPRS, UMTS/GPRS or without a defaulted operating mode) with the program files **GPRS**, **UMTS**, **UMTSGPRS**, **GPRSUMTS** and **CONN**.

The file **CONTROL** serves as an additional operating surface for one of the pre-named programs.

In the case of the file `ixconn.ini`, it pertains to the configuration file w.r.t. **ixconn**. You can open the same with the program **CONFIG** or with a text editor. All the configuration settings for the program are stored in this file.

The file `connlog.txt` contains the connection log. Should a file called `servilog.txt` exist, then you can find log outputs for verification purposes in it. The `sms.txt` contains all the SMS that have been received; the file `sms1.txt` contains the last received SMS respectively.

I want to install a new version of **ixconn**. Can I continue to use the older settings?

Yes. Just replace the program files (file **ixconn**, **GPRS**, **CONFIG** etc.). The new version of **ixconn** will read the settings from the old `ixconn.ini` file and if req. re-writes it to the file in a new format. For security reasons, you must subsequently verify the parameters post the first program start routine.

Sometimes I start **ixconn** anew, because the wireless modem has initialization problems. Must I mandatorily close the program prior to this action?

No. As soon as you start **ixconn**, while another instance of **ixconn** is running with the same user, then the previously opened instance of the program is automatically closed. The newly started program waits for the end of the previously opened program and only post this action is completed does it resume running.

It takes a very long time to detect a bad connection with **ixconn**.

- or -

What can I do in order to end the connection and re-establish it anew?

You can either reduce the error tolerance of **ixconn** (refer to chapter 9, section "Monitoring", or chapter 10, sections **ERR=** and **PING=**) or occasionally end the connection manually. Use the right mouse click action on the program window (or the mini window) to end the program and select **Reconnect**. **ixconn** will then terminate the connection and try to re-establish connection anew on its own.

The connection log **connlog.txt** is unclear to me. How can I generate a table that only contains data volumes?

You will find a simple semi-graphical evaluation in **CONFIG** in the registered tab "Log" (refer to chapter 9). A CSV table with daily values can also be generated via this function.

Why can I not pre-select "HSDPA" as the operating mode?

In the case of HSDPA (High Speed Downlink Packet Access), it does not deal with an individual operating mode, instead in this case it deals with a communication method of the standard UMTS (Universal Mobile Telecommunication System). HSDPA-capable modems then always use this communication method automatically, when it is available. The fact that HSDPA is being used is only identifiable by virtue of the instance of the Downlink-data transfer speed increasing to more than 48 kBytes/s. Correspondingly, the same is valid for EDGE (Enhanced Data Rates for GSM Evolution) as an additional modulation method of the operating mode GPRS (General Packet Radio Service). Speeds of more than the otherwise usual 6.7 kBytes/s that is available in case of GPRS are facilitated via EDGE.

I receive a warning regarding my firewall a few seconds after **ixconn** has established a connection. What are the consequences of this warning on the application?

Presumably, you have entered one or more IP-Addresses to test the connection (**CONFIG/Monitoring** or **ixconn.ini/PING=**) or deactivated the graphic compression (**CONFIG/Network** or **ixconn.ini/MOD=G**) in the configuration. Your firewall warns you w.r.t. the program **ixconn**, because this tries to send packets to the Internet. However, regular sending of the packets is necessary, in order to verify the reliability of the connection or in order to switch off the graphic compression. The test packets for the purpose of testing the connection do not contain any data; thus no personal data is transferred. Please allow the program **ixconn** to send the packets.

There exists a UMTS-connection. Why does the data transfer speed very often not exceed more than 20 kBytes/s?

This can be due to bottlenecks in the mobile network of the network operator that you use. Or it could be that its gateway between the mobile network and Internet has been weakly dimensioned.

Post switching of the operating mode (UMTS, GPRS) per context menu, the connection is disconnected for a short period.

Unfortunately, the some wireless modems do not allow the manual switching of operating mode during a connection. Thus, **ixconn** disconnects the connection for a short time, switches to the required operating mode and then re-establishes the connection anew once again.

During the Update verification, a browser window is opened, and my PC sends data. What information is being sent?

When you click on **ixconn.com/update?** in the context menu, **ixconn** requests an internet page with the number of presently available download version. Thereafter, the program shows you the appropriate update information. Besides these two page requests there is no information sent through the Internet.

I have configured **ixconn** in such a manner that my VPN-Access starts post establishing connection. How can I terminate the VPN connection before **ixconn** closes the Internet connection?

You can default commands, which **ixconn** executes at the end of the program run (program **CONFIG**, registered tab "External"). Unfortunately, the Internet connection is also terminated at this point of time. Therefore, it is best that you proceed as follows: Do not allow **ixconn** to terminate the connection (**CONFIG**, registered tab "Connection"). Generate a batch file to end the VPN and the Internet connection and start this batch file automatically at the end of the program run (see above). Content of the batch file is for e.g.:

```
killall Your_VPN_connection
killall ppp0
```

The credit query displays one Euro less than qualified amount.

A few Internet providers have technical difficulties in determining the exact credit during an active Internet connection, and display a lower amount to be on the safer side. In case of doubt, end the connection (menu option **Disconnect**) and restart the credit query anew.

My virus scan raises an alarm! The file **ixconn** supposedly contains a "P2P-Virus".

Please do not despair – this is unfortunately not a rarity of occurrence. The virus scan investigates every new program and reports suspicious contents. This also includes code segments, which can establish connection with the Internet. **ixconn** naturally contains such program components (establishing connection, switching-off the graphics compression, connection to the Linksys-Router). To ensure that you have not received a virus during download, it is recommended that the program be verified and checked with an online file scanner. For example:

www.kaspersky.com/scanforvirus

Should there be more questions over and above the explanations in this chapter, then please do not hesitate to contact the respective forums. It is quiet possible that another user has already faced the problem and has a solution for you. You can find the Internet addresses of the recommended forums on the **ixconn** homepage: **www.ixconn.net**

Helpful are MWconn forum **www.mwconn.info** and MWconn Wiki **www.mwconn.net**

Regrettably, at present, German language dominates both, forum and Wiki. Please do not hesitate to post your questions in English language! You will get answers in English too.

In case the reason for your query is difficulties with the program or with the hardware in use, then if possible, please start the service log at the earliest (per **CONFIG**, "Log", service log or per file **ixconn.ini**, **MOD=P**) and attach this to your post in MWconn forum.

17 User license

The private as well as the commercial or official usage of **ixconn** are free.

Your opinion of the program is appreciated and welcome. Please post a few lines in MWconn forum **www.mwconn.info**.

Your e-mail ID will be kept confidential and will not be forwarded to a third party without your prior explicit consent.

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20 Thank you...

...to all, who have supported me during the development of this program. With error messages, ideas and technical info!

If you would like to financially support the development/further development, as well as download options, we would appreciate that you click on the Donate button in the **ixconn** website or that you send a small amount to:

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