



Falcon D+
User Manual



GSM-Monitoring System

FALCON D+ User Manual

The system «FALCON D+» will be delivered as follows:

- Monitoring system for standard GSM-networks (GSM-900/1800) operating in the following modes
- without application of encryption algorithms;
- application of encryption algorithms A 5.1 when Ki is known;
- application of encryption algorithm A5/2.

Please read through the user's manual thoroughly before operating the system!

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1. General Definition of Purpose

The Falcon D+ system is designed for surveillance tasks and monitoring of telephone conversations within the GSM 900/1800 networks. The system provides the option of both stationary and mobile operation.

2. Technical data

- The system ensures that monitoring of audio and data traffic within standard GSM 900/1800 networks:
 - - Without application of encryption algorithms
 - - Application of encryption algorithm A5/2 [real-time] (decoding time: 0.01 sec.)
 - - Application of encryption algorithm A5/1 [real-time] when Ki is known
- Default configuration of the system - 8 reception channels
- The system ensures registration of radio-electronic circumstances within the radio cells to be monitored (frequency and characteristics of BCCH-channels)
- Channels which are to be monitored are, according to task, manually selected by the user.
- The system contains a database (up to 100,000 calling partners), operating in real-time, which can be accessed corresponding to the selected search criteria and parameters.
- Calling partners are identified according to the IMEISV, IMSI, TMSI, ISDN number (local and international number)
- Assessment of presence of calling partners to be monitored and identification of specific parameters (TMSI) occurs automatically by means of a mobile phone with special software. The special software is contained in the scope of delivery.
- Registration and storage of telephone conversations occurs on system's hard disk.
- The system ensures registration and storage as audio codec - types FR, EFR, HR.
- Playback of recordings may be carried out by the system itself (CoolEdit-Software).
- Identification of SMS and DTMF data.
- Systems's coverage:
 - Down-Link - up to 10 km
 - Up-Link - up to 500m in city
- Assessment of coverage between calling partner and base station; accuracy of up to 550 m
- Delivery format: in a special PC casing and Notebook
- Operation System software: Windows XP

3. Scope of delivery

FALCON D+, main components:

- PC Pentium 4-1.7 GHz or higher, 2 GB RAM, 80 GB HDD
- Circuit board with main generator and power supply module for receiver
- Circuit board with 8 duplex-channel receivers
- Circuit board with main processor ADP6201PCI for digital signal processing
- Data input module ADM214x10MX
- Antenna system with integrated amplifier
- Notebook with LAN interface and cable
- Special software for analysis and evaluation
- User's manual

- **Optional:** Mobile telephone with special function for assessment of calling partner's presence within the monitored GSM-cell (Ping-Handy)
- **Optional:** Mobile telephone with Netmonitor

4. Technical operating conditions

4.1. Technical data and operating conditions

In order to avoid destruction of the system, pay attention to the following:

- Power source (type and voltage) must correspond to PC power supply!
- Ambient temperature and humidity must comply with the operating standards of the respective device!
- Operation and storage **must not** put in rooms of dust, acid, alkali and corrosion gas!
- No operation under conditions which might lead to unfavourable mechanical, chemical, or atmospheric influences!
- Do not expose the device to heavy vibrations!
- When the device was exposed to low temperatures, do not turn it on immediately! Minimum temperature must be reached first; perspiration water must evaporate
- When the device was exposed to extreme conditions (storage, transport), it must "acclimatise" under optimum conditions for at least 2 hours.

5. Description and function of FALCON D+

5.1. Preparing the system for use

Make sure the device is not damaged. If, however, there is anything to complain about, please contact to the manufacturer.

5.1.1. Security advice

- Make sure the power source complies with the specifications of the PC's power supply before connecting the device to the mains supply.
- Do not shut the louvers of the device!
- The device must be turned off before any alterations in configuration are carried out.
- Alterations on the system require approval of the manufacturer!
- Do not use the antenna nearby power transmission lines!
- Do not use the antenna nearby transmission antennae!

5.1.2. Installation for Falcon D+ system

Note: For installation software direct on Falcon D+ Controller, you need external monitor, mouse and keyboard. If LAN connection is working you can setup by Notebook client (remote controlled).

5.1.2.1. Installing the driver for ADP6202PCI module

Install the driver by means of the standard tools of the system software. The driver **Adp6201a.sys** is to be found in the installation file **FALCON Adp6201 Driver**.
Restart your **Falcon D+ Controller** after successful installation!

5.1.2.2. Installing the «FALCON D+ Controller» system

In order to install the software, activate **setup.exe** from the installation file Falcon. The installation assistant guides you through the selection of files and software configuration. You may install the full version by choosing the installation option **Typical**. On successive "starts" the **setup.exe** program allows complete or partial reinstallation of the software. On system installation a single user (**root**) will be created, who has no password or administrator's rights. The system will be assigned the **IP-address 127.0.0.1** and a database **gsm39** will be created. Restart the system after successful software installation!

Installing USB Cable driver for connection of the PING-mobile phone (If in delivery scope)

Connect the **PING-mobile phone** to the system using the USB cable and install the driver by means of the enclosed CD.

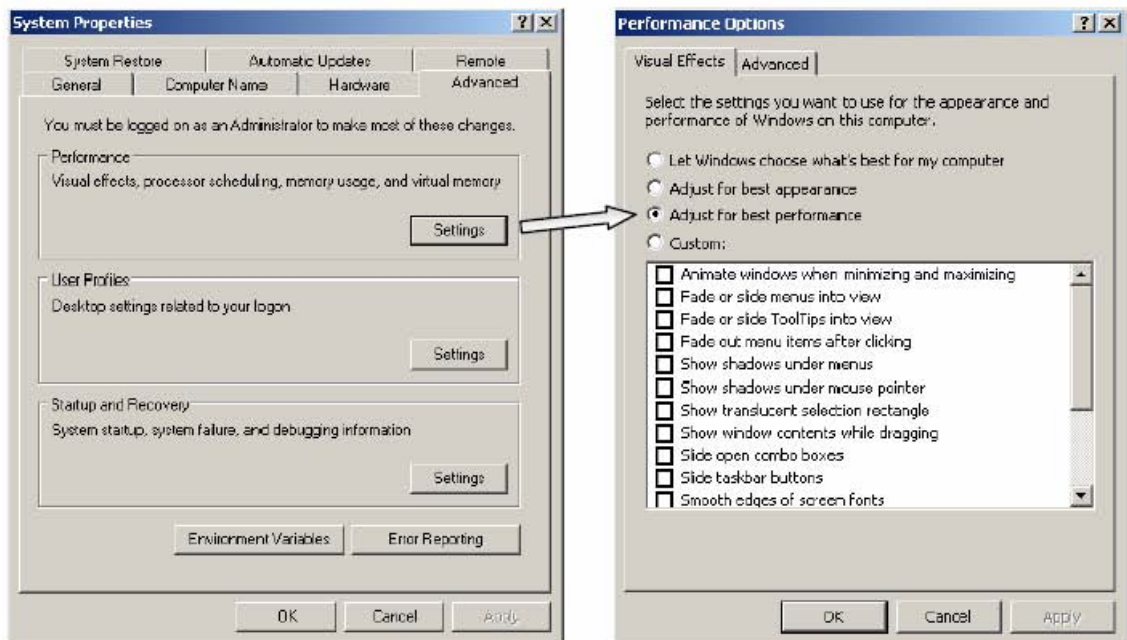
5.1.2.3. Installing the software on Notebook client

Before installation, please check some parameters in your Notebook client PC as follows:

- Right mouse click in My Computer on desktop PC and select properties. Select Remote window and setting parameters as below:

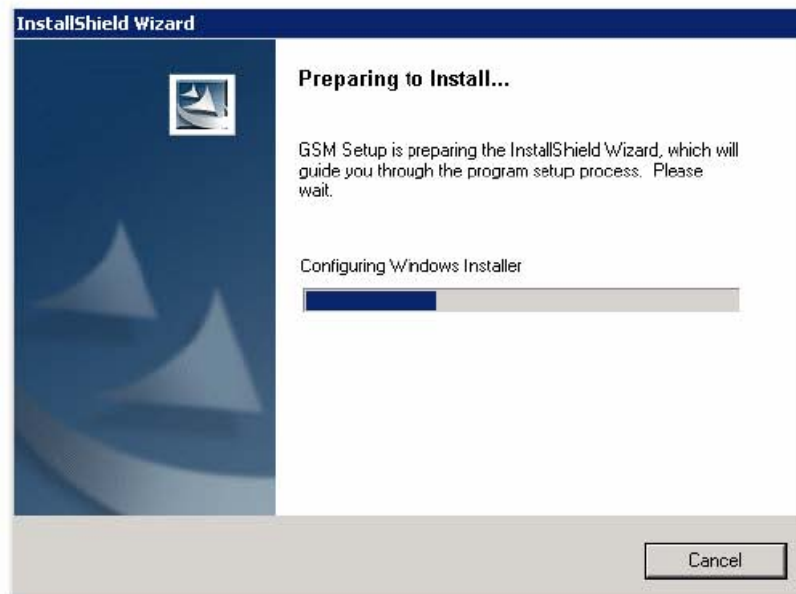


Select **Advance** window. In "Performance" press **Settings** button to setting parameters as below:

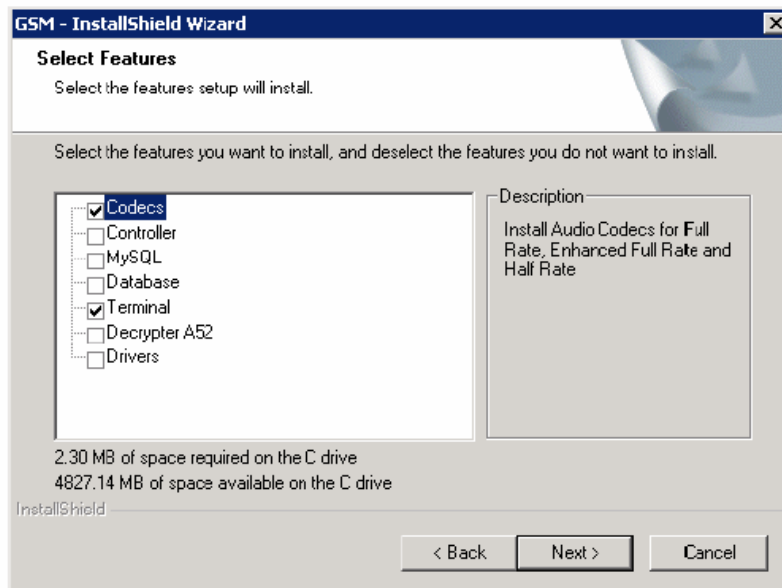


Now you can install software Falcon D+ on your **Notebook client**

In order to install the software, activate **setup.exe** from the installation file Falcon. The installation assistant guides you through the selection of files and software configuration.



You should select 2 setup features on your Notebook Client as below:



On successive “starts“ the **setup.exe** program allows complete or partial reinstallation of the software. On system installation a single user (**root**) will be created, who has no password or administrator’s rights. Database **gsm39** will be created.
Restart the Notebook client after successful software installation!

5.1.3. Preparing the system for use

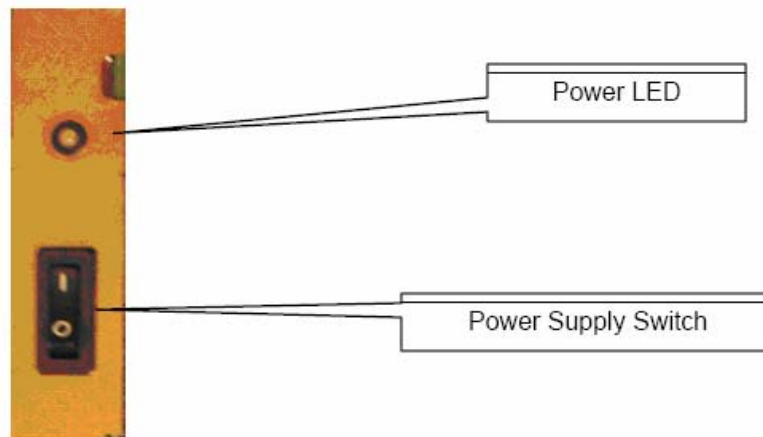
Connect network cable (LAN cable) from Notebook client to Falcon D+ Controller.

Note: Cross over cable can be connected from **Falcon D+ Controller** direct to **Notebook client**. Normal cable connection can be used for connected from **Falcon D+ Controller** to **Notebook client** by means of Hub or Switch.

Connect the antenna cable to the BNC socket on the rear side of the **Falcon D+ Controller**.

If you have ordered the optional **Ping-Mobile phone**, then connect the **Ping-mobile phone** to the COM or USB socket of the **Falcon D+ Controller**. An extension cable (USB) can be used so that mobile phone and antenna are suitably apart from each other

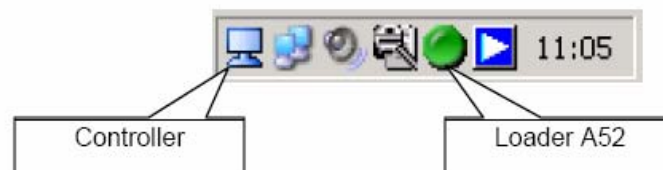
- Connect the power supply cable to the mains supply; thereafter, turn on the **Falcon D+ Controller**. Green LED: hardware is ready for use. Red LED: Turn off hardware’s power supply; wait for about 10 sec and turn it on again. If LED is red again, turn off power supply and contact the manufacturer.
- Hardware of the **Falcon D+ Controller** is ready for use after approx. 10 mins of warming.



Power Supply Switch & Power LED

Figure below shows operation of the **Falcon D+ Controller** in decoder and Controller mode. 2 status of the decoder mode (Loader A52) as follows:

- Green: calculation data are loaded in main memory
- Red: loading process is running



- Turn on **Notebook client** after startup completed double click on "Terminal" Icon on Desktop.

Note: the first time running "Terminal", please selects correct server's name and Database (gsm39) as below:

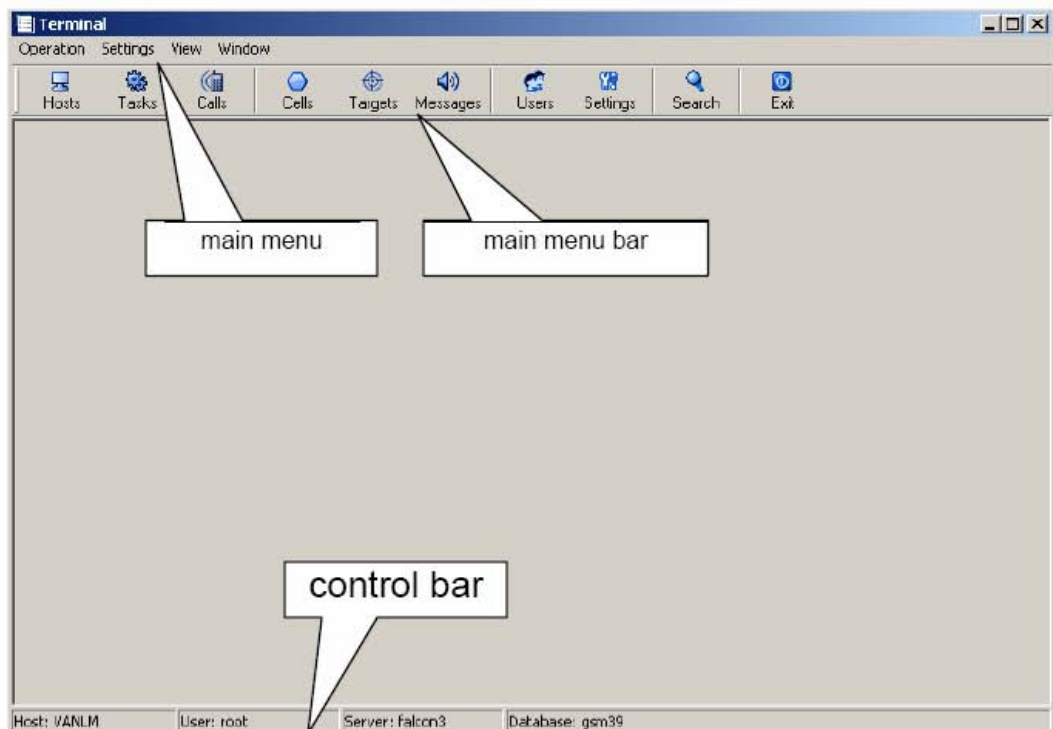


5.1.4. Starting the system

Be sure that **Falcon D+ Controller** and **Notebook client** is completed startup. Double Click on the Icon "Terminal" (on desktop Notebook client) to start the system. Enter a name and password into the dialog box (as figure below). Select a data base in the **Settings** file.



On first starting, you can interrupt the starting process by press **Esc** button. After the loading process the menu window **Control center** will appear on the screen.

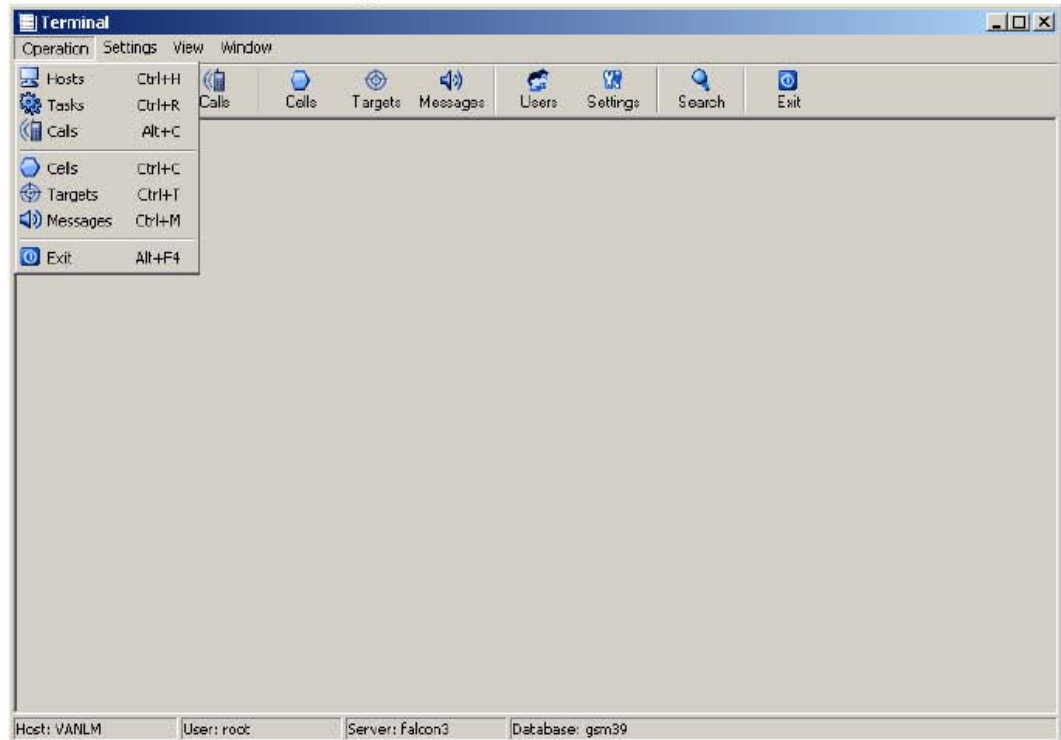


Main menu operation.

5.2. Operating the «FALCON» system

5.2.1. Main menu items

5.2.1.1. Main menu item «Operation»



Menu item **Operation**

5.2.1.1.1. Menu item <Hosts>


The menu item **Hosts** will show you one or more Hosts in system if you have. Falcon system can have one or more Hosts receiver. In this menu, there are more information related to GSM network and Falcon receiver. Open the menu window **Hosts** from the main menu **Operation** >

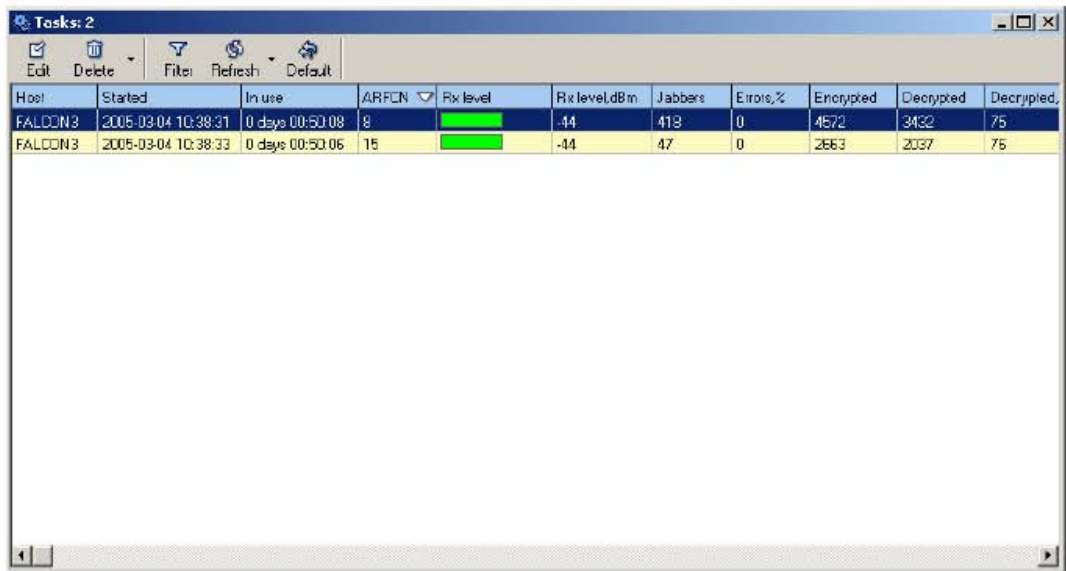
Hosts or click the icon  **Hosts** on main menu bar.

Name	Started	In use	Mode	Errors	Decrypted	Allocated	Cur
FALCON3	2005.03.04 10:07:11	0 days 23:31:44	Normal	16	76	91	11

5.2.1.1.2. Menu item <Tasks>

In this menu, you can see tasks of receiver. Channel monitored, Rx level, percentage of decrypted...also displayed in this window

Open the menu window **Tasks** from the main menu **Operation > Tasks** or click the icon  on main menu bar.



Host	Started	In use	ARPCN	Rx level	Rx level dBm	Jabbers	Errors, %	Encrypted	Decrypted	Decrypted,
FALCON3	2005-03-04 10:38:31	0 days 00:50:08	8	<div style="width: 100%; height: 10px; background-color: green;"></div>	-44	418	0	4672	3132	75
FALCON3	2005-03-04 10:38:33	0 days 00:50:06	15	<div style="width: 100%; height: 10px; background-color: green;"></div>	-44	47	0	2663	2037	75

Menu item **Task**

5.2.1.1.3. Menu item <Calls>

Menu item Calls serves for Live listening in higher priority.



Open the menu window **Calls** from the main menu **Operation > Calls** or click the icon **Calls** on main menu bar.

MS	BS	Direction	ISDN	Date/time	Date	ARFCN
Target#1605	Target#1606	Terminating	0914257070	2005-03-04 11:29:44	050304112944218.wav	15:15
Target#1602	Target#1603	Terminating	0963337920	2005-03-04 11:29:35	050304112935421.wav	8:8
Unknown	Unknown	Ongoing		2005-03-04 11:29:42	050304112942453.wav	8:8

Menu item Calls

5.2.1.1.4. Menu item <Cells>

The menu item **Cells** serves for network provider, base station, channel number...




Open the menu window **Cells** from the main menu **Operation > Cells** or click the icon **Cells** on main menu bar.

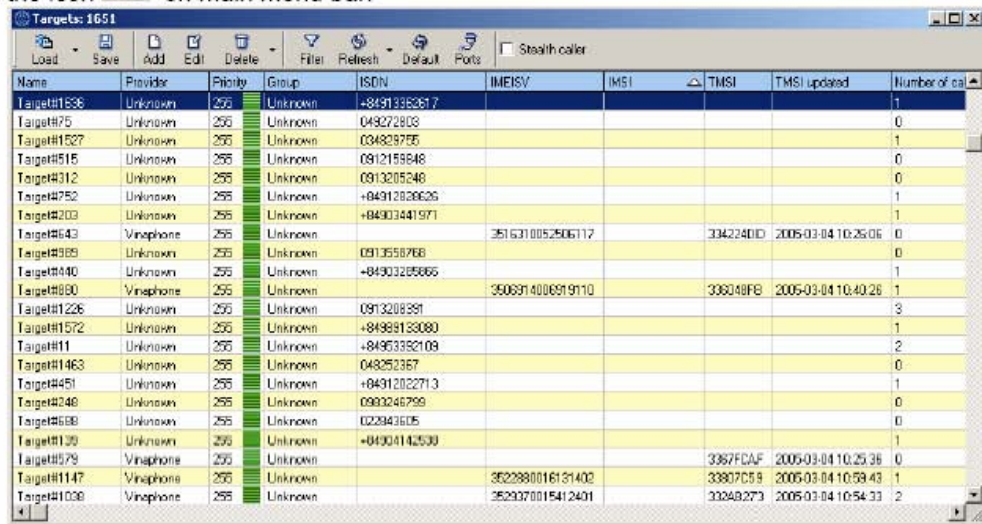
Host	ARFCN	Rx level,dBm	Provider	LAC	CI	CCCH conf	T3212	CA	BA
FALCON3	1	-66	Vinaphone	131	8171	SDCCH/8	18	16,27,33	1,3,4,7,9,11,12,13
FALCON3	2	-68	Vinaphone	131	8052	SDCCH/8	18	23,25,27	2,3,4,5,6,8,9,10,11,12,14,15
FALCON3	6	-70	Vinaphone	131	8111	SDCCH/8	18	38,41	2,4,5,6,8,9,10,11,12,15
FALCON3	8	-44	Vinaphone	131	8321	SDCCH/8	18	21,28	2,3,5,6,7,8,9,11,12,13,14,15
FALCON3	12	-70	Vinaphone	131	8323	SDCCH/8	18	30,36	2,3,4,6,8,9,11,12,14,15
FALCON3	13	-66	Vinaphone	133	1172	SDCCH/8	18	19,31,36	1,2,3,4,5,6,7,8,9,13,14,15,38
FALCON3	15	-46	Vinaphone	131	8322	SDCCH/8	18	17,34	2,5,6,8,9,12,13,15
FALCON3	43	-58	VietTel	11111	10682	SDCCH/8	40	43,69	43,45,48,50,53,55,58,60
FALCON3	45	-62	VietTel	11111	10751	SDCCH/8	40	45,71	43,45,48,50,52,53,56,57,59
FALCON3	46	-62	VietTel	11111	10242	SDCCH/8	40	46,74	46,48,49,53,55,56,57,59,60
FALCON3	48	-64	VietTel	11111	10042	SDCCH/8	40	48,72	43,44,46,48,50,51,53,55,56
FALCON3	51	-68	VietTel	11111	10363	SDCCH/8	40	51,78	47,51,54,56,60,61,63
FALCON3	53	-62	VietTel	11111	10211	SDCCH/8	40	53,76	43,45,46,47,48,50,53,55,56
FALCON3	54	-70	VietTel	11111	10941	SDCCH/8	40	54,83	43,44,47,51,54,57,60,63,64
FALCON3	56	-66	VietTel	11111	10542	SDCCH/8	40	56,65	43,44,46,48,49,51,53,55,58,60
FALCON3	58	-75	VietTel	11111	10041	SDCCH/8	40	58,68	43,44,46,47,48,50,52,53,55
FALCON3	59	-62	VietTel	11111	10482	SDCCH/8	40	59,79	45,46,48,49,51,53,56,59,62
FALCON3	64	-74	VietTel	11111	10722	SDCCH/8	40	64,77	43,45,47,49,51,53,55,58,60
FALCON3	91	-42	MobFone	1	10203	SDCCH/8	45	87,91	84,85,92,96,97,98,100,102,1
FALCON3	100	-56	MobFone	1	10542	SDCCH/8	45	95,100	84,85,86,88,91,92,96,97,99

Menu item Cells

5.2.1.1.5. Menu item «Targets»

The menu item **Targets** serves for retrieval of the entry window for editing the data base of targets to be monitored. Furthermore, automatic search for targets within the radio cell to be monitored occurs in this menu item.

In order to retrieve the **Targets** window, either select **Operation > Targets** from the main menu or click the icon  on main menu bar.




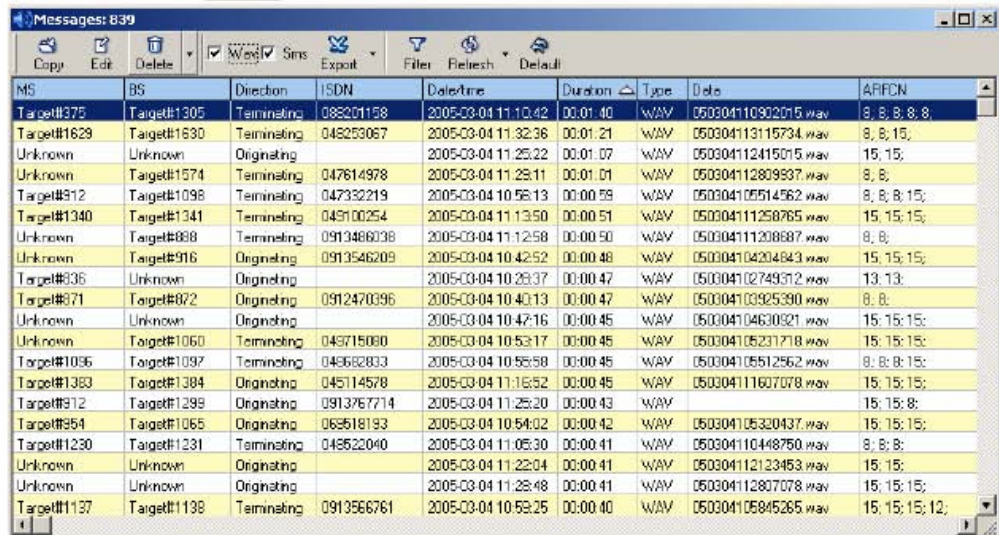
Name	Provider	Priority	Group	ISDN	IMEISV	IMSI	TMSI	TMSI updated	Number of call
Target#1536	Unknown	255	Unknown	+84913162617					1
Target#75	Unknown	255	Unknown	048272803					0
Target#1527	Unknown	255	Unknown	094829755					1
Target#515	Unknown	255	Unknown	0912159548					0
Target#312	Unknown	255	Unknown	0913205246					0
Target#752	Unknown	255	Unknown	+84912826625					1
Target#203	Unknown	255	Unknown	+84903441971					1
Target#643	Vodafone	255	Unknown		2516310052506117		3342240D	2005-03-04 10:25:05	0
Target#585	Unknown	255	Unknown	0913558768					0
Target#140	Unknown	255	Unknown	+84903265665					1
Target#690	Vodafone	255	Unknown		3506914006919110		336048F0	2005-03-04 10:40:26	1
Target#1226	Unknown	255	Unknown	0913208391					3
Target#1572	Unknown	255	Unknown	+84969133080					1
Target#11	Unknown	255	Unknown	+84903352109					2
Target#1463	Unknown	255	Unknown	048253357					0
Target#451	Unknown	255	Unknown	+84912022713					1
Target#246	Unknown	255	Unknown	0993246799					0
Target#588	Unknown	255	Unknown	023843605					0
Target#139	Unknown	255	Unknown	+84904142530					1
Target#579	Vodafone	255	Unknown				3367FCAF	2005-03-04 10:25:36	0
Target#1147	Vodafone	255	Unknown		3522880016131402		33807C59	2005-03-04 10:59:43	1
Target#1030	Vodafone	255	Unknown		3523070015412401		33249273	2005-03-04 10:54:33	2

Menu item **Targets**

5.2.1.1.6. Menu item «Messages»

The menu item **Messages** serves for retrieval of the search window wherein audio recordings can be played back as well as messages can be displayed.

In order to retrieve the **Messages** window, either select **Operation > Messages** from the main menu or click the icon  **Messages** on main menu bar.




MS	BS	Direction	ISDN	Datetime	Duration	Type	File	AFFCN
Target#1375	Target#1305	Terminating	088201158	2005-03-04 11:10:42	00:01:40	WAV	050304110902015.wav	8; 8; 8; 8;
Target#1629	Target#1630	Terminating	048253067	2005-03-04 11:32:36	00:01:21	WAV	050304113115734.wav	8; 8; 15;
Unknown	Unknown	Originating		2005-03-04 11:25:22	00:01:07	WAV	050304112415015.wav	15; 15;
Unknown	Target#1574	Terminating	047614978	2005-03-04 11:25:11	00:01:01	WAV	050304112809937.wav	8; 8;
Target#1312	Target#1098	Terminating	047332219	2005-03-04 10:56:13	00:00:59	WAV	050304105514562.wav	8; 8; 8; 15;
Target#1340	Target#1341	Terminating	045100254	2005-03-04 11:13:50	00:00:51	WAV	050304111250765.wav	15; 15; 15;
Unknown	Target#088	Terminating	0913486038	2005-03-04 11:12:58	00:00:50	WAV	050304111208687.wav	8; 8;
Unknown	Target#916	Originating	0913546209	2005-03-04 10:42:52	00:00:48	WAV	050304104204643.wav	15; 15; 15;
Target#036	Unknown	Originating		2005-03-04 10:29:37	00:00:47	WAV	050304102749312.wav	13; 13;
Target#071	Target#072	Originating	0912470396	2005-03-04 10:40:13	00:00:47	WAV	050304103925390.wav	8; 8;
Unknown	Unknown	Originating		2005-03-04 10:42:16	00:00:45	WAV	050304104630521.wav	15; 15; 15;
Unknown	Target#1060	Terminating	045715080	2005-03-04 10:53:17	00:00:45	WAV	050304105231718.wav	15; 15; 15;
Target#1056	Target#1097	Terminating	046662833	2005-03-04 10:55:58	00:00:45	WAV	050304105512562.wav	8; 8; 8; 15;
Target#1363	Target#1384	Originating	045114578	2005-03-04 11:16:52	00:00:45	WAV	050304111607078.wav	15; 15; 15;
Target#1312	Target#1299	Originating	0913767714	2005-03-04 11:25:20	00:00:43	WAV		15; 15; 8;
Target#954	Target#1065	Originating	065518193	2005-03-04 10:54:02	00:00:42	WAV	050304105320437.wav	15; 15; 15;
Target#1230	Target#1231	Terminating	048522040	2005-03-04 11:05:30	00:00:41	WAV	050304110448750.wav	8; 8; 8;
Unknown	Unknown	Originating		2005-03-04 11:22:04	00:00:41	WAV	050304112123453.wav	15; 15;
Unknown	Unknown	Originating		2005-03-04 11:28:48	00:00:41	WAV	050304112807078.wav	15; 15; 15;
Target#1137	Target#1138	Terminating	0913566761	2005-03-04 10:53:25	00:00:40	WAV	050304105845265.wav	15; 15; 15; 12;

Menu item **Messages**

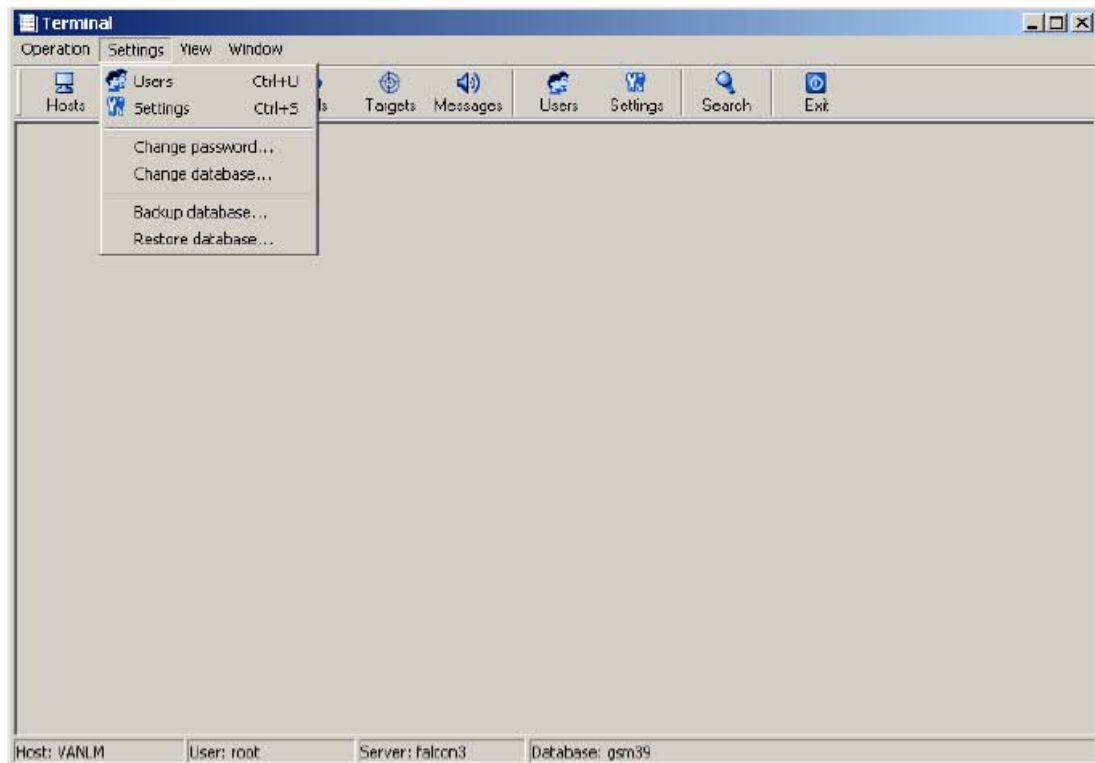
5.2.1.1.7. Menu item «Exit»

The submenu item **Exit** serves for terminating operation.

Click the icon  **Exit** on main menu bar, program will be exit if you select **Yes** and not exit if you select **No**




5.2.1.2. Main menu item «Settings»






Main menu item **Settings**

5.2.1.2.1. Menu item «Users»

The submenu **Users** serves for retrieval of the authentication window wherein user rights can be defined.

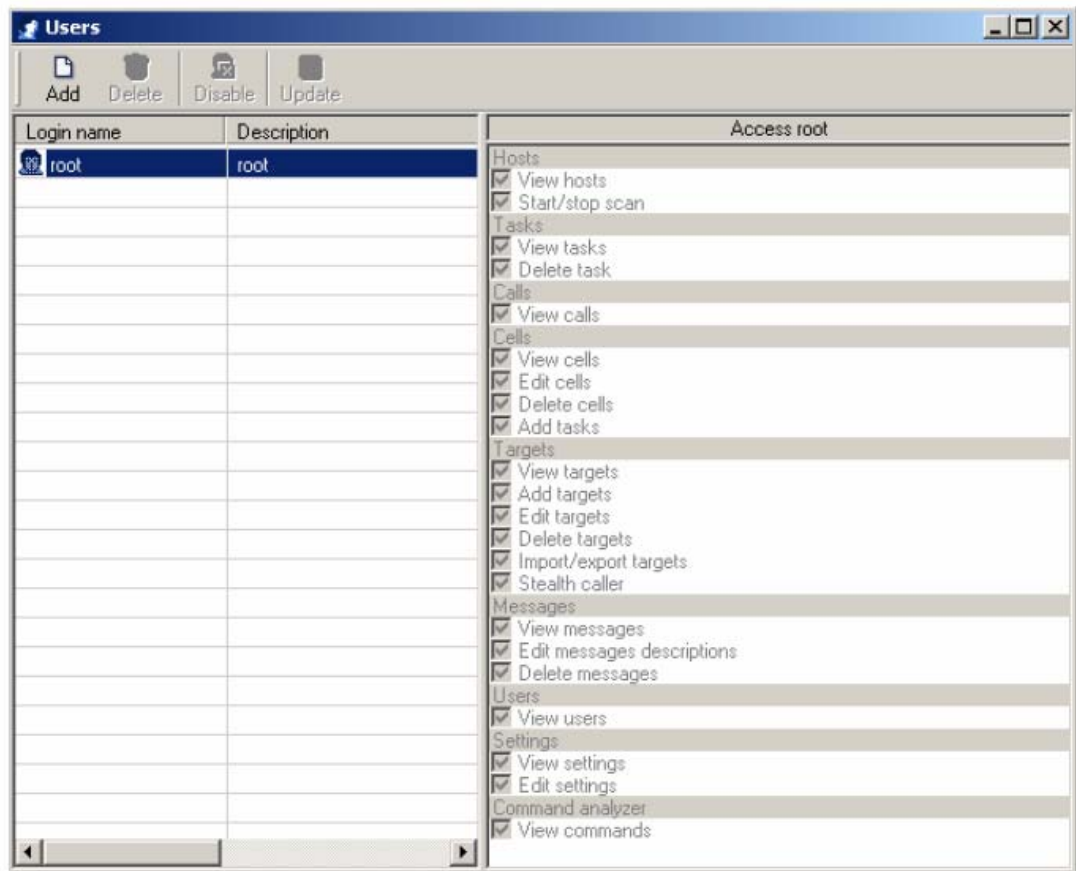
In order to retrieve the **Users** window, either select **Operation > Users** from the main menu or click the icon  on main menu bar .

There are various functions that define the rights of the respective user:

- **Add**  - new user
- **Delete**  - delete user
- **Disable**  - disable user
- **Update**  - storage of alterations in **Access**

The **Users** window displays name (**Login name**) and description of the user (**Description**) in the form of a table. User rights are defined within the **Check Box** by ticking the respective options within the **Access** pad.


Solely the **root** user may administrator users and assign them their rights.



Submenu **User**

5.2.1.2.2. Menu item «Settings»

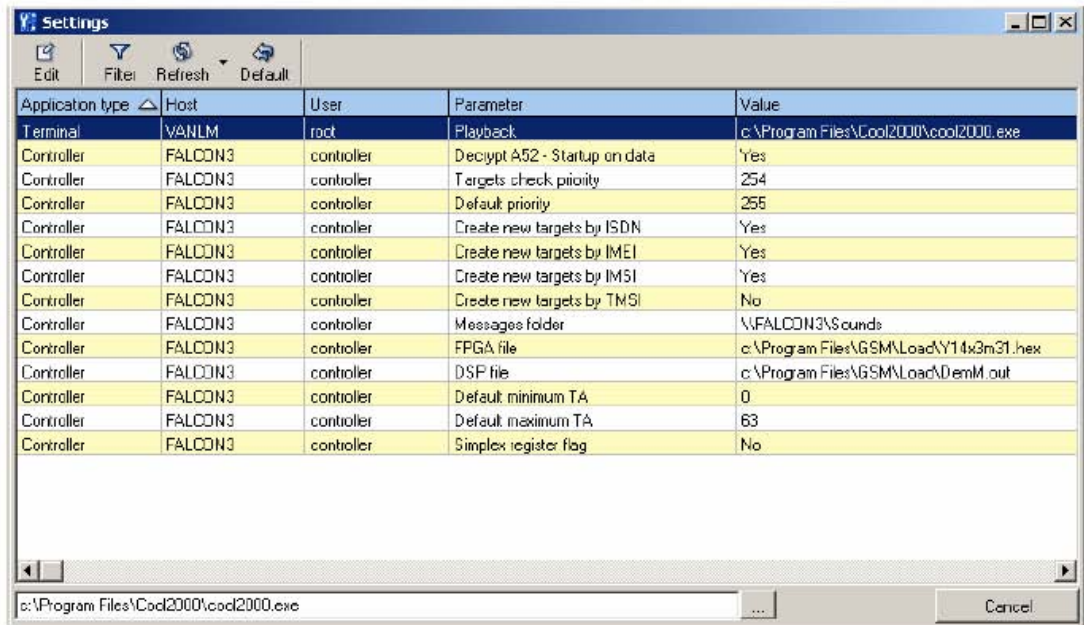
The menu item **Setting** serves for setting parameters of **Falcon D+ Controller**

In order to retrieve the **Setting** window, either select **Settings > Settings** from the main menu or click the icon  on main menu bar.

The menu item serves for retrieval of the playback window, selection of loaded protocol data, selection of the path for connection to the Audio file and retrieval of the folder containing decoder data.

Types of loaded data:


- «*.out» - file for loading ADP6201PCI
- «*.hex» - loading file FPGA;
- «...\cool2000.exe» - playback with CoolEdit software
- «...\Falcon3\Sounds» - path for connection to the Audio file

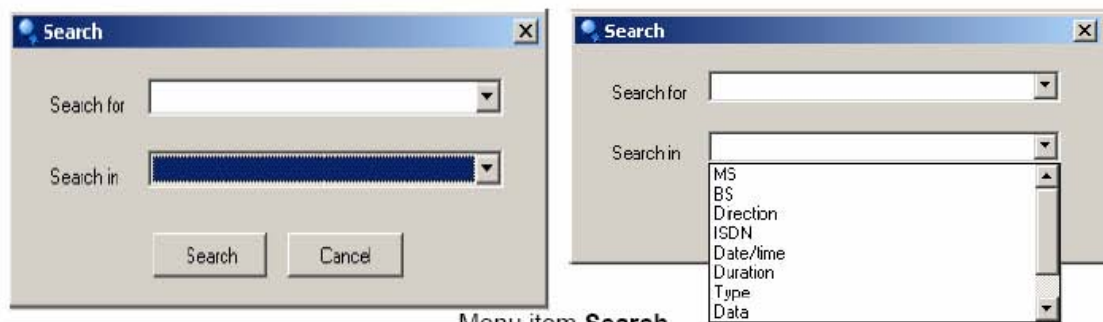


Menu item **Settings**

5.2.1.2.3. Submenu «Search»

The menu item **Search** serves for find essential parameters. This menu only activated when another menu was opened before.

In order to open **Search** menu, click the icon  on main menu bar

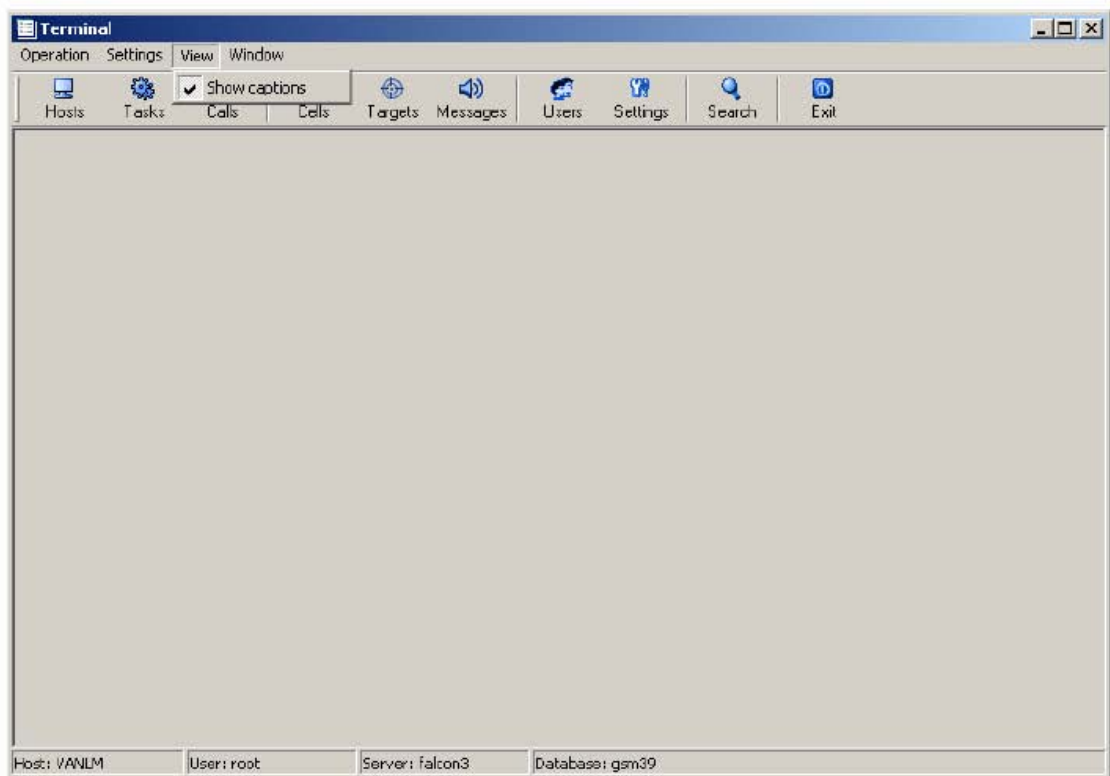


Menu item **Search**

5.2.1.2.2. Menu item «Change password»

The menu item **Change password** serves for retrieval of the password window by the current user of the FALCON system.

5.2.1.3. Main menu item «View»



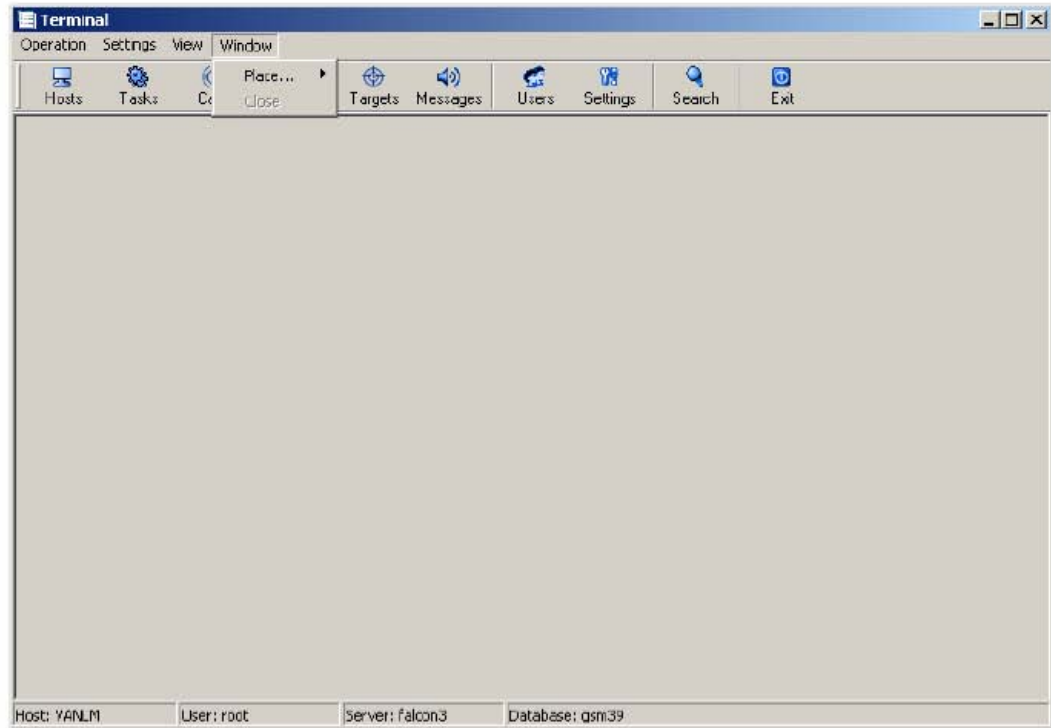
Main menu item **View**

5.2.1.2.5. Menu item «Show captions»

The menu item **Show captions** serves for pasting/deleting captions for keys of the main menu bars and submenu bars.

5.2.1.4. Main menu item «Window»

The main menu item **Window** serves for placing and aligning dialog boxes on the desktop.



Main menu item **Window**

6. Radio monitoring GSM 900/1800

6.1. Installation and use of antenna

The antenna is an essential part of the system. Effectivity of the FALCON system depends on thorough installation and use of the antenna.

6.1.1. Connecting the antenna to the system

Connect the antenna to the system by means of the cable. The amplifier's PSU has an integrated resetting fuse in order to avoid damage to the system through short circuit within antenna or antenna cable. Resetting of fuse lasts approx. 1 hour.

Short circuit within PSU of the amplifier might cause reduced reception signals.

In such case you should:

- turn off system's power supply
- fix antenna or antenna cable (remedy the cause for short circuit)
- Turn on the system again after approx. 1 hour
- perform system start
- If the problem cannot be solved, please contact the manufacturer.

Other causes for reduced reception signals could be a tear-off or damaged contact within the antenna cable.

In such case you should:

- turn off system's power supply
- make sure the antenna cable is not torn
- turn on system's power supply again
- perform system start

If the problem cannot be solved, please contact the manufacturer.

6.1.2. Operating conditions

The antenna is not designed for operation under conditions of precipitation. If the antenna is operated on any roof, you should equip it with an additional weatherproof casing.

Do not fold or compress the antenna cable! Do not damage its slipcover or its plug! Do not use any antennae which are not supplied by scope of delivery! Screw the antenna tightly onto the antenna casing and **Falcon D+ Controller!**

6.1.3. Recommendations for installation of antenna

By selecting the place of installation, pay attention to the following:

- do not operate antenna nearby power transmission lines
- do not operate antenna nearby transmission antennae
- do not shield antenna with any metal constructions
- secure maximum distance between reception antenna and **Ping-mobile phone** (If in the delivery scope)

The selection of place of installation should comply with the criteria required by the base stations to be monitored (BCCH channels). Thus the place should ensure minimal numbers of errors and maximum reception level for all channels.

Concerning this, the menu window **Tasks** provides all necessary information.

7. User's steps to operate the system

7.1. Net-monitoring – mobile phone (Optional)

The NET-monitoring mobile phone serves for quick definition of main parameters of GSM-networks as well as definition of control channels of the base stations. In order to activate the NET-Monitoring mobile phone, select the menu item "**Net monitor**" and the corresponding pages from the opened window.

Important pages are:

page 1 – Information about BCCH-channel's number of current base station and distance between base station and MS in relative measuring units (1 relative measuring unit = 550m)

pages 3...5 – Information about BCCH channel numbers of neighbouring base stations

page 10 – Information about TMSI and the channel number of current base station

page 11 – BCCH channel system information of current base station

page 12 – Information about activation of encoding and encoding type (CIPHER: A5x) and activation of HOPPING. These parameters are only displayed by Net-Monitor mobile phone during active phone call.

The «Netmonitor.pdf» document provides detailed description of all pages of the "**Netmonitor**".

Note: Use for your NET-Monitoring mobile phone a SIM-card which is supplied by the respective GSM provider to be monitored. Conduct all measurements nearby objects (targets) to be monitored.

7.2. Analysis of radio-electronic circumstances

Open the window **Hosts** to analyse the radio-electronic circumstances. Therefore select the main menu window **Operation > Hosts** or click the icon  on main menu bar. Click  to start scanning process. To interrupt scanning process, click .

After that, within **Cells** window the following parameters appear in table form:

ID	– ID Number
Hosts	– Hosts name
ARFCN	– Radio channel number of base station (ARFCN) BS;
Rx-level	– Signal strength of BS dBm;
NCC	– Colour code of network;
BCC	– Colour code of BS;
MCC	– Radio code of country;
Country	– Name of country
MNC	– Radio code of network;
Provider	– Name of provider
LAC	– Code of zone;
CI	– Network identify
CCCHconf	– Configuration of CCCH
T3212	– Timer 3212
CA	– Number of channels used by BS;
BA	– Number of channels of neighbouring BS;
Errors,%	– Number of processed data packets, number of erroneous data packets;
Date/time	– Date and time of recording;
Comment	– operator's comments on recordings.

The line **ARFCN BS** displays current results of analysis (**Last:74**)

Right mouse click to display desired parameters in this window.

Click left mouse to align selected parameters on the display.

Host	ARFCN	Rx level,dBm	Provider	LAC	D	CCCH conf	T3212	CA	BA
FALCON3	1	-88	Vinaphone	131	8171	50 CCH/8	18	16,27,33	1,3,4,7,9,11,12,13
FALCON3	2	-58	Vinaphone	131	8052	50 CCH/8	18	23,25,27	2,3,4,5,6,8,9,10,11,12,14,15
FALCON3	6	-70	Vinaphone	131	8111	50 CCH/8	18	38,41	2,4,5,6,8,9,10,11,12,15
FALCON3	8	-44	Vinaphone	131	8321	50 CCH/8	18	21,28	2,3,5,6,7,8,9,11,12,13,14,15
FALCON3	12	-70	Vinaphone	131	8323	50 CCH/8	18	30,36	2,3,4,6,8,9,11,12,14,15
FALCON3	13	-56	Vinaphone	133	1172	50 CCH/8	18	19,31,36	1,2,3,4,5,6,7,8,9,13,14,15,36
FALCON3	15	-46	Vinaphone	131	8322	50 CCH/8	18	17,34	2,5,6,8,9,12,13,15
FALCON3	43	-58	VietTel	11111	10682	50 CCH/8	40	43,69	43,45,48,50,53,55,56,58,60
FALCON3	45	-62	VietTel	11111	10151	50 CCH/8	40	45,71	43,45,49,50,52,53,56,57,59
FALCON3	46	-62	VietTel	11111	10242	50 CCH/8	40	46,74	46,48,49,53,55,56,57,59,60
FALCON3	48	-54	VietTel	11111	10042	50 CCH/8	40	46,72	43,44,46,49,50,51,53,55,56
FALCON3	51	-69	VietTel	11111	10363	50 CCH/8	40	51,79	47,51,54,56,60,61,63
FALCON3	53	-62	VietTel	11111	10211	50 CCH/8	40	53,76	43,45,46,47,48,50,53,55,56
FALCON3	54	-70	VietTel	11111	10941	50 CCH/8	40	54,83	43,44,47,51,54,57,60,63,64
FALCON3	56	-66	VietTel	11111	10542	50 CCH/8	40	56,65	43,44,46,49,49,51,56,59,62
FALCON3	58	-76	VietTel	11111	10041	50 CCH/8	40	56,68	43,44,45,47,48,50,52,53,55
FALCON3	59	-62	VietTel	11111	10492	50 CCH/8	40	59,79	45,46,48,49,51,53,56,59,62
FALCON3	64	-74	VietTel	11111	10722	50 CCH/4	40	64,77	43,45,47,49,51,53,56,58,60
FALCON3	91	-42	MobiFone	1	10303	50 CCH/8	45	67,91	84,85,92,96,97,98,100,102,1
FALCON3	100	-56	MobiFone	1	10542	50 CCH/8	45	65,100	84,85,86,93,91,92,96,97,98

To define base stations for monitoring, select **Cells** window from the main menu **Operation >**

Cells or click the icon . ARFCN channels of the monitored base stations can be entered by double click on the line of **Cells** window.


Notice: System have 8 receivers, but you should switch on maximum up to 5 receivers. Remaining receivers are used for free resources (hopping and handover)

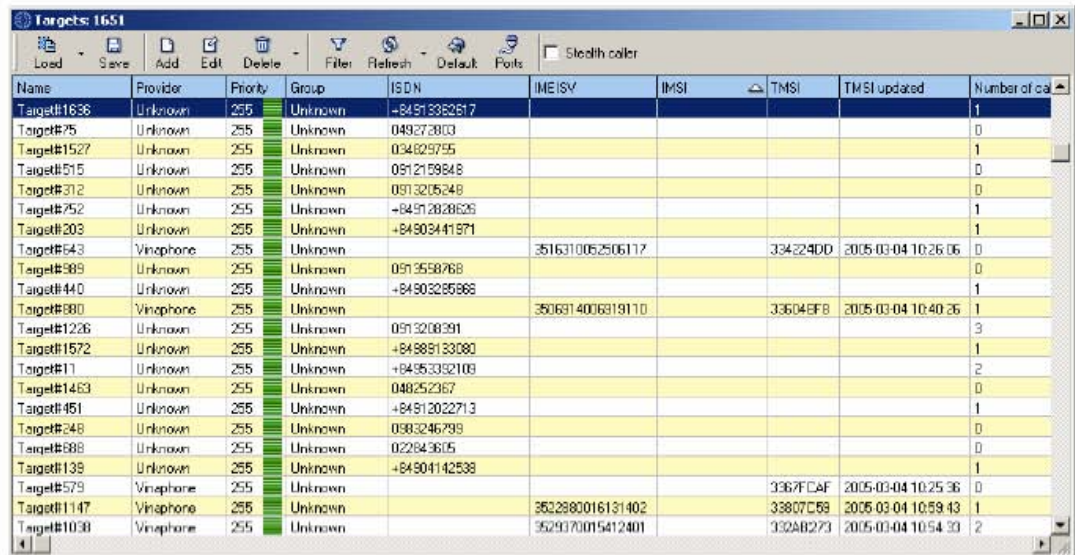
The data base provides several functions, which can be accessed by clicking the icons from the tool bar:

- Edit <F4>** - Editing comments on selected BS;
- Delete ** - Deleting BS;
- Filter <Ctrl+F>** - Cells filter
- Refresh <F5>** - Renewal of list of BS.
- Default** - Restore default

7.3. Data base

7.3.1. Data base «Targets»

In order to work with the **Targets** data base, open the data base display and editor window from the main menu **Operations > Targets** or click the icon  .



Name	Provider	Priority	Group	ISDN	IMEISV	IMSI	TMSI	TMSI updated	Number of calls
Target#1636	Unknown	255	Unknown	+84919382617					1
Target#75	Unknown	255	Unknown	049272803					0
Target#1527	Unknown	255	Unknown	034629755					1
Target#515	Unknown	255	Unknown	0912159848					0
Target#312	Unknown	255	Unknown	0913205248					0
Target#752	Unknown	255	Unknown	+84912828626					1
Target#203	Unknown	255	Unknown	+84903441871					1
Target#643	Vinaphone	255	Unknown		3516310052506117		334224DD	2005-03-04 10:26:06	0
Target#389	Unknown	255	Unknown	0913558768					0
Target#440	Unknown	255	Unknown	+84903285888					1
Target#880	Vinaphone	255	Unknown		3506914006919110		336048FB	2005-03-04 10:40:26	1
Target#1226	Unknown	255	Unknown	0913200391					3
Target#1572	Unknown	255	Unknown	+84989133080					1
Target#11	Unknown	255	Unknown	+84953352109					2
Target#1463	Unknown	255	Unknown	048252367					0
Target#451	Unknown	255	Unknown	+84912022713					1
Target#248	Unknown	255	Unknown	0983246799					0
Target#888	Unknown	255	Unknown	022843615					0
Target#138	Unknown	255	Unknown	+84904142538					1
Target#579	Vinaphone	255	Unknown				3367FCAF	2005-03-04 10:25:36	0
Target#1147	Vinaphone	255	Unknown		352280016131402		33807C59	2005-03-04 10:59:43	1
Target#1038	Vinaphone	255	Unknown		3529370015412401		332AB273	2005-03-04 10:54:39	2

Menu item **Targets**.

The window displays the following object data in table form:

ID	– Own identifier;
Name	– Object name;
Provider	– Name of provider
Priority	– Assigned object priority;
Group	– Name of object group;
ISDN	– ISDN-number of object;
IMEISV	– IMEISV of object;
IMSI	– IMSI of object;
Ki	– Ki of object;
TMSI	– Current TMSI of object;
TMSI updated	– Renewal time for TMSI of object;
Comment	– Comments on recording;
Number of calls	– Number of received messages from object.
Host	– Host name












Right mouse click in this window to change number of data to be displayed within corresponding window.

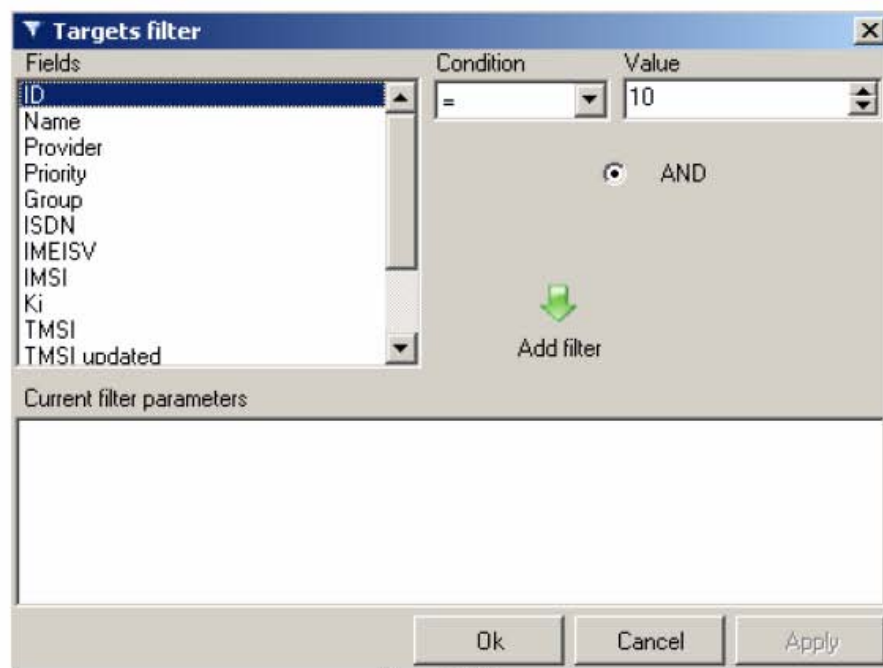
Within data base those objects are processed whose priority is higher than it is defined in the **Check priority window**.

Messages from low priority objects are only registered on availability of sufficient resources. Registered low priority objects will be saved in the data base as new objects with a priority of 255.

All object data is entered into the data base. Messages from objects, whose priority is not less than the assigned one, are preferredly processed and resources of the system are made available. All object data is stored on HDD.

The data base provides several functions, which can be accessed by clicking the icons from the tool bar:

- **Load**  - loads **Targets** data base from file.
- **Replace... <Alt+R>**  - exchange of current object list for object list from file.
- **Append... <Alt+A>**  - extending the object list with objects from file.
- **Save**  - Storage of current object list in file.
- **Add target <F2>**  - adding new object.
- **View detail/edit target <F4>**   - editing of selected object.
- **Delete target **  - deletion of selected object.
- **Delete the list**  - deletion of all objects or selected groups.
- **Delete all Targets**  - deletion of all targets
- **Filter <Ctrl+F>**  - window for system settings and display of objects.



Target Filter.



Activate **CheckBox** to show objects and enter the required parameter.

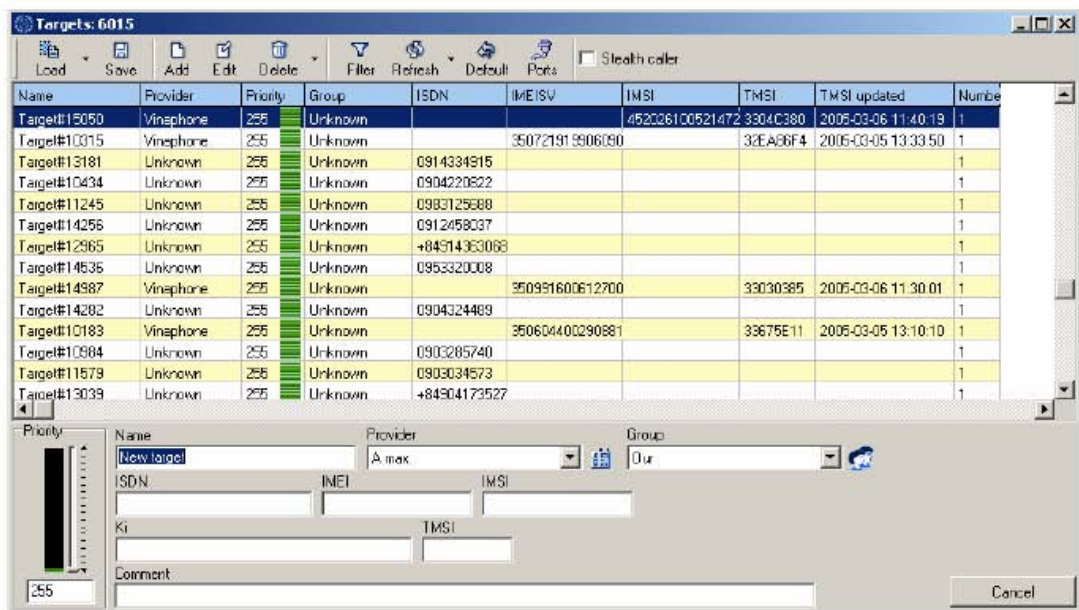
- **Refresh <F5>**  - renewal of object list.

The tool bar contains the **Find on pad**, wherein you can search for objects. The upper part of the window displays number of objects, e.g.: **Targets #**.

For each message data of two objects (calling and answering object) will be updated simultaneously within data base.
If involved objects are not contained in the data base, they must be added to the data base.

Double click on objects with left mouse to view messages from the selected objects.

On adding a new object (**Add target** <F2>  **Add**) or editing a newly selected object (**View detail / Edit target**<F4> ) , an extra window with identification criteria will be opened.



Name	Provider	Priority	Group	ISDN	IMEISV	IMSI	TMSI	TMSI updated	Number
Target#1E05D	Vinaphone	255	Unknown			452226120521472	3304C380	2005-03-06 11:40:19	1
Target#10315	Vinaphone	255	Unknown		35072191 5906090		33EA66F4	2005-03-05 13:33:50	1
Target#13181	Unknown	255	Unknown	0914334915					1
Target#10434	Unknown	255	Unknown	0904220922					1
Target#11245	Unknown	255	Unknown	0983125688					1
Target#14256	Unknown	255	Unknown	0912458037					1
Target#12965	Unknown	255	Unknown	+84914363068					1
Target#14636	Unknown	255	Unknown	0953320008					1
Target#14987	Vinaphone	255	Unknown		350991600612700		33030385	2005-03-06 11:30:01	1
Target#14282	Unknown	255	Unknown	0904324489					1
Target#10183	Vinaphone	255	Unknown		350604400290881		33675E11	2005-03-05 13:10:10	1
Target#10984	Unknown	255	Unknown	0903285740					1
Target#11579	Unknown	255	Unknown	0903034573					1
Target#13039	Unknown	255	Unknown	+84904173527					1

The editing form below the table includes fields for: Name (New target), Provider (A max), Group (Our), SDN, IMEI, IMSI, Ki, TMSI, and Comment. A priority slider is set to 255. A 'Cancel' button is at the bottom right.

Menu item **Targets**


The following object data is displayed in the editing window:

- Priority** – priority of object;
- Name** – object name;
- Provider** – name of provider
- Group** – name of object group;
- ISDN** – ISDN-number of object;
- IMEI** – IMEI of object;
- IMSI** – IMSI of object;
- Ki** – Ki of object;
- TMSI** – current TMSI of object;
- Comment** – comment on recording;

On entering of new data or editing of existing data, the changes must be made within the corresponding line.

Name of provider and name of object group can taken from data base.

Editing of displayed parameters occurs in dialog boxes by clicking the icons  and . The changes are stored in the data base via  **Save**.

Click **Edit**  if you do not want to save the changes made in the editing mode.

Real time listening-in occurs via:
Open window **Calls** then live listen telephone conversation

*You should switch off the operating mode **Calls**, when either no listening-in or listening into messages of only a small number of objects is necessary.*

7.3.2. Searching an object within monitored zone (with optional Ping-Mobile phone)

Search for an object within the monitored zone can occur easily by means of the **Ping-mobile phone** (If in delivery scope). The **Ping-mobile phone** makes a "silent" call to get access to current parameters of the object.

Note. You must use a SIM-card of the monitored provider for your **Ping-mobile phone**

There two options for searching an object:

- manual search;
- automatic search.

7.3.2.1. Manual search

- Select call diversion for **Ping-mobile phone**;
- Go to system's control panel «Ping-mobile phone»; tick **Stealth caller** in CheckBox of the **Targets** window;
- Turn off **Automat** in CheckBox;
- Open field **Caller ISDN**: enter ISDN-number of **Ping-mobile phone**;
- Select object with phone number from **Targets** window.
- Dial object's phone number with your **Ping-mobile** phone and press Call.
- When the message "diversion of all phone calls" appears on your display, abort phone call immediately. Repeat this procedure at intervals (5-10 times at intervals of 5-10 seconds).
- When the message "diversion of all phone calls" appears on your display, abort phone call immediately. Repeat this procedure at intervals (5-10 times at intervals of 5-10 seconds).
- Thereafter, press stop key on your **Ping-mobile** phone.

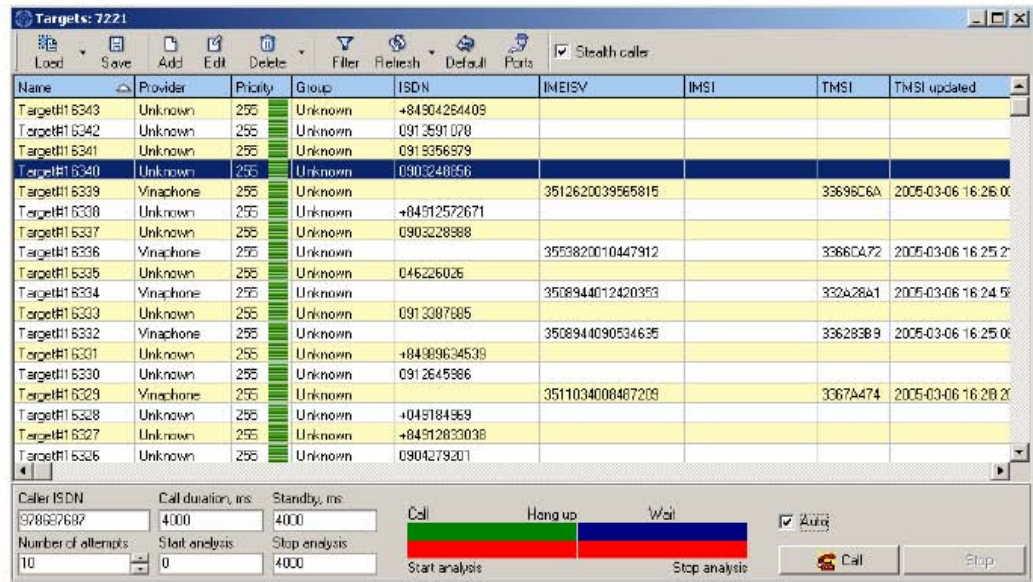
If the wanted object is within the monitored zone, identification criteria of the object such as telephone number, IMSI, IMEISV and current TMSI will appear on the display of the FALCON system.

7.3.2.2. Automatic search

- Connect **Ping-mobile phone** to the FALCON system by means of the interface cable; COM- or USB port. The window **Settings > Devices > Phone connection** shows the port to use. Secure maximum distance between FALCON system and Ping-mobile phone.
- Activate Ping-mobile phone from the tool bar of the **Targets** window; **Stealth caller** in CheckBox;
- Click **Automat** in CheckBox;
- Settings for Ping-mobile phone:
field **Caller ISDN** : ISDN-number of Ping-mobile phone.
field **Call duration, ms** : duration of impuls in msec;

field **Standby, ms**: - duration of break between calls in msec;
 field **Number of attempts**: - number of calls;
 field **Start analysis, ms**: - start time of analysis of received message in msec;
 field **Stop analysis, ms**: - end time of analysis of received message between calls in msec.

- Select object with ISDN-number from **Targets** window.
- Press **Call** and **Stop** to start and finish search.



windows **Targets**

Operator's tasks:

1. Define optimum pulse length of **Call duration** (green indication) on Ping-mobile phone panel as well as length of **Standby** between calls (blue indication) in order to avoid that the call is put through to BS. Optimum settings can be identified by means of the NET-Monitoring mobile phone (serves as virtual target).
2. Define optimum intervals for analysis of received messages (red indication), with measuring time of call until reception of message and time of **Start analysis** until **Stop analysis**.

Any test telephone with known IMEI, IMSI or TMSI can be used for this procedure.


The NET-Monitoring mobile phone (optional) can be also used for easier identification of call parameters for the Ping-mobile phone

If the object is found within the monitored zone, search will be stopped and identification criteria of the object such as IMSI, IMEISV and current TMSI will appear on the display.

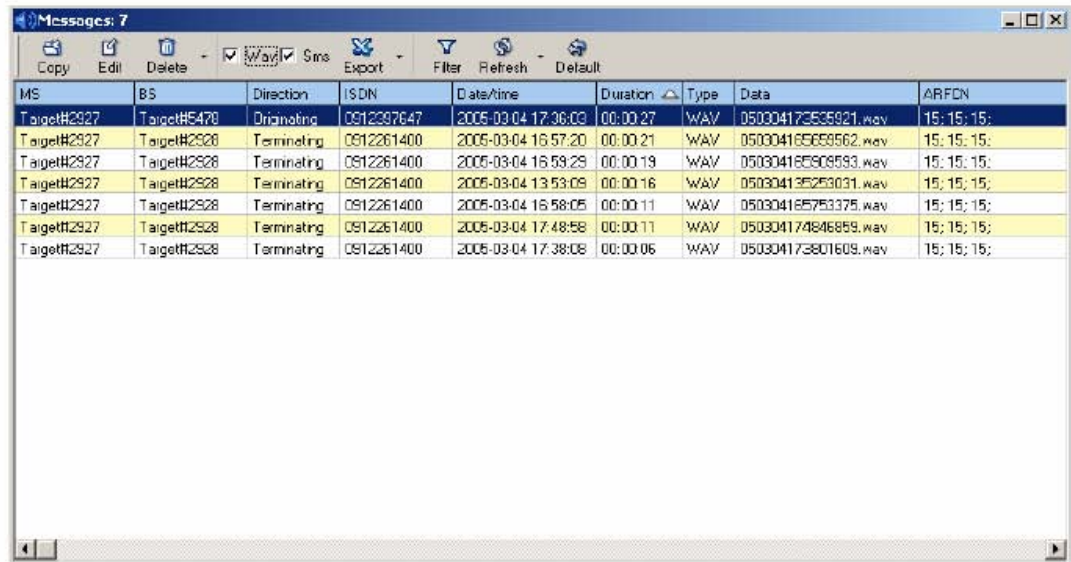
Note 1. The recommended search algorithm for an object does not guarantee absolute information. It serves only as auxiliary means for the operator of the system.

Note 2. Erroneous handling of the Ping-mobile phone might lead to complete exposure of the operation of the system!

7.3.3. Data base < Messages >

In order to work with the **Messages** data base, open the display and edit data base window from the main menu **Operation > Messages** or click the icon .

Double click in the window database **Targets** with left mouse button to view in the windows **Messages** only the selected object.



MS	BS	Direction	ISDN	Date/Time	Duration	Type	Data	ARFCN
Target#2927	Target#5478	Originating	0912261400	2005-03-04 17:36:03	00:00:27	WAV	050304173535921.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 16:57:20	00:00:21	WAV	050304165659562.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 16:59:29	00:00:19	WAV	050304165908593.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 13:53:09	00:00:16	WAV	050304135253031.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 16:58:05	00:00:11	WAV	050304165753375.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 17:48:58	00:00:11	WAV	050304174846859.wav	15; 15; 15;
Target#2927	Target#2928	Terminating	0912261400	2005-03-04 17:38:08	00:00:06	WAV	050304173801609.wav	15; 15; 15;

window **Messages**





The windows displays the following data in table form:

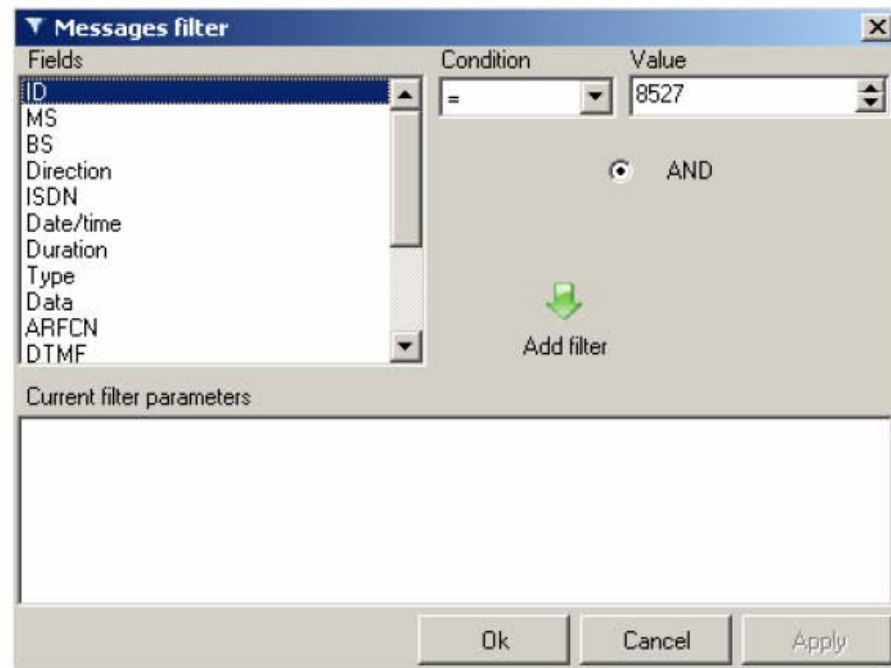
- ID** – internal identifier;
- MS** – object name of MS for current connection;
- BS** – object name of BS for current connection;
- Direction** – direction of connection for MS object;
- ISDN** – ISDN-number of object via BS;
- Date/time** – date and time of message;
- Duration** – duration of message;
- Type** – type of message;
- Data** – Content of text message or file name containing audio recording;
- ARFCN** – channel number of BS, wherein message from object occurred;
- DTMF** – content of DTMF message;
- Comment** – comments on recording;
- Status** – state of processing of messages
- User** – name of user working with data base;
- Checked** – date and time of editing of file containing recording of message
- Host** – host name

Right mouse click to determine number of displays on screen.

Click on headline with left mouse button to define position of the selected parameters on the display

The data base provides several functions which can be activated by clicking the icons from the tool bar:

- **Copy file <F2>**  - Copying the file containing recording of selected message;
- **Edit message <F4>**  - Editing comments on selected message;
- **Delete message **  - Deletion of message;
- **Delete file <Shift+Del>** - Deletion of file and recording of selected message;
- **Delete the list** - Deletion of all messages from data base;
- **Filter <Ctrl+F>**  - retrieval of system settings window.




Window Message **Filter**

Within Message Filter window you may create user-defined filters on the basis of varying criteria and parameters. Creation of filters containing symbols occur in the Value window, e.g. %% symbols: parameter DTMF-Filter: % 34%

Refresh list of messages <F5>  - updates message list.

*The Find on pad serves for search of messages within data base.
The upper part of the window displays overall number of messages,
e.g.:Messages: 4.*

Play back of the selected messages occurs via double click with left mouse button or pressing <Enter>.

The following entry windows will be opened for editing of messages (Edit <F4> ):
 Check Box Processed - operator ticks <<play back message>>
 Comment - operator's comments on recording.

All changes will be stored in the data base by clicking

8. Technical Data

	GSM 900	GSM 1800
Reception channels		8
Target numbers		up to 1000
Identification	through IMSI, TMSI, IMEI, Class mark, Telephone number, Distance	
Frequency range of Downlink (BTS⇐MS)	935 ... 960 MHz	1805 ... 1880 MHz
Frequency range of Uplink (MS⇐BTS)	890 ... 915 MHz	1710 ... 1785 MHz
Channel spacing	200 kHz	
Number of channel	124	375
Frequency deviation	45 MHz	95 MHz
Frequency stability	□ 0,03 ppm	
Receiver type	wide range receiver	
Receiver sensitivity	-105 dbm	
Antenna impedance	50 □	
Time of frequency change in Hopping mode	< 500 μs	
Dynamics range	> 75 dB	
Volume range	25 dB	
Demodulator	GMSK, asynchrony	
Decoder	for Protocol A5-2	
Speech codex	RPE/LTP: FR, EFR	
Channel structure	TDMA/FDMA	
System software	Windows XP	
Audio format	standard Wave-format	
Power supply	220 VAC, 50 Hz; 110 VAC, 60 Hz or external battery 12 V DC	
Operating temperature range	+ 5 °C ... 40 °C	

Model No: 580 200 0012

9. Scope of delivery

- Main unit *FALCON D+*
- Control unit (Notebook)
- network-connecting cable
- Power supply cable 230VAC
- Dual-band antenna (magnetic mount)
- User manual
- Transport case

10. Support

10.1. Guarantee

It applies a legal guarantee period of 24 months for material and faulty manufacturing.

There is no further, explicit or tacit guarantee possible.

The manufacturer is not responsible for sequence damages.

The warranty claim expires if repairs or interventions are done by persons who were not authorised by the manufacturer.

Errors which occurred due to an inappropriate use of the device, incorrect maintains or the use of accessories or special accessories not advised by the manufacturer do not fall under guarantee.

It is in no case allowed to open the device.

Any installation procedures for the programs presuppose an in itself conflict-free operating system. Problem solutions for it require either an intensive detail knowledge of the used system or its compromise less reconstruction.

The manufacturer does not take over any guarantee for that the programs or systems used by the user will furnish the striven utility.

Should any warranty return take place, it has before to be agreed by the manufacturer. Otherwise, it will not be handled.

The manufacturer does not take over any transport damages or transport insurances.

Any unfranked letter or parcel will not be accepted. If there is no error of the product found, a handling charge will be raised.

10.2. Customer Service, Hotline

Support is generally done by

IBH-IMPEX Elektronik GmbH
Friederikenplatz 55 a
D-06844 Dessau

Tel.: +49 340 2400242

Fax.: +49 340 2400244

E-Mail: mail@ibh-impex.de



If you would like further Information about ELAMAN,
or would like to discuss a specific requirement or project, please contact us at:

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