

USW 800 V 2.6.0

Operating manual

UFOcompact plus software

English

**IMPORTANT**  
Read carefully  
before use!



Die deutsche Version dieses Dokuments finden  
Sie auf [www.kathrein.com](http://www.kathrein.com).

**KATHREIN**

## Contents

<b>1</b>	<b>Introduction .....</b>	<b>7</b>
<b>2</b>	<b>Writing conventions of the operating manual.....</b>	<b>8</b>
<b>3</b>	<b>Preconditions .....</b>	<b>9</b>
3.1	Hardware.....	9
3.2	Interfaces.....	9
3.3	Ports/addresses used.....	9
<b>4</b>	<b>Installation.....</b>	<b>10</b>
4.1	Windows.....	10
4.2	Linux.....	10
<b>5</b>	<b>Starting the application .....</b>	<b>11</b>
5.1	Windows.....	11
5.2	Linux.....	11
5.3	Creating or opening a secure storage .....	12
5.4	Entering a password during the connection to the secure storage.....	13
<b>6</b>	<b>Elements of the user interface .....</b>	<b>14</b>
<b>7</b>	<b>Software Configuration .....</b>	<b>21</b>
7.1	Frequency settings.....	21
7.2	LNB Configuration .....	22
7.3	Network settings.....	22
7.4	Cache .....	23
7.5	Warnings .....	24
7.6	Secure Storage.....	24
7.7	Language .....	26
7.8	System networking .....	26
7.8.1	Groups.....	27
7.8.2	Choosing a system to be opened .....	27
7.8.3	Current system .....	32
<b>8</b>	<b>Read out, configure and send UFOcompact plus-system ...</b>	<b>38</b>
<b>8.1</b>	<b>Reading the system .....</b>	<b>38</b>
8.1.1	Direct connection via Ethernet .....	39
8.1.2	Possible errors when establishing a connection and while a connection is being established .	41
<b>8.2</b>	<b>Configuring channel units .....</b>	<b>44</b>
8.2.1	General settings .....	44
<b>8.3</b>	<b>Copying channel unit properties .....</b>	<b>45</b>
<b>8.4</b>	<b>Sending the configuration of a system .....</b>	<b>45</b>
<b>8.5</b>	<b>Importing an existing system configuration.....</b>	<b>46</b>
<b>8.6</b>	<b>Templates for UFOcompact plus system configurations.....</b>	<b>47</b>

8.7	Creating a template window .....	47
8.8	Adding and deleting modules .....	48
8.9	Opening and importing from saved system configurations .....	48
<b>9</b>	<b>Creating an NIT.....</b>	<b>49</b>
9.1	The UFOcompact plus NIT wizard.....	50
9.2	The UFOcompact NIT wizard.....	58
9.3	Importing external NIT data .....	66
<b>10</b>	<b>Creating LCN Lists for the Programme Distribution in the Network.....</b>	<b>67</b>
<b>11</b>	<b>Overviews.....</b>	<b>75</b>
11.1	General.....	75
11.2	Configuration of the table columns.....	75
11.3	Frontend overview .....	76
11.4	Output overview .....	77
<b>12</b>	<b>Favourites.....</b>	<b>78</b>
12.1	Select from the Favourites .....	78
12.2	Add the current attachment to the Favourites.....	79
12.3	Managing/organising Favourites.....	79
<b>13</b>	<b>Software Update .....</b>	<b>81</b>
13.1	USW 800 software updates.....	81
13.2	Module versions .....	81
13.3	Satellite lists .....	82
<b>14</b>	<b>Archiving customer service information .....</b>	<b>83</b>
<b>15</b>	<b>USW800 firmware update .....</b>	<b>85</b>
15.1	General Information.....	85
15.2	Updating the firmware.....	85
<b>16</b>	<b>Configure UFOcompact modules.....</b>	<b>89</b>
16.1	Overview of supported UFOcompact modules.....	89
16.2	Channel filter .....	89
16.3	PID list.....	91
16.4	Common Interface .....	92
16.5	Search for channels and transponders.....	94
<b>17</b>	<b>UFOcompact plus device categories and configuration .....</b>	<b>96</b>
17.1	UFOcompact plus module and device categories.....	96
17.1.1	General Information.....	96
17.1.2	Module "Type information" .....	97
17.2	Overview transmodulators .....	98

<b>17.3</b>	<b>Transmodulator configuration settings.....</b>	<b>98</b>
17.3.1	Input socket configuration.....	98
17.3.2	Multi-standard input configuration .....	98
17.3.3	Satellite input configuration.....	99
17.3.4	Frontend configuration .....	99
17.3.5	DVB-S/-S2 Frontend configuration .....	100
17.3.6	DVB-T/-T2 Frontend configuration.....	101
17.3.7	DVB-C Frontend configuration.....	102
17.3.8	Transport stream processing configuration.....	103
17.3.9	DVB-C-QAM output configuration .....	104
17.3.10	DVB-T-COFDM output configuration .....	105
17.3.11	Transport stream processing extra options.....	106
17.3.12	Channel table/filter configuration .....	107
17.3.13	PID list/filter configuration .....	110
17.3.14	Transport stream routing configuration .....	111
17.3.15	Network Configuration .....	116
17.3.16	IP Frontend.....	117
17.3.17	IP Backend .....	121
<b>17.4</b>	<b>Overview Common Interface module.....</b>	<b>124</b>
<b>17.5</b>	<b>Overview Common Interface module.....</b>	<b>124</b>
17.5.1	Basic Settings .....	124
17.5.2	CA Module.....	127
17.5.3	Programme table.....	131
17.5.4	Transport stream routing .....	138
17.5.5	Routing editor.....	139
<b>17.6</b>	<b>Overview Amplifier .....</b>	<b>145</b>
<b>17.7</b>	<b>Configuration settings Amplifier.....</b>	<b>145</b>
17.7.1	Equalizer.....	145
<b>17.8</b>	<b>Overview Encoder.....</b>	<b>147</b>
<b>17.9</b>	<b>Configuration Settings Encoder .....</b>	<b>147</b>
17.9.1	HDMI Frontend.....	147
17.9.2	Encoder TS-Processing/MUX .....	149
17.9.3	TS Routing of Transport Streams .....	150
<b>18</b>	<b>User information UFX 800 .....</b>	<b>151</b>
<b>18.1</b>	<b>Password .....</b>	<b>151</b>
<b>18.2</b>	<b>Grouping of systems.....</b>	<b>151</b>
<b>18.3</b>	<b>Password for a grouped system.....</b>	<b>152</b>
<b>18.4</b>	<b>Network configuration.....</b>	<b>152</b>
18.4.1	Firewall settings.....	152
18.4.2	Connecting the UFOcompact plus system without existing network infrastructure .....	153
18.4.3	Remote access to the UFOcompact plus system	



	over the Internet .....	154
18.4.4	Connecting the UFOcompact plus system with existing network infrastructure.....	155
18.4.5	IP configuration of the UFX 800 .....	156
<b>18.5</b>	<b>Status LED of the UFX 800 .....</b>	<b>158</b>
<b>18.6</b>	<b>Function of the Reset button .....</b>	<b>158</b>
<b>18.7</b>	<b>Software update .....</b>	<b>159</b>
18.7.1	Software update with a USB Stick.....	159
<b>19</b>	<b>User Information UFO 878/874 .....</b>	<b>161</b>
19.1	LED to show the device status .....	161
19.2	Configuration with USW 800 software .....	162
<b>20</b>	<b>User Information UFO 834 .....</b>	<b>164</b>
20.1	LED to show the device status .....	164
20.2	Configuration with USW 800 software .....	165
<b>21</b>	<b>User Information UFO 876 .....</b>	<b>167</b>
21.1	LED to show the device status .....	167
21.2	Configuration with USW 800 software .....	168
<b>22</b>	<b>User Information UFO 876/MX.....</b>	<b>170</b>
22.1	LED to show the device status .....	170
22.2	Configuration with USW 800 software .....	171
<b>23</b>	<b>User Information UFO 836 .....</b>	<b>173</b>
23.1	LED to show the device status .....	173
23.2	Configuration with USW 800 software .....	174
<b>24</b>	<b>User Information UFO836/MX.....</b>	<b>176</b>
24.1	LED to show the device status .....	176
24.2	Configuration with USW 800 software .....	177
<b>25</b>	<b>User Information UFZ 896 .....</b>	<b>179</b>
25.1	LED to show the device status .....	179
25.2	Configuration with USW 800 software .....	180
<b>26</b>	<b>User Information UFO 844 .....</b>	<b>182</b>
26.1	LED to show the device status .....	182
26.2	Configuration with USW 800 software .....	183
<b>27</b>	<b>User Information UFO 848 .....</b>	<b>184</b>
27.1	LED to show the device status .....	184
27.2	Configuration with USW 800 software .....	185
<b>28</b>	<b>User Information UFO 858 .....</b>	<b>186</b>
28.1	LED to show the device status .....	186
28.2	Configuration with USW 800 software .....	187
<b>29</b>	<b>User Information UVO 830 .....</b>	<b>188</b>

29.1	LED to show the device status .....	188
29.2	Configuration with USW 800 software .....	189
<b>30</b>	<b>User Information UFX 894 .....</b>	<b>190</b>
30.1	LED to Show the Device Status .....	190
30.2	LED to Show the HDMI Input Status .....	191
30.3	Configuration with USW 800 Software.....	191
<b>31</b>	<b>Open Source license of the module software .....</b>	<b>192</b>
31.1	OSS licenses for the modules.....	192
31.1.1	AT91 Bootstrap, at91lib.....	192
31.1.2	FreeRTOS.....	192
31.1.3	Loki.....	195
31.1.4	Google protobuf .....	195
<b>32</b>	<b>Licence texts of the libraries used.....</b>	<b>196</b>
32.1	Apache License .....	196
32.2	License SLF4J .....	197
32.3	License Protobuf.....	198
32.4	License JGoodies Looks .....	198
32.5	License JGoodies Forms.....	198
32.6	License JGoodies Common .....	199
32.7	License JGoodies Binding.....	199
32.8	License JCONFIG.....	199
32.9	GNU LESSER GENERAL PUBLIC LICENSE .....	200
32.10	LICENSE Apache 2.0.....	205
32.11	The Apache Software License, Version 1.1 .....	207

# 1 Introduction

The USW 800 program is platform-independent software for the configuration of UFOcompact plus systems that can be made up of one or more grouped UFOcompact plus base units.

The configuration of the system can either be done locally or through remote access via a TCP/IP connection over existing LAN or WAN infrastructure.

In addition to UFOcompact plus modules selected UFOcompact modules are also supported.

The operating concept of the USW 800 program allows the simple setting up of systems that can consists of groups of up to eight base units.

The user interface provides a convenient means by which the user can configure all the parameters of a UFOcompact plus system.



Fig. 1: Starting the application

## 2 Writing conventions of the operating manual

Overview of the various forms of display of text in this document and their meaning:

This is normal continuous text, in which a large part of the user manual for the application is written.



Warnings are formatted like this.

### Note

Important instructions are shown like this.

### Tip

Notes for experts, which are less important in normal use.

The text output of a command, contents of a file etc. are shown within the continuous text *like these words* and are shown as a block like this:

```
#!/bin/bash
# Example of a small shell script

echo "Hello, world! "
exit 0
```

## 3 Preconditions

### 3.1 Hardware

#### Minimum requirements:

- Hardware
  - Intel®Core™2 Duo CPU with at least 2 000 M Hz clock rate (or comparable CPU)
  - 4 GB RAM
  - 300 MB of free hard disk space
  - Graphic card, resolution at least
    - 1280 x 960 pixels (4:3 format)
    - 1366 x 768 pixels (16:9 format)
    - 1280 x 800 pixels (16:10 format)
- Software
  - Operating system: Microsoft Windows® Vista™/7™/8™/10™, Linux

### 3.2 Interfaces

The PC can be connected to the UFOcompact plus system by means of the following interfaces:

- Ethernet TCP/IP network

### 3.3 Ports/addresses used

The communication between the USW 800 and the UFOcompact plus system for module configuration is done via TCP, port **9320**.

The UFOcompact plus system publishes the service that is offered via Multicast-DNS and DNS-SD.

For these purposes the Multicast address **224.0.0.251** (IPv4) or **FF02::FB** (IPv6) respectively are used with port **5353**.

The network configuration of the carrier is done alternatively via Multicast, if the system cannot be reached via TCP.

For these purposes the Multicast address **224.0.225.0** (IPv4) **FF02::225** (IPv6) respectively is used with port **9321**.

## 4 Installation

### 4.1 Windows

**Note** From Windows Vista onwards Administration rights are required to allow an application to be installed in the "Programs" directory. This procedure is only recommended if the application is to be accessible for all users of the computer. For a subsequent start of the application Administration rights are only required if the "Online Update" function is to be used. If the application is only to be installed for the user who is currently logged in, then a directory is to be chosen that has the relevant Write rights.

Start the programme "usw800\_<version number>.exe" and follow the information that is then given.

### 4.2 Linux



Never install the software under Unix in the root directory, unless absolutely necessary. As user "root": you place the safety of your computer system at risk.

No root rights are required at any time in the Installation of USW 800. If ant any time you do require root user rights, for example, to change the access rights in a directory, please log out of root before starting to install USW 800 as "root".

**Note** Before you install the USW 800, make sure that a Java runtime environment, Version 1.8.0\_45or higher is installed.

Start the programme `usw800_Linux__(32Bit|64Bit)_<version number>.sh` and follow the further instructions of the installation programme. Input a target directory into which all the files that are necessary to start the programme can be copied.

Ensure that you have the necessary rights in the destination directory.

Under Linux and Solaris currently no icon can be generated on the Desktop or in the Start menu. You will need to create this yourself in accordance with the user guide for your distribution.

However, you have the option during the installation to create a symbolic link that you can also place on your Desktop.

## 5 Starting the application

### 5.1 Windows

Either start USW 800 via the Start menu (Programs | Kathrein | USW800) or from within your chosen installation directory by entering the command: `usw800`

### 5.2 Linux

1. Start the USW 800 programme by clicking on the symbolic pointer generated during installation, or from within your chosen installation directory by entering the command: `./usw800`.
2. If necessary, remove the tick from **Display the dialogue every time the application is started**.  
⇒ The tick can be set again in the main menu if required.
3. Highlight **UFOcompact plus**.
4. Acknowledge with **OK**:

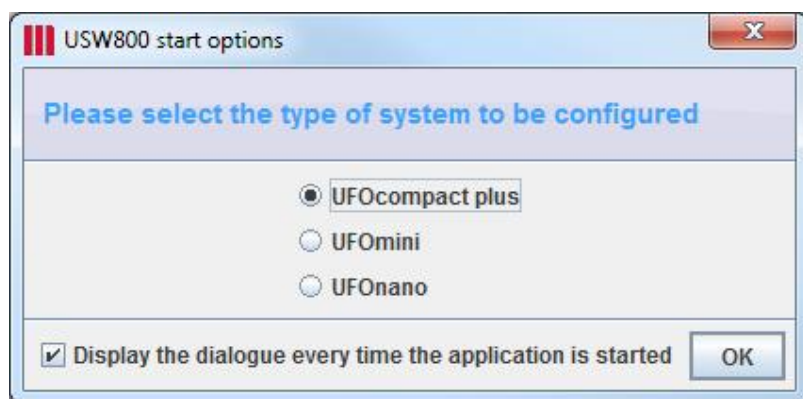


Fig. 2: System selection after starting USW 800

## 5.3 Creating or opening a secure storage

Before the application starts, you have a possibility to create a secure storage.

### Creating a new secure storage

If there is no secure storage yet, i.e., if you start the application for the first time, you can create a secure storage.

► Start the application.

⇒ The following dialogue appears:



Fig. 3: Creating a new secure storage

**Note** The password entry is optional. If you do not enter a password, the storage is encrypted with a default password.

### Opening a secure storage

If you have already created a secure storage and it is password protected, you have to enter the password.

► Start the application.

⇒ The following dialogue for the password entry appears:



Fig. 4: Opening a secure storage

**Note** If you did not save a master password when creating the secure storage, the dialogue above does not appear.



- ▶ Press **OK**.
  - ⇒ The USW 800 opens the secure storage after the password entry. If the storage cannot be opened because the password was entered incorrectly, the dialogue appears again.

**Note** If you forget the password, press **Cancel** to create a new secure storage.  
⇒ The dialogue from Fig. 3 appears.

For more information on secure storage, see *Secure Storage*, p. 24.

## 5.4 Entering a password during the connection to the secure storage

Starting from version 2.3.0 of the USW 800, it is possible to protect UFOmini systems by means of a password.

If a system is password protected, you will need to enter a password as soon as you want to establish a connection to this system.

If you have already saved a correct password for this system in the secure storage, you do not need to enter it again; see *Secure Storage*, p. 24.

If you enter an invalid password, an error message appears and you need to enter the password again.

- ▶ Press **Cancel** to stop the connection.

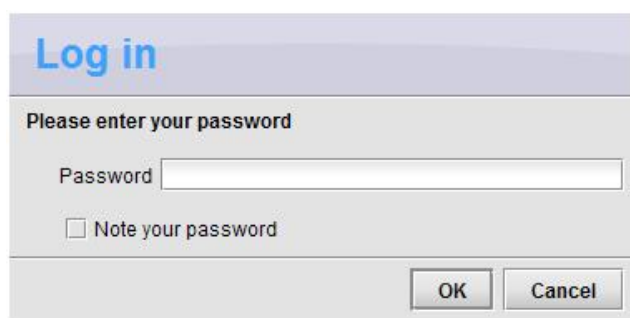


Fig. 5: Entering a password during the connection to the secure storage

### Saving a password for the secure storage

- ▶ Tick **Note your password**.
  - ⇒ After the successful login, the password is saved in the **secure storage**.

## 6 Elements of the user interface

This chapter gives an overview of the structure of the user interface for the USW 800. The main elements in the menu and the symbol bar are briefly introduced.

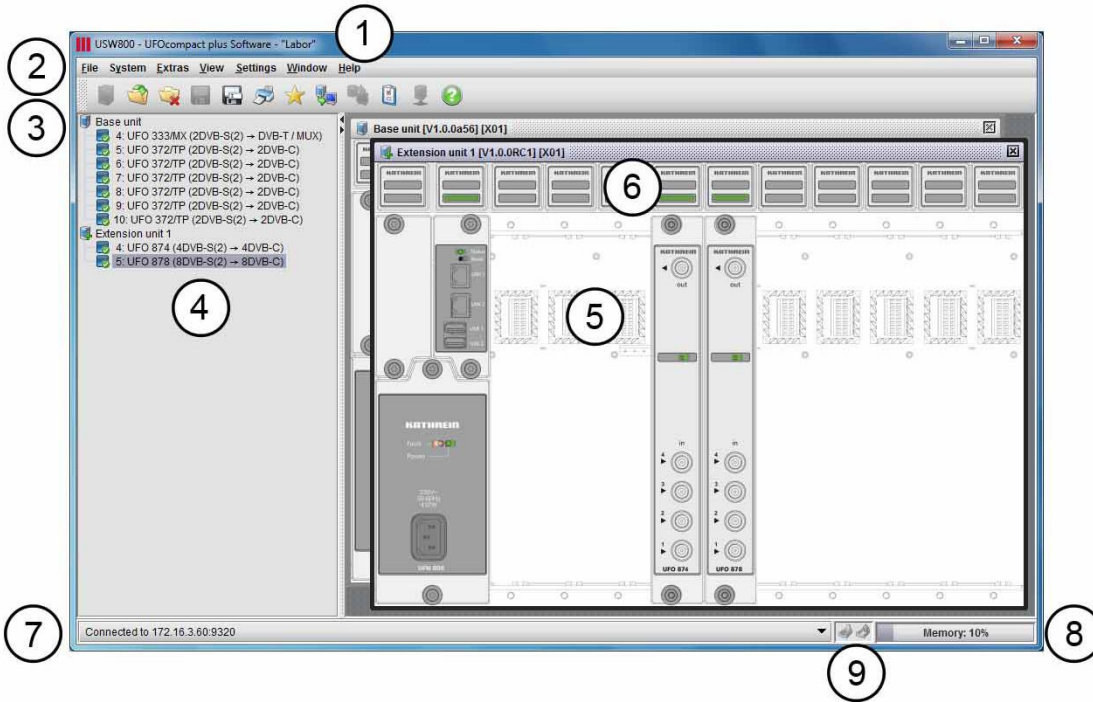


Fig. 6: Main window for the application

Structure of the user interface:

### ① Window title of the application

If the USW 800 program is connected to a UFOcompact plus system then the comments of the system is shown in quotation marks. Refer to Chapter 7.8 *System networking*, p.26 for more detailed information on comments.

The name of the current file follows in angle brackets.

If no file is loaded or the system being read has not yet been saved to a file, no name will be shown at this point.

### ② Menu of the application

The individual menu entries are explained in the following tables.

### ③ Symbol bar of the application

The individual symbols are explained in more detail in the following tables.

### ④ **Navigation tree of the application**

The navigation tree includes the base unit and all the extension units, each with their modules.

The tree permits rapid navigation. Clicking with the right mouse key brings up a context menu.

---

### ⑤ **Graphic display of the system**

The graphic display of the of the base and extension units appears in the right-hand [part of the application window. Clicking the display of each module with the right mouse key brings up a context menu. See Chapter 8.6 *Templates for UFOcompact plus system configurations*, p.47.

---

### ⑥ **Graphic display of the slot status**

With the aid of the two upper symbols communication with the module plugged into this slot can be shown in visual form. Data traffic incoming to the PC is indicated by the left-hand symbol briefly lighting up. When sending data to the module the right-hand symbol lights up briefly.

**The lower symbol indicates the current status of the plugged-in module.**

---

### ⑦ **Status bar for the application**

Messages regarding the operations currently being performed, such as warnings, appear in the status bar for the application. Left-click on the status bar to view earlier messages.

---

### ⑧ **Display of memory usage**

This bar shows the current memory usage of the application. Hold the mouse cursor over this surface element, and after a short interval a tool tip will appear, which specifies the memory usage in more precise figures.












---

### ⑨ **Graphic display of the data transmission**










With the aid of both symbols the communication to the UFOcompact plus system is shown in visual form. Data traffic incoming to the PC is indicated by the left-hand symbol briefly lighting up. Data being transmitted to the UFOcompact system is indicated by the right-hand symbol briefly lighting up.




---

The following descriptions apply to the various symbols in the navigation tree and in the graphic displays of the modules:













Navigation	Graphics	Description
		The slot is not being used
		The module is present and is operating correctly
		The module was added manually, see Chapter 8.6 <i>Templates for UFOcompact plus system configurations, p.47</i>
		However, the module firmware is old and no longer meets the minimum requirements of the USW 800. In order to assure correct functioning of the USW 800 it is recommended that the firmware of the module should be updated
		No suitable plugin could be found for this module. An update of your software may provide a remedy, see Chapter 13 <i>Software Update, p.81</i>
		An error occurred when reading or communicating with the module. You can find further information in Chapter 8.1.2 <i>Possible errors when establishing a connection and while a connection is being established, p.41</i>

The application contains the following menu entries and symbols:

Symbol	Menu	Shortcut	Description
	File   Open System	Ctrl O	Loading an existing system configuration
	File   Import System	Ctrl I	Importing an existing system configuration into the current system configuration  For further information see Chapter 8 <i>Read out, configure and send UFOcompact plus-system, p.38</i>
	File   Save	Ctrl S	Saving the system configuration that has been created or changed
	File   Save As... under ...	Ctrl Shift S	Saving a system configuration under a different file name
	File   Close	Ctrl W	The current system configuration will be closed. If the configuration has not yet been saved, you will be invited to save it before it is closed
	File   Export As PDF...	Ctrl E	The current system configuration is exported as a PDF file
	File   Print	Ctrl P	Printing out the system configuration
	File   1...		List of the files used most recently. Select one of these files to open it immediately.
	File   Exit	Ctrl Q	Ending the application
	System   Read out System	Ctrl R	Start reading the configuration of an actual UFOcompact plus system.  For further information see Chapter 8 <i>Read out, configure and send UFOcompact plus-system, p.38</i>

	System   Send System	Ctrl-T	Sends the current configuration to an actual UFOcompact plus system. For further information see Chapter 8 <i>Read out, configure and send UFOcompact plus-system, p.38</i>
	System   Select from the Favourites	Ctrl-F	Selection of the system to be read from a list of Favourites
	System   Add the current System to Favourites	Ctrl-A	Adds the system currently open to the Favourites list
	System   Create Base Unit System   Create Extension Unit	Ctrl-N	Creates a new base or extension unit. For further information see Chapter 8.6 <i>Templates for UFOcompact plus system configurations, p.47</i>
	System   ...		List of the most recently opened attachments. Select one of these attachments to read it immediately
	Extras   NIT Assistant...	F3	Creates and activates the cable NIT. For further information see Chapter 9 <i>Creating an NIT, p.49</i>
	Extras   Activate NIT		Activates the NIT
	Extras   Deactivate NIT		Deactivates the NIT
	Extras   LCN Wizard [IP]	F4	Creates sorted channel lists for the distribution over a network. For more information, see 10 <i>Creating LCN Lists for the Programme Distribution in the Network, p.67</i>
	Extras   Firmware Update		Open the Update Firmware dialogue
	Extras   Check for updates...		Starts the search for channel updates in the Internet <sup>1)</sup>
	Extras   Search for an updated Satellite...		Starts the search for updated satellite lists in the Internet <sup>1)</sup>

<sup>1)</sup> Write rights in the installation directory of the application are required to display this option.

	View   Additional Information in Navigation		Switches the display of the additional information in the navigation tree on or off.
	View   Use hexadecimal notation for SIIDs		SIIDs are displayed using hexadecimal notation and must be entered correspondingly. Otherwise, decimal notation is used. This performance feature is only supported by UFOcompact plus units.
	View   Frontend overview		Opens a window that gives an overview of all Frontends displayed.
	View   Output overview		Opens a window that gives an overview of all Outputs displayed.
	Settings   Settings ...		Configures the application. For further information see Chapter 7 <i>Software Configuration, p.21</i>
	Settings   Language		Configures the language for the application. For further information see Chapter 7 <i>Software Configuration, p.21</i>
	Settings   System Networking	F2	Configures the networking of the systems. For further information see Chapter 7.8 <i>System networking, p.26</i>
	Windows   Close all Windows	F4	All windows are closed
	Windows   1 ...		List of windows (max. 10). Select one of the windows to appear in the foreground
	Windows   All Windows...	F7	Shows the list of all windows
	Help   Manual	F1	Shows the manual
	Help   Release Notes		Shows the version information (in English only)
	Help   Archive Customer Service Information		Saves all customer-relevant information in a file, see Chapter 14 <i>Archiving customer service information, p.83</i>



---

Help | About  
USW800...

Information about the application.  
Here you will find information regarding the version, the plug-ins, satellite lists and the open-source licences used

---



## 7 Software Configuration

In the menu ([Settings](#) | [Basic Settings](#)) general settings can be performed, which apply equally to all connected systems. Within the individual tabs a variety of settings can be performed.

### 7.1 Frequency settings

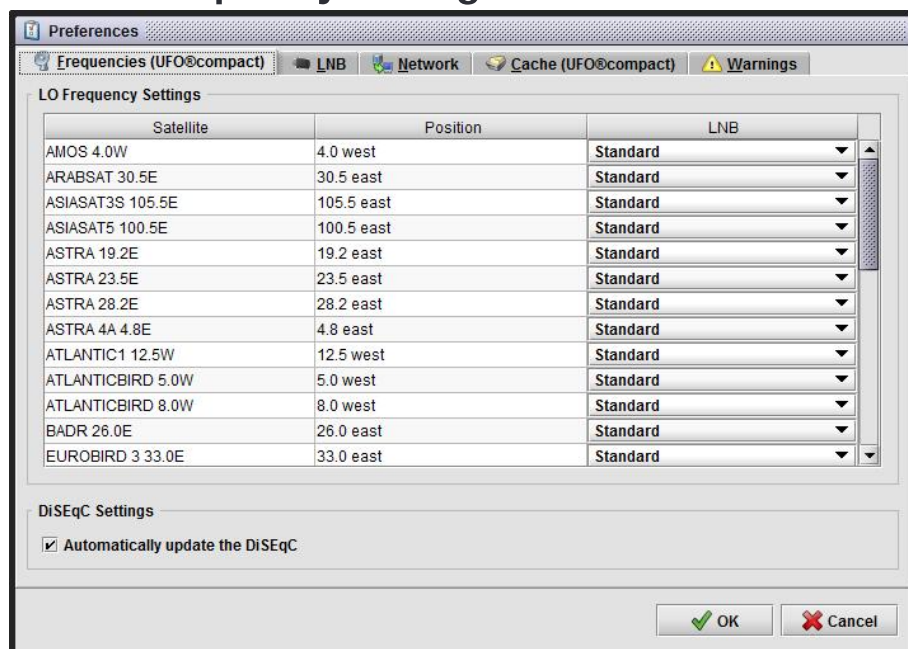


Fig. 7: Menu "Settings | Basic Settings | Frequencies"

**Note** This tab is only relevant for **UFOcompact** modules.  
The settings that are made here have no effect on the the functioning of the **UFOcompact plus** modules.

The LNB types can be configured separately for each satellite in the table.

The data defined in the LNB type (see [7.2 LNB Configuration, p.22](#)) is required by the USW 800 for conversion from satellite to SAT IF frequency.

The switch in the DiSEqC™ settings determines whether in the event of a change to the input frequency necessitating that the DiSEqC™ signal in the individual UFOcompact modules be switched over, this is performed automatically.

If the check mark is not set, the DiSEqC™ signal in the channel unit window must be switched over manually.

## 7.2 LNB Configuration

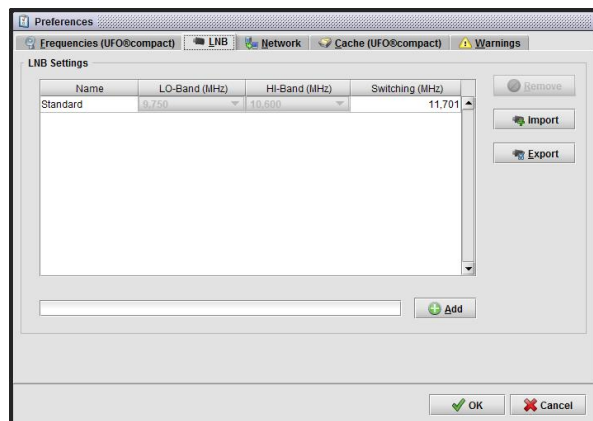


Fig. 8: Menu "Settings | Basic Settings | Frequencies"

The values for the LO/Hi frequency and the frequency for automatic changeover of the desired frequency band depend on your satellite system, in particular on the configuration of the LNB or satellite matrix.

The frequencies can be configured separately for each LNB type. The data that is input here is required by USW 800 for conversion from satellite to IF frequency.

## 7.3 Network settings

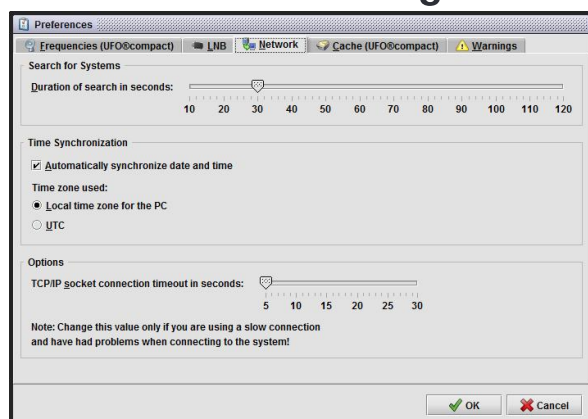


Fig. 9: Menu "Settings | Basic Settings | Network"

Under this tab you can adjust the settings for the network connection. The search duration for automatic system search can be changed in the top part of the dialogue window. Values between 10 and 120 seconds are possible.

Time synchronisation settings can be performed in the centre part of the dialogue window.

When automatic synchronisation is in operation, the current date and time information are shown in the background while a UFOcompact plus system is being read in.

There is also the option of performing the time synchronisation manually.

The time zone used is identical in both cases and can be specified in this dialogue window.

There is also the options of using the time zone currently in use on the PC, or UTC coordinated world time.

In the case of slow connections there is an appropriate option in the bottom part of the dialogue window.

This affects the time-out times when establishing a connection.

Do not change this default setting unless you have problems with timing out when establishing the connection.

## 7.4 Cache

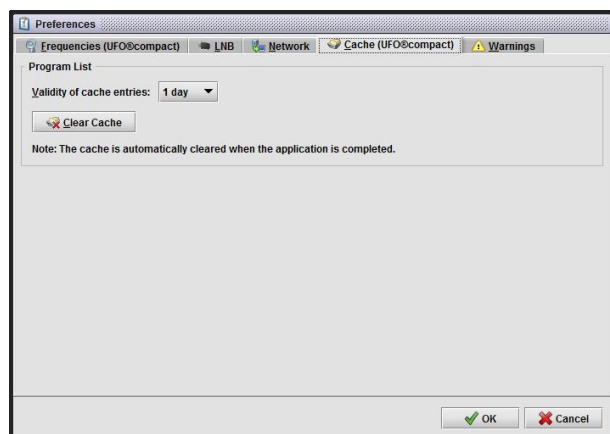


Fig. 10: Menu "Settings | Basic Settings | Cache"

**Note** This tab is only relevant for **UFOcompact modules**.  
The settings that are made here have no effect on the the functioning of the **UFOcompact plus modules**.

In this tab you can make the settings for the cache of the supported UFOcompact modules. When the channel list of a transponder or DVB-T channel is read by a UFOcompact module this channel list can be saved in the background.

This or another UFOcompact module wishes to read the channel list of the same transponder (or DVB-T channel) then the saved channel list is used instead. When using the same transponder (or DVB-T channel) successively, this can significantly reduce the waiting times.

Since the channel list of a transponder can change, it makes sense to rewrite the information saved in the background from time to time. This interval can be configured by setting the validity period of the cache entries.

There exists also the option of clearing the cache immediately.

This is particularly useful if you know that the channel list for a transponder has changed. If you are unsure whether a channel list is still current, clear the transponder cache and read in the transponder afresh.

The cache for the **UFOcompact modules** is deleted automatically when the application ends.

## 7.5 Warnings

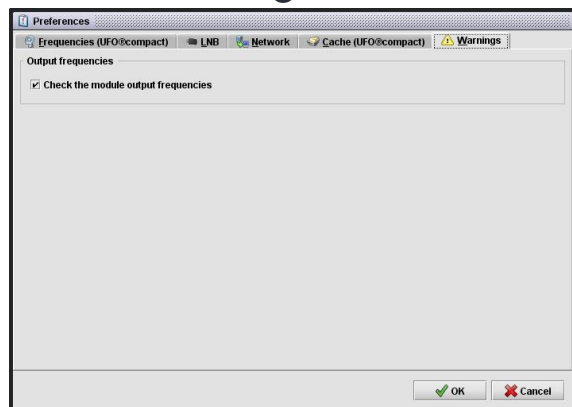


Fig. 11: Menu "Settings | Basic Settings | Warnings"

In this tab you can switch on or off the display of certain warnings.

A warning of this type can be shown if, for example, there are conflicts between the output frequencies of the modules (i.e. the output spectra overlap).

## 7.6 Secure Storage

The secure storage serves for the secure management of the login details necessary for the access to UFOcompact plus systems.

The data are encrypted and saved in the network file system and can only be read by entering a master password. You will only need to remember the master password, because the login details for the login on the UFOcompact plus systems are automatically determined and transferred from the secure storage.

- ▶ Enter the master password when starting the application, see *Starting the application*, p. 11.

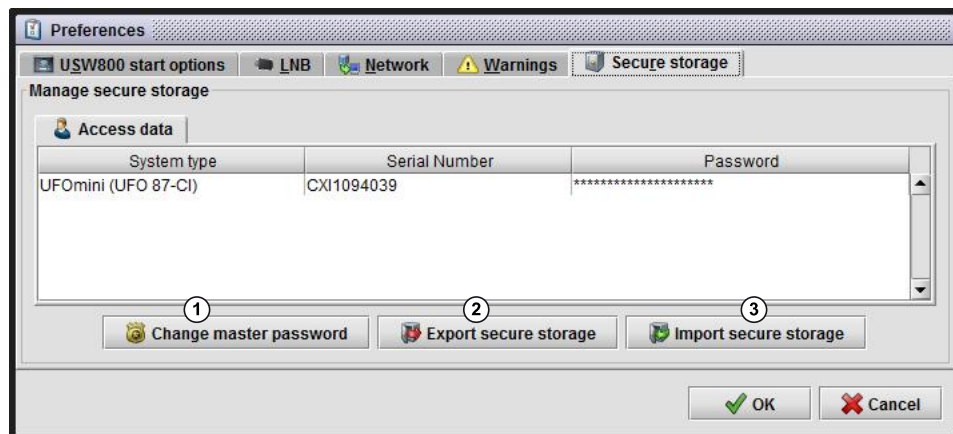


Fig. 12: Secure storage tab

- 
- ① Changes the master password used for the secure storage encryption
- 
- ② Exports the contents of the secure storage to a file  
Enter the master password again to verify authorisation. You can encrypt the export file by means of an optional password which you can enter at this point.
- 
- ③ Transfers the contents of an export file to the secure storage  
Enter the master password again to verify authorisation.  
You can choose one of the following options when combining new and already existing entries:
- delete all new entries
  - do not import any data
  - combine data; old data have priority
  - combine data; new data have priority
-

## 7.7 Language

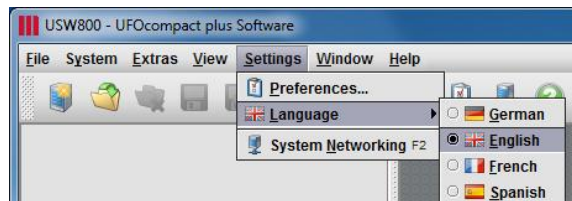


Fig. 13: Menu Settings | Language

In the menu **Settings | Language** you can choose between German, English, French and Spanish as the language.

The new language only takes effect when the application is restarted.

## 7.8 System networking

▷ **Settings** ▶ **Preferences** ▶ **System Networking**

The menu (**Settings | System Networking**) is used to open the dialogue window to configure the networking of the UFOcompact plus systems:

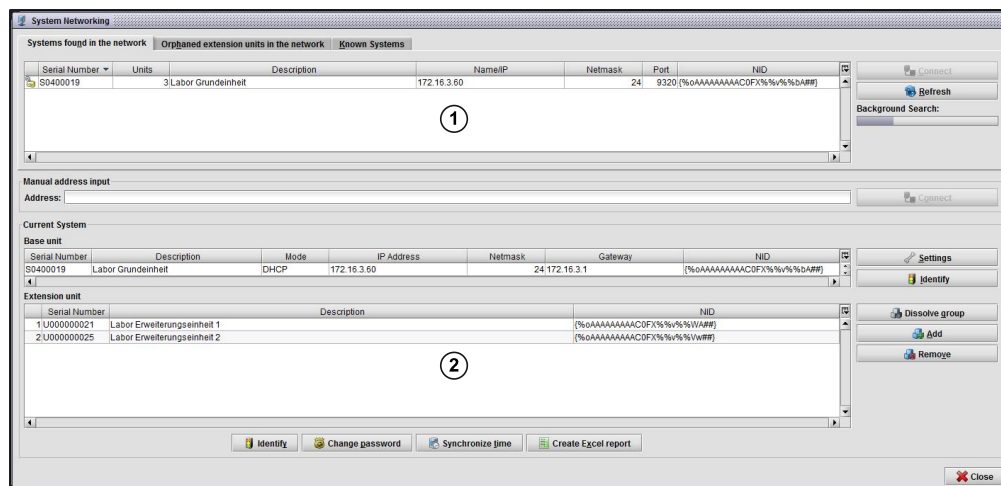


Fig. 14: Dialogue window for system networking with systems found in the network

- 
- ① List with systems to be opened; see *Choosing a system to be opened*, p. 27
- 
- ② system chosen in ①; see
-

## 7.8.1 Groups

In order to group together a number of UFOcompact plus base units they are organised in groups.

A group of this kind is called a UFOcompact plus system and is made up of at least one UFOcompact plus base unit.

As supplied, the devices are not assigned to any group.

Each group can contain a maximum of 8 devices.

## 7.8.2 Choosing a system to be opened

The dialogue offers four possibilities to choose a system to be opened:

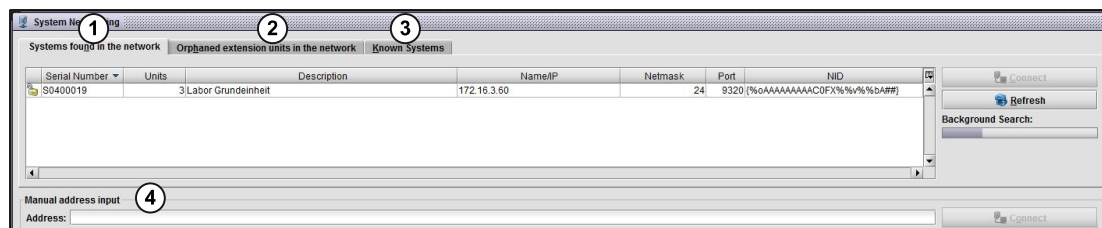


Fig. 15: Dialogue window for system networking with systems found in the network

- 
- ① Choosing from the list of the systems found in the network; see *Systems found in the network*, p. 28

---

  - ② Choosing from the list of the orphaned extension units found in the network; see *Orphaned extension units in the network*, p. 29

---

  - ③ Choosing from the list of the known systems; see *Known systems*, p. 30

---

  - ④ Manual address input; see *Manual address input*, p. 31

---





## Orphaned extension units in the network

Orphaned extension units are grouped units that have not been able to connect to the basic unit of the group for at least five minutes.

By opening the dialogue, the local network is searched and all orphaned extension units that could be detected in the local network are listed in the table.

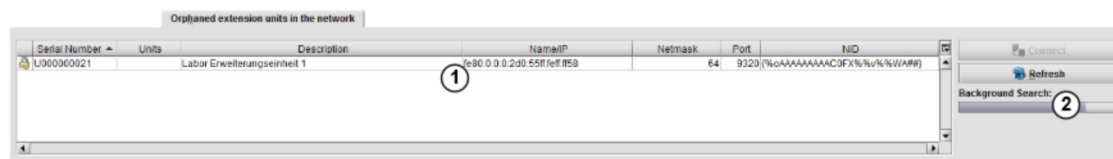


Fig. 17: Orphaned extension units in the network

- 
- ① List with the current status of the password protection, serial number, number of units in the group, description, address, port as well as the netmask and the so-called NID
- 
- ② Progress bar for the search
- 

### Note

The automatic detection of orphaned extension units only works for systems that are within the local network of the computer on which the USW 800 is executed. Ensure that IPv6 is activated on the computer.



Refresh:

The button starts the search in the network.



Connect:

The button is only active if an orphaned extension unit has been chosen in the list.

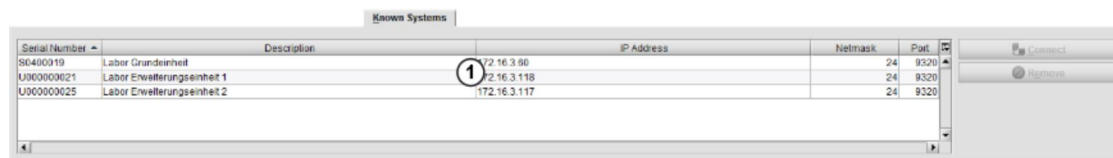
- ▶ Press the button to open the currently chosen orphaned extension unit.

Alternatively:

- ▶ Open an orphaned extension unit by double clicking a row in the table using the left-hand mouse key.
  - ⇒ The details of the opened system are shown in the lower part of the dialogue.

## Known systems

The tab shows the list of already known systems. Known systems are systems that have already been opened at least once before.



Serial Number	Description	IP Address	Netmask	Port
S0400019	Labor Grundeinheit	172.16.3.90	24	9320
U00000021	Labor Erweiterungseinheit 1	172.16.3.118	24	9320
U00000025	Labor Erweiterungseinheit 2	172.16.3.117	24	9320

Fig. 18: Known systems

- 
- ① List with the serial number, description, address, port as well as the netmask
- 



### Connect:

The button is only active if a system has been chosen in the list.

- ▶ Press the button to open the currently chosen system.

Alternatively:

- ▶ Open a system by double clicking a row in the table using the left-hand mouse key.
  - ⇒ The details of the opened system are shown in the lower part of the dialogue.



### Remove:

The button removes a system from the list of known system, e.g. if the system is no longer valid.

### Manual address input

Use the following input field to enter a known address directly:



Fig. 19: Manual address input

A manual address input is necessary whenever the system is not within the local network of the USW 800 computer and the automatic detection of the systems is not possible.

The field ① accepts the following address formats:

- IPv4 addresses, e.g. 172.16.3.60
- IPv4 addresses and port, e.g. 172.16.3.60:9320
- IPv6 addresses, e.g. [fe80:0:0:0:2d0:55ff:feff:ff6c]
- IPv6 addresses and port, e.g. [fe80:0:0:0:2d0:55ff:feff:ff6c]:9320
- Host names, e.g. ufx800-13.em.kathrein.de
- Host names and port, e.g. ufx800-13.em.kathrein.de:9320
- NID, e.g. {%oAAAAAAAAAC0FX%%v%%bA##}
- NID and port, e.g. {%oAAAAAAAAAC0FX%%v%%bA##}:9320

#### Note

The NID is a specific ID that clearly identifies a UFOcompact plus system within the local network. This NID is usually used by the units in order to coordinate the groups.

If the basic unit of a group is no longer available, for example due to a fault, the individual extension units of the group can no longer be accessed. In this case, the NID can be used to establish a connection to the individual extension units in order to delete them from the group.

After the deletion, the units can be accessed in the usual way, for example in order to create a new group with a new basic unit.

This feature is only available if the following conditions are fulfilled:

- The computer on which the USW 800 is executed and the unit to which a connection needs to be established are within the same local network, and
- IPv6 is activated on the computer.

### 7.8.3 Current system

A single system that has been chosen in the top part (① in Fig. 14, S. 26) is displayed and can be configured in the bottom part of the dialogue window for system networking:

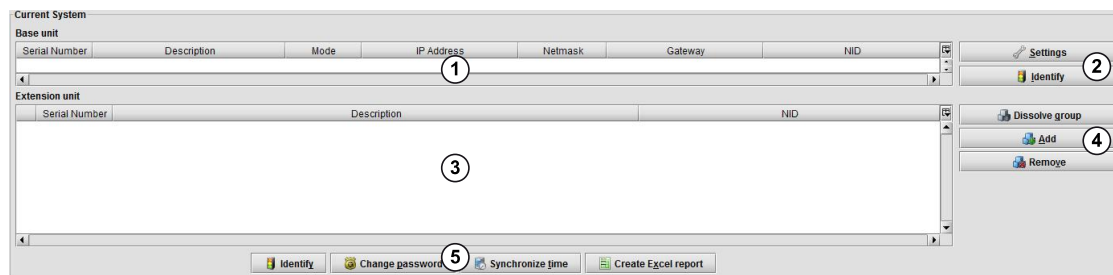


Fig. 20: Current system

- ① Base unit
- ② Buttons for editing the base unit
- ③ Groups
- ④ Buttons for editing the groups
- ⑤ Buttons for editing the complete system

**Note** The editing buttons (②, ④, ⑤) depend on the status of the connected system, see *Status of the connected system*, p. 32.

### Status of the connected system

#### The system is not part of any group

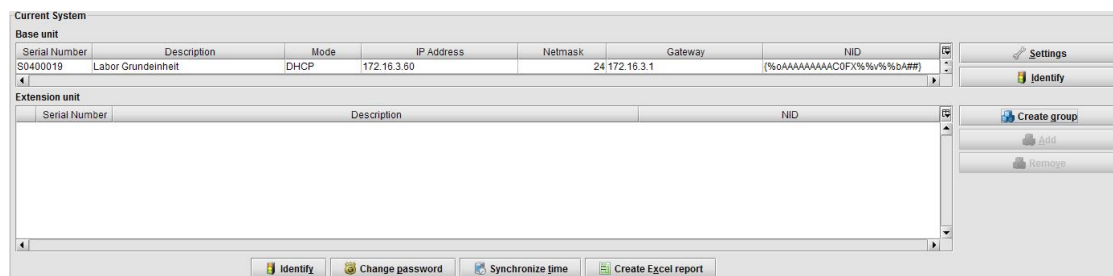


Fig. 21: Current system: the system is not part of any group

**The system is already part of a group**

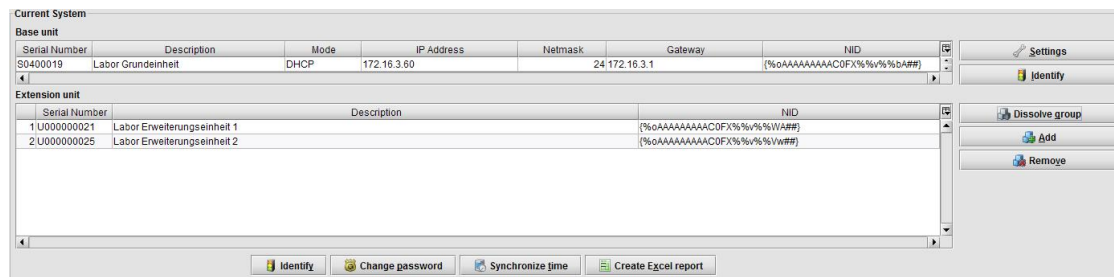


Fig. 22: Current system: the system is already part of a group

**The system is part of a group, however, there is a connection problem between the base unit and at least one extension unit**

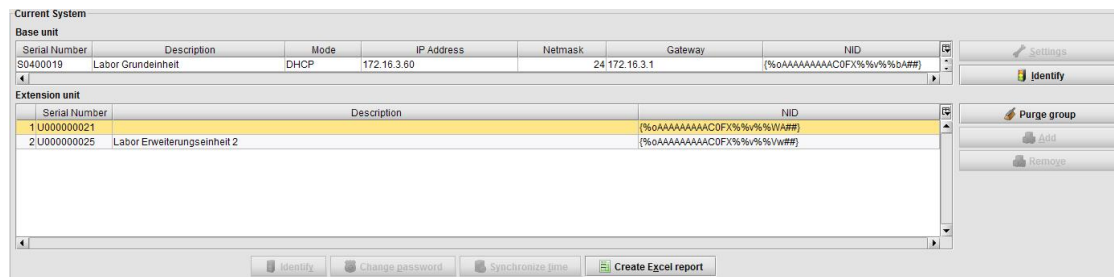


Fig. 23: Current system: connection problem between the base unit and at least one extension unit

**The system is an "orphaned extension unit"**

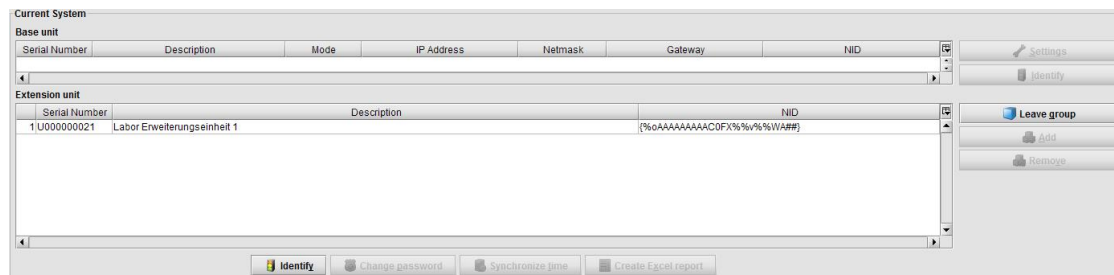


Fig. 24: Current system: orphaned extension unit

### Editing buttons



#### **Identify:**

This button identifies a single base unit or all units of the current system.

The LED of the control module (JFX 800) of the unit start to blink orange. After approximately 10 seconds, the blinking is switched off automatically.



#### **Synchronize time:**

This button executes the manual time synchronisation. The time zone used is based upon the selected settings, see *Network settings*, p. 22.



#### **Change password:**

This button changes the password of the current system.



#### **Create Excel report:**

This button saves the configuration of the current system in an Excel file.



#### **Create group:**

This button opens the wizard that helps you to create a group.



#### **Dissolve group:**

This button opens the wizard that helps you to dissolve a group.



#### **Purge group:**

This buttons opens the wizard that helps you to purge the group.

By purging a group, all those extension units are removed from the group configuration to which the base unit of the group cannot establish a connection.

Use this option only if it is not possible to establish a connection to the extension unit on a continuing basis, e.g. due to a fault.

The wizard does not change the group configuration saved on the non-accessible extension units.

Further action may be necessary, e.g. [Leave group](#).



### **Leave group:**

This button opens the wizard that helps you to leave the group.

This wizard enables you to delete the group configuration of an individual extension unit.

After completing the wizard, a direct connection to the unit can be set up again.

Use this option only if it is not possible to establish a connection to the base unit of the group on a continuing basis, e.g. due to a fault.

The wizard does not change the group configuration saved on the base unit and the other extension units.

Further action may be necessary, e.g. [Purge group](#).



### **Add:**

This button opens the wizard that helps you to add a further extension unit to a group.



### **Remove:**

This button opens the wizard that helps you to delete an extension unit from a group.



## Settings:

This button opens the dialogue for configuring the base unit:

Fig. 25: Changing the settings of the base unit

The following settings can be selected for the network mode ① of a unit:

Mode	Comment
Zeroconf	<p>The Zeroconf protocol is used to select the IP address. An <b>IP address</b> ranging from 169.254.1.0 to 169.254.254.255 is selected automatically. The <b>network mask</b> ③ is always 255.255.0.0. The <b>gateway</b> ④ can be edited as required.</p> <p>This configuration is only suitable for local networks. Routers cannot forward packages with this IP address.</p>
DHCP (IPv4)	<p>If a DHCP Server is used in the network, an <b>IP address</b> ② can be obtained from this Server. The <b>network mask</b> ③ and <b>gateway</b> ④ are also determined by the DHCP and cannot be changed.</p>
IPv6 link local	<p>At first, an <b>IPv6 address</b> ② in the range fe80::/64 is determined and assigned automatically.</p> <p>If there is an IPv6-ready router in the network to which an IPv6 address prefix has been allocated, this prefix is also allocated to the base unit by means of stateless address auto configuration (SLAAC). The IP address composed of the allocated prefix and the interface ID is additionally used by the base unit for communication.</p> <p>This configuration is only suitable for local networks. Routers cannot forward packages with this IP address.</p>



Manual (IPv4)	The <b>IP-Address</b> ②, <b>network mask</b> ③ and <b>gateway</b> ④ can be freely changed.
Manual (IPv6)	The <b>IP-Address</b> ②, <b>network mask</b> ③ and <b>gateway</b> ④ can be freely changed.

You can also enter the **Description** ⑤ of the unit.

### Note

Coordinate the network configuration with your network administrator or else have the administrator make the necessary settings.

In addition to the network configuration of the UFOcompact plus system it may also be necessary to modify the network settings of your computer.

If your computer is not in the same IP address range as the UFOcompact plus system and if the IP configuration of your computer was changed (static IP address or DHCP), it will be necessary to modify the IP settings, for example, by adding a Router.

If the system or the computer are not configured correctly, under certain circumstances it will not be possible to establish a connection to the system!

## 8 Read out, configure and send UFOcompact plus-system

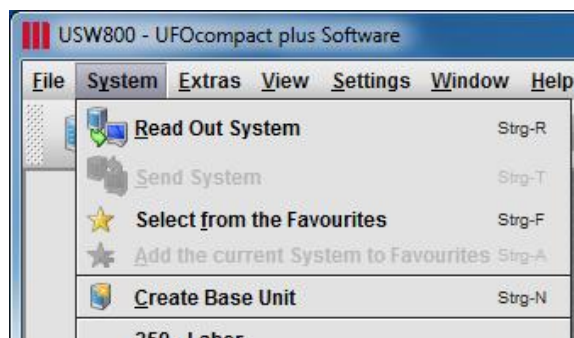



Fig. 26: Menu "System"

### 8.1 Reading the system

Via the menu (**System** | **Read System**) or the corresponding symbol  in the symbol bar it is possible to establish a connection with a UFOcompact plus system. The following dialogue that offers the following options to establish a connection then appears:

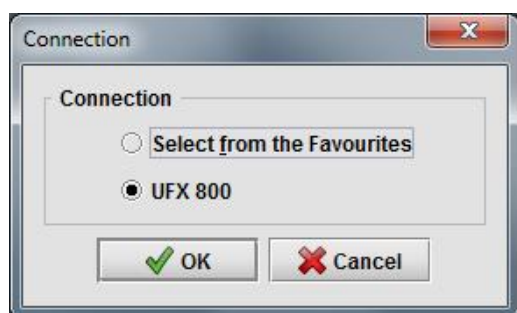



Fig. 27: Settings to establish a connection

1. Select from Favourites (see 12.1 *Select from the Favourites*, p.78)
2. UFX 800 (see 8.1.1 *Direct connection via Ethernet*, p.39)

### 8.1.1 Direct connection via Ethernet

Via the menu (**System | Read System**) or the corresponding symbol  in the symbol bar to the connection dialogue (see *Fig. 28: Connection dialogue for the UFX 800 control module, p.39*).

Select **UFX 800** and confirm your entry by clicking the **OK** button. The connection dialogue window for the UFX 800 control module is now opened.

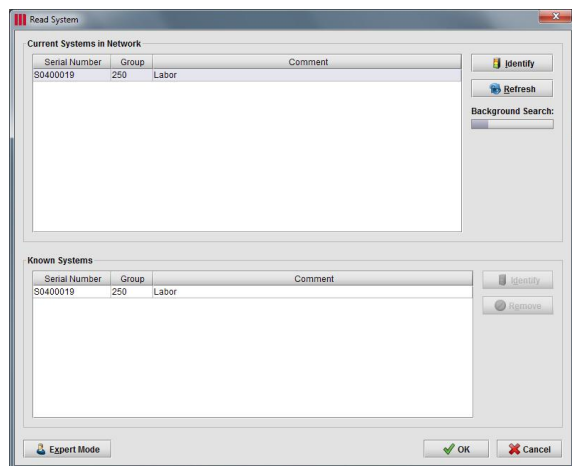


Fig. 28: Connection dialogue for the UFX 800 control module

The systems found in the network are listed in the top half of the dialogue window. Opening the dialogue window starts a network search and the systems that are found are listed in the top table. The progress bar on the right-hand side shows the time taken so far for the search.



#### Identification:

Clicking this button identifies a particular unit.

The LED of the control module (UFX 800) of the unit starts to flash orange.

It stops flashing automatically after approx. 10 seconds.



#### Refresh:

You can restart the search in the network at any time by clicking this button.

When searching for systems in the network it can happen that not all the systems are found.

This is especially the case if the systems are connected to the network via routers and/or firewalls. When the network search is performed, USW 800 sends special messages ("broadcast packages") which are, however, blocked by most routers and firewalls.



### **Add:**

Click on this button to accept into the table of found systems the IP address/computer name (including the port if applicable) that had been input in the text field on the left. In this way you can add systems which are not found when the network is searched.

If a TCP/IP port that differs from the default is used, then the IP address and the port are separated by a colon.

Example: "169.254.13.115:9800". This can be necessary if several systems are located behind a firewall with port forwarding.

If the default port is used it is only necessary to input the IP address.

The list of already known systems is displayed in the bottom half of the dialogue window. Known systems are systems that have already been opened at least once before. The list of known systems is stored when the application is closed so that it is available again when the application is restarted. A maximum of 10 known systems are stored.



### **Remove:**

This button is used to remove a system from the list of known systems, e.g. if the system is no longer valid.

The serial number, group and comments are shown for each known system.

In Expert mode the IP address is also displayed.

Double-clicking on a row in the table using the left-hand mouse key opens and reads the corresponding system.



### **Expert mode:**

This button is used to switch Expert mode on and off.

When Expert mode is activated the computer names and IP addresses of the systems are visible.

Under the table of current systems in the network it is possible to manually add the IP address of a system.

The IP address or the computer name or the port of a system can be added manually below the table of found systems.

The network mode, IP address, network mask and gateway are also displayed in the table for the current system.

## 8.1.2 Possible errors when establishing a connection and while a connection is being established

### 1. Connection cannot be established.

If a connection to actual systems cannot be established then the following error dialogue appears:

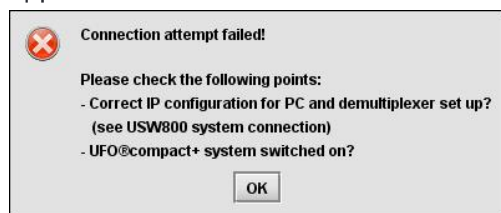


Fig. 29: Error dialogue when reading the system

### Check the following points and restart the application:

- Has the Ethernet cable (PC and UFOcompact plus system) been plugged in properly?
- Has the UFOcompact plus system been switched on?
- Has the network connection been configured correctly (IP address, network mask and, where applicable, gateway)?
- Have the network routers and firewalls been configured correctly (activation of the required ports)?

### 2. A connection exists already

If a connection to the system exists already, then the following error dialogue appears when attempting to establish an additional connection:



Fig. 30: Error dialogue if connection exists already

### 3. Too many units found

All UFOcompact plus base units are organised in groups of UFOcompact plus systems, see Chapter 7.8 *System networking*, p.26.

Each group can have a maximum of eight base units assigned to it. If the current group contains more than eight base units when a system is read in, then the following error dialogue window appears:

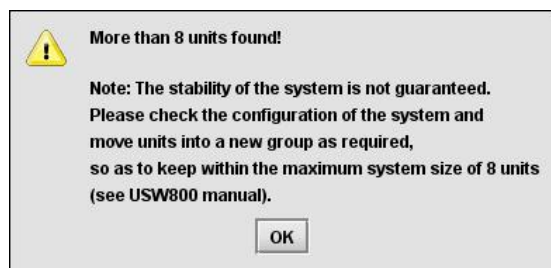


Fig. 31: Error dialogue if too many units are found

The stability of the system may be impaired. Please reconfigure the system in the dialogue window for system networking. Move the individual units to new groups or other groups until the maximum number of eight units per group is complied with.

#### 4. Connection interruption

During a connection to a UFOcompact plus-system a periodic check is made as to whether the connection has been interrupted by external influences. If this is the case then the following error dialogue window appears:

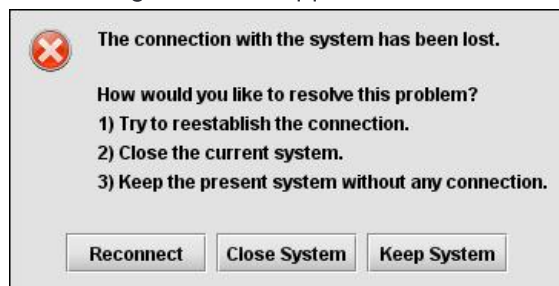


Fig. 32: Error dialogue window with connection interruption

**A connection interruption may be caused by a number of different reasons, e.g.:**

- Failure of the Ethernet connection (DSL failure, defective network cable, failure of other network components, e.g. switch, router, firewall, etc.)
- Temporary network overloading, too little bandwidth for the network connection
- Local power failure (UFOcompact plus system, network components, etc.)

Please check the connection as well as all cables and network components used.

### You now have the following selection options:

- **New connection:**  
An attempt is made to re-establish the connection to the system. If successful, the system is not read in again completely; and you can continue working immediately. If the connection cannot be re-established, the current system is converted into a virtual system. You can save any changes to a file and then transfer these changes to the system at a later time.
- **Close system:**  
The system is closed. Any changes that had been made can be saved to a file.
- **Retain:**  
The current system is converted into a virtual system. You can then, for example, save to a file any changes that had been made.

## 8.2 Configuring channel units

### 8.2.1 General settings

By double-clicking on a channel unit or by selecting the menu item **Properties** in the channel unit pop-up menu the channel unit properties window opens.

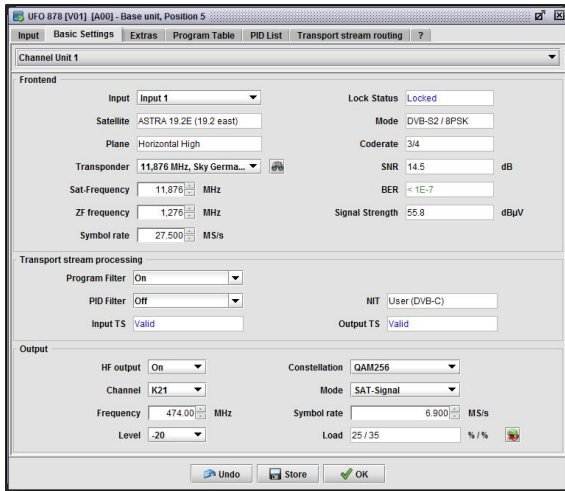


Fig. 33: Configuring the channel unit

All the configurable parameters of a channel unit, such as the input and output frequencies, can be set using the properties window.

Non-configurable parameters (such as SNR, code rate), which represent continually varying status information regarding the channel unit, are read at intervals of about 3 seconds while the UFOcompact plus system is connected, and updated in the dialogue window. If there is no UFOcompact plus system connected, no values can be displayed for these status parameters.

The actual layout of the properties window depends on the relevant type of channel unit. Further information concerning the parameters of a special channel unit type can be found in the corresponding application information.

Each properties window has three standard buttons:



#### Undo:

The settings saved in the channel unit are read in again. Unsaved changes in the properties window are discarded. Reading the data in again can take a few seconds.



#### Store:

The current settings are permanently loaded to the module.



**Note** Changes made to the parameter while there is a connection are transferred to the module at once. However, at this time they still have not been saved permanently.

In the event of a power failure these changes will be lost!

Therefore when you have made changes always save them permanently by clicking on the "Load" button before exiting the dialogue window.



**OK:**

The properties window is closed. On following up the current settings are permanently loaded or rejected by the channel unit.

### 8.3 Copying channel unit properties

All the properties of a channel unit can be copied to the Clipboard in the pop-up menu of the channel unit and inserted again from there.

In this way channel units with similar properties can be configured very quickly.

Copying and inserting channel unit characteristics can be performed within the USW 800 and also across several instances of the USW 800 running at the same time (provided they are the same version).

However, channel units can only be copied and inserted if they are compatible with one another. This includes identical downwards- and upwardly-compatible channel units (see Chapter 8.4 *Sending the configuration of a system*, p.45).

No parameters can be inserted into any other channel units.

### 8.4 Sending the configuration of a system

Via the menu ([System](#) | [Read System](#)) or by clicking on the corresponding symbol on the corresponding symbol. in the symbol bar it is possible to establish a connection with a UFOcompact plus system.

The following criteria are necessary for sending:

- an actual system must have been read, or
- an existing system configuration must have been opened, or
- a new system configuration must have been created.

Module data cannot be loaded unless it matches the actual system. After the data has been transferred a dialogue is displayed which gives information about which modules were successfully loaded and which were not.

If the modules units were incompatible then additional information is provided regarding the types of the module unit to be transferred and the actual existing module (in that order).

If an upwardly-compatible module is found this means that in the actual there is a module with a newer hardware version than that in the system configuration of the USW 800.

It is possible that new parameters had also been introduced with the new hardware version. Since in this case the USW 800 system configuration will have no values for these newly introduced parameters, these parameters will be set to their default values.

The opposite case may arise with upwards-compatible channel units.

Here the actual system contains a channel unit with an older hardware version, which may support fewer parameters.

Parameters which could not be assigned will be ignored during the upload.

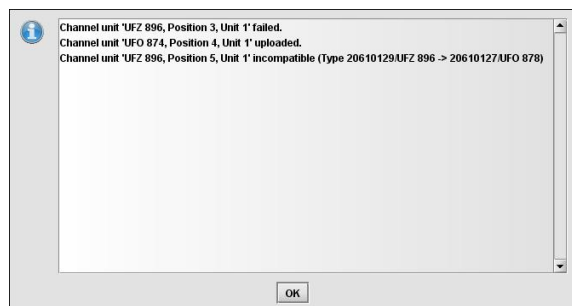


Fig. 34: Information dialogue for transferred channel units

## 8.5 Importing an existing system configuration

Using the menu item (**File | Import System**) an existing system configuration can be imported into a configuration that had been read from an actual system. The two configurations are combined. For each position in the existing base unit extension units, the following decisions are taken:

- If no module is present in the imported configuration at this position then the module from the actual system is retained.
- If no module is present in the actual system at this position then the module from the imported configuration is loaded.
- If in both configurations a module is present at this position then this is loaded from the imported configuration, providing the two modules are the same type. Otherwise the module from the actual system is retained.

The combined configuration can be loaded to the actual system or it can be saved as a file.

## 8.6 Templates for UFOcompact plus system configurations

There are two different methods of configuring a UFOcompact plus system.

You can configure an existing UFOcompact plus system directly (see *8 Read out, configure and send UFOcompact plus-system, p.38*), or else create a template can an be applied to several UFOcompact plus systems of the same type.

It is easy to create a template for the configuration of a UFOcompact plus system.

## 8.7 Creating a template window

Using the menu item (**System | Create Base Unit**), create the first window for your virtual UFOcompact plus system.

Each UFOcompact plus system must consist of a base unit. Each additional unit is called an extension unit and can be added via the menu (**System | Create extension unit**).

Up to seven extension units can be added to each base unit. Each extension unit added in this way is empty at first and can then be filled with modules.

### Note

Take care to insert modules into your template in the same way that the existing UFOcompact plus system will later appear. If the template and the actual UFOcompact plus system do not match, then your template cannot be transferred to the UFOcompact plus system.

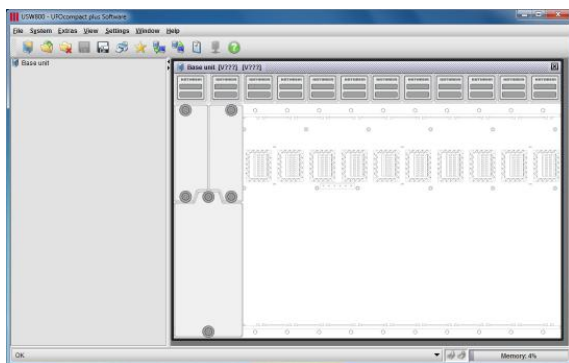


Fig. 35: Empty base unit

## 8.8 Adding and deleting modules

Right mouse-click on an empty position. In the pop-up menu that then appears, click on the menu item **New module** and select the module type. Now the module can be set up and configured. In the same menu there are also the functions **Delete module** and **Properties**.

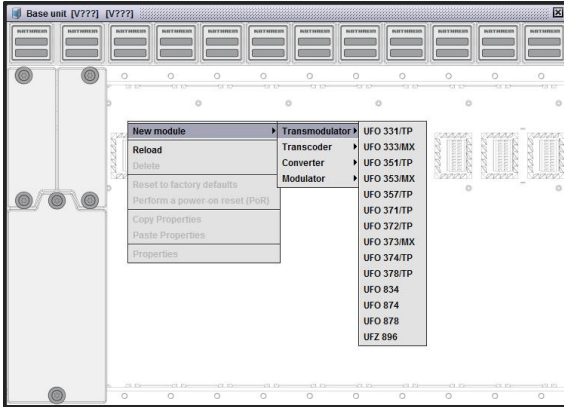


Fig. 36: Adding a module

## 8.9 Opening and importing from saved system configurations

The configuration of an actual or virtual system can be saved in a file for subsequent use.

If the system configuration of an actual system is opened, ensure that no values are exhibited by the elements of the user interface which presuppose a connection to the system.

This applies particularly to the programme, language and sub-title lists for the transcoder modules, but also to the displays of SNR and the lock status of the corresponding modules.

When a file is imported the system configuration in the file and the current configuration are merged. This is performed according to the following rules:

- If no module is present at a system position in the imported file, the corresponding module in the actual system is left unchanged.
- If no module is present at this position in the actual system, the module from the imported file is loaded. This also applies if the imported file contains more UFOcompact plus systems than are present in the current configuration.
- If a module that is incompatible with the real system is present at a system position in the imported file, the actual module is left unchanged. (Regarding the compatibility of modules see Chapter 8.4 *Sending the configuration of a system, p.45*)
- Otherwise the current module is superseded by the module from the imported file.

If an actual real UFOcompact plus system was read in, importing a configuration file and the associated loading of data can allow the complete system to be set up in a very short time.

## 9 Creating an NIT

The USW 800 provides the user with two wizards for creation of an NIT.

The NIT wizard familiar from earlier versions is included merely for reasons of compatibility.

The wizard should still be used if one or more NIT/LCN-capable UFOcompact cassettes are included in the system.

If only the new UFOcompact plus modules are included in the system, the new wizard should be used.

The selection of the appropriate wizard is performed by the USW 800 automatically, based on the actual system configuration.

## 9.1 The UFOcompact plus NIT wizard

The steps of the NIT/LCN wizard are described in detail below.

### Step 1

In Step 1 you receive information about the NIT/LCN wizard and, if desired, you can cancel it before starting.

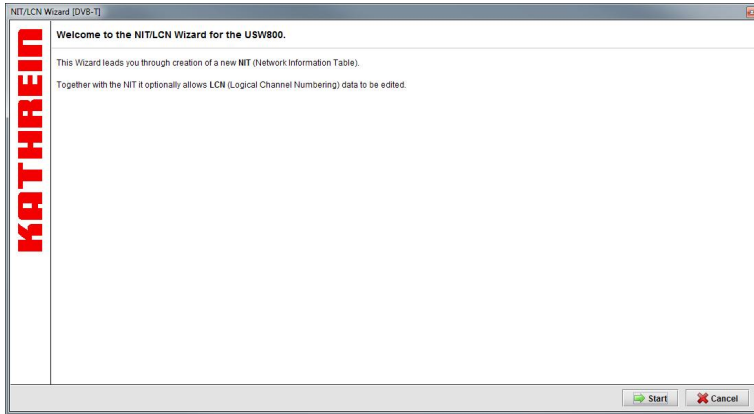


Fig. 37: NIT wizard – Step 1

## Step 2

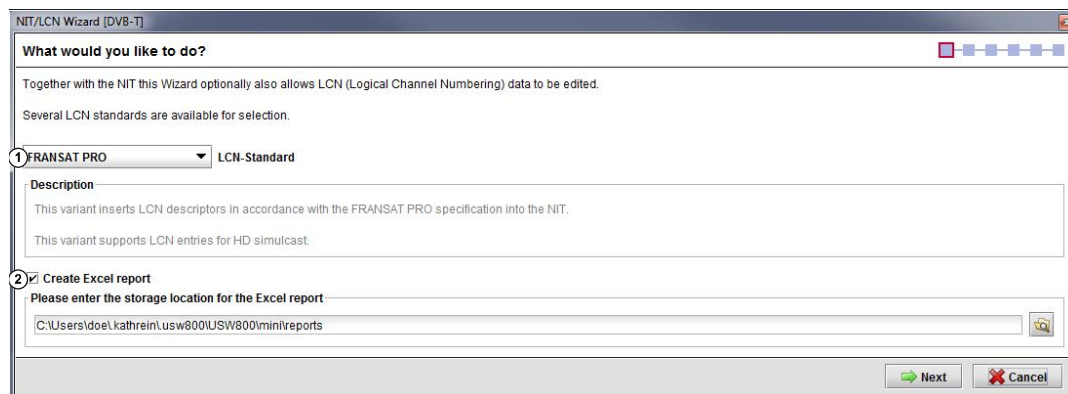


Fig. 38: NIT Wizard – step 2

- 
- ① Drop-down list for creating the LCN data:
    - Do not generate any LCN data:** No LCN data are generated.
    - NorDig (descriptor V1):** LCN descriptors are created to NorDig version 1.

Additionally for UFO 83 and UFO 83/CI:

    - IEC 62216:** LCN descriptors are created to the IEC 62216 specification
    - FRANSAT PRO:** LCN descriptors are created to the FRANSAT-PRO specification

The LCN data contain information about the preferred sequence of services on the terminals.

---

  - ② After the NIT data upload you have an option to create an Excel report which will be stored in the chosen folder. The software generates the file name automatically.
-

## Step 3

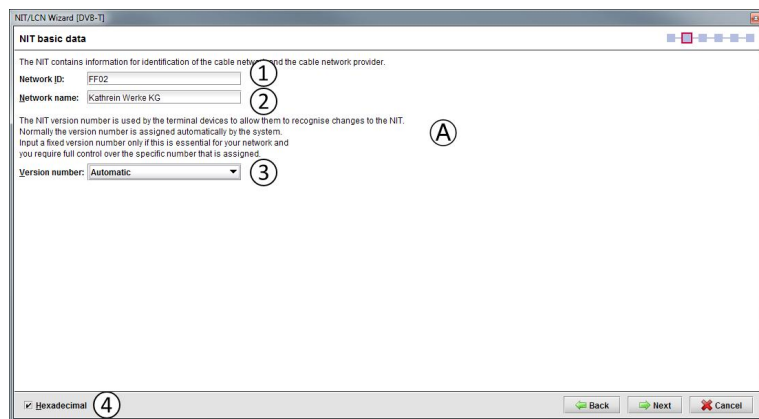


Fig. 39: NIT wizard – Step 3

- ① Each network is assigned its own network ID, which provides a unique identifier to the network.<sup>1)</sup> The list of currently assigned network IDs is obtainable from the DVB project <http://www.dvb.org/>.<sup>2)</sup> Example in Tab. 1.
- ② The network name describes the physical network in a form legible to the end customer.<sup>3)</sup> Examples: ASTRA, EUTELSAT, Munich Cable etc. It depends on the individual device whether the network name is displayed by the end device (DVB-C receiver).
- ③ For version number, see information ①A.
- ④ Check box not ticked: Network ID ① is decimal.  
Check box ticked: Network ID ① is hexadecimal.

Network ID	Network
0001	Astra Satellite Network 19,2°E
0002	Astra Satellite Network 28,2°E
0021	Hispasat Network 1
0030	Canal+ Satellite Network
2114	German Digital Terrestrial Television
F001	Deutsche Telekom
FF00 – FFFF	Private temporary use

Tab. 1: Examples for the assignment of network ID

1) Digital Video Broadcasting (DVB): Specification for Service Information (SI) in DVB Systems  
 2) Digital Video Broadcasting (DVB): Allocation of Service Information (SI) and Data Broadcasting Codes for Digital Video Broadcasting (DVB) Systems  
 3) Digital Video Broadcasting (DVB): Guidelines on implementation and usage of Service Information (SI)



Step 4

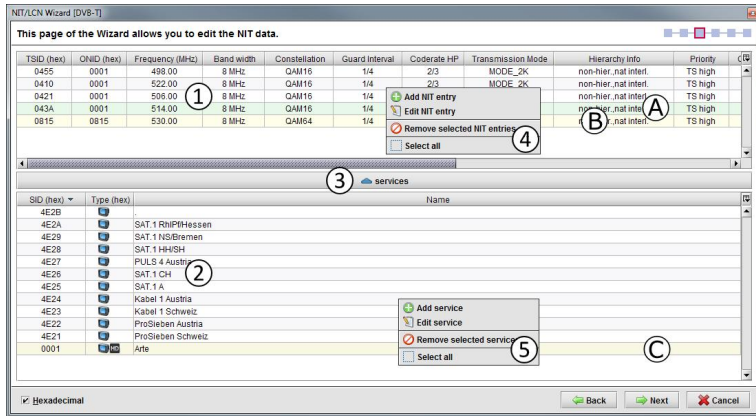


Fig. 40: NIT wizard – Step 4

- ① List showing the delivery system descriptors. Manually added entries ② (highlighted in yellow) can be edited by double clicking on them.<sup>1)</sup> Entries highlighted in green ③ are delivery system descriptors which have been automatically generated and which contain manually added NIT entries ④ within them.
- ② List showing NIT entries for the channel units. Manually added entries ② (highlighted in yellow) can be edited by double clicking on them.<sup>4)</sup>
- ③ Shows and hides the list ②.
- ④ Context menu for editing the delivery system descriptors.
  - Add NIT entry: Opens a data input dialogue.
  - Edit NIT entry<sup>2)</sup>: Opens a data input dialogue.
  - Delete selected NIT-entries<sup>3)</sup>: Deletes all the selected entries.
  - Select all: All the table entries are selected.
- ⑤ Context menu for editing the NIT entries.
  - Add service: Opens a data input dialogue.
  - Edit service<sup>2)</sup>: Opens a data input dialogue.
  - Remove selected services<sup>3)</sup>: Removes all the selected entries.
  - Select all: All the table entries are selected.

1) In offline mode, automatically generated entries can also be edited.

2) Available only for entries added manually. Available in offline mode even automatically generated entries

3) Only entries added manually can be deleted. In offline mode even automatically generated entries can be deleted.

Step 5

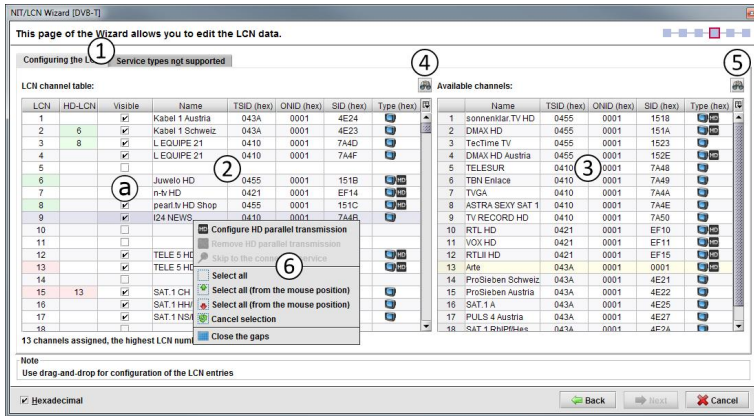


Fig. 41: NIT wizard – Step 5

- ① If **NorDig (Descriptor V1)** was selected in Step 2, the tab selects the area for which the LCN data should be set (**TV, Radio, other**).  
If **IEC 62216** or **FRANSAT PRO** was selected in Step 2, the tab selects the area for which the LCD data should be set (**Configure LCN**) and for which the non-editable should be displayed (**Service types not supported**).
- ② List showing the assigned LCN data.
  - The check boxes ③ specify whether a service appears at the end device when stepping through item by item, or is skipped.<sup>1)</sup> It depends on the individual device whether the function of the check box is supported or not.
  - The assignment of LCN data from list ③ to list ② and sorting them within the list ② is done by drag and drop.
  - Changing the LCN data is done by double clicking and keyboard input.
- ③ List showing non-assigned LCN data.
- ④ Starts the search for channels in the list ②.
- ⑤ Starts the search for channels in the list ③.
- ⑥ Context menu for editing the list entries.

1) If the check box is not highlighted, the service can still be selected at the terminal by inputting the channel position directly.

- **Configuring HD parallel broadcasting<sup>1)</sup>**: Opens the list for selection of an HDTV channel. Furthermore:
  - The HDTV channel selected from the list is assigned to the SDTV channel to which the mouse pointer was pointing when the context menu was opened.<sup>2)</sup>
  - The selected HDTV channel and the assigned SDTV channel are broadcast simultaneously (HD Simulcast).<sup>3)</sup>
  - The LCN number of the HDTV channel appears at the assigned SDTV channel in the **HD-LCN** column.<sup>2)</sup>
- **Removing HD-parallel broadcasting<sup>1)</sup>**: Removes the assigned HDTV channel from the SDTV channel to which the mouse pointer was pointing when the context menu was opened.
- **Skip to the connected service<sup>1)</sup>**: Skips to the assigned SDTV or HDTV channel.
- **Select all (...)** and **Cancel selection**: These commands highlight list entries or undo the existing highlighting.
- **Close the gaps<sup>1)</sup>**: Removes blank lines between the highlighted entries.

1) Available only if **IEC 62216** or **FRANSAT PRO** was selected in Step 2.

2) If **FRANSAT PRO** was selected in Step 2, the LCN number of the HDTV channel must be higher than the LCN number of the assigned SDTV channel. Otherwise the LCN numbers affected are highlighted in red and the **Continue** button is not enabled

3) Receiver which support the HD Simulcast automatically reproduce the HD channel.

## Step 6

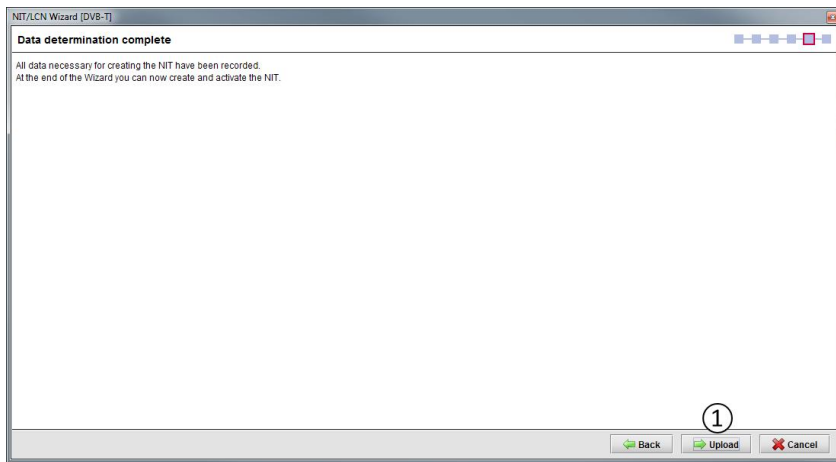


Fig. 42: NIT wizard – Step 6

① Sends the NIT to the on-line system, where it is permanently saved.<sup>1)</sup>

1) In offline mode the data are transferred to the current system configuration. This can then subsequently be archived by an export.

## Step 7

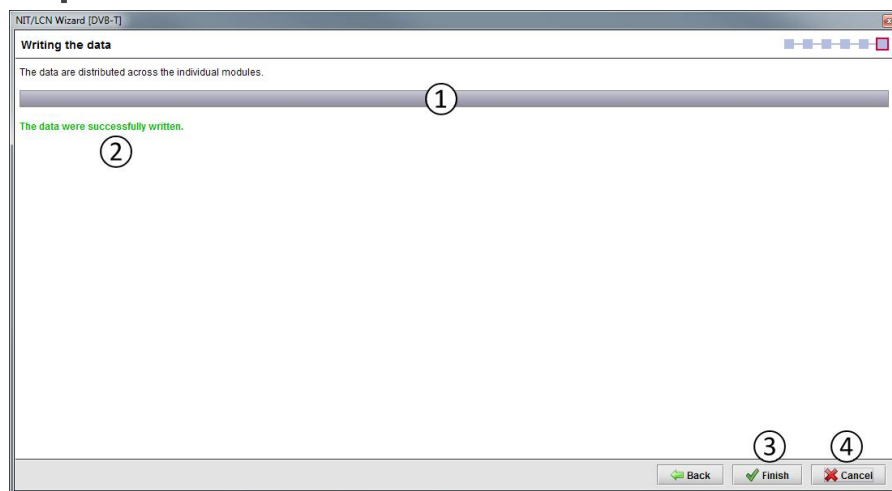


Fig. 43: NIT wizard – Step 7

---

① Progress bar for data transfer to the on-line system

---

② Completion information on the course of the data transfer

If you selected the option **Create Excel report** in *Step 2*, the status of the Excel export and the name of the generated file are displayed in this step. If there was an error in generating the Excel report, it is also displayed here.

---

③ Opens the generated Excel file

---

④ Exits the wizard

---

⑤ Cancels the wizard

If the push-button is pressed whilst the NIT is still being uploaded, the changes already made can be undone.

---

## 9.2 The UFOcompact NIT wizard

**Note** An NIT can be created only on a system configuration that has been read in.

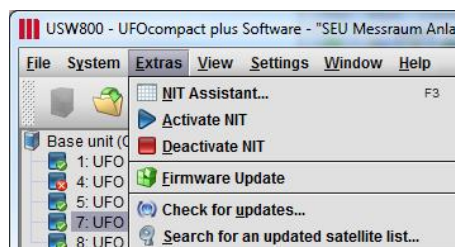


Fig. 44: Menu for the NIT

Once **Extras | NIT wizard...** has been selected, a wizard appears, which can be used to create the NIT. However, an NIT can only be created when all the modules provided for it are available and the transport streams at the backends relevant for the NIT layout are valid.

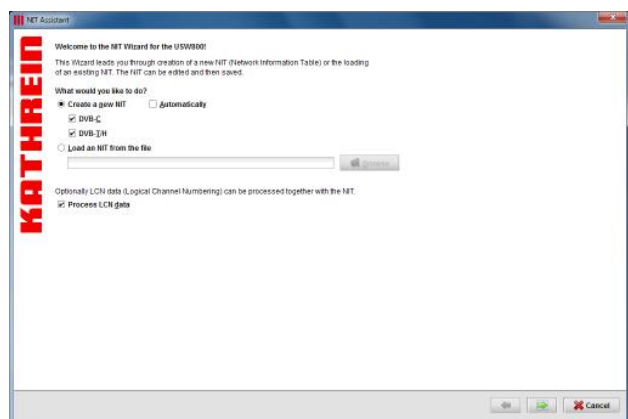


Fig. 45: First page of the NIT wizard

On the first page of the NIT wizard you can decide whether to generate a new NIT or to load an existing NIT from a file. During the generation you are asked to decide whether the NIT should be created for the DVB-C or DVB-T/H channel units, or for both.

Automatic NIT generation is available only if the USW 800 is connected to a system. In this case the NIT is created without any further user intervention. To load an NIT file, click the **Browse** button and select a file with the extension ".nit" in the file selection window.

With the USW 800 it is also possible to process LCN data (LogicalChannelNumbering).

In this way information can be created about the preferred sequence for the services on the terminal devices, such as set-top boxes, that are connected.



### **Back:**

You can go back a page with this button (not available on each page of the wizard).



### **Continue:**

By clicking on this button you confirm your inputs and go to the next page of the wizard.



### **Cancel:**

The current action is cancelled and the NIT wizard is quit at once. Any data that had not been saved is discarded (not available on each page of the wizard).



### **Finish:**

The current action is executed and the NIT wizard is then ended (only available on the last page of the wizard).

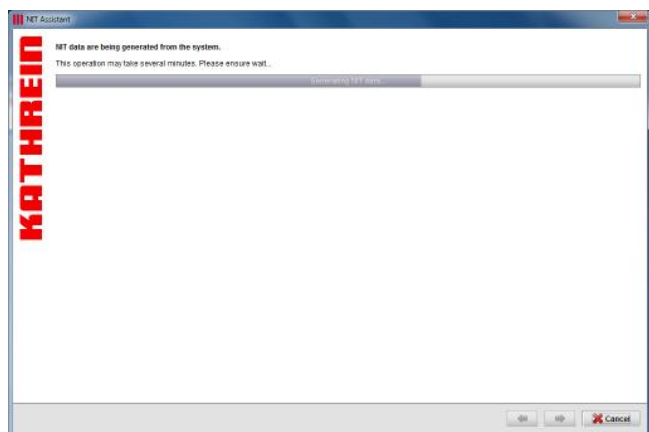


Fig. 46: Second page of the NIT wizard – generating NIT

The second page of the NIT is only visible when a new NIT is being generated. The progress bar gives information about the current phase of the generation of the NIT.

Various texts appear during the generation.

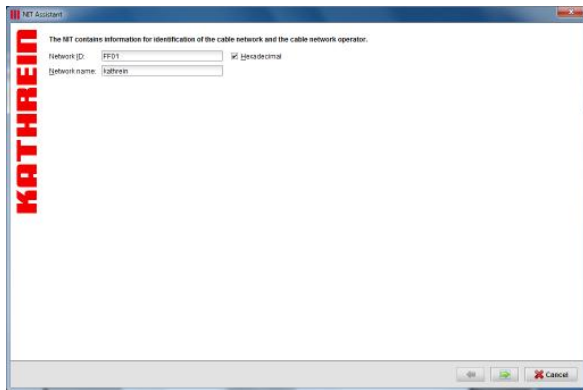


Fig. 47: Third page of the NIT wizard – network ID and name

On the third page of the NIT wizard, you can change the network ID and network name. Each network has its own network ID assigned to it, which serves as a unique identifier for networks.<sup>1)</sup>

The ID is a four-digit hexadecimal number, without any "0x" prefix.

The list of currently assigned network IDs is available from the DVB project (<http://www.dvb.org/>).<sup>2)</sup>

Here are some selected examples:

Network ID	Network
0001	Astra Satellite Network 19,2°E
0002	Astra Satellite Network 28,2°E
0021	Hispasat Network 1
0030	Canal+ Satellite Network
2114	German Digital Terrestrial Television
F001	Deutsche Telekom
FF00 – FFFF	Private temporary use

The network name describes the physical network in a form that can be read by the end user.<sup>3)</sup>

Examples: "ASTRA", "EUTELSAT", "Munich Cable".

Whether or not this name will be displayed by a DVB-C receiver depends on the relevant device.

1) Digital Video Broadcasting (DVB): Specification for Service Information (SI) in DVB Systems

2) Digital Video Broadcasting (DVB): Allocation of Service Information (SI) and Data Broadcasting Codes for Digital Video Broadcasting (DVB) Systems

3) Digital Video Broadcasting (DVB): Guidelines on implementation and usage of Service Information (SI)



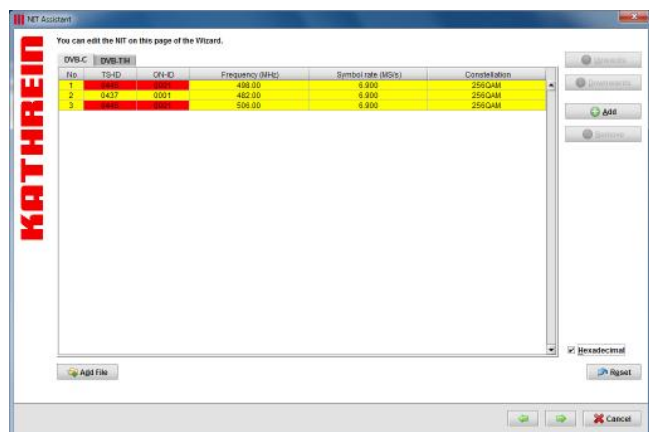


Fig. 48: Fourth page of the NIT wizard – editing the NIT

The fourth page of the wizard contains two tables which contain the NIT entries for the DVB-C and for the DVB-T/H channel units.

The individual entries can be edited. Double-click on the row to be edited to go into Edit mode. The changed values will be loaded when another cell is clicked or the Return key is pressed.

The values for the output frequency, the output symbol rates and the constellation were set in the relevant Backends of the modules and put in the table.

It is generally not advisable to change these values.

On the other hand, it is necessary to edit the table if new entries need to be added to it.

For example, this can be advisable if a system was made up from a combination of various products, e.g. UFOcompact plus and UFOcompact.

The ON-ID designates the "Original-Network-ID". This involves the original network ID. It is comparable to the network ID of the NIT to be created, but always relates to the original network.

The TS-ID designates the "Transport-Stream-ID", which is the original ID of the transport stream.

Each service can be uniquely identified using the path

"ON-ID/TS-ID/Service ID<sup>1)</sup>". ON-ID and TS-ID are read from the transport - stream of the channel unit.

It is generally not advisable to change these values.

If there are several entries with an identical ON-ID/TS-ID, then this means that there has been a configuration error in the modules and therefore Red is emphasised.

Manually entered values are subjected to only a limited check of their correctness. The respective user must use his best judgement regarding the validity of these values.

1) Digital Video Broadcasting (DVB); Guidelines on implementation and usage of Service Information (SI)



If an error in the NIT table is not corrected, it will be loaded to the TP modules when the NIT is loaded. No further checks are made!



### **Add:**

Click on this button to add new entries to the cable NIT.



### **Remove:**

Click on this button to remove the currently selected entry from the table.



### **Up:**

Click on this button to move the selected entry upwards in the table.



### **Down:**

Click on this button to move the selected entry downwards in the table.



### **Add file:**

With this you can add NIT entries from a file into the current table. Do this by selecting from the file selection dialogue a file with the ending "nitp".



### **Reset:**

This button is active when changes have been made to the NIT table or LCN table.

If the button is pressed, all manual changes are lost and the position is restored as it was when the modules were read in.

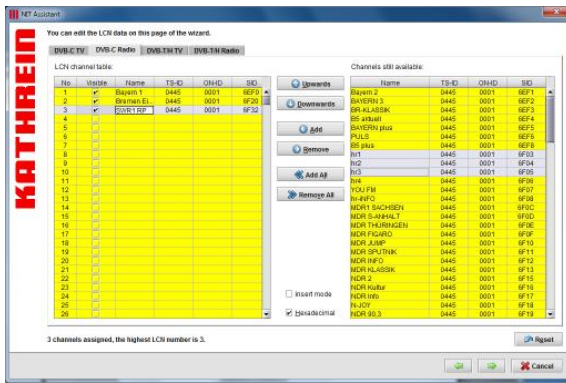


Fig. 49: Fifth page of the NIT wizard, editing the LCN data

The fifth page of the NIT wizard offers you the facility to edit the LCN data (Logical Channel Numbering).

The page consists of four tabs (DVB-C/DVB-T and one each for TV/Radio), each of which contains 2 tables.

In each case the left hand table shows the LCN entries that are currently assigned, and the right hand table shows the entries that are available.

In each of the left hand tables there are 999 channel slots available, which can be assigned as you like (including any gaps).

The entries can be sorted using the "Up" and "Down" buttons. There is also the facility to move an entry by inputting a number directly into the first column of the table.

The "visible" switch determines whether a service is visible or is skipped when stepping through the range of channels at the terminal device. The service is still available by direct selection of the channel slot.

**Note** Please note that not all terminal devices support the "visible" switch.



**Up:**

Moves the selected entries in the left hand table one line upwards.



**Down:**

Moves the selected entries in the left hand table one line downwards.



### **Add:**

All the selected entries from the right-hand table are moved to the left-hand table and replace (except in Insert mode) the entries that had been selected there.

For this it is necessary to select at least one line in the left hand table, to indicate where the entries should be inserted.



### **Remove:**

All the selected entries in the left-hand table are transferred, i.e., they are moved from the left-hand table to the right-hand table.



### **Add all:**

This button is active as soon as an entry is highlighted in the left-hand table, provided the right-hand table contains at least one entry.

Click on the button to transfer all the entries from the right-hand table into the left-hand table where they replace the entry highlighted there (except in Insert mode).



### **Remove all:**

This button is active as soon as the left-hand table contains at least one entry.

Click on the button to remove all the entries from the left-hand table and insert them into the right-hand table.



### **Reset:**

This button is active when changes have been made to the - NIT table or LCN table. If the button is clicked on, all manual changes are lost and the state when reading the modules is restored.

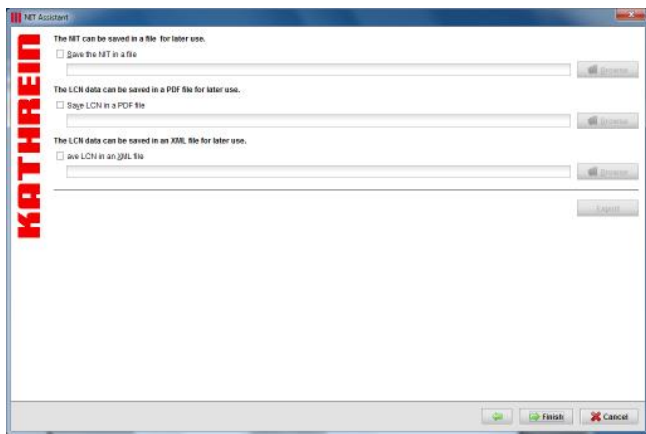


Fig. 50: Sixth page of the NIT wizard – saving the NIT/LCN data

On the sixth and last page of the NIT wizard you can save the current NIT, including the LCN data, to a file (optional).

In this way an NIT that has been edited and perhaps also edited can be reused later. Transfer to a second structurally identical system can also be done.

In addition to this, the LCN data can optionally be exported in a readable form (PDF) or in the form of a very simply structured XML file.

To select the data to be saved, click on the relevant **Browse** button and input the file to be created in the file selection dialogue.

Click on the **Export** button to save the relevant specified files (if desired).

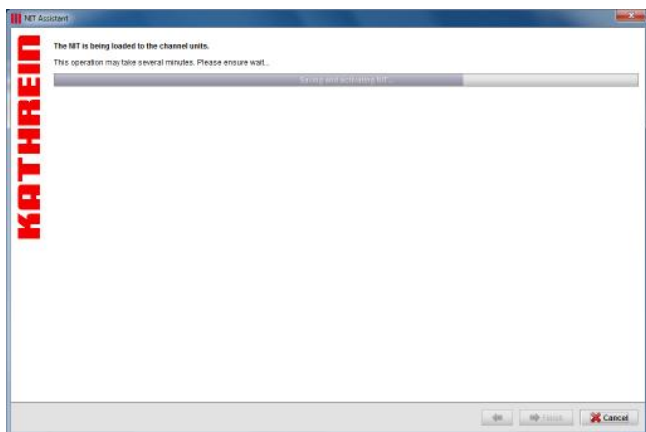


Fig. 51: Seventh page of the NIT wizard – transferring the NIT

The seventh and last page of the NIT wizard is visible while the NIT is being transferred to the modules.

The progress bar gives information about the current phase of the transfer.

## 9.3 Importing external NIT data

The NIT wizard has the capability to open NIT files generated by the USW 800 and to load them to the UFOcompact plus system.

Other NIT data formats cannot be directly imported.

Example of a USW 800 NIT file:

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<nit xmlns="http://www.kathrein.de/xsd/nit" id="ff01"
  name="NetworkProvider Name">
  <entry carrier="0" frequency="402.0" onid="1" port="1"
    qam="64QAM" symbolrate="6.9" tsid="1201"/>
  <entry carrier="0" frequency="650.0" onid="133" port="3"
    qam="256QAM" symbolrate="5.156" tsid="5"/>
  <entry carrier="0" frequency="658.0" onid="1" port="3"
    qam="64QAM" symbolrate="6.111" tsid="1058"/>
  <entry carrier="0" frequency="482.0" onid="1"
    port="7"qam="256QAM" symbolrate="6.9" tsid="1026"/>
  <entry carrier="0" frequency="306.0" onid="8468" port="10"
    qam="64QAM" symbolrate="6.9" tsid="12801"/>
  <entry carrier="0" frequency="314.0" onid="8468" port="10"
    qam="64QAM" symbolrate="7.15" tsid="13057"/>
  <entry carrier="-1" frequency="834.0" onid="10" port="-1"
    qam="128QAM" symbolrate="6.9" tsid="10"/>
</nit>
```

The USW 800 NIT files are saved in XML format. There exists a schematic which defines an XML file.

This schematic can be found in the installation directory:

<Installation directory for the USW 800>/config/nit.xsd

Other NIT data formats must be converted into XML so that they satisfy the schematic listed for the USW 800.

As a rule it is necessary to modify the NIT data for export into the external application, or to create software which performs the conversion.

If the external NIT data is already in an XML format, albeit a different structure, an XSL transformation can be created.

In this case the standard XML tools can be used to transform the data.

Further information:.

<http://en.wikipedia.org/wiki/XML>

<http://w3.org/TR/xml/>

[http://en.wikipedia.org/wiki/XML\\_Schema](http://en.wikipedia.org/wiki/XML_Schema)

<http://www.w3.org/TR/xmlschema-0/>

[http://en.wikipedia.org/wiki/XSL\\_Transformations](http://en.wikipedia.org/wiki/XSL_Transformations)

<http://www.w3.org/TR/xslt20/>

## 10 Creating LCN Lists for the Programme Distribution in the Network

The steps of the NIT/LCN wizard are described in detail below.

### Step 1

In Step 1 you receive information about the NIT/LCN wizard and, if desired, you can cancel it before starting.

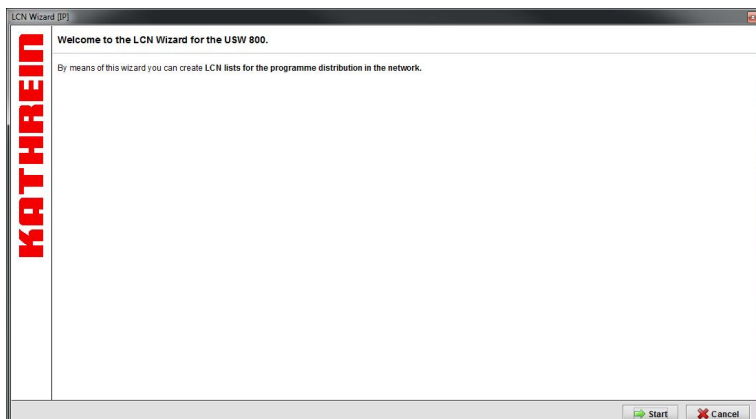


Fig. 52: NIT wizard [IP]– Step 1

## Step 2

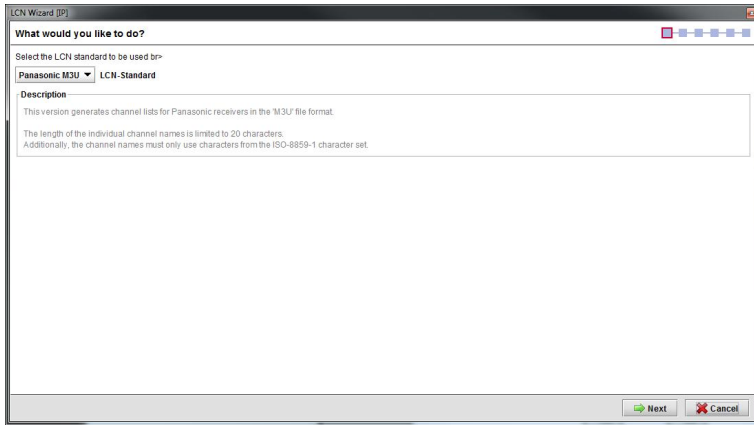


Fig. 53: NIT wizard [IP] – Step 2

- ① Drop-down list for creating the LCN data:  
**PANASONIC M3U:** Generates sorted channel lists for Panasonic receivers in the the M3U file format.



## Step 3

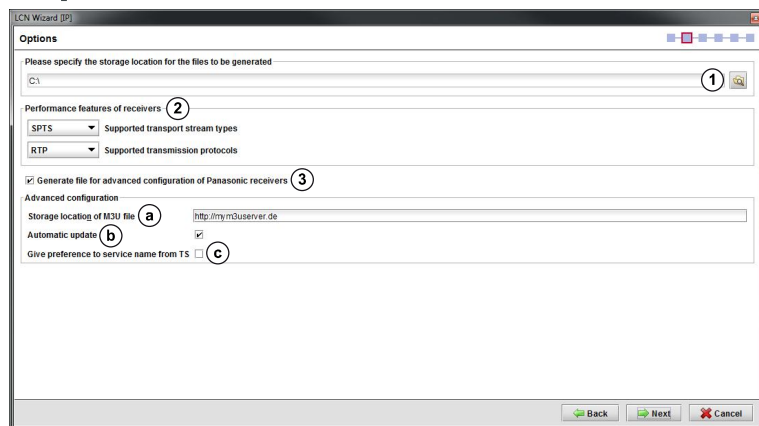


Fig. 54: NIT wizard [IP] – Step 3

① Destination folder for the configuration files to be generated

The LCN wizards generates the following files:

- Satip.m3u (sorted channel list)
- Satip\_multicast.txt (optional file with advanced configuration for Panasonic receivers)

② Performance features of receivers for which the user wants to generate the channel lists

The wizard uses this information to eliminate transport streams with inapplicable features from the channel list generation.

③ Information used for the generation of the advanced configuration file for Panasonic receivers

- **Storage location of M3U file (a):** informs the receiver of the storage location of the M3U file to be used.
- **Automatic update (b):** instructs the receiver to automatically search for updated M3U files at the specified storage location at specified intervals.
- **Give preference to service name from TS (c):** instructs the receiver to prefer the service names from the received transport stream to the ones taken from the M3U file.

**Note** How to handle the generated configuration files?

**Option 1: Device configuration without an advanced configuration file**

1. Copy the *Satip.m3u* file to the main directory of a USB stick.
2. Connect the USB stick to your Panasonic receiver.
3. To update the channel lists (DVB via IP), carry out the steps described in the manual of your receiver.

**Option 2: Device configuration with an advanced configuration file**

1. Copy the *Satip\_multicast.txt* to the main directory of a USB stick.
2. Copy the *Satip.m3u file* to the storage location in the network specified in the *Satip\_multicast.txt* file.
3. Connect the USB stick to your Panasonic receiver.
4. To update the channel lists (DVB via IP), carry out the steps described in the manual of your receiver.

## Step 4

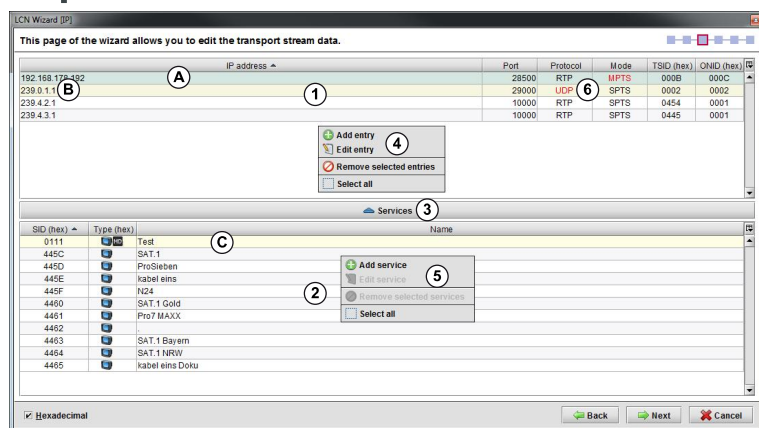


Fig. 55: NIT wizard [IP] – Step 4

- ① List of the IP transport streams
 

Manually added transport streams ② (highlighted in yellow) can be edited by double clicking on them.<sup>1)</sup>

Transport streams highlighted in green ① have been automatically added by the wizard due to the current system configuration. However, they contain manually added service entries ③.

---

- ② List with service entries for the individual transport streams
 

Manually added transport streams ③ (highlighted in yellow) can be edited by double clicking on them.<sup>1)</sup>

---

- ③ Shows and hides the list ②

---

- ④ Context menu for editing the transport stream information
  - Add entry: Opens a data input dialogue.
  - Edit entry <sup>2)</sup>: Opens a data input dialogue.
  - Remove selected entries <sup>3)</sup>: Deletes all the selected entries.
  - Select all: All the table entries are selected.

---

- ⑤ Context menu for editing the service entries
  - Add entry: Opens a data input dialogue.
  - Edit entry <sup>2)</sup>: Opens a data input dialogue.
  - Remove selected entries <sup>3)</sup>: Deletes all the selected entries.
  - Select all: All the table entries are selected.

---

- ⑥ All services of transport streams with a protocol or mode highlighted in red are not taken into consideration when generating the channel list in the following steps.

1) In offline mode, automatically generated entries can also be edited.  
 2) Available only for entries added manually. Available in offline mode even automatically generated entries  
 3) Only entries added manually can be deleted. In offline mode even automatically generated entries can be deleted.

## Step 5

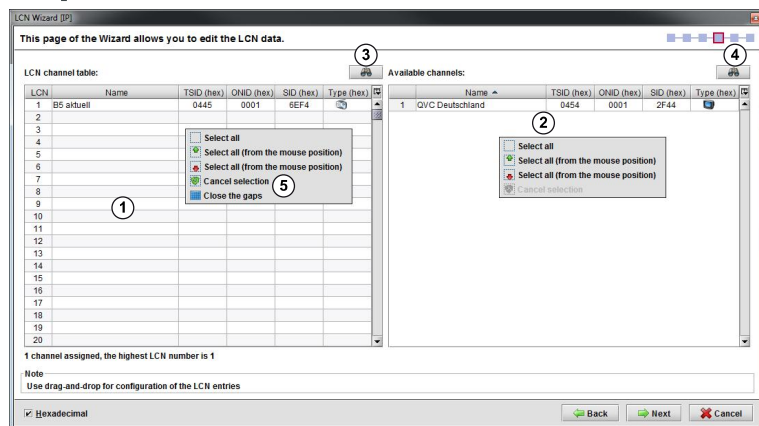


Fig. 56: NIT wizard [IP] – Step 5

- ① List showing the assigned LCN data
  - The assignment of LCN data from list ② to list ① and sorting them within the list ① is done by drag and drop.
  - Changing the LCN data is done by double clicking and keyboard input.
- ② List showing non-assigned LCN data
- ③ Starts the search for channels in the list ①
- ④ Starts the search for channels in the list ②
- ⑤ Context menu for editing the list entries

## Schritt 6

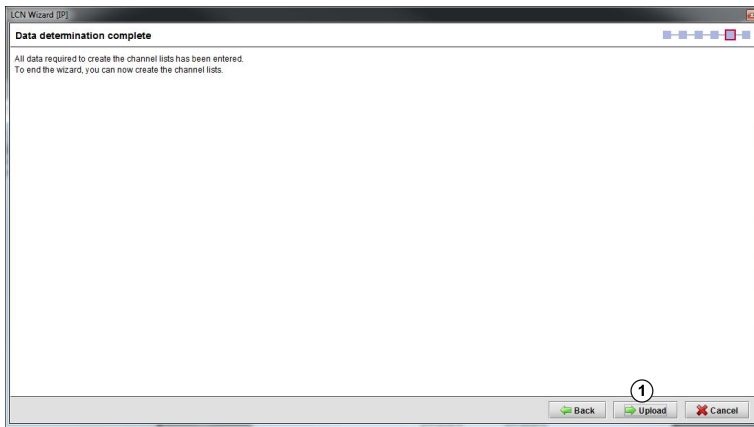


Fig. 57: NIT wizard [IP] – Step 6

- 
- ① Starts generating the files and sends the current configuration to the online system in which it is permanently saved<sup>1)</sup>
- 

1) In offline mode the data are transferred to the current system configuration. This can then subsequently be archived by an export.

## Step 7

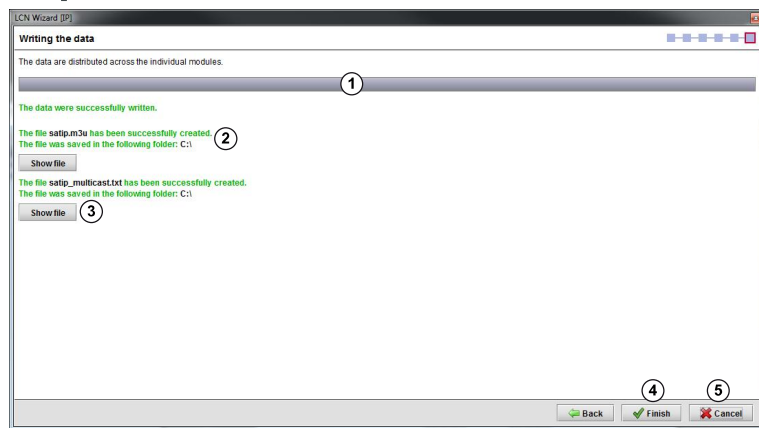


Fig. 58: NIT wizard [IP] – Step 7

- ① Progress bar for data transfer to the online system
- ② Completion information on the course of the data transfer
- ③ Opens the generated file
- ④ Exits the wizard
- ⑤ Cancels the wizard

# 11 Overviews

## 11.1 General

In order to give a better overview, separate windows for Frontends and outputs are provided and display the corresponding configuration values in tabular form.

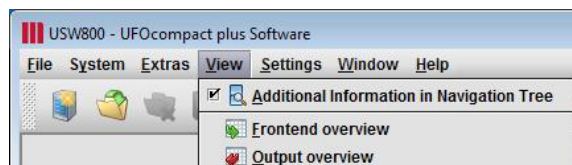


Fig. 59: "Frontend-overview" and "output overviews" menu entries

The values are split over several tabs according to type (DVB-C, DVB-T, PAL) within the windows. The tabs include the views filtered by the relevant type (see Fig. 60, S. 76 to Fig. 62, S. 77).

**Note** Not all the configuration information is displayed the case of **UFOcompact modules**. The table row is only completely filled in the case of **UFOcompact plus modules**.

Double-click on table row to open the Properties window of the associated module and to select the Frontend or output.

**Note** The automatic selection of the Frontend or the Output tab and of the channel unit, when double-clicking on a table row is only supported for **UFOcompact plus modules** and **UFOcompact modules** of the most recent generation (UFM 3xx, UFO 374/8). With older **UFOcompact modules** the 1st tab is always opened.

## 11.2 Configuration of the table columns

The displayed table columns within each tab can be configured as desired, i.e. by clicking on the symbol of the column configurator (located on the right-hand side of the table header) you can show or hide any desired columns.

Any changes made apply at the most until the end of the current system connection. When adding or deleting modules it can be necessary to restructure the tables, which discards the settings.

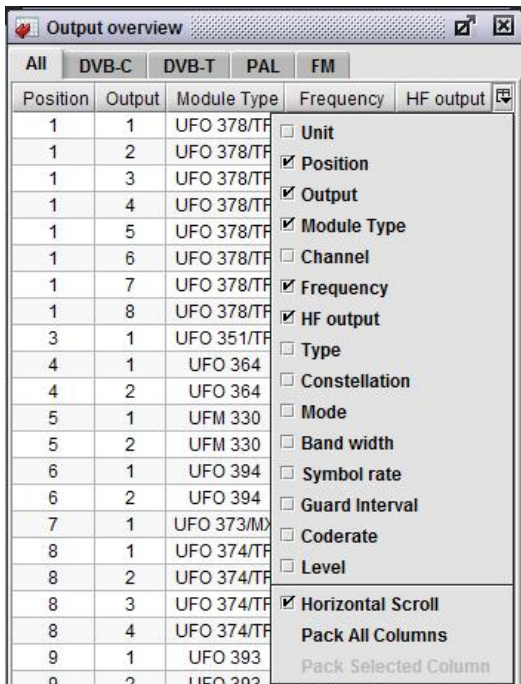


Fig. 60: Konfiguration der Tabellenspalten

### 11.3 Frontend overview

Select the **Display | Frontend overview** to open the following window:

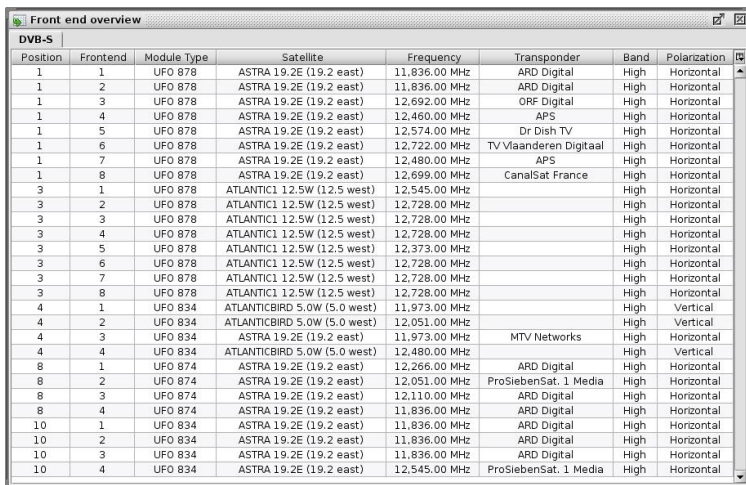


Fig. 61: Frontend overview



## 11.4 Output overview

Select the **Display | Output Overview** to open the following window:

Position	Output	Module Type	Channel	Frequency	HF output	Constellation	Mode	Symbol rate
1	1	UFO 878	K21	474.00 MHz	<input checked="" type="checkbox"/>	QAM64	SAT-Signal	6.9 MS/s
1	2	UFO 878	K27	522.00 MHz	<input checked="" type="checkbox"/>	QAM64	SAT-Signal	6.9 MS/s
1	3	UFO 878	K39	618.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
1	4	UFO 878	K40	626.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
1	5	UFO 878	K41	634.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
1	6	UFO 878	K42	642.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
1	7	UFO 878	K43	650.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
1	8	UFO 878	K44	658.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	1	UFO 878	K33	570.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	2	UFO 878	K26	514.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	3	UFO 878	K27	522.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	4	UFO 878	K28	530.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	5	UFO 878	K29	538.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	6	UFO 878	K30	546.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	7	UFO 878	K31	554.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
3	8	UFO 878	K32	562.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
8	1	UFO 874	K21	474.00 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
8	2	UFO 874	72.00 MHz	72.00 MHz	<input type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
8	3	UFO 874	---	510.25 MHz	<input checked="" type="checkbox"/>	QAM256	SAT-Signal	6.9 MS/s
8	4	UFO 874	K32	562.00 MHz	<input type="checkbox"/>	QAM128	SAT-Signal	6.7 MS/s

Fig. 62: Output overview

When amending the output frequency (in the Properties window) of a module a check is made in real time for conflicts with other outputs. Any frequency conflicts that are found are shown in red.

## 12 Favourites

### 12.1 Select from the Favourites

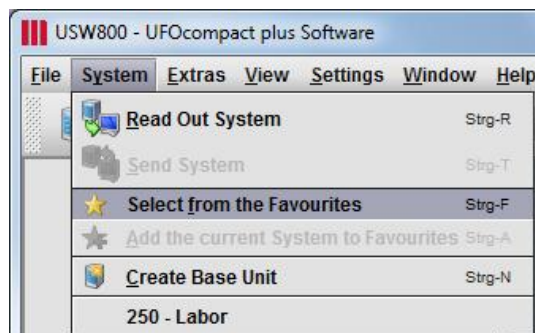


Fig. 63: "Select from the Favourites" menu entry

Via the menu (**System | Read System**) or the corresponding symbol ★ in the symbol bar the dialogue for management of the Favourites list is shown.

If a connection had already been established then it is closed before this dialogue is opened.

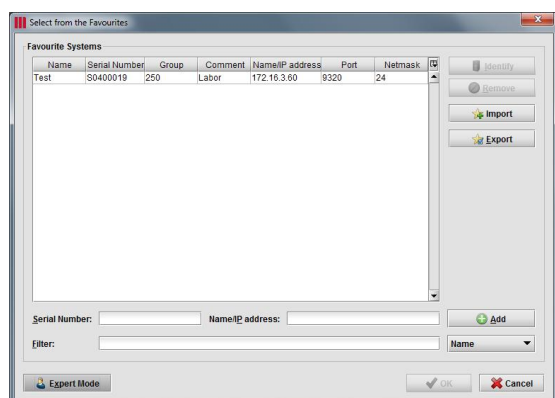


Fig. 64: Select from the Favourites

This dialogue allows a UFOcompact plus system to be selected from the Favourites list and opened. This can be done by double-clicking on the respective table entry or by selecting an entry and then confirming with **OK**.

## 12.2 Add the current attachment to the Favourites

It is very easy to add the currently opened UFOcompact plus system to the list of Favourites. Simply select the menu item (**System | Add current system to Favourites**).

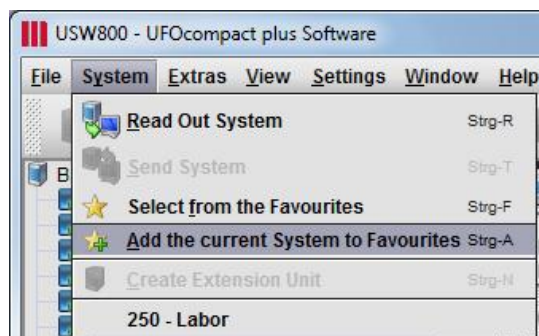


Fig. 65: Add the current attachment to the Favourites

## 12.3 Managing/organising Favourites

The **Select from the Favourites** dialogue offers a convenient way to manage the UFOcompact plus systems on the Favourites list.

As was described in Chapter 12.1 *Select from the Favourites*, p.78, this dialogue can be selected the menu item (**System | Select from Favourites**) or the corresponding symbol ★ in the symbol bar.

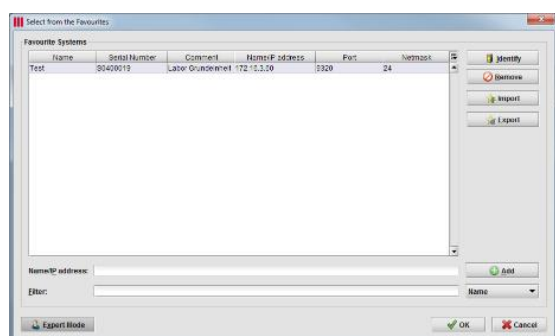


Fig. 66: Dialogue for the management of Favourites

The dialogue offers the following facilities to manage the Favourites:

1. Open a UFOcompact plus system by selecting the corresponding Favourite.
2. Export the current Favourite list in the form of a file.
3. Import an existing Favourite list from a file, with the option to overwrite or add to an existing list.
4. Use column-based filters to find a specific Favourite more quickly.
5. Add new Favourites based on their IP address. All further information is then determined automatically.

**Note** Systems can only be added to which a connection can also be established. Establishing the connection is necessary to complete the connection data.

6. Removing a Favourite from the list
7. Identifying a favourite UFOcompact plus system but saved in the configuration file of the USW 800
8. Assigning an individual name to a Favourite by simply editing the "Name" column.

**Note** This name is not saved in the UFOcompact plus system itself but instead in the configuration file of the USW 800. In addition, the name is also backed up when the Favourites are exported.

## 13 Software Update

### 13.1 USW 800 software updates

The latest USW 800 software updates are available for downloading from the Kathrein homepage. The download page carries a detailed description of how to install the update.

In addition, the USW 800 and the satellite lists can also be updated directly from the application.

(Extras | [Searching for updates to channels...](#))

(Extras | [Searching for updates to satellite lists...](#))

You can check the version of the software you are currently using in the menu (Help | About).

### 13.2 Module versions

Updated module plug-ins are included in every USW 800 update, and are not separately available for downloading.

To check the version of the module plug-ins, open the menu ([Help](#) | [About](#)) and click on the [Plug-ins](#) tab.

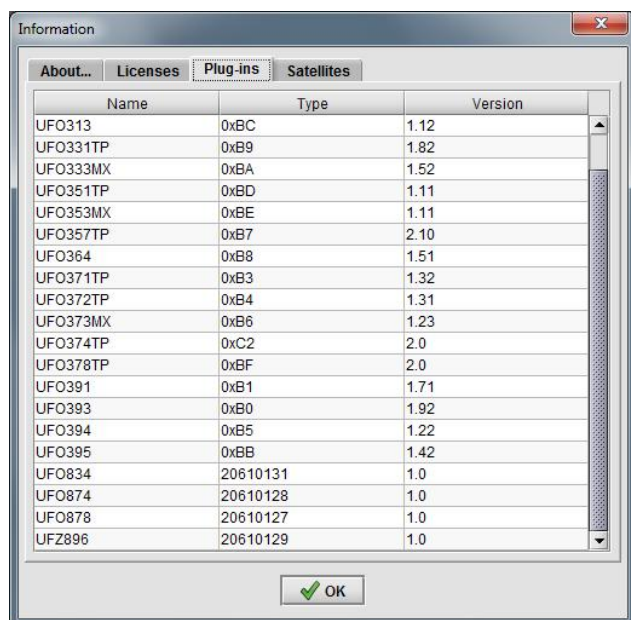


Fig. 67: Listing of all installed modules

### 13.3 Satellite lists

Updated satellite lists are included in every USW 800 update, and are not separately available for downloading.

To check the satellites that are currently supported, open the menu ([Help](#) | [About](#)) and click on the [Satellites](#) tab.

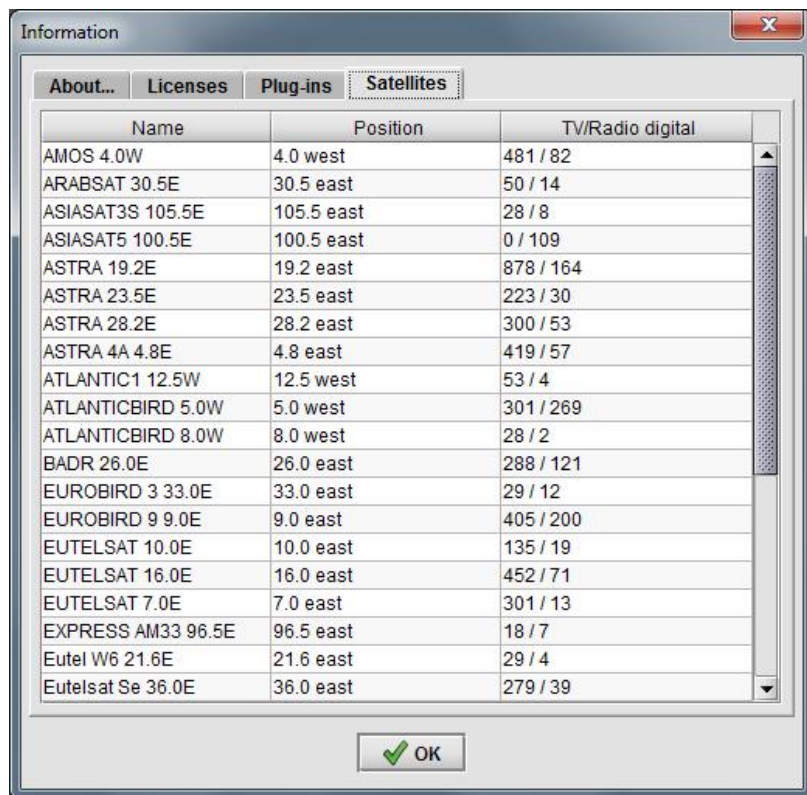


Fig. 68: Listing the installed satellite lists

## 14 Archiving customer service information

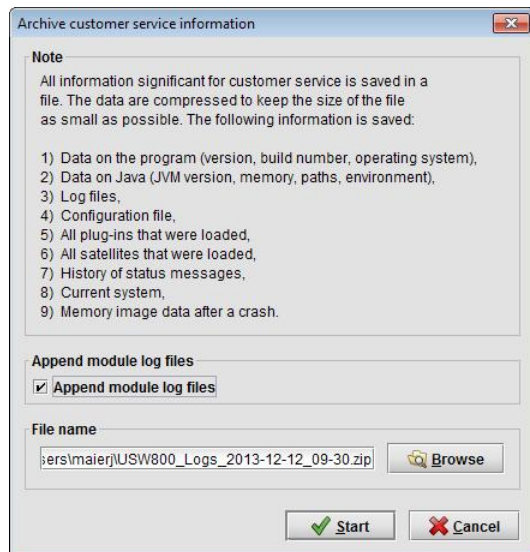


Fig. 69: Dialogue for the archiving of customer service information

To allow a quick response to customer service enquiries and fault reports, the customer service requires certain information regarding the installed software.

To avoid unnecessary follow-up questions, the USW 800 offers the facility to save all the relevant information in a single file. It is then sufficient simply to send this file to customer service by e-mail. The following information is saved in the archive file:

If **Append module log files** has been selected, then the log files of the UFX 800 and of all modules are downloaded and saved in the archive file:

- Data on the channel: version, build number, data, installation directory,
- Operating system: name, version, user directory,
- Data on Java: JVM version, memory, paths for classes and libraries,
- Configuration file for default values,
- List of plug-ins: name, type, version,
- List of satellites: name, date, type, ID,
- History of status reports,
- Log files
- Current system,
- Memory image data after a crash.
- (optional) UFX 800 and module log files

**Note** The appending of module log files is only possible when a system is connected.

The USW 800 does not save any backup-related data of the operating system in the archive file.

If necessary, you can very easily check what data has been saved. The archive is a normal ZIP file, which can be unpacked with a wide variety of programs. The archive only contains text files. Please refer to your system administrator if you need assistance in handling ZIP archive files.



## 15 USW800 firmware update

### 15.1 General Information

The firmware is generally updated via the UFX 800. The firmware of the UFX 800 itself can be updated, the supported UFOcompact- (see also Overview of supported UFOcompact modules) and the UFOcompact plus modules.

The new firmware is provided both for the UFX 800 as well as for the modules in a software bundle (KUB file). The software bundle includes a description file in addition to the actual firmware components. This includes all the main information on the device type for which the update is to be done and on the firmware components that are included.

The firmware is forwarded automatically to all UFX 800 systems in the system group.

When the firmware of the module is updated all modules of the same type are updated at the same time. The updating has been completed when the Status LED of the UFX 800 / modules no longer flashes green but instead lights up orange (bootup).

### 15.2 Updating the firmware

Select from the menu [Extras | Firmware Update](#) to call up the following dialogue:

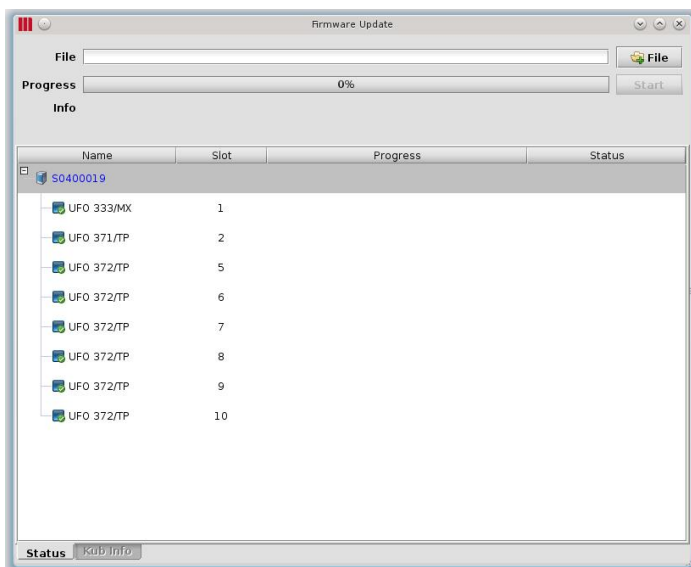


Fig. 70: "Update firmware" dialogue

If you are already connected to a system the dialogue is opened at once and all other open windows are hidden.

If you are not already connected to a system first the connection setup dialogue (see also [8.1 Reading the system, p.38](#)) is called up.

First of all, in the bottom part the UFX 800 modules and the UFOcompact, UFOcompact plus modules that are plugged in there are shown.

In the next step the KUB file is called up by clicking on the **File** button of the file selection dialogue window.

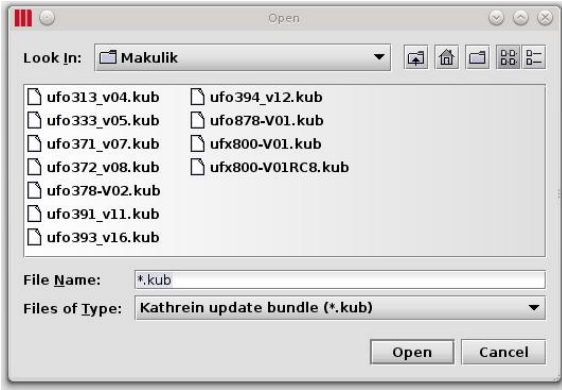


Fig. 71: Selection KUB file

After selecting a KUB file, only those modules that match the KUB file are shown in the bottom part.

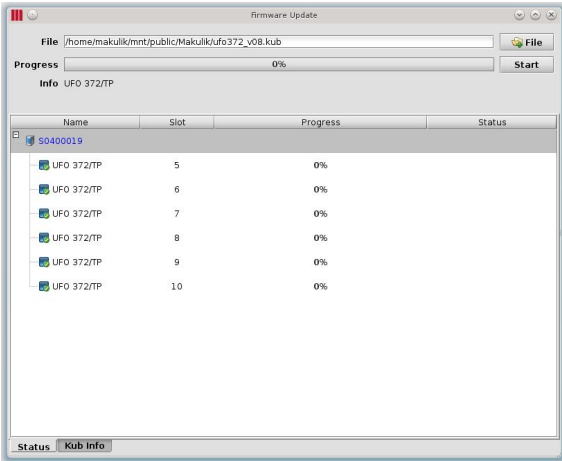


Fig. 72: Filtered display of the modules that match the selected KUB file

**Note** The selected software bundle is not checked against the firmware versions that are currently installed at the modules. The actual checking of the firmware version is done by the UFX 800. If the firmware is already up to date, the status **OK** is shown at once by the UFX 800.

Detailed information on the selected software bundle can be called up on the [Kub Info](#) page:

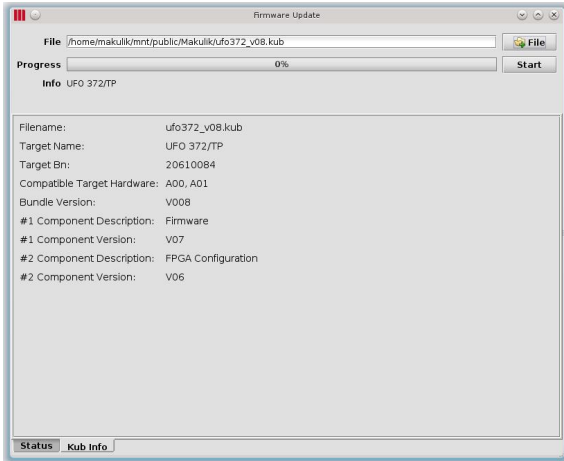


Fig. 73: Detailed information on the selected KUB file

The firmware update is carried out after clicking on the [Start](#) button. The process is done in several steps.

1. Upload of the KUB file to the connected UFX 800 system(s).  
It is possible for the updating to be interrupted during the upload. It is not possible to close the firmware update dialogue during the entire process.

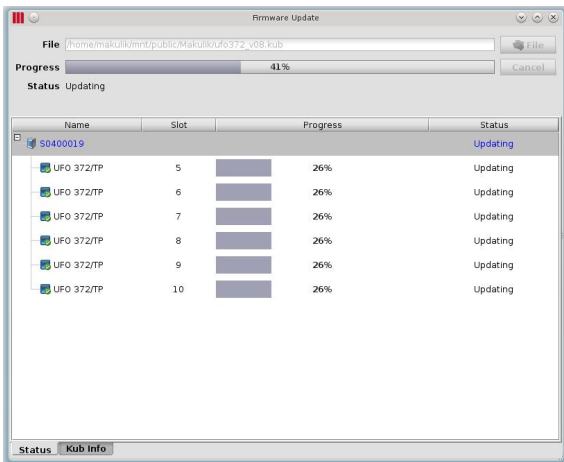


Fig. 74: Firmware update running

2. Each UFX 800 unpacks the included KUB file and carries out a firmware update. During this time progress information is constantly sent to the USW 800 software and this is shown correspondingly in the dialogue window.

- Once the firmware update has been completed all the UFX 800 systems and modules are rebooted. The connected UFX 800 systems wait with the status "Wait in cascade" until all the other UFX 800 systems and modules have completed their reboot.
- The corresponding status is shown once the firmware update has been completed. The firmware update dialogue can now be closed again.
- The system that is connected is read in again after the dialogue closes.

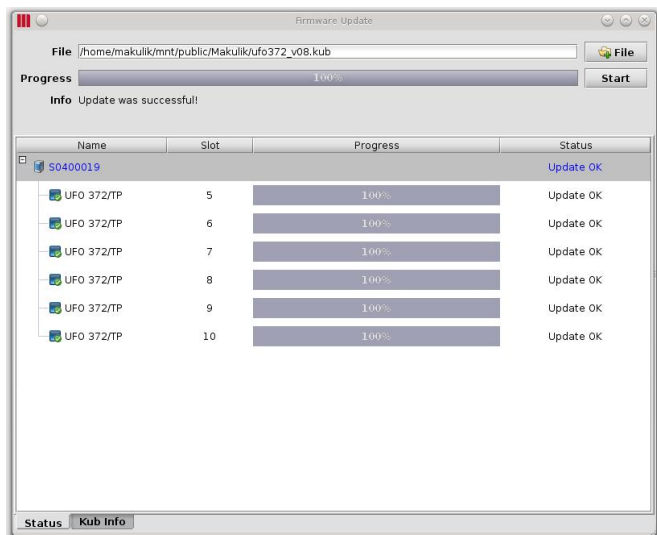


Fig. 75: Firmware update successfully completed

## 16 Configure UFOcompact modules

In order to make it easier to move from an existing UFOcompact system to a UFOcompact plus system, the most important UFOcompact modules are also supported in a UFOcompact plus system.

### 16.1 Overview of supported UFOcompact modules

Output	Input	DVB-S/-S2	DBV-T	ASI
<b>DVB-C (QAM)</b>		UFO 371/TP	UFO 357/TP	UFM 370
		UFO 372/TP		
		UFO 373/MX		
		UFO 374/TP		
		UFO 378/TP		
<b>DVB-T (COFDM)</b>		UFO 331/TP	UFO 351/TP	UFM 330
		UFO 333/MX	UFO 353/MX	
<b>PAL</b>		UFO 391	UFO 364	
		UFO 393		
		UFO 394		
		UFO 395		
<b>UKW</b>		UFO 313		

### 16.2 Channel filter

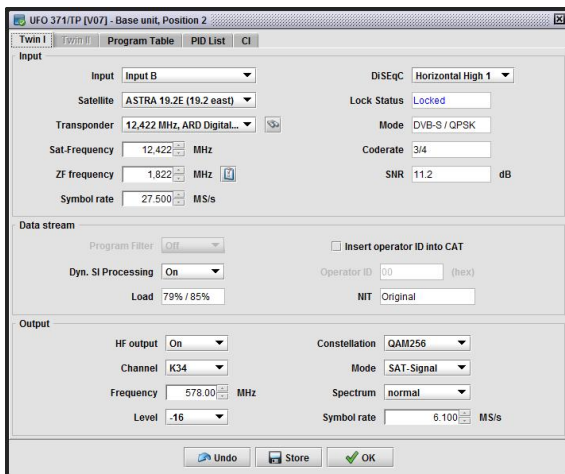


Fig. 76: Module with channel filter

Multiple UFOcompact transmodulator modules support the filtering of the transport stream. The filtering can be regulated by various parameters, by the channel table and the PID list. In general the filtering can be switched on and off.

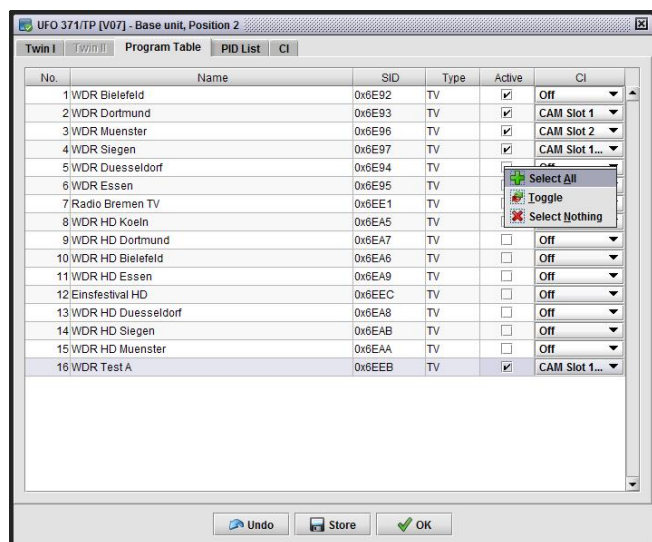
Special transmodulators such as the UFO 373/MX do not support this.

The CAT (Conditional Access Table) is generally taken from the satellite transport stream. In special cases, e.g. for provider "KabelKiosk", it can be necessary to replace the CAT-Operator-ID in the transport stream. The new value for the CAT Operator ID can be set manually, and is then inserted into the transport stream in place of the original ID.

**Dynamic SI Processing** monitors the transport stream and responds to changes in the channel data (Service Information Data/SI data).

The SI data may change for instance as a result of switching to another region.

Normally the dynamic SI processing is switched on; only in exceptional cases does it make sense to switch it off.



No.	Name	SID	Type	Active	CI
1	WDR Bielefeld	0x6E92	TV	<input checked="" type="checkbox"/>	Off
2	WDR Dortmund	0x6E93	TV	<input checked="" type="checkbox"/>	CAM Slot 1
3	WDR Muenster	0x6E96	TV	<input checked="" type="checkbox"/>	CAM Slot 2
4	WDR Siegen	0x6E97	TV	<input checked="" type="checkbox"/>	CAM Slot 1...
5	WDR Duesseldorf	0x6E94	TV	<input checked="" type="checkbox"/>	
6	WDR Essen	0x6E95	TV	<input checked="" type="checkbox"/>	
7	Radio Bremen TV	0x6EE1	TV	<input checked="" type="checkbox"/>	
8	WDR HD Koeln	0x6EA5	TV	<input checked="" type="checkbox"/>	
9	WDR HD Dortmund	0x6EA7	TV	<input type="checkbox"/>	Off
10	WDR HD Bielefeld	0x6EA6	TV	<input type="checkbox"/>	Off
11	WDR HD Essen	0x6EA9	TV	<input type="checkbox"/>	Off
12	Einsfestival HD	0x6EEC	TV	<input type="checkbox"/>	Off
13	WDR HD Duesseldorf	0x6EA8	TV	<input type="checkbox"/>	Off
14	WDR HD Siegen	0x6EAB	TV	<input type="checkbox"/>	Off
15	WDR HD Muenster	0x6EAA	TV	<input type="checkbox"/>	Off
16	WDR Test A	0x6EEB	TV	<input checked="" type="checkbox"/>	CAM Slot 1...

Fig. 77: Channel table

The channel table contains all the channels (services) for a module, or in the case of a multiplexer the channels for both inputs.

The table contains the service IDs and channel types in addition to the names of the channels.

It is possible to define for each channel in the **Active** column.

whether it is to be included in the transport stream of the output.

Please ensure that the maximum number of selected channels is not exceeded (e.g. 20). This can depend on the relevant module type.

The **Descramble** column is available only if the module has the capability to be fitted with a CI retrofit kit such as UFZ 394.

If no retrofit kit was found, no selection can be made in the **Descramble** column, otherwise it is possible to select the CI slot to be used.

## 16.3 PID list

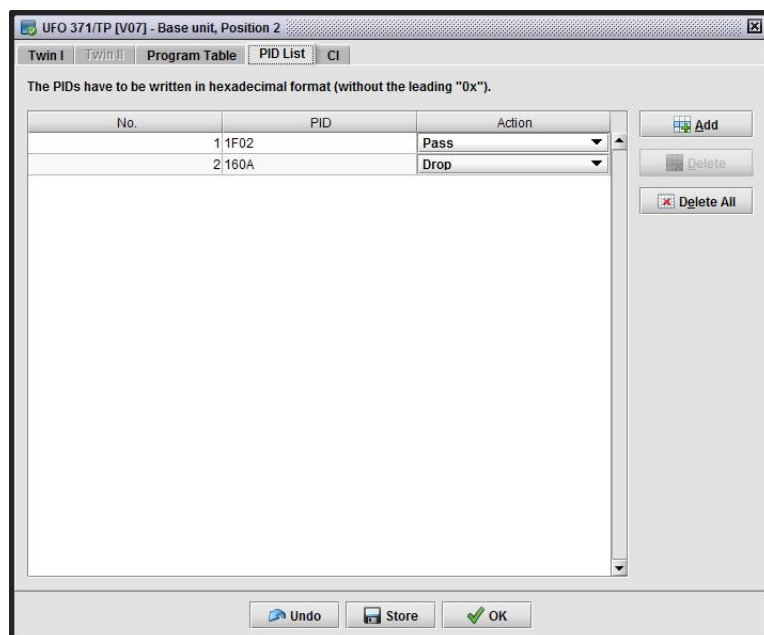


Fig. 78: PID table

### Tip

In the PID list, the package IDs (package IDs/PIDs) which are always allowed through by the filtering can be specified in addition to the channel table. The PID list is required only in exceptional cases.

Please note that the maximum length of the PID list is limited (e.g. to 100 entries). The maximum length can depend on the relevant module type and its firmware version.

## 16.4 Common Interface

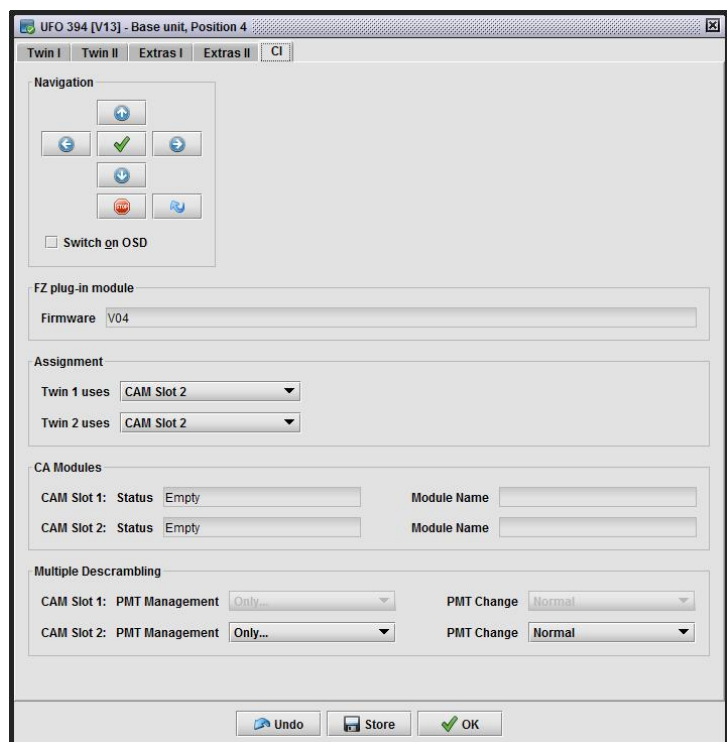


Fig. 79: Common Interface parameters

Some modules support a CI retrofit kit, e.g. UFZ 394.

The newer modules (apart from the UFO 353) offer the option to change various parameters for the Common Interface (CI).

If On Screen Display/OSD is supported the menu can be controlled with the buttons in the **Navigation** section.

You can find further information on the options for the OSD in the instructions for use of the module and the CI retrofit kit.

Please note that for some modules the tab can be changed so that the OSD switches on automatically, while for other modules the OSD must be switched on manually.

If a CI retrofit kit with several CI slots is used, it is possible to determine for the transcoder modules in the **Assignment** section which slot of the relevant "twin" is to be used.

With transmodulator modules this assignment is done by a channel filter, see *Chapter Channel filter*, p. 89.

Information on the Conditional Access modules that are used can be found in the **CA Modules** section.



If multiple decoding is used, i.e. one CA module decodes several channels concurrently, further settings can be performed in the last section.

Please note that for transmodulator modules these settings are always available, irrespective of the current channel table.

The **PMT-Management** parameter describes the way in which a CA module manages the list of channels.

It supports the modes **Only, Add, Add** and **First, More, More, Last**.

An optimised mode can also be used in addition to the normal mode during **PMT change**. If the optimised mode is supported by the CA module and is set, fewer loss-of-picture events will occur during a PMT change.

Some malfunctions (such as black screen or loss of decoding on the other twin) may occur if optimised mode is selected despite not being supported by the CA module.

## 16.5 Search for channels and transponders

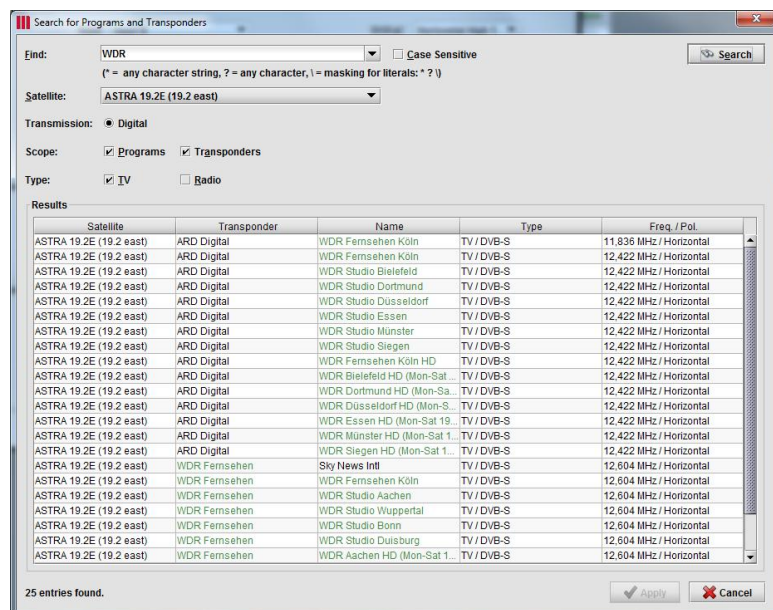


Fig. 80: Dialogue for the search for channels and transponders

In addition to direct selection of a transponder or programme via the selection boxes in the window of a module there is also the option to search for channels and transponders.

The search text can be input in the text field, whereby the following rules apply:

- An asterisk (\*) stands for any desired string of characters. Example: If "A\*D" is input in the search text, then both "ARD" and "ASTRA HD" are found.
- A question mark stands for any desired character. Example: If "A?D" is input in the search text, then "ARD" is found but not "ASTRA HD".
- Put a backslash (\) before them to emphasise the importance of the wildcard characters "asterisk" and "question mark". If you are searching for a backslash itself then in this case input "\\".
- If the search text does not include an asterisk, an asterisk will be added internally before the text and attached to the text (but only if there is no question mark at this position). Example: If "BBC" is input as the search text, then "BBC World", "1Xtra BBC" and "RFI BBC Hungary" are found.

It is also possible to narrow the search down further by using multiple criteria:

- Distinction between upper and lower case
- Selecting a specific satellite
- Broadcasting mode (digital or analogue)
- Search by channels and/or transponders
- Search by TV and/or radio channels and/or transponders

The table in the bottom half of the dialogue includes all the channels and transponders that had been found.

If the transponder or the name of a channel are shown in green then this indicates a "hit".

The number of entries found is shown for links below the table.



### **Search:**

The search is started with the current search parameters. The results are shown in the table.



### **Apply:**

The item currently selected in the table is taken over into the module window.



### **Cancel:**

The search dialogue is closed without the data being taken over into the module window.

# 17 UFOcompact plus device categories and configuration

## 17.1 UFOcompact plus module and device categories

### 17.1.1 General Information

The properties dialogue window for all UFOcompact plus channel types is set up according to this schematic:

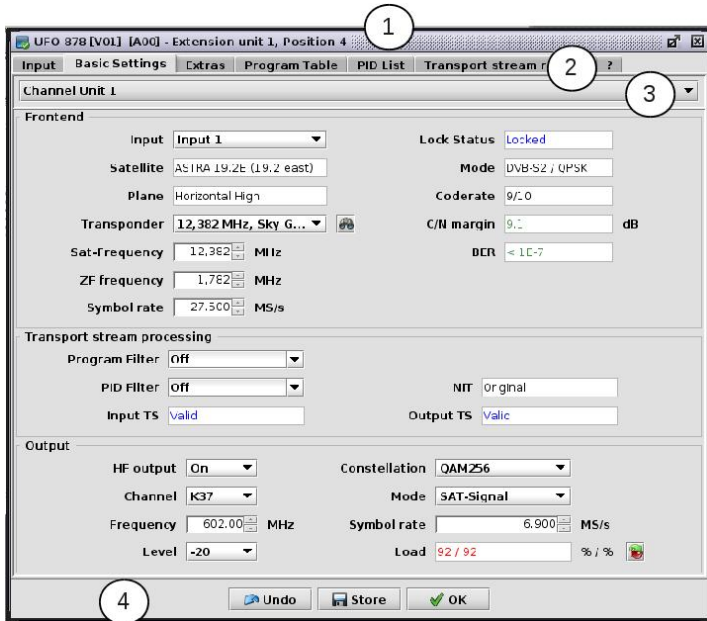


Fig. 81: Schematic UFO module properties dialogue window

- ① Title row with module designation, software version, hardware versions and slot number of the module in the base unit.
- ② Tab for the module-specific settings, grouped by hardware/ software functions.
- ③ Selection of the module in the module (or other module-specific function units).
- ④ The configuration changes are handled by the save/undo functions and **OK** closes the dialogue window.

## 17.1.2 Module "Type information"

You can get detailed information on the module concerning the hardware and software status on the page titled ?.

**Type information**

**Name** UFO 834 **BN** 20610127

**GST** A00 **MinSwCompGST** A00

**Software bundle information**

**Version** V01

**Components**

Name	Version	Revision number	Build date
FW_001	ufo834_firmware_v0.0.1	v00	May 21, 2013 11:51:00 AM (...)
CD_001	ufo834_fpga_v0.1.0		
BS_001	1.0.0-bootstrap		Sep 2, 2011 2:32:00 PM (UTC)
BL_001	1.0.0-bootloader		Nov 29, 2011 2:32:00 PM (UT...)

Fig. 82: Module "Type information"

## 17.2 Overview transmodulators

Input Output	DVB-S/-S2	DVB-S/-S2 DVB-T/-T2 DVB-C	IP
DVB-C (QAM)	UFO 878/874	UFO 876, UFO 876/MX	UFO 828
DVB-T (COFDM)	UFO 834	UFO 836, UFO 836/MX	UFO 858
IP		UFO 844	

## 17.3 Transmodulator configuration settings

### 17.3.1 Input socket configuration

The configuration of the inputs is done per the input socket in the [Input](#) tab.

The configuration of the available signal input sockets of a module is done with this mask.

Select the socket to be configured with the top selection box. The numbering of the sockets is marked accordingly on the front panel of the module.

**Note** Ensure that the settings made in the input configuration match up with the wiring of the module within the overall system (input matrices, etc.).

### 17.3.2 Multi-standard input configuration

For devices with a multi-standard frontend, configuration of the type of input signal is done in the upper part of the [Input](#) tab. The signal types available for selection here are [Satellite](#), [Cable](#) and [Terrestrial](#).

For [Cable](#) and [Terrestrial](#), no further settings are necessary. For [Satellite](#), the settings for the [Satellite input configuration](#) appear.

### 17.3.3 Satellite input configuration

The configuration of the satellite inputs is done per input socket in the **Input** tab.

The configuration of the available satellite input sockets of a module is done with this mask.

Fig. 83: Satellite input configuration

- ① chooses a known satellite from the USW 800 satellite list

This setting, together with the settings for polarisation and band (reception plane), determines which transponders can be selected in the mask **Frontend**; see *17.3.5 DVB-S/-S2 Frontend configuration, p.100*

- ② sets polarisation

- ③ sets band (reception plane)

- ④ determines the activation of the DiSEqC™ capable satellite reception equipment

Possible modes are:

DiSEqC™ mode	Description
Deactivated	No analogue control signals are sent by the module
Analogue	Analogue control signals are sent by the module (14 V/18 V, 0 kHz/22 kHz)
DiSEqC™1.0	Digital control signals according to the DiSEqC™1.0 standard are sent by the module

- ⑤ selects one of up to four LNBs that can be controlled within an input matrix (up to two in analogue mode)

- ⑥ determines the properties of the selected LNB; see also USW 800 settings/LNB

### 17.3.4 Frontend configuration

Configuration of the individual frontend of a module is done in the **Frontend** tab. Select the frontend to be configured with the top selection box.

Using the selection box **Input**, one of the configured inputs of the module is selected (see also *Input socket configuration, p. 98*). The respective frontend configuration parameters are displayed depending on the configuration of the selected input (“Satellite“, “Terrestrial“ or “Cable“).

## 17.3.5 DVB-S/-S2 Frontend configuration

Fig. 84: DVB-S/-S2 Frontend configuration

- ① selects one of the configured inputs of the module; see also *17.3.3 Satellite input configuration, p.99*

The satellite that has been assigned there and the reception plane are shown in the corresponding text boxes ② and ③.

- ② shows the assigned satellite

- ③ shows the assigned reception plane

- ④ list of transponders that are available on this reception plane, as long as they have been included in the satellite list

The selection of a transponder automatically sets the values for the **satellite frequency**, **IF frequency** and **symbol rate**.

- ⑤ activates the following search dialogue for channels and transponders:

Fig. 85: Search for channels and transponders

- Press **Apply**.

⇒ The transponders and the corresponding frequencies as well as symbol rates are filled in accordingly.

Alternatively:

- Enter the **satellite frequency/IF frequency** and **symbol rates** manually, e.g. if a particular transponder is not included in the list of satellites.



- ⑥ displays or manually sets values for satellite frequency, IF frequency and symbol rate

**Note** The satellite frequency and IF frequency depend directly on one another and are converted automatically.

- ⑦ If a valid DVB-S/-S2 transport stream is received on the set frequency, the **Lock-Status** is displayed as **Locked**.
- ⑧ The text boxes **Mode**, **Constellation**, **Coderate** and **C/N Reserve** show information on the properties and quality of the received satellite signal.

### 17.3.6 DVB-T/-T2 Frontend configuration

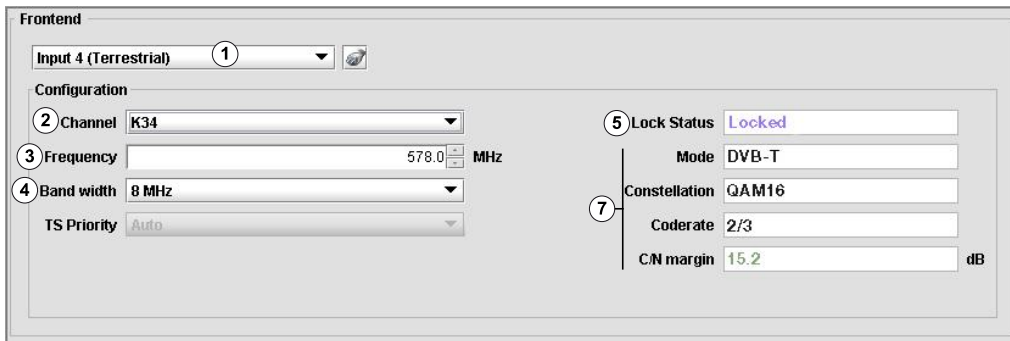


Fig. 86: DVB-T/-T2 Frontend configuration

- ① list of the module inputs configured with **Terrestrial**; only for modules with a multi-standard frontend; see also *17.3.2 Multi-standard input configuration, p.98*
- ② sets the channel to be received and, therefore, the frequency and bandwidth
- ③ displays or manually sets the frequency
- ④ displays or manually sets the bandwidth
- ⑤ If a valid DVB-T/-T2 transport stream is received on the set frequency, the **Lock Status** is displayed as **Locked**.
- ⑥ The text boxes **Mode**, **Constellation**, **Code rate** and **C/N Reserve** show information on the properties and quality of the received satellite signal.

### 17.3.7 DVB-C Frontend configuration

For modules with a multi-standard frontend, one of the module inputs configured with **Cable** is selected with the **Input** selection box; see also *17.3.2 Multi-standard input configuration, p.98*.

The screenshot shows a configuration window titled 'Frontend'. At the top, there is a dropdown menu labeled 'Input 2 (Cable)' with a circled '1' next to it. Below this is a 'Configuration' section with several fields: 'Channel' is a dropdown menu showing 'K54' with a circled '2'; 'Frequency' is a text field showing '738.0' with 'MHz' to its right and a circled '3'; 'Constellation' is a dropdown menu showing 'QAM64' with a circled '4'; 'Symbol rate' is a text field showing '6.900' with 'MS/s' to its right and a circled '5'. To the right of these fields are two more fields: 'Lock Status' is a text field showing 'Locked' with a circled '6'; 'C/N margin' is a text field showing '14.2' with 'dB' to its right and a circled '7'.

Fig. 87: DVB-C Frontend configuration

- 
- ① list of the module inputs configured with **Cable**; only for modules with a multi-standard frontend; see also *17.3.2 Multi-standard input configuration, p.98*

---

  - ② sets the channel to be received and, therefore, the frequency

---

  - ③ displays or manually sets the frequency

---

  - ④ sets the constellation of the channel to be received

---

  - ⑤ sets the symbol rate of the channel to be received

---

  - ⑥ If a valid DVB-C transport stream is received on the set frequency, the **Lock Status** is displayed as **Locked**.

---

  - ⑦ If a valid DVB-C transport stream is received on the set frequency, the **C/N Reserve** is displayed.

---

### 17.3.8 Transport stream processing configuration

The configuration of the DVB S/S2 Frontend of a module is done per channel unit in the **TS stream processing** tab.

Using the following mask, it is possible to configure the basic settings for the transport stream processing of a channel unit:

Input	State	SI-Data	TSID (hex)	ONID (hex)
1	Present	Valid	0445	0001
2	Present	Valid	0445	0001
3	Present	Valid	0445	0001

Filter settings

Program Filter: Off    PID-Filter: Off

Transport Stream ID (hex):  Replace 0001

Original Network ID (hex):  Replace 0000

Operator ID (hex):  Replace in CAT 00

State	SI-Data	NIT	TSID (hex)	ONID (hex)
Present	Incomplete	User (DVB-C)	0445	0001

Fig. 88: Transport stream processing configuration

- ① The **SI data** column of the two **Input TS** and **Output TS** tables shows whether the SI data that are being read from the current transport stream or are being generated for the outgoing transport stream are valid.
- ② If a module (such as UFO 876/MX) is configured with multiplex functionality, the **Input TS** table contains several lines, one for each input TS of the multiplex and transport stream processing unit. In this case, the input number in the first column refers to the input numbering under the **TS routing** tab.  
If at least one input is assigned / connected in **TS routing**, the assigned input with the lowest input number is highlighted pale green in the **Input TS** table. The highlighted input is referred to as the "main input". By default, the transport stream ID and the original network ID for the output TS are taken from this input.
- ③ switches channel filter on and off independently from the settings described in *17.3.12 Channel table/filter configuration, p.107*
- ④ switches PID filter on and off independently from the settings described in *17.3.13 PID list/filter configuration, p.110*
- ⑤ shows whether a user NIT (Network Information Table) has been created and activated for this module; see *Creating an NIT, p. 49*

### 17.3.9 DVB-C-QAM output configuration

The configuration of the DVB-C-QAM outputs of a module is done for each channel unit under the **Backend** tab.

Fig. 89: DVB-C-QAM output configuration

- 
- ① switches the **HF Output** of the channel unit on and off
- 
- ② describes a normal cable standard channel grid of K21-K69 and S21-S41 in steps of 8 MHz
- 
- ③ performs a fine adjustment of the frequency in the steps of 0.25 MHz
- 
- ④ sets the signal strength of the output signal in 40 steps from maximum (0) to minimum (-40)
- 
- ⑤ specifies the QAM constellation (QAM16, QAM32, ..., QAM256)
- 
- ⑥ allows the HF output to be modulated with various output signals, for example for measuring and analysis purposes:
1. In the normal operating mode the transmodulated **satellite signal** is output.
  2. **PRBS**: Test mode. The QAM signal is modulated with the PRBS-23 sequence. Normal mode is unavailable in this setting.
  3. **CW**: Test mode. Sine-wave signal for levelling using simple signal meters. Normal mode is unavailable in this setting.
- 
- ⑦ performs a fine adjustment of the symbol rate in steps of 1 KS/s
- 
- ⑧ shows the current and peak loads of the output in %
- 
- ⑨ resets the measured value for peak loading
-

### 17.3.10 DVB-T-COFDM output configuration

The configuration of the DVB-T-COFDM outputs of a module is done per channel unit in the **Backend** tab.



Fig. 90: DVB-T-COFDM output configuration

- ① switches the **HF Output** of the channel unit on and off

---

- ② describes a normal cable standard channel grid of K21-K69 and S21-S41 in steps of 8 MHz

---

- ③ performs a fine adjustment of the frequency in the steps of 0.25 MHz

---

- ④ sets the signal strength of the output signal in 40 steps from maximum (0) to minimum (-40)

---

- ⑤ shows the current and peak loads of the output in %

---

- ⑥ resets the measured value for peak loading

---

- ⑦ allows the selection of 5, 6, 7 or 8 MHz for the channel

---

- ⑧ specifies the QAM constellation (QPSK, QAM 16, ..., QAM 64)

---

- ⑨ allows the HF output to be modulated with various output signals, for example, for measuring and analysis purposes:
  1. In the normal operating mode the transmulated and, if applicable, filtered **satellite signal** is output.
  2. **PRBS**: Test mode. The QAM signal is modulated with the PRBS-23 sequence. Normal mode is unavailable in this setting.
  3. **CW**: Test mode. Sine-wave signal for levelling using simple signal meters. Normal mode is unavailable in this setting.

---

- ⑩ permits the settings 1/4, 1/8, 1/16 and 1/32

---

- ⑪ permits the settings 1/2, 2/3, 3/4, 5/6 and 7/8

### 17.3.11 Transport stream processing extra options

The configuration of the transport stream processing of a module is done per channel unit in the **TS processing** tab.

The screenshot shows the 'TS processing' configuration window. It is divided into several sections:

- Input TS:** A table with columns: Input, State, SI-Data, TSID (hex), and ONID (hex). It contains three rows, all with 'Present' state and 'Valid' SI-Data.
- Filter settings:** Includes 'Program Filter' and 'PID-Filter', both set to 'Off'.
- Transport Stream ID (hex) and Original Network ID (hex):** Each has a 'Replace' checkbox and a text input field. The first is set to '0001' and the second to '0000'.
- Operator ID (hex):** Has a 'Replace in CAT' checkbox and a text input field set to '00'.
- Output TS:** A table with columns: State, SI-Data, NIT, TSID (hex), and ONID (hex). It contains one row with 'Present' state, 'Incomplete' SI-Data, 'User (DVB-C)' NIT, and TSID/ONID values of '0445' and '0001'.

Fig. 91: Additional functions for transport stream processing

- ① In certain situations (such as modulation on DVB-T) it can be necessary to replace the Transport Stream ID and the Original Network ID in the outgoing transport stream.
  - ▶ Activate the **Replace Transport Stream ID/Original Network ID** checkbox.
    - ⇒ The new value for the Transport Stream ID/Original Network ID can be changed manually, and it is then inserted into the transport stream in place of the original ID.
- ② The CAT (Conditional Access Table) is generally taken from the satellite transport stream. In special cases, such as for the provider "KabelKiosk", it can be necessary to replace the CAT Operator ID in the transport stream.
  - ▶ Activate the **replace Operator ID in CAT** checkbox.
    - ⇒ The new value for the CAT Operator ID can be changed manually, and it is then inserted into the transport stream in place of the original ID.

## 17.3.12 Channel table/filter configuration

The configuration of the channel filter of a module is done per channel unit in the **Channel table** tab.

Input	State	SI-Data	TSID (hex)	ONID (hex)	Default filter
1	Present	Valid	0445	0001	Drop
2	Present	Valid	0445	0001	Drop
3	Present	Valid	0445	0001	Drop





In...	Name	SID (hex)	>SID (hex)	Type	Filter mode
1	1 LIVE	6F3B		Pass	
2	1 LIVE diGGi	6F41		Pass	
3	1 Antenne Brandenburg	6F26		Pass	
4	1 ARD-alpha	6F47		Drop	
5	1 B5 aktuell	6EF4		Drop	
6	1 B5 plus	6EF8		Drop	
7	1 Bayern 1	6EF0		Drop	
8	1 Bayern 2	6EF1		Drop	
9	1 BAYERN 3	6EF2		Drop	
10	1 BAYERN plus	6EF5		Drop	
11	1 Bremen Eins	6F20		Drop	
12	1 Bremen Vier	6F22		Drop	
13	1 BR Heimat	6EF7		Drop	
14	1 BR-KLASSIK	6EF3		Drop	
15	1 DASDING	6F37		Drop	
16	1 Fritz	6F29		Drop	
17	1 hr1	6F03		Drop	
18	1 hr2	6F04		Drop	
19	1 hr3	6F05		Drop	
20	1 hr4	6F06		Drop	
21	1 hr-INFO	6F08		Drop	






Fig. 92: Channel table/filter configuration

Fig. 92 shows the channel table for the case of a module with multiplex functionality. For modules without multiplex functionality there is no second **Input** column and the input status above the channel table itself contains only a single line.








If a valid transport stream is being received (at least one transport stream in case of modules with multiplex functionality), all the programmes (services) that are included are listed in the channel table.

The service type and runtime information are shown in visual form with various symbols.

Symbol	Description	Service type
	TV channel	
	Radio channel	
	Data service	
	Unknown	

Symbol	Description runtime information
	The corresponding runtime information is available for the selected service
	The channel is being broadcast at the moment
	The service is scrambled
	The filter settings have been modified by the user
	The channel is already being output at another output (if a transport stream is being output at several outputs simultaneously)

If a service has been selected from the list, the buttons to process the filter settings become active:

Button	Description
	The selected service is included in the outgoing transport stream
	The selected service is not included in the outgoing transport stream
	The selected service is handled according to the default setting (see selection <a href="#">Default Filter</a> )
	The filter setting for the selected service is inverted. If <a href="#">Default value</a> has been set for the service, then this has no effect
	Deletes user-defined filter settings This has no effect on services that are available in the transport stream
	Adds a user-defined service
 (only in the context menu)	As a result of the automatic purge only the configuration entries from the channel filter table whose references SIDs are not present in the current incoming transport stream are deleted



In addition to the filter settings for services which are currently available in the transport stream, it is possible to provide filter settings to SIDs which are not currently being transmitted. To do this, the desired settings are input with a user-defined service name in the text boxes **Name** and **SID (hex)** and the user-defined entry is added to the list through **Add**.

**Note** The user-defined service name is only shown in the list if the associated SID is currently not available in the transport stream. Otherwise, the service name from the transport stream data is always shown.

The column **>SID (hex)** is shown only for modules which can change service IDs. A value in the **>SID (hex)** column means that the respective service in the output transport stream has the new service ID shown. The new service ID can be changed or deleted by double clicking on the row for the respective service. The **Add filter** dialogue opens. The new service ID can be set or deleted here in the **replace with** field. Deletion means that the service in the output transport stream has the original service ID once again.

Modules with multiplex functionality must ensure that service IDs in the output transport stream are unique. If services with the same service ID are now fed into the output transport stream from different inputs, a service ID conflict arises which the module resolves automatically. To do so, the service IDs for the services from the main input are retained by default, and the service IDs for the services from the other inputs are changed. These automatically changed service IDs are also shown in the **>SID (hex)** column; but to distinguish them from manual changes they are shown in a green font.

Automatically changed service IDs are restored once the conflict no longer exists. This is intended to avoid unnecessarily frequent changes, since the latter can lead to problems with receivers.

If an automatically issued service ID is unacceptable, it can be changed to a user-defined value. User-defined service IDs always take priority over automatically assigned IDs.

The **Default filter** setting determines whether services from the input are blocked by default or permitted to be included in the output transport stream. The **Default filter** setting applies to all unconfigured services (services without the "gear wheel" symbol) and to all configured services for which the entry in the **Filter mode** column appears in a blue font (instead of the green one).

The **Default filter** value is shown in the input status table above the actual channel table. For modules with multiplex functionality there is a "Default filter" value for each input. Except for older modules, the "Default Filter" value can be changed by clicking on it.

### 17.3.13 PID list/filter configuration

The configuration of the PID filter of a module is done per channel unit in the **PID list** tab.

Input	State	TSID (hex)	ONID (hex)
1	Present	0445	0001
2	Present	0445	0001
3	Present	0445	0001

In...	PID (hex)	>PID (hex)	Filter mode
1	1	0012	Pass
2	1	0034	Drop
3	1	0455	Drop
4	1	0545	Pass
5	1	0F44	0022 Pass

Fig. 93: PID list/filter configuration

Whilst the channel table permits entire channels/services in the output transport stream to be transmitted or blocked, the same can be achieved at a PID or elementary stream level with the PID list/filter configuration. If the channel filter is activated on the **TS processing** tab, its settings take priority. The changes established via the PID filter configuration have an additional effect.

**Note** Appropriate measuring devices can be used to determine, for example, which PIDs are specifically being used for which elementary data streams; alternatively, this may be published by the broadcaster.

Fig. 93 shows the PID list for the case of a module with multiplex functionality. For modules without multiplex functionality there is no second **Input** column and the input status above the PID list itself contains only a single row.

The **>PID (hex)** column is shown only for modules which can change PIDs. A value in the **>PID (hex)** column means that the respective PID in the output transport stream has the new PID shown.

In order to input a PID filter, the corresponding entries are made in the fields **PID (hex)** and **Filter mode** fields and the entry is saved in the list with **Add**. The **Default value** filter mode means that transmitting or blocking the PID in question by the module automatically results in an output transport stream that is in conformity with MPEG and DVB.

Configured PID filters relate to the PIDs of the output transport stream of the TS processing unit. For modules with multiplex functionality, therefore, it is necessary to specify the correct TS input to the multiplex unit.

The buttons to edit the PID filter selected from the list behave in the same way as those

described under *17.3.12 Channel table/filter configuration, p.107* for the processing of service filters.



The filtering out of certain PIDS can make the transport stream unusable at the output.

### 17.3.14 Transport stream routing configuration

#### Note

The transport stream routing configuration of modules with multiplex functionality is somewhat different and is described at the end of the chapter in its own section. However, the information below is helpful for an understanding.

The configuration of the transport stream routing of a module is done per channel unit in the **TS-Routing** tab.

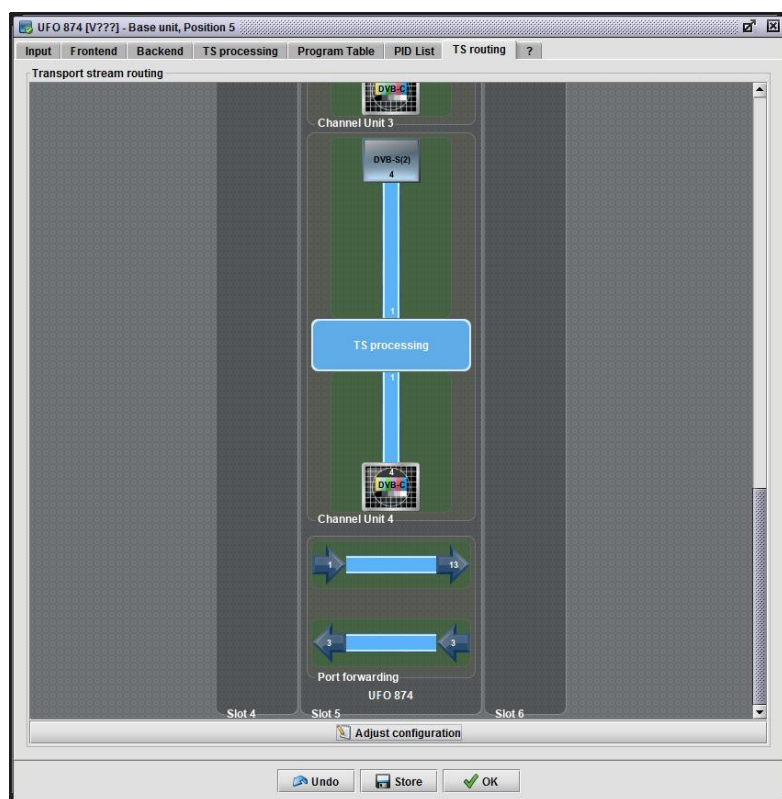


Fig. 94: Transport stream routing overview

Each UFOcompact plus module can exchange transport stream signals via the backplane of the base unit with the relevant neighbouring modules. Using transport stream routing, further/extended functions can be provided (for example, the coding/ decoding of programmes in the transport stream with CI interface, see Fig. 94).

The **Modify Configuration** button opens the transport stream routing configuration dialogue.



Fig. 95: Transport stream routing configuration

The routing for each channel unit of the module can be configured here using drag&drop. The **Send** button sends the settings to the module. **Cancel** discards the changes; the existing routing configuration is left unchanged.

Furthermore, in the case of modules with extended routing capabilities, several outputs can be fed from the same frontend. This way, a suitable filter configuration allows a transport stream to be split into two output channels.

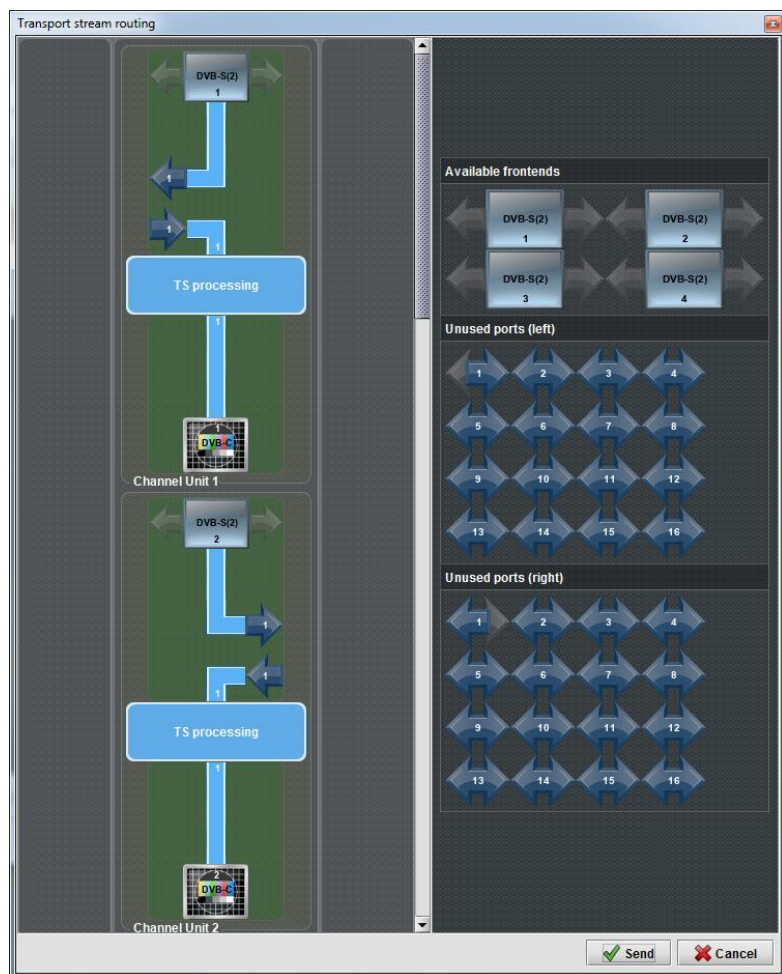


Fig. 96: Transport stream 1 diverted to or from the left, transport stream 2 diverted to or from the right.

Furthermore, for all modules it is possible to convey transport stream via the backplane.

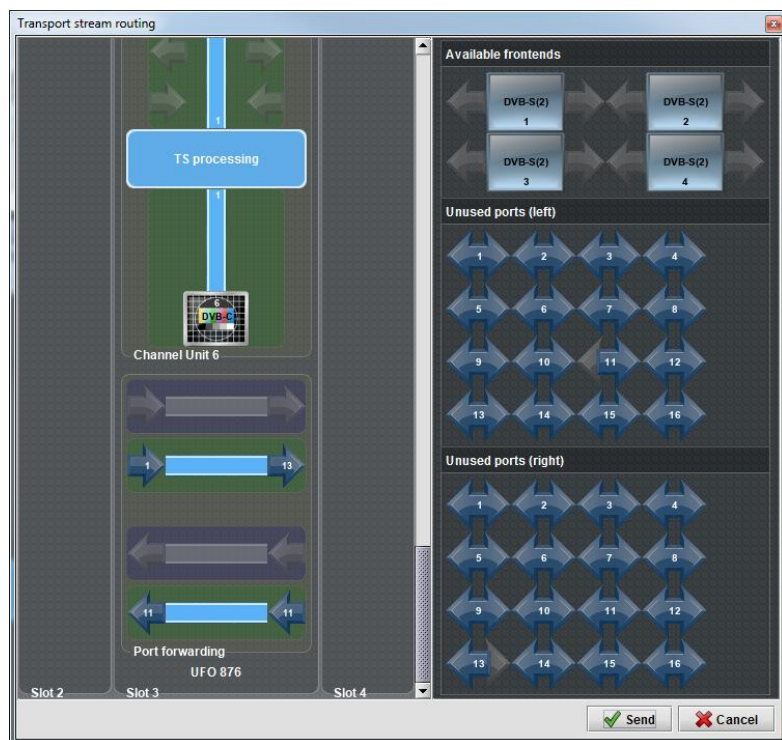


Fig. 97: Transport stream from Port 1 of the left neighbouring module is forwarded to Port 13 of the right neighbouring module. Transport stream from Port 11 of the right neighbouring module is forwarded to Port 11 of the left neighbouring module.



### Transport stream routing for modules with multiplex functionality

Fig. 98 shows, for instance, a potential transport stream routing view for modules with multiplex functionality. Compared to modules without multiplex functionality, it is noticeable that the **TS processing** block, has several inputs instead of only one (here: 3). The transport streams into these inputs are combined into a new transport stream and are then transmitted to the output (here: DVB-C).

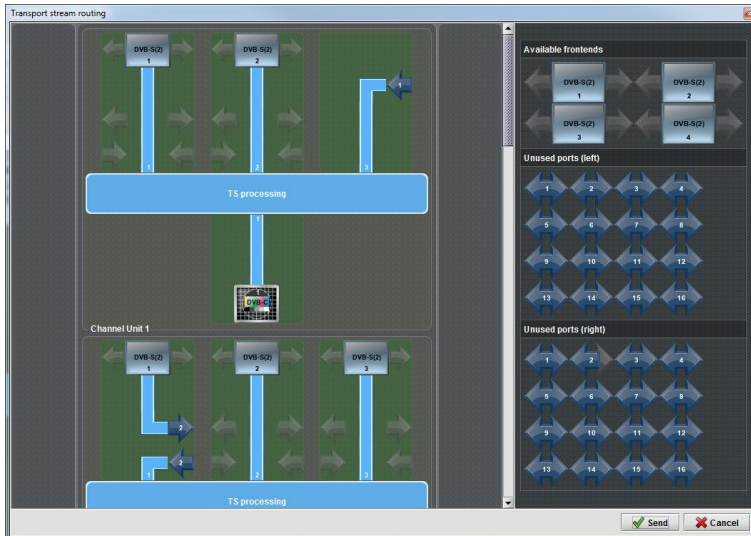


Fig. 98: Transport stream routing view for modules with multiplex functionality

To obtain a transport stream at the output, at least one input must be assigned / connected. Other inputs may remain unassigned. Amongst the assigned inputs, that with the lowest input number ranks as the "main input". By default, the transport stream ID and the original network ID for the output TS are taken from this input.

The following configuration is shown in Fig. 98:

- TS processing by channel unit 1:
  - Input 1 is the main input, and frontend 1 is assigned to it
  - Frontend 4 is assigned to input 2
  - The first transport stream from the neighbouring module on the right is assigned to input 3 (a corresponding transport stream output lead must be configured there)
- TS processing by channel unit 2:
  - Input 1 is the main input, and frontend 1 is assigned to it. The transport stream from this frontend is, however, also fed to the neighbouring module on the right before TS processing, for instance, for decoding of channels by means of the UFZ 896.
  - The assignment of the inputs 2 and 3 cannot be seen here. They may, for instance, even be unassigned / not connected.

### 17.3.15 Network Configuration

The network interfaces are configured via the input or output socket in the tab **Input** (**EdgeQAM/EdgeCOFDM**) or **Output (IP-Streamer)**. The following screen is used to configure the network interfaces of a network-compatible module:

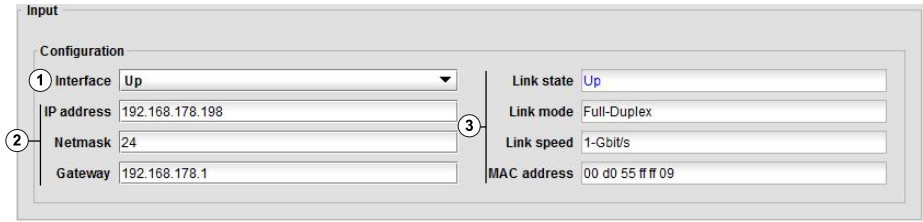


Fig. 99: Network configuration (input)

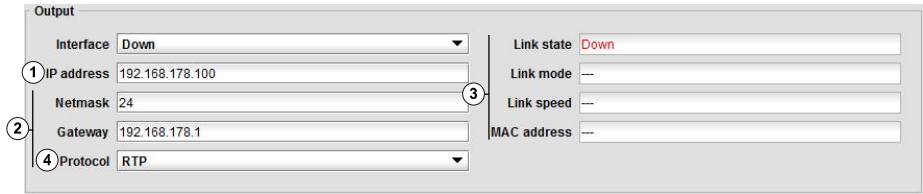


Fig. 100: Network configuration (output)

- ① activates (**up**) and deactivates (**down**) the network interface  
By default, the network interface is deactivated in order to prevent possibly occurring address collisions due to IP addresses that have been assigned twice.

---

- ② assigns the IP address parameters for IPv4 networks in the select boxes **IP address**, **Netmask** and **Gateway**  
Enter data into the netmask according to the CIDR notation. This means that the number of bits of the network prefix is entered in decimal form, e.g. 255.255.255.0 corresponds to the figure 8+8+8+0=24.

---

- ③ gives information on the **link state**, **link mode**, **link speed** and the **MAC address** of the Ethernet interface; provided that the interface is activated

---

- ④ selects the protocol type at the output between **UDP** and **RTP**



## 17.3.16 IP Frontend

The IP front ends are configured via the input data stream in the **Frontend** tab.

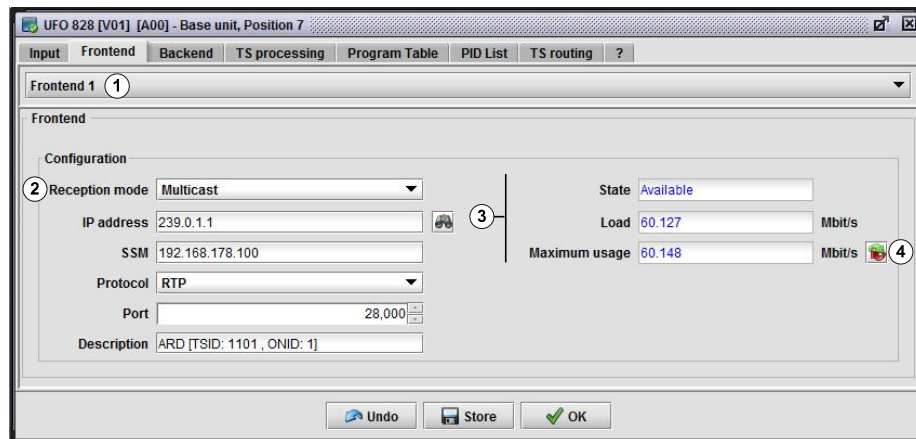


Fig. 101: IP Frontend

- ① selects the IP frontend to be configured
- ② Chooses between the operating modes **Multicast** and **Unicast**; see *Note, p.117*
- ③ shows information about the **State**, **Load** and the **Maximum usage**
- ④ resets the **Maximum usage**

**Note** **Multicast** is a point to group connection, which means that a sender distributes a data stream to many recipients via a suitable network infrastructure. The signalling used is the IGMP protocol (IGMPv1 - <https://tools.ietf.org/html/rfc1112>, IGMPv2 - <https://tools.ietf.org/html/rfc2236>, IGMPv3 - <https://tools.ietf.org/html/rfc3376>).

**Unicast** is a point to point connection, i.e. the sender establishes a separate data connection for each recipient.

## Multicast

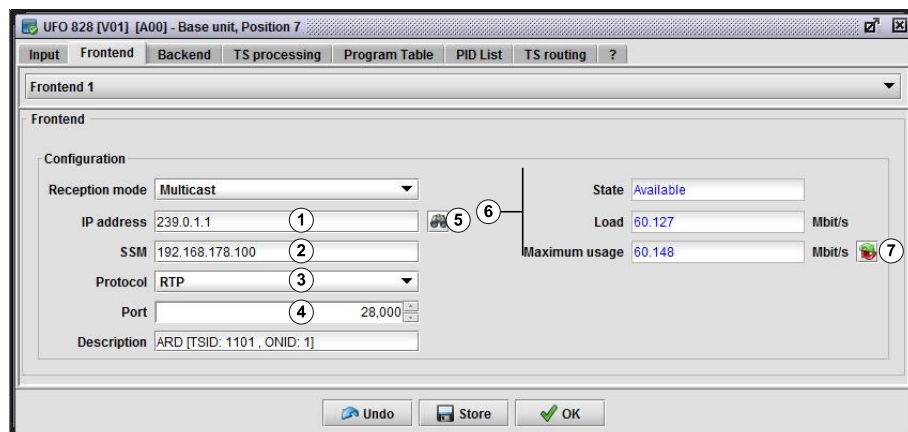


Fig. 102: IP Frontend: Multicast

- ① **IP address** assigned

**Note** The assigned IP address is the same multicast IP address that was assigned to the desired transport stream in the streaming module.

- ② additionally shows source IP addresses from which data streams are accepted exclusively, as comma or semicolon separated lists in the **SSM** field

**Note** SSM (*Source Specific Multicast*) is a special feature of IGMPv3. It enables a rudimentary backup of the data stream by determining defined source addresses.

- ③ type of protocol

- ④ port number

**Note** The port numbers are assigned in analogue form.

- ⑤ opens an SAP list; see *Selecting an entry from the SAP list, p.119*

If service information is provided by the streaming module in the form of SAP packages, this data can be used for configuring the IP frontends.

- ▶ Click the binoculars icon next to the IP address select box to open the SAP list.

⇒ The SAP list opens.

- ⑥ shows information about the **State**, **Load** and the **Maximum usage**

- ⑦ resets the **Maximum usage** by clicking the double arrow

## Selecting an entry from the SAP list

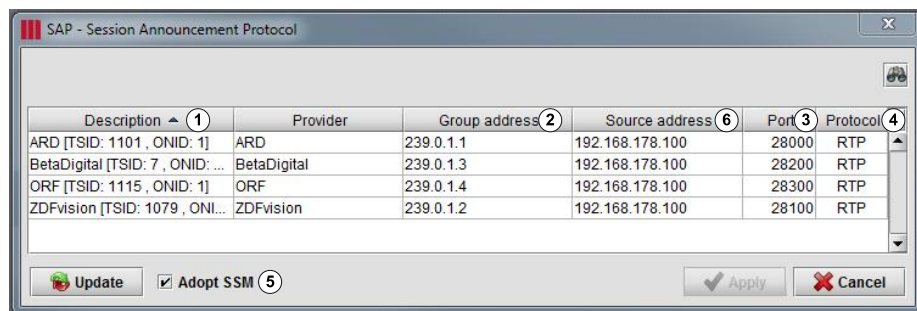


Fig. 103: IP Frontend: Multicast – editing an SAP entry

1. Double click to open an entry in the SAP list.
  - ⇒ The values for **Description** <sup>①</sup>, **Group address** <sup>②</sup>, **Port** <sup>③</sup> and **Protocol** <sup>④</sup> are passed on to the respective input fields of the IP frontend (see Fig. 103).
2. Tick the box by **Adopt SSM** <sup>⑤</sup>.
  - ⇒ The **Source address** (<sup>⑥</sup> in Fig. 103) is entered into the SSM box (Fig. 102).

## Unicast

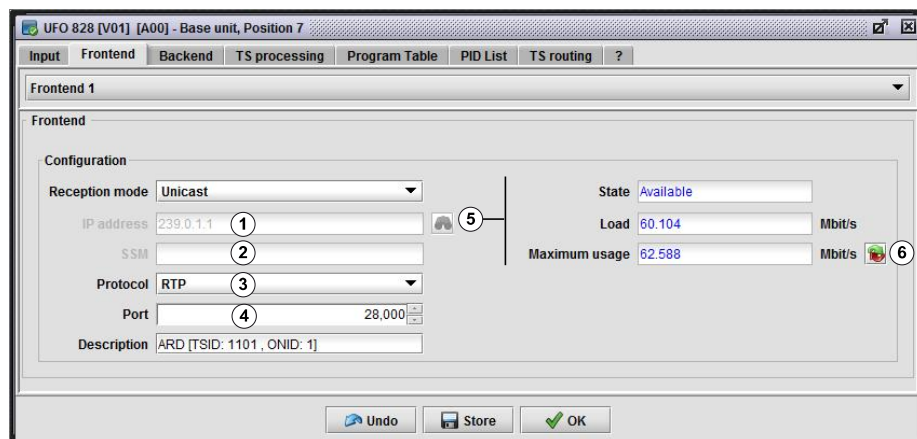


Fig. 104: IP Frontend: Unicast

- 
- ① **IP address** is not assigned  
In the Unicast mode, the module listens to its own interface IP address. For this reason, an IP address cannot be assigned.
- 
- ② **SSM** is not assigned, SAP is not available either
- 
- ③ type of protocol
- 
- ④ port number
- 
- ⑤ shows information about the **State**, **Load** and the **Maximum usage**
- 
- ⑥ resets the **Maximum usage** by clicking the double arrow
-

### 17.3.17 IP Backend

The IP backends are configured via the output data stream in the **Backend** tab.

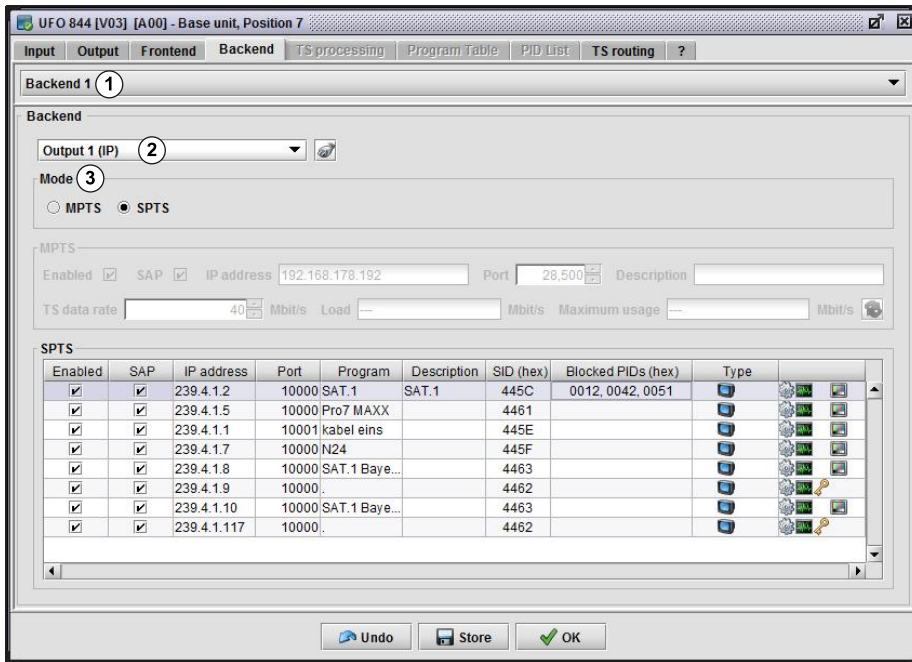


Fig. 105: IP Backend

- ① selects the IP backend to be configured

**Note** All IP backends are deactivated by default in order to prevent the network from overload due to faultily configured backends.

- ② selects one of the configured network interfaces of the module, see also *17.3.15 Network Configuration, p.116*
- ③ chooses between the operating modes **MPTS** and **SPTS**; see *Note, p.121*  
An IP backend can exclusively transmit either one MPTS or eight SPTS.

**Note** **MPTS** is a multiple program transport stream (MPEG transport stream of a constant bit rate with several services).  
**SPTS** is a single program transport stream (MPEG transport stream of a variable bit rate with only one service).

## MPTS

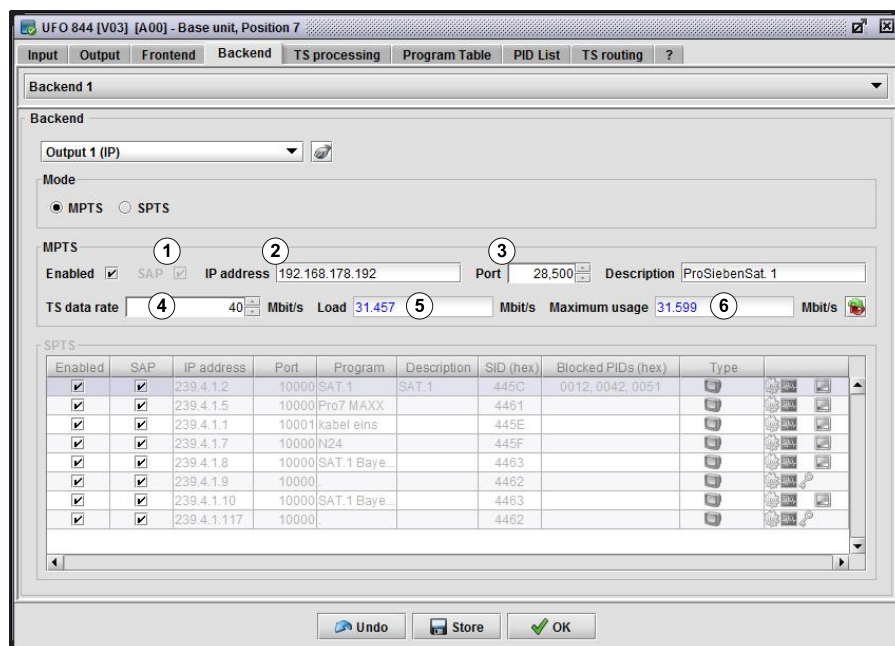


Fig. 106: IP Backend: MPTS

- ① enables the SDP/SAP protocol for emitting service information

**Note** SDP/SAP (*Service Discovery Protocol/Service Announcement Protocol*) is a protocol for spreading service information, e.g. source IP address, target IP address, port number and service name in a local network. For more information, go to <https://tools.ietf.org/html/rfc2974>.

- ② target address

For target address, enter either the interface IP address of the recipient (for unicast streaming) or a multicast IP address, preferably from the scope 239.0.0 – 239.255.255.255 (Organization-Local Scope, RFC 2365 <https://tools.ietf.org/html/rfc2365>) for Multicast streaming.

- ③ port number

If you choose a port number, make sure that there is no problem with other network services; see <https://www.iana.org/assignments/service-names-port-numbers/service-names-port-numbers.xhtml>.

## ④ TS data rate

It is possible to set the gross data rate of the MPTS to be generated.

The gross data rate must be set as close to the value of the maximum usage as possible, however, it may not fall below the latter because the package data will be rejected otherwise.

Due to the fact that the MPTS maximum usage is subject to deviations, it is necessary to plan for some buffer accordingly.

## ⑤ Load

Shows the current MPTS net data rate (user data without null packets)

## ⑥ Maximum usage

shows the maximum MPTS net data rate since the last reset



The IP address and port number must make an unambiguous combination for each IP data stream.

## SPTS

In SPTS mode, the parameters assigned to each service are generally the same as in the MPTS mode, see *MPTS*, p.122.

Double-clicking an SPTS entry in the SPTS list opens the SPTS configuration dialogue:

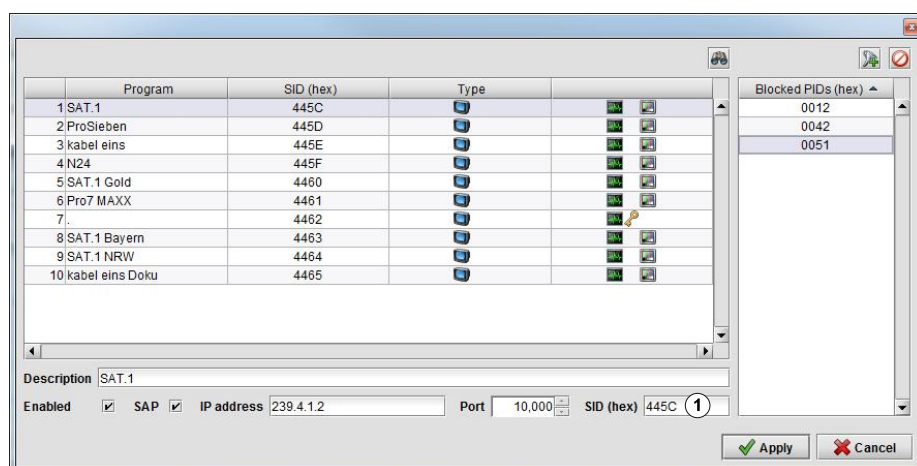


Fig. 107: IP Backend: SPTS

The SPTS configuration dialogue enables you to select a service of the respective frontend and to assign the corresponding streaming parameters. If only a temporary service is needed, the service ID can be entered manually into the **SID** text box ①.

Furthermore, it is possible to show a list of the PIDs to be blocked per SPTS.

## 17.4 Overview Common Interface module

Input	Backplane-TS
Output	
Backplane-TS	UFZ 896

## 17.5 Overview Common Interface module

### 17.5.1 Basic Settings

The Conditional Access Module - hereinafter abbreviated to CAM - can be configured and its status queried at the **Basic settings** tab. The slot is selected from the drop-down menu in the top area (Fig. 108).

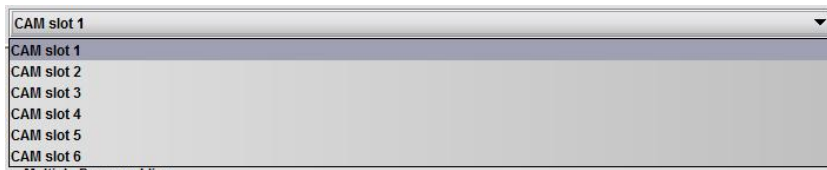


Fig. 108: Slot selection

The current status of the selected slot or CAM is shown in the section **CA Module**. The possible states are shown in the following illustrations.



Fig. 109: Empty slot

If the CAM is ready for operation the logged name is output.

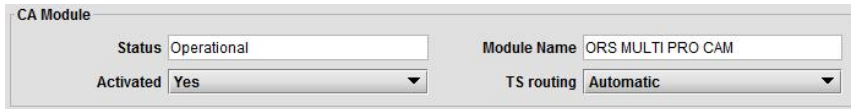


Fig. 110: CAM plugged in and activated

A CAM that has been plugged in as a reserve and deactivated is cut off from the power supply and logged in as a Spare CAM.



Fig. 111: CAM plugged in and deactivated



If any errors should occur when initialising a CAM, then the CAM is cut off from the power supply and put into the **Error** state. The front LED begins to alternately flash green and orange.

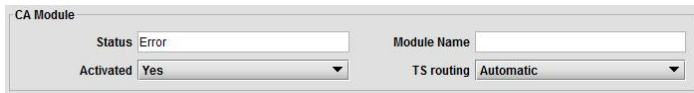


Fig. 112: CAM plugged in and defective

Subsequently it is possible to determine in the section **CA Module** via the option **TS Routing** (Fig. 113) whether the transport stream is always to be passed via the CAM or only if a programme in the associated redundancy group (see Page 131) was selected for processing.

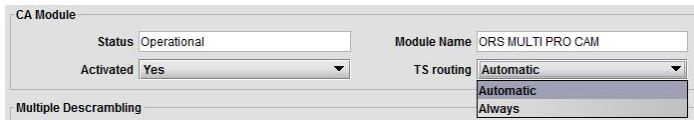


Fig. 113: TS routing

In the section **Multiple coding** various parameters are configured that affect the runtime behaviour of CAMs when decoding multiple programs. This option should not be changed under normal circumstances.

**Note** These settings should only be changed in exceptional cases, since they can lead to a malfunction of the CAMs.

There are several ways to notify the CAMs which programs are to be decoded. PMT management (Fig. 114) specifies which PMTs (Program Map Tables) are to be sent to the CAM.

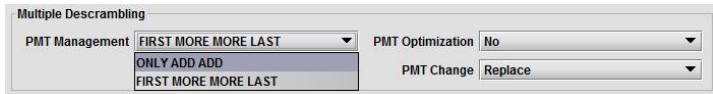


Fig. 114: PMT management

When changing the programme for runtime - for example, a PMT change during a regional window, there is the option to select whether the channel list is to be replaced completely in the CAM, or only the programme that is concerned (Fig. 115).

If the list is replaced completely it could cause a brief loss-of-picture event in all programmes that have to be decoded.

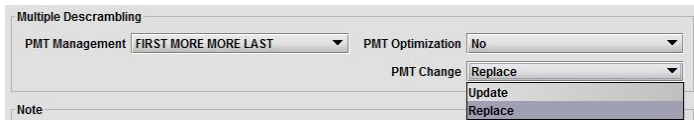


Fig. 115: PMT change

Since the CAMs only have limited resources provided internally for decoding, it may be possible to decode additional programs by optimising the PMT (Fig. 116). When optimising, references to uncoded elementary streams are removed from the PMT. The associated PIDs thus no longer take up any resources in the CAM.



**If further encoded PIDs are referenced during a PMT change, it can cause partial failures of the decoding due to the restriction on the limited number of PIDs in the CAMs.**

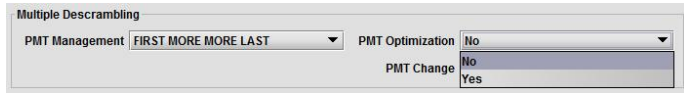


Fig. 116: PMT optimisation

In Chapter [Notes](#) (Fig. 117) any desired notes can be saved for the slot.



Fig. 117: Notes

The bottom area of the basic settings screen gives information on the input and output states of the transport stream assigned to the CAM.

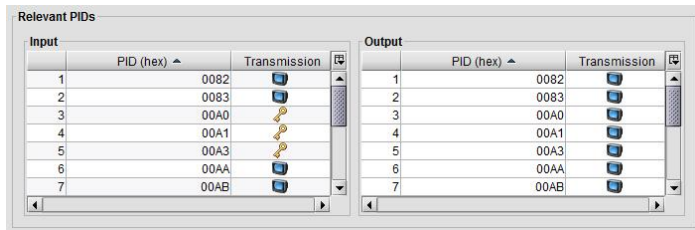


Fig. 118: Relevant PIDs

With this information you can easily check the proper functioning of the CAM. Encoded and decoded elementary streams are marked with different symbols (Tab. 2).



Encoded elementary stream



Uncoded elementary stream

Tab. 2: Coding status of an elementary stream

**Note**

When decoding, CAMs are limited both to a certain number of channels (services) and also to a certain number of elementary streams (PIDs). Depending on which restriction applies first, then probably not all the elementary streams can be decoded. Whether the decoding process is successful can be determined by comparing the left and right columns.

Decoding CAMs and other processing CAMs have similar restrictions and must be evaluated at the input and output according to their product description.

## 17.5.2 CA Module

The CA modules that are plugged in can be configured on the tab **CA module**.

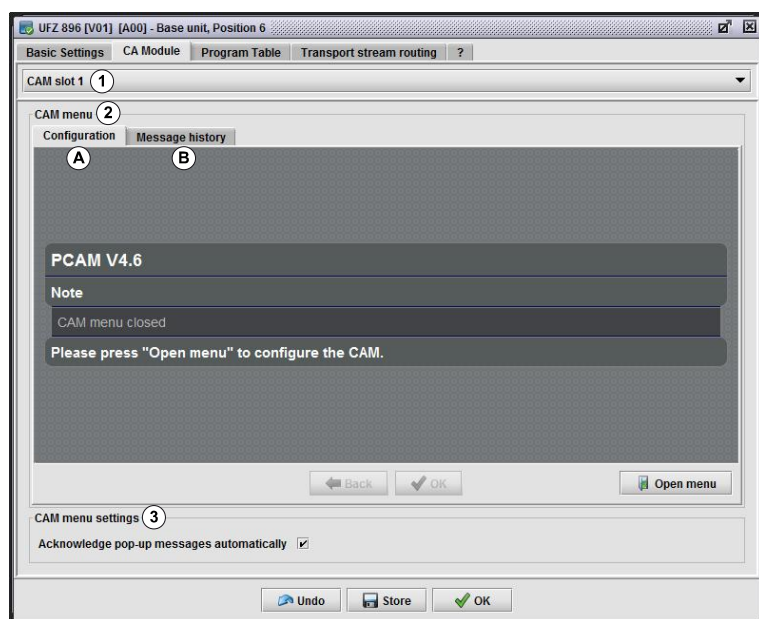


Fig. 119: Dialogue for the configuration of a CAM module

- ① Menu for the selection of the CAM slot
- ② CAM menu
  - Ⓐ Configuration
  - Ⓑ Message history
- ③ CAM menu settings

In order to configure a CAM, the corresponding slot must be selected via the drop down menu (① in Fig. 120) in the upper area.

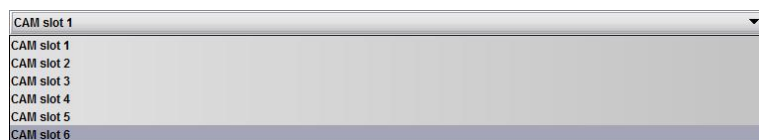


Fig. 120: Selection of the CAM slot

In the Configuration area of the CAM menu the OSD information that is generated from the relevant CAM is displayed graphically.



Fig. 121: Configuration area of the CAM menu

The following controls are offered for the CAM configuration and the display of information:



Fig. 122: Input field

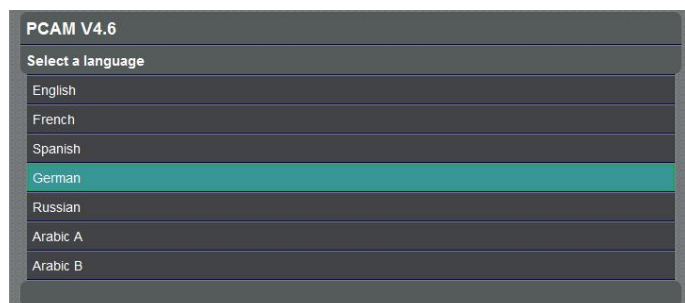





Fig. 123: Selection menu



Fig. 124: List display

The following buttons are available to control the OSD:

	Opens and closes the menu
	Data that was input and selected menu entries are accepted. This button is only active in selection menus and input fields.
	Switches to the previously displayed page, and closes the menu

Tab. 3: Controls

In the **Messages history**, so-called popup messages of the CA module are archived.

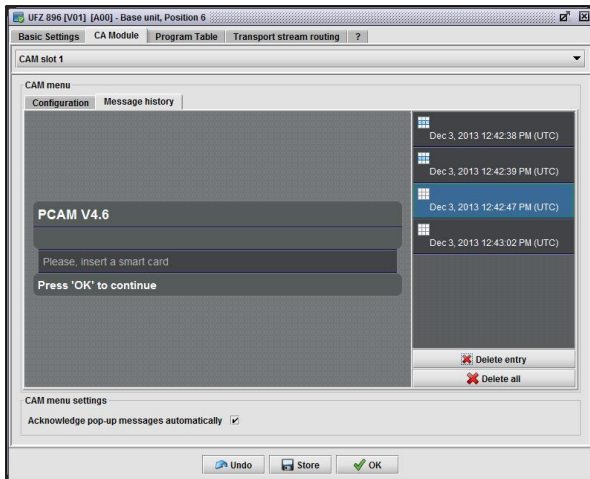


Fig. 125: Messages history of the CA menu

Popup messages primarily involve normal messages in the form of input fields, selection menus or displayed lists.

The difference lies solely in the fact that these messages are generated by the CA module when the menu is closed and are confirmed automatically by the UFZ.

Since these messages would no longer be accessible to the user, up to 10 entries are archived in the **Messages history**.

The **Messages history** consists of a picklist on the right-hand side in which the archived entries are displayed in chronological order and a display area on the left-hand side in which the entry that has currently been selected is displayed.

In the [Cam menu settings](#) a number of basic behaviour options of the UFZ can be configured with regard to the CAM menu.

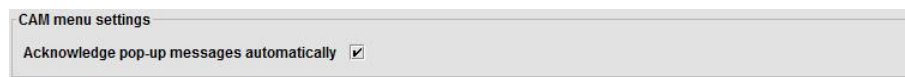


Fig. 126: CAM menu settings

Using the option [Automatically confirm popup messages](#) it is possible to determine how the UFZ is to react to messages from the CAM that are received when the CAM menu was closed. If the option is activated, then incoming messages are automatically confirmed at the CAM and archived in the messages history.

The CAM then closes the message automatically.

If the option has not been activated, then the message remains active until it has been confirmed by the user or is closed by the CAM itself.

### 17.5.3 Programme table

The redundancy groups can be configured in the [Channel table](#) tab.

**Note** Redundancy groups designate logical units within the CI module. They bundle multiple CAMs into redundantly designed decoding units. A redundancy group has a transport stream applied to it. On the output side the redundancy group determines the status of the decoded channels and automatically selects, if it has been so configured, the "best" transport stream and thus switches over to the functioning CAM in the event of malfunctions.

In order to configure a redundancy group, it must be selected from the drop-down menu in the top area (Fig. 127).

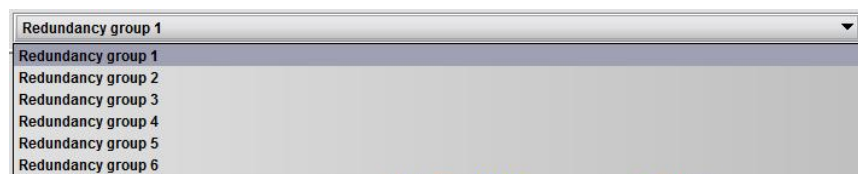


Fig. 127: Redundancy group selection

It is possible to see from the section [Input TS](#) (Fig. 128) whether a transport stream has been diverted to the redundancy group and whether the SI data is complete. In addition, it is possible to check on the basis of the TS and ON ID whether it involves the correct transport stream.

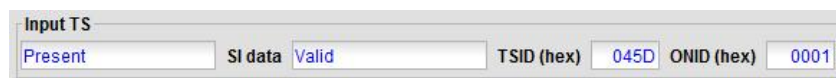


Fig. 128: Input TS

If no channel has been selected in the channel table dialogue then most of the controls are inactive (Fig. 129)

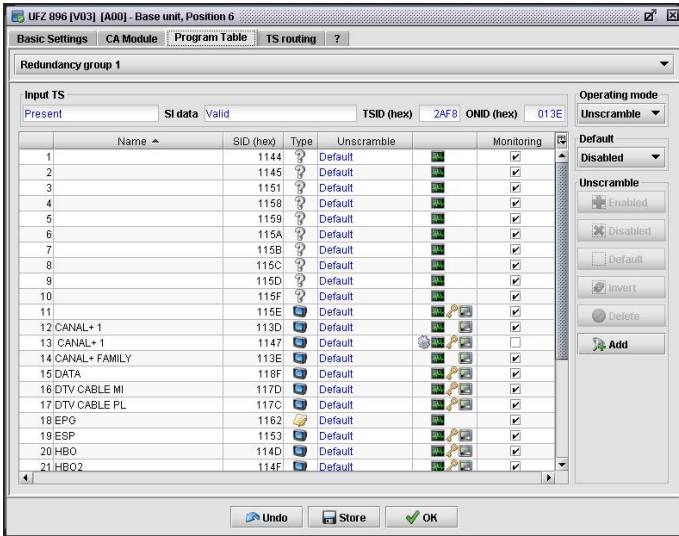


Fig. 129: Channel table dialogue with inactive controls

Only the common operating/processing mode of all CAMs of the redundancy group can be selected, and whether channels that have not been explicitly configured can be processed by default.

The redundancy group makes it possible to use various types of CAMs. CAMs that implement different functionalities are supported.

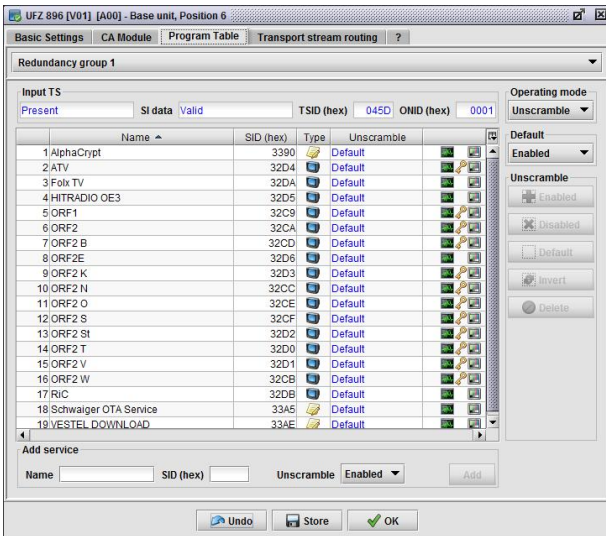


Fig. 130: Operating mode



The operating mode setting (Fig. 130) produces different forms of behaviour when monitoring the function.

► **Decoding**

In decoding mode the redundancy group monitors the decoding of the configured channels and, if a redundancy CAM is plugged in, switches over to the relevant best functioning CAM in the event of a malfunction. If none of the CAMs can decode satisfactorily, then the transport stream is passed through to the output unprocessed.

► **Encoding**

In encoding mode the redundancy group monitors the encoding of the configured channels and, if a redundancy CAM is plugged in, switches over to the relevant best functioning CAM in the event of a malfunction. If none of the CAMs can encode satisfactorily, then the transport stream is passed through to the output unprocessed.

► **Processing**

In processing mode the CI module does not know the type of outgoing transport stream to be expected. For that reasons all forms of monitoring and redundancy functions are deactivated. For example, this mode is helpful if a is to be updated via satellite. It thus ensures that the update process is not affected by actions of the CI module.

The **Default value** parameter (Fig. 131), determines whether the processing of the transport stream is to be activated or deactivated by default.

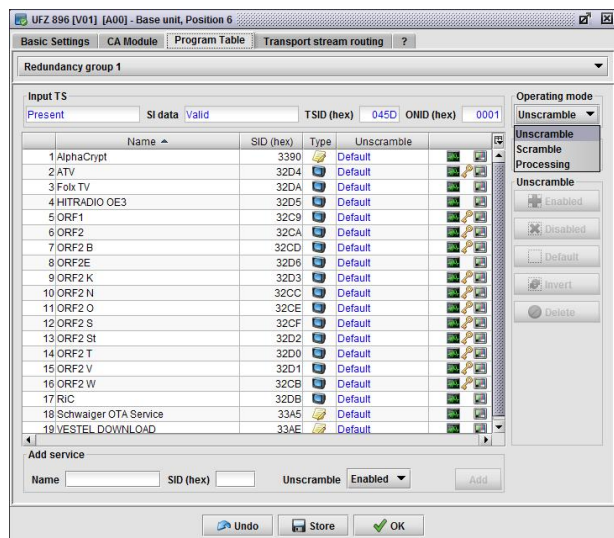


Fig. 131: Default value for the operating state

### Note

If **activated** was selected as the default mode, then all channels are sent to the CAM for decoding, apart from those that have been explicitly excluded. As has already been explained in the previous section, CAMs have restricted options for multiple decoding and this can lead to incomplete decoding.

The channel table dialogue (Fig. 132) allows one or more channels to be configured.

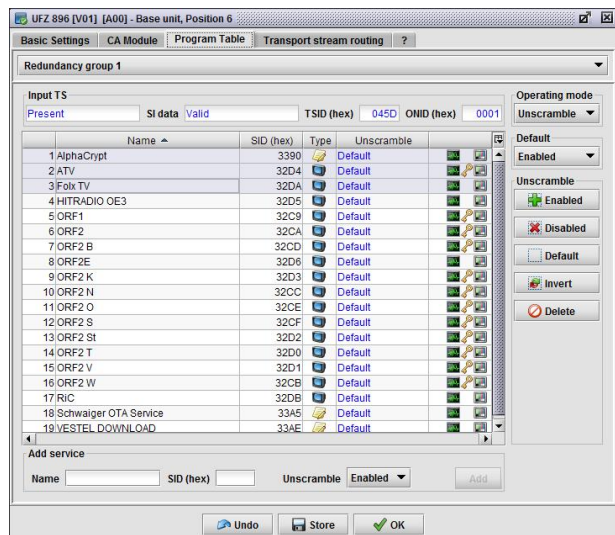






Fig. 132: Channel table editor

The channel table editor shows all the channels of the transponder in a list with their Service ID (SID), Service type (Tab. 4) and desired processing action.

	Radio service
	TV service
	Data service
	User-defined service
	Unknown service type

Tab. 4: Service type

Configuration and runtime information is shown on the basis of the symbols from table Tab. 5.



Settings were changed by the user.



Runtime information (SI data) is available for the channel.



The channel is encoded.



The channel is being broadcast at the moment.

Tab. 5: Runtime information of a channel

### Note

After selecting a channel from the list of channels the controls of the channel table editor are made available for use (Fig. 132)

The set operating mode can be found in the header of the channel list and in the controls. Default value, activation and deactivation respectively are coded in different colours.

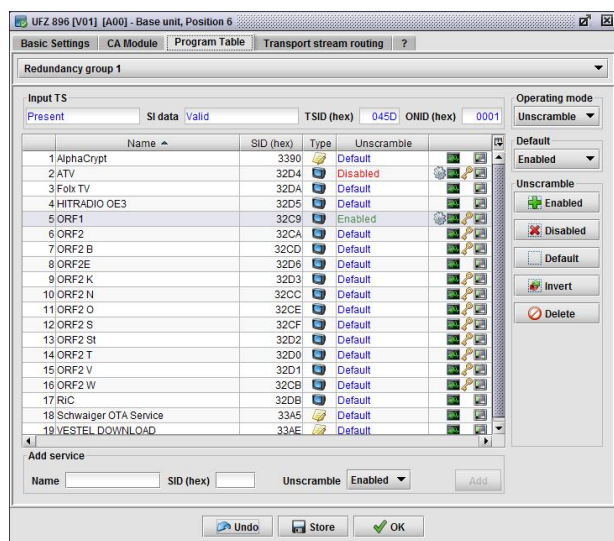


Fig. 133: Activation or deactivation

Pressing the **Add** button opens an input dialogue. This dialogue allows editing of channels which are not being broadcast at the time of editing, and for which therefore no run time information is available (Fig. 134).

These channels are marked in the channel list with a question mark as unknown channels.

The 'Add service' dialog box has the following fields and controls:

- Name:** Text input field containing 'Test\_1'.
- SID (hex):** Text input field containing 'abcd'.
- Monitoring:** Dropdown menu set to 'Enabled'.
- Unscramble:** Dropdown menu set to 'Default'.
- Buttons:** 'Apply' (with a green checkmark icon) and 'Cancel' (with a red X icon).

Fig. 134: Offline configuration

If another transport stream than the one for the configuration of the decoding table is diverted to the redundancy group, then the channels which are not available in the live data stream are marked with a question mark and the Purge button is shown (Fig. 135). All unknown programmes can be removed in one step with this function.



When purging, both unknown channels and manually configured channels are deleted. In order to prevent this, the unknown entries should be deleted individually with the **Delete** button.

The 'Transport stream routing' window displays the following table of channels:

Name	SID (hex)	Type	Unscramble	Operating mode
1 AlphaCrypt	3390	Default	Default	Enabled
2 ATV	32D4	Default	Default	Enabled
3 Fox TV	32DA	Default	Default	Enabled
4 HITRADIO OE3	32D5	Default	Default	Enabled
5 OE1	3341	Unknown	Default	Enabled
6 OE3	334D	Default	Default	Enabled
7 ORF1	32C9	Default	Default	Enabled
8 ORF2	32CA	Default	Default	Enabled
9 ORF2 B	32CD	Default	Default	Enabled
10 ORF2E	32D6	Default	Default	Enabled
11 ORF2 K	32D3	Default	Default	Enabled
12 ORF2 N	32CC	Default	Default	Enabled
13 ORF2 O	32CE	Default	Default	Enabled
14 ORF2 S	32CF	Default	Default	Enabled
15 ORF2 St	32D2	Default	Default	Enabled
16 ORF2 T	32D0	Default	Default	Enabled
17 ORF2 V	32D1	Default	Default	Enabled
18 ORF2 W	32CB	Default	Default	Enabled
19 RIC	32DB	Default	Default	Enabled

At the bottom of the window, there is an 'Add service' section with fields for Name, SID (hex), Unscramble, and a dropdown menu set to 'Enabled'. A 'Purge' button with a warning icon is located in the bottom right corner of the main window area.

Fig. 135: Purge

## 17.5.4 Transport stream routing

The current assignment of CAMs to redundancy groups and of redundancy groups to transport streams is shown graphically in the tab **Transport stream routing** (Fig. 136).



Fig. 136: Transport stream routing

The Routing editor can be called up by the **Adjust configuration** button.

## 17.5.5 Routing editor

The Routing editor is split up into five areas (Fig. 137).

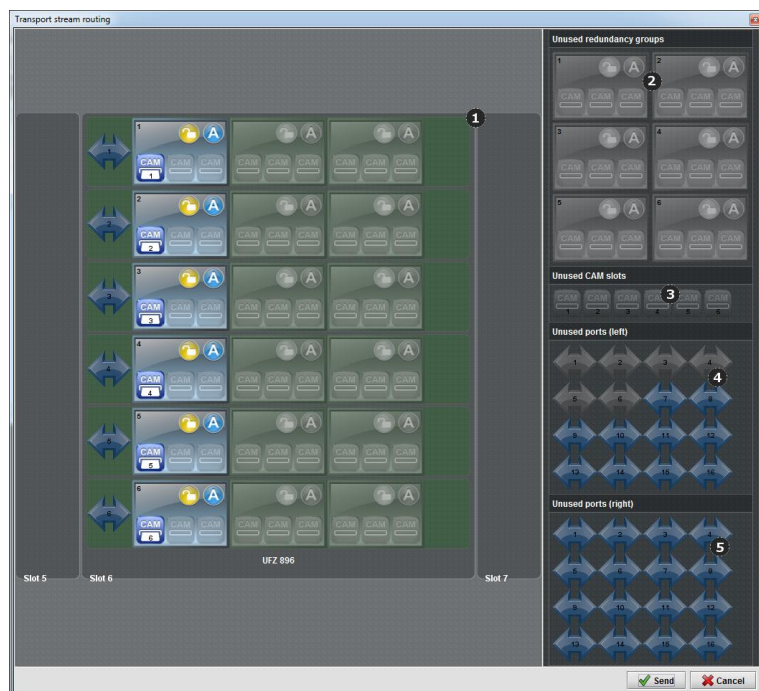


Fig. 137: Routing editor with default configuration

1. Block diagram
2. Storage for unused redundancy groups
3. Storage for unused CAM slots
4. Storage for unused I/O ports for the left-hand neighbouring module
5. Storage for unused I/O ports for the right-hand neighbouring module

The following function components are available in the Routing editor:

Redundancy group



Fig. 138: Redundancy group

A redundancy group can hold up to three CAM slots. The current operating mode is designated by the symbols described in Tab. 6.



The CAM decodes the channels selected from the channel table.



The CAM encodes the channels selected from the channel table.



The CAM is in processing mode and is executing a special function that is not described further.

Tab. 6: Operating mode

**Note**

Transport stream monitoring is deactivated in processing mode. Hence it does not make sense to assign several CAMs to the redundancy group in this operating mode



The redundancy behaviour within the redundancy group is shown by the icons from Tab. 7.



The CAM with the "best" status and the lowest slot number is selected automatically.



A CAM is explicitly selected, in this case with slot number 1.



The transport stream is diverted explicitly past the CAMs to the output.

Tab. 7: Redundancy behaviour

**Note**

In processing mode the transport stream is assigned by the redundancy group to the CAM with the lowest slot number unless the user explicitly selects another path.

The operating mode and the redundancy behaviour are set by a context menu that opens up the relevant symbol by right-clicking with the mouse (Fig. 139, Fig. 140).

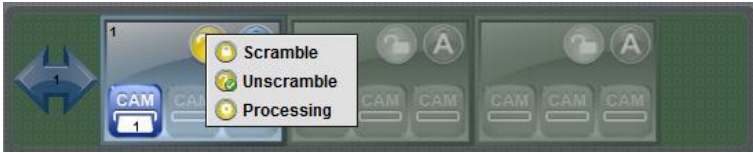


Fig. 139: Operating mode

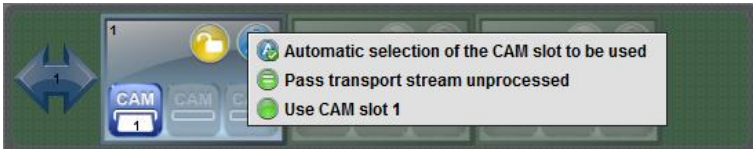


Fig. 140: Redundancy behaviour

The CAM selected by the redundancy group is marked in the configuration overview with a green dot (Fig. 141).



Fig. 141: Active CAM

### CAM slot

A CAM slot is assigned by dragging it into the redundancy group.



Fig. 142: CAM slot

### Input /Output port

An I/O port bundles a transport stream input and output. Depending on the signal source, up to 16 I/O ports are on each side, of which a total of six can be assigned.



Fig. 143: I/O port

Redundancy groups, CAM slots and I/O ports can be dragged into the block diagram. Module components which are no longer required are dragged into their assigned areas from the block diagram (Fig. 144).

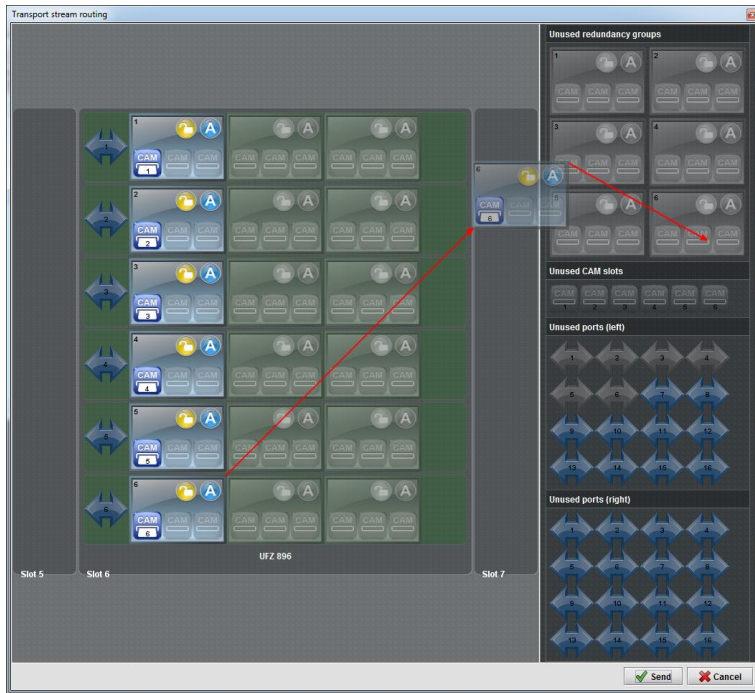


Fig. 144: Edit

Depending on whether an I/O port on the left or right is to be used, the redundancy groups are arranged from left or the right as applicable (Fig. 145).



Fig. 145: Edit

In order to decode more channels than a CAM allows in itself, up to three redundancy groups can be switched in series.



Fig. 146: Series switching

Fig. 147 shows a possible configuration. In this example a transport stream is supplied from a signal source on the left to I/O port 1.

The transport stream first runs through redundancy group 1. Within this group, the channels which had been configured in the associated channel table are decoded in parallel in CAMs 1 and 2. The redundancy group automatically selects the "best" decoded transport stream and diverts it to redundancy process 2.

Within group 2, the channels that had been selected in channel table 2 are encoded by CAM 3. The data stream is then passed on to redundancy group 3.

Redundancy group 3 diverts the transport stream directly via CAM 4 and executes a function that is not specified further. Monitoring is deactivated. For example, the CAM might be carrying out an update at that very moment.

The transport stream is then diverted from redundancy group 3 back to I/O port 1.



Fig. 147: Example configuration

If the infeed is on the right, the transport stream runs through the redundancy groups in the reverse order, hence redundancy group 3 via 2 to 1.

## 17.6 Overview Amplifier

UVO 830

## 17.7 Configuration settings Amplifier

### 17.7.1 Equalizer

On this tab the pre-equalisation of the amplifier can be set so that the unit is optimally matched to the cable network in question.

As can be seen in Fig. 148 the amplification of the signal over the spectrum 50 Hz – 1000 Hz is shown graphically for each pre-equalisation setting.

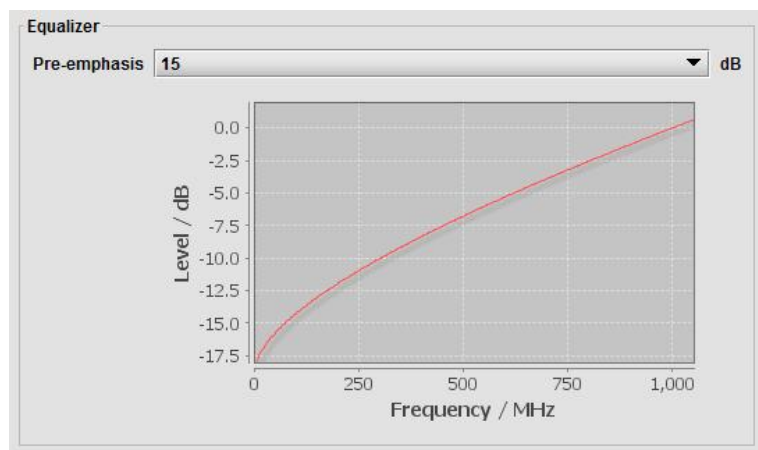


Fig. 148: Configuration equalizer

In Fig. 149 the possible setting values for the pre-equalisation of the UVO 830 system amplifier are shown. The selected values are applied after pressing [Apply](#) or [OK](#).

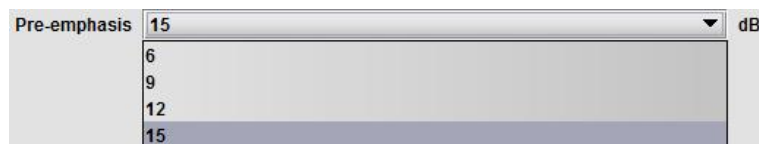


Fig. 149: Selection pre-equalisation taking as an example the UVO 830

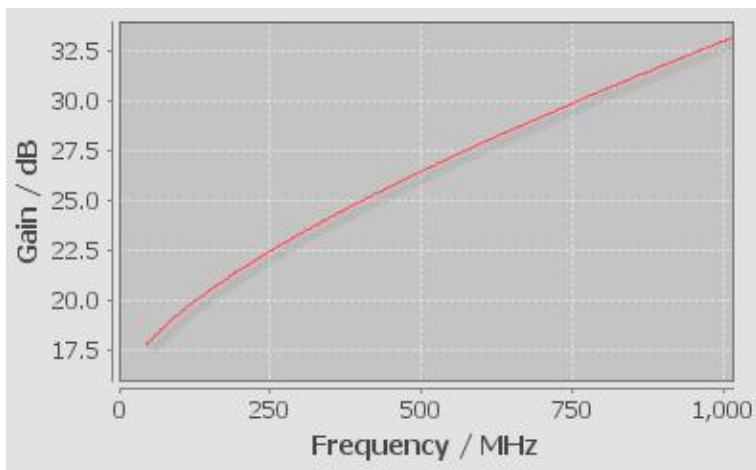


Fig. 150: Pre-equalisation curve taking the example of the UVO 830 for a selected pre-equalisation of 15 dB

In Fig. 150 a pre-equalisation curve of 15 dB is shown once again. The pre-equalisation is used to ensure that the level remains constant over the entire relevant frequency spectrum. In a cable network high frequencies are attenuated more strongly than low ones, therefore the level in the amplifier must be pre-equalized to attain at the measuring point an amplification of the signal that is always the same, regardless of the frequency.

## 17.8 Overview Encoder

Input	HDMI
Output	
UFOcompact plus backplane	UFX 894

## 17.9 Configuration Settings Encoder

### 17.9.1 HDMI Frontend

The transport streams generated from the HDMI input signal lack certain (P)SI information which has to be configured user-defined.

Furthermore, it is necessary to determine the data rate of the generated transport stream.

The HDMI frontend is configured by means of the input data stream in the **Frontend** tab.

Fig. 151: HDMI frontend configuration

- ① selects the frontend to be configured
- ② status of the input signal
- ③ video format of the input signal (unknown or, e.g. 1080i50)
- ④ activates and deactivates the generation of a programme from the input signal
- ⑤ name of the generated programme
- ⑥ provider name
- ⑦ Video data rate of the generated transport stream (2 – 25Mbit/s HD, 2 – 12.5Mbit/s SD)

- 
- ⑧ Audio data rate of the generated transport stream (96, 128, 192, 256, 320, 384 Kbit/s)

---

  - ⑨ Audio format (stereo, mono, multi-channel sound)

---

  - ⑩ Service ID of the generated transport stream

---

  - ⑪ PIDs of the generated transport stream for video and audio elementary data streams as well as PCR and PMT

**Note** The Service ID and PIDs may only be allocated once within a single transport stream.

- 
- ⑫ activates and deactivates the generation of a reference for HbbTV services

---

  - ⑬ reference URL

---

  - ⑭ reference name

---

  - ⑮ organisation ID

---

  - ⑯ PID of the AIT table in the generated transport stream

**Note** HbbTV services enable internet-capable terminal devices to call up additional information for the current programme as a website (red button on the remote control).



## 17.9.2 Encoder TS-Processing/MUX

The output data streams (MPTS) are configured by means of the TS processing.

The transport streams generated by the encoder frontend can be muxed into any output data stream by means of the TS processing.

The configuration takes place in the **TS processing** tab.

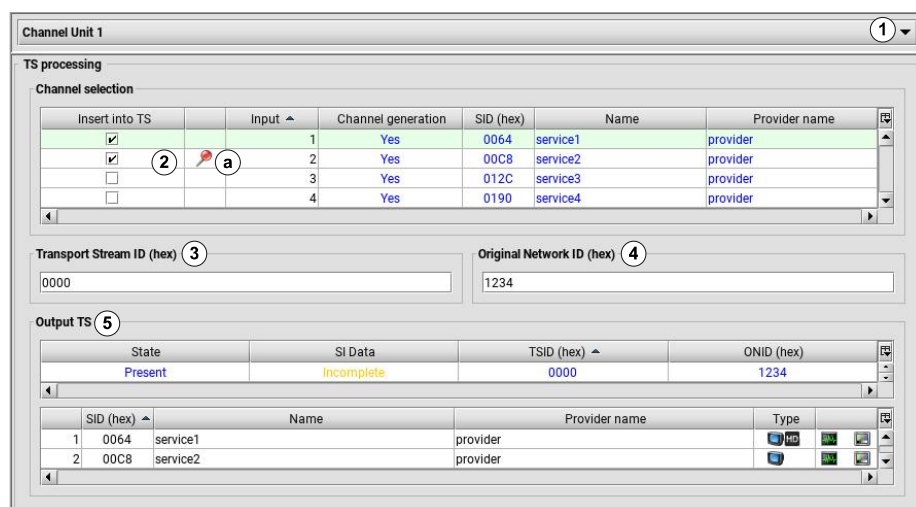


Fig. 152: TS processing/MUX

- ① selects the channel unit to be configured (output transport stream)
- ② all transport streams generated by the encoder frontends
  - ▶ To select a transport stream for the output transport stream, tick the checkbox.
  - If the same service has been selected for a different channel unit, it is shown by means of a red pin (a) in the second column.
- ③ transport stream ID of the output transport stream
- ④ Original Network ID of the output transport stream

**Note** The TS ID, ON ID and Service ID may be used by only one of the output transport streams which are streamed into the same (IP) network.

- ④ Status of the generated output transport stream

### 17.9.3 TS Routing of Transport Streams

Forwarding transport streams of a neighbouring module over the backplane ports of the encoder module makes it possible to operate several encoders without a modulator backend in one UFOcompact plus system without using a directly neighbouring transmodulator module.

The figure below provides a schematic representation of diverting and forwarding transport streams in a fully equipped UFOcompact plus system.

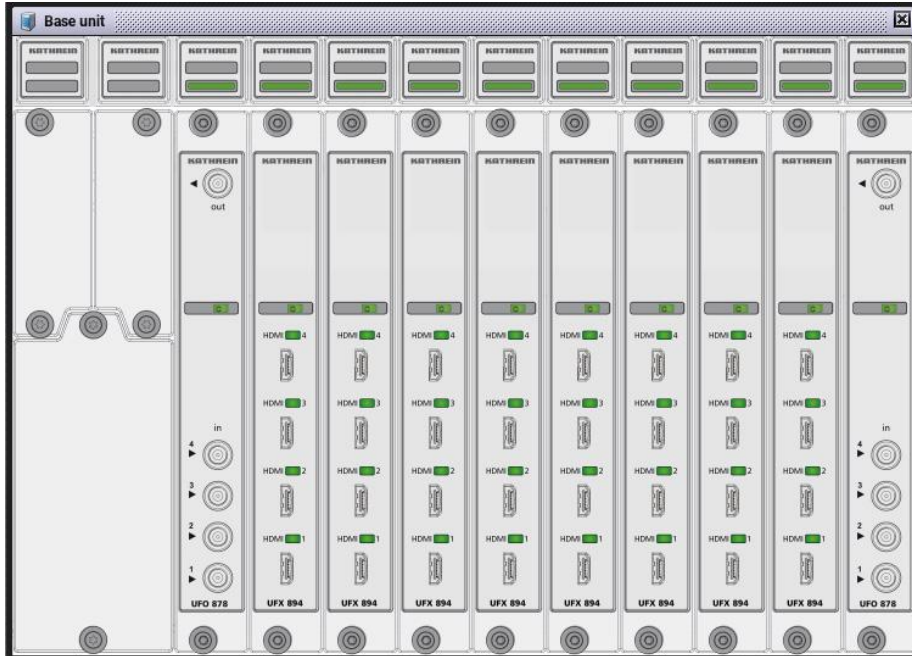
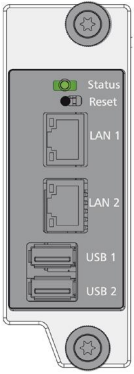


Fig. 153: Example TS Routing – forwarding

The system is equipped with 2 UFO 878 transmodulators for the modulation of the encoded transport streams to QAM (DVB-C) in the outer slots on the left and right.

8 UFX 894 HDMI encoders generate 16 transport streams in total which are diverted to the corresponding left or right neighbouring module and are then forwarded, if necessary.

## 18 User information UFX 800



The UFX 800 is the central control module of the UFOcompact plus system. It constitutes the communication interface between the USW 800 and the modules of the system.

### 18.1 Password

The UFX 800 can be protected from unauthorised access by a password. A password is not set:

- in the factory default setting
- after resetting the UFX 800 to the factory setting by pressing the reset button.

### 18.2 Grouping of systems

One or several UFOcompact plus base units can be grouped to form a system. In the factory default setting or after resetting the UFX 800 to the factory setting, the UFOcompact plus base unit is not assigned to any group.

A group is identified by the serial number of the UFX 800. In each UFX 800 of the group, a list of those serial numbers of the UFX 800 of the UFOcompact plus base units is stored which belong to the group.

The USW 800 and the system generally communicate via the base unit. Requests that are to be sent to the extension units, are forwarded to the respective extension unit from the base unit.

This means that an extension unit can only be added to the group or removed from it via the base unit. If the base unit is to be removed, the complete group must be deleted and a new group be created.

In case of a failure of the base unit, it is still possible to communicate with the extension units. For this purpose, a connection with each single extension unit must be established. This enables you to reset the grouping of the system via the USW 800.

#### Note

If it is not possible to reset the group configuration of all UFOcompact plus base units of a system by way of the USW 800, the configuration of each UFX 800 of the group must be reset to the factory setting by pressing the reset button.

## 18.3 Password for a grouped system

The password within a group is synchronised automatically. All extension units have the same password as the base unit.

A change of the password via the USW 800 must always be performed at the base unit. The base unit automatically changes the password of all extension units.

## 18.4 Network configuration



The two network connections (LAN 1 and LAN 2) of the UFX 800 are two ports of an internal Ethernet switch. It is not permissible to connect the two network connections at the same time to one and the same Ethernet switch. Furthermore, ensure that a network loop is not created when connecting additional network components.

### 18.4.1 Firewall settings

The communication between the USW 800 program and the UFOcompact plus system for module configuration is done via TCP, port 9320 and via Multicast (IPv4: 224.0.225.0, IPv6: FF02::225, Port 9321).

The UFOcompact plus system publishes the service that is offered via Multicast-DNS and DNS-SD. Multicast addresses 224.0.0.251 (IPv4) and FF02::FB (IPv6) with port 5353 are used for this.

The firewall must allow the following:

- TCP port: 9320
- Multicast addresses:
  - IPv4: 224.0.0.251 (port 5353), 224.0.225.0 (port 9321)
  - IPv6: FF02::FB (port 5353), FF02::225 (port 9321)

## 18.4.2 Connecting the UFOcompact plus system without existing network infrastructure

The PC/laptop is connected directly with the USW 800 via a network cable to one of the UFOcompact plus base units. Additional base units are connected together in series.

An external Ethernet switch is not required.

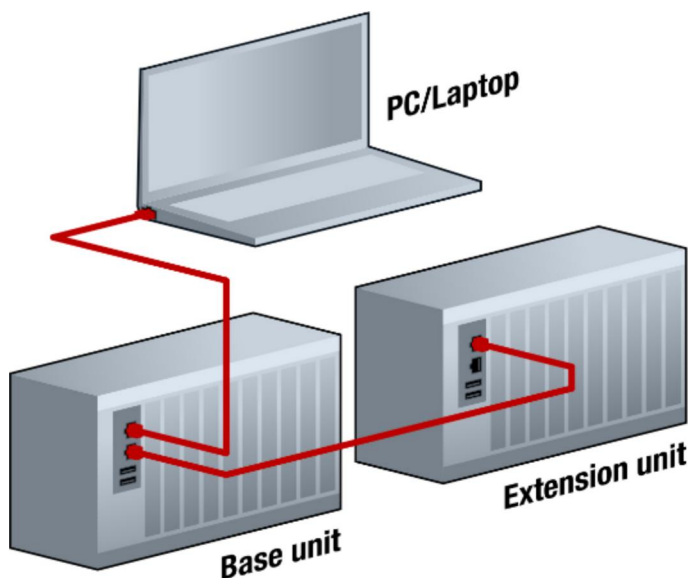


Fig. 154: Connection of a UFOcompact plus system, consisting of a base unit and an extension unit without network infrastructure

### Tip

Make sure that the IP configuration of the base unit is set to DHCP (IPv4) (standard setting) or Zeroconf and that the computer receives its IP address automatically; see [18.4.5 IP configuration of the UFX 800, p. 156](#).

Due to the fact that in this case there is no DHCP server in the network, the base unit and the computer automatically assign themselves an IP address within the scope of 169.254.1.0 to 169.254.254.255.

### 18.4.3 Remote access to the UFOcompact plus system over the Internet

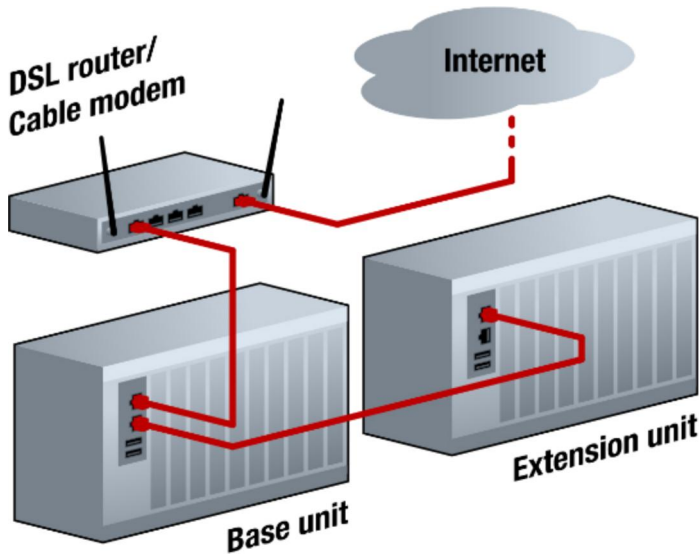


Fig. 155: Connection of a UFOcompact plus system consisting of a base unit and an extension unit to the Internet

Access to the UFOcompact plus system via the Internet is done with a DSL Router and a cable modem.

A fixed, public IP address or a fixed domain name are required for remote access.

#### Configuration of the DSL router/cable modem

The system is protected by a password and an encrypted connection. For protecting the network even better, it is recommended to set up a virtual private network (VPN) if you intend to connect the system directly to the Internet.

Therefore, use DSL routers or cable modems which support VPNs. You can find details on the configuration of VPNs with a DSL Router or a cable modem in the operating manuals of the router or modem.

**Note** The automatic search of UFOcompact plus systems may not necessarily function properly in a VPN. The connection must then be made via a known, fixed IP address to the base unit of the UFOcompact plus system.

## 18.4.4 Connecting the UFOcompact plus system with existing network infrastructure

Variant 1 (example):

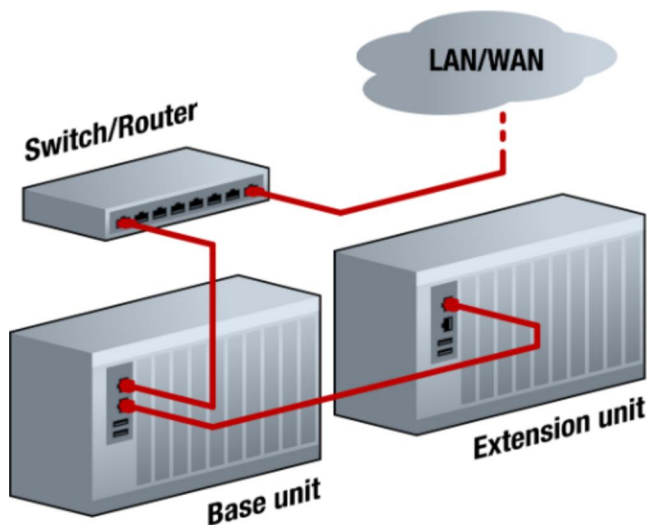


Fig. 156: Connection of a UFOcompact plus system consisting of a base unit and an external unit to an external switch (variant 1).

Variant 2 (example):

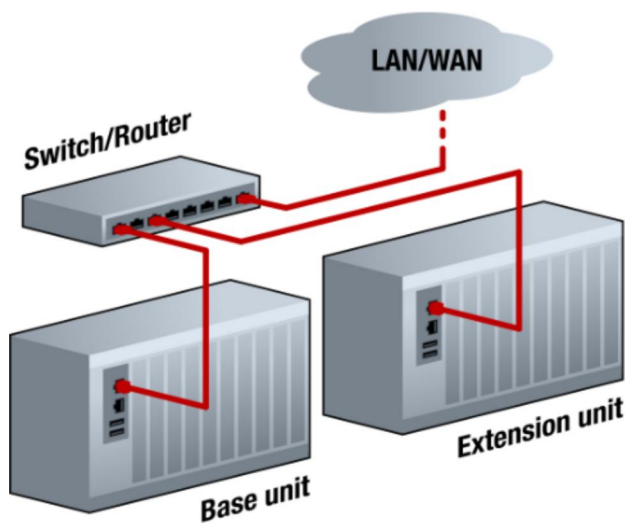


Fig. 157: Connection of a UFOcompact plus system consisting of a base unit and an extension unit to an external switch (variant 2).

Please ask your network administrator for details on the network infrastructure and which IP configuration is to be used for the UFX 800.

**Note** The publication of the services offered by the UFOcompact plus system and the setting of the network configuration are done using Multicast packets. Depending on the network infrastructure, under certain circumstances there are not forwarded by a Router or a switch. In this case, automatic searching and setting of the network configuration of UFOcompact plus systems is not available and the connection must be made via a known, fixed IP address of the base unit of the UFOcompact plus system.

### 18.4.5 IP configuration of the UFX 800

The configuration of the IP address is only necessary at the base unit. The communication between the individual UFOcompact plus base units of a group takes place via IPv6 link local addresses which are generated automatically by the UFX 800 on the basis of the MAC address.

Mode	Note
DHCP (IPv4) (default setting)	<p>The IPv4 address, the net mask and the gateway are assigned automatically via a DHCP server.</p> <p>If there is no DHCP server in the network after starting the UFX 800, an IPv4 link local address is automatically assigned to the UFX 800 after approx. 30 seconds (see Zeroconf).</p> <p>If a DHCP server assigns an IP address to the UFX 800 at a later time, the IPv4 link local address is deleted and the IP address that was received by the DHCP server is adopted.</p>
Zeroconf	<p>The Zeroconf protocol is used for the selection of the IP address. The following applies:</p> <ul style="list-style-type: none"> <li>• The Zeroconf protocol is only suitable for local networks.</li> <li>• The network mask is always 255.255.0.0.</li> <li>• System: The system automatically chooses an IPv4 link local address within the scope of 169.254.1.0 to 169.254.254.255 (routers do not forward packages with this IP address).</li> </ul>



---

Zeroconf	<ul style="list-style-type: none"><li>● Computer:<ul style="list-style-type: none"><li>– The computer must obtain its IP address automatically. Settings in Windows 7 via <a href="#">System control</a> ▶ <a href="#">Network and sharing centre</a> ▶ <a href="#">Change adapter settings</a> ▶ &lt;Network adapter for the system&gt; ▶ <a href="#">System properties</a> ▶ <a href="#">Internet protocol version 4 (TCP/IPv4)</a> ▶ <a href="#">Properties</a> ▶ <a href="#">General</a> ▶ <a href="#">Obtain IP address automatically</a></li><li>– If there is no DHCP server in the network, e.g. in case of a direct connection between the computer and the system, the computer assigns itself a Zeroconf address automatically. In this case, it might be necessary to restart the computer or reconnect the network cable.</li></ul></li></ul>
IPv6 link local	<p>The UFX 800 generates an IPv6 link local address in the address range FE80::/64. The suffix of the IPv6 address (interface ID) is always identical and results from the device's MAC address. If there is an IPv6-ready router in the network to which an IPv6 address prefix has been allocated, this prefix is also allocated to the UFX 800 by means of stateless address auto configuration (SLAAC). The IP address that is then used and displayed is composed of the allocated prefix and the same interface ID that is used for the IPv6 link local address.</p>
IPv4 manual	<p>The IPv4 address, the network mask and the Gateway are set manually</p>
IPv6 manual	<p>The IPv6 address, the network mask and the Gateway are set manually</p>

---

## 18.5 Status LED of the UFX 800

The following states are indicated by the Status LED:

Colour	Mode	Condition
Green	Continuously lit	OK
Green	Flashing	A software update (UFX 800 or module) is running
Red	Continuously lit	An error occurred during the software update
Red	Flashing	A hardware error has occurred: <ul style="list-style-type: none"> <li>• A fan has failed</li> <li>• The power section reports an overload or undervoltage</li> </ul>
Orange	Continuously lit	UFX 800 is booting
Orange	Flashing	In the USW 800 the "Identify" button was clicked on under "System networking" or in the connection dialogue under "read system".

## 18.6 Function of the Reset button

In the front panel of the UFX 800 there is an opening marked with **Reset**, through which the Reset button is accessible when using something such as a pin.

This button can initiate the following functions:

Action	Note
Reboot of the UFX 800	The UFX 800 reboots if the button is held down for less than five seconds
Restoring the factory default settings	<p>If the button is held down for five seconds (or longer), then the password, the group configuration and comments of the UFX 800 are deleted and the UFX 800 is rebooted. This process starts after five seconds.</p> <p>As soon as the Status LED shows <b>orange</b> (the UFX 800 is booting up) the button can be released again.</p>

Software update of the UFX 800 or the modules by using a USB Stick

If a USB Stick is connected with the UFX 800 and the button is held down for five seconds (or longer), then the UFX 800 searches for a software update file and carries out the update.

If there is no update file then only a reboot is done.

Thus as soon as the Status LED **flashes green** (software update running) or lights up **continuously orange** (the UFX 800 is booting up), the button can be released again.

The exact procedure to be followed for an update over USB is described in Chapter *18.7.1 Software update with a USB Stick*, p.159.

## 18.7 Software update

A software update is always done via the UFX 800. The UFX 800, all UFOcompact plus modules and the supported UFOcompact modules can be updated.

### Note

For the following UFOcompact modules the update is supported by the UFX 800:

- Transmodulators: UFO 331, UFO 333, UFO 351, UFO 357, UFO 371, UFO 372, UFO 373, UFO 374, UFO 378, UFM 330, UFM 370
- Transcoder: UFO 313, UFO 353, UFO 364, UFO 391, UFO 393, UFO 394, UFO 395

### Further information:

1. The software update is carried out automatically for all UFOcompact plus base units units in the group
2. When updating the module software all modules of the same type are updated at the same time
3. The update is finished when the Status LED no longer flashes greens or lights up continuously orange (the UFX 800 is booting up). If it lights continuously red then an error occurred during the update

### 18.7.1 Software update with a USB Stick

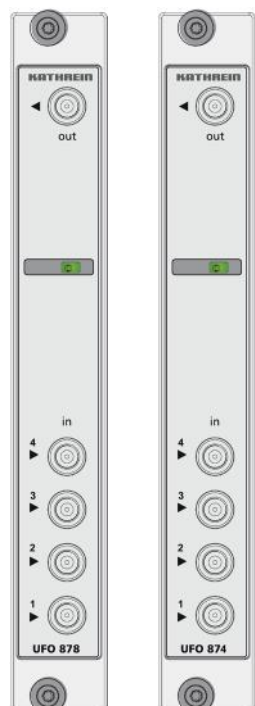
The following steps are required to carry out a software update with a USB stick:

1. Create the directory **kathrein** in the main directory of the USB Stick.
2. Copy the KUB file with the software update for the UFX 800 or a specific module type to this directory.
3. Rename the file to **ufx800\_update.kub**.
4. Connect the USB Stick to the base unit or an extension unit.
5. Press the button on the front panel until the Status LED flashes green.

6. The USB stick can now be removed.

**Note** It is essential to pay attention to upper and lower case in the directory and file names.

## 19 User Information UFO 878/874



The UFOcompact plus modules UFO 878/874 are 8 x or 4 x DVB-S/-S2 respectively on DVB-C transmodulators. Each of the two devices have 4 DVB-S/-S2 input sockets with the option to control DiSEqC™-capable LNBs and input matrices, and an output socket to feed the transmodulated data streams into a cable network.

### 19.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 19.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 878/874 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 158 appears.

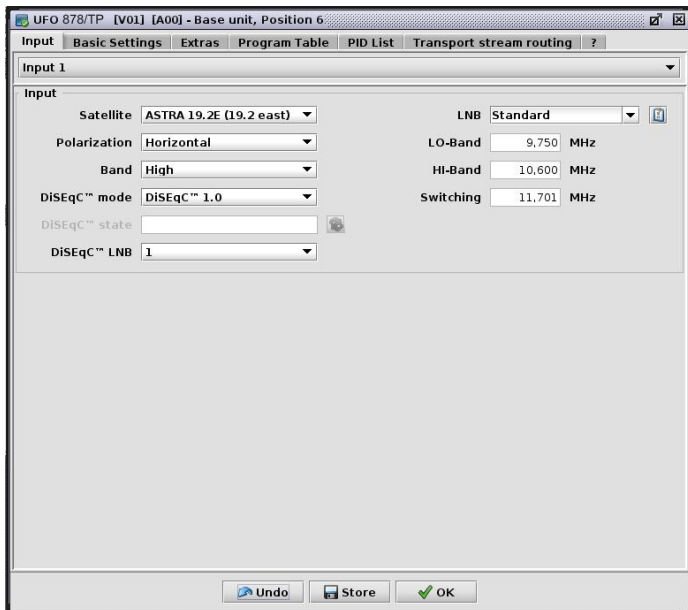


Fig. 158: UFO 878 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99*. If you are using DiSEqC™-capable equipment for reception, then you must select a DiSEqC™ mode.
2. Configure the DVB-S/-S2 Frontend of each channel unit that is used with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100*. Once you have selected a transponder that can receive properly, this should be indicated as Lock Status **Locked**. If that is not the case, then check again the input configuration and the Frontend assignment to the input.
3. Leave the settings of the errors described here *17.3.8 Transport stream processing configuration, p.103* in the factory default setting.
4. Configure the DVB-C output channels with the input mask described here: *17.3.9 DVB-C-QAM output configuration, p.104*. If you set the HF Output to **On**, the loading display should show a value > 0 % (by how much depends in the last resort on the selected transponder). If the available bandwidth of the QAM channel is not sufficient to download all channels from the Frontend, the loading display constantly shows more than 93 % and peak loadings of 93 %-100 % are shown. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111.*

## 20 User Information UFO 834



The UFOcompact plus module UFO 834 is a 4 x DVB-S/-S2 on a DVB-T transmodulator. The device has 4 DVB-S/-S2 input sockets with the option to control DiSEqC™-capable LNBs and input matrices, and an output socket to feed the transmodulated data streams into a cable network.

### 20.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started



## 20.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 834 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 159 appears.

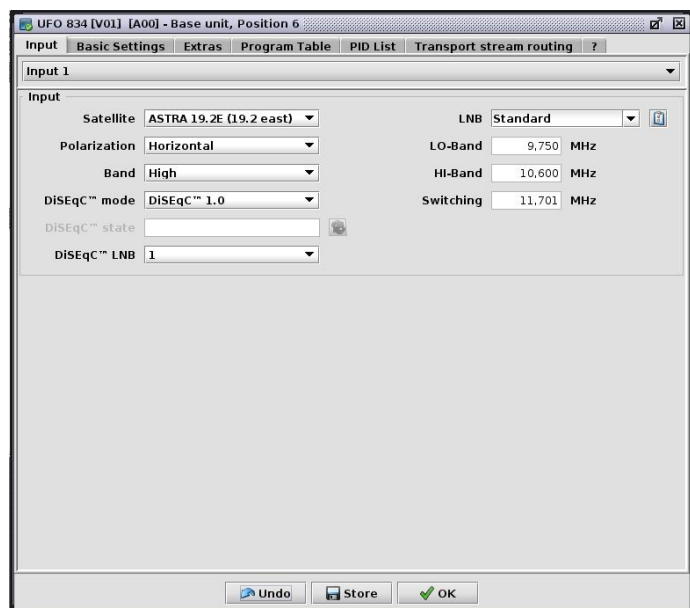


Fig. 159: UFO 834 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99*. If you are using DiSEqC™-capable equipment for reception, then you must select a DiSEqC™ mode.
2. Configure the DVB-S/-S2 Frontend of each channel unit that is used with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100*. Once you have selected a transponder that can receive properly, this should be indicated as Lock Status **Locked**. If that is not the case, then check again the input configuration and the Frontend assignment to the input.
3. Leave the settings of the errors described here *17.3.8 Transport stream processing configuration, p.103* in the factory default setting.
4. Configure the DVB-T output channels with the input mask described here: *17.3.10 DVB-T-COFDM output configuration, p.105*. If you set the HF Output to **On**, the loading display should show a value > 0 % (by how much depends in the last resort on the selected transponder). For most DVB-S2 transponders the available bandwidth of the COFDM channel is not sufficient to download all channels from the Frontend. An indication for this is that the loading constantly goes over 93 % and/or peaks of 93 %-100 % are shown. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111.*

## 21 User Information UFO 876



The UFOcompact plus module UFO 876 is a 4-way DVB-S/-S2/-T/-T2/-C to DVB-C transmodulator. The device has 4 RF input sockets with the capability to receive optionally DVB-T/-T2, DVB-C or DVB-S/-S2 signals and also to connect to DiSEqC™-capable LNBS and input matrices. It also has one output socket for feeding 6 transmodulated data streams into a cable network.

### 21.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 21.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 876 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 160 appears.

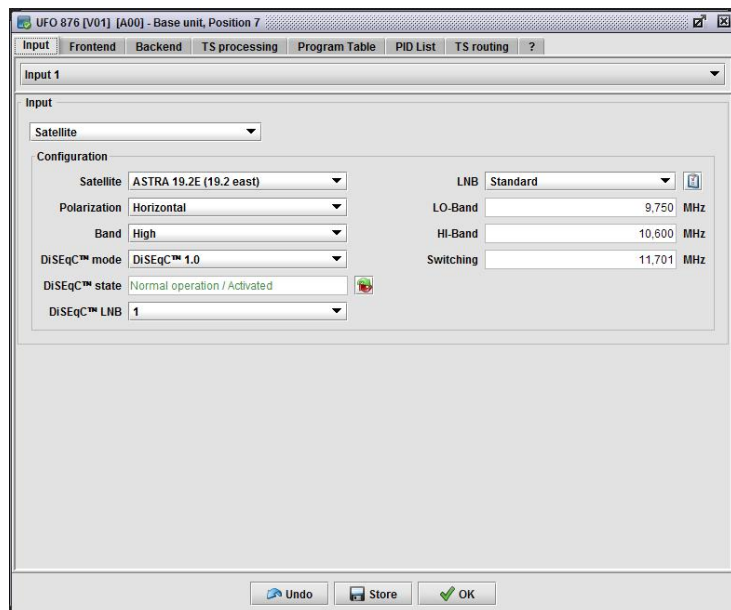


Fig. 160: UFO 876 Properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99*.
2. Configure the multi-standard frontend of each channel unit that is used, with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100* . Once you have selected a transponder that can receive properly , this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend assignment to the input.
3. Leave the factory settings unchanged for the errors *17.3.8 Transport stream processing configuration, p.103* in the factory default setting.
4. Configure the DVB-C output channels with the input mask described here: *17.3.9 DVB-C-QAM output configuration, p.104* . If you set the RF output to **On**, the loading display should show a value > 0 % (the actual value depends on the selected transponder).

5. If the available bandwidth of the QAM channel is insufficient to receive all the channels from the frontend, the loading will be continually over 93 %, and/or peaks of 93 %-100 % will be shown. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111.*

## 22 User Information UFO 876/MX



The UFOcompact plus module UFO 876/MX is a DVB-S/-S2/-T/-T2/-C to DVB-C-T transmodulator with multiplex functionality. The device has 4 RF input sockets with the capability to receive optionally DVB-T/-T2, DVB-C or DVB-S/-S2 signals and also to connect to DiSEqC™-capable LNBs and input matrices. It also has one output socket for feeding 6 transmodulated data streams into a cable network. The multiplex-functionality permits each of the 6 modulated data streams to be recompiled from up to 3 input data streams (incl. data streams from neighbouring modules).

### 22.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are available:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 22.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 876/MX modules can be set in a UFOcompact plus system. If you choose the item "Properties", within the context menu for a module then the dialogue window shown in Fig. 161 appears.

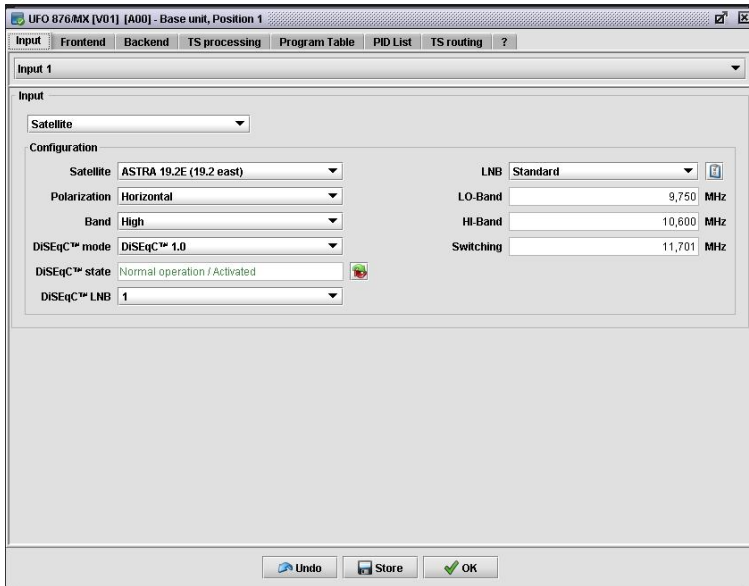


Fig. 161: UFO 876/MX Properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure all the inputs of the device to which cables are attached, as described under *17.3.3 Satellite input configuration, p.99*.
2. Configure the multi-standard frontend, as described under *17.3.5 DVB-S/-S2 Frontend configuration, p.100*. Once you have selected a transponder that can receive properly, this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend assignment to the input.
3. Leave the settings described under *17.3.8 Transport stream processing configuration, p.103* unchanged at the factory settings.
4. Configure the DVB-C output channels, as described under *17.3.9 DVB-C-QAM output configuration, p.104*. If you set the RF output to **On**, the loading display should show a value > 0 % (the value displayed depends on the transponder that was selected). If the available bandwidth of the QAM channel is not sufficient to download all channels, the loading display constantly shows more than 93 % and peak loadings of 93 %-100 % occur. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration can be found in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing is factory-set so that a UFO 876/MX behaves like a UFO 876. For this purpose, at each of the TS processing units only the first of the three inputs is assigned a multi-standard frontend. Details of the TS routing configuration can be found here: *17.3.14 Transport stream routing configuration, p.111*.



## 23 User Information UFO 836



The UFOcompact plus module UFO 836 is a 4-way DVB-S/-S2/-T/-T2/-C- to DVB-T transmodulator. The device has 4 RF input sockets with the capability to receive optionally DVB-T/-T2, DVB-C or DVB-S/-S2 signals and also to connect to DiSEqC™-capable LNBS and input matrices. It also has one output socket for feeding 6 transmodulated data streams into a cable network.

### 23.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 23.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 836 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties** then the dialogue window shown in Fig. 162 appears.

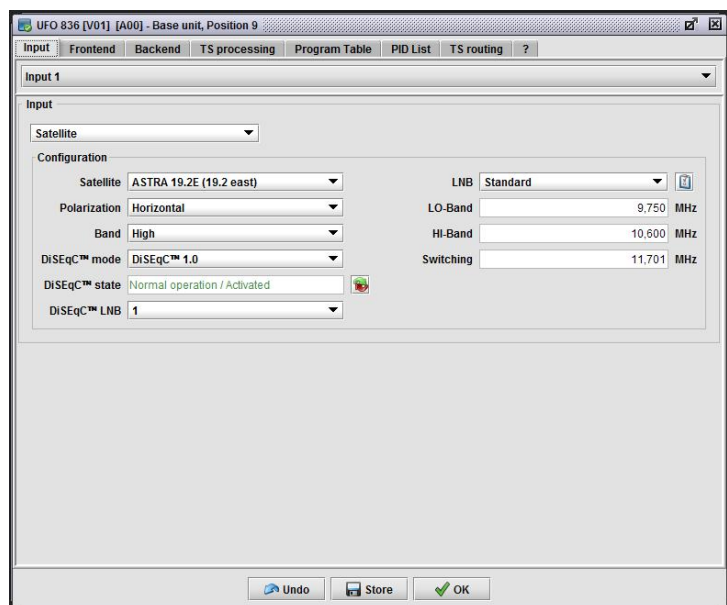


Fig. 162: UFO 834 Properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99.*
2. Configure the multi-standard frontend of each channel unit that is used, with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100.* Once you have selected a transponder that can receive properly, this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend a assignment to the input.
3. Leave the factory settings unchanged for the errors *17.3.8 Transport stream processing configuration, p.103* in the factory default setting.
4. Configure the DVB-T output channels with the input mask described here: *17.3.10 DVB-T-COFDM output configuration, p.105.* If you set the RF output to **On**, the loading display should show a value > 0 % (the actual value depends on the selected transponder). For most DVB-S2 transponders, the available bandwidth of the COFDM channel is insufficient to receive all the channels from the frontend. An indication of this is that the loading is continually over 93 % and/or peaks of 93 %-100 % are shown. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration are given in the following sections

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may be configured only in connection with an additional module, to or from which the transport stream is diverted. You can find details on this here: *17.3.14 Transport stream routing configuration, p.111.*

## 24 User Information UFO836/MX



The UFOcompact plus module UFO 836/MX is a DVB-S/-S2/-T/-T2/-C to DVB-T transmodulator with multiplex functionality. The device has 4 RF input sockets with the capability to receive optionally DVB-T/-T2, DVB-C or DVB-S/-S2 signals and also to connect to DiSEqC™-capable LNBs and input matrices. It also has one output socket for feeding 6 transmodulated data streams into a cable network. The multiplex functionality permits each of the 6 modulated data streams to be recompiled from up to 3 input data streams (incl. data streams from neighbouring modules).

### 24.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are available:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update in progress
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 24.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 836/MX modules can be set in a UFOcompact plus system. If you choose the item **Properties**, within the context menu for a module then the dialogue window shown in Fig. 163 appears.

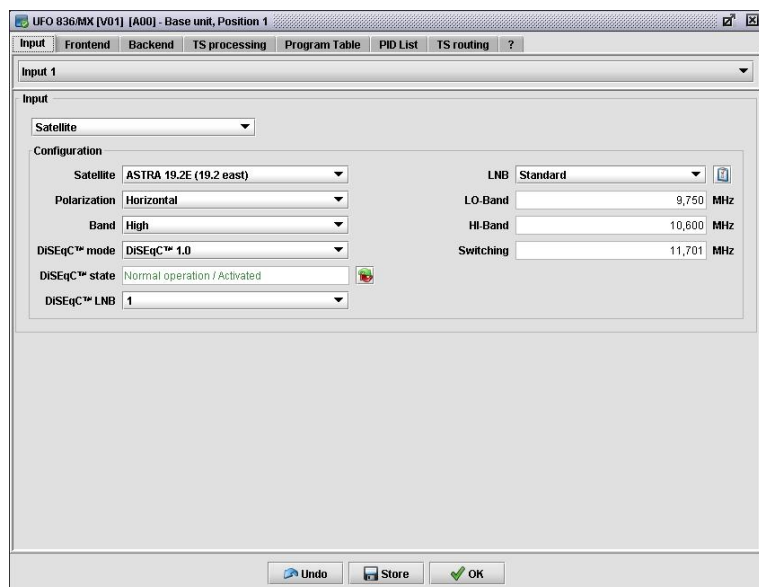


Fig. 163: UFO 836/MX Properties dialogue window

The Properties dialogue window has several pages which split the configuration settings into the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure all the inputs of the device to which cables are attached, as described under *17.3.3 Satellite input configuration, p.99*.
2. Configure the multi-standard frontend, as described under *17.3.5 DVB-S/-S2 Frontend configuration, p.100*. Once you have selected a transponder that can receive properly, this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend assignment to the input.
3. Leave the settings described under *17.3.8 Transport stream processing configuration, p.103* unchanged at the factory settings.
4. Configure the DVB-T output channels, as described under *17.3.10 DVB-T-COFDM output configuration, p.105*. If you set the RF output to **On**, the loading display should show a value > 0 % (the value displayed depends on the transponder that was selected). For most transponders the available bandwidth of the COFDM channel is insufficient to download all the channels from the frontend. An indication of this is that the loading is continually over 93 % and/or peaks of 93 %-00 % occur. This can be remedied by making suitable channel filter settings.

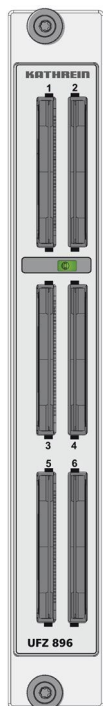
Further details on advanced transport stream processing and configuration can be found in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing is factory-set so that a UFO 836/MX behaves like a UFO 836. For this purpose, at each of the TS processing units only the first of the three inputs is assigned a multi-standard frontend. Details of the TS routing configuration can be found here:

*17.3.14 Transport stream routing configuration, p.111.*

## 25 User Information UFZ 896



The UFOcompact plus module UFZ896 implements six Common Interface slots to hold Conditional Access Modules (CAMs). Up to six transport streams can be decoded or encoded simultaneously. These transport streams are fed into transmodulators that are arranged to the left or right and are received again.

### 25.1 LED to show the device status

There is a multi-colour LED in front panel to indicate the current device status. The following statuses are possible:

Colour	Mode	Description
Green	Continuously lit	Then device is ready for use
Green	Flashing	A firmware update is running
Red	Continuously lit	A severe software malfunction has occurred (caused, for example, by a failed software update)
Red	Flashing	A hardware malfunction has occurred
Orange	Continuously lit	The device software is being started

Colour	Mode	Description
Green/ Orange	Flashing	<p>A hardware malfunction has occurred:</p> <ul style="list-style-type: none"> <li>• A CAM had a malfunction and was deactivated</li> <li>• A redundancy group has changed to data path to bypass in automatic mode due to decoding problems, i.e. the transport stream is forwarded unchanged to the CAMs.</li> <li>• The number of channels that are actually decoded has been reduced</li> </ul>

## 25.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 896 module can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 164 appears.

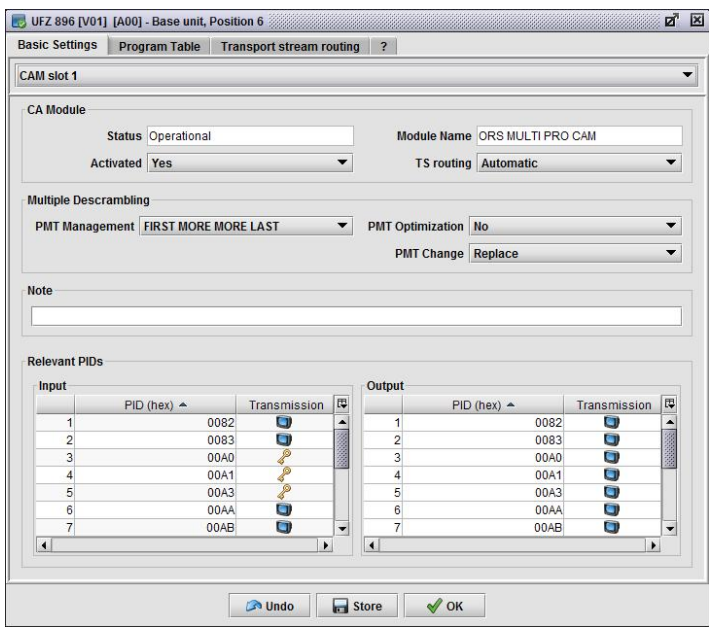


Fig. 164: The UFZ 896 properties dialogue window

The Properties dialogue window has several pages for the configuration of the various function areas of the module.



**Steps for the initial setup:**

In Fig. 165 the default configuration of the transport stream routing is shown.



Fig. 165: Default configuration

For the initial setup it is sufficient to position a signal source of the left-hand side of the UFZ 896 in the carrier and to configure it such that the desired transport streams are diverted via the six input and output ports. A CAM must be plugged into the relevant associated CAM slot. By default the module is configured such that the channels of a transport stream are decoded. Since this is not possible with each CAM, it is necessary to modify in the channel table the number of channels to be decoded to suit the capabilities of the CAM.

Further details on advanced transport stream processing and configuration are given in the following sections:

- 17.5.1 Basic Settings, p.124
- 17.5.3 Programme table, p.131
- 17.5.4 Transport stream routing, p.138
- 17.5.5 Routing editor, p.139

## 26 User Information UFO 844



- 4-way DVB-S/-S2/-T/-T2/-C on IP transmodulator
- DiSEqC™-capable
- 1000BASE-T Ethernet interface for feeding 4 MPTS or 32 SPTS into a GbE network

### 26.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 26.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 844 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 166 appears:

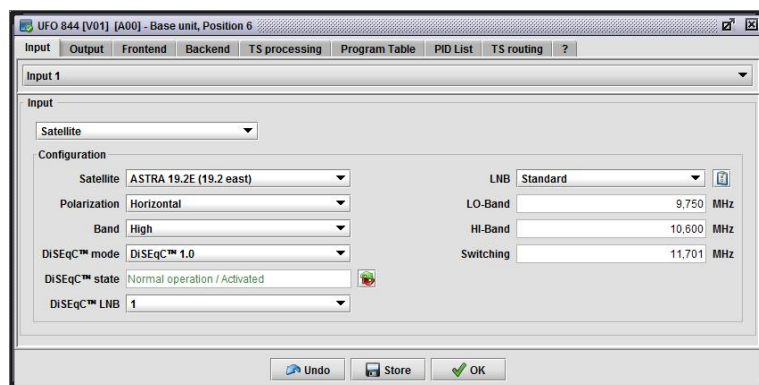


Fig. 166: The UFO 844 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99.*
2. Configure the network output as described in *17.3.15 Network Configuration, p.116.*
3. Configure the multi-standard frontend of each channel unit that is used with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100* . Once you have selected a transponder that can receive properly , this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend assignment to the input.
4. Leave the settings in the factory default setting as described in *17.3.17 IP Backend, p.121.*
5. Leave the settings in the factory default setting as described in *17.3.8 Transport stream processing configuration, p.103.*

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111.*

## 27 User Information UFO 848



- 8-way IP DVB-S/S2 on IP transmodulator
- DiSEqC 1.0™-capable
- 1000BASE-T Ethernet interface for feeding 8 MPTS or 64 SPTS into a GbE network

### 27.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 27.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 848 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties**, then the dialogue window shown in Fig. 167 appears:

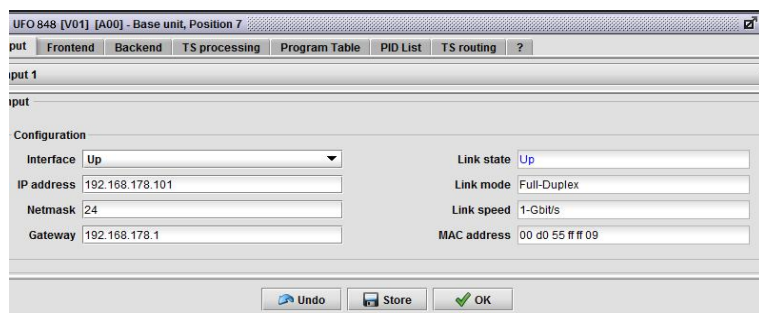


Fig. 167: The UFO 848 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure all wired inputs of the device with the input mask described here: *17.3.3 Satellite input configuration, p.99*.
2. Configure the network output as described in *17.3.15 Network Configuration, p.116*.
3. Configure the DVB-S/-S2 frontend of each channel unit that is used with the input mask described here: *17.3.5 DVB-S/-S2 Frontend configuration, p.100* . Once you have selected a transponder that can receive properly , this should be indicated as Lock Status **Locked**. If that is not the case, make a further check of the input configuration and the frontend assignment to the input.

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111*.

## 28 User Information UFO 858



- 8-way IP on DVB-T transmodulator (EdgeCOFDM)
- 1000BASE-T Ethernet for receiving 8 transport streams from a GbE network
- 1 output socket, 8 transmodulated data streams

### 28.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 28.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UFO 858 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item **Properties** then the dialogue window shown in Fig. 168 appears:

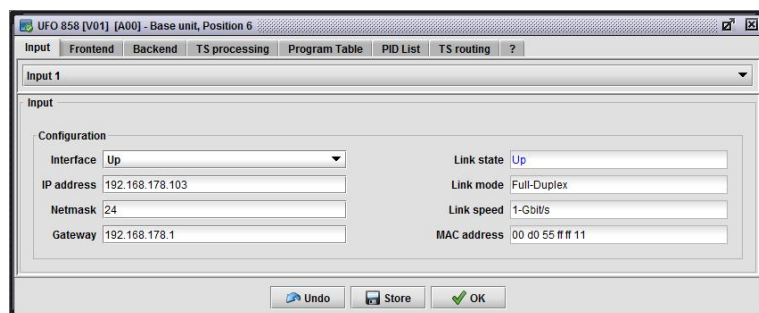


Fig. 168: The UFO 858 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure the network output as described in *17.3.15 Network Configuration, p.116*.
2. Leave the settings in the factory default setting as described in *17.3.16 IP Frontend, p.117*.
3. Leave the settings in the factory default setting as described in *17.3.8 Transport stream processing configuration, p.103*.
4. Configure the DVB-T output channels with the input mask described here: *17.3.10 DVB-T-COFDM output configuration, p.105*. If you set the RF output to **On**, the loading display should show a value > 0 % (the actual value depends on the selected transponder). For most DVB-S2 transponders, the available bandwidth of the COFDM channel is insufficient to receive all the channels from the frontend. An indication of this is that the loading is continually over 93 % and/or peaks of 93 %-100 % are shown. This can be remedied by making suitable channel filter settings.

Further details on advanced transport stream processing and configuration are given in the following sections:

- *17.3.11 Transport stream processing extra options, p.106*
- *17.3.12 Channel table/filter configuration, p.107*
- *17.3.13 PID list/filter configuration, p.110*

The transport stream routing may only be configured in connection with an additional module, from or to which the transport stream has been diverted. You can find details on this here:

*17.3.14 Transport stream routing configuration, p.111*.

## 29 User Information UVO 830



The UFOcompact plus module UVO 830 is a system amplifier for the UFOcompact plus system. The amplification and level behaviour is set especially at the system.

The unit has an input for BK cable signals and a signal and a test output.

The pre-equalisation (pre-emphasis) can be set in four levels on this unit (6 dB, 9 dB, 12 dB, 15 dB). As a result the amplifier can compensate for attenuation in the cable network.

### 29.1 LED to show the device status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The unit software is started



## 29.2 Configuration with USW 800 software

Using the USW 800 application, the specific parameters of the UVO 830 modules can be set in a UFOcompact plus system. If you select in the context-sensitive menu of a module the item **Properties**, then the dialogue window shown in Fig. 169 appears.

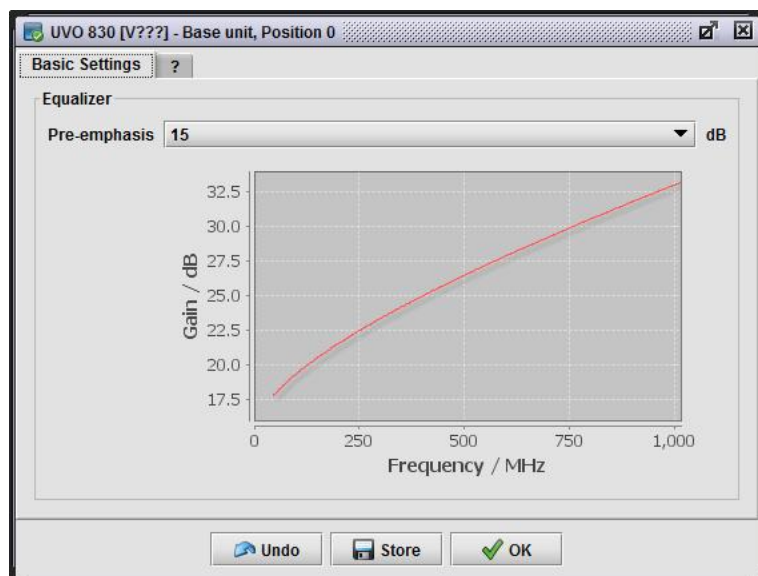


Fig. 169: UFZ 830 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure the pre-equalisation

Further details on the configuration of the pre-equalization can be found in the following chapters:

- 17.7.1 Equalizer, p.145

## 30 User Information UFX 894



- 4-way HDMI encoder
- 4 HDMI inputs
- supported Video formats: SD = 576i50, HD = 720p50, 1080i50 und 1080p50
- 2 integrated MUX units for fully flexible 4-to-2-multiplex of the encoded signals
- Transmission of the encoded signals to the transmodulator-, IP streamer and encoding modules via backplane

### 30.1 LED to Show the Device Status

There is a multi-colour LED recessed into the front panel to indicate the current device status. The following displays are possible:

Colour	Mode	Description
Green	Continuously lit	Device ready for operation/OK
Green	Flashing	Software update is being done
Red	Continuously lit	A software error has occurred (e.g. if an error occurs during the update)
Red	Flashing	A hardware error has occurred
Orange	Continuously lit	The device software is being started

## 30.2 LED to Show the HDMI Input Status

There are multi-coloured LEDs above the HDMI input ports to indicate the input status. The following displays are possible:

Colour	Mode	Description
Off		No cable connected/HDMI source is turned off
Red	Continuously lit	Active HDMI source, invalid input signal
Green	Continuously lit	Active HDMI source, valid input signal

## 30.3 Configuration with USW 800 Software

Using the USW 800 application, the specific parameters of the UFO 894 modules can be set in a UFOcompact plus system. If you choose within the context menu for a module the item Properties then the dialogue window shown in Fig. 170 appears:

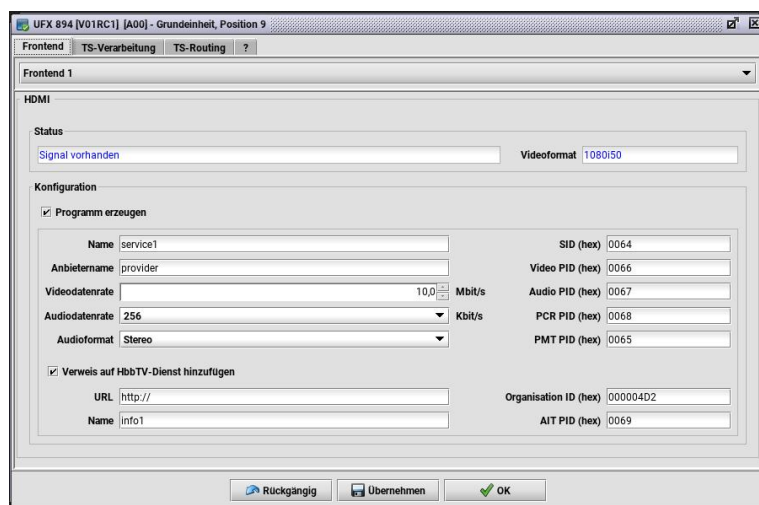


Fig. 170: UFX 894 properties dialogue window

The Properties dialogue window has several pages to split up the configuration settings for the various function areas of the device hardware and software.

### Steps for the initial setup:

1. Configure all connected inputs of the device as described in *17.9.1 HDMI Frontend, p.147*.
2. Configure the MUX units according to the desired combination of the output transport streams as described in *17.9.2 Encoder TS-Processing/MUX, p.149*.
3. Configure the transport stream routing for diverting the output transport streams to the left or the right neighbouring module as described in *17.9.3 TS Routing of Transport Streams, p.150*

## 31 Open Source license of the module software

### 31.1 OSS licenses for the modules

#### 31.1.1 AT91 Bootstrap, at91lib

```
/*-----  
*   ATMEL Microcontroller Software Support  
*-----
```

Copyright (c) 2008, Atmel Corporation

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- Redistributions of source code must retain the above copyright notice, this list of conditions and the disclaimer below.

Atmel's name may not be used to endorse or promote products derived from this software without specific prior written permission.

DISCLAIMER: THIS SOFTWARE IS PROVIDED BY ATMEL "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT ARE DISCLAIMED. IN NO EVENT SHALL ATMEL BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

#### 31.1.2 FreeRTOS

The FreeRTOS.org source code is licensed by the "modified" GNU General Public License (GPL), text provided below. A special exception to the GPL is included to allow you to distribute a combined work that includes FreeRTOS without being obliged to provide the source code for any proprietary components. See the licensing section of <http://www.FreeRTOS.org> for full details. The exception text is also included at the bottom of this file.

The FreeRTOS download also includes demo application source code, some of which is provided by third parties AND IS LICENSED SEPARATELY FROM FREERTOS.

For the avoidance of any doubt refer to the comment included at the top of each source and header file for license and copyright information.

This is a list of files for which Real Time Engineers Ltd are not the copyright owner and are NOT COVERED BY THE GPL.

- 1) Various header files provided by silicon manufacturers and tool vendors that define processor specific memory addresses and utility macros. Permission has been granted by the various copyright holders for these files to be included in the FreeRTOS download. Users must ensure license conditions are adhered to for any use other than compilation of the FreeRTOS demo applications.
- 2) The uIP TCP/IP stack the copyright of which is held by Adam Dunkels. Users must ensure the open source license conditions stated at the top of each uIP source file is understood and adhered to.
- 3) The lwIP TCP/IP stack the copyright of which is held by the Swedish Institute of Computer Science. Users must ensure the open source license conditions stated at the top of each lwIP source file is understood and adhered to.
- 4) Various peripheral driver source files and binaries provided by silicon manufacturers and tool vendors. Permission has been granted by the various copyright holders for these files to be included in the FreeRTOS download. Users must ensure license conditions are adhered to for any use other than compilation of the FreeRTOS demo applications.
- 5) The files contained within FreeRTOS\Demo\WizNET\_DEMO\_TERN\_186\tern\_code, which are slightly modified versions of code provided by and copyright to Tern Inc.

Errors and omissions should be reported to Richard Barry, contact details for whom can be obtained from <http://www.FreeRTOS.org>.

The GPL license text follows.

A special exception to the GPL is included to allow you to distribute a combined work that includes FreeRTOS without being obliged to provide the source code for any proprietary components. See the licensing section of <http://www.FreeRTOS.org> for full details. The exception text is also included at the bottom of this file.

-----  
GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc.

59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of

## Open Source license of the module software

the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Library General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender the rights.

These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

### GNU GENERAL PUBLIC LICENSE

#### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law:

that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program).

Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.

b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.

c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you also do one of the following:

a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,

c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

## Open Source license of the module software

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

### NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Programs

If you develop a new program, and you want it to be of the greatest possible use to the public, the best way to achieve this is to make it free software which everyone can redistribute and change under these terms.

To do so, attach the following notices to the program. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the program's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This program is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License\*\* as published by the Free Software Foundation; either version 2 of the License, or (at your option) any later version.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU General Public License for more details.

You should have received a copy of the GNU General Public License along with this program; if not, write to the Free Software Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA

Also add information on how to contact you by electronic and paper mail.

If the program is interactive, make it output a short notice like this when it starts in an interactive mode:

Gnomovision version 69, Copyright (C) year name of author Gnomovision comes with ABSOLUTELY NO WARRANTY; for details type `show w'. This is free software, and you are welcome to redistribute it under certain conditions; type `show c' for details.

The hypothetical commands `show w' and `show c' should show the appropriate parts of the General Public License. Of course, the commands you use may be called something other than `show w' and `show c'; they could even be mouse-clicks or menu items--whatever suits your program.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the program, if necessary. Here is a sample; alter the names:



## Open Source license of the module software

Yoyodyne, Inc., hereby disclaims all copyright interest in the program  
'Gnomovision' (which makes passes at compilers) written by James Hacker.  
<signature of Ty Coon>, 1 April 1989  
Ty Coon, President of Vice

This General Public License does not permit incorporating your program into proprietary programs. If your program is a subroutine library, you may consider it more useful to permit linking proprietary applications with the library. If this is what you want to do, use the GNU Library General Public License instead of this License.

-----  
The FreeRTOS GPL Exception Text:

Any FreeRTOS source code, whether modified or in its original release form, or whether in whole or in part, can only be distributed by you under the terms of the GNU General Public License plus this exception. An independent module is a module which is not derived from or based on FreeRTOS.

Clause 1:

Linking FreeRTOS statically or dynamically with other modules is making a combined work based on FreeRTOS. Thus, the terms and conditions of the GNU General Public License cover the whole combination.

As a special exception, the copyright holder of FreeRTOS gives you permission to link FreeRTOS with independent modules that communicate with FreeRTOS solely through the FreeRTOS API interface, regardless of the license terms of these independent modules, and to copy and distribute the resulting combined work under terms of your choice, provided that

+ Every copy of the combined work is accompanied by a written statement that details to the recipient the version of FreeRTOS used and an offer by yourself to provide the FreeRTOS source code (including any modifications you may have made) should the recipient request it.

+ The combined work is not itself an RTOS, scheduler, kernel or related product.

+ The independent modules add significant and primary functionality to FreeRTOS and do not merely extend the existing functionality already present in FreeRTOS.

Clause 2:

FreeRTOS may not be used for any competitive or comparative purpose, including the publication of any form of run time or compile time metric, without the express permission of Real Time Engineers Ltd. (this is the norm within the industry and is intended to ensure information accuracy).

### 31.1.3 Loki

//

// The Loki Library

// Copyright (c) 2008 by Rich Sposato

//

// Permission to use, copy, modify, distribute and sell this software for any

// purpose is hereby granted without fee, provided that the above copyright

// notice appear in all copies and that both that copyright notice and this

// permission notice appear in supporting documentation.

// The author makes no representations about the

// suitability of this software for any purpose. It is provided "as is"

// without express or implied warranty.

//

### 31.1.4 Google protobuf

Copyright 2008, Google Inc.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

\* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

\* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

\* Neither the name of Google Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Code generated by the Protocol Buffer compiler is owned by the owner of the input file used when generating it. This code is not standalone and requires a support library to be linked with it. This support library is itself covered by the above license.

## 32 Licence texts of the libraries used

### 32.1 Apache License

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

#### TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

##### 1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition,

"control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files.

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition,

"submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorporated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License.

You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.



7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

### END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License"); you may not use this file except in compliance with the License. You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

### SPRING FRAMEWORK 3.1 SUBCOMPONENTS:

Spring Framework 3.1 includes a number of subcomponents with separate copyright notices and license terms. The product that includes this file does not necessarily use all the open source subcomponents referred to below. Your use of the source code for these subcomponents is subject to the terms and conditions of the following licenses.

>>> asm-2.2.3:

Copyright (c) 2000-2005 INRIA, France Telecom

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. Neither the name of the copyright holders nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright (c) 1999-2009, OW2 Consortium <<http://www.ow2.org/>>

To the extent any open source subcomponents are licensed under the EPL and/or other similar licenses that require the source code and/or modifications to source code to be made available (as would be noted above), you may obtain a copy of the source code corresponding to the binaries for such open source components and modifications thereto, if any, (the "Source Files"), by downloading the Source Files from <http://www.springsource.org/download>, or by sending a request, with your name and address to: VMware, Inc., 3401 Hillview Avenue, Palo Alto, CA 94304, United States of America or email [info@vmware.com](mailto:info@vmware.com). All such requests should clearly specify: OPEN SOURCE FILES REQUEST, Attention General Counsel. VMware shall mail a copy of the Source Files to you on a CD or equivalent physical medium. This offer to obtain a copy of the Source Files is valid for three years from the date you acquired this Software product.

Copyright (c) 2004-2013 QOS.ch

All rights reserved.

## 32.2 License SLF4J

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

### 32.3 License Protobuf

Copyright 2008, Google Inc.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- \* Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- \* Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- \* Neither the name of Google Inc. nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Code generated by the Protocol Buffer compiler is owned by the owner of the input file used when generating it. This code is not standalone and requires a support library to be linked with it. This support library is itself covered by the above license.

### 32.4 License JGoodies Looks

Copyright (c) 2001-2013 JGoodies Software GmbH. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- o Neither the name of JGoodies Software GmbH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 32.5 License JGoodies Forms

Copyright (c) 2002-2013 JGoodies Software GmbH. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- o Neither the name of JGoodies Software GmbH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE

ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 32.6 License JGoodies Common

Copyright (c) 2009-2013 JGoodies Software GmbH. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- o Neither the name of JGoodies Software GmbH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 32.7 License JGoodies Binding

Copyright (c) 2002-2013 JGoodies Software GmbH. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

- o Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
- o Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
- o Neither the name of JGoodies Software GmbH nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

### 32.8 License JCONFIG

Copyright (c) 2004, jConfig

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.

Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution. Neither the name of jConfig nor the names of its contributors may be used to endorse or promote products derived from this software without specific prior written permission.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT OWNER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY,

WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

## 32.9 GNU LESSER GENERAL PUBLIC LICENSE

GNU LESSER GENERAL PUBLIC LICENSE

Version 2.1, February 1999

Copyright (C) 1991, 1999 Free Software Foundation, Inc.

51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

[This is the first released version of the Lesser GPL. It also counts as the successor of the GNU Library Public License, version 2, hence the version number 2.1.]

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public Licenses are intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users.

This license, the Lesser General Public License, applies to some specially designated software packages--typically libraries--of the Free Software Foundation and other authors who decide to use it. You can use it too, but we suggest you first think carefully about whether this license or the ordinary General Public License is the better strategy to use in any particular case, based on the explanations below.

When we speak of free software, we are referring to freedom of use, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish); that you receive source code or can get it if you want it; that you can change the software and use pieces of it in new free programs; and that you are informed that you can do these things.

To protect your rights, we need to make restrictions that forbid distributors to deny you these rights or to ask you to surrender these rights. These restrictions translate to certain responsibilities for you if you distribute copies of the library or if you modify it.

For example, if you distribute copies of the library, whether gratis or for a fee, you must give the recipients all the rights that we gave you. You must make sure that they, too, receive or can get the source code. If you link other code with the library, you must provide complete object files to the recipients, so that they can relink them with the library after making changes to the library and recompiling it. And you must show them these terms so they know their rights.

We protect your rights with a two-step method: (1) we copyright the library, and (2) we offer you this license, which gives you legal permission to copy, distribute and/or modify the library.

To protect each distributor, we want to make it very clear that there is no warranty for the free library. Also, if the library is modified by someone else and passed on, the recipients should know that what they have is not the original version, so that the original author's reputation will not be affected by problems that might be introduced by others.

Finally, software patents pose a constant threat to the existence of any free program. We wish to make sure that a company cannot effectively restrict the users of a free program by obtaining a restrictive license from a patent holder. Therefore, we insist that any patent license obtained for a version of the library must be consistent with the full freedom of use specified in this license.

Most GNU software, including some libraries, is covered by the ordinary GNU General Public License. This license, the GNU Lesser General Public License, applies to certain designated libraries, and is quite different from the ordinary General Public License. We use this license for certain libraries in order to permit linking those libraries into non-free programs.

When a program is linked with a library, whether statically or using a shared library, the combination of the two is legally speaking a combined work, a derivative of the original library. The ordinary General Public License therefore permits such linking only if the entire combination fits its criteria of freedom. The Lesser General Public License permits more lax criteria for linking other code with the library.

We call this license the "Lesser" General Public License because it does Less to protect the user's freedom than the ordinary General Public License. It also provides other free software developers Less of an advantage over competing non-free programs. These disadvantages are the reason we use the ordinary General Public License for many libraries. However, the Lesser license provides advantages in certain special circumstances.

## Licence texts of the libraries used

For example, on rare occasions, there may be a special need to encourage the widest possible use of a certain library, so that it becomes a de-facto standard. To achieve this, non-free programs must be allowed to use the library. A more frequent case is that a free library does the same job as widely used non-free libraries. In this case, there is little to gain by limiting the free library to free software only, so we use the Lesser General Public License.

In other cases, permission to use a particular library in non-free programs enables a greater number of people to use a large body of free software. For example, permission to use the GNU C Library in non-free programs enables many more people to use the whole GNU operating system, as well as its variant, the GNU/Linux operating system.

Although the Lesser General Public License is Less protective of the users' freedom, it does ensure that the user of a program that is linked with the Library has the freedom and the wherewithal to run that program using a modified version of the Library.

The precise terms and conditions for copying, distribution and modification follow. Pay close attention to the difference between a "work based on the library" and a "work that uses the library". The former contains code derived from the library, whereas the latter must be combined with the library in order to run.

### GNU LESSER GENERAL PUBLIC LICENSE

#### TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License Agreement applies to any software library or other program which contains a notice placed by the copyright holder or other authorized party saying it may be distributed under the terms of this Lesser General Public License (also called "this License"). Each licensee is addressed as "you".

A "library" means a collection of software functions and/or data prepared so as to be conveniently linked with application programs (which use some of those functions and data) to form executables.

The "Library", below, refers to any such software library or work which has been distributed under these terms. A "work based on the Library" means either the Library or any derivative work under copyright law: that is to say, a work containing the Library or a portion of it, either verbatim or with modifications and/or translated straightforwardly into another language. (Hereinafter, translation is included without limitation in the term "modification".)

"Source code" for a work means the preferred form of the work for making modifications to it. For a library, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the library.

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running a program using the Library is not restricted, and output from such a program is covered only if its contents constitute a work based on the Library (independent of the use of the Library in a tool for writing it). Whether that is true depends on what the Library does and what the program that uses the Library does.

1. You may copy and distribute verbatim copies of the Library's complete source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and distribute a copy of this License along with the Library.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Library or any portion of it, thus forming a work based on the Library, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) The modified work must itself be a software library.
- b) You must cause the files modified to carry prominent notices stating that you changed the files and the date of any change.
- c) You must cause the whole of the work to be licensed at no charge to all third parties under the terms of this License.
- d) If a facility in the modified Library refers to a function or a table of data to be supplied by an application program that uses the facility, other than as an argument passed when the facility is invoked, then you must make a good faith effort to ensure that, in the event an application does not supply such function or table, the facility still operates, and performs whatever part of its purpose remains meaningful.

(For example, a function in a library to compute square roots has a purpose that is entirely well-defined independent of the application. Therefore, Subsection 2d requires that any application-supplied function or table used by this function must be optional: if the application does not supply it, the square root function must still compute square roots.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Library, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Library, the distri-



tribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Library.

In addition, mere aggregation of another work not based on the Library with the Library (or with a work based on the Library) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may opt to apply the terms of the ordinary GNU General Public License instead of this License to a given copy of the Library. To do this, you must alter all the notices that refer to this License, so that they refer to the ordinary GNU General Public License, version 2, instead of to this License. (If a newer version than version 2 of the ordinary GNU General Public License has appeared, then you can specify that version instead if you wish.) Do not make any other change in these notices.

Once this change is made in a given copy, it is irreversible for that copy, so the ordinary GNU General Public License applies to all subsequent copies and derivative works made from that copy.

This option is useful when you wish to copy part of the code of the Library into a program that is not a library.

4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The executable is therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for the work may be a derivative work of the Library even though the source code is not. Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modi-

## Licence texts of the libraries used

fied version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent this user a copy. For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.

b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

9. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Library or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Library (or any work based on the Library), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Library or works based on it.

10. Each time you redistribute the Library (or any work based on the Library), the recipient automatically receives a license from the original licensor to copy, distribute, link with or modify the Library subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties with this License.

11. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Library at all. For example, if a patent license would not permit royalty-free redistribution of the Library by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Library.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply, and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

12. If the distribution and/or use of the Library is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Library under this License may add an explicit geographical distribution limitation excluding those countries, so that distri-

## Licence texts of the libraries used

bution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

13. The Free Software Foundation may publish revised and/or new versions of the Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns. Each version is given a distinguishing version number. If the Library specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Library does not specify a license version number, you may choose any version ever published by the Free Software Foundation.

14. If you wish to incorporate parts of the Library into other free programs whose distribution conditions are incompatible with these, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

### NO WARRANTY

15. BECAUSE THE LIBRARY IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE LIBRARY, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE LIBRARY "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE LIBRARY IS WITH YOU. SHOULD THE LIBRARY PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

16. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE LIBRARY AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE LIBRARY (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE LIBRARY TO OPERATE WITH ANY OTHER SOFTWARE), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

### END OF TERMS AND CONDITIONS

#### How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

<one line to give the library's name and a brief idea of what it does.>

Copyright (C) <year> <name of author>

This library is free software; you can redistribute it and/or modify it under the terms of the GNU Lesser General Public License as published by the Free Software Foundation; either version 2.1 of the License, or (at your option) any later version.

This library is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU Lesser General Public License for more details.

You should have received a copy of the GNU Lesser General Public License along with this library; if not, write to the Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Also add information on how to contact you by electronic and paper mail.

You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

Yoyodyne, Inc., hereby disclaims all copyright interest in the library 'Frob' (a library for tweaking knobs) written by James Random Hacker.

<signature of Ty Coon>, 1 April 1990



Ty Coon, President of Vice

That's all there is to it!

## 32.10 LICENSE Apache 2.0

Apache License

Version 2.0, January 2004

<http://www.apache.org/licenses/>

### TERMS AND CONDITIONS FOR USE, REPRODUCTION, AND DISTRIBUTION

#### 1. Definitions.

"License" shall mean the terms and conditions for use, reproduction, and distribution as defined by Sections 1 through 9 of this document.

"Licensor" shall mean the copyright owner or entity authorized by the copyright owner that is granting the License.

"Legal Entity" shall mean the union of the acting entity and all other entities that control, are controlled by, or are under common control with that entity. For the purposes of this definition,

"control" means (i) the power, direct or indirect, to cause the direction or management of such entity, whether by contract or otherwise, or (ii) ownership of fifty percent (50%) or more of the outstanding shares, or (iii) beneficial ownership of such entity.

"You" (or "Your") shall mean an individual or Legal Entity exercising permissions granted by this License.

"Source" form shall mean the preferred form for making modifications, including but not limited to software source code, documentation source, and configuration files,

"Object" form shall mean any form resulting from mechanical transformation or translation of a Source form, including but not limited to compiled object code, generated documentation, and conversions to other media types.

"Work" shall mean the work of authorship, whether in Source or Object form, made available under the License, as indicated by a copyright notice that is included in or attached to the work (an example is provided in the Appendix below).

"Derivative Works" shall mean any work, whether in Source or Object form, that is based on (or derived from) the Work and for which the editorial revisions, annotations, elaborations, or other modifications represent, as a whole, an original work of authorship. For the purposes of this License, Derivative Works shall not include works that remain separable from, or merely link (or bind by name) to the interfaces of, the Work and Derivative Works thereof.

"Contribution" shall mean any work of authorship, including the original version of the Work and any modifications or additions to that Work or Derivative Works thereof, that is intentionally submitted to Licensor for inclusion in the Work by the copyright owner or by an individual or Legal Entity authorized to submit on behalf of the copyright owner. For the purposes of this definition, "submitted" means any form of electronic, verbal, or written communication sent to the Licensor or its representatives, including but not limited to communication on electronic mailing lists, source code control systems, and issue tracking systems that are managed by, or on behalf of, the Licensor for the purpose of discussing and improving the Work, but excluding communication that is conspicuously marked or otherwise designated in writing by the copyright owner as "Not a Contribution."

"Contributor" shall mean Licensor and any individual or Legal Entity on behalf of whom a Contribution has been received by Licensor and subsequently incorporated within the Work.

2. Grant of Copyright License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable copyright license to reproduce, prepare Derivative Works of, publicly display, publicly perform, sublicense, and distribute the Work and such Derivative Works in Source or Object form.

3. Grant of Patent License. Subject to the terms and conditions of this License, each Contributor hereby grants to You a perpetual, worldwide, non-exclusive, no-charge, royalty-free, irrevocable (except as stated in this section) patent license to make, have made, use, offer to sell, sell, import, and otherwise transfer the Work, where such license applies only to those patent claims licensable by such Contributor that are necessarily infringed by their Contribution(s) alone or by combination of their Contribution(s) with the Work to which such Contribution(s) was submitted. If You institute patent litigation against any entity (including a cross-claim or counterclaim in a lawsuit) alleging that the Work or a Contribution incorpo-

## Licence texts of the libraries used

rated within the Work constitutes direct or contributory patent infringement, then any patent licenses granted to You under this License for that Work shall terminate as of the date such litigation is filed.

4. Redistribution. You may reproduce and distribute copies of the Work or Derivative Works thereof in any medium, with or without modifications, and in Source or Object form, provided that You meet the following conditions:

(a) You must give any other recipients of the Work or Derivative Works a copy of this License; and

(b) You must cause any modified files to carry prominent notices stating that You changed the files; and

(c) You must retain, in the Source form of any Derivative Works that You distribute, all copyright, patent, trademark, and attribution notices from the Source form of the Work, excluding those notices that do not pertain to any part of the Derivative Works; and

(d) If the Work includes a "NOTICE" text file as part of its distribution, then any Derivative Works that You distribute must include a readable copy of the attribution notices contained within such NOTICE file, excluding those notices that do not pertain to any part of the Derivative Works, in at least one of the following places: within a NOTICE text file distributed as part of the Derivative Works; within the Source form or documentation, if provided along with the Derivative Works; or, within a display generated by the Derivative Works, if and wherever such third-party notices normally appear. The contents of the NOTICE file are for informational purposes only and do not modify the License. You may add Your own attribution notices within Derivative Works that You distribute, alongside or as an addendum to the NOTICE text from the Work, provided that such additional attribution notices cannot be construed as modifying the License. You may add Your own copyright statement to Your modifications and may provide additional or different license terms and conditions for use, reproduction, or distribution of Your modifications, or for any such Derivative Works as a whole, provided Your use, reproduction, and distribution of the Work otherwise complies with the conditions stated in this License.

5. Submission of Contributions. Unless You explicitly state otherwise, any Contribution intentionally submitted for inclusion in the Work by You to the Licensor shall be under the terms and conditions of this License, without any additional terms or conditions. Notwithstanding the above, nothing herein shall supersede or modify the terms of any separate license agreement you may have executed with Licensor regarding such Contributions.

6. Trademarks. This License does not grant permission to use the trade names, trademarks, service marks, or product names of the Licensor, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of the NOTICE file.

7. Disclaimer of Warranty. Unless required by applicable law or agreed to in writing, Licensor provides the Work (and each Contributor provides its Contributions) on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied, including, without limitation, any warranties or conditions of TITLE, NON-INFRINGEMENT, MERCHANTABILITY, or FITNESS FOR A PARTICULAR PURPOSE. You are solely responsible for determining the appropriateness of using or redistributing the Work and assume any risks associated with Your exercise of permissions under this License.

8. Limitation of Liability. In no event and under no legal theory, whether in tort (including negligence), contract, or otherwise, unless required by applicable law (such as deliberate and grossly negligent acts) or agreed to in writing, shall any Contributor be liable to You for damages, including any direct, indirect, special, incidental, or consequential damages of any character arising as a result of this License or out of the use or inability to use the Work (including but not limited to damages for loss of goodwill, work stoppage, computer failure or malfunction, or any and all other commercial damages or losses), even if such Contributor has been advised of the possibility of such damages.

9. Accepting Warranty or Additional Liability. While redistributing the Work or Derivative Works thereof, You may choose to offer, and charge a fee for, acceptance of support, warranty, indemnity, or other liability obligations and/or rights consistent with this License. However, in accepting such obligations, You may act only on Your own behalf and on Your sole responsibility, not on behalf of any other Contributor, and only if You agree to indemnify, defend, and hold each Contributor harmless for any liability incurred by, or claims asserted against, such Contributor by reason of your accepting any such warranty or additional liability.

END OF TERMS AND CONDITIONS

APPENDIX: How to apply the Apache License to your work.

To apply the Apache License to your work, attach the following boilerplate notice, with the fields enclosed by brackets "[]" replaced with your own identifying information. (Don't include the brackets!) The text should be enclosed in the appropriate comment syntax for the file format. We also recommend that a file or class name and description of purpose be included on the same "printed page" as the copyright notice for easier identification within third-party archives.

Copyright [yyyy] [name of copyright owner]

Licensed under the Apache License, Version 2.0 (the "License");  
you may not use this file except in compliance with the License.

You may obtain a copy of the License at

<http://www.apache.org/licenses/LICENSE-2.0>

Unless required by applicable law or agreed to in writing, software distributed under the License is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the License for the specific language governing permissions and limitations under the License.

## 32.11 The Apache Software License, Version 1.1

=====

The Apache Software License, Version 1.1

Copyright (c) 1997-2003 The Apache Software Foundation. All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.
3. The end-user documentation included with the redistribution, if any, must include the following acknowledgment:  
"This product includes software developed by the Apache Software Foundation (<http://www.apache.org/>)."  
Alternately, this acknowledgment may appear in the software itself, if and wherever such third-party acknowledgments normally appear.
4. The names "Jakarta", "Avalon", and "Apache Software Foundation" must not be used to endorse or promote products derived from this software without prior written permission. For written permission, please contact [apache@apache.org](mailto:apache@apache.org).
5. Products derived from this software may not be called "Apache", nor may "Apache" appear in their name, without prior written permission of the Apache Software Foundation.

THIS SOFTWARE IS PROVIDED "AS IS" AND ANY EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE APACHE SOFTWARE FOUNDATION OR ITS CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

=====

This software consists of voluntary contributions made by many individuals on behalf of the Apache Software Foundation. For more information on the Apache Software Foundation, please see <http://www.apache.org/>.

