DHD

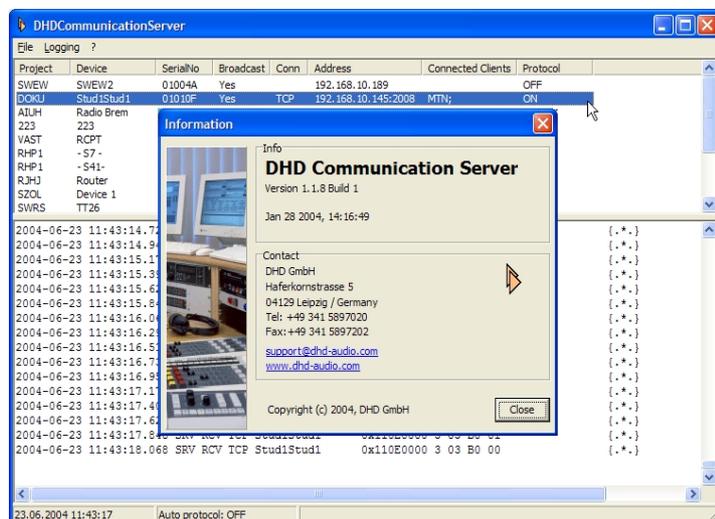## Digital Mixing and Routing System

RM4200D

— Manual —

Part 6

Application Software Manuals

Latest Revision: October 26th, 2005

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VI. Application Software Manual

About this Book

This book contains the operating manual for different DHD applications. These programs run on a standard Windows PC. If you use this PC with one or more RM4200D in a network, you can use the software to monitor, to remote control these RM4200D Devices and trigger certain functions within them.

Tip: This book *does not* contain the instructions for the configuration software `Toolbox 4`. You find them in Part 3 of this manual, „Toolbox 4 Configuration and Reference.“

There are several DHD applications for different functions. Each of these applications has its own chapter in the following book. If you use a DHD application, make sure to read the appropriate chapter to be able to make full use of the available functions and to avoid mistakes.

The following applications are described in this book:

1. *The DHD Communication Server (DHDCS)*. This software is always running in the background as soon as a DHD application is running on the PC. The DHDCS manages the network traffic between the PC and the RM4200D systems in the same network. Use can use the DHDCS also to monitor and protocol the network activities of RM4200D systems. (See "The DHD Communication Server (DHDCS)" on page 2.)

2. *RM420-550 Routing Software.* Use this software, if you want to operate your RM4200D as a router.

3. *RM420-552 Setup Manager.* Manage your individual Mixer Setups and Channel Setups with this PC software. (See "The Setup Manager (RM420-552)" on page 67.)

Last update of this manual: *October, 26th, 2005*.

1 The DHD Communication Server (DHDCS)

Note: The following description of the DHDCS is based on the software version *1.90.2 build 0.*

The DHD Communication Server, short „DHDCS", has two main tasks:

First, it is essential to run more than one DHD application *at the same time* on the same Windows PC. This is due to a Windows peculiarity concerning the UDP network traffic that is described in the next section. It is also the reason why the DHDCS is *always* running in the background as soon as you start a DHD application on the PC. In this case, you do not need to do anything - the DHDCS does its job.

Second, you can use the DHDCS to monitor RM4200D systems in the same network and to record their activities. This is especially useful for monitoring certain functions in complex RM4200D systems or for error checks. To do so, you can use the user interface of the DHDCS to set up the monitoring.

1.1 Overview

RM4200D systems have an Ethernet port to communicate with each other or with one or more PCs running DHD applications. For this communication, the network protocols UDP and TCP/IP are used as follows:

- *UDP protocol.* The RM4200D uses the connectionless UDP protocol for several DSP frames to communicate with each other and between DSP frames and PCs with DHD applications. During this communication, a DSP frame sends UDP packets as *Broadcast* that are read by all recipients and evaluated if necessary. The data in the packet do not require any feedback, thus being an „information to all". It is up to the recipient if he evaluates the data. The following information is broadcast via UDP:

1. Each second, each DSP frame broadcasts a „heartbeat packet". It contains information for all recipients, including Device name, project ID, IP address and its Ethernet MAC address. This procedure is used for example by the Toolbox4 software to automatically set up a list of all DSP frames available in the network.

2. Global Logic signals, Global Resources and Global Potentiometers are also transferred via UDP broadcast. In doing so, each Device in the network analyses the project ID of the sender. If this matches with the own project ID, the payload data is evaluated further. If not, the UDP packet is discarded.

3. Certain operating conditions are also reported via UDP broadcast. This includes for example over modulated audio inputs, communication problems of the DSP cards among each others, errors on the CAN bus, changes of the synchronization sources etc. Special DHD applications like DHDCS evaluate these messages and can generate a log file.

Important Note: To make the data transfer via UDP work correctly, all Devices in the network have to be able to exchange UDP broadcast packets. If this is not possible – e.g. because routers block the UDP traffic – Devices *can not communicate* this way! In this case, ask your system administrator for assistance.

- *TCP/IP protocol.* This protocol is mainly used by DHD applications that communicate directly with a DSP frame. For this, a point to point connection is

set up through the network that works in both ways. Using this data channel, the DSP frame can report its status to the DHD application; the software can control the DSP frame. TCP connections are used for the following:

1. The `Toolbox4` software uses a TCP connection to exchange configuration data with the DSP frame. The firmware of the DSP frame is also updated this way.
2. The DHD applications `Access` and `RC420` use a TCP connection to monitor or remote control a DSP frame.
3. The DHD application `Setup-Manager` uses a TCP connection to read a Setup from the DSP frame or to save setup data in the DSP frame.
4. Apart from evaluating UDP packages, the `DHDCS` can also set up TCP connections to DSP frames to request detailed status information. Doing so, messages from the CAN bus of a monitored Device are copied to the `DHDCS` and can be evaluated during troubleshooting.

Note: If Windows applications use UDP data, the following limitations apply: On the same PC, only one program can access a stream of UDP broadcasts at the same time. As soon as you start an application that receives UDP broadcasts, it uses this data exclusively. Any other program that is started afterwards can not access the UDP broadcast data. Practically, it is *not possible* to (theoretically) run two DHD applications (e.g.Toolbox 4 and Route) *at the same time* on the same PC.

For this reason, DHD developed the `DHD Communication Server` or short `DHDCS`. Since it has been published with the `Toolbox4` software (version 5.2.1 Build 104) in November 2003, all DHD applications work with this additional program, except for the `Access4` application. The `DHDCS` manages all UDP broadcast data on the PC and distributes them to all running DHD applications. The applications themselves are called *Clients* of the `DHDCS`, they also use the `DHDCS` for their data transfer. This way, from the same PC *at the same time, several DHD applications* can access the RM4200D systems available in the network. The figure on the next page illustrates the way the `DHDCS` works and demonstrates the data streams between the parts of the system.

As you can see, all data transfers on the PC are carried out using the `DHDCS`. In addition, the `DHDCS` can also be used to create log files recording the data transfer. This function is especially useful for troubleshooting more complex RM4200D systems.
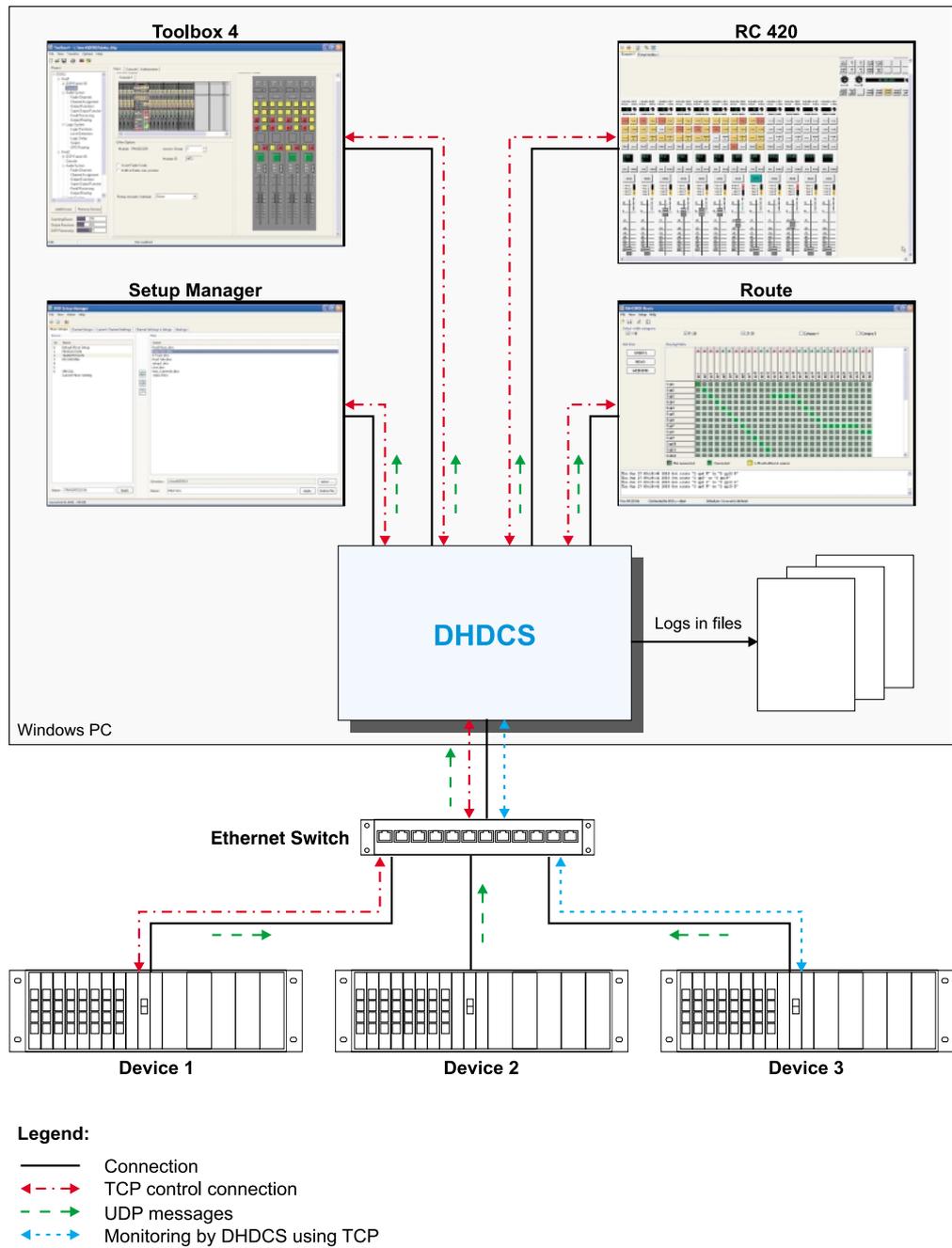
Figure 1–1: The principle of operation of the DHD Communication Server. Note the different data streams between the DHD applications and the RM4200D Devices.

The DHD Communication Server is a self-contained software component that is integrated in all DHD applications accessing the UDP data stream. When you start a DHD application, the DHDCS starts automatically and runs in the background. If you start additional DHD applications, they also use the DHDCS which is running already. The data transfer of all active DHD applications is processed completely by the DHDCS. The DHDCS is only quitted when the last DHD application that is accessing it is closed as well.

Tip: As a user of a DHD application, you do not have to bother about starting or quitting the DHDCS. Both is carried out automatically in the background. If for some reason this does not work, the affected DHD application displays a warning message.

As you can see in the figure, when the DHDCS is running, the Windows icon tray displays a small DHD logo as icon. A double click on this icon opens the main window of the DHDCS.

Figure 1–2: Icon of the active DHD Communication Servers in the Windows icon tray.

1.2 System Requirements and Installation

System Requirements

All DHD applications are programmed for and tested on Microsoft Windows XP. Therefore, you should use this operating system to run the programs.

Important Note: If you want to run DHD applications on other versions of the Windows operating system, you can do so at your own risk. In many cases, it will work. *Nevertheless, this is not recommended by DHD!* Tests and troubleshooting are carried out on Windows XP only, therefore, solving problems with DHD applications on other versions of Windows does not have any priority!

The DHD Communication Server is installed automatically when starting a DHD application for the first time. This software (e.g. Toolbox4) extracts the program file of the DHDCS and saves it to the hard disk of your PC. To make this work, your current Windows user account must have the permission to write in the directory containing the DHD application! If this is the case, the DHDCS file is created in this directory.

If the user has no write permission in this directory, the program file for the DHDCS is created in the users temporary directory.

Important Note: If your user account has no write permission on the Windows system at all, the DHD *Communication Server* can neither be extracted nor started! During the first start-up of the DHDCS the software also tries to insert data into the Windows Registry. This can only be successful if your Windows user account has the appropriate permissions!

Therefore, sort out the writing permissions of your Windows user account carefully with your system administrator. Otherwise, problems can occur when installing, updating and operating DHD applications. We recommend to start a DHD application for the first time with administrator permissions! But you also have to make sure that the directory for the DHDCS can be written into by normal users.

In order to make the `DHDCS` work correctly for all DHD applications, some entries have to be written into the Windows Registry. If your user account is not authorized to do that, the `DHDCS` can not be started! In both cases, an error message is displayed.

Figure 1–3:   Error message of the DHDCS that appears if the user account has no sufficient writing permissions.

In these cases, you can use the running DHD application, but to set up a connection to DSP frames is impossible.

Installing and updating the DHDCS

You do not have to install the `DHD Communication Server` manually. This software is shipped with the DHD application and „installs itself". It works like this:

At start-up of a DHD application, the program looks for a `DHDCS` program file already available on the PC. If there is no such file or only an older version, the DHD application extracts the up-to-date `DHDCS` program and writes it in its own file on the hard disk. Thus, any existing older `DHDCS` program file is replaced. Problems can only occur if your Windows account does not have the appropriate writing permissions or if a version of the `DHDCS` is already running. (Please find more detailed information in the following section.)

The `DHDCS` starts up as follows:

1. The DHD application compares the version of the integrated `DHDCS` with the ones available on the system.

2. If the version on the system is up-to-date, it is started.

3. If the integrated version is more up-to-date, it is extracted and replaces the version registered on the system. Then, the new version is started.

If the `DHDCS` update was successful, the following message is displayed:

Figure 1–4:   This message tells you that the DHD Communication Server was updated successfully.

Like all other DHD applications, also the `DHD Communication Server` is under constant development. Updates of DHD applications often require updates of the `DHDCS` shipped with the application. This means that the program file of recent DHD application also contains an updated `DHDCS` version.

If you want to know which DHDCS version is active on your PC, carry out the following steps:

1. Make sure the `DHDCS` is active. To do this, start any one of the DHD applications, e.g. `Toolbox4`. You can identify an active `DHDCS` when the small orange DHD logo is displayed in the icon tray of the Windows task bar.

2. Double click on this logo. The `DHDCS` application window opens. Alternatively, you can also right-click on the icon and use the context menu. Use the `Open` command to open the window.

3. Now select the `About` command from the help menu?.

4. The following information window opens. Under `Info` you find the version and the date of creation of the `DHDCS` currently active. Please always quote these two if you have questions to the DHD support.

Figure 1–5: **The information window of the DHD Communication Server.**

Important Note: There is a source of error when updating the DHDCS: If one DHD application is running already (e.g.Toolbox4) and you start another one (e.g. Route) which wants to update the DHDCS, this will not be successful, because the program file of an active program can not be deleted. So if Toolbox4 is active already, the DHDCS runs in the background and its program file is open. So Route can not update the DHDCS.

In this case, an error dialog is displayed asking you to first quit all DHD applications and the restart the software with the new `DHDCS`. If you do as requested, the `DHDCS` is updated correctly.

Figure 1–6: **Error message if a DHD Communication Server is already running and can not be updated.**

Though the DHD application starts after clicking OK in the error message, but it can not set up a connection to the RM4200D Devices in the network.

All versions of the `DHD Communication Server` are programmed in a way that also older versions of DHD applications work with the new `DHDCS`. Therefore, you can use older versions of DHD applications even if a newer version of the `DHDCS` is installed on your PC.

Note: You can *not* run older versions of DHD applications that do not work with the `DHDCS` yet and newer programs with `DHDCS` *at the same time!* As soon as an older application is started, it reserves the UDP data stream so the `DHDCS` has no access. It is the same the other way round: If the `DHDCS` is running, it uses the UDP data stream exclusively. Other applications have no access any more.

1.3   Using the DHDCS

Overview

Normally, the `DHD Communication Server` runs automatically in the background as soon as you start a DHD application. The server carries out all the UDP network communication for all DHD applications without a need for you to bother. At the same time, it records the UDP messages sent by DHD Devices in the network.

You can use this feature of the `DHDCS` to monitor and record the function from one or more RM4200D systems in the network. Doing so, the software receives UDP- and CAN-Bus-messages via the network and can save this data in log files. (See "Overview" on page 2.)

Important Note: Since its introduction, the `DHD Communication Server` is the only application that is able to record UDP- and CAN-Bus-messages and write them in files.

If you want to access the extended functions of the `DHDCS`, you first have to open its application window. For that, do the following:

1. Make sure the `DHDCS` is active. To do that, start any one of the DHD applications, e.g. `Toolbox4`. You recognize an active `DHDCS` when the small orange DHD logo is displayed in the icon tray of the Windows task bar.

2. Double click on this logo. The `DHDCS` application window opens. Alternatively, you can also right-click on the icon and use the context menu. Use the `Open` command to open the window.
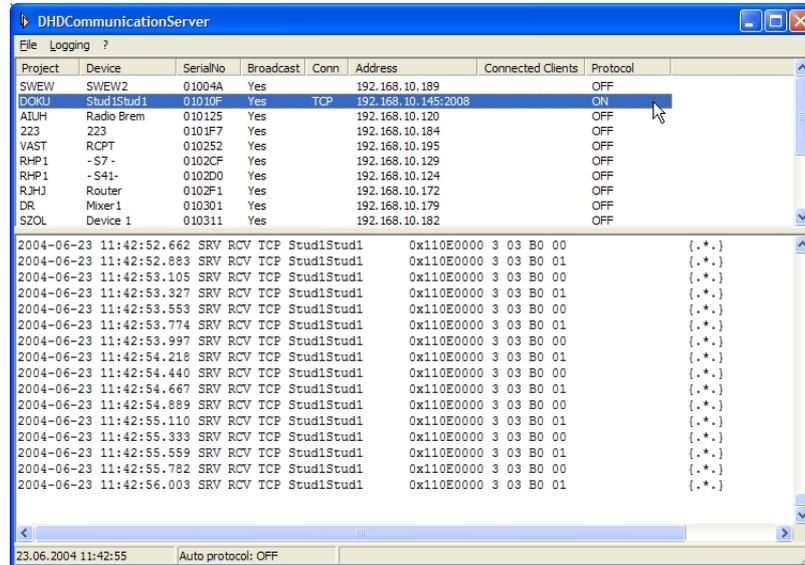
Figure 1–7: The application window of the DHD Communication Server. In the upper section, you see the Device list, below the logging area.

The application window consists of the following parts (top to bottom):

- *Menu bar.* Here you find menu commands that can be used to control the extended functions of the DHDCS.

- *List of Devices.* Here, all Devices in the network visible to the DHDCS are listed. The Devices in the list have registered automatically using UDP broadcast messages. In addition, you can add Devices manually. The listed details for each Device are explained in the next section. (See also "Add Device" on page 13.)

- *Logging area.* Here, all messages are displayed that are transferred from the Devices to the DHD Communication Server. The data can be transferred via the serial port or via Ethernet using the TCP/IP or UDP protocols. You can filter the display in the protocol section using the settings in the Extended Logging dialog. (See also "Options, Extended Logging" on page 16.)

Tip: You can shift the divider between the Device list and the logging area by clicking and dragging it.

- *Status bar.* Here, the current date and time are displayed. You can also see whether the option Auto Protocol is active or whether and how messages are filtered in the protocol area. (See "Options, Logging" on page 14.)

List of Devices

In the area below the menus, all Devices are listed that are available to the DHD Communication Server. Devices that can send UDP broadcast messages to the PC with the DHDCS are registered automatically and added to the list. Apart from that, you can use the Add Device command to add Devices manually. (See "Add Device" on page 13.)
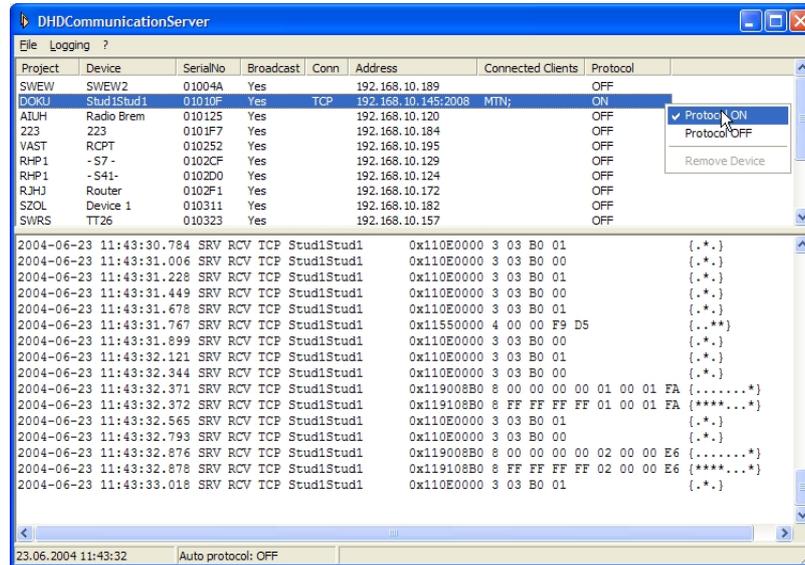
Figure 1–8: **The list of Devices of the DHD Communication Server with context menu activated.**

The list is subdivided in eight columns displaying the following information for each Device:

- *Project.* This is a four-digit project ID of the Device, which is broadcast by the Device.
- *Device.* These are the first ten characters of the Device name as broadcast from the Device.
- *Serial No.* This is the serial number of the Device. It corresponds to the last three bytes of DHDs own Ethernet MAC address. If the Device was not automatically registered via the UDP protocol, this information is not available.
- *Broadcast.* The value `Yes` means that the Device is broadcasting UDP messages. If this column is empty, there is no UDP connection possible at the time.
- *Conn.* Here, the kind of data connection is indicated. `COM` means that the Device is connected to the PC via a serial port. `TCP` means that there is a direct connection using the TCP/IP protocol.
- *Connected Clients.* In this column is indicated, which DHD applications are connected to the corresponding Device. The abbrevations have the following meaning:
    - „TB4“:   Toolbox4
    - „TBX“:   Toolbox45
    - „SMR“:   Setup Manager
    - „SRV“:   DHD Communication Server
    - „MTN“:   Maintenance Window
    - „RT4“:   Route
    - „RCS“:   Remote Control Software
- *Protocol.* This column indicates whether the logging for the Device is active (`ON`) or not (`OFF`). The additional information `ON (by <Client>)` indicates that the data connection was started by a DHD application. If the value `ON` is displayed, there is always a direct TCP/IP-connection or a serial connection.

If you want to activate or deactivate the logging for a Device in the list, make use of the contextual menu. Right-click on the selected Device. The contextual menu appears enabling you to select the commands `Protocol ON` or `Protocol OFF` respectively. If you have added a Device manually, also the `Remove Device` command is available. This way, you can remove the Device from the list.

The File Menu

Exit

Use this command to quit the `DHD Communication Server`. Alternatively, you can right-click on the small DHD logo in the icon tray of the Windows task bar. In the appearing context menu select the `Exit` command.

If at least one DHD application is running and uses the `DHDCS`, a warning message is displayed. This tells you that quitting the `DHDCS` can lead to errors in the DHD applications using the `DHDCS`.
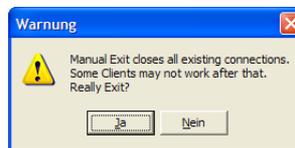
Figure 1–9:   Confirmation dialog when quitting the DHD Communication Server while DHD applications are active.

Normally, you should click on No in this dialog to continue the operation of the `DHDCS` and then quit all DHD applications. When you quit the last DHD application, the `DHDCS` is quitted automatically.

But if you click on the `Yes` button, the `DHDCS` is quitted without respect to any DHD applications still running. In this case, the corresponding DHD application may display an error message a few seconds later. This tells you that there is no communication possible between the software and the RM4200D Devices.
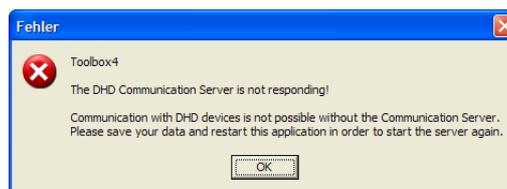
Figure 1–10:   Error message of the Toolbox4 software to indicate the interrupted communication with the DHDCS.

After confirming this message, you can further use the DHD application e.g. to carry out more Config changes using the `Toolbox4` software. *However, there is no network access to the RM4200D Devices any more!*

If you want to reconnect, first save your current data and quit the DHD application. Now restart the program to automatically restart the `DHDCS` in the background.

Important Note: Once you have quitted the `DHD Communication Server`, you can restart it by double clicking on the file `DHDCS.exe`! The connection to DHD applications already open can not be reopened though. In this case, you have to quit and restart the DHD applications concerned.

If you want to quit the DHDCS while a logging function is active, an error message is displayed telling you that quitting the server will interrupt the logging.
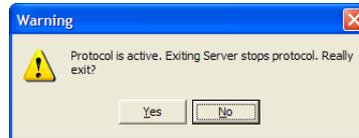
Figure 1–11: **Confirmation dialog of the DHD Communication Server when the logging function is active.**

After you confirmed the security check, the logging function and the server are quitted. If you do not confirm, the operation is continued and the DHDCS is not quitted. (See also "Options, Logging" on page 14.)

Important Note: If you have activated the logging function for a Device in the Device list, it only remains active as long as the DHDCS is running. If the server is quitted or restarted, you have to reactivate the logging function for this Device.

If you switch off the monitored DSP frame, the logging function is *not stopped*. When the Device is switched on again and transfers data under a known IP address, the protocol is continued. This may be useful for long-term protocols when the monitored Device is not always switched on.

The Logging Menu

Use this menu to control which data is recorded by the `DHD Communication Server`.

Add Device

Use this command to manually set up a connection to a RM4200D. This is necessary if the Device is either connected to your PC via a serial port or if it can not register using UDP broadcasts. After selecting this command, the following dialog opens:
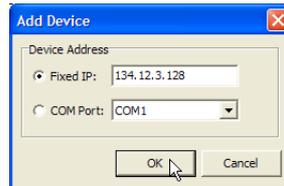
Figure 1–12:   Use his dialog to add a Device to the Device list manually.

Now, you have the following options to set up a connection to the Device:

- *Fixed IP.* If you know the IP address of a Device, you can enter it here. This is useful if the PC with the `DHD Communication Server` and the RM4200D can not communicate using the UDP protocol, but the IP address of the Device is known.

- *COM Port.* Select this option if you want to connect a Device to the PC using the serial port. Use the popup menu to select the correct port. Make sure that this port is *not used by other programs already!*

Now close the dialog by clicking on the `OK` button. The device you just added is displayed in the list.

Note: If you have added a Device to the list manually, from this moment on, it is available to all DHD applications able to access the `DHDCS`.

In the following figure you see a Device that is available to the serial port of a PC in the `Toolbox4` software. It is located in the `Select` area in the DHD Connection dialog.
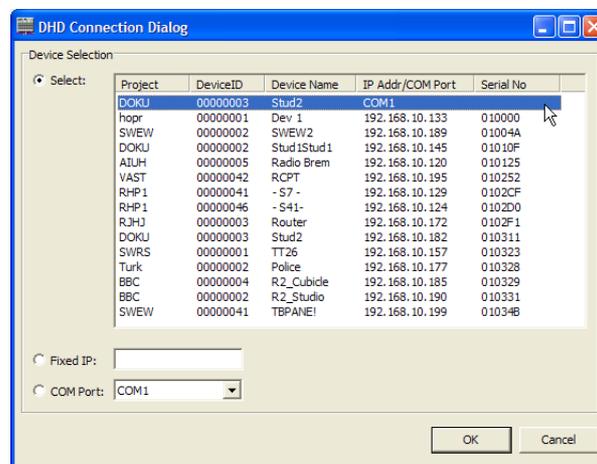
Figure 1–13:   The DHD Connection dialog of the Toolbox4-Software. In the first line, there is a Device connected to the serial port that was added manually.

Remove Device

Use this command to remove a Device from the Device list, if you have added it before using the `Add Device` command. Highlight the Device in the list and then select the command `Remove Device`. Alternatively, you can also right-click on the desired entry and select the `Remove Device` command from the contextual menu.

Tip: You should remove a Device from the list if the UDP communication between the Device and the PC is working again. In this case, the Device registers automatically and then appears in the list twice. Remove the Device that was added manually to the serial port. Now, data transfer is carried out using the faster Ethernet port.

Important Note: If you want to interrupt an existing serial connection to a Device, do the following: *First* remove the Device from the Device list before interrupting the connection! If not, this can cause error messages when interrupting the connection.

Suppress Memo Logging (F5)

Eventually it can happen that a lot of messages are displayed in the logging pane of the `DHD Communication Server` within a short period of time. The amount of incoming messages depends on how many Devices are monitored and what kind of messages are included into the logging. If the window is scrolling very quickly in this situation, you can stop the display using the `Suppress Memo Logging` command. Select this command again to continue the display. The logging indicates how many messages were skipped while the display was stopped.

Note: If you have configured in the options that the messages are recorded in a logging file, the output continues even if the display was stopped.

Clear Memo (F8)

Use this command to delete the contents of the logging pane. A possible output of the messages in a logging file is not influenced by this.

Show Logfile (F4)

In the options, if you have activated logging to a file, this command opens the file in the standard editor of the PC.

Options, Logging

Use this command to control the way the `DHD Communication Servers` works. If you have selected the `Options` command, the options dialog opens. It contains two tabs, `Logging` and `Extended Logging`. You use them to control the way the logging works.

Note: All settings in the options dialog keep their current values even if the `DHD Communication Server` is quitted.
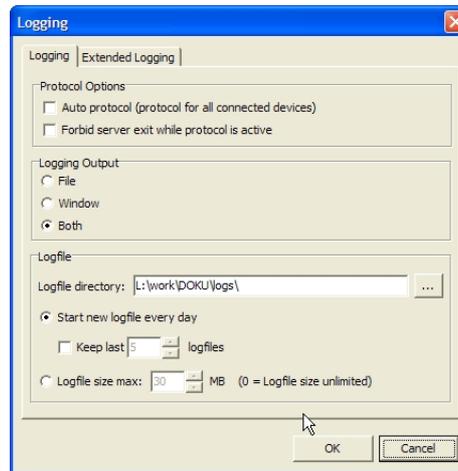
Figure 1–14: The options dialog for the operation of the DHD Communication Server. Here you can control the logging process.

In the `Logging` tab, set the general protocol options. You can use the following controls:

- *Protocol Options.* If you activate the checkbox `Auto protocol (protocol for all connected devices),` the `DHD Communication Server` records the messages for every Device a DHD application connects to – either via TCP/IP or via the serial port. If this condition is active, the column `Protocol` in the Device list will show `ON` for each Device affected. You can e.g. create log entries if you select a Device in the Device tree in the `Toolbox4` Maintenance Window or if you load a Config to the Device. By default, the checkbox is off.

Tip: Switch on this option if you want to monitor how other DHD applications (not running on your PC) communicate with a DSP frame. Keep in mind that certain actions, e.g. updating the firmware, can create more data in the protocol.

Switch on the checkbox `Forbid server exit when protocol is active` if you want to avoid that the DHDCS is quitted while recording a logging. This way, you can make sure that a long term logging can not be interrupted accidentally. If this option is active and you try to quit the DHDCS, the message `Protocol is active, Server could not stop` is displayed. In this case, the DHDCS can not be quitted as long as a logging is active. By default, this checkbox is off.

Important Note: If you have switched on the checkbox `Forbid server exit when protocol is active` and a log is being recorded for a Device, the PC can not be shut down just like that. Windows recognizes an active DHD application and requires to quit it or to interrupt the shut down. Other active programs on the PC can be quit by the system, though.

- *Logging output.* Use these three radio buttons to determine where the logging information should go. The `File` option outputs the logging only into a file, the option `Window` displays the messages only to the logging area and the

`Both` option writes data both into the logging area and to the file. By default, the latter option is active.

- *Logfile.* Here, you can set where the logging data is saved. Use the `Logfile directory` entry box to enter the path to the destination directory for the log files. At the first start-up of the `DHD Communication Server`, the directory is inserted, into which the program file `DHDCS.exe` is extracted.

  The log files contain the log entries as ASCII text and are named according to the scheme `DHDyyyy-mm-tt.log` (e.g. `DHD2004-01-16.log`) `yyyy` indicates the year, `mm` the month and `tt` the day when the protocol file was started.

Important Note: If you select a directory for the protocol files, you have to make sure that your current Windows user account has write permission to this directory!

Use the following two radio buttons to determine when a new log file should be started. If the option `Start new logfile every day` is selected, the `DHDCS` starts a new file every day at midnight. In addition, you can activate the `Keep last <No> logfiles` checkbox to keep as many log files as stated under `<No>`. By default, the last five files are kept; but you can set all values between 1 and 100.

If you activate the radio button `Logfile size max: <No> MB` though, the size of the log file is limited to the number stated (in megabytes). As soon as the file reaches this size, the oldest files are overwritten. Here, the default setting is 30 megabytes. If you set the value for the maximum size to `0 MB`, the log file may be unlimited.

Important Note: Depending on the number of logged Devices and the selected settings, log files can reach a size of 100 MB or more. Therefore make sure that sufficient space is available on the hard disk of the PC!

Options, Extended Logging

In this tab you can configure how UDP messages are filtered before being logged. The values set here influence the incoming messages of all monitored Devices. Only messages that match with the set filter criteria are logged.

Figure 1–15: Use this dialog to determine filter options for logging the messages from RM4200D Devices.

In the tab `UDP Logging`, you can use the following options:

- *Globallogics.* Activate this checkbox if you want to log all UDP messages transferring changes to Global Logic functions.
- *Everything else.* If this checkbox is active, all UDP commands that belong to the same project are logged, including routing commands, status messages of Global Resources and settings for Global Potentiometers.
- *Do not log UDP error messages.* If this checkbox is active, UDP messages are suppressed that normally are output as „error conditions". This includes e.g. the over modulation of inputs, changes of the synchronization sources or problems with DSP cards.

Caution: Use this option only in exceptional cases and only over a limited period of time. If you leave it switched on accidentally, important information can be lost.

By default, none of the checkboxes is switched on. If you activate one of them, the `DHD Communication Server` starts logging the incoming messages. Accordingly, all settings become active that you have chosen for logging.

Important Note: All settings in the pane `Extended Logging` are only active as long as the `DHD Communication Server` is running. If the program is quitted and restarted, all options are reset to their default values.

1.4 Practical Logging Tips

You can use the `DHD Communication Server` to search for faulty functions in a RM4200D system. Often, the activities of the system are logged in detail or logged in a long-time recording. To make the troubleshooting successful, keep the following in mind:

1. *Use a dedicated PC for monitoring the system.* For complex RM4200D systems with a high number of Global functions, there can emerge heavy network traffic that needs to be logged. To do that, use a sufficiently powerful PC that is used for this task only.

2. *Check the network.* Before starting the logging, check the used network. *You must avoid to operate RM 4200D Devices and the PC with the DHDCS in an existing office network.* The data traffic in such a network can disturb the transfer of UDP messages significantly. A RM4200D with several Devices should have its own network segment in which also the PC with the DHDCS is running. Read also the corresponding sections in „Part 5 - Installation Guide" of this manual.

3. *If necessary, use two network adapters.* If you need to remotely control the logging PC (e.g. with VNC, Timbuktu or PC Anywhere), it should be equipped with two network adapters. One should be located in the same network as the RM4200D Devices, the other one in the general network where also the controlling PC is running.

4. *Make sure there is enough free disk space.* Especially for long time loggings, it is necessary to have enough space available for the log files. If you want to store the files on a file server, check in advance whether this works in your network as desired.

5. *Compress the logging files.* Use an archive or compressing program like WinZip (www.winzip.com), to reduce the size of the protocol files, especially if you want to transfer the files via e-mail. By compressing, the file size is reduced to 5-10% of the original size.

6. *Plan the trouble shooting.* Certain errors occur only under certain conditions. If you suspect such an error, try to find out, when and under which conditions it is probable. Often, an error can be related to certain times of the day or certain user procedures. Record especially at the times in question.This way, try to keep the amount of data as low as possible to make analysis easier.

7. *Use special software to analyse logging data.* Short log files can be analysed using the Windows editor. But if you have to search several hundred MB of data for a certain message, the effort is very high. In such cases, make use of a software that can handle and search big text files. One of these programs is e.g. **UltraEdit** (www.ultraedit.com). Using it, you can effectively search huge text files and extract important information.

   UNIX based operating systems (e.g. Linux, Solaris, Irix, Mac OS X, HP-UX etc.) provide specialized command line applications for such purposes. If you have to analyse big amounts of protocol data, this could be quicker and more effective on a different operating system. Alternatively, you can also install UNIX tools on Windows. To do this, you can use **Cygwin Tools** (www.cygwin.com) or the Perl for for Windows, **ActivePerl** (www.activestate.com).

Tip: If you have any questions concerning the analysis of logfiles, please ask your DHD support!

2 RM420-550 Routing Software

2.1 Introduction

If you like, you can run an RM4200D DSP frame without control surface and use it exclusively for routing of audio signals. In this operation mode, the DSP frame works as a **Routing Matrix**, which can be used to switch various input signals to one or more outputs. All corresponding control commands - the **routing commands** - will be transferred to the DSP frame via an ethernet connection (or the serial interface).

Routing commands are special data packages which are sent to a DSP frame. Routingbefehle sind spezielle Datenpakete, an den DSP-Frame gesendet werden. In common, such commands will be generated by the `Routing Software`, running on a usual Windows PC. This PC is connected to the DSP frame via ethernet or a serial cable. Additionally you can force the execution of routing commands for a DSP frame from another RM4200D system. That is a valuable feature if for example a number of sources on a central routing device should be swtiched from a studio's or a control room's control surface.

This chapter describes the functionality of the `routing software`, which is used for remote controlling a RM4200D router in a simple and comfortable way. You can set crosspoints manually or control them automatically and scheduled. More complex sets of crosspoints can be predefined in scripts, which can be executed by a simple mouse-click.

If you like, you can run the routing software on multiple PCs to control a single RM4200D device. In this case you may create different input/output lists with restricted access. That way you can support varying responsibilities of different users.

2.2 System Requirements and Installation

All DHD applications are programmed for and tested on Microsoft Windows XP. Therefore, you should use this operating system to run the programs. The display of your PC should have a resolution of at least 1024 x 768 pixel to show all windows of the routing software properly.

Important Note: If you want to run DHD applications on other versions of the Windows operating system, you can do so at your own risk. In many cases, it will work. **Nevertheless, this is not recommended by DHD**! Tests and troubleshooting are carried out on Windows XP only, therefore, solving problems with DHD applications on other versions of Windows does not have any priority!

The `routing software` is a normal Windows program. It does not require any additional DLLs or other files. For installation, copy the program file on to the hard drive of your PC. To remove the program, just delete its program file. Start the software by opening the file *route.exe*.

To uninstall the software, you simply have to delete the file *route.exe*.

If you would like, you can run the software without an RM4200D device connected. In that case the functionality is strongly limited, as there is no hardware, which can be controlled by the software. The setting of crosspoints or controlling their current state is *not* possible.

You can connect your PC (with the `routing software` installed) to a DSP frame in two ways, via serial cable (RS232) or ethernet and TCP/IP.

Note: If possible, connect your PC with the routing software installed and the DSP frame via ethernet and TCP/IP. This connection is much faster than a coupling via serial cable. However, the network settings of your PC and the DSP frame need to be in the correct range. Additionally, you have to pay attention, that PC and RM4200D devices, which should be remotely controlled, are running in the same network to be able to share UDP Broadcasts. More detailed information about both ways of connections can be found in part 3 of this documentation, *Toolbox 4 Configuration Reference*.

2.3   Password protection

Unauthorised access to the configuration of crosspoints is restricted by a password. As a matter of course, this password can be indiviually changed. During the very first startup of the `routing software`, when there is no individual password specified, access to the configuration is restricted by a default password. As a user, you will be notified by a dialog box to enter this default password.

If you confirm this window by clicking „OK", you will reach the prompt to enter the password.
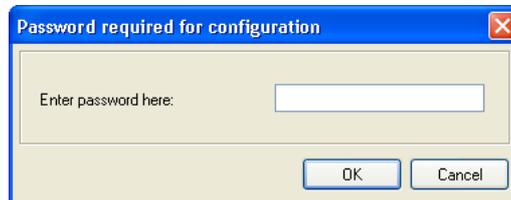
Enter „**default**" into the textbox and press „OK". (See also "Security" on page 41.)

2.4   Licensing

To be able to use the `routing software`, you need a *license key*. This key is a string of characters you will receive either within the shipment on the project's CD or by email directly from DHD.

This license is valid either for a RM4200D DSP frame or for a specified PC. In the former case you can connect from different PCs to the licensed DSP Frame. In the second case, you can run the software limited to one licensed PC, but with the possibility to control any DSP frame.

In every case the license key is based on the last 3 byte of the ethernet chip's MAC address of the respective device.

Important Note: If you order a license key for the `routing software`, you should have the MAC address of your PC or the according DSP Frame present.

Additional information about entering of license keys are mentioned in a later chapter. (See also "Enter license" on page 32.)

License for a certain DSP frame

If you get a license key for a certain DSP frame, you may install the routing software on any number of PCs. However, these PCs can only communicate with the licensed DSP frame.

You can detect the last 3 byte of the MAC adress as follows:

Start the `Toolbox4` software and open the `Maintenance Window`. Starten Sie die `Toolbox4`-Software und öffnen Sie das `Maintenance Fenster`. In the left part of the window you will see a list of all RM4200D devices available in the network. For every device, a 6-digit code is listed right beside its name and project ID.
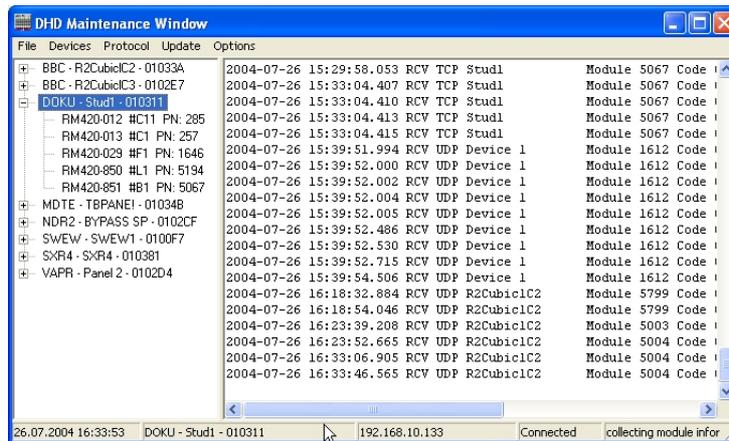
Figure 1–16:   Highlighted in blue: Project ID, name and the last 3 byte of the MAC address of a device.

Another way to find out the three byte of the MAC address is to display the modul information of the RM420-850 Communication Controller. Select the according module in the device tree and press key F11. A new window displays the detailed module information, wherein you can find the 3 byte of the MAC address in line `MAC address`.
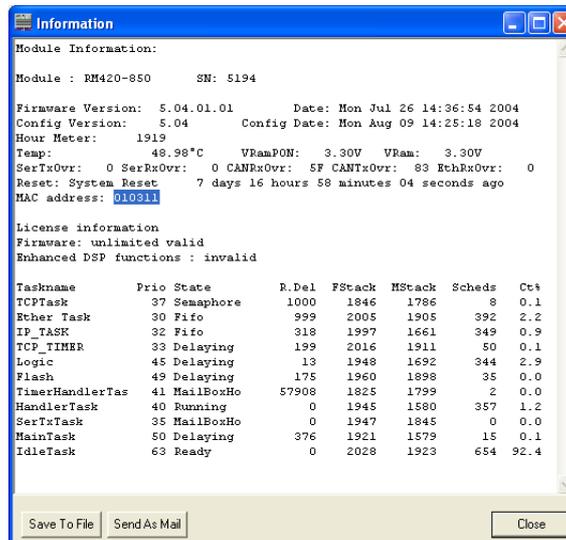
Figure 1–17:   Highlighted in blue: The MAC address shown in the module information of module RM420-850.

Important Note: If you need to exchange a communication controller module RM420-850, the spare module comes with another MAC address. This may invalidate your software's license code. Should this be the case, you need to order a new license code from DHD. Please specify the last 3 byte of the new controller's MAC address within your order.

License for a certain PC

Aternatively, the `routing software` can be licensed for a certain PC. That is useful, if you would like to manage several RM4200D DSP Frame from one single PC. For ordering a license, you need the MAC address of your PC. Please follow these steps to detect your PCs MAC address under Windows XP or Windows 2000:

1. Click on `Run` in the Windows Start-Menu.

2. In the opening dialog box, enter `cmd` and press the `OK` button.Enter Geben Sie im Eingabefeld den Befehl `cmd` ein und klicken Sie den Button `OK`. A command line window opens.

3. At the prompt, enter `ipconfig /all` and press `Enter`.

4. The current configuration of your PC's network interface is displayed. Search for the entry `Physical address`. On its right side, you will find the MAC address formatted like `ab-cd-ef-gh-ij-kl`. Please use this string for the request of a license code.

2.5 Principle of operation and control surface.

Overview

The routing software is used to interconnect inputs and outputs of a remote-controlled DSP frame. An interconnection of input- and outputsignal is also called crosspoint.

Note: You can only connect *one inputsignal* with *one output*. More than one inputsignals can *not be connected same time* with one single output. On the other side, you can connect the same input signal to any number of outputs.
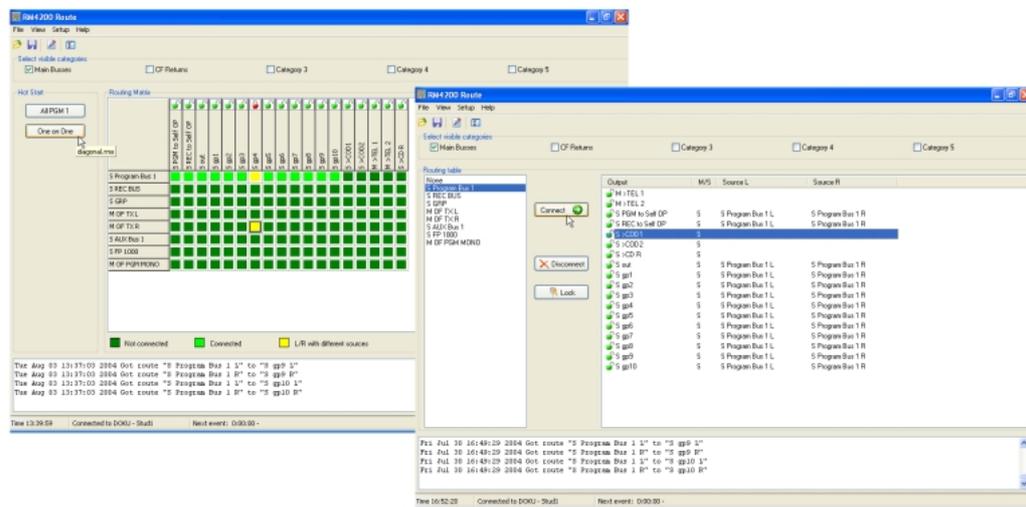
Figure 1–18: **Current crosspoints in routing matrix view and routing table view.**

You have several possibilities to set or release crosspoints:

1. To set or release crosspoints manually. Therefore two different views are available: the **routing matrix** and the **routing table**. (See "Using the Routing Software" on page 44.)

2. If you need to set a larger number of crosspoints at the same time, you can save this set of crosspoints as a script. Such scripts may be assigned inside the `routing software` to so called **Hot Start Buttons**. To start a script which changes defined crosspoints, you simply press the related Hot Start Button. The assigned script is executed and all defined crosspoints will be set. (See "Using Hot Start Buttons" on page 47.)

3. The `Routing Software` enables the scheduled execution of scripts. To plan your individual events an internal tool can be used, called the **Scheduler**. This tool represents an optional feature, which needs to be ordered separately. (See "Scheduler – Connecting crosspoints time controlled" on page 50.)

Note: The Routing Software offers internal security mechanisms to prevent unaware connections. Additionally, you can restrict any access to the setup by a password protection. (See "Security" on page 41.)

Loading the current state of a router

If you start the `Routing Software` for the very first time, you will probably get an error message. This dialog warns, that the software has not been connected to any RM4200D device before and that no configuration data could be found. Therefore the application is not able to connect to an RM4200D device. You will receive a similar warning, if the software still has been used on the same PC, but a connection to the last connected device could not be established.

Figure 1–19: Error message of the Routing Software, if no connection could be established.

The reason for this behaviour during the first startup is as follows:

During startup, the `Routing Software` requires basic configuration information to display a router's current state visually. This information is not available if the software is started primerly. It needs to be loaded before. Two „loading"-options are available:

1. You may open an existing `Toolbox4` project file and select a specified device: Use the `I/O Setup command in the Setup menu`. If you have not already selected a project file, the `Select Data Source Device` dialog automatically opens. If a project file still has been loaded, and you would like to exchange the selected project file, click on the `Change Device` button in the `I/O Setup` dialog. The `Select Data Source Device` dialog is opened. Please activate the radiobutton `File (*.ddp, *.ddf)`. Clock on button ..., and choose the required Toolbox4 project file. Use the popup menu `Device`, to choose the desired device.

2. Alternatively, you can download the current configuration from a still configured RM4200D device. Therefore you use the command `Preferences` from the menu `Setup`. (See "Preferences - Assignment of Pre-Settings" on page 40.)
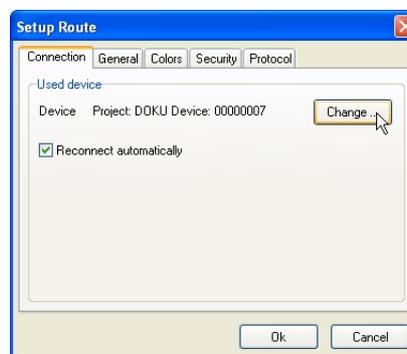
Figure 1–20: The dialog to select a RM4200D device.

1. Click on button `Change...` to open the DHD Connection dialog. Select the device you would like to use for downloading the current information. If you would like to configure the `Routing Software` to automatically reconnect to the specified device, please check `Reconnect automatically`. From now on, please proceed exactly as described in the first alternative. Open dialog `Select data source device`. The just selected device should be displayed.

Figure 1–21: **How to load the current state of a router**.

1. Activate radiobutton `Device` and click on `Load`. The current state of the router will be transferred to the software.

You have shifted the software into an working state.

The configuration will be stored in the file

IO.CFG

.

This file is located in the same directory as the `Routing Software`.

The Main Window

When starting the `Routing Software`, the main window is displayed at first. The largest part of the window is used for showing the current state of the connected router.

This view has two basic modes: the **Routing Matrix** and the **Routing Table**. In the routing matrix view, all inputs and outputs of the router are displayed checkered, crosspoints are shown different colors. In the routing table view, all configured crosspoints are displayed in text-format.

Tip: If names of input- and outputsignals appear insignificant, you may change them. Please use the `Rename I/Os` command from the menu `Setup`. (See "Rename I/Os - Renaming Signals" on page 38.)
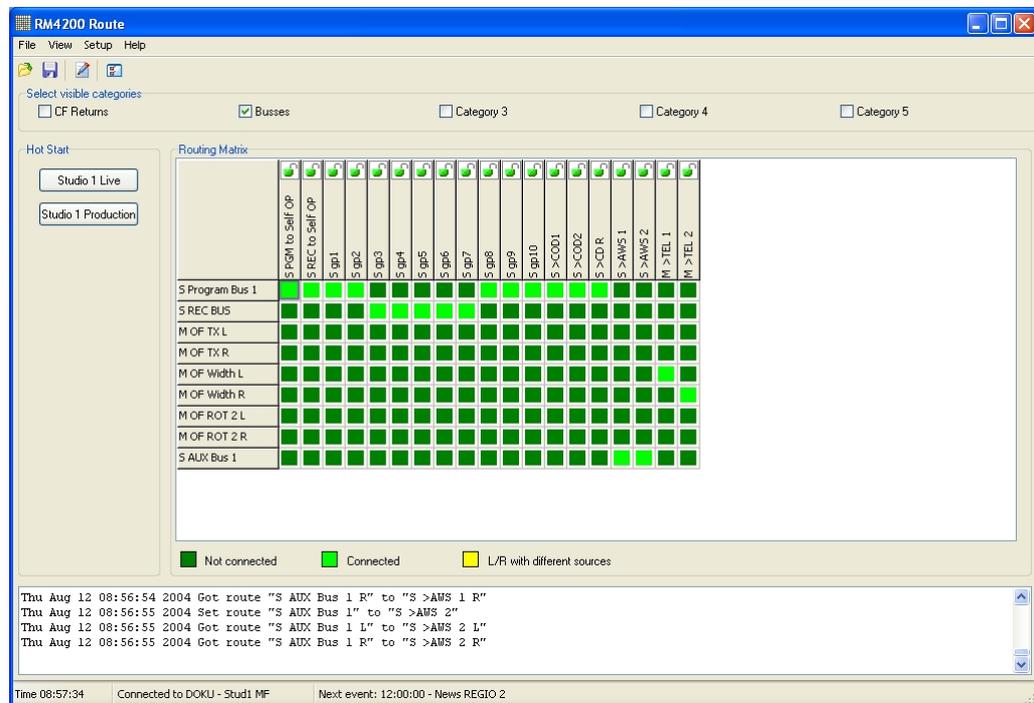
Figure 1–22: **The main window in the Routing Matrix view.**

The main window of the Routing Software exists of the following parts (from top to down):

- *Menu bar and icons.* The menu bar contains the menus `File`, `View`, `Setup` and `Help`. With the 4 icons below you can directly call to frequently used functions of the software: `File Open`, `File Save`, `Script Editor` and `I/O Setup`.

- *Select visible categories.* Use these 5 checkboxes to select, which audio sources are displayed in the routing views. In the `I/O Setup` dialog you can assign the available input signals of the DSP frame to categories and change the names of the categories, if needed. Switching the checkbox of a category to on will display all assigned signals in the routing view; besides, the signals will be masked. (See "I/O Setup -Assigning Inputs and Outputs" on page 33.)

- *Hot Start.* This area is reserved for the configured Hot Start Buttons, which can be used for starting predefined routing scripts by a single mouse-click. Only

configured buttons will be displayed. You may define your own, individual Fot Start Buttons using the dialog `Hot Start Configuration`. Key F10 or command `Hot Start Buttons` from menu `View` will switch the Hot Start area on or off. (See also "Using Hot Start Buttons" on page 47.)

- *Routingstate.* The largest part of the window is used for displaying the current routing state. The state of the router is shown in two possible modes, the Routing Matrix or the Routing Table. Below the routing view, a caption describes the meaning of the different colorcodes of the shown crosspoints. Use the commands `Routing Table` and `Routing Matrix` from the menu `View`, to switch betwenn both views.

- *Protocolarea.* This area protocols each single switching of crosspoints. The protocol registers the switching-time and which input signal has been routed to which output. With this information, you can extactly determine, when a specified coupling was done. Use the scrollbar to show older protocol entries. Additionally, all entries will be written into a logfile. (See also "Protocol" on page 43.)

- *Statusbar.* At the lower edge of the window, current state information will be shown:

    1. `Time` is the current system time, format is `hh:mm:ss`.

    2. `Connected to:` displays the Project ID and Device Name of the system, which is connected with the software. If the software is without any connection, `Not connected` is indicated.

    3. `Next Event:` shows the time of the next routing event planned with the `Scheduler` dialog. If no routing event is scheduled, the entry switches to `0:00:00 - No more Events today`. (See also "Scheduler – Connecting crosspoints time controlled" on page 50.)

2.6 Quickreference on menus and commands

This abstract offers a compact overview over menu commands of the Routing Software. Some of the commands and their related functionalities will be described in detail in a later abstract.

File Menu – Open and Save

Open Script

Use this command to load *and* execute a routing script from a file. A routing script represents a current state of a router, a set of crosspoints between inputsignals and outputs. Routing scripts will be saved as textfiles in a special format with the file extension

*.rms.

To save the current state of a router as a routing script, use `Save Script` command.

Important Note: If you open a file with file extension

*.rms

the routing script inside will be immediately executed. You can prevent from direct execution and insert a user prompt instead, if you want. To do so, open the script editor and activate the command `Script execution requires confirmation` from the menu `Options`. (See also "Menu Options" on page 62.)

You may also open scripts by using the following icon:

Save Script

This command enables to save a current router state as a routing script into a file. This file is a special textfile with file extension

*.rms

.

You may also save scripts by using the the following icon:

Exit

Use this command to close the `Routing Software`. There will be *no confirmation* before closing the software, as all activated crosspoints are stored in the router itself and the software merely displays these states.

View Menu – Viewing options

Refresh

Use this command to refresh your routing view. The software reconnects to the DSP frame and reloads the current state.

This command is useful whenever other instances of the Routing Software on different PCs control the same routing device or if users of RM4200D control surfaces remote-control the same crosspoints.

> **Tip:** Normally, it is not necessary to use the `Refresh` command. Every switching of a crosspoint forces a direct answer in an RM4200D, which is transferred via TCP to all connected DHD applications. Normalerweise ist es nicht nötig, dass Sie diesen Befehl benutzen. As a result, the Routing Software refreshes the routing view. Under certain conditions, it may happen that the display reacts delayed. In that case you may force a manual refresh by using the `Refresh` command.

Single View (F11)

This command switches between two different modes of displaying crosspoints: `Single view` means, that all crosspoints are shown channel by channel (left, right, mono), which means, that a stereo crosspoint is represented by a joint for the left and a joint for the right channel. If the Single View is not activated, stereo signals as well as mono signal are represented by a single joint. An activated Single View is indicated by a checkbox in front of the menu command.
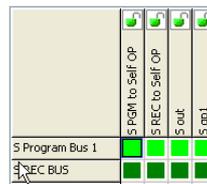
Figure 1–23:   Routing Matrix with mono/stereo view in normal mode.

> **Important Note:** Please note, that viewing a routing state in the Single View mode may increase the size of the routing matrix or the routing table enormously, because a lot more crosspoints need to be displayed.
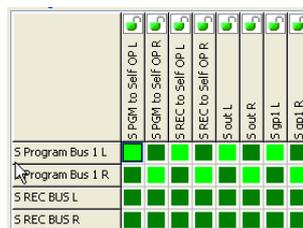
Figure 1–24:   Routing Matrix in single view mode.

Routing Table

Use this command together with the `Routing Matrix` command to switch the presentation of active crosspoints. The command `Routing Table` lists current couplings in a table. Inputs will be shown in the left column, outputs are listed in the right column. To set or release connections between inputs and outputs, you need to select the corresponding entries in the table and click on the available buttons. More detailed information can be found in a later abstract of this documentation. (See "Working with the list view" on page 44.)

Routing Matrix

This command activate the viewing of the routing state as a matrix. Available input signals will be listed in the first column of the matrix from top to down, configured outputs are arranged horizontally from left to right in the first line. To set or release crosspoints between inputs and outputs, you need to doubleclick the related joints. More detailed information can be found in a later abstract of this documentation. (See "Working with the matrix view" on page 46.)

Hot Start Buttons (F10)

Use this comand to switch on or off the **Hot Start Buttons** column in the left part of the application window. You may define up to 14 buttons, with each of them assigned to a routing script. Once you click onto a Hot Start Button, the assigned script will be executed immediately and the internally described routing state will be set.
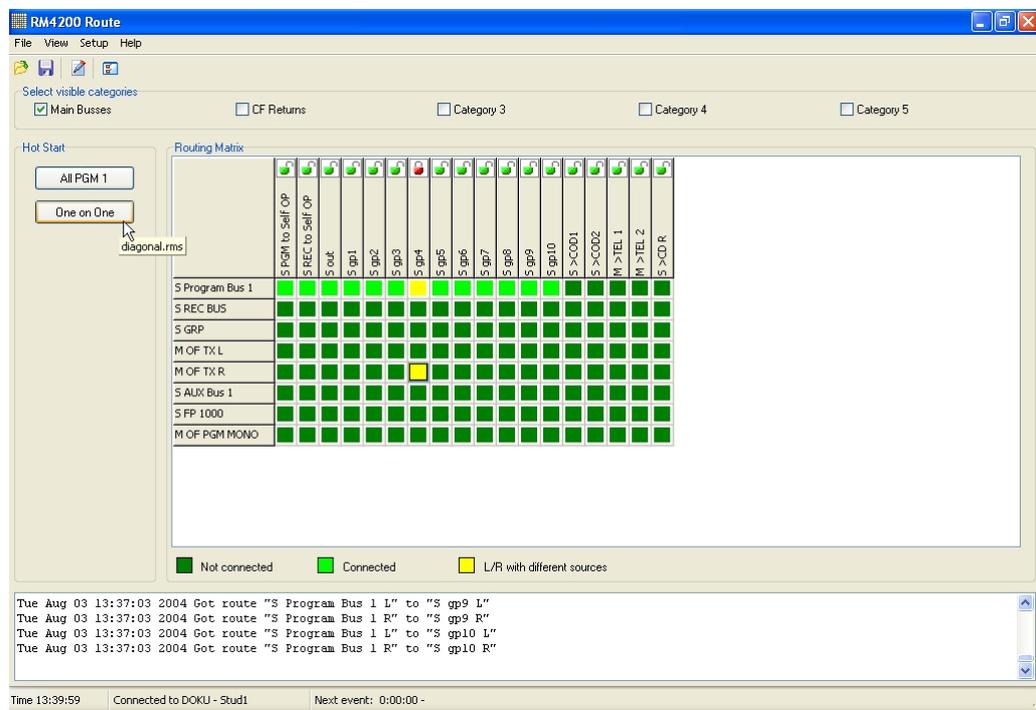
Figure 1–25: **The Hot Start Buttons view in the left part of the window. A tooltip indicates the assigned routing script file.**

Tip: If you place the mouse cursor over a Hot Start Button for a second, a tooltip will indicate the assigned routing script file.

If you right-click in the Hot Start area, a context menu appears. In this menu you may call the configuration dialog for the Hot Start Buttons (command `Hot Start Configuration...`) or switch of the Hot Start view (command `Show`). Additional information can be found in a later abstract of this documentation. (See "Using Hot Start Buttons" on page 47.)

Script Editor

This command opens a new window with an editor for routing scripts. This editor allows to edit, check and execute routing scripts. Further information can be found in a later abstract. (See "Using the Script Editor" on page 59.)

Important Note: Routing scripts are text files with a special syntax. You should *always edit such scripts using the Script Editor. Do not use a usual text editor.* The Script Editor suppresses particular information, which are necessary for its function, but should not be changed manually. A usual text editor will display this additional information and it may be changed. If you enter erroneous text and save a faulty script, running it may end up in malfunction. Therefore you should always use the Script Editor to edit routing scripts.

You can also activate the Script Editor by clicking on this icon:

Setup Menu – Preferences

In this menu you will find all commands to configure the routing software. As the amount of possible functions behind these commands is quiet extensive, their description will follow in a separate chapter. (See "Setup Menu - Software Configuration" on page 33.).

Help Menu

About

This command will open an information dialogue. Therein you can find information about version and creation date of your copy of the Routing Software.

Tip: Write down these information before contacting your DHD dealer!

Enter license

Use this command to enter the license code for your copy of the Routing Software. Please note, that you can only enter the code while hte software is connected to a RM4200D device. Additional information about the license code can be found in a previous chapter of this manual.

2.7 Setup Menu - Software Configuration

Lock Setup – Locking of Signal Paths

With this command you can activate the password protection for certain parts of the software. Usually, the settings for the used inputs and outputs (command `I/O Setup`) and for the pre-settings of the software itself (command `Preferences`) are protected by a password.

Important Note: When first starting the Routing Software, the pre-set password is „default".

When you start the program `Route.exe` and try to use one of these commands, you have to enter the right password. Once you did so, access to the two commands is activated for 15 minutes. Afterwards you have to enter the password again. However, for re-activating the password protection *before these 15 minutes are over*, please use the command `Lock Setup`. A dialogue is displayed for confirmation, and afterwards, the password protection is active again.

Tip: For entering or changing the password, please select the command `Preferences` from the menu `Setup`. Click on the register tab `Security` and then on the `Set...` button. Now you can enter the new password. After re-confirming it in another dialogue, the password is changed.

I/O Setup -Assigning Inputs and Outputs

This command opens a dialogue, with the aid of which you can define, to which input and output signals the Routing Software is to have access. These settings are very important for the operation of the program, thus they are protected by a password. Please read later on in this manual how to change the password. (See also "Security" on page 41.)

Note: Depending on the size, RM4200D-Routers can have very many inputs and outputs, which are not necessarily used. In such cases, you can control the `Routing Software` better, if only those inputs and outputs are displayed, which are actually used.

You can activate this command also by clicking on the following icon in the main screen:

Selecting the Source for the Signals

Before you can configure the signals, you first have to select from which *source* the data for the configuration of the router should come from: You can either load them from an existing project file (`*.ddp`), or transfer them directly from an RM4200D system in the network. By downloading, the `Routing Software` will receive the information necessary for the configuration, for instance about the available audio sources on the TDM bus, about configured outputs, the project ID and Device names.

Note: It does not matter if you load the configuration from a project file or directly from an RM4200D router. The stored information is equal.

Before you can actually start configuring inputs and outputs, a dialogue is displayed, in which you can select the data source. It is there where you have to decide if the information is to be loaded from a project file or from a Device.

Figure 1–26: **Please select the data source for the configuration of the inputs and outputs in this dialogue.**

In order to load the data from a configuration file, please activate the radio button `File (*.ddp, *.ddf)`. Then click on the ... button; a file dialogue is displayed. Select the desired project file. Afterwards all Devices from the project file are displayed in the pop-up menu Device. Select the Device that you want to remote-control with the `Routing Software`.

If the `Routing Software` already has been connected to a Device, and if this Device also is available in the network, it is displayed with project ID and Device name behind the radio button `Device`. If you hit the `Load` button, the current configuration is downloaded from the Device into the `Routing Software`.

If software has not yet been connected to a Device, or if this Device is not available in the network, you cannot use the `Device` option. In this case, `Not connected` is displayed.

Click the `OK` button after selecting the data source. Now the dialogue opens, in which you can configure the inputs and outputs:
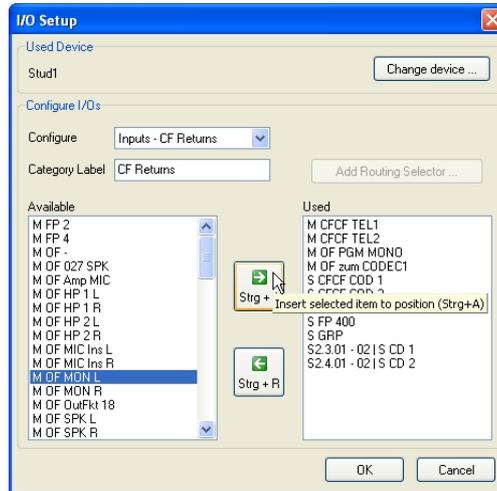
Figure 1–27: In this dialogue you can configure the inputs and outputs of the router.

In the upper area `Used Device` you can see, which Device you are currently configuring. If you want to access another Device, click the `Change device` button. The just described dialogue for selecting the data source opens and you can select a different Device.

Configuration of Inputs and Outputs

The `Configure I/Os` area of the dialogue serves for assigning the inputs and outputs that are „visible" to the `Routing Software`.

Tip: With respect to the `Routing Software`, it does not matter, which or how many of the signals available you are viewing. However, it is helpful only to configure those signals, which are actually used. Thus the screen display of the program becomes more clearly laid out, and the probability of faulty mal-operations decreases.
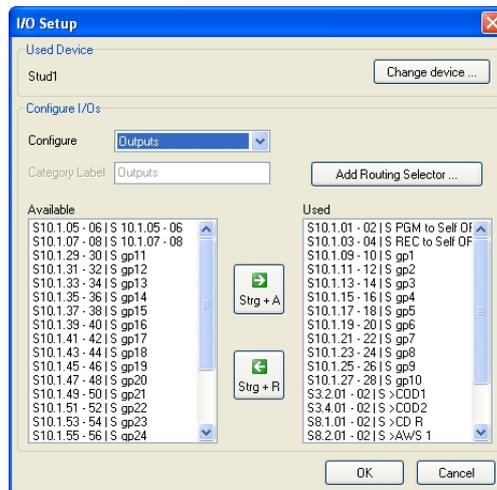

Figure 1–28: Dialogue for assigning the „visible" signals. The left column contains all signals available; the right column contains all signals that were selected for viewing.

The `Configure I/Os` area contains the following elements:

- `Configure`: Please select with this pop-up menu if you want to configure the inputs or the outputs of the router. There is one entry for the outputs (`Outputs`); however, there are five different categories for the inputs (`Input - <Category Name>`). Please select here, which signal group you would like to work with.

Tip: You can subdivide the inputs available into five categories. Each input can be located in *exactly one* category. As desired, you can then show or blank these categories in the display of the router status.

- `Category Label`: In this input field you can assign a name for the currently processed category of input signals. If you are just working on the output signals, you cannot use this field.
- `Add Routing Selector`: This button is only available when you are configuring outputs. On clicking it, another dialogue appears, in which you can insert and name a new **Routingselector**. This Routingselector then appears in the display as additional output. For more explanations please read the next section.
- `Available`: The left list contains all the signals available that have not been assigned yet.
- `Used`: The right list contains all signals that you already have selected for the display. You can change the order of the signals in the display by moving the entries within the list with Drag&Drop. The order of the entries in the list indicates how the signals are arranged in the matrix view - left to right for outputs and top to bottom for inputs.

The display of the available audio sources and outputs concisely contains the following information:

Category	Label	Explanation
Output	S8.1.01 - 02 | S>CD R	Stereo output (S) Slot 8. Port 1. Output 01 and 02 | Label
Output	M4.4.01 | M>TEL	Mono output (M) Slot 4. Port 4. Output 01 | Label
Output	Rt. Sel. 6 | S TX digital	Routingselector (Rt. Sel.) Number | Label
Source	M OF PFL Spk	Mono (M) Output Function Label
Source	S12.1.01 - 02 | CD	Stereo input (S) Slot 12. Port1. input 01 and 02 | Label
Soruce	S PGM BUS 1	Stereo bus (S) Label

Instructions for the configuration of *signal inputs*:

1. First, please select the category of inputs that you want to process in the pop-up menu `Configure`.

2. If you like, you can now label the selected category in the `Category Label` field. This name will then be respectively displayed in either the matrix view or the list view of the main window.

3. Now, in the left list, click on an input that you want to assign to the selected category. Hit the *upper* of the two buttons in the centre between the lists or use the shortcut Strg+A for moving the selected input from left list to right list.

4. Select another output in the left list and proceed the same way. Repeat this procedure until you have assigned all desired signals.

5. If you want to delete an entry from the right list, select it by clicking and use the *lower* of the two buttons in order to move the entry back to the left list. Or use the shortcut STRG+R.

Note: Each Signal can be located in only one of the two lists. If you move it from one to another, it will disappear from its original place. So duplication of crosspoints is avoided in the router matrix.

Configuration of *signal outputs*:

1. Please select the entry `Outputs` in the Popup-Menu `Configure`.

2. Click on the desired entry in the left list. Use the upper button between the lists or the shortcut Strg+A to assign the entry to the list on the right side / to the right list.

3. Proceed the same way with all other output signals that you want to make „visible" for the software.

4. If you want to delete an entry from the right list, select it by clicking and use the *lower* of the two buttons in order to move the entry back to the left list. Or use the shortcut STRG+R.

If you like, you can, in addition to the existing RM4200D outputs, define routing selectors as a kind „virtual outputs". Defined routing selectors appear in the matrix and list views just like normal outputs.

Note: Routing selectors are used to, within the RM4200D, route signals to the TDM bus, where they are available for further signal processing. This is the crucial difference to a direct routing to outputs - there, input and output signals are directly connected. In the `Routing Software`, routing selectors are then used when an RM4200D router is not only to be operated by the software, but in parallel additionally via routing pushbutton panels in control desks or in router control panels with LCD keys. In these cases, you have to realize the routing via routing selectors, as this is the only way that all control elements involved can synchronously display the actual router state. For more details, please see in Part 3 of this manual, „Toolbox 4 Configuration Reference".
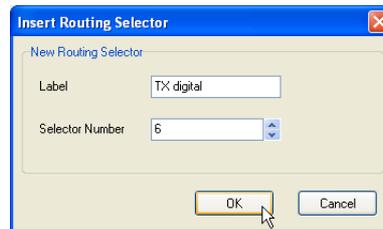
Figure 1–29:   Use this dialogue for defining a routing selector.

If you want to create a routing selector, click on the `Add Routing Selector…` button. An extra dialogue opens. In the field Label you can name the routing selector, in the field `Selector Number` you can select, which routing selector is to be used. You can use each selector only once, however, you have overall 768 routing selectors at your disposal. If you want to assign an already assigned routing selector, the dialogue shows the message `This Selector Number is already in use!` In this case you have to select a number that has not been assigned yet.

Now hit the `OK` button in order to define the routing selector. The dialogue disappears, and the re-defined routing selector appears in the right list with the output signals in use.

If you want to delete an already defined routing selector from the list, select it by clicking and then use the upper of the two buttons between the lists. You can also use the shortcut STRG+R. the routing selector is deleted from the list; in order to restore it, you will have to re-define it.
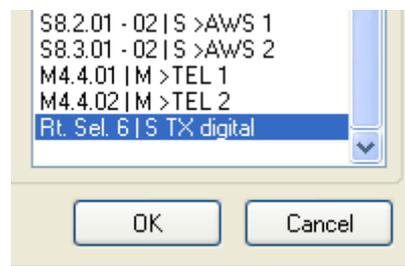

Figure 1–30:   Entry for a routing selector (to be recognized by the name „Rt. Sel.") in the list with the used outputs.

Important Note: It is crucial that the defined routing selectors are used accordingly in the Config of the RM4200D router - i.e. for instance that they are linked with output functions or Super output functions or directly connected with outputs in the output routing. *If this is not the case, signal assignments to routing selectors remain ineffective, because the signal is not continued in the RM4200D!* (Please read more about this in Part 3 of the manual, „Toolbox 4 Configuration Reference").

Rename I/Os - Renaming Signals

Normally, the `Routing Software` uses the names that have been assigned in the Config of the RM4200D Router for all signals. However, occasionally it is practical to change the names to simplify the operation of the software. Depending on the operation in each respective application, you can use the `Rename I/Os` command to adapt the signal names.

Tip: The names for the signals (OF, CF, FP, SOF, etc.), which are stored in the Config, often are not explanatory enough or even confusing for the actual `Routing Software` user. For these cases you can change the desired names in accordance with the user.

Note: If you change signal names, these changes are only stored for the individual copy of the `Routing Software` that you are modifying. This „renaming" is not stored in the RM4200D. The name assignment is stored in the file

`io.cfg.`

This file is located in the same directory as the program file of the Routing Software; it contains all settings of the program.
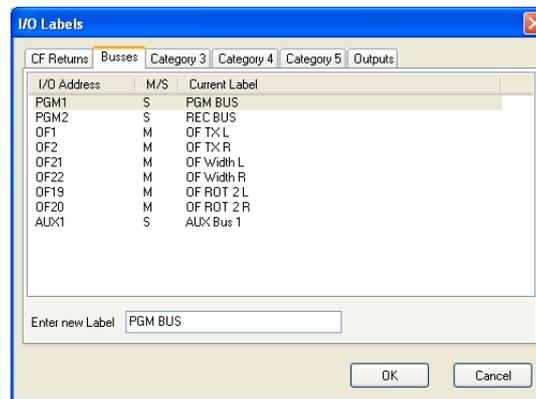

Figure 1–31:   In this dialogue you can rename the signals.

If you call the command `Rename I/Os`, a dialogue with six register tabs appears. Five of the cards contain the input signals of the five assigned categories, the sixth cards contains the defined outputs. (See also "Configuration of Inputs and Outputs" on page 35.)

The column `I/O Address` contains the internal name of the signal, the way it is stored in the Config of the Device. The column `M/S` shows if the signal is available as Mono ("M") or Stereo ("S"). The column `Current Label` displays the current name of the signal, the way it is used within the `Routing Software`.

In order to change the name of the signal, please first click on the tab for the category in which the signal is located. The list with the signals of this category is displayed. Click on the signal that you want to change. Now you can enter the new name in the input field `Enter new Label`. The name will change accordingly in the list while you are typing. Having finished writing, hit the `OK` button. The `Cancel` button cancels all changes.

Preferences - Assignment of Pre-Settings

With this command you access the dialogue, in which you can assign the pre-settings for the `Routing Software`. The dialogue consists of several areas, which are arranged as register tabs. Click on the respective tab for activating the desired area.

Note: The dialogue for the pre-settings is, just as the command `I/O Setup`, protected with a password. If you have not used any of these commands yet, you have to enter the password in order to access the pre-settings. Afterwards you can access it without password for 15 minutes. Within this time, you can activate the access protection with the command `Lock setup` in the `Setup` menu.You can change the password in the area `Security` of the pre-settings dialogue. (See "Security" on page 41.)

Connection

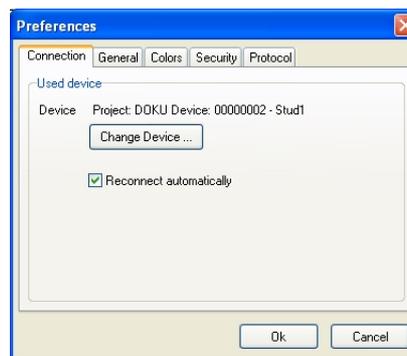In this dialogue, you can define, with which RM4200D the `Routing Software` is to be connected.

Figure 1–32: In this dialogue you can select the Device, which is to be controlled by the software.

Behind the word `Device` you can see which Device is currently connected to the software. For this Device, Project ID, Device ID and Device name are displayed. If no device is connected, the word `none` is displayed.

If you want to connect a different Device, click the `Change Device…` button. The DHD Connection Dialogue opens and you can establish the connection to another device. Please see Part 3 of this manual, „Toolbox 4 Configuration Reference" for more information about the DHD Connection Dialogue.

I you want the `Routing Software` to automatically re-install the connection to the Device after a separation, mark the `Reconnect automatically` checkbox.

General

In this dialogue you can define general settings for software operation.
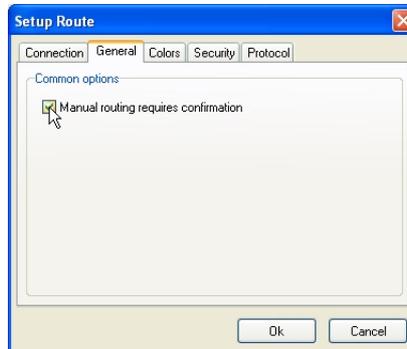

Figure 1–33: **Dialogue for General Settings**.

Presently, this dialogue only contains the item `Manual routing requires confirmation`. If you activate this checkbox, the software will always perform an authentication mechanism, when you manually set a crosspoint.

Colors

In this dialogue you can set the colours that the software will use for showing the different operation states of the matrix. For this, you can use the 16-bit system colours and the colours of the active Windows XP palette.

Figure 1–34: **In this Dialogue you can set the colours for the display of the routing matrix.**

You can separately set the colours for the following states:

- `Not connected`. The crosspoint is not.
- `Different sources`. You can connect two *different* input mono signals to a stereo output. In this case, the left channel and the right channel contain two different signals. You can select here, in which colour this state will be shown in the matrix view.
- `Connected`. The crosspoint is active, inputs and outputs are connected to each other.
- `Highlight frame`. This colour marks the currently selected crosspoint.

Security

In this dialogue, you can define the password for limiting access to the commands `I/`

O `Setup` and `Preferences` in the `Setup` menu. In order to activate this protection you need to mark the `Changing configuration requires Password` checkbox.

Figure 1–35: In this dialogue you can set the password.

If the access protection is activated, you need to enter the correct password before you can use the commands `I/O Setup` or `Preferences`. Afterwards access is activated for 15 minutes. You can terminate access within this time if you call the command `Lock setup` from the `Setup` menu.

For changing the password, hit the `Set…` button. An input field is displayed, in which you can enter the new password. Please confirm with the enter key or with the `OK` button. The same dialogue is shown again; please enter the new password here in exactly the same way for confirmation. Only if both confirmations are identical, the password is changed. Otherwise the software will show en error message. An error message will also be displayed if you leave the input fields blank.

Note: The password can have any number of characters (*case sensitive*); special and space characters are treated like all other characters. If you use the keyboard layout in different languages, you should not use umlauts and other language-specific letters in the password. Thus you will avoid problems when entering passwords with a different keyboard layout.

Important Note: The default password is "**default**". Please use it if you have not defined your own password yet.

Protocol

Note:

In newer versions of the Routing Software, the protocoling of processes is completely managed by the DHD Communication Server. Therefore, newer versions of the Routing software do no longer contain this register tab. More information about the DHD Communication Server can be found in this manual.

In this dialogue you can set how the `Routing Software` is to protocol all processes. Every time when a crosspoint is set, the software is creating an according entry in the protocol file. It protocols time and which input signal was connected to which output signal.

All entries are realized by default in the
`Route.log,`
file, which is located in the same directory as the software program file. Initially, the maximum size of the file is not limited. The entries are written on exit of the
`Routing Software.`

You can control with the following radio buttons, how the protocol files are written:

- `Unlimited`. A protocol file is written; its size is not limited.
- `One file per Day`. Every day a new file is created. The file name is extended by the date (`RouteYYYY-MM-DD.log`)
- If you additionally activate the `Delete after` checkbox, you can select, after which number of days (1-100) older protocol files shall be deleted.
- `Max. file size`. With this option, the protocol file is updated until it reaches a maximal size. After this, the oldest entries are deleted in the file in order to create space for new entries.

2.8 Using the Routing Software

Setting crosspoints manually

During a `Routing Software` Session, you will normally use the applications main dialogue, which displays the current state of the router. Simultaneously, you use this view, to set or release crosspoints.

The state of the router can be displayed in two possible views: In the *matrix view*, input signals and outputs are arranged in a two-dimensional matrix; states of crosspoints will be shown in different colours. In the *list view*, input signals and outputs are listed in columns. If required, you can switch on or off groups of signals.

It makes no difference which view is used to control crosspoints; you may switch any time between both modes via the `View` menu.

Working with the list view

The list view is displayed by clicking the command `Routing Table` from the menu `View`.
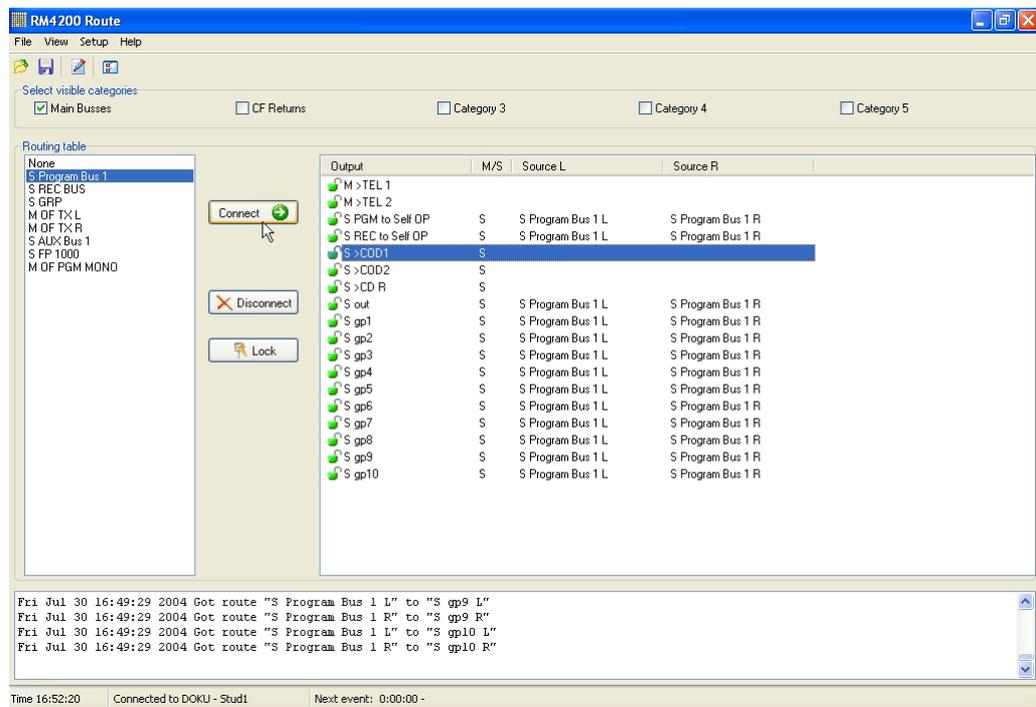

Figure 1–36:   List view of the router with signal table.

The list on the left hand side contains the available input signals. All sources are listed with the names set in the configuration by the `Toolbox4` software. Stereo sources are indicated by an „S" in front of their name, „M" indicates mono signals. On the very top of the list, you can find source „None", which can be used to mute an output.

The larger list on the right hand side contains all available outputs. As well as for input signals, all outputs are listed with the names set in the configuration by the `Toolbox4` Software. Stereo outputs are indicated by an „S" behind their name, „M" indicates mono outputs. Signals, which are connected to an output, are displayed in the `L` and `R` columns. If you assign „None" to an outout, it will be muted; the columns `L` and `R` will then be empty.

Tip: Use the checkboxes in the `Select visible categories` area to display or not groups of signals. , um bestimmte Gruppen von Signalen ein- oder auszublenden. The corresponding assignment can be set in the dialogue `I/O Setup`. (See also "I/O Setup -Assigning Inputs and Outputs" on page 33.)

Important Note: You are able route *one audio source to several outputs at the same time*. Inversely, it is not possible, to connect *several sources mixed to one single output*.

To connect an input source to an output, follow these steps:

1. In the left hand list, click on the desired input signal. It sill be selected.

2. In the right hand list, click on the output, which you would like to connect with the input signal. Between both lists, one or two buttons labelled `Connect` will be displayed now.

Figure 1–37: **Buttons to set crosspoints: The left button is for similar signals (both mono or stereo), the pair of buttons is for separate connection of left and right channel.**

Note: If input signal and output are of the same type - *both signals* are either mono or stereo - a single buttons appears, labelled `Connect`. If you have chosen a stereo input signal and you would like to connect it to a mono output, only the left channel of the input will be connected to the output.

If you would to connect a *mono input signal* with a *stereo output* instead, two `Connect` buttons will appear. Depending on which of the buttons you click on, a corresponding connection will be established. Alternatively, you can also assign a mono signal to the left or the right or even both output channels.

3. Click the `Connect` button to establish the desired connection. If you did no changes in the preferences of the software, you have to confirm a security alert, before the switching operation is executed. If you like, you can disable the security request. (See "General" on page 41.)
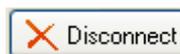

Figure 1–38: **Click this button to open a crosspoint.**

If you like to unlink an active connection, select the relevant output in the list and click on button `Disconnect`. If you did no changes in the preferences of the software, you have to confirm a security alert, before the connection is released. After confirmation, source `None` is being routed to the selected output. The output is without any signal.

You can also protect crosspoints from unaware release or changing. Choose the output, you would like to protect and click button `Lock`. Now, a red U-lock icon is

displayed in front of the list entry, indicating that the output cannot be changed anymore until it is released again.

Inversely, you can suspend cover by selecting the protected output from the right hand list and clicking on button `Unlock`. In the first column of the list, an opened green U-lock is displayed. The crosspoints can be changed again from now on.

Note: Please see, that you first select an output, before locking or unlocking a crosspoint. Otherwise, the buttons will be inactive!

Figure 1–39: **Klick the left button to lock a crosspoint. It will be indicated by a red U-lock symbol. With the right button, you can unlock a protected crosspoint; the green coloured U-lock indicates a changeable crosspoint.**

Important Note: Locking and unlocking of crosspoints does only work *within one single copy* of the `Routing Software`. A protection of a crosspoint is not being communicated from one PC to another, which takes control of the same RM4200D router. Locking of crosspoints is realised inside the `Routing Software` and not in the RM4200D router hardware.

Working with the matrix view

With the `Routing Matrix` command from the `View` menu, you enable the displaying of the state of the router as a matrix of inputs and outputs.
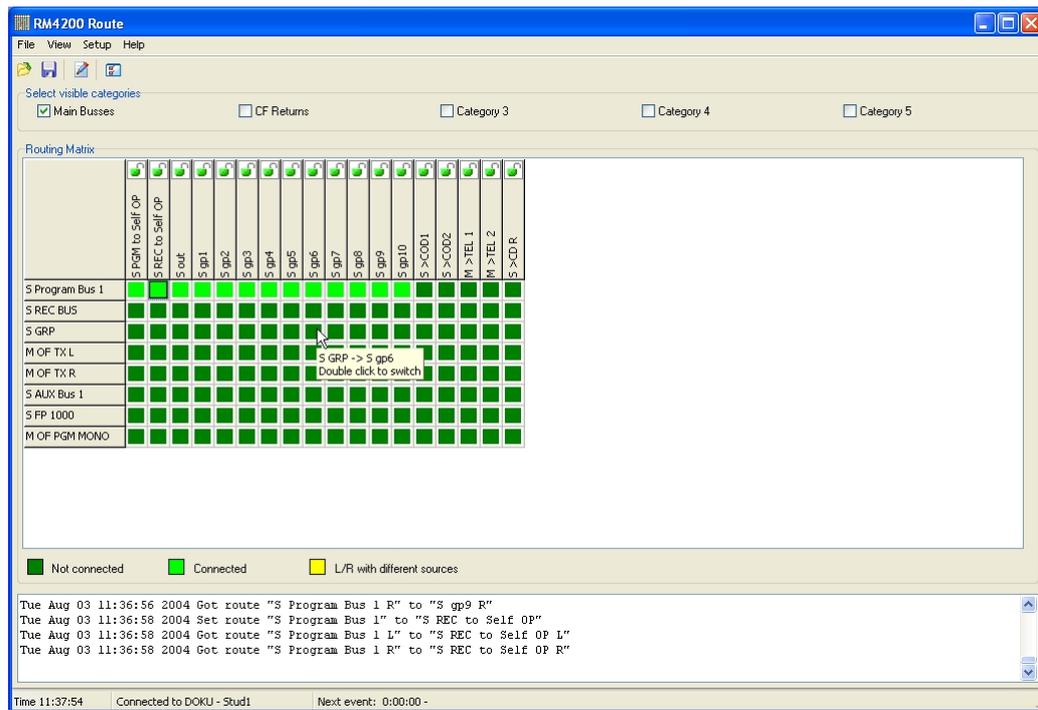

Figure 1–40: **A number of crosspoints in the matrix view.**

All inputs are arranged on the left hand side of the matrix from top to bottom and all outputs are placed from left to right at the top edge. Crosspoints are displayed as coloured quadrangles at the interconnetions of inputs and outputs. You can doubleclick on one of these crosspoints to close or open a link. If you did no changes in the preferences, you need to confirm an alert before the switching is done. It is possible to deactivate these security notifications in the preferences menu. (See "General" on page 41.)

Important Note: You are able to route *one audio source to several outputs at the same time*. Inversely, it is not possible, to connect *several sources mixed to one single output*.

Tip: If you leave the mouse cursor above a specified crosspoint for a second, a tooltip will appear. It will display which signals are connected by that crosspoint. The information is formatted `input signal -> output`. It is completed by the note `Double click to switch`.

In the matrix view, states of crosspoints are indicated by different colours. By default, opened crosspoints are indicated in dark green, activated crosspoints in light green. If both channels of an output are linked with two different input signals, this crosspoints will be shown in yellow. The caption below the matrix view shows the meaning of the used colours. If you like, you can change the colours in the `Preferences` dialogue, tab `Colors`. (See "Colors" on page 41.)

Tip: Use the checkboxes in the `Select visible categories` area, to switch on or off specified groups of signals. A corresponding group assignment can be set in the `I/O Setup` dialogue. (See also "I/O Setup -Assigning Inputs and Outputs" on page 33.)

As in the list view, you can also protect crosspoints from unaware release or changing. To lock a crosspoint, doubleclick the little green U-lock icon on top of the related output. It changes into a red-coloured and closed U-lock and the related crosspoint is protected then and cannot be changed from now on.

If you doubleclick the red-coloured U-lock icon, the crosspoint is unlocked. You are now able, to set or release the crosspoints again.

Note: If you operate the software using the matrix view in the `single view` mode, the second channel will be automatically locked or unlocked.

Using Hot Start Buttons

You can store router states in scripts, which can be started by a single mouseclick, if required. Therefore, you need to define so called *Hot Start Buttons*. Each Hot Start Button is assigned to a routing script, which is executed by a click on that specified button. Before you are able to create Hot Start Buttons, you need to create routing scripts. (See also "Using the Script Editor" on page 59.)

To define Hot Start Buttons, call the command `Hot Start Buttons...` from the `Setup` menu. A dialogue opens, which can be used to define up to 14 Hot Start Buttons.
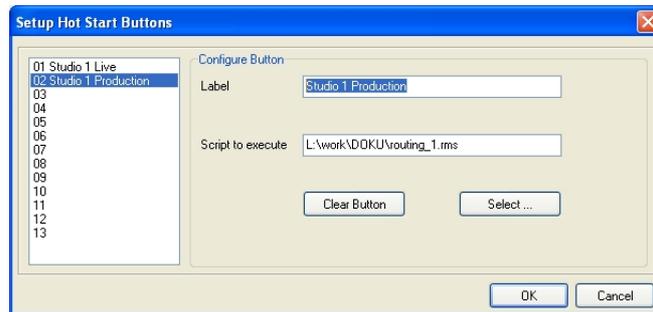
Figure 1–41: **Use this dialogue for defining Hot Start Buttons**.

Please follow this description to create or change Hot Start Buttons:

1. In the left hand list, click on the entry which you would like to edit. A name for this button can be entered in the field `Label`. This label will be shown on the button and can have a maximum length of 20 characters.

Note: If you do *not* enter a text in the field `Label`, this Hot Start Button will *not be displayed*!

2. Click the `Select…` `button`. A file dialogue appears. Choose a routing script, which you would like to connect to the selected button. You can choose only RM4200D routing scripts, indicated by the suffix „.rms".

3. If you would like to delete an already defined Hot Start Button, select the corresponding entry in the list, and click `Clear Button`.

4. Proceed in the same way for all further Hot Start Buttons, which you would like to edit. After you have finished your work, click the `OK` button.

To use these Hot Start Buttons in the software, you need to switch them on. Therefore, call the `Hot Start Buttons` command from the `View` menu or press function key F10 on your computers keyboard. Activating the command or the function key F10 again switches off the Hot Start Buttons.
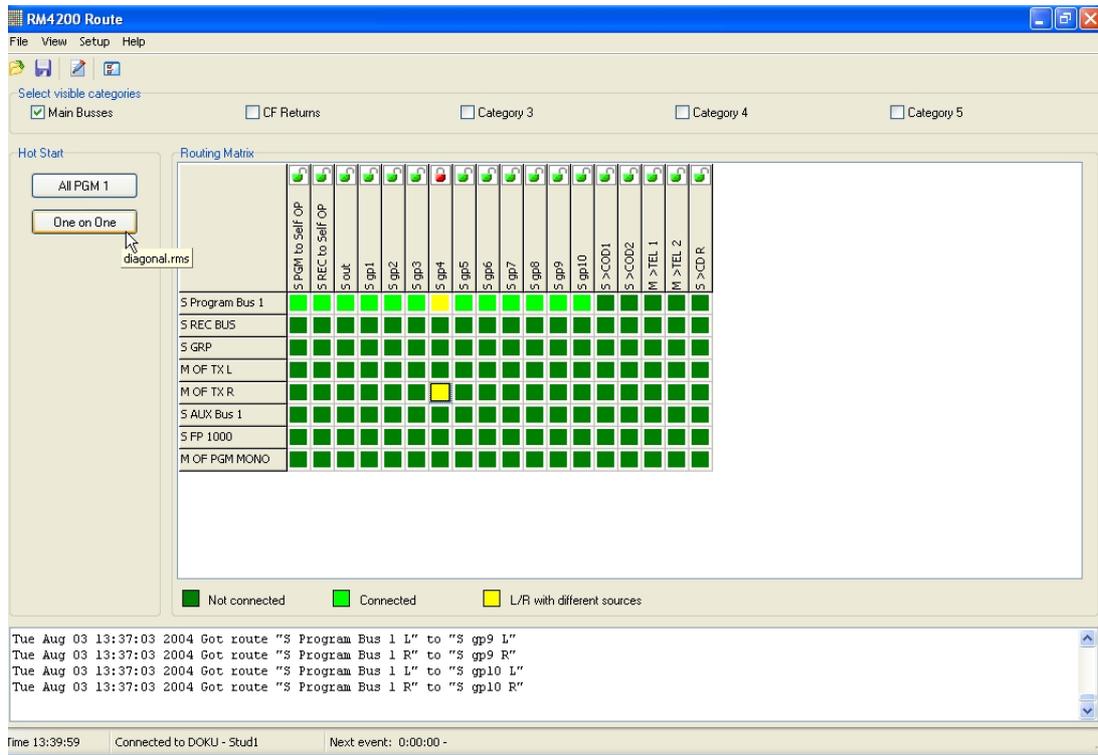
Figure 1–42: Matrix view with activated Hot Start Buttons. The tooltip indicates the assigned script.

In the software, only such Hot Start Buttons will be shown, which are labelled with a name. If you right click in the `Hot Start` area, a context menu with two entries appears. Command `Hot Start Configuration…` opens the configuration dialog for Hot Start Buttons, command `Show` switches off the Hot Start Buttons.

Tip: If you leave the mouse cursor above a specified Hot Start Button for a second, a tooltip will appear. It will display which script is assigned to the Hot Start Button.

By clicking a Hot Start Button, you immediately execute the assigned routing script.

Scheduler – Connecting crosspoints time controlled

With the „Scheduler" feature, you are able to automatically control router processes based on specified dates. You can configure singular or recurring events; the number of planable events is unlimited. Finally, you can also define, if a single crosspoint or a complex routing script is executed at a given date.

Important Note: If you would like to use the Scheduler, you need to have a license for this feature. This license can be purchased separately. Please contact your DHD dealer.

To display the Scheduler, call the `Scheduler` command in the `Setup` menu.

The Scheduler dialogue contains three register tabs: In the `Events` area, you can edit the planned events, in the `Special Events` area, up to three different lists of special days can be defined and the `Preview` area enables to check, which events are planned on which date.

Events – creating switching processes

In this register tab, you are able to edit your planned events. The list in the upper part of the dialogue contains all planned events in their chronological order. Each event is displayed with its execution time (`Time` column) and a short description (`Description` column). In the `Days` column is listed, on which days a process is performed.
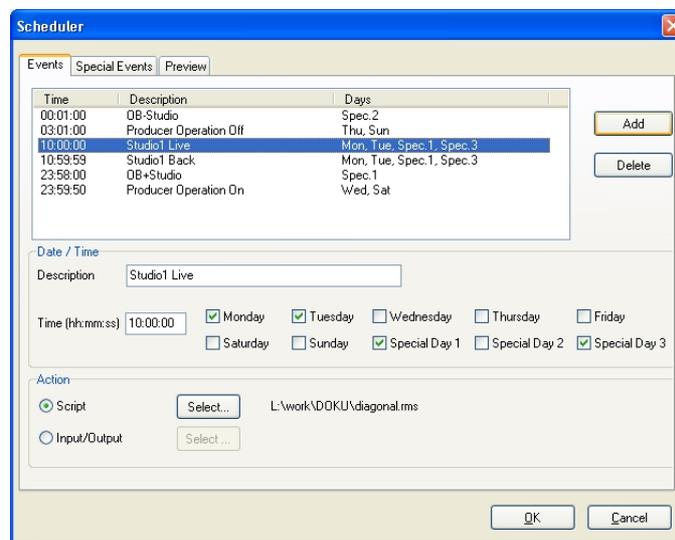

Figure 1–43:   Within this dialogue, you plan automated processes.

To create a new switching process, proceed like this:

1. Click the `Add` button, to create a new event. A new event is inserted, which is selected automatically. The starting time for this event will be automatically pre-set to `00:00:00`, which forces the entry to be displayed on the very top of the list.

2. In the `Date/Time` area, you enter details for the configured event. Enter a meaningful comment with a maximum length of 40 characters into the `Description` field. It will be displayed in the status bar of the main application window. Use the `Time` field to define an exact time for the switching process.

This entry needs to be formatted like „hh:mm:ss", hours must be entered from „00" to „23". In a next step, use the checkboxes to choose those days, when the process should be executed. You may select every weekday as well as each of the available „Special Days". If you change details of an event, the list of events will be refreshed according to these changes.

Important Note: To plan an event for the current day (which means „today"), you need to select the checkbox for the present day. If not selected, the event will not be executed!

3. In the `Action` area, you choose what exactly should happen on a certain time: If you select the `Script` radiobutton, a routing script can be executed on the specified date. Click on the `Select...` button to choose the desired script using a file dialogue. The script's name will be shown in the `Action` area.

4. Use the `Input/Output` radiobutton, if you would like to set a single crosspoint. Click the `Select…` button to open another dialogue, wherein you can choose input and output for this single crosspoint. If your assignment is done, it will also be shown in the `Action` area.

5. Create further events in the same way. Use the `Preview` tab to control whether your settings are correctly done.

6. If you would like to remove an already planned event, select the according entry in the list at first. Click the `Delete` button then. The event will be *directly deleted without any confirmation*!

The following picture shows the dialogue to assign a single input to a specified output:
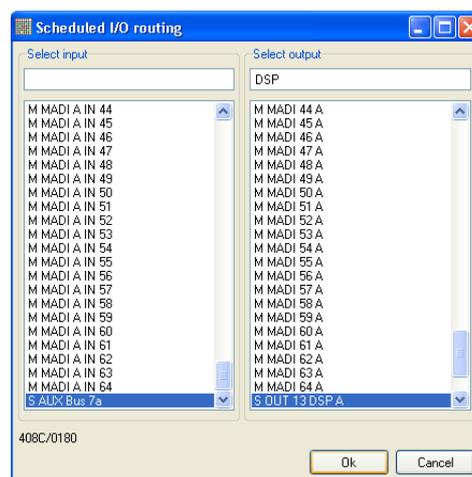

Figure 1–44: In this dialogue, you select which input should be connected with which output.

The left hand list displays all available inputs, the right hand list shows all available outputs. Use the text input field above the lists, to filter the displayed entries: enter any string to move the active selection to the first entry, which contains this string.

Select the input and the output you would like to connect, then click the OK button to store your selection.

Tip: Use the filter functionality of the text input field to find the right entries in very long lists. If you would like to mute an output, which means to connect *no* signal to it, choose the very first entry `None` of the left hand list of input signals. With this selection, an existing coupling will be suspended.

Special Events - Configuring particular dates

Occasionally, you would like to execute crosspoint switchings on specific, irregular days. In such cases, you can use this tab to create up to three lists for any date, on which a crosspoint processing should take place. These lists may be included by selecting the corresponding `Special Days` checkboxes while planning events. They are going to be used like usual weekdays: Switchings will be processed whenever current time and date is matching to a defined value in the activated lists.
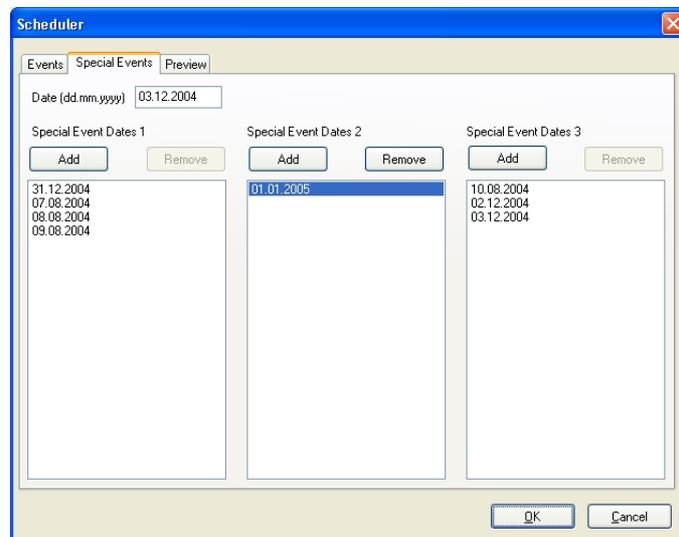
Figure 1–45: **In diesem Dialog können Sie drei Listen mit speziellen Daten anlegen.**

To create a new entry in one of the lists, you first need to enter a date (formatted „DD.MM.YYYY"), using the `Date` field. Then click the `Add` button above the list, wherein this new entry should be placed. Finally, the new entry appears in the list.

To remove an entry from a list, select it with a mouse click. Then press the `Remove` button to delete the selected entry from the list.

Preview - Monitoring Switching Operations

Use this register tab to see all switching processes of different days combined in one view. From the `Select` area, choose the tag you would like to monitor by using the radiobuttons on the left hand side of the dialogue. All planned events for this day will be listed, including their execution time, a description and the assigned routing script.

Note: If you have not assigned a specified routing script to an event, but a simple action, no entry will be shown in the `Script` column.

2.9 Scripts – Programming Switching Operations

Overview

You can program use scripts for programming internal RM4200D processes. They enable you to do certain things that otherwise would be quite complicated to realize with only the default means of the DHD software. Scripts are for instance used in the Toolbox4 software for controlling complex operations in the system at the push of a button. You can use scripts in the Routing Software in order to send a number of routing commands to the RM4200D router, which will be instantly implemented.

When working with the Routing Software, you can use scripts without having to enter script commands yourself: As soon as you select the Save Script command from the File menu, the current state of the router is stored in a script file. This "snapshot" consists of a sequence of routing commands, which will put the router in exactly the state that you have saved.

You can go on processing a thus generated script with the aid of the script editor, or you can directly link it to a hot-start button. On hitting the button, the commands stored in the script are sent to the RM4200D system. (See also "Using Hot Start Buttons" on page 47.)

Note: For many applications it is sufficient to save a once set router state as script, and to later retrieve it with a hot-start button. If you would like to progress with the scripts subject, please carefully read the following paragraphs and also note the information in other parts of this manual!

Scripts are regular text files, which are stored with the suffix *.rms.

Important Note: In principle you can use script files with a standard text editor. However, we recommend not doing so but instead using the script editor of the Routing Software, for the following reason: The script files contain special control commands which are hidden by DHD applications but are visible in the text file. If you accidentally alter or delete these control commands with a text editor, the script might not be correctly processed anymore. Therefore, always use the script editor of the Routing Software for editing scripts!

A script file consists of several lines; each of them contains a command, which sets a crosspoint. Example for the contents of this file type:

```
RO 2690, 16384
RO 2690, 16385
RO 896, 17152
RO 897, 17153
RO 898, 17152
RO 899, 17153
```

The `RO` character string indicates a routing command. The first figure is the addressed output channel; the second figure is the signal source, which is to be routed to this channel. If the second figure is "`0`", the output is muted. Each audio signal in an RM4200D has such an assigned number, which represents an **address**. Please read in the next paragraph about how to determine these addresses, and how to use the values in scripts.

Note: In the first `Routing Software` versions, signal addresses were stored in *decimal format*. The `Toolbox4` software, however, uses the *hexadecimal* format for the same addresses. Furthermore, control commands on the CAN bus are also used in hexadecimal form. For this reason, current Routing Software versions can also handle hexadecimal addresses. If you want to use these, mark the address with the prefix *0x*!

Addressing of Audio Signals

All audio signals in an RM4200D system are addressed via a special address, which is unambiguous for each signal. All *physically existing inputs and outputs*, as well as all *internal signals on the audio bus (program busses, aux busses, output functions etc.)* have an unambiguous address respectively.

You can determine the address of a physically existing input or output from its position in the DSP Frame. You first have to determine these data in order to compose the address in a second step.

The address of an input or an output consists of:

1. The number of the *slot*, in which the card with the input or output is located.

2. The number of the *port*, which belongs to the input or output.

3. The number of the channel in the port, to which signal is assigned.

Here is an example for a better illustration: For instance, you would like to determine the address of a certain audio signal. For this, you best use the `Toolbox4` software and load the project file of the DSP Frame. Now please mark the desired Device in the Device tree and select the `DSP Frame I/O` node. The assignment of the inputs and outputs of the DSP Frame is displayed. Look for the desired output and write down the value shown in the `Output Address` column, e.g. *3.2.01-02*.

This address reveals the following facts:

- The card with the output is located in *Slot 3* - this is the first cipher, the **slot number**.
- On the card, the output is in *port 2* - this is the second cipher, the **port number**.
- The first channel bears the **channel number** *01* - in this case, this is the left channel. Correspondingly, the right channel bears the channel number *02*.

Note: Stereo channels are not treated especially, but as two *separate* channels, *which however respond to one address*.There, the left channel has the lower number. Regarding ports with MADI channels, 56 or 64 channels are also counted *separately*.

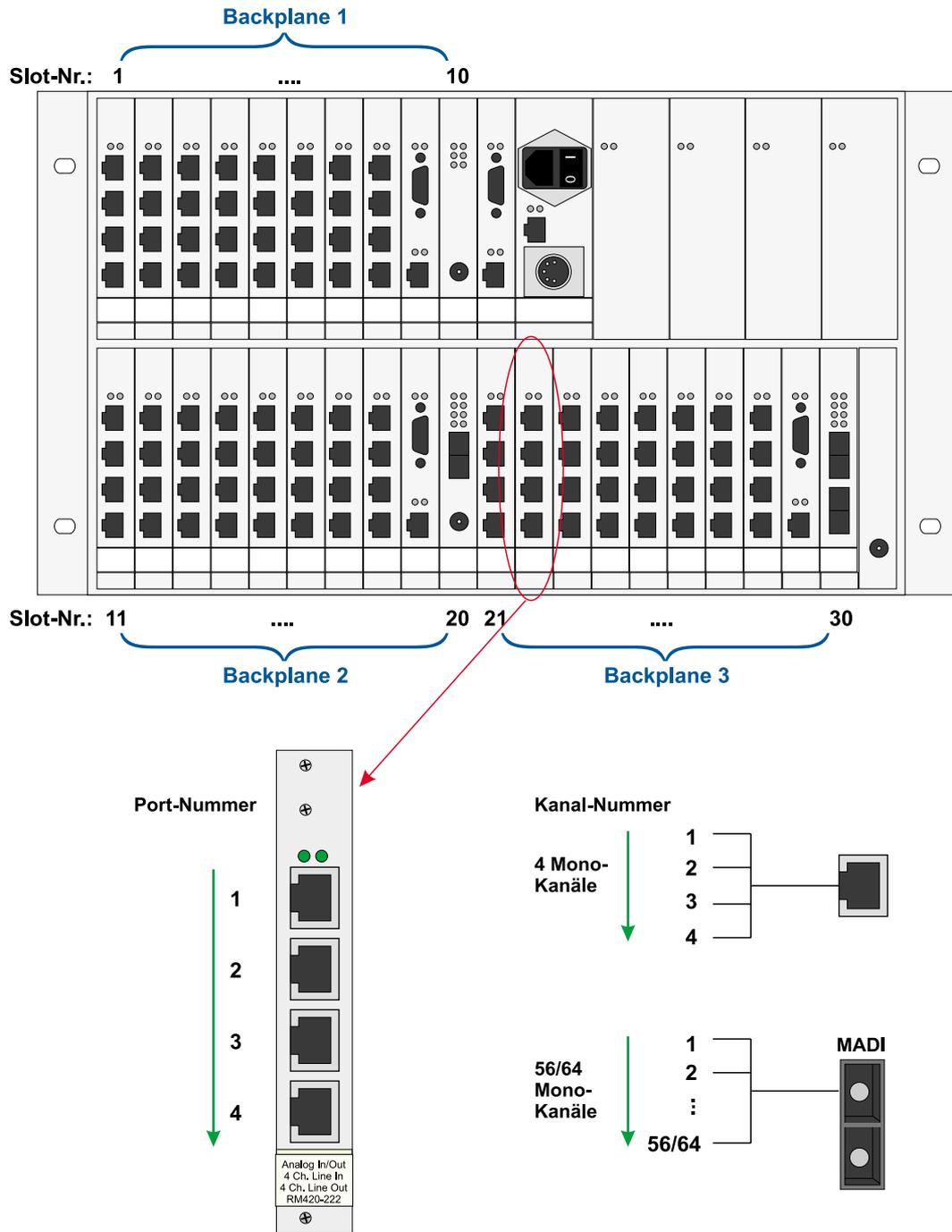The following figure clarifies how the different addresses are determined:

Figure 1–46: How to determine the number for a certain signal output: The slots are consecutively numbered from 1 to max. 30. On each card the ports are numbered from top to bottom. In each port the assigned channels are consecutively numbered.

The output address is formed from **slot number** and **port number**. The slot number is the slot in which the according card is located in the DSP Frame. The port number, however, is the consecutive number of the channel in the respective slot.

Please watch for the following particularities:

- If an output is concerned, you have to add the value *0x80* to the port number. Please also note, that the port numbering *starts at 0, not at 1*! So the following

port numbers may result for e.g. a card without MADI port:

I/O Address	Port ID Input	Port ID Output
Slot x.1.01	0x00	0x80
Slot x.1.02	0x01	0x81
Slot x.2.01	0x02	0x82
Slot x.2.02	0x03	0x83
Slot x.3.01	0x04	0x84
Slot x.3.02	0x05	0x85
Slot x.4.01	0x06	0x86
Slot x.4.02	0x07	0x87

- Not all cards dispose of eight inputs or eight outputs. MADI cards for instance can transport up to 64 signals per port. Please note that always those channels are numbered, which actually physically exist.

The *slot number* is identical with the number of the slot in which the card is located. Please note here, that the numbering starts at *1* and not at *0*! So the following possible numbers result for the slots:

Slot number	Backplane 1	Backplane 2	Backplane 3
1	0x01	0x0B	0x15
2	0x02	0x0C	0x16
3	0x03	0x0D	0x17
4	0x04	0x0E	0x18
5	0x05	0x0F	0x19
6	0x06	0x10	0x1A
7	0x07	0x11	0x1B
8	0x08	0x12	0x1C
9	Slot for a DSP controller, no inputs/outputs available!		
10	0x0A	0x14	0x1E

In order to now determine the output address, you have to combine slot number and port number. So, the routing addresses *0x0382* (left channel or 01) and *0x0383* (right channel or 02) result from the output address *3.2.01-02* (example). These figures in decimal format (898 and 898) accord to the addresses that were used in the routing script (see above).

You can use the same procedure to determine the addresses of physical inputs, except that the additional value 0x80 is omitted. So you can route physically existing inputs directly to outputs, i.e. use the classical way to realize router functions.

One more example:

Sources *17152* and *17153* be assigned to outputs 398 and 399. This corresponds to hexadecimal values *0x4300* and *0x4301*. Neither of the values can be assigned to physically existing inputs with the described methods, so they are signals on the TDM bus.

Tip: The largest possible address for a physically existing input signal is *0x1EFF*; this corresponds to the highest channel of a MADI port in Slot 30. If, in a routing script, you encounter an address as source, which is higher than this value, it is a signal on the TDM bus and not a physical input signal!

Part of the `Toolbox4` software is a command, with which you can easily determine addresses of audio signals. This includes also signals on the TDM bus (busses, Aux signals, output functions etc.). Use the command `Export DSP Frame I/O as CSV` in the `Toolbox4` software to export the signal list in CSV format as comma-separated list in a file. You can view this list with any text editor. However, it is much more comfortable to load the file in a spreadsheet (e.g. `Microsoft Excel`).

In this list you can find not only the arrangement/order of the cards in the DSP Frame, but also the configured fader channels and the addresses of the audio signals on the TDM bus. The following chart shows an excerpt from this kind of list:

Name	ID (hex)	ID (decimal)
PFL L	0x6000	24576
PFL R	0x6001	24577
Program Bus 1 L	0x6002	24578
Program Bus 1R	0x6003	24579
REC Bus L	0x6004	24580
REC Bus R	0x6005	24581
OF TX L	*0x4300*	*17152*
OF TX R	*0x4301*	*17153*
OF 027 SPK	0x4302	17154
OF Amp MIC	0x4303	17155
OF MON L	0x4304	17156
OF MON R	0x4305	17157
OF SPK L	0x4306	17158
OF SPK R	0x4307	17159

This chart clarifies that *output functions TX L and TX R are assigned to outputs 398 and 399.*

Note: According to this method you could also trace back the addresses 16384 (0x4000) and 16385 (0x4001) from the first example to TDM bus signals. There you need to note that, in the CSV file, *stereo sources are added a value of 8192(0x2000) to their actual address*. However, this does not play a role for the routing, and so it is disregarded.

If you should not be able to find the signals with the IDs 16384 and 16385 in the CSV file, you have to add 8192 for determining the correct IDs. For our example this would result in *values 24576* and *24577*. These point to stereo source *PFL L* and *PFL R*.

Using the Script Editor

The script editor is an separate application within the Route software, with which you can edit routing scripts. Open this dialogue by selecting the Script Editor command from the View menu. Alternatively you can click on the following icon in the tool bar:

A new window opens up, in which you can edit scripts. The window disposes of an own menu bar, which contains the commands for the editing.
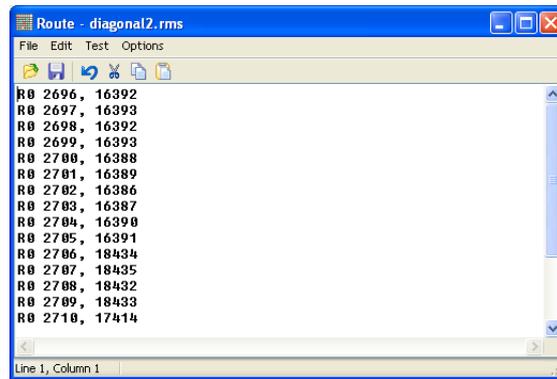

Figure 1–47: **The Edit Window of the Script Editor**.

Important Note: In principle you can use script files with a standard text editor. However, we recommend not doing so but instead using the script editor, for the following reason: The script files contain special control commands which are hidden by the Route software but are visible in the text file. If you accidentally alter or delete these control commands with a text editor, the result of a processed script might be faulty. Therefore, always use the script editor for editing scripts!

The following paragraphs/chapters describe the individual commands of the script editor in detail.

File Menu

New (Ctrl+N)

With this command you can generate a new, empty document in the script editor, in which you can enter commands/ for entering commands.

Open (Ctrl+O)

Use this command to open a script file. The dialogue for file selection is displayed; only RM4200D routing script files are shown. The files bear the ending

*.rms .

Alternatively you can open the file dialogue by hitting the following icon:

Save (Ctrl+S)

With this command you can save the currently open script as a file with another name. A file dialogue opens in which you can enter name and location for the new file. If a file with the same name already exists, you have to confirm the overwriting.

You can also call the command by hitting the following icon:

Save As

Mit diesem Befehl können Sie das aktuell geöffnete Skript unter einem anderen Namen speichern. Es öffnet sich ein Dateidialog, in dem Sie Namen und Speicherort für die neue Datei angeben können. Wenn eine Datei mit dem gleichen Namen bereits existiert, müssen Sie das Überschreiben bestätigen.

After saving, you progress in the script editor with the new file.

Exit

This command closes the script editor. If the current file contains still unsaved changes, an according dialogue will ask you to save them.

After saving, the script editor progresses in the new file.

Edit Menu

Undo (Ctrl+Z)

With this command you can undo the last editing step in the editor. If you use the command again, the undone step is restored. *This means that the undo function is only single staged!*

You can also call this command by clicking the following icon:

Cut (Ctrl+X)

This command cuts the highlighted part of the document and stores it in the Windows clipboard.

You can also call this command by clicking the following icon:

Copy (Ctrl+C)

This command copies the highlighted part of the document and stores it in the Windows clipboard.

You can also call this command by clicking the following icon:

Paste (Ctrl+V)

This command pastes the contents of the clipboard into the current document at the position of the cursor. If you already have highlighted a part of the document, this part is replaced by the contents of the clipboard. The command only works if the clipboard contains valid texts.

You can also call this command by clicking the following icon:

Comment Routing Commands

This command pastes/inserts a comment for each routing command, which explains the switching process. For this, the software analyses the command, inserts a semicolon, and then describes the switching process in clear text. The representation format is `audio source -> signal output`. The names for the signals are taken from the settings in the `I/O Setup` dialogue. If you like, you can change these names with the `Rename I/Os` command from the `Setup` menu. Dieser Befehl fügt für jedes Routingkommando einen Kommentar ein, der den Schaltvorgang beschreibt. Dazu wertet die Software den Befehl aus, fügt ein Semikolon an und beschreibt danach im Klartext den Schaltvorgang. Die Darstellung folgt dem Format `Audioquelle -> Signalausgang`. Die Bezeichnungen für die Signale werden den Einstellungen aus dem Dialog `I/O Setup` entnommen. Wenn Sie möchten, können Sie diese Bezeichnungen mit dem Befehl `Rename I/Os` aus dem Menü `Setup`ändern. (See "Rename I/Os - Renaming Signals" on page 38.)
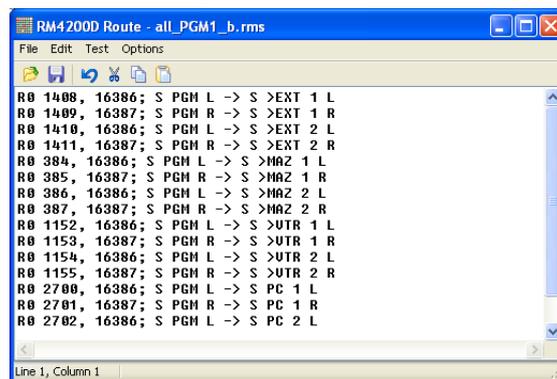

Figure 1–48:   **Routing Script with automatically inserted comments.**

Note: Once that you have called the command `Comment Routing Commands`, you can only delete automatically generated comments by hand afterwards. Even if you change routing commands, the comments are not refreshed automatically. Instead you have to carry out the command again.

Please read more about comments further on in this manual. (See "Tips and Tricks for Scripts" on page 63.)

Menu Test

Syntax (Shift+F9)

With this command you can check if the syntax of the current script is correct. The software reads in all command lines and checks if they accord to the defined script rules. Upon appearance of an error, a dialogue with details is displayed, and the test is discontinued. Please, in this case, correct the error and re-start the syntax check.

Figure 1–49: This dialogue points out to a script error.

Execute (F9)

This command carries out the script, which is loaded in the editor. The commands are sent to the RM4200D Device with which the Route software is currently connected.

Tip: The currently connected Device is shown in the main window of the Route software. You will find the information at the lower rim of the screen in the status bar.

Menu Options

Script execution requires confirmation

If you use this command, an authentication mechanism for the *entire script* is activated: On starting the script, a dialogue appears in which you have to re-confirm the action. If you do not, the script is not carried out. For deactivating this mode, call the command again. If the according command is marked the authentication query is activated, otherwise it is not.
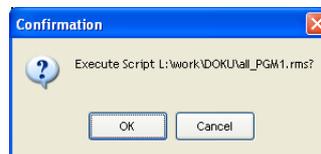

Figure 1–50: If you click „OK", the script is started. „Cancel" quits the process.

Each line requires confirmation

If you use this command, an authentication mechanism *for every single line is activated*. For every single switching process a dialogue appears in which you can confirm or skip the action. Afterwards the next line is processed, again with an authentication query. In order to deactivate this mode, please call the command again. If the according command is marked the query is activated, otherwise it is not.
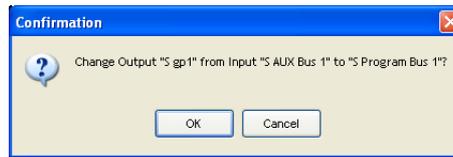
Figure 1–51: In this dialogue you can confirm („OK") of skip („Cancel") the switching process/action. The crosspoint details are displayed in the text.

Tips and Tricks for Scripts

Routing scripts normally consist of a list of commands for crosspoints. However, you can use additional functions in scripts, if you manually insert certain commands. This paragraph describes the available options and contains hints and tips that will help you in working with scripts.

Inserting Comments

You can insert comments into a script for more clarity and for documentation of its function. Comments start with a semicolon; all characters to the right are ignored by the `Route` software. So comments can stand as individual line as well as be inserted after routing commands:

```
;comment line, not analyzed
RO 898, 17152
RO 899, 17153; comment after command
```

Here you find an example how to make scripts more legible with comments:

```
;switch PGM to on-air output
RO 768, 24578
RO 769, 24579
;
```

Confirming the Script Execution

One of the subjects in the last paragraph was including authentication mechanisms into scripts if required. (See "Menu Options" on page 62.) If you activate these options, control commands are inserted at the beginning of the script. However, the script editor does not show these commands. If you view the script with a text editor, you can find the following values:

Option	Value
Script execution requires confirmation	ASKONCE
Each line requires confirmation	ASKALL

Confirming the Partly Execution of Scripts

If you need more than the two authentication mechanism options from the Options menu, you can also integrate individual queries into your script. These queries can stand at any position in the script, and are valid for a number of routing commands.

Tip: Use individual authentication mechanisms for instance on switching of particularly important crosspoints like on-air signals or return signals to codecs.

Example for an individual query:

```
ASK: SET PGM1 L/R to EXT1?
RO 1408, 16386;
RO 1409, 16387;
ASKEND
```

Enter the command "ASK" before the first relevant crosspoint command, followed by a colon. After the colon you can enter a character string, which is displayed in the authentication query. In the example, it is the text „SET PGM1 L/R to EXT1?“. The following lines contain the routing commands that are to be protected by the query. The protected section ends with the command „ASKEND“. As soon as the processing of the script comes to the line with the command „ASK“, the authentication query is displayed. If you answer with „Yes“, the script runs on as expected. If you do not confirm the mechanism, all commands until „ASKEND“ are skipped.
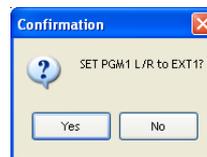

Figure 1–52: **Dialogue for an adapted/adjusted authentication mechanism**.

Sending CAN Bus Commands

From scripts, you can also send CAN bus commands directly to the connected RM4200D. So you can directly activate many Device functions. CAN bus functions are special control codes, which in scripts are started/initiated with the letter „C“. Read in chapter „Controlling Special Functions Via Scripts“ in part 3 of this manual, „Toolbox4 - Configuration and Reference“, about further syntax and formatting of the different CAN bus commands.

Important Note: CAN bus commands are very flexible and powerful; however, you can impair the function of the RM4200D with wrong commands or typing errors. Therefore, please do carefully read the documentation of the used commands. Ensure that you use the right commands and that those have exactly the desired function. In case of questions please contact you DHD dealer.

Two examples for sending CAN bus commands from scripts:

In the first example, the active PFL switching is to reset before the crosspoints are switched. You can find the according command, `11160000,0`, in part 3 of the manual.

For sending the command from a script, please insert an extra line with the command `C11160000,0` in the script before the routing commands.

The second example is about switching the monitors to program bus 1 after setting all crosspoints, but only upon prior confirmation by the user.

You can find the according CAN bus command in part 3 of this manual: `11000000,6,40,02,01,00,40,03`.

For implementing the function, please insert the following lines at the end of the script:

```
ASK: Set Monitor to PGM1?
C11000000,6,40,02,01,00,40,03
ASKEND
```

Using Hexadecimal I/O-Addresses

The `Route` software internally stores the crosspoint IDs in decimal format. With older software versions, you also had to use this decimal addressing in all routing scripts. This was especially error-prone because of the `Toolbox4` software's hexadecimal signal addressing. For this reason, DHD advanced the `Route` software for you now to be able to indicate signal IDs in decimal as well as in hexadecimal format.

As described before, you can export a file in CSV format, which contains all signals with hexadecimal IDs, from the Toolbox4 software. (See "Addressing of Audio Signals" on page 55.)

From these information, you can determine input and output addresses with the aid of the charts for *Slot ID* and *Port ID*.

Important Note: From version *5.2.3 Build 82* of the `Routing Software`, you can use the decimal and hexadecimal addressing in scripts together. If you use hexadecimal addresses in scripts, you always have to precede them with „0x". You can use decimal and hexadecimal addresses in any combination, as long as each address clearly identifies an existing signal.

The following chart contains a few examples for mixed addressing:

Routing command Format	Format Output Address	Format Input Address
`R0 1410, 17162; M OF > EXT 1 L -> S >EXT 2 L`	decimal	decimal
`R0 1411, 17163; M OF > EXT 1 R -> S >EXT 2 R`	decimal	decimal
`R0 0x0480, 1024; S VTR 1 L -> S >VTR 1 L`	hex	decimal
`R0 0x0481, 1025; S VTR 1 R -> S >VTR 1 R`	hex	decimal
`R0 1408, 0x430A; M OF > EXT 1 L -> S >EXT 1 L`	decimal	hex
`R0 1409, 0x430B; M OF > EXT 1 R -> S >EXT 1 R`	decimal	hex
`R0 0x0182, 0x4304; M OF > MAZ 2 L -> S >MAZ 2 L`	hex	hex
`R0 0x0183, 0x4305; M OF > MAZ 2 R -> S >MAZ 2 R`	hex	hex

Scripting Example with additional Explainations

The following example contains all possibilities to manually enhance the functions of a routing script.

Skriptcommand	Description
ASKONCE	Single query at the start, if script should be executed. This command is not visible in the Script Editor.
;RESET PFL	Comment line, prefaced by a semicolon.
ASK: Reset PFL?	Individual query (ASK:); the string „Reset PFL" will be displayed in the dialogue.
C11160000,0	CAN bus command to reset all PFL routings.
ASKEND	End of the individual query (ASKEND).
RO 2690, 16384 RO 2691, 16385 RO 896, 17152 RO 897, 17153	Routing commands
;PGM > Main Out	Comment line.
RO 768, 24578 ; L RO 769, 24579 ; R	Routing commands; both, output address and source signal are formatted decimal, followed by a comment.
;PGM > ATM	Comment line.
ASK: Main out to ATM?	Individual query(ASK:); the String „Main out to ATM?" will be displayed in the dialogue.
RO 0x0880, 0x4300 RO 0x0881, 0x4301	Routing commands; both, output address and source signal are formatted hexadecimal (audio source: output functions 1 and 2).
ASKEND	End of the individual query (ASKEND).
;Main Out > Monitor	Comment line.
C11000000,6,43,00,01,00,43,01	CAN bus command to switch monitor bus to the main output signal (here: output functions 1 and 2).

3   The Setup Manager (RM420-552)

Note: The following documentation of the `Setup Manager` is based on Version 1.0.5 build 9.

3.1   Overview

In an RM4200D you can store 7 Mixer Setups and 250 Channel Setups. These setups are stored in the Flash memory of the RM420-850 Communication Controller. You can increase the number of Mixer Setups to be stored by using an RM420-013 Central Overbridge Module with card reader and respective memory cards.

Except for the Default Mixer Setup (0), all Mixer Setups (1..6) can be overwritten with the aid of according key functions of the control desk. The same applies to Channel Setups 1..250. The `Setup Manager` is also the right tool if you want to save different states of individual or all Mixer Setups or of individual or all Channel Setups outside the RM4200D, in order to be able to repeatedly restore them to the Device (Backup Functions).

Even if it should be necessary to replace the RM420-850 Communication Controller, you have to ensure that the Mixer and Channel Setups stored in this module can be read out and transferred into the exchange module. Using the `Setup Manager`, you can easily organize this data transfer.(See "Backups" on page 89.)

The `Setup Manager` enables you to save all setup data of an RM4200D in a file on a PC (Backup) for restoration purposes. The software also allows storage of individual Mixer Setups or individual Channel Setups in files on a PC. With the aid of the PC, you can archive the setup data and, if required, copy them to the same or to another similarly configured RM4200D System.

Furthermore, the `Setup Manager` can show the data stored in setups, and give the user information about which parameters affect certain channels.

3.2   Starting the Setup Manager

The `Setup Manager` works with the `DHD Communication Server` (`DHDCS`). This application administrates the communication between the PC and the RM4200D systems that are available in the same network segment. The `DHD Communication Server` is integrated in the file „`SetupManager.exe`" and is automatically started along with the `Setup Manager`. For further information about the operation of the `DHDCS`, please see the chapter of this documentation titled „DHD Communication Server (DHDCS)".(See "The DHD Communication Server (DHDCS)" on page 2.)

For correct operation, the `Setup Manager` first requires data from an RM4200D. Directly at the start of the software, the user is therefore asked to establish a direct connection (TCP/IP or serial) to the desired RM4200D. (This does not apply if the user rights allow a fixed connection only.) For this purpose, the `DHD Connection Dialogue` opens after the start of the `Setup Manager`.
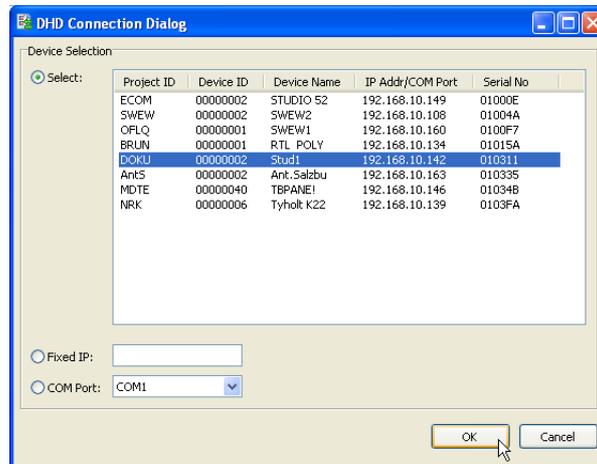
Figure 1–53:   Selecting a RM4200D device in the DHD Connection Dialogue.

You have the following options for establishing the connection:

- `Select:` In the upper list you can see all RM4200Ds connected in the IP network segment. The Devices in this list have automatically registered via UDP-Broadcasts. For each Device, the respective `Project ID`, the `Device ID`, the `Device Name` and the `IP address` are displayed. The last column contains the serial number of the Device; it is identical with the company-specific Bytes of the Ethernet-MAC-Address of the Device. Select the desired Device by mouse click.

- `Fixed IP:` Here you can directly enter the IP address of the Device. This is for instance necessary when UDP packets cannot be received, because configuration PC and RM4200D are located in different network segments. This option is also helpful for remote maintenance of systems via WAN connections.

- `COM Port:` Choose this option if the configuration PC is connected to the RM4200D via serial cable. It does not matter to which module you connect the cable, as all modules are interconnected via the CAN bus. The only exceptions are the overbridge modules. Depending on the PC equipment, you can select one of the serial interfaces COM 1 to COM 8.

After establishment of the connection, the `Setup Manager` starts and begins to read out setup names that are stored in the RM4200D. They are subsequently used for the representation. After a successful read-out, the `Setup Manager` presents itself as in the figure.
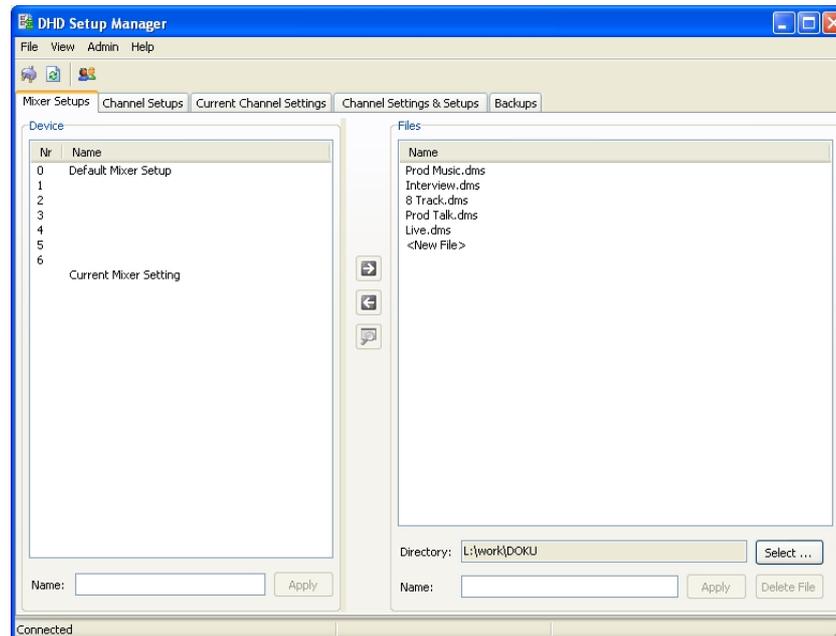
Figure 1–54:   The Setup Manager Software after starting up.

3.3   Using the Setup Manager

After the software is started, the application window is shown with a menu bar, a tool bar with direct access to essential functions, a main section, which is subdivided in two parts, and a status bar at the lower side of the window. The display in the subdivided main section can be selected via 5 register tabs.

The File Menu

Connect Drive...

Opens the `DHD Connection Dialogue` in order to establish a connection between software and an RM4200D. If, in the user rights, a fixed connection to a determined Device (`Fixed Device`) is set, the establishment of the set connection is attempted. (See "Starting the Setup Manager" on page 68.)

Exit

Closes the application. The user is *not asked* for a confirmation.

The View Menu

Refresh

Refreshes the representation in the main section by re-reading the names of Mixer Setups and Channel Setups.

The Admin Menu

User Rights...

The command opens the configuration menu `User Rights`. With the aid of this function you can restrict the rights of `Setup Manager` users. (See "Restriction of User Rights" on page 91.)

Change Password…

This function enables you to change the password necessary for opening the configuration menu `User Rights`. With this menu you can change the user rights. (See "Restriction of User Rights" on page 91.)

The Help Menu

About…

Here, the creation date of the software and the version of the `Setup Manager` used are displayed, e.g. „Version 1.0.5 Build 5". For service enquiries, please always indicate this complete version name.

Figure 1–55: **The information window of the Setup Manager.**

Tool Bar

Via the icons in this tool bar you can access frequently used functions of the `Setup Manager`.

- 🔌-Connect: Device Opens the `DHD Connection Dialogue` in order to establish a connection between software and an RM4200D. If a fixed connection to a determined Device (Fixed Device) is set in the user rights, the establishment of this connection is attempted.

- 🔄 - Refresh: Refreshes the representation in the main section by re-reading the names of Mixer Setups and Channel Setups.

- 👥- User rights: The command opens the configuration menu `User Rights`. With the aid of this function you can restrict the rights of `Setup Manager` users. For more detailed information please see paragraph Restriction of `User rights`. (See "Restriction of User Rights" on page 91.)

The Registry Cards

With the registry cards, users of the `Setup Manager` have access to all managing functions for mixer setups and channel setups of one or more RM4200D devices. As these are very extensive functions, they will be described in detail in a separate paragraph. (See also "The registry cards in detail" on page 71.)

The Status Bar

The status bar at the lower side of the `Setup Manager` displays if the software is currently connected to an RM4200D or not.

1. `Not connected`: The software is not connected to an RM4200D.

2. `Connected to …`: The software is connected to the displayed Device. The display is carried out in the format `Project ID - Device Name`.

3. ▭: The progress bar is displayed whenever data is interchanged between an RM4200D and the `Setup Manager`.

3.4 The registry cards in detail

Mixer Setups

Please use this window if you want to back up individual Mixer Setups (Input Gain, Input Processing and routing parameters of all configured Fader Channels, as well as their assignment to physical faders, stored in the RM4200D) on a PC, or if you want to restore Channel Setups from PC to RM4200D.

Device (Data in the Device)

The view `Mixer Setups` also is subdivided in two sections. The left section (`Device`) displays the Mixer Setups which are stored in the Device.

- `Nr 0 - Default Mixer Setup`: Standard Mixer Setup, is loaded after a software reset (F12 button in the Maintenance window). It is also called Setup 0; it cannot be overwritten from the console. You can only overwrite it with the aid of the `Setup Manager` or in the Maintenance window of `Toolbox4`.
- `Nr 1..6`: The Mixer Setups `1..6` can be adjusted user-specifically. You can load or save them during operation via according key functions of the console.
- `Current Mixer Setting`: The `Current Mixer Setting` represents the current settings of the system.

Underneath the lists, the text field Name is located, via which you can give individual names to the Mixer Setups `1..6` in the Device. These names are stored in the RM4200D and are henceforth available during operation. For entering or changing names, please follow below instructions:

1. Please establish a connection to the desired RM4200D.

2. In the window `Mixer Setups - Device`, please select the Mixer Setup (Nr. `1..6`) whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The number of characters is limited to 12. You can use all signs of the character set displayed below.

4. Hit the `Apply` button.

By clicking `Apply`, the entered name is sent to the Device. The respective setup is *directly* renamed. The entering of a setup name *does not* influence the operation of an RM4200D.

ì	▲	►	▼	◄	¿	à	Ø	ø	ò	ù	ñ	ç	ê	É	é
è	Æ	æ	Å	å	Ä	ä	Ö	ö	Ü	ü	°C	°F	ß	£	¥
	!	„	#	$	%	&	´	(	)	*	+	,	-	.	/
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	▓

Figure 1–56: Valid characters for naming setups.

The names of Setup `Nr 0 - Default Mixer Setup` and `Current Mixer Setting` cannot be adjusted. These setups have fixed names.

Important Note: Overwriting setups with new or default parameters *does not* influence setup names. Names are maintained independently of the setup content until they are deleted using the `Setup Manager`.

Deleting setup names:

1. Select a Mixer Setup (Nr `1..6`).

2. Delete the entry in the text field `Name`.

3. Hit the Apply button.

Tip: Deleting setup names on the RM4200D (`Device`) *does not* influence the parameters stored in the setup.

Files (Data on the PC)

In the right section of the view, you can find those Mixer Setup files, which are located in the selected directory. Files in which individual DHD RM4200D Mixer Setups are stored, always have the ending `*.dms`. Each `*.dms` file contains *one* Mixer Setup.

The directory, in which these files are stored, is shown in the text field Directory. Via the `Select...` button you can select any directory on the PC, to which you have access.

Below the text field `Directory`, the text field `Name` is located, via which you can give an individual name to a selected Mixer Setup file on your PC.

Changing the name of an existing Mixer Setup file:

1. By clicking `Select...`, please change to the according directory.

2. In the window `Mixer Setups - Files`, select the Mixer Setup file (`*.dms`), whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The length of the name is preset by the operating system, however it should not supersede 8 characters. You do not have to enter the file ending `*.dms` manually.

4. Hit the `Apply` button..

With the aid of the `Delete File` button you can delete a selected file. For this, select the file to be deleted and click the button. The file is deleted *without* confirmation..
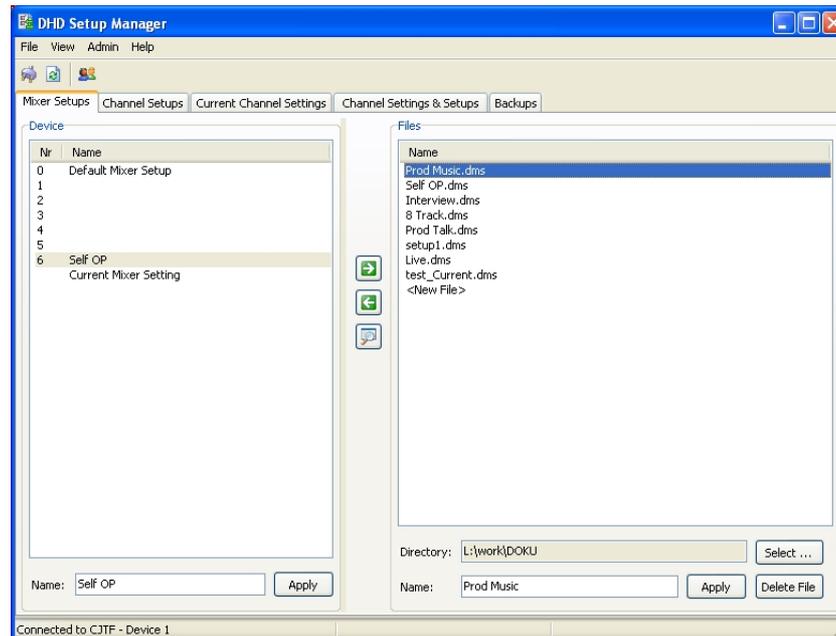
Figure 1–57:   Setup Manager, Mixer Setups view.

Copying Mixer Setups from RM4200D to PC

With the `Setup Manager` you can back up Mixer Setups from RM4200D to your PC. The data transfer from RM4200D to PC is carried out clicking the ▣ button between the sections Device and Files.

Important Note: Once a setup file has been overwritten, it *cannot* be restored anymore. Please imperatively *first* make sure you have selected the correct Mixer Setup file.

For backing up individual setups from the RM4200D as new file on the PC, please follow the instructions below:

1. Please change to the `Mixer Setups` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Mixer Setup file.

3. In the left section of the window (`Device`), select the Mixer Setup that you want to copy onto your PC.

4. In the right section of the window, select the entry <New File>. The transfer arrow changes from inactive ▣ to active ▣.

5. In the text field `Name`, enter any name for the new file. Thus you overwrite the automatic entry „`New File...`".

6. Now, hit the ▣ button. The copying process from RM4200D to PC starts. You can see a progress bar ▣▣▣▣▣▣▣▣▣▣▣▣▣ in the status bar at the lower side of the application window.

7. After the copying is completed, the bar disappears and the just generated file is added to the list of the stored Mixer Setup files (`Files`).

Of course you can also overwrite already existing Mixer Setup files with new data from an RM4200D.

1. Therefore please change to the `Mixer Setup` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Mixer Setup file.

3. 3.In the left section of the window (`Device`), select the Mixer Setup which you want to copy to your PC.

4. In the right section of the window, select the file that you want to overwrite. The transfer arrow changes from inactive ▣ to active ▣.

5. 5.If necessary, change the name of the file in text field Name. Now, hit the ▣ button. The copying process from RM4200D to PC is started. You can see a progress bar ▰▰▰▰▰▰▰▰▰▰▰▱ in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears and the Mixer Setup file has been overwritten.

Considering the fact that setups of several RM4200Ds can be administered on one PC, it is imperative to keep with unambiguous naming conventions.

Copying Mixer Setups from PC to RM4200D

With the `Setup Manager` you can copy Mixer Setups from PC to RM4200D. The data transfer from PC to RM4200D is carried out clicking the ◀ button between the sections Device and Files.

Important Note: Once a setup has been overwritten, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Mixer Setup.

Caution: The overwriting of the Current Mixer Setting with the data of a Mixer Setup file from your PC *directly influences* the active settings of your RM4200D. Active channels, whose signal is part of a mix during the copying, are not changed for the moment. However, they are accordingly preset (ACC button is blinking). All other channels are overwritten.

For copying individual setups from the PC to an RM4200D, please follow the instructions below:

1. Please change to the `Mixer Setup` register tab..

2. By clicking the `Select...` button in the right part of the window, go to the directory, from which you want to copy the Mixer Setup file.

3. In the right section of the window, select the Mixer Setup file (`*.dms`), which contains the according Mixer Setup.

4. In the left section of the window (`Device`), select the Mixer Setup you want to overwrite. The transfer arrow changes from inactive ⬅ to active ⬅.

5. Now, hit the ⬅ button. The copying process from PC to RM4200D starts. You can see a progress bar ▮▮▮▮▮▮▮▮▮▮▮▮▮▮ in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears.

View Mixer Setups

With the aid of the `Setup Manager` you can view the contents of Mixer Setups on an RM4200D or the contents of Mixer Setup files on your PC.

In order to view a Mixer Setup on the RM4200D, please follow the instructions below:

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Mixer Setups`.

3. In the left section of the window (`Device`), select the setup (`Default Mixer Setup`, Mixer Setup `1..6` or `Current Mixer Setting`) whose contents you would like to view. By setting a mark, you activate the 🔍 icon between the sections `Device` and `File`.

4. Click the 🔍 icon. After a short transfer process, a window is opened, in which the content of the setup is displayed in a tree.(See "The Setup Content Window" on page 97.)

Alternatively you can also view the contents of a Mixer Setup file. The procedure is similar.

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Mixer Setups`.

3. In the right section of the window (`Files`), select the file whose content you would like to inspect. Setting a mark activates the 🔍 icon between the sections `Device` and `Files`.

4. Click the 🔍 icon. Consequently a window is opened, in which the content of the setup is displayed in a tree. (See "The Setup Content Window" on page 97.)
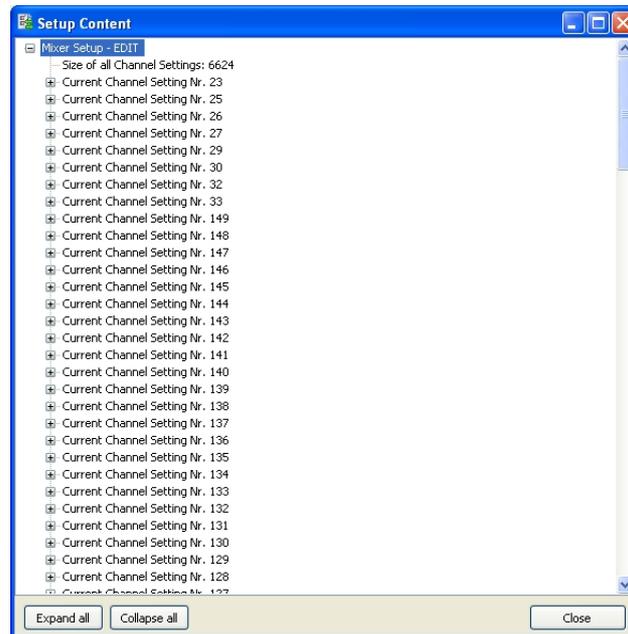
Figure 1–58: **View of a Mixer Setup in the Setup Content Window.**

Channel Setups

Please use this window if you want to back up individual Channel Setups (Input Gain and Input Processing parameters without direct assignment to a fader channel of the configuration, stored in the RM4200D) on a PC, or if you want to restore Channel Setups from PC to RM4200D.

Device (Data in the Device)

The view `Channel Setups` also is subdivided in two sections. In the left section (`Device`), those Channel Setups are displayed which are stored in the Device.

- `Nr 1..250`: The Channel Setups 1…250 can be adjusted user-specifically. You can load or save them during operation via according key functions of the console.

Beneath the lists, the text field `Name` is located, via which you can give individual names to the Channel Setups 1..250 in the Device. These names are stored in the RM4200D and are henceforth available during operation.

For entering or changing names, please follow below instructions:

1. Please establish a connection to the desired RM4200D.

2. In the window `Channel Setups - Device`, please select a Channel Setup (`Nr 1..250`) whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The number of characters is limited to 12.

4. Hit the `Apply` button..

By clicking `Apply`, the entered name is sent to the Device. The respective setup is `directly` renamed. The entering of a setup name `does not` influence the operation of an RM4200D.

Files (Data on the PC)

In the right section of the view, you can find those Channel Setup files, which are located in the selected directory. Files in which individual DHD RM4200D Channel Setups are stored always have the ending `*.dcs`. Each `*.dcs` file contains *one* Channel Setup.

The directory, in which these files are stored, is shown in the text field `Directory`. Via the `Select...` button you can select any directory on the PC, to which you have access.

Below the text field `Directory`, the text field `Name` is located, via which you can give an individual name to a selected Channel Setup file on your PC.

Changing the name of an existing Channel Setup file:

1. By clicking `Select...`, please change to the according directory.

2. In the window `Channel Setups - Files`, select the Channel Setup file `(*.dcs)`, whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The length of the name is preset by the operating system; however, it should not supersede 8 characters. You do not have to enter the file ending `*.dcs` manually.

4. Hit the `Apply` button.

With the aid of the `Delete File` button you can delete a selected file. For this, select the file to be deleted and click the button. The file is deleted *without* confirmation.
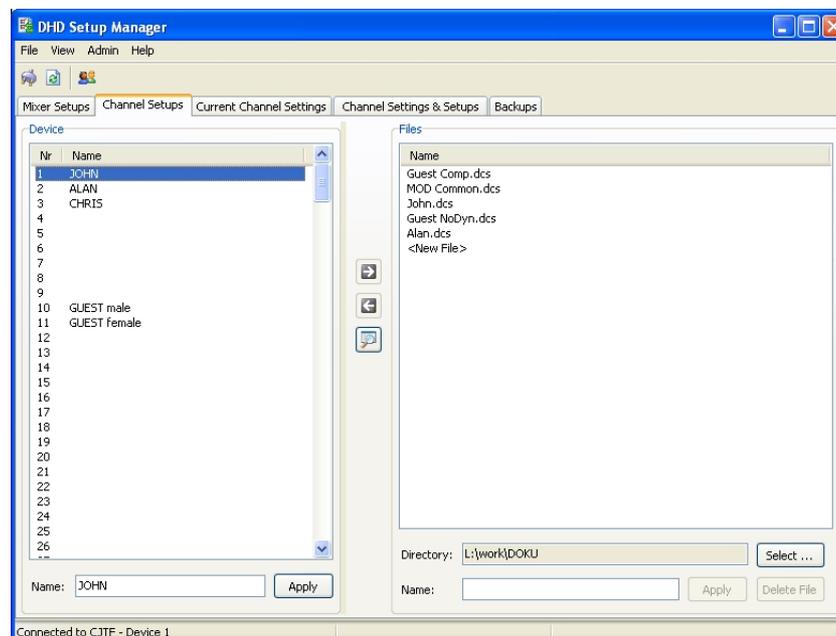
Figure 1–59: Setup Manager, Channel Setups view.

Copying Channel Setups from RM4200D to PC

With the `Setup Manager` you can back up Channel Setups from RM4200D to your PC. The data transfer from RM4200D to PC is carried out clicking the button between the sections `Device` and `Files`.

Important Note: Once a Channel Setup file has been overwritten on your PC, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Channel Setup file.

For backing up individual Channel Setups from the RM4200D as new file on the PC, please follow the instructions below:

1. Please change to the `Channel Setups` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Channel Setup file.

3. In the left section of the window (`Device`), select the Channel Setup you want to copy onto your PC.

4. In the right section of the window, select the entry „`New File`". The transfer arrow changes from inactive ▶ to active ▶.

5. In the text field `Name`, enter any name for the new file. Thus you overwrite the automatic entry „`New File`"

6. Now, hit the ▶ button. The copying process from RM4200D to PC starts. You can see a progress bar ▣▣▣▣▣▣▣▣▣▣▣▣ in the status bar at the lower side of the application window.

7. After the copying is completed, the bar disappears and the just generated file is added to the list of the stored Channel Setup files (`Files`).

Of course you can also overwrite already existing Channel Setup files with new data from an RM4200D.

1. Therefore please change to the `Channel Setup` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Channel Setup file.

3. In the left section of the window (`Device`), select the Channel Setup which you want to copy to your PC.

4. In the right section of the window, select the file that you want to overwrite. The transfer arrow changes from inactive ▶ to active ▶.

5. If necessary, change the `name` of the file in text field Name. Now, hit the ▶ button. The copying process from RM4200D to PC is started. You can see a progress bar ▣▣▣▣▣▣▣▣▣▣ in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears and the Channel Setup file has been overwritten.

Considering the fact that the Channel Setups of several RM4200Ds can be administered on one PC, it is imperative to keep with unambiguous naming conventions.

Copying Channel Setups from PC to RM4200D

With the `Setup Manager` you can copy Channel Setups from PC to RM4200D. The data transfer from PC to RM4200D is carried out clicking the [icon] button between the sections Device and Files.

Important Note: Once a Channel Setup has been overwritten in the RM4200D, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Channel Setup.

For copying individual Channel Setups from the PC to an RM4200D, please follow the instructions below:

1. Please change to the `Channel Setup` register tab..

2. By clicking the `Select...` button in the right part of the window, go to the directory, from which you want to copy the Channel Setup file.

3. In the right section of the window, select the Channel Setup file (`*.dcs`) that contains the according Channel Setup.

4. In the left section of the window (`Device`), select the Channel Setup you want to overwrite. The transfer arrow changes from inactive [icon] to active [icon].

5. Now, hit the [icon] button. The copying process from PC to RM4200D starts. You can see a progress bar [progress bar] in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears.

View Channel Setups

With the aid of the `Setup Manager` you can view the contents of Channel Setups on an RM4200D or the contents of Channel Setup files on your PC.

In order to view a Channel Setup on the RM4200D, please follow the instructions below:

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Channel Setups`.

3. In the left section of the window (`Device`), select the Channel Setup (`Nr 1..250`) whose contents you would like to view. By setting a mark, you activate the [icon] icon between the sections `Device` and `File`.

4. Click the [icon] icon. After a short transfer process, a window is opened, in which the content of the setup is displayed in a tree (see figure setman_011.tif). (See "The Setup Content Window" on page 97.)

Alternatively you can also view the contents of a Channel Setup file. The procedure is similar.

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Channel Setups`.

3. In the right section of the window (`Files`), select the file whose content you would like to inspect. Setting a mark activates the 🔍 icon between the sections `Device` and `Files`.

4. Click the 🔍 icon. Consequently a window is opened, in which the content of the setup is displayed in a tree.(See "The Setup Content Window" on page 97.)
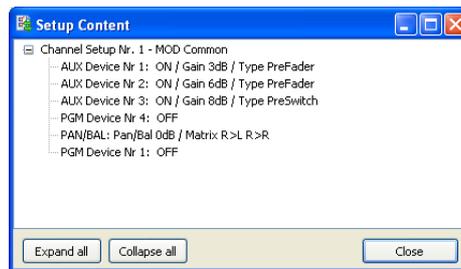
Figure 1–60:   View of a Channel Setup in the Setup Content Window.

Current Channel Settings

Please use this view, if you want to back up the *current* settings of individual Fader Channels (Input Gain and Input Processing parameters of the configured Fader Channels) on a PC, or if you want to copy Channel Setups stored on the PC to particular Fader Channels of an RM4200D.

Device (Data in the Device)

The view `Current Channel Settings` is subdivided in two sections. In the left section (`Device`), those Fader Channels are displayed which are configured in the Device. The name is in accordance with the name shown in the Channel display.

- `Nr 1..150`: The Fader Channels `Nr. 1..150` in this list correspond to those, which were generated with the configuration software `Toolbox4` under `Audio System/Fader Channels` in the configuration of the according RM4200D. The total number can be max. 150. Only those channels are displayed which are actually configured.

Beneath the lists, the text field `Name` is located, via which you can change the name of any Fader Channel (Nr. 1..150) in the Device. These names are temporarily stored in the RM4200D and are henceforth available during operation until

- the Device is subject to a software reset,
- the Device is switched off or
- the configuration is reloaded.

For entering or changing names, please follow below instructions:

1. Please establish a connection to the desired RM4200D.

2. In the window `Current Channel Settings - Device`, please select any Fader Channel (Nr 1..150) whose name you would like to change temporarily.

3. Below, in the text field `Name`, please enter any name. The length of the name is subject to the following restrictions:
- Fader Module RM420-029: maximum of 8 characters
- Fader Module RM420-020: maximum of 4 characters

4. You can use all signs of the character set displayed in before. (See "Device (Data in the Device)" on page 71.)

5. Hit the `Apply` button.

By clicking `Apply`, the entered name is sent to the Device. The respective Fader Channel is directly renamed. The changing of a channel name *does not* influence the operation of an RM4200D.

Files (Data on the PC)

In the right section of the view, you can find those Channel Setup files that are located in the selected directory. Files in which individual DHD RM4200D Channel Setups are stored, always have the ending `*.dcs`. Each `*.dcs` file contains one Channel Setup.

The directory, in which these files are stored, is shown in the text field `Directory`. Via the `Select...` button you can select any directory on the PC, to which you have access.

Below the text field Directory, the text field `Name` is located, via which you can give an individual name to a selected Channel Setup file on your PC.

Changing the name of an existing Channel Setup file:

1. By clicking `Select...`, please change to the according directory.

2. In the window `Current Channel Settings - Files`, select the Channel Setup file (`*.dcs`), whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The length of the name is preset by the operating system; however, it should not supersede 8 characters. You do not have to enter the file ending `*.dcs` manually.

4. Hit the `Apply` button..

With the aid of the `Delete File` button you can delete a selected file. For this, select the file to be deleted and click the button. The file is deleted *without* confirmation..
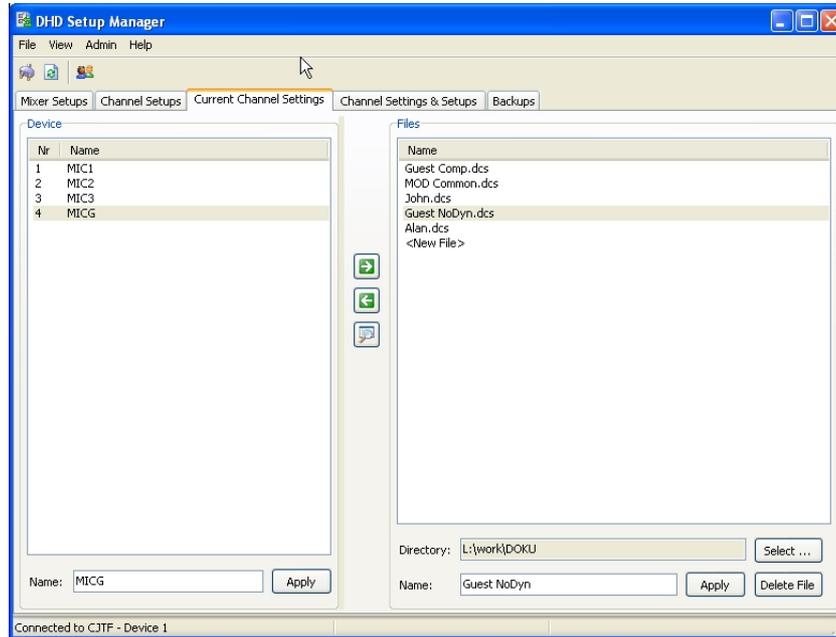
Figure 1–61: Setup Manager, Current Channel Settings view.

Copying Channel Settings from RM4200D to PC

With the Setup Manager you can back up Current Channel Settings from RM4200D to your PC. The data transfer from RM4200D to PC is carried out clicking the 🔲 button between the sections `Device` and `Files`.

> **Important Note:** Once a Channel Setup file has been overwritten on your PC, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Channel Setup file.

For backing up individual Current Channel Settings from the RM4200D as new file on the PC, please follow the instructions below:

1. Please change to the `Current Channel Settings` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Channel Setup file.

3. In the left section of the window (`Device`), select the Current Channel Setting you want to copy onto your PC.

4. In the right section of the window, select the entry `<New File>`. The transfer arrow changes from inactive 🔲 active 🔲.

5. In the text field `Name`, enter any name for the new file. Thus you overwrite the automatic entry „`New File...`“.

6. Now, hit the 🔲 button. The copying process from RM4200D to PC starts. You can see a progress bar ▮▮▮▮▮▮▮▮▮▮▮▮▮ in the status bar at the lower side of the application window.

7. After the copying is completed, the bar disappears and the just generated file is added to the list of the stored Channel Setup files (`Files`).

Of course you can also overwrite already existing Channel Setup files with new data from an RM4200D.

1. Therefore please change to the `Current Channel Settings` register tab..

2. By clicking the `Select...` button in the right part of the window, go to the directory in which you want to store the new Channel Setup file.

3. In the left section of the window (`Device`), select the Current Channel Setting you want to copy onto your PC.

4. In the right section of the window, select the file that you want to overwrite. The transfer arrow changes from inactive 🔳 to active 🔳.

5. If necessary, change the name of the file in text field `Name`. Now, hit the 🔳 button. The copying process from RM4200D to PC is started. You can see a progress bar ▮▮▮▮▮▮▮▮▮▮▮▮ in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears and the Channel Setup file has been overwritten.

Considering the fact that the Current Channel Settings of several RM4200Ds can be administered on one PC, it is imperative to keep with unambiguous naming conventions.

Copying Channel Settings from PC to RM4200D

With the Setup Manager you can copy Channel Settings from PC to RM4200D. The data transfer from PC to RM4200D is carried out clicking the 🔳 button between the sections `Device` and `Files`.

Important Note: Once a Current Channel Settings has been overwritten in the RM4200D, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Current Channel Setting.

Caution: The overwriting of the Current Channel Setting with the data of a Channel Setup file from your PC *directly* influences the active settings of your RM4200D. Parameters of active channels, whose signal is part of a mix during the copying, are changed *without confirmation*.

For copying individual Channel Setups from the PC to an RM4200D, please follow the instructions below:

1. Please change to the `Channel Setup` register tab.

2. By clicking the `Select...` button in the right part of the window, go to the directory, from which you want to copy the Channel Setup file.

3. In the right section of the window, select the Channel Setup file (`*.dcs`), which contains the according Channel Setup.

4. In the left section of the window (`Device`), select the Current Channel Setting you want to overwrite. The transfer arrow changes from inactive ▣ to active ▣.

5. Now, hit the ▣ button. The copying process from PC to RM4200D starts. You can see a progress bar ▭▭▭▭▭▭▭▭▭▭ in the status bar at the lower side of the application window.

6. After the copying is completed, the bar disappears.

View Channel Settings

With the aid of the `Setup Manager` you can view the contents of Current Channel Settings on an RM4200D or the contents of Channel Setup files on your PC.

In order to view a Current Channel Setting on the RM4200D, please follow the instructions below:

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Current Channel Settings`.

3. In the left section of the window (`Device`), select the Current Channel Setting (`Nr 1..150`) whose contents you would like to view. By setting a mark, you activate the ▣ icon between the sections `Device` and `Files`.

4. Click the ▣ icon. After a short transfer process, a window is opened, in which the content of the setup is displayed in a tree.(See "The Setup Content Window" on page 97.)

Alternatively you can also view the contents of a Channel Setup file. The procedure is similar.

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Channel Setups`.

3. In the right section of the window (`Files`), select the file whose content you would like to inspect. Setting a mark activates the ▣ icon between the sections `Device` and `Files`.

4. Click the ▣ icon. Consequently a window is opened, in which the content of the Channel Setup is displayed in a tree. (See "The Setup Content Window" on page 97.)
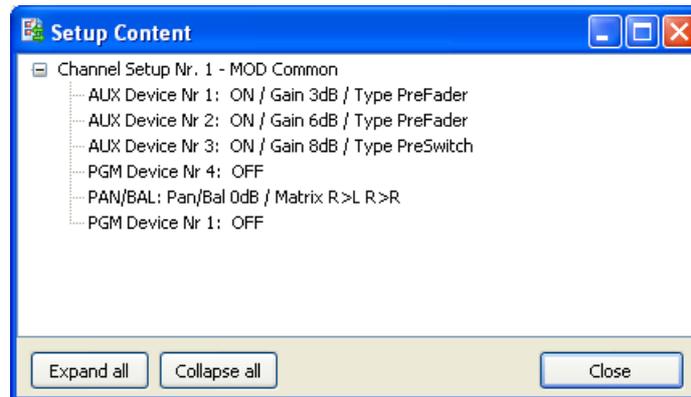
Figure 1–62:   View of a channel setup in the Setup Content window.

Channel Settings & Setups

Please use this view, if you want to save the current settings of individual Fader Channels (Input Gain and Input Processing parameters of the configured Fader Channels) as Channel Setups in the RM4200D, or if you want to overwrite them with Channel Setups that are stored in the RM4200D. This mode enables remote control of an RM4200D with the `Setup Manager`. In control modules, this function also can be configured directly on the console with the key functions „`Load Channel Setup`" and „`Save Channel Setup`".

Current Channel Settings

The register view `Channel Settings & Setups` is subdivided in two sections. In the left section (`Current Channel Settings`), those Fader Channels are displayed which are configured in the Device. The name is in accordance with the name shown in the Channel display.

- `Nr 1..150`: The Fader Channels Nr. 1..150 in this list correspond to those, which were generated with `Toolbox4` under `Audio System/Fader Channels` in the configuration of the according RM4200D. The total number can be *max*. 150. Only those channels are displayed which are actually configured.

Beneath the lists, the text field Name is located, via which you can change the name of any Fader Channel (Nr. 1..150) in the Device. These names are *temporarily* stored in the RM4200D and are henceforth available during operation until

- the Device is subject to a software reset,
- the Device is switched off or
- the configuration is reloaded.

For entering or changing names, please follow below instructions:

1. Please establish a connection to the desired RM4200D.

2. In the window `Channel Settings & Setups - Current Channel Set-tings`, please select any Fader Channel (`Nr 1..150`) whose name you would like to change temporarily.

3. Below, in the text field `Name`, please enter any name. The length of the name is subject to the following restrictions:
- Fader Module RM420-029: maximum of 8 characters

- Fader Module RM420-020: maximum of 4 characters

4. You can use all signs of the displayed character set.(See "Device (Data in the Device)" on page 71.)

5. Hit the `Apply` button.

By clicking `Apply`, the entered name is sent to the Device. The respective Fader Channel is directly renamed. The changing of a channel name does not influence the operation of an RM4200D.
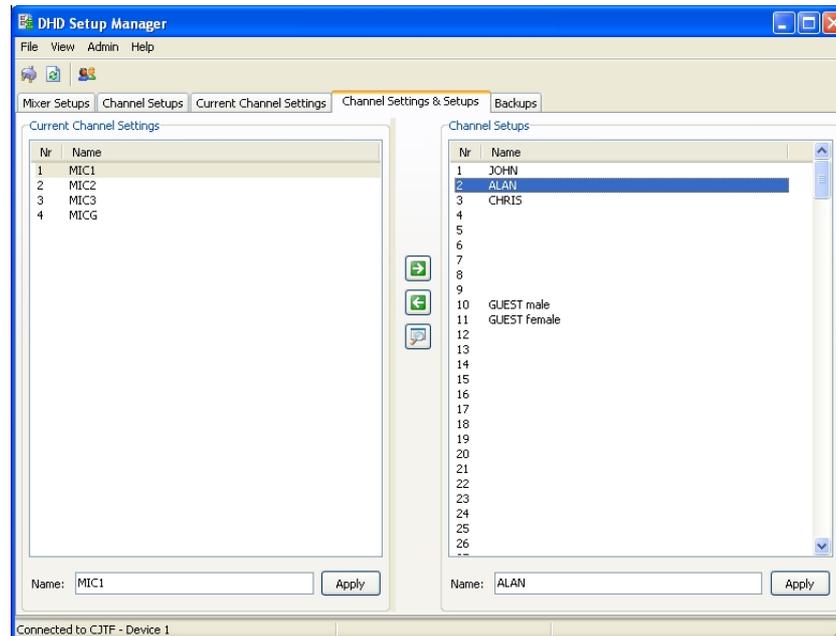
Channel Setups

In the right section of the view `Channel Settings & Setups`, you can see the Channel Setups that are stored in the RM4200D.

- `Nr 1..250`: The Channel Setups 1…250 can be adjusted user-specifically. You can also load or save them during operation via according key functions of the console.

Beneath the lists, the text field `Name` is located, via which you can give individual names to the Channel Setups 1..250 in the Device. These names are stored in the RM4200D and are henceforth available during operation.

For entering or changing names, please follow below instructions:

1. Please establish a connection to the desired RM4200D.

2. In the window `Channel Settings & Setups - Channel Setups`, please select a Channel Setup (`Nr 1..250`) whose name you would like to change.

3. Below, in the text field `Name`, please enter any name. The number of characters is limited to 12. You can use all signs of the already mentioned character set.(See "Device (Data in the Device)" on page 71.)

4. Hit the `Apply` button.

By clicking `Apply`, the entered name is sent to the Device. The respective setup is *directly* renamed. The entering of a setup name *does not* influence the operation of an RM4200D.

Figure 1–63: Setup Manager, Channel Settings & Setups view.

Remote-Controlled Loading and Saving of Channel Settings in the RM4200D

With the `Setup Manager` you can copy Channel Setups, which are stored in the RM4200D, to configured Fader Channels, or you can save their active parameter settings as Channel Setups in the RM4200D. The data transfer from and to the RM4200D memory is carried out with the or buttons between the sections Current `Channel Settings` (left) and `Channel Setups` (right).

Important Note: Once a Current Channel Settings has been overwritten in the RM4200D, it *cannot* be restored anymore. Please imperatively first make sure you have selected the correct Current Channel Setting. The same applies to Channel Setups. Once overwritten, you cannot undo the changes made.

Caution: The overwriting of the `Current Channel Setting` with the data of a Channel Setup directly influences the active settings of your RM4200D. Parameters of active channels, whose signal is part of a mix during the copying, are changed without confirmation.

For assigning individual Channel Setups from the RM4200D memory to a Fader Channel, please follow the instructions below:

1. Please change to the `Channel Settings & Setups` register tab.

2. In the right part of the window, select the Channel Setup, which contains the parameters that you want to assign to a Fader Channel.

3. In the left section of the window, select the Current Channel Setting you want to overwrite. The transfer arrow changes from inactive to active .

4. Now, hit the ⬅ button. The loading process within the RM4200D usually is very fast. Thus, in most cases, no progress bar will appear. After about 1 second, the Current Channel Setting has been overwritten.

The other way around, you can copy active parameters of a channel into a Channel Setup and thus back them up for further operation. For this, please proceed according to the following:

1. Please change to the `Channel Settings & Setups` register tab.

2. In the left section of the window, select the Current Channel Setting that contains the parameters that you want to store in a Channel Setup.

3. In the right part of the window, select the Channel Setup you want to write or to overwrite. The transfer arrow changes from inactive ➡ to active ➡.

4. Now, click the ➡ button. The copying process within the RM4200D usually is very fast. Thus, in most cases, no progress bar will appear. After about 1 second, the Channel Setup has been overwritten.

Note: Names of Fader Channels and names of Channel Setups are unaffected by the copying processes.

View Channel Settings

With the aid of the `Setup Manager` you can view the contents of Channel Settings and Channel Setups on an RM4200D.

In order to view a Current Channel Setting on the RM4200D, please follow the instructions below:

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Channel Settings & Setups`..

3. In the left section of the window (`Current Channel Settings`), select the Channel Setting (`Nr 1..150`) whose contents you would like to view. By setting a mark, you activate the 🔲 icon between.

4. Click the 🔲 icon. After a short transfer process, a window is opened, in which the set parameters are displayed in a tree. (See "The Setup Content Window" on page 97.)

Alternatively you can also view the contents of a Channel Setup file. The procedure is similar.

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. In the main part of the window, change to view `Channel Settings & Setups`..

3. In the right section of the window (`Channel Setups`), select the Channel Setup (`Nr 1..250`) whose content you would like to inspect. Setting a mark activates the 🔲 icon between the left and the right section.

4. Click the 🔍 icon. After a short transfer process, a window is opened, in which the set parameters are displayed in a tree. (See "The Setup Content Window" on page 97.)

Backups

As alternative to the copies of individual Mixer and Channel Setups, the `Setup Manager` can generate a general backup, a so-called *Device Backup*, from all setups stored in the RM4200D; this backup is then saved as file on the PC. It can be generated quickly and easily. The backup represents a complete copy of the setup segment, which can just as easily be restored to the RM4200D, either completely or partially. The functions can be accessed via the register tab `Backups` of the `Setup Manager`.
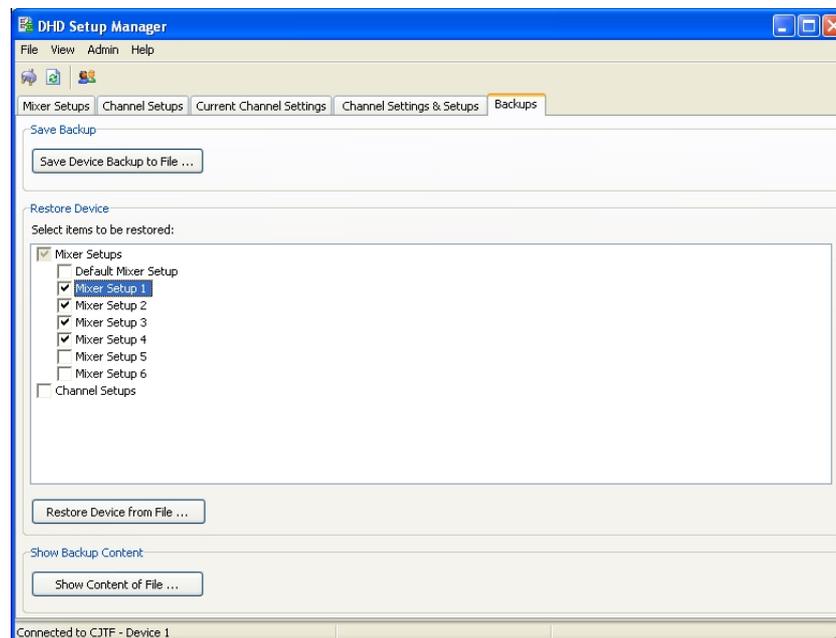
Figure 1–64: Setup Manager, Backups view.

Save Backup
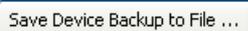
`Save Device Backup to File ...` : With the `Save Device Backup to File ...` button you can start the generation of a backup of the RM4200D setups. By clicking on this button, a window is opened.

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. Change to the view `Backups`.

3. First, please select a directory on your PC, in which you want to store the backup file.

4. Now, enter a name for the backup file. As file type, `DHD Mixer Backup` (`*.dmb`)is automatically selected. The length of the file name is preset by your operating system. You can also select and overwrite an already existing file. However, you need to confirm the overwriting.

Important Note: When assigning file names, please keep in mind that you can administer different backups of one or even more RM4200Ds with one PC. Therefore, choose an *unambiguous* file name, from which you can tell, when and from which Device the backup was generated (example: `Studio1_200411.dmb`).

5. Hit the `Save` button. This will start the copying process from RM4200D to PC. You can see a progress bar ▮▮▮▮▮▮▮▮▮▮▮▮▮▮ in the status bar. When the copying process is completed and the backup file is generated, the progress bar disappears.

The following setups are backed up in the Device backup:
- Default Mixer Setup (Setup 0)
- Mixer Setup 1..6
- Channel Setups 1..250

Restore Device

`Restore Device from File ...` : With the `Restore Device from File …` button, you can copy complete backups or backup parts back from the PC to an RM4200D. Before activating the button, please first select those parts of the backup that you want to copy into the RM4200D. Please follow this instruction:

1. Please establish a connection between the `Setup Manager` and the RM4200D.

2. Change to the view `Backups`.

3. In the section `Select items to be restored`, please select the checkboxes of the backup parts that are to be copied.
- Checking `Mixer Setups` automatically selects all Mixer Setups (`Default Mixer Setup` und Mixer Setup `Nr 1..6`).
-    You can also select each individual Mixer Setup.
- Checking `Channel Setups` selects all Channel Setups (`Nr 1..250`).

4. `Restore Device from File …` overwrites all selected setups. If you have not selected all Mixer Setups, the checkbox `Mixer Setups` is represented in grey.

5. Click the `Restore Device from File …` button.

6. The following dialogue requests you to select a backup file (`*.dmb`) from a directory of your PC.

7. `Opening` this file starts the copying process. A progress bar ▮▮▮▮▮▮▮▮▮▮▮▮▮▮ is displayed in the status bar. It disappears when the copying process is completed and the selected setups have been overwritten in the RM4200D by the according data of the backup file.

The branch for selecting the Mixer Setups, which are to be restored to the RM4200D, can be expanded or collapsed by double-clicking on the entry `Mixer Setups`.
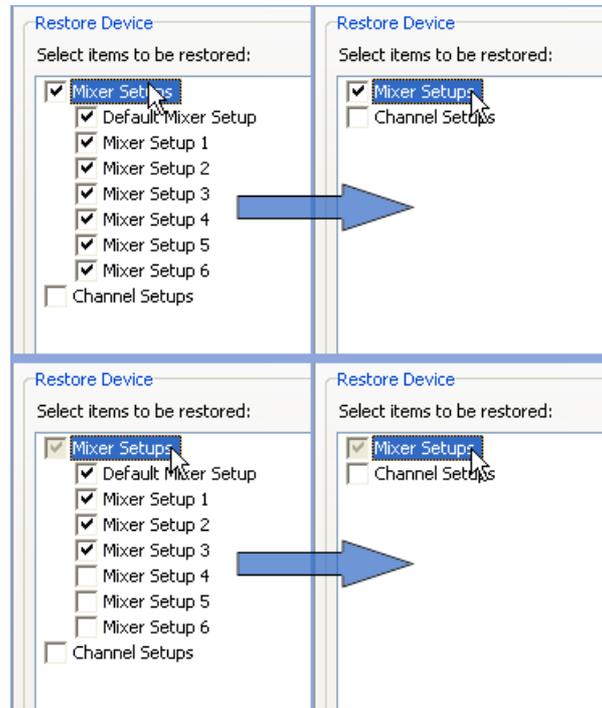
Figure 1–65: Double-clicking the entry Mixer Setups collapses the branch.

Show Backup Content

`Show Content of File ...` : For inspecting the content of backup files, you can access the according function via the `Show Content of File...` button.

1. Please establish a connection between the `Setup Manager` and an RM4200D.

2. Change to the view `Backups`.

3. Clicking on the `Show Content of File...` button opens a window, via which you can select any backup file (`*.dmb`) on your PC.

4. Click Open in order to show the content of the file in the `Setup Content` window.(See "The Setup Content Window" on page 97.)

3.5 Restriction of User Rights

In case that several users have access to the `Setup Manager`, it might be necessary to restrict access in order to ensure the failure-free operation of the RM4200D systems in the network. The configuration of user rights in the `Setup Manager` is realized in a simple but effective way.

The user of the `Setup Manager` can carry out only those functions, which are activated in the menu `User Rights`. Only if the user knows the password, he can change the user rights. It does not matter if an administrator or a normal user is working with the `Setup Manager`; after the start, the restrictions apply for all users.

You can access the configuration menu `User Rights` (see figure) by selecting the menu command `Admin / User Rights`, or by clicking on the icon in the icon bar.
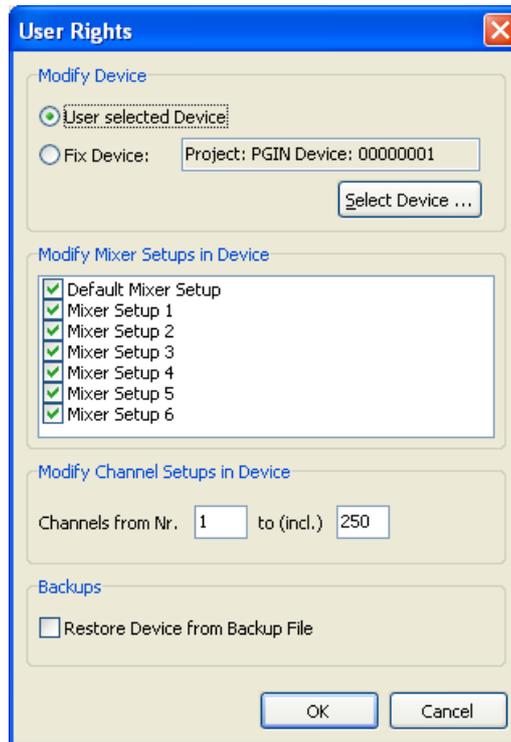
Figure 1–66: The „User Rights"-Window enables the setting of restrictions for the usage of the Setup Manager.

The configuration menu is subdivided in 4 sections:

Modify Device

- `User selected Device`: If this option is activated, the user can select the Device with which he wants to connect the `Setup Manager` directly after the start. Then the `DHD Connection Dialogue` is opened.
- `Fixed Device`: Via this option you can determine, to which Device the `Setup Manager` shall establish a connection directly after the start. For this, using the `Select Device...` button, you first have to open the `DHD Connection Dialogue` and then select the desired Device. This connection persists until it is replaced by a new one. If the option `Fixed Device` is activated, but the connected Device is not available, the following warning message appears.

Figure 1–67: Error Message after unsuccessful to connect to a Device.

Modify Mixer Setups in Device

In this section you can determine for each individual Mixer Setup in an RM4200D (`Default Mixer Setup`, Mixer Setup `Nr 1..6`), if it may be overwritten with the

Setup Manager or not. Selecting the checkbox ☑ allows the overwriting of a setup in the RM4200D with the aid of the `Setup Manager`.

Important Note: Please note that the restoring of Mixer Setups from a backup file is *not* affected by the settings in this section. Protected setups will still be overwritten by `Restore Device from File` ….

Modify Channel Setups in Device

Here you can determine, which of the 250 Channel Setups may be changed in the RM4200D via the Setup Manager. The entries in the text fields `from (Nr.)`… and `to (incl.)` indicate the first and the last Channel Setup that can be overwritten by the `Setup Manager`. Please enter values between 1 and 250 here.

Backups

The option `Restore Device from Backup File` activates and deactivates the Restore function. If the checkbox is not selected, you cannot restore to the RM4200D any Mixer Setups and Channel Setups, which were saved in backup files on the PC. (See "Backups" on page 89.)

3.6   What You should Know about Setups

Which Data are Stored in Setups

A setup is a collection of parameters, which are used in the context of a configuration in order to adapt DSP functions. This collection includes for instance parameters like amplification of a signal (Gain) or limiter threshold. In the RM4200D, there are Mixer Setups and Channel Setups. A *Mixer Setup* comprises the parameters for all configured Fader Channels of the entire RM4200D, whereas a Channel Setup contains only parameters for one individual Fader Channel. Moreover, it has no direct connection to the configured Fader Channels.

In order to keep saving and loading as short as possible, only values differing from a certain default value are stored in setups. The following chart shows which parameters are stored in Setups and which default values apply to them.

DSP-Funktion	Parameter	Wertebereich	Vorgabe-wert	Mixer Setup	Channel Setup
GAIN	Gain (digital)	-20 dB to 20 dB	0 dB	+	+
	AGain (analog)	0 dB to 50 dB	0 dB	+	+
	Phasereverse	OFF or ON	OFF	+	+
	Phantom	OFF or ON	OFF	+	+
LIMITER (Device 1)	LIM1	OFF or ON	OFF	+	+
	Threshold	-20 dB to 20 dB	20 dB	+	+
	Release	3 dB/s to 20 dB/s	6 dB/s	+	+

DSP-Funktion	Parameter	Wertebereich	Vorgabe-wert	Mixer Setup	Channel Setup
COMPRESSOR	COMP1	OFF or ON	OFF	+	+
	Threshold	-50 dB to 10 dB	0 dB	+	+
	Gain	0 dB to 30 dB	0 dB	+	+
	Ratio	1.0:1 to 5.0:1	1.0:1	+	+
	Attack	0.2 ms to 50 ms	0.2 ms	+	+
	Release	0.05 s to 10 s	0.05 s	+	+
EXPANDER (Device1)	EXP1	OFF or ON	OFF	+	+
	Threshold	-50 dB to 10 dB	0 dB	+	+
	Gain	0 dB to 30 dB	0 dB	+	+
	Ratio	1.0:1 to 3.0:1	1.0:1	+	+
	Attack	0.05 s to 10 s	0.05 s	+	+
	Release	0.2 ms to 50 ms	0.2 ms	+	+
EQUALIZER (Device 1-4)	EQ1-4	OFF or ON	OFF	+	+
	Gain	-15 dB to 15 dB	0 dB	+	+
	Frequency	22 Hz to 20000 Hz	1000 Hz	+	+
	Quality	0.3 Oct to 3.0 Oct	1.0 Oct	+	+
	Filter Type	Bell, Notch, High & Low Shelving	Bell	+	+
AUTOMATIC GAIN CONTROL (Device 1)	AGC1	OFF or ON	OFF	+	+
	Velocity	0.3 dB/s to 1.5 dB/s	1.5 dB/s	+	+
	Gain	5 dB to 30 dB	20 dB	+	+
	Level	-20 dB to 20 dB	20 dB	+	+
	Threshold	-40 dB to -20 dB	-20 dB	+	+
SUBSONIC (Device 1)	SUBS1	OFF or ON	OFF	+	+
	Frequency	32 Hz to 200 Hz	50 Hz	+	+
DEESSER (Device 1)	DeEs1	OFF or ON	OFF	+	+
	Ratio	1.0:1 to 4.0:1	1.0:1	+	+
	Threshold	1.0 to 1.8	1.0	+	+
	Bandwidth	0.2 to 0.5	0.2	+	+
DEESSER LIGHT (Device 1)	DeEs1	OFF or ON	OFF	+	+
	Frequency	1000 Hz to 20000 Hz	4000 Hz	+	+
	Threshold	-40 dB to 10 dB	0 dB	+	+

DSP-Funktion	Parameter	Wertebereich	Vorgabe-wert	Mixer Setup	Channel Setup
NOISE GATE (Device 1)	GATE1	OFF or ON	OFF	+	+
	Threshold	-50 dB to -10 dB	-10 dB	+	+
	Attenuation	0 dB to 30 dB	0 dB	+	+
	Attack	0.2 ms to 50 ms	0.2 ms	+	+
	Release	0.05 s to 10 s	0.05 s	+	+
FILTER (Device 1, 2)	FILT	OFF or ON	OFF	+	+
	Type	Low Pass or High Pass	Low Pass	+	+
	Frequency	22 Hz to 20000 Hz	1000 Hz	+	+
	Order	1 to 10	1	+	+
STEREO WIDTH CONTROL (Device 1)	Width	0.0 to 2.0	1.0	+	
	Direction	L10 > 0 > 10R > -0	0	+	
	Type	XY or MS	XY	+	
	Sign	+ or -	+	+	
DELAY (Device 1)	Delay	OFF or ON	OFF	+	
	Length	0 ms to 21800 ms (with 2 Ch.)	0 ms	+	
PANORAMA/ BALANCE	Pan (mono)	L10 to 10R	0	+	
	Bal (stereo)	L10 to 10R	0	+	
	Matrix (stereo)	L>L R>R, L>L L>R, R>L R>R, R>L L>R, Mono, Mono -3 dB, Mono -6 dB	L>L R>R	+	

DSP-Funktion	Parameter	Wertebereich	Vorgabe-wert	Mixer Setup	Channel Setup
MPX OUT	Gain	-30 dB to 10 dB	0 dB	+	
	Outsel	OFF or ON	OFF	+	
	Outsel Source	Eintrag 0 to 249	0	+	
	CF Cut	OFF or ON	OFF	+	
	N/N-1	N-1 Mix or N Mix	N-1 Mix	+	
MPX IN	Preparation	OFF or ON	OFF	+	
	Gain	-15 dB to 15 dB	0 dB	+	
PROGRAM BUS	Program Device Nr.	OFF or ON	ON	+	
AUX BUS	Aux Device Nr.	OFF or ON	ON	+	
	Gain	-oo dB to +15 dB	0 dB	+	
	Type	AfterFader, PreFader, PreSwitch	AfterFader	+	
VCA (from firmware version 5.5.0)	VCA	Group 1..8	-	+	

Mixer Setups additionally contain further information:

- `Channel Assignment:` Assignment of the configured Fader Channels to existing Hardware Faders.
- `Routing:` Assignment of sources to so-called routing selectors (optional from Firmware 5.5.0)
- `Fader Values:` Position of Fader Potentiometers (optional from Firmware 5.5.0, suggested for production operation only)
- `Show Timer in Channel Display:` Information about if a timer is shown in the Channel Display (only for RM420-020 from Firmware 5.5.0 on).

The Difference between Mixer Setup and Channel Setup

Parameters in a Mixer Setup always have a fixed relation to configured Fader Channels, independent of their position on the console. The fixed relation between the information in the setup and the information in the configuration file is characterized by the defined channel number. On the configuration of a Fader Channel, the channel number is assigned automatically in ToolBox4 (e.g. „CH1 Tel1") and reappears in a Mixer Setup (e.g. as `Current Channel Setting Nr. 1 - Tel1`).
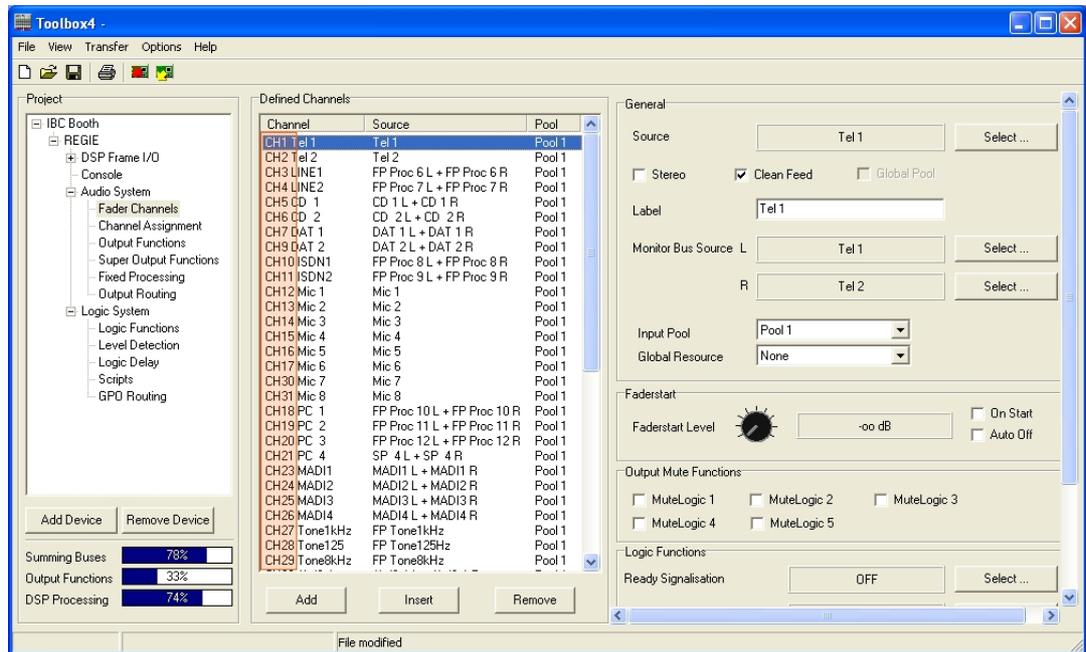
Figure 1–68: During configuration, each Fader Channel will have a unique channel number assigned.

In contrast to a Mixer Setup, a *Channel Setup* does not have a fixed relation to a particular Fader Channel. Thus the parameters stored in a Channel Setup can be applied to any Fader Channel. However, there are two peculiarities:

- On the one hand, you can load a Channel Setup to an active, open Fader Channel. There you may change the parameters for DSP functions (for instance limiter or compressor settings). However, you must not interrupt or change an active bus routing or set a new routing.

- On the other hand, a flexibly applicable Channel Setup has to be mono/stereo compatible. When loading, you only may change parameters without influence on the direction of the signal. Thus, for instance balance settings are not interpreted. The chart Parameters in Mixer Setups and Channel Setups shows precisely which parameters are stored in Mixer Setups and which in Channel Setups. (See "Which Data are Stored in Setups" on page 93.)

The Setup Content Window

Functions of the Setup Content Window

In the `Setup Content` window you can view and examine the contents of a setup. For opening this window, please first select a Mixer Setup or Channel Setup in the Device or a Setup file (`*.dms` or `*.dcs`) on the PC. Then click on the thereby activated [icon] on (`View`) on the divider in the centre of the main window. By clicking the button `Show Content of Backup File...` in the view Backup, you can also view the entire contents of a backup file in the `Setup Content` window.

The amount of the data shown in the `Setup Content` window varies depending on the kind of the selected Setup. While a Channel Setup has a manageable size, the bulk of information in a Mixer Setup file can appear quite complex at first sight.

Of help is the hierarchical representation of the setup parameters in a tree structure. By selectively *expanding* and *collapsing* individual branches, you can easily navigate to the wanted parameters.
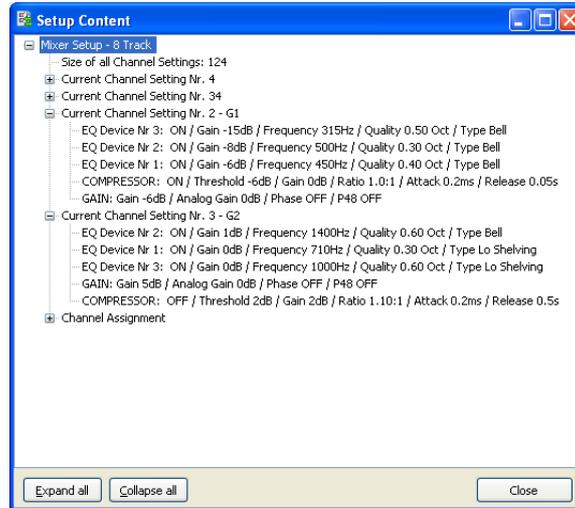
Figure 1–69: A detailed view into a mixer setup.

- *Collapsing* an expanded branch: Click the ▭-icon or double-click the entry to its right side.
- *Expanding* a collapsed branch: Click the ⊞- icon or double-click the entry to its right side.

In order to expand the entire tree structure with all branches, hit the button `Expand All`. Depending on the number of parameters stored in the setup, the list in the `Setup Content` window might then become very long. Hitting the button `Collapse All` closes all branches.

Understanding the Displayed Parameters

For better understanding please see the below showcase figure of the hierarchical Nesting Principle of Setups and Parameters.
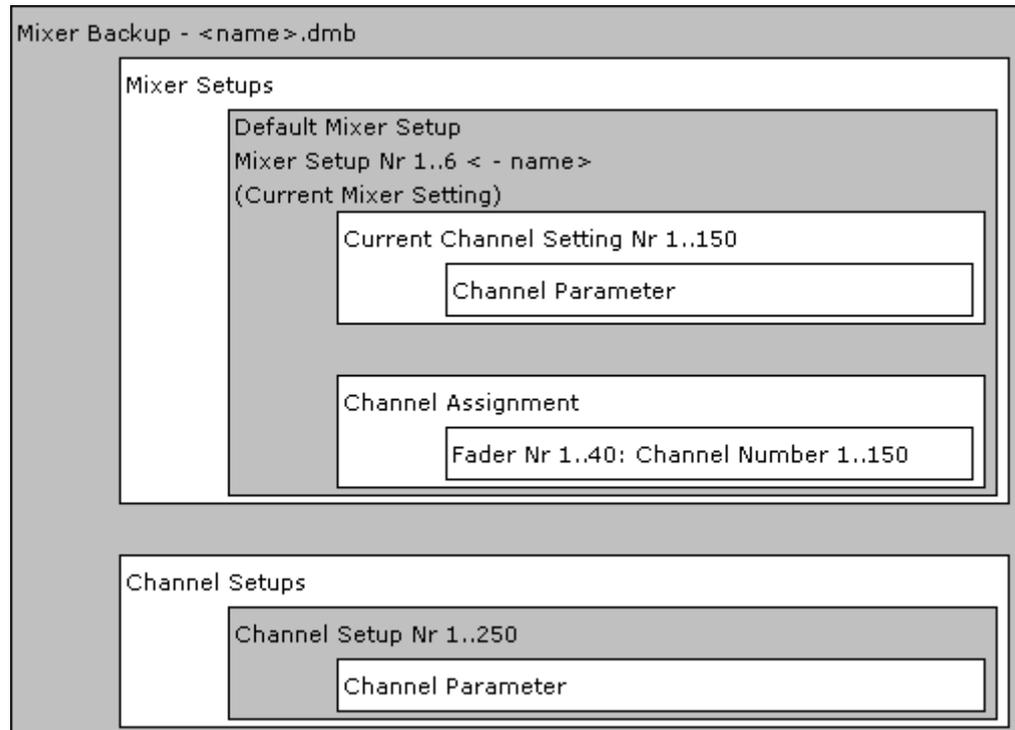
Figure 1–70: Nesting Principle of Setups and Parameters.

All grey sections can be accessed with the aid of the `Setup Manager`. You can back them up in files on the PC or copy them from the PC to an RM4200D.

Anzeigen von Mixer Backup Dateien

The type `Mixer Backup` and its file name are the root of the parameter list. The list contains all Mixer Setups and Channel Setups with parameters differing from the default values.(See "Which Data are Stored in Setups" on page 93.) Mixer Setups or Channel Setups without any content are not displayed. Neither do Mixer Backup files contain a copy of the Current Mixer Setting, i.e. the mixer settings that are active at the moment of saving.

Note: User-specific names of Mixer Setups and Channel Setups are stored in a Mixer Backup. However, they are only restored into the RM4200D if the `Channel Setups` segment is activated on restoring. (See "Restore Device" on page 91.)

View Mixer Setups

The root of the parameter list shows the type `Mixer Setup`, the number of the Mixer Setup (`Nr 1..6`) and its name. In the case of a `*.dms` file, the name matches the file name. In the case of a read-out Mixer Setup, the name corresponds to the setup name.

Beneath the root, the size (in `Byte`) of all Channel Settings stored in the Mixer Setup is shown under `Size of all Channel Settings`. This is followed by the Channel Settings stored in the Mixer Setup. If no Channel Settings are stored, i.e. all parameters equal their default value, `Size of all Channel Settings` shows *0* Byte.

Channel Settings are displayed, if at least one parameter of the respective channel differs from the intended default parameters. In this case, not only the differing parameter is shown, but also all other parameters relating to the same DSP process. If for instance the compressor threshold was changed, this value and all other compressor parameters are displayed.

Example: The compressor threshold of channel„ G1"was changed to *-6dB* via the console. All other parameters remain untouched. With the aid of the `Setup Manager`, you can now read out the following values:

> ⊟ Current Channel Setting Nr. 2 - G1
>   └─ COMPRESSOR: ON / Threshold -6dB / Gain 0dB / Ratio 1.0:1 / Attack 0.2ms / Release 0.05s

If you change parameters of other DSP processes of channel „G1", they are also added to the list.

> ⊟ Current Channel Setting Nr. 2 - G1
>   ├─ EQ Device Nr 3: ON / Gain -15dB / Frequency 315Hz / Quality 0.50 Oct / Type Bell
>   ├─ EQ Device Nr 2: ON / Gain -8dB / Frequency 500Hz / Quality 0.30 Oct / Type Bell
>   ├─ EQ Device Nr 1: ON / Gain -6dB / Frequency 450Hz / Quality 0.40 Oct / Type Bell
>   ├─ COMPRESSOR: ON / Threshold -6dB / Gain 0dB / Ratio 1.0:1 / Attack 0.2ms / Release 0.05s
>   └─ GAIN: Gain -6dB / Analog Gain 0dB / Phase OFF / P48 OFF

The order of the displayed parameters does not accord to the order designated in the configuration. Instead, the DSP process with the last parameter change is added to the bottom of the list. At first sight, the shown parameters may therefore appear to be arranged at random. Yet, their position is irrelevant for the usage of values in the DSP.

The branch Channel Assignment shows the assignments of Fader Channels to configured, physical faders. Physical faders without assigned Fader Channels are not displayed.

Note: User-specific Mixer Setup names are not stored in a Mixer Setup file, hence they *cannot* be restored into the RM4200D. After copying individual Mixer Setups from PC into an RM4200D, or after a partial restore process, please check if setup names need to be adjusted.

View Channel Setups

The root of the parameter list shows the type `Channel Setup`, the number of the Channel Setup (`Nr 1..6`)and its name. In the case of a `*.dcs` file, the name matches the file name. In the case of a read-out Channel Setup, the name corresponds to the setup name.

The actual parameters are displayed below. Channel Setup parameters are displayed, if at least one parameter of the respective channel differs from the intended default parameters. In this case, not only the differing parameter is shown, but also all other parameters relating to the same DSP process. If for instance the compressor threshold was changed, this value and all other compressor parameters are displayed.

Example: The compressor threshold of channel„ G1"was changed to *-6dB* via the console. All other parameters remain untouched. With the aid of the `Setup Manager`, you can now read out the following values:

```
⊟ Current Channel Setting Nr. 2 - G1
      COMPRESSOR: ON / Threshold -6dB / Gain 0dB / Ratio 1.0:1 / Attack 0.2ms / Release 0.05s
```

If you change parameters of other DSP processes of channel „G1", they are also added to the list.

```
⊟ Current Channel Setting Nr. 2 - G1
      EQ Device Nr 3: ON / Gain -15dB / Frequency 315Hz / Quality 0.50 Oct / Type Bell
      EQ Device Nr 2: ON / Gain -8dB / Frequency 500Hz / Quality 0.30 Oct / Type Bell
      EQ Device Nr 1: ON / Gain -6dB / Frequency 450Hz / Quality 0.40 Oct / Type Bell
      COMPRESSOR: ON / Threshold -6dB / Gain 0dB / Ratio 1.0:1 / Attack 0.2ms / Release 0.05s
      GAIN: Gain -6dB / Analog Gain 0dB / Phase OFF / P48 OFF
```

The order of the displayed parameters does not accord to the order designated in the configuration. Instead, the DSP process with the last parameter change is added to the bottom of the list. At first sight, the shown parameters may therefore appear to be arranged at random. Yet, their position is irrelevant for the usage of values in the DSP.

Note: User-specific Channel Setup names are not stored in a Channel Setup file, hence they *cannot* be restored into the RM4200D. After copying individual Channel Setups from PC into an RM4200D, please check if setup names need to be adjusted.

Parameters Without Respective Function

If a setup, for example containing a compressor function, was copied into a Device without configured compressor function, the parameters for the not included compressor function remain without effect after loading. This applies for all DSP functions, for which parameters can be stored in setups.

Important Note: The RM4200D software does not interpret parameters that relate to non-configured functions.

Parameters without respective function will appear in setups when

- the function has ceased to exist due to a configuration change.
  Example: A Mixer Setup contains the information for `Channel 1` that the signal is mixed with `+5 db` onto the Aux Bus 3 in the „PreFader" mode. Due to a configuration change, `Aux Bus 3` is removed. The parameters for the signal mixing of Channel 1 in `Aux Bus 3` are still included in the Mixer Setup, yet they are without effect. These parameters would only become reactivated in the case of a further change, when `Aux Bus 3` would be added again.
- the setup originates from another console with a different configuration.

In both cases, only those parameters are used, which have an intended function in the configuration of the Device. All parameters without respective function are ignored. However, they remain in the setup until it is overwritten by a renewed saving process via key functions on the console.

Note: In order to avoid misunderstandings you should immediately overwrite parameters *without* respective function by renewed saving of the respective setup(s) with key functions on the console.

Missing Channel Names in Mixer Setups

If you use the `Setup Manager` without connection to an RM4200D or if the connection is interrupted during your work, the `Setup Manager` cannot provide any information about channel names or setup names. You can still open e.g. Mixer Setup files (`*.dms`) on your hard disk. Yet, without an active connection, only the channel number of the included parameters is shown; the name of the according channel *cannot* be displayed.
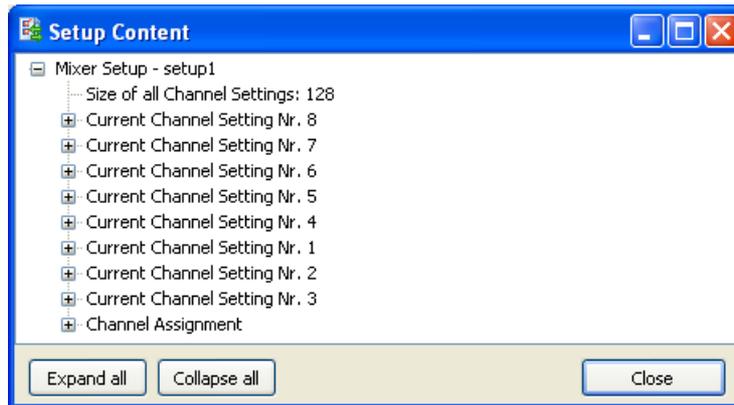
Figure 1–71: **View of a mixer setup file without an established connection between Setup Manager and PC. Channel labels will not be displayed.**

In networks with several RM4200D Devices, the following situation may occur:

You have connected the `Setup Manager` to a particular Device. In the meantime, you would like to view a Mixer Setup file (*dms), which was copied to the PC from a different Device. In this case, the configured Fader Channels in the connected Device might easily differ with respect to number and kind from those in the opened Mixer Setup file. Consequently in the `Setup Content` window, some channel parameters of the Mixer Setup file bear names, but some do not.
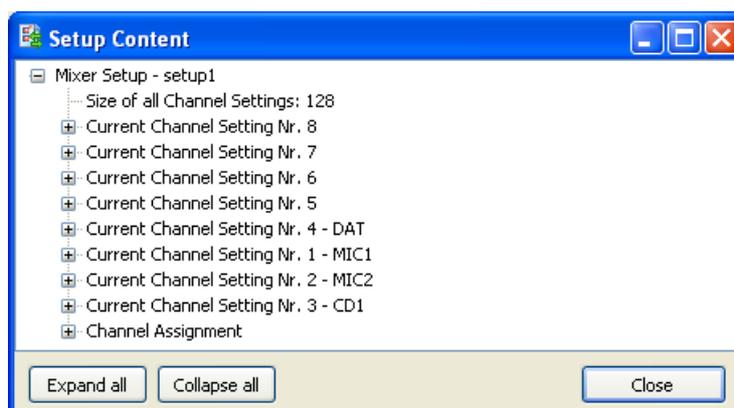
Figure 1–72: **View of a mixer setup file with an established connection between Setup Manager and PC. Channel labels will be displayed partly as a result of differences between setup and configuration.**

Nameless parameter sets may result not only from differences between online data and offline data. Mixer Setups *within* an RM4200D can contain nameless Fader Channels, also. This always occurs when

- a Mixer Setup file with parameter sets for channels that are not configured in the system has been copied in an RM4200D.
- one or more channels with existing parameter sets in the setup are deleted from the configuration.

Faulty Parameters in Mixer Setups and Channel Setups

From time to time, Mixer Setups and Channel Setups can contain faulty parameters. In the `Setup Content` window, faulty parameters bear a red warning icon and additional debug information.
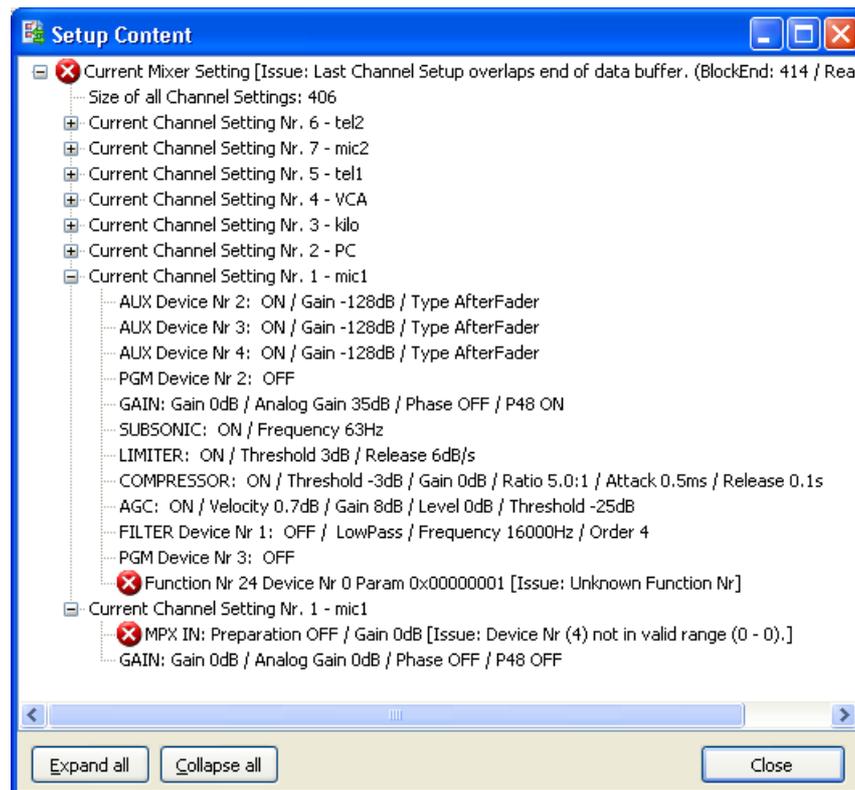
Figure 1–73: Faulty parameters and unknown functions are identified by a red warning icon.

Errors in setup parameters are infrequent and mostly originate from two reasons:

- a. A function and its parameters are unknown to the `Setup Manager`: In the course of the further development of the RM4200D, the amount of the functions and parameters stored in the setups has grown continuously. New functions will be regarded in an updated version of the `Setup Manager`. If certain functions and their parameters are *unknown* to the currently used `Setup Manager` version, the according line is displayed as faulty.

Note: For troubleshooting you should check if the version of the currently used `Setup Manager` is compatible with the firmware version of your RM4200D. If you are not sure which `Setup Manager` version matches the firmware of your RM4200D, please use the latest version. It can be obtained from your DHD dealer or from DHD directly. Please then use the newer version for renewed setup read-out.

- One or more parameters of a known function are invalid: All parameters of

functions stored in setups are only valid within defined ranges of values. (See "Which Data are Stored in Setups" on page 93.)As soon as a parameter of any function is out of its validity range, the according line in the list is displayed as faulty.

A potential reason for individual faulty parameters are terminated saving or loading processes, mostly under the use of chip cards, when those are removed from the card reader during access.

Note: For troubleshooting please first check if the version of the currently used `Setup Manager` is compatible with the firmware version of your RM4200D. In case of doubt, always use the newest `Setup Manager` version. If faulty values still occur when you use the newest version of the `Setup Manager`, overwrite or save the setup anew. Please first make sure that the parameters to be stored are not faulty already (`Current Mixer Settings` or Mixer Setup File, `*.dms`).

Channel Setups - With or Without Routing Parameters?

A previous paragraph points out that on loading Channel Setups, only parameters may be interpreted that do not influence bus routings and are mono/stereo compatible. (See "The Difference between Mixer Setup and Channel Setup" on page 96.)This is because, as already mentioned, Channel Setups can also be loaded onto „open" channels. There, with respect to On-Air operation, active bus routings must be prevented from being switched off.
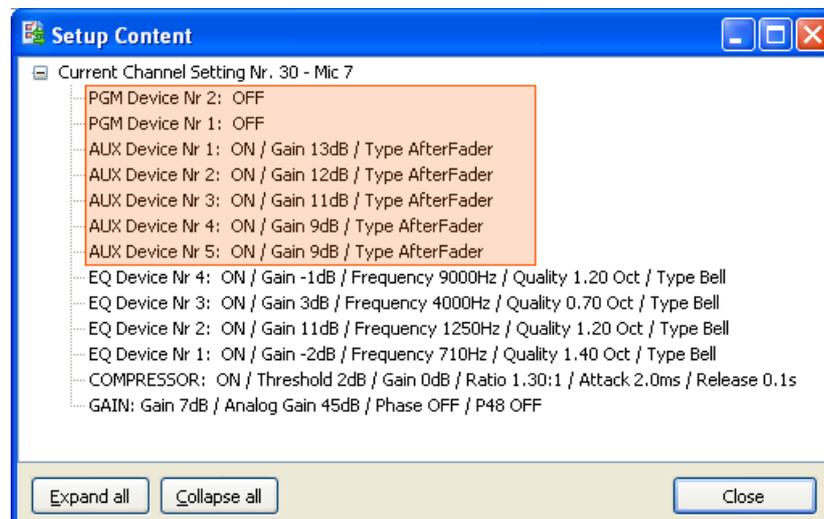
Figure 1–74:   **View of a channel setup in the Setup Content window**.

Comparing the actually read-out parameters of a Channel Setup with the information about routing parameters stated above, you will notice that, contrary to expectations, routing information *did* have been stored in Channel Setups (marked red).

In fact, routing parameters are stored in Channel Setups as well as in Mixer Setups, in which parameter sets are known to have a fixed assignment to a Fader Channel.

This results from the fact that, in the moment of saving, the software *does not* differentiate between the data structures. Discrimination between actual Channel Setups and channel parameters of a Mixer Setup does not take place until loading; and then the respective parameters are filtered.

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