Digital Broadcast Technology

DHD

Series 52

52/XR MADI Router
Manual

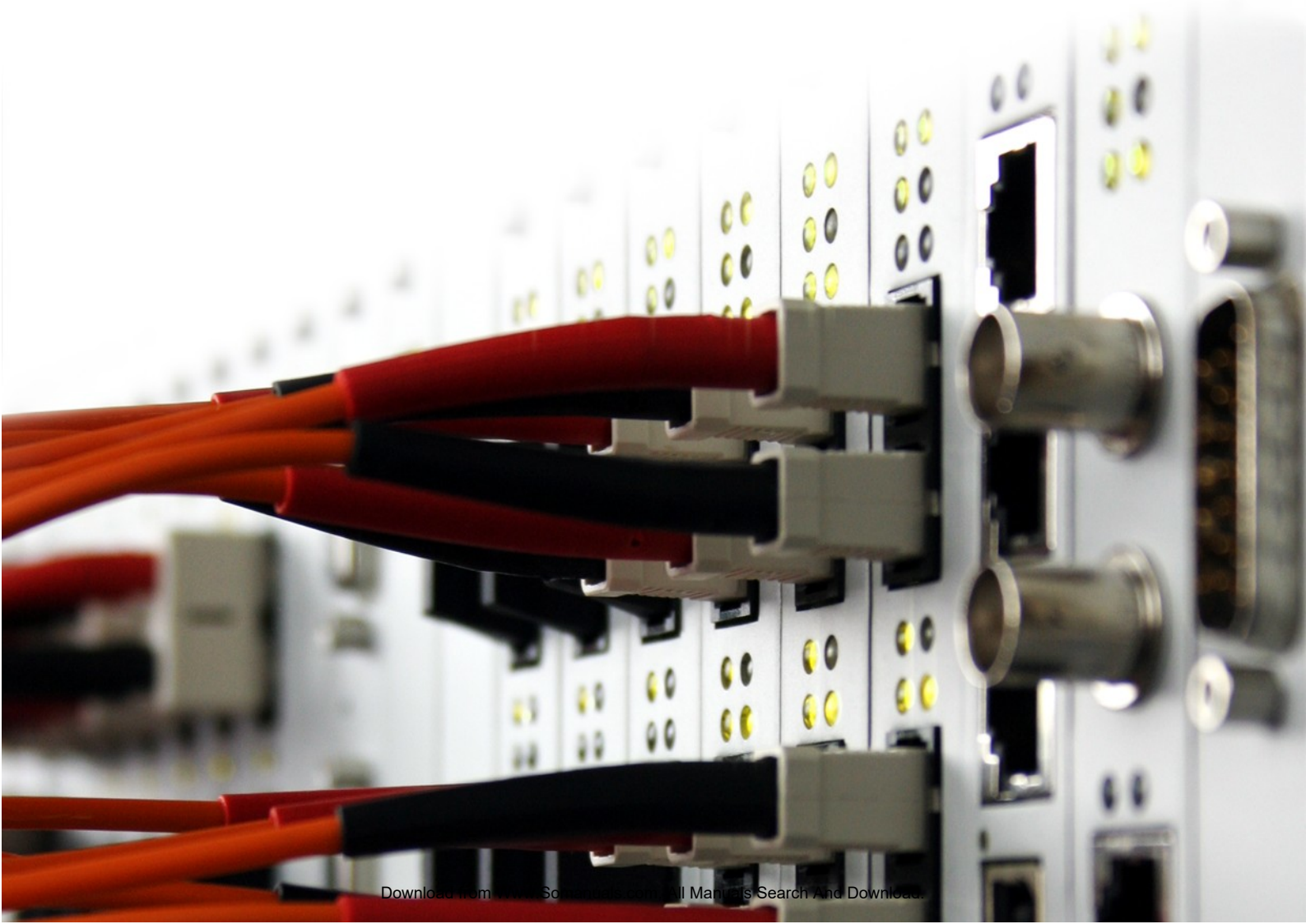© 2008 DHD Deubner Hoffmann Digital GmbH

Version: 1.8.0

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1   Terms of Use

Series 52

52/XR MADI Router Manual

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Version 1.8.0, 16.06.2008

2   About this Book

> This manual refers to the Toolbox5, Version 6.3.5, the DHD Operation Manager, Version 1.2.5 and the DHD Operation Server, Version 1.2.4

This manual will provide you a comprehensive overview about the applications of an 52/XR MADI Router and explains its configuration.

The content of this manual is subject to change without notice. DHD recommends to visit the DHD website once in a while to check if there is a newer version of this document available.

How to Use this Book

The Navigation Tree

You can find the navigation tree on the left-hand-side of the PDF document. Via the entries of this tree you can directly reach the several chapters and sections of this document. Click onto the text or the symbol of an entry to display its content.

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Links

Links are underlined to separate them from the rest of the text. These links can be a connection to other chapters or sections in the same document or to an URL (internet address).

- Same document: The hand symbol appears if you move the mouse over the link.
- URL: The hand symbol with an additional w appears if you move the mouse over the link.

Please notice, that you need an active internet connection to be able to execute a link to an URL.

The Meaning of Advices in the Text

Warning	The demands and advices in this fields should be followed **unconditional**, because otherwise hardware and software products, data bases, as well as persons may suffer a loss.
Important	The demands and advices in this fields should be followed, because these contents are necessary for the proper operation of the DHD systems.
Note	Recommendations and further information are marked as notes. Sometimes you will also find off-topic content in this field, which is related to the actual topic.
Tip	Tips are helpful advices, which should make work with DHD systems easier.
Weblink	In this fields you can find links to websites, which include for example an other manual or the possibility to download a driver for the respective DHD system. Please notice, that you need an active internet connection to be able to execute a link to an URL.
Download	You can directly open and download a file if the respective link is marked as download link (file link).

3 What is new in this version of the manual?

All sections that had been added, deleted or changed are listed below. Click on the entries to reach the respective sections directly.

Current version (1.8.0):

Chapter / Section	State	Note
52-6710A - XR Router/DSP Sync. Module	changed	Information changed.

Version 1.7.0:

Chapter / Section	State	Note
52-5320A - XD/XR_GPIO_Module, 16 out, 4 in	added	Pin assignment.
52-5320A - XD/XR_GPIO_Module, 16 out, 4 in	added	Meaning of the LEDs.

Version 1.6.0:

Chapter / Section	State	Note
Configuring MADI Redundancy	changed	Picture added.

Version 1.5.0:

Chapter / Section	State	Note
52-5310A - MB/XD/XR_GPIO_Module, 8 out,4 in	added	Pin assignment.
52-5311A - MB/XD/XR_GPIO_Module, 8 out,4 in	added	Pin assignment.
52-6710A - XR Router/DSP Sync. Module	added	Pin assignment.
52-6720A - XR True Output Monitoring	added	Pin assignment.
52-6120A - XR_Dual_MADI_Module, multimode	added	Meaning of the LEDs.
52-6125A - XR_Dual_MADI_Module, single mode	added	Meaning of the LEDs.
52-6129A - XR_Dual_MADI_Module, multi/single	added	Meaning of the LEDs.
52-5310A - MB/XD/XR_GPIO_Module, 8 out,4 in	added	Meaning of the LEDs.
52-5311A - MB/XD/XR_GPIO_Module, 8 out,4 in	added	Meaning of the LEDs.
52-6440A - XR_Router/DSP_Kernel Module 4096	added	Meaning of the LEDs.
52-6442A - XR_Router/DSP_Kernel Module 2048	added	Meaning of the LEDs.
52-6850A - XR Comm. Controller, red.	added	Meaning of the LEDs.
52-6851A - XR Communication Controller	added	Meaning of the LEDs.
52-6710A - XR Router/DSP Sync. Module	added	Meaning of the LEDs.
52-6720A - XR True Output Monitoring	added	Meaning of the LEDs.

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Version 1.4.0 and before:

No changelog available.

4   General Information

Safety Instructions

Ignoring the following safety instructions may lead to accidents with severe, life-threatening injuries, caused by fire or electric shocks.

Always act according to the directions of this manual.

Fix the device well in a rack or studio furniture with the mounting orientation given by DHD.

Only connect the power cable of the device to a socket, which carries the voltage stated on the specification plate.

> **Important**
>
> Make sure that the ventilation openings of the device are not covered and that the environmental temperature is ok to assure sufficient heat flow. (See Installation Guide)

Do not place heavy objects on the device.

> **Important**
>
> Do not place drinking vessels or any other vessels with liquids on the device or close to it.

The device or parts of the device can get very warm during the usage. Please be careful when touching the device after a longer operating time.

> **Important**
>
> Changes according to hardware configuration may only be done by qualified personnel (e.g. exchanging modules).

Care Instructions

	Important
⚠️	The cleaning of a device should be done in Off-Air mode as possible. That means the device does not handle relevant audio and/or logic signals that are integrated in the current broadcasting process.

To clean your DHD device, in general a soft, lint-free and dry cloth is sufficient. In case of severe soiling, you can use a damp cloth and household detergent.

	Important
⚠️	If a damp cloth is used for cleaning, you have to switch off the DHD device and to disconnect all hot cables from it.

	Warning
❌	Never use a dripping wet cloth. **In no case** water and/or cleaner may enter the device, since this could lead to electric shocks and fires!

	Warning
❌	**Never** use solvent or thinner for cleaning the surfaces. Furthermore, **do not** use abrasive as well as sharp objects for cleaning. You will damage the surface of the device.

Version 1.8.0 - 16.06.2008

5 Assemble a Device

Every device is getting assembled individual depending on your special needs. Therefore, different hardware modules, as well as configuration and control software applications are available.

If you need help to define your requirements for an 52/XR, please contact your local DHD partner.

5.1 List of Modules

> **Weblink**
>
> Go to the `52/XR MADI Router` area on our Website to find a current version of the detailed list of modules for the 52/XR MADI Router.

At that time, this manual is written, the following modules are available for the 52/XR MADI Router:

I/O Frames

- 52-6063A - XR Router/DSP Frame 3HU, empty
- 52-6066A - XR Router/DSP Frame 6HU, empty

Power Supplies

- 52-5048A - Power Supply Module 48V / 200W

Controller Modules

- 52-6440A - XR Router/DSP Kernel Module 4096
- 52-6442A - XR Router/DSP Kernel Module 2048
- 52-6850A - XR Comm. Controller, red.
- 52-6851A - XR Communication Controller
- 52-6710A - XR Router/DSP Sync. Module
- 52-5860A - XD/XR RS232/RS422 Extender
- 52-5862A - XD/XR RS232/RS232 Extender

I/O Modules

- 52-6120A - XR Dual MADI Module, multimode
- 52-6125A - XR Dual MADI Module, single mode
- 52-6720A - XR True Output Monitoring

Software

- 52-8550 - Routing/Scheduling Software
- 52-8551 - Routing Software
- 52-8553 - Additional license for 52-8550
- 52-8554 - Additional license for 52-8551
- 52-8555 - Routing Software, basic

5.2 Redundancy Options

If required, you can operate the 52/XR MADI Router in several redundant ways.

Power Supply Redundancy

An 52/XR MADI Router can be equipped with a redundant power supply pack. Thus, the internal and external electric power supplies of the device becomes more reliable.

> **Tip**
>
> We recommend to feed power supplies from different mains supply systems to prevent power failures.

The 52/XR MADI Router can optional be operated with two power supplies of the type 52-5048 (48V/200W).

Sync Module Redundancy

An 52/XR MADI Router can be equipped with a redundant synchronisation module. Thus, the device becomes more reliable concerning the internal and external synchronisation.

The 52/XR MADI Router can optional be operated with two synchronisation modules of the type 52-6710.

More information on the synchronisation and its configuration can be found in the section Synchronisation.

Controller Redundancy

An 52/XR MADI Router can be equipped with a redundant communication controller module. Thus, the device becomes more reliable concerning the communication in the configuration and controlling network (communication with configuration PCs).

The 52/XR MADI Router can optional be operated with two communication controller modules of the type 52-6850.

Router / DSP Kernel Redundancy

An 52/XR MADI Router can be equipped with a redundant Router / DSP Kernel module. Thus, the device becomes more reliable concerning the routing and DSP processing.

The following Router / DSP Kernel redundancy options are possible for the 52/XR MADI Router:

	Router / DSP Kernel module of the type 52-6440	Router / DSP Kernel module of the type 52-6442
3 HU frame	two modules	two modules
6 HU frame	two modules (if only the upper backplane is used) or four modules (if the upper and the lower backplane are equipped with redundancy)	two modules (if only the upper backplane is used) If you want to use both backplanes of an 6 HU 52/XR, you have to use modules of the type 52-6440.

It is not possible to use Router / DSP Kernel modules of different types in one device!

MADI Redundancy

The MADI modules in the slots 13 to 18 (and in the slots 34 to 39 in a 6 HU frame) can be configured as redundancy for the corresponding modules of the slots 3 to 8 (and the slots 24 to 29 in a 6 HU frame). That means, if you want to safeguard the channels of the MADI module in slot 5, you have to plug the redundant module into slot 15 and to assign this module to be redundant with the configuration software Toolbox5.

Please find more information on the MADI redundancy and its configuration in the section Configuring MADI Redundancy.

6   Connecting the Device to a PC

The configuration of an 52/XR MADI Router is done with the aid of a PC. Usually an ethernet interface is employed for this connection. The next section describes how to configure and use this interface of the communication controller.

In addition to the ethernet interface, each controller module has an USB interface. It replaces the RS232 interface known from the former DHD systems, but the transfer rate of the USB interface is comparable with the ethernet connection. Please follow <u>this description</u> to start the operation of the USB interface.

6.1   Configuring the Ethernet Interface

Every 52/XR MADI Router is equipped with an ethernet interface (with two ethernet interfaces in case of controller redundancy). The interface - an RJ45 female connector - is located on the communication controllers. It is a standard twisted pair interface with a data transfer rate of 100Mbit/s. The interface complies with the 100Base-TX, IEEE 802.3u standard.

The ethernet connection of the 52/XR MADI Router allows communication with DHD application software, as well as with conventional applications like Telnet and web browsers on one or more PCs.

⚠️	**Important**
	Please urgently note the network specifications before using the ethernet interface of a 52/XR MADI Router.
	If the 52/XR MADI Router is not run according to the network specifications, DHD cannot guarantee the proper operation of the device.

6.1.1   IP Basic Settings

Before delivery, each 52/XR MADI Router is configured with an IP basic setting. This setting accords to a certain pattern, unless the customer indicates different requirements in his order.

Each controller with an integrated ethernet interface has a dedicated network address, the so-called MAC address (`MAC – Media Access Control`). This address is always unambiguous and unique. DHD owns the MAC address range `00:0A:63:00:00:00` to `00:0A:63:FF:FF:FF`, therefore this address is also referred as serial number of a DHD device.

A network-compatible controller module is always identified in a network by its MAC address. As the first 3 Bytes of all DHD MAC addresses always are identical, only the last 3 Bytes are indicated in DHD software applications.

ℹ️	**Note**
	If you find the term "MAC address" in the context of a DHD system, it always refers to the last three Bytes of the actual address, although this is, strictly speaking, incorrect.

These last 3 Bytes of the MAC address are used for composing the IP address for the basic setting. Please find below an example for the MAC address 10:00:02:

- Every single Byte is translated into the decimal format: `10h = 16, 00h = 0, 02h = 2`
- Afterwards the decimal numbers are strung together; 10 is prepended, and all numbers are separated by periods: `10.16.0.2`

The subnet mask is automatically set to `255.0.0.0`, according to the classification of this IP range.

Thus the following IP basic setting results for the example device:

- `IP address: 10.16.0.2`
- `Subnet mask: 255.0.0.0`

Please learn in the following chapter how to change these settings and adjust them to your IT environment.

6.1.2   IP Configuration

The IP settings of a 52/XR MADI Router are no longer defined in the configuration file, but directly in the systems communication controller. To set IP parameters, please use the `Maintenance Window`, an application, which is implemented in Toolbox5. You can open the Maintenance Window by clicking the according command in the `View` menu or by pressing `F7` on your keyboard. The application opens in a window with three sections:
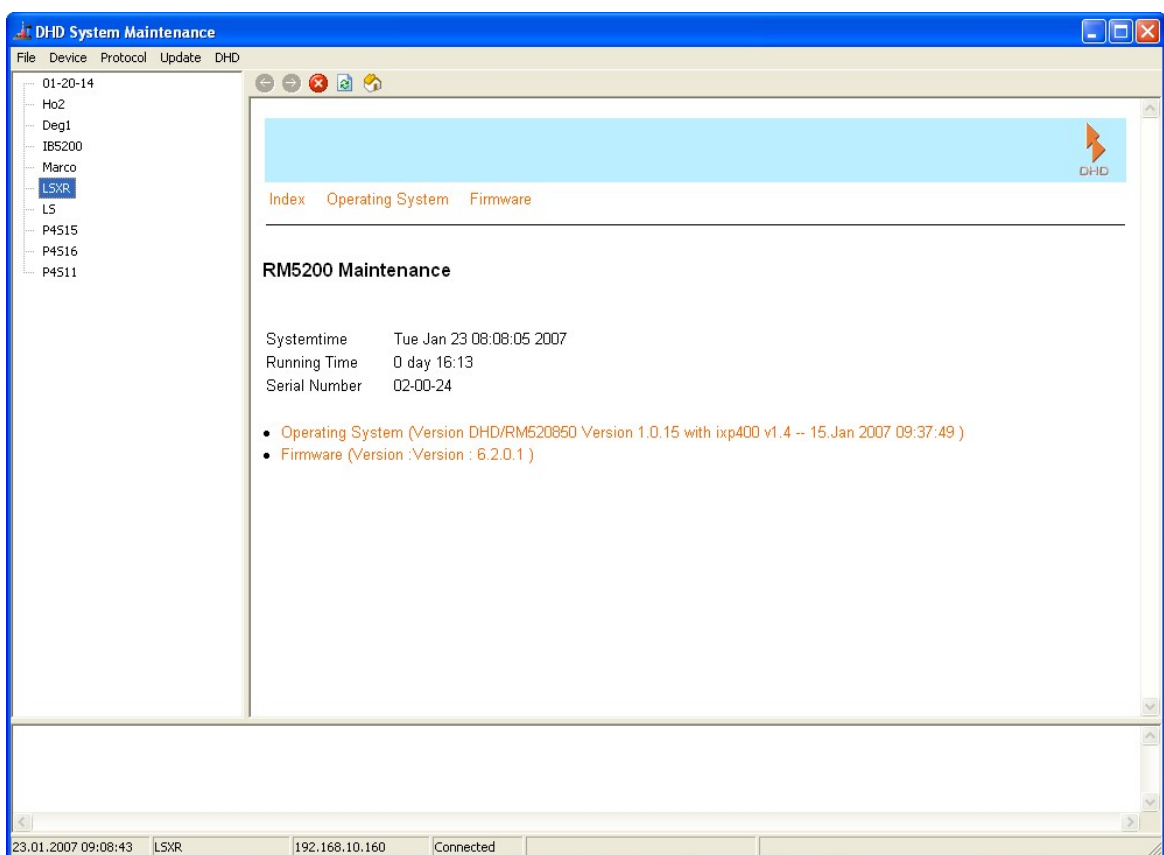
View of the Maintenance window after opening.

In the left upper part of the window, beneath the menu bar, you can see a list of the Series 52 systems accessible in the network. On the right side next to it, in the largest part of the window, you can see system information of the device which is selected in the left-handed list. Above the status bar in the lower part of the window, current messages are displayed, sent by DHD systems in the reachable network.

You have two options to adjust the IP settings of a Series 52 system, depending on the following conditions:

a. You can see the respective device in the list in the left part of the maintenance window.
b. You **cannot** see the respective device in the list in the left part of the maintenance window.

If you can see the device in the list (a)

1. Right-click on the displayed device name.
2. A context menu appears. Select the `Network Config...` command from this menu.
3. A window opens, displaying the current IP configuration of the device.

The Network Config window shows the current IP configuration of the
device with the serial number which is entered in the Serial No text field.

Serial No - The Serial Number

The device of which you can see the network settings, is always represented by its serial number (`Serial No`). This serial number is unambiguous and is only valid for one single controller. You can use the field to read out settings of devices that are located in a different network segment. Read more about this in section "If you do not see the device in the list (b)".

Hardware Name - The Device Name

You can provide every Series 52 system with a device name (`Hardware Name`) which will specify the device. This name will help you to identify the device in the network. You can choose any name up to 20 characters; however, no space characters are allowed. Not allowed special characters are rejected on entering.

Automatically via DHCP - Automatic IP Assignment by a DHCP Server

If there is a DHCP server on the network, which is also supposed to carry out the IP configuration of the 52/XR MADI Router, please just select the `Automatically via DHCP` radio button.

Fixed - Fixed IP Setting

If you cannot access a DHCP server or you want manually carry out the IP configuration, please first select `Fixed` and then fill in the according values (`IP Adress, Subnet Mask, Gateway, Broadcast`) into the activated text fields.

> **!** **Important**
>
> In case of questions about the parameters to be set, please contact your IT department or your network administrator.

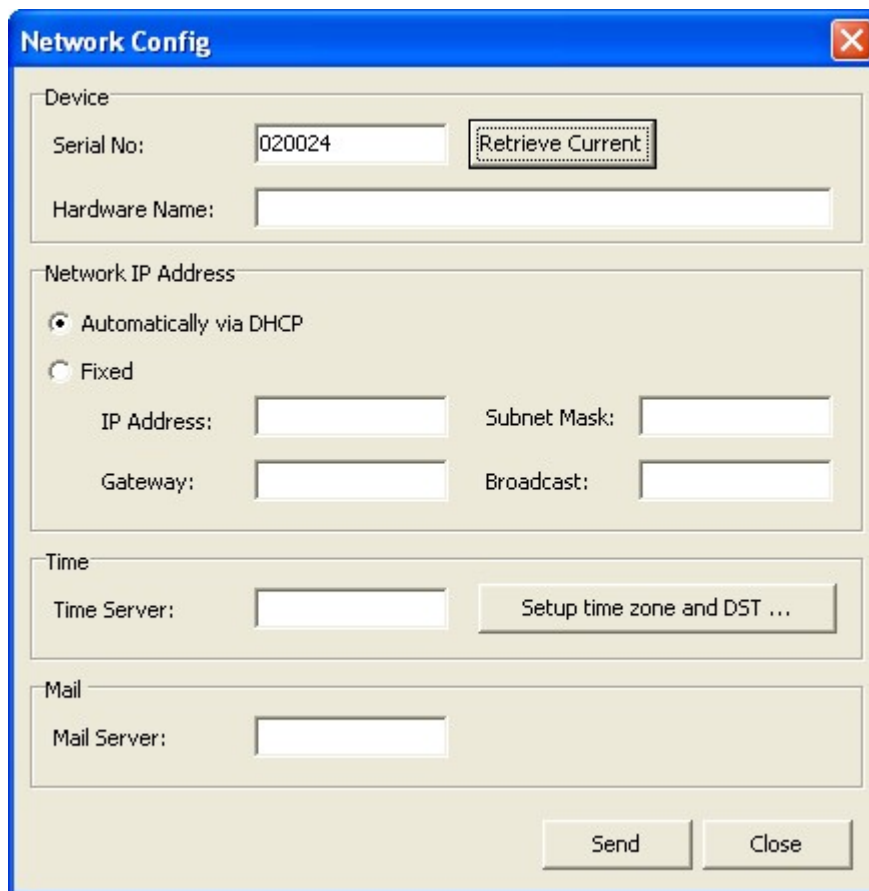*© 2008 DHD Deubner Hoffmann Digital GmbH*

Mail Server

This text field has no function yet and does not need to be filled in.

Time Server

Series 52 systems run with an internal system time which can be synchronised to a time server (NTP - Network Time Protocol). For this, please enter the IP address of your time server in the text field `Time Server`.

If you cannot see the device in the list (b)

1. Click on the `Device` command in the menu.
2. Select the `Network Config...` command from this menu.
3. The `Network Config` window will open; all its text fields are empty.

Enter the serial number of the device, for which you want to change the IP configuration, in the "Network Config" window.

4. Enter the serial number of the device into the `Serial No` text field. Hit the `Retrieve Current` button afterwards.

This will send a query into the network, searching for network devices outside of the subnet. If the 52/XR MADI Router should be located outside of the subnet of the PC, it will answer anyway and transmit its current IP settings. The settings are then displayed in the `Network Config` window, where you can change them.

You can change the data according to the principle described in the section "If you can see the device in the list (a)". The process is completed when you send the changed data to the device by hitting the `Send` button.

6.2   The USB Interface

You can connect 52/XR MADI Router devices to a PC via USB. The 52-6850 and 52-6851 modules have an according USB interface (B type, USB 2.0). Use the interface for instance in case you do not want an ethernet connection or if you want to locally connect a PC to the 52/XR MADI Router for maintenance purposes. In order to use the USB interface of the 52/XR MADI Router, first you have to install a driver on your PC.
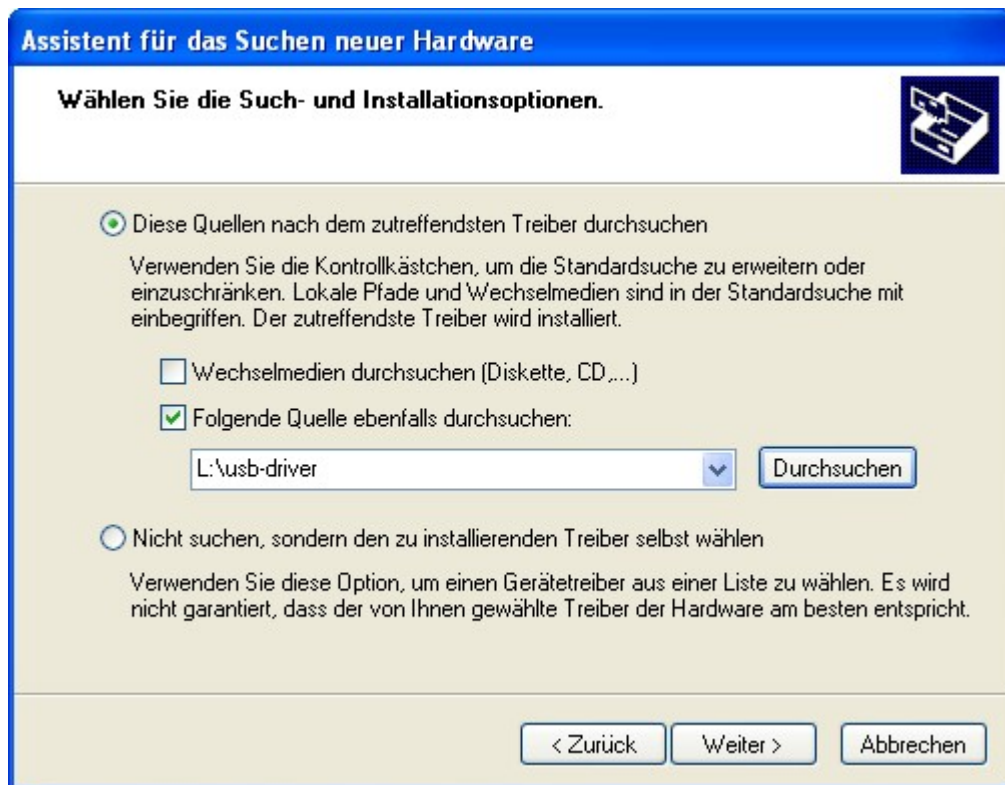
Installing the USB Driver

For this installation you need the file `MX-XR_usb-install.inf`. An access to the DHD-update download area is required, to be able to download this file. Please contact DHD or your DHD sales representative if you need this file and you don't hold a login for this website.

Connect the device to your configuration PC and switch it on. Microsoft Windows (TM) automatically opens the "Found New Hardware Wizard". Alternatively, click onto the `Hardware` icon in the `control panel` to open this dialog.
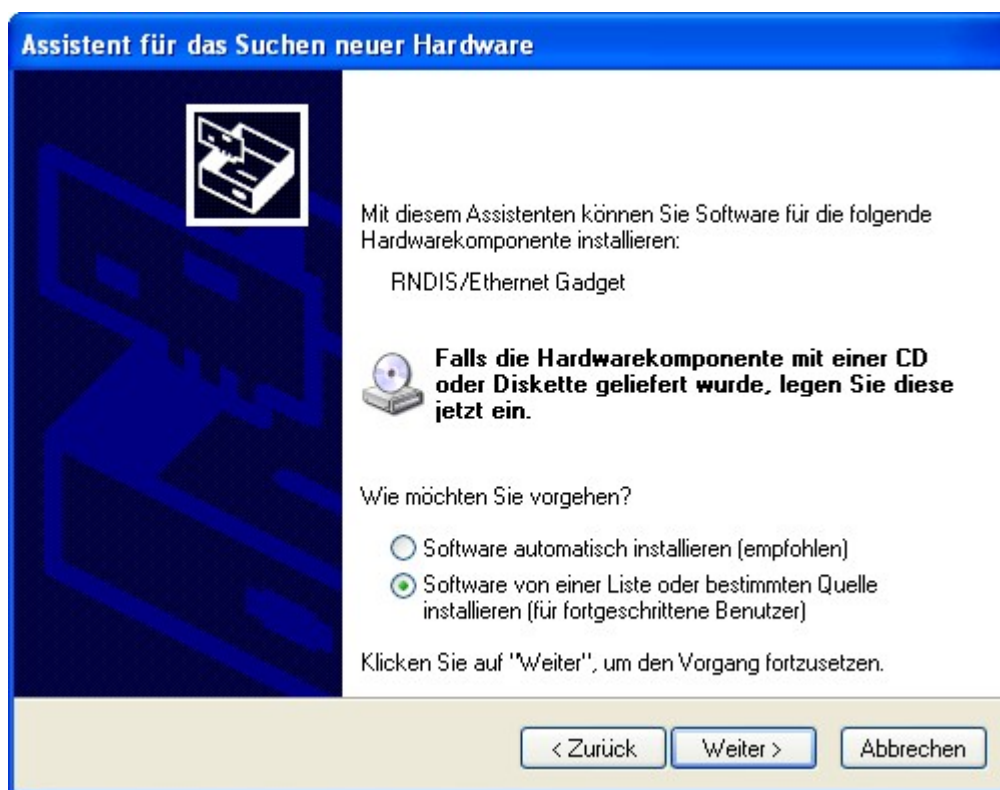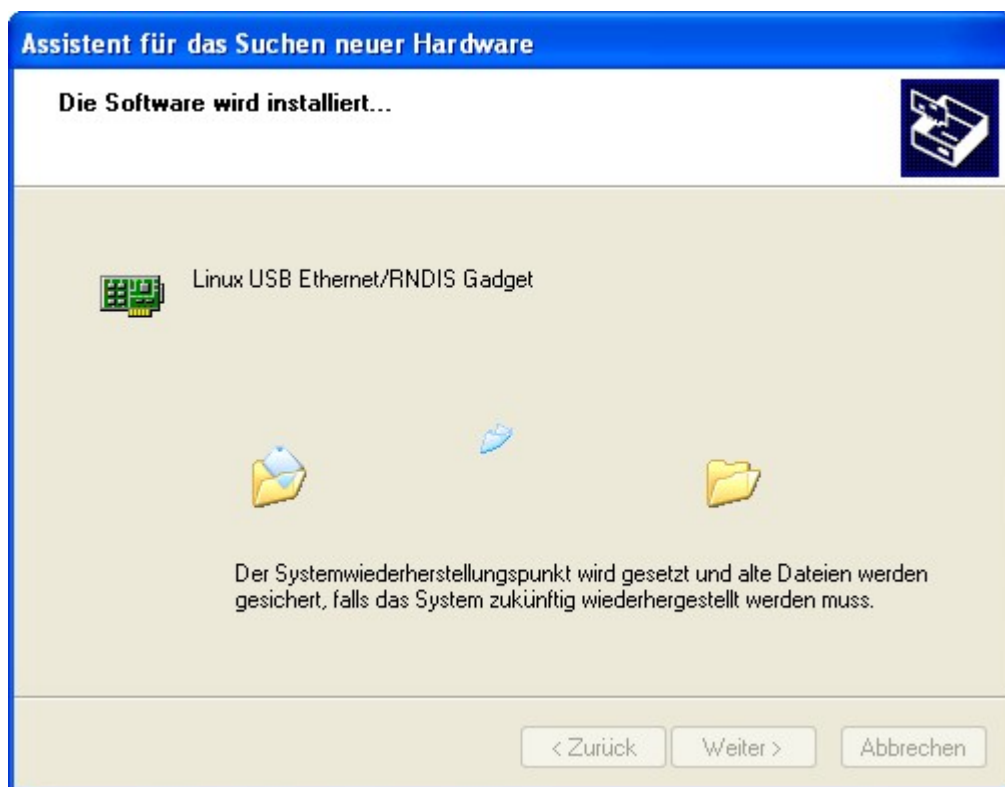

Step 1: Identification of the new hardware.

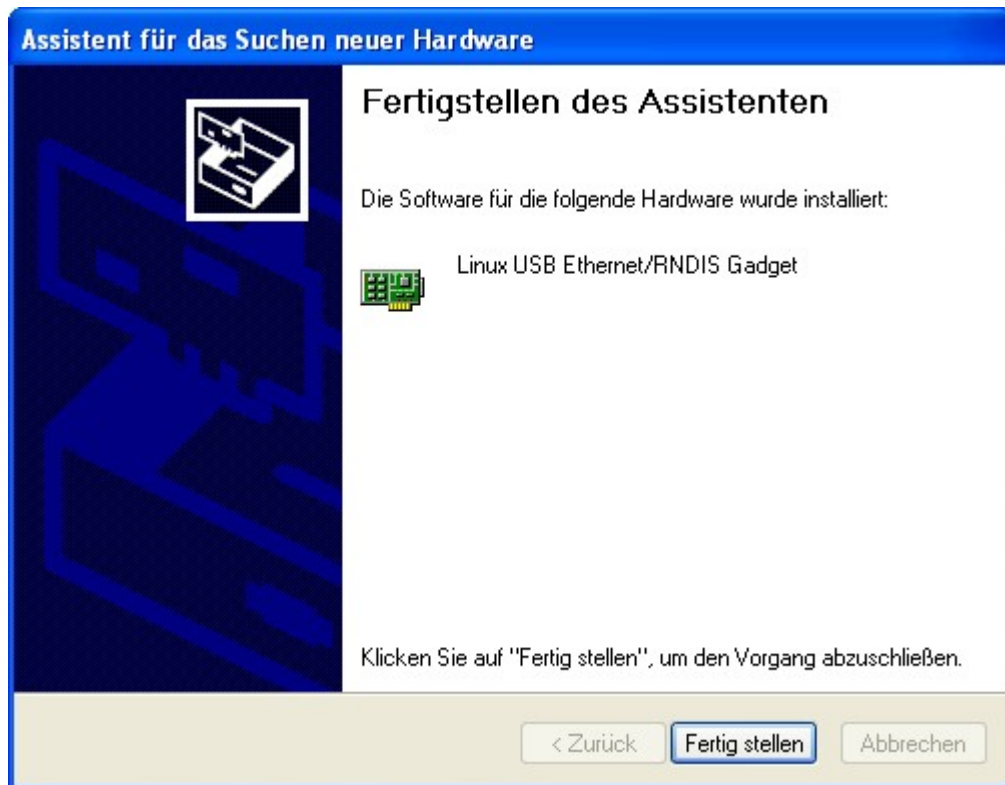Select "Install from a list or specific location" and click `Next`.

Step 2: Setting the path.

Enter the drive and if necessary the folders, to define the path to the file `MX-XR_usb-install.inf` and click `Next`.

Step 3: Installing the driver.

The driver now gets installed.

Step 4: Finish the installation.

Finally the "Found New Hardware Wizard" will tell you that it has finished the installation and you can end the process by clicking the `Finish` button. From now on you can communicate with the device via the USB interface.
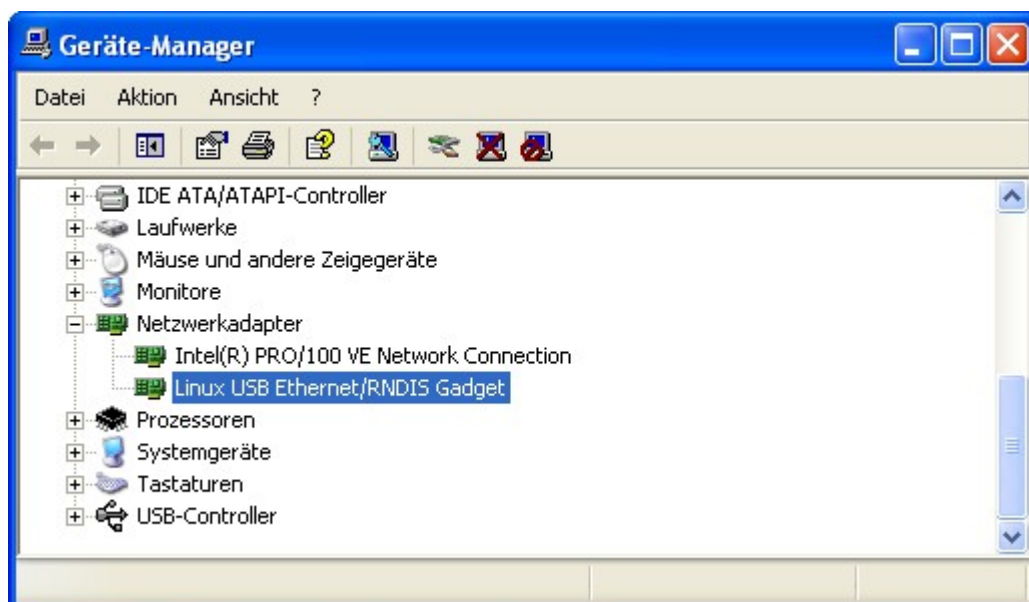
The device manager of the Windows (TM) control panel.

After the driver has been installed properly, the connection to the USB interface is simulated as a network connection. Therefore, you **don't** need to choose the USB connection in any DHD software application, because it is seen as a network connection.

Please contact your IT department or your administrator if you need help to install the driver.

7 Configuration and Operation of an 52/XR MADI Router

7.1 Configuring with the Toolbox5 Software

The configuration software is represented by a executable file named `Toolbox5.exe`. Double click the file `Toolbox5.exe` to start the application.

> **Note**
>
> In this manual only the most important steps to configure an 52/XR MADI Router with the Toolbox5 software are mentioned. Please find a comprehensive description of the configuration software Toolbox5 and its functions in the Toolbox5 manual.

When starting the Toolbox5 for the first time, a second application is extracted, called DHD Communication Server (`DHDCS.exe`). This software is handling the complete communication between DHD Devices and DHD applications on a PC. To learn more about the DHD Communication Server, please refer to the RM4200D manual, Part 6 `"Application Software Manuals, Chapter 1 - The DHD Communication Server"`. The corresponding manual file is called `"RM4200D_6_appsoftware_en.pdf"`.

> **Weblink**
>
> You can find this manual on our website:
>
> http://new.dhd-audio.biz/dhd_files/doc/6_appsoftw/html_en/start.html

The Toolbox5 software does not need any dynamic libraries or other additional files to run. Simply copy the file `Toolbox5.exe` to the desired directory and start it. To uninstall, delete the files `Toolbox5.exe` and `DHDCS.exe`.

After the software has started, it displays an empty project list and some basic project properties, which can be customized.
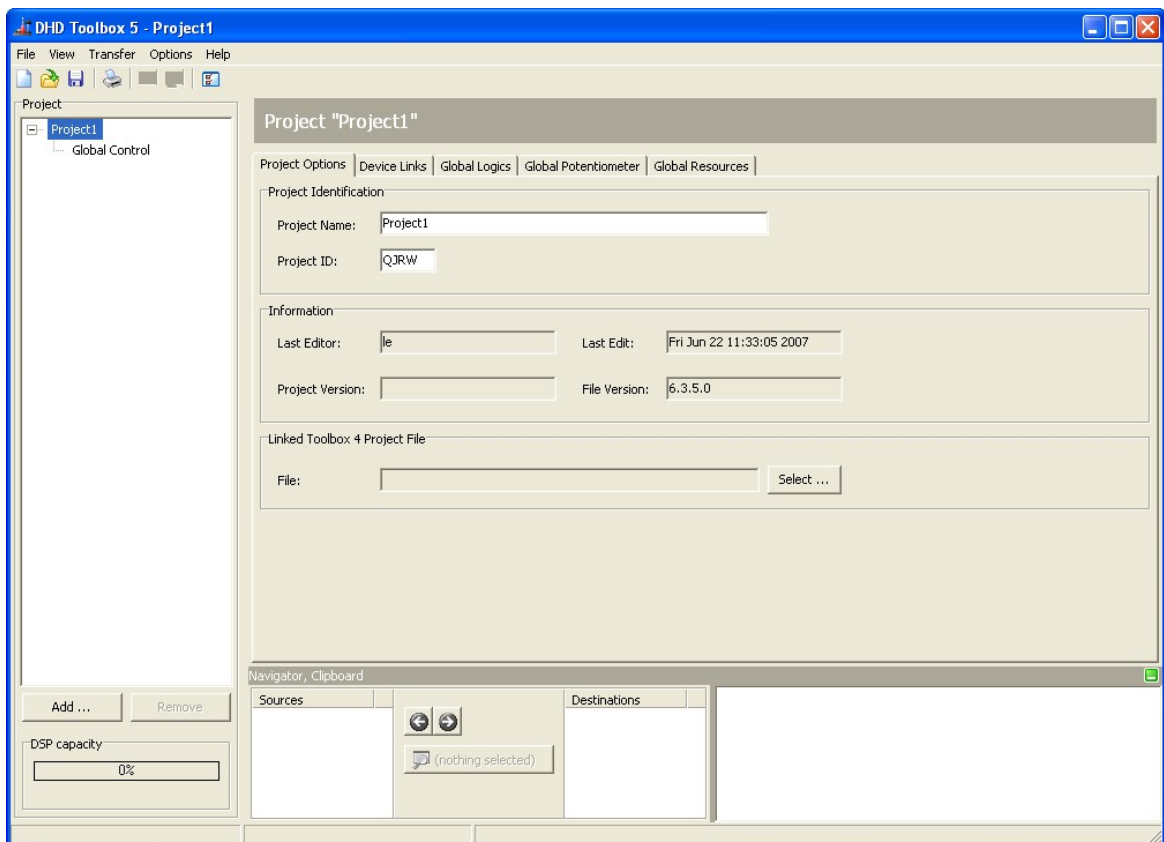
The Toolbox5 application window right after startup.

From here on, you have two ways to proceed:

1. You can create a new project to setup one or several routing devices from scratch.
2. You can load an existing project file (`*.dp5`) from your PC to edit the configuration of the existing devices.

A project is representing a collection of DHD Series 52 devices. Devices inside the same project are able to communicate with each other. This interoperability is comfortable to configure functions between several devices of one installation, e.g. talkback or on-air switching.

7.1.1   Add Devices

Below the project tree you can find the `Add...` button. A menu with devices - which can be added to the project - appears after clicking this button. Choose the entry `Add 52/XR Router` from this menu to add an 52/XR routing device to the project. Press `Remove` if you want to delete a device of the project tree.

Alternatively, you can reach this function via a context menu by right-click the project tree or the area around the project tree.
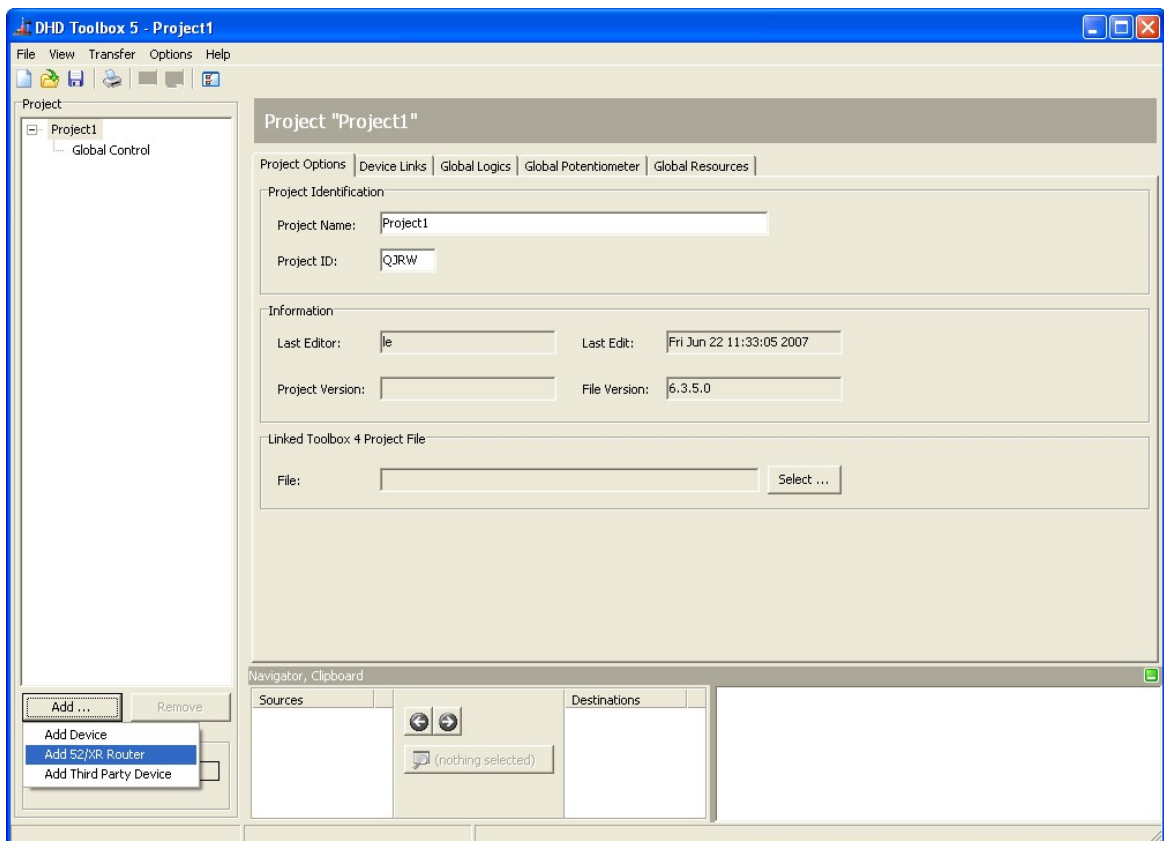
Add a routing device.

Select a 3 HU Frame (52-6063) or a 6 HU Frame (52-6066) in the pull down menu `DSP Frame Type`.

7.1.2   DSP Frame I/O Configuration

Click onto the `+` sign in front of the device label to reach the sub-branches of the device configuration.

On the `DSP Frame I/O` tab, the hardware layout of the routing device can be configured.

The selected frame size influences the number of configurable inputs and outputs in the Toolbox5, but it has no direct influence concerning the functionality of the hardware. Depending on the chosen router frame, in the DSP Frame I/O 21 or 42 slots (actual 36 configurable slots) can be configured.
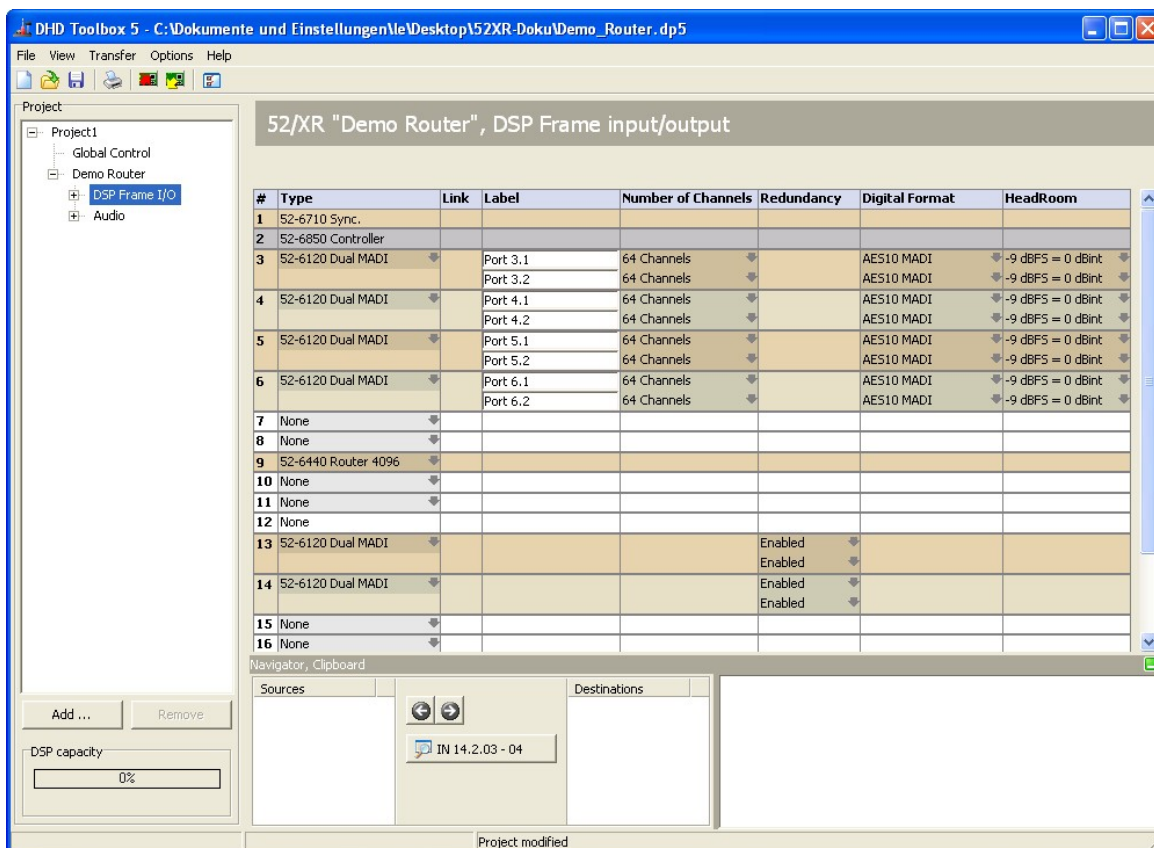
If DSP Frame I/O is selected, the currently configured layout of the router
is shown.

Slot 3 to 8 and 13 to 18 (as well as the slots 24 to 29 and 34 to 39 in a 6 HU frame) contain the MADI modules. Slot 13 to 18 (and 34 to 39 in a 6 HU frame) can be operated in a normal or a redundant mode. Please find more information on MADI redundancy in the section Configuring MADI Redundancy.

Currently, only a single type of module can be configured on the slots 3 to 8 and 13 to 18 (as well as 24 to 29 and 34 to 39 in a 6 HU frame). To make the configuration process easier, the labels of each MADI port can be customized.

Additionally, you can set the Number of Channels for each MADI port. You can use all 64 channels of the MADI signal or only the first 56 channels. Moreover, it possible to configure if the MADI port is linked to an 52/MB MADI Breakout System. By choosing this option, in the course of the configuration you will have some special setup possibilities for the linked 52/MB. More information on the configuration with a linked 52/MB can be found in the section Linked 52/MB at a MADI Port.

In the next column you choose, whether the digital format should be AES10 MADI or 32bit float. Headroom allows to adjust a corresponding level, which should refer to the internal reference level of 0 dBint.

Important

You need at least 3 modules to operate an 52/XR MADI Router. These modules are inserted into the DSP Frame I/O layout by default.

- `Slot 1: 52-6710 Sync Module`
- `Slot 2: 52-6850 Communication Controller`
- `Slot 9: 52-6440 Router Kernel`

You are allowed to change the type of the preconfigured router kernel (type 52-6442 supports 2048 channels, type 52-6440 supports 4096 channels), but at least one routing kernel is necessary for operation.

For each of these preconfigured, essential modules, you can configure a redundant module into the designated slot of the DSP frame.

Inserting a redundant module into the DSP Frame I/O does not automatically enable the redundancy for this part of the system. Make sure to insert redundant hardware into your frame, too.

7.1.3   Configure and Label Single Inputs and Outputs

Click onto the `+` sign in front of the `DSP Frame I/O` branch and select an existing port to reach the channel configuration.

If the `Number of Channels` is set to 64 or 56, you can switch channels to mono or stereo and set a label for each single input and output here. Additionally, you can set a local level adjustment for single inputs and outputs, which differs from the global settings.
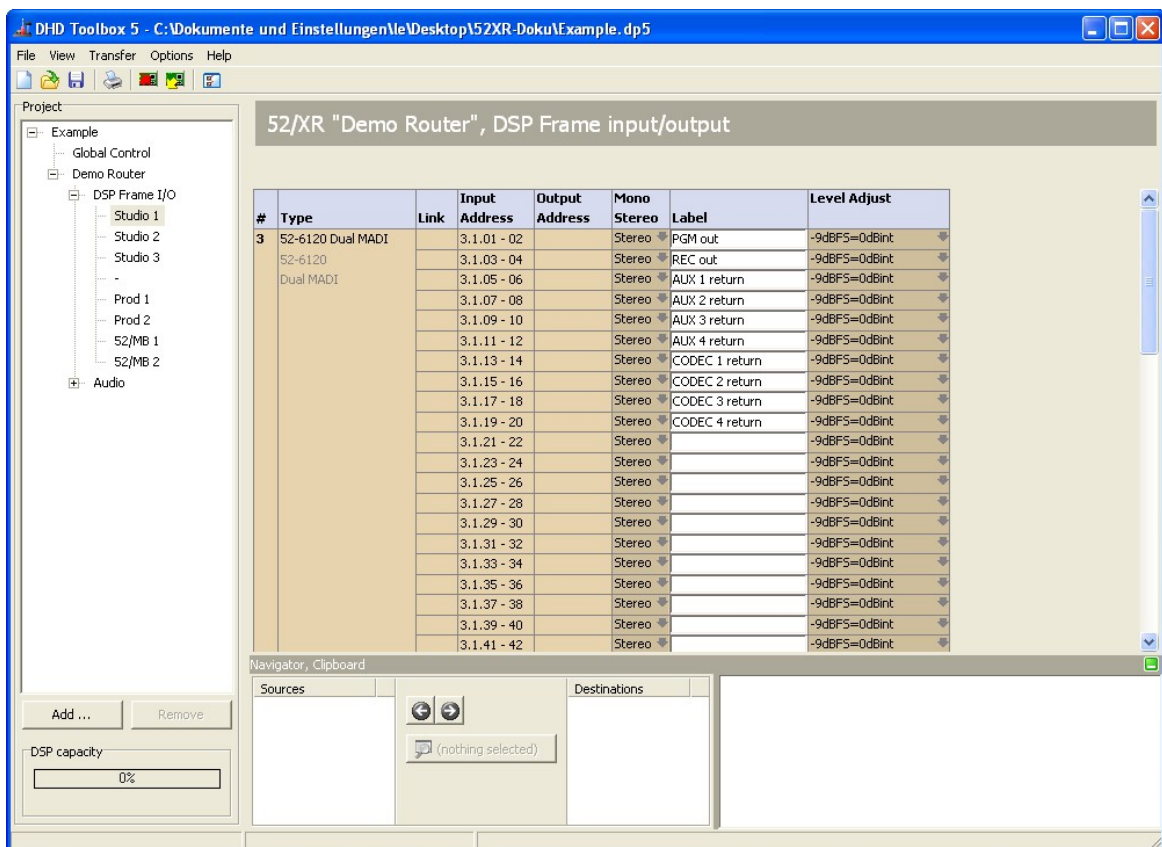
The Toolbox5 shows the inputs and outputs of a chosen MADI Port.

7.1.4   Linked 52/MB at a MADI Port

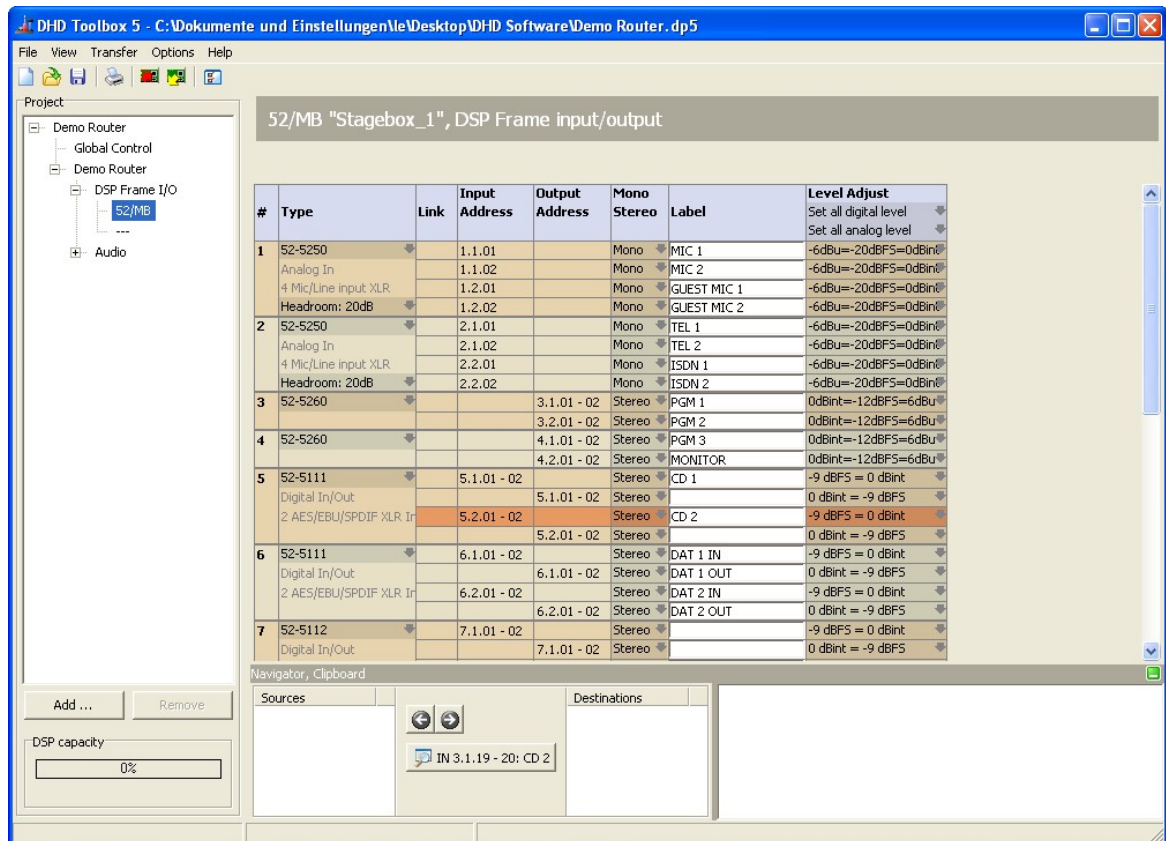If a MADI port was linked to an 52/MB MADI Breakout System, you are able to define the layout of the connected 52/MB device here. Basically, this part of the configuration is to make the whole configuration process easier. The 52/MB hardware itself must not be configured.

I/O configuration of a linked 52/MB.

The following modules can be configured in an 52/MB frame:

- 52-5111 XLR Digital In/Out Module, 4ch.
- 52-5112 XLR Digital In/Out Module, 4ch.
- 52-5240 XLR Analog In/Out Module, 4ch.
- 52-5243 XLR Analog In/Out Module, 4ch.
- 52-5250 XLR 4 Mic/Line Module, isolated
- 52-5260 XLR 4 Line Out Module, isolated

The channels of the selected I/O modules can be configured to mono or stereo and you can set a label for each single input and output here. Additionally, you can set a local level adjustment for each single input and output.

Moreover, you can adjust the headroom for the modules of the type 52-5250. Please note, that these settings influence the internal reference level (`0 dBint`) you select in the `Level Adjust` column. If you change the headroom of an 52-5250 module and use the function `Set all analog level` afterwards, may be some misinterpretation will occur. Therefore, check the values in the `Level Adjust` column of all 52-5250 modules and, if necessary, choose again the wanted values for the single inputs and outputs to correct the settings.

7.1.5   Configuring MADI Redundancy

Slot 13 to 18 (and slot 34 to 39 in a 6 HU frame) can be operated in a normal or a redundant mode. If switched to redundant, a MADI port duplicates the signals of the corresponding port on the left side of the router backplane.

Choose `Enabled` in the column `Redundancy` at the `DSP Frame I/O` to define the respective MADI port as redundant. If the corresponding module on the left side fails, the redundant module on the right side will automatically take over.

Example

The MADI ports of slot 13 and 14 are switched to be redundant. Now they are carrying the same output signals as the MADI ports of slot 3 and 4. They should be fed with redundant input signals of the MADI ports 3.1, 3.2, 4.1 and 4.2.

Toolbox5, DSP Frame I/O; The MADI ports of slot 13 and 14 are switched
to redundant.

7.1.6   Synchronisation

Selecting the `Audio` branch, displays the synchronisation window. Here you can do refinements on the current device synchronisation.

It is possible, to configure two independent synchronisation sources. `Sync Source 1` is always meant to be the master sync source and is used by the system as long as it is available. If it fails and a secondary sync source is configured and available, the system automatically switches over to `Sync Source 2`. If this source is not available, too, or not configured, the system switches to `Internal Synchronisation`.

Currently, the Toolbox5 supports synchronisation frequencies of 48 kHz and 44.1 kHz. In a future version, also 96 kHz and 88.2 kHz will be supported. The hardware is already able to handle both higher frequencies.

Switch on the `VariSpeed` option, if you want to synchronise the router to an external synchronisation frequency with a larger jitter. This option activates a VariPLL, which could handle such sources.

You can choose the synchronisation source out of a list of 9 possible sources:

- `Internal`
- `BNC 1 Word Clock`
- `BNC 2 Word Clock`
- `MADI 3.1`
- `MADI 13.1`
- `RJ45 AES3/EBU`
- `BNC 1 AES3/EBU`
- `BNC 2 AES3/EBU`
- `BNC 1 Video`
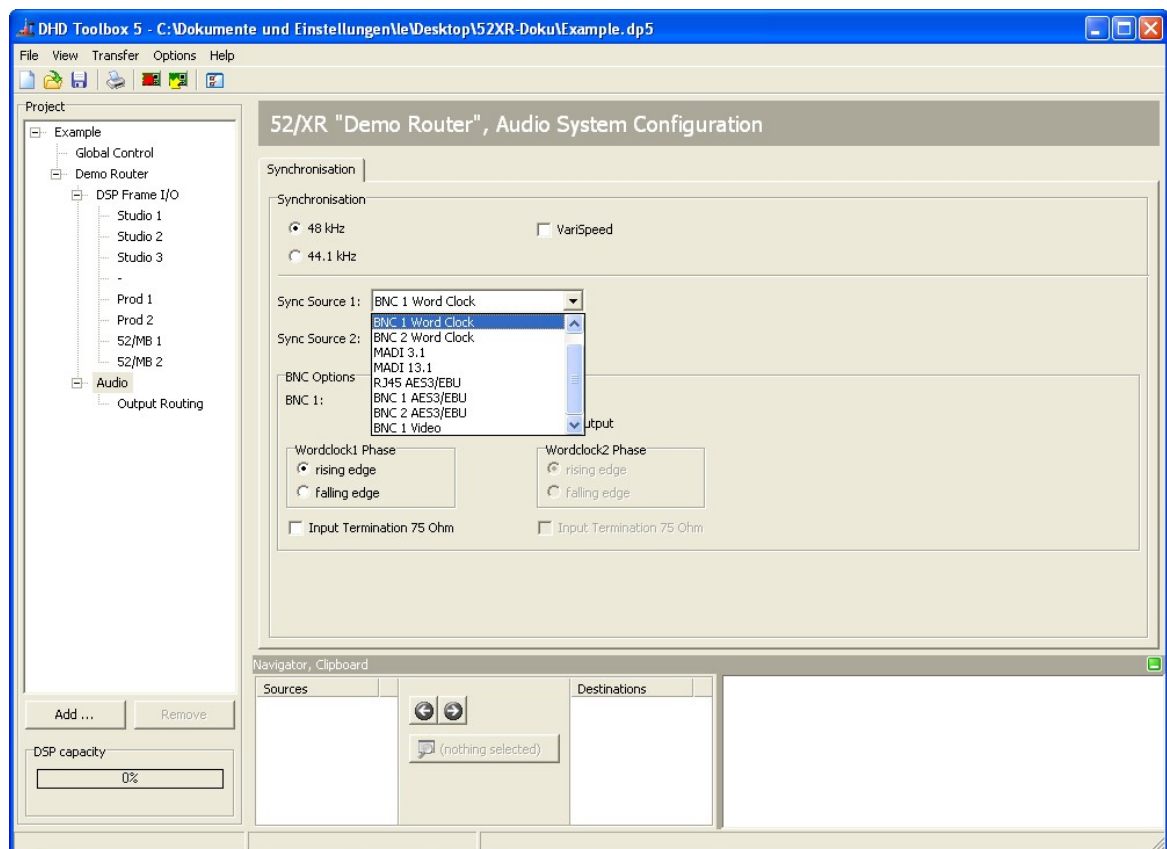
The synchronisation tab can be seen by selecting the Audio branch.

7.1.7   Transferring a Configuration to a Device

If you want to transfer a configuration to a device, please follow these steps:

- Select the desired device from the projects device tree.
- Click onto the symbol in the toolbar or choose `Load to Device` in the `Transfer` menu. The `DHD Connection Dialog` appears.
- Select the desired hardware from the list and press `OK`.

The transfer process starts and the configuration is copied to the chosen hardware.
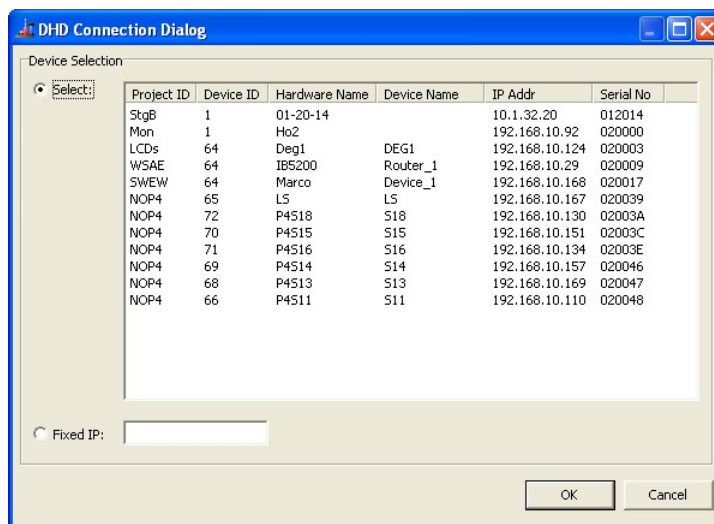
The Connection Dialog of the Toolbox5.

If an 52/XR MADI Router is available but unreachable via network, you probably need to refine the network settings. Please refer to the section Connecting the Device to a PC to learn more about the network configuration of an 52/XR MADI Router.

7.2   Operation with DHDOS and DHDOM

During its operation, the 52/XR MADI Router is controlled by the DHD Operation Server (DHDOS) and the user interface software DHD Operation Manager (DHDOM).

The DHDOS acts in the background and administrates the actual control of the crosspoints.

The DHDOM is a comfortable user interface to set the crosspoint states of an 52/XR MADI Router directly or scheduled. The software also offers a lot of additional options like user accounts and the adjustment of the software user interface concerning the rights and needs of each single user.

Note

Please find a comprehensive description of the DHDOS and the DHDOM and there functions in the DHDOS & DHDOM manual.

8   Further Information

8.1   Maintenance

For maintenance purposes the DHD Maintenance software is provided. Start the application by double clicking the file `MTN5.exe`.

It also possible to open the maintenance window in the Toolbox5 software. Therefore, choose the command `Maintenance Window` of the `View` menu or just press the key `F7`.

↗	**Weblink**
	Please find a comprehensive description of the maintenance software and its functions in the section `Maintenance Window` in the <u>Toolbox5 Manual</u>.
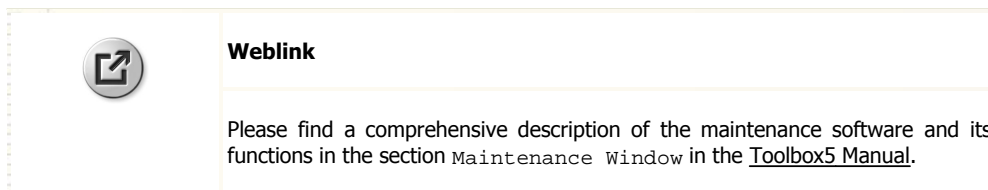
8.1.1   Firmware Update

When it leaves the factory, each 52/XR MADI Router is equipped with the most current operating software (firmware). As we are continuously developing the software, it might occur that after a while a newer version than that on your system will be available. Ask your DHD dealer about the current firmware version for your 52/XR MADI Router.

If a newer version is available, you first have to decide if it makes sense in your case to update the firmware.

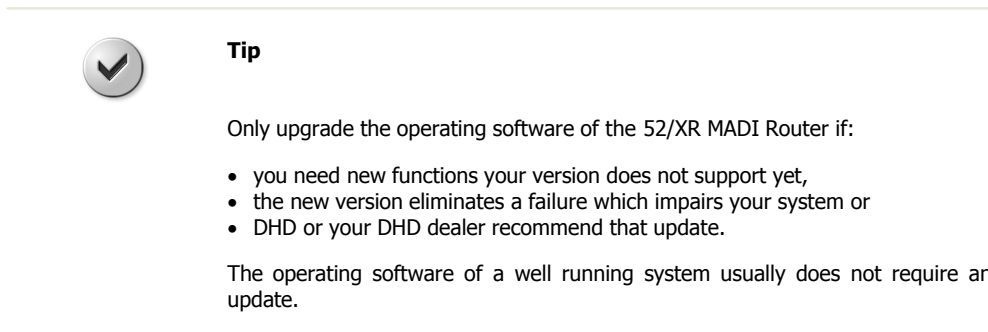|	
✓	**Tip**
	Only upgrade the operating software of the 52/XR MADI Router if:
	• you need new functions your version does not support yet, • the new version eliminates a failure which impairs your system or • DHD or your DHD dealer recommend that update.
	The operating software of a well running system usually does not require an update.

If you want to upgrade your operating software, first determine the firmware version that is currently running on your system.

1. Select the system in the device list of the maintenance software DHD Maintenance (DHDMT), which you want to upgrade with a new firmware version.

2. In the `Version` line of the main window you will find information about the currently running firmware version.

3. A firmware update is provided as a file. For the firmware update of an 52/XR the same file is used like for the 52/MX Mixing Console. Firmware update files for the 52/XR MADI Router are named according to the following pattern:

   `MX-XR_06-03-14.fw6`

   The `MX-XR_06` code indicates an official firmware version for the 52/XR MADI Router. Figure two (here: `03`) represents the major version of the firmware. The third figure refers to the minor version of the firmware (here: `14`). The fourth figure always must be `01`, meaning that it is an official version. This figure is not explicitly pointed out in the file name. Every 52/XR MADI Router firmware file ends with `.fw6`.

   Select the `Update Firmware...` command from the `Update` menu and open the update file. A validity check will follow and you will be asked to either start the update process by confirming or to cancel the process.

Version 1.8.0 - 16.06.2008

Confirmation

Selected device type : 52/XR
Current firmware version : 06.03.12.01

Update file device type : 52/XR
Update file firmware version : 06.03.14.01

Do you want to continue with firmware update?

[Yes]   [No]

Confirming the firmware upload.

4. The updating process starts after pressing `Yes`. A progress bar is shown during the process, which will only take a few seconds.

Mtn5

Uploading file

█████████████████
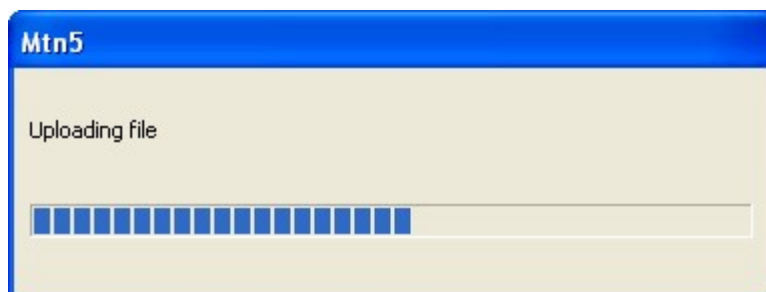
The progress bar during the firmware upload.

5. After successfully uploading the file, you will be asked to reset the system. The system loads the new operating software after a restart.

Confirmation

Update successful. Reset now?

[Yes]   [No]
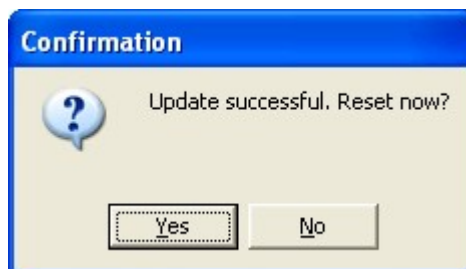
Confirming the reset.

> **!**   **Important**
>
> A reset will interrupt the audio process of the system for a short period of time. Please only reset your 52/XR MADI Router when you are sure that a reset will not affect any on-air signals.

You can postpone the reset to a later time. Please note that the system will keep running the old firmware version until being restarted.

8.2   I/O Module Pin Assignment

8.2.1   52-5310A - MB/XD/XR GPIO Module, 8 out,4 in

Type	Pin
CHASSIS	15
GPI 2 -	14
GPI 1 -	13
GPO 4 B	12
GPO 3 B	11
GPO 2 B	10
GPO 1 B	9

Pin	Type	Address
8	Pot. 1	Pot. 1
7	V GPI 1/2	
6	GPI 2 +	GPI 2
5	GPI 1 +	GPI 1
4	GPO 4 A	GPO 4
3	GPO 3 A	GPO 3
2	GPO 2 A	GPO 2
1	GPO 1 A	GPO 1

Type	Pin
CHASSIS	15
GPI 4 -	14
GPI 3 -	13
GPO 8 B	12
GPO 7 B	11
GPO 6 B	10
GPO 5 B	9

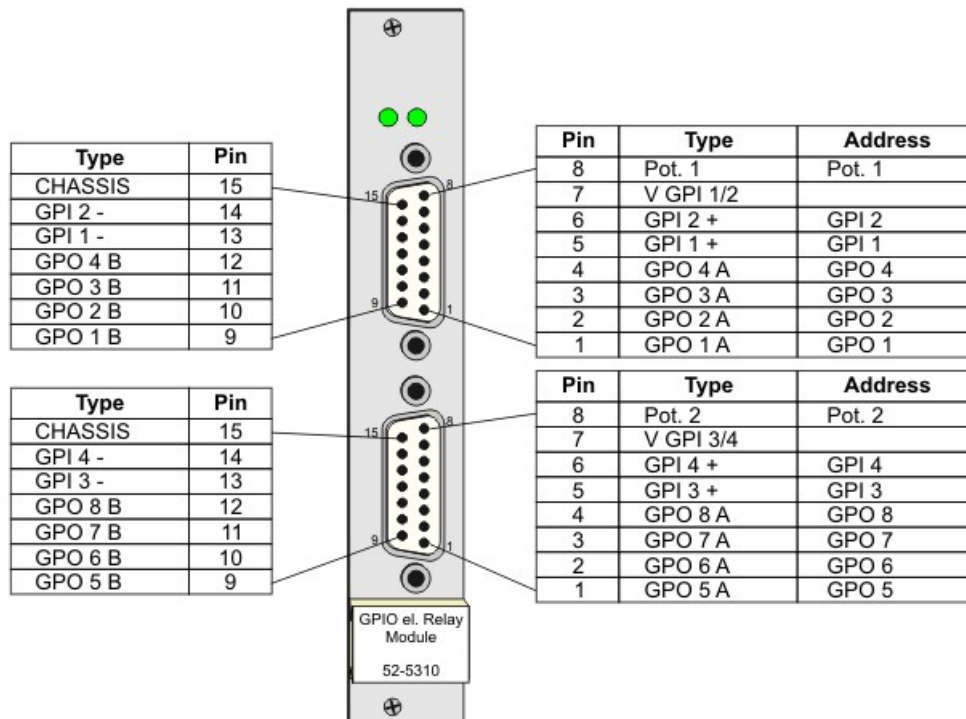| Pin	Type	Address
8	Pot. 2	Pot. 2
7	V GPI 3/4	
6	GPI 4 +	GPI 4
5	GPI 3 +	GPI 3
4	GPO 8 A	GPO 8
3	GPO 7 A	GPO 7
2	GPO 6 A	GPO 6
1	GPO 5 A	GPO 5

"CHASSIS" meint, nur verbunden mit Gehäuse des Gerätes und Steckergehäuse, jedoch nicht mit der internen Schaltungsmasse, da galvanisch getrennt.

"CHASSIS" means wired to DSP frame enclosure and connector housing, but not to internal circuit ground of the module because it is galvanically isolated.

Pin out for the 52-5310 Module.

8.2.2   52-5311A - MB/XD/XR GPIO Module, 8 out,4 in

Type	Pin
CHASSIS	15
GPI 2 -	14
GPI 1 -	13
GPO 4 B	12
GPO 3 B	11
GPO 2 B	10
GPO 1 B	9

Pin	Type	Address
8	Pot. 1	Pot. 1
7	V GPI 1/2	
6	GPI 2 +	GPI 2
5	GPI 1 +	GPI 1
4	GPO 4 A	GPO 4
3	GPO 3 A	GPO 3
2	GPO 2 A	GPO 2
1	GPO 1 A	GPO 1

Type	Pin
CHASSIS	15
GPI 4 -	14
GPI 3 -	13
GPO 8 B	12
GPO 7 B	11
GPO 6 B	10
GPO 5 B	9

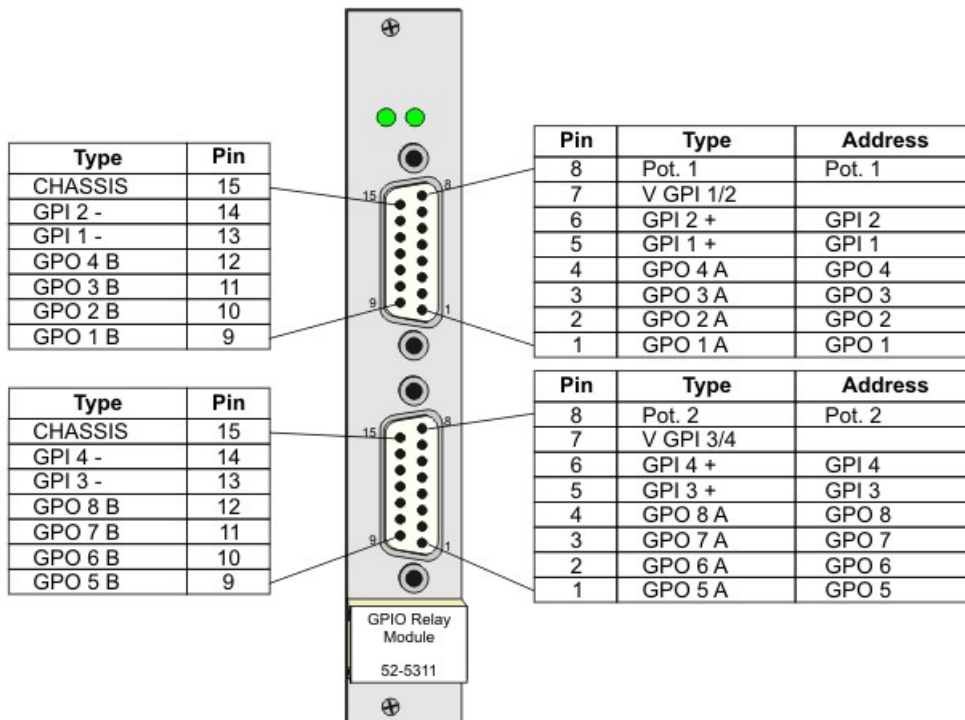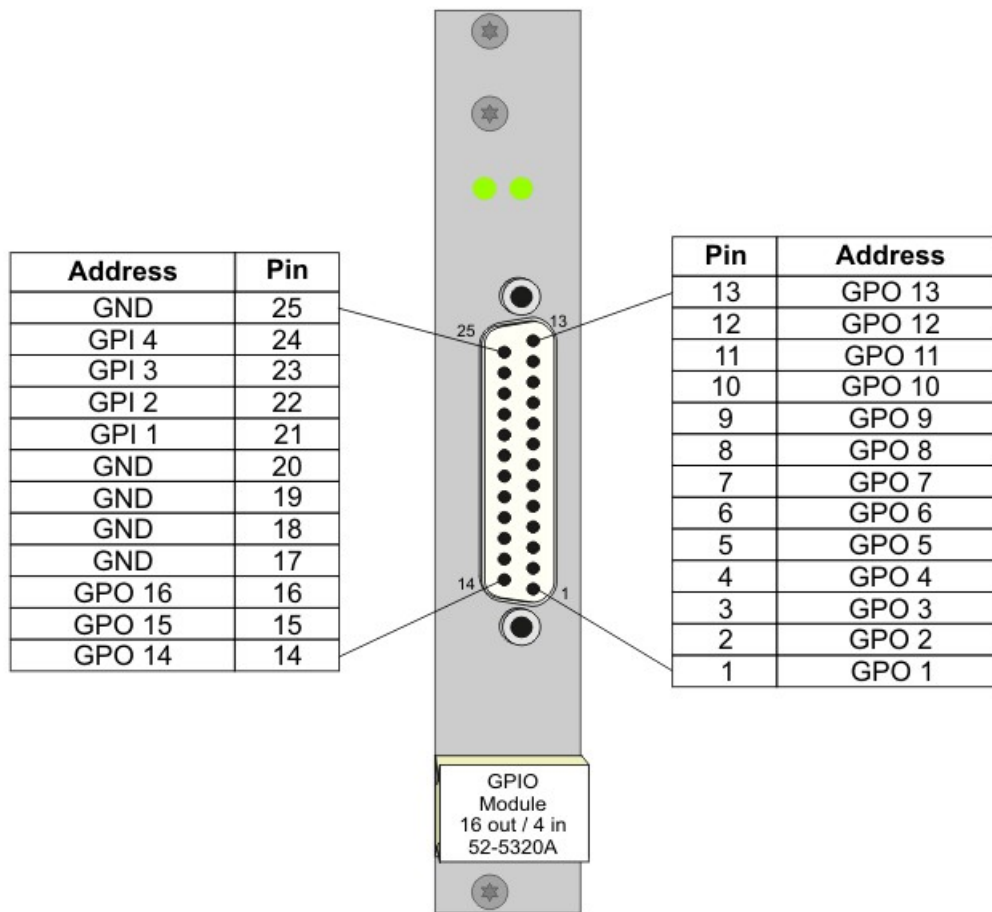| Pin	Type	Address
8	Pot. 2	Pot. 2
7	V GPI 3/4	
6	GPI 4 +	GPI 4
5	GPI 3 +	GPI 3
4	GPO 8 A	GPO 8
3	GPO 7 A	GPO 7
2	GPO 6 A	GPO 6
1	GPO 5 A	GPO 5

"CHASSIS" meint, nur verbunden mit Gehäuse des Gerätes und Steckergehäuse, jedoch nicht mit der internen Schaltungsmasse, da galvanisch getrennt.

"CHASSIS" means wired to DSP frame enclosure and connector housing, but not to internal circuit ground of the module because it is galvanically isolated.
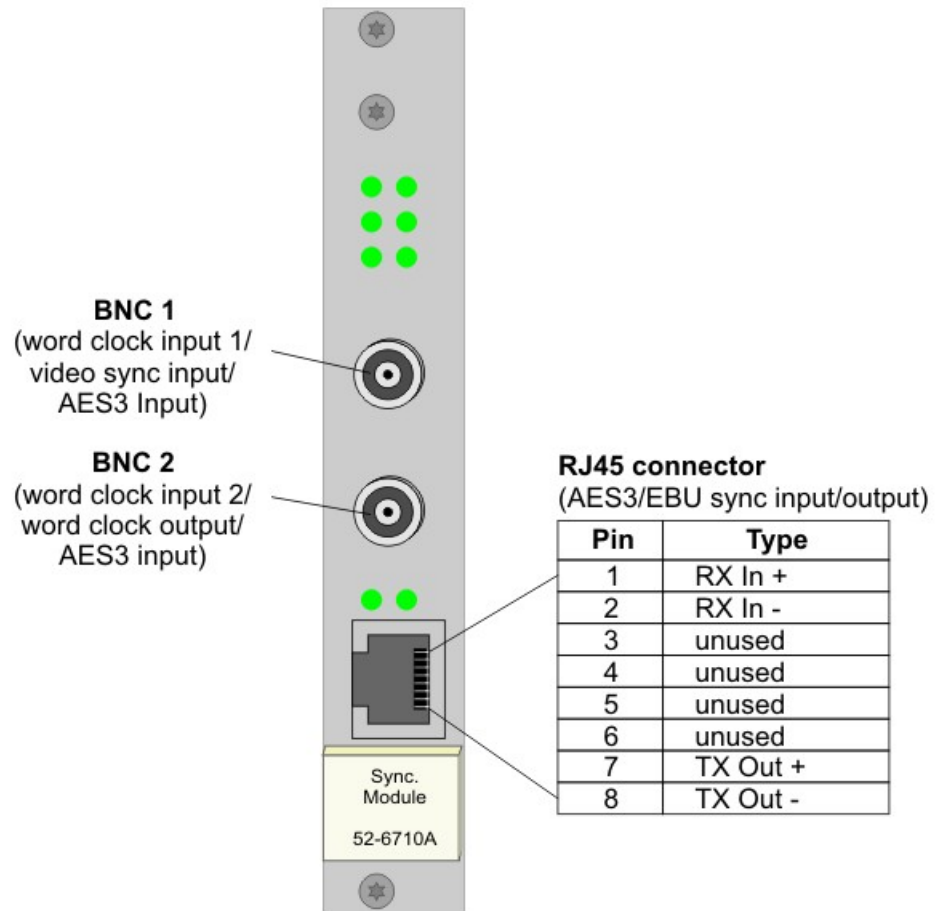
Pin out for the 52-5311 Module.

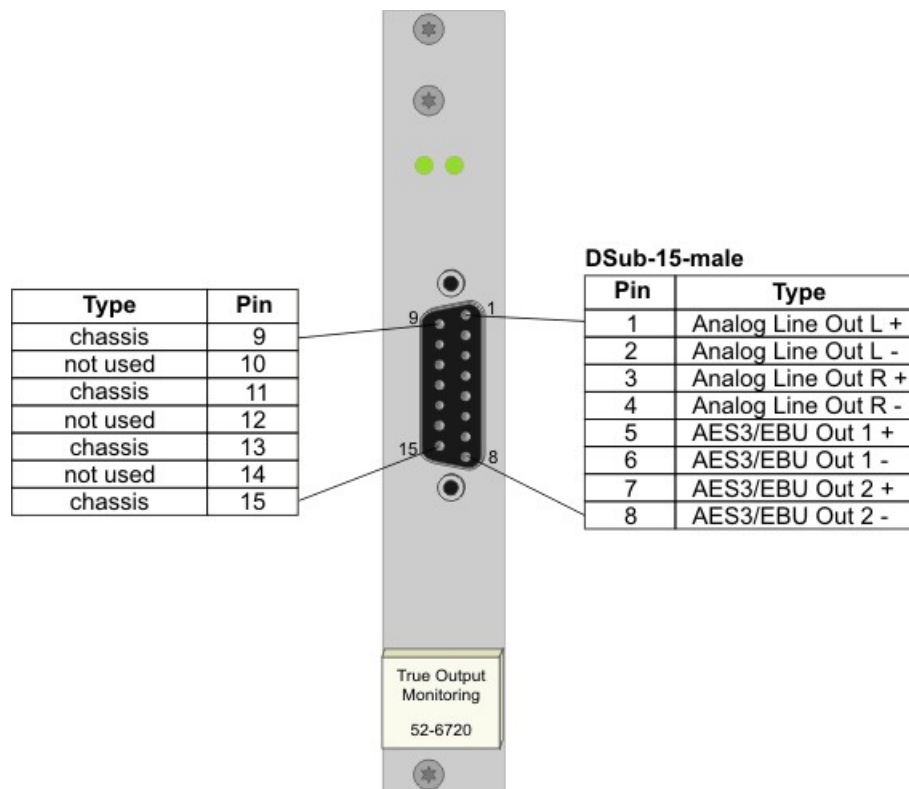### 8.2.3   52-5320A - XD/XR GPIO Module, 16 out, 4 in

Address	Pin
GND	25
GPI 4	24
GPI 3	23
GPI 2	22
GPI 1	21
GND	20
GND	19
GND	18
GND	17
GPO 16	16
GPO 15	15
GPO 14	14

Pin	Address
13	GPO 13
12	GPO 12
11	GPO 11
10	GPO 10
9	GPO 9
8	GPO 8
7	GPO 7
6	GPO 6
5	GPO 5
4	GPO 4
3	GPO 3
2	GPO 2
1	GPO 1

Pin out for the 52-5320 Module.

8.2.4   52-6710A - XR Router/DSP Sync. Module

BNC 1
(word clock input 1/
video sync input/
AES3 Input)

BNC 2
(word clock input 2/
word clock output/
AES3 input)

RJ45 connector
(AES3/EBU sync input/output)

Pin	Type
1	RX In +
2	RX In -
3	unused
4	unused
5	unused
6	unused
7	TX Out +
8	TX Out -

Sync.
Module

52-6710A

Pin out for the 52-6710 Module.

8.2.5   52-6720A - XR True Output Monitoring

Type	Pin
chassis	9
not used	10
chassis	11
not used	12
chassis	13
not used	14
chassis	15

DSub-15-male

Pin	Type
1	Analog Line Out L +
2	Analog Line Out L -
3	Analog Line Out R +
4	Analog Line Out R -
5	AES3/EBU Out 1 +
6	AES3/EBU Out 1 -
7	AES3/EBU Out 2 +
8	AES3/EBU Out 2 -

True Output
Monitoring
52-6720

"chassis" meint, nur verbunden mit Gehäuse des Gerätes und Steckergehäuse, jedoch nicht mit der internen Schaltungsmasse, da galvanisch getrennt

"chassis" means wired to DSP frame enclosure and connector housing, but not to internal circuit ground of the module because it is galvanically isolated

Pin out for the 52-6720 Module.

8.3   Meaning of the LEDs

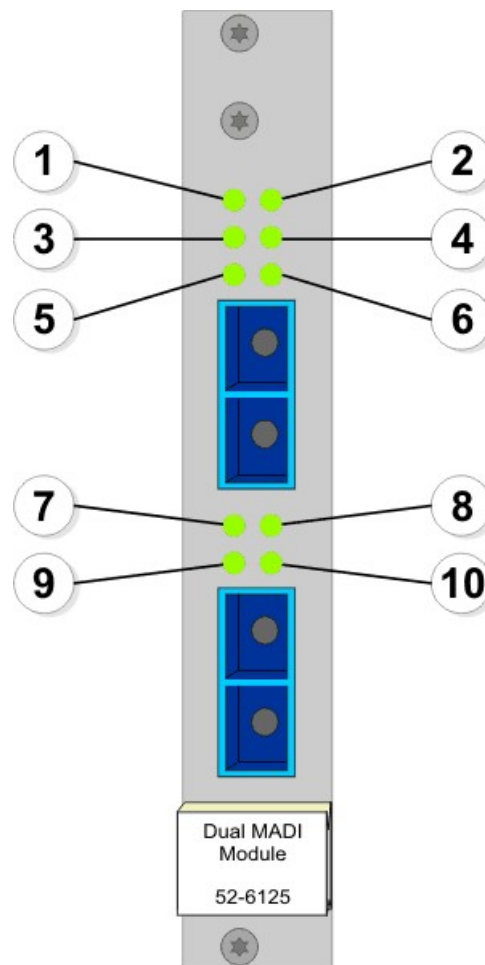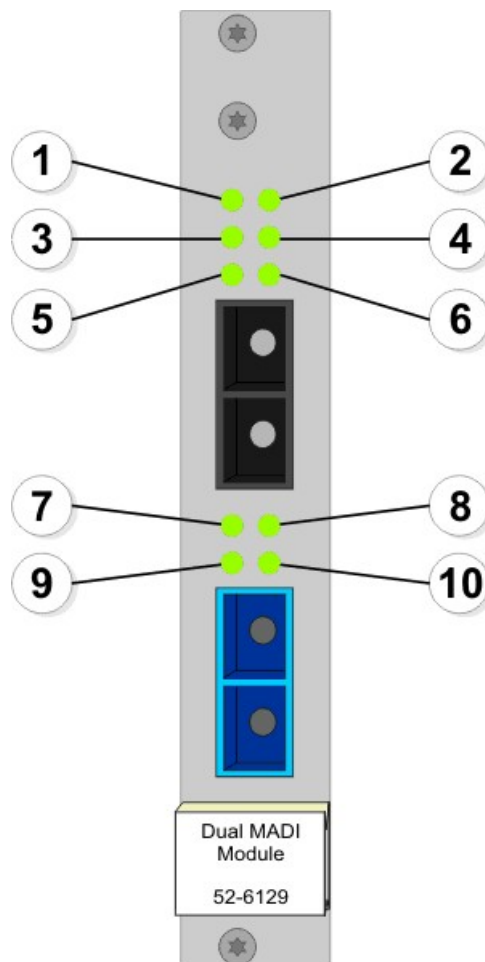## 8.3.1   52-6120A - XR Dual MADI Module, multimode
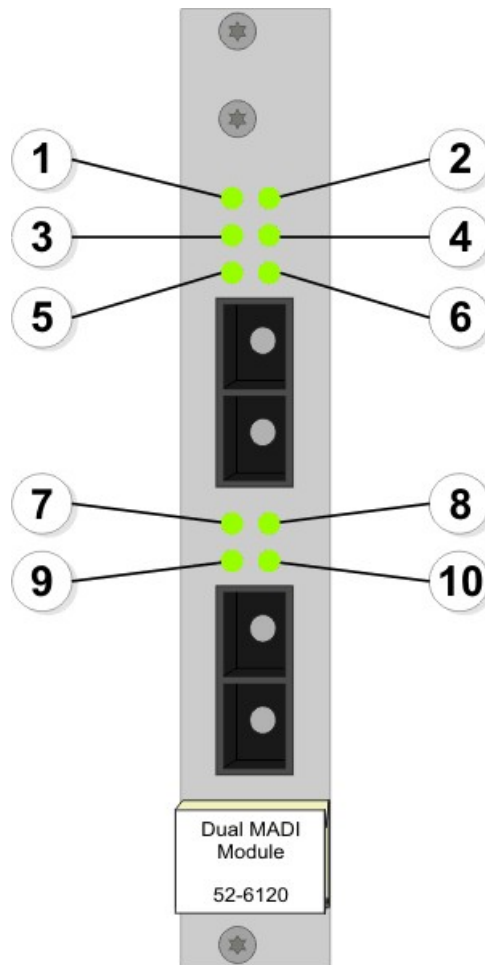
Meaning of the LEDs of the 52-6120 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

3. LED 3 indicates, that routing kernel no. 1 is sending data to the outputs of the upper MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the upper MADI port, but it does not. If a second, redundant routing kernel is available, LED 4 indicates, that the second routing kernel is operating now.

4. Normally, the first kernel should send data to the outputs of the upper MADI port. If the first kernel is malfunctioning, LED 4 indicates, that routing kernel no. 2 is sending data to the outputs of the upper MADI port.

5. The LED indicates, that routing kernel no. 1 is locked to the inputs of the upper MADI port.

6. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the upper MADI port.

7. LED 7 indicates, that routing kernel no. 1 is sending data to the outputs of the lower MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the lower MADI port, but it does not. If a second, redundant routing kernel is available, LED 8 indicates, that the second routing kernel

is operating now.

8. Normally, the first kernel should send data to the outputs of the lower MADI port. If the first kernel is malfunctioning, LED 8 indicates, that routing kernel no. 2 is sending data to the outputs of the lower MADI port.

9. The LED indicates, that routing kernel no. 1 is locked to the inputs of the lower MADI port.

10. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the lower MADI port.

8.3.2   52-6125A - XR Dual MADI Module, single mode

Meaning of the LEDs of the 52-6125 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

3. LED 3 indicates, that routing kernel no. 1 is sending data to the outputs of the upper MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the upper MADI port, but it does not. If a second, redundant routing kernel is available, LED 4 indicates, that the second routing kernel is operating now.

4. Normally, the first kernel should send data to the outputs of the upper MADI port. If the first kernel is malfunctioning, LED 4 indicates, that routing kernel no. 2 is sending data to the outputs of the upper MADI port.

5. The LED indicates, that routing kernel no. 1 is locked to the inputs of the upper MADI port.

6. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the upper MADI port.

7. LED 7 indicates, that routing kernel no. 1 is sending data to the outputs of the lower MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the lower MADI port, but it does not. If a second, redundant routing kernel is available, LED 8 indicates, that the second routing kernel is operating now.

8. Normally, the first kernel should send data to the outputs of the lower MADI port. If the first kernel is malfunctioning, LED 8 indicates, that routing kernel no. 2 is sending data to the outputs of the lower MADI port.

9. The LED indicates, that routing kernel no. 1 is locked to the inputs of the lower MADI port.

10. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the lower MADI port.

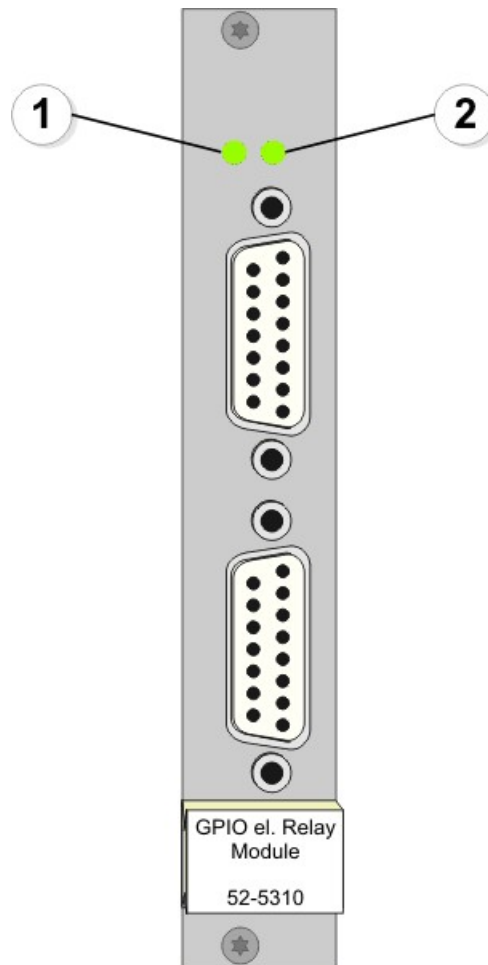### 8.3.3   52-6129A - XR Dual MADI Module, multi/single

Meaning of the LEDs of the 52-6129 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

---

3. LED 3 indicates, that routing kernel no. 1 is sending data to the outputs of the upper MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the upper MADI port, but it does not. If a second, redundant routing kernel is available, LED 4 indicates, that the second routing kernel is operating now.

4. Normally, the first kernel should send data to the outputs of the upper MADI port. If the first kernel is malfunctioning, LED 4 indicates, that routing kernel no. 2 is sending data to the outputs of the upper MADI port.

5. The LED indicates, that routing kernel no. 1 is locked to the inputs of the upper MADI port.

6. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the upper MADI port.

7. LED 7 indicates, that routing kernel no. 1 is sending data to the outputs of the lower MADI port. This LED is blinking if the first kernel starts malfunctioning. That means, the first kernel should send data to the outputs of the lower MADI port, but it does not. If a second, redundant routing kernel is available, LED 8 indicates, that the second routing kernel is operating now.

8. Normally, the first kernel should send data to the outputs of the lower MADI port. If the first kernel is malfunctioning, LED 8 indicates, that routing kernel no. 2 is sending data to the outputs of the lower MADI port.

9. The LED indicates, that routing kernel no. 1 is locked to the inputs of the lower MADI port.

10. If a redundant kernel is installed, this LED indicates, that routing kernel no. 2 is locked to the inputs of the lower MADI port.
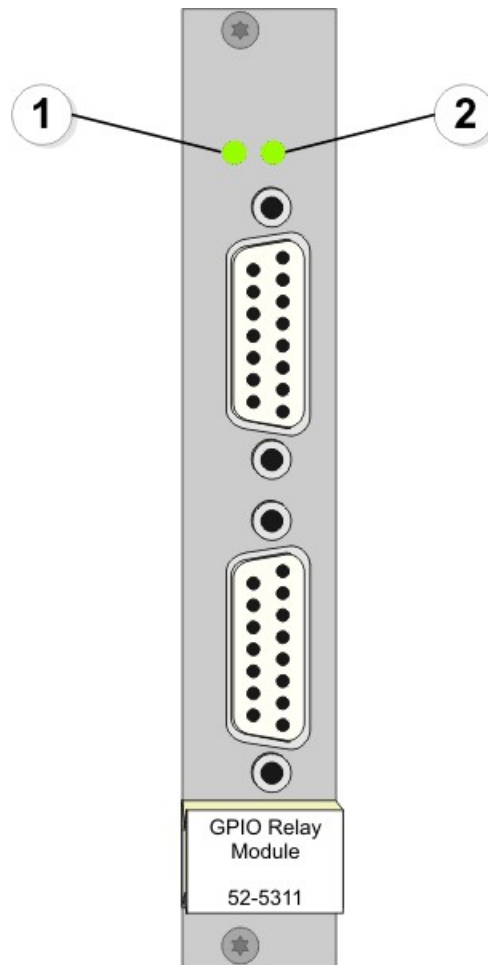
Version 1.8.0 - 16.06.2008

8.3.4   52-5310A - MB/XD/XR GPIO Module, 8 out, 4 in

Meaning of the LEDs of the 52-5310 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.
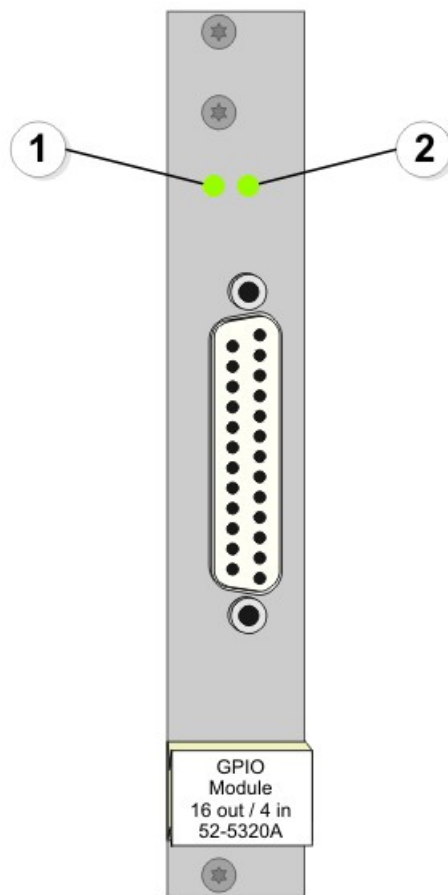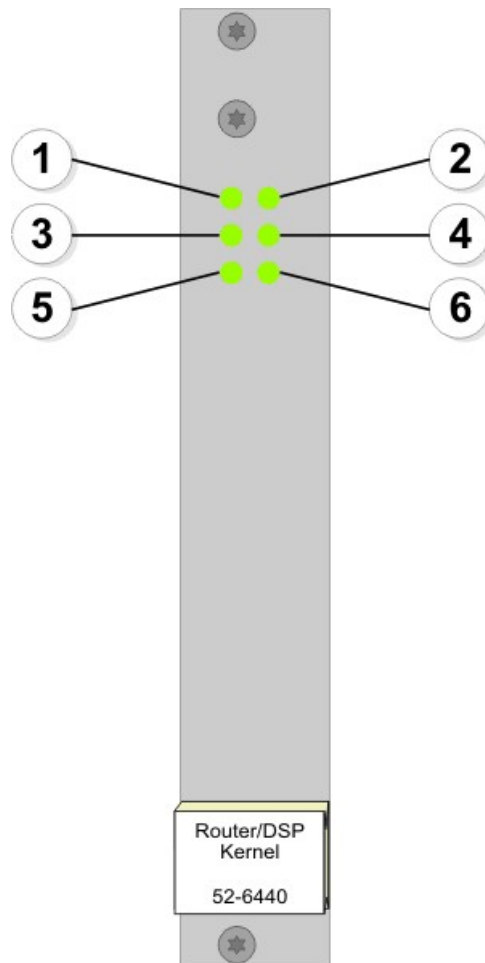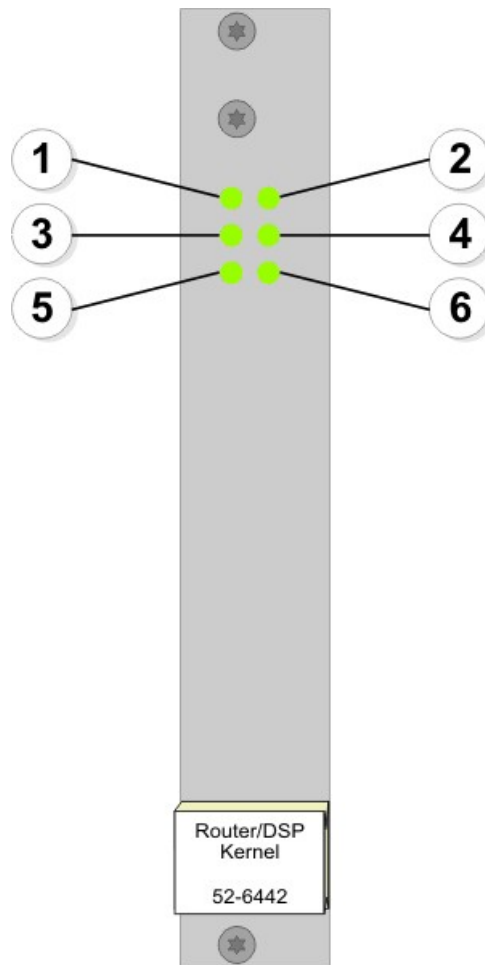
8.3.5   52-5311A - MB/XD/XR GPIO Module, 8 out, 4 in

Meaning of the LEDs of the 52-5311 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

8.3.6   52-5320A - XD/XR GPIO Module, 16 out, 4 in

Meaning of the LEDs of the 52-5311 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

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8.3.7   52-6440A - XR Router/DSP Kernel Module 4096

Meaning of the LEDs of the 52-6440 Module.

1. This LED is permanently on if the module is powered.

2. This LED shows the hardware status and is permanently on if the boot process of the programmable logic was successfully done.

3. This LED indicates the DSP usage. The more the LED glows, the more DSP power is used.

4. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

5. This LED is permanently on, but momentary unused and reserved for future functions.

6. This LED is permanently on, but momentary unused and reserved for future functions.

8.3.8   52-6442A - XR Router/DSP Kernel Module 2048

Meaning of the LEDs of the 52-6442 Module.

1. This LED is permanently on if the module is powered.

2. This LED shows the hardware status and is permanently on if the boot process of the programmable logic was successfully done.

3. This LED indicates the DSP usage. The more the LED glows, the more DSP power is used.

4. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

5. This LED is permanently on, but momentary unused and reserved for future functions.

6. This LED is permanently on, but momentary unused and reserved for future functions.
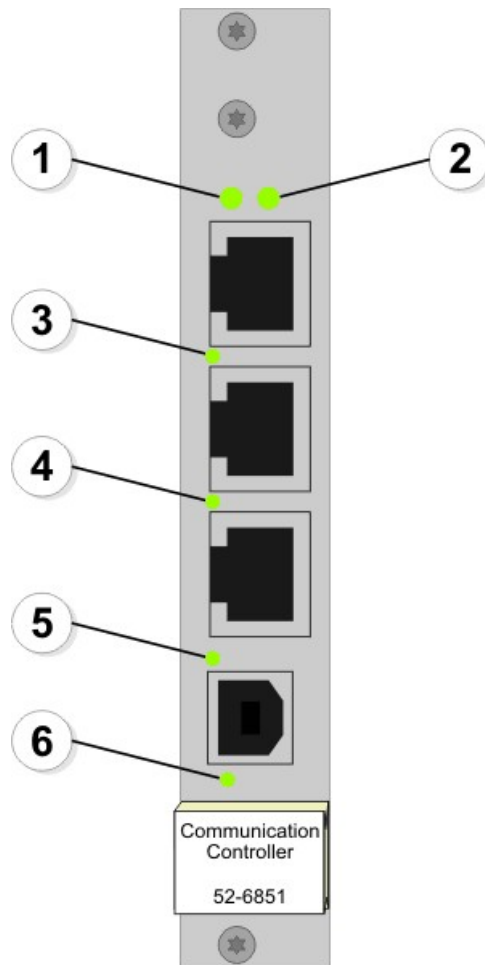
8.3.9   52-6850A - XR Comm. Controller, red.
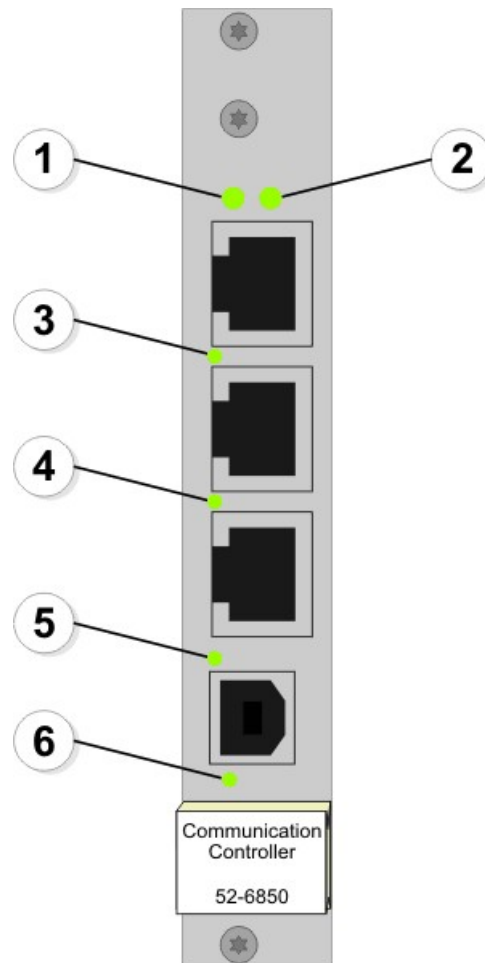
Meaning of the LEDs of the 52-6850 Module.

1. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

2. The LED flashes if data is transmitted or received via the upper RJ45 port.

3. The LED is on if the communication controller is connected to the controller network via the middle RJ45 connector. It flashes if data is received.

4. The LED is on if the communication controller is connected to the DHD network via the lower RJ45 connector. It flashes if data is received.

5. This LED shows the hardware status of the programmable logic and is permanently on if the boot process of the programmable logic was successfully done.

6. This LED is permanently on and indicates the PLL-Lock of the controller after a reset or power on.
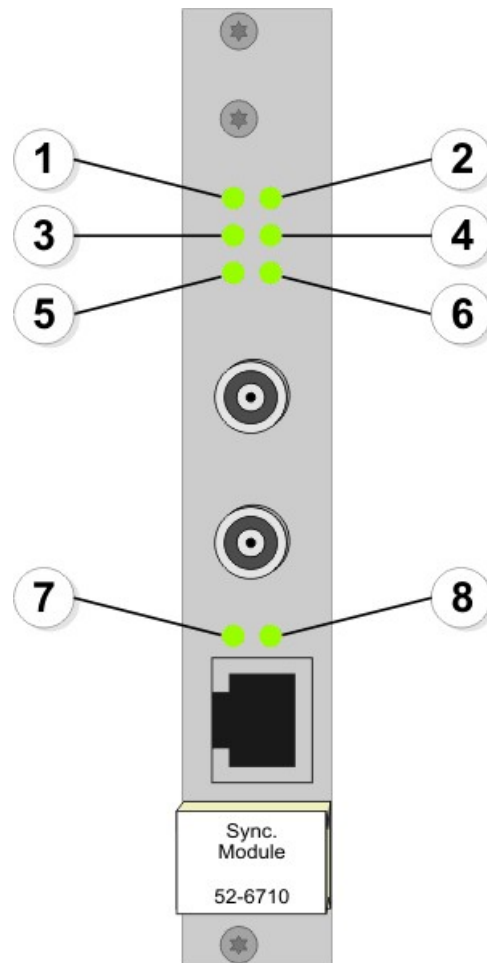
DHD

8.3.10 52-6851A - XR Communication Controller

Meaning of the LEDs of the 52-6851 Module.

1. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

2. This LED is momentary unused and is reserved for future functions.

3. The LED is on if the communication controller is connected to the controller network via the middle RJ45 connector. It flashes if data is received.

4. The LED is on if the communication controller is connected to the DHD network via the lower RJ45 connector. It flashes if data is received.

5. This LED shows the hardware status of the programmable logic and is permanently on if the boot process of the programmable logic was successfully done.

6. This LED is permanently on and indicates the PLL-Lock of the controller after a reset or power on.

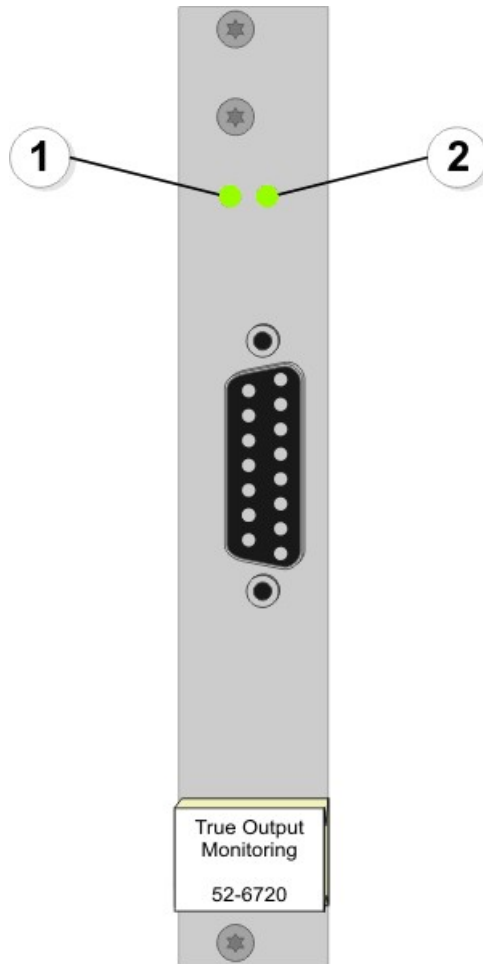## 8.3.11 52-6710A - XR Router/DSP Sync. Module

Meaning of the LEDs of the 52-6710 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

3. Indicates, that the primary sync is active. Dependent on the configuration, the primary sync source can be the upper BNC (Word Clock, AES3/EBU or Video), the lower BNC (Word Clock or AES3/EBU), the RJ45 connector of the sync module (AES3/EBU), a MADI signal (MADI port 3.1 or 13.1) or the internal sync. This LED can not be on if LED 4 glows and it blinks during the video signal locking process.

4. Indicates, that the secondary sync is active. Dependent on the configuration, the secondary sync source can be the upper BNC (Word Clock, AES3/EBU or Video), the lower BNC (Word Clock or AES3/EBU), the RJ45 connector of the sync module (AES3/EBU), a MADI signal (MADI port 3.1 or 13.1) or the internal sync. This LED can not be on if LED 3 glows and it blinks during the video signal locking process.

5. The LED is permanently on if the primary sync is functional. Blinking indicates, that PLL 1 is out of range.

6. The LED is permanently on if the secondary sync is functional. Blinking indicates, that PLL 2 is out of range.

7. Indicates, that the primary AES3/EBU sync signal (connected to the upper BNC, the lower BNC or the RJ45 jack of the sync module) is locked.

8. Indicates, that the secondary AES3/EBU sync signal (connected to the upper BNC, the lower BNC or the RJ45 jack of the

sync module) is locked.

8.3.12 52-6720A - XR True Output Monitoring

Meaning of the LEDs of the 52-6720 Module.

1. This LED is permanently on if the module is powered.

2. Indicates, that the module is running. This LED blinks. Seen from left to right over the entire system, these LEDs should blink as a moving light.

8.4   Audio Delay

In the table below you can find the delay times of single processes inside the 52/XR MADI Router and also for the 52/MB MADI Breakout System and the 52/CR Compact Router, because these devices are often used together. Besides, there are listed some total numbers of delays for possible combinations of processes.

Examples for possible signal flows:

	Audio Samples	An-Router -An	Dig-Router -An	An-Router -Dig	Dig-Router -Dig	DigSRC-Router -Dig	DigSRC-Router -DigSRC
Routing Kernel, general delay	4	4	4	4	4	4	4
52/MB and 52/CR input, general delay	10	10	10	10	10	10	10
52/MB and 52/CR output, general delay	10	10	10	10	10	10	10
AD converter CS5361, component dependent delay	12	12		12			
DA converter PCM1793, component dependent delay	29	29	29				
SRC AD1895 input, component dependent delay	48					48	48
SRC AD1895 output, component dependent delay	48						48
total delay samples (typical)		**65**	**53**	**36**	**24**	**72**	**120**
total delay @ 48kHz in ms (typical)		**1.35**	**1.10**	**0.75**	**0.50**	**1.50**	**2.50**

An-   analog input
Dig-   digital input
DigSRC-   digital input with sample rate converter
-An   analog output
-Dig   digital output
-DigSRC   digital output with sample rate converter

8.5   Example of Use

In the following drawing, you can find an example how to integrate an 52/XR MADI Router into an audio network.
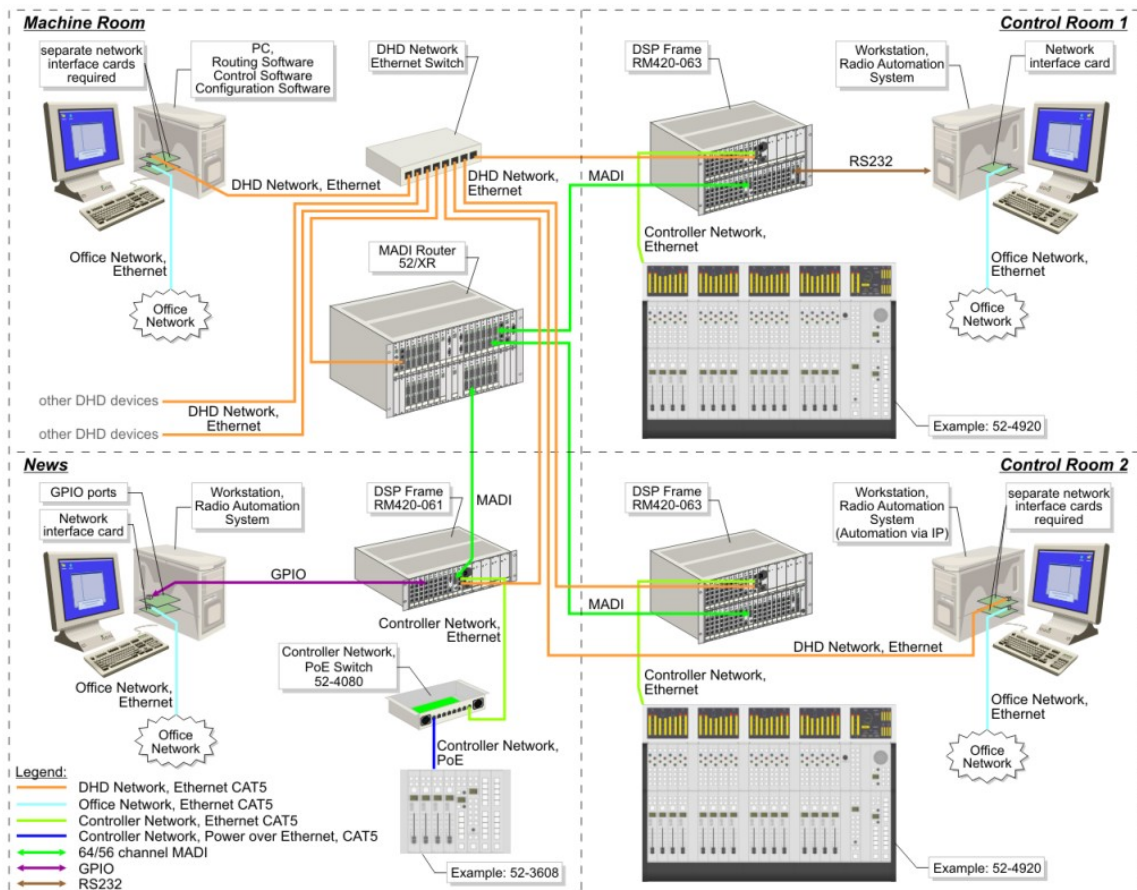
Series 52 audio network with an 52/XR MADI Router and 52/MX consoles.

In this example an 52/XR MADI Router is located in the machine room. The router is connected to the mixing consoles in the studios (Control Room 1, Control Room 2 and News) via MADI. Within the DHD ethernet network, the router is able to exchange control data with other devices.

Please find more information about the wiring of an 52/XR MADI Router in the 52/XR Installation Guide.

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