D*AP8 MAP Edition
Monitoring Audio Processor
Manual
Hardware features

- **D*AP8 unit**: 1RU / 19” generic compact 8 channel processing unit.
- **X*AP RM1**: Optional 1RU detachable remote panel.
- **Dolby decoder**: Optional built in Dolby D/D+/E decoder incl. metadata emulation.
- **Dolby encoder**: Optional built in Dolby D/D+/AAC/HE-AAC or Dolby E encoder.
- **Dolby metadata I/O**: Two 9-pin D-Sub connectors (RS485).
- **4x AES (BNC) I/O + SRC**: On board AES I/Os with relay bypass and selectable SRC per input.
- **Two interface slots**: Expansion slots for optional I/O boards: 3-G/HD/SD-SDI, MADI, DANTE, 4x AES I/O, 4Ch Analog I/O, 8Ch Analog (speaker) Out.
- **RJ45 network connector**: 100BaseT full duplex Ethernet interface.
- **USB connector**: Built in USB <> serial adapter to access the service port.
- **8x GPI/O**: Balanced inputs and relay contacts on a 25pin Sub-D.
- **Aux power supply**: Isolated 5V supply for external GPI/O wiring.
- **External sync IN**: BNC input (Word Clock, AES, Black Burst, Tri-Level).
- **Sync OUT**: BNC Word Clock output.

Software features

- **TP limiter**: Junger Audio true peak limiter control algorithm for speaker protection.
- **Speaker alignment**: Delay, level and frequency response compensation, speaker identification.
- **Bas management**: For subwoofer and satellite speaker installations.
- **Solo-/ In Place / Defeat**: Individual speaker control.
- **Mute / DIM**: Mutes / dims all speaker channels.
- **Delay, gain, polarity**: For input signal correction.
- **Downmix**: Separate downmix circuits for program and AUX feed.
- **Dolby metadata generator**: Generates RDD6 compliant metadata.
- **Dolby metadata emulation**: Shows the effect of metadata for decoded Dolby (E, D, D-D plus) or PCM signals.
- **Loudness measurement**: ITUBS.1770-1/-2/-3, EBU R128.
- **Loudness / level display**: X*AP RM1 display, J*AM Junger Application Manager.
- **SNMP agent**: SNMP v1 get (no set) and configurable traps (see MAP-MIB).
- **Remote control**: X*AP RM1 remote panel, l-s-b EmBER+ protocol and legacy GPI/Os.
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Introduction

The MAP is a monitoring processor, assembled from the generic digital audio processor D*AP8 that runs the MAP firmware and an optional X*AP RM1 remote panel. The bundle is designed to ease the quality monitoring of surround and stereo signals for producers, editorial staff and engineers especially when it comes to Dolby encoded signals.

For level and loudness measurement and logging applications the D*AP8 unit may be used as a measurement box that sits close to the signal sources while measurement data will be streamed over the network to a PC for live display and/or storing of such data.

A sophisticated audio processor at the heart of the MAP works. It renders the monitoring facility, audio delays, speaker bass management as well as level and loudness measurements.

A Dolby metadata generator is provided for emulation of the influence of metadata on PCM audio signals directly from the monitoring section of a mixing console. For live and post production it allows you to hear how the metadata will influence the listening experience on the customers side without introduction of an encoder / decoder. The emulation part incorporates a Dolby stream decoder. An optional Dolby consumer format or a Dolby-E encoder can be added to the device.

The four AES3id I/Os on the motherboard may be complemented by a variety of interface modules that can be installed as an option into the D*AP8 interface slots. For the MAP standalone application normally one slot will be fitted with the 8 channel analog speaker interface card.

Comprehensive routing set-ups allow almost every signal flow from hardware inputs, from and to optional Dolby decoder / encoder, from the audio processor itself to the speakers, to hardware outputs as well as the metadata I/Os, the metadata generator and the metadata emulator.

Routing paths, the enabling and disabling of audio processing blocks and the setting of processing parameters can be pre-configured by individual presets dedicated to each function block. The content of the presets can be displayed and edited off-line while the device is in use. These presets may either be recalled on demand by the operator via the GUI, the X*AP RM1 remote panel hot keys or external systems, but may also be part of complex scenarios defined by the administrator and automatically executed by the event manager of the device or by operator intervention.

The MAP provides a web based setup GUI and can be controlled by an X*AP RM1 remote panel that displays status and metering information and allows user intervention.

Junger Audios application manager J*AM is available as an add on and can be attached with a few simple clicks to the MAP so that users can log loudness data as well as display it as a live plot on a PC screen in real time or simply display level bar graphs. For production / post-production needs a built-in LTC reader will be available in the near future. So loudness logging may then be performed in regard to relative time as well as to time of day.

Completing the feature set of the MAP is the availability of an SNMP agent, which provides traps and status polling.

As with most advanced tools, the MAP can be driven in a variety of ways, depending on requirements and ideas of the user. These can range from simple and straightforward to quite complex set ups. Although this manual explains the functions and general operation of the MAP, it does not give detailed scenarios because the operational needs of today's broadcasters vary so widely between organizations and their work flows and cover so many different parameters – from ingest to studio operation, from master control rooms to play-out, or even rebroadcast applications.

Junger Audio is more than happy to discuss your particular requirements with you and to convey your ideas and solutions to other users of the Junger Audio Processors community.
Hardware concept

The MAP consists of a D*AP8 unit with MAP firmware that carries all relevant connectors and an optional X*AP RM1 remote panel both in 19" 1RU format.

D*AP8 unit front panel view

The front panel of the D*AP8 MAP has a 3 line status display and two hidden touch buttons ~ 2.5cm left of the display. Button 1 = Home will switch back to the power up display no matter which display level you are in. Button 2 controls the multi level display:

- **Level 1**: Power up display [Device type, firmware version]
- **Level 2**: Status [OK / Error] / Device Name / IP address
- **Level 3**: IN peak meter (10x)
- **Level 4**: OUT peak meter (10x)

The total number of display levels depends on the number of programs. For 5.1 + 2 mode (2 programs) we will have 4 more levels while for 4 x 2 (4 programs) we will have 8 more levels:

- **Level 5 - 8**: Program 1 - 4 Out - short term loudness
- **Level 9 - 12**: Program 1 - 4 Out - integrated loudness and integration time

The measures of the loudness displays depend on the setup of the respective loudness mode (see AUDIO PROCESSOR > SETUP > Loudness Mode).

- **Display background**: Green = hardware status OK
- **color**: Red = hardware status ERROR

X*AP RM1 front panel view

The X*AP RM1 remote panel is powered by POE (Power Over Ethernet) or external wall plug PS and designed to control multiple D*AP8 units one at a time. For details of operation see extra manual "XAP_manual_EN_140328.pdf" or later.
For fail safe operation the D*AP8 unit provides two independent power supplies. These power supplies operate in load balance. The status of both PS are displayed on the D*AP8 unit front panel as well as on the X*AP RM1 remote panel.

**STATUS**
LED indicates the status of the device controller. It becomes green at the end of a successful boot process.

**INIT / RESET**
pressing the INIT / RESET button briefly will warm start the device controller. Holding down the button and release it until the STATUS LED did flash:
3 times initiates a cold start
4 times the device will be cold started with the previous firmware image
5 times will initialize the D*AP8 unit to factory default and will be cold started
Be patient it takes about 20 sec. Until the flashing starts.

**LAN**
RJ45 socket for Ethernet connection to a LAN

**USB**
USB 2.0 type B socket to connect the built in USB >> serial converter with an external PC to reach the console interface of the system controller

**ISO-PWR**
LED indicates that the isolated 5V power supply for GPI/O application is active

**GPI/O**
25pin Sub-D female connector to interface with the 8 optical isolated general purpose inputs and with the 8 switch over relay general purpose outputs

**Interface 1**
slot to mount one of the optional interface boards (SDI, AES, analog)

**Interface 2**
slot to mount one of the optional interface boards (SDI, AES, analog)

**METADATA IN**
9pin Sub-D female connector to receive and send Dolby® serial metadata

**METADATA OUT**
9pin Sub-D male connector to send Dolby® serial metadata

**LTC IN**
*LTC timecode input not activated jet*

**SYNC IN**
75Ohm BNC connector to connect with external sync sources

**WCKL-OUT**
75Ohm BNC connector to synchronize external devices to the D*AP8 unit internal word clock

**AES IN 1/2 – 7/8**
AES3id inputs

**AES OUT 1/2 – 7/8**
AES3id outputs
The above schematic shows the principal blocks of a fully loaded MAP.

The core of the unit is the audio processor. It has 2x 8 inputs, 8 outputs and a 2ch downmix AUX output. It controls the speaker setup and settings during the monitoring session.

The device also provides the measurement data (true peak, level, loudness) for external applications like the J*AM (Junger Application Manager) for logging and/or display on a PC or tablet screen via the Log Ports.

The Dolby Metadata Emulation is a hardware option that comes with the Dolby decoder. It is a functional block that may be connected to the respective audio input / output signals via the device router. Same applies for the metadata paths that must be routed separately.

A Dolby encoder may be fitted as an option as well to provide encoded output to save the customers rack space and installation cost.

On the motherboard you will find 4x AES3id I/Os which are bridged by relays in case of a power failure. This hardware fail-over may be disabled for each I/O pair by internal jumpers.

Two interface slots which may carry option boards allow for extremely flexible interfacing of the MAP. One of the interface slots will normally be equipped with an 8-channel analog line output board for direct speaker connection while the other will normally hold a 3G/HD-SDI option board for TV production applications.

For comprehensive metadata processing the unit has serial metadata I/O connectors. All metadata functions are centralized in a metadata generator. Furthermore you will have the possibility to emulate the influence of Dolby metadata on the audio signals for stereo or surround signals and down mixes, without the need to involve an encoder and decoder.

The sync circuit can deal with all formats to integrate the device into digital facilities. Other devices may be synchronized via the word clock output of the MAP. The frame reference for D-E encoding, may be shifted to align the D-E guard band.

The MAP has 8 balanced GPIs and 8 SSR closure GPOs. This enables the user to simply recall presets or call events, change device configurations and report general status information.
Control concept

The communication between the X*AP RM1 remote panel, the D*AP8 unit, setup and operating tools, is based on TCP/IP over Ethernet.

The setup GUI utilizes web technology. At the time of editing this manual the functionality of the web GUI is optimized for Firefox 30.x and higher.

The setup GUI can be complemented by other application programs running on MS Windows® XP, W7 like the J.A. Application Manager J*AM.

An SNMP agent is also available on the device and may be explored via a SNMP monitoring system.

For 3rd party remote control Junger Audio highly recommends using the I-s-b EmBER+ protocol which is widely distributed in the European broadcast industry where the user community is rapidly increasing world wide. By the way, the X*AP RM1 remote panel and the D*AP8 unit "talk" Ember natively.

Operating concept

Further below you will see that the setup GUI for the device is grouped into several parameter areas. You can reach the parameters via a 3-tier navigation via tabs which may have sub tabs and sub tabs may have page embedded tabs or extra soft buttons for groups of parameters.

Each function block (parameter area) has dedicated presets. The presets can be recalled at any time during operation, either by manual intervention via the web technology based GUI, automatically by the internal event manager or by external applications.

For all relevant settings an ON AIR and a PRESET part exists. I.e. you may either edit the parameters ON AIR or offline for the respective function block of the D*AP8.

The presets of the D*AP8 MAP are persistent by nature. You are working directly on the preset memory, i.e. you must not worry about storing such presets. The D*AP8 MAP does it for you.

Event concept

The D*AP8 MAP incorporates a sophisticated event management system. Events may be combined to perform actions. The D*AP8 MAP offers these event types:

* Preset Events for System set-up, Interfaces, Routing, Audio Processing, Dolby related settings etc.
* I/O Events for GPOs
* Measurement Events for pre-configured measurement scenarios

These events may be combined with Actions which are fired by Triggers.

Triggers are defined by a logical combination (AND, OR, XOR) of two random trigger sources. A trigger source may be GPIs, hotkeys of the X*AP RM1 remote panel, network commands, parameters, other active events, other active triggers (nested trigger), or device status information (e.g. sync lost).
Getting started – IP setup in general

The process of installing a D*AP8 MAP into an IP network is as follows:
1. Ask the system service IT people for two unique IP addresses of the network, for the netmask and if a gateway address is necessary
2. Assign the D*AP8 unit an unique IP address
   - You have two choices to assign the D*AP8 an IP address:
     * From the serial console interface
     * Via Web browser
3. Assign the X*AP RM1 remote panel a unique IP address configuration
4. Attach the D*AP8 unit to the X*AP RM1 remote panel

Important Note! If you are not familiar with setting up devices for IP communication, we highly recommend you consult your system service or IT department to assist you.

Getting started – IP setup – via console interface

The tool to change the IP configuration of the D*AP8 unit can be selected via the console interface. You must connect it with the PC via an USB A to B cable. This will install the driver for the built-in USB to serial converter. Now you can open a terminal program. Here you must select the virtual COM port assigned by the OS. The communication parameters are:

115200kBaud, 8, N, 1 no hand shake. Pressing <ENTER> will open the console menu:

```
[2014-08-22 12:01] Your  choice: 2  <ENTER>
"Current network configuration"
IP Address: 10.110.24.128
Netmask ...: 255.255.0.0
Gateway ...: 10.110.0.1
```

You must enter the IP address and the netmask.

```
Enter new IP address, press ENTER to cancel: "192.168.176.78"  <Enter>
Enter new netmask, press ENTER to cancel: "255.255.255.0"  <Enter>
```

Important Note! The gateway entry is optional but you must take care that the gateway address matches the network mask related to the device IP address!
If you are not sure simply enter 0.0.0.0. or leave it without an entry.

```
Enter new gateway, press ENTER to configure without gateway:  <Enter>
```

Changing Network configuration
Network configuration has been changed. Please reboot the device to activate the new settings.
Select item 8:

Do you want to reboot the device? <ENTER>

Press small "y":

Do you want to reboot the device? y <ENTER>

Rebooting the device ........

After reboot has finished, the new IP configuration is active and will be displayed at the top of the configuration menu.

Getting started – IP setup of the D*AP8 unit – via web browser

* Read the default IP address printed on a label at the rear of the device.
* Set up network parameters of your PC to fit the default IP address of the D*AP8 unit (e.g. default IP + 1 and net mask = 255.255.0.0).
* Connect the D*AP8 unit with the PC either via an Ethernet patch cable (if the PC supports Auto-MDI(X) or an Ethernet cross over cable).
* Open a browser and type the IP address of the D*AP8 unit into the URL field and press <ENTER>. This will open the AUDIO PROCESSOR tab sheet of the GUI.
* Click on <SYSTEM> and afterwards the <Admin> tab:

Enter the desired network configuration and press <apply>

Afterwards you must reboot the D*AP8 unit in order to activate the new IP configuration.

Important Note! After reboot neither the web browser nor the X*AP RM1 remote panel will be able to communicate with the D*AP8 device. You must fill in the new IP address in the URL field and change the X*AP RM1 remote panel settings to attach this device with its new IP address.
Getting started – basic X*AP RM1 remote panel operation

**Power up display** – may show up to four D*AP4 MAPs enabled for remote control for this X*AP RM1 remote panel. This example has just one D*AP8 unit named "MonitorProc 3" attached for remote control while the status is "connect" (i.e. you may connect with that device). See X*AP RM1 manual for details.

![Remote Panel](image)

Pressing one of these buttons will connect with the respective D*AP8 MAP. Now the X*AP RM1 remote panel will gather all necessary information from that D*AP8 MAP (may take a few seconds) and open up the main operating display:

![Main Operating Display](image)

From here you may fire pre-defined hotkeys and observe the status of the volume setting. Because this is the main operating display, the escape button will light up red to indicate that the power up display is below the main operating display. Pressing <ESC> returns you back to the power up display (device selection).

The hot keys may be programmed by the administrator of the device to recall global settings (see EVENT management for details) and therefore may have dedicated names.

Operating – menu structure of the X*AP RM1 remote panel – operating display

**Important Note!** The functions described below expect a proper routing of the signal from hardware interfaces to the audio processor and back (see ROUTING pane).

When pressing the <MENU> button, the first page of the operating menu opens up:

![Operating Menu](image)

This menu allows for high level settings like the selection of the input (Primary / Secondary), converting signal pairs to mono mute all speaker channels or DIM them by a pre-configured value.

The bold face number [-26 dB] on the right hand side show the actual value of the master volume setting. This may be changed by turning the rotary encoder.
Important Note! Pressing on the rotary encoder will activate the MUTE ALL function.

The first key <EBU R128 Meter> opens the loudness measurement display:

The highlighted keys will control the measurement process. The display represents the measurements of Integrated- / Short Term- and Momentary-Loudness as well as LRA [LU] - the loudness range and Max TPL [dBTP] - the maximum true peak level.

The measure for the EBU meter display is [LUFS] (Loudness Units Full Scale) as long as not defined differently. For details pls. refer to the EBU-Tech 3341 document.

You may leave this display by pressing <ESC>. This will bring you back to the first page of the operating display.

The second key <Input Primary / Secondary> switches between the primary and secondary inputs of the audio processor (see block diagram AUDIO PROCESSOR > Overview).

The other keys will do what is written above tem.
Pressing <MENU> again will open the "Mute" page. It is the first of the 3 control pages. You will reach the others by pressing the <select> key here:

When you press one of the keys the respective speaker channel will be muted. This will be indicated in the check box above that key. In addition the word "Mute" will be displayed. It indicates on all 3 pages that one or all channels are muted. <default> resets the selected function (MUTE C = OFF in the above example).

The next page is the "Solo" page:

When you press one of the keys the respective speaker channel will be put into solo mode. This will be indicated in the check box above that key. In addition the word "Solo" will be displayed. It indicates on all 3 pages that one or more channels are put into solo mode. The way of listening in solo mode is set by key #7. It will change between:
- Solo in Place
- Solo to C
- Solo to L/R
<default> resets the selected function (Solo L = OFF in the above example).

Page 3 finally offers the "Solo Defeat" settings:

The channel(s) indicated in the check box will not be turned off if another channel is put into solo mode. <default> resets the selected function (Solo Def. LFE = OFF in the above example).
Operating – menu structure of the X*AP RM1 remote panel – menu tree

**Power Up Display**

<MENU> opens X*AP RM1 remote panel IP setup menu. See extra manual for details.

<Address> Setup
<Netmask> Setup
<Gateway> Setup
<empty>
Device 1 Setup IP & ON / OFF
Device 2 Setup IP & ON / OFF
Device 3 Setup IP & ON / OFF
Device 4 Setup IP & ON / OFF

<ESC> back to power up display

/connect> will connect with that particular D*AP8 unit and opens the main operating display:

Hotkey #
1 user defined
2 user defined
3 user defined
4 user defined
5 user defined
6 user defined
7 user defined
8 user defined

<ESC> will jump back to power up display

<MENU> opens operating displays:

Hotkey #
1 <EBU R128 Meter>
2 <Input>
    Primary / Secondary
3 <L/R Mono>
4 <Ls/Rs Mono>
5 <Mute All>
6 <Dim>
7 <empty>
8 <empty>

<ESC> back to main operating display

<MENU> opens 3 more operating / setup pages:

<select> Mute Solo Solo Defeat
1 <Mute L> <Solo L> <Solo Def. L>
2 <Mute R> <Solo R> <Solo Def. R>
3 <Mute C> <Solo C> <Solo Def. C>
4 <Mute LFE> <Solo LFE> <Solo Def. LFE>
5 <Mute Ls> <Solo Ls> <Solo Def. Ls>
6 <Mute Rs> <Solo Rs> <Solo Def. Rs>
7 <empty> <Solo in Place> <empty>
    <Solo to 1L+1L>
    <Solo to 1C>
8 <default> <default> <default>

<MENU> back to operating display
<ESC> back to main operating display
Setup GUI – connecting with the D*AP8 unit – AUDIO PROCESSOR > Overview

You must open a browser and enter the **IP address** of the D*AP8 unit into the **URL** field and press `<Enter>`. The browser will fetch the necessary information and open the entrance page:

The entrance page is the **AUDIO PROCESSOR** pane with its sub pane **Overview**. If you are returning from other pages or if you reload your browser content by pressing `<F5>` it may show a different page due to caching of the browser.

In the top area you have several bar graph displays for the two inputs (Primary / Secondary) of the audio processor, the measurement block and on the right hand side the level display of the audio processor outputs which in fact feed the speakers most of the time.

The display is rounded up by two numeric representations for loudness measurement.

On the following pages we will go through the various panes to perform the basic setup of the device.

You must setup the synchronization source. You may also give the device a name, tell it its location and define an administrative contact which may be used by monitoring systems of your company (e.g. via SNMP).

You must setup the installed interface modules and finally set the signal routing

You will find those settings under the **SYSTEM** link.
The **System Status** page provides a top level view of the various status information available for the device.

### Device Status
- **Power 1**
  - status of the first power supply (left hand side from rear)
- **Power 2**
  - status of second power supply (right hand side from rear)
- **Temperature**
  - measured on the surface of the main PCB
- **Sync Lock**
  - turns red if the external sync source is removed or unstable

### Processing Status
- **Bypass**
  - for the MAP is no bypass function implemented

### Interface Status
- **AES I/O**
  - turns red if an AES input that is internally in use (i.e. you have routed it to an input of a function block) has detected an error
- **SDI I/O Interface**
  - turns red if the SDI input is not locked (not present or bad SDI signal)
- **Analog Out Interface**
  - turns red if the analog output card does not communicate with the system controller

### Dolby Processing Status
- **Decoder**
  - turns orange if the input signal is not Dolby encoded (PCM)
- **Encoder A**
  - status of the first D-E encoder (if license is installed)
- **Encoder B1**
  - status of the first D-D/D-D+/AAC encoder (if optional CAT561 is installed)
- **Encoder B2**
  - status of the second D-D/D-D+/AAC encoder (if optional CAT569 is installed)
- **Metadata**
  - status of the metadata
System Messages
Displays a list of messages produced by the system controller.

System Log
The system controller activities will be logged. If there is a suspicious behavior we recommend to warm-start the D*AP8 by pressing the rear <INIT / RESET> button briefly. This will keep the log information for later investigation. If you do a power cycle instead the previous log information get lost.

<get diagnostics file>
Pressing this soft button will start the assembly of files to help with diagnostics. The packed .tar archive contains 3 files:

The console log from the System Status pane, the license file and the status XML. If you experience unexpected behavior of the device you may be asked by the Junger service team to send such file by e-mail for analysis.

Setup GUI – SYSTEM – Overview

The graphic overview shows the main building blocks of the device including the options actually installed such as a SDI interface module and the 8 channel analog output module.

You may click into the boxes and the respective page will open. The navigation is based on URLs so you may use the <Back> navigation button of the browser to return to this page.
Setup GUI – SYSTEM – Admin

This Device
Input fields for information utilized by higher level services.

Serial Number
The electronic serial number. Printed on a label at rear of the device.

Name
Give the device a meaningful name that may be used by name services and SNMP management.

Location
The place where the MAP is located (used by SNMP).

Admin / Contact
e-mail address of a person in charge (used by SNMP).

Graphical User Interface
Defines the appearance of the parameter panes regarding preset editor and on air parameter visibility (see below – for preset concept).

Authentication
To prevent non authorized people from changing D*AP8 MAP settings the administrator may assign passwords for either the admin and/or an operator (same applies for talent/artist). While the admin is allowed to set everything, an operator is just allowed to load presets. Parameters will be reset if there was an attempt from the operator to change it.

Enable
[enable / disable]
The administrator may turn authentication off.

Change Password for
[admin / operator]
Select which password you will set / change

Password
enter a password
Default passwords are: admin (for admin) and operator (for operator).

Repeat
repeat that password

Important Note! The authentication may be enabled / disabled from the console interface via USB connection as well (see page 8 “1: Manage Password”) but also via Telnet! If you have higher security demands you should turn the Telnet server off. Authentication will be turned off and passwords will be reset if one initializes the device to factory default (see Reboot - page 19, INIT/RESET rear button - page 4).
If there was an authentication failure, the admin will be notified on next proper login about such conditions. The pop up appears as often as a login failed. It shows the IP address of the device that caused the authentication failure.

After a correct login the status "who" (e.g. admin) and a <Log Out> button are available from the GUI:

**Network**

- **IP Address**
  - The address of your choice – default [10.110.xxx.yyy]
- **Netmask**
  - The net mask of your network – default [255.255.0.0]
- **Gateway**
  - The optional gateway address – default [0.0.0.0]

**Transmit Metering Data**

- [ON / OFF]
  - Metering data will be streamed via UDP protocol. In order to receive such data by external applications and the GUI, you must enable it.

**Service Options**

- **Maintenance Interface via RPC**
  - [ON / OFF]
  - For administrative use to enable communication with factory tools.
- **Telnet Server**
  - [ON / OFF]
  - Enables a telnet server to connect to the console interface via TCP (port 23). You must be aware about the security risks if you do that over the internet!

**Diagnostics**

- <save diagnostics file>
  - Pressing this soft button will start the assembly of a diagnostics file. The file will be presented in XML format for download.
  - If you experience unexpected behavior of the device you may be asked by the Junger service team to send such file by e-mail for analysis.

**Device Time**

- Allows you to set the device clock. At the factory it will be set to UTC (Coordinated Universal Time).
  - **Date (Local)**
    - If you click into the Date (local) input field, a calendar tool appears to select month and year.
  - **Time (Local)**
    - If you click into the Time (local) input field, you will be able to set the device time.
  - **Date (UTC)**
    - Similar as above for local date setting.
  - **Time (UTC)**
    - Similar as above for local time setting.
  - **Get Time from**
    - [Manual Setting / Browser / NTP Server]
    - If set to NTP Server the D*AP4 will look for the below servers to synchronize the internal clock.
  - **Primary NTP Server**
    - [5.9.110.236] default set to a publicly accessible NTP server via internet. This is used for device testing and may be overwritten at any time.
  - **Secondary NTP Server**
    - [10.110.2.7] default set to an internal NTP server from Junger Audio. This is used for device testing and may be overwritten at any time.
    - If no secondary NTP server is available set the address to 0:0:0:0 to avoid an error message regarding duplicated NTP server address setting.
**Important Note!** If it is impossible to synchronize the internal clock to one of the two NTP servers an **SNMP “ntpStatusTrap”** will be issued by the SNMP agent (if enabled SYSTEM > SNMP > Enable = ON).

**Update Rate (min) [1 ... 1440]**
Interval of synchronizing the internal clock of the **MAP**.

**Setup GUI – SYSTEM – Setup**

**Speaker Configuration**

[4 x 2.0 / 5.1 + 2.0 / 7.1 / 2 x 2.1 + 2.0]
the MAP may drive up to 8 speakers. Here you may select between possible speaker configurations. This will automatically configure the bar graph display and relevant audio processing blocks.

**Speaker Labels**

<table>
<thead>
<tr>
<th>Speaker Set 1 - 4</th>
<th>AUX</th>
</tr>
</thead>
</table>
here you can set the label for the audio processor speaker outputs. depending on the speaker configuration you may assign up to 4 independent labels.

**Current Sync Source Status**

- **Source**
- **Sample Rate**
- **Video Rate**
- **Show Detailed Status**

shows the status of the five tier sync priority circuit
active sync source
measured sample rate
measured frame rate of the video sync
[ON / OFF]
If you enable the checkbox you will get extra information (see below).
Sync Source Information
Appears if <Show Detailed Status> check box is checked

System Clock
- **Sample Rate**: [Follow Input / 44.1 / 48]
- **Fallback Sample Rate**: [44.1 / 48]
- **Fallback Video rate**: [25 / 29.97 / 30]
  Working with SDI or Dolby E signals, requires a sample rate of 48kHz.

Sync Source Priority
- **Choice 1 – 4**: [OFF / Internal / Sync-In WCLK / Input AES / Interface 1 SDI I/O (if fitted) / Sync-In Black Burst/Tri-Level]
- **Fallback on Sync Error**: Internal
- **AES Select**: [Sync-In AES / Input AES 1/2 BNC … AES 7/8 BNC]
  Select from which physical input the AES sync must be taken.
- **Accept SDI Generator**: [ON / OFF]
  If you run the SDI interface in generator mode and you want to synchronize the MAP to the SDI generator.

**Important note!** It is not possible to gen lock the SDI generator. The generator will run on its own internal 27MHz crystal clock.

Video Sync Shift
- **Offset (lines)**: [-1023 … 0 …. 1023]
  The number of lines the reference point can be moved in either direction.
The X*AP can control multiple D*APs one by one and a single D*AP may be controlled from multiple X*APs. This requires a flexible remote concept that allows you to recall pre-set configurations via the X*AP panel or via the Mobile UI. You can control pre-settings of the EVENTS system via remote access from the X*AP remote panel or from a Mobile UI on a tablet, a smart phone or even via a browser session from any PC in the network.

To better understand the possibilities of these settings it is recommended you study the comprehensive EVENTS system of the MAP.

At the moment of connecting a particular X*AP with a MAP the X*AP configuration will be transferred to that X*AP. I.e. configuration must take place at the MAP. You will decide here which feature set a particular X*AP is allowed to control:

For each X*AP you will be able to pre-set a Feature Set:

- **X*AP Remote**
  - **IP Address**
    - Default / Not listed
    - 10.110.68.120
    - [Other lines]
  - **X*AP Remote Feature Set**
    - Standard Set

**X*AP Remote**

In the first line: [Default / Not listed] you define the access policy for an "unknown" X*AP that connects with this D*AP8 for the first time. The other lines are used to pre-define features for known X*APs. When connecting from an unknown X*AP, the respective IP address will be inserted automatically into the next empty line.

**X*AP Remote Feature Set**

You can select between a "Standard Set" that is full access for now and the access to "Metering and Hotkeys".
The example above shows the preset concept of the D*AP8 MAP. It is a general feature of the device and you will come across it in almost every area. For all relevant setting one set of ON AIR parameters and a practically unlimited number of presets are available. The count depends on the NV memory space left. If you want to load parameters from a preset to the ON AIR area or save parameters from the ON AIR area to a preset, you must press `<load>`:

A dialog opens to select the desired preset. When you press `<ok>` the selected action will be executed. When you press on the little pencil icon the preset name turns italic and you may edit it.

To generate a new preset offline, you must click into the preset name box below the PRESET headline:

The pull down offers "Add Preset". If you click on that option a new entry to the list will be generated. Clicking on the small trash bin symbol will delete that preset. You may change the default name "Preset x" by clicking on the small pencil icon. Now the default name becomes italic and you may edit that name.

If you have selected the new preset or one of the existing presets indicated by the name displayed at the top, you may edit the parameter values.

Important Note! The presets of the D*AP8 MAP are persistent by nature. You are working directly on the preset memory, i.e. you need not worry about storing such presets. The D*AP8 MAP does it for you. On the other hand you must be aware that you are overwriting the actual preset settings! If you want to keep the original values (e.g. from a factory preset) you must simply copy the content of the existing one to the clip board, add a new preset, name it differently and paste the clip board to it.

At the bottom of the PRESET part you will find the soft buttons to `<copy>` the content of that preset to the clip board or to `<paste>` the content of the clip board into an other preset which you have selected before pasting.

You may also `<export>` or `<import>` the preset content to / from a file.

Setup GUI – SYSTEM – Preset Cleanup

It is sometimes desirable to delete presets which are used by multiple events without stepping through all processing blocks and deleting the respective presets one by one. This pane offers you a tool to delete presets from a central access point:

---

**Important Note!** The presets of the D*AP8 MAP are persistent by nature. You are working directly on the preset memory, i.e. you need not worry about storing such presets. The D*AP8 MAP does it for you. On the other hand you must be aware that you are overwriting the actual preset settings! If you want to keep the original values (e.g. from a factory preset) you must simply copy the content of the existing one to the clip board, add a new preset, name it differently and paste the clip board to it.

At the bottom of the PRESET part you will find the soft buttons to `<copy>` the content of that preset to the clip board or to `<paste>` the content of the clip board into an other preset which you have selected before pasting.

You may also `<export>` or `<import>` the preset content to / from a file.
You can sort the table by pressing on one of the column headlines. You can qualify your selection by the "Type" selector and / or the "Preset Block", "Linked to Event", "Last Modified" column headlines. The pull down lists allow to reduce the number of presets displayed:

The soft buttons at the bottom left hand side may also be used to search through the table by sorting it by the first letter or leading number. The arrow buttons at the bottom right hand side can be used to scroll through the table if the selection is too big for one page:

A selection is made by clicking on a line to activate the check box. Once you have made your selection (highlighted lines), you can press the `<delete>` soft button to execute the process. This will remove the selected presets permanently from the device.
This pane is meant for basic settings of the **SNMP Agent** of the device. If you don't use SNMP based system monitoring, you must not enable the SNMP agent.

**Setup GUI – SYSTEM – Backup / Restore**

Here you can backup the complete device and restore parts or all of it. If you press **<save back up file>**, the device controller will collect all necessary data and assemble it to an XML file. Finally you will get a pop up message:

You must select: **<Save File>**.

After pressing **<OK>**, the system file dialog opens:

Select a folder and alter the default file name if needed.

Similar applies to the restore process. You must **<Browse …>** for the desired backup file which you want to restore and check the necessary option(s) under “Restore Device Configuration”.

Setup GUI – SYSTEM – Firmware Update

The file to update the D*AP8 comes in ZIP format. You must unpack it to your PC’s hard drive. It contains also the manual a quick start guide the version history and a folder with the firmware for the X*AP remote panel. The folder /base_unit_image contains the so called “image” file for the D*AP8. Here an example: "rel_map_1_2_3-45678.img”. It is a bundle that brings the latest firmware versions for all interfaces and Dolby modules with it.

To update the D*AP8 MAP, you must <Browse …> for the respective firmware file (which you have unzipped before) and press <start update>. If you do not want to upload all individual module firmware files for any reason, you may take the "rel_map_1_2_3-basic-45678.img" file. After finishing the update the device will automatically reboot.

Important Note! After the update of the latest firmware image you must observe the Status messages below the firmware version displays. If it indicates that you don’t have the latest firmware installed you should select the respective file via the drop down box and press the <start update> soft button afterwards. But you can also upload an external file in case you need a specialized version for any reason that is not contained in the uploaded firmware image.
Interface 1

You may also update the firmware of an optionally installed SDI board or other interface boards.

Firmware
Display of actual installed firmware.

Status
[The latest firmware is installed / A firmware update is available]

Update Firmware
[Load External File / x.y.z.]
You can decide if you want to upload it manually or take the latest module firmware "x.y.z" that came with the release image (recommended). You may <Browse...> the file system and select a file of your choice.

Interface 2

If you have two interface boards installed, similar applies to the second one.

Dolby Decoder / E-Encoder (CAT1100)
For the example above we have the optional Dolby decoder installed. It is based on the Dolby OEM board CAT1100. The status says: "The latest firmware is installed".

<reset dolby decoder (cat1100)>
Pressing this soft button will warm start that module.

Dolby D Encoder (CAT561)
For the example above we have installed the optional Dolby E encoder. It is based on the Dolby OEM module CAT559.

<reset dolby d encoder (cat561)>
Pressing this soft button will warm start that module - depending on the Dolby module you may have installed.

Licensing
Here you can see a list of the licensed options of your device.

<save license info>
When you buy a license you must provide the "license info" file which you may obtain here.

Load License File
In return you will get a "license" file which you must apply to the device here. You must <Browse ...> to find the respective license file (which you have unzipped before) and press <apply new license>.

Setup GUI – SYSTEM – Reboot

Restore Factory defaults
Will clean up the parameter and preset memory and will initialize all parameters to their factory default values and will reset passwords and turn authentication off.

Overwrite Current IP
IP Configuration
You may exclude the current IP settings from this process to keep your local settings.
Status

Input Signal Status [OK / Fail]
Each AES input has a status detection that may show OK or Fail
(no carrier, unlock, cranky [too much jitter]).
This corresponds to the color of the soft LED (green / red).

Input Signal Type [Mute / PCM / Non PCM]
The Non PCM (e.g. Dolby encoded signal) status will be retrieved
from a logical combination of the Validity flag and the channel
status.

Important Note! The input signal status is logically combined and represented as part of the
System Status. If one of the inputs is not assigned by the ROUTING matrix, its status will not be
incorporated into the System Status. If non of the inputs is routed the Interface Status > AES I/O status soft
LED becomes grey.

Settings

Input Sample Rate
Converter

For asynchronous sources it is possible to turn a SRC on per input.
For asynchronous sources it is possible to turn a SRC on.
If an SRC is turned on and the input status becomes Non-PCM, the
SCR will be turned OFF automatically in order to maintain the
original data structure of the encoded bit stream (e.g. Dolby E).

Output Channel Status

[Transparent / Prof. PCM / Prof. Non-PCM / Cons. PCM / Cons. Non-PCM]
The channel status can either be transparent from
the input source of the D*AP8 or may be overwritten.
Setup GUI – INTERFACES – SDI I/O interface – Overview

If the D*AP8 is equipped with an optional SDI interface the following settings will be available. This pane has five sub panes imbedded:

- **SDI Status**: [Locked / Unlocked]
- **Video Format**: [SD / HD / 3G / N/A]
- **Video Standard**: [actual decoded standard (e.g. 1080i50) / No SDI Lock]
- **Audio De-Embedder Status**: [PCM / Dolby E / Dolby Digital / Dolby Digital Plus / MPEG-4 HE AAC / MPEG-4 AAC / N/A]
- **VANC Metadata De-Embedder Status**: The respective soft LED will turn green to indicate the SDID found in the stream while the angle brackets indicate the SDID one has selected in the de-embedder set-up as a pre-selected stream.
- **Audio Embedder Status**: [AUTO – Embedding / AUTO – Replace Audio / OFF / Delete]

**Group 1 – 4**

The embedding process distinguishes between 4 different modes for each group independently:

- **Embedding** – a new group will be built
- **Replace** – the structure of the group from the input is kept and the audio content is simple replaced
- **Delete** – the group from the input is deleted
- **OFF** – the embedder fro that group is turned off

**VANC Metadata Embedder Status**: [Enabled / Disabled & selected SDID#]

For details see **SMPTE 2020-2** standard.

**ARIB STD-B39 Control Data Status**: Meta information standard

- **Status**: [Available / Not Available]
Setup GUI – INTERFACES – SDI I/O interface – **Local Routing**

The SDI interface comes with a local routing matrix to shuffle audio signals from and to the system (device) (i.e. to and from the central device router) and from and to the physical de-embedders / embedders.

The example below shows the default routing that sends all signals 1:1 from the physical de-embedders [INTERFACE – SDI IN G1 CH1 … SDI IN G4 CH4] to the internal device matrix [SYSTEM – SDI De-Embedder DEM 1 … DEM 16].

The signals from the device router [SYSTEM – SDI Embedder EMB 1 … EMB 16] are routed by default 1:1 to the physical embedders [INTERFACE – SDI OUT G1 CH1 … G4 CH4].

You must use the scroll bar to navigate through the matrix. In the upper left corner you can select between the **ONAIR** and the **PRESETS** view of the matrix.

On the **ON AIR** page you will also see the device signal labels (see ROUTING section further below for details).

**Channel Linking**

- **[mono / stereo]**
  - You can decide if the routing must be performed in mono or stereo mode (where adjacent odd/even channels are routed at once).

You may select cross points by hovering with the mouse over the little squares and select / deselect cross points with a left mouse button click. A trace that symbolizes the signal flow is shown.

The color of the respective squares changes:

**Mouse over**

- **dark blue**
  - Possible new cross point.
- **orange**
  - You are about to reconnect a cross point.
- **grey**
  - Cross point is not allowed (i.e. routing will cause a loop and will not therefore be performed) or dedicated input is not activated.
- **red**
  - You are about to disable a cross point

An animated signal flow will help you when navigating through the matrix.
Setup GUI – INTERFACES – SDI I/O interface – Setup

SDI Bypass

SDI Relay Bypass
Will deactivate the Bypass Relay. It provides a shortcut from SDI-IN to SDI-OUT1 and disconnects the de-embedder from the SDI input. This relay also serves as a fail bypass if the power is off. This feature maintains the SDI signal for downstream equipment.

SDI Embedder Bypass
Will pass the embedded audio data from the de-embedder to the embedder 1:1. This function preserves the original Ancillary Data structure.

Video Delay

Video Delay (frames)
[0 … 15]
For compensation of any kind of audio processing delay within the chain of devices you may use a Video Delay. Position “0” turns off the delay function.

3G SDI Mode

Level B Stream Select
A 3G-SDI signal may have two HD sub streams (e.g. for 3-D TV), AKN as 3G-B standard select between stream 1 or 2 for embedded audio. See SMPTE 425M for details.

Test Pattern Generator
The interface offers a test generator to either check downstream connections during installation or for use in case of an input fail but you may also use it to move 16 independent audio channels over a single coax cable from point to point.

Mode
[OFF / AUTO (Input Loss) / Always ON]

Video Format
[Last valid / one of the defined SD / HD 3G formats (see specs)]
[Color Bars / Black Frame]

Setup GUI – INTERFACES – SDI I/O interface – De-Embedder

Audio Sync Source (Async HD)
The HD SDI standard allows for asynchronous audio. This critical if you have decided to synchronize the device on such signal. Here you find a solution. You may either use the embedded word clock

Embedded Word Clock
[Auto / De-Embedder CH1 (DEM 1) / OFF]
OFF = synchronized to the SDI carrier

Auto = In case of a-sync audio it is synchronized automatically to the SDI carrier
DEM1= from de-embedder channel 1
Setup GUI – INTERFACES – SDI I/O interface – **Embedder**

### Audio Embedder
Here you set the general functions of the embedder.

### Delete Existing Data
[ALL – New HANC Structure / OFF]

### Group 1 – 4 Mode
[OFF / AUTO – Embedding / AUTO – Replace Audio / Delete]

See SDI I/O Interface > Overview
For details

### AES Channel Status
[Transparent / Professional]

In case of Professional these values are used:
- **Format:** Professional
- **Audio Mode:** [Audio / Non Audio]
- **Emphasis:** None
- **Freq. Mode:** Locked
- **Sample Freq.:** 48kHz
- **Channel Mode:** Not Indicated
- **User Bits:** None
- **Auxiliary Bits:** 24Bit
- **Audio Word Length:** Not indicated

#### Important note!
If you generate a new AES channel status the **Audio Mode** will be automatically set to **Non Audio** (AKA “other”) for both channels, if an adjacent pair (1/2, 3/4 …..) carries a Dolby E stream for example.

### VANC Metadata
The embedder can insert one Dolby metadata stream into the Vertical Ancillary Data.

#### Enable
[ON / OFF]

#### Delete Existing Metadata
[ALL / OFF]

#### Stream Select (SDID)
[SDID 1 … SDID 9]

#### Video Line
[Auto / 9 … 44]

The line number depends on the actual video standard how many VANC lines are available for data insertion.

### Embedder Audio Delay
Each embedder signal may be delayed independently. This may be useful for Lips Sync alignment if a video delay is used.

**Important Note!** You must take care that for Dolby encoded signals the adjacent pairs must be set to the same delay values not to destroy the data structure.

- **SDI OUT G1 CH1 (ms)**: [0.0000 … 340.000]
- **to SDI OUT G4 CH16 (ms)**: [0.0000 … 340.000]
The implementation of MADI for the D*AP8 is based on the option module O_DAP_MB (BNC) or O_DAP_MO_MM (MADI optical multi mode fiber) or O_DAP_MO_SM (MADI optical single mode fiber).

Since the MAP is an eight channel processing device not all 64 MADI channels are available for device I/O. The first 16 channels are available via the MADI local router to the device router. They appear at the device router pane as MDIN 1 .. 16 and MDOUT 1 .. 16. These channels can be routed to and from any of the local routing sources MADIRX 1 .. 64 and MADITX 1 .. 64 respectively.

MADI Receiver

Status
[Locked / Locked-Async / Error]
The timing of the audio decoding is locked to the MADI clock. If the internal timing of the D*AP8 is different "Locked-Async" is displayed.

Receiver Sample Rate
[44.1 / 32 / 48 / 88.2 / 96kHz / Unknown]
The measured sample rate from the received MADI stream.

Receiver Channel Count
[32 / 56 / 64]
Depends on the upstream MADI transmitter settings.

Input Channel Status (MDIN)
[Transparent / Professional]
One may overwrite the input channel status by a set of professional ones.

Channel Mapping @ 96 kHz
[Normal]
MADI Transmitter
Transmitter Channel Count [64 (32) / 56 (28)]
Depends on the internal sample rate and the desired number of MADI channels. The numbers in brackets are valid for 96kHz.

Transmitter Channel Status [Transparent / Professional]
Channel Mapping @ 96 kHz [Normal]

Setup GUI – INTERFACES – MADI Interface – Local Routing

Below are some excerpts from the local routing pane. Single channels from or to the D*AP8 may be connected with the MADI transmitter or MADI receiver respectively. The example below shows the first eight MADI channels from the receiver (MADI RX 1 … MADI RX 8) connected with the device inputs SYSTEM - MADI INPUT (MDIN 1 … MDIN 8):

The Local Routing pane can also be used to route MADI signals from the receiver directly to the transmitter and vice versa:
You can also assign device outputs (MAOUT 1 … MDOUT 16) to MADI transmitter channels. For better visibility the matrix has been divided by cutting off the middle part:

![Matrix Diagram]

You must use the scroll bars to navigate through the huge matrix.

**Setup GUI – INTERFACES – Dante I/O Interface – Status**

The DANTE interface connects a D*AP8 to an audio over IP (AoIP) network. Junger Audio has committed itself to the quasi industry standard **DANTE** developed by the company **Audinate**.

"Based on industry standards, Audinate created Dante, an uncompressed, multi-channel digital media networking technology, with near-zero latency and synchronization … One cable does it all. Dante does away with heavy, expensive analog or multicore cabling, replacing it with low-cost, easily-available CAT5e, CAT6, or fiber optic cable for a simple, lightweight, and economical solution. Dante integrates media and control for your entire system over a single, standard IP network."

The network infrastructure for AoIP must be able to handle the IP multicast. The recommendation is to separate the control network from the audio network.

For details pls. refer to the Audinate web-site: [https://www.audinate.com](https://www.audinate.com). Here you will find many useful application videos and FAQs.

To configure such an audio network you need the **DanteController** software. You can download it from the Audinate web site. People who want to interface a PC or MAC to such an audio network can use the **VirtualSoundcard** software from Audinate. It provides standard audio drivers to connect with common sound tools.

We highly recommend to read the Audinate documents to understand how to set-up and operate a real-time AoIP network.

Looking at the rear panel the RJ45 connector on the left is the primary port while the second connector acts either as a redundant or as a switch port. Both RJ45s have built in LEDs. The left one shows network activities (flashing green) while the right one indicates the interface speed, with **green=1Gb/s** and **off=100Mb/s**.
Below is the Status page of the DANTE interface board:

The parameters you see here must be set via the DanteController software.

**Dante**

- **Device Name**: The name you gave the interface board via the DanteController.
- **Primary Network Status**: [Offline / Connected + bandwidth]
- **Secondary Network Status**: [Offline / Connected + bandwidth]

**Clock Synchronization**

- **Mute Status**: [OK (Unmuted) / Muted]
- **Sync Source**: [Dante Network / DA*P is Master]

Here you define the reference clock for this DANTE module.

**Important Note!** If this parameter is set to “Dante Network”, the MAP must be synchronized to the same clock as the network clock master (whoever it is). It must be set to “Dante Network” if this module is to become the “Preferred Master” of the network.

- **Sync Status**: [Unlocked / Locked / Locked-Async]

The sync source for the DANTE interface is the DANTE network. If no network cable is connected the interface is “Unlocked”. If it is connected to a network it will be “Locked”. If the D*AP8 is set to synchronize to other than the DANTE interface it will show “Locked-Async”.

- **Preferred Master**: [No / Yes]

The Dante algorithm automatically looks for the best clock master inside the network but one may force a DANTE module to become the clock master.

- **Network Audio Sample Rate**: [44.1 kHz / 48 kHz / 88.2 kHz / 96 kHz]

Depending on the A*P device type the sample rate is limited to the device specification.

- **Device Latency Setting**: [1000 µs]

You can allow for a certain transmission latency if you face network problems of any kind.
Setup GUI – INTERFACES – Dante I/O Interface – Inputs

The DanteController software gives you an overview of all members of such a DANTE network. You can assign channel labels for the inputs (from the network to the device interface). Those labels will automatically appear in the D*AP8 and will be displayed there.

Here is a glimpse on the GUI of the DanteController:

As an example you see here a "DAP8-LM" (name given by the Dante Controller) that has assigned the labels DAP8-LM 2/1 … 2/16 for the inputs and DAP8-LM 2/1/1 … 2/1/16 for the outputs. For the outputs you can assign up to 16 different labels used for multi layer routing.

Beside a few more devices on that network, we see the unfolded outputs of a DanteVirtualSoundcard (VSC) named "VSC-MARTIN" on the upper right hand side. The top horizontal area shows the transmitters while the receivers are shown vertically on the left hand side.

The outputs PCM 1 … PCM 4 from the VCS are assigned to the D*AP8 inputs DAP8-LM 2/1 … 2/4 while four outputs DAP-8 LM 2/1/1 … 2/1/4 are assigned to the VSC inputs 01 … 04.
We see the labels assigned by the DanteController software in the "Channel" column:

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Channel</th>
<th>Connected</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTIN 1</td>
<td>DAP8-LM 211</td>
<td>PCM1 @ YSC-Martin</td>
<td>Connected (Unicast)</td>
</tr>
<tr>
<td>DTIN 2</td>
<td>DAP8-LM 212</td>
<td>PCM2 @ YSC-Martin</td>
<td>Connected (Unicast)</td>
</tr>
<tr>
<td>DTIN 3</td>
<td>DAP8-LM 213</td>
<td>PCM3 @ YSC-Martin</td>
<td>Connected (Unicast)</td>
</tr>
<tr>
<td>DTIN 4</td>
<td>DAP8-LM 214</td>
<td>PCM4 @ YSC-Martin</td>
<td>Connected (Unicast)</td>
</tr>
<tr>
<td>DTIN 5</td>
<td>DAP8-LM 215</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 6</td>
<td>DAP8-LM 216</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 7</td>
<td>DAP8-LM 217</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 8</td>
<td>DAP8-LM 218</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 9</td>
<td>DAP8-LM 219</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 10</td>
<td>DAP8-LM 220</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 11</td>
<td>DAP8-LM 221</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 12</td>
<td>DAP8-LM 222</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 13</td>
<td>DAP8-LM 223</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 14</td>
<td>DAP8-LM 224</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 15</td>
<td>DAP8-LM 225</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
<tr>
<td>DTIN 16</td>
<td>DAP8-LM 226</td>
<td>no subscription</td>
<td>No Subscription</td>
</tr>
</tbody>
</table>

Inputs: 16 inputs are pre-defined for the DANTE interface installed in a D*AP8. They are organized in pairs and the input status is shown by soft LEDs (green = PCM audio / yellow = non audio/ grey no audio).

Channel: The labels assigned to that channel by the DanteController.

Connected: The source of the audio signal.

Status: [No Subscription / Subscription Unresolved / Wait / Naming Problem / Loopback / Idle / Subscription in Progress / Connected (Unicast) / Connected (Multicast) / Manual Config / Format Problem / QoS Problem / Latency Problem / Clock Domain Problem / Link Down / Fail / Unknown]
The DANTE module provides very detailed status information. In regular operation one will not see much of it.
Setup GUI – INTERFACES – Dante I/O Interface – Outputs

<table>
<thead>
<tr>
<th>Outputs</th>
<th>Channel</th>
<th>Channel Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTOUT1</td>
<td>01</td>
<td>DA8P-LM 21/11</td>
</tr>
<tr>
<td>OTOUT2</td>
<td>02</td>
<td>DA8P-LM 21/12</td>
</tr>
<tr>
<td>OTOUT3</td>
<td>03</td>
<td>DA8P-LM 21/3</td>
</tr>
<tr>
<td>OTOUT4</td>
<td>04</td>
<td>DA8P-LM 21/14</td>
</tr>
<tr>
<td>OTOUT5</td>
<td>05</td>
<td>DA8P-LM 21/5</td>
</tr>
<tr>
<td>OTOUT6</td>
<td>06</td>
<td>DA8P-LM 21/16</td>
</tr>
<tr>
<td>OTOUT7</td>
<td>07</td>
<td>DA8P-LM 21/17</td>
</tr>
<tr>
<td>OTOUT8</td>
<td>08</td>
<td>DA8P-LM 21/8</td>
</tr>
<tr>
<td>OTOUT9</td>
<td>09</td>
<td>DA8P-LM 21/9</td>
</tr>
<tr>
<td>OTOUT10</td>
<td>10</td>
<td>DA8P-LM 21/10</td>
</tr>
<tr>
<td>OTOUT11</td>
<td>11</td>
<td>DA8P-LM 21/11</td>
</tr>
<tr>
<td>OTOUT12</td>
<td>12</td>
<td>DA8P-LM 21/2</td>
</tr>
<tr>
<td>OTOUT13</td>
<td>13</td>
<td>DA8P-LM 21/3</td>
</tr>
<tr>
<td>OTOUT14</td>
<td>14</td>
<td>DA8P-LM 21/4</td>
</tr>
<tr>
<td>OTOUT15</td>
<td>15</td>
<td>DA8P-LM 21/5</td>
</tr>
<tr>
<td>OTOUT16</td>
<td>16</td>
<td>DA8P-LM 21/6</td>
</tr>
</tbody>
</table>

Outputs: The signals from the DANTE board to the network. They will also appear in the device ROUTING section.

Channel: Numeric count of the channels.

Channel Label: Up to 16 labels can be assigned for each stream from the interface to the network.

When you hover with the mouse over the channel labels, you will get a tool tip that shows the other (if any) labels assigned to the same outputs assigned for multi layer routing.

Setup GUI – INTERFACES – Dante I/O Interface – Network

Dante Redundancy: The DANTE interface allows redundant network operation. Please refer to manufacturer’s documentations of your Ethernet equipment on supported switching configuration and redundant operation.
**Mode**

[Switched / Redundant]

- **Redundant** – The interface will duplicate the audio traffic to both Ethernet ports. Both ports must have different IP addresses.
- **Switched** – The secondary port behaves like an Ethernet switch port allowing daisy-chaining through the interface. I.e. IP configuration of the second port is only available for redundant mode.

**Important Note!** When set to switched mode, do not connect both ports to the same network (same Ethernet switch) if it does not support STP (Spanning Tree Protocol). This is the case for most of the off-the-shelf (office) switches. Doing so will cause a race condition where IP packets are circling around from the external switch to the second DANTE (switch) port and back via the first port. This will tear down your network and may create a bunch of new "friends" in your facility.

**Primary Address Setup**

Setup of the primary network interface

<table>
<thead>
<tr>
<th>Network Status</th>
<th>[Offline / Connected + bandwidth]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP – Automatic IP Config.</td>
<td>[OFF / ON]</td>
</tr>
<tr>
<td>IP-Address</td>
<td></td>
</tr>
<tr>
<td>Netmask</td>
<td></td>
</tr>
<tr>
<td>DNS Server</td>
<td></td>
</tr>
<tr>
<td>Gateway</td>
<td></td>
</tr>
<tr>
<td>MAC Address</td>
<td></td>
</tr>
</tbody>
</table>

**Secondary Address Setup**

Setup of the secondary network interface

<table>
<thead>
<tr>
<th>Network Status</th>
<th>[Offline / Connected + bandwidth]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP – Automatic IP Config.</td>
<td>[OFF / ON]</td>
</tr>
<tr>
<td>IP-Address</td>
<td></td>
</tr>
<tr>
<td>Netmask</td>
<td></td>
</tr>
<tr>
<td>DNS Server</td>
<td></td>
</tr>
<tr>
<td>Gateway</td>
<td></td>
</tr>
<tr>
<td>MAC Address</td>
<td>[unknown / address]</td>
</tr>
</tbody>
</table>
**Setup GUI – INTERFACES – 8 Ch Analog Out Interface**

Analog Output Calibration (dBu) (level for digital 0 dBFS)

ANLx (dBu)

- Sets the factor for D/A conversion
- \([0.0 \ldots 15.0 \ldots 24.0]\)
- Output level for output "x" at 0dBFS.
- The default setting of 15.0dBu correlates to the 6 dBu = -9dBFS conversion.

**Setup GUI – INTERFACES – 4 Ch Analog I/O Interface**

An additional analog interface can be installed in the **Interface** slot. It provides 4 additional analog line inputs and outputs on a 25pin D-Sub connector:

Enable Relay Bypass (All Channels)

- \([ON / OFF]\)
- Power fail bypass relay that may be activated from the GUI

Analog Input Calibration (dBu) (level for digital 0 dBFS)

- \([0 \ldots 15.0 \ldots 24.0]\)
- A/D conversion parameter. It defines the analog input level in dBu to reach a digital full scale signal.

Analog Output Calibration (dBu) (level for digital 0 dBFS)

- \([0 \ldots 15.0 \ldots 24]\)
- D/A conversion parameter. It defines the analog output level in dBU for a digital full scale signal.
An additional AES3 interface can be installed in the **Interface** slot. It provides 4 additional AES3 inputs and outputs on a 25pin D-Sub connector:

**Status**
- **Input Signal Status**
  - green [OK] / red [Fail]
- **Input Signal Type**
  - [Mute / PCM / Non PCM]

**Settings**
- **Enable Relay Bypass (All Channels)**
  - [ON / OFF]
  - Power fail bypass relay that may be activated from the GUI
- **Input Sample Rate Converter**
  - [ON / OFF]
- **Output Channel Status**
  - [Transparent / Prof PCM / Prof Non-PCM / Cons PCM / Cons Non-PCM]
  - Controls the channel status for the AES output. It provides a set of useful channel status information (e.g. to prevent non audio signals to be fed to speakers).

**Important note!** The AES relay bypass circuit of the I/Os is activated on the option board. It is possible to deactivate it if necessary. You must open the cover plate from the **D*AP8** unit and locate the jumper shown in the schematic below. You must remove the jumpers to de-activate the AES I/O relay power fail circuit.

The bulk jumpers J13, 23, 33, 43 at the bottom of the picture are meant for setting the I/Os to unbalanced operation.

Putting them into the lower position will turn to unbalanced. Factory default setting is balanced.
This is the core of the **D*AP8 MAP** because it defines the audio signal flow inside the device:

Each functional block of the device has a source- and a destination-label. Vertically at the left hand side you will find the outputs of function blocks / hardware interfaces. The labels are organized hierarchically. I.e. we have source group names like SPEAKER OUTPUT, AES INPUT etc. and single channel (AKA mono) signal labels like \texttt{DEMx} \[x=1 \ldots 16\] for the SDI de-embedder or \texttt{SPKRx} \[x=1 \ldots 8\] for the speaker outputs of the audio processor.

Horizontally at the top of the ROUTING pane you will find the group names for destinations like PRIMARY INPUT, AES OUTPUT etc. and their respective single channel labels like \texttt{PRIMx} \[x=1 \ldots 8\] for the first 8 audio processor inputs or feeds to the hardware interfaces, like \texttt{AESx} \[x=1 \ldots 8\] for the AES outputs.

If applicable the labels have bluish dynamical signal descriptors [e.g. \texttt{1L / 1R / 1C} and so forth].

Green quads show active cross points. Due to the number of I/Os in total one must scroll through the matrix to set or disable cross points. To give you an indication while scrolling of which outputs have an active connection, red quads are shown in the top of the matrix beneath the output labels.

The matrix is organized for single channel (AKA mono) routing but it may also be controlled in 2-channel (AKA stereo) mode:

**Channel Linking**

\[
\begin{array}{c}
\text{[mono / stereo]}
\end{array}
\]

You may set cross points either in mono mode or pair wise for stereo routing.
Due to the size of the graphic you must select between <ONAIR> and <PRESET> view in the upper left corner.

**Important Note!** If a different optional interface board is installed the matrix will be expanded by the pre-defined number of I/Os for the D*AP8 platform with their labels:

<table>
<thead>
<tr>
<th>Signal</th>
<th>Option board:</th>
<th>Input label:</th>
<th>Output label:</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDI</td>
<td>[O_DAP_SDI_a]</td>
<td>DEM 1 ... DEM 16</td>
<td>EMB 1 ... EMB 16</td>
</tr>
<tr>
<td>MADI</td>
<td>[O_DAP_MB_a / O_MO_MM_a / _MS_a]</td>
<td>MDIN 1 ... MDIN 16</td>
<td>MDOUT 1 ... MDOUT 16</td>
</tr>
<tr>
<td>Dante</td>
<td>[O_DAP_Dante_a]</td>
<td>DTIN 1 ... DTIN 16</td>
<td>DTOUT 1 ... DTOUT 16</td>
</tr>
<tr>
<td>4 Ch ANALOG I/O</td>
<td>[O_DAP_ADDA_a]</td>
<td>ANL 1 ... ANL 4</td>
<td>ANL 1 ... ANL 4</td>
</tr>
<tr>
<td>8 Ch ANALOG out</td>
<td>[O_DAP_8DA_a]</td>
<td>AES 1 ... AES 8</td>
<td>AES 1 ... AES 8</td>
</tr>
<tr>
<td>AES</td>
<td>[O_DAP_AES_a]</td>
<td>AES 1 ... AES 8</td>
<td>AES 1 ... AES 8</td>
</tr>
<tr>
<td>Dolby Decoder</td>
<td>[O_DAP_Dolby_DEC_b]</td>
<td>DEC 1 ... DEC 10</td>
<td>DEC 1 ... DEC 8</td>
</tr>
<tr>
<td>Dolby E Encoder (A)</td>
<td>[O_DAP_Dolby_EENC_b]</td>
<td>ENC 1 ... ENC 8</td>
<td>ENC 1/ENC 2</td>
</tr>
<tr>
<td>Dolby D Encoder (B)</td>
<td>[O_DAP_Dolby_DENC_a]</td>
<td>ENC 1 ... ENC 8</td>
<td>ENC 1 ... ENC 4</td>
</tr>
<tr>
<td>Dolby E Encoder (B)</td>
<td>[O_DAP_Dolby_EENC_a]</td>
<td>ENC 1 ... ENC 8</td>
<td>ENC 1/ENC 2</td>
</tr>
</tbody>
</table>

**Source label**

- **SPKR x**: Outputs of the audio processor (DSP)
- **AES x**: Outputs from the hardware AES receiver on the motherboard
- **DEM x**: Outputs of the SDI local routing matrix
- **MDIN x**: Outputs of the MADI local routing matrix
- **DTIN x**: Outputs of the Dante Interface
- **DEC x**: Output of the optional Dolby decoder / emulation board
- **ENC x**: Output of the Dolby encoders

**Destination label**

- **PRIM x**: Primary inputs of the audio processor (DSP)
- **SEC x**: Secondary inputs of the audio processor (DSP)
- **AES x**: Inputs of the AES transmitters on the motherboard
- **EMB x**: Inputs of the SDI Local Routing matrix
- **MDOUT x**: Inputs of the MADI local routing matrix
- **DTOUT x**: Inputs of the Dante Interface
- **DEC x**: Input of the optional Dolby decoder / emulation board
- **ENC x**: Inputs of the optional Dolby encoders

**Mouse over**

Pls. see “Setup GUI – INTERFACES – SDI I/O interface – Local Routing” for details.
The Dolby metadata system is quite complex to describe in detail in a product manual such as this. If you are not familiar with it, we recommend you study the many publications from Dolby Inc. Especially the Dolby Metadata Guide is essential for understanding the parameters. For details please visit the Dolby web site: 


We cannot guarantee that the link is active forever so you may browse other Dolby resources as well. Specifically concerning metadata we also recommend the SMPTE document RDD6-2008.

So we must assume that you are familiar with this topic.

Metadata emulation means that Dolby metadata will be applied to listen to the effect of it without the need for encoding / decoding that may become a costly setup and introduces a lot of latency.

The aim is to check the influence of the Dialnorm (dialog normalization) value and the DRC (dynamic range control) settings.

**Important Note!** The D*AP8 platform is designed to operate an "all Dolby format" decoder and two independent encoders A and B. Encoder B can be consumer format (D-D, D-D+, AAC) or Dolby E professional while encoder A can be a second Dolby E. All solutions are based on the D*AP8 options model and require extra hardware and/or licenses.

**Setup GUI – DOLBY PROCESSING – Decoder/Emulation**

The Decoder/Emulation functions are built from the Dolby OEM board CAT1100. The graphic below illustrates the signal flow through it.

**Important Note!** The module must be routed into both the audio- and the metadata-signal paths. In order to decode a Dolby stream you must feed it to input DEC1/2. The metadata must be routed by the metadata router: DOLBY PROCESSING > Metadata > Routing.

The page embedded graphic shows the building blocks of the CAT1100 module. On the left hand side you have the decoding blocks, a signal router in the middle, and on the right hand side you have the downmix and the emulation part. You also can see the actual signal flow and their labels depending on the input signal status.

The emulation of the influence of metadata can be performed only on one program at a time. In the above case program 1 "P1" is pre-selected for emulation. But the signal is actually coming from the D/D+ decoder because a D+ signal is present at DEC 1/2 input and will be decoded automatically. The metadata set of the D+ stream has a channel mode of 3/2. Therefore the output labels show a surround signal 1L/1R, 1C/1LFE, 1Ls/1Rs, while the downmix output label is Lx/Rx.

If you feed PCM signals you have the setup mostly used for live or post pro mixing. The MAP may be connected to a monitoring insert of the mixing desk. The sound engineer can now switch between his mix and the emulated version of his surround mix or the downmix of it. He may now change DRC and downmix metadata by the generator to see how it would sound at home.
But he can also use external metadata from 9-pin input or from a SDI VANC stream which are routed to the metadata generator.
(see DOLBY PROCESSING > Metadata > Routing > Metadata Destination = D.Sub In).

Similar applies if one wants to listen to the influence of metadata from encoded streams. A professional decoder would normally not apply metadata to the decoded audio as a TV set or a STB implementation would do. With emulation you can listen to it. This example shows a Dolby E decoding situation with metadata for emulation coming from the decoder: and alternatively from the generator:

The right hand scenario allows for partially or fully overwriting the encoded metadata (see DOLBY PROCESSING > DECODER/EMULATION > Emulation > MD Generator overwrites encoded Metadata = ON)

Same applies to Dolby D / D+ decoding.

Metadata from decoder: metadata from generator:

A special application is Dolby Pro Logic decoding. The Pro Logic technology does not have metadata like its younger digital family members. So in case a Dolby Pro Logic signal must be evaluated it will be passed straight through to the Pro Logic decoder. But you may also listen to the Lt/Rt downmix (the Pro Logic format) by decoding it.

Decoding of Pro Logic from PCM input: Pro Logic decoding from a D-E stream:

The configuration at the right hand side will only work if the channel mode of the selected program is 2/0. It will be used if the Dolby Surround Mode is set to "Dolby surround encoded" and one wants to listen to the decoded surround signals.

The D*AP8 distinguishes between two major modes: Decoding (only) and Decoding/Emulation. For the decoding part we have pre-settings for each decoding type. The format detection is automatic so the desired general settings like DRC modes must be set manually prior to decoding.

Important Note! For parameter consistency reasons the preset editor can only be used for the respective active mode of the ON AIR area. If the preset active mode does not match the one from ON AIR, preset set-up is disabled and you will get the message “Setup not available for this mode”.

45
**D*AP8 MAP**

Setup GUI – DOLBY PROCESSING – Decoder/Emulation - **Decoder**

<table>
<thead>
<tr>
<th><strong>Active Mode</strong></th>
<th><strong>Decoder</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>[PCM / Dolby E 16/20/24 Bit Dolby Digital / Dolby Digital plus (I0, I0D0, I0I1, I0D0I1)] where Ix and Dx stands for independent and dependent sub stream IDs</td>
</tr>
<tr>
<td><strong>Bitstream Format</strong></td>
<td>[PCMdolby Digital]</td>
</tr>
<tr>
<td><strong>Bitstream Datarate</strong></td>
<td>[of a D-D or D-D+ stream]</td>
</tr>
</tbody>
</table>

**Decoder Status** [OK / Fail]

**Program Configuration** [in case of D-E]

**Channel Mode** [in case of D-D / D-D plus]

**Dolby E Frame Rate** [detected by the D-E decoder]

**Dolby D+ Decoding** [Main Only, Mixed Main & AD, AD Only]

Dolby Digital plus supports associated services like the provision of extra dialog or sending an audio descriptive (AD) track for visually impaired people or allows for separate commentary etc. that may be mixed automatically or by user intervention (depending on the consumer decoder implementation).

This selection allows you to listen to the main program only, the main and the associated audio description (AD) signals mixed together or the associated audio descriptive (AD) signal only.

It works only for streams where two Dolby Digital plus elementary streams are multiplexed (AKA single PID operation). For dual PID streams you may listen to the main and the associated signals independently only, because the Dolby OEM module has only one decoder input.

**Downmix / PL II Program** [Program 1 / Program 2]

Selects the program for downmix or PL II decoding. The drop down field becomes red colored if there is no second program available (e.g. PL II decoding from a D-D / D-D+ stream).

**Downmix Output Format** [AUTO / Lt/Rt / Lo/Ro / Pro Logic II]

AUTO=from Metadata, Lt/Rt (Pro Logic encoded), Lo/Ro (Stereo), Pro Logic II encoded.

The decoding functions of the D*AP8 are implemented to meet all possible applications in the field. Besides monitoring for QA, broadcasters use decoded consumer format (D-D/D+) streams for turn around or backup applications. On the one hand they receive it from suppliers to add content to their bouquet and on the other hand they must maintain older distribution systems (cable head ends) which are based on AC3 encoding but (e.g.) are fed by D-D+. So often they can not / will not rely on the received Dialnorm / DRC settings because they prefer to add automatic levelling and standard DRC settings to all signals to have seamless loudness across their bouquet. That's why we offer to skip DRC & Dialnorm if it makes sense for the application.

**Important Note!** Metadata will be applied to the downmix output at any time. Either from the decoder or from the MD Generator (if input format is PCM). The selection is only regarding the DRC profile which will be used.
General settings are available for each of the possible input signal types (Dolby D/D+ / Dolby E / PCM):

**Decoding and DRC**

- **Dolby D/D+ Main**
  - [Bypass DRC & Dialnorm, Apply Dialnorm Only]
  - [Line Mode, RF Mode, Mute Dolby D/D+]
  - This is a common setting for both D-D or D-D+.

- **D/D+ Downmix**
  - [Line Mode, RF Mode]

- **Dolby E Main**
  - [Bypass DRC & Dialnorm / Mute Dolby E]

- **Dolby E Downmix**
  - [Line Mode / RF Mode]

- **PCM Main**
  - [Mute PCM / Bypass DRC & Dialnorm]
  - **Mute PCM** is useful if one expects corrupted Dolby E blocks (if one runs a VTR or a switching device upstream is expected not to switch within the Dolby E guard band). In this case other than decoded Dolby E will not be audible.
  - **Bypass DRC & Dialnorm** must be used as an alternative setting (Mute PCM=OFF).

- **PCM Downmix**
  - [Line Mode / RF Mode]

- **PCM Latency**
  - [Matched, Minimum]

**ProLogic II Decoding**

There are a lot of Pro Logic / Pro Logic II consumer decoders installed and a lot of archived footage still has this sound track format. If you either must check such existing tracks or eventually produce such a sound track using the Dolby DP563 (Pro Logic II encoder), you may also listen to the decoded signal via the D*AP8.

- **Pro Logic II Decoding**
  - **Enable**
    - [OFF / ON]
    - When you hover with the mouse over that pull down, a hint will be displayed:
    
      Pro Logic II decoding requires an input signal with Channel Mode 2/0

  - **Decoder Mode**
    - [Movie / ProLogic Emulation]

Setup GUI – DOLBY PROCESSING – Decoder/Emulation – Decoder & Emulation

For emulation five more parameters are available:

- **Active Mode**
  - [Decoder & Emulation]

- **Program Select**
  - [Program 1 ... Program 8]
  - SMPTE RDD6 standard defines up to 8 independent programs. For the emulation process you must select one program at a time.

Pls. refer to the Decoder > Program Configuration to see how many programs belong to an actual Dolby E stream.
For applications like live mixing or others where the level must not be changed but listening to the influence of DRC is desired.

**MD Generator** overwrites encoded Metadata

If you want to see how different metadata will "sound" for already encoded signals you may decode it and apply different ones to it.

**Decoding and DRC**

- **Custom Mode**
- **Boost Factor**
  - [0 … 0.5 … 1]
  - If you want to check out different DRC behaviour from the defined profiles you may set the lower level boost factor here.

- **Custom Mode**
- **Cut Factor**
  - [0 … 0.5 … 1]
  - If you want to check out different DRC behaviour from the defined profiles you may set the higher level cut factor here.

Here a simplified DRC characteristic curve, published by Dolby®:

---

Important Note! Dolby Digital and Digital plus encoded streams do not contain metadata for DRC but pre-calculated gain words which may be applied to the decoded audio to decrease dynamic range for home reproduction. That's why you will not get a display of such metadata from the Input if consumer format streams are decoded. Similar applies to the professional metadata which is used to setup consumer format encoders (e.g. filters) and which is not present in the metadata stream as well.

**Status display of Decoder/Emulation / Encoder A / Encoder B / Metadata** (soft LEDs)

<table>
<thead>
<tr>
<th>Status</th>
<th>Decoder/Emulation</th>
<th>Encoder A</th>
<th>Encoder B</th>
<th>Metadata</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>* Dolby encoded stream at the input</td>
<td>* Metadata valid from the generator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orange</td>
<td>* Dolby E frame rate mismatch</td>
<td>* MD generator has entered the reversion mode</td>
<td>* Dolby E encoder has entered the reversion mode</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>* If the decoder receives corrupted (e.g. asynchronous) or no metadata</td>
<td>* Internal error</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Important Note! If no input metadata is available for PCM emulation and you tick a `<Follow Input>` checkbox, the generator enters the reversion mode as well.
Setup GUI – DOLBY PROCESSING – Metadata – Routing

The center of the D*AP8 Dolby processing is the Metadata Processor. It can be the point of origin of metadata but it may also modify existing metadata from available sources:

The metadata processor of the D*AP8 has a maximum of seven metadata destinations and four sources which can be routed individually.

The Metadata Generator in the middle can run independently but may take metadata from an available source at the "Input", may select some or all of it in the "Follow Input" section and present a complete set of metadata at the "Output".

Metadata Source Status - colors
The respective soft LED turns red if no metadata is present or the metadata are corrupted.
It turns green if a RDD 6 compliant metadata stream is detected.
It turns yellow if an AC3 or similar (D-D+) signal is decoded.

Setup GUI – DOLBY PROCESSING – Metadata – Generator Setup

The metadata processor generates SMPTE RDD 6 standard compliant metadata. It supports the most relevant program configurations for broadcast applications (5.1 / 5.1+2 / 3x2 / 4x2) used with Dolby E 16 or 20Bit bit depth. Since the number of programs from an external RDD 6 stream may differ from the generator setup, "off-size" program configurations will be handled this way:

If the input program configuration has more programs (e.g. 4x2) than the generator setup (e.g. 5.1+2) and you click on a "surplus" program (Program 3 or Program 4), only an Input table will be displayed while for the other programs an input and an output table is shown.

If the input program configuration has less programs (e.g. 3x2) than the generator setup (e.g. 4 x 2) and you click on a "surplus" program (e.g. Program 4), an empty input table will be shown.

If the metadata generator is set up for "Follow Input" and the input program configuration does not match the possible ones of the metadata generator it enters the reversion mode.

The output from the metadata generator is the source for the emulator engine but may also be selected for optional built-in encoders and for metadata transport interfaces like 9-pin (RS485) or VANC (SMPTE 2020).
Metadata Generator

Generator
Program Config. [Follow Input / 5.1+2 / 4 x 2 / 5.1 / 3 x 2]
Current Program Config. displays the actual program configuration used by the generator.
Frame Rate [OFF / ON] display of the frame rate
Generator used for Emulation (depends on Decoder Setup) SYSTEM > Setup > Video Rate (fps).

Reversion

Metadata Reversion Status [Normal / Reversion] Display of the reversion mode status.
Metadata Reversion Mode [Last Valid / Preset] Selection of what happens in case of input metadata failure.

Reversion Program [5.1+2, 4 x 2, 3 x 2]
Program Config. Pre-selection of the program configuration for reversion mode.
Reversion Preset You can select a preset for Program x to become the Program x Reversion preset for that program.

Important Note! There is only one set of reversion presets for all programs. You must be careful when you assign reversion presets to programs. It may be a good idea to name the presets used for reversion mode after the program number it is meant for.

Setup GUI – DOLBY PROCESSING – Metadata – Program x
Above you can see the input metadata of the processor and you can decide about the metadata output. You may set it to follow the input or you may overwrite it. The table shows the most relevant metadata. The Expert checkbox gives you access to more specific metadata:

Important Note! Dolby advises that the RF Overmodulation Protection must be off. Therefore Junger automatically turns it off. You are not able to set this parameter and no <Follow Input> check box exists, except for the preset parameters which will be ignored when loading it.

If Emulation is active and the option "MD Generator overwrites encoded Metadata" is turned on, the metadata are used for emulation are highlighted by a yellowish background:

This example shows the metadata from Program 1 of a Dolby E encoded stream.
Setup GUI – DOLBY PROCESSING – optional Dolby encoder – **Encoder A**

If the optional Dolby E encoder is licensed (see SYSTEM > Firmware Update > Licensing) the UI shows it as Encoder A:

![Encoder UI](image)

**Encoder**

- **Encoder Mode**: [Dolby E]
- **Encoder Status**: [Active / Metadata Reversion / Fail]
- **Program Configuration**: [3x2 / 4x2 / 5.1 / 5.1 +2]
- **Frame Rate**: [25 / 30 / 29.97 / Unknown]
- **Bit Depth**: [20 bits / 16 bits]
- **Metadata Reversion Status**: [Normal / Reversion]
- **Metadata Bitstream Status**: [Normal / Fail]
- **Video Frame Sync Status**: [present at Dolby E frame rate]

Setup GUI – DOLBY PROCESSING – optional consumer format encoder – **Encoder B**

The D*AP8 offers the option to install a consumer format (Dolby Digital / Dolby Digital plus / HE-AAC (v1/v2) / AAC) or another optional Dolby E encoder. If an encoder is installed it shows up under DOLBY PROCESSING. This example has a consumer format encoder installed:

![Encoder UI](image)

The OEM module from Dolby called **CAT561**. The implementation for the D*AP8 platform provides two encoded outputs. Both outputs may have independent consumer formats. If both encoders are set for Dolby Digital plus encoding special features like providing associated services (e.g. an extra audio track for visually impaired people, AKA audio descriptive service - AD) are available.

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**Encoder**

Encoder 1 (similar applies to Encoder 2 accept from setup where both encoders are used for associated services).

**Encoder Mode**

[Dolby Digital plus, Dolby Digital, Dolby Digital Pulse HE-AAC v1, Dolby Digital Pulse HE-AAV v2, Dolby Digital pulse AAC]

Here you may select the encoding format for the respective encoder

**Bitstream Packing Format**

AAC encoded bit-streams may be packed in different container formats. This parameter allows you to select one from the many possible formats.

**Encoder Status**

[OK, Fail]

**Encoder Configuration**

[2 (two-channel), 5.1 (surround)]

**Data Rate**

The data rate that is used for encoding

**Latency compensation**

[ON / OFF]

For parallel encoding of different formats the same latency may be desirable. In this case both encoders will have the same latency of 305ms. If you turn latency compensation OFF, latency will be reduced to 135ms for Dolby Digital.

**Metadata Program Select**

[Program 1 … Program 8]

Here you can select a program number of the RDD6 metadata set that shall be used for consumer encoding. If you are about to encode a 5.1 program that comes with a Dolby E stream as program 1, you must select Program 1 here.

**Metadata Bitstream Status**

[Metadata valid, Metadata not present]

**Dolby D+ Parameters**

**Stream Type**

[Independent, Dependent]

The streams which are encoded by both encoders can either be independent (i.e. there is no signal relationship of the audio signals) or dependent (if you use both encoders to encode 8 audio channels for 7.1 encoding).

**Stream Multiplexing**

[OFF (Dual PID) / ON / Single PID]

**Substream ID**

[1, 2, 3]

Since the encoded streams can be multiplexed by an on-board multiplexer they must have individual (sub-) stream IDs, so a de-multiplexer "knows" which data belong to which stream. If there is no intention to multiplex them together, the MAP sets both IDs to "0".

**Audio Description**

Audio description service employs both encoders to allow for the so called receiver mix. I.e. the mix between the program sound and the narrator who performs the audible scene description can be done in the decoder. This saves a lot of audio bandwidth compared to the so called broadcast mix, where two independent audio mixes are transmitted to the receiver at home.

**Mixing Metadata Enable**

[ON / OFF]

**External Program Scale Factor**

[-50 … 0 … 12]

To remote control the mixing of associated services you can change the level of the main program with this parameter.
Audio Mixing

Auto Voice Over Mode [OFF / ON]
In case of ON, the ducking parameter below will be used by the receiver to perform the mixing.

Trigger Level (dBFS) [-96 … 0]
Level of the associated audio channel that will turn on the ducking.

Trigger Delay Time (ms) [0 … 4992]
Time that must elapse before ducking becomes active after the trigger detects a signal that is above the trigger level.

Trigger Hold Time (ms) [0 … 4992]
Time the ducker stays open after trigger becomes active.

Duck Attack Time (ms) [0 … 4992]
Time the ducker needs to fully open up.

Duck Release Time (ms) [0 … 4992]
Time the ducker needs to fully close.

Look Ahead Time (ms) [0 … 85]
Time to look in advance for the level in the associated channel.

Warble Tone
Warble tone is a BBC invention to encode the volume and PAN values into one audio track while the other track carries the narrators voice signal.

Warble Tone Control Mode [OFF / ON]

Warble Tone Status [Unknown / Not Available / Not Valid / Valid]

Warble Tone Reversion Mode [Last Valid / Internal / Automatic]
Setup GUI – AUDIO PROCESSOR - Overview

The overview shows the active signal blocks of the audio processor, rendered by the DSPs. This overview depends on the actual speaker configuration of the MAP.

Below an example for 5.1 + 2.0 (see SYSTEM > Setup > Speaker Configuration):

The processing blocks in use, which may be activated from their individual setup panes, will be indicated in green. Blocks shown in grey are not activated by the user.

To navigate through the various processing blocks you may either use the mouse over function and click on the respective block or use the tabs provides in the navigation bars below the bar graph displays. The navigation is based on URLs so you may use the <Back> button of the browser to return to this page.

Important Note! Don’t be confused by the difference between speaker configuration and the channel mode of a program. Both can be set differently and must not necessarily match. E.g. you may configure the speaker set for 5.1 but listen to a stereo program via the left & right surround speakers. On the other hand it makes no sense to listen to a 3/2L signal via a pair of stereo speakers (except when you have selected the downmix ;>). You must always be careful to setup the router properly to connect the correct audio channels with the primary or secondary input of the AUDIO PROCESSOR.

Setup GUI – AUDIO PROCESSOR - Setup

Mono Attenuation

Mono Attenuation (dB) [0 / -3 / -4.5 / -6]

If a processing block is turned into mono operation this gain reduction will be used.
Setup GUI – AUDIO PROCESSOR - Input

Input Selector
- Switch Over Mode: [Fade-Out / Fade-In, Seamless]
- Select: [Primary, Secondary]

INPUT
- Default: pressing the <default> soft button will reset all values to "0" as shown above
- Mute: [ON / OFF]
  - Turns the respective input channel off
- Input Gain (dB): [-80.0 … 0.0 … 20.0]
- Invert Polarity: [ON / OFF]
- Input Delay Coarse (ms): [0.0 … 2000.0]
- Input Delay Fine (samples): [0 … 2000]
- Input Delay (meters): shows the calculated distance in meters for a selected delay (dry air, 20°C ~ 343m/s).
The MAP offers two independent downmix blocks (see AUDIO PROCESSOR > Overview). The one in the top is part of the main signal path and maybe configured for 5.1 (if 7.1 is applied) or 2.0. Or it may be put into transparent mode. The one in the bottom always feeds the AUX output of the audio processor.

**Downmix Mode**
- **Program Downmix**: [Transparent, Downmix 5.1, Downmix 2.0]
- **AUX Downmix**: [Transparent, Downmix 2.0]

**Downmix Parameters**
- **Default**: press `<default>` soft button to reset values
- **Output Gain (dB)**: [-20.0 … 0.0 … 20.0]
- **Center Mix Level (dB)**: [-12.0 … -3.0 … 0.0]
- **Surround Mix Level (dB)**: [-12.0 … -3.0 … 0.0]
- **Back Surround Mix Level (dB)**: [-12.0 … -3.0 … 0.0]
Setup GUI – AUDIO PROCESSOR – Solo/Mute

Default (Clear) press the soft button <default> to turn all solo and mute settings off

Mute [ON / OFF] Tick check box to enable individual speaker mute.

Mute All Mutes all active speakers.

Solo [ON / OFF] Tick check box to enable individual speaker solo.

Solo Defeat defeats respective speakers from solo

Solo Mode [Solo in Place, Solo to 1L+1R, Solo to C]
Setup GUI – AUDIO PROCESSOR – Volume

**Default**
Soft button <default> turns master volume to -50dB and DIM level to -20dB

**Volume (dB)**
[-100 ... -50 ... 0]
This setting maybe overwritten by the rotary encoder of the X*AP RM1 remote panel.

**Dim**
[OFF / ON]
Tick checkbox to enable the dim function.

**Dim Offset (dB)**
[-40 ... -3]

**Mono**
tick check box to turn mono circuit on.
Setup GUI – AUDIO PROCESSOR – Matrix

Here you may change the relationship between inputs and connected speakers. The appearance depends on the speaker configuration (SYSTEM > Setup > MAP Speaker Configuration).

Here an example for 5.1 + 2.0:

The speaker routing matrix works similarly to the central routing matrix of the device. You may set (CONNECT) or DISCONNECT cross points by use of the mouse-over function.

**Default Routing**
Press the `<default>` soft button to reset the matrix to 1:1 connection

**Pre Defined Routings**
Provides a set of useful cases

**Surround**
- Center to L+R
- LFE to L+R
- Ls/Rs to L/R
- Swap Lefts and Rights
- Swap L and R
- Swap Ls and Rs
- Swap 2L and 2R
Setup GUI – AUDIO PROCESSOR – Output – **Bass Management**

The **Output** block allows you to control the bass management, the speaker EQs and the speaker delay as well as individual speaker gain settings, to adapt the speaker set to a given listening situation.

For a 5.1-channel monitor system with full-range speakers on every channel and a subwoofer, you may not need bass management, and disable this feature. If no bass management is enabled, only the LFE channel is sent to the subwoofer. But if your system consists of five satellite speakers and a subwoofer, you can redirect the low frequencies from the five main channels to the subwoofer output:

### Bass Management

- **Default**
  - Pressing the soft button `<default>` will reset all settings to factory default.

- **Enable**
  - [ON / OFF]
  - Turns the bass management on.

- **Crossover Frequency (Hz)**
  - [20 … 80 … 200]

- **LFE Gain (dB)**
  - [0, 10]

- **Expert**
  - Tick check box to gain further access to specialized parameters.
Crossover Filter Enable [ON / OFF]
You may change from a crossover filter to a high pass filter

Crossover Frequency (Hz) [20 … 80 … 200]

Crossover Slope (db/oct) [12, 24]

Mix Channels [ON / OFF]
You may individually (depending on full-range speakers or not) mix channels into the subwoofer channel:

LFE Low Pass Filter Enable [ON / OFF]

LFE Low Pass Filter (Hz) [60 … 120 … 200]

Mix Sub/LFE into Channel [ON / OFF]
You can decide if the LFE signal shall be mixed into one or multiple speakers (e.g. if no sub speaker is connected).
Here is an example for mixing it to all 5 channels:

Sub Mix Attenuation (dB) [-20.0 … 0.0]
The amount of LFE signal for the above mix may be set here.
Setup GUI – AUDIO PROCESSOR – Output – Equalizer

The EQ section provides 5 fully parametric EQs for each speaker channel. The parameters may be linked for set-up purpose only to ease settings of multiple speakers. The EQ setup may be either done by numerical inputs and/or the graphical elements overlay above the frequency curve that results from the combination of multiple filters. The below example has 3 filters involved:

**Program / Section**

[Speaker, AUX, Preset Speaker, Preset AUX]

Which section of the audio processor will be represented in the graphical window above.

**Speaker Set**

[1L/1R/1Ls/1Rs, 1C, 1Sub, 2L/2R]

Depending on the global speaker configuration (5.1+2 in this case) and the link mode, you can make a selection here, to show and control the EQ settings for groups of speakers of a particular speaker set. You can also make the selection below by clicking and as a consequence, highlighting a different set (or single speakers).

**Enable**

[ON / OFF]

Here an example: The **Link** soft button shows the link set to <QUAD> for which the parameters are the same. The column is highlighted (bluish) to show the coincidence between graphic window and numeric parameters. Clicking on a different row (e.g. C) will highlight that column:
**Important Note!** For numeric input double click into the parameter field. You must use the period as a decimal separator. For graphical input use the left mouse button and drag it horizontally to change frequency and vertical to change gain while the mouse wheel will change the Q value.

### Graph Permanently Visible

[ON / OFF]

The color code of the column headers in the display will change depending on the selected speaker / speaker set. **White** color represents the actual selected speaker set while all others have the color of the display curve (pink represents Speaker set 2 in the example above).

### Link

[Unlinked, Quad, Movie, Live, Linked, Linked & Sub]

If you press the **Link** mode soft button that has the label of the actual link mode (“Quad” in the example above), the following options will be displayed:

- **Quad** 4 speakers are linked
- **Movie** 2 pairs of speakers are linked
- **Live** L/C/R and Ls/Rs are linked
- **Linked** All 5 speakers are linked except the LFE
- **Linked & Sub** All 6 speakers are linked

### Equalizer

[ON / OFF]

Enables / Disables the EQs for the highlighted section.

**Band x**

[1 ... 5]

Each speaker feed has five filters. Parameters and ranges are the same for all 5 bands.

**Filter Type**

[OFF, Peak 1, Peak 2, Lo Shelf, Hi Shelf, Lo Cut, Hi Cut]

**Frequency (Hz)**

[20 ... 20000]

**Gain (dB)**

[-20.0 ... 0.0 ... 20.0]

**Q**

[0.4 ... 1.0 ... 10.0]
**Speaker Set Selection**

Here you may select which set of speakers is active.

**Activate Speaker Set**

[activated, muted]

**Simultaneous Activation**

Tick the checkbox if you want to allow both sets of speakers to be activated together.

---

**Speaker Identification**

- **Active Test Tone**
  
  If you click on the dedicated soft button you will hear a verbal description which set of speakers and which speaker of that set is driven. Multiple selections will cause the test signal to go round in a row through all activated speakers.

**Limiter**

The individual feeds are equipped with a true peak limiter for speaker protection.

- **Enable**
  
  [ON / OFF]

- **Max True Peak (dBTP)**
  
  [-20.0 ... -1.0 ... 0.0]

---

**Output**

- **Default**
  
  The soft button will reset the values to default

- **Speaker Mute**
  
  [ON / OFF]

- **Attenuation (dB)**
  
  [-80.0 ... 0.0]

- **Output Delay Coarse (ms)**
  
  [0.0 ... 2000.]

- **Output Delay fine (samples)**
  
  [0 ... 2000]

- **Output Delay (meters)**
  
  Displays the calculated distance in meters for a selected delay (dry air, 20°C ~ 343m/s).
Setup GUI – MEASUREMENT

The MAP has an independent measurement block (see AUDIO PROCESSOR > Overview) that offers a comprehensive loudness meter. The measurement data are available for external applications like the Junger Audio Application Manager J*AM for bar graph level display or loudness over time plot or for logging of such data.

In the top of the GUI you can read these metering data of a preselected source:

When you click on the little triangle over here you will get a selection of the measurement formats available:

This display also shows the duration of the measurement. If the Speech Gate is active for the Dialogue Intelligence™ algorithm, the numbers become yellowish when the measurement has paused because there is no speech detected for the moment.

The other two buttons will control the measurement:

||<start>/<pause>/<continue>
x<reset>.

Setup GUI – MEASUREMENT – Setup

Dialog Level (Dialnorm) Measurement:
Beside the ability to measure loudness by above standards, the MAP offers the feature to measure the long-term A-weighted average level of dialogue within a presentation. A Dolby Digital / Digital plus consumer decoder (e.g. a Set Top Box) will normalize the output level to -31dBFS by applying a shift based on the Dialog Normalization (AKS Dialnorm) metadata setting.

The rule is: -31 - (dialog level value) = shift applied.

Example (Dialnorm = -23dB): -31 - (-23) = -8dB shift applied in the consumer decoder.

<table>
<thead>
<tr>
<th>Measurement Input Selector</th>
<th>[Primary Input / Secondary Input / Primary Input Cond. / Secondary Input Cond. / Input Selector / Downmix]</th>
</tr>
</thead>
</table>

| Dialogue Level (Dialnorm) Measurement | [L / R / C / L+R / L+R+C] |
| Channel Select | |
| Dialogue Norm Measurement | [Leq(A)] / ITU-BS.1770 |
| Algorithm | |
| Dialog Intelligence™ | [OFF / Active] |

The Dialog Intelligence™ algorithm developed by Dolby® Inc. searches for portions of the audio content where speech is present. Such portions may trigger the loudness measurement. If it is activated and no speech is detected, the number display becomes yellowish.

Log Port Labels | Text field to name the Log Ports. The names appear in the J*AM
The D*AP8 LM offers a sophisticated loudness measurement tool for the input and output of the program path of the device. The three control buttons `<pause>`, `<reset>`, `<reset max>` may be used to manually control the actual measurement.

### Current Measurement

- **Time elapsed since measurement started (excluding pauses).**

### Integrated Loudness (LUFS)

- **Dialnorm**
  - `-70.0` indicates that no speech has been detected. If it is activated in the setup but no speech is recognized by the algorithm, the background of the display box turns yellowish.

### Momentary Loudness (LUFS)

- **Convenient bar graph display.**

### Short-Term Max (LUFS)

- **Convenient bar graph display.**

### True Peak Max (dBTP)

- **Recent Measurement**
  - Values of the recent measurement are listed here for comparison.

### Important Note!

The measures of the parameters above depend on the loudness mode selected at AUDIO PROCESSOR > Setup pane.

The measurement data may also be streamed to the PC based J*AM (Junger Application Manager). The J*AM is a graph display and logging tool that one can download from the Jungeraudio.com web site. To perform loudness measurement and loudness logging one must buy a hardware (USB) dongle.

### Setup GUI – MEASUREMENT – Loudness – Log Ports

The four Log Ports are independent measurement blocks. They are designed to measure up to 7.1 audio channels per program. The audio channels must be routed via the Log Port Routing pane. You must take care that the audio channels match the respective program. No plausibility check is performed here.
For the description of the parameters pls. refer to the previous page.

Setup GUI – MEASUREMENT – Alarms – Main

Here you can set Alarm related parameters. These values will be used by the SNMP agent to sent respective traps.

Alarms

- **Measuremnt Thresholds**
  - **Short-Term Max (LUF**S)** [-30.0 ... -18.0 ... 0.0]
  - **Momentary Max (LUF**S)** [-30.0 ... -15.0 ... 0.0]
  - **True Peak Max (dBTP)** [-30.0 ... -3.0 ... 0.0]
  - **Silence Level (dBFS)** [-80.0 ... -60.0 ... -40.0]
  - **Silence Duration (s)** [1.5 ... 120.0]

- **Timing**
  - **Infinite Hold Time** [OFF / ON]
  - **Hold Time (s)** [1 ... 10 ... 300]

- **Alarm Status**
  - **Short-Term Max**
    - [Not Available / Normal / Alarm]
    - “Not Available” will be shown if the respective alarm is not enabled.
    - “Normal” = No alarm condition

- Reset
  - press to reset Alarm condition
D*AP8 MAP

Momenty Max [Not Available / Normal / Alarm]
True Peak Max [Not Available / Normal / Alarm]
Silence [Not Available / Normal / Alarm]

For the description of the parameters pls. refer to the previous page.

Setup GUI – MEASUREMENT – Log Ports

The MAP has four more measurement facilities for dedicated logging which you will reach from the J*AM. The sources you select for logging will be measured, the measurement values will be calculated and will be provided for streaming over the network to the J*AM. Compared to other solutions this saves a lot of bandwidth because only measurement data are transmitted and not the audio samples themselves.

Similar to the general ROUTING all relevant internal sources are available for a Log Port:

You must keep in mind the loudness measurement must be performed over all audio channels belonging to a program.
As mentioned previously, the **D*AP8 MAP** offers a sophisticated *event management* system. The event management system performs *actions*. These *actions* are built from *events*. Actions may be triggered manually (via the **X*AP RM1** remote panel **Hotkeys**), remotely (over the network or via GPIs) and automatically (via changes of device parameters or internal status information) or via a combination of all three.

The overview shows the building blocks of the **EVENTS** system of the **MAP**:

- **Triggers**: A trigger may be configured via a trigger equation (logically combined) from up to two sources. For both sources you can define a trigger type and a specific source that is bound to the type. E.g. a GPI is a trigger type while the hardware input (its input number) represents the trigger source. Other sources of specific types like the **X*AP RM1 Hotkeys** must be configured before using it:
  - **Remote Hotkeys**: You may assign hotkeys of the **X*AP RM1** remote to become a trigger source.
  - **Network**: Received via the **EmBER+** protocol designed by Co. l-s-b.
  - **Parameters**: Device parameters / status information grouped into system and Interfaces.

The **MAP** offers four different *event types*:
- **Preset Events**: for the System / Interfaces / Routing / Dolby Processing / Audio Processor / Programs / AUX / Measurement
- **Parameter Events**: to control (external) measurements of the **J*AM**
- **Measurement Events**: to control the measurement block of the **MAP**
- **I/O Events**: for GPOs
The MAP has the action type – "Event Actions"

An action runs like a flip-book inside the MAP. This powerful technology spans from simply recalling a certain system parameter over speaker or Dolby specific parameter combinations (household name: "Preset") to the complete reconfiguration of the device including all signal routing, processing parameters and so forth. It allows you to create your own snap shots where you decide what is part of it and what is not! But it also enables several fail over scenarios where the MAP will automatically react to the system and/or parameter status.

The steps to set up the EVENTS system are as follows:
1. Define - trigger sources
2. Configure - triggers by logical combination of the pre-defined trigger sources
3. Set up events - by selecting presets for function blocks
4. Create actions - which trigger will launch which event or what will happen in case someone presses a function key at the X*AP RM1 or engages the <Force Trigger Active> check box (see EVENTS > Actions > Event Actions).

Setup GUI – EVENTS – Triggers – Sources – Remote Hotkeys

The Triggers tab opens the trigger setup pane that has 4 embedded sub tabs: Sources: "Remote Hotkeys" / "Network" / "Parameters" and Configuration: "Trigger Equation":

- <add trigger> You can add lines here.
- # The number of the Hotkey on the X*AP RM1 remote panel, counting from left to right.
- Label Each Hotkey may have a label that appears in the display of the X*AP RM1 remote panel above that button.
- Enable [ON / OFF] If you turn it off the respective Hotkey on the X*AP RM1 remote panel becomes inactive - no label is displayed and the button background light turns off.

- <remove> will remove a line from the list. This will automatically disable the respective front panel button.

The number of hotkey triggers is not limited. You may also add virtual hotkeys which can be used by a graphical UI for example that may have more than 8 compared to the X*AP RM1.

Setup GUI – EVENTS – Triggers – Sources – Network

Network triggers are based on the EmBER+ protocol from Co. l-s-b [http://www.l-s-b.de/uk](http://www.l-s-b.de/uk)
The MAP receives such triggers over the TCP/IP network. The triggers are issued by a device that has implemented the EmBER+ protocol (e.g. VSM server, broadcast automation system). You may assign these triggers to virtual panels as well as physical (e.g. LBP) buttons of a VSM installation. But also a broadcast automation system may have an EmBER+ server running that will trigger events in the MAP.
Number of a network trigger.

Label of that network trigger. It will be used on the Configuration pane and serves as a reference for 3rd party software implementation (e.g. broadcast automation systems).

As an example you see the name of the first Trigger "Movie":

<remove>

will remove a line from the list.

The name of the respective trigger may be selected via an EmBER+ enabled device to fire that trigger. By means of a setup tool you must configure such network triggers in order to remote control the D*AP8 MAP. You will find the Ember+ protocol details, the implementation guidelines as well as an example here: code.google.com/p/ember-plus/

Below is a screen shot of the EmBER+ viewer tool:

In the EmBER tree you go to:
"Device" > controller_dsp > network_trigger > parameters > e.g. "idx_1”  
  As a value you will receive the trigger name from the MAP.  
  In this example it is the trigger named: "Movie".
Above is an example of parameter trigger sources. The phrase `<multiple values>` indicates that more than one value of the parameter "Status" is bound to that trigger source:
If you click into the "Expression 1" box you see two greenish marked entries.
I.e. if one of these values is true, "Expression 1" is true.

Setup GUI – EVENTS – Triggers – Configuration – **Trigger Equation**

To form a trigger you may logically combine two trigger sources:

**Trigger**
Here you define a name for the trigger ("Trigger 1").

**Source 1**
The first source of a logical combination of two trigger sources.

**Invert**
[ON / OFF]
If the type of trigger allows an inverted operation it can be defined here.

**Type**
[GPI / Hot Key, Network / Parameter / Event active / Trigger effective / Bypass / Sync Lock]

**Source**
[1 … 8]
It acts like an index for the trigger type (In case of GPI it is the physical GPI number or in case of X*AP RM1 Hotkeys it is the key number …).

**Logic**
[and / or / xor]
The kind of logical operation.

**Source 2**
Second source for the logical combination of two trigger sources.
If only one source exists, you may leave it unassigned [-].
A **Preset Event** is a group of presets you may load on one occasion to the On Air parameters of function blocks. When executing such an event you may for example change the routing, the Dolby processing, the metadata set-up etc. by simply assigning the individual preset of your choice to the system, to an interface, to the routing, to the program path or even to the measurement. This picture shows an excerpt from the Preset Events pane where a few presets are pre-selected for the event: "AutoDecPstE". Due to the number of function blocks the screen shot is split in two columns:

Pull down list of all presets available for the Decoder / Emulation function block.

If no preset is selected you will get a dash in the drop down field. Some function blocks (e.g. AES I/O) even have no preset assigned at all at the moment so there is no drop down box.
The **Preset Events** allow you to reconfigure the MAP completely, partially or to change a few audio parameters marginally.

You are also able to create a new preset event semi-automatically by pressing **<create event>**:

| Create Event | Event name | [New Event] default
A unique name to address this preset event later in the action manager. |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Use Settings from</td>
<td>[On Air / Existing Event / Empty]</td>
<td></td>
</tr>
<tr>
<td>&quot;On Air&quot;</td>
<td>The events manager will copy all <strong>On Air</strong> parameters to new presets for the function blocks, depending on the &quot;Include these Blocks&quot; check boxes.</td>
<td></td>
</tr>
<tr>
<td>&quot;Existing Event&quot;</td>
<td>The presets of the selected event will be copied to the new event and may be tuned afterwards to form a different event.</td>
<td></td>
</tr>
<tr>
<td>&quot;Empty&quot;</td>
<td>Creates a set of empty boxes where you may select the preset of your choice for the respective function block or leave it empty if no changes are needed ...</td>
<td></td>
</tr>
<tr>
<td>Include these Blocks:</td>
<td>[System / Interface / Routing / Dolby Processing / Audio Processor] Defines which blocks will be part of the creating process.</td>
<td></td>
</tr>
</tbody>
</table>

**Important Note!** This is the way to create a **snapshot**. The automatically created presets in all respective function blocks will be given the (same) name of this event. So you must be careful when selecting names!

**Setup GUI – EVENTS – Events – Parameter Events**

Right now the MAP supports parameter events to remote control the measurement / logging related features of the J*AM:

The above example selects the category "**Measurement**" with its sub category "**Loudness**". From the list of possible parameters, the setting of a marker "**J*AM Marker – Log Port1**" has been selected. This marker will appear in the log file if that preset event is executed. When you press **<create event>** these choices are provided:

<table>
<thead>
<tr>
<th>Create Event</th>
<th>Event Name</th>
<th>your choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use settings from</td>
<td>[Existing Event / Defaults / Empty]</td>
<td></td>
</tr>
</tbody>
</table>
Setup GUI – EVENTS – Events – Measurement Events

A measurement event is used to control the MAP internal loudness meter. (See MEASUREMENT > Loudness). For the example below "Reset Max" has been selected:

Setup GUI – EVENTS – Events – I/O Events

I/O Events at the moment control the GPOs of the MAP:

Each GPO (when enabled for that I/O event) can be set to one of these actions:

- **Clear**: Turns a GPO off that was previously turned on.
- **Set**: Turns a GPO on.
- **Follow**: The GPO follows the state of the trigger.
- **Toggle**: The trigger will toggle that GPO.
This is the point where all previously created sub-functions are combined. Here you create the action!

You should give the action a meaningful name, select a trigger (from one of the trigger equations) and select the respective event(s) you need to perform the desired action.
Setup GUI – EVENTS – Actions – Event Actions – Factory Defaults

Above you see the factory default EVENTS > Actions that come with the D*AP8 MAP from firmware 3.0.x onwards. They are prepared to ease the handling of Dolby PROCESSING functionalities of the device and support the operator UI that you recall when pressing the <accessDP> button in the upper right corner.

Five pre-configured Actions may be triggered manually from the X*AP RM1 remote panel. See the "Remote Hotkeys" settings below #4 - #8:

The remote hotkeys are used by the following "Trigger Equations" (Trigger four to eight):

I.e. the trigger named "PRG FollowInput" will be fired if one depresses the hotkey # 4 that is named "PRG Follow Input" or one activates GPI #4. It is also available as an action key on the operator UI.
On the page EVENTS > Events > Preset Events you see a list of combinations of individual presets for each of the factory default Preset Events. The line below the <export> / <import> etc. buttons reminds you of the pre selected speaker configuration [SYSTEM > Setup > Speaker Configuration = 5.1 + 2.0]. Below are two examples of such preset events:

"AutoDecPstE" (automatic decoding)

"MDOvrPstE" (metadata overwrite)

You can see the difference is the respective Decoder / Emulation preset.
The metadata routing: "MDRouting01", the metadata generator setup: "MDGenSetup01" and the metadata presets for program 1: "MD3/2L" and program 2: "MD2/0" are the same in both cases:

Routing > Routing has no preset selected here. It assumes that you connect the D*AP8 MAP via the AES inputs AES1/2 to a Dolby E source. If you have connected analog speakers for a QA room, the outputs are also routed to the analog interface card and the AES outputs. If you have installed an SDI module, the speaker outputs are sent to the SDI embedder. The SDI de-embedder outputs are not connected.

Important Note! If you receive the encoded audio via SDI instead of AES you should use routing preset, especially if you change the physical inputs frequently.
Pls. don’t forget to adjust the SDI embedder / de-embedder routing accordingly so audio channels appear in the correct position (e.g. encoded Dolby E must end up at decoder input 1/2 for decoding).

Metadata routing (see DOLBY PROCESSING > Metadata > Routing) connects the 9-pin input by default. If you decode D-E the metadata output of the decoder must be connected to the metadata generator input. The metadata generator output is connected to the "D Sub Out" and "SDI1 – VANC" (for embedding) or any encoder (if one is installed).

Metadata generator setup (see DOLBY PROCESSING > Metadata > Generator Setup).
The generator program configuration is set to "Follow Input", reversion mode to "preset" and the reversion program configuration to "5.1 + 2".

Metadata presets Program 1/Program 2 (see DOLBY PROCESSING > Metadata > Program 1 / 2) are set to the values recommended by FIFA World Cup 2014 for the international sound track that was used by HBS.
As an example you see two of the five parameter sets that may be loaded by their presets for the Decoder / Emulation processing block. The respective preset name is displayed in grayish above the active mode display:

**"AutoDecoder"**

```
<table>
<thead>
<tr>
<th>Active Mode</th>
<th>Decoder</th>
</tr>
</thead>
<tbody>
<tr>
<td>AutoDecoder</td>
<td>Decoder</td>
</tr>
</tbody>
</table>
```

**"OverwriteMDEmu"**

```
<table>
<thead>
<tr>
<th>Active Mode</th>
<th>Program Select</th>
</tr>
</thead>
<tbody>
<tr>
<td>OverwriteMDEmu</td>
<td>Program 1</td>
</tr>
</tbody>
</table>
```

![Diagram showing parameter sets for AutoDecoder and OverwriteMDEmu](image-url)
To round up the explanation of the factory default actions settings, here is the content of the metadata preset "MD3/2L" (DOLBY PROCESSING > Metadata > Program 1). The greyish letters like MD3/2L above the “Follow Input” column shows the name of the active preset:

Setup GUI – accessDP

The link in the upper right corner will launch the operator UI in a separate tab.
You may also use the URL: `<IP address>/mobile.xml` in a new browser on the same PC or an independent one.

This UI gives an operator direct access to relevant settings and controls. Its functionality is designed close to the well known UI of the Dolby DP570 but enhanced by the options provided by the built-in module CAT110. I.e. the decoding of D-E or D-D / D-D+ does not need an external decoder. The MAP can be used to emulate the audio path of a Set Top Box. But it may also generate metadata from scratch when mixing a 5.1 sound track. If you want a highly compact solution, you may also install an optional encoder to encode D-E or consumer formats right after emulating the metadata.

The MAP has a measurement section that can measure Dialnorm, Integrated Loudness, Loudness Range, True Peak, Short Term and Momentary Loudness. Loudness measurement will be controlled from the UI (start / pause / reset), i.e. one may save the cost for external meters like the DM100.

The UI makes use of the auto detect function of the decoder / emulator.
The status of the decoder (PCM, D-E, D-D, D-D+) will trigger actions which will control the routing of audio signals and metadata.
By factory default, the physical inputs and outputs are set to the following sources and destinations:
- AES Input 1/2 – Dolby D / D+ / E or stereo PCM input.
- AES Input 3/4 – 7/8 PCM audio (e.g. from a mixing desk or from an external decoder).
- AES Output 1/2 – 7/8 carry the 7.1 monitoring output signals.

The Dolby Decoder output feeds the primary monitoring path.
The Decoder Downmix output feeds the secondary monitoring path.

If the system is in 4x2 mode the **Program Select** buttons will route the respective signal pair from the decoder output to Primary Input **PRIM1** and **PRIM2**.

---

**Program Select**

depending on the system setup (5.1 / 5.1+2 / 4x2 / 3x2) you select the respective program of interest here.

**Emulation Active**

[Bypass / Emulation ON]

**Metadata Source**

The emulation circuit can use external metadata (9-pin, VANC, Decoder) or internal metadata from the built-in generator.

**Status**

Display of high level system information.
The soft LED turns brownish when the metadata system is in reversion mode, i.e. the pre-selected metadata source is not available or there is a mismatch between settings and detected metadata. Normally the generator will load a reversion preset.

**Program Metadata**

Selection of the most important metadata. Other metadata must be set in the metadata section of the device.

**Important Note!** Dialnorm Only is not available for the down mixes, thus will be ignored when listening to a down mix.
| **Measurement** | [Pause & Play / Reset / Reset MAX] The soft buttons control the time depending measurement (see also MEASUREMENT tab of the device). Please keep in mind that Dialnorm measurement uses a Dolby algorithm that detects a real dialogue. [Show Recent] recalls the recent measurement values. |
| **Primary** | Selection of the audio sources for the primary input of the speaker control section of the **MAP**. In standard routing the “native” loudspeaker formats are assigned to the primary input |
| **Secondary** | Selection of the audio sources for the primary input of the speaker control section of the **MAP**. All Dolby metadata related downmix formats are sent to the secondary input. |
| **Monitor Section** | This is a standard monitor control interface with solo and mute functions for all playback channels. A ‘Reference Level’ and ‘DIM’ can be recalled. Their values are configured in the **MAP** UI. |
Technical Data - 8 Channel Surround Monitoring Audio Processor [D*AP8 MAP EDITION]

| General | • 8 channel monitoring audio processor (1 program, program configuration 1.0 … 7.1)  
|         | • 2 channel (1 stereo) auxiliary output 
|         | • 4 additional programs can be logged over network using dedicated software tools  
|         | • Expandable by hard and software options |
| Audio Sample Rate | 44.1, 48kHz, (32 … 196kHz @ input with SRC)  
|                  | ±150ppm sync input capture, ±25ppm master-sync stability |
| AES/EBU Inputs | Relevant specifications comply with AES3-X-2009, IEC 60985 and AES11-2009  
|                | 8 channels (4 stereo inputs), 4 BNC connectors  
|                | 24bits, transparent forwarding of PCM and compressed audio (w/o SRC)  
|                | 24bits, PCM, sample rate converter (SRC) activated  
|                | Impedance 75Ohm single-ended  
|                | Input level 0.3 … 5Vpp @ 75Ohm single-ended  
|                | Sample Rate Converter (SRC)  
|                | THD+N -120dB @ 0dBFS, 1kHz  
|                | Latency < 0.3ms |
| AES/EBU Outputs | Relevant specifications comply with AES3-X-2009, IEC 60985 and AES11-2009  
|                 | 8 channels (4 stereo outputs), 4 BNC connectors  
|                 | 24bits, transparent forwarding of PCM and compressed audio  
|                 | Impedance 75Ohm single-ended  
|                 | Output voltage 1Vpp (typ.) @ 75Ohm single-ended |
| Sync Input | Multi-standard synchronization interface for AES/EBU, wordclock or video-sync (black burst, tri level), complies with AES11-2009 and relevant audio or video standards  
|            | Connector type BNC  
|            | AES/EBU input 0.3 … 5Vpp @ 75Ohm single-ended  
|            | Wordclock input 1 … 5Vpp @ 75Ohm single-ended  
|            | Video-sync input 1Vpp (nom.) @ 75Ohm single-ended  
|            | Rates supported: 23.975, 24, 24.975, 25, 29.97, 30, 49.95, 50, 59.94, 60fps (SD and HD)  
|            | On-board audio ports and master-sync capable option boards may also be selectable as sync source. |
| Sync Output | Word clock output, complies with AES11-2009  
|              | Connector type BNC  
|              | Wordclock output 2.4V (typ.) @ 75Ohm single-ended |
| Metadata Input | Relevant specifications comply with SMPTE RDD6-2008 (Dolby Metadata). |
## Connector type
- **D-Sub9 connector female**

## Input conditions
- 110Ohm RS485, 0.2 ... 5Vpp differential

## Metadata Output
- Relevant specifications comply with SMPTE RDD6-2008 (Dolby Metadata).
- **Connector type**
  - D-Sub9 connector female, same conn. as input
  - D-Sub9 connector male, output only
  - Both connectors carry the same signal.
- **Output conditions**
  - 3Vpp (typ.) @ 110Ohm differential, RS485

## Timecode Input
- LTC timecode input, BNC, currently not supported (TBD)

## Network Interface
- RJ45 connector, 10/100Mbit Ethernet auto sense, full duplex, auto MDI/X

## USB Interface
- USB 2.0 connector to internal console interface

## GPI Signals
- 8 general purpose inputs (GPI), divided into 2 groups with separate common signal, isolated
- **Connector type**
  - D-Sub25 connector female, same for GPI
- **Input conditions**
  - 3 ... 24Vdc, < 5mA
- **Auxiliary supply**
  - 5V (nom.), 200mA (max.), isolated

## GPO Signals
- 8 general purpose outputs (GPO), SPST, divided into 2 groups with separate common signal, isolated
- **Connector type**
  - D-Sub25 connector female, same for GPI
- **Output conditions**
  - 24Vac/dc (max.), 120mA (max.)

## Expansion Slots
- 2 general purpose expansion slots for option boards,
- 2 internal expansion slots for Dolby encoding, decoding and emulation

## Power Supply
- Dual power supply, automatic fail over,
- 85 ... 264Vac, 50 ... 60Hz, 58W (max.)

## Environmental
- Operating temperature 0 ... 50ºC, fan cooled (dual fan),
- Non-operating -20 ... 70ºC,
- Humidity < 90%, non-condensing

## Physical
- 19", 1RU, 27cm depth, net weight ca. 5kg, shipping weight ca. 7.5kg

---

### Technical Data – Option Board SDI I/O (3G/HD/SD) [O_DAP_SDI_a]

#### Standards
- Video complies with SMPTE 424/425M (3G, Level A and B), SMPTE 292M (HD) or SMPTE 259M (SD).
- Automatic format detection.
- Audio embedding and de-embedding complies with SMPTE 299M (3G, HD) or SMPTE 272M-AC (SD).
- Metadata embedding and de-embedding complies with SMPTE 2020-2.

#### Video Data Rate
- 2970/2967Mbps (3G), 1485/1483.5Mbps (HD), 270Mbps (SD)

#### Video Formats
- 1080p23.975, 24, 25, 29.97, 30, 50, 59.94, 60
- 1080i50, 59.94, 60
- 720p23.975, 24, 25, 29.97, 30, 50, 59.94, 60
- 625i50, 525i59.94, ...

#### Video Delay
- User selectable 0 ... 15frames, can be disabled

#### Audio
- 24bits, transparent forwarding of PCM and compressed audio

#### Audio Channels
- 16 inputs and 16 outputs (4 groups with 4 channels each)

#### Audio Sample Rate
- 48kHz (SDI compliant)

#### Audio Delay
- Embedder audio delay selectable 0 ... 320ms per channel
D*AP8 MAP

<table>
<thead>
<tr>
<th>Metadata (RDD6)</th>
<th>1 channel input and 1 channel output, SDID selectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>BNC Input</td>
<td>Impedance 75Ohm</td>
</tr>
<tr>
<td>Return loss</td>
<td>&gt; 15dB, 5 … 1485MHz</td>
</tr>
<tr>
<td></td>
<td>&gt; 10dB, 1485 … 2970MHz</td>
</tr>
<tr>
<td>Cable length (max.)</td>
<td>250m @ SD for Belden 1694A cable</td>
</tr>
<tr>
<td></td>
<td>230m @ HD for Belden 1694A cable</td>
</tr>
<tr>
<td></td>
<td>140m @ 3G for Belden 1694A cable</td>
</tr>
<tr>
<td>Jitter tolerance</td>
<td>&gt; 0.7UI (Alignment)</td>
</tr>
<tr>
<td>BNC Output</td>
<td>Impedance 75Ohm</td>
</tr>
<tr>
<td>Output voltage</td>
<td>0.8Vpp (typ.)</td>
</tr>
<tr>
<td>Return loss</td>
<td>&gt; 15dB, 5 … 1485MHz</td>
</tr>
<tr>
<td></td>
<td>&gt; 10dB, 1485 … 2970MHz</td>
</tr>
<tr>
<td>Output jitter</td>
<td>&lt; 0.2UI (Alignment), &lt; 0.5UI (Timing)</td>
</tr>
<tr>
<td>Audio Latency</td>
<td>Input to Output</td>
</tr>
<tr>
<td></td>
<td>Embedder and de-embedder combined</td>
</tr>
<tr>
<td></td>
<td>HD, 3G &lt; 0.6ms</td>
</tr>
<tr>
<td></td>
<td>SD typ. 1.5ms (&lt; 2ms)</td>
</tr>
<tr>
<td>Video Latency</td>
<td>Input to Output</td>
</tr>
<tr>
<td></td>
<td>120 … 200pixel, depends on video standard</td>
</tr>
</tbody>
</table>

General Features
- Power fail relay bypass (may be activated via GUI)
- Lip-Sync compensation for processed and non-processed audio signals
- Dedicated routing for non-processed channels, all channels (max. 16) can be routed to/from the device or looped through
- Test pattern generator
- Master-sync capable
- ITU-R BT.1685 / ARIB STD-B39 metadata support

Technical Data – Option Board 8 Ch Analog Out [O_DAP_8DA_a]

<table>
<thead>
<tr>
<th>Audio</th>
<th>24bit D/A-converter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Channels</td>
<td>8 output channels (e.g. for speakers)</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Analog Outputs</td>
<td>8 channels</td>
</tr>
<tr>
<td>Connector type</td>
<td>D-Sub25 connector female</td>
</tr>
<tr>
<td>Output Level (max.)</td>
<td>(0dBFS equiv.) 0 … 24dBu, adjustable in 0.5dB steps</td>
</tr>
<tr>
<td>Impedance</td>
<td>50Ohm (typ.), differential</td>
</tr>
<tr>
<td>THD+N</td>
<td>-91dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 103dB (RMS)</td>
</tr>
<tr>
<td>Crosstalk attenuation</td>
<td>&gt; 103dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Frequency response</td>
<td>20Hz … 22kHz (&lt; ±0.3dB) @ 48kHz</td>
</tr>
<tr>
<td></td>
<td>20Hz … 43kHz (&lt; ±0.3dB) @ 96kHz</td>
</tr>
</tbody>
</table>

General Features
- Power fail glitch prevention
- Balanced analog outputs
- Electrical isolation between outputs and device
Technical Data – Option Board 4 Ch Analog I/O [O_DAP_ADDA_a]

<table>
<thead>
<tr>
<th>Audio</th>
<th>24bit sigma-delta A/D-converter, 24bit D/A-converter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Channels</td>
<td>4 input channels, 4 output channels</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analog Inputs</th>
<th>4 channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector type</td>
<td>D-Sub25 connector female, same for outputs</td>
</tr>
<tr>
<td>Input Level (max.) (0dBFS equiv.)</td>
<td>0 ... 24dBu, adjustable in 0.5dB steps</td>
</tr>
<tr>
<td>Impedance</td>
<td>20kOhm (typ.), differential</td>
</tr>
<tr>
<td>THD+N</td>
<td>-93dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 110dB (RMS)</td>
</tr>
<tr>
<td>Crosstalk attenuation</td>
<td>&gt; 93dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>CMRR</td>
<td>&gt; 71dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Frequency response</td>
<td>20Hz ... 22kHz (&lt; ±0.1dB) @ 48kHz</td>
</tr>
<tr>
<td></td>
<td>20Hz ... 43kHz (&lt; ±0.1dB) @ 96kHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analog Outputs</th>
<th>4 channels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connector type</td>
<td>D-Sub25 connector female, same for inputs</td>
</tr>
<tr>
<td>Output Level (max.) (0dBFS equiv.)</td>
<td>0 ... 24dBu, adjustable in 0.5dB steps</td>
</tr>
<tr>
<td>Impedance</td>
<td>50Ohm (typ.), differential</td>
</tr>
<tr>
<td>THD+N</td>
<td>-91dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Dynamic range</td>
<td>&gt; 103dB (RMS)</td>
</tr>
<tr>
<td>Crosstalk attenuation</td>
<td>&gt; 103dB @ 0dBFS = 15dBu, 1kHz</td>
</tr>
<tr>
<td>Frequency response</td>
<td>20Hz ... 22kHz (&lt; ±0.3dB) @ 48kHz</td>
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<tr>
<td></td>
<td>20Hz ... 43kHz (&lt; ±0.3dB) @ 96kHz</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Power fail relay bypass between inputs and outputs</td>
</tr>
<tr>
<td>• Balanced analog inputs and outputs</td>
</tr>
<tr>
<td>• Electrical isolation between inputs, outputs and device</td>
</tr>
</tbody>
</table>
## Technical Data – Option Board AES/EBU I/O [O_DAP_AES_a]

<table>
<thead>
<tr>
<th>Standards</th>
<th>Relevant specifications comply with AES3-X-2009, IEC 60985 and AES11-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>24bits, transparent forwarding of PCM and compressed audio (w/o SRC)</td>
</tr>
<tr>
<td></td>
<td>24bits, PCM, sample rate converter (SRC) activated</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz, (32 … 196kHz @ inputs with SRC)</td>
</tr>
<tr>
<td>Inputs</td>
<td>8 channels (4 stereo inputs)</td>
</tr>
<tr>
<td>Connector type</td>
<td>D-Sub25 connector female, same for outputs</td>
</tr>
<tr>
<td>Impedance</td>
<td>110Ohm or 75Ohm, jumper selectable (110Ohm default)</td>
</tr>
<tr>
<td>Input level</td>
<td>0.3 … 5Vpp @ 110Ohm differential</td>
</tr>
<tr>
<td></td>
<td>0.3 … 5Vpp @ 75Ohm single-ended</td>
</tr>
<tr>
<td>Sample Rate Converter (SRC)</td>
<td>THD+N -120dB @ 0dBFS, 1kHz</td>
</tr>
<tr>
<td></td>
<td>Latency &lt; 0.3ms</td>
</tr>
<tr>
<td>Outputs</td>
<td>8 channels (4 stereo outputs)</td>
</tr>
<tr>
<td>Connector type</td>
<td>D-Sub25 connector female, same for inputs</td>
</tr>
<tr>
<td>Impedance</td>
<td>110Ohm or 75Ohm, jumper selectable (110Ohm default)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>3Vpp (typ.) @ 110Ohm differential</td>
</tr>
<tr>
<td></td>
<td>1Vpp (typ.) @ 75Ohm single-ended</td>
</tr>
<tr>
<td>General Features</td>
<td>• Power fail relay bypass (can be deactivated by jumper)</td>
</tr>
<tr>
<td></td>
<td>• Input sample rate converters (SRC)</td>
</tr>
<tr>
<td></td>
<td>• Electrical isolation between inputs, outputs and device (if configured for differential mode, 110Ohm)</td>
</tr>
<tr>
<td></td>
<td>• AES3 channel status management, non-audio detection</td>
</tr>
<tr>
<td></td>
<td>• Master-sync capable</td>
</tr>
</tbody>
</table>

## Technical Data – Option Board MADI I/O, BNC [O_DAP_MB_a]

<table>
<thead>
<tr>
<th>Standards</th>
<th>Relevant specifications comply with AES10-2008 and AES11-2009.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>24bits, transparent forwarding of PCM and compressed audio</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz, (88.2, 96kHz short framing)</td>
</tr>
<tr>
<td>BNC Input</td>
<td>64/56 channels @ 44.1 and 48kHz, 32/28 @ 88.2 and 96kHz</td>
</tr>
<tr>
<td></td>
<td>Processable by D*AP8: 16 channels @ 44.1, 48kHz</td>
</tr>
<tr>
<td></td>
<td>Processable by D*AP4: 8 channels @ 44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Impedance</td>
<td>75Ohm</td>
</tr>
<tr>
<td>Input level</td>
<td>0.15 … 0.8Vpp @ 75Ohm</td>
</tr>
<tr>
<td>Cable length (max.)</td>
<td>150m (Belden 1694A)</td>
</tr>
<tr>
<td>BNC Output</td>
<td>64/56 channels @ 44.1 and 48kHz, 32/28 @ 88.2 and 96kHz</td>
</tr>
<tr>
<td></td>
<td>Processable by D*AP8: 16 channels @ 44.1, 48kHz</td>
</tr>
<tr>
<td></td>
<td>Processable by D*AP4: 8 channels @ 44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Impedance</td>
<td>75Ohm</td>
</tr>
</tbody>
</table>
Output voltage 0.6Vpp (typ.) @ 75Ohm

General Features
- Input cable equalizer for extended range and robustness
- Reference grade word clock recovery, master-sync capable
- Dedicated routing for non-processed channels, all channels (max. 64) can be routed to/from the device or looped through
- AES3 channel status management, non-audio detection

Technical Data – Option Board MADI I/O, Optical [O_DAP_MO_MM_a, O_DAP_MO_SM_a]

<table>
<thead>
<tr>
<th>Standards</th>
<th>Relevant specifications comply with AES10-2008 and AES11-2009.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>24bits, transparent forwarding of PCM and compressed audio</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz, (88.2, 96kHz short framing)</td>
</tr>
<tr>
<td>Optical Input, LC</td>
<td>64/56 channels @ 44.1 and 48kHz, 32/28 @ 88.2 and 96kHz Processable by D<em>AP8: 16 channels @ 44.1, 48kHz Processable by D</em>AP4: 8 channels @ 44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Connector type</td>
<td>LC (IEC 61754-20)</td>
</tr>
<tr>
<td>Center wavelength</td>
<td>1310nm (typ.), 1270 … 1360nm</td>
</tr>
<tr>
<td>Input optical power</td>
<td>[O_DAP_MO_MM_a]: -31 … -8dBm, OM2 multimode (50/125µm) [O_DAP_MO_SM_a]: -23 … -8dBm, singlemode (9/125µm) (standard values, others on request)</td>
</tr>
<tr>
<td>Cable length (max.)</td>
<td>[O_DAP_MO.MM.a]: 1.5km, OM2 multimode [O_DAP_MO_SM_a]: 2km, singlemode (standard values, others on request)</td>
</tr>
<tr>
<td>Optical Output, LC</td>
<td>64/56 channels @ 44.1 and 48kHz, 32/28 @ 88.2 and 96kHz Processable by D<em>AP8: 16 channels @ 44.1, 48kHz Processable by D</em>AP4: 8 channels @ 44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Connector type</td>
<td>LC (IEC 61754-20)</td>
</tr>
<tr>
<td>Center wavelength</td>
<td>1310nm (typ.), 1270 … 1360nm</td>
</tr>
<tr>
<td>Output optical power</td>
<td>[O_DAP_MO.MM.a]: -23 … -14dBm, OM2 multimode (50/125µm) [O_DAP_MO_SM_a]: -15 … -8dBm, singlemode (9/125µm) (standard values, others on request)</td>
</tr>
<tr>
<td>BNC Output</td>
<td>Optical and BNC output carry the same signal.</td>
</tr>
<tr>
<td>Impedance</td>
<td>75Ohm</td>
</tr>
<tr>
<td>Output voltage</td>
<td>0.6Vpp (typ.) @ 75Ohm</td>
</tr>
</tbody>
</table>

General Features
- Field-replaceable optical module (SFP)
- Reference grade word clock recovery, master-sync capable
- Dedicated routing for non-processed channels, all channels (max. 64) can be routed to/from the device or looped through
- AES3 channel status management, non-audio detection
- Parallel outputs (BNC/LC) for media conversion
## Technical Data – Option Board Audio-over-IP DANTE™ I/O

<table>
<thead>
<tr>
<th>Standards</th>
<th>Audio-over-IP by Dante™ Digital Audio Networking Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio</td>
<td>24bits, transparent forwarding of PCM and compressed audio</td>
</tr>
<tr>
<td>Audio Sample Rate</td>
<td>44.1, 48, 88.2, 96kHz</td>
</tr>
<tr>
<td>Inputs and Outputs</td>
<td>2 x Gigabit Ethernet RJ45 connectors (100M/1Gbit), primary and secondary port</td>
</tr>
</tbody>
</table>
| Inputs | Processable by D*AP8: 16 channels @ 44.1, 48kHz  
Processable by D*AP4: 8 channels @ 44.1, 48, 88.2, 96kHz |
| Outputs | Processable by D*AP8: 16 channels @ 44.1, 48kHz  
Processable by D*AP4: 8 channels @ 44.1, 48, 88.2, 96kHz |
| General Features |  
• AES67 compliant (when available)  
• Network master-sync can be provided by D*AP device  
• Master-sync capable (for D*AP device)  
• Non-audio detection for input channels  
• Glitch-free Dante™ audio redundancy using dual Ethernet networks |

### Technical Data – Rear Connectors – **pin assignment**

<table>
<thead>
<tr>
<th>connector:</th>
<th>GPI/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>female</td>
<td>25-pin D-Sub</td>
</tr>
<tr>
<td>1</td>
<td>GPI_1, 2, 3, 4 common</td>
</tr>
<tr>
<td>2</td>
<td>GPI_1</td>
</tr>
<tr>
<td>3</td>
<td>GPI_2</td>
</tr>
<tr>
<td>4</td>
<td>GPI_3</td>
</tr>
<tr>
<td>5</td>
<td>GPI_4</td>
</tr>
<tr>
<td>6</td>
<td>GPI_5, 6, 7, 8 common</td>
</tr>
<tr>
<td>7</td>
<td>GPI_5</td>
</tr>
<tr>
<td>8</td>
<td>GPI_6</td>
</tr>
<tr>
<td>9</td>
<td>GPI_7</td>
</tr>
<tr>
<td>10</td>
<td>GPI_8</td>
</tr>
<tr>
<td>11</td>
<td>Isolated 5V +</td>
</tr>
<tr>
<td>12</td>
<td>Isolated 5V +</td>
</tr>
<tr>
<td>13</td>
<td>GPO_1, 2, 3, 4 common</td>
</tr>
<tr>
<td>14</td>
<td>GPO_1</td>
</tr>
<tr>
<td>15</td>
<td>GPO_2</td>
</tr>
<tr>
<td>16</td>
<td>GPO_3</td>
</tr>
<tr>
<td>17</td>
<td>GPO_4</td>
</tr>
<tr>
<td>18</td>
<td>GPO_5, 6, 7, 8 common</td>
</tr>
<tr>
<td>19</td>
<td>GPO_5</td>
</tr>
<tr>
<td>20</td>
<td>GPO_6</td>
</tr>
<tr>
<td>21</td>
<td>GPO_7</td>
</tr>
<tr>
<td>22</td>
<td>GPO_8</td>
</tr>
<tr>
<td>23</td>
<td>Isolated 5V -</td>
</tr>
<tr>
<td>24</td>
<td>Isolated 5V -</td>
</tr>
<tr>
<td>25</td>
<td>Isolated 5V -</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>connector:</th>
<th>Metadata IN</th>
</tr>
</thead>
<tbody>
<tr>
<td>female</td>
<td>9-pin D-Sub</td>
</tr>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>Tx (-)</td>
</tr>
<tr>
<td>3</td>
<td>Rx (+)</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>Tx (+)</td>
</tr>
<tr>
<td>8</td>
<td>Rx (-)</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>connector:</th>
<th>Metadata OUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>9-pin D-Sub</td>
</tr>
<tr>
<td>1</td>
<td>GND</td>
</tr>
<tr>
<td>2</td>
<td>GND</td>
</tr>
<tr>
<td>3</td>
<td>Tx (+)</td>
</tr>
<tr>
<td>4</td>
<td>GND</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
<tr>
<td>6</td>
<td>GND</td>
</tr>
<tr>
<td>7</td>
<td>GND</td>
</tr>
<tr>
<td>8</td>
<td>Tx (-)</td>
</tr>
<tr>
<td>9</td>
<td>GND</td>
</tr>
</tbody>
</table>
# D*AP8 MAP

## Technical Data - Optional Interface Modules – pin assignment

<table>
<thead>
<tr>
<th>connector: 4x analog I/O [O_DAP_ADDA_a]</th>
<th>connector: 4x AES I/O [O_DAP_AES_a]</th>
<th>connector: 8x analog out [O_DAP_8DA_a]</th>
</tr>
</thead>
<tbody>
<tr>
<td>female 25-pin D-Sub</td>
<td>female 25-pin D-Sub</td>
<td>female 25-pin D-Sub</td>
</tr>
<tr>
<td>1 OUT-4 +</td>
<td>1 OUT-4 +</td>
<td>1 OUT-8 +</td>
</tr>
<tr>
<td>2 GND</td>
<td>2 GND</td>
<td>2 GND</td>
</tr>
<tr>
<td>3 OUT-3 -</td>
<td>3 OUT-3 -</td>
<td>3 OUT-7 -</td>
</tr>
<tr>
<td>4 OUT-2 +</td>
<td>4 OUT-2 +</td>
<td>4 OUT-6 +</td>
</tr>
<tr>
<td>5 GND</td>
<td>5 GND</td>
<td>5 GND</td>
</tr>
<tr>
<td>6 OUT-1 -</td>
<td>6 OUT-1 -</td>
<td>6 OUT-5 -</td>
</tr>
<tr>
<td>7 IN-4 +</td>
<td>7 IN-4 +</td>
<td>7 OUT-4 +</td>
</tr>
<tr>
<td>8 GND</td>
<td>8 GND</td>
<td>8 GND</td>
</tr>
<tr>
<td>9 IN-3 -</td>
<td>9 IN-3 -</td>
<td>9 OUT-3 -</td>
</tr>
<tr>
<td>10 IN-2 +</td>
<td>10 IN-2 +</td>
<td>10 OUT-2 -</td>
</tr>
<tr>
<td>11 GND</td>
<td>11 GND</td>
<td>11 GND</td>
</tr>
<tr>
<td>12 IN-1 -</td>
<td>12 IN-1 -</td>
<td>12 OUT-1 -</td>
</tr>
<tr>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>14 OUT-4 -</td>
<td>14 OUT-4 -</td>
<td>14 OUT-8 -</td>
</tr>
<tr>
<td>15 OUT-3 +</td>
<td>15 OUT-3 +</td>
<td>15 OUT-7 -</td>
</tr>
<tr>
<td>16 GND</td>
<td>16 GND</td>
<td>16 GND</td>
</tr>
<tr>
<td>17 OUT-2 -</td>
<td>17 OUT-2 -</td>
<td>17 OUT-6 -</td>
</tr>
<tr>
<td>18 OUT-1 +</td>
<td>18 OUT-1 +</td>
<td>18 OUT-5 -</td>
</tr>
<tr>
<td>19 GND</td>
<td>19 GND</td>
<td>19 GND</td>
</tr>
<tr>
<td>20 IN-4 -</td>
<td>20 IN-4 -</td>
<td>20 OUT-4 -</td>
</tr>
<tr>
<td>21 IN-3 +</td>
<td>21 IN-3 +</td>
<td>21 OUT-3 +</td>
</tr>
<tr>
<td>22 GND</td>
<td>22 GND</td>
<td>22 GND</td>
</tr>
<tr>
<td>23 IN-2 -</td>
<td>23 IN-2 -</td>
<td>23 OUT-2 -</td>
</tr>
<tr>
<td>24 IN-1 +</td>
<td>24 IN-1 +</td>
<td>24 OUT-1 +</td>
</tr>
<tr>
<td>25 GND</td>
<td>25 GND</td>
<td>25 GND</td>
</tr>
</tbody>
</table>
Technical Data - GPI wiring

The device offers a unique circuitry to save GPI setups from hum and noise influence in complex installations. Here the principle circuit of one of the eight GPI inputs:

At the GPI input is a bridge rectifier i.e. you do not need to care about the polarity of the input voltage. A constant current source in line with the optical coupler limits the current. You must simply provide a voltage in the range from 5V to 30V to activate a GPI.

If you have open collector outputs or simple relay closures as the driving GPOs (this technique is commonly known as "low active" and will be found in most legacy equipment), you must wire up an auxiliary voltage supply.

The device provides such auxiliary power supply. It offers a balanced 5V source that you can imaging as a battery.

Here an example how to wire up GPI #4:

We strongly recommend to spent a wire for ground connection instead of using the chassis common grounds of an installation.
Safety Information

Electrical

Safety classification: Class 1 – grounded product / Schutzklasse 1
Corresponding to EN 60065:2002

Power connection: The device must be connected to a power socket that provides a protective earthing conductor.

Power switch: The power switch is a toggle switch placed at the rear of the device. The ON / OFF position is indicated by engravings [I] / [O] on the lever. It must be reached without difficulty.

The devices may be equipped with dual power supply, in this case it will have two power cords and switches. You must inform yourself about the location and assignment of the switches.

Water protection: The device must not be exposed to splash or dripping water. It is permitted to place a container filled with liquids (e.g. vases) on top of the device.

Service safety

Only qualified personnel should perform service procedures.

Do not service alone: Do not perform internal service or adjustments of the device unless another person capable of rendering first aid and resuscitation is present.

Disconnect power: To avoid electrical shock, switch off the device power, then disconnect the power cord from the mains power. Do not block the power cord; it must remain accessible to the user at all times.

To avoid fire or personal injury

Mounting: It must be placed on a flat surface or must be mounted into an 19" rack. It is recommended to use metal brackets (sheet steel angle) to support the device.

Provide proper ventilation: In this case and if the device has a built in fan, a gap of at least 1cm must be left between the device edge and the steel angle. It is highly recommended to leave a gap of at least 1RU above and below the device.

Use proper power cord: Use only the power cord specified for this product and certified for the country of use.

Do not operate without covers: Do not operate this product with covers or panels removed.

Do not operate with suspected failures: If you suspect that there is damage to this product, have it inspected by qualified service personnel.

Risk of explosion: The device contains a lithium battery. If replaced incorrectly or by a different or inadequate type an explosion may occur.

Warranty

Standard Junger Audio two-year warranty on parts and labor.

Specifications are subject to change without notice
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