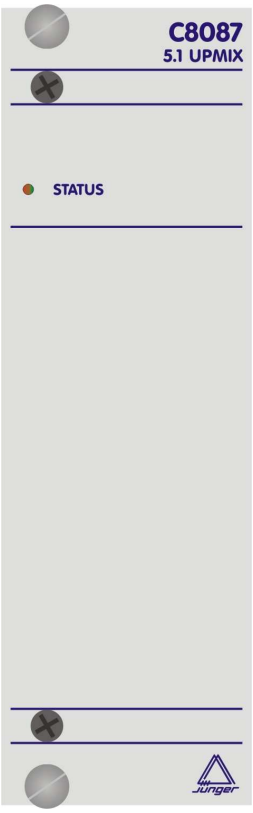
C8087

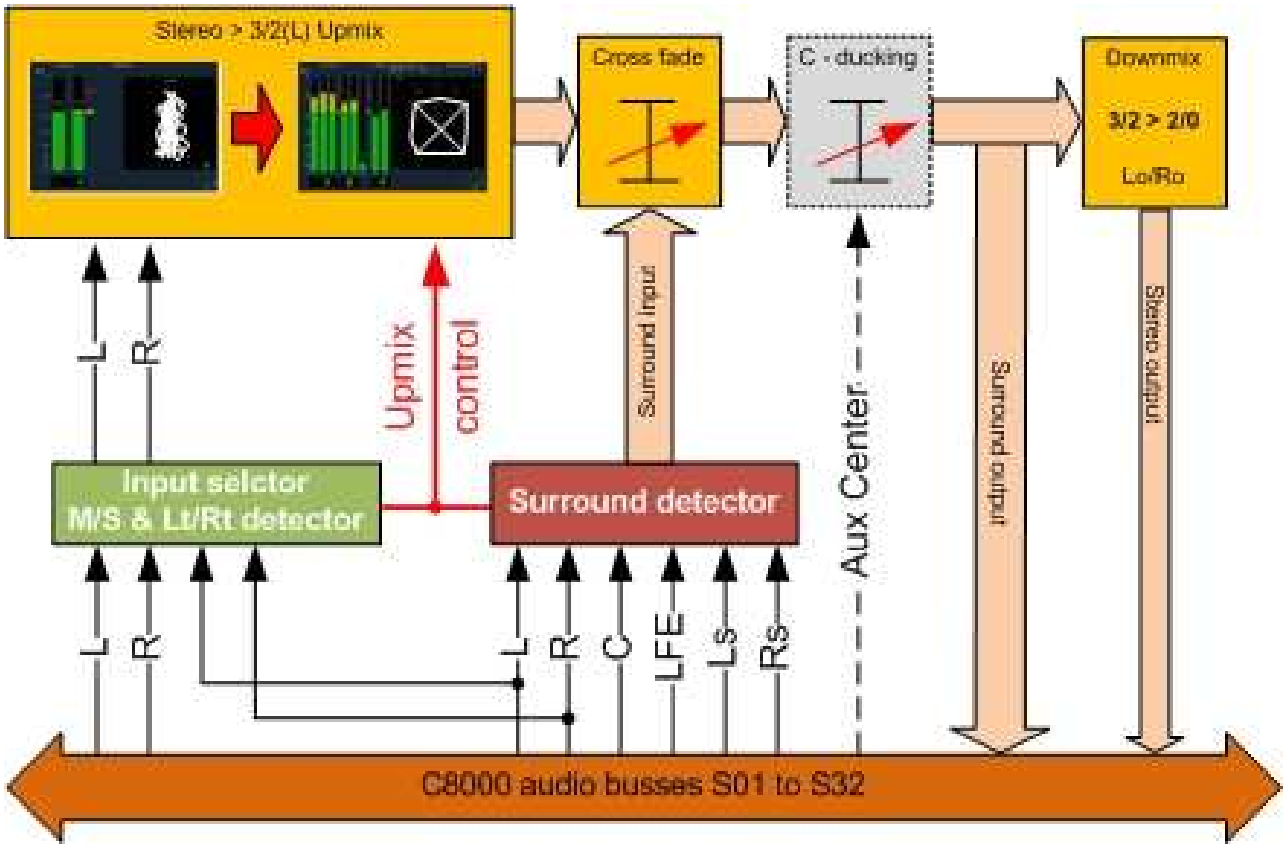
5.1 Upmix



features - *Future options in italic*

- Input format detector — auto detection of Mono, Stereo, Surround
- *Input mismatch detector* — *multiple stereo instead of expected surround*
- Stereo input selection — from surround L/R or independent stereo L/R
- Stereo upmix — permanent upmix from stereo input
- Upmix modes — 3/2, 3/2L
- *Lt/Rt compatible mode* — *auto detection of Lt/Rt*
- Automatic cross fade — between upmix and original surround if present
- *Center Ducking* — *over Center only or C & L/R (e.g. for commentator)*
- 8 presets

block diagram



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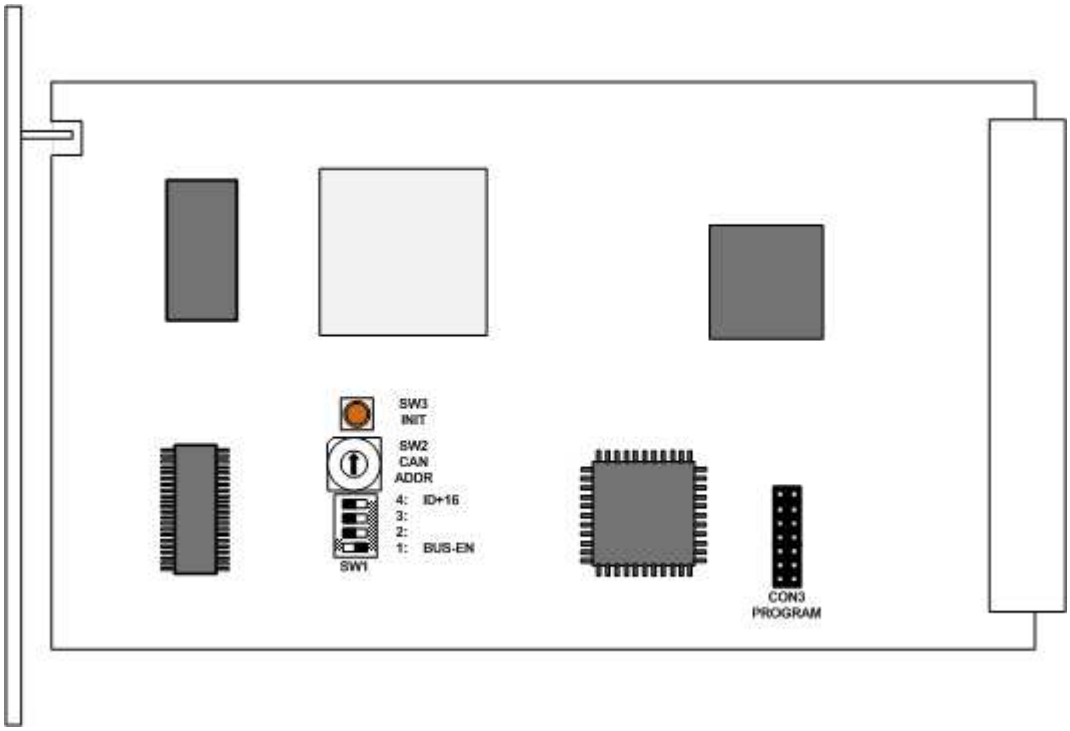
specifications

Resolution :	24bit
Sample rate :	48kHz
Digital processing delay :	3ms constantly
Backplane connector :	ref. to DIN41612, 64pin, a+b, male
Power supply :	+5V DC
Power consumption :	approx. 300 mA
Dimensions :	3RU, 8HP, 160mm depth

hardware settings

The C8087 does not have front panel controls.

It must be configured via web browser and the C8702 Frame Controller.



Above is a schematic view of the PCB . You must set these switches carefully in order not to disturb the audio signal of other parties within a c8k frame.

The module has a front panel **STATUS** LED. It shows green if the module is working correctly. It turns red if something is wrong and it flashes if the module is under remote control (in focus).

Since this type of module has an electronic output routing facility, great care must be taken when installing or exchanging a module!

SW1

1: BUS-EN **ON**
the output configuration will be taken from the **NV** (non volatile) **memory** after power up.
OFF
will set all bus outputs to Tri-State-Mode (inactive). Now you can use the frame controller to configure the board. This configuration will automatically be stored into the **NV memory**. To enable the configuration for the next power up you must **pull out** the module and set **BUS-EN=ON** again.

Important note! If an unknown output bus configuration is stored, it can cause a conflict with other modules in the frame. If you are not sure about the output bus configuration you must turn BUS-EN=OFF before inserting such a module into a system that is On Air.

2: Not used **OFF**

3: Not used **OFF**

4: ID +16 **ON**
CAN address range is extended by **+16**, ranges from 0x10 to 0x1F (16 – 31)
OFF
CAN address ranges from 0x0 to 0xF (0 – 15)

SW2

CAN rotary encoder **0 – F**
sets the CAN bus address. Each module within a frame must be assigned a **unique** CAN bus address for proper communication with other modules of the frame (see also ID +16 above).

Important note! This address also sets the position of the module graphic when you control the frame via the web GUI by a C8702 frame controller.

Addresses from “0” to “7” will place the module graphic into the third row (first row shows the frame controller and sync modules, second row is empty). Addresses “8” to “F” will place it into the fourth row and so on.
I.e. address “0” will place it in upper left position of row 3, while “1F” will place it in lower right position of row 6.

SW3

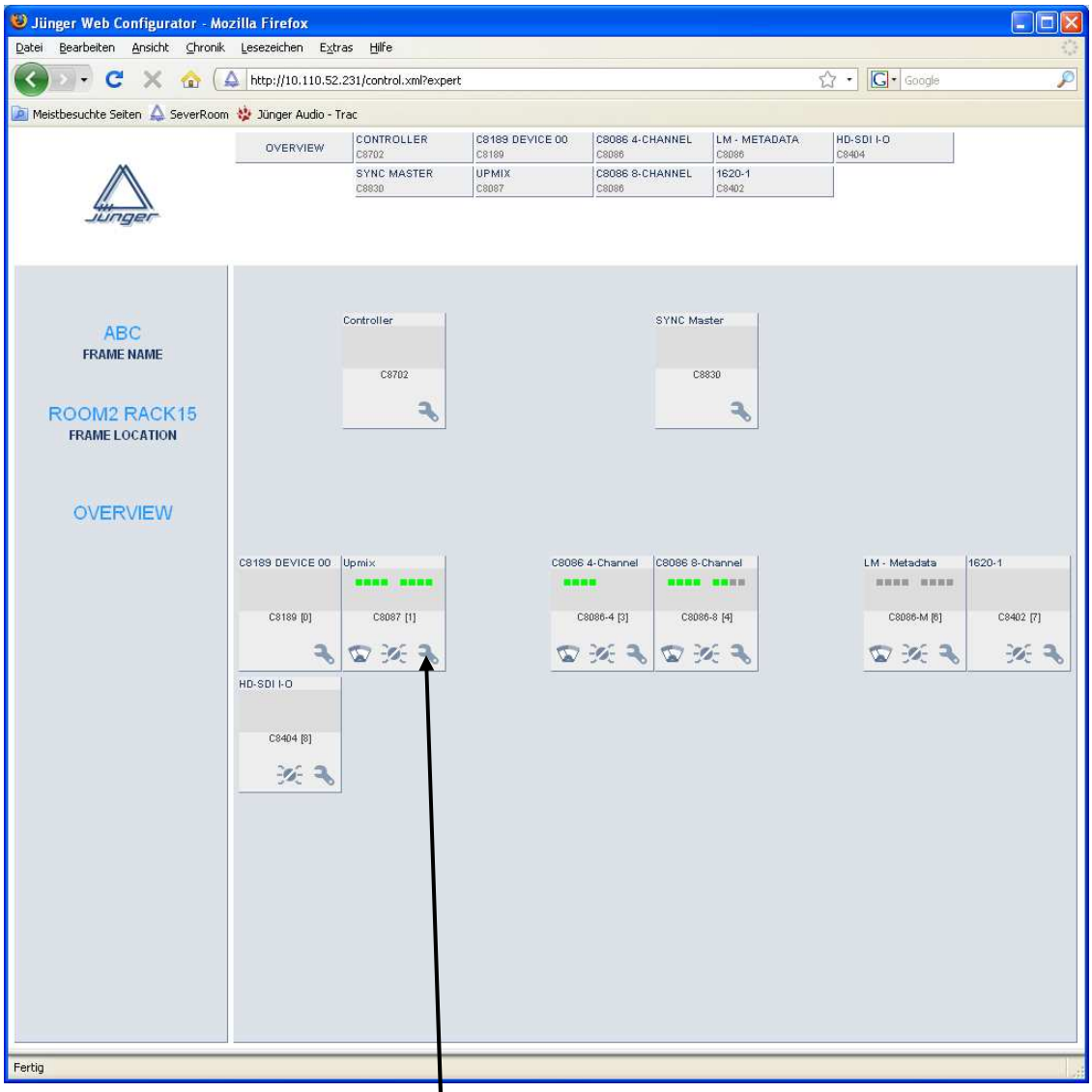
INIT pressing the **INIT** button during power up will initialize the module parameters to factory default values.

web browser based GUI

Set up of all configurations, parameters and functions via a web browser.
See also C8702 Frame Controller manual and respective firmware release notes.

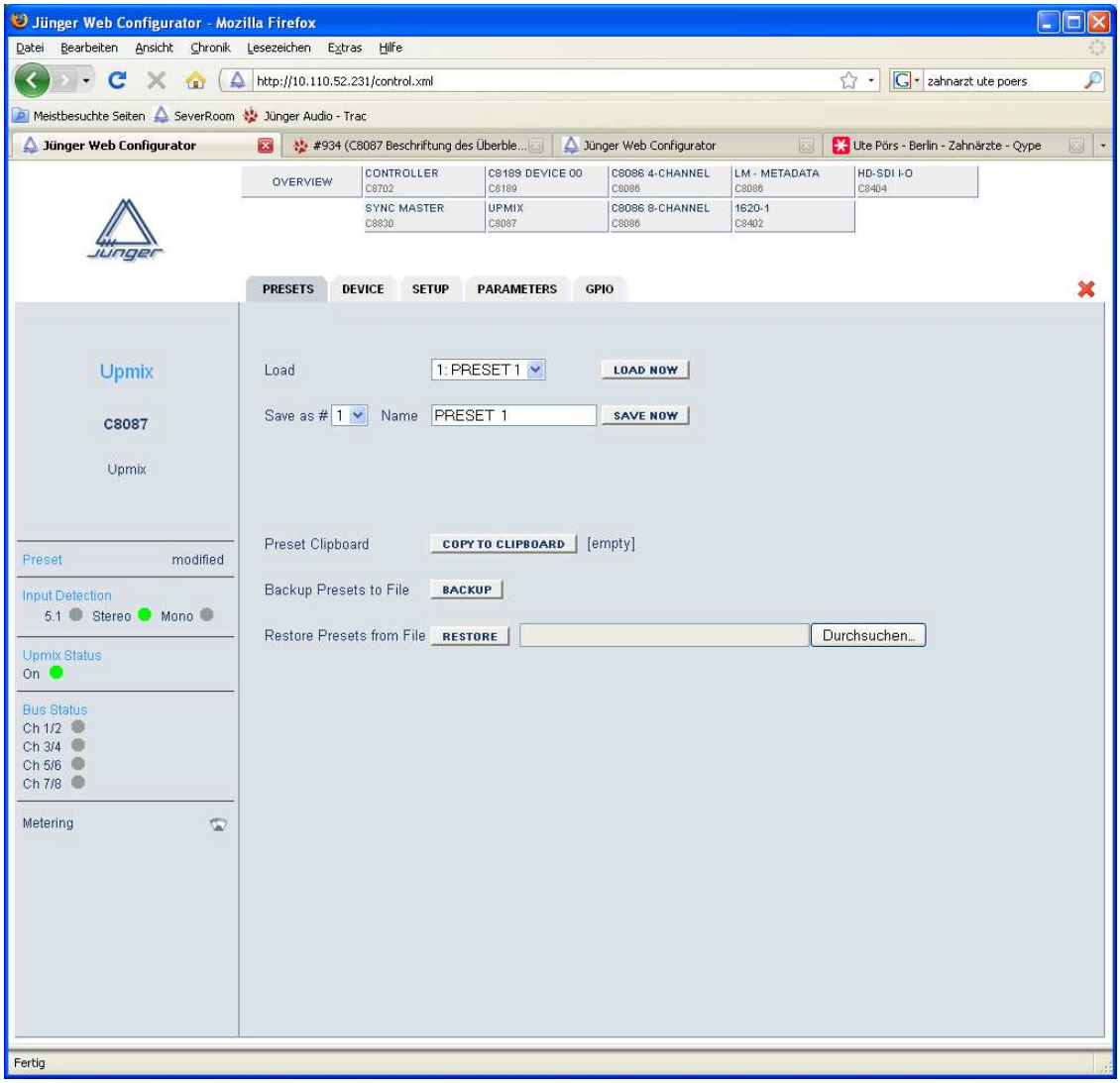
OVERVIEW

The modules overview of a frame (below the display of an example frame) :



By simply clicking on the tool symbol you will get the control pages of the selected module and the status window on the left side, which you will also see on mouse over.
The entrance to the module setup is the **PRESET** tab :

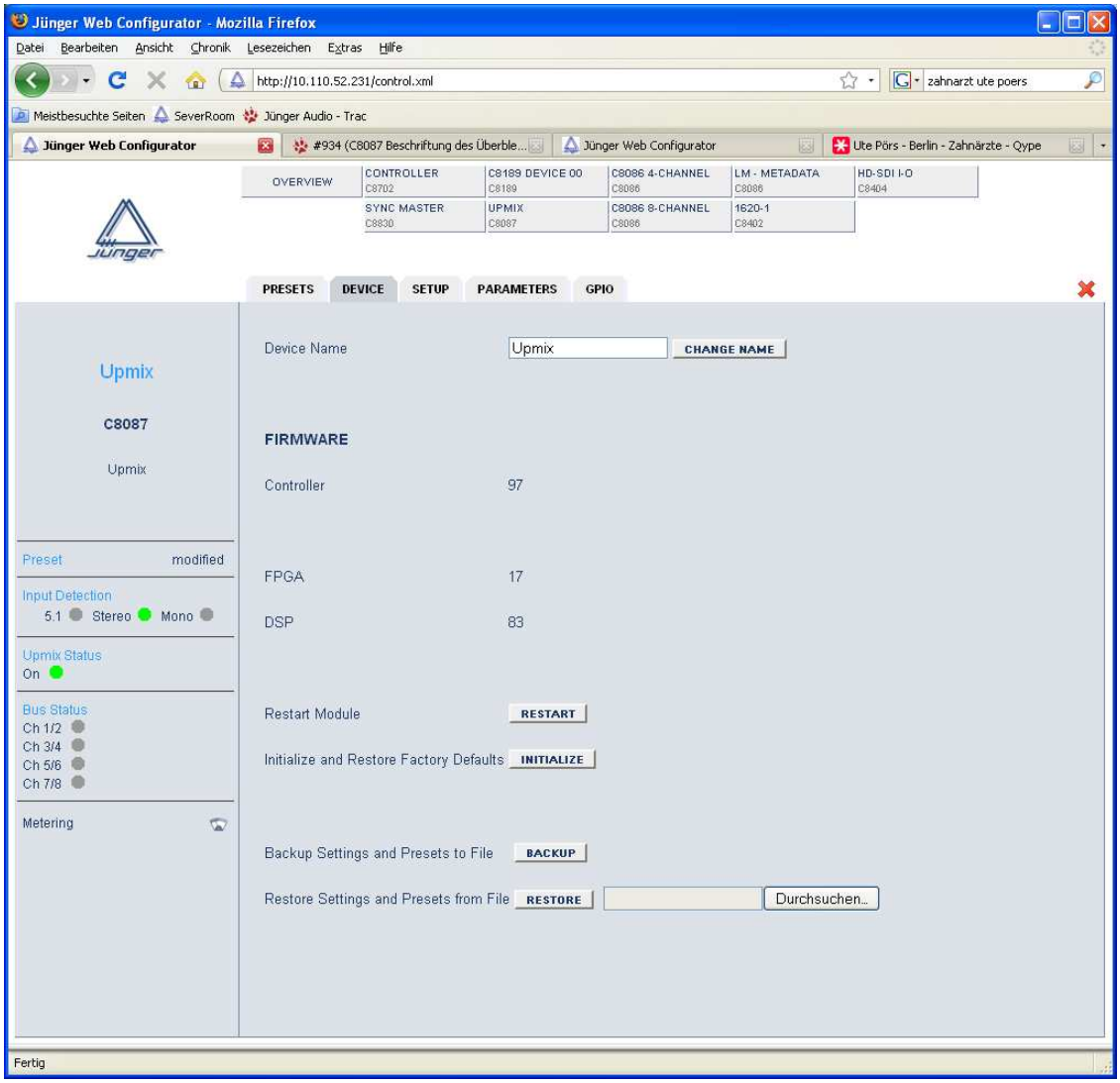
PRESETS



The **C8087** has **8 Presets**. These Presets are named **PRE1** to **PRE8** by default. The status window at the left hand side shows the name of the active preset. The phrase **"modified:"** will appear in line with the Preset name, if a preset parameter was changed by the operator.

Load Preset	select a preset by name and press **<LOAD NOW>**
Save as Preset #	select a preset memory number
Name	assign the preset a **4 digit name** and press **<SAVE NOW>**
Preset Clipboard	copy the active preset to a clip board, The data may be used by other modules inside the same frame.
Backup Presets to File	creates a backup **XML file** which may be stored to the PC
Restore Presets from File	you can select a **backup file** from the PC.

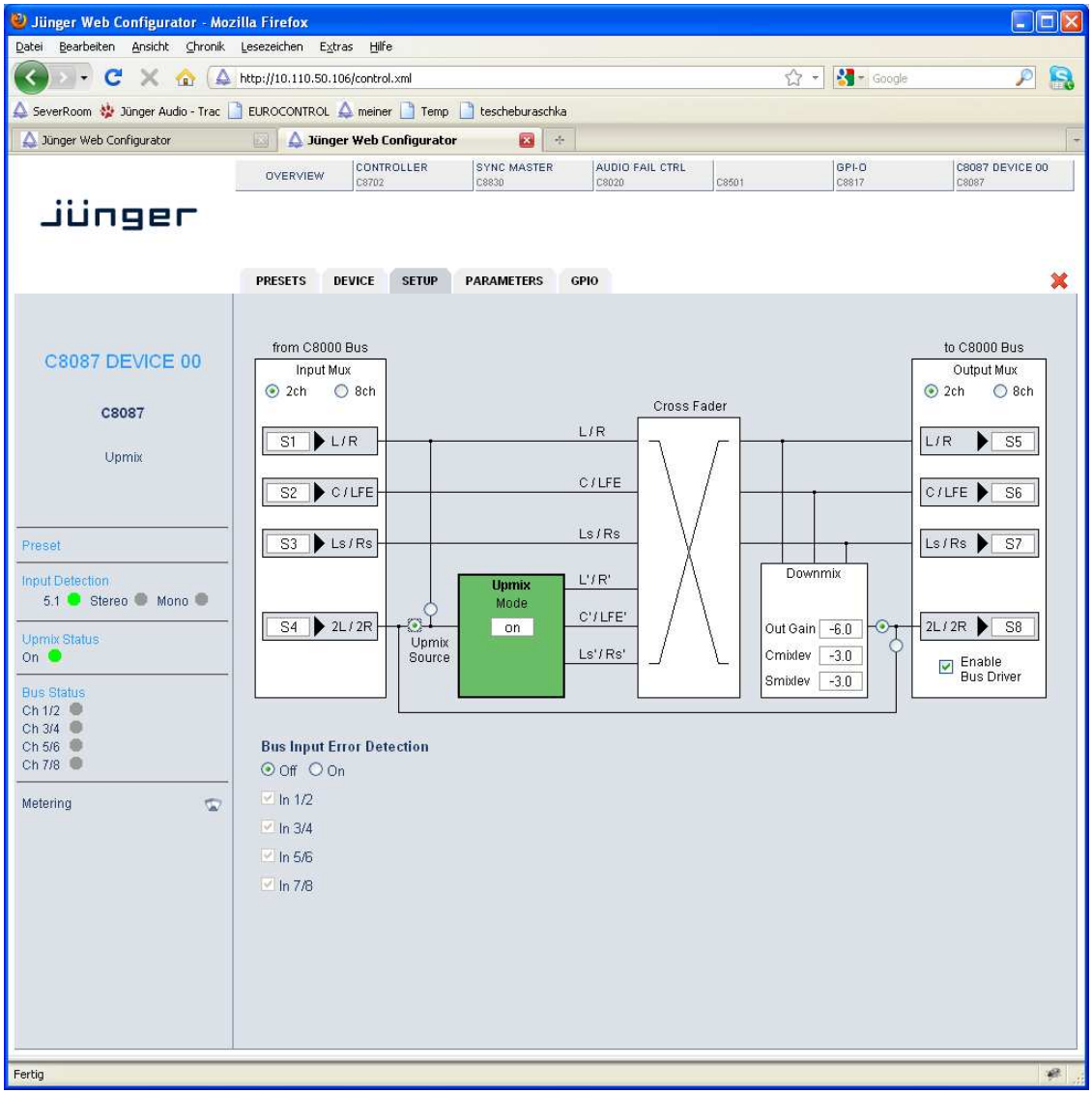
DEVICE



Device Name	you can assign the module a **16 digit name**
FIRMWARE	
Controller	of the module controller
FPGA	of the on board FPGA
DSP	of the DSP
Restart Module	**<RESTART>** performs a warm start (soft reset)
Initialize and Restore Factory Defaults	**<INITIALIZE>** restores the factory default values for all parameters of the module including all presets. The input bus assignment will be set to S01 … S04, the outputs are turned OFF and the bus drivers will be disabled.

Backup Settings and Presets to File	**<BACKUP>** will put all active parameters and the content of all presets into an XML file. You may store such file on a PC.
Restore Settings and Parameters from File	you may select a matching XML file from a PC. **<RESTORE>** will overwrite all active parameters and the content of the presets with the content of the backup file.

SETUP



From C8000 Bus	here you must assign the physical audio busses to the functional module inputs.
Input Mux	here you select if the input audio signals are multiplexed in **2ch** or **8ch** mode. If in 8ch mode only the upper bus assignment field will be available.
Upmix Source	the radio buttons select between surround L/R and independent stereo input as the feed for the upmix module
Bus Input Error Detection	the serial audio data from the frame bus can be monitored for proper positioning of an **Error-Flag**. A bad **Error-Flag** is an indication that there is disturbance upstream (input signal, input module, other DSP module). The **Error Detection** can be turned **Off** and **On** for each input from the bus. You will see the status of the busses on the left hand side: **"Bus Status"**. A **grey** "LED" shows that the detection is disabled. While **green** is OK, **red** indicates an error condition. The bus status may be presented to external monitoring systems via **SNMP**. The frame controller summarizes such status information and generates **SNMP traps** for the frame as an entity or may activate GPOs (if GPI/O module(s) are installed). The **SNMP manager** may afterwards poll the **"modulesStatus"** for more detailed status information per input (see SNMP documentation for details).
Cross Fader	this part cross fades the upmix output with the surround input, either automatically if surround is detected or manually on demand.
Downmix	this circuit generates an automatic downmix in Lo/Ro format by using the following parameters:
Ouput Gain	output level of the stereo downmix
Cmixlev	**Center Mix Level**
Smixlev	**Surround Mix Level**
To C8000 Bus	here you must assign the module outputs to the physical audio busses.
Output Mux	here you select if the output audio signals are multiplexed in **2ch** or **8ch** mode. In 8ch mode the upper bus assignment field will be available only.
Enable Bus Driver	turns on/off (tri state mode) all module bus drivers temporarily until power cycle to set up the module without interference with other modules already installed. See C8k system manual for details.

5.1 Upmix

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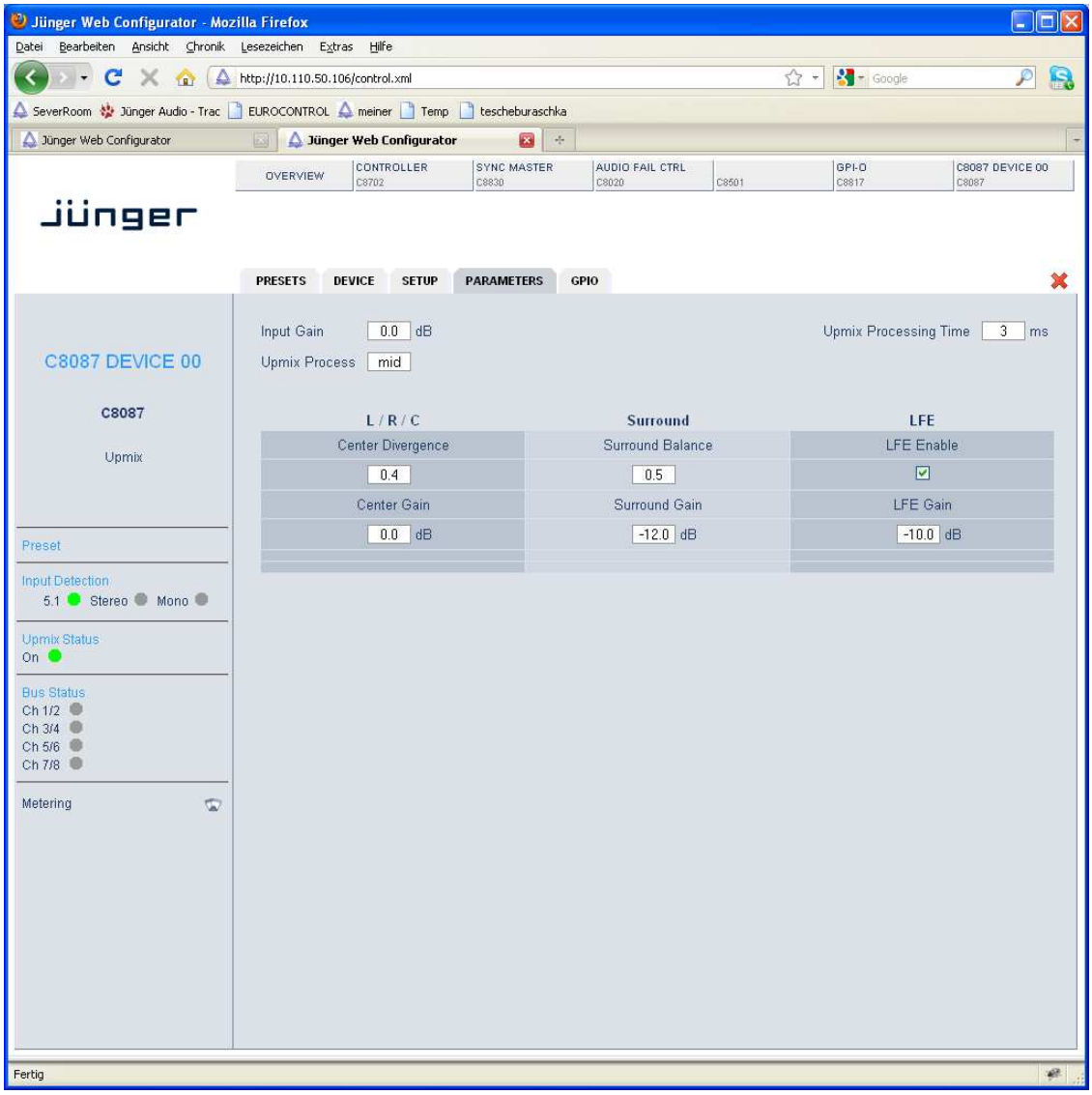
PARAMETERS



Input Gain here you may correct gain differences to match a certain level diagram or program feed dependent level differences.

Upmix Process **slow / mid / fast**
Reaction time of the upmix processes. For news, sports, shows with permanently changing content (e.g. applause) setting "fast" is recommended while mid / slow is recommended for music, movies.

Upmix Processing Time **3 – 100ms**
The Look-Ahead Delay has great influence on the quality of the upmix process in regard to the latency of the process. The more time you have to analyze the stereo signal the better the result of the upmix signal will be. Depending on the system latency requirements (ingest vs. live broadcast) you may change the processing time accordingly.

L / C / R

Center Divergence	the upmix process assembles a center signal from the input stereo. It may either be fed to the center channel only (0.0) or spread between L / C / R (1.0) The effect will be a wider presentation of center signals in a surround sound image.
Center Gain	sets the level of the center channel

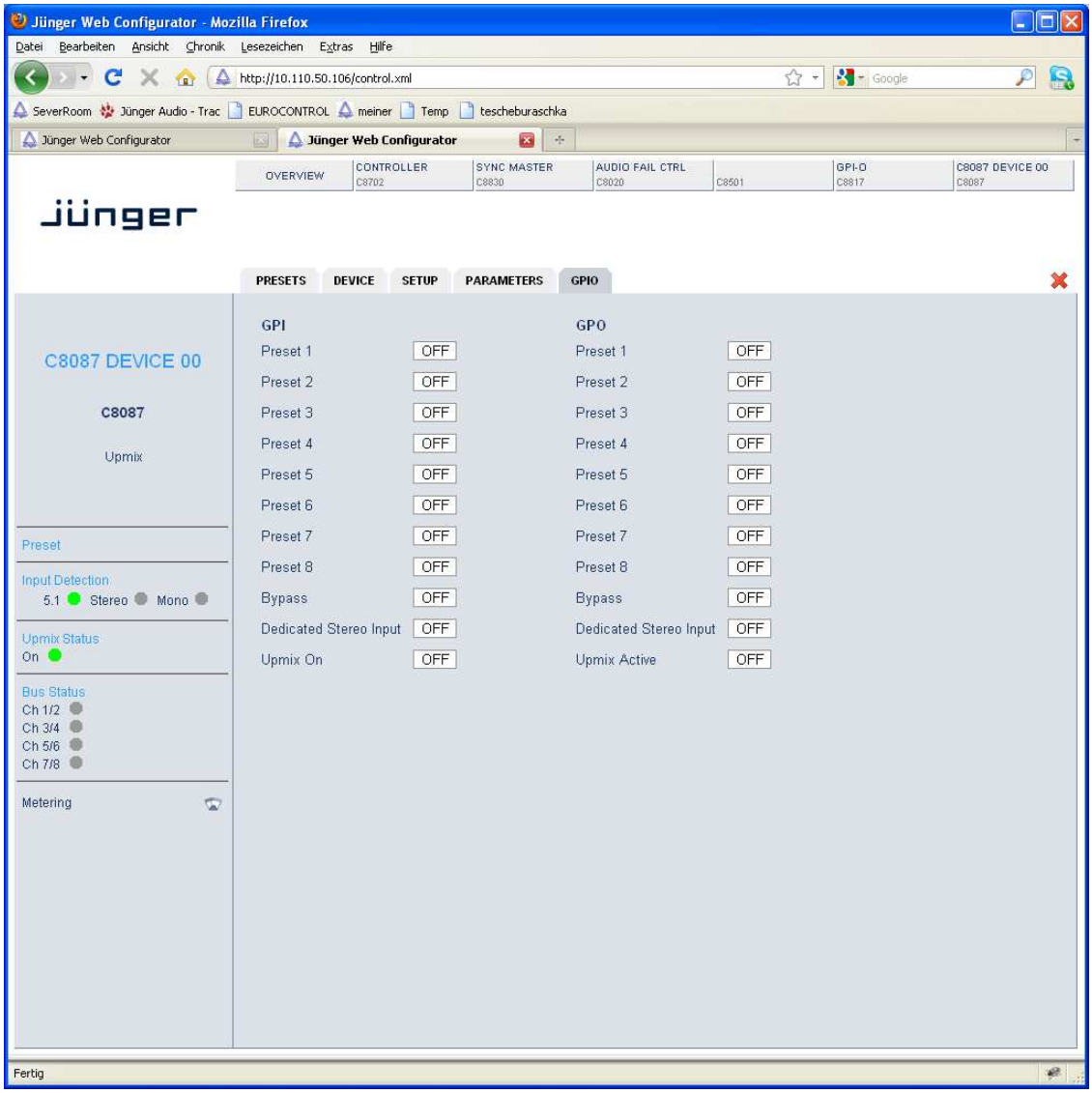
Surround

Surround Balance	defines the amount of direct sound mixed into the surround channels. 0.0 provides pure ambient sound while 0.1 to 1.0 will increase the amount of direct sound
Surround Gain	sets the level of Ls / Rs channels.

LFE

LFE Enbale	you may turn this option on if the upmix process must generate a subwoofer signal that will appear in the LFE channel of a surround sound system.
LFE Gain	you can set the LFE level here.

GPI/O



GPIs are useful if you want to recall settings remotely e.g. by presets.
The C8k frame can handle **127** different **GPIs**. You must assign a unique number to the respective function. Such numbers will be generated by the **brc8x** Broadcast Remote Controller or by a **GPI/O interface module GPO** (see C8817 manual for details). If the **C8087** receives such a number it will for example load the respective preset.

GPOs (Tallies) may signal the status of a module. The **GPI/O module** permanently listens for such numbers. If it reads such a number it will engage the respective **GPO** (see C8817 manual for details). This allows for easy interconnection with more generic monitoring equipment.