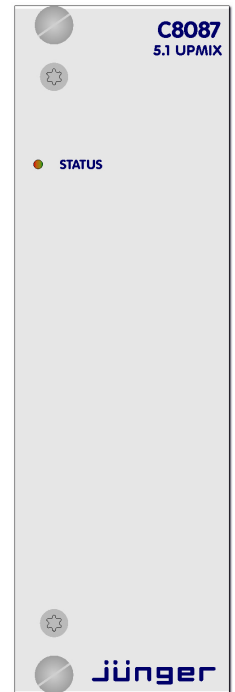


Upmix / Fail Over

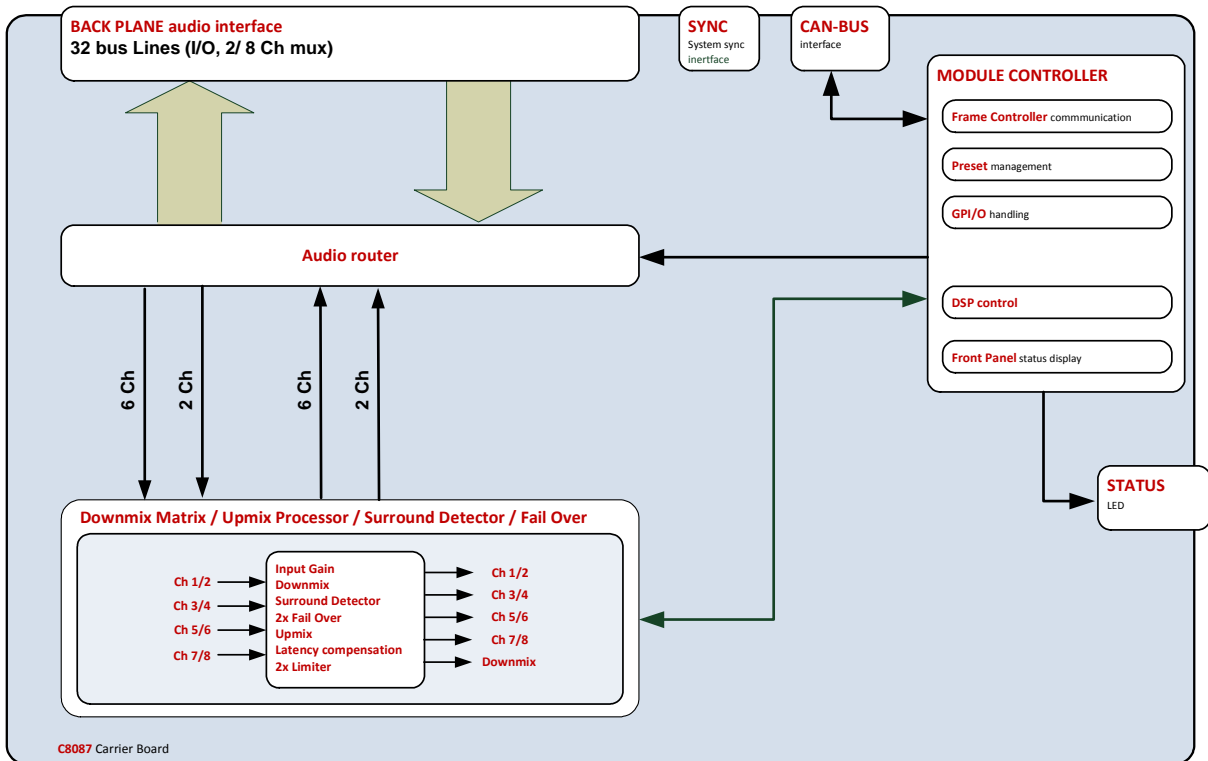
C8087

Features

- Input format detector auto detection of mono, stereo, surround
- Upmix input selection surround L/R or independent stereo L/R
- Upmix modes mono, stereo, automatic
- Surround fail over between surround input and upmix automatic or manual / remote controlled
- Stereo downmix from surround input
- Stereo fail over between alternative stereo input or surround downmix automatic or manual / remote controlled
- 8 Setup / routing presets manual (via GUI), remote controlled (GPI or Ember+)
- 8 Upmix presets manual (via GUI), remote controlled (GPI or Ember+)



Block diagram



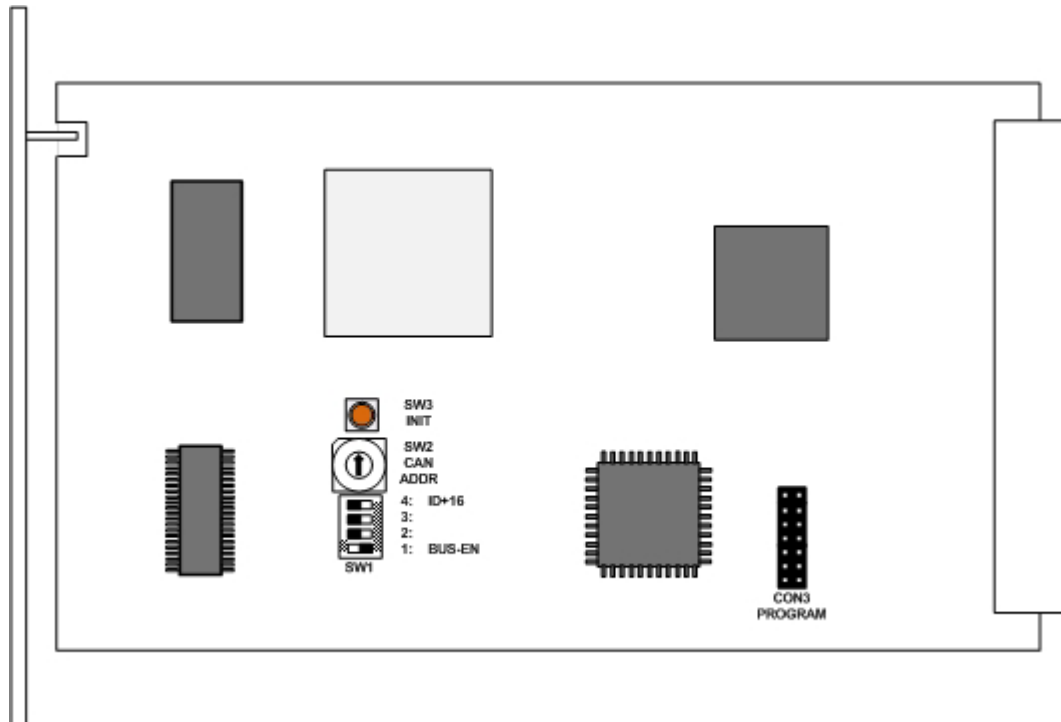
Technical data

Standards	Failover and Upmix module for uncompressed multichannel audio	
Audio Formats	PCM (24bits)	
Audio Channels	8 inputs 8 outputs	
Channel Modes	3/2L and 2/0	
Audio Sample Rate	48kHz	
Processing Latency	Upmix	3 ... 100ms
	Downmix	
Power Supply	5Vdc (4.75 ... 5.25V), max. 800mA	
Dimension	3RU, 4HP, 160mm depth (DIN41612 backplane connector)	
Environmental	Operating temperature 0 ... 40°C Non-operating -20 ... 70°C, Humidity < 90%, non-condensing	
General Features	<ul style="list-style-type: none"> <li>• Upmix of stereo or mono to 3/2L</li> <li>• Downmix of 3/2L to 2/0</li> <li>• Surround fail over to upmix</li> <li>• Stereo fail over to downmix</li> <li>• Automatic modes</li> <li>• Brick wall limiters</li> </ul>	

## Installation

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.

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Upmix / Fail Over

C8087

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<b>2: Not used</b>	<b>OFF</b>
<b>3: Not used</b>	<b>OFF</b>
<b>4: ID +16</b>	<b>OFF</b> CAN address ranges from 0x0 to 0xF (0 – 15) <b>ON</b> CAN address range is extended by <b>+16</b> , ranges from 0x10 to 0x1F (16 – 31)
<b>SW2 CAN ADDR</b>	Rotary encoder <b>0 – F</b> Sets the CAN bus address. Each module within a frame must be assigned a <b>unique</b> 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 the upper left position of row 3, while “1F” will place it in the lower right position of row 6.

<b>SW3 INIT</b>	pressing the <b>INIT</b> button during power up will initialize the module parameters to factory default values.
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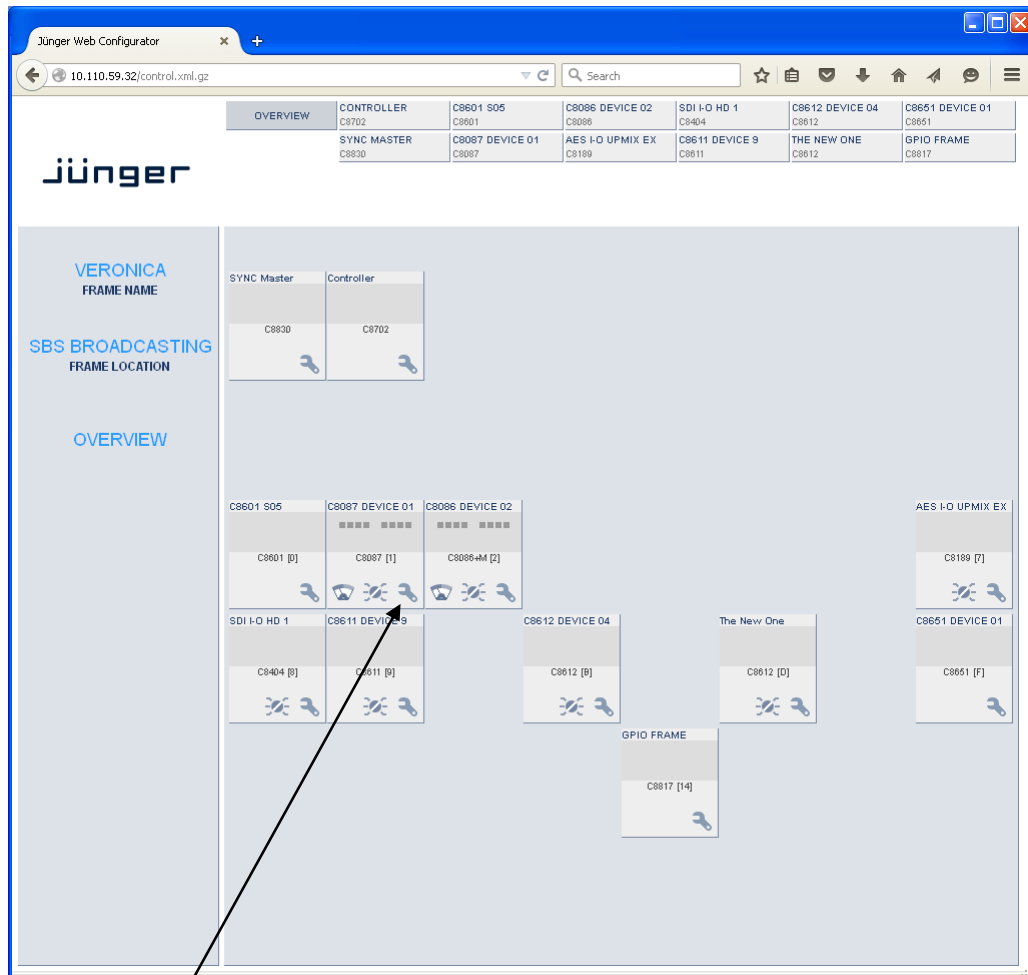
### Status LED

On the front panel is a status LED:

<b>STATUS</b>	<b>green</b> = OK <b>red</b> = bad <b>flashing</b> = module is in focus of the frame controller (under GUI control)
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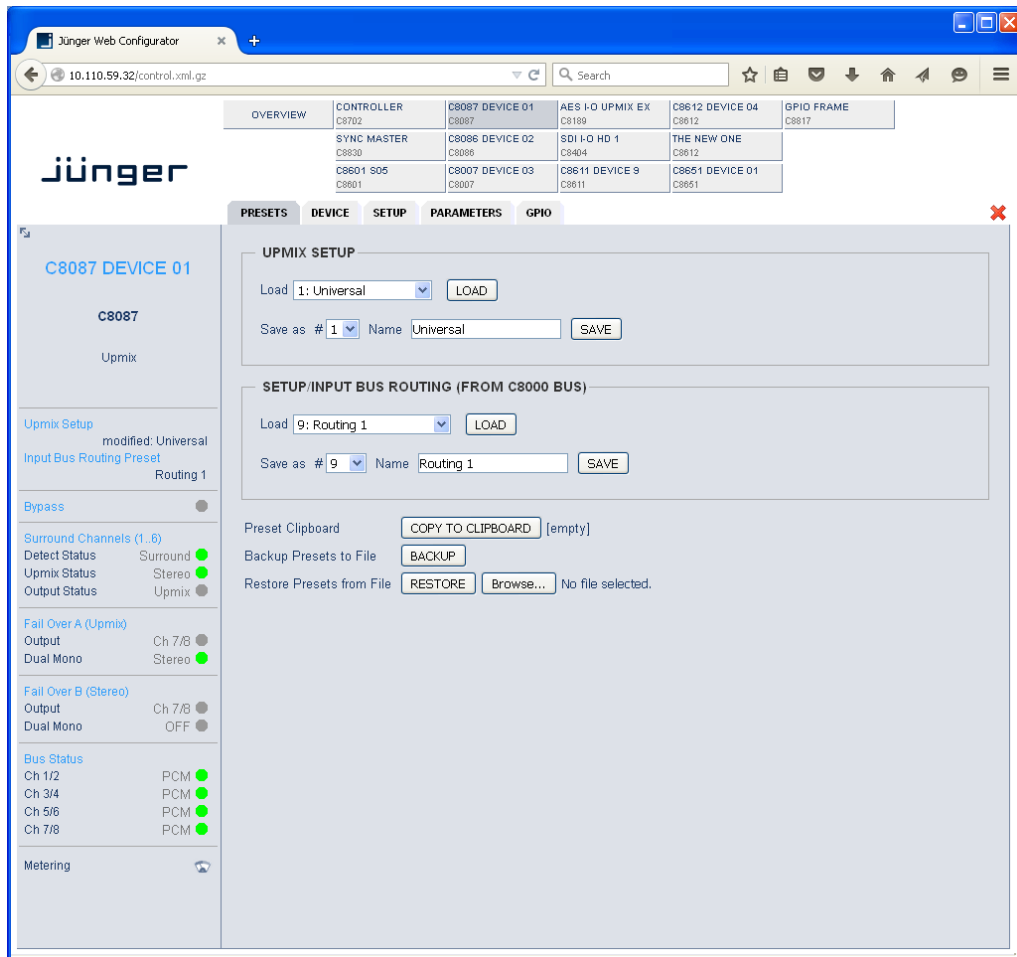
Remote configuration via web interface

### OVERVIEW:



Clicking on the ● **spanner tool** within the module graphics of the **C8087** will open the pages of that module.

PRESETS



The 8087 has two independent banks of presets to store and recall during operation.

UPMIX SETUP

- Load** [1: "name" ... 8: "name"]  
Select a preset by number/name and press **<LOAD NOW>**.  
The preset number and name loaded will automatically appear in the **Save as #** and **Name** field below.
- Save as #** [1 ... 8]  
You must **select** a preset memory number where you would like to save the actual parameters.
- Name** [16 character ASCII text]  
Assign a name to the preset you are about to save here.

**SETUP/INPUT BUS ROUTING  
(FROM C8000 BUS)**

**Load**

Refers to the **SETUP** pane  
A bank of 8 presets to recall device settings.

[9: "name" ... 16: "name"]

Select a preset by number/name and press **<LOAD NOW>**.

The preset number and name loaded will automatically appear in the **Save as #** and **Name** field below.

**Save as #**

[9 ... 16]

Select a preset memory number where you would like to save the actual audio program parameters.

**Name**

[16 character ASCII text]

Assign a name to the preset you are about to save (up to 16 digits) and press **<SAVE NOW>**.

**Preset Clipboard**

Copy the active presets to a **clipboard**, the data may be used by other modules inside the same frame.

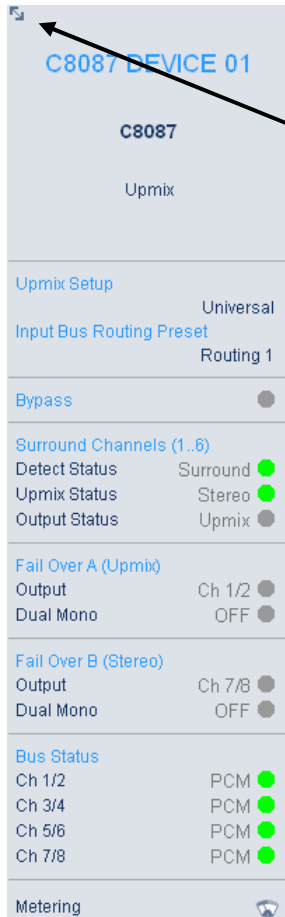
**Backup Presets to File**

Creates a backup **XML file** which may be stored to the PC.

**Restore Presets from File**

You can **<browse>** for a backup file from the PC and restore it by pressing the **<RESTORE>** soft button.

**STATUS DISPLAY**



If you are controlling a specific module you will see a status frame on the left hand side that also appears if you hover with the mouse over the graphical boxes in the GUIs **OVERVIEW** display. If the GUI size does not fit your screen well you may decrease the size of the status display by clicking on the little arrows in the upper left corner to get a smaller view.

**Upmix Setup**

Name of the actual setup preset loaded. The word "modified" appears as a prefix if a parameter has been changed by the operator.

**Input Bus Routing Preset**

Name of the actual input bus routing preset loaded. The word "modified" appears as a prefix if a parameter has been changed by the operator.

**Bypass**

Status of the Bypass switch (see PARAMETERS page) – lights red if bypass is on.

**Surround Channels (1 ... 6)**

**Detect Status**

[Surround / Stereo / Fail]

**Upmix Status**

[OFF / Stereo / Mono]

If upmix is enabled and upmix mode is set to "AUTO" the soft LED lights green.

**Output Status**

[Through / Upmix]

**Fail Over A (Upmix)**

[grey / green]

**Output**

[1/2 or 7/8]

Indicates the signal source that is used for the upmix. Lights green in auto mode.

**Dual Mono**

[Stereo or R/R Mono or L/L Mono]

**Fail Over B (Stereo)**

[grey / green / yellow]

**Output**

[Downmix or 7/8]

It can either be connected to Ch 7/8 or to the downmix from surround input or it can set to AUTO mode.

**Dual Mono**

[OFF or AUTO]

Lights green if in stereo mode. Lights yellow if in L/L or R/R mono mode.

**Bus Status**

[grey / green / red]

Signal status of the respective input, see SETUP pane further below.

**Ch 1/2 ... 7/8**

[PCM / NON AUDIO / ERROR]

Bus error status Ch 1/2 ... 7/8

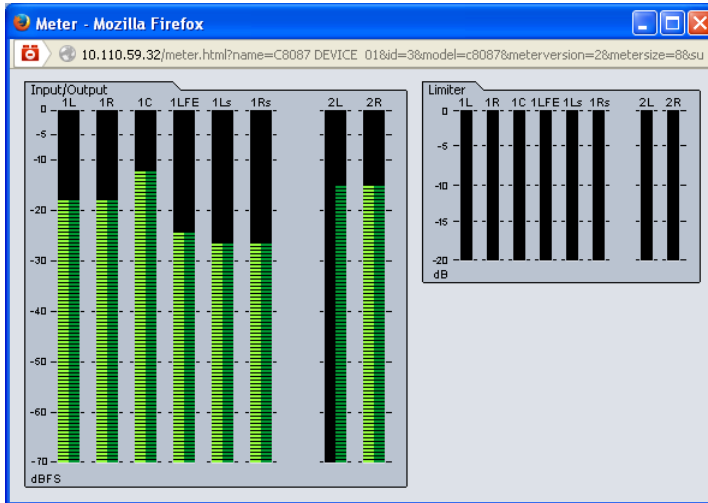
**Soft LED lights:**

- grey - if error detection is turned off
- green - if PCM is detected
- yellow - if non audio is detected
- red - if an error is detected



**Metering**

Link to call the JAVA Meter Applet.



This applet is based on JAVA technology. In order to run it, a certified and up-to-date JAVA version must be installed on the PC that is used to run the browser. The frame controller of the c8k system holds the certificate which Junger Audio bought. You must check with ORACLE that you have the appropriate JAVA runtime environment for your OS version installed on your PC.

**DEVICE**

**INFO**

**Device Name** [16 digit ASCII text]  
Pressing **<CHANGE NAME>** will do so.

**Platform** [C8621]  
Hardware related descriptor.

**Parameter Version** [x]  
Software related descriptor (feature set).

**FIRMWARE**

**Controller** [xy]  
Actual version of the module controller firmware.

**DSP** [xy]  
Actual version of the metadata subsystem.

**FPGA** [xy]  
Actual version of the system FPGA.

**RESET**

**Restart Module** **<RESTART>**  
Pressing the soft button will warm start the module

**Initialize and Restore  
Factory Defaults** **<INITIALIZE>**  
Pressing the soft button, will clear the parameter memory and  
will initialize all parameters to their factory default values.

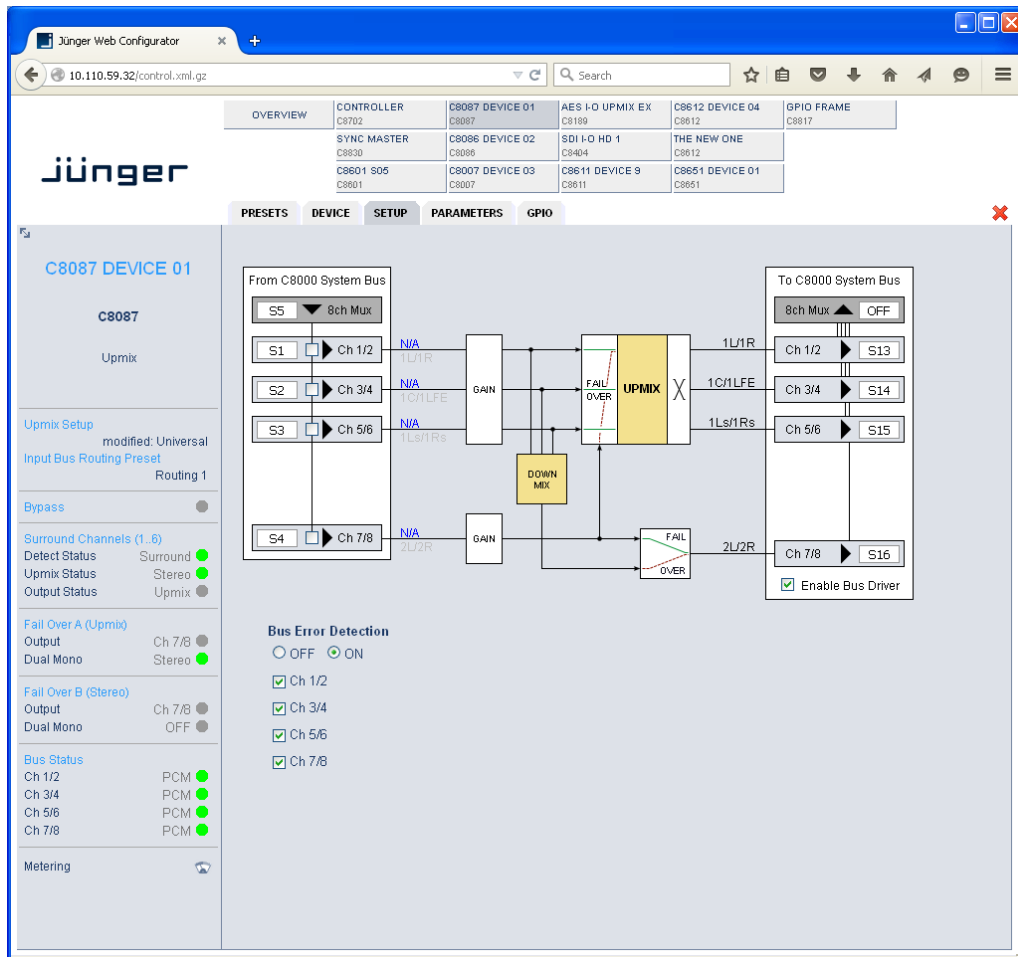
**BACKUP / RESTORE**

**Backup Settings and  
Presets to File** **<BACKUP>**  
Pressing the soft button will create an XML file that one may  
store on a PC.

**Restore Settings and  
Presets from File** **<RESTORE>** |  
Pressing the soft button will upload a backup file that has been  
selected via soft button **<BROWSE>** and move the previously  
stored settings back to the module.

SETUP

Setup of the module and the audio bus routing



**From C8000 System Bus**

**8 Ch Mux**

[S1 ... S32]

Selection of a backplane bus that carries an eight channel multiplex. The check boxes select which pair from the multiplex stream will feed the respective input(s) of the DECODER.

**Ch 1/2 ... Ch 7/8**

[S1 ... S32]

Here you may select the inputs of the audio processor.

**To C8000 Bus**

**8ch Mux**

The outputs from the decoder can be assigned to the C8k audio busses.

You can send the **8 channels** from the decoder in **8ch multiplex mode** via **one** audio bus line. Ch 1/2 to Ch 7/8 are multiplexed that way.

**Enable Bus Driver**

[OFF / ON]

You can disable the output drivers by un-checking the Enable Bus Driver check box.

**Important Note!** The bluish labels on the bus selectors represent the signal configuration of the audio processor. Downstream equipment must be configured to receive the correct audio channels.

**Bus Error Detection**

[ON / OFF]

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).

The **Error Detection** can be turned off and on in general or per input. You will see the status on the left hand side: **“Input 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 a GPI/O module is installed). The **SNMP manager** may afterwards poll the **“modulesStatus”** for more detailed status information per input (see SNMP documentation for details).

**PARAMETER**

display of general parameters and setup of functions:

The screenshot displays the 'PARAMETERS' tab for the C8087 device. On the left, a sidebar shows the device name 'C8087' and 'Upmix'. The main area features a block diagram at the top showing the signal flow from input channels (Ch 1/2-1L/1R, Ch 3/4-1C/1FE, Ch 5/6-1Ls/1Rs, Ch 7/8-2L/2R) through gain stages, a Downmix block, Fail Over A and B blocks, an Upmix block, and finally through latency compensation and limiters to output channels (Ch 1/2-1L/1R, Ch 3/4-1C/1FE, Ch 5/6-1Ls/1Rs, Ch 7/8-2L/2R). Below the diagram are several parameter control panels:

- Input Gain:** Input Gain 1L/1R/1C/1Ls/1Rs (dB) set to 0.0; Input Gain 1LFE (dB) set to 0.0; Input Gain 2L/2R (dB) set to 0.0.
- Output Limiter:** Limiter 1 (Surround) set to ON; Limiter 2 (Stereo) set to ON.
- Fail Over A (Upmix):** Mode set to Ch 1/2; Dual Mono set to OFF; Fail Threshold (dBFS) set to -60; Fail Wait (s) set to 1.5; Fail Return (s) set to 0.0; Side Chain Filter set to OFF.
- Fail Over B (Stereo):** Mode set to AUTO; Dual Mono set to OFF; Fail Threshold (dBFS) set to -60; Fail Wait (s) set to 1.5; Fail Return (s) set to 0.0; Side Chain Filter set to OFF.
- Surround Detect:** Switch set to FIX Upmix; Detection set to Signal Loss; Fail Threshold (dBFS) set to -60; Fail Wait (s) set to 1.0.
- Downmix:** Out Gain (dB) set to 0.0; Center Mix Level (dB) set to -3.0; Surround Mix Level (dB) set to -3.0.
- Upmix:** Enable set to ON; Upmix Mode set to AUTO; Profile set to Balanced; Processing Time (ms) set to 40; Center Divergence set to 0.70; Surround Gain (dB) set to -6.0; Surrnd Balance Stereo set to 0.50; Surrnd Balance Mono set to 0.35; LFE Enable set to Effect Gate; LFE Cutoff Freq (Hz) set to 80; LFE Gain (dB) set to -10.0; LFE Effect Gate Threshold (dB) set to -8.0.

On the left sidebar, the 'Bus Status' section shows green LEDs for Ch 1/2, Ch 3/4, Ch 5/6, and Ch 7/8, indicating they are in PCM mode and operational.

Upmix / Fail Over

C8087

Jünger Audio provides a **new** 5.1 upmix algorithm for upmixing stereo or even mono sources to multichannel surround sound while remaining acoustically downmix compatible. This is a real-time process which does a frequency analysis of the input signal. As known from the mathematical theory, the longer the time for such an analysis the better the result. But this will introduce more delay for the audio path, compared to the video. This delay, if acceptable in general, may be compensated by the video delay of the SDI embedder.

Please note that presets created with earlier firmware version are **not compatible** with the new upmix algorithm!

You may take the upmix source signal from either the surround input Ch 1/2 (1L/1R) in case it provides stereo PCM instead of surround L/R or from input Ch 7/8 (2L/2R).

The **Surround Detect** circuit monitors the input channels to decide if the surround signal has disappeared in order to do an automatic upmix if desired. But the upmix may also be forced by an event of the system that loads a preset configuration, that turns the upmix permanently on.

**Bypass**

[ON / OFF]

If Bypass is turned ON the following parameters will be set:

<b>Input Gain</b>	
1L/1R/1C/1Ls/1Rs (dB)	0.0
1LFE (dB)	0.0
2L/2R (d)	0.0
<b>Fail Over A (Upmix)</b>	
Mode	Ch 1/2
Dual Mono	OFF
<b>Surround Detect</b>	
Switch	FIX Surround
<b>Output Limiter</b>	
Limiter 1 (Surround)	OFF
Limiter 2 (Stereo)	OFF
<b>Fail Over B (Stereo)</b>	
Mode	Ch 7/8
Dual Mono	OFF

All other parameters are left as set by the operator.

**Input Gain**

<b>Input Gain</b> <b>1L/1R/1C/1Ls/1Rs (dB)</b>	[-20.0 ... 0.0 ... 20.0]
<b>Input Gain 1LFE (dB)</b>	[-20.0 ... 0.0 ... 20.0]
<b>Input Gain 2L/2R (dB)</b>	[-20.0 ... 0.0 ... 20.0]

**Fail Over A (Upmix)**

<b>Mode</b>	[Ch 1/2 / Ch 7/8 / AUTO]
<b>Dual Mono</b>	[OFF / AUTO] A detector looks for the input signal. If it is a left [L] or right [R] only it mirrors that signal to [L/L] or [R/R].
<b>Fail Threshold (dBFS)</b>	[-80 ... -60... -40]
<b>Fail Wait (s)</b>	[1.5 ... 10.0]
<b>Fail Return (s)</b>	[0.0 ... 10.0]
<b>Side Chain Filter</b>	[OFF / ON] A high pass filter (300Hz) and a low pass filter (3000Hz) is applied to the detector side chain (not the audio path) to prevent hum and noise from blocking fail over switching.

**Surround Detect**

This section also controls the signal flow at the surround output. The **Switch** is independent from the upmix state! You are able to feed the 1L/1R output even if the upmix is not activated either by "**Upmix Enable = Off**" or by "**Fail Over Upmix = AUTO**" setting of that switch. Here you can also decide which channels must be observed to operate the surround switch (**Signal Loss = All channels are gone**).

<b>Switch</b>	[AUTO / Fix Surround / Fix Upmix]
<b>Detection</b>	[Center / Surround / Center or Surround / Signal Loss]
<b>Fail Threshold (dBFS)</b>	[-80 ... -60 ... -40]
<b>Fail Wait</b>	[0.0 ... 1.0 ... 10.0]

**Downmix**

<b>Out Gain (dB)</b>	[-20.0 ... 0.0 ... 20.0]
<b>Center Mix Level (dB)</b>	[-12.0 ... -3.0 ... 0.0]
<b>Surround Mix Level (dB)</b>	[-12.0 ... -3.0 ... 0.0]

**Output Limiter**

This is the well know brick wall limiter algorithm from Junger Audio. It is set to profile = "Uni" while the threshold is set to 0dBFS and the look ahead time is 1ms.

<b>Limiter 1 (Surround)</b>	[OFF / ON]
<b>Limiter 2 (Stereo)</b>	[OFF / ON]

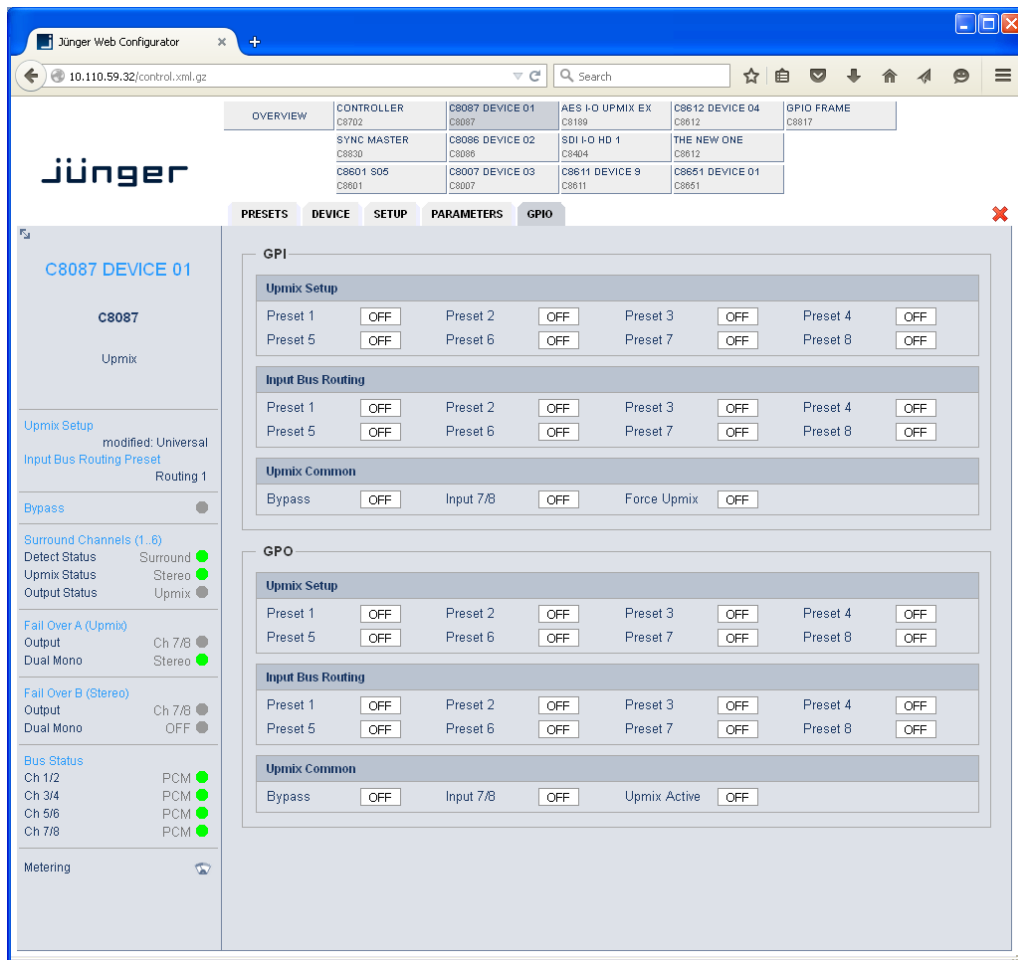
**Fail Over B (Stereo)**

<b>Mode</b>	[Ch 7/8 / Downmix / Auto]
<b>Dual Mono</b>	[OFF / AUTO]
<b>Fail Threshold (dBFS)</b>	[-80 ... -60 ... -40]
<b>Fail Wait (s)</b>	[1.5 ... 10]
<b>Fail Return (s)</b>	[0.0 ... 10.0]
<b>Side Chain Filter</b>	[OFF / ON] A high pass filter (300Hz) and a low pass filter (3000Hz) is applied to the detector side chain (not the audio path) to prevent hum and noise from blocking fail over switching.

**Upmix**

<b>Enable</b>	[OFF / ON]
<b>Upmix Mode</b>	[Mono / Stereo / AUTO]
<b>Profile</b>	[Front Projection / Emphasize Front / Balanced / Emphasize Surround / Wrap Surround]
<b>Processing Time (ms)</b>	[3 ... 40 ... 100]
<b>Center Divergence</b>	[0.0 ... 0.70 ... 1.00]
<b>Surround Gain (dB)</b>	[-24.0 ... -6.0 ... -3.0]
<b>Surrnd Balance Stereo</b>	[0.0 ... 0.50 ... 1.0]
<b>Surrnd Balance Mono</b>	[0.0 ... 0.50 ... 1.0]
<b>LFE Enable</b>	[OFF / ON / Effect Gate]
<b>LFE Gain (dB)</b>	[-20.0 ... 0.0 ... 20.0]
<b>LFE Effect Gate Threshold (dB)</b>	[-20.0 ... -6.0 ... 0.0]

GPI/O



**GPIs** are useful if you want to recall settings (e.g. by loading presets) or turn functions on or off remotely. A C8k frame can handle **127** independent virtual **GPI** numbers. You must assign a unique number to the respective preset / function. Such numbers are transmitted from the **brc8x** Broadcast Remote Controller or from the **C8817** GPI/O interface module via the CAN bus. If the **C8087** receives such a number, it will load the respective preset or execute the function.

**GPOs** are meant to present status information to external devices. A C8k frame can handle **127** independent virtual **GPO** numbers. You must assign a unique number to the respective preset / function. In case a preset is loaded either manually via the GUI or remotely via the **brc8x** or via a GPI/O module, the assigned number will be broadcast over the CAN bus. A GPI/O module which has that number assigned to a physical output will engage that relay or a **brc8x** may turn on an assigned button tally light.

**Important Note!** **GPOs** from modules and **GPIs** to modules don't "see" each other. I.e. you can't use a status **GPO** of module "A" to load a preset for module "B" by simply assigning a **GPO** number of module "A" as a **GPI** number of module "B". If this is a requirement you **must** involve the **GPI/O** conversion function of the **C8817** GPI/O module (see manual for details).