4/8/16 channels DSP with SDI & system-bus I/O C8492(B)

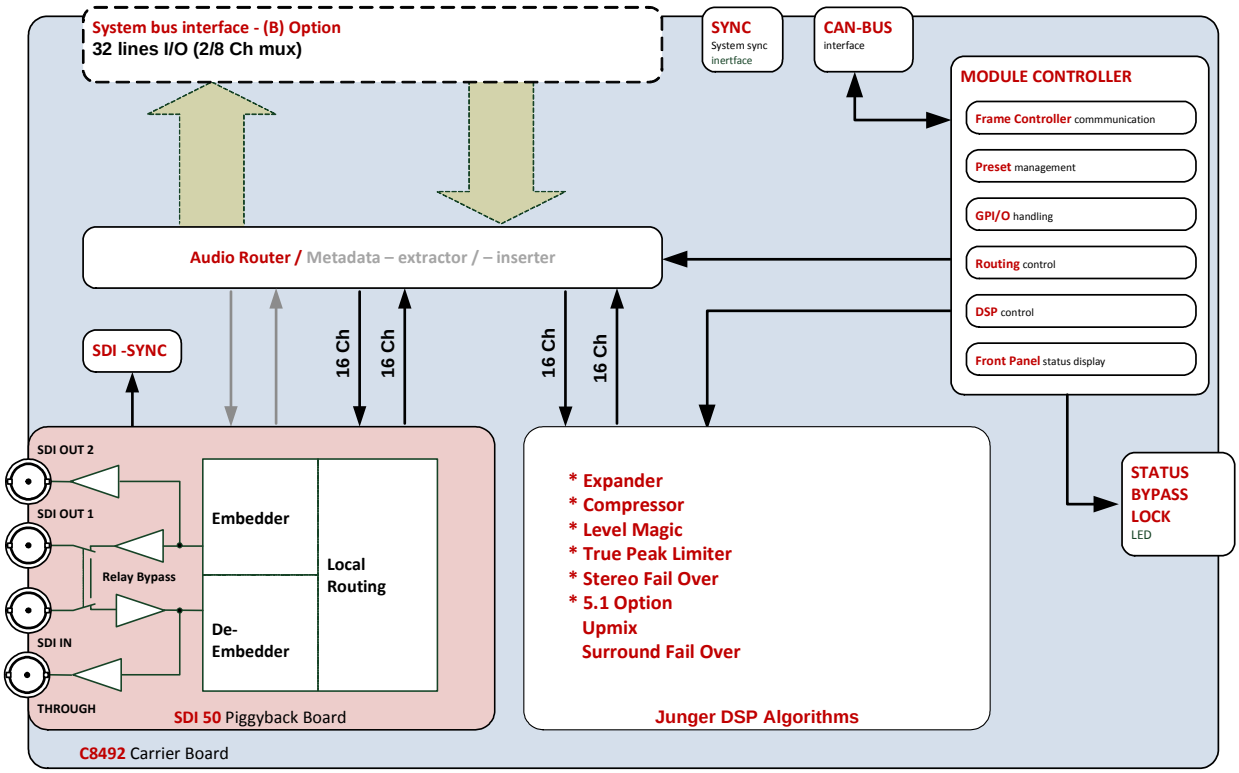
Features

- 4 processing channels
- Level Magic™ loudness management according to: ITU-R BS.1770 (all revisions), EBU R128, ATSC A/85, ARIB TR-B32, Free TV OP-59 and Portaria 354
- Expander / compressor
- Stereo fail over
- True Peak limiter
- SDI 3G/HD/SD audio de-embedder and embedder for 16 channels
- Video delay up to 15 frames
- Audio delay up to 340ms per SDI channel
- Audio delay up to 2s per DSP channel
- SDI pass-through and shuffle routing
- Video test generator
- Remote control via GUI, GPI/Os, EmBER protocol

Options and Variants

- 8 / 16 processing channels
- Surround processing
  - 5.1 Level Magic™
  - Automatic Upmix (from stereo or mono)
  - Surround fail over (via Upmix)
  - Downmix
- **C8492B** with C8000 system-bus access
  - 32 channels bus access (2 or 8 ch mux)
  - Metadata routing
  - Metadata de-embedding / embedding, SMPTE2020
  - Master-sync capability

Block diagram



4/8/16 channels DSP with SDI & system-bus I/O C8492(B)

The **C8492** is a variation of the next generation module platform that combines a 16 channel 3G/HD/SD-SDI embedder / de-embedder with a 16ch DSP. For a start it can be treated as the successor of the C8491. The **C8492** can be purchased as a four / eight or 16 channel processor (C8492-x) with surround option (C8492-xS) or without it.
It may also be purchased with c8k audio bus access and is then called **C8492B**.
Without the SDI piggyback board it is called **C8092** and offers a 16 channel c8k audio processor that is beyond a successor of the C8086+ since it combines LevelMagic loudness control with stereo and/or surround fail over functions inluding 5.1 downmix and 5.1 upmix. For details of versions and pricing pls. consult the actual price list.

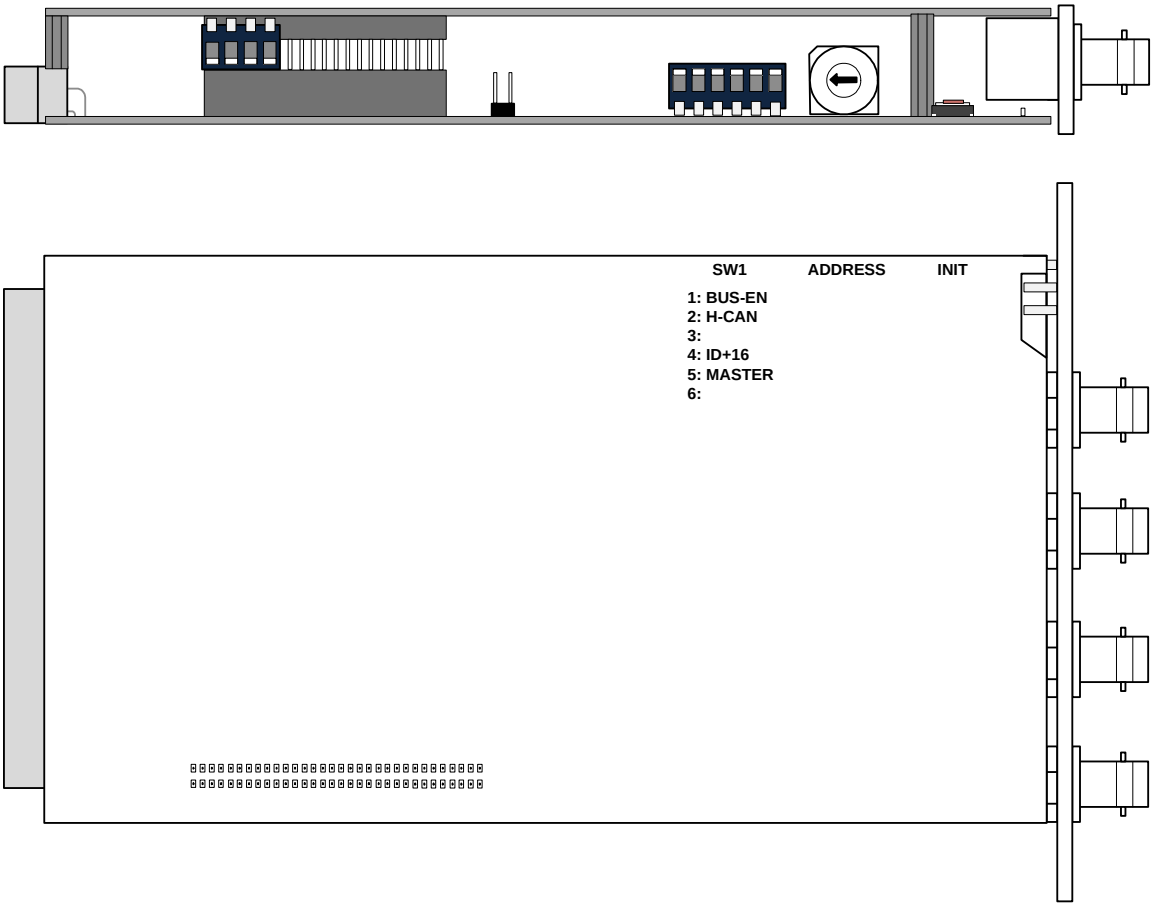
Technical specifications

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	2970/296Mbps (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 (SDI) 40bits floating point processing (DSP)	
Audio Channels	SDI: 16 inputs and 16 outputs (4 groups with 4 channels each) DSP: 16 inputs and 16 outputs Board: 32 inputs and 32 outputs (2 and 8ch TDM format)	
Audio Sample Rate	48kHz (SDI compliant)	
Audio Delay	Embedder audio delay selectable 0 … 340ms per channel DSP audio delay selectable 0 … 2s per channel	
Metadata (RDD6)	2 channel input and 2 channel output, SDID selectable	
BNC Input	Impedance	75Ohm
	Return loss	> 15dB, 5 … 1485MHz > 10dB, 1485 … 2970MHz
	Cable length (max.)	250m @ SD for Belden 1694A cable 230m @ HD for Belden 1694A cable 140m @ 3G for Belden 1694A cable
	Jitter tolerance	> 0.7UI (Alignment)
BNC Output	Impedance	75Ohm
	Output voltage	0.8Vpp (typ.)
	Return loss	> 15dB, 5 … 1485MHz > 10dB, 1485 … 2970MHz
	Output jitter	< 0.2UI (Alignment), < 0.5UI (Timing)

4/8/16 channels DSP with SDI & system-bus I/O C8492(B)

Video Latency	Input to Output	120 … 200pixel, depends on video standard
Audio Latency (SDI)	Input to Output	Embedder and de-embedder combined HD, 3G < 0.6ms SD typ. 1.5ms (< 2ms)
Power Supply	5Vdc (4.75 … 5.25V), max. 1.200mA	
Dimension	3RU, 4HP, 160mm depth (DIN41612 backplane connector)	
Environmental	Operating temperature 0 … 40ºC, Non-operating -20 … 70ºC, Humidity < 90%, non-condensing	
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 can be routed to/from the device or looped through • Test pattern generator • Master-sync capable	

Location of switches:



Initial set up

ADDRESS: This **rotary encoder** sets the **CAN ID** of the **C8492**. The 16 switch positions are hexadecimal numbers (0x0 to 0xF). The CAN address also defines the location of the module icon within the GUI overview of rows three to six.

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 may 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! Since this type of module has an electronic output routing facility, great care must be taken when installing or exchanging a module when such frame has components which are On Air!
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. If all settings are done remotely and the unit fits into the bus assignment scheme of that frame, you must remove it and place the switch back into position **BUS-EN=ON** to activate this setting for the next power up(s).

#2 H-CAN

OFF = CAN bus speed 256kBit/s
ON = CAN bus speed 1Mbit/s

Important Note! For a limited number of modules like the **C8492** it is possible to communicate with a CAN bus speed of 1MBit/s. This provides more bandwidth to move measuring data from the module via the frame controller to the **J*AM** based loudness logger. Be sure that all modules within a frame are operating with the same CAN bus speed.

#3

OFF = Internal use and **must** be set to **OFF**.

#4 ID +16

OFF = **CAN** bus address range is standard (counting from 0x0 to 0xF) see rotary encoder settings above.

ON = **CAN** bus address range is extended by **+16** (counting from 0x10 to 0x1F).

#5 MASTER

OFF = Sync is taken from the c8k frame.

ON = The **C8492(B)** is sync master for the frame.
Sync is derived from the SDI input.
Both settings are only valid if the **Bus Access** feature is enabled!

#6

OFF = Internal use and **must** be set to **OFF**.

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

General Remark! The **C8492** is a 16 channel device from the SDI de-embedding / embedding point of view but the number of audio processing channels may be different. Four channels are standard while eight or 16 channels are an option. Since the parameters are similar, this document describes the 16 channel processor version. The difference will be the number of fail-over circuits (one for the 4ch, two for the 8ch and four for the 16ch option).

The **(S)** option stands for 5.1 surround processing. If this option is unlocked you may also perform permanent surround upmix from a stereo or even a mono source or you may use the upmix for surround fail over. A 5.1 downmix from the surround input is also available then.

Finally, if the bus access option **(B)** is purchased the **C8492(B)** may be interconnected with other c8k modules to form highly complex signal chains.

The variations of the C8492 platform range from:

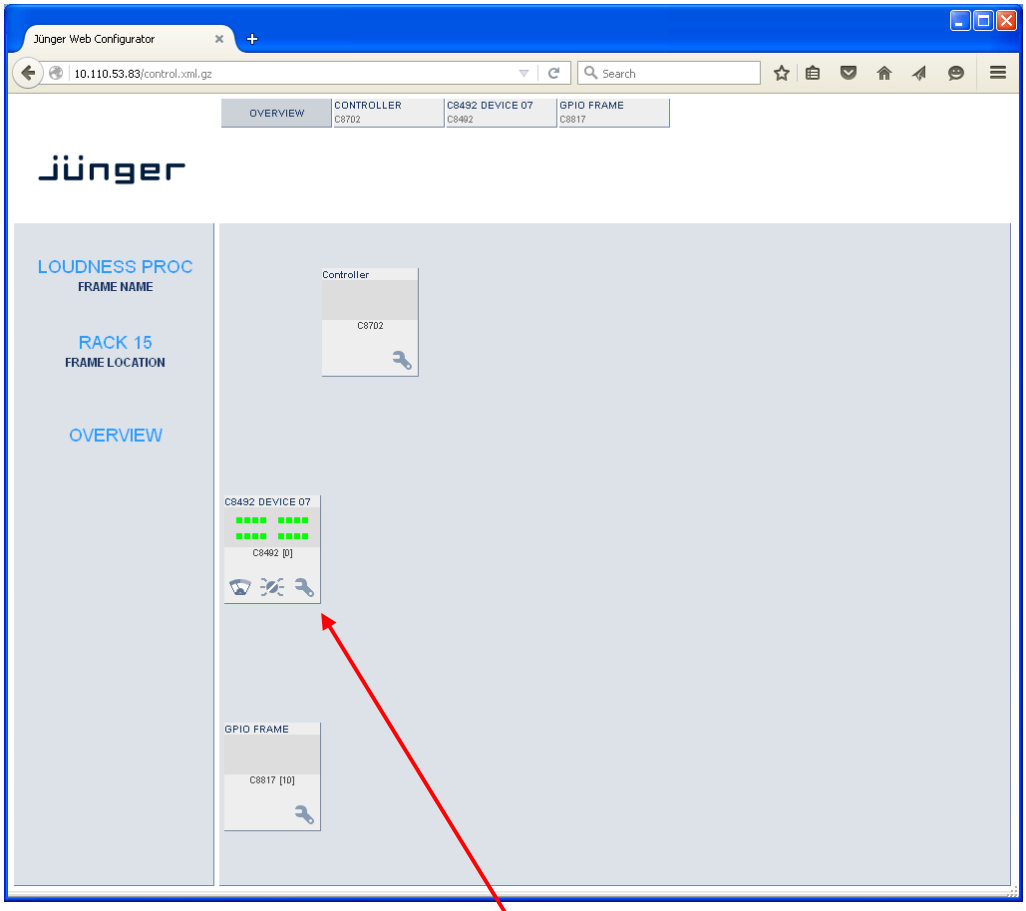
C8492-4 (four channel SDI I/O processor) to C8492-16S (16ch SDI I/O processor with surround option) to C8942B-16S (16ch SDI I/O processor with surround option and bus access option).

This manual describes the **C8492B-16S** because all other members of the family have a subset of features and options.

Web browser based GUI

OVERVIEW

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

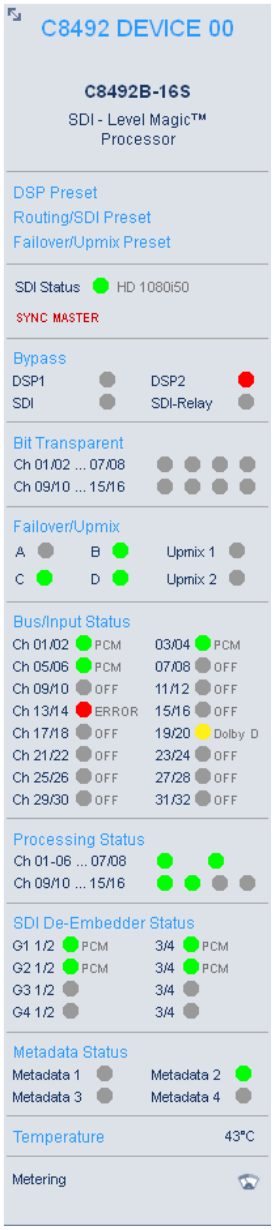


By simply clicking on the spanner tool symbol you will get the control pages of the **C8492** and the status pane on the left hand side, which is also shown on mouse over.

STATUS PANE

The status area is quite big for the **C8492** so you may face difficulties when displaying it on lower resolution displays. You may shrink it by pressing on the little "fly foot print":

Now some information are suppressed and you are able to see the most relevant status information without the need to put the browser into full screen mode.



C8492 DEVICE 00 - Given name of the module (may be changed on the DEVICE pane). It will be default set during initialization to module type amended by the word DEVICE and the CAN address 00 the module had at that moment.

System name of the module and short description.

DSP Preset — Name of the actual loaded preset.

Routing/SDI Preset — Name of the actual loaded preset.

Failover/Upmix Preset — Name of the actual loaded preset.

SDI Status — [SD / HD / 3G / TG / UNLOCKED]

Soft LED:
- **green** — if Rx locked.
- **yellow** — if Rx locked + async audio; if Rx unlocked + Always ON + Last Valid
- **red** — if Rx unlocked + TG=OFF or TG=AUTO; if TG=Always ON + None

SYNC MASTER — appears if the SW1 #5 is set to ON.

BYPASS grey / red — turns red if a bypass is activated.

DSP1 DSP2
SDI SDI-Relay — turns red if the DSP bypass check box is enabled, if the SDI bypass or the fail over relay is activated.

Bit Transparent
Ch 01/02 … 07/08
Ch 09/10 … 15/16 — shows the bit transparent status of the respective DSP channel pairs.

Failover/Upmix — turns green if a function is active.

A	**B**	**Upmix 1**
C	**D**	**Upmix 2**

Bus/Input Status — Error status of the bus inputs (see ROUTING).

Processing Status — turns green if observation of processing status is enabled. Turns red if processing status is bad (see DSP1-A Processing Status Enable).

Metadata Status — turns green if valid metadata are detected. Turns red if metadata are corrupted.

SDI De-Embedder Status — shows status of the de-embedder

Temperature — Module temperature measured on the carrier board.

Metering — clicking on that symbol will open the applet to display meter bar graphs (see page 24 for an example) channels.

Front panel Status LEDs color code

	off	green	flashing green	red	flashing red
STATUS	never	OK	OK, GUI access	boot error	boot error, GUI access
MODE [8492]	if STATUS = red	at least one program active, no SDI / relay bypass	all programs bypass or SDI / relay bypass	never	never
MODE [8492(B)]	if STATUS = red	at least one program active, no SDI / relay bypass and not clock master	all programs in bypass or SDI / relay bypass and not clock master	audio clock master active	audio clock master active but SDI unlocked
LOCK	never	SDI locked	never	SDI unlock	never

PRESETS Example for the C8492B-16S

The **C8492** has 3 banks of **Presets**: **DSP / Routing SDI / Failover/Upmix**
The status window on the left hand side shows the names of the active presets. The word **"modified"** will appear in line with the preset name if any preset parameter was changed since loading this preset.

DSP — Is dedicated to audio processing (Leveler, Compressor / Limiter / Expander / Fail Over / Upmix).

Load — Select a preset by name and press **<LOAD>.**

Loaded from preset — The soft LEDs show the channels which will be controlled by the active preset. The number of soft LEDs depends on the program configuration. E.g. channels 1-6 are represented by one soft LED because they belong to a 5.1 program while 7/8 represent a stereo program as well as 9/10 and 11/12. Channels 13, 14, 15, 16 belong to mono programs whereas channel 15, 16 are not part of the preset currently loaded.

Here another example where channels 15 and 16 are not part of the actual loaded preset:

Save as # — Select a preset NV memory number.

Name — Assign the preset a name (up to 16 digits).
and press **<SAVE>.**

Channels stored in presets — The check boxes define which channels will be stored when you save a preset. The number of check boxes depends on the program configuration.
Here an example where DSP1 (Ch 1 – 8) is set for 5.1 + 2 operating mode and DSP 2 (Ch 9 – 16) is set for 4 x 2 operating mode. Ch 9/10 and 11/12 are linked for stereo operation and 13, 14, 15, 16 are not linked (mono mode). The parameters of channels 15 and 16 will not be stored:

Routing/SDI — controls the **SDI** Embedder / De-Embdder including delays and the bus routing if the **(B)** option is activated.

Load — Select a preset by name and press **<LOAD>**.

The soft LEDs show which part (SDI and / or Input Bus Routin) is affected by the currently loaded preset.

Save as # Select a preset NV memory number.

Name Assign the preset a name (up to 16 digits).
and press **<SAVE>.**

The check boxes define which part will be stored (Input Bus Routing in the example above) when you press **<SAVE>** next time.

Failover/Upmix The third group (#33 … #40) is intended for fail over and upmix parameters.

Load Select a preset by name and press **<LOAD>.**

Loaded from preset The soft LEDs show the Fail Over circuit(s) controlled by the preset currently loaded:

I.e. a preset may change the parameters for one 2ch fail over without changing the parameters for another one.

Save as # Select a preset NV memory number.

Name Assign the preset a name (up to 16 digits).
and press **<SAVE>.**

Processing blocks stored in preset The check box(es) define from which processing block parameters will be stored next:

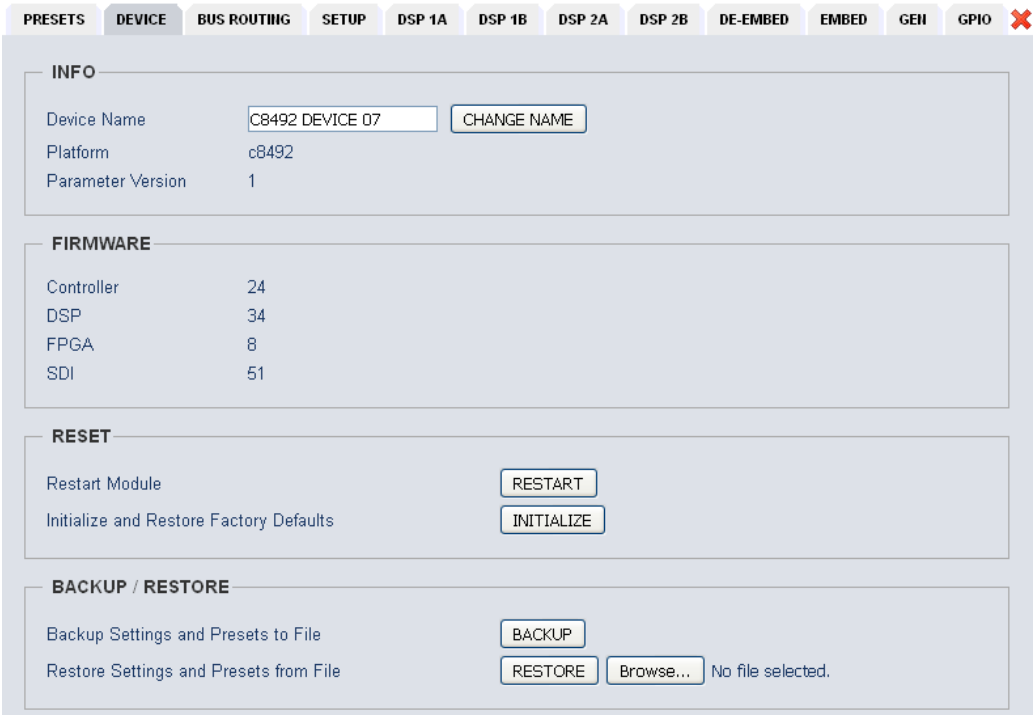
The number of processing blocks involved depend on the operating mode for the DSPs.

Preset Clipboard **<COPY TO CLIPBOARD>** copies the active preset to a clip board, the data may be used by other modules inside the same frame.

Backup Presets to File **<BACKUP>** creates a backup **XML file** which may be saved on a PC.

Restore Presets from File **<Browse… >** opens a file dialog to select a previously stored preset file. **<RESTORE>** will upload the file and overwrite existing presets for this module.

DEVICE



INFO

Device Name — You can assign the module an individual **name** (up to 16 digits). Press **<CHANGE NAME>** to make the new name effective.

Platform — [C8492-1]
Hardware platform of the module.

Parameter Version — [x]
The firmware of the module undergoes revisions where parameters may be added while others become obsolete. The parameter version indicates it.

Important Note! It is mandatory to **initialize** the module to **factory defaults** if the parameter version has changed in order to clean the memory from rubbish data. Otherwise you may experience malfunctions.

FIRMWARE — displays the firmware versions of the **C8492** components:

Controller — The module controller

DSP — The processing DSP

FPGA — The routing and audio interface for the DSP

SDI — The firmware of the SDI board

4/8/16 channels DSP with SDI & system-bus I/O C8492(B)

RESET

Restart Module

Pressing **<RESTART>** performs a warm start (soft reset)

Initialize and Restore Factory Defaults

Pressing **<INITIALIZE>** restores the factory default values for all parameters of the module including all presets. You will lose your presets and settings. It's highly recommended to backup the settings and presets to a PC first.

BACKUP / RESTORE

Backup Settings and Presets to File

Pressing **<BACKUP>** will put all active parameters and the content of all presets into an XML file.
You may store such file on a PC.

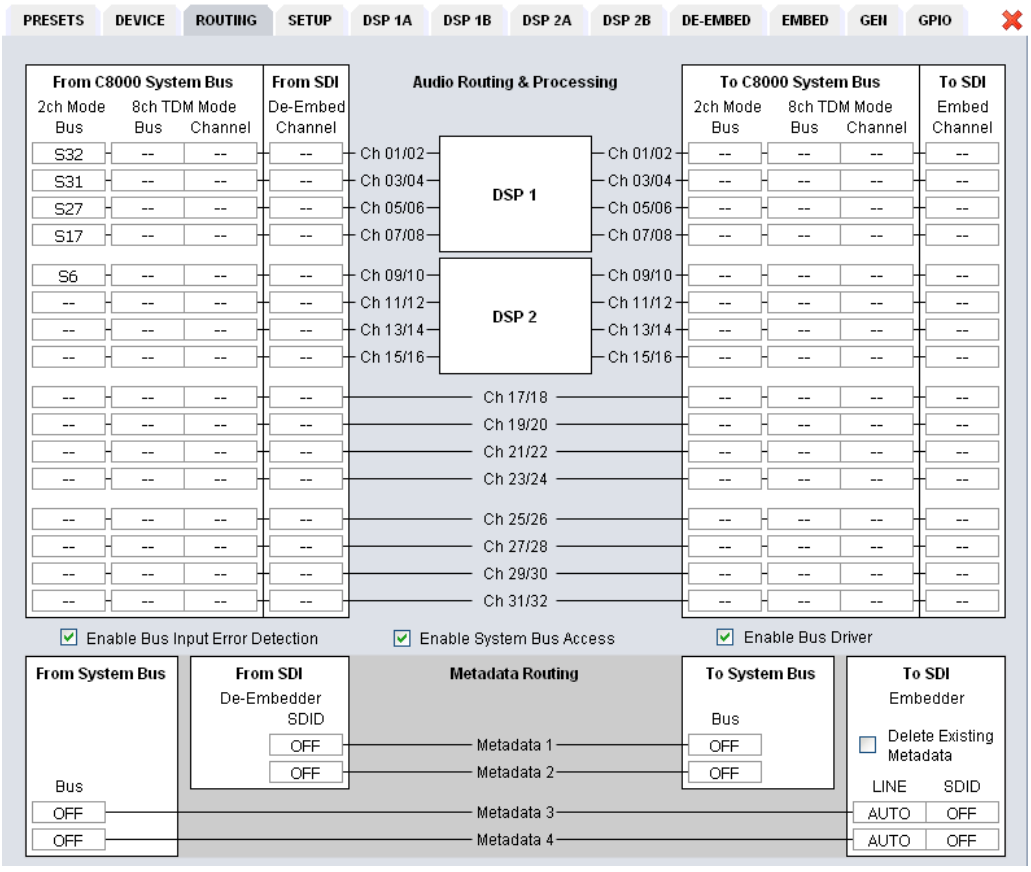
Restore Settings and Presets from File

You may browse a matching XML file from a PC.
Pressing **<RESTORE>** will overwrite all active parameters and the content of the presets with the content from the backup file.

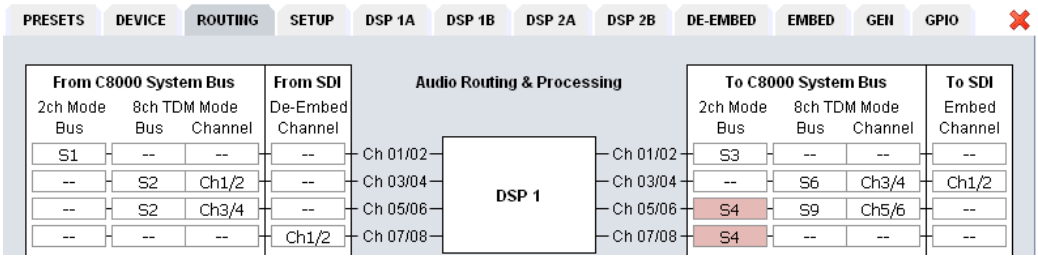
ROUTING

only available for C8492(B)

You may purchase the **(B)** option that expands the capabilities so the module can be used in standard c8k applications together with other c8k modules to allow for Dolby processing, AES / MADI or even analog break out for example. In this case the **ROUTING** pane will be accessible. If the **(B)** option is **not activated** the **ROUTING** pane will **not** appear in the GUI. In this case the signal routing to and from the DSPs is **only** possible via the SDI embedder / de-embeder.



The bus interface allows for very flexible interconnection from and to the c8k audio busses, either in two channel or eight channel multiplex mode, as well as the connection from and to the SDI embedder / de-embedder. The inputs to the DSPs (Ch 01/02 … Ch 15/16) exclude each other (see example below). You can select a specific DSP input pair only from c8k bus in 2ch [S1] **or** 8ch [S2] mode **or** a signal pair from the SDI de-embedder. When you select a bus that is fed in 8ch mode [S2] you must also select a signal pair from that bus [Ch1/2 and Ch3/4] for a dedicated DSP input:



Similar applies to the output routing. [S3] is fed in 2Ch and [S6] in 8Ch mode. Duplicated busses [S4] are marked red as a warning because the signal will be disturbed if you connect two outputs to the same bus.

Audio Routing & Processing

From C8000 System Bus — Select a 2ch or 8ch (multiplex) mode bus as an input for the DSP.

From SDI — Alternatively select a signal pair from the de-embedder local routing matrix output (see DE-EMBED pane for reference).

To C8000 System Bus — Decide between 2ch or 8ch (multiplex) mode and assign a bus to it.

To SDI — Additionally or alternately you may select a signal pair to the SDI embedder (see EMBED pane for reference).

Enable Input 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. Each input in use will automatically be observed. You will see the status on the left hand side: **"Bus/Input Status"**. A **grey** soft 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).

Enable System Bus Access — [ON/OFF]
If on a rare occasion you have a **C8489(B)** on shelf and must use it in a standard C8k frame and **don't** want to interfere with other modules. You can simply disable the modules system bus interface. If you uncheck this check box all related setup fields will turn grayish. You can still change the settings (e.g. to prepare a certain routing) but they are not active. To underline this behavior the switch will be encircled in red.

Important Note! If **System Bus Access** is disabled, you **must** do the DSP signal routing exclusively on the **DE-EMBED** and **EMBED** panes (see further below).

Enable Bus Driver

[ON/OFF]
You can disable the output drivers by un-checking the **Enable Bus Driver** check box. The state of this check box also depends on the setting of **SW1** on the module PCB.
If **SW1 #1** is turned off, this checkbox will be off after a power cycle. You can turn it on temporarily to check out your settings but you must keep in mind that after the next power cycle it will be off again unless you have turned **SW1 #1** on.
This procedure is useful if you must insert a module into a frame that is on air and other services must not be interrupted or disturbed.

Meta Data Routing

The metadata transport occupies one system bus line for one stream and uses the asynchronous data format specified by the SMPTE, that is outlined in the recommendation RDD-6 (2008). (See SMPTE 2020 for reference of VANC metadata embedding).

Important Note! This transport mechanism is **not** compatible with the previously used proprietary technology from Junger. I.e. you can not interconnect legacy Dolby modules with the C8492(B) for metadata transport. We recommend using the successor platform C862x (C8621 Dolby Decoder, C8631 Dolby E encoder and C8632 Dolby Digital / Digital plus encoder).

From System Bus

Select a bus as a source for metadata that must be embedded into SDI VANC (**v**ertical **anc**illary data space).

From SDI
De-Embedder

Select a SDID of an embedded metadata stream (if present) that you would like to send to a module via the system bus.
If you click into the SDID box a pop-up appears: that shows you which streams are available.

To System Bus

Decide which system bus you want to use to move metadata from the VANC de-embedder along the c8k back plane.

To SDI
Embedder

Delete Existing Metadata

[ON / OFF]
Deletes incoming VANC meta data from the line where they are embedded.

LINE

[11 … 19 / AUTO]
Here you select a line number that must be used to embed the metadata. AUTO selects the next possible line that is not in use for any VANC service. If you select the line that carries the incoming metadata, these metadata will be removed before the new ones will be embedded. To avoid difficulties with different video standards the line count for the VANC embedder starts with line #1.

SDID

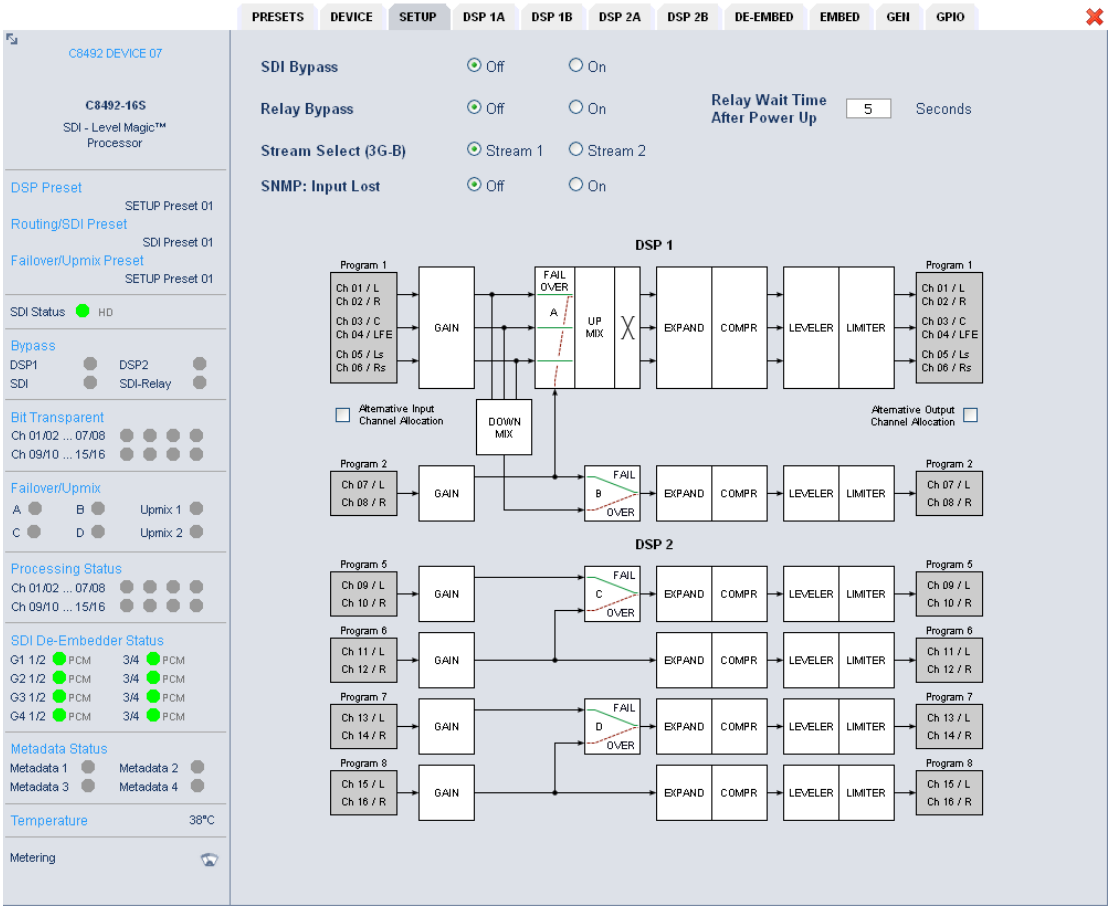
[1 … 9]
Here you select the SDID that is associated with the respective audio signal pairs (see SMPTE 2020 for details).

4/8/16 channels DSP with SDI & system-bus I/O C8492(B)

Important Note! The remainder of this manual refers to the **C8492-16S** version (16 channel and surround license enabled). Some settings are impossible for a four channel license, but the parameters for the audio processor are the same.

SETUP

This page shows the function blocks which are available for the respective programs. The display depends on the program configuration of the DSPs. Below an example where DSP 1 is configured for 5.1 + 2 whereas DSP 2 is configured for 4 x 2 program processing:



SDI Bypass [Off / On]
You may bypass the audio de-embedder / embedder for testing or trouble shooting purposes.

Relay Bypass [Off / On]
The main SDI pass from SDI IN to SDI OUT 1 has a power fail bypass relay. The relay may be turned off manually for testing or trouble shooting purposes.

Relay Wait Time After Power Up [3 … 60 seconds]
In order to have the DSP operational and all module function blocks up and running before processing starts you may delay the moment of switching on the signal path by x amount of seconds.

Stream Select (3G-B)

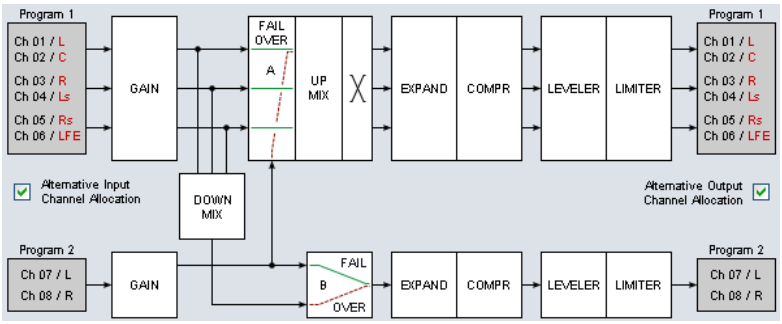
[Stream 1 / Stream 2]
For 3G-B SDI operation (see SMPTE 372 for details) you must select which of the two streams runs through this particular module.

SNMP: Input Lost

[Off / On]
The monitoring of the physical SDI input can be disabled for the SNMP agent to prevent unwanted traps if the module is frequently taken out of service.

Alternative Input Channel Allocation

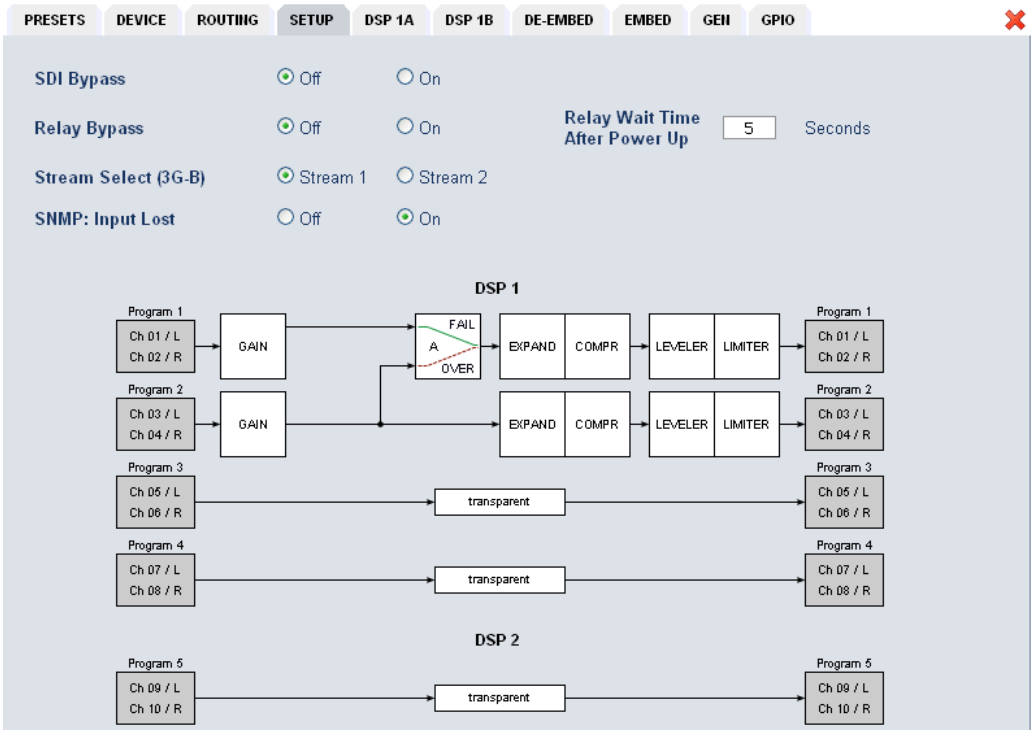
Due to the fact that the DSP is fed in 2Ch mode and in case of surround operation it is possible to select between the standard TV broadcast (L / R / C / LFE / Ls / Rs) and the alternative movie picture (L / C / R / Ls / Rs / LFE) channel allocation.



Alternative Output Channel Allocation

See above

Important Note! The available number of processing channels depends on the license that is enabled for the particular module. Here is an example for the basic configuration that has four processing channels only (no channel license is enabled):



DSP 1A - 4 x 2 mode

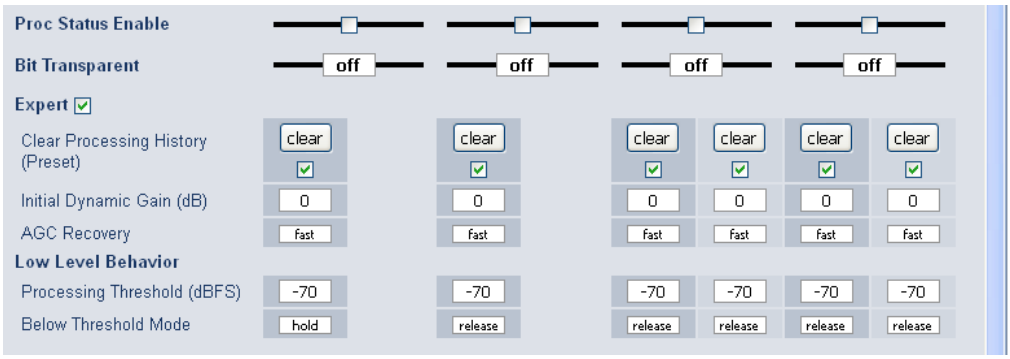
From here you can control the audio parameters of the **C8492** function blocks.
For detailed explanation of the LevelMagic parameters pls. see the separate document:
Junger_Processing-Parameters_xxyyzz.pdf which you may download from our web site.

Operating Mode [5.1 + 2 / 4 x 2]
defines the number of audio channels which are used for one audio program. All relevant processing blocks will be configured to meet the selected mode.

Loudness Control Mode [Level / ITU BS.1770-1, -2, -3, -4 / EBU R 128 / ARIB TR-B32 ATSC A/85 (2011 7 2013) / Free TV OP-59 / Porteria 354]

Bypass [ON / OFF]
The processing parameters will be bypassed to validate the actual settings. If enabled, the respective **Bypass** DSP1 or DSP2 soft LED turns red in the status panel:

Link	[Unlinked / Linked] defines the coupling of the control circuits in order to maintain the listening balance for correlated signals or to provide a grouping of the setup parameters for multi channel signals.
Input	[ON / OFF]
Input Gain	[-20 … +20 dB]
Input Delay Coarse (ms)	[0 … 2000]
Input Delay Fine (samples)	[0 … 255]
Leveler	[ON / OFF] turns off Transient Processor as well.
Processing Profile	[live / speech / pop / classic]
Loudness Target (dBFS) **(LKFS)** **(LUFS)**	Level mode [0 … -50] ITU mode [0 … -50] EBU mode [0 … -50]
Time (s/min/h)	[10, 20, 40 sec. / 1, 2, 5, 10, 20, 40 min / 1, 2 h]
Max Gain (dB)	[0 … 40]
Freeze Level (dBFS)	[-20 … -60]
Transient Processor	
Max Gain (dB)	[0 … 40]
Response	[soft, mid, hard]
Limiter	[ON / OFF]
Processing Profile	[live, speech, pop, uni, classic]
Max True Peak (dBTP)	[0.0 … -20]
Expander	[ON / OFF]
Threshold (dBFS)	[-60 … -20]
Range (dB)	[0 …. 20, Gate]
Release Mode	[0 / 1 live / 2 speech / 3 pop / 4 uni / 5 / 6 classic / 7 / 8 / 9]
Compressor	[ON / OFF]
Reference Level (dBFS)	[0 … -40]
Range (dB)	[0 … 8 …. 20]
Ratio	[1: 1.1 … 1: 4.0]
Processing	[0 / 1 live / 2 speech / 3 pop / 4 uni / 5 / 6 classic / 7 / 8 / 9]



Proc Status Enable [ON / OFF]
If the average gain of the module is equal or above the **Leveler Max Gain** for more than 10s the respective **Processing Status** soft LED turns **red**. This status information is condensed for all processing channels by the module controller. The frame controller will condense the status information for all processing modules within a frame and may generate a **SNMP trap** and/or fire a **GPO**. In this case the **SNMP manager** may poll the frame for details to "see" which processing channel sticks.

Bit Transparent [off / on]
indicates that a channel pair is in bit transparent mode to let non audio signals pass through without the DSP processing to maintain data structure for non audio signals.

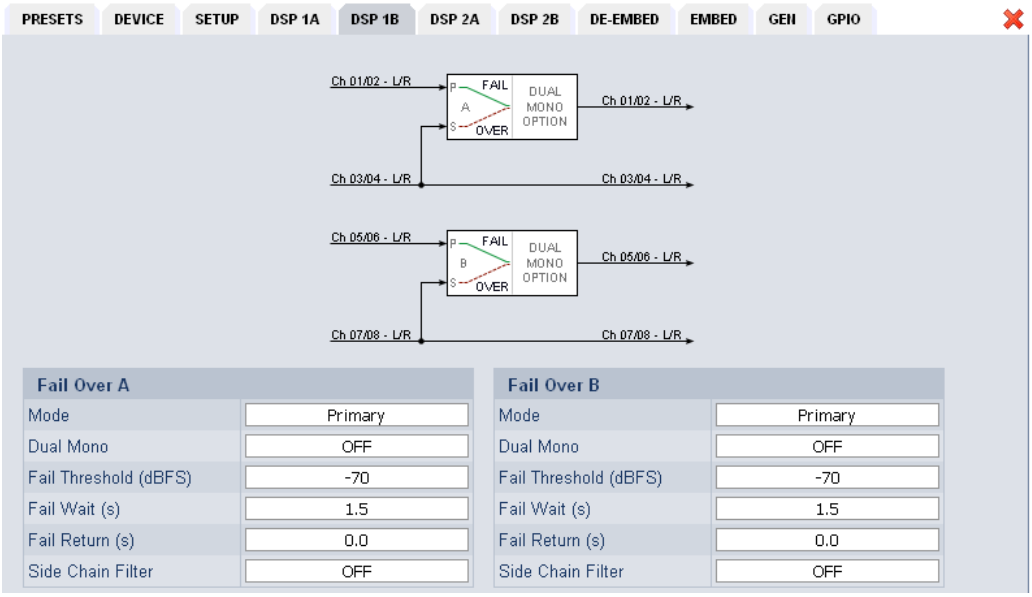
Expert [show / don't show]
The expert mode offers the possibility for manual intervention of the adaptive behavior of the **LevelMagic** process for critical material. For details pls. see the above mentioned document.

- **Clear Processing History (Preset)** manually or GPI controlled [disable / enable]
  defines if the switch is included in a preset. This allows clearing the processing history if a preset is loaded.
- **Initial Dynamic Gain (dB)** [-40 … 1 … 15]
  Start value for the LevelMagic process after Clear Processing History.
- **AGC Recovery** [normal / fast]

Low Level Behavior

- **Processing Threshold (dBFS)** [-80 … -70 … -20]
  The threshold from where the processing gain will behave as defined by Below Threshold Mode.
- **Below Threshold Mode** [release, hold]
  returns slowly to 0 dB gain change or stays at the Processing Threshold.

DSP 1B – 4 x 2 mode



The **C8492** offers the feature to use pairs of channels in a fail over mode. I.e. if the audio signal fails in the first audio pair, the processor may switch over to the adjacent (e.g. 1/2 >> 3/4) pair automatically.
The functions of the circuits Failover A – Failover B are similar.
The switch over will be performed by a cross fade.

Failover A

Mode [Primary / Secondary / AUTO]
Selection between both inputs and the auto mode.

Dual Mono [OFF / AUTO]
If the fail over input is fed by a dual mono signal, the circuit may automatically copy the opposite one if one fails.

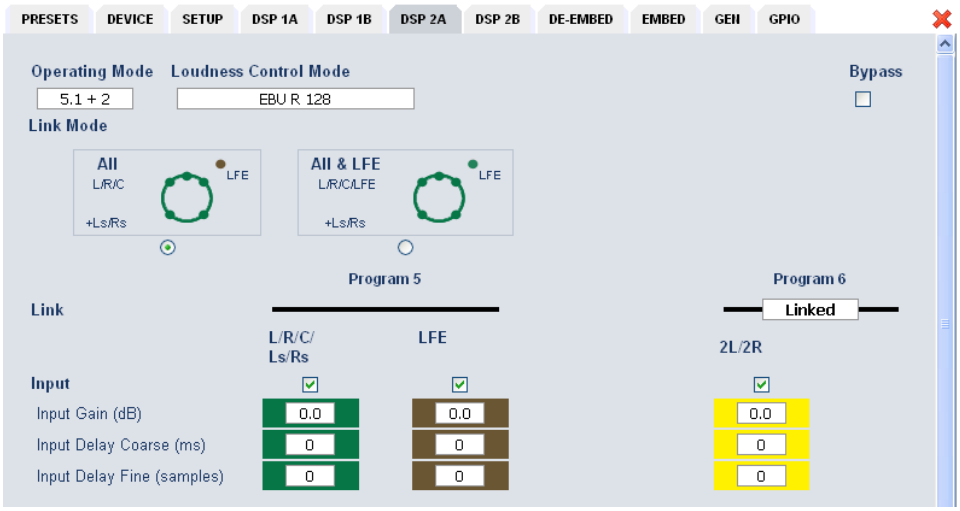
Fail Threshold (dBFS) [-60 … -40]
Trigger threshold for the fail detector.

Fail Wait (s) [1.5 … 10.0]
Time from detection of an audio loss to the moment of switch over.

Fail Return (s) [0.0 … 10.0]
Time from the detection of an audio until switch back.

Side Chain Filter [ON / OFF]
A high pass filter (300 Hz) and a low pass filter (3000 Hz) are applied to the detector side chain (not the audio path) to prevent hum and noise from blocking fail over switching.

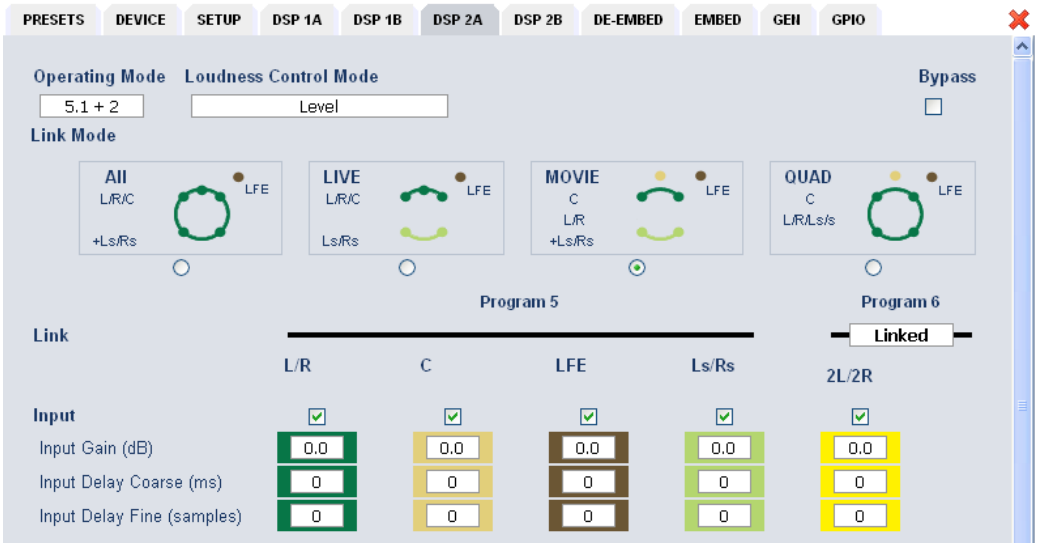
DSP 2A – 5.1 + 2 mode



As mentioned above there is also a 5.1 + 2 program configuration available if you have bought the **surround option** for the C8492. In this case the first 6 channels of the DSP are linked for surround processing. This will also apply to **DSP 1** if 5.1 + 2 is selected. The example above shows a condition where the LFE is not linked to the other surround channels and may be controlled independently.

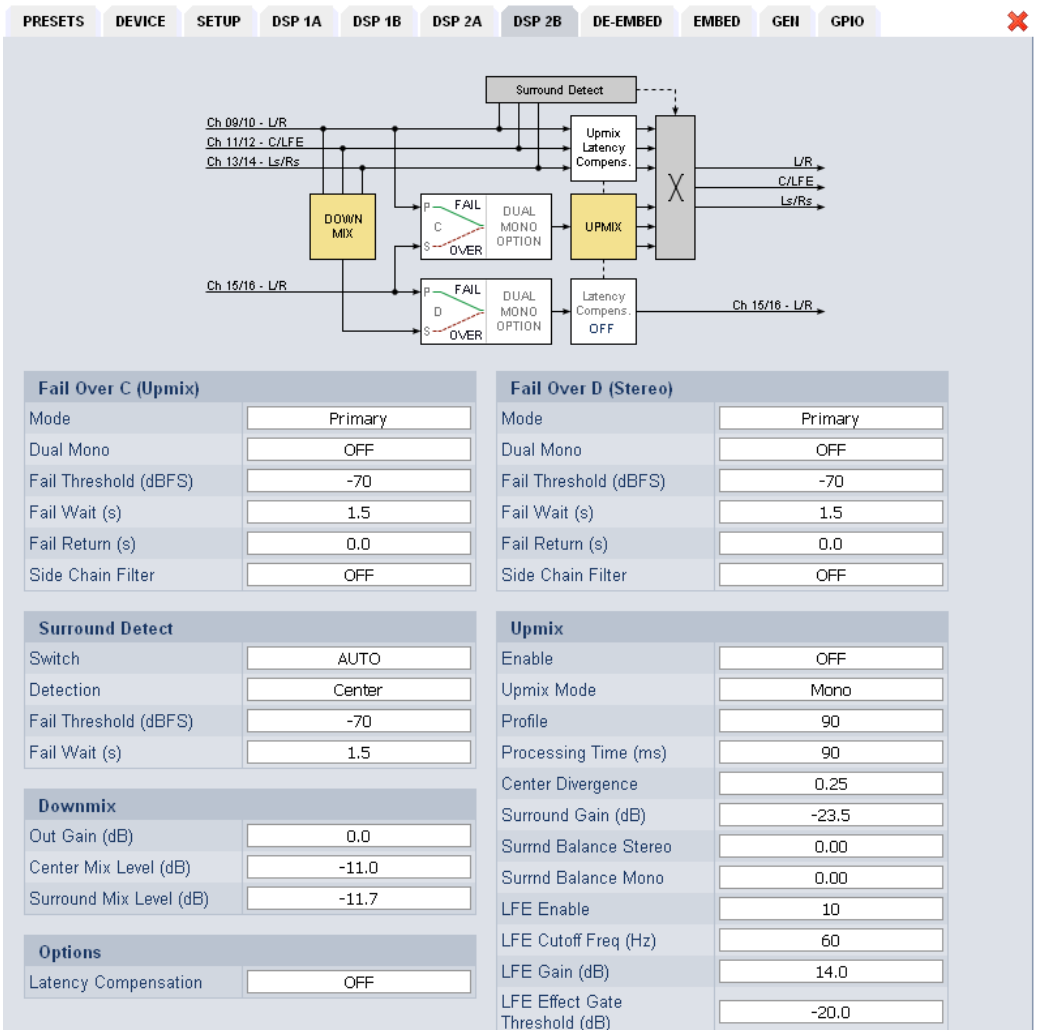
The remaining two channels may be used for an independent stereo audio program or for two mono channels. Above it is linked for stereo operation.

Depending on the loudness control mode, the link options are different. While ITU defines a certain link condition for loudness control and measurement, the proprietary Junger **"Level"** mode allows for more detailed link variances. The screen shot below shows the most sophisticated **MOVIE** mode:



DSP 2B – 5.1 + 2 mode

If you have bought the surround option you will get the option to do an upmix either for permanent operation or as a fail over feature to maintain a surround image if the input surround signal disappears. Also a downmix block is available that can be used to feed a stereo program path or it may be used as a fail over source for the stereo path.
Beside the upmix algorithm, the upmix block has a surround detector that will decide if an input surround signal has disappeared under certain conditions:



Fail Over C (Upmix)

This can be used to provide a two stage fail over in case of upmix. The upmix source signal can be either the incoming L/R surround pair "Primary" or an extra two channel input "Secondary".
If the surround input is driven by an upstream Dolby E decoder and the signal changes from decoded D-E to PCM stereo on L/R, this stereo will for example be used as an upmix source. But it may also be desirable that in case surround fails a different input is used as the upmix source or the upmix is performed permanently from the secondary input.

Mode	[Primary / Secondary / AUTO / AUTO no Upmix] You can select between one of the 2ch inputs and the auto mode and auto mode with upmix disabled (e.g. for path through of announcements).
Dual Mono	[OFF / AUTO] If the fail over input is fed by a dual mono signal, the circuit may automatically copy the opposite one if one fails.
Fail Threshold (dBFS)	[-60 … -40] Trigger threshold for the fail detector.
Fail Wait (s)	[1.5 … 10.0] Time from detection of an audio loss to the moment of switch over.
Fail Return (s)	[0.0 … 10.0] Time from detection of an audio loss until switch back.
Side Chain Filter	[ON / OFF] A high pass filter (300 Hz) and a low pass filter (3000 Hz) is applied to the detector side chain (not the audio path) to prevent hum and noise from blocking fail over switching.
Surround Detect	To perform an automatic upmix in case the main surround fails.
Switch	[AUTO / FIX Surround / FIX Upmix] The surround switch may be permanently [FIX] connected to the surround input or the upmix output but it may also perform an [AUTO] switch over in case the surround input fails.
Detection	[Center / Surround / Center or Surround / Signal loss] Here you can decide which channels must be observed for signal loss to operate the surround switch.
Fail Threshold (dBFS)	[-80 … -70 … -40] If the RMS weighted input level drops below this value a fail signal will be generated.
Fail Wait (s)	[0.0 … 10.0] Time from detection of an audio loss to the moment of switch over. The return from the fail condition (in case surround comes back) will be immediate.
Downmix	
Out Gain (dB)	[-20 … 0 … 20]
Center Mix Level (dB)	[-12.0 … -3.0 … 0.0]
Surround Mix Level (dB)	[-12.0 … -3.0 … 0.0]
Options	
Latency Compensation	[OFF / ON] Since the upmix has a certain latency (see Upmix > Processing Time) it can be compensated automatically for the stereo pair to avoid lip sync issues between an upmixed surround and the stereo path.
Failover D (Stereo)	
Mode	[Prinmary / Secondary / AUTO] The second fail over circuit can take the downmix as a fail over source in case the input signal fails. But it may simply put the downmix through permanently (Mode switch is set to Secondary). The other parameters are already described in the **DSP 1B** section.

Upmix

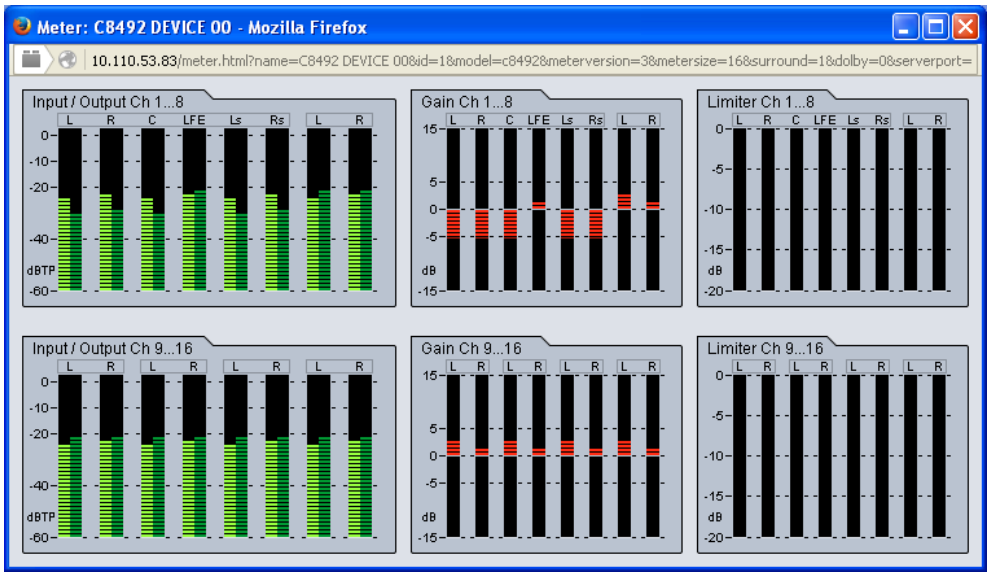
Enable	[OFF / ON]
Upmix Mode	[Mono / Stereo / AUTO]
Profile	[1 Front Projection, 2 Emphasize Front, 3 Balanced, 4 Emphasize Surround, 5 Wrap Surround] **1** Front Projection – Optimized for a stable surround image, independent of correlation of the input signal. Opens a stage-like presentation over the front speakers and uses the rear channels for ambience creation. **2** Emphasize Front – Based on setting 1 with a less strict front projection. **3** Balanced – A balanced distribution of the signal between the front and rear channels, without overemphasizing the rear channels. **4** Emphasize Surround – The distribution between the front and rear channels is highly dependent on the correlation of the input signal. Highly uncorrelated signals may create emphasized surround channels. **5** Wrap Surround – Even distribution of the signal between all channels, to create a feeling of being 'wrapped in sound' to create spectacular effects.
Processing Time (ms)	[3 … 100] The processing time has great influence on the quality of the upmix process but of course alters the latency of the audio signal. It is highly recommended to allow as much processing time as possible. E.g. one can e.g. increase the processing time instead of adding audio delay to compensate for a delayed video line. Depending on the system latency requirements (ingest vs. live broadcast) you may change the processing time accordingly.
Center Divergence	[0.0 … 1.0] 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/R (1.0). The effect will be a wider presentation of center signals in a surround sound image. Please note that the signal does not completely disappear from one source (L/R or C), depending on the selected profile.
Surround Gain (dB)	[-24.0 … 0.0] Sets the level of Ls/Rs channels.
Surround Balance Stereo	[0.00 … 1.00] 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. Works only if upmix mode is set to stereo or switched to stereo in auto mode.

Surround Balance Mono	[0.00 … 1.00] 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. Works only if upmix mode is set to mono or switched to mono in auto mode. For auto mode lower values (0.2 – 0.4) are recommended to prevent unwanted effects when auto switching between Mono and Stereo.
LFE Enable	[OFF / ON / Effect Gate] You may turn this option on if the upmix process is to generate a subwoofer signal that will appear in the LFE channel. When using the Effect Gate function the system interactively processes the subwoofer signal and generates a signal that comes very close to a real LFE signal, without creating permanent rumble and bass excitation.
LFE Cutoff Freq (Hz)	[60, 80, 100, 120] sets the cutoff frequency for the generated LFE signal.
LFE Gain (dB)	[-20.0 … 20.0] You can set the LFE level here
LFE Effect Gate Threshold (dB)	[-20.0 … 0.0] sets the relative threshold of the Effect Gate processor.

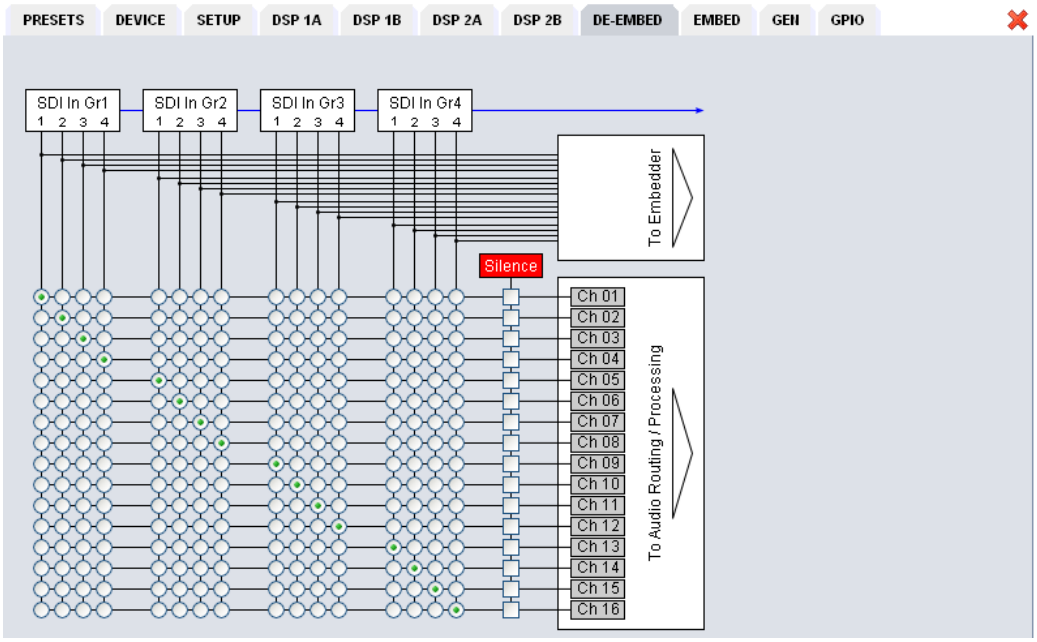
Important Note! If you encode the surround signals from this upmix to a Dolby format we recommend to set the center and the surround downmix level to -3dB for best downmix compatibility.

Metering

If you click on the **Metering** icon  on the left hand side in the status window, a Java applet opens up. This feature is only available if a valid Java plug-in is available for the browser that is used to display the GUI.



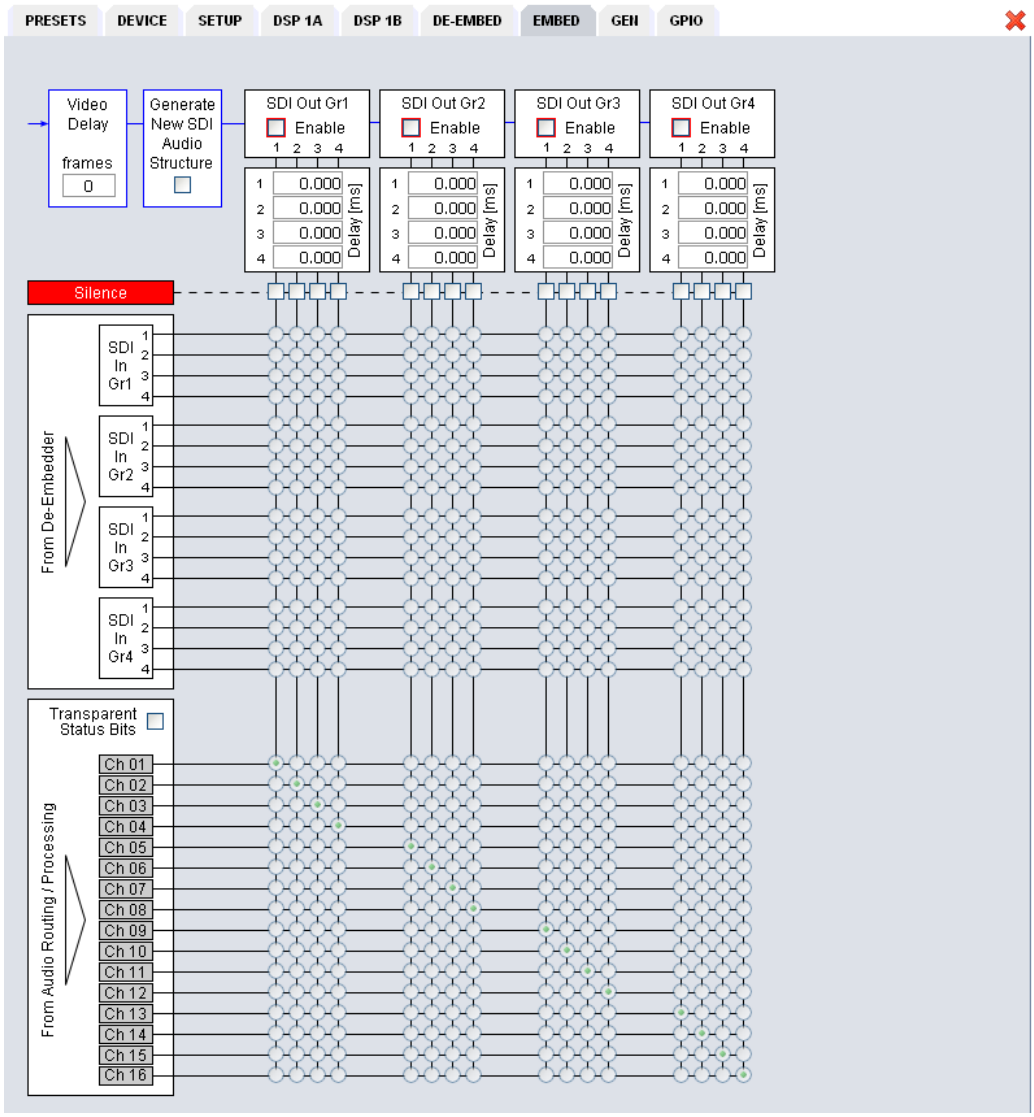
DE-EMBEDDER



Here you may assign the audio signals from the 16 de-embedded channels to **up to 16** processing channels.

Important Note! The number of processing channels may be different. It depends on the license that is activated for the module. A standard four channel module only has Ch 01 … Ch 04 connected to a DSP. See SETUP pane for details. The other channels are moved transparent to the embedder.

EMBEDDER



From here you can control the embedder. You may select between the 16 audio channels from the input (de-embedder) and the signals from the processors (DSPs).

Video Delay [1 … 8 frames]
To compensate for processing delay especially if upmix is involved or for other purposes, you can apply up to 8 frames of video dely. The amount of time depends on the video standard.

Generate New SDI Audio Structure [ON / OFF]
If you need to replace the structure of the **Ancillary Audio Data Blocks** [HANC – **h**orizontal **anc**illary data] you can clean the whole area and generate a new structure. This is an important feature to solve issues discovered from time to time with legacy embedders especially if it comes to SD-SDI. If the option is checked, no group will be generated as long as no **SDI Out Grx** is checked.

SDI Grx Enable

You **must** check these check boxes to enable the respective embedder. The check boxes show flashing red frames as a warning as long as no embedder is turned on. The respective column of the local (embedder) routing matrix for each group is not high lighted as long as its embedder is not enabled.

Delay

[0 … 340 ms]
Before the signals are embedded you may engage a delay per mono channel.

Silence

Mutes the respective audio channel at the embedder side.

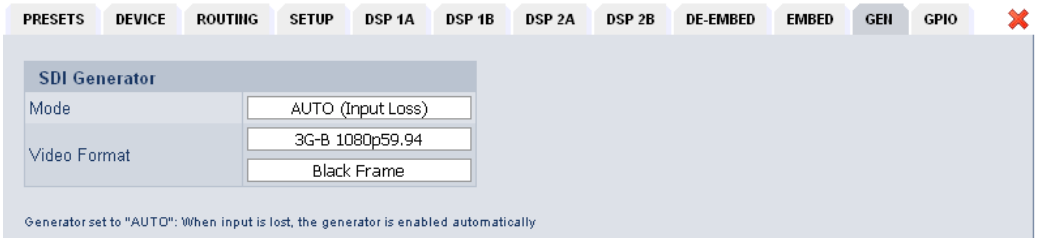
Transparent Status Bits

[ON / OFF]
You can decide whether the AES Channel Status Bits are taken (transparent) from their source or if you want to generate new ones:

Format	:	Professional
Audio Mode	:	Audio
Emphasis	:	None
Freq. Mode	:	Locked
Sample Freq.	:	48kHz
Channel Mode	:	Not Indicated
User Bits	:	None
Auxiliary Bits	:	24Bit
Audio Word Length	:	Not indicated

If the embedder detects a non audio signal it will set the "Audio Mode" to "Other" (non audio) and set the validity bit for the AES stream.

GEN



SDI Generator

Mode [AUTO (Input Loss) / ALWAYS ON / OFF]
If the generator is set to **"AUTO (Input Loss)"** and the input signal is lost, the generator will use the pre-selected video format from the setting below.

Video Format [Last Valid / None / SD 525i59,94 … HD 720p50 … 3G-B 1080p50]
For the generator mode **"ALWAYS ON"** you may select one of the standards to be used.
For the **"AUTO (Input loss)"** mode you may additionally decide between "**Last Valid"** or "**None".**

Last Valid - The generator uses the last seen input format. If no SDI signal is present when power is turned on, the output defaults to 720p60.

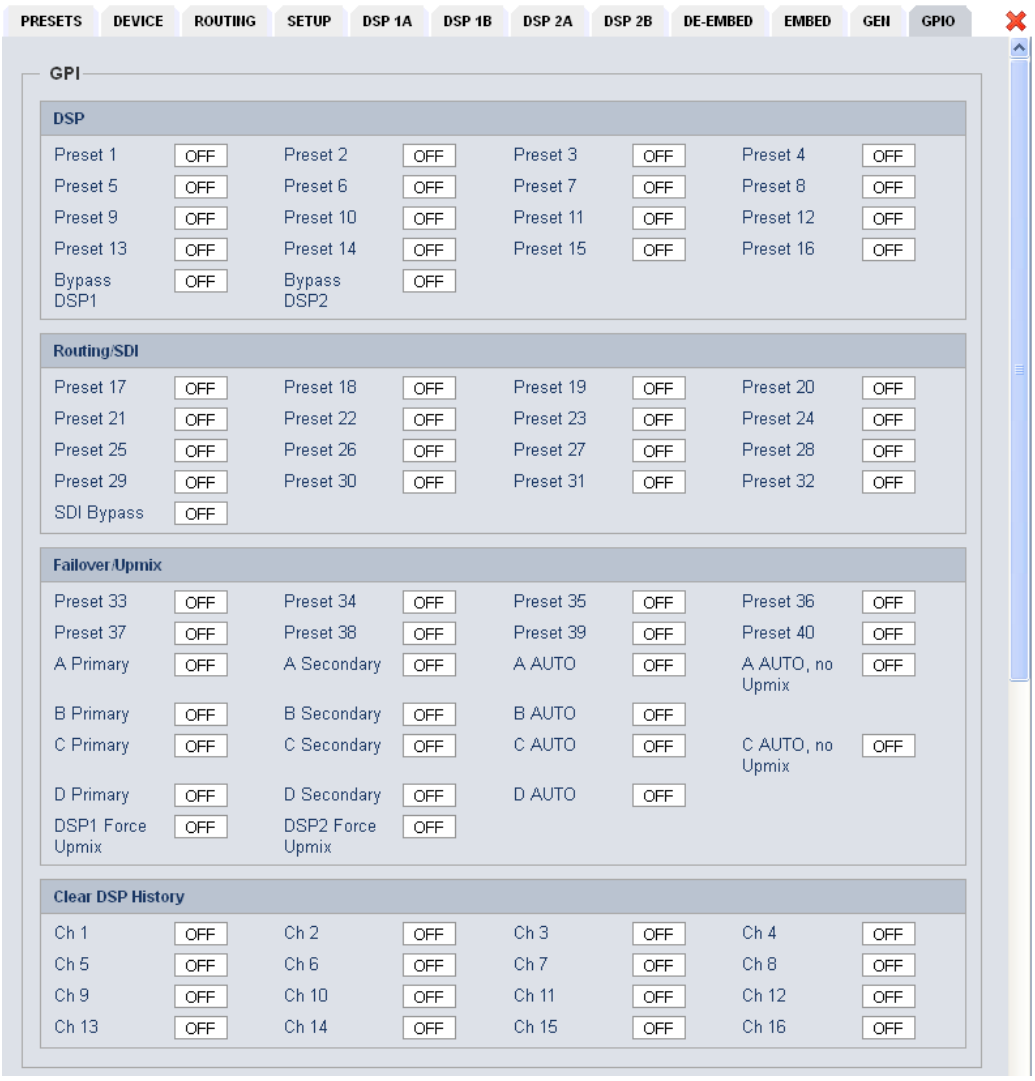
None - The generator output will stay off if the signal is lost.

[Color Bars / Black Frame]
The generator can either generate **100% Color Bars** or **Black**.

Important note! The generator always operates on an **internal quartz reference**.
I.e. the signal is **not** synchronized to the SDI input if it is enabled in the "ALWAYS ON" mode.

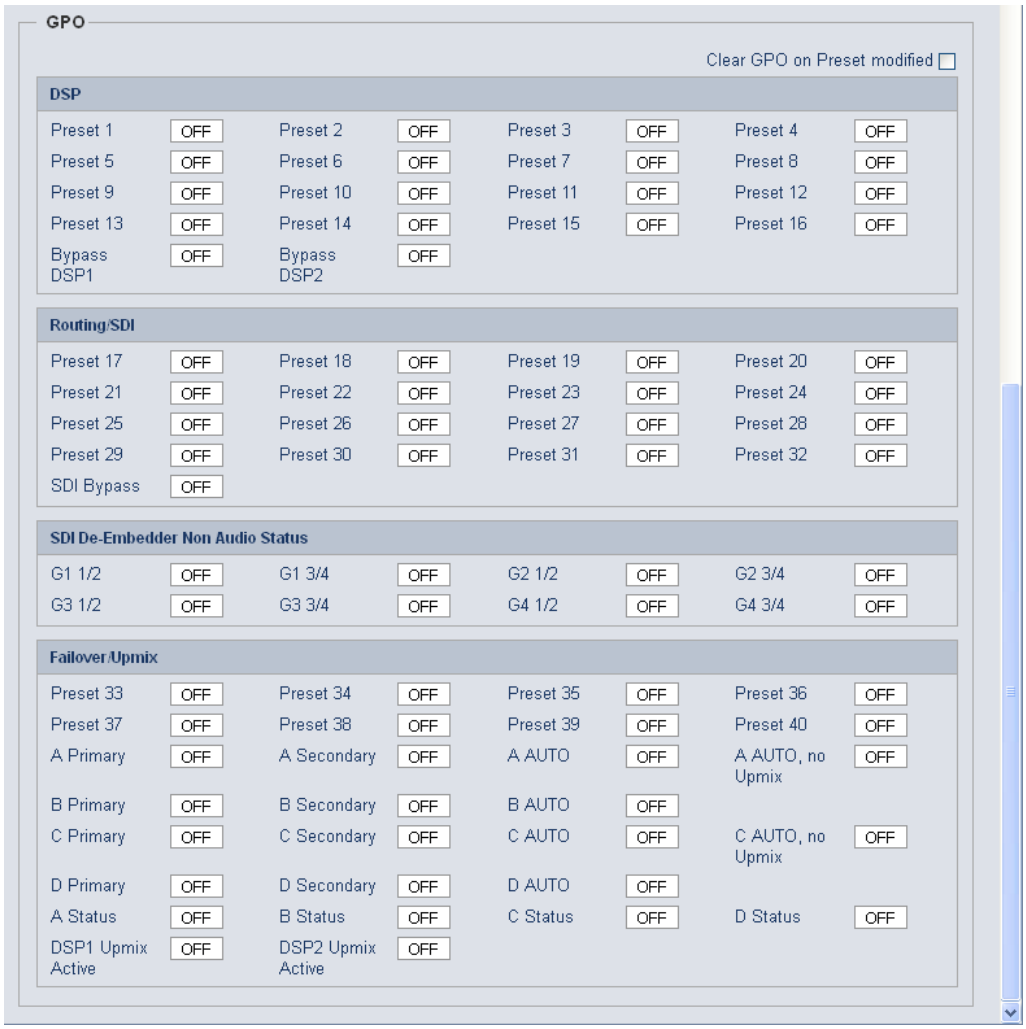
GPIO

The **C8492** has three dedicated sets of GPI/Os for the **DSP**, the **SDI** and the **Failover/Upmix.** Moreover it offers the function to clear the DSP history (see level magic expert parameters) by control of an external GPO device.



GPIs are useful if you want to recall settings remotely (e.g. via presets). The C8k frame can handle **127** different virtual (system) **GPI** numbers. 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 **C8817**. If the **C8492** receives such a number over the internal CAN bus, it will for example load the respective preset or it will turn on a bypass function or clear the processing (DSP) history.

GPOs (Tallies) may signal the status of a module for a **GPI** devices like legacy equipment monitoring systems. The c8k frame can handle **127** different virtual (system) **GPO** numbers.
If an event occurs, the **C8492** puts the assigned number on the CAN bus so a **C8817 GPI/O** module can engage a relay or the **brc8x** may activate its tallies.



Clear GPO on Preset modified

If a GPO indicates that a certain preset is loaded and if you change parameters which are related to that preset the word "modified" will be displayed in line with the preset name in the status window.
In this case you may clear that GPO to indicate that the parameters are not the same as the content of the previously loaded preset.

Important Note! Virtual **GPI** and **GPO** numbers do not "see" each other on the CAN bus. I.e. you can not use a **GPO** number to trigger an event inside the frame directly. If this is the task you **must** use the **C8817 GPI/O** module that can do the system **GPI/O** link-up that also provides you with the possibility to set up logical combinations of physical and virtual (system) **GPI/Os**.