switch over & ducking

C8082

features

Automatic or manual **Switch Over** or **Fail Over** in case of input level loss. **Ducking** of a main stereo or surround sound signal by a line level microphone or by a pre recorded announcement / ad input.

- 5.1 to stereo Fail Over / Switch Over
- 2x Stereo Fail Over / Switch Over
- 5.1 Ducking to C, L&R or L&C&R
- 2x Stereo ducking
- Detection of low input level and automatic Fail Over switching
- Detection of the ducking source signal and automatic Ducking
- Manual operation via GUI or GPI for Switch Over and Ducking

block diagram

The block diagram on the next page gives an overview of the signal flow within the C8082.
It receives the input signals via four C8k audio busses. The Main signals (Main Stereo #1 and #2) must be applied to Ch1/2 and Ch 3/4 respectively, while the Aux channels for Ducking or fail over must be applied to Ch 5/6 and Ch 7/8.

The C8082 has 6 mixing nodes which perform the switching or ducking functions. Honestly there is no real switch mode because all switch processes are cross fades to prevent from switching noise.

The mixing nodes receive their parameters depending on the operating mode from the DSP controller on the PCB. This DSP controller communicates via CAN bus with the C8k Frame Controller. Therefore it needs a unique CAN address.

The Frame Controller itself runs a web server. This web server generates a web technology based GUI. It may be displayed by IE8 or FireFox 3.6 or higher (see C8702 manual for details).

The inputs of the C8082 are equipped with level detectors for either detecting a loss of the input or an active source for Ducking. The Fail / Duck detection part performs the logical action depending on the various input statuses and user defined operating modes.

6 two channel outputs feed the processed signals back to the C8k frame bus. Each of these 6 outputs has the **Junger Brickwall limiter** inserted. This limiter not only provides smooth non distortion output in case of an overload but also defines the maximum output level. The algorithms are adaptive to the material so only one parameter, the **Limiter Program,** is needed to set up this part. For 5.1 or stereo processing the limiter control circuits are automatically linked together for proper multi channel operation.

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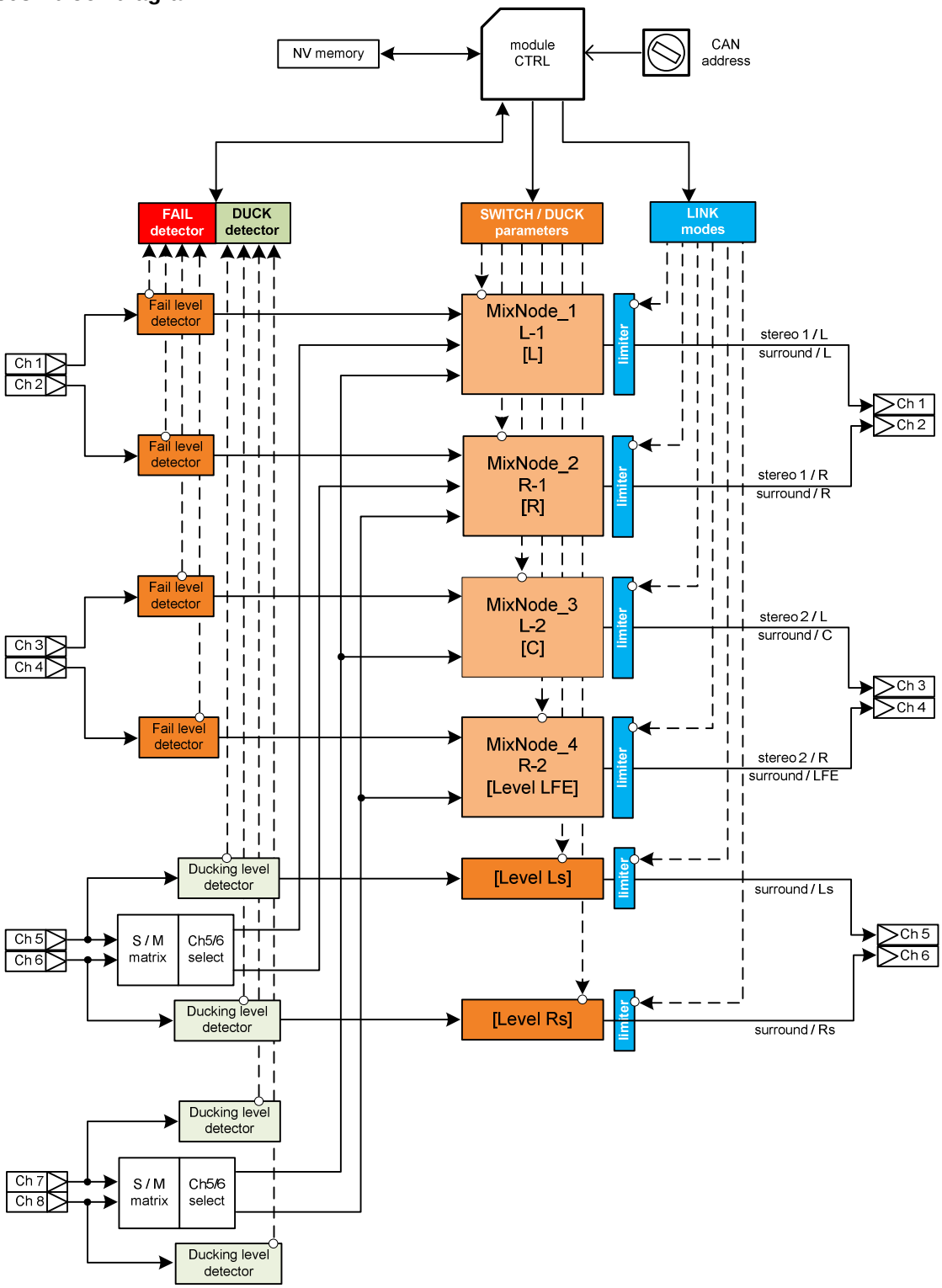
C8082 block diagram



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technical specifications

AUDIO :

resolution :	24bit
sample rate :	32...48kHz
digital processing delay :	2ms constantly

GENERAL :

backplane connector :	ref. to DIN41612, 64pin, a+b, male
power supply :	+5V DC
power consumption :	approx. 1.000mA
dimension :	3RU, 4HP, 160mm depth
temperature :	10℃ … 40℃
humidity :	90%, non condensing

hardware settings

The C8082 does not have front panel controls. It may be configured by switches and via web browser.

On the front panel there is a status LED with different display modes:

green	=	status OK
yellow flashing	=	the module is under control of the Frame Controller
red	=	status is bad. It needs remote reading of the status via GUI. It is likely that the Frame Controller has issued a SNMP trap.

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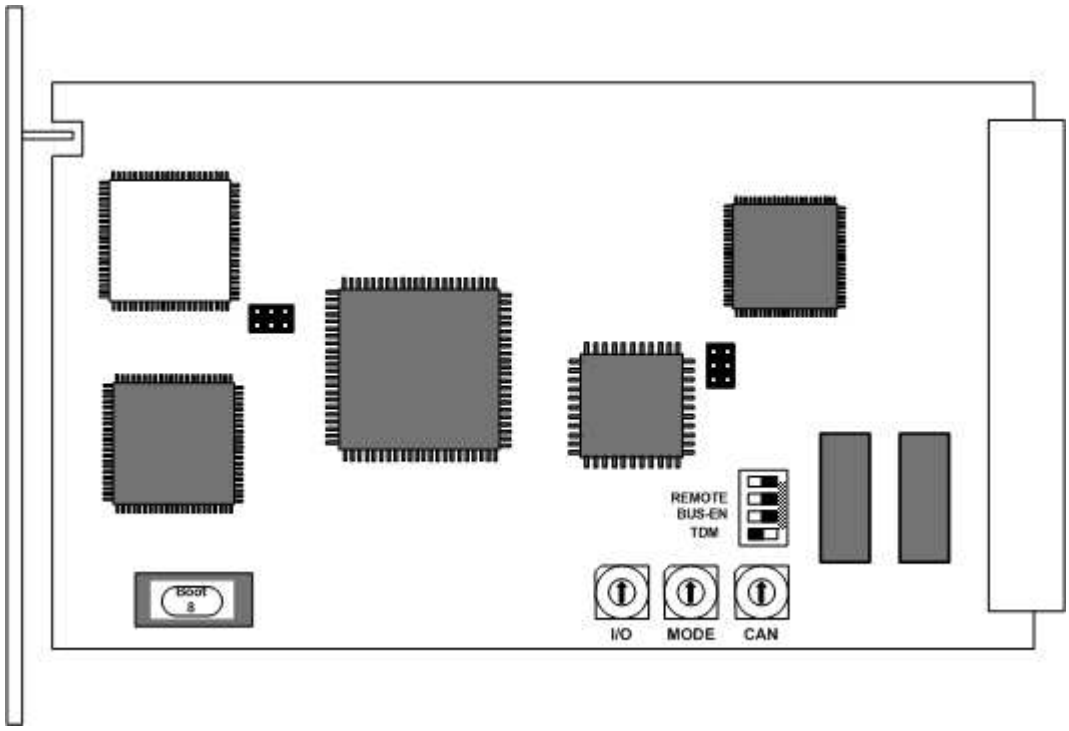
location of switches:



dip-switch settings

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

NO LABEL: **ON**
CAN address range is extended by **+16** (counting from 0x10 to 0x1F)
OFF
CAN address range is standard (counting from 0x0 to 0xF) see rotary encoder settings below.

REMOTE: **must be ON**

BUS-EN: **ON**
Connects the outputs to the C8k audio buses on power up automatically. The output configuration will be taken from the **NV** (non volatile) **memory.**
OFF
Disconnects the module outputs from the C8k buses on power up.

Important note! To avoid audio bus conflicts when you replace a module or install an additional one and the configuration is unknown, the output bus drivers must be disabled by **BUS-EN=OFF** before inserting it. If all settings are done remotely and the unit fits into the bus assignment scheme of a frame, you must remove it and place the switch back into position **BUS-EN=ON**.

TDM: **must be OFF**

rotary encoder settings

I/O	**not used**
MODE	**not used**
CAN	**0 – F** The 16 switch positions are hexadecimal numbers (0x0 to 0xF) it sets the CAN ID. Each module within a frame must be assigned a **unique** CAN bus address for proper communication with other parties of the frame, e.g. the frame controller or the GPI/O module.

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. See C8k system manual for details.

remote control operation

- Web-server based remote control of parameters via frame controller C8702
- 3rd party remote control by http protocol based API
  (please contact Junger Audio for details)
- Hardware GPI/O control of preset operation and special module functions
- Remote control by the **brc8x Broadcast Remote Controller** via CAN bus

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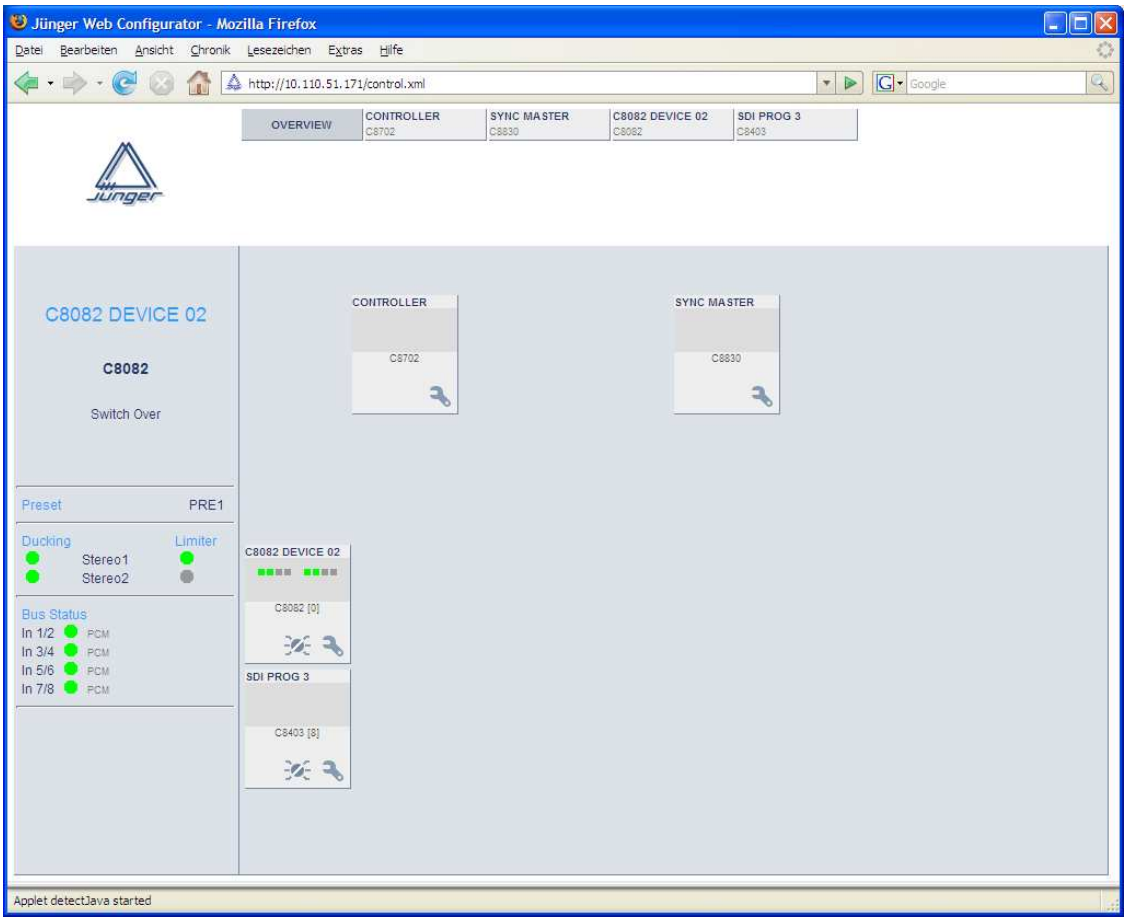
web browser based configuration

OVERVIEW



The above example shows a **C8082** working with the **C8403 HD-SDI** Interface.
Clicking on the spanner tool within the module graphics of the C8082, will open the pages of that module while the switching tool will open the Preset load function only.

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PRESETS

Audio	the 8082 has 16 processing related Presets
Input Bus Routing	for flexible signal routing you may change the input bus configuration by one of the 8 Presets
Load	will load one of the available presets from the modules NV memory
Save as # Name	here you can select a Preset Number (memory location) and assign the preset a 16 character name
Preset Clipboard	you can copy the data of the active parameters to a clip board and paste such data into the preset memory of another module within one frame
Backup Presets to File	store all presets of one C8082 into a file
Restore Presets from File	restore all presets for a C8082 from a file

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There are **16 presets** available for **audio processing**. The presets will store all the **PARAMETERS** as you see it on the PARAMETERS pages in the different operating modes. The Presets will be programmed with a set of **factory default parameters** if you initialize the module.

The **factory default** settings (PRE1 …. PRE8) for **2x Stereo Ducking** are :

#	Name (for both channels)	Value
	Main Stereo Source #1 and #2	
1	Gain	0.0dB
2	Ducking Gain	-6.0dB
3	Fade In Time	10msec.
4	Fade Out Time	5sec.
5	Limiter Threshold	0.0BFS
6	Limiter Program	uni
7	Ducking Mode	Auto
8	Bit Transparent	Off
	Ducking Source #1 and #2	
9	Gain	0.0dB
10	Ducking Threshold	-30.0dBFS.

There are another **8 presets** (#17 - #24) available for **Input Bus Routing.**
They have the following default values :

IN 1/2 Bus S1
IN 3/4 Bus S2
IN 5/6 Bus S3
IN 7/8 Bus S4

DEVICE settings

Device Name	a 16 character device name can be set
Platform	the hardware platform
Firmware	
Controller	firmware version of the built-in module controller
DSP (TI)	firmware of the DSP engine
FPGA	firmware of the FPGA
Restart Module	warm starts the module (like a reset)
Initialize ….	recalls factory default settings for parameters, presets, bus routing etc.
Backup	will store all module data from its NV-memory to file
Restore	will restore module data from file to its NV-memory

PARAMETERS for **2x Stereo Ducking** mode

On the **PARAMETER** page you can set the parameters for the two stereo processing channels independently. You will find a list of the parameters with a short description on **page 15**.
The content of the **PARAMETERS** page depends on the **Operating mode** of the **C8082**.

Bypass	The ducking processor will be bypassed when the check box is active.
Gain	The main channel gain setting to align the module to the level diagram of the signal path.
Ducking Gain	The relative gain represents the amount of level reduction of the Main Stereo channel if Ducking is active.
In Fade Time	The time the Main Stereo Channel needs to reduce its relative gain from 0dB to the value of Ducking Gain.
Hold Time	The time the module stays in ducking mode after ducking source is below Ducking Threshold again.

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Out Fade Time — The time the Main Stereo Channel needs to increase its relative gain from Ducking gain to 0dB.

Limiter Threshold — The threshold of the peak limiter defines the maximum output level of the respective stereo channel. Both stereo channels are linked together for proper operation.

Limiter Program — The dynamic parameters of the limiter are adaptive controlled by the DSP process. No attack, decay or release time needs to be set up, only one parameter called **Limiter Program** is required.

Ducking Mode — The ducking process may either be controlled automatically by the ducking source or manually via above radio buttons or external GPI. If the setup via GUI is **Auto**, an external GPI may set the Ducker to **On** to force ducking. If another external GPI turns ducking **Off** later on, it will return to **Auto mode**. If the previous setup was **Off** a GPI will turn ducking **On** and **Off** respectively. The administrative setup via GUI will overwrite GPI trigger.

Proc Status Monitor — The check box will turn on the monitoring of limiter activities. The **Limiter Status** soft LEDs are **grey** if turned off and **green** for normal activity. Limiter gain change over time is low pass filtered. If the outcome exceeds 3dB the respective status 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 has “hyper active” limiters.

Gain — A static gain that may be applied to the Ducking signal if the level does not fit into the **level diagram** of the **Main signal**.

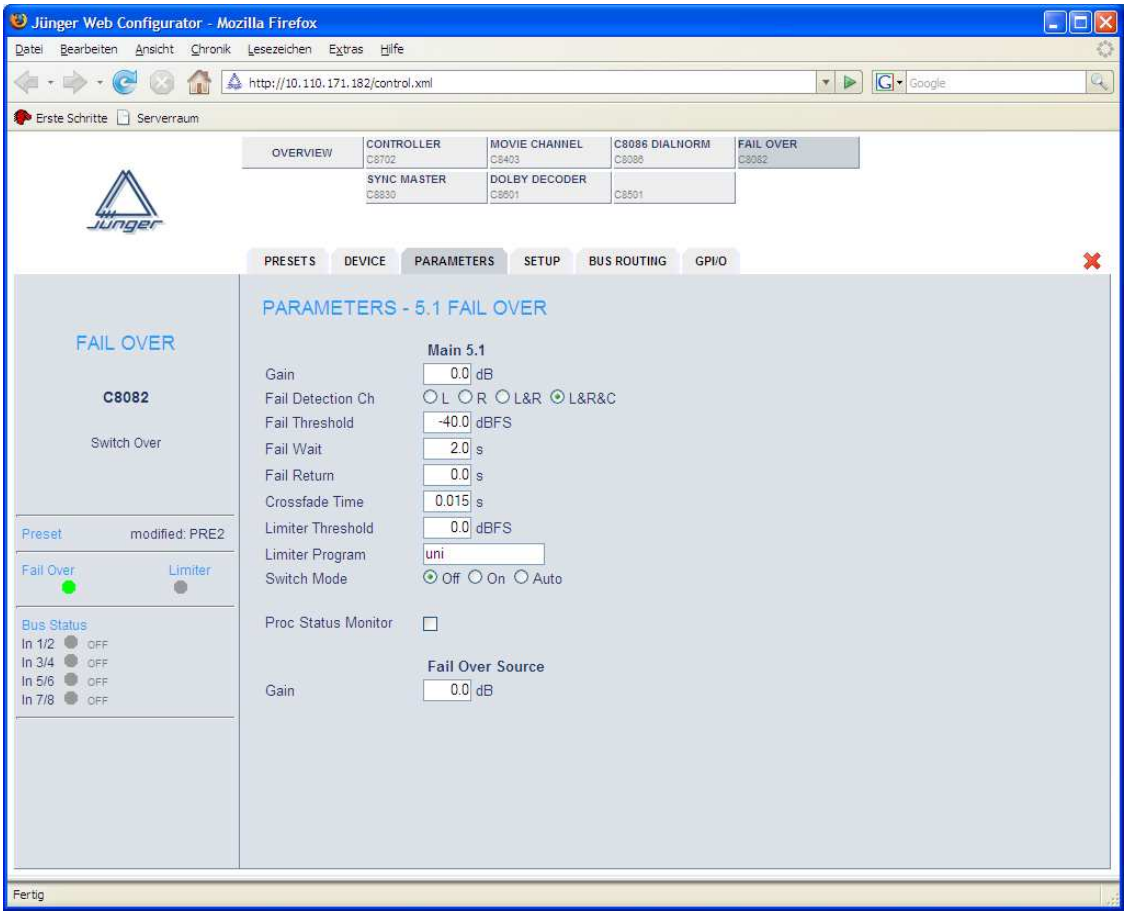
Ducking Threshold — For **automatic operation** this threshold determines the level of the Ducking Source which will initiate the ducking process.
A sophisticated Expander / Gate algorithm allows for fast but smooth fade in of the Ducking signal.

PARAMETERS for **5.1 Ducking** mode

Ducking Channel Here you can decide into which of the 5.1 front channels the ducking source will be mixed.

The other parameters above are the same as for the 2x stereo Ducking mode. Except for 5.1 only one program may be processed at a time by a C8082. See **SETUP** page for I/O details.

PARAMETERS for **5.1 Fail Over** mode



Gain	The **Main 5.1** channel has a gain setting to align the module to the level diagram of the signal path.
Fail detection Ch	You can select which of the surround channels L, R, L&R or L&R&C will be observed by the level detector to decide if the 5.1 input has failed.
Fail Threshold	The selected input will be RMS weighted. The level which determines an input failure must be set here.
Fail Wait	You can set up a wait delay before the switch over to the AUX channel takes place.
Fail Return	You can set up a Return delay before the switch over back to Main Channel takes place if weighted input level is back above Threshold.
Crossfade Time	This parameter defines the speed of the switch over in both directions.

Limiter Threshold	The threshold of the peak limiter defines the maximum output level of the respective stereo channel. Both stereo channels are linked together for proper operation.
Limiter Program	The dynamic parameters of the limiter are adaptive controlled by the DSP process. No attack, decay or release time needs to be set up, only one parameter called **Limiter Program** is required.
Switch Mode	The switch over process may either be controlled automatically by the failure of the Main Source or manually via above radio buttons or external GPI. If the setup via GUI is **Auto**, an external GPI may set the **Switch Over** to **On.** If another external GPI turns **Switch Over** to **Off** later on, it will return to **Auto mode**. If the previous setup was **Off** a GPI will turn **Switch Over** to **On** and **Off** respectively. The administrative setup via GUI will overwrite GPI trigger.
Proc Status Monitor	The check box will turn on the monitoring of limiter activities. The **Limiter Status** soft LEDs are **grey** if turned off and **green** for normal activity. Limiter gain change over time is low pass filtered. If the outcome exceeds 3dB the respective status 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 has “hyper active” limiters.
Gain	A static gain that may be applied to the Fail Over Source if the level does not fit into the **level diagram** of the **Surround signal**.

PARAMETERS for **2x Stereo Fail Over** mode

The above parameters also apply for the **2x Stereo Ducking.**

SETUP

The SETUP page defines the basic operating mode for the **C8082** and tells the module the signal format of the auxiliary channels for Ducking or Switch Over (Fail Over). The descriptions in Italic below are for future enhancements of the C8082.

5.1 Fail Over

If you feed the C8082 with a **Main 5.1** you may exchange that signal by a 2channel signal if the 5.1 input gets lost. The module will permanently monitor the 5.1 main channels in pre defined combinations to decide if the input gets lost. In this case it may automatically switch over to the stereo auxiliary input called **Fail Over Source**. Depending on the channel mode of the Fail Over Source (LL, RR or stereo) it will be switched into the L and R 5.1 channels while the other 5.1 channel will be muted. See PARAMETERS page: Switching Mode for details.

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2x Stereo Fail Over Two independent stereo channels will be monitored permanently to decide if one of the inputs got lost. In this case the C8082 may automatically switch over to the dedicated Fail Over Source depending on the channel mode of that source.

5.1 Ducking A 5.1 signal may be mixed with a 2 channel ducking source. The process may be initiated by the level of the ducking source in automatic mode or triggered manually by a GPI.

2x Stereo Ducking Two independent stereo Main channels may be mixed with a dedicated 2 channel ducking source. The mixing depends on the channel mode of the ducking source (LL, RR, stereo). The process may be initiated automatically by the level of the ducking source or triggered manually by a GPI.
For details see PARAMETERS – 2X STEREO DUCKING.

table of processing parameters (italic applies to Fail Over mode)

#	Name	Range	Steps	Description
1a	Gain	-20.0 … +20.0dB	0.1 dB	For Main channels (5.1 and stereo)
1b	Gain	-20.0 … +20.0dB	0.1dB	For AUX channels (LL, RR or stereo)
2a	*Fail Detection Ch*	*L or R or L&R*		*Stereo mode*
2b	*Fail Detection Ch*	*L or R or C or L&R&C*		*5.1 mode*
3	*Fail Threshold*	*-60 …. -40dBFs*	*1dB*	
4	*Fail Wait*	*0 …. 90 sec.*	*0.5sec.*	*Time from fail detection to switch over*
5	*Fail Release*	*0 ….. 5 sec.*	*0.5sec.*	*Time from good detection to switch back*
6	Fail Blend / Crossfade	15ms …. 5sec.	0,5sec.	
7	Limiter Threshold	0.0 … -20dBFS	In 0.1 dBFS steps	
8	Limiter Program	live, speech. pop, uni, classic		
9	*Switch Mode*	*Off, On, Auto(On,Off), Auto(On)*		
10	Ducking Gain	-3 …. -20dB	1dB	Reduction of Main signal in case of ducking
11	In Fade Time	0 … 200 msec.	0.5ms	
12	Hold Time	0 … 10sec.	500ms	
13	Out Fade Time	0 … 10sec.	500ms	
14	Ducking Mode	Off, On, Auto		
15	Ducking Channel	C or L&R or C&L&R		5.1 mode only
16	Ducking Threshold	-60 ….. -20dBFS	1dBFS	Ducking, source level threshold

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BUS ROUTING

Keeping in mind that normally 2 audio signals are multiplexed for transportation over one of the c8k frame bus lines, the C8082 offers the feature to **multiplex 8 audio signals** over one bus line. This will increase the density of the modular c8k system :

from C8000 Bus

8Ch Mux

Here you can select a bus line that carries 8 audio channels.
By use of the IN 1/2 – IN 7/8 check boxes you can decide if the signal for the relevant processing input is taken from the respective position within the 8 Ch Mux stream. The position is defined by the IN x/y number. I.e. the signal for input 1/2 will be taken from the audio channels 1 and 2 of the 8 channel Mux stream.

IN 1/2
IN 3/4
IN 5/6
IN 7/8

In the above example the 6 signals for the Surround Main input are taken from the audio channels 1 – 6 of the 8 Ch Mux on Bus # 31, while the stereo ducking signal is taken from Bus # 32.

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Error Detection

An upstream module may insert a flag into each channel of the serial audio data stream. If this flag is not detected, the **Bus Status** display will turn red. If an upstream module does not insert such a flag you must turn **Error Detection Off** in order to prevent non valid error conditions.

to C8000 Bus

8Ch Mux

Ch 1/2
Ch 3/4
Ch 5/6

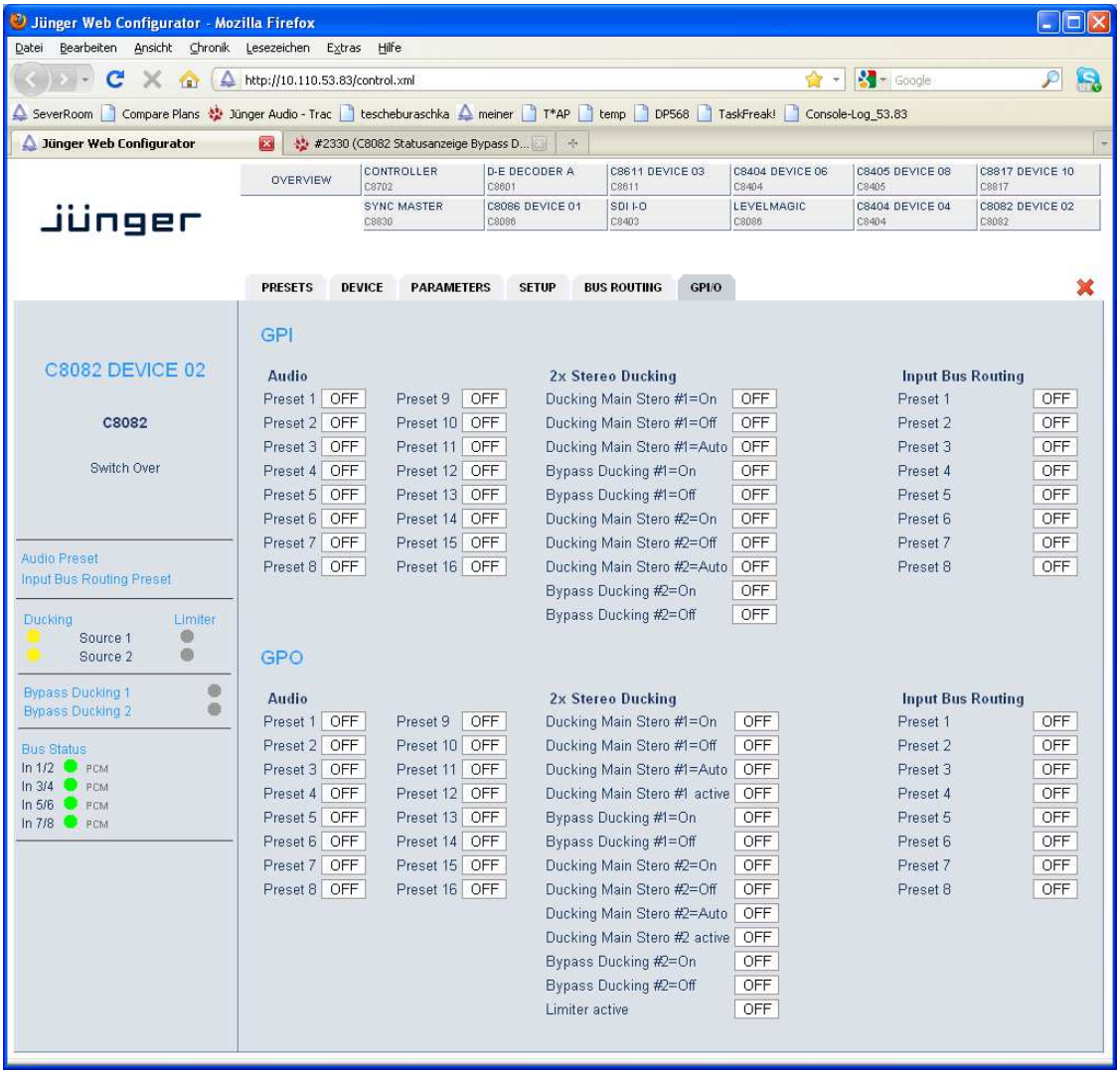
Here you select a bus that will carry the outputs of the processor in the order of Ch 1 – Ch 6. The positions for Ch 7 and Ch 8 are empty, because the C8082 has only 6 outputs in 5.1 ducking mode while it has only 4 outputs in 2x Stereo Ducking mode.
In parallel you may also assign a 2 Ch bus to one or all of the processor outputs

Enable C8k Bus Driver

You may turn off all bus drivers (put them into tri state mode) for installation / testing to prevent conflicts with modules already in use. See also BUS-EN switch (page 4)

GPI/O

On the **GPI/O** page you can assign GPIs numbers to activate Presets or turn special operating modes on and off and you can assign GPOs numbers to reflect the operating status of the C8082 via parallel GPO interface :



If the C8082 reads one of the GPI numbers on the CAN bus (you have assigned above), it will load the respective **Preset** or turn the respective processing mode on.

If a **GPO** is asssigned, the **C8082** will generate this number on the CAN bus for the **C8817 parallel GPI/O** module or the **brc8x broadcast remote controller**.

Important Note! It is not possible that a module may issue a GPO that will be interpreted by another module of the same frame as a GPI. If you need dependent actions triggered by modules of the same frame you must use the **GPI/O conversion** feature of the C8817 module.