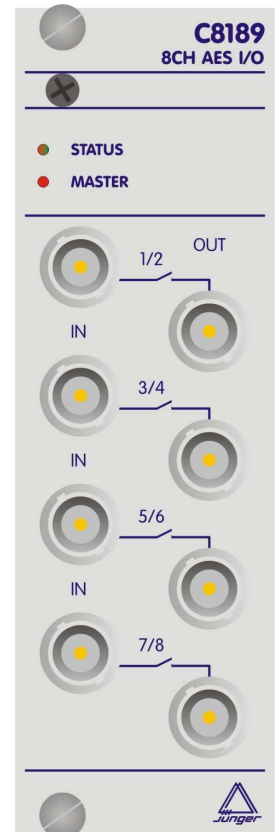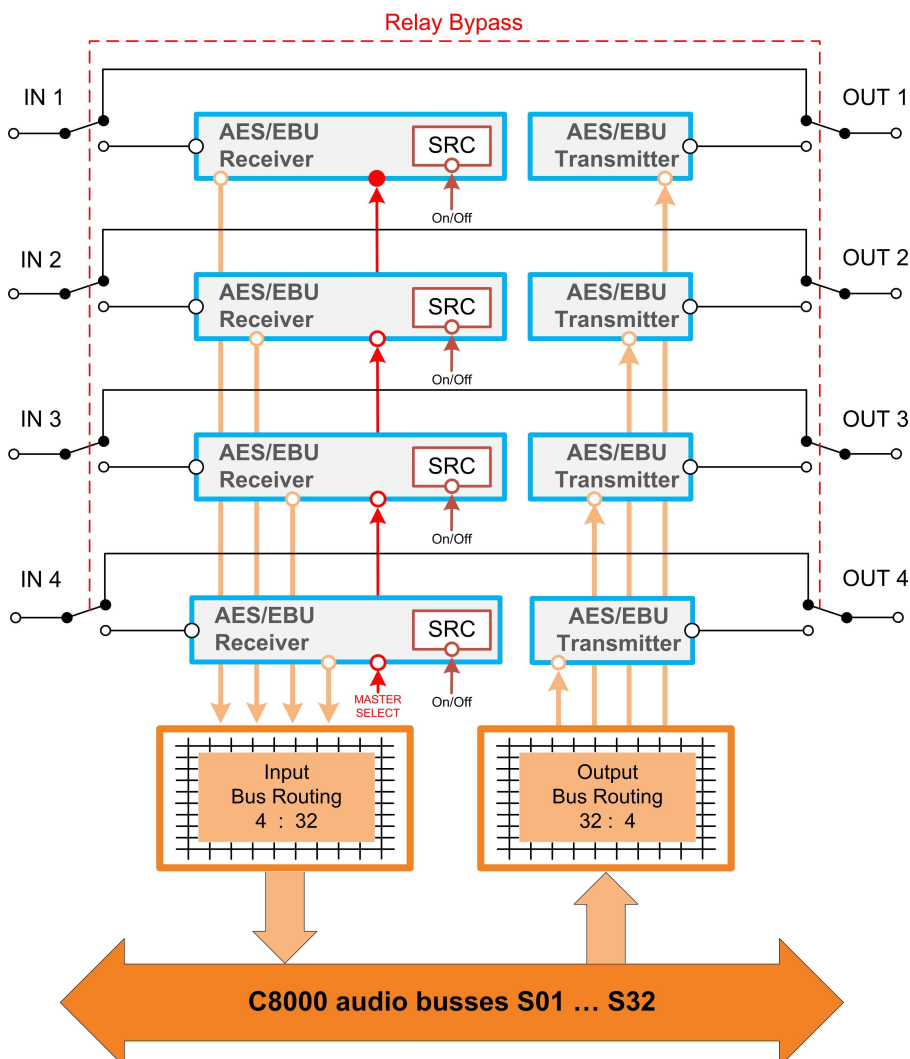## 4 Channel unbalanced AES/EBU I/O

C8189

features

- 4 unbalanced AES inputs

- Input Sample Rate Converters (SRC)

- 4 unbalanced AES outputs

- Relay bypass for pairs of I/Os

- Relay wait time after power up

- Master mode (clock master for the frame)

- 75Ohm BNC connectors

- Remote control via C8702 Frame Controller, or http based API

block diagram

4 Channel unbalanced AES/EBU I/O

C8189

technical specifications

AUDIO :
resolution :	24bit
sample rate :	32...48kHz
format:	AES3id
Input level :	0,3 … 5Vpp
Output level :	1,0Vpp at 75Ohm

GENERAL :
I/O connector	BNC / 75Ohm
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 C8189 does not have front panel controls. It may be configured via a DIP switch and a rotary encoder. On the **front panel** there are two **LEDs** with different display modes:
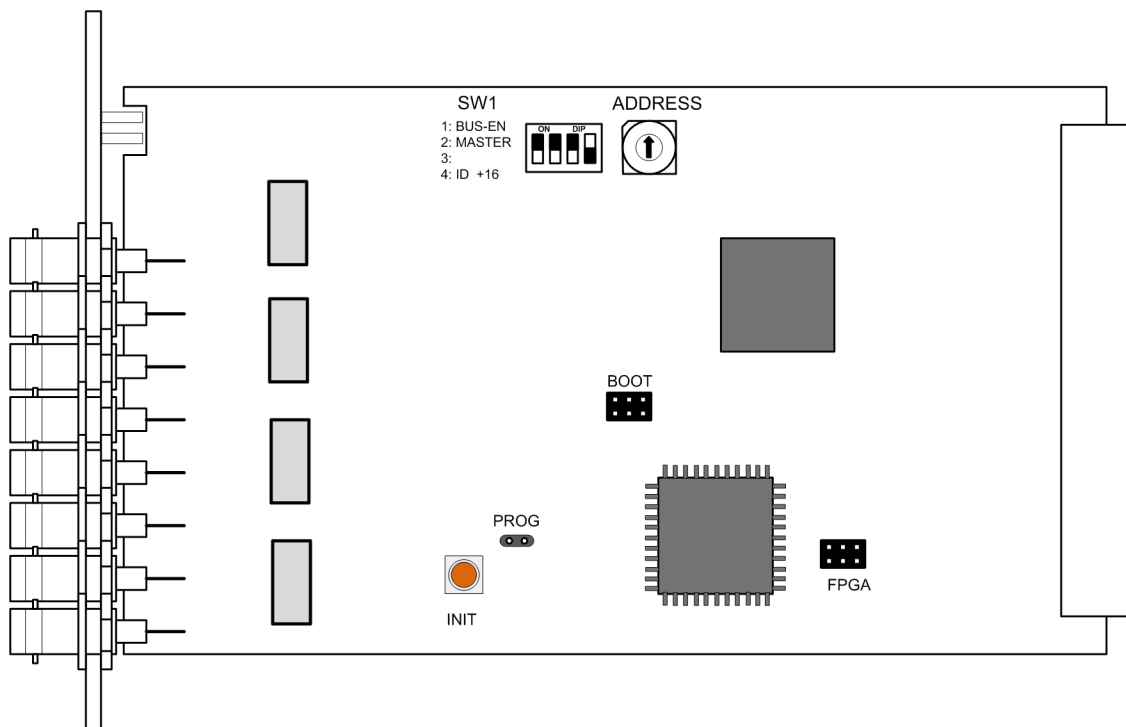
STATUS
green	=	status OK
flashing	=	the module is under control of the Frame Controller
red	=	status is bad, remote reading of the status via GUI is required. It is likely that the Frame Controller has issued a SNMP trap.

MASTER
Off	=	the audio bus interface clock must be provided by the frame
red	=	the 8188 is clock master for the frame

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4 Channel unbalanced AES/EBU I/O — C8189

location of switches:

switch settings

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

MASTER:
ON
the module is clock master for a C8932 frame
OFF
an other module is sync master for the frame

#3
not used

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

rotary encoder settings

ADDRESS   **0 – F**
sets the CAN ID . The 16 switch positions are hexadecimal numbers (0x0 to 0xF). Each module within a frame must be assigned a **unique** CAN bus address for proper communication with other modules of the frame.

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**.

INIT   the button initializes the module to factory default if one holds it down while power up.

digital audio
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4 Channel unbalanced AES/EBU I/O

C8189

web browser based GUI

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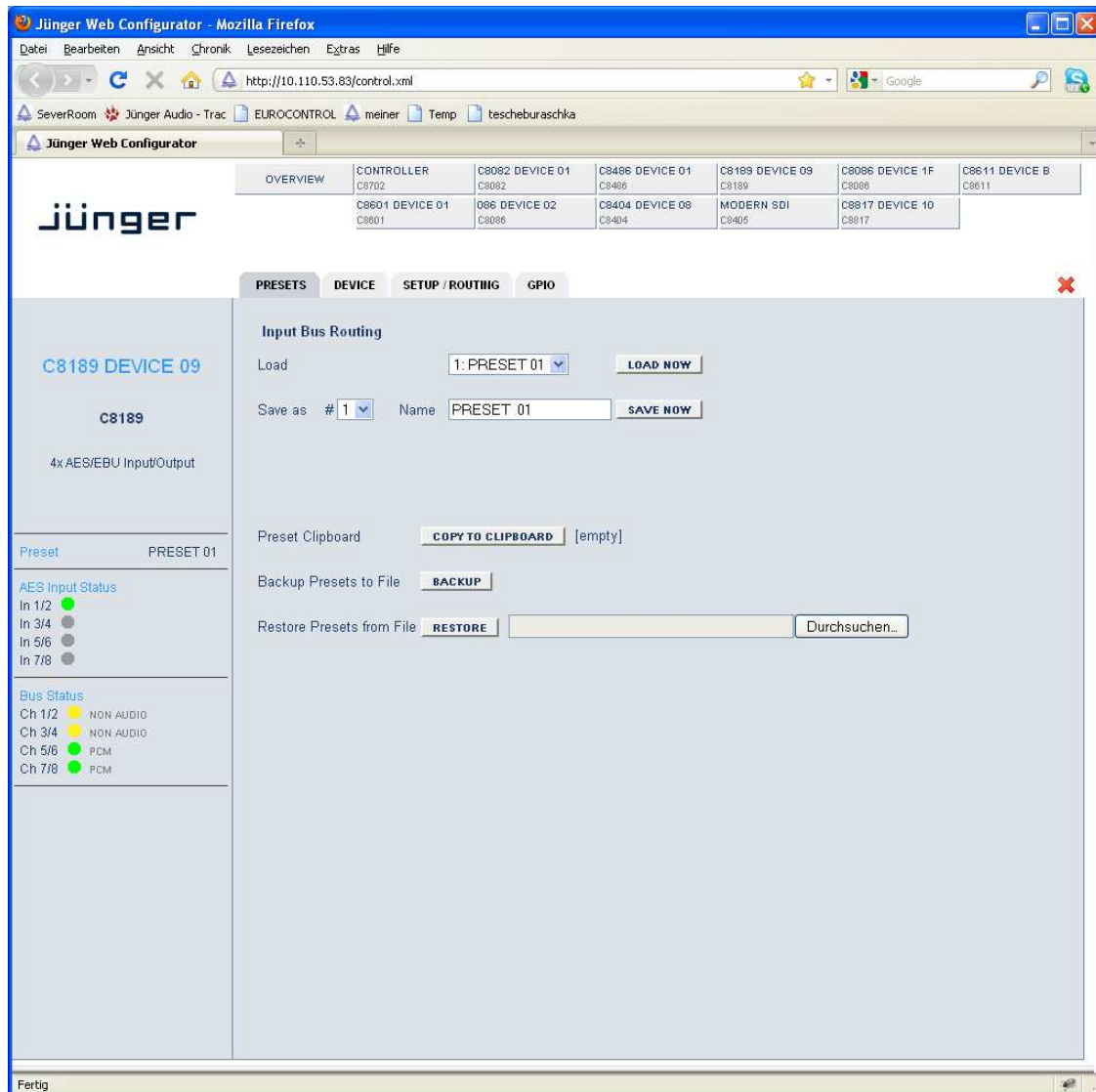*See also C8702 Frame Controller manual*

OVERVIEW

The modules overview of a frame (below the display of an example frame) :
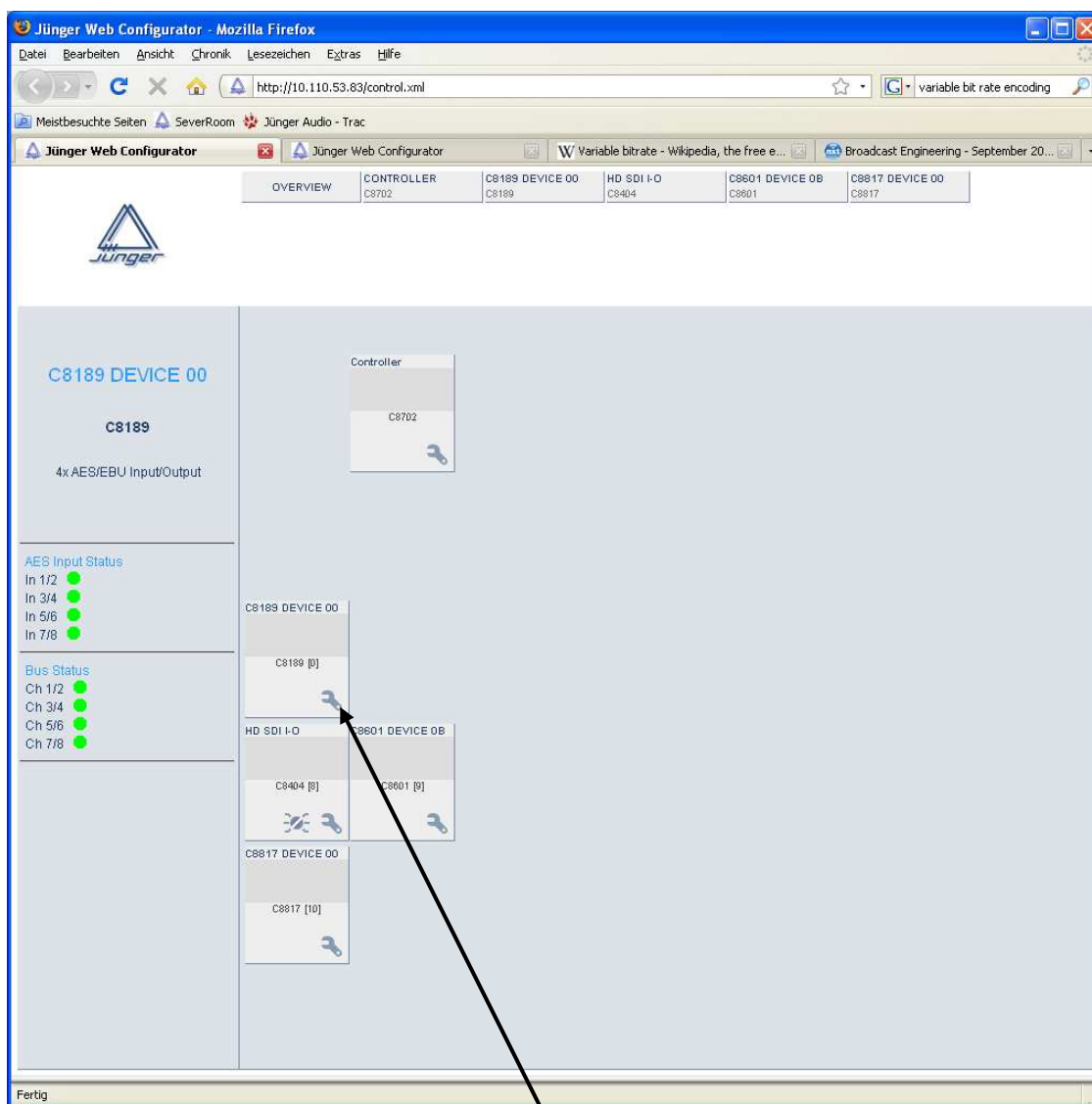
By simply clicking on the spanner tool symbol   you will get the control pages of the **C8189** and the status window on the left side, which you will also see on mouse over.
The entrance to the module setup is the **PRESET** page:

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4 Channel unbalanced AES/EBU I/O

C8189

PRESET

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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4 Channel unbalanced AES/EBU I/O

C8189
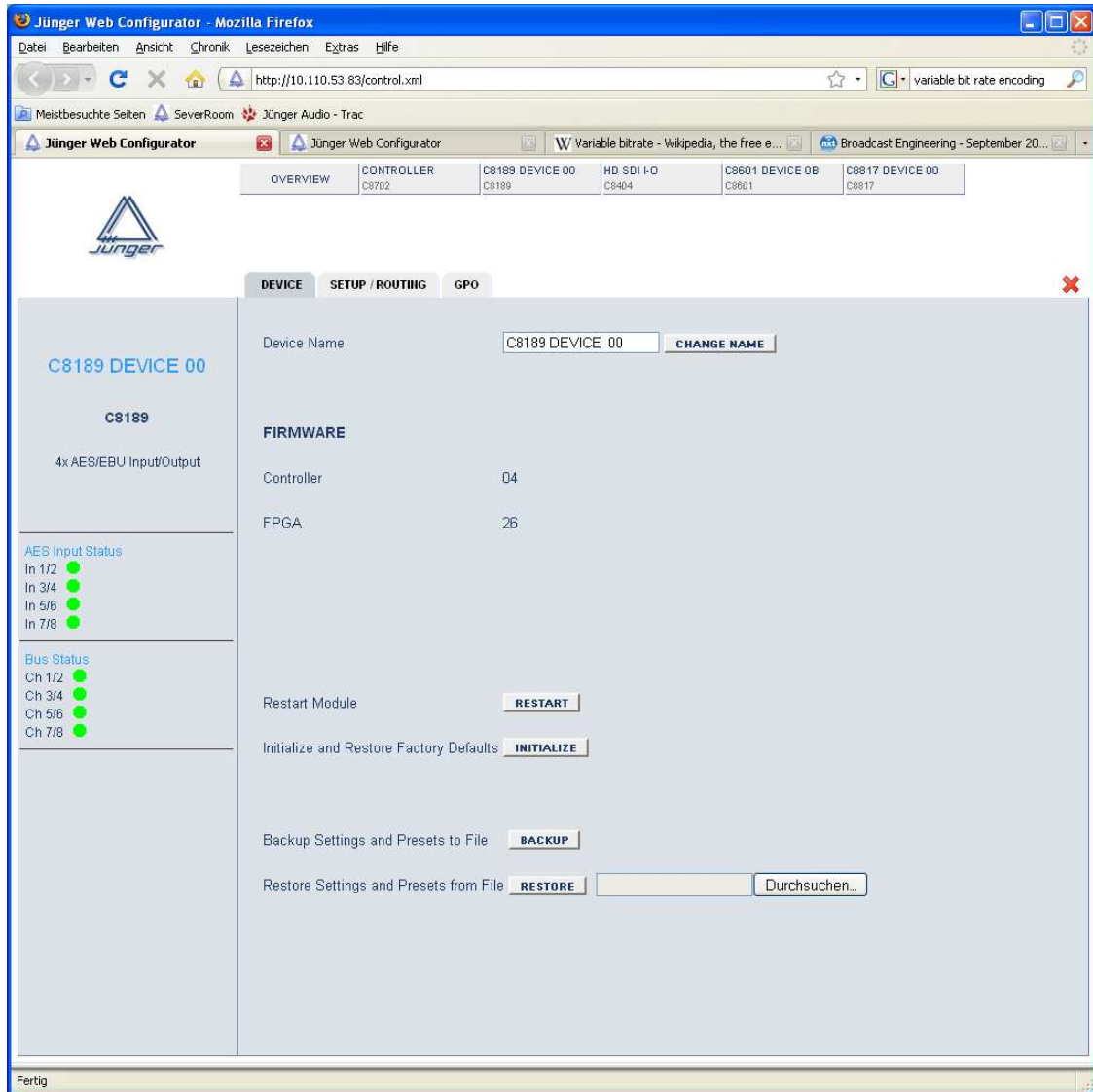
DEVICE

Device Name	a 16 character device name can be set
Firmware	
Controller	firmware version of the built-in module controller
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

SETUP / ROUTING
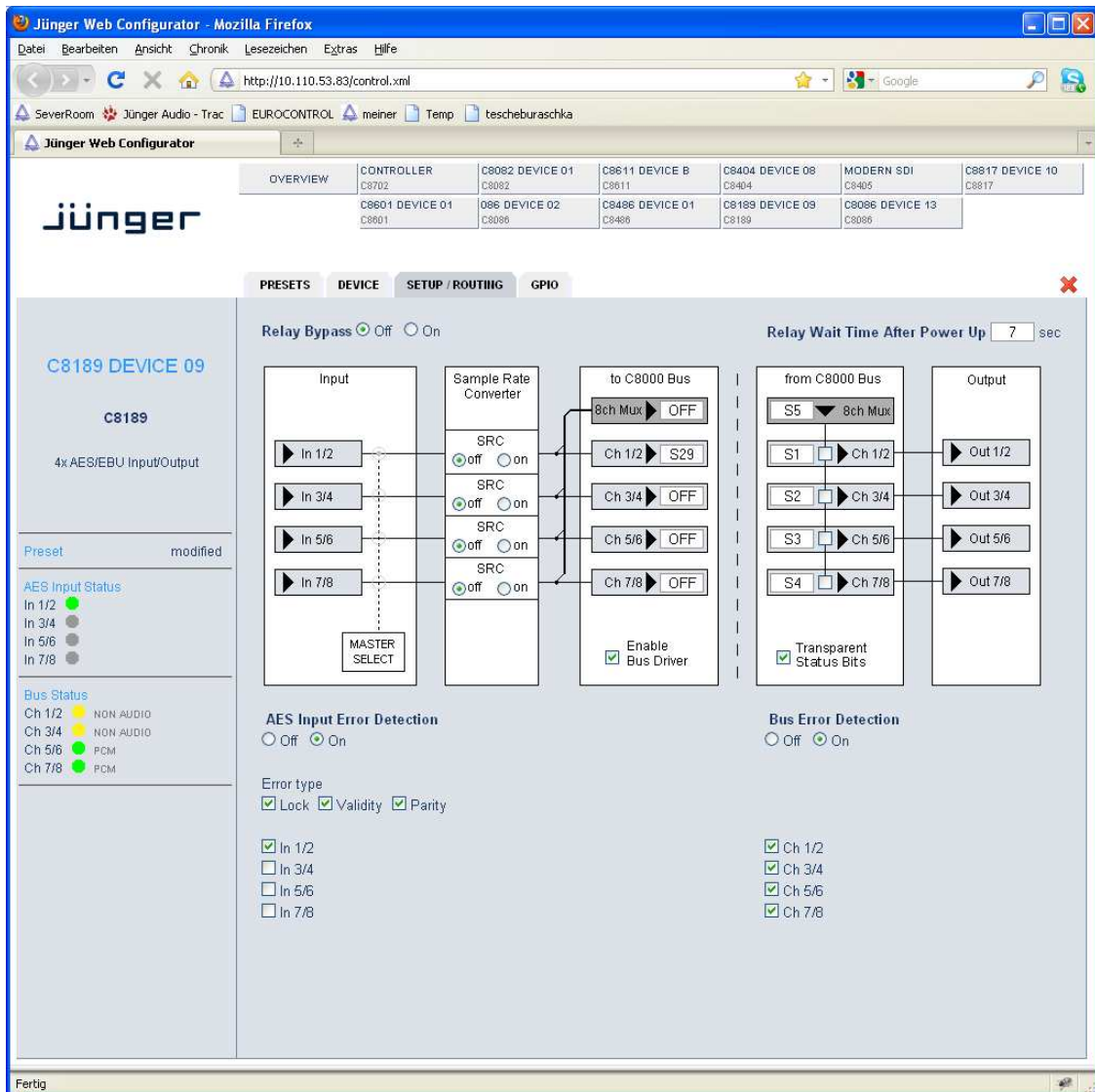
Relay Bypass	the AES I/Os provide a relay for each pair, which may be turned off with this switch, i.e. the I/Os are put in **Relay Bypass** mode.
Relay Wait Time After Power Up	the **Relay Bypass** is active as long as the module has no power. If power is turned on, the module will wait this amount of time before the relays are engaged to disable **Relay Bypass**.

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4 Channel unbalanced AES/EBU I/O

C8189

MASTER SELECT	if the module is turned into **Master mode** by **SW1**, you may select here one of the four **AES inputs** as the actual MASTER input. In this case the clock reference of that input will be used to synchronize the whole C8932 or an island of the C8934 frame.

Important note! For a **C8932** frame the **C8189** must be placed into one of the slots marked red and no other sync source (e.g. C8830) must be installed.

Sample rate Converter	it is possible to turn on a SRC for that AES input.

to C8000 Bus
   8ch Mux
   Ch 1/2 … Ch 7/8
	here you assign the audio signals from the AES inputs to c8k busses
	sends all 4 signal pairs on one bus line
	sends a pair of input signals to one bus line

Enable Bus Drivers	turns on all module bus drivers (from tri state mode to active).

from C8000 Bus
   8ch Mux
 	
   Ch 1/2… Ch 7/8
	here you assign the signals from the c8k bus to the AES outputs
	receives 8 channels from one bus line. The assignment of pairs to the AES outputs must be done by the respective check boxes
	receives a pair of signals from the c8k bus

**Transparent Status Bits**   if **not** checked the Channel Status of the AES transmitter will be set to:

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

AES Input Error Detection   the status of the AES inputs can be monitored for AES signal present and for 3 detailed error types:

Lock	AES receiver lock status
Validity	AES3 validity bit detected
Parity	AES parity (data errors detection)

You can mask each AES input for error detection:

grey	- error detection disabled
green	- no error detected / PCM audio
yellow	- no error detected / non audio (Dolby E, D)
red	- indicates an error condition.

Bus 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 **Bus Status** on the left hand side as a soft LED.

grey	- error detection is disabled
green	- no error detected / PCM
yellow	- no error detected / non audio (Dolby E, D)
red	- indicates an error condition.

The bus status may also be presented to external monitoring systems via **SNMP**.

GPO
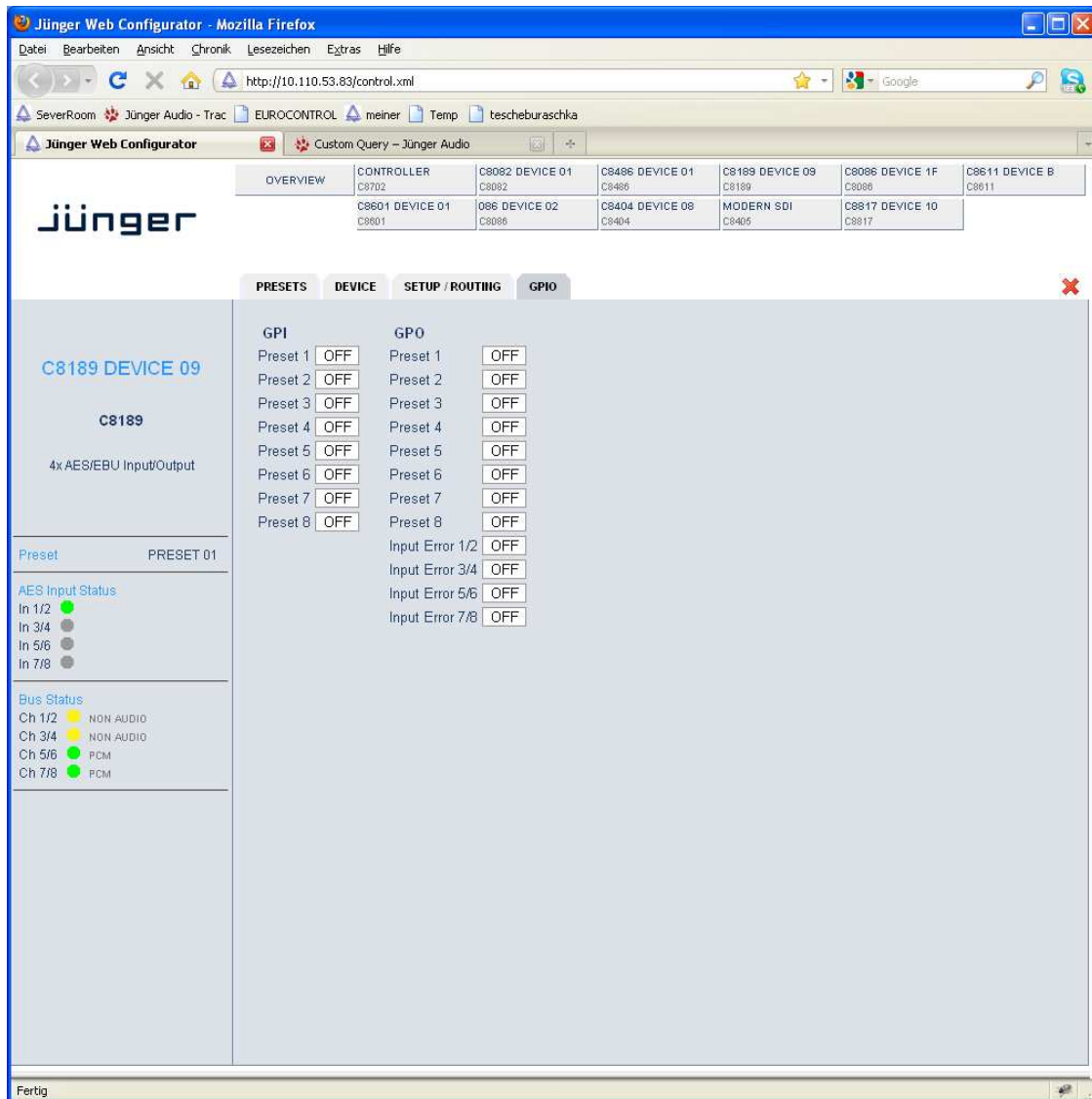
GPOs (Tallies)   may signal the status of a module by means of relay switches. Those relays have **NO** (normally open) as well as **NC** (normally closed) contacts. This allows easy interconnection with more generic monitoring equipment. If an event occurs the C8189 puts the assigned number on the CAN bus so a C8817 **GPI/O** module or the **brc8x** may turn on a relay or button LEDs (see C8817 manual for details).