

features

- Standard sync module for a C8000 frame
- Internal sync @ 44.1 / 48 / 88.2 / 96kHz
- External sync auto format sensing : AES, Word Clock, Video Reference
- Video Reference :
Black Burst (NTSC or PAL)
Composite Sync (525 or 625)
Tri Level Sync (HD - 720p, 1080i, 1080p)
- Generates a Dolby-E frame sync reference that can be shifted in respect to the defined video switching point
- Two fully redundant sync inputs
- Synchronous Word Clock output
- Front panel status indicator
- Front panel Lock A, Lock B indicator



The C8840 as the heart of a C8000 system. It synchronizes the backplane audio transport to maintain glitch free hand over of serial audio data between the various I/O and processing modules.

For redundant operation it offers two inputs with automatic switch over. This allows the system integrator to design a fail over system with independent feeds which may even have different reference formats (E.g. BB and AES sync).

For Dolby E encoding inside a C8000 frame a frame sync pulse (AKA frame reference) is necessary. The C8840 extracts such frame sync pulse from the input video reference. A circuit is provided to move the edge of that reference in respect to the input video frame. I.e. one may align a Dolby E encoded signal by the accuracy of a video line to the reference switching point. If no video reference is connected the frame sync pulse will be generated from the internal sync source.

For non video applications like CD mastering or high resolution audio production the C8840 may be synchronized to audio sample rates of 44.1, 88.21 or 96kHz. Pls. keep in mind that those sample rates can not be used for SDI (Serial Digital Video) embedding / de-embedding.

The C8840 measures the input format and displays it via the Web GUI status display of the module.

In case of a severe sync problem, the Frame Controller can send a SNMP trap and / or activate a SNMP GPO. A higher-ranking monitoring system may poll the status of the sync module(s) via SNMP.

Finally there is the feature to set the sync source via presets loaded by a GPI and to get a GPO for the selected source.

technical specifications

Internal sync	:	44.1, 48, 88.2, 96kHz
SYNC A IN / SYNC B IN	:	BNC, 75 Ohm
VIDEO	:	Black Burst, Composite Sync, Tri Level Sync
level	:	nominal 1V (0,5 ... 2Vpp)
stability	:	< ±100ppm (typ. ±50ppm lt. AES 11, Grade2)
format	:	PAL / NTSC / HDTV
rates	:	625i50 (PAL)
	:	525i60 / 525i59,94 (NTSC)
	:	1035i 59,94/60
	:	1080i/50/59.94/60
	:	720p/50/59.94/60
	:	1080p/23.98/24/25/29.97/30/50/59.94/60
frame sync pulse	:	25 ... 30Hz ±1023 lines - generated from video reference
WCKL	:	
level	:	TTL, 1 ... 5V
rates	:	44,1, 48, 88.2, 96 kHz
stability	:	< ±120ppm (typ. ±50ppm lt. AES 11, Grade 2)
AES/EBU	:	AES-3id
level	:	nom 1V (0,3 ... 1.2Vpp)
rates	:	44,1, 48, 88.2, 96 kHz
stability	:	< ±120ppm (typ. ±50ppm lt. AES 11, Grade 2)
WCLK OUT	:	BNC, 75 Ohm
level	:	≥2,4V @ 75 Ohm
rates	:	44,1, 48, 88.2, 96 kHz
stability	:	typ. ±25ppm internal generator

General

Backplane connector	:	ref. to DIN41612, 64pin, a+b, male
Power supply	:	+5V DC
Consumption	:	approx. 300 mA
Dimensions	:	3RU, 4HP, 160mm depth

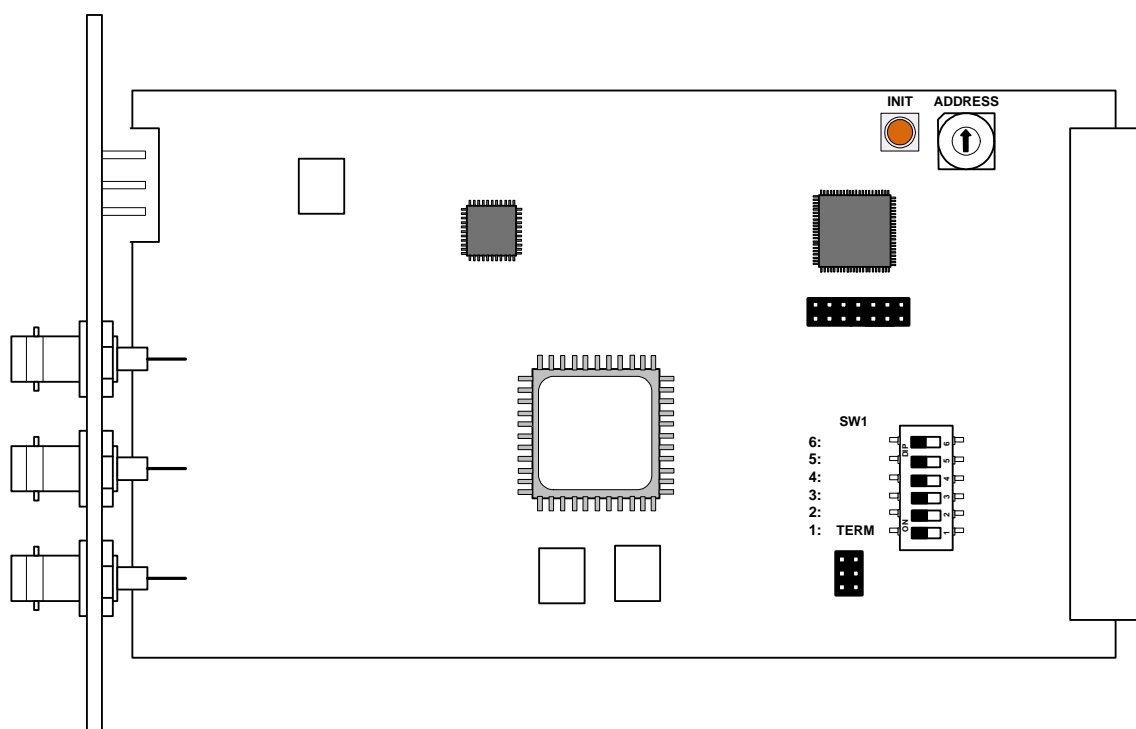
general remark

For the alignment of the guard band of Dolby E encoded streams, the C8840 provides a frame sync pulse [see VIDEO-REF at C8611 Dolby E encoder]. It must be derived from a 25 or 30fps (or their fractional representatives) video reference. If the C8840 is set to internal sync (or falls back to internal sync), the frame sync pulse will be generated internally. If one provides a frame rate > 30Hz it will automatically divided by two. This maintains Dolby E encoding but the phase relationship is lost. Due to the data rates Dolby E data frames will span over two progressive HD video frames. Dolby recommends to use a HD synchronous black burst derived from the HD master SPG of a facility. The consequence is that video editing / routing in respect to Dolby E encoded signals can be performed every second frame only.

installation

The C8000 frame **must** be switched **off** for installation or swapping of a sync module! Without a stable clock, some interface modules can fall into irregular condition which could **destroy** parts of the circuits!

The C8840 must be installed in one of the red coloured fitting rails at rear of a C8932 frame, close to the mains connector(s).



Setting the CAN address of the module :

ADDRESS

[0, 1, 2, 3]
16 position rotary encoder

A C8000 frame employs the CAN-bus for internal communication and remote control purposes. For proper operation it is necessary to assign each module its unique **ID**. To avoid conflicts, the address scheme of a C8000 system must be planned with care (see C8000 System Manual for details).

Since the sync module has a special role in a C8000 frame it resides in a dedicated address room like the C8702 frame controller. One may install up to four C8840 modules in a C8934 split (island) frame to support four independent services, each with Dolby E encoding in a progressive HD format.

Setting the CAN address for special applications :

In standard applications one does not need to set the CAN address of a C8840, simply leave it at address "0".

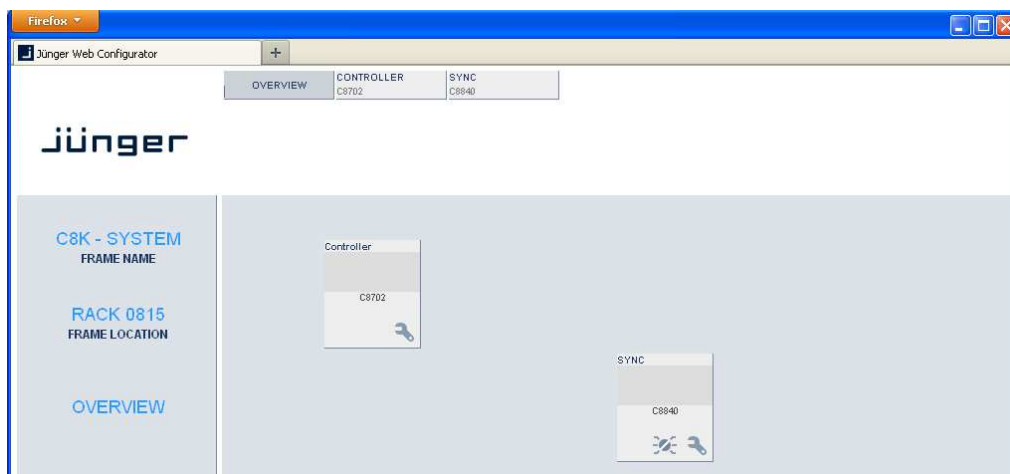
In applications for the C8934 split frame, you may need a C8840 for each island to maintain proper Dolby E encoding in reference to progressive HD video.

To distinguish between the number of C8840s each must have an unique CAN address. Due to the general address scheme, C8702 and C8840s appear in the top rows of the Web GUI.

The rotary ADDRESS encoder settings translates to the following logical addresses and graphical positions :

Rotary enc. ADDRESS	logical address	GUI row / column
0	0	1st / 1st
1	4	1st / 5th
2	8	2nd / 1st
3	C	2nd / 5 th

Here is an example for a C8840 in a C8934 frame that is setup for rotary encoder ADDRESS #3 (logical C) :



SW1

1: TERM

[ON, OFF]

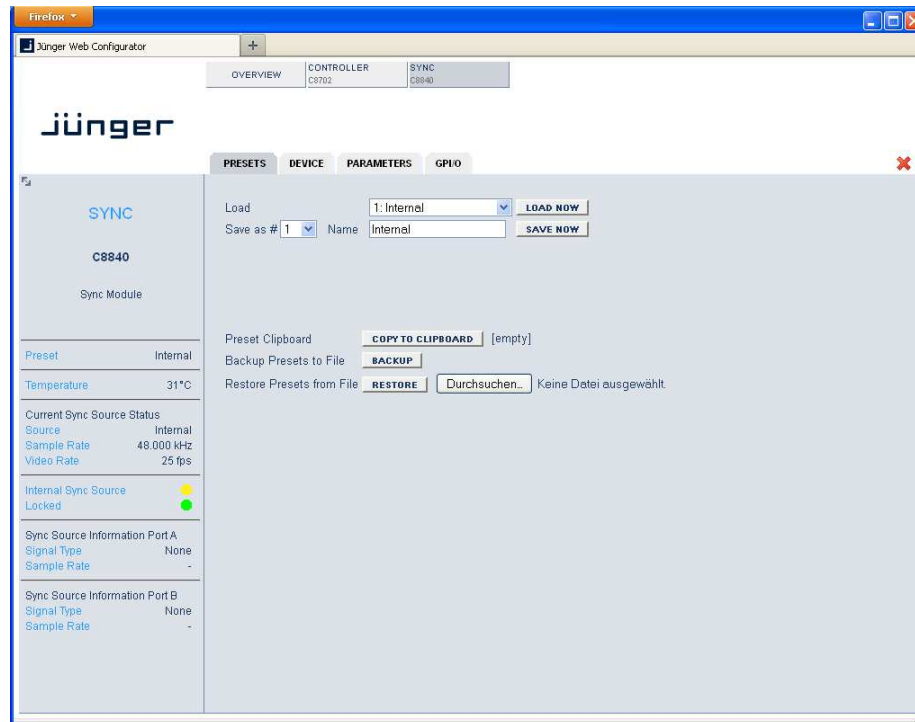
The CAN bus is a two wire bus that must be terminated at both ends. On one of the modules in a C8k frame which is able to terminate the CAN bus, the **TERM** switch **must** be set to **ON**. The suggestion is to turn it **ON** for the **C8702** and **OFF** for the **C8840**. But for special applications one may turn it on at the C8840.

- 2: Not used – must be OFF
- 3: Not used – must be OFF
- 4: Not used – must be OFF
- 5: Not used – must be OFF
- 6: Not used – must be OFF

operation

Click on the spanner tool of the graphical box of a C8840 in the GUI to navigate the pages of the C8840:

PRESET



Load

select a preset by name and press **<LOAD NOW>**.

Save as #

select a preset memory number.

Name

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

Preset Clipboard

copies the active preset to a clip board, The data may be used by other modules inside the **same** frame.

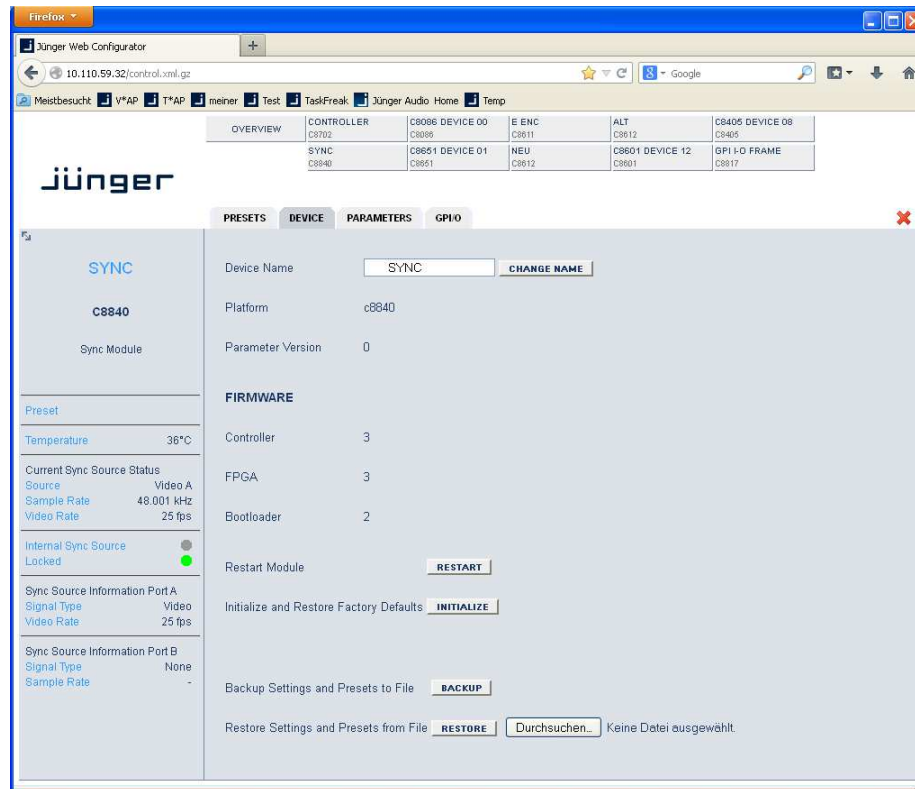
Backup Presets to File

creates an backup **XML file** which may be stored to the PC

Restore Presets from File

you can select a backup file from the PC.

DEVICE



Device Name you can assign the module a name (up to 16 digits) and assign it by pressing **<CHANGE NAME>**.

Platform shows the hardware platform of the C8840

Parameter Version shows the parameter version of the module controller

FIRMWARE

Controller shows the firmware of the module controller

FPGA shows the actual firmware of the Module FPGA

Bootloader shows the bootloader version

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

Initialize and Restore Factory Defaults **<INITIALIZE>** restores the factory default values for all parameters of the module including all presets. The input bus assignment will be set to S01 ... S04, The outputs are turned **OFF** and the bus drivers will be disabled.

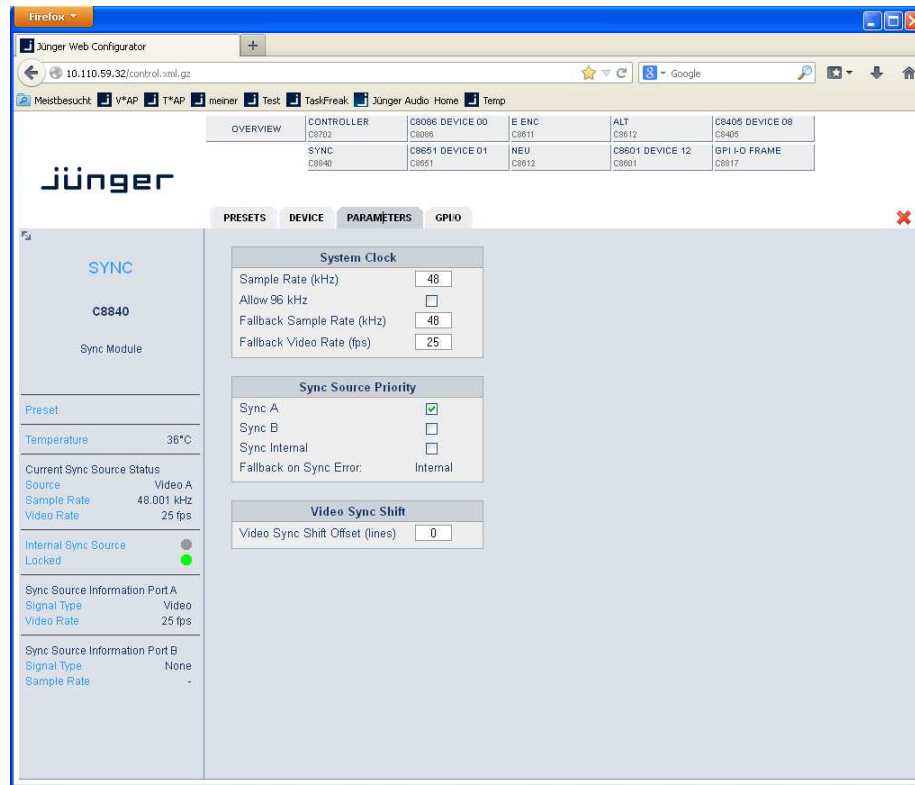
Backup Settings and Presets to File **<BACKUP>** will put all active parameters and the content of all presets into an XML file. You may store such file on a PC.

Restore Settings and parameters from File you may select **<browse>** a matching XML file from a PC. **<RESTORE>** will overwrite all active parameters and the content of the presets by the content of the backup file.

PARAMETERS

Connect a clock source with **SYNC A IN** and an other one with **SYNC B IN**

The dedicated **LOCK A** LED turns from red to green to indicate that this input is in use right now and the C8000 system timing is locked to that source. The **LOCK B** LED slowly flashes green to indicate that the input is locked to that reference but it is not in use for the C8000 system clock :



SYSTEM CLOCK

selection of the C8000 system clock

Sample Rate (kHz)

[44.1, 48, 88.2, 96 FOLLOW]

Allow 96kHz

[ON, OFF]

Fallback Sample Rate (kHz)

[44.1, 48, 88.2, 96]

Fallback Video Rate (fps)

[25, 29,97, 30]

Sync Source Priority

Sync A

[ON, OFF]

Sync B

[ON, OFF]

Sync Internal

[ON, OFF]

Fallback on Sync Error

Internal

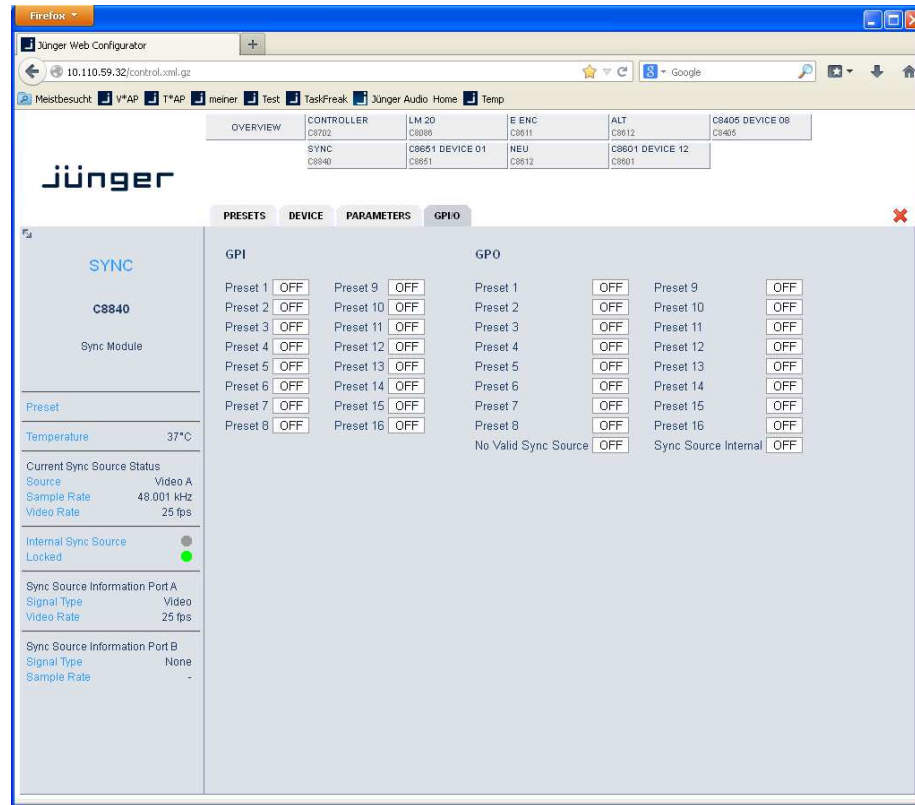
Video Sync Shift

Video Sync

[-1023 ... 0 ... 1023]

Shift Offset (lines)

GPI/O



GPIs

are useful if you want to recall settings remotely (e.g. by presets). The C8k frame can handle **127** different **GPIs**. You must assign a unique number to the respective function. Such numbers will be generated by the **brc8x** Broadcast Remote Controller or by a **GPI/O** interface module. If the **C8840** receives such a number via the CAN bus, it will load the respective preset for example.

GPOs (Tallies)

may signal the status of a module. If you load a preset the **C8840** puts the assigned number on the CAN bus so a C8817 **GPI/O** module may turn on a relay or the **brc8x** may turn on button LEDs (see respective manuals for details). The 8817 relays have **NO** (normally open) as well as **NC** (normally closed) contacts. This allows for easy interconnection with more generic monitoring equipment or very simple push button controls.