nanosyncs HD 3.0 update documentation

December 2022

FIRMWARE UPDATE

New firmware 3.0 can be installed on all nanosyncs HD units manufactured since 2006 / from serial number H (year of production) 0001.

Newest Apple M1 or AMD Ryzen hardware cannot connect to our USB implementation from 2006 anymore. This firmware update will also program the USB bios to version 3. Therefore this firmware upgrade must be done on an Intel Windows PC or Intel Mac computer which still connects with the old firmware and original bios from 2006.

Once the new bios version 3 is installed you can connect your nanosyncs to new USB 3 hardware/ M1/ AMD Ryzen.

Download the windows or OSX version from **www.rosendahl-studiotechnik.com** and start the program. Allow the operating system to run this application from an unknown/ non certified publisher. (Windows UAC, OSX "right click" -> open)

- Requires Windows 7 or later, OSX 10.11.6 or later.
- Please download the apps only from our website.

Connect your nanosyncs and start the "Firmware Update". When finished the nanosyncs will reboot as a new USB device with new "PID" product ID.
When the new device has been detected and installed please press Connect again.

This documentation describes features and changes of new firmware 3 only.
Please refer also to nanosyncs HD manual 2.1 for basic documentation.

USER PROFILES

Firmware 3 allows to save 4 user profiles with individual names (12 characters maximum).
These profiles are stored in the nanosyncs HD flash memory and can be loaded and modified independent of the connected host computer.

When you update your nanosyncs to firmware 3 your last settings from firmware 2.1 will be copied to user profile 4: "User FW21".

SD STANDARD B&W 30

New SD video standard black & white has been added. An interlaced 525 line sync without colour burst running at 30 frames per second. Useful for post-/ transcoding applications. Indicated by LEDs PAL25 and NTSC.

AES11 on WO 7-8

word clock outputs 7-8 can configured to output coaxial AES-11 sync signals (DARS).
LEDs x1 and x256 indicate AES-11 at base sample rate,
LEDs x2 and x256 indicate AES-11 at double sample rates.
LEDs x1 and x2 indicate Pilotton output running at the SD- field frequency (i.e. 50 Hz when set to PAL 25).

FOLLOW AUDIO

When the AUDIO REFERENCE is set to EXT. WORD FS the word clock and the video generators will follow to the external word clock reference. When set to Ext. Word FS 48 for example you have to provide a 48 kHz word clock signal at the word clock input to reference the generators.

Note: the word clock signal should be at least 5 ppm accurate to satisfy the tuning demand of a slaved video system. Also understand that a word clock signal does not define the start of picture/ the field sequence, it can only tune the video sync generators.

Nevertheless this feature can be useful for a rock concert to lock an OB van to the FOH console.
When possible always use video as master reference and not the other way around.

EXT. WORD 1:1

In firmware 3.0 the word output multipliers (x1 x2 x4) do not follow to the detected word clock input. The input sample rate is always divided down to x1 and the multipliers can be set manually to x1 x2 x4 rates.

EXTERN VIDEO LOCK

The new firmware supports two different extern video lock modes:

(1) Sync only:
H- and V-syncs from the external video reference signals are used to phase lock and synchronise the internal video generators.

(2) Syncs and SC:
same as (1) Syncs only, but when phase lock is achieved the synchroniser will use the colour burst/ subcarrier to lock the internal to external subcarrier phase very accurately. This will only work when your external video reference provides a correctly SC-H locked subcarrier/ colour burst. This lock mode should be used in a broadcast enviroment.

TIME CODE

A connected host computer (USB MIDI) can control the nanosyncs time code generator using MMC (MIDI Machine Control) commands.
An MMC Play command will start the time code generator.

In firmware 3 the nanosyncs will then send back MTC MIDI Time Code to the host computer.

In firmware 2.1 only external LTC time code (on the LTC input) was translated into MTC to the host computer.

In firmware 3 the MMC controlled generator as well as an external LTC time code will send MTC to the host computer, blocking the alternate source:

When LTC -> MTC translation is running an MMC command is ignored and will not interrupt the LTC -> MTC translation.

When the MMC generator is running (after a PLAY comand is received) it will not get interrupted by incoming LTC time code.

Bidirectional MTC <-> LTC translation as in firmware 2.1 is still possible:

When the LTC input is translated into MTC to the host, the host can still send an other MTC to the nanosyncs which will be translated into LTC at the LTC output.

When translating MTC from a host computer into LTC the tuning is derived from the nanosyncs reference. So your host computer generating the MTC must be locked to word clock from the nanosyncs via audio hardware used by the MTC generating application.

Nanosyncs will not synchronise free running MTC to LTC !

USER INTERFACE CHANGES

When the unit is not in editing mode (no LEDs are blinking) press and hold the SELECT key to display the additional settings:

selected user profile (1 to 4) is shown on the left LED column (VIDEO REFERENCE) one LED profile 1, two LEDs profile 2, three LEDs profile 3. four LEDs profile 4.

+7.5 IRE black level is indicated by LED NTSC.

Extern Video Lock Syncs & SC is indicated by LED PAL 25.

VO6 HD Black Dolby mode is indicated by LED VO6=HD.

Press MENU ">" key while holding SELECT to enter "additional setup" mode to change these settings (Active user profile, black level, lock and black dolby modes). Press MENU "<" and ">" keys to exit and store.

nanosyncs HD 3.0 CONTROL SOFTWARE FEATURES

After a successful firmware update the OSX or Windows software offers 3 different tab views:

TAB VIEW "Settings"

All settings are viewed and edited easily from a tabular view. Four user profiles can be named and stored non volatile inside the nanosyncs flash memory.

The new video reference "Follow Audio" mode is selected by setting the AUDIO REFERENCE to one of the EXT. WORD FS selections.

Note: the CONFIG. PROTECT checkbox disables all 4 hardware buttons on your nanosyncs to avoid unwanted changes.

To unlock this safeguarding press and hold menu left "<" and menu right ">" buttons for at least 4 seconds.

TAB VIEW "Time Code"

The MTC Midi Time Code Reader displays received MTC and also shows the status of the MTC source:

(1) MMC controlled generator with frame rate (fps: frames per second)

(2) LTC Reader conversion with MTC format (fo: format) MTC provides only four formats: 24, 25, 30 or 29.97DF, a 29.97 non drop time code is equal to format "fo 30".

Midi Machine Control section allows controlling the nanosyncs time code generator with standard MMC commands: Locate, Play, Stop. Use the three stepper boxes to set up hours, minutes and seconds, and the Listbox to select the time code format to set up the Locate command. Press Play/ Stop to start and stop the generator.
Jam LTC Reader copies the current received time code value and jam syncs the internal generator.

Section System Time starts the time code generator triggered from the host computers system time. The time code generator is phase locked to the internal video sync generator and is running free/ independent of the host computers timing reference.

The accumulated error (difference between PC system time and time code) is displayed and an automated re-trigger can be enabled with the checkbox "auto jam when error > 1s" when the error exceeds 1 second.
Checkbox "daily auto jam 3:00" enables a re-start every day at 03:00 AM.

The drift/ error accumulation depends on both sides: the host computer- and the nanosyncs -timebase.
A nanosyncs typically drifts less than a frame (40 ms) per day.

TAB VIEW "Calibration"

Subcarrier Phase defines subcarrier phase relation to H-phase field 1 (8 field sequence).
This setting can be useful for analog CVBS video application. Otherwise set to default value 0.

H-Phase Offset sets a fixed offset when synchronised to external syncs. Should be set to default value 0.

Word Clock Varispeed Enter a varispeed sample rate frequency from 44000000 to 52025000 milliHertz and press "Varispeed". The Audio Reference must be set to "Follow Video" for varispeed operation. Press "Release" to set back to standard sample rates.

User Calibration Offset Allows programming of a user calibration offset to the factory programmed tuning.

Crystal oscillators can become out of tune by aging. You can correct/ calibrate your nanosyncs with the user calibration offset.
If you do not have a GPS locked reference generator for measuring you can alternatively use a satellite broadcast video signal to compare to the black & burst from your nanosyncs. Set by default to value 0.

The windows version "nanosyncs_HD_30.exe" accepts the following comand line arguments:
-a (or -A) enables checkbox "auto connect"
-j (or -J) enables checkbox "auto jam"
-t (or -T) start program with tab view "Time Code"
-s (or -S) logging all MIDI sysex data
-d hh:mm (or -D hh:mm) enables daily jam at hh:mm