Sync-Generator

User Manual

Sync-Generator is an in-front of camera device which generates synchronous pulses of audio and light to assist in verifying the state of audio and visual sync in systems. Ideally, measurements should be taken using a Sync-One2 device.

This manual is for Firmware release v1.x.x

! IMPORTANT !
Sync-Generator produces brief intense pulses of light and sound, and they may be perceived as stroboscopic lights. Accordingly, persons with photosensitive epilepsy or similar condition that can be triggered by flashing audio or visual stimuli should take suitable precautions when using Sync-Generator and do so at their own risk.

Overview

A known good source is essential to test a system's Audio Visual (AV) synchronisation. For playback and editing, specific test files are available for this purpose. For live / broadcast scenarios, a suitable source to put in front of the camera is essential.

Sync-Generator produces a synchronous pulse of light and sound at a known rate and duration. This dependable test source enables live systems to be verified by measuring the output of Sync-Generator with a Sync-One2 further down the processing chain as needed.

Outputs

The outputs are on the front of the device. The white opaque bar is the light source, with the audio just above the two buttons. The 3.5mm audio output jack is located on the left-hand side.
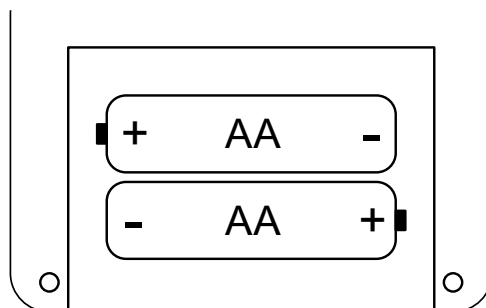
External interfaces

There are two external interfaces on the left-hand side, a 3.5mm stereo audio jack and a mini-USB port.

The audio jack outputs the audio pulse in stereo at a nominal 0dBu (0.775v RMS). The default behaviour is to switch to the external audio when a lead is plugged in, silencing the internal sounder. However, this may be overridden to force internal or external sound pulses or leave both enabled.

The USB Mini-B port offers power and control of the settings via the Sync-Generator Manager application. An API to change the settings is also available, and details are available in a separate API manual.

Power

Sync-One2 uses 2 AA 1.5v batteries (including rechargeable); a red glow to the left of the light output window indicates a low battery condition. Should the batteries get too low, Sync-Generator will switch off to avoid incorrect operation and protect the batteries from over-discharge. Power may also be supplied via the mini-USB port, where it will run for as long as power is applied.

Orientation of the batteries in the battery compartment

Buttons

On Off   Press and hold to turn on, press again to turn off.

Mode   To flip between pulses at 1Hz or the variable rate.

Operating Modes

Sync-Generator runs in two distinct modes. At power on, the unit defaults to 1Hz mode.

- Standard 1Hz pulses
- Variable rate pulses

Moving between these modes is via the **Mode** button.

Standard mode is a simple pulse repeated once per second (1 Hz). The pulse duration is two frames long for the frame rate set. For example, at a rate of 24fps, the pules are 83.3ms long. At 60fps, they are 33.3ms.

Variable mode operates a repeating pattern, where the time between the pulses of 2 frames reduces after each pulse. The gap between pulses is 13, 12, 11, 10, and then 9 frames before repeating. The timing of these gaps is dynamic based on the set frame rate.

Basic operation

Position Sync-Generator on a flat surface in front of the camera and zoom in to the white opaque bar below the Sync-Generator text. Keeping the camera out of focus can help record an even white frame.

Place a microphone directly next to the sound apertures to pick up the audio. If required, a direct connection can be made via the audio output port, the output is set at a nominal 0dBu or 0.775v RMS. By default, when the external output is used, the internal sounder is disabled. This can be adjusted as needed.

Press and hold the **On Off** button until Sync-Generator starts a self-test of coloured lights, a white flash, and an audible tone from the internal speaker. A green light will be shown for 1 second before the synchronised pulses begin.

Sync-Generator will now run autonomously until turned off or if left untouched automatically after a default of 15 minutes. The auto-off time may be adjusted from 1 to 15 minutes or be turned off. Sync-Generator will operate continuously if powered via the USB port.

Sync-Generator supports frame rates of 23.976, 24, 25, 29.97,30, 48, 50, 59.94, and 60.

Status Lights

A coloured light is shown on the left-hand side of the opaque window to indicate various system states as per the table below.

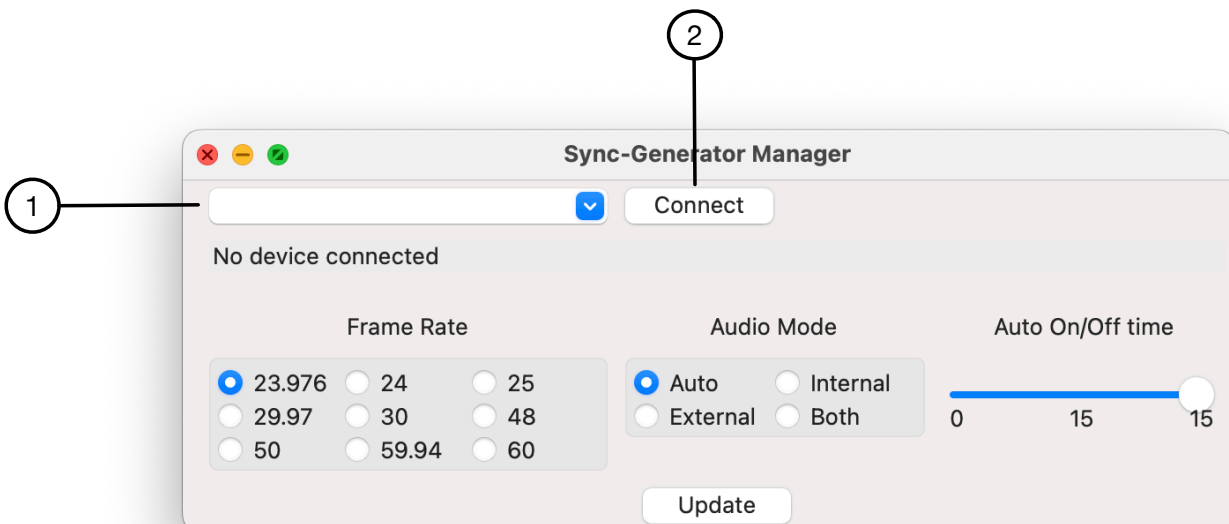| Light	Status
Green	Pulsed at start-up once internal checks have been completed.
Red	The batteries is low and should be changed.
Red flashing	The batteries are too low, Sync-Generating is powering down.
Blue	Waiting for firmware to be updated.
Blue flashing	Firmware upgrade in progress.

Changing settings

Sync-Generator settings are viewed and changed via the Sync-Generator Manager available for Windows and Apple Mac computers. This may be downloaded from the Sync-Generator website or scan the code below to go directly to the support page.

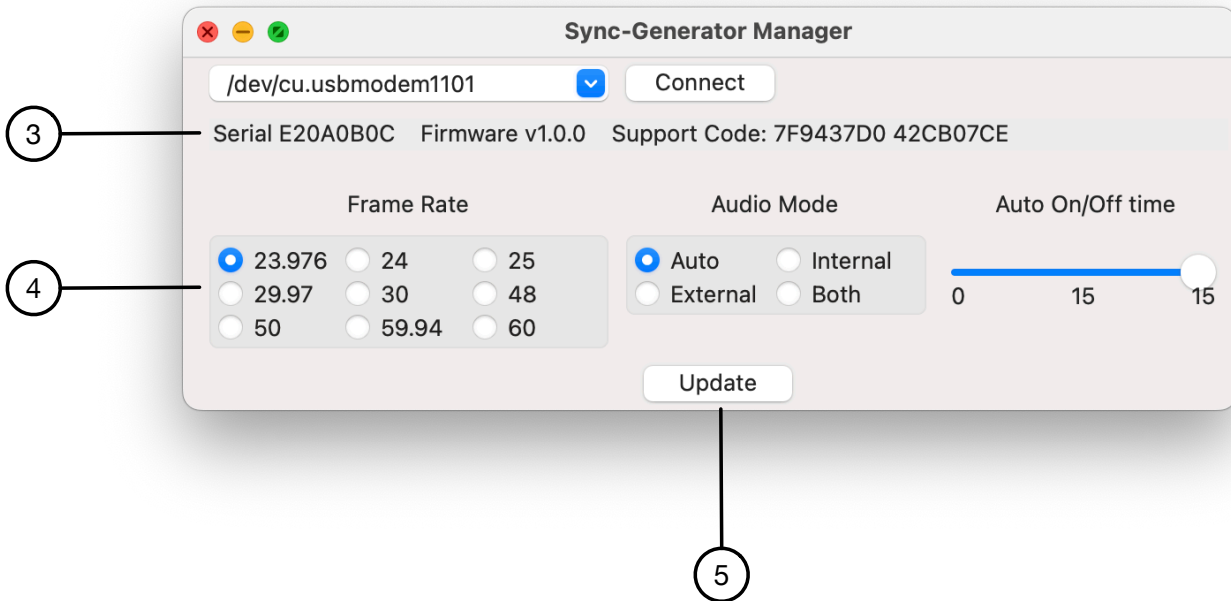
https://sync-generator.harkwood.co.uk/support

Connect Sync-Generator to your computer and open Sync-Generator Manager. Sync-Generator appears to the computer as a serial port and should be enumerated without requiring additional drivers to be installed.

1. Use the dropdown to select the port Sync-Generator appears as. Only ports likely to be a Sync-Generator are shown.
2. Click Connect; an error will be displayed if the device isn't a Sync-Generator.

3. Details of the connected Sync-Generator, including serial number, firmware revision, and a support code if requesting technical support. This text may be highlighted and copied.
4. On connection, the settings reflect the current Sync-Generator settings. Adjust as required.
5. Click Update to send the settings to Sync-Generator.

The settings are stored in non-volatile memory so are retained even with the batteries removed.

To close the connection, close the application.

Firmware Updates

Sync-Generator uses the same firmware updater utility as Sync-One2. It may be downloaded from the Sync-Generator or Sync-One2 websites. Full instructions and release notes are available from the Sync-Generator website support page.

To put Sync-Generator into firmware update mode, press and hold the Mode whilst attaching the USB cable. Release the button when the solid blue status light appears. Sync-Generator will wait a short time for the firmware to be sent. The blue light flashes during the upgrade, and Sync-Generator will reboot once complete.

If no firmware was received Sync-Generator will reboot into normal operation.
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Troubleshooting

Unit does not power on?	You must hold down the [On Off] button for more than a second to turn the unit on. Check the batteries are installed the right way around and that they are not discharged (i.e. flat). If Sync-Generator comes on when using USB power than the problem will be the batteries.
On power up only a Blue light is shown	When turned on Sync-Generator verifies the installed firmware is complete and valid. Should a problem be detected it will wait for new firmware to be uploaded. Follow the firmware update procedure. Should updating the firmware not resolve the issue, the unit will require service.
How to generate a support code when contacting us for support	Use the Sync-Generator manager app to view the support code for your unit.

Specifications

The specifications of Sync-Generator are below:

- 2 x AA (LR6) 1.5v batteries, including rechargeable.
- Whilst off, Sync-Generator does draw a tiny amount of battery power (less than 0.1 µA). However, if not used for some time, it is always best to remove the batteries.
- Dimensions (H x W x D) 144mm x 90mm x 30mm (5.6" x 3.5" x 1.2")
- 169g (6oz), excluding batteries
- Reverse battery protection
- Low battery indication and auto shutdown when batteries too low to sustain operation
- External power via USB Mini-B port, installed batteries do not require removal.
- External stereo audio output via 3.5mm audio jack, the signal is set to a nominal 0dBu or 0.775v RMS
- Windows / Apple Mac app for changing settings over the USB Mini-B port, API available too.
- Upgradeable firmware

There are no elements within Sync-Generator which require internal end user adjustment.

Standards compliance

CE

EN 55103-1 Part 1 (EMC Emissions)
EN 55103-2 Part 2 (EMC Immunity)
IEC 61000-4-2 (ESD)

Sync-One2 is RoHS compliant and lead free.

For additional support or information, please visit the website, or
e-mail sync-generator@harkwood.co.uk

sync-generator.harkwood.co.uk

HARKWOOD
SERVICES

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