User's Guide

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TCO HDSP / FF

Time Code Option

for HDSP PCI / Fireface 800

LTC / SMPTE Reader and Generator
Video to Word Clock Converter
Low Jitter Word Clock Regeneration

Contents

1. Introduction

Thank you for choosing the TCO. The Time Code Option provides synchronisation to SMPTE and video in professional studio quality. SteadyClock ensures that the word clock derived from the input signals is of low jitter and therefore highly compatible. The TCO supports all standard formats and conversions of these, turning it into a highly useful tool within the studio environment.

2. Package Contents

Please check your TCO component's package to include each of the following:

TCO-FF

- TCO board with fixed ribbon cable
- 1 set of screws
- User's guide

TCO-HDSP

- TCO
- 1 ribbon cable
- User's guide

3. Hardware Requirements

The TCOs can be operated with the following hardware:

TCO-FF:

Fireface 800

TCO-HDSP:

HDSP AES-32

The HDSP 9632 will be supported later too.

Current state:

Under Windows XP the TCO-HDSP provides the SMPTE position as APP (ASIO Positioning Protocol) and as MTC Sync. Under Mac OS X the TCO-HDSP provides the SMPTE position as MTC Sync.

Under Windows XP the FF-HDSP provides the SMPTE position as APP (ASIO Positioning Protocol) and as MTC Sync. Under Mac OS X the TCO-FF provides the SMPTE position as MTC Sync.

Upcoming features:

Compatibility to HDSP 9632
LTC Output

4. Technical Specifications

4.1 TCO-FF

LTC/Video In
- LTC In: BNC, unbalanced
- Level range LTC In: -25 dBu up to +12 dBu

- Video In: BNC unbalanced, switchable termination 75 Ohm
- Format: PAL and NTSC

LTC Out
- BNC
- Output level: +4 dBu, via jumper –7 dBu
- Output impedance: 220 Ohm

- Power supply via ribbon cable, 5 V DC, 100 mA
- Dimensions (WxD): 100 x 75 mm

4.2 TCO-HDSP

LTC In
- BNC, unbalanced
- Level range: -25 dBu up to +12 dBu

Video In (Word Clock In)
- BNC, switchable termination 75 Ohm
- Format: PAL and NTSC

Word Clock In (Video In)
- BNC, switchable termination 75 Ohm
- Transformer coupled, galvanically isolated input
- Not affected by DC-offsets within the network
- Signal Adaptation Circuit: signal refresh through auto-center and hysteresis
- Overvoltage protection
- Level range: 1.0 Vpp – 5.6 Vpp
- Lock Range: 28 kHz – 200 kHz
- Jitter when synced to input signal: < 1 ns
- Jitter suppression: > 30 dB (2.4 kHz)

LTC Out
- BNC
- Output level: +4 dBu, via jumper –7 dBu
- Output impedance: 220 Ohm

Word Clock Out
- BNC
- Max. output voltage: 5 Vpp
- Output voltage @ 75 Ohm termination: 4.0 Vpp
- Output impedance: 10 Ohm
- Frequency range: 28 kHz – 52 kHz

- Power supply via ribbon cable, 5 V DC, 100 mA
- Standard bracket, dimensions PCB (WxD): 98 x 75 mm

5. Installing the TCO-HDSP

Before installing the TCO card, please make sure the computer is switched off and the power cable is disconnected from the mains supply.

1. Disconnect the power cord and all other cables from the computer.

2. Remove the computer's housing. Further information on how to do this can be obtained from your computer´s instruction manual.

3. Before removing the TCO from its protective bag, discharge any static in your body by touching the metal chassis of the PC.

4. Connect the TCO with the PCI card using the supplied flat ribbon cable. For this, plug one end of the cable into the matching connector of the PCI card. On the **AES-32** the connector is labeled **Synchronizer Board**, on the **9632** the TCO replaces the **Wordclock Module**. Plug the other end into the connector X101 on the TCO.

5. Insert the TCO into a free PCI slot and fasten the screw. The TCO needs no slot on the motherboard, but includes a stabilizing edge, which fits in both PCI and ISA slots.

6. Insert the PCI card firmly into a free PCI slot, press and fasten the screw.

7. Replace the computer's housing.

8. Reconnect all cables including the power cord.

6. Installing the TCO-FF

To install the TCO the Fireface 800 must be opened. If you feel unsecure to do so please consult a technician and let him show you how to do it. Else please follow the instructions below step by step.

Before installing the TCO, please make sure the Fireface 800 is switched off and the power cable is disconnected from the mains supply.

1. Disconnect the power cord and all other cables from the Fireface 800.

2. Loosen and remove both rack ears (two screws each).

3. Use a screwdriver (Phillips 1) to remove the 3 screws on the cover near the back panel, and 2 screws on each side of the Fireface 800, so that the cover can be taken off by sliding it to the rear.

4. Remove the TCO spare plate within the rear panel (2 screws).

5. Before removing the TCO from its protective bag, discharge any static in your body by touching the metal chassis of the Fireface.

6. Slide the TCO into the rear panel's hole from the inside. Watch the correct position, so that both screws found in the PCB of the TCO do not press on the TRS jacks, but are placed in-between those.

7. Fasten the TCO with the two black self-tapping screws from the TCO screw set. Do not use the screws of the spare plate, as these are thread screws.

8. Fold the ribbon cable one time and plug it into socket X1105 on the motherboard, see picture below.

Now you are ready to re-assemble the Fireface.

9. Check that the safety-earth wire (yellow–green) is still connected to the cover. Then put the cover on and slide it into the aluminum front panel of the Fireface 800.

10. Fasten the 3 screws on the cover and the two screws on each side of the Fireface 800.

11. Attach and fasten the rack ears. Finished!
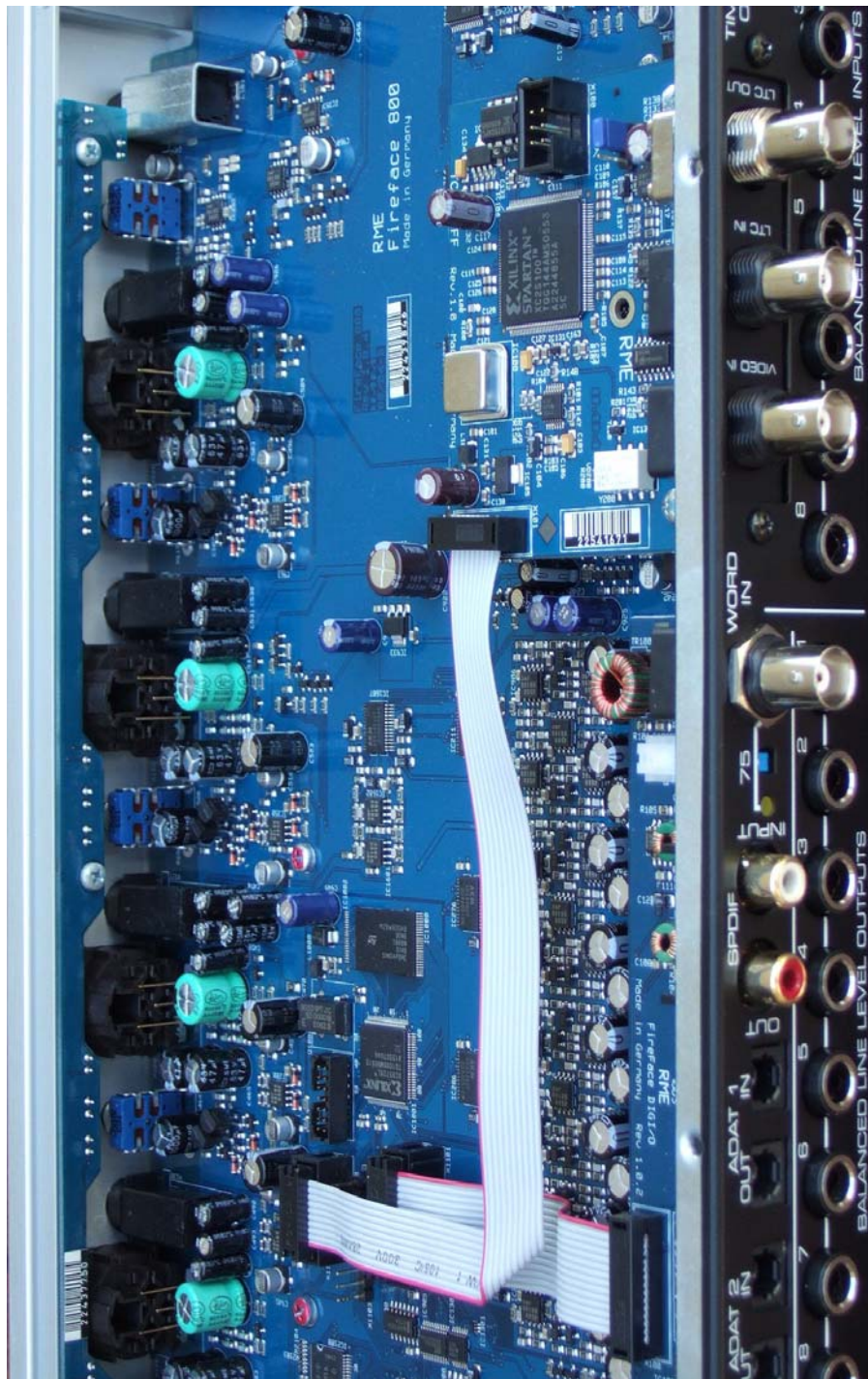
7. Operation and Usage

7.1 TCO-FF

After installation of the TCO the Fireface 800 has to be updated to the latest driver and firmware version. The current files are found on the website www.rme-audio.com in the section Download. At the time of printing these are:

http://www.rme-audio.com/download/fut_win_fire_tco.zip
Firmware updater version 2.63 for Windows 2000/XP/Vista

http://www.rme-audio.com/download/w2fire_265.zip
Driver version 2.65 for Windows 2000/XP

http://www.rme-audio.com/download/fut_mac_fire_tco.gz
Firmware updater version 2.64 for Mac OS X

http://www.rme-audio.com/download/macfire_258.gz
Driver version 2.58 for Mac OS X

http://www.rme-audio.com/download/fireface_x86.gz
Driver version 2.58 for Intel Macs

The settings dialog now includes an additional page TCO, and on the main page the new sync-option TCO can be selected.

For synchronization to a video or LTC signal choose *Clock Mode* AutoSync and TCO as *Preferred Sync Ref* on the main page of the settings dialog. All further settings are done on the TCO page.

Sync Source: Input select switch for the inputs LTC and video. *Lock* is dispayed as soon as the TCO is able to synchronize on an input signal.

Video Input: The BNC input can be terminated with 75 Ohms.

Frame Rate: The frame rate of the incoming SMPTE signal must always be defined manually.

Sample Rate: The TCO derives a word clock of 44.1 kHz or 48 kHz from the sync-signal. In the setting 'from App' the value sent from the ASIO application to the driver is used. The lower field provides common Pull-Up and Pull-Down values. The final value of the previously defined sample rate is shown in the field **Frequency** in case the sync-signal is valid.

Frequency: The TCO measures the word clock that it generates and shows the current value in this field.

MIDI Input: The Fireface's MIDI input includes either the MTC signal of the TCO, or the MIDI data of the 5-pin DIN input (External).
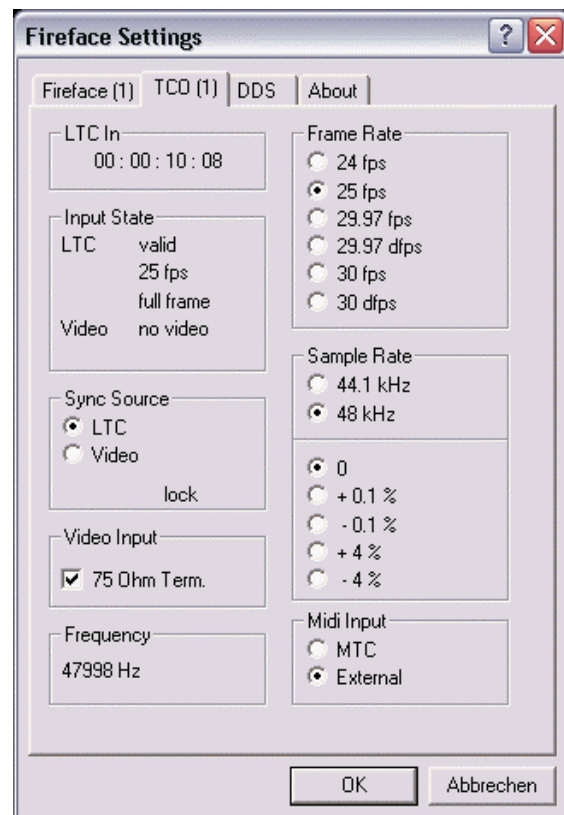
7.2 TCO-HDSP

After installation of the TCO-HDSP the HDSP AES-32 has to be updated to the latest driver and firmware version. The current files are found on the website www.rme-audio.com in the section Download. At the time of printing these are:

http://www.rme-audio.com/download/fut_win_dsp_b10.zip
Firmware updater version 233 for AES-32 under Windows 2000/XP/Vista

http://www.rme-audio.com/download/hdsp_wdm_302.zip
WDM streaming driver version 3.02 for HDSP series under Windows 2000/XP/Vista

http://www.rme-audio.com/download/fut_mac_madi.gz
Firmware updater version 233 for AES-32 under Mac OS X

http://www.rme-audio.com/download/madi_aes_253.gz
Driver version 2.53 for AES-32 under Mac OS X

The settings dialog now includes an additional page TCO, and on the main page the new sync-option TCO can be selected.

For synchronization to a video or LTC signal choose *Clock Mode* AutoSync and TCO as *Preferred Sync Ref* on the main page of the settings dialog. All further settings are done on the TCO page.

Sync Source: Input select switch for the inputs LTC, video and word clock. *Lock* is dispayed as soon as the TCO is able to synchronize on an input signal. Also at the bracket the green LED will light up.

Video / Word Input: The BNC input can be terminated with 75 Ohms. At the bracket the yellow LED will light up.

WCK Conversion: Default setting is 1:1. This very special option allows for a synchronous conversion of the word clock input signal. 44.1 kHz will turn into 48 kHz, where the 48 kHz are not free running, but have a synchronous relationship to the original clock. The same is available for converting 48 kHz to 44.1 kHz.

Frame Rate: The frame rate of the incoming SMPTE signal must always be defined manually.

Sample Rate: The TCO derives a word clock of 44.1 kHz or 48 kHz from the sync-signal. With the setting 'from App' the value sent from the ASIO application to the driver is used.
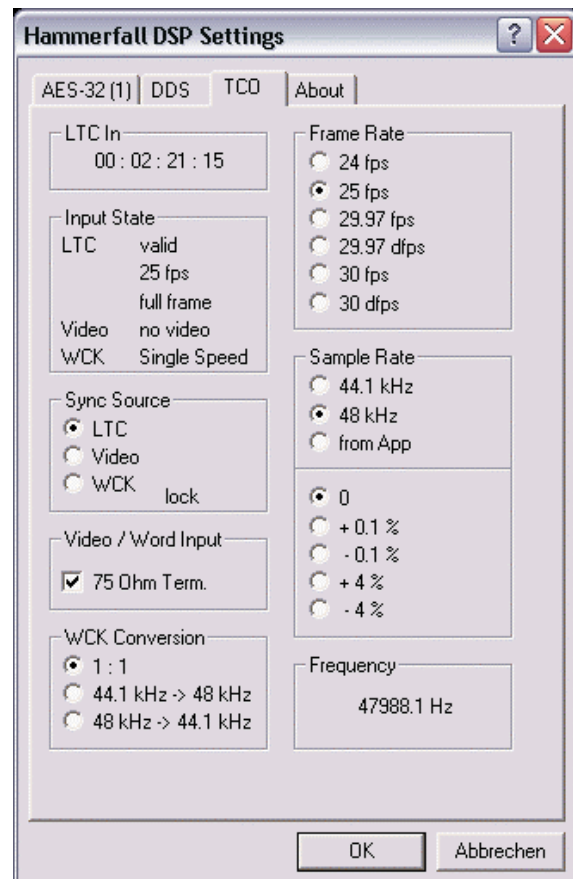
The lower field provides common Pull-Up and Pull-Down values. The final value of the previously defined sample rate is shown in the field **Frequency** in case the sync-signal is valid.

Frequency: The TCO measures the word clock that it generates and shows the current value in this field.

Note: The MTC signal is provided via a new (virtual) MIDI input port. This one has to be chosen as MTC sync source in the application.

7.3 Status Displays

The page TCO includes useful status displays, providing detailed information about the incoming signal.

LTC In: The time values read from the LTC signal. These values are passed unchanged to the application.

Input State: An LTC input signal detection as valid (valid) is followed by the display of the number of frames per second, and wether this is Full Frame or Drop Frame code. A valid video signal is shown as PAL or NTSC. An incoming word clock signal is analyzed and displayed to be in the Single Speed, Double Speed or Quad Speed range.

8. Warranty

Each individual TCO undergoes comprehensive quality control and a complete test at IMM before shipping. The usage of high grade components allow us to offer a full two year warranty. We accept a copy of the sales receipt as valid warranty legitimation.

If you suspect that your product is faulty, please contact your local retailer. The warranty does not cover damage caused by improper installation or maltreatment - replacement or repair in such cases can only be carried out at the owner's expense.

Synthax Audio AG does not accept claims for damages of any kind, especially consequential damage. Liability is limited to the value of the TCO. The general terms of business drawn up by Synthax Audio AG apply at all times.

9. Appendix

RME news, driver updates and further product information are available on our website:

http://www.rme-audio.com

Manufacturer:
IMM Elektronik GmbH, Leipziger Strasse 32, D-09648 Mittweida

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CE / FCC Compliance

CE
This device has been tested and found to comply with the limits of the European Council Directive on the approximation of the laws of the member states relating to electromagnetic compatibility according to RL89/336/EWG and RL73/23/EWG.

FCC Compliance Statement
Certified to comply with the limits for a Class B computing device according to subpart J or part 15 of FCC rules. See instructions if interference to radio reception is suspected.

FCC Warning
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This device complies with part 15 of FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the seperation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help.

In order for an installation of this product to maintain compliance with the limits for a Class B device, shielded cables must be used for the connection of any devices external to this product.

Note on Disposal

According to the guide line RL2002/96/EG (WEEE – Directive on Waste Electrical and Electronic Equipment), valid for all european countries, this product has to be recycled at the end of its lifetime.

In case a disposal of electronic waste is not possible, the recycling can also be done by IMM Elektronik GmbH, the manufacturer of the Micstasy.

For this the device has to be sent **free to the door** to:

> IMM Elektronik GmbH
> Leipziger Straße 32
> D-09648 Mittweida
> Germany

Shipments not prepaid will be rejected and returned on the original sender's costs.