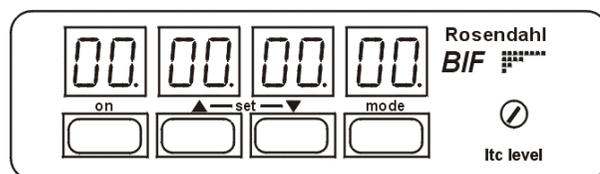


# ***BIF***

## **bi-phase interface**

### **user manual**

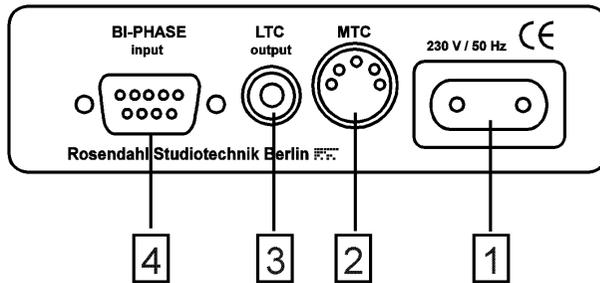


#### **Table Of Contents**

<b>Installation</b>	<b>2</b>
<b>Controls</b>	<b>4</b>
<b>Reference point</b>	<b>6</b>
<b>User bits</b>	<b>7</b>
<b>Format</b>	<b>8</b>
<b>Operation</b>	<b>11</b>
<b>Clock generator</b>	<b>12</b>



## INSTALLATION



### 1 POWER CONNECTION

Mains connection is provided by a standard European mains cable (DIN 49464 F). 220-230 volts, 50-60 Hz, maximal consumption is 4 watts.

### 2 MTC connector

This 5-pin DIN connector outputs Midi Time Code (MTC). The MTC signal can be applied to any MIDI interface. For reliable operation use only shielded Midi cables.

### 3 LTC output

The LTC output connector is a female RCA connector. The output impedance is  $< 1k$  ohms. The LTC output level can be adjusted on the front panel potentiometer with a small screwdriver up to 3 Vpp. For connecting to a balanced time code input, just use a standard audio adapter cable.

### 4 BI-PHASE input

The bi-phase connector is a female 9-pin D-type socket:

1	anode	opto-isolated input a
2	cathode	opto-isolated input a
3	anode	opto-isolated input b
4	cathode	opto-isolated input b
5	Ground	
6	TTL-input a	
7	TTL-input b	
8	Ground	
9	5 volts output (100 mA)	

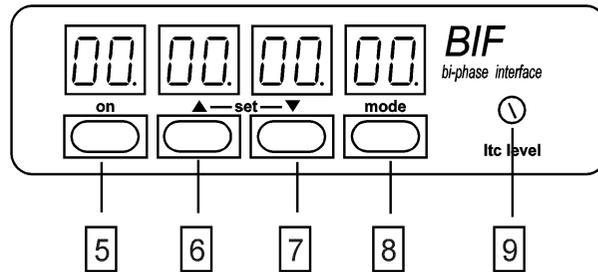
Most bi-phase signals are standard TTL outputs. In this case, use the TTL-inputs on pins 6 and 7. The TTL-inputs need a good ground connection from the bi-phase output to the bi-phase input (pin 5 & 8). Use only single shielded cables. Use the shield as ground.

Don't care about the polarity of the two signals, because you can change it by software. See "Input format" on page 8.

The two opto isolated inputs need a minimum current of +10 mA. If your bi-phase outputs are strong enough to drive these inputs (TTL outputs are not), you should use the advantage of opto-isolated inputs. Connect the bi-phase outputs to the anodes and the output ground to both cathodes. The bi-phase input ground can be grounded too or also left floating.

If you are using two mechanical switches as bi-phase clock, you can connect the two cathodes to ground, and the 5 volts output serial through the switches to the anodes.

## Controls



### 5 On key

Turns the BIF on and off. Each time the BIF is powered up, it runs through the display test, displays the software version and starts operation in the time code window.

**8.8.8.8.8.8.8.8**

**Soft 1.00**

**00.00.00.00.**

If it's necessary to reset the BIF to default parameters, then press and hold up & down keys (6 & 7) when the power is turned on. The BIF will display "reset".

**rE SE t**

### 6 Up key

In set mode (display is flashing) the up key increases the edited value. Holding the up key over one second starts auto-increase. Set mode is entered by pressing the up & down keys simultaneously.

### 7 Down key

In set mode (display is flashing) the down key decreases the edited value. Holding the down key over one second starts auto decrease. Set mode is entered by pressing the up & down keys simultaneously.

### 8 Mode key

In **normal operation mode** (display isn't flashing) the mode key passes through the sequence of these three windows:

**00.00.00.00**

The **time code window** displays the current time of the bi-phase time code counter. Only **three** decimal points (hours.minutes.seconds.) are indicating the time code window. The last decimal point (frames.) indicates "locked".

**0.0.0.0.0.0.0.0.**

The **user bits window** displays the current LTC user bits. Eight decimal points are indicating the user bit window.

**Fo 24.24**

The **format window** displays the selected input and output format.

In **set mode** (display is flashing) the mode key passes through the set sequences.

### 9 LTC level

The SMPTE output level can be adjusted with a small screwdriver up to 3 Vpp.

## Reference point

Cue up your film transport to the reference point.

**Note:** The exact edit point is the beginning of the frame and not its centre. If you are using the play back head of a mag machine as edit point, the right end of the start mark must be in the centre of the head, when the tape is running from left to right.

Select the **time code window** with the mode key.

**00. 00. 00. 00**

Enter **set mode** by pressing **up & down** keys simultaneously.

**xx. xx. xx. xx**

All digits are flashing. You can set full hours (nn.00.00.00) with **up** and **down** keys. Minutes, seconds and frames will be set to zero.

Press the **mode** key.

**xx. 00. 00. 00**

Hours are flashing. You can set the hours with **up** and **down** keys, without changing the minutes, seconds and frames.

Press the **mode** key.

**00. xx. 00. 00**

Minutes are flashing. You can set the minutes with **up** and **down** keys.

Press the **mode** key.

**00. 00. xx. 00**

Seconds are flashing. You can set the seconds with **up** and **down** keys.

Press the **mode** key.

**00. 00. 00. xx**

Frames are flashing. You can set the frames with **up** and **down** keys.

Press the **mode** key.

**FrEerun**

In this window you can start the BIF by pressing the **up key** as a free running, X-tal tuned time code generator. The generator function is stopped by the **mode key**.

Note: The generator starts from the current bi-phase position, but does not change or move the reference point.

Press the **mode** key.

Now you are again in the **normal operation mode**

and the new reference point is stored in the non-volatile memory.

## User bits

Select the **user bits window** with the mode key.

**0.0.0.0.0.0.0.0.**

Enter **set mode** by pressing **up & down** keys simultaneously.

**x.x.x.x.x.x.x.x.**

All digits are flashing. You can set the user bits (0.0.0.0.0.0.0.n.) with **up** and **down** keys. User bit group 2-8 will be set to zero.

Press the **mode** key.

**0.0.0.0.0.0.x.**

First user bit group is flashing. You can set the group with **up** and **down** keys, without changing the other groups.

Step through all groups with the **mode** key until you are back in the **normal operation mode**.

## Format

Select the **format window** with the mode key.

**Fo 24. 24**

Enter **set mode** by pressing **up & down** keys simultaneously.

**Fo xx. xx**

**Format** is flashing. You can set the format with **up** and **down** keys.

The first number is the transport format, the second number is the generated output format. If your mag machine is running at 24 frames per second, generating a 48 Hz or multiple bi-phase signal, and you want to generate 25 fps time code, you must use [Fo 24.25]. Software version 1.00 supports 18.24, 18.25, 18.30, 24.24, 24.25, 24.30, 25.24, 25.25, 25.30, 3d.3d, 30.24, 30.25, 30.30.

Press the **mode** key

**In. Fo. xx. Xx**

**Input format** is flashing.

You can set the input format with **up** and **down** keys.

A bi-phase signal consists of two 90° shifted square wave signals (a,b). If the two bi-phase signals are reversed, the travel direction will also be reversed. Therefore you can set the BIF input format to bi-phase a,b (in.Fo.bp.ab) or bi-phase b,a (in.Fo.bp.ba).

Pulse & direction signals are decoded bi-phase signals. One signal defines the travel direction (forward / backwards), the other one is counting. The travel direction could be reverse and also the two signals could be exchanged. Therefore the bif supports 4 different input formats called Pd0, Pd1, Pd2, Pd3 for all four possible combinations.

Because there are only six possibilities (bp.ab, bp.ba, Pd0, Pd1, Pd2, Pd2) the empirical method is recommended.

Press the **mode** key

**P.P.F. xxx**

**Pulses per frame** are flashing.

You can set the pulses per frame with **up** and **down** keys.

Normally the bi-phase signals from a film transport, running at 24 frames per second, are 48 Hz. This means two falling and two rising edges per each frame (p.p.f. 4). But also 24,96 or 480 Hz signals are sometimes used. The BIF can handle all rates from 1 to 256 pulses per frame.

Start your first test with the default settings **ppf = 4** and input format **bp.ab**. If BIF is running in reverse direction change the input format to bp.ba.

If BIF runs with the half play speed set **ppf = 2**.  
If BIF runs with the double play speed set **ppf = 8**. If BIF is toggling between two frames try input formats pd0, pd1, pd2 or pd3.  
If BIF is not counting at all, check your bi-phase levels (See page 3).

Press the **mode** key.

**S.out OFF**

**Serial output mode** is flashing.

You can set the Serial output mode with **up** and **down** keys to:  
„oFF“, „FuLL“, „Loc“, „q.F.“, „q.F.-2“.

If you do not use the MTC output, set „S.out“ mode to „oFF“.

Any DAW, which is able to chase to MTC, will follow to your film transport at normal play speed. If the film transport is moving slowly, fast winding or moving reverse, MTC-slaved DAWs will not follow to the film transport. For this reason the BIF bi-phase interface supports several tricky output modes to cue up your slaved DAW frame-accurate also at non-play speed.

Midi Time Code uses two types of messages, described as quarter frame and full frame. The quarter frame message is used for normal running status at play speed and the full message communicates a specific time for cueing and locating.  
Unfortunately most DAWs and sequencer programs do not support the „full message“.

Another method to cue up your DAW is the use of the Midi Machine Control (MMC) „Locate“-command, if your DAW software supports MMC slave mode together with MTC slave mode.

If the slaved DAW supports the Midi Time Code Full Frame messages set „S.out“ to „Full“

If the slaved DAW supports MMC slave mode together with MTC slave mode, set „S.out“ to „Loc“ (for example with Digidesign ProTools 4.2, Roland VS-880, Fostex FD4).

If the slaved DAW only supports MTC slave mode, try to cue up your DAW with the „S.out“-settings „q.F.“ or „q.F.-2“ (the Creamware Triple DAT software for example can be cued up with the „q.F.-2“-setting).

Press the **mode** key again to return to the **normal operation mode**.

## Operation

The BIF is translating bi-phase signals from 90% to 110% of normal play speed into LTC and MTC quarter frames. All other speeds from 0 up to 30 times play speed will be translated into LTC-bursts and MTC full / locate / quarter burst messages.

(See serial output mode)

An LTC burst is an LTC-loop of one frame. Most LTC chase synchronizers will cue up to it.

The decimal point of the frames (in the time code window) is indicating locked time code generation in play speed. In this "locked" mode the BIF is interpolating even bad jittering bi-phase signals into jitterfree linear time code, ideal for slaving digital audio systems.

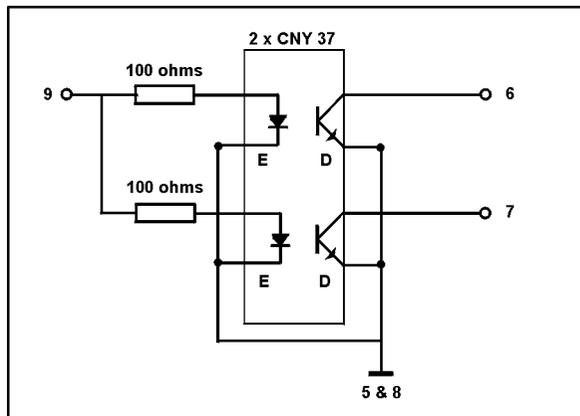
The BIF's non volatile flash memory (software version 1.20 or higher/ hardware version bif.02) stores all settings and also the power on/ off status.

If the mains connection is temporarily interrupted the unit holds the power on/ off status, entered before with the on-key (5).

The reference point is stored at any time you step through the reference point edit procedure. If you want to switch off the unit without losing your actual transport-position you must store your current position by stepping through the reference point set procedure without changes (Page 6).

## Clock generator

This is an example how you can make a bi-phase clock generator with two light barriers (CNY 37 or TCST 2000) and two 100 ohms resistors.



The bi-phase aperture must be on the film driving axle and must have at least 1 tooth per frame.

The distance between both photo interrupters must be the half of an apertures tooth.