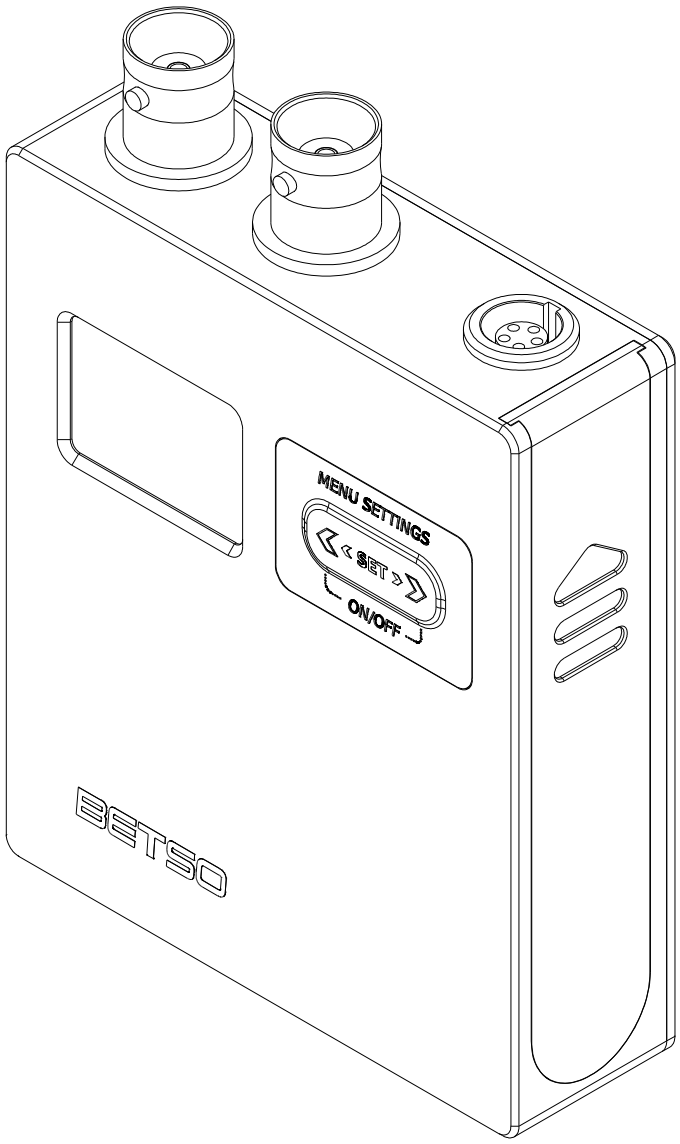
BETSO

SBOX-1N

Highly accurate Time Code & Wordclock generator



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Used symbols

Indicates text that has only informative character. If you overlook this information, it can't result in product damage by it's mishandling.

Indicates text that has important instruction character. If you overlook this information, it may result in product damage.

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Thank you for purchasing BETSO product!

Please pay sufficient attention to the following user manual of your new product BETSO. Following these instructions, you will avoid the possible damages of your new device and at the same time, they will be presented to you all the available features that allow you to take advantage of the potential of the product.

For the latest information about our products BETSO please contact your local distributor or visit our website http://www.betso.eu.

1. Product description

BETSO SBOX-1N is a highly accurate time code and wordclock generator for ENG/EFP or studio usage. Using high precise TCXO and special algorithms for generating and jamming of time code, we are able to offer very low drift during shooting day. Because of OLED display and three buttons, it is really easy to set all functions and control status of product. Menu setting is very intuitive and even without reading this manual user is able to set all functions easily. Its very small dimensions and weight is also important benefit of SBOX-1N.

2. Top features

- generates all frame rates (23.976 fps - 30 fps) drop frame and non drop frame SMPTE TC formats includes its 0.2 and 2 multiples (12.5 fps, 15 fps, 50 fps, etc.)
- precise mechanic construction from anodized aluminium alloy
- bidirectional BNC connector for timecode input (if WC is turned OFF) and WC output
- optional displaying of time code / user bits
- 3 levels of display brightness
- intuitive control with quick, menu based setting of all advanced functions
- low consumption allowing operating time up to 50 hours in active operation
- advanced monitoring of batteries level with signalization of discharged batteries
- Power Saving function which allows to turn off OLED display after selectable time of last button pushing
- TC hold function (not hold of generating TC) allowing reading of display without speedy changes of TC
- Automatic ON & JAM function, which allows to turn on and JAM simultaneously without need to turn SBOX-1N on first
- Variable powering using 2x AA batteries/accu or external power 0.9 – 3V DC

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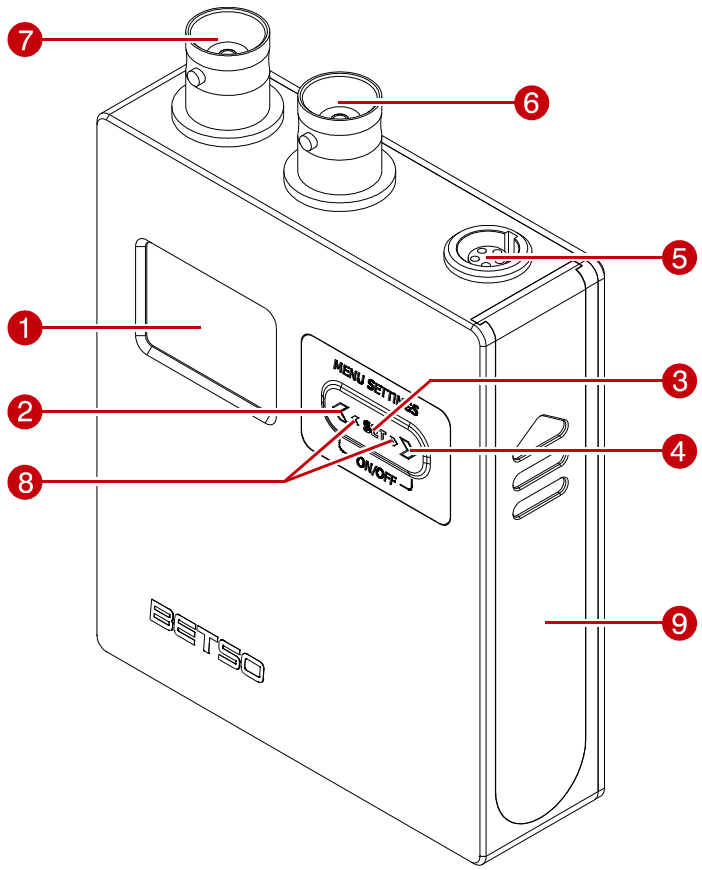
3. Control elements



1. OLED displey
2. Button „LEFT“
3. Button „SET“
4. Button „RIGHT“
5. LEMO 5-pin connector
6. BNC connector for TC output
7. BNC connector for TC input and WC output
8. Two informative LEDs
9. Battery door

4. Insertion of batteries / accumulators

To power SBOX-1N insert two AA alkaline/lithium cell or accumulators. After checking right polarity of inserted batteries according to back side label, close the door.

SBOX-1N is protected against destruction by inserting battery pack with wrong polarity.

Warning: Never insert the batteries if you use the external power supply. It may result in the damage of the device and rapid battery discharge!

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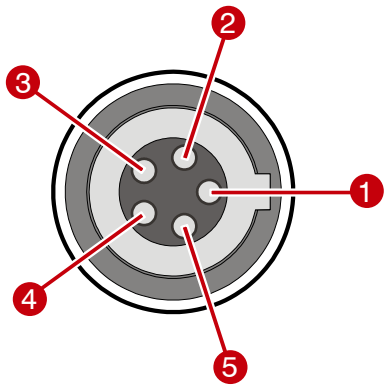
5. External power supply

External power supply 0.9 - 3V DC is possible to connect using a special cable connected to the input LEMO connector, which connection is shown below.



1. GND
2. TC input
3. GPS input
4. External power 0.9V – 3V DC
5. TC output

Warning: Never insert the batteries if you use the external power supply. It may result in the damage of the device and rapid battery discharge!

Warning: Never connect the external power with the voltage higher than 3V. It would cause serious damage of the device.

6. Turning ON/OFF

Turning device ON	long simultaneous pressing **LEFT** and **RIGHT** buttons
Turning device OFF	long simultaneous pressing **LEFT** and **RIGHT** buttons

After turning ON of SBOX-1N, there will be BETSO logo and after that, it starts to generate TC immediately according to previous setting in the menu.

If jamming is enabled and there is an external TC source connected to SBOX-1N, it starts to jam immediately.

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7. Menu control

Enter the menu	long press of **SET** button
Exit the menu	long press of **SET** button in main menu
Move up	short press of **LEFT** button
Move down	short press of **RIGHT** button
Enter the setting	short press of **SET** button
Change setting	short press of **LEFT** / **RIGHT** button
Save setting	short press of **SET** button

After exitting of the menu, all changes are saved and set.

If there were made changes of TC parameters (Frame rate, UB,..) and SBOX-1N is in master mode, it will start to generate „new“ TC according to new settings.

8. Setting of SBOX-1N

Menu control is described in previous chapter 7 Menu control.

8.1 **TC frame rate** – setting frame rate of generated Time Code

menu / TC frame rate

This function allows to set different frame rate of generated time code. When cross jamming is enabled, this frame rate will be used after jamming. SBOX-1N can generate any type of time code including 0.5 and 2.0 multiples of standard frame rates.

Standard rate TC:	**30, 30DF, 29.97, 29.97DF, 25, 24, 23.976**
2x multiplied rate TC:	**60, 60DF, 59.54, 59.54DF, 50, 48, 47.952**
0.5x multiplied rate TC:	**15, 15DF, 14.985, 14.985DF, 12.5, 12, 11.988**

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8.2 TC amplitude – setting amplitude of generated Time Code

menu / TC amplitude

This function allows to set output amplitude of generated time code on both BNC and LEMO output.

TC amplitude: **+6dBu, +3dBu, 0dBu, -3dBu, -6dBu, -9dBu, -12dBu, -15dBu, -18dBu**

This function is really useful when using SBOX-1N with small DV camcorders or photo cameras without TC input and when standard amplitude of Time Code could overload audio input of device.

8.3 TC default – setting of default Time Code start time/frame

menu / TC default

This function allows to set default beginning time and frame of generated time code after turning SBOX-1N on.

HH:MM:SS:FF HH: hours, MM: minutes, SS: seconds, FF: frame number

8.4 TC offset – setting of Time Code offset for jamming

menu / TC offset

This function allows to set offset of generated time code in comparison with jamming source.

-10 fr to +10 fr offset setting from -10 frames to +10 frames

This function is really helpfull for compensation of TC offset when using some types of HD camcorders.

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8.5 **UB settings** – setting of User Bits of generated Time Code

menu / UB settings

SBOX-1N allows to choose one of three possible UB sources, which is inserted in generated time code.

As jammed TC	User bits of generated TC are the same as in jamming source
Manual UB	User bits of generated TC are manually set in format: **U_8U_7:U_6U_5:U_4U_3: U_2U_1**
External TC	This setting allows to insert external Time Code connected to SBOX-1N to user bits of output Time Code of SBOX-1N

8.6 **WC sample rate** – setting of WordClock frequency

menu / WC sample rate

WC: **OFF** – generation of WC is disabled

32 000, 44 100, 48 000, 88 200, 96 000, 176 400, 192 000 Hz

All WordClock frequencies are available in the following modifications

PAL/SECAM pull-down

NTSC pull-down

Standard rate

NTSC pull-up

PAL/SECAM pull-up

If WordClock sample rate is set to OFF, BNC connector TC in / WC out (control element 7) is automatically used as TC input.

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8.7 **Battery type** – setting type of batteries powering SBOX-1N

Menu / Battery type

This function allows to choose right chemical type of cells powering SBOX-1N. Only then you can see the right status of battery condition on OLED display.

Alkaline	SBOX-1N is using alkaline cells
NiMH	SBOX-1N is using NiMH cells
Lithium	SBOX-1N is using lithium cells (1.5V only!)

We recommend to set right type of batteries to get valid information about battery status and right turning OFF moment when batteries are dead.

8.8 **Auto on** – setting of automatic power on when TC source is connected

Menu / Auto on

This function allows to turn on SBOX-1N when TC source is connected to LEMO input connector. When Enable + JAM is chosen, immediatelly after SBOX-1N is turned on and TC source is still connected to LEMO input, jamming starts.

Enable	Auto on function is enabled
Enable + JAM	Auto on function is enabled and jamming starts after turning on
Disable	Auto on function is disabled

We recommend to set this option to „Enable + JAM“. Then you can easily turn on and JAM SBOX-1N to external TC source and avoid necessity to use standard turning ON/OFF and jamming procedure.

8.9 **Jamming** - setting of jamming to external TC source

Menu / Jamming

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Once / Manual	SBOX-1N can be jammed once without asking and then user has to allow next jamming
Continuous	SBOX-1N can be jammed every time without asking
Disable	Jamming is disabled. Useful for forced master mode.

When contiuous option is selected and external TC source is connected, every time TC is changed, SBOX-1N jams to this new time code.

8.10 Cross jamming – jamming SBOX-1N with different TC frame rate

Menu / Cross jamming

This function enables SBOX-1N to be jammed from external TC source preserving TC frame rate set in TC frame rate option (chapter 8.1).

Enable	Cross jamming is enabled
Disable	Cross jamming is disabled

Example. When SBOX-1N is set to 25 fps and TC source has 30 fps, SBOX-1N will be jammed to external TC time/frames, but will have the same frame rate as set in TC frame rate, in this case 25 Fps.

8.11 OLED brightness – setting of OLED display brightness

Menu / OLED brightness

High	OLED display has the highest brightness
Medium	OLED display has medium brightness
Low	OLED display has the lowest brightness

Notice that, the more brightness OLED display has, the bigger is current consumption and the sooner will be batteries discharged.

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8.12 **OLED power save mode** – setting of OLED power save function

Menu / OLED power save mode

This function turn off OLED display after 5-30s after last button pressing. Display can be again turned on when any button is pressed.

5s	Display is turned off after 5s after last button pressing.
10s	Display is turned off after 10s after last button pressing.
30s	Display is turned off after 30s after last button pressing.
OFF	Display power save mode is disabled

This function prolongs battery life and saves OLED display from burn.

8.13 **Display orientation** – setting of OLED display orientation

Menu / Display orientation

Normal	OLED display is standardly orientated
Rotated	OLED display is rotated upside down

When OLED display is rotated, it doesn't mean, that LEFT and RIGHT buttons functions are swapped. They remains the same as in normal mode.

8.14 **GPS time TC** – generation time code with UTC time of GPS signal

Menu / GPS time TC

This function allows to generate accurate time code with UTC time and number of frames according to setting „TC frame rate“. This is really useful for example for synchronize two camcorders on different places on the world.

Synchronize	It starts synchronization with UTC time (only with BETSO GPS module)
Exit	It cancel synchronization and go back to main menu

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If there is no GPS signal or no GPS module connected to SBOX-1N and „Synchronize“ is chosen, it won't start generation of UTC time code.

8.15 **GPS calibration** – calibration of internal TCXO using GPS module

Menu / GPS calibration

This function allows to calibrate internal TCXO using GPS signal. It means that one second generated by SBOX-1N will last the same time as accurate GPS atomic clock based second.

Calibrate	It starts calibration (only with BETSO GPS module)
Exit	It cancel calibration and go back to main menu

If there is no GPS signal or no GPS module connected to SBOX-1N and „Calibrate“ is chosen, it won't cause any calibration problems. Calibration just won't start.

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9. Control of SBOX-1N – button functions

9.1 Without TC source connected to SBOX-1N

RIGHT (short push)	Switching between dispaying TC and UB of generated time code
SET (short push)	Freeze displaying time code for 5s, generation of TC is still continuous
SET (long push)	Enter the menu settings, more information in Chapter 7

9.2 With TC source connected to SBOX-1N

LEFT (short push)	Show TC offset in frames between generated TC and external TC source
RIGHT (short push)	Switching between dispaying TC and UB of generated time code and external source time code
SET (short push)	Force jamming to external source time code
SET (long push)	Enter the menu settings, more information in Chapter 7

10. Informative LEDs function

Master mode	LEDs flash with frequency equal to frame
Not jammed SBOX-1N to external TC	rate of generated Time Code
Slave mode	LEDs flash every 00 frame of generated
Jammed SBOX-1N to external TC	Time Code => once per second

Informative LEDs are very useful for checking if SBOX-1N was jammed or not. For example if device was turned off and then turned on, user can see that there is a necessity to do the jamming of SBOX-1N.

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11. Recommended accessories

Optional accessories include various cables for the connection of the TC signal and velcro protective case.

For the latest information about our products BETSO please contact your local distributor or visit our websites http://www.betso.eu

12. Troubleshooting

It is not possible to turn on SBOX-1N

Most probably batteries inside of SBOX-1N are dead. Please insert new batteries and try it again. If problem still remains, please contact your BETSO distributor.

Warning: Never insert the batteries if you use the external power supply. It may result in the damage of the device and rapid battery discharge!

Warning: Never connect the external power with the voltage higher than 3V. It would cause serious damage of the device.

Warning: Never connect the outputs of SBOX-1N to microphone inputs with phantom power turned on. It would cause serious damage of SBOX-1N.

Safety instruction

Never open an electrical device! All reparations must be performed by an authorized service center. In the case of opening of the device away from the authorized service center, you will automatically loose the warranty of the device.

Do not use the electrical device in the places with high humidity, especially take care to protect the device against direct contact with water.

To clean the device, use a dampened piece of cloth. Never use any chemical solvents!

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13. Technical specification

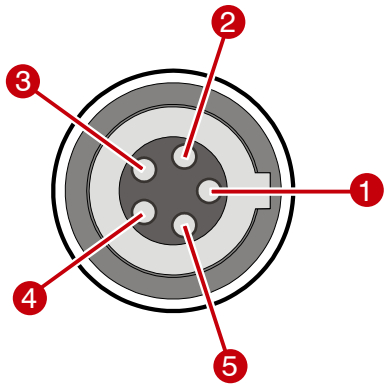
Dimensions (w x h x d)	75 x 62 x 20 mm (2.95 x 2.44 x 0.79")
Displays	1“ OLED display, blue
Weight	approx. 210 g (including battery)
Mechanical construction	anodized aluminium alloy
SMPTE TC signal	23,976 fps - 30 fps (even 0.5 and 2.0 multiples of standard TC)
TCXO Crystal	Temperature compensated oscillator (+/- 0.2 ppm)
Accuracy error	Less than 0.5 Fr / 24 hours
Input sensitivity	0,2 – 10 V (p-p)
Powering	2x AA battery (alkaline or lithium) / 2x accu (NiMH, NiCd)
	external powering 0.9-3 V DC
Current consumption	40 – 80 mA *
Battery life	Up to 50 (80) hours **

* depends on the operating mode

** with the lowest display brightness, WC off, alkaline batteries (Lithium cells)

14. LEMO connector wiring

Used type: LEMO EGG.0B.305.CLL



1. GND
2. TC input
3. GPS input
4. External power 0.9V – 3V DC
5. TC output

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15. EC Declaration of conformity

CE

BETSO ELECTRONICS s.r.o.

Elisky Premyslovny 1335, 156 00 Prague 5 – Zbraslav, Czech Republic

Reg. number: 28955706

declare that this device

BETSO SBOX-1N

specifications: Compact Time Code and Wordclock generator

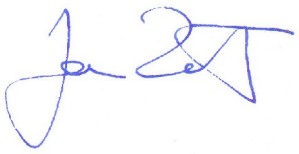
conform to the essential requirements of the R&TTE Directive 1999/5/EC. To demonstrate compliance with these requirements, the following standards were consulted:

EN 301 489 (Electromagnetic Compatibility)

EN 60065/2002 (Safety of Electrical Equipment)

Conformity assessed via Annex III. using a Technical Construction and Results of measurements.

September 2013



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