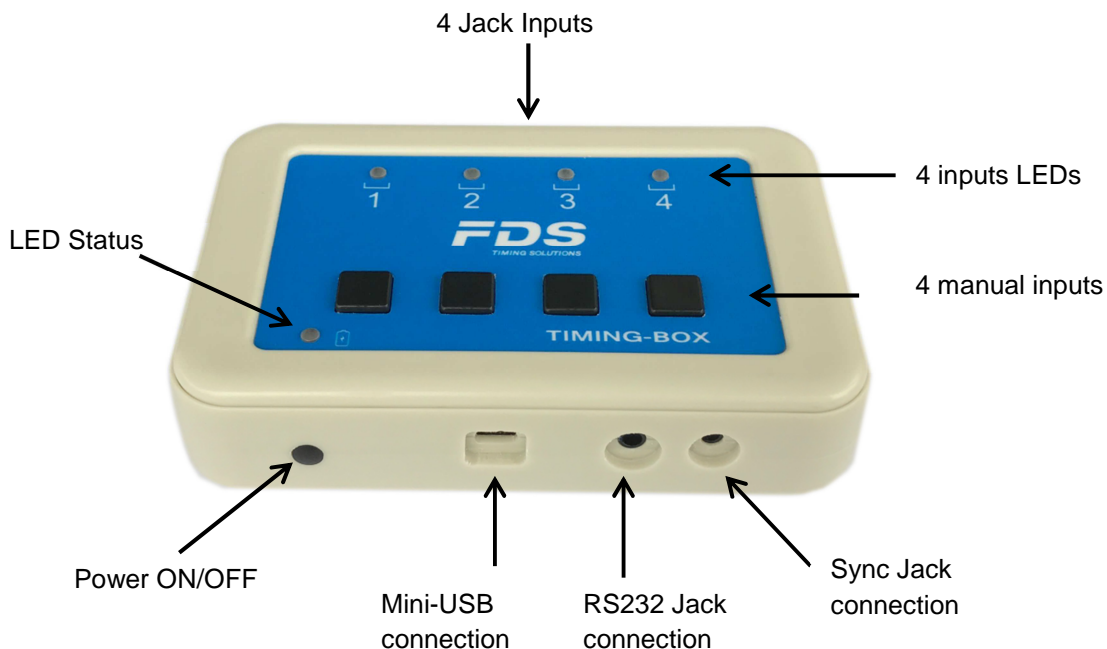


The timing system TBox is simple to use

1. Appearance



2. Power ON/OFF the TBox:

The ON/OFF Button indicates the charge level of the battery and Switches ON/OFF the Box

1) Battery status

Press and hold the ON/OFF button (front left)

The Input's LEDs (1 – 4) will illuminate to indicate the battery charge status

4 LED's ON green: 100 %

3 LED's ON green : 75%

2 LED's ON green : 50%

1 LED ON green : 25%

1 LED ON red : < 10% (TBox will only power on with external power applied)

2) Switch ON / OFF the TBox

a) Press briefly the ON/OFF button (0.5s – 1.5s) until the battery status is indicated on the Input's LED's 1 – 4

b) Release the ON/OFF button and repress it within 1 second, and hold down until the 4 inputs LEDs are ON, and the audible beep signal is emitted (provided that the buzzer is not deactivated)

Led Status

	TBox On/Off	USB	Battery
Yellow ON	OFF	connected	Battery Charging
Green ON	OFF	connected	100% charged
Yellow blinking	ON	connected	Battery Charging
Green blinking	ON	connected	100% Charged
Green blinking	ON	disconnected	> 25%
Red blinking	ON	disconnected	Low battery

3. Timing Inputs:

TBox offers 4 inputs

- Manual Push Buttons (inputs 1 to 4)
- Jack-Mono inputs (inputs 1 to 4) – working contact without potential (short-circuit). Each press of the button or short-circuits on the Inputs are stored in the TBox memory, with associated date and time of impulse as CSV files.

The user has the ability to configure a locking time (using TBox Setup app), this facility allows the blocking of undesired impulses corresponding to the channel configured.

E.g. – to ignore multiple inputs from dirt or snow dust

4. Mini-USB:

The Mini-USB connector has various functions including :

- Recharge the TBox battery
- Real time of day in many formats (FDS, TAG Heuer, Alge, Seiko protocol)
- Set and configure the options of the TBox (with the app “TBox-Setup”)
- Access to the Time files in CSV format
- Update the TBox firmware (procedure at the end of this document)

The USB connection allows the emulation of a serial port (COM) for data transfer.

It also allows you to directly access the internal memory (USB memory).

The capacity of the memory is approximately 2Gb (user needs to maintain sufficient memory availability to ensure storage of impulse data)

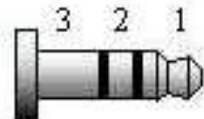
The space required for a competition of 1000 times is approximately 40 Kbytes

5. RS232:

Jack-Stereo connection 3.5mm

In conjunction with the TBox-Setup, the protocol output can be configured by the user

- FDS / TAG Heuer / Alge / Seiko Time of day protocol
- Serial printer
- Display Output (TAG Heuer / Alge Protocol)

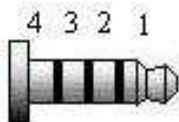


- 1: TBox TXD
- 2: TBox RXD
- 3: GND

In/Out Synchro:

Jack-4pin connection 2.5mm

- Allows to synchronize the **TBox** with other timing systems



- 1: TBox +3.3V
- 2: TBox Sync In
- 3: TBox Sync Out
- 4: GND

TBox Sync In:

Internal resistor to Vcc: 10 kOhm

Active state : Tie to Gnd, Sink current 0.3mA

Inactive state : Leave unconnected

TBox Sync Out:

Min ext resistor to Vcc: 1kohm

Max Vcc: 5V

Active state: Tied to Gnd (1ms)

Inactive state: Open circuit

6. Synchronization:

There are four different methods to synchronize the **TBox**

a) Sync at Zero.

- This is the default synchro method. Once the TBox is switching ON, the first impulse will sync the internal time at Zero time.

b) GPS Sync

- It is possible only with the TBox model with GPS (TBox-20)
- To start the GPS Sync, ensure TBox is powered off, hold down the button “Input 1” whilst powering on the TBox
- The sync will commence once the TBox receives sufficient GPS data.

c) External.

- Not yet implemented.

d) Sync via app - TBox-Setup

- Dedicated user Apps (TBox-Setup) automatically synchronize a TBox with their internal time.

7. Bluetooth:

A Bluetooth connection can be established with compatible FDS timing or setup Apps. After power up, the TBox advertises its presence for 2 minutes. During this period the box can be detected and connected by the user App. To re-establish detection after the 2 minute period simply momentarily press the power button to reactivate the Bluetooth advertising process

8. Update TBox Firmware:

To update the firmware it is very easy. No software is required.

- a) Copy and paste the .bin file to the “USB SD-Memory card “ of the TBox

Note that you should have only ONE firmware file on the menu. If you want to save the previous .bin files, create a sub-directory on the SD-Memory

- b) Ensure that you have no file call “UPDATLOG.txt” on the SD-Memory. If so delete it
- c) Disconnect your TBox from your PC
- d) Ensure that the TBox is OFF, then press the ON/OFF button.
The 4 Inputs LED’s will switch Yellow then Green to indicate that the firmware updated successfully.
- e) A file “UPDATLOG.txt” is created on the SD-Memory to confirm that the new firmware is installed.
- f) Once the operation completed, It is advised to remove the .bin file from the root directory.

9. Technical specification:

Operating temperature:	-20°C to 70°C
Time Base precision:	+/- 3ppm @ -20°C to 70°C (internal thermos-regulated quartz)
External power:	USB compatible (5V +/- 10%) Max 1A
Battery:	1500mAh
Autonomy:	50 - 100 hours (100 hours with GPS inactive)
Bluetooth module:	BLE-4.1
Dimension:	(124x80x31mm)
Weight:	150 gr

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