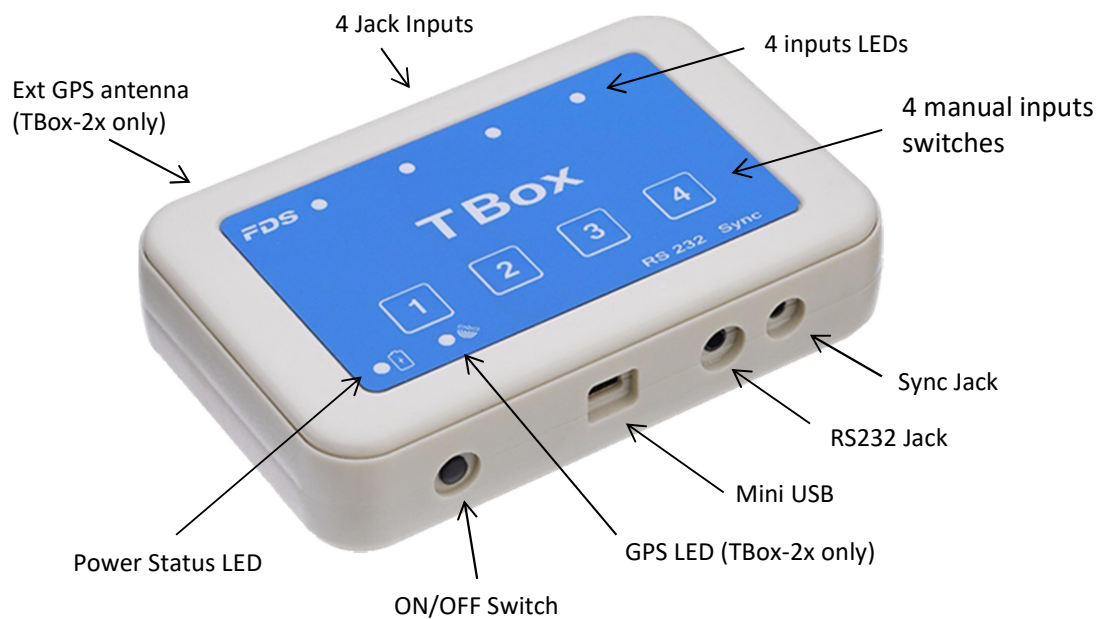# TBOX-TANDARD

1. Appearance

The TBox-Standard is a compact and well equipped timing console. Its 4 inputs accept wired peripherals like photocells or other starting devices.

2. Power ON/OFF

The ON/OFF switch has 3 functions:

1) 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).

2) Battery status
   Press and hold the ON/OFF button
   The Inputs LEDs (1 – 4) will illuminate to indicate the battery charge status

   4 LEDs ON green: 75-100 %
   3 LEDs ON green: 50-75%
   2 LEDs ON green: 25-50%
   1 LED ON green: 10-25%
   1 LED ON red :   < 10% (Will work only with external power plugged)

3) Reactivate Bluetooth advertising

Power Status LED

	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

The TBox models 1x and 2x 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 the "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:

- External power supply and battery charging
- COM port emulation for RS232 communication and data transfer
  - Real time of day in many formats (FDS, TAG Heuer, Alge, Seiko)
  - Configure the TBox-Radio options and parameters (with the app "TBox-Setup")
- 2GB USB Flash Drive
  - All impulse data are stored in a .csv file on the drive
    A new file is created every time the TBox-Radio is swiched ON
  - User needs to maintain sufficient memory availability to ensure storage of data
  - The space required for a competition of 1000 times is approximately 40 Kbytes
  - Flash Drive access is only possible when the TBox-Radio is turned OFF

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
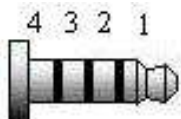- Display Output (TAG Heuer & Alge Protocols)
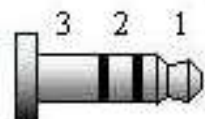
1: TBox TXD
2: TBox RXD
3: GND

6. 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:	1 kOhm
Max Vcc:	5V
Active state:	Tied to Gnd (1ms)
Inactive state:	Open circuit

7. Synchronization

After power up, all 4 inputs LEDs will flash yellow as long as the TBox is not synchronized.
There are four different methods to synchronize the TBox.

a) Sync at Zero.

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

b) GPS Sync (models 20 & 21)

- 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
- Once synchronized, the internal clock drift is constantly compensated by GPS signals (as long as GPS coverage is maintain)

c) External.

- Not yet implemented.

d) Sync via app

- All synchro methods presented above can be controlled manually or automatically by our Timing Applications
- It is also possible to synchronize the TBox to a user define time of day, using one of the 2 inputs

8. 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.

9. How to update the TBox Firmware

Update the firmware is an easy task. No software is required.

a) Copy and paste the ".bin" file to the USB Flash Drive root directory of the TBox.
Note that you should have only ONE ".bin" file on the drive. If you want to save the previous ".bin" files, create a sub-directory
b) Delete the file "UPDATLOG.txt" if exist on the Drive
c) Disconnect the USB connector from your TBox
d) Wait 1-2 seconds and reconnect the USB cable between the TBox and your PC.
All LED's will switch yellow for a few seconds
e) A file "UPDATLOG.txt" is created on the Drive. Open it and check that the update completes with success. **Do not delete this file**

10. Technical specifications

Operating temperature:	-20°C to 60°C Battery charge possible only between 0°C and 45°C
Ext inputs precision:	1/10'000 sec
Time drift:	1ppm @ 20°C; max 2.5ppm from -20°C to 60°C
External power input:	USB compatible (5V +/- 10%) up to 1.5A

Battery:
    TBox-10, TBox-20
    TBox-11, TBox-21
	
	LiPo 1500mAh
	LiPo 2200mAh

Autonomy:
    TBox-10, TBox-20
    TBox-11, TBox-21
	
	50 - 100 hours (100 hours with GPS inactive)
	70 - 130 hours (130 hours with GPS inactive)

Bluetooth module:	BLE-4.1
Dimension:	124x80x31mm (Without GPS) 124x86x31mm (With GPS connector)
Weight:	170gr - 180gr

11. Copyright and Declaration

This manual has been compiled with great care and the information it contains has been thoroughly verified. The text was correct at the time of printing, however the content can change without notice. FDS accepts no liability for damage resulting directly or indirectly from faults, incompleteness or discrepancies between this manual and the product described.

The sale of products, services of goods governed under this publication are covered by FDS's standard Terms and Conditions of Sales and this product publication is provided solely for informational purposes. This publication is to be used for the standard model of the product of the type given above.

Trademarks: All hardware and software product names used in this document are likely to be registered trademarks and must be treated accordingly.

FDS-TIMING Sàrl

Rue du Nord 123

2300 La Chaux-De-Fonds

Switzerland

www.fdstiming.com