



USER GUIDE

# T-1000 Stopwatch



***T-1000 DIGITAL STOPWATCH  
H:MM:SS.ddd  
based on PIC16F887  
with 7 SEGMENT DISPLAY***

# FEATURES

- ❑ Power Supply: **9-12Vdc**.
- ❑ PCB dimensions: **114 x 68 mm**.
- ❑ Range of measurement: up to **9h 59min 59sec 999ms** in 1/1000 seconds.
- ❑ **Indicator Light +10H** to extend measure up to **19h 59min 59sec 999ms**.
- ❑ Resolution: **0.001 s** (1 ms).
- ❑ Management by a **Microchip PIC16F887** microcontroller.
- ❑ **Quartz accuracy**.
- ❑ Detection of **INTERMEDIATE** times.
- ❑ **4 operating mode**.
- ❑ **User setting stored** in the microcontroller memory.
- ❑ **8 Display** (7 segment - 0.59" - 13 mm).
- ❑ 4 On Board command buttons: **START**, **INTERMEDIATE**, **STOP** and **RESET**.
- ❑ Screw terminal block for remote control of **START** and **INTERMEDIATE/STOP**.
- ❑ Protection diode against **inversion polarity** of power supply.



## USER GUIDE

The T-1000 stopwatch can detect times up to '9:59:59.999' and the turning ON the dot on the last display at the right indicates that 10 hours must be added to the total. So the total time that the stopwatch can detect will be 20 hours ('9:59:59.999.').

The use of this stopwatch is very simple and intuitive.

- When power on, after the **TEST DISPLAY**, the stopwatch displays the value '0:00:00.000'.
- **To start the count**, press the **START** button. The display shows the real time with a resolution of 1 thousandth/second.
- **To take the intermediate times**, press the **STOP** button. The intermediate time will be stored on the display and will "freeze" until the **MODE** button is pressed.
- To return real-time display of the count, press the **MODE** button.
- **To reset the count**, press the **RESET** button: the display will return to stand-by mode and will show the value '0:00:00.000'. The **RESET** button is active only when an intermediate time is shown on the display: any press of the **RESET** button during the real-time count will have no effect.
- When the count exceeds the value '9:59:59.999' a small light dot will ON in the last display on the right and the stopwatch continues the count re-starting from '0:00:00.000.' (as told, this dot ON indicates that **10 hours** must be added to the value displayed).

The stopwatch also can be managed remotely by means of actuators to be connected on the **START** and **STOP** terminal block: the contacts of the actuators must be **Normally Open (N.O.)** and the contacts closed activate the stopwatch.

## CHOICE OF OPERATING MODES

This stopwatch can work in 4 different modes: two for **counting** and two for **commands**.

### COUNTING MODE SELECTION

To set the **counting mode**, press and hold the **MODE** button and simultaneously press the **STOP** button.

Release the buttons when the first display at the right show the character “*r*” or “*c*” as specified below:



#### Reset count after each STOP

The character “*r*” indicates that after each STOP/INTERMEDIATE, the stopwatch count always restarts from '0:00:00.000'.



#### Continue count after each STOP

The character “*c*” indicates that after each STOP/INTERMEDIATE, the counting of the stopwatch never stops.

### COMMAND MODE SELECTION

To set the **command mode**, press and hold the **MODE** button and simultaneously press the **RESET** button.

Release the buttons when the first display at the left show the character “*s*” or “*d*” as specified below:



#### Single command for START/STOP

The character “*s*” indicates that the stopwatch works only with the **START** button (both for starting and for intermediates). In this mode, the **STOP** button (and relative terminal block) has no effect.



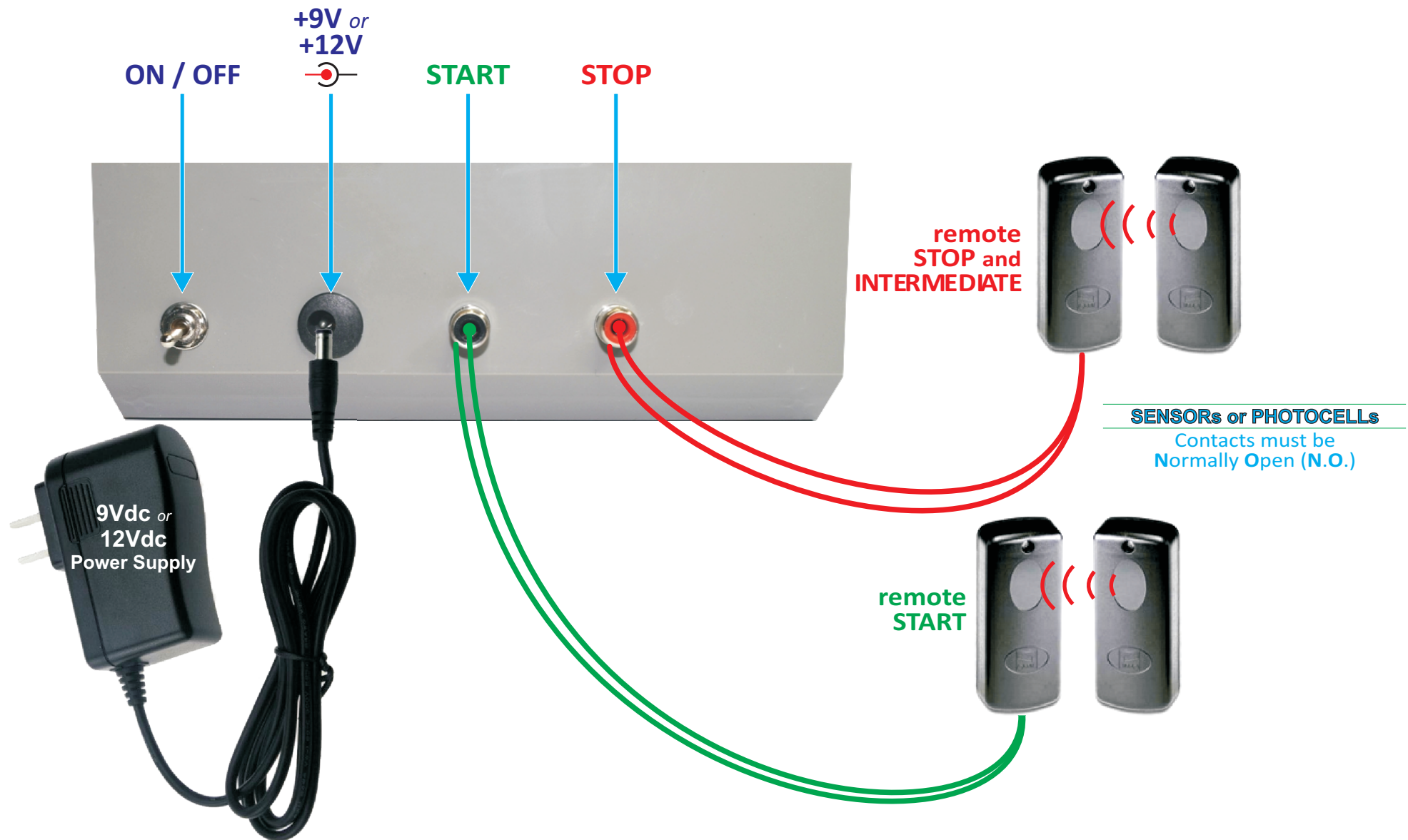
#### Double command for START and STOP

The character “*d*” indicates that the stopwatch works with the **START** button to start the count and the **STOP** button to take the intermediate times.

The operating modes are saved in the memory of the microcontroller (non-volatile settings) and for this reason, after each power ON, the stopwatch will always work with the last modes programmed by the user.

The two operating modes chosen by the user will be displayed each time the stopwatch is power on, immediately after the DISPLAY TEST.

# WIRING





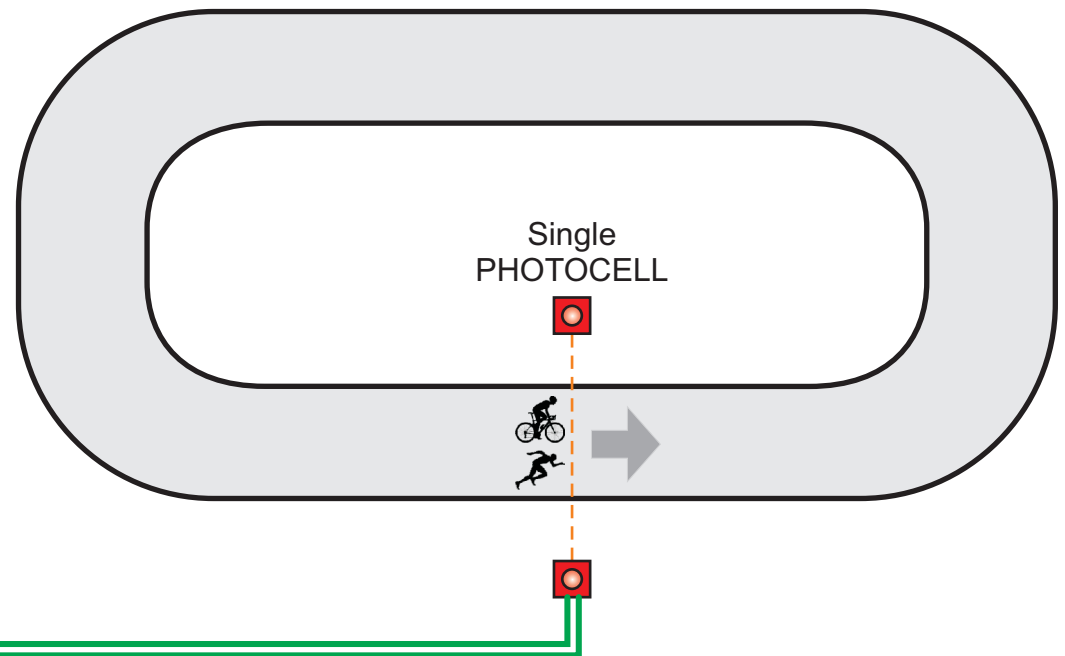
# STOPWATCH with SINGLE COMMAND

PROGRAMMING:



= Single command for **START** and **STOP/INTERMEDIATE**

**START**



# STOPWATCH with TWO COMMANDs (START and STOP)

## PROGRAMMING:



= Double command: **START** and **STOP/INTERMEDIATE**

