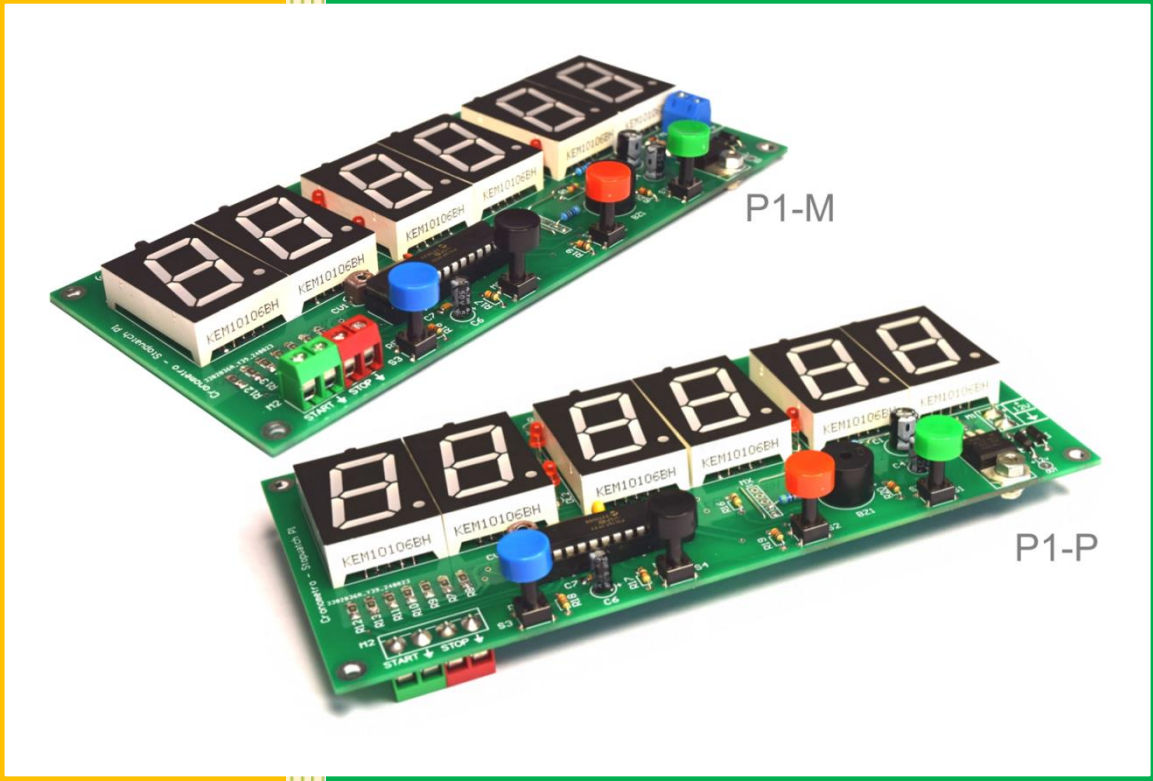
OWNER'S MANUAL

P1 DIGITAL STOPWATCH



P1
DIGITAL STOPWATCH

mm:ss.dd

(with 1" Display)

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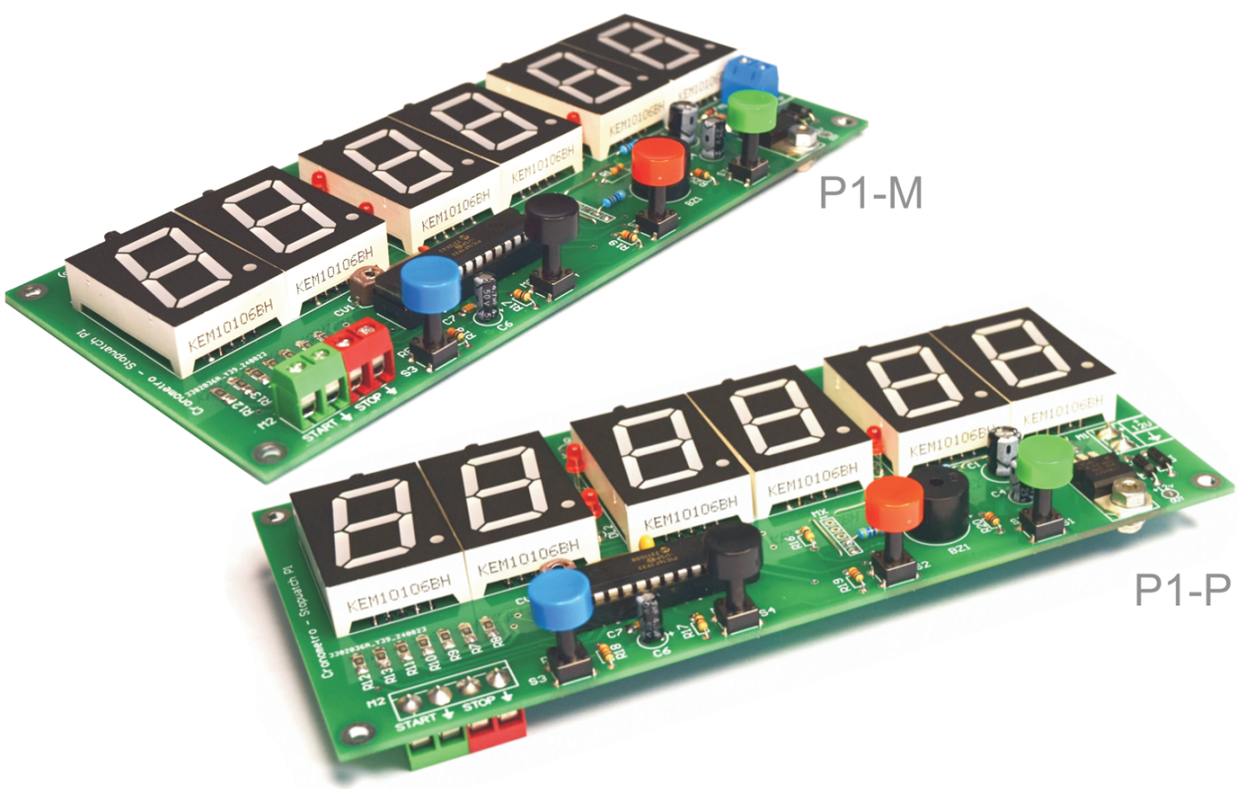
AVVERTENZE DI SICUREZZA E CONDIZIONI D'USO (SCHEDA NUDA): Questo manuale si riferisce a una scheda elettronica fornita esclusivamente in versione nuda, priva di contenitore e di isolamento esterno (open-frame). Si tratta di una realizzazione artigianale in pezzo unico o tiratura limitata, priva di certificazione e marcatura CE, da considerarsi come sub-assemblaggio o modulo sperimentale destinato unicamente all'integrazione in altri apparati o all'uso in ambiente di laboratorio da parte di personale qualificato.

P1 FEATURES

- Power Supply: **12Vdc**.
- Management by a **Microchip PIC16F1933 microcontroller**.
- **Quartz accuracy**.
- Range of measurement: fino a **59***min* **59***sec* **99***cent*.
- Resolution: **0.01 s** (in 1/100 seconds).
- **Overflow** Indicator.
- Detection of **INTERMEDIATE times**.
- **4 operating mode**.
- **6 Display** (7 segment - 1” - Digit H25 mm.).
- 4 On Board command buttons: **START**, **STOP**, **RESET** and **MODE**.
- Screw terminal block for remote control of **START** and **STOP/INTERMEDIATE**.
- **User setting stored** in the microcontroller memory.
- Protection diode against **inversion polarity** of power supply.
- Easy to use.
- PCB dimensions: mm. **170 x 80**.



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USER's GUIDE

The **P1** Digital Stopwatch can detects times up to "**59:59.99**" and the turning ON the small dot on the last display at the right, indicates that the count is **Overflow** and the count continue with dot on ("**00:00.00.** ").

The use of this stopwatch is very simple and intuitive.

- When power on, after the **TEST DISPLAY**, the stopwatch displays the value "**00:00.00**".
- **To start the count**, press the **START** button. The display shows the real time with a resolution of 1 hundredth of second.
- With "Double command for START and STOP" - **To take the intermediate times**, always press the **STOP** button. The intermediate time will be displayed on the display and it will "frozen" until the **MODE** button is pressed.
- With "Single command for START/STOP" - **To take the intermediate times**, always press the **START** button. The intermediate time will be displayed on the display and it will "frozen" until the **MODE** button is pressed.
- As told, to return in real-time counting, press the **MODE** button.
- **To reset the count**, press the **RESET** button: the display will return to ready and will show the value "**00:00.00**". 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 "**59:59.99**" a small light dot will ON in the last display at the right and the stopwatch continues the count re-starting from "**00:00.00.**" (the right light dot indicates an **Overflow**).

The stopwatch also can be managed remotely by means of actuators to be connected on the **START** and **STOP** terminal blocks (M2 socket): the contacts of the actuators must be **N**ormally **O**pen (**N**.**O**.) and the contacts closed will activate the stopwatch.

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CHOICE OF OPERATING MODES

The P1 stopwatch can work by 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 "***C***" or "***r***" as specified below:

Continue count after each STOP

The character "***C***" indicates that after each STOP/INTERMEDIATE, the counting of the stopwatch continue and never restart to "**00:00.00**".

Reset count after each STOP

The character "***r***" indicates that after each STOP/INTERMEDIATE, the stopwatch count always restarts to "**00:00.00**".

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 "***d***" or "***S***" as specified below:

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 stop or intermediate times.

Single command for START/STOP

The character "***S***" indicates that the stopwatch works ONLY with the **START** button (both for Start and for Stop/Intermediates). In this mode, the **STOP** button (and relative terminal block) has no effect.

The operating modes are saved in the memory of the chip (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.

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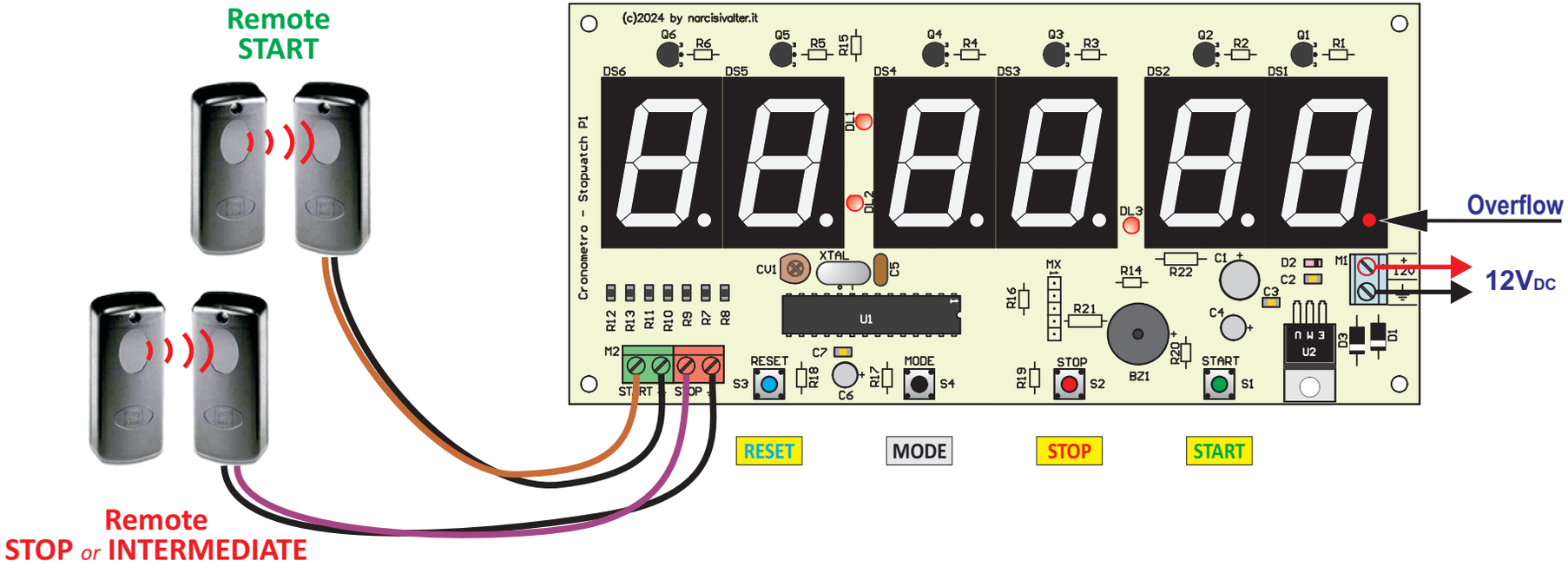
P1 Stopwatch - Terminal Blocks and Commands



SENSORs, BUTTONs or PHOTOCELLs
Contacts must be
Normally **O**pen - **N.O.**

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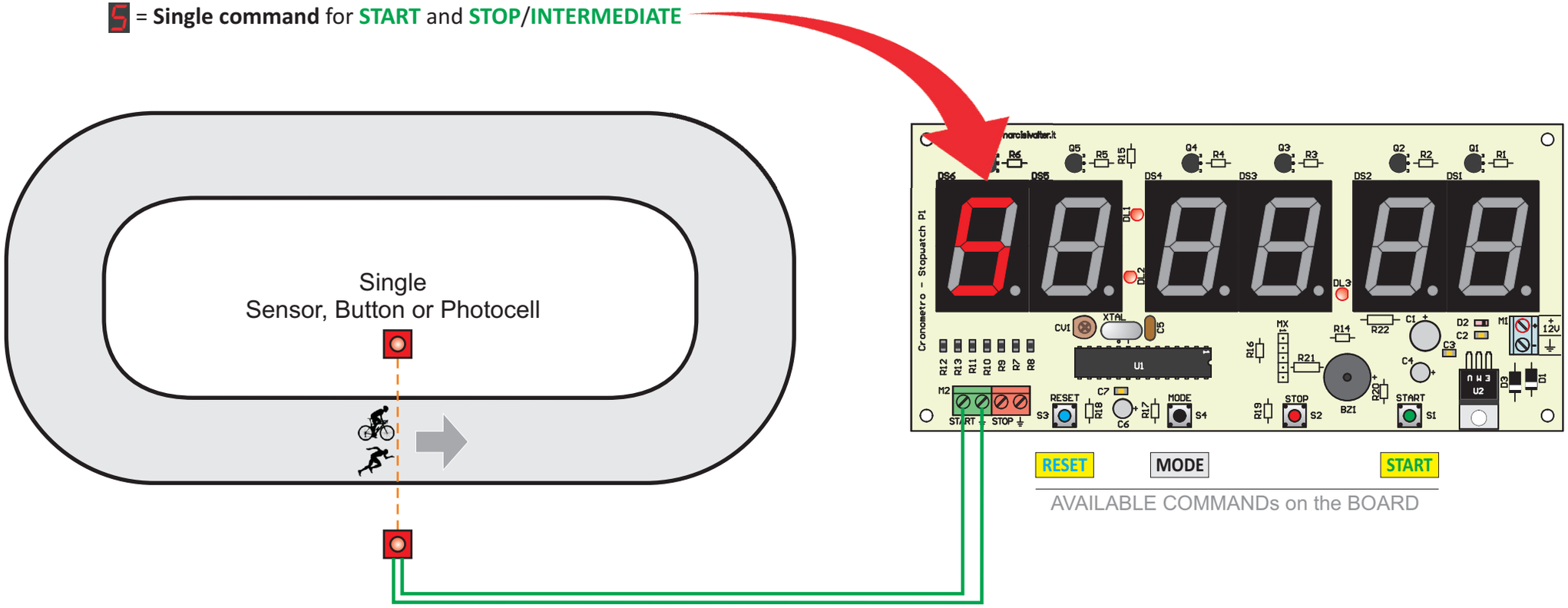
P1 Stopwatch - SINGLE COMMAND mode

PROGRAMMING:

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



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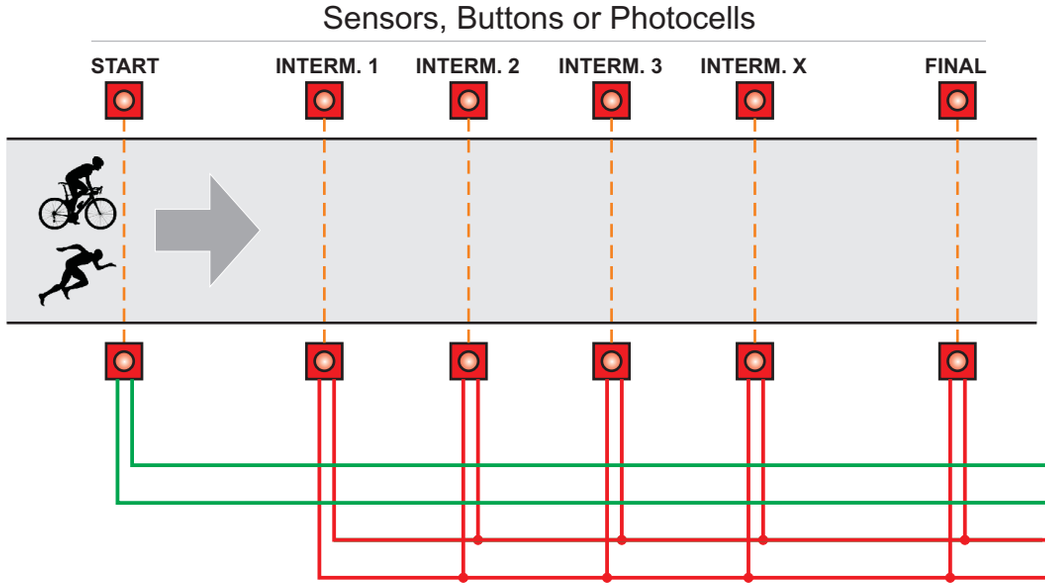
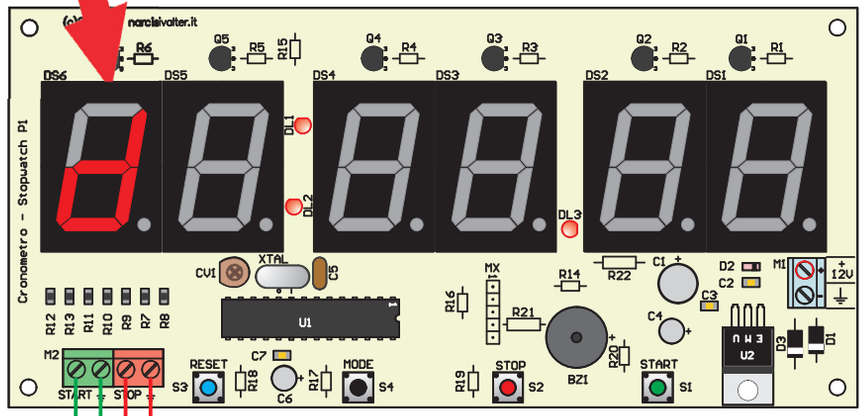
P1 Stopwatch - DOUBLE COMMAND mode

PROGRAMMING:

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





RESET MODE STOP START

AVAILABLE COMMANDs on the BOARD

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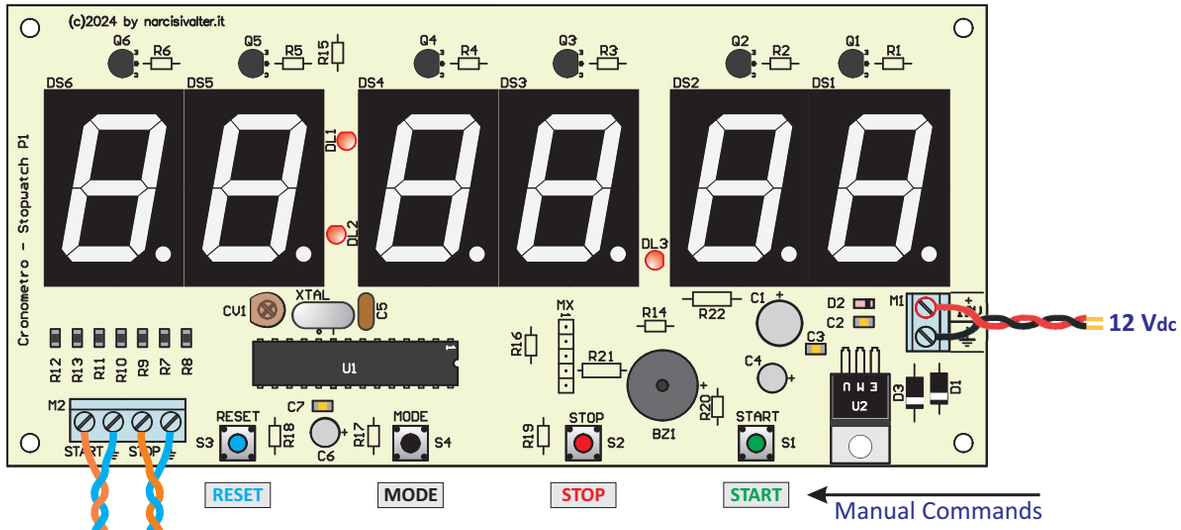
P1 Stopwatch - Wiring sample with External Buttons



EXTERNAL COMMANDs with BUTTONS

To manage the P1 stopwatch with external manual buttons, these must be the **N.O.** type (**N**ormally **O**pen).
When the **START** button is pressed, the stopwatch starts.
When the **STOP** button is pressed, the stopwatch displays the value of the intermediate time (the value is fixed to allow the user to note it on a paper sheet).
To return to the real-time display, press the **MODE** button on the board.

***NOTE** - If you use a long cable for connections, it is recommended to use a shielded cable with the metal braid to be connected to the terminal board in correspondence with the symbol ⏚.*

***NOTE** - In the "**SINGLE COMMAND**" mode, only the START button is used for both commands, so the STOP button can be omitted.*

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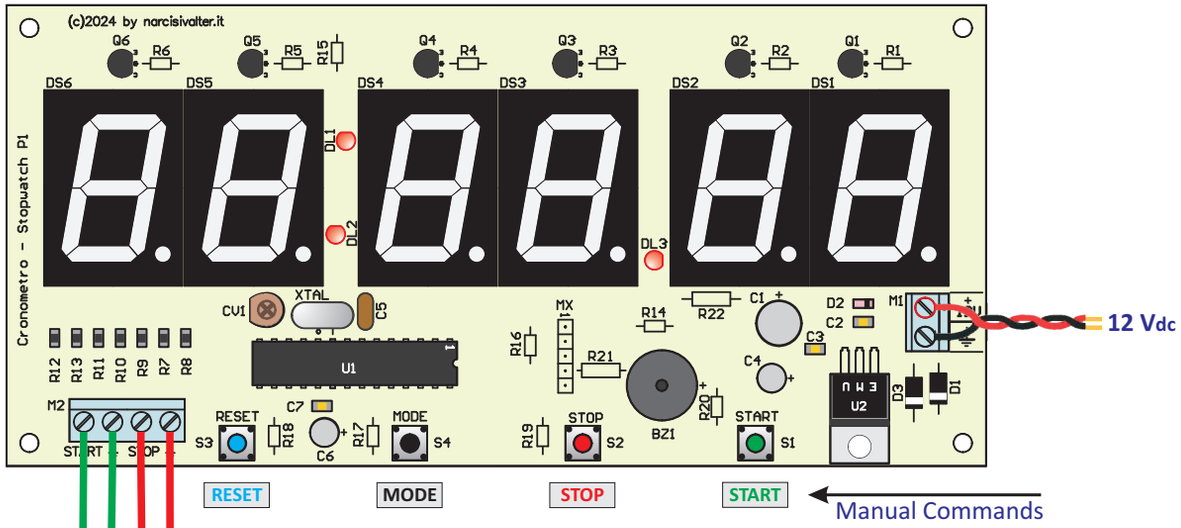
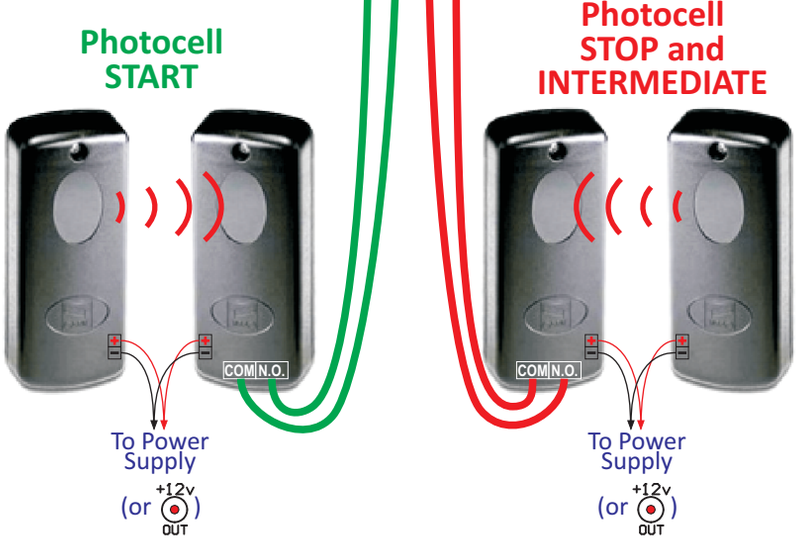
P1 Stopwatch - Wiring sample with Photocells





EXTERNAL COMMANDs with PHOTOCELLs

To the **START** and **STOP** terminal blocks can be applied different types of sensors and photocells (infrared, reflection, etc.)

It's most important that these photocells or sensors have three relay outputs marked **COM-NO-NC** (**COM**mon, **N**ormally **O**pen, **N**ormally **C**losed). After centering the photocells and making sure that no object is obstructing the light beam, connect the relay outputs **COM** and **NO** to the stopwatch terminal blocks (**START** and **STOP**).
To power the photocells, use an external power source or, if they operate with 12Vdc, you can use the output on the board (marked **+12V OUT** +12v OUT).

***NOTE** - Use photocells with a low sensitivity value.*

***NOTE** - If you use a long cable for connections, it is recommended to use a shielded cable with the metal braid to be connected to the terminal board in correspondence with the symbol ⏚.*

***NOTE** - In the "**SINGLE COMMAND**" mode, only the START photocell is used for both commands, so the STOP photocell can be omitted.*

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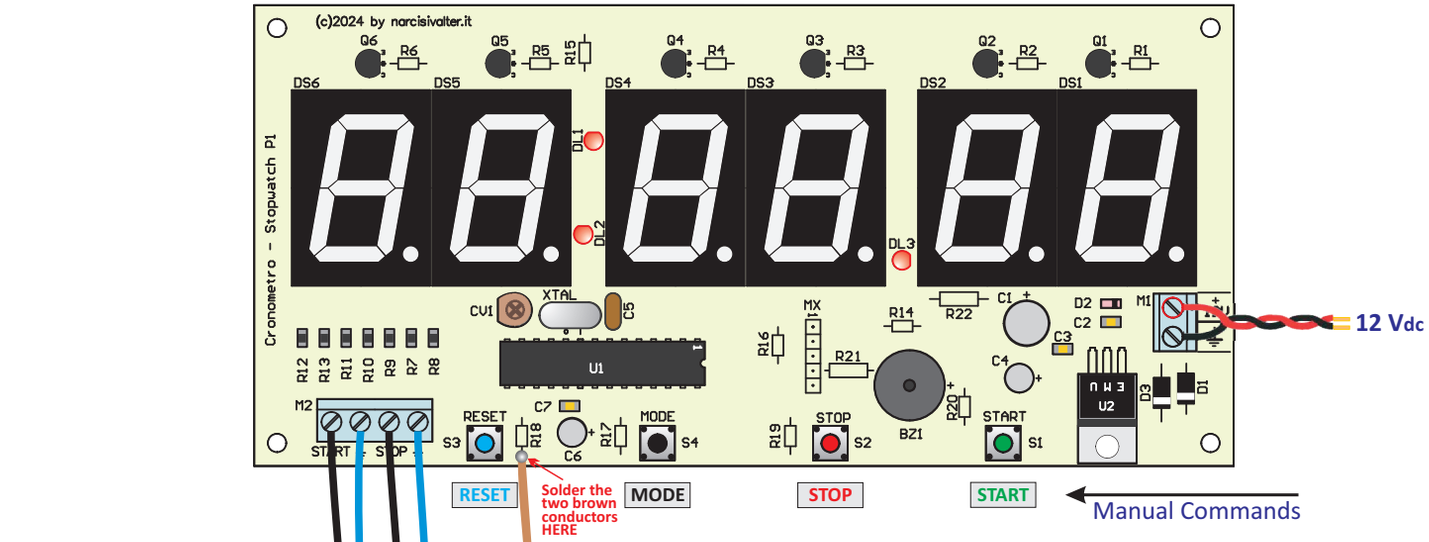
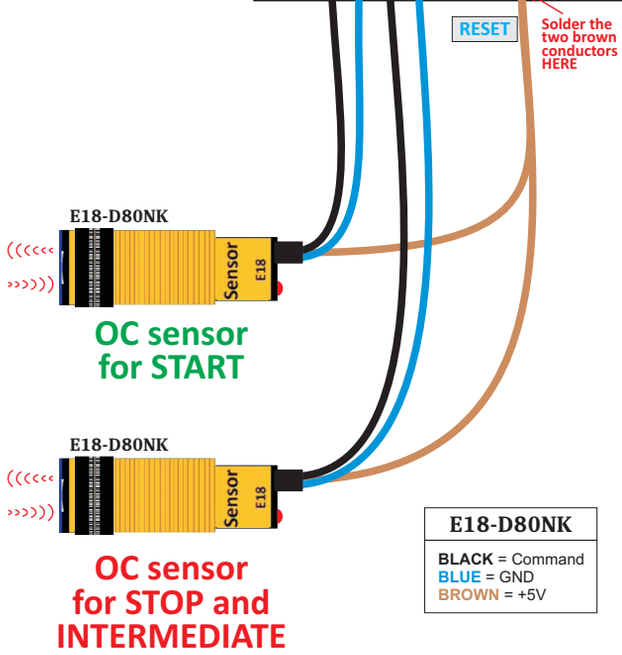
P1 Stopwatch - Wiring sample with OC sensors (NPN)





EXTERNAL COMMANDs with OC-NPN sensor E18-D80NK

You can apply the OC-NPN sensor E18-D80NK to the START and STOP terminal blocks. This type of sensor does not have a relay but simply an Open Collector Transistor. The collector of sensor must be connected on the terminal block (START or STOP) while its emitter (or negative of the sensor) must be connected to the terminal blocks marked with the symbol ⏚.

Only 5V OC sensors can be connected to the P1 stopwatch: power is taken from the board via a small soldering to be done in a specific part of board (see figure).

***NOTE** - Use only **OC - NPN sensor** with 5Vdc power supply.*

***NOTE** - If you use a long cable for connections, it is recommended to use a shielded cable with the metal braid to be connected to the terminal board in correspondence with the symbol ⏚.*

***NOTE** - In the "**SINGLE COMMAND**" mode, only the START sensor is used for both commands, so the STOP sensor can be omitted.*

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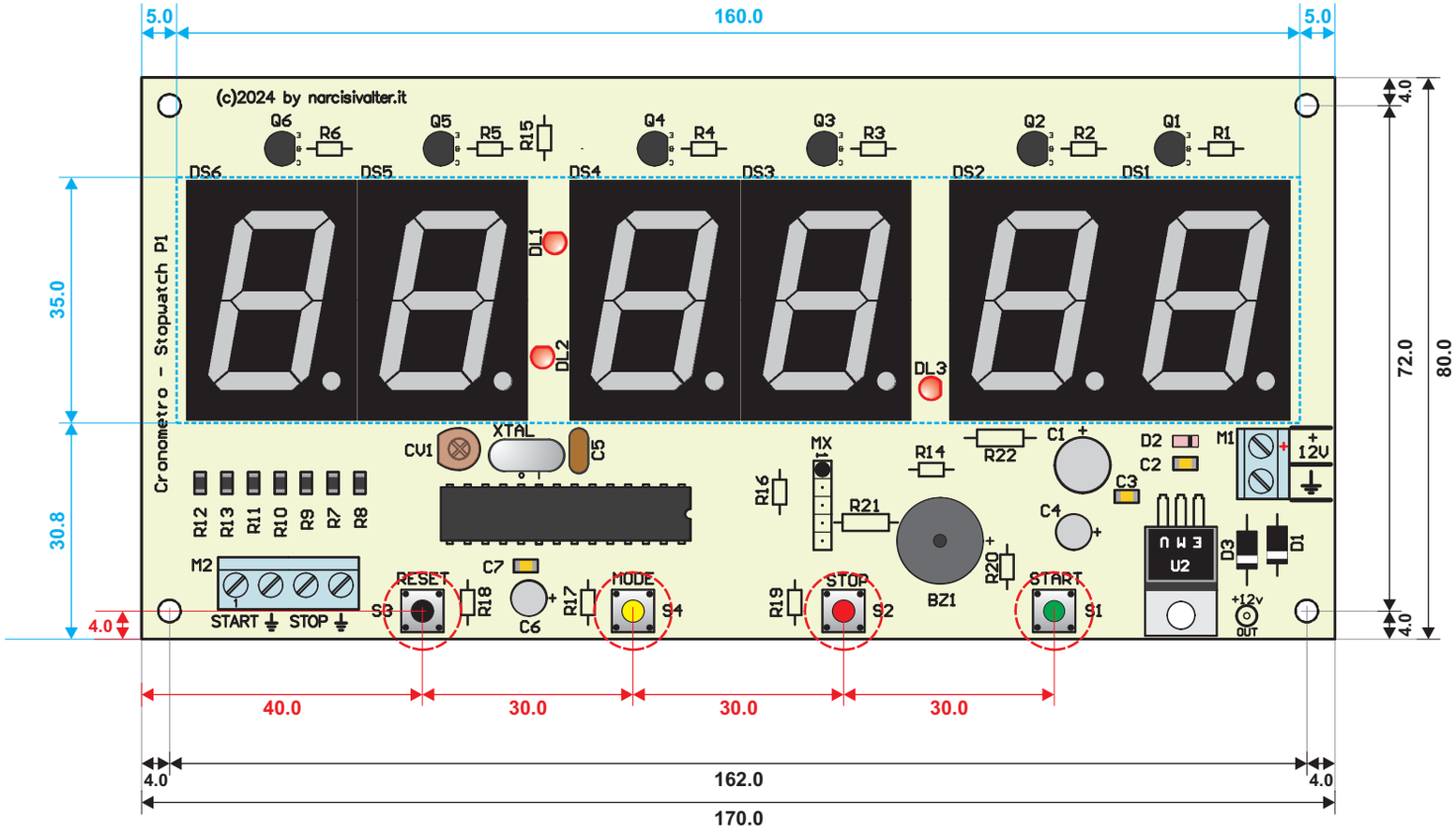
P1 - Dimensions and Holes / Dimensioni e Fori

Window for display:
Finestra display: **160**x**35** mm.

Holes for installing the PCB:
Fori per il fissaggio scheda: **4** x Ø**3.2** mm.

Holes for buttons:
Fori per i pulsanti: **4** x Ø**10.5** mm.



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