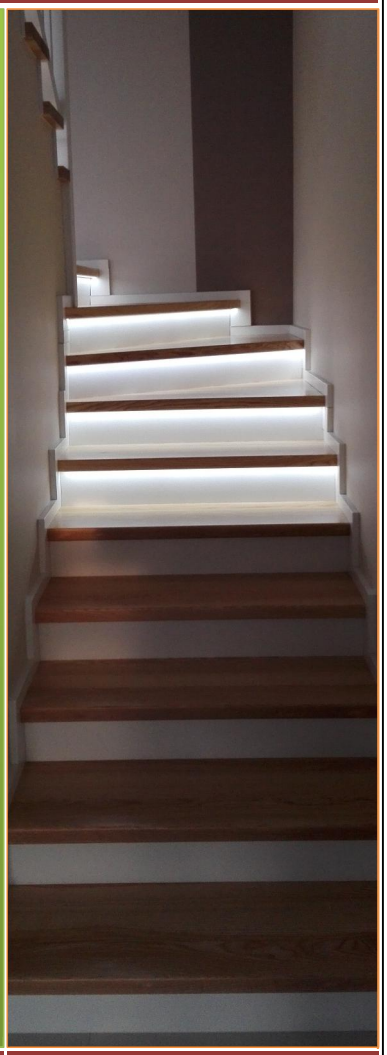
NOWOSTER

Time module supporting optical Sharp sensors

for stair-light controllers

V 1.16



2016

www.firmaled.pl

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1. Technical data

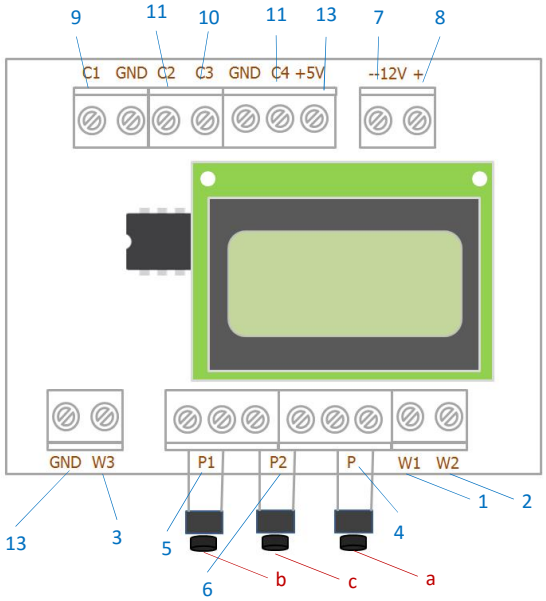
Operating voltage	8-15V DC (typically 12V DC)
Current consumption (only the module) Current consumption (module with Sharp sensors)	20 mA 80 mA
Power consumption (only the module) Power consumption (module with Sharp sensors)	0,25W 1,00W
Supported sensors	optical Sharp and mini Sharp – inputs C1 and C3 others types of sensors (optical 0,8m, mini PIR with adapter, mini mini PIR) – inputs C2 and C4
Operating temperature	5-45 ˚C
Dimensions*	7cm x 5,5cm x 2,5cm

*a plexi-case available optional. Dimensions with the case: 8cmx 12cm x 4cm

2. Timer module for optical Sharp sensors - description

The primary function of the time module is to enable the cooperation between optical Sharp and mini Sharp detectors and Nowoster stair light drivers. Detector's threshold (in volts) is set in the module. The threshold has a direct impact on the detector's range in centimetres (see section 2.2). In addition, there is a short-term sensors blocking option (after the sensor gives signal) (see section 2.5) and standard time functions, enabling programming interruptions in the operation of sensors and controller, e.g. in the day when the stairs are bright (see sections 2.3 and 2.4).

2.1. Inputs and outputs



Inputs and outputs:
1 – W1 output (have to be connected with PD input in the stair-light controller)
2 – W2 output (have to be connected with PD input in the stair-light controller)
3 – W3 output (to connect with PB input in the stair-light controller (if there is a PB input)
4 – P button input (to enter and exit menu and to move within menu)
5 –P1 button input (to set the menu parameters)
6 – P2 button input (to set the menu parameters)
7 – (-) 12V terminal
8 – (+) 12V terminal
9 – C1 input (bottom optical Sharp sensor). Do NOT connect any voltage!
10 – C3 input (upper optical Sharp sensor). Do NOT connect any voltage!
11 – inputs C2 i C4 – to optionally connect other types of sensors. Do NOT connect any voltage!
12 – (+) 5V terminal (to power the sensors)
13 – GND terminal (to connect with GND in the stair-light controller)

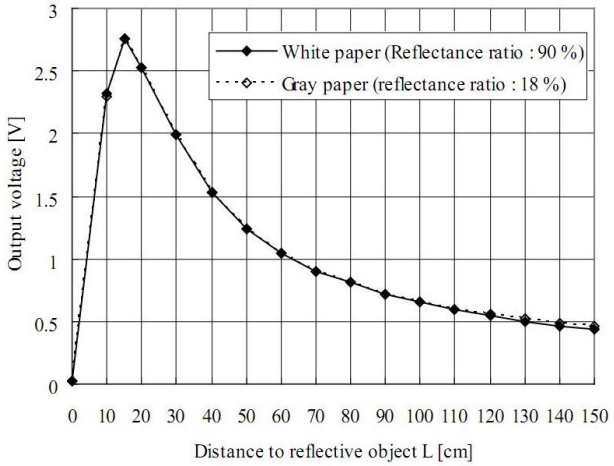
Micro buttons:
a – micro button P: to enter and exit the menu or moving to the next position
b – micro button P1: to set the parameters (down)/ quick view the blockade range
c – micro button P2: to set the parameters (up)/ enter sensors testing mode

2.2. Sharp optical detectors operation

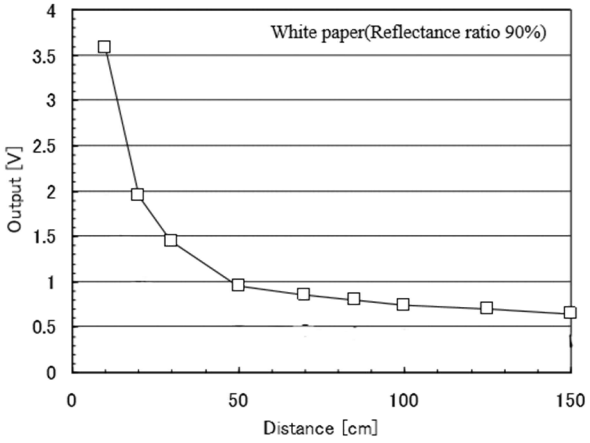
Time module for Sharp sensor allows to use optical Sharp sensors and optical mini Sharp sensors with Nowoster stair light controllers (more information about sensors: www.firmaled.pl). Whole stair lighting system will be working optimal, if the time module will be use with controller with blocking input PB.

Optical Sharp sensors working distance is 20-150cm. Depending on the distance from the detector to the reflecting object (here: people entering the stairs), the detector's output voltage has a different value. This relationship is shown below.

Optical Sharp sensor



Optical mini Sharp sensor



In the inputs/ outputs settings menu, the entry threshold in Volts (for inputs C1 and C3) has to be set. Changing the threshold affects the operating range of the detector in centimetres. This allows to adjust the operation of sensors and matching them to the conditions of concrete stairs.
Example:
Stair treads have a width of 90cm. Optical Sharp sensors have been used. First, set the threshold at 0.7V (the value read from the graph for optical Sharp detectors above). Then check the real range of detectors and, if necessary, revise the entered value of the threshold (increasing the threshold will reduce the detector's range, reducing the threshold – will enlarge the detector's range).

Sharp optical detectors should be connected to the inputs C1 and C3, W1 and W2 outputs should be connected to the PD and PG stair driver inputs (see the wiring diagrams in Section 2.8).

2.3. Locking the sensors in the day (or other time intervals)

Time module with LCD display has a function of temporary output lock (programmable), which allows you to lock the detectors in a day or in other selected hours ranges. An important feature of the timer is that the lock time ranges are setting separately for specific pairs of months - due to differences in the length of the day and night throughout the year. In practice, in December you can program the lock from 9 to 15, in the spring from 7 to 18, and in the summer from 5 up to 20 or 21, if the stairs are illuminated by daylight.
Hours of the lock-on (B-ON) and lock-off (B-OFF) have to be set in the inputs / outputs settings menu (see Section 3.2).

2.4. Locking the stair-light controller

The sensors lock described in the previous section does not affect the entire staircase controller. This means that despite the lock the Stand-by lighting will be active. To avoid this situation and allow the complete extinction of lighting the stairs during the day time module has an output W3. Connecting W3 module output with the stair-light controller blocking input (PB) allows to lock the entire system. Only the "constant lighting" PS function, which has a higher priority, will be unlocked. PS can be activated at any time, despite the blockade.
Lock hours-range (time interval) for output W3 coincides with the scope of the lock defined for detectors.

2.5. Sensors short-lock (blockade)

Short-lock is activated after a pass through the detector signal. Optimum blocking time of about 3 seconds allows to avoid a situation in which the detector with a fast response time will give a signal twice per person, as it detects passing each of the legs separately. The risk of a double detector activation is the greater, the lower it is mounted.

2.6. Blockade range – quick view

It is possible to quickly check the sensors lock time interval at any given time (day / month). To enter to view the blockade range, press the button P1. There will be info on the bottom LCD line such as: BL 07> 17. This means that the current lock is active from 7am to 17.

2.7. Sensors testing mode

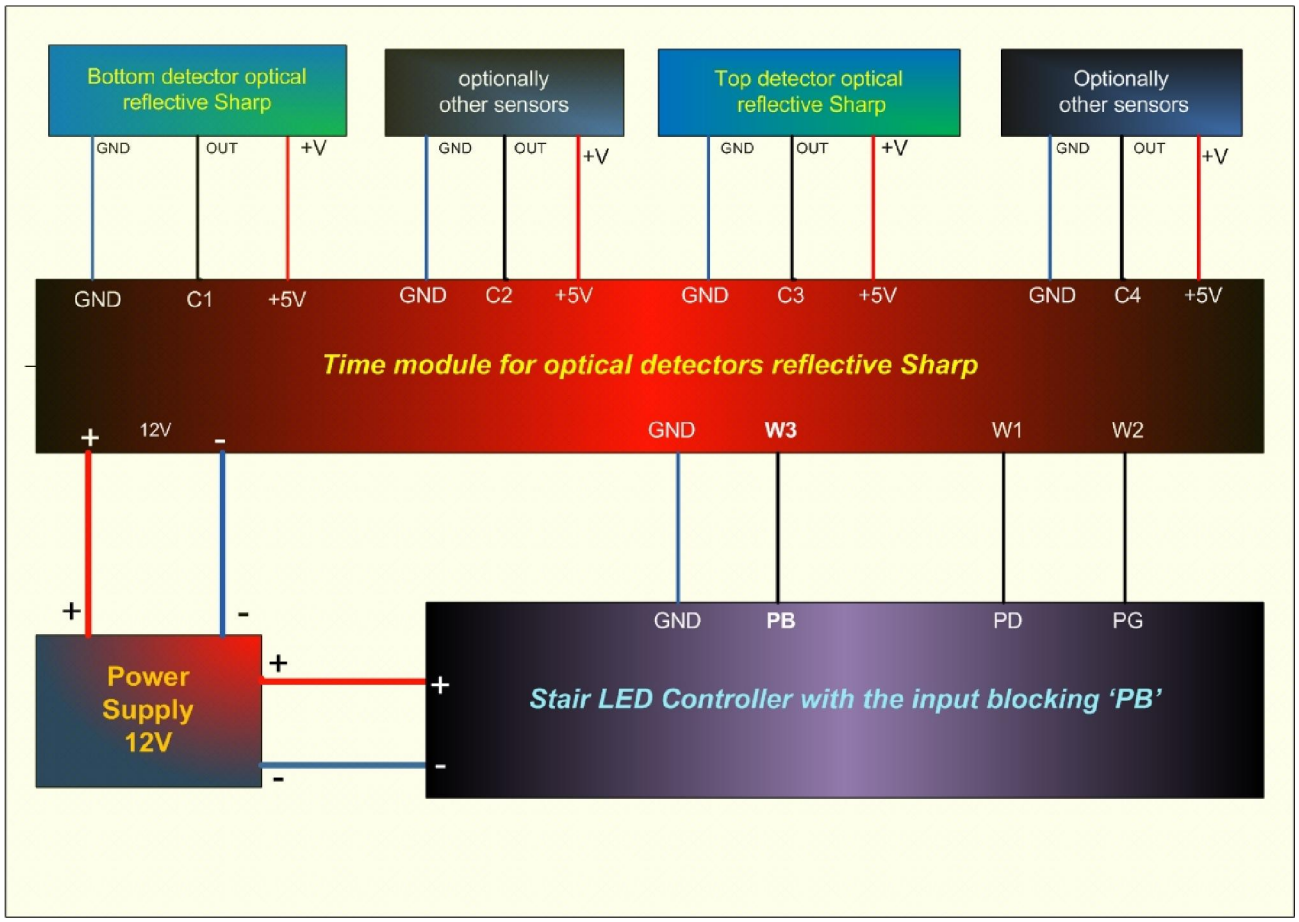
Pressing P2 enters into the sensors-testing mode. This mode makes it easy to adjust the range of Sharp sensors and set the thresholds for the inputs C1 and C3 correctly (for the conditions on the stairs).

1,1V	0,4
0,8V	1,0

The LCD top line contains data for the detector connected to the input C1, the bottom – to the C3. The values in volts, on the left side, that are current output voltages for each of the Sharp sensors. The values on the right side (shown without unit), are the threshold for inputs C1 and C3 set in the menu.

When the detector is mounted at the target place (can be temporarily) and it gives signal (is activated eg. for a person going up the stairs) the actual sensor's voltage can be read on the LCD in the testing mode and can be compared with the set threshold immediately. **The sensor works (supply signal) when the output voltage is greater than the set threshold**. However, be careful not to set the threshold too low. It can lead to a situation in which the sensor detects a person on the stairs, but it will also detect a person passing next to the stairs (and such a situation we want to avoid).
To exit sensors-testing mode press again the P2 button.

2.8. Installation scheme



3. Settings menu

To access the menu, press the attached micro button **P**. A message: "MENU set clock" will appear. Navigating the menu items is done by pressing **P**. Setting the parameters: micro button **P1** (down) and micro button **P2** (up). Exit from the menu - press and hold micro button **P** for about 2 seconds. After reaching the last menu item "June-Jul BL-OFF-20 *" and pressing P you will automatically exit the menu (* 20 is an example of the lock-off hour).
The menu consists of 3 submenus: clock settings menu, inputs/outputs settings menu and time range settings menu. You can only go through all this menus one after the other (by pressing P button). Any particular submenu cannot be reached directly.

3.1. Clock settings menu

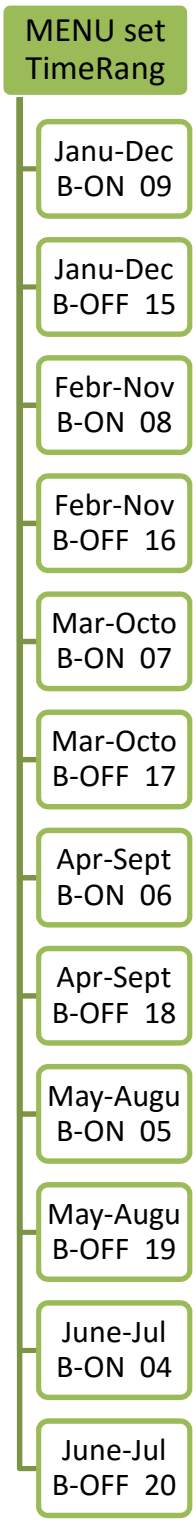
Time module is equipped with a real-time clock. In the "Menu set clock", set the current date and time. According to the set date and time it will operate the sensors lock during the day (or any other period of time), defined in the third part of the menu.

MENU set clock	
Hours 10	Actual hour (from 0 to 23). P1 – previous, P2 – next.
Minutes 5	Minutes (from 0 to 59). P1 – previous, P2 – next.
DaysWeek sobota	Day of the week. P1 – previous, P2 - next. Avaible: Monday, Tuesday, Wednesd.,Thursday, Friday, Saturday, Sunday.
DayMonth 9	Day of the month (from 1 to 31). P1 – previous, P2 - next.
Month 7	Current month. Avaible 1 to 12, where 1 – January and 12 is December. P1 – previous, P2 – next.
Year 16	Current year (two last numbers from 00 to 99). P1 – previous, P2 – next.

3.2. Inputs/ outputs settings menu

MENU set in/out	
Blockade Out1 3s	You can set the short-lock time in the range of 1-20s. The lock serves as a protection against detection e.g. two legs instead of one walking person. This would result in the driver being sent to the two signals instead of one, which would be interpreted as an entrance of one more person or turning back of the previous one. If you set the short-lock time to 3 seconds, further sensor's signals (after the first activation) will be ignored by another 3 seconds. Short-lock time to be set separately for each output (W1 and W2).
Blockade Out2 3s	
Range C1 In 1,0V	The threshold input in Volts can be set in the range of 0.3 to 4,00V. It lets to adjust the range [cm] of the Sharp optical detectors. It is the best to set the threshold after sensors installation (even temporarily, but at the target site). The threshold is set separately for the top and bottom detector, because the conditions at the bottom and top of the stairs are often different. Detailed characteristics depending on the detector range (in cm) and voltage, see 2.2 Sharp optical detectors operation.
Range C3 In 0,9 V	

3.3. Time range settings menu



INFORMATIONS ON THE LCD

Top LCD line:

A pair of months, for which the blockade time range will be the same.

The pairs of months have been determined on the basis of similar duration of day and night during the months. Avaible are following pairs:

- January - December (Janu-Dec)
- February – November (Febr-Nov)
- March – October (Mar-Octo)
- April – September (Apr-Sept)
- May – August (May-Augu)
- June – Juli (June-Jul)

Bottom LCD line:

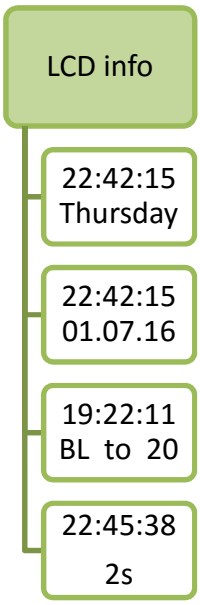
B-ON HH – hour the blockade get on (HH – hour in 24h format)

B-OFF HH – hour the blockade get off (HH – hour in 24h format)

EXAMPLE:

For a couple of months March - October beginning of the lock is set for 07 hour, blockade end is set for 17. This means that from 7am to 17 the signal from the detectors placed at the stairs will be ignored and the lighting of the stairs will not be initiated.

4. Information on the LCD



TOP LINE
Hour HH:MM:SS, where HH – hour (w formacie 24-godzinnym), MM – minutes, SS – seconds

BOTTOM LINE
Day of the week / date (DD.MM.YY). Changing time: 10s

If the output/ sensors blockade is active, there are three informations on cyclic on the display: day of the week – blockade info – date – blockade info – day of the week and so on. Changing time: 5s.

If the sensor gives signal, there is countdown on the display. It starts from as many second, as set for W1 and W2 in menu (ex. from 3s to 0s).

5. Utilization

Please find out how you should proceed with waste electronic equipment in your country!