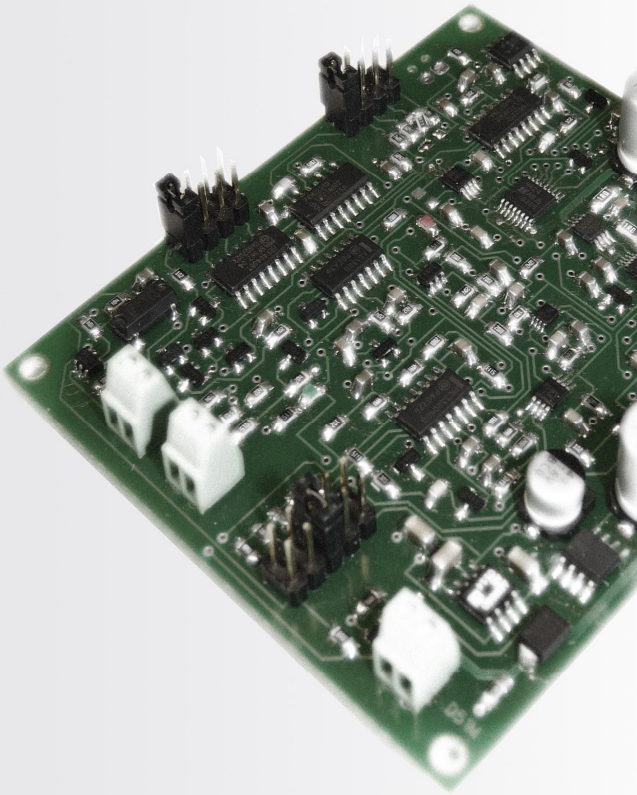
LED
Microsensor NT

D-51
UNIVERSAL LED DRIVER
INSTRUCTION MANUAL



rev. 120912

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Application

D-51M driver is designed for power supply of Mid-IR LEDs.

Features

- **Pulse mode operation** (mode that provides **maximum peak optical power**).
- **Adjustment** of LED current amplitude, frequency and pulse duration via driver's **jumpers**.
- **Synchronization input** terminal block which allows:
  - **synchronizing** driver with an external device (synchronous detector etc.);
  - **synchronizing** two or more drivers simultaneously;
  - **setting custom** frequency of the LED signal.
- Possibility of **synchronization** with an **external device** with the help of **synchronization output** terminal block.
- **Safety system** for prevention of LED damage in case of **circuit brake**.
- **Temperature control** – possibility to judge LED p-n junction temperature changing by observing voltage changing using current-voltage dependence.

Operation conditions

Indoor operation only. Ingress Protection Rating IP00.

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PRECAUTIONS

- Do not switch jumpers during work.
- Do not turn on the driver without jumpers inserted.
- Do not use multimeter to control and adjust current.
- Please keep the following driver's regimes listed in the table below. Otherwise excessive load may cause overheating and LED damage.

Current, A		Frequency			
		512 Hz	2 kHz	8 kHz	16 kHz
Pulse duration, μs	2	2.0	2.0	1.6	1.2
	5	2.0	2.0	1.2	0.8
	10	2.0	1.6	0.8	0.4
	20	2.0	1.2	0.4	0.4

Maximum allowed current at different operation modes (frequency and pulse duration).

Note! Please refer to your provider if you have any questions.

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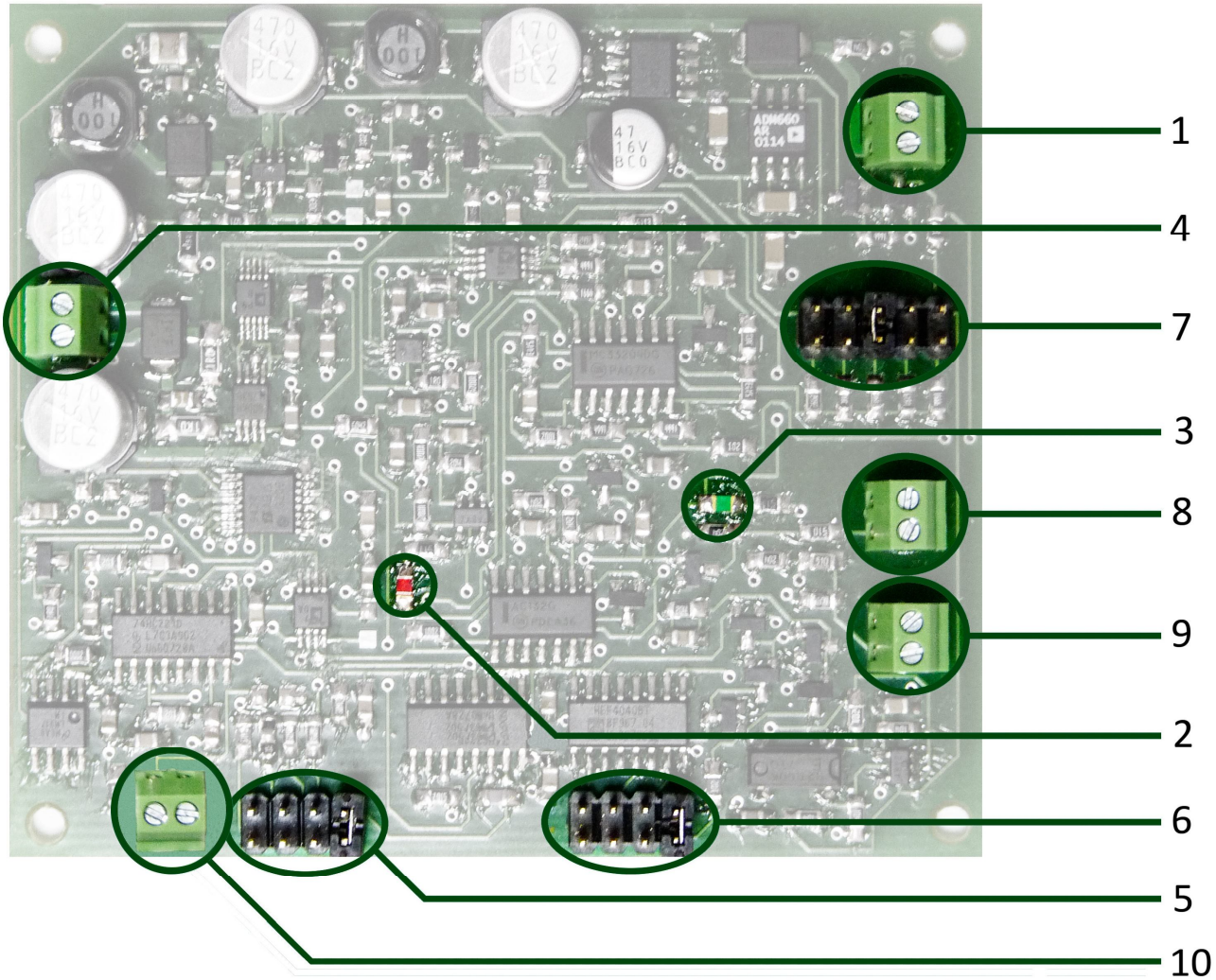
DRIVER LAYOUT



1. Power input terminal block.
2. Circuit break indicator (red).
3. LED current indicator (green).
4. LED connection terminal block.
5. Pulse duration adjustment jumper.
6. Frequency adjustment jumper.
7. LED current adjustment jumper.
8. Synchronization input terminal block.
9. Synchronization output terminal block.
10. Temperature control voltage output terminal block.

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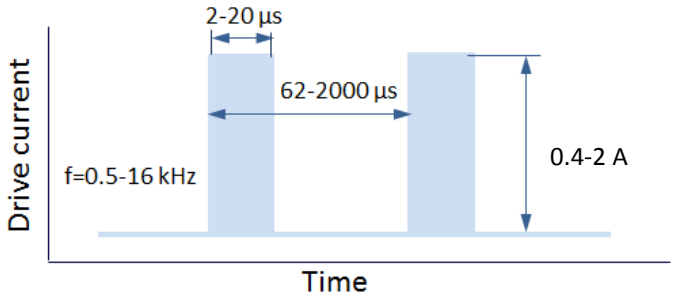
OPERATING MODE DESCRIPTION

D51-M driver works in a **pulse mode**. This mode provides LED maximum peak optical power. LED current can be changed switching the jumper 7 (0.4; 0.8; 1.2; 1.6; and 2.0 A). Pulse duration can be changed using the jumper 5 (2; 5; 10 and 20 µs). Frequency of an LED can be adjusted using the jumper 6 (512 Hz, 2 kHz, 8 kHz or 16 kHz). Frequency can be also adjusted by an external signal source connected via synchronization input.



Pulse mode current-time relation.

Note! When external signal source is connected to the synchronization input, frequency of an LED is determined by this source and NOT by the jumper. External signal should meet the following requirements:

Pulse duration	>10 µs
Frequency	0.5 – 16 kHz
Pulse voltage amplitude	5 V

Note! You can stop driving the LED temporarily by putting external signal with **5V constant voltage** on synchronization input.

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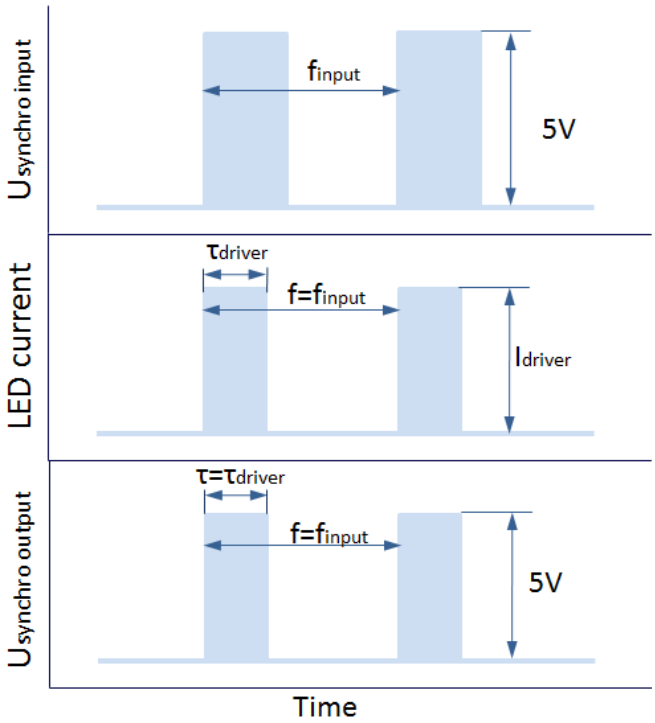
OPERATING INSTRUCTIONS

1. Carefully connect appropriate pins of the LED with LED connection terminal block (4) till tight fixation.

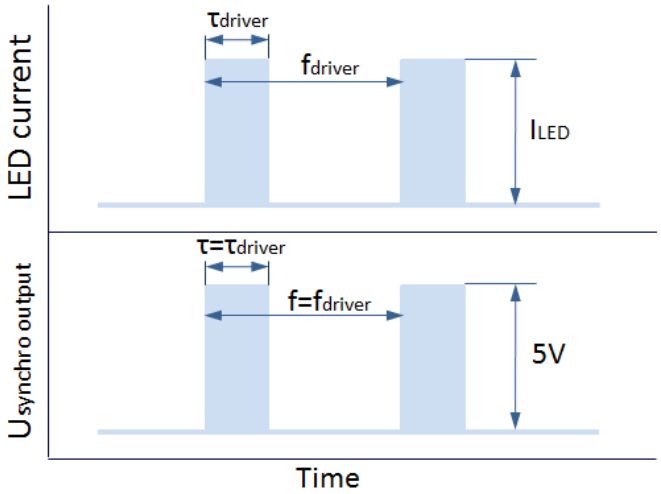
Note! Terminal block header marked with "LED +" must be connected to the appropriate pin of an LED (marked with a red point). Improper connection may cause LED damage.

Note! LED case must be electrically isolated from the ground.

2. If necessary, make all external connections with synchronization input (8) and synchronization output (9).



D-51 signal synchronization with BOTH synchronization input and synchronization output



D-51 signal synchronization with synchronization output

3. Select required regime using pulse duration, frequency and LED current adjustment jumpers (5, 6 and 7 respectively). You can also adjust frequency with an external signal source connecting it to the synchronization input.

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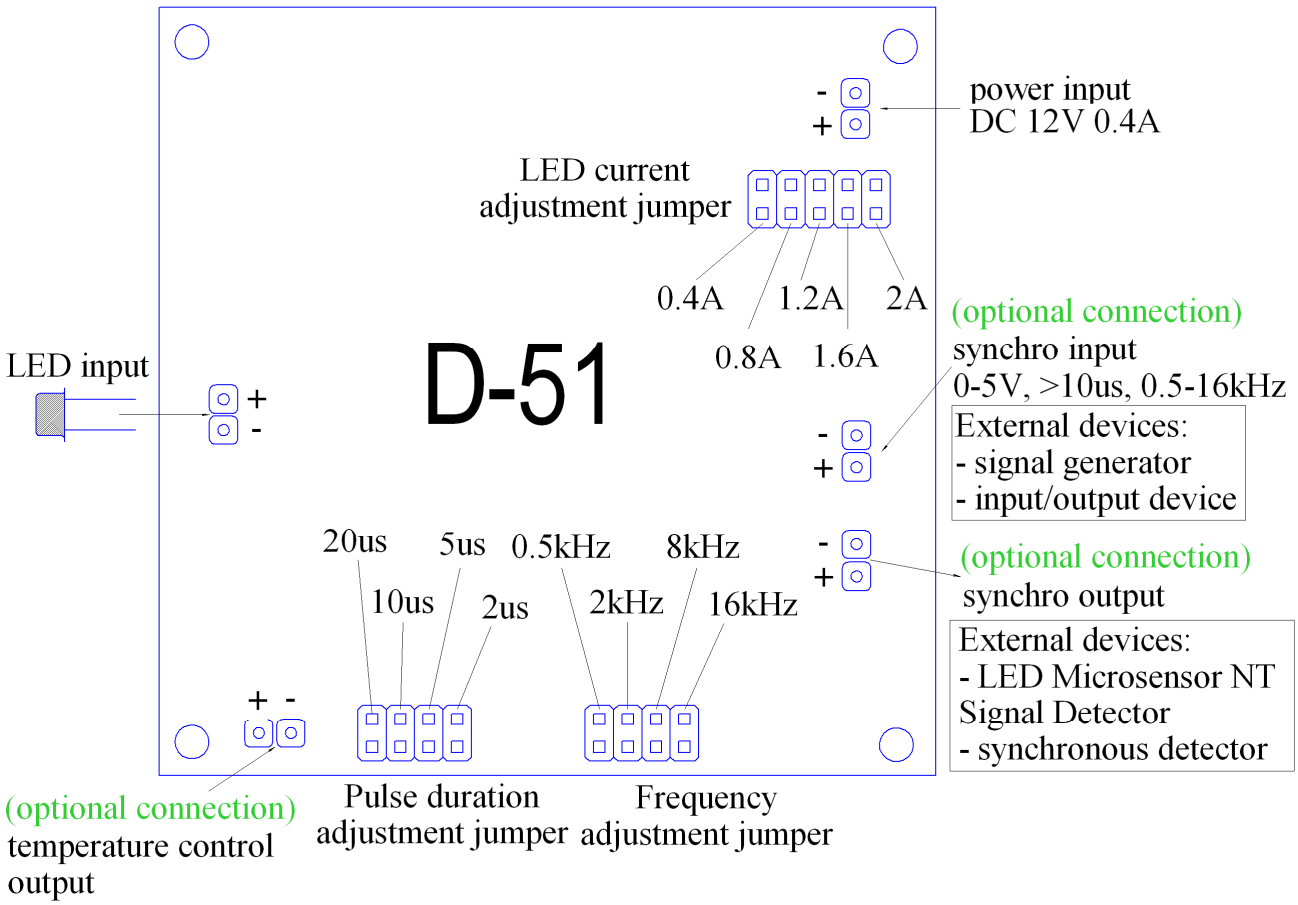
4. Connect power supply to the power input (1). LED current indicator (green) (3) will be turned on if everything is connected properly. In case of circuit break red indicator (2) will be turned on and LED current indicator (3) will be pulsing till the problem will be solved.

5. To control the temperature connect any voltage measuring device to temperature control voltage output terminal block (10). Note that since every LED has a unique current-voltage characteristic, correspondence between output voltage and temperature will be different depending on measured LED.

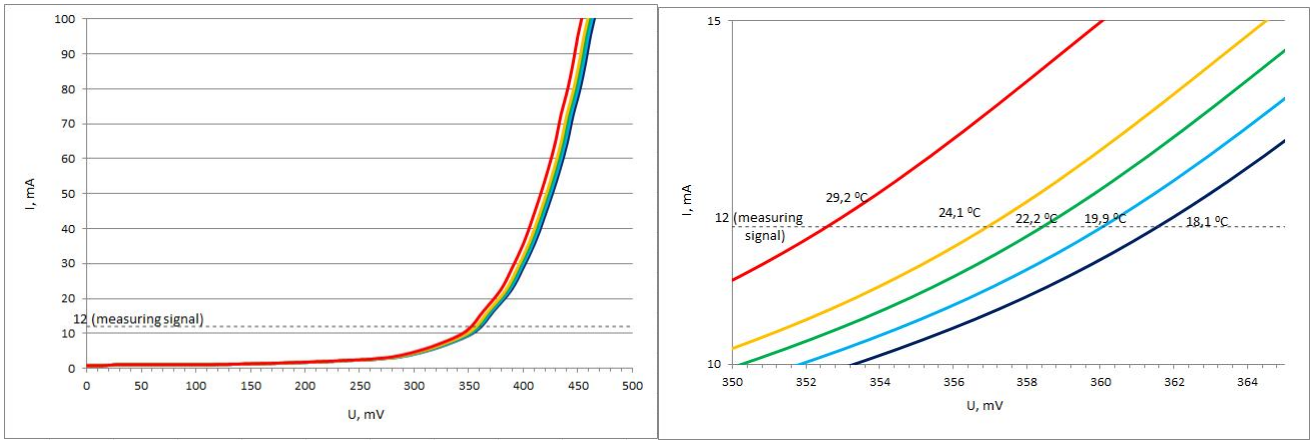
Note! Please follow the requirements presented in the table on the "Technical Characteristics" page to provide driver's faultless operation.



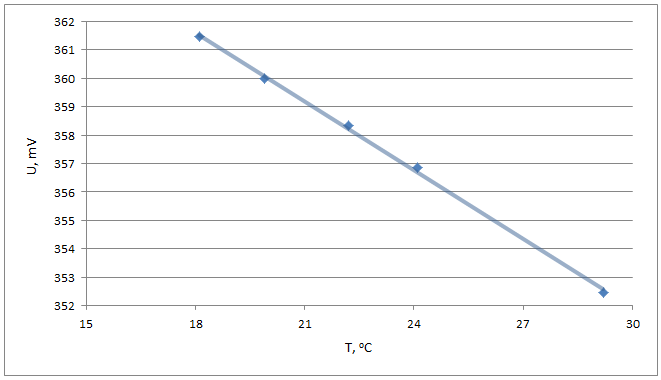
D-51 connections

ABOUT TEMPERATURE CONTROL

Temperature control is possibility to define LED p-n junction temperature and observe temperature changing using current-voltage dependence. Driver generates low current signals with amplitude 12 mA and duration 500 ns for plugged LED. These signals are placed between driving signals and don't affect LED temperature. Special block of D-51 driver registers the pulse voltage value and converts it into constant voltage. Since there is a univocal dependence of voltage on intrinsic LED temperature it becomes possible to judge temperature changing by observing voltage changing.



Family of current-voltage characteristics at different temperatures.



Voltage-temperature dependence at 12mA measuring signal. Straight-line relationship is clearly seen.

Every LED has a unique current-voltage characteristic, that's why relation between output voltage and temperature will be different depending on measured LED. Therefore, for measuring exact p-n junction temperature, the calibration for every LED is needed. To calibrate we recommend measuring voltage values at room temperature and some other temperature and use linear approximation (U(T)=kT+b).

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TECHNICAL CHARACTERISTICS

Input voltage	+12 V, stabilized
Voltage tolerance	-5..+5 %
Input current	max. 0.3 A
Board dimensions	80×70×15 mm
Synchronization output voltage	5 V

Adjustable parameters	
Pulse duration	2/5/10/20 μs
Frequency	0.5/2/8/16 kHz
Output current amplitude	0.4/0.8/1.2/1.6/2.0 A

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