



The universal driver for LEDs **D-31M**

Operations manual

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1. Application.

The driver D-31M is designed for power supply of Mid-IR LEDs.

2. Features.

- Provides two modes of operation:
 - Quasi Continuous Wave (QCW) mode (mode of LED *maximum average optical power*),
 - Pulse mode (mode of LED *maximum peak optical power*).
- Possibility of tuning LED current amplitude, repetition rate and pulse duration.
- Can be synchronized with a selective amplifier or with another device.
- Easy in use and durable.

WARNING!

Please do not use multimeter for control and adjustment of the current.
Please refer to your provider if you have any questions.

3. Service conditions.

Temperature tolerance	-15 °C..+50 °C
Relative air humidity (at temperature + 35°C)	less than 80 %
Atmospheric pressure	86...107 kPa

4. Appearance of the driver and its interface.

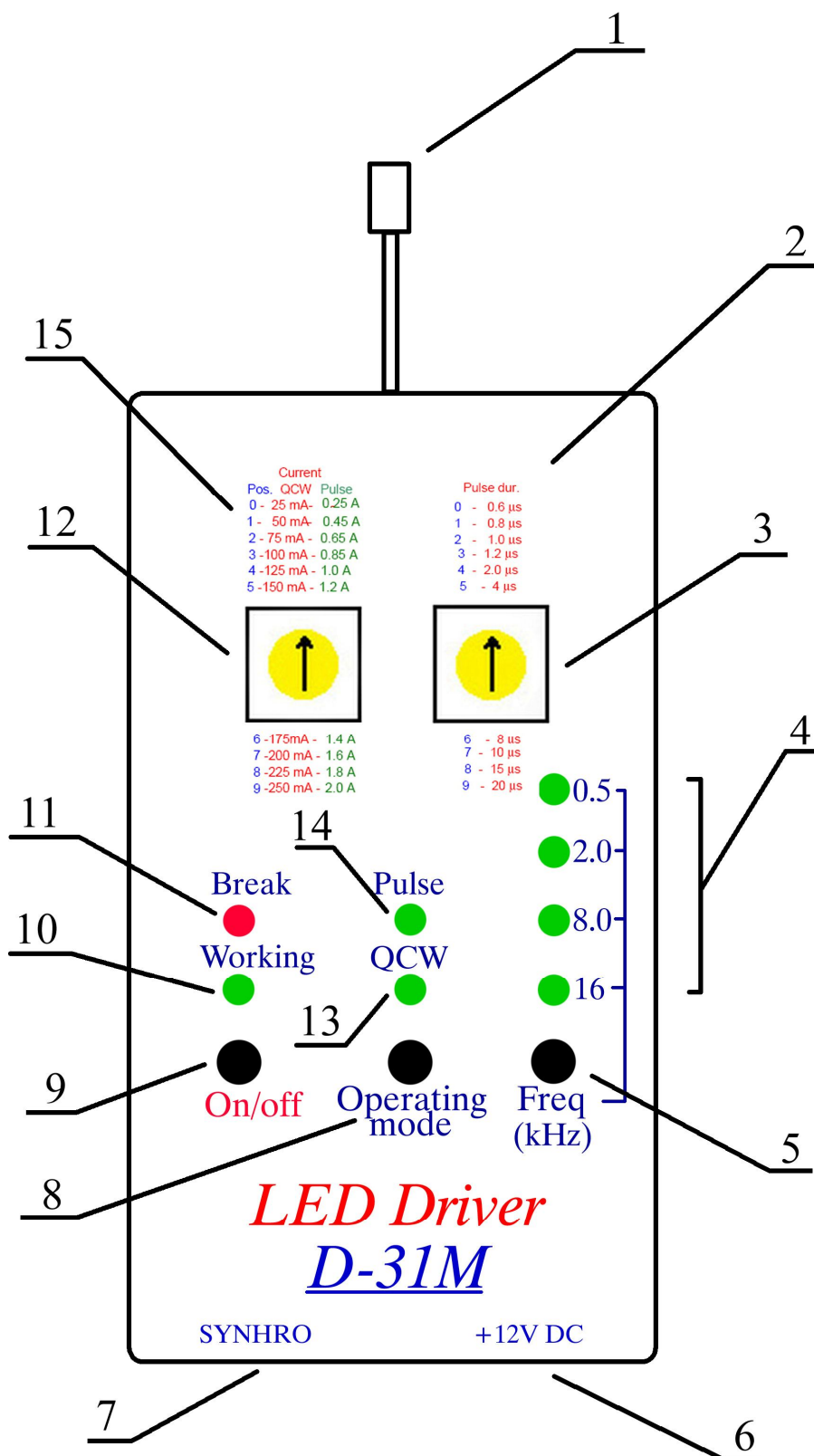


Fig.1. Appearance of the driver and its interface.

1. LED connection jack.
2. Lookup table of switch position and pulse duration. (The table of correspondence between switch position and pulse duration)
3. Multiposition switch for pulse duration adjustment.
4. Indicators of selected frequency.
5. Frequency selection button.
6. AC/DC adapter cable jack.
7. Synchronization cable jack.
8. Mode selection button.
9. LED power supply on/off button.
- 10.LED current indicator.
- 11.LED current failure indicator.
- 12.Multiposition switch for LED current adjustment.
13. Quasi continuous wave mode LED indicator (green).
- 14.Pulse mode LED indicator of (green).
- 15.Lookup table of switch position and LED current amplitude. (The table of correspondence between switch position and LED current amplitude)

5. Mode description.

Driver provides two modes of operation: Quasi Continuous Wave (quasi steady-state) mode and Pulse mode.

5.1. Quasi continuous wave mode is an oscillating mode of symmetrical unipolar meander (fig.2.). This mode provides LED maximum average optical power. LED current in this mode can be changed in a range from 20 to 250 mA using the multiposition switch for LED current adjustment (12). Using the button 5 one can select frequency (512 Hz, 2 kHz, 8 kHz or 16 kHz). The pulse duration will be equal to 1000 μ s, 250 μ s, 62 μ s and 31 μ s respectively.

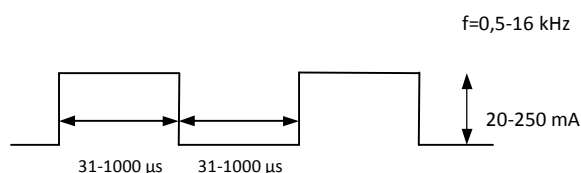


Fig.2. Current pulse form in QCW mode.

5.2. Pulse mode is an oscillating mode of pulse sequence (fig.3). This mode provides LED maximum peak optical power. Likewise the quasi continuous wave mode, LED current can be changed adjusting switch 12, but in the wider range – from 0.1 to 2.0 A. Frequency adjustment (512 Hz, 2 kHz, 8 kHz or 16 kHz) can be made with the help of button 5. Pulse duration can be also selected in a range from 0.6 to 20 μ s with the help of switch 3.

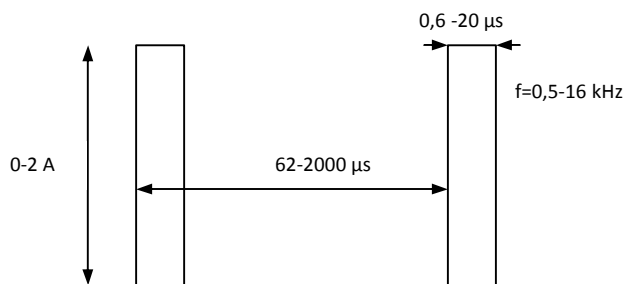


Fig.2. Current pulse form in case of pulse mode.

Note! Please don't use the combination of frequency and pulse duration that leads to more than 10 percent duty cycle (table 1).

Note! We recommend using the pulse current of 2 A only at pulse duration less than 1 μ s. Otherwise, LED can be damaged.

		Frequency			
		512 Hz	2 kHz	8 kHz	16 kHz
Pulse duration, μ s	0,6				
	0,8				
	1				
	1,2				
	2				
	4				
	8				
	10				
	15				
	20				

Table 1. **Permissible** and **impermissible** combinations of frequency and pulse duration in pulse mode.

6. Operating instruction.

1. Carefully connect appropriate wires of the LED with pins of “LED” connector (1) till tight fixation.

Note! Connector pin marked with the red point must be connected to the appropriate wire of the LED (It is also marked with the red point). In case of wrong connection LED can be damaged.

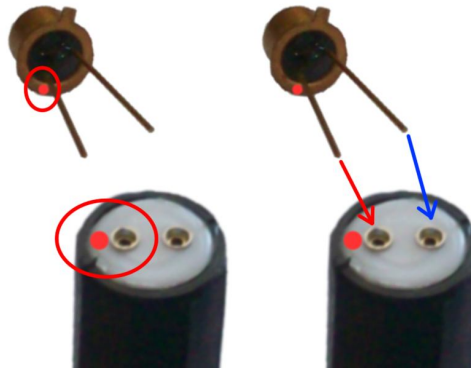


Fig.4. Mind the polarity connecting LED to the LED connector (1).

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

2. Connect signal detector with the D-31M driver (“SYNCHRO” jack (7)) via synchronization cable if necessary.

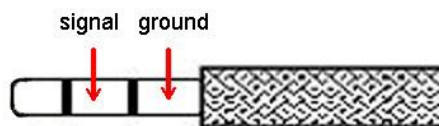


Fig.5. The polarity of jackplug of synchronization cable.

3. Insert the jackplug of AC/DC cable adapter into "+12V DC" connector (6).

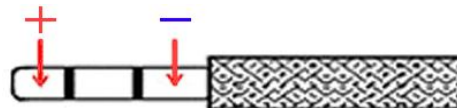


Fig.6. The polarity of jackplug of power cable.

4. Select the driver operating mode (QCW or pulse) using the “Operation mode” button (8). The appropriate green LED indicator “Pulse” (14) or “QCW” (13) will be turned on.

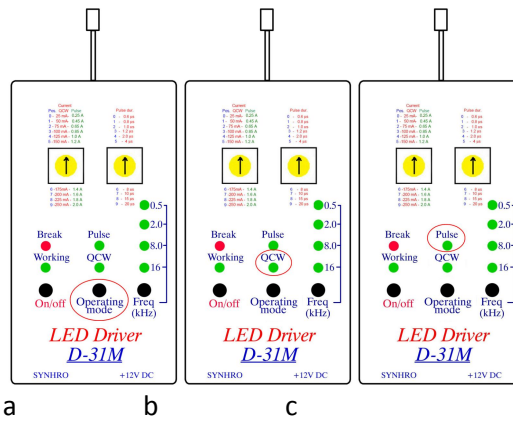


Fig.7. a –button for mode selection, b – QCW mode, c – pulse mode.

5. Set the “Current” switch (12) to the “0” position, which corresponds to the LED current minimum value .
6. Select the required frequency value using the “Freq” button. In case of working in the pulse mode select the required pulse duration value adjusting the “Pulse dur.” switch (3) and using the table 2 presented on the driver case.

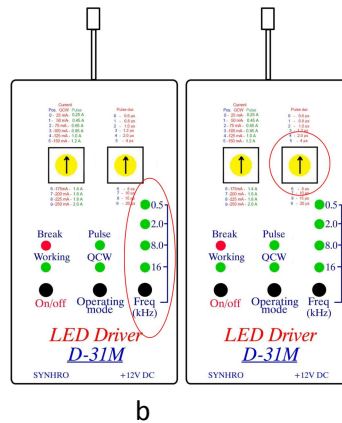


Fig.8. a –button for frequency selection and the indicators of selected frequency, b – multiposition switch for adjusting the pulse duration.

7. Switch on the LED current pressing the “On/Off” button (9). “Working” LED indicator (green) (10) will be turned on and “Break” indicator (red) will be turned off. If the “Break” indicator (11) is not turned off that means that there is a failure of LED current (for example, LED is damaged). If everything is OK set the LED current using switch 12 and table 15.

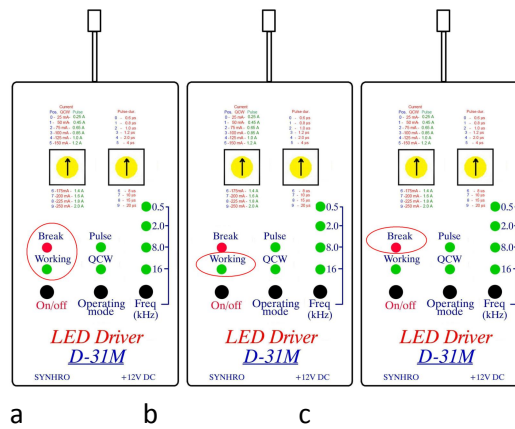


Fig.9. a – LED current is off, b –LED current is on, c –LED current is on, but LED circuit is broken.

8. Please make sure that running LED current complies with the LED specification.

7. Technical characteristics.

Input voltage	+12 V, stabilized
Voltage tolerance	-5..+5 %
Power consumption	Less then 4 W
Adjustment temperature range	-10 °C..+25 °C
Board dimensions	90×50×25 mm
Weight	90 g

	QCW mode	Pulsed mode
Pulse duration	31 – 1000 μ s	0,6 – 20 μ s
Repetition rate (Frequency)	0,5 – 16 kHz	0,5 – 16 kHz
Output current amplitude	20 – 250 mA	0,1- 2,0 A

8. Block diagram

The driver block diagram (pulse power supply) D-31M is presented in fig.10.

The pulse power supply of light-emitting diodes functionally consists of generator G, single-shot multivibrator M, multiplexer MX1, voltage-to-current converter U/I and pulse power supply converter DC/DCLED.

Generator G forms the pulse sequence with variable repetition rate. The repetition rate can be changed with the help of the button "Frequency". It is indicated by light-emitting diodes "2 kHz", "4 kHz", "8 kHz", "16kHz". The waiting multivibrator M and the multiplexer MX1 receive the voltage impulses in the form of a meander from generator G .

The single-shot multivibrator M generates voltage impulses with the adjustable fixed duration synchronously with rise-up portion of input voltage impulses. Switching of impulse duration is performed by means of switch SW1 in the range from 0.6 to 20 μ c.

Multiplexer MX1 via the "Operating mode" button switches the clock pulses at the voltage-to-current converter input U/I. In addition, clock pulses come to the "Synchro" jack to synchronize with an external photoreception amplifier.

The IR-light-emitting diode LED receive a pulse current from U/I converter. Start-up of U/I circuit is made with the button "Curent ON/OFF". The "Work" light-emitting diode (green) lights up in this case. If the circuit of a LED is broken, the "Break" indicator lights up. Amplitude adjustment of the LED pulse current is made with a multiposition switch SW2.

The DC / DC circuit is a pulse voltage converter from + 12 V in + 5 V, -5 V for power supply of all the elements of the D-31M. The input voltage of DC / DC converter supplies from "+12 VDC" jack.

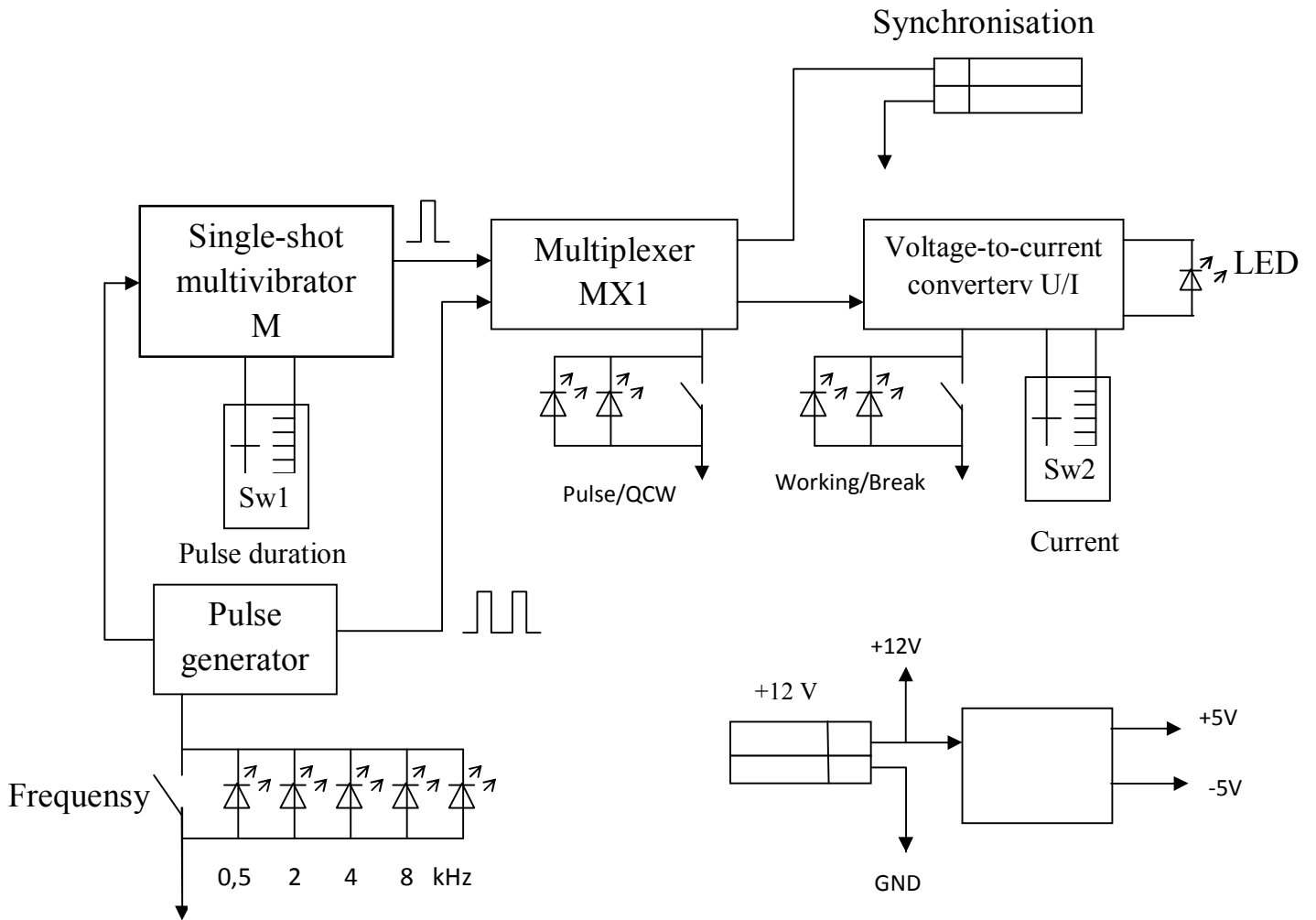


Fig.10. Block diagram of D-31M.