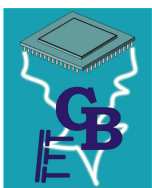


Operating Manual

Infrared Light Module LM-IR-8-1 V1.00



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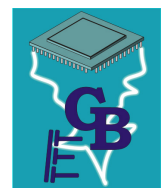


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Description

The infrared light module LM-IR-8-1 is an expansion module for the SFR-1, USM-RC-2, USM-RC-3, MSM-1 and UFR-1230 modules.

The light module can be used to control lights and a servo output on a (truck) trailer and semi-trailer. The signals are transmitted wirelessly via an infrared diode. A separate battery is required in the trailer or semi-trailer to supply voltage to the light module.

The LM-IR-8-1 has 8 switching outputs for connecting lights (e.g. lamps and LEDs). The light signals are passed on from the main module to the light module. Only outputs 1 – 8 are always transmitted, even if the main module has more than 8 outputs.

There is also 1 servo output that can be used to control various movements. A speed controller can also be connected to the servo output to control a motor. Applications for this include trailer supports, locking and unlocking a fifth wheel, steerable axles, or tilting movements for a tipper truck.

In order to be able to control the LM-IR-8-1 via the SFR-1, the sound modules USM-RC-2/USM-RC-3 or the speed controller UFR-1230, the light module must be activated in the software Sound Teacher of the main module. This requires at least version V1.30 of the SFR-1 Sound-Teacher and version V1.80 of the USM-RC-2 Sound-Teacher. Version V1.30 of the Drive-Teacher is required for the UFR-1230.

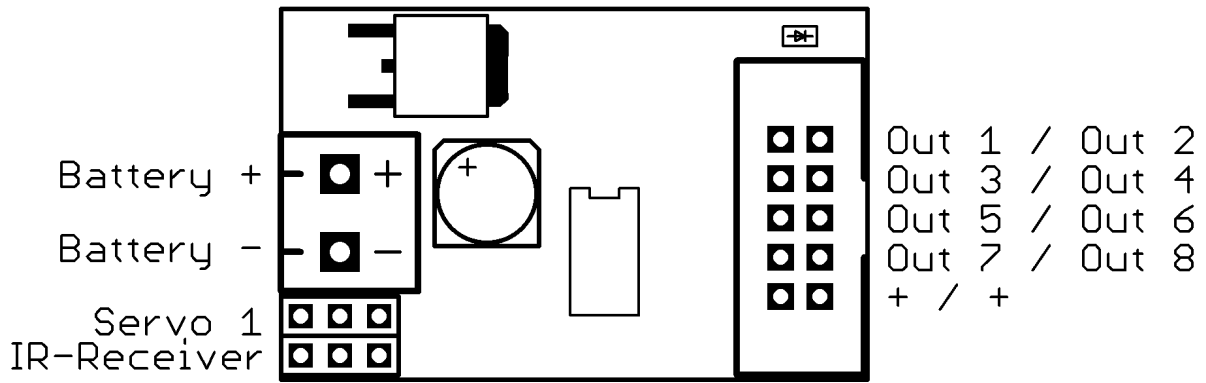
Safety instructions

- Read these operating instructions carefully before starting to use and keep them safe for future use!
- The integrated circuits on the light module are sensitive to electrostatic charges. Therefore, do not touch these components until you have “discharged” yourself (e.g. by touching a radiator or another grounded device).
- The light module may only be operated with the specified supply voltage.
- Wiring may only be carried out in a de-energized state.
- The sound module is not suitable for children under 14 years of age to use.

Technical data

Supply voltage (U_b):	6-12V DC voltage
Current consumption:	Standby current: approx. 15 mA
Switching outputs:	8 pieces (minus-switching, N-channel MOSFET), max. 1.5 A per output, the total current of all outputs must not exceed 3.0 A
Light functions:	1:1 copy of outputs 1 - 8 of the main module
Servo output:	1 piece (1,000 - 2,000 ms) Max. current consumption of the servo: 1 A (short-term 4 A)
IR receiver:	IR receiver pluggable, included in delivery
Permissible ambient temperature:	0 – 60°C
Permissible relative humidity:	Max. 85 %
Dimension:	39 x 28 x 17 mm
Weight:	12 g

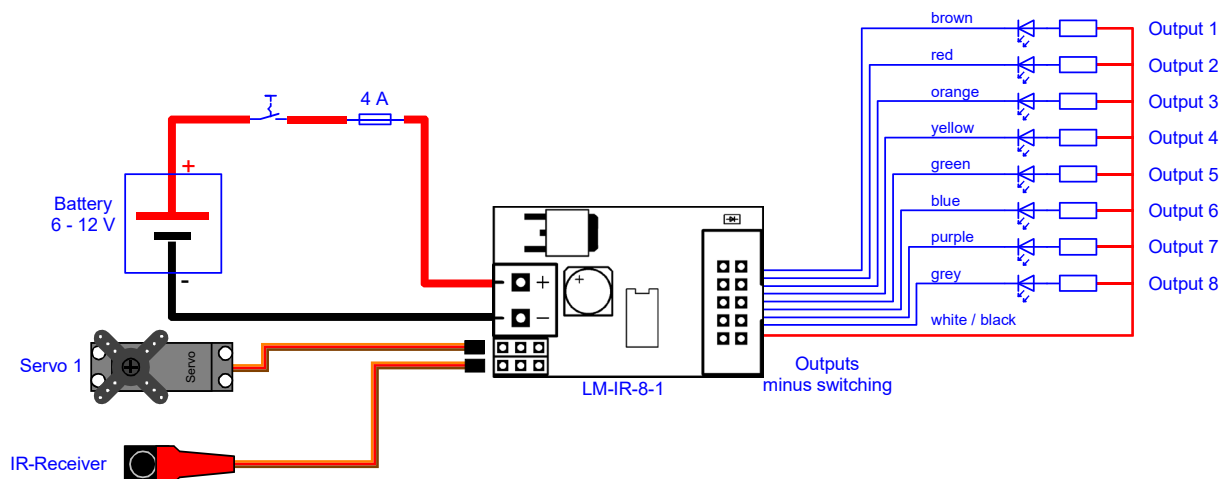
Pin assignment



Connections on the light module:

X1/+	Battery + (6 – 12 V)
X1/-	Battery -
X3	Switching outputs 1 - 8
X5/1	Servo 1
X5/2	IR receiver

Wiring diagram



Always carry out all connection work with the supply voltage switched off!

Connection of the supply voltage

The LM-IR-8-1 requires a DC voltage of 6 - 12 V (e.g. a battery) as a supply. It is connected to terminal X1. Please pay attention to the correct polarity! Reverse polarity can destroy the module!

The cable cross section for the supply voltage should be 0.75 mm² - 1.5 mm².

In addition, a switch for switching off the light module and a 4 A fuse (available in our shop) should be installed in the supply line (positive line) of the supply voltage.

Connecting the IR transmitter diode and the IR receiver

IR transmission:

The prerequisite for the function of the LM-IR-8-1 light module is an SFR-1 sound speed controller, a USM-RC-2/USM-RC-3/MSM-1 sound module or a UFR-1230 speed controller! Operation with other sound modules or speed controllers is not possible.

With the USM-RC-2, USM-RC-3 and SFR-1 modules, you can choose between two different IR protocols (slow and fast). The LM-IR-8-1 understands both protocols. With the MSM-1 and UFR-1230 there is only 1 protocol and this is automatically activated.

The distance between the IR diode and the IR receiver should not be greater than 10 cm to ensure reliable transmission.

If the IR transmission is working correctly, the green LED on the light module will flash quickly at regular intervals. If the light module does not receive any IR signals for longer than 2 s, all outputs are switched off and the servo moves to the neutral position.

Connection of the IR transmitter diode:

The included IR transmitter diode (blue, round) comes with a soldered cable and 3-pin plug.

On the SFR-1 sound speed controller, the black plug is connected to the pin header X5/I. The brown cable points outwards, towards the edge of the board.

For the USM-RC-2 sound module, the black plug is connected to pin header X9. The brown cable points to the SD card, the orange cable points towards the gray terminal strip X1.

For the USM-RC-3 sound module, the black plug is connected to the X10 pin header. The brown cable points outwards, towards the edge of the board.

For the MSM-1 sound module, the black plug is connected to pin header X11. The brown cable points outwards, towards the edge of the board.

For the UFR-1230 speed controller, the black plug is connected to the pin header X6/2, the brown cable points outwards towards the edge of the board.

Connection of the IR receiver:

The IR receiver (black, rectangular) is supplied with a soldered cable and 3-pin plug. The black plug is plugged into the pin header X5/2 on the light module. The brown cable points outwards towards the edge of the board. The sensitive side of the receiver is the semicircular dome. So the IR transmitting diode should point to it.

We offer the [KB-IR-T](#) king pin for Tamiya trucks with a special bracket so that the IR receiver can be mounted easily and stably. The king pin has a through-hole for transmitting the infrared signal.



Connection of the switching outputs

The outputs 1 - 8 of the module are located on the pin header X3.

The supplied [ribbon cable](#) can be used to connect the outputs. For a simple connection (without soldering) the terminal clamps [AKL-8](#) and [AKL-8-W](#) can be ordered in our shop.

Other cables or plugs can also be connected to the X3 pin header. A cable cross section of 0.14 mm² - 0.5 mm² should be used for the switching outputs.

The light module always switches the negative pole of all outputs to the connected load. The negative pole of the load is therefore connected to the light module (see wiring diagram on page 5).

The common positive pole for outputs 1 – 8 are the black and white cables of the ribbon cable. It is also possible to connect the load directly to the positive terminal of the battery.

Assignment of the ribbon cable:

Output	Ribbon cable (X3)
1	brown
2	red
3	orange
4	yellow
5	green
6	blue
7	purple
8	gray
Positive pole	white
Positive pole	black

The switched voltage at the outputs (with brightness set to 100%) is always as high as the module's supply voltage.

If LEDs are connected, series resistors must always be used. It doesn't matter whether the series resistors are connected to the positive or negative line. The correct polarity is important for LEDs, otherwise they will not light up.

The series resistors required for the LEDs depend on the LED colors and the LED current. For orientation, here is a table with series resistors for standard LEDs (current approx. 15 mA) as a rough guide:

Supply voltage	Series resistance
6 V	270 ohms
7.2 V	330 ohms
8.4 V	470 ohms
9.6 V	510 ohms
12 V	680 ohms

There are also LED series resistor calculators on the Internet (e.g. www.leds.de/widersrechner), with which the ideal resistance can be calculated quickly and easily.

If relays or other inductive loads (e.g. motors) are connected to the switching outputs, freewheeling diodes (e.g. 1N4007) must be used.

Connecting the servo

One servo, speed controller and other modules that are intended for direct connection to a receiver (e.g. relay modules, rotating lights, etc.) can be connected to the X5/1 pins.

The brown cable points outwards, towards the edge of the board.

If a speed controller with BEC is connected, the red wire must be removed from the servo plug and insulated! This is necessary because the LM-IR-8-1 has its own BEC, which is connected to the servo output.

The current consumption of the connected servos or modules on X5/1 must not exceed 1 A (for a short time 4 A)! Otherwise an external BEC is necessary.

Switching outputs

The outputs are copies of outputs 1 - 8 of the module that sends the IR signal to the LM-IR-8-1. This means that whenever an output on the SFR-1, USM-RC-2, USM-RC-3, MSM-1 or UFR-1230 switches, the output with the same number on the LM-IR-8-1 also switches in the same brightness.

Example:

Output 4 is configured on the sound module as a “right turn signal”. If the right turn signal is switched on, output 4 on the sound module (turn signal for the truck) and at the same time output 4 on the light module (turn signal for the trailer) will flash. The brightness of the output of both modules corresponds to the settings in the Sound Teacher.

Controlling the servo output

For the servo output, a basic position and 2 further positions can be specified in the Sound Teacher. In addition the speed of movement can be adjusted in the Sound or Drive Teacher.

The programmed positions can be activated via the free function assignment in the sound/drive teacher, via the proportional channels, the nautic mode, the EKMFA mode or the switching inputs.

The functions in the Sound/Drive Teacher are:

- LM: Servo 1 position 1
- LM: Servo 1 position 2

Direct, proportional servo control via a prop channel is also possible.

More detailed information about the functions of the servo outputs can be found in the operating instructions for the SFR-1, USM-RC-2, USM-RC-3, MSM-1 and UFR-1230 modules.

After an interruption of the IR signal, the servo output returns to neutral (center).

If a speed controller is connected to the servo output, for example to control trailer supports, it is important to suppress interference in the IR receiver and the motor cables. This can be done with [ferrite rings](#) (available in our shop).

Green LED on the LM-IR-8-1

The green LED on the LM-IR-8-1 indicates various states of the module:

LED	Status
Continuous lighting	No IR connection
Blinking regularly	IR reception is ok
Flash 3 times, then pause for 3 seconds	Overcurrent at switching outputs

Troubleshooting:

Green LED	Status	Troubleshooting
Flashing	Normal condition, everything ok	
Continuous lighting	No data transfer	<ul style="list-style-type: none"> • IR transmitter diode not plugged correctly into SFR-1 X5/1, USM-RC-2 X9, USM-RC-3 X10 or MSM-1 X11 • IR receiver not plugged correctly into X5/2 • IR transmitter diode and IR receiver have no line of sight • Data transmission to the light module was switched off via function on the SFR-1, USM-RC-2 or USM-RC-3 • LM-IR-8-1 in SFR-1, USM-RC-2 or USM-RC-3 not activated (Sound Teacher: Configuration → Generally → light module) • SFR-1, USM-RC-2 or USM-RC-3 switched on but not functional (e.g. SD card not inserted)
Flash 3 times, then pause for 3 seconds	Overcurrent switching outputs	<ul style="list-style-type: none"> • Check the wiring of the switching outputs • Check the load from the connected consumers • Disconnect and reconnect the supply voltage to the LM-IR-8-1

Note on disposal:

Retired electrical and electronic equipment contains a variety of valuable resources, including precious metals and critical raw materials. Achieving a high collection and recycling rate and the associated return of these raw materials into the production cycle is one of the central goals of the environmentally friendly and sustainable disposal of electrical and electronic devices.

For this reason, our modules must not be disposed of with normal household waste, but must be collected separately. Municipal collection points such as recycling centers can be used for this. Larger retailers also offer take-back points that can be used even if the product was not purchased there. We are happy to take care of the professional disposal free of charge. To do this, send the module back to us with sufficient postage (!!!).

