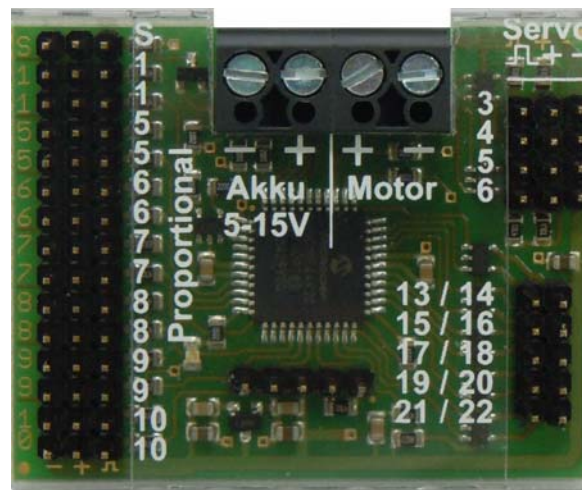


## Operating Manual

# Extension Module

# EXM-2



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## Safety Notes

- Please read this operating manual carefully and keep it for future use!
- The integrated are sensitive to electrostatic charge. Therefore it is important not to touch these components, before discharging yourself (e.g. through a grip onto a grounded device).
- Always switch off power first before connecting the module!
- The sound module is not suitable for children under 14 years.

## Description

The EXM-2 is an extension module for our sound module USM-RC-2. It is connected directly to the USM-RC-2 and increases the number of proportional channels with 6 more channels. In combination with the sound module 10 proportional channels are available.

The EXM-2 also offers 10 more switching outputs. Every light function and brightness level (between 0 and 100%) can be set, just like the switching outputs at the USM-RC-2.

The EXM-2 contains also 2 additional programmable servo outputs with up to 4 positions plus one neutral position.

As special feature, the EXM-2 includes a small motor controller. A secondary drive (e.g. for a tank turret rotation) can be connected directly to this motor controller. The motor output can be controlled in 3 different ways:

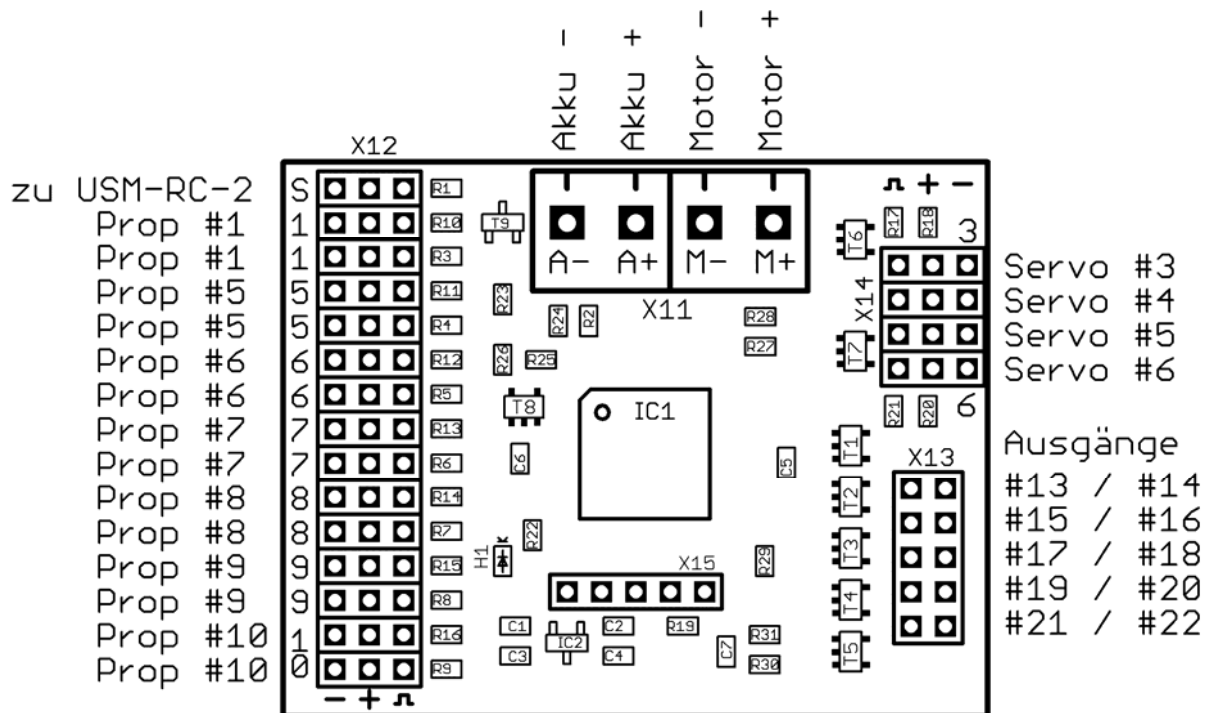
1. Controlling a motor by using function "left" and "right" with fixed speed.
2. Controlling a motor by using one proportional channel with variable speed and direction.
3. Controlling a hydraulic pump through monitoring of up to 10 servo channels on leaving the neutral position. The channels to be monitored can be set in the Sound-Teacher.

The servo output X14/5 is a "copy" of the motor output. It enables to control a brushless motor via an external speed controller. The brushless motor can for example be used to drive a hydraulic pump.

|                       |
|-----------------------|
| <b>Technical Data</b> |
|-----------------------|

|  |  |
|--|--|
| <b>Supply voltage (U<sub>b</sub>):</b> | 4,0 – 8,4V DC (supply voltage of receiver)   |
| <b>Power consumption:</b>              | Standby-current approx. 20mA   |
| <b>Proportional inputs:</b>            | 7 pieces <ul style="list-style-type: none"> <li>• Prop #1 (shift from USM-RC-2 to EXM-2)</li> <li>• Prop #5 - Prop #10</li> </ul>  |
| <b>Switching outputs:</b>              | 10 pieces (npn – open collector),<br>max. 1,5A per output, total current of all outputs must not exceed 3,0A   |
| <b>Servo outputs:</b>                  | 4 pieces (1,000 - 2,000ms) <ul style="list-style-type: none"> <li>• 2 programmable servo outputs</li> <li>• 1 copy of motor output for a brushless speed controller</li> <li>• 1 reserve for future expansion</li> </ul> |
| <b>Motor output:</b>                   | 1 piece<br>Voltage 5V - 15V DC<br>Current max. 8A  |
| <b>Dimension:</b>                      | 52 x 44 x 18 mm  |
| <b>Weight:</b>                         | 24g  |

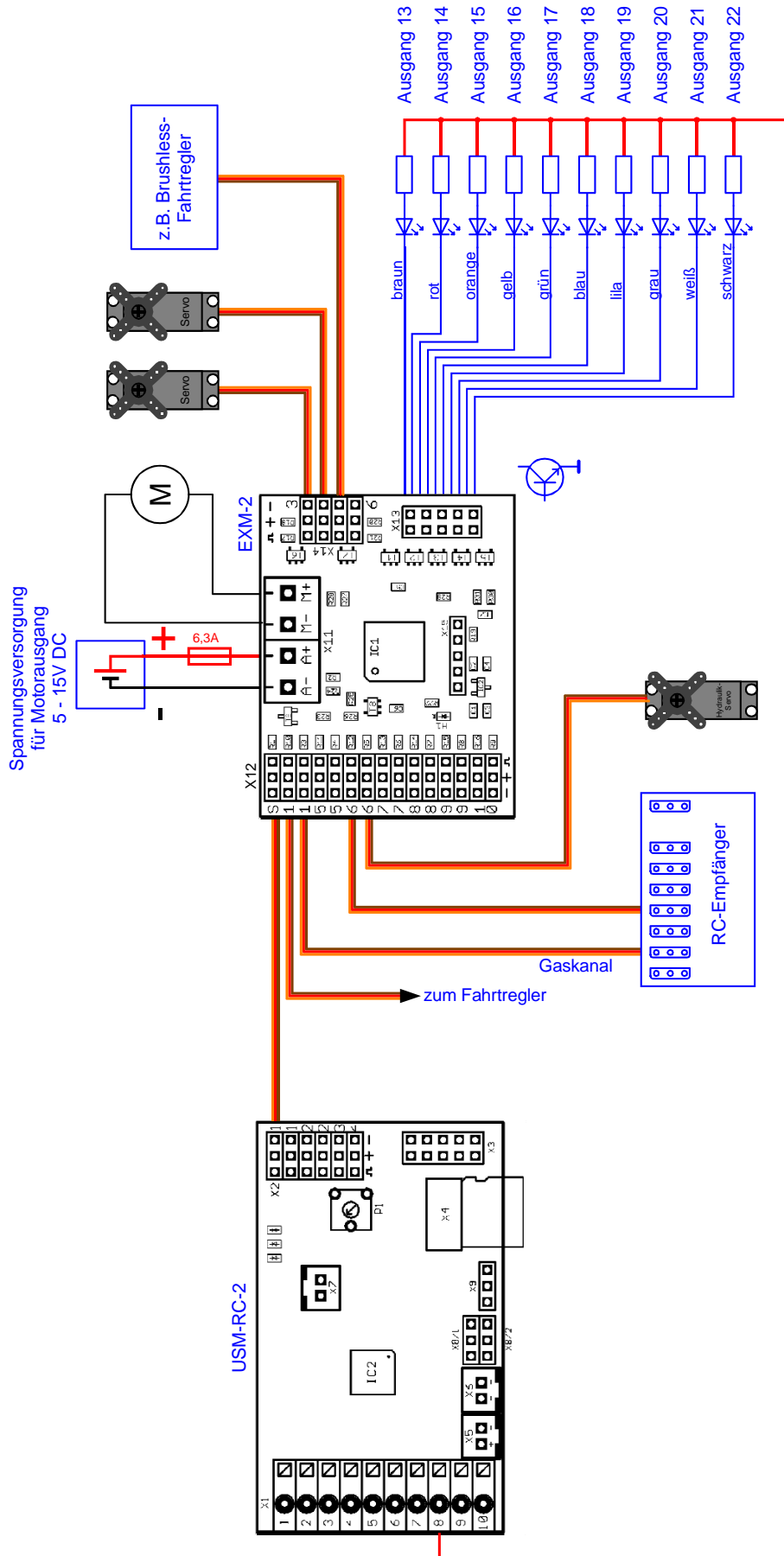
## Pin Assignment



|                 |  |
|-----------------|--|
| <b>X11 / A-</b> | Supply voltage - for motor               |
| <b>X11 / A+</b> | Supply voltage + for motor (5 – 15V DC)  |
| <b>X11 / M-</b> | Connection for motor -                   |
| <b>X11 / M+</b> | Connection for motor +                   |
| <b>X12 / S</b>  | Connection to sound module USM-RC-2 X2/1 |
| <b>X12 / 1</b>  | Proportional channel Prop #1             |
| <b>X12 / 5</b>  | Proportional channel Prop #5             |
| <b>X12 / 6</b>  | Proportional channel Prop #6             |
| <b>X12 / 7</b>  | Proportional channel Prop #7             |
| <b>X12 / 8</b>  | Proportional channel Prop #8             |
| <b>X12 / 9</b>  | Proportional channel Prop #9             |
| <b>X12 / 10</b> | Proportional channel Prop #10            |
| <b>X13</b>      | Switching outputs 13 - 22                |
| <b>X14 / 3</b>  | Servo output #3 (programmable)           |
| <b>X14 / 4</b>  | Servo output #4 (programmable)           |
| <b>X14 / 5</b>  | Servo output #5 (copy of motor output)   |
| <b>X14 / 6</b>  | Servo output #6 (reserve)                |

Connecting supply voltage to X11/A- and X11/A+ is only necessary, if the motor output X11/M- and X11/M+ is used.

# Wiring Diagram



## Connection of EXM-2

### **Connection of gas channel and speed controller:**

Proportional channel #1 and proportional channel X2/1 at the USM-RC-2 are normally used for gas channel (from receiver) and speed controller. Both servo patch cables are removed from the USM-RC-2 and connected to X12/1 (two terminals available) at the EXM-2.

Prop. channel # 1 thus "migrates" from the sound module to the expansion module.

### **Connection to sound module:**

Proportional channel X2/1 at the sound module is now connected to X12/S at the extension module.

### **Connection of proportional channels:**

With servo patch cables, up to 6 additional proportional channels can be connected from the RC receiver to terminal X12/5 - X12/10 at the EXM-2

All terminals are available twice. In case the servo monitoring should be used to control a hydraulic pump, the hydraulic servos can be connected directly to the EXM-2. No y-cable is required.

### **Connection of switching-outputs:**

The 10 switching outputs 13-22 (minus switching) are connected to terminal X13 on the EXM-2. The connection is the same as at the USM-RC-2. Keep in mind to use pre-resistors for LEDs.

Assignment of flat ribbon cable:

| <b>Output</b> | <b>Flat ribbon cable</b> |
|---------------|--------------------------|
| <b>13</b>     | brown                    |
| <b>14</b>     | red                      |
| <b>15</b>     | orange                   |
| <b>16</b>     | yellow                   |
| <b>17</b>     | green                    |
| <b>18</b>     | blue                     |
| <b>19</b>     | purple                   |
| <b>20</b>     | grey                     |
| <b>21</b>     | white                    |
| <b>22</b>     | black                    |

The pluspole for all outputs is terminal X1/8 at the USM-RC-2. It is also possible to connect consumers directly to the pluspole of the battery.

**Connection of servos or speed controller to servo outputs:**

At servo output X14/3 - X14/6 up to 4 servos or speed controller can be connected.

The servos are supplied with power from the power supply of the receiver. This means a strong BEC is necessary. Therefore keep in mind, when connecting servos, that the power supply of the receiver can bring a sufficiently high current.

When connecting a speed controller with BEC, it is necessary that only one BEC is active at the same time in the whole model! When using more speed controller with BEC it is important to disconnect the red wire at the speed controllers servo cable.

**Connection of power supply to motor-output:**

To use the motor output, connect the power supply of the motor to X11/A- and X11/A+ (5 - 15V). Otherwise nothing is connected to this output.

**Connection of a motor to motor-output:**

To terminal X11/M- und X11/M+ a DC motor can be connected. The maximum power consumption of the motor must not exceed 8A.

Servo output X14/5 is a "copy" of the motor control signal. Therefore it possible to connect a brushless motor when using a brushless speed controller. The motor reacts as a DC motor at the motor output.

**!!! Important !!!**

**It is absolutely necessary to suppress the motor!  
Otherwise the data transfer between USM-RC-2 and EXM-2 might be impaired!**

## Activation

To activate the expansion module, the option "Activate extension module EXM-2 on X2/1" must be selected in the Sound-Teacher under Configuration → EXM-2. To activate the EXM-2 at least Sound-Teacher version 1.30 is required.

If the transmission between USM-RC-2 and EXM-2 is working correctly the blue LED on the EXM-2 is flashing at regular intervals.

