

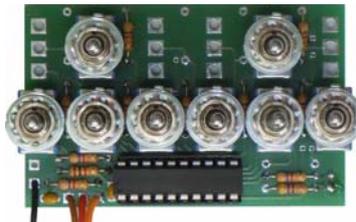
## Operating manual

# One channel multiswitch

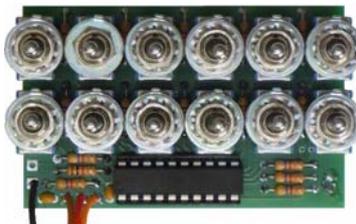
## EMS-16-R



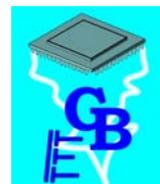
## EMS-16-G



## EMS-24-G



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## Safety notes

- Please read this operating manual carefully and keep it for future use!
- The integrated circuits 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 one channel multiswitch module EMS is an extension for the RC transmitter, available with 8 and 12 switches. It is suitable for the sound module USM-RC-2 and the multiswitch decoder MSD-16.

The EMS modules are built into the remote control housing and require for installation only one free proportional channel at the USM-RC-2 in order to control 16 or 24 additional functions, such as triggering sounds and other outputs. The output of the receiver is directly connected to a free proportional channel at the sound module (X2/3 or X2/4). For connection no additional decoder is required.

**The EMS is compatible with most 2.4 GHz systems, in contrast to other nautic and multiswitch modules.**

Each switch has three positions: up - middle - down. The middle position is neutral and no function can be assigned to this position. This means with the positions "up" and "down" each switch can control at least two functions. After pressing, the switch returns automatically to neutral and the activation of the switching output stops. However, using the memory setting (Sound-Teacher) you can activate each switching output permanently. This is useful e.g. for controlling lights.

The transmission of data is carried out with time division multiplex, which leads to a short response time delay of each switch. The delay depends on each switch position. For example, with a slow transfer rate the maximum delay of the last/highest EMS-24 switch is 1,4s.

**Always use only one switch at the same time!**

The EMS modules are available in 3 different versions:

### **EMS-16-R:**

The EMS-16-R is suitable for installation in Robbe/Futaba transmitter. It has 8 switches to trigger 16 functions.

### **EMS-16-G:**

The EMS-16-G is suitable for installation in Graupner transmitter. It has 8 switches to trigger 16 functions.

### **EMS-24-G:**

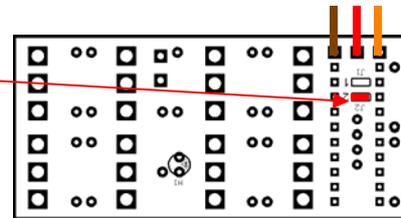
The EMS-24-G is suitable for installation in Graupner transmitter. It has 12 switches to trigger 24 functions.

**All EMS modules can also be built into other transmitter. This might require additional reconstruction work and soldering.**

## One channel multiswitch EMS-16-R

The EMS-16-R is suitable for Robbe/Futaba transmitter with a recess for 2x4 switches. The EMS-16-R switches are the same size as original Robbe/Futaba multiswitch modules, e.g. for F-16. It is also possible to build the module into other transmitter. This might require additional reconstruction work of the transmitter.

With a 2.4GHz system we recommend to use a slow transfer to eliminate transmission errors. Bridge "J2" soldering strap for a slow transfer.



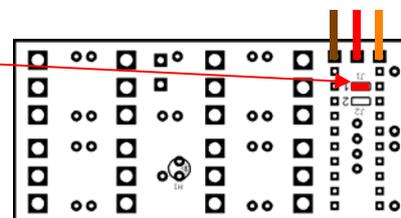
### Installation into transmitter:

The installation of the EMS-16-R differs, depending whether the module is built into the left or the right slot of the transmitter.

When using (from outside) the right slot (from inside it is the left side) the soldered on encoder cable (servo patch cable) of the EMS-16 must point downwards to the middle of the transmitter.

When using (from outside) the left slot (from inside it is the right slot) the soldered on encoder cable (servo patch cable) must point upwards towards the housing of the transmitter.

When using the left slot, bridge "J1" with solder. This shifts the number assignment of the switches and corrects the rotation of 180°.



### Connection to transmitter:

Before connecting the EMS, always switch off the transmitter first!

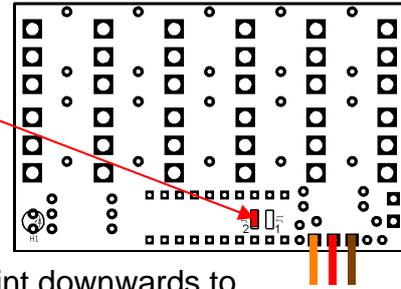
The encoder cable (black connectors, 3-core cable with brown, red, orange) is connected to a free encoder slot at the transmitter e.g. CH1 - CH8. **Pay attention to a correct insertion direction!** You can see the correct direction at the colors of the other encoder cables, that are already plugged into the encoder slots.

## One channel multiswitch EMS-16-G and EMS-24-G

The modules EMS-16-G and EMS-24G are suitable for transmitter from Graupner with recesses for 2 x 6 and 2 + 6 switches, e.g. mc-19 or mc-22. The switches have the same size as original Graupner nautic modules.

For installation of EMS no additional adapter or interface distributor are necessary.

With a 2.4GHz system we recommend to use a slow transfer to eliminate transmission errors. Bridge "J2" soldering strap for a slow transfer.



### Installation into transmitter:

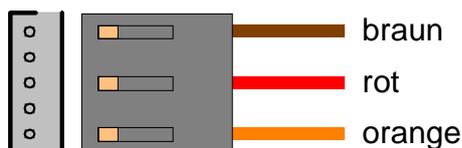
For installation the soldered on encoder cable has to point downwards to the middle of the transmitter.

### Connection to transmitter:

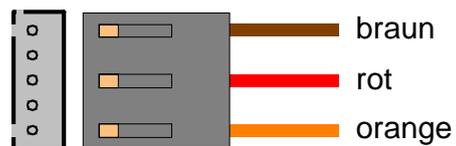
Before connecting the EMS, always switch off the transmitter first!

The encoder cable (black connectors, 3-core cable with brown, red, orange) is connected to a free encoder slot at the transmitter e.g. CH7. **Pay attention to a correct insertion direction!** You can see the correct direction at the lateral slots of the encoder slots and at the colors of the other encoder cables that are already plugged into the encoder slots:

Graupner generally



MC-32



### **!!! Important !!!**

**All EMS cables should be laid as far away as possible from the antenna and the HF transmitting unit in the transmitter. Otherwise, it may cause interference!**

## Activation

After installation and connection of the EMS, turn your transmitter on and check the red LED at the EMS. If the red LED flashes regularly, the EMS is operating correctly.

Otherwise, turn off the transmitter immediately and check again all connections of the EMS. Particularly pay attention to the correct insertion direction of the 3-core encoder cable.

In case problems occur during transmission of switch status data, bridge soldering strap "J2" in order to activate a slow transfer.

To use EMS modules you need at least Sound-Teacher version V1.30 (USM-RC-2).

If you are using an older version, please download the latest Sound-Teacher from the Internet.

In your Sound-Teacher you need to specify the used EMS type under Configuration → Nautic 1/2 → Type.

Should the function assignment of the switches be vice versa, only reverse the used proportional channel. This can be set either at the transmitter or in the Sound-Teacher (channel reversion).

## Settings at transmitter

Following settings are required at your transmitter:

1. No time delays must be set at the proportional channel.
2. The servo way must not be limited and the center position must be set to 1.5ms or 0%.
3. No encoder offset programming must be set at the transmitter and the defined way must be 100% (or more).
4. The trimming must be centered at the proportional channel.

## Connection to transmitter without free encoder slot

If no free encoder slot is available, a proportional channel can be converted. This can, for example be a joystick, a rotary- or slider switch. Switches and buttons are often no "full" proportional channel replacements.

Before connection check polarity of the voltage supply with a multimeter. For measuring, the remote control need to be switched on. Usually the power supply is at the outer legs of the encoder connector.

**Never connect plus and minus incorrectly to the EMS!  
This leads to a destruction of the EMS or the transmitter!**

Before cutting the encoder cable, the power supply of the remote control must be switched off. The plus pole is soldered to the orange, the negative pole to the brown and the signal line to the red wire.

If there is no space for the EMS in your RC housing, the module can be built into a small housing outside the transmitter. The housing should be attached to the transmitter and the 3 connecting wires must be routed inside the transmitter.

