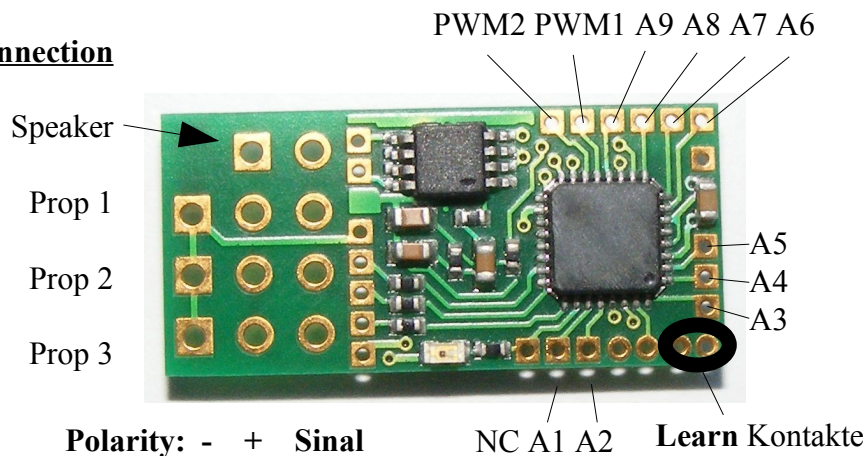
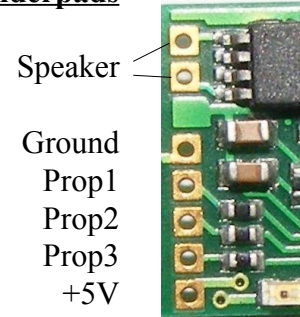


## RC - Soundunit TBS Micro V2.0

### RC Connection



### Solderpads



### Technical datas:

Dimensions:	11 x 23,5 x 3,2mm (min.11x16x3,2mm)
Voltage:	3V to <b>max. 5V!</b> (supplied by the receiver)
Current:	app. 10mA without sound, app. 250mA at max. volume
Speaker:	8-32 Ohm
Output power:	1W at 8-Ohm at 5V 0,6W at 8-Ohm at 3V
Proportional inputs:	Positiver Impuls 0,8ms bis 2,0ms
Soundquality:	up to 22,05 kHz

### Connections:

LS:	Speaker or external amplifier
PROP_1:	Prop.input for <b>speed controller</b>
PROP_2:	Prop.input for <b>special functions</b> (configurable)
PROP_3:	Prop.input for <b>controlling</b> .
LRN:	Used for 12position encoder or two position toggle Switch.
Prog:	Bridge to enter the learn mode.
	<b>Attention:</b> Don't solder wires at this contacts, because they are also used for connecting the optional programming adaptor.
	Connector for the optional programming adaptor
	<b>Note:</b>
	<b>Prog cable must be connected with its BROWN wire at the outer (right) side of the PCB (see last page)</b>

Power is provided through the receiver by one of the PROP inputs.

### Set controlmode at delivery:

☐ Encoder   
 ☐ Direct soundselect   
 ☐ Indirekt soundselect   
 ☐ Autostart

## **1. Introduction**

The digital sound unit TBS Micro can be used for any kind of RC-Model. It is connected directly to the receiver outputs, in parallel to the speedcontroller. This ensures the ability to use the sound unit in combination with brushless motors.

A 1W NF amplifier is already included.

Due to the dimensions and the weight of the unit, it is highly suitable for models in 1/87 scale and electric planes.

The electrical connections to the receiver can be done by common servo cables, plugged into sockets mounted on the PCB area at the left side of the TBS Micro. The power supply is provided by the receiver.

### **Note the maximum supply voltage of 5V!**

In space critical applications, the PCB area for the sockets can be cut. In this case the servo signals and the power supply must be connected to the copper spots beside the socket area. Good solder skills are necessary!

The TBS Micro is delivered with **unmounted sockets** for the receiver cables. This ensures the flexibility to use sockets **or** soldering the servo wires directly at the PCB **or** cutting the PCB area off.

**External amplifiers** are available.

The volume can be adjusted remotely via the RC-transmitter or manually at the amplifier.

A optional programming adaptor is available to configure the sound unit at a common PC or to install new sounds on it.

The **free of charge** configuration software TBS Flash is available at [www.benedini.de](http://www.benedini.de), as well as free of charge **soundlibraries**.

The soundunit can be controlled by a separate proportional channel or in “Autostart” mode.

Possible control modes:

- 12 position encoder
- 3 position switch for direct sound selection (only two sounds selectable)
- 3 position switch for indirect sound selection (all sounds selectable)
- Autostart

The desired control mode can be selected by the programing adapter or manually.

## 2. Control modes

### 2.1. Controlling the sound unit by the 12-position encoder

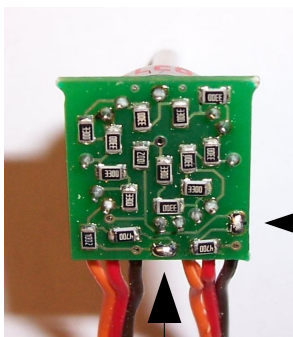
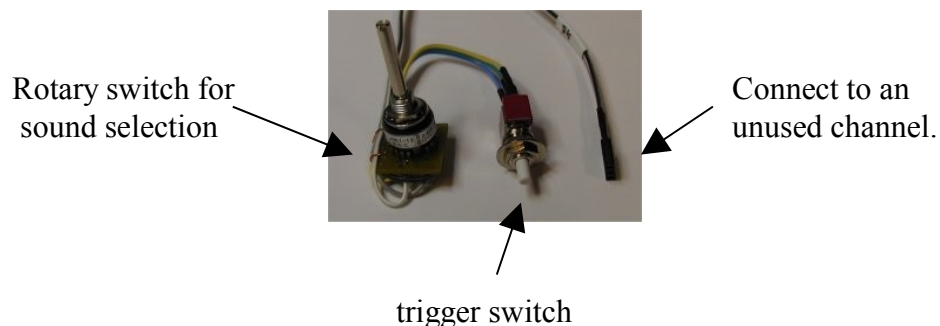
The most comfortable way of controlling the sound unit is using the so-called “12-position encoder”. It consists of a 12 position rotary switch in combination with a push button. The desired sound is **selected** by the rotary switch and is **triggered** by the pushbutton.

The encoder must be mounted in your transmitter and must be connected at a unused proportional channel.

The encoder must be ordered separately!

After installation you should test the encoder by a common servo at the according receiver channel. Keep the encoder push button pressed and move the rotary switch through all positions. The attached servo must move to a new position at each rotary switch position. The total movement of the servo should be about the same as at the normal joystick channels set to 100%.

**The installation of the encoder in your transmitter is on your own risk**  
**Proper functionality is not guaranteed at ALL transmitter brands / types**



The total resistance of the encoder can be adjusted to your TX by two solder bridges at the rear side of the encoder pcb:

**BOTH bridges**

open  
closed

**Total resistance**

app. 22 KOhm  
app. 5 KOhm

**Teaching the sound unit for encoder control:**

1. Power on transmitter and receiver. LED blinks fast -> normal mode  
Bring all joysticks to neutral position. Model must not move.
2. Bridge LRN contact for about 0.5 seconds until one beep occurs -> LED cont. on.  
At this moment all neutral/idle positions are stored.
3. Move throttle stick to your desired acceleration point (throttle stick position where idle dead band stops and engine running sound starts) and push the button of the encoder.  
-> A short sequence of acceleration is played  
Now the dead (neutral) band of the speed channel is defined
4. Move throttle stick to full speed position and push the encoder button again  
A short sequence of full speed is played.
5. Bring the encoder rotary switch to its first position and push the encoder button  
-> Engine start/stop is stored to this position
6. Bring the encoder rotary switch to the next position and push the encoder button.  
-> Reeving up the engine is stored to this position
7. Repeat step 6 until all 12 rotary switch positions are stored
8. The 12<sup>th</sup> position is usually set to volume control

After programming, the sound unit beeps 3x and is back in the normal operation mode.

**Explanations:**

1. Dead- or neutral band is the throttle/speed stick range in which no sound change will occur.
2. The rotary switch of the encoder has no mechanical limits. It can be rotated multiple times through all positions.
3. Position #1 can be located at any indexed position of the encoder

## **2.2. Direct sound selection by a 3 position switch (toggle switch)**

If you want to run only the engine sound and **ONE** special sound (f.e. MG), you can use this control mode.

You need a proportional channel equipped with a 3 position switch with neutral position and momentary contacts to both sides or a common joystick channel.

A attached servo must leave its middle/neutral position when the switch is pressed in one direction and must return to its middle position when the switch is released. Pushing the switch in the opposite direction causes the servo to move to the other side.

Please compare the very left and right positions of the servo with a common joystick channel.

They should be about the same.

This is the first test you should do before programming the sound unit.

To use this mode the soundunit must be set to **“12position encoder”** control mode.

### **Teaching the direct sound selection:**

1. Power on transmitter and receiver. LED blinks fast -> normal mode  
Bring all joysticks to neutral position. Model must not move.
2. Bridge LRN contact for about 0.5 seconds until one beep occurs -> LED cont. on.  
At this moment all neutral / idle positions are stored.
3. Move throttle stick to your desired acceleration point (throttle stick position where idle dead band stops and engine running sound starts) and flick the toggle switch.  
-> A short sequence of acceleration is played  
Now the dead (neutral) band of the speed channel is defined
4. Move throttle stick to full speed position and flick the switch again  
-> A short sequence of full speed is played.
5. Flick the switch **UP**  
-> Engine start/stop is stored to this position
6. If you want to skip the next sound, flick the switch again **UP**. A section of the next sound is played but **NOT** stored to this position of the switch, because it is already occupied.
7. Repeat step 6 to skip further sounds
8. If you want to store the next sound flick the switch **DOWN**
9. Switch soundunit **off** and **on**.
10. Now you can select the two stored sounds directly by the switch.

### **2.3. Indirect sound selection by a 3 position switch (toggle switch)**

Another control mode is possible by using a toggle switch with neutral position (recommended), or a common joystick at a available proportional channel.

A attached servo must leave its middle/neutral position when the switch is pressed in one direction and must return to its middle position when the switch is released. Pushing the switch in the opposite direction causes the servo to move to the other side.

Please compare the very left and right positions of the servo with a common joystick channel. They should be about the same.

This is the first test you should do before programming the sound unit.

#### **Selecting a Sound:**

The desired sound (f.e. sound #3) is **selected** by pushing the switch/stick 3 times from its neutral position to one direction. The selected sound is **triggered/played** by pushing the switch/stick to the other direction. The last selected sound can be triggered multiple times, without new selection.

### **Teaching the sound unit for toggle switch / joystick control**

1. Power on transmitter and receiver. LED blinks fast -> normal mode  
Bring throttle stick to minimum and control the center position of the toggle switch
2. Bridge LRN contact for about 0.5 seconds until beep -> LED cont. on.  
At this moment all neutral positions are stored.
3. Move throttle stick to your desired acceleration point (throttle stick position where idle dead band stops and engine running sound starts) and push the switch/joystick of the control channel once  
-> A short sequence of acceleration is played  
Now the dead (neutral) band of the speed channel is defined
4. Move the throttle stick to full speed position and push the switch/stick of the control channel again (like pos.3)  
-> A short sequence of full speed is played.

After this the sound unit is back in the normal operation mode. All special sounds can be controlled as mentioned above.

## **2.4. Autostart**

If you only want to play the engine sound, the “autostart” mode can be selected. The engine starts automatically, as soon as the model is accelerated the first time.

If the engine is more than 20s idle, it shuts down automatically.

**No special sounds** can be played in this mode!

### **Teaching the autostart mode:**

1. Power on transmitter and receiver. LED blinks fast -> normal mode  
Bring throttle stick to idle. Motor must not move.
2. Bridge LRN contact for about 0.5 seconds until beep -> LED cont. on.  
At this moment the idle position of the throttle stick is stored.
3. Move throttle stick to your desired acceleration point (throttle stick position where idle dead band stops and engine running sound starts) and wait for a beep  
Now the dead (neutral) band of the speed channel is defined.
4. Move the throttle stick to full speed position and wait for three beeps.

After this the sound unit is back in the normal operation mode.

### **During the programing sequence:**

**If you leave the last stored throttle stick position, a very short beep is played. Since then, you have about 2 seconds to adjust the new throttle stick position to be stored next.**

## **2.5. Changing a already set control mode**

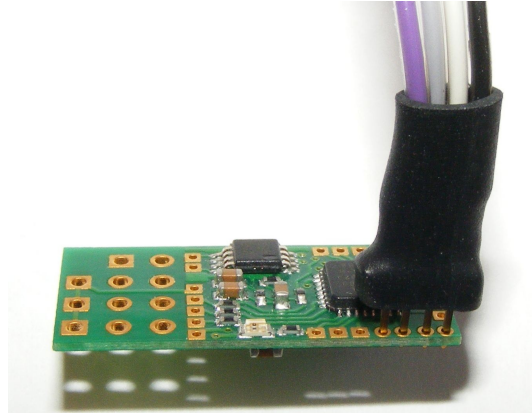
It is possible to change the adjusted control mode **without** the optional programing adaptor:

1. Bridge the LRN contact **DURING** powering the soundmodule
2. Remove the LRN contact
3. Close LRN contact momentary and wait for the “Beep-Code”
4. Repeat closing the LRN contact until the desired control mode is signalized by the according “Beep-Code”
5. Switch soundmodule off and on again

### **„Beep-Code“**

- |          |    |                     |
|----------|----|---------------------|
| 1 x Beep | -> | Autostart           |
| 2 x Beep | -> | Toggle switch       |
| 3 x Beep | -> | 12 position encoder |

### **3. Connecting the programming cable**



The **free of charge** configuration software TBS Flash is available at [www.benedini.de](http://www.benedini.de), as well as free of charge soundlibraries.

### **Disclaimer**

1. [www.benedini.de](http://www.benedini.de) provides the equipment solely to be used by each purchaser in accordance with the specific instructions supplied with each Sound Module and that the purchaser undertakes that the Sound Module and any associated equipment e.g. Amplifier, Speakers, etc. will be operated within the parameters contained therein.
2. [www.benedini.de](http://www.benedini.de) accepts no liability for any damage to any Sound Module if it is determined that the damage has been caused by either non adherence to the instructions or due to any malfunction by any cause or reason whatsoever within the model or its equipment and thereby outside of the control of [www.benedini.de](http://www.benedini.de).
3. [www.benedini.de](http://www.benedini.de) supplies each Sound Module on the strict undertaking that it will be used in such a manner to comply with the laws of the purchaser's country of residence.
4. [www.benedini.de](http://www.benedini.de) has no control over the final assembly, no liability shall be assumed nor accepted for any damage resulting from any use by user of the final assembled product, the user accepts all resulting liability.

## **Technical changes reserved**

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