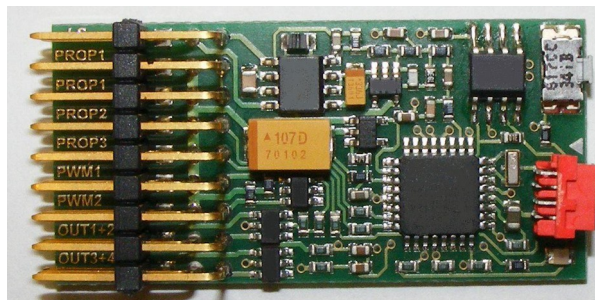


Manual

Digital Multifunctional RC-Soundunit

TBS Mini



Set control mode at delivery

Encoder (PROP3)
-> **Page 5**

Direct sound selection (PROP2)
-> **Page 7**

Indirect sound selection (PROP3)
-> **Page 8**

Autostart
-> **Seite 9**

Loaded sound: _____

Flashing output: None Out1 Out2

Comment: _____

1. Features

The TBS Mini is developed for all kind of RC controlled models, including airplanes, tanks, trucks, crawlers,...

It is an enhanced version of the proofed TBS Micro soundunit.

- Fully customer programmable. Your own sounds can be loaded!
- Large soundlibrary of original recordings available. Please check www.benedini.de
- Soundquality 22KHz, 8Bit
- Capability to play two sounds simultaneously (engine and one special sound)
- 16Mbit soundmemory, enough for 93sec. at 22KHz
- Internal amplifier with 1,2W at 8 Ohm speaker
- External high power amplifiers available
- **Remote volume control** (depending on control mode)
- Up to 6 switching outputs
 - Triggerable by sound (f.e. Muzzle flashing) or independantly (universal switching unit)
 - Switching-, momentary- or flashing mode adjustable
- Only **one** proportional channel necessary to control **all** functions of the unit.
- Speed signal derived from the receiver. This allows combination with brushless or brushed motors.
- Horizontal plug connections. This allows total electric isolation by shrinking plastic tube.
- Very little dimensions and weight
- USB or RS232 programming cable available (optional)
- Totally programmable by the free of charge software "TBS Flash":
 - You can load your own sounds or any of the Benedini sounds available at www.benedini.de
 - Firmware update! This means you have always the latest software at you unit.
 - **FREE OF CHARGE sound libraries available at www.benedini.de**

The TBS Mini soundunit can be fully configured by the optional programming cable and a common PC. Please see the separate programming manual.

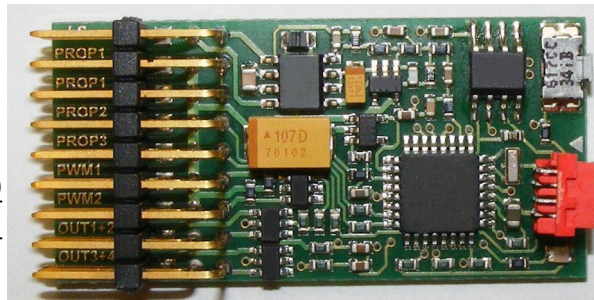
The unit can be controlled by a spare proportional channel by one of the following modes:

- 12-position encoder (combination of rotary switch and push button)
- 3-position switch for **direct** sound selection
- 3-position switch for **indirect** sound selection
- Autostart (without any additional proportional channel for control)

2. Connection

Plugs (from top to bottom)

1. **8 Ohm** speaker or ext. amplifier
2. Prop1 **Input** (Speed IN)
3. Prop1 **Output** (Speed OUT)
4. Prop2 Input (Receiver), optional
5. Prop3 Input (Control channel)
6. PWM1 (Servosignal 1) or Out 10
7. PWM2 (Servosignal 2) or Out 11
8. Out 1+2 switching output
9. Out 3+4 switching output

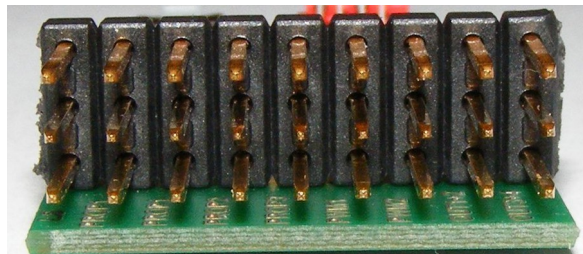


Learn Button

Prog. Cable

Watch plug orientation

!!! ORANGE (or white) signal lead always on TOP !!!



Top: Signal (orange)

Center: Power (red)

Bottom: GND (black)

Speaker / Ampl.	PROP 1 In	PROP 1 Out	PROP 2 In	PROP 3 In	PWM 1 (OUT10)	PWM 2 (OUT 11)	OUT 1+2	OUT 3+4
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Speaker Plus	Signal (Input)	Signal (Output)	Signal (Input)	Signal (Input)	Signal (Output)	Signal (Output)	OUT 2 (negative)	OUT 4 (negative)
Speaker Minus	Power	Power	Power	Power	Power	Power	Power	Power
Ground	Ground	Ground	Ground	Ground	Ground	Ground	Out 1 (negative)	OUT 3 (negative)

Speaker connection:

If a speaker is connected directly at the TBS Mini, make sure using the **Speaker Plus** and **Speaker Minus** pins (upper two ones). You must **NOT** use the Ground pin at the speaker connector!

Use **8 Ohm** speaker.

Switching outputs (Out 1..4, Out10, Out11)

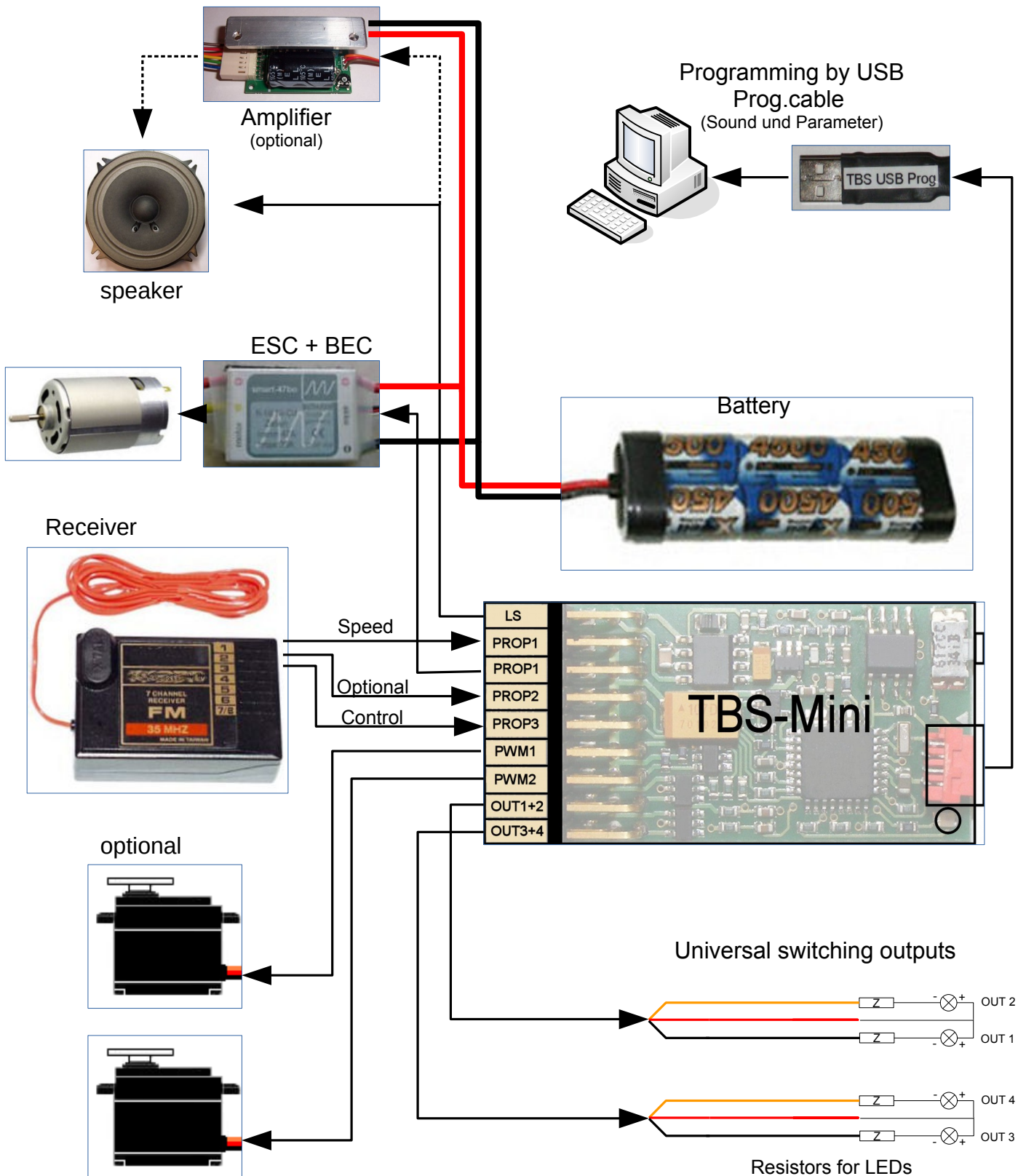
All outputs are switching to **NEGATIVE** of the receiver supply voltage. **PLUS** is available at the center pins of the according plugs.

Out 10 is available at the PWM1 plug

Out 11 is available at the PWM2 plug

2.1. Installation schematic

See also last page !



All **switching outputs** (Out1-6) can be configured to different modes (switching, latching, flashing) and can be routed to different sounds for simultaneous action. Most common is using them for gun muzzle flashing. High power LEDs, including pre wired cable sets are available.

First setup

Important:

! Watch safety aspects at the end of this manual before first flight !

The TBS Mini is delivered full programmed and **ready to run**, according to your order.
It MUST only be teached to the radio!

The set control mode of the TBS Mini is checked at the first page of this manual.
Please see the following chapters how to teach the Mini according to the set control mode:

Encoder: Page: 5
Direct sound selection: Page: 7
Indirect sound selection: Page: 8
Autostart: Page: 9

!! Any changes on the sound system should be made AFTER the first setup was successfully !!

Remote volume control

If “Encoder” or “Indirect sound selection” control mode is used, the volume can be set from the transmitter.

Standard setting: Funktion Nr. 11: Volume up Nr. 12: Volume down

Operation:

Select the desired function and KEEP it triggered → Volume changes

If the desired volume is reached, release the trigger button.

3. Control modes

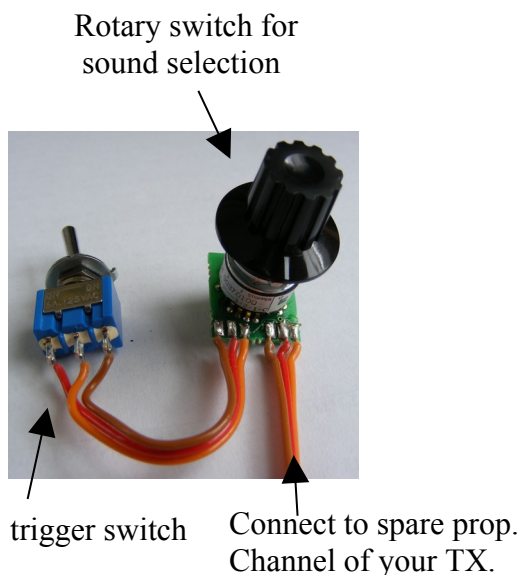
3.1. Encoder (12-Key coder)

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 push button.

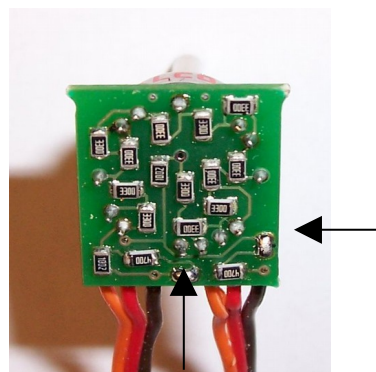
The encoder is mounted in your transmitter and connected at a spare proportional channel.

It is optional and 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 a normal joystick channels set to 100% travel.



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



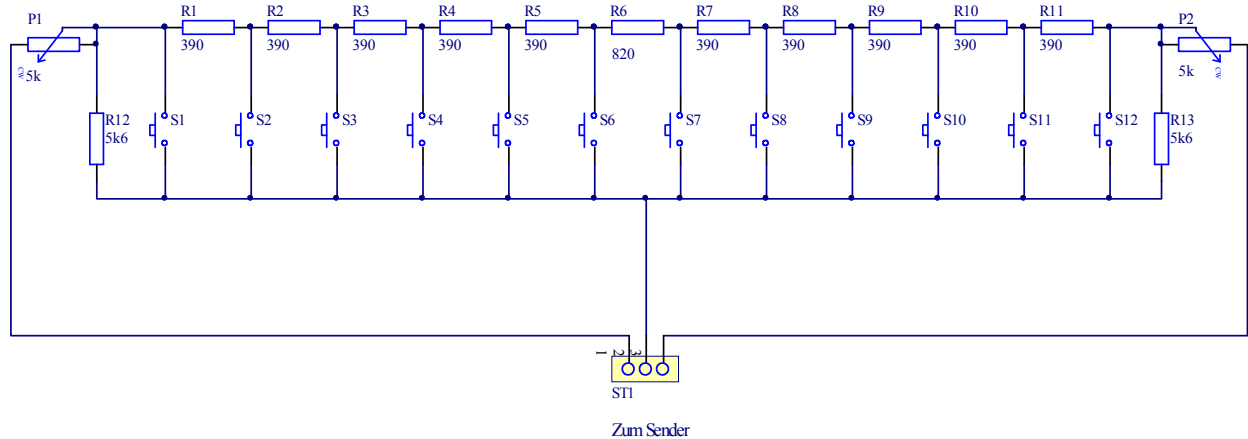
BOTH bridges
open
closed

Total resistance
app. 22 KOhm
app. 5 KOhm

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

3.1.1. Push button encoder

A simple resistor array combined with some push buttons can be also used to control the soundunit. This is only a suggestion and needs to be build by your own:



You should check the operation by a common servo. Adjust the min. and max. travel range with the potentiometers P1 and P2 in comparison to the travel at a common joystick channel(f.e.Ch1).

The installation of this circuit in your transmitter is on your own risk
Proper functionality is not guaranteed at ALL transmitter brands / types

3.1.2. Teaching the sound unit for encoder control

- 1) Power transmitter and receiver. LED blinks fast -> normal mode
Bring all joysticks to neutral position. Model must not move.
- 2) Press the TEACH. button until one beep occurs -> LED cont. lit.
At this moment all neutral / idle positions are stored.
- 3) Move throttle stick to your desired acceleration point (throttle stick position where engine idle sound changes to moving sound) and push the button of the encoder.
-> A short sequence of acceleration is played
- 4) Move throttle stick to full speed 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
Hint: The rotary switch has no mechanical limits. You can define any position as the "first" one.
- 6) Bring the encoder rotary switch to the next position, wait about 2s and push the encoder button again.
-> Reeving up the engine is stored to this position
- 7) Repeat step 6 until all 12 rotary switch positions are stored
- 8) After teaching all positions the sound unit beeps 3x and is back in normal operation mode.

Hint:

If you are using the resistor network shown above instead of the encoder, each rotary switch position is represented by one of the push buttons.

3.2. Direct sound selection

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 having a 3 position switch or a common joystick channel.

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

Please compare the very left and very 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 teaching the sound unit.

3.2.1. Teaching direct soundselection using Prop2 input (recommended)

The 3pos switch receiver channel must be connected to **Prop2** input of the TBS Mini. Prop2 input mode must be set to “**Function ½**” at the TBS Flash software. The desired sounds must be selected too. These settings are already done if this control mode was ordered.

Teaching is very simple and is the same as described below in “**3.4. Autostart**” → **Page 9**

Hint:

The triggered sounds are fix (as set by the TBS Flash program) and can not be selected during teaching. They can be changed by the optional USB programming cable.

3.2.2. Teaching the direct sound selection using Prop3 input

This is a **alternative** method for direct sound selection. It can be used if the model has two speed channels. In this case Prop2 input can be used as a second speed input.

1. Power on transmitter and receiver. LED blinks fast -> normal mode
Bring all joysticks to neutral position. Model must not move.
2. Press the prog. button 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 switching direction of the switch
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 direction of the switch, because it is already occupied.
7. Repeat step 6 to **skip** further sounds
8. If your desired special sound comes up **next** flick the switch **DOWN**
9. Switch soundunit **off** and **on**.
10. Now you can select the two selected sounds directly by the switch.

Hint:

- The control mode for Prop3 must be set to “**12 position encoder**”
- The 3-pos switch receiver channel must be connected to **Prop3**
- You may run the teaching sequence several times because you don't know at the very first run which sound appears next in the soundlist.
- Advantage of this direct sound selection is, that you can choose the desired sounds during teaching

3.3. Indirect soundselection “2-Key Coder” on Prop3

Another control mode is using a 3 position switch with neutral position at a spare proportional channel. A common joystick can also be used.

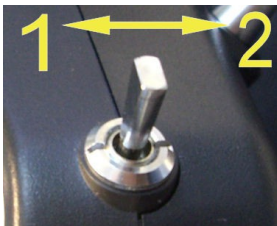
A attached servo must leave its center/neutral position when the switch is pressed in one direction and must return to its center position when the switch is released. Pushing the switch in the opposite direction causes the servo moving to the other side.

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 teaching the sound unit.

Selecting a Sound:

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



- 1: Selection of sound / action (1-12)**
- 2: Triggering of selected sound / action**

3.3.1. Teaching the sound unit for “2-Key Coder” control

1. Power on transmitter and receiver. LED blinks fast -> normal mode.
Bring throttle stick(s) to neutral and the 3-position control switch at the transmitter to its center position
2. Press the programing button -> Beep and LED permanent on.
At this moment all neutral positions are stored.
3. Move throttle stick to your desired acceleration point and keep this position.
(throttle stick position where the engine sound leaves idle)
4. Flick the 3-position control switch at the transmitter and set it back to center
-> A short sequence of acceleration is played.
5. Move the throttle stick to full speed and keep this position
6. Flick the 3-position control switch at the transmitter and set it back to center
-> A short sequence of full speed is played.
7. Soundunit returns to normal operation mode → Green LED is blinking fast

3.4. Autostart

If you are interested only in engine sound, the “autostart” mode can be used. The engine starts automatically at first short acceleration.

If the engine is more than 20s idle, it shuts down automatically. There is no extra control channel necessary.

No special sounds can be played in this mode and **NO switching outputs** can be used !!!!

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. Press the programing button 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 and wait for a beep
4. Move the throttle stick to full speed position and wait for three beeps.
5. After this the sound unit is back in the normal operation mode.

During the programing sequence:

After you left 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.

4. Changing a already set control mode

It is possible to change the set control mode **without** the optional programing cable:

1. Press the programing button **DURING** powering the soundunit
2. Release the button
3. Press the prog. button momentarily and wait for the “Beep-Code”
4. Repeat pressing the button 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 | -> | Indirect sound selection (2-Key coder) |
| 3 x Beep | -> | 12 position encoder |

Note:

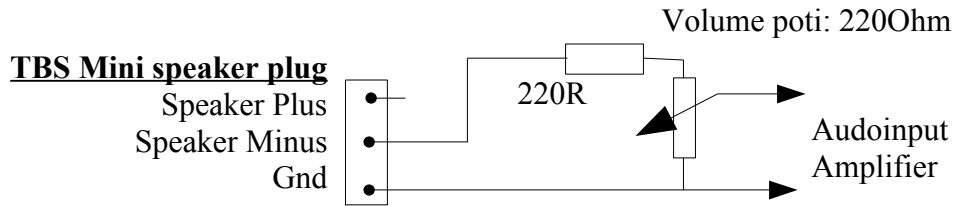
If the control mode “Autostart” is selected, there is no control channel defined.

If you want to switch from Autostart back to another control mode you need to select a control channel by the optional programming cable!

5. Connecting an external amplifier

If you want to connect an external amplifier, other than a Benedini one, please follow this schematic:

Watch ground connection !!!!



6. Configuration of the soundunit by the optional programming cable and a common PC

Please see the separate manual for the configuration software called “TBS Flash”.

The manual as well as the software is available free of charge at www.benedini.de.

Note: The soundunit must be powered from the receiver or a receiver battery while being connected. It is **NOT** powered by the USB cable!

7. Technical datas

Supplyrange:	3,5 – 12V (from receiver)
Internal amplifier:	1,2W at 8 Ohm and 5V supply
Switching outputs:	Negative switching, max. 12V/0,5A each
Dimensions:	55x25x10mm
Weight:	about 6g

!!!! SAFETY ASPECTS !!!!

- You must do a **range check** of your remote control with **running** sound system !
- Ensure a proper working radio under **ALL** conditions !
- **Receiver Power supply:**

If a **speed controller BEC** is used for powering the receiver, it is highly recommended using a separate servo **Y-cable** for connecting the **receiver** to the **ESC** and the **TBS Mini** (speed channel). In this case the receiver is powered **directly** and not via the two Prop1 connectors of the TBS Mini. Maximum current of the Prop1 connectors is **3A**, if according wires are used!

- The switching outputs of the TBS Mini **MUST** not be used to trigger any dangerous actions in the model (f.e. triggering any firing mechanisms)

Disclaimer

- 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.
- 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.
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Technical changes reserved

Not suitable for children under 14 years

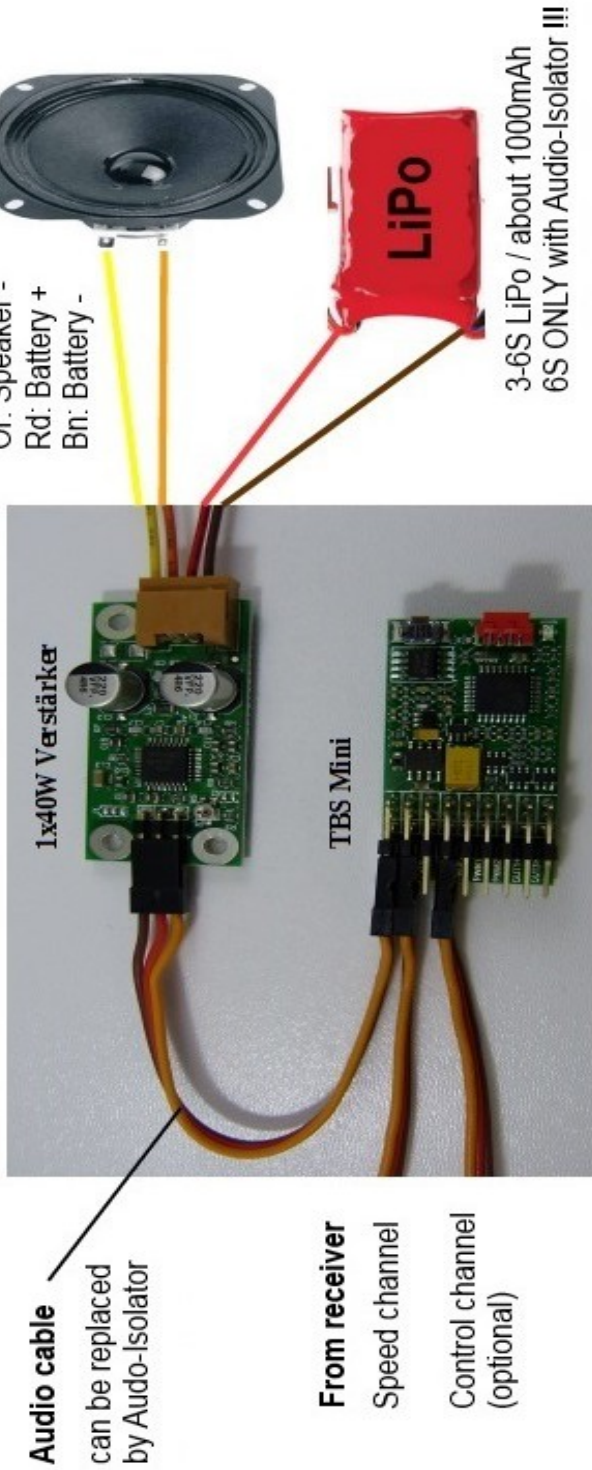


Benedini Modellbauelektronik
Müllergasse 15, 52159 Roetgen, Germany
Web: www.benedini.de
Mail: Thomas@Benedini.de



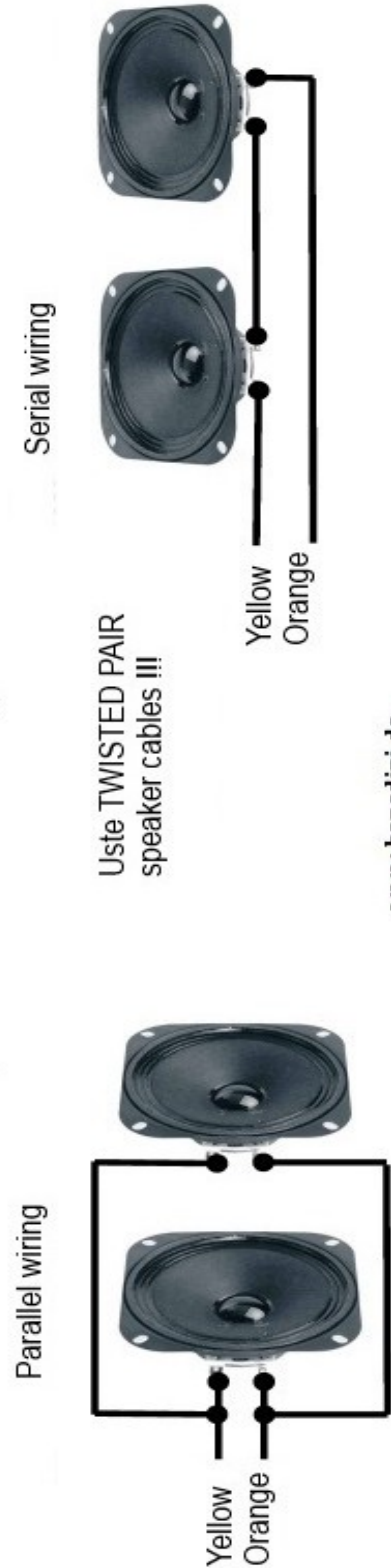
Standard wiring of TBS Mini in “Autostart” control mode, together with 1x40W amplifier

Standard wiring TBS Mini + 1x40W external amplifier



Connecting two speakers to the 1x40W amplifier

-> Amplifier manual states the wiring version to use



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