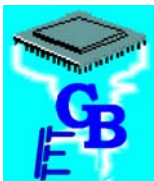
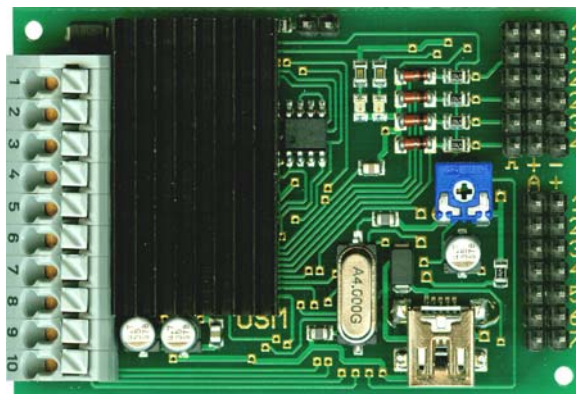


Operating Manual

Sound module USM-RC V1.10



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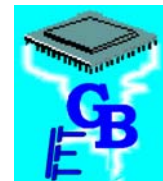


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Introduction

The Sound module USM-RC was developed for the RC model construction in order to equip models, with an as faithful as possible, speed-dependent driving sound (e.g. engine sound). To make the background noise perfect, in addition to the driving sound, up to 16 additional sounds can be played. Automatic turn on-, turn off, starting-, stopping-, idling-, braking- and driving noises can also be played. Also another 8 conveniently configurable random sounds are possible.

The sound output occurs on this module four channeled, so in addition to the driving sound, 3 further additional-/random sounds simultaneously can be played.

The information of the driving speed (up to 75 steps!) can be taken from 1 to 2 motors (analogous operation), or 1 to 2 proportional channels (digital operation) of the receiver are used for the speed information.

All sounds can be changed at any time on the Sound module. For this purpose, only a Windows PC with an USB port and our software "USM-RC Sound-Teacher" is necessary. You can use this Sound module for the most different kinds of models.

Since there is already an efficient audio amplifier on the board, only a loudspeaker needs to be connected for the sound output.

At 7 switching outputs for example LEDs, lamps, relays can be connected, and different lighting effects (light, stop light, indicators, hazard warning light, MG fire, flickering-light and so forth) can be realized.

Safety notes

- Read this operating manual carefully and keep it for a future use well!
- The integrated circuits on the Sound module are sensitive to electrostatic charge. You may not touch therefore these components, before you don't have discharged yourself (e.g. through a grip onto a grounded device).
- To guarantee an interference-proof operation, the Sound module should be built in a suitable case.
- The Sound module may be use only with those, in the technical data given supply voltages.
- Always switch off power before connecting the module!
- For children under 14 years, the using of the Sound module is not suitable.

| Technical Data | |
|---|---|
| Supply Voltage (U_b): | 5 – 14V DC |
| Power consumption: | Standby-current: ca. 30mA Operation (only sound): max. 0,4A Operation (sound + switching outputs): max. 2,5A |
| Switching-inputs: | 5 pieces LO-Signal = U < 2V HI-Signal = U > 5V Integrated pull-up resistors (4k7/10k) |
| Switching-outputs: | 7 pieces max. 0,3A (npn – open collector) universal, freely programmable e.g. - light - reverse drive light - stop light - indicators (left and right)/hazard warning light |
| Proportional Inputs: | 4 pieces |
| Voltage inputs for drive speed: | 0 – 14V DC |
| Audio amplifier: | max. 3W |
| Recommended loudspeakers: | at U _b 5,0 – 9,6V: 8 – 16Ω (3 – 20W) at U _b 9,6 – 14,0V: 16 – 32Ω (3 – 20W) |
| Volume control: | By external potentiometer (100kΩ) and/or remote control possible |
| Memory for sound files : | 4MB Flash (32MBit) |
| Max. length for the sounds: | 380s (at 11kHz) |
| Supported sound files: | WAV-format, 8 bit, mono, 11kHz or 22kHz |
| Sound output: | 12 bit D/A-converter |
| Number of possible sounds: | 75 for driving noise in full load 75 for driving noise in partial load 1 turn on noise (automatic) 1 turn off noise (automatic) 1 starting noise (automatic) 1 stopping noise (automatic) 1 idling noise (automatic) 1 brake noise (automatic) 1 reverse driving noise (automatic) 4 additional sounds (via inputs) 12 additional sounds (via prop.-channels) 8 random sounds (random generator) |
| Random generator: | Times between 1 to 250s adjustable |
| Interface: | USB 2.0 Mini B |
| Permissible ambient temperature: | 0 – 60°C |
| Permissible relative air humidity: | max. 85% |
| Measurement: | 67 x 44 x 16 mm |

Operating Modes: Digital- and analogue operation

In order to make the Sound module as universally usable as possible, 2 different operating modes are available. Since the operating mode is very decisive for the possible functions, and particularly for the connection of the Sound module, it should be decided now at the beginning, which one of the two operating modes is better suitable for the respective model. The operating mode of the Sound module is set in the USM-RC Sound-Teacher (see page 37).

If possible, always the digital operation should be used, because this offers more functions than the analogous operation.

Digital operation:

The digital operation will be presumably always be used if you use standard RC remote control radios and receivers with PPM-signals. Here is the Sound module connected directly to the RC-receiver, and it recognizes the driving speed directly from 1 or 2 proportional channels (parallel to the speed controller). Via 2 more proportional channels, up to 12 additional sounds can be played, the engine sound can be switched on and off, the volume can be adjusted, also light and indicators can be switched. Via digital switching inputs also another 4 more additional sounds can be played.

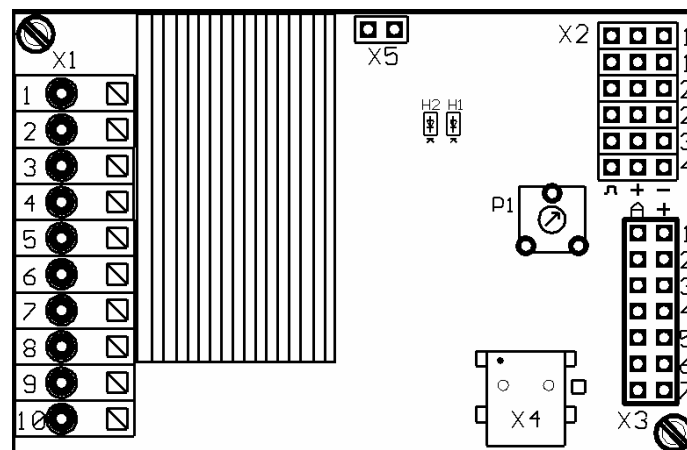
Analogous operation:

The analogous operation always becomes used, if you didn't have „standard“ RC equipment.

In the analogous operation the driving speed is determined by a voltage measurement of 1 or 2 motors. In order to activate additional sounds, or turn on and switch off the engine sound, the digital switching inputs of the Sound module must be connected here (e.g. with switching modules).

Because of the missing proportional channels, as many functions unfortunately are not possible in the analogous operation, as in the digital operation. So for example you can only activate 6 additional sounds with 6 switching inputs. Also the light and the volume cannot be switched or controlled here by the remote control.

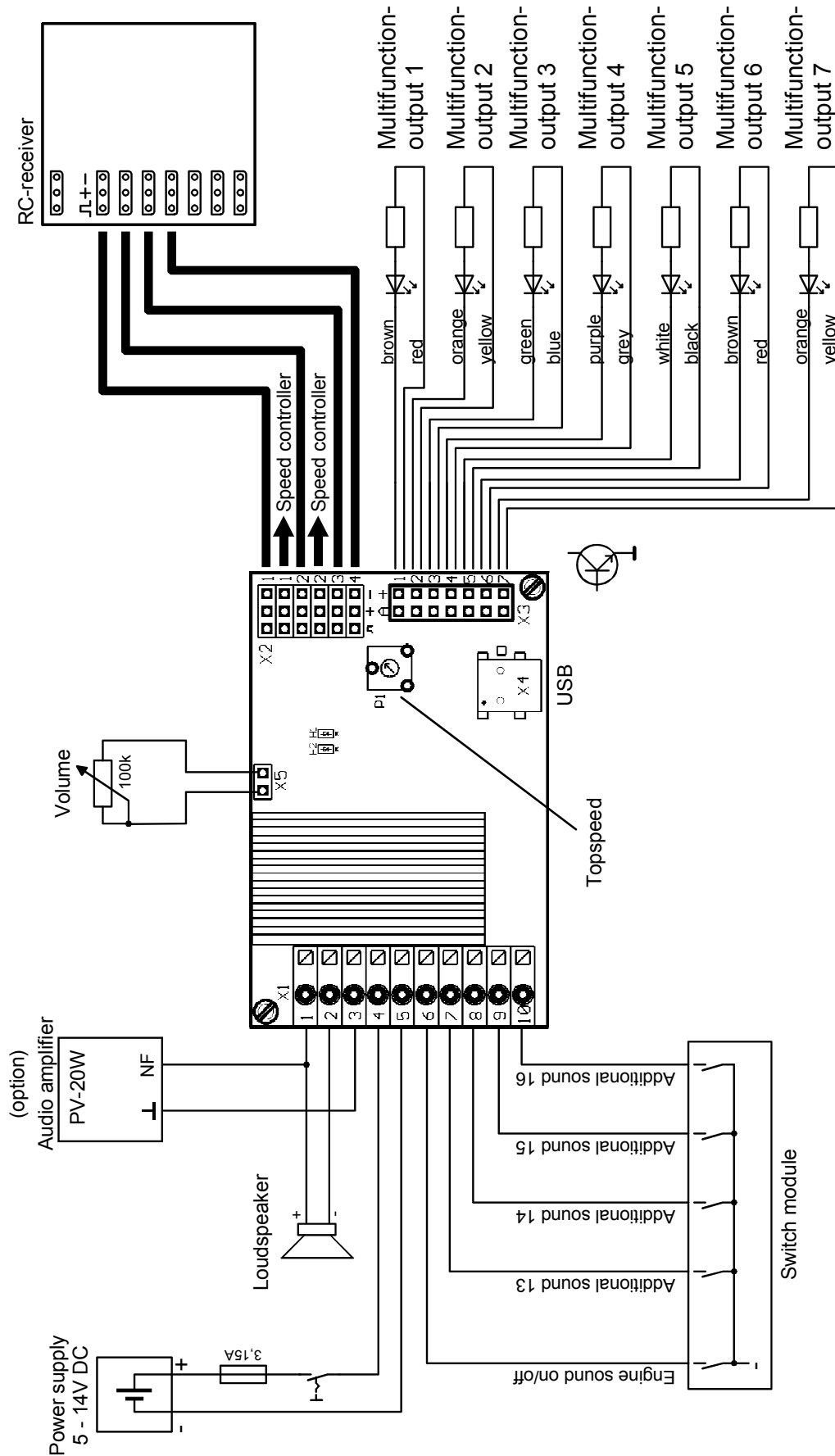
Pin assignments in digital operation



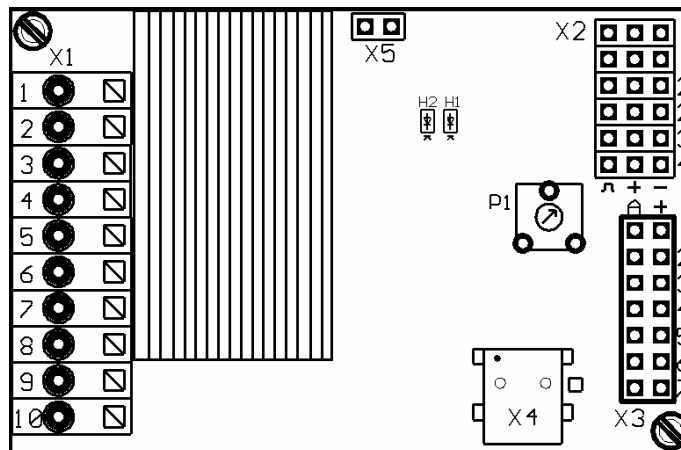
Connections on the Sound module:

| | |
|--------------|--|
| X1/1 | Loudspeaker + |
| X1/2 | Loudspeaker - |
| X1/3 | Ground for additional audio amplifier |
| X1/4 | Supply voltage + (5 – 14V DC) |
| X1/5 | Supply voltage - |
| X1/6 | Input for engine sound on/off |
| X1/7 | Input for additional sound 13 |
| X1/8 | Input for additional sound 14 |
| X1/9 | Input for additional sound 15 |
| X1/10 | Input for additional sound 16 |
| | |
| X2/1 | Connection for proportional channel 1 (speed) |
| X2/2 | Connection for proportional channel 2 (speed or additional sound 9-12) |
| X2/3 | Connection for proportional channel 3 (additional sound 1-4) |
| X2/4 | Connection for proportional channel 4 (additional sound 5-8) |
| | |
| X3/1 | Connection for output 1 |
| X3/2 | Connection for output 2 |
| X3/3 | Connection for output 3 |
| X3/4 | Connection for output 4 |
| X3/5 | Connection for output 5 |
| X3/6 | Connection for output 6 |
| X3/7 | Connection for output 7 |
| | |
| X4 | USB connector |
| | |
| X5 | Connection for the potentiometer for the volume control |

Wiring diagram for digital operation



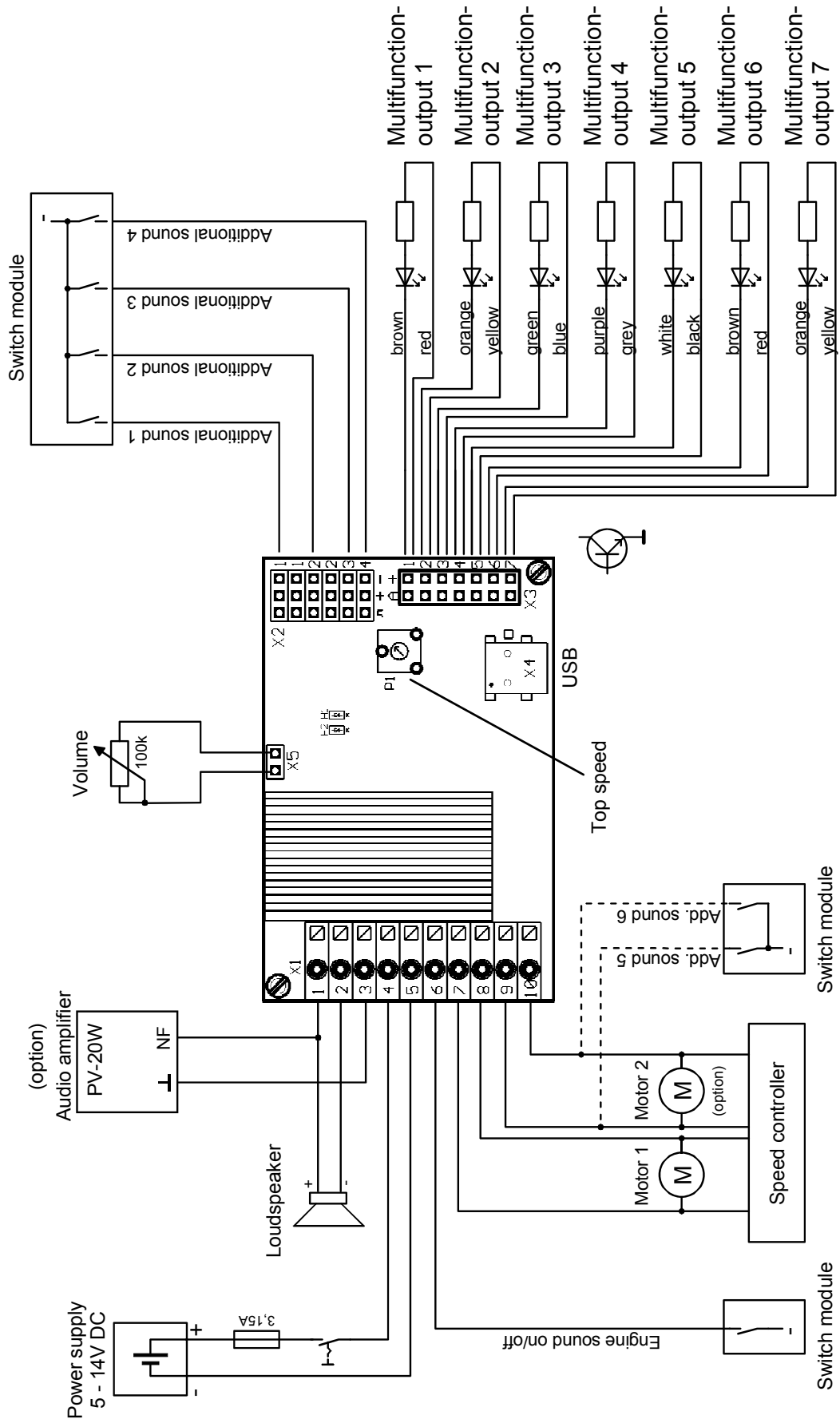
Pin assignment in analogue operation



Connections on the Sound module:

| | |
|--------------|---|
| X1/1 | Loudspeaker + |
| X1/2 | Loudspeaker - |
| X1/3 | Ground for additional audio amplifier |
| X1/4 | Supply voltage + (5 – 14V DC) |
| X1/5 | Supply voltage - |
| X1/6 | Input for engine sound on/off |
| X1/7 | Motor 1 (speed) |
| X1/8 | Motor 1 (speed) |
| X1/9 | Motor 2 (speed)/Input for additional sound 5 |
| X1/10 | Motor 2 (speed)/Input for additional sound 6 |
| | |
| X2/1 | Input for additional sound 1 |
| X2/2 | Input for additional sound 2 |
| X2/3 | Input for additional sound 3 |
| X2/4 | Input for additional sound 4 |
| | |
| X3/1 | Connection for output 1 |
| X3/2 | Connection for output 2 |
| X3/3 | Connection for output 3 |
| X3/4 | Connection for output 4 |
| X3/5 | Connection for output 5 |
| X3/6 | Connection for output 6 |
| X3/7 | Connection for output 7 |
| | |
| X4 | USB connector |
| | |
| X5 | Connection for the potentiometer for the volume control |

Wiring diagram for analogue operation



Installation of the Sound module

In order to fix the Sound module in the model, 2 mounted holes with $\varnothing 2,1\text{mm}$ are available. Pay attention that no components or conducting paths of the board touch any metal parts during the installation of the module! This can induce to short-circuit which can destroy the Sound module and connected devices.

Connection of the Sound module

The connection of the supply voltage, the connection of the loudspeaker and the connection of the outputs are always identical, independent whether you would like to use the module in the digital or analogous operation.

The remaining wiring is dependent in which operating mode you want to use the module.

Always switch off power before connecting the module!

The terminal X1 is a spring cage terminal which allows a fast and simple connection of the Sound module. To put a wire in or out, you simply push in from above, with a small screwdriver, onto the actuating lever of the terminal. The wires should be approximately 7-8mm stripped and before connecting ideally be tin-plated.

Connection of the supply voltage (battery):

The Sound module is designed for a DC voltage of 5V to 14V. You connect the positive pole to terminal X1/4 and to terminal X1/5 the negative pole of the supply voltage. If the supply voltage is connected correctly, the green LED light.

We recommend switching also a fuse (3,15A) into power line, so if you have a wrong wiring or a defect, you don't get any greater damages at your model and the Sound module.

As an option you can connect a switch into the power supply of the Sound module to make it powerless. There is especially an advantage with battery used models, if you don't want to have a permanently sound.

Connection of the loudspeaker:

The positive pole of the loudspeaker is connected into the terminal X1/1 the negative pole is connected into the terminal X1/2.

Connection of the outputs:

The 7 outputs of the module are on the pin connector X3. We recommend using the supplied, attachable ribbon cable. Of course you can also connect other wire/plugs to the pin connector. Per output there are always 2 pin's available, at which the load (e.g. lamps, LEDs, small engines) can be connected.

The pin at the board edge is the positive pole; the output (switched negative pole) is next to the pin

| Output | Ribbon cable | |
|--------|--------------|------------|
| #1 | brown (-) | red (+) |
| #2 | orange (-) | yellow (+) |
| #3 | green (-) | blue (+) |
| #4 | purple (-) | grey (+) |
| #5 | white (-) | black (+) |
| #6 | brown (-) | red (+) |
| #7 | orange (-) | yellow (+) |

So that the cable colors are right, the ribbon cable must be put on correctly on the connector (it could be put up theoretically rotated around 180°, however, the configuration is changed then). The brown wire must point above (board middle), the yellow below (board edge).

The switched voltage at the outputs is always as high, as the supply voltage of the Sound module. If the Sound module is supplied e.g. with 12V, only lamps with 12V should be connected. If you want to connect LEDs, series resistors are always needed. In addition attention must be paid at LEDs to the correct polarity. The series resistors for the LED's are depended from the supply voltage, the LED-color and the LED-current. Modellers familiar with electronics will certainly be able to calculate the ideal value for the model's LEDs, but everyone else should refer to the small table below, which shows the resistance values required for standard LEDs (approx. 15mA rating):

| Supply voltage | Series resistor |
|----------------|-----------------|
| 6V | 270 Ohm |
| 7,2V | 330 Ohm |
| 8,4V | 470 Ohm |
| 9,6V | 510 Ohm |
| 12V | 680 Ohm |

If multiple LEDs are connected to one output (e.g. front and rear direction indicators), it is always better to use separate dropping resistors than to wire the LEDs in series.

Connection of an external audio amplifier (option):

To the terminals X1/1 and X1/3 an additional audio amplifier can be connected. We recommend using our **PV-20W** as audio amplifier. This amplifier is optimally designed for the USM-RC Sound module. Of course also other amplifiers can be connected, but a voltage divider which divides the audio-voltage, to the voltage of the audio-input, of the used amplifier is needed.

General references to the wiring in the model:

Unfortunately the speed controllers and motors in the model are often strong interference sources, which can disturb the electronic of the Sound module or the sound output (whistles, humming in the loudspeaker). Therefore all motors should absolutely be suppressed!

It is also important to pay attention, to most possible „clean" wire routing. You should use always short wires and don't make any unnecessary loops. The wires for the supply voltage of the Sound module, should be connected to the driving-battery as direct as possible, and not connected over the same wires with other devices or speed controllers.

Connection of the Sound module in digital operation

Connection of the proportional channels

At connectors X1/1 - X1/4 up to 4 proportional outputs of an RC receiver can be connected. You use the 2 supplied servo patch cables for the connection. If more than 2 proportional channels should be connected, further servo patch cables are needed, which you can order in our shop.

There is a labeling that characterizes where the 4 channels on the board are. The channels #1 and #2 are carried out twice, so the proportional signal keeps on being able to be continued directly to the speed controller or servo. If further speed controllers or servos should be connected to the channels #3 and #4, Y-cables are needed.

To put on the servo patch cables onto the Sound module, be sure that the brown wire points to the board edge (to the right), the orange wire to the board middle (to the left).

With the 4 proportional channels following functions on the Sound module can be triggered:

| Channel | Model with 1 motor | Model with 2 drive motor |
|---------|---|---|
| #1 | speed-dependent driving noise | speed-dependent driving noise |
| #2 | additional sounds 9-12 light, indicators, hazard warning light | speed-dependent driving noise |
| #3 | additional sounds 1-4 one-channel multifunction select | additional sounds 1-4 one-channel multifunction select |
| #4 | additional sounds 5-8 driving sound on/off volume control | additional sounds 5-8 driving sound on/off volume control |

If you have a model with 2 motors (e.g. chain vehicle) and use the proportional channel #2 for the driving speed identification, unfortunately you can't activate the additional sounds 9-12 with this proportional channel. In the same way, no outputs for light, indicators and hazard warning light can be switched then.

Connection of the switching-inputs

At the terminals X1/7 - X1/10, the additional sounds 13-16 can be triggered. To activate a sound, the negative pole of the supply voltage must be switched to the respective input. Normally switch modules are used for this (as our RC-SM-2 or other standard multi-switch-modules). Because these switch modules are all negativ-switched, only the outputs of the switch module must be connected to the inputs of the Sound module.

Terminal X1/6 is the switching-input, with which the engine sound is turned on and off. For switching, simply the negative pole (e.g. by a switch module or switch) must be connected to this input.

In the digital operation, the engine sound can also be switched directly with the proportional channel #4.

Connection of the sound operation in analogue mode

Connection of the motors

In the analogous operation, the driving speed is determined by the motor voltage. 1 or 2 DC motors can be connected to the terminals X1/7 / X1/8 and X1/9 / X1/10. The connection to the Sound module occurs parallel to the existing connections of the speed controllers which powers the motors.

To the polarity of the motor connections, attention must be paid only if you want to use the output for the reverse driving light. If the reverse driving light shines at the forward drive, the connections must simply be changed.

If only 1 motor is connected, the terminals X1/9 and X1/10 can be used as switching-inputs, with which 2 more additional sounds and the indicators can be activated.

Connection of the switching-inputs

At the connectors X2/1 - X2/4, the additional sounds 13-16 can be triggered. The input pin is the left pin (direction board middle). The other two pins do not have any functions.

To activate a sound, the negative pole of the supply voltage must be switched to the respective input. Normally switch modules are used for this (as our RC-SM-2 or other standard multi-switch-modules). Because these switch modules are all negativ-switched, only the outputs of the switch module must be connected to the inputs of the Sound module.

Terminal X1/6 is the switching-input, with which the driving sound is turned on and off. For switching, simply the negative pole (e.g. by a switch module or switch) must be connected to this input.

If this switching-input is not connected, the driving sounds will be always switched off!

Functional assignment at proportional channels #1- #4

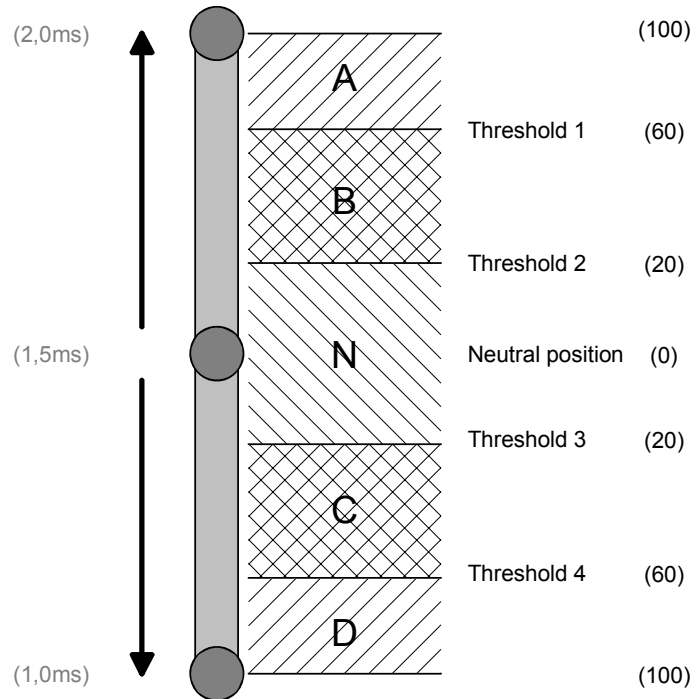
The proportional channel #1 is responsible only for the speed recognition. The other 3 channels have several functions. If channel #2 is used also for the speed determination, the other functions (light, indicators, additional sounds 9-12) are not available.

To occupy the proportional channels #2 - #4 with several functions, these channels are split into the 5 areas "A, B, N, C and D". These areas represent the possible positions of a stick.

The area N is the neutral position that is the center position of the stick.

The same principle is valid also for a horizontal stick. The area A is in this case to the left and area D to the right.

The areas can also be adjusted/optimized to your remote control, by setting the 4 thresholds in the USM-RC Sound-Teacher.



Assignment of channel #2:

| Position | Function | |
|----------|---|-----------------------------|
| | short (0,5-1,0s) in position | long (>2,5s) in position |
| A | additional sound 9 (#22) indicator left on/off | light on/off |
| B | additional sound 11 (#24) | |
| C | additional sound 12 (#25) | |
| D | additional sound 10 (#23) indicator right on/off | hazard warning light on/off |

Assignment of channel #3:

| Position | Function |
|----------|--------------------------------|
| A | additional sound 1 (#10 - #12) |
| B | additional sound 3 (#16) |
| C | additional sound 4 (#17) |
| D | additional sound 2 (#13 - #15) |

Assignment of channel #4:

| Position | Function | |
|----------|------------------------------|--------------------------|
| | short (0,5-1,0s) in position | long (>2,5s) in position |
| A | additional sound 5 (#18) | volume control on |
| B | additional sound 7 (#20) | |
| C | additional sound 8 (#21) | |
| D | additional sound 6 (#19) | engine sound on/off |

Of course, you do not have to use all the functions listed here. This overview is only intended to indicate all the possibilities of channels #2 - #4.

In order to activate the additional sound 5 for example, the stick of proportional channel #4 must be brought from center position N to position A. This movement should be done quite fast (< 0, 5s), because the movement of the stick goes also through the area B. If you move the stick too slowly, also the additional sound 7 would be played.

Neutral position

You can configure in the Sound-Teacher, whether the neutral position of the 4 sticks should be read in automatically after switching on the power supply of the Sound module, or whether the neutral position is put on the usual default value (1,5ms) firmly.

If the automatic neutral position search is used, pay attention that the sticks are really in neutral position, during the switch-on of the Sound module!

Stick simulation with switches

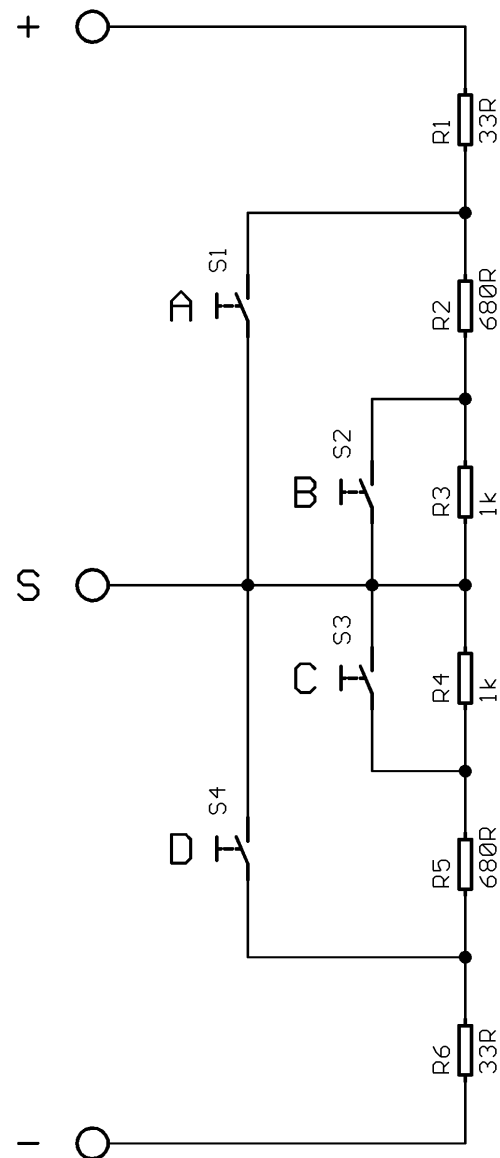
To use all functions of the proportional channels #2 - #4 conveniently, you can simulate the different potentiometer positions of a stick, through a simple keystroke. If you press the key S1, a stick position is simulated for position A.

Often the available sticks are already reserved by other functions, but the remote control has still other free channels. This schematic can be used for the further channels to activate the additional sounds.

You need only 6 resistors and 4 switches for this per channel.

With the indicated resistors values, this schematic should work with all standard remote controllers. If needed, you can also configure the thresholds of the 5 areas in the Sound-Teacher.

How and where this schematic is connected in the remote control, is unfortunately always a little different according to manufacturer and model.



Loudspeaker

You can connect every loudspeaker to the Sound module USM-RC, which has an impedance of 8 - 32Ω and was designed for the respective maximal power. The maximum power and the volume of the Sound module, is depending very much from the height of the supply voltage and the loudspeaker impedance.

The following table shows which maximum sine-wave power at different voltages and loudspeaker impedances can be reached.

| | U=6V | U=7,2V | U=8,4V | U=9,6V | U=12V |
|---------------------|-------------|---------------|---------------|---------------|--------------|
| Power at 8Ω | 1,3W | 2,0W | 3,0W | 4,1W | - |
| Power at 16Ω | 0,6W | 1,0W | 1,5W | 2,1W | 3,5W |
| Power at 32Ω | 0,3W | 0,5W | 0,7W | 1,0W | 1,7W |

If the supply voltage of the Sound module is over 9,6V, only loudspeakers with an impedance of 16Ω may be connected. Otherwise the amplifier circuit could become too hot.

If only loudspeakers with 8Ω are available to you, you can connect also 2 pieces in series to get 16Ω.

To reach an optimal volume and sound quality, the loudspeaker must be installed in a suitable resonating body.

If the volume of the integral output stage is not sufficient for your purpose, or if you wish to use lower-impedance speakers (2 - 4Ω), then you might wish to connect the more powerful external amplifier (e.g. our PV-20W).

At every amplifier a certain heat arises through power dissipation that must be mentioned by a cooling element into the air. Generally attention should always be paid to heat dissipation as good as possible (air circulation).

Volume control

A volume control is possible by an external potentiometer (100k Ω).

You connect this potentiometer to connector X3 (see wiring diagram, page 7).

If no potentiometer is connected, always the maximum volume is spent.

If the Sound module is used in the digital operation, the volume can be controlled also by the remote control. The proportional channel #4 is used for that. To activate the volume adjustment, the stick must be brought for at least 2,5s in position A. After this, the volume control is active. You will recognize this also by the red LED on the Sound module which lights during the activated volume control.

If you move the stick now in position D, the sound becomes louder. In position A the Sound becomes quieter. In order to hear, how you adjust the volume, it is of course reasonable, to switch the engine sound on, before adjusting the volume.

If the stick from channel #4 is not moved for 5s anymore, then the volume controlling is switched off. The red LED turns off and the sound output is interrupted very shortly. The stick has now his normal function.

General notes to the volume

Please also notice that the sound data's which you transfer into the Sound module should have an optimal modulation. Therefore e.g. not already record the sounds much too quiet.

With the supplied software „GoldWave" you can adjust the volume of the single sound files accord to your wishes.

With low supply voltage (e.g. 6V) it can happen that the Sound is overdriven, so it can come to an unclean sound output (scratch noise). In this case, the volume should be turned down a little.

Sounds

All sounds are stored in the Sound module with our software USM-RC Sound-Teacher, in so called „slots". Generally we can say, you don't have to occupy every slot with a sound. If you don't want e.g. any starting-noise, let the slot #3 simply free.

Here an overview, which sounds in which slots, can be stored:

| Slot | Sound |
|------|--|
| #1 | Turn on noise |
| #2 | Idling noise |
| #3 | Starting noise (idling → drive) |
| #4 | Driving noise (depend on speed) |
| #5 | Driving noise partial load (depend on speed) |
| #6 | Stopping noise (drive → idling) |
| #7 | Turn off noise |
| #8 | Reverse driving noise |
| #9 | Brake noise |
| #10 | Additional sound 1 (Tune in) |
| #11 | Additional sound 1 (Loop) |
| #12 | Additional sound 1 (Tune out) |
| #13 | Additional sound 2 (Tune in) |
| #14 | Additional sound 2 (Loop) |
| #15 | Additional sound 2 (Tune out) |
| #16 | Additional sound 3 |
| #17 | Additional sound 4 |
| #18 | Additional sound 5 |
| #19 | Additional sound 6 |
| #20 | Additional sound 7 |
| #21 | Additional sound 8 |
| #22 | Additional sound 9 |
| #23 | Additional sound 10 |
| #24 | Additional sound 11 |
| #25 | Additional sound 12 |
| #26 | Additional sound 13 |
| #27 | Additional sound 14 |
| #28 | Additional sound 15 |
| #29 | Additional sound 16 |
| #30 | Random sound 1 |
| #31 | Random sound 2 |
| #32 | Random sound 3 |
| #33 | Random sound 4 |
| #34 | Random sound 5 |
| #35 | Random sound 6 |
| #36 | Random sound 7 |
| #37 | Random sound 8 |

Engine sound (Slot #1 - #9)

The engine sound consists of several single noises. Normally there is a turn on noise, idling noise, driving noise and turn off noise. This Sound module offers also the possibility to imitate a driving noise under partial load, a reverse driving noise, a brake noise, a starting noise and a stopping noise. All engine sounds (therefore also the reverse driving and brake noise) play only when the engine sound is switched on.

Turn on noise (#1)

The turn on noise is played when the engine sound is switched on. After the turn on noise was played, the sound changes into the idling noise.

If the engine sound is switched on and the vehicle is already in motion, the turn on noise will skip and the module directly plays the driving noise.

Idling noise (#2)

The idling noise is always played when the vehicle is in idle. The sound is played in an endless loop. It suffices therefore, when in this sound slot a relatively short sound (approx. 1-2s) is stored.

Starting noise (#3)

The starting noise is played uniquely when the vehicle sets off (idle → drive).

Driving noise (#4)

The driving noise is always played when the vehicle drives. The driving noise is always played like the idling noise in an endless loop. The playing speed is dependent on the speed of the vehicle. The Sound module recognizes how fast the vehicle moves, and plays the driving noise also in the corresponding speed. In this sound slot the driving noise is stored in the **slowest** driving speed. The Sound module produces all faster driving steps (up to 75) itself.

Driving noise in partial load (#5)

When the driving speed of a real vehicle is reduced, the sound character of the driving noise changes (engine produces less power). This effect is also possible with this Sound module. In slot #5 "another" driving noise can be stored, that always is played when the driving speed is reduced. The driving-noise in partial load is played speed-dependently, too.

Stopping noise (#6)

The stopping noise is played uniquely when the vehicle stops (drive → idle).

Turn off noise (#7)

The turn off noise is played when the engine sound is switched off.

Reverse driving noise (#8)

The reverse driving noise is played when the vehicle drives backwards. This could be e.g. the beeping of a reverse driving warn sound of a truck.

Brake noise (#9)

The brake noise is played when the driving speed is strongly reduced.

In the folder „USM-RC Sounds”, on the supplied CD-ROM, you will find some exemplary sounds for different vehicle types. In order to store a new sound on the Sound module, simply start the program „USM-RC Sound-Teacher”, open an *.usm project file that is in the respective folder and upload the new sound with the USB cable to the Sound module.

The great advantage of this Sound module is that you also are able to edit and compile your own driving noises. That could make your model into a unique, individual object.

Additional sounds 1 - 16 (Slot #10 - #29)

With the proportional channels and the switching-inputs, according to operation mode (digital or analogue) and number of motors, up to 16 different additional sounds can be played.

To play an additional sound, it must be started with a start pulse. This happens either, if you activate the corresponding switching-input shortly or, in the digital operation, putting the stick into the corresponding position (A, B, C or D).

| Additional sound (Slot) | Digital operation | Analogue operation |
|-------------------------|-------------------|--------------------|
| 1 (#10 - #12) | Prop. #3 - Pos. A | X2/1 |
| 2 (#13 - #15) | Prop. #3 - Pos. D | X2/2 |
| 3 (#16) | Prop. #3 - Pos. B | X2/3 |
| 4 (#17) | Prop. #3 - Pos. C | X2/4 |
| 5 (#18) | Prop. #4 - Pos. A | X1/9 |
| 6 (#19) | Prop. #4 - Pos. D | X1/10 |
| 7 (#20) | Prop. #4 - Pos. B | - |
| 8 (#21) | Prop. #4 - Pos. C | - |
| 9 (#22) | Prop. #2 - Pos. A | - |
| 10 (#23) | Prop. #2 - Pos. D | - |
| 11 (#24) | Prop. #2 - Pos. B | - |
| 12 (#25) | Prop. #2 - Pos. C | - |
| 13 (#26) | X1/7 | - |
| 14 (#27) | X1/8 | - |
| 15 (#28) | X1/9 | - |
| 16 (#29) | X1/10 | - |

The two additional sounds 1 and 2 offers a special feature:

These sounds consist in each case of 3 single sound slots. When the additional sound 1 is started, the slot #10 is played at first once (tune in). Then the sound changes to the slot #11 (loop) and plays this slot in an endless loop so long as the start signal for the additional sound 1 is still present. When the start signal for additional sound 1 disappears, the slot #12 (tune out) is played uniquely. Additional sound 2 works in same principle.

In this way, now such things like a ship horn with variable length (without a hard cut at the end), can be realized. Also for example a MG fire can be fitted with a beautiful reverberation.

The tune in and the tune out slots are only options which can be used. You can let these slots also simply free.

For additional sounds 3-16 various playback modes can be set up using the USM-RC Sound-Teacher. In this way it is possible to fine-tune every additional sound to produce a perfect match to your particular mode.

Sound playback modes when triggered using proportional channels #2 - #4:

| Mode | Function |
|---------------------|---|
| Once/Complete | When the sound is started, it is played exactly <u>once</u> , from start to finish, and then stops. It is not possible to halt the sound prematurely; it is <u>always</u> played back completely. |
| Once/Immediate stop | When the sound is started, it is played exactly <u>once</u> , from start to finish, and then stops. However, if the sound is started again while it is already or still running, the sound is then <u>stopped immediately</u> . |
| Loop/Complete | When the sound is started, it is played again and again from start to finish in an <u>endless loop</u> . To switch the sound off again it must be virtually "started" again. The sound then runs from start to finish once more <u>completely</u> , and then stops. |
| Loop/Immediate stop | When the sound is started, it is played again and again from start to finish in an <u>endless loop</u> . To switch the sound off again it must be virtually "started" again. The sound then <u>stops immediately</u> . |

Sound playback modes when triggered via switched inputs:

| Mode | Function |
|---------------------|---|
| Once/Complete | When the input is switched on, the sound starts and is played exactly <u>once</u> , from start to finish, and then stops. It is not possible to halt the sound prematurely; it is <u>always</u> played back <u>completely</u> . |
| Once/Immediate stop | When the input is switched on, the sound starts and is played exactly <u>once</u> , from start to finish, and then stops. However, if the input is switched off again while it is still running, the sound is then <u>stopped immediately</u> . |
| Loop/Complete | When the input is switched on, the sound is played again and again from start to finish in an <u>endless loop</u> . If the input is switched off again, the sound runs from start to finish once more <u>completely</u> , and then stops. |
| Loop/Immediate stop | When the input is switched on, the sound is played again and again from start to finish in an <u>endless loop</u> . If the input is switched off again, the sound then <u>stops immediately</u> . |

Random sounds (Slot #30 - #37)

Up to 8 random sounds can be played with the Sound module USM-RC. The point of time of the sound playback is determined then by a random generator. The time spans (min./max.) can, for every sound separately, be programmed by 1 – 250s. In the same way it can be programmed for each of the 8 random sounds, under which conditions (idling/drive - engine sound on/off) the sound should play. So you can define, e.g. at a tank a randomized “chain squeaking” is played, only during the drive and not in the idling.

Because the 8 random sounds run completely independently from each other, it could happen that 2 or even 3 of the random sounds are played simultaneously at once.

Turning on/off engine sound

To turn on and switch off the engine sound, the switching-input X1/6 must be connected. When this input is put e.g. over a switch module on the negative pole, the engine sound turns on. When this input is open, or not switched on the switch module, the engine sound turns off.

In the digital operation, the engine sound can also be turned on and switched off by the proportional channel #4. If you move the stick minimum for 2,5s in position D (see page 16), the engine sound will turn on or switch off. Here the switching-input X1/6 is not needed.

Adjusting the driving sound to the top speed

With the trimmer P1 the top speed sound can be adjusted. Run your model with the highest driving speed and turn the trimmer until the wanted speed of the driving-noise is reached.

Switching outputs

The Sound module has 7 outputs, which can be used to drive electrical consumer units such as lamps, light-emitting diodes, relays etc. Different switching functions can be assigned to the 7 outputs using the Sound-Teacher.

The following functions are possible:

- Static output when playing back one or more sounds
- Flashing output when playing back one or more sounds
- Flickering output when playing back one or more sounds
- Light
- Reversing light
- Brake light
- Indicator right
- Indicator left
- Output on when model is in motion
- Output on when model is stationary
- Output on when model is accelerating
- Output on starting from a user-defined running speed

“Static” output when sounds are played back

If this function is selected, the output is always switched on when the unit is actually generating a sound for which this output is selected. To accomplish this, the selected outputs have to be activated in the sound slots.

“Flashing” output when sounds are played back

This function is similar to the previous one, but the output flashes at a user-defined rate (frequency) while the sound is running, instead of being switched on continuously.

The flashing frequency can be set separately for each output in the Sound-Teacher. Values within the range 1 to 255 can be set: 1 corresponds to the fastest flashing frequency (50Hz) and 255 the slowest (0.196Hz).

The flashing frequency can be calculated as follows: $f = 1 / (\text{value} \times 0.02)$

“Flickering” output when sounds are played back

When this function is selected the outputs flicker at the same rhythm as the sound that is currently playing.

This can be used to generate some very impressive lighting effects, such as a simulation of fire or a welding torch.

The Sound-Teacher allows you to adjust the sensitivity of the flickering effect separately for each of the outputs; the range of values available is 1 to 255. The higher the value the higher the sound volume must be to activate the flicker effect.

“Light” output

The output for the light is only available in the digital operation mode, and only, if the proportional channel #2 isn't used for a second drive motor. To switch the light on/off the stick from channel #2 must be put longer than 2,5s in position A.

Of course this output can also be used to switch other systems, not only lights.

“Reverse driving light” output

The output for the reverse driving light is always switched on when the vehicle runs backwards. If the Sound module is configured for 2 drive motors, the reversing light is only triggered when both motors are running in reverse.

“Brake light” output

The brake light is always shortly turned on when the driving speed is reduced substantial. The sensitiveness can also be configured for that in USM-RC Sound-Teacher.

“Indicator left” output

To switch the indicator on or off, the stick of proportional channel #2 must be put very shortly in position A.

In the analogous operation the indicator is switched by the switching-input X1/9.

“Indicator right” output

To switch the indicator on or off, the stick of proportional channel #2 must be put very shortly in position D.

In the analogous operation the indicator is switched by the switching-input X1/10.

Hazard warning light

To switch the hazard warning light on or off, the stick of proportional channel #2 must be put for at least 2,5s into position D. In the analogous operation the two switching-inputs X1/9 and X1/10 must simply be activated. If the hazard warning light is turned on, the left and the right indicators are flashing.

“Motion” output

This output is always switched on when the model is in motion, whether it is moving forwards or in reverse.

“Stationary” output

This output is always switched on when the model is stationary.

“Accelerate” output

This output is always switched on briefly as soon as the model accelerates from rest.

“Starting from running speed” output

This output is switched on when the model exceeds the running speed previously selected in the Sound-Teacher.

One-channel multi-function select (EKMFA)

If “One-channel multi-function select” (EKMFA) is activated, you can control virtually all the functions of the Sound module using just one proportional channel. Proportional channel #3 is used for this mode of operation. As in “normal” mode, the travel of the transmitter stick is sub-divided into the 5 ranges A, B, N, C and D (see page 16). Of course, other switches already fitted to the transmitter can also be used to control the functions in this mode.

To trigger a particular sound or function, the transmitter stick must be moved from position N to position A or D a particular number of times. In the one direction (A) the movement only triggers sound effects; movement in the other direction (D) switches the running sound, the 7 switched outputs and the indicator/warning indicator on and off.

The last numerical value is always stored, enabling you to repeat the last sound or the last function as many times as you wish by holding the stick at position B (sound) or C (function) for one second, thereby eliminating the need to count a particular number of movements again.

Example - sound:

We wish to trigger additional sound 3 which we have programmed in the “Loop” playback mode. We quickly move the stick three times from the neutral position N to position A. If the stick is now left alone for one second, the sound starts, and runs in an endless loop. There are two methods of switching it off again:

1. We move again the stick three times from position N to position A, and wait one second.
2. We move the stick to position B and hold it there for one second.

If the playback mode is programmed as “Once” instead of “Loop”, there is no need to switch the sound off again, because it only runs through once, and then it stops automatically.

| Counter position A | Sound |
|--------------------|------------------------------|
| 1 | Additional sound 1 (on) |
| 2 | Additional sound 2 (on) |
| 3 | Additional sound 3 (on/off) |
| 4 | Additional sound 4 (on/off) |
| 5 | Additional sound 5 (on/off) |
| 6 | Additional sound 6 (on/off) |
| 7 | Additional sound 7 (on/off) |
| 8 | Additional sound 8 (on/off) |
| 9 | Additional sound 9 (on/off) |
| 10 | Additional sound 10 (on/off) |
| 11 | Additional sound 11 (on/off) |
| 12 | Additional sound 12 (on/off) |

In the case of the three-stage additional sounds 1 and 2 the control is a little bit different from the rest of the additional sounds. In this case the sound is played back constantly as long as the stick is held in position A or B.

Example - function:

We wish to switch output #4 on as we quickly move the stick five times from the neutral point N to position D. If the stick is now left alone for one second, the output is switched on. There are two options for switching the same output off again:

1. Move the stick five times from position N to position D, and wait one second.
2. Move the stick to position C and hold it there for one second.

| Counter position D | Function |
|--------------------|----------------------------|
| 1 | Running sound (on/off) |
| 2 | Output #1 (on/off) |
| 3 | Output #2 (o/off) |
| 4 | Output #3 (on/off) |
| 5 | Output #4 (on/off) |
| 6 | Output #5 (on/off) |
| 7 | Output #6 (on/off) |
| 8 | Output #7 (on/off) |
| 9 | Indicator left (on/off) |
| 10 | Indicator right (on/off) |
| 11 | Warning indicator (on/off) |

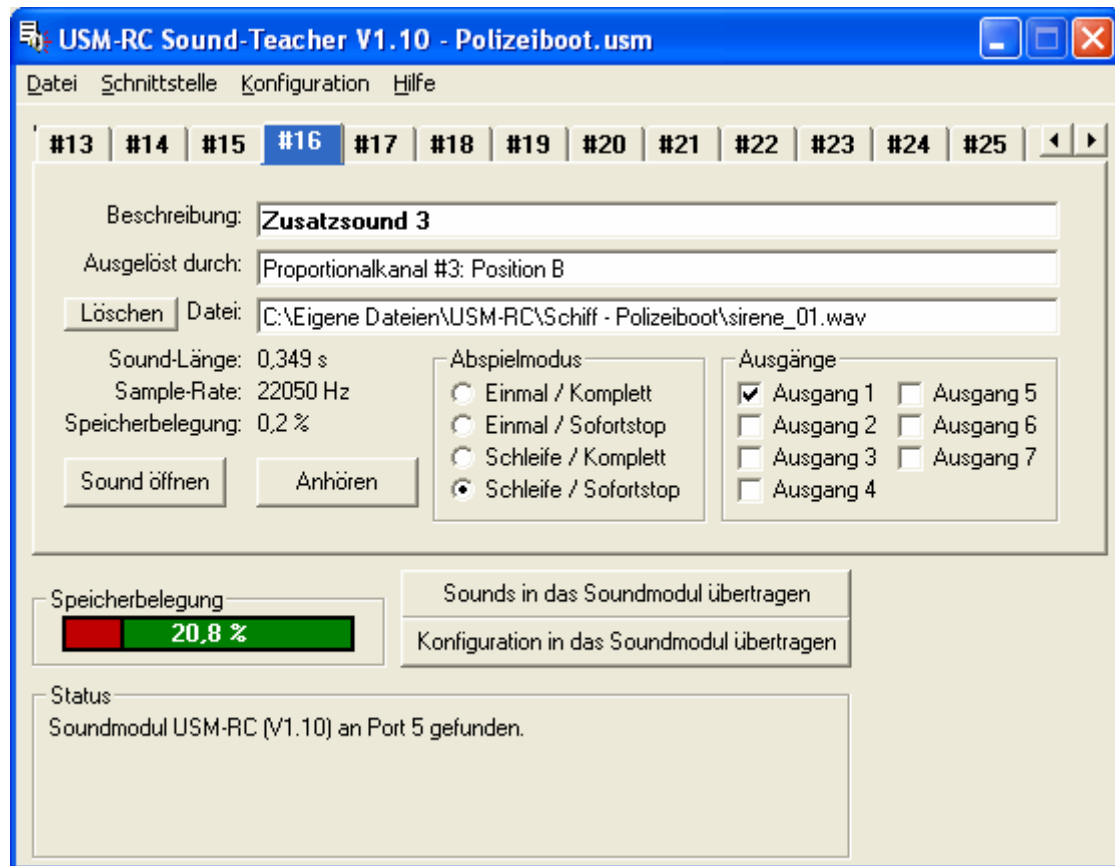
To ensure that the seven outputs can be switched, it is essential to set them to “**static**” or “**flashing**” in the Sound-Teacher. An output which is configured as a reversing light or brake light cannot be switched on in this way.

If EKMFA mode is activated, all the functions which are assigned to proportional channels #2 and #4 (light, indicator, warning indicator, running sound on/off, volume control) can still be controlled using these channels.

In contrast, the sounds assigned to proportional channels #2 and #4 can no longer be triggered using these channels!

PC-Software „USM-RC Sound-Teacher“

With our software „USM-RC Sound-Teacher“, the Sound module can be configured and the sound files can be transferred to the Sound module.



System requirements

- Windows PC
- 16 MB RAM
- 3 MB of free HD space
- Windows 98, ME, 2000, NT, XP or Windows Vista
- free USB-port (1.0, 1.1 or 2.0)
- CD/DVD-ROM disk drive

Software installation

Normally the „CD-Installer“ starts automatically after you insert the CD-ROM. If this not happens, please start the file „CD-Installer.exe“ which is in the root folder of the CD-ROM.

To install the Sound-Teacher, click on the „USM-RC Sound-Teacher“ button and follow the further instructions on the screen.



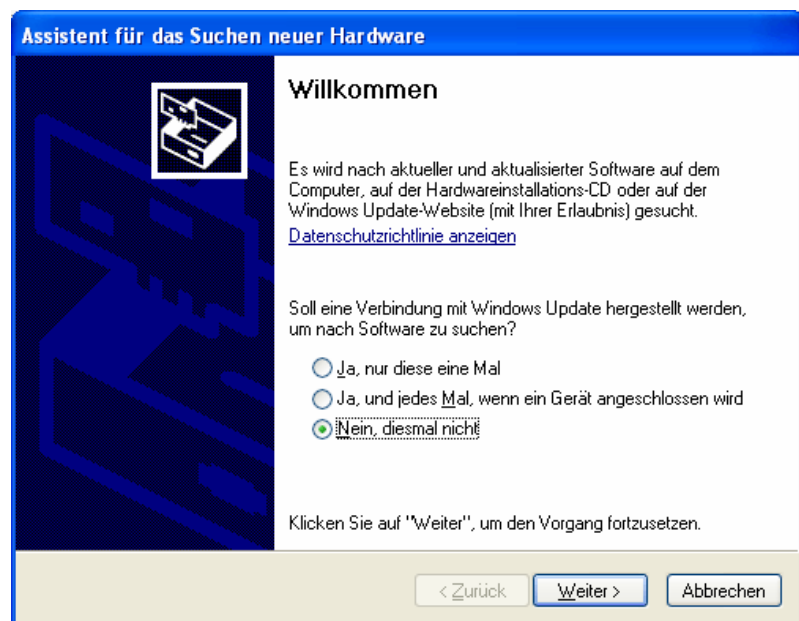
USB-Driver installation

Before you start the USM-RC Sound-Teacher, the USB driver for the Sound module should be installed first.

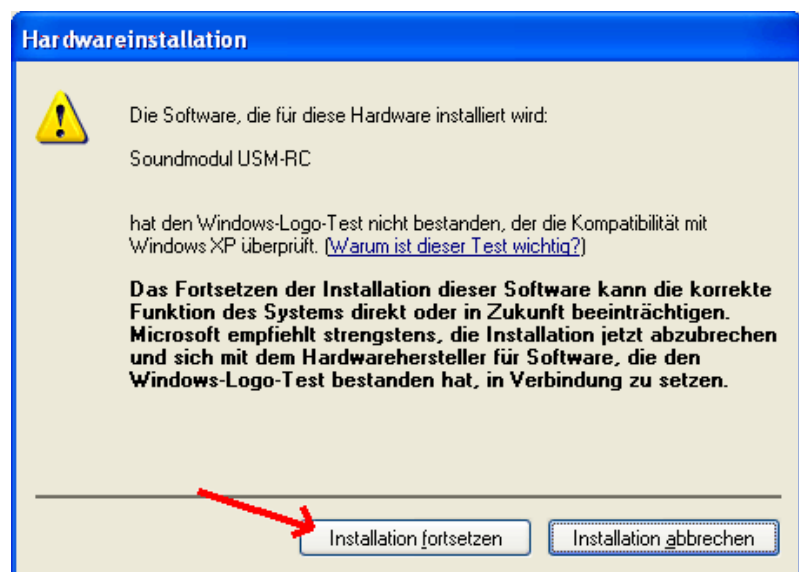
Connect the USB cable to a free USB port (1.0, 1.1 or 2.0) of your computer, and put the other end into the USB socket on the Sound module. A further voltage supply is not necessary, because the Sound module gets his power directly from the USB port.

The new Sound module is recognized by the automatically hardware recognition and Windows starts the hardware assistant. This looks a little different at the different operating systems and languages, but it always run in a similar way. It is only important that the supplied CD-ROM is in a CD/DVD-drive.

You can click on "Weiter" until the driver installation is complete.



If the message "Windows-Logo-Test nicht bestanden" appears during the installation, it is important to click on "Installation fortsetzen".



If the USB-Driver is successfully installed, this final message appears. Click on “Fertig stellen” to complete the installation.

The USM-RC Sound-Teacher can now be started and the Sound module is ready to be programmed.



Starting Sound-Teacher

During the installation of the Sound-Teacher an entry is added to the Start menu, which can be used to start the program. Click on the “Start” button at the bottom left-hand corner of the screen then on “Programs”, on to “USM-RC Sound-Teacher” and finally click on “USM-RC Sound-Teacher”. The program should now start. If you chose to place an icon on the desktop during the installation procedure you can start the program by double-clicking on that icon.

It automatically opens the project you last worked on when you start the software.

Brief instructions for loading new sounds into the module

Instruction for transferring a new sound into the Sound module:

1. Connect the Sound module to your PC using the USB lead supplied in the set.
2. Start the USM-RC Sound-Teacher.
3. Locate the menu “**Datei**” at the top of the screen, and click on “**Projekt öffnen**”.
4. Now select (typically) the desired sound project (.usm file) e.g. on a CD-ROM, and click on the button “**Öffnen**”.
5. Transfer the new sounds to the Sound module by clicking on the button “**Sounds in das Soundmodule übertragen**”.

Using the software "USM-RC Sound-Teacher"

The software is designed to be as simple as possible to operate, with the intention that you should be able to use it intuitively. Many seasoned Windows-users will certainly be able to control the program without any further help.

The following section provides a brief explanation of all the program's functions:

Menu:

| | | |
|----------------------|---|--|
| Datei | Neues Projekt erstellen | Creating a new project |
| | Projekt öffnen | Opening an existing project |
| | Projekt speichern | Saving the current project |
| | Projekt speichern unter | Saving the current project with a new filename |
| | Firmware aus dem Internet laden | Downloading a new firmware from the internet |
| | Firmwareupdate durchführen | Updating the Sound module with a new firmware |
| | Sounds aus dem Internet laden | Downloading new sounds from the internet |
| | USM-RC Sound-Teacher Update aus dem Internet laden | Downloading updates for the USM-RC Sound-Teacher |
| | Beenden | Closing the program |
| Schnittstelle | Soundmodul suchen | Searching the Sound module at the USB ports |
| Konfiguration | Konfiguration ändern | Configuring the Sound module |
| Hilfe | Bedienungsanleitung | Opening this operating manual |
| | Diagnose | Starting a diagnostic tool |
| | Info | Shows information about the software |

Configuring sounds

Up to 37 different sounds can be stored in the slots of the Sound module. With the sound-select-bar you can choose the sound slot you would like to edit. Simply click for this purpose on the wanted number.

If data are already available for this sound number, these are shown and can be edited now.

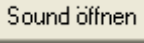
The screenshot shows the software interface for configuring sound #16. At the top, a row of buttons labeled #13 through #25 is visible, with #16 highlighted in blue. Below this, the configuration details for sound #16 are displayed:

- Beschreibung:** Zusatzsound 3
- Ausgelöst durch:** Proportionalkanal #3: Position B
- Löschen** (button) | **Datei:** C:\Eigene Dateien\USM-RC\Schiff - Polizeiboot\sirene_01.wav
- Sound-Länge:** 0,349 s
- Sample-Rate:** 22050 Hz
- Speicherbelegung:** 0,2 %
- Abspielmodus:**
 - Einmal / Komplett
 - Einmal / Sofortstop
 - Schleife / Komplett
 - Schleife / Sofortstop
- Ausgänge:**
 - Ausgang 1
 - Ausgang 2
 - Ausgang 3
 - Ausgang 4
 - Ausgang 5
 - Ausgang 6
 - Ausgang 7

At the bottom, there are two buttons: **Sound öffnen** and **Anhören**.

| | |
|-------------------------|---|
| Beschreibung | A description of the Sound in this slot. |
| Ausgelöst durch | Shows how the sound can be started. |
| Löschen | With this button the current sound file will be deleted. |
| Datei | Path and filename of the WAV-file, which is stored in this slot. |
| Sound-Länge | Length of the current sound in seconds. |
| Sample-Rate | Quality of the current sound. |
| Speicherbelegung | Shows you how much memory usage is needed in %. |
| Sound öffnen | With this button a new sound file can be loaded into the slot |
| Anhören | Playing the current sound over the PC-loudspeakers. Therefore a soundcard in the PC and connected loudspeakers are needed. |
| Ausgänge | Configure which outputs were activated by playing the current sounds. |

Opening of sound files

With a click on the  button, the Windows usual "file open dialog" opens, in which you can select the wanted sound file on your hard disk.

All WAV-files with following properties can be opened:

- 8 bit
- mono
- 11,025kHz or 22,050kHz


If you want to open a file, which is not in the necessary format, an error message appears. To be able to use this file, you have to convert it with a suitable program. How this works, is explained in an example on page 41.

We recommend, to store all sound files for a complete project, in an own separate folder on your hard disk.

"Speicherbelegung" indicates how much memory is already occupied in the Sound module.



After all wanted sound files were assigned to their slots and the module was configured, it is recommended to save the complete project (**Datei** → **Projekt speichern**).

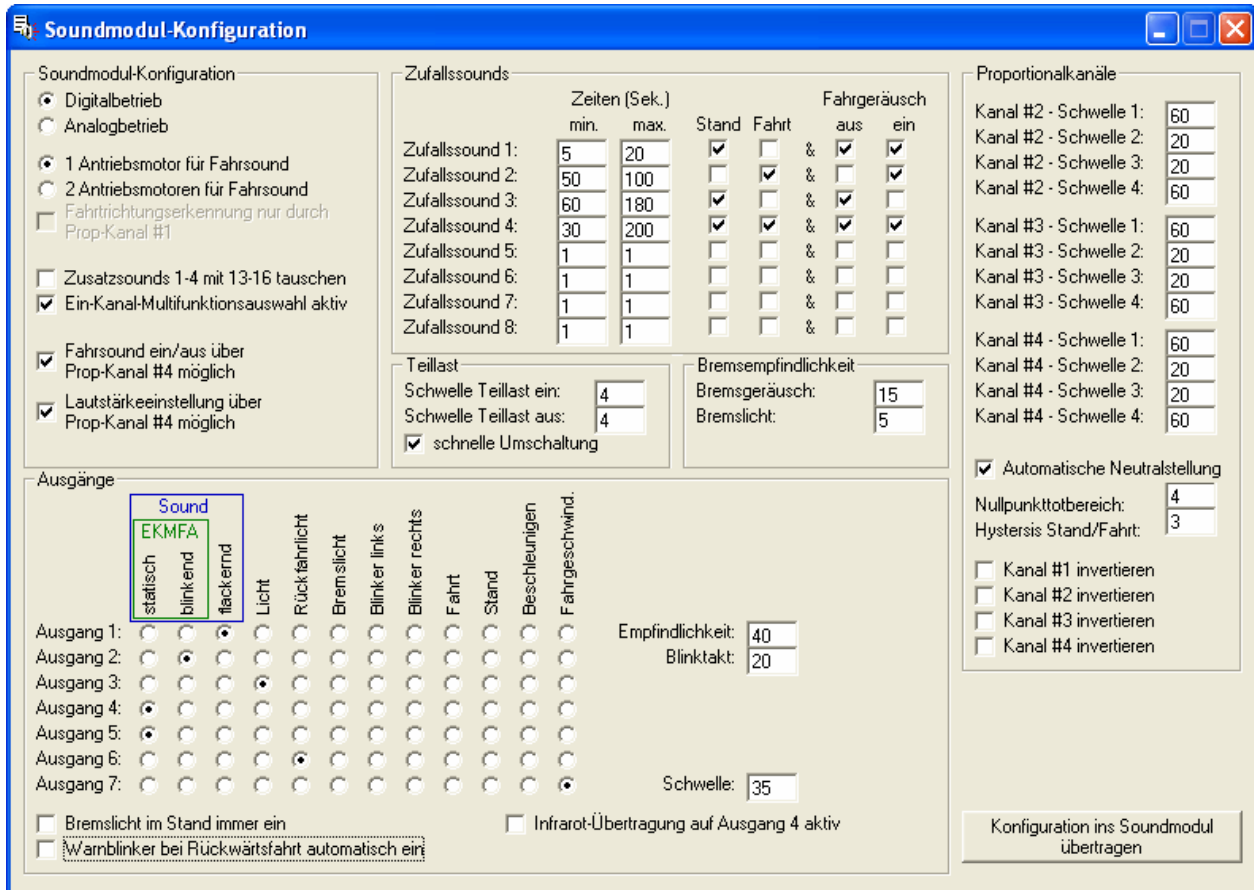
If you would like to delete a sound in a slot, select the slot, and click simply on the button .

In the folder „Sounds" on the CD you will find some example sounds. In addition there are examples for different driving noises in the folder „USM-RC Sounds".

Configuring the Sound module

To make different settings on the Sound module, please click in the menu „Konfiguration” on „Konfiguration ändern”.

A new window is opened, in which different settings can be done.



“Soundmodul-Konfiguration” – Sound modul configuration

Here is determined whether the module should work in the digital or analog operation mode (see page 5).

You can also inform the program whether the model is powered by one or two drive motors which is/are to be used to determine the speed-dependent nature of the running sound.

If you use two drive motors you can select that the driving direction is only detected by proportional channel #1. This is necessary e.g. when you want to mix the drive and steering channel with a mixer after the Sound module.

As an option, the additional sounds 1 - 4 can be interchanged with the additional sounds 13 - 16. Normally, of course, additional sound 1 is triggered via proportional channel #3, and additional sound 13 via the switched input X1/7. If you activate this option, proportional channel #3 triggers additional sound 13, and the three-stage additional sound 1 is then assigned to the switched input at X1/7. The point of all this is that the two three-stage sounds can now also be triggered directly via the switched inputs.

If you activate one-channel multi-function select (EKMFA), you can control virtually all the functions of the Sound module using proportional channel #3 (see page 29)

This part of the program also allows you to disable the following functions: special functions of proportional channel #4, running sound on/off, and volume control.

“Bremsempfindlichkeit” – brake sensitivity

Here are 2 thresholds which are responsible for detecting the “braking” condition.

The threshold for the braking noise (sound #9) determines how strong the vehicle must be slowed down, so that the brake noise is played.

The threshold for the stop light determines how strongly the vehicle must be slowed down, so that the stop light lights.

The higher the thresholds are set, the more strongly must be slowed down, to activate these functions.

“Teillast” – partial load

With the 2 thresholds for partial load on and partial load off, will be configured how strongly the speed must be changed, that between full load (sound #4) and partial load (sound #5) is switched over.

If you activate “fast change-over”, the sound will immediately alter when the vehicle makes the transition from full-load to part-load. This is particularly effective when you are using the long sounds stored in slots #4 and #5.

“Zufallssounds” – random sounds

If you want to play random sounds with your Sound module (see page 25), you can configure here, in which temporally distances the random sounds are supposed to be played. Times between 1 and 255s are possible.

Here is also configured under which conditions the random sounds should be activated. For example, whether the random sounds only should playing when the model stands and/or moves or whether the driving sound is on and/or off.

“Ausgänge” - outputs

Here the seven multi-function outputs can be assigned to the various functions (see page 27).

In the case of flashing outputs you can set how fast the outputs are to flash (1 - 255) at this point.

In the case of flickering outputs you can set how fast the outputs are to flicker (1 - 255) at this point.

For outputs which are to be switched on when a particular running speed is reached, you can determine the speed at which the outputs are to be switched (1 - 100) at this point.

If the “Brake light always on when stationary” point is active, then the brake light always glows when the model is not moving.

If you activate the “Warning flashers on automatically when reversing” point, both direction indicators are switched on as soon as the vehicle starts travelling backwards.

A special option available here is the activation of a supplementary infra-red signal at output 4. This can be used, for example, to transfer light signals to a truck trailer without requiring a wired connection. Caution: if the infra-red signal is active, output 4 on the Sound module cannot be used for any other function.

“Proportional-Kanäle” – proportional channels

You can configure here, the thresholds which separates the proportional channels #2 - #4 into the 5 areas A, B, N, C and D (see page 16).

It can also be configured, if the neutral positions of the sticks should be read in automatically, after the switch-on of the Sound module.

There are also another 2 more thresholds which are responsible for the optimal crossing from idling to drive. These 2 thresholds should only be changed, if it's really necessary.

Thresholds for the zero dead-point range:

When your vehicle doesn't move and the drive engines doesn't runs, but the Sound module doesn't play the idling noise and play the driving noise, this value must be increased.

If the idling noise is also still played although the vehicle already moves, this value can be reduced a little.

Hysteresis idling/drive:

If you drive very slowly and the sound changes always from idling noise to driving noise, this value should be increased a little.

If a value is changed in the configuration, the configuration must be uploaded to the Sound module so that a change becomes effective!

While saving a project, the sound configurations of the slots and the configuration of the Sound module are saved together in the project file.

Uploading sounds into the Sound module

!!! ATTENTION !!!

If the Sound module is only powered via the USB lead, then you must not connect the seven switched outputs, and must not switch them on!


If you ignore this and switch the outputs on, the current required by the connected loads will be drawn directly from the USB port. Under unfavourable circumstances this could ruin your PC's USB port!

Put off the ribbon cable from X3 during the programming!

For the upload of new sound files or a changed configuration, you connect the supplied USB cable to your PC and then to the Sound module. The Sound module is supplied with power over the USB port; it must be not powered by an external power source (battery).

You start the USM-RC Sound-Teacher now and the new sounds can be selected, and/or make the wanted configuration of the Sound module.

Only the complete sound files can always be uploaded into the Sound module, not every sound separately.

Through a click onto the button  the file transfer is started. Depending on the quantity of data, this process may take up to 4 minutes. After the upload, the files are available in the Sound module and can be played. During the transfer of the sound files, always the configuration of the Sound module is transferred automatically.

If only a setting in the configuration is changed, the whole sound files do not need to be uploaded again. It suffices then to transfer only the configuration. This happens through a click on the  button.

During the transfer to the Sound module the red LED flashes.

If an error happens during the transmission, this is shown at the PC. If a transmission error occurs often, you should restart your PC, close all not needed programs and try the transfer again.

Attention: The sounds and the configuration cannot be downloaded from the Sound module!

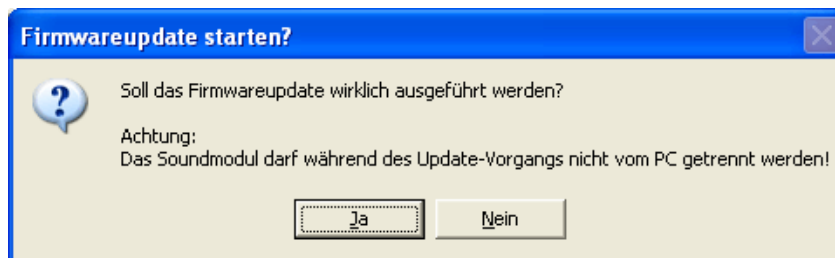
Firmware update

Also the firmware (the internal software) of the Sound module can be updated by the USM-RC Sound-Teacher

With the menu **Datei → Firmware aus dem Internet laden** can be checked whether a new firmware (e.g. with new functions) for the USM-RC Sound module is available. You can download these from our internet page to your hard disk.

The firmware update is uploaded to the Sound module by the USB cable. Connect the Sound module with the USB-cable to your PC. An external power supply isn't necessary.

With the menu **Datei → Firmwareupdate durchführen** you can start the update. At first the version of the firmware is read out from the Sound module and shown. Now you select the new firmware (.bin file) on your hard disk, which should be uploaded to the Sound module. After loading the firmware file, the update is started by a click on the „Yes“-button.



Now the Sound module may not be disconnected from the USB cable! The pure update takes now about 5s. After this, the Sound module can be used with the new firmware as usual.

Converting sound files

If the sound files aren't in the necessary format, they must be converted before they are able to be transferred into the Sound module.

Every arbitrary sound converter which offers the necessary functions can be used for this.

There is a demo version of the software „**GoldWave**” on the supplied CD. You find the software in the folder „**Goldwave**”. For installing the software, you start the „CD-Installer”, click on „Goldwave installieren” and follow the instructions on the screen.

This program is only a free test version which has a single restriction, it allows only saving files with maximum sound length of 45s. Normally this should suffice for the most applications. You find further information about this software or other versions at the page: <http://www.goldwave.com>

Please notice that we aren't the developer of the software „**GoldWave**” and we don't offer any support for this product.

Here is an example how a conversion of a sound file is done with the software „**GoldWave**”:

1. Start the software „**GoldWave**”
2. Open the file that you want to convert
3. You click in the menu „**Effekte**” on „**Resample**” and choose 11025 or 22050.
4. Now save the file with a new name:
 - a. Click on „**Speichern als**” in the menu „**Datei**”.
 - b. Choose the folder and filename
 - c. At „**Dateityp**” you have to choose „**Wave (*.wav)**”
 - d. At „**Attribute**” you have to choose „**8-bit, mono, unsigned**”.
5. Now you can upload the new file with our software „USM-RC Sound-Teacher” to the Sound module.

If you have any questions please read the help section of the software.




Record and edit new sounds with the PC

There are some sample sounds on the supplied CD-ROM, with which you can make first attempts with the Sound module. The Internet offers a virtually infinite array of sound data which you can download generally for free and transfer them to your Sound module if you want to use your own sounds.

A good start to search a sound data is to enter the name of the desired sound and the term "download" into any search engine, e.g. (<http://www.google...>).

A further possibility is the recording of own sounds with your sound card. As sources for example a cassette recorder, a MP3-Player, a CD/DVD or a microphone can be used.

In following example it is shown how you can do this with the software „**GoldWave**”.

1. Start the software „**GoldWave**”
2. Choose in menu „**Datei**” the entry „**Neu**”.
3. Click in the opened window on „**Radio**” and then on „**OK**”.
4. Adjusting the volume for the recording source (e.g. line, microphone or audio CD):
 - a. Choose in the menu „**Werkzeug**” the entry „**Lautstaerkeregler**” (opens the configuration of the volume).
 - b. Adjust the volume at the wanted recording. Normally the slider is mostly in the upper third. During the recording, the recording level indicator in windows „**Gerätekontrolle**” should reach maximally the yellow field.
 - c. Close the window „**Lautstaerkeregelung**”
5. With a click on the record button  in the window „**Gerätekontrolle**” the recording starts.
6. Control now whether the volume control which you have done in step 4 was correct. If necessary correct your volume configuration.
7. With a click on the stop button  in the window „**Gerätekontrolle**” the recording stops.
8. Now in the blue window the recorded sound appears. You can listen to the recorded sound by a click on the play button .
9. The sound can be edited by the extensive functions of the software. Now a example how you can cut a sound:
 - a. Click with the **left mouse button** at the place where the sound should begin.
 - b. Click with the **right mouse button** at the place where the sound should end.
 - c. You click now in the menu „**Bearbeiten**” on „**Trimmen**”, to remove the not needed sound.
10. Save now the file to your hard disk:
 - a. Click on „**Speichern als**” in the menu „**Datei**”.
 - b. Choose the folder and filename
 - c. At „**Dateityp**” you have to choose „**Wave (*.wav)**”
 - d. At „**Attribute**” you have to choose „**8-bit, mono, unsigned**”.
11. Now you can upload the new file with our software „USM-RC Sound-Teacher” to the Sound module.

If you have any questions please read the help section of the software.

