IntelliSound

DIGITAL 2

The auxiliary sound module for locomotive decoders with the SUSI interface

Characteristics

• Intelligent sound control with up to 40 seconds of original sound, coordinated to the operating situation (i.e., speed, etc.) of the locomotive
• Generates the operating (motor) sound of the locomotive, "squealing" brakes, incidental noises while stationary (mechanical devices (e.g., air pumps, etc.), coal shovels etc.)
• 3 additionally adjustable noises such as whistle, bell, horn, uncoupling sound or door warning signal
• Sound changes as engine load changes, such as up/down grade operation; reaction to load change can be adjusted
• Adjustable volume and audio muting: the sound can be faded or turned off by function key, e.g. during travels into and away from the station
• Provisions for a wheel sensor (e.g., reed contact, etc.) for synchronized exhaust sounds with steam locomotives
• Efficient digital output circuitry renders sounds over 3 independent channels
• Up to three modules can be connected to a locomotive decoder, e.g. for multi-engine locomotives
• Comes with speaker and resonating chamber
• Locomotive sounds can be downloaded; various sounds are available at www.uhlenbrock.de

Description

The Intellisound sound module is an auxiliary module for locomotive decoders with the standardized SUSI interface, and can be identified by the appropriate logo.

The sound modules supply original, faithfully reproduced sounds of real locomotives. Using "intelligent sound control" the sounds produced are adapted to match the locomotive's actual operating environment. Even when driving uphill and downhill, the sounds change to accurately reflect prototypical operation. If the locomotive is stopped, the appropriate "squealing" brake sound is produced. While stationary, different operating noises for the-respective type of locomotive are produced by chance (coal shovels, compressed air). With diesel locomotives, the engine startup and shutdown sounds can be heard when this function is switched on and off. In addition to the driving (motor) sound of the locomotive, which can be switched on and off using the appropriate function key, 3 more sounds can be triggered by function keys. Here, depending upon the type of locomotive (as displayed in the table below), whistle, horn, bell, door warning / closing signal or uncoupling sounds can be played.

If the locomotive travels out of the visible range of a model railway facility, e.g. into a shadow station, then „audio muting" can be softly faded out by a special function key. By pressing the function key again, the sound is gradually faded in, adapting itself to the existing driving conditions (i.e., sound synchronized to the motor speed).

Various models

Item	Locomotive Type	Sound 1	Sound 2	Sound 3	Sound 4
32 110	Steam (small, T3)	Bell	Whistle	Driving (motor) sound	Uncoupling sound
32 120	Steam (larve, BR 01)	Whistle 1	Whistle 2	Driving (motor) sound	Uncoupling sound
32 210	Diesel (medium, BR 212)	Bell	Horn	Driving (motor) sound	Uncoupling sound
32 220	Diesel (large, BR 220)	Whistle	Horn	Driving (motor) sound	Uncoupling sound
32 290	Diesel (small, Köf)	Bell	Horn	Driving (motor) sound	Uncoupling sound
32 310	Electric (old, E10)	Whistle 1	Whistle 2	Driving (motor) sound	Uncoupling sound
32 320	Electric (new, E101, ICE)	Horn 1	Horn 2	Driving (motor) sound	Uncoupling sound
32 620	Diesel railcar (VT628)	Horn 1	Horn 2	Driving (motor) sound	Door closing sound

Installation of a sound module

Connecting the SUSI-interface

Insert the plug with the red, blue, grey and black cable into the appropriate socket of your locomotive's motor decoder. The sound module receives its power and data from the decoder.
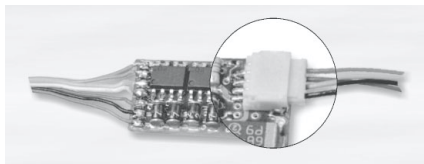
Loudspeaker

Each speaker needs a resonator. It is sometimes possible to use the locomotive body or the wagon body as resonator. If this is not possible, then please use the included plastic resonator.

If using the plastic resonator, please make sure that it is glued air-tight to the speaker. Please do close with glue also the hole of the speaker cables as well as any other mounting hole present on the speaker/resonator.

The speaker is to be mounted inside the locomotive so that it faces the widest possible "aperture" towards the outside (e.g., close to a locomotive window, behind an open grid, etc.).

Attaching the sound module

Using a piece of double-sided "sticky" tape, fasten the sound module to any place in the locomotive. The sticky tape holds the sound module reliably in place and protects it from coming in contact with other wires, components, etc.

Wheel revolution sensor

For the production of wheel-synchronized exhaust "chuff" sounds for steam locomotives, the sound module possesses a connection for wheel revolution sensors. A reed contact or "Hall effect" sensor can be used in conjunction with a magnet at a locomotive wheel, or a light reflection sensor with an appropriate marking on a locomotive wheel. The reed contact, "Hall effect" sensor or light reflection sensor is attached to the solder pads illustrated in the picture below:
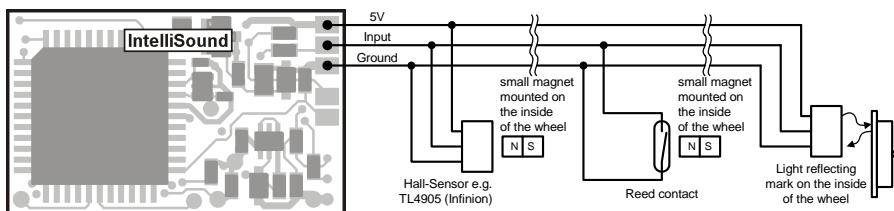
Start-up

Make sure that placing the module in the locomotive will not cause a short circuit! Also insure that, once you have replaced the body (shell) of the locomotive no wires are "pinched" which could also cause short-circuits to develop.

A short circuit between engine, lighting, pickup shoe, wheel sets and the module can possibly destroy the decoder's components as well as the electronic of the locomotive!

Switching sounds on and off

Each sound module has 4 different, adjustable sounds plus a mute switching function:

Number of Sound	Type of Sound	Default Operation
1	Bell, whistle or horn	Function f4
2	Whistle or horn	Function f2
3	Motor sound	Function f1
4	Uncoupling or door warning tone	Function f3
5	Mute switch	Function f8

The individual sounds can be switched on and off using special function keys on your digital Command Station/Throttle. The allocation (or mapping) of the various sounds to individual special function keys can be modified using CV's 903 - 915. Decoders are delivered with sounds initially allocated as indicated in the above table.

Additionally, the mute switching function can be mapped to a function key using sound #8. As the locomotive drives out of the visible range of a model railway, e.g. into a shadow station, then the entire sound of the locomotive can be softly faded out by switching on this special function (preset at the factory to function f8). The sound continues to be generated by the module in this "faded out" condition in accordance with the respective driving conditions. If the sound is gradually faded in by subsequently switching the special function off, then the sound again will adapt to the driving conditions in effect at that moment.

Volume
Speaker volume can be changed via CV 902. As shipped from the factory, the volume is set to its maximum level.

Configuring the dynamic change of sound
Settings which affect the sound pertaining to the immediate operating (driving) condition can be modified to accommodate the type of locomotive being used. These settings affect the change of sound with load changes (e.g., uphill and downhill), the speed threshold for triggering the squealing brake sound and the switching threshold for the electrical exhaust with an electric locomotive (E-lok).

CV 925 is used to define load sensitivity. If a value of 1 is programmed here, then the sound reacts very quickly to uphill and/or downhill driving, whereas a value of 8 produces a retarded reaction. CV 921 sets the minimum trigger level for a change of sound for a load increase (going uphill) and CV 922 controls the minimum trigger level for a change of sound for a load decrease (driving downhill). All values depend on the locomotive decoder used as well as the locomotive itself, and therefore must be determined by experimentation.

CV 924 sets the speed threshold at which the brake squealing sound is produced when the speed of the locomotive is reduced.

CV 923 specifies the speed threshold at which point an electric locomotive (E-lok) produces sound for its cooling exhaust.

The values for these CV's are preset at the factory for Uhlenbrock locomotive decoders for "common" HO locomotives, and can be easily modified to suit other locomotives.

Controlling several sound or special function modules from a locomotive decoder
Up to three sound or special function modules can be controlled through a single SUSI interface. CV 897 is used to allocate each module's own CV address range, thus allowing each module to be programmed independently. To accomplish this, each module must first be connected individually to the locomotive decoder. Its own CV address range is determined by assigning the value 1, 2 or 3 to CV 897. Once all modules are connected, each can be addressed and programmed within its own CV address range. The CV to be modified will depend on the CV address range as specified in the list of CV's at the end of this document. Please you note that the explanations in the preceding sections refer to address range #1 (CV's 900 – 925). Use the appropriate CV address from the list of CV's provided in the accompanying table.

Programming
The Configuration Variables (CV's) form the basis for controlling and selecting all possible features and functions of the decoder in accordance with the DCC standard. The sound module is connected to a loco decoder and could be programmed by those methodes which are provided by the loco decoder. In the case of an Uhlenbrock loco decoder the sound module can be programmed with the Intellibox, DCC Command Stations and Märklin Central Units.

Programming with the Intellibox
We recommend that, regardless of the format by which the locomotive decoder will be ultimately operated, the sound module, if connected to an Uhlenbrock locomotive decoder, should be programmed using the programming menu for DCC decoders. The procedure for doing this can be found in the appropriate chapter in the Intellibox manual.

Programming with DCC devices

Use the programming menu of your DCC Command Station (or throttle) to select and program decoder CV's by register, direct or Page Programming mode. Some Command Stations/throttles also support the so called "main track programming" (also known as "operations mode programming"). Please refer to the operating manual of your device for specific instructions.

Programming with a Märklin Central Unit

If the sound module is attached to an Uhlenbrock locomotive decoder, all CV's can be programmed with a Märklin Central Unit, although they cannot be read back.

1. Turn the Central Unit off, and then on.
2. Enter the decoder address and then turn its light "on" (normally by pressing the [function]-key).
3. Turn the control knob all the way to the left (direction change position) and hold it there for approx. 10 sec., until the locomotive light turns off.
4. Release the control knob. The rear light will now flash slowly 4 times.
5. Enter the number of the CV to be programmed (as if you were entering a locomotive address).
6. Turn the control knob all the way to the left briefly. Now the rear light will flash 4 times quickly.
7. Enter the desired value for CV.
8. Turn the control knob all the way to the left briefly. Now the rear light will flash 4 times slowly.

If additional CV's are to be programmed, repeat steps 5-8. To stop programming, press "STOP" on the Central Unit or enter "80" as the CV number and turn the control knob all the way to the left briefly.

Since programming with a Märklin Central Unit only allows input values of 01 to 80, the value "0" must be entered as the value of "80".

Using the page-register to access CV addresses greater than 79

CV-addresses greater than 79 can only be accessed by the page-register. This is CV 66. If a value other than zero is programmed in this CV, then that value, times 64, will be added to the CV address specified by all subsequent writes. The value written into CV 66 must be in range 0 through 64.

The Page register (CV 65) is automatically set to the value zero upon leaving the Motorola programming mode.

Example

You would like to program CV 82 with the value of 15. First, CV 66 must be programmed with the value 1. Next, program CV 18 with a value of 15. This will have the effect of entering the value 15 in CV 82, since the value of 1 (the contents of CV 66) will be multiplied by 64 (and 1 x 64 = 64, and then added to the value specified by the user (18), hence: 64 + 18 = 82.

Using the offset-register to set CV values greater than 79

CV-values greater than 79 can only programmed by employing the offset-register. This is CV 65. If a value other than zero is programmed in this CV, then that value, times 4, will be added to the CV value specified by all subsequent writes and then it will be written in the specified CV.

The Offset register (CV 66) is automatically set to the value zero upon leaving the Motorola programming mode.

Example

Consider CV 49 to be programmed for a value of 157. First CV 65 must be set to a value of 25. Now CV 49 must be set to value of 57. The decoder will hold 157 in CV 49, because the offset of CV 65 will be multiplied by 4 (=100) and added to 57. After programming, reset the contents of CV 65 to zero in order to avoid unwanted offsets.

Observe: When programming CV 65 and CV 66 the mutual contents are ignored.

Table of the Configuarion Variables

CV Addr. Range 1	CV Addr. Range 2	CV Addr. Range 3	Description	Allowable Values	Factory Setting
897	897	897	SUSI address range 1 = from 900 to 925 2 = from 940 to 965 3 = from 980 to 1005	1-3	1
900	940	980	Manufacturer ID	-	85
901	941	981	Software version	-	1
902	942	982	Speaker volume	0-255	255
903	943	983	function activates sound "x" (x = value of the CV) x = 0 no sound is produced x = 1 bell or horn #1 x = 2 whistle or horn #2 x = 3 motor (driving) sound x = 4 uncoupling or door warning sound x = 8 fade in/out all sounds	0-8	0
904	944	984	f1 activates sound "x" where "x" is defined as per CV903/943/983	0-8	3
905	945	985	f2 activates sound "x" where "x" is defined as per CV903/943/983	0-8	2
906	946	986	f3 activates sound "x" where "x" is defined as per CV903/943/983	0-8	4
907	947	987	f4 activates sound "x" where "x" is defined as per CV903/943/983	0-8	1
908	948	988	f5 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
909	949	989	f6 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
910	950	990	f7 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
911	951	991	f8 activates sound "x" where "x" is defined as per CV903/943/983	0-8	8
912	952	992	f9 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
913	953	993	f10 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
914	954	994	f11 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
915	955	995	f12 activates sound "x" where "x" is defined as per CV903/943/983	0-8	0
920	960	1000	Configuration Wert Bit 0 = 0 The "chuff" sound of a steam locomotive is 0 * controlled by the locomotive speed. However, if a sensor is present, its information shall be automatically used in order to synchronize the "chuff" to the wheels. Bit 0 = 1 The "chuff" sound of a steam locomotive is 0 * controlled only by the sensor. Bit 7 = 0 The module sound power output stage is 0 always turned on. Bit 7 = 1 The module sound power output stage is 128 * turned off if the sound is turned off.	0, 1, 128, 129	128
921	961	1001	Threshold for the load-dependend sound generation by increasing load: 128 = load-dependend sound generation is off	0-128	5
922	962	1002	Threshold for the load-dependend sound generation by decreasing load: 128 = load-dependend sound generation is off	0-128	5
923	963	1003	Threshold for exhaust fan for electric locomotive 255 = no exhaust fan sound	0-255	128
924	964	1004	Threshold for brake squeal sound 255 = no brake squeal	0-255	27
925	965	1005	Sensitivy to load changes 1 = reacts very quickly / 8 = reacts very slowly	1-8	4

Loading new sounds into the module

In order to load a new sound into the IntelliSound module, the module must be separated from the locomotive decoder and be connected via the SUSI plug into the appropriate socket of the IntelliSound load adapter (# 31 010).

The module has writing protection, which protects it module against accidental overwriting. Before new sounds can be loaded, this protection must be removed. To accomplish this, the points illustrated in the accompanying picture must be connected (jumpered) before the module is attached to the IntelliSound load adapter. The operating steps for changing / loading sounds are provided with the IntelliSound load adapter. You can find a large selection of different sounds on our web page: www.uhlenbrock.de.
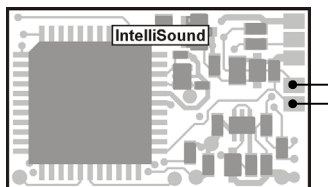
Technical data

Sound channels: 3
Duration (total) of stored sounds: 40 seconds
Power input: max. 0.1 A
Size: 15 x 25 x 5 mm

Delivery status

Intellisound modules are setup from the factory with the following configuration:

Special function f1 switches noise #3 (driving noise of the locomotive)
Special function f2 switches noise #2 (audio signal 2)
Special function f3 switches noise #4 (uncoupling or door warning / closing tone)
Special function f4 switches noise #1 (audio signal 1)
Special function f8 switches noise #8 (mute switching function)
Maximum volume

www.uhlenbrock.de

For the latest information regarding the Intellibox, dealers, list prices or additional information, please visit our web site.

Declaration of guarantee

Each component is examined before distribution for proper operation. However, if a problem should arise within the guarantee period of 2 years, then we will repair it for you free of charge upon receipt of your sales invoice.

The warranty claim is void, if damage was caused by inappropriate treatment, use or modification.

For EU only: Please note that, according to EMV law, this component may be operated only within vehicles which carry the CE designation.

The label names mentioned are registered trade marks that-respective companies.