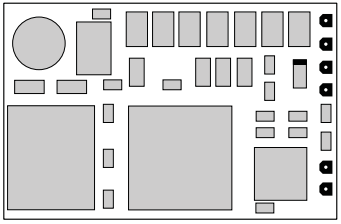
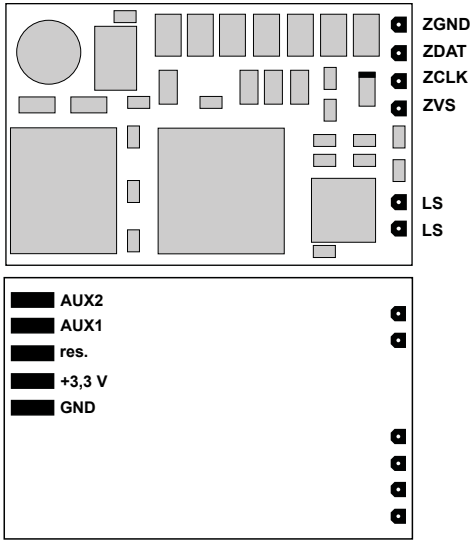
Doehler & Haass

SOUND MODULE



SH10A

Sound module SH10A



GND	SUSI-ground	LS	Speaker
ZDAT	SUSI-data	AUX1, AUX2	Unamplified additional functions 1, 2
ZCLK	SUSI-clock	+ 3,3 V	Electronic supply voltage
ZVS	SUSI-supply voltage	res.	Please do not connect anything!

Maximum capacity AUX1, AUX2: each 20 mA

Maximum capacity + 3,3 V: 100 mA

Contents

	SH10A
Specifications	
Dimensions [mm]	20,0 x 12,0 x 1,9
Sampling rate	22 kHz
Independent sound channels	8
Memory size	32 Megabits
Memory period	Up to 190 s
Max. output rating	1,4 W (4 Ω)
Max. operating voltage	30 V
Connection options	
Without connection wires	SH10A-0
With connection cable for SUSI-interface	SH10A-2
With connection wires	SH10A-3

1 Introduction

Sound module SH10A is compatible with SUSI-standard and can be operated with all locomotove decoders delivering this system format.

It can be used for all system formats supported by the locomotive decoder.

Operating on digital layouts without locomotive decoder is not allowed!
The track signal destroys the sound module!

2 Safety Instructions

This product is not suitable for children under 14 years. It might be swallowed by children under 3 years! An improper use involves a risk of injury due to sharp edges and points!

3 Warranty

Every decoder is fully tested before delivery. Should nevertheless a failure occur please contact the dealer where you purchased the decoder or directly the producer (Doehler & Haass enterprises). The warranty period is 2 years from the date of purchase.

4 Support and Help

In case you have any problems or questions please contact us by E-mail under the address:

doehler-haass@t-online.de

Normally you will get an answer within a few days.

5 Functions

- Operation on all locomotive decoders with standard SUSI-interface.
- Originally designed sound projects for steam-, diesel- and electric-locomotive-sound (no „standard sounds“).
- Realistic steam sound with synchronized wheel and overlapping chuffs, pitch independent from speed steps and boiling sound.
- Realistic diesel-hydraulic driving sound with pitch independent from speed steps, variable coasting speed, independent acceleration steps, turbocharger and dynamic brakes.
- Realistic diesel-mechanic driving sound with several gears, coasting speed, several driving- and acceleration steps and possible shift sound.
- Realistic electric driving sound with traction motor-, traction motor fan-, upgrading-, (Pantograph, main switch etc.), switchgear- and dynamic brake-sounds.
- Bell, horn, whistle, close doors etc. (according to the sound project) can be separately triggered at any time.
- All sound flows are freely configurable („Function Mapping“) and can be accidentally triggered.
- Speaker connection protected from short circuit and overload.
- Small heat generation through high tech.
- Reset function.
- Firmware updating by programmer over SUSI-interface.
- Loading the sound projects by programmer over SUSI-interface.

Updating or loading can be executed in the implemented status of the sound module. For this the locomotive has to be opened and the sound module has to be connected via SUSI-interface with the programmer. Free internet download of the software-, firmware- and sound project-data.

6 Sound module installation

6.1 Preparation

Check if the locomotive is in perfect running order electrically and mechanically, prior to any mounting work. Defects or dirt must be eliminated first. Pay attention to the instructions of the locomotive producer.

Only locomotives running smoothly in digital mode, should be equipped with the sound modul. New locomotives should be run in at least 30 minutes in each driving direction.

Further on, all capacitors have to be removed, particularly those associated to the connections of light and motor.

Fix the sound module with a double sided adhesive tape.

6.2 Check after insertion

The first test should be executed in the programming mode (e.g. by reading out the manufacturer identification). In case of an incorrect feedback (confirmation signal) to the central unit („error“), please check again the correct assignment of the connections.

6.3 Installation

There are three variants to connect the sound module:

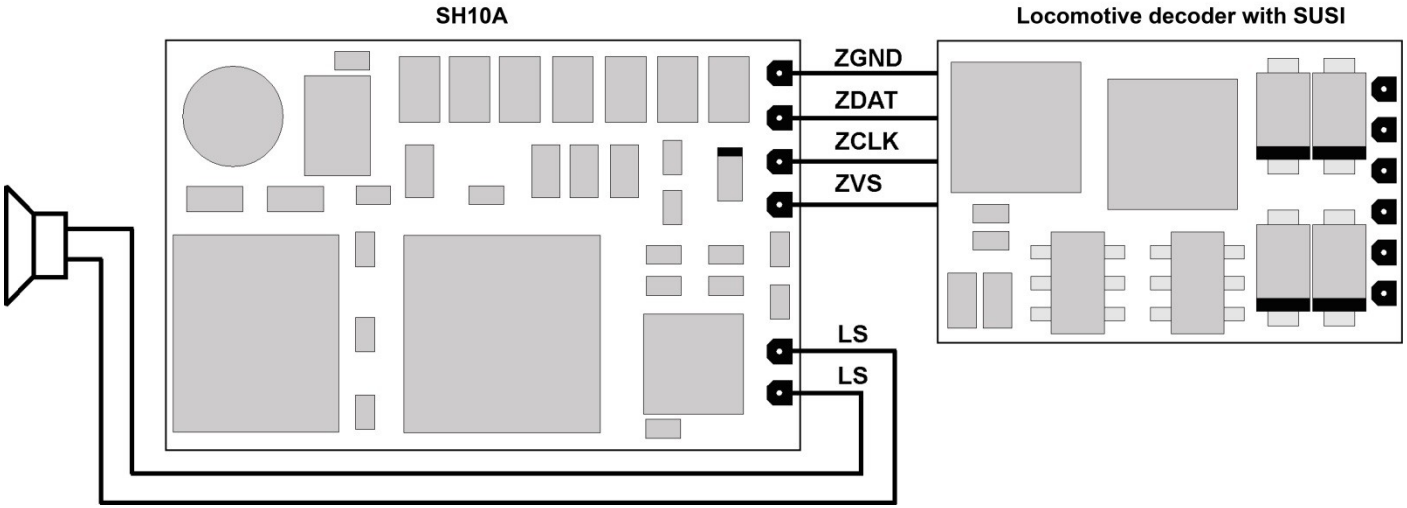
1 In case your locomotive decoder is equipped with a SUSI-standard socket, you should take the sound module SH10A-**2.** It has already the appropriate connections for this socket. The connection cable of the sound module can be inserted in the interface without any problem now.

2 In case your locomotive decoder is equipped with a SUSI-contact pads, the sound module has to be wired individually. Use to this the sound module with the connection wires (SH10A -**3**).

3 Sound module SH10A-**0** should be used only by experienced model railroaders, as the connection wires have to be soldered directly onto the sound module.

Connect the wires of the sound module as follows:

black wire	SUSI-ground (GND)
gray wire	SUSI-data (ZDAT)
blue wire	SUSI-clock (ZCLK)
red wire	SUSI-supply voltage (ZVS)
brown wires	speaker



Function outputs:

The function outputs AUX1, AUX2 are on the underside of the sound module and must be connected by extra wires with the switching amplifiers (see illustration page 2). The function outputs are currently not available. An appropriate firmware update is in planning.

Notice:

Since the function outputs cannot switch higher load currents, it‘s absolutely necessary to connect the consumers via switching amplifiers (MOSFET, bipolar transistors or the like), if they need either a higher supply voltage (> 3,3 V) or a higher current (> 20 mA).

7 Operating System SUSI

7.1 Functions

Spees steps	127
Light functions	yes
Additional functions	28
Main track programming	yes

7.2 Setup features

Operation features of the sound module can be changed any numbers of time by programming the „Configuration Variables“ (CV) resp. the parameters (par). Please see the documentation of your programming device for programming the CV resp. the parameters.

The sound module assigns always CV-ranges 1 and 2. Another additionally connected SUSI-modul has to be therefore adjusted to CV-range 3 (CV897/par897 = 3). As to that the sound modul SH10A may remain connected, because it does not react to the readout- resp. programming instructions of CV897/par897. Thus the heavy-handed and just badly comprehensible „CV-Banking“-process will be avoided (see SUSI-specification version 3.10 for further details).

Notice:

If in DCC-operation the locomotive decoder is programmed with other speed steps than the control device, it may come to malfunctions. They have an impact also to the connected sound modules. Pay also attention to the references of your digital system.

List of supported CV resp. supported parameter:

CV/par	Name and definition	Range
900	**Manufacturer identification** (Read only) 97 = Doehler & Haass (Decoder reset with „8“ or „101“)	
901	**Decoder identifier** (Read only) SH10A = 100	
902	**Version number** (Read only)	
903	**Date** (Read only)	
904	**Revision number** (Read only)	
905	**Date** (Read only)	
908	**Function mapping AUX1** 0 = deactivated, 1 … 28 = F1 … F28, 29 = F0 (light) 30 = driving sound, 31 = secondary driving sound, 32 = gear sound, 33 = brake sound, 34 … 46 = sound flow 4 … 16, value higher 46 = deactivated	**0 – 255 (0)**
909	**Function mapping AUX2** (as CV908)	**0 – 255 (0)**
911	**Function mapping driving sound** 0 = deactivated, 1 … 28 = F1 … F28, 29 = F0 (light) Traction motor at electric locomotives, exhaust whams at steam locomotives etc.	**0 – 29 (1)**
912	**Function mapping secondary driving sound** (as CV911) Traction motor fan at electric locomotives, boiling sound at steam locomotives etc.	**0 – 29 (1)**
913	**Function mapping gear sound** (as CV911)	**0 – 29 (0)**
914	**Function mapping brake sound** (as CV911)	**0 – 29 (7)**

915	**Function mapping sound flow 3**	(as CV911)	**0 – 29 (2)**
916	**Function mapping sound flow 4**	(as CV911)	**0 – 29 (3)**
917	**Function mapping sound flow 5**	(as CV911)	**0 – 29 (4)**
918	**Function mapping sound flow 6**	(as CV911)	**0 – 29 (5)**
919	**Function mapping sound flow 7**	(as CV911)	**0 – 29 (6)**
920	**Function mapping sound flow 8**	(as CV911)	**0 – 29 (9)**
921	**Function mapping sound flow 9**	(as CV911)	**0 – 29 (10)**
922	**Function mapping sound flow 10**	(as CV911)	**0 – 29 (11)**
923	**Function mapping sound flow 11**	(as CV911)	**0 – 29 (12)**
924	**Function mapping sound flow 12**	(as CV911)	**0 – 29 (13)**
925	**Function mapping sound flow 13**	(as CV911)	**0 – 29 (14)**
926	**Function mapping sound flow 14**	(as CV911)	**0 – 29 (15)**
927	**Function mapping sound flow 15**	(as CV911)	**0 – 29 (16)**
928	**Function mapping sound flow 16**	(as CV911)	**0 – 29 (17)**
929	**Function mapping fade-out effect**	(as CV911)	**0 – 29 (8)**
930	**Total volume** 0 … 255 = 0% … 100%		**0 – 255 (64)**
931	**Volume driving sound** 0 … 128 … 255 = 0% … 100% …200% Values higher 100% can lead to overload!		**0 – 255 (128)**
932	**Volume secondary driving sound**	(as CV931)	**0 – 255 (128)**
933	**Volume gear sound**	(as CV931)	**0 – 255 (128)**
934	**Volume brake sound**	(as CV931)	**0 – 255 (128)**
935	**Volume sound flow 3**	(as CV931)	**0 – 255 (128)**
936	**Volume sound flow 4**	(as CV931)	**0 – 255 (128)**

937	**Volume sound flow 5**	(as CV931)	**0 – 255 (128)**
938	**Volume sound flow 6**	(as CV931)	**0 – 255 (128)**
939	**Volume sound flow 7**	(as CV931)	**0 – 255 (128)**
940	**Volume sound flow 8**	(as CV931)	**0 – 255 (128)**
941	**Volume sound flow 9**	(as CV931)	**0 – 255 (128)**
942	**Volume sound flow 10**	(as CV931)	**0 – 255 (128)**
943	**Volume sound flow 11**	(as CV931)	**0 – 255 (128)**
944	**Volume sound flow 12**	(as CV931)	**0 – 255 (128)**
945	**Volume sound flow 13**	(as CV931)	**0 – 255 (128)**
946	**Volume sound flow 14**	(as CV931)	**0 – 255 (128)**
947	**Volume sound flow 15**	(as CV931)	**0 – 255 (128)**
948	**Volume sound flow 16**	(as CV931)	**0 – 255 (128)**
949	**Volume fade-out effect**	(as CV930)	**0 – 255 (0)**
950	**Coasting delay time** The value corresponds to the time in 100 ms-steps until the compulsory change from driving sound to coasting, 0 = switched off		**0 – 255 (0)**
951	**Acceleration time** The value corresponds to the time in seconds from start to maximum speed		**0 – 255 (3)**
952	**Deceleration time** The value corresponds to the time in seconds from maximum speed to stop		**0 – 255 (3)**
953	**Chuffs at speed step 1** The value corresponds to the time in 64 ms-steps between the chuffs at speed step 1		**0 – 255 (120)**

954	**Chuffs at higher speed step** The value determines the time of reduction between the chuffs at higher speed steps	**0 – 255 (20)**
955	**Brake squeal minimale speed step** The minimum speed step before starting brake squeal	**0 – 127 (20)**
956	**Brake squeal initial speed step** The speed step, at which brake squeal starts, after the minimal speed step was reached or exceeded before	**0 – 127 (13)**
957	**Secondary driving sound modulation** The value determines to which extent the speed step influences the pitch, 0 = switched off	**0 – 255 (0)**
958	**Driving sound modulation** (as CV957)	**0 – 255 (11)**
959	**Timer for fade-out effect** The value corresponds to the time in seconds from the adjusted total volume to silence	**0 – 255 (8)**
960	**Write protection Flash-ROM** Must be „0“ for sound operation (it will be operated during the loading process)	**0, 1 (0)**
961	**Threshold value ZVS** The value corresponds about to the supply voltage in volts at which it is getting changed in the energy saver mode (small value induces resetting the sound module and a high value causes a „stuttering” sound)	**0 – 14 (9)**
962	**Chuffs at speed step 127** The value corresponds the minimum time in 1 ms-steps between the chuffs at the speed step 127, which must not be undercut.	**0 – 255 (0)**

964	**Brake squeal final speed step** The speed step, at which the brake squeal changes into the final part of the sound sequence (actual end at the latest at speed step 0)	**0 – 127 (6)**
965	**Brake squeal delay time** The value corresponds to the time in 8 ms-steps, which may pass by between two speed step reductions at the maximum, in order that brake squeal is still possible	**0 – 255 (3)**
966	**Brake squeal minimum deceleration** The value corresponds to the number of speed steps, which have to be run through at least within the deceleration time, in order that brake squeal is possible	**0 – 127 (0)**
967	**Random sounds** **Bit Function Value** 0 Random sounds allowed while standing 1 1 Random sounds allowed while running 2 2 Currently without function	**0 – 7 (3)**
968	**Volume dynamic sound flow** (as CV931)	**0 – 255 (128)**
969	**Volume turbo charger** (as CV931)	**0 – 255 (128)**
970	**Modulation dynamic brake** (as CV957)	**0 – 255 (0)**
971	**Modulation dynamic drive** (as CV957)	**0 – 255 (0)**
972	**Modulation turbo charger proportional part** (as CV957)	**0 – 255 (0)**
973	**Modulation turbo charger integral part** (as CV957)	**0 – 255 (0)**
974	**Function mapping volume reducing** (as CV911) With every keystroke (on/off) the total volume will be permantely reduced	**0 – 29 (0)**
975	**Function mapping volume enhancing** (as CV911) With every keystroke (on/off) the total volume will be permantely enhanced	**0 – 29 (0)**

976	**Function mapping brake squeal deactivating** (as CV911) If the corresponding function key is pushed, no brake squeal will be represented, even if the conditions are fulfilled	**0 – 29 (0)**
977	**Function mapping forced coasting** (as CV911) If the corresponding function key is pushed, the driving sound remains coasting also during an acceleration	**0 – 29 (0)**

All programmable CV resp. parameters can be changed during operation (POM / „Programming on the Main“ / maintrack programming).

The stated default values may be overwritten dependent on the sound project!

7.3 Operation

Put the locomotive on the programming track and readout the manufacturer identification of the sound module (CV900/par900). The default value should be 97. Program the desired setups and start running the locomotive keeping these setup values. After the first check you can vary the CV resp. parameters of the sound module according to your requirements.

In case your programming device indicates „error“, please check again the correct wiring of the locomotive and pay attention to the notices for connecting the programming track. Never put such a locomotive into operation!

The mapping which sound flow represents which sounds, is described in the instruction of the particular sound project. Not all sound flows from 1 to 16 must contain sounds.

Starting delay:

The starting delay from speed step 0 to 1 (CV63/par016) of the locomotive decoder should be adjusted to an appropriate value. Inappropriate values cause, that the starting of the locomotive do not match the backgroud noise. The exact value depends on the individual sound data.

Notice:

The acceleration time (CV03/par011) and the deceleration time (CV04/par012) of the locomotive decoder should be adjusted to value 8 at the minimum. Too small adjusted time sequences lead to the skipping of some of the sound sequences and therefore they could not be represented! The values of the CV/par951 and CV/par952 can be enhanced gradually for fine tuning on demand.

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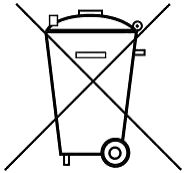	This product must not be disposed at the end of service life in normal household waste. Please use the recycling depot of your community.

CE	Nicht geeignet für Kinder unter 3 Jahren wegen der Gefahr des Verschluckens sowie der Verletzung durch scharfkantige Teile! Not suitable for children under 36 month because of the danger of swallowing the product and of injuries due to sharp-edged parts. Ne convient pas aux enfants au-dessous de 3 ans, dus au risque d'avaler le produit ou bien d'être blessés par des pièces à arêtes vives!

Company stamp

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