Bank CV	CV Adr.ber. 1	CV Adr.ber. 2	CV Adr.ber. 3	Beschreibung	Wertebereich	Wert ab Werk
4	900	940	980	Sound Volume 01	0 - 255	255
	901	941	981	Sound Volume02	0 - 255	16
	902	942	982	Sound Volume 03	0 - 255	64
	903	943	983	Sound Volume 04	0 - 255	64
	904	944	984	Sound Volume 05	0 - 255	64
	905	945	985	Sound Volume 06	0 - 255	64
	906	946	986	Sound Volume 07	0 - 255	64
	907	947	987	Sound Volume08	0 - 255	32
	908	948	988	Sound Volume 09	0 - 255	64
	909	949	989	Sound Volume 10	0 - 255	64
	910	950	990	Sound Volume 11	0 - 255	64
	911	951	991	Sound Volume 12	0 - 255	64
	912	952	992	Sound Volume 13	0 - 255	64
	913	953	993	Sound Volume 14	0 - 255	32
	914	954	994	Sound Volume 15	0 - 255	64
	915	955	995	Sound Volume 16	0 - 255	64
	916	956	996	Sound Volume17	0 - 255	64
	917	957	997	Sound Volume 18	0 - 255	64
	918	958	998	Sound Volume 19	0 - 255	64
	919	959	999	Sound Volume20	0 - 255	64
	920	960	1000	Sound Volume21	0 - 255	64
	921	961	1001	Sound Volume22	0 - 255	32
	922	962	1002	Sound Volume 23	0 - 255	64
	923	963	1003	Sound Volume 24	0 - 255	128
	924	964	1004	Sound Volume 25	0 - 255	128
	925	965	**1005**	Sound Volume 26	0 - 255	128
	926	966	1006	Sound Volume27	0 - 255	128
	927	967	1007	Sound Volume 28	0 - 28, 255	25
	928	968	1008	Sound Volume 29	0 - 255	64
	929	969	1009	Sound Volume 30	0 - 255	128
	930	970	1010	Sound Volume 31	0 - 255	64
	931	971	1011	Sound Volume 32	0 - 255	50
-	1021	1061	1101	CV for to code of Bank	0, 1, 2, 3, 4, 8	0

#36229 PIKO Sound module with loudspeaker for "Electrical loco BR 103"

The Sound module with loudspeaker for all loco decoders with SUSI Interface

1. Characteristics

• Intelligent Sound control with 480 second Sound buffer
• High-resolution Sound: 22050Hz Samplerate, 12bit
• Efficient output final stage for 4-8 Ohm loudspeaker
• Generates the operating sounds of the locomotive, brake squeal and random noises while stationary e.g. auxiliary aggregates
• Sound is specially adjusted to the body of the locomotive for best resonance
• Simultaneous rendition of 8 independent sound channels
• Additional adjustable sounds like e.g. whistle, bell, horn, uncoupling sound, door warning signal, or own custom sounds
• Function Mapping up to f 28
• Switchable random sounds
• With smart start function: The Sound module stops the locomotive decoder, when starting until the vehicle's engine synchronise with the sound.
• Separate adjustable volume for almost all sound events (only DS4)
• Muting with fade in and out function
• Analogue operation with start-up and shut-down noises, when used with a suitable decoder

2. Description

The PIKO Electrical loco BR 103 sound modules deliver faithful sounds like those in the original locomotives. With the intelligent Sound control the reproduced sounds are matched to particular operating situation.

The PIKO Sound Module plugs into the SUSI interface of the locomotive decoder.

When the locomotive starts the Sound module stops the motor (via the locomotive decoder) until the vehicle's sound is synchronised. So the engine howls with motor noise before it moves. If the loco is pulled up the brake squealing sounds. When stationary different random sounds are heard e.g. compressor, auxiliary generator others. The random sounds are switchable by special function key.

The module's two special function outputs are controlled directly by the sounds. So it is possible to simulate the glowing of brake discs . With the 4 channel technology the running sounds of the locomotive and 3 additional locomotive specific sounds can be controlled by function key. The auxiliary sounds can be varied in length, - short on pulse results e.g. a short whistle, a longer on pulse results in a longer whistle. These auxiliary sounds are called up with function keys f0 - f28.

If the locomotive drives out of view on the layout i.e. into the shadow station, then 'audio muting' with a function key, can be used to slowly fade out the entire sound of the locomotive and when it re-emerges to slowly fade the sound in again. Almost all sounds can have their volume independently set with CV programming.

In combination with a correspondingly suitable locomotive decoder the IntelliSound 4 module can even be in analogue mode with start-up and shutdown sounds.

Technical Data

Sound channels for reproduction:	8
Maximum duration of stored sounds:	480 seconds
Power usage:	up to 160 mA
Dimensions:	24,6 x 15,3 x 3,6 mm

CE

3. Installing a Sound Module

SUSI interface
Insert the SUSI plug into the SUSI socket of your decoder. The sound module is supplied with power and data from the decoder.

Loudspeaker
Install the speaker in the intended opening at the bottom of the locomotive.

Fastening the Sound module into the Vehicle
Using the double sided adhesive pad provided, affix the decoder to the desired location in the locomotive. The adhesive pad protects the decoder from coming in contact with conducting surfaces and holds it in place.
Please note that according to the EMV laws the component may only be operated in vehicles that carry the CE symbol.

Start-up
Double check the correct installation with a continuity tester or an Ohmmeter.
When placing the device make sure it does not come into contact with any conducting surfaces in the vehicle. Also ensure that a shot circuit cannot occur when the locomotive is close, and that the wire is not cinched.

> **A short circuit can destroy the component and eventually the locomotive electronics!**

4. Switching the Sound on and off

Individual sounds can be turned on and off with special function keys on the digital center. Assignment of sounds to the function key is done with CV's 903 to 931. When delivered the sounds are assigned as shown in the Table.*

Factory setting	Type of Sound	Sound number
Special function f0		
Special function f1	Sound on/off: Load leve Tranformator Change gear, switch Set up Fan Brake squal sound Driving direction switcher (automatic) Motor Random noise	2 3 4 5 6 7 8 24 32
Special function f2	Horn short	26
Special function f3	Horn long	9
Special function f4		Drivers cab light 1
Special function f5		Drivers cab light 2
Special function f6		Engine room lighting
Special function f8	Shunting mode	31
Special function f9	Panto up/down	13
Special function f10	Conductors whistle	16
Special function f11	Air presser	11
Special function f12	Auxiliary air presser	22
Special function f13	Hand brake	10
Special function f14	Station announcement	29
Special function f15	Coupling	15
Special function f16	Drain compressed air	14
Special function f17	Fan	30
Special function f18	Fling protection	23
Special function f19	Radio	18
Special function f20	Sifa	17
Special function f21	Door open/close	12
Special function f22	Sanding valve	21
Special function f23	Curve noise	19
Special function f24	Rail clank sound	20
Special function f25	Engine room door open/close	27
Special function f26	Window open/close	28
Special function f27	Volume control	
Special function f28	Sound fader (tunnel mode)	

* Loco decoder and digital command station must support functions till F28.

If the locomotive travels out of the visible range of the layout, e.g. into the shadow station, then by switching the mute function (f28 "on", factory setting) the entire sound is faded out. Internally the module keeps rendering the sound according the diving situation. If the mute is switched off again then the sound is faded back in and can be heard again in keeping with the current running situation.

Volume
The overall volume can be changed with CV 902. In CV 908B an alternative volume (e.g. for night operation) can be setup, and can then be switched with a special function key programmed into CV 914A. The volume the auxiliary sounds can be adjusted in Bank B (see CV-Table).

Setting the dynamic Characteristics of the Sound
Some sound characteristics change according to current running state of the vehicle and can be adapted to the type of locomotive being used. The settings affect load regulation (up/down hill), the speed step at which the brake squealing cuts in and the speed step at which the cooling fan cuts in for electric locomotives.

CV 937 changes the sensitivity to load regulation. If this is set to a value of 1 then the sound reacts to the load change rapidly. A value of 8 results in a slower reaction. Using CV 938 you can set the speed step at which the sound changes with uphill (load increase) running and with CV 939 the speed step at which the sound changes when running down hill (load reduction). All values depend on the decoder and the locomotive being used and must be determined by test runs.

CV 936 specifies the speed step at which the brake squealing cuts in when the speed of the locomotive is reduced. CV 934 specifies the speed step at which an electric locomotive turns on the sound for the cooling fan.

The repetition rate of the chuffs in steam locomotive sound can be adjusted. CV 938 sets the time between 2 chuffs at the top speed and CV 939 set the time between 2 chuffs at the lowest speed. The higher the value is in the respective CV the longer the time between the chuffs. CV 937 specifies the that the idle sound is heard during idle running.

All factory default values for PIKO Locomotive decoders are usable with this H0 locomotive, but can be changed to suit other locomotives without problems.

Operating several Sound or Function modules on a Loco Decoder
When several (up to three) Sound or Special function modules are operated with a decoder with SUSI interface then each module can be assigned an CV address range in CV 897 so that all module can be programmed independently of each other. Firstly each module is individually connected to the locomotive decoder. Each module can now have its own address range assigned in CV 897 (1, 2 or 3, see CV Table). If after that all the modules are connected together they can be addressed and programmed using their own CV address range. The changed CV addresses depending on the CV address range are specified in the list of CV's. Please note the explanation in the previous sections refer to address range 1. When changing the address range you must remember to use the CV addresses for the 2nd and 3rd address range from the list of CV's.

5. Programming

In the factory default state all decoder options are changed using configuration variables (CVs) according to the DCC Stopard. The sound module can be programmed with SUSIkomm software and Sound Loading Adapter, or via the locomotive decoder. The decoders can be programmed by an Intellibox, DCC Centre and Motorola Centre. With other makes of locomotive decoder follow the instructions for that decoder.

Programming with DCC devices
Use the programming menu in your DCC Centre to program the decoder CVs in either register, direct CV or page programming mode. It is also possible to program the decoder on the main line using a DCC Centre. Refer to the manual of your control centre for full instructions on the process.

Table of CVs (Configuration Variables) for the Sound module)

Bank CV	CV Address Range 1	CV Address Range 2	CV Address Range 3	Description	Value Range	Factory default
0	897	897	897	Model number	1-3	3
	900	940	980	**Manufacturer ID**	-	162
	901	941	981	**Version number**	-	1
	905	945	985	**Reset**	> 0	-
1	900	940	980	Hardware ID	-	16
	901	941	981	Version number	-	3
2	900	940	980	Total volume	0 - 255	250
	905	945	985	Minimum random time	0 - 255	30
	906	946	986	Maximum random time	0 – 255	50
	907	947	987	Rail Joint-Trigger Offset	0 – 255	100
	908	948	988	Rail Joint-Trigger Gain	0 – 255	42
	910	950	990	Function key tunnel mode	0-28, 255	28
	911	951	991	Function key volume control	0-28, 255	27
8	900	940	980	running step for switching noise1	0-255	1
	939	979	1019	running step for switching noise 40	0-255	253