Smile Sound User's Manual Rev 0.46/20240501

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In order to realize an open DCC sound environment, Desktop Station Co., Ltd. and the DCC Electronics Union jointly developed and provide a DCC sound decoder that conforms to the NMRA standard called SmileSound. This sound decoder was designed in Japan and was designed to allow users to freely program and modify the sounds of Japan railways. Compared to sound decoders from overseas manufacturers, we are trying to differentiate ourselves by incorporating functions and performance that meet the needs of Japan.

Since it is still under development, there are some shortcomings, bugs, and functional limitations related to support. We will carry out improvement activities from time to time.

This book introduces how to use the decoder, how to use the software, and how to create sound data.

If you have any questions, please post them on the Digital Model Railroad Forum (https://desktopstation.net/bb/), and we will update the manual to reflect the contents when this manual is revised.



Products covered in this manual

- -- SmileSound Mini Next18 (Developer: Nagoden/DesktopStation)
- -- SmileSound Standard MTC21 (Developer: DesktopStation)
- -- SmileSound Slim USB (Developer: Nagoden/DesktopStation)
- -- SmileSound Sound Development Board (developed by Nagoden/DesktopStation)
- \cdot DSSP (Developed by DesktopStation)
- USB writer (developer: SmileWorks/DesktopStation)

Desktop Station Co., Ltd. Nerima, Tokyo, JAPAN



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SmileSound

1.At first

The Smile Sound Decoder is an automotive DCC sound decoder designed and developed in Japan that conforms to the NMRA DCC standard that can be used universally worldwide.

By using a script called a sound flow, it is possible to describe sound programming, including the control of locomotive behavior and lights. Equipped with a proprietary interpreter sound engine that can execute sound flow in parallel at the same time, it is possible to realize the behavior and expression of various railway locomotives, contributing to the creation of expressive sound models.

In addition, we have introduced a mechanism that allows sound flow to operate without DCC so that it is possible to express the movement of LEDs and sound not only in locomotives but also in structures such as buildings. SmileSound can be used not only for model railroad locomotives, but also for a wide range of layouts, dioramas, etc.

- Sound decoder utilizing RP2040 and 16MB (128Mbit) of large-capacity, high-speed FLASH memory
- Equipped with a simple, simple, and highly functional interpreter engine, up to 16 usercustom programs can be executed simultaneously. Realization of sound programming that can express state transitions
- Supports up to 10 simultaneous pronunciation channels, 32kHz 16bit playback. It also supports 16kHz and 8kHz Mr./Ms. rates and 8-bit audio, which contributes to memory savings.
- Standard installation of RailCom (BiDi) and other DCC-related technologies that are becoming more popular worldwide
- High-speed firmware and sound data update via USB via a dedicated adapter
- Realization of functions and performance that can port a huge sound library of open sound data
- Analog control is not supported.
- Compatible with third-party command stations other than those made by DesktopStation

It is assumed that it can be used in combination with open sound data¹, and more than 200 types of sound data can be easily written and used in SmileSound at any time.



Figure 1.1 Positioning of SmileSound

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¹ https://desktopstation.net/sounds/

2.Precautions and prohibitions

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Please observe the following precautions and prohibitions and use SmileSound appropriately. Failure to comply with the following may result in injury or harm to health. The user or the administrator of the device is responsible for the use.

	Do not use outdoors, chemicals, liquids, humidity, oil, dust, sealed,
	flammable or flammable materials, or in high or cryogenic environments.
	Do not use the product in an environment where medical devices or other
	devices that pose a risk of human harm are used. Harmonic noise contained
	in the DCC may cause malfunction
	When mounting, insulate electric wires, conductive parts, and exposed parts.
	Inadequate insulation work can cause the locomotive to be destroyed,
	damaged, or malfunctioned.
	There is a risk of short circuit, electric shock, smoke, and burst of capacitors.
	Do not touch rails, wiring, conductive parts of the locomotive, wheels, etc.
	while the power is energized.
	Use only with products that comply with the Digital Command Control (DCC)
	specification.
	Age of use: 13 years old or older. Use of infants and children should be under
	the supervision and responsibility of a parent or guardian
$\mathbf{\wedge}$	If you hear any noise, smell, or smoke, immediately stop using the product
	and contact the manufacturer for repair. Continued use is prohibited.
•	Comply with the operating voltage and current ranges. To be used in the
	range of 12-18 VDC. Use a genuine power adapter with the PSE mark that
	is approved for use in Japan. Use a power adapter with a voltage that meets
	the specifications of the scale, locomotive, and decoder.
	During power-up/use, it should be monitored by the user at all times.
	Regardless of whether the power is turned on or not, the command station
	is not left unattended with the AC adapter connected, and unmanned
	operation is prohibited.
	When leaving the device, disconnect the AC adapter from the electrical outlet
	and make sure that the command station is not turned on and that power
	cannot be supplied to the locomotive.
	It is prohibited to use it in applications that require long-term continuous
	operation, high durability, and stable operation in business and industry, as
	well as in aviation, space, and military use.

3.Warranty Policy

[The warranty policy for the SmileSound decoder is listed here]

1. Warranty Coverage

We warrant for the products described in this document.

2. Warranty Period

From the date of purchase of the user, the warranty period shall be one year. In addition, paid repairs and replacements will be made for three years from the date of purchase.

3. Warranty Information

In the event that a defect occurs due to a defect attributable to the Company within the warranty period, we will replace it with a substitute product or repair it free of charge. If the warranty period has passed, you will be charged.

If the product is no longer sold, we may replace it with a replacement product.

If you want to receive a warranty, please contact the store where you purchased it. Purchases made at the Desktop Station Online Store can be purchased at the Desktop Station Online Store.

4. Paid repairs and replacements

Even within the warranty period, if any of the following items apply, it will be a paid repair or replacement.

• If you do not present information proving the place of purchase and date of purchase (order email, order number, delivery note, receipt, etc.)

• Defects or failures caused by installation work by the user or the processor (e.g., short circuit failures due to insulation failures during installation, failures due to incorrect wiring, derailment, contact with conductive materials, etc.)

• Defects when used for applications that exceed the performance of the indicated product (for example, products for HO are used for G gauge and No. 1 gauge, etc.)

 \cdot Aging of products or parts (wear and tear due to use, wear, etc.), deterioration over time, or other defects associated with these

 \cdot Factors caused by the environment of the storage and mounting locations. Dust, hair, pet hair, dust, high temperature and humidity, condensation, corrosion or other defects

- Specifications associated with the material characteristics of the product or component (processing of the end face of the board, connector, etc.)

• Defects caused by natural disasters or other force majeure (e.g., storms, torrential rains, storm surges, earthquakes, lightning strikes, floods, land subsidence, fires, etc.), or defects caused by these that exceed the performance of the product.

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- Malfunctions due to operating errors, inadequate coordination or failure to properly maintain (e.g., cleaning of wheels and rails, maintenance of command stations, etc.)

 \cdot Defects caused by the user's own installation, repair, or modification (including installation and removal of necessary parts)

•Use for commercial applications (e.g., dioramas in museums) or industrial applications (factories, museums, museums, event venues) that require operation under severe conditions such as long-term or long-term operation, continuous operation, frequent stops, and running.

5. Scope of repair and replacement

In the following cases, you will not be able to receive a warranty, paid repair, or paid replacement.

- If you intend to receive a warranty or paid repair other than the store where you purchased it
- \cdot When it was obtained due to an illegal act such as a crime
- When purchased or received by means other than our company or our distributor
- \cdot When a competitor or individual is purchased or modified for the purpose of analyzing the product.
- When products for the domestic market in Japan are used overseas
- $\boldsymbol{\cdot}$ When using firmware other than the firmware provided by the Company
- · Imitation of our products or products modified without our permission
- When it is used for business or industrial purposes without a paid business support contract with our company, whether indirectly or directly.
- If it is sold as junk and purchased

6. Revision of Warranty Policy

This warranty is subject to change without notice.

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4.Hardware & Software Used

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The hardware and software intended for use in this manual are shown below.

hardware	
PC (Windows 10 or later)	
* We do not guarantee operation with the Windows ARM version or	
the emulation function of Mac.	
USB cable (A-mini-B)	
USB Lighter(75018)	
Decoder Tester (LaisDcc860033, ESU53900)	
Either ESU or LaisDcc. We do not support your own work. If you use	
your own work, you will not be able to receive support, so please use it at your own risk.	
SmileSound Decoder	5 S 91/88
Mini Next18 (75019) or Standard MTC21 (75017)	SSDN18
DSair2 (Command Station)	
* Used for operation check, etc.	

Table 4.1 List of hardware used

Table 4.2 List of software used

software	remarks
DSSP (Chapter 7)	Used for writing to SmileSound and editing sound data
	[Where to get it]
	https://desktopstation.net/smilesound/index.php?SoundProgrammer
WAVE File Editing Tool	Audacity, etc.
	[Where to get it]
	https://www.audacityteam.org/
Text editors	Sakura Editor, Visual Studio Code, etc.
	[Where to get it]
	https://sakura-editor.github.io/

SmileSound

5.SmileSound Decoder

5.1.Introduction to the SmileSound Decoder

SmileSound is a Japan design sound decoder that is being developed as the ideal DCC sound decoder for "Open Sound Data", a Japan sound data disclosure project launched in 2019. Development began at the end of 2021 and sales began in 2023. We have developed functions and specifications that are easy to adapt to open sound data from scratch with software and hardware, and have realized DCC sound only in Japan without relying on overseas sound decoders.

Decoders that support SmileSound are currently available in the following types: The major differences between these types are shown in Table 5.1. As shown in 1, the board shape and AUX are at the motor output. This is due to the size of the scale and the application.

- 75017 SmileSound Mini Next18
 Compact sound decoder developed for N gauge
- 75019 Generic sound decoder developed for the SmileSound Standard MTC21 HO
- 75022 SmileSound Sound Development Board: A board for developing sound data. Direct connection to PC.
- 75026 SmileSound Slim USB sound decoder for N-gauge (mainly GreenMax locomotives) and HO with integrated interior light.



Figure 5.1.1 SmileSound decoder series

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Table 5.1.1 Functional Differences Between SmileSound Decoders

item	Mini Next18	Standard MTC21	Slim USB	
Supported	Next18	MTC21	USB	
Connectors				
Motor power	Instantaneous	Instantaneous 1.5Amax,	Instantaneous	
	0.7Amax,	Continuous 1.0A	1.5Amax,	
	Continuous 0.5A		Continuous 1.0A	
Usable pads	without	And	And	
size	10.5x25mm	16x30mm	100x13x3.6mm	
Working voltage		DC12V~16V, up to 21V		
Number of AUX	Up to AUX4	Up to AUX6	Up to AUX2	
used				
volume	small	large	small	
Capacitor load	small	Approx. 50uF	300uF	
External	Specify electrolytic	capacitors or polymer	300uF polymer	
Capacitor	capacitors. Ceramic	capacitors are not	capacitor mounted on	
Requirements	recommended because	e they have a reduced	board	
	capacitance due to DC b	pias characteristics.		
External	Minimum 200uF	External 100-200uF	Not required in	
Capacitor	externally.	recommended.	principle	
Required	Recommended 400uF			
Capacitance				

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5.2.specification

The functional specifications supported by SmileSound are listed below.

lable			
Supported Protocols	NMRA DCC (with RailCom Cutout)		
SpeedStep	14, 28, 128		
Function	F0-F32, according to the new 2022 specification		
Asymmetrical DCC	Asymmetrical DCC not supported (automatic braking function not		
	supported)		
CV method	Direct, OPS/POM (RailCom linkage function is planned in the future)		
Motor PWM	32kHz (configurable)		
Line voltage	12V~16V(recommended), up to 21V		
AUX Output	Headlights, taillights, AUX1-2:		
	Power, Open Collector Output, 100mAmax		
	AUX3-6 (AUX3-4 for Mini Next18):		
	Logic, 3.3V CMOS output. When connecting lights, etc., it is		
	necessary to convert it to power output.		
Sound Memory	120Mbit(15MB)		
Sound Output	32/16/8kHz 16bit/8bit.		
Speaker Capacity	3Wmax, 4-32Ω		
Number of	12 sounds (2 of which are dedicated to steam sounds)		
simultaneous sound			
User modification of	Supported by dedicated tools. Proprietary scripting method.		
the sound			
Firmware Capacity	8Mbit(1MB)		
Analog operation	Not supported (not planned)		
Servo Functions	Currently under consideration		
SUSI	Not supported (not planned)		
RailCom(BiDi)	support		
Safety & Protection	- Motor output protection (overheating, overcurrent, overvoltage,		
Functions	undervoltage)		
	\cdot Speaker output protection (short circuit between speaker wiring,		
	short circuit between output ~ GND only)		
	\cdot Power supply protection (overheating, undervoltage, soft start)		

Table 5.2.1 SmileSound Specifications (Common)

5.3.Support CV

See 71page.

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5.4.DCC Connector

5.4.1.What is a DCC connector?

SmileSound supports two DCC connectors: Next18 and MTC21. It is rarely used by model manufacturers in Japan, but it is widely used overseas.

As the name suggests, the SmileSound Mini Next18 is compatible with the Next18 connector. The Standard MTC21 is also compatible with the MTC21 connector. In addition, there are standards such as NEM652 (NMRA 8 pins) and PluX.



Figure 5.4.1.1 Example of SmileSound Compatible Connector

5.4.2.Next18

The Next18 connector is a DCC connector that is mainly used for N gauge. A board-to-board connector is used, and the pinout is devised so that failure does not occur even if it is reversed.

Although it has not been adopted in model railroads in Japan, it is widely used mainly by European model manufacturers. TRAINO (https://traino.jpn.org/) sells mounting auxiliary boards for Japan model railroad locomotives, so by using these, the threshold for DCC conversion of N gauge is relatively low.

Below you can see the pinouts for the Next18 connector.

Assignment	Pin		Assignment
Terminals	Number		Terminals
Track A	9	10	Track A
Headlight (P)	8	11	Motor Power-
Speakers+	7	12	AUX2(P)
COM+	6	13	AUX4(L)
GND	5	14	GND
AUX3(L)	4	15	COM+
AUX1(P)	3	16	Loudspeaker-
Motor Power+	2	17	Taillight (P)
Track B	1	18	Track B

Table 5.4.2.1 Next18-S standard pin assignments

(P): Power output (open collector), (L): Logic output CMOS 3.3V

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5.4.3.MTC21

The MTC21 connector is a DCC connector that is mainly used for HO and No. 16. The connector features a general-purpose 2x11 1.27mm pitch pin header, but the 11th pin, called the INDEX pin, cannot be used, but can be worn as a marker. In addition, the decoder side has a structure in which the pin frame and the board are integrated, and Figure 5.4.3.As shown in 1, it is configured to be inserted from the top through the hole on the board.

It uses thicker pins than the Next18 connector, which allows it to withstand high currents in HO.

Assignment	Pin Number		Assignment
Terminals			Terminals
Sensor 1/AUX7(L)	1	22	Track A
Sensor 2/AUX8(L)	2	21	Track B
AUX6(L)	3	20	GND
AUX4(L)	4	19	Motor Power+
—	5	18	Motor Power-
—	6	17	AUX5(L)
Taillight (P)	7	16	COM+
Headlight (P)	8	15	AUX1(P)
Speakers+	9	14	AUX2(P)
Loudspeaker-	10	13	AUX3(L)
No Pin	INDEX	12	VCC(3.3V)

Table 5.4.3.1 MTC21 Standard Pin Assignments

(P): Power output (open collector), (L): Logic output CMOS 3.3V



Figure 5.4.3.1How to use the MTC21 connector

5.4.4.PluX

Conversion to the PluX standard, which is supported by European locomotives, is not recommended due to the complexity of the structure and wiring. The design is designed in which the connector is shared between the N gauge standard and the HO standard.

5.4.5.NEM651 6-pin

Some European N-gauge locomotives have a 1.27mm pitch 6-pin connector. SmileSound does not support it, so please create and use your own adapter to convert from Next18 to 6 pin.

5.4.6.NEM652 NMRA 8-pin

Some of KATO's HOPLA, Tenshodo and Tramway locomotives are equipped with NEM652 (NMRA 8-pin) DCC connector sockets. Basically, it is a connector for HO (No. 16), so I will explain how to convert it on the premise of Standard MTC21.

Use the NEM652-MTC21 adapter

860046 Use an MTC21 to NEM652 conversion cable. It can be easily converted to NEM652. However, since it consumes volume, please secure the mounting space. It can be purchased at LaisDcc or the Desktop Station online store. Similar products are also sold by European and American manufacturers. You can also make your own.



Figure 5.4.6.1Lais860046 MTC21 to NEM652 Conversion Cable

• 10047/10050 ExpBoard M21 SuperShort narrow version (implemented) to NEM652 by

yourself

Use the MTC21 pull-out board to pull the NEM652 wiring from it. In addition, since it is not assumed to be NEM652, there is a disadvantage that the wiring tends to be messy.



Figure 5.4.6.2 10047/10050 ExpBoard M21 Super Short Narrow Edition

Pull the wiring directly from the decoder without using the MTC21 connector

To convert to the NEM652, you can also prepare and wire the AWG32 wires and connectors yourself. By using two 860047 NEM652 plugs and cables, or four 860006 NEM652 plugs only, you can save yourself the need to collect and consider parts that are difficult to obtain.

5.5.Decoder Description

5.5.1.SmileSound Standard MTC21

This is a sound decoder designed for HO gauges. It complies with the MTC21 standard and is capable of a motor output of 1.5 A max. Since there is enough space for large speakers, the amplifier circuit is adjusted so that it can produce a louder volume than a decoder for N gauge.

The SmileSound Standard MTC21 is available with user-usable pads (soldering points). The Mini Next 18 does not have any user-available pads. Figure 5.5.1 indicates the pads available to the user.



Figure 5.5.1.1 Appearance of the SmileSound Standard MTC21



Figure 5.5.1.2 How to pull wires out of the pads of the Standard MTC21 Table 5.5.1.1 Standard MTC21 Pad

Pad Name	Pad Description
Speaker	Loudspeaker. There are two lines. When used with a single speaker, polarity does
	not matter. When using two or more pieces, pay attention to the phase of the
	sound.
MotorR/L	Wiring to the motor. There are two lines and they are polar. If the wiring is

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q		reversed, the motor will rotate in reverse.
5	TAIL	wiring to the taillight (cathode side for LED), (power output)
ō	HEAD	Wiring to headlightsGeneral-purpose terminals (power output)
	COM+	Power supply common terminal. The light is wired to the anode side.
-	AUX1	General-purpose terminals, mainly interior lights (power output). Open Collector
3		Output
5	AUX2	General-purpose terminals (power output). Open Collector Output
	TrackR/L	Track-side wiring

GND GND terminal. Used for Tomaran capacitors, etc.

5.5.2. SmileSound Mini Next18

The SmileSound Mini Next18 is a general-purpose compact sound decoder intended for use in N-gauge locomotives. It is compliant with the Next18 standard and can be used for Next18compliant locomotives worldwide.



Figure 5.5.2.1 Appearance of the SmileSound mini Next 18

5.5.3.SmileSound Slim USB

The SmileSound Slim USB is a sound decoder that has an integrated interior light and is mainly aimed at GreenMax, but is also suitable for other KATO and Tomix N-gauge and small HO and narrow sounds. The motor output has beenenhanced from the S mileSound Next18, and can be operated even on lightweight HO locomotives.

It is used by drawing wires from the pads on the board and connecting them to the wiring from the locomotive's motor or tracks. Headlight and taillight pads are also available for single-line locomotives.

The ears on the end of the SmileSound Slim USB can be cut off. Depending on the locomotive, the ears can be used for fixation, or they may need to be cut.



Figure 5.5.3.1 Appearance of the SmileSound Slim USB Table 5.5.3.1SmileSound Slim USB Pad Instructions

Pad notation	Signal content
RailA, RailB	Wiring from the railway line
F0 F	headlight
F0 R	tail light
12V	COM+ or C+. Common power supply.
KAC+	Tomaran Capacitor Connection Pad (+ Side)
GND	gland
AUX1	Interior light (POWER)
AUX2	External output (POWER)
M+/M-	Motor power

5.5.4.SmileSound Sound Development Board

The SmileSound Sound Development Board has a USB connector, which is a connection interface to a PC, and can be easily connected to a PC to rewrite firmware and write sound data. It is suitable for use in the creation of sound data.

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5.6.Current Collector Measures and Tomaran Capacitors

The electronic components used in the SmileSound decoder consume a large amount of power, so there is a problem that it is slightly inferior to current collection failure. For this reason, it is recommended to install an external electrolytic capacitor in the decoder. In addition to capacitors, the improvement effect is also increased by collecting current for all locomotives (collecting current in multiple locomotives and installing wiring between locomotives). For example, all of the model train cars running in the diorama of the museum are basically current collectors.

As for the capacitor requirements, we recommend using an electrolytic capacitor with a withstand voltage of 25 V, with a minimum of 200 uF for the SmileSound mini Next18 and a minimum of 100 uF for the SmileSound Standard MTC21. In addition, it varies greatly depending on the current collection performance of the locomotive to be installed, the number of current collector shafts, the presence or absence of rubber tires, etc. This recommendation should be used as a reference only.

For example, if rubber tires are attached, the climbing force will be improved, but the current collection performance will be reduced because the insulating rubber is attached to the wheels. In the case of locomotives with rubber tires, it is necessary to take measures to increase the number of capacitors. If multiple locomotives can be used to collect current with an energizing coupler, etc., reducing the capacitor may not be a major problem.

Care must be taken when using ceramic capacitors for Tomaran capacitors. A phenomenon called DC bias occurs in which the capacitance of the capacitor decreases. For this reason, it may be reduced to 1/2~1/3 from the stated capacity. For this reason, it is recommended to use electrolytic capacitors or polymer capacitors that do not cause DC bias. In addition, ceramic capacitors have a small internal resistance, so they are prone to inrush currents, and if there is no Tomaran capacitor circuit, rails and wheels are likely to become dirty.

Tomaran Capacitors

https://desktopstation.net/wiki/doku.php/%E3%83%88%E3%83%9E%E3%83%A9%E 3%83%B3%E3%82%B3%E3%83%B3%E3%83%87%E3%83%B3%E3%82%B5

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Figure 5.6.1Connection example of Tomaran capacitor

5.7. Mounting in locomotives

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A separate manual is available for instructions on how to install SmileSound in your locomotive. There are various precautions for mounting, so please take your time to prepare and work carefully.

It is also very effective to get advice from experts.



Figure 5.7.1Precautions for locomotive installation

Table 5.7.1Tips and precautions for locomotive installation

Let's take a picture of the installation. Later, you can find problems and use them for the next task. It is also easier to receive advice when receiving support.

Always be humble. Be aware that no matter how much you check, mistakes will happen.

Choose thin wires. The thinness of AWG32 is a guide.

Thin wires are sold at Oyaide Electric in Akihabara and Senshi Densho.

Be sure to have a tester. A short test is always conducted!

Prepare insulating tape (polyimide tape or acetate tape)

Use multiple soldering irons, such as thin and thick ones at the end

Heat shrink tubing should also be prepared in various thicknesses.

Keep the speakers fixed. There have been many reported cases where magnets are included, and they come into contact with the tracks and cause short circuits, causing the decoder to fail. If the speaker wiring comes into contact with the tracks, the decoder will surely fail.

Be sure to prepare a decoder tester. Let's make sure it works before installing it.

Use an inexpensive decoder to test if your locomotive works. There are many people who use an expensive decoder to break down from the beginning.

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5.8.Decoder insulation measures

Decoder isolation is very important. The most common is a short circuit through the wiring connected to the decoder, but it can also break when the decoder itself is hit by some metal or conductive object. Here, we will show you how to cover the decoder itself with an insulating member.

To cover the decoder itself with an insulating member, you can do the following:

- Cover with heat-shrink tubing
- Winding using polyimide tape
- Winding using acetate tape
- Wrap using sellotape *Not recommended because it looks bad
- Wrap using vinyl tape *Not recommended because it is sticky

The most effective and good-looking method is to "cover with heat shrink tubing". The following is an explanation of how to insulate using heat shrink tubing, which is sold in electronic component stores. For this method, you will need an industrial dryer. If you don't have one, you can use it by warming the tip of a soldering iron, or you can roast it with a burner or lighter, but it is not recommended because of the risks.

Table 5.8.1How to put on a heat shrink tube

	Cut the heat shrink tubing to the size of the decoder. At this
ANBO SOFT TUBE	time, do not cover the MTC21 connector or the Next18
	connector. Also, especially for the Standard MTC21, make
	sure that the length of the round pad on the edge of the
	board where the pogo pin is applied is the USB lighter.
and the second se	Cover with the cut heat shrink tubing
	If possible, apply heat to the heat gun (industrial dryer) from
	a little distance and deflate.
	At this time, the decoder and the heat shrink tube are
	sandwiched between each other with tweezers. After
	applying heat, it is very hot, so be careful not to burn
	yourself.

5.9.Speaker insulation measures

There are compact 15x11mm cube speakers that are often used in N gauge and others. In fact, if you use it as it is, the risk is very high. What is the problem is that the red frame part below is the conductive part (where the electric machine flows) through which the speaker signal flows.



Figure 5.9.1Cube speaker conductive part

This is connected to the decoder's speaker terminals, and if this comes into contact with the wiring from the wire, the voltage from the line flows back to the decoder, causing damage. This is because the circuit determines the part where the high voltage of the line can be entered, and the part that is dedicated to the low voltage where the high voltage is NG. The speaker wiring does not emit high voltage. Also, of course, it doesn't have a function like a microphone, so you can't input anything.

Since the line voltage is a high voltage, such as 12V, the electrical properties of flowing from a high place to a low place cause reverse flow. Since voltage is applied from the speaker to the decoder forcibly, the internal circuit is broken.



Figure 5.9.2 Mechanism by which the decoder fails

Therefore, it is necessary to take measures to prevent the speaker from short-circuiting due to different wiring, die-casting, metal, etc. Below is an example of covering it with masking tape. It doesn't matter if it's sellotape or polyimide tape. Attach a cover. It is also effective to fix it with glue so that it does not move so that it does not come into contact.

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Figure 5.9.3Speakers insulated with masking tape

6.USB Writer

6.1.Introduction to USB Writers

Smile Sound DecoderThis is an adapter device for writing sound data and firmware to SmileSound via USB. The firmware and sound data for SmileSound are written via a USB writer.

The USB wiring uses a pogo pin (like a sword mount with a built-in spring) to connect between the USB writer and the decoder. The Next18's Smile Sound Decoder can be easily removed with your fingers, but when removing the MTC21's



illustration 6.1.1 USB Writer

Smile Sound Decoder, use a claw, plastic pin, or guitar pick. At this time, be careful not to directly hit the parts on the decoder board with the tip of the jig used for removal.

For example, please do not pull it out with a flathead screwdriver. In fact, there have been several cases where the tip of the driver hits the decoder component and the decoder fails due to a short circuit. If the decoder is damaged due to incorrect usage by the user, operation cannot be guaranteed.



Figure 6.1.2 Example of incorrect removal of the decoder

6.2. How to use the USB lighter

By using a USB writer and DSSP, which is software that runs on a computer, you can write firmware and write sound data.

There are two main ways to write firmware and sound data to SmileSound, but in general, we strongly recommend using the "Write sound to SmileSound decoder" and "Update firmware" functions, which are direct writing functions using DSSP.

In addition, you can export the sound data in UF2 format by performing "Export sound data in UF2 format", and then write it by performing a manual write operation. The

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manual writing procedure is not introduced in this manual because it is an emergency evacuation operation in the event of a SmileSound failure and is a procedure used within our company.

6.3.Writing sound data to SmileSound using DSSP

Please complete 7.2 below before reading this section. Also, download the sound data you want to write from the Open Sound Data website in advance, or obtain the sound data in some way.

DSSP is equipped with a function that detects the smile sound decoder and forces the drive to open so that it can be written. Depending on the PC environment and the status of the USB device, there are rare cases where it does not work. In that case, perform work such as inserting and reinserting it once. The operation procedure is as follows.

procedure	How do I do it?
1	Attaching the Smile Sound Decoder to the USB Lighter
2	Plug the USB lighter cable into your computer.
3	Launch DSSP. If DSSP is already running, you do not need to start it. Verify
	that "Found SmileSound on SerialPort" is displayed on the bottom bar of
	the DSSP.
4	Open the sound data you want to burn in DSSP.
5	Press the write button in DSSP 🗖 to write.
6	Until the end of writing
7	When writing is finished, the drive is automatically removed, so disconnect
	the USB cable from the computer.
8	Remove the Smile Sound decoder from the USB writer.
9	Writing work completed

Table 6.3.1 Procedure for writing sound data

6.4. Writing firmware to SmileSound using DSSP

Please complete 7.2 below before reading this section.

You can use DSSP to update the software (firmware) inside your SmileSound decoder. Multiple versions of the past are available in the DSSP, so if you have a problem, you can revert to the old version. In addition, if a new function is added, it may not work well due to discrepancies. Basically, please select the latest version of the firmware.

Select the "Firmware" tab to perform the firmware update operation.

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Figure 6.4.1 DSSP Firmware Tab

The firmware is different between the MTC21 and Next18 versions. Normally, it is selected automatically, but please note that if you change it by mistake and write the firmware, problems such as the motor not working will occur. If you make a mistake, manually change the type of decoder from the drop-down and press the "Update" button.

After selecting the date (version) of the firmware you want to write, press the "Download" button to write. Normally, the latest version is automatically selected.

At this time, make sure that SmileSound recognizes it. If SmileSound is not recognized, you may not be able to write properly.

If SmileSound fails, many decoders will not be able to recognize it in DSSP. In addition, the decoder may generate abnormal heat due to the power supply from the PC. In this case, please stop using the malfunctioning SmileSound immediately and use a paid defect replacement service (the service is available only for a certain period of time from the date of purchase).



Figure 6.4.2 Display after automatic recognition of SmileSound (version information is displayed)

SmileSound

7.Sound Programmer DSSP 7.1.What is DSSP?

DesktopStation SoundProgrammer (DSSP) is a software for Windows that allows you to create sound data for SmileSound. This tool allows the user to freely program the SmileSound decoder. The sound data (SSDX files) generated by this tool can also be shared with other users. By combining sound movements, AUX operations, function buttons, and driving speed states in scripts, SmileSound functions as a sound decoder.

It mainly has the following functions.

- View, create, and edit sound data for SmileSound
- Writing sound data to the SmileSound decoder
- Updating the SmileSound Decoder Firmware
- CV editing for SmileSound decoder

DSSP can be used free of charge by anyone who complies with the license and agreement.

7.2. Download and install DSSP

You can download the latest version of DSSP from the SmileSound website. The downloaded DSSP is packaged in ZIP format, so unzip (extract) it using Explorer or an archiver such as 7zip.

DSSP Public URL

https://desktopstation.net/smilesound/index.php?SoundProgrammer

SoundProgrammer(DSSP)	MENU
Sound rogrammer (5551)	ТОР
DesktopStation SoundProgrammer(DSSP)は、SmileSoundのサウンドデータを作成するための、	仕様
Vindows向けのソフトウェアです。	サポート
『のツールを使う事で ユーザーはSmileSoundデコーダを自由にプログラミングできます。このツー	配線方法
レで生成したサウンドデータ(ssdxファイル)は、他のユーザーと共有することも可能です。	作成ツール DSSP
	マニュアル
ナウントの動きやAUXの操作、ファンクションボタンや走行スピート状態を組み合わせてスクリフト で記述することで、SmileSoundをサウンドデコーダとして機能させます。	ファームウェア書込
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DSSP本体のダウンロード	サウンド作成方法
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• DSSP 20230420版 ※TEST	CV
• DSSP 20230416版 ※TEST	AUX
• DSSP 20230409版 ※TEST	モータ機能
• DSSP 20230401版 ※TEST	SmileSound Standard
更新內容(2023/5/2):	SmileSound Mini
・【ファームウェア】20230502に更新。バグ修正,AUX関連の修正	USB = イター
・【DSSP】バグの修正	購入ページ
如期西西	FAQ

Figure 7.2.1 DSSP download page

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Figure 7.2.2 Example in a DSSP ZIP file opened in Explorer

When unzipped, a folder will be created as shown below. The path (folder location) differs depending on the extraction destination and the user's PC environment and settings.

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Figure 7.2.3 Example of unzipped DSSP folder

You can double-click the file called DSSProgrammer.EXE to launch DSSP. At the very first startup, a warning screen is displayed.



Figure 7.2.4 How to work around the Defender SmartScreen feature

7.3.DSSP Startup and Brief Description

When DSSP is launched, Figure 7.3. You will see a screen similar to the one shown in 1. DSSP

is running normally. From this screen, you can edit the sound data and write it to the SmileSound decoder. First, let's open the sound data and edit it.

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Figure 7.3.1 Screen immediately after DSSP startup

Sound data can be downloaded from the Open Sound Data website. Here, we will explain the process of downloading the Kiha 40 and opening it in DSSP.

First, open the Open Sound Data homepage with one of the browsers installed on your computer, such as Chrome, EDGE, or Safari.

Open Sound Data Homepage

https://desktopstation.net/sounds/

When the Open Sound Data home page is displayed, select "Sound List" from the menu at the top displayed by a black bar and click on it. Then, a list of sound data will be displayed. The sound data marked next to the model name**S** of the locomotive has been ported to the SmileSound decoder. **S**Please note that unmarked sound data is only compatible with LokSound5.

Here, from the "Diesel / Railcar" item, "DMF15HSA KiHa 40 series diesel locomotiveLet's choose. Then, along with a photo of the KiHa 40, a sentence explaining the contents of the sound data and a list of function key assignments will be displayed.



illustration 7.3.2 Open Sound Data Homepage Screen

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sound data

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From this page, you can download the "Sound Data File **SmileSound**". Click the DOWNLOAD button to download.

Please note that if you download the data for LokSound by mistake, you will not be able to open it with the DSSP described below. The sound data file that can be used with SmileSound must be a file with the "s sdx" extension. Once the download is complete, open this file in DSSP. You can either D&D it on the screen or open it from the File menu.

Figure 7.3.5 shows the state in which the sound data of the KiHa 40 is open. Some of the sound data includes sound flow (CSV) and sound source data (WAV)and the contents are displayed in the two file viewers on the lower side. These files can be replaced, and users can import their own original sound sources and CSV files from outside. You can import from the Edit



illustration 7.3.4 KiHa 40 Data

menu, right-click on the file viewer to display the pop-up menu, or D&D.

In this state, you can write the sound data to the SmileSound decoder by following the procedure for writing sound data to SmileSound described above. It is also possible to perform editing work and modify it to the original sound data.

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Figure 7.3.5With KiHa 40 data open in DSSP

7.4.General Information

The General Information tab is divided into a screen for registering the title, content, date, etc. of the sound data, and a section for displaying overall information.

The title, version, and description are used as information to note the content of the sound data. As sound data, it is not processed in any way. The contents of this article do not affect the operation of the decoder or the content of the sound data. Please use it for data management and as a reminder.



illustration 7.4.1 General Information Tab

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7.5.Sound Flow

When you select a sound flow from the list of sound flows on the left side of the two file viewers, you will automatically switch to a screen where you can edit the sound flow. More on that later.

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5	20一予約	sf erng cav	F6			
6	70-予約	名册审举合图.csw	FG			
7	70一予約	sf vol master.csv	F7			
8	20一予約	sf railjointzw	F8			
9	7日一予約	sf_lb.csv	FB			
10	20一矛豹	sf_cryflange.csv	F10			
11	20~予約	sf door2.csv	E11			
12	20-予約	sf doorl.csv	F12			
13	20一予約	st_door/UL.csv	F13			
14	20~予約	名駅発車ペル_豊饒方.csv	F15			
15	20-予約	名訳発車ベル_中本ーム.esv	F16			
16	20一予約	CP建物誌ab.csv	F18			
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Figure 7.5.1 List of soundflows

7.6.Sound data

The one on the right of the two file viewers at the bottom is the sound data stored in the sound data. Uncompressed RIFF WAV format of linear PCM integer type (UINT16, INT8). You can register new sound data in D&D. Double-click to play the sound. If you want to stop the sound, wait until it finishes playing, or press the ■ button on the left toolbar to stop it. More on that later.

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4	20一矛肋		名数ED.csv	F4			
6	70~予約		sf_emg.csv	F6			
6	70-予約		名號車掌合図.csv	FG			
7	7日一予約		sf_vol_master.csv	F7			
8	70一予約		sf_railjointosv	F8			
9	70一予約		sf_lb.csv	FB			
10	7日一予約		sf_crvflange.csv	F10			
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Figure 7.6.1 List of soundflows

SmileSou

The sound data can be used to adjust the sound volume. You can adjust the volume by selecting the sound data, right-clicking, and selecting the sound volume.

WAVファイル名		サイズ[bytes]	長さ[ms]	WAV情報	ボリューム
227_panta_age.	wav	212,660	4,821	44100Hz, 8bit, Mono	100%
227_panta_sam	a 16130	52,896	1,221	44100Hz, 8bit, Mono	100%
A6loop.wav	ファイル名を変更	134	795	44100Hz, 16bit, Mono	100%
atc.wav	ファイルを削除	940	815	44100Hz, 16bit, Mono	100%
ATSalm.wav		466	508	44100Hz, 8bit, Mono	100%
ATSchk.wav	他のサワントノアイル	で入れ替え 254	481	44100Hz, 8bit, Mono	100%
cflange_1.w	サウンドボリュール	940	1,131	44100Hz, 8bit, Mono	100%
cflange_10.w	9 7219h9± 14	098	296	44100Hz, 8bit, Mono	100%
cflange_11.w	外部ファイルをインポ	(474	44100Hz, 8bit, Mono	100%
cflange_12 <i>x</i>	がキジーフライルキエク	718	1,285	44100Hz, 8bit, Mono	100%
cflange_2.w	クトロリビノアイルをエフ	576	1,871	44100Hz, 8bit, Mono	100%
cflange_3.wav		20,496	464	44100Hz, 8bit, Mono	100%
cflange_4.wav		23,396	530	44100Hz, 8bit, Mono	100%
cflange_5.wav		12,954	293	44100Hz, 8bit, Mono	100%
cflange_6.wav		23,541	533	44100Hz, 8bit, Mono	100%
cflange_7.wav		13,388	303	44100Hz, 8bit, Mono	100%
cflange_8.wav		23,397	530	44100Hz, 8bit, Mono	100%
cflange_9.wav		38,627	875	44100Hz, 8bit, Mono	100%
E231_駅緊急停	『止ブザー_Loop.wav	82,874	939	44100Hz, 16bit, Mono	100%
E231_駅緊急停	『止ブザー_後.wav	63,298	717	44100Hz, 16bit, Mono	100%
E231_駅緊急停	移止ブザー_前.wav	12,680	143	44100Hz, 16bit, Mono	100%
E233_Bkankai	wav	137,429	3,115	44100Hz, 8bit, Mono	100%
E233 Byurume	wav	174,783	3,962	44100Hz, 8bit, Mono	100%

Figure 7.6.2 Modification and adjustment of sound data

Menu Items	explanation
Rename the file	Change the name of the sound data. Please note that the file
	name in the soundflow will not be corrected automatically.
Delete file	Deletes the sound data from the sound data. Please note that
	the file name in the soundflow will not be corrected
	automatically.
Swap with other sound files	Replace the sound data with another sound data. The file
	name written in the sound flow is automatically corrected.
Sound Volume	You can adjust the volume of the sound data to make it louder
	or quieter.
Import external files	Imports new sound data into the sound data.
Export files externally	Exports the selected sound data to the outside world. Please
	be very careful with copyright. If you use sound data beyond
	the default range, you may be punished by law.

Table 7.6.1 Pop-up menu on the sound data screen

7.7.log

If there is an error in the sound flow, the log will show the error status. In addition, the operation status may be recorded. It can be used when a problem occurs.


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Figure 7.7.1 Example of an error in the log tab

7.8.firmware

This screen is used to update the firmware of the connected SmileSound. Since the firmware is released as a set with the DSSP, it is recommended to update the DSSP regularly and update when the latest firmware is available. In the lower left corner, the firmware version of the SmileSound decoder connected to the USB writer is displayed, so you can easily check it.

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Figure 7.8.1 Firmware screen

8.Sound Flow

8.1.At first

SmileSound stores user-created programs in the flash memory inside the decoder and can be freely operated within the scope of the specifications and functions described in this chapter. Sound data in SDX format published in Open Sound Data is created using the commands described here. The ssdx format is the sound data exclusive to SmileSound. Please note that competitor sound data is encrypted or special data, and cannot be used in DSSP at all due to legal protection.

The program that runs on SmileSound is called "Sound Flow". Sound flows can be described in CSV format and can also be created with a text editor.

You can create original sound data by referring to the sound data published in Open Sound Data.

8.2. File formats that can be used in soundflows

The following file formats can be used to program soundflows: Soundflow basically only uses CSV and WAV files internally. The packed file is SSDX. In addition, there are administrative files that the DSSP generates on its own, but do not require you to use them.

File type	Requirements	remarks
CSV	UTF-8, Plain Text, Comma Separated	Do not allow double quotation
	Values	marks.
WAV	RIFF-WAVE, Uncompressed (Linear PCM),	Tagged files are not available
	Mr./Ms. rate: 32kHz,16kHz,8kHz,	Except for float format, it is
	Number of bits: 16bit or 8bit	automatically converted by
	Mono only	DSSP.
ssdx	A sound data format developed by Desktop	Available with the import
	Station Co., Ltd.	function

Table 8.2.1 What files can be used in a soundflow and	what are their requirements?
---	------------------------------

8.3. Screen description

The soundflow editing screen consists of three main screens, as shown below. Sound Flow Editor, Sound Flow List, Sound List List.

The sound flow list displays a list of sound flows registered in the sound data. Select a soundflow from this list of soundflows, and edit the actual movement in the Soundflow editor.

The Sound Flow Editor is a screen for editing sound programs described in the sound flow, and the commands are arranged in order from the top to achieve the desired movement while assembling conditional branches and sound playback commands.

The sound list indicates WAV files (sound source files) registered in the sound data.

Figure 8.3.2 shows the meaning of the icons in the editing toolbox. In addition, you can rightclick to display a pop-up menu. It also provides keyboard shortcuts.

一般性	輪数 サウンドノロー OV編集 ノアー	-4717 D5					
1		sf_ats-s.csv					
	コマント	175X-51	N5×-52	75×-53			
1	分岐がないが	forces1	PLAY ON	START			
2	[5/0].]	PLAY ON	1011_011	0.0011			
3	分岐ジャンプ	spdl=0	RUNNING		Sound Flow F	ditor	
4	ウェイト	500ms					
5	音再生(再生終了まで待ち)	A1Salm.wav	再生回数 2	[約了後]			
8	音再生(再生終了まで行ち)	ATSchk way	再生回数8	[報了役]			
7	[=<) .]	PLAY_LOOP					
8	分売シャプ	fnc==1	PLAY_LOOP				
9	7日-終了						
10	DOM:	RUNNING	THE R.				
11	古井土(井土裕丁まで守5)	ATSalm.wav	<u>并生回读(1</u>	軽丁俊			
12	201歳シャンノ 来またいまた約(まで注意)	tnc==0	PLAY_LOOP3	197 - 299.1			
13	日代工作工作「あいけり」	Arsamway	+	[#*?] 190]			
16	音声仕(声仕線で書で行為)	ATColor man	T211687-2	185 7 791			
16	公的现在分词	toc D	PLAY LOOPS	1997 1 1001			
17	音画生(画生総了まで行ち)	ATSalmway	正生回数 2	1857(約1			
18	今山まジャンプ	foc==0	PLAY LOOP3	100 1 100			
19	法国上限	0					
20	音再午(再午終了まで行ち)	ATSalm.way	リピート	(終了後)			
21	[5KUL]	STOP					
22	分岐ジャンプ	spd>0	STOP				
23	含再生(再生終了まで待ち)	A1Salm.wav	王 牛同歌: 4	酸了後1			
ーウン	KDD- #V.2 Bydev	WAV 75-CL	么 #	√7[bales]	集之[as] WAV推翻	$\pm \delta U_{2} = I_{1}$	
main	373	■ ■CA- 3#	FF END.wey	35.052	397 44100Hz 15bit More	100%	
afate		DA- 3	E Nwsy	73.592	835 44100Ht 15bit More	1006	
ofete	-s.cev 674	■CA- 浅	E LCOP.wev	91,620	1,038 44100Hz 15bit, More	z 100%	
- 21	1.1	atoway		71,540	81		
~		ATSalm.wa	IV.	22,466	50 Lict	of	
Sol	undflow List	ATSchkwa	IV.	21,254	48 LISU	01	
		AM2+AM6	Z€C2 IN wev	40,412	45		
0.0		A//(C+A///5-	Z4,02 LOOP.way	94,364	1,069 44100Hz, 15bit, Mon	0 100%	
states	rLesv 178	AM2 (A96	20 C2 OUT way	100,198	1,135 (44100Hz, 155it, More	5 100%	
Lizat rikaca	rc.cov 214	 buzzerjend 	WEV.	72,342	820 44100Hz, 15bit, More	5 I TCD%	

Figure 8.3.1 DSSP Sound Flow Screen



Figure 8.3.2 Sound Flow Editor Editing Toolbox

8.4.Creation and Execution Rules

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Soundflow operates according to the following rules:

- After the script is loaded, it is always executed.
- When the decoder is powered up, the main.csv is always loaded first and starts running after the start-up process, regardless of the DCC signal. By describing the process of calling each csv in the main.csv, various functions can be realized.
- The sound program (sound flow) described in CSV can execute 16 slots (16 sound flows) at the same time.
- The called sound flow is automatically assigned to the vacant slot.
- It has a function to automatically terminate unused flows (slots), so you don't need to be aware of it.
- There is also a command (exit) to release the allocated flow (slot).
- 12 sounds can be played at the same time. However, two of them are occupied by the steam sound function.
- At all times with a period of 0.1 seconds, the sound flow is carried out from top to bottom

rows.

- The sound file supports 8-bit and 16-bit mono 32kHz, 16kHz, and 8kHz RIFF WAVE files (LPCM). By using DSSP, when writing to the decoder, it is automatically converted to a Mr./Ms. rate that can be processed by the SmileSound firmware. Please do not add information such as tags.
- State transitions are described in scripts. Use if and goto to create conditions for waiting for state transitions. Once the if conditional expression is established, it is a form of transition.
- A single CSV script can have up to 128 lines.
- In addition to sound, it is equipped with AUX operation, speed limiter, and various variable functions.
- Even without a DCC signal, the sound flow can be moved. However, functions related to DCC signals (functions, speeds, direction of travel, etc.) are not available.

8.5. Editing method and principle of operation

Soundflow is a principle similar to the main function in the C language, and the soundflow named main.csv is always called at the very beginning. Therefore, be sure to place main.csv in the sound data. If there are no main.csv in the sound data, the decoder will not start properly. main.csv, the SmileSound decoder is activated and called when the DCC power supply is turned on or the analog power supply is applied to 7V or more. Therefore, even if it is not DCC, if the power supply is done to the decoder, it will start automatically and operate. In other words, a DCC command station is not required for the activation process of SmileSound.

When you call up a soundflow, you can assign a function number. There is a 1:1 relationship between sound flow and function.



Figure 8.5.1 Soundflow Operation Order

8.6.Adding, editing, and deleting commands

To add a command, right-click and select "Add Flow Item" or click the "Add Command" icon to increase the number of commands.

If you want to change an existing command, you can double-click the command to edit it, change the command and change the parameters.

If you want to remove an existing command from the sound flow, you can do so by pressing Delete or by cutting with Ctrl+C.

You can also select one or more soundflows and copy them to the clipboard. You can also paste the command data of the sound flow from the clipboard. When used in conjunction with an external text editor, the dedicated identifier of the sound flow is included in the first line, so do not delete it.



Figure 8.6.1 How to add a command

8.7.Labels and Conditional Branching

Labels are frequently used to define the target position when jumping using the if command, etc.

By writing a process that "waits for the operation of the function", you can describe the movement corresponding to the function. In the following example, depending on whether the function state is ON or OFF, it is moving in a circle.

The variables that can be used for parameter 1 of a conditional branch are all listed in Section 8.9.

1	コマンド	パラメータ1	パラメータ2	パラメータ3
0	ラベル	START 🔶		
1	分岐ジャンプ	fnc==0 →ファンクションがOFFのとき	START	
2	音再生(再生終了まで待ち)	atc.wa∨	1	0
3	ラベル	PLAY_LOOP		
4	分岐ジャンプ	fnc==1 →ファンクションがONのとき	PLAY_LOOP	
5	サウンド停止			
6	フロー終了			

Figure 8.7.1 Example of Creating a Conditional Branch

Table 8.7.1 Meaning of Conditiona	I Branching Operators
-----------------------------------	-----------------------

operator	Meaning of	example
	operators	
==	When left and right	spd==0
	are the same	
>=	When the left is	acc>=1



(- ()	
10	

8.8. How to end the fl	ow
------------------------	----

<=

>

<

!=

greater

right

right

than

When the right is

greater than the left When the left is

When the right is

greater than the left When the left and

right are different

greater than

the

the

acc < = -1

ref>0

ref<128

fnc!=1

There are multiple ways to run and end a soundflow. Depending on the process, there are actions (e.g., CP) that should not be finished. Therefore, there are three main ways to end the flow, as shown below, and you can choose your own depending on the features you want to implement in your soundflow.

	=	
How to end the flow	Corresponding	explanation
	command	
Back to top	ret	In the case of a repetitive operation.
Terminate the flow	exit or do not write	Non-repeating processing, in the case of a
		soundflow called on date.
Return (jump)	goto	In the case of a process that is repeatedly
to any location		moved, there is a problem when returning
		to the beginning

Table 8.8.1 Example of how to end a flow

8.9.List of variables

A variable is an identifier that represents a value that changes in the sound flow. For example, the current driving speed is expressed in alphabetic letters such as s pd, which is used to change the movement in the sound flow according to conditions. The only variable names that can be used in a soundflow are the variables listed below, and cannot be freely added or changed by the user.

Predefined	aliac	ovplanation	Range of	Lisago oyamplos
Variables	allas		values	Usage examples
local	Local	Variables that can be used in the soundflow that you	0-65535	
local	Variables	are calling		

Table 8.9.1 List of Soundflow Variables



	Shared	Variables that can be used in the sound flow of the	0-65535	share1,share2,
snare	Variables	entire decoder		share8
end	Current	The speed at which the locomotive is traveling	0-255	and
spu	speed	The speed at which the locomotive is traveling		spu
ref	Command	During acceleration and deceleration, there is a	0-255	ref
	speed	deviation from the current speed		
		Indicates the function state assigned to the sound flow	0-1	
fnc	Function	as 0 (OFF) or 1 (ON). You cannot check the status of a		fnc,fnc0,fnc1, fnc32
		specific function number.		
aux	AUX State	Indicates the AUX output status as 0 (OFF) or 1 (ON).	0-1	aux1,aux2 aux6
		Timers that can be used in the soundflow that is being	0-65535	
tmr	Timer invoked. If you set a value greater than or equal to 1,			tmr1,tmr2 tmr4
		it will decrease by 1 every second.		
	Acceleration		0-255	
	/	Positive values when accelerating, negative values		200
acc	deceleration	when decelerating		
	speed			
dir	Direction of	0 to go straight 1 to roverse	0-1	dir
un	travel			
CV	SoundCV	SoundCV is in the CV155-CV170 range	0-255	cv1 cv16
	settings			
rnd	Random	A variable that returns a random value. RND1-RND100	0-100	rnd1 rnd100
	Variables	can be used.		
	Emergency		0-1	
	braking	When in emergency braking mode, it becomes 1.		
emg	state	Normally, it is 0.		emg
	variables			
			1	

8.10. List of commands

The following commands are available in the soundflow:

aux	AUX Output			
auxs	AUX Output Voltage Adjustment			
call	Instant readout of sound flow			
cxif	Clearing all of the constant monitoring			
	condition branch ifs			
date	Readout when operating a soundflow function			
dirx	Direction of travel restriction			
echo	echo			
emg	Emergency braking settings			
exit	End of Soundflow			
if	Conditional IF			
goto	Go to label now			

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label	Configuring Labels
let	Calculating Variables and Numbers
monf	Monitoring Function Number Setting
play	Sound playback (with weights)
plyx	Sound playback (no weight)
pit	Setting the Playback Pitch
ret	Jump to top
set	Set a value for a variable
spdx	Speed Limit (Effective Speed Designation)
sply	Acceleration and deceleration sound linked
	sound reproduction
stm	Setting the Steam Sound
stmc	Clear Steam Sound Settings
stms	Adjusting the time of the steam sound
stop	Stop the sound
slim	Speed Limit
vol	Sound volume settings in the sound flow
volm	Overall sound volume setting
wait	weight
wrnd	Random Weights
xif	Registering an Always-on Monitoring
	Condition Branch IF

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8.11. How to use the main commands

8.11.1.aux

Turn on/off the headlights, taillights, and AUX outputs. The AUX commands are operated one by one. If you want to operate more than one, please continue to describe it.

command	Argument 1	Argument 2	Argument 3
aux	AUX Number (0,255,1-8)	AUX operation (0 or 1)	-

The AUX number is stipulated as follows:

AUX Number	definition
0	headlight
255	tail light
1	AUX1
2	AUX2
3	AUX3
4	AUX4
5	AUX5
6	AUX6
7	AUX7
8	AUX8

[Example]

aux,0,1 aux,255,0

8.11.2.auxs

When the headlights, taillights, and AUX outputs are turned on, the amount of output voltage is adjusted. The AUXS commands perform operations one at a time. If you want to operate more than one, please continue to describe it.

command	Argument 1	Argument 2	Argument 3
aux	AUX Number (0,255,1-8)	AUX Output Voltage (0-255)	-

The AUX output voltage is defined as follows: Please note that if you set it to 0, the light will not turn on even if you turn it on with the AUX command. Also, even if you set a value close to 0, the brightness may be difficult to see. It varies depending on the LED and circuit, so refer to the instruction manual of the light unit for details.

AUX Output Voltage	definition
0	Off
1-254	Output intermediate voltage by PWM method
255	Normal lighting

[Example]

auxs,0,128 auxs,1,255

8.11.3.call

Invoke and execute other soundflows. Calling other soundflows is not affected by the behavior because they run in parallel. It is used to produce multiple sounds under certain conditions. For example, the sound of the brakes loosening or the horn when the locomotive starts.

command	Argument 1	Argument 2	Argument 3
call	Sound flow file (csv)	Function number to be assigned (0-28)	-

The following example is an example of invoking a flow1.csv. If you do not use a function number in particular, set it to 0. If you don't use the if command to manipulate fnc variables in the soundflow, there is no problem.

[Example]

call,flow1.csv,2

8.11.4.cxif

You can clear all the "anytime if" conditions registered with XIF.

command	Argument 1	Argument 2	Argument 3
cxif	-	-	-

[Example]

cxif

8.11.5.date

Invoke and execute other soundflows. However, it will be loaded and operated only when the assigned function is changed from OFF to ON. It is used for simple functions such as horns and doors.

Calling other soundflows is not affected by the behavior because they run in parallel. It is used to produce multiple sounds under certain conditions. For example, the sound of the brakes loosening or the horn when the vehicle starts.

command	Argument 1	Argument 2	Argument 3
date	Sound flow file (csv)	Function number to be assigned (0-28)	-

This is an example of invoking a flow1.csv. If you do not use a function number in particular, set it to 0. If you don't use the if command to manipulate fnc variables in the soundflow, there is no problem.

[Example]

date,flow1.csv,2

8.11.6.dirx

This is a heading restriction command. In effect, you can also specify the direction of travel.

command	Argument 1	Argument 2	Argument 3
dirx	Direction of travel (0: Release, 1: FWD, 2: REV)	-	-

[Example]

dirx,1

8.11.7.echo

Indicates a comment line. No special processing is performed. Ignored.

command	Argument 1	Argument 2	Argument 3
echo	comment	-	-

An example of a comment.

[Example]

echo, comment.

8.11.8.emg

Emergency braking (emergency stop) can be turned on and off. Since it operates separately from the speed limit command (SLIM) and the speed limit command (SPDX), it automatically recovers when the emergency braking is released.

When emergency braking is turned on, the system suddenly decelerates and stops in a short time of 1/5 of the speed set by CV4. The standstill state is held until the emergency braking is turned off.

command	Argument 1	Argument 2	Argument 3
emg	0 or 1	-	-

If 1 is specified in argument 1, emergency braking is turned on. Specify 0 to release emergency braking. Be sure to release emergency braking after the motor has been stopped.



When the emg command is turned on for emergency braking, the emg variable is set to 1. You can use if, etc. to determine whether or not you are in emergency braking. When emergency braking is turned off, the emg variable is set to 0.

[Example]

emg,1

8.11.9.exit

Terminates the soundflow and releases the slot it was using. It cannot be restarted. Even if you do not enter exit, the same process as exit will automatically operate when the end of the sound flow is reached. If you don't want it to end, put goto etc. at the end of the script.

command	Argument 1	Argument 2	Argument 3
exit	-	-	-

[Example]

exit,

8.11.10.if

When the conditions are met, it jumps to the specified label. If you omit the destination label when the condition is false, the commands following the if statement are executed in order. For example, if you want to create a state transition using multiple if commands, try omitting the destination label when false.

command	Argument 1	Argument 2		Argument 3		
if	condition	True	Time	Fake	destination	label
		Destination Label		(optional)		

The condition includes a variety of variables (see Table 8.9.1) can be used. An example of jumping by a function operation. Here is an example when the monitoring function is turned on.

[Example]

label,START
if,fnc==1,SOUND_ON,START
~Other Commands~
label,SOUND_ON
~Other Commands~
label,SOUNDLOOP
if,fnc==0,SOUND_OFF,SOUNDLOOP

label,SOUND_OFF

goto

8.11.11.goto

Jump to the destination label.

command	Argument 1	Argument 2	Argument 3
goto	Destination	—	
	label name		

The description example is an example of jumping to the TEST label.

[Example]

goto,TEST ~Other Commands~ label,TEST

8.11.12.label

It sets the position to jump from the goto command and the if command.

command	Argument 1	Argument 2	Argument 3
label	Label Name	-	-

Example of jumping to TEST

[Example]

goto,TEST

 $\sim \sim \sim$

label,TEST

8.11.13.let

This command is used to assign a value to a variable that can be set by the user. Only simple formulas are supported.

command	Argument 1	Argument 2	Argument 3
let	Substitution ceremony (see below)		

The variables on the left side that can be used in assignment expressions are as follows.

Types	of	Variable descriptions	Usable range	Range of values

variables			
local	Variables that can only be used in	local1~local4	0-255
	flows. Cleared when the flow ends.		
share	Shared variables: Variables that can	share1~share4	0-255
	be used in the sound flow of the entire		
	decoder		
tmr	Timer variables. If you set the value,	tmr1~tmr4	0-255
	the value decreases every 1 second,		
	and when it reaches 0, the value does		
	not decrease.		

The assignment expression indicates a statement similar to the following: local2=5+1

Parentheses are not allowed.

 \times let,share3=(1+9)*2

The number on the right side can be a variable.

let,share1=share1+10

In addition to assignable variables, variables such as spd and acc, which can also be used with the if command, can be used for variables on the right side.

let,share2=share2+acc

8.11.14.monf

You can change the function number monitored by the FNC variable used in the IF command of the soundflow. For example, it can be used to create a function function for each soundflow. The default is function 0 (F0).

command	Argument 1			Argument 2	Argument 3
monf	Function monitor (0-	Function number to monitor (0-32)			-

An example of configuring Function 8 (F8) to be monitored by this sound flow. The fnc variable will automatically monitor F8.

[Example]

monf,8

8.11.15.play

The command to play the sound. The function equivalent to wait is automatically set internally, and the next line of the play command does not transition until just before the end of playback.

command Argument 1		nt 1	Argument 2	Argument 3
play	play WAV File		Number of loops (0 infinite loops, 1-100	Play Immediately (1 or
	Name		loops)	0)

If you want to play the loop, set the loop ON/OFF argument to 0. If you want to play it only once, enter 1. If you put 2, it will play twice. You can specify it up to 100 times. If you want to play the WAV file immediately with the play command, enter 1 in the immediate playback argument. If there is a sound that is already playing in this soundflow, and you want to stop it before playing, put 0 in the Immediate playback argument.

If this command is called while another sound is looping, it will switch to this WAV file at the moment when the WAV file ends playing.

[Example]

play,seibuaw_in.wav,1,0 echo,playwav play,seibuaw_loop.wav,0,0

8.11.16.plyx

The command to play the sound. There is no waiting wait function like the play command, and the transition to the next line immediately after playback is performed. Please use it when you want to realize complicated stop control and movement while playing. Except for the weight, the function is the same as the play command.

command Argument 1		t 1	Argument 2	Argument 3
plyx	WAV	File	Number of loops (0 infinite loops, 1-100	Play Immediately (1 or
	Name		loops)	0)

If you want to play the loop, set the loop ON/OFF argument to 0. If you want to play it only once, enter 1. If you put 2, it will play twice. You can specify it up to 100 times. If you want to play the WAV file immediately with the play command, enter 1 in the immediate playback argument. If there is a sound that is already playing in this soundflow, and you want to stop it before playing, put 0 in the Immediate playback argument.

If this command is called while another sound is looping, it will switch to this WAV file at the moment when the WAV file ends playing.

[Example]

8.11.17.pit

This command changes the sound playback pitch (playback speed). It is used to adjust the sound of the motor or mechanical shaft according to the speed, such as coasting sound.

command	Argument 1	Argument 2	Argument 3
pit	Pitch (upstream)	-	-
pit	Pitch Lower Limit	Pitch Limit	-

If only parameter 1 is given, the playback pitch will be changed regardless of the speed. If you enter a pitch value in argument 1 and argument 2, the pitch will automatically switch according to the speed. The lower pitch limit must always be less than the upper pitch limit.

The pitch will be the standard playback speed if you give it 1024. The lowest value is 32 (about 3% playback speed) and the maximum value is 2048 (twice the playback speed). If the upper and lower pitch limits are set, the sound of the slot in the corresponding sound flow will be played at half the playback speed of the lower limit when the speed is stopped, the maximum speed of the upper limit value when the maximum speed is stopped, and half the playback speed of the upper and lower limits when the speed is 50%.

Please note that the playback pitch cannot be adjusted for each sound file.

When you run the pit command, it takes effect immediately. If the pitch is changed regardless of the speed, the automatic switching according to the speed is immediately turned off.

[Example]

pit,512,1024 play,dakou_loop.wav,1,0

[Example]

pit,684 play,beep.wav,0,0

8.11.18.ret

This command returns to the beginning of the soundflow. Regardless of the position that is filled in, it returns to the beginning of the sound flow. After returning, the execution will continue as it is. If you want to stop or end the sound flow, use the exit command.

command	Argument 1	Argument 2	Argument 3
ret	-	-	-

No matter where you put it, you can go back to the beginning of the soundflow.

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[Example]

ret

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8.11.19.set

A command that stores a value in a variable that can be changed by the user.

command	Argument 1	Argument 2	Argument 3
set	Variable name	Values to set	

The possible values for a variable depend on the variable.

Types of	Variable descriptions	Usable range	Range of
variables			values
local	Variables that can only be used in flows.	local1~local4	0-255
	Cleared when the flow ends.		
share	User variables that can be shared and	share1 \sim share4	0-255
	used with other soundflows		
tmr	When the value is set, the value of the	tmr1~tmr4	0-255
	timer variable is automatically decreasing		
	every 1 second.		
CV	CV setting value	cv1-cv1024	0-255

[Example]

set,local1,100

8.11.20.spdx

This is a command to set the lower speed limit. It can also be used instead of a command without receiving a speed command and automatic driving.

command	Argument 1	Argument 2	Argument 3
spdx	Lower speed limit (0-255)	-	-

[Example]

spdx,30

8.11.21.sply

This command plays a sound in conjunction with speed. Set the length of the WAV file to be played back to 100%, and the playback start position will be automatically changed according to the speed. When acceleration is over, the sound stops automatically.

command	Argument 1	Argument 2	Argument 3
sply	WAV File Name	-	-

The VVVF sound used in the open sound data is implemented by dividing the acceleration and deceleration sounds into 6 or 8 divisions according to the LokSound specification. However, by dividing it, it is difficult to continue to produce sound even though acceleration has stopped, or to reproduce a little acceleration. By using this command, you can play back the WAV file as if it were divided steplessly according to the speed and acceleration / deceleration state.

When using this command, it is necessary to set the length (playback time) of the WAV file and the acceleration time (CV2) and deceleration time (CV3) to the same time due to the relationship with the speed. If it is out of sync, it will not work well with the speed.

The following examples illustrate accelerated and deceleration sound flows. Both should be implemented so that they are loaded just before the motor is driven, or call in conjunction with the sound ON.

[Example of entry (acceleration)]

label,START if,spd<1,START if,acc<=1,START sply,E233_kasoku.wav, goto,START

[Example of entry (deceleration)]

label,START if,spd<2,START if,acc>=-1,START sply,E233_gensoku.wav, goto,START

8.11.22.stm

This is a command to set the steam sound function.

command	Argument 1	Argument 2	Argument 3
stm	WAV File Name	Slot Number (0-3)	-

If you set 4 WAV files from slot number 0 to 3, the above draft sound will be played in conjunction with the speed according to the time interval set by the stms command.

It can also be changed during the soundflow operation. You can also change the draft sound depending on the speed and situation (e.g. heavy load).

[Example]

stm,A-01.wav,0,0 stm,A-02.wav,1,0 stm,A-03.wav,2,0 stm,A-04.wav,3,0

8.11.23.stmc

This command clears the steam sound function.

command	Argument 1	Argument 2	Argument 3
stmc	-	-	-

Clear the 4 WAV files set in slot numbers 0 to 3. Virtually, the steam sound function can be stopped.

[Example]

stmc,

8.11.24.stms

This is a command to adjust the time interval at which the sound is played in the steam sound function.

command	Argument 1	Argument 2	Argument 3
stms	1: At the start of the run, 2: At the maximum speed	Adjustment time (ms)	

At the start of the run, approximately 800~1200 ms, and at the maximum speed, about 50-100 ms. Adjustments may be required depending on the locomotive. You can use this command in Soundflow, but you can also fine-tune this value with CV57 (at the start of the run) and CV58 (at maximum speed).

[Example]

stms,1,800,



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stms,2,50,

8.11.25.stop

This is a command to stop the sound played by the play command.

command	Argument 1	Argument 2	Argument 3
stop	-	-	-

Regardless of whether the loop is in progress, the sound stops. Note that it does not stop the sound of other soundflows that are running at the same time.

[Example]

stop

8.11.26.slim

This command is used to limit the speed of the motor. If you set a speed limit with this command, the decoder will limit it to less than or equal to that speed. It behaves as if the speed command has been switched from the command station to the speed limit. When the speed limit is below the limit, it does not change. Also, even if the speed is set above the speed limit from the command station, the speed will not change above the speed limit.

command	Argument 1	Argument 2	Argument 3
slim	Speed Limits (0-255)	-	-

If you want to stop, set the speed limit to 0. If you want to set the speed limit as unrestricted (up to the maximum speed allowed), specify the speed limit as 255.

[Example]

slim,255

8.11.27.vol

This command adjusts the volume of the sound.

command	Argument 1	Argument 2	Argument 3
vol	Volume (0-255)		

If you want to silence it, set it to 0. If you want the volume to be standard, specify 255. 50% volume is 127.

[Example]

vol,255

8.11.28.volm

This command adjusts the master volume of the sound (the sound volume of the entire decoder). Commands from any file in the sound flow adjust the common master volume.

command	Argument 1	Argument 2	Argument 3
volm	Volume (0-255)	-	-

If you want to silence it, set it to 0. If you want the volume to be standard, specify 255. 50% volume is 127.

[Example]

volm,127

8.11.29.wait

Wait for ms (milliseconds). It does not affect sound flow running in parallel.

command	Argument 1	Argument 2	Argument 3
wait	Latency (ms)	-	-

Here is an example of waiting for 5000 milliseconds:

[Example]

wait,5000

8.11.30.wrnd

ms (milliseconds), wait randomly. It does not affect sound flow running in parallel.

command	Argument 1			Argument 2			Argument	
								3
wait	Random lat	tency limit (ms)		-			-
wait	Random	latency	lower	limit	Random	latency	limit	-
	(millisecon	ds)			(ms)			

Here is an example of waiting randomly between 0-5000ms and randomly waiting between 1000-2000ms.

[Example of entry (random weight between 0-5000ms)]

wrnd,5000

[Example of entry (random weight between 1000-2000ms)]

wrnd,1000,2000

8.11.31.wspd

In conjunction with the speed, the weight time can be set. In the linear equation of y=ax+b, a is the velocity-linked weight time, x is the velocity, and b is the offset time.

In inverse proportional mode (0), the weight decreases with each increase in speed. At maximum speed, wait for the waiting time. On steam locomotives, for example, use it in inverse proportional mode. In proportional mode (1), the weight increases with each increase in speed. When stopping, wait for the offset time.

command	Argument 1	Argument 2	Argument 3
wspd	Speed-linked weight time	Inverse proportional (0) or proportional (1)	Offset time

If omitted, the offset time is set to 0 ms.

8.11.32.xif

Regardless of the situation, it is a registration function to move the "anytime if" to monitor. Up to four conditions can be registered. From the fourth point onwards, the registered conditions are ignored. To clear all the conditions registered with XIF, use CXIF.

command	Argument 1	Argument 2	Argument 3
xif	Conditional Expressions	Jump to Label	-

For example, you can stop waiting for a sound to play and start working on something else. It is used when you want to switch the sound when you start decelerating or react immediately while accelerating.

[Example]

xif,f==0,END_LOOP

9.CV Settings 9.1.What is a CV?

CV is an abbreviation for Configuration Variable, which is a general term for the mechanism for setting the DCC decoder. SmileSound provides a setting function that complies with the CV standard, and implements a mechanism that can be easily performed on DSSP.

NIND	編集(E) 3	HIND AINJUD								
-	敷補給 サン	*73- CVR課業 7?-	501F 09							
2	ov-%					€-3 iME	サウンド 速度	ひーブ アドレス	AUX AUX	Steam
	2016 2017 2028 2028 2028 2028 2028 2028 2028 202	OV (新生物) Shut Address Table 11 지방 11년 지방 11년 11년 11년 11년 11년 11년 11년 11년 11년 11년	n Number ober sout stion stion Status Fi stion 2 Status Fi	F8 F3+F13		モータ規算モー 開始電圧(C) 中間電圧(C) 泉大電圧(C) P(M)電源数 パルスアウスト パルスアウスト	- 5 BERF fee (2) 61 ⊕ (5) 210 ⊕	tecki v EENF及びPは カットオン環境 遅度(A) 注意(A) 花分がイン 名工ネサウンドの	140305 2 2 2 9 201 9 9 9 9 9 9 9 9 9 9	
0.00	2018	Densist Address			» ⁴					
17 10	100 F70 - eincev		<u> ተተጽዮ</u> ^	WAV2m114名 ID213~ポLawy			#4.Xbyt 206	en] (0)	長8[ms] 2365	WAV ISE 4000Hz, 18bit, Nors
51	atc.pev			ID2159			300.	643	3,468	44100Hz, 16bit, Mone
51	515-6.06V			ID2II37KUNMeV			212.	135	2,468	41100Hz, 16bit, Mone
51	bkankai.pev			TUSE18 01195) INVev			166.	40	1.952	44100Hz 16bit Mone
51	preaksglosv			Interse 01000 way			157.	104	1.784	44100Hz, 16bit, Mone
21	buzzer.osv			▼16132568_04(60) way			157.	(6)	1.767	44100Hz, 16bit, Mone
1.44	byurumexisv			TESES LCOR(90) May			148,1	16)	1.815	44100Hz, 16bit, Mone
1 1 1				ato way			21.0	40	815	44100Hz 16bit More
91. 91.	Convitionete dav									

Figure 9.1.1 DSSP CV edit screen

9.2.How to initialize a CV

If you want to initialize or reset the CV, you can do the following.

How to initialize a CV	explanation
Writing 8 to CV1	The CV can be initialized while it is mounted on the locomotive.
	This can be done using a common DCC command station.
Using DSSP to rewrite sound	Use a USB writer to connect your PC to the SmileSound
data	decoder. Along with the sound data, the CV data is also
	rewritten to the initial value.
Use DSSP to rewrite CVs	Use a USB writer to connect your PC to the SmileSound
	decoder.
	You can use the CV programming function of DSSP to rewrite
	only the CV.

Table 9.2.1List of CV initialization methods

9.3.Motor Tab

The motor tab allows you to adjust the movement of the motor.

In addition, the motor configuration file (Figure 9.3.1It can be easily set by selecting the scale gauge and the data tuned according to the locomotive manufacturer, motor and type of bogie. These are provided by user volunteers. I would like to express my gratitude here.

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7	5 NewProject - DSSP	20240102		
×	ファイル(F) 編集(E)	ツール(T) ヘルプ(H)		_
1	一般情報 サウ	DSSPの設定(S)		
, k		CVプログラミングツール		サウンドデータ情報
×	・	CV一覧のインポート・エクスポート	•	ファイルサイズ 0 bytes
		既定のモータ設定ファイル一覧から選択		ファイル数 Ofiles
ر ا م	עפעייא 📊	モータ設定のエクスポート		サウンドメモリ使用率 0%
	- 説明	モータ設定のインポート		
		1		

Figure 9.3.1 How to List Motor Configuration Files

t → 2837£7711.24 greenmax_n_coreless.mcfg kato_ho_C56.mcfg kato_ho_c68.mcfg kato_ho_D665mcfg kato_no_conventional_plaloc.mcfg kato_n_slotless_shinkansen.mcfg microace_ho_JNR_183.mcfg tomix_ho_EF210.mcfg tomix_ho_EF210.mcfg tomix_ho_EF81.mcfg tomix_ho_EF81.mcfg tomix_ho_EH200.mcfg tomix_ho_JNR_475.mcfg tomix_ho_JNR_k16440.mcfg tomix_ho_JNR_k16440.mcfg tomix_ho_MR_k16440.mcfg	TEXT.TITLE.N KATO スロットレス新幹線用 TEXT.MANUFACTURE.KATO TEXT.MOTORKATO N TEXT.POWERUNT.KATO N Slotless TEXT.DESCRIPTION.KATO N Slotless,20240103 CV.2.8 CV.5.200 CV.5.200 CV.5.200 CV.5.70 CV.9.0 CV.5.14 CV.55.	
	CV.71.20 CV.72.24 CV.73.28 CV.73.28	~

Figure 9.3.2Motor configuration file selection screen

	Adjustment method	remarks
Starting voltage CV2	It varies greatly depending on the motor, bogie,	
	gear ratio, etc. It is often set in the range of 16-	
	64.	
Intermediate voltage	Aim for a value around half of 255, or a value of	
CV6	about CV5/2. By setting the value from CV5/2 to	
	CV5/3, it will be more realistic.	
Maximum voltage CV5	This is the setting item that determines the	
	maximum speed. 255 is the maximum. It is better	
	to decide on around 200-255.	
PWM Frequency	If there is no problem, leave it at 32 kHz.	
BEMF & PI Control Setti	ngs	
Cut-off speed	If there are no problems with BEMF, no changes	
	are required.	
Speed factor	Set it as follows.	
	Old Country, Narrow, etc.: 128	

SmileSound

	Commuter trains, express trains: 64-96	
	Shinkansen: 64	
Measurement Gap	Adjustable from 0.3ms \sim 4.0ms (3-40d), this is	
	the timing time setting for detecting BEMF. By	
	adjusting it by the motor, the pulsation of the	
	speed can be suppressed.	

モータ	運転	サウンド	速度カーブ	アドレス他	AUX	蒸気サウンド	始動パルスアシスト
モータ	制御モー	- K BEMI	F feedback(P	n v			

開始電圧(CV2) 中間電圧(CV6) 最大電圧(CV5) PWM周波数 省エネ電力カット	32 110 255 32kHz ∨ Enable ∨	-BEMF及びPI制御設5 カットオフ速度 速度係数 計測ギャップ[0.1ms] 比例ゲイン 積分ゲイン	2 96 30 6 4
モータ設定の)エクスポート	モータ設定のイン	·ポート

Figure 9.3.3 Motor CV setting screen

9.4.Start-up pulse assist function

Since a phenomenon called static friction occurs when an object starts moving, the pulse assist function is a function to reduce the effect of this static friction. Due to the static friction, there will always be cases where the locomotive will be reluctant to start running. The pulse assist function is responsible for slightly boosting the power applied to the motor so as to reduce the effect of static friction. Depending on the weight of the motor and the locomotive, it is necessary to set an exquisite value that is neither too large nor too small.





Figure 9.4.2 Pulse Assist Settings

[When not using the pulse assist function]

CV64=0,CV65=0. The pulse assist function does not work. In DSSP, if all the assist parameters are set to 0, the pulse assist function is disabled.

[When applying the pulse assist function]

First, set CV64=15 and CV65=205 as initial values. In the DSSP, set the pulse assist output (CV65) to 40%, the pulse assist time (CV64) to 15ms, and the pulse assist adjustment to 0. After that, I think it would be a good idea to try it while running in the direction of lowering (raising) the CV64.

The target is about $1/2 \sim 2/3$ of the speed (minimum speed) just before stopping at deceleration without assistance in SpeedStep1 (the lowest running speed).

The diagram below illustrates. The leftmost time (ms in milliseconds) is the time to move the pulse assist function. The pulse assist function only moves for a moment, but you can fine-tune that moment. The default is CV64=15, so the pulse assist time is 15ms, which is the "normal" setting. The longer the pulse assist time, the longer it will be popping out. Depending on the specifications of the motor, it may not start running unless it is longer, so if the CV65 described below is not enough, try increasing the time of the CV64 little by little.

The CV65 has a pulse assist force of 205 as the standard, so the duty is 40%. If the value of CV65 is reduced, the pulse assist force will be reduced. If the locomotive pops out, make the CV65 smaller so that the ejection stops, so find a lower limit that is just right.

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	CV64			REV時に短くアシスト		通常	REV時に長くアシスト		レスト				· a #	
			25.00	-3	-2	-1	0	1	2	3		C۱	/65	22170
						CV64	设定值							CV65設定
		0	0	-	-	-	-	-	-	-			0	0
		1	1	33	65	97	129	161	193	225			1	5
		2	2	34	66	98	130	162	194	226		_	2	10
	[sm	3	3	35	67	99	131	163	195	227		۸I %]	3	15
		~	~	~	~	~	~	~	~	~		100 I	~	~
	5.7 F	15	15	47	79	111	143	175	207	239		ス出力	40	205
	17.	~	~	~	~	~	~	~	~	~		15	~	~
	Ϋ́.	28	28	60	92	124	156	188	220	252		1111	47	241
		29	29	61	93	125	157	189	221	253			48	246
		30	30	62	94	126	158	190	222	254			49	251
		31	31	63	95	127	159	191	223	255			50	255

Figure 9.4.3Pulse Assist Adjustment Table

Pulse assist adjustment corresponds to the horizontal adjustment items $-3 \sim 0 \sim +3$ in the table on the left.



Figure 9.4.4Range of Pulse Assist Adjustment

9.5.Driving Tab

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USER'S MANUAL

This is a screen for editing acceleration and deceleration times related to CV3 and CV4. Some commands output sound based on the acceleration and deceleration times set here, so if you develop new sound data, you need to make adjustments for each sound data. The sound data published on the Open Sound Data website has already been adjusted, so there is no need to change this screen.

Note that if you change the settings on this screen for the adjusted sound data, the sound

during acceleration and deceleration may behave differently. If you want to use the adjusted sound data, we strongly recommend that you do not change this screen.

モータ	運転	サウント	* 速度力	リーブ	アドレス他	AUX	Steam		
加速	朝朝間(C)	/3)	120	-	72 sec				
)顾短	四子周(C/	/4)	90	÷	54 sec				

Figure 9.5.1 Operation setting screen

9.6.Sound Tab

This screen allows you to set the CV63 master volume and the CV196 and CV197 equalizer functions.

The master volume can be set in the range of 0-255.

The equalizer has 16 disabled (no effect) and a value greater than 16 will emphasize low (below 800 Hz) or high (above 4 kHz) sounds. Conversely, if you put a value lower than 16, it will weaken the sound in the low or high frequencies. OPS/Program on Main (PoM) allows the CV value to be changed during operation.

The equalizer is greatly affected by the characteristics of the speaker itself, the enclosure, how and where the speaker is fixed, and the surrounding structure. Please note that small speakers and thin enclosures, in particular, may not provide the expected bass enhancement effect.

マ7月-辛春 [100] [10]	
イコライザ・低域 16	
イコライザ・高域 16	

Figure 9.6.1 Sound setting screen

9.7. Speed Curves Tab

The DCC decoder has a function called the speed table that adjusts the ascent curve of acceleration. As standard, a speed curve with straight line interpolation using CV2, CV5, and CV6 is used, but a smoother ascent curve can be set by using the 28-step speed curve provided in the CV67-94. Switching between speed tables is easy on the DSSP speed curve setting screen. Speed curves can be saved and loaded in a simple CSV file, so they can be created and freely swapped according to the characteristics of the locomotive, motor, and bogie. You can also easily adjust the speed curve parameters by clicking on the graph with a mouse operation.



Figure 9.7.1Speed curve setting screen

9.8.Addresses and Other Tabs

In this screen you can set the address of the decoder. In general, it is recommended to keep it as 3 for short addresses. This is because if you set an address other than 3 in the sound data, there are cases where it may be confused with a malfunction when checking the operation. In DSSP, you should do the sound data, and change the address at your command station.

車両アドレス	-CV29 デコーダ設定	
3	🗌 ロングアドレス	
SHORT ADDRESS	🗹 RailCom(BiDi)	
	🔽 128速度ステップ	
	🗌 進行方向を逆にする	

Figure 9.8.1 Address and other settings screen

9.9.AUX Tab

This is a screen for setting the effect of lights using LEDs such as interior lights, headlights, and taillights, which can be controlled by outputting with the AUX terminal of the decoder.

モータ 運転 ち	サンド 速度カーブ	アドレス他 AUX Steam	
ヘッドライト	10ms すぐ点灯	\sim	
テールライト	10ms すぐ点灯	\sim	
AUX1	10ms すぐ点灯	\sim	
AUX2	10ms すぐ点灯	\sim	
AUX3	10ms すぐ点灯	\sim	
AUX4	10ms すぐ点灯	\sim	
AUX5	10ms すぐ点灯	\sim	
AUX6	10ms すぐ点灯	\sim	
AUX7*	10ms すぐ点灯	\sim	
AUX8*	10ms すぐ点灯	\sim	

Figure 9.9.1 AUX setting screen

9.10. Steam Tab

It is used with steam commands (e.g. stm).

By lengthening the interval between sound emitting at low speeds and shortening the interval between emitting sounds at high speeds, the above squirming sound is reproduced. However, if the interval is shortened in a straight line, the sound changes rapidly at low speeds. Therefore, we have performed an interpolation process to draw the orange line below and adjusted it so that the interval between sounds is shortened smoothly. This adjustment is also included in this test.

Setting Values	Explanation of the settings
Low spd interval	This is a CV that adjusts the time interval of the steam sound
(CV57)	at the beginning of the run. The number is added 10 times the
	set value. If you enter 1, 10ms will be added.
High spd interval	This is a CV that adjusts the time interval [ms] at the maximum
(CV58)	speed. A number of 1 times the set value is added. If you put
	1, 1ms will be added.

table 9.10.1 Setting the Steam Sound

The four sounds are played in sequence, but the two channels are combined and played alternately. Due to the peculiarity of this movement, a dedicated function is implemented in the firmware. The time interval of moving to $0\rightarrow 1$ or $1\rightarrow 2$ is controlled by the above speed ~ steam sound reproduction interval [ms (milliseconds)]. The file name is specified by the stm command

described later, so it is a good idea to give it an arbitrary name for ease of understanding. In addition, since the sound can be changed while driving on the sound flow, it is also possible to switch between the sound of the spospo at low speeds and the sound of the spospo at high speeds with the STM command.



Figure 9.10.1 stmControlling the playback timing of steam sounds using commands

-F	タン運転	サウンド	速度カーブ	アドレス他	AUX	Steam		
	Speed int	erval adjust	tment					
	Low sp	d interval	0	= sec				
	High sp	od interval	0	🗧 – sec				
	This fur sound p value is	nction appli playing inte s signed, 12	ies to adjust rval. Becaus 18-255 mean:	steam e of the s minus				

Figure 9.10.2 CV setting screen for steam sound

10.support

10.1. Guaranteed environmental conditions

The support provided by Desktop Station Co., Ltd. to users is based on the following environment. If we are able to repair or adjust the operation and confirm the operation, if you are using a usage environment, conditions, or settings that do not conform to these conditions, we will consider that the operation has been confirmed in the user environment. Thank you for your understanding.

	Warranty-compatible equipment	Other conditions			
Command Station	DSair2, DSairLite	The firmware should be the latest			
		version.			
decoder	SmileSound Series	The firmware should be the latest			
		version.			
Decoder Tester	ESU 53900 Decoder Tester or	Even if the user makes an			
	LaisDcc 860033 Decoder Tester Pro	equivalent device himself/herself,			
		the operation is not guaranteed.			
AC Adapter	AC adapter DC12V or DC15V,	Only AC adapters that are within			
	DC16V sold by Akizuki Electronics	3 years of purchase are			
		guaranteed to work. We do not			
		guarantee other equipment and			
		other equipment.			
Railroad Tracks &	Verification is performed without	using a railway track, and the			
Rolling Stock	command station and decoder tester are directly connected by feeder				
	wires. We do not guarantee that the decoder will work in the				
	locomotive.				

Table 10.1.1 Guaranteed	Environmental Conditions
-------------------------	---------------------------------



Command Station

Decoder Tester



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10.2. About the support system

Desktop Station Co., Ltd. is an Internet-only company and does not have a physical store or direct support desk. We do not provide any telephone support. In addition, we are strongly promoting business simplification in order to keep selling prices down. For this reason, unlike ordinary stores, we use a very small number of people to develop, sell, and operate our business, so we omit various services. Thank you for your understanding.

Table 10.2.1 Contents of su	upport inquiries	and contact points
-----------------------------	------------------	--------------------

Details of support inquiries	Support Desk
Consultation before purchase,	Digital Model Railroad Forum
questions	https://desktopstation.net/bb/
Post-purchase questions and	
consultations	 Registration and usage fee are completely free
Consultation on how to use	\cdot Operated by Desktop Station Inc.
equipment and software	
Consultation on assembling the kit	
Consultation and questions about	
installation	
Compatibility consultation with other	
companies' equipment	
When it is not possible to determine	
whether it is a problem or not	
Initial Failure	Please consult with the store where you purchased the
In the event of equipment failure	product. For the Desktop Station Online Store, please
(regardless of whether it is outside	contact us using the inquiry form or e-mail with your
the free repair period)	order number. We will support you by matching your
Inventory and delivery date inquiries	order number with your purchase history.
before purchase	
Inquiries about missing parts	Desktop Station Online Store
Changing the payment method	https://desktopstation.net/shop/contact
when placing an order	
Inquiries about the sale of parts for	Desktop Station Mail Desk
kit assembly, parts replacement,	support @ desktopstation.net
and provision of alternative parts	
Other inquiries other than those	Desktop Station Mail Desk
listed above	support @ desktopstation.net
	\ast We will not reply to sales emails or inquiries that are
	not related to our products.

10.3. Questions & Answers

Here are some of the most frequently asked questions: If you have any other questions or concerns, please use the Digital Model Railroad Forum. At our company, individual support is only in the event of failure or initial failure, and we do not provide support to users for normal use. Even if we receive an inquiry, we may not respond. Thank you for your understanding. In addition, please note that for failures caused by the user, it will be replaced for a fee in

accordance with the warranty provisions (Chapter 3).

Digital Model Railroad Forum: https://desktopstation.net/bb/

Q. Suddenly there is no sound and there is a malfunction.

If there is a problem with the handling of the speaker wiring and a short circuit with the track, AUX or COM+ related wiring, the internal IC of the SmileSound will fail. Make sure that the insulation treatment is done correctly. In particular, there are many cases where long wiring, exposed soldering and conductive parts, or when the decoder or speaker is not fixed properly, or when it comes into contact with unexpected parts due to vibration or shock during driving, causing a short circuit.

Q. The volume of the SmileSound mini Next 18 is low.

At the discretion of the designers, the SmileSound mini Next18 is designed to have a more modest sound volume than the Standard MTC21.

Q. CV readout fails.

If the current consumption of the motor is small, or if it is compatible with the command station, the CV may fail to be read. The SmileSound decoder is recommended for use in Direct mode.

Q.If you run it on the tracks, it will stop immediately.

Is it a locomotive that can run normally in analogues? Locomotives that cannot run stably in analog will not work properly in DCC. There are locomotives that have few current collection points, and there are locomotives that are not naturally resistant to current collection due to their design. Current collection is the most effective for all locomotives, but please take measures against current collection failures, such as strengthening capacitors and reviewing wiring. In some cases, the cause may not be the locomotive, but the track, feeder wire, or line voltage. HO should be used for 15-16V.

Q.Can I write and use competitor's sound data?

SmileSound can only use sound data developed for SmileSound. Competitor's sound data is encrypted and specially processed based on the competitor's specifications and rights, and we are prohibited by law from infringing on those rights. Therefore, you cannot use any of your competitors' sound data.

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10.3.1.List of CVs

The following is a list of CVs that are set as standard in SmileSound. The initial values listed here vary depending on the sound data, so please refer to them.

CV Number	Functional description	Initial value
CV1	Short Address	3
CV2	Starting voltage	8
CV3	Acceleration time (seconds divided by 0.6)	120
CV4	Deceleration time (seconds divided by 0.6)	90
CV5	Maximum Voltage	200
CV6	Intermediate voltage	70
CV9	PWM Carrier	0 (32kHz)
CV10	BEMF Cutout Factor	2
CV17	Long Address LSB	0
CV18	Long Address MSB	0
CV28	RailCom Enabled Settings	1
CV29	Decoder settings	10
CV54	BEMF coefficient (1.0x divided by 16, 3.0x by 48)	96
CV55	PI controller P-gain	16
CV56	PI Controller I Gain	32
CV62	Current collection failure countermeasures and automatic sound OFF	0
CV63	Master Volume	100
CV64	Kickstart switching speed	50
CV65	Kickstart voltage	0
CV67-94	Speed Curve	-
CV118	BEMF Detection Timing	30
CV154	User Volume Settings	255
CV155-170	SoundCV Settings	-
CV185	Headlight and AUX output settings	0
CV186	Taillight and AUX output settings	0
CV187	AUX1 and AUX output settings	0
CV188	AUX2 / AUX output setting	0
CV189	AUX3 / AUX output setting	0
CV190	AUX4 and AUX output settings	0
CV191	AUX5 and AUX output settings	0
CV192	AUX6 / AUX output setting	0
CV193	AUX7 / AUX output setting	0
CV194	AUX8 / AUX output setting	0

Table 10.3.1.1 List of CVs

CV195	reservation	0
CV196	Equalizer Low Frequency (-800Hz)	16
CV197	Equalizer High Frequency (4kHz-)	16
CV198	reservation	0
CV199	reservation	0
CV200	reservation	0
CV201	reservation	0
CV202	reservation	0
CV203	reservation	0
CV204	reservation	0

10.3.2.bibliography

SmileSound was developed using the following references, OSS, software, specifications, etc. as a reference. I would like to express my gratitude.

- NMRA DCC Standard Public Specification
- RailCommunity Public Standards (RCN)
- DCCwiki (https://dccwiki.com/)
- Arduino, Arduino IDE, Arduino eco system https://www.arduino.cc/
- Pico-SDK https://github.com/raspberrypi/pico-sdk
- earlephilhower Arduino Pico Library https://github.com/earlephilhower/arduino-pico
- NMRA Digital Command Control (DCC) Library https://github.com/mrrwa/NmraDcc
- mklittlefs https://github.com/earlephilhower/mklittlefs
- uf2 https://github.com/microsoft/uf2
10.3.3.thanks

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