Desktop Station

NMRA DCC CV Read and Writer

DSbluebox

User Manual (English)

Version 0.34

DSbluebox   User Manual

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DSbluebox　User Manual

1. Introduction

   DSbluebox is a dedicated device that can independently read, write and test CV conforming to Digital Command Control (DCC) standard which is a world standard digital communication standard of railroad model. It has a function to complement the command station and can be used for setting change and adjustment of vehicle and point. Please observe the precautions and use it correctly.

   DSbluebox has a command station function complying with the NMRA DCC standard. NMRA standard 9.2.3 apply to Appendix F of **Direct CV Programmers (devices that perform CV reading and writing in the DIRECT mode).** Rewriting in OPS mode or Paged mode is not supported.

   DCC is a digital railway model communication standard proposed
   by the National Railway Model Association (NMRA).

2. Security

   DSbluebox guarantees 1 year of finished product under our company's usage condition. As for kit items, we can not judge by customer's assembly precision, so we will exchange only initial defects with non-defective parts.

   Compensation for customer's damage / opportunity loss caused by an unknown defect on DSbluebox's product will be the compensation amount up to the amount paid and further amount will not be covered by our company's warranty.

   If a failure occurs beyond the warranty period, you will be entitled to extensive repair (maximum amount of repair fee will be up to DSbluebox finished product equivalent). The repair service may be terminated without notice depending on the inventory status of parts.

   We are not covered by our warranty about damage, failure, opportunity loss caused by customer's misuse, negligence.

   The scope and contents of the warranty are subject to change without notice.

Desktop Station

3. Attention Notes

Please use DSbluebox correctly with precautions.

⚠	Do not use in outdoor use, liquids, humidity, oil, dust, sealed, high temperature / cryogenic environments
⚠	Do not use in an environment that uses medical equipment. Danger of malfunction due to harmonic noise included in DCC
⚠	Short, risk of electric shock accident
⚠	Use only for digital Command Control (DCC) specification compliant products
⚠	Age 13 years and over. The use of infants and children should be used with supervision and responsibility of parents
⚠	Discontinue use immediately when abnormal noise, unusual odor, smoke emission
⚠	Observe the operating voltage and current range. DC 12 - 18 V, (continuous) 2A max. Use an authorized power adapter that is approved for use in Japan. Use a power adapter with a voltage that conforms to the specifications of the scale, vehicle, and decoder.
⚠	Users are always on while power is on / in use. Leave the AC adapter connected, unattended operation, prohibition of unattended operation.

4. Equipment necessary for operation

In order to run DSbluebox, the following devices are required. In addition, separate tracks, decorated vehicles, etc. are required.

	DSbluebox mainbody
	AC adapter DC12V to 18V ˙ 1A or more ** Center plus, inner diameter 2.1 mm, outer diameter 5.5 mm ⊖—©—⊕
	Feeder wire, AWG 24 or more recommended Please use 2A current wire.

* You can change the voltage to be used by the scale of the vehicle. For Japanese type N, HO (No. 16) please use 12V. For European and American HO, we use about 12V to 16V. It depends on the manufacturer. In the case of O or G gauge, it is preferable to use 18 V instead of 12 V (vice versa).
** by boosting the output of USB mobile battery You may be able to also use the booster cable to output at 12V, but it is a guaranteed operating range.

5. How to use

5.1. About hardware
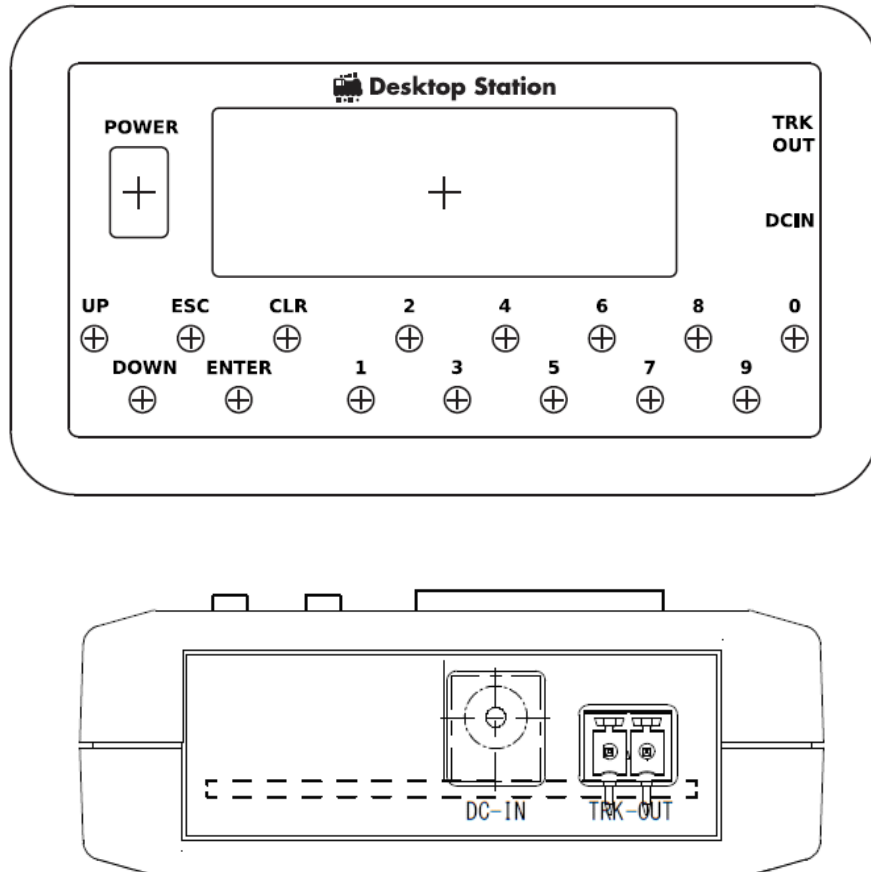
POWER	It is a power switch.
TRKOUT	Connect the feeder wire to the track. Please fix the wiring with a minus precision screwdriver on the detachable terminal.
DCIN	Connect the AC adapter.

The blue silicon cover can be removed.

Please prepare a Phillips screwdriver when disassembling.

Due to wood screws, repeated screw disassembly many times may cause screw holes to become large, which may prevent screwing to the case.

5.2. LCD Screen

The liquid crystal screen has a display that can display 16 x 2 letters, and you can designate screen switching and motion by button operation. For global correspondence, it will be in English.。

```
123456789ABCDEF
123456789ABCDEF
```
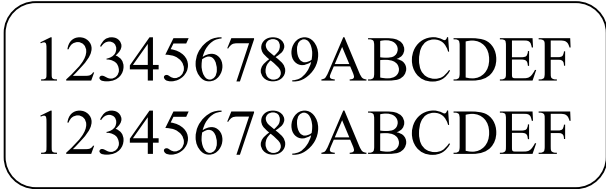
5.3. Buttons

Buttons can be divided into two groups, the buttons for menu operation on the left side and the buttons for inputting the numeric keypad on the right side.

UP	Move the menu, change selection.
DOWN	
ESC	Cancel, use it to return to the menu.
ENTER	It is used for confirmation and so on.
CLR	The numerical value entered by the numeric keypad is cleared to 0. When setting the speed of Loco commissioning, it will behave like 0.
1	It is a numeric keypad to enter a numerical value.
2	
3	
4	
5	
6	
7	
8	
9	
0	

6. Screen Menu

When you turn on the power and start it, you can move the desired function from the following menu.

CV Read	Read the CV value. Enter the CV number and press ENTER to load.
CV Write	Write the CV value. Enter CV number and press ENTER or DN button to enter CV value. Press ENTER to write further.
CV Read Write	After reading the CV value, change the value and write. When entering the CV number and pressing the ENTER or DN button, the CV is loaded and the read CV value is displayed, so you can edit it. Press ENTER to write further. If CV reading fails, the display will return to the main menu.
NuckySignal	You can easily set the address of Japanese type traffic light made by Nucky. ABCDE is read as setting address slots 1, 2, 3, 4, and 5. You can move from A to E with ENTER or DN. I will return with UP. E and press ENTER to rewrite the address of the slot containing the number other than 0.
Check LocAddr	Read Loco's address. I also recognize either LONG or SHORT.
Write LocAddr	Loco address will be rewritten. If it is within 100, write it as SHORT. If it is 100 or more, write it as LONG address. This specification is adapted to the implementation form of European manufacturers, and in America there are many cases up to 127.
Loc Control	It is the trial operation mode of Loco. The speed equivalent to 10 steps, the operation of function F 0 - F 28 is possible. It is a simple function.
Acc Control	It is a test operation mode of point · signal machine · DCC accessories. Specify an address and specify straight (green) or branch (red).
Manufacturer	It is a function to read the maker code (CV 8) and display the maker name of the decoder. An error occurs if CV8 can not be read. Also, if you are not registered, see NMRA.
Config	It is the setting mode.

7.   How to use CV programming

7.1.   CV Reading

I will explain how to use the function to read the CV value from the loco.

From the menu, select CV Read and press ETNER.

>CV Read
 CV Write

Use the numeric keypad to enter the CV No. By pressing CLR you can clear the state you are entering. It is possible to read up to 1024 CV values. After entering the CV No., press ENTER to actually execute the reading process. **Since** the **flow of current to the line,** please make sure that the wiring is correct. If you want to return to the menu, you can cancel by pressing ESC.

>CV No.   0001

When reading CV, the following screen is displayed.

 CV No.   0001
>CV Reading...

If CV reading fails, the following error screen will be displayed. Press ENTER to return to the menu. Check the wiring and check the wearing state of the decoder of the vehicle. Depending on the vehicle, reading may fail, so please read it again.

 CV No.   0001
>Read Error

When CV reading is successful, the CV value is displayed as shown below. This CV value is confirmed by performing reverse bit error check, and it has high reliability value. Press ENTER to

return to the menu.

```
 CV No.    0001
>CV Value XXX
```

7.2. CV writing

I will explain how to use the function to write the CV value from the loco. From the menu, select CV Write and press ETNER.

```
>CV Write
 CV ReadWrite
```

Use the numeric keypad to enter the CV No. By pressing CLR you can clear the state you are entering. It is possible to read up to 1024 CV values. After entering the CV No., press ENTER to specify the CV value. If you want to return to the menu, you can cancel by pressing ESC.

```
>CV No.    0001
 CV Value    003
```

You can set a CV value from 0 to 255. Press ENTER to write CV. If you want to return to editing CV No., you can return by pressing ESC.

```
 CV No.    0001
>CV Value    003
```

The CV writing process actually operates. <u>**Since**</u> the <u>**flow of current to the line,**</u> please make sure that the wiring is correct. When CV is being written, the following screen is displayed.

```
 CV No.   0001
>CV Writing...
```

If you can not confirm whether writing was successful, the following screen will be displayed. Press ENTER to return to the menu. Check the wiring and check the wearing state of the decoder of the vehicle. Sometimes the CV value can be written correctly just by not being able to detect the reaction. If you do CV Read, you can see how the values   are entered.

```
 CV No.   0001
>Write End
```

When CV writing succeeds, it is displayed as follows. Press ENTER to return to the menu.

```
 CV No.   0001
>Write Ok!
```

7.3. CV reading and writing

It is a function to read and write CV at once.

From the menu, select CV ReadWrite and press ENTER.

```
>CV ReadWrite
 Nucky Signal
```

Use the numeric keypad to enter the CV No. By pressing CLR you can clear the state you are entering. It is possible to read up to 1024 CV values. After entering the CV No., press ENTER to actually execute the reading process. **Since** the **flow of current to the line,** please make sure that the wiring is correct. If you want to return to the menu, you can cancel by pressing ESC.

```
>CV No.   0001
```

When reading CV, the following screen is displayed.

```
 CV No.   0001
>CV Reading...
```

If CV reading fails, the following error screen will be displayed. Press ENTER to return to the menu. Check the wiring and check the wearing state of the decoder of the vehicle. Depending on the vehicle, reading may fail, so please read it again.

```
 CV No.   0001
>Read Error
```

When CV reading is successful, the CV value is displayed as shown below. You can edit the CV value with the numeric keypad, so enter the value you want to change.Press ENTER to start writing.

```
CV No.    0001
>CV Value XXX
```

The CV writing process actually operates. **Since** the **flow of current to the line,** please make sure that the wiring is correct. When CV is being written, the following screen is displayed.

```
CV No.    0001
>CV Writing...
```

If you can not confirm whether writing was successful, the following screen will be displayed. Press ENTER to return to the menu. Check the wiring and check the wearing state of the decoder of the vehicle. Sometimes the CV value can be written correctly just by not being able to detect the reaction. If you do CV Read, you can see how the values   are entered.
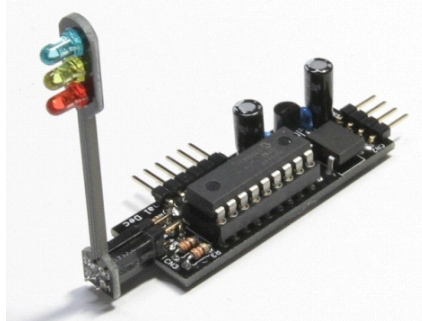
```
CV No.    0001
>Write End
```

When CV writing succeeds, it is displayed as follows. Press ENTER to return to the menu.

```
CV No.    0001
>Write Ok!
```

7.4. Nucky Signal configuration

It is a function for easily setting point address of Japanese type traffic light made by Nucky.

http://web.nucky.jp/

FSG1 Signal Decoder
日本型信号機デコーダ

If you select Nucky Signal and press ENTER, you will be taken to the address setting screen of the Nucky Japanese type traffic light decoder.

```
>NuckySignal
 Check LocAddr
```

Six addresses can be set. T is the traffic light condition condition address (CV 11, CV 12), A is signal present condition 1 (CV 13, CV 14), B is signal present condition 2 (CV 15, CV 16), C is signal present condition 3 (CV 17, CV 18), D is the signal present condition 4 (CV 19, CV 20), E is the signal present condition 5 (CV 21, CV 22). You can change the selection address with the up key and the down key. After selecting E, press ENTER to write the address to the decoder. Please be patient as it will take time.

```
>T000 A000 B000
 C000 D000 E000
```

When CV writing is completed, it will be displayed as follows. Since Nucky's Japanese type traffic signal decoder has a light load, it can not read the CV value.Actually move it and check its operation. Press ENTER to return to the menu.

Nucky Signal
>Write Ok!

7.5. Confirm Loco Address

You can automatically retrieve the address of the loco without being conscious of CV1, CV17, CV18. Pressing ENTER reads the CV value for checking the detailed address of the loco by applying current to the track.

> LocAddr Check
> \>Enter to start

When the reading is completed normally, it displays 4 digit address and whether it belongs to SHORT address or LONG address in parentheses. Press ENTER to return to the menu.

> LocAddr Check
> \>0003(SHORT)

If reading fails, the following screen will be displayed. Make sure that the load such as the motor is connected to wiring and decoder. DS bluebox does not guarantee that addresses of all decoders can be read out. Press ENTER to return to the menu.

> LocAddr Check
> \>Read error!

7.6.   Writing Loco Address

You can write the address of the loco by specifying the address without conscious of CV1, CV17, CV18. CV 29 is also automatically changed. Since CV 29 operates only bits related to LONG / SHORT, it does not affect other functions.

In the loco address you want to change, specify a value from 1 to 9999.

```
LocAddr Write
>0000
```

When writing is successfully completed, a message will be displayed as follows.

```
LocAddr Write
>Finished!
```

When this function is not able to perform CV reading properly, loco address writing does not work. This is because it includes processing to read and judge the value of CV 29. In the case of a decoder that can not read CV, use the CV Write function to set it while judging by seeing the movement by yourself.

8. How to test Loco

The trial operation function is installed. Select Loc Control from the menu and press ENTER. When the trial operation function screen is reached, the current starts to flow through the track. Please prepare the wiring beforehand.

```
>Loc Control
 Acc Control
```

⚠	Turn on the DCC power supply to the line. Attention to electric shock, short circuit.

By using the up and down keys you can select and change the loco address, speed / direction of travel, function 0 to 28 and operate. To return to the menu press ESC. When returning to the menu, the current to the track is automatically stopped.

```
>Loc0003 Spd0 F>
 F00_ F01_ F02_
```

9. How to test turnouts

The turnout address can be 1 to 2044. To change the address, you can use the numeric keys or UP / DOWN keys. You can switch between branching and straightforward with ENTER.

⚠	Turn on the DCC power supply to the line. Attention to electric shock, short circuit.

```
>Acc0001 DIV/
```

* Within DSbluebox, it has a function to hold the status up to 1-512 addresses. Please keep in mind that it will not hold after 513.

10. Configuration screen

    If you select Config from the menu, the setting screen will be displayed.

> >Read mode: Fast
> Return to Top

In Read mode, you can select whether to slowly (Slow) read CV or fast (Fast). Some decoders may have a slow response time. In some cases, reading at high speed (Fast) may cause the read timing to shift so that it can not be read normally.

11. Troubleshooting

11.1. Can not turn on DSbluebox

· Is the AC adapter connected?

· Is the AC adapter properly outputting voltage?

· Short wiring in DSbluebox is not done? Please check the soldering.

· Is the DSbluebox's power switch faulty? If it gives too much heat when soldering it will fail.

11.2. Can not turn on the track

· In Loco equipped with large capacity capacitors, inrush current is huge and safety functions may work. There are cases where it moves when inserting a large wattage resistance (cement resistance of several 10 Ω or so) (not covered by operation guarantee).

· When the DSbluebox cabinet is generating heat, the overheat cutoff function works and no current flows in the line. Please do not use in overload environment.

11.3. Can not read CV

· Does the decoder support CV reading?

· In Config, you may be able to read by setting Read mode to Slow.

· Is a load such as motor and resistance connected to the decoder? In CV reading, data is read by the amount of current flow. If the current is small, data can not be read correctly. Please check the instruction manual of the decoder.

· Is the current flowing to the decoder small? DSbluebox can not detect unless a current of 60 mA or more flows reliably. Also, when the normal current consumption is close to 60 mA, data may not be read well.

11.4. Can not write CV

· If the decoder starts very slowly, there are cases where the CV write command is moved before starting, and there are cases in which writing can not be done normally.

· There may be some problems on the decoder side. Make sure that you can write in other command station.

11.5. Can not work loco

· Is the motor connected?

· Are the feeder wires and wiring inside the vehicle properly connected? Is the connector or screw stop loose?

· Have the decoder failed?

11.6. Turnout does not work

In some manufacturers, the point address may be offset by four (offset). Please +4, please

operate by shifting the address. DSbluebox is an implementation without offset.

11.7. After updated, it failed.

Fails to write the firmware to the ATMEGA328-PU might have. In Arduino IDE, from writing the boot loader to the first, please write the firmware via the writing device. Please note that if you update yourself, problems caused by this update failure are not supported. In Desktop Station, it offers a paid distribution service of replacement ROM chip for the update (one 500 yen).

11.8. I failed to make a kit. I broke it.

· When the terminal of the rocker switch contacts the metal part on the board, short circuit may occur and the IC etc. may break down. In case of failure, repair such as parts replacement is necessary.

· When soldering failure or failure of the IC4 current detection chip, the CV reading function does not work at all. Please check the state of the chip.

· We offer parts, boards and casing cases that have been broken by actual cost + non-standard-size postage fee. Please be assured even if it gets broken.

12. Schematics

We will post the circuit diagram for reference when the user modifies it.

Some changes may be made by revising the board.

This circuit diagram can be used by DSbluebox users for personal use and club use. We will prohibit making it a reference for creating DSbluebox's competing command station products for commercial purposes.

DSbluebox Schematics

Desktop Station Empty Box R4
2016 Dec 18, yaasan
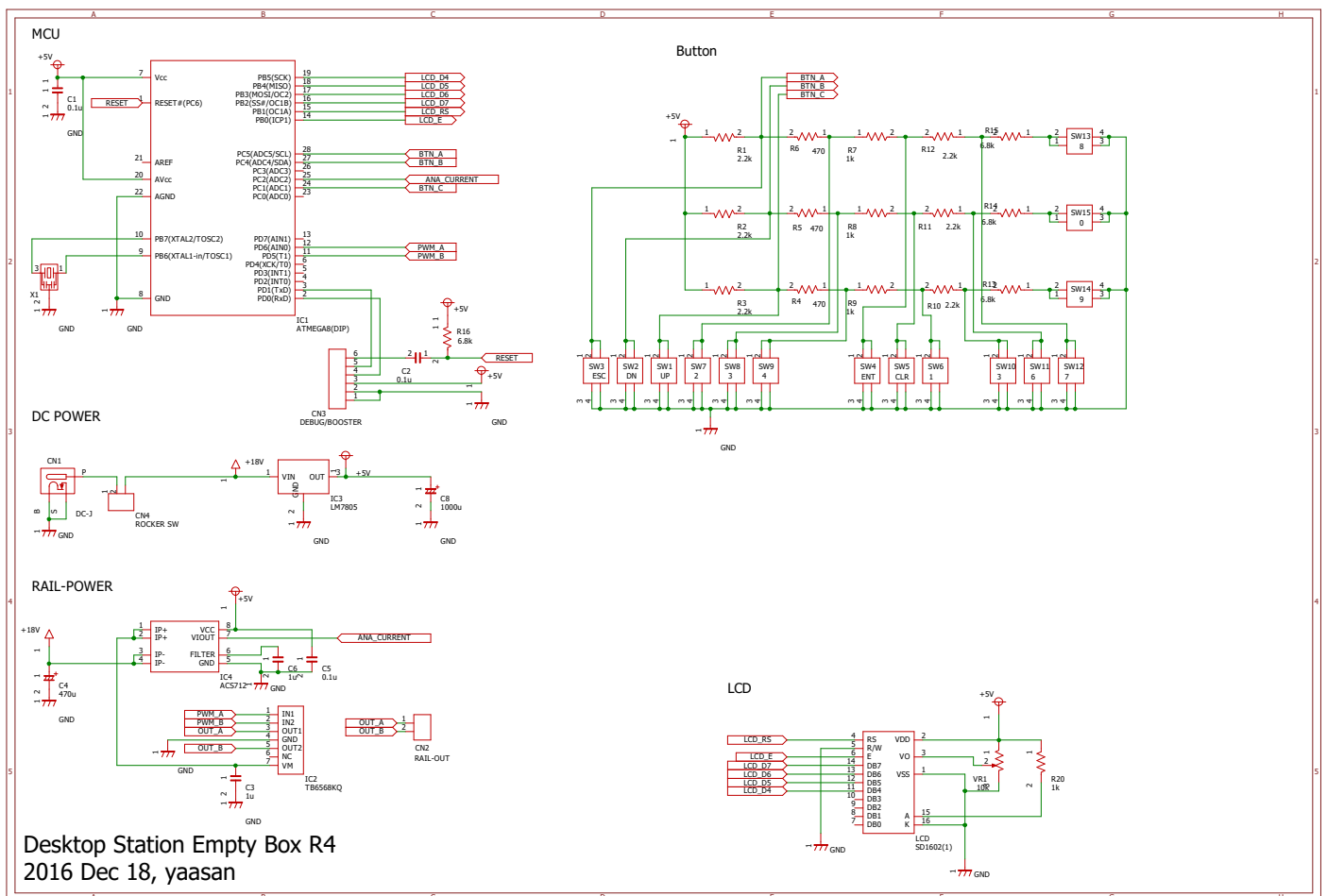
13. Parts list

Parts list shows in the following.

C1,C2,C5,C6	0.1uF, 25V or more
C3	1uF, 50V
C4	220uF, 35V
C8	100uF, 16V
CN1	DC jack, 4Amax
CN2	15EDG-3.81 2P
CN3	N.C. (USB-Serial)
CN4	2Pin L Header
CN4'	ROCKER SW
CN4'	2Pin Jumper cable
LCD0	SD1602, 16pin header
IC1	ATMEGA328P-PU(DIP)
IC2	TB6643KQ
IC3	TA78M05/SMD
IC4	ACS723ELCTR-12A
R1,R2,R3,R10,R11,R12	2.2k Ohm
R4,R5,R6	470 Ohm
R7,R8,R9,R20	1k Ohm
R13,R14,R15,R16	6.8k Ohm
SW1-SW15	18mm 6x6 TacktSW
VR1	10k, 3362-103
X1	16MHz Ceralock

14. Operation confirmed DCC decoders

With cooperation of volunteers, there are reports that CV reading, writing and operation are possible with the following decoders and vehicles. Furthermore, regardless of whether this list is posted or not, there is no guarantee of motion perfectly. There are also cases that do not move due to wearing state or compatibility with the vehicle.

Manufacture	Product code, name	Notes
Nucky	Nucky one coin decoder 3, 4, Japan signal	Japan signal decoder can not read CV.
Nagoden	MP3 decoder V4, V5	
Nagasue	DE29X2, DE32sx, DA7Extln, d51k	
minitrix	16251, etc.	
Fleischmann	715290, etc.	
ZIMO	Unknwon decoders	
Uhlenbrock	Unknwon decoders	
ESU	LokSoundV4,	
cT Elektronik	DCX77z	
digitraxx	EM13, DS51K1	
Lenz	Unknwon decoders	
Soundtraxx	Unknwon decoders, Tsunami	
LGB	DCC support locos	
Tenshodo	Quantum sound decoder series	

15. Decoder Manufacturer

If you read CV8, you can check the manufacturer's manufacturer number (0-255).

Even Manufacture r of the menu, you can view the typical manufacturer name. Manufacturers not listed below are displayed as "See NMRA". For details, refer to Appendix A of the following NMRA official site.

NMRA Manufacturer ID Numbers:

http://www.nmra.org/manufacturer-id-numbers

DCC Manufacturer ID	Manufacturer	Country
156	Nucky	JP
140	Desktop Station	JP
40	KATO	JP
108	Nagoden	JP
103	Nagasue	JP
186	Brawa	DE
99	Lenz	DE
141	Soundtraxx	US
129	Digitraxx	US
151	ESU	DE
161	Roco	AU
159	LGB	DE
27	MTH	US
11	NCE	US
143	MRC	US
145	ZIMO	AU
113	QSI	
153	TCS	
101	BACHMANN	US
127	Atlas	US
131	Trix	DE
85	Uhlenbrock	DE
48	Hornby	UK
109	Viessmann	DE
157	Kuehn	DE
123	Massoth	DE

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