

- Decoder with 4 configurable function outputs
- Used to control sound, lighting, signals, switch machines or other on/off devices
- Each function output operates a maximum load of 300 mA, and is protected against overload.
- Suitable for N-Scale to Large-Scale
- Compatible with NMRA DCC systems including: Arnold Digital; Märklin Digital=; ROCO 'Digital is cool' and LGB Multi-Train Control.
- Length 26mm x width 13mm x height 7mm
(Length 1" x width 0.5" x height 0.3").

Information

LF100

Art. No. 10104

DIGITAL
— plus

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The features of the LF100 Function Decoder

The Digital Plus function decoder, LF100 can be used in locomotives that call for more functions than the decoder suited for that locomotive can supply or wherever extra functions are needed.

Characteristics

The LF100 can be used anywhere you need to control up to 4 extra functions. For example, the LF100 can be used in locomotives that call for more functions than the decoder suited for that locomotive can switch. When used in a locomotive, the LF100 is programmed to the same address as the locomotive decoder, so that you can reach all the available functions with the same address.

It is of course also possible to equip passenger cars or cab cars with LF100 to turn on and off interior lights and headlights / rear end lights. Here the LF100 can either be programmed to the same address as the locomotive that pulls or pushes the train, or you can give the decoder its own address ("cab car address"), that you are not using for any locomotive. If you then connect the cab car to a train, you simply make up a multiple unit consist of the locomotive address and the "cab car address."

Hooked up to an external relay the LF100 can also be used to switch 4 slow motion switch machines. In this case a locomotive address is used and the F1-F4 commands each control one switch machine.

The function outputs of LF100

LF100 has 4 function outputs. You can use the open programmability of these function outputs in various ways:

- I. You can use the first two outputs for directional light change, the third function responds as Function 1 (press button '1' on the hand held controller LH100 when controlling a locomotive); the fourth output responds as Function 2 (press button '2' on the hand held controller when controlling a locomotive), or

- II. You can use the first two outputs for directional light change, the third function responds as Function 3 (press button '3' on the hand held controller LH100 when controlling a locomotive); the fourth output responds as Function 4 (press button '4' on the hand held controller when controlling a locomotive), or
- III. You program it so that you can use all four function outputs independently. That way with Function 1 (button '1' on the hand held controller LH100 when controlling a locomotive) you can turn output 1 on and off; with Function 2 (button '2' on the hand held controller LH100 when controlling a locomotive) you can turn output 2 on and off and so on.

Each function output operates a maximum load of 300 mA, and is protected against overload.

Preparing to Install the LF100

The components of the function decoder must not touch metal parts of frame or shell of the vehicle under any circumstances. Contact will lead to a short circuit within the decoder and it will be destroyed. Never wrap the decoder in electrician's tape, since this will prevent necessary air circulation around the decoder. Instead cover the metal parts with electrician's tape or similar. This way you can prevent accidental short circuits, without "suffocating" the decoder.

The shrink tube that is over a part of the decoder protects touch sensitive parts, and must therefore not be removed. The best way to attach the decoder is to use double-sticking tape.

Vehicles equipped with LF100 must not be used on 2-rail layouts with a separately fed overhead catenary, since the LF100 could receive double voltage if put on the track in the wrong direction. This will destroy the decoder!

Installation of LF100 :

There are two possibilities for connecting the LF100.

The functions in the vehicle can either be wired with their common wire to a wheel pickup, or be polarity free (that is insulated from the wheel pickups and the shell). A mixture of the

two methods is also possible, for instance light bulbs for lighting can be connected to a wheel pickup, and other function devices can be isolated. This mixed-type connection is shown in illustration 1.

If the light bulbs of the headlights are isolated and connected to the blue wire, then they will light a little brighter than if connected to a wheel pickup. Also the directional light change will work when used on a normal DC layout.

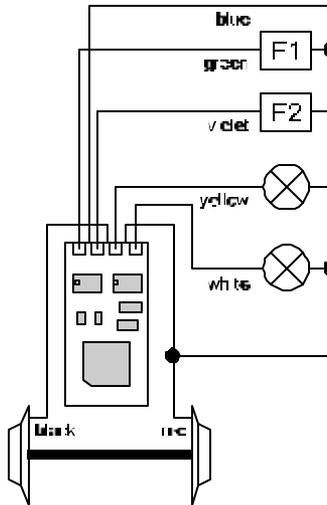


Figure 1: Wiring the LF100

Therefore, which version you use largely depends on the construction of the vehicle.

Step by Step Installation

Connect the decoder to the track voltage pickups:

- Red wire to right rail pickup
- Black wire to the left rail pickup

Now connect the four function outputs:

- white wire: function output 1
- yellow wire: function output 2
- green wire: function output 3
- violet wire: function output 4
- blue wire: common wire for functions

Follow the illustrations for your installation. Illustration 2 shows an example of the connections in a cab car. It makes use of the ability to wire outputs 1 and 2 as a directional function.

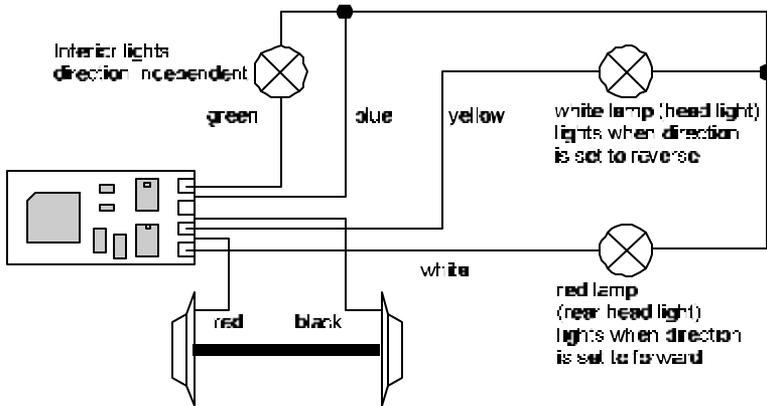


Figure 2: Cab Car Wiring Example

Installation testing:

After you are done wiring, put the vehicle on the programming track and read out the address (follow the instructions provided with LH100 or the system instructions). If you wired the decoder correctly, you can now read the address 3 (factory set) on the display.

Next put the vehicle on a 'normal' track and call up address 3 on the hand held controller.

From the factory, outputs 1 and 2 are set for directional light change. Turn on the light function (Button 0, the light symbol shows on the display). Depending on the direction chosen on LH100, either the function connected to the yellow (direction forward) or to the white wire is turned on. Changing the direction turns off the one function and the other on.

When pressing the button 1 on LH100 the function connected to the green wire is turned on or off; pressing button 2 turns the function connected to the violet wire on or off.

Now program LF100 to the desired address and configurations.

Programming the function decoder LF100

To program function decoder LF100 you need DCC programmer that can support Register Mode programming such as a command station LZ100 and a hand held controller LH100 or interface LI100.

You can also program the locomotive decoder with Arnold and Märklin programmers, or use Control 80(f). With these units you can only write and read registers 1 to 6. To write and read position 7, use the *pointer register*. (Contact you Lenz dealer for an explanation on how to use pointer registers.)

With the LGB Multi-Train Control, ROCO 'Digital is cool' or MRC Command 2000 command stations you can only write register 1 (locomotive address). To configure Register 7 you must use a DCC system capable of writing Register 7. Please refer to the user manuals of the mentioned units for specific programming instructions.

Following is an explanation of the meaning of the registers supported by the LF100. On the left is the number of the register, in the middle the content and on the right the allowable values:

If you do not have a programmer that can program in binary mode, then enter the value that you find in the right hand column.

The configuration variables and their meaning

The following table lists the CVs supported in the LF100 decoder.

Please note: Some Registers (such as REG7) have specific meanings for each bit. The bit assignments in this table use a bit numbering scheme of 1-8 to correspond to the 1-8 display on DIGITAL plus systems. Many other systems use a scheme of 0-7 to refer to the individual bits. If you are using such a system you should subtract one from all bit numbers described in these CVs. For example DIGITAL plus Bit3 becomes Bit2 for systems that number the bits from 0-7 instead of from 1-8.

Table 1: LF100 Configuration Variables

R e g	Description	Range	Factory setting
1	Locomotive address: This is the number with which you select a locomotive in the DIGITAL plus system.	1-112	3
7	Function Settings This register provides the function mapping for the 4 function outputs	0-12	0

Table 2: LF100 Register 7 Function Mapping

Bit 4	Bit 3	Description	Decimal
0	0	Output 1: F0 directional on during reverse Output 2: F0 directional on during forward	0
0	1	Output 3: F1 Output 4: F2	4
1	0	Output 1: F0 directional on during reverse Output 2: F0 directional on during forward Output 3: F3 Output 4: F4	8
1	1	Output 1: F1 Output 2: F2 Output 3: F3 Output 4: F4	12

Warranty

Lenz GmbH does everything it can do to ensure that its products are free from defects and will operate for the life of your model railroad equipment. From time to time even the best engineered products fail either due to a faulty part or from accidental mistakes in installation. To protect your investment in Digital Plus products, Lenz GmbH offers a very aggressive 10 year Limited Warranty.

This warranty is not valid if the user has altered, intentionally misused the Digital Plus product, or removed the product's protection, for example the heat shrink from decoders and other devices. In this case a service charge will be applied for all repairs or replacements. Should the user desire to alter a Digital Plus Product, they should contact Lenz GmbH for prior authorization.

Year One: A full repair or replacement will be provided to the original purchaser for any item that that has failed due to manufacturer defects or failures caused by accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturers discretion. The user must pay for shipping to

an authorized Lenz GmbH warranty center.

Year 2 and 3: A full replacement for any item will be provided that has failed due to manufacturer defects. If the failure was caused by accidental user installation or use, a minimal service charge may be imposed. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturers discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

Year 4-10: A minimal service charge will be placed on each item that has failed due to manufacturer defects and/or accidental user installation problems. Should the item no longer be produced and the item is not repairable, a similar item will be substituted at the manufacturers discretion. The user must pay shipping to and from the authorized Lenz GmbH warranty center during this portion of the warranty period.

Please contact your dealer or authorized Lenz GmbH warranty center for specific instructions and current service charges prior to returning any equipment for repair.

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This equipment complies with Part 15 of FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.