

CV	Description	Area	Value*
1	Locomotive address	DCC: 1 - 127 Mot: 1 - 80	3
7	Firmware version (The processor can be updated)	-	differently
8	Manufacturer's ID Decoderreset CV8 = 8	-	162
12	Decoder operating mode Bit 0=1 DC (analog operation; direct current) on Bit 2=1 DCC data format on Bit 4=1 AC (analog 3-rail operation; alternating current) on Bit 5=1 Motorola® data format on Bit 6=1 mfx® data format on	Value *1 *4 *16 *32 *64	0 - 117 117
13	Activating Function Keys in Analog Operation Bit 0-7 -> F1 to F8; When the Bit =0 the function is off. When the Bit =1 the function is on.	0 - 255	9
14	Activating Function Keys in Analog Operation Bit 0 - 5 -> F0v, F0h and F9 bis F12; When the Bit = 0, the function is off. When the Bit = 1, the function is on.	0 - 63	3
17 18	Long locomotive address 17 = high Byte 18 = low Byte	1 - 10239 192 - 231 0 - 255	1000 195 232
29	DCC standard configuration Bit 0=0 Normal direction of travel Bit 0=1 Opposite direction of travel Bit 1=0 14 speed steps Bit 1=1 28 speed steps Bit 2=0 Digital mode only Bit 2=1 Automatic analog/digital recognition Bit 3=0 RailCom® turned off Bit 3=1 RailCom® turned on Bit 4=0 Speed steps over CV 2, 5, and 6 Bit 4=1 Use the characteristic curve from CV 67 - 94 Bit 5=0 Short address (CV1) Bit 5=1 Long address (CV 17/18)	Value *0 1 0 *2 0 *4 0 *8 *0 16 *0 32	0 - 63 14
30	Error codes for the thermal overload and function outputs: 1 = function error (A3, A4), 2 = thermal overload error, 4 = function output error	0 - 7	0
33-46	Simple function mapping (DCC standard RCN-225) Assignment of the function outputs to the CVs CV 33 Light function key (F0) during forward travel CV 34 Light function key (F0) during reverse travel CV 35 function key F1 CV 36 function key F2 CV 37 function key F3 CV 38 function key F4 CV 39 function key F5 CV 40 function key F6 CV 41 function key F7 CV 42 function key F8 CV 43 function key F9 CV 44 function key F10 CV 45 function key F11 CV 46 function key F12	Assignment of the Fct. outputs f0v f0h A1 A2 A3 A4 A5 A6 A7 A8 - - - -	1 2 16 8 4 16 8 4 0 0 0 0 0 0 0
97	Function outputs "Off" in forward direction (simple function mapping) Bit 0-7 -> A1 to A8; Bit = 1 output off	0 - 255	0
98	Function outputs "Off" in reverse direction (simple function mapping) Bit 0-7 -> A1 to A8; Bit = 1 output off	0 - 255	0

\* set ex works

#### Function assignments

F0	Light (white/red)	F3	High Beam	F6	Red tail Light (optional)
F1	Interior Light	F4	Destination Board		
F2	Cab Light	F5	Driver Desk Light		



## PIKO SmartDecoder XP F PluX16 - for Centre-entry Cab Car Halberstädter - Multi-protocol function decoder compatible with fits mfx®



**NOTE:** The detailed operating manual for the PIKO SmartDecoder XP can be found as a PDF in our online shop on the product page of the respective item. It provides comprehensive information on all the features of your new PIKO SmartDecoder XP.

#### Product description

The PIKO SmartDecoder XP F PluX16 is a state-of-the-art multi-protocol function decoder that is both compact and powerful. It complies with current RailCommunity standards in all areas and can be used with DCC, mfx® and Motorola® digital systems. It also works in analog mode with DC or AC voltage. The decoder is RailCom® and RailCom Plus® compatible. The decoder automatically senses whether the layout is being operated in digital or analog mode and responds accordingly.

The decoder maintains eight amplified function outputs and two additional function outputs that send logic level data to externally amplified loads. Thanks to its advanced function mapping, these outputs can be activated using keys F1 to F68. The decoder's advanced power management keeps the PIKO SmartDecoder XP F running cool and operational in the event of short-term voltage loss.

#### Installing the PIKO SmartDecoder XP F PluX16

The SmartDecoder XP F PluX16 function decoder is installed on your model's PluX16 DCC receptacle. The receptacle may alternatively be located on the model's lighting board. Carefully insert the decoder onto the receptacle, making sure that the decoder's missing PIN 11 is centered over the correct hole on the receptacle. Make sure that no wires are bent and there are no short circuits before you replace the model's shell onto the chassis. The model should now be placed on a programming track to be given a DCC address. When programming or reading CVs, there are small amounts of current that flow which do not damage the decoder.

#### Special function outputs

The decoder's amplified function outputs can only be used if the desired function outputs are already connected to the PluX16 receptacle. The amplified outputs are A0f, A0r, A1, A2, A3 (Motor+), A4 (Motor-), as well as A5 (LSA) and A6 (LSB).

**CAUTION: A short circuit anywhere in the model can destroy the decoder and/or the model's electronics!**

#### Special function outputs with logic levels

The special function outputs on SUSI GPIO/A (A7) and GPIO/B (A8) only send out logic level data. If amplifier circuits for additional function outputs are installed on the motherboard, they can be controlled with logic level data.

**CAUTION:** Soldering on the decoder and on the model should only be done by experienced hobbyists. The warranty does not cover damage done to the decoder by improper soldering.

#### First-time use of the decoder

Place the model on the programming track and bring up DCC address 3 on your controller. Depending on the data format with which it was addressed, the decoder works in 28-step DCC mode or in Motorola mode. When using a RailCom Plus-compatible® DCC system or an mfx-compatible® DCC system, the decoder logs in automatically and can be operated immediately. If the decoder is used on conventional analog systems, it can be controlled with a traditional DC or AC throttle. The decoder will automatically detect what type of control system is in use.

#### Function outputs in analog operation

The decoder can be programmed so that functions F0 – F12 operate during analog operation. To do this, CVs 13 & 14 must first be programmed with a digital control center. The corresponding values can be found in the CV table. F0, F1 and F4 (light functions) are factory-set to ON.

#### Motorola®

To activate functions F1 - F16 when used with Motorola-format control systems, the decoder has four possible Motorola® addresses for each function key F1 - F16. For example, address 3 would switch functions F1 – F4. Next, address 4 would switch functions F5 – F8. Then, address 5 would switch functions F9 – F12, and so on. The additional addresses can be activated in CV61 as required by the values 1 (F5 - F8), 2 (F5 - F12), or 3 (F5 - F16).

#### Configuration CVs

Next to the decoder address, configuration CVs are the most important CVs in a digital decoder. With the PIKO SmartDecoder XP F, these are CVs 12 and 29. A configuration CV usually contains basic settings of a decoder, like those that govern headlight behavior relevant to direction of travel. To calculate configuration CV values, consult the extended operating instructions found on the PIKO website.

## RailCom®, RailCom Plus®

RailCom® can be switched off or on in CV29. If RailCom Plus® is also switched on in CV28 (Bit7 = 1), the function decoder will automatically log on to a RailCom Plus® - compatible control system (like the PIKO SmartControl<sup>wlan</sup>). It will automatically display the decoder symbol, decoder name, and function symbols. RailCom Plus® technology eliminates the need to store model data in the DCC system or to assign the decoder an address (though you probably will want to change the address from 3).

## fits mfx®

The PIKO SmartDecoder XP F PluX16 also works with the mfx® data format and is "fits mfx®"-certified. When used on an mfx® control system the function decoder will automatically log in with its symbol, decoder name and function symbols. The decoder's mfx® -compatible technology eliminates the need to store model data in the DCC system or assign an address to the decoder (though you probably will want to change the address from 3).

## Function outputs

A comprehensive description of all the possibilities of each function output (such as dimming or assigning effects) can be found in the extended operating instructions for the SmartDecoder XP F on the PIKO website.

## Easy Function Mapping (Factory Default Setting)

In **simple function mapping** (according to RCN-225 standards, when CV96 = 1), switchable effects like lighting can be freely assigned to function keys F0 to F12. The value written to a CV in function mapping determines the outputs that can be switched with the function key assigned to that CV. CVs 33 to 46 are used for this.

CV / Function key	Bit 7 (128)	Bit 6 (64)	Bit 5 (32)	Bit 4 (16)	Bit 3 (8)	Bit 2 (4)	Bit 1 (2)	Bit 0 (1)	Factory setting
33 / F0v	A6	A5	A4	A3	A2	A1	F0h	F0v	1
34 / F0r	A6	A5	A4	A3	A2	A1	F0h	F0v	2
35 / F1	A6	A5	A4	A3	A2	A1	F0h	F0v	4
36 / F2	A6	A5	A4	A3	A2	A1	F0h	F0v	8
37 / F3	A6	A5	A4	A3	A2	A1	F0h	F0v	16
38 / F4	A9	A8	A7	A6	A5	A4	A3	A2	4
39 / F5	A9	A8	A7	A6	A5	A4	A3	A2	8
40 / F6	A9	A8	A7	A6	A5	A4	A3	A2	16
41 / F7	A9	A8	A7	A6	A5	A4	A3	A2	32
42 / F8	A9	A8	A7	A6	A5	A4	A3	A2	64
43 / F9	A12	A11	A10	A9	A8	A7	A6	A5	16
44 / F10	A12	A11	A10	A9	A8	A7	A6	A5	32
45 / F11	A12	A11	A10	A9	A8	A7	A6	A5	64
46 / F12	A12	A11	A10	A9	A8	A7	A6	A5	128

## Switch off function outputs depending on the direction (CV96 = 1)

In CVs 97 (forward direction) and 98 (reverse direction), you can specify which function output (A1 – A8) should be shut off. If the particular function output was already switched on, it will automatically be switched off in the desired direction of travel.

CV 97:	Value	CV 98:	Value
Bit 0 A1 forward off	1	Bit 0 A1 backwards off	1
Bit 1 A2 forward off	2	Bit 1 A2 backwards off	2
Bit 2 A3 forward off	4	Bit 2 A3 backwards off	4
Bit 3 A4 forward off	8	Bit 3 A4 backwards off	8
Bit 4 A5 forward off	16	Bit 4 A5 backwards off	16
Bit 5 A6 forward off	32	Bit 5 A6 backwards off	32
Bit 6 A7 forward off	64	Bit 6 A7 backwards off	64
Bit 7 A8 forward off	128	Bit 7 A8 backwards off	128

Each case may be a combination value (a sum of individual values).

## Advanced Function Mapping (CV96 = 6)

Due to its enormous complexity, **extended function mapping** cannot reasonably be achieved by programming individual CVs. If you want to change **extended function mapping** you will need a PIKO SmartProgrammer device (#56415). A Piko SmartTester (#56416) is also helpful in this area. For more information on **advanced function mapping**, please refer to the extended operation instructions on the PIKO website.

## Servo control

The decoder allows for the control of up to four servo motors. Assigning function keys to servos is done exclusively via extended function mapping.

Connecting servo circuits to the decoder requires electronics expertise.

For more information, please refer to the extended operating instructions on the PIKO website.

CAUTION: Soldering on the decoder and on the model should only be done by experienced hobbyists. The warranty does not cover damage done to the decoder by improper soldering.

## Factory reset

To restore the decoder to factory settings, program CV8 = 8.

## Programming

Configuration variables (CVs) form the basis of all decoder settings. This decoder can be programmed with the PIKO SmartControl<sup>wlan</sup>, PIKO SmartControl<sup>light</sup>, or other DCC or Mototola control centers. For more information on programming options, refer to the extended operating instructions on the PIKO website

## Updating the decoder

The PIKO SmartDecoder XP F can be updated with either the PIKO SmartProgrammer (#56415) or the PIKO SmartControl<sup>wlan</sup> (#55821).

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**NOTE:** This product is not a toy and is not suitable for children under the age of 14. Any liability for damage of any kind caused by improper use or failure to observe these instructions is excluded.

## Service:

Internet: [www.piko.de](http://www.piko.de)

E-Mail: [info@piko.de](mailto:info@piko.de)

Hotline: Di + Do 16-18 Uhr

In the event of a defective decoder, please return the decoder module to PIKO along with proof of purchase, and the completed complaint form, which you can find in our webshop at:

[https://www.piko-shop.de/de/medien/reklamationschein-11574/vw\\_name-download.html](https://www.piko-shop.de/de/medien/reklamationschein-11574/vw_name-download.html)

## Warranty Statement

Each decoder module is fully tested before shipment. Nevertheless, should a malfunction occur within the 2-year warranty period, we will repair the module free of charge on presentation of the proof of purchase. This warranty is voided if the unit has been damaged by improper use. Please note that, according to the German Electromagnetic Compatibility Law (EMV-Gesetz), the decoder module may only be used inside models bearing the CE mark.

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