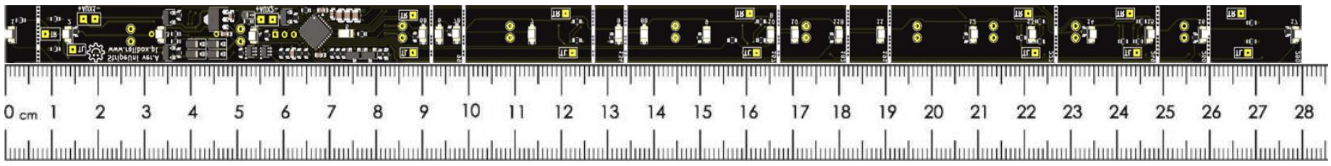
# Universal LED strip RB 2124

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## Introduction

Universal lighting PCB RB 2124 with built-in DCC decoder is used to for wagon lighting in H0 or TT scale. RB 2124 works in DCC mode and in "analog", it allows you to light different parts of the wagons in different sizes by shortening the PCB along perforations, in the way to fit into desired wagon. This decoder supports Railcom ® and DCCA protocols.

## Basic functions:

- **PCB length range: 85mm – 280mm (examples of use here)**
- **There are 2 versions of the PCB: with warm color LEDs (letter W) and neutral color (letter N)**
- **Additional outputs F0 F, F0 R for connecting the ending LEDs with a built-in resistor.**
- **Direction recognition (also in analog mode).**
- **Easy configuration via RailBOX: Railroad Control App (more here)**
- **Possibility to add up to 10 external electrolytic capacitors (could be placed under the roof)**
- **Separate high voltage outputs (AUX 1, AUX2 ≈ 16V) for digital couplings or smoke generator.**
- **Possibility to connect a reed switch to quickly activate interior and end lights alternately depending on the direction using a magnetic "wand" (details here)**




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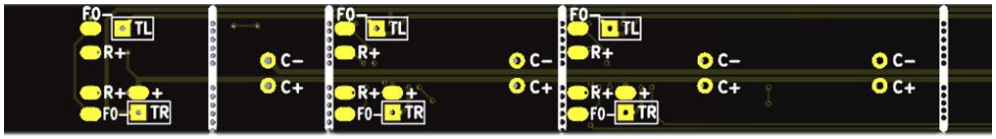
- **Possibility to independently map each of the LED to separate function in DCC mode**
- **Lighting effects (see demo video here)**
- **Supported formats: DCC, analog (not compatible with Motorola ®, Märklin ® MFX ® protocols)**
- **Supports Railcom ® and DCCA protocols**

## Technical parameters

- **PCB dimensions - 12 x min 85 (max 280) mm.**
- **PWR supply - 12 - 20 V AC/DC or DCC.**
- **Current consumption-25 mA (max 1A)**

## Connection: PCB outputs description

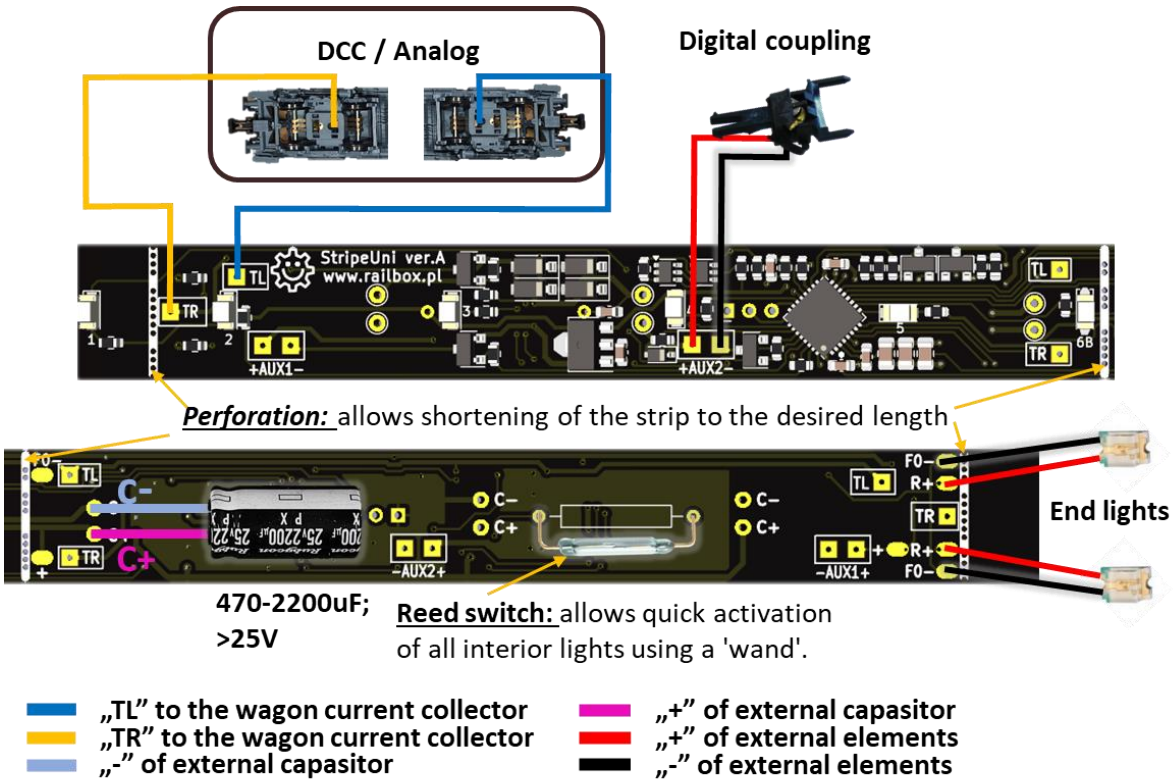



- „TR” – Right rail
- „TL” – Left rail
- „F0”, „R+” – outputs for connecting external ending lights with built in resistors (only external LEDs are needed)


- „-AUX1+” “-AUX2+” – high voltage outputs (≈16V) for connecting digital couplings
- „C+” – Anode of external electrolytic capacitors (outputs have a diode and a 100 Ohm resistor for the correct operation of the CV writing process)
- „C-” – Cathode of external electrolytic capacitors
- „+” – pad is for connecting the LEDs for end lights with a built-in resistor

## Connection of RB2124 to wagon’s current collectors and external components

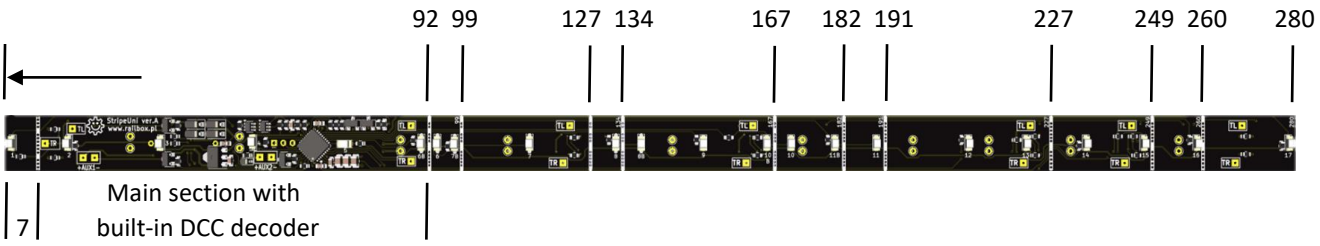
**Important:** The strip must be connected to the wagon's power pickups in accordance with the bogie design, allowing power collection from one or both pairs of wheels on the bogie.
**A reed switch soldered in the designated location allows lighting control according to the following sequence:**
**First tap** with the "wand" – turns on all interior lights simultaneously
**Second tap** – additionally turns on the end lights ("tail lights") on one side
**Third tap** – switches the side of the illuminated end lights
**Fourth tap** – turns off all lights




*End lights outputs and AUX are powered from tracks (≈16V)*

## Dimensions of the RB 2124 lighting strip sections

The RB 2124 LED Strip consists of 5 main sections and 2 additional small sections for lighting the tambour halls. The stripe can be adjusted to the length of the wagon by breaking off the unnecessary LED section along a perforation line.




## Programming the RB 2124 decoder

Programming can be done using Programming track (Programming track) or PoM (Main Track) mode.

## Connection with RailBOX: Railroad Control App

**This symbol means "Easy configuration". All RailBOX products with this symbol on the PCB or sticker on the case are enabling round-way communication (Railcom® and DCCA protocols) with Railcom®, DCCA command station:**

- **Automatic detection of new decoders connected to the tracks and the ability to automatically assign the address to the decoder (only with Command stations, e.g., DCC Wi-Fi Command Station RB 1110)**
- **Ability to read and write configuration variables (CV) at any time on the main track (POM)**
- **Ability to assign a short name to the decoder (POM) for quick identification of the device in the RailBOX: Railroad Control App**

Users of RailBOX decoders with the symbol and the DCC Wi-Fi Command station RB 1110 no longer need to manually program addresses of the decoders (accessories and RailBOX wagon and loco decoders), just connect a new device to the tracks (Command station) and the system itself will automatically find the next free address and transmit it to the decoder. In the RailBOX: Railroad Control application, a new locomotive or accessory will automatically appear with the already established address. In the case of turnouts, railroad crossing and semaphores you will only need to move them to the suitable place on the map in the RailBOX: Railroad Control App


*Add this decoder in mobile app RailBOX: Railroad control*

## RB2124 Examples of the use in different wagons

Strip mainly intended for non-compartment or non-standard compartment wagons (e.g. dinning, postal, baggage, etc.)

| Total used length, mm | Type, class, epoch, railways | Examples | Manufacturer, scale |
|---|---|---|---|
| **85-99** | Postal, baggage cars, 1,2,3 class, I-III Epoch, DB, DR, DRG, ÖBB, KPEV, SNCB |  | Tillig, TT |

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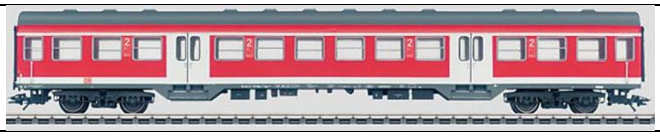
| | | | |
|---|---|---|---|
| **127-134** | Postal, baggage cars, 1,2,3 class, III Epoch, DB, DR, SNCB |  | MÄRKLIN, Tillig, H0 |
| **160-167** | 1, 2, 3 class, DRG, PKP, ČSD, ČD, ÖBB, SBB |  | Tillig, Brawa, TT, H0 |
| **182-191** | 1,2 class, IV-IV Epoch, ČSD, ČD, SJ, ZSSK, (Y/B-70 TT) |  | MÄRKLIN, Tillig, H0, TT |
| **227** | 1,2 class, IV-VI Epoch, SJ, SBB |  | MÄRKLIN, H0 |
| **249** | 1,2 class, V-VI Epoch, SBB |  | Roco, PIKO, H0 |

| | | | |
|---|---|---|---|
| **260** | 1,2 class, PKP, SNCF, SNCB, DR, DB (Y/B70 H0) |  | Piko, H0 |
| **280** | 1,2 class, DB (Z H0) |  | Marklin, H0 |

## CV address settings table of the decoder

Configuration table:

| CV | Value | Default value | Description |
|---|---|---|---|
| 1 | 1..127 | 3 | Decoder address |
| 7 | 0..255 | | Software version:<br>Read only |
| 8 | 0..255 | 172 | Manufacturer ID / Decoder reset:<br>Manufacturer code / Write value 1 to reset decoder to factory settings |
| 110 | 0..100 | 21 | Product code 1:<br>Product code 1, read only.<br>Value X of the product code in format RBXXYY |
| 111 | 0..100 | 24 | Product code 2:<br>Same as CV110 |
| 13 | bit | | Analog Mode 1, F1-F8 state |
| | 0 | 1 | F1:<br>0-on, 1-off |
| | 1 | 1 | F2:<br>0-off, 1-on |
| | 2 | 1 | F3:<br>0-off, 1-on |
| | 3 | 1 | F4:<br>0-off, 1-on |
| | 4 | 1 | F5:<br>0-off, 1-on |
| | 5 | 1 | F6:<br>0-off, 1-on |
| | 6 | 1 | F7:<br>0-off, 1-on |
| | 7 | 1 | F8:<br>0-off, 1-on |
| 14 | bit | | Analog mode 2, FL, F9-F12 state |

| CV | Value | Default value | Description |
|---|---|---|---|
| | 0 | 1 | F0f:<br>0-on, 1-off |
| | 1 | 1 | F0r:<br>0-off, 1-on |
| | 2 | 1 | F9:<br>0-off, 1-on |
| | 3 | 1 | F10:<br>0-off, 1-on |
| | 4 | 1 | F11:<br>0-off, 1-on |
| | 5 | 1 | F12:<br>0-off, 1-on |
| 17 | 192..231 | 192 | Long address (higher byte):<br>Long decoder address (CV17 and 18). To turn on: set bit 5 in CV29 |
| 18 | 0..255 | 100 | Long address (lower byte):<br>Same as CV17 |
| 19 | 0..127 | 0 | Address for multiple traction:<br>If CV #19 > 0: speed and direction are defined by this address |
| 28 | bit | | Railcom Configuration |
| | 0 | 0 | Decoder address transmission in the first channel CH1:<br>0-off, 1-on |
| | 1 | 1 | Enable the second channel CH2:<br>0-off, 1-on |
| | 7 | 1 | Enable automatic detection system:<br>0-off, 1-on |
| 29 | bit | | Decoder configuration 1 |
| | 1 | 1 | Number of speed steps:<br>0-14/27, 1-28/128 |
| | 2 | 1 | Analog mode:<br>0-DCC only, 1-Enabled |
| | 3 | 1 | RailCom:<br>0-disabled, 1-enabled |
| | 5 | 0 | Address type:<br>0-Short address in CV1, 1-Long address in CV17 and CV18 |

| CV | Value | Default value | Description |
|---|---|---|---|
| 33 | 0..135 | 0 | Lighting effect, output F0_F:<br>0: light bulb<br>1: flashing with frequency 1 (frequency in CV 49)<br>2: flashing with frequency 1 (reverse)<br>3: flashing with frequency 2 (frequency in CV 50)<br>4: flashing with frequency 2 (reverse)<br>5: short pulse with time with CV53<br>6: first own sequence (CV60-72)<br>7: second own sequence (CV73-85)<br>9: Servo Mode<br>10: Fluorescent lamp<br>11: Old fluorescent lamp<br>-- Additional effects --<br>+ 16 enables light intensity fade in during time from CV51<br>+ 32 enables light intensity fade in during time from CV52<br>+ 64 enables light intensity fade in during 500 ms<br>+ 128 to the CV value will disable own sequence after 1 execution. |
| 34 | 0..135 | 0 | Lighting effect, output F0_R:<br>Same as CV33 |
| 35 | 0..135 | 0 | Lighting effect, output L1:<br>Same as CV33 |
| 36 | 0..135 | 0 | Lighting effect, output L2:<br>Same as CV33 |
| 37 | 0..135 | 0 | Lighting effect, output L3:<br>Same as CV33 |
| 38 | 0..135 | 0 | Lighting effect, output L4:<br>Same as CV33 |
| 39 | 0..135 | 0 | Lighting effect, output L5:<br>Same as CV33 |
| 40 | 0..135 | 0 | Lighting effect, output L6:<br>Same as CV33 |
| 100 | 0..135 | 0 | Lighting effect, output L7:<br>Same as CV33 |
| 101 | 0..135 | 0 | Lighting effect, output L8:<br>Same as CV33 |
| 102 | 0..135 | 0 | Lighting effect, output L9:<br>Same as CV33 |
| 103 | 0..135 | 0 | Lighting effect, output L10:<br>Same as CV33 |
| 104 | 0..135 | 0 | Lighting effect, output L11:<br>Same as CV33 |
| 105 | 0..135 | 0 | Lighting effect, output L12:<br>Same as CV33 |

| CV | Value | Default value | Description |
|---|---|---|---|
| 106 | 0..135 | 0 | Lighting effect, output L13:<br>Same as CV33 |
| 107 | 0..135 | 0 | Lighting effect, output L14:<br>Same as CV33 |
| 280 | 0..135 | 0 | Lighting effect, output L15:<br>Same as CV33 |
| 281 | 0..135 | 0 | Lighting effect, output L16:<br>Same as CV33 |
| 282 | 0..135 | 0 | Lighting effect, output L17:<br>Same as CV33 |
| 283 | 0..135 | 0 | Lighting effect, output AUX1:<br>Same as CV33 |
| 284 | 0..135 | 0 | Lighting effect, output AUX2:<br>Same as CV33 |
| 41 | 0..255 | 255 | Maximum brightness, output F0_F |
| 42 | 0..255 | 255 | Maximum brightness, output F0_R |
| 43 | 0..255 | 255 | Maximum brightness, output L1 |
| 44 | 0..255 | 255 | Maximum brightness, output L2 |
| 45 | 0..255 | 255 | Maximum brightness, output L3 |
| 46 | 0..255 | 255 | Maximum brightness, output L4 |
| 47 | 0..255 | 255 | Maximum brightness, output L5 |
| 48 | 0..255 | 255 | Maximum brightness, output L6 |
| 112 | 0..255 | 255 | Maximum brightness, output L7 |
| 113 | 0..255 | 255 | Maximum brightness, output L8 |
| 114 | 0..255 | 255 | Maximum brightness, output L9 |
| 115 | 0..255 | 255 | Maximum brightness, output L10 |
| 116 | 0..255 | 255 | Maximum brightness, output L11 |
| 117 | 0..255 | 255 | Maximum brightness, output L12 |
| 118 | 0..255 | 255 | Maximum brightness, output L13 |
| 119 | 0..255 | 255 | Maximum brightness, output L14 |
| 288 | 0..255 | 255 | Maximum brightness, output L15 |
| 289 | 0..255 | 255 | Maximum brightness, output L16 |
| 290 | 0..255 | 255 | Maximum brightness, output L17 |
| 291 | 0..255 | 255 | Maximum brightness, output AUX1 |
| 292 | 0..255 | 255 | Maximum brightness, output AUX2 |
| 49 | 0..255 | 100 | Flashing period 1:<br>Flashing period 1 (value x 10 msec) |
| 50 | 0..255 | 100 | Flashing period 2:<br>Same as CV49 |
| 51 | 0..255 | 10 | Light intensity fade in time 1 |
| 52 | 0..255 | 50 | Light intensity fade in time 2 |

| CV | Value | Default value | Description |
|---|---|---|---|
| 53 | 0..255 | 1 | Single flash time:<br>Single flash time (value x 10 msec) |
| 54 | 0..255 | 1 | Own sequences step time:<br>Own sequences repetition period (value x 10 msec) |
| 55 | 0..1 | 1 | Output status when power is turned on:<br>1-Remember the output state after turning off the power of the decoder 0-do not remember |
| 56 | 0..9 | 0 | Wagon type:<br>Changing this CV automatically generates output mapping for functions F1 – vestibules of the carriage, and F2 – main lighting, depending on the type and length of the carriage. The values are as follows:<br>0: 99 mm, TT Epoch III DB<br>1: 134 mm, H0 Epoch III DB<br>2: 167 mm, TT Epoch V SJ<br>3: 191 mm, TT compartmentless type Y<br>4: 227 mm, H0 Epoch V SJ<br>5: 249 mm, H0 SBB<br>6: 260 mm, H0 Bonanza<br>7: 280 mm, H0 compartmentless type Z<br>8: 280 mm, "Bonanza" H0 Germany<br>9: 191 mm, "Bonanza" TT |
| 60 | | | First own sequence, beginning:<br>First own sequence CV60-CV72<br>write one byte of sequence at a time<br>---------- 1 Factory sequence ----------<br>0xB5, 0xFD,0x6F, 0xF7, 0xB5,0xFD,0x6F,0xF7,0xB5,0xFD,0x6F,0xF7,0xB5 |
| 72 | | | First own sequence, end:<br>Same as CV60 |
| 73 | | | Second own sequence, beginning:<br>Second own sequence CV73-CV85<br>write one byte of sequence at a time<br>---------- 2 factory sequence ----------<br>0xC7, 0x9F, 0xFF,0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF, 0xFF,0xFF |
| 85 | | | Second own sequence, end:<br>Same as CV73 |
| 90 | 0..255 | 0 | Minimum brightness, output F0_F |
| 91 | 0..255 | 0 | Minimum brightness, output F0_R |
| 92 | 0..255 | 0 | Minimum brightness, output L1 |
| 93 | 0..255 | 0 | Minimum brightness, output L2 |
| 94 | 0..255 | 0 | Minimum brightness, output L3 |
| 95 | 0..255 | 0 | Minimum brightness, output L4 |
| 96 | 0..255 | 0 | Minimum brightness, output L5 |
| 97 | 0..255 | 0 | Minimum brightness, output L6 |

| CV | Value | Default value | Description |
|---|---|---|---|
| 182 | 0..255 | 0 | Minimum brightness, output L7 |
| 183 | 0..255 | 0 | Minimum brightness, output L8 |
| 184 | 0..255 | 0 | Minimum brightness, output L9 |
| 185 | 0..255 | 0 | Minimum brightness, output L10 |
| 186 | 0..255 | 0 | Minimum brightness, output L11 |
| 187 | 0..255 | 0 | Minimum brightness, output L12 |
| 188 | 0..255 | 0 | Minimum brightness, output L13 |
| 189 | 0..255 | 0 | Minimum brightness, output L14 |
| 296 | 0..255 | 0 | Minimum brightness, output L15 |
| 297 | 0..255 | 0 | Minimum brightness, output L16 |
| 298 | 0..255 | 0 | Minimum brightness, output L17 |
| 299 | 0..255 | 0 | Minimum brightness, output AUX1 |
| 300 | 0..255 | 0 | Minimum brightness, output AUX2 |

## Output configuration table (mapping):

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 L6 | 6 L5 | 5 L4 | 4 L3 | 3 L2 | 2 L1 | 1 F0_R | 0 F0_F |
| 120 | F0 (forward FL) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 121 | F0 (backward FR) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 122 | F1 (forward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 123 | F1 (backward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 124 | F2 (forward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 125 | F2 (backward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 126 | F3 (forward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 127 | F3 (backward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 128 | F4 (forward) | 32 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 129 | F4 (backward) | 32 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 130 | F5 (forward) | 64 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 131 | F5 (backward) | 64 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 132 | F6 (forward) | 128 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 133 | F6 (backward) | 128 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 134 | F7 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 135 | F7 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 136 | F8 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 137 | F8 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 138 | F9 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 139 | F9 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 140 | F10 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 141 | F10 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 142 | F11 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 L6 | 6 L5 | 5 L4 | 4 L3 | 3 L2 | 2 L1 | 1 F0_R | 0 F0_F |
| 143 | F11 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 144 | F12 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 145 | F12 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 146 | F13 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 147 | F13 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 148 | F14 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 149 | F14 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 150 | F15 (forward) | 252 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 151 | F15 (backward) | 252 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 152 | F16 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 153 | F16 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 154 | F17 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 155 | F17 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 156 | F18 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 157 | F18 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 158 | F19 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 159 | F19 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 160 | F20 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 161 | F20 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 163 | F21 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 164 | F22 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 165 | F22 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 166 | F23 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 167 | F23 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 168 | F24 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 169 | F24 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 170 | F25 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 171 | F25 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 172 | F26 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 173 | F26 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 174 | F27 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 175 | F27 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 176 | F28 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 177 | F28 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **CV** | **Opis** | **Ustaw. fabr.** | **Bit** | | | | | | | |
| | | | **7 L14** | **6 L13** | **5 L12** | **4 L11** | **3 L10** | **2 L9** | **1 L8** | **0 L7** |
| 190 | F0 (forward FL) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 191 | F0 (backward FR) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 192 | F1 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 193 | F1 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 194 | F2 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 195 | F2 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 196 | F3 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 L6 | 6 L5 | 5 L4 | 4 L3 | 3 L2 | 2 L1 | 1 F0_R | 0 F0_F |
| 197 | F3 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 198 | F4 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 199 | F4 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 200 | F5 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 201 | F5 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 202 | F6 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 203 | F6 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 204 | F7 (forward) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 205 | F7 (backward) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 206 | F8 (forward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 207 | F8 (backward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 208 | F9 (forward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 209 | F9 (backward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 210 | F10 (forward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 211 | F10 (backward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 212 | F11 (forward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 213 | F11 (backward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 214 | F12 (forward) | 32 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 215 | F12 (backward) | 32 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 216 | F13 (forward) | 64 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 217 | F13 (backward) | 64 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 218 | F14 (forward) | 128 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 219 | F14 (backward) | 128 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 220 | F15 (forward) | 255 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 221 | F15 (backward) | 255 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 222 | F16 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 223 | F16 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 224 | F17 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 225 | F17 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 226 | F18 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 227 | F18 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 228 | F19 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 229 | F19 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1230 | F20 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 231 | F20 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 233 | F21 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 234 | F22 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 235 | F22 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 236 | F23 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 237 | F23 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 238 | F24 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 239 | F24 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 240 | F25 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 241 | F25 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 242 | F26 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 L6 | 6 L5 | 5 L4 | 4 L3 | 3 L2 | 2 L1 | 1 F0_R | 0 F0_F |
| 243 | F26 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 244 | F27 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 245 | F27 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 246 | F28 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 247 | F28 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 | 6 | 5 | 4 AUX2 | 3 AUX1 | 2 L17 | 1 L16 | 0 L15 |
| 310 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 311 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 312 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 313 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 314 | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 315 | F3 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 316 | F3 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 317 | F4 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 318 | F4 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 319 | F5 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 320 | F5 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 321 | F6 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 322 | F6 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 323 | F7 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 324 | F7 (backward) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 325 | F8 (forward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 326 | F8 (backward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 327 | F9 (forward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 328 | F9 (backward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 329 | F10 (forward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 330 | F10 (backward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 331 | F11 (forward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 333 | F11 (backward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 334 | F12 (forward) | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 335 | F12 (backward) | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 336 | F13 (forward) | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 337 | F13 (backward) | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 338 | F14 (forward) | 128 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 339 | F14 (backward) | 128 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 340 | F15 (forward) | 7 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| 341 | F15 (backward) | 7 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 342 | F16 (forward) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 343 | F16 (backward) | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 344 | F17 (forward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 345 | F17 (backward) | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

| CV | Opis | Ustaw. fabr. | Bit | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 7 | 6 | 5 | 4 AUX2 | 3 AUX1 | 2 L17 | 1 L16 | 0 L15 |
| 346 | F18 (forward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 347 | F18 (backward) | 4 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 348 | F19 (forward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 349 | F19 (backward) | 8 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 350 | F20 (forward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 351 | F20 (backward) | 16 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 352 | F21 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 353 | F21 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 354 | F22 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 355 | F22 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 356 | F23 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 357 | F23 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 358 | F24 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 359 | F24 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 360 | F25 (forward ) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 361 | F25 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 362 | F26 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 363 | F26 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 364 | F27 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 365 | F27 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 366 | F28 (forward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 396 | F28 (backward) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |