



# **Evolis SDK**

## **Magnetic encoding**

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## General information about magnetic encoding with Evolis printers

Could be performed High-co or Lo-co in two different modes. The written data are automatically checked by the printer.

### A. Following ISO 7811 magnetic encoding standards

See Glossary for further information.

### B. Using a magnetic encoding custom mode

To fit all needs, each track could be set with custom setting: Density, start position and special data format.

All data exchange between the application software and the Evolis Printer to either write or read magnetic data are exchanged exclusively using ASCII format. This allows to write (encode) or read any data from 0 to 255.

Use cases samples :

#### Encode custom mode bit stream in **8 bits on track # 1**

The 8 bits custom values are 0x80, 0xC3, 0xD2, 0x45. So, we need to send the following escape command (raw) :

bit stream	1 0 0 0 0 0 0 0	1 1 0 0 0 0 1 1	1 1 0 1 0 0 1 0	0 1 0 0 0 1 0 1				
	8	0	C	3	D	2	4	5
8 bits custom	80	C3	D2	45				

Dm;l;80C3D245

The Evolis printer will receive the following data:

Escape command	D	m	;	1	;	8	0	C	3	D	2	4	5
Data byte sent	0x44	0x6D	0x3B	0x31	0x3B	0x38	0x30	0x43	0x33	0x44	0x32	0x34	0x35

Where data byte :

**0x44** corresponds to the hexadecimal ASCII code of the **D** letter

**0x6D** corresponds to the hexadecimal ASCII code of the **m** letter

**0x3B** corresponds to the hexadecimal ASCII code of the semicolon ;

An so on...

#### Encode custom mode bit stream in **5 bits on track # 1**

Using a 5 bits format, hexadecimal value of the bit stream are 0x10, 0x03, 0x01, 0x1D, 0x04, 0x11, 0x08, broken down as follow :

Escape command	D	m	;	1	;	1	0	0	3	0	1	1	D	0	4	1	1	0	8
Data byte sent	0x44	0x6D	0x3B	0x31	0x3B	0x31	0x30	0x30	0x33	0x30	0x31	0x31	0x44	0x30	0x34	0x31	0x30	0x38	0x38

## Download sequence using Custom 2 mode

Thanks to standard download command “Dm;track;data” and specify format “Pmt;1;c2;s;8” , to encode 0x80 0x1A 0xFF 0x00 0x2B 0x01.

Required command is the following Dm;1;801AFF002B01. Then Smw to encode (write physically) the track

Data will be encoded as the following figure:

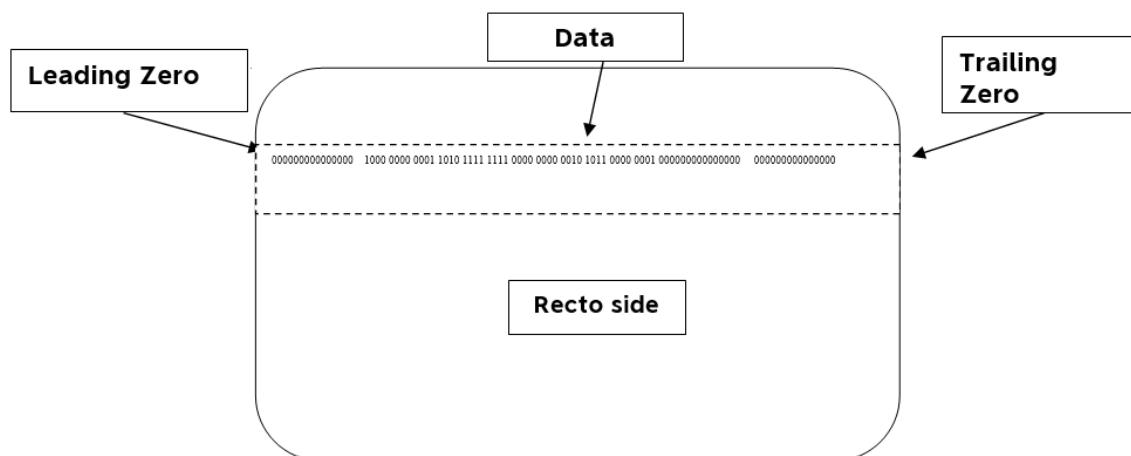


Figure 1 Magnetic card description

Now, if you send the command “Smr;1”, the printer will decode the string with the **Rmt;1** format.

For 8 bits format, the printer starts to decode on the first 1 detected, so the printer reads:

```
10000000(0x80)
00011010(0x1A)
11111111(0xFF)
00000000(0x00)
00101011(0x2B)
00000001(0x01)
```

So, the answer for the command Smr;l will be “801AFF2B01”

If the track format is “Pmt;l;c2;s;5”, the printer will read:

```
10000(0x10)
00000(0x00)
01101(0x0D)
01111(0x0F)
11110(0x1E)
00000(0x00)
00001(0x01)
01011(0x0B)
00000(0x00)
00100(0x04)
```

If the track format is “Pmt;l;c2;r;8”, the printer will read:

```
10000000 reverse
00000001(0x01)00011010
rev 01011000(0x58)11111111
rev 11111111(0xFF)00000000
rev 00000000(0x00) 00101011
rev 11010100 (0xD4)00000001
rev. 10000000 (0x80)
```

## Possible combinations matrix:

4 bits standard mode	Pmt;l;c2;s;4	Dm;l;0800010A0F0F0000020B0001
4 bits reverse mode	Pmt;l;c2;r;4	Dm;l;010008050F0F0000040D0008
5 bits standard mode	Pmt;l;c2;s;5	Dm;l;10000D0F1E00010B0004
5 bits reverse mode	Pmt;l;c2;r;5	Dm;l;0100161E0F00101A0004
6 bits standard mode	Pmt;l;c2;s;6	Dm;l;120012B3F00022C01
6 bits reverse mode	Pmt;l;c2;r;6	Dm;l;0120353F00100D20
7 bits standard mode	Pmt;l;c2;s;7	Dm;l;140065F70012C02
7 bits reverse mode	Pmt;l;c2;r;7	Dm;l;01307D07401A20

4 bits standard mode	Pmt;l;c2;s;4	Dm;l;0800010A0F0F0000020B0001
8 bits standard mode	Pmt;l;c2;s;8	Dm;l;801AFF002B01
8 bits reverse mode	Pmt;l;c2;r;8	N/A

## Technical data limitation

This part explains how you can know the number of words that you can encode on the magnetic track.

Length magnetic track min: 85.6 mm (3.37 inch)

Leading zero min: 5 mm (default setting printer: 7.44mm conforming to ISO standard)

Trailing zero min: 5 mm

Length data max:  $85.6 - 7.44 - 5 = 73.16$  mm (2.88 inch)

So, 2.88 inch in 210bits / inch, you can encode 604 bits. (2.88 inch / (1/210))  
When using 8 bits format, it allows 75 words of 8 bits (604 bits / 8 bits) and using 5 bits format, it allows 120 words of 5 bits.

So 2.88 inch in 75 bits / inch, you can encode 216 bits.

When using 8 bits format, it allows 27 words of 8 bits (604 bits / 8 bits) and using 5 bits format, it allows 43 words of 5 bits.

Note: the data string must always begin by a "1" because the printer begins to decode the data string at the first "1" encoded.

# Printer's Commands references related to magnetic encoding

## Set of commands related to magnetic encoding

Command	Parameter 1	Parameter 2	Options	scope	Description	Sample	Meaning
<b>Dm</b>	1 2 3	Track1 data Track2 data Track3 data	N/A	Communi- cation	<b>Download Magnetic</b> data to printer	Dm;1;ABCDE E Dm;2;1234 Dm;3;3456	Download ABCDE on track 1 Download 1234 on track 2 Download 3456 on track 3
<b>Mm</b>	i (initialization) + (up position) - (down position)	N/A	N/A	Hardware command	<b>Motor Magnetic</b> allows to test the motor that control the magnetic head positioning	Mm;i Mm;+ Mm;-	Initialize magnetic motor position up Position down
<b>Plmr</b>	1 2 3 ... (default)	1 (Default) 2 3 ...	N/A	Configurat- ion	<b>Parameter Loop Magne- tic Repetition</b> , Set the number of writing and read repetition in case of error	Plmr;3;1	Read data 3 times after a write operation, process this 1 time per card
<b>Rlmr</b>	N/A	N/A	N/A	Configurat- ion reading value	<b>Read Loop Magnetic Re- petition</b> , Read the current value for the magnetic checkings (read and writes loops)	Rlmr	Get the current number of loops set for hardware error managemen- t
<b>Pmbs</b>	183 (a distance in dots)	N/A	N/A	Configurat- ion	<b>Parameter Magnetic Ba- se Start</b> , to define the value of the encoding start distance after card edge detection	Pmbs;183	Encoding starts at 183 dots of the edge of the card
<b>Rmbs</b>	N/A	N/A	N/A	Configurat- ion reading value	<b>Read Magnetic Base St- art</b>	Rmbs	
<b>Pmc</b>	h l	N/A	N/A	Configurat- ion	<b>Parameter Magnetic Co- ercivity</b>	Pmc;l Pmc;h	Set coercivity to low-co Set

Command	Parameter 1	Parameter 2	Options	scope	Description	Sample	Meaning
							coercivity to high-co
<b>Rmc</b>	N/A	N/A	N/A	Configuration reading value	<b>Read Magnetic Coercivity</b> , read current coercivity	Rmc	Get the value of the current coercivity (HICO or LOCO)
<b>Pmd</b>	1 2 3	75 (BPI) 210 (BPI)	NA	Configuration	<b>Parameter Magnetic Density</b> , set the density of tracks 1,2 or 3 between 75 and 210 BPI	Pmd;1;75 Pmd;2;210 Pmd;3;75	Set track 1 to 75 BPI density Set track 2 to 210 BPI density Set track 3 to 75 BPI density
<b>Rmd</b>	1 2 3	N/A	N/A	Configuration reading value	<b>Read Magnetic Density</b> of track 1,2 or 3	Rmd;1 Rmd;2 Rmd;3	
<b>Pmf</b>	ON or OFF	ON or OFF	N/A	Configuration	<b>Parameter Magnetic Filter</b> , enable or disable writing /reading filter	Pmf;ON;ON Pmf;OFF;OFF	
<b>Rmf</b>	N/A	N/A	N/A	Configuration reading	<b>Read Magnetic Filter</b>	Rmf	Read current magnetic feature status
<b>Pmms</b>	80 (value)	70 (value)	N/A	Configuration	<b>Parameter Magnetic Motor Speed</b>	Pmms;80;70	
<b>Rmms</b>	N/A	N/A	N/A	Configuration reading	<b>Read Magnetic Motor Speed</b>	Rmms	
<b>Pmt</b>	1 2 3	1 (ISO1) 2 (ISO2) 3 (ISO3) c1 (SIPASS) c2 (CUSTOM2 free data, density 210) c3 (CUSTOM3) c4 (CUSTOM4)		Configuration	<p><b>Parameter Magnetic Track</b>. To set Magnetic track. For each character, send 2 characters that represent the hexa value. The printer will use the number of bit required. Default setting 8 bits. When you read data from the printer using the command (ESC)Smr;track(CR), the printer will return the data in the same format.</p> <p><b>Note:</b> custom2 mode in function of the data you would like to read, it's possible you will have to remove the reading filter (See point 5 on command Pmf for more details).</p>	Pmt;1;1 Pmt;2;2 Pmt;3;3	Set track 1 to ISO Set track 2 to ISO Set track 3 to ISO



Command	Parameter 1	Parameter 2	Options	scope	Description	Sample	Meaning
					The printer will keep this information on the no volatile area.		
<b>Rmt</b>	1 2 3	N/A	N/A	Reading Configurat ion	<b>Read Magnetic Track</b> , read the current track mode (ISO,...)	Rmt;1 Rmt;2	read track 1 configuration Read track 2 configuration
<b>Pmts</b>	1 2 3	24 (default)	NA	configurati on	<b>Parameter Magnetic Track Start</b> , set the start distance value of the track coding (value in dot, default value 24), possible range 0 to 1016.	Pmts;1;24 Pmts;2;48 pmts;3;36	Default value Set start track value to 48 dots set value to 36 dots
<b>Smr</b>	1 2 3	NA	NA	Communi cation	<b>Sequence Magnetic Read</b>	Smr;1 Smr;2 Smr;3	Read current track 1 Read current track 2 Read current track 3
<b>Ss</b>	NA	NA	NA	Communi cation	<b>Sequence Start</b> , Initiate a Sequence command	Ss	Start sequence



## Glossary

ASCII TABLE:

**Buffer:** Is a region of a physical memory storage used to temporarily store data while it is being moved from one place to another. Typically, the data is stored in a buffer as it is retrieved from an input device (i.e magnetic track) or just before it is sent to an output device (data to computer).

Coercivity:

There are 2 types of available magnetic stripes cards. High-coercivity and Low-coercivity. Lo-Co cards generally have a light brown mag stripe, Hi-Co will have a black mag stripe (colors may differ depending on the manufacturer). A correct magnetic encoding requires to set the coercivity according to the card's specifications (mostly described on the packaging).

Generic Hico card	Generic Loco card
	

**Dot:** Unit measure for Evolis printer. 1 mm = 11,8 dots.

ISO 7811 standard:

Track #	Field separator	Track density	Authorized character set	Maximum number of characters
Track 1	^	210 bpi (Bits per inch)	Alphanumeric : A-Z (CAPITAL) 0-9 ASCII TABLE 20-95 except ? character	79 ( <b>including</b> Start, Stop and LRC characters)
Track 2	=	75 bpi	Numerical 0-9 ASCII TABLE 48-62	40 ( <b>including</b> Start, Stop and LRC characters)
Track 3	=	210 bpi	Numerical 0-9 ASCII TABLE 48-62	107 ( <b>including</b> Start, Stop and LRC characters)

Official documentation available at iso.org [here](#) (charged).

# Disclaimer

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