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QUANTUM

USER GUIDE MULTIFEATURE REVERSIBLE ENCODER

Integration of Smart Card Encoders
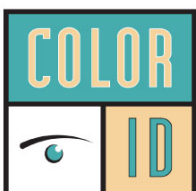
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Contents

Foreword

This user guide details the operation of the Evolis QUANTUM multifeature encoding module.

This highly flexible module encodes all types of conventional-sized cards: cards with magnetic stripes, contact smart cards and contactless smart cards.

Furthermore, this unique encoding module is reversible. Thus, it enables the user to flip the module over in a snap, enabling printing of the magnetic stripe side without having to use a dedicated, time-consuming and laborious system for flipping each and every card over. This feature makes it possible to speed up the full encoding process and printing cycle.

Chapter 1 – Overview

The encoding module is very conveniently located between the QUANTUM's feeder and print head.

The autonomous module manages the full encoding process, in parallel of the printing job executed by the other module.

It thereby enables personalization in runs within the concurrent operation time, which greatly speeds up the delivery of a ready-to-use personalized card in comparison with any traditional printer.

The reversible module makes it very convenient to encode and print any type of card, with optimized throughput and efficiency.

The encoding module has a motherboard with multiple connectors to link up to the contact and contactless smart card encoders. Such encoders can be placed in a dedicated area located behind the Quantum, and subsequently, be connected to the printer.

Chapter 2 – Features

The encoding module has a fixed electronic component that is installed below the mechanical area. This also comes with a read/write head for magnetic stripes, a contact station for smart cards and a housing for contactless encoders with or without a remote antenna.

2-1 FACTORY SETTINGS

In its factory configuration, the module comes with the following:

- An ISO 7811 encoding unit, a 3-track HiCo/LoCo
- An ISO 7816-2 contact station for smart cards
- An antenna bracket
- 2 x internal USB ports to connect a contact smart card encoder and a contactless smart card encoder
- 1 x MAX232 dual I/O to connect a contact smart card encoder and a contactless smart card encoder
- Internal power supply connectors to power the encoders
- 2 x female DB9 plugs on the external connecting panel to directly link the encoders or smart coupler to the PC
- A connector that links the motherboard to the reversible encoding unit
- A system to flip the encoding unit over and enable the following:
  - Magnetic encoding on the reverse side and chip encoding on the front side (factory settings), with the encoder in A position
  - Or, magnetic encoding on the front side and chip encoding on the reverse side, with the encoder in B position

On demand, this encoding module can be fitted with the following features:

- JIS2 (Japan) encoding unit in replacement of the ISO encoder
- Smart card encoder (contact or contactless). The list of supported encoders is available upon request

2-2 ON-SITE UPGRADABLE OPTIONS

For maximized flexibility, the encoding module can be reconfigured within minutes and by the users themselves.

Integration can be easily achieved, thanks to the information and advice provided in this document, and to the available extension kits and the connectors from Evolis.

In compliance with the safety, quality, assembly and connections guidelines, users can customize the Quantum to their specific needs, when, for example, switching from a Mifare encoder to a device that manages HID Prox cards.

> *You must strictly comply with the instructions and guidelines on assembling and disassembling an encoder to ensure user safety and prevent your Quantum from being compromised.*

Chapter 3 – Using the Reversible Mode

The encoding module is reversible. This means it can turn over and proceed to card encoding and printing in a single pass, without having to flip each and every card over:

● Encoding position A: Magnetic encoding on the reverse side, and chip encoding on the front side (factory settings), or

● Encoding position B: magnetic encoding on the front side and chip encoding on the reverse side
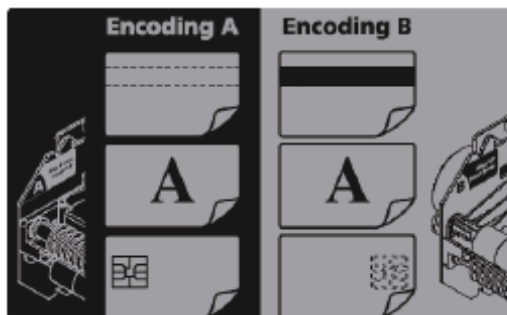
Flipping the encoding module over requires that the machine be switched off, and that the power cable be disconnected to avoid any damage to the electronic boards and the encoders.

> *Flipping the encoding module over requires that the machine be switched off, and that the power cable be disconnected to avoid any damage to the electronic boards and the encoders.*

3-1 REPLACING THE ENCODING MODULE

Despite the attention paid to the manufacture and quality of our products, the need to replace the encoding module may arise over the lifetime of the machine.

The module can be replaced by the user with no tools needed, simply by following the instructions very carefully.

Before doing anything else, please contact your Evolis dealer in order to check the advisability of replacing the encoding module. The dealer will supply a new encoding module if need be.

Under these circumstances, the following procedure will need to be scrupulously carried out, in order to keep very high quality encoding, copying the properties and settings for the replacement module in the printer.

To exchange the encoding module, please proceed as follows:

⚠️ *Replacing the encoding module should only be done after turning the machine off and unplugging the mains power cable.*

❶ Open the encoding module cover.

❷ Remove the encoding module found inside the machine.

❸ Take the new encoding module, and note the code shown on the label stuck on it (bottom right of the front side when the module is in position A). You will be asked for this code subsequently.

❹ Fit the new encoding module in its housing, in position A.

❺ Close the cover.

❻ Power up the printer and check that it is properly connected to a computer on which the printer's print driver is installed.

❼ Under the print driver's Properties, click on the "Tools" tab.

❽ In the "Printer dialogue" section, enter the following command: Pmn;x

where x = the encoding module kit code number that you noted in Step 3.
For example, if the encoding module kit number is 89012700009321234567, the command to be entered is: Pmn;89012700009321234567

⚠️ *If the encoding module kit number is not entered correctly, machine malfunctions may occur and the warranty may be voided.*

Chapter 4 – Connecting a Smart Card Encoder

Connecting an encoder to the electronic board requires advanced skills.

A connector kit with cables and connectors is available from the Evolis product list. It is recommended that the use of any connectivity accessories, other than those provided by Evolis, is totally avoided in order to prevent damages (e.g. low quality cables with substandard insulation, quality of welds and contacts, polarizing, etc.).

> *Connecting an encoder to the electronic board must be carried out by technically trained personnel, and only after unplugging the printer's power cable.*

> *The user is fully responsible for the process of connecting/integrating an encoder.*
>
> *Evolis disclaims any liability for material damage or failures related to this integration. In particular, Evolis reserves the right to waive all or part of the product warranty in the event of modifications or damages caused by erroneous integration.*

➤ Overview of the Connectors

The connectors required for integrating an encoder are provided on the motherboard of the encoding module.

The following figure (top view taken from the back) shows all available connectors, as well as their purpose and type.

Each connector has a reference number, stated in the technical charts, to identify each and every cable terminal.

Grouped by colors, each connection item has a specific function which is highlighted in the following colors:
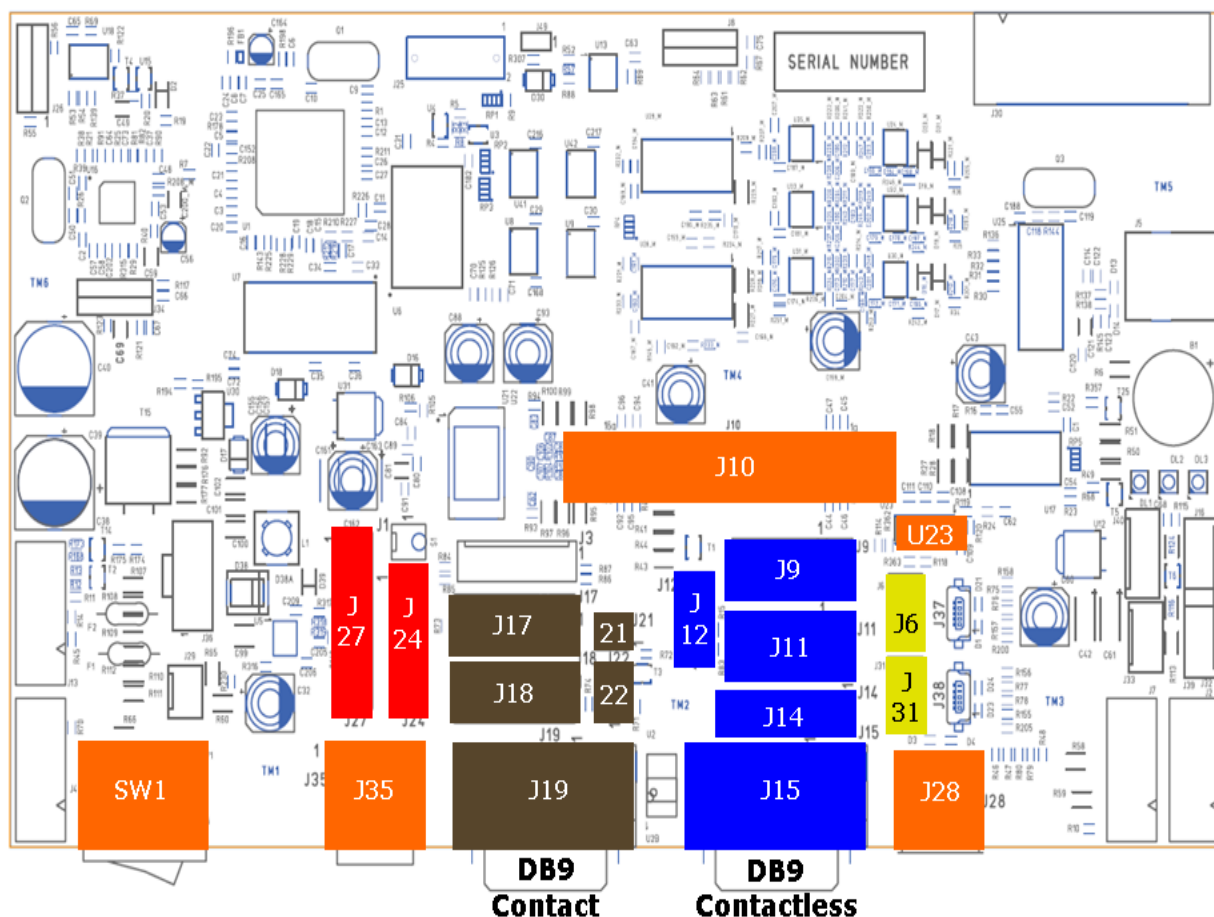
Red :	Power supply
Brown :	of the smart card contact station (external DB9 connector), and of its encoder (RS232)
Blue :	Monitoring of the contactless smart card encoder (RS232 or TTL)
Yellow :	Monitoring of contact and contactless smart card encoders using the internal USB hub
Orange :	lectrical or electronic components required for operating the module and connecting the encoder

The plug board chart is available in Appendix 1. Please review it carefully before undertaking any intervention.

Factory setting:

● Flat cable between J17 and J18

● Flat cable between J9 and J11

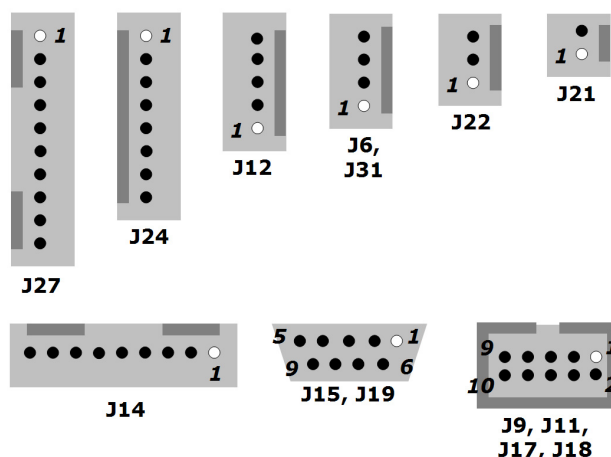● Jumper positioned between J22-1 and J22-2

➤ Profile of Connectors

The number « 1 » located next to the white circle identifies the marker for each connector.

⚠️ **For connectors with two rows, you must pay attention the numbering of all pins!**

J27 J24 J12 J6, J31 J22 J21

J14 J15, J19 J9, J11, J17, J18

➤ Electrical and Electronic Items Required for Operating the Module and Connecting the Encoders

(Items colored orange)

Marker	Feature	Comment
SW1	On/Off power switch	Switches the printer on or off *NOTE:* *Always turn the printer off before working on its electrical and electronic parts*
J35	Connecting the external power supply	*NOTE:* *Always unplug the power cable before working on the electrical and electronic parts of the printer*
J28	USB port (onto the USB hub)	Enables a USB device to be plugged into the printer's internal USB hub
J10	Connector for the reversible encoding unit	This connector facilitates communication between the electronic board and the encoding module. *Do not use this connector. It is dedicated to monitoring the encoding module.*
U23	MAX232 component	TTL/RS232 – ST3232E converter TTL signal: J12 RS232 signal: J9

➤ Power Supply

(Items colored red)

Marker	Feature	Comment
J24	J24-1: GND (Masse) J24-2: GND (Masse) J24-3: GND (Masse) J24-4: GND (Masse) J24-5: + 3,3V J24-6: + 5V J24-7: + 5V J24-8: + 24V	Type: HE14 – 1 x 8
J27	J27-1: GND (Masse) J27-2: GND (Masse) J27-3: GND (Masse) J27-4: GND (Masse) J27-5: + 3,3V J27-6: + 5V J27-7: + 5V J27-8: + 24V J27-9: + 24V J27-10: + 3,3V	Type: HE14 – 1 x 10

It is suggested to power the contactless encoder from one connector, and the encoder for contact smart card from the other encoder, so that the power supply is distinct for each encoder. For example:

● J24: Encoder for contactless smart cards

● J27: Encoder for contact smart cards

The choice between these two connectors is left to the technician.

> ⚠️ *To avoid failures, check that the intensity during operation does not exceed the maximum intensity delivered by Quantum (see Consumption chart in Appendix 2).*

➤ Connecting the Encoders to a Port of the Internal USB Hub

(Items colored yellow)

Marker	Feature	Comment
J6 and J31	J6-1: +5V J6-2: D- J6-3: D+ J6-4: GND (Ground)	Type: HE14 – 1 x 4

Connecting a smart card encoder or any other additional component (barcode reader, for example) may be done using one of the two ports from QUANTUM's internal USB hub.

> ⚠️ *Generally, such accessories are self powered through the USB port. To avoid any failure, check that the intensity during operation does not exceed the maximum intensity delivered by Quantum (see Consumption chart in Appendix 2).*

➤ Monitoring the Smart Contact Station

(Items colored brown)

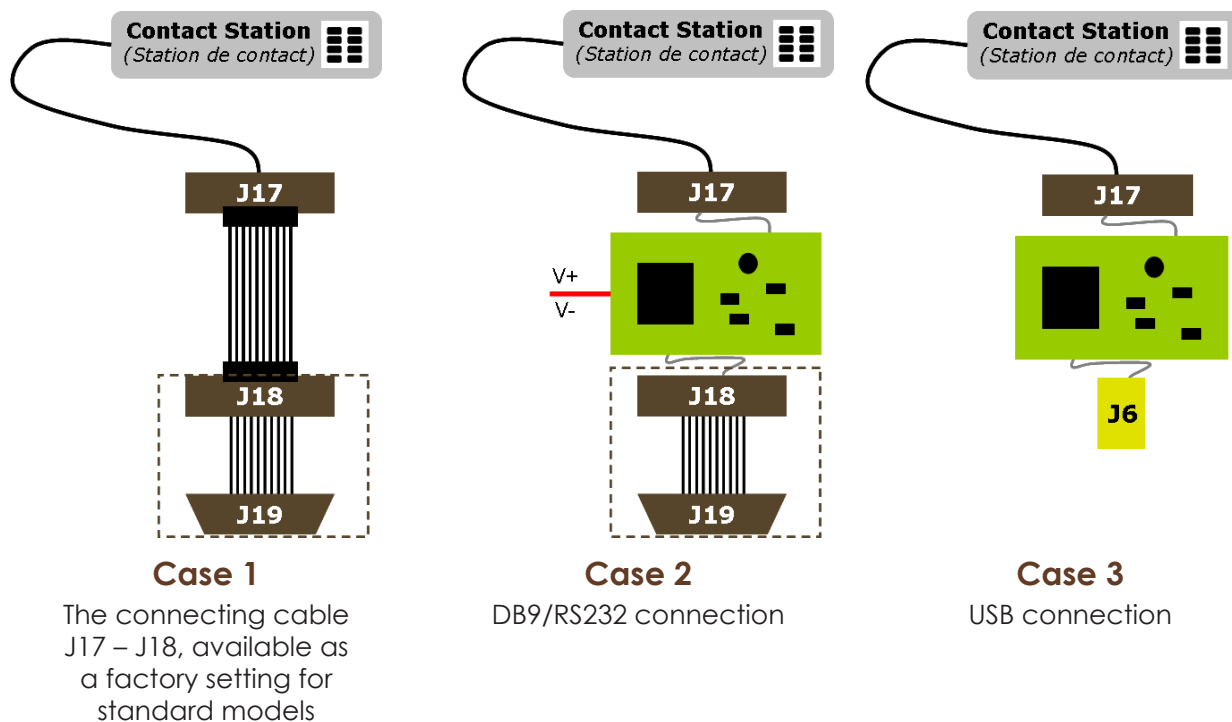| Market	Feature	Comment
J17	J17-1: Smart C1 Vcc J17-2: Smart C2 RST J17-3: Smart C3 CLK J17-4: Smart C4 Reserved J17-5: Smart C5 GND (Masse) J17-6: Smart C6 Vpp J17-7: Smart C7 I/O J17-8: Smart C8 Reserved J17-9: Smart OPTO+ J17-10: Smart OPTO-	Type: HE10 – 2 x 5 OPTO+ and OPTO- : Signals the presence of a card
J18	J18-1: DB9-1 J18-2: DB9-2 J18-3: DB9-3 J18-4: DB9-4 J18-5: DB9-5 J18-6: DB9-6 J18-7: DB9-7 J18-8: DB9-8 J18-9: DB9-9	Type HE10 – 2 x 5 Connected to J19 (DB9 Contact external connector) OPTO- is grounded (GND)
J21	J21-1: Smart OPTO+ J21-2: Smart OPTO-	Type: HE14 – 1 x 2 OPTO+ and OPTO-: Signals the presence of a card
J22	Jumper from J22-1 to J22-2 Card in contact with Smart station = OPTO closed Card is not available = OPTO open *Factory setting* Jumper from J22-2 to J22-3 Card in contact with Smart station = OPTO open Card absent = OPTO closed	Type: HE14 – 1 x 3 Specification of how card-presence signal is performed OPTO open : OPTO closed :
J19		DB9 external connector (female)

A contact smart card station can be connected in multiple ways. The most common ones are the following:

Case 1 - Use of an external smart card encoder. The encoder is plugged into the external DB9 (factory settings, if the printer is shipped without the encoder)

This mode supports all Evolis products that come with a smart card encoder option (Pebble, Dualys, Securion)

Case 2 - Use of an internal smart card encoder. The smart station is connected to the encoder, and the encoder is connected to the external DB9 socket

Case 3 - Use of an internal smart card encoder. The smart station is connected to the encoder, and the encoder is connected to the internal USB hub

Contact Station (Station de contact)	Contact Station (Station de contact)	Contact Station (Station de contact)

Case 1

The connecting cable J17 – J18, available as a factory setting for standard models

Case 2

DB9/RS232 connection

Case 3

USB connection

➤ Monitoring the Contactless Smart Card Encoder (RS232 or TTL)

(Items colored blue)

This chapter describes how to connect a contactless smart card encoder with an integrated or remote antenna.

The antenna-connecting process varies according to the encoder profile and is therefore not addressed in the manual.

Market	Feature	Comment
J12	J12-1: RXD1 TTL (In) J12-2: TXD1 TTL (Out) J12-3: TXD2 TTL (Out) J12-4: RXD2 TTL (In) J12-5: GND (Masse)	Type: HE14 – 1 x 5 TTL signals of the MAX232 (U23) component
J9	J9-1: Ne pas utiliser J9-2: TXD1 RS232 (In) J9-3: RXD1 RS232 (Out) J9-4: Ne pas utiliser J9-5: GND (Masse) J9-6: Ne pas utiliser J9-7: RXD2 RS232 (Out) J9-8: TXD2 RS232 (In) J9-9: Ne pas utiliser J9-10: Ne pas utiliser	Type: HE10 – 2 x 5 RS232 signals of the MAX232 (U23) component *On the computer side:* J9-2 = R x D J9-3 = T x D J9-7 = RTS J9-8 = CTS
J11	J11-1: DB9-1 J11-2: DB9-2 J11-3: DB9-3 J11-4: DB9-4 J11-5: DB9-5 J11-6: DB9-6 J11-7: DB9-7 J11-8: DB9-8 J11-9: DB9-9 J11-10: Ne pas utiliser	Type: HE10 – 2 x 5 Directly wired to J15 (DB9 connector)
J14	J14-1: DB9-1 J14-2: DB9-2 J14-3: DB9-3 J14-4: DB9-4 J14-5: DB9-5 J14-6: DB9-6 J14-7: DB9-7 J14-8: DB9-8 J14-9: DB9-9	Type: HE14 – 1 x 9 Directly wired to J15 (DB9 connector)
J15		Directly wired to J15 (DB9 connector)

J11 and J14 are directly wired to the DB9 connector (J15).

The user can choose to connect one HE 14 (9-pin connector), or 2 HE10 (5-pin connector). This has no impact on features and signals.

A contactless smart card station can be connected in various ways. The most common ones are the following:

Case 1 - Use of an internal smart card encoder with a TTL interface that requires a TTL ➤ RS232 conversion. Output to the DB9 connector
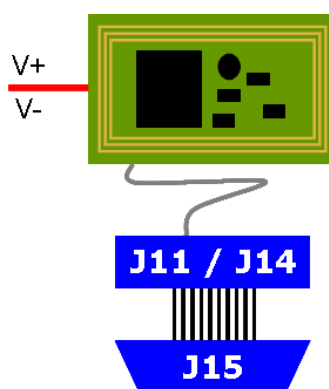
Case 2 - Use of an internal smart card encoder that has a RS232 data interface. Output to the DB9 connector

Case 3 - Use of an internal smart card encoder with a USB interface that also powers the system. Connection to a USB port from the internal USB hub
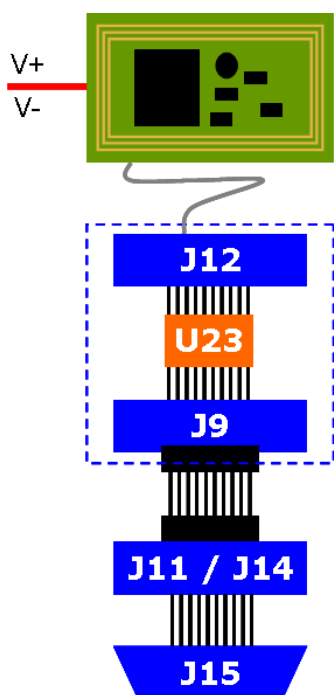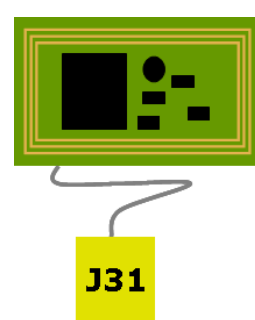

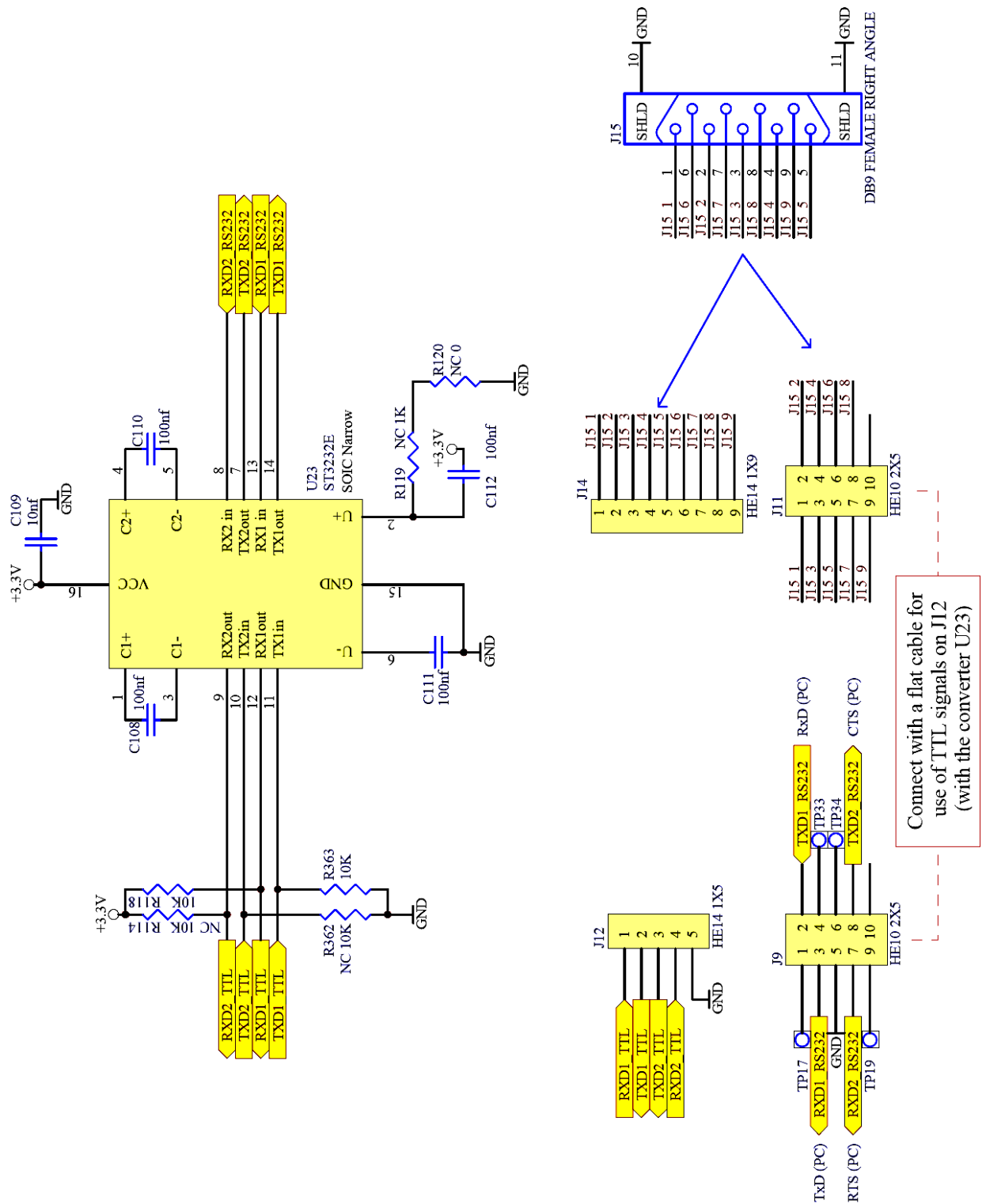| **Case 1**	**Case 2**	**Case 3**
Connecting cable J9 – J11, available as a factory setting for standard models	DB9/RS232 connection	USB connection

Appendix 1

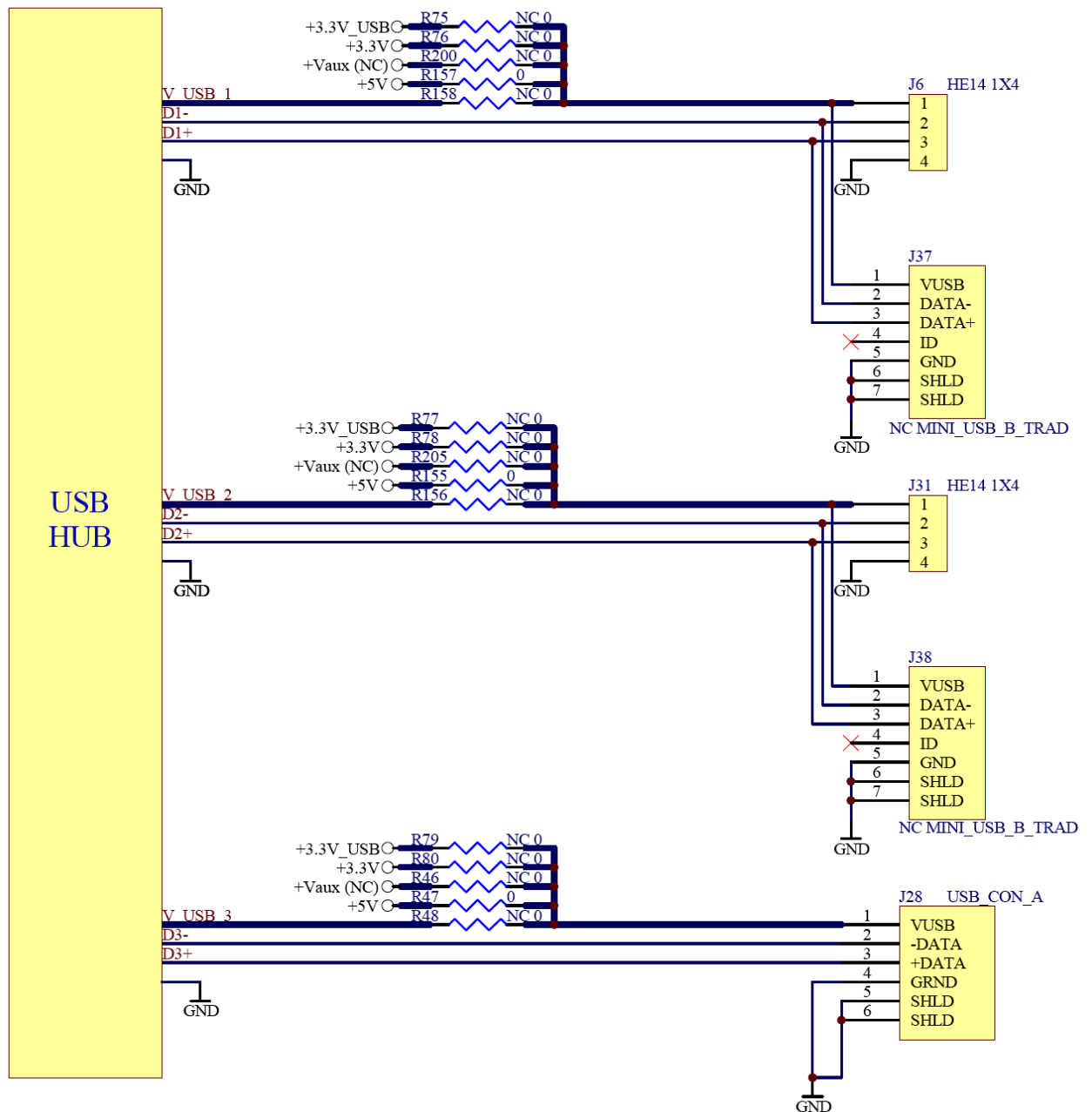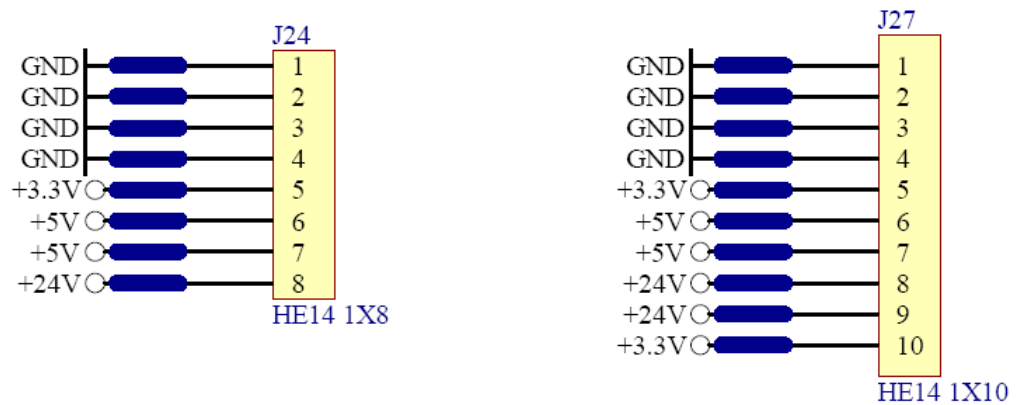## A1-1 SMART CARD ENCODERS CONNECTIONS – ELECTRICAL CHARTS

➤ RS232 & TTL

➤ USB

USB HUB

+3.3V_USB R75 NC 0
+3.3V R76 NC 0
+Vaux (NC) R200 NC 0
+5V R157 0
V_USB_1 R158 NC 0

D1-
D1+
GND

J6 HE14 1X4
1
2
3
4
GND

J37
1 VUSB
2 DATA-
3 DATA+
4 ID
5 GND
6 SHLD
7 SHLD
GND
NC MINI_USB_B_TRAD

+3.3V_USB R77 NC 0
+3.3V R78 NC 0
+Vaux (NC) R205 NC 0
+5V R155 0
V_USB_2 R156 NC 0

D2-
D2+
GND

J31 HE14 1X4
1
2
3
4
GND

J38
1 VUSB
2 DATA-
3 DATA+
4 ID
5 GND
6 SHLD
7 SHLD
GND
NC MINI_USB_B_TRAD

+3.3V_USB R79 NC 0
+3.3V R80 NC 0
+Vaux (NC) R46 NC 0
+5V R47 0
V_USB_3 R48 NC 0

D3-
D3+
GND

J28 USB_CON_A
1 VUSB
2 -DATA
3 +DATA
4 GRND
5 SHLD
6 SHLD
GND

➤ Power Supply

J24
GND 1
GND 2
GND 3
GND 4
+3.3V 5
+5V 6
+5V 7
+24V 8
HE14 1X8

J27
GND 1
GND 2
GND 3
GND 4
+3.3V 5
+5V 6
+5V 7
+24V 8
+24V 9
+3.3V 10
HE14 1X10

➤ Contact Station

Appendix 2

A2-1 POWER SUPPLY AND USB-BASED POWER SUPPLY

Power supply for J24/J27	
+24 V	500 mA max
+5V	650 mA max
+3,3V	300 mA max

Power supply through USB	
+3,3V_USB	Not used
+3,3V	300 mA max
+VAUX	Not used
+VUSB1 +VUSB2 +VUSB3	Please refer the technical document of the PC-powered USB Generally, 500mA max overall