

# COMMUNICATION PROTOCOL

For

- ENC899
  - ENC2K1
  - TDS2K3
  - OBTM260
  - EMTS
- 

PRODUCED BY

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## INDEX

<b>1</b>	<b>COMMUNICATION PROTOCOL</b> .....	<b>4</b>
1.1	INTERFACE.....	4
1.2	TRANSMISSION MODE.....	4
<b>2</b>	<b>COMMANDS</b> .....	<b>4</b>
<b>3</b>	<b>ANSWERS</b> .....	<b>5</b>
<b>4</b>	<b>COMMANDS AND ANSWERS LIST</b> .....	<b>6</b>
4.1	RESET COMMAND.....	7
4.2	FIRMWARE VERSION REQUEST.....	7
4.3	STATUS REQUEST.....	7
4.4	AUTOMATIC READ ON COMMAND.....	9
4.5	AUTOMATIC READ OFF COMMAND.....	11
4.6	READ COMMAND.....	11
4.7	READ DATA REQUEST COMMAND.....	13
4.8	SET DATA TO PRINT.....	14
4.9	SET DATA TO ENCODE COMMAND.....	16
4.10	ENCODE PRINT AND ISSUE COMMAND.....	17
4.11	DISPLAY DATA SET COMMAND.....	20
4.12	I/O STATUS REQUEST.....	20
4.13	SET OUTPUT COMMAND.....	21
4.14	I/C CARD POSITIONING.....	22
4.15	COMMAND.....	22
4.16	SEND COMMAND TO I/C CARD CONTROLLER.....	22
4.17	FEED COMMAND.....	23
4.18	PRINT DENSITY SET COMMAND.....	23
4.19	INPUT E OUTPUT SERIAL STATUS REQUEST.....	23
4.20	SERIAL OUTPUT ACTIVATION COMMAND.....	24
4.21	SET CUTTING POSITION COMMAND FOR FEEDER.....	25
4.22	CUTTING POSITION STORE COMMAND.....	25
4.23	RTC SET COMMAND.....	25
4.24	RTC DATE AND TIME READ COMMAND.....	26
4.25	MOBILE PRINTER POSITIONING COMMAND.....	26
4.26	ERROR CODE DESCRIPTION.....	26
4.27	OPERATION CODE DESCRIPTION.....	28
<b>5</b>	<b>COMMAND AND ANSWER LIST FOR CONTACTLESS CARD MODULE</b> .....	<b>28</b>
5.1	CARD NUMBER READING COMMAND.....	28
5.2	CARD SECTOR READING COMMAND.....	29
5.3	CARD SECTOR WRITING COMMAND.....	29

# 1 COMMUNICATION PROTOCOL

## 1.1 INTERFACE

The standard interface is EIA RS232C.

The RS485 is available as option, with a RS422/485 protocol for multipoint communications.

## 1.2 TRANSMISSION MODE

Communication is serial, asynchronous, full duplex, with the following characteristics:

Speed	19200 bauds
Bit per character	7
Stop Bit	1
Parity	even

# 2 COMMANDS

The “command” is the message sent from the host to the module with the purpose to execute a determined operation (like reading of a title, request of read data ...).

The command format is:

*stx cc data etx*

Where:	<i>stx</i>	Start message (character Hex 02)
	<i>cc</i>	Command code of two ascii characters in ascii mode, that define the kind of command
	<i>data</i>	Data associated to the command of variable length according to the type of command. The command may also have no data
	<i>etx</i>	End message (character Hex 03)

In the indicated format the spaces between the fields are inserted of greater clarity, and they are not part of the message.

As an example the reset command is composed by four characters (Hex 02, Hex 30, Hex 31, Hex 03), and the format is indicated with “*stx 01 etx*”.

When the host sends a command, the following cases can be verified:

1) The module answers with the character ack (Hex 06). This happens when there are no communication errors and the command is formally corrected. At this point the host must wait for the answer message that the module will send at the end of the execution of the command. The execution time of the command can vary from a few milliseconds up to various seconds according to operations in execution.

2) The module answers with the character nak (Hex 15). This happens when there are communication errors, or if the command is not valid. At this point the host must send the command again, and eventually signal the state of out of service of the module if the error is repeated.

3) The module does not answer within 300 msec. This happens when the module is not connected or is down. At this point the host can transmit the command again, or send a status request, and eventually signal the state of out of service of the module if the error is repeated.

### 3 ANSWERS

The answer is the message sent from the module with the purpose to confirm to the host the execution of command received, or if there is an asynchronous and independent event from the execution of commands (for example a hardware reset).

The format of the answer is:

stx cc rr data etx

Where:	stx	Start of the message (character Hex 02)
	cc	Code of the executed command composed from by two ascii characters. If the generated answer is generated from an asynchronous event, the code command has value “ 00 “. For example, after a hardware reset, the module sends to the host the message “ stx 00 51 all etx “.
	data	Data associated to the command of variable length according to the type of answer. The answer can also have no data.
	etx	End of the message (Hex character the 03)

In the indicated format spaces between the fields are inserted of greater clarity, and they are not part of the message. For example the answer to reset command is composed by six characters (Hex 02, Hex 30, Hex 31, Hex 35, Hex 31, Hex 03) and the format is indicated with “ stx 01 51 etx “.

When the module receives a valid message from host it sends the character ack (Hex 06), it executes the command, and, finally, sends the answer. At this point the following cases can be verified:

- 1) The host receives the answer without errors. In this case it analyses the answer and it can send another command to the module.
- 2) The host receives the answer with communication errors or the answer is not valid. In this case it can send the *nak* character (Hex 15) in order to ask the repetition of the answer from the module, and, eventually, signal the out of service of the module if the error is repeated.
- 3) The host does not receive the answer within 20 seconds. In this case it can send the *nak* character (Hex 15) in order to ask the repetition of the answer from the module, or to send the status request, and eventually signal the out of service of the module if the error is repeated.

## 4 COMMANDS AND ANSWERS LIST

In the following paragraphs are described the commands available for the Motor driven encoders.

Command	Answer	Description
<i>stx 01 etx</i>	<i>stx 01 51 al etx</i>	Software Reset
<i>stx 02 etx</i>	<i>stx 02 52 ve etx</i>	Version request
<i>stx 03 etx</i>	<i>stx 03 53 status etx</i>	Staus request
<i>stx 04 t1 t2 t3 t4 t5 sh etx</i>	<i>stx 04 53 al op ar ms tt etx</i>	Automatic read On
	<i>stx 00 56 4 e1 e2 e3 e4 e5 al etx</i>	Automatic read execution
<i>stx 05 etx</i>	<i>stx 05 53 status etx</i>	Automatic read Off
<i>stx 06 s t1 t2 t3 t4 t5 ej etx</i>	<i>stx 06 56 s e1 e2 e3 e4 e5 al etx</i>	Read
<i>stx 07 tn etx</i>	<i>stx 07 57 tr te data etx</i>	Read data request
<i>stx 08 data etx</i>	<i>stx 08 58 ed etx</i>	Set data to print
<i>stx 09 tn data etx</i>	<i>stx 09 59 tr ed etx</i>	Set data to encode
<i>stx 10 s t1 t2 t3 t4 t5 pr ej [co] etx</i>	<i>stx 10 60 s e1 e2 e3 e4 e5 al co etx</i>	Encode, print, issue
<i>stx 11 r data etx</i>	<i>stx 11 61 ed etx</i>	Display data
<i>stx 12 etx</i>	<i>stx 12 62 i1 i2 i3 o1 o2 o3 etx</i>	I/O status request
<i>stx 13 o1 o2 o3 etx</i>	<i>stx 13 62 i1 i2 i3 o1 o2 o3 etx</i>	Set output
<i>stx 14 s etx**</i>	<i>stx 14 53 status etx</i>	I/C and Contactless Card in read position
<i>stx 15 com etx**</i>	<i>stx 15 65 err ris etx</i>	Send command to I/C Card controller and contactless card
<i>stx 16 ta etx</i>	<i>stx 16 53 status etx</i>	Command to feed paper
<i>stx 17 etx</i>	<i>stx 17 67 dcm nch etx</i>	Command to modify print density
<i>stx 18 etx ***</i>	<i>stx 18 68 i1 – i16 o1- o16 etx</i>	Status request for serial input output
<i>stx 19 etx o1- o16 etx ***</i>	<i>stx 19 68 i1 – i16 o1- o16 etx</i>	Set serial output
<i>stx 20 +/-xx etx</i>	<i>stx 20 70 +/-xx etx</i>	Set cutting position for FED899
<i>stx 21 etx</i>	<i>stx 21 x etx</i>	Store cutting position
<i>stx 22 date time etx</i>	<i>stx 22 72 x etx</i>	Set RTC
<i>stx 23 etx</i>	<i>stx 23 73 x date time etx</i>	Read date and time

\*\* The command for contactless card are explained in chapter

\*\*\* This command requires a special firmware and the I/O expander board.

#### 4.1 RESET COMMAND

This command executes a software reset of the CPU module and, if there is a ticket in the module, the ticket is ejected from the front opening.

Command: *stx 01 etx*

Answer: *stx 01 51 al etx*

Where: *al* A character for the alarm code

- “0” No error
- “5” Position error
- “6” Shutter opening error
- “7” Ticket jammed
- “8” Not valid configuration

When the module is reset by the means of the SW1 button or at the Power On, the module sends the message:

*stx 00 51 al etx*

#### 4.2 FIRMWARE VERSION REQUEST

The host may require the firmware version sending the following command:

Command: *stx 02 etx*

Answer: *stx 02 52 ve etx*

Where: *ve* Firmware version

#### 4.3 STATUS REQUEST

The host may require, at any time, the current status of the module, also while a previous command is made, by sending the following command:

Command: *stx 03 etx*

Answer: *stx 03 53 al op ar ms tt ptk FdAll roll etx*

Where: *al* A character for the code alarm

- “0” No error
- “1” Command in execution
- “2” Command not executed because the ticket is non present
- “3” Command not executed because the ticket is already in the module
- “4” Command not executed for automatic read always On
- “5” Position error
- “6” Shutter opening error

- “7” Ticket jammed
- “8” Non valid configuration
- “9” Command not executable

*op* A character that indicates the current operation

- “0” No operation
- “1” Execution of reset
- “2” Read/verify in execution
- “3” Encode/print in execution
- “4” Issuing in execution

*ar* A character that indicates the automatic read mode status

- “0” Automatic read Off
- “1” Automatic read On

*ms* A character that indicates the front opening status

- “0” Front opening free and shutter open
- “1” Ticket present in front opening and shutter open
- “2” Shutter closed
- “5-4-6” If the escrow module is installed and the back opening is used, the numbers “0”, “1” and “3” become “4”, “5” and “6”.

*tt* A character that indicates the kind of title

- “0” Title not present
- “1” Magnetic ISO title (85,6 mm)
- “8” Chip card

*ptk* A character that indicates the status of the ticket in the parking group or in the feeder. This character is present only in versions with parking or feeding unit.

- “0” Ticket not fed and not in parking
- “1” Ticket not fed and not cut
- “2” Ticket fed and cut
- “3” Ticket in parking
- “4” Card in parking (only when the parking edvice is installed)
- “5” Ticket in parking and Card in parking (only when the parking device is installed)
- “6” Ticket in the module and ticket parked (only for version with 90° feeder)

*FdAll* A character that indicates the feeder’s alarms:

- “0” No error
- “1” Command in execution
- “2” Paper not present
- “3” Parking busy
- “4” Finished paper (only for feeder with FW version 43.12.04)
- “5” Wrong ticket length (only for feeder with FW version 43.12.04)

- “6” Cutting error
- “7” Feeding error
- “8” Configuration not valid
- “N” Feeder not present

*roll1* A character that indicates the status of the roll. This character is present on versions with feeder and with dual feeder, referred to roll 1 (upper roller)

- “0” Roll not present
- “1” Roll present, in paper low mode
- “2” Roll present not running out

*roll 2* This character is present only on versions with double roll and refers to roll 2 (lower roll)

- “0” Roll not present
- “1” Roll present, in paper low mode
- “2” Roll present not running out

#### **4.4 AUTOMATIC READ ON COMMAND**

When the automatic read mode is on, the module reads the ticket automatically when the ticket is inserted into the module. The specified parameters define the tracks to read, and how to manage the shutter.

Command: *stx 04 t1 t2 t3 t4 t5 sh etx*

Where:*t1* A character to read the ISO1 track

- “T” Read the ISO1 track
- “0” Don’ t read the ISO1 track

*t2* A character to read the ISO2 track

- “T” Read the ISO2 track
- “0” Don’ t read the ISO2 track

*t3* A character to read the ISO3 track

- “T” Read the ISO3 track
- “0” Don’ t read the ISO3 track

*t4* A character to read the Transac 2 track.

- “T” Read the Transac 2 track
- “0” Don’ t read the Transac 2 track

*t5* A character to read the Transac 3 track.

“T” Read the Transac 2 track  
“0” Don’ t read the Transac 2 track

*sh* A character to open the shutter

“S” Open immediately the shutter  
“0” Open the shutter only when a magnetic ticket is inserted  
“M” Open immediately the shutter, drive the card in the I/C card read position and activate the I/C card solenoid

Answer: *stx 04 53 status etx*

Where:*status* See parameters of the status command

The module reads the ticket automatically when the ticket is inserted in the module, and after reading the ticket it switches in automatic read mode Off, sending the message:

*stx 00 56 4 e1 e2 e3 e4 e5 al etx*

Where:*e1* A character that indicates the reading of the ISO1 track.

“0” ISO 1 reading not executed  
“T” ISO 1 reading correctly  
“V” ISO 1 track not encoded  
“E” ISO 1 reading failed  
“N” ISO 1 track not configured

*e2* A character that indicates the reading of the ISO2 track.

“0” ISO 2 reading not executed  
“T” ISO 2 reading correctly  
“V” ISO 2 track not encoded  
“E” ISO 2 reading failed  
“N” ISO 2 track not configured

*e3* A character that indicates the reading of the ISO2 track

“0” ISO 3 reading not executed  
“T” ISO 3 reading correctly  
“V” ISO 3 track not encoded  
“E” ISO 3 reading failed  
“N” ISO 3 track not configured

*e4* A character that indicates the reading of the Transac 2 track

“0” Transac 2 reading not executed  
“F” Transac 2 forward reading correctly  
“R” Transac 2 reverse reading correctly  
“V” Transac 2 not encoded  
“E” Transac 2 reading failed

- “N” Transac 2 not configured
- e5* A character that indicates the reading of the Transac 3 track.
- “0” Transac 3 reading not executed  
“F” Transac 3 forward reading correctly  
“R” Transac 3 reverse reading correctly  
“V” Transac 3 not encoded  
“E” Transac 3 reading failed  
“N” Transac 3 not configured
- al* A character that indicates the alarm code
- “0” No error  
“6” Shutter opening error  
“7” Ticket jammed  
“8” Non valid configuration

#### **4.5 AUTOMATIC READ OFF COMMAND**

When the automatic read mode is off the module cannot accept a ticket from front opening.  
If the ticket is already inserted the module ejects the ticket before answering, and the answer is:

Command: *stx 05 etx*

Answer: *stx 05 53 status etx*

Where:*status* See parameters of the status command

#### **4.6 READ COMMAND**

When the module receives this command, it reads the ticket that is in the module.

The command is:

Command : *stx 06 s t1 t2 t3 t4 t5 ej etx*

Where: *s* A character that specifies the ticket to be read

- “0” Ticket in the module  
“1” Ticket in the feeder (only if feeder is present)  
“2” Ticket in the parking device (only if parking device or feeder is present)  
“3” Ticket in the parking device (only if parking device is present )  
“4” Ticket in the front opening

*t1* A character to read the ISO1 track

- “1” Read the ISO1 track  
“0” Does not read the ISO1 track

*t2* A character to read the ISO2 track

“T” Read the ISO2 track

“0” Does not read the ISO2 track

*t3* A character to read the ISO3 track

“T” Read the ISO3 track

“0” Does not read the ISO3 track

*t4* A character to read the Transac 2 track.

“T” Read the Transac 2 track

“0” Does not read the Transac 2 track

*t5* A character to read the Transac 3 track.

“T” Read the Transac 2 track

“0” Does not read the Transac 2 track

*ej* A character to indicate to issue ticket

“0” Does not issue after reading

“E” Issue after reading

“e” Issue after reading, but it is possible to capture the ticket if the user does not take the ticket

“B” Swallow the ticket from the back, after reading

“P” Park the ticket after reading (only when the parking device or feeder is

present)

“D” Swallow or issue ticket from the front escrow (only for ENC899/E version)

After reading the module send this message:

Answer: *stx 06 56 s e1 e2 e3 e4 e5 al etx*

Where: *s* A character that indicates the place of origin of the read ticket

“0” Ticket in the module

“1” Ticket in the feeder

“2” Ticket in the parking device

*e1* A character that indicates the reading of the ISO1 track.

“0” ISO 1 reading not executed

“T” ISO 1 reading correctly

“V” ISO 1 track not encoded

“E” ISO 1 reading failed

“N” ISO 1 track not configured

*e2* A character that indicates the reading of the ISO2 track.

“0” ISO 2 reading not executed  
“I” ISO 2 reading correctly  
“V” ISO 2 track not encoded  
“E” ISO 2 reading failed  
“N” ISO 2 track not configured

*e3* A character that indicates the reading of the ISO2 track

“0” ISO 3 reading not executed  
“I” ISO 3 reading correctly  
“V” ISO 3 track not encoded  
“E” ISO 3 reading failed  
“N” ISO 3 track not configured

*e4* A character that indicates the reading of the Transac 2 track

“0” Transac 2 reading not executed  
“F” Transac 2 forward reading correctly  
“R” Transac 2 reverse reading correctly  
“V” Transac 2 not encoded  
“E” Transac 2 reading failed  
“N” Transac 2 not configured

*e5* A character that indicates the reading of the Transac 3 track.

“0” Transac 3 reading not executed  
“F” Transac 3 forward reading correctly  
“R” Transac 3 reverse reading correctly  
“V” Transac 3 not encoded  
“E” Transac 3 reading failed  
“N” Transac 3 not configured

*al* A character that indicates the alarm code

“0” No error  
“1” Command in execution  
“2” Command not executed for ticket not present  
“5” Position error  
“7” Ticket jammed  
“8” Non valid configuration

#### **4.7 READ DATA REQUEST COMMAND**

When the module receives this command it sends to the host the last read data.

Command: *stx 07 tn etx*

Where: *tn* A character that indicates the kind of track required

“1” ISO 1 Track

“2” ISO 2 Track  
“3” ISO 3 Track  
“4” Transac 2 Track  
“5” Transac 3 Track

Answer: *stx 07 57 tr te dati etx*

Where: *tr* A character that indicates the kind of track required

“1” ISO 1 Track  
“2” ISO 2 Track  
“3” ISO 3 Track  
“4” Transac 2 Track forward  
“5” Transac 3 Track forward  
“N” Track not configured

*te* A character that indicates reading results

“0” Reading not executed  
“I” ISO reading correctly  
“F” Transac reading forward correctly  
“R” Transac reading reverse correctly  
“V” Track not encoded  
“E” Reading failed

*data* Data read from the magnetic head. The character number depends on track type. If the track is not read or virgin the character number is zero. If the reading of the ticket fails, the parameter may have partial data.

For the ISO tracks the data are inclusive of the *start sentinel* e *end sentinel* character; the lrc characters is checked but not sent to the host.

The transac track data are inclusive of the start and end track.

#### **4.8 SET DATA TO PRINT**

The host sends this command to set the characters to print on the ticket with the following print and encode command.

Command: *stx 08 data etx*

Where: *data* Alphanumerical string with variable length from 0 to up to 70 characters, holding data to be printed. All characters must be printable and in caps.

For versions with longitudinal printing following control characters are allowed to modify printing mode:

Hex 0E prints characters with double width  
Hex 0F single width print (default)  
Hex 10 Hex 30 set 5x7 dot matrix (default)  
Hex 10 Hex 31 set 5x5 dot matrix  
Hex 10 Hex 32 set 7x9 dot matrix  
Hex 16 reverse print  
Hex 17 forward print (default)

Answer: *stx 08 58 ed etx*

Where: *ed* “0” Data accepted  
“1” Data with non valid characters  
“2” Number of characters overflow.

For versions with 90° printer following control characters are allowed to change kind of printing:

Hex 0E print following characters with double width  
Hex 0F print following characters with single width (default)  
Hex 10 Hex 30 print following characters with 5x7 matrix (default)  
Hex 10 Hex 31 print following characters with 5x5 matrix  
Hex 10 Hex 32 print following characters with 7x9 matrix  
Hex 09 must be followed by two numerical characters that indicate the number of next line on which following characters will be printed. The number of the line must be between value 01 and 30. Line position is indicated in the scheme that follows this description  
Hex 15 as code Hex 09  
Hex 0A must be followed by 3 numerical characters that indicate the position of the following line on which following characters will be printed. The position is referred to current line and the value is in steps of 0,1 mm.  
Hex 12 as code Hex 0A  
Hex 0D print following characters on following line  
Hex 11 as code Hex 0D

Answer: *stx 08 58 ed etx*

Where: *ed* “0” Data accepted  
“1” Data sent contain invalid characters  
“2” Number of characters is higher than maximum allowed

Line position for 90° printing:

LINE 01	LINE02
LINE 03	LINE04
LINE 05	LINE06
LINE 07	LINE08
LINE 09	LINE10
LINE 11	LINE12
LINE 13	LINE14
LINE 15	LINE16
LINE 17	LINE18
LINE 19	LINE20
LINE 21	LINE22
LINE 23	LINE24
LINE 25	LINE26
LINE 27	LINE28
LINE 29	LINE30

#### 4.9 SET DATA TO ENCODE COMMAND

The host sends this command to set the data to be encoded on the ticket, at the following print and encode command.

Command: *stx 09 tn data etx*

Where: *tn* A character that indicates the track

- “1” ISO 1 track
- “2” ISO 2 track
- “3” ISO 3 track
- “4” Transac 2 track
- “5” Transac 3 track
- “B” ISO 2 track in bit mode

*data* String of data to be encoded.

The ISO1 track must start with the character “%” (Hex 25) and end with the character “?” (Hex 3F). The total length can change from 2 up to 78 characters and are valid all characters with ascii code from Hex 20 e Hex 5F.

The ISO2 track must start with the character “;” (Hex 3B) and end with the character “?” (Hex 3F). The total length can change from 2 up to 39 characters and all characters with ascii code from Hex 30 e Hex 3F are valid.

The ISO3 track must start with the character “;” (Hex 3B) and end with the character “?” The total length can change from 2 up to 106 characters and are valid all characters with ascii code from Hex 30 e Hex 3F.

The transac 2 and 3 tracks must start with the character “5” (Hex 35) and end with the character “2” (Hex 32). The total length can change from 2 up to 26 characters and are valid all characters with ascii code from Hex 30 e Hex 3F.

The “B” character allows to encode in bit mode. Using this option data to be encoded are fixed to 50 chr x 4 bit (total 200 bit) with “B” as start sentinel and “F” as end sentinel

Answer: *stx 09 59 tr ed etx*

Where: *tr* A character that indicates the track

- “1” ISO 1 track
- “2” ISO 2 track
- “3” ISO 3 track
- “4” Transac 2 forward track
- “5” Transac 3 forward track
- “B” ISO 2 track in bit mode
- “N” Track not configured

*ed* “0” Data accepted

- “1” Data with not valid characters
- “2” Number of characters overflow.

“3” Start or end track non valid

#### **4.10 ENCODE PRINT AND ISSUE COMMAND**

When the module receives this command, it encodes and prints the ticket that is in the module and issues if the correspondent parameter is set. The printer buffer length is 60 characters including control code characters.

The command format is:

Command: **stx** 10 *s t1 t2 t3 t4 t5 pr ej [co] etx*

Where: *s* A character that indicates the title to be encoded

“0” Title in the module

“1” Title in the feeder, only for version with feeder. When this parameter is active, the modules loads automatically the ticket from the feeder and cuts the ticket if it is not cut.

“2” Title in the park group (only for version with parking device or feeder)

“3” Title in the card parking group (only for version with parking device)

“5” Title from roll 1 (upper one) of the dual feeder, only for versions with dual roll feeder present. When this parameter is used the module draws the ticket from the feeder, operating all necessary operations of feeder and cutting of the ticket, in the event that this has not been prearranged before with the feeding command **stx 16 ta etx**.

“6” Title from roll 2 (lower one) of the dual feeder, only for versions with dual roll feeder present. When this parameter is used the module draws the ticket from the feeder, operating all necessary operations of feeder and cutting of the ticket in the event that this has not been prearranged before with the feeding command **stx 16 ta etx**

*t1* A character that indicates if ISO 1 track must be encoded

“I” Encode ISO 1

“0” Don’t encode ISO 1

*t2* A character that indicates if ISO 2 track must be encoded

“I” Encode ISO 2

“0” Don’t encode ISO 2

*t3* A character that indicates if ISO 3 track must be encoded

“I” Encode ISO 3

“0” Don’t encode ISO 3

*t4* A character that indicates if Transac 2 track must be encoded

“F” Encode Transac 2 track forward

“R” Encode Transac 2 track reverse

“0” Don’t encode Transac 2 track

*t5* A character that indicates if Transac 3 track must be encoded.

“F” Encode Transac 2 track forward

“R” Encode Transac 3 track reverse

“0” Don’t encode Transac 3 track

*pr* A character that indicates if the ticket must be printed

“0” Don’t print

“P” Print

*ej* A character that indicates if the title must be issued

“E” Full issuing after encoding

“e” Partial issuing after encoding, allowing to capture the ticket leaf by the user in the front opening.

“B” Swallow the ticket from the back

“b” Swallow the card from the back

“0” Don’t issue after encoding

“P” Park the title in the parking group after encoding

“p” Park the title ( plastic card, only for version with the parking device installed)

“D” Issue ticket from the front escrow after encoding (only for the ENC899/E)

“T” Ticket capture with mechanical obliteration (Only for encoder equipped with the mechanical obliteration module and FW version 12.37.32)

*co* A character that indicates the coercitivity of the magnetic tracks.

“L” Low coercitivity

“H” High coercitivity

Note: If the parameter “co” is not present in the command, the coercitivity does not change. The default at reset is Low coercitivity.

Answer: ***stx 10 60 s e1 e2 e3 e4 e5 al co etx***

Where: *s* A character that indicates the place of origin of the encoded ticket

“0” Ticket in the module

“1” Ticket in the feede

“2” Ticket in the parking device

*e1* A character that indicates the ISO 1 encoding result

“0” ISO 1 not encoded

“T” ISO 1 encoded correctly

“E” ISO 1 encoding failed

“N” ISO 1 not configured

*e2* A character that indicates the ISO 2 encoding result.

“0” ISO 2 not encoded  
“T” ISO 2 encoded correctly  
“B” ISO 2 encoded correctly in bit mode  
“E” ISO 2 encoding failed  
“N” ISO 2 not configured

*e3* A character that indicates the ISO 3 encoding result.

“0” ISO 3 not encoded  
“T” ISO 3 encoded correctly  
“E” ISO 3 encoding failed  
“N” ISO 3 encode failed

*e4* A character that indicates the transac 2 encoding result

“0” Transac 2 not encoded  
“F” Transac 2 forward encoded correctly  
“R” Transac 2 reverse encoded correctly  
“E” Transac 2 encoding failed  
“N” Transac 2 not configured

*e5* A character that indicates the transac 3 encoding result.

“0” Transac 3 not encoded  
“F” Transac 3 forward encoded correctly  
“R” Transac 3 reverse encoded correctly  
“E” Transac 3 encoding failed  
“N” Transac 3 not configured

*al* A character that indicates the alarm code

“0” No error  
“1” Command in execution  
“2” Command not executed for ticket not present  
“5” Position error  
“7” Ticket jammed  
“8” Invalid configuration

*co* A character that indicates the magnetic tracks coercivity

“L” Low coercitivity  
“H” High coercitivity

Note: all send data to encode commands on track 2 and the encoding command must specify the same kind of track (ISO2 o bit mode)

#### 4.11 DISPLAY DATA SET COMMAND

This command allows to set the data to be displayed on the LCD display.

Command: *stx 11 r data etx*

Where: *r* A character that indicates the display row

“0” First row

“1” Second row

*data* String of characters to be displayed. Only printable characters are allowed.  
The number of characters cannot exceed the display row length.

Answer: *stx 11 61 ed etx*

Where: *ed* A character that indicates the result of operation.

“0” Display correctly

“1” Data not valid

“2” Number of character not valid.

“3” Display not present

#### 4.12 I/O STATUS REQUEST

This command allows to read the status of the optocoupled input and output.

Command: *stx 12 etx*

Answer: *stx 12 62 i1 i2 i3 o1 o2 o3 etx*

Where: *i1* A character that indicates input 1 status

“0” Input not active

“1” Input active

*i2* A character that indicates input 2 status

“0” Input not active

“1” Input active

*i3* A character that indicates input 3 status

“0” Input not active

“1” Input active

*o1* A character that indicates output 1 status

“0” Output not active

“1” Output active

*o2* A character that indicates output 2 status

“0” Output not active  
“1” Output active

*o3* A character that indicates output 3 status  
“0” Output not active  
“1” Output active

#### **4.13 SET OUTPUT COMMAND**

This command allows to set and reset the optocoupled outputs.

Command: *stx 13 o1 o2 o3 etx*

Where: *o1* A character that modifies the output 1 status

“0” Reset output 1  
“1” Set output 1

*o2* A character that modifies the output 2 status

“0” Reset output 2  
“1” Set output 2

*o3* A character that modifies the output 3 status

“0” Reset output 3  
“1” Set output 3

Answer: *stx 13 62 i1 i2 i3 o1 o2 o3 etx*

Where: *i1* A character that indicates the input 1 status

“0” Input 1 not active  
“1” Input 1 active

*i2* A character that indicates the input 2 status

“0” Input 2 not active  
“1” Input 2 active

*i3* A character that indicates the input 3 status

“0” Input 3 not active  
“1” Input 3 active

*o1* A character that indicates the output 1 status

“0” Output 1 not active  
“1” Output 1 active

*o2* A character that indicates the output 2 status

“0” Output 2 not active

“1” Output 2 active

*o3* A character that indicates the output 3 status

“0” Output 3 not active

“1” Output 3 active

#### **4.14 I/C CARD POSITIONING COMMAND**

When the module receives this command it executes the positioning of the I/C card and switches on the solenoid.

Command: *stx 14 s etx*

Where *s* A character that indicates the title to manage

“0” Title in the module

“1” Title in the feeder (only for version with feeder)

“2” Title in the park group (only for version with parking device)

Answer: *stx 14 53 status etx*

Where: *status* See parameters of the status command

#### **4.15 SEND COMMAND TO I/C CARD CONTROLLER**

When the module receives this message it sends to the I/C card controller the specified command. The answer of the controller is sent to the host by the answer message.

Command: *stx 15 com etx*

Where: *com* Command to be sent to the I/C controller without the carriage return

Answer: *stx 15 65 err ris etx*

Where: *err* A character that indicates the error code

“0” The controller has received correctly the command

“1” The controller has already received a command that is in execution

“2” The command is too long and is ignored

“3” The controller does not respond or is not present

*ris* Answer sent by the controller without cr. This parameter is present only if the error code is “0”

#### 4.16 FEED COMMAND

When the module receives this command, it executes the positioning of the ticket from roll or fanfold in the cutting position.

The command format is:

Command: *stx 16 ta etx*

Where: *ta* A character that indicates the operation being performed

“0” Ticket not cut

“1” Ticket cut

“V” Verify cutting procedure

Answer: *stx 16 53 status etx*

Where: *status* See parameters of the status command

#### 4.17 PRINT DENSITY SET COMMAND

This command allows to set the print density. The module calculates the number of printable characters, and inserts the result in the answer.

The minimum density is 5 dot/cm, the maximum density is 30 dot/cm.

The command format is:

Command: *stx 17 dcm etx*

Where: *dcm* Two characters that indicate the print density in dot/cm

Answer: *stx 17 67 dcm nch etx*

Where: *dcm* Two characters that indicate the print density in dot/cm

*nch* Two characters that indicate the maximum number of printable characters

#### 4.18 INPUT OUTPUT SERIAL STATUS REQUEST

This command allows to read the status of the serial I/O.

Command: *stx 18 etx*

Answer: *stx 18 68 i1 i2 i3 i4 i5i i6 i7 i8 i9 i10 i11 i12 i13 i14 i15 i16  
o1 o2 o3 o4 o5 o6 o7 o8 o9 o10 o11 o12 o13 o14 o15 o16 etx*

Where: *i1* A character that indicates the input 1 status

“0” Input not active

“1” Input active

....

....

*i16* A character that indicates the input 16 status

“0” Input not active  
“1” Input active

*o1* A character that indicates the output 1 status

“0” Output not active  
“1” Output active

““

““

*o16* A character that indicates the output 16 status

“0” Output not active  
“1” Output active

\*\*\* This command requires a special version of firmware and the I/O expander board

#### **4.19 SERIAL OUTPUT ACTIVATION COMMAND**

This command allows to activate and deactivate the serial output

Command: *stx* 19 *o1* *o2* *o3* *o4* *o5* *o6* *o7* *o8* *o9* *o10* *o11* *o12* *o13* *o14* *o15* *o16* *etx*

Where: *o1* A character that modifies output 1

“0” Reset output 1  
“1” Set output 1

““

*o16* A character that modifies output 16

“0” Reset output 16  
“1” Set output 16

Answer: *stx* 19 68 *i1* *i2* *i3* *i4* *i5i* *i6* *i7* *i8* *i9* *i10* *i11* *i12* *i13* *i14* *i15* *i16*  
*o1* *o2* *o3* *o4* *o5* *o6* *o7* *o8* *o9* *o10* *o11* *o12* *o13* *o14* *o15* *o16* *etx*

Where: *i1* A character that indicates input 1 status

“0” Input not active  
“1” Input active

““

*i16* A character that indicates input 16 status

“0” Input not active  
“1” Input active

*o1* A character that indicates output 1 status

“0” Output not active  
“1” Output active

““

*o16* A character that indicates output 16 status

“0” Output not active  
“1” Output active

\*\*\* This command requires a special version of firmware and the I/O expander board

#### **4.20 SET CUTTING POSITION COMMAND FOR FEEDER**

This command allows to modify the cutting position when the encoder is equipped with feeder.

Command: *stx 20 +/- xx etx*

Where: *xx* Two characters that modify the offset of the cutting position, in tenths of millimetres, positive or negative.

Answer: *stx 20 70 +/- xx etx*

Where: *xx* Two characters that indicate the current offset of the cutting position, in tenths of millimetres, positive or negative.

#### **4.21 CUTTING POSITION STORE COMMAND**

This command allows to store permanently in the flash memory the cutting position selected with the previous command.

Command: *stx 21 etx*

Answer: *stx 21 71 x etx*

Where: *x* A character that indicates the result of the command  
0 = memo OK  
E = memo failed

#### **4.22 RTC SET COMMAND**

This command allows to set date and time into the hardware RTC.  
The RTC is a optional device with a supercap to save date and time.

Command: *stx 22 date time etx*

Where: *date* Eight numeric characters that indicate the date in the following format:  
Two characters for the day ( from 01 to 31)  
Two characters for the month (from 01 to 12)  
Four characters for the year (from 1980 to 2079)  
*time* Six numeric characters that indicate the time in the following format:  
Two characters for ours (from 00 to 23)  
Two characters for minutes (from 00 to 59)  
Two characters for seconds (from 00 to 59)

Answer: *stx 22 72 x etx*

Where: *x* A character that indicates the result of the command  
“0” Date and time stored without errors  
“1” Date not valid  
“2” RTC not present

#### **4.23 RTC DATE AND TIME READ COMMAND**

This command allows to read date and time from the RTC.

Command: *stx 23 etx*

Answer: *stx 23 73 x date time etx*

Where: *x* A character that indicates the result of the command  
“0” Date stored without error  
“1” Not valid date  
“2” RTC not present

*date* Eight numeric characters that indicate the date in the following format:  
Two characters for the day ( from 01 to 31)  
Two characters for the month (from 01 to 12)  
Four characters for the year (from 1980 to 2079)

*time* Six numeric characters that indicate the time in the following format:  
Two characters for ours (from 00 to 23)  
Two characters for minutes (from 00 to 59)  
Two characters for seconds (from 00 to 59)

#### **4.24 MOBILE PRINTER POSITIONING COMMAND**

This command allows to modify the position of the printer head when the longitudinal mobile impact printer is installed on the encoder.

Command: *stx 24 xxx etx*

Where: *xxx* These 3 characters indicate the position of the printer head, the measure is expressed in tenths of millimetres. The *xxx* can assume the value between 000 (home position) and the maximum position that the head can reach. If *xxx* is higher than the maximum value, the head goes to the max position available. If *xxx* is absent (command *stx 24 etx*), the head remains in its positions and the answer is the current position.

Answer: *stx 24 74 xxx etx*

Where: *xxx* These 3 characters indicate the position reached by the printer head, the measure is in tenths of millimetres. If the device that moves the head is not installed, *xxx* assumes the value “NNN”.

#### **4.25 ERROR CODE DESCRIPTION**

The *al* parameter contained in the answer that the module sends to the host might have the following value:

“0” No error

“1” Command in execution.

The module receives a command before the end of the execution of the previous command; it refuses the command and the host must wait for the answer of the command in execution. The only command that the host may send when the module executes a command is the status request. The answer to all other commands contain the alarm code “1”.

“2” Command not executed for title not present.

This alarm occurs when the module receives a command that requires a title in the module (for example a read or encode command). The same alarm occurs with the command to reload the ticket from the park position when it is empty.

“3” Command not executed for title already present in the module.

This alarm occurs when the module receives a command that requires no title in the module (for example a automatic read on command). The same alarm occurs with the command to park the ticket when the park position is busy

“4” Command not executed because automatic read on command is active.

If the automatic read is active and the module receives a second automatic read on command this alarm code occurs. In order to send the automatic read on command with different parameters, reading must be enabled and tuned on again.

“5” Position error.

When the ticket is moves into the module the CPU checks the position by the means of the photo sensor.

If the ticket position is not correct due to sliding on the transport belt or a photo sensor is damaged the “position error” command occurs.

The module accepts other commands and tries to position correctly the ticket.

It is recommended to check the photo sensor and the transport mechanism.

“6” Shutter opening error.

This alarm occurs when the module fails to open the shutter. There might be damages on the shutter or a high pressure on the shutter made by a plastic card pushed from the front opening

“7” Title jammed.

This alarm code occurs when a title is jammed in the module. Title must be removed manually and the module must be reset

“8” Configuration not valid.

This alarm indicates that the configuration stored in the flash memory is not valid.

This requires program reloading or the flash memory substitution.

“9” Command not executable.

This alarm occurs when the host sends a command that the module cannot execute because the current configuration does not allow it (for example to issue ticket when the feeder module is not present)

#### **4.26 OPERATION CODE DESCRIPTION**

The *op* parameter contained in the answer that the module sends to the host might have the following value:

“0” No operation.

The module is waiting for command from host.

“1” Reset execution.

The module is initialising itself and the only command accepted is the status request.

“2” Read/verify in execution.

The module is reading a title and the only command accepted is the status request.

“3” Print/encode in execution.

The module is printing or encoding a ticket and the only command accepted is the status request.

“4” Issuing in execution.

The module is issuing a title from the front opening or from the back, and the only command accepted is the status request.

## **5 COMMAND AND ANSWER LIST FOR CONTACTLESS CARD MODULE**

The card contains 16 sectors, of which the first one (sector ‘0’) is reserved to the number of the card. The sectors from 1 to 15 have a dimension of 48 characters and they are available for data memorisation.

Once card has been introduced in the module, it needs to be positioned using the command stx 14 s etx (see page 20)

Once card has been positioned, it is managed by the following commands:

### **5.1 CARD NUMBER READING COMMAND**

stx 15 00 etx

Answer: stx 15 65 and number etx

where: e error code (one character)  
0 --> no error  
1 --> card not present

2 --> card not valid  
4 --> command not valid  
5 --> communication error between CPU and controller  
number card number (16 characters)

## **5.2 CARD SECTOR READING COMMAND**

stx 15 s etx

where: s number of the sector (two characters)  
from 01 to 15

Answer: stx 15 65 e etx data

Where: e error code (one character)  
0 --> no error  
1 --> card not present  
2 --> card not valid  
4 --> not valid command  
5 --> communication error between CPU and controller

data sector data (48 characters)

## **5.3 CARD SECTOR WRITING COMMAND**

stx 15 s data etx

Where: s number of the sector plus 20 (two characters) from 21 to 35  
data sector data (from 0 to 48 characters); all characters with ASCII code are qualified including 0x20 and 0x7f

Answer: stx 15 65 e etx

Where: e error code (one character)  
0 --> no error  
1 --> card not present  
2 --> card not valid  
4 --> command not valid  
5 --> communication error between CPU and controller