FQ
Ingeniería Electrónica
SMART IDENT

G41 Series
Motorized card reader for barcode and RFID contactless cards

USER MANUAL

REVISIONS

DATE	AUTHOR	VER.	CHANGES
12/03/2006	GB	1.0	First edition
27/06/2006	LB	1.1	Modified paragraph 4.10
29/06/2006	LB	1.2	Modified paragraph 4.7
08/05/2008	GB	1.3	Modified paragraph 4.9
01/07/2008	GB	1.4	Modified paragraph 4.3 Added paragraph 4.12
01/04/2009	GB	1.5	Modified paragraph 4, 4.4, 4.6 4.11 4.12
08/04/2009	GB	1.6	Added paragraph 4.13 and 4.14 Mod par 1.1
27/01/2010	GB	1.7	Added paragraph 4.15, 4.16, 4.17 and 4.18 Mod par 4 and 4.06
12/07/2010	GB	1.8	Modified paragraph 4.3, 4.6
02/12/2010	GB	1.9	Modified paragraph 1.2

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1 GENERALITIES

The G41 series is a motorized device for reading of ISO format tickets.
Barcode reading occurs by a laser scanner for transversal printed codes or with a CCD scanner for codes printed longitudinally.
Optionally, a contactless reader for contactless card and ticket reader is available.

The G42 COMBO version, ideal for automatic cashers and payment operations allows to install both the barcode reader and the contactless card reader.
In this way you can realize parking systems with barcode tickets for occasional parkers and contactless card for season parkers or pre-paid cards for habitual users.

1.1 DIMENSIONS

	BASE VERSION	COMBO VERSION
Length:	144.5 mm.	224.5 mm
Width:	104.2 mm.	104.2 mm.
Height:	115 mm.	115 mm.
Weight:	1.2 Kg.	1.4 Kg.

1.2 ELECTRIC POWER SUPPLY

Tension: 24 Vcc +/- 10% Current: at rest < 100 mA in activity 2.5 A max.

1.3   INTERFACE

Standard: RS232

1.4   AVERAGE LIFE

Mechanical parts subject to wear: > 1.000 000 cycles

1.5   ENVIRONMENT CONDITIONS

Working temperature:	from + 10 °C to + 50 °C.
Stocking temperature:	from - 10 °C to + 60 °C.
Relative humidity:	from 10 % a 85 %. RH not condensing

2 MODULE DESCRIPTION

2.1   MECHANICAL STRUCTURE

The module is composed by the following mechanical groups:

- Flanks for title transport
- Card and ticket transport
- Laser scanner
- CCD scanner
- R/W contactless unit

2.1.1 FLANKS FOR TITLE TRANSPORT

The flanks are realized in high resistant plastic with fiber and they host the symmetrical transport guides trough which title to be read passes; the right flak hosts the stepping motor and the paper transport devices. The control electronic board is fixed to the left flank.

2.1.2 TICKET AND CARD TRANSPORT

The transport is guaranteed by rubber roller that adapt automatically to card and ticket width between 0.18 and 0.76 mm.
Title movement during insertion, returning to user or swallowing is managed by a stepping motor.

2.1.3 LASER SCANNER

Transversal barcode reader: reading is activated automatically by the BCR module after ticket positioning. After reading, the code read is available and it can be required by apposite command sent by the host on the serial communication line.
This scanner can read all kinds of barcodes.

2.1.4 CCD IMAGER SCANNER

Also this device, in alternative to the laser scanner, allows the reading of barcodes.
The IMAGER scanner is more performing than the laser scanner because it can read also bad resolution barcodes.
The reading resolution is higher and there is a high tolerance in the reading position.
The reading is activated automatically from the BCR module sliding the ticket under the reader.
After reading the code is available and it can be required by apposite command sent by the host on the serial communication line.
This scanner can read all kind of barcodes and two-dimensional barcodes (pdf).

2.1.5 LONGITUDINAL SCANNER

Optionally the CCD IMAGER scanner can be mounted longitudinally in order to read longitudinally printed barcodes.

2.1.6 R/W CONTACTLESS UNIT

For reading and writing of MIFARE contactless cards in the BCR reader a module in accordance with following standards is employed: ISO 14443-A and ISO 15693. On request the ISO 14443-B standard is available. This module is installed between the two flanks at a distance that allows communication with the card.
The device is connected to the CPU board by the means of the C_LESS connector and it is managed by the CPU board FW trough special protocol encapsulated in the BCR module protocol.

NOTE: during assembling the module is set and tested for optimal functioning; the set changing can compromise the correct functioning of the device.

3 ELECTRONIC CONTROL

3.1 CPU BOARD

All elaboration and management tasks are entrusted to this control board.
The base circuit modules are:
- Microprocessor Fujitsu 16 bit
- Laser Scanner and IMAGER driver interface
- Set of optical sensor for title position survey within the module
- Stepping motor driving circuit
- RS232 serial interface

3.2 MANAGING FIRMWARE

The managing FW controls all functions performed by the module, such as:
- Host communication management trough RS232 serial communication port
- Title movement control within the module
- Laser scanner, IMAGER and R/W contactless module communication management.

4 ELECTRIC CONNECTIONS AND ARRANGEMENTS

4.1 ELECTRIC CONNECTIONS

4.1.1 POWER SUPPLY CONNECTOR

Power supply is given by the connector SUPPLY (JST PH 4x1 PM 90°) with the following pinout:

Pin 1   +24V
Pin 2   +24V
Pin 3   GND
Pin 4   GND

4.1.2 SERIAL INT. RS232 CONNECTOR

The serial interface used for communication with the BCR module is available in the connector RS232 (JST PHD 2x5 PM 90°), with the following pinout:

Pin 1   NC   Pin 2   NC
Pin 3   Tx RS232   Pin 4   NC
Pin 5   Rx RS232   Pin 6   GND
Pin 7   NC   Pin 8   NC
Pin 9   GND   Pin 10 NC

4.1.3 I/O SIGNAL CONNECTORS

It is possible to connect to the BCR module three input digital signals and three output signals open collector type. The I/O connector 1 (JST PHD 6x2 PM 90°) pinout is the following:

Pin 1	OUT 0B	Pin 2	GND
Pin 3	OUT 1B	Pin 4	GND
Pin 5	OUT 2B	Pin 6	GND
Pin 7	IN 0B	Pin 8	GND
Pin 9	IN 1B	Pin 10	GND
Pin 11	IN 2B	Pin 12	GND

4.1.4 I/O SIGNAL CONNECTOR

Besides the I/O signals present on the I/O 1 connector, on the I/O 2 connector an input digital signal and a power output signal are available and ideal to drive a ralay.
The I/O 2 (JST PH 4x1 PM 90°) connector pinout is the following:

Pin 1	OUT 3B
Pin 2	GNDPP
Pin 3	IN 3B
Pin 4	GND

4.1.5 OPTO #3 CONNECTOR

On the OPTO #3 connector the connection for a optional external optical sensor is available.
The OPTO #3 (JST PH 4x1 PM 90°) connector pinout is the following:

Pin 1	VCC
Pin 2	OSC
Pin 3	VCC
Pin 4	OPTO

4.1.6 STEPPING MOTOR CONNECTOR

The connection of the stepping motor occurs by the means of the connector MOTOR (AMP MODII 4 PM 90°) with the following pinout

Pin 1	OUT 1
Pin 2	OUT 2
Pin 3	OUT 3
Pin 4	OUT 4

4.1.7 SCANNER CONNECTOR

The laser scanner is connected to the CPU board by the means of the connector BCR (JST PH 4x1 PM 90°) with the following pinout:

Pin 1   VCC
Pin 2   GND
Pin 3   LASER_TRIGGER
Pin 4   TX

4.1.8 CONTACLESS MODULE CONNECTOR

The contactless module is connected to the CPU board by the means of the connector C_LESS (JST PHD 2x5 PM 90°) with the following pinout:

Pin 1   VCC   Pin 2   Rx1
Pin 3   Rx1_RS232   Pin 4   Tx1
Pin 5   Tx1_RS232   Pin 6   I/O AUX1B
Pin 7   C_GND   Pin 8   C_GND
Pin 9   I/O AUX0B   Pin 10   I/O AUX2B

Following drawing and form show the pinout of the connector that must be inserted in the contactless module.
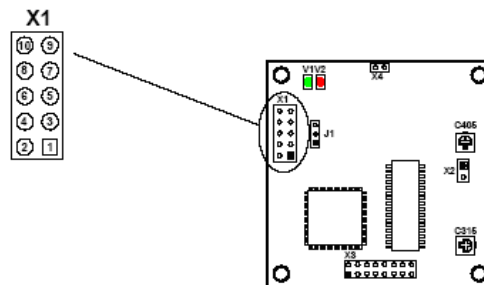
X1 Pin N°	Function	Description
		ID CPR.M02 –B/-BA
3	TxD	RS232 TTL –Transmit data
4	GND	GND
5	RxD	RS232 TTL –Receive Data
8	VCC	+5V DC
9	GND	GND

4.1.9 PROGRAMMING CONNECTOR

The firmware download occurs by the means of the connector FLASHPRG (JST PH 4x1 PM 90°)

Pin 1   GND
Pin 2   TX
Pin 3   GND
Pin 4   RX

4.2   BUTTONS

The RESET button allows to reset the board without disconnecting power supply.
The SWP1 button activates the ticket issue function.
The SWP2 button activates the barcode scanner.

4.3   DIP SWITCH

The dip switch SW1 allows the execution of special statements and to activate the firmware download.   The dip switch function is the following:

Dip 1   On = Contactless reader   Off = Barcode reader
Dip 2   On = Activates the reverse ticket reading function   Off = Disabled function
Dip 3   On = Activates the barcode slow reading function   Off = Disabled function
Dip 4   On = Disabled function   Off = Activatr output switch off timer
Dip 5   RESERVED
Dip 6   On = firmware Download

See paragraph 6 for programming procedure

4.4   SIGNALLING LED

DL1   Photo sensor status display   OP1
DL2   Photo sensor status display   OP2
DL3   Photo sensor status display   OP3
DL4   On in programming
DL5   Display trough flash sequences machine status and possible alarms

FIXED ON   Regular functioning
1 FLASH   Command in execution
2 FLASHES   Command not executed for title not present in the module
3 FLASHES   Command not executed for title already present in the module
4 FLASHES   Command not executed for reading already enabled
5 FLASHES   Position error
7 FLASHES   Title jammed
8 FLASHES   Configuration not valid

5 PROGRAMMING PROCEDURE

For FW download, after setting dip 4-5-6 follow these instructions:

a. Connect serial cable to connector FLASHPRG (JST 4 P.M. a 90°).
b. Keep RESET button pressed and, at the same time, move the dipswitch 6 to On position; verify that the DL4 led is on and release RESET button.
c. Execute the FUJITSU FLASH MCU Programmer program.

- Select in the Target Microcontroller field the MB90F497/G model.
- Select in the Cristal Fquency field the value of 4MHz.
- Open the file with MHX extension.
- Select the COM port to which the serial cable is connected.
- The screen appears as the one on the button if the COM1 port is used.
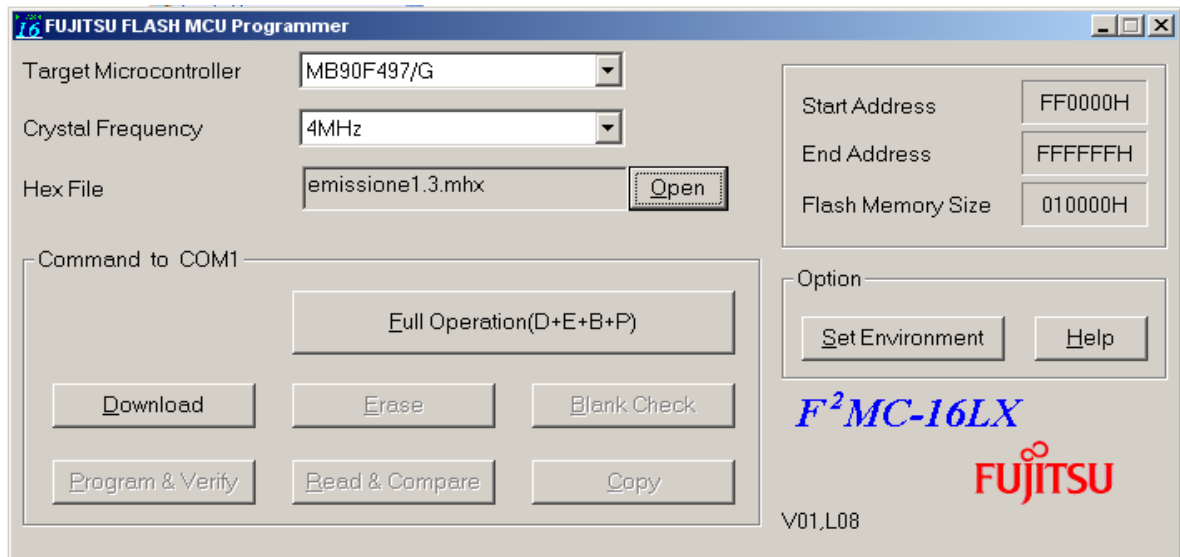
- Press the "Full Operation(D+E+B+P)" button.
- When the Flash window appears press "OK".
- Wait for procedure to finish.

d. At the end of the procedure press OK and close the program.
e. Select in the Target Microcontroller field the MB90F497/G model.
f. Press reset button and at the same time move the dipswitch 6 in Off position and verify that the LED DL4 switches off. Release the reset button.

6 BCR CPU LAYOUT
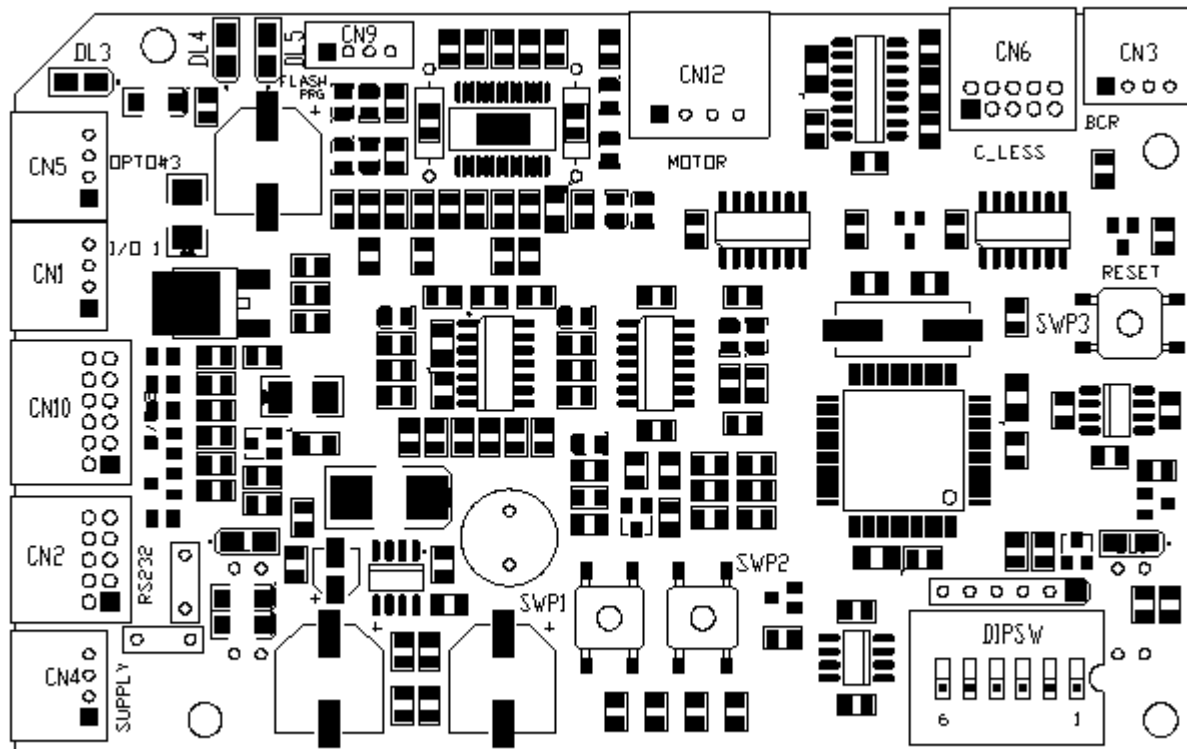
7 ADJUSTMENTS AND SETTINGS

7.1 BARCODE AND CONTACTLESS READER SETTING

The barcode reader is regulated in the position that guaranties best reading performances of barcodes.
The change of this position can reduce or compromise reading reliability.

7.2 BARCODE READING POSITION SETUP

The communication protocol provides a special command to define the ticket position under the scanner.
It is recommended to position barcode printing near the front edge f the ticket.

8 DIMENSIONS

CONTACTLESS VERSION

BARCODE VERSION

LASER SCANNER

C_LESS R/W
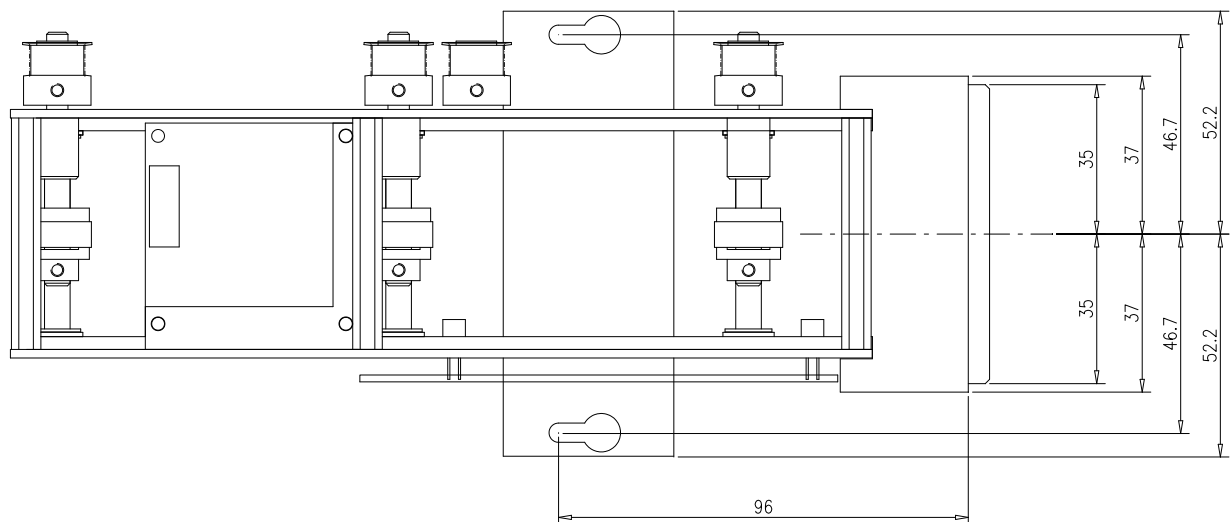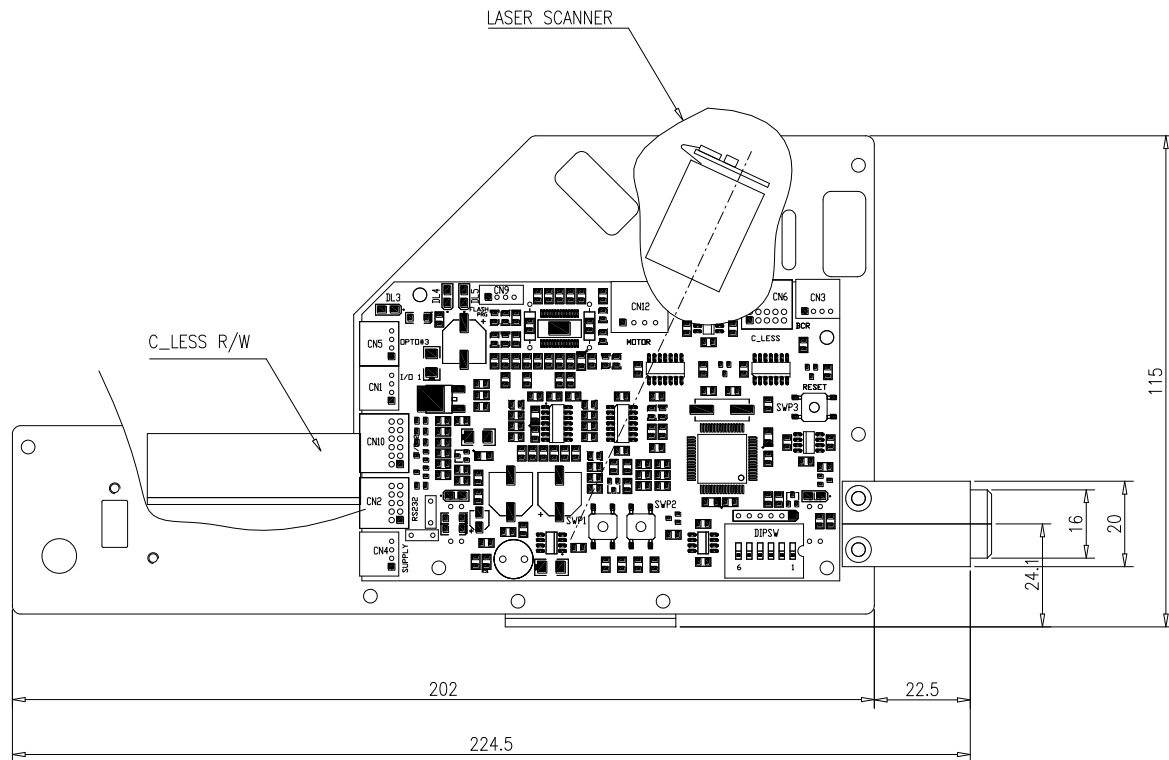
COMBO VERSION

9 COMMUNICATION PROTOCOL

9.1 ELECTRICAL INTERFACE

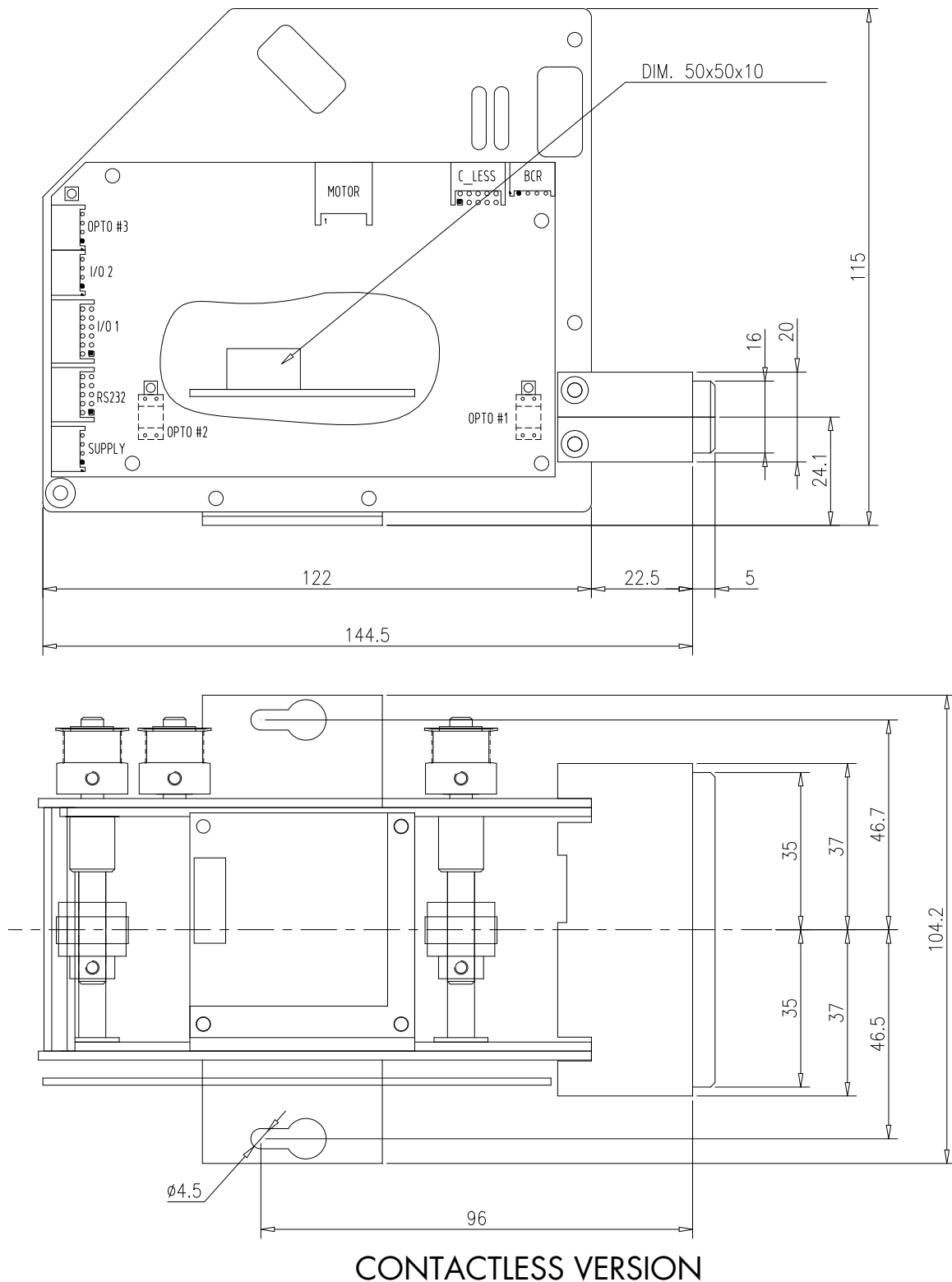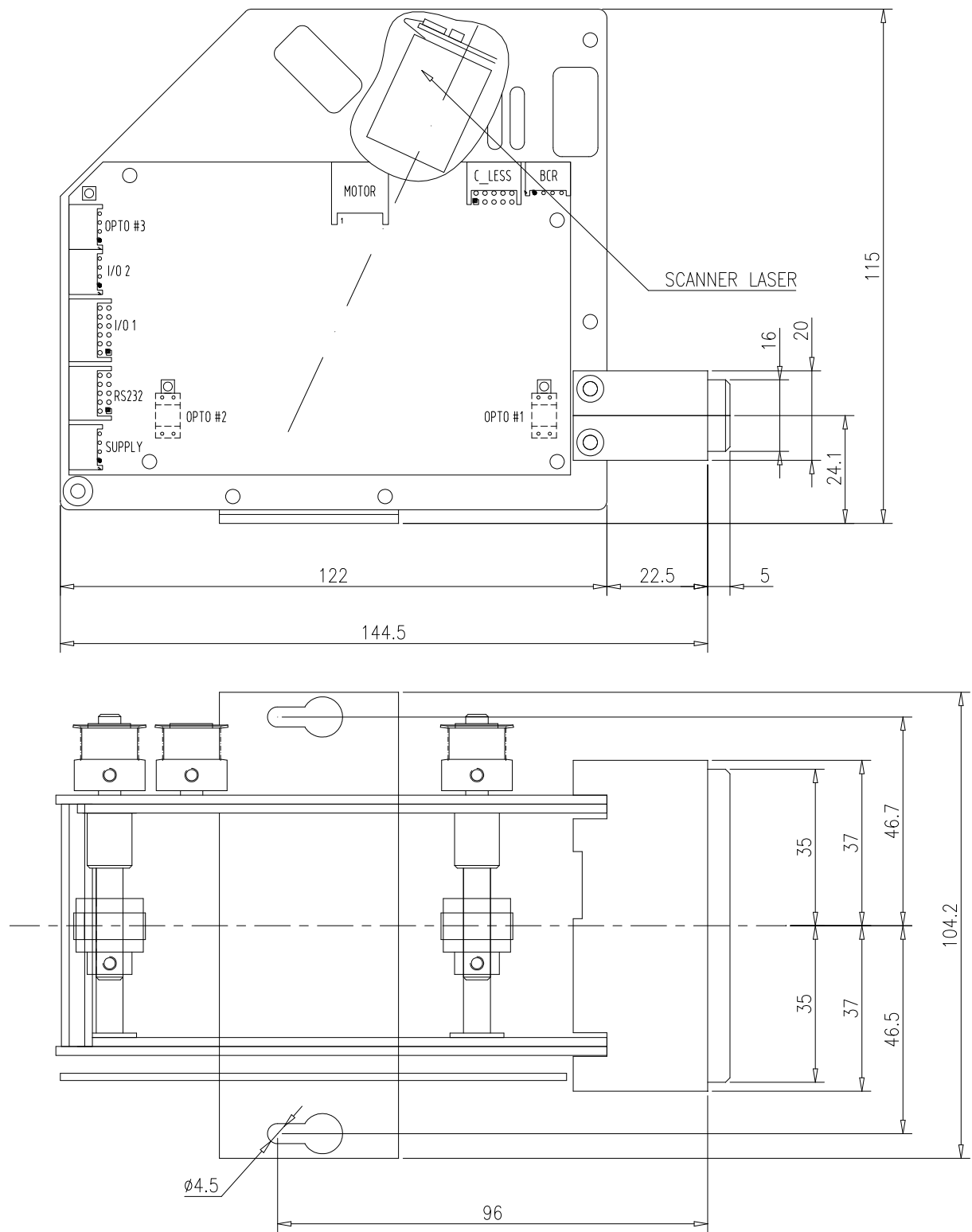The standard interface supplied is the serial line EIA RS232C with standard electric levels (+/- 12 Volt).

9.2 COMMUNICATION MODE

The serial communication is asynchronous full duplex with the following characteristics

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

10 COMMANDS

The command is the message sent by the host to the module in order to execute a certain operation (for example the reading of a title, request of data read).

The command format is the following:

stx *cc data* **etx**

Where:
	stx	Beginning of the message (character Hex 02)
	cc	Command code composed by two ascii characters, that define the kind of command.
	data	Data of the command of different length, variable according to kind of command The command can also has no data.
	etx	End of the message (character Hex 03)

In the format indicated the spaces between the fields have been used to make message clear but they are not part of the message. For 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, following cases can occur:

1) The module responds with the character **ack** (Hex 06). This case occurs if there have not been communication errors and the command is formally correct. At this point the host waits for the answer message that the module will send after executing the command. Note that the command execution time varies from a few milliseconds to a few seconds according to the operation that must be done.

2) The module responds with the character **nak** (Hex 15). This case occurs when there are communication errors or if the command is not valid. At this point the host must transmit again the command and, if the error repeats, eventually signal the out of order status of the module.

3) The module does not respond within 300 msec. This case occurs if the module is not connected, if it is off or broken. The host can send again the command or send a status request , and eventually signal the out of order service of the module if the error repeats.

11 ANSWERS

The answer is the message sent by the module in order to communicate to the host that command received has been executed, or that a asynchronous event, independent from execution of the command has occurred (for example a reset hardware reset).

The format of the answer is the following:

stx *cc rr data* **etx**

Where: **stx**   Beginning of the message (character Hex 02)

   cc   Command code executed composed by two ascii characters. If the answer is generated by a asynchronous event, the command code takes "00" value. For example after hardware reset the module send this message: "**stx** 00 51 *all* **etx**".

   rr   Response code to executed command, the code consists of two ascii characters.

   data   Data associated to the command with variable length according to kind of answer. The answer can also not have data.

   etx   End of the message (character Hex 03)

In the format indicated the spaces between each field have been inserted in order to have a more clearer message. For example the answer to the 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 the host, it sends the character **ack** (Hex 06), executes the command, and at the end sends the answer. At this point following events can occur:

1) The Host receives the answer with communication errors, or the answer is not valid. In this case it can send the character **nak** (Hex 15) that requires the repetition of the answer from the module, and if needed signal the out of service status of the module if error repeats.

2) The host receives the answer without errors. In this case it analyses the answer and can send another command to the module.

3) The host does not receive the answer within 20 seconds. In this case it can send the character **nak** (Hex 15) to ask the repetition of the answer from the module, or send a status request, and if the error repeats it can send a out of service signal.

12 LIST OF COMMANDS AND ANSWERS

Following paragraphs describe in detail each command. In the form that follows commands, answers and relevant description are listed.

Command	Answer	Description
stx 01 etx	**stx** 01 51 al **etx**	Reset software
stx 02 etx	**stx** 02 52 ve **etx**	Version request
stx 03 etx	**stx** 03 53 al op ar ms tk **etx**	Status request
stx 04 t etx	**stx** 04 54 status **etx**	Enable automatic reading
	stx 00 56 le al [data]**etx**	Execute automatic reading
stx 05 etx	**stx** 05 55 status **etx**	Disable automatic reading
stx 06 t ej **etx**	**stx** 06 56 le al [data]**etx**	Reading
stx 07 com **etx**	**stx** 07 57 err ris **etx**	Send commands to contactless controller
stx 08 etx	**stx** 08 58 i1 i2 i3 i4 o1 o2 o3 o4 **etx**	Input and output status request
stx 09 o1 o2 o3 **etx**	**stx** 09 59 i1 i2 i3 i4 o1 o2 o3 o4 **etx**	Output activation command
stx 10 aaa etx	**stx** 1060 aaa **etx**	Barcode or contactless card reading position setting
stx 11 etx	stx 1161 x etx	Barcode or contactless card position memorization.
stx 12 etx	stx 1262 x etx	Restore default parameter
stx 13 aaa etx	**stx** 1363 aaa **etx**	Ticket length setting
stx 14 etx	stx 1464 x etx	Ticket length memorization.
stx 15 aaa etx	**stx** 1565 aaaaa **etx**	Laser beam, position setting
stx 16 etx	stx 1666 x etx	Laser beam position memorization.
stx 17 aaa etx	**stx** 1767 aaa **etx**	Barcode height setting
stx 18 etx	stx 1868 x etx	Barcode height memorization.

12.1 RESET COMMAND

This command determines a CPU software reset. During this phase the module is initialized; titles present in the module are eject from issuing opening.

Command: **stx** *01* **etx**

Answer: **stx** *01 51 al* **etx**

Where :   *al*   Character that indicates the alarm code
        "0"   No error
        "7"   Title jammed

When module is reset pressing the SW1 button or when it is switched on it sends the following message:
    stx *00 51 al* **etx**

12.2 FIRMWARE VERSION REQUEST COMMAND

The host can require the FW version installed on the module by sending the following command:

Command: **stx** *02* **etx**

Answer: **stx** *02 52 ve* **etx**

Where: *ve*   alphanumerical string of variable length that contains the firmware version.

12.3 STATUS REQUEST COMMAND

The host can use this command to ask the current status of the module. It can send this message at any time, also during the execution of a previous command.

Command: **stx** *03* **etx**

Answer: **stx** *03 53 al op ar ms tk (ris)* **etx**

Where: *al*   A character that indicates the alarm code

        "0"   No error
        "1"   Command in execution
        "2"   Command not executed for title not present in the module
        "3"   Command not executed for title already present in the module
        "4"   Command not executed for reading already enabled
        "7"   Title jammed

op A character that indicates operation in execution

"0"   No operation
"1"   Reset in execution
"2"   Reading/verifying in execution
"3"   Issuing in execution

ar A character that indicates automatic reading status

"0"   Automatic reading disabled
"1"   Automatic reading enabled

ms A character that indicates front opening status

"0"   Front opening free and shutter open
"1"   Title in front opening

tk A character that indicates the status of the title in the module

"0"   Title not present in the module
"1"   Title present in the module

ris A character that indicates the status of the title in the module (only in firmware version with card dispenser installed)

"0"   Card not present
"1"   Card present not running out

12.4 ENABLE AUTOMATIC READING COMMAND

When automatic reading is enabled, the module reads the title as the title is inserted in the front opening.

Command: **stx** *04 t* **etx**

Where: *t*   A character that advised if a contactless title or a barcode must be read

"C"   Read barcode
"M"   Read contactless title
"0"   Do not read

Answer: **stx** *04 54 status* **etx**

Where: *status* Check read status command parameters

The module reads the title as it is inserted in the front opening and, at the end of reading, disables automatic reading and sends the following message:

stx *00 56 e al [data]* **etx**

Where: *e*   A character that indicates the result of reading made.

"0"   Reading not executed
"C"   Barcode reading
"M"   Place title under contactless reader

al   A character that indicates possible alarms.

"0"   No error
"1"   Command in execution
"2"   Command not executed for title not present in the module
"3"   Command not executed for title already present in the module
"4"   Command not executed for reading already enabled
"7"   Title jammed

data   Data read from barcode. Data will be visualised only if reading has a positive result; if a contactless card reader is connected this parameter is not present

12.5 DISABLE AUTOMATIC READING COMMAND

When reading is disabled, the module does not accept the introduction of the title in the front opening. If title is already inserted, the module ejects the title before sending the answer. Please note that if the host sends the command right after the introduction of the tile, before reading is done, the module will send the reading message before ejecting the title.

Command: **stx** *05* **etx**

Answer: **stx** *05 55 status* **etx**

Where: *status* Check status reading command parameters

12.6 TITLE READING COMMAND

When the module receives this command, it sends relevant data to the last reading executed.

Command: **stx** *06 t ej* **etx**

Where: *t*   A character that indicates kind of title to read: barcode or contactless

"0"   Do not execute reading
"C"   Read the barcode
"M"   Position the card under the contactless reader

        ej   A character that indicates destination of the title

        "0"   Stays in the module
        "E"   Issuing from front opening
        "e"   Partial issuing, the ticket remain under the roller
        "B"   Swallowing of the title
        "F"   Feed the card from the card dispenser (only in firmware version with the card dispenser installed)

Answer: **stx** 06 56 e al [data] **etx**

Where: *e*   A character that indicates reading result

        "0"   Reading not executed
        "C"   Barcode reading
        "M"   Position title under contactless card reader

        al   A character that indicates possible alarms
        "0"   No error
        "1"   Command in execution
        "2"   Command not executed for title not present in the module
        "3"   Command not executed for title already present in the module
        "7"   Title jammed

        data Data read from barcode. Data will be visualized only if reading gives a positive result; when a contactless card reader is connected this parameter is not present.

12.7 SEND COMMANDS TO CONTACLESS CONTROLLER COMMAND

When the module receives this message it sends the command specified to the R/W controller of the I/C Card.   The Answer of the controller is send to the host via answer message.

Command: **stx** 07 com **etx**

Where: *com*   Command to be sent to the controller without final crc

Answer: **stx** 07 57 err [ris] **etx**

Where: *err*   A character that indicates error code

        "0"   The controller has received the command correctly
        "1"   The controller has received a command that has not been executed yet
        "2"   Command not executed for title not present in the module
        "3"   The controller does not respond or is not installed
        "4"   The data sent from the controller contain of the errors
        "5"   The command sent is too long and is ignored

| | *ris* | Answer sent from the controller without final crc. This parameter is present only if the error code is "0". |

12.8 INPUT / OUTPUT STATUS REQUEST COMMAND

This command is used to read input and output status

Command: **stx** *08* **etx**

Answer: **stx** 08 58 i1 i2 i3 i4 o1 o2 o3 o4 **etx**

Where:
	i1	A character that indicates input 1 status
	"0"	Input status not active
	"1"	Input status active
	i2	A character that indicated input 2 status
	"0"	Input status not active
	"1"	Input status active
	i3	A character that indicates the input 3 status
	"0"	Input status not active
	"1"	Input status active
	i4	A character that indicates the input 4 status
	"0"	Input status not active
	"1"	Input status active
	o1	A character that indicates output 1 status
	"0"	Output status not active
	"1"	Output status active
	o2	A character that indicates output 2 status
	"0"	Output status not active
	"1"	Output status active
	o3	A character that indicates output 3 status
	"0"	Output status not active
	"1"	Output status active
	o4	A character that indicates output 4 status
	"0"	Output status not active
	"1"	Output status active

12.9 OUTPUT ACTIVATION COMMAND

This command is used to activate or deactivate the output.

Command: **stx** 09 o1 o2 o3 o4 **etx**

Where: o1   A character to modify output 1 status
"0"   Deactivate output 1
"1"   Activate output 1
o2   A character to modify output 2 status
"0"   Deactivate output 2
"1"   Activate output 2
o3   A character to modify output 3 status
"0"   Deactivate output 3
"1"   Activate output 3
o4   A character to modify output 4 status
"0"   Deactivate output 4
"1"   Activate output 4

Answer: **stx** 09 59 i1 i2 i3 i4 o1 o2 o3 o4 **etx**

Where: i1   A character that indicates input 1 status
"0"   Input status not active
"1"   Input status active
i2   A character that indicated input 2 status
"0"   Input status not active
"1"   Input status active
i3   A character that indicates the input 3 status
"0"   Input status not active
"1"   Input status active
i4   A character that indicates the input 4 status
"0"   Input status not active
"1"   Input status active

o1   A character that indicates output 1 status
"0"   Output status not active
"1"   Output status active
o2   A character that indicates output 2 status
"0"   Output status not active
"1"   Output status active
o3   A character that indicates output 3 status
"0"   Output status not active
"1"   Output status active
o4   A character that indicates output 4 status
"0"   Output status not active
"1"   Output status active

12.10 TITLE READING POSITION SETTING COMMAND

This command allows setup the barcode or contactless reading position. The reading position is relative to the lower border of the title.

Command: **stx** 10 aaa **etx**

Where: *aaa*   3 characters that indicate reading position in tenths of millimetres

Answer: **stx** *10 60* aaa **etx**

Where: *aaa*   3 Characters that indicate reading position in tenths of millimetres

12.11 TITLE READING POSITION STORE COMMAND

This command allows to store permanently on the EEPROM the position set with the command 10

Command: **stx** *11* **etx**

Answer: **stx** *11 61 x* **etx**

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

12.12 DEFAULT PARAMETERS RESTORE COMMAND

This command restore the default values of the BCR parameters

Command: **stx** *12* **etx**

Answer: **stx** *12 62 x* s**tx**

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

12.13 TITLE LENGHT SETTING COMMAND

This command allows set up the title length, Values are show in tenths of millimetres, the module could manage title with length between 845 dmm and 999 dmm. If the value is not valid the command will answer with the actual value.

Command: **stx** 13 aaa **etx**

Where: *aaa*   3 characters that indicate title length in tenths of millimetres

Answer: **stx** 13 63 aaa **etx**

Where: *aaa*   3 characters that indicate title length in tenths of millimetres

12.14 TITLE LENGHT STORE COMMAND

This command allows to store permanently on the EEPROM the title length set with the command 13

Command: **stx** *14* **etx**

Answer: **stx** *14 64 x* **etx**

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

12.15 LASER BEAM POSITION SETTING COMMAND

This command allows to set up the laser beam position The value are show in tenths of millimetres between 0 dmm and 2000 dmm, it indicates the distance between the optical sensor under the motor and the laser beam. If the value is not valid the command will answer with the actual value.

Command: **stx** 15 aaaaa **etx**

Where: *aaaaa* 5 characters that indicate the distance in tenths of millimetres

Answer: **stx** 15 65 aaaaa **etx**

Where: *aaaaa* 5 characters that indicate the distance in tenths of millimetres

12.16 LASER BEAM POSITION STORE COMMAND

This command allows to store permanently on the EEPROM the laser beam position set with the command 15

Command: **stx** *16* **etx**

Answer: **stx** *16 66 x* **etx**

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

12.17 BARCODE HEIGHT SETTING COMMAND

This command allows to set up the height of the barcode, The value are show in tenths of millimetres the between 40 dmm and 999 dmm. If the value is not valid the command will answer with the actual value.

Command: **stx** *17 aaa* **etx**

Where: *aaa*   3 characters that indicate height of the barcode in tenths of millimetres

Answer: **stx** *17 67 aaa* **etx**

Where: *aaa*   3 characters that indicate height of the barcode in tenths of millimetres

12.18 BARCODE HEIGHT STORE COMMAND

This command allows to store permanently on the EEPROM the barcode height set with the command 17

Command: **stx** *18* **etx**

Answer: **stx** *18 68 x* **etx**

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