Programming manual

Electronic EL7

Rev.3

italora

1 Revisions table

Version No.	Date	Revision description
0	04/03/2022	Overall update
1	28/03/2023	Documented ?G4& command, corrected errors
2	23/06/2023	Models list updated
3	13/11/2023	Updated "Control unit without expansion - internal power supply and ground" paragraph

2 Summary

3   Printer models

This manual refers to printers equipped with a 32-bit electronic board called Electronic 7 (EL7) and includes the following models:

Paper width	Desktop	OEM - line
60 mm	WITTY 2000 WITTY 2000_280 WITTY 2001 CS WITTY 3001 CS TX 53-12 CS	AH 53-8 BH 53-8 EH 53-8 CS AH 53-12 BH 53-12 SHQ 2"-12 CS MH 2"-8 CS MH 2"-12 CS
90 mm		BH 80-8 BH 80-12 CS EH 80 CS SHQ 3"-12 CS MH 3"-8 CS MH 3"-12 CS
110 mm	SMART 2000 SMART 2000_280 SMART 2000 CS SMART 2001 CS SMART 3001 CS	AH 871 CS AH 1271 CS MH 4"-8 CS MH 4"-12 CS
180 mm	SMART 2006 CS	AH 2006 CS

(*) some commands or features might be unavailable

4   Manual conventions

This manual contains the software programming commands available on **Italora** printers equipped with the EL7 electronic board.

The following printer models can have a different set of commands than the ones documented in this manual:

- 'KA', 'KP' series
- 2000_280 series (e.g. Smart 2000_280)

The commands that set parameters kept in the permanent memory (therefore kept even after the printer is turned off) are identified with the symbol ☺.

5 **Printhead resolution and print width**

Model	Resolution (Dots/mm)	Width	
		(mm)	(dots)
BH 53-8 CS	8 s. 7.52	51.1	384
BH 53-12 CS	12	54.2	640
BH 80 CS	8	80	640
BH 80-12 CS	12	80	960
AH 53-8 CS	8 s. 7.52	51.1	384
AH 53-12 CS	12	54.2	640
AH 871 CS	8 s. 7.52	102	768
AH 1271 CS	12	108.5	1280
AH 2006 CS	8	168	1344
EH 53-8 CS	8	56	448
EH 80 CS	8	80	640
WITTY 2000	8 s. 7.52	51.1	384
WITTY 2000 280	8	56	448
WITTY 3000	12	54.2	640
WITTY 3001 CS	12	54.2	640
SMART 2000	8 s. 7.52	102	768
SMART 2000 280	8	104	832
SMART 2000 CS	8 s. 7.52	102	768
SMART 2001 CS	8 s. 7.52	102	768
SMART 3001 CS	12	108.5	1280
SMART 2006 CS	8	168	1344
TX 53-12 CS	12	54.2	640
SHQ 2"-12 CS	12	54.2	640
SHQ 3"-12 CS	12	80	960
MH 2"-8 CS	8	56	384
MH 2"-12 CS	12	54.2	640
MH 3"-8 CS	8	80	640
MH 3"-12 CS	12	80	960
MH 4"-8 CS	8	102	768
MH 4"-12 CS	12	108.5	1280

6 Maximum print speed

Model	Speed (mm/sec)
BH 53-8 CS	300
BH 53-12 CS	200
BH 80 CS	300
BH 80-12 CS	200
AH 53-8 CS	300
AH 53-12 CS	200
AH 871 CS	300
AH 1271 CS	200
AH 2006 CS	200
EH 53-8 CS	300
EH 80 CS	300
WITTY 2000	170
WITTY 2000 280	170
WITTY 3000	200
WITTY 3001 CS	200
SMART 2000	170
SMART 2000 280	170
SMART 2000 CS	250
SMART 2001 CS	250
SMART 3001 CS	200
SMART 2006 CS	200
TX 53-12 CS	200
SHQ 2"-12 CS	200
SHQ 3"-12 CS	200
MH 2"-8 CS	300
MH 2"-12 CS	200
MH 3"-8 CS	300
MH 3"-12 CS	200
MH 4"-8 CS	300
MH 4"-12 CS	200

7   LEDs and LCD

The front panel of **Italora** printers can have 3 different configurations of LED and LCD.

1. **Printers without DISPLAY**
   - 1 red LED
   - 1 green/orange LED

2. **Printers equipped with DISPLAY** (see Appendix B)
   - 8 colors backlit LCD

Meaning of LEDs

'ON-LINE' STATE

In this state, the LEDs conditions are:
- Red LED: **solid red**
- Green/orange LED: **solid green**

'END OF PAPER' STATE

In this state, the LEDs conditions are:
- Red LED: **solid red**
- Green/orange LED: **blinking green-off**

'END OF RIBBON' STATE

In this state, the LEDs conditions are:
- Red LED: **solid red**
- Green/orange LED: **blinking green-orange**

'HIGH PRINTHEAD TEMPERATURE' STATE

In this state, the LEDs conditions are:
- Red LED: **solid red**
- Green/orange LED: **blinking orange-off**

'SYNTAX ERROR' STATE

In this state, the LEDs conditions are:
- Red LED: **solid red**
- Green/orange LED: **solid orange**

8   Home position definition

In this section we define the origin positions of the label printing area and the all of the printed elements (texts, barcodes, lines, rectangles, logos). Each element is positioned by means of the X,Y coordinates.

Printing area home position

The following figure shows the origin position of the print area on the label.
Considering the direction of advancement of the paper as shown in the figure, the X and Y coordinates have the positive direction highlighted by the arrows.
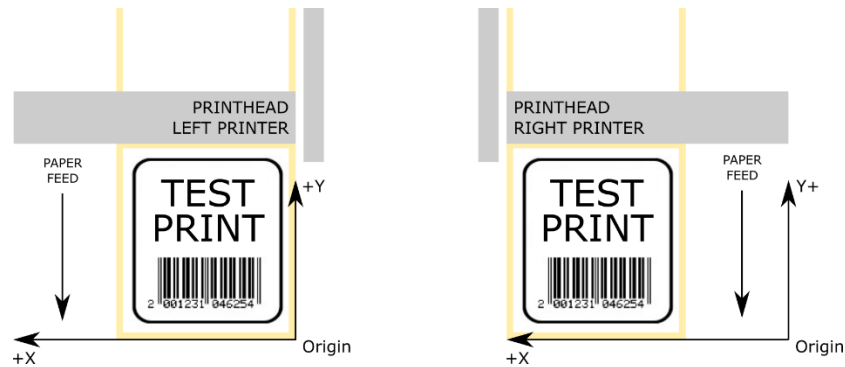
The figure below shows the position of the X coordinate of the print area on TX 53-12 CS printers equipped with dual print heads.
The increment of the Y coordinate occurs as in printers equipped with a single print head (see above).
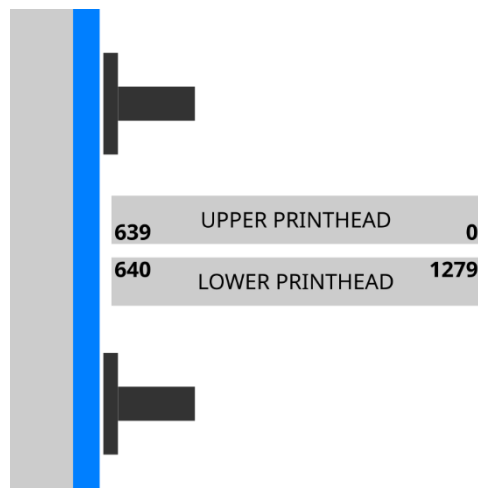
?B6& - fields home position offset

Command: ?B6&sX,sY

Description: the following command allows to set an offset value for the origin coordinates of all fields that will be placed on the label.

Parameter	Description
s = sign	**Values:** sign '+' or '-'
X = X coordinate offset, expressed in dots	**Values:** 0 to 9999
s = sign	**Values:** sign '+' or '-'
Y = Y coordinate offset, expressed in dots	**Values:** 0 to 9999

Example: 'text field FIST positioned at X = 15, Y = 25
?B6&+0,+0
?52&10,15,25,2,11;FISRT

'text field SECOND positioned at X = 15, Y = 25
?B6&+15,+25
?52&10,0,0,2,11;SECOND

'text field THIRD positioned at X = 30, Y = 50
?B6&+15,+25
?52&10,15,25,2,11;THIRD

Texts and barcodes home position

The following two figures show the origin position of texts and barcodes, according to the '0' origin of the label. The origin of the print elements is marked by a '+'.

Paper feed

Printing directions

This section explains the four possible print directions for texts and barcodes. The origin positions of the print elements are marked by a '+'.

Paper feed

| Direction 0 | Direction 1 | Direction 2 | Direction 3 |
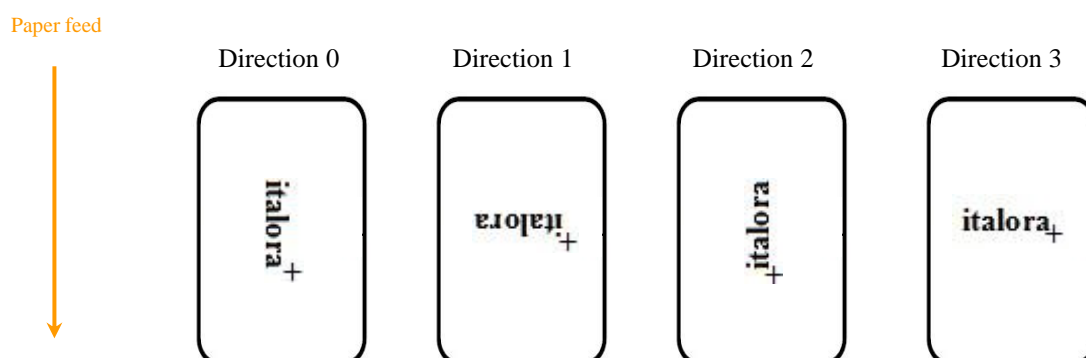
Texts alignment setup

As can be seen from the examples above, when text is written in direction 0 or direction 3, the origin is taken from the bottom of the text, that is, from the last letter that composes it. This can be inconvenient if there is the need to align (on the first letter) several texts placed on different lines.

Using the command ?81& it is possible to change the origin convention of the texts in directions 0 and 3. Activating this command will force the printer to work in left alignment mode, which provides for the following situations:

Paper feed

| Direction 0 | Direction 3 |
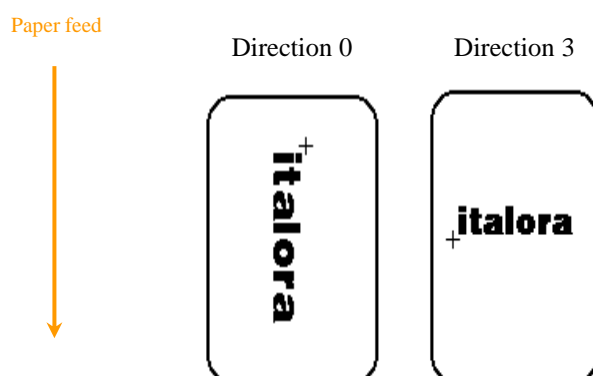
As you can see from the figures, with the left alignment the origin coordinates of the texts always refer to the first letter of the text, thus facilitating the alignments between texts placed on different lines.

NOTE: left alignment only changes the origin of the TEXTS: the origin positions of all other label elements (barcodes, lines, rectangles, graphics, etc...) will remain unchanged.

9   Operative commands

When the printer is in the online state, it's waiting to receive commands to compose elements the label. The commands, which, depending on the printer model used, can be sent via serial port, USB or Ethernet, are strings of ASCII characters with a particular syntax.

Every command begins with four specific ASCII characters and ends with the CR terminator (Carriage Return, ASCII code = 13 or 0D hexadecimal). Any other character following the terminator is ignored until another correct "command sequence" is identified.

The commands of **Italora** printers are divided into two large families:

- Commands for the **immediate composition** of a label
- Commands for **storing print elements** of label

Immediate composition commands

These commands are used to compose a label, but not to store it in the printer's persistent memory. This means that a label created with these commands is lost when the printer is turned off.

Layouts

These commands are used to compose a label and store it in the printer's persistent memory. A label composed with these commands therefore remains in memory even after the printer is turned off.

In the rest of the manual, we will refer to the labels stored in the printer using the term **LAYOUTS**. The layouts are named after the capital letters of the alphabet and can be recalled using the appropriate command.

All printer models have 26 available formats (A ... Z), with up to 100 elements each.

This manual contains the syntax and detailed explanation of all available commands.

10 Texts

List of available fonts for texts

Italora printers have a set of fonts, stored in their persistent memory, that can be used for printing texts. Each Font has a sequential index (G) used to recall it.

The following table shows all the available fonts:

Base fonts - for all models but Witty 2000_280 and Smart 2000_280			
Index	**Dimensions in dot**	**Font**	**Spacing**
G = 0	5 x 7	Standard	fixed
G = 1	5 x 5	Micro	fixed
G = 2	height 32	Arial	proportional
G = 3	8 x 13	Draft	fixed
G = 4	32 x 48	Motor	fixed
G = 5	height 45	New Century	proportional
G = 6	88 x 88	Tile	fixed
G = 7	height 19	Compact	proportional
G = 8	5 x 7 reverse	Standard	fixed
G = 9	5 x 5 reverse	Micro	fixed
G = 10	height 32 reverse	Arial	proportional
G = 11	8 x 13 reverse	Draft	fixed
G = 12	32 x 48 reverse	Motor	fixed
G = 13	height 45 reverse	New Century	proportional
G = 14	88 x 88 reverse	Tile	fixed
G = 15	height 19 reverse	Compact	proportional
G = 16	height 31	Century	proportional
G = 17	height 49	Arial Rounded	proportional
G = 18	height 63	Bookman	proportional
G = 24	height 31 reverse	Century	proportional
G = 25	height 49 reverse	Arial Rounded	proportional
G = 26	height 63 reverse	Bookman	proportional

NOTE: the "Tile" font prints only numeric digits, uppercase letters and the following characters: BLANK, '*', '/', '-'.

Base fonts – for models Witty 2000_280 and Smart 2000_280			
Index	**Dimensions in dot**	**Font**	**Spacing**
G = 0	5 x 7	Standard	fixed
G = 1	5 x 5	Micro	fixed
G = 2	16 x 24	Big	fixed
G = 3	8 x 13	Draft	fixed
G = 4	32 x 48	Motor	fixed
G = 5	height 45	New Century	proportional
G = 6	height 32	Arial	proportional
G = 7	height 19	Compact	proportional
G = 8	5 x 7 reverse	Standard	fixed
G = 9	5 x 5 reverse	Micro	fixed
G = 10	16 x 24 reverse	Big	fixed
G = 11	8 x 13 reverse	Draft	fixed
G = 12	32 x 48 reverse	Motor	fixed
G = 13	height 45 reverse	New Century	proportional
G = 14	height 32 reverse	Arial	proportional
G = 15	height 19 reverse	Compact	proportional
G = 16	height 31	Century	proportional
G = 17	height 49	Arial Rounded	proportional
G = 18	height 63	Bookman	proportional
G = 24	height 31 reverse	Century	proportional
G = 25	height 49 reverse	Arial Rounded	proportional
G = 26	height 63 reverse	Bookman	proportional

In addition to the 11 basic fonts, compatible with old production printers, 12 additional fonts are also available and preloaded, all with proportional matrix:

Additional fonts		
Index	Height in dot of the letter 'A'	Font
G = 32	8	Alka 3,5
G = 33	12	Alka 5
G = 34	24	Alka 8
G = 35	8	Rex 3,5
G = 36	14	Rex 5
G = 37	24	Rex 8
G = 38	36	"Arial" 12 like
G = 39	48	"Uni Narrow" 16 like
G = 40	64	"Arial Narrow" 20G like
G = 41	80	"Switz Narrow" 24 like
G = 42	112	"Switz Narrow" 32 like
G = 43	168	"Switz Narrow" 48 like

As an alternative to the 12 additional pre-loaded fonts, other types of fonts can also be uploaded and used in conjunction with those listed in the previous table. These fonts are:

Height in dot of the letter 'A'	Font
8	"Courier New" like
12	"Courier New" like
20	"Courier New" like
24	"Times New Roman" like
32	ITL Tah - "Tahoma" like
32	ITL Tah - "Tahoma" like
64	ITL Tah - "Tahoma" like
72	ITL Imp - "Impact" like
128	ITL Imp - "Impact" like

The index G of the additional fonts start from G = 32 and, with a periodicity equal to 112, allows to obtain negative texts

Example: G = 145 = 33 +112, generates a negative text with font ALKA 3

It's possible to use the ETIK software in the Full version (with license) to create new sets of fonts.

If new types or sizes of fonts are needed, please send a request to **Italora**.

Printing examples of the base fonts

Standard	0123456789ABCDEFGHILMNOPQRSTUVZ
Micro	0123456789ABCDEFGHILMNOPQRSTUVZ
Big	0123456789ABCDEFGHILMNOPQRSTUVZ
Draft	1234567890ABCDEFGHILMNOPQRSTUVZ
Motor	0123456789 ABCDEFGHILMNOPQRSTUVZ
New Century	0123456789 ABCDEFGHILMNOPQRSTUVZ
Arial	0123456789 ABCDEFGHILMNOPQRSTUVZ
Title	0 1 2 3 4 5 6 7 ABCDEFG
Compact	0123456789ABCDEFGHILMNOPQRSTUVZ
Century	0123456789ABCDEFGHILMNOPQRSTUVZ
Arial Rounded	0123456789ABCDEFGHILMNOPQRSTUVZ
Bookman	1234567890ABCDEFGHILMNOPQRSTUVZ

WARNING: in some examples, the proportions between the different fonts are not correct

Magnification for fixed and proportional fonts

As can be seen from the tables above, all fonts have a specific base size. However, the texts can be magnified up to 8 times their original sizes, choosing between base, height or both dimensions.

NOTE: the expansion of the characters inevitably causes loss of definition; a very expanded character will be printed as "jagged", i.e. its normally curved parts will be transformed into small steps.
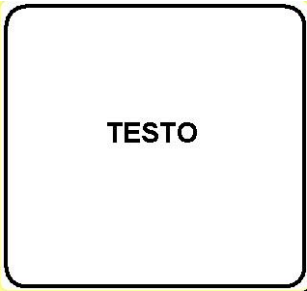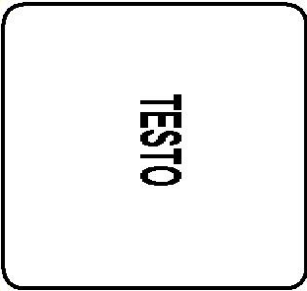
?52& - immediate composition of texts

Command: ?52&D0,X,Y,G,OV;data

Description: with this command it is possible to compose a text on the label. The text will be available for printing until the graphics buffer is cleared.

Parameter	Description
D = text printing direction	**Values:** from 0 to 3 refer to the 'Printing directions' paragraph
0 = (zero) specific for texts	**Values:** 0 = immediate composition of TEXT
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
data = characters that make up the text to be printed	**Values:** characters that make up the text to be printed

Example:

Immediate composition of texts	
?52&10,570,121,2,11;TESTO D = 1 (direcrtion) 0 = text composition X = 570 dot (X coordinate) Y = 121 dot (Y coordinate) G = 2 (font index) OV = 11 (horizontal and vertical expansion) TESTO (text to be printed)	TESTO
?52&20,592,98,2,12;TESTO D = 2 (direcrtion) 0 = text composition X = 592 dot (X coordinate) Y = 98 dot (Y coordinate) G = 2 (font index) OV = 12 (horizontal and vertical expansion) TESTO (text to be printed)	TESTO

?V2& - immediate composition of texts with vectorial fonts

Command: ?V2&X,Y,D,I,O,V,C,F;DATA

Description: with this command it is possible to compose a text with vectorial fonts on the label. The text will be available for printing until the graphics buffer is cleared.

Only available on printers with TrueType fonts.

Parameter	Description
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
I = tilt (Italic), expressed in degrees	**Values:** 0 to 45
O = base dimension (horizontal), expressed in dots	**Values:** 4 to 85
V = vertical dimension (height), expressed in dots	**Values:** 4 to 85
C = code page	**Values:** 0 = 1250 Central Europe 1 = 1251 Cyrillic 2 = 1252 Western 3 = 1253 Greek 4 = 1254 Turkish 7 = 1257 Baltic 9 = Unicode
F = vectorial font index	**Values:** 0 to 7
DATA = characters that make up the text to be printed	

Storing texts in persistent memory

The following commands allow to store texts in the printer's persistent memory and compose them on the label for printing.

We must distinguish between two types of texts to be printed:

- Fixed texts
- Variable texts

Fixed texts programming

Fixed texts are all those texts that never change within a layout; the fixed text is associated with a layout and is composed automatically every time the layout is activated. **Italora** printers have a database that can contain up to 50 fixed texts, with a maximum length of 50 characters each.

NOTE: The database for fixed texts and fixed barcodes (command ?78& ...) is the same: therefore, be careful not to assign the same index to two different data to be stored.

The commands for programming fixed texts are the following:

- **?72&...**
- **?73&...**
- **?74&...**

Let's see them in detail.

?72& - fixed texts - storing and composition

Command: ?72&N,I,D,X,Y,G,OV,F;dati

Description: this command allows to store the text in the printer, making it persistent, and to compose it on the label for printing.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
F = index to be assigned to the fixed text	**Values:** 0 to 49
data = characters that make up the text to be printed	**Values:** characters (max 50) that make up the text to be printed

Example: 'delete layout B
?04&B
…
'fixed texts programming
?72&B,6,3,100,50,5,11,0;This is the first fixed #0
?72&B,7,3,100,150,5,11,1;This is the fixed text #1
…
'enable layout B
?05&B

With this example, the two texts are stored in the database at indexes 0 and 1 respectively; in addition, the two texts are associated with format B, with an incremental field index assigned automatically, starting from zero, and composed on the label with the specified printing parameters.

?73& - fixed texts - storing in database

Command: ?73&F;data

Description: this command allows to store a fixed text in the printer's persistent database, without composing it in the print buffer.

Parameter	Description
F = index to be assigned to the fixed text	**Values:** 0 to 49
data = characters that make up the text to be printed	**Values:** characters (max 50) that make up the text to be printed

Example: ?73&2;Fixed text with index 2 in database
?73&3;Fixed text with index 3 in database

This example stores the two texts in the database at indexes 2 and 3 respectively.

?74& - fixed texts - printing parameters

Command: ?74&N,I,D,X,Y,G,OV,F

Description: this command allows to choose a fixed text from those already present in the database and compose it on the label, specifying all the printing parameters.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
F = index to be read from the database	**Values:** 0 to 49

Example: 'delete layout F
?04&F

…

?74&F,6,3,100,50,5,11,4

…

'enable layout F
?04&F

This example associates to format F a fixed text with automatically assigned incremental field index, starting from zero, and places it on the label at coordinates X = 100, Y = 50, using font 5 at its original size

?90& - formatted text composition

Command: ?90&D,X,Y,G1,G2,G3;data

Description: this command allows to compose a fixed text string that contains up to 3 different fonts. The characters delimited by '*' will be composed with the font G2, those delimited by '+' with the font G3 and the rest with the font G1.

To print a '+' or '*' character without changing the font, prepend " to the character itself. To print the character " enter it twice.

Parameter	Description
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G1 = first font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
G2 = second font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
G3 = third font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
data = characters that make up the text to be printed	**Values:** characters (150 max) that make up the text to be printed

Example: ?90&3,100,75,5,1,4;apple*pear*+banana+

Direction=3, X=100, Y=75, font1=5, font2=1, font3=4
'apple' printed with font1=5
'pear' printed with font2=1
'banana' printed with font3=4

?91& - formatted text storing

Command: ?91&N,I,D,X,Y,G1,G2,G3;data

Description: this command allows to enter the formatted fixed text programming, so that it is automatically composed when the layout itself is activated

It's possible to compose a fixed text string that contains up to 3 different fonts. The characters delimited by '*' will be composed with the font G2, those delimited by '+' with the font G3 and the rest with the font G1.

To print a '+' or '*' character without changing the font, prepend " to the character itself. To print the character " enter it twice.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G1 = first font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
G2 = second font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
G3 = third font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
data = characters that make up the text to be printed	**Values:** characters (150 max) that make up the text to be printed

Example: 'delete layout A
?04&A
…
?91&A,9,3,100,75,5,1,4;apple*pear*+banana+
...
'enable layout A
?05&A

Layout = A, Field index = (assigned automatically, starting from zero, incrementally),
    Direction=3, X=100, Y=75, font1=5, font2=1, font3=4
'apple' printed with font1=5
'pear' printed with font2=1
'banana' printed with font3=4

Variable texts programming

Variable texts are texts that can change during printing.

As an example, let's think of a weight whose data arrives, via serial port, from a scale.

In constructing the layout, we must therefore only foresee the printing characteristics of the text (coordinates, fonts, etc...), but not the actual data, which will be specified during printing by an external device.

The commands for programming variable texts are the following:

- **?53&…**
- **?V3&…**
- **?25&…**
- **?26&…**
- **?27&…**
- **?A5&…**
- **?C5&…**
- **?73&…**

Let's see them in detail.

Variable texts programming

?53& - variable texts

Command: ?53&N,I,D0,X,Y,G,OV

Description: with this command it is possible to set the printing characteristics of the text (coordinates, font, etc...), but not the actual data, which will be specified in the printing phase from an external device.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 99
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
0 = (zero) specific for texts	**Values:** 0 = immediate composition of TEXT
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9

Example: ?53&A,0,30,100,50,5,11

This example programs the field of index 0 of the A layout as a variable field; the coordinates X = 100, Y = 50, the printing direction of the text = 3, the font to be used = 5 at its real size are also specified.

?V3& - variable texts with vectorial fonts

Command: ?V3&N,M,X,Y,D,I,O,V,C,F

Description: with this command it is possible to set the printing characteristics of the text (coordinates, font, etc...) with vectorial fonts, but not the actual data, which will be specified in the printing phase from an external device.

Only available on printers with TrueType fonts.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
M = field index within the layout	**Values:** 0 to 99
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
I = tilt (Italic), expressed in degrees	**Values:** 0 to 45
O = base dimension (horizontal), expressed in dots	**Values:** 4 to 85
V = vertical dimension (height), expressed in dots	**Values:** 4 to 85
C = code page	**Values:** 0 = 1250 Central Europe 1 = 1251 Cyrillic 2 = 1252 Western 3 = 1253 Greek 4 = 1254 Turkish 7 = 1257 Baltic 9 = Unicode
F = vectorial font index	**Values:** 0 to 7

?25& - sending variable data

Command: ?25&data

Description: with this command it is possible to send the variable data to the printer, after having programmed the variable fields of the chosen layout.

Parameter	Description
data = characters that make up the text to be printed	**Values:** characters that make up the text to be printed

Warning: Numerous variable fields can be inserted into a layout; these must be filled in with data at the time of printing, using the command ?25&...
The order in which the variable fields are filled upon arrival of the data reflects the order in which the variable fields themselves have been programmed in the layout.
When the last variable field of the label is filled with data sent with the command ?25&... the newly composed label will be automatically printed, without the need for specific commands for printing.

Example: refer to 'An example of layout programming' paragraph

?26& - sending variable data without header (start)

Command: ?26&

Description: with this command it is possible to send variable data to the printer without having to prepend the command header "?25&".
This simplifies the direct use of software packages such as databases.

After receiving the ?26& command, the printer interprets all input characters as variable data; the strings of variable data sent in this way must be terminated by the control character <Carriage Return> (which has an ASCII 13 decimal code).

The only command that the printer is able to recognize during this type of operation is the command that restores traditional operation, that is "?27&".

?27& - sending variable data without header (end)

Command: ?27&

Description: with this command the standard way of managing the variable fields is restored, therefore the variable data must be prepended with "?25&".

Warning: the information of the commands ?26& and ?27& is kept in memory even after the printer is turned off.

Example: ?26&
I'm writing in field #1
I'm writing in field #2
I'm writing in field #3
?27&

?A5& - indexed variable data

Command: ?A5&I,data

Description: with the following command variable field data can be sent to the printer, also specifying the index within the active layout.

This allows to send fields to the printer without following the programming order.

The index of the variable fields is given by the order in which they appear within the layout programming (command ?53&...).

The first variable field programmed in the layout always has index 0.

Parameter	Description
I = variable field index	**Values:** 0 to 99
data = data to be inserted in the variable field	

Example: suppose that the A layout is programmed with 3 variable fields

'enable layout A
?05&A
?25&First field #1
?25&Second field #1
?25&Third field #1
'the first label gets printed
?A5&2,Third field #2
?14&1
'the second label gets printed

?C5& - indexed variable data - variable fonts

Command: ?C5&I,F,data

Description: with the following command variable field data can be sent to the printer, also specifying the index within the active layout and the font to be used.
This allows to send fields to the printer without following the programming order.
The index of the variable fields is given by the order in which they appear within the layout programming (command ?53&...).
The first variable field programmed in the layout always has index 0.

Parameter	Description
I = variable field index	**Values:** 0 to 99
F = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
data = data to be inserted in the variable field	

Example: suppose that the A layout is programmed with 3 variable fields

'enable layout A
?05&A
?25&First field #1
?25&Second field #1
?25&Third field #1
'the first label gets printed
?C5&2,3,Third field #2
?14&1
'the second label gets printed

?73& - reading variable data from database

Command: ?73&F

Description: the following command, after programming the fixed text database and the variable fields in the chosen layout, allows you to read data from the fixed text database and use it as variable data.

Parameter	Description
F = fixed text index to use as a variable field	**Values:** 0 to 49

Example: refer to 'An example of layout programming' paragraph

?19& - composition of texts with counters

Command: ?19&N,0,X,Y,D,G,1,OV

Description: with this command it is possible to compose texts with counters.

Parameter	Description
N = counter number	**Values:** 0 to 5
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9

Example: ?19&2,0,250,100,3,5,1,15

With this command the following parameters are programmed:
- counter #2
- text
- text origin X = 250 dots
- text origin Y = 100 dots
- directiom 3
- font 5 = New Century
- horizontal text expansion 1
- vertical text expansion 5

11 Barcodes

List of available barcodes

Italora printers are able to compose and print numerous types of barcodes; it is also possible to print human readable digits under the barcode.

Each barcode has a sequential index (C) used to recall it.

The table below lists all the available barcode types.

Barcodes	
Index	**Type**
C = 0	2/5
C = 1	2/5 interleaved
C = 2	EAN 13 without automatic calculation of the check digit
C = 3	EAN 13 with automatic calculation of the check digit
C = 4	EAN 8 without automatic calculation of the check digit
C = 5	EAN 8 with automatic calculation of the check digit
C = 6	3/9 without automatic calculation of the check digit
C = 7	CODABAR 2/7 MONARCH AA
C = 8	CODABAR 2/7 MONARCH BB
C = 9	CODABAR 2/7 MONARCH CC
C = 10	CODABAR 2/7 MONARCH DD
C = 11	3/9 with automatic calculation of the check digit
C = 12	UPC-B without automatic calculation of the check digit
C = 13	UPC-A with automatic calculation of the check digit
C = 14	128
C = 15	EAN128
C = 16	2/8 interleaved with automatic calculation of the check digit
C = 17	UPC-E 6 characters data input
C = 18	CODABAR 2/7 MONARCH AB
C = 19	CODABAR 2/7 MONARCH AC
C = 20	CODABAR 2/7 MONARCH AD
C = 21	CODABAR 2/7 MONARCH BA
C = 22	CODABAR 2/7 MONARCH BC
C = 23	CODABAR 2/7 MONARCH BD
C = 24	CODABAR 2/7 MONARCH CA
C = 25	CODABAR 2/7 MONARCH CB
C = 26	CODABAR 2/7 MONARCH CD
C = 27	CODABAR 2/7 MONARCH DA
C = 28	CODABAR 2/7 MONARCH DB
C = 29	CODABAR 2/7 MONARCH DC
C = 30	3/9 - sincr. $ without automatic calculation of the check digit

C = 31	3/9 - sincr. $ with automatic calculation of the check digit
C = 32	EAN13 + ADDON 5
C = 33	EAN13 + ADDON 2
C = 34	CODICE 32 Italian Pharmaceutical
C = 35	PZN CODE
C = 36	CODABAR 2/7 MONARCH AA check MOD 11
C = 37	CODABAR 2/7 MONARCH BB check MOD 11
C = 38	CODABAR 2/7 MONARCH CC check MOD 11
C = 39	CODABAR 2/7 MONARCH DD check MOD 11
C = 40	RESERVED - do not use
C = 41	CODE 93

?52& - immediate composition of barcodes

Command: ?52&D1,X,Y,C,H;data

Description: with this command it is possible to compose a barcode on the label.
The barcode will be available for printing until the graphics buffer is cleared.

Parameter	Description
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
1 = (one) specific for barcodes	**Values:** 1 = immediate composition of BARCODES
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
data = characters that make up the barcode to be printed	**Values:** characters that make up the barcode to be printed

Example:

Immediate composition of barcodes	
?52&11,497,98,15,90;1234567890123 D = 1 (direction) 1 = barcode composition X = 497 dot (X coordinate) Y = 98 dot (Y coordinate) C = 15 (barcode index - EAN128) H = 90 (barcode height) 1234567890123 (data to be printed)	
?52&01,577,52,34,95;12545678 D = 0 (direction) 1 = barcode composition X = 577 dot (X coordinate) Y = 52 dot (Y coordinate) C = 34 (barcode index - CODICE 32) H = 12 (barcode height) 12345678 (data to be printed)	

Storing barcodes in persistent memory

The following commands allow to store barcodes in the printer's persistent memory and compose them on the label for printing.

We must distinguish between two types of barcodes to be printed:

- Fixed barcodes
- Variable barcodes

?78& - fixed barcodes in persistent memory

Command: ?78&N,I,D,X,Y,C,H,F;data

Description: this command allows to store a fixed barcode in the printer making it persistent and to compose it on the label for printing.

Fixed barcodes are all those that never change within a layout; the fixed barcode is associated with a layout and is automatically composed every time the layout is activated.

Italora printers have a database that can contain up to 50 fixed barcodes, with a maximum length of 50 characters each.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99
D = barcode direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
F = index to assign to the fixed barcode	**Values:** 0 to 49
data = characters that make up the barcode to be printed	**Values:** characters (50 max) that make up the barcode to be printed

Warning: the database for fixed barcodes and fixed texts is the same: therefore be careful not to assign the same index to two different data to be stored.

Example: 'delete layout F
?04&F
…
?78&F,3,1,83,91,15,90,0;test123
…
'enable layout F
?05&F

?53& - variable barcodes composition

Command: ?53&N,I,D1,X,Y,C,H

Description: Variable barcodes are fields that can change during printing.
As an example, let's think of a weight whose data arrives via serial from a scale.
Therefore, in constructing the format, only the printing characteristics of the barcode (coordinates, type, etc ...) have to be set but not the actual data, which will be specified during printing by an external device.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 99
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
1 = (one) specific for barcodes	**Values:** 1 = immediate composition of BARCODES
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size

Example: 'delete layout C
?04&C
…
?53&C,3,31,100,50,5,200
…
'enable layout C
?05&C

This example programs the field of index 3 of the C layout as a variable barcode; the coordinates X = 100, Y = 50, the printing direction 3, the type 5 (EAN8 with automatic check digit) of the barcode and the height of 200 dots are also specified.

?25& - sending variable data

Command: ?25&data

Description: with this command it is possible to send the variable data to the printer, after having programmed the variable fields of the chosen layout.

Parameter	Description
data = characters that make up the barcode to be printed	**Values:** characters that make up the barcode to be printed

Warning: Numerous variable fields can be inserted into a layout; these must be filled in with data at the time of printing, using the command ?25&...
The order in which the variable fields are filled upon arrival of the data reflects the order in which the variable fields themselves have been programmed in the layout.
When the last variable field of the label is filled with data sent with the command ?25&... the newly composed label will be automatically printed, without the need for specific commands for printing.

Example: refer to 'An example of layout programming' paragraph

?A5& - indexed variable data

Command: ?A5&I,data

Description: with the following command variable field data can be sent to the printer, also specifying the index within the active layout.
This allows to send fields to the printer without following the programming order.
The index of the variable fields is given by the order in which they appear within the layout programming (command ?53&...).
The first variable field programmed in the layout always has index 0.

Parameter	Description
I = variable field index	**Values:** 0 to 99
data = data to be inserted in the variable field	

Example: suppose that the A layout is programmed with 3 variable fields

'enable layout A
?05&A
?25&First field #1
?25&Second field #1
?25&Third field #1
'the first label gets printed
?A5&2,Third field #2
?14&1
'the second label gets printed

?09& - wide parameter

Command: ?09&W

Description: barcodes **3/9, 2/5, 2/5I, 2/7** use the Wide and Narrow values in the coding of the bars that compose them. The value of Wide corresponds to the number of dots that make up the wide bar. Once programmed, the value remains valid until it is changed by a subsequent command or until the printer is turned off. At power-up, the Wide parameter is set to 2.

Parameter	Description
W = number of dots that make up the wide bar	**Values:** 1 to 16 **Default:** 2

Example:

Wide parameter	
?09&2	
?09&4	
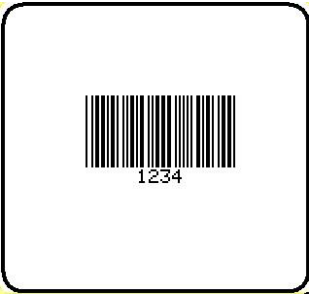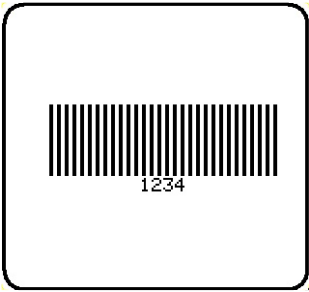
?10& - narrow parameter

Command: ?10&N

Description: barcodes **3/9, 2/5, 2/5I, 2/7** use the Wide and Narrow values in the coding of the bars that compose them. The value of Narrow corresponds to the number of dots that make up the narrow bar. Once programmed, the value remains valid until it is changed by a subsequent command or until the printer is turned off. At power-up, the Narrow parameter is set to 1.

Parameter	Description
N = number of dots that make up the narrow bar	**Values:** 1 to 16 **Default:** 1

Example:

Narrow parameter	
?10&1	
?10&2	

?13& - human readable characters

Command: ?13&N

Description: this command allows to enable/disable the printing of legible characters under the barcodes.
If printing is disabled, the space occupied by characters will be occupied by bars.
Once programmed, this option remains valid until it is changed by a subsequent command or until the printer is restarted. At power-up, the readable characters are enabled.

Parameter	Description
N = set human readable characters under barcodes	**Values:** 2 = enables printing of readable characters 3 = disables printing of readable characters **Default:** 2

Example:

Readable characters	
?13&2	
?13&3	

?11& - barcode expansion

Command: ?11&E

Description: the original width of barcodes can be expanded up to 9 times. Once programmed, the barcode expansion remains effective until it is changed by a subsequent command or until the printer is turned off. At power-up, the expansion value is set to 2.

Parameter	Description
E = barcode expansion	**Values:** 1 to 9 **Default:** 2

Example:

Barcode expansion	
?11&2	
?11&3	

?B4& - barcode-characters distance ⊛

Command: ?B4&D

Description: the following command allows to set the distance between the barcode and the readable characters under it. The factory setting is zero.

This parameter is expressed in dots and will be kept in persistent memory.

Parameter	Description
D = distance between the barcode and the readable characters, expressed in dots	**Values:** 0 to 999 **Default:** 0

?F0& - characters filter for CODE128 and EAN128 barcodes ✆

Command: ?F0&D,N,Ascii1,Ascii2,…

Description: the following command allows to filter (delete) up to 5 characters in the bars and 5 characters in the text of CODE128 and EAN128 barcodes.
The settings made remain in the persistent memory until a different programming.
Filtering settings in bars and text are independent; it is therefore possible to filter, in the same barcode, different characters for the bars and for the texts.

Parameter	Description
D = filtering target	**Values:** 0 = bar filtering 1 = text filtering
N = number of characters to be filtered	**Values:** 0 to 5
Ascii1 = decimal ASCII code of the character to be filtered	
Ascii2 = decimal ASCII code of the character to be filtered	
…	

Example 1:   Filtering of ASCII characters 0x84 (=132 dec.) and 0x95 (=149 dec.) from the text underneath the barcode:

?F0&1,2,132,149

Example 2:   Filtering of ASCII characters 123 (='{') and 125 (='}') from the barcode:

?F0&0,2,123,125

sending 9876{ABC} only 9876ABC will be composed in the barcode

Example 3:   Reset of filtering operations on both the barcode and the text

?F0&0,0
?F0&1,0

?55& - CODE128 and EAN128 barcodes in persistent memory

Command: ?55&F,N;data

Description: this command allows to store the data (control characters included) for CODE128 and EAN128 barcodes in persistent memory.
It is possible to save in persistent memory up to 10 fixed barcodes (max. 255 characters) and then recall and compose them on the label with the command ?56&.
The CODE128 and EAN128 barcodes can encode characters with ASCII code between 0 and 127 (decimal values).

Parameter	Description
F = index of the barcode in perisstent memory	**Values:** 0 to 9
N = number of characters in the data string	**Values:** 1 to 255
data = characters that make up the barcode to be printed	**Values:** characters with ASCII code between 0 and 127

Warning: The ?55& command shares the same persistent memory area as the fixed data database commands ?72&, ?73&, ?74&; it is therefore not possible to use these commands within the same layout programming because the memory would be corrupted.

?56& - CODE128 and EAN128 barcode composition with fixed indexed data

Command: ?56&D1,X,Y,C,H,F

Description: this command allows to compose a barcode on the label using the strings already stored in the persistent memory as data.
The composed field will thus be of the fixed type.

Parameter	Description
D = barcode direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
1 = (one) specific for barcodes	
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
F = index of the data string in persistent memory	**Values:** 0 to 9

Example: ?56&31,150,35,15,80,7

With this example, a barcode printed in direction 3 is composed on the label, at the coordinates X = 150 and Y = 35, with a height of 80 dots; the barcode is of the EAN128 type and the data is read from field 7 of the fixed barcode database.

?31& - CODE128 and EAN128 variable barcodes composition with indexed data

Command: ?31&F

Description: the following command allows to read the data of a CODE128 or EAN128 variable barcode field directly from the persistent memory. The data read from memory with this command is used to compose variable fields of the label.

Parameter	Description
F = index of the stored fixed barcode	**Values:** 0 to 9

?19& - composition of barcodes with counters

Command: ?19&N,1,X,Y,D,C,H

Description: with this command it is possible to compose barcodes with counters.

Parameter	Description
N = counter number	**Values:** 0 to 5
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = barcode direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size

Example: ?19&2,1,50,200,1,3,21

With this command the following parameters are programmed:
- Counter #2
- barcode
- barcode origin X = 50 dots
- barcode origin Y = 200 dots
- direction 1
- barcode type 3 = EAN13
- horizontal barcode expansion 2
- vertical barcode expansion 1

12 Bidimensional codes (2D)

?92& - PDF417

Command: ?92&X,Y,Eb,Eh,LivSic,Lin,Col,Tronc,Dim;DATA

Description: with this command it is possible to compose a PDF417 two-dimensional barcode.

Parameter	Description
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
Eb = unitary element X expansion	**Values:** 1 to 9
Eh = unitary element Y expansion	**Values:** 1 to 9
LivSic = security level of the code. Indicates the redundancy of the encoded data	**Values:** 0 to 8
Lin = number of lines to be used	**Values:** 0 to 90
Col = number of columns to be used	**Values:** 0 to 30
Tronc = truncated or standard code	**Values:** 0 = truncated code 1 = standard code
Dim = number of bytes making up the data part	**Values:** depends on the size of the data
DATA = bytes to be encoded for printing in PDF417 format	**Values:** data to compose the PDF417

Hint: To find the correct aspect ratio of the code, try the following parameters:
Eb = Eh = 3, LivSic = 2, Lin = Col = 0 (the printer automatically scales the aspect ratio), Tronc = 0.
If you want to use ZZ lines, set Lin = ZZ and Col = 0
If you want to use WW columns, set Lin = 0 and Col = WW

Example:

PDF417	
?92&512,128,2,6,2,0,0,0,12;CodicePDF417 X = 512dots Y = 128dots Eb = 2 Eh = 6 LivSic = 2 Lin = 0 Col = 0 Tronc = 0 Dim = 12 DATA = CodicePDF417	
?92&487,128,2,6,4,0,0,1,7;ITALORA X = 487dots Y = 128dots Eb = 2 Eh = 6 LivSic = 4 Lin = 0 Col = 0 Tronc = 1 Dim = 7 DATA = ITALORA	
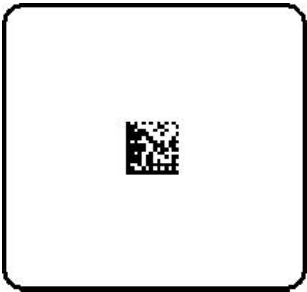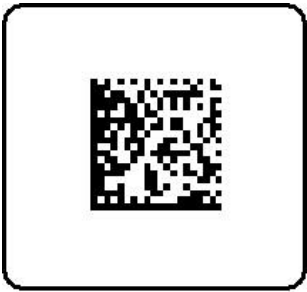
?93& - Datamatrix

Command: ?93&X,Y,Exp,Lin,Col,Dim;DATA

Description: with this command it is possible to compose a Datamatrix two-dimensional barcode.

Parameter	Description
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
Exp = unitary element expansion	**Values:** 1 to 16
Lin = number of lines to be used Col = number of columns to be used	**Values:** (Lin x Col) 10x10, 12x12, 14x14, 16x16, 18x18, 20x20, 22x22, 24x24, 26x26, 32x32, 36x36, 40x40, 44x44, 48x48, 52x52, 64x64, 72x72, 80x80, 88x88, 96x96, 104x104, 120x120, 132x132, 144x144, 8x18, 8x32, 12x26, 12x36, 16x36, 16x48
Dim = number of bytes making up the data part	**Values:** depends on the size of the data
DATA = bytes to be encoded for printing in Datamatrix format	**Values:** data to compose the Datamatrix

Example:

Datamatrix

?93&588,124,4,0,0,7;Italora X = 588dots Y = 124dots Exp = 4 Lin = 0 Col = 0 Dim = 7 DATA = Italora	
?93&553,79,7,20,20,7;Italora X = 553dots Y = 79dots Exp = 7 Lin = 20 Col = 20 Dim = 7 DATA = Italora	

?G2& - GS1 DataBar

Command: ?G2&D,X,Y,T,E,S,R;DATA|COMPOSITE

Description: with this command it is possible to compose a GS1 DataBar barcode.

Parameter	Description
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
T = barcode type	**Values:** 0 = GS1 DataBar Omnidirectional 1 = GS1 DataBar Truncated 2 = GS1 DataBar Stacked 3 = GS1 DataBar Stacked Omnidirectional 4 = GS1 DataBar Limited 5 = GS1 DataBar Expanded 6 = GS1 DataBar Expanded Stacked
E = print expansion of the barcode only and of the relative composite, if present	**Values:** 1 to 9
S = number of segments per linear part	**Values:** 2 to 22, or 0
R = plain text and expansion	**Values:** 0 = disabled 1 = enabled 2 to 9 = enabled and expanded of this value
DATA|COMPOSITE = data that make up the DataBar	

Warning: The S parameter is ignored for all types of barcodes other than the Expanded Stacked DataBar and, as per GS1 specification, varies from 2 to 22 in the absence of the composite, otherwise the minimum value rises to 4

Warning: For T from 0 to 4, the maximum number of characters that can be entered is 13 excluding the application identifier 01 (fixed and already inserted in the barcode) and the relative control character (it will be calculated and added by the printer).
For T from 5 to 6, for each AI that requires a check character, according to GS1 specifications, the check digit must be calculated in advance and sent to the printer.

FNC1:   To insert a FNC1 character (read by the scanner as GS) it is necessary to insert the # character

Example 1:   *GS1 DataBar Omnidirectional* **with 13 digits**
the check digit will be calculated by the printer
?G2&2,200,100,0,2,0,2;9988776655443

Example 2:   *GS1 DataBar Expanded Stacked*
the check digit of the AI, if required, must be pre-calculated
?G2&1,200,100,6,2,0,2;(01)99887766554435

Example 3:   *GS1 DataBar Expanded Stacked*
FNC1 after the AI data
(10)?G2&1,200,100,6,2,0,2;(01)99887766554435(10)995#(17)100101

?G3& - variable GS1 DataBar

Command: ?G3&N,I,D,X,Y,T,E,S,R

Description: with this command it is possible to compose a variable GS1 DataBar barcode.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = progressive identification number of the field	**Values:** 0 to 99
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
T = barcode type	**Values:** 0 = GS1 DataBar Omnidirectional 1 = GS1 DataBar Truncated 2 = GS1 DataBar Stacked 3 = GS1 DataBar Stacked Omnidirectional 4 = GS1 DataBar Limited 5 = GS1 DataBar Expanded 6 = GS1 DataBar Expanded Stacked
E = print expansion of the barcode only and of the relative composite, if present	**Values:** 1 to 9
S = number of segments per linear part	**Values:** 2 to 22, or 0
R = plain text and expansion	**Values:** 0 = disabled 1 = enabled 2 to 9 = enabled and expanded of this value

Warning: The S parameter is ignored for all types of barcodes other than the Expanded Stacked DataBar and, as per GS1 specification, varies from 2 to 22 in the absence of the composite, otherwise the minimum value rises to 4

Warning: For T from 0 to 4, the maximum number of characters that can be entered is 13 excluding the application identifier 01 (fixed and already inserted in the barcode) and the relative control character (it will be calculated and added by the printer).
For T from 5 to 6, for each AI that requires a check character, according to GS1 specifications, the check digit must be calculated in advance and sent to the printer.

FNC1:   To insert a FNC1 character (read by the scanner as GS) it is necessary to insert the # character

Example 1:   *GS1 DataBar Omnidirectional* **with 13 digits**
the check digit will be calculated by the printer
?04&A
?G3&A,0,1,200,100,0,2,0,2
?05&A
?25&9988776655443

Example 2:   *GS1 DataBar Expanded Stacked*
the check digit of the AI, if required, must be pre-calculated
?04&A
?G3&A,0,1,200,100,6,2,0,1
?05&A
?25&(01)99887766554435

Example 3:   *GS1 DataBar Expanded Stacked*
FNC1 after the AI data (10)
?04&A
?G3&A,0,1,200,100,6,2,0,1
?05&A
?25&(01)99887766554435(10)995#(17)100101

?94& - GS1 Datamatrix

Command: ?93&X,Y,Exp,Lin,Col,Dim;DATA

Description: with this command it is possible to compose a GS1 Datamatrix two-dimensional code.

Parameter	Description
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
Exp = unitary element expansion	**Values:** 1 to 16
Lin = number of lines to be used Col = number of columns to be used	**Values:** (Lin x Col) 10x10, 12x12, 14x14, 16x16, 18x18, 20x20, 22x22, 24x24, 26x26, 32x32, 36x36, 40x40, 44x44, 48x48, 52x52, 64x64, 72x72, 80x80, 88x88, 96x96, 104x104, 120x120, 132x132, 144x144, 8x18, 8x32, 12x26, 12x36, 16x36, 16x48
Dim = number of bytes making up the data part	**Values:** depends on the size of the data
DATA = bytes to be encoded for printing in Datamatrix format	**Values:** data to compose the Datamatrix

?Q0& - QR-Code

Command: ?Q0&X,Y,Dir,Esp;Strutt,Vers,Liv,CaseSens,Byte;DATA

Description: the following command allows to compose a QR-Code in the graphic print buffer.

Parameter	Description
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
Dir = QR-Code print direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
Esp = QR-Code expansion	**Values:** 1 to 16
Strutt = standard or structured	**Values:** 0 = standard 1 = structured
Vers = QR-Codeversion	**Values:** 1 to 40
Liv = error correction level	**Values:** 0 = L 1 = M 2 = Q 3 = H
CaseSens = enable/disable discrimination between uppercase and lowercase characters	**Values:** 0 = disabled 1 = enabled
Byte = number of bytes of the DATA field	
DATA = characters contained in the QR-CODE	

Example:

QR-Code composition	
?Q0&137,133,1,4;0,1,0,0,23;test qr-code prova12345 X = 137 Y = 133 Dir = 1 Esp = 4 Strutt = 0 = standard Vers = 1 Liv = 0 = L CaseSens = 0 = disabled Byte = 23 DATI = test qr-code prova12345	
?Q0&82,133,1,4;1,1,0,0,23;test qr-code prova12345 X = 82 Y = 133 Dir = 1 Esp = 4 Strutt = 1 = strutturato Vers = 1 Liv = 0 = L CaseSens = 0 = disabled Byte = 23 DATI = test qr-code prova12345	

13 **Combined texts and codes**

?C0& - combined texts

Command: ?C0&N,I,D,X,Y,G,OV,Blocks

Description: the following command allows you to create a "combined" text, that is, made up of several parts. It is also possible to define the composition rules, specifying, for each individual part, the source of the data.
The maximum number of parts making up the text varies according to their type, since not all of them have the same memory occupation.

Each combined text has 22 Memory Units (M.U.) available for storing the parts that compose it. The memory occupation of each individual part is detailed in the 'List of parts making up a combined field' paragraph.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 77
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
Blocks = list of the parts making up the text	**Values:** refer to the 'List of parts making up a combined field' paragraph

?C1& - combined barcodes

Command: ?C1&N,I,D,X,Y,C,H,Blocks

Description: the following command allows you to create a "combined" barcode, that is, made up of several parts. It is also possible to define the composition rules, specifying, for each individual part, the source of the data.
The maximum number of parts making up the barcode varies according to their type, since not all of them have the same memory occupation.

Each combined barcode has 16 Memory Units (M.U.) available for storing the parts that compose it. The memory occupation of each individual part is detailed in the 'List of parts making up a combined field' paragraph.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 77
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
Blocks = list of the parts making up the barcode	**Values:** refer to the 'List of parts making up a combined field' paragraph

?C2& - UCC/EAN barcodes with combined AI

Command: ?C2&N,I,D,X,Y,C,H,AI-Blocks

Description: the following command allows you to create a "combined" barcode, that is, made up of several parts. It is also possible to define the composition rules, specifying, for each individual part, the source of the data.

The maximum number of parts making up the barcode varies according to their type, since not all of them have the same memory occupation.

Each combined barcode has 16 Memory Units (M.U.) available for storing the parts that compose it. The memory occupation of each individual part is detailed in the paragraph 'List of parts making up a combined field'.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 77
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
C = barcode type	**Values: Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
AI-Blocks = list of the AI (Application Identifier) of the code with the related data	**Values:** consisting of several occurrences of the following structure: AI, Block refer to the 'List of parts making up a combined field' paragraph

Example: UCC/EAN barcode composed of AI 02, 10 and 37 with fixed data

?C2&A,2,1,10,200,15,170,*02,100,0061414100041,**10**,100,000214,**37**,100,1234XAB*

?C3& - combined Datamatrix

Command: ?C3&N,I,E,X,Y,C,R,Blocks

Description: the following command allows you to create a "combined" Datamatrix two-dimensional code, that is, made up of several parts. It is also possible to define the composition rules, specifying, for each individual part, the source of the data.
The maximum number of parts making up the Datamatrix varies according to their type, since not all of them have the same memory occupation.

Each combined two-dimensional code has 16 Memory Units (M.U.) for storing the parts that compose it. The memory occupation of each individual part is detailed in the "List of parts making up a combined field" paragraph.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 77
Exp = unitary element expansion	**Values:** 1 to 16
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
R = number of lines to be used C = number of columns to be used	**Values:** (R x C) 10x10, 12x12, 14x14, 16x16, 18x18, 20x20, 22x22, 24x24, 26x26, 32x32, 36x36, 40x40, 44x44, 48x48, 52x52, 64x64, 72x72, 80x80, 88x88, 96x96, 104x104, 120x120, 132x132, 144x144, 8x18, 8x32, 12x26, 12x36, 16x36, 16x48
Blocks = list of the parts making up the code	**Values:** refer to the 'List of parts making up a combined field' paragraph

?C4& - combined GS1 Datamatrix

Command: ?C4&N,I,E,X,Y,C,R,Blocks

Description: the following command allows you to create a "combined" GS1 Datamatrix two-dimensional code, that is, made up of several parts. It is also possible to define the composition rules, specifying, for each individual part, the source of the data.
The maximum number of parts making up the Datamatrix varies according to their type, since not all of them have the same memory occupation.

Each combined two-dimensional code has 16 Memory Units (M.U.) for storing the parts that compose it. The memory occupation of each individual part is detailed in the "List of parts making up a combined field" paragraph.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z
I = field index within the layout	**Values:** 0 to 77
Exp = unitary element expansion	**Values:** 1 to 16
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
R = number of lines to be used C = number of columns to be used	**Values:** (R x C) 10x10, 12x12, 14x14, 16x16, 18x18, 20x20, 22x22, 24x24, 26x26, 32x32, 36x36, 40x40, 44x44, 48x48, 52x52, 64x64, 72x72, 80x80, 88x88, 96x96, 104x104, 120x120, 132x132, 144x144, 8x18, 8x32, 12x26, 12x36, 16x36, 16x48
Blocks = list of the parts making up the code	**Values:** refer to the 'List of parts making up a combined field' paragraph

List of parts making up a combined field

Already received variable field — Memory used = 3 M.U.

Variable data that has already been received can be used as part of a combined field. In this case it is necessary to specify which variable field to use in addition to the starting and ending position of the data.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: Index,Start,Stop

Parameter	Description
Index = index of the variable field	**Values:** 0 to 77
Start = first byte of the variable field	**Values:** 0 to 49
Stop = last byte of the variable field	**Values:** 0 to 49

Example: Barcode consisting of bytes 0...6 of the variable field with index 0 and bytes 0...6 of the variable field with index 1

?C1&A,12,1,39,199,14,135,*0,0,6,1,0,6*

Fixed text entered directly — Memory used = 2 M.U.

It is possible to enter text directly in the commands ?C0&... or ?C1&... to be used as part of a combined field.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 100,Text

Parameter	Description
100 = fixed value	**Values:** 100
Text = data to be written	**Values:** characters (50 max) that make up the text

Example: Text composed by "FIXED part" + "entered DIRECTLY"

?C0&A,5,1,50,120,2,11,100,FIXED part,100,entered DIRECTLY

Already stored fixed text — Memory used = 2 M.U.

Fixed texts already in persistent memory can be used as part of a combined field.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 101,Index

Parameter	Description
101 = fixed value	**Values:** 101
Index = index of the fixed text to be used	**Values:** 0 to 49

Example: Text composed by fixed texts of index 12 and 3

?C0&A,5,1,50,120,2,11,*101,12,101,3*

DD/MM/YYYY   Memory used = 1 M.U.

With this option, the indication of Day/Month/Year (4 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 110

Parameter	Description
110 = fixed value	**Values:** 110

Example: Barcode composed by (example) "01/06/2004"

?C1&A,5,1,50,120,14,90,*110*

DD/MM/YY   Memory used = 1 M.U.

With this option, the indication of Day/Month/Year (2 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 111

Parameter	Description
111 = fixed value	**Values:** 111

Example: Barcode composed by (example) "01/06/04"

?C1&A,5,1,50,120,14,90,*111*

MM/YYYY   Memory used = 1 M.U.

With this option, the indication of Month/Year (4 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 112

Parameter	Description
112 = fixed value	**Values:** 112

Example: Barcode composed by (example) "06/2004"

?C1&A,5,1,50,120,14,90,*112*

With this option, the indication of Month/Year (2 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 113

Parameter	Description
113 = fixed value	**Values:** 113

Example: Barcode composed by (example) "06/04"

?C1&A,5,1,50,120,14,90,*113*

YYYY   **Memory used = 1 M.U.**

With this option, the indication Year (4 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 114

Parameter	Description
114 = fixed value	**Values:** 114

Example: Barcode composed by (example) "2004"

?C1&A,5,1,50,120,14,90,*114*

YY   **Memory used = 1 M.U.**

With this option, the indication Year (2 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 115

Parameter	Description
115 = fixed value	**Values:** 115

Example: Barcode composed by (example) "04"

?C1&A,5,1,50,120,14,90,*115*

DDD - day 1…365 Memory used = 1 M.U.

With this option, the indication of the day calculated as an annual progressive is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 116

Parameter	Description
116 = fixed value	**Values:** 116

Example: Barcode composed by (example) "075"

?C1&A,5,1,50,120,14,90,*116*

WW - week 1…52 Memory used = 1 M.U.

With this option, the indication of the week calculated as an annual progressive is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 117

Parameter	Description
117 = fixed value	**Values:** 117

Example: Barcode composed by (example) "18"

?C1&A,5,1,50,120,14,90,*117*

DDD/YYYY Memory used = 1 M.U.

With this option, the indication of Day/Year (4 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 118

Parameter	Description
118 = fixed value	**Values:** 118

Example: Barcode composed by (example) "076/2004"

?C1&A,5,1,50,120,14,90,*118*

WW/YYYY Memory used = 1 M.U.

With this option, the indication of Week/Year (4 digits) is entered in the combined field.
The date is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 119

Parameter	Description
119 = fixed value	**Values:** 119

Example: Barcode composed by (example) "26/2004"

?C1&A,5,1,50,120,14,90,*119*

HH:MM:SS Memory used = 1 M.U.

With this option, the indication of Hours:Minutes:Seconds is entered in the combined field.
The time is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 130

Parameter	Description
130 = fixed value	**Values:** 130

Example: Barcode composed by (example) "16:47:28"

?C1&A,5,1,50,120,14,90,*130*

HH:MM Memory used = 1 M.U.

With this option, the indication of Hours:Minutes is entered in the combined field.
The time is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 131

Parameter	Description
131 = fixed value	**Values:** 131

Example: Barcode composed by (example) "18:27"

?C1&A,5,1,50,120,14,90,*131*

With this option, the indication of Hours is entered in the combined field.
The time is read from the printer's internal clock.

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 132

Parameter	Description
132 = fixed value	**Values:** 132

Example: Barcode composed by (example) "09"

?C1&A,5,1,50,120,14,90,*132*

Counter   Memory used = 2 M.U.

With this option, the value stored in the specified counter is inserted into the combined field.
The programming related to the counter parameters (increasing/decreasing count, max and min value, module, etc...) is independent of this command and must be done with the appropriate commands (?18&..., ?82&..., etc...)

The Blocks parameter of the commands ?C0&... or ?C1&... will be:

Blocks: 140,Index

Parameter	Description
140 = fixed value	**Values:** 140
Index = index of the counter to be used	**Values:** 0 to 3

Example: Text composed by the counter of index 2

?C0&A,5,1,50,120,2,11,*140,2*

14 Lines
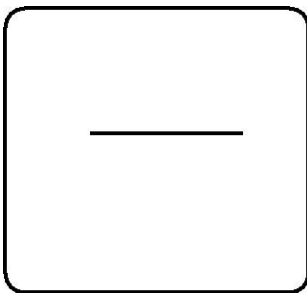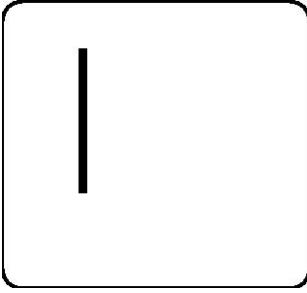
?15& - immediate composition of horizontal and vertical lines

Command: ?15&X,Y,L,D,S

Description: with this command it is possible to compose a horizontal or vertical line.

Parameter	Description
X = line origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = line origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
L = line length, expressed in dots	**Values:** ≤ label size
D = line direction	**Values:** 0 = increasing Y 1 = decreasing Y 2 = increasing X 3 = decreasing X
S = line thickness, expressed in dots	**Values:** 1 to 16

Example:

Immediate composition of lines
?15&550,130,150,2,4 X = 550 dot (X coordinate) Y = 130 dot (Y coordinate) L = 150 dot (length) D = 2 (increasing X) S = 4 dot (thickness)
?15&541,50,150,0,9 X = 541 dot (X coordinate) Y = 50 dot (Y coordinate) L = 150 dot (length) D = 0 (increasing Y) S = 9 dot (thickness)
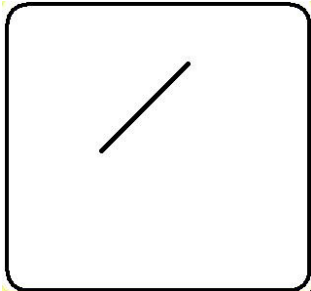
?58& - immediate composition of diagonal lines

Command: ?58&X1,Y1,X2,Y2,S

Description: this command allows to compose generic lines on the label: depending on the coordinates of the start and end of the line, it will be diagonal, horizontal or vertical.
If X1 = X2 the line will be vertical
If Y1 = Y2 the line will be horizontal

Parameter	Description
X1 = line start X coordinate	**Values:** depend on the lable size
Y1 = line start Y coordinate	**Values:** depend on the lable size
X2 = line end X coordinate	**Values:** depend on the lable size
Y2 = line end Y coordinate	**Values:** depend on the lable size
S = line thickness, expressed in dots	**Values:** 0 to 99

Example:

Immediate composition of diagonal lines	
?58&561,156 ,645,68,3 X1 = 561 dot Y1 = 156 dot X2 = 645 dot Y2 = 68 dot S = 3 dot	

?34& - storing horizontal and vertical lines in persistent memory

Command: ?34&N,I,X,Y,L,D,S

Description: the following command allows to program one or more lines in a layout, so that they are automatically composed when the layout is activated

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
X = line origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = line origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
L = line length, expressed in dots	**Values:** ≤ label size
D = line direction	**Values:** 0 = increasing Y 1 = decreasing Y 2 = increasing X 3 = decreasing X
S = line thickness, expressed in dots	**Values:** 1 to 16

Example: 'delete layout G
?04&G
…
?34&G,4,10,20,50,2,4
…
'enable layout G
?05&G

This example programs the field with incremental field index automatically assigned, starting from zero, of the layout G as a line; the starting coordinates are X = 10 and Y = 20, the length is 50 dots, the direction is 2 (looking at the printer from the front, the direction goes from the point (X, Y) of origin to the left) and the thickness is 4 dot

15 Rectangles
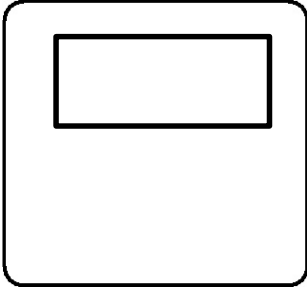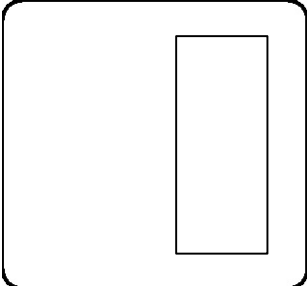
?46& - immediate composition of rectangles

Command: ?46&X,Y,H,L,S

Description: with this command it is possible to compose a rectangle.

Parameter	Description
X = rectangle origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = rectangle origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
H = height of the rectangle, expressed in dots (in the Y direction)	**Values:** ≤ label size
L = base of the rectangle, expressed in dots (in the X direction)	**Values:** ≤ label size
S = line thickness, expressed in dots	**Values:** 1 to 16

Example:

Immediate composition of rectangles	
?46&120,30,110,235,4 X = 120 dot (X coordinate) Y = 30 dot (Y coordinate) H = 110 (height) L = 235 dot (base) S = 4 dot (thickness)	
?46&251,30,240,103,2 X = 251 dot (X coordinate) Y = 30 dot (Y coordinate) H = 240 (height) L = 103 dot (base) S = 2 dot (thickness)	

?35& - storing rectangles in persistent memory

Command: ?35&N,I,X,Y,H,L,S

Description: the following command allows to program one or more rectangles in a layout, so that they are automatically composed when the layout is activated.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
X = rectangle origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = rectangle origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
H = height of the rectangle, expressed in dots (in the Y direction)	**Values:** ≤ label size
L = base of the rectangle, expressed in dots (in the X direction)	**Values:** ≤ label size
S = line thickness, expressed in dots	**Values:** 1 to 16

Example: 'delete layout B
?04&B
…
?35&B,9,250,40,50,200,4
…
'enable layout B
?05&B

This example programs the field with incremental field index assigned automatically, starting from zero, of layout B as a rectangle with origin at the coordinates X = 250 and Y = 40, of height 50 dots in the Y direction, base of 200 dots in the X direction, line thickness equal to 4 dots.

16 Shaded areas
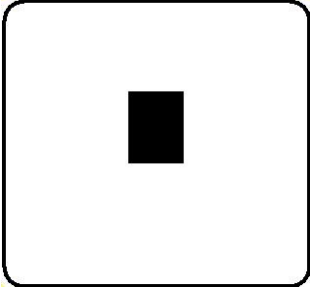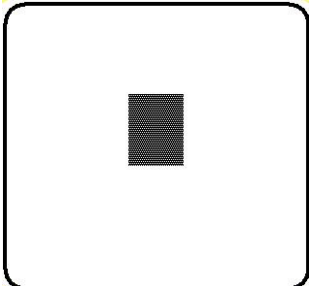
?22& - immediate composition of shaded areas

Command: ?22&X,Y,L,H,T

Description: with this command it is possible to compose a shaded area.

Parameter	Description
X = area origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = area origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
L = base of the rectangle, expressed in dots (in the X direction)	**Values:** ≤ label size
H = height of the rectangle, expressed in dots (in the Y direction)	**Values:** ≤ label size
T = type of area to print	**Values:** 0 = white 1 = black 2 = reverse 3 = shaded black 4 = shaded white

Example:

Immediate composition of shaded areas

?22&590,98,53,74,1 X = 590 dot (X coordinate) Y = 98 dot (Y coordinate) L = 53 dot (width) H = 74 dot (height) T = 1 (area type)	
?22&590,98,53,74,3 X = 590 dot (X coordinate) Y = 98 dot (Y coordinate) L = 53 dot (width) H = 74 dot (height) T = 3 (area type)	
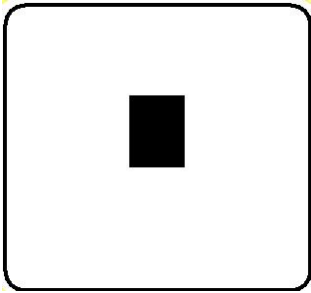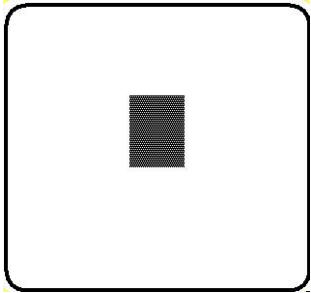
?45& - storing shaded areas in persistent memory

Command: ?45&N,I,X,Y,L,H,T

Description: the following command allows to program one or more shaded areas in a layout, so that they are automatically composed when the layout is activated.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
X = area origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = area origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
L = base of the rectangle, expressed in dots (in the X direction)	**Values:** ≤ label size
H = height of the rectangle, expressed in dots (in the Y direction)	**Values:** ≤ label size
T = type of area to print	**Values:** 0 = white 1 = black 2 = reverse 3 = shaded black 4 = shaded white

Example:

Storing shaded areas in persistent memory	
?04&G ?45&G,4,590,98,53,74,1 ?05&G N = layout G I = index X = 590 dot (X coordinate) Y = 98 dot (Y coordinate) L = 53 dot (width) H = 74 dot (height) T = 1 (area type)	
?04&G ?45&G,4,590,98,53,74,3 ?05&G N = layout G I = index X = 590 dot (X coordinate) Y = 98 dot (Y coordinate) L = 53 dot (width) H = 74 dot (height) T = 3 (area type)	

17 Graphics

Italora printers allow to customize the label to be printed with company logos and graphic images.

There is a choice between immediate composition or persistent memory storage of image data.

?17& - immediate composition of graphics

Command: ?17&X,Y;data

Description: this command allows the immediate composition of the graphic image.

In order to transmit an image to an Italora printer, it must be in graphic programming mode. During this phase of programming the printers only recognize the commands necessary for the graphics, returning an error for any other command received.

The graphic images are composed immediately with the command ?17&…, which allows to:

- enter graphics mode
- compose the image
- exit graphics mode

Parameter	Description
X = X coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size
Y = Y coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size
data = ASCII characters that make up the first line of the logo	**Values:** refer to the 'Graphics DOT' table

The data string represents the first horizontal line of the logo; it must be composed by grouping the dots in groups of four and transforming them into ASCII characters according to the table below. The following lines of dot are defined using the data entry command in graphic mode.

Graphics DOT			
ASCII character	DOT sequence	ASCII character	DOT sequence
'0'	0000	'8'	1000
'1'	0001	'9'	1001
'2'	0010	'A'	1010
'3'	0011	'B'	1011
'4'	0100	'C'	1100
'5'	0101	'D'	1101
'6'	0110	'E'	1110
'7'	0111	'F'	1111

Note: in the 'DOT sequence' column: 0 = white dot, 1 = black dot

Command: ?17&;data

Description: once the graphics mode is activated with the previous command (?17&X,Y;data), it is possible to send the rest of the graphic data making up the image you want to print. The command ?17&; data is required for each line of the logo

Parameter	Description
data = ASCII characters that make up a line of the logo	**Values:** refer to the 'Graphics DOT' table

Command: ?17&.

Description: once all the lines of the image to be printed have been sent to the printer, it is necessary to terminate the graphics mode to continue working.

Parameter	Description
. = 'dot. Ending character	**Values:** . (dot)

Example:

Immediate composition fo graphics
?17&526,116;0001F8 /* command to enter graphics mode */ ?17&;0003B8 /* graphics commands ......*/ ?17&;03E70C ?17&;07F60C ?17&;063E0C1C ?17&;041C0C1C ?17&;040C0FDC ?17&;040C1BDC ?17&;060C3BD ?17&;070E73F ?17&;0387E0B ?17&;01FFE0FE ?17&;00FFF0FF ?17&;00FF78C98 ?17&;01FF7D89C8 ?17&;01FFBF8DDC ?17&;03F7BF8DFC ?17&;03F7BF86E4 ?17&;037FFF87FC ?17&;037BDFC3FC ?17&;037BDFC06 ?17&;01FBDFE06 ?17&;01FBDF7FE ?17&;00FBDF3F8 ?17&;00FBFE ?17&;007FFF ?17&;3E7FF78 ?17&;7F78FFE ?17&;63FFFFF ?17&;40FFFE18 ?17&;407BFC18 ?17&;6007E018 ?17&;700E4018 ?17&;38FCF038 ?17&;1FFFFFF ?17&;0007078 ?17&. /* command to exit graphics mode */	

?37& - storing graphics in persistent memory

It is possible to store graphic images in the printer's persistent memory, associating them with a layout to make them compose automatically every time the layout is activated. Storing an image saves the time of transmission of graphic data at the time of printing.

The images are stored with a sequential index that allows to recall them.
The limit is not given by the index, but by the amount of memory occupied.

To store more images, it is necessary to send them to the printer in sequential order; the index of the images sent must start from 0 and gradually increase up to the necessary value.

To upload graphic images, you need to follow these steps:

- enter graphics mode
- send graphics data
- exit graphics mode

During these operations, the printer recognizes only the commands necessary for storing graphics, returning an error for any other command received.

Below are the three steps.

Start command: ?37&IDX

Description: in this phase, which must necessarily be the first of the three, the index of the image to be stored is specified.

Parameter	Description
IDX = image index	**Values:** 0 to 999

Warning: It is not possible to insert an image with an IDX index between two images already sent without compromising the pre-existing images with an index higher than IDX.

For example, if 10 images have already been stored (with index 0 to 9) and a new image with index 6 is sent, the existing images with index 7, 8 and 9 will be lost..

Send command: ?37&;data

Description: the second phase for the graphic loading operations consists in sending the graphic data making up the image.

This command must be repeated for each horizontal dot line making up the logo.

Parameter	Description
data = ASCII characters that make up a line of the logo	**Values:** refer to the 'Graphics DOT' table

End command: ?37&.

Description: this is the last phase for storing images in memory and must be performed after the last image has been transmitted.

After this command, the printer returns to standard operating mode.

Parameter	Description
. = 'dot. Ending character	**Values:** . (dot)

Example: Storing 3 logos

?37&0	Start with index 0
?37&;40404	dot
?37&;............	dot
?37&.	End
?37&1	Start with index 1
?37&;............	dot
?37&.	End
?37&2	Start with index 2
?37&;............	dot
?37&.	End
?37&6	Start with index 6.
	error: index NOT allowed with this sequence
?37&;............	dot
?37&.	End

Once memorized, a logo can be recalled in two different ways: with the first way, the image is composed on the label; with the second way an image is associated with a layout, to make it automatically compose when the layout is activated

?A0& ?A1& - speeding up graphics storing operations

To speed up the transmission of graphic images to the printer, it is advisable (note that it is not mandatory) to precede and postpone two specific commands to the traditional graphic commands (?37&...).

Command to open graphic programming: ?A0&1

Command to close graphic programming: ?A1&0

Example: ...
      ?A0&1   // Open graphic programming
      ?37&0   // Start of first image
      ...
      ?37&.   // End of first image
      ?37&1   // Start of second image
      ...
      ?37&.   // End of second image
      ...
      ...
      ?37&.   // End of last image
      ?A1&0   // Close graphic programming

?38& - immediate composition of images in persistent memory

Command: ?38&IDX,X,Y

Description: with this command, after having stored the images in the persistent memory, they can be recall to be composed on the label.

The command allows you to specify the printing coordinates and the index of the logo to be composed.

If an image index not yet memorized is recalled, no printing effects are obtained.

Parameter	Description
IDX = image index	**Values:** 0 to 999
X = X coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size
Y = Y coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size

Example: ?38&5,120,45

This example composes the image with index 5 starting from the coordinates X = 120 and Y = 45

?36& - linking an image with a layout

Command: ?36&N,I,X,Y,IDX

Description: the following command allows to use the images stored in the persistent memory by linking them to a layout, so that they are automatically composed every time the layout is activated.
If a logo index not yet memorized is recalled, no printing effects are obtained.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
X = X coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size
Y = Y coordinate, expressed in dot, of the bottom right corner of the graphic	**Values:** depend on the lable size
IDX = index of the image to be recalled	**Values:** 0 to 999

Example: 'delete layout E
?04&E
…
?36&E,2,120,45,8
…
'enable layout E
?05&E

This example programs the field with an incremental field index assigned automatically, starting from zero, of the format E with the image of index 8, and specifies the starting coordinates of the print at X = 120 and Y = 45

18 Other commands related to layouts in persistent memory

?04& - layout programming

Command: ?04&N

Description: this command is necessary when there is a need to reprogram an existing layout. Generally, this command is the first of all those related to layouts; first of all the layout to be programmed is deleted and then the programming commands are sent.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z

Example: ?04&E

With this command the E layout is deleted from the persistent memory.

?05& - layout activation

Command: ?05&N

Description: this command allows to choose one of the layouts in persistent memory and have its fields be composed in the print buffer memory. Before sending variable data, it is always necessary to activate the layout intended for receiving them. Once activated, the layout remains in the print memory until the printer is turned off or until another activation command different from the previous one is received.

Parameter	Description
N = capital letter indicating the layout to be activated	**Values:** A to Z

Example: ?05&A

With this command, layout A is activated.

?79& - storing the printing parameters of a label in a layout

To complete a layout, it is necessary to specify some parameters typical of the printer operation (e.g. speed).

The ?79&... command allows you to specify the following parameters:

- Print speed
- Print intensity (software trimmer)
- Label alignment (Gap)
- Advance at the end of printing, in continuous paper mode (Feed)
- Enabling/Disabling od counters and internal clock/calendar
- DC2 character at the end of print
- Enabling/Disabling the print button
- Enabling/Disabling the label taken sensor
- Enabling/Disabling the cutter
- Enabling/Disabling of long PRINT END signal
- Selecting the text alignment mode
- Enabling/Disabling the filter of alphabetic characters in barcodes that don't include them
- Selecting the printhead energy level
- Enabling/Disabling the software control if the printhead energy adjustment

The command ?79&... consists of two parts; depending on the functions to be programmed, it is possible to choose each time only the part of interest.

When the parameters described above are programmed with the command ?79&, they are automatically activated when the layout to which they have been linked is activated.

Command (first part): ?79&N,I,0,SPD,PWR,GAP,FEED,BB0,BB1

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
0 = (zero) fixed value	**Values:** 0
SPD = printing speed	**Values:** see the 'Maximum print speed' paragraph
PWR = printhead power percentage	**Values:** 0 to 100
GAP = label alignmenti, advcance/retract the label at the end of print, in label mode	**Values:** –999 to +999
FEED = advance at the end of printing, in continuous paper mode	**Values:** 0 to 999
BB0 = 8 digits ABCDEFGH A = counter #0 B = counter #1 C = internal clock/calendar #0 D = internal clock/calendar #1 E = DC2 character (18dec) at end of print F = disable print button G = label taken sensor H = cutter	**Values:** A = 1 = ON A = 0 = OFF B = 1 = ON B = 0 = OFF C = 1 = ON C = 0 = OFF D = 1 = ON D = 0 = OFF E = 1 = ON E = 0 = OFF F = 1 = disabled F = 0 = enabled G = 1 = ON G = 0 = OFF H = 1 = ON H = 0 = OFF

BB1 = 8 digits IJKLMNOP
I = long PRINT END signal
J = not used
K = not used
L = not used
M = texts alignment
N = characters filter for numeric barcodes
O = not used
P = controllo software energia testina
	Values:
	I = 1 = ON I = 0 = OFF
	                J = 0 = OFF
	                K = 0 = OFF
	                L = 0 = OFF
	M = 1 = left M = 0 = standard
	N = 1 = ON N = 0 = OFF
	                O = 0 = OFF
	P = 1 = ON P = 0 = OFF

Example: 'delete layout F
?04&F
…
?79&F,4,0,120,35,+85,0,00000000,00000001
…
'enable layout F
?05&F

The example programs the field with an incremental field index automatically assigned, starting from zero, of the F layout; the following settings will be activated automatically when the layout is activated: print speed = 120 mm / sec, head power = 35%, label advancement of 85 dots at each end of printing in label mode, no advancement at each end of printing in continuous paper mode, no counter, no date or time field, transmission of the DC2 character (ASCII code 18Dec) at the end of printing disabled, print key enabled, label taken sensor and cutter disabled, normal optoisolated PRINT END signal, standard text alignment, character filter for barcode disabled, software control of head energy enabled.

Command (third part):   ?79&N,I,2,BB2,BB3

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99 This parameter is not taken into account, but it must still be filled in. The index will be assigned automatically, starting from zero, incrementally.
2 = (due) fixed value	**Values:** 2
BB2 = 8 digits xxxxABCD x = not used A = calculation base #3 B = calculation base #2 C = calculation base #1 D = calculation base #0	**Values:** x = 0 = OFF A = 1 = ON A = 0 = OFF B = 1 = ON B = 0 = OFF C = 1 = ON C = 0 = OFF D = 1 = ON D = 0 = OFF
BB3 = 8 digits xxEFGHIL x = not used E = printing image #5 F = printing image #4 G = printing image #3 H = printing image #2 I = printing image #1 L = printing image #0	**Values:** x = 0 = OFF E = 1 = ON E = 0 = OFF F = 1 = ON F = 0 = OFF G = 1 = ON G = 0 = OFF H = 1 = ON H = 0 = OFF I = 1 = ON I = 0 = OFF L = 1 = ON L = 0 = OFF

Example: 'delete layout B
?04&B
…
?79&B,5,2,00000001,00000011
…
'enable layout B
?05&B

This example programs the field with incremental field index automatically assigned, starting from zero, of the layout B; the following settings will be activated automatically when the layout is activated: the calculation base #0 will be used and the printing images #0 and #1 will be active. The specific commands for programming the calculation bases and printing images of the counters can be found in the 'Counters' chapter.

?21& - variable fields protection

We have already seen how numerous variable fields can be programmed in a layout. There is the possibility of making some of these fixed, so that they do not change their content when other data, different than the previous ones, get received by the printer.

There are 10 levels of protection (from 0 to 9); when the printer is turned on, the default protection level is 0, i.e. no variable field is protected.

Each time the security level is raised, the values of the variable fields sent to the printer up to that point become fixed and the printer does not expect to have to change them. Each time the level is lowered, the deletion of previously protected data is allowed.

If protection are used, the number of variable data to be sent to the printer decreases by the number of protected variable fields.

Command: ?21&L

Description: with this command it is possible to set the protection level of the variable fields.

Parameter	Description
L = protection level index	**Values:** 0 to 9

Example: Suppose format E contains 5 variable fields:

    ?05&E   // enable layout E
    ?25&11111   // 1st variable data
    ?25&22222   // 2nd variable data

    ?21&1   // I protect the first two variable fields

    ?25&33333   // 3rd variable data
    ?25&44444   // 4th variable data
    ?25&55555   // 5th variable data.

At this point, a label is printed with the texts "11111", "22222", "33333", "44444", "55555"

    ?25&AAAA   // 3rd variable data
    ?25&BBBB   // 4th variable data
    ?25&CCCC   // 5th variable data.

At this point, a label is printed with the texts "11111", "22222", "AAAA", "BBBB", "CCCC"

?A2&38 - enable/disable label alignment change (GAP) upon layout activation ☙

Command: ?A2&38,E

Description: this command allows not to take into consideration the label alignment value (GAP), set with the command ?79&.., when loading a layout.

Parameter	Description
E = enable/disable label alignment change	**Values:** 0 = alignment change enabled 1 = alignment change disabled

Example: ?A2&38,1
?05&B

Layout B is loaded without taking into account the new alignment.

19 Other commands for graphic composition

?00& - delete graphic print buffer

Command: ?00&

Description: this command allows you to delete the entire memory area intended for the composition of the label. This is usually the first command to be sent. The command has no parameters and consists of only 4 characters followed by the line terminator (Carriage Return).

?81& - left alignment

Command: ?81&M

Description: this command allows to change the text alignment mode, as explained in detail in the 'Texts alignment setup' section.

When needed, the command must be sent to the printer before sending text composition commands.

At power on, the printer defaults to standard mode; the left alignment, when activated, remains valid until the printer is turned off or the reset commands !1 or !2 are received.

Parameter	Description
M = configuration parameter	**Values:** 0 = standard alignment 1 = left alignment

Example: ?81&1

Command used to set the left alignment of the texts.

?A3&18 - restore the graphic print buffer from Flash memory to RAM

Command: ?A3&18,1

Description: this command allows to restore the graphic print buffer, that was saved in Flash memory using the command ?A2&18,1 ,in RAM.

Parameter	Description
18 = fixed value	**Values:** 18 = fixed value
1 = fixed value	**Values:** 1 = fixed value

Example: …
?A2&18,1
…
?A2&18,0
…
… the printer is turned off and on again
…
?A3&18,1
?01&

?M3& - splitting the graphic print buffer into 4 sections - composition of layouts

Command: ?M3&N,X

Description: the following command allows to split the graphic print buffer into 4 sections (1,2,3,4) and to compose a different layout in each part.

This function is useful for having 4 different labels in RAM ready for printing, without having to load the desired layout from the Flash and compose it from time to time.

Parameter	Description
N = capital letter indicating the layout to be programmed in the graphic buffer section	**Values:** A to Z
X = section of the graphic print buffer in which the layout is going to be composed	**Values:** 1 to 4

Example: ?M5&1
?M3&A,1
?M3&B,2
?M3&C,3
?M3&D,4

the management of the graphic buffer in 4 sections is enabled and sections 1,2,3,4 are associated with formats A, B, C, D respectively.

?M4& - splitting the graphic print buffer into 4 sections - activating one section

Command: ?M4&X

Description: the following command allows to activate a section of the graphic print buffer.

Parameter	Description
X = section of the graphics print buffer to be activated	**Values:** 1 to 4

Example: ?M4&3
?01&

The graphic print buffer section #3 is activated and a label is printed.

?M5& - splitting the graphic print buffer into 4 sections - enabling/disabling

Command: ?M5&E

Description: the following command allows to enable and disable the management of the graphic print buffer in 4 sections

Parameter	Description
E = enable/disable	**Values:** 0 = split disabled 1 = split enabled

20 Other commands for printing

?01& - single label printing

Command: ?01&

Description: this command allows the printing of a label with the current contents of the print buffer. The command has no parameters and consists of only 4 characters followed by the line terminator (Carriage Return).

?14& - printing a batch of labels

Command: ?14&N

Description: this command allows you to print a large number of labels with the current content of the print buffer. If there are variable fields on the label (date/time, counters, etc.) these are updated before each print.

Warning: after receiving this command, the printer continuously print all the required labels; to stop printing, just press the 'Esc' key. By pressing the 'Pause' button it is possible to temporarily stop the printing of labels; to resume printing, press the 'Pause' button again.

Parameter	Description
N = number of labels to print	**Values:** 1 to 9999

Example: ?14&12

With this command, the printer prints 12 labels.

?70& - printing a white label

Command: ?70&

Description: this command causes the emission of a completely white label.

    The command has no parameters and consists of only 4 characters followed by the line terminator (Carriage Return).

21 An example of layout programming

```
?67&0
?69&0
?07&120
?51&0
?27&
?81&0
?08&0
?63&0
?43&0
?44&1
?60&1
?76&00000000
?68&0
?06&-20
?66&0
?83&0,0,0
?83&0,1,0
?83&0,2,0
?83&0,3,0
?83&1,0,0
?83&1,1,0
?83&1,2,0
?83&1,3,0
?83&1,4,0
?83&1,5,0
?20&2,0
?20&3,0
?12&1
?A0&1
?37&0
?37&;03FFFFFFFFE
?37&;07FFFFFFFFF
?37&;0FFFFFFFFFF
?37&;0FFFFFFFFFF
?37&;0FE07FFFFFF8
?37&;1FC07FFFFFF8
?37&;1FC07FFFFFFC
?37&;3F80FFFFFFFC
?37&;7F80FFFFFFFE
?37&;7F80FFFFFFFE
?37&;7F01FFFFFFFE
?37&;7F01FFFFFFFE
?37&;7F03FFFFFFFF
?37&;7F03FFFFFFFF
?37&;7F03FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F07FFFFFFFF
?37&;7F03FFFFFFFE
?37&;7FC1FFFFFFFE
?37&;3FC0FFFFFFFE
?37&;3FE0FFFFFFFE
?37&;1FE07FFFFFFC
?37&;0FF87FFFFFF8
?37&;07FC3FFFFFF
?37&;07FE3FFFFFF
?37&;01FFFFFFFFC
```

```
?37&;00FFFFFFF
?37&;003FFFFFFC
?37&;001FFFFFF8
?37&;0001FFFFC
?37&;00007FFF8
?37&;00001FFE
?37&;00001FFE
?37&;00000FFC
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;000007F8
?37&;00000FFC
?37&;00000FFE
?37&;0003FFFFF
?37&;3FFFFFFFFFF8
?37&;7FFFFFFFFFFC
?37&;7FFFFFFFFFFC
?37&.
?A1&0
?04&C
?79&C,0,0,120,0,-20,0,00000000,00000000
?79&C,1,2,00000000,00000000
?45&C,2,10,154,618,479,2
?35&C,3,7,0,635,625,4
?45&C
,4,49,166,541,441,0
?72&C,5,1,88,523,18,11,0;Handle with care
?35&C,6,88,202,134,112,2
?34&C,7,9,151,620,2,7
?36&C,8,117,235,0
?72&C,9,1,266,213,17,11,1;12 Crystal
?72&C,10,1,266,287,17,11,2;glasses
?79&C,11,1,1,4,2,1
?78&C,12,1,76,363,8,146,3;5499981284
?72&C,13,1,64,30,5,22,4;FINE GLASS
?05&C
?22&0,634,1,1,0
```

22 Printer setting commands

?07& - print speed (⊛)

Command: ?07&S

Description: this command allows you to set the printing and label output speed.

For printers without LCD: at power on, the speed value is 80 mm / sec and can be changed with the command ?07&... The new value remains active until it is turned off or until a new updated value is received.

For printers with LCD: at power on, the speed value is loaded from the persistent memory, and is therefore the last that was set. The default value is 80 mm / sec.

The minimum speed value, valid for all printer models, is 35 mm/sec; the maximum speed values vary from model to model and are detailed in the 'Maximum print speed' table at the beginning of the manual.
Experimentally it is possible to define the optimal printing speed according to the desired print quality. In the case of barcode rotated by 90° or 270°, with lines or rectangles, it will be necessary to reduce the speed to obtain a better print quality.

Parameter	Description
S = print speed	**Values:** maximum = depends on the model **Default:** 110 mm/sec for Smart 2006 CS, Smart 2006 CS BGR and AH 2006 CS 80 mm/sec for all the other models

Example: ?07&100

sets the print speed to 100 mm/sec.

?06& - label alignment (gap) ☉

Command: ?06&SG

Description: this command (not valid in continuous paper mode) allows to change the stopping position of the label at the end of printing by making it advance (i.e. protrude further forward) or stopping it in before the zero position.
The gap value is marked by the sign; a plus sign ('+') advances the label with respect to zero, while a minus sign ('-') makes it stop before the zero position.
The gap value is kept in persistent memory even when the printer is turned off. If this parameter is programmed with a different value from the one already in memory, the printer will perform a realignment by expelling some labels.
The gap can be reset to zero by executing the procedure 'key pressed at boot' or by executing the command: ?06&+0

Parameter	Description
S = gap sign	**Values:** "+" positive sign: the label stops G dots beyond zero "-" negative sign: the label stops G dots before zero
G = gap value, expressed in dots	**Values:** 0 to 999

Example: ?06&+28

The label stops 28 dots beyond zero

?08& - paper advance at end of printing in continuous paper mode ⊛

Command: ?08&F

Description: when the printer is programmed to operate in continuous paper mode, the advancement of the paper during printing stops immediately after the last printed line. To advance the paper further, it is necessary to this command.

Parameter	Description
F = advance, expressed in dots	**Values:** 0 to 999 **Default:** 0

Example: ?08&110

this command advances the paper 110 lines after the end of printing.

?A2&6 - direct thermal or thermal transfer mode ☉

Command: ?A2&6,M

Description: with this command it is possible to make the printer work in direct thermal mode or in thermal transfer mode. When working in direct thermal mode, the printer does not perform checks for the presence of the ink ribbon.

Parameter	Description
6 = fixed value	**Values:** 6
M = working mode	**Values:** 0 = direct thermalmode 1 = thermal transfer mode **Default:** 1

?51& - head energy level ☿

?77& - print intensity

The intensity of the print can be adjusted in two different ways: via hardware (manually acting on the printer) and via software (with appropriate programming commands).

Models without display

Manual adjustment via hardware

The adjustment can be made by acting with a small flat-blade screwdriver on the screw (trimmer) located on the rear panel of the printers. A clockwise rotation causes the intensity level to increase.

Software adjustment

There are two software commands that can adjust the energy delivered by the printhead, thus allowing the most appropriate values to be linked to each label based on the type of material, printing speed and graphic composition required.

Command: ?51&L

Description: this command allows to select between the HIGH ENERGY level, capable of delivering more energy at the expense of the life of the printhead, and the LOW ENERGY level (recommended) which guarantees the best working conditions of the printhead even at 100% contrast.

The HIGH ENERGY mode can be especially useful for adapting the printer to ribbon or, in general, to media that require particular energy levels.

This setting is saved in persistent memory and therefore remains valid even after the printer is turned off.

Note: the HIGH ENERGY level can only be activated on special configurations

Parameter	Description
L = printhead energy level	**Values:** 0 = HIGH ENERGY level 1 = LOW ENERGY level **Default:** 1 = low energy

Example: ?51&0

enabling the high energy level.

Command: ?77&P

Description: the contrast can be adjusted by:

- acting with a small flat-blade screwdriver on the screw (trimmer) located on the rear panel of the printers. A clockwise rotation causes the intensity level to increase.
- sending the command that specifies the percentage of energy of the printhead. When the printer receives this command, it disables the hardware trimmer and the software adjustment remains valid until the printer is turned off or a different value is sent.

Parameter	Description
P = print intensity level	**Values:** 0 = minimum 100 = maximum **Default:** 50

Example: ?77&65

set the intensity percentage to 65%.

Models with display

Manual adjustment via hardware

In these models the rear screw (trimmer) is replaced by the arrows on the keypad located on the front panel. Pressing the up (or down) arrow causes the increase (or decrease) of the percentage of energy, together with a message on the display indicating the percentage itself.

Software adjustment

The energy adjustment software commands are identical to those described above.

?86& - print intensity boosting

Command: ?86&xxx

Description: the writing intensity can be controlled through hardware, via the adjustment screw (trimmer) on the back of the printer, or through software, via the commands ?51& and ?77&. The ?86& command allows to exceed the percentage limit of 100% and give the printhead a certain amount of power boost. When this command is used, the printer automatically switches to the low energy mode.

Warning: the higher the percentage, the shorter the life of the printhead. Exceeding the 100% value can cause the writing dots to break.

Parameter	Description
xxx = print intensity level	**Values:** 0 = minimum 150 = maximum

Example: ?86&110

set the intensity percentage to 65% in low energy mode.

?43& - cutter activation

Command: ?43&N

Description: with this command it is possible to enable/disabled the cutter. This command remains active until the printer is turned off or until the deactivation command is received. At power on, the cutter is disabled.

Parameter	Description
N = enable/disable the cutter	**Values:** 0 = cutter disabled 1 = cutter enabled **Default:** 0 = cutter disabled

Example: ?43&1

this command enables the cutter, which will cut the paper at the end of the print.

?44& - cutter periodicity setting

Command: ?44&KKK

Description: when the cutter is enabled and a batch of labels is printed, the cutting period must also be programmed; you must therefore specify every how many prints you want to activate the cutter. This programming allows the cutter, if enabled, to operate periodically instead of at the end of each print.

The setting of this command remains active until the printer is turned off or until another?44&KKK command, with a period different from the previous one, is received. At power on, the default value is set to 1, i.e. one cut after each print.

Parameter	Description
KKK = number of prints between cuts	**Values:** 1 = minimum 999 = maximum **Default:** 1

Example: ?44&10

this command causes the cutter to be activated only every 10 prints.

?67& - use of labels, tags or continuous paper ☹

Italora printers are able to work with labels, tags and continuous paper.

When set in label mode or in tag mode, the printer will maintain the alignment given by the size of the label or tag.

When set in continuous paper mode, the printer will advance the paper until the last written line, neglecting any alignment.

Below are the commands and settings needed to switch from one mode to another.

Labels, tags and continuous paper

It is necessary to distinguish between two types of printers:

- Printers without display
- Printers with display

Let's see each type in detail

Models without display

Command: ?67&N

Description: in the models without display, the settings for working with labels, tags or continuous paper are made using this software command.
Before sending the command, make sure that the white part of the label or tag is under the paper photo sensor. The programmed setting will be kept in the persistent memory even when the printer is turned off.

Parameter	Description
N = configuration parameter	**Values:** 0 = labels or tags with hole (fork photosensor) 1 = continuous paper (fork photosensor) 2 = tags without transparency and with black mark (reflective photosensor) 3 = tags with hole, alternatove mode (fork photosensor)

Example: ?67&1

after this command the printer will work in continuous paper mode.

Models with display

Printers with displays can be programmed in two different ways:

- Through software exactly as for models without display
- With the button of the keypad on the front panel (see the 'Main configuration menu' paragraph)

If the labels or tags mode is selected via the setup menu, it is then necessary to carry out the 'key pressed at boot' procedure, taking care to place the white part of the label or tag under the paper photosensor.

?A6& - reflection paper photosensor

Command: ?A6&F

Description: this command is used for choosing which paper photosensor to use in the labels/tags mode.

The use of the reflection photosensor allows to recognize tags with a black mark placed on the lower side (opposite side to the one on which printing takes place), which is impossible with the fork photosensor.

The use of the fork photosensor is instead advisable if you use labels on backing paper or tags with equidistant holes.

Is it an alternative command to ?67&

Parameter	Description
F = photosensor type	**Values:** 0 = fork photosensor 1 = reflection photosensor

Warning: use this command only if you work in label/tag mode

?69& - labels recognition mode ☉

If the labels used have pre-printed parts (company logo, colored parts, etc ...), to have a correct alignment, it may be necessary to change the way in which the printer recognizes the levels of transparency.

Models without display

In the models without display the settings are made via a software command.

Command: ?69&M

Parameter	Description
M = labels recognition mode	**Values:** 0 = default mode 1 = alternative mode **Default:** 0

Models with display

Printers with displays can be programmed in two different ways:

- Through software exactly as for models without display
- With the button of the keypad on the front panel (see the 'Main configuration menu' paragraph)

?63& - label backfeed before printing ⊛

Command: ?63&F

Description: When it is necessary to peel the label (i.e. make it come out of the printhead already detached from the backing paper), the GAP value (the command ?06&…) must be set = 0; in this way the edge of the label is positioned a few millimeters beyond the printhead, these millimeters of media which are therefore already ejected are no longer printable.

In order to write on the entire available surface of the label, it is necessary to retract the label just before printing.

Parameter	Description
F = label backfeed length, expressed in dots	**Values:** 0 to 999 **Default:** 0

Example: ?63&80

the printer retracts the label by 80 lines (dots) before printing.

?A2&14 - label backfeed in batch printing ☮

Command: ?A2&14,O

Description: this command allows to optimize the backfeed when printing batches of labels (i.e. using the command ?14&...)
Normally when a batch of labels is printed and the backfeed is used without the ?A2&14 command, the printer executes each print as follows:

1.   retracts the label of the programmed value
2.   prints the contents of the label
3.   realigns itself as before starting printing
4.   for the next print it restarts from the point 1

As can be seen, the retraction of the label occurs at each print.

With the command ?A2&4 it is possible to set other modes for the backfeed

Parameter	Description
14 = fixed value	**Values:** 14
O = backfeed optimizarion	**Values:** 0 = backfeed at the beginning of each print 1 = backfeed only on first print 2 = backfeed at the end of each print **Default:** 0

Funzionamento:

- mode 1 (?A2&14,1): the printer will retract the label only before the first print, maintaining the new alignment until the batch of prints is finished.

  The printer will print this way:

  1.   retracts the label of the programmed value
  2.   print the contents of the first label
  3.   print the contents of the second label
  4.   print the contents of the third label
  5.   ...
  6.   print the contents of the last label
  7.   realigns itself as before starting printing

  In this way, the printer retracts the label only at the beginning of the batch, maintaining the new alignment until the end and thus optimizing execution times.
  The new programmed setting will be kept in the persistent memory.

- mode 2 (?A2&14,2): the printer will retract each label as soon as printing is finished.

  The printer will print this way:

  1.   prints the contents of the label
  2.   retracts the label of the programmed value realigning itself for printing
  3.   for the next print it restarts from the point 1

Example: ?A2&14,1

backfeed only on first print.

?68& - enabling/disabling the label taken sensor ☉

Italora printers can be equipped with an optional photocell to check that the last printed label has been removed. This photosensor, familiarly called "label taken sensor", when enabled, inhibits the printing of a label until the previous one has been taken.

It is necessary to distinguish between two types of printers:

- Printers without display
- Printers with display

Let's see each type in detail.

Models without display

Command: ?68&F

Description: this command allows to enable/disable the label taken sensor.

Parameter	Description
F = enable/disable label taken sensor	**Values:** 0 = label taken sensor disabled 1 = label taken sensor enabled

Example: ?68&1

this command enables the label taken sensor

Models with display

Printers with displays can be programmed in two different ways:

- Through software exactly as for models without display
- With the button of the keypad on the front panel (see the 'Main configuration menu' paragraph)

?A2&21 - pre-paper end sensor setting ☻

Some **Italora** printers can be equipped with an optional photosensor to stop operation as soon as the label roll is empty.
This photosensor, called pre-paper end, when enabled, inhibits operation and activates the paper end alarm to prevent the final part of the label roll from going over the rubber rollers, creating possible gluing problems.

Command: ?A2&21,T

Description: this command allows to enable/disable the pre-end paper sensor and to choose its sensitivity.
The functionality can also be programmed through the setup menu accessible on the LCD.

Parameter	Description
21 = fixed value	**Values:** 21
T = sets the pre-end paper sensor	**Values:** 0 = disabled 1 = enabled, medium sensitivity (suggested) 2 = enabled, high sensitivity 3 = enabled, low sensitivity **Default:** 0

?A2&3 - SUB character at power on ☉

Command: ?A2&3,T

Description: if this function is activated, the printer will transmit a control character at the first machine status query made by the external device. This feature allows to monitor any voltage drops on the printer power line. The control character transmitted is the SUB, which has an ASCII code = $1A_{hex} = 26_{dec}$

Parameter	Description
3 = fixed value	**Values:** 3
T = SUB character at power on	**Values:** 0 = transmission OFF (disabled) 1 = transmission ON (enabled) **Default:** 0

?A2&15 - character transmission upon activation of the Start Print signal ☉

Command: ?A2&15,T

Description: if this function is activated, the printer will transmit a control character each time the external Start Print signal is activated. The transmitted control character is ETB, which has an ASCII code = 17_{hex} = 23_{dec}.

Parameter	Description
15 = fixed value	**Values:** 15
T = transmission of the ETB character	**Values:** 0 = transmission OFF (disabled) 1 = transmission ON (enabled) **Default:** 0

?50& - character transmission at the end of printing and the end of application

Description: the following command allows the printer to transmit the control character 'Device Control 2' (DC2, of ASCII code 18 decimal = 12 hexadecimal) at the end of each print cycle and the control character 'Device Control 4' (DC4, of ASCII code 20 decimal = 14 hex) at the end of each application cycle.

Parameter	Description
S = character transmission at the end of printing and at the end of the application	**Values:** 0 = no character transmitted at the end of the print 1 = DC2 character transmitted at the end of printing 2 = no character transmitted at the end of the application 3 = DC4 character transmitted at the end of the application **Default:** 0 = no character transmitted at the end of the print 2 = no character transmitted at the end of the application

Example: ?50&1
              ?50&2

the control character DC2 is sent at each end of printing,

Example: ?50&1
              ?50&3

at each end of printing the control character DC2 is sent and at each end of application the control character DC4 is sent.

?60& - print button configuration

Command: ?60&N

Description: this command allows to set the operating mode of the print button of the printer.
The print button can operate in multiple modes; one of these is the reprint of the last printed label. This function, which is enabled at power up, can be changed with the following command.

Parameter	Description
N = print button configuration parameter	**Values:** 0 = print button disabled 1 = repetition of the last print (condition at power on) 2 = obsolete 3 = print blank labels

?76& - character filter for numeric barcodes ☉

?76& - endless print cycle ☉

?76& - activation of the last used layout at power on ☉

Command: ?76&ABCDEFGH

Description: with this command it is possible to enable/disable some particular functions:
- filtering non-numeric characters from the data of a numeric-only barcode.
- enter an infinite print cycle immediately after turning on the printer.
- activate the last used layout immediately after turning on the printer.

The last two functions, for example, are useful for carrying out an infinite print cycle when the photo-pick-up label is also activated. In this mode, it is possible to program the label format with the aid of a PC only once and operate the printer without the PC itself.

Parameter	Description
A = unused	**Values:** 0
B = unused	**Values:** 0
C = unused	**Values:** 0
D = unused	**Values:** 0
E = obsolete	**Values:** 0
F = non-numeric character filter for numeric barcodes (such as EAN13)	**Values:** 0 = disabled 1 = enabed **Default:** 0 **Note:** if F = 0 is set, the printer signals will enter an error state upon receipt of a string containing non-numeric data; if, on the other hand, F = 1, the printer will accept strings containing non-numeric data and eliminate the non-numeric characters.
G = activation of the infinite print cycle at power on	**Values:** 0 = disabled 1 = enabed **Default:** 0 **Note:** it is recommended to use this mode together with the label taken programming, to prevent the labels from being printed one after the other without checking when the printer is turned on **Important:** to exit the infinite print cycle mode, it is necessary to send the !2 command to the printer or turn it off and on following the initialisation procedure with the 'key pressed at boot'.
H = activation of the last layout used at power on	**Values:** 0 = disabled 1 = enabed **Default:** 0 **Note:** activating a layout means composing the layout of the label on the label, without however entering the variable data

Example: ?76&0000011

this command activates the infinite print cycle and the latest used layout when the printer is turned on.

133

?A2&2 - print after last variable field ☻

Command: ?A2&2,M

Description: **Italora** printers are designed to automatically print the label when the last of the variable fields present in it has been composed. If this working mode is not necessary, it can be disabled; in this way the printer will always need a specific command to print the label and will no longer print automatically even if all the variable fields have been composed.

Note: automatic printing is only compatible with the ?25& command, not with ?A5&

Parameter	Description
2 = fixed value	**Values:** 2
M = print after last variable field	**Values:** 0 = DO NOT print after last variable field 1 = AUTOMATICALLY print after last variable field **Default:** 1

?A4& - print after last variable field ☉

Command: ?A4&M

Description: **Italora** printers are designed to automatically print the label when the last of the variable fields present in it has been composed. If this working mode is not necessary, it can be disabled; in this way the printer will always need a specific command to print the label and will no longer print automatically even if all the variable fields have been composed.

This is an alternative command to ?A2&2,M.

Note: automatic printing is only compatible with the ?25& command, not with ?A5&

Parameter	Description
M = print after last variable field	**Values:** 0 = DO NOT print after last variable field 1 = AUTOMATICALLY print after last variable field **Default:** 1

?A3&0 - temporary activation of an infinite cycle of prints

Command: ?A3&0,X

Description: with this command it is possible to activate or deactivate the infinite prints cycle without saving the setting in the persistent memory.
This command can be useful when, after sending the last variable field of the label, you want to have an automatic issue of labels, perhaps controlled by the label taken sensor.

The settings made with this command remain valid:

- until the printer is turned off
- until the same command is sent with a different parameter

Parameter	Description
0 = fixed value	**Values:** 0
X = enable/disable the inifnite print cycle	**Values:** 0 = cycle disabled 1 = cycle disabled

?57& - user code setting ☻

Command: ?57&XXX

Description: this command allows to set a 3-character code (letters, digits or control characters), which will be stored in the persistent memory.
The programmed user code can be read with the command ?54&5.

Parameter	Description
XXX = 3 characters of the user code	**Values:** letters, digits or control characters

?88& - printed labels counter

Command: ?88&N

Description: this command allows you to set the initial value of a counter used to count the printed labels. With each printed label, the counter value increases by 1 and can be checked by querying the printer with the command ?54&23.

Parameter	Description
N = initial value of the counter (maximum 6 digits)	**Values:** 0 = minimum 999999 = maximum

?A8& - delay at the start of printing ☺

Command: ?A8&ss,mmm

Description: The printer can be programmed to have a delay before printing.
The wait begins immediately after any event that causes a label to be printed: pressing the front button, using the external START PRINT signal, printing a batch of labels, receiving software printing commands.

Parameter	Description
ss = seconds	**Values:** 0 to 99 **Default:** 0
mmm = milliseconds	**Values:** 0 to 999 **Default:** 0

?F1& - temporary activation of the PRINT END signal

Command: ?F1&ctSec

Description: the following command allows to temporarily activate the PRINT END signal for a duration of ctSec hundredths of a second.

Parameter	Description
ctSec = hundredths of a second of activation of the PRINT END signal	**Values:** 0 to 999

?A9& - subdivision of the label ☣

Command: ?A9&N

Description: The printer can be programmed to partially print the label.
This command is a valid alternative to using the backfeed (?63& command).

Parameter	Description
N = Y coordinate, expressed in dots, of the point at which the label must be divided	**Values:** 0 to 9999 **Default:** 0

Example: having a label 500 lines (dot) long, the ?A9&100 command will print the label up to coordinate 100, the remainder will be printed at the next print request. In this way it is possible to print the END of the first label (from coordinate 101 to coordinate 500) and the BEGINNING of the next one (from coordinate 0 to coordinate 100).

?B3& - programming of the 'A' layout only in RAM

Command: ?B3&P1

Description: the following command allows to store the layout 'A' in the RAM memory of the printer instead of using the FLASH memory, thus further speeding up the composition of the label layout.

When the printer is powered on, this parameter is set to zero, enabling the use of the FLASH memory.

Parameter	Description
P1 = layout in RAM	**Values:** 0 = do not use RAM to store the 'A' format 1 = use RAM to store the 'A' format

?A7& - serial port parameters configuration - mode 1 ☉

Command: ?A7&P1,P2,P3,P4

Description: with this command it is possible to program the parameters of the serial port of the printer. You will need to turn the printer off and on after sending this command for the changes to take effect. After receiving this command, the printer is no longer able to receive any characters and will remain in an offline state until it is rebooted.

Parameter	Description
P1 = baud rate setting	**Values:** 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud 3 = 19200 baud 4 = 38400 baud 5 = 57600 baud 6 = 115200 baud **Default:** 2 = 9600 baud
P2= parity setting	**Values:** 0 = no parity 1 = odd parity 2 = even parity **Default:** 0 = nessuna parità
P3 = data bits setting	**Values:** 0 = 7 bits 1 = 8 bits **Default:** 1 = 8 bits
P4 = stop bits setting	**Values:** 0 = 1 bits 1 = 2 bits **Default:** 0 = 1 bits

Example: ?A7&5,0,1,0

with this command the serial port is configured with: baud rate = 57600, no parity, 8 data bits and 1 stop bit.

?85& - serial port parameters configuration - mode 2 ☻

Command: ?85&B,P

Description: with this command it is possible to program the parameters of the serial port of the printer. You will need to turn the printer off and on after sending this command for the changes to take effect. After receiving this command, the printer is no longer able to receive any characters and will remain in an offline state until it is rebooted.

Parameter	Description
B = baud rate setting	**Values:** 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud 3 = 19200 baud 4 = 38400 baud 5 = 57600 baud **Default:** 2 = 9600 baud
P = serial port parameters setting	**Values:** 1 = no parity, 8 data bits, 1 stop bit 2 = even parity, 7 data bits, 1 stop bit 3 = odd parityi, 7 data bits, 1 stop bit **Default:** 1 = no parity, 8 data bits, 1 stop bit

Example: ?85&5,1

with this command the serial port is configured with: baud rate = 57600, no parity, 8 data bits and 1 stop bit.

?B5& - COM2 serial port parameters configuration - mode 1 ⊛

Command: ?B5&P1,P2,P3,P4

Description: with this command it is possible to program the parameters of the COM2 serial port (Y8) of the printer, The command must be sent to the printer followed by an on/off cycle to make the changes active. After receiving this command, the printer is no longer able to receive any characters and will remain in an offline state until it is rebooted.

Parameter	Description
P1 = baud rate setting	**Values:** 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud 3 = 19200 baud 4 = 38400 baud 5 = 57600 baud 6 = 115200 baud **Default:** 2 = 9600 baud
P2= parity setting	**Values:** 0 = no parity 1 = odd parity 2 = even parity **Default:** 0 = nessuna parità
P3 = data bits setting	**Values:** 0 = 7 bits 1 = 8 bits **Default:** 1 = 8 bits
P4 = stop bits setting	**Values:** 0 = 1 bits 1 = 2 bits **Default:** 0 = 1 bits

Example: ?B5&5,0,1,0

with this command the COM2 serial port (Y8) is configured with: baud rate = 57600, no parity, 8 data bits and 1 stop bit.

?A2&0 - control characters management ☻

Command: ?A2&0,M

Description: with this command it is possible to set the reception mode of the control characters. The two possible ways are:

1. <u>Standard mode</u>: no input characters are changed

2. <u>Mainframe mode</u>: all control characters (less than ASCII code 32) in input are transformed into the CR character (Carriage Return = ASCII code $0D_{hex} = 13_{dec}$)

Parameter	Description
0 = fixed value	**Values:** 0
M = control characters reception mode	**Values:** 0 = STANDARD mode 1 = MAINFRAME mode **Default:** 0

?A2&1 - national character set setting ⊛

Command: ?A2&1,S

Description: each national character set is distinguished by special characters belonging to the alphabet of that country; this is a command that allows to select the national character set to use for texts composition. See the 'National character sets' paragraph for the table containing all national characters.

Parameter	Description
1 = fixed value	**Values:** 1
S = indicates the character set to activate	**Values:** 0 = U.S.A. character set 1 = Italia character set 2 = Svezia character set 3 = Norvegia character set 4 = Francia character set 5 = Germania character set 6 = Gran Bretagna character set **Default:** 0

?71& - manual setting of the label photosensor levels

Command: ?71&K,X

Description: The transparency values of the materials used are automatically acquired by the printer with the initialization procedure 'key pressed at boot'. In case of irregular labels ejection caused by wrong transparency levels, it is possible to use this command to manually set the levels. To manage the labels, the printer uses to 3 levels of transparency and an intermediate stage:
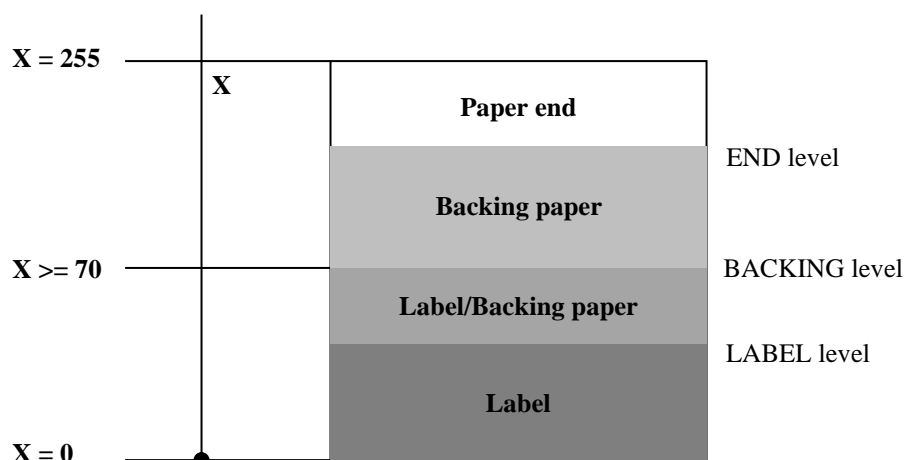
The levels of transparencies LABEL, BACKING and END are X values to be interpreted in the following way:

- 0 to **LABEL level**   Printer recognizes labels

- **LABEL level** to **BACKING level**   Paper/backing or backing/paper transition occurs

- **BACKING level** to **END level**   Printer recognizes backing paper

- Over **END level**   Printer recognizes that there is no paper and enters an error state

Transparency levels are automatically acquired by the printer. In the event of irregular operation, however, (i.e. if the printer does not keep alignment appropriately) it is possible to enter via software the correct values for the levels.

Parameter	Description
K = level to be edited	**Values:** 0 = makes the LABEL level coincide with the BACKING level, setting them to the average of the two. The X parameter is ignored. **Liv.SIL = Liv. ET = Liv.ET+(Liv.SIL-Liv.ET)/2** 1 = sets **BACKING level** to the X value 2 = sets **LABEL level** to the X value
X = value to assign to the level	**Values:** 0 to 255

Note: Abnormal situations are usually resolved with the command ?71&0,0

Adjusting **BACKING level** and **LABEL level** requires specific knowledge of printer operation; contact your distributor for the necessary information. In any case, an incorrect setting does not affect the operation of the printer which can be restored with the initialization procedure.

?A2&18 - flash memory backup of the graphic print buffer ⊗

Command: ?A2&18,B

Description: this command allows to copy the graphic print buffer in FLASH memory and automatically restore the image when the printer is turned on.

Parameter	Description
18 = fixed value	**Values:** 18
B = sets the backup mode	**Values:** 0 = backup OFF (disabled) 1 = backup ON (enabled) and stores the graphic print buffer active at the instant the command is received. **Default:** 0

Note: If this function is activated, the FLASH memory area dedicated to LOGO storage (command ?37&) will no longer be available and the previously stored logos will be lost.

If this function is activated, it won't be possible to obtain the composition of the test label at power on; to compose the test label you can use the command ?X0&.. can be used

?B7&0 - configuration setting in flash memory ☸

Command: ?B7&0,P1

Description: the following command allows to store the programmed settings in the FLASH memory. The flash memory offers the advantage of being able to be erased only after precise instructions while the RAM memory can be more subject to electrical interferences that can compromise its content.

Parameter	Description
0 = fixed value	**Values:** 0
P1 = operation to be performed	**Values:** 0 = flash memory initialization 1 = save configuration in flash memory 2 = delete configuration in flash memory

?B7&1 - serial port configuration in flash memory ☉

Command: ?B7&1,E,P1,P2,P3,P4

Description: the following command allows to store the serial port settings in FLASH memory.

Parameter	Description
1 = fixed value	**Values:** 1
E = enable/disable the serial configuration	**Values:** 0 = disable the serial configuration 1 = enable the serial configuration
P1 = baud rate setting	**Values:** 0 = 2400 baud 1 = 4800 baud 2 = 9600 baud 3 = 19200 baud 4 = 38400 baud 5 = 57600 baud 6 = 115200 baud
P2= parity setting	**Values:** 0 = no parity 1 = odd parity 2 = even parity
P3 = data bits setting	**Values:** 0 = 7 bits 1 = 8 bits
P4 = stop bits setting	**Values:** 0 = 1 bits 1 = 2 bits

Example: 'set serial port parameters
?B7&1,1,5,0,1,0

'save
?B7&0,1

?B7&2 - test label descriptive text in flash memory ☉

Command: ?B7&2,E,S

Description: the following command allows to store a text to be written in the test label in FLASH memory.

Parameter	Description
2 = fixed value	**Values:** 2
E = enable/disable string configuration	**Values:** 0 = disable the configuration of the string 1 = enable the configuration of the string
S = string to be printed, max 32 characters	**Values:** string to be printed, max 32 characters

Example: 'string setting
?B7&2,1,ITALORA TEST

save
?B7&0,1

?39& - disabling the print button ☉

Command: ?39&

Description: with this command it is possible to disable the print button.

?40& - enabling the print button ⊛

Command: ?40&

Description: with this command it is possible to enable the print button.

?A2&19 - communication channel for replies ����

Command: ?A2&19,C

Description: this command allows to choose on which communication channel to receive replies from the printer.

Parameter	Description
19 = fixed value	**Values:** 19
C = sets the communication channel for replies	**Values:** 0 = reply on the last port where a character was received 1 = reply on COM1 (DB9) 2 = reply on COM2 (Y8) 3 = reply on USB 4 = reply on Ethernet port #1 5 = reply on Ethernet port #2 6 = reply on Ethernet port #3 **Default:** 0

?A2&30 - communication mode on DB9 (RS232/RS422) ⊛

Command: ?A2&30,A

Description: this command allows to set the communication that takes place via the DB9 connector in RS232 or RS422 mode

Parameter	Description
30 = fixed value	**Values:** 30
A = DB9 connector setting in RS232 or RS422	**Values:** 0 = RS232 1 = RS422

?A2&31 - paper photosensor energy level ⊛

Command: ?A2&31,A

Description: this command allows to change the energy level used for the paper photosensor.

Valid only for printers with electronics directly integrated into the mechanics.

Parameter	Description
31 = fixed value	**Values:** 31
A = sets the energy level of the paper photosensor	**Values:** 0 = normal level 1 = higher energy level (+) 2 = higher energy level (++) 3 = higher energy level (+++) **Default:** 0

?A2&32 - saving mode for persistent parameters ☉

Command: ?A2&32,A

Description: this command allows to change the way persistent parameters are saved.

By disabling the automatic saving (A = 0), the maximum performance is reached in terms of interpretation speed of the commands sent to the printer.

Parameter	Description
32 = fixed value	**Values:** 32
A = setting of the saving mode for persistent parameters	**Values:** 0 = automatic saving daibled 1 = sautomatic saving enabled 2 = instant manual saving when this command is received **Default:** 1

?A2&34 - enabling/disabling the encoder ☻

Command: ?A2&34,A

Description: this command allows to enable/disable the encoder.

Parameter	Description
34 = fixed value	**Values:** 34
A = enable/disable the encoder	**Values:** 0 = encoder disabled 1 = encoder enabled **Default:** 1

?A2&36 - alarm threshold on the length of the paper photosensor readings ⊛

Command: ?A2&36,A

Description: this command allows to set a threshold on the length of the readings, without detecting paper/silicone transitions, made by the paper photosensor.
When the threshold is reached, the printer will go into alarm.

Parameter	Description
36 = fixed value	**Values:** 36
A = alarm threshold, in millimeters	**Values:** DFT to 9999 with DFT the distance from paper photosensor to printhead in millimeters, multiplied by 2

?A2&37 - ribbon photosensor threshold ⚉

Command: ?A2&37,A

Description: this command allows to set the threshold below which the reading from photo ribbon is considered valid (ribbon present).

Parameter	Description
37 = fixed value	**Values:** 37
A = ribbon photosensor threshold	**Values:** 0 to 9999 all values greater than 253 will be automatically set to 688 **Default:** 688

?A3&2 - real-time reply to priority commands '!'

Command: ?A3&2,X

Description: with this command it is possible to enable or disable the real-time reply to priority commands starting with '!'. Useful for managing data containing combinations such as '!*' in the datamatrix. A similar command that is faster in its execution is the !%

Parameter	Description
2 = fixed value	**Values:** 2
X = enable/disable the real-time reply to prioritary commands	**Values:** 0 = disabled 1 = enabled

?A3&3 - reset '?' commands count

Command: ?A3&3,0

Description: with this command it is possible to reset the count of commands starting with '?' received from the printer. This count is displayed on the LCD in the event of a syntax error in the commands received (refer to 'Appendix B')

Parameter	Description
3 = fixed value	**Values:** 3
0 = fixed value	**Values:** 0

?Y8& - reset to factory settings

Full reset to factory settings

Command: ?Y8&0,9

Description: with this command it is possible to reset all the settings stored in the printer persistent memory (indicated in this manual with the ☻ symbol).

Turn the printer off and back on after sending this command.

Parameter	Description
0 = fixed value	**Valori:** 0
9 = fixed value	**Valori:** 9

Reset of communication parameters to factory settings

Command: ?Y8&5,9

Description: with this command it is possible to reset the communication parameters of the serial and Ethernet ports that are stored in the printer persistent memory (indicated in this manual with the ☻ symbol).

The printer will automatically restart after receiving this command.

Parameter	Description
5 = fixed value	**Valori:** 5
9 = fixed value	**Valori:** 9

23 Software commands to manage external signals (Pick and Place)

The Pick & Place operating mode allows an external device (e.g. a PLC, a presence photocell, a pneumatic applicator, etc...) to block or enable the printing of a label.

When the Pick & Place option is active, three optoisolated signals are available:

- INPUT-1

  START PRINT - START APPLY

  Input to start a print or to allow an application

- OUTPUT-1

  PRINT END

  Output that signals the end of the print cycle

- OUTPUT-2

  ALARM - AUX

  Auxiliary output to signal error conditions

The START PRINT signal is used to request printing and can work in 2 ways, as described below.

The activation of the signals can be done via the front keypad (for models with display) or via software commands.

Refer to 'Appendix E' for information on hardware signal wiring.

The following commands allow to manage external signals for printing control by an external device.

?A2&4 - enabling/disabling the START PRINT signal ⊛

Command: ?A2&4,M

Description: using this command it is possible to enable/disable the START PRINT signal in input to the printer.

The setting made with this command remains present in the printer's persistent memory even after it is turned off.

Parameter	Description
4 = fixed value	**Values:** 4
M = enable/disable the START PRINT signal	**Values:** 0 = disable the signal 1= enable the signal **Default:** 0

?A2&17 - enabling/disabling the START APPLY signal ⊛

Command: ?A2&17,M

Description: the START APPLY input signal can be enabled or disabled through a software command. If the signal is activated, the printer prints the label and waits for the START APPLY signal to execute the application. The setting made with this command remains present in the printer's persistent memory even after it is turned off.

Parameter	Description
17 = fixed value	**Values:** 17
M = enable/disable the START APPLY signal	**Values:** 0 = disable the signal 1 = enable the signal **Default:** 0

?A2&8 - START PRINT signal mode �

Command: ?A2&8,X

Description: this command allows to choose how to use the START PRINT input signal.
There are two ways:

0.   CONSENT: dependent on a print command (for example after the command ?14&…). This mode implies that the signal starts the printing of a label only if a print queue it's already present in the printer (see ?14&... command), otherwise no label will be printed.

1.   COMMAND: print a label even without having sent any other print command. Each time the signal is activated, a label will be printed.

Parameter	Description
8 = fixed value	**Values:** 8
X = START PRINT signal mode	**Values:** 0 = only with existing print queue use 1 = direct indipendent use **Default:** 1

?A2&9 - START PRINT logic level ☣

Command: ?A2&9,L

Description: normally, if an external connection is used, the START PRINT signal is enabled when the transistor is conducting. With the following command it is possible to invert the logic of this signal (and make it active when the transistor is off), thus adapting to all possible situations.

Parameter	Description
9 = fixed value	**Values:** 9
L = START PRINT logic level	**Values:** 0 = inverted logic level (transistor disabled) 1 = standard logic level (transistor in conduction) **Default:** 1

?A2&5 - enabling/disabling and mode of the PRINT END signal ☉

Command: ?A2&5,M

Description: using this command it is possible to enable/disable the PRINT END output signal. The setting made with this command remains present in the printer's persistent memory even after it is turned off.

Parameter	Description
4 = fixed value	**Values:** 4
M = enable/disable the PRINT END signal	**Values:** 0 = disable the signal 1 = enable the first mode 2 = enable the second mode **Defualt:** 0 refer to the next page for details on the modes

?66& - PRINT END signal mode ☯

Command: ?66&M

Description: with this command it is possible to select the PRINT END signal mode.
To enable/disable this signa, refer to the ?A2&5,.. command.
The setting made with this command remains present in the printer's persistent memory even after it is turned off.

Parameter	Description
M = mode selection	**Values:** 0 = first mode 1 = second mode **Default:** 0 refer to the next page for details on the modes

First mode:

In the first mode, the printer will emit a 250 msec long signal (optotransistor in conduction) starting when it finishes printing a label.

In this phase, the PRINT END signal switches from one logic level to another based on the configuration set. The minimum waiting time between two labels in this case is 250 msec.
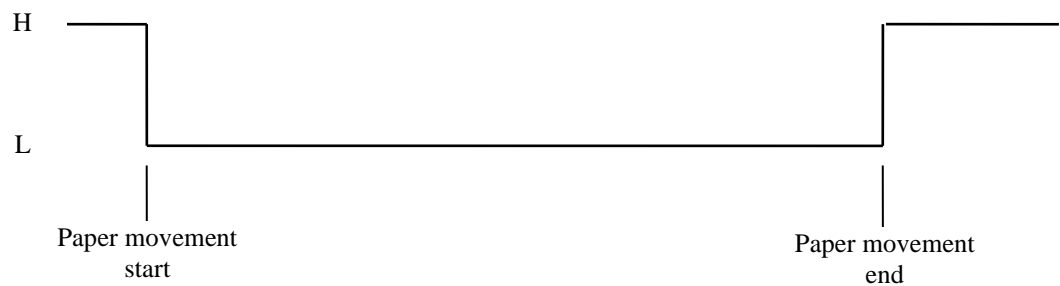
The signal timing diagram is shown below.

End of label printing
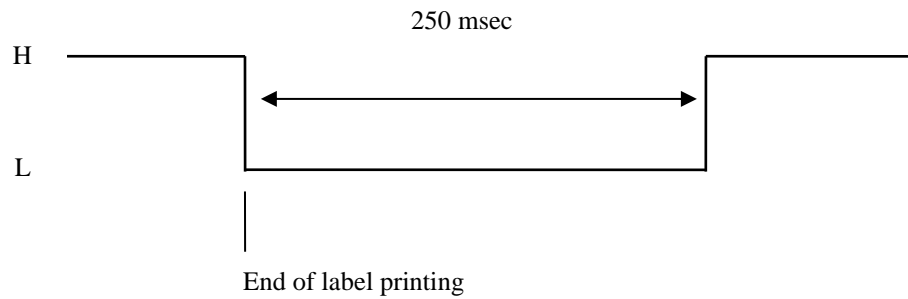
Second mode:

In the second mode, the printer will emit a signal (optotransistor changes state) during the paper movement, therefore, in this period, the signal level is opposite to that in rest conditions.

The signal timing diagram is shown below.

Refer to Appendix E for information on hardware signal wiring.

?A2&35 - PRINT END signal duration ☻

Command: ?A2&35,A

Description: this command allows you to change the duration, in milliseconds, of the PRINT END signal.

Parameter	Description
35 = fixed value	**Values:** 35
A = duration, in milliseconds, of the PRINT END signal	**Values:** 0 to 9999 **Default:** 250

?A2&10 - PRINT END logic level ☻

Command: ?A2&10,L

Description: normally, if an external connection is used, the PRINT END signal is enabled when the transistor is conducting (active low). With the following command it is possible to invert the logic of this signal (and make it active when the transistor is off), thus adapting to all possible situations

Parameter	Description
10 = fixed value	**Values:** 10
L = PRINT END logic level	**Values:** 0 = inverted logic level (transistor disabled) 1 = standard logic level (transistor in conduction) **Default:** 1

?A2&11 - ALARM/AUX logic level �})

Command: ?A2&11,L

Description: the ALARM signal is used to indicate the operating condition of the printer to an external device. In particular, in the end of paper or end of ribbon conditions, the signal changes state according to the set configuration and doesn't change back until normal operation has been restored. Normally the ALARM signal is active low. It is possible to invert the logic of this signal (and make it active high when the transistor is off), thus adapting to all possible situations.

  Refer to Appendix E for information on hardware signal wiring.

Parameter	Description
11 = fixed value	**Values:** 11
L = ALARM/AUX logic level	**Values:** 0 = inverted logic level (transistor disabled) 1 = standard logic level (transistor in conduction) **Default:** 1

?A2&12 - START PRINT minimum activation time ⌚

Command: ?A2&12,L

Description: the activation time of the START PRINT signal (time necessary for the printer to recognize it as valid) is calculated between the rising edge and the falling edge of the signal itself. The activation time must normally be greater than 50ms, this means that if the signal is activated for a period less than this value it is ignored by the printer. This timing can be changed via software. The programmed values can vary from a minimum of 0msec to a maximum of 990ms.

If a recognition time equal to zero is programmed, the signal will work in "level mode"; therefore, only the "peak" will be sufficient to be recognized as valid by the printer. In this situation, even the falling edge is no longer necessary: an always high signal will be recognized as always valid.

Parameter	Description
12 = fixed value	**Values:** 12
L = minimum activation time of the START PRINT signal, in hundredths of a second.	**Values:** 0 to 99 **Default:** 5

Example: ?A2&12,3

set a minimum activation time of 30ms.

?A2&13 - START PRINT delay ☉

Command: ?A2&13,R

Description: this command allows to set a delay between the activation of the START PRINT signal and the start of printing. This feature can be useful when the external sensor that activates the START PRINT signal is not located near the label output. For example, a check for the presence of packages that pass over a conveyor belt not in the immediate vicinity of the label output. The delay must be expressed in milliseconds.

Parameter	Description
13 = fixed value	**Values:** 13
R = delay (in milliseconds) before printing	**Values:** 0 to 9999 **Default:** 0

Example: ?A2&13,500

half second delay after each valid START PRINT signal.

?89& - alarm for printed labels counter and count on LCD with F2 menu (☻)

Command: ?89&A,B

Description: this command allows to:

- set an alarm threshold on the printed labels counter which, once reached, enables the alarm signal and the red backlighting of the LCD. The setting made remains present in the printer's persistent memory even after it is turned off
- enable/disable the printed labels count menu, accessible from the main printer screen by pressing F2

Parameter	Description
A = parameter to configure	**Values:** 0 = alarm threshold value 1 = enable/disable alarm 2 = enable/disable F2 menu
B = if A=0: alarm threshold value if A=1: enable/disable if A=2: enable/disable	**Values:** if A=0: 0 to 999999999 if A=1: 1 = ON 0 = OFF if A=2: 1 = ON 0 = OFF

?A2&20 - number of copies printed for each START PRINT signal received ☉

Command: ?A2&20,N

Description: this command allows to choose how many copies to print at each START PRINT signal received by the printer.

Parameter	Description
20 = fixed value	**Values:** 20
N = number of copies to print for each START PRINT signal	**Values:** 0 to 9999 **Default:** 1

24 Software commands to manage applicator signals (I/O 16+16)

The expansion board provides 32 opto-isolated lines (16 IN + 16 OUT) that can be controlled directly from the printer CPU.

The control procedures of the input signals and output drivers can be easily programmed by the user with sequences of commands illustrated in the specific hardware and programming manual of the expansion board.

The following commands are available to activate or verify the applicator cycle or individual I/O channels:

?A2&7 - enable/disable the applicator cycle ⊗

Command: ?A2&7,C

Description: with this command it is possible to enable/disable the control cycle of the input/output signals for the management of external devices such as label applicators, photocells, etc...

The specific programming of the I/O signal control cycle must be done by following the instructions in the 'Hardware and Applicator Programming Manual'

Parameter	Description
7 = fixed value	**Values:** 7
C = enable/disable the applicator cycle	**Values:** 0 = cycle disabled 1 = cycle enabled **Default:** 0

?B1& - control output signals

Command: ?B1&N,S

Description: with this command it is possible to activate or deactivate an output signal of the I/O expansion board.

Parameter	Description
N = channel nunber	**Values:** 0 to 15
S = signal state	**Values:** 0 = disabled 1 = enabled

?B2& - control input signals

Command: ?B2&

Description: with this command it is possible to check the 16 input signals of the I/O expansion board.

The status of the signals is shown on the display (if present) and sent to the serial port with a sequence of 16 characters containing '0' or '1' depending on the status of the signals.

?B0& - I/O expansion board signals programming

Command: ?B0&1

Description: with this command it is possible to start programming the I/O expansion signals. For more information on the procedure, refer to the 'Hardware and Applicator Programming Manual'

Parameter	Description
1 = fixed value	**Values:** 1

25 Counters and clock

What is a counter?

Counters are particular fields (texts or barcodes) that can be inserted on a label. With these fields it is possible, during the printing of a batch of labels, to make a count (incremental or decremental) and print the reached number on the label; each label can thus be distinguished by a unique number that increases or decreases as the prints are made.

The counter fields can contain numbers up to 16 digits and can also be combined with fixed parts to be prepended or postponed to the number indicating the actual count.

The counters are composed of two fundamental elements: calculation engine and print image.

Let's see these in more details.

Calculation engines

This defines those areas of the printer's persistent memory in which the counting calculations are carried out and in which the values reached will be kept even after the machine is turned off.

There are 4 available calculation engines: from #0 up to #3.

The calculation engines are independent of the print images; this means that the same engine can be associated with two or more different images. This feature allows to print two separate fields (therefore two different images) on the label, perhaps one of which is a text and the other is a barcode, using the same calculation engine.

Print images

The print images are those parts of the label that are chosen to print the content of the calculation engines.

They are associated with the information necessary for printing (for example coordinates of the field, type of character or barcode to be used, etc...) and the link with the calculation engine to perform the count.

There are 6 print images available: from #0 up to #5.

Note:

The counters, when enabled, are managed during the printing of batches of labels (command ?14&) but are NOT managed if the printer is requested to print the last composed label (e.g. by pressing the button on the front panel).

The commands needed to program the counters are the following:

- **?18&...** calculation engines settings
- **?82&...** print images settings
- **?83&...** enable/disable counters

?18& - calculation engines settings

Command: ?18&N,ST,MAX,MIN,U/D,MOD,INC

Description: with this command it is possible to program all the parameters related to the counter.

Parameter	Description
N = engine selection	**Values:** 0 to 3
ST = initial value to print. The number of characters specified determines how many digits to print in the field on the label	**Values:** 0 to 9999999999999999 max 16 digits
MAX = maximum value reached by the increase; after which the counter restarts from MIN	**Values:** 0 to 9999999999999999 max 16 digits
MIN = minimum value reached by the decrease; after which the counter restarts from MAX	**Values:** 0 to 9999999999999999 max 16 digits
U/D = counting direction	**Values:** 1 = incremental count 2 = decremental count
MOD = module: number of identical labels printed before varying the counter value	**Values:** 0 to 9999999999
INC = increment/decrement: value to be added or subtracted at each update	**Values:** 0 to 9999999999999999 max 16 digits

Example: ?18&2,0035,1100,20,1,3,15

With this command the following parameters are programmed:
1. calculation engine #2
2. initial value of 35 printed with 4 digits
3. maximum value equal to 1100
4. minimum restart value equal to 20
5. counting performed incrementally
6. number of identical labels before updating the counter equal to 3
7. increase of 15

The value "0035" will be printed on the first, second and third labels of the batch of prints; the value "0050" on the fourth, fifth and sixth, and so on until the counter reaches the value "1100". At this point the count will restart from "0020" and will continue until a software command disables the counter.

?82& - print images settings

With this command all the parameters related to the printing of the counters are programmed.
Note in particular the possibility of creating composed barcodes, i.e. consisting of a fixed part and an incremental (or decremental) part.
The fixed texts linked to the counters are read from the list of fixed texts present in the persistent memory (see the 'Storing texts in persistent memory' paragraph).
The command parameters assume a different meaning depending the need to program an image in text format or in barcode format.

Command for print image in text format: ?82&N,0,X,Y,D,G,OV,M,TF,IT

Parameter	Description
N = print image selection	**Values:** da 0 a 5
0 = (zero) fixed valued for texts	**Values:** 0
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = text printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
M = number of the engine to which link the image	**Values:** 0 to 3
TF = adding fixed text	**Values:** 0 = no fixed text 1 = fixed text added before the counter 2 = fixed text added after the counter
IT = index of the fixed text to add	**Values:** 0 to 49

Example: ?82&3,0,120,75,3,5,11,2,1,15

With this example image #3 is programmed as text; the printing coordinates are X = 120 and Y = 75, the direction is # 3, the font used is the "New Century" (#5) with expansion equal to 1 for both the base and the height; the image is related to engine #2. The fixed index 15 text is also added before the count digits.

Command for print image in barcode format: ?82&N,1,X,Y,D,C,H,M,TF,IT

Parameter	Description
N = print image selection	**Values:** da 0 a 5
1 = (one) fixed values for barcodes	**Values:** 1
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = barcode printing direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
M = number of the engine to which link the image	**Values:** 0 to 3
TF = adding fixed text	**Values:** 0 = no fixed text 1 = fixed text added before the counter 2 = fixed text added after the counter
IT = index of the fixed text to add	**Values:** 0 to 49

Example: ?82&2,1,120,75,1,5,110,3,2,7

With this example image #2 is programmed as a barcode; the printing coordinates are X = 120 and Y = 75, the direction is #1, the bar code used is EAN8 (#5) with a height of 110 dots; the image is related to engine #3. The fixed index 7 text is also added after the count digits.

?83& - enable/disable counters ☮

Command: ?83&M/I,N,A/D

Description: this command allows to enable or disable the motors and images of the counters. Activating a calculation engine means making the counter active.

Activating a print image means activating the label field that contains the value calculated by the engine.

To have a counter printed, it is therefore necessary to activate both the calculation engine and the print image.

Parameter	Description
M/I = specifies whether the command refers to engines or images	**Values:** 0 = command for calculation engines 1 = command for print images
N = engine or image selection	**Values:** 0 to 3 if it is a motor 0 to 5 if it is an image
A/D = enabled/sisable engine or image	**Values:** 0 = disable 1 = enable

A complete example on counters

This example demonstrates the use of 4 images combined with 2 calculation engines; for each engine, one image prints the counter as a barcode, the other as text. Note that some images have been associated with fixed texts

?00&	; Clear the print buffer
?73&0;Before	; Program the first fixed text in persistent memory
?73&1;After	; Program the second fixed text in persistent memory
?83&0,0,0	; Disable calculation engines
?83&0,1,0	
?83&0,2,0	
?83&0,3,0	
?83&1,0,0	; Disable print images
?83&1,1,0	
?83&1,2,0	
?83&1,3,0	
?83&1,4,0	
?83&1,5,0	
?18&0,10,40,10,1,1,10	; Program 2 engines
?18&3,1000,1100,1000,1,1,25	
?82&0,1,10,20,3,14,50,3,1,0	; Program 4 images
?82&1,0,280,20,3,5,11,3,1,0	
?82&2,0,480,20,2,16,11,0,0,0	
?82&3,1,520,20,3,14,50,0,2,1	
?83&1,0,1	; Enable images
?83&1,1,1	
?83&1,2,1	
?83&1,3,1	
?83&0,0,1	; Enable engines
?83&0,3,1	
?14&10	; Print a batch of 10 labels
?83&0,0,0	; Disable engines
?83&0,3,0	
?83&1,0,0	; Disable images
?83&1,1,0	
?83&1,2,0	
?83&1,3,0	

Clock functions

The internal clock (Real Time Clock or RTC) performs both function of calendar and clock.

This device allows the printing of fields containing the date, time or various combinations of this information.

The internal clock is equipped with a battery, which guarantees its operation even after the printer is turned off.

The fields dedicated to use with the clock are a maximum of 2 per label and can be reconfigured in each individual label. The active configuration is the last one that is sent to the printer.

The commands related to the clock/calendar are the following:

- **?47&…** date/time setting
- **?48&…** immediate composition of date/time fields
- **?20&…** enable/disable clock

?47& - date/time setting

Command: ?47&YYMMDD,d,H,M,hhmmss

Description: the following command allows you to set the internal clock with the appropriate date and time.
Once this command is used, the date and time settings are kept in memory.

Parameter	Description
YY = 2 digits indicating tens and units of the year	**Values:** 00 to 99 **Example:** 2021 = 21
MM = 2 digits indicating the month	**Values:** da 01 a 12
DD = 2 digits indicating the day	**Values:** da 01 a 31
d = day of the week	**Values:** 0 = Sunday 1 = Monday 2 = Tuesday 3 = Wednesday 4 = Thursday 5 = Friday 6 = Saturday
H = time format to print	**Values:** 0 = 24 hours (0…24) 1 = 12 hours (1…12AM / 1…12PM)
M = how to interpret the programmed time	**Values:** 0 = AM 1 = PM **Warning:** if H = 0 then M is ignored
hh = 2 digits indicating the hours	**Values:** if O = 0: 00 to 23 if O = 1: 01 to 12
mm = 2 digits indicating the minutes	**Values:** 00 to 59
ss = 2 digits indicating the seconds	**Values:** 00 to 59

Example: ?47&010628,5,1,1,041035

The clock is set with the date 28/06/2001, Friday, 4:10:35 PM.
The time will be printed in 12 hours format.

?48& - immediate composition of date/time fields

Text composition command: ?48&N,T,X,Y,D,G,OV,S

Description: the following command allows you to compose a date/time field in text format.

Parameter	Description
N = field selection	**Values:** 2 or 3
T = type of data to be printed	**Values:** 0 = date 1 = time
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = text direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9

S = date/time format	**Values:**
	if T = 0:
	0 = DD/MM/YY
	1 = MM/DD/YY
	2 = YY/MM/DD
	3 = DD/MM/YYYY
	4 = MM/DD/YYYY
	5 = YYYY/MM/DD
	6 = DD/MM/YYYY hh:mm:ss
	
	if T = 1:
	0 = hh:mm:ss
	1 = hh:mm
	
	with
	DD = day
	MM = month
	YY = 2 digits year
	YYYY = 4 digits year
	hh = hours
	mm = minutes
	ss = seconds

Barcode composition command: ?48&N,2,X,Y,D,C,H,S

Description: the following command allows you to compose a date/time field in barcode format.

Parameter	Description
N = field selection	**Values:** 2 or 3
2 = (two) fixed value for barcodes	**Values:** 2
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
D = barcode direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
C = barcode type	**Values:** 0 to 41 refer to the 'List of available barcodes' paragraph
H = barcode height, expressed in dots	**Values:** ≤ label size
S = date/time format	**Values:** 0 = DDMMYY 1 = MMDDYY 2 = YYMMDD 3 = hhmmss 4 = hhmm 5 = YYMMDDhhmmss 6 = DDMMYYYY 7 = MMDDYYYY 8 = YYYYMMDD 9 = YYYYMMDDhhmmss 10 = DD/MM/YYYY hh:mm:ss 11 = DD/MM/YYYY hh:mm 12 = DD/MM/YYYY hhmm with DD = day MM = month YY = 2 digits year YYYY = 4 digits year hh = hours mm = minutes ss = seconds

Example:

Immediate composition of date/time fields	
?48&2,2,37,30,1,15,90,0 N = field 2 2 = fixed for barcodes X = 37 dot (X coordinate) Y = 30 dot (Y coordinate) D = 1 (printing direction) C = 15 = EAN128 H = 90 dot (height) S = 0 = DDMMYY (format)	
?48&2,2,37,30,1,15,90,0 ?48&3,1,125,234,1,2,22,0 (referred to text field) N = field 3 T = 1 = time X = 125 dot (X coordinate) Y = 234 dot (Y coordinate) D = 1 (printing direction) G = 2 (font) OV = 22 (XY expansion) S = 0 = hh:mm:ss (format)	

?20& - enable/disable clock

Command: ?20&N,A/D

Description: with this command it is possible to enable or disable each of the two fields available to print the clock data.

When one of these fields is enabled, it will be inserted on the label according to the programming made with the command ?48&... and the clock data will be printed on each printed label.

Parameter	Description
N = field to be enabled	**Values:** 2 = first field 3 = second field
A/D = enabled/disable the field	**Values:** 0 = disabled 1 = enabled

26 Expiration date

?75& - expiration date composition

Command: ?75&N,I,D,X,Y,G,OV,GG

Description: within the layout it is possible to introduce one or more fields containing the expiration date of a product calculated as the sum of the days with reference to the date/time inside the printer. The number of days to add to get the expiration date is specified in one of the command parameters.

Note: The date format will be DD/MM/YYYY.
If a different format is needed, refer to the ?95& command.

Parameter	Description
N = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99
D = text direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
GG = product shelf life days	**Values:** 1 to 9999

Example: 'delete layout C
?04&C
…
?75&C,4,3,550,15,5,11,365
…
'enable layout C
?05&C

with this example the field of index 4 of the C layout is programmed as the expiration date; the printing direction 3, the coordinates X = 550 and Y = 15, the font number 5 at its real size and the number of days of product validity = 365 are also specified.

?49& - expiration date shift

Command: ?49&Shh:mm

Description: the following command allows to set a delay or an advance on the expiration dates to be printed.

Parameter	Description
S = sign	**Values:** + = expiration date delay - = expiration date advance
hh = number of hours to delay or advance the expiry date	**Values:** 0 to 31
mm = number of minutes to delay or advance the expiry date	**Values:** 0 to 99

?95& - expiration date composition with different format

Command: ?95&L,I,D,X,Y,G,OV,N,F

Description: within the layout it is possible to introduce one or more fields containing the expiration date of a product calculated as the sum of the days with reference to the date/time inside the printer. The number of days to add to get the expiration date is specified in one of the command parameters.

With this command it is also possible to choose the format of the date to be printed.

Parameter	Description
L = capital letter indicating the layout to be programmed	**Values:** A to Z This parameter is not taken into account, but it must still be filled in. The layout to be programmed must be specified with ?04&
I = field index within the layout	**Values:** 0 to 99
D = text direction	**Values:** 0 to 3 refer to the 'Printing directions' paragraph
X = field origin's X coordinate, expressed in dots	**Values:** depend on the lable size
Y = field origin's Y coordinate, expressed in dots	**Values:** depend on the lable size
G = font index	**Values:** 0 to 26 for base fonts 32 onwards for additional fonts (if loaded into printer memory) refer to the 'List of available fonts for texts' paragraph
OV = two digits referring to the horizontal and vertical expansion of the font	**Values:** O 1 to 9 V 1 to 9
N = product shelf life days	**Values:** 1 to 9999

F = expiration date format	**Values:** 0 = DD/MM/YY 1 = MM/DD/YY 2 = YY/MM/DD 3 = DD/MM/YYYY 4 = MM/DD/YYYY 5 = YYYY/MM/DD 6 = DDMMYY 7 = MMDDYY 8 = YYMMDD 9 = DDMMYYYY 10 = MMDDYYYY 11 = YYYYMMDD 12 = MON YYYY 13 = MES YYYY 14 = MON YY 15 = MES YYYY 16 = MM/YYYY 17 = MM/YY 18 = DD.MM.YY 19 = MM.DD.YY 20 = YY.MM.DD 21 = DD.MM.YYYY 22 = MM.DD.YYYY 23 = YYYY.MM.DD con: DD = day MM = month YY = 2 digits year YYYY = 4 digits year MES = 3 characters month in Italian MON = 3 characters month in English

27 Macro interpreter mode

Operation in macro interpreter mode allows **Italora** printers to connect directly to external devices (such as scales, PLCs, piece counters, etc...) without having to change their firmware to modify their output. These devices can send the data to be printed on the label directly to the printer.

Programming the macro interpreter mode gives printers the flexibility to adapt to a very large number of devices.

Operation in macro interpreter mode is based on the use of the printer's internal layouts. In particular, the operations to use this mode correctly are:

- Programming of internal printer layouts
- Macro interpreter command programming
- Connection to external device

Once the printer has been programmed to work in macro interpreter mode, it will not recognize any other programming command, except the one that will allow it to exit this mode (the command is !$ - see 'Priority commands' chapter).

The software command needed to program the macro interpreter mode is ?59&… which must be programmed in several phases. Let's see them one by one.

?59& - macro interpreter mode

Protected protocol command: ?59&0,Enabling,Start,Stop

Description: this command allows you to activate or deactivate the data reception protocol protection. If the protection is activated, the ASCII value of the reception start and stop characters must be specified.

This phase is mandatory for the correct programming of the macro interpreter.

Parameter	Description
0 = fixed value	**Values:** 0
Enabling = specifies whether to enable or disable the secure protocol	**Values:** 0 = disabled 1 = enabled
Start = start character (if the protocol is active)	**Values:** ASCII decimal value of the character
Stop = stop character (if the protocol is active)	**Values:** ASCII decimal value of the character

Example: Let's consider the following data structure (record) input to the printer from a scale:

{	N	E	T	_	W	E	I	G	H	T	}

As can be seen from the diagram, the scale record is made up of 10 bytes enclosed in curly brackets which can be considered start and stop characters.
The ASCII value is '{' = 123 and '}' = 125.

The syntax for the first step of the macro command is: ?59&0,1,123,125

Variable fields programming command: ?59&1,Layout,N_Fields,Data

Description: this command allows to program the order and position of the variable fields to be extracted from the data arriving from the external device.

This phase is mandatory for the correct programming of the macro interpreter.

Parameter	Description
1 = fixed value	**Values:** 1
Layout = capital letter indicating the layout to be programmed	**Values:** A to Z
N_Fields = number of variable fields in the layout	**Values:** 1 to 19
Data = start/end value pairs of fields in the input data structure	**Values:** 0 to 255 **Example:** 1,10 = start at byte #1, end at byte #10

Example: Let's consider the following data structure (record) input to the printer from a scale:

{	N	E	T	_	W	E	I	G	H	T	}

Byte #:

0	1	2	3	4	5	6	7	8	9	10	11
*	N	E	T	_	W	E	I	G	H	T	*

As can be seen from the diagram, the scale record consists of 12 bytes, whose count starts from 0.
The data to be printed is NET_WEIGHT and is composed of bytes 1…10.
The syntax for the this step is ?59&1,A,1,1,10
This command refers to the 'A' layout.

Input data structure programming command: ?59&2,PosLay,NCLay,Type,DimTer

Description: this command allows to program the characteristics of the input record, for example by specifying its size or terminator character.

It is also possible to read directly from the record which layout to activate before printing.

This phase is mandatory for the correct programming of the macro interpreter.

Parameter	Description
2 = fixed date	**Values:** 2
PosLay = position of the first digit indicating the layout number	**Values:** 0 to 255
NCLay = number of characters to read starting from PosLay to obtain the layout number	**Values:** 0 = A layout 1 = B layout 2 = C layout …
Type = specifies whether the record will always be the same length or always have the same terminator character	**Values:** 0 = fixed length record 1 = fixed terminator chracter record
DimTer = indicates the record size or the ASCII code of the terminator character	**Values:** 1 to 255

Example: ?59&2,1,3,0,15

With this example we program the record length, which will always have a fixed size (0) of 15 bytes (15). Furthermore, the number of the format to be activated is read starting from byte #1 (1) for 3 characters (3).

Byte #:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	*	0	0	2	*	N	E	T	_	W	E	I	G	H	T

Input character filter command: ?59&3,DimAlf,DataAlf

Description: this command allows to specify a set of characters that must never be printed in the variable fields composed by the macro interpreter.
The characters belonging to the specified set will be received at the input, but will be eliminated from the print.

This phase is **not** mandatory for the correct programming of the macro interpreter.

Parameter	Description
3 = fixed value	**Values:** 3
DimAlf = indicates the size, expressed as the amount of characters, of the set to be filtered	**Values:** 1 to 20
DataAlf = characters to be filtered, written one after the other	**Values:** characters to be filtered

Example: ?59&3,2,£$

With this example a set of 2 characters is programmed not to be printed. The two characters are the symbols '£' and '$'. These two characters will never appear in the variable fields composed by the macro interpreter.

Batch copies setting command: ?59&4,PosCop,NCCop

Description: With the macro interpreter it is possible to read in the input record how many repetitive copies to execute of the same label.

This phase is mandatory for the correct programming of the macro interpreter.

Parameter	Description
4 = fixed value	**Values:** 4
PosCop = position of the first digit indicating the number of copies	**Values:** 0 to 255
NCCop = number of characters to read starting from PosCop to obtain the number of copies	**Values:** 0 to 4

Example: ?59&4,12,3

This example reads the copies to be made directly from the incoming record. <u>The number indicating the quantity of copies to be made starts at position 12 and occupies 3 characters.</u>

Byte n°:	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
	*	N	E	T	_	W	E	I	G	H	T	*	0	0	5

Macro interpreter programming example

Suppose that:
- The programming of formats A (with 3 variable fields) and B (with 2 variable fields) inside the printer has already been made
- The external device has the following two records of 20 bytes each:

1) Record to enable A layout

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
0	*	M	E	L	E	*	P	E	S	O	*	E	U	R	O	*	0	1	@

2) Record to enable B layout

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	*	D	A	T	A	.	.	.	.	*	O	R	A	.	.	*	0	2	@

- '@' (character with ASCII code 64) is the record terminator
- We want to filter the 'M' character

Then the programming steps are the following:

?59&1,A,3,2,5,7,10,12,15   A layout, 3 variable fields, data start/stop

?59&1,B,2,2,9,11,15   B layout, 2 variable fields, data start/stop

?59&2,0,1,1,64   Starting position of the layout number = 0, 1 digit, variable length record, terminator = ASCII(64)

?59&3,1,M   number of characters to be filtered = 1, character to be filtered = 'M'

?59&4,17,2   Position of the number of batch copies = 17, number of digits = 2

28 Printer status, messages, delays

?54& - sensors values, printer information and parameters

Command: ?54&N

Description: with this command it is possible to read, through the communication port, the values read by the various sensors present in the printer.
This function can be very useful for testing the machine status.
It is also possible to read information about the printer and saved parameters

Parameter	Description
N = request index	**Values:** 0 = printhead substrate temperature **Example of return values:** 160 = normal (ambient temperature) 76 = max (~60°C) °C calculated with: $[94 - (Val * 3 / 7)]$
	Values: 1 = printhead intensity timmer **Example of return values:** 0 = maximum intensity 255 = minimum intensity
	Values: 2 = barrier label photosensor **Example of return values:** 15 = with label 70 = with backing paper
	Values: 3 = label taken photosensor **Example of return values:** 220 = with label 0 = without label
	Values: 4 = printer firmware version
	Values: 5 = user code **Note:** when quering with this parameter, the response string is composed of 3 bytes, all other responses end with the <Carriage Return> character (ASCII code 13 decimal = 0D hexadecimal)
	Values: 6 = ink ribbon photosensor **Example of return values:** 80 = with ink ribbon
	Values: 7 = reflection label photosensor **Example of return values:** 180 = with label 0 = without label

	Values: 8 = START PRINT signal (printers without expansion board) **Example of return values:** 250 = signal disabled 0 = signal enabled
	Values: 9 = auxiliary channel on Y22 internal connector
	Values: 10 = printer name
	Values: 11 = identifier of the stored basic fonts (e.g. FNT1)
	Values: 12 = FLASH memories type on CPU
	Values: 13 = odometer value
	Values: 14 = FLASH memories quantity on CPU
	Values: 15 = identifier of additional fonts
	Values: 20 = speed detected by the encoder (only for some printer models)
	Values: 21 = parameters stored in persistent memory **Example of return values:** ▪ detected label length ▪ paper end level threshold ▪ backing paper level threshold ▪ label level threshold ▪ 0 = label; 1 = continuous media; 2 = tickets ▪ 0 = without backing paper; 1 = with backing paper
	Values: 22 = reading of the applicator cycle
	Values: 23 = printer labels counter
	Values: 30 = value to be printed by the counting engine 0
	Values: 31 = value to be printed by the counting engine 1
	Values: 32 = value to be printed by the counting engine 2
	Values: 33 = value to be printed by the counting engine 3
	Values: 34 = value read by the label photosensor

?Y3& - internal sensor readings

Command: ?Y3&N,R

Description: with this command it is possible to read the values of the various sensors present in the printer. The values can be transmitted via the communication port or shown on the display (for models equipped with them). This function can be very useful to check the status of the machine. Upon receiving this command, the printer will query the required sensor and provide the answer on the communication port or on the display.

Parameter	Description
N = sensor to query	**Values:** 0 = printhead substrate temperature **Example of return values:** >600 = normal (ambient temperature) ~300 = max (~60°C) °C calculated with: [94 – (Val * 3 /27)]
	Values: 1 = printhead intensity timmer **Example of return values:** 0 = maximum intensity 255 = minimum intensity
	Values: 2 = barrier label photosensor **Example of return values:** 15 = with label 70 = with backing paper
	Values: 3 = label taken photosensor **Example of return values:** 220 = with label 0 = without label
	Values: 4 = ink ribbon photosensor **Example of return values:** 0…700 = with ink ribbon >700 = without ink ribbon
R = response type	**Values:** 0 = response transmitted thtough communication port (USB, serial, etc.) 1 = response shown on the display

?X5& - printer settings and sensors values

Command: ?X5&

Description: with this command it is possible to read, through the communication port, the settings and values of the various sensors present in the printer. This function can be very useful for checking the status of the machine.

?Y8& - "dump" display mode of the input data

Command: ?Y8&N,9

Description: this mode allows to print all the characters entering the communication port. Data can be printed in three formats: hexadecimal, decimal, ASCII. This feature can be useful to determine if the communication link between the PC and the printer is correct.

Parameter	Description
N = data display mode	**Values:** 1 = hexadecimal display 2 = decimal display 3 = ASCII display
9 = fixed value	**Values:** 9

?X0& - test labels

Command: ?X0&T

Description: with this command it is possible to compose in the printer's graphic buffer, and subsequently print, some test labels to check the printer status.

Parameter	Description
T = index of the test label to be composed	**Values:** 0 = label with grid of coarse dots 1 = label with grid of small dots and lines 2 = basic test label with printer settings 5 = information about the type of FLASH memory mounted on the CPU 8 = information on the quantity and type of SRAM and FLASH memories mounted on the CPU

Example: composition and printing of a test label

?X0&1
?01&

?Y2& - message to be shown on the display
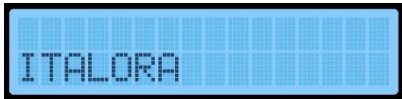
Command: ?Y2&Mess

Description: with this command it is possible to transmit, through the communication port, a message with a maximum length of 16 characters which will be shown on the printer display.

Note: command valid only for models with display

Parameter	Description
Mess = message to be displayed on the printer display	**Values:** maximum 16 characters

Example:

Message on display	
?Y2&ITALORA Mess = ITALORA	ITALORA

?Y4& - standard, version, odometer or clock display on LCD

Command: ?Y4&S

Description: with this command it is possible to choose what to display on the LCD between the standard menu, the firmware version, the odometer and the clock

Parameter	Description
S = selector	**Values:** 0 = standard 1 = firmware version 2 = odometer 3 = clock

?A2&22 - display applicator cycle operations on LCD ☉

Command: ?A2&22,A

Description: this command allows to enable/disable the display of the current operation of the applicator cycle on the LCD.

Parameter	Description
22 = fixed value	**Values:** 22
A = enable/disable the display of the current operation of the applicator cycle on the LCD	**Values:** 0 = disabled 1 = enabled **Default:** 0

?D0& - delay

Command: ?D0&M

Description: the following command allows to generate a delay, expressed in milliseconds.

Parameter	Description
M = delay in milliseconds	**Values:** 0 to 99999

?G4& - viewing the printer's graphic buffer

Command: ?G4&M

Description: the following command allows to receive the graphic buffer composed in the printer memory as an image.

Parameter	Description
M = mode	**Values:** 0 = raster 1 = BMP

Mode 0 - raster:
The printer sends data in the following format: pixels_per_line, total_data_bytes, data
The data part must be considered in binary form where the 1 bits represent black pixels.
Example:
The response 400,30000,[data] indicates that the received data must be formatted in an image 400 pixels wide and the data part to be received will be 30000 Bytes. The height of the image will therefore be 30000/(400/8) = 600 pixels.

Mode 1 - BMP:
The printer sends the data that makes up a bitmap file.
Save all the received data in a file with the .bmp extension to be able to view the graphic buffer of the printer.

29 TX specific commands

?B9&2 - distance between printheads ☉

Command: ?B9&2,N

Description: the following command allows to set the distance in dots between the two print heads. This function can be useful in case the Y coordinates of the front and back prints do not match each other.

Partameter	Description
3 = fixed value	**Values:** 3 = fixed value
N = distance in dots between printheads	**Values:** 0 to 9999 **Default:** check commands ?B9&3

?B9&3 - reset distance between printheads ⊗

Command: ?B9&3,0

Description: the following command allows to reset the distance in dots between the two print heads to the factory value.

Parameter	Description
3 = fixed value	**Values:** 3 = fixed value
0 = fixed value	**Values:** 0 = fixed value

?B9&4 - enable/disable upper ribbon sensor ⊕

Command: ?B9&4,E

Description: the following command allows to enable or disable the upper ribbon movement sensor.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
E = enable/disable	**Values:** 0 = upper ribbon sensor disabled 1 = upper ribbon sensor enabled **Default:** 1

?B9&5 - enable/disable lower ribbon sensor ⊕

Command: ?B9&5,E

Description: the following command allows to enable or disable the lower ribbon movement sensor.

Parameter	Description
5 = fixed value	**Values:** 5 = fixed value
E = enable/disable	**Values:** 0 = lower ribbon sensor disabled 1 = lower ribbon sensor enabled **Default:** 1

?B9&7 - enable/disable feed at end of batch ⊗

Command: ?B9&7,E

Description: the following command allows to enable or disable the end-of-batch feed function. If enabled, the printer will eject white print material for a length equal to the distance between the two printheads at the end of a batch print.

Parameter	Description
7 = fixed value	**Values:** 7 = fixed value
E = enable/disable	**Values:** 0 = feed at end of batch disabled 1 = feed at end of batch enabled **Default:** 0

?B9&8 - enable/disabled additional batch printing ☉

Command: ?B9&8,E

Description: the following command allows to enable or disable the additional batch printing function.
The first print made in a batch of labels is always to be discarded because the the print material between the two printheads cannot be printed on both sides.
If enabled, the printer prints one extra label with respect to the number of labels requested at the launch of the batch, in order to have the correct number of labels printed in their entirety.

Parameter	Description
8 = fixed value	**Values:** 8 = fixed value
E = enable/disable	**Values:** 0 = stampa aggiuntiva in lotto disabilitata 1 = stampa aggiuntiva in lotto abilitata **Default:** 0

?B9&9 - enable/disable feed roller sensor ☮

Command: ?B9&9,E

Description: the following command allows to enable or disable the feed roller position sensor.

Parameter	Description
9 = fixed value	**Values:** 9 = fixed value
E = enable/disable	**Values:** 0 = feed roller position sensor disabled 1 = feed roller position sensor enabled **Default:** 1

?B9&10 - enable/disable upper printhead sensor ⊛

Command: ?B9&10,E

Description: the following command allows to enable or disable the upper printhead position sensor.

Parameter	Description
10 = fixed value	**Values:** 10 = fixed value
E = enable/disable	**Values:** 0 = upper printheas position sensor disabled 1 = upper printheas position sensor enabled **Default:** 1

?B9&11 - enable/disable lower printhead sensor ☉

Command: ?B9&11,E

Description: the following command allows to enable or disable the lower printhead position sensor.

Parameter	Description
11 = fixed value	**Values:** 11 = fixed value
E = enable/disable	**Values:** 0 = lower printheas position sensor disabled 1 = lower printheas position sensor enabled **Default:** 1

?B9&12 - enable/disable cutter&stacker sensor ☌

Command: ?B9&12,E

Description: the following command allows to enable or disable the position sensor of the cutter&stacker guard.

Parameter	Description
12 = fixed value	**Values:** 12 = fixed value
E = enable/disable	**Values:** 0 = cutter&stacker guard position sensor disabled 1 = cutter&stacker guard position sensor enabled **Default:** 0

?B9&13 - ribbon movement sensor initialization

Command: ?B9&13,0

Description: the following command allows to execute the initialization and calibration procedure of the ribbon movement sensors.

Parameter	Description
13 = fixed value	**Valori:** 13 = fixed value
0 = fixed value	**Valori:** 0 = fixed value

30 SHQ specific commands

?Y8& - printhead in end-of-print position

Command: ?Y8&4,0

Description: the following command allows to move the printhead to the end-of-print position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
0 = fixed value	**Values:** 0 = fixed value

?Y8& - printhead in printing position

Command: ?Y8&4,1

Description: the following command allows to move the printhead to the printing position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
1 = fixed value	**Values:** 1 = fixed value

?Y8& - printhead in pause position

Command: ?Y8&4,2

Description: the following command allows to move the printhead to the pause position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
2 = fixed value	**Values:** 2 = fixed value

?Y8& - ribbon movement sensor initialization

Command: ?Y8&4,3

Description: the following command allows to execute the initialization and calibration procedure of the ribbon movement sensor.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
3 = fixed value	**Values:** 3 = fixed value

31 MH specific commands

?Y8& - printhead in end-of-print position

Command: ?Y8&4,0

Description: the following command allows to move the printhead to the end-of-print position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
0 = fixed value	**Values:** 0 = fixed value

?Y8& - printhead in printing position

Command: ?Y8&4,1

Description: the following command allows to move the printhead to the printing position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
1 = fixed value	**Values:** 1 = fixed value

?Y8& - printhead in pause position

Command: ?Y8&4,2

Description: the following command allows to move the printhead to the pause position.

Parameter	Description
4 = fixed value	**Values:** 4 = fixed value
2 = fixed value	**Values:** 2 = fixed value

32 Real-time commands

This list represents all the available real time commands:

- **!0**
- **!1**
- **!2**
- **!3**
- **!4**
- **!5**
- **!6**
- **!9**
- **!$**
- **!***
- **!+**
- **!-**
- **!%**
- **^xxx** (RS485 addressing)

These commands are defined as "real-time" because they are not buffered (as happens with all the others) but are executed by the printer at the same time in which they are received.

All real-time commands starting with '!' consist of only two characters: there is therefore no need to terminate them with any control character.

Let's see them in detail.

!0 - printer status request - mode 1

Command: !0

Description: this command allows to receive a response from the printer about its operating condition.

Upon receiving the command, the printer will respond with one of the following control characters:

06 Hex   normal operation (online)

15 Hex   syntax error condition in commands or parity error in serial communication. To resume operation, you will need to press the button on the front of the printer

07 Hex   paper end or thermal ribbon end condition

1A Hex   mains power failure flag.
It is sent only at the first machine status request after power on.
(Enabling this response is done via the setup menu)

08 Hex   printer busy for print in progress

!1 - printer reboot

Command: !1

Description: this command allows to stop any operation in progress and restart as if the printer had been turned off and on.

Before sending other commands, wait for the LED on the front panel to turn on (for printers without LCD).

The effects of this command are listed below:

- **Print buffer** is completely erased
- **Wide / Narrow** barcodes parameters are set to 2 / 1
- **Barcode unit element width** is set to 2
- **Barcode readable characters** are set to ON
- **Batch prints** are stopped
- **Protection level** is set to 0
- **Print button** is set to normal behavior
- **End of print character transmission** is disabled
- **Texts alignment** is set to standard condition
- **Cutter** is disabled

!2 - persistent memory reset

Command: !2

Description: The printer is equipped with persistent memory in which settings are stored and maintained even after the printer is turned off. It is possible to delete all stored data and restore to factory conditions.

Before sending other commands, wait for the LED on the front panel to turn on (for printers without LCD).

The effects of this command are listed below:

- All those caused by "**!1**" command

- All **layouts** stored in persistent memory are erased

- The **batch print counter** is reset to 0

- The forward **feed** (paper advance at the end of printing in continuous paper mode) is set to 0

- The **gap** (label alignment at the end of printing in label mode) is set to 0

- **Automatic calibration** of photosensor levels

- The **backfeed** (retraction of the label before printing) is set to 0

- The printer, if in label mode, performs a **realignment**

- All the settings of the counters (Engines and Images) and of the clock fields are reset

- The **infinite print loop**, if enabled, is interrupted

!3 - receive buffer erasing

Command: !3

Description: this command allows to delete all not yet decoded characters contained in the data reception buffer.

!4 - Printer status request - mode 2

Command: !4

Description: this command allows to receive a response from the printer about its operating condition.

Upon receiving the command, the printer will respond with one of the following control characters:

06 Hex   normal operation (online)

15 Hex   syntax error condition in commands or parity error in serial communication. To resume operation, you will need to press the button on the front of the printer

16 Hex   waiting for START PRINT signal

18 Hex   label taken sensor busy (only if enabled)

19 Hex   paper end or thermal ribbon end condition

1A Hex   mains power failure flag.
It is sent only at the first machine status request after power on.
(Enabling this response is done via the setup menu)

1B Hex   control of label taken sensor not executed

08 Hex   printer busy for print in progress

!5 - Printer status request - mode 3

Command: !5

Description: this command allows to receive a response from the printer about its operating condition.

The single response byte from the printer should be interpreted as follows:

BIT0	1 = paper end	0 = ok
BIT1	1 = thermal ribbon end	0 = ok
BIT2	1 = syntax error	0 = ok
BIT3	1 = first status request after power on	0 = ok
BIT4	1 = printhead temperature too high	0 = ok
BIT5	1 = applicator running	0 = applicator in standby
BIT6	1 = label taken sensor busy	0 = label taken sensor free
BIT7	1 = waiting for START PRINT signal	0 = ok

Note: BIT0 is the least significant bit, BIT7 is the most significant bit

!6 - exit from alarm state

Command: !6

Description: this command allows to exit an alarm state without having to press the button on the control unit and without resetting the graphic buffer.

!9 - interrupt batch printing

Command: !9

Description: this command allows to interrupt the printing of a batch started with the command ?14&...

Upon receiving this command, the printer will complete the print in progress and then cancel the remaining print queue.

!$ - exit macro interpreter mode

Command: !$

Description: this command is recognized only when in Macro Interpreter mode and allows to exit it, restoring the standard operating mode.

!* - label alignment

Command: !*

Description: this command allows to realign the labels and acquire new paper transparency values.

In order to execute the label realignment command, the printer must be in stand-by mode (i.e., it must not be blocked by external signals or have batches of prints in progress).

!+ - stop print job and receive buffer erasing

Command: !+

Description: this command allows to stop the printer cycle in progress and cancel the queue of commands received by the printer.

Warning: the settings of the 3 external signals are also reset to the factory values. To avoid this, use the command !- instead

!- - stop print job and receive buffer erasing

Command: !-

Description: this command allows to stop the printer cycle in progress and cancel the queue of commands received by the printer.

See also the !+ command.

!% - disable real-time responses to '!' commands

Command: !%

Description: with this command it is possible to disable the response to real-time commands starting with '!'. Useful for managing data containing combinations such as '!*' In the datamatrix.

To reactivate the real-time response, refer to the ?A3&2 command

33 RS485 network

?I0& - RS485 address setting ⊛

Command: ?I0&Address

Description: the following command allows to set the 485 address of the printer.

After receiving this command, the printer will be enabled to receive data from the serial port only if activated with the appropriate immediate command (^xxx).
Valid addresses are between 0 (zero) and 255.
Address 0 (zero) puts the printer in the "broadcast" reception state; the printer with address 0 will decode and execute commands sent to any address.
The factory setting of the address is 0 (zero).

Note: this command is available only for models with RS485 serial port

Parameter	Description
Address = printer address	**Values:** 0 to 255 **Default:** 0

ˆxxx - immediate printer enabling in RS485

Command: ^xxx

Description: the following command, sent to a network of printers connected with RS485 serial, places the printer with the local address corresponding to the transmitted one in the receiving status. All other printers will automatically enter an inactive state where they will not execute any commands they receive.

In an RS485 network (where "broadcast" transmission is not used) only one printer is active at a time.

This command is part of the immediate commands, i.e. those commands that are executed by the printer immediately after receiving them, without entering the queue.

The address 000 (zero) allows to perform a "broadcast" transmission to all printers at the same time.

Parameter	Description
xxx = address of the printer to be enabled	**Values:** 000 to 255 **Note:** it must consist of 3 digits

Example: ^025   enabling printer #25
                              from here on, only that printer will execute the transmitted commands

34 Serial communications

Italora printers support the two most popular serial communication protocols:

- XON/XOFF software protocol
- RTS/CTS hardware protocol

XON/XOFF software protocol

When the printer's serial receive buffer becomes more than 3/4 full, an XOFF control character (13 Hex character) is sent from the printer over the serial line.

The application that is sending data to the printer must at this point stop sending the data.

When the commands stored in the serial reception buffer are executed and therefore the buffer itself is emptied, the printer sends an XON control character (11 Hex) on the serial line to signal the restored readiness to receive data.

The external application can at this point resume sending new commands to the printer.

The serial connection diagram for the use of this protocol is shown below:

9 PIN PC CONNECTOR	25 PIN PC CONNECTOR
PC PRINTER 2 —————— 3 TX 3 —————— 2 RX 5 —————— 5 GND PC side jumpers: PIN 1 - 4 - 6 PIN 7 - 8	PC PRINTER 2 —————— 2 RX 3 —————— 3 TX 7 —————— 5 GND PC side jumpers: PIN 6 - 8 - 20 PIN 4 - 5
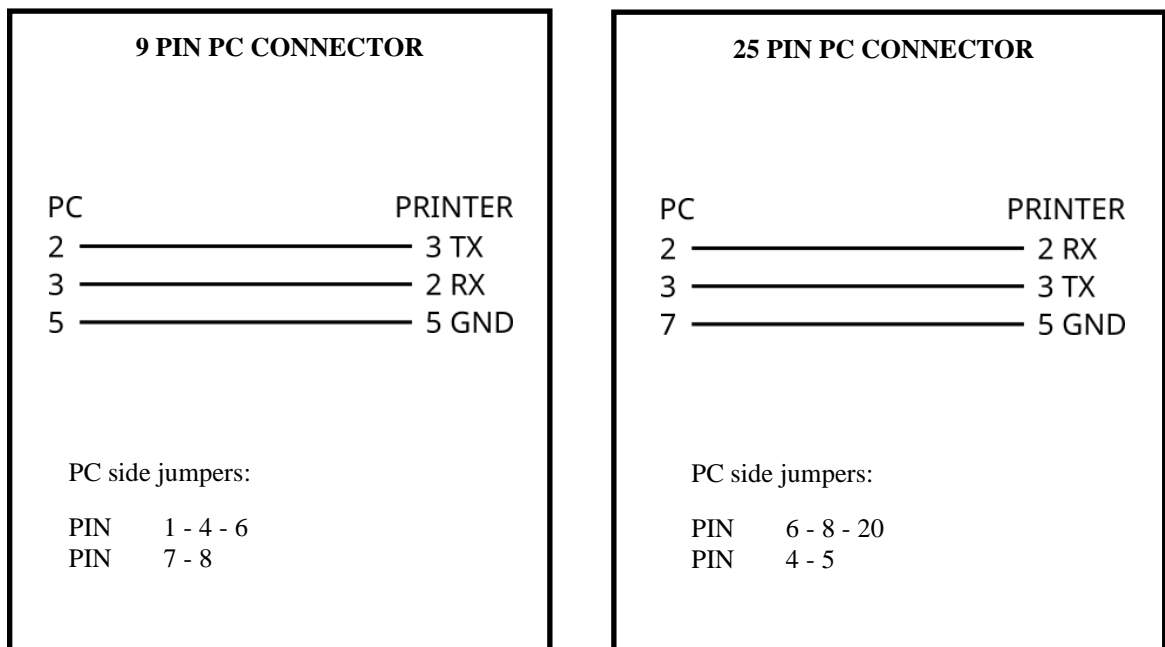
RTS/CTS hardware protocol

To use this protocol, it is sufficient to use the correct serial communication cables.

The serial port of the external device that sends data to the printer must be able to manage the appropriate RTS / CTS hardware lines.

The external application does not have to perform any software check of printer availability, since the checks are performed by the hardware circuitry of the serial ports.

The serial connection diagram for the use of this protocol is shown below:

```
┌─────────────────────────────────┐   ┌─────────────────────────────────┐
│       9 PIN PC CONNECTOR        │   │       25 PIN PC CONNECTOR       │
│                                 │   │                                 │
│                                 │   │                                 │
│  PC                 PRINTER     │   │  PC                 PRINTER     │
│  2 ───────────────── 3 TX       │   │  2 ───────────────── 2 RX       │
│  3 ───────────────── 2 RX       │   │  3 ───────────────── 3 TX       │
│  8 ───────────────── 7 RTS      │   │  5 ───────────────── 7 RTS      │
│  5 ───────────────── 5 GND      │   │  7 ───────────────── 5 GND      │
│                                 │   │                                 │
│                                 │   │                                 │
│  PC side jumpers:               │   │  PC side jumpers:               │
│                                 │   │                                 │
│  PIN     1 - 4 - 6              │   │  PIN     6 - 8 - 20             │
│                                 │   │                                 │
└─────────────────────────────────┘   └─────────────────────────────────┘
```
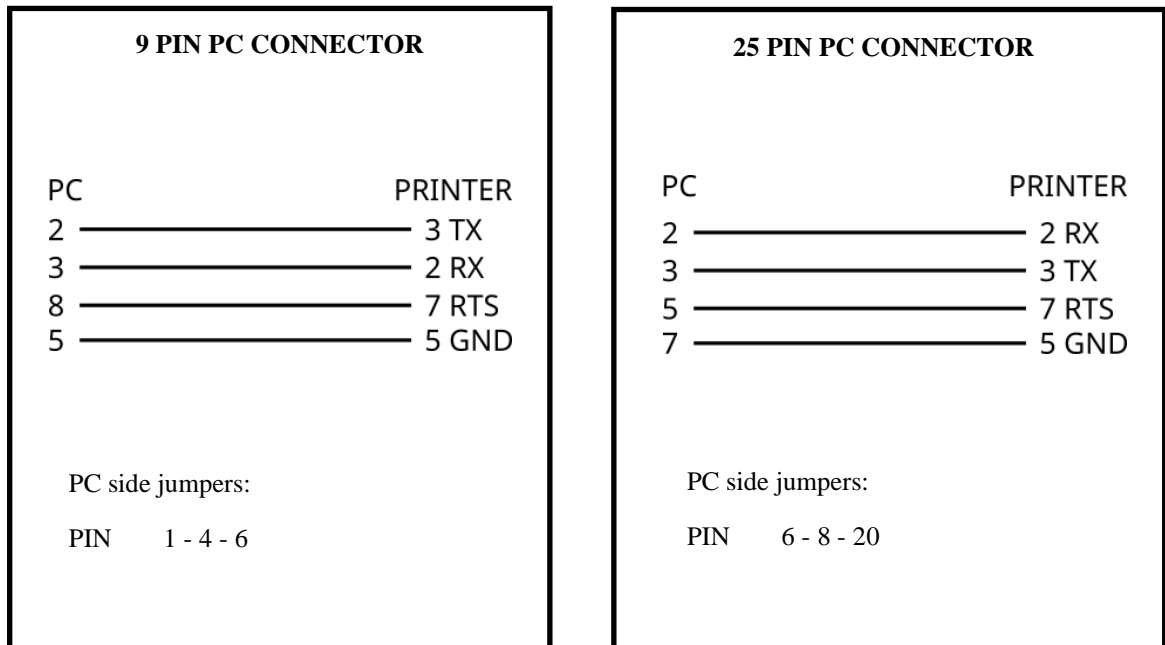
35 Ethernet communication

Italora printers equipped with an Ethernet port with firmware release ≥ TX.XX have the ability to communicate via TCP packets on 3 different sockets.

The default settings are as follows:
DHCP: disabled
IP: 192.168.0.9
Subnet: 255.255.255.0
Gateway: 192.168.0.1
DNS: 8.8.8.8
Port 1: 2101
Port 2: 2102
Port 3: 2103

?E9&0 - reading Ethernet connection parameters

Command: ?E9&0,A

Description: the following command allows to read the Ethernet connection parameters.

Parameter	Description
0 = fixed value	**Values:** 0
A = parameter to read	**Values:** 0 = DHCP **Reply:** 0 = Static | 1 = DHCP 1 = IP IP address 2 = Subnet subnet address 3 = Gateway gateway address 4 = DNS DNS address 5 = port 1 first port 6 = port 2 second port 7 = port 3 third port 8 = MAC MAC address

?E9&1 - Ethernet connection parameters setting ⊛

Command: ?E9&1,A,B

Description: the following command allows to set the Ethernet connection parameters.

Parameter	Description
1 = fixed value	**Values:** 1
A = parameter to set B = value to set	**A values:** 0 = DHCP 1 = IP 2 = Subnet 3 = Gateway 4 = DNS 5 = port 1 6 = port 2 7 = port 3 with NNN from 0 to 255 with MMMMM from 1 to 65535 **B values:** 0 = Static | 1 = DHCP NNN.NNN.NNN.NNN NNN.NNN.NNN.NNN NNN.NNN.NNN.NNN NNN.NNN.NNN.NNN MMMMM MMMMM MMMMM

36 Appendix A - available characters

FIRST / SECOND	2	3	4	5	6	7	8	9	A
0		0	@	P	`	p	€	É	á
1	!	1	A	Q	a	q	ü	æ	í
2	"	2	B	R	b	r	é	Æ	ó
3	#	3	C	S	c	s	â	ô	ú
4	$	4	D	T	d	t	ä	ö	ñ
5	%	5	E	U	e	u	à	ò	Ñ
6	&	6	F	V	f	v	å	û	ᵃ ø
7	'	7	G	W	g	w	ç	ù	º
8	(	8	H	X	h	x	ê	ÿ	*
9	)	9	I	Y	i	y	ë	Ö	*
A	*	:	J	Z	j	z	è	Ü	*
B	+	;	K	[	k	{	ï	¢	*
C	,	<	L	\	l	¦	î	£	*
D	-	=	M	]	m	}	ì	Ø	*
E	.	>	N	^	n	~	Ä	ß	*
F	/	?	O	_	o	ø	Å	§	*

Note: the ASCII character with code A6 Hex (116 Dec) is not the same for all fonts.

In particular:
- for the "NewCent" font, the character is: ᵃ
- for all other fonts the character is: Ø

National character sets

It is possible to set the national character set to be used for printing.

Below is the table with the differences:

Hex code / Nation	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E
Italy	#	$	@	[	\	]	^	`	{	¦	}	~
USA	#	$	@	[	\	]	^	`	{	¦	}	~
Sweden	#	Ø	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
Norway	#	Ø	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
France	#	$	à	°	ç	§	^	`	é	ù	è	"
Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
Great Britain	£	$	@	[	\	]	^	`	{	¦	}	~

37 Appendix B - printers with display

Keypad

The behavior of the printer in response to the use of the keypad depends on the operating conditions of the printer.

At power on

Features available when the printer is turned on.

NB: press and hold the corresponding button <u>while turning the printer on</u>.

I	II
Press and hold the button on the front of the printer	Turn on the printer (and release the key pressed previously)
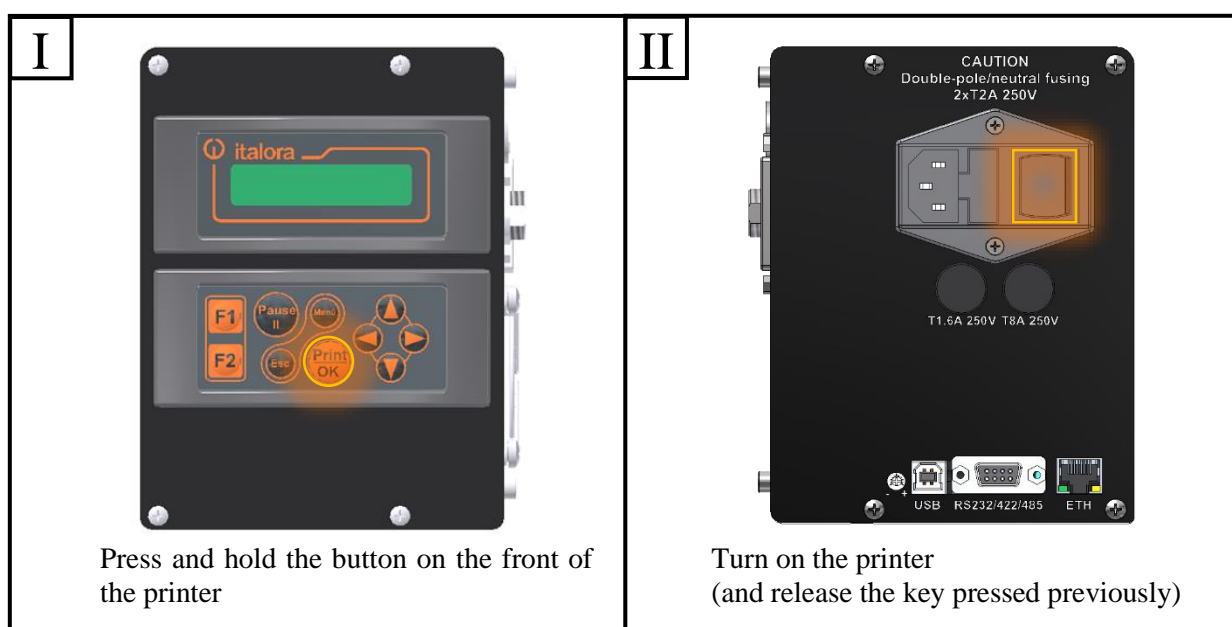
Procedure for pressing a key during power on
(I = front panel, II = rear panel)

- Print/OK
  o Perform the "initialization procedure" of the printer
- Menu
  o Access the "configuration menu" of the printer before it reaches the condition of "standard operation" (ready / data reception)
- UP arrow
  o Starts the "DUMP mode" for receiving the input data

Standard operation (ready / data reception)

```
(Printer Name)
ITALORA
```

- Print/OK

  Print the contents of the print buffer (repetition of the last label issued)
  (if the print buffer is empty - a condition that occurs when the Printer is turned on or after a "reset procedure" is performed -, it prints the so-called "test label" of the printer, containing a list of settings and current operating parameters of the printer)

- UP arrow

  o Increases the percentage of energy supplied to the print head (0 - 150%), thus increasing the print contrast

- DOWN arrow

  o Decreases the percentage of energy supplied to the print head (150 - 0%), thus increasing the print contrast

Warning: too high a percentage could cause serious damage to the print head or otherwise shorten its life

- Menu

  o Access the "configuration menu" of the printer
  (see the 'Configuration menu' paragraph)

- F1

  o Access the "layout selection" section
  (see the 'Layout selection (A - Z)' paragraph)

- Pause

  o Enables / Disables the reading of the "applicator cycle" present in the printer memory
  (function available only for models equipped with applicator / "OEM expansion card")

- "UP arrow" + DOWN arrow" (simultaneous press)

  o Performs the "reset procedure" of the printer

Configuration menu

```
 PRINTER SETUP
--> OK to ENTER
```

Features available within the "configuration menu" of the printer.

- RIGHT/LEFT arrows
  - Scroll through the options available for each item in the menu and submenus
- UP/DOWN arrows
  - Scroll through the options available for each item in the menu and submenus
  - Increase/decrease of the numerical parameters present among the options
- Print/OK
  - Store the displayed option
  - Access the submenus (in correspondence with the message "OK to Enter")
  - Execute the displayed procedure (in correspondence with the message "OK to START!")
- Esc
  - Exit submenus and return to previous menu/submenu
  - Exit the menu and return to "ready"

Warning: to actually modify the value of any option it is necessary to press the "Print/OK" button!!
In case of changing menu item ("RIGHT/LEFT arrows") or exiting the submenu/menu ("Esc" key) without pressing the "Print/OK" key, the value of the option previously shown on the display will NOT be stored!!
In this case, the previously stored parameters are kept valid.
Each press of the "Print/OK" key causes the option currently displayed to be saved.

Layout selection (A-Z)

```
LABEL FORMAT 'A'
Set as DEFAULT
```

Features available in the "Layout selection" section.

- RIGHT/LEFT arrows
  - Scrolling of "label formats" ('A' to 'Z')
- UP/DOWN arrows
  - Scrolling of available options ("Set as Default" o "Erase!")
- Print/OK
  - Confirmation of the action to be performed
- Esc
  - Exit the section and return to "ready"

Dedicated procedures

Key sequences to be pressed in succession (starting from the "ready" condition) to access particular functions.

Debug menu


```
INTERNAL SENSORS
--> OK to ENTER
```

This succession of keys allows you to access the "debug menu", a function that allows the analysis of the internal settings of the printer and external interfacing signals.

"ready" screen → "Menu" key → "F1" key

      "Print/OK" key → access the "debug menu"

      "Esc" key → back to "ready"

Features available in the "debug menu" of the printer:

- RIGHT/LEFT arrows
  - Scroll through menu items and submenus
- UP/DOWN arrows
  - Scroll through the options available for the "output commands" ("ON" and "OFF") (function available only for "OEM" models)
- Pause
  - Suspension/resumption of "internal sensors" reading
  - Suspension/resumption of "input signals" reading
- Print/OK
  - Access the submenus (in correspondence with the message "OK to Enter")
  - Execute the displayed procedure (in correspondence with the message "OK to START!")
  - Resumption of "internal sensors" reading from pause condition
  - Resumption of "input signals" reading from pause condition (function available only for "OEM" models)
  - Execute the displayed procedure for the "output commands" (function available only for "OEM" models)
- Esc
  - Exit submenus and return to previous menu/submenu
  - Exit the menu and return to "ready"

Batch printing of labels

Function available when printing "batches of labels".

```
Batch copies:
# (x) of (N)
```
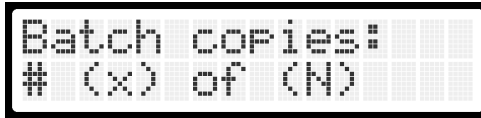
- Pause
  - Suspension/resumption of the printing cycle
- Print/OK
  - Resume reading of the print cycle from the pause condition
- Esc
  - Suppression of the print cycle and return to "ready"

Syntax error

```
(Printer Name)
Err.Cmd:13 ?52&
```

Error condition after the printer receives a command with invalid parameters.

The number of the ? command that generated the error is indicated on the LCD followed by the command itself. To reset the count of ? commands received by the printer refer to the ?A3&3,0 command.

In image: error generated by the 13th ? command received by the printer, a ?52& in this case

- Esc
  o Return to "ready"

Configuration menu

The configuration menu allows to set the parameters and settings of the printer.

The available settings are divided into the following submenus:

- PRINTER SETUP
  printer operating parameters

- EXTERNAL SIGNALS   (only for "OEM" models)
  management of external control signals

- SPECIAL OPTIONS
  special modes of operation of the printer

- INITIALIZATION
  it performs the learning of the paper photosensor levels, the realignment, the reset of the backfeed, advancement at the end of the print and infinite print cycle.

Note: the menus of the TX 53-12 CS printer differ slightly from those shown below.
Refer to the specific user manual for a more accurate description.

Printer Setup

```
PRINTER SETUP
    ├── Writing Mode
    ├── Paper Settings
    │       ├── Paper Mode
    │       ├── Paper Photosens.
    │       ├── Preprinted Lab.
    │       └── Pre-PaperEnd Lev
    ├── Y Alignment
    ├── Print Speed
    ├── Print Intensity
    │       ├── Head EneryRange
    │       └── Contrast
    └── Ethernet Setup
            └── Static Setup
                    ├── IP Address
                    ├── Subnet Mask
                    ├── Gateway Address
                    └── DNS Address

DHCP Setup
    ├── DHCP
    ├── IP Address
    ├── Subnet Mask
    ├── Gateway Address
    └── DNS Address

Ports Setup
    ├── Port #1
    ├── Port #2
    └── Port #3

MAC Address

COM1 Setup
    ├── COM1: BAUDRATE
    ├── COM1: PARITY
    ├── COM1: DATA Bits
    └── COM1: STOP bits

COM2 Setup *
    ├── COM2: BAUDRATE
    ├── COM2: PARITY
    ├── COM2: DATA Bits
    └── COM2: STOP bits

RS485 Address *

Set Time/Date

Set BB TimeShift
    ├── Set BB TimeShift
    └── Time

LabelTaken Sens.

Connection Mode

Character Set

Set PhotoRIBBON *
```

The "printer setup" submenu consists of the following items:

- Writing Mode
  printing method:
  - Direct Thermal: directly on thermosensitive media
  - Thermal Transfer: through inked ribbon transfer
- Paper settings
  print media management:
  - Paper Mode
    print media type:
    - Labels
    - Continuous: continuous form paper
    - Tag/Tickets
  - Paper Photosens.
    type of media reading sensor:
    - Fork
    - Reflection
  - Preprinted Lab.
    levels learning mode for the paper photosensor
  - Pre-PaperEnd Lev
    setting for the use of the pre-end paper sensor
- Y alignment
  alignment "gap" at the end of printing
- Print Speed
- Print Intensity
  print intensity adjustment:
  - Head EnergyRange
    limitation of the energy supplied to the print head:
    - STANDARD (Low): "low energy" operation
    - HIGH Energy: "high energy" operation
  - Contrast
    percentage of energy supplied to the printhead
- Ethernet Setup
  setting the Ethernet connection parameters:
  - Static Setup
    static connection parameter settings:
    - IP Address
      static IP address
    - Subnet Address
      static subnet address
    - Gateway Address
      static gateway address
    - DNS Address
      static DNS address
  - DHCP Setup
    DHCP connection parameters setting/display:
    - DHCP
      DHCP enabling/disabling:
      - Enabled: DHCP enabled
      - Disabled: DHCP disabled
    - IP Address
      IP address obtained via DHCP
    - Subnet Address
      subnet address obtained via DHCP
    - Gateway Address
      gateway address obtained via DHCP
    - DNS Address
      DNS address obtained via DHCP

- Ports Setup
  TCP port settings:
  - Port #1
    first port
  - Port #2
    second port
  - Port #3
    third port
- MAC Address
  displays the MAC address of the printer

- COM1 Setup
  serial communication parameters for the COM1 port:
  - COM1: BAUDRATE
  - COM1: PARITY
  - COM1: DATA bits
  - COM1: STOP bits
- COM2 Setup (* only for models with two RS232 serial ports)
  serial communication parameters for the COM2 port:
  - COM2: BAUDRATE
  - COM2: PARITY
  - COM2: DATA bits
  - COM2: STOP bits
- RS485 Address (* only for RS485 models)
  printer address for communications via RS485 protocol
- Set Time/Date
  setting the internal clock and calendar of the printer
- Set BB TimeShift
  setting a delay or advance for the expiration date:
  - Set BB TimeShift
    - Delayed: delayed expiration date
    - Preempted: anticipated expiration date
  - Time: hh:mm
    hours and minutes late/early
- LabelTaken Sens.
  use/presence of the label taken sensor
- Connection Mode
  control characters reception mode:
  - Standard: no changes to the input characters
  - Mainframe: transformation of all input control characters into the "Carriage Return" character (CR, ASCII code = 13 Dec)
- Characters Set
  selection of the alphabetic character set used
- Set PhotoRIBBON (* only in Thermal Transfer mode)
  setting of the level beyond which the ribbon end is detected

External Signals

```
┌─────────────────────┐
│ EXTERNAL SIGNALS *  │
└─────────────────────┘
   │
   │    ┌─────────────────────┐
   ├──▶ │ StartPrint Sign.    │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartPrint Mode     │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartPrint Level    │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartPrint Time     │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartPrintDelay     │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartPr. Copies     │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ Print-End Signal    │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ Print-End Level     │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ AlarmSign. Level    │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ Apply Equipment *   │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   ├──▶ │ StartApply Sign. *  │
   │    └─────────────────────┘
   │    ┌─────────────────────┐
   └──▶ │ Encoder En./Dis. *  │
        └─────────────────────┘
```
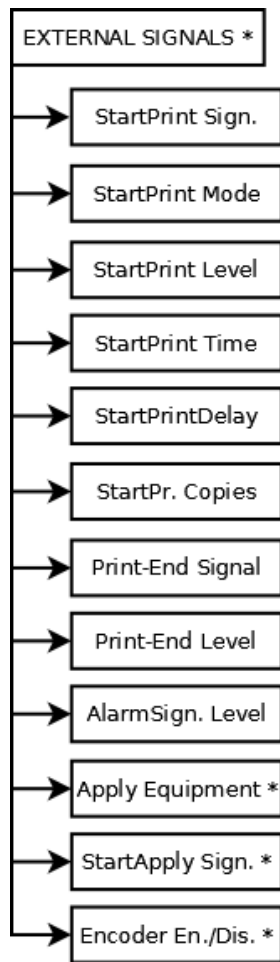
The "external signals" submenu consists of the following items (* only for "OEM" models):

- StartPrint Sign.
  enabling/disabling of the START PRINT signal
- StartPrint Mode
  setting of the operation mode of the START PRINT signal
- StartPrint Level
  setting of the logic level of activation of the START PRINT signal
- StartPrint Time
  setting of the minimum duration of the START PRINT signal
- StartPrintDelay
  setting of the printing delay time after receiving the START PRINT signal
- StartPr. Copies
  setting of the number of copies to be printed after receiving the START PRINT signal
- Print-End Signal
  setting of the operation mode of the PRINT END signal
- Print-End Level
  setting of the logic level of the PRINT END signal
- AlarmSign. Level
  setting of the logic level of the ALARM/AUX signal
- Apply Equipment (* only for "OEM" models with applicator)
  enabling/disabling of the applicator cycle
- StartApply Sign. (* only for "OEM" models with applicator)
- enabling/disabling of the START APPLY signal
- Encoder En/Dis. (* only for "OEM" models with applicator)
  enabling/disabling of the encoder

Special Options

SPECIAL OPTIONS

- 'SUB' at PowerON
- MACRO Status
- DUMP Mode
- LABEL ON @ PwrON
- Endless Printing
- View LabelsCount
- View AP cycle
- IFCYCLE state *
- Power Motor
- RFID module *
- RFID calibration *
- RFID CheckTAG *
- skip GAP @Layout
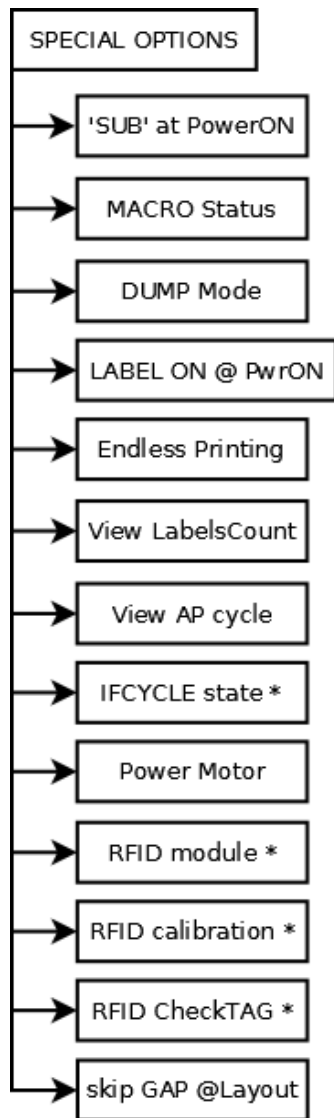
The "special option" submenu consists of the following items:

- 'SUB' at PowerON
  sending of the "SUB" character (by the printer) every time the power supply is restored (e.g. at power on or in the event of a power failure)
- MACRO Status
  "Macro Interpreter" operating mode: the printer functions by automatically composing the labels with the data received directly from the device to which it is connected (e.g. scale)
- DUMP Mode
  "DUMP" operating mode: the printer decodes all the characters it receives in input and prints them as a sequence of single values based on the set code (hexadecimal, decimal or ASCII)
- LABEL ON @ PwrON
  automatic activation of the last active layout at power on
- Endless Printing
  "infinite print" operating mode: continuous printing of the contents of the print buffer
- View LabelsCount
  enable/disable the printed labels count menu, accessible from the main printer screen by pressing F2
- IFCYCLE state (* only for "OEM" models with applicator)
  Enable/disable the execution of the line following the IFCYCLE command in the applicator cycle
- View AP Cycle
  enable/disable the display of the current operation of the applicator cycle
- Power Motor
  allows to set the motor current (protected)
- RFID module (* only for models with RFID)
  enable/disable the RFID module
- RFID calibration (* only for models with RFID)
  RFID module calibration
- RFID CheckTAG (* only for models with RFID)
  enable/disable TAG checking
- skip GAP @Layout
  skip labels alignment when loading a layout

Debug menu

A flow diagram of the Debug menu structure. Top-level menu items connected by bidirectional arrows:

INTERNAL SENSORS → **STORED PARAM.** → **TEST PROCEDURES** → **EXTERNAL SIGNALS *** → **I/O CHANNELS *** → **EN/DIS Val.Speed ***

INTERNAL SENSORS:
- PrintHead Temp.
- Print Contrast
- Fork PhotoLabel
- Pick Photosensor
- Ribbon Photosens
- Refl. PhotoLabel
- StartPrint Sign.
- Y22 Channel

STORED PARAM.:
- Paper Photosens.
- Labels Level
- BackingPaper Lev
- PaperOut Level
- Odometer
  - Printed Labelsl
  - Printed Meters
  - Ejected Meters
- Encoder *
  - Resol. = ...
  - Diameter = ...

TEST PROCEDURES:
- Test Labels
- Printer Param.
- Points and Lines
- Large Points
- Memory Config.
- FLASH Mem. Info
- Check COM1 Port
- Check LCD Colors

EXTERNAL SIGNALS *:
- StartPrint Sign.
- Print-End Signal
- Alarm Signal

I/O CHANNELS *:
- Input Signals
  - Overall View
  - Channel-IN 1
  - Channel-IN ...
  - Channel-IN 16
- Output Commands
  - Channel-OUT 1
  - Channel-OUT ...
  - Channel-OUT 16

EN/DIS Val.Speed *

273

The debug menu allows to check and analyze the printer settings and any external control/interface signals, in order to identify and solve any problems.

It consists of the following submenus:

- INTERNAL SENSORS
  readings from the internal sensors of the printer

- STORED PARAM.
  transparency levels, number of prints and encoder parameters

- TEST PROCEDURES
  procedures to test printer functionalities

- EXTERNAL SIGNALS   (* only for OEM models)
  external control signals check

- I/O CHANNELS   (* only for OEM models with applicator)
  input signals and output commands check

- EN/DIS Val.Speed   (* only for models with encoder)
  enable/disable the display of the speed detected by the encoder during printing

Internal Sensors

- PrintHead Temp.
  printhead temperature
- Print contrast
  print contrast percentage
- Fork PhotoLabel
  value read by the media fork photosensor
- Pick Photosensor
  value read by the label taken photosensor
- Ribbon Photosensor
  value read by the ink ribbon photosensor
- Refl. Photolabel
  value read by the media reflection photosensor
- StartPrint Sign.
  START PRINT input signal state
- Y22 channel
  value read by the printhead position sensor

Stored Param.

- Paper Photosens.
  media transparency levels stored during the last label alignment:
  - Labels Level
    limit value for the detection/recognition of the label
  - BackingPaper Lev
    limit value for the detection of the backing paper
  - PaperOut Level
    limit value for the recognition of the end of the paper
- Odometer
  print statistics:
  - Printed Labels
    printed labels count
  - Printed Meters
    printed media length count
  - Ejected Labels
    ejected media length count
- Encoder (* only for models with encoder)
  encoder parameters:

- ▪ Resol.
  encoder resolution
- ▪ Diameter
  encoder diameter

Test Procedures

- • Test Labels
  prints test labels:
  - ▪ Printer Param
    printer operating parameters (printer's test label)
  - ▪ Points and Lines
    check pattern of the integrity of the printhead dots
  - ▪ Large Points
    check pattern of the integrity of the printhead dots
  - ▪ Memory Config.
    printer memories configuration
  - ▪ Flash Info
    printer flash memories configuration
- • Check COM Port
  serial communication check procedure (only for COM1)
- • Check LCD Colors
  procedure to check the operation of the 8-color LCD

External Signals (* only for OEM models)

- • StartPrint Sign.
  START PRINT input signal state
- • Print-End Signal
  PRINT END output signal control
- • Alarm Signal
  ALARM/OUX output signal control

I/O Channels (* only for OEM models with applicator)

- • Input Signals
  readings form the 16 input channels (Channel-IN)
- • Output Commands
  16 output channels control (Channel-OUT)

Display colors

LCD backlight colors meanings:

- White
  - "ready"/normal operation

- Red
  - error/alarm signal due to factors external to the printer (direct intervention by the operator needed to identify and resolve the anomaly)

- Yellow
  - error/alarm signal due to critical operating conditions inside the printer (the printer is reactivated when the operating conditions return to optimal)

- Light blue
  - browsing within the printer configuration menu
  - browsing within the "layout selection" section

- Pink
  - browsing within the "debug menu"

- Blue
  - printer busy doing internal procedures
  - pause during batch printing
  - pause during internal sensor reading (debug)
  - pause during input signals reading (debug) (only for OEM models)

- Green
  - "ready"/normal operation with applicator cycle enabled (only for OEM models with applicator)

- Blinking yellow/green
  - the operator needs to restart the printer (in correspondence with the "TurnOFF/ON to do" message)

38 Appendix C - printing examples

To print these examples, use any text editor capable of producing an ASCII character file and sending the file itself to the communication port connected to the printer.

These examples were made with an 8 dot/mm resolution printer.

Example 1

```
?00&
?07&80
?06&-13
?52&10,161,270,2,11;Handle with care
?22&134,244,310,70,2
?16&130,0,318,318,4
?09&2
?10&1
?11&2
?13&2
?52&11,168,183,8,58;5499981284
?16&164,87,76,88,2
?15&132,76,316,2,4
?22&134,80,24,164,2
?22&420,80,24,164,2
?22&178,95,48,72,0
?17&178,95;07FFFFFFFC
?17&;07FFFFFFFC
?17&;0FFFFFFFFE
?17&;1FFFFFFFFE
?17&;1FC1FFFFFF
?17&;1F81FFFFFF
?17&;1F81FFFFFF
?17&;3F81FFFFFF
?17&;3F03FFFFFF8
?17&;7F03FFFFFF8
?17&;7F07FFFFFFC
?17&;7F07FFFFFFC
?17&;7F07FFFFFFC
?17&;7E07FFFFFFC
?17&;7E07FFFFFFC
?17&;7E07FFFFFFC
?17&;7E0FFFFFFFC
?17&;7E0FFFFFFFC
?17&;7E0FFFFFFFC
?17&;7E0FFFFFFFC
?17&;7E0FFFFFFFC
?17&;7E0FFFFFFFC
?17&;7F0FFFFFFFC
?17&;7F07FFFFFFC
?17&;7F07FFFFFFC
?17&;3F87FFFFFFC
?17&;3FC3FFFFFF8
?17&;1FC3FFFFFF
?17&;1FE1FFFFFF
?17&;0FF1FFFFFE
?17&;07F8FFFFFE
?17&;07FC7FFFFC
?17&;03FFFFFFFF8
```

Feed

+X

Fine Glass

6 Cristal
glasses

5499981284

+Y

Handle with care

```
?17&;01FFFFFFF
?17&;007FFFFFC
?17&;003FFFFF8
?17&;0007FFFC
?17&;0001FFF8
?17&;00007FF
?17&;00007FF
?17&;00003FC
?17&;00003FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00001FC
?17&;00003FC
?17&;00007FE
?17&;0007FFFF
?17&;3FFFFFFFFE
?17&;7FFFFFFFFF
?17&;7FFFFFFFFF
?17&.
?52&10,191,12,5,11;Fine Glass
?52&10,263,98,2,11;6 Cristal
?52&10,263,136,2,11;glasses
?14&1
```

Example 2

```
?00&
?07&80
?06&-13
?17&232,159;0000FF8
?17&;000FFFE
?17&;003FFFF8
?17&;007FFFFC
?17&;01FF00FF
?17&;01F0001F8
?17&;07E0000FC
?17&;0FC00007E
?17&;1F800003F
?17&;1E000001F
?17&;3E000000F8
?17&;3C07FF0078
?17&;7807FF003C
?17&;7807FF003E
?17&;780700001E
?17&;F00700001E
?17&;F00700001E
?17&;F00700001E
?17&;F007FE001F
?17&;F007FE000F
?17&;F007FE000F
?17&;F00700001E
?17&;F00700001E
?17&;F00700001E
?17&;700700001E
?17&;780700003E
?17&;780700003C
?17&;3C0700007C
?17&;3E070000F8
?17&;3F000001F8
?17&;1F000003F
?17&;0FC00003E
?17&;07F0001FC
?17&;03F8003F8
?17&;01FFC7FF8
?17&;00FFFFFE
?17&;003FFFF8
?17&;0007FFC
?17&;000038
?17&;
?17&.

?17&368,159;F80000000007C
?17&;F80000000007C
?17&;FE060C0C0C1FC
?17&;FE0E0E1C1C3FC
?17&;FB1F9F3F3E77C
?17&;F9F1F3F3F3E7C
?17&;F8E0E0E0E1C7C
?17&;F80000000007C
?17&;F80000000007C
?17&;F80000000387C
?17&;F800000007C7C
?17&;F800000006C7C
?17&;F800000007C7C
```
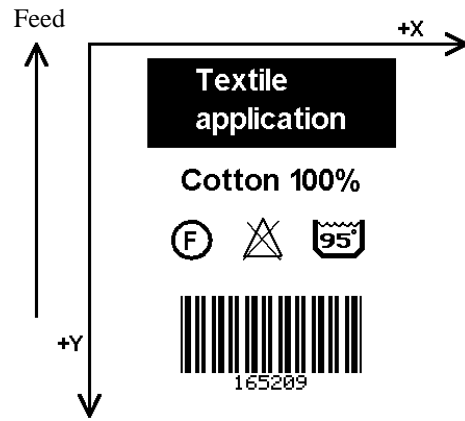
?17&;F83FC1FFF387C
?17&;F8FFF1FFF007C
?17&;F9F0F9E00007C
?17&;F9E079E00007C
?17&;F9E079FF8007C
?17&;F9F0F9FFE007C
?17&;F8FFF801F007C
?17&;F83FF800F007C
?17&;F800F800F007C
?17&;F800F800F007C
?17&;F801F1E0F007C
?17&;F803E1F1F007C
?17&;F87FC0FFE007C
?17&;F87F003F8007C
?17&;FC000000000FC
?17&;FE000000001FC
?17&;7F000000003F8
?17&;3F800000007F
?17&;1FC0000000FE
?17&;0FFFFFFFFFFC
?17&;07FFFFFFFFF8
?17&;03FFFFFFFFF
?17&;01FFFFFFFFE
?17&;00FFFFFFFFC
?17&.

?17&300,156;
?17&;000018
?17&;00001C
?17&;00003C
?17&;00003E003
?17&;040076006
?17&;06006700C
?17&;0300E3018
?17&;0180C383
?17&;00C1C186
?17&;004181C4
?17&;006380CC
?17&;003300F8
?17&;001F007
?17&;000E007
?17&;000E00F
?17&;000F01B8
?17&;001D8318
?17&;0018C61C
?17&;00384C0C
?17&;0030780E
?17&;00703006
?17&;00603807
?17&;00E06C03
?17&;00C0C6038
?17&;01C183018
?17&;01830181C
?17&;03860080C
?17&;030C00C0E
?17&;071800606
?17&;063000307
?17&;0E6000183
?17&;0CC0000C38
?17&;1D80000618

?17&;190000031C
?17&;3B0000018C
?17&;360000008E
?17&;7FFFFFFFFE
?17&;7FFFFFFFFC
?17&;300000003
?17&;600000001C
?17&;4000000008
?17&;
?17&.
?09&2
?10&1
?11&2
?13&2
?52&11,241,232,0,90;165209
?52&10,242,105,2,11;Cotton 100%
?52&10,256,9,2,11;Textile
?52&10,256,46,2,11;application
?22&208,0,240,90,2
?14&1

Example 3

```
?00&
?07&80
?06&-13
?04&A
?53&A,0,10,49,161,13,11
?53&A,1,10,174,251,7,11
?53&A,2,10,208,279,2,11
?53&A,3,10,202,324,2,11
?09&2
?10&1
?11&2
?13&2
?53&A,4,11,301,228,5,123
?72&A,5,1,147,226,7,11,0;12/05/96
?72&A,6,1,60,21,4,12,1;EUROSPAR-MI
?72&A,7,1,37,279,2,11,2;Net W.(Kg)
?72&A,8,1,37,251,7,11,3;Price/Kg:
?72&A,9,1,37,226,7,11,4;Pack Date:
?72&A,10,1,37,324,2,11,5;Total:
?05&A
?22&24,150,424,69,1
?25&Red APPLES
?25&2.800
?25&1,500
?25&4.200
?25&3044200
```

Feed

+X

EUROSPAR-MI

Red APPLES

Pack Date: 12/05/96
Price/Kg: 2.800

+Y

Net W.(Kg)   1,500

Total: 4.200   30442009

39 Appendix D - serial interfacing

The models equipped with a serial port are fitted with a 9-pole female "DB9" connector that can have different configurations based on the type of serial protocol (RS232, RS422 or RS485) supplied with the printer.

RS232 - DB9 connector

The mapping of the signals on the connector is

3 - RS232 TX
5 - logic ground GND
2 - RS232 RX
9 - +5V
7 - RS232 RTS
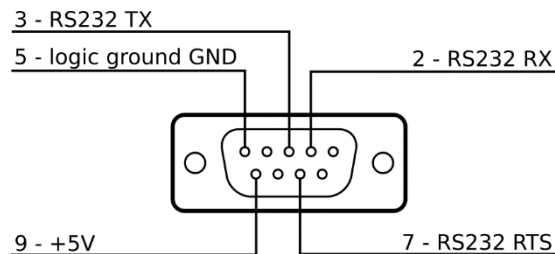
Connection to the PC can be done in the following ways:

9 PIN PC CONNECTOR	
PC	PRINTER
2 ————————————	2 RX
3 ————————————	3 TX
5 ————————————	7 RTS
7 ————————————	5 GND

PC CONNECTOR:
- with the XON/XOFF software protocol:
    jumper PIN 7-8 and 1-4-6.
- with the CTS/RTS hardware protocol:
    jumper PIN 1-4-6.

25 PIN PC CONNECTOR	
PC	PRINTER
2 ————————————	2 RX
3 ————————————	3 TX
5 ————————————	7 RTS
7 ————————————	5 GND

PC CONNECTOR:
- with the XON/XOFF software protocol:
    jumper PIN 4-5 and 6-8-20.
- with the CTS/RTS hardware protocol:
    jumper PIN 6-8-20.

RS422 - DB9 connector

The mapping of the signals on the connector is

```
4 - RS422 RX-                    1 - RS422 TX+



8 - RS422 TX-                    6 - RS422 RX+
```
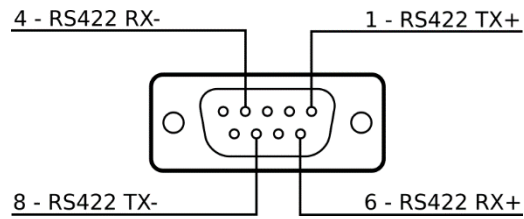
Flow control

The RS422 protocol does not provide for hardware data flow control lines.
This means that if you have to transmit a number of bytes equivalent to the size of the printer's reception buffer, you must insert a short delay (1 or 2 msec) between the sending of one character and the next to avoid transmission errors or to resort to XON/XOFF software flow control.

Connection to the PC can be done in various ways, depending on the type of converter used.

RS485 - DB9 connector

The mapping of the signals on the connector is

```
4 - RS422 RX-                    1 - RS422 TX+



        ○      ○ ○ ○ ○ ○      ○
                 ○ ○ ○ ○


8 - RS422 TX-                    6 - RS422 RX+
```
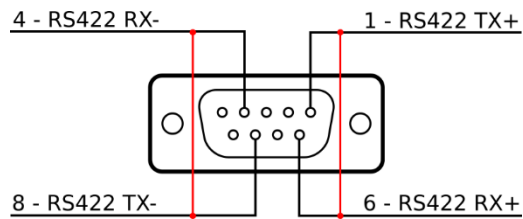
Depending on the number of printers installed in the 485 network, it may be necessary to put a short circuit connection between pin 2 and 4 of the connector of the last printer in the ring to activate the termination resistor already included in the 485 driver on the printer.

```
2 ─────────────────────────────────────────
3 ─────────────────────────────────────────

                                    2 ┤├ 4
    ┌─────────┐  ┌─────────┐    ┌─────────┐
    │ Addr. 00│  │ Addr. 01│    │ Addr. 14│
    └─────────┘  └─────────┘    └─────────┘
```
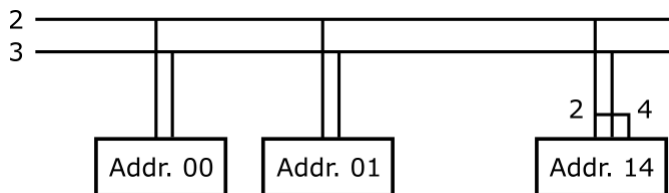
Flow control

The RTS signal, normally used in the RS232 line to control the data flow in transmission, in the RS485 protocol is used to control the transmission direction.
This means that if you have to transmit a number of bytes equivalent to the size of the printer's reception buffer, you must insert a short delay (1 or 2 msec) between the sending of one character and the next to avoid transmission errors.

Connection to the PC can be done in various ways, depending on the type of converter used.

40 Appendix E - wiring diagrams for external signals

Wiring and parameters for I/O signals - 6 poles DIN connector

The Pick & Place working mode allows an external device (e.g. PLC, photocell, pneumatic applicator, etc.) to start or halt printing. When Pick & Place options is enabled 3 optoisolated signals are available:

- START PRINT   **Input** - print consent
- PRINT END   **Output** - print end signal
- ALARM   **Output** - auxiliary output for error conditions

These 3 signals are mapped on a 6 poles DIN plug with the following outline.
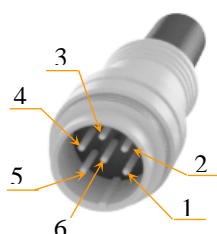
6 poles DIN connector (external view)

The I/O signals needed to synchronize the printing system with external devices, connected on the 6 poles DIN socket of the control unit, are all optoisolated. Depending on whether it's an input or an output signal, this will be connected at the positive pole of the diode or the transistor respectively.
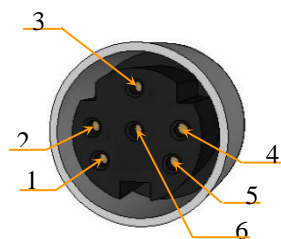
6 poles DIN socket (external front view)
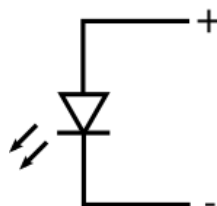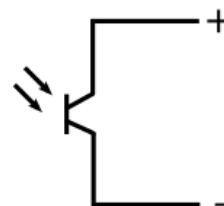
Control unit without expansion - external power supply and ground

The pinout of a 6 poles DIN socket of a control unit without expansion and with external power supply and ground is shown below.
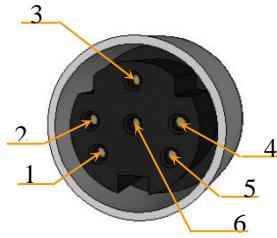
1	+ START PRINT (INPUT)
2	- START PRINT (INPUT)
3	+ ALARM (OUTPUT)
4	- ALARM (OUTPUT)
5	+ PRINT END (OUTPUT)
6	- PRINT END (OUTPUT)

The pinout of the 6 poles DIN plug used to connect to the control unit is shown below.

The examples refer to the connection with a DIN plug seen from the welding side.

3) + ALARM (output)
4) - ALARM (output)
2) - START PRINT (input)
5) + PRINT END (output)
1) + START PRINT (input)
6) - PRINT END (output)

Start print signal (START PRINT)

SWITCH

PNP PHOTOCELL
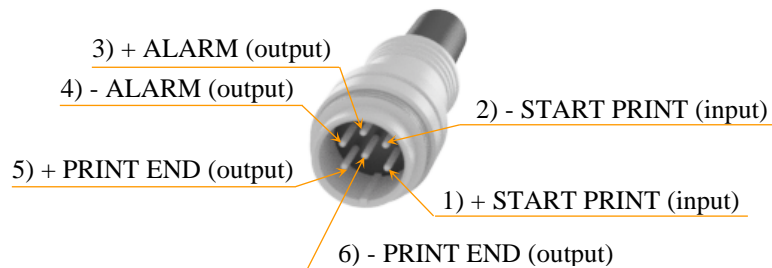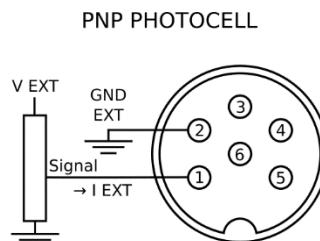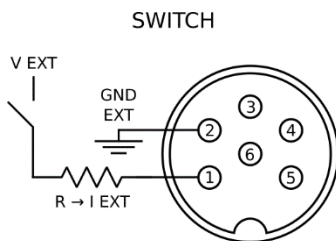
Vext (Volt)	Iext (mA)	R (Ohm)
24	15	1270
24	30	470
24	50	150
12	15	470
12	30	70
5	15	0

Vext = external power supply voltage
Iext = current generated by the external circuit
R = resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

Alarm signal (ALARM) and print end signal (PRINT END)

ALARM

PRINT-END
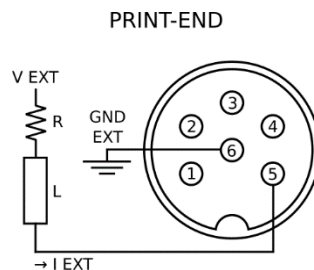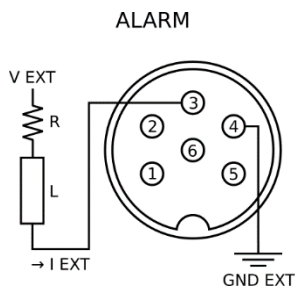
Vext (Volt)	Iext (mA)	R+L (Ohm)
24	10	2400
24	20	1200
24	50	240
12	10	1200
12	20	600
12	50	120
5	10	500
5	20	250
5	50	100

Vext = external power supply voltage
Iext = current generated by the external circuit
R = current limiting resistor
L = load resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

Application example with PLC
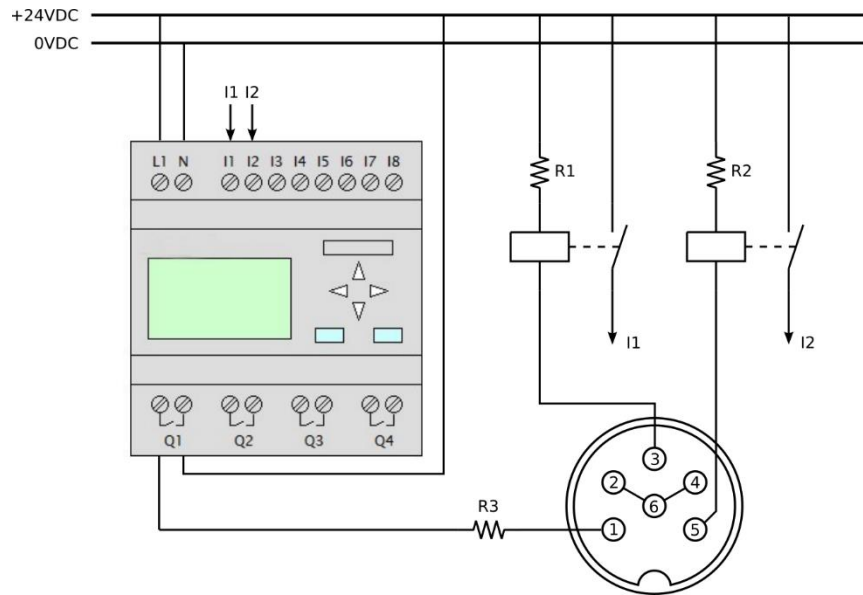
Control unit without expansion - internal power supply and ground

The pinout of a 6 poles DIN socket of a control unit without expansion and with internal power supply and ground is shown below.
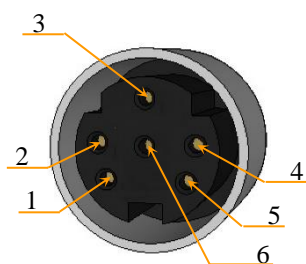
1	+ START PRINT (INPUT)
2	- START PRINT (INPUT)
3	+ 36/24/12 V
4	GND
5	+ PRINT END (OUTPUT)
6	- PRINT END (OUTPUT)

The pinout of the 6 poles DIN plug used to connect to the control unit is shown below.
The examples refer to the connection with a DIN plug seen from the welding side.

3) +36/24/12V
4) GND
5) + PRINT END (output)
2) - START PRINT (input)
1) + START PRINT (input)
6) - PRINT END (output)

Start print signal (START PRINT)

SWITCH PNP PHOTOCELL
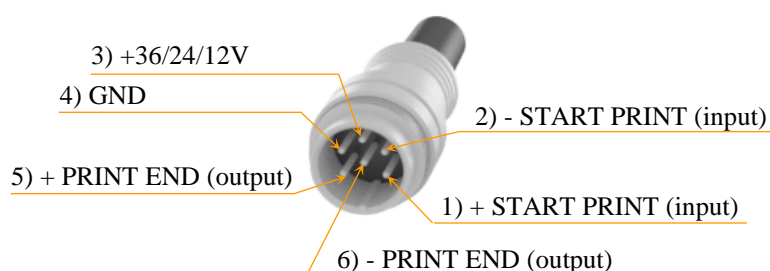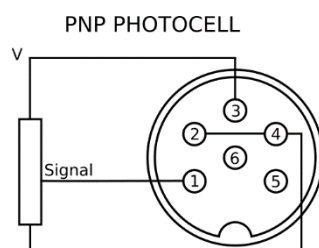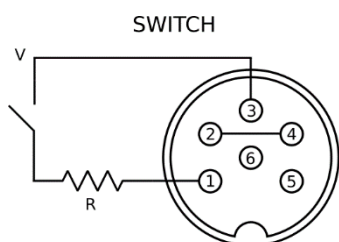
V (Volt)	I (mA)	R (Ohm)
36	15	2000
24	15	1270
24	30	470
24	50	150
12	15	470
12	30	70

V = internal power supply voltage
I = generated current
R = resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

Print end signal (PRINT END) - the alarm signal is not available
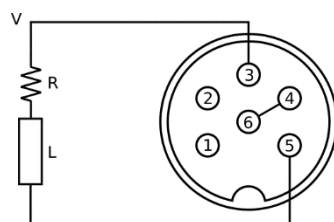
V (Volt)	I (mA)	R+L (Ohm)
36	20	1800
24	10	2400
24	20	1200
24	50	240
12	10	1200
12	20	600
12	50	120

V = internal power supply voltage
I = generated current
R = current limiting resistor
L = load resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

Control unit with expansion - internal +24V power supply and ground

The pinout of a 6 poles DIN socket of a control unit with expansion and with internal +24V power supply and ground is shown below.
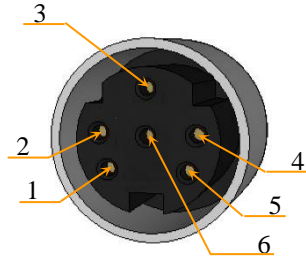
1	+ START PRINT (INPUT)
2	GND
3	+ ALARM (OUTPUT)
4	GND
5	+ PRINT END (OUTPUT)
6	+24V

The pinout of the 6 poles DIN plug used to connect to the control unit is shown below.
The examples refer to the connection with a DIN plug seen from the welding side.

3) + ALARM (output)
4) GND
2) GND
5) + PRINT END (output)
1) + START PRINT (input)
6) +24V

Start print signal (START PRINT)

SWITCH

PNP PHOTOCELL

24V
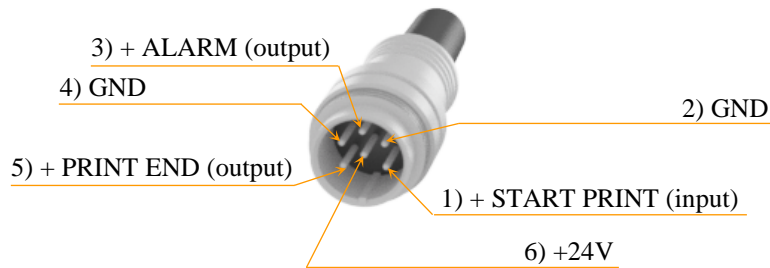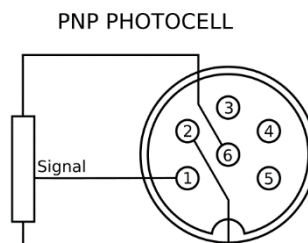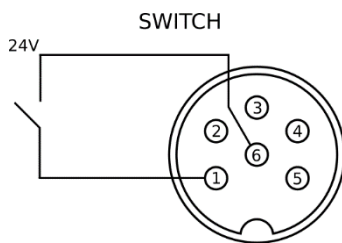
Signal

The internal circuit resistance in 1800 Ohm

Alarm signal (ALARM) and print end signal (PRINT END)

ALARM

PRINT-END
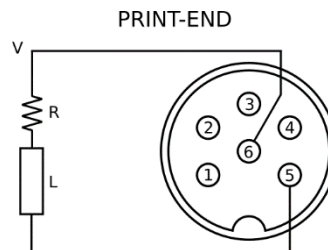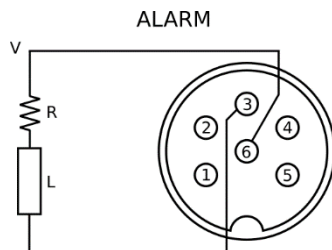
V (Volt)	I (mA)	R+L (Ohm)
24	10	2400
24	20	1200
24	50	240

V = internal power supply voltage
I = generated current
R = current limiting resistor
L = load resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

V = internal +24V
The transistor can output a maximum current of 1A

$I = V/(R+L)$
with Imax = 1A

290

Wiring and parameters for I/O signals - 3, 4 and 5 poles connectors

The Pick & Place working mode allows an external device (e.g. PLC, photocell, pneumatic applicator, etc.) to start or halt printing. When Pick & Place options is enabled 3 optoisolated signals are available:

- START PRINT **Input** - print consent
- PRINT END **Output** - print end signal
- ALLARME **Output** - auxiliary output for error conditions

These 3 signals can be found, on control units with expansion, internal +24V power supply and ground, on the 6 poles DIN socket as well as on the 3 other connectors.

3 poles connector - Start Print

2) +24V

3) INPUT - Start Print

1) GND
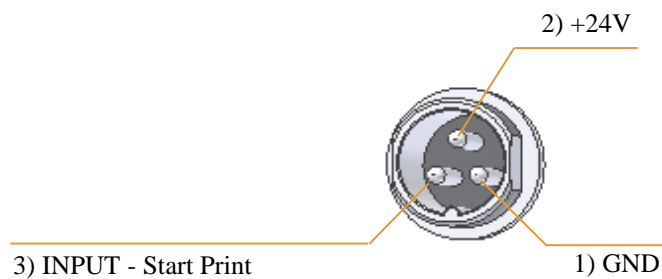
3 poles socket- Start Print

2) +24V

1) GND

3) INPUT - Start Print

3 poles plug - Start Print

SWITCH

PNP PHOTOCELL
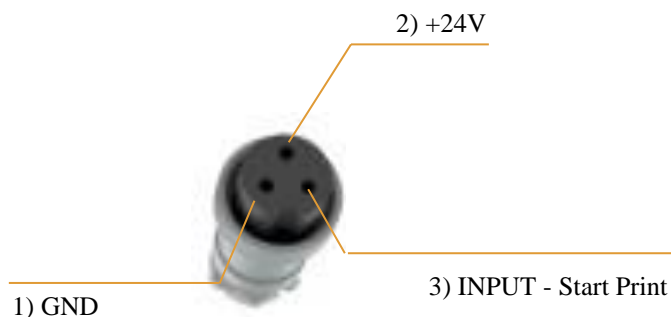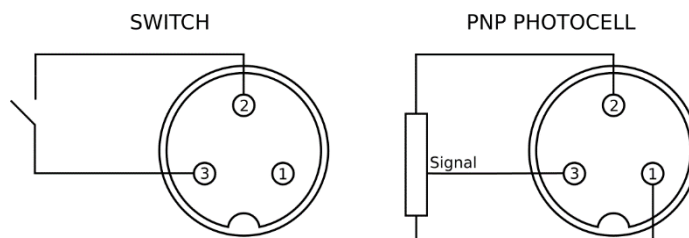
Signal

Welding side view

Input signal
The internal circuit resistance is 1800 Ohm.

4 poles connector - Print End

3) OUTPUT - Print End

2) +24V

4) not connected

1) GND

2) +24V

3) OUTPUT - Print End

1) GND

4) not connected

PRINT-END

V (V)	I (mA)	R (Ohm)
24	15	1270
24	30	470
24	50	150

Output signals
V = internal power supply voltage
I = generated current
R = current limiting resistor
L = load resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

V = internal +24V
The transistor can output a maximum current of 1A

$I = V/(R+L)$
with Imax = 1A

5 poles connector - Alarm

3) OUTPUT - Alarm

4) not connected

2) +24V

5 poles socket - Alarm

5) not connected

1) GND

3) OUTPUT - Alarm

2) +24V

4) not connected

5 poles socket - Alarm

1) GND

5) not connected
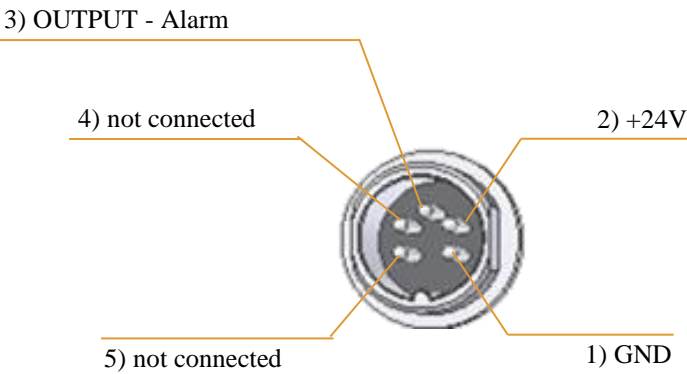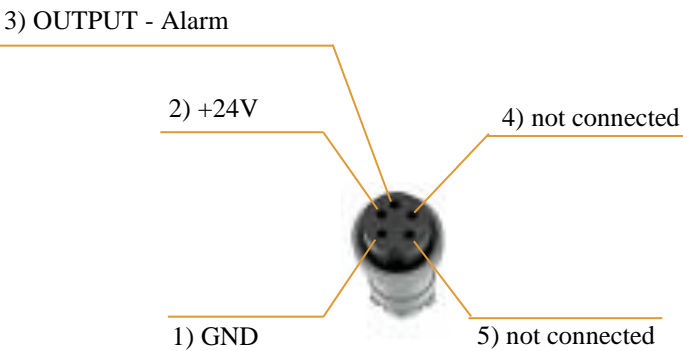
ALARM
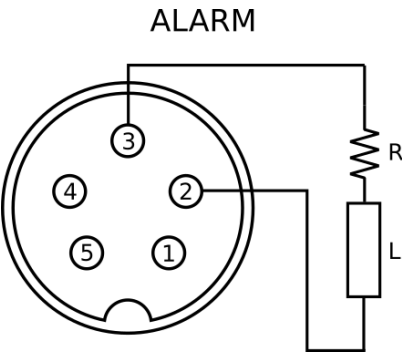
Welding side view

V (V)	I (mA)	R (Ohm)
24	15	1270
24	30	470
24	50	150

Output signals
V = internal power supply voltage
I = generated current
R = current limiting resistor
L = load resistance of the external circuit
NOTE: the highlighted rows indicate the recommended values

V = internal +24V
The transistor can output a maximum current of 1A

$I = V/(R+L)$
with Imax = 1A

41 Appendix F - control characters

The following table is for US ASCII code, ANSI X3.4-1986 (ISO 646 International Reference Version).
The decimal codes 0 to 31 are non-printing characters (control codes).

Legend:
Dec - decimal character code
Oct - octal character code
Hex - hexadecimal character code

Dec	Oct	Hex	Name	Description
0	0	0	NUL (Ctrl-@)	NULL
1	1	1	SOH (Ctrl-A)	START OF HEADING
2	2	2	STX (Ctrl-B)	START OF TEXT
3	3	3	ETX (Ctrl-C)	END OF TEXT
4	4	4	EOT (Ctrl-D)	END OF TRANSMISSION
5	5	5	ENQ (Ctrl-E)	ENQUIRY
6	6	6	ACK (Ctrl-F)	ACKNOWLEDGE
7	7	7	BEL (Ctrl-G)	BELL (Beep)
8	10	8	BS (Ctrl-H)	BACKSPACE
9	11	9	HT (Ctrl-I)	HORIZONTAL TAB
10	12	0A	LF (Ctrl-J)	LINE FEED
11	13	0B	VT (Ctrl-K)	VERTICAL TAB
12	14	0C	FF (Ctrl-L)	FORM FEED
13	15	0D	CR (Ctrl-M)	CARRIAGE RETURN
14	16	0E	SO (Ctrl-N)	SHIFT OUT
15	17	0F	SI (Ctrl-O)	SHIFT IN
16	20	10	DLE (Ctrl-P)	DATA LINK ESCAPE
17	21	11	DC1 (Ctrl-Q)	DEVICE CONTROL 1 (XON)
18	22	12	DC2 (Ctrl-R)	DEVICE CONTROL 2
19	23	13	DC3 (Ctrl-S)	DEVICE CONTROL 3 (XOFF)
20	24	14	DC4 (Ctrl-T)	DEVICE CONTROL 4
21	25	15	NAK (Ctrl-U)	NEGATIVE ACKNOWLEDGE
22	26	16	SYN (Ctrl-V)	SYNCHRONOUS IDLE
23	27	17	ETB (Ctrl-W)	END OF TRANSMISSION BLOCK
24	30	18	CAN (Ctrl-X)	CANCEL
25	31	19	EM (Ctrl-Y)	END OF MEDIUM
26	32	1A	SUB (Ctrl-Z)	SUBSTITUTE
27	33	1B	ESC (Ctrl-[)	ESCAPE
28	34	1C	FS (Ctrl-\)	FILE SEPARATOR
29	35	1D	GS (Ctrl-])	GROUP SEPARATOR
30	36	1E	RS (Ctrl-^)	RECORD SEPARATOR
31	37	1F	US (Ctrl-_)	UNIT SEPARATOR

42 Index