



CLI Specification

For XL-Series printers

DETAIL SPECIFICATION

Text

Important Notes

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1 Introductory notes

1.1 Intended audience

The Command Language Interface Specification (CLI) is provided for those users who wish to manage images or control the XLU printers from a source other than the a:design2, JDS7 program or printer handset. These specifications are provided as a courtesy for those who wish to develop their own interface or to employ the services of a third party to develop such an interface.

It is strongly recommended that the user of this document be familiar with the features and functions of the XLU printers and a:design2, a:control or JDS7 programs before attempting a direct interface through CLI.

1.2 Applicability

The content of this document applies to the firmware of all “XL-Series” printers, being the 53XL40, 53XL80, 53XLCR, 53XLCL, 25XLi.

1.3 Preface

The command strings and responses described in the following pages are implemented through a serial link, Ethernet or USB link to the printer. Please note that the configuration of the computer used in the serial, Ethernet or USB links must match the communication settings used in the XLU printers for the connection to be successful. The default printer’s connection is serial connection.

The commands sent and received from the printer are **UTF-8 text strings**. Send the commands as listed in this document. The commands are upper case text and/or numeric strings and some of them are enclosed in “less-than” and “greater-than” signs, < >. The commands are shown in **bold** text.

For example, to display the current GENERAL CONSTANTS as stored in the printer, send:

<PGO>

Responses from the printer will also be enclosed in the same characters.

2 General Information

2.1 Companion Documents

Document Name and Version	Available through
XL Series printer handbook	Allen Coding

3 GENERAL SETUP CONSTANTS

3.1 Set SETUP constants

Send to the printer:

<PSI, num. fields, language, mirror print, print head resistance>

Where

- **Num. fields** is the number of variable listed between this variable and the closing sign >This allows for flexibility and future growth.
- **Language** is the interface language displayed on any connected terminal. This also determines the string table language used for month and day of week variables.

Default = 0

0 - English

1 - French

2 - Italian

3 - Spanish

4 - German

5 - Danish

6 - Czech

7 - Turkish

8 - Portuguese

9 - Dutch

10 - Polish

11 - Swedish

65 - Chinese

66 - Korean

- **Mirror print** is a numeric value of 0 or 1 (off or on)
Default = 0
0 - Mirror print disabled.
1 - Mirror print enabled.
- **Print head resistance** is a numeric value from 1075 to 1455 that represents the internal impedance of the printing element. This value must match the resistance of the print head in use.
Default = 1265

3.2 Get SETUP constants.

Send to the printer:

<PSO>

The printer will respond with following sequence:

< num. fields, language, mirror print, print head resistance>

Refer to the according SET command for field values.

3.3 SETUP to default.

Send to the printer:

<PS*>

With which the appropriate default values (as listed below) are loaded in the printer -

- **Language** – Default = 0 - English
- **Mirror print** – Default = 0 – Mirror print disabled.
- **Print head resistance is not changed**

4 GENERAL CONSTANTS

4.1 Set the GENERAL CONSTANTS.

Send to the printer:

<PGI, num. fields, contrast, external signal-trigger type, printing speed, backward speed, print separation, prints by cycle, adjust to frame>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Contrast** is a numeric value from 0 to 9
Default = 5
- **External signal – trigger type** is a numeric value of 0 or 1
Default = 1
0 – Trigger by level
1 – Trigger by edge
- **Printing speed** is a numeric value from 75 to 400 mm/s
Default = 250 mm/s
- **Backward speed (only used in INTERMITENT printer)** is a numeric value from 75 to 400 mm/s
Default = 250 mm/s
- **Print separation (only used in CM printer)** is a numeric value from 1 to 9999 mm
Default = 1200 mm
- **Print by cycle (only used in CM printer)** is a numeric value from 1 to 99
Default = 1
- **Adjust to frame (only used in CM printer)** is a numeric value from 0 to 1
Default = 0
0 – Adjust to frame disabled
1 – Adjust to frame enabled

4.2 Get the GENERAL CONSTANTS.

Send to the printer:

<PGO>

The printer will respond with following sequence:

<Num. fields, contrast, external signal-trigger type, printing speed, backward speed, print separation, prints by cycle, adjust to frame>

Refer to the according SET command for field values.

4.3 Set the GENERAL CONSTANTS to default.

Send to the printer:

<PG*>

With which the appropriate default values (as listed below) are loaded in the printer -

- **contrast** - Default = 5
- **external signal type** - Default = 1 – Trigger by edge
- **Printing speed** - Default = 250
- **Backward speed** - Default = 250
- **Print separation steps** - Default = 1200
- **Prints by cycle** - Default = 1
- **Adjust to frame** – Default = 0 - Disabled

5 TIMING CONSTANTS

5.1 Set the timing constants.

Send to the printer:

<PTI, num. fields, print delay, electro valve, backward delay, cycle end delay, advance electro valve OFF, motors>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Print delay** is a numeric value from 0 to 9999
(IM and CM without Encoder: ms; CM with encoder: encoder pulses)
Default = 100
- **Electro valve** is a numeric value from 0 to 9999 ms
Default = 18 ms
- **Backward delay (only used in IM printer)** is a numeric value from 0 to 9999 ms
Default = 25 ms
- **Cycle end delay** is a numeric value from 0 to 9999
Default = 50 ms
- **Advance electro valve OFF (only used in CM printer)** is a numeric value from 0 to 9999 encoder pulses
Default = 20 encoder pulses
- **Motors (only used in CM printer)** is a numeric value from 0 to 9999
Default = 15

5.2 Get the timing constants.

Send to the printer:

<PTO>

The printer will respond with following sequence:

<Num. fields, print delay, electro valve, backward delay, cycle end delay, advance electro valve OFF, motors>

Refer to the according SET command for field values.

5.3 Set the timing constants to default.

Send to the printer:

<PT*>

With which the appropriate default values (as listed below) are loaded in the printer -

- Print delay - Default = 100
- Electro valve - Default = 18
- Backward delay - Default = 25
- Cycle end delay - Default = 50
- Advance electro valve OFF - Default = 20
- Motors - Default = 15

6 ADJUST CONSTANTS

6.1 Set ADJUST constants.

Send to the printer:

<ATI, num. fields, using ribbon, lateral advance, number lateral advances, using encoder>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Using ribbon** is a numeric value of 0 or 1 (off or on)
Default = 1
0 – Printing without using ribbon
1 – Printing with ribbon installed.
- **Lateral advance (only used in IM printer)** is a numeric value from 1 mm to half width of printhead (mm)
Default = 3 mm
- **Number lateral advances (only used in IM printer)** is a numeric value from 0 to 17
Default = 0
- **Using encoder (only used in CM printer)** is a numeric value from 0 to 1
Default = 1
0 – Printing without encoder, at fixed speed.
1 – Printing using encoder.

6.2 Get ADJUST constants

Send to the printer:

<ATO>

The printer will respond with following sequence:

<Num. fields, using ribbon, lateral advance, number lateral advances, using encoder>

Refer to the according SET command for field values.

6.3 Set ADJUST constants to default.

Send to the printer:

<AT*>

With which the appropriate default values (as listed below) are loaded in the printer –

- **Using ribbon** - Default = 1 – Printing using ribbon
- **Lateral advance** - Default = 3
- **Number lateral advances** - Default = 0
- **Using encoder** - Default = 1 – Printing using encoder

7 COMMUNICATION SETTINGS.

7.1 Set communication settings.

Send to the printer:

<PCI, num. fields, type of connection, baud rate (RS-232), IP0, IP1, IP2, IP3, MK0, MK1, MK3, MK4, GW0, GW1, GW2, GW3>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Type of connection** is a numeric value of 0 to 2
Default = 0
0 – RS-232
1 – Ethernet
2 – USB Virtual COM
- **Baud rate (RS-232):** is a numeric value of 0 to 4
Default = 4
0 – 9600
1 – 19200
2 – 38400
3 – 57600
4 – 115200
- **IP0, IP1, IP2, IP3 (IP address):** are numeric values from 0 to 255
Default = 192, 168, 1, 254
- **MK0, MK1, MK2, MK3 (Subnet mask)** are numeric values from 0 to 255
Default = 255, 255, 255, 0
- **GW0, GW1, GW2, GW3 (IP Gateway)** are numeric values from 0 to 255
Default = 192, 168, 1, 1

Notes:

- If the connection type is changed, printer returns <> when it is read. This means that will have to reboot the printer to apply those changes. Reboot process can be done by software, sending <ZR> command or by hardware using the Power switch.
- The configuration for USB Virtual COM Port must be 115200 bps.
- The number of fields could be reduced depending on the current type of connection. Type 0 (RS232) need 2 fields, type 1 (Ethernet) need 14 fields and type 2 (USB) need only 1 field.
- TCP port number is 30001

7.2 Get communication settings

Send to the printer:

<PCO>

The printer will respond with following sequence:

<num. fields, type of connection, baud rate (RS-232), IP0, IP1, IP2, IP3, MK0, MK1, MK3, MK4, GW0, GW1, GW2, GW3>

Refer to the according SET command for field values.

8 DATE AND TIME FUNCTIONS

8.1 Set printer date and time.

Send to the printer:

<PFI, num. fields, day of the month, month, year, hour, minute, seconds>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Day of the month** is a two-digit numeric value from 01 to 31
- **Month** is a two-digit numeric value from 01 to 12
- **Year** is a four-digit numeric value
- **Hour** is a two-digit numeric value from 00 to 23
- **Minutes** is a two-digit numeric value from 00 to 59
- **Seconds** is a two-digit numeric value from 00 to 59

8.2 Get printer date and time.

Send to the printer:

<PFO>

The printer will respond with following sequence:

< num. fields, day of the month, month, year, hour, minute, seconds>

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

Refer to the according SET command for field values.

9 STATUS & PRINT FUNCTIONS.

9.1 Get the printer setup status

Send to the printer:

C10

The printer will respond with following sequence:

<num. Fields, printer model, language, coder version>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Printer model**
 - 14 – 53XL40
 - 15 – 53XLC-R
 - 16 – 53XL80
 - 17 – 53XLC-L
 - 18 – 25XL40
 - 22 – 53XL5000
 - 23 – 53XL5000CL
- **Language**
 - 0 - English
 - 1 – French
 - 2 - Italian
 - 3 -Spanish
 - 4 - German
 - 5 - Danish
 - 6 - Czech
 - 7 - Turkish
 - 8 – Portuguese
 - 9 – Dutch
 - 10 – Polish
 - 11 – Swedish
 - 65 – Chinese
 - 66 - Korean
- **coder version** is the printer firmware version

9.2 Get the printer user status

Send to the printer:

C11

The printer will respond with following sequence:

<num. Fields, status, error, internal database modified>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Status**
 - 0- Online (Free)
 - 1- Initializing
 - 2- Processing
 - 3- On print cycle
 - 4- Ready to print
 - 5- Waiting update
 - 6- Checking fonts
 - 7- Downloading fonts
 - 8- Waiting RS fields
 - 9- Deleting fonts
 - 99- Hardware test
- **Error**
 - 0- No error
 - 1- Ribbon out
 - 2- Cassette open
 - 3- Print head disconnected
 - 4- Command transmission error
 - 5- Memory full
 - 7- Serial (frame, overrun) transmission error
 - 8- Ribbon path error
 - 20- Error home position
 - 22- Error power supply
 - 24- Printing speed out of range
 - 30- Error checking fonts
 - 31- Error cache fonts
 - 32- Error serial flash
 - 50- Initialization error
 - 51- Internal SD card error
 - 52- Label not found
 - 53- External memory failure
 - 54- Printer model not defined
 - 55- Error 55
- **Database modified**
 - 0- Label database not modified
 - 1- Label database modified

9.3 Get the printer printing status.

Send to the printer:

C12

The printer will respond with one of the following sequences:

If status is in printing cycle –

<num. fields, label, num. prints done, print quantity>

If status is not printing cycle –

<0>

Where

- **Num. Fields** is the number of variables listed between this variable and the closing sign >.
- **Label** name of the label in printing process
- **Num. Prints done**
- **Print quantity** prints to do

9.4 Message Commands

- **STOP** Message

Send to the printer:

C00

The printer will stop the printing cycle and will remain in idle state (“free”). If handset was connected, it returns to main menu.

- **PRINT** Message

Send to the printer:

C20

If the printer is in “Ready to Print” state, a print will be done.

- **START RIBBON REWIND** Messages

Send to the printer:

C30

The printer will rewind the ribbon. (7 seconds as maximum).

- **STOP RIBBON REWIND** Messages

Send to the printer:

C31

The printer will stop to rewind

- **XY OFFSET LABEL** Messages

Send to the printer:

- C21** to move the label 1 dot up (until zero)
- C22** to move the label 1 dot down (until zero)
- C23** to move the label 32 dots left
- C24** to move the label 32 dots right
- C25** reset label position

The offset applied values will be stored in each individual label.

- **CYLINDERS ON/OFF** Messages

Send to the printer:

- C40** main cylinder ON
- C41** print cylinder ON
- C50** main cylinder OFF
- C51** print cylinder OFF

This messages are only used for testing proposes

- **ENABLE/DISABLE ERRORS** Messages

Send to the printer:

- C98** disable error messages
- C99** enable error messages

This messages are only used for testing proposes

9.5 Restart command

Send to the printer:

<ZR>

The printer will restart.

10 PRINT COMMANDS.

10.1 Print a specific label.

Send to the printer:

<I, label to print, print quantity>

Where

- **label to print** name of the label to print (max. 35 characters)
- **Print quantity** number of prints to be done. It is a numeric value from 0 to 999999999

Notes:

- If **print quantity** is 0 that's means "infinite prints"
- The printer will load the image to memory and make it ready to print.
- After each print, the printer sends <D> through the PC communication port

10.2 Print a TEST label.

Send to the printer:

<T>

The printer will execute once cycle of the firmware embedded test label (pattern).

Note:

The printer must be in the idle state (free) to execute it.

11 PRINT QUEUE.

11.1 Get the print queue

Send to the printer:

<QL>

The printer will respond with following sequence:

<num. of print orders, label1-name, label1 –print quantity,....>

- **Num. of print orders in the queue** is a numeric value from 0 to 20
- **Labeln-name** Name of the label to print (max. 35 characters)
- **Labeln-print** quantity number of prints to be done of the label n. It is a numeric value from 0 to 999999999

11.2 Clear the print queue.

Send to the printer:

<QD>

The print queue will be cleared. The printer will stop the printing cycle and will remain in idle state (free).

12 COMMON VARIABLES.

12.1 Set a COMMON VARIABLE.

Send to the printer:

<VI, number, content>

Where

- **number** from 1 to 5
- **content** is the value associated with that name

12.2 Get a COMMON VARIABLE.

Send to the printer:

<VO, number>

The printer will respond with following:

<content>

Where

- **number** from 1 to 5
- **content** is the value associated with that name

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

13 LABELS

13.1 Get label details

Send to the printer:

<LO, label name>

The printer will respond with the following sequence –

<LI, name, size, Fonts aux, [, [name font]]; num. fields, print height, print width, X-offset, Y-offset, ribbon advance (only used by IM printers), ribbon rewind (only used by CM printers), save variable fields; contents>

Where

- **name** Name of the label (max. 35 characters)
- **size** is the size in bytes from the next position from the follow “,” until the last closing sign
- **Fonts Aux** is the number of True Type fonts used in the image
- **List of used True Type fonts**
 - Numbers 0 through 6 are reserved for standard printer resident fonts
 - Numbers from 7 for optional printer downloadable fonts
- **num. fields** is the number of variables listed between this variable and the closing sign >.
- **print height**
- **print width**
- **X- offset**

- **Y- offset**
- **Ribbon advance**
- **Ribbon rewind**
- **Save variable fields:** When the printer ends the print job, there is the option to save or not the current content of variable fields. If “no” is selected, there is a real save of time **between print orders. By default 0 (no save)**
- **contents** see Appendix A

See the printer manual for value ranges

13.2 Save a LABEL

Send to the printer:

<LI, name, size, Fonts aux, [, [name font]]; num. fields, print height, print width, X-offset, Y-offset, ribbon advance (only used by IM printers), ribbon rewind (only used by CM printers), save variable fields; contents>

Refer to the according GET command for field values.

Note:

When the printer receive the label, it will send **<R>** through the PC communication port.

13.3 Delete a LABEL

Send to the printer:

<LD, label >

Where

- **label** is the name of the label to be removed from printer memory

13.4 Request a list of all labels.

Send to the printer:

<LL>

The printer will respond with the following sequence

<num. of labels, label 1, label 2, .. , label n>

Where

- **num. of labels** is the number of labels saved in SD card
- **label n** Name of the label (max. 35 characters)

13.5 Verify the existence of an individual LABEL.

Send to the printer:

<L?, label>

Where

- **label** is the name of the label to be check (max 35 characters)

The printer will respond with following sequence:

<existence>

- **existence** is an **Y** character if label exists or **N** character if label does not exist into the SD card

14 MEMORY FUNCTIONS.

14.1 Delete all LABELS

Send to the printer:

<MQ, 4735300>

14.2 Restore Factory configuration (constants)

Send to the printer:

<ME, 4735300>

Reboot process need be done by software, sending <ZR> command or by hardware using the Power switch.

14.3 Get the free space in printer memory (internal SD card)

Send to the printer:

<M?>

The printer will respond with following sequence:

<num. bytes>

15 OPTIONAL FONTS (TRUE TYPE)

15.1 List optional fonts

Send to the printer:

<YL>

The printer will respond with following sequence:

<num. of fonts, long name 1, short name 1, long name 2, short name 2, font n>

Where

- **num. of fonts** is the number of fonts in printer memory
- **long name n** Name of the font (max. 36 characters)
- **short name n** Name of the true type file without extension(max. 22 characters)

Example: <1,Calibri Bold Italic,calibriz>

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

15.2 Delete all the optional fonts

Send to the printer:

<YD>

The printer will respond **after 5 minutes** with following sequence:

<Y> or <N>

15.3 Get the free space in printer memory for allocate optional fonts

Send to the printer:

<Y?>

The printer will respond with following sequence:

<num. bytes>

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

15.4 Send an optional font

Send to the printer:

<YI, long name, short name, size, content>

Where

- **long name** is the name of the font (max. 36 characters)
- **short name** is the name of the true type file without extension(max. 22 characters)
- **size** is the size of the true type file
- **content** is the content of the true type file
-
- The printer will respond after some time (depending on the font size) with the following sequence:
 - <Y> or <N>

16 AUDIT CODE CONSTANTS

16.1 Set AUDIT CODE constants.

Send to the printer:

<PAI, num. fields, Line ID, Customer ID, Site ID>

Where

- **Num. fields** is the number of variable listed between this variable and the closing sign >.
- **Line ID, Customer ID and Site ID** are one alphanumeric character needed to compose the Audit code

16.2 Get AUDIT CODE constants.

Send to the printer:

<PAO>

The printer will respond with following sequence:

< num. fields, Line ID, Customer ID, Site ID>

Refer to the according SET command for field values.

16.3 AUDIT CODE to default.

Send to the printer:

<PA*>

With which the appropriate default values (as listed below) are loaded in the printer -

- **Line ID** – Default = 0
- **Customer ID** – Default = 0
- **Site ID** – Default = 0

17 TIME OFFSET CONSTANTS

17.1 Set TIME OFFSET constants.

Send to the printer:

<POI, num. fields, Hour, Minute>

Where

- **Num. fields** is the number of variable listed between this variable and the closing sign >.
- **Hour** value for offset
- **Minute** value for offset

17.2 Get TIME OFFSET constants.

Send to the printer:

<POO>

The printer will respond with following sequence:

< num. fields, Hour, Minute>

Refer to the according SET command for field values.

17.3 TIME OFFSET to default.

Send to the printer:

<PO*>

With which the appropriate default values (as listed below) are loaded in the printer -

- **Hour** – Default = 0
- **Minute** – Default = 0

18 SEVEN DAY BATCH CONSTANTS

18.1 Set SEVEN DAY BATCH constants.

Send to the printer:

<P7I, num. fields, Day, Hour, Minute>

Where

- **Num. fields** is the number of variable listed between this variable and the closing sign >.
- **Day** value for seven day batch
- **Hour** value for seven day batch
- **Minute** value for seven day batch

18.2 Get SEVEN DAY BATCH constants.

Send to the printer:

<P7O>

The printer will respond with following sequence:

< num. fields, Day, Hour, Minute>

Refer to the according SET command for field values.

18.3 SEVEN DAY BATCH to default.

Send to the printer:

<P7*>

With which the appropriate default values (as listed below) are loaded in the printer -

- **Day** – Default = 0 = Sunday
- **Hour** – Default = 0
- **Minute** – Default = 0

19 USER DEFINED DATE TABLES

19.1 Set a USER DEFINED DATE TABLE

Send to the printer:

<JI, table number, D1, D2, D3, D4, D5, D6, D7, M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12>

Where

- **Table number** from 1 to 10
- **D1 to D7 strings corresponding to days (starting on Sunday)**
- **M1 to M12 strings corresponding to months**

19.2 Get a USER DEFINED DATE TABLE

Send to the printer:

<JO, table number>

The printer will respond with following sequence:

< D1, D2, D3 , D4, D5, D6, D7, M1, M2, M3, M4, M5, M6, M7, M8, M9, M10, M11, M12>

Refer to the according SET command for field values.

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

20 SENSORS TEST command

20.1 Read the sensors status

Note:

As this test needs the cassette open to operate inside, applications must send a C98 command to disable printer error reporting before sending <UM> command.

Don't forget to send C99 command to enable printer errors again before going out this test

Send to the printer:

<UH>

The printer will respond with following sequence:

< num. fields, value>

Where

- **Value is a byte value with this meaning:**
 Bit 0 = external signal sensor
 Bit 1 = ribbon turn sensor
 Bit 2 = cassette sensor
 Bit 3 = home sensor
 Bit 4 = ribbon out sensor

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

21 PRINTED METERS command

21.1 Get the printed meters (Administrator level)

Send to the printer:

<?M>

The printer will respond with following sequence:

< num. fields, printed meters, printed cycles>

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

21.2 Reset the printed meters (Administrator level)

Send to the printer:

<?0>

22 TECHNICAL SERVICE Commands

22.1 Read the print head voltage

Send to the printer:

<UV>

The printer will respond with following sequence:

< voltage> (example 243 means 24.3 v)

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

22.2 Read the print head temperature

Send to the printer:

<UT>

The printer will respond with following sequence:

< temperature> (example 258 means 25.8 °)

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

22.3 Set the MAC address

Send to the printer:

<EMI, num. fields, MC1, MC2, MC3, MC4, MC5, MC6>

Where

- **Num. fields** is the number of variables listed between this variable and the closing sign >.
- **MC1 to MC6** the six decimal MAC values

22.4 Get the MAC address

Send to the printer:

<EMO>

The printer will respond with following sequence:

< num. fields, MC1, MC2, MC3, MC4, MC5, MC6>

Refer to the according SET command for field values.

22.5 Set the Printer Model

Send to the printer:

<PMI, num. fields, printer model ID>

Where

- **Num. fields** is the number of variables listed between this n and the closing sign >.
- **Printer model ID** See C10 "Setup Status" documentation

After this command, send a <ZR> "Restart" command.

22.6 Get the Printer Model

Send to the printer:

<PMO>

The printer will respond with following sequence:

< num. fields, printer model ID>

Refer to the according SET command for field values.

22.7 Get the printed meters (Technical service level)

Send to the printer:

`<?m>`

The printer will respond with following sequence:

`< num.fields, printed meters, printed cycles>`

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

22.8 Reset the printed meters (Technical service level)

Send to the printer:

`<?1>`

23 Diagnostics

23.1 Read the diagnostics list

Send to the printer:

`<DO>`

The printer will respond with following sequence:

`< num.regs, code1, date1, time1 code2, date2, time2>`
 (Lines of code, date, time are separated by a character decimal 13)

Where

- **Num. regs** is the number of registers stored since last reset of the diagnostics list.
- **Code n** is a code to identify the event that generated the register
 - 0001 – End of ribbon
 - 0002 – Cassete open
 - 0003 – Print head not connected
 - 0004 – Transmission error
 - 0007 – Transmission fault
 - 0008 – Ribbon path error
 - 0020 – Error home position
 - 0022 – Power supply error
 - 0024 –Speed out of range
 - 0030 – Error checksum fonts
 - 0031 – Error cache fonts
 - 0032 – Error serial flash
 - 1000 – On line
 - 1001 – Nvram initalized
 - 1100 – Download fonts ok
 - 1101 – Download fonts ko
 - 1102 – Font erased ok
 - 1103 – Font erased ko
 - 1104 – Font not found

1105 – Font found
1106 – Resident fonts not loaded

- **Date n** is the date of the event (ddmmyy)
- **Time n** is the time of the event (hhmmss)

Note:

Printer will not respond to this command if:

- It is in the print cycle
- It is on error state

23.2 Clear the diagnostics list

Send to the printer:

<DD>

24 Motor test

24.1 Start the motor test

Send to the printer:

<UM>

24.2 Stop the motor test

Send to the printer:

C00

25 Post View

25.1 The total number of a format

Send to the printer:

<?P>

25.2 The Date for a line in a format

Send to the printer:

<?p, xxxx> (xxxx: the line number in format)

26 Open Source Notice

This firmware includes parts of “libzint”, which are published under the BSD License.

Zint is available at <https://sourceforge.net/projects/zint/>.

26.1 libzint license

libzint - the open source barcode library
Copyright (C) 2009 Robin Stuart <robin@zint.org.uk>

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Appendix A

The **contents** of a label file are commands separated by the carriage return character (CR). These commands define sets of fields to be printed in a label.

There are two types of fields used in the XLU printers: Definition Fields and Printable Fields. The Definition Fields are used to describe the format of the data that is to be printed. The Printable Fields describe the appearance of that data.

The command structure for the name, location, and orientation of a printed label is described in section 11 of this document.

This appendix describes the individual elements that are used to build a label and are referred to as “**contents**” in the label files description.

26.2 DEFINITION COMMANDS

A.1.1 COUNTER

C, counter identifier, type, initial value, step, frequency, number of digits

Where

- **counter** identifier is a numeric value from 1 to 255.
- **type**
 - type = 0 leading digits filled with spaces.
 - type = 1 value cut to the length defined.
 - type = 2 leading digits filled with zeros.
- **Initial value** must be adjust to the number of digits defined, filled with zeros.
- **step** is the increment by which the counter value is modified, value from –32768 to 32767
- **frequency** determines how many labels are printed with the same number, value from 0 to 65535
- **number of digits** is the number of digits to print, value from 1 to 9.

A.1.2 DATE

Change the date once per day

D, date identifier, add days, add months, add years, offset time, table number, separator; attr 1*, attr n*

Where

- **date identifier** is a numeric value from 1 to 255
- **add days.** Add days to the actual date
- **add months.** Add months to the actual date
- **add years.** Add years to the actual date
- **offset time.** To use the Time Offset value .
- **table number.** To print text dates you can select between the printer language and a user defined table.
 - 0 - printer language in uppercase
 - 1 to 10 - user defined tables.
 - 255 - printer language in lowercase.
- **separator** is the printed separator between two attributes.
- **D:1** prints the numeric day of the month in 1 or 2 digits (without leading zero)
01...31
- **D:2** prints the numeric day of the month in 2 digits (with leading zero)
01...31

- **M:1** prints the numeric month in 1 or 2 digits (without leading zero)
1...12
- **M:2** prints the numeric month in 2 digits (with leading zero)
01...12
- **M:3** prints the abbreviated text month in 3 characters.
- **M:4** prints the full text month
- **A:0** prints the last digit of the year
0...9
- **A:1** prints the abbreviated year in 1 or 2 digits (without leading zero)
1...99
- **A:2** prints the abbreviated year in 2 digits (with leading zero)
01...99
- **A:4** prints the full year in 4 digits
0001...9999
- **J:1** prints the numeric day of the year in 1, 2, to 3 digits (without leading zero)
1...365
- **J:3** prints the numeric day of the year in 3 digits (with leading zero)
001...365
- **J:4** prints the numeric day of the year in 3 digits (with leading zero)
001...365 (29 Feb = 366)
- **W:1** prints the **week** number in 1 or 2 digits (without leading zero)
1...52
- **W:2** prints the week number in 2 digits (with leading zero)
01...52
- **L:1** prints the day of the week in numbers, the first day of the week is Monday.
- **L:2** prints the day of the week in numbers, the first day of the week is Sunday.
- **L:3** prints the abbreviated text day of the week in 3 characters.
- **L:4** prints the full text day of the week.

Example:

If we want to print **2000/12/31**

```
separator = /
attri1 = A:4
attri2 = M:2
attri3 = D:2
```

A.1.3 DATE SEVEN DATE BATCH

Changes the date once per week.

H, date identifier, add days, add months, add years, 0, table number, separator; attri 1*,..., attri n*

See section **"DATE"** for attribute values.

A.1.4 TIME

W, time identifier, 0, separator; attri 1*, .., .., .., attri n*

Where

- **time identifier** is a numeric value from 1 to 255
- **separator** is the printed separator between two attributes.
- **H:1** prints the hour in 1 or 2 digits in a 24 hour format (without leading zero)
0...23
- **H:2** prints the hour in 2 digits in a 24 hour format (with leading zero)
00...23
- **H:3** prints the hour in 1 or 2 digits in a 12 hour format (without leading zero)
0...11
- **H:4** prints the hour in 2 digits in a 12 hour format (with leading zero)
00...11
- **M:1** prints the minute in 1 or 2 digits (without leading zero)
0...59
- **M:2** prints the minute in 2 digits (with leading zero)
00...59
- **S:1** prints the second in 1 or 2 digits (without leading zero)
0...59
- **S:2** prints the second in 2 digits (with leading zero)
00...59
- **T:1** prints AM or PM without a leading space
- **T:2** prints AM or PM with a leading space

Example:

If we want to print **09:02 PM**
 separator = :
 attri1 = H:4
 attri2 = M:2
 attri3 = T:2

A.1.5 SHIFT CODE

K, shift code identifier, weekday1, shift1data, shift1start .. shift1end,

.

.

weekdayN, shiftNdata, shiftNstart ..shiftNend;

Where

- **shift code identifier** is a numeric value from 1 to 255
- **weekday** is the day of the week to apply the shift code
 weekday = 0 every day
 weekday = 1 Sunday
 weekday = 2 Monday
 weekday = 3 Tuesday
 weekday = 4 Wednesday
 weekday = 5 Thursday
 weekday = 6 Friday
 weekday = 7 Saturday
- **shiftNdata** is the shift code string to be printed, up to a maximum of 4 characters.
- **shiftNstart** is the shift start time, in minutes from midnight.
- **shiftNend** is the shift end time, in minutes from midnight.

NOTE: The maximum number of shifts is 96

A.1.6 VARIABLE FIELD - ALPHANUMERIC

A, variable field identifier, title, default value

Where

- **variable field identifier** is a numeric value from 1 to 255
- **title** is the title which appears on the display when the printer requests this field, up to 20 UTF8 characters in length. Sometimes referred to as the operator prompt. This title may or may not be printed – Refer to “TEXT” printable documentation
- **default value** is the default value for the entry, up to forty characters in length.

A.1.7 VARIABLE FIELD - NUMERIC

N, variable field identifier, title, default value, number of digits, number of decimals

Where

- **variable field identifier** is a numeric value from 1 to 255
- **title** is the title which appears on the display when the printer requests this field, up to 20 UTF8 characters in length. Sometimes referred to as the operator prompt. This title may or may not be printed – Refer to “TEXT” printable documentation
- **default value** is the default value for the entry, from 0 to 999999999
- **number of digits** is a numeric value from 0 to 9
- **number of decimals** is the number of digits that will be placed to the right of the decimal point, value from 0 to number of digits –1

A.1.8 VARIABLE DATE (CALENDAR)

F, calendar identifier, 0, 0, 0, 0, table number, separator; attri 1*, ... , attri n*; title, day, month, year

See the section „DATE” for attribute values.

26.3 PRINTABLE COMMANDS

A.1.9 TEXT

T, X position, Y position, print direction, n.font, character height, % width, character attributes; message

Where

- **X position**, X position of the field, in tenths of a millimetre.
- **Y position**, Y position of the field, in tenths of a millimetre.
- **print direction**,
 - 1 is 0°
 - 2 is 90°
 - 3 is 180°
 - 4 is 270°
- **N. font**
 - Values from 0 to 2 for resident fonts
 - Values from 8 for True Type fonts
- **Character height** (defined in points)
- **% width**. To modify the original width of the text. Allowed values 55, 70, 85, 100, 115, 130, 145, 160
- **Character attributes**.
 - 0 = normal
 - 1 = reverse
- **message** definition of what to print
 - **a/** fixed text in an image.
 - **b/** text in some variable identify between `[[]]`
the possible variable are

`[[V, common variable number]]`
`[[A, alphanumeric field identifier, print title, prompt by handset]]`
`[[N, numeric field identifier, print title, prompt by handset]]`
`[[C, counter identifier]]`
`[[D, date identifier]]`
`[[H, date seven day batch identifier]]`
`[[F, variable date (calendar) identifier]]`
`[[W, time identifier]]`
`[[Y]]` Audit code line 1
`[[Z]]` Audit code line 2
`[[K, shift code identifier]]`
`[[S]]` checksum until start of the string or before brackets.

or combinations of them

- **c/** Serial data field in an image:

STX (ASCII 2) position in the raw, data length STX

where:

Position in the raw the first valid character in the received string (1..65355)

length it's the number of the valid characters (1..255) to use starting from the position value

Notes:

- To send raw data to the printer, send data between brackets []
- After receive each string of data, the printer will send ACK (Ascii 6).
- After each print using Rs field, the printer send SYN (Ascii 0x16).

A.1.10 BARCODE

B, X position, Y position, print direction, n.font for human readable, human readable, attribute, barcode type, narrow line, ratio, height barcode; message

Where

- **X position**, X position of the field, in tenths of a millimetre.
- **Y position**, Y position of the field in tenths of a millimetre.
- **print direction**,
 - 1 is 0°
 - 2 is 90°
 - 3 is 180°
 - 4 is 270°
- **N.font for human readable**
Values from 0 to 2
- **Human readable**: A 0 implies no text below the barcode, a 1 implies print the text below.
- **attribute**
0 = normal
1 = reverse
- **barcode types**
 - 1- Ean13
 - 2- Ean8
 - 3- UPC
 - 4- Cod.128 -For EAN 128 code a FNC1 character is added at the beginning of the string
 - 5- ISBN
 - 6- Cod. 93
 - 7- Cod. 39
 - 8- Interleaved 2 of 5
 - 9- Dun14
 - 10- Databar (*)
 - 11- Databar truncated (*)
 - 12- Databar limited (*)
 - 13- Databar Stacked (*)
 - 14- Databar Stacked Omnidirectional (*)
 - 15- Datamatrix and FNC1-Datamatrix
- **narrow bar**: Number of dots in the narrow bar. In Datamatrix barcode it is the density.
- **ratio**: Relation between bars
- **barcode height**: Height of the barcode in millimetres.
- **message** definition of what to print . See description of “**message**” in the “TEXT” printable documentation.

(*) If the message for this type of barcode (RSS variants) is fixed text, this text must be formatted as:

Text1 | Text2

Where

Text1 = 13 numeric characters

'|' = ASCII character number 124

Text2 = up to 80 alphanumeric characters

A.1.11 QR CODE

LTU CLI EXTENSION

Additional fields are required. Since the LTU CLI does not provide a mechanism for flexible fields, existing fields had to be re-used.

With QR code (Code number 20), the meaning of the CLI barcode fields is as follows:

```

X offset within label, in 1/10th mm
|  Y offset within label, in 1/10th mm
|  |  Rotation, 1 = 0°, 2 = 90°, 3 = 180°, 4 = 270°
|  |  |  QR code version, 1-40
|  |  |  |  ECC Level, 1 = L, 2 = M, 3 = Q, 4 = H
|  |  |  |  |  Transfer Mode, 1 = UNICODE, 2 = GS1, 0 = DATA
|  |  |  |  |  |  Barcode type, 20 for QR
|  |  |  |  |  |  |  Min. module size (pixels, 1/12th mm)
|  |  |  |  |  |  |  |  not used
|  |  |  |  |  |  |  |  |  Min. symbol size (printer units, 1/10th mm)
|  |  |  |  |  |  |  |  |  |
B,010,010,1,1,1,1,20,2,2.0,150;[|A,1,0,1|]
    
```

RENDERING OPTIONS:

SCALING

There are two minimums that can be set independently.

1. Minimum pixels per module. This value determines the minimum size, in thermal bar resolution pixels, that must be used for a single QR module. (= black square.)
2. Minimum symbol size of the entire QR symbol. This value determines the minimum size, in 1/10th millimeters, that must be used for the QR symbol. (= code area.)

Both minimums can be set; the symbol will be scaled up to fulfill both minimums, but will never be scaled down.

The smallest allowed scale is minimum pixels per module = 1, minimum symbol size = 0, resulting in a module size of 1 pixel, or 1/12th mm.

Note: If a symbol's minimum symbol size is set to a marginal value with respect to the data to be encoded the symbol may grow unexpectedly when the encodation string grows, resulting in a higher version QR code with more modules.

POSITION

The symbol can be translated horizontally and vertically in steps of 1/10th mms anywhere within the label's print area.

ROTATION

The symbol can be rotated in 90 degree steps to any facing.

ENCODATION OPTIONS:**QR CODE VERSION**

This value represents a minimum QR code version as specified in ISO/IEC 18004:2006. If the data to be encoded can not fit into this version including the desired ECC Level, a larger QR code version is automatically selected.

If the data to be encoded would fit into a smaller QR code version, the QR code is padded.

ECC LEVEL

This value represents the minimum ECC Level to be used as specified in ISO/IEC 18004:2006.

If the data to be encoded at the desired ECC Level can not fit into the selected QR code version, a larger QR code version is automatically selected.

TRANSFER MODE

This value selects the encodation of the data transferred over the CLI.

In `UNICODE_MODE` as well as `GS1_MODE`, the printer will attempt to transcode the data string according to Shift-JIS as specified in ISO/IEC 18004:2006. Note: "UNICODE" mode is *not* to be confused with actual Unicode or UTF-8. QR code predates the current Unicode standards. To use UTF-8 encoded in QR codes, `DATA_MODE` is used.

In `DATA_MODE`, no Shift-JIS transcoding is performed. This mode is recommended for user-defined character tables making use of QR BYTE encodation, such as UTF-8.

In `GS1_MODE`, a GS-1 conforming QR code is generated. AI numerals enclosed in square brackets must precede AI data to be encoded. All input data is expected to be well-formed. Example:

```
[01]01234567890123[8200]http://www.allencoding.com[3140]000000
```

In this example, the first AI is 01, followed by the fixed length AI 01 data. A second AI 8200 follows with the content `http://www.allencoding.com`. A third AI with additional fixed length data, 3140, follows.

NOTES

This implementation does not support any ECI (Extended Channel Interpretation) modes. Data received that cannot be encoded in either *ALPHA* mode, *NUMERIC* mode, or *KANJI* mode is always encoded in *BYTE* mode.

This implementation does not support structured append mode.

Micro QR codes are currently not supported.

KANJI mode has not been extensively tested and is provided as-is without any guarantees.

A.1.12 GRAPHIC

G, X position, Y position, print direction, size, content of the monochrome pcx file

Where

- **X position**, X position of the field, in tenths of a millimetre.
- **Y position**, Y position of the field, in tenths of a millimetre.
- **print direction.**
 - 1 is 0°
 - 2 is 90°
 - 3 is 180°
 - 4 is 270°
- **Size of the pcx file**
- **Content of the monochrome pcx file**

A.1.13 LINE-FRAME

L, X position, Y position , print direction, thickness, length (horizontal), height (vertical), line attributes

Where

- **X positions**, X position of the field, in tenths of a millimetre.
- **Y position**, Y position of the field, in tenths of a millimetre.
- **print direction,**
 - 1 is 0°
 - 2 is 90°
 - 3 is 180°
 - 4 is 270°
- **thickness** is the line thickness in tenths of a millimetre.
- **length** is the length of the line in tenths of a millimetre.
- **height** is the height of the frame in tenths of a millimetre. For lines, this value is set to zero.
- **line attributes** is always set to 1, black line.

Appendix B

These commands are only expected to RECEIVE through the serial port attached to the handset.

B.1 Number of print cycles

Ixxxxxxxx

(Example I000000234 means 234 print cycles done)

B.2 Print speed (continuous models)

Vxxxxx

(mm/s)

B.3 Status messages

Mxxx

Where

002 = Exit print cycle
003 = Ready to print - *
005 = Print job cancelled - *
006 = Starting print cycle
007 = Printing test - *
008 = Motors test - *
009 = Waiting RS field - *
010 = Waiting for update
011 = Updating printer firmware
012 = Printer hardware test
013 = Initializing - *
014 = Processing
015 = Checking fonts (resident fonts) - *
016 = Downloading fonts - *
017 = Rebooting

Some of these commands are used to let the handset show a message on what is the printer doing. The lowercase mxxx message received later will clear this message.

Not all the "M" commands have the "m" one. The ones marked with * have it.

B.4 Error messages

Exxx

The number following the “E” letter matches the error code of the Status C11 command. When the error is recovered from, the printer sends the matching lowercase “e” message

Appendix C - Errorcodes

| | |
|--|---|
| E001 End of ribbon | e001 End of end of ribbon |
| E002 Magazine Open | e002 End of Magazine Open |
| E003 Printhead Not Connected | e003 End of Printhead Not Connected |
| E004 Protocol Transmission error, message not correct. | e004 End of Protocol Transmission Error, message not correct. |
| E007 Transmission error, Frame, Overrun. | e007 End of Transmission Error, Frame, Overrun. |
| E008 Ribbon is throwing by the web (CM). | e008 End of ribbon throwing status |
| E020 Home Position Error. | e020 End of Home Position Error. |
| E022 Power Supply Error. | e022 End of Power Supply Error. |
| E024 Printing Speed Out of range. | e024 End of Printing Speed Out of range. |
| E030 Error Checksum fonts. | e030 End of Error Checksum fonts. |
| E031 Error Cache Fonts Manager. | e031 End of Error Cache Manager. |
| E032 Error Programming serialflash | e032 End of Error Programming serialflash |
| E050 ERR_MAQ_INITIALIZATION | |
| E051 ERR_MAQ_SD_CARD | |
| E052 LABEL_NOT_FOUND | e052 LABEL_NOT_FOUND Message clear |
| E053 ERR_MAQ_EXT_MEMORY_FAIL | |
| E054 ERR_MAQ_MODEL | |
| E055 ERR_MAQ_NOT_TESTED | |
| | |
| M002 End of print cycle | |
| M003 Waiting for print signal | m003 Print signal received |
| M005 Deleting printing order | m005 End Deleting printing order |
| M006 Entry in print cycle after processing "M014" | |
| M007 Test procedure | m007 End test procedure |
| M008 Motors Test | m008 End motors test |
| M009 Waiting RS Fields | m009 End waiting RS Fields --Used in LT machines |
| M010 Message firmware update test software | m010 End of Message firmware update |
| M011 Message firmware update test software | |
| M012 Missatge test software | m012 Missatge test software |
| M013 Start-up process initialization | m013 End of initialization machine. |
| M014 Processing label after a print order. | |
| M015 Waiting for resident fonts. | m015 Resident Fonts loaded. |
| M016 Downloading external fonts. | m016 External fonts downloaded. |
| M017 Rebooting | m017 Used by Handset to Reboot. |
| M017 Used by Handset to Reboot. | |
| M018 Delete external fonts. | m018 External fonts deleted. (Several minutes) |
| | |
| R001 Printing image using field RS. | r001 End of field RS image. |
| R002 Printing image with promotional code. | r002 End of promotional code image. |

Appendix D

Document History

| Document Version | Firmware Version | Document Date | Author | Description |
|------------------|------------------|---------------|------------|--|
| 1.60 | 1.00U | 27.05.13 | c.gonzalez | Initial Release |
| 1.70 | 1.13U | 23.10.13 | b.kunz | Added detailed Documentation for QR code |
| 1.70 | 1.13U | 23.10.13 | b.kunz | Removed references to <VL> command. Deprecated by <VO,num> |
| 1.71 | 1.16U | 26.11.13 | b.kunz | Further clarification of QR transfer modes. |
| 1.73 | 1.43U | 27.10.17 | m.zhang | Printer types XL5000 added |
| 1.74 | 1.53U | 20.03.17 | d.frede | Appendix C – Errorcodes added |

