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# Ap1300
# Thermal Printer

# Programmer Guide

Also covers the ATB102, ATB1200 and Ap863

ap1300usg13.doc

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**Contents**


**1 INTRODUCTION ..... 3**

Notes on Printer Firmware Revisions (Including Flash) ..... 3

Copyright Notice and Disclaimer ..... 4

**2 MODES OF OPERATION ..... 5**

Paper Feed Button ..... 5

Printing Method ..... 5

Built-In Fonts ..... 6

User Font ..... 6

Multiple Code Page Fonts ..... 6

Dot Addressable Graphics ..... 6

Serial Interface ..... 8

Data Buffer and Flow Control ..... 8

IRDA and Bluetooth Wireless Interfaces ..... 8

(Ap1300-IR, Ap1300-BT and Ap1300-BTi only) ..... 8

Paper Out, Paper Low and Head Up Sensors ..... 9

**3 CONTROL CODE TABLES ..... 10**

Command Description Format ..... 10

Command Codes Received ..... 11

Formatting Commands (Continued) ..... 14

Barcode Commands ..... 17

Cutter Control Commands (ATB102 driving M-T102A Only) ..... 17

Mark Sense Operation ..... 17

Reserved Commands ..... 18

Codes Transmitted ..... 19

**4 SETTINGS AND CONFIGURATION ..... 20**

Setting Configuration Information ..... 20

Saving Configuration Information ..... 22

Querying Configuration Information ..... 24

**5 COMMAND SUMMARIES ..... 25**

Summary of Print Format Commands and Volatile Settings ..... 25

Summary of Real Time Status Information ..... 25

Summary Of Non-Volatile Settings ..... 26


**1**

## Introduction

This Programmers Guide provides a description of the software commands supported by the:

- Ap1300 and Ap1310 Battery Operated Portable Packaged Printers
- Ap1310DP and Ap1310DC Direct Power Packaged Printers
- Ap863-F Packaged Printer with various power options,
- Ap1200 Panel Mounting Packaged Printer

It also contains some specific information relating to the:

- ATB102 OEM Printer interface for the EPSON M-T102 (& M-T102A)
- ATB1200 OEM Printer interface for the APS ELM205 mechanism

The firmware in all these products is largely compatible across the range, and also with earlier versions of printers (e.g.: Ap824, Ap842, Ap824-B, Ap842-B, Ap860-B, Ap862-B, Ap863).

A User Guide, which contains connection data and details of operation, is available for each product and should be read in conjunction with this document. Please see individual User Guides for more specific details of each product.

**Throughout this Programmers Guide the term "Printer" should be taken to refer to all products where no distinction is necessary from the point of view of the system programmer.**

If individual products differ in some important aspect, then this is noted.

A wide range of software commands are supported, allowing control of printing format (e.g. width, height and spacing of text, underlining, text orientation etc.), as well as selection of modes of operation (e.g. support for rechargeable battery packs and sleep options, Serial Comms settings, Paper Out, Paper Low and Head Up indications and actions etc).

Many of the software commands are emulations of the EPSON TM-Series ESCPOS codes. Since the implementation of ESCPOS varies from one EPSON printer to another, there is no universal standard. The command set for these products has primarily been based on that of the EPSON TM-T Series of thermal printers. Please refer to the acknowledgement and disclaimer.

# Notes on Printer Firmware Revisions (Including Flash)

Able Systems reserves the right to modify and improve the firmware in its products at any time. Whilst every effort is made to ensure backward compatibility, no guarantee in this respect is given or implied.

These products include a flash re-programmable microcontroller (excluding the ATB102). This allows firmware upgrades under customer control. A Flash Programming Utility is available to aid the user in re-flashing printers.

Also available is a Font Editor Utility, which allows the user to design and use bespoke fonts as required. User created or modified fonts may be flashed into the printer using the same Flash Programming Utility.

Refer to the factory for more information on these features.

On battery operated printers, some host-selectable features may be retained during sleep mode by saving them to non-volatile memory (FLASH). The user must ensure that any changes to the printer's internal parameters are saved to flash memory, either manually or by timed auto-save. Refer to section 5.2 SAVING CONFIGURATION INFORMATION for more details.

## Copyright Notice and Disclaimer

Copyright subsists in all Able Systems intellectual property, including controller firmware (embedded software) and circuit diagrams, pin connection lists and application data. No warranty in respect of patent rights of Able Systems Limited or of third parties is given. Unauthorised reproduction or amendment of controller firmware may result in prosecution.

Able Systems does not assume responsibility for interchangeable functionality of other parties' command sets.

# 2 Modes Of Operation

Please refer to the User Guide for an overview of the modes of operation, including waking, sleeping, idle mode and spool mode (where applicable).

Some of the host-selectable features may be retained during sleep mode by storage in non-volatile memory (FLASH), but the others are lost. This is clearly shown in the individual command descriptions below. The user must ensure that any changes to the printer's internal parameters are saved to non-volatile memory (FLASH), either manually or by timed auto-save.

Operational status is indicated by factory-programmable colour combinations on the front-panel LED. These can indicate charger/battery status, buffer mode, paper status and so on. Refer to the User Guide for details.

## Paper Feed Button

No external power switch is fitted, so additional functions have been assigned to the paper feed button.

- A single press and release of the button:
- in idle or spooling mode, advances paper, also prints any partial line data from the buffer;
- in sleep mode, wakes up the printer into idle mode (Ap1300, Ap1310 and Ap863-F only).

- "Double-clicking" the button:
- in idle mode, prints a demo/test message including the firmware version, encoded calibration data, and optionally the full character set and sample bar codes;
- in spooling mode, prints any stored data and enters idle mode.

Double-clicking means pressing and releasing twice in quick succession, in a similar manner to a PC mouse.

Some functions of the paper feed button can be invoked or disabled by the host. The button is also disabled for 0.25 seconds after each data byte is received, to prevent the user from prematurely printing partial lines (Data from the host will generally be continuous).

## Printing Method

Each printer mechanism has 384 horizontally-arranged elements, printing a single dot line across the full width of the paper at once. The paper is advanced past the print head by a rubber platen driven by a stepper motor. Typical print speed is 50 mm/s at a battery voltage of 6 Volts. Each printed dot is nominally 0.125 mm square. The paper may only be fed through the printer in the forward direction.

It is not possible to print partial lines in isolation: if such a line remains in the buffer, it will not be printed until flushed out by: a line terminator; some following data; a programmable timeout; or by the user pressing the paper feed button, if enabled. Once a partial line has been flushed out, it may not be extended. Any following data will be printed on the next line.

Character lines may be printed in single or double width, single or double height, and underlined. These three text mode attributes may be combined at will. If single and double height characters are mixed in a line, the bottom of the characters will be aligned.

## Built-In Fonts

The built-in font characters are formed according to the Font Mode:

| Font Mode | Chars/Line | Character Height | Row Height | Printer Model |
|---|---|---|---|---|
| 0 | 32 | 24 dots (3.00 mm) | 30 dots (3.75 mm) | All |
| 1 | 42 | 24 dots (3.00 mm) | 30 dots (3.75 mm) | All |
| 2 | 24 | 24 dots (3.00 mm) | 30 dots (3.75 mm) | All |
| 3 | 32 | 24 dots (3.00 mm) | 24 dots (3.00 mm) | All |

Font Mode 0 is the default factory setting. Character heights refer to the maximum spans of capital letters and descenders. Row heights refer to the interval from the top of one character row to the top of the next, including inter-row spacing. The row height may be adjusted if required.

In all the built-in Font Modes, the character set is the standard IBM® character set (also known as Code Page 437) which includes graphics box-drawing characters. These box-drawing characters are extended to link up in both axes where appropriate. This character set has been modified (except in the ATB102) to include the Euro symbol ('€') at position 80H (128 Decimal), in place of the usual capital C with cedilla ('Ç'). Also, certain special character substitutions are possible for particular applications (e.g.:- switching the '£' and '#' characters, or including the Nordic 'ø' & 'Ø' characters in place of the '¢' & '¥' characters). Printers running firmware V8.3 or higher also support Code Page 1252 which is the default character set for the Ap1300-BTi. See the section on SETTING CONFIGURATION INFORMATION for details.

The Font Mode is normally stored in non-volatile memory (FLASH). This means that the printer can be pre-configured to operate in 24, 32 or 42 Char/Line modes as applicable.

If required, Font Mode changes may be disabled. See the section on SETTING CONFIGURATION INFORMATION for details.

## User Font

N.B. The User Font facility is not available for the ATB102.

This mode gives access to a single User Font programmed into the printer's non-volatile memory using the Flash Programming Utility. The format of the characters in the User Font is defined within the font itself.

When a User Font is present, the Built-In Fonts, and any character substitutions, are disabled. If the User Font is subsequently removed, then the Built-In Fonts are re-enabled automatically.

Several fonts, covering a variety of code pages are available at www.able-systems.com

## Multiple Code Page Fonts

N.B. Multiple Code Page Fonts are only available for the Ap1300 and Ap1310 printer range.

This type of User Font consists of multiple code pages resident at ASCII 0x80 to 0xFF. A simple command can be issued to switch between these pages, providing access to multilingual character sets.

## Dot Addressable Graphics

Several protocols for dot-addressable graphics data are supported:

- Eight (8) dot high graphics are aligned with the top of text characters. In these modes the dot patterns sent by the host may be doubled-up, tripled-up or quadrupled-up, both horizontally and vertically before printing. The dot size is nominally 0.25, 0.375 or 0.5 mm square.

- Twenty-four (24) dot high graphics are also aligned with the top of text characters, and are printed dot-for-bit as sent by the host. The nominal dot size is 0.125 mm square. Successive blocks can be vertically contiguous only if Font Mode 3 is selected.
- Single dot high graphics are also aligned with the top of text characters. Successive horizontal dot lines can be vertically contiguous if no other printing is performed between them.

Graphics may be combined with text printing as required. Large areas of solid dots are not recommended, as they may cause overheating and shorten the head life: try shading. Heavy graphics printing will also drain the battery more quickly.

## Serial Interface

The default serial interface format for all printers is 9600 baud, 8 data bits, 1 or 2 stop bits, and no parity. Other formats can be programmed into the printer at the factory or in the field, from the host. A setup program, suitable for use with a PC, is available from Able Systems to simplify this process.

Serial data is expected on Rx in RS-232C format with -12V meaning 'mark' or logical '1', and +12V meaning ‘space’ or logical '0', with reference to the common ground. The serial data output line, Tx, transmits XON/XOFF and status information to the host at the same baud rate and format as the serial data input. The hardware busy line, Busy, is true (nominally -12V) when busy.

Some host equipment use a constant space condition (+12V) to indicate a reset condition or wait state. Some battery powered host equipment present the same output signal when they go to sleep. By default the printer will interpret this condition as a repetitive receive error, and will print multiple ‘?’ characters to indicate the fault. If required, the printer may be set to ignore this condition.

## Data Buffer and Flow Control

The printer has a nominal 20k byte buffer which enables data to be received while previous lines are being printed. The state of the data buffer is transmitted to the host as follows:

| | | |
|---|---|---|
| XOFF | (13HEX) sent when buffer fills to | 3/4 full; |
| XON | (11HEX) sent when buffer empties to | 1/4 full; and also after a controller reset. |

The hardware busy line is set when 256 bytes of space remains; and incoming data are no longer passed to the buffer (but may be processed) when 128 bytes remain. The hardware busy line goes ready again when 384 bytes become free. Note that the buffer can become filled with non-printable codes, in which case the controller will go busy.

The printer always transmits an XON character when it has woken up and is ready to receive data. It always attempts to transmit an XOFF character to the host before going to sleep. It is not necessary to select hardware or software handshaking. Both are active at all times.

In the event of the battery becoming exhausted, the printer will automatically protect its own control circuitry by entering sleep mode if the instantaneous battery voltage drops below a threshold (e.g. during a particularly heavy section of print). In this event no XOFF character is transmitted.

## IRDA and Bluetooth Wireless Interfaces (Ap1300-IR, Ap1300-BT and Ap1300-BTi only)

The wireless interfaces present in the Ap1300-IR, Ap1300-BT and Ap1300-BTi are virtually transparent emulations of a standard serial connection. In each case, complex link management protocols are employed to ensure the integrity of the data transport and handle link making and breaking. However, the 'payload' data required to control the printer is unaffected by the transport mechanism.

See the User Guide for more details on the protocols and profiles supported for each.

SDK’s and demonstration software/apps are available for the following mobile platforms:

- Windows CE
- Blackberry
- Android
- iOS

Please contact the factory for more details

## Paper Out, Paper Low and Head Up Sensors

The sensors present in each product are shown below:

| Product | Mechanism | Paper Out | Paper Low | Head Up | Auto-Spool |
|---|---|---|---|---|---|
| Ap1300 | FTP-628MCL103 | ✓ | | ✓ | By default |
| Ap1310 | FTP-628MCL103 | ✓ | | ✓ | By default |
| Ap863-F | M-T102 | ✓ | ✓ | | Selectable |
| Ap1200 | ELM205 | ✓ | | | Selectable |
| ATB102 | M-T102 | ✓ | | ✓ | Selectable |
| ATB1200 | ELM205 | ✓ | | | Selectable |

In all the products a reflective optical Paper Out sensor within the mechanism detects an out-of-paper condition, and/or senses black marks to register with pre-printed forms. In the Ap863-F only, a mechanical switch with optical sensing Paper Low indication provides a 'near-end' paper alert. In the Ap1300, Ap1310 and the ATB102 only, a mechanical Head Up sensor detects when the lid is open.

The printer can be set to enter Spool mode automatically when the sensors become active. When selected, Spool mode can be automatically exited, when the problem is cleared. This behaviour may be modified. See the section on SETTING CONFIGURATION INFORMATION for details.

The state of the sensors is reported in the STATUS BYTE.

# 3 Control Code Tables

General Notes: All codes from 00 to 1F which are not listed below are ignored.

An ESC, GS etc code followed by an unrecognised command is ignored, but any following parameters are interpreted as normal characters. Any ESC, GS etc sequence which is described below but which has an illegal parameter is abandoned at that point. The controller will attempt to interpret subsequent characters as normal characters.
There is no need to follow ESC or GS control code strings with a line terminator. If one is added it will be interpreted as such.

Most control codes are executed when they fall through the data buffer at printing time. Some ("real time") codes are interpreted immediately on receipt, so that the printer can respond even if the buffer is full.

The settings defined in some commands, identified by N, may be stored in non-volatile memory [FLASH]. All settings are implemented as soon as they are interpreted, except for communication settings. Newly set values for the Baud rate, parity, data and stop bit parameters are not implemented until the printer has been cycled into sleep mode and back to waking mode.

## Command Description Format

In the explanations that follow, commonly recognised labels have been used (e.g. LF, CR, FF, ESC); command parameters are given as equivalent ASCII characters (e.g. "J"); or as hexadecimal [hex] values (e.g. 4AH); or decimal numbers (e.g. 74 or n) which are single byte values. Dots (...) mean more parameters follow.

The command string descriptions are punctuated by commas [,] for clarity, though most versions of BASIC will use semi-colons [;]. However, these separators will not be transmitted by the host.

As an example, the command to select the underlined printing mode can be expressed in a number of ways, all of which are equivalent:

| | |
|---|---|
| ESC, "!" ,n | (as in the command description) |
| 27 , 33 ,128 | (expressed as decimal character values) |
| 1BH,21H,80H | (expressed as hex values) |

n is a number, such that if expressed in binary, setting its most significant bit (bit 7) will select the underline mode.

This expression could be written into a BASIC program as:

```
10 PRINT#1,CHR$(27);"!Ç";                          ...using ASCII characters, or as:
10 PRINT#1,CHR$(27);CHR$(33);CHR$(128);            ...using decimal values, or as:
10 PRINT#1,CHR$(&H1B);CHR$(&H21);CHR$(&H80);       ...which is equivalent, but using hex.
```

## Command Codes Received

To assist programmers in converting existing host software, the following codes are used:

| | |
|---|---|
| ✓ | Fully supported as in EPSON ESCPOS |
| ✓+ | Altered functionality compared with ESCPOS |
| @ | Able special code, no ESCPOS equivalent exists |
| N | Setting may be retained in non-volatile [FLASH] memory |

| **ESC,"L"** | **1BH,4CH** | **Enter spooling mode** | **✓+** |
|---|---|---|---|
| Data and control codes received after this command will be stored in the buffer until either a command (FF) or GS,L command to exit spooling mode is received, or the paper feed button is double-clicked by the operator (double-click operation can be disabled by the ESC,c,5.. command). Note that the normal sleep inactivity timeout period is extended in spooling mode. | | | |

| **ESC,"c","5",..** | **1BH,63H,35H,n** | **Enable/Disable button functions** | **✓+N** |
|---|---|---|---|
| n is encoded so:<br>bit 0 clear (0) Disable paper feed button<br>bit 0 set (1) Enable paper feed button (default condition)<br>bit 1 clear (0) Disable double-click demo mode<br>bit 1 set (1) Enable double-click demo mode (default condition)<br>Other bits are ignored; the double-click demo mode only functions if the paper feed button is enabled. | | | |

| **ESC,"X",..** | **1BH,58H,m..** | **eXtended Commands (special to Able)** | **@ N** |
|---|---|---|---|
| See the section SETTING INTERNAL CONFIGURATION INFORMATION below for format. | | | |

| **ESC,"!",..** | **1BH,21H,n** | **Select printing mode** | **✓+N** |
|---|---|---|---|
| The third byte n is interpreted as follows:<br>bit 0 } Select Font Mode 0 to 4<br>bit 1 } (Mode 0 is factory setting)<br>bit 2 } (Invalid Font Mode Values are Ignored)<br>bit 4 Select(1)/Cancel(0) Double height mode<br>bit 5 Select(1)/Cancel(0) Double width mode<br>bit 7 Select(1)/Cancel(0) Underlined mode<br>Bits 3 and 6 are ignored.<br>Each of these attributes remains in force until actively cancelled, or the printer enters sleep mode. The Font Mode may be stored in non-volatile memory (FLASH) and retained through sleep mode. Some older host equipment may require the Font Mode Select bits to be disabled; See the ESC,"X",09H,n command for details of how to do this.<br>Font Modes (0 to 4) cannot be mixed within a single print line: a new line results when the Font Mode is changed. | | | |

| **ESC,"R", …** | **1BH,52H,n** | **Select Extended Page** | **@ N** |
|---|---|---|---|
| Font Format 2 and 3 are user font images containing multiple code pages. This command is used to select one of the code pages in the image. | | | |

## Graphics Commands

| ESC,"*",.. | 1BH,2AH,m,n1,n2,d1...dk | Dot-Addressable (Bit) Graphics | ✓+ |
|---|---|---|---|

Several modes of Dot Addressable Graphics are possible:
In all modes dot patterns are coded as 1= dot, 0= space, patterns are arranged in dot-columns, and the MSBit of each byte is printed at the top. The number of dot columns is given by (n1+ 256*n2).

When the third byte, m=0 or 2 (00H or 02H): **Doubled-up 8 dot graphics** [ k = n1+ 256*n2 ]
Each 8-dot vertical column is encoded as a single byte. Each dot is doubled in both axes to 0.25 mm square. Successive rows of 8-dot graphics cannot be printed contiguously in the vertical direction unless using a 16 dot high User Font.

When the third byte, m=3 (03H): **Tripled-up 8 dot graphics** [ k = n1+ 256*n2 ]
Each 8-dot vertical column is encoded as a single byte. Each dot is tripled in both axes to 0.375 mm square. Successive rows of 8-dot graphics can be printed contiguously in the vertical direction only in Font Mode 3 or a User Font which is 24 dots high.

When the third byte, m=4 (04H): **Quadrupled-up 8 dot graphics** [ k = n1+ 256*n2 ]
Each 8-dot vertical column is encoded as a single byte. Each dot is quadrupled in both axes to 0.5 mm square. Successive rows of 8-dot graphics can be printed contiguously in the vertical direction only in Font Modes 0, 1 or 2 or a User Font which is 32 dots high.

When the third byte, m=32 (20H): **Plain 24 dot graphics** [ k = 3 x (n1+ 256*n2)]
Each 24-dot vertical column is encoded as three successive bytes. Bytes d1, d4, d7 etc are at the top of the 24-dot vertical columns. The printed graphic pattern is therefore represented by the byte numbers as follows:

d1 d4 d7 ... d(k-2)
d2 d5 d8 ... d(k-1)
d3 d6 d9 ... dk

Each dot is the mechanism dot size of 0.125 mm square. Significant features should be coded using at least 2 dots together. Successive rows of 24-dot graphics can be printed contiguously in the vertical direction only in Font Mode 3 or a User Font which is 24 dots high.

When the third byte, m=8 (08H): **Single Dot Line graphics** [ k = n1+ 256*n2 ]
Data bytes are printed horizontally in order from left to right across the page, with the Most Significant Bit to the left. Each byte encodes 8 horizontal dots. Each dot is the mechanism dot size of 0.125 mm square. Successive horizontal dot rows can be printed contiguously in any Font Mode only if no other printing occurs between them.

If the print mechanism is allowed to stop between successive contiguous graphics patterns, slight discontinuities may occur due to mechanical hysteresis. Consider using spool mode to prevent this.

## Formatting Commands

| ESC,"-".. | 1BH,2DH,n | Turn underline on/off | ✓+ |
|---|---|---|---|
| If n=0: Underlining is turned off; otherwise is turned on. | | | |

| ESC,"2" | 1BH,32H | Set default Row Height | ✓ |
|---|---|---|---|
| Set default row height. ie:-30 (0.125mm) dots in Font Mode 0,1 and 2; 24 dots in Font Mode 3; and 16 dots in Font Mode 4. | | | |

| ESC,"3",.. | 1BH,33H,n | Set Row Height | ✓ |
|---|---|---|---|
| n is the row height. Allowed range: 20 to 100. Row height refers to the interval from the top of one character row to the top of the next, including inter-row spacing. This setting is retained until cleared, or the Font Mode is changed or the printer enters sleep mode | | | |

| ESC,"D",.. | 1BH,44H,d1..dk,00 | Set horizontal tab positions | ✓+ |
|---|---|---|---|
| Up to 6 positions may be recorded, and replace the default settings. If more are given, the first 6 are accepted and normal processing resumes from that point. If less than 6 are given then the command should be terminated with a NUL(00H) character. Note that tab settings take variable character spacing into account. Setting is retained until cleared or the printer enters sleep mode. | | | |

| ESC,"J",.. | 1BH,4AH,n | Print and feed extra paper | ✓+ |
|---|---|---|---|
| n is the count of notional 1/20th print lines to be fed. This command terminates the current line; n is divided by 20 (remainder discarded) and the quotient used as a count of additional blank single-height character lines. | | | |

| ESC,"$",.. | 1BH,24H,n1,n2 | Set absolute print position | ✓+ |
|---|---|---|---|
| Position = (n1 + 256*n2) dots from start of line. If printing is currently to the left of this position, blank space is inserted up to it. If it is to the right, then over-printing can occur, allowing special character combinations to be formed. Any overflow is cut off at end of line. | | | |

| ESC,"\",.. | 1BH,5CH,n1,n2 | Set relative position | ✓ |
|---|---|---|---|
| Position = (n1+ 256*n2) dots from current position in text lines. Blank space is inserted up to the selected dot position. Any overflow is cut off at end of line. | | | |

| ESC,"d",.. | 1BH,64H,n | Print and feed n lines | ✓ |
|---|---|---|---|
| Terminates the current line and feeds n blank print lines | | | |

| ESC,"{",.. | 1BH,7B,n | Set/Cancel inverted character printing | ✓ |
|---|---|---|---|
| n is encoded so:<br>bit 0 cleared (0) Normal (upright) text<br>bit 0 set (1) Inverted text<br>Normal and inverted text cannot be mixed in a single line. This setting is temporary (the default setting can be redefined by the ESC,X command and stored in non-volatile memory [FLASH]). | | | |

## Formatting Commands (Continued)

| **HTAB** | **09H** | **Horizontal Tab** | ✓ |
|---|---|---|---|
| Default positions: 8,16,24,32,40;<br>6 positions available; programmed using ESC,D command. Ignored if off the end of a line. The first HTAB does not move from a HTAB position to the next:<br>e.g.<br>1234567890123456<br>123456 T (1 Tab before "T")<br>1234567T (1 Tab before "T")<br>1234567 T (2 Tabs before "T")<br>12345678 T (1 Tab before "T") | | | |

| **LF** | **0AH** | **Line Feed** | ✓ |
|---|---|---|---|
| Works in an either/or way with CR: CR/LF pairs are treated as a single line terminator. Line terminators immediately following full lines are ignored. | | | |

| **FF** | **0CH** | **(Real time) Form Feed** | ✓+ |
|---|---|---|---|
| Exit spooling mode and print buffer contents.<br>Ignored if the printer is not already in spooling mode or an error condition exists. | | | |

| **CR** | **0DH** | **Carriage Return** | @ |
|---|---|---|---|
| Line terminator: works in an either/or way with LF. CR/LF pairs are treated as a single line terminator | | | |

| **ESC," ",..** | **1BH,20H,n** | **Set right-of-character spacing** | ✓ |
|---|---|---|---|
| n is the number of additional (note!) dot spaces placed to the right of each character printed.<br>Default= 0; maximum value= 31. Setting is retained until cleared or the printer enters sleep mode. | | | |

## Initialise and Request Status Commands

| ESC,"@" | 1BH,40H | Initialise printer | ✓ |
|---|---|---|---|
| Clears print parameters to power-on default, ie normal width and height, no underline, no extra space, and default tabs. Does not affect the inverted mode. Not real-time, executed in data sequence (unlike CAN). | | | |

| CAN | 18H | (Real time) Abort printing and initialise | @ |
|---|---|---|---|
| Same result as ESC,'@' but executed immediately when received. A line in progress is allowed to finish, but printing then continues from data received after the CAN code. Ignored if embedded in an ESC, GS or graphics sequence. | | | |

| GS,ENQ | 1DH,05H | (Real time) request for printer status | ✓+ |
|---|---|---|---|
| This command is executed and the STATUS byte is transmitted immediately on receipt, even if the printer is busy. See the section CODES TRANSMITTED for format. | | | |

| GS,"I",.. | 1DH,49H,n | Request to transmit information | ✓+ |
|---|---|---|---|
| See the section QUERYING INTERNAL CONFIGURATION INFORMATION below for format. | | | |

| GS,"L",.. | 1DH,4CH,n | Exit Spool Mode and Transmit confirmation data | @ |
|---|---|---|---|

If spool mode is entered by ESC, L command and this command is used to exit from spool mode, confirmation of the number of bytes sent whilst in spool mode will be returned. The sequence on exiting spool mode is;
(i) Transmit initial confirmation string with data packet information
(ii) Exit Spool Mode
(iii) Print all spooled data from buffer
(iv) Transmit final confirmation string

When the **GS,'L'** command is received a 4 byte confirmation string is transmitted by the printer as follows:

**STX ByteCountLo ByteCountHi CheckDigit**
**[02h] [06h] [00h] [4Fh]**

ByteCount is transmitted as two consecutive bytes such that (ByteCountLo + (ByteCountHi x 256) ) gives the actual ByteCount value. In this case, there are 6 data bytes between the ESC,'L' and GS,'L' commands, and the result of a cumulative XOR of each of these 6 bytes yields 4Fh as the CheckDigit.

The printer then exits from Spool mode and processes the data which has been held in the buffer in the normal way. Once the data buffer is completely empty and the mechanism is no longer running (as normally reported by bits 1 and 2 of the STATUS byte), then the packet of data is judged to have been processed completely. At this point a further confirmation string is transmitted as follows:

**ETX ByteCountLo ByteCountHi CheckDigit**
**[03h] [06h] [00h] [4Fh]**

Note that the first byte is STX for the first string and ETX for the second string.
The final 3 bytes are identical in both strings.

## Initialise and Request Status Commands (Continued)

| GS,"a",.. | 1DH,61H,n | Enable/Disable automatic status | ✓+N |
|---|---|---|---|
| Defines the conditions under which the STATUS byte is transmitted without explicit request from the host. A bit set in 'n' causes the STATUS to be sent whenever the corresponding bit in the STATUS byte changes state (see CODES TRANSMITTED for format). A value of n=00H disables automatic reporting, and is the default condition. | | | |

| ESC,"u",.. | 1BH,75H,n | Transmit peripheral device status | ✓+ |
|---|---|---|---|
| Transmit STATUS byte when decoded. n is discarded; this command is exactly the same as ESC,v This command is in the buffer when the response is sent, so the buffer will not be reported as empty. See the section CODES TRANSMITTED below for format. | | | |

| ESC,"v" | 1BH,76H | Transmit printer status | ✓+ |
|---|---|---|---|
| Transmit STATUS byte when decoded. This command is in the buffer when the response is sent, so the buffer will not be reported as empty. See the section CODES for format. | | | |

## Barcode Commands

| GS,"H",n | 1DH,48H,n | Select automatic text in barcode | ✓ |
|---|---|---|---|

n is encoded so:

| | | |
|---|---|---|
| bit 0 cleared | (0) | No barcode text above barcode symbol (default) |
| bit 0 set | (1) | Print barcode text above barcode symbol |
| bit 1 cleared | (0) | No barcode text below barcode symbol (default) |
| bit 1 set | (1) | Print barcode text below barcode symbol |

This setting is retained and used for all subsequent barcodes, but is cleared to the default when the printer enters sleep mode

| GS,"h",n | 1DH,68H,n | Select height of barcode | ✓+ |
|---|---|---|---|

Height of barcode = (n x 0.125mm) n is valid in the range 1 <= n <= 150.
Default value 100; a zero value is ignored; a value of 150 is used in place of values greater than 150. This setting is retained and used for all subsequent barcodes, but is cleared to the default when the printer is powered off.

| GS,"k",.. | 1DH,6BH,m,d1..dk,t | Print barcode using data provided | ✓ |
|---|---|---|---|

N.B. This command must always be terminated with value “t” shown below.
The number and type of bytes of data varies with barcode type "m".

| Valid m values: | | Terminator (t) |
|---|---|---|
| 0: UPC-A | Numeric only ASCII data: supply 11 digits | 00H |
| 1: UPC-E | Numeric only ASCII data: supply 6 digits | 00H |
| 2: EAN-13 | Numeric only ASCII data: supply 12 digits | 00H |
| 3: EAN-8 | Numeric only ASCII data: supply 7 digits | 00H |
| 4: Code 39 | Alphanumeric ASCII data: variable length (Max 22) | 00H |
| 5: Int2 of 5 | Numeric only ASCII data: variable length (Max 23) | 00H |
| 6: Code 128A | Alphanumeric ASCII data 0x00 to 0x5F: variable length (Max 14) | FFH |
| 7: Code 128B | Alphanumeric ASCII data 0x20 to 0x7F: variable length (Max 14) | FFH |
| 8: Code 128C | Numeric only ASCII data 30H to 39H: variable length (Max 14 bytes) | FFH |
| 9: Code 93 | Alphanumeric ASCII data 0x00 to 0x7F: variable length (Max 16) | FFH |

Note that the user should verify that a given barcode will fit on the paper, especially when using the variable length barcodes. Barcodes may not be mixed with normal text.

| GS,"w",n | 1DH,77H,n | Select width of barcode | ✓ |
|---|---|---|---|

Width of barcode element (narrow bar) = (n x 0.125mm)
n is valid in the range 2 <= n <= 4. Other values are ignored; Default value is 3.
This setting is retained and used for all subsequent barcodes, but is cleared to the default when the printer enters sleep mode. Note that the user should verify that a given barcode will fit on the paper, especially when using the variable length barcodes.

## Cutter Control Commands (ATB102 driving M-T102A Only)

The ATB102 has two additional commands for control of the cutter (when driving the M-T102A only):

| ESC,"i" | 1BH,69H | Execute a Full Cut | ✓ |
|---|---|---|---|

Perform a full cut.

| ESC,"m" | 1BH,6DH | Execute a Partial Cut | ✓ |
|---|---|---|---|

Perform a partial cut.

## Mark Sense Operation

Please refer to the factory for more detailed information before using the Mark Sense feature.

## Reserved Commands

In general, commands which are not implemented and described above should not be sent to the printer, as the outcome may not be as expected. However, some additional EPSON ESCPOS commands are recognised, and an attempt is made to decode them, so that following commands will remain in synchronism and correctly interpreted. Please refer to Able Systems in case of difficulty.

## Codes Transmitted

The printer automatically transmits XON and XOFF bytes when the buffer status changes, as follows:

| **XON** | **11H** | **Start transmission** | |
|---|---|---|---|
| Meaning: The buffer is ready to receive data.<br>Transmitted after a reset, or when the data buffer empties to only 1/4 full. | | | |

| **XOFF** | **13H** | **Stop transmission** | |
|---|---|---|---|
| Meaning: The buffer is not ready to receive data.<br>Transmitted when the data buffer becomes 3/4 full, or before a controlled entry into sleep mode. | | | |

In addition the printer can transmit a special STATUS byte, either on request, or optionally when individual status conditions change state:
The commands ESC,"u",n and ESC,"v" request the STATUS byte be transmitted at the time that the command is interpreted. (N.B. The buffer is never reported as empty when these commands are used, as it contains at least this command at the time of transmission).
The command GS,ENQ requests the STATUS byte be transmitted immediately on receipt of the command, even if the buffer contains large amounts of data yet to be interpreted and/or printed.
The GS,"a",n command specifies individual bits of the STATUS byte which should be monitored, and result in the STATUS byte being automatically transmitted if a change of state is detected.

| **[STATUS]** | | **Status Report** | |
|---|---|---|---|
| The STATUS byte is encoded bitwise:<br>bit 0 Head Up Sensor Active?<br>bit 1 Mechanism running<br>bit 2 Data buffer completely empty?<br>bit 3 Paper Out Sensor Active?<br>bit 4 Reserved<br>bit 5 Spooling mode?<br>bit 6 Error<br>bit 7 Always Set | | [0= head OK 1= head up ]<br>[0= stopped 1= running ]<br>[0= not empty 1= empty ]<br>[0= paper OK 1= paper out ]<br>[ ]<br>[0= normal 1= spooling ]<br>[0= no error 1= error present]<br>[ Always 1 ] | |

The command GS,"I",n is also a request for information to be transmitted at the time that the command is interpreted (i.e. not in 'real-time'). For details of the valid values for n, and the resultant transmitted information see the QUERYING INTERNAL CONFIGURATION INFORMATION section below.

If an error condition exists, then the usual single STATUS byte is followed by a second error identification byte. This second byte is only sent if bit6 of the STATUS byte is set. The values of the error ID byte are as follows:

| Value | Error type |
|---|---|
| 80H | Mechanism Voltage (Vmech) above upper limit |
| 7FH | Mechanism Voltage (Vmech) below lower limit |
| 40H | Mechanism Head Temperature above upper limit |
| 07H | Cutter Blade stuck out - probably jammed (ATB102 only) |
| 06H | Cutter Blade stuck in or no cutter found (ATB102 only) |

Other values are either not defined or represent internal controller hardware errors.

**N.B.**
The ATB102 and Ap1200 differ in the use of bits 0 and 3 of the STATUS byte. These two printers report the "Paper Out" status via bit 0. The ATB102 (only) also provides for an additional "Head Up" input which is reported via bit 3. The Ap1200 has no provision for a "Head Up" sensor.

# 4 Settings and Configuration

The printer maintains a large number of internal settings and configuration information which is not derived from ESCPOS control codes, and is unique to Able Systems printers.
In general, the ESC,"X",m,... command is used to set these values, and the GS,"I",m command is used to query them. The following table details all valid combinations of these commands:
**(N.B. See the section SAVING CONFIGURATION INFORMATION).**

| m | ESC,"X",m,... | |
|---|---|---|
| | | |
| 4 | eg "9600,N,8,1",CR | Set Baud |
| | | |
| 9 | n1 | Set Internal Defaults |
| 11 | n1,n2 | Set Sleep Period |
| 15 | | |
| 18 | n1..n18 | Set LED patterns |
| 19 | n1 | Set MT102FLAGS |
| 20 | n1,n2 | Set MarkFeed / EjectFeed |
| 23 | n1 | Set AUXFLAGS |
| 33 | n1 | Set MaxDotsAtOnce |
| 42 | n1 | Set EjectOffset |
| 48 | | Save all settings to Flash |
| 50 | n1,n2 | Set Spool Sleep Period |
| 52 | n1,n2 | Set Auto-Save Period |
| 66 | n1 | Set print darkness |
| 110 | | Produce test print |

| m | GS,"I",m | |
|---|---|---|
| 3 | n1,n2 | Report Firmware Version Number |
| 4 | eg " 9600,N,8,1",CR | Report Baud Setting |
| 6 | eg "SerialNo",CR | Report Unit Serial Number |
| 9 | n1,n2,n3 | Report Internal Defaults |
| 11 | n1,n2 | Report Sleep Period |
| 15 | n1,n2,n3 | Report Voltage/Temp Data |
| 18 | n1..n18 | Report LED patterns |
| 19 | n1 | Report MT102FLAGS |
| 20 | n1,n2 | Report MarkFeed / EjectFeed |
| 23 | n1 | Report AUXFLAGS |
| 33 | n1 | Report MaxDotsAtOnce |
| 42 | n1 | Report EjectOffset |
| | | |
| 50 | n1,n2 | Report Spool Sleep Period |
| 52 | n1,n2 | Report Auto-Save Period |
| 66 | n1 | Report print darkness |
| | | |

## Setting Configuration Information

**N.B. This section contains details of how to modify some of the basic operating functions of the printer. Do NOT attempt to modify any parameter unless you fully understand the potential consequences.**

The command ESC,"X",m,... may be used to set various internal configuration values according to the value of m as defined below.

m=4 Select Baud rate, parity, word length and number of stop bits. (Default: "9600,N,8,1")
Command parameters must have format: e.g."19200,E,8,2", so:

| | |
|---|---|
| 4 or 5 number characters, | [the required Baud rate] |
| 1 comma character | |
| 1 "N/n/E/e/O/o" letter character, | [the required Parity] |
| 1 comma character | |
| 1 "7/8" number character, | [the required Data bits] |
| 1 comma character | |
| 1 "1/2" number character | [the required Stop bits] |

e.g. To select 19200,E,8,2 the following 14 byte command should be sent:
ESC,"X",04H,"19200,E,8,2"
or as hex codes: 1BH,58H,04H,31H,39H,32H,30H,30H,2CH,45H,2CH,37H,2CH,32H

The following RS232 baud rates are accepted;
1200, 2400, 4800, 9600, 38400, 57600

Each printer accepts 8 data bits followed by either 1 or 2 stop bits and can use Odd, Even or No parity.
The setting must be saved to non-volatile memory (FLASH), and does not come into effect until after the next sleep/waking mode transition.

m=9 Set Internal Default Values.

The command ESC,"X",09H,n sets the internal default values according to individual bits in the value of n. In each case, a bit set(1) means the following statement is true:

Bit 0 Default to inverted print mode
Bit 1 Disable FontMode bits of ESC,"!",n command
Bit 2 Suppress "?" printing on RX error
Bit 3 [Unassigned]
Bit 4 Enable Split dots printing (See MaxDotsAtOnce [m=33] for details)
Bit 5 [Unassigned]
Bit 6 Disable printing of partial data in buffer before going to sleep
Bit 7 [Unassigned]

Note: the setting of bit 0 does not come into effect until after the next sleep/waking mode transition.

m=11 Set auto-sleep timeout period. (or request sleep mode immediately).
The command ESC,"X",0BH,n1,n2 sets the period of inactivity before the printer automatically enters sleep mode.
The following two bytes define the period in seconds (n1+ 256*n2). For example, the string 1BH,58H,0BH,84H,03H sets a period of 15 minutes [(132+ 256*3) = 900 seconds].
The printer will normally print any buffer contents before entering sleep mode, but this can be disabled. A value of 65535 (n1=n2=255) disables the auto-sleep feature; a value of zero (n1=n2=0) leaves the stored setting intact, but enters sleep mode immediately. The printer will never enter the sleep mode while a charger is connected. When in spooling mode, a different sleep period setting is used (See Spool Sleep Period [m=50] for details).
The direct powered products (Ap1200, ATB102 and ATB1200) cannot enter sleep mode, but this timeout period can be used to initiate an auto-purge of the buffer if required.

m=18 Set LED patterns.
The standard pattern set displayed by the printer has been worked out with a great deal of care to provide the maximum useful information while remaining clear and unambiguous. However they may be modified if required. Please refer to Able for details.

m=19 Set MT102FLAGS value.
The command ESC,"X",13H,n sets the internal values according to individual bits in the value of n. In each case, a bit set(1) means the following statement is true:

Bit 0 [Must be set to enable paper out optical sensor]
Bit 1 Enable Mark Sense Operation
Bit 2 [Unassigned]
Bit 3 [Unassigned]
Bit 4 [Unassigned]
Bit 5 Led Pattern Dependent on Paper Out Sensor
Bit 6 [Must be set to enable head up sensor]
Bit 7 Led Pattern Dependent on Head Up Sensor

The standard setting for this value is: E1H for the Ap1300.

m=20 Set MarkFeed and EjectFeed values.
The command ESC,"X",14H,n1,n2 sets the values of MarkFeed and EjectFeed. These parameters are used in Mark Sense operation. See MARK SENSE OPERATION section for details.

m=23 Set AUXFLAGS value.
The command ESC,"X",17H,n sets the internal values according to individual bits in the value of n. In each case, a bit set(1) means the following statement is true:

Bit 0 Select Short Demo Print
Bit 1 Select swapping '#' (23H) and '£' (9CH) chars
Bit 2 Select switching in Nordic 'ø' & 'Ø' chars in place of '¢' (9BH) & '¥' (9DH)
Bit 3 Select original CP437 character 'Ç' in place of new standard '€' (80H)
Bit 4 Select Busy to go active when Paper Out condition seen
Bit 5 [Unassigned]
Bit 6 Select Code Page 1252 (this is selectable in printers running firmware V8.3 or higher)
Bit 7 [Unassigned]

m=33 Set MaxDotsAtOnce value.
The command ESC,"X",21H,n sets the value of MaxDotsAtOnce. This value controls the operation of the printing process to limit the maximum instantaneous current that may be drawn from the battery (or power supply).
Valid values are in the range 01H to 30H. This value equates to the number of dots that may be energised divided by eight. 01H represents the lowest current draw (i.e. only 8 dots may be energised at a time), and 30H represents maximum peak current draw (i.e. all dots are allowed to be energised simultaneously).
The printer automatically slows the paper feeding to allow all the dots to be printed. Therefore, reducing the value of MaxDotsAtOnce also reduces the overall print speed.

The default value for the Ap1300 is 08H. Refer to the factory if more information is required.
N.B. This value is disabled, and no splitting occurs, if bit4 of Internal Defaults (m=9) is clear.

m=42 Set EjectOffset value.
The command ESC,"X",2AH,n sets the value of EjectOffset. This parameter is used in Mark Sense operation. See MARK SENSE OPERATION section for details.

**m=48 Save all settings to Flash.**
**The command ESC,"X",30H forces an immediate save of all the configuration settings to flash. This takes less than a second, but the printer goes busy during the process.**

m=50 Set auto-sleep timeout period for when Spooling mode is active.
The command ESC,"X",32H,n1,n2 has the same format as the (m=11) command. By default the sleep period when in Spooling Mode is set to 300 seconds (5 minutes).

m=52 Set Auto-Save-to-Flash Period.
The command ESC,"X",34H,n1,n2 has the same format as the (m=11) command. By default the Auto-Save-to-Flash function is disabled (See below for more details).

m=66 Set Print Darkness.
The command ESC,"X",42H,n sets the value of print darkness. This value controls the operation of the printing process to suit different paper types.
Valid values are in the range 55H to 90H. Increasing the value causes the printed output to become darker. 55H suits standard thermal paper. 90H suits Linerless paper.

## Saving Configuration Information

All configuration information must be saved to Flash if it is to be non-volatile. Ideally, this should be performed manually by sending the command ESC,"X",30H (see above).

Before executing a controlled transition to sleep mode, the printer automatically saves any changes to the configuration information.

Alternatively, the printer maintains a special timer which will perform an automatic save of the configuration information after a pre-set period of inactivity. This automatic timed save is normally disabled, but may be enabled by sending the ESC,"X",34H,n1,n2 command.

Note that during the saving procedure the printer effectively performs a full system reset. Therefore, it is advised that the save command be issued in isolation (i.e. not embedded in a stream of printable data).

## Querying Configuration Information

In general, for each ESC,"X",m,.. command, the corresponding GS,"I",m command may be used to query the current value. In some cases the information reported is different from the value(s) set.

m=3 Report Firmware Version.
In response to the command GS,"I",03H the printer transmits 2 packed BCD bytes. The first byte contains the major and minor version, and the second byte contains the revision number. eg:- 12H and 34H means Version 1.2.34

m=4 Report Baud rate, parity, word length and number of stop bits.
In response to the command GS,"I",04H the printer transmits a string of ASCII characters in the same format as used in the ESC,"X",04H,... command. eg:- "19200,E,7,2"

m=6 Report Unit Serial Number.
In response to the command GS,"I",06H the printer transmits a string of up to 10 ASCII characters terminated by a CR character. eg:- "123456",CR
This is the Unit Serial Number as set by the factory during printer test/setup.

m=9 Report Internal Defaults.
In response to the command GS,"I",09H the printer transmits 3 bytes. The first byte contains the current values of the flags set using the ESC,"X",09H,n command. The following 2 bytes are for Able diagnostics only.

m=11 Report Auto-Sleep Timeout Period.
In response to the command GS,"I",0BH the printer transmits 2 bytes which form a 16 bit timeout value in seconds: (n1 + 256*n2).

m=15 Report Real-Time Voltage and Temperature Values.
In response to the command GS,"I",0FH the printer transmits 3 bytes.
n1 = Battery Voltage x 10 [ eg:- 43H means 6.7V ]
n2 = Printhead temperature in ºC [ eg:- 14H means 20ºC ]
n3 is a coded byte: bit 0 Charger is present
bit 1 Reserved
bit 2 Battery voltage is low (normally indicated by Red LED)

m=18 Report LED patterns.
Please refer to Able for details if required.

m=19 Report MT102FLAGS value.
m=20 Report MarkFeed and EjectFeed values.
m=23 Report AUXFLAGS value.
m=33 Report MaxDotsAtOnce value.
m=42 Report EjectOffset value
m=50 Report Spooling Mode Sleep Period value
m=52 Report Auto-Save Period value
m=66 Report Print Darkness

In response to each of the above commands (in the form GS,"I",m), the printer transmits the current values of the parameters set using the corresponding ESC,"X",m,… command.

# 5 Command Summaries

## Summary of Print Format Commands and Volatile Settings

| Function | Command |
|---|---|
| Clear Print Settings and Buffer<br>(Select single width, single height, no underlining, no extra inter-character space, and default HTAB positions) | ESC,"@"<br>CAN (real-time) |
| Font Mode, Double Height, Double Width, Underlining | ESC,"!",n |
| Underlining only | ESC,"-",n |
| Inverted Print Mode | ESC,"{",n |
| Print positioning | HTAB<br>ESC,"$",n1,n2<br>ESC,"\",n1,n2 |
| Line termination<br>(and Paper Feed) | LF<br>CR<br>ESC,"J",n<br>ESC,"d",n |
| Dot Addressable (Bit) Graphics | ESC,"*",.. |
| Entering and exiting Spooling Mode | ESC,"L"<br>FF |
| Extra inter-character and inter-line spacing | ESC," ",n<br>ESC,"2"<br>ESC,"3",n |
| Set HTAB positions | ESC,"D",.. |
| Request Printer STATUS BYTE | ESC,"u",n<br>ESC,"v"<br>GS,ENQ (real-time) |
| Select Barcode Size and Format | GS,"H",n<br>GS,"h",n<br>GS,"w",n |
| Print Barcode | GS,"k",.. |
| Cutter Control (ATB102 with M-T102A only) | ESC,"i"<br>ESC,"m" |

## Summary of Real Time Status Information

| Information | How reported | Note |
|---|---|---|
| Mechanism Status | GS,ENQ | STATUS BYTE bit 1 (Set = Mech is Active) |
| Data Buffer Status | GS,ENQ | STATUS BYTE bit 2 (Set = Buffer is Empty) |
| Paper Out Status | GS,ENQ | STATUS BYTE bit 3 (Set = Paper is Out) |
| Spool Mode Status | GS,ENQ | STATUS BYTE bit 5 (Set = In Spool Mode) |
| | | |
| Real Time Battery Voltage | GS,"I",15 | Also In Self Test |
| Charger Status | GS,"I",15 | Also In Self Test |

## Summary Of Non-Volatile Settings

| Setting | How set | How reported | Note |
|---|---|---|---|
| Firmware Version No. | | GS,”I”,3 | Also In Self Test |
| Unit Serial No. | | GS,”I”,6 | Also In Self Test |
| | | | |
| Save all configuration to Flash | ESC,"X",48 | | |
| Auto-Save config to Flash (Period) | ESC,"X",52.. | GS,”I”,52 | |
| | | | |
| Baud Rate, Parity etc | ESC,”X”,4.. | GS,”I”,4 | Also In Self Test |
| LED patterns & LED Flash Period | ESC,”X”,18.. | GS,”I”,18 | |
| Sleep Period | ESC,”X”,11.. | GS,”I”,11 | Also In Self Test |
| Sleep Period (In Spool Mode) | ESC,”X”,50.. | GS,”I”,50 | Also In Self Test |
| | | | |
| Default to Inverted Print | ESC,”X”,9.. | GS,”I”,9 | Also Coded In Self Test |
| Short Demo Message | ESC,”X”,23.. | | Coded In Self Test |
| Suppress "?" on Rx Error | ESC,”X”,9.. | GS,”I”,9 | Also Coded In Self Test |
| Split dots Printing (enable) | ESC,”X”,9.. | GS,”I”,9 | Also Coded In Self Test |
| Split dots Printing (MaxDotsAtOnce) | ESC,”X”,33.. | GS,”I”,33 | Also Coded In Self Test |
| Sleep without Buffer Purge | ESC,”X”,9.. | GS,”I”,9 | Also Coded In Self Test |
| Disable Feed Switch | ESC,”c5”.. | | Coded In Self Test |
| Disable Demo Mode | ESC,”c5”.. | | Coded In Self Test |
| | | | |
| Swap '#' (23H) <-> '£' (9CH) chars | ESC,"X",23,n | GS,"I",23 | |
| Use 'ø' & 'Ø' <-> '¢' (9BH) & '¥' (9DH) | ESC,"X",23,n | GS,"I",23 | |
| Use 'Ç' <-> '€' (80H) | ESC,"X",23,n | GS,"I",23 | |
| Use Code Page 1252 | ESC,"X",23,n | GS,"I",23 | Also Coded In Self Test |
| | | | |
| Enable Black Mark Operation | ESC,”X”,19.. | GS,”I”,19 | Also Coded In Self Test |
| Black Mark parameters (detail) | ESC,”X”,20.. | GS,”I”,20 | |
| Black Mark parameters (more detail) | ESC,”X”,42.. | GS,”I”,42 | |
| | | | |
| Paper Out -> LED Pattern | ESC,”X”,19.. | GS,”I”,19 | Also Coded In Self Test |
| Head Up -> LED Pattern | ESC,”X”,19.. | GS,”I”,19 | Also Coded In Self Test |
| Select Busy on Paper Out condition | ESC,"X",23,n | GS,"I",23 | |
| | | | |
| Font Mode | ESC,"!",n | | Also Coded In Self Test |
| Disable FontMode changes | ESC,”X”,9.. | GS,”I”,9 | Also Coded In Self Test |
| AUTO_STATUS settings | GS,”a”.. | | |

A simple Windows setup program is available from Able on request, and when connected to a printer with a suitable data cable, gives easy access to the settings in the tables above.

Please refer to Able Systems or visit our website at **www.able-systems.com** for more information.

You are always welcome to contact Able Systems or your local supplier for specific assistance.

We would also appreciate reports of any errors in our documentation, or suggested improvements.

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