APPROVED
By Deborah Howe at 12:43 pm, Mar 06, 2013



Zebra® TTP 2100 Kiosk Ticket Printer

Technical Manual

ZEBRA TECHNOLOGIES

P1003640-003 Rev. A

© 2012 ZIH Corp. The copyrights in this manual and the software and/or firmware in the printer described therein are owned by ZIH Corp. and Zebra's licensors. Unauthorized reproduction of this manual or the software and/or firmware in the printer may result in imprisonment of up to one year and fines of up to $10,000 (17 U.S.C.506). Copyright violators may be subject to civil liability.

This product may contain ZPL®, ZPL II®, and ZebraLink™ programs; Element Energy Equalizer™ Circuit; E^{3}™; and Monotype Imaging fonts. Software © ZIH Corp. All rights reserved worldwide.

ZebraLink, Element Energy Equalizer, E^{3} and all product names and numbers are trademarks, and Zebra, the Zebra head graphic, ZPL and ZPL II are registered trademarks of ZIH Corp. All rights reserved worldwide.

All other brand names, product names, or trademarks belong to their respective holders. For additional trademark information, please see "Trademarks" on the product CD.

Proprietary Statement This manual contains proprietary information of Zebra Technologies Corporation and its subsidiaries ("Zebra Technologies"). It is intended solely for the information and use of parties operating and maintaining the equipment described herein. Such proprietary information may not be used, reproduced, or disclosed to any other parties for any other purpose without the express, written permission of Zebra Technologies Corporation.

Product Improvements Continuous improvement of products is a policy of Zebra Technologies Corporation. All specifications and designs are subject to change without notice.

Liability Disclaimer Zebra Technologies Corporation takes steps to ensure that its published Engineering specifications and manuals are correct; however, errors do occur. Zebra Technologies Corporation reserves the right to correct any such errors and disclaims liability resulting therefrom.

Limitation of Liability In no event shall Zebra Technologies Corporation or anyone else involved in the creation, production, or delivery of the accompanying product (including hardware and software) be liable for any damages whatsoever (including, without limitation, consequential damages including loss of business profits, business interruption, or loss of business information) arising out of the use of, the results of use of, or inability to use such product, even if Zebra Technologies Corporation has been advised of the possibility of such damages. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

Contents

1 • Introduction 7

About this Manual 7

2 • Product Presentation 9

TTP 2100 Series 9

Presenter 12

Eject Mode 12

Hold Mode 12

Controls 13

Feed Button 13

Power Indicator 14

Status Indicator 14

3 • Installation 15

Installing a Paper Guide 15

Top of Form (TOF) Sensor 19

Selecting Fork (Transmissive) or Reflex (Black Mark) TOF Sensor 19

Calibrating the TOF Sensor 20

Positioning the TOF Sensor 20

Installation Considerations 22

Orientation 23

Quick-Fit Hubs 24

Design Your Own Mounting 25

Electrostatic Discharges and Earth Currents 26

Ambient Light 26

Installing a Paper-low Sensor (Optional) 27

Connecting to the Computer 28

TTP 2110 28

TTP 2130 29

Connecting the Power 30
Making a Self-Test Printout 32
Customizing the Self-Test Printout 33
Installing a Printer Driver 33

4 • Operation 35
Loading Fanfold Ticket Stock 35
Installing a Paper Roll 36
Clearing Paper Jams 38

5 • Programming 39
Programming Overview 40
How the Commands are Described 41
Summary of Control Codes and Escape Sequences 43
Software Command Syntax 46
Black Mark (Top-of-Form) Commands 46
Text Commands 47
Barcode Commands 54
Graphics Commands 60
Print Commands 63
Cut and Present Commands 65
System Related Commands 68
Status Reporting Commands 72
Font Loading 83
File Format 83
Character Bitmap Data 85
Logotypes 86
Loading 86
File Format 86
Printing 87
Erasing 87
Status Reporting 88

6 • Default Parameter Settings 91
Parameter Settings 91
How the Parameters are Described 92
Default Value 92
Examples 92
Summary of Parameter Settings 92
Serial Interface Set-up 94
Print Setup 95
Fixed Document Mode 100

7 • Page Setup 109
Printable Area 109
Aligning Preprint and Thermal Print 110
Simple Calibration Process 112
FF (Form Feed) 113
Black Mark Sensing from within Windows 113

8 • Interface 115
Printer Interface 115
Serial: TTP 2110 115
Setup Options 116
USB: TTP 2130 117

9 • Maintenance 119
Fault Finding / Troubleshooting 119
Cleaning the Printhead 121
Cleaning the Presenter and Platen Rollers 121
Firmware 121
Loading 122
Firmware Identification 126

10 • Specifications 127
Ticket Specifications 128
TOF Detection 129
Features 129
Print Module 129
Ticket Separation 129
Presenter 130
Electronics 130
Firmware 130
Text Mode 131
Miscellaneous 131
Basic Character Set 131
Part Number List 133
Printers 133
Accessories 133
Dimensions 134
Printer 134
Media Holder 135
Power Supply 136
Output Tray 136

A • 中国 RoHS 材料声明 (China RoHS Material Declaration) 137

Index 139

1

Introduction

Contents

About this Manual 7
Contacts 8

About this Manual

This manual is updated from time to time when printer functions and features are added or amended. You can find the latest edition on our website at www.zebra.com. If you require functions not found in this manual edition, please contact Technical Support for your region or the Zebra partner from which you purchased the printer.

2

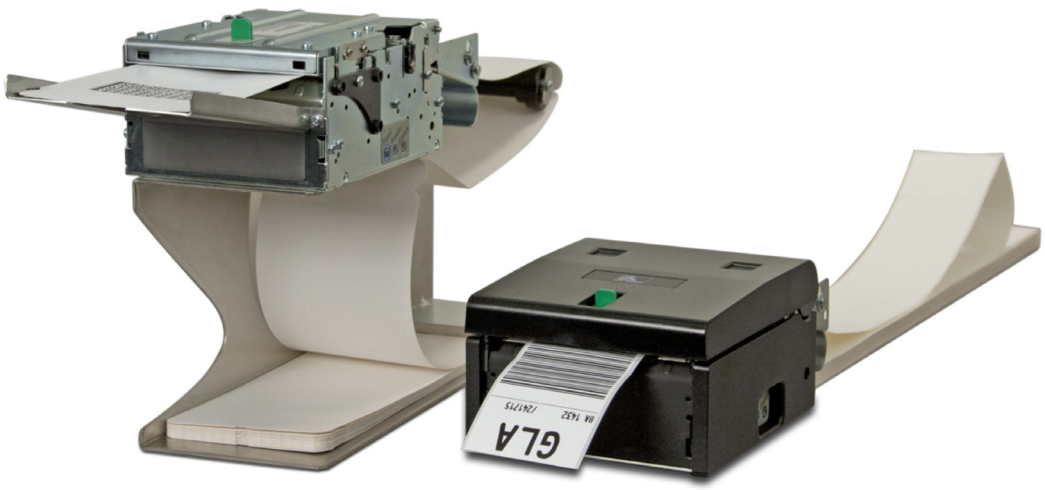
Product Presentation

Contents

TTP 2100 Series 9
Presenter 12
Controls 13

TTP 2100 Series

The TTP 2100 series of ticket printers are available both for Kiosk integration and Desktop use. These printers are Common Use Self-Service (CUSS) capable.



These ticket printers print on most ticket media from 50 mm to 82.5 mm wide using direct thermal printing. The ticket media can be up to 0.25 mm thick, fanfold, roll, or single cut handfed.

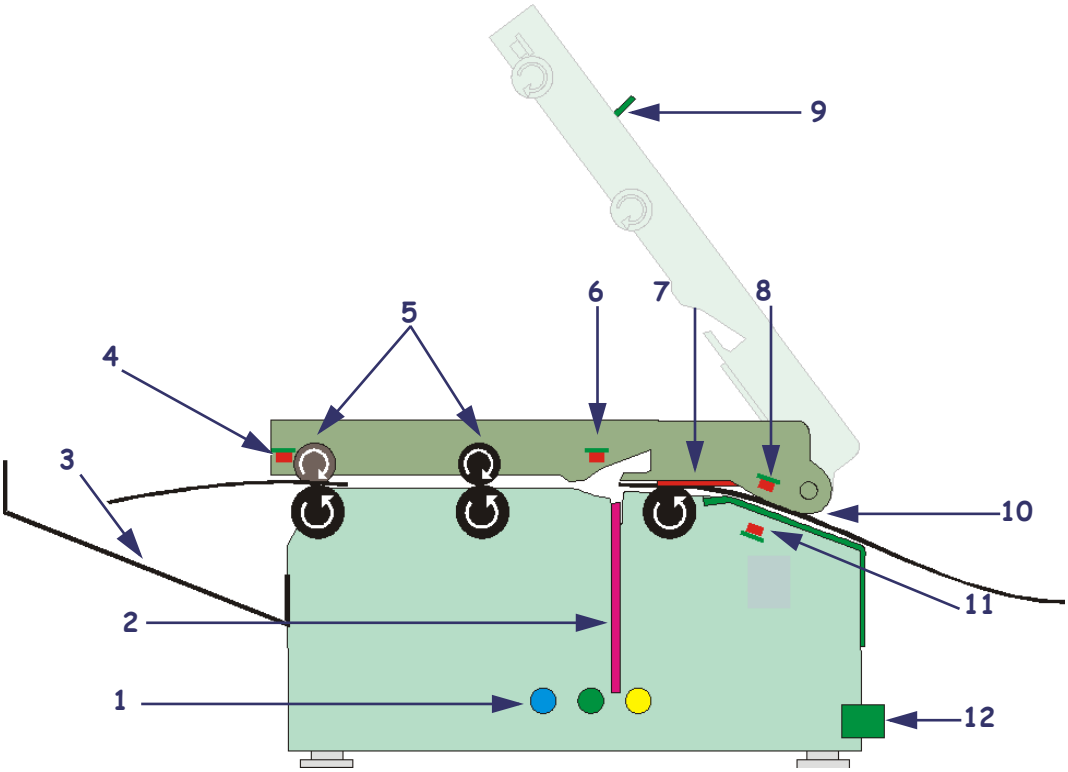
The printers have an integrated guillotine cutter, straight presenter, and control board. The print speed is up to 150 mm/s and the eject speed 300 mm/s to ensure high throughput.

The cut can be synchronized with:

- Gaps between tickets, or punched holes
- Black marks on the non thermal side of the ticket stock
- Ticket corner radius
- Label gaps (for adhesive labels on backing/liner)

You can also print fixed-length or variable-length tickets without synchronization. The presenter can be set to eject the ticket into a tray or hold it by the back edge until the customer takes it. The top can easily be opened to give the operator access to the paper path and printhead for maintenance purposes.

Figure 1 • Principle of Operation



1	Control panel on both sides
2	Cutter
3	Tickets fall (into tray)
4	Ticket sensor (taken/fallen)
5	Straight presenter
6	Ticket load sensor
7	Printhead
8	Upper media sensor (IR light source), adjustable sideways
9	Top release lever
10	Paper entry
11	Lower media sensor (IR light receiver), adjustable sideways
12	Control board

The upper media sensor is an IR light source that illuminates the media. The lower media sensor is an IR light receiver. These sensors must work together to sense media gaps or out-of-media conditions.

The printer is available with two different control boards; the TTP 2110 with serial interface and the TTP 2130 with USB interface.

A printer driver for Microsoft Windows™ is available, and the TTP 2130 interface is compatible with the Plug and Play standard.

The KPL control command language makes it easy to print directly from the ticket software without using a driver. This is especially useful for the serial interface version with its limited data transfer rate.

Presenter

The TTP 2100 does not loop the media. The presenter carries the media through the printer for presentation to the user.

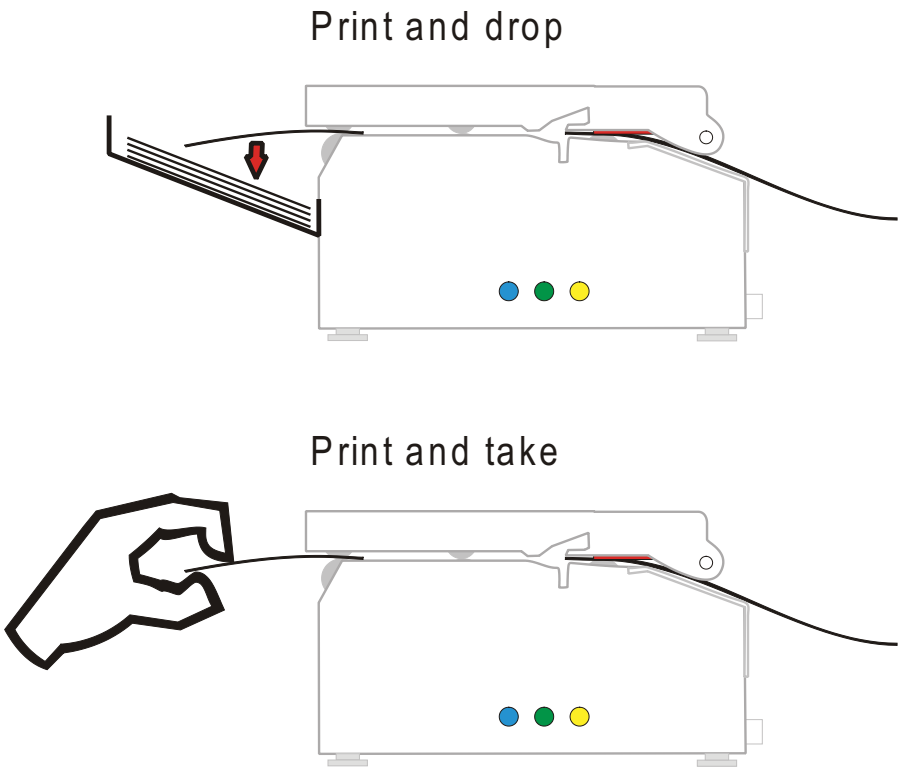
Eject Mode

The ticket is ejected after being cut. The printer is designed so that the ticket always drops down. A sensor is located at the exit of the presenter to ensure that the printer can verify that the ticket drops down. To enable this functionality, in the **Properties** dialog, click the **Device Settings** tab, and under **Presenter Settings** set the **Clear presenter** value to **Yes**.

Hold Mode

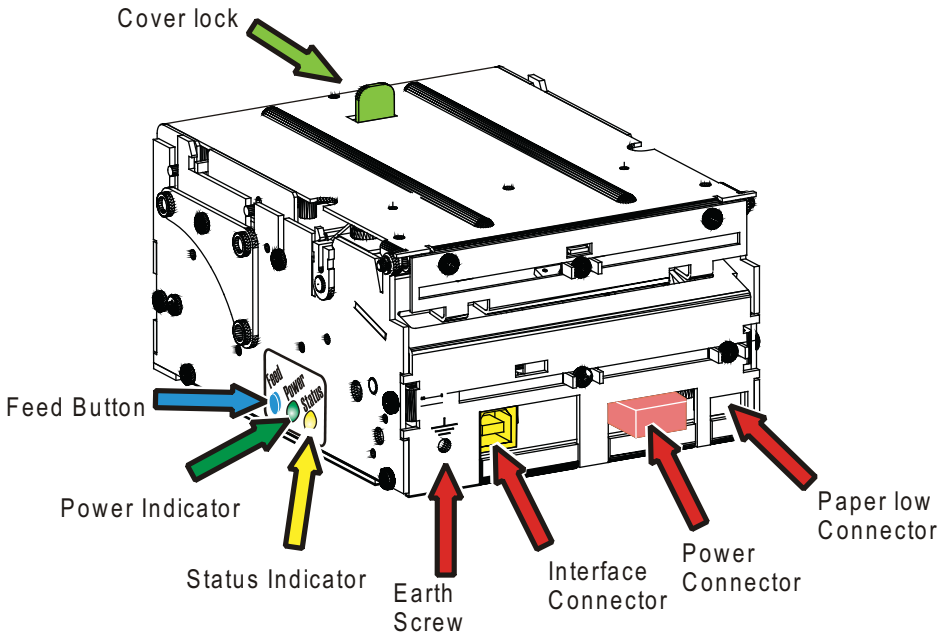
When presented, only the very end of the printout is held by the printer so the customer can easily take the printout no matter how long or short it is. If a customer is printing more than one ticket, the printer can detect when the first is taken and automatically print the next and hold that ticket until taken, continuing this process until all tickets have been printed.

Figure 2 • The Presenter



Controls

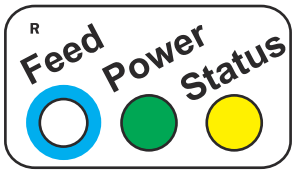
Figure 3 • Rear View



The buttons and indicators are duplicated on both sides of the printer so that they are easily accessible regardless of how the printer is installed.

Feed Button

The **Blue** Feed button has several functions:



- Press and release will feed, cut, and present a complete page.
- Any data in the print buffer will be printed.
  If the buffer is empty the page will be blank.
  In black mark mode, the page will be synchronized with the black mark.
- Press and hold Feed for three seconds to print a self-test printout (See Making a Self-Test Printout).
- With no paper in the printer, hold the Feed button pressed while closing the printhead to enter TOF mark calibration mode (see Print Setup).

Note • If the printer has firmware version 3.82 or lower, press and hold the Feed button while turning on the printer to print a self-test printout.

Power Indicator

When the green power indicator is illuminated, a 24V supply is connected to the printer.

Status Indicator

The status indicator has several functions:

- **ON constantly** — the printer is operational
- **Flash, flash, pause, flash, flash** — is the warning-code for paper low. The warning-code is reset automatically when the condition causing it is removed. This behavior is disabled by default but can be enabled by setting parameter 52 (Warning Level) to 1.
- **Flashes rapidly** — indicates error. Hold down the Feed button and the number of flashes will reflect the *status-code*.

Table 1 • Status Indicator Flash Codes

Number of Flashes	Description
1	Presenter jam, paper cannot be ejected
2	Cutter cannot return to home position
3	Out of paper
4	Printhead lifted
5	Paper did not reach presenter sensor in time
6	Temp error, printhead is above 60°C
7	Paper jam during present
10	TOF mark not found (on media load)
11	TOF mark calibration error
Fast flashes	Checksum error at firmware loading
Steady light	Wrong firmware type
Constantly off	Waiting for paper in TOF mark calibration mode

Status codes are reset:

- When the conditions causing them are removed.
- When the printer is power cycled (turned off and then on).
- For all paper jam conditions, after the jam is cleared, lifting and lowering the printhead.

3

Installation

Contents

Installing a Paper Guide 15
Top of Form (TOF) Sensor 19
Installation Considerations 21
Installing a Paper-low Sensor (Optional) 26
Connecting to the Computer 27
Connecting the Power 29
Making a Self-Test Printout 31
Installing a Printer Driver 33

Installing a Paper Guide

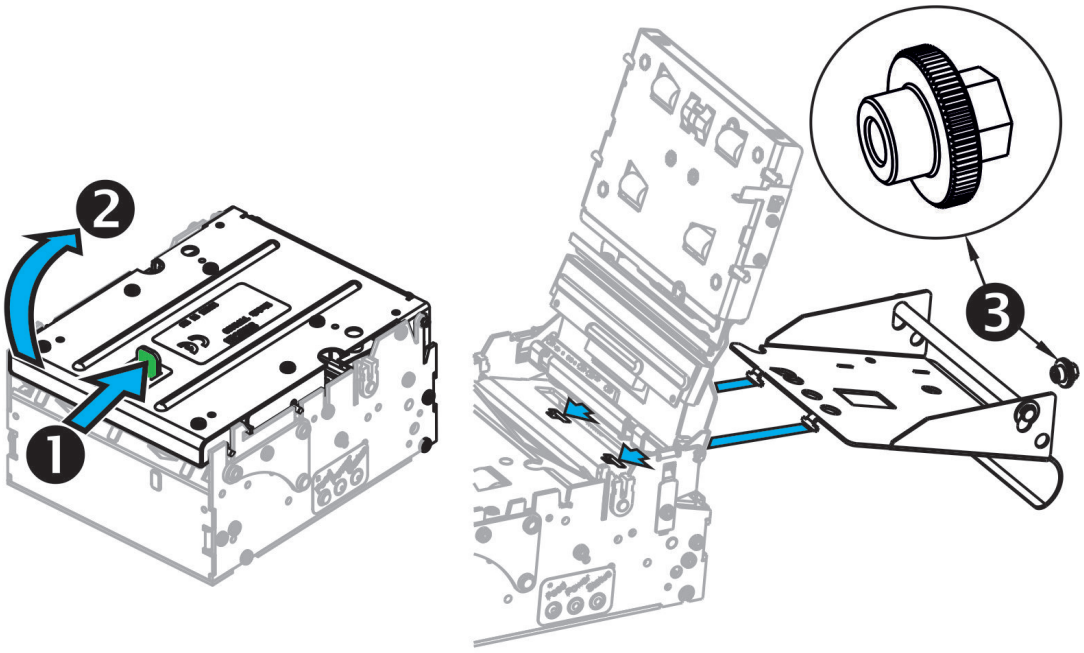


Caution • Before proceeding, always disconnect the printer from power to avoid the guide installation short circuiting the electronics in the printer. If the printer is installed in a Kiosk, then all Kiosk power should be turned off to prevent the screw or media guide bracket from accidentally falling into powered up Kiosk components (e.g., the screw or bracket may fall and bounce into the Kiosk components mounted adjacent to or mounted below the printer).

TTP 2100 printers are delivered without the paper guide fitted. TTP 2100 paper guides are available in widths ranging from 51 mm to 82.5 mm. A dual paper guide is available with a 54 mm and 82.5 mm paper path.

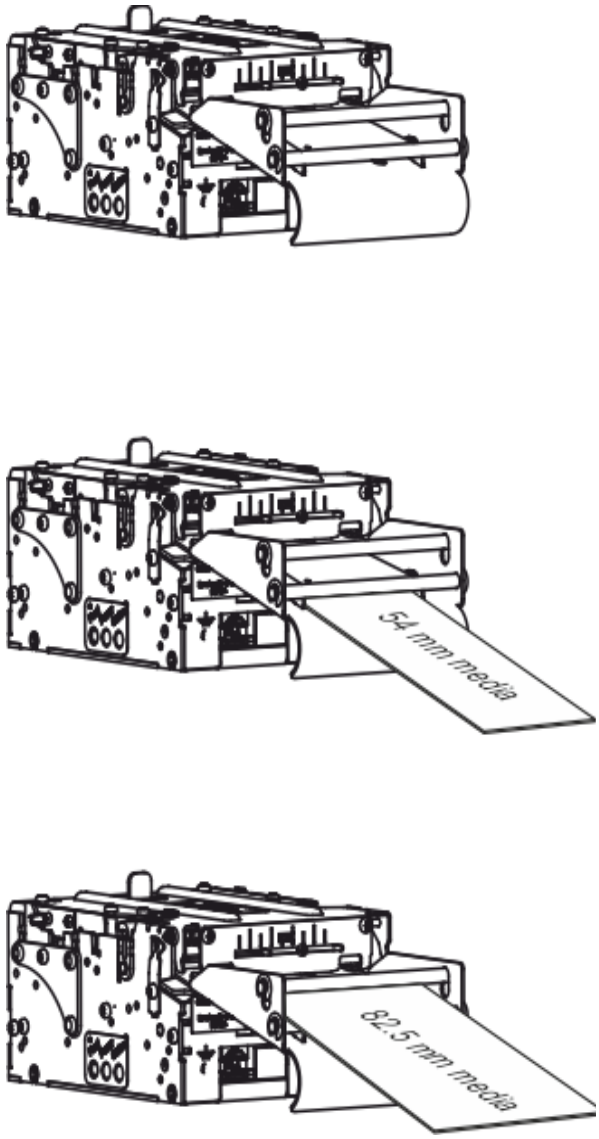
1. Push the green printhead open lever backwards.
2. Lift up the printhead. See Clearing Paper Jams.
3. Insert the T-shaped tabs of the paper guide into the “T”-holes, press the rear of the guide down, and using your fingers or a 5 mm wrench tighten the knurled nut.
4. Close the printhead.

Figure 4 • Fitting the TTP 2100 Paper Guide



When a guide is fitted, make an auto calibration (see *Calibrating the TOF Sensor* on page 20) with the ticket media that you are going to use in the printer. Most ticket media auto calibrate perfectly, and the printer is ready to use.

Figure 5 • TTP 2100 Dual Paper Guide

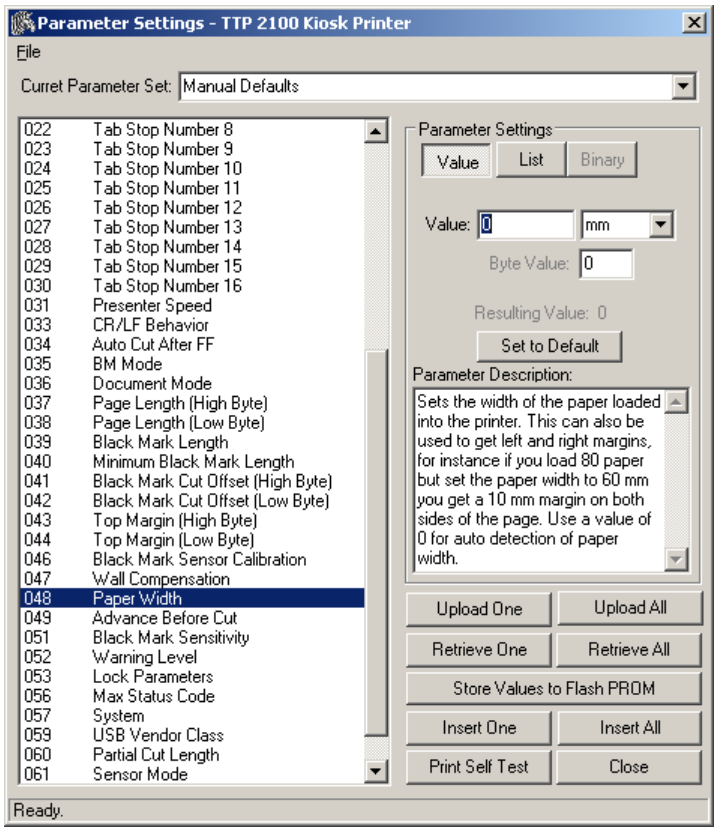


If you use the TTP 2100 Dual Paper Guide 01990-400 on your printer, you must calibrate twice (once in the wide paper path and once in the narrow paper path). The printer chooses the appropriate set of parameters based on which paper path contains ticket stock.

If auto calibration fails on your media, set up paper width parameter n48, and sensor selected parameter n63 to reflect your media. Then redo the auto calibration.

5. Start the utility program Zebra Toolbox. This application is available from www.zebra.com.

6. On the **Tools** menu, click **Parameter Settings**.



7. Select **048 Paper Width**, click **Value**, and enter the value in millimeters of the desired print width.

Paper Width	Setting
82.5 mm	n48=80
80 mm	n48=72
76 mm	n48=70
60 mm	n48=54
54 mm	n48=50
51 mm	n48=46

8. Click **Upload One**.

9. Select **063 BM Sensor** and enter the desired value. Recommended values are:

Value	When Used
0	Auto selects between 1, 2, 3, and 4 based on width of media loaded
1	(edge sensor) for ATB tickets without hole in the perforation
2	(center sensor) for ISO tickets, most other ticket types, and adhesive labels
3	17.5 mm from center sensor
4	12.5 mm from center sensor (for baggage tags according to IATA 740)

10. Click **Upload One**.
11. Click **Store Values to Flash PROM**.
12. Wait for the printer to buzz as a confirmation that the new value is stored.



Note • It is recommended that you run the auto calibration routine when the printer is taken out of the box and whenever you change the media. Running auto calibration after a head open event is recommended but is only necessary to insure proper first ticket registration.

Top of Form (TOF) Sensor

The TTP 2100 has a flexible top of form detection system. When delivered the printer is configured with fork (transmissive) sensor to detect holes/gaps between tickets. The holes/gaps should be in the paper center, 12.5 mm to the right of the center (Bag tags according to IATA resolution 740), 17.5 mm to the right of the center, or at the edge of 82.5 mm wide tickets (Boarding cards).

If the Top Of Form (TOF) mark is at a suitable position, an auto calibration routine configures everything for you.

You can force the printer to use a specific sensor. If you switch to reflex sensor for black mark detection by setting up the parameters in the printer to enable the use of non-standard sensor positions, you can physically move the sensor to other positions.

Selecting Fork (Transmissive) or Reflex (Black Mark) TOF Sensor

The TTP 2100 can use a fork (transmissive) sensor that looks for holes between tickets, or a reflex (black mark) sensor that looks for black marks on the back of the ticket stock. Sensor mode is selected with parameter n61, see Summary of Parameter Settings.

Calibrating the TOF Sensor

1. Open the printhead.
2. Remove the ticket stock.
3. Press and hold the Feed button, and then close the printhead (keeping the button pressed the entire time).
4. Release the button.

   The Status LED should be off.
5. Load ticket stock (slide it into the paper guide and let the printer auto load the paper).

Note • To ensure good calibration conditions, lightly press the ticket stock towards the bottom of the input guide during calibration.

The printer will forward the paper until it finds two TOF marks and then stop and save all TOF-mark parameters.

6. Open the printhead and remove the ticket stock.
7. Close the printhead and feed the tickets in through the paper guide again.

   The printer is ready for use.

Repeat this procedure if the calibration fails or if the printer is used with tickets that differ from the original specification.

Note • If you use the Dual guide 01990-400 on your printer, you must calibrate twice (once in the wide paper path and once in the narrow). The printer will choose the appropriate set of parameters based on which paper path contains ticket stock.

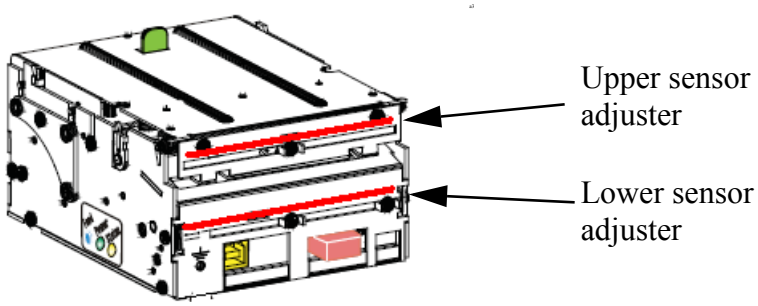
Positioning the TOF Sensor

Note • Moving the sensor and IR source require customized paper guides with holes for the new sensor position. Please contact Zebra Development Services (CAG) if your application requires a non-standard sensor position.

The sensor board containing the lower media sensor sits on a bracket that can slide left and right in a groove (see Figure 32, *Sensor Positioning,* on page 110). This bracket is located below the ticket entry. The IR light source (upper media sensor) sits on a similar bracket above the ticket entry. When delivered, the bracket is positioned to the far right. In this position Sensor 1 is at the right side ready to detect the corner radius of Boarding cards, Sensor 2 is at the center of the page, and Sensor 4 is 12.5 mm to the right of the center at the position determined for baggage tags in IATA resolution 740. To configure the printer for other papers that do not fall into any of the three categories, complete the following steps:

1. Loosen the screw holding the sensor 1 ½ turns.
2. Press the screw in with the screwdriver and carefully slide it to the new position making sure the cables to the sensor do not obstruct the movement.

3. Tighten the screw.
4. Move the IR light source (upper media sensor) to the same position, directly above the sensor.



Installation Considerations

The TTP 2100 Kiosk printer is for embedded applications and should be installed in an enclosure such as a self-service Kiosk.

Caution • NEVER use screws that go into the printer more than 4 mm! Longer screws will destroy the electronics inside.

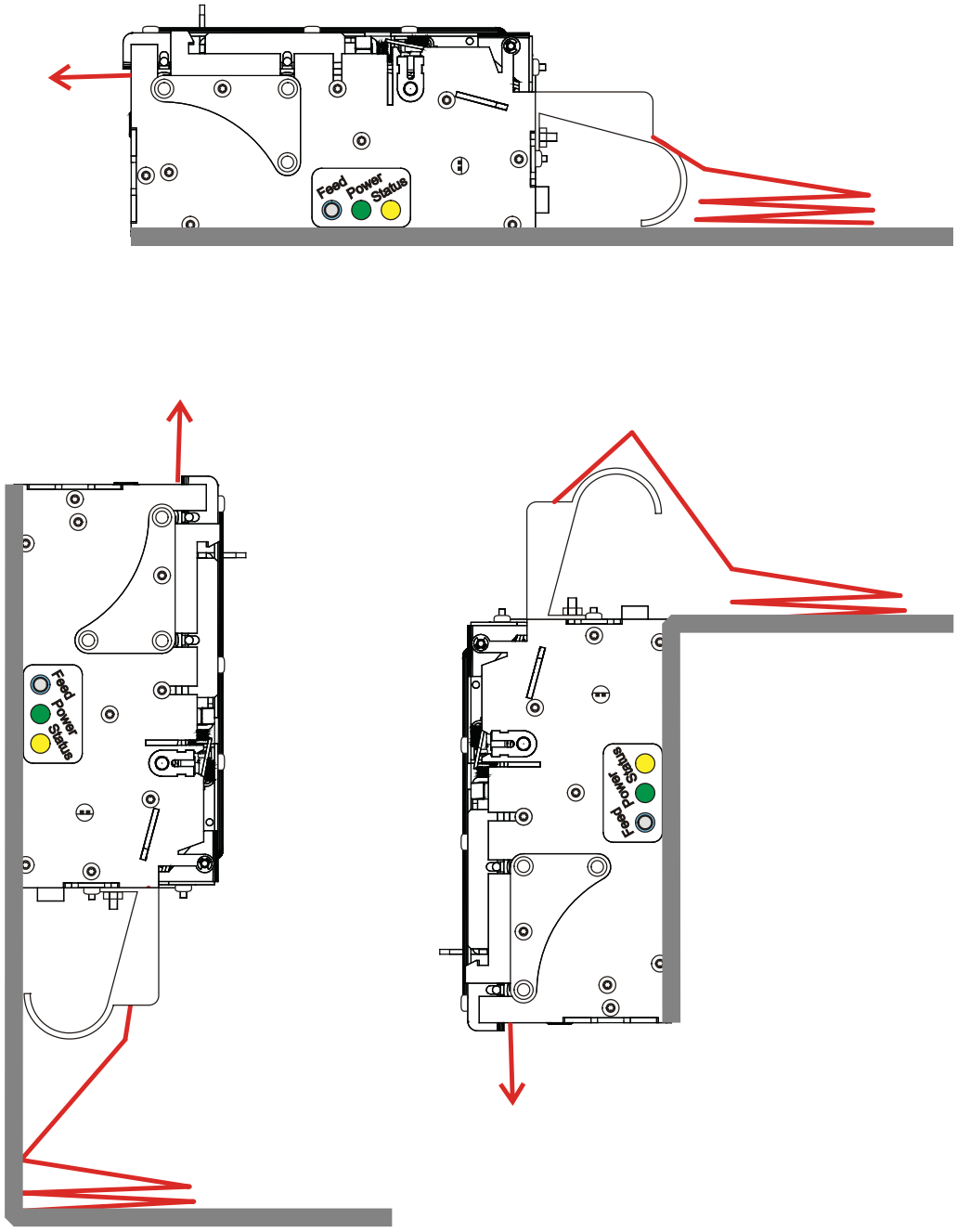
The TTP 2100 Desktop printer is a stand alone printer in a housing. The housings can be stacked so two or more printers can reside on top of each other to save space.



Orientation

The TTP 2100 can be installed at any angle. Horizontal is the most common use but vertical with the ticket presenting upwards can be used if you want the ticket to come up from the desk surface. Vertical with the ticket presented downwards can be used if you want to stack many tickets before picking them up.

Figure 6 • Printer Installation Orientation Options

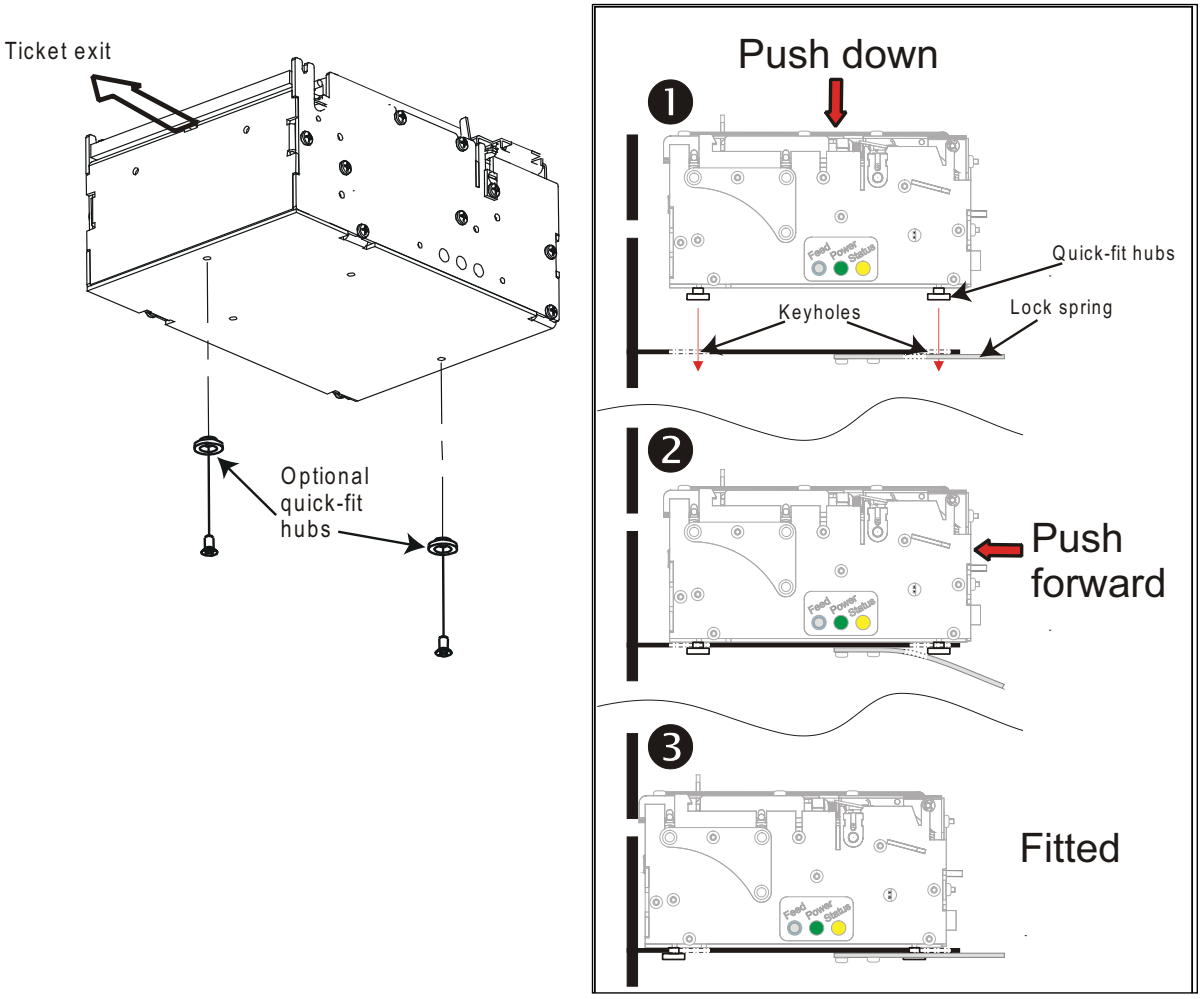


Quick-Fit Hubs

The printers attach to the Kiosk in two ways:

- Using two screws
- Using slides with leaf spring retainers and the quick-fit hubs

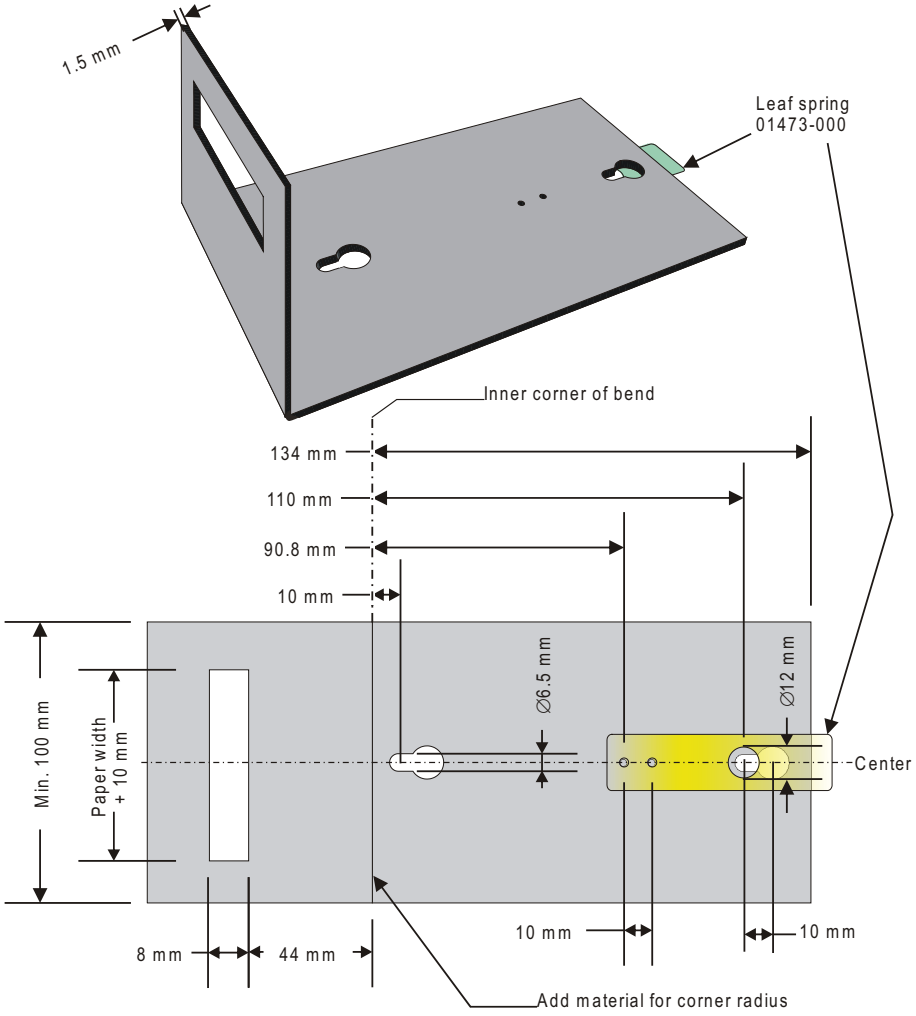
Figure 7 • Front, Bottom View



Design Your Own Mounting

The illustration below gives an example of a printer-mounting shelf. See Dimensions, and the 3D solid models and outline drawings for CAD that are available on www.zebra.com.

Figure 8 • Example of a Simple Shelf for Fastening a Standard Printer Using Quick-Fit Hubs and a Leaf Spring Retainer (Order No. 01473-000)



Additional space is required for paper loading and paper jam removal, Consider mounting the printer on a movable platform so that the printer can be maintained outside the printer enclosure.

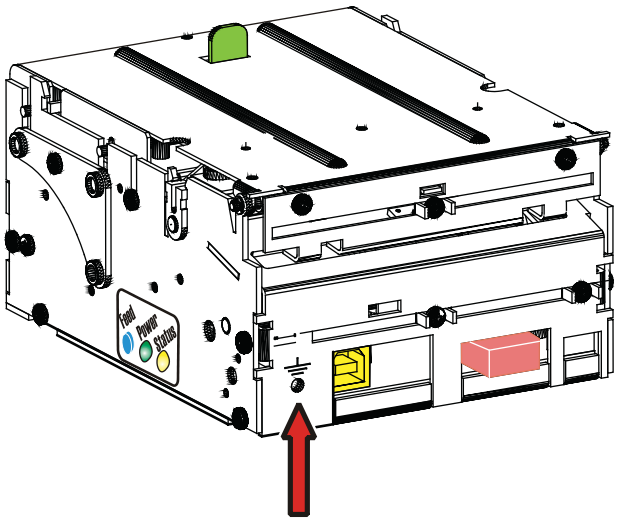
We recommend that you make the output slot 97 mm wide. This way you will be able to use all paper widths that the TTP 2100 series of printers can handle.

Caution • NEVER use screws that go into the printer more than 4 mm! This will destroy the electronics inside.

Electrostatic Discharges and Earth Currents

Preventing ESD and earth currents from affecting the printer operation requires proper connection of the printer chassis to protective earth through a mounting platform or through a separate earth conductor. A threaded hole for an M4 earth screw is provided on the back of the printer. Use an M4 x 10 screw and two lock washers when fastening the ground cable.

Figure 9 • Location of Earth Grounding Screw



Note • An optional antistatic brush can be fitted to the front of the printer if required.

Ambient Light

There is an optical sensor at the paper exit at the front of the printer.

To ensure proper printer operation, design the Kiosk so that it prevents direct sunlight or light from indoor lamps from reaching the sensor through the paper exit.

Installing a Paper-low Sensor (Optional)

A paper-low sensor alerts the system that the media stock level is running low. The paper-low sensor works with paper rolls and fanfold media.The purpose of this sensor is to get an early alert so that you can replace the ticket stock in time in remotely located Kiosks.

The paper-low sensor operates by reflecting a light against the side of a media roll to detect it. When the media is low, no light is reflected.

The printer automatically reads the paper-low sensor to check media status every time a printout is cut. After three successive readings show that no paper is present at the sensor, the status is set to paper low which alerts the system that the media needs to be replaced. Three successive readings are required to prevent false paper low readings if the side of the media roll is not clean. When a new roll of media is installed, the printer reads the sensor when the printout is cut and the paper-low status is changed to paper present or paper not low.

Roll holders supplied by Zebra can be equipped with paper-low sensors. Attach the sensor and connect the cable to the paper low connector at the back of the printer.

Figure 10 • Paper-low Sensor Connection

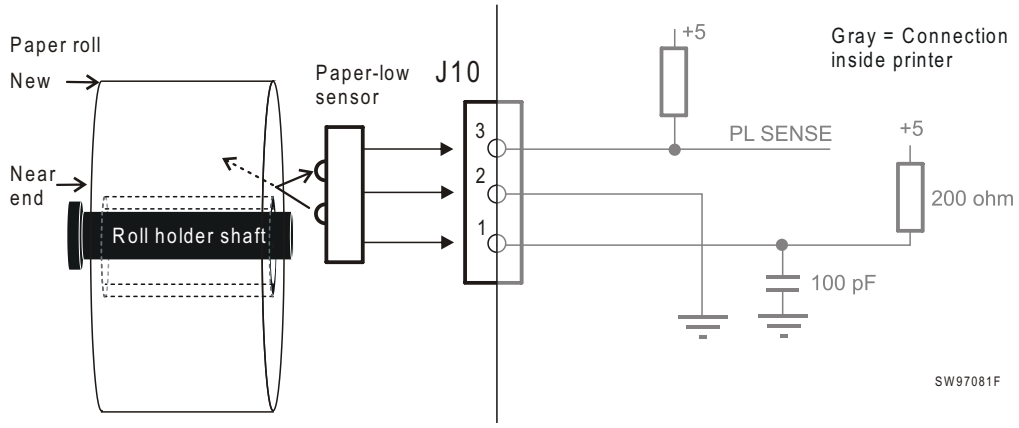
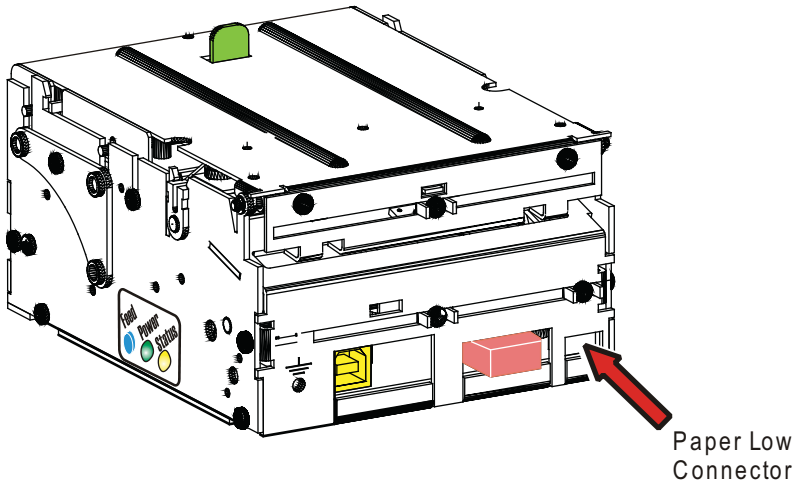
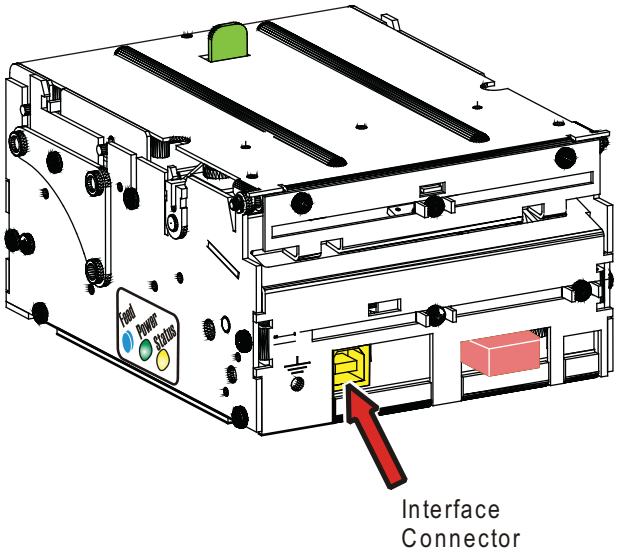


Figure 11 • Location of Paper-low Connector



Connecting to the Computer

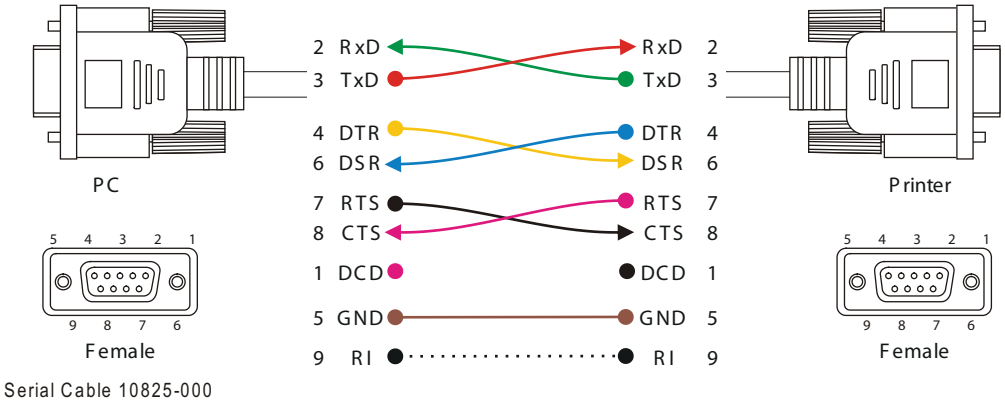
Figure 12 • Location of Interface Connector



TTP 2110

Connect a Zebra serial cable (part No. 10825-000) between the printer and the computer to be used. We strongly recommend using the Zebra cable because many incompatible cables are available, which may cause communication problems.

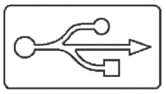
Figure 13 • Serial Interface Cable 10825-000.



Dotted leads are not connected in the printer. To be able to connect the cable in any direction, make symmetrical cables.

TTP 2130

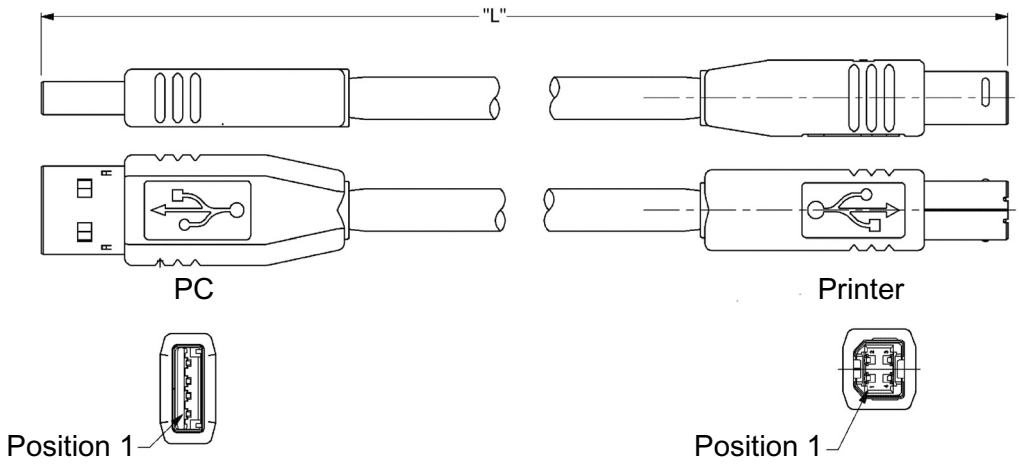
Connect the printer to the USB port of the computer or the USB hub to be used. USB connectors can be recognized by the following symbol:



The connector on the printer is a 4-pin USB type B connector. See Table 4 for pin assignment.

A suitable cable is available from Zebra, part number 105850-028.

Figure 14 • USB Cable with Type A and Type B Connectors



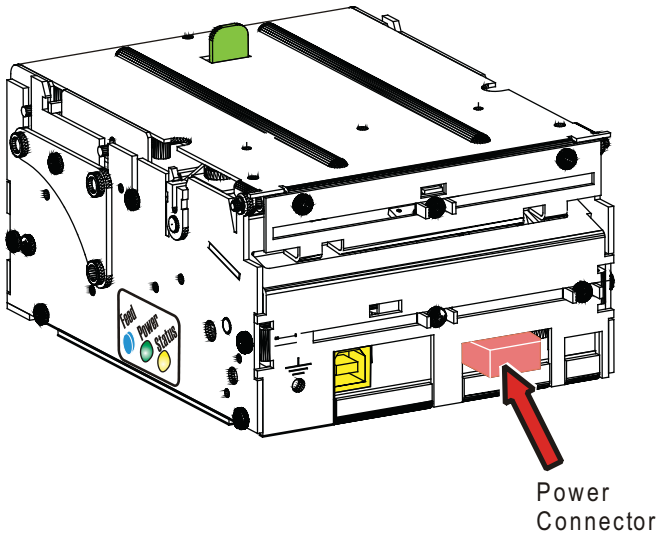
Connecting the Power

Caution • Using a non-Zebra power supply may cause excessive EMC interferences and void the EMC certifications of the printer.

Caution • To avoid electrical shock and printer damage, wiring of a non-Zebra power supply should only be done by qualified service personnel. Use ONLY a power supply which meets the following minimum requirements:

- 24 VDC ±5%
- 70W (2.92A)

Figure 15 • Location of Power Connector



Caution • On power supplies with line voltage selector, make sure it is set to your local line voltage.

Using the appropriate Zebra power supply for TTP 2100 Desktop, or Embedded (Power Supply):

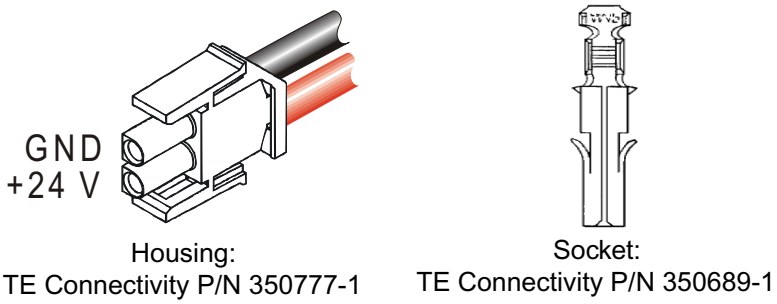
1. Connect the cable from the power supply to the power connector on the back of the printer.
2. Connect the power cable to the line outlet.
3. Turn ON the power.

In Kiosk applications you may draw power from a common PSU in the Kiosk if the characteristics are suitable. In such a case, cables that fit the connector on the back of the TTP 2100 are available from Zebra (see Part Number List on page 133). If you make cables of your own, connect the voltages according to the following illustration.

Note • Protective ground and minus output should *not* be interconnected in the power supply.

A 600 mm power cable is available from Zebra. Use this if you have a common power supply for the entire Kiosk and power the printer from there. Use the connector shown below if you want to make cables of other lengths. At the printer end of the cable, use a TE Connectivity Mate-N-Lok connector housing and two contact-sockets.

Figure 16 • Power Connection



Housing:
TE Connectivity P/N 350777-1

Socket:
TE Connectivity P/N 350689-1

Table 2 • Current Consumption

Mode	58-60 mm paper width	80-82.5 mm paper width
Idle	150 mA	150 mA
Standard text printing	0.7 A average	1 A average
All black printing	4 A	6 A

Making a Self-Test Printout

A Self-Test Printout provides a printout showing information specific to the printer, including:

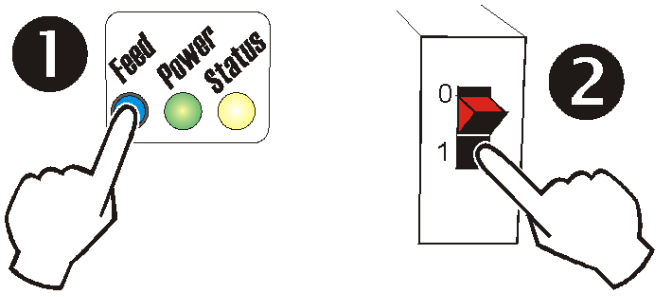
- Firmware version
- Control board (PCA) revision
- Paper width
- Serial number
- Installed fonts and logotypes
- Parameter settings
- Barcode support

To make a Self-Test Printout:

1. Enter Self-Test Mode using one of the following methods:

If…	Then…
The printer has firmware version 3.83 or higher	Press and hold the Feed button for 3 seconds.
The printer has firmware lower than version 3.83	**a.** Press and hold the Feed button just after closing the print head. **b.** See Figure 17. Press and hold the Feed button (1) while turning on the power (2) to the printer. **c.** Hold down the Feed button until printing starts. Each successive time the Feed button is pressed will produce an additional Self-Test printout until Self-Test Mode is exited. **d.** Exit Self-Test Mode by power cycling the printer (turning the power off then on again). If the power switch is not easily accessible, open and close the print head.

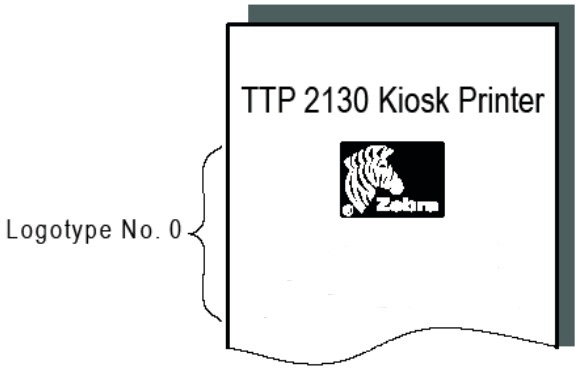
Figure 17 • Locate the Feed Button and On/Off Switch



Customizing the Self-Test Printout

The self test printout starts with a text line, and then a Zebra logotype. This logotype is just a printout of logotype No. 0, so if you want to personalize the self test printouts in your installation, delete all logotypes and store your own logotype as No. 0 (see Logotypes).

Figure 18 • Logotype No. 0 is Printed on the Self-Test Printout



Installing a Printer Driver

The Microsoft Windows™ printer driver for the TTP 2100 is available on the Zebra website at www.zebra.com/drivers. Please follow the installation instructions in the *Zebra Kiosk Printer Driver User Guide* available at www.zebra.com/support.

Notes •

4

Operation

Contents

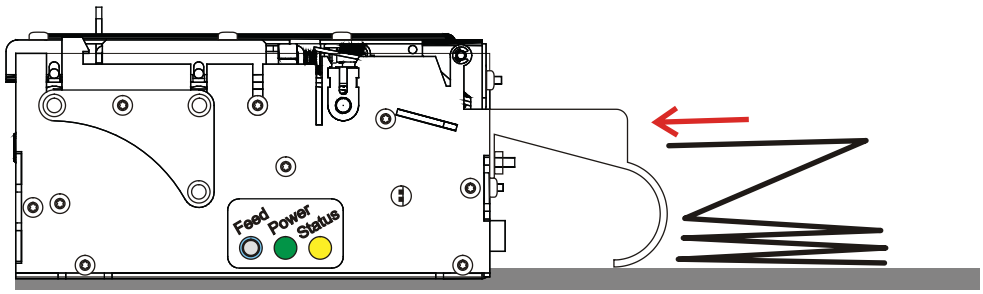
Loading Fanfold Ticket Stock 35
Installing a Paper Roll 36
Clearing Paper Jams 38

Loading Fanfold Ticket Stock

1. Turn the tickets so that the surface to be printed (temperature sensitive side) faces upwards. Put the first ticket on the input guide and slide it up the guide into the printer.
2. The printer will feed the paper, locate the edge and reverse to printing position.
3. When ready, the yellow status led will be ON indicating that the printer is ready to be used.

Note • Remember that the thermal coating should be upwards and black marks (if used) should face down. The printer will automatically load the tickets when the sensors detect a ticket is loaded.

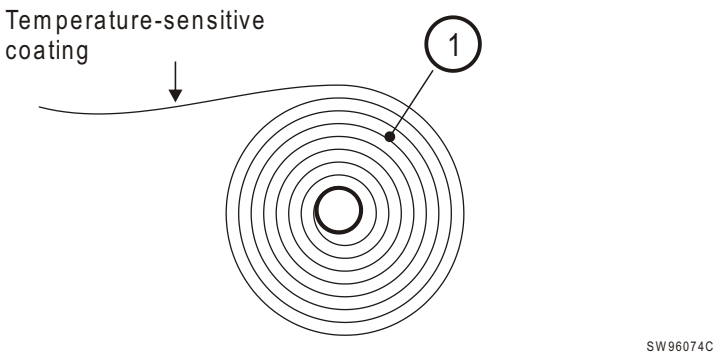
Figure 19 • Loading Ticket Stock



Installing a Paper Roll

1. Turn the new paper roll as shown. The paper should be inserted into the printer with the temperature-sensitive side up so that the paper leaves the roll from the top.

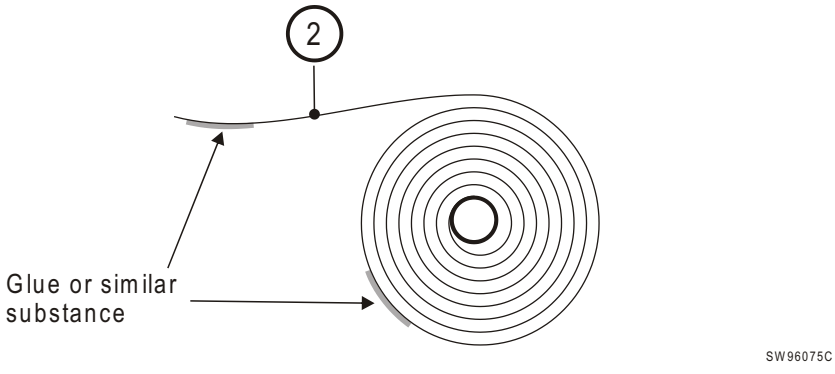
Figure 20 • Installing a Paper Roll



2. Tear off a full turn of the paper from the new paper roll.

Caution • This is important since the outer end of the paper is usually fixed to the roll with some type of glue or self-adhesive substance that might otherwise cause paper jam or even printhead damage.

Figure 21 • Remove Outer Layer of Paper Roll



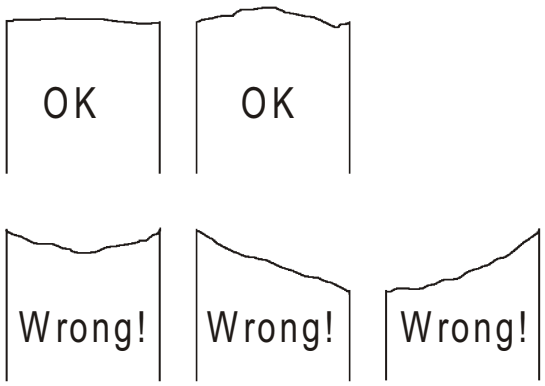
3. Make sure the printer is turned ON.

4. Insert the ticket stock through the paper entry opening at the back of the printer.

Note • The ticket sensor is at the center of the print width. If the ticket edge is torn off in such a way that the sensor does not see it, auto load will not be triggered. If so, reshape the edge so that the sensor sees the ticket stock.

5. Press the **Feed** button so that the printer feeds, cuts, and ejects a page. This ensures that the first ticket printed will have a straight edge.

Figure 22 • Example of Bad Page Edges

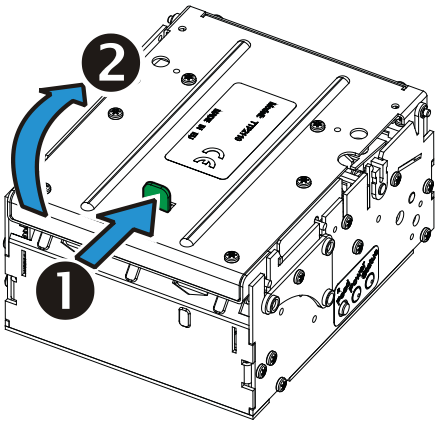


Clearing Paper Jams

Should a paper jam occur, follow the procedure below:

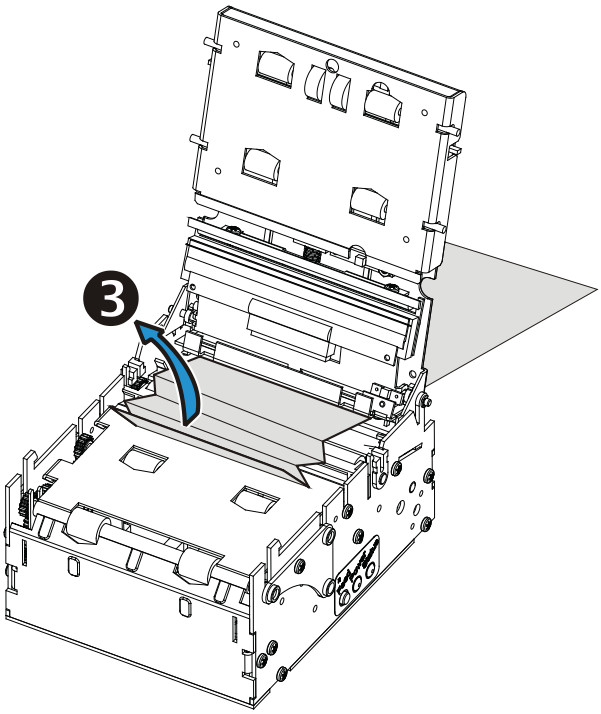
1. Open the printer lid.
   a. Press the green release lever toward the rear of the printer.
   b. Lift the lid.

Figure 23 • Opening the Lid



2. Remove all jammed paper, make sure the paper path is clear, and close the lid.

Figure 24 • Remove Paper Trash



5

Programming

Contents

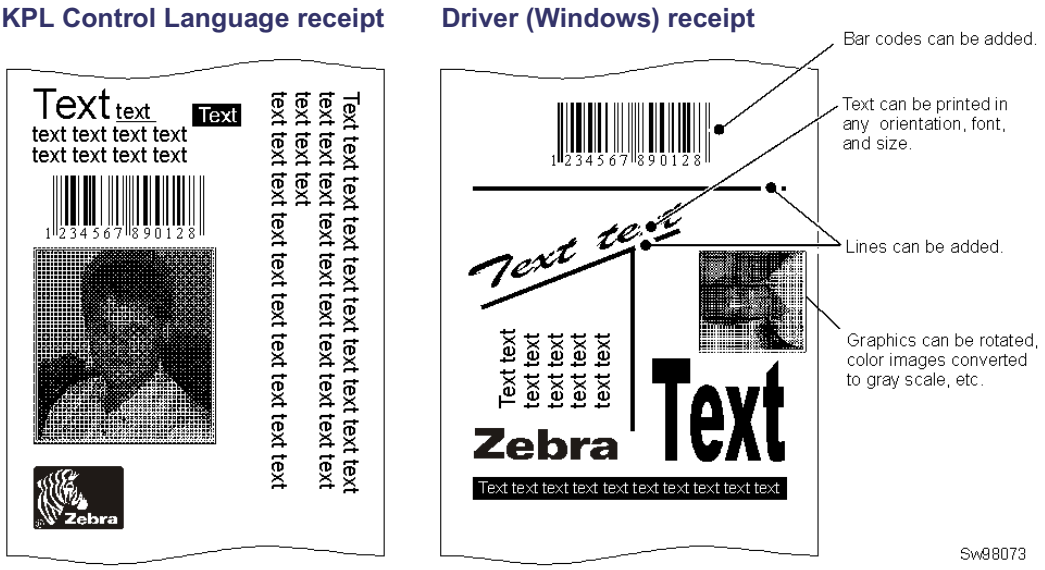
Programming Overview 40
How the Commands are Described 41
Summary of Control Codes and Escape Sequences 43
Software Command Syntax 46
Font Loading 83
Logotypes 85
Status Reporting 87

Programming Overview

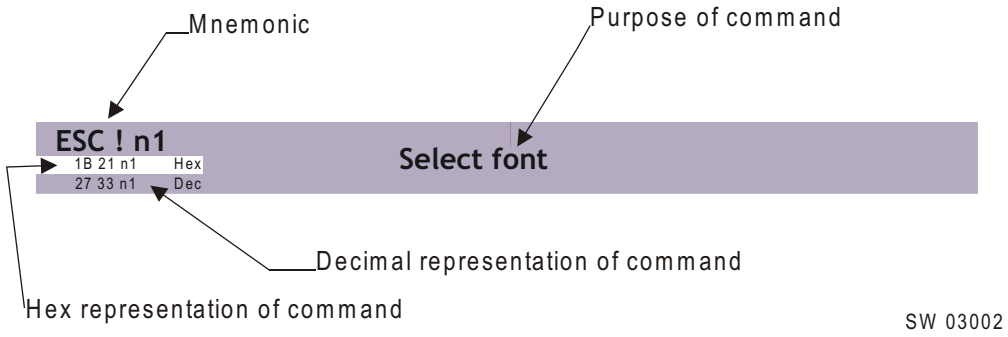
There are two ways of generating a printout with the TTP 2100 printer: using the KPL control language or using a printer driver.

KPL Control Language	When operating in this mode, you have direct control over what the printer does using KPL command sequences. The printer has two operation modes you can choose from. In variable page mode, the printer can act as a simple word processor, printing text that it receives. It can also print some types of barcodes and basic graphics in this mode. The selection of fonts and barcode types that are available are limited to what is stored in the flash PROM and the firmware of the printer. In this mode, information is printed in the same sequence as it is received. In fixed page mode, you can place rotated text, barcodes, images, and ruled lines. This mode provides more flexibility than variable page mode, but is limited by available printer memory. Printout elements can be specified in any order. You instruct the printer when your layout is complete, and it is all printed at once. Selection of the mode is controlled by the setting of parameter n36. (Refer to Document Mode for more information about parameter n36) Use the Zebra Toolbox (available from www.zebra.com) to easily build text oriented designs.
Printer Driver	TTP 2130 printers can print documents through a driver. When a Windows driver is used, you can use any Windows program to design the ticket with text, graphics, barcodes or whatever you want to print and in any orientation. When using a driver, printout is not limited by printer memory. The Windows driver issues all the necessary commands. By setting up printing preferences in the driver you select how the printer should cut and present the printout.

Figure 25 • Printout Styles



How the Commands are Described



Mnemonic

Is the popular command name that should be easy to remember.

Hex

Give the command in hex representation.

Decimal

Give the command in decimal representation.

Values

n1, n2, etc. represent values that you specify to control how the command behaves. These are different for each command and are explained in the text that follows each command description.

Examples

Command examples are formatted in `Courier` and typed in the same way as used in the Zebra Toolbox:

```
<ESC>&P<1><19>
```

Where `<ESC>` means the escape character 27 decimal (hexadecimal 1B). Numbers between less-than and greater-than characters, for example `<1><19>`, means 1 and 19 decimal. When the numbers indicate a hex value, a leading h and then a space is placed before the hex value (`<h 1><h 13>`).

Example • `<65>, <h 41>` and `A` are three different ways of expressing the character A.

Two-Byte Character Definitions

Some commands and parameters are used with a two-byte value definition because the internal structure of the printer's firmware limits access to values greater than 255.

To represent values greater than 255 in this two-byte format, divide the value by 256. The whole number (quotient) is the value of the leading byte and the remainder (modulo) is the value of the trailing byte.

Example • To represent 731 in two-byte notation, divide 731 by 256.

731 ÷ 256 = 2 with a remainder of 219 (2 x 256 + 219 = 731)

Therefore, the two-byte representation of 731 is <2><219>.

Summary of Control Codes and Escape Sequences

Command	Hex	Decimal	Function	Page
BS	08	8	Backspace	51
CAN	18	24	Cancel	51
CR	0D	13	Carriage Return	52
EM n1	19 n1	25 n1	Enforced Clear Presenter	67
ENQ	05	5	Clear Presenter	67
ESC ACK n1	1B 06 n1	27 6 n1	Acknowledge Marker	82
ESC | 5	1B 7C 05...n2-nx	27 124 5...n2-nx	2-D Barcode Print	57
ESC ! n1	1B 21 n1	27 33 n1	Select Font	48
ESC #	1B 23	27 35	Calibrate TOF Sensor	46
ESC & 000	1B 26 00	27 38 0	Load Font	69
ESC & 001	1B 26 01	27 38 1	Load Logotype	68
ESC & 004	1B 26 04	27 38 4	Store Current Parameter Values	68
ESC & b n1 n2 n3	1B 26 62	27 38 98	Set bit field parameters	69
ESC & C	1B 26 43	27 38 67	Erase All Fonts	69
ESC & D	1B 26 44	27 38 68	Erase Fonts 4 to 7	70
ESC & F	1B 26 46	27 38 70	Recall Parameter Profile	70
ESC & L	1B 26 4C	27 38 76	Erase All Logotypes	68
ESC & P n1...n2	1B 26 50 n1...n2	27 38 80 n1...n2	Set Parameter Value	70
ESC & s n1	1B 26 73	27 38 115	Load SPI Slave Firmware	71
ESC & S	1B 26 53	27 38 83	Return to Saved Values	71
ESC ?	1B 3F	27 63	Reset (Full)	68
ESC @	1B 40	27 64	Reset (Initialize)	68
ESC b n1...n5	1B 62 n1...n5	27 98 n1...n5	Print Bitmap at XY-Position	60
ESC B n1	1B 42 n1	27 66 n1	Bold	49
ESC B C	1B 42 43 n1	27 66 67 n1	Barcode Clear	57
ESC B S n1...n11	1B 42 53 n1...n11	27 66 83 n1...n11	Barcode Field Specify	55
ESC BW	1B 42 57 n1	27 66 87 n1	Barcode Write	56
ESC d n1	1B 64 n1	27 100 n1	Make n Linefeeds	52
ESC ENQ 1	1B 05 01	27 5 1	Status Enquiry	72

Command	Hex	Decimal	Function	Page
ESC ENQ 2	1B 05 02	27 5 2	Paper-Near-End Enquiry	74
ESC ENQ 4	1B 05 04	27 5 4	Fonts and Logotype Enquiry	75
ESC ENQ 5	1B 05 05	27 5 5	Sensor Enquiry	76
ESC ENQ 6	1B 05 06	27 5 6	Status Report	77
ESC ENQ 7	1B 05 07	27 5 7	Firmware-Version Enquiry	78
ESC ENQ 9	1B 05 09	27 5 9	Serial-Number Enquiry	78
ESC ENQ 10	1B 05 0A	27 5 10	Control Board Revision Enquiry	78
ESC ENQ 11	1B 05 0B	27 5 11	Head Temperature Enquiry	79
ESC ENQ 12	1B 05 0C	27 5 12	Bootware Version Enquiry	79
ESC ENQ c	1B 05 63	27 5 99	Device ID Enquiry	80
ESC ENQ E	1B 05 45	27 5 69	Read Extended Status	80
ESC ENQ H	1B 05 48	27 5 72	Read Printer Info	80
ESC ENQ P n1	1B 05 50 n1	27 5 80 n1	Parameter-Setting Data Enquiry	81
ESC ENQ = ?	1B 05 3D 3F	27 5 61 63	Media Loaded into Tray Enquiry	81
ESC FF n1	1B 0C n1	27 12 n1	Eject (Run Presenter)	67
ESC g n1...n5	1B 67 n1...n5	27 103 n1...n5	Print Logotype	62
ESC h n1	1B 68 n1	27 104 n1	Text Height	50
ESC i n1	1B 69 n1	27 105 n1	Italics	49
ESC j n1	1B 6A n1	27 106 n1	Paper Reverse	64
ESC J n1	1B 4A n1	27 74 n1	Paper Advance	64
ESC L n1	1B 4C n1	27 76 n1	Print Logotype at Current Position	63
ESC N n1	1B 4E n1	27 78 n1	Align Text	48
ESC NUL	1B 00	27 0	Load Firmware	72
ESC o n1	1B 6F n1	27 111 n1	Text and Logotype Orientation	47
ESC p	1B 70	27 112	Print	63
ESC P n1	1B 50 n1	27 80 n1	Print Self-Test Printout	64
ESC Q n1 n2	1B 51 n1...n2	27 81 n1...n2	Quick Advance	65
ESC r n1...n9	1B 72 n1...n9	27 114 n1...n9	Print Ruler Line	61
ESC RS	1B 1E	27 30	Cut Only, No Eject	66
ESC s n1 data	1B 73 n1	27 115 n1	Send Dot-Line, 203 dpi	61
ESC t n1...n5	1B 74 n1...n5	27 116 n1...n5	Print Text at XY	51

Command	Hex	Decimal	Function	Page
ESC T n1	1B 54 n1	27 84 n1	Reversed/Inversed Text	49
ESC u n1	1B 75 n1	27 117 n1	Underline	50
ESC w n1	1B 77 n1	27 119 n1	Text Width	50
ESC Z	1B 5A	27 90	Go to Next Top of Form	46
FF	0C	12	Form Feed	53
HT	09	9	Horizontal Tabulation	53
LF	0A	10	Linefeed	52
RS	1E	30	Cut and Eject	65
US	1F	031	Partial Cut (Unit Separate)	66

Note • In all responses from the printer the most significant byte (MSB) is transmitted first.

Software Command Syntax

The commands in this section are grouped after what they do, and these groups are sorted in a theoretical usage sequence. It starts with commands for specifying the printed page—through text-and-graphics commands—to cut-and-present commands. System and status commands are presented at the end.

Black Mark (Top-of-Form) Commands

See Aligning Preprint and Thermal Print.

ESC

Hex	Decimal
1B 23	27 35

Calibrate TOF Sensor

When the printer is not in black mark mode, the calibration measures the out of paper level (parameter 58) and the whiteness of the paper.

In Black Mark Mode, it also determines if it should trigger on black marks or holes, then measures the contrast of the mark and distance between marks, then sets parameters n37-n40, n51, n57 bit 3, and n58 to suitable values for the analyzed ticket.

To make the calibration permanent, send <ESC>&<4> to store parameter values.

Note • If black mark calibrations fails, the printer will indicate error code 11 by blinking 11 times when you press and hold the Feed button, and by answering <NAK><11> to the status enquiry.

ESC Z

Hex	Decimal
1B 5A	27 90

Go to Next Top of Form

In black mark mode, an <ESC>Z starts looking for a black mark at the current position and continues for one page length. If no black mark is found, bit 3 in status byte 1 is set to 1 and the printer will report <NAK><10> on the next status query.

When black mark mode is disabled, <ESC>Z will perform a form feed.

Text Commands

Text received by the printer is printed with the currently selected font and font attributes. Text exceeding the page width is wrapped with the line spacing selected.

ESC o n1

1B 6F n1	Hex
27 111 n1	Decimal

Text and Logotype Orientation

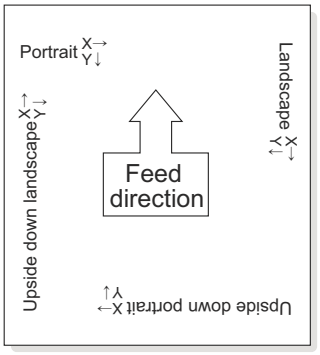
Changes the orientation of text and logotypes in Fixed Page Mode (n36=0).

n1 = 0	Gives portrait orientation
n1 = 1	Gives landscape orientation
n1 = 2	Gives upside down portrait orientation
n1 = 3	Gives upside down landscape orientation

Portrait and landscape or upside-down portrait and upside-down landscape can be mixed on the same printout (see Figure 26, *Printing Orientations,* on page 47). There are four cursors, one for each orientation. The cursor always starts at the top left corner of the selected orientation. Looking at the paper when it exits the printer, the portrait cursor is at the top left corner of the printout, moving to the right as text is typed, while the landscape cursor is at the top right corner, moving downwards, etc.

Note • The printer is capable of printing all four orientations on a single fixed page. This is valid in firmware versions 3.90 and higher.

Figure 26 • Printing Orientations




```
<ESC>&P<36><000><* Document Mode: Fixed>
<ESC>o<0>Portrait<LF>
<ESC>o<1>Landscape<LF>
<ESC>o<2>Upside down Portrait<LF>
<ESC>o<3>Upside down Landscape<LF>
<RS>
```

ESC N n1

1B 4E n1 Hex
27 78 n1 Decimal

Align Text

Changes the alignment of text, barcodes, and logotypes printed with <ESC>L on the current line; on subsequent lines, it defaults back to Left align. The alignment can be changed multiple times per text line.

n1 = 0	Left
n1 = 1	Center
n1 = 2	Right

ESC ! n1

1B 21 n1 Hex
27 33 n1 Decimal

Select Font

This command selects one of the printer's eight installed fonts. The font design depends on which fonts have been loaded into the printer's flash PROM. Make a test printout to see which fonts are available in your printer.

n1 = 0	Normal font (font 0)
n1 = 1	Font 1
n1 = 2	Font 2
n1 = 3	Font 3
n1 = 4	Font 4
n1 = 5	Font 5
n1 = 6	Font 6
n1 = 7	Font 7



Note • For information on loading fonts, see Font Loading.

This command performs the same function as setting parameter n14, Font Selection. Refer to Font Selection for more information.

If a line of text is too long to be printed due to the font, position, print width, or any other factor, the text line will be automatically wrapped. If wrapping occurs, any alignment command is canceled. Different fonts can be used on the same line.

Selecting an empty font location will set bit 4 of byte 1 in the <ESC><ENQ><6> response to 1. The printer will also return a <NAK><12> on the next <ESC><ENQ><1> enquiry. This <NAK><12> is a one-time error that will clear after read.



Note • If more than 379 characters are sent to the printer before an LF, the text buffer is printed automatically. Each font or text style change consumes two bytes in this buffer. The text is formatted based on the formatting commands as they were received.

ESC B n1 — Bold

1B 42 n1 Hex
27 66 n1 Decimal

Bold command works best with normal character width. With higher widths, the effect of bold becomes less pronounced. The Bold command can be applied to single characters, words, or text lines.

Bold remains in effect until deactivated or until the printer is reset.

n1 = 0	Turns OFF bold (Normal)
n1 = 1	Turns ON **bold**

ESC i n1 — Italics

1B 69 n1 Hex
27 105 n1 Decimal

The Italics command works best with normal character width and height. At other values, the output can become pixelated. The Italics command can be applied to single characters, words, or text lines.

Italics remains in effect until deactivated or until the printer is reset.

n1 = 0	Turns OFF Italics (Normal)
n1 = 1	Turns ON *Italics*

ESC T n1 — Reverse Text and Background

1B 54 n1 Hex
27 84 n1 Decimal

Selects normal black text on a white background or reversed white text on a black background. Single characters, words, or complete text can be reversed.

This command remains in effect until deactivated or until the printer is reset.

n1 = 0	Gives normal print, black on white
n1 = 1	Gives reversed print, white on black

Note • Reverse text and underline invert the print data. This means that the order in which the commands are issued affect the printout if the text overlaps, such as in the case of italics.

ESC u n1 — Underline

1B 75 n1 Hex
27 117 n1 Decimal

n1 = 0	Turns OFF underline
n1 = 1...7	Turns ON a 1–7 pixel thick underline

Characters, single words, or complete text lines can be underlined.

ESC h n1 — Text Height

1B 68 n1 Hex
27 104 n1 Decimal

This command scales the height of the text printed by a factor of up to 16x. The valid range of values is 0 to 15.

n1 = 0	Resets the character height to the base character height
n1 = 1...15	Increases the character height to 2...16 times the base character height.

In combination with variable character width (<ESC>w<n1>), gives highly legible characters depending on the font to which the command has been applied.

Different heights can be mixed on the same print line.

ESC w n1 — Text Width

1B 77 n1 Hex
27 119 n1 Decimal

This command scales the width of the text printed by a factor of up to 8x. The valid range of values is 0 to 7.

n1 = 0	Resets the character width to the base character width
n1 = 1...7	Increases the character width to 2...8 times the base character width.

In combination with variable character height (<ESC>h<n1>), gives highly legible characters depending on the font to which the command has been applied.

Different widths can be mixed on the same print line.

Important • Use of the multiple width function when printing barcodes is not recommended as the text data may become illegible.

ESC t n1...n5 data — Print Text at XY

1B 74 n1...n5	data	Hex
27 116 n1...n5	data	Decimal

Prints a text string at the specified XY position. The string is formatted based on the current active formatting attributes except for alignment.

n1n2	Two byte definition of the X print position (in pixels).
n3n4	Two byte definition of the Y print position (in pixels).
n5	The number of characters in the string. To avoid having to count characters you can set n5 to <0> (null) and then terminate the text string with null.
data	The text string. If text string length is specified with n5, the length must be exactly the number of characters specified, otherwise the printer will stop, waiting for more characters. Data that extends off the edge of the printable area will not be wrapped to the next line.

After the data has been printed, the cursor will return to the position it had before the print text.

Note • The Y coordinate will be ignored if the printer is in variable document mode (n36=1).

Note • <ESC>t<n1...n5> clears the text buffer each time it is used, destroying any unprinted text on the same line. Commands will not be cleared.

BS — Backspace

08	Hex
8	Decimal

Moves the print-position one step to the left. Backspace can be used to combine characters. For instance to print a Ø, send text command O<BS>/ to the printer, and the slash will overprint the O.

The print position can only be moved one step to the left. Multiple backspaces in succession are ignored.

CAN — Cancel

18	Hex
24	Decimal

Cancels text and attributes sent before the <CAN> command on the same line.

Commands are not cancelled.

CR — Carriage Return

0D	Hex
13	Decimal

By default, carriage return is ignored.

Parameter n33 (CR/LF Behavior) can be changed so the printer interprets <CR> as follows:

- Interpret it as <CR>, returning the print position to beginning of line without line feed.
- Interpret <CR> as <CR><LF>, inserting line space as specified by the line spacing setting (see parameter n13), and returning the print position to beginning of the line.

See CR/LF Behavior.

LF — Linefeed

0A	Hex
10	Decimal

Linefeed is interpreted as <CR><LF> by default. This inserts line spacing as specified by the line spacing setting (see parameter n13), and returns the print position to beginning of the line. <LF> also converts text from the text buffer to pixel lines and stores them in the line buffer, ready to be printed.

By changing the default settings, you can:

- Interpret <LF> as Linefeed. This inserts line space as specified by the line spacing setting (see parameter n13), without returning the print position to the beginning of the line.
- Ignore <LF>.

See CR/LF Behavior.

ESC d n1 — Make n Linefeeds

1B 64 n1	Hex
27 100 n1	Decimal

Executes the number of linefeeds as defined by variable n1. The length of each line feed is determined by the default value for selected font or the line spacing setting specified by n13, whichever is greater (refer to parameter Line Spacing).

If an <LF> has not yet been sent to convert the text buffer to the line buffer, the lines printed by <ESC>d<n1> are copies of that line. Following this, the print position is returned to the beginning of the line.

FF — Form Feed

0C Hex
12 Decimal

Prints data from the text buffer and feeds the paper to the top of the next page.

In fixed document length mode (n36 = 0) this command prints data in the text buffer and feeds the paper to the top of next page.

In variable document length mode, <FF> advances to the minimum page length as specified by n37 and n38. If the printout already is longer than the minimum page length, <FF> does not feed any additional paper.

In black mark mode, the <FF> command looks for a black mark, see ESC Z .

If Auto Cut (n34) is set to 1 (see Auto Cut After FF), <FF> affects form-feed, cut, and eject.



Note • Use parameter p37 and p38 to define page length.

HT — Horizontal Tabulation

09 Hex
9 Decimal

Shifts the current print position to the next Tab position

Set tab positions with parameters n15 – n30. Refer to Tab Stop.

Barcode Commands

A standard TTP 2100 can print 1-D barcodes EAN 8, EAN 13, EAN128, UPC, 2-of-5 Interleaved, ISBN, Code39, and Code128, plus 2-D barcodes PDF417, and Aztec.

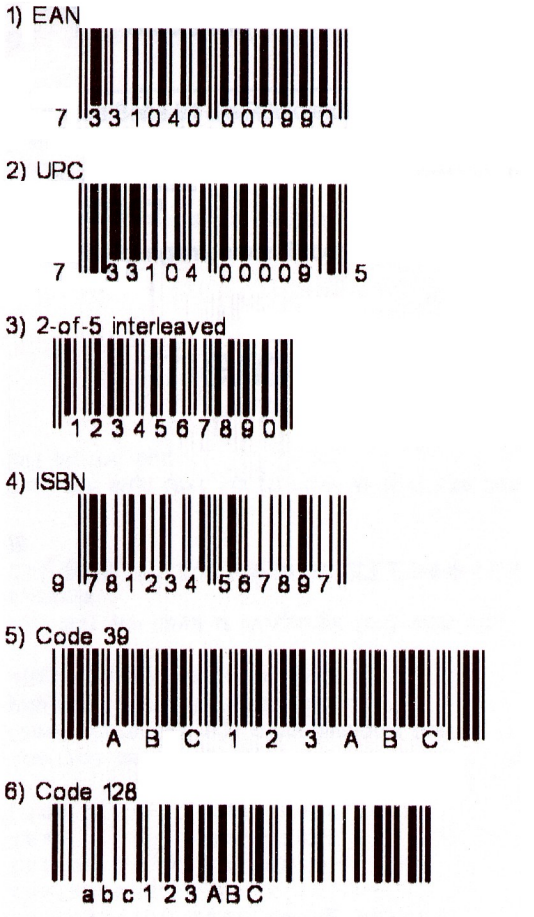
Older versions of the printer (serial numbers lower than 2-0913-27444) can only print the 1-D barcodes as standard, but can be upgraded with a firmware that replaces the 1-D barcodes with PDF417 only. See Firmware and 2-D Barcode Print (PDF 417).

Printing Barcodes Without Text

The 1-D barcodes print the encoded message under the code itself, see Samples of Barcodes. If you want to print only the barcode without the text, follow the procedure below:

1. Load the font “1x1 blank” that comes with the Zebra Toolbox utility.
2. Select that font with the <ESC>!<n> command.
3. Send the commands for the barcode.
4. Return to the normal font after the barcode data.

Figure 27 • Samples of Barcodes



Example • This example will print an EAN barcode with height = 10 mm, 15 mm in from the left margin.

```
<ESC>BS<0><0><72><0><0><0><0><64><0><2><2>
<ESC>BW<0>733104000099<0>
<LF><RS>
```

ESC B S n1...n11

1B 42 53 n1...n11	Hex
27 66 83 n1...n11	Decimal

Barcode Field Specify

Barcodes can only be printed in portrait mode unless Fixed Document Mode is selected. See Document Mode

n1	Specifies the barcode field number. The valid range is 0 – 15. Barcode fields may be specified in any order.
n2n3	Specifies the X coordinate of the barcode field origin (n2 is the higher order byte and n3 the low order byte). n2 and n3 are one-byte numbers. Refer to Two-Byte Character Definitions for more information about two-byte values. Values that place the barcode outside the printable area may cause the barcode to be partially printed and be unreadable.
n4n5	Specifies the Y coordinate of the barcode field origin (n4 is the high order byte and n5 is the low order byte). n4 and n5 are one-byte numbers. Refer to Two-Byte Character Definitions for more information about two-byte values. Values that place the barcode outside the printable area may cause the barcode to be partially printed and be unreadable.
n6	Must be specified but is not used.
n7n8	Specifies the height of the bars in pixels (n7 is the high order byte and n8 is the low order byte).
n9	Specifies the type of barcode. The following types are supported.
n9 = 0	EAN 8 or 13 (auto detect). The printer calculates the necessary check digit.
n9 = 1	UPC
n9 = 2	2/5 Interleaved (even number of characters must be sent)
n9 = 3	ISBN
n9 = 4	Code128 (Start data string with C2h to encode EAN128)
n9 = 6	Code39
n10	Specifies the thickness of the narrow bar 0=1 pixel, 1=2 pixel, and so on.
n11	Specifies the wide-bar-to-narrow-bar ratio. Only used in Code 39 and 2-of-5 interleaved where different ratios are allowed

This command reserves an information field as a barcode field. The command also identifies the type, number of digits, and the configuration of bars to be placed in the barcode field.

Code 128 / EAN128

The following codes select function codes in Code 128:

Name	Dec	Hex
FNC1	193	C1h
FNC2	194	C2h
FNC3	195	C3h
FNC4	196	C4h

Starting the data string with `FNC1` generates an EAN128 code.

Note • By default, the printer will print barcodes with human readable characters. To avoid this behavior, load the font `1x1_blank.swf` to the PROM and select that font with `ESC !` before you specify the barcode. After the `ESC BW` command, you can return to the normal font. This font is available in the Toolbox application.

ESC BW n1 nx — **Barcode Write**

1B	42 57	n1	nx	Hex
027	066 087	n1	nx	Decimal

Writes data to the barcode field reserved by the `ESC BS` command.

n1	Specifies the barcode field number. The valid range is 0 - 15. This number must be the same number used to specify the field using the `ESC BS` command. Fields can be specified in any order but other values than 0 to 15 are ignored.
n2 . . . nx	Specifies barcode data bytes. Up to 80 bytes may be specified. To create a barcode add-on, insert a space character and then the data for the add-on. Two of five characters are allowed of the add-on.
NUL	Must be placed at the end of the barcode data.

Any invalid barcode character terminates the command, and prints `<Invalid bar code>` on the printout.

Example • This example will print one barcode with height = 10 mm and located 15 mm to the right.

```
<ESC>BS<0><0><72><0><0><0><0><64><0><2><2>
<ESC>BW<0>733104000099<0>
<LF><RS>
```

ESC B C — Barcode Clear

1B 42 43 n1	Hex
27 66 67 n1	Decimal

Clears the barcode field reserved by command <ESC><BS><n1>.

n1	Specifies which barcode field to clear. The range is 0 to 15. The fields may be cleared in any order.

ESC | 5 n2-nx — 2-D Barcode Print (PDF 417)

1B	7C	05	n2-nx	Hex
027	124	5	n2-nx	Decimal

This command positions and prints a PDF 417 2-D barcode.

Note • 2-D barcodes are standard in all printers starting with serial number 93J. Older printers require special firmware to be loaded. See Firmware.

n1	Specifies the type of barcode.
n1 = 5	PDF 417
n2n3	Specifies the X-coordinate of the barcode field origin. n2 is the most significant byte (MSB). n3 is the least significant byte (LSB).
n4n5	Specifies the Y-coordinate of the barcode field origin. The Y-coordinate is discarded in variable document mode. n4 is the most significant byte (MSB). n5 is the least significant byte (LSB).
n6 (PDF 417)	Rows of barcode data. The valid range is 0 for automatic row calculation or 3–90 to specify the number of rows.
n7	Columns of barcode data. The valid range is 0 for automatic column calculation or 1–30 to specify the number of columns.
n8	Specifies the error correction level for the PDF 417 barcode. The valid range is 0 for automatic calculation or 1–9 to specify an error level (ErrorLevel 0 to ErrorLevel 8, respectively).
n9	Specifies in pixels the height of each row of the barcode.
n10	Specifies the scaling factor of the barcode
n11n12	Specifies the length of the data to follow. Both n11 and n12 are specified as 0. The data field (n13...nx) is terminated by a null. If n11 and n12 are non-zero, they specify the length of the n13...nx data that follows. The valid range for this parameter is 0 (which species the null terminated behavior) and 1 to 2710. Even when using the null terminated behavior, you cannot specify more than 2710 bytes (not including the terminating null).
n13...nx	Byte data to be encoded. Data must be null-terminated if n11 and n12 are 0 or must be the length specified by n11 and n12 otherwise.

Example • To print Zebra as a PDF 417 barcode, send the following to the printer:

```
<ESC><124><5><0><0><0><0><0><0><0><3><3><0><0>Zebra<0>
```

This example will print a barcode that looks like this:



ESC | 7			n2-nx	
1B	7C	07	n2-nx	Hex
027	124	7	n2-nx	Decimal

Aztec-Barcode Print

This command positions and prints an Aztec 2-D barcode.

<ESC> "|"	<type=5> <x_msb> <x_lsb> <y_msb> <y_lsb> <rows> <cols> <errLevel> <dotHeight> <scale> <len_msb> <len_lsb> <data>
n1	Specifies the type of barcode.
n1 = 7	Aztec
n2n3	<x_msb> <x_lsb> Sets the X-coordinate of the barcode field origin.
n4n5	<y_msb> <y_lsb> Sets the Y-coordinate of the barcode field origin. The Y-coordinate is discarded in variable document mode.
n6	Flag - Instructs the barcode engine how it should interpret <27> bytes in the data stream. If set to <0>, Data is assumed to be straight bytes to be encoded. If set to <1>, placing <27> in Data is interpreted to be FLG markers to be encoded in the barcode. The byte in Data after <27> represents the FLG to be encoded. To encode <27> in when Flag is 1, send <27><27>.
n7	Menu - If non-zero, the barcode is encoded as an Aztec menu barcode.
n8	Multi - The number of symbols to use in encoding the barcode. The valid range is <1> to <26>.
n9n10	Layer - The encoding scheme and error correction. n9 is always <0>. The following values are valid for this field: <0> = Default Error Correction Level <1> to <99> = Minimum Error Correction Percentage <101> to <104> = 1 to 4-layer Compact Symbol <201> to <232> = 1 to 32-layer Full-Range Symbol
n11	Scale - The size in pixels of a single dot element.
n12n13	The length of the data to follow. The maximum number of bytes that can be encoded is 1914 (<7><122>), however the maximum readable size is dependent on many factors including print speed, burn time, media quality, scale, error correction percentage, and reader quality. If set to <0>, <nul> indicates the end of the data block <data>. If length is set to other values, the value indicates the number of bytes in <data>.
<data>	Data to be encoded.

Example • To print Zebra as an Aztec barcode, send the following to the printer:

```
<ESC><124><7><0><30><0><10><0><0><1><0><206><5><0><5>
Zebra<CR><LF><RS>
```

This example will print a barcode that looks like this:



Graphics Commands

ESC b n1...n5 data — Print Bitmap at XY-position

1B 62 n1...n5	data	Hex
27 98 n1...n5	data	Decimal

Prints a black & white (1-bit color depth) Windows bitmap (BMP file) at the specified X-Y position. The bitmap must be a complete uncompressed Windows bitmap where the data starts with BM. The maximum bitmap size is limited to the free RAM printed on the self-test printout.

n1	Always 0
n2n3	Two byte definition of the X print position (in pixels)
n4n5	Two byte definition of the Y print position (in pixels)
data	Bitmap data

After the bitmap has been printed, the cursor will return to the X-position that it had before the bitmap command was issued.

Selecting horizontal mode (with <ESC>o<0>) prints the image in portrait orientation, while selecting the vertical mode (with <ESC>o<1>) prints the image in landscape orientation.

Note • The Y print-position and horizontal/vertical orientation only works if Fixed Document Mode is set. See Document Mode.

ESC s n1 data — Send Dot-Line, 203 dpi

1B 73 n1	data	Hex
27 115 n1	data	Decimal

Sends one line of dot data. This command is used to build images, one dot line at a time by the printer driver and should not be combined with text commands.

n1	Determines the number of bytes. Range: 1-255.
<data>	1 – x bytes, where x is the paper width in bytes. The paper width is set by parameter n48. If n48 is set to 0 (automatic width), 58 mm and 60 mm printers will use 54 bytes, while 80 mm and 82.5 mm printers use 72 bytes. The maximum width setting is 80 bytes. If you specify more bytes in n1 than the paper width of the printer, the additional bytes are discarded. If you specify less bytes in n1 than the paper width of the printer, the printer will fill the remaining portion of the dot line with blank pixels.

Caution • Always send the number of bytes that you specify with n1.

If you transmit more data than the number of bytes specified by n1, the rest of the bytes will be interpreted as text or commands. This can cause numerous problems in the printer as graphics data can contain any hex value.

ESC r n1...n9 — Print Ruler Line

1B 72 n1...n9	Hex
27 114 n1...n9	Decimal

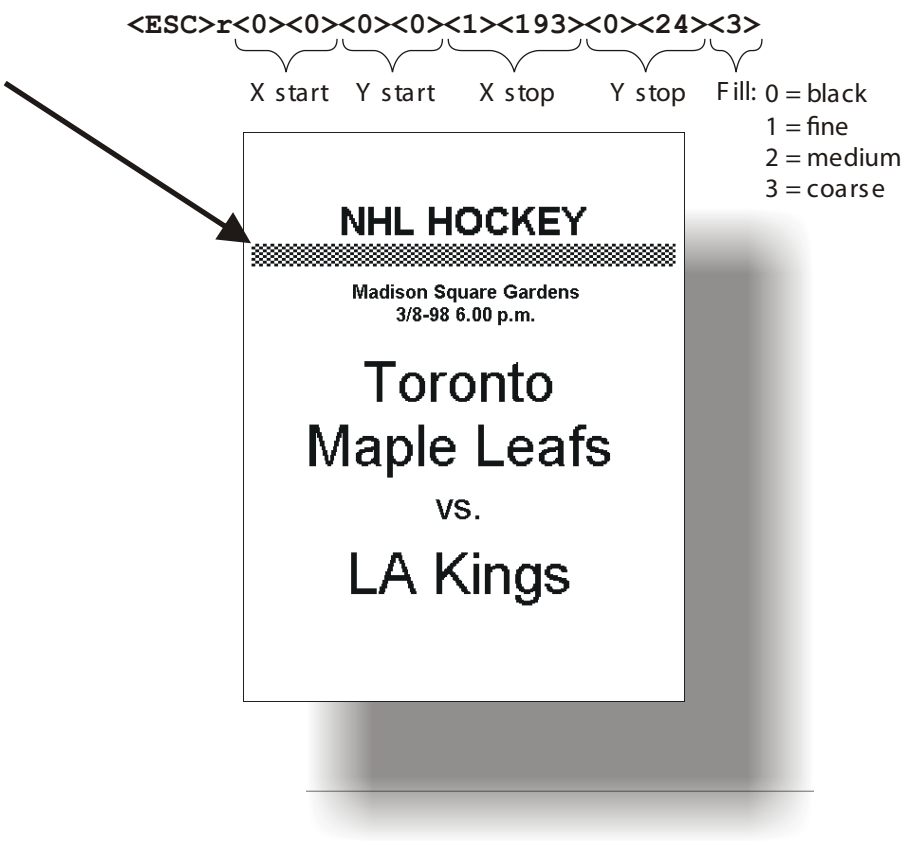
Prints a ruler line across the paper.

A ruler line is normally used to divide the printout into logical parts to make it easier to read. A ruler line is actually an area defined by a start X-Y position and a stop X-Y position. This area is filled with black or a checkered pattern.

n1n2	Two byte definition of the X print position to start the ruler line (in pixels)
n3n4	Two byte definition of the Y print position to start the ruler line (in pixels)
n5n6	Two byte definition of the X print position to stop the ruler line (in pixels). This value must be larger than the X start position.
n7n9	Two byte definition of the Y print position to stop the ruler line (in pixels). This value must be larger than the Y start position.
n9	Specifies the fill pattern. The valid range is 0 to 3. 0 is black and 1-3 are various checkered patterns. Values out of range are interpreted as 0.

Note • The Y print-position and horizontal/vertical orientation only works if Fixed Document Mode is set. See Document Mode.

Figure 28 • Printout with Checkered Ruler Line



ESC g n1...n5 — Print Logotype

1B 67 n1...n5	Hex
27 103 n1...n5	Decimal

Prints a customized logotype stored in the flash PROM. See also Logotypes.

n1	One-byte logotype identification number. The valid range is 0 to 15.
n2n3	Two byte definition of the X print position to place the upper left corner of the logotype (in pixels). If the logotype extends outside the printable area, it will be cropped.
n4n5	Two byte definition of the Y print position to place the upper left corner of the logotype (in pixels). If the logotype extends outside the printable area, it will be cropped.

Note • The Y print position and horizontal/vertical orientation only works if Fixed Document Mode is set. Refer to Document Mode for more information.

Note • For information about logotype loading, refer to ESC & 001.

ESC L n1

Hex	Decimal
1B 4C n1	27 76 n1

Print Logotype at Current Position

Prints a customized logotype stored in the flash PROM at the position of the cursor. The bottom edge of the logotype is positioned at the baseline of the text on the line. If the logotype is taller than the text, the line spacing is increased as necessary.

n1	One-byte logotype identification number. The valid range is 0 to 15.

Note • When using <ESC>L the logotype is added to the text buffer, so a text printing command such as <LF> or <FF> must be used to generate the printout.

Print Commands

ESC p

Hex	Decimal
1B 70	27 112

Print

This command makes the printer print the contents of the line buffer.

Text is converted to image data in the line buffer when an <LF> is received. If the line buffer is empty when <ESC>p is received, nothing is printed.

Text to be printed <LF><ESC>p prints “Text to be printed” on the paper.

Printout occurs automatically at:

Cut	<RS> and <ESC><RS>
Form feed	<FF>
Clear presenter	<ENQ>
Run presenter	<ESC><FF><n>
Text or line buffer full	
When the Feed button is pressed	

ESC P n1

Hex	Decimal
1B 50 n1	27 80 n1

Print Self-test Printout

This command makes the printer generate a self-test page based on the current parameter settings and print that page. The parameter values printed are the ones currently being used. They can differ from Power-ON default values if for example a printout has been made by a driver before `ESC P` is sent to the printer.

For more information, refer to Making a Self-Test Printout.

n1 = 0	Gives standard self-test printout.
n1 = 1	Gives a character set printout using the font selected by parameter n14.

ESC J n1

Hex	Decimal
1B 4A n1	27 74 n1

Paper Advance

The value n1 represents the number of dot lines the paper is to be transported forwards. The valid range is 1 to 255.

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.

Important • Using paper feeding command (<ESC>J<n>, <ESC>j<n>, and <ESC>Q<n>) when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use <LF>.

ESC j n1

Hex	Decimal
1B 6A n1	27 106 n1

Paper Reverse

The value n1 represents the number of dot lines the paper is to be transported backwards. The valid range is 0 to 255.

A dot line is 0.125 mm, and 255 dot lines equal approximately 32 mm.

Caution • NEVER reverse more than 7 mm (n1 = 56) at top of page! The platen can lose grip on the media, which can fall out of the printer.

Important • Using paper feeding command (<ESC>J<n>, <ESC>j<n>, and <ESC>Q<n>) when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use <LF>.

ESC Q n1 n2		Quick Advance
1B 51 n1	Hex	
1B 81 n1	Decimal	

The value n1 n2 represents high byte and low byte of the number of dot lines the paper is to be transported forwards. Minimum value is 1, and maximum value is 32767.

A dot line is 0.125 mm, and 32767 dot lines equals approximately 4.1 m.

Using paper feeding command (<ESC>J<n>, <ESC>j<n>, and <ESC>Q<n> when operating in fixed page mode (n36 = 0) causes the fixed page to be printed and then the feed operation occurs. To create white space without generating a printout of the fixed page, use <LF>.

Cut and Present Commands

Important • The printer will not receive data while cut and present commands are executed.

RS		Cut and Present Media
1E	Hex	
30	Decimal	

The paper is cut and presented through the presenter module. The <RS> command automatically gives the presentation length of 50 mm in addition to the amount specified by parameter n47.

If the printout length is less than the minimum page length (75 mm or the value specified by n37 and n38, whichever is greater), paper is fed until the minimum printout length is reached before execution of any cut command.

Note • The cut position is 9 mm after the print line. This makes the last 72 dot lines of the previous page end up on the beginning of the next page. To have the printer position the cut after these dot lines, set parameter n49 = 1 (Advance before cut to automatic distance calculation). The auto advance function also adds an additional 16 dot lines (2 mm) of feed due to the width of the cutter blade.

If you prefer to set n49 to 0 (off), you can use a paper advance command to perform the same task:

```
<ESC>J<88><RS>
```

This will position the cut 16 dot lines (2 mm) after the end of the print data.

ESC RS — Cut Only, No Present

1B 1E	Hex
27 30	Decimal

<ESC><RS> causes the paper to be cut but performs no present operation.

Eject can be effected with the <ESC><FF><n> command (see Present Media).

To avoid thin strips of paper in the printer, multiple cut commands without paper feed in-between will not be performed. If the printout length is less than the minimum page length (75 mm or the value specified by n37 and n38, whichever is greater), paper is fed until the minimum printout length is reached before execution of any cut command.

Also, refer to the note in RS concerning the cut position with regard to the print line.

```
Text to be printed<CR><LF>
<ESC><RS>
<ESC><FF><30>
```

will print “Text to be printed” and cut and then eject 30 mm.

Note • Use the Cut Only command if you want full control over the printer from your system. When using <ESC><RS>, you must add commands to feed to the correct cut position (if n49 is not set to 1) and commands to eject the paper so that the customer can retrieve the printout.

US — Partial Cut (Unit Separate)

1F	Hex
031	Decimal

Prints a dotted line, a pair of scissors, and partially cuts the paper from both edges towards the center to make it easier to tear off the paper. This command causes all data in the image buffer to be printed and generates the printout of a fixed page when n36 = 0.

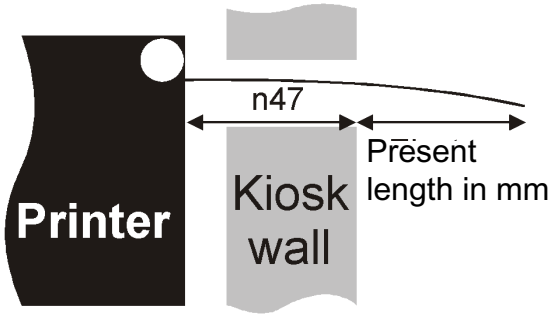
The length of the partial cut can be set with parameter n60. Refer to Partial Cut Length for more information.

ESC FF n1

1B 0C n1	Hex
27 12 n1	Decimal

Present Media

<ESC><FF> presents a piece of media that has been previously cut. Variable n1 represents the present length in millimeters. The setting of parameter n47 is always added to the value of n1.



The valid range for n is 1 to 127. The range 128-255 is reserved for future use.

Place this command after a cut command (<ESC><RS>) to partially present the printout to the customer. Set the present length so that the customer sees that the printout comes out of the Kiosk wall. The pull detector gives motorized eject of the rest of the printout when the customer begins to pull the paper.

Note • The cut and present command <RS>, automatically presents 50 mm in addition to the amount stored in parameter n47.

Note • No matter how long a present you set, the printer will not loose grip of the printout. To eject fully, use the <ENQ> command.

EM n1

19 n1	Hex
25 n1	Decimal

Enforced Clear Presenter

<EM><n1> functions the same as <ENQ>. The valid range of n1 is 0 to 255. The command will clear the presenter immediately (with printing synchronization).

ENQ

05	Hex
5	Decimal

Clear Presenter

<ENQ> clears the paper path of the presenter from printouts. This command completely ejects a document that has not been removed during the print/cut/present operation.

System Related Commands

ESC ?

1B 3F	Hex
27 63	Decimal

Reset (Full)

<ESC>? restarts the printer with a complete reset. During this operation, all buffers are purged, all memory is cleared, and stored parameters are reloaded. USB printers will go off the bus during execution of this command and will reconnect when the reset is complete. After issuing this command, wait approximately 3 seconds for the printer to reset before issuing data to the printer.

ESC @

1B 40	Hex
27 64	Decimal

Reset (Initialize)

<ESC>@ terminates command processing and reinitializes the control board. All parameters are set to power on values and all buffers are purged. After issuing this command, wait approximately 3 seconds for the printer to reset before issuing data to the printer.

ESC & 001

1B 26 01	Hex
27 38 1	Decimal

Load Logotype

<ESC>&<1> stores a logotype bitmap in the flash PROM. The logotype is stored to flash memory and the printer is reset. The logotype can then be printed with <ESC>g<n1> and <ESC>L<n1> commands, see ESC g n1...n5 and ESC L n1. Also see Logotypes. The printer indicates that storage is complete by operating the presenter motor for a short period of time.

ESC & L

1B 26 4C	Hex
27 38 76	Decimal

Erase All Logotypes

<ESC>&L erases all logotypes stored in the flash PROM. The printer indicates that erasure is complete by operating the presenter motor for a short period of time.

ESC & 004

1B 26 04	Hex
27 38 4	Decimal

Store Current Parameter Values

<ESC>&<4> stores the current setting of all parameter values in the printer's flash memory. These parameters are then used as default power on parameters. Storing the parameters to flash memory takes approximately 4 seconds, during which time the printer cannot communicate. The printer indicates that storage is complete by operating the presenter motor for a short period of time.

ESC & 000

1B 26 00 Hex
27 38 0 Decimal

Load Font

<ESC>&<0> is used to load a font to the printer flash PROM. The font is placed in the first free position. The printer indicates that storage is complete by operating the presenter motor for a short period of time. The font position is determined by the order that the fonts are loaded into the printer.

A Kiosk printer font file consists of a header containing data describing the font as well as data for each individual character in the font.

Fonts can be designed with the FastFont application included with Toolbox and can be loaded or deleted using the Toolbox application. The fonts loaded are not used by the Windows driver, so it is not necessary to load fonts into the printer to use the Windows driver.

For complete specification of the font format, refer to Font Loading.

Note • The available font memory is printed on the self-test printout. A maximum of 8 fonts may be loaded (numbered 0 to 7). If you attempt to load a font that is larger than available memory or attempt to load more than 8 fonts, the font loading command will not load the font.

ESC & b n1 n2 n3

1B 26 62 Hex
27 38 98 Decimal

Set Bit Field Parameters

<ESC>&b<n1><n2><n3> sets the bit field parameters using the following:

n1	Parameter number
n2	Operation (1=set to 1(on), 0=set to 0(off))
n3	Mask

Example • This example sets bits 0 and 3 of n64 to 0

```
<ESC>&b<64><0><b 00000101>
```

ESC & C

1B 26 43 Hex
27 38 67 Decimal

Erase All Fonts

<ESC>&C erases all fonts stored in the flash PROM. The printer indicates that erasure is complete by operating the presenter motor for a short period of time.

ESC & D

1B 26 44	Hex
27 38 68	Decimal

Erase Fonts 4 to 7

<ESC>&D erases the fonts in positions 4–7. Fonts in positions 0–3 are not affected by this command.

The font position is determined by the order that the fonts are loaded into the printer. This command can take up to 20 seconds to execute.

ESC & F

1B 26 46	Hex
27 38 70	Decimal

Reset Parameter Profile

<ESC>&F temporarily sets all parameters to predefined default values that are stored in the firmware. To make the default values permanent, store them in the EEPROM with command <ESC>&<4>.

Unless the parameters are stored, a reset command or power cycle will return the parameters to the settings stored in the EEPROM.

ESC & P n1...n2

1B 26 50 n1...n2	Hex
27 38 80 n1...n2	Decimal

Set Parameter Value

The printer stores its configuration settings in an EEPROM. When the printer is powered on, the values are loaded from the EEPROM. Using this command, a parameter value can be temporarily overridden. The value can later be made permanent with the <ESC>&<4> command. Permanently stored values are loaded after a printer reset or at power on.

n1	Parameter number, range 1-255.
n2	Parameter value. Refer to Default Parameter Settings for information about the valid range for each parameter number.

Set Several Parameters at Once

You can use this command to set multiple parameters at once. The format for this option is as follows:

```
<ESC>&P<0><n2><n3><data>
```

When operating in this mode, specify a value of 0 for n1, the first parameter you want to set for n2, and the number of parameters to set for n3, followed immediately by the parameter data.

To set parameters that extend over a range in which the parameter number is not defined, specify 0 for the parameters that do not exist. For example, to set n4 to n7, you must provide all four parameters in data even though n6 does not exist.

Example • This example sets the first 5 tabs to 5, 10, 15, 20, and 25. (n2 = 5, n3 = 5)

```
<ESC>&P<0><15><5><5><10><15><20><25>
```

Store parameters permanently by sending <ESC>&<4>.

ESC & s n1 — Load SPI Slave Firmware

1B 26 73 0A	Hex
27 38 115 10	Decimal

This command is only valid for the following:

- TTP 2110, serial number higher than 2-0913-27444, or starting with 93J
- TTP 2130, serial number higher than 2-0913-27471, or starting with 93J

The TOF sensor has its own firmware that can be upgraded using this command.

n1	SPI Slave address, for the sensor board, the address is 10 dec.
<file>	the bin file with the new firmware

ESC & S — Return to Saved Values

1B 26 53	Hex
27 38 83	Decimal

If parameters are temporarily set in RAM, this command returns them to the values stored in the non volatile memory.

ESC NUL	Load Firmware
1B 00 Hex 27 0 Decimal	

This command should be used when you integrate firmware loading into your Kiosk program. After transmitting this command, send the firmware binary file. If the firmware is the proper version for the printer and the firmware checksum is valid, the firmware is then programmed into the printer's flash memory. This process can take up to 60 seconds and the printer will reset when the process is complete, and reappear on the USB bus. Therefore, if your application needs to know when the upgrade is ready, monitor the USB bus for the printer return.



Note • The Toolbox application can be used to load new firmware.

Status Reporting Commands



Important • All status commands except for the acknowledge marker are immediate. This means that these commands bypass the print queue and are answered as soon as they possibly can be.

Status codes are reset when:

- the conditions causing them are removed
- the printer is power cycled (turned off/on)
- the printhead is lifted and then lowered to clear a paper jam.

ESC ENQ 1	Status Enquiry
1B 05 01 Hex 27 5 1 Decimal	

<ESC><ENQ><1> issues a status enquiry that results in response <ACK> (hex 06) if there are no errors, or <NAK> (hex 15) and a byte indicating an error if one or more sensors report some condition.

Table 3 • Status Codes

Status Code	Meaning
ACK	OK (printer is operable)
NAK 1	Paper left in presenter module. Attempt to clear the paper path failed.
NAK 2	Cutter jammed
NAK 3	Out of paper
NAK 4	Printhead lifted
NAK 5	Paper-feed error. No paper detected in presenter although 10 cm has been printed. Paper might be wound around the platen or, in some way, has been forced above the presenter module.
NAK 6	Temperature error. The printhead temperature has exceeded the 60 °C maximum limit.

Table 3 • Status Codes

Status Code	Meaning
NAK 7	Presenter not running
NAK 0A	Black mark not found
NAK 0B	Black mark calibration error
NAK 0C	Index error
NAK 0D	Checksum error
NAK 0E	Wrong firmware type or target for firmware loading
NAK 0F	Firmware cannot start because no firmware is loaded or firmware checksum is wrong.

Note • Errors 0B, 0C, and 10 are one-time errors that clear once they are read.

Important • Errors 2 and 5 are terminal faults that require you to reset the printer before it will be operable again. A reset means that any data in the buffer is lost. The printer automatically recovers from the other conditions as soon as the condition is corrected.

<ESC><ENQ><1> can only return one status code at a time. If there are two or more simultaneous conditions, each condition should be cleared and the status enquiry repeated in order to get a complete report of all status codes.

The host computer cannot be certain that all conditions have been cleared until an ACK is received.

In the case of multiple error conditions, the one with the lowest number is reported.

Note • To read out all status information at once, use <ESC><ENQ>E.

ESC ENQ 2

1B 05 02 Hex
27 5 2 Decimal

Paper-near-end Enquiry

This command requests a paper-near-end sensor (paper low) status from the printer in a 1-byte format.

Value = 1	indicates “No paper”
Value = 0	indicates “Paper present” at the sensor position

The status of the sensor is sampled every time the printout is cut. If three successive samples show that there is no paper present at the sensor, the status reply changes to 1. This is to prevent false readings if the side of the paper roll is not clean. If you want instantaneous status of the sensor, use <ESC><ENQ><6> and examine the paper near end bit.

If you do not have a paper-low sensor connected, the reply to this query will be 1, “No paper at the sensor position.”

ESC ENQ 4

1B 05 04 Hex
27 5 4 Decimal

Fonts and Logotype Enquiry

<ESC><ENQ><4> requests information regarding loaded fonts and logotypes. This command does not return information about the length of the structure, so you must read all the data up to the last <CR><LF>.

Example • (↵ = CR LF)

Send→ <ESC><ENQ><4>

Read←
```
0:7862 ATM9↵
1: ↵
2: ↵
3: ↵
4: ↵
5: ↵
6: ↵
7: ↵
Free font memory:123082↵
00:38 117 Zebra Logo ↵
01: ↵
02: ↵
03: ↵
04: ↵
05: ↵
06: ↵
07: ↵
08: ↵
09: ↵
10: ↵
11: ↵
12: ↵
13: ↵
14: ↵
15: ↵
16: ↵
Free logo memory:126352↵
```

ESC ENQ 5

1B 05 05 Hex
27 5 5 Decimal

Sensor Enquiry

<ESC><ENQ><5> returns a 2-byte response, reflecting the status of all virtual sensors. Virtual sensors maintain their functionality in all configurations of this printer, while physical sensors reported by <ESC><ENQ><6> may signal differently depending on installation factors such as vertical or horizontal installation.

The same physical sensor can give several virtual statuses depending on when the sensor is activated in the print cycle.

The first byte of the response is reserved for future use.

Second Byte:

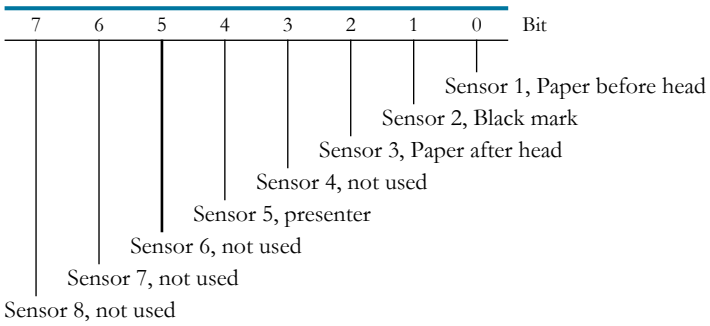
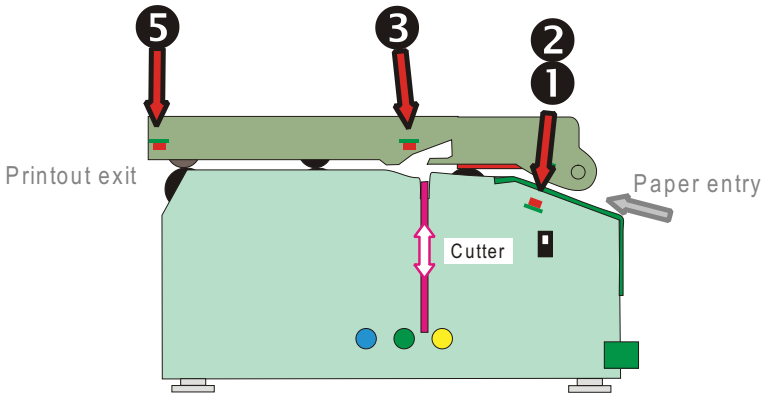


Figure 29 • Physical-to-Virtual Sensor Mapping



ESC ENQ 6

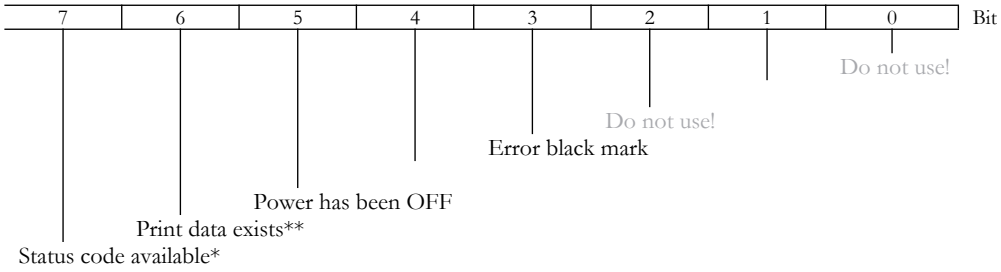
1B 05 06	Hex
27 5 6	Decimal

Status Report

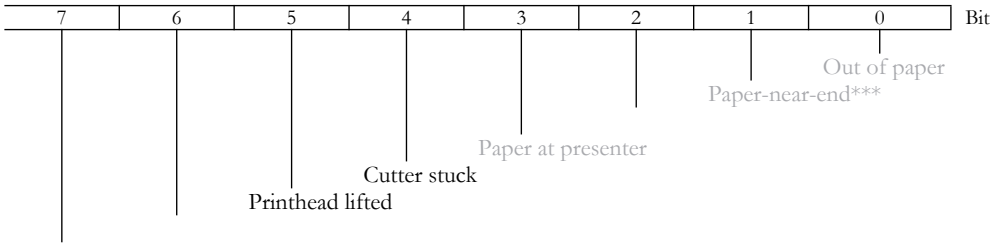
Note • The sensor status reported in the status report are for compatibility with older printers. Please use <ESC><ENQ><5> in new applications. Refer to ESC ENQ 5 on page 76 for more information.

Results in a 2-byte response, reflecting the status of each sensor. This command is intended as a go/no go indication.

First Byte:



Second Byte:



*	This bit indicates that a status code is available. Use <ESC><ENQ><1> or <ESC><ENQ>E to fetch it.
**	This bit tells you that there are data in the printer that have not yet been printed. There are two possible reasons for that: **1.** The last command received by the printer was not a command that triggers a printout. **2.** The printer is printing.
***	This paper-near-end bit differs from the <ESC><ENQ><2> response.

Bit 4 and 5 in the first byte are reset when read.

Note • Mask away the undefined bits in your application program to avoid having to change the application, if future firmware releases starts using them.

- Mask first reply byte with E8.
- Mask second reply byte with BB.

ESC ENQ 7 — Firmware-Version Enquiry

1B 05 07	Hex
27 5 7	Decimal

Results in a 2-byte response representing the version of the installed firmware.

The first byte represents major versions, and the second byte minor versions.

If no firmware is loaded, the printer will answer with <0><0>.

Example •

Send→ <ESC><ENQ><7>

Read← <3><96>

That is, a response with the value <3><96> indicates version 3.96.

ESC ENQ 9 — Main Logic Board Serial-Number Enquiry

1B 05 09	Hex
27 5 9	Decimal

Results in an 6-byte response representing the serial number of the control board, however the TTP 2100 series of printers do not have a serial No. chip on the control board so this query always gives 000000 as the reply.

In printers with serial number starting with 93J, the printer serial number is stored and can be read out with the command <ESC><ENQ>HSN<0>.

ESC ENQ 10 — Control Board Revision Enquiry

1B 05 0A	Hex
27 5 10	Decimal

Results in a 1-byte response representing the control board revision. A minus sign indicates that no revision has been made, while A indicates the first revision, and so on.

Example •

Send→ <ESC><ENQ><10>

Read← n Where n can be ‘A’ (ASCII) or 41h (hex) or 065 (dec).

ESC ENQ 11

1B 05 0B Hex
27 5 11 Decimal

Head Temperature Enquiry

Results in a 1-byte response representing the temperature of the printhead.

Example •

Send→ `<ESC><ENQ><11>`

Read← `n` Where `n` is a value representing the approximate temperature in Celsius.

The answer is a signed byte (two's complement). If bit 7 is 1 then it is a negative value; invert all bits and add 1 the get the value.

ESC ENQ 12

1B 05 0C Hex
27 5 12 Decimal

Bootware Version Enquiry

Results in a 2-byte response representing the version of the installed bootware.

The first byte represents major versions, and the second byte minor versions.

Example •

Send→ `<ESC><ENQ><12>`

Read← `<1><30>`

That is, a response with the value `<1><48>` indicates version 1.48.

Note • TTP 2100 does not store the bootware in the printer so this query will always return `<0><0>`.

ESC ENQ c — Device ID Enquiry

1B 05 63 Hex
27 5 99 Decimal

Results in a string containing the device ID in the Windows Plug and Play string format. The two first bytes represent the string length.

Example •

Send→ <ESC><ENQ>c

Read← <0><106> This indicates that the string is 104 characters (plus two characters indicating the string length).

ESC ENQ E — Read Extended Status

1B 05 45 Hex
27 5 69 Decimal

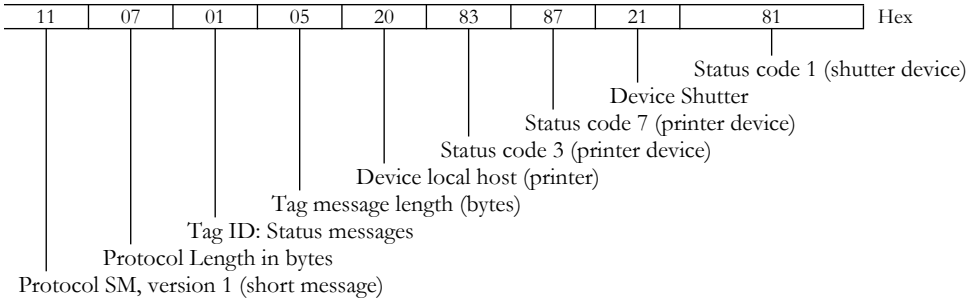
Extended status is status from the printer together with devices connected to the I^2C options-bus available in some Zebra printers (the TTP 2100 series does not have any I^2C bus so these parts of the command can be ignored). The short message protocol gives replies up to 255 bytes. Other protocols may be defined in the future. Protocols are described in separate documents.

<ESC><ENQ>E results in a variable length reply:

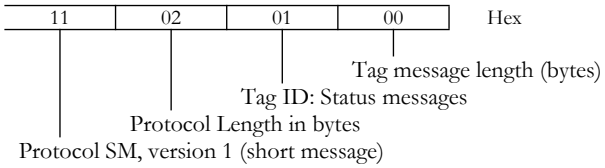
n1	Protocol version, 11h = Short Message Protocol
n2	Protocol length in bytes
n3-n255	Data specified by the protocol

Short Message Status Examples

Example 1 • Out of paper presenter Jam, and shutter open error.



Example 2 • No errors in any device.



ESC ENQ P n1

1B 05 50 n1 Hex
27 5 80 n1 Decimal

Parameter-Setting Data Enquiry

This command requests information about the setting of parameter n1, that is, the parameter value stored in EEPROM or any parameter value temporarily set by other ESC commands.

n1= 1	Gives the setting of parameter 1, etc. The parameter names are listed under Summary of Parameter Settings.
n1 = 0	Gives a response where the first two bytes specify the length of data to come, and then follows a block of data for all parameters in the temporary setup.

ESC ENQ = ?

1B 05 3D 3F Hex
27 5 61 63 Decimal

Media Loaded into Tray Enquiry

This command enquires the printer if media is loaded or not and if yes, into which input tray. The result is a 1-byte response representing tray status.

0	No media loaded
1	Media in wide tray
2	Media in narrow tray

The printer has two virtual trays that you only see when the dual media guide 01990-400 is fitted to the printer. This guide has two trays:

- one wide tray or ticket path for 82.5 mm wide tickets like boarding passes
- one narrow tray or ticket path for 54 mm wide tickets like baggage tags

This command is very useful if you need to send special set up commands to the printer once you discover which media is being loaded, and when you need to have your application format the print to fit the loaded media.

ESC ENQ H — Read Printer INFO

Hex	Decimal
1B 05 48	27 5 72

This command gives extra information about the printer.

Valid types are: SN, PN, MODEL. MOD, AST.

`<ESC><ENQ>HSN<0>` (Serial Number)

`<ESC><ENQ>HPN<0>` (Part Number)

`<ESC><ENQ>HMODEL<0>` (Printer model)

`<ESC><ENQ>HMOD<0>` (Modification level)

`<ESC><ENQ>HAST<0>` (Asset tag)

Most of the fields are only populated in printers with serial number starting with 93J.

ESC ACK n1 — Acknowledge Marker

Hex	Decimal
1B 06 n1	27 6 n1

n1 =	One-byte marker. Range <1> to <255>.

The “acknowledge marker” n is placed in the command queue and when the execution of commands reaches the marker it is sent back to the host computer. This is an addition to the status commands that pass the queue and are answered immediately when received.

Example •

"Print data" `<LF><ESC>p<ESC><ACK><1>`

Wait for `<1>`

`<RS><ESC><ACK><2>`

Wait for `<2>`

The printer will send `<1>` when `<print data>` has executed and `<2>` when the ejecting has been performed.

Note • You must wait for the acknowledge marker to return before sending any more data to the printer.

Note • Acknowledge marker cannot be used for events that write to the flash PROM, for instance font loading. This is because the writing procedure erases the buffer, including the markers, and uses all RAM in the printer.

Font Loading

The printer can store 8 fonts in its flash PROM. The memory available for fonts is printed on the self-test printout. The character size is fixed, so you must load one font file for each character size you require. The fonts are given font numbers when they are loaded into the printer. The first font is assigned number 0 and the next font 1 etc. up to font 7. Parameter p14 “Font Selection” will determine what font to use when no font selection command has been received (see Font Selection).

You cannot erase a single font, but must erase font 4-7 with command `<ESC>&D`, or all eight fonts with `<ESC>&C`, then reload the fonts you wanted to keep.

In a Windows environment, the Zebra Toolbox utility can be used for font generation and management and is available for download from http://www.zebra.com/support. If you need to load fonts in a non-Windows environment, use the `ESC & NUL` command.

The time required for processing the font data that is loaded is typically 15–20 seconds per font, excluding transfer time. During this time, any data sent to the printer will be lost.

Note • The font processing ends with a reset. The presenter motor runs momentarily to indicate that the printer is ready to be used.

Caution • Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.

File Format

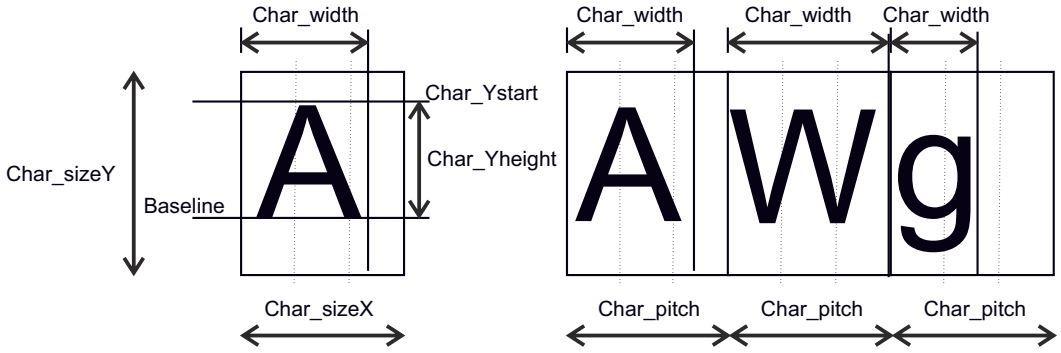
A font consists of a header describing the font, then data for every character in the font. The header has to be downloaded even if the font consists of a single character only. Below is a description of the font header.

1 byte	Reserved	Should always be 0 (zero)
1 byte	Reserved	Should always be 0 (zero)
1 byte	Char. width (X)	The number of bytes required for the width of one character, usually 2 or 3. Range 1 to 8.
1 byte	Character pitch	The maximum width of one character in the set. This value is used for tab position calculation. Range 1 to 255.
1 byte	Char. height (Y)	The maximum height of one character matrix measured in pixels. This is also the minimum line spacing for this character set.
27 byte	Font name	String of characters used to identify the character set. This will be printed on status printouts. (e.g., Swiss 10 cpi.)

Char_matrix table: 256 records, each containing 3 bytes.

3 byte Char_width (pixels) + Char_Ystart (pixels) + Char_Yheight (pixels)

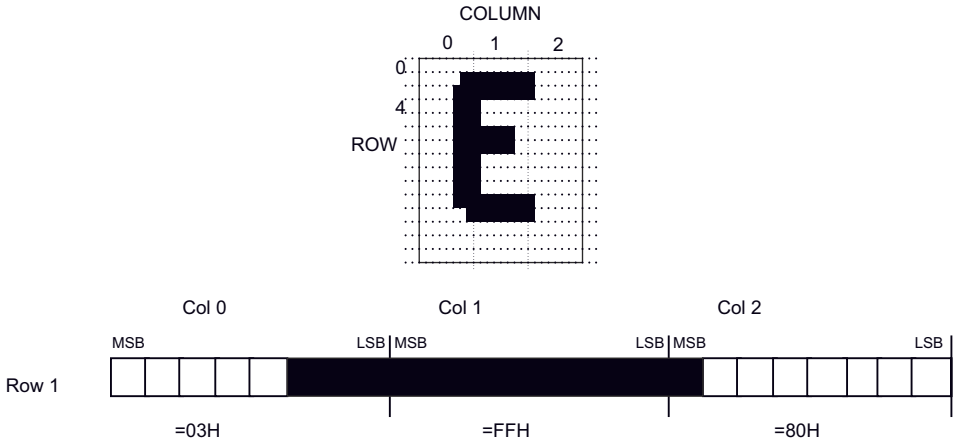
Char_bitmap data: Bitmap data for all characters that are to be defined.



Character Bitmap Data

A character is made up of a bitmap the size of which is:

Char. width (X) * Char. Height (Y) bytes.



The bitmap data consists of bitmap patterns for each character in a character set for which the parameter Char_width in the Char_matrix table is set to a value between 1 and 24. A character that has its Char_width set to zero, is not included in the bitmap data.

The bitmap for one character is then defined according to the following table:

Example • In this example, each row consists of 3 columns equal to 3 bytes.

(COL 0, ROW Ystart), (COL 1, ROW Ystart), (COL 2, ROW Ystart)

(COL 0, ROW Ystart+1), (COL 1, ROW Ystart+1), (COL 2, Ystart+1)

(COL 0, ROW Ystart + Yheight), (COL 1, ROW Ystart + Yheight), (COL 2, ROW Ystart + Yheight)

In order to minimize the required storage space, only rows between Ystart and Ystart + Yheight are included in the character bitmap.

Logotypes

Up to 16 logotypes can be stored in the flash PROM of the printer. The logotypes can be positioned and printed out with commands <ESC>g or <ESC>L.

The exact number of logotypes and their sizes is determined by the total amount of memory used for fonts, logotypes and loaded firmware. Make a test printout to see how much memory is available.

Note • Logotype No. 0 is printed in the top of the self test printout, so this can be used to customize the self test printout.

Loading

Windows software that converts black and white BMP bitmap files to logotypes and loads them into the printer is available in the Zebra Toolbox utility, which is available to download from http://www.zebra.com/support.

If you need to load logotypes in a non-Windows environment, use the ESC & 1 command.

The time required by the printer to process logotype data, excluding transfer time from the PC, is typically 15 to 20 seconds, per logotype. During this time, any data sent to the printer will be lost.

File Format

A header containing information about the logotype number, size and logotype name shall define each loaded logotype. Immediately after the header follows the actual bitmap of the logotype.

<ESC>&<1><Header><Bitmap>

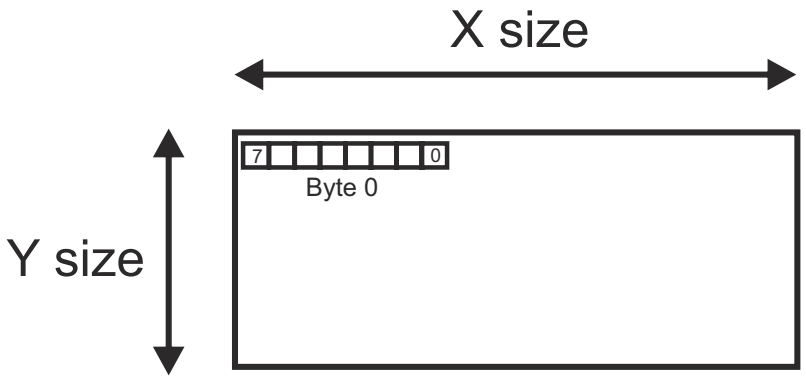
Header

Byte 0	Logotype number used to identify the logotype when printing.
Byte 1	X size measured in bytes.
Byte 2	Y size measured in pixels.
Byte 3-15	A logotype name that will be printed on test printouts.

Bitmap

The bitmap **must** have exactly (X size * Y size) number of bytes. 1=black, 0=white dot.

Bit No. 7 in byte 0 represents the top left corner of the logotype.



Printing

To print a logotype you can use two commands, <ESC>L<n1>, prints the logotype at the current cursor position, just like any character. <ESC>g<n1>...<n5> prints the logotype at a specified X-Y position.

n1	One byte logotype number, (0-15)
n2n3	Two byte X position measured in pixels from the left hand edge of the print window.
n4n5	Two byte Y position in pixels from top of the page. These bytes must always be inserted but they are ignored in variable-page-length mode where logotypes are always printed at the current Y-position.

Erasing

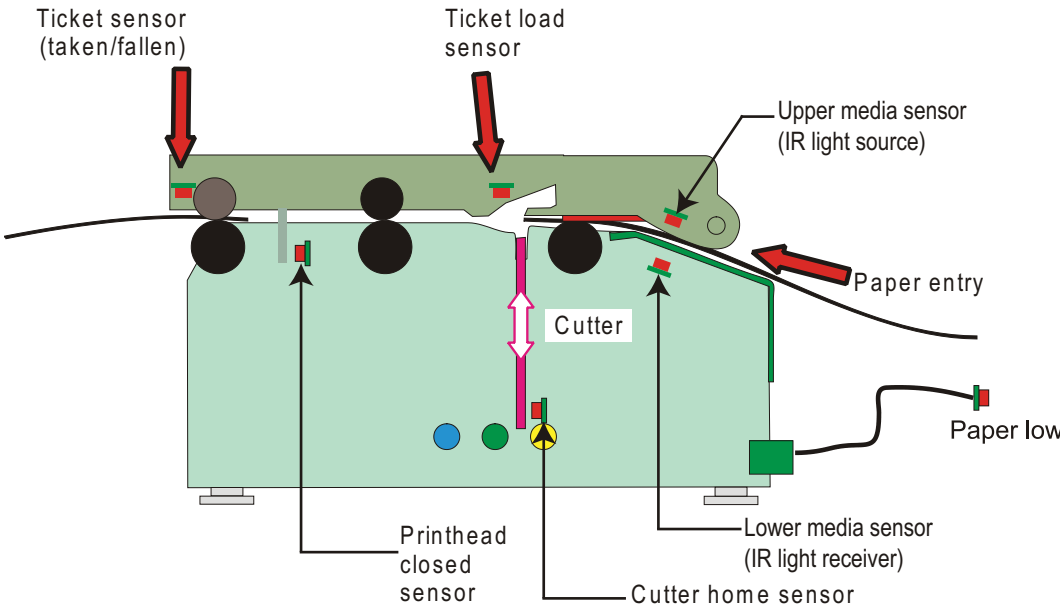
All logotypes are erased with the <ESC>&<L> command.

Caution • Loading to the flash PROM will erase the RAM completely since the RAM is used during the loading process. Any print data residing in RAM will thus be lost.

Status Reporting

The printer is equipped with a number of sensors that report the printer status and various conditions such as out-of-paper, previous printout not removed, etc.

Figure 30 • Sensor placement in the printer



A good practice in unattended printer applications is to check for errors and paper availability before printing.

1. Send a Status Report Query (<ESC><ENQ><6>) and check that the answer is "No errors"

2. If “Status codes available” is indicated, read out the status message with Status Request (<ESC><ENQ><1>), and take appropriate actions.

3. Send a paper-near-end query (<ESC><ENQ><2>) to see if the sensor reports low paper level.

4. If paper-near-end is indicated, report the condition to the systems supervisor to schedule a service visit to the printer.

5. Print the printout.



Notes • A status reply must be read! Sending a second status query without reading the reply of the first query may lock the printer.

When using a multitask OS, status queries and responses may not be transferred immediately from your application to the printer and vice versa. So write your program in such a way that it repeats the query if it gets a timeout or an invalid reply. Good practice is to ask once every ten seconds, five times before giving up.

You should construct your application in such a way so as not to request status while printing, as this can result in loss of data.

6

Default Parameter Settings

Contents

Parameter Settings. 91
How the Parameters are Described 92
Summary of Parameter Settings 92
Serial Interface Set-up 94
Print Setup 95

Parameter Settings

Some of the printer settings can be stored in an EEPROM so that they will be used also after power OFF.

The stored parameter settings are printed out on the self-test printout.

The number in front of the function is the parameter number (n) used when setting the parameter with the command <ESC>&P<n><v>.

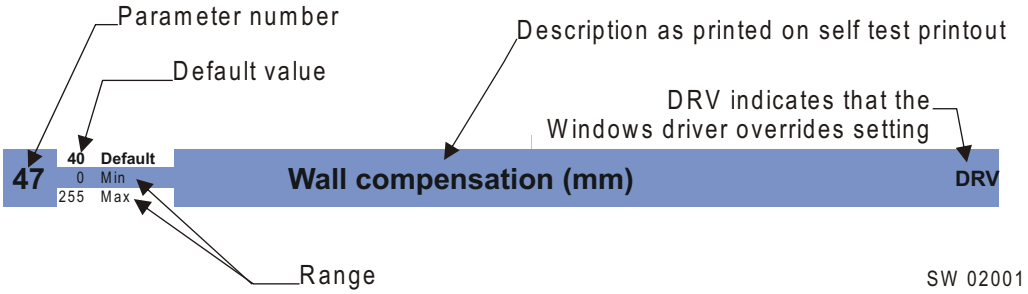
You can use the parameter settings like normal commands. Either send the parameter values with each printout, or set them up once and then send <ESC>&<4> to store all settings in the EEPROM.

You can always return to factory default settings by sending <ESC>&F, and then storing those settings with <ESC>&<4>.

Note • The parameters can be locked so that no changes are possible. Check parameter 53 on the self-test printout to find out.

Note • If you try to set a parameter to an invalid value, the parameter will be set to the nearest valid value below.

How the Parameters are Described



Default Value

The default values indicated are “factory default settings” you get by sending <ESC>&F. These are not necessarily the settings that your printer was originally delivered with because many printers have customized settings when delivered.

Examples

Command examples are formatted in Courier and typed in the same way as used in the Zebra Toolbox:

<ESC>&P<1><19>

Where <ESC> means the escape character 27 decimal (hex 1B). Numbers between less-than and greater-than characters, for example <1><15>, means 1 and 15 decimal (hex 1 and F).

Summary of Parameter Settings

Parameter	Description	ESC&F Default	Page	TTP model	
				2110	2130
1	Baud rate	96 (9600 Baud)	94	X	
2	Data bits	8	94	X	
3	Parity	0 (No parity)	94	X	
4	Flow control	2 (Hardware)	95	X	
7	Burn time	9	95	X	X
8	Print speed	17 (123 mm/s)	95	X	X
10	Pulse control	3 (2 burn pulses)	95	X	X
12	Font attributes	0 (off)	96	X	X
13	Line spacing	0 (Auto)	96	X	X

Parameter	Description	ESC&F Default	Page	TTP model	
				2110	2130
14	Font selection	0 (ATM9)	96	X	X
15 to 30	Tab stop	4, 8, 12 etc.	96	X	X
31	Presenter speed	150	97	X	X
33	CR/LF	0 (LF = CR/LF, CR=Ignored)	97	X	X
34	Auto cut after FF	1 (Off)	97	X	X
35	Black mark sync	1 (On)	98	X	X
36	Document mode	1 (Variable)	98	X	X
37 & 38	Page length, Minimum / fixed / BM	2, 88 (75 mm)	99	X	X
39	Max black mark length	80 (10 mm)	93	X	X
40	Min black mark length	24 (3 mm)	93	X	X
41 & 42	Black Mark cut offset	0, 0 (0 mm)	93	X	X
43 & 44	Black Mark top margin	0, 0 (Disabled)	101	X	X
46	Cut position calibration	0 (no adjustment)	102	X	X
47	Wall compensation	0	102	X	X
48	Print width	0 (Auto)	103	X	X
49	Advance before cut	0 (Off)	103	X	X
51	Black mark level	75	93	X	X
52	Warning level	0 (Off)	104	X	X
53	Lock parameters	0 (Unlocked)	104	X	X
56	Max status code	255 (Show all)	104	X	X
57	System	247 (Gap sensor)	105	X	X
58	Out of paper level	0	105	X	X
59	Vendor class mode	0 (Disabled)	106	X	X
60	Partial cut length	10	106	X	X
61	TOF Sensor Mode	2 (Gap sensor)	107	X	X
62	TOF Sensor Mask	11 (Masks away sensor BM 3)	107	X	X
63	BM Sensor	0 (Auto select between sensors 1, 2, 3, and 4)	107	X	X
64	Bit Operations	1 (move back to home position)	108	X	X
65	Sensor selected	Information only field	108	X	X

Note • When the printer is set up the way you like it to be, you send <ESC>&4h, and all settings will be stored.

Serial Interface Set-up

1 Baud Rate

96 Default
11 Min
96 Max

Stores the communication speed on the serial interface.

<ESC>&P<1><24>	2400 bps
<ESC>&P<1><48>	4800 bps
<ESC>&P<1><96>	9600 bps
<ESC>&P<1><19>	19200 bps
<ESC>&P<1><38>	38400 bps
<ESC>&P<1><57>	57600 bps
<ESC>&P<1><11>	115200 bps

Note • If you set an invalid value, the baud rate will return to the previous value.

2 Data Bits

8 Default
7 Min
8 Max

Selects if 7-bit ASCII, or 8-bit, is used on the serial interface.

<ESC>&P<2><8>	8-bits (characters 0-255)
<ESC>&P<2><7>	7-bits (characters 0-127)

Note • In 7-bit mode you cannot print graphic, read status or set parameters because no value can ever be greater than 127.

3 Parity

0 Default
0 Min
2 Max

Select what parity to use on the serial interface.

<ESC>&P<3><0>	No parity
<ESC>&P<3><1>	Odd parity
<ESC>&P<3><2>	Even parity

4 Flow-control

2 Default
0 Min
2 Max

Select the handshaking method to use on the serial interface.

<ESC>&P<4><0>	No flow control
<ESC>&P<4><1>	Xon / Xoff
<ESC>&P<4><2>	Hardware

Print Setup

7 Burn Time DRV

9 Default
1 Min
15 Max

A long burn time gives darker print. On insensitive paper types you may have to increase the burn time to get an acceptable print quality.

8 Max Print Speed DRV

17 Default
1 Min
17 Max

The main reason to decrease the print speed is to enhance print quality, and to reduce average current consumption.

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
mm/s	47	48	49	50	51	52	53	55	57	61	65	70	77	86	96	107	123	136	150

Note • Low speed settings may result in printer chassis resonance causing increased noise and deteriorated print quality.

10 Printhead Pulse Control

3 Default
1 Min
7 Max

Controls how the printhead burns the pixels. Four burn pulses give a more even blackness over the width of the paper and a lower peak current consumption. Two burn pulses give faster printouts at high burn times. At normal burn times the speed is the same for both settings.

<ESC>&P<10><3>	2 burn pulses
<ESC>&P<10><7>	4 burn pulses

Caution • Values 3 and 7 are the only allowed settings. Do not set anything else!

12 Font Attributes

0 Default
0 Min
255 Max

Selects which font attributes are selected at power ON or after reset. Font attributes bold, height and width are stored in this parameter.

bits 0-3	Height Multiplier
bits 4-6	Width Multiplier
bit 7	Bold enable

13 Line Spacing

0 Default
0 Min
30 Max

The line spacing is normally set by the font height. With this parameter you can set a line spacing that is higher that the font height. Line spacing settings lower than the font height will be ignored.

<ESC>&P<13><30>	30 pixels or font height, whichever is the largest

14 Font Selection

0 Default
0 Min
7 Max

Store which font number is used if no font is specified. Font is selected using the “Select Font” command <ESC>!<n>. Selecting an invalid font gives a software error status message (invalid index).

15 to 30 Tab Stop

- Default
1 Min
255 Max

Stores 16 different TAB stop positions. The position is set in increments of 2.5-mm.

Tab position 255 sets a tab stop on the last position of the line. Use this if you want underline or reversed text to extend across the full paper width.

To set all tab stops at once, follow the procedure Set Several Parameters at Once.

To move a single tab stop, use the set parameter command <ESC>&P. For example:

Example • This example sets the first tab stop 25 mm from the left margin.

```
<ESC>&P<15><10>
```

Default positions are one TAB on each cm; that is parameter values 4, 8, 12 etc.

31 Presenter Speed

150 Default
0 Min
150 Max

Sets the speed at which the paper is presented/ejected. 1 = 10 steps/s, therefore the default setting of 150 means 1500 steps/s. Do not exceed the default setting, as this may cause the motor to stall. To print in cold weather conditions, it may be necessary to reduce the speed. In addition, parameter 8 may need to be adjusted for temperature.

<ESC>&P<31><150>	Sets speed at default setting of 150 (1500 steps/s)

33 CR/LF Behavior

0 Default
0 Min
4 Max

Carriage Return and Line Feed can be interpreted in five different ways to suit different operating systems.

<ESC>&P<33><0>	LF = CR/LF	CR = Ignored
<ESC>&P<33><1>	LF = CR/LF	CR = CR
<ESC>&P<33><2>	LF = LF	CR = CR
<ESC>&P<33><3>	LF = LF	CR = CR/LF
<ESC>&P<33><4>	LF = Ignored	CR = CR/LF



Note • The character currently interpreted as LF converts text from the input buffer to pixels on the paper. If no such character has been received after 379 characters, a linefeed is inserted automatically.

34 Auto Cut After FF

1 Default
0 Min
1 Max

Decides if the printer should cut after executing an FF command, or if it should just feed the form length.

<ESC>&P<34><0>	No cut
<ESC>&P<34><1>	Cut

35 Black Mark Sync DRV

1 Default
0 Min
1 Max

Determines what should control the page length:

<ESC>&P<35><0>	No synchronization
<ESC>&P<35><1>	Cuts will be synchronized with black marks / gaps.

This parameter also determines the function of auto sensor calibration:

- If black mark / gap sync is enabled, the auto calibration will set n37 - n40, n51, n57 bit 3, n58, n61, and n62.
- If set to zero, only the BM level n51, and out of paper level n58 will be set.

Note • Use parameter n61 to select if gaps or black marks should be detected. The default behavior is to detect gaps.

36 Document Mode DRV

1 Default
0 Min
1 Max

Determines what should control the page length:

<ESC>&P<36><0>	Fixed Document Mode. Shorter documents will automatically be extended, while longer documents will be divided into several pages of the desired length. Page length will be the length set by parameters 37 and 38.
<ESC>&P<36><1>	Variable Document Mode. The length of the page varies with the contents (printouts shorter than the value specified by parameters 37 and 38 will be extended to that length).
<ESC>&P<36><3>	Single Page Mode. The printout is limited to a single page and will stop printing when a delimiter (e.g., black mark, gaps, and punched holes, etc.) is reached. It will not print or feed any more until a cut command is received.

Note • Max page length in Fixed Document Mode is determined by free RAM (printed on self test printout) and print width setting parameter n48. For example, if print width is 50 mm and free RAM is 180267 bytes, max page length is 180267/(50x8)=450 mm.

37 & 38	2, 88 Default 0, 0 Min 255, 255 Max	Page Length	DRV

Defines three different things:

1. The minimum length of a page in variable document mode
2. The actual page length in fixed document mode
3. The distance between black marks in black mark mode

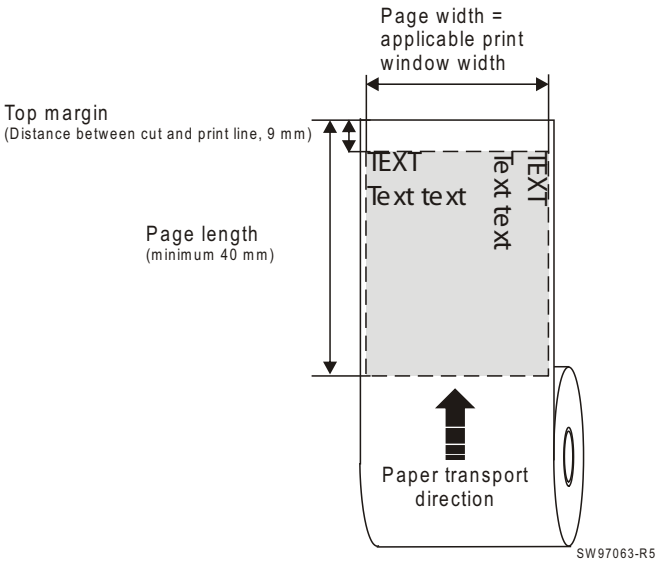
Note • If auto calibration has been used, it is not necessary to make any changes to this parameter.

One step is 0.125 mm. Settings shorter than 37 mm will be extended to 37 mm when printing.

<ESC>&P<37><2><ESC>&P<38><88>	Set page length to 75 mm.

Figure 31 • Definition of Page Size

Length	p37	p38
40 mm	<1>	<64>
75 mm	<2>	<88>
85.6 mm	<2>	<173>
156 mm	<4>	<224>
203 mm	<6>	<90>
16”	<12>	<180>
19”	<15>	<21>
21”	<16>	<171>



Fixed Document Mode

In *fixed document mode*, the printable length depends on the amount of free RAM and the print width setting. Make a self-test printout to check how much is available in your printer (depends on firmware version).

$$Printable\ length = \frac{Free\ RAM\ in\ bytes}{Print\ width\ setting\ (n48) \times 8}$$

To get the paper length, you must add the top and bottom margins in mm to the printable length. Paper width is in bytes or mm (1 byte = 1 mm).

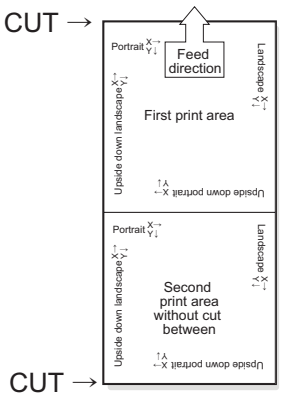
Example • Free RAM on a TTP 2100 is 114627 bytes, print width is 80 mm = 80 bytes, top margin is 20 mm, and bottom margin 10 mm.

$$Page\ length = \frac{114627}{80 \times 8} + 20 + 10 = 209\ mm$$

Printable length — **Top margin** — **Bottom margin**

If a too large fixed page is specified the printout will be blank from memory full to the cut.

Note • If the length is too short one can stack fixed documents print lengths one after another with a print command between and make printouts of any size. Each of these stacked squares can have different lengths, and build a 21” bag tag for example, with all its individual elements in the right places.




```
<ESC>&P<36><000><* Document Mode: Fixed>
<ESC>&P<37><002><* Printout length fist area (High Byte)>
<ESC>&P<38><048><* Printout length fist area (Low Byte)><ESC>o<0>Portrait<LF>
<ESC>o<1>Landscape<LF>
<ESC>o<2>Upside down Portrait<LF>
<ESC>o<3>Upside down Landscape<LF>
<ESC>p

<ESC>&P<37><001><* Printout length second area (High Byte)>
<ESC>&P<38><224><* Printout length second area (Low Byte)>
<ESC>o<0>Portrait<LF>
<ESC>o<1>Landscape<LF>
<ESC>o<2>Upside down Portrait<LF>
<ESC>o<3>Upside down Landscape<LF>
<RS>
```

39 BM (Black Mark) Length

50 Default
1 Min
160 Max

Specifies the length of the black mark in 0.125-mm steps. Measure the length of the black mark on your paper and enter that value here.

Marks 5 mm longer than this value are interpreted as paper out. The default value of 80 equals 10 mm.

<ESC>&P<39><40>	Sets max black mark length to 5 mm.

40 Min BM (Black Mark) Length "Garbage Filter"

30 Default
1 Min
159 Max

Specifies the minimum length of the black mark in 0.125-mm steps. Shorter marks are ignored. The default value of 24 equals 3 mm.

<ESC>&P<40><36>	Sets minimum black mark length to 4 mm.

41 & 42 BM (Black Mark) Cut Offset

0, 0 Default
0, 0 Min
255, 255 Max

Defines the paper feed between the black mark detection and cut. One step is 0.125 mm.

<ESC>&P<41><1><ESC>&P<42><144>	Feeds 50 mm between black mark and cut.
<ESC>&P<41><0><ESC>&P<42><0>	Automatically sets cut offset so the printer cut is in the middle of the black mark.

43 & 44 Top Margin (mm)

0, 0 Default
0, 0 Min
255, 255 Max

Defines the distance between the cut in black mark mode and the top of the first text line in 0.125 mm steps.

0	Disabled top margin. This gives the physical top margin of the printer, which is 9 mm.

Settings that give a shorter margin than 9 mm will be extended to 9 mm so this parameter can only be used to extend the margin, not reduce it.

<ESC>&P<43><0><ESC>&P<44><240>	Add 30-mm top margin.

46 Cut Position Calibration

0 Default
0 Min
255 Max

Calibrates the cut position. The value is a signed byte.

A change of 1 moves the cut 1/8 of a mm *more* than normal.

A change of –1 moves the cut 1/8 of a mm *less* than normal. -1 is entered as 256-1=255

The positive range is 1-127. The negative range is 128-256

This parameter can be individually set for each printer and is not affected by the driver or reset commands. It is used to compensate for differences in sensor position in production. After moving or replacing the TOF-sensor, the calibration may have to be done again.

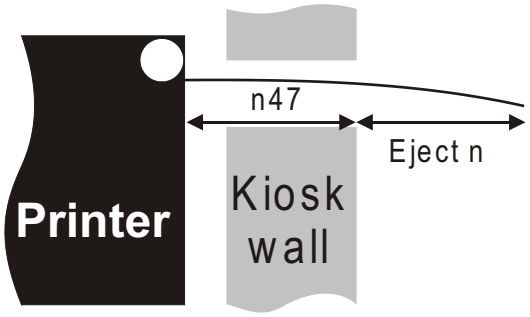
Note • The cut is not 100% repetitive because the paper may be closer to the sensor for one ticket than it is for the next. So do not expect a perfect synchronization between perforation and cut.

It is better to cut slightly after a perforation than before because cutting before a perforation leaves a flap that is pushed through the printer and may cause a paper jam.

47 Wall Compensation (mm) DRV

40 Default
0 Min
255 Max

When the printout is printed and cut, the presenter ejects 50 mm of the page so that the customer can grab it. If the Kiosk wall is thick, or if you just want a longer part of the printout to be visible, this parameter adds extra eject length.



<ESC>&P<47><50>	Adds 50 mm extra eject = 100 mm in total.

48 Print Width (mm) DRV

0 Default
0 & 20 Min
80 Max

Sets the width of the print area on the paper. The range is 20 to 80 mm. This can also be used to get left and right margins, for instance if you load 80 paper but set the paper width to 60 mm you get a 10 mm margin on both sides of the page.

Note • You should not change paper width within a page.

<ESC>&P<48><0><ESC>&<4>	Detects if wide or narrow paper is loaded and sets print width (54 or 72 mm) depending on which is detected
<ESC>&P<48><60><ESC>&<4>	Sets 60 mm print width

Note • We recommend you to set a somewhat narrower print width than the loaded paper width to allow the paper to wander a bit sideways without losing print.

49 Advance Before Cut DRV

1 Default
0 Min
1 Max

Selects if the cut command cuts at the position where the paper is at, or if the printer should advance the paper before cutting.

<ESC>&P<49><0>	Off
<ESC>&P<49><1>	Automatic Distance Calculation

Set to 1 if the printer is used in text mode and 0 if it is used from a driver that takes care of this in the driver.

Note • The paper is advanced before the FF command calculates the page length to see if the page length is longer than the set minimum length.

51 Black Mark Sensitivity

50 Default
0 Min
255 Max

Sets the lever at which the sensor output is interpreted as paper or as black mark.

<ESC>&P<51><0>	White
<ESC>&P<51><255>	Pitch black

Note • This parameter is set automatically when you run the Calibrating the TOF Sensor procedure manually or using ESC #.

52 Warning Level

0 Default
0 Min
255 Max

Turns on/off indication of Paper near end level on the status indicator. This affects only the status indicator, not the status enquiries

<ESC>&P<52><0>	No indication
<ESC>&P<52><1>	Paper Near End indication

53 Lock Parameters

0 Default
0 Min
2 Max

You can lock the parameters so that they cannot be changed by the ESC & P command.

<ESC>&P<53><0>	Unlocked
<ESC>&P<53><1>	Locked
<ESC>&P<53><2>	Lock only parameter n36 from being overwritten to prevent the driver from disabling cut enforcement mode

56 Max Status Code

255 Default
0 Min
255 Max

This will control the highest status code that is reported by <ESC><ENQ><6> and <ESC><ENQ><1> (Pending-status-code bit). You use this if your Kiosk software is not written so it masks away unknown status messages.

Example • If you want the TTP 2100 to be compatible with software written for TTP 1020, set parameter 56 to 6h and error codes 7 and up will not be reported.

57 System

247 Default
0 Min
255 Max

The System parameter will control up to eight system components in the printer.

The bits specified so far are these:

bit 0	Clear presenter at reset
bit 1	Pull detector
bit 2	-
bit 3	Standard BM
bit 4	Disable USB reconnect

Setting a bit to 1 enables the function and setting it to 0 disables it.

Note • Bits whose function are not yet specified must always be set to 1.

Note • n57 is a bit field value. From Firmware version 3.89 and higher there is a command available to set individual bits in a bit field without affecting other bits. See *ESC & b n1 n2 n3* on page 43.

Examples •

`<ESC>&P<57><254>` Presenter will not be cleared at power ON and reset.

`<ESC>&P<57><253>` The pull detector is disabled.

`<ESC>&P<57><252>` The presenter will not be cleared at power ON and reset and the pull detector is disabled.

`<ESC>&P<57><239>` The printer will monitor USB heartbeat, and thus try to reconnect if it disappears.

`<ESC>&P<57><247>` The printer is reset to normal behavior (gap sensor).

58 Out-of-Paper Level

0 Default
0 Min
255 Max

Sets the level at which the TOF sensor detects out of paper. The out-of-paper level may differ from the black mark level on label stock where the foil opacity indicates top of form.

Note • This parameter is set automatically when you run the Calibrating the TOF Sensor procedure manually or using ESC #.

59 Vendor Class

0 Default
0 Min
1 Max

Switches identity of the device from Printer Class (7 hex) to Vendor Class (FF hex).

This parameter is used when you want to communicate with an USB printer in Linux without having to install a driver.

The vendor class parameter is normally 0, which sets the TTP 2130 to be a Printer Class device. If you set it to 1, the TTP 2130 will be a Vendor Class device, which means that it will not require a driver but will appear as a file in Linux. You can then communicate with the printer just by writing data to, or reading from, that file.



Caution • When not set to “Printer Class”, no programs that rely on the Windows printer driver will be able to communicate with the printer, and thus not be able to reset the parameter to Printer Class again. To reset the printer to Printer Class:

1. Power OFF the printer.
2. Disconnect the USB cable.
3. Open the printhead and remove the paper.
4. Hold the Feed button down and power ON the printer with the printhead open.
5. Connect the USB Cable.
6. Save Parameter Settings with <ESC>&<4>.

60 Partial Cut Length

10 Default
1 Min
40 Max

Sets the length of the partial cuts in mm from the edges of the paper (the blade cuts from the paper edges towards the middle).

The paper width parameter n48 is used to specify the edges of the paper so the printer knows where to start to cut. If parameter n48 is set to auto width, the setting of the TOF sensor selector switch determines the print width and thus also the start position for the partial cut.



Caution • A too large partial cut may cause problems with the presenter, so stay with the default setting if possible.

61 TOF Sensor Mode

2 Default
0 Min
2 Max

TOF Sensor Mode should be set to 1 for media where the cut should be synchronized with black marks printed on the back of the media.

It should be set to 2 for media where the cut should be synchronized on gaps, holes, or space between labels.

0	All transmitters OFF
1	Reflex sensor mode
2	Gap sensor mode

62 TOF Sensor Mask

9 Default
0 Min
255 Max

The sensor mask is set automatically at calibration. It will mask away all sensors seeing the guide and is used for the virtual sensor “Paper before head” and will affect paper loading and calibration start. Any raw value will not be affected by the mask.

bit 0	Sensor BM1 in use (edge sensor for 82.5 mm paper)
bit 1	Sensor BM2 in use (center sensor)
bit 2	Sensor BM3 in use (sensor 17.5 mm from center)
bit 3	Sensor BM4 in use (sensor 12.5 mm from center)
bit 4	Reserved, shall be 0

Note • n62 is a bit field value. From Firmware version 3.89 and higher there is a command available to set individual bits in a bit field without affecting other bits. See *ESC & b n1 n2 n3* on page 43.

63 BM Sensor

1 Default
0 Min
4 Max

Selects which sensor should be used for black mark/gap detection.

<ESC>&P<63><0>	Auto, selects sensor BM1, BM2, BM3, or BM4 depending on paper width and TOF mark availability
<ESC>&P<63><1>	Force the use of sensor BM1 (edge sensor for 82.5 mm paper)
<ESC>&P<63><2>	Force the use of sensor BM2 (center sensor)
<ESC>&P<63><3>	Force the use of sensor BM3 (sensor 17.5 mm from center)
<ESC>&P<63><4>	Force the use of sensor BM4 (sensor 12.5 mm from center)

64 Bit Operation

255 Default
0 Min
255 Max

Controls the presenter clearing behavior.

The bits specified so far are these:

bit 0 = 1	Move back to home position
bit 0 = 0	Move forward to the cut position, cut and eject

Note • Unspecified bits are bit 1 through bit 7. Bits whose function are not yet specified must always be set to 1.

Note • n64 is a bit field value. From Firmware version 3.89 and higher there is a command available to set individual bits in a bit field without affecting other bits. See *ESC & b n1 n2 n3* on page 43.

65 Sensor Selected

1 Default
1 Min
4 Max

Shows what sensor is in use by the system when n63 is set to 0 (Auto) sensor mode. This parameter cannot be set, only read out.

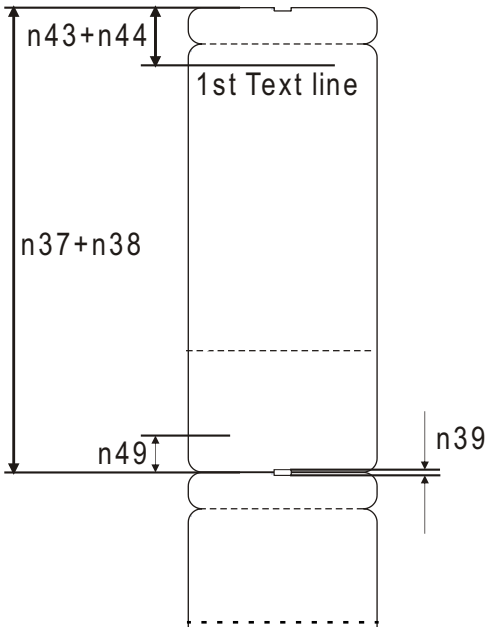
7

Page Setup

Contents

Printable Area 109
Aligning Preprint and Thermal Print 110
FF (Form Feed) 113
Black Mark Sensing from within Windows 113

Printable Area



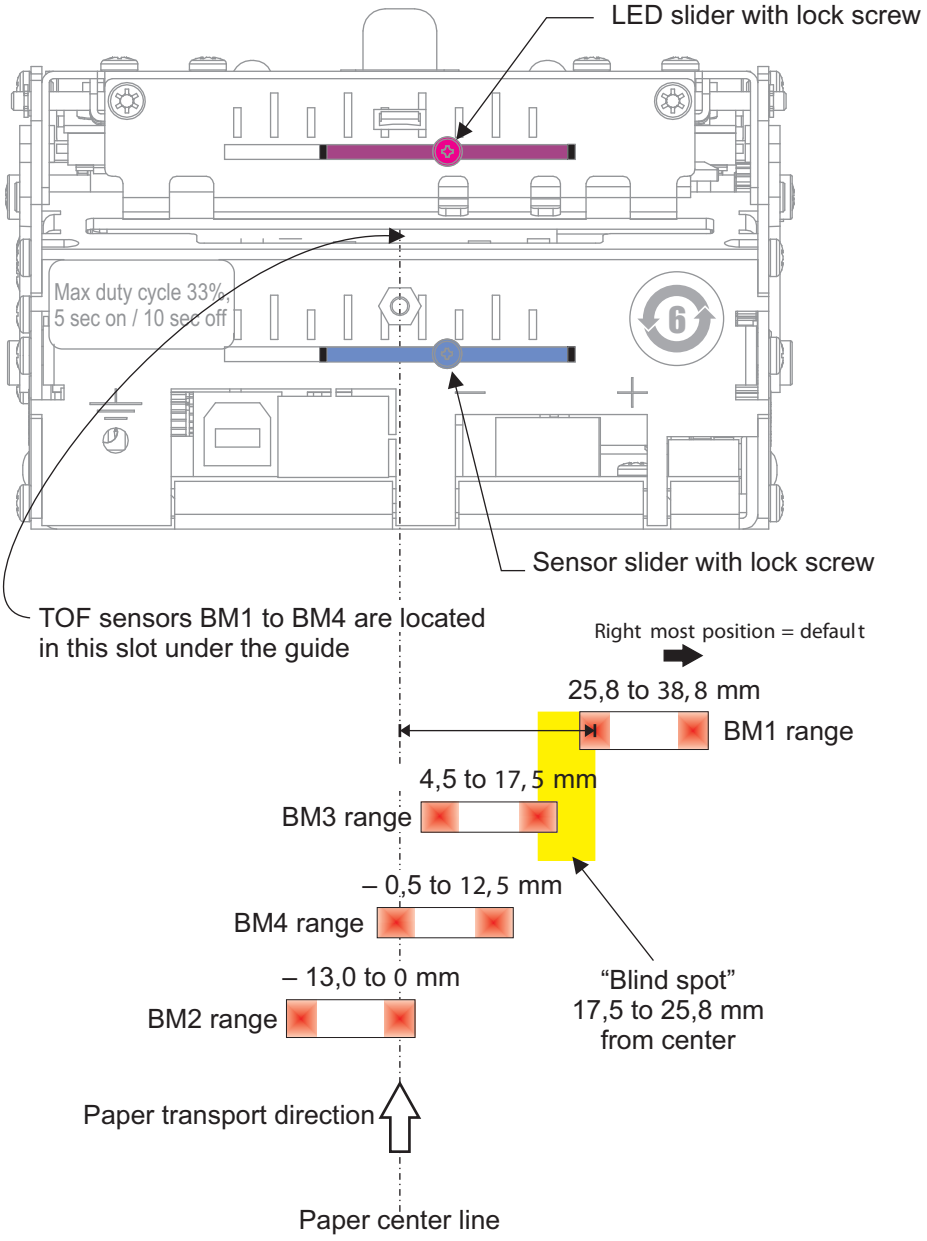
Top margin, bottom margin, page length, and synchronization with preprint are set up with parameters in the printer. In addition to the above, n41+n42 are used if the hole or black mark is not on the desired cut position.

Aligning Preprint and Thermal Print

The printer normally synchronizes the cutting with black marks printed on the back of the paper, punched holes, or gaps in-between tickets. If you use continuous paper without TOF marks, you can disable TOF mark check by setting parameter 35 to 0 and storing the parameters.

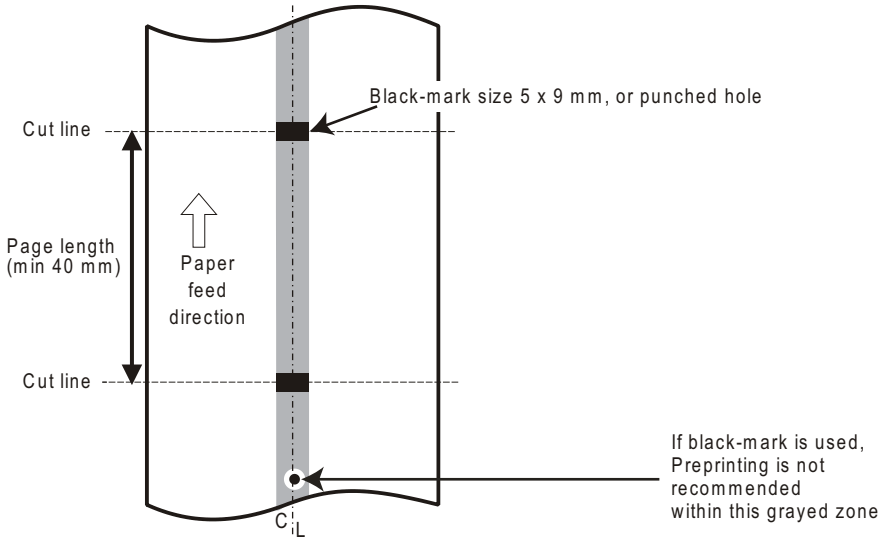
The sensor used to detect the marks is the same sensor as used for paper end detection. Several sensors are provided to take care of most ticket material. If the standard positions at center—12.5 mm, 17.5 mm, and 38.8 mm to the right of center—are not enough, the sensors can be moved up to 13 mm to the right.

Figure 32 • Sensor Positioning



For the best results when designing paper with a TOF mark, place the mark at the center, as this works for any paper width.

Figure 33 • Recommended Black Mark Size and Position



The sensor measures the length of the black mark (in the transport direction), and the cut is placed in the middle of the mark.

Since the same sensor is used for both paper end and black mark detection, the printer must know the length of the black mark to avoid signaling end-of-paper when it detects a black mark. When you perform an auto calibration, the printer measures the TOF mark size and stores the values in the parameter memory, so you need not enter any values yourself.

Note • It is essential that you store the parameters in the printer for black mark synchronization even if you enable black marks in the Windows driver. This is because Windows is not used at paper loading, and feeding with the FF button on the printer.

Simple Calibration Process

1. Open the printhead.
2. Remove ticket stock.
3. Press and hold the Feed button, and then close the printhead (keeping the button pressed the entire time).
4. Release the button.

   The Status LED should be off.
5. Load ticket stock (slide it into the paper guide and let the printer auto load the paper).



Note • To ensure good calibration conditions, lightly press the ticket stock towards the bottom of the input guide during calibration.

The printer will forward the paper until it finds two TOF marks and then stop and save all TOF-mark parameters.

6. Open the printhead and remove the ticket stock.
7. Close the printhead and feed the tickets in through the paper guide again.

   The printer is ready for use.

Repeat this procedure if the calibration fails or if the printer is used with tickets that differ from the original specification.



Note • If you use the dual guide 01990-400, you must calibrate once with the wide media (82.5 mm) and once with the narrow media (54 mm). The printer will store individual values for both widths and use the appropriate values for the ticket stock loaded.

The following parameters are affected: n37 - n40, n51, n57 bit 3, n58, n61 and n62.

FF (Form Feed)

Use Form Feed (FF) to print the buffer content, go to the next top of form (black mark), and cut the paper.

<ESC>Z (Go To Next Top of Form)

Use <ESC>Z to move the paper to the next top of form. This is practically a Form-Feed without printing and cut. It searches for the next black mark for maximum one page length + black mark length (256 x n37 + n38 + n39)/8. An additional length of 20 mm is added to be sure to pass the edge of the next black mark. If there is no black mark within the set distance plus 20 mm, an error is raised.

The commands are used together as shown in the following example.

Example • The following examples are not made for a specific programming language or editor, but can be implemented with the tools of your choice. The data sent **to the printer** are marked with "Send→".

When setting up the printer:

Send→ <ESC>&P<35><1> Enables black mark sync

Cut Offset parameters n41 and n42.

Send→ <ESC>&<4> Stores the above parameters as default parameters.

The above sets up and stores the parameters in the EEPROM of the printer, so this needs only be sent once to the printer when setting it up for TOF-mark sync.

Document:

Send→ the text and graphics

At the end of the document:

Send→ <ESC>Z Feeds the printout to the next black mark + the additional feed specified by the Cut Offset parameters n41 and n42 command.

Send→ <RS> Cuts and ejects the printout.

Black Mark Sensing from within Windows

Refer to the *Kiosk Printer Driver User Guide*, available for download from www.zebra.com/support for detailed information on Black Mark Sensing.



Notes •

8

Interface

Contents

Serial: TTP 2110 115
USB: TTP 2130 117

Printer Interface

The printer has one standard interface, and an optional serial interface. There are no selections to be made, but only one interface can be used at a time. The printer will not function properly if data is received on more than one interface at a time.

Serial: TTP 2110

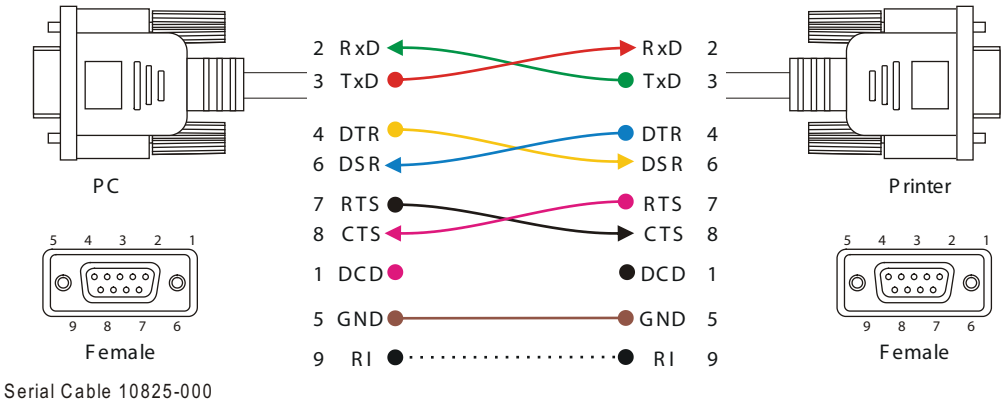


Caution • Using a non-approved cable with the printer may void the FCC and other EMC approvals of the printer.

The RS-232 interface of the TTP 2110 printer has a transfer speed that can be set to between 2400 and 115200 bits/s.

Applications where text-only printouts are to be printed are suitable for serial interface because of its easy to use bidirectional capability. The relatively low transfer speed limits the printing speed when printing graphics. Full-width graphics with 115200 bits/s result in printing speeds of about 24 mm/s for the 80-mm version of the printer.

Figure 34 • Serial connector pin assignment



Setup Options

Parameter	Options
Baud	2400, 4800, 9600, 19200, 38400, 57600, and 115200 bits/s
Flow control	None, Xon / Xoff, or Hardware
Data bits	7/8
Stop bits	1 (fixed)
Parity	None, Odd, or Even

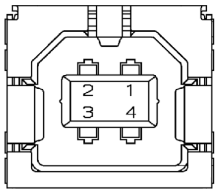
Default Settings: 9600 bit baud, Hardware flow control, 8 Data bits, 1 Stop bit, and no parity.

See also Default Parameter Settings.

USB: TTP 2130

The USB (Universal Serial Bus) is an interface designed to handle peripherals daisy chained to a single connector. The transfer speed is up to 12 Mbits/s, which is quite adequate for the printer. Use this interface in operating systems with USB support, for instance Windows XP. USB devices are Plug and Play compatible and hot swappable, which means that they can be connected and disconnected without turning off the power, or rebooting the computer.

Table 4 • USB Connector (J13) Pin Assignment

	Contact Number	Signal Name	Comment
	1	VCC	Cable power
	2	– Data	
	3	+ Data	
	4	Ground	Cable ground



Notes •

9

Maintenance

Contents

Fault Finding / Troubleshooting 119
Cleaning the Printhead. 121
Cleaning the Presenter and Platen Rollers 121
Firmware 121

Fault Finding / Troubleshooting

In connection with service of the printer it is good practice to remove paper dust and lint from the paper path, cutter and sensor areas. Paper dust, when accumulated, may interfere with printer functions such as optical sensors.

To avoid smudging the paper, do not apply oil on the cutting knife.

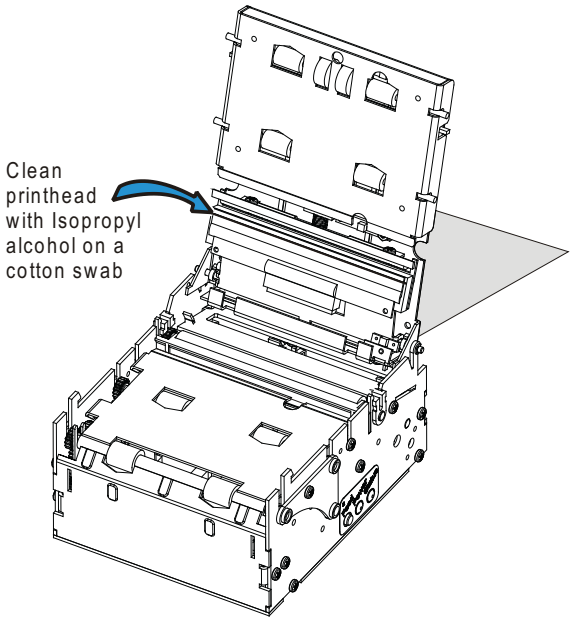
Table 5 • Fault Finding / Troubleshooting)

Symptom	Suggested Actions
Nothing is printed when you press the feed button in self-test mode, but the document is transported, cut and ejected.	• Check that the paper roll is turned the correct way with thermal sensitive layer facing up. • Check that the paper used meets the paper specification • Check that the printhead cable is fully inserted into the connectors at each end.
Paper jam	• Check cutter-home sensor.
Printer does not work at all	• Check that the printhead is closed. • Check that power is supplied to the printer. • Check the function of the paper-out sensor.

Table 5 • Fault Finding / Troubleshooting) (Continued)

Self-test prints OK, but the printer works strangely in normal operation.	• Check that both ends of the interface cable are properly connected. • Application program might be incorrect. Contact system manager.
No cutting	• Check that the connector for the cutting motor is fully seated on the control board.
Bad cutting (uneven top and bottom document edges).	• Switch OFF printer and remove any obstructing paper particles in cutter and presenter modules.
Inconsistent cutter operation	• Check/clean cutter-home sensor.
Missing print or irregular spots.	• Paper may be too humid. Let it adapt to ambient temperature and humidity for approximately 24 hours before use. • The paper used might not meet the paper specification.
White longitudinal lines in the printout.	• Faulty printhead. Replace.
Faint print.	• The paper used might not meet the paper specification. • Clean printhead with ethyl or isopropyl alcohol. • Adjust print contrast, see Print Setup.
Strange characters or graphics printed, or any kind of strange printer behavior.	• Might be caused by erroneous data sent from the host. Check validity of transferred data.

Cleaning the Printhead



The printhead can be cleaned without removal.

1. Open the printhead.
2. Clean the heat elements with a cotton swab immersed in ethyl or isopropyl alcohol.

Note • Note • Zebra recommends using a clean swab dipped in a solution of isopropyl alcohol (minimum 90%) and deionized water (maximum 10%) to clean the printhead.

Cleaning the Presenter and Platen Rollers

The presenter rollers feed out the receipt to the customer. But the friction between the feed rollers and the pressure rollers is also essential for the function of the pull detector. So make it a rule to clean the presenter and platen rollers whenever media is replaced in the Kiosk. Use a cotton swab and isopropyl alcohol and wipe the rollers clean while rotating them with your finger.

Firmware

The firmware is stored in flash-PROM on the control board. A replacement control board may not contain the same firmware version that you are currently using, so if you replace the control board, upgrade it to the firmware version that you want to use.

Loading

Note • Always design your Kiosk system so that remote upgrade of firmware is possible. If you need to upgrade firmware in the future, the Kiosks can be spread over a vast area and upgrade can become very expensive.

1. Download the firmware from the Zebra website at www.zebra.com/firmware. The Toolbox utility (Windows™ software) facilitates the loading of the firmware, fonts, and logos into the printer and is also available on the website.
2. Are you using a Windows environment to load the firmware?

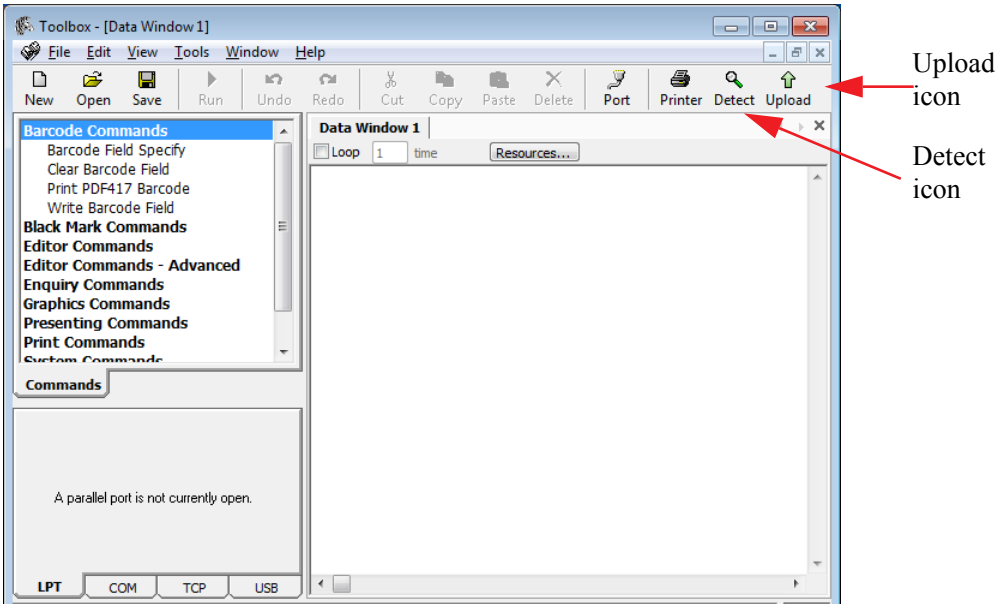
If…	Then…
No	Send <ESC><NUL> (hex 1B 00) 1Bto the printer. **a.** Wait 0.5 seconds. **b.** Send the firmware file to the printer. **c.** Wait until the printer buzzes to confirm that the loading is complete (the presenter motor runs for a second).
Yes	The Zebra **Toolbox** utility (Windows software) enables you to easily upload the firmware. See Loading Firmware, Fonts, and Logos Using Toolbox.

Caution • The loading and burning can take up to one minute. Do not abort before one minute by turning OFF the power to the printer. Doing so may leave the printer in a state where new firmware cannot be loaded. If this happens, please return the printer to a Zebra authorized service provider or repair center.

Loading Firmware, Fonts, and Logos Using Toolbox

You can download the **Toolbox** utility at www.zebra.com/support to reload your files. After you download and install the Toolbox utility, the icon appears on the Desktop.

1. Double-click the **Toolbox** icon to start the utility.

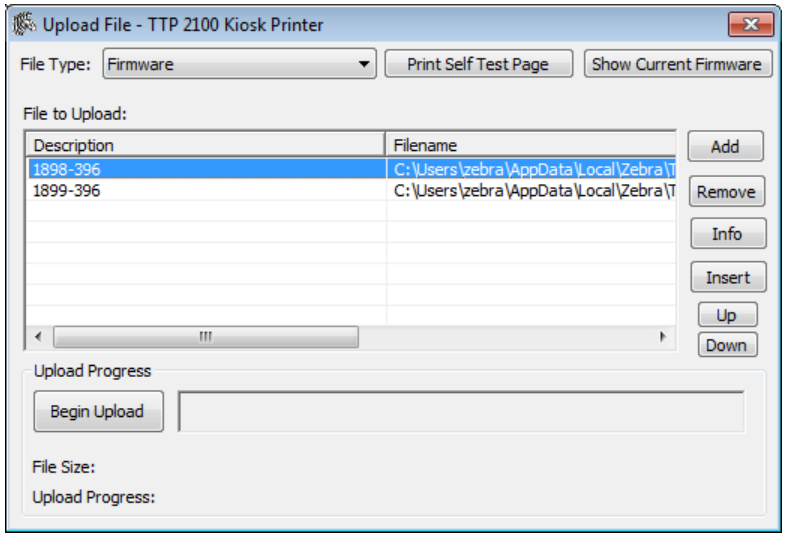


2. Click the **Detect** icon to let Toolbox find your TTP 2100 printer.

   If you use a USB interface a dialog appears; select to communicate with the USB port directly, rather than to communicate through the driver.

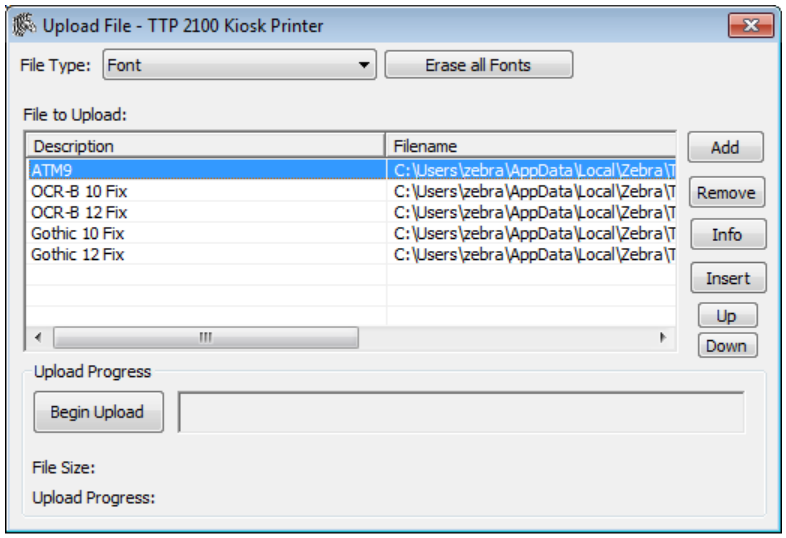
3. Click the **Upload** icon to open the **Upload File** dialog.

4. In the **File Type** list, select **Firmware**.



5. In the **File to Upload** list, click the firmware that you want to upload.
   - Select **1898-xxx** if you are updating a TTP 2130 (USB)
   - Select **1899-xxx** if you are updating a TTP 2110 (Serial)
6. Click **Begin Upload** to upload the firmware and wait for a confirmation.
7. In the **File Type** list, select **Font**.

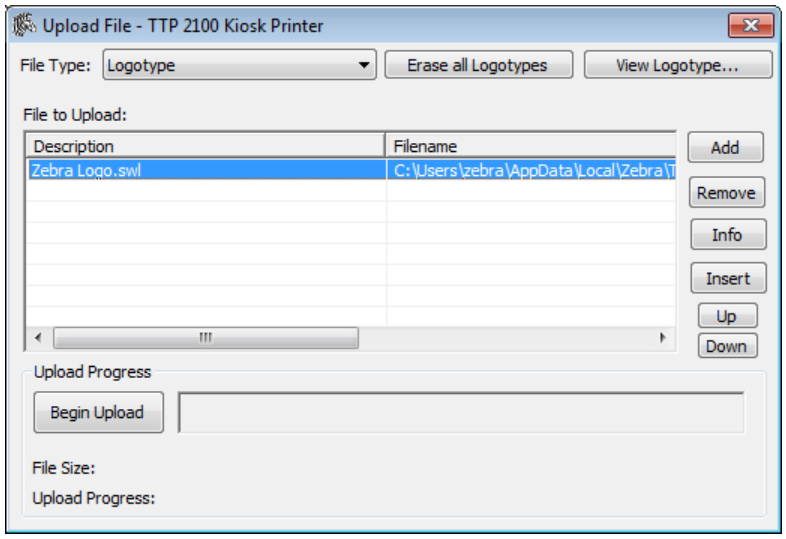
Note • If a printer is upgraded from firmware with 1-D barcodes to firmware with both 1-D and 2-D barcodes all fonts and logotypes in the printer will be erased and need to be reloaded after the new firmware file is loaded.



The standard fonts (ATM9, OCR-B 10, OCR-B 12, Gothic 10, and Gothic 12) must be reloaded one at a time in that order. **After** you load the standard fonts, you can load any additional fonts.

Note • If you manually reload your fonts, **ATM9** = 0, **OCR-B 10** = 1, **OR-B 12** = 2, **Gothic 10** = 3, and **Gothic 12** = 4.

8. In the **File to Upload** list, click **ATM9**, and then click **Begin Upload**.
9. Repeat step 7 for **OCR-B 10 Fix**, **OCR-B 12 Fix**, **Gothic 10 Fix**, and **Gothic 12 Fix**.
10. In the **File Type** list, select **Logotype**.



11. In the **File to Upload** list, click **Zebra Logo.swl**, and then click **Begin Upload**.

Firmware Identification

Functions and features are being added from time to time affecting the firmware in the printer.

Please visit Drivers and Downloads at www.zebra.com/support for the current firmware versions and release notes.

Make a self-test printout to determine which firmware version you have in your printer. The firmware number is divided into two sections, the header and the version, separated by a dash.

Printer	Barcode Support	Firmware Header
TTP 2110	1-D	1824-xxx
TTP 2110	2-D, PDF 417	1826-xxx
TTP 2110	1-D + 2-D (PDF 417 & Aztec)	1899-xxx
TTP 2130	1-D	1823-xxx
TTP 2130	2-D, PDF 417	1825-xxx
TTP 2130	1-D + 2-D (PDF 417 & Aztec)	1898-xxx

A printer can only be updated with firmware that has the same header as the original number. The first four digits indicate the header. The three digits after the dash indicate the firmware version. For example, 390 means firmware version 3.90.

Note • Printers with serial numbers 2-0913-27444 and higher or that start with 93J (e.g., 93J101300033) can be updated from 1-D barcode only firmware to 1-D + 2-D barcode firmware if an intermediate firmware is loaded first and all fonts and logos are reloaded after completion of the firmware loading procedure.

10

Specifications

Contents

Ticket Specifications 128
TOF Detection 129
Print Module 129
Ticket Separation 129
Presenter 130
Electronics 130
Firmware 130
Text Mode 131
Miscellaneous 131
Basic Character Set 131
Part Number List 133
Dimensions 134

Important • Specifications subject to change without notice.

Ticket Specifications

Ticket materials	Paper, laminate, synthetic, and label stock.					
Ticket widths	50.8 mm 2 in.	53.98 mm 2.125 in. ISO credit card	60 mm 2.333 in.	66.3 mm 2.61 in. dollar bill	80 mm 3.167 in.	82.5 mm 3.25 in. ATB airline ticket
Paper thickness	0.28 mm 11 mils			0.18 mm 7 mils		
Ticket length		85.6 mm for ISO 7811, and up to 21 in for baggage tags		156 mm		203.2 mm
Ticket length in text mode	25 cm			17 cm		
	Min. 40 mm, Max depends on free RAM and print width					
Ticket length in driver mode	Min. 40 mm, Max 534 mm (1.37 to 21 in.)					
Paper weight	80 – 240 g/m^2 depending on thickness, see above					
Paper supply	Roll, fan-fold paper, or hand fed single cut					
Roll diameter	Max 184.2 mm (7.25 in.)					
Spindle diameter	50 mm minimum, recommended 76.2 mm (3 in.)					
Fanfold tickets	Straight or with corner radius					
Label stock	With punched hole, or opaque space, variable length. Carrier must be at least 0.5 mm wider than the label on both sides.					

TOF Detection

Handles the following Top of Form-indicators:

1. Gap in-between tickets, Gap length from 6 mm down to 1.59 mm.
2. Black marks on the non thermal side of the ticket stock.
3. Label gap (for labels on backing/liner) Length from 6 mm down to 3.175 mm. Optical translucency of backing shall be a minimum of 57%, while maximum optical translucency of label is 18% including backing paper, adhesive and face material.
4. Corner radius down to 3.15 mm.
5. Fixed length without TOF indicator.
6. Variable length without TOF indicator.

Features

- Cut is placed in the middle of the TOF-mark regardless of mark length.
- It is possible to detect the TOF mark before reaching the end of the document.
- Auto loads ticket material without wasting a ticket.
- Fully prints and ejects last ticket in ticket stock.
- Conforms to IATA Resolution 740 for baggage tag TOF detection.

Print Module

Resolution	8 dots/mm (203 dpi)
Print speed	Up to 150 mm/s
Print duty cycle	Up to 33%, (5s on, 10s off)
Max print width	Max 640 pixels = 80 mm. Selectable through parameter n48.
Life Expectancy	100 km paper (= about 1,000,000 85.6 mm tickets) $1x10^8$ pulse lines (typically)

Ticket Separation

The separator is able to cut roll paper and separate fanfold paper in perforations already in the ticket stock.

Guillotine cutter	Yes
Partial cut	Yes, Parameter selects the size of the cut.
Life Expectancy	1,000,000 cuts for 54 mm wide 0.18 mm thick paper (typically)

Presenter

Straight presenter with two modes:

Mode 1	Holds the ticket by its back end
Mode 2	Ejects ticket fully so it falls down and leaves the printer
Retract	No
Life Expectancy	1,000,000 tickets of 85.6 mm length (typically)

Electronics

Interfaces	Serial RS 232 (TTP 2110)	115200 bps
	USB (TTP 2130)	Version 1.1 High Speed (2.0 and 3.0 compatible)
TOF sensors	Selectable between light-barrier (transmissive) and reflex (black mark) type detectors.	

Firmware

Driver mode	Yes: Windows (2000, 2003, XP, XPe, 7, 7-embedded, and 8) and Linux CUPS
Text Mode	Yes: KPL
Emulations	No

Text Mode

Orientation	Portrait, Landscape, Reverse Portrait, and Reverse Landscape
Standard fonts	ATM9 (40 characters/line at 72 mm width), OCR-B 10 and 12, and Gothic 10 and 12
Text attributes	Underline, Bold, Italics, reverse print, multiple width, multiple height, left aligned, center aligned, right aligned
Character set	224 printable characters out of a 255-character space. Default character sets should use Windows Code Page 1252 (Western). Possible to use other code pages if new fonts are loaded.
Barcodes	1-D: EAN-13, UPC, Interleaved 2-of-5, ISBN, Code 39, and Code 128 **For firmware versions 1898-390 and 1899-390 and higher:** 1-D: EAN-13, UPC, Interleaved 2-of-5, ISBN, Code 39, and Code 128 2-D: PDF 417, and Aztec
Graphics	Logotypes and b&w BMP-files

Miscellaneous

Versions	Kiosk embedded and desktop versions
Environment	0°C to +50°C, 35% to 75% RH, non-condensing
Size	Mechanism: approx 107 x 71 x 127 mm (W x H x D) + 67 mm for input guide
Desktop	Approximately 117 x 85 x 137 mm (W x H x D) + 63 mm for input guide
Weight	Approximately 1.2 kg for embedded and 1.4 kg for desktop
Power requirements	24 Vdc ± 5% 70W (2.92A)

Basic Character Set

The default fonts use Windows code page 1252 Western which contains ISO 8859-1 (ANSI) characters. You can use other character sets by creating and loading appropriate font files.

Characters 0 to 31 are control codes that cannot be changed, but 32 to 255 can be custom designed.

The table below shows the characters stored in flash PROM on the printer control board.

Table 6 • Code Page 1252 Character Table

Dec	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
Hex	20	21	22	23	24	25	26	27	28	29	2a	2b	2c	2d	2e	2f
Key		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
Dec	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
Hex	30	31	32	33	34	35	36	37	38	39	3a	3b	3c	3d	3e	3f
Key	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
Dec	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
Hex	40	41	42	43	44	45	46	47	48	49	4a	4b	4c	4d	4e	4f
Key	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Dec	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
Hex	50	51	52	53	54	55	56	57	58	59	5a	5b	5c	5d	5e	5f
Key	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
Dec	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Hex	60	61	62	63	64	65	66	67	68	69	6a	6b	6c	6d	6e	6f
Key	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
Dec	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
Hex	70	71	72	73	74	75	76	77	78	79	7a	7b	7c	7d	7e	7f
Key	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	A0127
	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	□
Dec	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
Hex	80	81	82	83	84	85	86	87	88	89	8a	8b	8c	8d	8e	8f
Key	A0128	A0129	A0130	A0131	A0132	A0133	A0134	A0135	A0136	A0137	A0138	A0139	A0140	A0141	A0142	A0143
	€	□	‚	ƒ	„	…	†	‡	ˆ	‰	Š	‹	Œ	□	□	□
Dec	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
Hex	90	91	92	93	94	95	96	97	98	99	9a	9b	9c	9d	9e	9f
Key	A0144	A0145	A0146	A0147	A0148	A0149	A0150	A0151	A0152	A0153	A0154	A0155	A0156	A0157	A0158	A0159
	□	‘	’	“	”	•	–	—	˜	™	š	›	œ	□	□	Ÿ
Dec	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
Hex	a0	a1	a2	a3	a4	a5	a6	a7	a8	a9	aa	ab	ac	ad	ae	af
Key	A0160	A0161	A0162	A0163	A0164	A0165	A0166	A0167	A0168	A0169	A0170	A0171	A0172	A0173	A0174	A0175
		¡	¢	£	¤	¥	¦	§	¨	©	ª	«	¬	-	®	¯
Dec	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
Hex	b0	b1	b2	b3	b4	b5	b6	b7	b8	b9	ba	bb	bc	bd	be	bf
Key	A0176	A0177	A0178	A0179	A0180	A0181	A0182	A0183	A0184	A0185	A0186	A0187	A0188	A0189	A0190	A0191
	°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
Dec	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
Hex	c0	c1	c2	c3	c4	c5	c6	c7	c8	c9	ca	cb	cc	cd	ce	cf
Key	A0192	A0193	A0194	A0195	A0196	A0197	A0198	A0199	A0200	A0201	A0202	A0203	A0204	A0205	A0206	A0207
	À	Á	Â	Ã	Ä	Å	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
Dec	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
Hex	d0	d1	d2	d3	d4	d5	d6	d7	d8	d9	da	db	dc	dd	de	df
Key	A0208	A0209	A0210	A0211	A0212	A0213	A0214	A0215	A0216	A0217	A0218	A0219	A0220	A0221	A0222	A0223
	Ð	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
Dec	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
Hex	e0	e1	e2	e3	e4	e5	e6	e7	e8	e9	ea	eb	ec	ed	ee	ef
Key	A0224	A0225	A0226	A0227	A0228	A0229	A0230	A0231	A0232	A0233	A0234	A0235	A0236	A0237	A0238	A0239
	à	á	â	ã	ä	å	æ	ç	è	é	ê	ë				
Dec	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255
Hex	f0	f1	f2	f3	f4	f5	f6	f7	f8	f9	fa	fb	fc	fd	fe	ff
Key	A0240	A0241	A0242	A0243	A0244	A0245	A0246	A0247	A0248	A0249	A0250	A0251	A0252	A0253	A0254	A0255
		ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

Part Number List

Printers

Printer Model/Type	NA/LA/AP	EMEA
TTP 2110 Ticket Printer, Serial, Embedded	01991-000	01991-000
TTP 2130 Ticket Printer, USB, Embedded	01993-000	01993-000
TTP 2110 Ticket Printer, Serial, Desktop	01991-100	01991-100
TTP 2130 Ticket Printer, USB, Desktop	01993-100	01993-100
Evaluation Kit, TTP 2100 Ticket Printer, Serial, Embedded	N/A	01991-800
Evaluation Kit, TTP 2130 Ticket Printer, USB, Embedded	N/A	01993-800
Evaluation Kit, TTP 2130 Ticket Printer, USB, Desktop	N/A	01993-801

Accessories

Item	NA/LA/AP	EMEA
Paper Guide Kit 51 mm	01990-051	01990-051
Paper Guide Kit 54 mm	01990-054	01990-054
Paper Guide Kit 60 mm	01990-060	01990-060
Paper Guide Kit 66 mm	01990-066	01990-066
Paper Guide Kit 80 mm	01990-080	01990-080
Paper Guide Kit 82.5 mm	01990-082	01990-082
Paper Guide Kit 82.5 + 54 mm	01990-400	01990-400
Media holder, roll and fanfold	104877	104877
Paper-low sensor with 300 mm cable	01890-300	01890-300
Paper-low sensor with 500 mm cable	01890-500	01890-500
Quick-fit hub kit with screws	103939	103939
Leaf spring retainer for quick-fit hubs	01473-000	01473-000
Output tray	104385	104385
Credit card sized ticket, Gapped, box of 3500	N/A	01770-000
Ticket, ATB blank, box of 1000	N/A	01807-000
RS232 serial cable	10825-000	10825-000
USB cable, straight, 1.8 m (6 ft.)	105850-028	105850-028
USB cable, 90 angled, 1.8 m (6 ft.)	01542-002	01542-002
Power supply 24V, 70W (for general printing)	808099-005	808099-005
Power supply 24V, 100W (for printing text and large graphics)	808101-005	808101-005

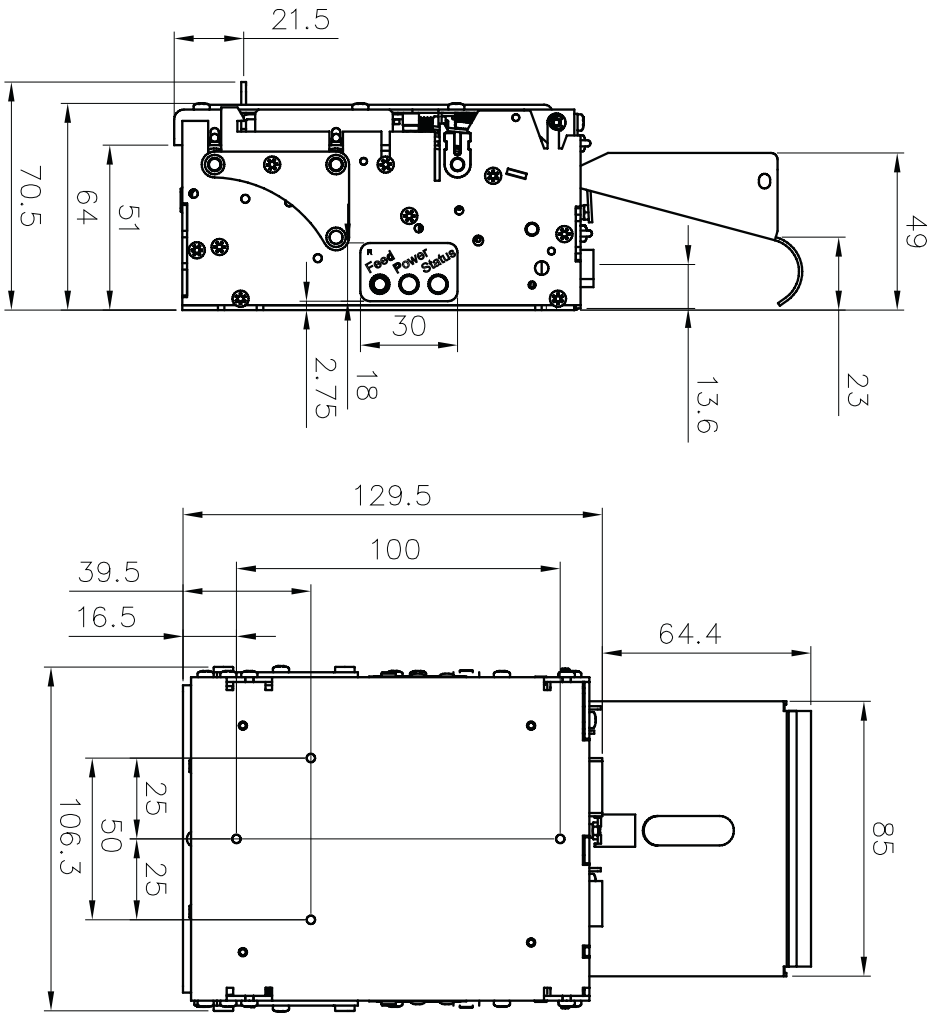
Item	NA/LA/AP	EMEA
Power supply to printer cable, 600mm (Requires installation by a qualified engineer)	G01370-000	G01370-000
AC Power Cable	300020-001 (US)	46629 (EU) 46637 (UK)

Dimensions

Printer

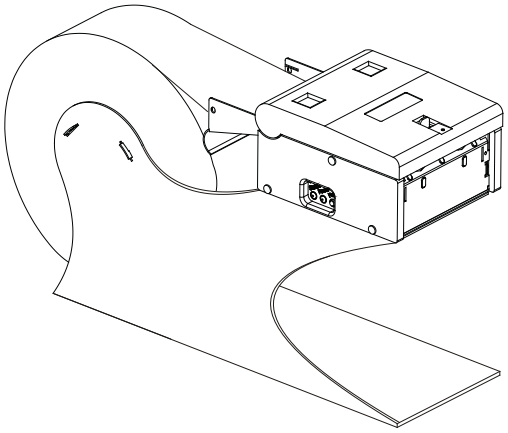
Note • Additional space is required for paper roll and handling.

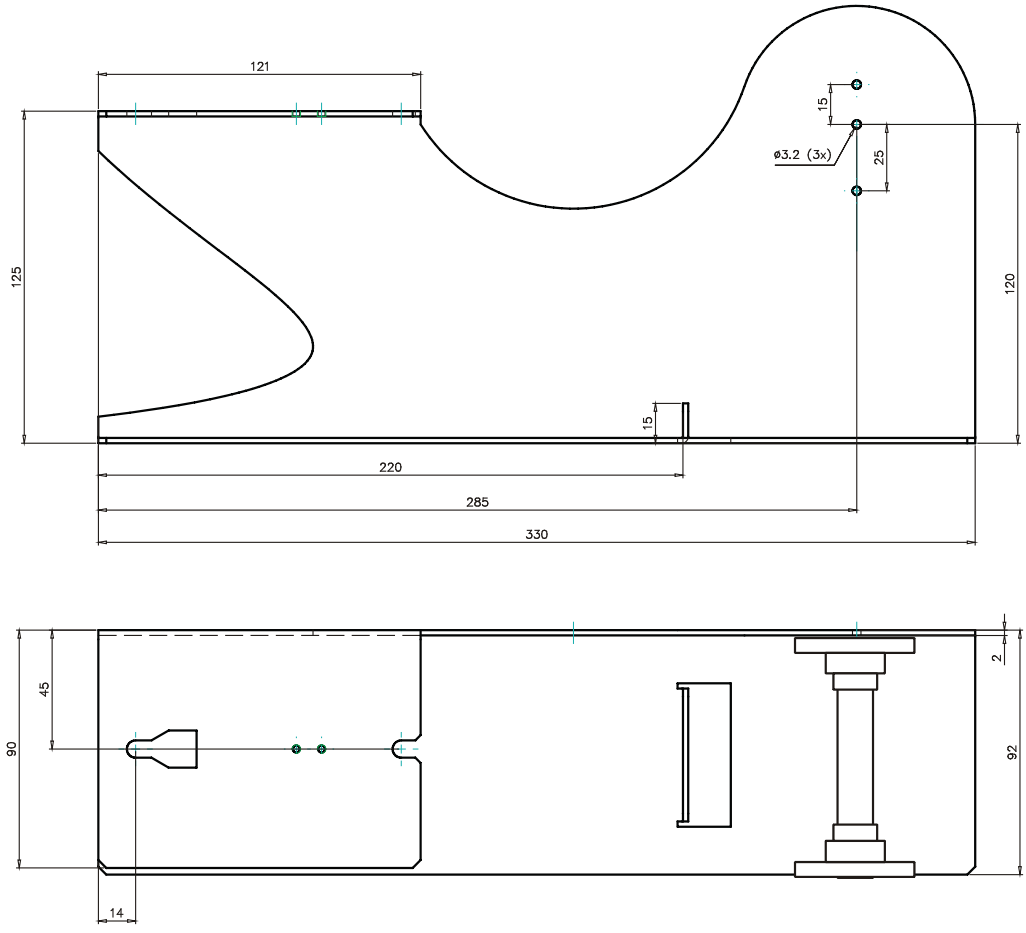
Figure 35 • Measurements Drawing



Media Holder

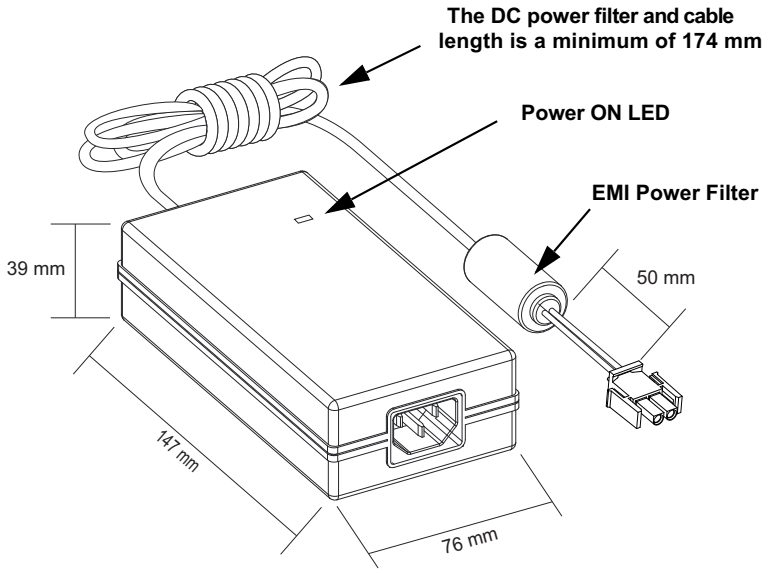
The media holder can take both fanfold and roll ticket stock. The roll shaft has three levels so it supports 54 mm, 60-66 mm, and 80-82.5 mm media, and rolls up to 180 mm in diameter.





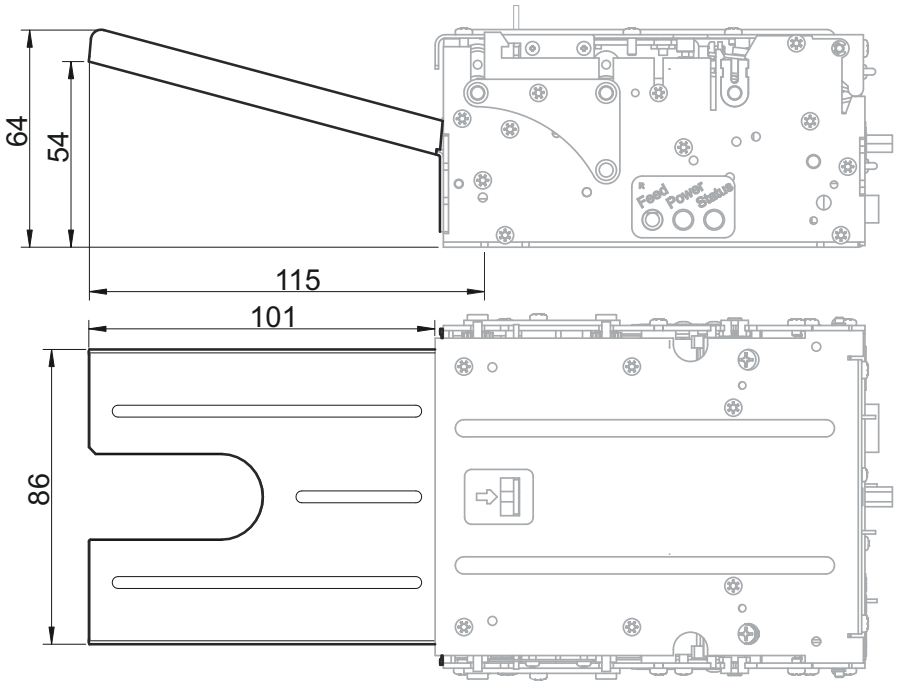
Power Supply

Figure 36 • Measurements of 70W and 100W PSU



Output Tray

Figure 37 • Measurements of Output Tray



11

中国 RoHS 材料声明 (China RoHS Material Declaration)

部件名称	有毒 / 有害物质或元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价格 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电子组件 (Electronics)	X	O	O	O	O	O
驾驶火车 (Drive Train)	X	O	O	O	O	O
紧固件 (Fasteners)	X	O	O	O	O	O
打印头 (Printheads)	X	O	O	O	O	O

X 表示该部件的某一均质材料中的有毒有害物质的含量超出 SJ/Txxx-2006 标准规定的限量要求。
(Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.)

O 表示不含有此类物质或此类物质的含量在上述标准规定的限量要求以下。
(Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.)

Notes •

Index

A

accessories, ordering number list, 133
ACK, 72
acknowledge marker command, 82
add-on, bar code, 56
advance before cut, 103
align text command, 48
ambient light, 26
auto cut after FF, 97

B

background reversed, 49
backspace, 51
bar code
  add-on, 56
  clear command, 57
  field specify command, 55
  print (PDF 417) command, 57, 59
  samples, 54
  write command, 56
basic character set (firmware), 131
baud rate, 94
bitmap at XY positions, print command, 60
bitmap, logotypes, 87
black mark (BM)
  black mark (top-of-form) commands, 46
  black mark minimum length, 101
  sensing within Windows, 113
BM sensor, 107, 108
BMP file, 60
bold text, 49
bootware version enquiry command, 79
burn time, 95

C

calibrating TOF sensor
  calibration command, 46
  during installation, 20
cancel, 51
carriage return, 52
carriage return, behavior, 97
center align, 48
character bitmap data, 85
character map, print command, 64
cleaning the presenter and platen rollers, 121
cleaning the printhead, 121
clear presenter, 67
clearing paper jams, 38
Code 128, 56
command syntax, software, 46
commands, description, 41
computer, connecting, 28
connecting the power, 30
connecting to the computer, 28
control board revision enquiry command, 78
control codes, summary, 43
controls
  status indicator, 14
  voltage indicator, 14
CR/LF behavior, 97
currents, earth, 26
customizing self test printout, 33

cutter
auto cut after FF, 97
cut and eject, 65
cut and present commands, 65
cut only no eject, 66
cut position calibration, 102
cutter jam error code, 72
partial cut, 66
partial cut length, 106

D

data bits, 94
default parameter settings, 91
default value, 92
description of commands, 41
decimal, 41
examples, 41
hex, 41
mnemonic, 41
values, 41
description of parameters, 92
default value, 92
examples, 92
design your own mounting, 25
detection, TOF, 129
device ID enquiry command, 80
dimensions, 134
discharges, electrostatic, 26
document mode, 98
dot line, send, 61
driver oriented printout, 40

E

EAN128, 56
earth currents, 26
eject
eject mode, 12
eject presented page, 67
run presenter, 67
electronics, 130
electrostatic discharges, 26
enforced clear presenter, 67
erase fonts
4 to 7, 70
all, 69
erasing logotypes, 87
error codes, 72
escape sequences, summary, 43

F

fanfold ticket stock, loading, 35
fault finding, 119
file format, 83
file format, logotypes, 86
firmware
maintenance, 121
firmware (specifications), 130
firmware version enquiry command, 78
firmware, identification, 126
firmware, loading, 122
fixed document mode, 100
flow-control, 95
font attribute, 96
font loading, 83
character bitmap data, 85
file format, 83
font selection, 96
fonts
enquiry, 75
erase 4 to 7, 70
erase all, 69
load, 69
fork sensor, 19
form feed
auto cut, 97
FF command, 53
page setup, 113

G

garbage filter, 101
graphics commands, 60

H

head temperature enquiry commands, 79
header, logotypes, 86
hold mode, 12
horizontal lines, 61
horizontal tabulation command, 53
hubs, quick-fit, 23, 24

I

indicator
status, 14
voltage, 14
installation, 15
connecting the power, 30
connecting to the computer, 28
TTP 2110, 28
TTP 2130, 29
considerations
ambient light, 26
design mounting, 25

earth currents, 26
electrostatic discharges, 26
orientation, 23
quick-fit hubs, 23, 24
making a test printout, 32
customizing, 33
paper-low sensor, 27
printer driver, 33
installing a printer driver, 33
interface, 115
serial, TTP 2100, 115
setup options, 116
USB, TTP 2130, 117
italics, 49

L

landscape, 47
liability, 2
line feed, behavior, 97
line spacing, 96
linefeed, 52
lines, horizontal, 61
loading fanfold ticket stock, 35
loading firmware, 122
loading fonts, 69
loading logotypes, 86
lock parameters, 104
Logotypes, 68
logotypes, 86
enquiry, 75
erasing, 87
file format, 86
bitmap, 87
header, 86
load, 68
loading, 86
orientation, 47
print, 62
print command, 62
printing, 87

M

maintenance, 119
cleaning the presenter and platen rollers, 121
cleaning the printhead, 121
fault finding, 119
firmware, 121
firmware identification, 126
loading, 122
making a test printout, 32
max print speed, 95
max status code, 104
media holder, dimensions, 135
minimum black mark (BM) length, 101
miscellaneous (specifications), 131
mode
eject, 12
hold, 12
TOF Sensor Mode, 107
mounting, design, 25

N

n1, n2, etc., 41
NAK, 72
next top-of-form command, 46

O

ommand, 81
operation, 35
orientation, 23, 47
out of paper error code, 72
out-of-paper level, 105

P

page length, 99
page setup, 109
aligning preprint, 110
aligning thermal print, 110
black mark sensing within Windows, 113
printable area, 109
paper
advance, 64
advance forward, 64
feed error, 72
left in paper path, 72
near-end status, 74
quick advance, 65
reverse, 64
paper jams, clearing, 38
paper width (mm), 103
paper-low sensor, 27
parameter setting data enquiry command, 81
parameter settings, summary, 92
parameter values, storing, 68
parameters, description, 92
parameters, lock, 104
parity, 94
partial cut, 66
partial cut length, 106
PDF 417, bar code print command, 57, 59
Pixel-line, 61
portrait, 47

positioning TOF sensor, 20
power supply, 70 W dimensions, 136
power, connecting, 30
preprint, aligning, 110
present commands, 65
presentation, product, 9
presenter
  cleaning, 121
  clear presenter command, 67
  description, 12
  eject, 67
  enforced clear presenter, 67
  presenter not running error, 73
  specifications, 130
print
  bar code, 57, 59
  bitmap, 60
  horizontal (ruler) lines, 61
  logotype, 62, 87
print commands, 63
print module, 129
print setup
  advance before cut, 103
  auto cut after FF, 97
  black mark (BM) length, min, 101
  BM sensor, 107, 108
  burn time, 95
  CR/LF behavior, 97
  cut position calibration, 102
  document mode, 98
  fixed document mode, 100
  font attribute, 96
  font selection, 96
  garbage filter, 101
  line spacing, 96
  lock parameters, 104
  max print speed, 95
  out-of-paper level, 105
  page length, 99
  paper width (mm), 103
  partial cut length, 106
  printhead pulse control, 95
  status code, max, 104
  system, 105
  tab stop, 96
  TOF sensor mask, 107
  TOF sensor mode, 107
  top margin (mm), 101
  vendor class, 106
  wall compensation (mm), 102
  warning level, 104
print speed, max, 95
printable area, 109
printer dimensions, 134
printer reset, 68
printhead
  cleaning, 121
  printhead lifted error, 72
  pulse control, 95
printout
  character map, 64
  self-test, 64
product presentation, 9
programming, 39
  driver oriented, 40
pull detector, 67
  maintenance, 121
pulse control, printhead, 95

Q

quick advance, 65
quick-fit hubs, 23, 24

R

read extended status commands, 80
reset printer, 68
rest status codes, 14
retract presented page, 67
reverse paper, 64
Right align, 48
ruler line, print command, 61
ruler lines, 61

S

selecting fork or reflex TOF sensor, 19
self test
  customizing printout, 33
self-test
  print command, 64
send dot-line, 61
sensors
  status of virtual sensors, 76
serial interface set-up
  baud rate, 94
  data bits, 94
  flow-control, 95
  parity, 94
serial interface, set-up, 94
serial number enquiry command, 78
serial, TTP 2110, 115
setup options, serial TTP 2110, 116
short message status, examples, 80

software command syntax, 46
  bar code commands, 54
    bar code clear, 57
    bar code field specify, 55
    bar code print (PDF 417), 57, 59
    bar code write, 56
  black mark (top-of-form) commands, 46
    go to next top-of-form command, 46
  cut and present commands, 65
  graphics commands, 60
    print bitmap at XY positions, 60
    print logotype, 62
    print ruler line, 61
  print commands, 63
  status reporting commands
    acknowledge marker, 82
    bootware version enquiry, 79
    control board revision enquiry, 78
    device ID enquiry, 80
    firmware version enquiry, 78
    head temperature enquiry, 79
    parameter setting data enquiry, 81
    read extended status, 80
    serial number enquiry, 78
    status report, 77
  system related commands, 68
  text commands, 47
    align text, 48
    horizontal tabulation, 53
    text width, 50
specifications, 127
  dimensions, 134
    70 W power supply, 136
    media holder, 135
    printer, 134
  electronics, 130
  firmware, 130
    basic character set, 131
    text mode, 131
  miscellaneous, 131
  ordering number list
    accessories, 133
  presenter, 130
  print module, 129
  ticket, 128
  ticket separation, 129
  TOF detection, 129
    features, 129
specify print position, 51
status code, max, 104
status codes, 72
status codes, reset, 14
status indicator, 14
status of virtual sensors, 76
status report command, 77
status reporting, 88
store current parameter values, 68
straight presenter, 12
summary of control codes, 43
summary of escape sequences, 43
summary of parameter settings, 92
system parameter, 105
system related commands, 68

T

tab stop, 96
temperature error, 72
terminal faults, 73
text
  bold, 49
  commands, 47
  italics, 49
  orientation, 47
  position, 51
  reversed text and background, 49
  underline, 50
text alignment command, 48
text mode (firmware), 131
text width command, 50
thermal print, aligning, 110
ticket separation, 129
ticket specification, 128
TOF detection, 129
TOF sensor
  calibration command, 46
  calibration during installation, 20
  fork sensor, 19
  mask, 107
  mode, 107
  positioning, 20
  reflex sensor, 19
top margin (mm), 101
TTP 2110, 28
TTP 2130, 29
TTP 2130, USB, 117

U

underline text, 50
USB, TTP 2130, 117

V

vendor class, 106
virtual sensor status, 76

voltage indicator, 14

W

wall compensation (mm), 102
warning level, 104
write bar code, 56



Zebra Technologies Corporation
Zebra Technologies Corporation
475 Half Day Road, Suite 500
Lincolnshire, IL 60069 USA
T: +1 847 634 6700
Toll-free +1 866 230 9494
F: +1 847 913 8766

Zebra Technologies Europe Limited
Dukes Meadow
Millboard Road
Bourne End
Buckinghamshire, SL8 5XF, UK
T: +44 (0)1628 556000
F: +44 (0)1628 556001

Zebra Technologies Asia Pacific, LLC
120 Robinson Road
#06-01 Parakou Building
Singapore 068913
T: +65 6858 0722
F: +65 6885 0838

http://www.zebra.com

© 2013 ZIH Corp.

P1003640-003 Rev. A