



Thermal Printer Family **XPM**

Linux Driver
S690004-R4-V1.03b-BETA-
2018AUG16

Installation Guidelines
Operation Manual
Driver Synopsis
Programming Manual
Printer Tools

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Safety Precautions

- Please read and understand these specifications thoroughly before using the printer driver in combination with your application. Please keep the specifications carefully in a place where they may be easily consulted when the printer driver is used.
- Please do not modify this printer driver as this may cause unpredictable behavior.
- The printer driver is not intended to be installed in computer systems or in combination with devices, such as those used in life-support medical equipment, undersea relays, and aerospace applications or for nuclear power control, in which extremely high reliability is required. If you are considering such applications, please consult our customer service department.
- There is a general possibility of component failure. Every effort has been made to improve product quality but such failures cannot be completely excluded. Please assume that such failure may occur before using the printer driver.
- Take care that the contents of this document match the version of your printer driver.

We would urge that these specifications should be thoroughly understood to assure that the printer driver is used safely in your company or associated organization. Please indicate or describe in your products and in the user manuals those items, which are related to the prevention or avoidance of danger and draw these to the attention of the eventual client (the user).

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Document History

Revision	Mod. Nr.	Status	Description
1	4 250110 LT1	Closed	Initial version: created for XPM CUPS Linux driver R1-V1.00-FINAL-2010JAN25.
2	4 230712 LT1	Closed	Version: created for XPM CUPS Linux driver R2-V1.01c-BETA 2012JUL23.
3	4 130812 LT1	Closed	Version: created for XPM CUPS Linux driver R2-V1.01d-BETA 2012AUG13.
4	4 250517 LT1	Closed	Updated with x64 and arm support.
4	4 010818 LT1	Closed	FIFO buffer implementation, USB2.0 preparation
5	4 160818 LT1	Closed	Timing corrections, 64-bit pointer corrections

Comments

Revision	Comments
-	-

Driver History

Version	Date	Major Modification
R1-V1.00	2010JAN25	1 st FINAL release of XPM CUPS driver for Linux
R2-V1.01c	2012JUL23	2 nd release of XPM CUPS driver for Linux
R2-V1.01d	2012AUG13	3 rd release of XPM CUPS driver for Linux
R3-V1.02	2017MAY25	4 th release of XPM CUPS driver for Linux
R4-V1.03a	2018AUG01	5 th release of XPM CUPS driver for Linux
R4-V1.03b	2018AUG16	6 th release of XPM CUPS driver for Linux

Applicable Documentation

The following documentation is applicable to this document:

- [1] XPM Emulation Command Set Reference Manual
Part-Nr: Hengstler D690004
- [2] XPM Firmware Release Note
Part-Nr: Hengstler D690001
- [3] XPM Linux Driver Release Note

Current Driver

The current XPM CUPS printer driver with part number S690004 has version "**R4-V1.03b-BETA**" and contains various sub-components with own version history.

Abbreviations

Abbreviation	Description
<cd>	Absolute path to the installation CD-ROM (e.g. "D:")
<root>	Sub-directory on <cd> that contains XPM driver package.
API	<i>Application Program Interface</i> , a set of routines, protocols, and tools for building software applications. A good API makes it easier to develop a program by providing all the building blocks. A programmer puts the blocks together.
Shell	Terminal window in Linux (console)
CUPS	C ommon U nix P rinting S ystem

1 Introduction

This reference manual describes the XPM CUPS printer driver for Linux which has Hengstler part number S689004. The XPM printer driver is suitable for use with Hengstler thermal printers: XPM80 (203 dpi), XPM80HR (300 dpi), XPM200 (203 dpi), XPM200HR (300 dpi), TPM200(XPM)(203 dpi) and TPM200HR(XPM)(300 dpi).

This manual is divided into the following sections:

- Installation Guidelines
- Operation Manual
- Driver Synopsis
- Programming Manual
- Printer Tools

2 Installation Guidelines

2.1 Introduction

This chapter describes the basic installation and un-installation of the CUPS printer driver with the Linux operating system. This CUPS printer driver can be used with XPM80 (203 dpi), XPM80HR (300 dpi), XPM200 (203 dpi), XPM200HR (300 dpi), TPM200(XPM)(203 dpi) and TPM200HR(XPM)(300 dpi) printers using the USB printer port.

The following subjects are described throughout this chapter:

- The CUPS printer driver distribution
- Installing the printer driver
- The printer driver files
- Un-installing the printer driver
- Re-installing the printer driver

Usage of this driver under operating systems other than Linux is prohibited.

2.2 The CUPS printer driver distribution

The XPM printer driver package contains several sub-directories containing driver files and tools. In the following text, the root directory of this driver package is called “<root>”.

Directory “<root>” contains following files:

- **.\S-690-004-XPM-LinuxDriver-R3-V1_02b-BETA-2018AUG16.zip**
This is the compressed representation of the XPM printer driver (ZIP)
- **.\README.TXT**
Information about XPM Linux driver package
- **.\install_x86**
Installation script under Linux **x86** systems
- **.\install_x64**
Installation script under Linux **x64** systems
- **.\install_arm**
Installation script under Linux **arm** systems
- **.\uninstall_x86**
Un-Installation script under Linux **x86** systems
- **.\uninstall_x64**
Un-Installation script under Linux **x64** systems
- **.\uninstall_arm**

Un-Installation script under Linux **arm** systems

Directory "<root >" contains the following sub-directories:

- **.\Driver**

This directory contains all printer driver files for installation under Linux:

.\hengstlerxpm80.ppd	= Information file used for installation with XPM80 printers (PPD)
.\hengstlerxpm80hr.ppd	= Information file used for installation with XPM80HR printers (PPD)
.\hengstlerxpm200.ppd	= Information file used for installation with XPM200 printers (PPD)
.\hengstlerxpm200hr.ppd	= Information file used for installation with XPM200HR printers (PPD)
.\hengstlerxpm80.ppd.gz	= Information file used for installation with XPM80 printers (PPD) in gzip format
.\hengstlerxpm80hr.ppd.gz	= Information file used for installation with XPM80HR printers (PPD) in gzip format
.\hengstlerxpm200.ppd.gz	= Information file used for installation with XPM200 printers (PPD) in gzip format
.\hengstlerxpm200hr.ppd.gz	= Information file used for installation with XPM200HR printers (PPD) in gzip format
.\rastertoxpm	= Raster file for XPM printers (Driver)

- **.\Api**

.\Xpm_Api.h	= Include file specifying the XPM Application Programming Interface functionality
.\libXpmApi.so.1.0	= Application Programming Interface/API (Linux library for x86/x64/arm)
.\libXpmTb.so.1.0	= ToolBox Interface (Linux library for x86/x64/arm)

.\Tools\x86 or .\Tools\arm or .\Tools\x64

This directory contains various XPM driver-related tools:

.\Xpm_Demo_FormFeed	= eXtendo demo application for form feed
.\Xpm_Demo_InquiryStatus	= eXtendo demo application for inquiring printer status package
.\Xpm_Demo_PageLength	= eXtendo demo application for settings page length
.\Xpm_ConfigurationTool	= Tool for printer configuration.
.\Xpm_UploadTool	= Tool for uploading firmware, fonts, images...
.\Xpm_InquiryTool	= Tool for inquiring on printer status.
.\libXpmApi.so.1.0	= Application Programming Interface/API (Linux library for x86/x64/arm)
.\libXpmTb.so.1.0	= ToolBox library (Linux library for x86/x64/arm)
.\README.txt	= Instruction to demo applications

- **.\Sources**

.\Xpm_Api.h	= Include file specifying the eXtendo Application Programming Interface
.\Xpm_Demo_FormFeed.c	= Source code of demo application for setting form feed
.\Xpm_Demo_InquiryStatus.c	= Source code of demo application for inquiring printer status
.\Xpm_Demo_PageLength.c	= Source code of demo application for page length settings
.\README.txt	= Instruction for demo application on how to compile sources and how to run executables

2.3 Installation steps

Installation of the CUPS printer driver for a Hengstler XPM printer can be done as follows:

- Installation of CUPS
- Installation of printer using the Printers dialog
- Installation of printer by shell

Note that you must have at least CUPS v1.2 installed in your Linux distribution.

Note that the screen shots below were made during an installation using the Linux Debian Platform and Gnome environment. They may appear differently in other Linux Platforms.

2.3.1 Installing CUPS

Download CUPS package from www.cups.org, file “cups-1.2.12–“ <version> ”-sources.tar.gz” (e.g. “cups-1.2.12–sources. tar.gz”).

- Unzip with command ...
 - `tar xvf cups-<version>-sources.tar.gz`
- ... and install it with commands
 - `./configure`
 - `make`
 - `make install`

Note that the GCC compiler must be installed for compiling and installing CUPS.

After CUPS installation, you have to set up password for your CUPS server. Type:

```
➤ lppasswd -g sys -a root
```

And then type your password twice to verify it.

After your password has been set, you can test CUPS server with typing “localhost:631” in your web browser.

For restarting CUPS you can do following:

```
➤ /etc/init.d/cups stop  
➤ /etc/init.d/cups start  
  
OR  
➤ /etc/init.d/cups restart
```

2.3.2 Printer installation using the Printers dialog

Manual installation of the printer driver under Linux is done as standard Windows® “Printers” installation in following steps:

- Selecting the “Printers” dialog
- Adding a new printer to “Printer” dialog
- Going through the “Add

2.3.2.1 Selecting the “Printers” dialog

The “Printers” dialog is started through the menu by selecting...

[Desktop] ·· [Preferences] ·· [Printers]

... as is shown in Figure 1 below.

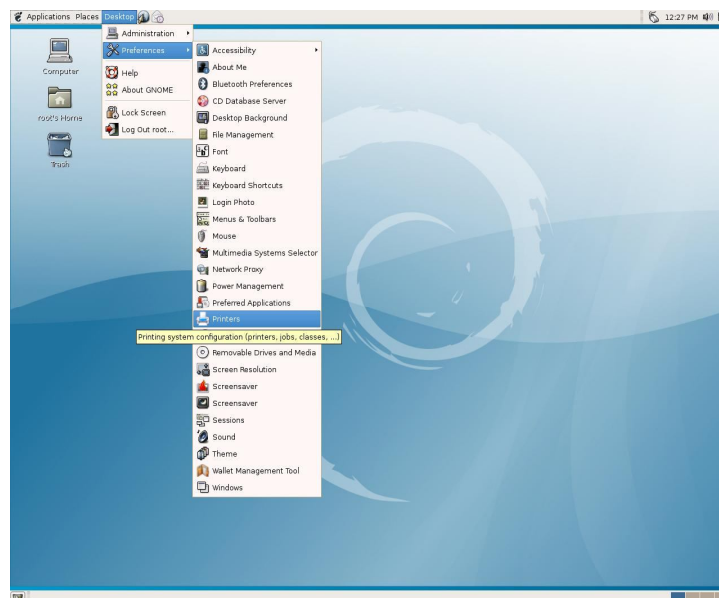


Figure 1: Selecting the "Printers" dialog

Within the “Printer” dialog, installed printers are listed as shown in Figure 2 below.

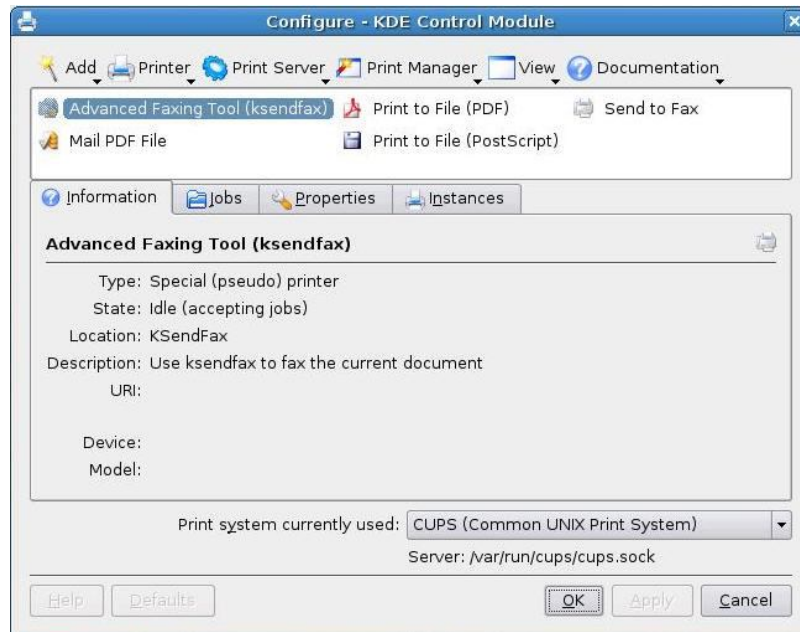


Figure 2: List of installed printers

Note that you may install only one printer of model "Hengstler XPM 80/XPM 200" (e.g. USB001, COM1, etc.), whereas all of them must use the same XPM driver version.

In SUSE 10.1 KDE, the "Printers" dialog is positioned under [K-Menu] .. [Utilities] .. [Printing] .. [Printing Manger].

2.3.2.2 Adding a new printer to "Printer" dialog

The XPM printer driver is installed with use of the "Add". The wizard is started from the "Printers" dialog, simply by selecting the "Add printer" item in "Add" as shown in Figure 3 below.

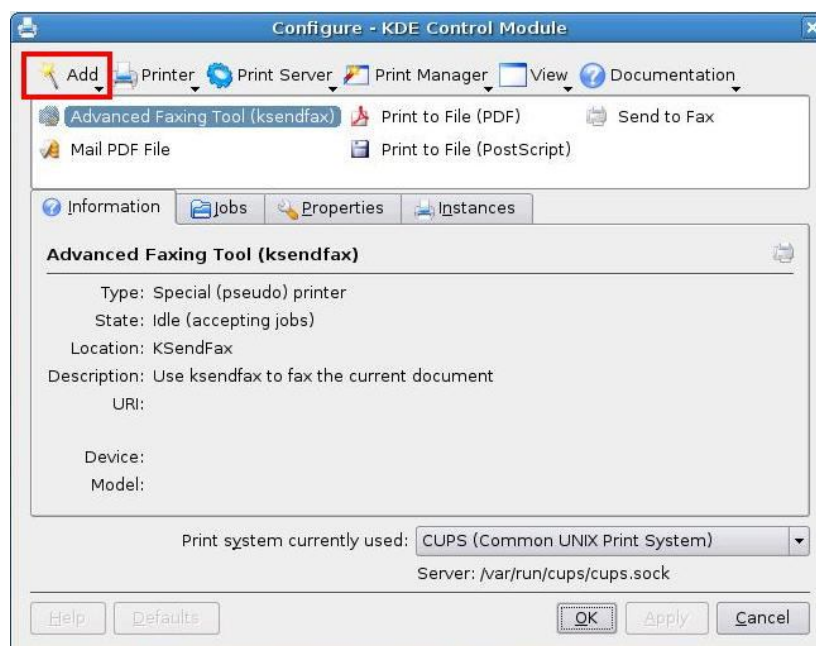


Figure 3: Adding a printer from the "Printers" dialog

The “Add function” guides you through this installation.

2.3.2.3 Going through the “Add” function

This chapter guides you through the “Add” function.

2.3.2.3.1 The “Welcome....” page

The first page of the “Add” function (see Figure 4) displays information on the wizard and plug and play printers. This information on “plug and play” can be ignored when installing the XPM printer driver.



Figure 4: The “Welcome” page of the “Add”

2.3.2.3.2 The “Backend Selection” page

The 2nd page of the “Add” function is used to select either a local or a network printer. The XPM thermal printer can only be attached as local printer. See Figure 5 for the appropriate settings.

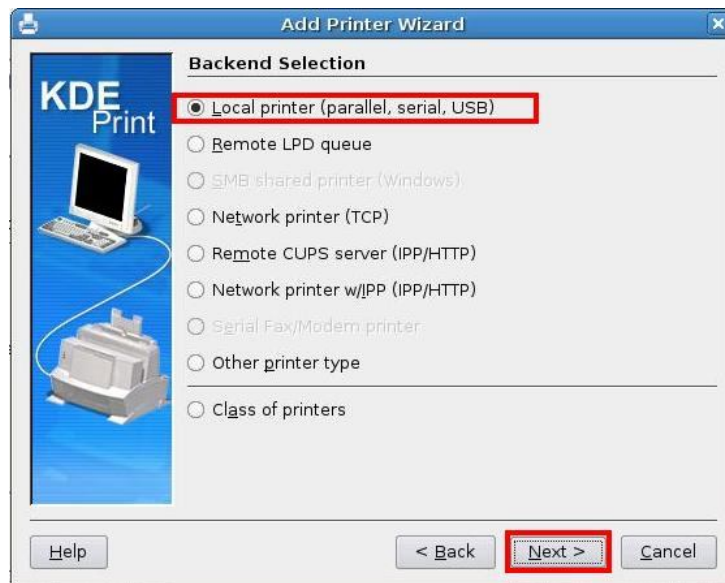


Figure 5: The “Backend Selection” page of the “Add” function

2.3.2.3.3 The “Local Port Selection” page

The 3rd page of the “Add” function is used to attach a printer. Since the XPM thermal printers only support the USB or RS232 connection, you need to select an USB or SERIAL printer. Figure 6 shows the “Local Port Selection” page.

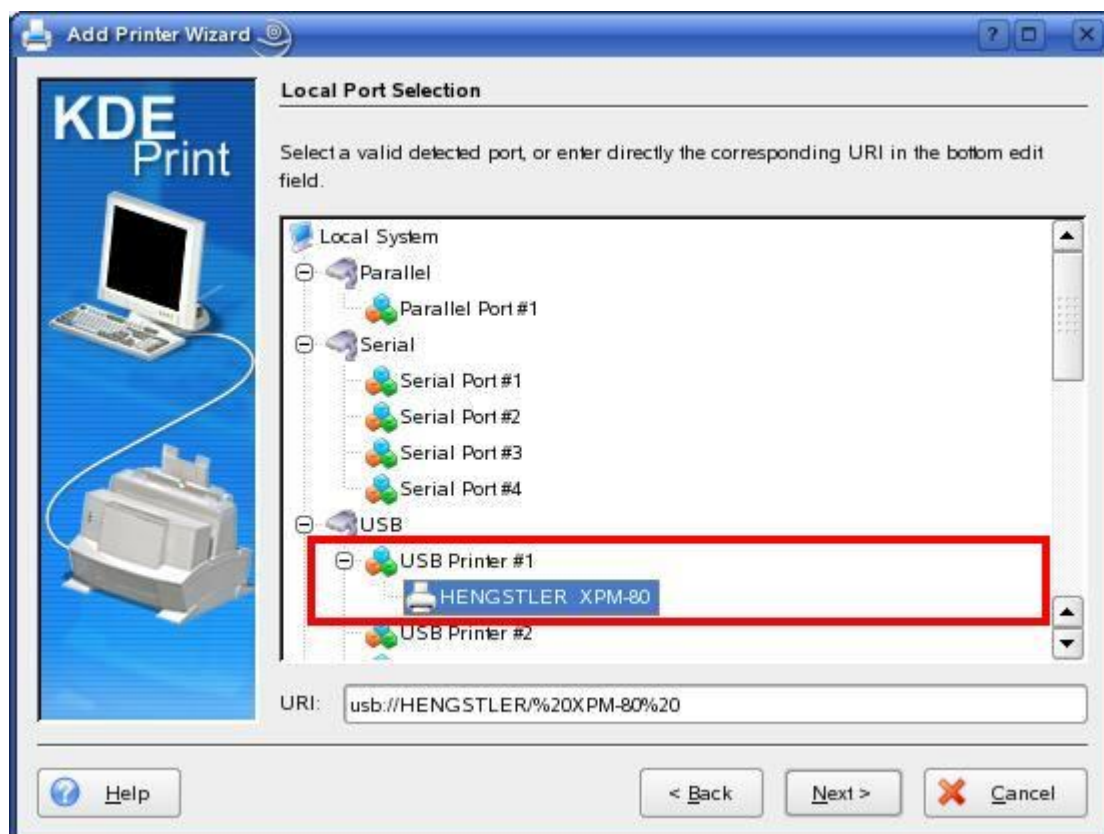


Figure 6: The “Local Port Selection” page of the “Add” function

2.3.2.3.4 The “Printer Model Selection” page

The 4th page of the “Add” is used to select the printer model. The printer model is selected by ...

- ... specifying the path to the PPD file “**hengstlerxpm80.ppd**” or “**hengstlerxpm80hr.ppd**” or “**hengstlerxpm200.ppd**” or “**hengstlerxpm200hr.ppd**”
- ... selecting “**HENGSTLER XPM80**” or “**HENGSTLER XPM80HR**” or “**HENGSTLER XPM200**” or “**HENGSTLER XPM200HR**” from the list of available printers.

Note:

To unzip the driver package for driver files you can use:

➤ `unzip XPM-LinuxDriver-S690004-<version>-product.zip`

OR

If you are using graphic mode KDE right click on driver package gzip and choose “Extract”.

Figure 7. shows all steps required for selecting the appropriate printer model.

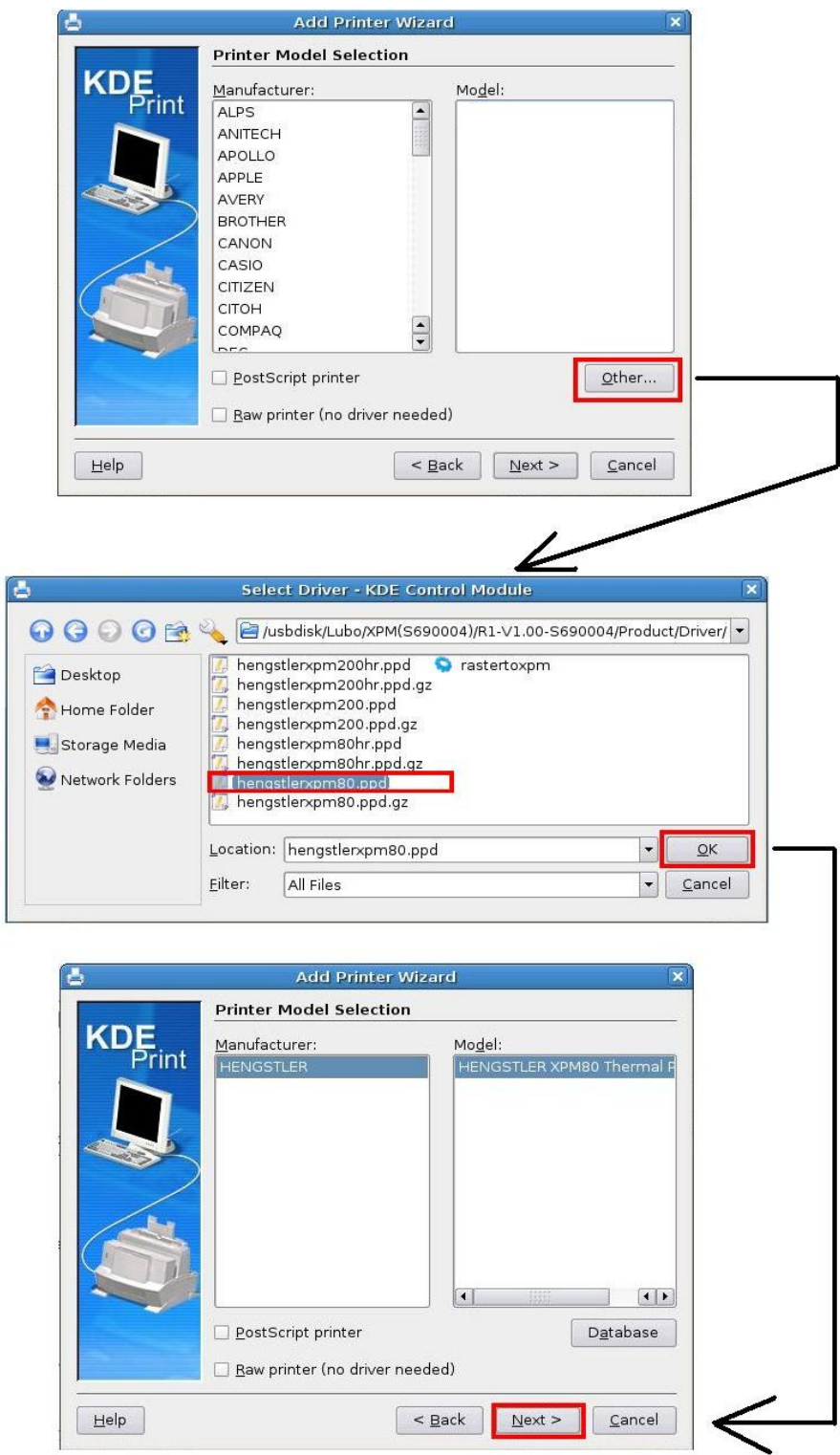


Figure 7: The “Printer Model Selection” page of the “Add” function

Note : Selected ppd file is positioned in “/etc/cups/ppd/”.

2.3.2.3.5 The “Printer Test ” page

The 5th page of the “Add” allows you to print “Test” page.

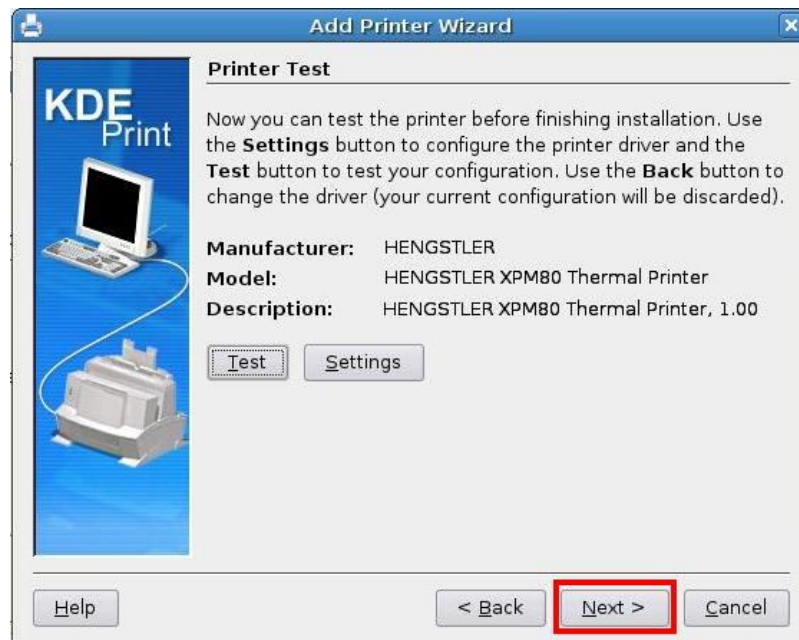


Figure 8: The “Printer Test” page of the “Add” function

2.3.2.3.6 The “Banner Selection” page

The 6th page is used to set up extra banners at Starting and Ending of printing.



Figure 9: The “Banner Selection” page of the “Add” function

2.3.2.3.7 The “Printer Quota Settings” page

The 7th page is used to set up Quota Settings and Page Limits.

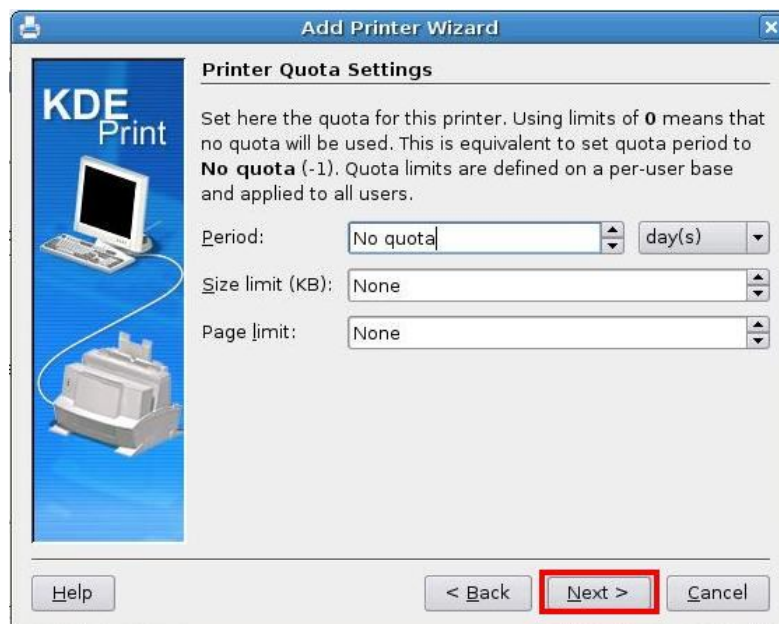


Figure 10: The “Printer Quota Settings” page of the “Add” function

2.3.2.3.8 The “User Access Settings”

The 8th page is used to set up User Access to this printer.



Figure 11: The “User Access Settings” page of the “Add” function

2.3.2.3.9 The “General Information” Page

The 9th page is used to set Printer Name and Location of the printer.

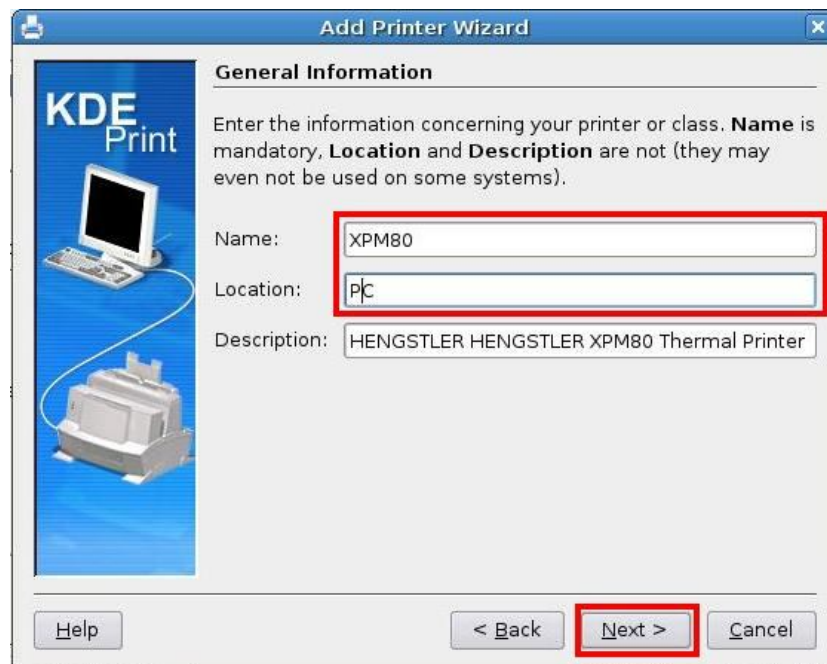


Figure 12: The “General information” page of the “Add” function

2.3.2.3.10 The “Confirmation”

The 10th page is used to confirm all settings.

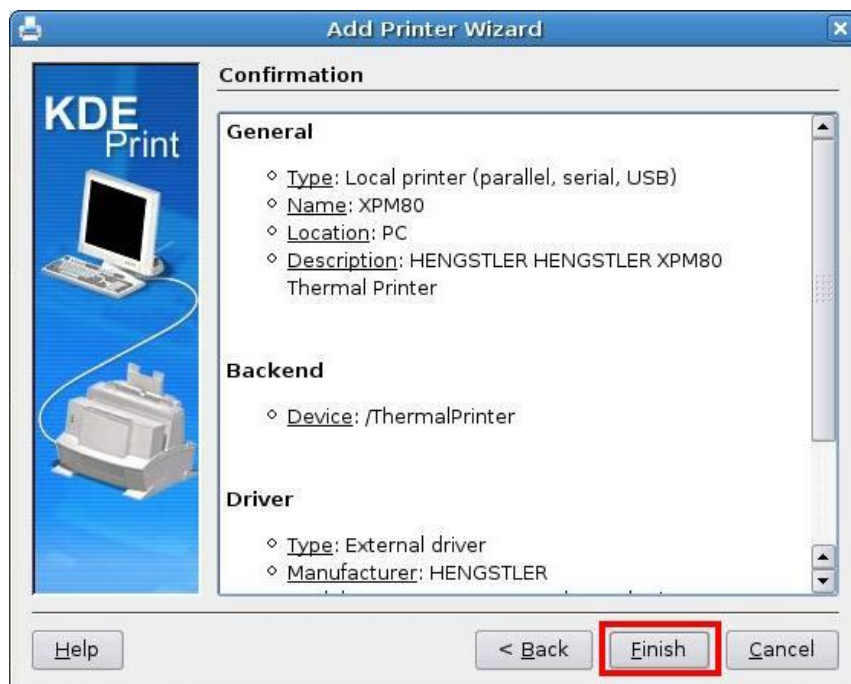


Figure 13: The “General information” page of the “Add” function

2.3.2.3.11 The “Printers” dialog

The final “Printers” dialog is used to see if the printer was correctly installed to the system.

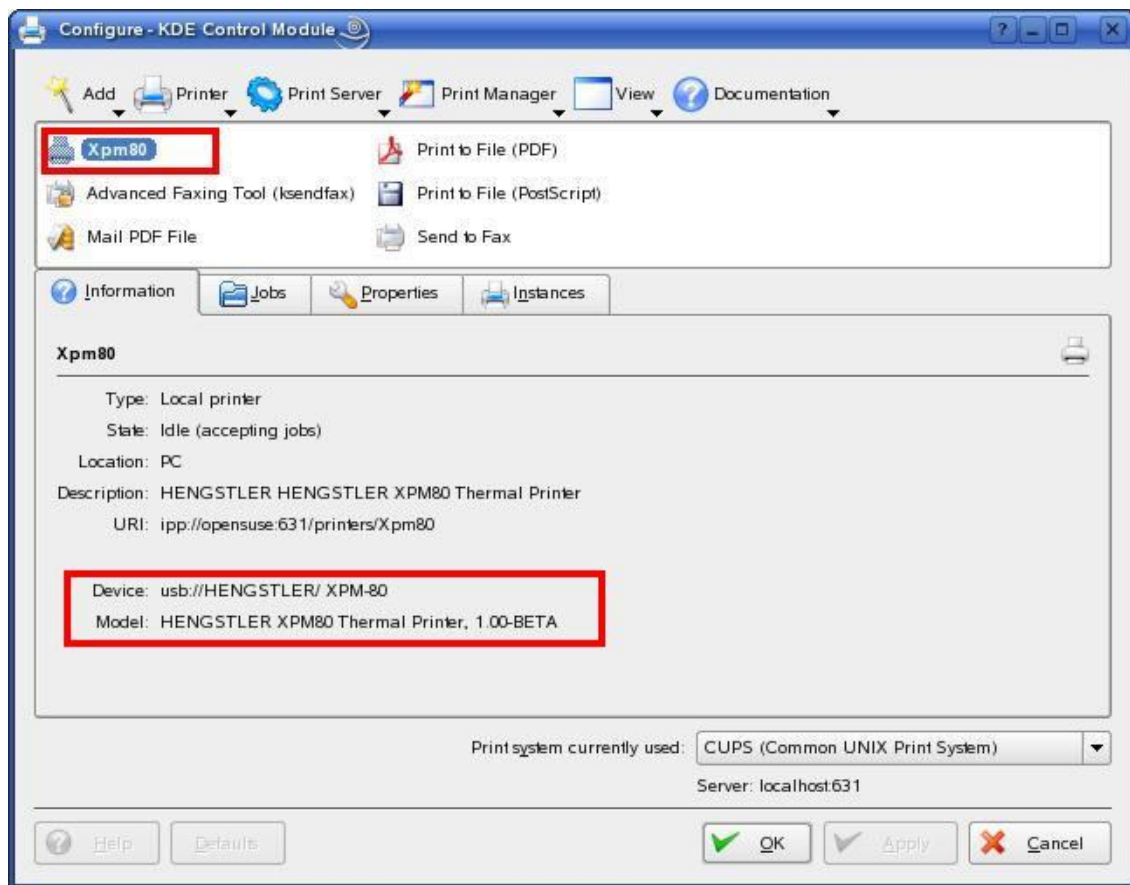


Figure 14: The “Printers” dialog

2.3.3 Printer installation using shell terminal

Sometimes it is required that the installation of the printer driver becomes integrated into a customer specific installation utility. For those cases Linux permits you to install a printer from the shell whereas this command might be easily integrated into the customer specific installation utility.

The command for Hengstler printer installation under Linux is:

```
root:/# lpadmin -p PrinterName -E -v Device-Uri -m ppd-filename ENTER
```

Sample printer installation commands:

- Installation of the Hengstler XPM 80 printer driver on USB1:

```
root:/# lpadmin -p HengstlerXPM-80 -E -v usb://dev/usb/lp0 -m hengstlerxpm80.ppd  
ENTER
```

Detailed information on the printer user interface can be retrieved by shell command:

```
root:/# info lpadmin
```

2.3.4 Printer driver files

For installation of printer you can also use your browser with address localhost:631 where you can manually add printer to the system. This address is reachable from all Linux platforms.

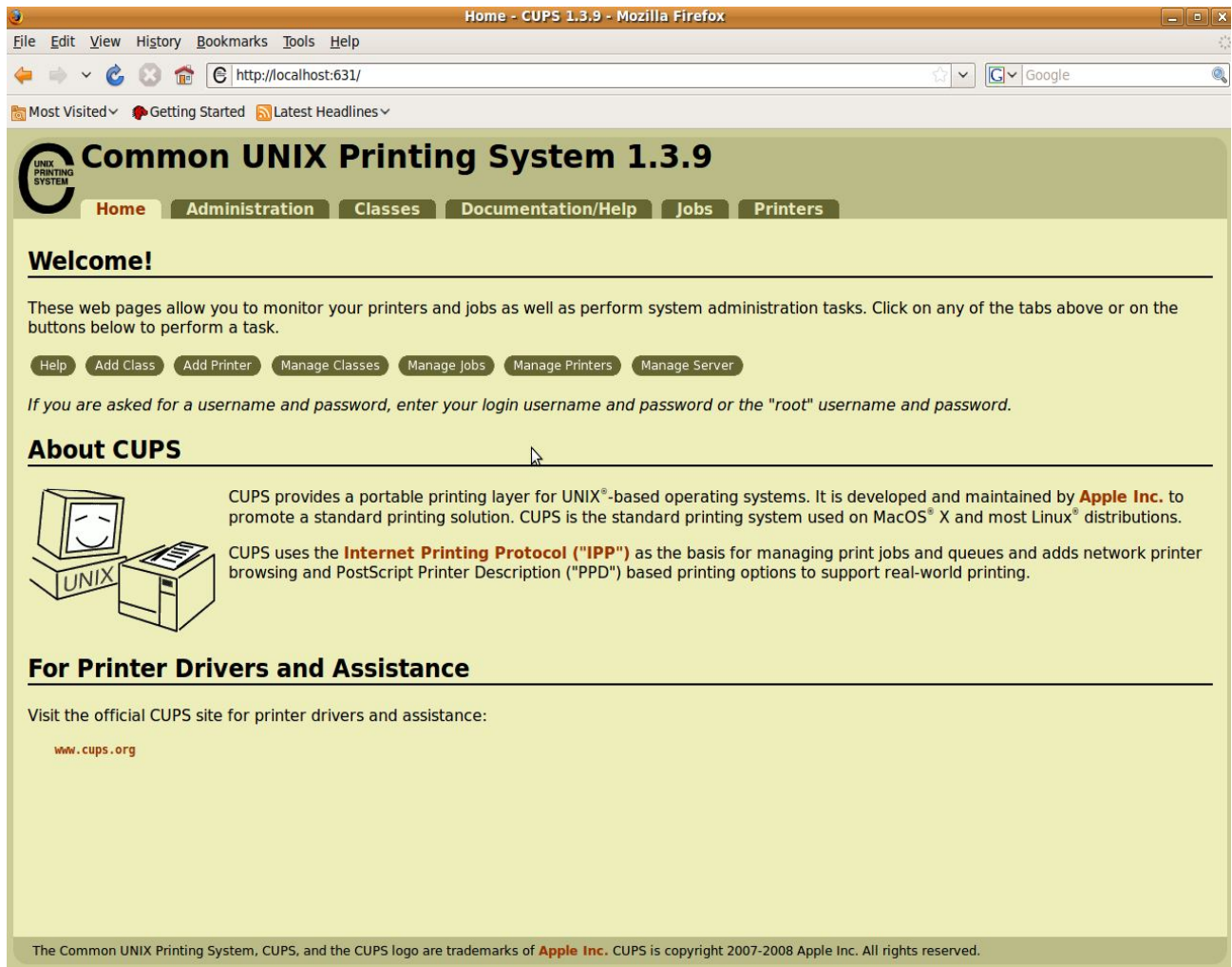


Figure 15: localhost:631 address

2.3.5 Printer driver files

After adding the printer to the system, it is necessary to also copy the printer driver files to specific destinations.

In **<root>** directory of the driver package run the script:

```
root:/# ./install_x86
```

- for **x86** system types

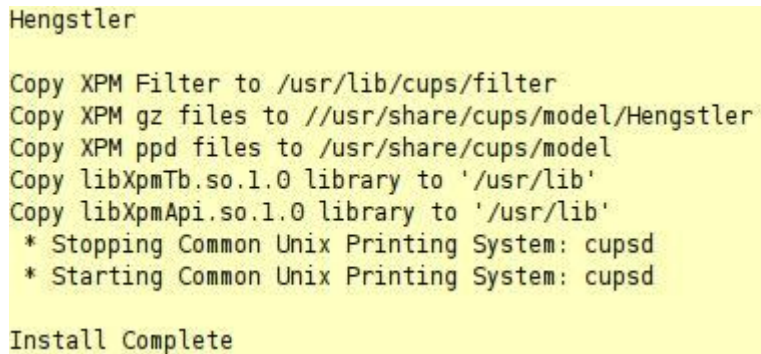
```
root:/# ./install_x64
```

- for **x64** system types

```
root:/# ./install_arm
```

- for **arm** system types

This script will copy all files to their destination directories. The output of the shell window should look like this:



```
Hengstler
Copy XPM Filter to /usr/lib/cups/filter
Copy XPM gz files to //usr/share/cups/model/Hengstler
Copy XPM ppd files to /usr/share/cups/model
Copy libXpmTb.so.1.0 library to '/usr/lib'
Copy libXpmApi.so.1.0 library to '/usr/lib'
* Stopping Common Unix Printing System: cupsd
* Starting Common Unix Printing System: cupsd
Install Complete
```

Figure 16: Shell window after copying driver files

You can find information on copied files and their destination directories in chapter 2.3.6.

2.3.6 Printer driver files overview

After installation of the printer driver, various files are copied into specific directories as follows:

- **/usr/lib/cups/filter**
.rastertoxpm = Raster printer driver for XPM printers
- **/usr/share/cups/model**
.hengstlerxpm80.ppd = Printer driver settings for driver “Hengstler-XPM 80”
.hengstlerxpm80hr.ppd = Printer driver settings for driver “Hengstler-XPM 80HR”
.hengstlerxpm200.ppd = Printer driver settings for driver “Hengstler-XPM 200”
.hengstlerxpm200hr.ppd = Printer driver settings for driver “Hengstler-XPM 200HR”
- **/usr/lib**
.libXpmApi.so.1.0 = Application Programming Interface/API (Linux library)
.libXpmTb.so.1.0 = TOOLBOX Interface (Linux library)

2.4 Un-installing the printer driver

Un-installation of the printer driver must be done with the Un-Installation script.

2.4.1 The XPM un-installation script

The XPM printer driver un-installation must be done with the XPM Un-installation script “uninstall”. This script is located in the driver package in directory “<root>”.

The “uninstall” script will uninstall (remove) all installed XPM printer driver files from the system together with the API library.

```
root:/# ./uninstall_x86
```

- for **x86** system types

```
root:/# ./uninstall_x64
```

- for **x64** system types

```
root:/# ./uninstall_arm
```

- for **arm** system types

Removal of all printer driver files is required to avoid a XPM driver file version mismatch after installing a different XPM driver version.

Note that deleting a XPM printer from the “Printers” dialog is also necessary. You can also do this with the shell command:

```
root:/# lpadmin -x PrinterName
```

The XPM un-installation script is show in Figure 17.

```
Hengstler
Deleting Xpm Filter from /usr/lib/cups/filter
Deleting XPM gz files from //usr/share/cups/model/Hengstler
Deleting XPM ppd files from /usr/share/cups/model
Deleting libXpmApi.so.1.0 library from '/usr/lib'
Deleting libXpmTb.so.1.0 library from '/usr/lib'
* Stopping Common Unix Printing System: cupsd
* Starting Common Unix Printing System: cupsd

Un-Install Complete
```

Figure 17: The XPM Un-installer script

2.5 Re-installing the printer driver

For manual re-installation of the printer driver following steps must be done:

- Delete printer using **[Desktop] ·· [Preferences] ·· [Printers]**
In SUSE 10.1 KDE **[Start] ·· [Utilities] ·· [Printing Manger] ·· [Remove]**
- Un-install the driver by opening a terminal in the driver package and by entering “./uninstall”. Reboot the computer afterwards. (see chapter 2.4)
- Add the printer using **[Desktop] ·· [Preferences] ·· [Printers]**
In SUSE 10.1 **[Start] ·· [Utilities] ·· [Printing Manger] ·· [Add]**
Note that the USB printer must be connected before adding the printer. (see chapter 2.3)
- Install the driver by opening a terminal in the driver package and by entering “./install”. Reboot the computer afterwards.

3 Operation Manual

After successful installation, the printer driver can be referenced to by applications that have a printing function (such as kWord, Firefox ...) using the GDI.

3.1 Configuring the printer driver

The printer driver is configured from the printer configure dialog. Among other things, this dialog allows you to:

- Specify the print density
- Specify the print speed
- Specify if trailing blank dot lines must be removed from the printed page
- Specify cutter control at end of print
- Specify if a form feed is required at end of print
- Specify a limited form length in dot lines
- Specify which paper path is to be selected

3.1.1 Selecting the “Printer Properties” dialog

The “Configure” dialog is started from the “Printers” dialog as shown in Figure 18,

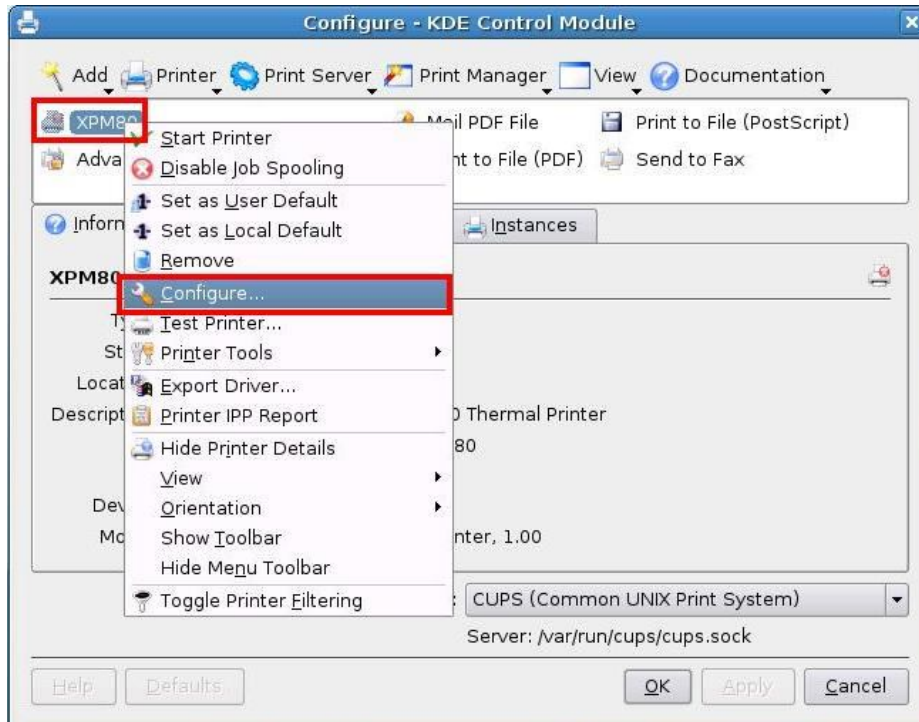


Figure 18: Starting the “Printer Properties” dialog for the printer driver

3.1.2 Overview of attributes in the “Configure” dialog

Within the “Configure” dialog, the following attributes are available:

Attributes	Function
Driver Information	Displays information on the XPM driver.
Paper Control	Paper settings related to the printout: remove trailing blanks flag, reduced form length, initiate form feed flag, paper path selection and cutter control setting for end of page.
Printer Settings	Printer related settings: print density and print speed.
Others	Print resolution settings.
General	Media size (paper size) settings.

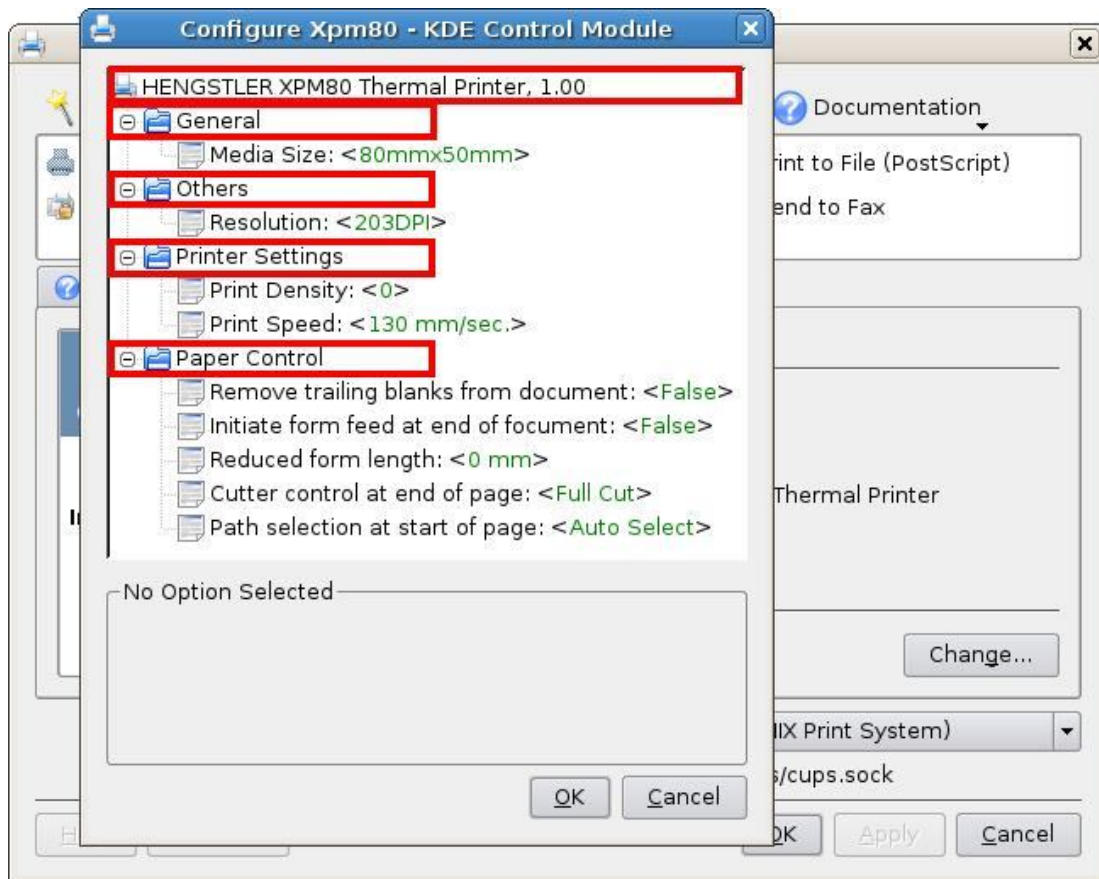


Figure 19: Selecting Attributes in the "Configure" dialog

3.1.3 The “Driver Information” attribute

The “Driver Information” attributes displays information on the printer driver as shown in Figure 20. The most important information is the version/release (here R1-V1.00) of the printer driver.

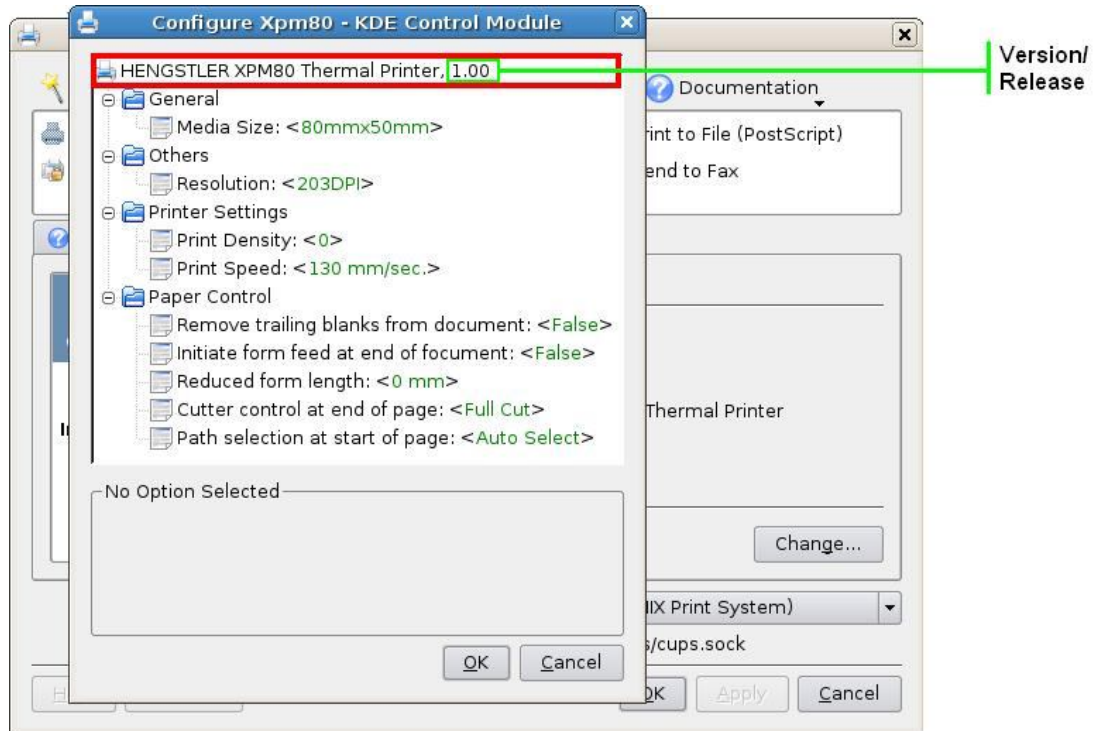


Figure 20: The “Driver Information” attribute in the “Configure” dialog

3.1.4 The “Paper Control” attributes

The “Paper Control” attributes are used to specify:

- Remove trailing blanks
- Reduced form length
- Form feed at end of document,
- Cutter control at end of page
- Path selection at start of page

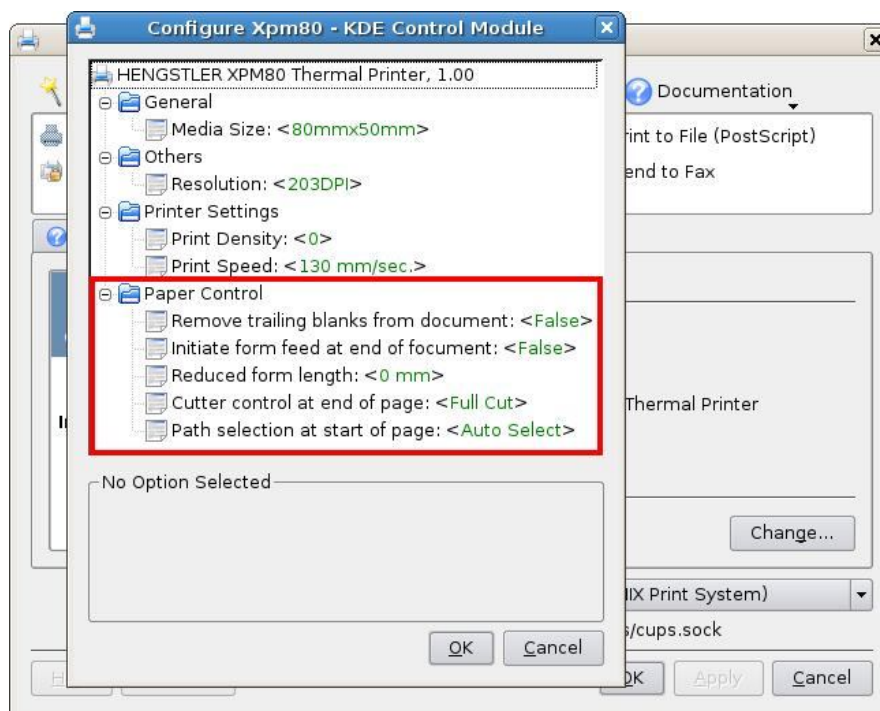


Figure 21: The “Paper Control” attributes in the “Configure” dialog

The “reduced form length” is specified in mm.

The “remove trailing blanks” option is helpful when the length of the printout needs to be variable (not fixed). If enabled, then all trailing blank dot lines of GDI printouts will not be printed.

A variable size printout is done with following steps:

- In your GDI application, select one of the XPM specific paper sizes and large height (“3000mm” is the largest height currently available in the driver)
- Clear the complete page (e.g. fill the page with white color)
- Setup the top part of the page with data (e.g. page contents) that is to be printed
- Print the whole page as portrait, whereas only the top part (e.g. page contents) will be printed

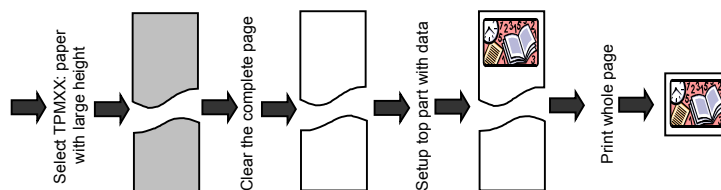


Figure 22: Printing with variable paper size

The maximum document length option allows limitation of the page length. The part of the page that exceeds the specified document length is not sent to the printer, when this option is enabled. Note that the initial and final paper feed specification do not affect the page length. When using this option, be sure to remove any footer or page number feature that would normally print on the bottom of the page. Otherwise, these features would cause the full length of the page to be printed so that the footer or page number could be included.

The “reduced form length” option is helpful when the length of the selected form needs to be reduced. This might be the case when paper with black marks is used, whereas the selected form exceeds the distance between two adjacent black marks.

The remove trailing blanks is also of great use when black/hole mark control is enabled. The adjacent form feed will automatically feed paper to the end of form..

A form feed will assure that the length of the printout matches the form length which is specified within the printer. A form feed is also required to feed the paper to the end of form when black/hole mark control is enabled within the printer.

The following keys in the [PaperControl/Paper Control] section of the hengstlerxpm80/ hengstlerxpm80hr/ hengstlerxpm200/ hengstlerxpm200hr.ppd files relate to this attribute:

Key	Description	Units	Domain	Comment
inBlanks	Remove trailing blanks from document	N/A	[0,1]	0 = FALSE 1 = TRUE
inFormFeed	Form feed at the end of document	N/A	[0,1]	0 = FALSE 1 = TRUE
inFormLength	Reduced form length	mm	[0..20]	Printer domain might differ
inCutterControl	Cutter control at end of page	N/A	[0,1]	0 = NO CUT, 1 = FULL CUT,
inPathSelection	Paper path selection at start of page	N/A	[0,1,2,3]	0 = auto-select any path 1 = select path #1, 2 = select path #2, 3 = Do not use

3.1.5 The “Printer Settings” attributes

The “Printer Settings” attributes are used to:

- Specify the print density of the thermal printer
- Specify the print speed of the thermal printer

The print density can be specified in the range from –100 to +100 percent, whereas 0% is default. It specifies the burn time for the thermal line, which might need to be corrected depending on the type of thermal paper used. The print density of the printer is set in advance of each page printout.

The print speed can be specified in the range from 30 mm/sec to 250 mm/sec, whereas 130 mm/sec is the default. It specifies the maximum speed which the printer may use for printing the document. The print speed of the printer is set in advance to each page printout.

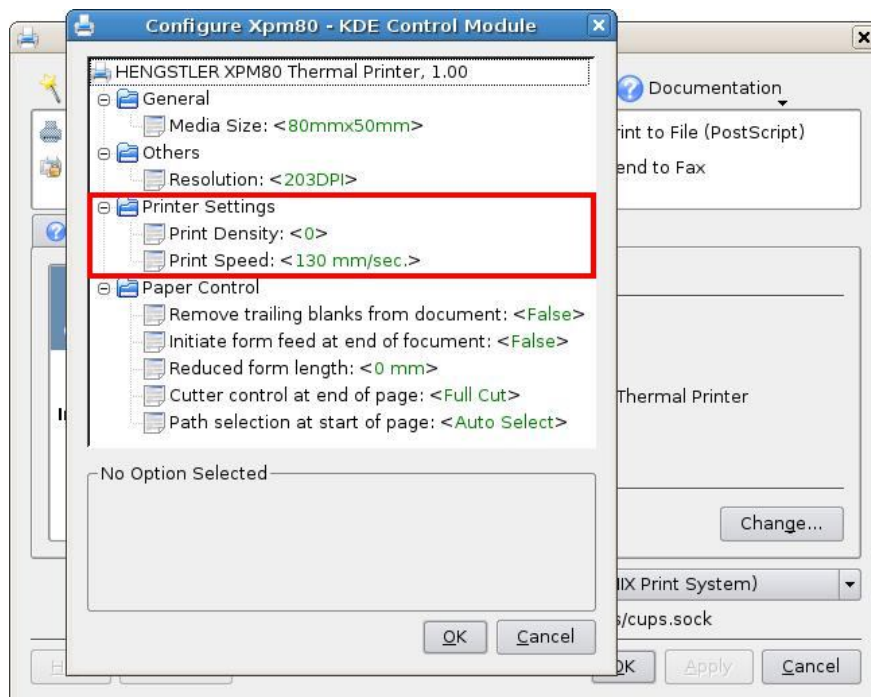


Figure 23: The “Printer Settings” attributes in the “Configure” dialog

The following keys in the [PrinterSettings/Printer Settings] section of the hengstlerxpm80/hengstlerxpm200.ppd files relate to this attribute:

Key	Description	Units	Domain	Comment
PrintDensity	Energation level for the thermal line	Percent	[-100..+100, Disabled]	0=-0%, 15=+15%
PrintSpeed	Maximum speed for printed	Mm/sec	[30..250, Disabled]	130=130 mm/sec

3.1.6 The “General” attribute

The “General” attribute is used to select media (paper) size for printing. The media size can be specified in the range from 50mm to 3000mm long paper plus specific paper sizes (A2, A3, A4...).

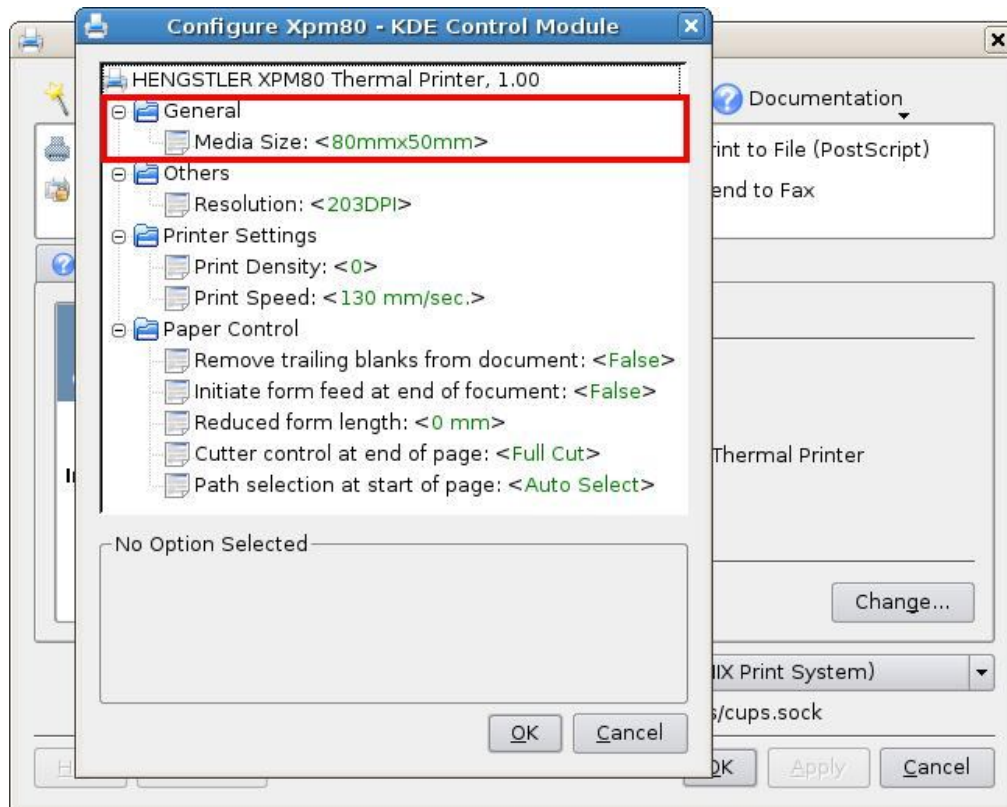


Figure 24: The “General” attribute in the “Configure” dialog

The following keys in the [PageRegion/Media Size] section of the hengstlerxpm80/ hengstlerxpm200.ppd files relate to this attribute:

Key	Description	Units	Domain	Comment
PageSize	Maximum page size settings	mm	[50..3000, A3, A4, A5, B4, B5, LETTER, LEGAL]	50=50mm 1000=1000mm

3.1.7 The “Others” attribute

The “Others” attribute is used to select resolution for printing. Default resolution for XPM80/XPM200/TPM200(XPM) is 203DPI, for XPM80HR/XPM200HR/TPM200HR(XPM) is 300DPI.

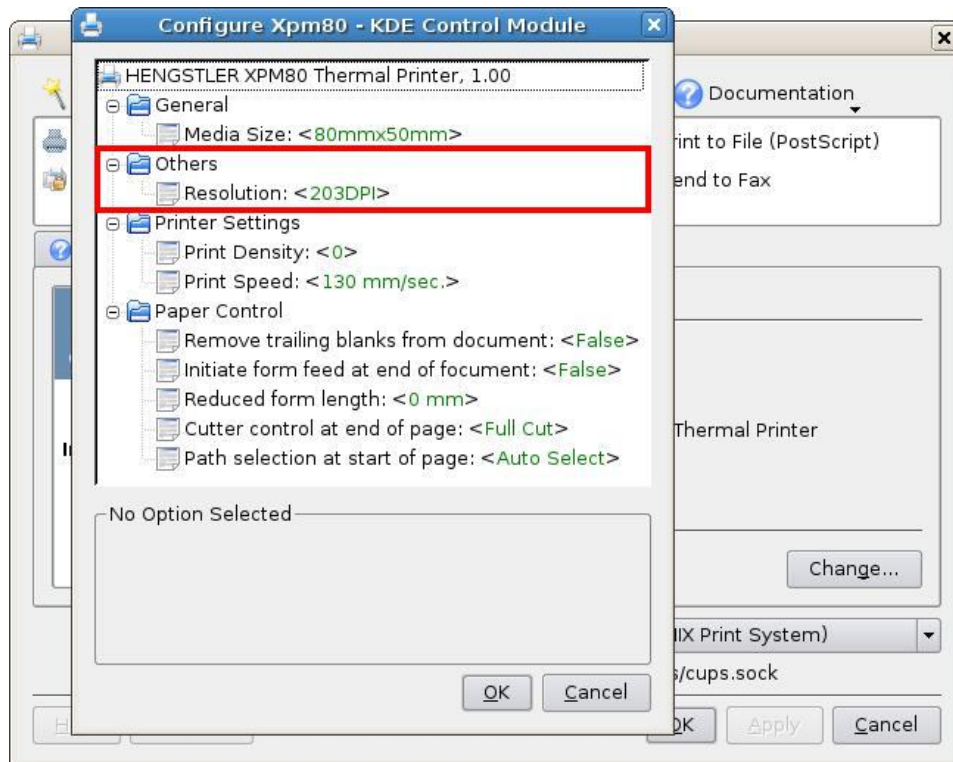


Figure 25: The “Others” attributes in the “Configure” dialog

3.2 Using the printer driver

The printer (CUPS driver) can be used by standard applications (e.g. kWord) through the Graphical Device Interface (GDI), or, by special applications (e.g. Receipt-Systems) through both the GDI and the Software Development Kit (SDK=>API).

3.2.1 Using the printer driver in common applications

The printer can be used in common applications that use GDI for printing (such as kWord), however with following restrictions:

- The selected paper size must match one of the XPM predefined paper sizes (e.g. "XPM 80: A4").
- If the selected paper size differs from an XPM pre-defined paper size, then the selected paper will be used.

Note that you can set the default paper size in the "Configure" dialog (see the "General" attribute in the "Printers" dialog).

3.2.2 Using the printer driver in special applications

The printer driver can be used in special applications that use the API interface of the printer driver for printing.

The API (Application Programming Interface) offers functional interface (open, close, read, write) which allow applications to communicate with the printer directly using emulation commands:

4 Driver Synopsis

This chapter describes the concept of the XPM CUPS printer driver components and environment. Currently available driver version is R2-V1.01d-BETA-2012AUG13.

4.1 The XPM CUPS printer driver

The XPM CUPS printer driver is designed for use with Hengstler XPM80/XPM80HR and XPM200/XPM200HR printers whereas it offers an interface to the application that has printing, status inquiry and printer control capabilities.

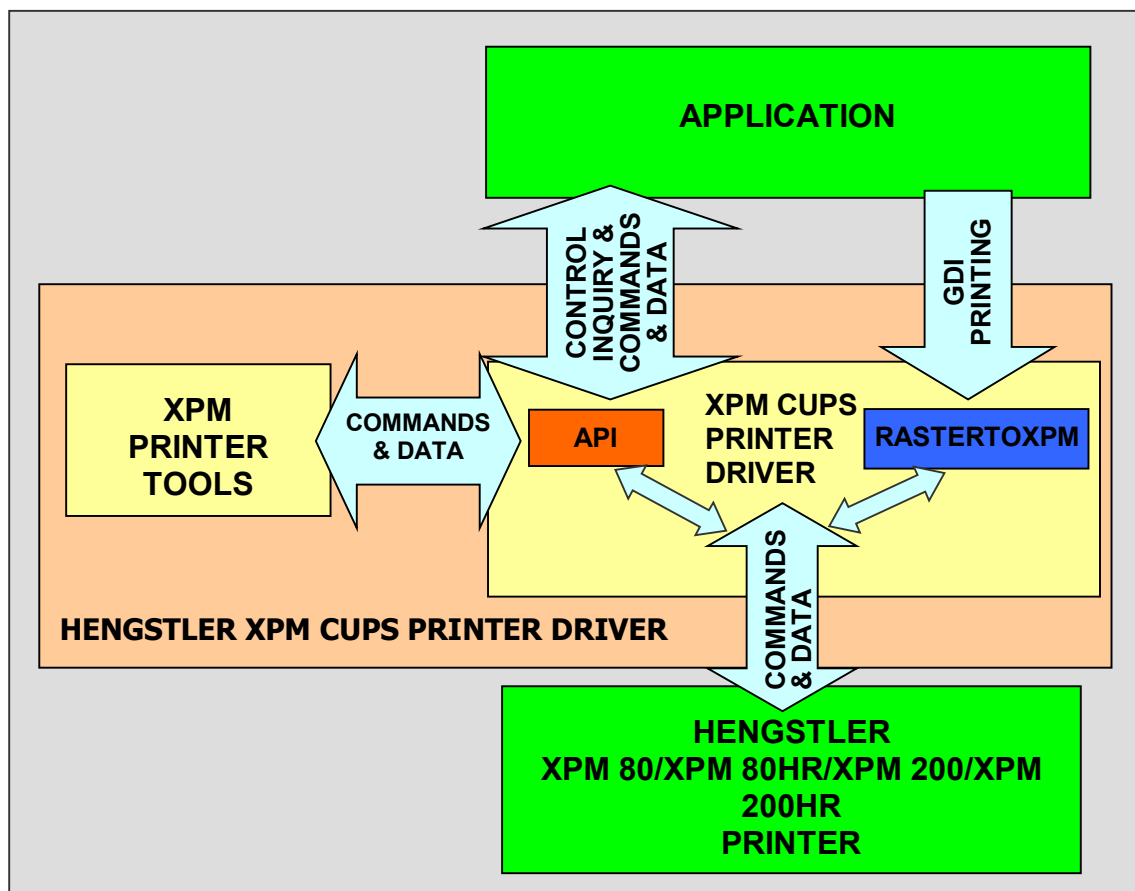


Figure 26: The XPM CUPS printer driver environment without Print Monitor

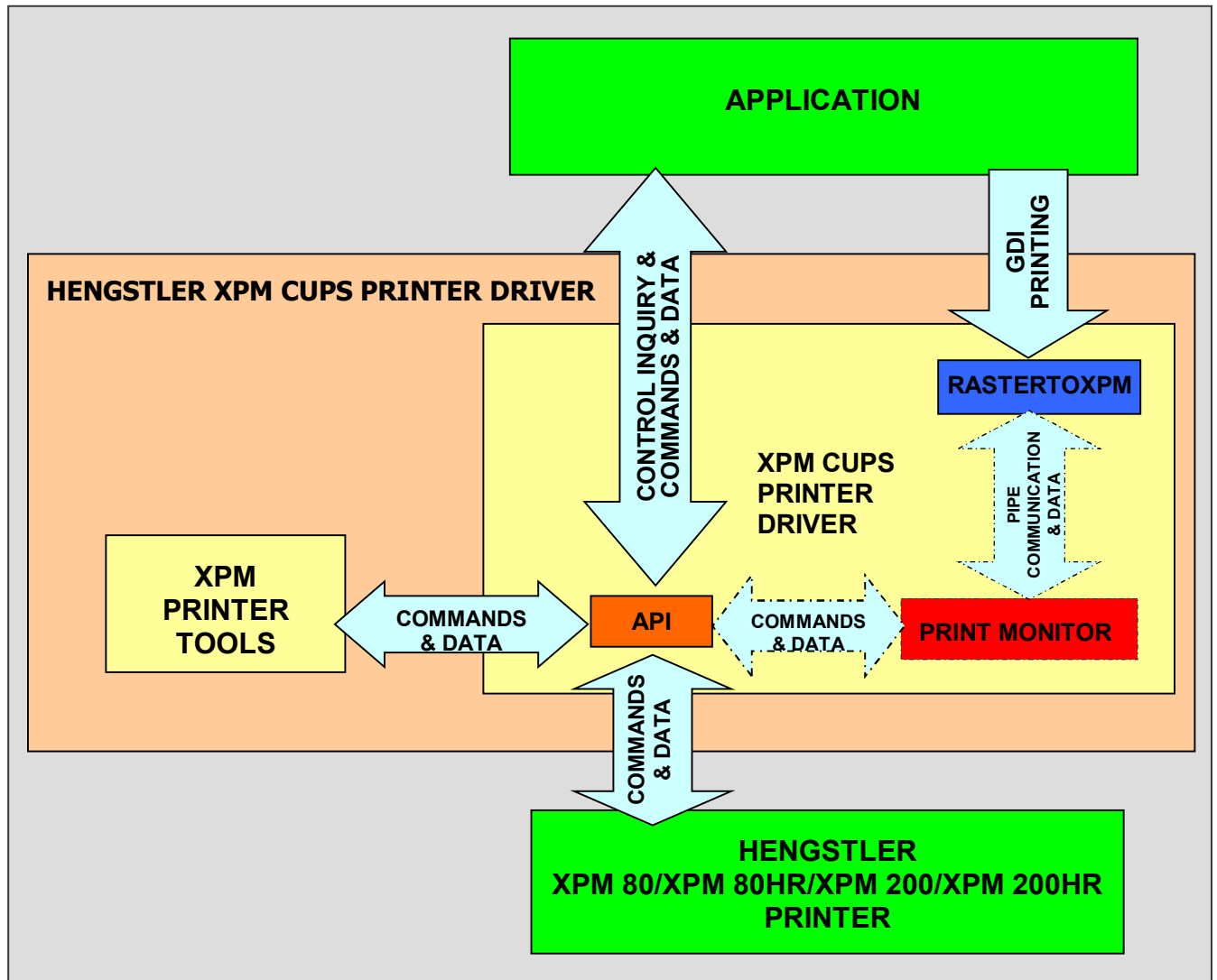


Figure 27: The XPM CUPS printer driver environment with Print Monitor

The application may use one or more of following XPM interfaces:

- **GDI printing**
This graphical device interface allows printing from standard applications, where the XPM driver renders the colored printout to a monochrome print job that is sent to the rastertoxpm and next to printer. If the Print Monitor is running, rastertoxpm sends all data to the Print Monitor, which controls communications between rastertoxpm and the Print Monitor and informs the user about progress with GUI dialogs. For Print Monitor use, see chapter 6.6.
- **Application Programming Interface (API)**
This interface allows the application to open/close the connection to the printer and query information or control paper movement (e.g. reject, present, etc.).

Figure 26 shows the XPM CUPS printer driver environment with Print Monitor. The Print Monitor is a special application with can be run separately, for use see chapter 6.6.

5 Programming Manual

This chapter describes the application programming interfaces (API) that are part of the printer driver package.

5.1 Integrating the XPM CUPS printer driver in an application

The XPM offers two different interfaces to the application:

- **GDI**
The graphical device interface is a Linux standard for representing graphical objects and transmitting them to output devices, such as monitors and printers. An application printout through GDI will result in one or more pages that are passed to the rastertoxpm, whereas this component converts it to the data which is sent to the printer. If the Print Monitor is running, rastertoxpm sends all data to the Print Monitor, which informs the user about progress with GUI dialogs. For Print Monitor use, see chapter 6.6.
- **API**
An application can use the application programming interface to directly interact with the printer by means of `open()`, `close()`, `read()`, `write()`, etc.

From CUPS v1.4, CUPS are not using for communication “usbip” library anymore. New library “libusb” is used. Therefore new API in latest XPM Linux driver R2-V1.01d-BETA is extended to this communication also, so now it supports both ways “usbip” and “libusb”.

Differences for opening printer connection for each library type:

usbip – to open connection to printer you need to type “**/dev/usb/lpX**” as printer port(X- means port number 0-99)

Example: “**/dev/usb/lp0**”

libusb – to open connection to printer you need to type “**/dev/bus/usb/00X/00Y**” as printer port(X-means USB bus-number and Y-means device number)

Example: “**/dev/bus/usb/005/002**”

To check what is bus and device number for the printer connected to your system, type in shell:

```
>> lsusb
```

In output search for row “**1bf1:XXXX**” where “1bf1” is VID number(bus) and “XXXX”(device) is PID number for XPM printers.

XPM PID numbers:

- 0x0002 - Hengstler XPM-80 (OLD), XPM-80HR (OLD), XPM-200 (OLD), XPM-200HR (OLD)
- 0x0010 - Hengstler XPM-80
- 0x0011 - Hengstler XPM-80HR
- 0x0012 - Hengstler XPM-200
- 0x0013 - Hengstler XPM-200HR
- 0x0014 - Hengstler TPM-80 (XPM)
- 0x0015 - Hengstler TPM-200 (XPM)
- 0x0016 - Hengstler TPM-200HR (XPM)

If you are using **RS232** printer type connection in some Linux distributions, you need to set READ/WRITE permission to printer port to have access to it before any use.

```
COM1 = "/dev/ttyS0"
```

```
COM2 = "/dev/ttyS1"
```

```
...
```

To set permission RIGHT click on the file and select PROPERTIES, tab PERMISSION and set OTHER to READ and WRITE or type in shell:

```
>> chmod o+rw /dev/ttyS0
```

After each printer disconnect or reset this BUS number are changed. To ensure that your printer is always mapped to same path you need to create symlinks. More information about how to create / write udev rules study Linux manual.

Example:

```
/dev/bus/usb/00X/00Y is always mapped to > /dev/usb/Xpm80
```

5.2 The XPM application programming interface (API)

Currently available driver version is R4-V1.03b-BETA-2018AUG16.

5.2.1 Installing XPM API into the Linux system

Library libXpmApi.so.1.0 is automatically installed to the system with driver installation.

-To check if this library was installed in your system, type in shell:

```
>> ldconfig -p
```

-It will list all installed libraries in your system, where you should find also libXpmApi.so.1.0 together with symbolic links.

If this library was not installed into your system you can do it manually in the shell terminal:

-Go to <root>Api folder and copy the library to /usr/lib, then create symbolic links

```
>> cp libXpmApi.so.1.0 /usr/lib
```

```
>> ln -sf /usr/lib/libXpmApi.so.1.0 /usr/lib/libXpmApi.so
```

```
>> ln -sf /usr/lib/libXpmApi.so.1.0 /usr/lib/libXpmApi.so.1
```

```
>> ldconfig
```

Same steps are applicable for manual installing libXpmTb.so.1.0 library.

5.2.2 Integrating XPM API in an application

The XPM API (application programming interface) is represented by file **libXpmApi.so.1.0**, a dynamic library (.so) that exports all functions of the XPM API. File **libXpmApi.so.1.0** is located in /usr/lib/.

Three additional files allow integration of the libXpmApi.so.1.0 in your application:

- **Xpm_Api.h**
This is the header file of the XPM API which describes the API through macro definitions, type definitions, function prototypes, etc. This header file must be included in your application C-source files that call XPM API functions. Note that this file is used during compile time to check if your function calls are syntactically correct.

This file can be found on the distribution CD in directory "<root>\Api".

Note that libXpmApi.so.1.0 is a vital component of your final application environment and that its availability is a must. File Xpm_Api.h, however, is only used during the application development phase and is not needed for the final application environment.

If you want to use the library in your application, you have to include header file in your application sources and in compilation you have to add library (-lXpm_Api) as parameter.

Note that, you need to add time library (-lrt) as parameter in compilation in some Linux distribution.

5.2.3 The interface definition file Xpm_Api.h

The XPM API is defined in header file Xpm_Api.h which is divided into following parts:

- INCLUDES -> list of include files
- MACROS -> macro definitions
- TYPES -> type definitions
- FUNCTIONS -> function prototypes
- VARIABLES -> exported variables

5.2.3.1 Includes Part (API-INCLUDES)

The "INCLUDES" part in file Xpm_Api.h includes all header files required for successful compilation of this header file. Currently no "INCLUDES" are available.

5.2.3.2 Macros Part (API-MACROS)

The "MACROS" part in file Xpm_Api.h specifies the following macros:

- Error Code
- Data packets id's
- Data request id's
- Printer status packet -> printer status bits

- Printer status packet -> printer error codes
- Printer sensor packet
- Printer flash packet
- Printer feed packet
- Printer present packet
- Configuration Data ->UART Baud rates
- Configuration Data ->UART parity on/off
- Configuration Data ->UART parity odd/even
- Configuration Data ->UART data bits (7/8)
- Configuration Data ->UART stop bits (1/2)
- Configuration Data ->UART flow control (handshake)
- Configuration Data ->External LED control
- Configuration Data ->Printer Options
- Configuration Data ->Paper Path Options
- Configuration Data ->Test page code

5.2.3.3 Types Part (API-TYPES)

The "TYPES" section in file Xpm_Api.h specifies following basic data type definitions.

- TYPEDEF STRUCT
- TYPEDEF ENUM

NOTE: All definitions and structures are described in the emulation command set manual (command "GS A+[n]") and the XP driver manual and application notes.

5.2.3.4 Functions Part (API-FUNCTIONS)

The "FUNCTIONS" part in file Xpm_Api.h specifies following function types:

- Printer Access Functions
- Library Functions

5.2.3.4.1 Printer Access Functions

The following functions are available for accessing the printer:

Function	Description	
	Return Value	Parameter
xpm_api_printer_open	Function xpm_api_printer_open (...) opens the connection to printer.	
	intptr_t printer_handler	char * port
xpm_api_printer_close	Function xpm_api_printer_close (...) closes the printer connection	
	VOID	intptr_t printer_handler
xpm_api_printer_read	Function xpm_api_printer_read (...) reads data sent by printer until all data has been received or until the timeout runs out	
	int nr_of_read_bytes	intptr_t printer_handler
		unsigned char * read_data
		int size_of_data
xpm_api_printer_clear	Function xpm_api_printer_clear (...) clears all buffered data that has been or has not yet been sent by printer.	
	int result	intptr_t printer_handler
xpm_api_printer_write	Function xpm_api_printer_write (...) sends data to the printer until all data has been sent or until the timeout runs out	
	int nr_of_write_data	intptr_t printer_handler
		unsigned char * write_data
		int size_of_data
xpm_api_printer_set_serial	Function xpm_api_printer_set_serial (...) sets up the serial printer port, return handle of printer	
	int printer_handler	intptr_t printer_handler
		unsigned long baud_rate
		unsigned char data_bits
		unsigned char parity
	unsigned char stop_bits	

5.2.3.4.2 Library Functions

The following functions are available for accessing the API version:

Function	Description	
	Return Value	Parameter
xpm_api_get_library_info	Function xpm_api_get_library_info (...) Retrieves info about the library	
	char * library_info	VOID

5.2.3.5 Variables Part (API-VARIABLES)

There are no variables exported by the XPM API.

5.2.4 XPM API Coding Examples

This section contains following XPM API coding examples:

- Printer Communication Coding Example

5.2.4.1 Printer Communication Coding Example

The following C-Programming example is an extract from an application and shows the procedure for inquiring on printer status.

```
void inquire_printer_status
(char *printer_port)
{
    intptr_t printer = 0; // Handler to printer
    int nr_of_read_data = 0; // Number of read bytes from printer

    //-- Open connection to printer
    printer = xpm_api_printer_open (printer_port);

    //-- Check if printer was opened
    if ( (printer != D_XPM_API_OPEN_FAILED)
        || (printer != D_XPM_API_INVALID_DEVICE)
        || (printer != D_XPM_API_DETACH_FAILED)
        || (printer != D_XPM_API_CLAIM_FAILED)
        || (printer != D_XPM_API_GET_ACTIVE_CONFIG_FAILED)
        || (printer != D_XPM_API_NO_INTERFACE)
        || (printer != D_XPM_API_ENDPOINT_COUNT_FAILURE)
    ) {

        BYTE ub_printer_data_request[] = {0x1d,0x61,0x00, 0x01}; // GS a+[n]+[m],m=0x00,n=0x01 =>
                                                                // emulation command for requesting
                                                                // printer status

        //-- Clear receive buffer
        xpm_api_printer_clear(printer);

        //-- Request printer status
        if ( xpm_api_printer_write
            (printer, ub_printer_data_request, sizeof(ub_printer_data_request), 1000)
            == sizeof(ub_printer_data_request)
        ) {

            BYTE ub_printer_data_response[255];

            //-- Receive printer status packet header
            nr_of_read_data = xpm_api_printer_read
                (printer, ub_printer_data_response, sizeof(ub_printer_data_response), 1000);

            //-- Check if response data is a printer status
            if ( nr_of_read_data > 4)
                && (ub_printer_data_response[0] == 0x1B)
                && (ub_printer_data_response[1] == 0xFF)
                && (ub_printer_data_response[2] == 0x02) // Printer status packet
            ) {
```

Call xpm_api_printer_open() to open the connection with the printer

Declaration of the emulation command "GS 'a'+[n]+[m]" with [n]==[00] and [m]==[01] will inquire the printer status.

Call xpm_api_printer_clear() to clear receive buffer.

Call xpm_api_printer_write() to send the emulation command to the printer.

Declaration of the 255 bytes packet will be used to identify the printer status packet.

Call xpm_api_printer_read() to read the packet which precedes the printer status

```
        //-- Process printer status
        ....
    }
}
}
//-- Close connection with printer
xpm_api_printer_close(printer);
}
```

Call `xpm_api_printer_close ()` to close connection with the printer

6 Printer Tools

6.1 Introduction

This chapter describes the XPM printer tools, which are distributed as part of the printer driver package and which are available in directory "<root>\Tools".

Currently, the following printer tools are available:

- ***The XPM Print Terminal***
- The XPM Configuration Tool
- The XPM Inquiry Tool
- The XPM Upload Tool
- ***The XPM Print Monitor***
- ***The XPM API Test***
- ***The XPM Demo Applications***

6.2 The XPM Print Terminal

The XPM Print Terminal tool is used for immediate communication with the printer using emulation commands. The tool is started by writing in the shell window in directory <root>/Tools/:

```
>> ./Xpm_PrintTerminal
```

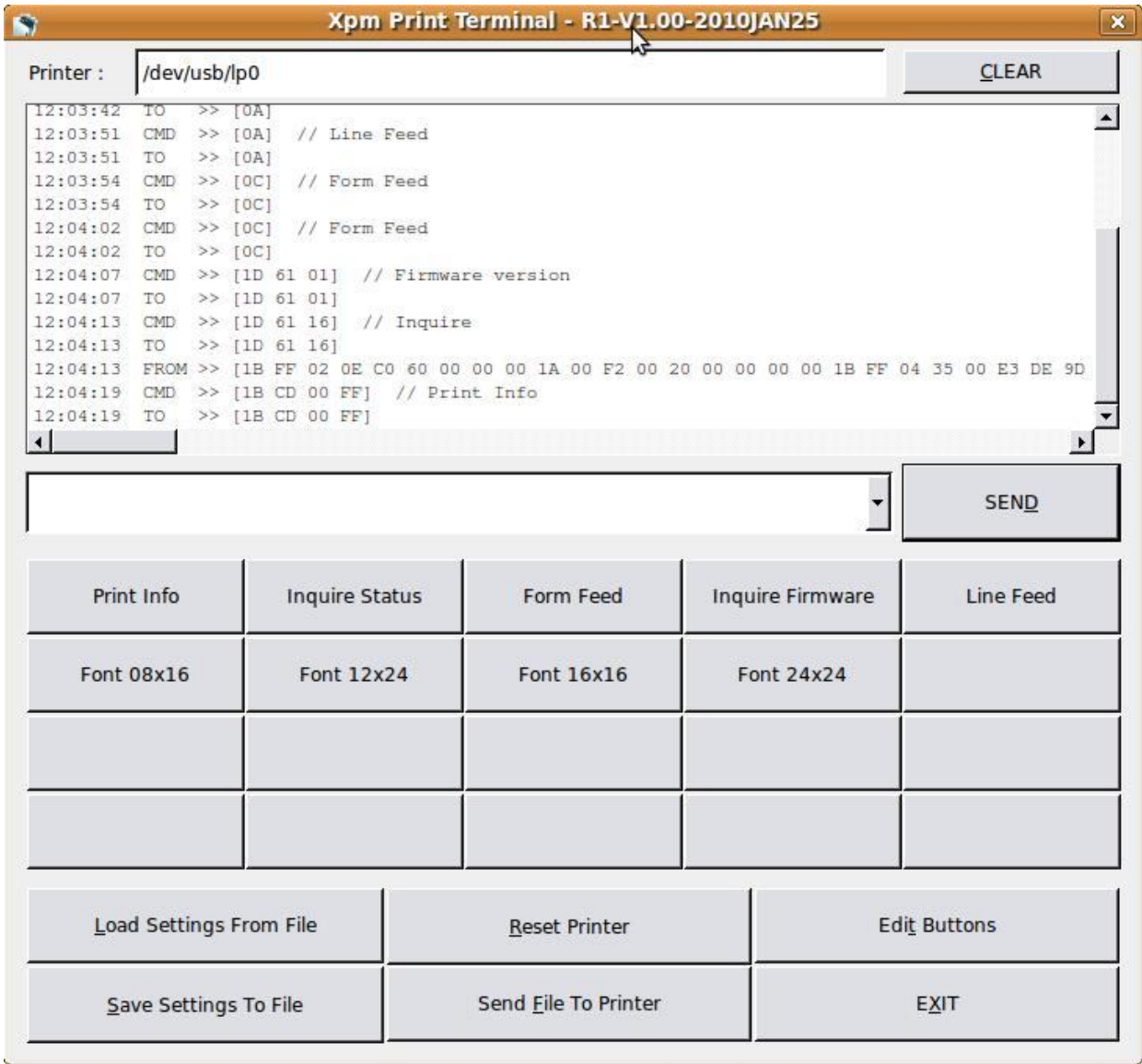


Figure 28: The XPM Print Terminal - main dialog

Button Text		Button CMD
Button #1	Print Info	[1B CD 00 FF] // Print Info
Button #2	Inquire Status	[1D 61 16] // Inquire
Button #3	Form Feed	[0C] // Form Feed
Button #4	Inquire Firmware	[1D 61 01] // Firmware version
Button #5	Line Feed	[0A] // Line Feed

Row #2

Button #1	Font 08x16	[1b 21 00] >>> 08x16 FONT <<<
Button #2	Font 12x24	[1b 21 01] >>> 12x24 FONT <<<
Button #3	Font 16x16	[1b 21 02] >>> 16x16 FONT <<<
Button #4	Font 24x24	[1b 21 03] >>> 24x24 FONT <<<
Button #5		

Row #3

Button #1		
Button #2		
Button #3		
Button #4		
Button #5		

Row #4

Button #1		
Button #2		
Button #3		
Button #4		
Button #5		

Figure 29: The XPM Print Terminal – setup dialog

The XPM Print Terminal tool allows simultaneous input in TEXT and HEX mode whereas the mode is selected by special character combinations:

- **\X switches to hex mode.**

All hex digit pairs entered afterwards represent HEX values that are converted to bytes when the data is transmitted to the printer.

Sample: »\X0a0A0a« are three linefeeds whereas 'LF' 'LF' 'LF' is send to the printer

- **[] start and end of hex sequence.**

All hex digit pairs between the brackets represent HEX values that are converted to bytes when the data is transmitted to the printer.

Sample: »[0a 0A 0a]« are three linefeeds whereas 'LF' 'LF' 'LF' is send to the printer

- **\A switches to text mode**

All data entered afterwards represents ASCII text that is transmitted to the printer without conversion:

Sample: »\ATEXT« are 4 characters whereas 'T' 'E' 'X' 'T' is send to the printer

- **“ start and end of text sequence.**

All characters between quotation marks (e.g. “) are regarded as text characters

Example: “[0a]” the four characters '[' '0' 'a' ']' are sent to the printer

Other special character combinations are:

- \n a line feed
- \l a form feed
- \\ a single backslash
- \" a single quotation mark
- // beginning of a comment

Note that, this tool is not available from release R3-V1.02-FINAL – 2017MAY25.

6.3 The XPM Configuration Tool

The XPM Configuration Tool is used to upload or download configuration data to the printer. This tool is a console application.

The tool is started by writing in the shell window in directory <root>/Tools/:

```
>> ./Xpm_ConfigurationTool [-s] [-h] [-u] [-d] [-v] [-r] Printer
```

Example:

```
>> ./Xpm_ConfigurationTool -s -d -v "/dev/usb/lp0"
```

or

```
>> ./Xpm_ConfigurationTool -s -d -v "/dev/bus/usb/002/003"
```

XPM Configuration Tool parameters:

[-s] = enables silent mode

[-h] = enables help printout

[-u] = enables upload of configuration data

[-d] = enables download of configuration data

[-v] = enables verbose output of downloaded configuration

[-r] = enables reset of the printer

Printer = name of the printer port to which the printer is connected starting with "\"

The configuration data is uploaded from stdin and downloaded to stdout. In case both upload and download is selected, upload is done before download. In case reset is selected, reset is done after both upload and download.

```
! Xpm_ConfigurationTool: missing printer port (e.g. "\dev\usb\lp0")
# Hengstler - Xpm_ConfigurationTool - Version R1-V1.00-BETA - Jan 25 2010 - 10:41:35
# Usage: Xpm_ConfigurationTool [-s] [-h] [-u] [-d] [-v] [-r] Printer
#       [-s] = enables silent mode
#       [-h] = enables help printout
#       [-u] = enables upload of configuration data
#       [-d] = enables download of configuration data
#       [-v] = enables verbose output of downloaded configuration
#       [-r] = enables reset of the printer
#       Printer = name of the printer port to which the printer is connected starting with "\"
# Notes: The configuration data is uploaded from stdin and downloaded to stdout.
#       In case both upload and download is selected, upload is done before download.
#       In case reset is selected, reset is done after both upload and download.
#       The printer requires a reset for uploaded configuration data to become effective.
# Examples: Xpm_ConfigurationTool -s -ur -d -v "/dev/Ttys1"
# Examples: Xpm_ConfigurationTool -s -d -v "/dev/usb/lp0"
```

Figure 30: The XPM Configuration Tool - console

The printer requires a reset for uploaded configuration data to become effective.

6.4 The XPM Inquiry Tool

The XPM Inquiry Tool is used to inquire on printer status. This tool is a console application.

The tool is started by typing in a shell window in directory <root>/Tools/:

```
>> ./Xpm_InquiryTool [-s] [-h] [-v] Printer Code
```

Example:

```
>> ./Xpm_InquiryTool -v -s "/dev/usb/lp0" [007F]
```

or

```
>> ./ Xpm_InquiryTool -v -s "/dev/bus/usb/002/003" [007F]
```

XPM Inquiry Tool parameters:

[-s] = enables silent mode

[-h] = enables help display

[-v] = enables verbose output

Printer = name of the printer port to which the printer is connected starting with "\\"

Code = a 4 hex digit inquiry code enclosed in square brackets [0000]

The hex digit inquiry code is a 2 unsigned char bitmask that corresponds with the 4 nibbles of parameter [n1] and [n2] in emulation command '\GS A+[n1]+[n2]'. The individual bits in the inquiry code generate the following inquiries:

[0001] = bit #0 = printer status

[0002] = bit #1 = general information regarding the printer (part number, firmware, etc.)

[0004] = bit #2 = information regarding the printer sensors,

[0008] = bit #3 = information regarding the flash memory (contents, etc.)\n");

[0010] = bit #4 = status information regarding the feed unit\n");

[0040] = bit #6 = status information regarding the presenter unit\n");

[0080] = bit #7 = life data\n");

The inquired data is output as hex data string.

```
! Xpm_InquiryTool: missing printer port (e.g. "\dev\usb\lp0")
# Hengstler - Xpm_InquiryTool - Version R1-V1.00-BETA - Jan 25 2010 - 11:06:24
# Usage: Xpm_InquiryTool [-s] [-h] [-v] Printer Code
#         [-s]           = enables silent mode
#         [-h]           = enables help display
#         [-v]           = enables verbose output
#         Printer        = name of the printer port to which the printer is connected starting with "\"
#         Code           = a 4 hex digit inquiry code enclosed in square brackets "[" and "]"
# Notes:  The hex digit inquiry code is a 2 unsigned char bitmask that corresponds with the 4 nibbles
#         of parameter [n1] and [n2] in emulation command "GS A+[n1]+[n2]"
#         The individual bits in the inquiry code cause following inquiries:
#         [0001] = bit #0 = printer status
#         [0002] = bit #1 = general information regarding the printer (part number, firmware, etc.)
#         [0004] = bit #2 = information regarding the printer sensors
#         [0008] = bit #3 = information regarding the flash memory (contents, etc.)
#         [0010] = bit #4 = status information regarding the feed unit
#         [0040] = bit #6 = status information regarding the presenter unit
#         [0080] = bit #7 = life data
#         The inquired data is output as hex data string.
# Examples: Xpm_InquiryTool -s "/dev/Ttys1" [0003]
#           Xpm_InquiryTool -s -v "/dev/usb/lp0" [0013]
```

Figure 31: The XPM Inquiry Tool - console

6.5 The XPM Upload Tool

The XPM Upload Tool is used to upload files to printer, especially printer firmware, fonts or images. This tool is a console application.

The tool is started by typing in a shell window in directory <root>/Tools/:

```
>> ./Xpm_UploadTool [-s] [-h] [-v] [-r] [-S] Printer [File]
```

Example:

```
>> ./Xpm_UploadTool -v "/dev/usb/lp0" "Xpm-Firmware-<VERSION>.XpmBin"
```

or

```
>> ./Xpm_UploadTool -v "/dev/bus/usb/002/003" "Xpm-Firmware-<VERSION>.XpmBin"
```

XPM Upload Tool parameters:

- [-s] = enables silent mode
- [-h] = enables help printout
- [-v] = enables verbose output of uploaded files
- [-r] = enables reset of the printer at the end of all uploads
- [-S] = enables secure upload (slow upload which can be used in case flow control is off)
- Printer = name of the printer port to which the printer is connected starting with "\"
- [File] = name of the file which must be uploaded

```
! Xpm_UploadTool: missing printer printer_port (e.g. "\dev\usb\lp0")
# Hengstler - Xpm_UploadTool - Version R1-V1.00-BETA - Jan 25 2010 - 10:45:26
# Usage: Xpm_UploadTool [-s] [-h] [-v] [-r] [-S] Printer [File]
# [-s] = enables silent mode
# [-h] = enables help printout
# [-v] = enables verbose output of uploaded files
# [-r] = enables reset of the printer at the end of all uploads
# [-S] = enables secure upload (slow upload which can be used in case flow control is off)
# Printer = name of the printer printer_port to which the printer is connected starting with "\"
# [File] = name of the file which must be uploaded
# Notes: The data is uploaded from files only.
# The printer requires a reset for uploaded data to become effective.
# Examples: Xpm_UploadTool -s -r "/dev/Ttys1" Xpm_Firmware.XpmBin
# Xpm_UploadTool -s "/dev/Ttys1" Xpm_Fonts.XpmBin
```

Figure 32: The XPM Upload Tool - console

The data is uploaded from files only. The printer requires a reset for uploaded data to become effective.

6.6 The XPM Print Monitor (BA)

The XPM Print Monitor tool is used as an add-on for the printer driver. The Print Monitor controls and processes print data sent to printer and interact with users through a GUI interface.

The tool is started by typing in a shell window in directory <root>/Tools/:

```
>> ./Xpm_PrintMonitor -s "path_to_printer_port"
```

Example:

```
>> ./Xpm_PrintMonitor -s "/dev/usb/lp0"
```

or

```
>> ./Xpm_PrintMonitor -s "/dev/bus/usb/002/003"
```

To stop the Print Monitor type:

```
>> ./Xpm_PrintMonitor -k
```

To show help, type:

```
>> ./Xpm_PrintMonitor -h
```

```
# Hengstler - Xpm_PrintMonitor - Version R1-V1.00-BETA - Jan 25 2010 - 10:57:14
# Usage:    ./Xpm_PrintMonitor [-s] [-k] [-h] [-?]
#           [-s]                = start Xpm_PrintMonitor
#           [-k]                = stop(kill) Xpm_PrintMonitor
#           [-h]                = help for Xpm_PrintMonitor
#           [-?]                = show Xpm_PrintMonitor version
# Examples: ./Xpm_PrintMonitor -s "/dev/Ttys1"
#           ./Xpm_PrintMonitor -s "/dev/usb/lp0"
#           ./Xpm_PrintMonitor -k
#           ./Xpm_PrintMonitor -h
```

Figure 33: The XPM Print Monitor help - console

For Print Monitor use, libXpm_Api and libXpm_Tb must be installed. These libraries are installed during XPM CUPS driver installation.

```
Stopping Xpm_PrintMonitor ..... DONE
Xpm_PrintMonitor succesfully stopped, PID=3984
Creating Daemon ..... DONE
Creating Client-Server FIFO ..... DONE
Creating Server-Client FIFO ..... DONE
Creating QDialogs ..... DONE
Creating LogFile ..... NOT-AVAILABLE
Xpm_PrintMonitor succesfully started, PID=19390
```

Figure 34: The XPM Print Monitor start - console

After a successful start, it will display all main parts status of Print Monitor with its PID number (process number). Creating LogFile depends upon settings in the "config" file.

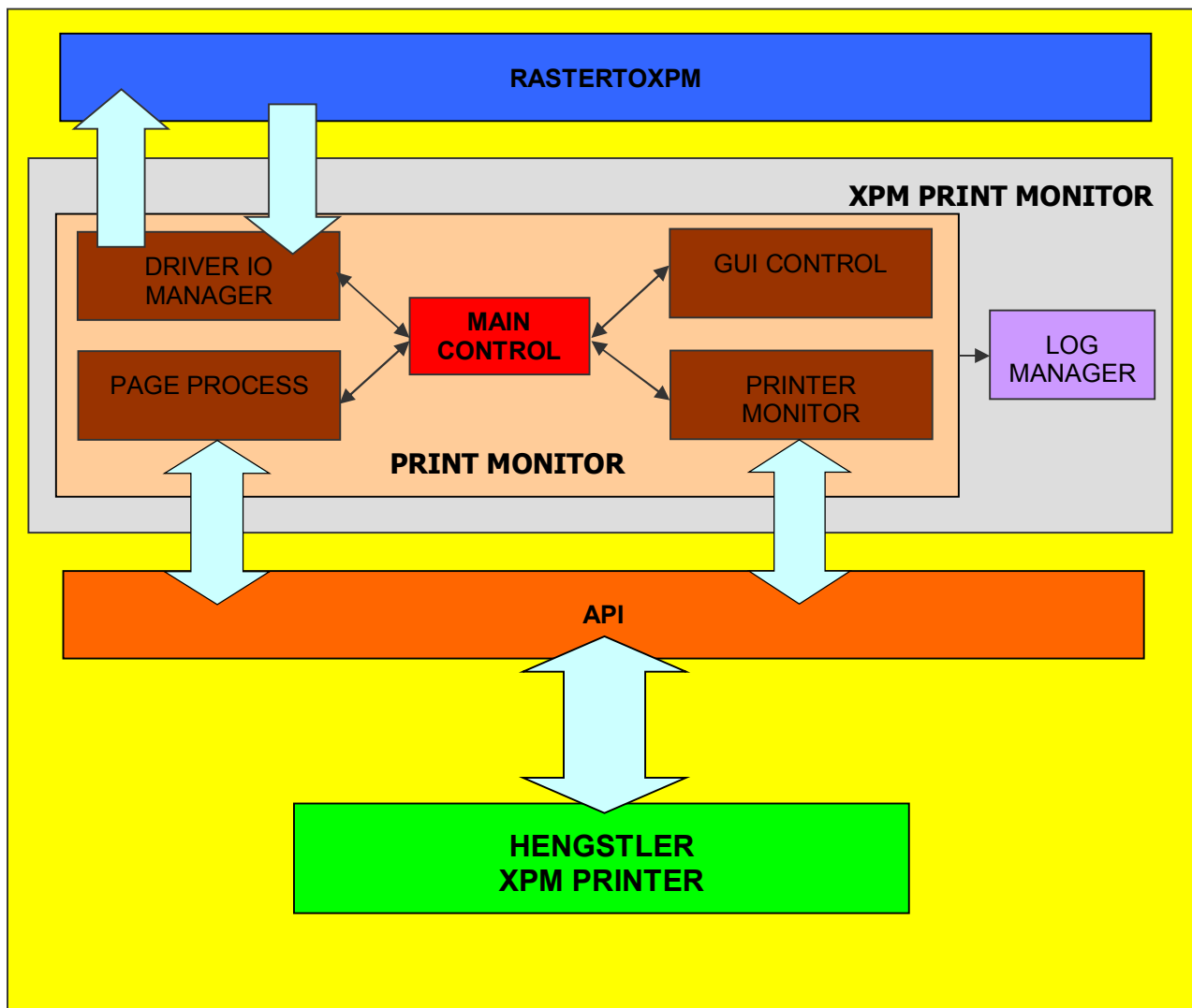


Figure 35: The XPM Print Monitor diagram (main parts of Print Monitor)

- MAIN CONTROL controls another 4 sub-monitors and an evaluating state machine.
 - >> DRIVER IO MANAGER controls communication between rastertoxpm and XPM Print Monitor through the pipes.
 - >> GUI CONTROL shows dialogs and messages depend upon MAIN CONTROL MONITOR state. (Printing, Canceling, Failure ...)
 - >> PAGE PROCESS processes data for each page to the API for printing. It also takes care of initial and final commands defined in the printer settings for each page or whole print job.
 - >> PRINTER MONITOR inquires on each *StatusInquiryIntervalMs* time defined in the config file printer status and evaluates it. Depending upon the printer status, the MAIN CONTROL MONITOR may show a dialog with appropriate error messages.

- Settings for the Print Monitor are stored in "XPM_PrintMonitor.conf" file, which is located in <root>/Tools/:

Content of "Xpm_PrintMonitor.conf" file :

PARAMETER	DEFAULT VALUE	DESCRIPTION
ContinueCancelDialogTimeoutMs	10000	Time in Ms, for how long the continue button should be shown, when <i>NumberOfPagesToContinueCancelDialog</i> is printed Values: <1000-10000>
NumberOfPagesToContinueCancelDialog	10	Number of pages printed before <i>Continue</i> button will be displayed (Continue printing dialog). Values : <1-9999>
LogEnabled	0	Flag for enabling logging to log file. Values: <0,1> 0=disabled, 1=enabled
MaxNumberOfPages	100	Define maximum number of pages to be printed after print monitor is started. If page count reaches this number, it will show a dialog with warning and will not cancel all following print jobs, if any. Values: <1-9999>
ResetPageCountOnJob	1	Flag for resetting <i>MaxNumberOfPages</i> value to 0 after each print starts. This will define maximum number of pages to be printed for 1 print job. Values: <0,1> 0=disabled, 1=enabled
AdditionalDialogDisplayTimeMs	7000	Time in Ms, for how long the dialog will remain visible after printing has been done or canceled. Values: <1000-10000>
Language	0	Define language for dialogs. Values:<0,1> 0=English,1=German
StatusInquiryIntervalMs	5000	Time in Ms, for periodical inquiring of printer status. Values: <5000-30000>
LogDays	7	Number of day that log files should be kept. After X days they will be removed from system. Values: <1-7>
WidgetAlwaysOnTop	1	Flag to always show dialog on top Values: <0,1> 0=disabled, 1=enabled
WidgetBorderType	1	Flag to show dialog style (Linux style). Values: <0,1> 0=disabled, 1=enabled
WidgetBorderWidthPixels	5	Width in pixels for border, if <i>WidgetBorderType</i> is disabled(0). Values: <0-10>
ShowDateAndTime	1	Flag for showing date and time in left upper corner in dialog. Values: <0,1> 0=disabled, 1=enabled
MaximumDialogDisplayTimeMm	60	Time in minutes, for how long the dialog will be visible after printing has been done or canceled if there is no user interaction. This is only available if <i>AdditionalDialogDisplayTimeMs</i> is set to 0 (no countdown of automatically closing dialog).

- XPM Print Monitor and rastertoxpm communicate through PIPES, these Pipes are always re-created at the startup of Print Monitor. TX Pipe sends data from the Print Monitor to rastertoxpm and RX Pipe sends data from rastertoxpm to the Print Monitor.
- If the parameter `LogEnabled` is enabled in the config file, LOG MANAGER will store all information about all processes to a log file. It is created at the startup of the Print Monitor and stored in `../Logs`

Naming of log file:

`Xpm_PrintMonitor-<YEAR-MONTH-DAY>_<HOURL-MINUTES-SECONDS>.log`

Example of naming:

`Xpm_PrintMonitor-2010-02-05_17-49-03.log`

Every midnight, name of log file is changed and log files older than `LogDays` are deleted from system.

Example of log file:

```
[05.02.2009_17:49:03] : =====
[05.02.2009_17:49:03] :                XPM PRINT MONITOR LOG FILE
[05.02.2009_17:49:03] : =====
[05.02.2009_17:49:03] : GUI MONITOR -> STOPPING GUI MONITOR                                STOPPING
[05.02.2009_17:49:03] : GUI MONITOR -> GUI MONITOR                                                STOPPED
[05.02.2009_17:49:03] : MAIN MONITOR CONTROL -> CANCELING GUI MONITOR                            DONE
[05.02.2009_17:49:03] : PAGE PROCCES MONITOR -> STOPPING PAGE PROCCES MONITOR                  STOPPING
[05.02.2009_17:49:03] : MAIN MONITOR CONTROL -> CANCELING PAGE PROCCES MONITOR                  DONE
[05.02.2009_17:49:03] : MAIN MONITOR CONTROL -> CANCELING PRINTER STATUS INQUIRY MONITOR        DONE
[05.02.2009_17:49:03] : DRIVER IO MONITOR -> STOPPING PIPE COMMUNICATION ...                   STOPPING
.....
```

- If `ShowDateAndTime` is enabled in the config file, in the upper-left corner you will see the current system date and time.



Figure 36: The XPM Print Monitor Dialog on Printing

- If a printer error occurs, you will see in the upper-left corner under date and time, "Driver version" and "Firmware version" (only if printer is connected).

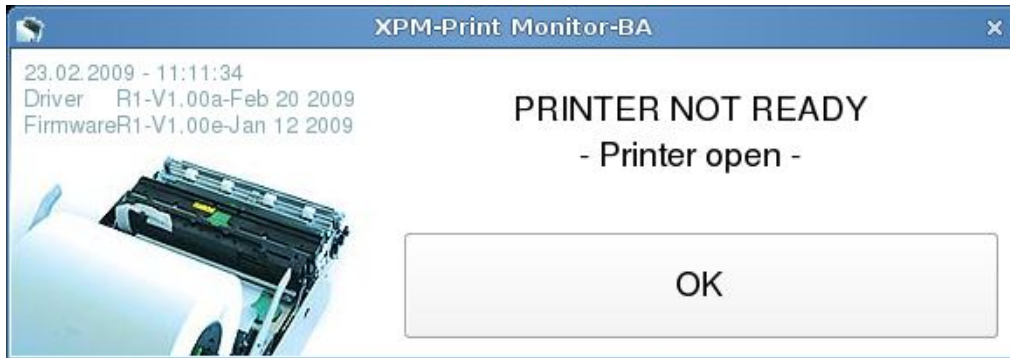


Figure 37: The XPM Print Monitor Dialog on Printer Error

- If `WidgetBorderType` is set to 0, then default windows style is disabled. Then you can set the widget border width `WidgetBorderWidthPixels`.



Figure 38: The XPM Print Monitor Dialog with no border style

Note that, this tool is not available from release R3-V1.02-FINAL – 2017MAY25.

6.7 The XPM API Test

The XPM Api Test tool is used to test functionality of XPM API and communication with printer. The tool is started by writing in shell window in directory <root>/Tools/x86 or <root>/Tools/x64 or <root>/Tools/arm based on system type:

```
>> ./Xpm_Api_Test "/path/to/printer"
```

Example:

```
>> ./Xpm_Api_Test "/dev/bus/usb/002/011"
```

Source code of the Api Test Tool:

```
#include <stdio.h>
#include <string.h>
#include "../Libraries/Xpm_Api.h"
int main (int argc, char *argv[])
{
    int          iPrinter          =0;
    int          iWritenData       =0;
    unsigned char cmd_FormFeed[]   = {0x0C};           // Form feed
    unsigned char cmd_Cut[]        = {0x1B,0xF0,0x06,0x01,0x02}; // Cut cmd_Cut
    char printer_name[32];

    if (argc < 2){
        printf("\nERROR: No printer path available , example usage : Xpm_Api_Test
\"/dev/bus/usb/001/011\" \n\n");

        goto FAILURE;
    }

    //-- Copy printer name
    memcpy(printer_name,argv[1], strlen(argv[1]) );
    printer_name[strlen(argv[1])] = '\0';

    //-- Open printer connection
    iPrinter = xpm_api_printer_open(&printer_name[0]);

    //-- Check if printer was opened
    if ( (iPrinter == D_XPM_API_OPEN_FAILED)
        || (iPrinter == D_XPM_API_INVALID_DEVICE)
        ) goto FAILURE;

    //-- Clear pending data
    xpm_api_printer_clear (iPrinter);

    //-- Write cmd to printer
    if ((iWritenData = xpm_api_printer_write(iPrinter, cmd_FormFeed, 1, 5000)) != 1)
        goto FAILURE;

    //-- Write cmd to printer
    if ((iWritenData = xpm_api_printer_write(iPrinter, cmd_Cut, sizeof(cmd_Cut), 5000)) !=
sizeof(cmd_Cut))
        goto FAILURE;
FAILURE :
    //-- Close printer
    xpm_api_printer_close(iPrinter);
```

```
    return 0;  
}
```

Note that, this tool is not available from release R4-V1.03a-BETA – 2018AUG01.

6.8 The XPM Demo Applications

The Demo Application are used to demonstrate functionality of XPM API. The tools are started by typing in a shell window in directory <root>/Tools/x86 or <root>/Tools/x64 or <root>/Tools/arm based on system type:

```
>> ./Xpm_Demo_PageLength "Printer path" PageLength
>> ./Xpm_Demo_FormFeed "Printer path"
>> ./Xpm_Demo_InquiryStatus "Printer path"
```

Example:

```
>> ./Xpm_Demo_PageLength "/dev/bus/usb/003/025" 1255
>> ./Xpm_Demo_FormFeed "/dev/bus/usb/003/025"
>> ./Xpm_Demo_InquiryStatus "/dev/bus/usb/003/025"
```

All these demo applications in driver package are available also with sources and description how to compile it and evaluate on each environment. Feel free to use and modify them.

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