



Thermal Printer Family C-56

Linux Driver

S684019-R3-V1.02f-BETA-2015NOV10

**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 combinations 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 matches 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).

Any approval or order based upon this manual will not be accepted by HENGSTLER. Any approval must be made upon samples of the product.

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Document History

Revision	Mod. Nr.	Status	Description
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2	4 150709 LT2	Closed	Current version: created for C-56 CUPS Linux driver R2-V1.01-FINAL-2009JUL15.
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Comments

Revision	Comments
-	-

Driver History

Version	Date	Major Modification
R1-V1.00	2008MAR14	1 st release of C-56 CUPS driver for Linux
R2-V1.01b	2008SEP30	2 st release of C-56 CUPS driver for Linux
R2-V1.01	2009JUL15	3 rd release of C-56 CUPS driver for Linux
R3-V1.02d	2011DEC09	4 th release of C-56 CUPS driver for Linux
R3-V1.02f	2015NOV10	6 th release of C-56 CUPS driver for Linux

Applicable Documentation

Following documentation is applicable to this document:

- [1] C-56 Emulation Command Set Reference Manual
Part-Nr: Hengstler D684017
- [2] C-56 Firmware Release Note
Part-Nr: Hengstler D684063
- [3] C-56 Linux Driver Release Note
Part-Nr: Hengstler D684125

Current Driver

The current C-56 CUPS printer driver with part number S684019 has version “**R3-V1.02f-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 C-56 driver package.
SDK	Software Development Kit , a programming package that enables a programmer to develop applications for a specific platform. Typically an SDK includes one or more APIs, programming tools, and documentation.
API	Application Program Interface , 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 windows in Linux (konsole)
CUPS	Common Unix Printing System

Introduction

This reference manual describes the C-56 CUPS printer driver for Linux which has Hengstler part number S684019. The C-56 printer driver is suitable for usage with Hengstler thermal printers: C-56 (203 dpi).

This manual is divided into the following sections:

Installation Guidelines

Operation Manual

Driver Synopsis

Programming Manual

Printer Tools

Installation Guidelines

Introduction

This chapter describes the basic installation and un-installation of the CUPS printer driver within the Linux operating system. This CUPS printer driver can be used with C-56 printers using the USB printer port.

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 operations other than Linux is prohibited.

The CUPS printer driver distribution

The C-56 printer driver package contains out of several sub-directories containing driver files and tool. In the adjacent text, the root directory of this driver package is called “<root>”.

Directory “<root>” contains following files:

- **.IS-684-019-C-56-LinuxDriver-R3-V1_02f-BETA-2015NOV10.zip**
This is the compressed representation of the C-56 printer driver (ZIP)
- **.README.TXT**
Information about C-56 Linux driver package
- **.install_x86**
Installation script under Linux **x86** systems
- **.install_arm**
Installation script under Linux **arm** systems
- **.uninstall_x86**
Un-Installation script under Linux **x86** systems
- **.uninstall_arm**
Un-Installation script under Linux **arm** systems

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

.\Driver\x86 or .\Driver\arm

This directory contains all printer driver files for installation under Linux **x86** and **arm** :

.\hengstlerc56.ppd	= Information file used for installation with C-56 printers (PPD)
.\hengstlerc56.ppd.gz	= Information file used for installation with C-56 printers (PPD) in gzip format
.\rastertoc56	= Raster file for C-56 printers (Driver)

• **.\Api\x86 or .\Api\arm**

.\C56_Api.h	= Include file specifying the C56 Application Programming Interface
.\libC56Api.so.1.0	= Application Programming Interface/API (Linux library for x86/arm)
.\libC56Tb.so.1.0	= ToolBox library (Linux library for x86/arm)

.\Documents

This directory contains all relevant documents of C-56 driver :

.\D-684-125-C-56-LinuxDriver-ReleaseNote.pdf	= Release note for the C-56 printer driver (PDF)
.\D-690-141-C-56-LinuxDriver-Manual.pdf	= Manual for the C-56 printer driver (PDF)

.\Tools\x86 or .\Tools\arm

This directory contains various C-56 driver related tools:

.\C56_Api_Test	= Sample tool for evaluating C-56 Linux API.
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Installing the printer driver

Installation of the CUPS printer driver for a Hengstler C-56 printer can be done as follows:

Installation of CUPS

Installation by using the Printers dialog

Installation by shell

Installation of printer using **localhost:631** in browser

Note that, you need to 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.

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") or higher.

Compile and install CUPS with command ...

```
➤ rpmbuild -ta cups-<version>-sources.tar.gz
```

... or unzip with command ...

```
➤ tar xvf cups-<version>-sources.tar.gz
```

... and install with commands

```
➤ ./configure
```

```
➤ make
```

```
➤ make install
```

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

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"

Selecting the “Printers” dialog

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

[Desktop] · [Preferences] · [Printers]

... as is shown in Figure 1 below.

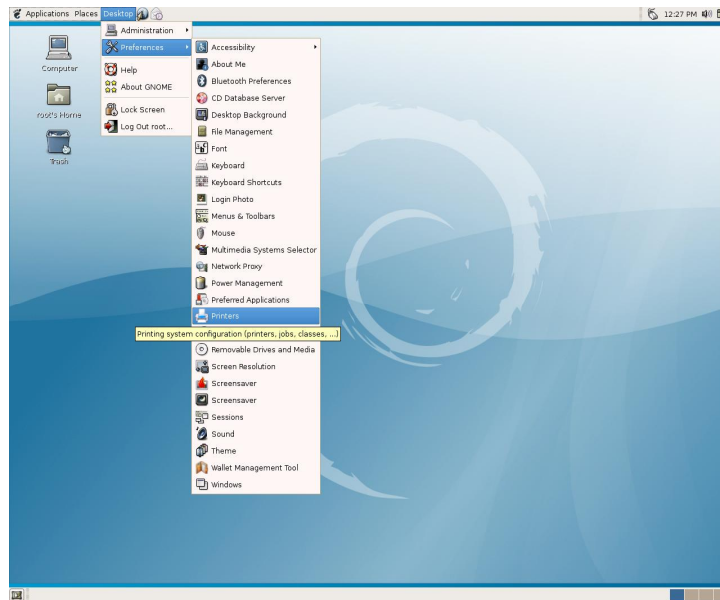


Figure 1: Selecting the "Printers" dialog

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

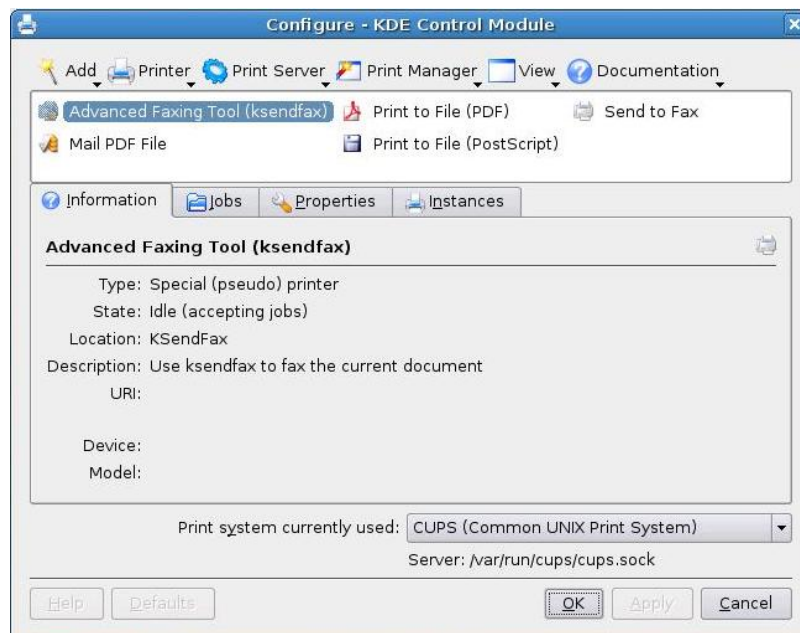


Figure 2: List of installed printers

Note that you may install only one printer of model „ Hengstler C-56“ (e.g. USB001, COM1, etc.), whereas all of them must use the same C-56 driver version.

Adding a new printer to “Printer” dialog

The C-56 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.

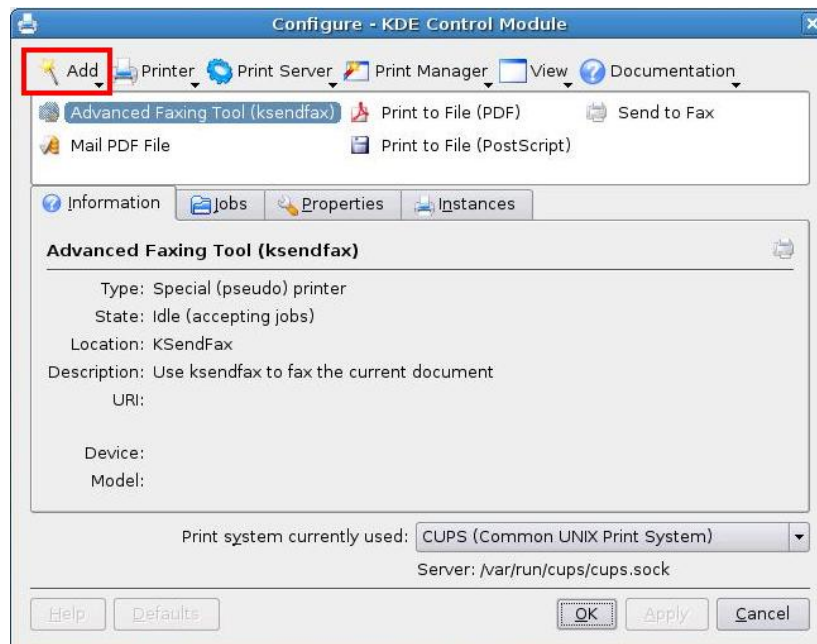


Figure 3: Adding a printer from the „Printers“ dialog

The „Add“ guides you through this installation.

Going through the “Add”

This chapter guides you through the „Add “.

The „Welcome....“ page

The first page of the „Add“ (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 C-56 printer driver.



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

The „Backend Selection“ page

The 2nd page of the „Add“ is used to select either a local or a network printer. The C-56 thermal printer can only be attached as local printer. See Figure 5 for the appropriate settings.

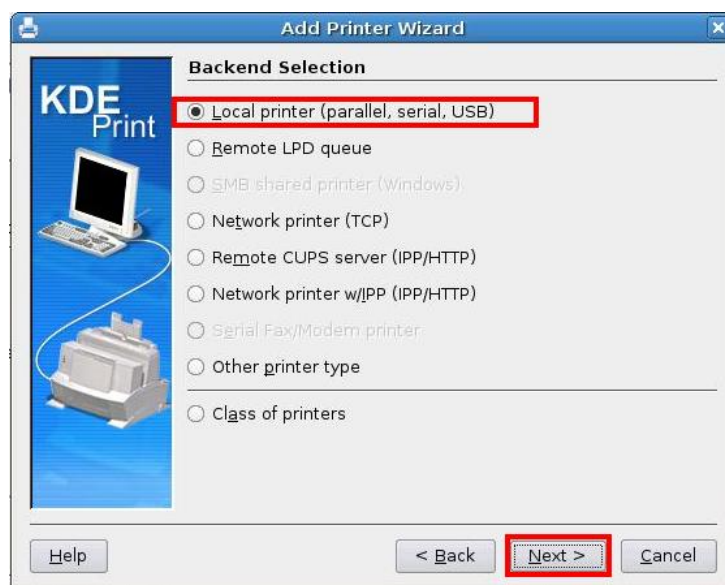


Figure 5: The „Backend Selection“ page of the „Add“

The „Local Port Selection“ page

The 3rd page of the „Add“ is used to attach a printer. Since the C-56 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.

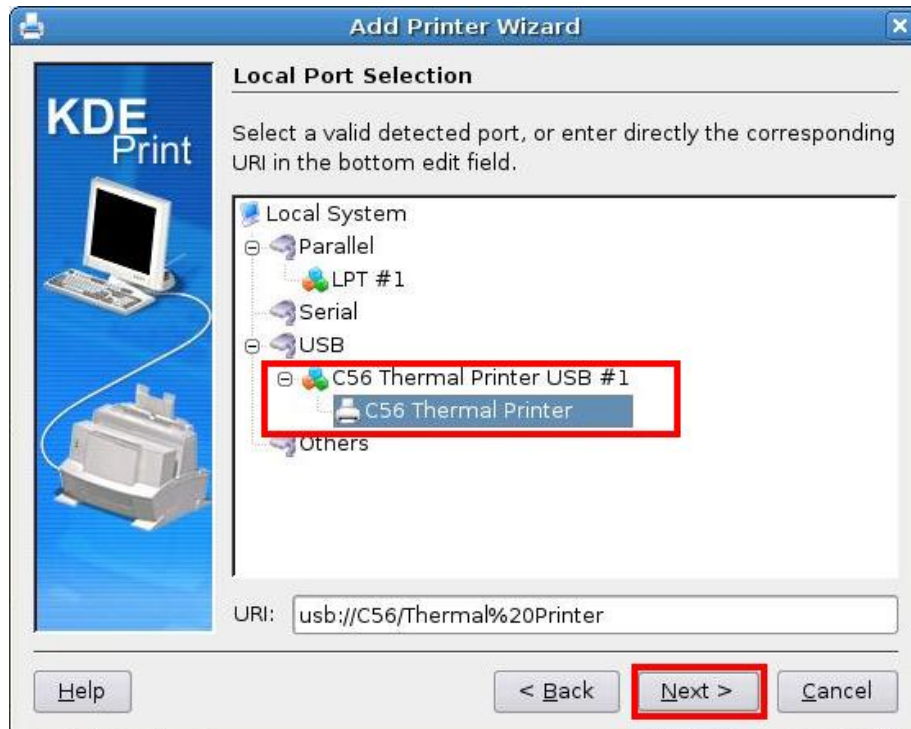


Figure 6: The „Local Port Selection“ page of the „Add“

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 „hengstlerc56.ppd“

... selecting „HENGSTLER C-56“ from the list of available printers.

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

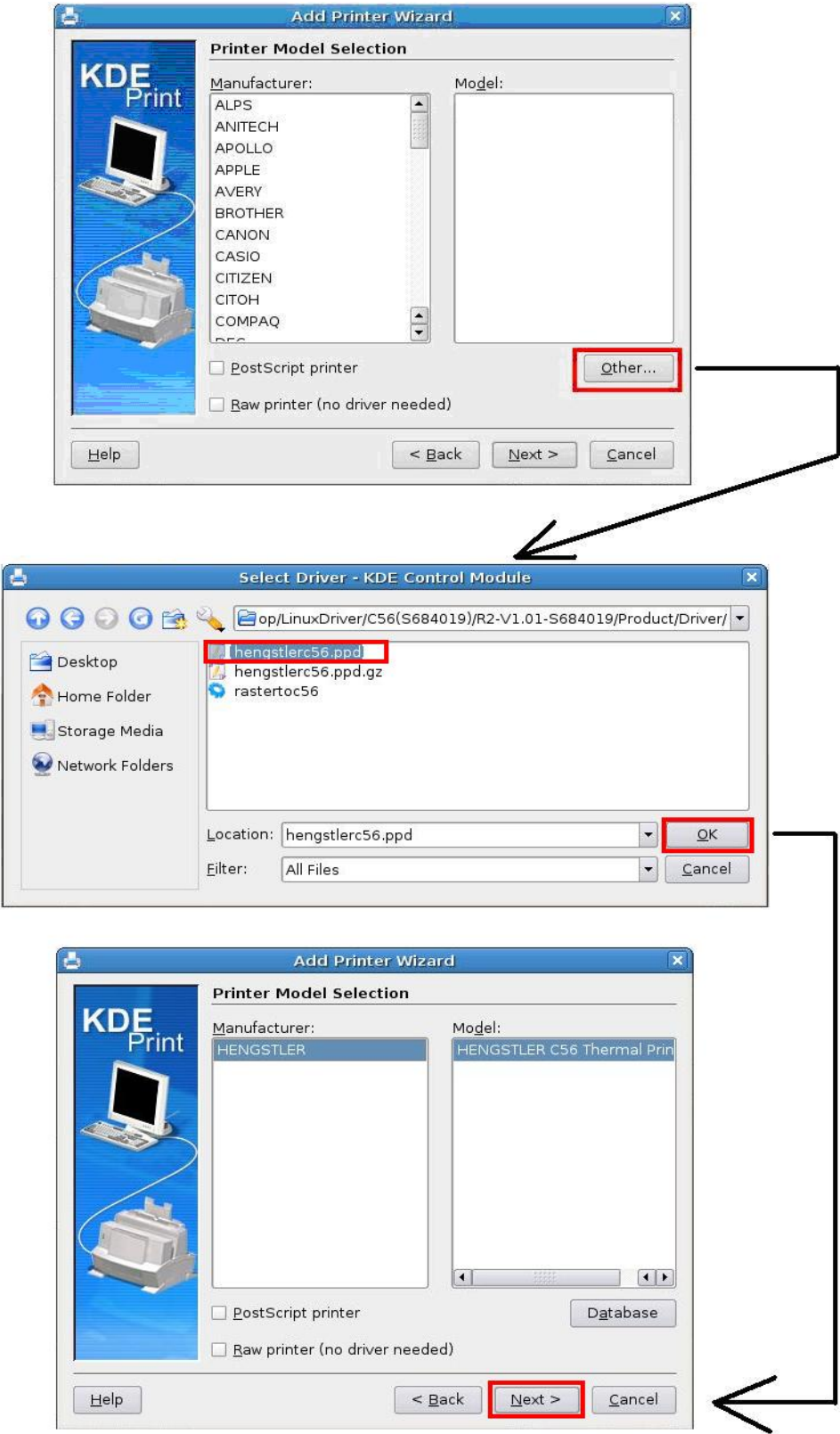


Figure 7: The „Printer Model Selection“ page of the „Add“

The „Printer Test “ page

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

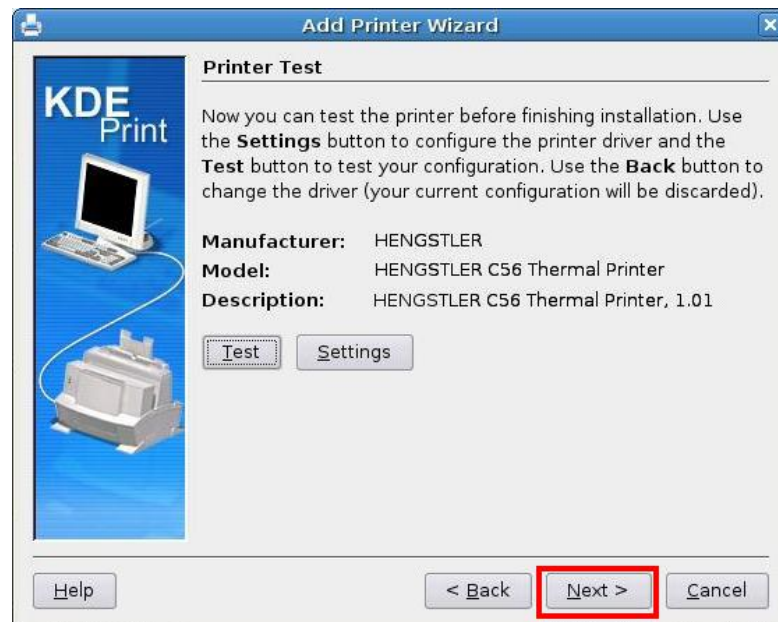


Figure 8: The „Printer Test“ page of the „Add“

The „Banner Selection“ page

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



Figure 9: The „Banner Selection“ page of the „Add“

The „Printer Quota Settings“ page

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

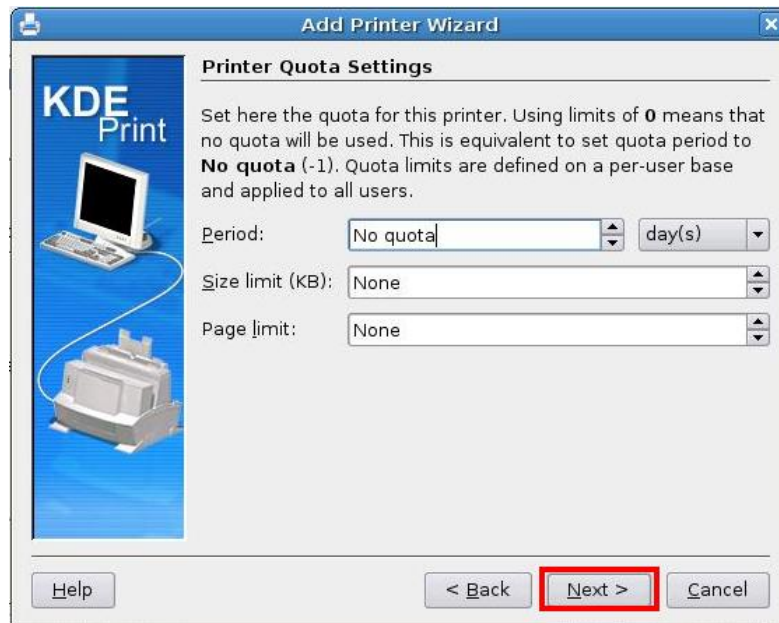


Figure 10: The „Printer Quota Settings“ page of the „Add“

The “User Access Settings”

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

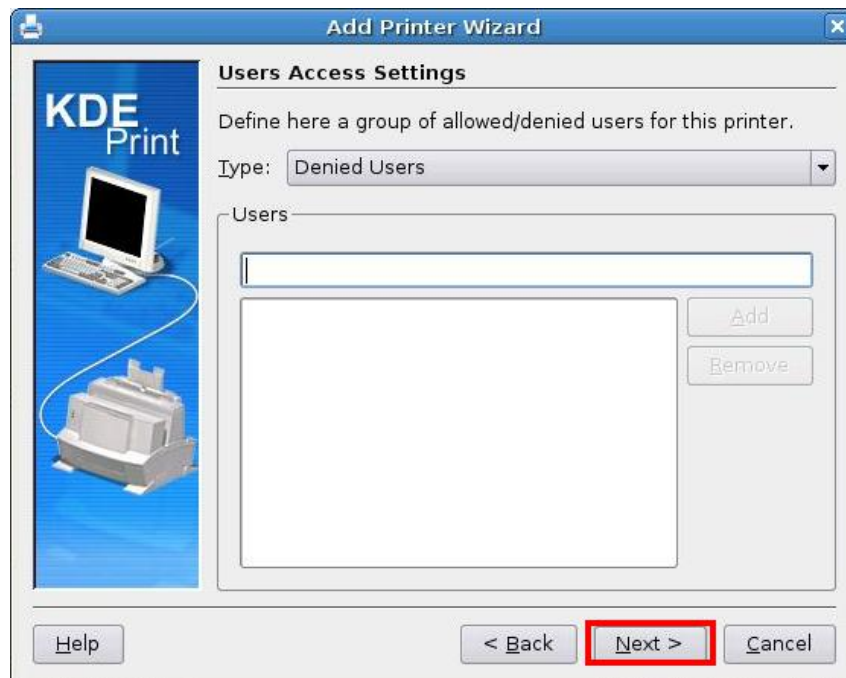


Figure 11: The „User Access Settings“ page of the „Add“

The “General Information” Page

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

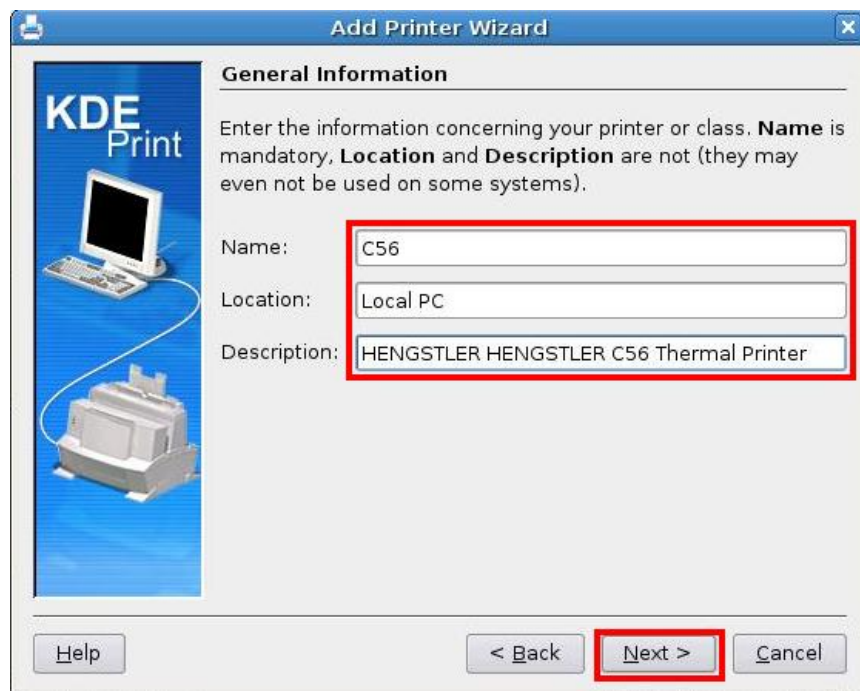


Figure 12: The „General information“ page of the „Add“

The “Confirmation”

The 10th page is used to confirm all settings.

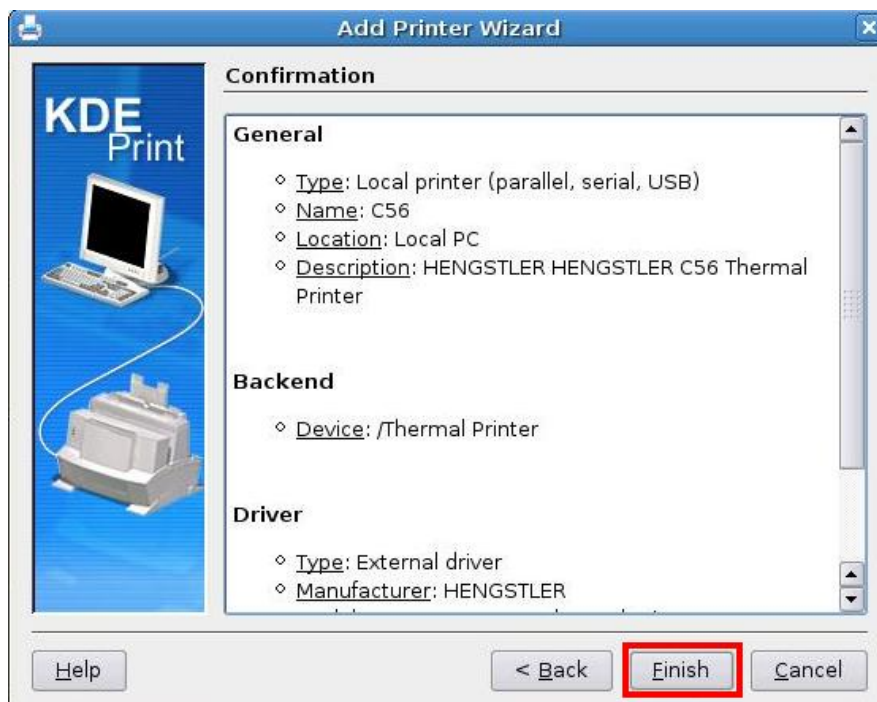


Figure 13: The „General information“ page of the „Add“

The “Printers” dialog

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

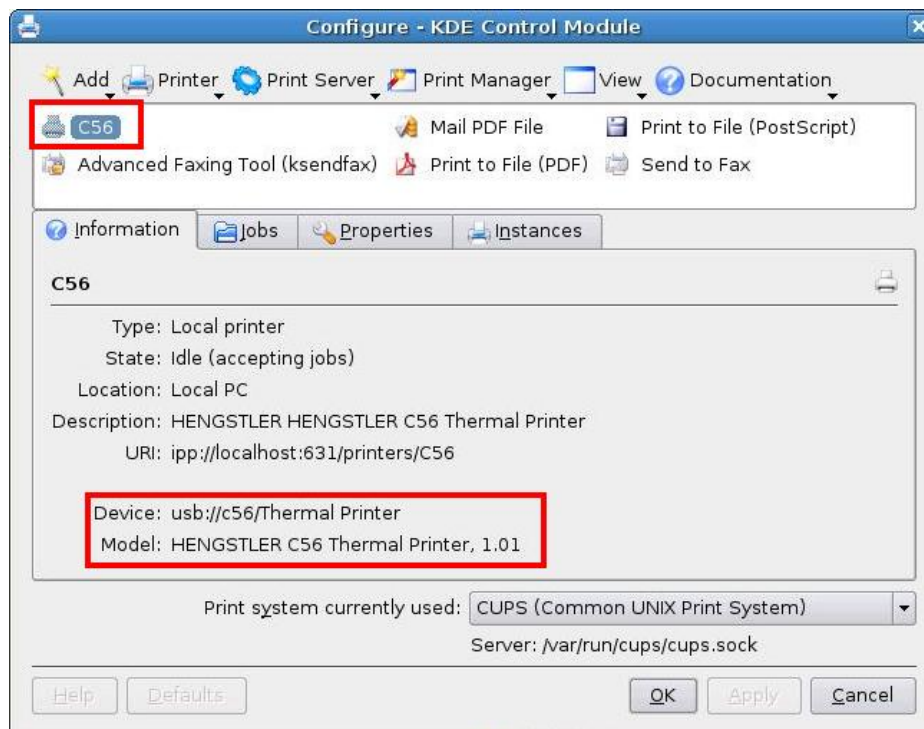


Figure 14: The „Printers“ dialog

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 to integrate into the customer specific installation utility.

The commands 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 C-56 printer driver on USB1:

```
root:/# lpadmin -p HengstlerC56 -E -v usb:///dev/usb/lp0 -m hengstlerc56.ppd  
ENTER
```

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

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


Printer installation using browser localhost:631

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.

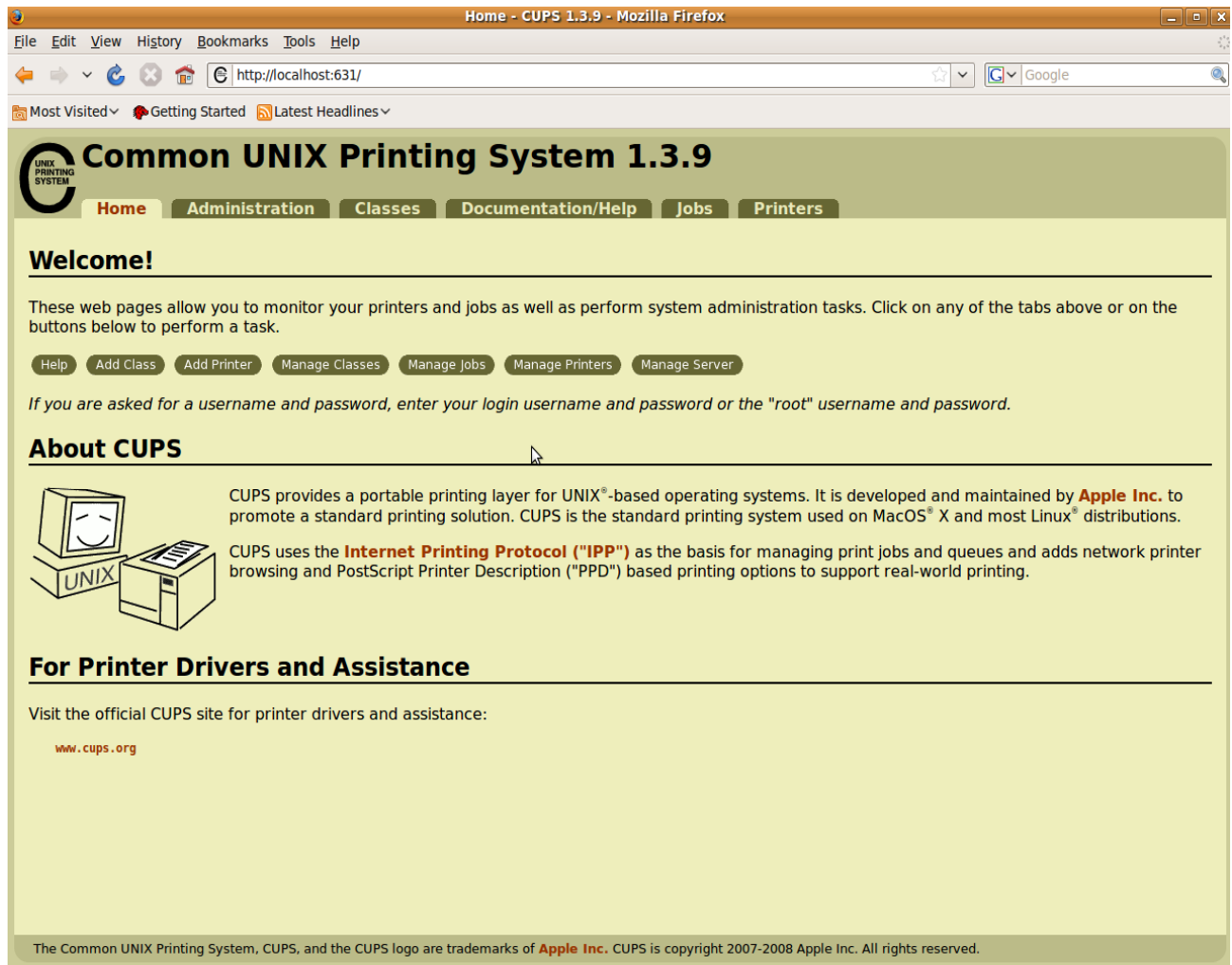


Figure 15: localhost:631 address

Printer driver files

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

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

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

- for **x86** system types

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

- for **arm** system types

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

```
Install C56 CUPS Driver
Hengstler
Copy CUPS FILTER to /usr/lib/cups/filter
Copy C56 gz files to //usr/share/cups/model/Hengstler
Copy C56 ppd files to /usr/share/cups/model
Copy libC56Api.so.1.1 library to '/usr/lib'
cups: stopped scheduler.
cups: started scheduler.

Install Complete
Now you can add a printer queue using the Cups tool, go
to address http://localhost:631 with a simpe browser and
set up the printer
```

Figure 16: Shell window after copying driver files

You can find information on copied files and their destination directories in chapter 0.

Printer driver files overview

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

/usr/lib/cups/filter

.rastertoc56 = Raster printer driver for C-56 printers

/usr/lib

.libC56Api = Application Programming Interface/API (Linux library)

.libC56Tb = ToolBox functions (Linux library)

Un-installing the printer driver

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

The C-56 un-installation script

The C-56 printer driver un-installation must be done with the C-56 Un-installation script “uninstall”. This script is located in the driver package in directory “<root>”.

The “uninstall” script will uninstall (remove) all installed C-56 printer driver files from the system together with API library.

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

- for **x86** system types

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

- for **arm** system types

Removal of all printer driver files is required to avoid a C-56 driver file version mismatch after installing a different C-56 driver version.

Note that deleting a C-56 printer from the “Printers” dialog is also necessary. You can also do it in shell command:

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

The C-56 un-installation script is show in Figure 17.

```
Un-Install C56 CUPS Driver
Hengstler
Deleting CUPS FILTER from /usr/lib/cups/filter
Deleting C56 gz files from //usr/share/cups/model/Hengstler
Deleting C56 ppd files from /usr/share/cups/model
Deleting libC56Api.so.1.1 library from '/usr/lib'
cups: stopped scheduler.
cups: started scheduler.

Un-Install Complete
```

Figure 17: The C-56 Un-installer script

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.

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.

Configuring the printer driver

The printer driver is configured from the printer configure dialog. Among other, 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 if a form feed is required at end of print

Specify a limited form length in dot lines

Specify black mark size

Selecting the “Printer Properties” dialog

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

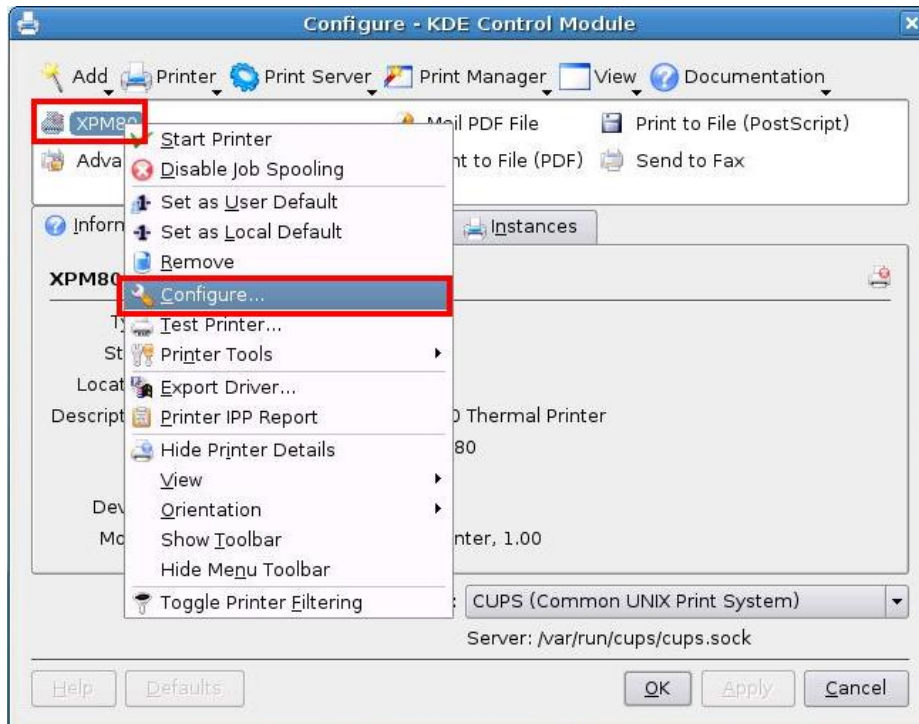


Figure 18: Starting the „Printer Properties“ dialog for the printer driver

Overview of attributes in the “Configure” dialog

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

Attributes	Function
Driver Information	Displays Information on the C-56 driver.
Paper Control	Paper settings related to the printout: remove trailing blanks flag, initiate paper feed flag, final paper feed, minimum/maximum black mark size
Printer Settings	Printer related settings: print quality, impressed energy, print speed, horizontal compression RLE8, vertical compression
Others	Print resolution settings.
General	Media size (paper size) settings.

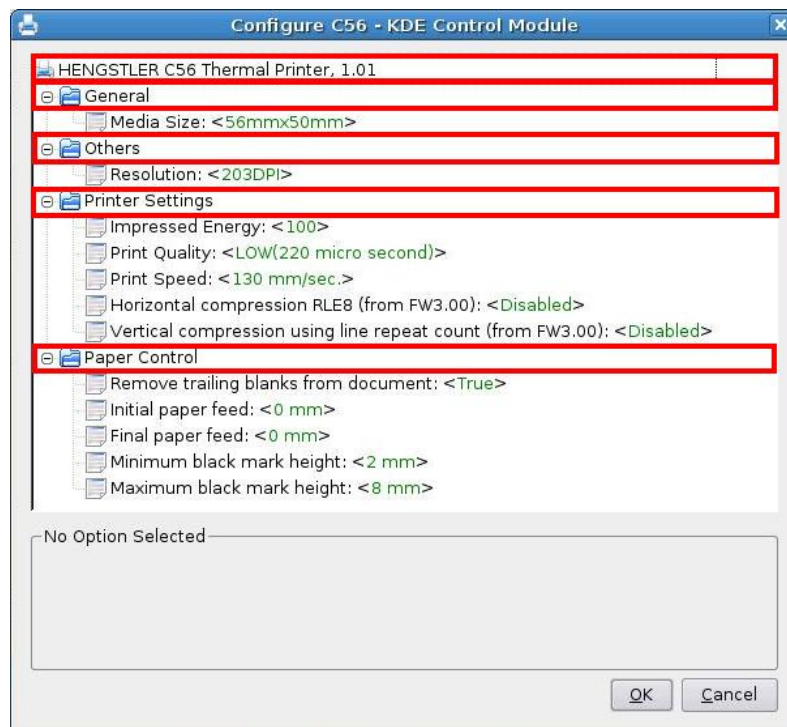


Figure 19: Selecting Attributes in the „Configure“ dialog

The “Driver Information” attribute

The „Driver Information“ attribute displays information on the printer driver as shown in Figure 20. The most important information is the version/release (here R2-V1.01) of the printer driver.

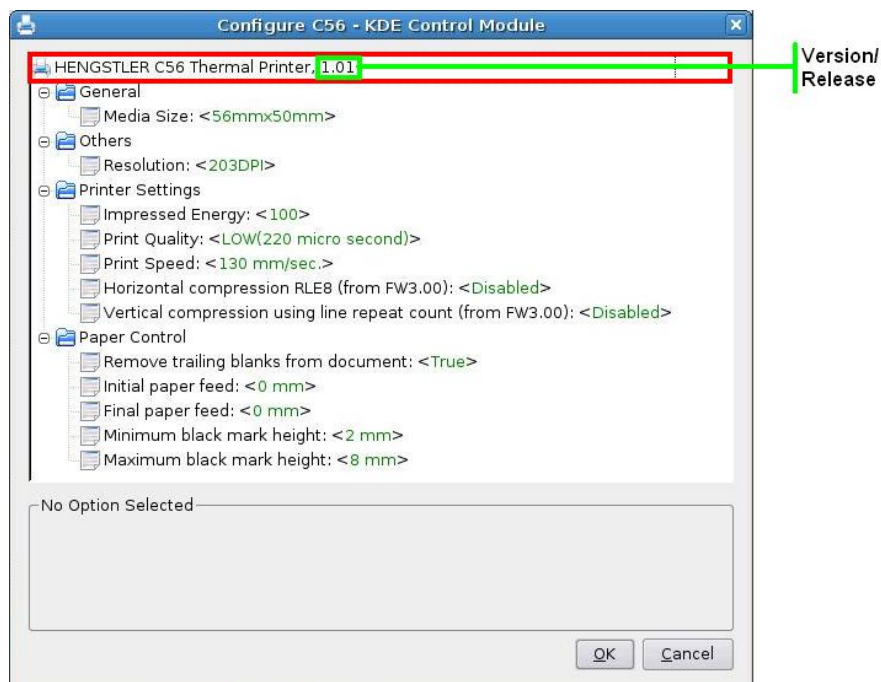


Figure 20: The „Driver Information“ attribute in the „Configure“ dialog

The “Paper Control” attributes

The „Paper Control” attributes are used to specify:

Remove trailing blanks

Initial paper feed

Final paper feed

Minimum black mark size

Maximum black mark size

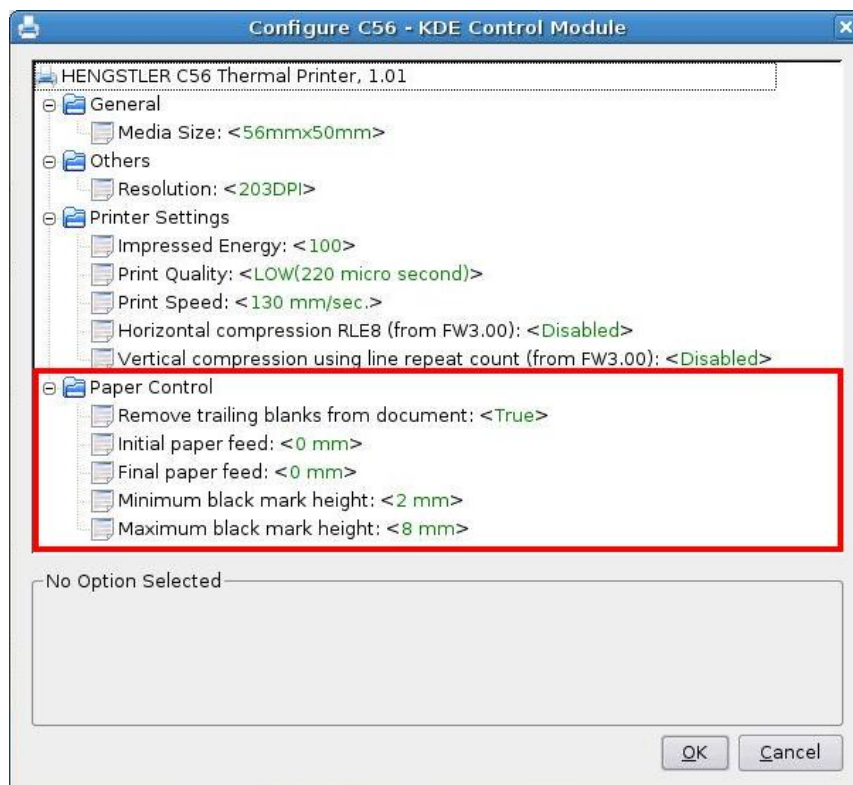


Figure 21: The „Paper Control” attributes in the „Configure” dialog

The “minimum/maximum black mark size” 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 in following steps:

In your GDI application, select one of the C-56 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

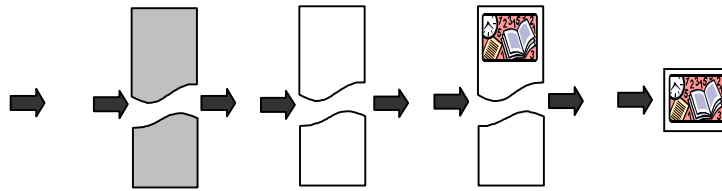


Figure 22: Printing with variable paper size

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.

Following keys in the [PaperControl/Paper Control] section of the hengstlerc56.ppd file relate to this attribute:

Key	Description	Units	Domain	Comment
inInitialFeed	Initial paper feed	mm	[-30..30]	0=0mm, 20=20mm,-20=-20mm(backward)
inFinalFeed	Final paper feed	mm	[-30..30]	0=0mm, 20=20mm,-20=-20mm(backward)
inMinBlackMark	Minimum black mark size	mm	[0..15]	0=0mm, 10=10mm
inMaxBlackMark	Maximum black mark size	mm	[0..35]	0=0mm, 10=10mm

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 energization level 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 to 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 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.

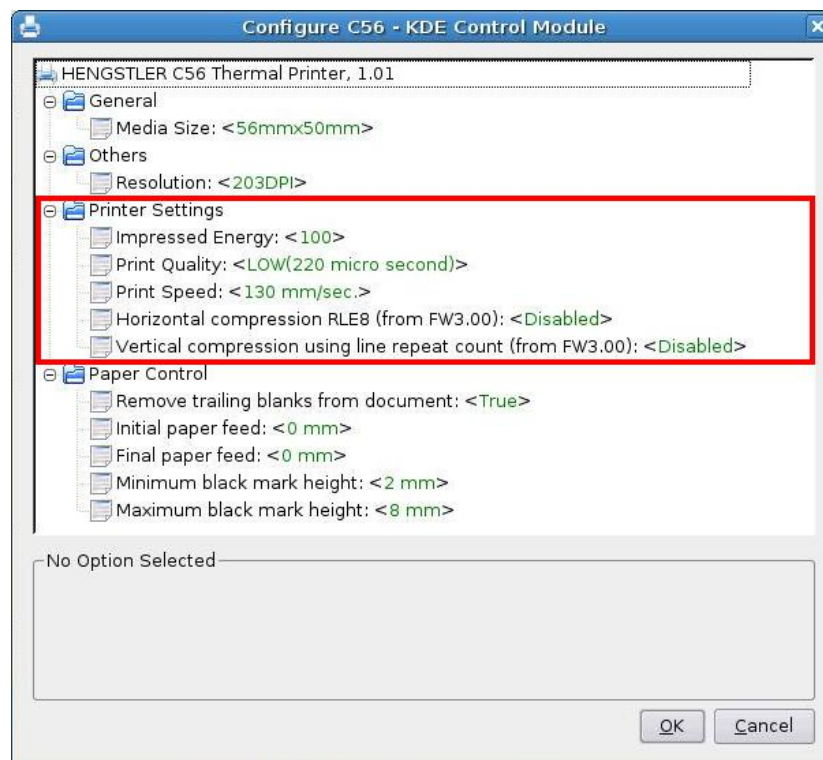


Figure 23: The „Printer Settings” attributes in the „Configure” dialog

Following keys in the [PrinterSettings/Printer Settings] section of the hengstlerc56.ppd files relate to this attribute:

Key	Description	Units	Domain	Comment
inImpresedEnergy	Energation level for the thermal line	Percent	[0..250, Disabled]	0=0%, 50=50%
inPrintQuality	Quality of printing	integer	[0, 1]	0=LOW, 1=HIGHT
inPrintSpeed	Maximum speed for printed	Mm/sec	[50..240, Disabled]	130=130 mm/sec
inHorizCompression	Horizontal compression	Bool	[true, false]	true=enable, false=disable
inVerticCompression	Vertical compression	Bool	[true, false]	true=enable, false=disable

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...).

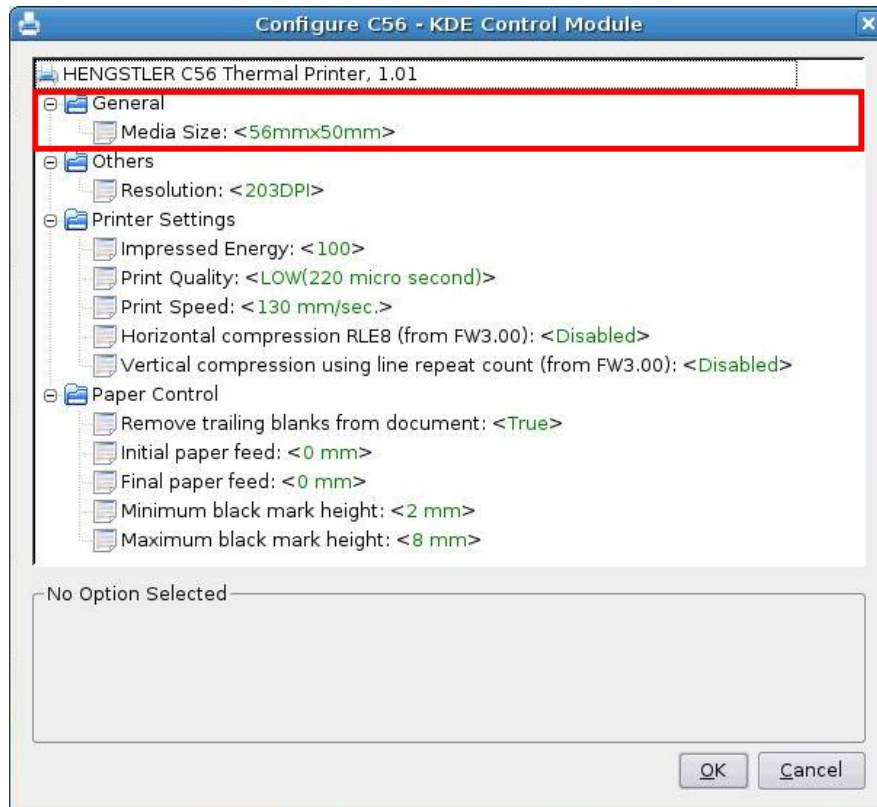


Figure 24: The „General” attribute in the „Configure” dialog

Following keys in the [PageRegion/Media Size] section of the hengstlerc56.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

The “Others” attribute

The „Others” attribute is used to select resolution for printing. Default resolution for C-56 is 203DPI.

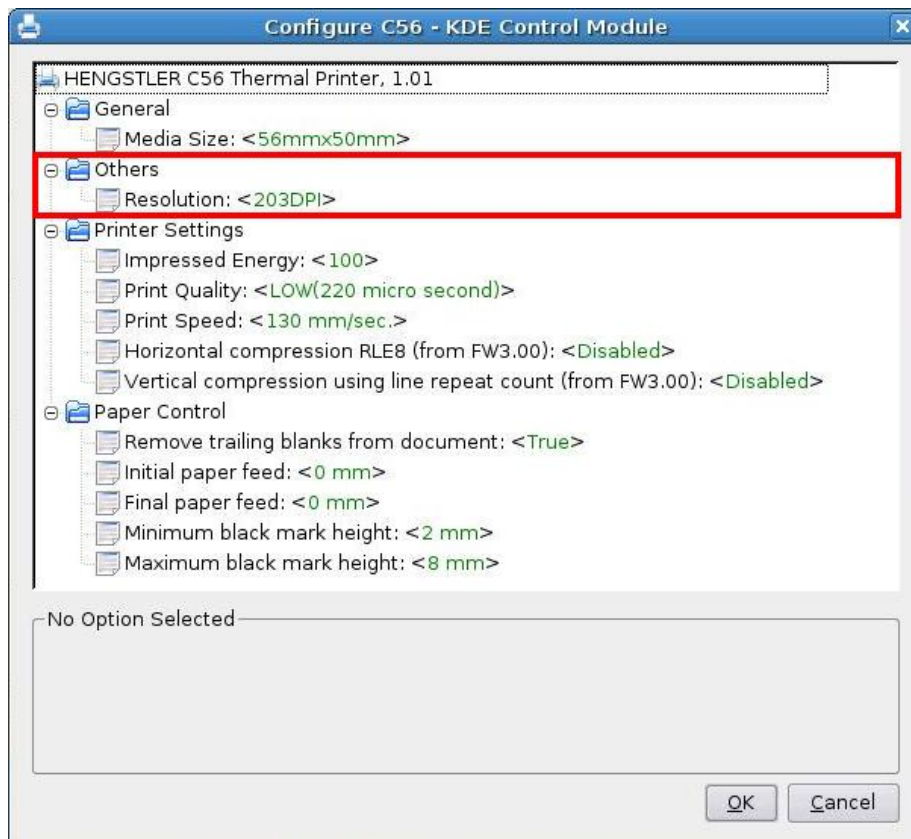


Figure 25: The „Others” attributes in the „Configure” dialog

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).

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 C-56 predefined paper sizes (e.g. "C-56 56: A4").

If the selected paper size differs from an C-56 pre-defined paper size, then the selected paper will be used.

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

Using the printer driver in special applications

The printer driver can be used in special applications that use the SDK or SDK + GDI interface of the printer driver for printing.

The SDK offers an API (Application Programming Interface) that supports:

Direct printer access (open, close, read, write, reset)

... and more ...

Driver Synopsis

This chapter describes the conception of the C-56 CUPS printer driver components and environment.

The C-56 CUPS printer driver

The C-56 CUPS printer driver is designed for usage with Hengstler C-56 printers whereas it offers an interface to the application that has printing, status inquiry and printer control capabilities.

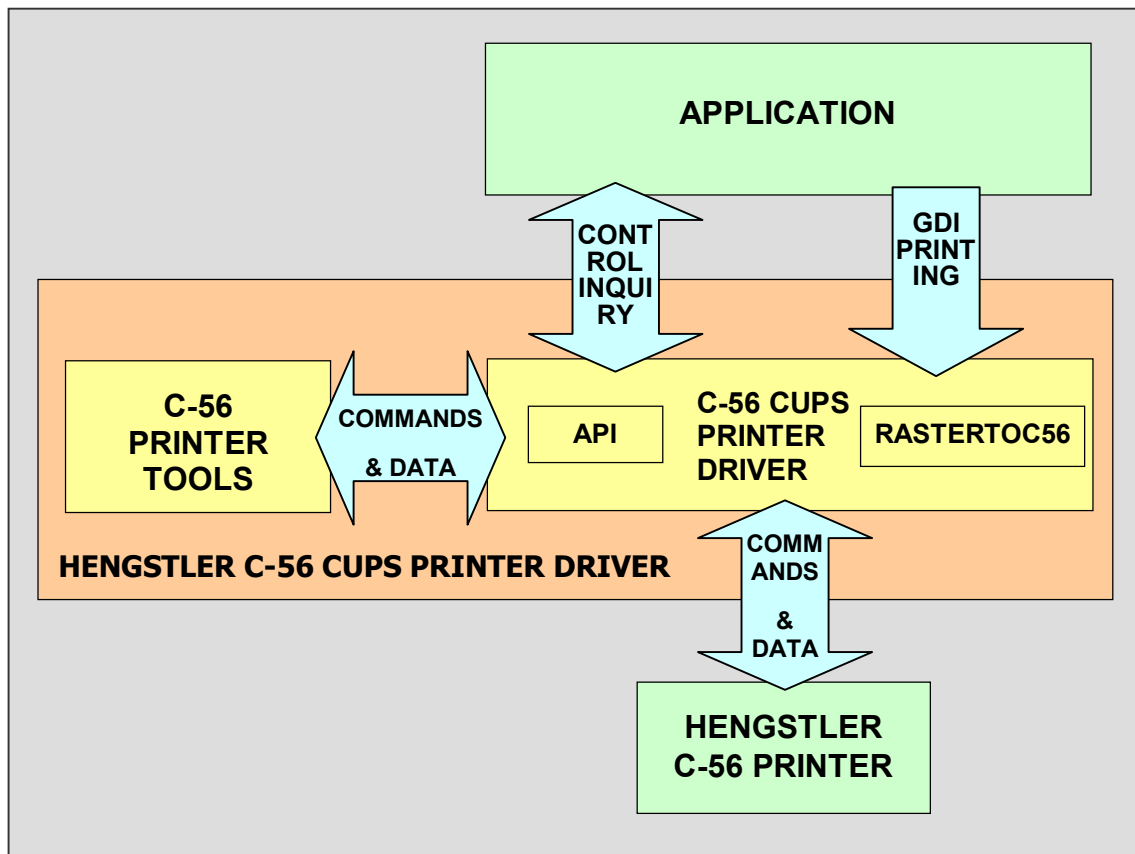


Figure 26: The C-56 CUPS printer driver environment

The application may use one or more of following C-56 interfaces:

GDI printing

This graphical device interface allows printing from standard applications, whereas C-56 driver send data to the printer

Application Programming Interface (API)

This interface allows the application to open/close the connection to the printer and inquire information or control paper movement (e.g. reject, present, etc.).

Figure 26 shows the C-56 CUPS printer driver environment.

Programming Manual

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

Integrating the C-56 CUPS printer driver in an application

The C-56 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 color pages that are passed to the C-56 raster, whereas this component converts it to the data, which are send to the printer.

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 C-56 Linux driver R3-V1.02f-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)

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 where **"13ea:0001"** is. "13ea" is VID number and "0001" is PID number for C-56 printer.

The C-56 application programming interface (API)

Installation C-56 API into Linux system

Library libC56Api.so.1.1 is automatically installed to system with driver installation.

-To check if 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 libC-56Api.so.1.0 together with symbolic links.

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

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

```
>> cp libC56Api.so.1.1 /usr/lib
>> ln -sf /usr/lib/libC56Api.so.1.1 /usr/lib/libC56Api.so
>> ln -sf /usr/lib/libC56Api.so.1.1 /usr/lib/libC56Api.so.1
>> ldconfig
```

Same steps are applicable for manual installing libC56Tb.so.1.0 library.

Integrating C-56 API in an application

The C-56 API (application programming interface) is represented by file **libC56Api.so.1.0**, a dynamic library (.so) that exports all functions of the C-56 API. File **libC56Api.so.1.0** is located in /usr/lib/.

Three additional files allow integrating of the libC56Api.so.1.0 in your application:

C56_Api.h

This is the header file of the C-56 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 C-56 API functions. Note that this file is used during compile time to check if your function calls are syntactically correct.

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

Note that libC56Api.so.1.0 is a vital component of your final application environment and that its availability is a must. Files C56_Api.h however, is only used during the application development phase and obsolete for the final application environment.

If you want to use library in your application, you have to include header files in your application sources and in compilation you have to add library (-lC56Api) as parameter.

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

The interface definition file C56_Api.h

The C-56 API is defined in header file C56_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

Includes Part (API-INCLUDES)

The “INCLUDES” part in file C56_Api.h includes all header files required for successful compilation of this header file. Currently no “INCLUDES” are available.

Macros Part (API-MACROS)

The “MACROS” part in file C56_Api.h specifies following macros:

Printer Types

Error Code

Printer Path

Error Codes

Following macros specify error codes that are used for informing the caller about errors in printer access functions.

Macro	Description
D_C56_API_OPEN_FAILED	This error code informs that the opening printer communication failed
D_C56_API_INVALID_DEVICE	This error code informs that the device is not correct (USB or SERIAL)
D_C56_API_DETACH_FAILED	This error code informs that the device cannot be detached (from R3-V1.02d).
D_C56_API_CLAIM_FAILED	This error code informs that the device cannot be claimed (from R3-V1.02d).

Types Part (API-TYPES)

The “TYPES” part in file C56_Api.h specifies following basic data type definitions. Currently no “TYPES” are available.

Functions Part (API-FUNCTIONS)

The “FUNCTIONS” part in file C56_Api.h specifies following function types:

Printer Access Functions

Library Functions

Printer Access Functions

Following functions are available for accessing the printer:

Function	Description	
	Return Value	Parameter
C56_api_printer_open	Function C56_api_printer_open (...) opens the connection to printer.	
	int iPrinterHandler	char *PrinterType
C56_api_printer_close	C56_api_printer_close (...) closes the printer connection	
	VOID	int iPrinterHandler
C56_api_printer_read	Function C56_api_printer_read (...) reads data send by printer until all data has been received or until the timeout runs out	
	int iNrOfBytesRead	int iPrinterHandler
		unsigned char *ReadData
		int iNrOfData
		unsigned long uDelay
C56_api_printer_clear	Function C56_api_printer_clear (...) clears all buffered data that has been or has not yet been send by printer.	
	int iSuccess	int iPrinterHandler
C56_api_printer_write	Function C56_api_printer_write (...) sends data to the printer until all data has been sent or until the timeout runs out	
	int iNrOfBytesWritten	int iPrinterHandler
		unsigned char *WriteData
		int iNrOfData
		unsigned long uDelay
C56_api_printer_set_serial	Function C56_api_printer_set_serial (...)sets up the serial printer port	
	int fResult	int printer_handler
		unsigned long baud_rate
		unsigned char data_bits
		unsigned char parity
		unsigned char stop_bits

Library Functions

The following functions are available for accessing the API version:

Function	Description	
	Return Value	Parameter
C56_api_get_library_info	Function C56_api_get_library_info (...) Retrieves info about the library	
	char	* library_info VOID

Variables Part (API-VARIABLES)

There are no variables exported by the C-56 API.

C-56 API Coding Examples

This chapter contains following C-56 API coding examples:

Printer Communication Coding Example

Printer Communication Coding Example

Document printing through the C-56 API is done to initiate print outs on a specific printer type and port.

Following C-Programming example is an extract from a demo application and shows the procedure for document printout through the C-56 API:

```
void InquirePrinterStatusThroughC56_Api
(char *PrinterType, int PrinterPort)
{
    int iPrinter      = 0; // Handler to printer
    int iNrReadData = 0; // Number of read bytes from printer
    char ubVersion[6]; // Firmware version

    //-- Open connection to printer
    iPrinter = C56_api_printer_open (PrinterPort);

    //-- Check if printer was opened
    if ( (iPrinter != D_C56_API_OPEN_FAILED)
        || (iPrinter != D_C56_API_INVALID_DEVICE)
        || (iPrinter != D_C56_API_DETACH_FAILED)
        || (iPrinter != D_C56_API_CLAIM_FAILED)
        ) {

        unsigned char aubC56CmdVersionAndStatus [] = { 0x1D , 0x61 , 0x01,0x1D , 0x61 , 0x16};
        // command to "get printer version
        // and status"

        unsigned char aubC56DatVersionOrStatus[4];
        // C-56 DWORD as respond to command
        // "get printer version and status"
```

Call **C56_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 initiate the printer status

```
//-- Clear receive buffer
```

```
C56_api_printer_clear (iPrinter);
```

Call **C56_api_printer_clear** () to clear receive buffer.

```
//-- Request printer status
```

```
if ( C56_api_printer_write
```

```
(iPrinter, aubC56CmdVersionAndStatus, sizeof(aubC56CmdVersionAndStatus), 1000)
```

```
) {
```

Call **C56_api_printer_write** () to send the emulation command to the printer.

```
//-- Receive printer status packet header
```

```
iNrReadData = C56_api_printer_read
```

```
(iPrinter, aubC56DatVersionOrStatus, sizeof(aubC56DatVersionOrStatus), 1000);
```

Call **C56_api_printer_read** () to read the packet which precedes the printer status

```
//-- Check MSB in status information for being valid
```

```
if ( ! ( (((unsigned char *) &aubC56DatVersionOrStatus)[0] & 0x80) == 0x80)
```

```
&&((( unsigned char *) &aubC56DatVersionOrStatus)[1] & 0x80) == 0x80)
```

```
&&((( unsigned char *) &aubC56DatVersionOrStatus)[2] & 0x80) == 0x80)
```

```
&&((( unsigned char *) &aubC56DatVersionOrStatus)[3] & 0x80) == 0x80))
```

```
{
```

```
//-- Check for version information
```

```
if (((unsigned char *) &aubC56DatVersionOrStatus)[0] & 0x03) == 0x03 ){
```

```
//-- Set version from DWORD
```

```
ubVersion [0]='V';
```

```
ubVersion [1]='0' + (((unsigned char *) &aubC56DatVersionOrStatus)[1] %10);
```

```
ubVersion [2]='.';
```

```
ubVersion [3]='0' + (((unsigned char *) &aubC56DatVersionOrStatus)[2] /10);
```

```
ubVersion [4]='0' + (((unsigned char *) &aubC56DatVersionOrStatus)[2] %10);
```

```
ubVersion [5]=(( unsigned char *) &aubC56DatVersionOrStatus)[3] ? 'a' + (((BYTE
```

```
*)
```

```
&aubC56DatVersionOrStatus)[3]-1) % 26) : '\0';
```

```
ubVersion [6]='\0';
```

```
}
```

```
//-- Otherwise process status information
```

```
else {
```

```
//-- Process printer status
```

```
....
```

```
}
```

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}
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}
```

Call **C56_api_printer_close** () to close connection with the printer

```
//-- Close connection with printer
```

```
C56_api_printer_close (iPrinter);
```

Printer Tools

Introduction

This chapter describes the C-56 printer tools, which are distributed as part of the printer driver package and which are available in directory "<root>\Tools".

Currently following printer tools are available:

- The C-56 Print Terminal (not available in R3-V1.02f-BETA-2015NOV10)
- The C-56 Api Test

The C-56 Print Terminal

The C-56 print terminal tool is used for immediate communication with the printer using emulation commands. The tool is started by writing in shell window in directory <root>/Tools/:

```
>> ./C56_PrintTerminal
```

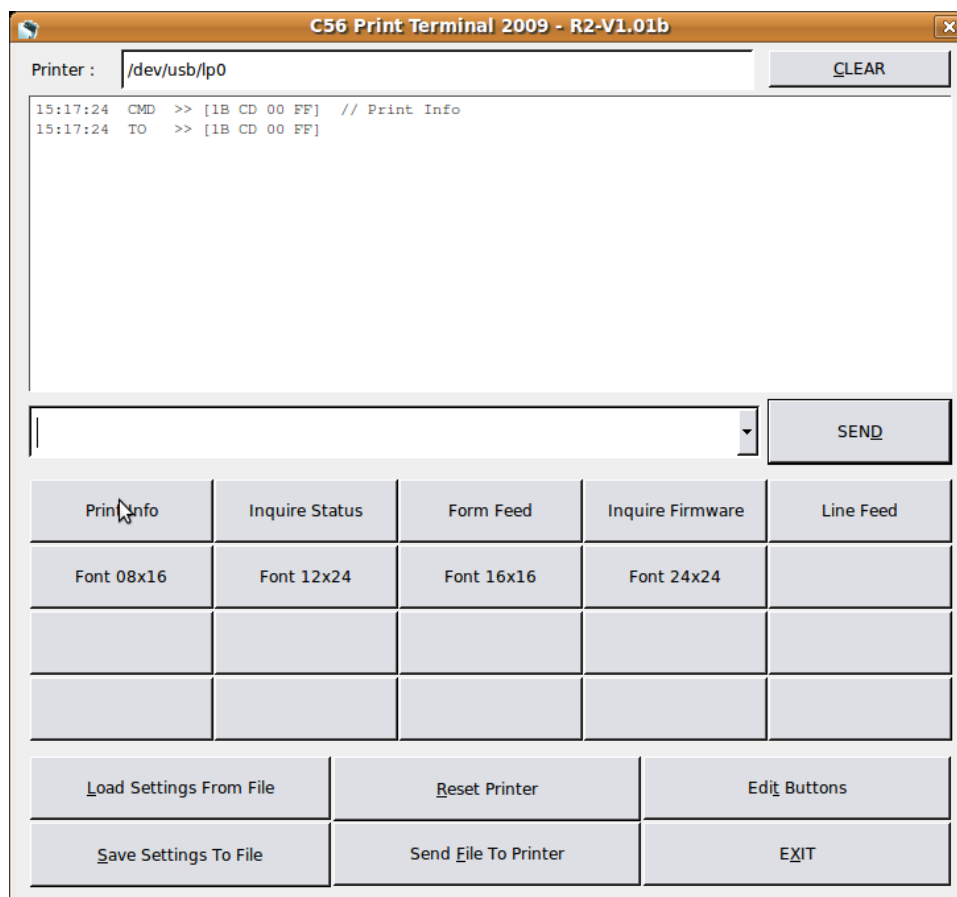


Figure 27: The C-56 Print Terminal

	Button Text	Button CMD
Row #1		
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		

OK CANCEL

Figure 28: The C56 Print Terminal-setup dialog

The C-56 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 in release R3-V1.02f-BETA – 2015NOV10.

The C-56 Api Test

The C-56 Api Test tool is used to test functionality of C56 API and communication with printer. The tool is started by writing in shell window in directory <root>/Tools/x86 or <root>/Tools/arm based on system type:

```
>> ./C56_Api_Test "/path/to/printer"
```

Example:

```
>> ./C56_Api_Test "/dev/bus/usb/002/011"
```

Source code of the Api Test Tool:

```
#include <stdio.h>
#include "../Libraries/C56_Api.h"
void main (int argc, char *argv[])
{
    int          iPrinter          =0;
    int          iWrittenData      =0;
    unsigned char cmd_FormFeed[] = {0x0C};           // Form feed
    char printer_name[32];

    if (argc < 2){

        printf("\nERROR: No printer path available , example usage : C56_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 = C56_api_printer_open(&printer_name[0]);

    //-- Check if printer was opened
    if ( (iPrinter == D_C56_API_OPEN_FAILED)
        || (iPrinter == D_C56_API_INVALID_DEVICE)
        ) goto FAILURE;

    //-- Clear pending data
    C56_api_printer_clear (iPrinter);

    //-- Write text to printer
    if ((iWrittenData = C56_api_printer_write(iPrinter, (unsigned char *) "C-56 API TEST -
START\n", sizeof("C-56 API TEST - START\n"), 5000)) != sizeof("C-56 API TEST - START\n"))
        goto FAILURE;

    //-- Write cmd to printer
    if ((iWrittenData = C56_api_printer_write(iPrinter, cmd_FormFeed, 1, 5000)) != 1)
        goto FAILURE;

    //-- Write text to printer
    if ((iWrittenData = C56_api_printer_write(iPrinter, (unsigned char *) "C-56 API TEST -
END\n", sizeof("C-56 API TEST - END\n"), 5000)) != sizeof("C-56 API TEST - END\n"))
        goto FAILURE;

    //-- Write cmd to printer
    if ((iWrittenData = C56_api_printer_write(iPrinter, cmd_FormFeed, 1, 5000)) != 1)
```



```
        goto FAILURE;

FAILURE :

    //-- Close printer
    C56_api_printer_close(iPrinter);

    return;
}
```

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